

# MBS DataTypes Plugin Documentation

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## 0.1 Introduction

This is the PDF version of the documentation for the Xojo Plug-in from Monkeybread Software Germany.  
Plugin part: MBS DataTypes Plugin

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## Chapter 3

### List of all interfaces

- NotificationReceiverMBS

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## Chapter 4

# List of all global methods

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# Chapter 5

## Data Types

### 5.1 class ComplexDoubleMBS

#### 5.1.1 class ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** A class for complex numbers.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
dim d as new ComplexDoubleMBS(4,7)
```

```
dim sum as ComplexDoubleMBS = c+d
```

```
MsgBox sum.str
```

#### Blog Entries

- [New MBS REALbasic Plugin Version 10.4](#)
- [MBS REALbasic Plugins Version 10.4 release notes](#)
- [MBS REALbasic Plugins, version 10.4pr4](#)

#### 5.1.2 Methods

#### 5.1.3 abs as Double

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The absolute value of the complex number.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox str(c.abs)
```

#### 5.1.4 Add(c as ComplexDoubleMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds the given value to this complex number.

See also:

- 5.1.5 Add(x as Double)

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#### 5.1.5 Add(x as Double)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds the given value to this complex number.

See also:

- 5.1.4 Add(c as ComplexDoubleMBS)

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#### 5.1.6 arg as Double

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return phase angle of complex.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox str(c.arg)
```

#### 5.1.7 conj as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns complex conjugate.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
dim e as ComplexDoubleMBS = c.conj
```

MsgBox e.str

### 5.1.8 Constructor(other as ComplexDoubleMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new complex number with the values from the given one.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
dim d as new ComplexDoubleMBS(c)
```

```
d.Add 1 // modify second object
MsgBox "d: "+d.str+" , c: "+c.str
```

See also:

- 5.1.9 Constructor(x as Double = 0.0, y as Double = 0.0)

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### 5.1.9 Constructor(x as Double = 0.0, y as Double = 0.0)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new complex number with the given values.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox str(c.Real)+" "+str(c.Imag)
```

See also:

- 5.1.8 Constructor(other as ComplexDoubleMBS)

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### 5.1.10 cos as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return cosine of complex.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox c.cos.str
```

### 5.1.11 cosh as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return hyperbolic cosine of complex.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox c.cosh.str
```

### 5.1.12 Divide(c as ComplexDoubleMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides this complex number by the given complex number.

See also:

- 5.1.13 Divide(x as Double)

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### 5.1.13 Divide(x as Double)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides this complex number by the given value.

See also:

- 5.1.12 Divide(c as ComplexDoubleMBS)

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### 5.1.14 exp as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return exponential of complex.

**Notes:** dim c as new ComplexDoubleMBS(1,2)

MsgBox c.exp.str

### 5.1.15 log as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

## 5.1. CLASS COMPLEXDOUBLEMBS

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**Function:** Return natural logarithm of complex.

**Example:**

```
dim c as new ComplexDoubleMBS(10,10)
MsgBox c.log.str
```

### 5.1.16 log10 as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return common logarithm of complex.

**Example:**

```
dim c as new ComplexDoubleMBS(10,0)
MsgBox c.log10.str
```

### 5.1.17 Multiply(c as ComplexDoubleMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiplies this complex number with the given value.

See also:

- 5.1.18 Multiply(x as Double)

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### 5.1.18 Multiply(x as Double)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiplies this complex number with the given value.

See also:

- 5.1.17 Multiply(c as ComplexDoubleMBS)

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### 5.1.19 norm as Double

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return norm of complex number.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox str(c.norm)
```

### 5.1.20 Operator\_Add(c as ComplexDoubleMBS) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to add two complex numbers.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
dim d as new ComplexDoubleMBS(3,4)
dim e as ComplexDoubleMBS = c+d
MsgBox e.str
```

See also:

- 5.1.21 Operator\_Add(x as Double) as ComplexDoubleMBS 52

### 5.1.21 Operator\_Add(x as Double) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to add a value to this complex number.

**Example:**

```
dim c as new ComplexDoubleMBS(3,4)
dim e as ComplexDoubleMBS = c+2
MsgBox e.str
```

See also:

- 5.1.20 Operator\_Add(c as ComplexDoubleMBS) as ComplexDoubleMBS 52

### 5.1.22 Operator\_Compare(c as ComplexDoubleMBS) as Integer

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Compares two complex numbers.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
dim d as new ComplexDoubleMBS(1,2)
```

```

if c = d then
MsgBox "equal"
else
MsgBox "not equal"
end if

```

### 5.1.23 Operator\_Divide(c as ComplexDoubleMBS) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to divide one complex number by another.

**Example:**

```

dim c as new ComplexDoubleMBS(1,2)
dim d as new ComplexDoubleMBS(3,4)
dim e as ComplexDoubleMBS = c/d
MsgBox e.str

```

See also:

- 5.1.24 Operator\_Divide(x as Double) as ComplexDoubleMBS

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### 5.1.24 Operator\_Divide(x as Double) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to divide a complex number by the given value.

**Example:**

```

dim c as new ComplexDoubleMBS(3,4)
dim e as ComplexDoubleMBS = c/2
MsgBox e.str

```

See also:

- 5.1.23 Operator\_Divide(c as ComplexDoubleMBS) as ComplexDoubleMBS

53

### 5.1.25 Operator\_Multiply(c as ComplexDoubleMBS) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to multiply two complex numbers.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
dim d as new ComplexDoubleMBS(3,4)
dim e as ComplexDoubleMBS = c*d
MsgBox e.str
```

See also:

- 5.1.26 Operator\_Multiply(x as Double) as ComplexDoubleMBS 54

### 5.1.26 Operator\_Multiply(x as Double) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to multiply a double to a complex number.

**Example:**

```
dim c as new ComplexDoubleMBS(3,4)
dim e as ComplexDoubleMBS = c*2
MsgBox e.str
```

See also:

- 5.1.25 Operator\_Multiply(c as ComplexDoubleMBS) as ComplexDoubleMBS 53

### 5.1.27 Operator\_Power(x as ComplexDoubleMBS) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to calculate the power of two complex numbers.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
dim d as new ComplexDoubleMBS(3,4)
dim e as ComplexDoubleMBS = c^d
MsgBox e.str
```

### 5.1.28 Operator\_Subtract(c as ComplexDoubleMBS) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to subtract one complex number from another.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
dim d as new ComplexDoubleMBS(3,4)
dim e as ComplexDoubleMBS = c-d
MsgBox e.str
```

See also:

- 5.1.29 Operator\_Subtract(x as Double) as ComplexDoubleMBS

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### 5.1.29 Operator\_Subtract(x as Double) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to subtract the given value from this complex number.

**Example:**

```
dim c as new ComplexDoubleMBS(3,4)
dim e as ComplexDoubleMBS = c-2
MsgBox e.str
```

See also:

- 5.1.28 Operator\_Subtract(c as ComplexDoubleMBS) as ComplexDoubleMBS

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### 5.1.30 PI as Double

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The PI constant.

**Example:**

```
MsgBox str(ComplexDoubleMBS.PI)
```

### 5.1.31 polar(rho as Double, theta as Double) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new complex number with the given polar coordinate.

**Example:**

```
MsgBox ComplexDoubleMBS.polar(10, 0.5).str
```

### 5.1.32 pow(x as ComplexDoubleMBS) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return complex power.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
dim d as new ComplexDoubleMBS(2,0)
dim m as ComplexDoubleMBS = c.pow(d)
```

```
MsgBox "c: "+c.str+EndOfLine+"d: "+d.str+EndOfLine+"c^d: "+m.str
```

See also:

- 5.1.33 pow(x as Double) as ComplexDoubleMBS 56
- 5.1.34 pow(x as Double, y as ComplexDoubleMBS) as ComplexDoubleMBS 56

### 5.1.33 pow(x as Double) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return complex power.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
dim m as ComplexDoubleMBS = c.pow(2)
```

```
MsgBox "c: "+c.str+EndOfLine+"c^2: "+m.str
```

See also:

- 5.1.32 pow(x as ComplexDoubleMBS) as ComplexDoubleMBS 56
- 5.1.34 pow(x as Double, y as ComplexDoubleMBS) as ComplexDoubleMBS 56

### 5.1.34 pow(x as Double, y as ComplexDoubleMBS) as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the power of the given values.

**Example:**

```
dim x as new ComplexDoubleMBS(2,3)
dim c as ComplexDoubleMBS = ComplexDoubleMBS.pow(2, x)
```

```
MsgBox c.str
```

See also:

- 5.1.32 pow(x as ComplexDoubleMBS) as ComplexDoubleMBS 56
- 5.1.33 pow(x as Double) as ComplexDoubleMBS 56

### 5.1.35 sin as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return sine of complex.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox c.sin.str
```

### 5.1.36 sinh as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return hyperbolic sine of complex.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox c.sinh.str
```

### 5.1.37 sqrt as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return square root of complex.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
dim r as ComplexDoubleMBS = c.sqrt
```

```
dim m as ComplexDoubleMBS = r*r
```

```
MsgBox "number: "+c.str+EndOfLine+"root: "+r.str+EndOfLine+"back: "+m.str
```

### 5.1.38 str as string

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Shows the number in an human readable format.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox c.str
```

**Notes:** The actual format can change.

### 5.1.39 Subtract(c as ComplexDoubleMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts the given complex number from this complex number.

See also:

- 5.1.40 Subtract(x as Double)

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### 5.1.40 Subtract(x as Double)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts the given value from this complex number.

See also:

- 5.1.39 Subtract(c as ComplexDoubleMBS)

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### 5.1.41 tan as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return tangent of complex.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox c.tan.str
```

### 5.1.42 tanh as ComplexDoubleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return hyperbolic tangent of complex.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox c.tanh.str
```

### 5.1.43 Properties

#### 5.1.44 Imag as Double

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or set the imaginary part of the complex number.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox str(c.Imag)
```

**Notes:** (Read and Write property)

#### 5.1.45 Real as Double

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or set the real part of the complex number.

**Example:**

```
dim c as new ComplexDoubleMBS(1,2)
MsgBox str(c.Real)
```

**Notes:** (Read and Write property)

## 5.2 class ComplexSingleMBS

### 5.2.1 class ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** A class for complex numbers.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
```

```
dim d as new ComplexSingleMBS(4,7)
```

```
dim sum as ComplexSingleMBS = c+d
```

```
MsgBox sum.str
```

#### Blog Entries

- [New MBS REALbasic Plugin Version 10.4](#)
- [MBS REALbasic Plugins Version 10.4 release notes](#)
- [MBS REALbasic Plugins, version 10.4pr4](#)

### 5.2.2 Methods

#### 5.2.3 abs as single

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The absolute value of the complex number.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
```

```
MsgBox str(c.abs)
```

#### 5.2.4 Add(c as ComplexSingleMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds the given value to this complex number.

See also:

- 5.2.5 Add(x as single)

### 5.2.5 Add(x as single)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds the given value to this complex number.

See also:

- 5.2.4 Add(c as ComplexSingleMBS)

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### 5.2.6 arg as single

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return phase angle of complex.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
MsgBox str(c.arg)
```

### 5.2.7 conj as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns complex conjugate.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
dim e as ComplexSingleMBS = c.conj
MsgBox e.str
```

### 5.2.8 Constructor(other as ComplexSingleMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new complex number with the values from the given one.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
dim d as new ComplexSingleMBS(c)
```

```
d.Add 1 // modify second object
MsgBox "d: "+d.str+", c: "+c.str
```

See also:

- 5.2.9 Constructor(x as single = 0.0, y as single = 0.0) 62

### 5.2.9 Constructor(x as single = 0.0, y as single = 0.0)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new complex number with the given values.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
MsgBox str(c.Real)+" "+str(c.Imag)
```

See also:

- 5.2.8 Constructor(other as ComplexSingleMBS) 61

### 5.2.10 cos as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return cosine of complex.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
MsgBox c.cos.str
```

### 5.2.11 cosh as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return hyperbolic cosine of complex.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
MsgBox c.cosh.str
```

### 5.2.12 Divide(c as ComplexSingleMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

## 5.2. CLASS COMPLEXSINGLEMBS

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**Function:** Divides this complex number by the given complex number.  
See also:

- 5.2.13 Divide(x as single)

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### 5.2.13 Divide(x as single)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides this complex number by the given value.  
See also:

- 5.2.12 Divide(c as ComplexSingleMBS)

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### 5.2.14 exp as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return exponential of complex.  
**Notes:** dim c as new ComplexSingleMBS(1,2)  
MsgBox c.exp.str

### 5.2.15 log as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return natural logarithm of complex.  
**Example:**

```
dim c as new ComplexSingleMBS(10,10)
MsgBox c.log.str
```

### 5.2.16 log10 as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return common logarithm of complex.  
**Example:**

```
dim c as new ComplexSingleMBS(10,0)
MsgBox c.log10.str
```

### 5.2.17 Multiply(c as ComplexSingleMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiplies this complex number with the given value.

See also:

- 5.2.18 Multiply(x as single) 64

### 5.2.18 Multiply(x as single)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiplies this complex number with the given value.

See also:

- 5.2.17 Multiply(c as ComplexSingleMBS) 64

### 5.2.19 norm as single

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return norm of complex number.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
MsgBox str(c.norm)
```

### 5.2.20 Operator\_Add(c as ComplexSingleMBS) as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to add two complex numbers.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
dim d as new ComplexSingleMBS(3,4)
dim e as ComplexSingleMBS = c+d
MsgBox e.str
```

See also:

- 5.2.21 Operator\_Add(x as single) as ComplexSingleMBS 65

**5.2.21 Operator\_Add(x as single) as ComplexSingleMBS**

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to add a value to this complex number.

**Example:**

```
dim c as new ComplexSingleMBS(3,4)
dim e as ComplexSingleMBS = c+2
MsgBox e.str
```

See also:

- 5.2.20 Operator\_Add(c as ComplexSingleMBS) as ComplexSingleMBS

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**5.2.22 Operator\_Compare(c as ComplexSingleMBS) as Integer**

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Compares two complex numbers.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
dim d as new ComplexSingleMBS(1,2)

if c = d then
  MsgBox "equal"
else
  MsgBox "not equal"
end if
```

**5.2.23 Operator\_Divide(c as ComplexSingleMBS) as ComplexSingleMBS**

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to divide one complex number by another.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
dim d as new ComplexSingleMBS(3,4)
dim e as ComplexSingleMBS = c/d
MsgBox e.str
```

See also:

- 5.2.24 `Operator_Divide(x as single) as ComplexSingleMBS` 66

### 5.2.24 `Operator_Divide(x as single) as ComplexSingleMBS`

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to divide a complex number by the given value.

**Example:**

```
dim c as new ComplexSingleMBS(3,4)
dim e as ComplexSingleMBS = c/2
MsgBox e.str
```

See also:

- 5.2.23 `Operator_Divide(c as ComplexSingleMBS) as ComplexSingleMBS` 65

### 5.2.25 `Operator_Multiply(c as ComplexSingleMBS) as ComplexSingleMBS`

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to multiply two complex numbers.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
dim d as new ComplexSingleMBS(3,4)
dim e as ComplexSingleMBS = c*d
MsgBox e.str
```

See also:

- 5.2.26 `Operator_Multiply(x as single) as ComplexSingleMBS` 66

### 5.2.26 `Operator_Multiply(x as single) as ComplexSingleMBS`

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to multiply a single to a complex number.

**Example:**

```
dim c as new ComplexSingleMBS(3,4)
dim e as ComplexSingleMBS = c*2
```

MsgBox e.str

See also:

- 5.2.25 Operator\_Multiply(c as ComplexSingleMBS) as ComplexSingleMBS 66

### 5.2.27 Operator\_Power(x as ComplexSingleMBS) as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to calculate the power of two complex numbers.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
dim d as new ComplexSingleMBS(3,4)
dim e as ComplexSingleMBS = c^d
MsgBox e.str
```

### 5.2.28 Operator\_Subtract(c as ComplexSingleMBS) as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to subtract one complex number from another.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
dim d as new ComplexSingleMBS(3,4)
dim e as ComplexSingleMBS = c-d
MsgBox e.str
```

See also:

- 5.2.29 Operator\_Subtract(x as single) as ComplexSingleMBS 67

### 5.2.29 Operator\_Subtract(x as single) as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This method is called by Xojo in order to subtract the given value from this complex number.

**Example:**

```

dim c as new ComplexSingleMBS(3,4)
dim e as ComplexSingleMBS = c-2
MsgBox e.str

```

See also:

- 5.2.28 Operator\_Subtract(c as ComplexSingleMBS) as ComplexSingleMBS

67

### 5.2.30 PI as Double

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The PI constant.

**Example:**

```
MsgBox str(ComplexSingleMBS.PI)
```

### 5.2.31 polar(rho as single, theta as single) as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new complex number with the given polar coordinate.

**Example:**

```
MsgBox ComplexSingleMBS.polar(10, 0.5).str
```

### 5.2.32 pow(x as ComplexSingleMBS) as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return complex power.

**Example:**

```

dim c as new ComplexSingleMBS(1,2)
dim d as new ComplexSingleMBS(2,0)
dim m as ComplexSingleMBS = c.pow(d)

```

```
MsgBox "c: "+c.str+EndOfLine+"d: "+d.str+EndOfLine+"c^d: "+m.str
```

See also:

5.2. CLASS COMPLEXSINGLEMBS	69
• 5.2.33 pow(x as single) as ComplexSingleMBS	69
• 5.2.34 pow(x as single, y as ComplexSingleMBS) as ComplexSingleMBS	69

### 5.2.33 pow(x as single) as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return complex power.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
dim m as ComplexSingleMBS = c.pow(2)
```

```
MsgBox "c: "+c.str+EndOfLine+"c^2: "+m.str
```

See also:

• 5.2.32 pow(x as ComplexSingleMBS) as ComplexSingleMBS	68
• 5.2.34 pow(x as single, y as ComplexSingleMBS) as ComplexSingleMBS	69

### 5.2.34 pow(x as single, y as ComplexSingleMBS) as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the power of the given values.

**Example:**

```
dim x as new ComplexSingleMBS(2,3)
dim c as ComplexSingleMBS = ComplexSingleMBS.pow(2, x)
```

```
MsgBox c.str
```

See also:

• 5.2.32 pow(x as ComplexSingleMBS) as ComplexSingleMBS	68
• 5.2.33 pow(x as single) as ComplexSingleMBS	69

### 5.2.35 sin as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return sine of complex.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
MsgBox c.sin.str
```

### 5.2.36 sinh as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return hyperbolic sine of complex.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
MsgBox c.sinh.str
```

### 5.2.37 sqrt as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return square root of complex.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
dim r as ComplexSingleMBS = c.sqrt
dim m as ComplexSingleMBS = r*r
```

```
MsgBox "number: "+c.str+EndOfLine+"root: "+r.str+EndOfLine+"back: "+m.str
```

### 5.2.38 str as string

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Shows the number in an human readable format.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
MsgBox c.str
```

**Notes:** The actual format can change.

### 5.2.39 Subtract(c as ComplexSingleMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts the given complex number from this complex number.

See also:

- 5.2.40 Subtract(x as single)

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### 5.2.40 Subtract(x as single)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts the given value from this complex number.

See also:

- 5.2.39 Subtract(c as ComplexSingleMBS)

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### 5.2.41 tan as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return tangent of complex.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
MsgBox c.tan.str
```

### 5.2.42 tanh as ComplexSingleMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Return hyperbolic tangent of complex.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
MsgBox c.tanh.str
```

### 5.2.43 Properties

#### 5.2.44 Imag as single

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or set the imaginary part of the complex number.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
MsgBox str(c.Imag)
```

**Notes:** (Read and Write property)

#### 5.2.45 Real as single

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or set the real part of the complex number.

**Example:**

```
dim c as new ComplexSingleMBS(1,2)
MsgBox str(c.Real)
```

**Notes:** (Read and Write property)

## 5.3 Globals

### 5.3.1 FFTDoubleAbsMBS(x as MemoryBlock, N as Integer = -1) as Double()

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

**Deprecated:** This item is deprecated and should no longer be used. **Function:** Performs a Fast Fourier Transformation and applies abs operation on result.

**Notes:** Memoryblock contains DoubleValue values (8 byte each).

If N is not provided, the plugin chooses a value.

See also:

- 5.3.2 FFTDoubleAbsMBS(x() as ComplexDoubleMBS, N as Integer = -1) as Double() 73
- 5.3.3 FFTDoubleAbsMBS(x() as Double, N as Integer = -1) as Double() 73

### 5.3.2 FFTDoubleAbsMBS(x() as ComplexDoubleMBS, N as Integer = -1) as Double()

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Deprecated:** This item is deprecated and should no longer be used. **Function:** Performs a Fast Fourier Transformation and applies abs operation on result.

**Notes:** If N is not provided, the plugin chooses a value.

See also:

- 5.3.1 FFTDoubleAbsMBS(x as MemoryBlock, N as Integer = -1) as Double() 73
- 5.3.3 FFTDoubleAbsMBS(x() as Double, N as Integer = -1) as Double() 73

### 5.3.3 FFTDoubleAbsMBS(x() as Double, N as Integer = -1) as Double()

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Deprecated:** This item is deprecated and should no longer be used. **Function:** Performs a Fast Fourier Transformation and applies abs operation on result.

**Notes:** If N is not provided, the plugin chooses a value.

**Blog Entries**

- [MBS REALbasic Plugins Version 10.4 release notes](#)
- [MBS REALbasic Plugins, version 10.4pr11](#)

See also:

- 5.3.1 FFTDoubleAbsMBS(x as MemoryBlock, N as Integer = -1) as Double() 73
- 5.3.2 FFTDoubleAbsMBS(x() as ComplexDoubleMBS, N as Integer = -1) as Double() 73

### 5.3.4 FFTDoubleMBS(x() as ComplexDoubleMBS, N as Integer = -1) as ComplexDoubleMBS()

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Deprecated:** This item is deprecated and should no longer be used. **Function:** Performs a Fast Fourier Transformation.

**Notes:** If N is not provided, the plugin chooses a value.

See also:

- 5.3.5 FFTDoubleMBS(x() as Double, N as Integer = -1) as ComplexDoubleMBS() 74

### 5.3.5 FFTDoubleMBS(x() as Double, N as Integer = -1) as ComplexDoubleMBS()

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Deprecated:** This item is deprecated and should no longer be used. **Function:** Performs a Fast Fourier Transformation.

**Notes:** If N is not provided, the plugin chooses a value.

**Blog Entries**

- [MBS REALbasic Plugins Version 10.4 release notes](#)
- [MBS REALbasic Plugins, version 10.4pr11](#)

See also:

- 5.3.4 FFTDoubleMBS(x() as ComplexDoubleMBS, N as Integer = -1) as ComplexDoubleMBS() 74

### 5.3.6 FFTSingleAbsMBS(x as MemoryBlock, N as Integer = -1) as single()

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

**Deprecated:** This item is deprecated and should no longer be used. **Function:** Performs a Fast Fourier Transformation and applies abs operation on result.

**Notes:** Memoryblock contains SingleValue values (4 byte each).

If N is not provided, the plugin chooses a value.

See also:

- 5.3.7 FFTSingleAbsMBS(x() as ComplexSingleMBS, N as Integer = -1) as single() 75
- 5.3.8 FFTSingleAbsMBS(x() as single, N as Integer = -1) as single() 75

### 5.3.7 FFTSingleAbsMBS(x() as ComplexSingleMBS, N as Integer = -1) as single()

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Deprecated:** This item is deprecated and should no longer be used. **Function:** Performs a Fast Fourier Transformation and applies abs operation on result.

**Notes:** If N is not provided, the plugin chooses a value.

See also:

- 5.3.6 FFTSingleAbsMBS(x as MemoryBlock, N as Integer = -1) as single() 74
- 5.3.8 FFTSingleAbsMBS(x() as single, N as Integer = -1) as single() 75

### 5.3.8 FFTSingleAbsMBS(x() as single, N as Integer = -1) as single()

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Deprecated:** This item is deprecated and should no longer be used. **Function:** Performs a Fast Fourier Transformation and applies abs operation on result.

**Notes:** If N is not provided, the plugin chooses a value.

**Blog Entries**

- [MBS REALbasic Plugins Version 10.4 release notes](#)
- [MBS REALbasic Plugins, version 10.4pr11](#)

See also:

- 5.3.6 FFTSingleAbsMBS(x as MemoryBlock, N as Integer = -1) as single() 74
- 5.3.7 FFTSingleAbsMBS(x() as ComplexSingleMBS, N as Integer = -1) as single() 75

### 5.3.9 FFTSingleMBS(x() as ComplexSingleMBS, N as Integer = -1) as ComplexSingleMBS()

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Deprecated:** This item is deprecated and should no longer be used. **Function:** Performs a Fast Fourier Transformation.

See also:

- 5.3.10 FFTSingleMBS(x() as single, N as Integer = -1) as ComplexSingleMBS() 76

### 5.3.10 FFTSingleMBS(x() as single, N as Integer = -1) as ComplexSingleMBS()

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Deprecated:** This item is deprecated and should no longer be used. **Function:** Performs a Fast Fourier Transformation.

**Notes:** If N is not provided, the plugin chooses a value.

#### Blog Entries

- [MBS REALbasic Plugins Version 10.4 release notes](#)
- [MBS REALbasic Plugins, version 10.4pr11](#)

See also:

- 5.3.9 FFTSingleMBS(x() as ComplexSingleMBS, N as Integer = -1) as ComplexSingleMBS() 75

## 5.4 class IntegerHashSetIteratorMBS

### 5.4.1 class IntegerHashSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the IntegerHashSet class.

#### Example:

```
// Create a map
dim m as new IntegerHashSetMBS

m.insert(1)
m.insert(2)
m.insert(3)

// get iterators pointing to first and after last element
dim i as IntegerHashSetIteratorMBS = m.first
dim e as IntegerHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)
  i.MoveNext
wend
```

### 5.4.2 Methods

### 5.4.3 isEqual(other as IntegerHashSetIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new IntegerHashSetMBS

m.insert(1)
m.insert(2)
m.insert(3)

// get iterators pointing to first and after last element
dim i as IntegerHashSetIteratorMBS = m.first
dim e as IntegerHashSetIteratorMBS = m.last

// Show all keys and values
while i.isEqual(e) = false
  MsgBox str(i.Key)
  i.MoveNext
wend
```

### 5.4.4 isNotEqual(other as IntegerHashSetIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new IntegerHashSetMBS

m.insert(1)
m.insert(2)
m.insert(3)

// get iterators pointing to first and after last element
dim i as IntegerHashSetIteratorMBS = m.first
dim e as IntegerHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
```

```
MsgBox str(i.Key)
i.MoveNext
wend
```

### 5.4.5 Key as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

### 5.4.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new IntegerHashSetMBS

m.insert(1)
m.insert(2)
m.insert(3)

// get iterators pointing to first and after last element
dim i as IntegerHashSetIteratorMBS = m.first
dim e as IntegerHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)
i.MoveNext
wend
```

## 5.5 class IntegerHashSetMBS

### 5.5.1 class IntegerHashSetMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for a hash set with integers.

**Example:**

```
dim s as new IntegerHashSetMBS
```

```
s.insert 1
```

```
s.insert 2
```

```
MsgBox str(s.Count) // shows 2
```

**Notes:** You can choose whether you want to keep the set ordered using the `OrderedSet` class or whether you prefer a higher speed with the `HashSet` class.

### 5.5.2 Methods

#### 5.5.3 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

#### 5.5.4 Constructor

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

See also:

- 5.5.5 Constructor(Keys() as Integer)

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#### 5.5.5 Constructor(Keys() as Integer)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new set from the values in the array.

**Notes:** If the array has duplicates, the later elements overwrite the earlier keys.

See also:

- 5.5.4 Constructor

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### 5.5.6 CountKey(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this set.

### 5.5.7 find(key as Integer) as IntegerHashSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

### 5.5.8 first as IntegerHashSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the set.

**Example:**

```
// Create a map
dim m as new IntegerHashSetMBS

m.insert(1)
m.insert(2)
m.insert(3)

// get iterators pointing to first and after last element
dim i as IntegerHashSetIteratorMBS = m.first
dim e as IntegerHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)
  i.MoveNext
wend
```

### 5.5.9 insert(key as Integer)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a value to the set.

### 5.5.10 Key(index as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

### 5.5.11 Keys as Integer()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new IntegerHashSetMBS
```

```
m.insert(1)
```

```
m.insert(2)
```

```
for each v as Integer in m.Keys
```

```
MsgBox str(v)
```

```
next
```

**Notes:** The order is stable and matches the order returned by the Values method at least until the Dictionary is modified. Use this method with For Each to loop through all the keys.

### 5.5.12 last as IntegerHashSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the set.

**Example:**

```
// Create a map
```

```
dim m as new IntegerHashSetMBS
```

```

m.insert(1)
m.insert(2)
m.insert(3)

// get iterators pointing to first and after last element
dim i as IntegerHashSetIteratorMBS = m.first
dim e as IntegerHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)
i.MoveNext
wend

```

### 5.5.13 lookup(key as Integer) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks whether an element with the given key exists in this set.

**Example:**

```

dim set as new IntegerHashSetMBS

set.insert 1
set.insert 2

MsgBox str(set.lookup(3)) // shows false as value is missing
MsgBox str(set.lookup(1)) // shows true as value is found

```

**Notes:** Returns true if yes and false if no.

### 5.5.14 Remove(first as IntegerHashSetIteratorMBS, last as IntegerHashSetIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.5.15 Remove(key as Integer) as Integer 83
- 5.5.16 Remove(pos as IntegerHashSetIteratorMBS) 83

### 5.5.15 Remove(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.5.14 Remove(first as IntegerHashSetIteratorMBS, last as IntegerHashSetIteratorMBS) 82
- 5.5.16 Remove(pos as IntegerHashSetIteratorMBS) 83

### 5.5.16 Remove(pos as IntegerHashSetIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.5.14 Remove(first as IntegerHashSetIteratorMBS, last as IntegerHashSetIteratorMBS) 82
- 5.5.15 Remove(key as Integer) as Integer 83

### 5.5.17 Properties

### 5.5.18 BinCount as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of bins the hash table uses.

**Example:**

```
dim v as new IntegerHashSetMBS
```

```
v.insert 1
```

```
v.insert 5
```

```
MsgBox str(v.BinCount)
```

**Notes:** This is a measure of the hash table size, independent of the number of items the Dictionary contains.  
(Read only property)

### 5.5.19 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this set.

**Example:**

```
dim set as new IntegerHashSetMBS
```

```
set.insert 1
```

```
set.insert 2
```

```
MsgBox str(set.Count)
```

**Notes:** (Read only property)

### 5.5.20 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.5.21 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this set.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

## 5.6 class IntegerOrderedSetIteratorMBS

### 5.6.1 class IntegerOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the IntegerOrderedSet class.

**Example:**

```
// Create a map
dim m as new IntegerOrderedSetMBS

m.insert(1)
m.insert(2)
m.insert(3)

// get iterators pointing to first and after last element
dim i as IntegerOrderedSetIteratorMBS = m.first
dim e as IntegerOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)
  i.MoveNext
wend
```

### 5.6.2 Methods

### 5.6.3 isEqual(other as IntegerOrderedSetIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new IntegerOrderedSetMBS

m.insert(1)
m.insert(2)
m.insert(3)

// get iterators pointing to first and after last element
dim i as IntegerOrderedSetIteratorMBS = m.first
dim e as IntegerOrderedSetIteratorMBS = m.last
```

```
// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)
i.MoveNext
wend
```

#### 5.6.4 isNotEqual(other as IntegerOrderedSetIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new IntegerOrderedSetMBS

m.insert(1)
m.insert(2)
m.insert(3)

// get iterators pointing to first and after last element
dim i as IntegerOrderedSetIteratorMBS = m.first
dim e as IntegerOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)
i.MoveNext
wend
```

#### 5.6.5 Key as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

#### 5.6.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new IntegerOrderedSetMBS

m.insert(1)
m.insert(2)
m.insert(3)

// get iterators pointing to first and after last element
dim i as IntegerOrderedSetIteratorMBS = m.first
dim e as IntegerOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)
  i.MoveNext
wend
```

### 5.6.7 MovePrev

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the previous item.

## 5.7 class IntegerOrderedSetMBS

### 5.7.1 class IntegerOrderedSetMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for an ordered set with integers.

**Example:**

```
dim s as new IntegerOrderedSetMBS
```

```
s.insert 1
```

```
s.insert 2
```

```
MsgBox str(s.Count) // shows 2
```

**Notes:** You can choose whether you want to keep the set ordered using the `OrderedSet` class or whether you prefer a higher speed with the `HashSet` class.

### 5.7.2 Methods

### 5.7.3 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

### 5.7.4 Constructor

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

See also:

- 5.7.5 Constructor(Keys() as Integer)

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### 5.7.5 Constructor(Keys() as Integer)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new set from the values in the array.

**Notes:** If the array has duplicates, the later elements overwrite the earlier keys.

See also:

- 5.7.4 Constructor

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### 5.7.6 CountKey(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this set.

### 5.7.7 find(key as Integer) as IntegerOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

### 5.7.8 first as IntegerOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the set.

**Example:**

```
// Create a map
dim m as new IntegerOrderedSetMBS

m.insert(1)
m.insert(2)
m.insert(3)

// get iterators pointing to first and after last element
dim i as IntegerOrderedSetIteratorMBS = m.first
dim e as IntegerOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)
  i.MoveNext
wend
```

### 5.7.9 insert(key as Integer)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a value to the set.

### 5.7.10 Key(index as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

### 5.7.11 Keys as Integer()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new IntegerOrderedSetMBS
```

```
m.insert(1)
```

```
m.insert(2)
```

```
for each v as Integer in m.Keys
```

```
MsgBox str(v)
```

```
next
```

**Notes:** The order is stable and matches the order returned by the Values method at least until the Dictionary is modified. Use this method with For Each to loop through all the keys.

### 5.7.12 last as IntegerOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the set.

**Example:**

```
// Create a map
```

```
dim m as new IntegerOrderedSetMBS
```

```

m.insert(1)
m.insert(2)
m.insert(3)

// get iterators pointing to first and after last element
dim i as IntegerOrderedSetIteratorMBS = m.first
dim e as IntegerOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)
i.MoveNext
wend

```

### 5.7.13 lookup(key as Integer) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks whether an element with the given key exists in this set.

**Example:**

```

dim set as new IntegerOrderedSetMBS

set.insert 1
set.insert 2

MsgBox str(set.lookup(3)) // shows false as value is missing
MsgBox str(set.lookup(1)) // shows true as value is found

```

**Notes:** Returns true if yes and false if no.

### 5.7.14 LowerBound(key as Integer) as IntegerOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is not less than k.

### 5.7.15 Remove(first as IntegerOrderedSetIteratorMBS, last as IntegerOrderedSetIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.7.16 Remove(key as Integer) as Integer 92
- 5.7.17 Remove(pos as IntegerOrderedSetIteratorMBS) 92

### 5.7.16 Remove(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.7.15 Remove(first as IntegerOrderedSetIteratorMBS, last as IntegerOrderedSetIteratorMBS) 92
- 5.7.17 Remove(pos as IntegerOrderedSetIteratorMBS) 92

### 5.7.17 Remove(pos as IntegerOrderedSetIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.7.15 Remove(first as IntegerOrderedSetIteratorMBS, last as IntegerOrderedSetIteratorMBS) 92
- 5.7.16 Remove(key as Integer) as Integer 92

### 5.7.18 UpperBound(key as Integer) as IntegerOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is greater than k.

### 5.7.19 Properties

### 5.7.20 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this set.

**Example:**

```
dim set as new IntegerOrderedSetMBS
```

```
set.insert 1
```

```
set.insert 2
```

```
MsgBox str(set.Count)
```

**Notes:** (Read only property)

### 5.7.21 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.7.22 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this set.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

## 5.8 class IntegerToIntegerHashMapIteratorMBS

### 5.8.1 class IntegerToIntegerHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the IntegerToIntegerHashMap class.

**Example:**

```
// Create a map
dim m as new IntegerToIntegerHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToIntegerHashMapIteratorMBS = m.first
dim e as IntegerToIntegerHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

### 5.8.2 Methods

### 5.8.3 isEqual(other as IntegerToIntegerHashMapIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new IntegerToIntegerHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToIntegerHashMapIteratorMBS = m.first
dim e as IntegerToIntegerHashMapIteratorMBS = m.last
```

```
// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

#### 5.8.4 isNotEqual(other as IntegerToIntegerHashMapIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new IntegerToIntegerHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToIntegerHashMapIteratorMBS = m.first
dim e as IntegerToIntegerHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

#### 5.8.5 Key as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

#### 5.8.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new IntegerToIntegerHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToIntegerHashMapIteratorMBS = m.first
dim e as IntegerToIntegerHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)+" ->" +str(i.Value)
  i.MoveNext
wend
```

### 5.8.7 Properties

### 5.8.8 Value as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value of the current item in the iterator.

**Notes:** (Read and Write computed property)

## 5.9 class IntegerToIntegerHashMapMBS

### 5.9.1 class IntegerToIntegerHashMapMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for a hash map with integers as keys and values.

**Example:**

```
dim s as new IntegerToIntegerHashMapMBS
```

```
s.Value(1)=3
```

```
s.Value(2)=4
```

```
MsgBox str(s.Count) // shows 2
```

```
MsgBox str(s.Value(1)+s.Value(2)) // shows 7
```

**Notes:** You can choose whether you want to keep the map ordered using the OrderedMap class or whether you prefer a higher speed with the HashMap class.

### 5.9.2 Methods

#### 5.9.3 AddKeys(targetArray() as Integer)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to keys, but adds keys to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.9.4 AddValues(targetArray() as Integer)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to values, but adds values to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

### 5.9.5 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

### 5.9.6 Clone as IntegerToIntegerHashMapMBS

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map.

### 5.9.7 CloneDictionary as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map as a dictionary.

### 5.9.8 Constructor

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

See also:

- 5.9.9 Constructor(dic as dictionary) 98
- 5.9.10 Constructor(other as IntegerToIntegerHashMapMBS) 99

### 5.9.9 Constructor(dic as dictionary)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the dictionary.

See also:

- 5.9.8 Constructor 98
- 5.9.10 Constructor(other as IntegerToIntegerHashMapMBS) 99

**5.9.10 Constructor(other as IntegerToIntegerHashMapMBS)**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the existing map.

See also:

- 5.9.8 Constructor 98
- 5.9.9 Constructor(dic as dictionary) 98

**5.9.11 CountKey(key as Integer) as Integer**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this map.

**5.9.12 find(key as Integer) as IntegerToIntegerHashMapIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

**5.9.13 first as IntegerToIntegerHashMapIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the map.

**Example:**

```
// Create a map
dim m as new IntegerToIntegerHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToIntegerHashMapIteratorMBS = m.first
dim e as IntegerToIntegerHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
```

```
i.MoveNext  
wend
```

#### 5.9.14 `hasKey(key as Integer)` as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns True if Key is in the map and False if it is not. Returns a Boolean.

#### 5.9.15 `Key(index as Integer)` as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an `OutOfBoundsException` error. The first item has the index zero.

#### 5.9.16 `Keys as Integer()`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new IntegerToIntegerHashMapMBS
```

```
m.Value(1)=5
```

```
m.Value(2)=7
```

```
for each v as Integer in m.keys
```

```
MsgBox str(v)
```

```
next
```

**Notes:** The order is stable and matches the order returned by the `Values` method at least until the Dictionary is modified. Use this method with `For Each` to loop through all the keys.

#### 5.9.17 `last as IntegerToIntegerHashMapIteratorMBS`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the map.

**Example:**

```
// Create a map
dim m as new IntegerToIntegerHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToIntegerHashMapIteratorMBS = m.first
dim e as IntegerToIntegerHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

### 5.9.18 lookup(key as Integer, defaultvalue as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Looks up the passed value of Key.

**Example:**

```
dim map as new IntegerToIntegerHashMapMBS

map.value(10)=1
map.value(100)=2
map.value(1000)=3

MsgBox str(map.lookup(5,0)) // shows 0 as value is missing
MsgBox str(map.lookup(10,0)) // shows 1 as value is found
```

**Notes:** If Key is found, it returns the corresponding value. If Key is not found, it returns the passed defaultValue.

### 5.9.19 Operator\_Convert as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the map as dictionary.

### 5.9.20 Remove(first as IntegerToIntegerHashMapIteratorMBS, last as IntegerToIntegerHashMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.9.21 Remove(key as Integer) as Integer 102
- 5.9.22 Remove(pos as IntegerToIntegerHashMapIteratorMBS) 102

### 5.9.21 Remove(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.9.20 Remove(first as IntegerToIntegerHashMapIteratorMBS, last as IntegerToIntegerHashMapIteratorMBS) 102
- 5.9.22 Remove(pos as IntegerToIntegerHashMapIteratorMBS) 102

### 5.9.22 Remove(pos as IntegerToIntegerHashMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.9.20 Remove(first as IntegerToIntegerHashMapIteratorMBS, last as IntegerToIntegerHashMapIteratorMBS) 102
- 5.9.21 Remove(key as Integer) as Integer 102

### 5.9.23 ValueAtIndex(index as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value with the given index.

**Notes:** If there is no `Indexth` item in the map, a call generates an `OutOfBoundsException` error. The first item has the index zero.

### 5.9.24 Values as Integer()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the values as an array

**Example:**

```
dim m as new IntegerToIntegerHashMapMBS
```

```
m.Value(1)=5
```

```
m.Value(2)=7
```

```
for each v as Integer in m.Values
```

```
MsgBox str(v)
```

```
next
```

**Notes:** The order is stable and matches the order returned by Keys at least until the Map is modified. Use this method with For Each to loop through all the values.

### 5.9.25 Properties

### 5.9.26 BinCount as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of bins the hash table uses.

**Example:**

```
dim v as new IntegerToIntegerHashMapMBS
```

```
v.value(1)=10
```

```
v.value(2)=20
```

```
MsgBox str(v.BinCount)
```

**Notes:** This is a measure of the hash table size, independent of the number of items the Dictionary contains. (Read only property)

### 5.9.27 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this map.

**Example:**

```
dim map as new IntegerToIntegerHashMapMBS
```

```
map.Value(1)=3
```

```
map.Value(2)=4
```

```
MsgBox str(map.Count)
```

**Notes:** (Read only property)

### 5.9.28 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.9.29 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this map.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

### 5.9.30 value(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value associated with the given key.

**Notes:** If you query for a key which does not exist, a `KeyNotFoundException` is raised.

(Read and Write computed property)

## 5.10 class IntegerToIntegerOrderedMapIteratorMBS

### 5.10.1 class IntegerToIntegerOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the IntegerToIntegerOrderedMap class.

**Example:**

```
// Create a map
dim m as new IntegerToIntegerOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToIntegerOrderedMapIteratorMBS = m.first
dim e as IntegerToIntegerOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

### 5.10.2 Methods

### 5.10.3 isEqual(other as IntegerToIntegerOrderedMapIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new IntegerToIntegerOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToIntegerOrderedMapIteratorMBS = m.first
dim e as IntegerToIntegerOrderedMapIteratorMBS = m.last
```

```
// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

#### 5.10.4 `isNotEqual`(other as `IntegerToIntegerOrderedMapIteratorMBS`) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new IntegerToIntegerOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToIntegerOrderedMapIteratorMBS = m.first
dim e as IntegerToIntegerOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

#### 5.10.5 `Key` as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

#### 5.10.6 `MoveNext`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new IntegerToIntegerOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToIntegerOrderedMapIteratorMBS = m.first
dim e as IntegerToIntegerOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

### 5.10.7 MovePrev

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the previous item.

### 5.10.8 Properties

#### 5.10.9 Value as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value of the current item in the iterator.

**Notes:** (Read and Write computed property)

## 5.11 class IntegerToIntegerOrderedMapMBS

### 5.11.1 class IntegerToIntegerOrderedMapMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for an ordered map for integers for keys and values.

**Example:**

```
dim s as new IntegerToIntegerHashMapMBS
```

```
s.Value(1)=3
```

```
s.Value(2)=4
```

```
MsgBox str(s.Count) // shows 2
```

```
MsgBox str(s.Value(1)+s.Value(2)) // shows 7
```

**Notes:** You can choose whether you want to keep the map ordered using the OrderedMap class or whether you prefer a higher speed with the HashMap class.

### 5.11.2 Methods

#### 5.11.3 AddKeys(targetArray() as Integer)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to keys, but adds keys to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.11.4 AddValues(targetArray() as Integer)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to values, but adds values to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

**5.11.5 Clear**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

**5.11.6 Clone as IntegerToIntegerOrderedMapMBS**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map.

**5.11.7 CloneDictionary as Dictionary**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map as a dictionary.

**5.11.8 Constructor**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

See also:

- 5.11.9 Constructor(dic as dictionary) 109
- 5.11.10 Constructor(other as IntegerToIntegerOrderedMapMBS) 110

**5.11.9 Constructor(dic as dictionary)**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the dictionary.

See also:

- 5.11.8 Constructor 109
- 5.11.10 Constructor(other as IntegerToIntegerOrderedMapMBS) 110

### 5.11.10 Constructor(other as IntegerToIntegerOrderedMapMBS)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the existing map.

See also:

- 5.11.8 Constructor 109
- 5.11.9 Constructor(dic as dictionary) 109

### 5.11.11 CountKey(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this map.

### 5.11.12 find(key as Integer) as IntegerToIntegerOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

### 5.11.13 first as IntegerToIntegerOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the map.

**Example:**

```
// Create a map
dim m as new IntegerToIntegerOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToIntegerOrderedMapIteratorMBS = m.first
dim e as IntegerToIntegerOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
```

```
i.MoveNext  
wend
```

#### 5.11.14 hasKey(key as Integer) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns True if Key is in the map and False if it is not. Returns a Boolean.

#### 5.11.15 Key(index as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

#### 5.11.16 Keys as Integer()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new IntegerToIntegerOrderedMapMBS
```

```
m.Value(1)=5
```

```
m.Value(2)=7
```

```
for each v as Integer in m.keys
```

```
MsgBox str(v)
```

```
next
```

**Notes:** The order is stable and matches the order returned by the Values method at least until the Dictionary is modified. Use this method with For Each to loop through all the keys.

#### 5.11.17 last as IntegerToIntegerOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the map.

**Example:**

```
// Create a map
dim m as new IntegerToIntegerOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToIntegerOrderedMapIteratorMBS = m.first
dim e as IntegerToIntegerOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

### 5.11.18 lookup(key as Integer, defaultvalue as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Looks up the passed value of Key.

**Example:**

```
dim map as new IntegerToIntegerOrderedMapMBS

map.value(10)=1
map.value(100)=2
map.value(1000)=3

MsgBox str(map.lookup(5,0)) // shows 0 as value is missing
MsgBox str(map.lookup(10,0)) // shows 1 as value is found
```

**Notes:** If Key is found, it returns the corresponding value. If Key is not found, it returns the passed defaultValue.

### 5.11.19 LowerBound(key as Integer) as IntegerToIntegerOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is not less than k.

### 5.11.20 Operator\_Convert as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the map as dictionary.

### 5.11.21 Remove(first as IntegerToIntegerOrderedMapIteratorMBS, last as IntegerToIntegerOrderedMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.11.22 Remove(key as Integer) as Integer 113
- 5.11.23 Remove(pos as IntegerToIntegerOrderedMapIteratorMBS) 113

### 5.11.22 Remove(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.11.21 Remove(first as IntegerToIntegerOrderedMapIteratorMBS, last as IntegerToIntegerOrderedMapIteratorMBS) 113
- 5.11.23 Remove(pos as IntegerToIntegerOrderedMapIteratorMBS) 113

### 5.11.23 Remove(pos as IntegerToIntegerOrderedMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.11.21 Remove(first as IntegerToIntegerOrderedMapIteratorMBS, last as IntegerToIntegerOrderedMapIteratorMBS) 113
- 5.11.22 Remove(key as Integer) as Integer 113

### 5.11.24 UpperBound(key as Integer) as IntegerToIntegerOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is greater than k.

### 5.11.25 ValueAtIndex(index as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value with the given index.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

### 5.11.26 Values as Integer()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the values as an array

**Example:**

```
dim m as new IntegerToIntegerOrderedMapMBS
```

```
m.Value(1)=5
```

```
m.Value(2)=7
```

```
for each v as Integer in m.Values
```

```
MsgBox str(v)
```

```
next
```

**Notes:** The order is stable and matches the order returned by Keys at least until the Map is modified. Use this method with For Each to loop through all the values.

### 5.11.27 Properties

### 5.11.28 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this map.

**Example:**

```
dim map as new IntegerToIntegerOrderedMapMBS
```

```
map.Value(1)=3
```

```
map.Value(2)=4
```

```
MsgBox str(map.Count)
```

**Notes:** (Read only property)

### 5.11.29 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.11.30 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this map.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

### 5.11.31 value(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value associated with the given key.

**Notes:** If you query for a key which does not exist, a `KeyNotFoundException` is raised.

(Read and Write computed property)

## 5.12 class IntegerToStringHashMapIteratorMBS

### 5.12.1 class IntegerToStringHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the IntegerToStringHashMap class.

**Example:**

```
// Create a map
dim m as new IntegerToStringHashMapMBS

m.value(1)="Hello"
m.value(2)="World"
m.value(3)="!"

// get iterators pointing to first and after last element
dim i as IntegerToStringHashMapIteratorMBS = m.first
dim e as IntegerToStringHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.12.2 Methods

### 5.12.3 isEqual(other as IntegerToStringHashMapIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new IntegerToStringHashMapMBS

m.value(1)="Hello"
m.value(2)="World"
m.value(3)="!"

// get iterators pointing to first and after last element
dim i as IntegerToStringHashMapIteratorMBS = m.first
dim e as IntegerToStringHashMapIteratorMBS = m.last
```

```
// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.12.4 isNotEqual(other as IntegerToStringHashMapIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new IntegerToStringHashMapMBS

m.value(1)="Hello"
m.value(2)="World"
m.value(3)="!"

// get iterators pointing to first and after last element
dim i as IntegerToStringHashMapIteratorMBS = m.first
dim e as IntegerToStringHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.12.5 Key as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

#### 5.12.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new IntegerToStringHashMapMBS

m.value(1)="Hello"
m.value(2)="World"
m.value(3)="!"

// get iterators pointing to first and after last element
dim i as IntegerToStringHashMapIteratorMBS = m.first
dim e as IntegerToStringHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)+" ->" +i.Value
  i.MoveNext
wend
```

### 5.12.7 Properties

### 5.12.8 Value as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value of the current item in the iterator.

**Notes:** (Read and Write computed property)

## 5.13 class IntegerToStringHashMapMBS

### 5.13.1 class IntegerToStringHashMapMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for a hash map with integers as keys and strings as values.

**Example:**

```
dim s as new IntegerToStringHashMapMBS
```

```
s.Value(1)="Hello"
```

```
s.Value(2)="World"
```

```
MsgBox str(s.Count) // shows 2
```

```
MsgBox s.Value(1)+" "+s.Value(2) // shows "Hello World"
```

**Notes:** You can choose whether you want to keep the map ordered using the `OrderedMap` class or whether you prefer a higher speed with the `HashMap` class.

### 5.13.2 Methods

#### 5.13.3 AddKeys(targetArray() as Integer)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to `keys`, but adds keys to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.13.4 AddValues(targetArray() as string)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to `values`, but adds values to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

### 5.13.5 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

### 5.13.6 Clone as IntegerToStringHashMapMBS

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map.

### 5.13.7 CloneDictionary as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map as a dictionary.

### 5.13.8 Constructor

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

See also:

- 5.13.9 Constructor(dic as dictionary) 120
- 5.13.10 Constructor(other as IntegerToStringHashMapMBS) 121

### 5.13.9 Constructor(dic as dictionary)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the dictionary.

See also:

- 5.13.8 Constructor 120
- 5.13.10 Constructor(other as IntegerToStringHashMapMBS) 121

**5.13.10 Constructor(other as IntegerToStringHashMapMBS)**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the existing map.

See also:

- 5.13.8 Constructor 120
- 5.13.9 Constructor(dic as dictionary) 120

**5.13.11 CountKey(key as Integer) as Integer**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this map.

**5.13.12 find(key as Integer) as IntegerToStringHashMapIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

**5.13.13 first as IntegerToStringHashMapIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the map.

**Example:**

```
// Create a map
dim m as new IntegerToStringHashMapMBS

m.value(1)="Hello"
m.value(2)="World"
m.value(3)="!"

// get iterators pointing to first and after last element
dim i as IntegerToStringHashMapIteratorMBS = m.first
dim e as IntegerToStringHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
```

```
i.MoveNext  
wend
```

#### 5.13.14 `hasKey(key as Integer)` as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns True if Key is in the map and False if it is not. Returns a Boolean.

#### 5.13.15 `Key(index as Integer)` as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an `OutOfBoundsException` error. The first item has the index zero.

#### 5.13.16 `Keys as Integer()`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new IntegerToStringHashMapMBS
```

```
m.Value(1)="Hello"  
m.Value(2)="World"
```

```
for each v as Integer in m.keys  
MsgBox str(v)  
next
```

**Notes:** The order is stable and matches the order returned by the `Values` method at least until the Dictionary is modified. Use this method with `For Each` to loop through all the keys.

#### 5.13.17 `last as IntegerToStringHashMapIteratorMBS`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the map.

**Example:**

```
// Create a map
dim m as new IntegerToStringHashMapMBS

m.value(1)="Hello"
m.value(2)="World"
m.value(3)="!"

// get iterators pointing to first and after last element
dim i as IntegerToStringHashMapIteratorMBS = m.first
dim e as IntegerToStringHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.13.18 lookup(key as Integer, defaultvalue as string) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Looks up the passed value of Key.

**Example:**

```
dim map as new IntegerToStringOrderedMapMBS

map.value(10)="Hello"
map.value(100)="World"
map.value(1000)="!"

MsgBox str(map.lookup(5,"?")) // shows "?" as value is missing
MsgBox str(map.lookup(10,"?")) // shows "Hello" as value is found
```

**Notes:** If Key is found, it returns the corresponding value. If Key is not found, it returns the passed defaultValue.

### 5.13.19 Operator\_Convert as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the map as dictionary.

### 5.13.20 Remove(first as IntegerToStringHashMapIteratorMBS, last as IntegerToStringHashMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.13.21 Remove(key as Integer) as Integer 124
- 5.13.22 Remove(pos as IntegerToStringHashMapIteratorMBS) 124

### 5.13.21 Remove(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.13.20 Remove(first as IntegerToStringHashMapIteratorMBS, last as IntegerToStringHashMapIteratorMBS) 124
- 5.13.22 Remove(pos as IntegerToStringHashMapIteratorMBS) 124

### 5.13.22 Remove(pos as IntegerToStringHashMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.13.20 Remove(first as IntegerToStringHashMapIteratorMBS, last as IntegerToStringHashMapIteratorMBS) 124
- 5.13.21 Remove(key as Integer) as Integer 124

### 5.13.23 ValueAtIndex(index as Integer) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value with the given index.

**Notes:** If there is no `Index`th item in the map, a call generates an `OutOfBoundsException` error. The first item has the index zero.

### 5.13.24 Values as string()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the values as an array

**Example:**

```
dim m as new IntegerToStringHashMapMBS
```

```
m.Value(1)="Hello"
```

```
m.Value(2)="World"
```

```
for each v as string in m.Values
```

```
MsgBox v
```

```
next
```

**Notes:** The order is stable and matches the order returned by Keys at least until the Map is modified. Use this method with For Each to loop through all the values.

### 5.13.25 Properties

### 5.13.26 BinCount as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of bins the hash table uses.

**Example:**

```
dim v as new IntegerToStringHashMapMBS
```

```
v.value(1)="Hello"
```

```
v.value(2)="World"
```

```
MsgBox str(v.BinCount)
```

**Notes:** This is a measure of the hash table size, independent of the number of items the Dictionary contains. (Read only property)

### 5.13.27 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this map.

**Example:**

```
dim map as new IntegerToStringHashMapMBS
```

```
map.Value(1)="Hello"  
map.Value(2)="World"
```

```
MsgBox str(map.Count)
```

**Notes:** (Read only property)

### 5.13.28 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.13.29 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this map.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

### 5.13.30 value(key as Integer) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value associated with the given key.

**Notes:** If you query for a key which does not exist, a `KeyNotFoundException` is raised.

(Read and Write computed property)

## 5.14 class IntegerToStringOrderedMapIteratorMBS

### 5.14.1 class IntegerToStringOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the IntegerToStringOrderedMap class.

**Example:**

```
// Create a map
dim m as new IntegerToStringOrderedMapMBS

m.value(1)="Hello"
m.value(2)="World"
m.value(3)="!"

// get iterators pointing to first and after last element
dim i as IntegerToStringOrderedMapIteratorMBS = m.first
dim e as IntegerToStringOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.14.2 Methods

### 5.14.3 isEqual(other as IntegerToStringOrderedMapIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new IntegerToStringOrderedMapMBS

m.value(1)="Hello"
m.value(2)="World"
m.value(3)="!"

// get iterators pointing to first and after last element
dim i as IntegerToStringOrderedMapIteratorMBS = m.first
dim e as IntegerToStringOrderedMapIteratorMBS = m.last
```

```
// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.14.4 `isNotEqual`(other as `IntegerToStringOrderedMapIteratorMBS`) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new IntegerToStringOrderedMapMBS

m.value(1)="Hello"
m.value(2)="World"
m.value(3)="!"

// get iterators pointing to first and after last element
dim i as IntegerToStringOrderedMapIteratorMBS = m.first
dim e as IntegerToStringOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.14.5 `Key` as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

#### 5.14.6 `MoveNext`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new IntegerToStringOrderedMapMBS

m.value(1)="Hello"
m.value(2)="World"
m.value(3)="!"

// get iterators pointing to first and after last element
dim i as IntegerToStringOrderedMapIteratorMBS = m.first
dim e as IntegerToStringOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.14.7 MovePrev

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the previous item.

### 5.14.8 Properties

#### 5.14.9 Value as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value of the current item in the iterator.

**Notes:** (Read and Write computed property)

## 5.15 class IntegerToStringOrderedMapMBS

### 5.15.1 class IntegerToStringOrderedMapMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for an ordered map with integer keys and string values.

**Example:**

```
dim s as new IntegerToStringOrderedMapMBS
```

```
s.Value(1)="Hello"
```

```
s.Value(2)="World"
```

```
MsgBox str(s.Count) // shows 2
```

```
MsgBox s.Value(1)+" "+s.Value(2) // shows "Hello World"
```

**Notes:** You can choose whether you want to keep the map ordered using the `OrderedMap` class or whether you prefer a higher speed with the `HashMap` class.

### 5.15.2 Methods

#### 5.15.3 AddKeys(targetArray() as Integer)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to `keys`, but adds keys to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the `values and keys` function returns always `nil`.

#### 5.15.4 AddValues(targetArray() as string)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to `values`, but adds values to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the `values and keys` function returns always `nil`.

**5.15.5 Clear**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

**5.15.6 Clone as IntegerToStringOrderedMapMBS**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map.

**5.15.7 CloneDictionary as Dictionary**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map as a dictionary.

**5.15.8 Constructor**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

See also:

- 5.15.9 Constructor(dic as dictionary) 131
- 5.15.10 Constructor(other as IntegerToStringOrderedMapMBS) 132

**5.15.9 Constructor(dic as dictionary)**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the dictionary.

See also:

- 5.15.8 Constructor 131
- 5.15.10 Constructor(other as IntegerToStringOrderedMapMBS) 132

### 5.15.10 Constructor(other as IntegerToStringOrderedMapMBS)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the existing map.

See also:

- 5.15.8 Constructor 131
- 5.15.9 Constructor(dic as dictionary) 131

### 5.15.11 CountKey(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this map.

### 5.15.12 find(key as Integer) as IntegerToStringOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

### 5.15.13 first as IntegerToStringOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the map.

**Example:**

```
// Create a map
dim m as new IntegerToStringOrderedMapMBS

m.value(1)="Hello"
m.value(2)="World"
m.value(3)="!"

// get iterators pointing to first and after last element
dim i as IntegerToStringOrderedMapIteratorMBS = m.first
dim e as IntegerToStringOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
```

```
i.MoveNext  
wend
```

#### 5.15.14 hasKey(key as Integer) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns True if Key is in the map and False if it is not. Returns a Boolean.

#### 5.15.15 Key(index as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

#### 5.15.16 Keys as Integer()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new IntegerToStringOrderedMapMBS
```

```
m.Value(1)="Hello"  
m.Value(2)="World"
```

```
for each v as Integer in m.keys  
MsgBox str(v)  
next
```

**Notes:** The order is stable and matches the order returned by the Values method at least until the Dictionary is modified. Use this method with For Each to loop through all the keys.

#### 5.15.17 last as IntegerToStringOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the map.

**Example:**

```
// Create a map
dim m as new IntegerToStringOrderedMapMBS

m.value(1)="Hello"
m.value(2)="World"
m.value(3)="!"

// get iterators pointing to first and after last element
dim i as IntegerToStringOrderedMapIteratorMBS = m.first
dim e as IntegerToStringOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.15.18 lookup(key as Integer, defaultvalue as string) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Looks up the passed value of Key.

**Example:**

```
dim map as new IntegerToStringOrderedMapMBS

map.value(10)="Hello"
map.value(100)="World"
map.value(1000)="!"

MsgBox str(map.lookup(5, "?")) // shows "?" as value is missing
MsgBox str(map.lookup(10, "?")) // shows "Hello" as value is found
```

**Notes:** If Key is found, it returns the corresponding value. If Key is not found, it returns the passed defaultValue.

### 5.15.19 LowerBound(key as Integer) as IntegerToStringOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is not less than k.

### 5.15.20 Operator\_Convert as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the map as dictionary.

### 5.15.21 Remove(first as IntegerToStringOrderedMapIteratorMBS, last as IntegerToStringOrderedMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.15.22 Remove(key as Integer) as Integer 135
- 5.15.23 Remove(pos as IntegerToStringOrderedMapIteratorMBS) 135

### 5.15.22 Remove(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.15.21 Remove(first as IntegerToStringOrderedMapIteratorMBS, last as IntegerToStringOrderedMapIteratorMBS) 135
- 5.15.23 Remove(pos as IntegerToStringOrderedMapIteratorMBS) 135

### 5.15.23 Remove(pos as IntegerToStringOrderedMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.15.21 Remove(first as IntegerToStringOrderedMapIteratorMBS, last as IntegerToStringOrderedMapIteratorMBS) 135
- 5.15.22 Remove(key as Integer) as Integer 135

### 5.15.24 UpperBound(key as Integer) as IntegerToStringOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is greater than k.

### 5.15.25 ValueAtIndex(index as Integer) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value with the given index.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

### 5.15.26 Values as string()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the values as an array

**Example:**

```
dim m as new IntegerToStringOrderedMapMBS
```

```
m.Value(1)="Hello"
```

```
m.Value(2)="World"
```

```
for each v as string in m.Values
```

```
MsgBox v
```

```
next
```

**Notes:** The order is stable and matches the order returned by Keys at least until the Map is modified. Use this method with For Each to loop through all the values.

### 5.15.27 Properties

### 5.15.28 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this map.

**Example:**

```
dim map as new IntegerToStringOrderedMapMBS
```

```
map.Value(1)="Hello"  
map.Value(2)="World"
```

```
MsgBox str(map.Count)
```

**Notes:** (Read only property)

### 5.15.29 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.15.30 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this map.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

### 5.15.31 value(key as Integer) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value associated with the given key.

**Notes:** If you query for a key which does not exist, a `KeyNotFoundException` is raised.

(Read and Write computed property)

## 5.16 class IntegerToVariantHashMapIteratorMBS

### 5.16.1 class IntegerToVariantHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the IntegerToVariantHashMap class.

**Example:**

```
// Create a map
dim m as new IntegerToVariantHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToVariantHashMapIteratorMBS = m.first
dim e as IntegerToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.16.2 Methods

### 5.16.3 isEqual(other as IntegerToVariantHashMapIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new IntegerToVariantHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToVariantHashMapIteratorMBS = m.first
dim e as IntegerToVariantHashMapIteratorMBS = m.last
```

```
// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.16.4 isNotEqual(other as IntegerToVariantHashMapIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new IntegerToVariantHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToVariantHashMapIteratorMBS = m.first
dim e as IntegerToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.16.5 Key as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

#### 5.16.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new IntegerToVariantHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToVariantHashMapIteratorMBS = m.first
dim e as IntegerToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)+" ->" + i.Value
  i.MoveNext
wend
```

### 5.16.7 Properties

### 5.16.8 Value as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value of the current item in the iterator.

**Notes:** (Read and Write computed property)

## 5.17 class IntegerToVariantHashMapMBS

### 5.17.1 class IntegerToVariantHashMapMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for a hash map with integers as keys and variants as values.

**Example:**

```
dim s as new IntegerToVariantHashMapMBS
```

```
s.Value(1)="Hello"
```

```
s.Value(2)="World"
```

```
MsgBox str(s.Count) // shows 2
```

```
MsgBox s.Value(1)+" "+s.Value(2) // shows "Hello World"
```

**Notes:** You can choose whether you want to keep the map ordered using the OrderedMap class or whether you prefer a higher speed with the HashMap class.

### 5.17.2 Methods

#### 5.17.3 AddKeys(targetArray() as Integer)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to keys, but adds keys to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.17.4 AddValues(targetArray() as Variant)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to values, but adds values to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

### 5.17.5 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

### 5.17.6 Clone as IntegerToVariantHashMapMBS

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map.

### 5.17.7 CloneDictionary as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map as a dictionary.

### 5.17.8 Constructor

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

See also:

- 5.17.9 Constructor(dic as dictionary) 142
- 5.17.10 Constructor(other as IntegerToVariantHashMapMBS) 143

### 5.17.9 Constructor(dic as dictionary)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the dictionary.

See also:

- 5.17.8 Constructor 142
- 5.17.10 Constructor(other as IntegerToVariantHashMapMBS) 143

**5.17.10 Constructor(other as IntegerToVariantHashMapMBS)**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the existing map.

See also:

- 5.17.8 Constructor 142
- 5.17.9 Constructor(dic as dictionary) 142

**5.17.11 CountKey(key as Integer) as Integer**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this map.

**5.17.12 find(key as Integer) as IntegerToVariantHashMapIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

**5.17.13 first as IntegerToVariantHashMapIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the map.

**Example:**

```
// Create a map
dim m as new IntegerToVariantHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToVariantHashMapIteratorMBS = m.first
dim e as IntegerToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
```

```
i.MoveNext  
wend
```

#### 5.17.14 `hasKey(key as Integer)` as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns True if Key is in the map and False if it is not. Returns a Boolean.

#### 5.17.15 `Key(index as Integer)` as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an `OutOfBoundsException` error. The first item has the index zero.

#### 5.17.16 `Keys as Integer()`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new IntegerToVariantHashMapMBS
```

```
m.Value(1)="Hello"  
m.Value(2)="World"
```

```
for each v as Integer in m.keys  
MsgBox str(v)  
next
```

**Notes:** The order is stable and matches the order returned by the `Values` method at least until the Dictionary is modified. Use this method with `For Each` to loop through all the keys.

#### 5.17.17 `last as IntegerToVariantHashMapIteratorMBS`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the map.

**Example:**

```
// Create a map
dim m as new IntegerToVariantHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToVariantHashMapIteratorMBS = m.first
dim e as IntegerToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)+" ->" + i.Value
  i.MoveNext
wend
```

### 5.17.18 lookup(key as Integer, defaultvalue as Variant) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Looks up the passed value of Key.

**Example:**

```
dim map as new IntegerToVariantHashMapMBS

map.value(10)=1
map.value(100)=2
map.value(1000)=3

MsgBox str(map.lookup(5,0)) // shows 0 as value is missing
MsgBox str(map.lookup(10,0)) // shows 1 as value is found
```

**Notes:** If Key is found, it returns the corresponding value. If Key is not found, it returns the passed defaultValue.

### 5.17.19 Operator\_Convert as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the map as dictionary.

### 5.17.20 Remove(first as IntegerToVariantHashMapIteratorMBS, last as IntegerToVariantHashMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.17.21 Remove(key as Integer) as Integer 146
- 5.17.22 Remove(pos as IntegerToVariantHashMapIteratorMBS) 146

### 5.17.21 Remove(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.17.20 Remove(first as IntegerToVariantHashMapIteratorMBS, last as IntegerToVariantHashMapIteratorMBS) 146
- 5.17.22 Remove(pos as IntegerToVariantHashMapIteratorMBS) 146

### 5.17.22 Remove(pos as IntegerToVariantHashMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.17.20 Remove(first as IntegerToVariantHashMapIteratorMBS, last as IntegerToVariantHashMapIteratorMBS) 146
- 5.17.21 Remove(key as Integer) as Integer 146

### 5.17.23 ValueAtIndex(index as Integer) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value with the given index.

**Notes:** If there is no `Index`th item in the map, a call generates an `OutOfBoundsException` error. The first item has the index zero.

### 5.17.24 Values as Variant()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the values as an array

**Example:**

```
// Create a map
dim m as new IntegerToVariantHashMapMBS

m.Value(1)="Hello"
m.Value(2)="World"

for each v as Variant in m.Keys
MsgBox v
next
```

**Notes:** The order is stable and matches the order returned by Keys at least until the Map is modified. Use this method with For Each to loop through all the values.

### 5.17.25 Properties

#### 5.17.26 BinCount as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of bins the hash table uses.

**Example:**

```
dim v as new IntegerToVariantHashMapMBS

v.value(1)="Hello"
v.value(2)="World"

MsgBox str(v.BinCount)
```

**Notes:** This is a measure of the hash table size, independent of the number of items the Dictionary contains. (Read only property)

#### 5.17.27 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this map.

**Example:**

```
dim map as new IntegerToVariantHashMapMBS
```

```
map.Value(1)=3
```

```
map.Value(2)=4
```

```
MsgBox str(map.Count)
```

**Notes:** (Read only property)

### 5.17.28 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.17.29 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this map.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

### 5.17.30 value(key as Integer) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value associated with the given key.

**Notes:** If you query for a key which does not exist, a `KeyNotFoundException` is raised.

(Read and Write computed property)

## 5.18 class IntegerToVariantOrderedMapIteratorMBS

### 5.18.1 class IntegerToVariantOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the IntegerToVariantOrderedMap class.

**Example:**

```
// Create a map
dim m as new IntegerToVariantOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToVariantOrderedMapIteratorMBS = m.first
dim e as IntegerToVariantOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.18.2 Methods

### 5.18.3 isEqual(other as IntegerToVariantOrderedMapIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new IntegerToVariantOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToVariantOrderedMapIteratorMBS = m.first
dim e as IntegerToVariantOrderedMapIteratorMBS = m.last
```

```
// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.18.4 `isNotEqual`(other as `IntegerToVariantOrderedMapIteratorMBS`) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new IntegerToVariantOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToVariantOrderedMapIteratorMBS = m.first
dim e as IntegerToVariantOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.18.5 `Key` as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

#### 5.18.6 `MoveNext`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new IntegerToVariantOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToVariantOrderedMapIteratorMBS = m.first
dim e as IntegerToVariantOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.18.7 MovePrev

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the previous item.

### 5.18.8 Properties

### 5.18.9 Value as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value of the current item in the iterator.

**Notes:** (Read and Write computed property)

## 5.19 class IntegerToVariantOrderedMapMBS

### 5.19.1 class IntegerToVariantOrderedMapMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for an ordered map with integers as keys and variants as values.

**Example:**

```
dim s as new IntegerToVariantOrderedMapMBS
```

```
s.Value(1)="Hello"
```

```
s.Value(2)="World"
```

```
MsgBox str(s.Count) // shows 2
```

```
MsgBox s.Value(1)+" "+s.Value(2) // shows "Hello World"
```

**Notes:** You can choose whether you want to keep the map ordered using the OrderedMap class or whether you prefer a higher speed with the HashMap class.

### 5.19.2 Methods

#### 5.19.3 AddKeys(targetArray() as Integer)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to keys, but adds keys to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.19.4 AddValues(targetArray() as Variant)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to values, but adds values to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

**5.19.5 Clear**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

**5.19.6 Clone as IntegerToVariantOrderedMapMBS**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map.

**5.19.7 CloneDictionary as Dictionary**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map as a dictionary.

**5.19.8 Constructor**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

See also:

- 5.19.9 Constructor(dic as dictionary) 153
- 5.19.10 Constructor(other as IntegerToVariantOrderedMapMBS) 154

**5.19.9 Constructor(dic as dictionary)**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the dictionary.

See also:

- 5.19.8 Constructor 153
- 5.19.10 Constructor(other as IntegerToVariantOrderedMapMBS) 154

### 5.19.10 Constructor(other as IntegerToVariantOrderedMapMBS)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the existing map.

See also:

- 5.19.8 Constructor 153
- 5.19.9 Constructor(dic as dictionary) 153

### 5.19.11 CountKey(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this map.

### 5.19.12 find(key as Integer) as IntegerToVariantOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

### 5.19.13 first as IntegerToVariantOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the map.

**Example:**

```
// Create a map
dim m as new IntegerToVariantOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToVariantOrderedMapIteratorMBS = m.first
dim e as IntegerToVariantOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
```

```
i.MoveNext  
wend
```

#### 5.19.14 hasKey(key as Integer) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns True if Key is in the map and False if it is not. Returns a Boolean.

#### 5.19.15 Key(index as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

#### 5.19.16 Keys as Integer()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new IntegerToVariantOrderedMapMBS
```

```
m.Value(1)="Hello"  
m.Value(2)="World"
```

```
for each v as Integer in m.keys  
MsgBox str(v)  
next
```

**Notes:** The order is stable and matches the order returned by the Values method at least until the Dictionary is modified. Use this method with For Each to loop through all the keys.

#### 5.19.17 last as IntegerToVariantOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the map.

**Example:**

```
// Create a map
dim m as new IntegerToVariantOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as IntegerToVariantOrderedMapIteratorMBS = m.first
dim e as IntegerToVariantOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)+" ->" + i.Value
  i.MoveNext
wend
```

### 5.19.18 lookup(key as Integer, defaultvalue as Variant) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Looks up the passed value of Key.

**Example:**

```
dim map as new IntegerToVariantOrderedMapMBS

map.value(10)=1
map.value(100)=2
map.value(1000)=3

MsgBox str(map.lookup(5,0)) // shows 0 as value is missing
MsgBox str(map.lookup(10,0)) // shows 1 as value is found
```

**Notes:** If Key is found, it returns the corresponding value. If Key is not found, it returns the passed defaultValue.

### 5.19.19 LowerBound(key as Integer) as IntegerToVariantOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is not less than k.

### 5.19.20 Operator\_Convert as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the map as dictionary.

### 5.19.21 Remove(first as IntegerToVariantOrderedMapIteratorMBS, last as IntegerToVariantOrderedMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.19.22 Remove(key as Integer) as Integer 157
- 5.19.23 Remove(pos as IntegerToVariantOrderedMapIteratorMBS) 157

### 5.19.22 Remove(key as Integer) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.19.21 Remove(first as IntegerToVariantOrderedMapIteratorMBS, last as IntegerToVariantOrderedMapIteratorMBS) 157
- 5.19.23 Remove(pos as IntegerToVariantOrderedMapIteratorMBS) 157

### 5.19.23 Remove(pos as IntegerToVariantOrderedMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.19.21 Remove(first as IntegerToVariantOrderedMapIteratorMBS, last as IntegerToVariantOrderedMapIteratorMBS) 157
- 5.19.22 Remove(key as Integer) as Integer 157

### 5.19.24 UpperBound(key as Integer) as IntegerToVariantOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is greater than k.

### 5.19.25 ValueAtIndex(index as Integer) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value with the given index.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

### 5.19.26 Values as Variant()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the values as an array

**Example:**

```
// Create a map
dim m as new IntegerToVariantOrderedMapMBS

m.Value(1)="Hello"
m.Value(2)="World"

for each v as Variant in m.Keys
  MsgBox v
next
```

**Notes:** The order is stable and matches the order returned by Keys at least until the Map is modified. Use this method with For Each to loop through all the values.

### 5.19.27 Properties

### 5.19.28 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this map.

**Example:**

`dim map as new IntegerToVariantOrderedMapMBS`

`map.Value(1)=3`

`map.Value(2)=4`

`MsgBox str(map.Count)`

**Notes:** (Read only property)

### 5.19.29 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.19.30 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this map.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

### 5.19.31 value(key as Integer) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value associated with the given key.

**Notes:** If you query for a key which does not exist, a `KeyNotFoundException` is raised.

(Read and Write computed property)

## 5.20 class StackDoubleMBS

### 5.20.1 class StackDoubleMBS

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** A class for a stack of doubles.

**Example:**

```
dim s as new StackDoubleMBS
call s.Push 5
MsgBox str(s.Top)
```

### 5.20.2 Methods

### 5.20.3 Bottom as Double

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the bottom item of the stack and returns the value.

**Example:**

```
dim s as new StackDoubleMBS
call s.Push 5
MsgBox str(s.Bottom)
```

### 5.20.4 clear

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Clears the stack.

**Example:**

```
dim s as new StackDoubleMBS

call s.Push 5

s.Clear

if s.IsEmpty then
MsgBox "OK"
end if
```

### 5.20.5 close

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destructor.

**Notes:** There is no need to call this method except you want to free all resources of this object now without waiting for Xojo to do it for you.

### 5.20.6 Contains(o as Double) as boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if one of the items on the stack is equal to the given double value.

**Example:**

```
dim s as new StackDoubleMBS
```

```
call s.Push 5
```

```
if s.Contains(5) then
```

```
  MsgBox "found. OK"
```

```
else
```

```
  MsgBox "not found. Failed"
```

```
end if
```

### 5.20.7 Deep as Integer

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how much items are on the stack.

**Example:**

```
dim s as new StackDoubleMBS
```

```
MsgBox str(s.Deep)
```

```
call s.Push 5
```

```
MsgBox str(s.Deep)
```

### 5.20.8 Pop as Double

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes the top item of the stack and returns the value.

**Example:**

```
dim s as new StackDoubleMBS
call s.Push 5
MsgBox str(s.pop)
```

**Notes:** Returns 0 on any error.

### 5.20.9 PopBottom as Double

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes the bottom item of the stack and returns the value.

**Example:**

```
dim s as new StackDoubleMBS
call s.Push 5
MsgBox str(s.PopBottom)
```

### 5.20.10 Push(o as Double) as boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Pushes a value on the stack.

**Example:**

```
dim s as new StackDoubleMBS

call s.Push 5
```

**Notes:** Returns true if successful.  
May fail on low memory.

### 5.20.11 Top as Double

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of the top item on the stack.

**Example:**

```
dim s as new StackDoubleMBS
call s.Push 5
MsgBox str(s.Top)
```

**Notes:** Returns 0 on any error.

### 5.20.12 Properties

#### 5.20.13 IsEmpty as Boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if the stack is empty.

**Example:**

```
dim s as new StackDoubleMBS

if s.IsEmpty then
MsgBox "IsEmpty ok"
else
MsgBox "IsEmpty failed"
end if

call s.Push 5

if s.IsEmpty then
MsgBox "IsEmpty failed"
else
MsgBox "IsEmpty ok"
end if
```

**Notes:** (Read only property)

## 5.21 class StackIntegerMBS

### 5.21.1 class StackIntegerMBS

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** A class for a stack of integers.

**Example:**

```
dim s as new StackIntegerMBS
```

```
call s.Push 5
```

```
MsgBox str(S.Top)
```

### 5.21.2 Methods

### 5.21.3 Bottom as Integer

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the bottom item of the stack and returns the value.

**Example:**

```
dim s as new StackIntegerMBS
```

```
call s.Push 5
```

```
MsgBox str(s.Bottom)
```

### 5.21.4 clear

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Clears the stack.

**Example:**

```
dim s as new StackIntegerMBS
```

```
call s.Push 5
```

```
s.Clear
```

```
if s.IsEmpty then
MsgBox "OK"
end if
```

### 5.21.5 close

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destructor.

**Notes:** There is no need to call this method except you want to free all resources of this object now without waiting for Xojo to do it for you.

### 5.21.6 Contains(o as Integer) as boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if one of the items on the stack is equal to the given integer value.

**Example:**

```
dim s as new StackIntegerMBS

call s.Push 5

if s.Contains(5) then
MsgBox "found. OK"
else
MsgBox "not found. Failed"
end if
```

### 5.21.7 Deep as Integer

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how much items are on the stack.

**Example:**

```
dim s as new StackIntegerMBS

MsgBox str(s.Deep)

call s.Push 5
```

```
MsgBox str(s.Deep)
```

### 5.21.8 Pop as Integer

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes the top item of the stack and returns the value.

**Example:**

```
dim s as new StackIntegerMBS
```

```
call s.Push 5
```

```
MsgBox str(s.pop)
```

**Notes:** Returns 0 on any error.

### 5.21.9 PopBottom as Integer

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes the bottom item of the stack and returns the value.

**Example:**

```
dim s as new StackIntegerMBS
```

```
call s.Push 5
```

```
MsgBox str(s.PopBottom)
```

### 5.21.10 Push(o as Integer) as boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Pushes a value on the stack.

**Example:**

```
dim s as new StackIntegerMBS
```

```
call s.Push 5
```

**Notes:** Returns true if successful.  
May fail on low memory.

### 5.21.11 Top as Integer

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of the top item on the stack.

**Example:**

```
dim s as new StackIntegerMBS
```

```
call s.Push 5
```

```
MsgBox str(S.Top)
```

**Notes:** Returns 0 on any error.

### 5.21.12 Properties

### 5.21.13 IsEmpty as Boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if the stack is empty.

**Example:**

```
dim s as new StackIntegerMBS
```

```
if s.IsEmpty then  
  MsgBox "IsEmpty ok"  
else  
  MsgBox "IsEmpty failed"  
end if
```

```
call s.Push 5
```

```
if s.IsEmpty then  
  MsgBox "IsEmpty failed"  
else  
  MsgBox "IsEmpty ok"  
end if
```

**Notes:** (Read only property)

## 5.22 class StackObjectMBS

### 5.22.1 class StackObjectMBS

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** A class for a stack of objects.

**Example:**

```
dim s as new StackObjectMBS
call s.Push window1
MsgBox window(s.top).title
```

### 5.22.2 Methods

#### 5.22.3 Bottom as object

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the bottom item of the stack and returns the value.

**Example:**

```
dim s as new StackObjectMBS
call s.Push window1
MsgBox window(s.Bottom).title
```

#### 5.22.4 clear

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Clears the stack.

**Example:**

```
dim s as new StackObjectMBS

call s.Push window1

s.Clear

if s.IsEmpty then
MsgBox "OK"
end if
```

### 5.22.5 close

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destructor.

**Notes:** There is no need to call this method except you want to free all resources of this object now without waiting for Xojo to do it for you.

### 5.22.6 Contains(o as object) as boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if one of the object references on the stack is equal to the given object reference.

**Example:**

```
dim s as new StackObjectMBS

call s.Push window1

if s.Contains(window1) then
  MsgBox "found. OK"
else
  MsgBox "not found. Failed"
end if
```

### 5.22.7 Deep as Integer

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how much items are on the stack.

**Example:**

```
dim s as new StackObjectMBS

MsgBox str(s.Deep)

call s.Push window1

MsgBox str(s.Deep)
```

### 5.22.8 Pop as object

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes the top item of the stack and returns the value.

**Example:**

```
dim s as new StackObjectMBS
call s.Push window1
MsgBox window(s.pop).title
```

**Notes:** Returns nil on any error.

### 5.22.9 PopBottom as object

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes the bottom item of the stack and returns the value.

**Example:**

```
dim s as new StackObjectMBS
call s.Push window1
MsgBox window(s.PopBottom).title
```

### 5.22.10 Push(o as object) as boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Pushes a value on the stack.

**Example:**

```
dim s as new StackObjectMBS
call s.Push window1
```

**Notes:** Returns true if successful.

May fail on low memory.

Does not push nil.

### 5.22.11 Top as object

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of the top item on the stack.

**Example:**

```
dim s as new StackObjectMBS
call s.Push window1
MsgBox window(s.top).title
```

**Notes:** Returns nil on any error.

### 5.22.12 Properties

#### 5.22.13 IsEmpty as Boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if the stack is empty.

**Example:**

```
dim s as new StackObjectMBS

if s.IsEmpty then
MsgBox "IsEmpty ok"
else
MsgBox "IsEmpty failed"
end if

call s.Push window1

if s.IsEmpty then
MsgBox "IsEmpty failed"
else
MsgBox "IsEmpty ok"
end if
```

**Notes:** (Read only property)

## 5.23 class StackSingleMBS

### 5.23.1 class StackSingleMBS

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** A class for a stack of singles.

**Example:**

```
dim s as new StackSingleMBS
```

```
call s.Push 5
```

```
MsgBox str(S.Top)
```

### 5.23.2 Methods

### 5.23.3 Bottom as single

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the bottom item of the stack and returns the value.

**Example:**

```
dim s as new StackSingleMBS
```

```
call s.Push 5
```

```
MsgBox str(s.Bottom)
```

### 5.23.4 clear

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Clears the stack.

**Example:**

```
dim s as new StackSingleMBS
```

```
call s.Push 5
```

```
s.Clear
```

```
if s.IsEmpty then
  MsgBox "OK"
end if
```

### 5.23.5 close

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destructor.

**Notes:** There is no need to call this method except you want to free all resources of this object now without waiting for Xojo to do it for you.

### 5.23.6 Contains(o as single) as boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if one of the items on the stack is equal to the given single value.

**Example:**

```
dim s as new StackSingleMBS

call s.Push 5

if s.Contains(5) then
  MsgBox "found. OK"
else
  MsgBox "not found. Failed"
end if
```

### 5.23.7 Deep as Integer

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how much items are on the stack.

**Example:**

```
dim s as new StackSingleMBS

MsgBox str(s.Deep)

call s.Push 5
```

```
MsgBox str(s.Deep)
```

### 5.23.8 Pop as single

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes the top item of the stack and returns the value.

**Example:**

```
dim s as new StackSingleMBS
```

```
call s.Push 5
```

```
MsgBox str(s.Pop)
```

**Notes:** Returns 0 on any error.

### 5.23.9 PopBottom as single

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes the bottom item of the stack and returns the value.

**Example:**

```
dim s as new StackSingleMBS
```

```
call s.Push 5
```

```
MsgBox str(S.PopBottom)
```

### 5.23.10 Push(o as single) as boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Pushes a value on the stack.

**Example:**

```
dim s as new StackSingleMBS
```

```
call s.Push 5
```

**Notes:** Returns true if successful.  
May fail on low memory.

### 5.23.11 Top as single

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of the top item on the stack.

**Example:**

```
dim s as new StackSingleMBS
```

```
call s.Push 5
```

```
MsgBox str(S.Top)
```

**Notes:** Returns 0 on any error.

### 5.23.12 Properties

### 5.23.13 IsEmpty as Boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if the stack is empty.

**Example:**

```
dim s as new StackSingleMBS
```

```
if s.IsEmpty then
```

```
MsgBox "IsEmpty ok"
```

```
else
```

```
MsgBox "IsEmpty failed"
```

```
end if
```

```
call s.Push 5
```

```
if s.IsEmpty then
```

```
MsgBox "IsEmpty failed"
```

```
else
```

```
MsgBox "IsEmpty ok"
```

```
end if
```

**Notes:** (Read only property)

## 5.24 class StackStringMBS

### 5.24.1 class StackStringMBS

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** A class for a stack of strings.

**Example:**

```
dim s as new StackStringMBS
call s.Push "Hello"
MsgBox s.pop
```

### 5.24.2 Methods

#### 5.24.3 Bottom as string

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the bottom item of the stack and returns the value.

**Example:**

```
dim s as new StackStringMBS
call s.Push "Hello"
MsgBox s.bottom
```

#### 5.24.4 clear

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Clears the stack.

**Example:**

```
dim s as new StackStringMBS

call s.Push "abc"

s.Clear

if s.IsEmpty then
MsgBox "OK"
end if
```

### 5.24.5 close

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destructor.

**Notes:** There is no need to call this method except you want to free all resources of this object now without waiting for Xojo to do it for you.

### 5.24.6 Contains(o as string) as boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if one of the string references on the stack is equal to the given double reference.

**Example:**

```
dim s as new StackStringMBS
```

```
call s.Push "Hello"
```

```
if s.Contains("Hello") then
```

```
  MsgBox "found. OK"
```

```
else
```

```
  MsgBox "not found. Failed"
```

```
end if
```

### 5.24.7 Deep as Integer

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how much items are on the stack.

**Example:**

```
dim s as new StackStringMBS
```

```
MsgBox str(s.Deep)
```

```
call s.Push "Hello"
```

```
MsgBox str(s.Deep)
```

### 5.24.8 Pop as string

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes the top item of the stack and returns the value.

**Example:**

```
dim s as new StackStringMBS
call s.Push "Hello"
MsgBox s.pop
```

**Notes:** Returns "" on any error.

### 5.24.9 PopBottom as string

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes the bottom item of the stack and returns the value.

**Example:**

```
dim s as new StackStringMBS
call s.Push "Hello"
MsgBox s.PopBottom
```

### 5.24.10 Push(o as string) as boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Pushes a value on the stack.

**Example:**

```
dim s as new StackStringMBS
call s.Push "Hello"
```

**Notes:** Returns true if successful.  
May fail on low memory.

### 5.24.11 Top as string

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of the top item on the stack.

**Example:**

```
dim s as new StackStringMBS
call s.Push "Hello"
MsgBox s.Top
```

**Notes:** Returns "" on any error.

### 5.24.12 Properties

#### 5.24.13 IsEmpty as Boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if the stack is empty.

**Example:**

```
dim s as new StackStringMBS

if s.IsEmpty then
MsgBox "IsEmpty ok"
else
MsgBox "IsEmpty failed"
end if

call s.Push "Hello"

if s.IsEmpty then
MsgBox "IsEmpty failed"
else
MsgBox "IsEmpty ok"
end if
```

**Notes:** (Read only property)

## 5.25 class StackVariantMBS

### 5.25.1 class StackVariantMBS

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** A class for a stack of variants.

**Example:**

```
dim s as new StackVariantMBS
```

```
call s.Push 5
```

```
MsgBox s.PopBottom
```

### 5.25.2 Methods

### 5.25.3 Bottom as Variant

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the bottom item of the stack and returns the value.

**Example:**

```
dim s as new StackVariantMBS
```

```
call s.Push 5
```

```
MsgBox s.Bottom
```

### 5.25.4 clear

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Clears the stack.

**Example:**

```
dim s as new StackVariantMBS
```

```
call s.Push 5
```

```
s.Clear
```

```
if s.IsEmpty then
MsgBox "OK"
end if
```

### 5.25.5 close

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The destructor.

**Notes:** There is no need to call this method except you want to free all resources of this object now without waiting for Xojo to do it for you.

### 5.25.6 Contains(o as Variant) as boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if one of the variant references on the stack is equal to the given variant reference.

**Example:**

```
dim s as new StackObjectMBS

call s.Push window1

if s.Contains(window1) then
MsgBox "found. OK"
else
MsgBox "not found. Failed"
end if
```

### 5.25.7 Deep as Integer

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how much items are on the stack.

**Example:**

```
dim s as new StackVariantMBS

MsgBox str(s.Deep)

call s.Push window1
```

MsgBox str(s.Deep)

### 5.25.8 Pop as Variant

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes the top item of the stack and returns the value.

**Example:**

```
dim s as new StackVariantMBS
```

```
call s.Push 5
```

```
MsgBox s.pop
```

**Notes:** Returns nil on any error.

### 5.25.9 PopBottom as Variant

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes the bottom item of the stack and returns the value.

**Example:**

```
dim s as new StackVariantMBS
```

```
call s.Push 5
```

```
MsgBox s.PopBottom
```

### 5.25.10 Push(o as Variant) as boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Pushes a value on the stack.

**Example:**

```
dim s as new StackVariantMBS
```

```
call s.Push 5
```

**Notes:** Returns true if successful.  
May fail on low memory.

### 5.25.11 Top as Variant

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of the top item on the stack.

**Example:**

```
dim s as new StackVariantMBS
```

```
call s.Push 5
```

```
MsgBox s.top
```

**Notes:** Returns nil on any error.

### 5.25.12 Properties

### 5.25.13 IsEmpty as Boolean

Plugin Version: 3.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if the stack is empty.

**Example:**

```
dim s as new StackVariantMBS
```

```
if s.IsEmpty then  
  MsgBox "IsEmpty ok"  
else  
  MsgBox "IsEmpty failed"  
end if
```

```
call s.Push 5
```

```
if s.IsEmpty then  
  MsgBox "IsEmpty failed"  
else  
  MsgBox "IsEmpty ok"  
end if
```

**Notes:** (Read only property)

## 5.26 class StringHashSetIteratorMBS

### 5.26.1 class StringHashSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the StringHashSet class.

**Example:**

```
// Create a map
dim m as new StringHashSetMBS

m.insert("1")
m.insert("2")
m.insert("3")

// get iterators pointing to first and after last element
dim i as StringHashSetIteratorMBS = m.first
dim e as StringHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox i.Key
i.MoveNext
wend
```

### 5.26.2 Methods

### 5.26.3 isEqual(other as StringHashSetIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new StringHashSetMBS

m.insert("1")
m.insert("2")
m.insert("3")

// get iterators pointing to first and after last element
dim i as StringHashSetIteratorMBS = m.first
dim e as StringHashSetIteratorMBS = m.last
```

```
// Show all keys and values
while i.isEqual(e) = false
MsgBox i.Key
i.MoveNext
wend
```

#### 5.26.4 `isNotEqual`(other as `StringHashSetIteratorMBS`) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new StringHashSetMBS

m.insert("1")
m.insert("2")
m.insert("3")

// get iterators pointing to first and after last element
dim i as StringHashSetIteratorMBS = m.first
dim e as StringHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox i.Key
i.MoveNext
wend
```

#### 5.26.5 `Key` as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

#### 5.26.6 `MoveNext`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new StringHashSetMBS

m.insert("1")
m.insert("2")
m.insert("3")

// get iterators pointing to first and after last element
dim i as StringHashSetIteratorMBS = m.first
dim e as StringHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox i.Key
  i.MoveNext
wend
```

## 5.27 class HashSetMBS

### 5.27.1 class HashSetMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for a hash set with strings.

**Example:**

```
dim s as new HashSetMBS
```

```
s.insert "test"
```

```
s.insert "Test"
```

```
MsgBox str(s.Count) // shows 2
```

**Notes:** All text comparison is done either case sensitive or insensitive. Defined in constructor.

You can choose whether you want to keep the set ordered using the OrderedSet class or whether you prefer a higher speed with the HashSet class.

### 5.27.2 Methods

#### 5.27.3 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

#### 5.27.4 Constructor(CaseSensitive as Boolean = true)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

**Notes:** If CaseSensitive is true, the comparison of texts or strings is case sensitive.

See also:

- 5.27.5 Constructor(Keys() as string)

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#### 5.27.5 Constructor(Keys() as string)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new set from the values in the array.

**Example:**

```
dim s() as string = array("Hello", "World", "test")
```

```
dim set as new StringHashSetMBS(s)
```

```
MsgBox str(set.Count)+" entries: "+Join(set.keys,", ")
```

**Notes:** If the array has duplicates, the later elements overwrite the earlier keys.  
See also:

- 5.27.4 Constructor(CaseSensitive as Boolean = true)

### 5.27.6 CountKey(key as string) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this set.

### 5.27.7 find(key as string) as StringHashSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

### 5.27.8 first as StringHashSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the set.

**Example:**

```
// Create a map
```

```
dim m as new StringHashSetMBS
```

```
m.insert("1")
```

```
m.insert("2")
```

```
m.insert("3")
```

```
// get iterators pointing to first and after last element
```

```
dim i as StringHashSetIteratorMBS = m.first
```

```
dim e as StringHashSetIteratorMBS = m.last
```

```
// Show all keys and values
while i.isNotEqual(e)
  MsgBox i.Key
  i.MoveNext
wend
```

### 5.27.9 insert(key as string)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a value to the set.

### 5.27.10 Key(index as Integer) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an `OutOfBoundsException` error. The first item has the index zero.

### 5.27.11 Keys as string()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new StringHashSetMBS
```

```
m.insert("1")
m.insert("2")
```

```
for each v as string in m.Keys
  MsgBox v
next
```

**Notes:** The order is stable and matches the order returned by the `Values` method at least until the Dictionary is modified. Use this method with `For Each` to loop through all the keys.

### 5.27.12 last as StringHashSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the set.

**Example:**

```
// Create a map
dim m as new StringHashSetMBS

m.insert("1")
m.insert("2")
m.insert("3")

// get iterators pointing to first and after last element
dim i as StringHashSetIteratorMBS = m.first
dim e as StringHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox i.Key
  i.MoveNext
wend
```

### 5.27.13 lookup(key as string) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks whether an element with the given key exists in this set.

**Example:**

```
dim set as new StringHashSetMBS

set.insert "Hello"
set.insert "World"

MsgBox str(set.lookup("missed")) // shows false as value is missing
MsgBox str(set.lookup("Hello")) // shows true as value is found
```

**Notes:** Returns true if yes and false if no.

### 5.27.14 Remove(first as StringHashSetIteratorMBS, last as StringHashSetIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.27.15 Remove(key as string) as Integer 194
- 5.27.16 Remove(pos as StringHashSetIteratorMBS) 194

### 5.27.15 Remove(key as string) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.27.14 Remove(first as StringHashSetIteratorMBS, last as StringHashSetIteratorMBS) 194
- 5.27.16 Remove(pos as StringHashSetIteratorMBS) 194

### 5.27.16 Remove(pos as StringHashSetIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.27.14 Remove(first as StringHashSetIteratorMBS, last as StringHashSetIteratorMBS) 194
- 5.27.15 Remove(key as string) as Integer 194

### 5.27.17 Properties

### 5.27.18 BinCount as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of bins the hash table uses.

**Example:**

```
dim v as new StringHashSetMBS
```

```
v.insert "1"
v.insert "Hello"
```

```
MsgBox str(v.BinCount)
```

**Notes:** This is a measure of the hash table size, independent of the number of items the Dictionary contains.  
(Read only property)

### 5.27.19 CaseSensitive as Boolean

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether text/string comparison is case sensitive.

**Example:**

```
dim s1 as new StringHashSetMBS(true)
dim s2 as new StringHashSetMBS(false)
```

```
s1.insert "a"
s1.insert "A"
```

```
s2.insert "a"
s2.insert "A"
```

```
MsgBox str(s1.Count)+" "+str(s2.Count)
```

**Notes:** (Read only property)

### 5.27.20 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this set.

**Example:**

```
dim set as new StringHashSetMBS
```

```
set.insert "a"
set.insert "b"
```

```
MsgBox str(set.Count)
```

**Notes:** (Read only property)

### 5.27.21 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.27.22 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this set.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

## 5.28 class StringOrderedSetIteratorMBS

### 5.28.1 class StringOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the StringOrderedSet class.

**Example:**

```
// Create a map
dim m as new StringOrderedSetMBS

m.insert("1")
m.insert("2")
m.insert("3")

// get iterators pointing to first and after last element
dim i as StringOrderedSetIteratorMBS = m.first
dim e as StringOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox i.Key
i.MoveNext
wend
```

### 5.28.2 Methods

### 5.28.3 isEqual(other as StringOrderedSetIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new StringOrderedSetMBS

m.insert("1")
m.insert("2")
m.insert("3")

// get iterators pointing to first and after last element
dim i as StringOrderedSetIteratorMBS = m.first
dim e as StringOrderedSetIteratorMBS = m.last
```

```
// Show all keys and values
while i.isEqual(e) = false
MsgBox i.Key
i.MoveNext
wend
```

#### 5.28.4 `isNotEqual`(other as `StringOrderedSetIteratorMBS`) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new StringOrderedSetMBS

m.insert("1")
m.insert("2")
m.insert("3")

// get iterators pointing to first and after last element
dim i as StringOrderedSetIteratorMBS = m.first
dim e as StringOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox i.Key
i.MoveNext
wend
```

#### 5.28.5 `Key` as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

#### 5.28.6 `MoveNext`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new StringOrderedSetMBS

m.insert("1")
m.insert("2")
m.insert("3")

// get iterators pointing to first and after last element
dim i as StringOrderedSetIteratorMBS = m.first
dim e as StringOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox i.Key
  i.MoveNext
wend
```

### 5.28.7 MovePrev

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the previous item.

## 5.29 class StringOrderedSetMBS

### 5.29.1 class StringOrderedSetMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for an ordered set of strings.

**Example:**

```
dim s as new StringOrderedSetMBS
```

```
s.insert "test"
```

```
s.insert "Test"
```

```
MsgBox str(s.Count) // shows 2
```

**Notes:** All text comparison is done either case sensitive or insensitive. Defined in constructor.

You can choose whether you want to keep the set ordered using the OrderedSet class or whether you prefer a higher speed with the HashSet class.

### 5.29.2 Methods

#### 5.29.3 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

#### 5.29.4 Constructor(CaseSensitive as Boolean = true)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

**Notes:** If CaseSensitive is true, the comparison of texts or strings is case sensitive.

See also:

- 5.29.5 Constructor(Keys() as string)

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#### 5.29.5 Constructor(Keys() as string)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new set from the values in the array.

**Example:**

```
dim s() as string = array("Hello", "World", "test")
```

```
dim set as new StringOrderedSetMBS(s)
```

```
MsgBox str(set.Count)+" entries: "+Join(set.keys,", ")
```

**Notes:** If the array has duplicates, the later elements overwrite the earlier keys.  
See also:

- 5.29.4 Constructor(CaseSensitive as Boolean = true)

### 5.29.6 CountKey(key as string) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this set.

### 5.29.7 find(key as string) as StringOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

### 5.29.8 first as StringOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the set.

**Example:**

```
// Create a map
```

```
dim m as new StringOrderedSetMBS
```

```
m.insert("1")
```

```
m.insert("2")
```

```
m.insert("3")
```

```
// get iterators pointing to first and after last element
```

```
dim i as StringOrderedSetIteratorMBS = m.first
```

```
dim e as StringOrderedSetIteratorMBS = m.last
```

```
// Show all keys and values
while i.isNotEqual(e)
  MsgBox i.Key
  i.MoveNext
wend
```

### 5.29.9 insert(key as string)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a value to the set.

### 5.29.10 Key(index as Integer) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an `OutOfBoundsException` error. The first item has the index zero.

### 5.29.11 Keys as string()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new StringOrderedSetMBS
```

```
m.insert("1")
m.insert("2")
```

```
for each v as string in m.Keys
  MsgBox v
next
```

**Notes:** The order is stable and matches the order returned by the `Values` method at least until the Dictionary is modified. Use this method with `For Each` to loop through all the keys.

### 5.29.12 last as StringOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the set.

**Example:**

```
// Create a map
dim m as new StringOrderedSetMBS

m.insert("1")
m.insert("2")
m.insert("3")

// get iterators pointing to first and after last element
dim i as StringOrderedSetIteratorMBS = m.first
dim e as StringOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox i.Key
  i.MoveNext
wend
```

### 5.29.13 lookup(key as string) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks whether an element with the given key exists in this set.

**Example:**

```
dim set as new StringOrderedSetMBS

set.insert "Hello"
set.insert "World"

MsgBox str(set.lookup("missed")) // shows false as value is missing
MsgBox str(set.lookup("Hello")) // shows true as value is found
```

**Notes:** Returns true if yes and false if no.

### 5.29.14 LowerBound(key as string) as StringOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is not less than k.

### 5.29.15 Remove(first as StringOrderedSetIteratorMBS, last as StringOrderedSetIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.29.16 Remove(key as string) as Integer 204
- 5.29.17 Remove(pos as StringOrderedSetIteratorMBS) 204

### 5.29.16 Remove(key as string) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.29.15 Remove(first as StringOrderedSetIteratorMBS, last as StringOrderedSetIteratorMBS) 204
- 5.29.17 Remove(pos as StringOrderedSetIteratorMBS) 204

### 5.29.17 Remove(pos as StringOrderedSetIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.29.15 Remove(first as StringOrderedSetIteratorMBS, last as StringOrderedSetIteratorMBS) 204
- 5.29.16 Remove(key as string) as Integer 204

### 5.29.18 UpperBound(key as string) as StringOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is greater than k.

### 5.29.19 Properties

### 5.29.20 CaseSensitive as Boolean

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether text/string comparison is case sensitive.

**Example:**

```
dim s1 as new StringOrderedSetMBS(true)
dim s2 as new StringOrderedSetMBS(false)
```

```
s1.insert "a"
s1.insert "A"
```

```
s2.insert "a"
s2.insert "A"
```

```
MsgBox str(s1.Count)+" "+str(s2.Count)
```

**Notes:** (Read only property)

### 5.29.21 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this set.

**Example:**

```
dim set as new StringOrderedSetMBS
```

```
set.insert "a"
set.insert "b"
```

```
MsgBox str(set.Count)
```

**Notes:** (Read only property)

### 5.29.22 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.29.23 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this set.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

## 5.30 class StringToStringHashMapIteratorMBS

### 5.30.1 class StringToStringHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the StringToStringHashMap class.

**Example:**

```
// Create a map
dim m as new StringToStringHashMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToStringHashMapIteratorMBS = m.first
dim e as StringToStringHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)+" ->" + i.Value
  i.MoveNext
wend
```

#### Blog Entries

- [MonkeyBread Software Releases the MBS Plugins 8.2](#)

### 5.30.2 Methods

### 5.30.3 isEqual(other as StringToStringHashMapIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new StringToStringHashMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"
```

```
// get iterators pointing to first and after last element
dim i as StringToStringHashMapIteratorMBS = m.first
dim e as StringToStringHashMapIteratorMBS = m.last

// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.30.4 isNotEqual(other as StringToStringHashMapIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new StringToStringHashMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToStringHashMapIteratorMBS = m.first
dim e as StringToStringHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.30.5 Key as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

### 5.30.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new StringToStringHashMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToStringHashMapIteratorMBS = m.first
dim e as StringToStringHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.30.7 Properties

### 5.30.8 Value as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value of the current item in the iterator.

**Notes:** (Read and Write computed property)

## 5.31 class StringToStringHashMapMBS

### 5.31.1 class StringToStringHashMapMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for a hash map with strings as keys and values.

**Example:**

```
dim s as new StringToStringHashMapMBS
```

```
s.Value("Test")="Hello"
```

```
s.Value("test")="World"
```

```
MsgBox str(s.Count) // shows 2
```

```
s.Value(ConvertEncoding("test",encodings.UTF16))="Just a"
```

```
s.Value(ConvertEncoding("Test",encodings.UTF16))="test"
```

```
MsgBox str(s.Count) // shows 4
```

**Notes:** All text comparison is done either case sensitive or insensitive. Defined in constructor.

You can choose whether you want to keep the map ordered using the OrderedMap class or whether you prefer a higher speed with the HashMap class.

**Blog Entries**

- [MonkeyBread Software Releases the MBS Plugins 8.2](#)

### 5.31.2 Methods

#### 5.31.3 AddKeys(targetArray() as string)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to keys, but adds keys to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.31.4 AddValues(targetArray() as string)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to values, but adds values to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys

function returns always nil.

### 5.31.5 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

### 5.31.6 Clone as ToStringHashMapMBS

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map.

### 5.31.7 CloneDictionary as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map as a dictionary.

**Example:**

```
dim d as new Dictionary
d.Value("Hello") = "World"

// convert o map
dim m as new ToStringHashMapMBS(d)
MsgBox str(m.Count)

// convert back
dim o as Dictionary = m.CloneDictionary
MsgBox o.Value("Hello")
```

### 5.31.8 Constructor(CaseSensitive as Boolean = true)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

**Notes:** If CaseSensitive is true, the comparison of texts or strings is case sensitive.

See also:

- 5.31.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true)

- 5.31.10 Constructor(other as StringToStringHashMapMBS)

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### 5.31.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the dictionary.

**Example:**

```
dim d as new Dictionary
d.Value("Hello") = "World"

// convert o map
dim m as new StringToStringHashMapMBS(d)
MsgBox str(m.Count)

// convert back
dim o as Dictionary = m.CloneDictionary
MsgBox o.Value("Hello")
```

See also:

- 5.31.8 Constructor(CaseSensitive as Boolean = true) 211
- 5.31.10 Constructor(other as StringToStringHashMapMBS) 212

### 5.31.10 Constructor(other as StringToStringHashMapMBS)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the existing map.

**Example:**

```
dim d as new Dictionary
d.Value("Hello") = "World"

// convert o map
dim m as new StringToStringHashMapMBS(d)
MsgBox str(m.Count)

// convert back
dim o as StringToStringHashMapMBS = m.Clone
MsgBox o.Value("Hello")
```

See also:

5.31. CLASS STRINGTOSTRINGHASHMAPMBS	213
• 5.31.8 Constructor(CaseSensitive as Boolean = true)	211
• 5.31.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true)	212

### 5.31.11 CountKey(key as string) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this map.

### 5.31.12 find(key as string) as StringToStringHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

### 5.31.13 first as StringToStringHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the map.

**Example:**

```
// Create a map
dim m as new StringToStringHashMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToStringHashMapIteratorMBS = m.first
dim e as StringToStringHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

**5.31.14** `hasKey(key as string)` as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns True if Key is in the map and False if it is not. Returns a Boolean.

**5.31.15** `Key(index as Integer)` as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an `OutOfBoundsException` error. The first item has the index zero.

**5.31.16** `Keys` as string()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new StringToStringHashMapMBS
```

```
m.Value("1")="Hello"
m.Value("2")="World"
```

```
for each v as string in m.Keys
MsgBox str(v)
next
```

**Notes:** The order is stable and matches the order returned by the `Values` method at least until the Dictionary is modified. Use this method with `For Each` to loop through all the keys.

**5.31.17** `last` as `StringToStringHashMapIteratorMBS`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the map.

**Example:**

```
// Create a map
dim m as new StringToStringHashMapMBS
```

```

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToStringHashMapIteratorMBS = m.first
dim e as StringToStringHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)+" ->" +i.Value
  i.MoveNext
wend

```

### 5.31.18 lookup(key as string, defaultvalue as string) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Looks up the passed value of Key.

**Example:**

```

dim map as new StringToStringHashMapMBS

map.value("a")="Hello"
map.value("b")="World"
map.value("c")="!"

MsgBox str(map.lookup("d","?")) // shows "?" as value is missing
MsgBox str(map.lookup("a","?")) // shows "Hello" as value is found

```

**Notes:** If Key is found, it returns the corresponding value. If Key is not found, it returns the passed defaultValue.

### 5.31.19 Operator\_Convert as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the map as dictionary.

**Example:**

```

dim d as new Dictionary
d.Value("Hello") = "World"

```

```
// convert o map
dim m as StringToStringHashMapMBS = d
MsgBox str(m.Count)

// convert back
dim o as Dictionary = m
MsgBox o.Value("Hello")
```

### 5.31.20 Remove(first as StringToStringHashMapIteratorMBS, last as StringToStringHashMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.31.21 Remove(key as string) as Integer 216
- 5.31.22 Remove(pos as StringToStringHashMapIteratorMBS) 216

### 5.31.21 Remove(key as string) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.31.20 Remove(first as StringToStringHashMapIteratorMBS, last as StringToStringHashMapIteratorMBS) 216
- 5.31.22 Remove(pos as StringToStringHashMapIteratorMBS) 216

### 5.31.22 Remove(pos as StringToStringHashMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.31.20 Remove(first as StringToStringHashMapIteratorMBS, last as StringToStringHashMapIteratorMBS) 216
- 5.31.21 Remove(key as string) as Integer 216

### 5.31.23 ValueAtIndex(index as Integer) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value with the given index.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

### 5.31.24 Values as string()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the values as an array

**Example:**

```
dim m as new StringToStringHashMapMBS
```

```
m.Value("1")="Hello"  
m.Value("2")="World"
```

```
for each v as string in m.Values  
MsgBox str(v)  
next
```

**Notes:** The order is stable and matches the order returned by Keys at least until the Map is modified. Use this method with For Each to loop through all the values.

### 5.31.25 Properties

### 5.31.26 BinCount as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of bins the hash table uses.

**Example:**

```
dim v as new StringToStringHashMapMBS
```

```
v.value("1")="Hello"  
v.value("2")="World"
```

```
MsgBox str(v.BinCount)
```

**Notes:** This is a measure of the hash table size, independent of the number of items the Dictionary contains.  
(Read only property)

### 5.31.27 CaseSensitive as Boolean

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether text/string comparison is case sensitive.

**Example:**

```
dim s1 as new StringToStringHashMapMBS(true)
dim s2 as new StringToStringHashMapMBS(false)
```

```
s1.value("a") = "1"
s1.value("A") = "2"
```

```
s2.value("a") = "1"
s2.value("A") = "2"
```

```
MsgBox str(s1.Count)+" "+str(s2.Count)
```

**Notes:** (Read only property)

### 5.31.28 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this map.

**Example:**

```
dim map as new StringToStringHashMapMBS
```

```
map.Value("?")="?"
map.Value("Hello")="World"
```

```
MsgBox str(map.Count)
```

**Notes:** (Read only property)

### 5.31.29 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.31.30 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this map.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

### 5.31.31 value(key as string) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value associated with the given key.

**Notes:** If you query for a key which does not exist, a KeyNotFoundException is raised.

(Read and Write computed property)

## 5.32 class StringToStringOrderedMapIteratorMBS

### 5.32.1 class StringToStringOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the StringToStringOrderedMap class.

**Example:**

```
// Create a map
dim m as new StringToStringOrderedMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToStringOrderedMapIteratorMBS = m.first
dim e as StringToStringOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### Blog Entries

- [MonkeyBread Software Releases the MBS Plugins 8.2](#)

### 5.32.2 Methods

### 5.32.3 isEqual(other as StringToStringOrderedMapIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new StringToStringOrderedMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"
```

```
// get iterators pointing to first and after last element
dim i as StringToStringOrderedMapIteratorMBS = m.first
dim e as StringToStringOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.32.4 isNotEqual(other as StringToStringOrderedMapIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new StringToStringOrderedMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToStringOrderedMapIteratorMBS = m.first
dim e as StringToStringOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e) = false
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.32.5 Key as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

### 5.32.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new StringToStringOrderedMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToStringOrderedMapIteratorMBS = m.first
dim e as StringToStringOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)+" ->" + i.Value
  i.MoveNext
wend
```

### 5.32.7 MovePrev

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the previous item.

### 5.32.8 Properties

### 5.32.9 Value as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value of the current item in the iterator.

**Notes:** (Read and Write computed property)

## 5.33 class StringToStringOrderedMapMBS

### 5.33.1 class StringToStringOrderedMapMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for an ordered map with strings for keys and values.

**Example:**

```
dim s as new StringToStringOrderedMapMBS
```

```
s.Value("Test")="Hello"
```

```
s.Value("test")="World"
```

```
MsgBox str(s.Count) // shows 2
```

```
s.Value(ConvertEncoding("test",encodings.UTF16))="Just a"
```

```
s.Value(ConvertEncoding("Test",encodings.UTF16))="test"
```

```
MsgBox str(s.Count) // shows 4
```

**Notes:** All text comparison is done either case sensitive or insensitive. Defined in constructor.

You can choose whether you want to keep the map ordered using the OrderedMap class or whether you prefer a higher speed with the HashMap class.

**Blog Entries**

- [MonkeyBread Software Releases the MBS Plugins 8.2](#)

### 5.33.2 Methods

#### 5.33.3 AddKeys(targetArray() as string)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to keys, but adds keys to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.33.4 AddValues(targetArray() as string)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to values, but adds values to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys

function returns always nil.

### 5.33.5 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

### 5.33.6 Clone as StringToStringOrderedMapMBS

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map.

### 5.33.7 CloneDictionary as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map as a dictionary.

### 5.33.8 Constructor(CaseSensitive as Boolean = true)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

**Notes:** If CaseSensitive is true, the comparison of texts or strings is case sensitive.

See also:

- 5.33.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true) 224
- 5.33.10 Constructor(other as StringToStringOrderedMapMBS) 225

### 5.33.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the dictionary.

See also:

- 5.33.8 Constructor(CaseSensitive as Boolean = true) 224
- 5.33.10 Constructor(other as StringToStringOrderedMapMBS) 225

**5.33.10 Constructor(other as StringToStringOrderedMapMBS)**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the existing map.

See also:

- 5.33.8 Constructor(CaseSensitive as Boolean = true) 224
- 5.33.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true) 224

**5.33.11 CountKey(key as string) as Integer**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this map.

**5.33.12 find(key as string) as StringToStringOrderedMapIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

**5.33.13 first as StringToStringOrderedMapIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the map.

**Example:**

```
// Create a map
dim m as new StringToStringOrderedMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToStringOrderedMapIteratorMBS = m.first
dim e as StringToStringOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
```

```
i.MoveNext  
wend
```

#### 5.33.14 `hasKey(key as string)` as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns True if Key is in the map and False if it is not. Returns a Boolean.

#### 5.33.15 `Key(index as Integer)` as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an `OutOfBoundsException` error. The first item has the index zero.

#### 5.33.16 `Keys` as `string()`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new StringToStringOrderedMapMBS
```

```
m.Value("1")="Hello"  
m.Value("2")="World"
```

```
for each v as string in m.Keys  
MsgBox str(v)  
next
```

**Notes:** The order is stable and matches the order returned by the `Values` method at least until the Dictionary is modified. Use this method with `For Each` to loop through all the keys.

#### 5.33.17 `last` as `StringToStringOrderedMapIteratorMBS`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the map.

**Example:**

```
// Create a map
dim m as new StringToStringOrderedMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToStringOrderedMapIteratorMBS = m.first
dim e as StringToStringOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.33.18 lookup(key as string, defaultvalue as string) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Looks up the passed value of Key.

**Example:**

```
dim map as new StringToStringOrderedMapMBS

map.value("a")="Hello"
map.value("b")="World"
map.value("c")="!"

MsgBox str(map.lookup("d","?")) // shows "?" as value is missing
MsgBox str(map.lookup("a","?")) // shows "Hello" as value is found
```

**Notes:** If Key is found, it returns the corresponding value. If Key is not found, it returns the passed defaultValue.

### 5.33.19 LowerBound(key as string) as StringToStringOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is not less than k.

### 5.33.20 Operator\_Convert as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the map as dictionary.

### 5.33.21 Remove(first as StringToStringOrderedMapIteratorMBS, last as StringToStringOrderedMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.33.22 Remove(key as string) as Integer 228
- 5.33.23 Remove(pos as StringToStringOrderedMapIteratorMBS) 228

### 5.33.22 Remove(key as string) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.33.21 Remove(first as StringToStringOrderedMapIteratorMBS, last as StringToStringOrderedMapIteratorMBS) 228
- 5.33.23 Remove(pos as StringToStringOrderedMapIteratorMBS) 228

### 5.33.23 Remove(pos as StringToStringOrderedMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.33.21 Remove(first as StringToStringOrderedMapIteratorMBS, last as StringToStringOrderedMapIteratorMBS) 228
- 5.33.22 Remove(key as string) as Integer 228

### 5.33.24 UpperBound(key as string) as StringToStringOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is greater than k.

### 5.33.25 ValueAtIndex(index as Integer) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value with the given index.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

### 5.33.26 Values as string()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the values as an array

**Example:**

```
dim m as new StringToStringOrderedMapMBS
```

```
m.Value("1")="Hello"  
m.Value("2")="World"
```

```
for each v as string in m.Values  
MsgBox str(v)  
next
```

**Notes:** The order is stable and matches the order returned by Keys at least until the Map is modified. Use this method with For Each to loop through all the values.

### 5.33.27 Properties

### 5.33.28 CaseSensitive as Boolean

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether text/string comparison is case sensitive.

**Example:**

```
dim s1 as new StringToStringOrderedMapMBS(true)
dim s2 as new StringToStringOrderedMapMBS(false)
```

```
s1.value("a") = "1"
s1.value("A") = "2"
```

```
s2.value("a") = "1"
s2.value("A") = "2"
```

```
MsgBox str(s1.Count)+" "+str(s2.Count)
```

**Notes:** (Read only property)

### 5.33.29 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this map.

**Example:**

```
dim map as new StringToStringOrderedMapMBS
```

```
map.Value("a")="1"
map.Value("Hello")="World"
```

```
MsgBox str(map.Count)
```

**Notes:** (Read only property)

### 5.33.30 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.33.31 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this map.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

### 5.33.32 value(key as string) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value associated with the given key.

**Notes:** If you query for a key which does not exist, a KeyNotFoundException is raised.

(Read and Write computed property)

## 5.34 class StringToVariantHashMapIteratorMBS

### 5.34.1 class StringToVariantHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the StringToVariantHashMap class.

**Example:**

```
// Create a map
dim m as new StringToVariantHashMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToVariantHashMapIteratorMBS = m.first
dim e as StringToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)+" ->" + i.Value
  i.MoveNext
wend
```

#### Blog Entries

- [MonkeyBread Software Releases the MBS Plugins 8.2](#)

### 5.34.2 Methods

#### 5.34.3 isEqual(other as StringToVariantHashMapIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new StringToVariantHashMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"
```

```
// get iterators pointing to first and after last element
dim i as StringToVariantHashMapIteratorMBS = m.first
dim e as StringToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.34.4 isNotEqual(other as StringToVariantHashMapIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new StringToVariantHashMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToVariantHashMapIteratorMBS = m.first
dim e as StringToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.34.5 Key as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

### 5.34.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new StringToVariantHashMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToVariantHashMapIteratorMBS = m.first
dim e as StringToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.34.7 Properties

### 5.34.8 Value as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value of the current item in the iterator.

**Notes:** (Read and Write computed property)

## 5.35 class StringToVariantHashMapMBS

### 5.35.1 class StringToVariantHashMapMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for a hash map with strings as keys and variants as values.

**Example:**

```
dim s as new StringToVariantHashMapMBS
```

```
s.Value("Test")="Hello"
```

```
s.Value("test")="World"
```

```
MsgBox str(s.Count) // shows 2
```

```
s.Value(ConvertEncoding("test",encodings.UTF16))="Just a"
```

```
s.Value(ConvertEncoding("Test",encodings.UTF16))="test"
```

```
MsgBox str(s.Count) // shows 4
```

**Notes:** All text comparison is done either case sensitive or insensitive. Defined in constructor.

You can choose whether you want to keep the map ordered using the OrderedMap class or whether you prefer a higher speed with the HashMap class.

**Blog Entries**

- [MBS Real Studio Plugins, version 12.5pr10](#)
- [MonkeyBread Software Releases the MBS Plugins 8.2](#)

### 5.35.2 Methods

#### 5.35.3 AddKeys(targetArray() as string)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to keys, but adds keys to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.35.4 AddValues(targetArray() as Variant)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to values, but adds values to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

### 5.35.5 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

### 5.35.6 Clone as StringToVariantHashMapMBS

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map.

### 5.35.7 CloneDictionary as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map as a dictionary.

### 5.35.8 Constructor(CaseSensitive as Boolean = true)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

**Notes:** If CaseSensitive is true, the comparison of texts or strings is case sensitive.

See also:

- 5.35.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true) 236
- 5.35.10 Constructor(other as StringToVariantHashMapMBS) 237

### 5.35.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the dictionary.

See also:

5.35. CLASS STRINGTOVARIANTHASHMAPMBS	237
• 5.35.8 Constructor(CaseSensitive as Boolean = true)	236
• 5.35.10 Constructor(other as StringToVariantHashMapMBS)	237

### 5.35.10 Constructor(other as StringToVariantHashMapMBS)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the existing map.

See also:

- 5.35.8 Constructor(CaseSensitive as Boolean = true) 236
- 5.35.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true) 236

### 5.35.11 CountKey(key as string) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this map.

### 5.35.12 find(key as string) as StringToVariantHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

### 5.35.13 first as StringToVariantHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the map.

**Example:**

```
// Create a map
dim m as new StringToVariantHashMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToVariantHashMapIteratorMBS = m.first
```

```

dim e as StringToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend

```

### 5.35.14 hasKey(key as string) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns True if Key is in the map and False if it is not. Returns a Boolean.

### 5.35.15 Key(index as Integer) as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Example:**

```

dim v as new StringToVariantHashMapMBS
v.Value("Hello") = "World"
MsgBox v.Key(0)+": " + v.ValueAtIndex(0)

```

**Notes:** If there is no Indexth item in the map, a call generates an `OutOfBoundsException` error. The first item has the index zero.

### 5.35.16 Keys as string()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```

dim m as new StringToVariantHashMapMBS

m.Value("1")="Hello"
m.Value("2")="World"

for each v as string in m.Keys

```

```
MsgBox str(v)
next
```

**Notes:** The order is stable and matches the order returned by the Values method at least until the Dictionary is modified. Use this method with For Each to loop through all the keys.

### 5.35.17 last as StringToVariantHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the map.

**Example:**

```
// Create a map
dim m as new StringToVariantHashMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToVariantHashMapIteratorMBS = m.first
dim e as StringToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.35.18 lookup(key as string, defaultvalue as Variant) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Looks up the passed value of Key.

**Example:**

```
dim map as new StringToVariantHashMapMBS

map.value("a")="Hello"
map.value("b")="World"
map.value("c")="!"
```

```
MsgBox str(map.lookup("d","?")) // shows "?" as value is missing
MsgBox str(map.lookup("a","?")) // shows "Hello" as value is found
```

**Notes:** If Key is found, it returns the corresponding value. If Key is not found, it returns the passed defaultValue.

### 5.35.19 Operator\_Convert as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the map as dictionary.

### 5.35.20 Remove(first as StringToVariantHashMapIteratorMBS, last as StringToVariantHashMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.35.21 Remove(key as string) as Integer 240
- 5.35.22 Remove(pos as StringToVariantHashMapIteratorMBS) 240

### 5.35.21 Remove(key as string) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.35.20 Remove(first as StringToVariantHashMapIteratorMBS, last as StringToVariantHashMapIteratorMBS) 240
- 5.35.22 Remove(pos as StringToVariantHashMapIteratorMBS) 240

### 5.35.22 Remove(pos as StringToVariantHashMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

5.35. CLASS STRINGTOVARIANTHASHMAPMBS 241

- 5.35.20 Remove(first as StringToVariantHashMapIteratorMBS, last as StringToVariantHashMapIteratorMBS) 240
- 5.35.21 Remove(key as string) as Integer 240

### 5.35.23 ValueAtIndex(index as Integer) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value with the given index.

**Example:**

```
dim v as new StringToVariantHashMapMBS
v.Value("Hello") = "World"
MsgBox v.Key(0)+"": "+v.ValueAtIndex(0)
```

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

### 5.35.24 Values as Variant()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the values as an array

**Example:**

```
dim m as new StringToVariantHashMapMBS
```

```
m.Value("1")="Hello"
m.Value("2")="World"
```

```
for each v as string in m.Values
MsgBox str(v)
next
```

**Notes:** The order is stable and matches the order returned by Keys at least until the Map is modified. Use this method with For Each to loop through all the values.

### 5.35.25 Properties

### 5.35.26 BinCount as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of bins the hash table uses.

**Example:**

```
dim v as new StringToVariantHashMapMBS
```

```
v.value("1")="Hello"
```

```
v.value("2")="World"
```

```
MsgBox str(v.BinCount)
```

**Notes:** This is a measure of the hash table size, independent of the number of items the Dictionary contains.  
(Read only property)

### 5.35.27 CaseSensitive as Boolean

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether text/string comparison is case sensitive.

**Example:**

```
dim s1 as new StringToVariantHashMapMBS(true)
```

```
dim s2 as new StringToVariantHashMapMBS(false)
```

```
s1.value("a") = "1"
```

```
s1.value("A") = "2"
```

```
s2.value("a") = "1"
```

```
s2.value("A") = "2"
```

```
MsgBox str(s1.Count)+" "+str(s2.Count)
```

**Notes:** (Read only property)

### 5.35.28 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this map.

**Example:**

```
dim map as new StringToVariantHashMapMBS
```

```
map.Value("?")="?"
map.Value("Hello")="World"
```

```
MsgBox str(map.Count)
```

**Notes:** (Read only property)

### 5.35.29 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.35.30 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this map.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

### 5.35.31 value(key as string) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value associated with the given key.

**Example:**

```
dim v as new StringToVariantHashMapMBS
v.Value("Hello") = "World"
MsgBox v.Key(0)+"": "+v.ValueAtIndex(0)
```

**Notes:** If you query for a key which does not exist, a KeyNotFoundException is raised.  
(Read and Write computed property)

## 5.36 class StringToVariantOrderedMapIteratorMBS

### 5.36.1 class StringToVariantOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the StringToVariantOrderedMap class.

**Example:**

```
// Create a map
dim m as new StringToVariantOrderedMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToVariantOrderedMapIteratorMBS = m.first
dim e as StringToVariantOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### Blog Entries

- [MonkeyBread Software Releases the MBS Plugins 8.2](#)

### 5.36.2 Methods

#### 5.36.3 isEqual(other as StringToVariantOrderedMapIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new StringToVariantOrderedMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"
```

```
// get iterators pointing to first and after last element
dim i as StringToVariantOrderedMapIteratorMBS = m.first
dim e as StringToVariantOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.36.4 isNotEqual(other as StringToVariantOrderedMapIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new StringToVariantOrderedMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToVariantOrderedMapIteratorMBS = m.first
dim e as StringToVariantOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

#### 5.36.5 Key as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

### 5.36.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new StringToVariantOrderedMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToVariantOrderedMapIteratorMBS = m.first
dim e as StringToVariantOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.36.7 MovePrev

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the previous item.

### 5.36.8 Properties

#### 5.36.9 Value as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value of the current item in the iterator.

**Notes:** (Read and Write computed property)

## 5.37 class StringToVariantOrderedMapMBS

### 5.37.1 class StringToVariantOrderedMapMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for an ordered map with strings as keys and variants as values.

**Example:**

```
dim s as new StringToVariantOrderedMapMBS
```

```
s.Value("Test")="Hello"
```

```
s.Value("test")="World"
```

```
MsgBox str(s.Count) // shows 2
```

```
s.Value(ConvertEncoding("test",encodings.UTF16))="Just a"
```

```
s.Value(ConvertEncoding("Test",encodings.UTF16))="test"
```

```
MsgBox str(s.Count) // shows 4
```

**Notes:** All text comparison is done either case sensitive or insensitive. Defined in constructor.

You can choose whether you want to keep the map ordered using the OrderedMap class or whether you prefer a higher speed with the HashMap class.

**Blog Entries**

- [MonkeyBread Software Releases the MBS Plugins 8.2](#)

### 5.37.2 Methods

#### 5.37.3 AddKeys(targetArray() as string)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to keys, but adds keys to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.37.4 AddValues(targetArray() as Variant)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to values, but adds values to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys

function returns always nil.

### 5.37.5 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

### 5.37.6 Clone as StringToVariantOrderedMapMBS

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map.

### 5.37.7 CloneDictionary as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map as a dictionary.

### 5.37.8 Constructor(CaseSensitive as Boolean = true)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

**Notes:** If CaseSensitive is true, the comparison of texts or strings is case sensitive.

See also:

- 5.37.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true) 248
- 5.37.10 Constructor(other as StringToVariantOrderedMapMBS) 249

### 5.37.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the dictionary.

See also:

- 5.37.8 Constructor(CaseSensitive as Boolean = true) 248
- 5.37.10 Constructor(other as StringToVariantOrderedMapMBS) 249

**5.37.10 Constructor(other as StringToVariantOrderedMapMBS)**

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the existing map.

See also:

- 5.37.8 Constructor(CaseSensitive as Boolean = true) 248
- 5.37.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true) 248

**5.37.11 CountKey(key as string) as Integer**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this map.

**5.37.12 find(key as string) as StringToVariantOrderedMapIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

**5.37.13 first as StringToVariantOrderedMapIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the map.

**Example:**

```
// Create a map
dim m as new StringToVariantOrderedMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToVariantOrderedMapIteratorMBS = m.first
dim e as StringToVariantOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
```

```
i.MoveNext  
wend
```

#### 5.37.14 `hasKey(key as string)` as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns True if Key is in the map and False if it is not. Returns a Boolean.

#### 5.37.15 `Key(index as Integer)` as string

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an `OutOfBoundsException` error. The first item has the index zero.

#### 5.37.16 `Keys` as `string()`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new StringToVariantOrderedMapMBS
```

```
m.Value("1")="Hello"  
m.Value("2")="World"
```

```
for each v as string in m.Keys  
MsgBox v  
next
```

**Notes:** The order is stable and matches the order returned by the `Values` method at least until the Dictionary is modified. Use this method with `For Each` to loop through all the keys.

#### 5.37.17 `last` as `StringToVariantOrderedMapIteratorMBS`

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the map.

**Example:**

```
// Create a map
dim m as new StringToVariantOrderedMapMBS

m.value("1")="Hello"
m.value("2")="World"
m.value("3")="!"

// get iterators pointing to first and after last element
dim i as StringToVariantOrderedMapIteratorMBS = m.first
dim e as StringToVariantOrderedMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" + i.Value
i.MoveNext
wend
```

### 5.37.18 lookup(key as string, defaultvalue as Variant) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Looks up the passed value of Key.

**Example:**

```
dim map as new StringToVariantOrderedMapMBS

map.value("a")="Hello"
map.value("b")="World"
map.value("c")="!"

MsgBox str(map.lookup("d","?")) // shows "?" as value is missing
MsgBox str(map.lookup("a","?")) // shows "Hello" as value is found
```

**Notes:** If Key is found, it returns the corresponding value. If Key is not found, it returns the passed defaultValue.

### 5.37.19 LowerBound(key as string) as StringToVariantOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is not less than k.

### 5.37.20 Operator\_Convert as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the map as dictionary.

### 5.37.21 Remove(first as StringToVariantOrderedMapIteratorMBS, last as StringToVariantOrderedMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.37.22 Remove(key as string) as Integer 252
- 5.37.23 Remove(pos as StringToVariantOrderedMapIteratorMBS) 252

### 5.37.22 Remove(key as string) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.37.21 Remove(first as StringToVariantOrderedMapIteratorMBS, last as StringToVariantOrderedMapIteratorMBS) 252
- 5.37.23 Remove(pos as StringToVariantOrderedMapIteratorMBS) 252

### 5.37.23 Remove(pos as StringToVariantOrderedMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.37.21 Remove(first as StringToVariantOrderedMapIteratorMBS, last as StringToVariantOrderedMapIteratorMBS) 252
- 5.37.22 Remove(key as string) as Integer 252

### 5.37.24 UpperBound(key as string) as StringToVariantOrderedMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is greater than k.

### 5.37.25 ValueAtIndex(index as Integer) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value with the given index.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

### 5.37.26 Values as Variant()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the values as an array

**Example:**

```
dim m as new StringToVariantOrderedMapMBS
```

```
m.Value("1")="Hello"  
m.Value("2")="World"
```

```
for each v as string in m.Values  
MsgBox v  
next
```

**Notes:** The order is stable and matches the order returned by Keys at least until the Map is modified. Use this method with For Each to loop through all the values.

### 5.37.27 Properties

### 5.37.28 CaseSensitive as Boolean

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether text/string comparison is case sensitive.

**Example:**

```
dim s1 as new StringToVariantOrderedMapMBS(true)
dim s2 as new StringToVariantOrderedMapMBS(false)
```

```
s1.value("a") = "1"
s1.value("A") = "2"
```

```
s2.value("a") = "1"
s2.value("A") = "2"
```

```
MsgBox str(s1.Count)+" "+str(s2.Count)
```

**Notes:** (Read only property)

### 5.37.29 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this map.

**Example:**

```
dim map as new StringToVariantOrderedMapMBS
```

```
map.Value("?")="?"
map.Value("Hello")="World"
```

```
MsgBox str(map.Count)
```

**Notes:** (Read only property)

### 5.37.30 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.37.31 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this map.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

### 5.37.32 value(key as string) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value associated with the given key.

**Notes:** If you query for a key which does not exist, a KeyNotFoundException is raised.

(Read and Write computed property)

## 5.38 class VariantHashSetIteratorMBS

### 5.38.1 class VariantHashSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the VariantHashSet class.

**Example:**

```
// Create a map
dim m as new VariantHashSetMBS

m.insert(1.0) // double
m.insert("Hello") // string
m.insert(3) // integer

// get iterators pointing to first and after last element
dim i as VariantHashSetIteratorMBS = m.first
dim e as VariantHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox i.Key
i.MoveNext
wend
```

### 5.38.2 Methods

### 5.38.3 isEqual(other as VariantHashSetIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new VariantHashSetMBS

m.insert(1.0) // double
m.insert("Hello") // string
m.insert(3) // integer

// get iterators pointing to first and after last element
dim i as VariantHashSetIteratorMBS = m.first
dim e as VariantHashSetIteratorMBS = m.last
```

```
// Show all keys and values
while i.isEqual(e) = false
MsgBox i.Key
i.MoveNext
wend
```

#### 5.38.4 isNotEqual(other as VariantHashSetIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new VariantHashSetMBS

m.insert(1.0) // double
m.insert("Hello") // string
m.insert(3) // integer

// get iterators pointing to first and after last element
dim i as VariantHashSetIteratorMBS = m.first
dim e as VariantHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox i.Key
i.MoveNext
wend
```

#### 5.38.5 Key as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

#### 5.38.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new VariantHashSetMBS

m.insert(1.0) // double
m.insert("Hello") // string
m.insert(3) // integer

// get iterators pointing to first and after last element
dim i as VariantHashSetIteratorMBS = m.first
dim e as VariantHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox i.Key
  i.MoveNext
wend
```

## 5.39 class VariantHashSetMBS

### 5.39.1 class VariantHashSetMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for a hash set with variants.

**Example:**

```
dim s as new VariantHashSetMBS
```

```
s.insert "test"
```

```
s.insert "Test"
```

```
MsgBox str(s.Count) // shows 2
```

```
s.insert ConvertEncoding("test",encodings.UTF16)
```

```
s.insert ConvertEncoding("Test",encodings.UTF16)
```

```
MsgBox str(s.Count) // shows 4
```

**Notes:** When using variants for keys, you may get better results if all keys used have the same data type to improve comparison.

All text comparison is done either case sensitive or insensitive. Defined in constructor.

You can choose whether you want to keep the set ordered using the OrderedSet class or whether you prefer a higher speed with the HashSet class.

### 5.39.2 Methods

#### 5.39.3 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

#### 5.39.4 Constructor(CaseSensitive as Boolean = true)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

**Notes:** If CaseSensitive is true, the comparison of texts or strings is case sensitive.

See also:

- 5.39.5 Constructor(Keys() as string) 260
- 5.39.6 Constructor(Keys() as Variant) 260

### 5.39.5 Constructor(Keys() as string)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new set from the values in the array.

**Notes:** If the array has duplicates, the later elements overwrite the earlier keys.

See also:

- 5.39.4 Constructor(CaseSensitive as Boolean = true) 259
- 5.39.6 Constructor(Keys() as Variant) 260

### 5.39.6 Constructor(Keys() as Variant)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new set from the values in the array.

**Notes:** If the array has duplicates, the later elements overwrite the earlier keys.

See also:

- 5.39.4 Constructor(CaseSensitive as Boolean = true) 259
- 5.39.5 Constructor(Keys() as string) 260

### 5.39.7 CountKey(key as Variant) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this set.

### 5.39.8 find(key as Variant) as VariantHashSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

**5.39.9 first as VariantHashSetIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the set.

**Example:**

```
// Create a map
dim m as new VariantHashSetMBS

m.insert(1.0) // double
m.insert("Hello") // string
m.insert(3) // integer

// get iterators pointing to first and after last element
dim i as VariantHashSetIteratorMBS = m.first
dim e as VariantHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox i.Key
i.MoveNext
wend
```

**5.39.10 insert(key as Variant)**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a value to the set.

**5.39.11 Key(index as Integer) as Variant**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

**5.39.12 Keys as Variant()**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new VariantHashSetMBS
```

```
m.insert("1")
m.insert("2")
```

```
for each v as Variant in m.Keys
  MsgBox v
next
```

**Notes:** The order is stable and matches the order returned by the Values method at least until the Dictionary is modified. Use this method with For Each to loop through all the keys.

### 5.39.13 last as VariantHashSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the set.

**Example:**

```
// Create a map
dim m as new VariantHashSetMBS

m.insert(1.0) // double
m.insert("Hello") // string
m.insert(3) // integer

// get iterators pointing to first and after last element
dim i as VariantHashSetIteratorMBS = m.first
dim e as VariantHashSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox i.Key
  i.MoveNext
wend
```

### 5.39.14 lookup(key as Variant) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks whether an element with the given key exists in this set.

**Example:**

```
dim set as new VariantHashSetMBS
```

```
set.insert "Hello"
set.insert "World"
```

```
MsgBox str(set.lookup("missed")) // shows false as value is missing
MsgBox str(set.lookup("Hello")) // shows true as value is found
```

**Notes:** Returns true if yes and false if no.

### 5.39.15 Remove(first as VariantHashSetIteratorMBS, last as VariantHashSetIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.39.16 Remove(key as Variant) as Integer 263
- 5.39.17 Remove(pos as VariantHashSetIteratorMBS) 263

### 5.39.16 Remove(key as Variant) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.39.15 Remove(first as VariantHashSetIteratorMBS, last as VariantHashSetIteratorMBS) 263
- 5.39.17 Remove(pos as VariantHashSetIteratorMBS) 263

### 5.39.17 Remove(pos as VariantHashSetIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.39.15 Remove(first as VariantHashSetIteratorMBS, last as VariantHashSetIteratorMBS) 263

- 5.39.16 Remove(key as Variant) as Integer

### 5.39.18 Properties

### 5.39.19 BinCount as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of bins the hash table uses.

**Example:**

```
dim v as new VariantHashSetMBS
```

```
v.insert "1"
v.insert "Hello"
```

```
MsgBox str(v.BinCount)
```

**Notes:** This is a measure of the hash table size, independent of the number of items the Dictionary contains.  
(Read only property)

### 5.39.20 CaseSensitive as Boolean

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether text/string comparison is case sensitive.

**Example:**

```
dim s1 as new VariantHashSetMBS(true)
dim s2 as new VariantHashSetMBS(false)
```

```
s1.insert("a")
s1.insert("A")
```

```
s2.insert("a")
s2.insert("A")
```

```
MsgBox str(s1.Count)+" "+str(s2.Count)
```

**Notes:** (Read only property)

### 5.39.21 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this set.

**Example:**

```
dim set as new VariantHashSetMBS
```

```
set.insert 1
```

```
set.insert 2
```

```
MsgBox str(set.Count)
```

**Notes:** (Read only property)

### 5.39.22 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.39.23 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this set.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

## 5.40 class VariantOrderedSetIteratorMBS

### 5.40.1 class VariantOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the VariantOrderedSet class.

**Example:**

```
// Create a map
dim m as new VariantOrderedSetMBS

m.insert(1.0) // double
m.insert("Hello") // string
m.insert(3) // integer

// get iterators pointing to first and after last element
dim i as VariantOrderedSetIteratorMBS = m.first
dim e as VariantOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox i.Key
i.MoveNext
wend
```

### 5.40.2 Methods

### 5.40.3 isEqual(other as VariantOrderedSetIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new VariantOrderedSetMBS

m.insert(1.0) // double
m.insert("Hello") // string
m.insert(3) // integer

// get iterators pointing to first and after last element
dim i as VariantOrderedSetIteratorMBS = m.first
dim e as VariantOrderedSetIteratorMBS = m.last
```

```
// Show all keys and values
while i.isEqual(e) = false
MsgBox i.Key
i.MoveNext
wend
```

#### 5.40.4 isNotEqual(other as VariantOrderedSetIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new VariantOrderedSetMBS

m.insert(1.0) // double
m.insert("Hello") // string
m.insert(3) // integer

// get iterators pointing to first and after last element
dim i as VariantOrderedSetIteratorMBS = m.first
dim e as VariantOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox i.Key
i.MoveNext
wend
```

#### 5.40.5 Key as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

#### 5.40.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new VariantOrderedSetMBS

m.insert(1.0) // double
m.insert("Hello") // string
m.insert(3) // integer

// get iterators pointing to first and after last element
dim i as VariantOrderedSetIteratorMBS = m.first
dim e as VariantOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox i.Key
  i.MoveNext
wend
```

#### 5.40.7 MovePrev

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the previous item.

## 5.41 class VariantOrderedSetMBS

### 5.41.1 class VariantOrderedSetMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for an ordered set with variants.

**Example:**

```
dim s as new VariantOrderedSetMBS
```

```
s.insert "test"  
s.insert "Test"
```

```
MsgBox str(s.Count) // shows 2
```

```
s.insert ConvertEncoding("test",encodings.UTF16)  
s.insert ConvertEncoding("Test",encodings.UTF16)
```

```
MsgBox str(s.Count) // shows 4
```

**Notes:** When using variants for keys, you may get better results if all keys used have the same data type to improve comparison.

All text comparison is done either case sensitive or insensitive. Defined in constructor.

You can choose whether you want to keep the set ordered using the OrderedSet class or whether you prefer a higher speed with the HashSet class.

### 5.41.2 Methods

#### 5.41.3 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

#### 5.41.4 Constructor(CaseSensitive as Boolean = true)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

**Notes:** If CaseSensitive is true, the comparison of texts or strings is case sensitive.

See also:

- 5.41.5 Constructor(Keys() as string) 270
- 5.41.6 Constructor(Keys() as Variant) 270

### 5.41.5 Constructor(Keys() as string)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new set from the values in the array.

**Notes:** If the array has duplicates, the later elements overwrite the earlier keys.

See also:

- 5.41.4 Constructor(CaseSensitive as Boolean = true) 269
- 5.41.6 Constructor(Keys() as Variant) 270

### 5.41.6 Constructor(Keys() as Variant)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new set from the values in the array.

**Notes:** If the array has duplicates, the later elements overwrite the earlier keys.

See also:

- 5.41.4 Constructor(CaseSensitive as Boolean = true) 269
- 5.41.5 Constructor(Keys() as string) 270

### 5.41.7 CountKey(key as Variant) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this set.

### 5.41.8 find(key as Variant) as VariantOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

**5.41.9 first as VariantOrderedSetIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the set.

**Example:**

```
// Create a map
dim m as new VariantOrderedSetMBS

m.insert(1.0) // double
m.insert("Hello") // string
m.insert(3) // integer

// get iterators pointing to first and after last element
dim i as VariantOrderedSetIteratorMBS = m.first
dim e as VariantOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox i.Key
i.MoveNext
wend
```

**5.41.10 insert(key as Variant)**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a value to the set.

**5.41.11 Key(index as Integer) as Variant**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

**5.41.12 Keys as Variant()**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
dim m as new VariantOrderedSetMBS
```

```
m.insert("1")
m.insert("2")
```

```
for each v as Variant in m.Keys
  MsgBox v
next
```

**Notes:** The order is stable and matches the order returned by the Values method at least until the Dictionary is modified. Use this method with For Each to loop through all the keys.

### 5.41.13 last as VariantOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the set.

**Example:**

```
// Create a map
dim m as new VariantOrderedSetMBS

m.insert(1.0) // double
m.insert("Hello") // string
m.insert(3) // integer

// get iterators pointing to first and after last element
dim i as VariantOrderedSetIteratorMBS = m.first
dim e as VariantOrderedSetIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox i.Key
  i.MoveNext
wend
```

### 5.41.14 lookup(key as Variant) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks whether an element with the given key exists in this set.

**Example:**

```
dim set as new VariantOrderedSetMBS
```

```
set.insert "Hello"
set.insert "World"
```

```
MsgBox str(set.lookup("missed")) // shows false as value is missing
MsgBox str(set.lookup("Hello")) // shows true as value is found
```

**Notes:** Returns true if yes and false if no.

### 5.41.15 LowerBound(key as Variant) as VariantOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is not less than k.

### 5.41.16 Remove(first as VariantOrderedSetIteratorMBS, last as VariantOrderedSetIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.41.17 Remove(key as Variant) as Integer 273
- 5.41.18 Remove(pos as VariantOrderedSetIteratorMBS) 274

### 5.41.17 Remove(key as Variant) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.41.16 Remove(first as VariantOrderedSetIteratorMBS, last as VariantOrderedSetIteratorMBS) 273
- 5.41.18 Remove(pos as VariantOrderedSetIteratorMBS) 274

### 5.41.18 Remove(pos as VariantOrderedSetIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.41.16 Remove(first as VariantOrderedSetIteratorMBS, last as VariantOrderedSetIteratorMBS) 273
- 5.41.17 Remove(key as Variant) as Integer 273

### 5.41.19 UpperBound(key as Variant) as VariantOrderedSetIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is greater than k.

## 5.41.20 Properties

### 5.41.21 CaseSensitive as Boolean

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether text/string comparison is case sensitive.

**Example:**

```
dim s1 as new VariantOrderedSetMBS(true)
dim s2 as new VariantOrderedSetMBS(false)
```

```
s1.insert("a")
s1.insert("A")
```

```
s2.insert("a")
s2.insert("A")
```

```
MsgBox str(s1.Count)+" "+str(s2.Count)
```

**Notes:** (Read only property)

### 5.41.22 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this set.

**Example:**

```
dim set as new VariantOrderedSetMBS
```

```
set.insert 1
```

```
set.insert 2
```

```
MsgBox str(set.Count)
```

**Notes:** (Read only property)

### 5.41.23 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.41.24 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this set.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

## 5.42 class VariantToVariantHashMapIteratorMBS

### 5.42.1 class VariantToVariantHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the VariantToVariantHashMap class.

**Example:**

```
// Create a map
dim m as new VariantToVariantHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as VariantToVariantHashMapIteratorMBS = m.first
dim e as VariantToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

#### Blog Entries

- [MonkeyBread Software Releases the MBS Plugins 8.2](#)

### 5.42.2 Methods

### 5.42.3 isEqual(other as VariantToVariantHashMapIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new VariantToVariantHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8
```

```
// get iterators pointing to first and after last element
dim i as VariantToVariantHashMapIteratorMBS = m.first
dim e as VariantToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

#### 5.42.4 isNotEqual(other as VariantToVariantHashMapIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new VariantToVariantHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as VariantToVariantHashMapIteratorMBS = m.first
dim e as VariantToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

#### 5.42.5 Key as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

### 5.42.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new VariantToVariantHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as VariantToVariantHashMapIteratorMBS = m.first
dim e as VariantToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

### 5.42.7 Properties

### 5.42.8 Value as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value of the current item in the iterator.

**Notes:** (Read and Write computed property)

## 5.43 class VariantToVariantHashMapMBS

### 5.43.1 class VariantToVariantHashMapMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for an hash map with variants and keys and values.

**Example:**

```
dim s as new VariantToVariantHashMapMBS
```

```
s.Value("Test")="Hello"
```

```
s.Value("test")="World"
```

```
MsgBox str(s.Count) // shows 2
```

```
s.Value(ConvertEncoding("test",encodings.UTF16))="Just a"
```

```
s.Value(ConvertEncoding("Test",encodings.UTF16))="test"
```

```
MsgBox str(s.Count) // shows 4
```

**Notes:** Think of this class like the reimplementation for dictionary class with being case sensitive.

When using variants for keys, you may get better results if all keys used have the same data type to improve comparison.

All text comparison is done either case sensitive or insensitive. Defined in constructor.

You can choose whether you want to keep the map ordered using the OrderedMap class or whether you prefer a higher speed with the HashMap class.

**Blog Entries**

- [MonkeyBread Software Releases the MBS Plugins 8.2](#)

### 5.43.2 Methods

#### 5.43.3 AddKeys(targetArray() as Variant)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to keys, but adds keys to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.43.4 AddValues(targetArray() as Variant)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to values, but adds values to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.43.5 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

#### 5.43.6 Clone as VariantToVariantHashMapMBS

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map.

#### 5.43.7 CloneDictionary as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map as a dictionary.

#### 5.43.8 Constructor(CaseSensitive as Boolean = true)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

**Notes:** If CaseSensitive is true, the comparison of texts or strings is case sensitive.

See also:

- 5.43.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true) 280
- 5.43.10 Constructor(other as VariantToVariantHashMapMBS) 281

#### 5.43.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

5.43. CLASS VARIANTTOVARIANTHASHMAPMBS 281

**Function:** Creates a new map with the keys and values from the dictionary.

See also:

- 5.43.8 Constructor(CaseSensitive as Boolean = true) 280
- 5.43.10 Constructor(other as VariantToVariantHashMapMBS) 281

### 5.43.10 Constructor(other as VariantToVariantHashMapMBS)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the existing map.

See also:

- 5.43.8 Constructor(CaseSensitive as Boolean = true) 280
- 5.43.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true) 280

### 5.43.11 CountKey(key as Variant) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this map.

### 5.43.12 find(key as Variant) as VariantToVariantHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

### 5.43.13 first as VariantToVariantHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the map.

**Example:**

```
// Create a map  
dim m as new VariantToVariantHashMapMBS
```

```
m.value(1)=2
```

```
m.value(2)=4
```

```
m.value(3)=8
```

```
// get iterators pointing to first and after last element
dim i as VariantToVariantHashMapIteratorMBS = m.first
dim e as VariantToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

#### 5.43.14 hasKey(key as Variant) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns True if Key is in the map and False if it is not. Returns a Boolean.

#### 5.43.15 Key(index as Integer) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

#### 5.43.16 Keys as Variant()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
// Create a map
dim m as new VariantToVariantHashMapMBS

m.Value(1)="Hello"
m.Value(2)="World"

for each v as Variant in m.Keys
MsgBox v
next
```

**Notes:** The order is stable and matches the order returned by the Values method at least until the Dictionary is modified. Use this method with For Each to loop through all the keys.

### 5.43.17 last as VariantToVariantHashMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the map.

**Example:**

```
// Create a map
dim m as new VariantToVariantHashMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as VariantToVariantHashMapIteratorMBS = m.first
dim e as VariantToVariantHashMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
  MsgBox str(i.Key)+" ->" +str(i.Value)
  i.MoveNext
wend
```

### 5.43.18 lookup(key as Variant, defaultvalue as Variant) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Looks up the passed value of Key.

**Example:**

```
dim map as new VariantToVariantHashMapMBS

map.value("a")="Hello"
map.value("b")="World"
map.value("c")="!"

MsgBox str(map.lookup("d","?")) // shows "?" as value is missing
MsgBox str(map.lookup("a","?")) // shows "Hello" as value is found
```

**Notes:** If Key is found, it returns the corresponding value. If Key is not found, it returns the passed defaultValue.

### 5.43.19 Operator\_Convert as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the map as dictionary.

### 5.43.20 Remove(first as VariantToVariantHashMapIteratorMBS, last as VariantToVariantHashMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.43.21 Remove(key as Variant) as Integer 284
- 5.43.22 Remove(pos as VariantToVariantHashMapIteratorMBS) 284

### 5.43.21 Remove(key as Variant) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.43.20 Remove(first as VariantToVariantHashMapIteratorMBS, last as VariantToVariantHashMapIteratorMBS) 284
- 5.43.22 Remove(pos as VariantToVariantHashMapIteratorMBS) 284

### 5.43.22 Remove(pos as VariantToVariantHashMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.43.20 Remove(first as VariantToVariantHashMapIteratorMBS, last as VariantToVariantHashMapIteratorMBS) 284

- 5.43.21 Remove(key as Variant) as Integer

### 5.43.23 ValueAtIndex(index as Integer) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value with the given index.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

### 5.43.24 Values as Variant()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the values as an array

**Example:**

```
// Create a map
dim m as new VariantToVariantHashMapMBS

m.Value(1)="Hello"
m.Value(2)="World"

for each v as Variant in m.Values
MsgBox v
next
```

**Notes:** The order is stable and matches the order returned by Keys at least until the Map is modified. Use this method with For Each to loop through all the values.

### 5.43.25 Properties

### 5.43.26 BinCount as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of bins the hash table uses.

**Example:**

```
dim v as new VariantToVariantHashMapMBS

v.value(1)="Hello"
v.value(2)="World"
```

```
MsgBox str(v.BinCount)
```

**Notes:** This is a measure of the hash table size, independent of the number of items the Dictionary contains.  
(Read only property)

### 5.43.27 CaseSensitive as Boolean

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether text/string comparison is case sensitive.

**Example:**

```
dim s1 as new VariantToVariantHashMapMBS(true)
dim s2 as new VariantToVariantHashMapMBS(false)
```

```
s1.value("a") = "1"
s1.value("A") = "2"
```

```
s2.value("a") = "1"
s2.value("A") = "2"
```

```
MsgBox str(s1.Count)+" "+str(s2.Count)
```

**Notes:** (Read only property)

### 5.43.28 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this map.

**Example:**

```
dim map as new VariantToVariantHashMapMBS
```

```
map.Value(1)=true
map.Value("Hello")="World"
```

```
MsgBox str(map.Count)
```

**Notes:** (Read only property)

### 5.43.29 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.43.30 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this map.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

### 5.43.31 value(key as Variant) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value associated with the given key.

**Notes:** If you query for a key which does not exist, a KeyNotFoundException is raised.

(Read and Write computed property)

## 5.44 class VariantToVariantMapIteratorMBS

### 5.44.1 class VariantToVariantMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The iterator for the VariantToVariantMap class.

**Example:**

```
// Create a map
dim m as new VariantToVariantOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as VariantToVariantMapIteratorMBS = m.first
dim e as VariantToVariantMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

### 5.44.2 Methods

### 5.44.3 isEqual(other as VariantToVariantMapIteratorMBS) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are equal.

**Example:**

```
// Create a map
dim m as new VariantToVariantOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as VariantToVariantMapIteratorMBS = m.first
dim e as VariantToVariantMapIteratorMBS = m.last
```

```
// Show all keys and values
while i.isEqual(e) = false
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

#### 5.44.4 isNotEqual(other as VariantToVariantMapIteratorMBS) as boolean

Plugin Version: 10.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns true if both iterators are not equal.

**Example:**

```
// Create a map
dim m as new VariantToVariantOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as VariantToVariantMapIteratorMBS = m.first
dim e as VariantToVariantMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

#### 5.44.5 Key as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the current key.

#### 5.44.6 MoveNext

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the next item.

**Example:**

```
// Create a map
dim m as new VariantToVariantOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as VariantToVariantMapIteratorMBS = m.first
dim e as VariantToVariantMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

#### 5.44.7 MovePrev

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Moves the iterator to the previous item.

#### 5.44.8 Properties

#### 5.44.9 Value as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value of the current item in the iterator.

**Notes:** (Read and Write computed property)

## 5.45 class VariantToVariantOrderedMapMBS

### 5.45.1 class VariantToVariantOrderedMapMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An alternative dictionary class for an ordered map with variants as keys and values.

**Example:**

```
dim s as new VariantToVariantOrderedMapMBS
```

```
s.Value("Test")="Hello"
s.Value("test")="World"
```

```
MsgBox str(s.Count) // shows 2
```

```
s.Value(ConvertEncoding("test",encodings.UTF16))="Just a"
s.Value(ConvertEncoding("Test",encodings.UTF16))="test"
```

```
MsgBox str(s.Count) // shows 4
```

**Notes:** Think of this class like the reimplementaion for dictionary class with being case sensitive and with storing items ordered.

When using variants for keys, you may get better results if all keys used have the same data type to improve comparison.

All text comparison is done either case sensitive or insensitive. Defined in constructor.

You can choose whether you want to keep the map ordered using the OrderedMap class or whether you prefer a higher speed with the HashMap class.

**Blog Entries**

- [MonkeyBread Software Releases the MBS Plugins 8.2](#)

### 5.45.2 Methods

#### 5.45.3 AddKeys(targetArray() as Variant)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to keys, but adds keys to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.45.4 AddValues(targetArray() as Variant)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Similar to values, but adds values to the given array.

**Notes:** For older Xojo version 2007/2008 where the plugin can't create an array, so the values and keys function returns always nil.

#### 5.45.5 Clear

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all of the elements.

#### 5.45.6 Clone as VariantToVariantOrderedMapMBS

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map.

#### 5.45.7 CloneDictionary as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of this map as a dictionary.

#### 5.45.8 Constructor(CaseSensitive as Boolean = true)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The default constructor.

**Notes:** If CaseSensitive is true, the comparison of texts or strings is case sensitive.

See also:

- 5.45.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true) 292
- 5.45.10 Constructor(other as VariantToVariantOrderedMapMBS) 293

#### 5.45.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

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**Function:** Creates a new map with the keys and values from the dictionary.

See also:

- 5.45.8 Constructor(CaseSensitive as Boolean = true) 292
- 5.45.10 Constructor(other as VariantToVariantOrderedMapMBS) 293

### 5.45.10 Constructor(other as VariantToVariantOrderedMapMBS)

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new map with the keys and values from the existing map.

See also:

- 5.45.8 Constructor(CaseSensitive as Boolean = true) 292
- 5.45.9 Constructor(dic as dictionary, CaseSensitive as Boolean = true) 292

### 5.45.11 CountKey(key as Variant) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Counts how often a key is used in this map.

### 5.45.12 find(key as Variant) as VariantToVariantMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds the key and returns an iterator.

**Notes:** Returns the same value as the last method if the item was not found.

### 5.45.13 first as VariantToVariantMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the beginning of the map.

**Example:**

```
// Create a map  
dim m as new VariantToVariantOrderedMapMBS
```

```
m.value(1)=2
```

```
m.value(2)=4
```

```
m.value(3)=8
```

```
// get iterators pointing to first and after last element
dim i as VariantToVariantMapIteratorMBS = m.first
dim e as VariantToVariantMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

#### 5.45.14 hasKey(key as Variant) as boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns True if Key is in the map and False if it is not. Returns a Boolean.

#### 5.45.15 Key(index as Integer) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value of key for the Indexth sequential item.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

#### 5.45.16 Keys as Variant()

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the keys as an array.

**Example:**

```
// Create a map
dim m as new VariantToVariantOrderedMapMBS

m.Value(1)="Hello"
m.Value(2)="World"

for each v as Variant in m.Keys
MsgBox v
next
```

**Notes:** The order is stable and matches the order returned by the Values method at least until the Dictionary is modified. Use this method with For Each to loop through all the keys.

### 5.45.17 last as VariantToVariantMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator pointing to the end of the map.

**Example:**

```
// Create a map
dim m as new VariantToVariantOrderedMapMBS

m.value(1)=2
m.value(2)=4
m.value(3)=8

// get iterators pointing to first and after last element
dim i as VariantToVariantMapIteratorMBS = m.first
dim e as VariantToVariantMapIteratorMBS = m.last

// Show all keys and values
while i.isNotEqual(e)
MsgBox str(i.Key)+" ->" +str(i.Value)
i.MoveNext
wend
```

### 5.45.18 lookup(key as Variant, defaultvalue as Variant) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Looks up the passed value of Key.

**Example:**

```
dim map as new VariantToVariantOrderedMapMBS

map.value("a")="Hello"
map.value("b")="World"
map.value("c")="!"

MsgBox str(map.lookup("d","?")) // shows "?" as value is missing
MsgBox str(map.lookup("a","?")) // shows "Hello" as value is found
```

**Notes:** If Key is found, it returns the corresponding value. If Key is not found, it returns the passed defaultValue.

#### 5.45.19 LowerBound(key as Variant) as VariantToVariantMapIteratorMBS

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is not less than k.

#### 5.45.20 Operator\_Convert as Dictionary

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the map as dictionary.

#### 5.45.21 Remove(first as VariantToVariantMapIteratorMBS, last as VariantToVariantMapIteratorMBS)

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases all elements in a range.

See also:

- 5.45.22 Remove(key as Variant) as Integer 296
- 5.45.23 Remove(pos as VariantToVariantMapIteratorMBS) 297

#### 5.45.22 Remove(key as Variant) as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element with the given key.

See also:

- 5.45.21 Remove(first as VariantToVariantMapIteratorMBS, last as VariantToVariantMapIteratorMBS) 296
- 5.45.23 Remove(pos as VariantToVariantMapIteratorMBS) 297

**5.45.23 Remove(pos as VariantToVariantMapIteratorMBS)**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Erases the element pointed to by the pos iterator.

See also:

- 5.45.21 Remove(first as VariantToVariantMapIteratorMBS, last as VariantToVariantMapIteratorMBS) 296
- 5.45.22 Remove(key as Variant) as Integer 296

**5.45.24 UpperBound(key as Variant) as VariantToVariantMapIteratorMBS**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns an iterator for the first element whose key is greater than k.

**5.45.25 ValueAtIndex(index as Integer) as Variant**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the value with the given index.

**Notes:** If there is no Indexth item in the map, a call generates an OutOfBoundsException error. The first item has the index zero.

**5.45.26 Values as Variant()**

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns all the values as an array

**Example:**

```
// Create a map
dim m as new VariantToVariantOrderedMapMBS

m.Value(1)="Hello"
m.Value(2)="World"

for each v as Variant in m.Values
  MsgBox v
next
```

**Notes:** The order is stable and matches the order returned by Keys at least until the Map is modified. Use this method with For Each to loop through all the values.

### 5.45.27 Properties

### 5.45.28 CaseSensitive as Boolean

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether text/string comparison is case sensitive.

**Example:**

```
dim s1 as new VariantToVariantOrderedMapMBS(true)
dim s2 as new VariantToVariantOrderedMapMBS(false)
```

```
s1.value("a") = "1"
s1.value("A") = "2"
```

```
s2.value("a") = "1"
s2.value("A") = "2"
```

```
MsgBox str(s1.Count)+" "+str(s2.Count)
```

**Notes:** (Read only property)

### 5.45.29 Count as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The number of items in this map.

**Example:**

```
dim map as new VariantToVariantOrderedMapMBS
```

```
map.Value(1)=true
map.Value("Hello")="World"
```

```
MsgBox str(map.Count)
```

**Notes:** (Read only property)

### 5.45.30 Empty as Boolean

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** True if the size is zero.

**Notes:** (Read only property)

### 5.45.31 MaxSize as Integer

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the largest possible size for this map.

**Notes:** Value is -1 if no limit is defined.

(Read only property)

### 5.45.32 value(key as Variant) as Variant

Plugin Version: 8.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The value associated with the given key.

**Notes:** If you query for a key which does not exist, a KeyNotFoundException is raised.

(Read and Write computed property)



# Chapter 6

## Math

### 6.1 class BiggerNumberMBS

#### 6.1.1 class BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The class for a big number.

**Example:**

```
// speed of light in m/s
Dim SpeedOfLight As New BiggerNumberMBS("299792458")

// seconds per day
Dim SecondsPerDay As New BiggerNumberMBS(24 * 3600)

Dim DaysPerYear As New BiggerNumberMBS(365.25)

Dim LightYear As BiggerNumberMBS = SpeedOfLight * DaysPerYear * SecondsPerDay
MsgBox LightYear.StringValue+" meter per light year"

// 9.460.730.472.580.800 matches number from Wikipedia

Dim AgeOfUniverse As New BiggerNumberMBS(1381000000)

Dim MaxDistance As BiggerNumberMBS = LightYear * AgeOfUniverse

MsgBox MaxDistance.GetStringValue(10, False, 100, 3, True)+" meter maximum"
```

**Notes:** This is floating point number with 320 bits in `BigNumber` and 2560 bits in `BiggerNumber` class. Precision is about 77 digits dot for the smaller one and 617 for the bigger one. So use first for speed and second for precision.

So if you want to store currency or other values where rounding should not happen, better store values multiplied, e.g. in cents.

Compared to normal double values, you have 5 times the bits. And we check for math errors and raise exceptions if something goes wrong.

See `LargeNumberMBS` for a 4128 bit integer number, about 1200 digits in length.

### **Blog Entries**

- [News from the MBS Xojo Plugins Version 24.0](#)
- [MBS Xojo Plugin, June 2021 News](#)
- [News from the MBS Xojo Plugins Version 21.1](#)
- [Video about MBS Xojo Plugins 21.1](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 21.1](#)
- [MBS Xojo Plugins, version 21.1pr9](#)

### **Videos**

- [MBS Xojo Plugins 21.1](#)
- [MBS Xojo Videos - MBS Xojo Plugin, June 2021 News](#)

### **Xojo Developer Magazine**

- 21.3, page 68: [Large, Big, and Bigger Numbers, Working with giant numbers](#) by Stefanie Juchmes
- 21.1, page 27: [News from MBS Xojo Plugins, What's up with MonkeyBread Software](#) by Stefanie Juchmes
- 19.3, page 44: [Xojo Time and Space,ÄiInto a Programming Black Hole, How converting durations and distances into human-readable form reveals a 32-bit problem at the heart of Xojo's 64-bit math module](#) by Markus Winter
- 19.3, page 10: [News](#)

## 6.1.2 Methods

### 6.1.3 Abs as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries absolute value.

**Example:**

```
dim o as BiggerNumberMBS = new BiggerNumberMBS(-123)
dim z as BiggerNumberMBS = o.Abs
```

```
MsgBox z.StringValue
```

**Notes:** Removes sign.

See also:

- 6.1.4 Abs(value as BiggerNumberMBS) as BiggerNumberMBS

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### 6.1.4 Abs(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Absolute value of x.

**Example:**

```
Dim c As New BiggerNumberMBS(-3)
Dim d As BiggerNumberMBS = BiggerNumberMBS.Abs(c)
Dim e As BiggerNumberMBS = c.Abs
```

```
MsgBox d.StringValue+EndOfLine+e.StringValue // shows 3
```

See also:

- 6.1.3 Abs as BiggerNumberMBS

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### 6.1.5 ACos(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Arc Cosine.

**Example:**

```
Dim c As New BiggerNumberMBS(0.5)
Dim d As BiggerNumberMBS = BiggerNumberMBS.ACos(c)
```

```
Dim x As Double = ACos(0.5)
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** we're using the formula:  $\text{acos}(x) = \pi/2 - \text{asin}(x)$

### 6.1.6 ACosh(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Inverse hyperbolic cosine.

**Example:**

```
Dim c As New BiggerNumberMBS(2.0)
Dim d As BiggerNumberMBS = BiggerNumberMBS.ACosh(c)

// ACosHMBS is in MBS Xojo Util Plugin
Dim x As Double = ACosHMBS(2.0)

MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:**  $\text{acosh}(x) = \ln(x + \sqrt{x^2 - 1})$   $x$  in  $<1, \infty$

### 6.1.7 ACot(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Arc Cotangent.

**Notes:** we're using the formula:  $\text{actan}(x) = \pi/2 - \text{atan}(x)$

### 6.1.8 ACoth(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates inverse hyperbolic cotangent.

**Notes:**  $\text{acoth}(x) = 0.5 * \ln((x+1) / (x-1))$   $x$  in  $(-\infty, -1)$  or  $(1, \infty)$

### 6.1.9 Add(other as BiggerNumberMBS, round as boolean = true) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a number.

**Example:**

```
dim x as new BiggerNumberMBS(2)
dim d as new BiggerNumberMBS(3)
dim p as BiggerNumberMBS = x.Add(d)
```

```
MsgBox p.StringValue // shows 5
```

### 6.1.10 ASin(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Arc Sine.

**Example:**

```
Dim c As New BiggerNumberMBS(1.0)
Dim d As BiggerNumberMBS = BiggerNumberMBS.ASin(c)
```

```
Dim x As Double = ASin(1.0)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** Range is from -1 to 1.

### 6.1.11 ASinh(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Inverse hyperbolic sine.

**Example:**

```
Dim c As New BiggerNumberMBS(0.5)
Dim d As BiggerNumberMBS = BiggerNumberMBS.ASinH(c)
```

```
// ASinHMBS is in MBS Xojo Util Plugin
Dim x As Double = ASinHMBS(0.5)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:**  $\operatorname{asinh}(x) = \ln(x + \sqrt{x^2 + 1})$

### 6.1.12 ATan(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Arc Tangent.

**Example:**

```
Dim c As New BiggerNumberMBS(0.5)
Dim d As BiggerNumberMBS = BiggerNumberMBS.ATan(c)
```

```
Dim x As Double = ATan(0.5)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

### 6.1.13 ATanh(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates inverse hyperbolic tangent.

**Example:**

```
Dim c As New BiggerNumberMBS(0.5)
Dim d As BiggerNumberMBS = BiggerNumberMBS.ATanh(c)
```

```
// ATanhMBS is in MBS Xojo Util Plugin
Dim x As Double = ATanhMBS(0.5)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:**  $\operatorname{atanh}(x) = 0.5 * \ln\left(\frac{1+x}{1-x}\right)$   $x$  in  $(-1, 1)$

### 6.1.14 BitAnd(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates bitwise AND operation.

**Example:**

```
dim x as new BiggerNumberMBS(17)
dim y as new BiggerNumberMBS(16)
dim r as BiggerNumberMBS = x.BitAnd(y)
```

```
MsgBox r.StringValue
```

### 6.1.15 BitOr(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates bitwise or operation.

**Example:**

```
dim x as new BiggerNumberMBS(17)
dim y as new BiggerNumberMBS(16)
dim r as BiggerNumberMBS = x.BitOr(y)
```

```
MsgBox r.StringValue
```

### 6.1.16 BitXOr(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates bitwise xor operation.

**Example:**

```
dim x as new BiggerNumberMBS(17)
dim y as new BiggerNumberMBS(16)
dim r as BiggerNumberMBS = x.BitXOr(y)
```

```
MsgBox r.StringValue
```

### 6.1.17 Ceil as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This function returns a value representing the smallest integer that is greater than or equal to x.

**Example:**

```
Dim c As New BigNumberMBS(-3.7)
```

```
Dim d As BigNumberMBS = c.Ceil
```

```
MsgBox d // shows -3
```

**Notes:** e.g.

```
Ceil(-3.7) = -3
```

```
Ceil(-3.1) = -3
```

```
Ceil(-3.0) = -3
```

```
Ceil(4.0) = 4
```

```
Ceil(4.2) = 5
```

```
Ceil(4.8) = 5
```

### 6.1.18 Constructor

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Initialize the number with zero value.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS
```

```
MsgBox o.StringValue
```

See also:

- 6.1.19 Constructor(other as BigNumberMBS) 309
- 6.1.20 Constructor(value as Currency) 309
- 6.1.21 Constructor(value as Double) 310
- 6.1.22 Constructor(value as Int32) 310
- 6.1.23 Constructor(value as Int64) 311
- 6.1.24 Constructor(value as Single) 312
- 6.1.25 Constructor(value as String) 312
- 6.1.26 Constructor(value as UInt32) 313
- 6.1.27 Constructor(value as UInt64) 314

**6.1.19 Constructor(other as BiggerNumberMBS)**

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Initialize the number with other value.

**Example:**

```
dim o as BiggerNumberMBS = new BiggerNumberMBS(2.5)
dim c as BiggerNumberMBS = new BiggerNumberMBS(o)
```

```
MsgBox c.StringValue
```

See also:

- 6.1.18 Constructor 308
- 6.1.20 Constructor(value as Currency) 309
- 6.1.21 Constructor(value as Double) 310
- 6.1.22 Constructor(value as Int32) 310
- 6.1.23 Constructor(value as Int64) 311
- 6.1.24 Constructor(value as Single) 312
- 6.1.25 Constructor(value as String) 312
- 6.1.26 Constructor(value as UInt32) 313
- 6.1.27 Constructor(value as UInt64) 314

**6.1.20 Constructor(value as Currency)**

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number object with a currency object.

**Example:**

```
dim v as Currency = 123.456
dim b as new BiggerNumberMBS(v)
MsgBox b.StringValue
```

See also:

- 6.1.18 Constructor 308
- 6.1.19 Constructor(other as BiggerNumberMBS) 309

- 6.1.21 Constructor(value as Double) 310
- 6.1.22 Constructor(value as Int32) 310
- 6.1.23 Constructor(value as Int64) 311
- 6.1.24 Constructor(value as Single) 312
- 6.1.25 Constructor(value as String) 312
- 6.1.26 Constructor(value as UInt32) 313
- 6.1.27 Constructor(value as UInt64) 314

### 6.1.21 Constructor(value as Double)

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Initialize the number with double value.

**Example:**

```
dim o as BiggerNumberMBS = new BiggerNumberMBS(2.5)
MsgBox str(o.DoubleValue)+" = "+str(o.StringValue)#
```

See also:

- 6.1.18 Constructor 308
- 6.1.19 Constructor(other as BiggerNumberMBS) 309
- 6.1.20 Constructor(value as Currency) 309
- 6.1.22 Constructor(value as Int32) 310
- 6.1.23 Constructor(value as Int64) 311
- 6.1.24 Constructor(value as Single) 312
- 6.1.25 Constructor(value as String) 312
- 6.1.26 Constructor(value as UInt32) 313
- 6.1.27 Constructor(value as UInt64) 314

### 6.1.22 Constructor(value as Int32)

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number with a 32-bit integer.

**Example:**

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```
dim v as Int32 = 123
dim b as new BiggerNumberMBS(v)
MsgBox b.StringValue
```

See also:

- 6.1.18 Constructor 308
- 6.1.19 Constructor(other as BiggerNumberMBS) 309
- 6.1.20 Constructor(value as Currency) 309
- 6.1.21 Constructor(value as Double) 310
- 6.1.23 Constructor(value as Int64) 311
- 6.1.24 Constructor(value as Single) 312
- 6.1.25 Constructor(value as String) 312
- 6.1.26 Constructor(value as UInt32) 313
- 6.1.27 Constructor(value as UInt64) 314

### 6.1.23 Constructor(value as Int64)

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number with a 64-bit integer.

**Example:**

```
dim v as Int64 = 123
dim b as new BiggerNumberMBS(v)
MsgBox b.StringValue
```

See also:

- 6.1.18 Constructor 308
- 6.1.19 Constructor(other as BiggerNumberMBS) 309
- 6.1.20 Constructor(value as Currency) 309
- 6.1.21 Constructor(value as Double) 310
- 6.1.22 Constructor(value as Int32) 310
- 6.1.24 Constructor(value as Single) 312

- 6.1.25 Constructor(value as String) 312
- 6.1.26 Constructor(value as UInt32) 313
- 6.1.27 Constructor(value as UInt64) 314

### 6.1.24 Constructor(value as Single)

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number with a 32-bit floating point number.

**Example:**

```
dim v as Single = 123
dim b as new BiggerNumberMBS(v)
MsgBox b.StringValue
```

See also:

- 6.1.18 Constructor 308
- 6.1.19 Constructor(other as BiggerNumberMBS) 309
- 6.1.20 Constructor(value as Currency) 309
- 6.1.21 Constructor(value as Double) 310
- 6.1.22 Constructor(value as Int32) 310
- 6.1.23 Constructor(value as Int64) 311
- 6.1.25 Constructor(value as String) 312
- 6.1.26 Constructor(value as UInt32) 313
- 6.1.27 Constructor(value as UInt64) 314

### 6.1.25 Constructor(value as String)

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Initialize the number with string value.

**Example:**

```
dim o as BiggerNumberMBS = new BiggerNumberMBS("123.456")
MsgBox o.StringValue
```

See also:

6.1. CLASS BIGGERNUMBERMBS	313
• 6.1.18 Constructor	308
• 6.1.19 Constructor(other as BiggerNumberMBS)	309
• 6.1.20 Constructor(value as Currency)	309
• 6.1.21 Constructor(value as Double)	310
• 6.1.22 Constructor(value as Int32)	310
• 6.1.23 Constructor(value as Int64)	311
• 6.1.24 Constructor(value as Single)	312
• 6.1.26 Constructor(value as UInt32)	313
• 6.1.27 Constructor(value as UInt64)	314

### 6.1.26 Constructor(value as UInt32)

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number with an unsigned 32-bit integer.

**Example:**

```
dim v as UInt32 = 123
dim b as new BiggerNumberMBS(v)
MsgBox b.StringValue
```

See also:

• 6.1.18 Constructor	308
• 6.1.19 Constructor(other as BiggerNumberMBS)	309
• 6.1.20 Constructor(value as Currency)	309
• 6.1.21 Constructor(value as Double)	310
• 6.1.22 Constructor(value as Int32)	310
• 6.1.23 Constructor(value as Int64)	311
• 6.1.24 Constructor(value as Single)	312
• 6.1.25 Constructor(value as String)	312
• 6.1.27 Constructor(value as UInt64)	314

### 6.1.27 Constructor(value as UInt64)

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number with an unsigned 32-bit integer.

**Example:**

```
dim v as UInt64 = 123
dim b as new BiggerNumberMBS(v)
MsgBox b.StringValue
```

See also:

- 6.1.18 Constructor 308
- 6.1.19 Constructor(other as BiggerNumberMBS) 309
- 6.1.20 Constructor(value as Currency) 309
- 6.1.21 Constructor(value as Double) 310
- 6.1.22 Constructor(value as Int32) 310
- 6.1.23 Constructor(value as Int64) 311
- 6.1.24 Constructor(value as Single) 312
- 6.1.25 Constructor(value as String) 312
- 6.1.26 Constructor(value as UInt32) 313

### 6.1.28 Cos(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the cosine value.

**Example:**

```
Dim c As New BiggerNumberMBS(1.0)
Dim d As BiggerNumberMBS = BiggerNumberMBS.Cos(c)

Dim x As Double = Cos(1.0)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** We're using the formula  $\cos(x) = \sin(x + \text{PI}/2)$ .

**6.1.29 Cosh(value as BiggerNumberMBS) as BiggerNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Hyperbolic Cosine.

**Example:**

```
Dim c As New BiggerNumberMBS(0.5)
Dim d As BiggerNumberMBS = BiggerNumberMBS.CosH(c)
```

```
// CosHMBS is in MBS Xojo Util Plugin
Dim x As Double = CosHMBS(0.5)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** We're using the formula  $\cosh(x) = (e^x + e^{-x}) / 2$ .

**6.1.30 Cot(value as BiggerNumberMBS) as BiggerNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Cotangent.

**Notes:** We're using the formula  $\cot(x) = \cos(x) / \sin(x)$ .

**6.1.31 Coth(value as BiggerNumberMBS) as BiggerNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Hyperbolic Cotangent.

**Notes:** We're using the formula  $\coth(x) = (e^x + e^{-x}) / (e^x - e^{-x})$

**6.1.32 DegToDeg(d as BiggerNumberMBS, m as BiggerNumberMBS, s as BiggerNumberMBS) as BiggerNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts degrees in the long format into one value.

**Notes:** long format: (degrees, minutes, seconds)

minutes and seconds must be greater than or equal zero

result:

if  $d \geq 0$  : result =  $d + ((s/60)+m)/60$   
 if  $d < 0$  : result =  $d - ((s/60)+m)/60$

$((s/60)+m)/60 = (s+60*m)/3600$  (second version is faster because there's only one division)

for example:

DegToDeg(10, 30, 0) = 10.5  
 DegToDeg(10, 24, 35.6)=10.4098(8)

### 6.1.33 DegToGrad(d as BiggerNumberMBS, m as BiggerNumberMBS, s as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts degrees in the long format to gradians.

See also:

- 6.1.34 DegToGrad(value as BiggerNumberMBS) as BiggerNumberMBS 316

### 6.1.34 DegToGrad(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts degrees to gradians.

**Notes:** it returns:  $x * 200 / 180$

See also:

- 6.1.33 DegToGrad(d as BiggerNumberMBS, m as BiggerNumberMBS, s as BiggerNumberMBS) as BiggerNumberMBS 316

### 6.1.35 DegToRad(d as BiggerNumberMBS, m as BiggerNumberMBS, s as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts degrees in the long format to radians.

See also:

- 6.1.36 DegToRad(value as BiggerNumberMBS) as BiggerNumberMBS 316

### 6.1.36 DegToRad(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts degrees to radians.

**Notes:** It returns:  $x * \pi / 180$

See also:

- 6.1.35 DegToRad(d as BiggerNumberMBS, m as BiggerNumberMBS, s as BiggerNumberMBS) as BiggerNumberMBS 316

### 6.1.37 Divide(other as BiggerNumberMBS, round as boolean = true) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides the number.

**Example:**

```
dim x as new BiggerNumberMBS(8)
dim d as new BiggerNumberMBS(2)
dim p as BiggerNumberMBS = x.Divide(d)
```

MsgBox p.StringValue // shows 4

### 6.1.38 E as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value zero.

**Example:**

```
dim b as BiggerNumberMBS = BiggerNumberMBS.e
MsgBox b.StringValue
```

### 6.1.39 Equals(other as BiggerNumberMBS) as Boolean

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks if two numbers are the same.

**Example:**

```
dim o as BiggerNumberMBS = new BiggerNumberMBS(123)
dim z as BiggerNumberMBS = new BiggerNumberMBS(123)

if o.Equals(z) then
  MsgBox "equal"
```

```

else
Break // error
end if

```

**Notes:** Returns true if equal.

### 6.1.40 Exp(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates  $e^{\text{value}}$ .

**Example:**

```

dim x as new BiggerNumberMBS(2)
dim p as BiggerNumberMBS = BiggerNumberMBS.Exp(x)

```

MsgBox p.StringValue // shows  $e^2 = 7.38$

### 6.1.41 Floor as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes any fraction part.

**Example:**

```

dim o as BiggerNumberMBS = new BiggerNumberMBS(2.3)
dim s as BiggerNumberMBS = o.Floor

```

MsgBox s.StringValue

```

dim a as BiggerNumberMBS = new BiggerNumberMBS(-2.3)
dim b as BiggerNumberMBS = a.Floor

```

MsgBox b.StringValue

### 6.1.42 Frac as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Extracts the fraction part.

**Example:**

```
dim o as BiggerNumberMBS = new BiggerNumberMBS(2.5)
dim s as BiggerNumberMBS = o.Frac
```

```
MsgBox s.StringValue
```

```
dim a as BiggerNumberMBS = new BiggerNumberMBS(-2.5)
dim b as BiggerNumberMBS = a.Frac
```

```
MsgBox b.StringValue
```

### 6.1.43 GetStringValue(Base as Integer = 10, scientific as boolean = false, scientificFrom as Integer = 15, round as Integer = -1, TrimZeros as Boolean = true, comma as String = ",") as String

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries string value.

**Example:**

```
dim o as new BiggerNumberMBS(1234)
```

```
// show as hex
MsgBox o.GetStringValue(16)
```

```
// show as number with comma and 3 digits
dim z as new BiggerNumberMBS(12.345)
MsgBox z.GetStringValue(10, false, 15, 3, true, ",")
```

**Notes:** Base: The base of the number system. Normally 10, but also 16 for hex is common.

scientific: Whether to use scientific notation.

scientificFrom: How many digits we show.

Round: Whether to round to n digits.

TrimZeros: Whether to trim unneeded zeros.

comma: The character to use as decimal dot.

See also:

- 6.1.44 GetStringValue(Conversion as BigNumberConversionMBS) as String

### 6.1.44 GetStringValue(Conversion as BigNumberConversionMBS) as String

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries string value.

**Example:**

```
Dim o As New BiggerNumberMBS(1234567.890)
```

```
Dim conv As New BigNumberConversionMBS
conv.Comma = ","
conv.Group = ""
conv.Scientific = False
conv.Round = 3
```

```
Dim s1 As String = o.GetStringValue(conv)
// 1'234'567,89
```

```
conv.Comma = ""
conv.Group = ","
```

```
Dim s2 As String = o.GetStringValue(conv)
// 1,234,567,89
```

```
conv.Comma = ","
conv.Group = ""
conv.Scientific = True
```

```
Dim s3 As String = o.GetStringValue(conv)
// 1,235e+6
```

Break

See also:

- 6.1.43 `GetStringValue(Base as Integer = 10, scientific as boolean = false, scientificFrom as Integer = 15, round as Integer = -1, TrimZeros as Boolean = true, comma as String = "")` as String 319

### 6.1.45 `GradToDeg(value as BiggerNumberMBS) as BiggerNumberMBS`

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts degrees to gradians.

**Notes:** it returns:  $x * 180 / 200$

### 6.1.46 `GradToRad(value as BiggerNumberMBS) as BiggerNumberMBS`

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts gradians to radians.

**Notes:** It returns:  $x * \pi / 200$ .

### 6.1.47 HalfPi as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value  $\pi/2$ .

**Example:**

```
dim b as BiggerNumberMBS = BiggerNumberMBS.HalfPi
MsgBox b.StringValue
```

### 6.1.48 LibTypeStr as String

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries what implementation is used for this platform.

**Notes:** Shows asm in the text if assembler code is used.

Assembler code is not available for all platforms.

### 6.1.49 Ln(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates natural logarithm.

**Example:**

```
dim x as new BiggerNumberMBS(2)
dim p as BiggerNumberMBS = BiggerNumberMBS.Ln(x)
```

MsgBox p.StringValue // shows  $\ln(2) = 0.69$

### 6.1.50 Ln10 as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value  $\ln(10)$ .

**Example:**

```
dim b as BiggerNumberMBS = BiggerNumberMBS.Ln10
MsgBox b.StringValue
```

### 6.1.51 Ln2 as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value  $\ln(2)$ .

**Example:**

```
dim b as BiggerNumberMBS = BiggerNumberMBS.Ln2
MsgBox b.StringValue
```

### 6.1.52 Log(value as BiggerNumberMBS, base as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates logarithm in a given base.

**Example:**

```
dim x as new BiggerNumberMBS(100)
dim d as new BiggerNumberMBS(10)
dim p as BiggerNumberMBS = BiggerNumberMBS.Log(x, d)
```

```
MsgBox p.StringValue // shows  $\ln(100)/\ln(10) = 2$ 
```

### 6.1.53 Max as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with maximum value.

**Example:**

```
dim b as BiggerNumberMBS = BiggerNumberMBS.Min
MsgBox b.StringValue
```

### 6.1.54 Min as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with minimum value.

**Example:**

```
dim b as BiggerNumberMBS = BiggerNumberMBS.Min  
MsgBox b.StringValue
```

### 6.1.55 Modulate(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Modulates a number.

**Example:**

```
dim x as new BiggerNumberMBS(17)  
dim y as new BiggerNumberMBS(3)  
dim r as BiggerNumberMBS = x.Modulate(y)
```

```
MsgBox r.StringValue
```

**Notes:** Similar to mod keyword in Xojo.

### 6.1.56 Modulate2 as Integer

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Modulates by 2.

**Example:**

```
dim x as new BiggerNumberMBS(8)  
dim y as new BiggerNumberMBS(9)  
MsgBox str(x.Modulate2)+" "+str(y.Modulate2)
```

**Notes:** Returns 0 or 1.

### 6.1.57 `Multiply`(other as `BiggerNumberMBS`, round as boolean = true) as `BiggerNumberMBS`

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiplies two numbers.

**Example:**

```
dim x as new BiggerNumberMBS(8)
dim d as new BiggerNumberMBS(2)
dim p as BiggerNumberMBS = x.Multiply(d)
```

`MsgBox p.StringValue // shows 16`

See also:

- 6.1.58 `Multiply`(value as Integer) as `BiggerNumberMBS` 324
- 6.1.59 `Multiply`(value as UInt32) as `BiggerNumberMBS` 324

### 6.1.58 `Multiply`(value as Integer) as `BiggerNumberMBS`

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiply by an integer.

**Example:**

```
dim x as new BiggerNumberMBS(2)
dim p as BiggerNumberMBS = x.Multiply(3)
```

`MsgBox p.StringValue // shows 6`

See also:

- 6.1.57 `Multiply`(other as `BiggerNumberMBS`, round as boolean = true) as `BiggerNumberMBS` 324
- 6.1.59 `Multiply`(value as UInt32) as `BiggerNumberMBS` 324

### 6.1.59 `Multiply`(value as UInt32) as `BiggerNumberMBS`

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiply by an unsigned integer.

**Example:**

```
dim x as new BiggerNumberMBS(17)
dim r as BiggerNumberMBS = x.Multiply(3)
```

```
MsgBox r.StringValue
```

See also:

- 6.1.57 Multiply(other as BiggerNumberMBS, round as boolean = true) as BiggerNumberMBS 324
- 6.1.58 Multiply(value as Integer) as BiggerNumberMBS 324

### 6.1.60 Nan as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value NaN.

**Example:**

```
dim b as BiggerNumberMBS = BiggerNumberMBS.Nan
MsgBox b.StringValue
```

### 6.1.61 Negate as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Negates the number.

**Example:**

```
dim o as BiggerNumberMBS = new BiggerNumberMBS(123)
dim z as BiggerNumberMBS = o.Negate
```

```
MsgBox z.StringValue
```

### 6.1.62 NumberWithCurrency(value as Currency) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with a currency value.

**Example:**

```
dim v as Currency = 123.456
dim b as BiggerNumberMBS = BiggerNumberMBS.NumberWithCurrency(v)
```

MsgBox b.StringValue

### 6.1.63 NumberWithDouble(value as Double) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with a 64-bit floating number.

**Example:**

```
dim v as Double = 123.456
dim b as BiggerNumberMBS = BiggerNumberMBS.NumberWithDouble(v)
```

MsgBox b.StringValue

### 6.1.64 NumberWithInt32(value as Int32) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with a signed 32-bit integer.

**Example:**

```
dim v as Int32 = 123
dim b as BiggerNumberMBS = BiggerNumberMBS.NumberWithInt32(v)
```

MsgBox b.StringValue

### 6.1.65 NumberWithInt64(value as Int64) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with a signed 64-bit integer.

**Example:**

```
dim v as Int64 = 123
dim b as BiggerNumberMBS = BiggerNumberMBS.NumberWithInt64(v)
```

MsgBox b.StringValue

### 6.1.66 NumberWithInteger(value as Integer) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with an integer.

**Example:**

```
dim v as Integer = 123
dim b as BiggerNumberMBS = BiggerNumberMBS.NumberWithInteger(v)
```

MsgBox b.StringValue

### 6.1.67 NumberWithSingle(value as single) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with an 32-bit floating point number.

**Example:**

```
dim v as Single = 123
dim b as BiggerNumberMBS = BiggerNumberMBS.NumberWithSingle(v)
```

MsgBox b.StringValue

### 6.1.68 NumberWithString(value as String) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with value from string.

**Example:**

```
dim v as String = "123"
dim b as BiggerNumberMBS = BiggerNumberMBS.NumberWithString(v)
```

MsgBox b.StringValue

### 6.1.69 NumberWithUInt32(value as UInt32) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with an unsigned 32-bit integer.

**Example:**

```
dim v as UInt32 = 123
dim b as BiggerNumberMBS = BiggerNumberMBS.NumberWithUInt32(v)
```

```
MsgBox b.StringValue
```

**6.1.70 NumberWithUInt64(value as UInt64) as BiggerNumberMBS**

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with an unsigned 64-bit integer.

**Example:**

```
dim v as UInt64 = 123
dim b as BiggerNumberMBS = BiggerNumberMBS.NumberWithUInt64(v)
```

```
MsgBox b.StringValue
```

**6.1.71 NumberWithUInteger(value as UInteger) as BiggerNumberMBS**

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with an unsigned integer.

**Example:**

```
dim v as UInteger = 123
dim b as BiggerNumberMBS = BiggerNumberMBS.NumberWithUInteger(v)
```

```
MsgBox b.StringValue
```

**6.1.72 NumberWithVariant(value as Variant) as BiggerNumberMBS**

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number based on a variant.

**Example:**

```
dim v as Variant = 123.456
dim b as BiggerNumberMBS = BiggerNumberMBS.NumberWithVariant(v)
```

```
MsgBox b.StringValue
```

**Notes:** Internally redirects to other NumberWith functions based on the value type.

### 6.1.73 One as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value one.

**Example:**

```
dim b as BiggerNumberMBS = BiggerNumberMBS.One
MsgBox b.StringValue
```

### 6.1.74 Operator \_Add(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a number.

**Example:**

```
dim a as new BiggerNumberMBS(3)
dim b as new BiggerNumberMBS(4)

// add
dim c as BiggerNumberMBS = a + b

MsgBox c.StringValue
```

### 6.1.75 Operator \_AddRight(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a number.

**Example:**

```
dim a as new BiggerNumberMBS(3)
dim b as new BiggerNumberMBS(4)

// add
dim c as BiggerNumberMBS = a + b
```

MsgBox c.StringValue

### 6.1.76 Operator\_Compare(other as BiggerNumberMBS) as Integer

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Compares two numbers.

**Example:**

```
dim a as new BiggerNumberMBS(1.2)
dim b as new BiggerNumberMBS(1.2)
dim c as new BiggerNumberMBS(1.3)
```

```
if a = b then
  // ok
else
  break
end if
```

```
if a <c then
  // ok
else
  Break
end if
```

```
if c >b then
  // ok
else
  break
end if
```

### 6.1.77 Operator\_Convert as String

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts big number to string automatically.

**Example:**

```
dim b as new BiggerNumberMBS
dim n as Double = 5
```

```
// convert from double to big number automatically
b = n
```

```
// convert to string automatically
MsgBox b
```

See also:

- 6.1.78 Operator\_Convert(value as String) 331

### 6.1.78 Operator\_Convert(value as String)

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts a string to a big number.

**Example:**

```
dim b as new BiggerNumberMBS
dim n as string = "5"
```

```
// convert from string to big number automatically
b = n
```

```
// convert to double automatically
dim d as Double = b
MsgBox str(d)
```

See also:

- 6.1.77 Operator\_Convert as String 330

### 6.1.79 Operator\_Divide(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides two numbers.

**Example:**

```
dim a as new BiggerNumberMBS(9.3)
dim b as new BiggerNumberMBS(3.0)
```

```
dim r as BiggerNumberMBS = a / b
```

```
MsgBox r.StringValue
```

### 6.1.80 `Operator_DivideRight`(other as `BiggerNumberMBS`) as `BiggerNumberMBS`

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides two numbers.

### 6.1.81 `Operator_IntegerDivide`(other as `BiggerNumberMBS`) as `BiggerNumberMBS`

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates an integer divide.

**Example:**

```
dim a as new BiggerNumberMBS(9.3)
dim b as new BiggerNumberMBS(3.0)
```

```
dim r as BiggerNumberMBS = a \ b
```

```
MsgBox r.StringValue
```

**Notes:** Same as normal divide, but removes fraction part.

### 6.1.82 `Operator_IntegerDivideRight`(other as `BiggerNumberMBS`) as `BiggerNumberMBS`

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates an integer divide.

**Notes:** Same as normal divide, but removes fraction part.

### 6.1.83 `Operator_Modulo`(other as `BiggerNumberMBS`) as `BiggerNumberMBS`

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the modulo of two numbers.

**Example:**

```
dim a as new BiggerNumberMBS(9.3)
dim b as new BiggerNumberMBS(3.0)
```

```
dim r as BiggerNumberMBS = a mod b
```

MsgBox r.StringValue

#### 6.1.84 Operator\_ModuloRight(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the modulo of two numbers.

#### 6.1.85 Operator\_Multiply(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiply two numbers.

**Example:**

```
// speed of light in m/s
Dim SpeedOfLight As New BiggerNumberMBS("299792458")

// seconds per day
Dim SecondsPerDay As New BiggerNumberMBS(24 * 3600)

Dim DaysPerYear As New BiggerNumberMBS(365.25)

Dim LightYear As BiggerNumberMBS = SpeedOfLight * DaysPerYear * SecondsPerDay
MsgBox LightYear.StringValue+" meter per light year"

// 9.460.730.472.580.800 matches number from Wikipedia

Dim AgeOfUniverse As New BiggerNumberMBS(1381000000)

Dim MaxDistance As BiggerNumberMBS = LightYear * AgeOfUniverse

MsgBox MaxDistance.GetStringValue(10, False, 100, 3, True)+" meter maximum"
```

#### 6.1.86 Operator\_MultiplyRight(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiply two numbers.

### 6.1.87 Operator\_Negate as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Negates a number.

**Example:**

```
dim a as new BiggerNumberMBS(3)
```

```
// negate
```

```
dim c as BiggerNumberMBS = -a
```

```
MsgBox c.StringValue
```

### 6.1.88 Operator\_Power(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates power of two numbers.

**Example:**

```
dim a as new BiggerNumberMBS(3)
```

```
dim b as new BiggerNumberMBS(4)
```

```
// pow
```

```
dim c as BiggerNumberMBS = a ^ b
```

```
MsgBox c.StringValue
```

### 6.1.89 Operator\_PowerRight(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates power of two numbers.

### 6.1.90 Operator\_Subtract(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts one number from other.

**Example:**

```
dim a as new BiggerNumberMBS(3)
dim b as new BiggerNumberMBS(4)
```

```
// subtract
dim c as BiggerNumberMBS = a - b
```

```
MsgBox c.StringValue
```

### 6.1.91 Operator\_SubtractRight(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts one number from other.

### 6.1.92 Pi as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value pi.

**Example:**

```
dim b as BiggerNumberMBS = BiggerNumberMBS.Pi
MsgBox b.StringValue
```

### 6.1.93 Pow(other as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the power of the number.

**Example:**

```
dim x as new BiggerNumberMBS(2)
dim o as new BiggerNumberMBS(5)
dim p as BiggerNumberMBS = x.Pow(o)
```

```
MsgBox p.StringValue // shows 32
```

**6.1.94 RadToDeg(value as BiggerNumberMBS) as BiggerNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts radians to degrees.

**Notes:** It returns:  $x * 180 / \pi$ .

**6.1.95 RadToGrad(value as BiggerNumberMBS) as BiggerNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts radians to gradians.

**Notes:** it returns:  $x * 200 / \pi$

**6.1.96 Rand as BiggerNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates random number.

**Notes:** Mantissa and exponent are filled with random bytes to generate a random names.

**6.1.97 Root(value as BiggerNumberMBS, index as BiggerNumberMBS) as BiggerNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Indexth Root of x

**Example:**

```
Dim c As New BiggerNumberMBS(5*5*5*5)
Dim e As New BiggerNumberMBS(4)
Dim d As BiggerNumberMBS = BiggerNumberMBS.Root(c, e)
```

MsgBox d.StringValue

**Notes:** index must be integer and not negative (<0;1;2;3....)

if index==0 the result is one

if x==0 the result is zero and we assume root(0;0) is not defined

if index is even (2;4;6...) the result is  $x^{(1/\text{index})}$  and  $x > 0$

if index is odd (1;2;3;...) the result is either

$-(\text{abs}(x)^{(1/\text{index}}))$  if  $x < 0$   
 or  
 $x^{(1/\text{index})}$  if  $x > 0$

(for  $\text{index} == 1$  the result is equal  $x$ )

### 6.1.98 Round as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Rounds the number.

**Example:**

```
dim o as BiggerNumberMBS = new BiggerNumberMBS(2.3)
dim s as BiggerNumberMBS = o.Round
```

```
MsgBox s.StringValue
```

```
dim a as BiggerNumberMBS = new BiggerNumberMBS(-2.3)
dim b as BiggerNumberMBS = a.Round
```

```
MsgBox b.StringValue
```

### 6.1.99 SetStringValue(Text As String, Base as Integer, byref AfterText as String, Byref ValueRead as boolean)

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Parses number from string.

**Example:**

```
// set to 1.2 and show
dim o as new BiggerNumberMBS
```

```
dim after as string
dim ValueRead as Boolean
```

```
o.SetStringValue "1.2 hello", 10, after, ValueRead
```

```
MsgBox "value: "+o.StringValue+EndOfLine+"after: "+after
Break
```

**Notes:** Returns also the text after the given text following the number.  
Also sets ValueRead if a value was read.  
See also:

- 6.1.100 SetStringValue(Text As String, Conversion as BigNumberConversionMBS) 338
- 6.1.101 SetStringValue(Text As String, Conversion as BigNumberConversionMBS, byref AfterText as String, Byref ValueRead as boolean) 338

### 6.1.100 SetStringValue(Text As String, Conversion as BigNumberConversionMBS)

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Parses number from string.

**Example:**

```
Dim o As New BiggerNumberMBS
```

```
Dim conv As New BigNumberConversionMBS
```

```
conv.Comma = ","
```

```
conv.Group = ""
```

```
conv.Scientific = False
```

```
conv.Round = 3
```

```
o.SetStringValue("1'234'567,89", conv)
```

```
MessageBox o.StringValue
```

See also:

- 6.1.99 SetStringValue(Text As String, Base as Integer, byref AfterText as String, Byref ValueRead as boolean) 337
- 6.1.101 SetStringValue(Text As String, Conversion as BigNumberConversionMBS, byref AfterText as String, Byref ValueRead as boolean) 338

### 6.1.101 SetStringValue(Text As String, Conversion as BigNumberConversionMBS, byref AfterText as String, Byref ValueRead as boolean)

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Parses number from string.

**Example:**

```
Dim o As New BiggerNumberMBS
```

```
Dim conv As New BigNumberConversionMBS
conv.Comma = ","
conv.Group = ""
conv.Scientific = False
conv.Round = 3
```

```
Dim after As String
Dim read As Boolean
```

```
o.SetStringValue("1'234'567,89abc", conv, after, read)
// read will be true and after contains "abc".
```

```
Dim value As String = o.StringValue
```

```
Dim after2 As String
Dim read2 As Boolean
```

```
o.SetStringValue("abc", conv, after2, read2)
// read2 will be false and after2 contains "abc".
```

```
Break
```

**Notes:** Returns the text after the given text following the number in AfterText parameter.  
Sets ValueRead if a value was read.  
See also:

- 6.1.99 SetStringValue(Text As String, Base as Integer, byref AfterText as String, Byref ValueRead as boolean) 337
- 6.1.100 SetStringValue(Text As String, Conversion as BigNumberConversionMBS) 338

### 6.1.102 Sgn(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries sign of number.

**Example:**

```
Dim negative As New BiggerNumberMBS(-5.6)
Dim sign1 As BiggerNumberMBS = BiggerNumberMBS.Sgn(negative)
```

```
Dim positive As New BiggerNumberMBS(5.6)
Dim sign2 As BiggerNumberMBS = BiggerNumberMBS.Sgn(positive)
```

```
Break
```



**6.1.103 Sin(value as BiggerNumberMBS) as BiggerNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the sinus value.

**Example:**

```
Dim c As New BiggerNumberMBS(1.0)
Dim d As BiggerNumberMBS = BiggerNumberMBS.Sin(c)
```

```
Dim x As Double = Sin(1.0)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**6.1.104 Sinh(value as BiggerNumberMBS) as BiggerNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Hyperbolic Sine.

**Example:**

```
Dim c As New BiggerNumberMBS(0.5)
Dim d As BiggerNumberMBS = BiggerNumberMBS.SinH(c)
```

```
// SinHMBS is in MBS Xojo Util Plugin
Dim x As Double = SinHMBS(0.5)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** we're using the formula  $\sinh(x) = (e^x - e^{-x}) / 2$

**6.1.105 SkipFraction as BiggerNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This function skips the fraction.

**Example:**

```
Dim c As New BiggerNumberMBS(-3.7)
Dim d As BiggerNumberMBS = c.SkipFraction
```

```
MsgBox d // shows -3
```

**Notes:** Similar to floor, but different for negative ones.

e.g  
 2.2 =>2  
 2.7 =>2  
 -2.2 =>2  
 -2.7 =>2

### 6.1.106 Sqrt as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the square root.

**Example:**

```
dim o as BiggerNumberMBS = new BiggerNumberMBS(256)
dim s as BiggerNumberMBS = o.Sqrt
```

```
MsgBox s.StringValue
```

### 6.1.107 Subtract(other as BiggerNumberMBS, round as boolean = true) as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts a number.

**Example:**

```
dim x as new BiggerNumberMBS(2)
dim d as new BiggerNumberMBS(3)
dim p as BiggerNumberMBS = x.Subtract(d)
```

```
MsgBox p.StringValue // shows -1
```

### 6.1.108 Tan(value as BiggerNumberMBS) as BiggerNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Tangent.

**Example:**

```
Dim c As New BiggerNumberMBS(1.0)
Dim d As BiggerNumberMBS = BiggerNumberMBS.Tan(c)

Dim x As Double = Tan(1.0)

MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** We're using the formula  $\tan(x) = \sin(x) / \cos(x)$ .

**6.1.109 Tanh(value as BiggerNumberMBS) as BiggerNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Hyperbolic Tangent.

**Example:**

```
Dim c As New BiggerNumberMBS(0.5)
Dim d As BiggerNumberMBS = BiggerNumberMBS.TanH(c)

// TanHMBS is in MBS Xojo Util Plugin
Dim x As Double = TanHMBS(0.5)

MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** We're using the formula  $\tanh(x) = (e^x - e^{-x}) / (e^x + e^{-x})$

**6.1.110 TwoPi as BiggerNumberMBS**

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value  $2 * \text{PI}$ .

**Example:**

```
dim b as BiggerNumberMBS = BiggerNumberMBS.TwoPi
MsgBox b.StringValue
```

### 6.1.111 Zero as BiggerNumberMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value zero.

**Example:**

```
dim b as BiggerNumberMBS = BiggerNumberMBS.Zero
MsgBox b.StringValue
```

### 6.1.112 Properties

### 6.1.113 CurrencyValue as Currency

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sets/Queries currency value.

**Example:**

```
dim u as Currency = 1234.5678
dim b as new BiggerNumberMBS(u)
MsgBox str(b.CurrencyValue)
```

**Notes:** (Read and Write property)

### 6.1.114 DataExponent as MemoryBlock

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The exponent for this number.

**Notes:** Setting this may need to update flags, too.

(Read and Write property)

### 6.1.115 DataFlags as Integer

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The flags.

**Notes:** Bits are 128 for Sign, 64 for NAN and 32 for zero.

(Read and Write property)

**6.1.116 DataMantissa as MemoryBlock**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The mantissa for this number.

**Notes:** Setting this may need to update flags, too.  
(Read and Write property)

**6.1.117 DoubleValue as Double**

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or Set the double value.

**Example:**

```
dim o as BiggerNumberMBS = new BiggerNumberMBS(2.5)
```

```
MsgBox str(o.DoubleValue)+" = "+str(o.StringValue)
```

**Notes:** (Read and Write property)

**6.1.118 Int64Value as Int64**

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get/Set value as Int64.

**Example:**

```
dim u as Int64 = &h7FFFFFFFFFFFFFFFFF // maximum Int64
```

```
dim b as new BiggerNumberMBS(u)
```

```
MsgBox str(b.Int64Value)
```

```
dim one as new BiggerNumberMBS(1)
```

```
b = b + one
```

```
// raises exception due to overflow
```

```
MsgBox str(b.Int64Value)
```

**Notes:** (Read and Write property)

### 6.1.119 IntegerValue as Integer

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or Set the integer value.

**Example:**

```
dim o as BiggerNumberMBS = new BiggerNumberMBS(2.5)
```

```
MsgBox str(o.IntegerValue)+" = "+str(o.StringValue)
```

**Notes:** (Read and Write property)

### 6.1.120 IsInteger as Boolean

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this number is an integer.

**Example:**

```
dim o as BiggerNumberMBS = new BiggerNumberMBS(1)
```

```
dim z as BiggerNumberMBS = new BiggerNumberMBS(1.5)
```

```
if o.IsInteger then
```

```
MsgBox o.StringValue+" is integer"
```

```
else
```

```
break // error
```

```
end if
```

```
if z.IsInteger then
```

```
break // error
```

```
else
```

```
MsgBox z.StringValue+" is not integer"
```

```
end if
```

**Notes:** If true, there are no digits after the dot.  
(Read only property)

### 6.1.121 IsNan as Boolean

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this is an invalid number.

**Example:**

```
dim o as BiggerNumberMBS = BiggerNumberMBS.zero
dim z as BiggerNumberMBS = BiggerNumberMBS.NaN
```

```
if z.IsNaN then
  MsgBox z.StringValue+” is NaN”
else
  break // error
end if
```

```
if o.IsNaN then
  break // error
else
  MsgBox o.StringValue+” is not NaN”
end if
```

**Notes:** (Read only property)

### 6.1.122 IsNegative as Boolean

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this value is negative.

**Example:**

```
dim o as BiggerNumberMBS = BiggerNumberMBS.one
dim z as BiggerNumberMBS = BiggerNumberMBS.one.Negate
```

```
if z.IsNegative then
  MsgBox z.StringValue+” is negative”
else
  break // error
end if
```

```
if o.IsNegative then
  break // error
else
  MsgBox o.StringValue+” is not negative”
end if
```

**Notes:** (Read only property)

### 6.1.123 IsZero as Boolean

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks if value is zero.

**Example:**

```
dim o as BiggerNumberMBS = BiggerNumberMBS.one
dim z as BiggerNumberMBS = BiggerNumberMBS.zero
```

```
if z.IsZero then
  MsgBox z.StringValue+" is zero"
else
  break // error
end if
```

```
if o.IsZero then
  break // error
else
  MsgBox o.StringValue+" is not zero"
end if
```

**Notes:** (Read only property)

### 6.1.124 StringValue as String

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or set string value of text.

**Example:**

```
// set to 1.2 and show
dim o as new BiggerNumberMBS("1.2")
MsgBox o.StringValue
```

```
// set to 2.3
o.StringValue = "2.3"
MsgBox o.StringValue
```

**Notes:** (Read and Write property)

See also:

- 6.1.127 StringValue(Base as Integer) as String

**6.1.125 UInt64Value as UInt64**

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get/Set value as UInt64.

**Example:**

```
dim u as UInt64 = 12345678901234567890
dim b as new BiggerNumberMBS(u)
MsgBox str(b.UInt64Value)
```

**Notes:** (Read and Write property)

**6.1.126 VariantValue as Variant**

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries/Sets value with variant.

**Notes:** Floating point values are given as Double.

Integer types as Int32, Int64 or UInt64.

If value exceeds the ranges of those data types, we fall back to string.

When setting, the value is converted to a big number similiar to NumberWithVariant.

(Read and Write property)

**6.1.127 StringValue(Base as Integer) as String**

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get/Set string value with a given base.

**Example:**

```
dim o as new BiggerNumberMBS(1234)

// show as hex
MsgBox o.StringValue(16)
```

**Notes:** (Read and Write computed property)

See also:

- 6.1.124 StringValue as String

## 6.2 class BigNumberConversionMBS

### 6.2.1 class BigNumberConversionMBS

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** This class holds information to convert numbers to/from text.

**Example:**

```
Dim o As New BigNumberMBS(1234567.890)
```

```
Dim conv As New BigNumberConversionMBS
conv.Comma = ","
conv.Group = ""
conv.Scientific = False
conv.Round = 3
```

```
Dim s1 As String = o.GetStringValue(conv)
// 1'234'567,89
```

```
conv.Comma = "."
conv.Group = ","
```

```
Dim s2 As String = o.GetStringValue(conv)
// 1,234,567,89
```

```
conv.Comma = "."
conv.Group = ""
conv.Scientific = True
```

```
Dim s3 As String = o.GetStringValue(conv)
// 1,235e+6
```

Break

#### Blog Entries

- [News from the MBS Xojo Plugins Version 24.0](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 24.0](#)
- [MBS Xojo Plugins, version 23.6pr2](#)
- [MBS Xojo Plugins, version 23.6pr1](#)

#### Xojo Developer Magazine

- [22.2, page 9: News](#)

## 6.2.2 Methods

### 6.2.3 Constructor

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** The constructor.

### 6.2.4 Properties

### 6.2.5 Base as Integer

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** base (radix) on which the value will be shown (or read)

**Notes:** default: 10

(Read and Write property)

### 6.2.6 BaseRound as Boolean

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** Whether to round last digit.

**Notes:** if 'base\_round' is true and 'base' is different from 2, 4, 8, or 16 and the result value is not an integer then we make an additional rounding (after converting the last digit from the result is skipped)

default: true

(Read and Write property)

### 6.2.7 Comma as String

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** The main comma operator (used when reading and writing)

**Notes:** default is a dot "."

(Read and Write property)

### 6.2.8 Comma2 as String

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** Additional comma operator (used only when reading)

**Example:**

```
Dim o1 As New BigNumberMBS
Dim o2 As New BigNumberMBS
Dim o3 As New BigNumberMBS

Dim conv As New BigNumberConversionMBS
Dim after1, after2, after3 As String
Dim read1, read2, read3 As Boolean

conv.Comma = "."
conv.Comma2 = ","

// by default comma accepts dot and comma
o1.SetStringValue("1,2", conv, after1, read1)
o2.SetStringValue("1.2", conv, after2, read2)

// now set us conversion
conv.Comma = "."
conv.Comma2 = ""
conv.Group = ","

o3.SetStringValue("1,234.5", conv, after3, read3)

Dim value1 As String = o1.StringValue
Dim value2 As String = o2.StringValue
Dim value3 As String = o3.StringValue

Break
```

**Notes:** If you don't want it just set it to zero.  
default is a comma ','

This allows you to convert from a value:  
123.45 as well as from 123,45  
(Read and Write property)

## 6.2.9 Group1 as String

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** It sets the character which is used for grouping after comma.

**Notes:** If group1 and group2 are both a space then: 1234,56789 will be printed as: 1 234,567 89  
If you don't want grouping just set it to "" (which is default)

(Read and Write property)

### 6.2.10 Group2 as String

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** It sets the character which is used for grouping before comma.

**Notes:** If group1 and group2 are both a space then: 1234,56789 will be printed as: 1 234,567 89

If you don't want grouping just set it to "" (which is default)

(Read and Write property)

### 6.2.11 GroupDigits as Integer

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** How many digits should be grouped (it is used if 'group' is non "")

**Notes:** default: 3

(Read and Write property)

### 6.2.12 Round as Integer

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** Tells how many digits after comma are possible.

**Notes:** default: -1 which means all digits are printed

set it to zero if you want integer value only.

for example when the value is: 12.345678 and 'round' is 4 then the result will be 12.3457 (the last digit was rounded)

(Read and Write property)

### 6.2.13 Scientific as Boolean

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** Whether to use scientific mode.

**Notes:** If true the value will be always shown in the scientific mode, e.g: 123e+30

default: false  
(Read and Write property)

### 6.2.14 ScientificFrom as Integer

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** Scientific from this exponent value.

**Notes:** If scient is false then the value will be printed in the scientific mode only if the exponent is greater than ScientificFrom.

default: 15  
(Read and Write property)

### 6.2.15 TrimZeroes as Boolean

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** Whether to trim zeros.

**Notes:** If true that not mattered digits in the mantissa will be cut off  
(zero characters at the end – after the comma operator)

e.g. 1234,78000 will be: 1234,78

default: true  
(Read and Write property)

## 6.3 class BigIntegerErrorExceptionMBS

### 6.3.1 class BigIntegerErrorExceptionMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The exception class for big number math.

**Example:**

```
dim b as new BigIntegerMBS(5)
dim c as BigIntegerMBS = BigIntegerMBS.Zero
```

```
// raises exception due to division by zero
dim x as BigIntegerMBS = b/c
```

**Notes:** Raised when operations fail due to division by zero, invalid numbers or overflow/underflow.  
Subclass of the RuntimeException class.

**Blog Entries**

- [MBS Xojo Plugins, version 19.2pr8](#)
- [Big numbers for Xojo](#)

**Xojo Developer Magazine**

- [17.6, page 65: Big Numbers and Large Numbers, How you can use the BigIntegerMBS and LargeNumberMBS class in Xojo by Stefanie Juchmes](#)

## 6.4 class BigNumberMBS

### 6.4.1 class BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The class for a big number.

**Example:**

```
// speed of light in m/s
Dim SpeedOfLight As New BigNumberMBS("299792458")

// seconds per day
Dim SecondsPerDay As New BigNumberMBS(24 * 3600)

Dim DaysPerYear As New BigNumberMBS(365.25)

Dim LightYear As BigNumberMBS = SpeedOfLight * DaysPerYear * SecondsPerDay
MsgBox LightYear.StringValue+" meter per light year"

// 9.460.730.472.580.800 matches number from Wikipedia

Dim AgeOfUniversum As New BigNumberMBS(13810000000)

Dim MaxDistance As BigNumberMBS = LightYear * AgeOfUniversum

MsgBox MaxDistance.GetStringValue(10, False, 100, 3, True)+" meter maximum"
```

**Notes:** This is floating point number with 320 bits in BigNumber and 2560 bits in BiggerNumber class. Precision is about 77 digits dot for the smaller one and 617 for the bigger one. So use first for speed and second for precision.

So if you want to store currency or other values where rounding should not happen, better store values multiplied, e.g. in cents.

Compared to normal double values, you have 5 times the bits. And we check for math errors and raise exceptions if something goes wrong.

See LargeNumberMBS for a 4128 bit integer number, about 1200 digits in length.

**Blog Entries**

- [News from the MBS Xojo Plugins Version 24.0](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 24.0](#)

- [MBS Xojo Plugins, version 23.6pr1](#)
- [News from the MBS Xojo Plugins Version 21.1](#)
- [Video about MBS Xojo Plugins 21.1](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 21.1](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 19.1](#)
- [Large integer numbers in Xojo](#)
- [MBS Xojo / Real Studio plug-ins in version 16.5](#)
- [Big numbers for Xojo](#)

#### Videos

- [MBS Xojo Plugins 21.1](#)
- [Presentation from London conference about MBS Plugins.](#)
- [Presentation from Xojo Developer Conference 2019 in Miami.](#)

#### Xojo Developer Magazine

- [22.2, page 9: News](#)
- [21.3, pages 68 to 69: Large, Big, and Bigger Numbers, Working with giant numbers by Stefanie Juchmes](#)
- [19.3, page 44: Xojo Time and Space, ÆInto a Programming Black Hole, How converting durations and distances into human-readable form reveals a 32-bit problem at the heart of Xojo's 64-bit math module by Markus Winter](#)
- [19.3, page 10: News](#)
- [17.6, page 65: Big Numbers and Large Numbers, How you can use the BigNumberMBS and LargeNumberMBS class in Xojo by Stefanie Juchmes](#)
- [17.6, pages 61 to 63: Big Numbers and Large Numbers, How you can use the BigNumberMBS and LargeNumberMBS class in Xojo by Stefanie Juchmes](#)
- [17.5, page 33: What's New in the MBS Plugins, With the Plugins growing every year, here are new capabilities you may have missed by Stefanie Juchmes](#)
- [16.1, page 28: MBS London Conference 2017, Marc visits England by Richard Duke, Mediatec](#)
- [15.1, page 8: News](#)

## 6.4.2 Methods

### 6.4.3 Abs as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries absolute value.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS(-123)
dim z as BigNumberMBS = o.Abs
```

```
MsgBox z.StringValue
```

**Notes:** Removes sign.

See also:

- 6.4.4 Abs(value as BigNumberMBS) as BigNumberMBS

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### 6.4.4 Abs(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Absolute value of x.

**Example:**

```
Dim c As New BigNumberMBS(-3)
Dim d As BigNumberMBS = BigNumberMBS.Abs(c)
Dim e As BigNumberMBS = c.Abs
```

```
MsgBox d.StringValue+EndOfLine+e.StringValue // shows 3
```

See also:

- 6.4.3 Abs as BigNumberMBS

358

### 6.4.5 ACos(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Arc Cosine.

**Example:**

```
Dim c As New BigNumberMBS(0.5)
Dim d As BigNumberMBS = BigNumberMBS.ACos(c)
```

```
Dim x As Double = ACos(0.5)
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** we're using the formula:  $\text{acos}(x) = \pi/2 - \text{asin}(x)$

### 6.4.6 ACosh(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Inverse hyperbolic cosine.

**Example:**

```
Dim c As New BigNumberMBS(2.0)
Dim d As BigNumberMBS = BigNumberMBS.ACosh(c)

// ACosHMBS is in MBS Xojo Util Plugin
Dim x As Double = ACosHMBS(2.0)

MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:**  $\text{acosh}(x) = \ln( x + \sqrt{x^2 - 1} )$   $x$  in  $<1, \infty$

### 6.4.7 ACot(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Arc Cotangent.

**Notes:** we're using the formula:  $\text{actan}(x) = \pi/2 - \text{atan}(x)$

### 6.4.8 ACoth(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates inverse hyperbolic cotangent.

**Notes:**  $\text{acoth}(x) = 0.5 * \ln( (x+1) / (x-1) )$   $x$  in  $(-\infty, -1)$  or  $(1, \infty)$

### 6.4.9 Add(other as BigNumberMBS, round as boolean = true) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a number.

**Example:**

```
dim x as new BigNumberMBS(2)
dim d as new BigNumberMBS(3)
dim p as BigNumberMBS = x.Add(d)
```

```
MsgBox p.StringValue // shows 5
```

### 6.4.10 ASin(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Arc Sine.

**Example:**

```
Dim c As New BigNumberMBS(1.0)
Dim d As BigNumberMBS = BigNumberMBS.ASin(c)
```

```
Dim x As Double = ASin(1.0)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** Range is from -1 to 1.

### 6.4.11 ASinh(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Inverse hyperbolic sine.

**Example:**

```
Dim c As New BigNumberMBS(0.5)
Dim d As BigNumberMBS = BigNumberMBS.ASinH(c)
```

```
// ASinHMBS is in MBS Xojo Util Plugin
Dim x As Double = ASinHMBS(0.5)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:**  $\operatorname{asinh}(x) = \ln( x + \sqrt{x^2 + 1} )$

#### 6.4.12 ATan(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Arc Tangent.

**Example:**

```
Dim c As New BigNumberMBS(0.5)
Dim d As BigNumberMBS = BigNumberMBS.ATan(c)
```

```
Dim x As Double = ATan(0.5)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

#### 6.4.13 ATanh(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates inverse hyperbolic tangent.

**Example:**

```
Dim c As New BigNumberMBS(0.5)
Dim d As BigNumberMBS = BigNumberMBS.ATanh(c)
```

```
// ATanhMBS is in MBS Xojo Util Plugin
Dim x As Double = ATanhMBS(0.5)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:**  $\operatorname{atanh}(x) = 0.5 * \ln( (1+x) / (1-x) )$  x in (-1, 1)

#### 6.4.14 BitAnd(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates bitwise AND operation.

**Example:**

```
dim x as new BigNumberMBS(17)
dim y as new BigNumberMBS(16)
dim r as BigNumberMBS = x.BitAnd(y)
```

```
MsgBox r.StringValue
```

#### 6.4.15 BitOr(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates bitwise or operation.

**Example:**

```
dim x as new BigNumberMBS(17)
dim y as new BigNumberMBS(16)
dim r as BigNumberMBS = x.BitOr(y)
```

```
MsgBox r.StringValue
```

#### 6.4.16 BitXOr(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates bitwise xor operation.

**Example:**

```
dim x as new BigNumberMBS(17)
dim y as new BigNumberMBS(16)
dim r as BigNumberMBS = x.BitXOr(y)
```

```
MsgBox r.StringValue
```

#### 6.4.17 Ceil as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This function returns a value representing the smallest integer that is greater than or equal to x.

**Example:**

```
Dim c As New BigNumberMBS(-3.7)
```

```
Dim d As BigNumberMBS = c.Ceil
```

```
MsgBox d // shows -3
```

**Notes:** e.g.

```
Ceil(-3.7) = -3
```

```
Ceil(-3.1) = -3
```

```
Ceil(-3.0) = -3
```

```
Ceil(4.0) = 4
```

```
Ceil(4.2) = 5
```

```
Ceil(4.8) = 5
```

### 6.4.18 Constructor

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Initialize the number with zero value.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS
```

```
MsgBox o.StringValue
```

See also:

- 6.4.19 Constructor(other as BigNumberMBS) 364
- 6.4.20 Constructor(value as Currency) 364
- 6.4.21 Constructor(value as Double) 365
- 6.4.22 Constructor(value as Int32) 365
- 6.4.23 Constructor(value as Int64) 366
- 6.4.24 Constructor(value as Single) 367
- 6.4.25 Constructor(value as String) 367
- 6.4.26 Constructor(value as UInt32) 368
- 6.4.27 Constructor(value as UInt64) 369

### 6.4.19 Constructor(other as BigNumberMBS)

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Initialize the number with other value.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS(2.5)
dim c as BigNumberMBS = new BigNumberMBS(o)
```

```
MsgBox c.StringValue
```

See also:

- 6.4.18 Constructor 363
- 6.4.20 Constructor(value as Currency) 364
- 6.4.21 Constructor(value as Double) 365
- 6.4.22 Constructor(value as Int32) 365
- 6.4.23 Constructor(value as Int64) 366
- 6.4.24 Constructor(value as Single) 367
- 6.4.25 Constructor(value as String) 367
- 6.4.26 Constructor(value as UInt32) 368
- 6.4.27 Constructor(value as UInt64) 369

### 6.4.20 Constructor(value as Currency)

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number object with a currency object.

**Example:**

```
dim v as Currency = 123.456
dim b as new BigNumberMBS(v)
MsgBox b.StringValue
```

See also:

- 6.4.18 Constructor 363
- 6.4.19 Constructor(other as BigNumberMBS) 364

6.4. CLASS <i>BIGNUMBERMBS</i>	365
• 6.4.21 Constructor(value as Double)	365
• 6.4.22 Constructor(value as Int32)	365
• 6.4.23 Constructor(value as Int64)	366
• 6.4.24 Constructor(value as Single)	367
• 6.4.25 Constructor(value as String)	367
• 6.4.26 Constructor(value as UInt32)	368
• 6.4.27 Constructor(value as UInt64)	369

### 6.4.21 Constructor(value as Double)

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Initialize the number with double value.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS(2.5)
MsgBox str(o.DoubleValue)+" = "+str(o.StringValue)#
```

See also:

• 6.4.18 Constructor	363
• 6.4.19 Constructor(other as BigNumberMBS)	364
• 6.4.20 Constructor(value as Currency)	364
• 6.4.22 Constructor(value as Int32)	365
• 6.4.23 Constructor(value as Int64)	366
• 6.4.24 Constructor(value as Single)	367
• 6.4.25 Constructor(value as String)	367
• 6.4.26 Constructor(value as UInt32)	368
• 6.4.27 Constructor(value as UInt64)	369

### 6.4.22 Constructor(value as Int32)

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number with a 32-bit integer.

**Example:**

```

dim v as Int32 = 123
dim b as new BigNumberMBS(v)
MsgBox b.StringValue

```

See also:

- 6.4.18 Constructor 363
- 6.4.19 Constructor(other as BigNumberMBS) 364
- 6.4.20 Constructor(value as Currency) 364
- 6.4.21 Constructor(value as Double) 365
- 6.4.23 Constructor(value as Int64) 366
- 6.4.24 Constructor(value as Single) 367
- 6.4.25 Constructor(value as String) 367
- 6.4.26 Constructor(value as UInt32) 368
- 6.4.27 Constructor(value as UInt64) 369

### 6.4.23 Constructor(value as Int64)

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number with a 64-bit integer.

**Example:**

```

dim v as Int64 = 123
dim b as new BigNumberMBS(v)
MsgBox b.StringValue

```

See also:

- 6.4.18 Constructor 363
- 6.4.19 Constructor(other as BigNumberMBS) 364
- 6.4.20 Constructor(value as Currency) 364
- 6.4.21 Constructor(value as Double) 365
- 6.4.22 Constructor(value as Int32) 365
- 6.4.24 Constructor(value as Single) 367

6.4. CLASS <i>BIGNUMBERMBS</i>	367
• 6.4.25 Constructor(value as String)	367
• 6.4.26 Constructor(value as UInt32)	368
• 6.4.27 Constructor(value as UInt64)	369

#### 6.4.24 Constructor(value as Single)

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number with a 32-bit floating point number.

**Example:**

```
dim v as Single = 123
dim b as new BigNumberMBS(v)
MsgBox b.StringValue
```

See also:

• 6.4.18 Constructor	363
• 6.4.19 Constructor(other as BigNumberMBS)	364
• 6.4.20 Constructor(value as Currency)	364
• 6.4.21 Constructor(value as Double)	365
• 6.4.22 Constructor(value as Int32)	365
• 6.4.23 Constructor(value as Int64)	366
• 6.4.25 Constructor(value as String)	367
• 6.4.26 Constructor(value as UInt32)	368
• 6.4.27 Constructor(value as UInt64)	369

#### 6.4.25 Constructor(value as String)

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Initialize the number with string value.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS("123.456")
MsgBox o.StringValue
```

See also:

- 6.4.18 Constructor 363
- 6.4.19 Constructor(other as BigNumberMBS) 364
- 6.4.20 Constructor(value as Currency) 364
- 6.4.21 Constructor(value as Double) 365
- 6.4.22 Constructor(value as Int32) 365
- 6.4.23 Constructor(value as Int64) 366
- 6.4.24 Constructor(value as Single) 367
- 6.4.26 Constructor(value as UInt32) 368
- 6.4.27 Constructor(value as UInt64) 369

### 6.4.26 Constructor(value as UInt32)

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number with an unsigned 32-bit integer.

**Example:**

```
dim v as UInt32 = 123
dim b as new BigNumberMBS(v)
MsgBox b.StringValue
```

See also:

- 6.4.18 Constructor 363
- 6.4.19 Constructor(other as BigNumberMBS) 364
- 6.4.20 Constructor(value as Currency) 364
- 6.4.21 Constructor(value as Double) 365
- 6.4.22 Constructor(value as Int32) 365
- 6.4.23 Constructor(value as Int64) 366
- 6.4.24 Constructor(value as Single) 367
- 6.4.25 Constructor(value as String) 367
- 6.4.27 Constructor(value as UInt64) 369

**6.4.27 Constructor(value as UInt64)**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number with an unsigned 32-bit integer.

**Example:**

```
dim v as UInt64 = 123
dim b as new BigNumberMBS(v)
MsgBox b.StringValue
```

See also:

- 6.4.18 Constructor 363
- 6.4.19 Constructor(other as BigNumberMBS) 364
- 6.4.20 Constructor(value as Currency) 364
- 6.4.21 Constructor(value as Double) 365
- 6.4.22 Constructor(value as Int32) 365
- 6.4.23 Constructor(value as Int64) 366
- 6.4.24 Constructor(value as Single) 367
- 6.4.25 Constructor(value as String) 367
- 6.4.26 Constructor(value as UInt32) 368

**6.4.28 Cos(value as BigNumberMBS) as BigNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the cosine value.

**Example:**

```
Dim c As New BigNumberMBS(1.0)
Dim d As BigNumberMBS = BigNumberMBS.Cos(c)
```

```
Dim x As Double = Cos(1.0)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** We're using the formula  $\cos(x) = \sin(x + \text{PI}/2)$ .

### 6.4.29 Cosh(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Hyperbolic Cosine.

**Example:**

```
Dim c As New BigNumberMBS(0.5)
Dim d As BigNumberMBS = BigNumberMBS.CosH(c)
```

```
// CosHMBS is in MBS Xojo Util Plugin
Dim x As Double = CosHMBS(0.5)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** We're using the formula  $\cosh(x) = (e^x + e^{-x}) / 2$ .

### 6.4.30 Cot(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Cotangent.

**Notes:** We're using the formula  $\cot(x) = \cos(x) / \sin(x)$ .

### 6.4.31 Coth(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Hyperbolic Cotangent.

**Notes:** We're using the formula  $\coth(x) = (e^x + e^{-x}) / (e^x - e^{-x})$

### 6.4.32 DegToDeg(d as BigNumberMBS, m as BigNumberMBS, s as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts degrees in the long format into one value.

**Notes:** long format: (degrees, minutes, seconds)

minutes and seconds must be greater than or equal zero

result:

if  $d \geq 0$  : result =  $d + ((s/60)+m)/60$

if  $d < 0$  : result =  $d - ((s/60)+m)/60$

$((s/60)+m)/60 = (s+60*m)/3600$  (second version is faster because there's only one division)

for example:

DegToDeg(10, 30, 0) = 10.5

DegToDeg(10, 24, 35.6)=10.4098(8)

### 6.4.33 DegToGrad(d as BigNumberMBS, m as BigNumberMBS, s as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts degrees in the long format to gradians.

See also:

- 6.4.34 DegToGrad(value as BigNumberMBS) as BigNumberMBS

371

### 6.4.34 DegToGrad(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts degrees to gradians.

**Notes:** it returns:  $x * 200 / 180$

See also:

- 6.4.33 DegToGrad(d as BigNumberMBS, m as BigNumberMBS, s as BigNumberMBS) as BigNumberMBS

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### 6.4.35 DegToRad(d as BigNumberMBS, m as BigNumberMBS, s as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts degrees in the long format to radians.

See also:

- 6.4.36 DegToRad(value as BigNumberMBS) as BigNumberMBS

371

### 6.4.36 DegToRad(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts degrees to radians.

**Notes:** It returns:  $x * \pi / 180$

See also:

- 6.4.35 DegToRad(d as BigNumberMBS, m as BigNumberMBS, s as BigNumberMBS) as BigNumberMBS 371

### 6.4.37 Divide(other as BigNumberMBS, round as boolean = true) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides the number.

**Example:**

```
dim x as new BigNumberMBS(8)
dim d as new BigNumberMBS(2)
dim p as BigNumberMBS = x.Divide(d)
```

MsgBox p.StringValue // shows 4

### 6.4.38 E as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value zero.

**Example:**

```
dim b as BigNumberMBS = BigNumberMBS.e
MsgBox b.StringValue
```

### 6.4.39 Equals(other as BigNumberMBS) as Boolean

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks if two numbers are the same.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS(123)
dim z as BigNumberMBS = new BigNumberMBS(123)
```

```
if o.Equals(z) then
MsgBox "equal"
```

```

else
Break // error
end if

```

**Notes:** Returns true if equal.

#### 6.4.40 Exp(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates  $e^x$  value.

**Example:**

```

dim x as new BigNumberMBS(2)
dim p as BigNumberMBS = BigNumberMBS.Exp(x)

```

MsgBox p.StringValue // shows  $e^2 = 7.38$

#### 6.4.41 Floor as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Removes any fraction part.

**Example:**

```

dim o as BigNumberMBS = new BigNumberMBS(2.3)
dim s as BigNumberMBS = o.Floor

```

MsgBox s.StringValue

```

dim a as BigNumberMBS = new BigNumberMBS(-2.3)
dim b as BigNumberMBS = a.Floor

```

MsgBox b.StringValue

#### 6.4.42 Frac as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Extracts the fraction part.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS(2.5)
dim s as BigNumberMBS = o.Frac
```

```
MsgBox s.StringValue
```

```
dim a as BigNumberMBS = new BigNumberMBS(-2.5)
dim b as BigNumberMBS = a.Frac
```

```
MsgBox b.StringValue
```

#### 6.4.43 GetStringValue(Base as Integer = 10, scientific as boolean = false, scientificFrom as Integer = 15, round as Integer = -1, TrimZeros as Boolean = true, comma as String = ",") as String

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries string value.

**Example:**

```
dim o as new BigNumberMBS(1234)

// show as hex
MsgBox o.GetStringValue(16)

// show as number with comma and 3 digits
dim z as new BigNumberMBS(12.345)
MsgBox z.GetStringValue(10, false, 15, 3, true, ",")
```

**Notes:** Base: The base of the number system. Normally 10, but also 16 for hex is common.

scientific: Whether to use scientific notation.

scientificFrom: How many digits we show.

Round: Whether to round to n digits.

TrimZeros: Whether to trim unneeded zeros.

comma: The character to use as decimal dot.

See also:

- 6.4.44 GetStringValue(Conversion as BigNumberConversionMBS) as String

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#### 6.4.44 GetStringValue(Conversion as BigNumberConversionMBS) as String

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries string value.

**Example:**

```
Dim o As New BigNumberMBS(1234567.890)
```

```
Dim conv As New BigNumberConversionMBS
conv.Comma = ","
conv.Group = ""
conv.Scientific = False
conv.Round = 3
```

```
Dim s1 As String = o.GetStringValue(conv)
// 1'234'567,89
```

```
conv.Comma = ""
conv.Group = ","
```

```
Dim s2 As String = o.GetStringValue(conv)
// 1,234,567,89
```

```
conv.Comma = ","
conv.Group = ""
conv.Scientific = True
```

```
Dim s3 As String = o.GetStringValue(conv)
// 1,235e+6
```

Break

See also:

- 6.4.43 GetStringValue(Base as Integer = 10, scientific as boolean = false, scientificFrom as Integer = 15, round as Integer = -1, TrimZeros as Boolean = true, comma as String = "") as String 374

#### 6.4.45 GradToDeg(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts degrees to gradians.

**Notes:** it returns:  $x * 180 / 200$

#### 6.4.46 GradToRad(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts gradians to radians.

**Notes:** It returns:  $x * \pi / 200$ .

#### 6.4.47 HalfPi as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value  $\pi/2$ .

**Example:**

```
dim b as BigNumberMBS = BigNumberMBS.HalfPi
MsgBox b.StringValue
```

#### 6.4.48 LibTypeStr as String

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries what implementation is used for this platform.

**Notes:** Shows asm in the text if assembler code is used.

Assembler code is not available for all platforms.

#### 6.4.49 Ln(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates natural logarithm.

**Example:**

```
dim x as new BigNumberMBS(2)
dim p as BigNumberMBS = BigNumberMBS.Ln(x)
```

MsgBox p.StringValue // shows  $\ln(2) = 0.69$

#### 6.4.50 Ln10 as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value  $\ln(10)$ .

**Example:**

```
dim b as BigNumberMBS = BigNumberMBS.Ln10
MsgBox b.StringValue
```

### 6.4.51 Ln2 as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value  $\ln(2)$ .

**Example:**

```
dim b as BigNumberMBS = BigNumberMBS.Ln2
MsgBox b.StringValue
```

### 6.4.52 Log(value as BigNumberMBS, base as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates logarithm in a given base.

**Example:**

```
dim x as new BigNumberMBS(100)
dim d as new BigNumberMBS(10)
dim p as BigNumberMBS = BigNumberMBS.Log(x, d)
```

```
MsgBox p.StringValue // shows  $\ln(100)/\ln(10) = 2$ 
```

### 6.4.53 Max as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with maximum value.

**Example:**

```
dim b as BigNumberMBS = BigNumberMBS.Min
MsgBox b.StringValue
```

### 6.4.54 Min as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with minimum value.

**Example:**

```
dim b as BigNumberMBS = BigNumberMBS.Min  
MsgBox b.StringValue
```

### 6.4.55 Modulate(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Modulates a number.

**Example:**

```
dim x as new BigNumberMBS(17)  
dim y as new BigNumberMBS(3)  
dim r as BigNumberMBS = x.Modulate(y)
```

```
MsgBox r.StringValue
```

**Notes:** Similar to mod keyword in Xojo.

### 6.4.56 Modulate2 as Integer

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Modulates by 2.

**Example:**

```
dim x as new BigNumberMBS(8)  
dim y as new BigNumberMBS(9)
```

```
MsgBox str(x.Modulate2)+" "+str(y.Modulate2)
```

**Notes:** Returns 0 or 1.

**6.4.57 Multiply(other as BigNumberMBS, round as boolean = true) as BigNumberMBS**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiplies two numbers.

**Example:**

```
dim x as new BigNumberMBS(8)
dim d as new BigNumberMBS(2)
dim p as BigNumberMBS = x.Multiply(d)
```

MsgBox p.StringValue // shows 16

See also:

- 6.4.58 Multiply(value as Integer) as BigNumberMBS 379
- 6.4.59 Multiply(value as UInt32) as BigNumberMBS 379

**6.4.58 Multiply(value as Integer) as BigNumberMBS**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiply by an integer.

**Example:**

```
dim x as new BigNumberMBS(2)
dim p as BigNumberMBS = x.Multiply(3)
```

MsgBox p.StringValue // shows 6

See also:

- 6.4.57 Multiply(other as BigNumberMBS, round as boolean = true) as BigNumberMBS 379
- 6.4.59 Multiply(value as UInt32) as BigNumberMBS 379

**6.4.59 Multiply(value as UInt32) as BigNumberMBS**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiply by an unsigned integer.

**Example:**

```
dim x as new BigNumberMBS(17)
dim r as BigNumberMBS = x.Multiply(3)
```

```
MsgBox r.StringValue
```

See also:

- 6.4.57 Multiply(other as BigNumberMBS, round as boolean = true) as BigNumberMBS 379
- 6.4.58 Multiply(value as Integer) as BigNumberMBS 379

### 6.4.60 Nan as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value NaN.

**Example:**

```
dim b as BigNumberMBS = BigNumberMBS.Nan
MsgBox b.StringValue
```

### 6.4.61 Negate as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Negates the number.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS(123)
dim z as BigNumberMBS = o.Negate
```

```
MsgBox z.StringValue
```

### 6.4.62 NumberWithCurrency(value as Currency) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with a currency value.

**Example:**

```
dim v as Currency = 123.456
dim b as BigNumberMBS = BigNumberMBS.NumberWithCurrency(v)
```

MsgBox b.StringValue

### 6.4.63 `NumberWithDouble(value as Double)` as `BigNumberMBS`

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with a 64-bit floating number.

**Example:**

```
dim v as Double = 123.456
dim b as BigNumberMBS = BigNumberMBS.NumberWithDouble(v)
```

MsgBox b.StringValue

### 6.4.64 `NumberWithInt32(value as Int32)` as `BigNumberMBS`

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with a signed 32-bit integer.

**Example:**

```
dim v as Int32 = 123
dim b as BigNumberMBS = BigNumberMBS.NumberWithInt32(v)
```

MsgBox b.StringValue

### 6.4.65 `NumberWithInt64(value as Int64)` as `BigNumberMBS`

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with a signed 64-bit integer.

**Example:**

```
dim v as Int64 = 123
dim b as BigNumberMBS = BigNumberMBS.NumberWithInt64(v)
```

MsgBox b.StringValue

### 6.4.66 NumberWithInteger(value as Integer) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with an integer.

**Example:**

```
dim v as Integer = 123
dim b as BigNumberMBS = BigNumberMBS.NumberWithInteger(v)
```

MsgBox b.StringValue

### 6.4.67 NumberWithSingle(value as single) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with an 32-bit floating point number.

**Example:**

```
dim v as Single = 123
dim b as BigNumberMBS = BigNumberMBS.NumberWithSingle(v)
```

MsgBox b.StringValue

### 6.4.68 NumberWithString(value as String) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with value from string.

**Example:**

```
dim v as String = "123"
dim b as BigNumberMBS = BigNumberMBS.NumberWithString(v)
```

MsgBox b.StringValue

### 6.4.69 NumberWithUInt32(value as UInt32) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with an unsigned 32-bit integer.

**Example:**

```
dim v as UInt32 = 123
dim b as BigNumberMBS = BigNumberMBS.NumberWithUInt32(v)
```

```
MsgBox b.StringValue
```

**6.4.70 NumberWithUInt64(value as UInt64) as BigNumberMBS**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with an unsigned 64-bit integer.

**Example:**

```
dim v as UInt64 = 123
dim b as BigNumberMBS = BigNumberMBS.NumberWithUInt64(v)
```

```
MsgBox b.StringValue
```

**6.4.71 NumberWithUInteger(value as UInteger) as BigNumberMBS**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with an unsigned integer.

**Example:**

```
dim v as UInteger = 123
dim b as BigNumberMBS = BigNumberMBS.NumberWithUInteger(v)
```

```
MsgBox b.StringValue
```

**6.4.72 NumberWithVariant(value as Variant) as BigNumberMBS**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number based on a variant.

**Example:**

```
dim v as Variant = 123.456
dim b as BigNumberMBS = BigNumberMBS.NumberWithVariant(v)
```

```
MsgBox b.StringValue
```

**Notes:** Internally redirects to other NumberWith functions based on the value type.

### 6.4.73 One as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value one.

**Example:**

```
dim b as BigNumberMBS = BigNumberMBS.One
MsgBox b.StringValue
```

### 6.4.74 Operator\_\_Add(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a number.

**Example:**

```
dim a as new BigNumberMBS(3)
dim b as new BigNumberMBS(4)

// add
dim c as BigNumberMBS = a + b

MsgBox c.StringValue
```

### 6.4.75 Operator\_\_AddRight(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a number.

**Example:**

```
dim a as new BigNumberMBS(3)
dim b as new BigNumberMBS(4)

// add
dim c as BigNumberMBS = a + b
```

MsgBox c.StringValue

### 6.4.76 Operator\_Compare(other as BigNumberMBS) as Integer

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Compares two numbers.

**Example:**

```
dim a as new BigNumberMBS(1.2)
dim b as new BigNumberMBS(1.2)
dim c as new BigNumberMBS(1.3)
```

```
if a = b then
  // ok
else
  break
end if
```

```
if a < c then
  // ok
else
  Break
end if
```

```
if c > b then
  // ok
else
  break
end if
```

### 6.4.77 Operator\_Convert as String

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts big number to string automatically.

**Example:**

```
dim b as new BigNumberMBS
dim n as Double = 5
```

```
// convert from double to big number automatically
b = n
```

```
// convert to string automatically
MsgBox b
```

See also:

- 6.4.78 Operator\_Convert(value as String)

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### 6.4.78 Operator\_Convert(value as String)

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts a string to a big number.

**Example:**

```
dim b as new BigNumberMBS
```

```
dim n as string = "5"
```

```
// convert from string to big number automatically
b = n
```

```
// convert to double automatically
```

```
dim d as Double = b
```

```
MsgBox str(d)
```

See also:

- 6.4.77 Operator\_Convert as String

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### 6.4.79 Operator\_Divide(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides two numbers.

**Example:**

```
dim a as new BigNumberMBS(9.3)
```

```
dim b as new BigNumberMBS(3.0)
```

```
dim r as BigNumberMBS = a / b
```

```
MsgBox r.StringValue
```

**6.4.80 Operator\_DivideRight(other as BigNumberMBS) as BigNumberMBS**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides two numbers.

**6.4.81 Operator\_IntegerDivide(other as BigNumberMBS) as BigNumberMBS**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates an integer divide.

**Example:**

```
dim a as new BigNumberMBS(9.3)
dim b as new BigNumberMBS(3.0)
```

```
dim r as BigNumberMBS = a \ b
```

```
MsgBox r.StringValue
```

**Notes:** Same as normal divide, but removes fraction part.

**6.4.82 Operator\_IntegerDivideRight(other as BigNumberMBS) as BigNumberMBS**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates an integer divide.

**Notes:** Same as normal divide, but removes fraction part.

**6.4.83 Operator\_Modulo(other as BigNumberMBS) as BigNumberMBS**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the modulo of two numbers.

**Example:**

```
dim a as new BigNumberMBS(9.3)
dim b as new BigNumberMBS(3.0)
```

```
dim r as BigNumberMBS = a mod b
```

MsgBox r.StringValue

#### 6.4.84 Operator\_ModuloRight(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the modulo of two numbers.

#### 6.4.85 Operator\_Multiply(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiply two numbers.

**Example:**

```
// speed of light in m/s
Dim SpeedOfLight As New BigNumberMBS("299792458")

// seconds per day
Dim SecondsPerDay As New BigNumberMBS(24 * 3600)

Dim DaysPerYear As New BigNumberMBS(365.25)

Dim LightYear As BigNumberMBS = SpeedOfLight * DaysPerYear * SecondsPerDay
MsgBox LightYear.StringValue+" meter per light year"

// 9.460.730.472.580.800 matches number from Wikipedia

Dim AgeOfUniverse As New BigNumberMBS(1381000000)

Dim MaxDistance As BigNumberMBS = LightYear * AgeOfUniverse

MsgBox MaxDistance.GetStringValue(10, False, 100, 3, True)+" meter maximum"
```

#### 6.4.86 Operator\_MultiplyRight(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiply two numbers.

### 6.4.87 Operator\_Negate as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Negates a number.

**Example:**

```
dim a as new BigNumberMBS(3)
```

```
// negate
```

```
dim c as BigNumberMBS = -a
```

```
MsgBox c.StringValue
```

### 6.4.88 Operator\_Power(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates power of two numbers.

**Example:**

```
dim a as new BigNumberMBS(3)
```

```
dim b as new BigNumberMBS(4)
```

```
// pow
```

```
dim c as BigNumberMBS = a ^ b
```

```
MsgBox c.StringValue
```

### 6.4.89 Operator\_PowerRight(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates power of two numbers.

### 6.4.90 Operator\_Subtract(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts one number from other.

**Example:**

```
dim a as new BigNumberMBS(3)
dim b as new BigNumberMBS(4)

// subtract
dim c as BigNumberMBS = a - b

MsgBox c.StringValue
```

### 6.4.91 Operator\_SubtractRight(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts one number from other.

### 6.4.92 Pi as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value pi.

**Example:**

```
dim b as BigNumberMBS = BigNumberMBS.Pi
MsgBox b.StringValue
```

### 6.4.93 Pow(other as BigNumberMBS) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the power of the number.

**Example:**

```
dim x as new BigNumberMBS(2)
dim o as new BigNumberMBS(5)
dim p as BigNumberMBS = x.Pow(o)

MsgBox p.StringValue // shows 32
```

**6.4.94 RadToDeg(value as BigNumberMBS) as BigNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts radians to degrees.

**Notes:** It returns:  $x * 180 / \pi$ .

**6.4.95 RadToGrad(value as BigNumberMBS) as BigNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts radians to gradians.

**Notes:** it returns:  $x * 200 / \pi$

**6.4.96 Rand as BigNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates random number.

**Notes:** Mantissa and exponent are filled with random bytes to generate a random names.

**6.4.97 Root(value as BigNumberMBS, index as BigNumberMBS) as BigNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Indexth Root of x

**Example:**

```
Dim c As New BigNumberMBS(5*5*5*5)
Dim e As New BigNumberMBS(4)
Dim d As BigNumberMBS = BigNumberMBS.Root(c, e)
```

MsgBox d.StringValue

**Notes:** index must be integer and not negative <0;1;2;3....)

if index==0 the result is one

if x==0 the result is zero and we assume root(0;0) is not defined

if index is even (2;4;6...) the result is  $x^{(1/\text{index})}$  and  $x > 0$

if index is odd (1;2;3;...) the result is either

$-(\text{abs}(x)^{(1/\text{index}}))$  if  $x < 0$   
 or  
 $x^{(1/\text{index})}$  if  $x > 0$

(for  $\text{index} == 1$  the result is equal  $x$ )

### 6.4.98 Round as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Rounds the number.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS(2.3)
dim s as BigNumberMBS = o.Round
```

```
MsgBox s.StringValue
```

```
dim a as BigNumberMBS = new BigNumberMBS(-2.3)
dim b as BigNumberMBS = a.Round
```

```
MsgBox b.StringValue
```

### 6.4.99 SetStringValue(Text As String, Base as Integer, byref AfterText as String, Byref ValueRead as boolean)

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Parses number from string.

**Example:**

```
// set to 1.2 and show
dim o as new BigNumberMBS
```

```
dim after as string
dim ValueRead as Boolean
```

```
o.SetStringValue "1.2 hello", 10, after, ValueRead
```

```
MsgBox "value: "+o.StringValue+EndOfLine+"after: "+after
Break
```

**Notes:** Returns also the text after the given text following the number.  
Also sets ValueRead if a value was read.  
See also:

- 6.4.100 SetStringValue(Text As String, Conversion as BigNumberConversionMBS) 393
- 6.4.101 SetStringValue(Text As String, Conversion as BigNumberConversionMBS, byref AfterText as String, Byref ValueRead as boolean) 393

### 6.4.100 SetStringValue(Text As String, Conversion as BigNumberConversionMBS)

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Parses number from string.

**Example:**

```
Dim o As New BigNumberMBS
```

```
Dim conv As New BigNumberConversionMBS
```

```
conv.Comma = ","
```

```
conv.Group = ""
```

```
conv.Scientific = False
```

```
conv.Round = 3
```

```
o.SetStringValue("1'234'567,89", conv)
```

```
MessageBox o.StringValue
```

See also:

- 6.4.99 SetStringValue(Text As String, Base as Integer, byref AfterText as String, Byref ValueRead as boolean) 392
- 6.4.101 SetStringValue(Text As String, Conversion as BigNumberConversionMBS, byref AfterText as String, Byref ValueRead as boolean) 393

### 6.4.101 SetStringValue(Text As String, Conversion as BigNumberConversionMBS, byref AfterText as String, Byref ValueRead as boolean)

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Parses number from string.

**Example:**

```
Dim o As New BigNumberMBS
```

```
Dim conv As New BigNumberConversionMBS
```

```
conv.Comma = ","
```

```
conv.Group = ""
```

```
conv.Scientific = False
```

```
conv.Round = 3
```

```
Dim after As String
```

```
Dim read As Boolean
```

```
o.SetStringValue("1'234'567,89abc", conv, after, read)
```

```
// read will be true and after contains "abc".
```

```
Dim value As String = o.StringValue
```

```
Dim after2 As String
```

```
Dim read2 As Boolean
```

```
o.SetStringValue("abc", conv, after2, read2)
```

```
// read2 will be false and after2 contains "abc".
```

```
Break
```

**Notes:** Returns the text after the given text following the number in AfterText parameter.

Sets ValueRead if a value was read.

See also:

- 6.4.99 SetStringValue(Text As String, Base as Integer, byref AfterText as String, Byref ValueRead as boolean) 392
- 6.4.100 SetStringValue(Text As String, Conversion as BigNumberConversionMBS) 393

### 6.4.102 Sgn(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries sign of number.

**Example:**

```
Dim negative As New BigNumberMBS(-5.6)
```

```
Dim sign1 As BigNumberMBS = BigNumberMBS.Sgn(negative)
```

```
Dim positive As New BigNumberMBS(5.6)
```

```
Dim sign2 As BigNumberMBS = BigNumberMBS.Sgn(positive)
```

```
Break
```



### 6.4.103 Sin(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the sinus value.

**Example:**

```
Dim c As New BigNumberMBS(1.0)
Dim d As BigNumberMBS = BigNumberMBS.Sin(c)
```

```
Dim x As Double = Sin(1.0)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

### 6.4.104 Sinh(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Hyperbolic Sine.

**Example:**

```
Dim c As New BigNumberMBS(0.5)
Dim d As BigNumberMBS = BigNumberMBS.SinH(c)
```

```
// SinHMBS is in MBS Xojo Util Plugin
Dim x As Double = SinHMBS(0.5)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** we're using the formula  $\sinh(x) = (e^x - e^{-x}) / 2$

### 6.4.105 SkipFraction as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This function skips the fraction.

**Example:**

```
Dim c As New BigNumberMBS(-3.7)
Dim d As BigNumberMBS = c.SkipFraction
```

```
MsgBox d // shows -3
```

**Notes:** Similar to floor, but different for negative ones.

e.g  
2.2 =>2  
2.7 =>2  
-2.2 =>2  
-2.7 =>2

#### 6.4.106 Sqrt as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the square root.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS(256)
dim s as BigNumberMBS = o.Sqrt
```

```
MsgBox s.StringValue
```

#### 6.4.107 Subtract(other as BigNumberMBS, round as boolean = true) as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts a number.

**Example:**

```
dim x as new BigNumberMBS(2)
dim d as new BigNumberMBS(3)
dim p as BigNumberMBS = x.Subtract(d)
```

```
MsgBox p.StringValue // shows -1
```

#### 6.4.108 Tan(value as BigNumberMBS) as BigNumberMBS

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Tangent.

**Example:**

```
Dim c As New BigNumberMBS(1.0)
Dim d As BigNumberMBS = BigNumberMBS.Tan(c)
```

```
Dim x As Double = Tan(1.0)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** We're using the formula  $\tan(x) = \sin(x) / \cos(x)$ .

**6.4.109 Tanh(value as BigNumberMBS) as BigNumberMBS**

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates the Hyperbolic Tangent.

**Example:**

```
Dim c As New BigNumberMBS(0.5)
Dim d As BigNumberMBS = BigNumberMBS.TanH(c)
```

```
// TanHMBS is in MBS Xojo Util Plugin
Dim x As Double = TanHMBS(0.5)
```

```
MsgBox d.StringValue+EndOfLine+Str(x)
```

**Notes:** We're using the formula  $\tanh(x) = (e^x - e^{-x}) / (e^x + e^{-x})$

**6.4.110 TwoPi as BigNumberMBS**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value  $2 * \text{PI}$ .

**Example:**

```
dim b as BigNumberMBS = BigNumberMBS.TwoPi
MsgBox b.StringValue
```

### 6.4.111 Zero as BigNumberMBS

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a number with value zero.

**Example:**

```
dim b as BigNumberMBS = BigNumberMBS.Zero
MsgBox b.StringValue
```

### 6.4.112 Properties

### 6.4.113 CurrencyValue as Currency

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sets/Queries currency value.

**Example:**

```
dim u as Currency = 1234.5678
dim b as new BigNumberMBS(u)
MsgBox str(b.CurrencyValue)
```

**Notes:** (Read and Write property)

### 6.4.114 DataExponent as MemoryBlock

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The exponent for this number.

**Notes:** Setting this may need to update flags, too.

(Read and Write property)

### 6.4.115 DataFlags as Integer

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The flags.

**Notes:** Bits are 128 for Sign, 64 for NAN and 32 for zero.

(Read and Write property)

### 6.4.116 DataMantissa as MemoryBlock

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The mantissa for this number.

**Notes:** Setting this may need to update flags, too.  
(Read and Write property)

### 6.4.117 DoubleValue as Double

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or Set the double value.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS(2.5)
```

```
MsgBox str(o.DoubleValue)+" = "+str(o.StringValue)
```

**Notes:** (Read and Write property)

### 6.4.118 Int64Value as Int64

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get/Set value as Int64.

**Example:**

```
dim u as Int64 = &h7FFFFFFFFFFFFFFFF // maximum Int64
```

```
dim b as new BigNumberMBS(u)
```

```
MsgBox str(b.Int64Value)
```

```
dim one as new BigNumberMBS(1)
```

```
b = b + one
```

```
// raises exception due to overflow
```

```
MsgBox str(b.Int64Value)
```

**Notes:** (Read and Write property)

### 6.4.119 IntegerValue as Integer

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or Set the integer value.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS(2.5)
```

```
MsgBox str(o.IntegerValue)+" = "+str(o.StringValue)
```

**Notes:** (Read and Write property)

### 6.4.120 IsInteger as Boolean

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this number is an integer.

**Example:**

```
dim o as BigNumberMBS = new BigNumberMBS(1)
dim z as BigNumberMBS = new BigNumberMBS(1.5)
```

```
if o.IsInteger then
MsgBox o.StringValue+" is integer"
else
break // error
end if
```

```
if z.IsInteger then
break // error
else
MsgBox z.StringValue+" is not integer"
end if
```

**Notes:** If true, there are no digits after the dot.  
(Read only property)

### 6.4.121 IsNan as Boolean

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this is an invalid number.

**Example:**

```
dim o as BigNumberMBS = BigNumberMBS.zero
dim z as BigNumberMBS = BigNumberMBS.Nan
```

```
if z.IsNan then
  MsgBox z.StringValue+” is NaN”
else
  break // error
end if
```

```
if o.IsNan then
  break // error
else
  MsgBox o.StringValue+” is not NaN”
end if
```

**Notes:** (Read only property)

### 6.4.122 IsNegative as Boolean

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this value is negative.

**Example:**

```
dim o as BigNumberMBS = BigNumberMBS.one
dim z as BigNumberMBS = BigNumberMBS.one.Negate
```

```
if z.IsNegative then
  MsgBox z.StringValue+” is negative”
else
  break // error
end if
```

```
if o.IsNegative then
  break // error
else
  MsgBox o.StringValue+” is not negative”
end if
```

**Notes:** (Read only property)

**6.4.123 IsZero as Boolean**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks if value is zero.

**Example:**

```
dim o as BigNumberMBS = BigNumberMBS.one
dim z as BigNumberMBS = BigNumberMBS.zero
```

```
if z.IsZero then
  MsgBox z.StringValue+" is zero"
else
  break // error
end if
```

```
if o.IsZero then
  break // error
else
  MsgBox o.StringValue+" is not zero"
end if
```

**Notes:** (Read only property)

**6.4.124 StringValue as String**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or set string value of text.

**Example:**

```
// set to 1.2 and show
dim o as new BigNumberMBS("1.2")
MsgBox o.StringValue
```

```
// set to 2.3
o.StringValue = "2.3"
MsgBox o.StringValue
```

**Notes:** (Read and Write property)

See also:

- 6.4.127 StringValue(Base as Integer) as String

**6.4.125 UInt64Value as UInt64**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get/Set value as UInt64.

**Example:**

```
dim u as UInt64 = 12345678901234567890
dim b as new BigNumberMBS(u)
MsgBox str(b.UInt64Value)
```

**Notes:** (Read and Write property)

**6.4.126 VariantValue as Variant**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries/Sets value with variant.

**Notes:** Floating point values are given as Double.

Integer types as Int32, Int64 or UInt64.

If value exceeds the ranges of those data types, we fall back to string.

When setting, the value is converted to a big number similar to NumberWithVariant.

(Read and Write property)

**6.4.127 StringValue(Base as Integer) as String**

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get/Set string value with a given base.

**Example:**

```
dim o as new BigNumberMBS(1234)

// show as hex
MsgBox o.StringValue(16)
```

**Notes:** (Read and Write computed property)

See also:

- 6.4.124 StringValue as String

## 6.5 class LargeNumberErrorExceptionMBS

### 6.5.1 class LargeNumberErrorExceptionMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The exception class used to report with problems in LargeNumberMBS class.

**Notes:** Subclass of the RuntimeException class.

#### Blog Entries

- [MBS Xojo Plugins, version 19.1pr5](#)

## 6.6 class LargeNumberMBS

### 6.6.1 class LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** An 4128 bit integer number.

**Example:**

```
Dim n1 As Int64 = 10000000000
```

```
Dim n2 As Int64 = 10000000000
```

```
Dim n3 As Int64 = n1 * n2 // overflow, so wrong result
```

```
Dim l1 As LargeNumberMBS = LargeNumberMBS.NumberWithInt64(n1)
```

```
Dim l2 As LargeNumberMBS = LargeNumberMBS.NumberWithInt64(n2)
```

```
Dim l3 As LargeNumberMBS = l1 * l2
```

```
Dim s4 As String = l3.StringValue // this is correct
```

Break

**Notes:** Can be useful to calculate with more than Int64.  
This class works with up to 1224 digits.

See BigNumberMBS for a 320 bit floating point number.

**Blog Entries**

- [News from the MBS Xojo Plugins Version 24.0](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 24.0](#)
- [MBS Xojo Plugins, version 23.6pr3](#)
- [MBS Xojo Plugins, version 23.6pr1](#)
- [News from the MBS Xojo Plugins Version 21.1](#)
- [MBS Xojo Plugins, version 19.2pr1](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 19.1](#)
- [MBS Xojo Plugins, version 19.1pr6](#)
- [MBS Xojo Plugins, version 19.1pr5](#)
- [Large integer numbers in Xojo](#)

**Videos**

- [Presentation from Xojo Developer Conference 2019 in Miami.](#)

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- [19.3, page 44: Xojo Time and Space, Into a Programming Black Hole, How converting durations and distances into human-readable form reveals a 32-bit problem at the heart of Xojo's 64-bit math module by Markus Winter](#)
- [17.6, pages 63 to 64: Big Numbers and Large Numbers, How you can use the BigNumberMBS and LargeNumberMBS class in Xojo by Stefanie Juchmes](#)
- [17.6, page 61: Big Numbers and Large Numbers, How you can use the BigNumberMBS and LargeNumberMBS class in Xojo by Stefanie Juchmes](#)
- [17.5, page 33: What's New in the MBS Plugins, With the Plugins growing every year, here are new capabilities you may have missed by Stefanie Juchmes](#)
- [17.3, page 10: News](#)

## 6.6.2 Methods

### 6.6.3 Add(other as LargeNumberMBS)

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds other number.

See also:

- [6.6.4 Add\(other as LargeNumberMBS\) as LargeNumberMBS](#) 407

### 6.6.4 Add(other as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds other number and returns result.

See also:

- [6.6.3 Add\(other as LargeNumberMBS\)](#) 407

### 6.6.5 AddMod(v as LargeNumberMBS, Modulo as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Addition with modulo.

**Example:**

```
Dim v As New LargeNumberMBS(100)
Dim o As New LargeNumberMBS(200)
Dim n As New LargeNumberMBS(&hFF)
```

```
Dim r As LargeNumberMBS = v.AddMod(o, n)
```

```
MsgBox r.StringValue // shows 45 = (100+200) mod 255
```

### 6.6.6 CheckBit(bit as integer) as Boolean

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks whether a bit is set.

**Notes:** Returns true if bit is set.

### 6.6.7 Clone as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the number.

### 6.6.8 Constructor

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new instance with value zero.

**Example:**

```
Dim l1 As New LargeNumberMBS
MsgBox l1.StringValue
```

See also:

6.6. CLASS LARGENUMBERMBS	409
• 6.6.9 Constructor(other as LargeNumberMBS)	409
• 6.6.10 Constructor(value as Int32)	409
• 6.6.11 Constructor(value as Int64)	410
• 6.6.12 Constructor(value as String)	410
• 6.6.13 Constructor(value as UInt32)	411
• 6.6.14 Constructor(value as UInt64)	411

### 6.6.9 Constructor(other as LargeNumberMBS)

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a copy of the number.

**Example:**

`Dim l1 As New LargeNumberMBS(123456789)`

`Dim l2 As New LargeNumberMBS(l1)`

`MsgBox l2.StringValue`

See also:

• 6.6.8 Constructor	408
• 6.6.10 Constructor(value as Int32)	409
• 6.6.11 Constructor(value as Int64)	410
• 6.6.12 Constructor(value as String)	410
• 6.6.13 Constructor(value as UInt32)	411
• 6.6.14 Constructor(value as UInt64)	411

### 6.6.10 Constructor(value as Int32)

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new instance with an 32-bit integer.

See also:

• 6.6.8 Constructor	408
• 6.6.9 Constructor(other as LargeNumberMBS)	409

- 6.6.11 Constructor(value as Int64) 410
- 6.6.12 Constructor(value as String) 410
- 6.6.13 Constructor(value as UInt32) 411
- 6.6.14 Constructor(value as UInt64) 411

### 6.6.11 Constructor(value as Int64)

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new instance with an 64-bit integer.

See also:

- 6.6.8 Constructor 408
- 6.6.9 Constructor(other as LargeNumberMBS) 409
- 6.6.10 Constructor(value as Int32) 409
- 6.6.12 Constructor(value as String) 410
- 6.6.13 Constructor(value as UInt32) 411
- 6.6.14 Constructor(value as UInt64) 411

### 6.6.12 Constructor(value as String)

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new number based on a string.

**Notes:** Raises OutOfBoundsExceptionMBS if your string is too long.

See also:

- 6.6.8 Constructor 408
- 6.6.9 Constructor(other as LargeNumberMBS) 409
- 6.6.10 Constructor(value as Int32) 409
- 6.6.11 Constructor(value as Int64) 410
- 6.6.13 Constructor(value as UInt32) 411
- 6.6.14 Constructor(value as UInt64) 411

**6.6.13 Constructor(value as UInt32)**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new instance with an unsigned 32-bit integer.

See also:

- 6.6.8 Constructor 408
- 6.6.9 Constructor(other as LargeNumberMBS) 409
- 6.6.10 Constructor(value as Int32) 409
- 6.6.11 Constructor(value as Int64) 410
- 6.6.12 Constructor(value as String) 410
- 6.6.14 Constructor(value as UInt64) 411

**6.6.14 Constructor(value as UInt64)**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new instance with an unsigned 64-bit integer.

See also:

- 6.6.8 Constructor 408
- 6.6.9 Constructor(other as LargeNumberMBS) 409
- 6.6.10 Constructor(value as Int32) 409
- 6.6.11 Constructor(value as Int64) 410
- 6.6.12 Constructor(value as String) 410
- 6.6.13 Constructor(value as UInt32) 411

**6.6.15 Decrement(value as UInt32 = 1)**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Decrement number with an integer.

**Example:**

```
Dim o As New LargeNumberMBS(5)
MsgBox o.StringValue
o.Increment
MsgBox o.StringValue
o.Decrement
```

MsgBox o.StringValue

**Notes:** This is faster than building a new LargeNumberMBS, just to subtract some small number.

### 6.6.16 Divide(other as LargeNumberMBS)

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides value with by value.

See also:

- 6.6.17 Divide(other as LargeNumberMBS) as LargeNumberMBS 412
- 6.6.18 Divide(value as UInt32) as LargeNumberMBS 412

### 6.6.17 Divide(other as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides value with by value.

See also:

- 6.6.16 Divide(other as LargeNumberMBS) 412
- 6.6.18 Divide(value as UInt32) as LargeNumberMBS 412

### 6.6.18 Divide(value as UInt32) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divide by given integer and return result.

**Example:**

```
Dim o As New LargeNumberMBS(63)
Dim r1 As LargeNumberMBS = o.Divide(8)
Dim r2 As UInt32 = o.Modulo(8)
```

```
MsgBox r1.StringValue+" " +str(r2) // shows 7 and 7
```

**Notes:** For small numbers this is more efficient than creating new LargeNumberMBS to store value.

See also:

- 6.6.16 Divide(other as LargeNumberMBS) 412

- 6.6.17 Divide(other as LargeNumberMBS) as LargeNumberMBS

### 6.6.19 DivMod(other as LargeNumberMBS, byref DivResult as LargeNumberMBS, byref ModResult as LargeNumberMBS)

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Performs divide and modulo together.

**Example:**

```
Dim d As New LargeNumberMBS(100)
```

```
Dim n As New LargeNumberMBS(13)
```

```
Dim x As LargeNumberMBS
```

```
Dim y As LargeNumberMBS
```

```
d.DivMod n, x, y
```

```
MsgBox d.StringValue + " = " + x.StringValue + " * " + n.StringValue + " + " + y.StringValue
```

**Notes:** Puts result into both byref parameters.

### 6.6.20 Equals(other as LargeNumberMBS) as Boolean

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Compares if two numbers are equal.

**Notes:** Returns true if equal.

### 6.6.21 ExpMod(e as LargeNumberMBS, Modulo as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates an exponent.

**Example:**

```
Dim o As New LargeNumberMBS(2)
```

```
Dim e As New LargeNumberMBS(11)
```

```
Dim m As New LargeNumberMBS(255)
```

```
Dim r As LargeNumberMBS = o.ExpMod(e,m)
```

```
MsgBox r.StringValue // shows 8 = 2^11 mod 255
```

**Notes:** Returns  $x^e \bmod n$  where  $x$  is the current number,  $e$  a parameter and  $n$  the modulo parameter.

### 6.6.22 FindGCD(*v* as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds greatest common divisor for two positive numbers.

### 6.6.23 GetStringValue(Base as Integer = 10, ThousandsDelimiter as String = "") as String

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries number with a given base and delimiter.

**Example:**

```
Dim l As New LargeNumberMBS(1234567890)

Dim s0 As String = l.StringValue
Dim s1 As String = l.GetStringValue
// 1234567890
Dim s2 As String = l.GetStringValue(10, ",")
// 1,234,567,890
Dim s4 As String = l.GetStringValue(8, "")
// 499602d2
Dim s3 As String = l.GetStringValue(16, "")
// 11145401322

Break // check in debugger
```

**Notes:** With all default parameter, this is same as StringValue property.

### 6.6.24 Increment(value as UInt32 = 1)

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Increment number with an integer.

**Example:**

```
Dim o As New LargeNumberMBS(5)
```

```
MsgBox o.StringValue
o.Increment
MsgBox o.StringValue
o.Decrement
MsgBox o.StringValue
```

**Notes:** This is faster than building a new LargeNumberMBS, just to add some small number.

### 6.6.25 IsPrime(iter as Integer) as Integer

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks if number is a prime number.

**Example:**

```
Dim lines() As String

For i As Integer = 61 To 69 Step 2
  Dim a As New LargeNumberMBS(i)
  lines.Append a.StringValue+": "+Str(a.IsPrime(5))
Next

MsgBox Join(lines, EndOfLine)
```

**Notes:** Returns 1 if prime and 0 if not.  
Returns -1 in case of error.

Iter is the factor between 1 and 680 about how deep to iterate. The bigger the this factor, the more exact the check is.

Miller-Rabin Algorithm (ret=1 .. n is composit)

### 6.6.26 LeftShift(bits as integer) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Shifts value to left by given number of bits.

**Notes:** Bits must be <= 32.

### 6.6.27 `MaxInt32` as `LargeNumberMBS`

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Maximum value which can be represented as `Int32`.

### 6.6.28 `MaxInt64` as `LargeNumberMBS`

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Maximum value which can be represented as `Int64`.

### 6.6.29 `MaxUInt32` as `LargeNumberMBS`

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Maximum value which can be represented as `UInt32`.

### 6.6.30 `MaxUInt64` as `LargeNumberMBS`

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Maximum value which can be represented as `UInt64`.

### 6.6.31 `MinInt32` as `LargeNumberMBS`

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Minimum value which can be represented as `Int32`.

### 6.6.32 `MinInt64` as `LargeNumberMBS`

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Minimum value which can be represented as `Int64`.

**6.6.33 MinUInt32 as LargeNumberMBS**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Minimum value which can be represented as UInt32.

**6.6.34 MinUInt64 as LargeNumberMBS**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Minimum value which can be represented as UInt64.

**6.6.35 ModInverse(Modulo as LargeNumberMBS) as LargeNumberMBS**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** This function calculates modular multiplicative inverse of an given integer a modulo m.

**Example:**

`Dim l As New LargeNumberMBS(3)`

`Dim n As New LargeNumberMBS(26)`

`Dim r As LargeNumberMBS = l.ModInverse(n)`

`MsgBox r.StringValue`

**6.6.36 Modulo(other as LargeNumberMBS)**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Modulo value.

**Notes:** Divides value and returns the rest.

See also:

- 6.6.37 Modulo(other as LargeNumberMBS) as LargeNumberMBS 417
- 6.6.38 Modulo(value as UInt32) as UInt32 418

**6.6.37 Modulo(other as LargeNumberMBS) as LargeNumberMBS**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Modulo value.

**Notes:** Divides value and returns the rest.

See also:

- 6.6.36 Modulo(other as LargeNumberMBS) 417
- 6.6.38 Modulo(value as UInt32) as UInt32 418

### 6.6.38 Modulo(value as UInt32) as UInt32

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divide by given integer and return remainder.

**Example:**

```
Dim o As New LargeNumberMBS(63)
Dim r1 As LargeNumberMBS = o.Divide(8)
Dim r2 As UInt32 = o.Modulo(8)
```

```
MsgBox r1.StringValue+" "+str(r2) // shows 7 and 7
```

**Notes:** For small numbers this is more efficient than creating new LargeNumberMBS to store value.

See also:

- 6.6.36 Modulo(other as LargeNumberMBS) 417
- 6.6.37 Modulo(other as LargeNumberMBS) as LargeNumberMBS 417

### 6.6.39 MulMod(v as LargeNumberMBS, Modulo as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiply with modulo.

**Example:**

```
Dim o As New LargeNumberMBS(50)
Dim f As New LargeNumberMBS(80)
Dim m As New LargeNumberMBS(255)
Dim r As LargeNumberMBS = o.MulMod(f, m)
```

```
MsgBox r.StringValue // shows 175 = (50 * 80) mod 255
```

### 6.6.40 Multiply(other as LargeNumberMBS)

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiplies value with other value.

See also:

- 6.6.41 Multiply(value as UInt32) as LargeNumberMBS

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### 6.6.41 Multiply(value as UInt32) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiply by given integer and return result.

**Example:**

```
Dim o As New LargeNumberMBS(5)
Dim r As LargeNumberMBS = o.Multiply(8)
```

```
MsgBox r.StringValue // shows 40
```

**Notes:** For small numbers this is more efficient than creating new LargeNumberMBS to store value.

See also:

- 6.6.40 Multiply(other as LargeNumberMBS)

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### 6.6.42 Negate as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Negates the value.

**Notes:** Returns new value with different sign.

### 6.6.43 NumberWithInt32(value as Int32) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with the given Int32 value.

**Example:**

```
Dim l1 As LargeNumberMBS = LargeNumberMBS.NumberWithInt32(123456789)
MsgBox l1.StringValue
```

### 6.6.44 NumberWithInt64(value as Int64) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with the given Int64 value.

**Example:**

```
Dim d1 As LargeNumberMBS = LargeNumberMBS.NumberWithInt64(0)
Dim d2 As LargeNumberMBS = LargeNumberMBS.NumberWithInt64(123)
Dim d3 As LargeNumberMBS = LargeNumberMBS.NumberWithInt64(123456789012345)
```

```
MsgBox d1.StringValue+EndOfLine+d1.HexString+EndOfLine+_
d2.StringValue+EndOfLine+d2.HexString+EndOfLine+_
d3.StringValue+EndOfLine+d3.HexString
```

### 6.6.45 NumberWithInteger(value as Integer) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with the given integer value.

**Example:**

```
Dim l1 As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(123456789)
MsgBox l1.StringValue
```

### 6.6.46 NumberWithString(value as String) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with the given string.

**Example:**

```
Dim l1 As LargeNumberMBS = LargeNumberMBS.NumberWithString("123456789")
MsgBox l1.StringValue
```

### 6.6.47 NumberWithUInt32(value as UInt32) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with the given UInt32 value.

**Example:**

`Dim l1 As LargeNumberMBS = LargeNumberMBS.NumberWithUInt32(123456789)`  
`MsgBox l1.StringValue`

### 6.6.48 NumberWithUInt64(value as UInt64) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with the given UInt64 value.

**Example:**

`Dim l1 As LargeNumberMBS = LargeNumberMBS.NumberWithUInt64(123456789)`  
`MsgBox l1.StringValue`

### 6.6.49 NumberWithUInteger(value as UInteger) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with the given unsigned integer value.

**Example:**

`Dim l1 As LargeNumberMBS = LargeNumberMBS.NumberWithUInteger(123456789)`  
`MsgBox l1.StringValue`

### 6.6.50 NumberWithVariant(value as variant) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a number with the given variant value.

**Example:**

`Dim l1 As LargeNumberMBS = LargeNumberMBS.NumberWithVariant(123456789)`  
`MsgBox l1.StringValue`

**Notes:** Variant can be integer or string.

### 6.6.51 Operator\_Add(other as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds other number and returns result.

**Example:**

`Dim l As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(20)`

`Dim o As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(10)`

`Dim r As LargeNumberMBS = l+o`

`Dim s As LargeNumberMBS = o+l`

`MsgBox r.StringValue+" "+s.StringValue`

### 6.6.52 Operator\_AddRight(other as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds other number and returns result.

### 6.6.53 Operator\_And(other as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Performs bitwise AND operator on the values.

**Example:**

`Dim l As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(16+4)`

`Dim o As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(4+2)`

`Dim ra As LargeNumberMBS = l And o`

`Dim ro As LargeNumberMBS = l Or o`

`MsgBox ra.StringValue + " "+ro.StringValue`

**Notes:** Returns new value.

### 6.6.54 Operator\_Compare(other as LargeNumberMBS) as Integer

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Compares two values.

**Example:**

```
Dim l As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(20)
Dim o As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(10)
```

```
If l > o Then
  MsgBox "l is bigger"
Else
  MsgBox "o is bigger"
end if
```

**Notes:** Returns -1, 1 or 0.

### 6.6.55 Operator\_Convert as String

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts the number to string.

**Example:**

```
Dim l As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(23)
MsgBox l
```

See also:

- 6.6.56 Operator\_Convert(value as String)

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### 6.6.56 Operator\_Convert(value as String)

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts string to large number.

**Example:**

```
Dim l As LargeNumberMBS = "123"
MsgBox l
```

See also:

- 6.6.55 Operator\_Convert as String

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### 6.6.57 Operator\_Divide(other as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides value by other value.

**Example:**

```
Dim l As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(21)
```

```
Dim o As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(3)
```

```
Dim r As LargeNumberMBS = l / o
```

```
MsgBox r.stringValue
```

### 6.6.58 Operator\_DivideRight(other as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Divides value by other value.

**Example:**

```
Dim o As New LargeNumberMBS(5)
```

```
// "10" is auto converted to LargeNumberMBS and Operator_DivideRight is called
```

```
Dim r As LargeNumberMBS = "10" / o
```

```
MsgBox r.StringValue
```

### 6.6.59 Operator\_Modulo(other as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Modulo value.

**Example:**

```
Dim l As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(23)
```

```
Dim o As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(3)
```

```
Dim r As LargeNumberMBS = l Mod o
```

```
MsgBox r.stringValue
```

**Notes:** Divides value and returns the rest.

**6.6.60 Operator\_ModuloRight(other as LargeNumberMBS) as LargeNumberMBS**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Modulo value.

**Notes:** Divides value and returns the rest.

**6.6.61 Operator\_Multiply(other as LargeNumberMBS) as LargeNumberMBS**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiplies value with other value.

**Example:**

```
Dim l As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(4)
```

```
Dim o As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(5)
```

```
Dim r As LargeNumberMBS = o*1
```

```
MsgBox r.stringValue
```

**6.6.62 Operator\_MultiplyRight(other as LargeNumberMBS) as LargeNumberMBS**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiplies value with other value.

**Example:**

```
Dim o As New LargeNumberMBS(5)
```

```
// "10" is auto converted to LargeNumberMBS and Operator_MultiplyRight is called
```

```
Dim r As LargeNumberMBS = "10" * o
```

```
MsgBox r.StringValue
```

**6.6.63 Operator\_Negate as LargeNumberMBS**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Negates the value.

**Example:**

```
Dim l As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(20)
```

```
Dim r As LargeNumberMBS = -1
```

```
MsgBox r.StringValue
```

### 6.6.64 Operator\_\_Or(other as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Performs bitwise OR operator on the values.

**Example:**

```
Dim l As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(16+4)
```

```
Dim o As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(4+2)
```

```
Dim ra As LargeNumberMBS = l And o
```

```
Dim ro As LargeNumberMBS = l Or o
```

```
MsgBox ra.StringValue + " " + ro.StringValue
```

**Notes:** Returns new value.

### 6.6.65 Operator\_\_Subtract(other as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts other number and returns result.

**Example:**

```
Dim l As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(20)
```

```
Dim o As LargeNumberMBS = LargeNumberMBS.NumberWithInteger(10)
```

```
Dim r As LargeNumberMBS = l-o
```

```
Dim s As LargeNumberMBS = o-l
```

```
MsgBox r.StringValue + " " + s.StringValue
```

### 6.6.66 Operator\_\_SubtractRight(other as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts other number and returns result.

**Example:**

```
Dim o As New LargeNumberMBS(5)
```

```
// "10" is auto converted to LargeNumberMBS and Operator_SubtractRight is called
```

```
Dim r As LargeNumberMBS = "10" - o
```

```
MsgBox r.StringValue
```

### 6.6.67 Prime(byte as Integer) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new big prime number.

**Example:**

```
Dim lines() As String
```

```
For i As Integer = 1 To 10
```

```
Dim r As LargeNumberMBS = LargeNumberMBS.Prime(i)
```

```
lines.Append r.StringValue
```

```
Next
```

```
MsgBox Join(lines,EndOfLine)
```

**Notes:** Byte defines how big the prime number becomes. Range 1 to 680.

### 6.6.68 RightShift(bits as integer) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Shifts value to right by given number of bits.

**Notes:** Bits must be <= 32.

### 6.6.69 SetStringValue(Text As String, Base as Integer, byref AfterText as String, Byref ValueRead as boolean)

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sets number from text.

**Notes:** Returns the text after the given text following the number in AfterText parameter.  
Sets ValueRead if a value was read.

### 6.6.70 SetZero

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sets number to zero.

**Example:**

```
Dim l1 As LargeNumberMBS = LargeNumberMBS.NumberWithInt32(12345)
MsgBox l1.StringValue

// set to zero
l1.SetZero
MsgBox l1.StringValue
```

### 6.6.71 SqrMod(Modulo as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Multiply with itself and modulo.

**Example:**

```
Dim o As New LargeNumberMBS(90)
Dim m As New LargeNumberMBS(255)
Dim r As LargeNumberMBS = o.SqrMod(m)

MsgBox r.StringValue // shows 195 = (90 * 90) mod 255
```

### 6.6.72 sqrt as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates square root of value.

**Example:**

```
Dim l As New LargeNumberMBS(1234567890123456)

// let's multiple first and then
Dim q As LargeNumberMBS = l * l
Dim root As LargeNumberMBS = q.Sqrt
```

```

If l = root Then
Break // okay
Else
Break // failed
End If

```

**Notes:** Get nearly square root of a. The answer will be a  $\geq \text{ret}^2$ .

### 6.6.73 Square as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Calculates square of current value.

**Notes:** Return  $x^2$ .

### 6.6.74 SubMod(v as LargeNumberMBS, Modulo as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtraction with modulo.

**Example:**

```

Dim v As New LargeNumberMBS(100)
Dim o As New LargeNumberMBS(200)
Dim n As New LargeNumberMBS(&hFF)

Dim r As LargeNumberMBS = v.SubMod(o, n)

MsgBox r.StringValue // shows 155 = (100-200) mod 255

// -100 is too small, so 255 is added to bring to range.

```

### 6.6.75 Subtract(other as LargeNumberMBS)

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts other number.

See also:

- 6.6.76 Subtract(other as LargeNumberMBS) as LargeNumberMBS

### 6.6.76 Subtract(other as LargeNumberMBS) as LargeNumberMBS

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Subtracts other number and returns result.

See also:

- 6.6.75 Subtract(other as LargeNumberMBS)

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### 6.6.77 Properties

### 6.6.78 BitSize as Integer

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries bit size of the number.

**Notes:** Up to 4128 bits.

(Read only property)

### 6.6.79 Bytes as MemoryBlock

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Provides raw bytes of number in memory.

**Example:**

```
Dim o As New LargeNumberMBS(&h12345678)
```

```
Dim m As MemoryBlock = o.Bytes
```

Break

**Notes:** Without sign as number is always positive.

(Read only property)

### 6.6.80 ByteSize as Integer

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries byte size of the number.

**Notes:** Up to 516 bytes.

(Read only property)

### 6.6.81 DoubleValue as Double

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries value as double.

**Notes:** Result is not correct if value is not in range of a double.  
(Read only property)

### 6.6.82 HexString as String

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries value as hex string.

**Notes:** (Read only property)

### 6.6.83 Int64Value as Int64

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries value as Int64.

**Notes:** Result is not correct if value is not in range of a double.  
(Read and Write property)

### 6.6.84 IntegerValue as Integer

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries value as integer.

**Example:**

```
Dim l As New LargeNumberMBS(123)
```

```
Dim u As UInteger = l.UIntegerValue
```

```
Dim i As Integer = l.IntegerValue
```

Break

**Notes:** Result is not correct if value is not in range of a double.  
(Read and Write property)

### 6.6.85 IsDouble as Boolean

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this value fits in double range.

**Notes:** (Read only property)

### 6.6.86 IsInt32 as Boolean

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this value fits in Int32 range.

**Notes:** (Read only property)

### 6.6.87 IsInt64 as Boolean

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this value fits in Int64 range.

**Notes:** (Read only property)

### 6.6.88 IsNegate as Boolean

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether value is negative.

**Notes:** (Read and Write property)

### 6.6.89 IsUInt32 as Boolean

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this value fits in UInt32 range.

**Notes:** (Read only property)

### 6.6.90 IsUInt64 as Boolean

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this value fits in UInt64 range.

**Notes:** (Read only property)

### 6.6.91 IsZero as Boolean

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether value is zero.

**Notes:** (Read only property)

### 6.6.92 StringValue as String

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries value as string.

**Notes:** Result is not correct if value is not in range of a double.

(Read and Write property)

### 6.6.93 UInt64Value as UInt64

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries value as UInt64.

**Notes:** Result is not correct if value is not in range of a double.

(Read and Write property)

### 6.6.94 UIntegerValue as UInteger

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries value as unsigned integer.

**Example:**

```
Dim l As New LargeNumberMBS(123)
```

```
Dim u As UInteger = l.UIntegerValue
```

```
Dim i As Integer = l.IntegerValue
```

Break

**Notes:** Result is not correct if value is not in range of a double.

(Read and Write property)

### 6.6.95 VariantValue as Variant

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries value as variant.

**Notes:** Result is can be string, integer or double.

(Read and Write property)

# Chapter 7

## Notifications

### 7.1 class NotificationMBS

#### 7.1.1 class NotificationMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The class for an application internal notification.

**Example:**

```
dim n as new NotificationMBS("DatabaseChangedNotification")
NotificationMBS.send(n)
```

**Notes:** The point of notifications is to inform some other part of your application about something. For example a chart updating if the user enters data in textfields.

So you register for notifications in existing classes/windows with the NotificationReceiverMBS interface. Or you create a subclass of the NotificationObserverMBS class to receive notifications

All notifications are delivered on the same thread as the send method. If needed we could have an asynchronous notification system. Please email for that.

Other notifications:

NSNotification: Notifications send from the Cocoa frameworks within your application over NSNotificationCenterMBS class or send across all applications with NSDistributedNotificationCenterMBS.

MacNotificationMBS: A notification message to the user which may have a sound, a message box and/or a jumping dock icon.

#### Blog Entries

- [MBS Xojo / Real Studio Plugins, version 15.2pr1](#)
- [MBS REALbasic Plugins Version 10.4 release notes](#)
- [MBS REALbasic Plugins, version 10.4pr8](#)

#### Xojo Developer Magazine

- [12.1, page 9: News](#)

### 7.1.2 Methods

#### 7.1.3 Constructor(name as string = "", ref as Variant = nil, tag as Variant = nil)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new notification with the given values.

**Example:**

```
dim n as new NotificationMBS("DatabaseChangedNotification")
NotificationMBS.send(n)
```

#### 7.1.4 RegisterReceiver(target as NotificationReceiverMBS, name as string = "", ref as Variant = nil)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Registers a receiver.

**Notes:** You have a class/window and you add NotificationReceiverMBS to the interfaces. Xojo will add a ReceivedNotification method which looks like this:

```
ReceivedNotification(name as string, ref as Variant, tag as Variant, notification as NotificationMBS)
```

Don't forget to call UnregisterReceiver later in the Close event or destructor.

If you register with name = "" and ref = nil, you receive all notifications. If you have a name, you get only notifications matching the name (case sensitive compare). If you have a reference object, you receive only objects for that object. And you can use both name and object.

### 7.1.5 Send(name as string, ref as object = nil, tag as Variant = nil)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a notification.

**Example:**

```
NotificationMBS.Send("DatabaseChangedNotification")
```

**Notes:** This is a convenience method which creates a new NSNotificationMBS object and sends it.

All registered receivers will get the ReceivedNotification method called as well as all registered observers will get an ReceivedNotification event.

Of course notifications are filtered by name and/or referenced object.

See also:

- 7.1.6 Send(notification as NotificationMBS)

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### 7.1.6 Send(notification as NotificationMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a notification.

**Example:**

```
dim n as new NotificationMBS("DatabaseChangedNotification")
NotificationMBS.send(n)
```

**Notes:** All registered receivers will get the ReceivedNotification method called as well as all registered observers will get an ReceivedNotification event.

Of course notifications are filtered by name and/or referenced object.

See also:

- 7.1.5 Send(name as string, ref as object = nil, tag as Variant = nil)

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### 7.1.7 SendDelayed(name as string, ref as object = nil, tag as Variant = nil)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a notification.

**Example:**

```
NotificationMBS.SendDelayed("DatabaseChangedNotification")
```

**Notes:** Same as Send method, but the notification will be delivered later on the main thread. The notification is queued and will wait until there is free CPU time.

See also:

- 7.1.8 SendDelayed(notification as NotificationMBS) 438

### 7.1.8 SendDelayed(notification as NotificationMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a notification.

**Example:**

```
dim n as new NotificationMBS("DatabaseChangedNotification", window1, "test")
NotificationMBS.SendDelayed(n)
```

**Notes:** Same as Send method, but the notification will be delivered later on the main thread. The notification is queued and will wait until there is free CPU time.

See also:

- 7.1.7 SendDelayed(name as string, ref as object = nil, tag as Variant = nil) 437

### 7.1.9 SendNotification

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends this notification.

**Example:**

```
dim n as new NotificationMBS("DatabaseChangedNotification")
n.SendNotification
```

**Notes:** All registered receivers will get the ReceivedNotification method called as well as all registered observers will get an ReceivedNotification event.

Of course notifications are filtered by name and/or referenced object.

### 7.1.10 SendNotificationDelayed

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Sends a notification.

**Example:**

```
dim n as new NotificationMBS("DatabaseChangedNotification")
n.SendNotificationDelayed
```

**Notes:** Same as SendNotification method, but the notification will be delivered later on the main thread. The notification is queued and will wait until there is free CPU time.

### 7.1.11 UnregisterReceiver(target as NotificationReceiverMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Unregisters an receiver.

### 7.1.12 Properties

### 7.1.13 Name as String

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The name for the notification.

**Example:**

```
dim n as new NotificationMBS("DatabaseChangedNotification", window1, "test")
MsgBox n.Name
```

**Notes:** (Read and Write property)

### 7.1.14 Ref as Variant

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The reference object.

**Notes:** Defines which object the notification references. If nil, you target all objects. (Read and Write property)

### 7.1.15 Tag as Variant

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The attached value.

**Example:**

```
dim n as new NotificationMBS
n.Tag = "Hello World"
```

**Notes:** You can use this property as you like.

This value is sent to the receivers. It allows you to pass an additional value without needing to write a subclass of the NotificationMBS class.

(Read and Write property)

## 7.2 class NotificationObserverMBS

### 7.2.1 class NotificationObserverMBS

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The class for receiving notifications.

**Blog Entries**

- [MBS REALbasic Plugins Version 10.4 release notes](#)
- [MBS REALbasic Plugins, version 10.4pr8](#)

### 7.2.2 Methods

### 7.2.3 Constructor(name as string = "", ref as object = nil, tag as Variant = nil)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new notification observer.

**Notes:** If you register with name = "" and ref = nil, you receive all notifications. If you have a name, you get only notifications matching the name (case sensitive compare). If you have a reference object, you receive only objects for that object. And you can use both name and object.

### 7.2.4 Properties

### 7.2.5 Name as String

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The name of the notification to listen for.

**Notes:** (Read only property)

### 7.2.6 Ref as Object

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The target object to listen for.

**Notes:** (Read only property)

### 7.2.7 Events

### 7.2.8 ReceivedNotification(name as string, ref as Variant, tag as Variant, notification as NotificationMBS)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: .

**Function:** The event called if a notification was received.

**Notes:** This event is registered automatically, so do not call RegisterReceiver with the NotificationObserverMBS object.

If you register with name = "" and ref = nil, you receive all notifications. If you have a name, you get only notifications matching the name (case sensitive compare). If you have a reference object, you receive only objects for that object. And you can use both name and object.

# Chapter 8

## String

### 8.1 Globals

#### 8.1.1 SplitMBS(value as String, delimiter as String = " ") as String()

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Splits string.

**Example:**

```
dim a() as string = SplitMBS("Hello World Test", " ")
dim b() as string = SplitMBS("Gr√ü", " ")
dim c() as string = SplitMBS("Just$ test$ a$ test$ test", "$ test$ ")
```

break

**Notes:** Similar to the Split() function, but without the problems we see with Split function. See feedback cases for Split.

If delimiter is "", we return an array with all characters in string.

Else we split given string with delimiter.

**Blog Entries**

- [MBS Releases the MBS Xojo / Real Studio plug-ins in version 16.4](#)
- [Split and Join strings](#)
- [MBS Xojo / Real Studio Plugins, version 16.4pr8](#)
- [MBS Xojo / Real Studio Plugins, version 16.4pr7](#)

- [MBS Real Studio Plugins, version 13.0pr10](#)

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- [14.6, page 10: News](#)

### 8.1.2 JoinDataMBS(blocks() as memoryblock) as string

Plugin Version: 14.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Joins an array of memoryblocks in new string.

**Example:**

```
dim s() as MemoryBlock

// make memoryblock with a space character
dim m as MemoryBlock = "Hello"

s.Append m
s.Append m
s.Append m

// now join
dim r as string = JoinDataMBS(s)

// define to be ASCII:
r = DefineEncoding(r, encodings.ASCII)

// and show
MsgBox r
```

**Notes:** Returned string has no encoding defined.

Raises `OutOfMemoryException` in case of low memory.

See also:

- [8.1.3 JoinDataMBS\(strings\(\) as string\) as string](#) 444
- [8.1.4 JoinDataMBS\(values\(\) as Variant\) as string](#) 445

### 8.1.3 JoinDataMBS(strings() as string) as string

Plugin Version: 14.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Joins an array of strings in new string.

**Example:**

```

dim s() as string

s.Append "Hello"
s.Append " "
s.Append "World"

// now join
dim r as string = JoinDataMBS(s)

// define to be ASCII:
r = DefineEncoding(r, encodings.ASCII)

// and show
MsgBox r

```

**Notes:** Returned string has no encoding defined.  
 Raises `OutOfMemoryException` in case of low memory.  
 See also:

- 8.1.2 `JoinDataMBS(blocks() as memoryblock) as string` 444
- 8.1.4 `JoinDataMBS(values() as Variant) as string` 445

### 8.1.4 `JoinDataMBS(values() as Variant) as string`

Plugin Version: 14.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Joins an array of variants in new string.

**Example:**

```

dim s() as Variant

// make memoryblock with a space character
dim m as new MemoryBlock(1)
m.Int8Value(0) = 32

s.Append "Hello"
s.Append m
s.Append "World"

// now join
dim r as string = JoinDataMBS(s)

// define to be ASCII:
r = DefineEncoding(r, encodings.ASCII)

```

```
// and show
MsgBox r
```

**Notes:** Variants can be memoryblocks or strings or normal objects which can give stringValue.  
Returned string has no encoding defined.  
Raises OutOfMemoryException in case of low memory.

**Blog Entries**

- [Split and Join strings](#)
- [MBS Xojo / Real Studio Plugins, version 14.2pr3](#)

See also:

- 8.1.2 JoinDataMBS(blocks() as memoryblock) as string 444
- 8.1.3 JoinDataMBS(strings() as string) as string 444

### 8.1.5 JoinStringMBS(strings() as string) as string

Plugin Version: 14.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Joins an array of strings in new string.

**Example:**

```
dim s() as string
```

```
s.Append "Hello"
s.Append " "
s.Append "World"
```

```
dim r as string = JoinStringMBS(s)
```

```
MsgBox r
```

**Notes:** Converts all strings if necessary into UTF-8. If you want to join them as they are, please use JoinDataMBS.

Raises OutOfMemoryException in case of low memory.

See also:

- 8.1.6 JoinStringMBS(values() as Variant) as string 446

### 8.1.6 JoinStringMBS(values() as Variant) as string

Plugin Version: 14.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Joins an array of strings in new string.

**Example:**

```
dim s() as Variant
```

```
s.Append "Hello"
```

```
s.Append " "
```

```
s.Append "World"
```

```
dim r as string = JoinStringMBS(s)
```

```
MsgBox r
```

**Notes:** Converts all strings if necessary into UTF-8.

Raises `OutOfMemoryException` in case of low memory.

**Blog Entries**

- [Split and Join strings](#)
- [MBS Xojo / Real Studio Plugins, version 14.2pr3](#)

See also:

- [8.1.5 JoinStringMBS\(strings\(\) as string\) as string](#)

### 8.1.7 StringCodePointsMBS(text as string) as UInt32()

Plugin Version: 21.3, Platforms: macOS, Linux, Windows, iOS, Targets: All.

**Function:** Query unicode code points for a text.

**Example:**

```
// take Hello World in Japanese
```

```
Dim Text As String = "„Äi„Çi„Ä´„Ä°„ÄØ%õñÄiä”
```

```
// get code points
```

```
Dim v() As UInt32 = StringCodePointsMBS(Text)
```

```
// check in debugger
```

```
Break
```

**Notes:** We get text as UTF32 and return you the characters as an array of numbers.

Can be faster than Xojo’s character iterator as we don’t construct temporary strings and an iterator object

here.

### Blog Entries

- [MonkeyBread Software Releases the MBS Xojo Plugins in version 21.3](#)
- [MBS Xojo Plugins, version 21.3pr7](#)
- [Iterating character speed](#)

## 8.2 class StringHandleMBS

### 8.2.1 class StringHandleMBS

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** A class for attaching strings together very fast.

**Example:**

```
dim s as StringHandleMBS
```

```
s=new StringHandleMBS
```

```
// Add some text
```

```
s.Add "Hello"
```

```
s.Add " "
```

```
s.Add "World"
```

```
// Insert a string
```

```
s.Insert " great",6
```

```
// check it
```

```
MsgBox s.Copy
```

```
// Delete the great from above
```

```
s.Delete 6,7
```

```
// check
```

```
MsgBox s.Copy
```

```
// Insert again
```

```
s.Insert " great ",6
```

```
// check
```

```
MsgBox s.Copy
```

```
// Now we extract the middle, so it's deleted
```

```
MsgBox s.Extract(6,7)
```

```
// check again
MsgBox s.copy
```

**Notes:** The class initialized itself on the first use.

#### **Blog Entries**

- [MBS Xojo Plugins, version 23.5pr4](#)
- [News from the MBS Xojo Plugins Version 22.1](#)
- [MBS Xojo Plugins, version 22.1pr5](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 21.3](#)
- [MBS Xojo Plugins, version 21.3pr7](#)
- [MBS Xojo Plugins, version 21.1pr2](#)
- [MBS Xojo Plugins, version 19.2pr1](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 19.1](#)
- [MBS Xojo Plugins, version 19.1pr7](#)
- [MBS Xojo Plugins, version 19.1pr6](#)

#### **Xojo Developer Magazine**

- [21.1, page 28: News from MBS Xojo Plugins, What's up with MonkeyBread Software by Stefanie Juchmes](#)
- [17.3, page 11: News](#)

### **8.2.2 Methods**

#### **8.2.3 Add(data as MemoryBlock)**

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds data from memoryblock to the string handle.

See also:

- [8.2.4 Add\(data as Ptr, size as Integer\)](#) 450
- [8.2.5 Add\(data as string\)](#) 450
- [8.2.6 Add\(data as StringHandleMBS\)](#) 450

### 8.2.4 Add(data as Ptr, size as Integer)

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds data from ptr to the string handle with given size.

**Notes:** Using invalid Ptr or size combination can cause a crash.

See also:

- 8.2.3 Add(data as MemoryBlock) 449
- 8.2.5 Add(data as string) 450
- 8.2.6 Add(data as StringHandleMBS) 450

### 8.2.5 Add(data as string)

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds the string at the end of the current data.

**Notes:** Note that all strings added must have the same encoding.

See also:

- 8.2.3 Add(data as MemoryBlock) 449
- 8.2.4 Add(data as Ptr, size as Integer) 450
- 8.2.6 Add(data as StringHandleMBS) 450

### 8.2.6 Add(data as StringHandleMBS)

Plugin Version: 22.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds content of other string handle to this one.

**Example:**

```
Dim s1 As New StringHandleMBS
```

```
s1.add "Hello World"
```

```
Dim s2 As New StringHandleMBS
```

```
s2.add "Got: "
```

```
s2.add s1
```

```
MessageBox s2.Copy
```

**Notes:** Just like asking first StringHandle for content as string or Memoryblock and then adding that to the target one. But without the intermediate copying.

See also:

8.2. CLASS STRINGHANDLEMBS	451
• 8.2.3 Add(data as MemoryBlock)	449
• 8.2.4 Add(data as Ptr, size as Integer)	450
• 8.2.5 Add(data as string)	450

### 8.2.7 AddByte(value as UInt8)

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a byte to the string handle.

### 8.2.8 AddInteger(value as Int64)

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Adds a integer value to the string handle.

**Notes:** This is like AddString(str(value)).

### 8.2.9 Clear

Plugin Version: 21.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Clears the string handle.

**Notes:** Resets size to zero, but does not release memory, so it can be reused.

### 8.2.10 clone as StringHandleMBS

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Creates a new StringHandleMBS object with the same content.

### 8.2.11 Constructor

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The constructor of this class.

See also:

- 8.2.12 Constructor(InitValue as MemoryBlock) 452
- 8.2.13 Constructor(initvalue as string) 452

### 8.2.12 Constructor(InitValue as MemoryBlock)

Plugin Version: 23.5, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Initializes a StringHandle and inserts the content of the memoryblock.

See also:

- 8.2.11 Constructor 451
- 8.2.13 Constructor(initvalue as string) 452

### 8.2.13 Constructor(initvalue as string)

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The second constructor of this class which sets the value directly to the given Xojo string.

**Example:**

*// An utility function you can define in a module:*

```
Function BinaryReplaceAll(s as string, a as string,b as string) As string
dim h as StringHandleMBS
```

```
h=new StringHandleMBS(s)
h.ReplaceAll(a,b)
```

```
Return h.Copy
End Function
```

See also:

- 8.2.11 Constructor 451
- 8.2.12 Constructor(InitValue as MemoryBlock) 452

### 8.2.14 Copy as string

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the content as a Xojo string.

**Notes:** This string will have the encoding set in the encoding property.

### 8.2.15 CopyMemory as MemoryBlock

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Copies content of handle in new memoryblock.

### 8.2.16 Delete(start as Integer, lengthBytes as Integer)

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Deletes the bytes within the range.

**Notes:** One based like RB's string functions.

The start and length parameters use bytes not charcters as unit. You can use the Copy method to get a RB string for characterwise editing.

### 8.2.17 Extract(start as Integer, lengthBytes as Integer) as string

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a part of the string.

**Notes:** One based and the returned part is removed form the string data.

The start and length parameters use bytes not charcters as unit. You can use the Copy method to get a RB string for characterwise editing.

### 8.2.18 FindByte(value as UInt8, StartByteOffset as Integer = 1) as Integer

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds position of a given value.

**Example:**

```
Dim s As New StringHandleMBS("Hello")
```

```
// 64 = big letters
```

```
// +32 = small letters
```

```
// + 5 = for 5th letter in alphabet
```

```
Dim c As Integer = 64+32+5
```

```
Dim p As Integer = s.FindByte(c)
```

```
MsgBox "position "+Str(p)+" for letter e"
```

**Notes:** Returns one based byte offset.

Result is 0 if not found.

StartPosition added in v21.3.

See also:

- 8.2.19 FindByte(values() as UInt8, StartByteOffset as Integer = 1) as Integer 454

### 8.2.19 FindByte(values() as UInt8, StartByteOffset as Integer = 1) as Integer

Plugin Version: 21.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds position of a given value.

**Example:**

```
Dim s As New StringHandleMBS("Hello Welt")
```

```
Dim values() As UInt8
```

```
values.append Asc("e")
```

```
values.append Asc("o")
```

```
Dim p As Integer = s.FindByte(values, 3)
```

```
MsgBox "position "+Str(p)+" for letter "+s.Mid(p, 1)
```

**Notes:** Values is an array of possible values to find.

For best performance avoid duplicates in that array.

Returns one based byte offset.

Result is 0 if not found.

See also:

- 8.2.18 FindByte(value as UInt8, StartByteOffset as Integer = 1) as Integer 453

### 8.2.20 FirstNonWhiteSpace(StartByteOffset as Integer = 1) as Integer

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds first non-whitespace byte in the data starting at given offset.

**Example:**

```
Dim s As New StringHandleMBS("Hello World")
```

```
Dim p As Integer = s.FirstWhiteSpace(1)
```

```
Dim x As Integer = s.FirstNonWhiteSpace(p+1)
```

```
MsgBox "position "+Str(p)+" for white space and "+Str(x)+" for following text"
```

**Notes:** StartByteOffset is one based.  
 White space are space, tab and new line characters.  
 Returns 0 if not found.

### 8.2.21 FirstWhiteSpace(StartByteOffset as Integer = 1) as Integer

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Finds first whitespace byte in the data starting at given offset.

**Example:**

```
Dim s As New StringHandleMBS("Hello World")
Dim p As Integer = s.FirstWhiteSpace(1)
Dim x As Integer = s.FirstNonWhiteSpace(p+1)
```

MsgBox "position "+Str(p)+" for white space and "+Str(x)+" for following text"

**Notes:** StartByteOffset is one based.  
 White space are space, tab and new line characters.  
 Returns 0 if not found.

### 8.2.22 Insert(data as string, position as Integer)

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Inserts the string data at the given byte position.

**Notes:** One based.

Note that on Unicode the character position and the byte position are not equal!  
 (On 16bit Unicode charpos=2\*bytepos and on US ASCII charpos=bytepos)

The position parameter uses bytes not characters as unit. You can use the Copy method to get a RB string for characterwise editing.

### 8.2.23 InStr(OffsetBytes as Integer = 1, target as String, EndOffsetBytes as Integer = -1) as Integer

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Searches for a binary string inside the StringHandle.

**Example:**

```
// We test if RB returns the same values as the plugin

dim s as String
dim h as StringHandleMBS

s="Christian"
h=new StringHandleMBS

h.Add s

MsgBox "MBS: "+str(h.InStr("is"))+", RB: "+str(InStr(s,"is"))
MsgBox "MBS: "+str(h.InStr(5,"ia"))+", RB: "+str(InStr(5,s,"ia"))
MsgBox "MBS: "+str(h.InStr("xy"))+", RB: "+str(InStr(s,"xy"))
```

**Notes:** The same as `InStr` but with a second parameter to specify the start of the search inside the string handled.

The `srcOfs` parameter uses bytes not characters as unit. You can use the `Copy` method to get a RB string for characterwise editing.

Returns positive value if something is found and zero in case nothing is found.

Returns negative value in case of error.

Casesensitive search!

### 8.2.24 `InStrUTF8(OffsetCharacters as Integer = 1, target as String, EndOffsetCharacters as Integer = -1) as Integer`

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Searches for a binary string inside the `StringHandle`.

**Example:**

```
Dim sh As New StringHandleMBS
sh.Encoding = sh.encodingUTF8 // so copy gives right encoding

sh.Add "√Ñ test Hello Word √§√° test string."

Dim s As String = sh.Copy

MsgBox "position of text: "+Str(sh.InStr(5,"test"))+"/"+Str(s.InStrB(5,"test"))+"th byte "+_
"or "+Str(sh.InStrUTF8(5,"test"))+"/"+Str(s.InStr(5,"test"))+"th character"
```

**Notes:** This function uses UTF8 characters instead of bytes as unit.

Returns positive value if something is found and zero in case nothing is found.

Returns negative value in case of error.

The same as InStrUTF8 but with a second parameter to specify the start of the search inside the string handle.

Casesensitive search!

### 8.2.25 IsValidASCII(data as ptr, TotalByteLength as integer) as Boolean

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks whether given data is valid ASCII text.

### 8.2.26 IsValidUTF8(data as ptr, TotalByteLength as integer) as Boolean

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Checks whether given data is valid UTF-8 text.

### 8.2.27 Left(lengthBytes as Integer) as string

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a copy of the first left bytes of the string.

**Notes:** May return less strings if the stored string is not long enough.

The length parameter uses bytes not characters as unit. You can use the Copy method to get a RB string for characterwise editing.

### 8.2.28 LeftUTF8(lengthCharacter as integer) as string

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries given number of characters from string from the left side.

**Example:**

```
Dim s As String = "Hello √√§√°!"
Dim d As New StringHandleMBS(s)
```

```
d.Encoding = d.encodingUTF8
```

```
// ✓ is two bytes
MsgBox d.LeftUTF8(8)+" in UTF8 and "+d.Left(8)+" in bytes"
```

### 8.2.29 Mid(startByte as Integer, lengthBytes as Integer) as string

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a part of the string.

**Notes:** One based.

The length parameter uses bytes not characters as unit. You can use the Copy method to get a RB string for characterwise editing.

### 8.2.30 MidInteger(startByte As Integer, lengthBytes As Integer = -1) as Int64

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Converts some bytes read as ASCII text to number.

**Example:**

```
Dim s As New StringHandleMBS("123456789")
```

```
Dim v As Integer = s.MidInteger(3,3)
MsgBox str(v)
```

**Notes:** startByte is one based.

### 8.2.31 MidUTF8(startCharacter as integer, lengthCharacter as integer) as string

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries characters from UTF-8 string with given characters.

**Example:**

```
Dim s As String = "Hello ✓✓§✓!"
Dim d As New StringHandleMBS(s)
```

```
d.Encoding = d.encodingUTF8
```

```
// ✓ is two bytes
MsgBox d.MidUTF8(7,4)+" in UTF8 and "+d.Mid(7,4)+" in bytes"
```

**Notes:** startCharacter starts with 1 as in Xojo's mid function.

### 8.2.32 Replace(a as String, b as string)

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Replaces the first string found with content of a with the content of b.

**Example:**

```
dim s as StringHandleMBS
s=new StringHandleMBS
s.Add "Hallo Leutle, Hellau"
s.Replace("H","h")
s.Replace("l","i")
MsgBox s.Copy+" "+str(s.Len)
```

**Notes:** Note that all strings are compared binary and must have the same encoding. Basically this is just a call to instr, one to delete and one to insert. See also:

- 8.2.33 Replace(startpos as Integer, a as String, b as string)

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### 8.2.33 Replace(startpos as Integer, a as String, b as string)

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Replaces the first string found with content of a with the content of b.

**Notes:** If you don't give a startpos parameter the call uses one and is equal to Replace(a,b).

Startpos is one based like all indexes in this class.

The startpos parameter uses bytes not characters as unit. You can use the Copy method to get a RB string for characterwise editing.

See also:

- 8.2.32 Replace(a as String, b as string)

459

### 8.2.34 ReplaceAll(a as String, b as string)

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Replaces all strings with content of a with the content of b.

**Example:**

```
dim s as StringHandleMBS

s=new StringHandleMBS

s.Add "Hallo Leutle, Hellau"

s.Replaceall("H", "h")
s.Replaceall("l", "i")

MsgBox s.Copy+" "+str(s.Len)
```

**Notes:** Note that all strings are compared binary and must have the same encoding. Basically this is just a loop with calls to instr, to delete and to insert. See also:

- 8.2.35 ReplaceAll(startpos as Integer, a as String, b as string)

460

### 8.2.35 ReplaceAll(startpos as Integer, a as String, b as string)

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Replaces all strings with content of a with the content of b.

**Notes:** If you don't give a startpos parameter the call uses one and is equal to ReplaceAll(a,b). Startpos is one based like all indexes in this class.

The startpos parameter uses bytes not characters as unit. You can use the Copy method to get a RB string for characterwise editing.

See also:

- 8.2.34 ReplaceAll(a as String, b as string)

460

### 8.2.36 Reverse as StringHandleMBS

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Reverses bytes in string.

**Example:**

```
Dim s As New StringHandleMBS("Hello")
Dim r As StringHandleMBS = s.Reverse
```

```
MsgBox r.Copy
```

**Notes:** Returns copy of the string with reversed order.

### 8.2.37 Right(lengthBytes as Integer) as string

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns a copy of the first right bytes of the string.

**Example:**

```
// There was a small bug in the Right and the Mid function for the version 3.1 of this plugin.
// This test failed in 3.1, but works in 3.2:
```

```
dim Text as StringhandleMBS
dim Part as String
```

```
Text = New StringHandleMBS
Text.Add "" + chr(13) + chr(10)
```

```
Part = Text.Copy
' Now Part is "<CR><LF>" which is correct
```

```
if lenb(Part)<>3 then
MsgBox "Failed on Copy "+str(lenb(Part))
end if
```

```
Part = Text.Right(1)
' Now Part is "<LF>" which is correct
```

```
if lenb(Part)<>1 then
MsgBox "Failed on Right(1) "+str(lenb(Part))
end if
```

```
Part = Text.Right(2)
' Now Part is "<CR><LF>" which is correct
```

```
if lenb(Part)<>2 then
MsgBox "Failed on Right(2) "+str(lenb(Part))
end if
```

```
Part = Text.Right(3)
```

```
' Now Part is "" which is wrong!
```

```
if lenb(Part)<>3 then
MsgBox "Failed on Right(3) "+str(lenb(Part))
end if
```

**Notes:** May return less strings if the stored string is not long enough. The length parameter uses bytes not characters as unit. You can use the Copy method to get a RB string for characterwise editing.

### 8.2.38 RightUTF8(lengthCharacter as integer) as string

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries given number of characters from string from the right side.

**Example:**

```
Dim s As String = "Hello √√§/!"
Dim d As New StringHandleMBS(s)
```

```
d.Encoding = d.encodingUTF8
```

```
// √ is two bytes
MsgBox d.RightUTF8(8)+" in UTF8 and "+d.Right(8)+" in bytes"
```

### 8.2.39 Truncate(lengthBytes as Integer)

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Truncates the string handle content.

**Notes:** Sets the length of the string back to the given value if it's greater.

The length parameter uses bytes not characters as unit. You can use the Copy method to get a RB string for characterwise editing.

### 8.2.40 TruncateUTF8(lengthCharacters as integer)

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Truncates data to given number of UTF-8 characters.

**Example:**

```
Dim s As New StringHandleMBS("√§√√°")
```

```
// limit to 2 characters, here 4 bytes
s.TruncateUTF8 2
```

```
MsgBox s.Copy
```

**8.2.41 UTF8Length(data as ptr, TotalByteLength as integer) as Integer**

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries how many UTF-8 characters are in one memory area.

**Example:**

```
Dim s As String = "Hello √§√√°"
```

```
Dim m As MemoryBlock = s
```

```
Dim c As Integer = StringHandleMBS.UTF8Length(m, m.size)
```

```
MsgBox str(c)+" characters, "+str(m.size)+" bytes"
```

**Notes:** Please make sure ptr is a valid ptr.

This is the internal function we use ourselves for the UTF-8 related functions.

**8.2.42 UTF8LengthToBytes(data as ptr, TotalByteLength as integer, Characters as Integer) as Integer**

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries how many bytes are needed for UTF-8 characters.

**Example:**

```
Dim s As String = "Hello √§√√°"
```

```
Dim m As MemoryBlock = s
```

```
Dim c As Integer = StringHandleMBS.UTF8Length(m, m.size)
```

```
Dim b As Integer = StringHandleMBS.UTF8LengthToBytes(m, m.size, c)
```

```
MsgBox Str(c)+" characters, "+Str(b)+" bytes"
```

**Notes:** Please make sure ptr is a valid ptr.  
This is the internal function we use ourselves for the UTF-8 related functions.

### 8.2.43 Properties

#### 8.2.44 BlockLen as Int64

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The size of the memory currently used for this class.

**Notes:** This value increases by BlockSize if more memory is needed.  
(Read only property)

#### 8.2.45 BlockSize as Int64

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The size of the blocks to allocate for storing the data.

**Notes:** (Read and Write property)

#### 8.2.46 Encoding as Int64

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** The encoding to use for returned strings.

**Notes:** Only useful on Xojo 4.5 and newer.

Some example values for encoding:

MacRoman	0	Also for ASCII or binary data used.
WindowsLatin1	&h0500	ANSI codepage 1252
ISOLatin1	&h0201	ISO 8859-1
NextStepLatin	&h0B01	NextStep encoding
Unicode	&h0100	16 bit Unicode
UTF8	&h08000100	8 bit Unicode
Invalid	&hFFFFFFFF	(Binary)
Invalid	&hFFFF	(Binary)

(Read and Write property)

### 8.2.47 Len as Int64

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Returns the len in bytes of the stored string.

**Notes:** (Read only property)

### 8.2.48 LenUTF8 as Int64

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Queries length of text in UTF-8 encoded characters.

**Example:**

```
Dim s As String = "Hello √/§/!"
Dim d As New StringHandleMBS(s)
```

```
MsgBox Str(d.Len)+" bytes, "+Str(d.LenUTF8)+" characters"
```

**Notes:** Returns incorrect values if string is not UTF-8!

(Read only property)

### 8.2.49 ReplaceCount as Int64

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** After a call to one of the Replace functions the number of items replaced.

**Notes:** (Read and Write property)

### 8.2.50 ValidASCII as Boolean

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this string handle contains valid ASCII text.

**Notes:** (Read only property)

### 8.2.51 ValidUTF8 as Boolean

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Whether this string handle contains valid UTF-8 text.

**Example:**

```
Dim s As New StringHandleMBS

s.Add "Hello World"

Dim validUTF8a As Boolean = s.ValidUTF8

// now make invalid
s.AddByte 222

Dim validUTF8b As Boolean = s.ValidUTF8

Break
```

**Notes:** (Read only property)

### 8.2.52 UInt16Value(offset as Integer) as UInt16

Plugin Version: 21.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or set an UInt16 value.

**Example:**

```
Dim t As String = ConvertEncoding("Hello Welt", encodings.UTF16)
Dim s As New StringHandleMBS(t)

// offset 1 is first character, so second character is offset 3
Dim n As Integer = s.UInt16Value(3)
s.UInt16Value(3) = Asc("a")

MsgBox s.Copy

// append

s.UInt16Value(s.Len+1) = Asc("!")
MsgBox s.Copy
```

**Notes:** Offset is range checked and may raise an `OutOfBoundsException`.

When you assign a value and the offset is exactly size of the string handle plus one, we append the new byte.  
(Read and Write computed property)

### 8.2.53 UInt32Value(offset as Integer) as UInt32

Plugin Version: 21.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or set an UInt32 value.

**Notes:** Offset is range checked and may raise an OutOfBoundsException.

When you assign a value and the offset is exactly size of the string handle plus one, we append the new byte.  
(Read and Write computed property)

### 8.2.54 UInt8Value(offset as Integer) as UInt8

Plugin Version: 21.3, Platforms: macOS, Linux, Windows, Targets: All.

**Function:** Get or set a byte value.

**Example:**

```
Dim s As New StringHandleMBS("Hello Welt")
```

```
dim n as integer = s.UInt8Value(2)
```

```
s.UInt8Value(2) = Asc("a")
```

```
MsgBox s.Copy
```

```
// append
```

```
s.UInt8Value(s.Len+1) = Asc("!")
```

```
MsgBox s.Copy
```

**Notes:** Offset is range checked and may raise an OutOfBoundsException.

When you assign a value and the offset is exactly size of the string handle plus one, we append the new byte.  
(Read and Write computed property)

### 8.2.55 Constants

Encodings

Constant	Value	Description
encodingASCII	&h0600	ASCII encoding.
encodingBinary	&hFFFF	No encoding.
encodingLatin1	&h0201	ISO Latin 1 encoding.
encodingMacRoman	0	Mac Roman encoding.
encodingUnicode	&h0100	Unicode UTF16 encoding.
encodingUTF8	&h08000100	UTF-8 encoding.
encodingWindows	&h0500	Windows encoding.

## Chapter 9

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# Chapter 10

## The FAQ

### 10.0.1 Can anyone help me convert seconds to time in this format hh:mm:ss?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Sure, here's a routine I use (which has an advantage over the previously-posted Date-based solution in that you don't have to rely on the creation of an object – all that happens is some division and string concatenation):

**Example:**

```
Function SecsToTimeString(timeInSecs as Integer, padHours as boolean, padMinutes as boolean) as string
// Given an amount time (in seconds), generates a string representing that amount
// of time. The padHours and padMinutes parameters determine whether to display
// hours and minutes if their values are zero.
```

```
// Examples:
// timeInSecs = 90, padHours = true; returns "00:01:30"
// timeInSecs = 1, padHours = false, padMinutes = true; returns "00:01"
// timeInSecs = 3601, padMinutes = false; returns "01:00:01"
```

```
dim hours, minutes, seconds as Integer
dim hoursString, minutesString as string
```

```
hours = timeInSecs / 3600
minutes = (timeInSecs mod 3600) / 60
seconds = timeInSecs mod 60
```

```
if hours = 0 then
if padHours then
hoursString = "00:"
else
hoursString = ""
end if
```

```

else
hoursString = Format(hours, "##\:")
end if
if minutes = 0 then
if hours <>0 or padMinutes then
minutesString = "00:"
else
minutesString = ""
end if
else
minutesString = Format(minutes, "00\:")
end if

return hoursString + minutesString + Format(seconds, "00")
End Function

```

**Notes:** (from the rb mailinglist)

### 10.0.2 Do you have plugins for Android?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Since there is no plugin SDK for Android, we have no way to make a plugin for Android.

**Notes:** We support macOS, Windows, Linux and iOS.

### 10.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use functions from NSColor to get proper highlight color in RGB:

**Example:**

```

Function ProperHighlightColor(active as Boolean) As Color
#if TargetCocoa
Dim theColor As NSColorMBS
If active Then
theColor = NSColorMBS.alternateSelectedControlColor
Else
theColor = NSColorMBS.secondarySelectedControlColor
End If

```

```

Dim rgbColor As NSColorMBS = theColor.colorUsingColorSpaceName(NSColorSpaceMBS.NSCalibrate-

```

```

dRGBColorSpace)
If rgbColor <>Nil Then
Dim red as Integer = rgbColor.redComponent * 255.0
Dim green as Integer = rgbColor.greenComponent * 255.0
Dim blue as Integer = rgbColor.blueComponent * 255.0
Return RGB(red, green, blue)
Else
Return HighlightColor
End If
#else
return HighlightColor
#endif
End Function

```

**Notes:** As you see we convert color to Calibrated RGB for best results.  
See also:

- 10.0.4 How to catch delete key? 481
- 10.0.5 How to convert cmyk to rgb? 482
- 10.0.6 How to delete a folder? 483
- 10.0.7 How to detect if CPU if 64bit processor? 484
- 10.0.8 How to query variant type string for a variant? 485
- 10.0.9 How to refresh a htmlviewer on Windows? 486

## 10.0.4 How to catch delete key?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** The following is the code in keydown event catches delete or backspace keys.

**Example:**

```

Function KeyDown(Key As String) As Boolean
if asc(key) = 8 or asc(key) = 127 then
MsgBox "Delete"
Return true
end if
End Function

```

See also:

- 10.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 480

- 10.0.5 How to convert cmyk to rgb? 482
- 10.0.6 How to delete a folder? 483
- 10.0.7 How to detect if CPU is 64bit processor? 484
- 10.0.8 How to query variant type string for a variant? 485
- 10.0.9 How to refresh a htmlviewer on Windows? 486

### 10.0.5 How to convert cmyk to rgb?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:**

The following is the code to convert cmyk values to an RGB color datatype.

It's just a basic estimate of the color values. If you are looking for completely color accurate solution, this is not it. It should work for most people. :)

**Example:**

**Function** CMYKToRGB(c as Integer, m as Integer, y as Integer, k as Integer) As color

// converts c,m,y,k values (0-100) to color data type RGB

// place this in a method. Supply C,M,Y,K values-

// it returns color datatype

```
dim color_RGB as color
```

```
dim r, g, b as Integer
```

```
r=255-round(2.55*(c+k))
```

```
if r<0 then
```

```
r=0
```

```
end if
```

```
g=255-round(2.55*(m+k))
```

```
if g<0 then
```

```
g=0
```

```
end if
```

```
b=255-round(2.55*(y+k))
```

```
if b<0 then
```

```
b=0
```

```
end if
```

```
color_RGB=RGB(r,g,b)
```

```
return color_RGB
```

```
End Function
```

**Notes:**

(from the rb mailinglist)  
See also:

- 10.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 480
- 10.0.4 How to catch delete key? 481
- 10.0.6 How to delete a folder? 483
- 10.0.7 How to detect if CPU is 64bit processor? 484
- 10.0.8 How to query variant type string for a variant? 485
- 10.0.9 How to refresh a htmlviewer on Windows? 486

**10.0.6 How to delete a folder?**

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** The following is the code that deletes a folder recursively.

**Example:**

```
Sub deletefolder(f as folderitem)
dim files(-1) as FolderItem

if f=nil then Return

// delete single file
if f.Directory=false then
f.Delete
Return
end if

// get a list of all items in that folder
dim i,c as Integer
c=F.Count
for i=1 to c
files.Append f.TrueItem(i)
next

// delete each item
for each fo as FolderItem in files
if fo=nil then
' ignore
elseif fo.Directory then
deletefolder fo
fo.delete
else ' file
```

```
fo.Delete
end if
next
```

```
f.Delete
End Sub
```

See also:

- 10.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 480
- 10.0.4 How to catch delete key? 481
- 10.0.5 How to convert cmyk to rgb? 482
- 10.0.7 How to detect if CPU is 64bit processor? 484
- 10.0.8 How to query variant type string for a variant? 485
- 10.0.9 How to refresh a htmlviewer on Windows? 486

### 10.0.7 How to detect if CPU is 64bit processor?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Via CPUID you can ask CPU:

**Example:**

```
dim c as new CPUIDMBS

if c.Flags(CPUIDMBS.kFeatureLM) then
MsgBox "64-bit CPU"
else
MsgBox "32-bit CPU"
end if
```

**Notes:** Should work on all intel compatible CPUs.

See also:

- 10.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 480
- 10.0.4 How to catch delete key? 481
- 10.0.5 How to convert cmyk to rgb? 482
- 10.0.6 How to delete a folder? 483
- 10.0.8 How to query variant type string for a variant? 485
- 10.0.9 How to refresh a htmlviewer on Windows? 486

## 10.0.8 How to query variant type string for a variant?

Plugin Version: 20.5, Platforms: macOS, Linux, Windows.

**Answer:** The following example function returns type string for variant.

**Example:**

```
Public Function VariantTypeString(v as Variant) as string
// Xojo's VarType doesn't know Unsigned integers
'Dim type As Integer = VarType(v)

// MBS VarType can detect unsigned integer
Dim type As Integer = GetVariantTypeMBS(v)

Dim IsArray As Boolean = BitwiseAnd(type, Variant.TypeArray) = Variant.TypeArray

// type without array
type = BitwiseAnd(type, Bitwise.OnesComplement(Variant.TypeArray))

// build a dictionary to map types on first call
Static TypeMap As Dictionary
If TypeMap = Nil Then
TypeMap = New Dictionary
TypeMap.Value(Variant.TypeBoolean) = "Boolean"
TypeMap.Value(Variant.TypeCFStringRef) = "CFStringRef"
TypeMap.Value(Variant.TypeColor) = "Color"
TypeMap.Value(Variant.TypeCString) = "CString"
TypeMap.Value(Variant.TypeCurrency) = "Currency"
TypeMap.Value(Variant.TypeDate) = "Date"
TypeMap.Value(Variant.TypeDateTime) = "DateTime"
TypeMap.Value(Variant.TypeDouble) = "Double"
TypeMap.Value(Variant.TypeInt32) = "Int32"
TypeMap.Value(Variant.TypeInt64) = "Int64"
TypeMap.Value(Variant.TypeInteger) = "Integer"
TypeMap.Value(Variant.TypeNil) = "Nil"
TypeMap.Value(Variant.TypeObject) = "Object"
TypeMap.Value(Variant.TypeOSType) = "OSType"
TypeMap.Value(Variant.TypePString) = "PString"
TypeMap.Value(Variant.TypePtr) = "Ptr"
TypeMap.Value(Variant.TypeSingle) = "Single"
TypeMap.Value(Variant.TypeString) = "String"
TypeMap.Value(Variant.TypeStructure) = "Structure"
TypeMap.Value(Variant.TypeText) = "Text"
TypeMap.Value(Variant.TypeWindowPtr) = "WindowPtr"
TypeMap.Value(Variant.TypeWString) = "WString"

// MBS extra types
TypeMap.Value(Variant.TypeInt32+100) = "UInt32"
TypeMap.Value(Variant.TypeInt64+100) = "UInt64"
```

End If

```
// lookup type

#if DebugBuild then
If Not TypeMap.HasKey(type) Then
Break // missing type
End If
#endif

If IsArray Then
Return "Array of " + TypeMap.Lookup(type,"?")
Else
Return TypeMap.Lookup(type,"?")
End If
End Function
```

See also:

- 10.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 480
- 10.0.4 How to catch delete key? 481
- 10.0.5 How to convert cmyk to rgb? 482
- 10.0.6 How to delete a folder? 483
- 10.0.7 How to detect if CPU is 64bit processor? 484
- 10.0.9 How to refresh a htmlviewer on Windows? 486

### 10.0.9 How to refresh a htmlviewer on Windows?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can ask the browser to reload the website with this code line:

**Example:**

```
call htmlViewer1.IERunJavaScriptMBS("javascript:document.location.reload()")
```

See also:

- 10.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 480
- 10.0.4 How to catch delete key? 481
- 10.0.5 How to convert cmyk to rgb? 482

- 10.0.6 How to delete a folder? 487
  - 10.0.7 How to detect if CPU is 64bit processor? 483
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- 485

### 10.0.10 Is there an example for vector graphics in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Try this example inside the paint event of a window:

**Example:**

```
dim v as Group2D
dim r as RectShape
dim s as StringShape
```

```
const pi=3.14
```

```
s=new StringShape
s.Text="Hello World!"
s.TextFont="Geneva"
s.TextSize=24
s.FillColor=rgb(0,0,255)
s.Italic=true
s.y=5
s.x=0
```

```
r=new RectShape
```

```
r.X=0
r.y=0
r.Height=100
r.Width=180
r.BorderColor=rgb(255,0,0)
r.FillColor=rgb(0,255,0)
r.BorderWidth=5
r.Border=50
```

```
v=new Group2d
v.Append r
v.Append s
v.Rotation=pi*-20.0/180.0
v.x=150
v.y=150
```

```
g.DrawObject v
```

### 10.0.11 Picture functions do not preserve resolution values?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Yes, the picture functions return pictures with no/default resolution values.

**Example:**

```
dim l as Picture = LogoMBS(500)
```

```
l.HorizontalResolution = 300
```

```
l.VerticalResolution = 300
```

```
dim r as Picture = l.Rotate90MBS
```

```
MsgBox str(r.HorizontalResolution)+" x "+str(r.VerticalResolution)
```

```
r.HorizontalResolution = l.HorizontalResolution
```

```
r.VerticalResolution = l.VerticalResolution
```

```
MsgBox str(r.HorizontalResolution)+" x "+str(r.VerticalResolution)
```

**Notes:** So please fix them yourself after calling a function.

Maybe in the future this changes, but currently you can't really set this easily from plugin code.

### 10.0.12 A toolbox call needs a rect - how do I give it one?

Plugin Version: all, Platforms: macOS, Windows.

**Answer:** Fill a memoryblock like this:

**Example:**

```
Dim MB As Memoryblock
```

```
MB = NewMemoryBlock(8)
```

```
MB.Short(0) = window1.Top
```

```
MB.Short(2) = window1.Left
```

```
MB.Short(4) = window1.Height+window1.Top // bottom
```

```
MB.Short(6) = window1.Width+window1.Left // right
```

### 10.0.13 API client not supported?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** If you get this exception message on `SQLConnectionMBS.Connect`, we may have a problem.

**Notes:** First case is that the given thing is not supported (e.g. MS SQL directly on Mac).

Second case is that the plugin compilation went wrong and the support for the database was not linked into the plugin. Like MySQL missing or MS SQL on Windows missing. In that case please contact us to fix the plugin.

### 10.0.14 Can I access Access Database with Java classes?

Plugin Version: all, Platform: Windows.

**Answer:** You can use `ucanaccess` to access databases created with Microsoft

**Example:**

```

dim options(-1) as string

// load all the jar files we have in a folder called java:

dim appFolder as FolderItem = GetFolderItem("")

Dim count as Integer = appFolder.Parent.Child("java").Count
dim libjs() as string
For i as Integer = 1 to count
Dim f As FolderItem = appFolder.Parent.Child("java").item(i)
If f <> Nil and f.Exists Then
libjs.append f.NativePath+";"
End If
Next

// now init virtual machine
dim library as string = Join(libjs, "")
dim vm as new JavaVMMBS(library)

if vm.Handle = 0 then
MsgBox "Failed to initialize virtual machine"
else
// now make a new database connection with ucanaccess
dim d as new JavaDatabaseMBS(vm,"net.ucanaccess.jdbc.UcanaccessDriver")
Dim DbFile as FolderItem = appFolder.Parent.Child("Database11.accdb")
dim j as JavaConnectionMBS = d.getConnection("jdbc:ucanaccess://" + DbFile.NativePath)

// select and show values
dim r as JavaResultSetMBS = j.MySelectSQL("Select * From test")
while r.NextRecord
MsgBox r.getString("FirstName") + " " + r.getString("LastName")
wend

end if

```

**Exception** e as JavaExceptionMBS  
MsgBox e.message+" **errorcode:** "+str(e.ErrorNumber)

**Notes:** see website:  
<http://ucanaccess.sourceforge.net/site.html>

### 10.0.15 Can I create PDF from Xojo Report using DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Yes, we have a graphics class integration for DynaPDF.

**Notes:** Since MBS Plugin in version 19.2, we can integrate reports with Xojo.

### 10.0.16 Can I use AppleScripts in a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Yes, but they run on the server, not on the client.

**Example:**

```
dim a as new AppleScriptMBS

// query my application name
a.Compile "tell application ""System Events"" to return name of current application"

// run
a.Execute

// show result
label1.text = a.Result

// shows something like "My Application.fcgi.debug"
```

**Notes:** This can be useful to control the server from remote, if and only if the your sever is running Mac OS X.

### 10.0.17 Can I use graphics class with DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Sorry, no. We can't provide a graphics subclass from plugin.

**Notes:** This is a feature request to allow graphics subclasses:

Feedback case 11391: [feedback://showreport?report\\_id=11391](https://feedback.apple.com/feedback/showreport?report_id=11391)

### 10.0.18 Can I use sockets on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Yes, but they run on the server, not on the client.

**Notes:** You can use `HTTPSocket`, `SMTPSocket`, `POP3Socket`, `SMTPSecureSocket`, `SecurePOP3Socket`, `EasyTCPSocket`, `EasyUDPSocket`, `AutoDiscovery`, our Bonjour classes or our `CURL*` classes. But all of them work on the server, not on the client.

This means if you search for a printer with Bonjour, you can find the printers in the local network on your server hosting site. Using `SMTPSocket` may be a good idea for sending emails from the server like notifications.

### 10.0.19 Can I use your ChartDirector plugin on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Yes, our ChartDirector plugin works just fine on the Xojo Web Edition.

**Example:**

```
// The data for the pie chart
dim data(-1) as Double=array(55.0, 18.0, 25.0, 22.0, 18.0, 30.0, 35.0)

// The labels for the pie chart, Words are chosen random to check font!
dim labels(-1) as string=array("Germany", "Italy", "France", "Spain", "UK", "Poland", "Russia")

// The colors to use for the sectors
dim colors(-1) as Integer

colors.Append &h66aaee
colors.Append &heebb22
colors.Append &hbbsbbb
colors.Append &h8844ff

if TargetLinux then
  CDBaseChartMBS.SetFontSearchPath "/usr/share/fonts/truetype/msttcorefonts"
end if

// Create a PieChart object of size 360 x 300 pixels
dim c as new CDPieChartMBS(700, 600)
```

```

c.setBackground(c.linearGradientColor(0, 0, 0, c.getHeight(), &h0000cc, &h000044))
c.setRoundedFrame(&hffffff, 16)
dim tt as CDTextBoxMBS = c.addTitle("ChartDirector Demonstration", "timesbi.ttf", 18)
tt.setMargin(0, 0, 16, 0)
tt.setFontColor(&hFFFFFF)

// Set the center of the pie at (180, 140) and the radius to 100 pixels
c.setPieSize 350,300,150
// Set the sector colors
c.setColors(c.kDataColor, colors)

// Draw the pie in 3D with a pie thickness of 20 pixels
c.set3D(20)

dim t as CDTextBoxMBS = c.setLabelStyle("arialbd.ttf", 10, &h000000)
t.setBackground(CDPieChartMBS.kSameAsMainColor, CDPieChartMBS.kTransparent, CDPieChartMBS.soft-
Lighting(CDPieChartMBS.kRight, 0))
t.setRoundedCorners(8)

// Use local gradient shading for the sectors, with 5 pixels wide
// semi-transparent white (bbffffff) borders
c.setSectorStyle(CDPieChartMBS.kLocalGradientShading, &hbbffffff, 0)

// Set the pie data and the pie labels
c.setData data,labels
call c.setLabelStyle "arialbd.ttf",18

dim pic as picture = c.makeChartPicture
dim wp as new WebPicture(pic, Picture.FormatJPEG) // JPEG makes it smaller and faster

ImageView1.Picture=wp

```

**Notes:** Be aware that our plugin produces pictures for you, which you assign to ImageViews. Transferring those pictures takes time, so you can optimize that with using WebPicture class. There you can decide between different compressions to improve speed (use JPEG instead of PNG).

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

### 10.0.20 Can I use your DynaPDF plugin on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Yes, our DynaPDF plugin works just fine on the Xojo Web Edition.

**Notes:** PDF files are created on the server. You may want to offer a preview to the user which uses reduced resolution images to reduce the time to download the PDF.

See our Create PDF example for the Xojo Web Edition.

### 10.0.21 Can I use your plugin controls on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** No.

### 10.0.22 Can you get an unique machine ID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** There is nothing like an unique machine ID.

**Notes:** 1:

You can use the MAC IDs of the network interfaces.

This can be changed by the user with software tools.

And the list of network interfaces changes if user reorder the interfaces.

2:

You can use the system folder creation date/time.

This may stay equal after cloning machines or after migration to new PC.

3:

You can use the Mac Serialnumber.

Mac only and it can happen that a Mac does not have a serial number.

4:

You can use the x86 CPU ID.

This is x86 CPU only and does not avoid running on the same CPU in different PCs.

### 10.0.23 ChartDirector: Alignment Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

**Answer:** ChartDirector: Alignment Specification

**Notes:** In many ChartDirector objects, you may specify the alignment of the object's content relative to its boundary. For example, for a TextBox object, you may specify the text's alignment relative to the box boundary by using TextBox.setAlignment.

The ChartDirector API defines several constants for the alignment options.

ConstantValueDescription

BottomLeft	1	The leftmost point on the bottom line.
BottomCenter	2	The center point on the bottom line.
BottomRight	3	The rightmost point on the bottom line.
Left	4	The leftmost point on the middle horizontal line.
Center	5	The center point on the middle horizontal line.
Right	6	The rightmost point on the middle horizontal line.
TopLeft	7	The leftmost point on the top line.
TopCenter	8	The center point on the top line.
TopRight	9	The rightmost point on the top line.
Bottom	2	The center point on the bottom line. Same as BottomCenter.
Top	8	The center point on the top line. Same as TopCenter.
TopLeft2	10	An alternative top-left position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, TopLeft2 refers to refers to the left of the top side, while TopLeft refers to the top of the left side. The reverse applies for a horizontal axis.
TopRight2	11	An alternative top-right position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, TopRight2 refers to refers to the right of the top side, while TopRight refers to the top of the right side. The reverse applies for a horizontal axis.
BottomLeft2	12	An alternative bottom-left position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, BottomLeft2 refers to refers to the left of the bottom side, while BottomLeft refers to the bottom of the left side. The reverse applies for a horizontal axis.
BottomRight2	13	An alternative bottom-right position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, BottomRight2 refers to refers to the right of the bottom side, while BottomRight refers to the bottom of the right side. The reverse applies for a horizontal axis.

## 10.0.24 ChartDirector: Color Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

**Answer:** ChartDirector: Color Specification

**Notes:** Many functions in the ChartDirector API accept colors as parameters. ChartDirector supports col-

ors specified in web and HTML compatible ARGB format, in which ARGB refers to the Alpha transparency, Red, Green and Blue components of the color.

In addition to ARGB colors, ChartDirector supports "dynamic" colors. A dynamic color is a color that changes depending on the position of the pixels. The "dynamic" colors that ChartDirector supports include "pattern colors", "metal colors", "gradient colors", "zone colors" and "dash line colors".

ChartDirector supports specifying colors indirectly using "palette colors". When a "palette color" is used, the color is specified as an index to a palette. The actual color is looked up from the palette. ARGB Color ARGB color consists of 4 components - alpha transparency, red, green and blue. The four components are encoded as a 32-bit number, with each component occupying 8 bits. In hexadecimal notation, it is AAR-RGGBB, where AA, RR, GG and BB are the alpha transparency, red, green and blue components.

Each component ranges from 00 - FF (0 - 255), representing its intensity. For example, pure red color is 00FF0000, pure green color is 0000FF00, and pure blue color is 000000FF. White color is 00FFFFFF, and black color is 00000000.

Most programming language requires you to put special prefix in front of hexadecimal characters. For C++, the prefix is "0x". For example, the syntax for the hexadecimal number 00FFFFFF is 0x00FFFFFF, or simply 0xFFFFFF.

For the alpha transparency component, a zero value means the color is not transparent at all. This is equivalent to traditional RGB colors. A non-zero alpha transparency means the color is partially transparent. The larger the alpha transparency, the more transparent the color will be. If a partially transparent color is used to draw something, the underlying background can still be seen.

For example, 80FF0000 is a partially transparent red color, while 00FF0000 is a non-transparent red color.

Note that ChartDirector's ARGB color is web and HTML compatible. For example, red is FF0000, the same as in HTML. There are many resources on the web that provide tables in which you can click a color and it will show its HTML color code. These color codes can be used in ChartDirector.

If alpha transparency is FF (255), the color is totally transparent. That means the color is invisible. It does not matter what the RGB components are. So in ChartDirector, only one totally transparent color is used - FF000000. All other colors of the form FFnnnnnn are reserved to represent palette colors and dynamic colors, and should not be interpreted as the normal ARGB colors.

The totally transparent color FF000000 is often used in ChartDirector to disable drawing something. For example, if you want to disable drawing the border of a rectangle, you can set the border color to totally transparent.

For convenience, ChartDirector defines a constant called Transparent, which is equivalent to FF000000. Pattern Color

A pattern color is a dynamic color that changes according to a 2D periodic pattern. When it is used to fill an area, the area will look like being tiled with a wallpaper pattern.

Pattern colors are created using `BaseChart.patternColor`, `BaseChart.patternColor2`, `DrawArea.patternColor` and `DrawArea.patternColor2`. The `patternColor` method creates pattern colors using an array of colors as a bitmap. The `patternColor2` method creates pattern colors by loading the patterns from image files.

These methods return a 32-bit integer acting as a handle to the pattern color. The handle can be used in any `ChartDirector` API that expects a color as its input.

**Metal Color**  
A metal color is a color of which the brightness varies smoothly across the chart surface as to make the surface look shiny and metallic. `ChartDirector` supports using any color as the base color of the metal color. In particular, using yellow and grey as the base colors will result in metal colors that look gold and silver.

Metal colors are most often used as background colors of charts. They are created using `CDBaseChartMBS.metalColor`, `CDBaseChartMBS.goldColor` and `CDBaseChartMBS.silverColor`. The first method allows you to specify an arbitrary base color. The second and third methods use yellow and grey as the base colors, resulting in gold and silver metal colors.

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any `ChartDirector` API that expects a color as its input.

**Gradient Color**  
A gradient color is a color that changes progressively across a direction.

Gradient colors are created using `BaseChart.gradientColor`, `BaseChart.gradientColor2`, `DrawArea.gradientColor` and `DrawArea.gradientColor2`. The `gradientColor` method creates a 2-point gradient color that changes from color A to color B. The `gradientColor2` method creates a multi-point gradient colors that changes from color A to B to C ....

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any `ChartDirector` API that expects a color as its input.

One common use of multi-point gradient colors is to define colors that have metallic look and feel. Please refer to `DrawArea.gradientColor2` for details.

**Dash Line Colors**  
A dash line color is a color that switches on and off periodically. When used to draw a line, the line will appear as a dash line.

Dash line colors are created using `BaseChart.dashLineColor` and `DrawArea.dashLineColor`. They accept a line color and a dash pattern code as arguments, and return a 32-bit integer acting as a handle to the dash line color. The handle can be used in any `ChartDirector` API that expects a color as its input.

**Zone Colors**  
A zone color is for XY charts only. It is a color that automatically changes upon reaching a data threshold value along the x-axis or y-axis. Zone colors are created using `Layer.xZoneColor`, `Layer.yZoneColor`, `XYChart.xZoneColor` or `XYChart.yZoneColor`.

**Palette Colors**  
Palette colors are colors of the format `FFFFnnnn`, where the least significant 16 bits (`nnnn`) are the index to the palette. A palette is simply an array of colors. For a palette color, the actual color is obtained by

looking up the palette using the index. For example, the color FFFF0001 is the second color in the palette (first color is index 0).

The colors in the palette can be ARGB colors or "dynamic" colors (pattern, gradient and dash line colors).

The first eight palette colors have special significance. The first three palette colors are the background color, default line color, and default text color of the chart. The 4th to 7th palette colors are reserved for future use. The 8th color is a special dynamic color that is equal to the data color of the "current data set".

The 9th color (index = 8) onwards are used for automatic data colors. For example, in a pie chart, if the sector colors are not specified, ChartDirector will automatically use the 9th color for the first sector, the 10th color for the second sector, and so on. Similarly, for a multi-line chart, if the line colors are not specified, ChartDirector will use the 9th color for the first line, the 10th color for the second line, and so on.

The ChartDirector API defines several constants to facilitate using palette colors.

#### ConstantValueDescription

Palette	FFFF0000	The starting point of the palette. The first palette color is (Palette + 0). The nth palette color is (Palette + n - 1).
BackgroundColor	FFFF0000	The background color.
LineColor	FFFF0001	The default line color.
TextColor	FFFF0002	The default text color.
[ Reserved ]	FFFF0003 - FFFF0006	These palette positions are reserved. Future versions of ChartDirector may use these palette positions for colors that have special significance.
SameAsMainColor	FFFF0007	A dynamic color that is equal to the data color of the current data set. This color is useful for objects that are associated with data sets. For example, in a pie chart, if the sector label background color is SameAsMainColor, its color will be the same as the corresponding sector color.
DataColor	FFFF0008	The starting point for the automatic data color allocation.

When a chart is created, it has a default palette. You may modify the palette using BaseChart.setColor, BaseChart.setColors, or BaseChart.setColors2.

The advantages of using palette colors are that you can change the color schemes of the chart in one place. ChartDirector comes with several built-in palettes represented by the following predefined constants.

#### ConstantDescription

### 10.0.25 ChartDirector: Font Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

defaultPalette	An array of colors representing the default palette. This palette is designed for drawing charts on white backgrounds (or lightly colored backgrounds).
whiteOnBlackPalette	An array of colors useful for drawing charts on black backgrounds (or darkly colored backgrounds).
transparentPalette	An array of colors useful drawing charts on white backgrounds (or lightly colored backgrounds). The data colors in this palette are all semi-transparent.

**Answer:** ChartDirector: Font Specification

**Notes:** Font Name

In ChartDirector, the font name is simply the file name that contains the font. For example, under the Windows platform, the "Arial" font is "arial.ttf", while the "Arial Bold" font is "arialbd.ttf".

NOTE: Mac OS X Specific Information

In Mac OS X, in addition to ".ttf", ChartDirector also supports Mac OS X font file formats, such as Font Suitcase files and Datafork files (.dfont). These files often contain multiple fonts. For example, the "GillSans.dfont" file contains 6 fonts.

So in addition to the file name, an index is needed to determine the font. The index is specified by appending a " | " character to the font name, followed by the index number. For example, the third font in "GillSans.dfont" is denoted as "GillSans.dfont | 2". (Note: The first font starts at 0.) If no index number is provided, the first font is assumed.

ChartDirector also supports using Mac OS X Font Manager names. For example, one may use "Gill Sans Light Italic" instead of using "GillSans.dfont | 1" as the font name. However, the Mac OS X Font Manager is active only if someone has logged into the Mac GUI console, so this method is only recommended for developing applications that run on the GUI console.

The sample programs that come with ChartDirector are designed to run on all operating systems, so they use generic font file names (eg. "arial.ttf") instead of Mac OS X specific names. To allow them to run on Mac OS X, ChartDirector on Mac OS X has a built-in table to map common font file names to Mac OS X font names:

"arial.ttf", "arialbd.ttf", "ariali.ttf" and "arialbi.ttf" are mapped to "Arial | 0" (Arial), "Arial | 1" (Arial Bold), "Arial | 2" (Arial Italic) and "Arial | 3" (Arial Bold Italic)

"times.ttf", "timesbd.ttf", "timesi.ttf" and "timesbi.ttf" are mapped to "Times New Roman | 0" (Times New Roman), "Times New Roman | 1" (Times New Roman Bold), "Times New Roman | 2" (Times New Roman Italic) and "Times New Roman | 3" (Times New Roman Bold Italic)

"cour.ttf", "courbd.ttf", "couri.ttf" and "courbi.ttf" are mapped to "Courier New | 0" (Courier New), "Courier New | 1" (Courier New Bold), "Courier New | 2" (Courier New Italic) and "Courier New | 3" (Courier New Bold Italic)

### Font Location

ChartDirector on Windows does not come with any font files. It relies on the operating system's font files in the " [ windows ] \Fonts" directory. To see what fonts are installed in your operating system and their file names, use the File Explorer to view that directory.

ChartDirector on Windows will also search for the font files in the "fonts" subdirectory (if it exists) under the directory where the ChartDirector DLL "chartdir.dll" is installed. This is useful for private fonts. Also, for some especially secure web servers, the web anonymous user may not have access to the " [ windows ] \Fonts" directory. In this case, you may copy the font files to the above subdirectory.

ChartDirector on Mac OS X relies on operating system font files in "/Library/Fonts" and "/System/Library/Fonts".

ChartDirector on Linux, FreeBSD and Solaris assume the fonts files are in the "fonts" subdirectory under the directory where the ChartDirector shared object "libchartdir.so" is installed. ChartDirector on Linux, FreeBSD and Solaris come with a number of font files in the "fonts" subdirectory.

To keep the download size small, ChartDirector on Linux, FreeBSD and Solaris only come with some commonly used fonts. You may download additional fonts from the Internet. In particular, the Microsoft fonts at

[http://sourceforge.net/project/showfiles.php?group\\_id=34153&release\\_id=105355](http://sourceforge.net/project/showfiles.php?group_id=34153&release_id=105355)

is highly recommended. Please refer to

<http://www.microsoft.com/typography/faq/faq8.htm>

on how you could use the fonts legally in your system.

ChartDirector supports True Type fonts (.ttf), Type 1 fonts (.pfa and .pfb) and Windows bitmap fonts (.fon). On Mac OS X, ChartDirector also supports Font Suitcase and Datafork (.dfont) files. On Linux, FreeBSD and Solaris, ChartDirector also supports Portable Compiled Fonts (.pcf fonts).

If you want ChartDirector to search other directories for the font files, you may list the directories in an environment variable called "FONTSPATH".

If you specify an absolute path name for the font file, ChartDirector will use the absolute path name and will not search other directories.

**Artificial Boldening and Italicizing**  
Whereas most popular font comes with different styles for "normal", "bold", "italic" and "bold italic", some fonts only come with one style (the normal style). For example, the Monotype Corsiva font that comes with MS Office only has the normal style (mtcorsva.ttf). For these cases, you may append the "Bold" and/or "Italic" words after the font file name (separated with a space) to ask ChartDirector to artificially bolden and/or italicize the font. For example, you may specify the font name as "mtcorsva.ttf Bold".

**Font List**  
Instead of specifying a single font file as the font name, you may specify a list of font files as the font name, separated by semi-colons. This is useful when using international characters that are only available in some fonts.

For example, if you would like to use the Arial font ("arial.ttf") for western characters, and the MingLiu font "mingliu.ttc" for Chinese characters (since the Arial font does not have Chinese characters), you may specify the font name as "arial.ttf;mingliu.ttc". In this case, ChartDirector will try the Arial font first. If it cannot find a certain character there, it will try the MingLiu font.

ChartDirector supports several special keywords for specifying the font name indirectly. When these keywords are used as font names, ChartDirector will look up the actual font names from a font table. The keywords are as follows:

#### KeywordsDescription

"normal"	This default normal font, which is the first font in the font table. This is initially mapped to "arial.ttf" (Arial).
"bold"	The default bold font, which is the second font in the font table. This is initially mapped to "arialbd.ttf" (Arial Bold).
"italic"	The default italic font, which is the third font in the font table. This is initially mapped to "ariali.ttf" (Arial Italic).
"boldItalic"	The default bold-italic font, which is the fourth font in the font table. This is initially mapped to "arialbi.ttf" (Arial Bold Italic).
"fontN"	The (N + 1)th font in the font table (the first font is "font0").

The font table can be modified using `BaseChart.setFontTable` or `DrawArea.setFontTable`.

The advantage of using indirect font names is that you can change the fonts in your charts in one place.

Most font files contain one font. However, it is possible a font file contains multiple fonts (that is, a font collection). For example, in True Type fonts, font files with extension ".ttc" may represent a font collection.

If a font file contains multiple font, the font index can be used to specify which font to use. By default, the font index is 0, which means the first font in the font file will be used.

The font size decides how big a font will appear in the image. The font size is expressed in a font unit called points. This is the same unit used in common word processors.

Instead of specifying font size, some ChartDirector API (eg. `TextBox.setFontSize`) allow you to specify font height and font width separately. You may use different point sizes for font height and font width to create special effects.

This is the color to draw the font. (See Color Specification on how colors are represented in ChartDirector.)

This is the angle in degrees by which the font should be rotated anti-clockwise.

By default, text are laid out horizontally, with characters being drawn from left to right.

ChartDirector also supports vertical layout, with characters being drawn from top to bottom. For example, you may use `BaseChart.addText` to add text that are laid out vertically. Vertical layout is common for

oriental languages such as Chinese, Japanese and Korean.

## 10.0.26 ChartDirector: Mark Up Language

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

**Answer:** ChartDirector: Mark Up Language

**Notes:** ChartDirector Mark Up Language (CDML) is a language for including formatting information in text strings by marking up the text with tags.

CDML allows a single text string to be rendered using multiple fonts, with different colors, and even embed images in the text. **Font Styles**

You can change the style of the text by using CDML tags. For example, the line:

```
<*font=timesi.ttf,size=16,color=FF0000>Hello <*font=arial.ttf,size=12,color=8000*>world!
```

will result in the following text rendered:

In general, all tags in CDML are enclosed by <\*> and \*>. Attributes within the tags determine the styles of the text following the tags within the same block.

If you want to include <\*> in text without being interpreted as CDML tags, use «\* as the escape sequence.

The following table describes the supported font style attributes in CDML. See [Font Specification](#) for details on various font attributes.

AttributeDescription

Set the following text to be in superscript style. This attribute does not need to have a value. (You may use "super" as the attribute instead of "super=1".)

Note that unlike HTML tags, no double or single quotes are used in the tags. It is because CDML tags are often embedded as string literals in source code. The double or single quotes, if used, will conflict with the string literal quotes in the source code. Therefore in CDML, no quotes are necessary and they must not be used.

Also, unlike HTML tags, CDML uses the comma character as the delimiter between attributes. It is because certain attributes may contain embed spaces (such as the font file name). So space is not used as the delimiter and the comma character is used instead.

Note the font attribute above starts a new style section, while other attributes just modify the current style

font	Starts a new style section, and sets the font name. You may use this attribute without a value (that is, use "font" instead of "font=arial.ttf") to create a new style section without modifying the font name.
size	The font size.
width	The font width. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
height	The font height. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
color	The text color in hex format.
bgColor	The background color of the text in hex format.
underline	The line width of the line used to underline the following characters. Set to 0 to disable underline.
sub	Set the following text to be in subscript style. This attribute does not need to have a value. (You may use "sub" as the attribute instead of "sub=1".)
super	Set the following text to be in superscript style.
xoffset	Draw the following the text by shifting the text horizontally from the original position by the specified offset in pixels.
yoffset	Draw the following the text by shifting the text vertically from the original position by the specified offset in pixels.
advance	Move the cursor forward (to the right) by the number of pixels as specified by the value this attribute.
advanceTo	Move the cursor forward (to the right) to the position as specified by the value this attribute. The position is specified as the number of pixels to the right of the left border of the block. If the cursor has already passed through the specified position, the cursor is not moved.

section. You may use `</font*>` to terminate a style section, which will restore the font styles to the state before the style section.

**Blocks and Lines**  
In CDML, a text string may contain multiple blocks. A block may contain multiple lines of text by separating them with new line characters ("`\n`") or with `<br*>`. The latter is useful for programming languages that cannot represent new line characters easily.

For example, the line:

```
<*size=15*><*block*><*color=FF*>BLOCK<*br*>ONE<*/*>and <*block*><*color=FF00*>BLOCK<*br*>TWO
```

will result in the following text rendered:

The above example contains a line of text. The line contains two blocks with the characters " and " in between. Each block in turn contains two lines. The blocks are defined using `<*block*>` as the start tag and

`<*/*>` as the end tag.

When a block ends, font styles will be restored to the state before entering the block. Embedding Images  
CDML supports embedding images in text using the following syntax:

```
<*img=my_image_file.png*>
where my_image_file.png is the path name of the image file.
```

For example, the line:

```
<*size=20*>A <*img=sun.png*>day
will result in the following text rendered:
```

ChartDirector will automatically detect the image file format using the file extension, which must either png, jpg, jpeg, gif, wbmp or wmp (case insensitive).

Please refer to `BaseChart.setSearchPath` or `DrawArea.setSearchPath` on the directory that ChartDirector will search for the file.

The `<*img*>` tag may optionally contain width and height attributes to specify its pixel width and height. In this case, ChartDirector will stretch or compress the image if necessary to the required width and height. Blocks Attributes

CDML supports nesting blocks, that is, a block can contain other sub-blocks. Attributes are supported in the `<*block*>` tag to control the alignment and orientation of the sub-blocks. The `<*img=my_image_file.png*>` is treated as a block for layout purposes.

For example, the line:

```
<*block,valign=absmiddle*><*img=molecule.png*><*block*>Hydrazino\nMolecule<*/*><*/*>
will result in the following text rendered:
```

The the above starts `<*block,valign=absmiddle*>` which specifies its content should align with each others in the vertical direction using the absolute middle alignment. The block contains an image, followed by a space characters, and then another block which has two lines of text.

The following table describes the supported attributes inside `<*block*>` tag:

Attribute	Description
-----------	-------------

The value `baseline` means the baseline of sub-blocks should align with the baseline of the block. The `baseline`

width	The width of the block in pixels. By default, the width is automatically determined to be the width necessary for the contents of the block. If the width attribute is specified, it will be used as the width of the block. If the width is insufficient for the contents, the contents will be wrapped into multiple lines.
height	The height of the block in pixels. By default, the height is automatically determined to be the height necessary for the contents of the block. If the height attribute is specified, it will be used as the height of the block.
maxwidth	The maximum width of the block in pixels. If the content is wider than maximum width, it will be wrapped into multiple lines.
truncate	The maximum number of lines of the block. If the content requires more than the maximum number of lines, it will be truncated. In particular, if truncate is 1, the content will be truncated if it exceeds the maximum width (as specified by maxwidth or width) without wrapping. The last few characters at the truncation point will be replaced with "...".
linespacing	The spacing between lines as a ratio to the default line spacing. For example, a line spacing of 2 means the line spacing is two times the default line spacing. The default line spacing is the line spacing as specified in the font used.
bgColor	The background color of the block in hex format.
valign	The vertical alignment of sub-blocks. This is for blocks that contain sub-blocks. Supported values are baseline, top, bottom, middle and absmiddle.

is the underline position of text. This is normal method of aligning text, and is the default in CDML. For images or blocks that are rotated, the baseline is the same as the bottom.

The value top means the top line of sub-blocks should align with the top line of the block.

The value bottom means the bottom line of sub-blocks should align with the bottom line of the block.

The value middle means the middle line of sub-blocks should align with the the middle line of the block. The middle line is the middle position between the top line and the baseline.

The value absmiddle means the absolute middle line of sub-blocks should align with the absolute middle line of the block. The absolute middle line is the middle position between the top line and the bottom line.

**halign** The horizontal alignment of lines. This is for blocks that contain multiple lines. Supported values are left, center and right.

The value left means the left border of each line should align with the left border of the block. This is the default.

The value center means the horizontal center of each line should align with the horizontal center of the block.

The value right means the right border of each line should align with the right border of the block.

**angle** Rotate the content of the block by an angle. The angle is specified in degrees in counter-clockwise direction.

### 10.0.27 ChartDirector: Parameter Substitution and Formatting

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

**Answer:** ChartDirector: Parameter Substitution and Formatting

**Notes:** ChartDirector charts often contain a lot of text strings. For example, sector labels in pie charts, axis labels for x and y axes, data labels for the data points, HTML image maps, etc, are all text strings.

ChartDirector uses parameter substitution to allow you to configure precisely the information contained in the text and their format.

Format Strings

In parameter substitution, format strings are used to specify the entities to be include into labels and how to format numbers and dates.

For example, when drawing a pie chart with side label layout, the default sector label format string is:

```
" { label } ( { percent } %)"
```

When the sector label is actually drawn, ChartDirector will replace " { label } " with the sector name, and " { percent } " with the sector percentage. So the above label format will result is a sector label similar to "ABC (34.56%)".

You may change the sector label format by changing the format string. For example, you may change it to:

```
" { label } : US$ { value | 2 } K ( { percent } %)"
```

The sector label will then become something like "ABC: US\$ 123.00 (34.56%)".

In general, in ChartDirector parameter substitution, parameters enclosed by curly brackets will be substituted with their actual values when creating the texts.

For parameters that are numbers or dates/times, ChartDirector supports a special syntax in parameter substitution to allow formatting for these values. Please refer to the Number Formatting and Date/Time Formatting sections below for details.

#### Parameter Expressions

ChartDirector supports numeric expressions in format strings. They are denoted by enclosing the expression with curly brackets and using "=" as the first character. For example:

```
"USD { value } (Euro { = { value } *0.9 } )"
```

In the above, "{ value }" will be substituted with the actual value of the sector. The expression "{ = { value } \*0.9 }" will be substituted with the actual value of the sector multiplied by 0.9.

ChartDirector parameter expressions support operators "+", "-", "\*", "/", "%" (modulo) and "^" (exponentiation). Operators "\*", "/", "%", "^" is computed first, followed by "+" and "-". Operators of the same precedence are computed from left to right). Parenthesis "(" and ")" can be used to change the computation order.

#### Parameters for Pie Charts

The following table describes the parameters available for pie charts.

Parameter	Description
sector	The sector number. The first sector is 0, while the nth sector is (n-1).
dataSet	Same as { sector } . See above.
label	The text label of the sector.
dataSetName	Same as { label } . See above.
value	The data value of the sector.
percent	The percentage value of the sector.
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using BaseChart.addExtraField or BaseChart.addExtraField2.

#### Parameters for All XY Chart Layers

The followings are parameters that are apply to all XY Chart layers in general. Some layer types may have additional parameters (see below).

Note that certain parameters are inapplicable in some context. For example, when specifying the aggregate label of a stacked bar chart, the { dataSetName } parameter is inapplicable. It is because a stacked bar is composed of multiple data sets. It does not belong to any particular data set and hence does not have a data set name.

{ fieldN } means the extra field is indexed by the data point number. The Pth data point corresponds to the Pth element of the extra field.

#### Additional Parameters for Line Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

#### Additional Parameters for Trend Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

#### Additional Parameters for Box-Whisker Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

#### Additional Parameters for HLOC and CandleStick Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

#### Additional Parameters for Vector Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

#### Parameters for All Polar Layers

The followings are parameters that are apply to all Polar Chart layers in general. Some layer types may have additional parameters (see below).

{ fieldN } means the extra field is indexed by the data point number. The Pth data point corresponds to the Pth element of the extra field.

#### Additional Parameters for PolarVector Layers

The followings are parameters that are in additional to the parameters for all Polar Chart layers.

#### Parameters for Axis

The following table describes the parameters available for pie charts.

#### Number Formatting

For parameters that are numbers, ChartDirector supports a number of formatting options in parameter substitution.

For example, if you want a numeric field { value } to have a precision of two digits to the right of the decimal point, use ',' (comma) as the thousand separator, and use '.' (dot) as the decimal point, and you may use { value | 2, . } . The number 123456.789 will then be displayed as 123,456.79.

For numbers, the formatting options are specified using the following syntax:

```
{ [ param ] | [ a ] [ b ] [ c ] [ d ] }
```

where:

If this field starts with "E" or "e", followed by a number, it means formatting the value using scientific notation with the specified number of decimal places. If the "E" or "e" is not followed by a number, 3 is assumed.

For example, { value | E4 } will format the value 10.3 to 1.0300E+1, and { value | e4 } will format the same value to 1.0300e+1.

If this field starts with "G" or "g", followed by a number, it means formatting the value using the scientific notation only if the value is large and requires more than the specified number of digits, or the value is less than 0.001. If scientific notation is used, the number following "G" or "g" also specifies the number of significant digits to use. If the "G" or "g" is not followed by a number, 4 is assumed.

For example, consider the format string { value | G4 } . The value 10 will be formatted to 10. The value 100000 will be formatted to 1.000E+5. Similarly, for { value | g4 } , the value 10 will be formatted to 10, while the value 100000 will be formatted to 1.000e+5.

If you skip this argument, ChartDirector will display the exact value using at most 6 decimal places.

You may skip [ b ] [ c ] [ d ] . In this case, the default will be used.

#### Date/Time Formatting

For parameters that are dates/times, the formatting options can be specified using the following syntax:

```
{ [ param ] | [ datetime_format_string ] }
```

where [ datetime\_format\_string ] must start with an english character (A-Z or a-z) that is not "G", "g", "E" or "e", and may contain any characters except ' ' . (If it starts with "G", "g", "E" or "e", it will be considered as a number format string.)

Certain characters are substituted according to the following table. Characters that are not substituted will be copied to the output.

For example, a parameter substitution format of { value | mm-dd-yyyy } will display a date as something similar to 09-15-2002. A format of { value | dd/mm/yy hh:nn:ss a } will display a date as something similar to 15/09/02 03:04:05 pm.

If you want to include characters in the format string without substitution, you may enclose the characters in single or double quotes.

For example, the format `{ value | mmm '<*color=dd0000*>'yyyy }` will display a date as something like `Jan <*color=dd0000*>2005` (the `<*color=dd0000*>` is a CDML tag to specify red text color). Note that the `<*color=dd0000*>` tag is copied directly without substitution, even it contains "dd" which normally will be substituted with the day of month.

Escaping URL/HTML/CDML characters

Parameter substitution is often used to create HTML image maps. In HTML, some characters has special meanings and cannot be used reliably. For example, the `'>'` is used to represent the end of an HTML tag.

Furthermore, if the field happens to be used as an URL, characters such as `'?'`, `'&'` and `'+'` also have special meanings.

By default, ChartDirector will escape template fields used in URL and query parameters when generating image maps. It will modify URL special characters to the URL escape format `"%XX"` (eg. `"?"` will become `"%3F"`). After that, it will modify HTML special characters to the HTML escape format `"&#nn;"` (eg. `">"` will become `"&#62;"`). Similarly, it will escape other attributes in the image map using HTML escape format (but not URL escape format).

In addition to escaping HTML and URL special characters, ChartDirector will also remove CDML fields in creating image maps. It is because CDML is only interpreted in ChartDirector, should not be useful outside of ChartDirector (such as in browser tool tips).

In some cases, you may not want ChartDirector to escape the special characters. For example, if the parameters have already been escaped before passing to ChartDirector, you may want to disable ChartDirector from escaping them again.

ChartDirector supports the following special fields to control the escape methods - `" { escape_url } "`, `" { noescape_url } "`, `" { escape_html } "`, `" { noescape_html } "`, `" { escape_cdml } "` and `" { noescape_cdml } "`. These fields enable/disable the escape methods used in the template fields that follow them.

## 10.0.28 ChartDirector: Shape Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

**Answer:** ChartDirector: Shape Specification

**Notes:** Several ChartDirector API accept shape specification as arguments. For example, `BarLayer.setBarShape` and `BarLayer.setBarShape2` can be used to specify shapes of bars in bar charts, while `DataSet.setDataSymbol`, `DataSet.setDataSymbol4`, `PolarLayer.setDataSymbol` and `PolarLayer.setDataSymbol4` can be used to specify shapes for data symbols.

Note that in addition to shapes, in many cases ChartDirector also accepts images or custom draw objects for data representation. For example, see `DataSet.setDataSymbol2`, `DataSet.setDataSymbol3`, `PolarLayer.setDataSymbol2` and `PolarLayer.setDataSymbol3`.

## Built-In Shapes

Built-in shapes are specified as integers. The integers can be explicit constants, or can be generated by a `ChartDirector` method for parameterized shapes. For example, a circle is represented by an explicit constant `CircleShape (=7)`. On the other hand, the number representing a polygon depends on the number of sides the polygon has, so it is generated by using the `PolygonShape` method, passing in the number of sides as argument.

The following table illustrates the various `ChartDirector` shapes:

## Custom Shapes

In `ChartDirector`, custom shapes are specified as an array of integers `x0, y0, x1, y1, x2, y2 ...` representing the coordinates of the vertices of the custom polygonal shape.

The polygon should be defined with a bounding square of 1000 x 1000 units, in which the x-axis is from -500 to 500 going from left to right, and the y-axis is from 0 to 1000 going from bottom to top.

`ChartDirector` will automatically scale the polygon so that 1000 units will become to the pixel size as requested by the various `ChartDirector` API.

As an example, the shape of the standard diamond shape in `ChartDirector` is represented as an array with 8 numbers:

```
0, 0, 500, 500, 0, 1000, -500, 500
```

### 10.0.29 Copy styled text?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** How to quickly copy styled text from one textarea to another?

**Example:**

```
#if TargetWin32 then
TextArea1.WinRTFDataMBS = TextArea2.WinRTFDataMBS
#elseif TargetMacOS then
TextArea1.NSTextViewMBS.textStorage.setAttributedString TextArea2.NSTextViewMBS.textStorage
#else
TextArea1.StyledText = TextArea2.StyledText
#endif
```

**Notes:** The code above uses special plugin functions on Mac and Windows and falls back to framework for Linux.

### 10.0.30 Do you have code to validate a credit card number?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can check the checksum to tell if a credit card number is not valid.

**Example:**

```

Dim strNumber As String
Dim nLength as Integer
Dim nValue as Integer
Dim nChecksum as Integer
Dim nIndex as Integer

strNumber = EditField1.Text
nLength = Len(strNumber)
nChecksum = 0

For nIndex = 0 To nLength - 2
nValue = Val(Mid(strNumber, nLength - (nIndex + 1), 1)) * (2 - (nIndex Mod 2))
If nValue <10 Then
nChecksum = nChecksum + nValue
Else
nChecksum = nChecksum + (nValue - 9)
End If
Next

If Val(Mid(strNumber, Len(strNumber), 1)) = (10 - (nChecksum Mod 10)) Mod 10 Then
MsgBox("The credit card number looks valid")
Else
MsgBox("The credit card number is invalid")
End IF

```

**Notes:** Here's some code that will validate the checksum for a credit card. It works for Visa, MasterCard, American Express and Discover. Not sure about others, but I imagine they use the same basic algorithm. Of course, this doesn't actually mean that the credit card is valid, it's only useful for helping the user catch typos.

The above code doesn't have any error checking and it expects that the credit card number will be entered without spaces, dashes or any other non-numeric characters. Addressing those issues will be an exercise left to the reader. :)

(From Mike Stefanik)

### 10.0.31 Do you have plugins for X-Rite EyeOne, eXact or i1Pro?

Plugin Version: all.

**Answer:** Our EyeOne plugin is available on request for licensees of the X-Rite SDKs.

**Notes:** Please first go to X-Rite and get a SDK license.

Then we can talk about the plugin.

### 10.0.32 Does SQL Plugin handle stored procedures with multiple result sets?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Yes, the plugin can work with multiple recordsets.

**Notes:** You need to use SQLCommandMBS class. When you get back results, you use FetchNext to walk over all records in the first result set. Then you simply start again with FetchNext to get the second record set.

Even the RecordSet functions should work, just use them twice to get all records from both record sets.

### 10.0.33 Does the plugin home home?

Plugin Version: all, Platform: macOS.

**Answer:** Yes, we like to know who is using the plugin, so the plugin may contact our server.

**Example:**

none.

**Notes:** Please note that this does not affect your users as the plugin will only do this in the IDE and the relevant plugin part is never included in your applications.

The plugin if used for some hours, does contact our server to provide statistical data about Xojo version and OS versions. This way we know what versions are used. We can return the version number of the current plugin which may be visible in future versions somehow. And we transmit partial licenses data so we can track use of illegal license keys.

If you do not like to have this, you can block Xojo IDE from contacting our website via your Firewall.

Blocking the transfer will not disable the plugin or change the features.

Or contact us for a plugin version which explicitly does not contain this feature.

### 10.0.34 folderitem.absolutePath is limited to 255 chars. How can I get longer ones?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Paths on a Mac are not unique, so use them only to display them to the user.

**Example:**

```
Function AbsolutePath(f as FolderItem) As String
Dim s as string
Dim nf as FolderItem
nf = f
s = ""
while nf<>nil
s = nf.name + "." + s
nf = nf.parent
wend
Return s
End Function
```

### 10.0.35 Has anyone played round with using CoreImage to do things like add dissolve transitions say when changing from one tab to another within a window?

Platform: macOS.

**Answer:** This code implements animations for a tabpanel change:

**Example:**

*// in a tabpanel.change event:*

```
dim r as CGSTransitionRequestMBS
dim co as new CGSConnectionMBS
dim cw as CGSWindowMBS
dim ct as CGSTransitionMBS
static OldTab as Integer

cw=co.CGSWindow(window1)
If cw = Nil Then
return // 10.3...
End If
r=new CGSTransitionRequestMBS
r.TransitionType=r.CGSFlip
r.HasBackGround=false
r.HasBackColor=false
r.Win=cw
```

```

// watch the value of the clicked tab versus the last tab
if tabpanel1.Value=0 or tabpanel1.Value <OldTab then
r.TransitionOption=r.CGSLeft
ct=co.NewTransition(r)
if ct<>Nil then
Refresh
ct.Invoke(1)
ct.Wait(1)
ct.Release
else
MsgBox "Error creating the transition."
end if
else
r.TransitionOption=r.CGSRight
ct=co.NewTransition(r)
if ct<>Nil then
Refresh
ct.Invoke(1)
ct.Wait(1)
ct.Release
else
MsgBox "Error creating the transition."
end if
end if
// Keep track of the last tab clicked
OldTab = tabpanel1.Value

```

**Notes:** See CGS\* classes for more details.

### 10.0.36 How about Plugin support for older OS X?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** We support in general Mac OS X 10.5 and newer.

**Notes:** All the 64-bit plugins on Mac require OS X 10.7.

Intel 32-bit plugins on Mac require OS X 10.5 or newer.

Currently the ChartDirector 6, GraphicsMagick and GameKit plugins requires Mac OS X 10.6.  
Also for SQL Plugin the built in SQLite library requires 10.6.

### 10.0.37 How can I detect whether an Intel CPU is a 64bit CPU?

Plugin Version: all.

**Answer:** Look on the CPU family returned by sysctl:

**Example:**

Function is64bit() As Boolean

```
#if TargetLittleEndian
```

```
dim m as MemoryBlock = NewMemoryBlock(8)
```

```
dim family as Integer
```

```
dim s as string
```

```
m=SystemControlNameToMIBMBS("hw.cpufamily")
```

```
m=SystemControlMBS(m)
```

```
if m<>nil then
```

```
m.LittleEndian=True
```

```
family=m.Long(0)
```

```
const CPUFAMILY_INTEL_6_14 = &h73d67300 /* "Intel Core Solo" and "Intel Core Duo" (32-bit Pentium-M with SSE3) */
```

```
const CPUFAMILY_INTEL_6_15 = &h426f69ef /* "Intel Core 2 Duo" */
```

```
const CPUFAMILY_INTEL_6_23 = &h78ea4fbc /* Penryn */
```

```
const CPUFAMILY_INTEL_6_26 = &h6b5a4cd2 /* Nehalem */
```

```
Select case family
```

```
case CPUFAMILY_INTEL_6_14
```

```
Return false
```

```
case CPUFAMILY_INTEL_6_15
```

```
Return true
```

```
case CPUFAMILY_INTEL_6_23
```

```
Return true
```

```
case CPUFAMILY_INTEL_6_26
```

```
Return true
```

```
// newer CPUs may be missing here
```

```
end Select
```

```
end if
```

```
#endif
```

```
Return false
```

```
Exception
```

```
Return false
```

```
End Function
```

**Notes:** This code is written for Mac OS X where you only have a limited number of possible CPUs.

### 10.0.38 How can I disable the close box of a window on Windows?

Plugin Version: all, Platform: Windows.

**Answer:** The following code will remove the close item from the system menu of the window.

**Example:**

```
#if TargetWin32 then
Declare Function GetSystemMenu Lib "user32" (hwnd as Integer, bRevert as Integer) as Integer
Declare Function RemoveMenu Lib "user32" (hMenu as Integer, nPosition as Integer, wFlags as Integer) as Integer
Dim hSysMenu as Integer
hSysMenu = GetSystemMenu(me.WinHWND, 0)
RemoveMenu hSysMenu, &HF060, &H0
#endif
```

**Notes:** The window may not be updated directly.

### 10.0.39 How can I get all the environment variables from Windows?

Plugin Version: all, Platform: Windows.

**Answer:** Try this code:

**Example:**

```
#if targetWin32
declare function GetEnvironmentStrings Lib "kernel32" () as ptr
dim m as memoryBlock
dim n as Integer

m=GetEnvironmentStrings()

n=0
do
msgBox m.cstring(n)
while m.byte(n)<>0
n=n+1
wend
n=n+1
```

```
loop until m.byte(n)=0
#endif
```

**Notes:** The MBS Plugin has an EnvironmentMBS class for this.

#### 10.0.40 How can i get similar behavior to Roxio Toast or iTunes where clicking a 'burn' button allows the next inserted blank CD-R to bypass the Finder and be accepted by my application?

Plugin Version: all, Platform: macOS.

**Answer:** You need to get a media reservation.

**Example:**

```
dim d as DRDeviceMBS // get a device
d.AcquireMediaReservation
```

**Notes:** Use the plugin function AcquireMediaReservation and later release it using ReleaseMediaReservation.

See plugin examples on how to use it and check Apples DiscRecording framework documentation for more details.

#### 10.0.41 How can I get text from a PDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Crossplatform you can use DynaPDF Pro.

**Notes:** On Mac OS X you can also use PDFKit for the same job.

While DynaPDF Pro gives you each bit of text with rotation, font information and encoding details, PDFKit gives you only the text string for a PDF page.

#### 10.0.42 How can I get text from a Word Document?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** to get the text string from a doc file, use the NSAttributedStringMBS class.

**Notes:** The NSAttributedStringMBS class is Mac OS X only and we have currently no solution for Windows or Linux.

Use the `NSAttributedStringMBS.initWithDocFormat(data as string)` as boolean method.

### 10.0.43 How can I get the item string for a given file creator?

Plugin Version: all.

**Answer:** Try this function:

**Example:**

```
Sub pullNativeDocs(aCREA As string)
Dim result as Integer
Dim m, k as memoryBlock
Dim f as folderItem
Dim newType as string
Dim anIcon As picture
Dim ofs as Integer
```

```
Declare Function GetFileTypesThatAppCanNativelyOpen Lib "Carbon" (appVRefNumHint as Short, appSignature as OSType, nativeTypes as Ptr) as Short Inline68K("701CABFC")
Declare Function GetDocumentKindString Lib "Carbon" (docVRefNum as Short, docType as OSType, docCreator as OSType, kindString as ptr) as Short Inline68K("7016ABFC")
```

```
listBox1.deleteAllRows
```

```
m = newMemoryBlock(1024)
result = GetFileTypesThatAppCanNativelyOpen(Volume(0).MacVRefNum, aCREA, m)
if result <> 0 then
listBox1.addRow "<Not found.>"
return
end if
```

```
do
if m.byte(ofs*4) = 0 then
exit
else
newType = m.OSTypeMBS(ofs*4)
listBox1.addRow newType
k = newMemoryBlock(64)
result = GetDocumentKindString(Volume(0).MacVRefNum, newType, aCREA, k)
if result = 0 then
listBox1.cell(ofs,1) = k.pString(0)
ofs = ofs + 1
else
listBox1.cell(ofs,1) = "(unknown)"
end if
end if
```

loop

End Sub

**Notes:** Change "Translation" to "CarbonLib" for Mac OS X.

#### 10.0.44 How can I launch an app using it's creator code?

Plugin Version: all, Platform: macOS.

**Answer:** Send an AppleEvent "odoc" with the creator code to the Finder ("MACS"):

**Example:**

```
Function LaunchByCreator(C As String) As Boolean
Dim A As AppleEvent
A = NewAppleEvent("aevt","odoc","MACS")
A.ObjectSpecifierParam("—") = GetUniqueIDObjectDescriptor("appf",nil,C)
return A.Send
End Function
```

#### 10.0.45 How can I learn what shared libraries are required by a plugin on Linux?

Plugin Version: all, Platform: macOS.

**Answer:** Please use the ldd command in the terminal.

**Notes:** You build an app on any platform, but for Linux.

For the resulting .so files in the libs folder, you can run the ldd command with the library path as parameter. It shows you references lib files and you can make sure you have those installed.

This is a sample run of our graphicsmagick plugin:

```
cs@Ubuntu32:
textasciitilde /MeinProgramm/MeinProgramm Libs$ ldd libMBSGraphicsMagickPlugin17744.so
linux-gate.so.1 =>(0xb76ee000)
libdl.so.2 =>/lib/i386-linux-gnu/libdl.so.2 (0xb6f0e000)
libgtk-x11-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgtk-x11-2.0.so.0 (0xb6aa6000)
libpthread.so.0 =>/lib/i386-linux-gnu/libpthread.so.0 (0xb6a8a000)
libstdc++.so.6 =>/usr/lib/i386-linux-gnu/libstdc++.so.6 (0xb69a5000)
libm.so.6 =>/lib/i386-linux-gnu/libm.so.6 (0xb6979000)
libgcc_s.so.1 =>/lib/i386-linux-gnu/libgcc_s.so.1 (0xb695b000)
libc.so.6 =>/lib/i386-linux-gnu/libc.so.6 (0xb67b1000)
```

```

/lib/ld-linux.so.2 (0xb76ef000)
libgdk-x11-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgdk-x11-2.0.so.0 (0xb6701000)
libpangocairo-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpangocairo-1.0.so.0 (0xb66f4000)
libX11.so.6 =>/usr/lib/i386-linux-gnu/libX11.so.6 (0xb65c0000)
libXfixes.so.3 =>/usr/lib/i386-linux-gnu/libXfixes.so.3 (0xb65ba000)
libatk-1.0.so.0 =>/usr/lib/i386-linux-gnu/libatk-1.0.so.0 (0xb659a000)
libcairo.so.2 =>/usr/lib/i386-linux-gnu/libcairo.so.2 (0xb64ce000)
libgdk_pixbuf-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgdk_pixbuf-2.0.so.0 (0xb64ad000)
libgio-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgio-2.0.so.0 (0xb6356000)
libpangoft2-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpangoft2-1.0.so.0 (0xb632a000)
libpango-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpango-1.0.so.0 (0xb62e0000)
libfontconfig.so.1 =>/usr/lib/i386-linux-gnu/libfontconfig.so.1 (0xb62ab000)
libgobject-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgobject-2.0.so.0 (0xb625c000)
libglib-2.0.so.0 =>/lib/i386-linux-gnu/libglib-2.0.so.0 (0xb6163000)
libXext.so.6 =>/usr/lib/i386-linux-gnu/libXext.so.6 (0xb6151000)
libXrender.so.1 =>/usr/lib/i386-linux-gnu/libXrender.so.1 (0xb6147000)
libXinerama.so.1 =>/usr/lib/i386-linux-gnu/libXinerama.so.1 (0xb6142000)
libXi.so.6 =>/usr/lib/i386-linux-gnu/libXi.so.6 (0xb6132000)
libXrandr.so.2 =>/usr/lib/i386-linux-gnu/libXrandr.so.2 (0xb6129000)
libXcursor.so.1 =>/usr/lib/i386-linux-gnu/libXcursor.so.1 (0xb611e000)
libXcomposite.so.1 =>/usr/lib/i386-linux-gnu/libXcomposite.so.1 (0xb611a000)
libXdamage.so.1 =>/usr/lib/i386-linux-gnu/libXdamage.so.1 (0xb6115000)
libfreetype.so.6 =>/usr/lib/i386-linux-gnu/libfreetype.so.6 (0xb607b000)
libxcb.so.1 =>/usr/lib/i386-linux-gnu/libxcb.so.1 (0xb605a000)
libpixman-1.so.0 =>/usr/lib/i386-linux-gnu/libpixman-1.so.0 (0xb5fc2000)
libpng12.so.0 =>/lib/i386-linux-gnu/libpng12.so.0 (0xb5f98000)
libxcb-shm.so.0 =>/usr/lib/i386-linux-gnu/libxcb-shm.so.0 (0xb5f93000)
libxcb-render.so.0 =>/usr/lib/i386-linux-gnu/libxcb-render.so.0 (0xb5f89000)
libz.so.1 =>/lib/i386-linux-gnu/libz.so.1 (0xb5f73000)
libgmodule-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgmodule-2.0.so.0 (0xb5f6e000)
libselinux.so.1 =>/lib/i386-linux-gnu/libselinux.so.1 (0xb5f4f000)
libresolv.so.2 =>/lib/i386-linux-gnu/libresolv.so.2 (0xb5f36000)
libexpat.so.1 =>/lib/i386-linux-gnu/libexpat.so.1 (0xb5f0c000)
libffi.so.6 =>/usr/lib/i386-linux-gnu/libffi.so.6 (0xb5f05000)
libpcre.so.3 =>/lib/i386-linux-gnu/libpcre.so.3 (0xb5ec9000)
librt.so.1 =>/lib/i386-linux-gnu/librt.so.1 (0xb5ec0000)
libXau.so.6 =>/usr/lib/i386-linux-gnu/libXau.so.6 (0xb5ebb000)
libXdmcp.so.6 =>/usr/lib/i386-linux-gnu/libXdmcp.so.6 (0xb5eb4000)
cs@Ubuntu32:
textasciitilde /MeinProgramm/MeinProgramm Libs$

```

As you see all library have been found and their load address is printed behind the name. If a library is missing, you usually see the address missing there or being zero.



```

while theRegexMatch <>nil
theStart = theRegexMatch.subExpressionStartB(0) + len(theRegexMatch.subExpressionString(0))

result = result + theRegexMatch.subExpressionString(1)
infoCharset = theRegexMatch.subExpressionString(2)
encodedPart = theRegexMatch.subExpressionString(4)
if theRegexMatch.subExpressionString(3) = "B" then
encodedPart = DecodeBase64(encodedPart)
elseif theRegexMatch.subExpressionString(3) = "Q" then
encodedPart = DecodeQuotedPrintable(encodedPart)
end if
if right(result, 1) = " " then
result = mid(result, 1, len(result)-1)
end if
encodedPart = encodedPart.DefineEncoding(GetInternetTextEncoding(infoCharset))
result = result + encodedPart

theRegex.SearchStartPosition = theStart
theRegexMatch = theRegex.search()
wend

result = result + mid(src, theStart+1)

else
result = src
end if
// theRegexMatch = theRegex.search

msgbox result

```

**Notes:** May not look nice depending on the controls used.  
This is no longer needed when using MimeEmailMBS class which decodes for you.

#### 10.0.48 How do I enable/disable a single tab in a tabpanel?

Plugin Version: all, Platform: macOS.

**Answer:** Use the TabpanelEnabledMBS method.

**Example:**

```
TabpanelEnabledMBS(tabpanel1, 1, false)
```

**Notes:** Use Carbon for MachO and CarbonLib for Mac Carbon and AppearanceLib for Mac OS Classic as

library.

For Cocoa, please use enabled property of NSTabViewItemMBS class.

### 10.0.49 How do I find the root volume for a file?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Try this function:

**Example:**

```
Function GetRootVolume(f as FolderItem) as FolderItem
dim root, dum as folderItem
if f <> nil then
root = f // f might be the volume
do
dum = root.parent
if dum <> nil then
root = dum
end if
loop until dum = nil
return root
end if
End Function
```

### 10.0.50 How do I get the current languages list?

Plugin Version: all, Platform: macOS.

**Answer:** Try this code:

**Example:**

```
dim p as new CFPreferencesMBS
dim a as CFArrayMBS
dim s as CFStringMBS
dim o as CFOBJECTMBS
dim sa(-1) as string

o=p.CopyAppValue("AppleLanguages", ".GlobalPreferences")

if o<>Nil then
a=CFArrayMBS(o)

dim i,c as Integer
```

```
c=a.Count-1
for i=0 to c
o=a.Item(i)

if o isa CFStringMBS then
s=CFStringMBS(o)
sa.Append s.str
end if
next
end if

MsgBox Join(sa,EndOfLine)
```

**Notes:** On Mac OS X you can get the list of current languages like this list:

```
de
en
ja
fr
es
it
pt
pt-PT
nl
sv
nb
da
fi
ru
pl
zh-Hans
zh-Hant
ko
```

Which has German (de) on the top for a German user.  
This code has been tested on Mac OS X 10.5 only.

### 10.0.51 How do I get the Mac OS Version?

Plugin Version: all, Platform: macOS.

**Answer:** Try this code:

**Example:**

```

dim i as Integer
if system.gestalt("sysv", i) then
//do this in an 'If' in case you don't get any value back at all and system.gestalt returns boolean
if i = &h750 then //If OS is 7.5
//do stuff
elseif i = &h761 then //If OS is 7.6.1
//do stuff
end if
end if

```

**Notes:** The MBS Plugin has a function SystemInformationMBS.OSVersionString for this.

### 10.0.52 How do I get the printer name?

Plugin Version: all.

**Answer:** For Mac OS Classic see the code below and for Mac OS X use the Carbon Print Manager Classes from the MBS Plugin.

**Example:**

```

dim s as String
dim i as Integer

s=app.ResourceFork.GetResource("STR ",-8192)
if s<>"" then
i=ascb(leftb(s,1))
s=mid(s,2,i)

MsgBox s
end if

```

**Notes:** A note from Craig Hoyt:

After looking at your example I had a little deja-vu experience. Several years ago I played around with this same code if FutureBasic. I discovered that it did not and still doesn't provide the 'Printer Name', it does return the print driver name. If it returns 'LaserWriter 8' as the print driver you can look into this file and get the 'PAPA' resource #-8192 to get the actual Printer Name. Unfortunately this does not hold true for other printers. My Epson and HP Printers (the Epson has an Ethernet Card and the HP is USB) do not provide this info in their drivers. As far as I can tell it only returns the name by polling the printer itself.

### 10.0.53 How do I make a metal window if RB does not allow me this?

Plugin Version: all, Platform: macOS.

**Answer:** The following declare turns any window on Mac OS X 10.2 or newer into a metal one.

**Example:**

```
declare sub ChangeWindowAttributes lib "Carbon" (win as windowptr, a as Integer, b as Integer)
```

```
ChangeWindowAttributes window1,256,0
```

**Notes:** May not look nice depending on the controls used.

### 10.0.54 How do I make a smooth color transition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:**

I'd like to show in a report some bars, which start with color A and end with color B.

The color change should be very smooth.

My problem: If I would start from 255,0,0 and end by 0,0,0, I would have 255 different colors. If the bars are longer than 255 pixels, would this look nice?

**Example:**

```
// Window.Paint:
Sub Paint(g As Graphics)
dim w,w1,x,p as Integer
dim c1,c2,c as color
dim p1,p2 as Double

c1=rgb(255,0,0) // start color
c2=rgb(0,255,0) // end color

w=g.Width
w1=w-1

for x=0 to w1
p1=x/w1
p2=1.0-p1
```

```

c=rgb(c1.red*p1+c2.red*p2, c1.green*p1+c2.green*p2, c1.blue*p1+c2.blue*p2)

g.ForeColor=c
g.DrawLine x,0,x,g.Height

next
End Sub

```

**Notes:**

Try the code above in a window paint event handler.

**10.0.55 How do I read the applications in the dock app?**

Plugin Version: all, Platform: macOS.

**Answer:** Use CFPREFERENCESMBS class like in this example:

**Example:**

```

// Reads file names from persistent dock applications and puts them into the list

dim pref as new CFPREFERENCESMBS

dim persistentapps as CFStringMBS = NewCFStringMBS("persistent-apps")
dim ApplicationID as CFStringMBS = NewCFStringMBS("com.apple.dock")
dim tiledata as CFStringMBS = NewCFStringMBS("tile-data")
dim filelabel as CFStringMBS = NewCFStringMBS("file-label")

// get the array of persistent applications from dock preferences
dim o as CObjectMBS = pref.CopyValue(persistentapps, ApplicationID, pref.kCFPreferencesCurrentUser,
pref.kCFPreferencesAnyHost)

if o isa CFArrayMBS then
dim a as CFArrayMBS = CFArrayMBS(o)

// walk over all items in array
dim c as Integer = a.Count-1
for i as Integer = 0 to c

// get dictionary describing item
o = a.Item(i)

if o isa CFDictionaryMBS then
dim d as CFDictionaryMBS = CFDictionaryMBS(o)

```

```

// and pick tile data dictionary
o = d.Value(tiledata)
if o isa CFDictionaryMBS then
d = CFDictionaryMBS(o)

// and pick there the file label
o = d.Value(filelabel)
if o isa CFStringMBS then
// and display it
dim name as string = CFStringMBS(o).str
List.AddRow name
end if
end if
end if

next

else
MsgBox "Failed to read dock preferences."
end if

```

**Notes:** You can use the `CFPreferencesMBS.SetValue` to change a value and `CFPreferencesMBS.Synchronize` to write the values to disc. You may need to restart the `Dock.app` if you modified things.

### 10.0.56 How do I truncate a file?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** In a `binarystream` you can set the `length` property to truncate.

### 10.0.57 How do update a Finder's windows after changing some files?

Plugin Version: all, Platform: macOS.

**Answer:** Try this code:

**Example:**

```

dim f as folderitem // some file
dim ae as appleevent
ae=newappleevent("fndr","fupd","MACS")
ae.folderitemparam("—")=f
if not ae.send then
//something went wrong

```

end if

**Notes:** The `folderitem.finderupdate` from the MBS Plugin does something like this.

### 10.0.58 How to access a USB device directly?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** First, it depends on the device.

**Notes:** Some devices can be talked directly from user mode code, but some require a kernel driver.

For some devices you can use plugins to access them like:

- Audio and Video sources using the `QTGrabberClassMBS`
- Mass storage devices using the `folderitem` class.
- Serial devices using the `System.SerialPort` function.
- HID USB devices can be used with `MacHIDMBS`, `WinHIDMBS` or `LinuxHIDInterface` class.
- Any USB device may be used with `MacUSBMBS` or `WinUSBMBS` classes.

In general it is always the best to take the most high level access to have others do the work for the details.

### 10.0.59 How to add icon to file on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use `FolderItem.AddCustomIcon` or `NSWorkspaceMBS.setIcon` functions.

**Notes:** Please close any open stream for the file you want to add an icon.

### 10.0.60 How to ask the Mac for the Name of the Machine?

Plugin Version: all, Platform: macOS.

**Answer:** Using Apple Events you can use this code:

**Example:**

**Function** `Computername()` *As string*

```

dim theEvent as AppleEvent
dim err as boolean

theEvent = newAppleEvent("mchn", "getd", "MACS")

err = theEvent.send

return theevent.ReplyString

End Function

```

**Notes:** Code above is for Mac OS 9!

Also the MBS Plugin has a function for this which may be faster and work also on Macs without Filesharing (which handles this event).

### 10.0.61 How to automatically enable retina in my apps?

Plugin Version: all, Platform: macOS.

**Answer:** You can run a build script on each build with this code:

**Example:**

```

Dim App As String = CurrentBuildLocation + "/" + CurrentBuildAppName + ".app"
Call DoShellCommand("/usr/bin/defaults write " + App + "/Contents/Info ""NSHighResolutionCapable""
YES")

```

**Notes:** This will set the NSHighResolutionCapable flag to YES.

### 10.0.62 How to avoid leaks with Cocoa functions?

Plugin Version: all, Platform: macOS.

**Answer:** You can try this code on Mac OS X:

**Example:**

```

// in a Timer Action event:
Sub Action()
static LastPool as NSAutoreleasePoolMBS = nil
static CurrentPool as NSAutoreleasePoolMBS = nil

```

```

LastPool = CurrentPool
CurrentPool = new NSAutoreleasePoolMBS

```

End Sub

**Notes:** With Xojo 2009r4 the code above should not be needed as Xojo runtime does automatically handle the `NSAutoreleasePools` for you. For older Xojo versions you need to use code with a timer with the action event above to avoid memory leaks.

Please do not use Xojo 2009r4 and newer with plugins before version 9.5. You can get crashes there which typically show a line with a `objc_msgSend` call.

### 10.0.63 How to avoid trouble connecting to oracle database with SQL Plugin?

Plugin Version: all, Platform: macOS.

**Answer:** For oracle the most important thing is to point the plugin to the libraries from oracle.

**Notes:** In environment variables, the paths like `ORACLE_HOME` must be defined.

On Mac OS X you also need to define `DYLD_LIBRARY_PATH` to point to the dylib files from oracle.

For that you need to modify `/etc/launchd.conf` for Mac OS X 10.8 and newer.

In older versions those variables in `.MacOSX/environment.plist` file in user's home.

Another way for the case you bundle things inside your app is to use the `LSEnvironment` key in `info.plist`. In `info.plist` it looks like this:

```
<key>LSEnvironment</key>
<dict>
<key>test</key>
<string>Hello World</string>
</dict>
```

### 10.0.64 How to avoid `___NSAutoreleaseNoPool` console messages in threads?

Plugin Version: all, Platform: macOS.

**Answer:** You need to use your own `NSAutoreleasePool` on a thread like this:

**Example:**

```
sub MyThread.run
dim pool as new NSAutoreleasePoolMBS
// do work here

pool=nil
```

end sub

**Notes:** For more details read here:

[http://developer.apple.com/mac/library/documentation/Cocoa/Reference/Foundation/Classes/NSAutoreleasePool\\_Class/Reference/Reference.html](http://developer.apple.com/mac/library/documentation/Cocoa/Reference/Foundation/Classes/NSAutoreleasePool_Class/Reference/Reference.html)

### 10.0.65 How to bring app to front?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** On Mac you can use this code:

**Example:**

```
// First way:
```

```
app.FrontMostMBS = true
```

```
// second way:
```

```
dim p as new ProcessMBS
```

```
p.GetCurrentProcess
```

```
p.FrontProcess = true
```

```
// third way:
```

```
NSApplicationMBS.sharedApplication.activateIgnoringOtherApps(true)
```

```
// for Windows:
```

```
RemoteControlMBS.WinBringWindowToTop
```

**Notes:** This will bring a Mac app to the front layer.

### 10.0.66 How to bring my application to front?

Plugin Version: all, Platform: macOS.

**Answer:** This makes SimpleText (Code txt) to the frontmost application:

**Example:**

```
Dim A As AppleEvent
```

```
A = NewAppleEvent("misc", "actv", "")
```

```
If Not A.Send then
```

```
Beep
```

```
end if
```

**Notes:** (Code is Mac only)

### 10.0.67 How to catch Control-C on Mac or Linux in a console app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use SignalHandlerMBS class for this.

**Example:**

```
// watch for Control-C on Mac
call SignalHandlerMBS.SetFlagHandler(2)

dim ende as boolean = false
do
if SignalHandlerMBS.IsFlagSet(2) then
Print "Flag 2 set. Existing..."
ende = true
end if

DoEvents 1
loop until ende
```

**Notes:** The signal is caught, a flag is set and you can ask later in your normal application flow for the result.

### 10.0.68 How to change name of application menu?

Plugin Version: all, Platforms: macOS, Windows.

**Answer:** Use this code to change the application menu name on Mac OS X:

**Example:**

```
dim mb as new MenubarMBS
dim m as MenuMBS = mb.item(1) // 1 is in my tests the app menu
if m<>Nil then
m.MenuTitle = "Hello World"
end if
```

**Notes:** This code is for Carbon only.

### 10.0.69 How to change the name in the menubar of my app on Mac OS X?

Plugin Version: all, Platform: macOS.

**Answer:**

You mean it screws up if the file name of the bundle itself is different than the name of the executable file in the MacOS folder within the bundle? If so, you should find something like this within your Info.plist file (or the 'plst' resource that the RB IDE builds for you):

```
<key>CFBundleExecutable</key>
<string>Executable file name here</string>
```

Just make sure that file name matches.

However, if your question involves how you can change the name of the app that appears in the menu and the dock, that's different. You can make this name different from the file name by changing the CFBundleName key:

```
<key>CFBundleName</key>
<string>Name for menu here</string>
```

Note that if you use my free AppBundler program, this second part is taken care of for you – just fill in a custom name in the right field. You can find AppBundler (from Thomas Reed) at <http://www.bitjuggler.com/products/appbundler/>.

### 10.0.70 How to check if a folder/directory has subfolders?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use code like this to check all items in a folder:

**Example:**

```
Function HasSubFolder(folder as FolderItem) As Boolean
dim c as Integer = folder.Count
```

```
for i as Integer = 1 to c
dim item as FolderItem = folder.TrueItem(i)
```

```
if item<>Nil and item.Directory then
Return true
end if
```

next

End Function

**Notes:** We use trueitem() here to avoid resolving alias/link files. Also we check for nil as we may not have permission to see all items. And if one is a directory, we return without checking the rest.

### 10.0.71 How to check if Macbook runs on battery or AC power?

Plugin Version: all, Platform: macOS.

**Answer:** Please use our IOPowerSourcesMBS class like this:

**Example:**

```
Function PowerSourceState() as Integer
dim p as new IOPowerSourcesMBS

// check all power sources
dim u as Integer = p.Count-1
for i as Integer = 0 to u
dim d as CFDictionaryMBS = p.Item(i)
if d<>nil then
// check if they have a power source state key:
dim o as CFObjectMBS = d.Value(NewCFStringMBS("Power Source State"))
if o isa CFStringMBS then
dim s as string = CFStringMBS(o).str

'MsgBox s

if s = "AC Power" then
Return 1
elseif s = "Battery Power" then
Return 2
end if
end if
end if
next
Return 0 // unknown
End Function
```

**Notes:** If you want to check the CFDictionaryMBS content, simply use a line like "dim x as dictionary = d.dictionary" and check the contents in the debugger.

### 10.0.72 How to check if Microsoft Outlook is installed?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** If you need Outlook for Scripting, you should simply check registry for the required Outlook.Application class:

**Example:**

```
Function OutlookInstalled() As Boolean
    #if TargetWin32 then

    try
    dim r as new RegistryItem("HKEY_CLASSES_ROOT\Outlook.Application\CLSID", false)

    Return true

    catch r as RegistryAccessErrorException
    // not installed
    Return false

    end try

    #else

    // Windows only, so false on other platforms
    Return false

    #endif

End Function
```

### 10.0.73 How to check on Mac OS which country or language is currently selected?

Plugin Version: all, Platform: macOS.

**Answer:** The code below returns a country value.

**Example:**

```
dim result as Integer

IF TargetMacOS THEN
```

```

CONST smScriptLang = 28
CONST smSystemScript = -1

DECLARE FUNCTION GetScriptManagerVariable LIB "Carbon" ( selector as Integer) as Integer
DECLARE FUNCTION GetScriptVariable LIB "Carbon" ( script as Integer, selector as Integer) as Integer

result=GetScriptVariable(smSystemScript, smScriptLang)

END IF

```

**Notes:** Returns values like:

For more values, check "Script.h" in the frameworks.

### 10.0.74 How to code sign my app with plugins?

Plugin Version: all, Platform: macOS.

**Answer:** When you try to code sign the application with plugin dylibs on Mac OS X, you may see error message that there is actually a signature included.

**Notes:** Please use the -f command line parameter with codesign utility to overwrite our MBS signature. We sign our plugins for MacOS, iOS and Windows to make sure they have not been modified.

In terminal, you do like this:

```
cd <Path to folder of app>
```

```

xattr -cr <Appname>.app
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app/Contents/Frameworks/*.dylib
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app/Contents/Frameworks/*.framework
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app

```

Please use the name of your certificate (See keychain), the name of your app and the path to the app folder. If you have helper apps you need to sign them first.

You can use a build step to automatically sign your app on build.

### 10.0.75 How to collapse a window?

Plugin Version: all, Platform: macOS.

**Answer:** Use this function (Mac only):

**Example:**

```
Sub CollapseRBwindow(w as window, CollapseStatus as boolean)
dim state, err as Integer
dim wh as MemoryBlock
```

```
Declare Function CollapseWindow Lib "Carbon" (window as Integer, collapse as Integer) as Integer
```

```
IF CollapseStatus THEN
state = 1
ELSE
state = 0
END IF
```

```
err = CollapseWindow(w.MacWindowPtr, state)
```

```
End Sub
```

**Notes:** Also the MBS Plugin has a window.collapsedmbs property you can set. For Windows the MBS Plugin has a window.isiconicmbs property.

### 10.0.76 How to compare two pictures?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can try this code:

**Example:**

```
Function ComparePictures(p as picture,q as picture) as Integer
dim r,u as RGBSurface
dim x,y,n,m,h,w as Integer
dim w1,w2,h1,h2,d1,d2 as Integer
dim c1,c2 as color
```

```
h1=p.Height
h2=q.Height
w1=p.Width
w2=q.Width
d1=p.Depth
d2=q.Depth
```

```
if d1<>d2 then
Return 1
elseif w1<>w2 then
```

```

return 2
elseif h1<>h2 then
Return 3
else
r=p.RGBSurface
u=q.RGBSurface

if r=nil or u=nil then
Return -1
else
h=h1-1
w=w1-1
m=min(w,h)

for n=0 to m
c1=r.Pixel(n,n)
c2=u.Pixel(n,n)
if c1<>c2 then
Return 4
end if
next

for y=0 to h
for x=0 to w
c1=r.Pixel(x,y)
c2=u.Pixel(x,y)
if c1<>c2 then
Return 5
end if
next
next

// 0 for equal
// -1 for error (no RGBsurface)
// 1 for different depth
// 2 for different width
// 3 for different height
// 4 for different pixels (fast test)
// 5 for different pixels (slow test)
end if
end if

Exception
Return -1
End Function

```

**Notes:** Remember that this only works on bitmap pictures, so the `picture.BitmapMBS` function may be useful.

### 10.0.77 How to compile PHP library?

Plugin Version: all, Platform: macOS.

**Answer:** You have to download the source code and compile a static version of the library.

**Notes:** This instructions were written based on PHP 5.2.6 on Mac OS X:

- Best take a new Mac with current Xcode version installed.
- Download the source code archive. e.g. "php-5.2.6.tar.bz2"
- Expand that archive on your harddisc.
- Open terminal window
- change directory to the php directory. e.g. "cd /php-5.2.6"
- execute this two lines to define the supported CPU types and the minimum Mac OS X version:
- export CFLAGS="-arch ppc -arch i386 -mmacosx-version-min=10.3"
- export CXXFLAGS="-arch ppc -arch i386 -mmacosx-version-min=10.3"
- the command "./configure help" does show the configure options.
- use configure with a line like this:
- ./configure --enable-embed --with-curl --enable-ftp --enable-zip --enable-sockets --enable-static --enable-soap --with-zlib --with-bz2 --enable-exif --enable-bcmath --enable-calendar
- start the compilation with "make all"
- other option is to use "make install" which first does the same as "make all" and than does some installation scripts.
- you may get an error about a duplicate symbole \_\_yytext. Search the file "zend\_ini\_scanner.c", search a line with "char \*yytext;" and change it to "extern char \*yytext;"
- On the end you get a lot of error messages, but you have a working library (named libphp5.so) file in the invisible ".libs" folder inside your php source folder.

Possible problems and solutions:

- If the path to your files has spaces, you can get into trouble. e.g. "/RB Plugins/PHP" is bad as files will be searched sometimes in "/RB".

- If you have in /usr/local/lib libraries which conflict with the default libraries, you can get into trouble.
- If you installed some open source tools which compiled their own libraries, you can get into conflicts.
- if you have to reconfigure or after a problem, you may need to use "make clean" before you start "make all" again.

Feel free to install additional libraries and add more packages to the configure line.

### 10.0.78 How to convert a BrowserType to a String with WebSession.Browser?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use code like this:

**Example:**

```
Function GetBrowserName(s as WebSession.BrowserType) As string
Select case s
case WebSession.BrowserType.Android
Return "Andriod"
case WebSession.BrowserType.Blackberry
Return "Blackberry"
case WebSession.BrowserType.Chrome
Return "Chrome"
case WebSession.BrowserType.ChromeOS
Return "ChromeOS"
case WebSession.BrowserType.Firefox
Return "Firefox"
case WebSession.BrowserType.InternetExplorer
Return "InternetExplorer"
case WebSession.BrowserType.Opera
Return "Opera"
case WebSession.BrowserType.Safari
Return "Safari"
case WebSession.BrowserType.SafariMobile
Return "SafariMobile"
case WebSession.BrowserType.Unknown
Return "Unknown"
else
Return "Unkown: "+str(integer(s))
end Select

End Function
```

### 10.0.79 How to convert a EngineType to a String with WebSession.Engine?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use code like this:

**Example:**

```
Function GetRenderingEngineName(s as WebSession.EngineType) As string
Select case s
case WebSession.EngineType.Gecko
Return "Gecko"
case WebSession.EngineType.Presto
Return "Presto"
case WebSession.EngineType.Trident
Return "Trident"
case WebSession.EngineType.Unknown
Return "Unknown"
case WebSession.EngineType.WebKit
Return "WebKit"
else
Return "Unkown: "+str(integer(s))
end Select

End Function
```

### 10.0.80 How to convert a PlatformType to a String with WebSession.Platform?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use code like this:

**Example:**

```
Function GetPlatformName(s as WebSession.PlatformType) As string
Select case s
case WebSession.PlatformType.Blackberry
Return "Blackberry"
case WebSession.PlatformType.iPad
Return "iPad"
case WebSession.PlatformType.iPhone
Return "iPhone"
case WebSession.PlatformType.iPodTouch
Return "iPodTouch"
case WebSession.PlatformType.Linux
Return "Linux"
case WebSession.PlatformType.Macintosh
Return "Macintosh"
```

```

case WebSession.PlatformType.PS3
Return "PS3"
case WebSession.PlatformType.Unknown
Return "Unknown"
case WebSession.PlatformType.WebOS
Return "WebOS"
case WebSession.PlatformType.Wii
Return "Wii"
case WebSession.PlatformType.Windows
Return "Windows"
else
Return "Unkown: "+str(integer(s))
end Select

```

End Function

### 10.0.81 How to convert a text to iso-8859-1 using the TextEncoder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

#### Answer:

This code can help you although it's not perfect.  
You need to set lc to the current color you use.

#### Example:

```

dim outstring as string
dim theMac, thePC as textencoding
dim Mac2PC as textconverter

theMac = getTextEncoding(0) // MacRoman
thePC = getTextEncoding(&h0201) // ISOLatin1

Mac2PC = getTextConverter(theMac, thePC)
// if you wanted to do the opposite just create a converter
// PC2Mac = getTextConverter(thePC, theMac)

outstring = Mac2PC.convert("Bj√rn, this text should be converted")
Mac2PC.clear

```

#### Notes:

You have to call Mac2PC.clear after every conversion to reset the encoding engine.  
See also newer TextConverterMBS class.

### 10.0.82 How to convert ChartTime back to Xojo date?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** We have this example code:

**Example:**

```
Function ChartTimeToDate(ChartTime as Double) As date
static diff as Double = 0.0

if diff = 0.0 then
dim d2 as Double = CDBaseChartMBS.chartTime(2015, 1, 1)
dim da as new date(2015, 1, 1)
dim ts as Double = da.TotalSeconds

diff = ts - d2
end if

dim d as new date
d.TotalSeconds = diff + ChartTime

Return d
End Function
```

**Notes:** As you see we calculate the difference in base date from Date and ChartTime and later use difference to convert.

### 10.0.83 How to convert line endings in text files?

Plugin Version: all, Platform: macOS.

**Answer:** You can simply read file with TextInputStream and write with new line endings using TextOutputStream class.

**Example:**

```
dim inputfile as FolderItem = SpecialFolder.Desktop.Child("test.txt")
dim outputfile as FolderItem = SpecialFolder.Desktop.Child("output.txt")
dim it as TextInputStream = TextInputStream.Open(inputfile)
dim ot as TextOutputStream = TextOutputStream.Create(outputfile)

ot.Delimiter = EndOfLine.Windows // new line ending
while not it.EOF
ot.WriteLine it.ReadLine
wend
```

**Notes:** `TextInputStream` will read any input line endings and with `delimiter` property in `TextOutputStream` you can easily define your new delimiter.

### 10.0.84 How to convert picture to string and back?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use this plugin functions:

**Notes:** JPEG:

`JPEGStringToPictureMBS(buf as string)` as picture  
`JPEGStringToPictureMBS(buf as string,allowdamaged as Boolean)` as picture  
`PictureToJPEGStringMBS(pic as picture,quality as Integer)` as string

PNG:

`PictureToPNGStringMBS(pic as picture, gamma as single)` as string  
`PictureToPNGStringMBS(pic as picture, mask as picture, gamma as single)` as string  
`PictureToPNGStringMBS(pic as picture, gamma as single, Interlace as Boolean, FilterType as Integer)` as string  
`PictureToPNGStringMBS(pic as picture, mask as picture, gamma as single, Interlace as Boolean, FilterType as Integer)` as string  
`PNGStringToPictureMBS(data as string, gamma as single)` as picture  
`PNGStringToPNGPictureMBS(data as string, gamma as single)` as PNGpictureMBS

Tiff:

`TIFFStringToPictureMBS(data as string)` as picture  
`TIFFStringToTiffPictureMBS(data as string)` as TiffPictureMBS

BMP:

`BMPStringtoPictureMBS(data as string)` as picture  
`Picture.BMPDataMBS(ResolutionValueDPI as Integer=72)` as string

GIF:

`GifStringToGifMBS(data as string)` as GIFMBS  
`GifStringToPictureMBS(data as string)` as Picture

### 10.0.85 How to copy an array?

Plugin Version: all, Platform: macOS.

**Answer:** You can use a function like this to copy an array:

**Example:**

```
Function CopyArray(a() as Double) as Double()
dim r() as Double
for each v as Double in a
r.Append v
next
Return r
End Function
```

**Notes:** If needed make several copies of this method with different data types, not just double.  
For a deep copy of an array of objects, you need to change code to also make a copy of those objects.

### 10.0.86 How to copy an dictionary?

Plugin Version: all, Platform: macOS.

**Answer:** You can use a function like this to copy a dictionary:

**Example:**

```
Function CopyDictionary(d as Dictionary) As Dictionary
dim r as new Dictionary
for each key as Variant in d.keys
r.Value(key) = d.Value(key)
next
Return r
End Function
```

**Notes:** If needed make several copies of this method with different data types, not just double.  
For a deep copy of an dictionary of objects, you need to change code to also make a copy of those objects.

### 10.0.87 How to copy parts of a movie to another one?

Plugin Version: all, Platforms: macOS, Windows.

**Answer:** The code below copies ten seconds of the snowman movie to the dummy movie starting at the 5th second.

**Example:**

```

dim f as FolderItem
dim md as EditableMovie
dim ms as EditableMovie

f=SpecialFolder.Desktop.Child("Our First Snowman.mov")
ms=f.OpenEditableMovie

ms.SelectionStartMBS=5
ms.SelectionLengthMBS=10

f=SpecialFolder.Desktop.Child("dummy.mov")
md=f.CreateMovie

msgbox str(md.AddMovieSelectionMBS(ms))

```

**Notes:** If result is not 0, the method fails.

**10.0.88 How to create a birthday like calendar event?**

Plugin Version: all, Platform: macOS.

**Answer:** Try this code:

**Example:**

```

// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

dim r as CalRecurrenceRuleMBS = CalRecurrenceRuleMBS.initYearlyRecurrence(1, nil) // repeat every
year without end

dim a as new CalAlarmMBS // add alarm
a.action = a.CalAlarmActionDisplay
a.relativeTrigger = -3600*24 // 24 Hours before

// create a new calendar
dim c as new CalEventMBS

dim d as new date(2011, 04, 20) // the date

dim calendars() as CalCalendarMBS = s.calendars

```

```

// set properties
c.Title="Test Birthday"
c.startDate=d
c.recurrenceRule = r
c.calendar=calendars(0) // add to first calendar
c.addAlarm(a)
c.endDate = d
c.isAllDay = true

// save event
call s.saveEvent(c,s.CalSpanAllEvents, e)
if e<>nil then
MsgBox e.localizedDescription
else
MsgBox "New event was created."
end if

```

**Notes:** This adds an event to iCal for the given date with alarm to remember you and repeats it every year.

### 10.0.89 How to create a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use the UUIDMBS class for this.

### 10.0.90 How to create a Mac picture clip file?

Plugin Version: all, Platform: Windows.

**Answer:** You can use code like this one.

**Example:**

```

dim f As FolderItem
dim p As Picture

f=SpecialFolder.Desktop.Child("Test.pictClipping")
if f=nil then Return

p=new Picture(300,200,32) 'Make a sample picture
p.Graphics.ForeColor=RGB(0,255,255)
p.Graphics.FillOval 0,0,99,99

```

```
p.Graphics.ForeColor=RGB(255,0,0)
p.Graphics.DrawOval 0,0,99,99
```

```
dim r As ResourceFork 'ResourceFork is needed for a clip file
```

```
// Please define a file type Any
r=f.CreateResourceFork("Any")
```

```
// get PICT data using plugin function
dim pictdata as string = p.PicHandleDataMBS
r.AddResource(pictdata,"PICT",256,"Picture")
```

```
dim m as new MemoryBlock(8)
```

```
m.LittleEndian = false
m.Int16Value(0) = 0
m.Int16Value(2) = 0
m.Int16Value(4) = p.Width
m.Int16Value(6) = p.Height
```

```
r.AddResource(m,"RECT",256,"")
```

```
'Values taken from a sample file and irrelevant to the problem
```

```
dim data as string = DecodeBase64("AQAAAAAAAAAAAAAAAAACAFRDRVIAAABAAAAAAAAAAAAAAAAABUQ0IQAAAAA")
r.AddResource(data,"drag",128,"") 'ditto
r.Close
```

**Notes:** In general Apple has deprecated this, but a few application still support clippings.

### 10.0.91 How to create a PDF file in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Check our DynaPDF plugin and the examples.

**Notes:** An alternative can be to use the CoreGraphics and Cocoa functions on Mac OS X. For Windows, we can only suggest our DynaPDF plugin.

### 10.0.92 How to create EmailAttachment for PDF Data in memory?

Plugin Version: all, Platform: macOS.

**Answer:** You can use code like the one below:

**Example:**

```
Function EmailAttachmentFromPDFData(PDFData as string, filename as string) As EmailAttachment
dim a as new EmailAttachment
```

```
a.data = EncodeBase64(PDFData, 76)
a.ContentEncoding = "base64"
a.MIMEType = "application/pdf"
a.MacType = "PDF "
a.MacCreator = "prvw"
a.Name = filename
```

```
Return a
End Function
```

**Notes:** Compared to sample code from Xojo documentation, we set the mime type correct for PDF. The MacType/MacCreator codes are deprecated, but you can still include them for older Mac email clients. "prvw" is the creator code for Apple's preview app.

### 10.0.93 How to create PDF for image files?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use DynaPDF like this:

**Example:**

```
Function CreatePrintPDF(jpgFiles() as folderitem, pdfFile as FolderItem, PageWidth as Integer, PageHeight
as Integer) As Boolean
// have files?
If pdfFile = Nil Then Return False
If jpgFiles = Nil Then Return False

If jpgFiles.Ubound < 0 Then Return False

// new DynaPDF
Dim pdf As New MyDynapdfMBS

// page width/height in MilliMeter
Dim pdfWidth as Integer = PageWidth * 72 / 25.4
Dim pdfHeight as Integer = PageHeight * 72 / 25.4

// put your license here
Call pdf.SetLicenseKey "Starter"

// create pdf
Call pdf.CreateNewPDF pdfFile
```

```

// set a couple of options
Call pdf.SetPageCoords(MyDynaPDFMBS.kpcTopDown)
Call pdf.SetResolution(300)
Call pdf.SetUseTransparency(False)
Call pdf.SetSaveNewImageFormat(False)
Call pdf.SetGStateFlags(MyDynaPDFMBS.kgfUseImageColorSpace, False)
Call pdf.SetJPEGQuality(100)

// set page size
Call pdf.SetBBox(MyDynaPDFMBS.kpbMediaBox, 0, 0, pdfWidth, pdfHeight)
Call pdf.SetPageWidth(pdfWidth)
Call pdf.SetPageHeight(pdfHeight)

// append pages with one image per page
For i as Integer = 0 To jpgFiles.Ubound
Call pdf.Append
Call pdf.InsertImageEx(0, 0, pdfWidth, pdfHeight, jpgFiles(i), 1)
Call pdf.EndPage
Next

// close
Call pdf.CloseFile

Return True
End Function

```

**Notes:** This is to join image files in paper size to a new PDF.  
e.g. scans in A4 into an A4 PDF.

### 10.0.94 How to CURL Options translate to Plugin Calls?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Below a few tips on how to translate command line CURL calls to plugin calls.

**Notes:** `curl -vX PUT http://localhost:5984/appserials/78569238475/DocumentRegister.docx?rev=3-25634563456 -data-binary @DocumentRegister.docx -H "Content-Type: application/msword"`

- The option `-v` means verbose. You can use `OptionVerbose` and listen for messages in the `DebugMessage` event.
- The option `-X PUT` means we want to do a HTTP PUT Request. So set `OptionPut` to true. Also you will want to set `OptionUpload` to true as you upload data.
- We have the URL which you put into `OptionURL` property.

- The `-data-binary` option tells CURL to pass the given data. With the `@` before the data, it is interpreted as a file name, so the data is read from the given file. You'll need to open this file and pass data with the Read event as needed. (See CURLS ftp file upload example project)
- The last option `-H` specifies an additional header for the upload. Pass this additional header with the `SetOptionHTTPHeader` method.

```
curl -X PUT http://127.0.0.1:5984/appserials/f2f4e540bf8bb60f61cfd4328001c59 -d '{ "type": "Product", "description": "Application Serial", "acronym": "AppSerial", "dateAdded": "2011-03-21 14:57:36" } '
```

- Option `-X PUT` like above.
- Pass the URL again in `OptionURL`
- This time data is passed in command line for CURL. You'd put this data in the quotes into a string and make it available in the Read event. (See CURLS ftp upload example project)

### 10.0.95 How to delete file with ftp and curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can set post/pre quotes to have ftp commands executed before or after the download/upload.

**Example:**

```
dim d as CURLMBS // your curl object
```

```
// delete file
```

```
dim ws() As String
```

```
ws.Append "DELE Temp.txt"
```

```
d.SetOptionPostQuote(ws)
```

**Notes:** Use `SetOptionPostQuote`, `SetOptionPreQuote` or `SetOptionQuote`.

The ftp commands you pass here are native ftp commands and not the commands you use with ftp applications. To delete use `DELE` and the file path.

### 10.0.96 How to detect display resolution changed?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** On Mac OS X simply listen for display changed notifications.

**Notes:** Use the "Distribution Notification Center.rbp" example project as a base and use it to listen to notifications with the name "O3DeviceChanged".

### 10.0.97 How to detect retina?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Please use Window.BackingScaleFactorMBS to query the factor.

**Example:**

```
msgbox str(window1.BackingScaleFactorMBS)
```

### 10.0.98 How to disable force quit?

Plugin Version: all, Platform: macOS.

**Answer:**

Please visit this website and get the control panel for Mac OS 9 there:

<http://www3.sk.sympatico.ca/tinyjohn/DFQ.html>

For Mac OS X use the MBS Plugin with the SetSystemUIModeMBS method.

**Notes:**

Please use presentationOptions in NSApplicationMBS for Cocoa applications.

### 10.0.99 How to disable the error dialogs from Internet Explorer on javascript errors?

Plugin Version: all, Platform: Windows.

**Answer:** You can use this code in the htmlviewer open event:

**Example:**

```
if targetwin32 then
htmlviewer1._ole.Content.value("Silent") = True
end if
```

**Notes:** This disables the error dialogs from Internet Explorer.

### 10.0.100 How to display a PDF file in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** On Mac OS X you can use CoreGraphics or PDFKit to display a PDF.

**Notes:** An alternative can be to load the PDF into a htmlviewer so the PDF plugin can display it.

On Windows you may need to use the Acrobat ActiveX control from Adobe or launch Acrobat Reader.

### 10.0.101 How to do a lottery in RB?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Try this function:

**Example:**

```

Sub Lotto(max as Integer,count as Integer,z() as Integer)
// Lotto count numbers of max put into the array z beginning at index 0
dim n(0) as Integer ' all the numbers
dim m as Integer ' the highest field in the current array
dim i,a,b,d as Integer ' working variables

'fill the array with the numbers
m=max-1
redim n(m)

for i=0 to m
n(i)=i+1
next

' unsort them by exchanging random ones
m=max*10
for i=1 to m
a=rnd*max
b=rnd*max

d=n(a)
n(a)=n(b)
n(b)=d
next

' get the first count to the dest array
m=count-1
redim z(m)
for i=0 to m
z(i)=n(i)
next

'sort the result
z.sort
End Sub

```

```

Sub Open()
// Test it

dim za(0) as Integer ' the array of the numbers

lotto 49,6,za ' 6 of 49 in Germany

' and display them
staticText1.text=str(za(0))+chr(13)+str(za(1))+chr(13)+str(za(2))+chr(13)+str(za(3))+chr(13)+str(za(4))+chr(13)+str(za(5))+chr(13)+str(za(6))+chr(13)+str(za(7))+chr(13)+str(za(8))+chr(13)+str(za(9))
End Sub

```

### 10.0.102 How to do an asycron DNS lookup?

Plugin Version: all, Platform: Windows.

**Answer:** use CFHostMBS class (Mac OS X only).

**Notes:** Xojo internal functions and plugin DNS functions are sycronized.

You can use DNSLookupThreadMBS class for doing them asycron.

### 10.0.103 How to draw a dushed pattern line?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can try this code:

**Example:**

```
// call like this: DrawDushedPatternLine g,0,0,width,height,10
```

```

Sub DrawDushedPatternLine(g as graphics,x1 as Integer,y1 as Integer,x2 as Integer,y2 as Integer, partlen
as Integer)
dim x,y,ox,oy as Double
dim dx,dy as Double
dim w,h,d as Double
dim b as Boolean

w=x2-x1
h=y2-y1

d=sqrt(w*w+h*h)

dx=w/d*partlen
dy=h/d*partlen

```

```

b=true
x=x1
while (x<x2) and (y<y2)
  ox=x
  oy=y

  x=x+dx
  y=y+dy

  if b then
    g.DrawLine ox,oy,x,y
  end if

  b=not b
wend

```

End Sub

**Notes:** It would be possible to add this to the plugin, but I think it's better if you do it in plain Xojo code, so it even works on Windows.

### 10.0.104 How to draw a nice antialiased line?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:**

This code can help you although it's not perfect.  
You need to set lc to the current color you use.

**Example:**

```

Sub drawLine(xs as Integer, ys as Integer, xe as Integer, ye as Integer, face as RGBSurface, lineColor as
color)
  dim intX, intY, count, n, xDiff, yDiff as Integer
  dim v, v1, floatX, floatY, xx, yy, xStep, yStep as Double
  dim c as color

  const st=1.0

  xDiff=xe-xs
  yDiff=ye-ys
  count=max(abs(xDiff), abs(yDiff))
  xStep=xDiff/count
  yStep=yDiff/count

```

```

xx=xs
yy=ys
for n=1 to count
intX=xx
intY=yy
floatX=xx-intX
floatY=yy-intY

v=(1-floatX)*(1-floatY)*st
v1=1-v
c=face.pixel(intX, intY)
face.pixel(intX, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*(1-floatY)*st
v1=1-v
c=face.pixel(intX+1, intY)
face.pixel(intX+1, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=(1-floatX)*floatY*st
v1=1-v
c=face.pixel(intX, intY+1)
face.pixel(intX, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*floatY*st
v1=1-v
c=face.pixel(intX+1, intY+1)
face.pixel(intX+1, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)

xx=xx+xStep
yy=yy+yStep
next

End Sub

```

**Notes:**

PS: st should be 1 and face should be a RGBSurface or a Graphics object.

**10.0.105 How to dump java class interface?**

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** In terminal you can use "javap -s <classname>" to display the class with the method names and parameters.

**Notes:** For example show ResultSet class: javap -s java.sql.ResultSet

**10.0.106 How to duplicate a picture with mask or alpha channel?**

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use code like this function:

**Example:**

```
Function Duplicate(extends p as Picture) As Picture
#if RBVersion >= 2011.04 then
if p.HasAlphaChannel then

// create nw picture and copy content:
dim q as new Picture(p.Width, p.Height)
q.Graphics.DrawPicture p,0,0

Return q

end if
#endif

// create new picture
dim q as new Picture(p.Width, p.Height, 32)

// get mask
dim oldMask as Picture = p.mask(false)
if oldMask = nil then
// no mask, so simple copy
q.Graphics.DrawPicture p,0,0
Return q
end if

// remove mask
p.mask = nil

// copy picture and mask
q.Graphics.DrawPicture p, 0, 0
q.mask.Graphics.DrawPicture oldMask,0,0

// restore mask
p.mask = oldmask

Return q
End Function
```

**Notes:** Simply copy it to a module and call it like this: `q = p.duplicate`.

The code above works with old Xojo versions because of the `#if` even if your RS version does not support alpha channel pictures. This way it's future proof.

### 10.0.107 How to enable assistive devices?

Plugin Version: all, Platform: macOS.

**Answer:** You can use AppleScript code like below:

**Notes:** tell application "System Events"  
activate

```
set UI elements enabled to true
```

```
return UI elements enabled
end tell
```

You can run this with AppleScriptMBS class.

### 10.0.108 How to encrypt a file with Blowfish?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use code like this:

**Example:**

```
dim fi as FolderItem = SpecialFolder.Desktop.Child("test.xojo_binary_project")
dim fo as FolderItem = SpecialFolder.Desktop.Child("test.encrypted")
```

```
// read input
```

```
dim bi as BinaryStream = BinaryStream.Open(fi)
```

```
dim si as string = bi.Read(bi.Length)
```

```
bi.Close
```

```
// encrypt
```

```
dim so as string = BlowfishMBS.Encrypt("MyKey",si)
```

```
// write output
```

```
dim bo as BinaryStream = BinaryStream.Create(fo)
```

```
bo.Write so
```

```
bo.Close
```

**Notes:** Of course you can decrypt same way, just use Decrypt function and of course swap files.

**10.0.109 How to extract text from HTML?**

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use both RemoveHTMLTagsMBS and DecodingFromHTMLMBS like this:

**Example:**

```
dim html as string = "<p><B>Gr&uuml;&szlig;e</B></P>"
dim htmltext as string = RemoveHTMLTagsMBS(html)
dim text as string = DecodingFromHTMLMBS(htmltext)
```

MsgBox text // shows: Gr√üë

**Notes:** You can use it together with RemoveHTMLTagsMBS to remove html tags. What you get will be the text without tags.

DecodingFromHTMLMBS turns HTML escapes back to unicode characters. Like &auml; to √§.

**10.0.110 How to find empty folders in a folder?**

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Try this code:

**Example:**

```
dim folder as folderitem // your folder

dim c as Integer = folder.count
for i as Integer = 1 to c
dim item as folderitem = folder.trueitem(i)
if item = nil then
// ignore
elseif item.directory then
// folder
if item.count = 0 then
// found empty folder
end if
end if
next
```

**10.0.111 How to find iTunes on a Mac OS X machine fast?**

Plugin Version: all, Platform: macOS.

**Answer:** You can try Launch Services.

**Example:**

```
dim f as FolderItem

f=LaunchServicesFindApplicationForInfoMBS("hook","com.apple.iTunes","iTunes.app")

MsgBox f.NativePath
```

### 10.0.112 How to find network interface for a socket by it's name?

Plugin Version: all, Platform: macOS.

**Answer:** You can use our plugin to build a lookup table.

**Example:**

```
Function FindNetworkInterface(name as string) As NetworkInterface
name = name.trim

if name.len = 0 then Return nil

// search by IP/MAC
dim u as Integer = System.NetworkInterfaceCount-1
for i as Integer = 0 to u
dim n as NetworkInterface = System.GetNetworkInterface(i)
if n.IPAddress = name or n.MACAddress = name then
Return n
end if
next

// use MBS Plugin to build a mapping
dim interfaces() as NetworkInterfaceMBS = NetworkInterfaceMBS.AllInterfaces
dim map as new Dictionary

for each n as NetworkInterfaceMBS in interfaces
dim IPv4s() as string = n.IPv4s
dim IPv6s() as string = n.IPv6s

for each IPv4 as string in IPv4s
map.Value(IPv4) = n.Name
next
for each IPv6 as string in IPv6s
map.Value(IPv6) = n.Name
next
if n.MAC<>>" then
map.Value(n.MAC) = n.Name
```

```

end if
next

// now search interfaces by name, IPv4 or IPv6
for i as Integer = 0 to u
dim n as NetworkInterface = System.GetNetworkInterface(i)
if map.Lookup(n.IPAddress, "") = name then
Return n
end if

if map.Lookup(n.MACAddress, "") = name then
Return n
end if
next

End Function

```

**Notes:** The code above uses a lookup table build using NetworkInterfaceMBS class to find the network interface by name.

### 10.0.113 How to find version of Microsoft Word?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use code like this:

**Example:**

```

// find Word
dim f as FolderItem = LaunchServicesFindApplicationForInfoMBS("", "com.microsoft.Word", "")

// open bundle
dim c as new NSBundleMBS(f)

// read info
dim d as Dictionary = c.infoDictionary

// show version
MsgBox d.Lookup("CFBundleVersion", "")

```

**Notes:** Older versions of Word can be found with creator code "MSWD".

### 10.0.114 How to fix CURL error 60/53 on connecting to server?

Plugin Version: all, Platform: macOS.

**Answer:** You probably connect with SSL and you have no valid certificate.

**Example:**

```
dim d as new CURLSMBS

// Disable SSL verification
d.OptionSSLVerifyHost = 0 // don't verify server
d.OptionSSLVerifyPeer = 0 // don't proofs certificate is authentic

// With SSL Verification:
dim cacert as FolderItem = Getfolderitem("cacert.pem")
d.OptionCAInfo = cacert.NativePath
d.OptionSSLVerifyHost = 2 // verify server
d.OptionSSLVerifyPeer = 1 // proofs certificate is authentic
```

**Notes:** You can either use the code above to disable the SSL verification and have no security. Or you use the cacert file and enable the verification. Than you only get a connection if the server has a valid certificate.

see also:

<http://curl.haxx.se/ca/>

### 10.0.115 How to format double with n digits?

Plugin Version: all, Platform: macOS.

**Answer:** You can use the FormatMBS function for this.

**Example:**

```
dim d as Double = 123.4567890
listbox1.AddRow FormatMBS("%f", d)
listbox1.AddRow FormatMBS("%e", d)
listbox1.AddRow FormatMBS("%g", d)

listbox1.AddRow FormatMBS("%5.5f", d)
listbox1.AddRow FormatMBS("%5.5e", d)
listbox1.AddRow FormatMBS("%5.5g", d)

d = 0.000000123456
listbox1.AddRow FormatMBS("%f", d)
listbox1.AddRow FormatMBS("%e", d)
```

```
listbox1.AddRow FormatMBS("%g", d)

listbox1.AddRow FormatMBS("%5.5f", d)
listbox1.AddRow FormatMBS("%5.5e", d)
listbox1.AddRow FormatMBS("%5.5g", d)
```

**Notes:** see FormatMBS for details.

In general %f is normal style, %e is scientific and %g is whichever gives best result for given space.

### 10.0.116 How to get a time converted to user time zone in a web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use the WebSession.GMTOffset property.

**Example:**

```
Sub Open()
// current date on server
dim d as new date
dim s as string = d.LongTime

// adjust to client GMT offset
d.GMTOffset = d.GMTOffset + Session.GMTOffset

dim t as string = D.LongTime

MsgBox s+EndOfLine+t
End Sub
```

### 10.0.117 How to get an handle to the frontmost window on Windows?

Plugin Version: all, Platform: Windows.

**Answer:** This function returns a handle for the frontmost window:

**Example:**

```
Function GetForegroundWindowHandle() as Integer
#if targetwin32 then
declare function GetForegroundWindow Lib "user32.dll" as Integer
Return GetForegroundWindow()
#endif
End Function
```

### 10.0.118 How to get CFAbsoluteTime from date?

Plugin Version: all, Platforms: macOS, Windows.

**Answer:** Use code like this:

**Example:**

```
dim d as new date
dim t as CFTimeZoneMBS = SystemCFTimeZoneMBS
dim g as new CFGregorianCalendarMBS
g.Day = d.Day
g.Month = d.Month
g.Year = d.Year
g.Minute = d.Minute
g.Hour = d.Hour
g.Second = d.Second

dim at as CFAbsoluteTimeMBS = g.AbsoluteTime(t)
dim x as Double = at.Value
```

```
MsgBox str(x)
```

**Notes:** As you see we need a timezone and put the date values in a gregorian date record. Now we can query absolute time for the given timezone.

### 10.0.119 How to get client IP address on web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use the WebSession.RemoteAddress property.

**Example:**

```
Sub Open()
Title = Session.RemoteAddress
End Sub
```

### 10.0.120 How to get fonts to load in charts on Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Please use the `SetFontSearchPath` method in the `CDBaseChartMBS` class to specify where your fonts are.

**Example:**

```

if TargetLinux then
CDBaseChartMBS.SetFontSearchPath "/usr/share/fonts/truetype;/usr/share/fonts/truetype/msttcorefonts"
else
// on Mac and Windows we use system fonts.
end if

// also you can later switch default fonts:

dim Chart as CDBaseChartMBS // your chart

#If TargetARM And TargetLinux Then
// use specific fonts on Linux on Raspberry Pi
Call Chart.setDefaultFonts("/usr/share/fonts/truetype/piboto/PibotoLt-Regular.ttf", "/usr/share/fonts/truetype/piboto/Pi
#EndIf

```

**Notes:** On macOS, iOS and Windows, the fonts are loaded from the system's font folder.

e.g. if you use ubuntu, you can install the `ttf-mscorefonts-installer` package and call this method with `"/usr/share/fonts/truetype/msttcorefonts"` as the path. No backslash on the end of a path, please.

### 10.0.121 How to get fonts to load in DynaPDF on Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Please use the `AddFontSearchPath` method in the `DynaPDFMBS` class to specify where your fonts are.

**Example:**

```

dim d as new DynaPDFMBS
if TargetLinux then
call d.AddFontSearchPath "/usr/share/fonts/truetype", true
else
// on Mac and Windows we use system fonts.
end if

```

**Notes:** On Mac OS X and Windows, the fonts are loaded from the system's font folder.

e.g. if you use ubuntu, you can install the `ttf-mscorefonts-installer` package and call this method with `"/usr/share/fonts/truetype/msttcorefonts"` as the path. No backslash on the end of a path, please.

### 10.0.122 How to get GMT time and back?

Plugin Version: all, Platform: macOS.

**Answer:** You can use the date class and the GMTOffset property.

**Example:**

```
// now
dim d as new date

// now in GMT
dim e as new date
e.GMTOffset = 0

// show
MsgBox str(d.TotalSeconds,"0.0")+ " " +str(e.TotalSeconds, "0.0")

dim GMTTimeStamp as Double = e.TotalSeconds

// restore
dim f as new date

// add GMT offset here
f.TotalSeconds = GMTTimeStamp + f.GMTOffset*3600
// because here it's removed
f.GMTOffset = f.GMTOffset

MsgBox d.ShortTime+" (" +str(d.GMTOffset)+") " +str(d.TotalSeconds,"0.0")+EndOfLine+_
e.ShortTime+" (" +str(e.GMTOffset)+") " +str(e.TotalSeconds,"0.0")+EndOfLine+_
f.ShortTime+" (" +str(f.GMTOffset)+") " +str(f.TotalSeconds,"0.0")
```

**Notes:** It's sometimes a bit tricky with the date class as setting one property often changes the others.

### 10.0.123 How to get good crash reports?

Plugin Versions: all, Platforms: macOS, Linux, Windows.

**Answer:** Check this website from the webkit website:

**Notes:** <http://webkit.org/quality/crashlogs.html>

**10.0.124 How to get list of all threads?**

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use the runtime module like in this function:

**Example:**

```
Function Threads() As Thread()
#pragma DisableBackgroundTasks
dim t() as Thread

Dim o as Runtime.ObjectIterator=Runtime.IterateObjects
While o.MoveNext
if o.Current isa Thread then
t.Append thread(o.current)
end if
Wend

Return t
End Function
```

**Notes:** This returns an array of all thread objects currently in memory.

The pragma is important here as it avoids thread switches which may cause a thread to be created or deleted.

**10.0.125 How to get parameters from webpage URL in Xojo Web Edition?**

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use the Webpage.ParametersReceived event.

**Example:**

```
Sub ParametersReceived(Variables As Dictionary)
for each key as Variant in Variables.keys
MsgBox key+" ->" +Variables.Value(key)
next
End Sub
```

**Notes:** The text encodings of this strings is not defined in Xojo 2010r5. Please use DefineEncoding.

**10.0.126 How to get the color for disabled textcolor?**

Plugin Version: all, Platform: macOS.

**Answer:** Ask the appearance manager:

**Example:**

```
Function GetThemeTextColor(inColor as Integer, inDepth as Integer, inColorDev as Boolean) As Color
declare function GetThemeTextColor lib "Carbon" (inColor as Integer, inDepth as Integer, inColorDev as
Boolean, outColor as Ptr) as Integer
```

```
dim i as Integer
```

```
dim col as MemoryBlock
```

```
col = newMemoryBlock(6)
```

```
i = GetThemeTextColor(inColor, inDepth, inColorDev, col)
```

```
return RGB(col.UShort(0)\256, col.UShort(2)\256, col.UShort(4)\256)
```

```
End Function
```

**Notes:** The color for this is:

```
const kThemeTextColorDialogInactive = 2.
```

```
c = GetThemeTextColor(kThemeTextColorDialogInactive, Screen(0).Depth, true)
```

For Mac OS X you should use "CarbonLib" instead of "AppearanceLib" ...

### 10.0.127 How to get the current free stack space?

Plugin Version: all, Platform: macOS.

**Answer:** You can something like the code below:

**Example:**

```
Sub ShowStackSize()
```

```
dim threadid as Integer
```

```
dim size as Integer
```

```
declare function GetCurrentThread lib "Carbon" (byref threadid as Integer) as short
```

```
declare function ThreadCurrentStackSize lib "Carbon" (threadid as Integer, byref size as Integer) as short
```

```
if GetCurrentThread(threadid)=0 then
```

```
if 0=ThreadCurrentStackSize(threadid,size) then
```

```
MsgBox str(size)
```

```
end if
```

```
end if
```

End Sub

**Notes:** For Mac OS 9, use "ThreadLib" instead of "CarbonLib". You can use #if if you like for that.

### 10.0.128 How to get the current timezone?

Plugin Version: all, Platforms: macOS, Windows.

**Answer:**

You can use the TimeZoneMBS class or the CFTimeZoneMBS class.  
Or code like below:

**Example:**

```
Function GMTOffsetInMinutes() as Integer
// Returns the offset of the current time to GMT in minutes.
// supports Mac OS and Windows, but not Linux yet (let me know if
// you have code for that, please)
//
// Note that the offset is not always an even multiple of 60, but
// there are also half hour offsets, even one 5:45h offset

// This version by Thomas Tempelmann (rb@tempel.org) on 25 Nov 2005
// with a fix that should also make it work with future Intel Mac targets.
//
// Using code from various authors found on the RB NUG mailing list

dim result, bias, dayLightbias as Integer
dim info as memoryBlock
dim offset as Integer

#if targetMacOS then

Declare Sub ReadLocation lib "Carbon" (location As ptr)

info = NewMemoryBlock(12)
ReadLocation info
if false then
// bad, because it does not work on Intel Macs:
'offset = info.short(9) * 256 + info.byte(11)
else
offset = BitwiseAnd (info.long(8), &hFFFFFF)
end

offset = info.short(9) * 256 + info.byte(11)
```

```

offset = offset \60
return offset

#endif

#if targetWin32 then

Declare Function GetTimeZoneInformation Lib "Kernel32" ( tzInfoPointer as Ptr ) as Integer
// returns one of
// TIME_ZONE_ID_UNKNOWN 0
// - Note: e.g. New Delhi (GMT+5:30) and Newfoundland (-3:30) return this value 0
// TIME_ZONE_ID_STANDARD 1
// TIME_ZONE_ID_DAYLIGHT 2

info = new MemoryBlock(172)
result = GetTimeZoneInformation(info)

bias = info.Long(0)
// note: the original code I found in the NUG archives used Long(84) and switched to Long(0)
// only for result=1 and result=2, but my tests found that Long(0) is also the right value for result=0

if result = 2 then
daylightBias = info.long(168)
end if
offset = - (bias + dayLightbias)
return offset

#endif

End Function

```

### 10.0.129 How to get the current window title?

Plugin Version: all, Platform: macOS.

**Answer:** The code below returns the current window title for the frontmost window on Mac OS X if Accessibility services are

**Example:**

```

Function CurrentWindowTitle() As string
// your application needs permissions for accessibility to make this work!

dim SystemWideElement,FocusedApplicationElement,FocusedWindowElement as AXUIElementMBS
dim FocusedApplication,FocusedWindow,Title as AXValueMBS
dim s as String
dim cs as CFStringMBS

```

```

SystemWideElement=AccessibilityMBS.SystemWideAXUIElement
if SystemWideElement<>nil then
FocusedApplication=SystemWideElement.AttributeValue(AccessibilityMBS.kAXFocusedApplicationAttribute)
if FocusedApplication.Type=AccessibilityMBS.kAXUIElementMBSTypeID then
FocusedApplicationElement=new AXUIElementMBS
FocusedApplicationElement.Handle=FocusedApplication.Handle
FocusedApplicationElement.RetainObject

FocusedWindow=FocusedApplicationElement.AttributeValue(AccessibilityMBS.kAXFocusedWindowAttribute)

if FocusedWindow<>nil and AccessibilityMBS.kAXUIElementMBSTypeID=FocusedWindow.Type then

FocusedWindowElement=new AXUIElementMBS
FocusedWindowElement.Handle=FocusedWindow.Handle
FocusedWindowElement.RetainObject

Title=FocusedWindowElement.AttributeValue(AccessibilityMBS.kAXTitleAttribute)
if Title<>nil and Title.Type=kCFStringMBSTypeID then
cs=new CFStringMBS
cs.handle=Title.Handle
cs.RetainObject
Return cs.str
end if
end if
end if
end if
End Function

```

### 10.0.130 How to get the cursor blink interval time?

Plugin Version: all, Platform: macOS.

**Answer:** On Mac OS you can use GetCaretTime from the toolbox.

**Example:**

```
declare function GetCaretTime lib "Carbon" () as Integer
```

```
MsgBox str(GetCaretTime())+" ticks"
```

**Notes:** 60 ticks make one second.

### 10.0.131 How to get the list of the current selected files in the Finder?

Plugin Version: all, Platform: macOS.

**Answer:**

Use the AppleScript like this one:

```
tell application "finder"
return selection
end tell
```

Which translates into this AppleEvent:

```
Process("Finder").SendAE "core,getd,'—':obj { form:prop, want:type(prop), seld:type(sele), from:'null'() }
"
```

and as Xojo code it looks like this:

**Example:**

```
dim ae as appleEvent
dim o1 as appleEventObjectSpecifier
dim f as folderItem
dim alist as appleEventDescList
dim i as Integer
dim dateiname as string

// setup the AppleEvent
o1=getpropertyObjectDescriptor( nil, "sele")
ae= newappleEvent("core", "getd", "MACS")
ae.objectSpecifierParam("—")=o1

// send it
if ae.send then
// got the list
alist=ae.replyDescList

// now show the list of filename into an editfield:

for i=1 to alist.count
f=alist.folderItem(i)

dateiname=f.name
// editfield1 with property "multiline=true"!
editfield1.text=editfield1.text + dateiname + chr(13)
next
```

end if

### 10.0.132 How to get the Mac OS system version?

Plugin Version: all, Platform: macOS.

**Answer:** The following code queries the value and displays the version number:

**Example:**

```

dim first as Integer
dim second as Integer
dim third as Integer
dim l as Integer

if System.Gestalt("sysv",l) then

Third=Bitwiseand(l,15)
second=Bitwiseand(l\16,15)
first=Bitwiseand(l\256,15)+10*Bitwiseand(l\256\16,15)
end if

if First>=10 then
msgbox "Mac OS X "+str(First)+" "+str(Second)+" "+str(third)
else
msgbox "Mac OS "+str(First)+" "+str(Second)+" "+str(third)
end if

```

### 10.0.133 How to get the Mac OS Version using System.Gestalt?

Plugin Version: all, Platform: macOS.

**Answer:** Try this code:

**Example:**

```

Dim s As String
Dim b As Boolean
Dim i, resp as Integer

// Systemversion
b = System.Gestalt("sysv", resp)
If b then
s = Hex(resp)

```

```

For i =Len(s)-1 DownTo 1
s=Left(s,i)+””+Mid(s,i+1)
Next
MsgBox ”Systemversion: Mac OS ” + s
end if

```

**Notes:** The MBS Plugin has a SystemInformationMBS.OSVersionString function for this.

### 10.0.134 How to get the screensize excluding the task bar?

Plugin Version: all, Platform: Windows.

**Answer:** Try this code:

**Notes:** Use the Screen class with the available\* properties.

### 10.0.135 How to get the size of the frontmost window on Windows?

Plugin Version: all, Platform: Windows.

**Answer:** Try this code:

**Notes:** Make yourself a class for the WindowRect with four properties:

```

Bottom as Integer
Left as Integer
Right as Integer
Top as Integer

```

Add the following method to your class:

```

Sub GetWindowRect(windowhandle as Integer)
dim err as Integer
dim mem as memoryBlock
#if targetwin32 then
Declare Function GetWindowRect Lib ”user32.dll” (hwnd as Integer, ipRect As Ptr) as Integer

mem = newmemoryBlock(16)
err = GetWindowRect(windowhandle, mem)
Left = mem.long(0)
Top = mem.Long(4)
Right = mem.Long(8)
Bottom = mem.Long(12)

```

```
#endif  
End Sub
```

Good to use for the MDI Master Window!

### 10.0.136 How to get the source code of a HTMLViewer?

Plugin Version: all, Platform: macOS.

**Answer:** Try this code:

**Example:**

```
// for Windows:
```

```
msgbox HTMLViewer1.IEHTMLTextMBS
```

```
// for MacOS with WebKit 2.x:
```

```
msgbox HTMLViewer1.WKWebViewMBS.HTMLText
```

### 10.0.137 How to get Xojo apps running Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You need to install some require packages.

**Notes:** You need CUPS as well as GTK packages. On 64 bit systems also the ia32-libs package.

Please note that you need a x86 compatible Linux. So no PPC, Power, ARM or other CPUs.

### 10.0.138 How to handle really huge images with GraphicsMagick or ImageMagick?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Sometimes it may be better to use an extra application to process images.

**Notes:** A typical 32 bit app made with Xojo can use around 1.8 GB on Windows and 3 GB on Mac OS X. Some images may be huge, so that processing them causes several copies of the image to be in memory. With a 500 MB image in memory, doing a scale or rotation may require a temp image. So with source, temp and dest images with each 500 MB plus your normal app memory usage, you may hit the limit of Windows with 1.8 GB.

In that case it may be worth running a tool like gm in the shell class. gm is the command line version of GraphicsMagick. There you can run the 64 bit version which is not limited in memory like your own application. Also you can monitor progress and keep your app responsive.

### 10.0.139 How to handle tab key for editable cells in listbox?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use code like this function:

**Example:**

```
Function HandleTabInList(list as listbox, row as Integer, column as Integer, key as String) As Boolean
// Handle tab character in Listbox.CellKeyDown event
```

```
Select case asc(key)
case 9
if Keyboard.AsyncShiftKey then
// back

// look for column left
for i as Integer = column-1 downto 0
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next

// not found, so look in row before
row = row - 1
if row >= 0 then
for i as Integer = list.ColumnCount-1 downto 0
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
end if
else
// forward

// look for column right
for i as Integer = column+1 to list.ColumnCount-1
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
```

```

// not found, so look in row below
row = row + 1
if row <list.ListCount then
for i as Integer = 0 to list.ColumnCount-1
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
end if
end if
end Select
End Function

```

**Notes:** You call it from CellKeyDown event like this:

```

EventHandler Function CellKeyDown(row as Integer, column as Integer, key as String) As Boolean
if HandleTabInList(me, row, column, key) then Return true
End EventHandler

```

As you see in the code, we handle tab and shift + tab for moving back and forward. Also we wrap to previous/next row if needed. Feel free to extend this to wrap from last to first row or create a new row for editing.

### 10.0.140 How to hard link MapKit framework?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Our MapKit classes weak link the framework. If you need hard linking it for the App Store, you can add this method to a class:

**Example:**

```

Sub ReferenceMapKit()
// just put this in window or app class

#if TargetMachO and Target64Bit then
Declare sub testing Lib "MapKit" Selector "test" (id as ptr)
testing(nil)
#endif

End Sub

```

**Notes:** No need to call the method.

Just having it in a window or app, will cause the compiler to hard link the framework.

### 10.0.141 How to have a PDF downloaded to the user in a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use a WebHTMLViewer control and load the PDF file with the PDF plugin from the browser.

**Example:**

```
dim CurrentFile as WebFile // a property of the WebPage

// define the PDF file
CurrentFile = new WebFile
CurrentFile.Filename = "test.pdf"
CurrentFile.MIMEType = "application/pdf"
CurrentFile.Data = "some pdf data" // MyDynaPDF.GetBuffer
CurrentFile.ForceDownload = true

// start the download
showurl(CurrentFile.url)
```

**Notes:** See our Create PDF example for the Xojo Web Edition.

### 10.0.142 How to hide all applications except mine?

Platform: macOS.

**Answer:** The code below will on Mac OS hide all applications except your one:

**Example:**

```
dim p as new ProcessMBS

p.GetFirstProcess
do
if not p.FrontProcess then
p.Visible=false
end if
loop until not p.GetNextProcess
```

### 10.0.143 How to hide script errors in HTMLViewer on Windows?

Plugin Version: all, Platform: Windows.

**Answer:** Set Internet Explorer to silent mode with code like this:

**Example:**

```
htmlviewer1._ole.Content.value("Silent") = True
```

**Notes:** Simply put this code in the open event of your htmlviewer control (using me instead of htmlviewer1).

### 10.0.144 How to hide the grid/background/border in ChartDirector?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** If you want to hide something in a chart, simply assign the kTransparent constant as color.

### 10.0.145 How to hide the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

**Answer:** Try this declare:

**Example:**

```
Declare Sub HideCursor Lib "Carbon" () Inline68K("A852")
```

```
HideCursor
```

**Notes:** The MBS Plugin has this function and supports it on Windows, too.

### 10.0.146 How to insert image to NSTextView or TextArea?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** With NSTextViewMBS you can use this code to insert file:

**Example:**

```
// insert a file to textview
```

```
Public Sub InsertFile(textview as NSTextViewMBS, f as FolderItem)
```

```
// read to file
```

```

dim b as BinaryStream = BinaryStream.Open(f)
dim s as string = b.Read(b.Length)

// build wrapper
dim fileWrapper as NSFileWrapperMBS = NSFileWrapperMBS.initRegularFileWithContents(s)
fileWrapper.preferredFilename = f.name

// make attachment
dim fileAttachment as new NSTextAttachmentMBS(fileWrapper)
dim attributedString as NSAttributedStringMBS = NSAttributedStringMBS.attributedStringWithAttachment(fileAttachment)

// add to a NSTextViewMBS
textview.insertText attributedString

End Sub

```

**Notes:** For TextArea you can query the underlying NSTextViewMBS object via TextArea.NSTextViewMBS method.

### 10.0.147 How to jump to an anchor in a htmlviewer?

Plugin Version: all, Platforms: macOS, Windows.

**Answer:** You can use javascript to change the current window's location.

**Example:**

```

// load website
htmlviewer1.LoadURL "http://www.monkeybreadsoftware.net/addressbook-abpersonmbs.shtml"

// later jump to anchor named "16":

if TargetWin32 then
call HTMLViewer1.IERunJavaScriptMBS "window.location = ""#16""
end if

```

### 10.0.148 How to keep a movieplayer unclickable?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** To keep the user away from clicking on a playing Movie you can just drop a Canvas in front of the Movieplayer and take the clicks there.

**Example:**

```
Function Canvas1.MouseDown(X as Integer, Y as Integer) as boolean
return true // take it and do nothing
End Function
```

### 10.0.149 How to keep my web app from using 100% CPU time?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** On Linux and MacOS you can use renice command in the terminal. On Windows use the task manager to reduce priority.

**Notes:** If you launch your app with nohup on Linux or Mac OS X like this from the terminal or a script:

```
nohup /webapps/MyApp/MyApp &
```

you can simply have a second line saying this:

```
renice 20 $ !
```

which tells the system to lower priority to lowest value for the latest background process.

### 10.0.150 How to kill a process by name?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can kill a process (or application) by name if you loop over all the processes and kill the one you need.

**Example:**

```
dim p as new ProcessMBS
p.GetfirstProcess ' get first
do
if p.name = "TextEdit" then
call p.KillProcess
Return
end if
loop until not p.GetNextProcess
```

**Notes:** You may want to check the result of killProcess function. Not every user is allowed to kill every application.

### 10.0.151 How to know how many CPUs are present?

Plugin Version: all, Platform: macOS.

**Answer:** Try this function:

**Example:**

```
Function GetCPUCount() as Integer
Declare Function MPProcessors Lib "Carbon" () as Integer
```

```
Return MPProcessors()
End Function
```

**Notes:** Your app will than need that library to launch on Classic. To avoid this the MBS plugin checks if this library is available and return 1 if it's not available.

### 10.0.152 How to know the calling function?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** On Mac you can use a helper function like this this code:

**Example:**

```
Public Function CallingFunction() as string
// Query name of calling function of a function
```

```
#Pragma BreakOnExceptions false
```

```
try
```

```
// raise a dummy exception
dim r as new NilObjectException
raise r
```

```
catch x as NilObjectException
```

```
// get stack
dim stack() as string = x.Stack
```

```
// pick function name and return
dim name as string = stack(2)
Return name
```

```
end try
End Function
```

**Notes:** You need to include function names in your application.

### 10.0.153 How to launch an app using it's creator code?

Plugin Version: all, Platform: macOS.

**Answer:** Send an AppleEvent "oapp" with the creator code to the Finder ("MACS"):

**Example:**

```
Dim a as AppleEvent
dim creator as string

creator = "MSIE" ' here the Internet Explorer

a = NewAppleEvent("aevt", "odoc", "MACS")
a.Timeout = -1

a.ObjectSpecifierParam("—") = GetUniqueIDObjectDescriptor("appf", nil, creator)

if not a.send then
msgBox "An error has occured"
else

end if
```

### 10.0.154 How to launch disc utility?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use this code:

**Example:**

```
dim f as FolderItem = LaunchServicesFindApplicationForInfoMBS("", "com.apple.DiskUtility", "")

if f<>Nil then
f.Launch
end if
```

**Notes:** This works even if people renamed the disc utility or moved it to another folder.

### 10.0.155 How to make a lot of changes to a REAL SQL Database faster?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You may try to embed your changes to the database between two transaction calls.

**Example:**

```
dim db as Database // some database

db.SQLiteExecute "BEGIN TRANSACTION"
// Do some Stuff
db.SQLiteExecute "END TRANSACTION"
```

**Notes:** This can increase speed by some factors.

### 10.0.156 How to make a NSImage object for my retina enabled app?

Plugin Version: all, Platform: macOS.

**Answer:** You can use code like this:

**Example:**

```
Function NewRetinaImage(pic as Picture, mask as Picture = nil) As NSImageMBS
// first make a NSImageMBS from it
dim n as new NSImageMBS(pic, mask)

// now set to half the size, so we have 2x pixels for the image
n.size = new NSSizeMBS(n.width/2, n.height/2)

// and return
Return n
End Function
```

**Notes:** The thing to do is to have 2x the pixels, but assign a size to the image which gives it the right size in points.

You can pass the NSImageMBS from here to NSMenuItemMBS. For Retina displays, the full resolution is used. For others it will be reduced.

### 10.0.157 How to make a window borderless on Windows?

Plugin Version: all, Platform: Windows.

**Answer:** Try this declares:

**Example:**

```
// Sets window to borderless popup type, and sets its initial dimensions.
// Call this method, then Win32SetBorderlessPos, and then RB's Show
// method. Use RB Frame type 7 (Global Floating Window).
```

```
Const SWP_NOMOVE = &H2
Const SWP_FRAMECHANGED = &H20
Const HWND_TOPMOST = -1
Const GWL_STYLE = -16
Const WS_POPUPWINDOW = &H8080000
```

```
Dim styleFlags as Integer
```

```
#If TargetWin32 Then
```

```
Declare Function SetWindowLong Lib "user32" Alias "SetWindowLongA" (hwnd as Integer, nIndex as Integer, dwNewLong as Integer) as Integer
```

```
Declare Function SetWindowPos Lib "user32" (hwnd as Integer, hWndInstertAfter as Integer, x as Integer, y as Integer, cx as Integer, cy as Integer, flags as Integer) as Integer
```

```
styleFlags = SetWindowLong( w.WinHWND, GWL_STYLE, WS_POPUPWINDOW )
styleFlags = BitwiseOr( SWP_FRAMECHANGED, SWP_NOMOVE )
styleFlags = SetWindowPos( w.WinHWND, HWND_TOPMOST, 0, 0, wd, ht, styleFlags )
```

```
#EndIf
```

### 10.0.158 How to make an alias using AppleEvents?

Plugin Version: all, Platform: macOS.

**Answer:** Try this code:

**Example:**

```
Sub MakeAlias(folder as folderitem, target as folderitem, aliasname as string)
```

```
dim ev as AppleEvent
```

```
dim myResult as boolean
```

```
dim properties as AppleEventRecord
```

```
ev = NewAppleEvent("core", "crel", "MACS")
```

```
ev.MacTypeParam("kocl") = "alis"
```

```
ev.FolderItemParam("to ") = target
```

```
ev.FolderItemParam("insh") = folder
```

```
properties=new AppleEventRecord
```

```

properties.StringParam("pnam")=aliasname

ev.RecordParam("prdt")=properties

myResult = ev.send
// true on success, false on error
End Sub

```

**Notes:** Call it like this:

```
MakeAlias SpecialFolder.Desktop, SpecialFolder.Desktop.Child("Gif Copy.rb"), "test.rb alias"
```

Seems to not work on Mac OS X 10.6

### 10.0.159 How to make AppleScripts much faster?

Plugin Version: all, Platform: macOS.

**Answer:** use "ignoring application responses" like in this example:

```

Notes: on run { fn,fpx,fpy }
ignoring application responses
tell app "Finder" to set the position of folder fn to fpx,fpy
end ignoring
end run

```

### 10.0.160 How to make double clicks on a canvas?

Plugin Version: all, Platform: macOS.

**Answer:**

Update: Newer Xojo versions support DoubleClick event, so you don't need this code.

Here's my tip from the tips list on how to add a double-click event to the Canvas control. The technique could easily be used for a window or any Rectcontrol:

Because of its built-in drawing methods, the Canvas control is often used to create custom interface controls. But while the Canvas control has event handlers for most mouse events, it doesn't have an event handler for DoubleClick events. Fortunately, you can add a double-click event handler to a Canvas control easily. Basically, you're going to create a new class based on Canvas and add a double-click event to that. You can then use the new class anytime you need a Canvas with a double-click event.

To create a new Canvas class with a DoubleClick event handler, do this:

1. Add a new class to your project.
2. Set the Super property of the new class to "Canvas".
3. Change the name of this new class to "DoubleClickCanvas".

A double-click occurs when two clicks occur within the users double-click time (set in the Mouse control panel on both Macintosh and Windows) and within five pixels of each other. So, you'll need a few properties to store when and where the last click occurred.

4. Add a new property with the following declaration and mark it as private: lastClickTicks as Integer
5. Add a new property with the following declaration and mark it as private: lastClickX as Integer
6. Add a new property with the following declaration and mark it as private: lastClickY as Integer

Since the Canvas control doesn't have a DoubleClick event, you will need to add one.

7. Add a new event to your class by choosing New Event from the Edit menu and enter "DoubleClick" as the event name.

Double-clicks occur on MouseUp. In order for the mouseUp event to fire, you must return True in the MouseDown event.

8. In the MouseDown event, add the following code:  
Return True

In the MouseUp event, you will need to determine what the users double-click time is. This value is represented on both the Mac and Windows in ticks. A tick is 1/60th of a second. Since there isn't a built-in function for this, you'll need to make a toolbox call. The mouseUp event code below makes the appropriate toolbox call for both Macintosh and Windows. It then compares the time of the users last click to the time of the current click and compares the location of the users last click to the location of the current click.

9. Add the following code to the MouseUp event:

```
dim doubleClickTime, currentClickTicks as Integer

#if targetMacOS then
Declare Function GetDbtTime Lib "Carbon" () as Integer
doubleClickTime = GetDbtTime()
#endif

#if targetWin32 then
Declare Function GetDoubleClickTime Lib "User32.DLL" () as Integer
```

```

doubleClickTime = GetDoubleClickTime()/60 // convert to ticks from milliseconds
#endif

currentClickTicks = ticks
//if the two clicks happened close enough together in time
if (currentClickTicks - lastClickTicks) <= doubleClickTime then
//if the two clicks occurred close enough together in space
if abs(X - lastClickX) <= 5 and abs(Y - LastClickY) <= 5 then
DoubleClick //a double click has occurred so call the event
end if
end if
lastClickTicks = currentClickTicks
lastClickX = X
lastClickY = Y

```

10. Now to test out your new DoubleClickCanvas, drag the class from the Project window to a window in your project to create an instance of it.

11. Double-click on the canvas you just added to your window to open the Code Editor. Notice that the canvas has a DoubleClick event handler. In this event handler, add the following code:  
BEEP

### 10.0.161 How to make my Mac not sleeping?

Plugin Version: all, Platform: macOS.

**Answer:** Just inform the Mac OS about some system activity with code like this:

**Example:**

```

Sub UpdateSystemActivity()

#if TargetCarbon
declare function myUpdateSystemActivity lib "Carbon" alias "UpdateSystemActivity" (activity as Integer)
as short

const OverallAct = 0 // Delays idle sleep by small amount */
const UsrActivity = 1 // Delays idle sleep and dimming by timeout time */
const NetActivity = 2 // Delays idle sleep and power cycling by small amount */
const HDAActivity = 3 // Delays hard drive spindown and idle sleep by small amount */
const IdleActivity = 4 // Delays idle sleep by timeout time */

dim e as Integer

e=myUpdateSystemActivity(UsrActivity)

```

```
// you may react on an error if e is not 0 after the call.
```

```
#endif
End Sub
```

**Notes:** You may use another constant if you prefer some different behavior. Call it maybe every second.

### 10.0.162 How to make my own registration code scheme?

Plugin Version: all, Platform: Windows.

**Answer:** There are excellent articles about how to make a registration code scheme, but you can also simply use our RegistrationEngineMBS class.

**Notes:** If you need a license text, why not use the one from Xojo as a starting point?

### 10.0.163 How to make small controls on Mac OS X?

Plugin Version: all, Platform: macOS.

**Answer:** You can try this code on Mac OS X:

**Example:**

```

'/*
** Use the control's default drawing variant. This does not apply to
** Scroll Bars, for which Normal is Large.
**/
const kControlSizeNormal = 0

'/*
** Use the control's small drawing variant. Currently supported by
** the Check Box, Combo Box, Radio Button, Scroll Bar, Slider and Tab
** controls.
**/
const kControlSizeSmall = 1

'/*
** Use the control's small drawing variant. Currently supported by
** the Indeterminate Progress Bar, Progress Bar and Round Button
** controls.
**/
const kControlSizeLarge = 2

```

```

'/*
' * Control drawing variant determined by the control's bounds. This
' * ControlSize is only available with Scroll Bars to support their
' * legacy behavior of drawing differently within different bounds.
' */
const kControlSizeAuto = &hFFFF

const kControlSizeTag = "size"

declare function SetControlData lib "Carbon" (controlhandle as Integer, part as short, tagname as OS-
Type, size as Integer, data as ptr) as short

dim m as MemoryBlock

m=NewMemoryBlock(2)
m.UShort(0)=kControlSizeSmall

Title=str(SetControlData(CheckBox1.Handle, 0, kControlSizeTag, 2, m))

```

### 10.0.164 How to mark my Mac app as background only?

Plugin Version: all, Platform: macOS.

**Answer:** You can run a build script on each build with this code:

**Example:**

```

Dim App As String = CurrentBuildLocation + "/" + CurrentBuildAppName + ".app"
Call DoShellCommand("/usr/bin/defaults write " + App + "/Contents/Info ""NSUIElement"" YES")

```

**Notes:** This will set the NSUIElement flag to YES.

### 10.0.165 How to move a file or folder to trash?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use code like below:

**Example:**

```

Function MoveToTrash(f as FolderItem) As Boolean
#If TargetMacOS then
dim r as FolderItem
dim e as Integer = MacFileOperationMBS.MoveObjectToTrashSync(f, r, MacFileOperationMBS.kFSFile-
OperationDefaultOptions)

```

```

if e = 0 then
Return true // Ok
end if

#elseif TargetWin32 then
dim w as new WindowsFileCopyMBS

dim flags as Integer = w.FileOperationAllowUndo + w.FileOperationNoErrorUI + w.FileOperationSilent
+ w.FileOperationNoConfirmation
if w.FileOperationDelete(f, flags) then
Return true // OK
end if

flags = w.FileOperationNoErrorUI + w.FileOperationSilent + w.FileOperationNoConfirmation
if w.FileOperationDelete(f, flags) then
Return true // OK
end if
#else
// Target not supported
break
Return false
#endif
End Function

```

**Notes:** If you want to move a file to trash, you could use `f.movefileto f.trashfolder`, but that will overwrite existing files in the trash. You can use our `MacFileOperationMBS` class to move a file on Mac to the trash. And it uses the same code as the Finder, so files are renamed when the same name is already in use in the trash:

On Windows we use `WindowsFileCopyMBS` class.  
Requires Mac OS X 10.5.

### 10.0.166 How to move an application to the front using the creator code?

Plugin Version: all, Platform: macOS.

**Answer:** This makes SimpleText (Code ttxt) to the frontmost application:

**Example:**

```

dim a as appleevent

a=newappleEvent("misc","actv","ttxt")

```

```
if a.send then
end if
```

**Notes:** (Code is Mac only)

### 10.0.167 How to move file with ftp and curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can set post/pre quotes to have ftp commands executed before or after the download/upload.

**Example:**

```
dim d as CURLMBS // your curl object

// rename/move file
dim ws() As String
ws.Append "RNFR Temp.txt"
ws.append "RNT0 MyFile.txt"

d.SetOptionPostQuote(ws)
```

**Notes:** Use SetOptionPostQuote, SetOptionPreQuote or SetOptionQuote.

The ftp commands you pass here are native ftp commands and not the commands you use with ftp applications. So rename is two commands. First RNFR to tell where to rename from and second RNT0 with the new file name. To delete use DELE and the file path.

### 10.0.168 How to normalize string on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use code like below:

**Example:**

```
Function Normalize(t as string) As string
const kCFStringNormalizationFormD = 0 // Canonical Decomposition
const kCFStringNormalizationFormKD = 1 // Compatibility Decomposition
const kCFStringNormalizationFormC = 2 // Canonical Decomposition followed by Canonical Composition
const kCFStringNormalizationFormKC = 3 // Compatibility Decomposition followed by Canonical Composition

dim s as CFStringMBS = NewCFStringMBS(t)
dim m as CFMutableStringMBS = s.Normalize(kCFStringNormalizationFormD)
```

```
Return m.str  
End Function
```

**Notes:** This uses Apple's CFString functions to normalize unicode variants.

### 10.0.169 How to obscure the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

**Answer:** Try this declare:

**Example:**

```
Declare Sub ObscureCursor Lib "Carbon" ()
```

```
ObscureCursor
```

**Notes:** The MBS Plugin has this function, but it's not supported for Windows.

### 10.0.170 How to open icon file on Mac?

Plugin Version: all, Platform: macOS.

**Answer:** Use the NSImageMBS class like this:

**Example:**

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.ico")  
dim n as new NSImageMBS(f)
```

```
window1.Backdrop = n.CopyPictureWithMask
```

### 10.0.171 How to open PDF in acrobat reader?

Plugin Version: all, Platform: macOS.

**Answer:** Try this code:

**Example:**

```
dim pdf as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
```

```

// open PDF in Acrobat Reader on Mac:

// find app
dim bundleID as string = "com.adobe.Reader"
dim app as FolderItem = LaunchServicesFindApplicationForInfoMBS("", bundleID, "")

if app<>nil then

// launch app with parameters

dim docs() as FolderItem
docs.Append pdf

dim param as new LaunchServicesLaunchParameterMBS
param.Defaults = true
param.Application = app

dim x as FolderItem = LaunchServicesOpenXMBS(docs, param)

// on failure, simply launch it
if x = nil then
pdf.Launch(true)
end if

else
pdf.Launch(true)
end if

```

**Notes:** On Windows, simply use pdf.launch or WindowsShellExecuteMBS.

### 10.0.172 How to open printer preferences on Mac?

Plugin Version: all, Platform: macOS.

**Answer:** You can use our OpenMacOSXPreferencesPaneMBS function like this:

**Example:**

```

dim e as Integer = OpenMacOSXPreferencesPaneMBS("PrintAndFax")
if 0 = e then
MsgBox "OK"
elseif e = -43 then
MsgBox "File not found."
else
MsgBox "Error: "+str(e)
end if

```

### 10.0.173 How to open special characters panel on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** We have functions for that in Cocoa and Carbon.

**Example:**

```
dim a as new NSApplicationMBS
a.orderFrontCharacterPalette
```

**Notes:** For Cocoa, you can use `orderFrontCharacterPalette` method in `NSApplicationMBS` class.

Or simply for Carbon and Cocoa the `ShowCharacterPaletteMBS` method.

### 10.0.174 How to optimize picture loading in Web Edition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use the `WebPicture` class.

**Notes:** Take your picture and create a `WebPicture` object. Store this `WebPicture` in a property of the `WebPage`, `Session` or `app` (as global as possible). On the first time you use this picture on an user session, the browser will load it. Second time you use it, the browser will most likely pick it from the cache.

Having pictures in `App` or some module reuses the same picture for all sessions which reduces memory footprint.

This does not work well with pictures you change very often or use only for one webpage on one user.

If you like to see an example, check our `Map` example.

### 10.0.175 How to parse XML?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use code like this:

**Example:**

```
dim s as string = "<test><test /></test>"
```

```
try
```

```

dim x as new XmlDocument(s)
MsgBox "OK"
catch xe as XmlException
MsgBox "invalid XML"
end try

```

**Notes:** If you got an exception, you have a parse error.

### 10.0.176 How to play audio in a web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use the HTML5 audio tag and control it with javascript.

**Notes:** This is just another example app I made today. It plays a christmas song. The audio file is provided by the application to the server, so no external web server is needed and this application can run stand alone. To compile and run you need Xojo 2010r5.

In the open event we search the audio files and open them as binarystreams. We create the two webfile objects. Those webfiles are part of the app class, so we have them globally. There we set the data with the content of our streams. We also define file names and mime types. They are needed so browser know what we have here:

```

audioFileM4V = new WebFile
audioFileM4V.Data = bM.Read(BM.Length)
audioFileM4V.Filename = "music.m4a"
audioFileM4V.MIMEType = "audio/m4a"

```

```

audioFileOGG = new WebFile
audioFileOGG.Data = bO.Read(BO.Length)
audioFileOGG.Filename = "music.ogg"
audioFileOGG.MIMEType = "audio/ogg"

```

Next in the open event of the webpage we have a PageSource control. The location is set to be before content. In the open event we define the html code for this. First we pick the URLs for the audio files. Than we build the html to use the audio tag. As you see, we give it an ID for later use and have it preload automatically. If you add an autoplay tag, you can have the audio play right away. Inside the audio tag we have two sources so we provide audio for both Firefox (OGG) and Safari (MPEG4). Finally we have a text to display if HTML5 audio tag is not supported.

You can set the source in the EditSource event:

```
dim urlo as string = app.audioFileOGG.URL
dim urlm as string = app.audioFileM4V.URL
me.Source = "<audio id=""mymusic"" preload=""auto""><source src="""+urlo+""" type=""audio/ogg""
/><source src="""+urlm+""" type=""audio/mpeg"" />Your browser does not support the audio ele-
ment.</audio>"
```

Next in the Play button we execute code to play the audio. This is a short javascript code which searches in the html document for the element with the ID "mymusic" which is the ID of our audio tag above. Once we got the object, we call it's play method to start playback.

```
me.ExecuteJavaScript("document.getElementById('mymusic').play();")
```

same for pause:

```
me.ExecuteJavaScript("document.getElementById('mymusic').pause();")
```

and finally for changing volume:

```
me.ExecuteJavaScript("document.getElementById('mymusic').volume="+str(me.Value/100.0)+"");")
```

### 10.0.177 How to pretty print xml?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use the XML Transform method with the right XLS.

**Notes:** Learn more here:

<http://docs.xojo.com/index.php/XMLDocument.Transform>

### 10.0.178 How to print to PDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** This code below shows how to redirect printing to a PDF file on Mac OS X.

**Example:**

```
// get Xojo printer setup
dim p as new PrinterSetup

// now put it into NSPrintInfo to manipulate
dim n as new NSPrintInfoMBS
n.SetupString = p.SetupString
```

```

// change destination to file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
n.SetSaveDestination(f)

// move back
p.SetupString = n.SetupString

// and print as usual
dim g as Graphics = OpenPrinter(p)
g.DrawString "Hello World", 20, 20

```

**Notes:** And you can use normal graphics class for that.

### 10.0.179 How to query Spotlight's Last Open Date for a file?

Plugin Version: all, Platform: macOS.

**Answer:** You can use a MDItemMBS objec to query this value:

**Example:**

```

Function LastOpenedDate(Extends F As FolderItem, DefaultOtherDates As Boolean = True) As Date
#If TargetMacOS Then
Dim xMDItem as New MDItemMBS(F)
Dim xDate as Variant

If xMDItem <>Nil Then
xDate = xMDItem.GetAttribute(xMDItem.kMDItemLastUsedDate).DateValue
If xDate IsA Date Then Return xDate
Else
If xDate <>Nil Then Break
End If
#EndIf

If DefaultOtherDates Then
If F.ModificationDate <>Nil Then Return F.ModificationDate
If F.CreationDate <>Nil Then Return F.CreationDate
End If
End Function

```

**Notes:** Thanks for Josh Hoggan for this example code.

**10.0.180 How to quit windows?**

Plugin Version: all, Platform: Windows.

**Answer:** Try this code:

**Example:**

```
#if targetwin32 then
dim i1,i2,r as Integer
declare function ExitWindowsEx lib "user32" (uFlags as Integer, dwReserved as Integer) as Integer
i1 = 2
i2 = 0
r = ExitWindowsEx(i1,i2)
if r<>0 then
' Error()
end if

#endif
```

**Notes:** uFlags parameters:

```
'4 = EWX_Force
'0 = EWX_Logoff
'2 = EWX_Reboot
'1 = EWX_shutdown, should shut down computer
```

Also check the ExitWindowsMBS method.

**10.0.181 How to read a CSV file correctly?**

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** With all the rules for quotes and delimiters, you can simply use the SplitCommaSeparatedValuesMBS method in our plugins like this:

**Example:**

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.csv")
dim t as TextInputStream = f.OpenAsTextFile

while not t.EOF
dim s as string = t.ReadLine(encodings.ASCII)

dim items() as string = SplitCommaSeparatedValuesMBS(s, ";", """")
```

```
List.AddRow """
dim u as Integer = UBound(items)
for i as Integer = 0 to u
List.Cell(List.LastIndex,i) = items(i)
next

wend
```

**Notes:** Please make sure you choose the right text encoding.

### 10.0.182 How to read the command line on windows?

Plugin Version: all, Platform: Windows.

**Answer:** Try this code:

**Example:**

```
#if targetwin32 then
dim line as string
Dim mem as MemoryBlock

Declare Function GetCommandLineA Lib "kernel32" () As Ptr

mem=GetCommandLineA()
s=mem.cstring(0)

#endif
```

**Notes:** Newer Xojo versions have a system.commandline property.

### 10.0.183 How to render PDF pages with PDF Kit?

Plugin Version: all, Platform: Windows.

**Answer:** Try this code:

**Example:**

```
// choose a file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")

// open it as PDF Document
dim sourceFile as New PDFDocumentMBS(f)
```

```

if sourceFile.handle <>0 then // it is a PDF file

// get upper bound of pages
dim c as Integer = sourceFile.pageCount-1

// from first to last page
for n as Integer = 0 to c

// pick that page
dim page as PDFPageMBS = sourceFile.pageAtIndex(n)

// render to image
dim p as NSImageMBS = page.Render

// and convert to RB picture and display
Backdrop = p.CopyPictureWithMask

next

end if

```

**Notes:** PDFKit works only on Mac OS X.

### 10.0.184 How to restart a Mac?

Plugin Version: all, Platform: macOS.

**Answer:** Ask the Finder via Apple Events:

**Example:**

```

dim ae as appleevent
ae=newappleEvent("FNDR","rest","MACS")
if not ae.send then
msgBox "The computer couldn't be restarted."
end if

```

### 10.0.185 How to resume ftp upload with curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** CURL supports that and you simply need to set the right options.

**Notes:** First of course OptionUpload must be true. Second OptionFTPAppend must be true so the OptionResumeFrom is used. Store there (or in OptionResumeFromLarge) your start value. Don't forget to implement the read event and return data there as requested.

## 10.0.186 How to rotate a PDF page with CoreGraphics?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** This code opens a PDF and draws the first page into a new PDF with 90° rotation.

**Example:**

```
// Rotate a PDF page

// our files
dim sourcefile as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
dim destfile as FolderItem = SpecialFolder.Desktop.Child("rotated.pdf")

// open PDF
dim pdf as CGPDFDocumentMBS = sourcefile.OpenAsCGPDFDocumentMBS

// query media size of first page
dim r as CGRectMBS = pdf.MediaBox(1)

// create new PDF
dim c as CGContextMBS = destfile.NewCGPDFDocumentMBS(r,"title","Author","Creator")

// create rotated rectangle
dim nr as new CGRectMBS(0,0,r.Height,r.Width)

// create new page
c.BeginPage nr
c.SaveGState

const pi = 3.14159265

// rotate by 90°
c.RotateCTM pi*1.5

// fix origin
c.TranslateCTM -r.width,0

// draw PDF
c.DrawCGPDFDocument pdf,r,1

// cleanup
c.RestoreGState
c.EndPage
```

```
c = nil

// show in PDF viewer
destfile.Launch
```

**Notes:** This code is Mac only as it needs CoreGraphics.

### 10.0.187 How to rotate image with CoreImage?

Plugin Version: all, Platform: macOS.

**Answer:** Use the code like the one below:

**Example:**

```
// Rotate image with CoreImage

// load image
dim f as FolderItem = SpecialFolder.Desktop.Child("test.png")
dim image as new CIImageMBS(f)

// rotate 45 degree
dim n as new NSAffineTransformMBS
n.rotateByDegrees(45)

dim TransformFilter as new CIFilterAffineTransformMBS
TransformFilter.inputImage = image
TransformFilter.inputTransform = n

// get result
dim resultImage as CIImageMBS = TransformFilter.outputImage

// for saving to file
dim outputImage as NSImageMBS = resultImage.RenderNSImage(false)

f = SpecialFolder.Desktop.Child("output.png")
dim b as BinaryStream = BinaryStream.Create(f, true)
b.Write outputImage.PNGRepresentation

// as Xojo picture object for display
dim pic as Picture = outputImage.CopyPictureWithMask

Backdrop = pic
```

### 10.0.188 How to run a 32 bit application on a 64 bit Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Install 32 bit compatibility libraries.

**Notes:** The package is called ia32-libs for ubuntu (and others).

Some applications need to be run on a 32 bit system as they need some hardware related libraries. Like libUSB or libHID for USB devices.

### 10.0.189 How to save HTMLViewer to PDF with landscape orientation?

Plugin Version: all, Platform: macOS.

**Answer:** You can use NSPrintInfoMBS to change the options for PrintToPDFFile function.

**Example:**

```
// make it landscape
dim n as NSPrintInfoMBS = NSPrintInfoMBS.sharedPrintInfo
n.orientation = n.NSLandscapeOrientation

// save html to file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
call HTMLViewer1.PrintToPDFFileMBS(f,10,30,10,30)
```

**Notes:** You may want to reset options later.  
This code is only for Mac OS X.

### 10.0.190 How to save RTFD?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** With NSTextViewMBS you can use this code to save to RTFD:

**Example:**

```
// save text as RTFD including image attachments
dim f as FolderItem = GetSaveFolderItem(FileTypes1.ApplicationRtfd, "test.rtf")

if f = nil then Return

dim a as NSAttributedStringMBS = textView.textStorage
dim w as NSFileWrapperMBS = a.RTFDFileWrapperFromRange(0, a.length, DocumentAttributes)

dim e as NSErrorMBS
if w.writeToFile(f, e) then
```

```

else
MsgBox e.LocalizedDescription
end if

```

**Notes:** For TextArea you can query the underlying NSTextViewMBS object via TextArea.NSTextViewMBS method.

### 10.0.191 How to save RTFD?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** How to load PDF to htmlviewer on desktop?

**Example:**

```

Public Sub LoadPDFData(viewer as HTMLViewer, PDFData as string)
Dim base64string As String = EncodeBase64(PDFData)

// remove line endings to make it a big line
base64string = ReplaceLineEndings(base64string, "")

// build data URL
// https://en.wikipedia.org/wiki/Data_URI_scheme
Dim dataURL As String = "data:application/pdf;base64," + base64string

// show in webviewer
HTMLViewer1.LoadURL(dataURL)

// may not work everywhere due to URL length limit
// for Web projects, use WebFile instead!
End Sub

```

**Notes:** This avoids a temporary file, which may also work.  
For Web Apps, please use WebFile.

### 10.0.192 How to scale a picture proportionally with mask?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** For a proportional scaling, we calculate the new picture size relative to the target maximum size.

**Example:**

```

Function ProportionalScaledWithMask(extends pic as Picture, Width as Integer, Height as Integer) As Pic-
ture
// Calculate scale factor

dim faktor as Double = min( Height / Pic.Height, Width / Pic.Width)

// Calculate new size
dim w as Integer = Pic.Width * faktor
dim h as Integer = Pic.Height * faktor

// create new picture
dim NewPic as new Picture(w,h,32)

// check if we have a mask and clear it
dim m as picture = pic.mask(False)
pic.mask = nil

// draw picture in the new size
NewPic.Graphics.DrawPicture Pic, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height

if m <>nil then
// restore mask and scale it
pic.mask = m
NewPic.mask.Graphics.DrawPicture m, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height
end if

// return result
Return NewPic
End Function

```

**Notes:** This version handles mask. As you see we actually have to remove mask in order to copy the picture part correctly.

### 10.0.193 How to scale a picture proportionally?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** For a proportional scaling, we calculate the new picture size relative to the target maximum size.

**Example:**

```

Function ProportionalScaled(extends pic as Picture, Width as Integer, Height as Integer) As Picture
// Calculate scale factor

dim faktor as Double = min( Height / Pic.Height, Width / Pic.Width)

```

```

// Calculate new size
dim w as Integer = Pic.Width * faktor
dim h as Integer = Pic.Height * faktor

// create new picture
dim NewPic as new Picture(w,h,32)

// draw picture in the new size
NewPic.Graphics.DrawPicture Pic, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height

// return result
Return NewPic
End Function

```

**Notes:** This does not handle mask, but you can scale the mask the same way and assign it to the new picture.  
(see other FAQ entry with mask)

### 10.0.194 How to scale/resize a CIIImageMBS?

Plugin Version: all, Platform: Windows.

**Answer:** Use the CIFilterLanczosScaleTransform filter to scale down a picture to a specific size.

**Example:**

```

Dim pic As Picture = LogoMBS(500)
Dim image As CIIImageMBS = CIIImageMBS.imageWithPicture(pic)

Dim filter As New CIFilterLanczosScaleTransformMBS

Const targetWidth = 600.0
Const targetHeight = 400.0

Dim scale As Double = targetHeight / image.Extent.Height
Dim aspect As Double = targetWidth / (image.Extent.Width * scale)

filter.inputImage = image
filter.inputScale = scale
filter.inputAspectRatio = aspect

Dim result As Picture = filter.outputImage.RenderPicture

Backdrop = result

```

**Notes:** This is same code as our scaleTo convenience method.

### 10.0.195 How to scale/resize a picture?

Plugin Version: all, Platform: Windows.

**Answer:** There are several ways to scale or resize a picture. The easiest way may be the ScaleMBS function in the Picture class.

**Example:**

```
dim Original,Scaled as Picture
```

```
Original=LogoMBS(500)
Scaled=Original.ScaleMBS(100,100,true)
```

**Notes:** The plugin ways:

- GraphicsMagick can scale/resize.
- CoreImage scale filter may result in the fastest and best images on Mac OS X 10.4.
- NSImageMBS can scale, but is Mac OS X only.
- CGImageMBS can scale, but is Mac OS X only.
- CIImageMBS can scale, but is Mac OS X only.
- QuickTime Graphics exporter and importer can be connected to scale. (this was used more often a few years ago)
- ImageMagick can scale very nice and crossplatform. But the ImageMagick libraries are big.
- The picture.ScaleMBS function is self written and results in equal output on Mac, Windows and Linux without any additional libraries installed.
- Picture.ScalingMBS does crossplatform scaling with several modes.

with pure Xojo:

- make a new picture and draw the old one with new size inside.

### 10.0.196 How to search with regex and use unicode codepoints?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can specify unicode characters in search string with backslash x and digits.

**Example:**

```
dim r as RegExMbs
dim s as string
dim c as Integer
```

```

s="123 √√√° ABC 456"

r=new RegExMBS
if r.Compile("√.") then
c=r.Execute(s,0)
MsgBox str(c)+" "+str(r.Offset(0))+" "+str(r.Offset(1))
// shows: 1 4 10
// 1 for ubound of the offset array
// 4 for 4 bytes before the matched pattern
// 10 for the 10 bytes before the end of the matched pattern
end if

r=new RegExMBS
if r.Compile("\xF6.") then // finds √ using Unicode codepoint
c=r.Execute(s,0)
MsgBox str(c)+" "+str(r.Offset(0))+" "+str(r.Offset(1))
// shows: 1 4 10
// 1 for ubound of the offset array
// 4 for 4 bytes before the matched pattern
// 10 for the 10 bytes before the end of the matched pattern
end if

```

### 10.0.197 How to see if a file is invisible for Mac OS X?

Plugin Version: all, Platform: macOS.

**Answer:** Try this function:

**Example:**

```

Function Invisible(F As FolderItem) As Boolean
Dim TIS As TextInputStream
Dim S,All As String
Dim I as Integer
dim g as folderitem

If Left(F.Name,1)="." or not f.visible Then
Return True
End If

g=F.Parent.Child(".hidden")
If g.Exists Then
TIS=g.OpenAsTextFile
if tis<>Nil then
All=TIS.ReadAll
For I=1 to CountFields(All,Chr(11))
S=NthField(All, Chr(11), I)

```

```

If S=F.name Then
Return True
End If
Next
end if
End if
End Function

```

### 10.0.198 How to set cache size for SQLite or REALSQLDatabase?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You use the pragma cache\_size command on the database.

**Example:**

```

// set cache size to 20000 pages which is about 20 MB for default page size
dim db as REALSQLDatabase
db.SQLiteExecute "PRAGMA cache_size = 20000"

```

**Notes:** Default cache size is 2000 pages which is not much.

You get best performance if whole database fits in memory.

At least you should try to have a cache big enough so you can do queries in memory.

You only need to call this pragma command once after you opened the database.

### 10.0.199 How to set the modified dot in the window?

Plugin Version: all, Platform: macOS.

**Answer:** Try this declares:

**Example:**

```

window1.ModifiedMBS=true

```

### 10.0.200 How to show a PDF file to the user in a Web Application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use a WebHTMLViewer control and load the

**Example:**

```

dim CurrentFile as WebFile // a property of the WebPage

// define the PDF file
CurrentFile = new WebFile
CurrentFile.Filename = "test.pdf"
CurrentFile.MIMEType = "application/pdf"
CurrentFile.Data = "some pdf data" // MyDynaPDF.GetBuffer

// load into html viewer
HTMLViewer1.URL = CurrentFile.URL

```

**Notes:** See our Create PDF example for the Xojo Web Edition.

### 10.0.201 How to show Keyboard Viewer programmatically?

Platform: macOS.

**Answer:** Use Xojo or AppleScript to launch the KeyboardViewerServer.app.

**Example:**

```

dim a as new AppleScriptMBS
dim text as string
dim lines(-1) as string

lines.append "set theApplication to ""KeyboardViewerServer""
lines.append "set thePath to ""/System/Library/Components/KeyboardViewer.component/Contents/Shared-
Support/KeyboardViewerServer.app""
lines.append ""
lines.append "set POSIXPath to ((POSIX file thePath) as string)"
lines.append "tell application ""System Events"" to set isRunning to 0 <(count (application processes whose
name is theApplication))"
lines.append "if isRunning then tell application POSIXPath to quit"
lines.append "delay 0.15"
lines.append ""
lines.append "ignoring application responses"
lines.append " tell application POSIXPath to run"
lines.append "end ignoring"

text=join(lines,EndOfLine.macintosh)

a.Compile text
a.Execute

```

**Notes:** AppleScript code:

```
set theApplication to "KeyboardViewerServer"
set thePath to "/System/Library/Components/KeyboardViewer.component/Contents/SharedSupport/KeyboardViewerServer.app"
```

```
set POSIXPath to ((POSIX file thePath) as string)
tell application "System Events" to set isRunning to 0 <(count (application processes whose name is theApplication))
if isRunning then tell application POSIXPath to quit
delay 0.15
```

```
ignoring application responses
tell application POSIXPath to run
end ignoring
```

### 10.0.202 How to show the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

**Answer:** Try this declare:

**Example:**

```
Declare Sub ShowCursor Lib "Carbon" ()
```

```
ShowCursor
```

**Notes:** The MBS Plugin has this function and supports it on Windows, too.

### 10.0.203 How to shutdown a Mac?

Plugin Version: all, Platform: macOS.

**Answer:** Ask the Finder via Apple Events:

**Example:**

```
dim ae as appleevent
ae=newappleEvent("FNDR","shut","MACS")
if not ae.send then
msgBox "The computer couldn't be shutdown."
end if
```

**Notes:** Or toolbox call (Attention: This method will stop the computer immediatly: No document asked to be saved, all applications quitting without knowing).

```
Declare Sub ShutDwnPower Lib "Carbon" ()
ShutDwnPower
```

### 10.0.204 How to sleep a Mac?

Plugin Version: all, Platform: macOS.

**Answer:** Ask the Finder via Apple Events:

**Example:**

```
dim ae as appleevent
ae=newappleEvent("FNDR","slep","MACS")
if not ae.send then
msgBox "The computer doesn't want to sleep."
end if
```

### 10.0.205 How to speed up rasterizer for displaying PDFs with DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Here a few speed tips:

**Notes:**

- Use the DynaPDFRasterizerMBS function instead of our render functions.
- Reuse DynaPDFRasterizerMBS as long as the target picture size doesn't change.
- Import only the PDF pages you want to display.
- Let DynaPDF do zooming, rotating or other effects instead of you change it.

### 10.0.206 How to use PDFLib in my RB application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** The PDFlib plugin was discontinued in favor of our DynaPDF plugin.

**Notes:** If you need help to move, please contact us.

### 10.0.207 How to use quotes in a string?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Just double them.

**Example:**

```
msgbox "This String contains ""quotes"""
```

### 10.0.208 How to use Sybase in Web App?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Please use our MBS Xojo SQL Plugin to connect to a Sybase Database in your web application.

**Notes:** If you see db.Connect giving the error message "cs\_ctx\_alloc ->CS\_MEM\_ERROR", than some things are not setup right for Sybase.

The Apache process may not have all the SYBASE environment variables being set when the CGI was launched.

Adding these lines to /etc/httpd/conf/httpd.conf stopped the faux memory errors for us:

```
SetEnv LD_LIBRARY_PATH /opt/sybase/OCS-15_0/lib:/opt/sybase/OCS-15_0/lib3p64:/opt/sybase/OCS-15_0/lib3p:
SetEnv SYBROOT /opt/sybase
SetEnv SYBASE_OCS /opt/sybase
SetEnv SYBASE /opt/sybase
```

### 10.0.209 How to use the Application Support folder?

Plugin Version: all, Platform: macOS.

**Answer:**

I was saving a registration code for an app to the Preference folder. People on the list have suggested that it would be better in the ApplicationSupportFolder. How do I save the file called CWWPrefs into that folder using MBS?

I have checked for examples and the docs but can't see how to apply it

```
//f = SpecialFolder.Preferences.child("CWWPrefs")
f = ApplicationSupportFolderMBS(-32768)
```

**Example:**

```

dim folder,file as FolderItem

folder = createApplicationSupportFolderMBS(-32763)

if folder=nil then
// Some very old Mac OS Versions may not support it
// or the plugin may fail for any reason
folder=SpecialFolder.Preferences
end if

file=folder.Child("CWWPrefs")

MsgBox file.NativePath

```

**Notes:**

You may not be able to write there with a normal user account!

**10.0.210 How to use the IOPMCopyScheduledPowerEvents function in Xojo?**

Plugin Version: all, Platform: macOS.

**Answer:** You can use the following code which does this using the SoftDeclareMBS class.

**Example:**

```

Sub Open()
dim c as CFDateMBS
dim t as CFAbsoluteTimeMBS

// get current date
c=NewCFDateMBS

// in absolute time (seconds since x)
t=c.AbsoluteTime

// add 600 seconds (= 10 Minutes)
t.Value=t.Value+600

// Make a Date from it
c=t.Date

// Schedule the event
// 0 on success
// E00002C1 for missing root rights

```

```

Title=hex(schedulePowerEvent(c, "wake"))

// Just for information, display the scheduled stuff
CFShowMBS CopyScheduledPowerEvents
End Sub

Function CopyScheduledPowerEvents() As carrayMBS
dim s as SoftDeclareMBS
dim m as MemoryBlock

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMCopyScheduledPowerEvents") then
if s.CallFunction(0,nil) then
Return NewCFArrayMBSHandle(s.Result,true)
else
MsgBox "Failed to Call IOPMCopyScheduledPowerEvents."
end if
else
MsgBox "Failed to load IOPMCopyScheduledPowerEvents."
end if
else
MsgBox "Failed to load IOKit."
end if

Return nil
End Function

Function SchedulePowerEvent(time_to_wake as CFDateMBS, Type as CFStringMBS) as Integer
dim s as SoftDeclareMBS
dim m as MemoryBlock

'/*
'* Types of power event
'* These are potential arguments to IOPMSchedulePowerEvent().
'* These are all potential values of the kIOPMPowerEventTypeKey in the CFDictionaryes
'* returned by IOPMCopyScheduledPowerEvents().
'*/
'/*!
'@define kIOPMAutoWake
'@abstract Value for scheduled wake from sleep.
'*/
'#define kIOPMAutoWake "wake"
,
'/*!
'@define kIOPMAutoPowerOn
'@abstract Value for scheduled power on from off state.

```

```

*/
'#define kIOPMAutoPowerOn "poweron"
,
/*!
'@define kIOPMAutoWakeOrPowerOn
'@abstract Value for scheduled wake from sleep, or power on. The system will either wake OR
'power on, whichever is necessary.
*/
,
'#define kIOPMAutoWakeOrPowerOn "wakepoweron"
/*!
'@define kIOPMAutoSleep
'@abstract Value for scheduled sleep.
*/
,
'#define kIOPMAutoSleep "sleep"
/*!
'@define kIOPMAutoShutdown
'@abstract Value for scheduled shutdown.
*/
,
'#define kIOPMAutoShutdown "shutdown"

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMSchedulePowerEvent") then

m=NewMemoryBlock(12)
m.Long(0)=time_to_wake.handle
m.Long(4)=0 // nil
m.Long(8)=type.Handle

if s.CallFunction(3,m) then
Return s.Result
end if
end if
end if

End Function

```

**Notes:** Requires Mac OS X and to execute root rights.

### 10.0.211 How to validate a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use this function below which uses a regular expression to verify that the string is a valid UUID/GUID:

**Example:**

Function IsGUID(guid as string) As Boolean

dim r as new RegEx

```
r.SearchPattern = "^(\{ { 0,1 } ( [ 0-9a-fA-F ] ) { 8 } -( [ 0-9a-fA-F ] ) { 4 } -( [ 0-9a-fA-F ] ) { 4 } -( [ 0-9a-fA-F ] ) { 4 } -( [ 0-9a-fA-F ] ) { 12 } \} { 0,1 } )$ "
```

Return r.Search(guid)<>nil

End Function

**Notes:** Simply parsing the GUID with CFUUIDMBS does not give the same result as CFUUIDMBS will also take a string like "DDDD".

### 10.0.212 How to walk a folder hierarchie non recursively?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Use code like this one:

**Example:**

Sub Walk(folder as FolderItem)

dim folders() as FolderItem

folders.Append folder

while UBound(folders)>=0

dim currentFolder as FolderItem = folders.pop

dim c as Integer = currentFolder.Count

for i as Integer = 1 to c

dim item as FolderItem = currentFolder.TrueItem(i)

if item = Nil then

// no permission

elseif item.Visible then // only visible

if item.Directory then

folders.Append item

```
else
// work with file here
end if

end if

next

wend
End Sub
```

**Notes:** As you see we go with a long loop which runs until we don't have more folders to process. We ignore items we can't access due to permission limits. And we only work visible items. If you like, check `folderitem.isBundleMBS` on item to handle packages and applications better on Mac OS X.

#### 10.0.213 I got this error: PropVal, QDPictMBS.Name (property value), Type mismatch error. Expected CGDataProviderMBS, but got Variant, Name:QDPictMBS

Plugin Version: all, Platform: macOS.

**Answer:** The plugins MacOSX and MacOSXCF belong together. If you use one part, please also install the other part.

**Notes:** We splitted the plugin because the Xojo IDE on Windows crashed on compilation.

#### 10.0.214 I registered the MBS Plugins in my application, but later the registration dialog is shown.

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** There are two main reasons.

**Notes:** 1. you may use the plugin before registering them. This is often the case if you register in a window open event and use the plugin in a control open event.

On the console on Mac OS X or Windows, you may see a message like this "MBS Plugins were used by the application before the RegisterMBSPlugin function was called. Please fix this in your code!".

2. you may have mixed different plugin versions which are not compatible.

In this case you can see a message "Internal plugin registration error." on the console on Mac OS X. Newer plugins may show a message dialog reporting this. Older version simply think they are not registered.

If the installer just merges old and new applications, users may have libraries of older and newer plugin versions in the libs folder. If your application loads the wrong version, the registration fails.

If you use remote debugging, make sure you clear the temporary files there, too. Otherwise you may have old DLLs on your hard disc which may disturb your application.

You can run into issues if you use your registration code on different places of your app. Please register only once in app.open (or app Constructor). If you have several codes, simply call them one after the other.

Also check that you only call RegisterMBSPlugin with valid serial number. If you later call RegisterMBSPlugin with Demo like in example code above, you remove the license.

Next check if you can clear the Xojo caches and that helps. This includes the Xojo Scratch folder and the Plugins & Project caches. Simply locate those folders and delete them. For Windows look in hidden AppData folder in your user folder. For Mac, please check textasciitilde /Library/Caches and your temp folders.

Finally make sure you use the right serial number. Not an older one or a misspelled one.

### 10.0.215 I want to accept Drag & Drop from iTunes

Plugin Version: all, Platform: macOS.

**Answer:** You need to accept AcceptMacDataDrop "itun" and Handle the DropObject.

**Example:**

```
Sub Open()
window1.AcceptMacDataDrop "itun"
End Sub
```

```
Sub DropObject(obj As DragItem)
dim s as string
dim f as folderItem
dim d as CFDictionaryMBS
dim o as CFObjectMBS
dim key as CFStringMBS
dim dl as CFDictionaryListMBS
dim i,c as Integer
dim u as CFURLMBS
dim file as FolderItem
```

```
if obj.MacDataAvailable("itun") then
s = obj.MacData("itun")
```

```
// Parse XML
o=NewCFObjectMBSFromXML(NewCFBinaryDataMBSStr(s))

// Make dictionary
if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

// get Tracks Dictionary
key=NewCFStringMBS("Tracks")
o=d.Value(key)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)
dl=d.List

// Walk over all entries in the Tracks dictionary
c=dl.Count-1
for i=0 to c
o=dl.Value(i)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

key=NewCFStringMBS("Location")
o=d.Value(key)
if o isa CFStringMBS then
u=NewCFURLMBS CFStringMBS(o),nil

file=u.file
if file<>nil then
MsgBox file.NativePath
end if
end if
end if
next
end if
end if
end if
End Sub
```

**Notes:** The code above inside a window on Xojo 5.5 with MBS Plugin 5.3 will do it nice and show the paths.

### 10.0.216 I'm drawing into a listbox but don't see something.

Plugin Version: all.

**Answer:** If you draw this in a listbox cellbackground, you need to draw on the correct position

**Example:**

```
Function CellBackgroundPaint(g As Graphics, row as Integer, column as Integer) As Boolean
dim f as FolderItem
f=SpecialFolder.Desktop
f.DrawWideIconMBS(g,listbox1.left,listbox1.top+row*20,16)
Return true
End Function
```

**Notes:** Try this in a listbox. The Graphics object there has a clipping and an offset which the plugin doesn't know about.

### 10.0.217 I'm searching for a method or so to move a window from position x.y to somewhere else on the screen.

Platform: macOS.

**Answer:**

The code I produced in RB isn't smooth enough. Is there a call in MBS, if not, can it be done? The speed of it has to be like the show of a DrawerWindow.

Try the declare below for Carbon. With WindowLib it will work on Mac OS 8.5 and newer.

**Notes:**

See Window.Transition functions.

### 10.0.218 If I use one of your plug-ins under windows, would this then impose the use of dll after compilation or my would my compiled soft still be a stand-alone single file software?

Platforms: macOS, Linux, Windows.

**Answer:** Stand alone.

**Notes:** Xojo compiles all used plugins into the application binary.

Some plugin parts need external dlls but you will find that in the documentation. (e.g. pdflib for some classes)

**10.0.219** Is the fn key on a powerbook keyboard down?

Plugin Version: all, Platform: macOS.

**Answer:** I am unable to figure out how or if it is possible to detect if the fn key is down on a powerbook keyboard. Is it possible?

**Example:**

' Window.Open Event of a blank project:

```
dim i as Integer

for i=0 to 127
if keyboard.asynckeydown(i) then
title=str(i) // found
return
end if
next
title="" // not found
```

**Notes:** This test application shows the keycode (decimal) 63 for the fn key.

**10.0.220** Is there a case sensitive Dictionary?

Plugin Version: all.

**Answer:** The MBS Plugin has several classes which can work as a replacement.

**Notes:** First you could use VariantToVariantHashMapMBS or VariantToVariantOrderedMapMBS.

If you know that all keys are Strings or Integers only, you can use the specialized classes which are a little bit faster due to avoiding variants:

```
IntegerToIntegerHashMapMBS class
IntegerToIntegerOrderedMapMBS class
IntegerToStringHashMapMBS class
IntegerToStringOrderedMapMBS class
IntegerToVariantHashMapMBS class
IntegerToVariantOrderedMapMBS class
StringToStringHashMapMBS class
StringToStringOrderedMapMBS class
StringToVariantHashMapMBS class
StringToVariantOrderedMapMBS class
```

### 10.0.221 Is there a way to use the MBS plugin to get only the visible item and folder count on a volume?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can use the DirectorySizeMBS class for this as in the example below:

**Example:**

```
dim d as DirectorySizeMBS

d=new DirectorySizeMBS

// volume(1) as my boot volume is very full
if d.update(volume(1),true,0) then
MsgBox str(d.VisibleItemCount)+" visible items, "+str(d.HiddenItemCount)+" invisible items."
end if
```

**Notes:** Complete Question: Is there a way to use the MBS plugin to get only the visible item and folder count on a volume? The FileCount and FolderCount properties of VolumeInformationMBS seem to provide the total # of items including invisible items such as .DS\_Store and more importantly .Trashes which is causing me a great amount of difficulty during a recursive scan of a volume. I've got a progress bar which uses the total of the filecount and foldercount properties as the maximum value, but my routine needs to filter out all invisible items, as it is creating a catalog of a volume for archiving purposes. Any thoughts how I could get accurate number.

### 10.0.222 Is there an easy way I can launch the Displays preferences panel?

Plugin Version: all, Platform: macOS.

**Answer:** Use the code below:

**Example:**

```
dim error as Integer

error=OpenMacOSXPreferencesPaneMBS("Displays")
if error<>0 then
MsgBox "Failed to launch QuickTime System Preferences panel."
end if
```

### 10.0.223 List of Windows Error codes?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** We have a list of windows error codes on our website.

**Notes:** <http://www.monkeybreadsoftware.de/xojo/winerror.shtml>

### 10.0.224 Midi latency on Windows problem?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** The issue is system related, not a problem with RB or the plugin.

**Notes:** Two things will adversely affect the timing:

(1) latency of the software synthesizer output driver. The default Windows wavetable synthesizer has considerable latency. I don't know how many milliseconds, but it is noticeable.

(2) latency of the digital audio output driver. Different systems have different drivers for different audio hardware. My Dell laptop has a minimum 15ms latency in the audio driver.

These two things put together were causing a very sluggish MIDI response. I was able to verify these as the culprits by routing MIDI directly out of RB into a sample player, which only introduces the latency of (2) and does not include latency of (1).

I don't know how widely known are these facts, if not then you may want to add this information to the documentation, since Windows programmers using the MIDI plugin may not know those problems, and might mistakenly blame your plugin, as I did :) Sorry about that!

(From Aaron Andrew Hunt)

### 10.0.225 My Xojo Web App does not launch. Why?

Plugin Version: all, Platform: macOS.

**Answer:** Here is a list of checks to do for linux apache installations with Xojo or Xojo Web applications:

**Notes:** Just a list of checks to do for linux apache installations:

- You have 64bit linux? Then you need 32 bit compatibility libraries.
- The folder of your app is writable? Set permissions to 777.
- The cgi script is executable? Set permissions to 755.

- The app file itself is executable? Set permissions to 755.
- You uploaded cgi file as text, so it has unix line endings? (this often gives error "Premature end of script headers" in apache log)
- You uploaded config.cfg file and made it writable? Set permissions to 666.
- Your apache allows execution of cgi scripts? You enabled cgi for apache and uncommented addhandler command for CGI on a new apache installation?
- You uploaded the app file and libraries as binary files? Upload as text breaks them.
- You did upload the libs folder?
- You don't have code in app.open, session.open and other events which crashes app right at launch?
- You don't have a print command in your app.open event? (see feedback case 23817)
- You allowed htaccess file to overwrite permissions?

### 10.0.226 SQLiteDatabase not initialized error?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Before you can use SQLiteDatabaseMBS, it must be initialized.

**Example:**

```
dim d as new SQLiteDatabaseMBS
```

**Notes:** This happens normally when you use "new SQLiteDatabaseMBS".

But if you just have a SQLConnectionMBS and get a recordset there, the initialization may not have happened, yet.

So please simply add a line "dim d as new SQLiteDatabaseMBS" to your app.open code after registration, so the plugin part can initialize and late provide recordsets.

### 10.0.227 Textconverter returns only the first x characters. Why?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:**

Some older Xojo versions limit the Textconverter to around 1024 characters in input and output. This should be fixed with RB5.

**Notes:**

Xojo seems not to support Textconverters at all on Windows.

### 10.0.228 The type translation between CoreFoundation/Foundation and Xojo data types.

Plugin Version: all, Platform: macOS.

**Answer:** The plugin does conversion between Cocoa/Carbon data types and native Xojo data types. The following list help you knowing what the current plugins support:

**Notes:** Cocoa NSObject to Variant:

```

nil ->nil
NSDictionary ->Dictionary
NSData ->MemoryBlock
NSString ->String
NSAttributedString ->NSAttributedStringMBS
NSDate ->Date
NSNumber ->double/integer/Int64/UInt64/UInt32/Boolean
NSURL ->String
NSValue with NSRect ->NSRectMBS
NSValue with NSPoint ->NSPointMBS
NSValue with NSSize ->NSSizeMBS
NSValue with NSRange ->NSRangeMBS
NSValue with QTTime ->QTTimeMBS
NSValue with QTTimeRange ->QTTimeRangeMBS
NSArray ->Array of Variant
QuartzFilter ->QuartzFilterMBS

```

- ->\*MBS

Variant to Cocoa NSObject:

```

nil ->nil
Dictionary ->NSDictionary
Boolean ->NSNumber
Integer ->NSNumber
Color ->NSColor
Int64 ->NSNumber
Single ->NSNumber
Double ->NSNumber
Date ->NSDate
MemoryBlock ->NSData
String ->NSString
NSImageMBS ->NSImage
NSAttributedStringMBS ->NSAttributedString
NSColorMBS ->NSColor
NSRectMBS ->NSValue with NSRect
NSSizeMBS ->NSValue with NSSize

```

NSPointMBS ->NSValue with NSPoint  
 NSRangeMBS ->NSValue with NSRange  
 NSBurnMBS ->NSBurn  
 NSViewMBS ->NSView  
 NSFontMBS ->NSFont  
 NSParagraphStyleMBS ->NSParagraphStyle  
 NSAttributedStringMBS ->NSAttributedString  
 WebPolicyDelegateMBS ->WebPolicyDelegate  
 WebUIDelegateMBS ->WebUIDelegate  
 WebFrameLoadDelegateMBS ->WebFrameLoadDelegate  
 WebResourceLoadDelegateMBS ->WebResourceLoadDelegate  
 NSIndexSetMBS ->NSIndexSet  
 QTTimeMBS ->QTTime  
 QTTimeRangeMBS ->QTTimeRange  
 Array of Variant ->NSArray  
 Array of String ->NSArray  
 CFStringMBS ->NSString  
 CFNumberMBS ->NSNumber  
 CFDataMBS ->NSData  
 CFURLMBS ->NSURL  
 CFArrayMBS ->NSArray  
 CFDictionaryMBS ->NSDictionary  
 CFBinaryDataMBS ->NSData

Carbon CTypeRef to Variant:

CFDictionaryRef ->Dictionary  
 CFStringRef ->String  
 CFDataRef ->String  
 CFURL ->String  
 CFNumber ->Integer/Double/Int64  
 CFArray ->Array  
 CFDate ->date  
 nil ->nil  
 CGColorSpace ->CGColorSpaceMBS  
 CGColor ->CGColorMBS  
 CGImage ->CGImageMBS  
 CF\* ->CF\*MBS

Variant to Carbon CTypeRef:

Dictionary ->CFDictionaryRef  
 Boolean ->CFBooleanRef  
 Color ->CFNumberRef  
 Integer ->CFNumberRef

Int64 ->CFNumberRef  
 Single ->CFNumberRef  
 Double ->CFNumberRef  
 String ->CFStringRef  
 Color ->CGColorRef  
 Date ->CFDateRef  
 nil ->nil  
 Memoryblock ->CFDataRef  
 FolderItem ->CFURLRef  
 Dictionary ->CFDictionaryRef  
 Array of Variant/String/Date/Double/Single/Int64/Integer ->CFArray  
 CGRectMBS ->CGRect as CFDataRef  
 CGSizeMBS ->CGSize as CFDataRef  
 CGPointMBS ->CGPoint as CFDataRef  
 CGColorMBS ->CGColor  
 CGColorSpaceMBS ->CGColorSpace  
 CGImageMBS ->CGImage  
 CGDataConsumerMBS ->CGDataConsumer  
 CGDataProviderMBS ->CGDataProvider  
 CF\*MBS ->CF\*

Strings without encodings should be put into dictionaries as memoryblocks.

### 10.0.229 Uploaded my web app with FTP, but it does not run on the server!

Plugin Version: all, Platform: Windows.

**Answer:** If you see errors like a simple "Segmentation Fault" on Linux or some other wired errors, you may want to check your FTP upload mode. It must be binary for web apps. ASCII mode corrupts the application.

### 10.0.230 What classes to use for hotkeys?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Please use CarbonHotKeyMBS class on Mac and WindowsKeyFilterMBS on Windows.

**Notes:** CarbonHotKeyMBS will also work fine in Cocoa apps.

### 10.0.231 What do I need for Linux to get picture functions working?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** In order to get our plugins working on Linux systems without GUI, the plugin loads graphics

libraries dynamically.

**Notes:** To get it working, the plugin tries to load gtk with this paths:

- libgtk-x11-2.0.so”
- libgtk-x11-2.0.so.0”
- /usr/lib/libgtk-x11-2.0.so”
- /usr/lib32/libgtk-x11-2.0.so”
- /usr/lib/libgtk-x11-2.0.so.0”
- /usr/lib32/libgtk-x11-2.0.so.0”

gdk is loaded with this paths:

- libgdk-x11-2.0.so”
- libgdk-x11-2.0.so.0”
- /usr/lib/libgdk-x11-2.0.so”
- /usr/lib32/libgdk-x11-2.0.so”
- /usr/lib/libgdk-x11-2.0.so.0”
- /usr/lib32/libgdk-x11-2.0.so.0”

For the paths without explicit path, the system will search in /lib, /usr/lib and all directories in the LD\_LIBRARY\_PATH environment variable.

### 10.0.232 What does the NAN code mean?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:**

### 10.0.233 What font is used as a 'small font' in typical Mac OS X apps?

Plugin Version: all, Platform: macOS.

**Answer:**

Xojo 4.5 has a constant "SmallSystem" to use for a font name.

For older versions try this code:

**Example:**

```

Sub GetThemeFont(fontType as Integer, ByRef fontName as String, ByRef fontSize as Integer, ByRef
fontName as Integer)
dim err as Integer
dim theFont, theFontSize, theFontStyle as MemoryBlock

const smSystemScript = -1

Declare Function GetThemeFont Lib "Carbon" (inFontID as Integer, inScript as Integer, outFontName
as Ptr, outFontSize as Ptr, outStyle as Ptr) as Integer

theFont = NewMemoryBlock(256) //Str255
theFontSize = NewMemoryBlock(2) //SInt16
theFontStyle = NewMemoryBlock(1) //Style

err = GetThemeFont(fontType, smSystemScript, theFont, theFontSize, theFontStyle)

if err = 0 then
fontName = theFont.PString(0)
fontSize = theFontSize.UShort(0)
fontStyle = theFontStyle.Byte(0)
else
fontName = ""
fontSize = 0
fontStyle = 0
end if
End Sub

```

### 10.0.234 What is last plugin version to run on Mac OS X 10.4?

Plugin Version: all, Platform: Windows.

**Answer:** Last Version with 10.4 support is version 15.4.

**Notes:** With version 15.4 you can build applications for OS X 10.4 and newer.

For Version 16.0 we disabled 10.4 and moved minimum to 10.5. We may be able to enable it again to build a version of 16.x, but may need to charge for this by hour.

### 10.0.235 What is last plugin version to run on PPC?

Plugin Version: all, Platform: Windows.

**Answer:** Last Version with PPC is 15.4.

**Notes:** With version 15.4 you can build PPC applications for OS X 10.4 and newer.

For Version 16.0 we disabled PPC. We may be able to enable it again to build a PPC version of 16.x, but may need to charge for this by hour.

### 10.0.236 What is last version of the plugins for macOS 32-bit?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Please use version 23.0 or older.

**Notes:** We stopped including 32-bit code for macOS in version 23.1.

Please use older versions if you use an old Xojo.

Xojo 2017r3 and newer load our 64-bit plugins.

### 10.0.237 What is the difference between Timer and WebTimer?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Timer is server side and WebTimer client side.

**Notes:** Timer is the normal timer class in Xojo. It runs on the server. On the client side the WebTimer runs on the client. It triggers a request to the server to perform the action. So a WebTimer is good to keep the connection running and the website updated regularly. A timer on the server is good to make regular jobs like starting a database backup every 24 hours.

### 10.0.238 What is the list of Excel functions?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Below is a list of function names known by LibXL.

**Notes:** LibXL parses the functions and writes tokens to the excel file. So even if Excel can do more functions, we can only accept the ones known by LibXL.

ABS, ABSREF, ACOS, ACOSH, ACTIVE.CELL, ADD.BAR, ADD.COMMAND, ADD.MENU, ADD.TOOLBAR, ADDRESS, AND, APP.TITLE, AREAS, ARGUMENT, ASC, ASIN, ASINH, ATAN, ATAN2, ATANH, AVEDEV, AVERAGE, AVERAGEA, BAHTTEXT, BETADIST, BETAINV, BINOMDIST, BREAK, CALL, CALLER, CANCEL.KEY, CEILING, CELL, CHAR, CHECK.COMMAND, CHIDIST, CHIINV, CHITEST, CHOOSE, CLEAN, CODE, COLUMN, COLUMNS, COMBIN, CONCATENATE, CONFIDENCE, CORREL, COS, COSH, COUNT, COUNTA, COUNTBLANK, COUNTIF, COVAR, CREATE.OBJECT, CRITBINOM, CUSTOM.REPEAT, CUSTOM.UNDO, DATE, DATEDIF, DATESTRING, DATEVALUE, DAVERAGE, DAY, DAYS360, DB, DBCS, DCOUNT, DCOUNTA, DDB, DEGREES, DELETE.BAR, DELETE.COMMAND, DELETE.MENU, DELETE.TOOLBAR, DEREf, DEVSQ, DGET, DIALOG.BOX, DIRECTORY, DMAX, DMIN, DOCUMENTS, DOLLAR, DPRODUCT, DSTDEV, DSTDEVP, DSUM, DVAR, DVARP, ECHO, ELSE, ELSE.IF, ENABLE.COMMAND, ENABLE.TOOL, END.IF, ERROR, ERROR.TYPE, EVALUATE, EVEN, EXACT, EXEC, EXECUTE, EXP, EXPONDIST, FACT, FALSE, FCLOSE, FDIST, FILES, FIND, FINDB, FINV, FISHER, FISHERINV, FIXED, FLOOR, FOPEN, FOR, FOR.CELL, FORECAST,

FORMULA.CONVERT, FPOS, FREAD, FREADLN, FREQUENCY, FSIZE, FTEST, FV, FWRITE, FWRITELN, GAMMADIST, GAMMAINV, GAMMALN, GEOMEAN, GET.BAR, GET.CELL, GET.CHART.ITEM, GET.DEF, GET.DOCUMENT, GET.FORMULA, GET.LINK.INFO, GET.MOVIE, GET.NAME, GET.NOTE, GET.OBJECT, GET.PIVOT.FIELD, GET.PIVOT.ITEM, GET.PIVOT.TABLE, GET.TOOL, GET.TOOLBAR, GET.WINDOW, GET.WORKBOOK, GET.WORKSPACE, GETPIVOTDATA, GOTO, GROUP, GROWTH, HALT, HARMEAN, HELP, HLOOKUP, HOUR, HYPERLINK, HYPGEOMDIST, IF, INDEX, INDIRECT, INFO, INITIATE, INPUT, INT, INTERCEPT, IPMT, IRR, ISBLANK, ISERR, ISERROR, ISLOGICAL, ISNA, ISNONTEXT, ISNUMBER, ISPMT, ISREF, ISTEXT, ISTHAIDIGIT, KURT, LARGE, LAST.ERROR, LEFT, LEFTB, LEN, LENB, LINEST, LINKS, LN, LOG, LOG10, LOGEST, LOGINV, LOGNORMDIST, LOOKUP, LOWER, MATCH, MAX, MAXA, MDETERM, MEDIAN, MID, MIDB, MIN, MINA, MINUTE, MINVERSE, MIRR, MMULT, MOD, MODE, MONTH, MOVIE.COMMAND, N, NA, NAMES, NEGBINOMDIST, NEXT, NORMDIST, NORMINV, NORMSDIST, NORMSINV, NOT, NOTE, NOW, NPER, NPV, NUMBERSTRING, ODD, OFFSET, OPEN.DIALOG, OPTIONS.LISTS.GET, OR, PAUSE, PEARSON, PERCENTILE, PERCENTRANK, PERMUT, PHONETIC, PI, PIVOT.ADD.DATA, PMT, POISSON, POKE, POWER, PPMT, PRESS.TOOL, PROB, PRODUCT, PROPER, PV, QUARTILE, RADIANS, RAND, RANK, RATE, REFTTEXT, REGISTER, REGISTER.ID, RELREF, RENAME.COMMAND, REPLACE, REPLACEB, REPT, REQUEST, RESET.TOOLBAR, RESTART, RESULT, RESUME, RETURN, RIGHT, RIGHTB, ROMAN, ROUND, ROUNDBAHTDOWN, ROUNDBAHTUP, ROUNDDOWN, ROUNDUP, ROW, ROWS, RSQ, RTD, SAVE.DIALOG, SAVE.TOOLBAR, SCENARIO.GET, SEARCH, SEARCHB, SECOND, SELECTION, SERIES, SET.NAME, SET.VALUE, SHOW.BAR, SIGN, SIN, SINH, SKEW, SLN, SLOPE, SMALL, SPELLING.CHECK, SQRT, STANDARDIZE, STDEV, STDEVA, STDEVP, STDEVPA, STEP, STEYX, SUBSTITUTE, SUBTOTAL, SUM, SUMIF, SUMPRODUCT, SUMSQ, SUMX2MY2, SUMX2PY2, SUMXMY2, SYD, T, TAN, TANH, TDIST, TERMINATE, TEXT, TEXT.BOX, TEXTREF, THAIDAYOFWEEK, THAIDIGIT, THAIMONTHOFYEAR, THAINUMSOUND, THAINUMSTRING, THAISTRINGLENGTH, THAIYEAR, TIME, TIMEVALUE, TINV, TODAY, TRANSPOSE, TREND, TRIM, TRIMMEAN, TRUE, TRUNC, TTEST, TYPE, UNREGISTER, UPPER, USDOLLAR, USERDEFINED, VALUE, VAR, VARA, VARP, VARPA, VDB, VIEW.GET, VLOOKUP, VOLATILE, WEEKDAY, WEIBULL, WHILE, WINDOW.TITLE, WINDOWS, YEAR and ZTEST.

### 10.0.239 What is the replacement for PluginMBS?

Plugin Version: all, Platform: macOS.

**Answer:** Use the SoftDeclareMBS class to load libraries dynamically.

### 10.0.240 What to do on Xojo reporting a conflict?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:**

I get an error like "This item conflicts with another item of the same name" when using one of the plugin functions.

Xojo just wants to tell you that you dropped something in the plugins folder what is not a plugin.

**Notes:**

Some users dropped the examples, the documentation or other files into the plugins folder. Don't do it.

### 10.0.241 What to do with a NSImageCacheException?

Plugin Version: all, Platforms: macOS, Windows.

**Answer:** You need to add exception handlers for NSExcptionMBS in order to catch this exception.

**Notes:** You may also add code to write the stack of the exception into a log file for later locating the error source.

A NSImage has several image representations in memory. So basicly you pass in the base image and for whatever size an image is needed, the NSImage class will create a cache image representation of the requested size so on the next query it can use that cache for the same requested size.

### 10.0.242 What to do with MySQL Error 2014?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** You can get this error on MySQL if you have a recordset open while you create another one.

### 10.0.243 What to do with SQL Plugin reporting Malformed string as error?

Plugin Version: all, Platform: macOS.

**Answer:** Please make sure the table and/or database fields have a text encoding set.

**Notes:** For Firebird our plugin tries to use UTF-8 encoding if possible and to correctly convert between various tables, the tables and their fields need to have a text encoding defined.

e.g. if the text field in the table is windows-1252 and the other ISO 8859-5, then the Firebird database can convert them to UTF-8 and deliver texts to the plugin.

If encoding is set to none, it may get confused for non-ascii text.

### 10.0.244 Where is CGGetActiveDisplayListMBS?

Plugin Version: all, Platform: Windows.

**Answer:** This is now CGDisplayMBS.GetActiveDisplayList.

### 10.0.245 Where is CGGetDisplaysWithPointMBS?

Plugin Version: all, Platform: Windows.

**Answer:** This is now CGDisplayMBS.GetDisplaysWithPoint.

### 10.0.246 Where is CGGetDisplaysWithRectMBS?

Plugin Version: all, Platform: Windows.

**Answer:** This is now CGDisplayMBS.GetDisplaysWithRect.

### 10.0.247 Where is CGGetOnlineDisplayListMBS?

Plugin Version: all, Platform: Windows.

**Answer:** This is now CGDisplayMBS.GetOnlineDisplayList.

### 10.0.248 Where is GetObjectClassNameMBS?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Please use this replacement method:

**Example:**

```
Function GetObjectClassNameMBS(o as Object) As string
dim t as Introspection.TypeInfo = Introspection.GetType(o)
Return t.FullName
End Function
```

**Notes:** GetObjectClassNameMBS was removed from the plugins.

### 10.0.249 Where is NetworkAvailableMBS?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** We removed NetworkAvailableMBS some versions ago. It was not working right and basically it's not useful. If you want to check whether you have a network, than do a DNS resolve:

**Example:**

```

// two independent domain names
const domain1 = "www.google.com"
const domain2 = "www.macs.w.de"

// resolve IPs
dim ip1 as string = DNSNameToAddressMBS(Domain1)
dim ip2 as string = DNSNameToAddressMBS(Domain2)

// if we got IPs and not the same IPs (error/login pages)
if len(ip1)=0 or len(ip2)=0 or ip1=ip2 then
MsgBox "no connection"
else
MsgBox "have connection"
end if

```

**Notes:** This way you can detect whether you got something from DNS. And you can make sure that a DNS redirection to a login page won't catch you.

### 10.0.250 Where is StringHeight function in DynaPDF?

Plugin Version: all, Platform: Windows.

**Answer:** Use the function GetFTextHeight or GetFTextHeightEx.

**Notes:** Be aware that GetFTextHeight works with format commands and you may want to escape your text if you don't use them.

### 10.0.251 Where is XLSDocumentMBS class?

Plugin Version: all, Platform: macOS.

**Answer:** This class has been removed in favor of XLBookMBS class.

**Notes:** These classes have been removed: XLCellMBS, XLSDocumentMBS, XLSFormatRecordMBS, XLSMergedCellsMBS, XLSRowMBS and XLSSheetMBS.

### 10.0.252 Where to get information about file formats?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:**

Please visit this web page:

<http://www.wotsit.org>

### 10.0.253 Where to register creator code for my application?

Plugin Version: all, Platform: macOS.

**Answer:**

Register at Apple:

<http://developer.apple.com/dev/cftype/information.html>

### 10.0.254 Which Mac OS X frameworks are 64bit only?

Plugin Version: all, Platform: macOS.

**Answer:** Some frameworks from Mac OS X do not support 32 bit applications, so we can't provide plugins for Xojo until 64bit target is available.

**Notes:** For Mac OS X 10.8:

- Accounts
- EventKit
- GLKit
- Social

and in 10.9:

- Accounts
- AVKit
- EventKit
- GameController
- GLKit
- MapKit
- MediaLibrary
- Social
- SpriteKit

In general Apple makes all new frameworks being 64 bit only.

### 10.0.255 Which plugins are 64bit only?

Plugin Version: all, Platform: macOS.

**Answer:** Some of our plugins work only in 64 bit modes as operation systems do not provide 32 bit code.

**Notes:** This effects currently: EventKit, Accounts, Social frameworks from Apple and our matching plugins.

### 10.0.256 Why application doesn't launch because of a missing ddraw.dll!?

Plugin Version: all, Platform: Windows.

**Answer:** Some RB versions require that you install DirectX from Microsoft on your Windows.

### 10.0.257 Why application doesn't launch because of a missing shlwapi.dll!?

Plugin Version: all, Platform: Windows.

**Answer:** Some RB versions require that you install the Internet Explorer from Microsoft on your Windows.

**Notes:** This bug is for several older Windows 95 editions.

### 10.0.258 Why do I hear a beep on keydown?

Plugin Version: all, Platform: Windows.

**Answer:** When the user presses a key, RB goes through all keydown event handlers till on returns true.

**Notes:** If no keydown event handler returns true for the key, a beep is performed.

### 10.0.259 Why does folderitem.item return nil?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:** Because Xojo fails to make a folderitem for you. Reason may be an alias file which can't be resolved or simply that you don't have enough access rights to read the folder content.

**Notes:** A more rarely reason is that the directory changed and the file with the given index or name does no longer exist.

### 10.0.260 Why doesn't showurl work?

Plugin Version: all, Platforms: macOS, Linux, Windows.

**Answer:**

There are three main reasons:

1. showurl is not supported by Xojo in 68k applications.
2. there is now application defined for the protocol (e.g. http) in the Internet Control panel.
3. You don't have Internet Config installed.

You can use the InternetConfigMBS class to check for this stuff.

**10.0.261 Why don't the picture functions not work on Linux?**

Plugin Version: all, Platform: macOS.

**Answer:** Please make sure libcairo is installed.

**Notes:** For accessing pictures on Linux, the MBS Plugin relays on the cairo library.

Please install the package if you don't have it already.

Our plugin looks for library called libcairo.so or libcairo.so.2.

**10.0.262 Why have I no values in my chart?**

Plugin Version: all, Platforms: macOS, Windows.

**Answer:** You have no data points visible, there may be several reasons:

**Notes:** For example one of the data values may be infinite or invalid.

Or the scaling may be out of range, so you simply see nothing.

**10.0.263 Will application size increase with using plugins?**

Plugin Version: all, Platform: Windows.

**Answer:** All plugins used by your application will be included in the application.

**Notes:** If you use no plugins, your application will not change size.

And if you use one class from the plugins, your application size will increase by a few kilobytes.

The documentation of the plugins include a list of all plugin parts and their sizes for the different platforms.

**10.0.264 XLS: Custom format string guidelines**

Plugin Version: all, Platform: macOS.

**Answer:** You have to download the source code and compile a static version of the library.

**Notes:** Up to four sections of format codes can be specified. The format codes, separated by semicolons, define the formats for positive numbers, negative numbers, zero values, and text, in that order. If only two sections are specified, the first is used for positive numbers and zeros, and the second is used for negative numbers. If only one section is specified, it is used for all numbers. Four sections example:

```
#,###.00_); [ Red ] (#,###.00);0.00;"sales "@
```

The following table describes the different symbols that are available for use in custom number formats.

#### Specify colors

To set the text color for a section of the format, type the name of one of the following eight colors in square brackets in the section. The color code must be the first item in the section.

Instead of using the name of the color, the color index can be used, like this [ Color3 ] for Red. Valid numeric indexes for color range from 1 to 56, which reference by index to the legacy color palette.

#### Specify conditions

To set number formats that will be applied only if a number meets a specified condition, enclose the condition in square brackets. The condition consists of a comparison operator and a value. Comparison operators include: = Equal to; >Greater than; <Less than; >= Greater than or equal to, <= Less than or equal to, and <>Not equal to. For example, the following format displays numbers that are less than or equal to 100 in a red font and numbers that are greater than 100 in a blue font.

```
[ Red ] [ <=100 ] ; [ Blue ] [ >100 ]
```

If the cell value does not meet any of the criteria, then pound signs ("##") are displayed across the width of the cell.

#### Dates and times

#### Examples

### 10.0.265 Xojo doesn't work with your plugins on Windows 98.

Plugin Version: all, Platform: Windows.

**Answer:** Please upgrade your Windows version.

**10.0.266** Xojo or my RB application itself crashes on launch on Mac OS Classic.  
**Why?**

Plugin Version: all.

**Answer:**

You may check if the application has enough memory to be loaded.

RB should have on Mac OS Classic more than 20 MB of RAM.

I preferred to use 50 MB and for an application a 10 MB partition is a good way to start.

Parameter	Description
x	The x value of the data point. For an enumerated x-axis (see <code>Axis.setLabels</code> on what is an enumerated axis), the first data point is 0, and the nth data point is (n-1).
xLabel	The bottom x-axis label of the data point.
x2Label	The top x-axis label of the data point.
value	The value of the data point.
accValue	The sum of values of all data points that are in the same x position and same data group as the current data point, and with data set number less than or equal to the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
totalValue	The sum of values of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
percent	The percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
accPercent	The accumulated percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
gpercent	The percentage of the data point based on the total value of all data points in a layer.
dataSet	The data set number to which the data point belongs. The first data set is 0. The nth data set is (n-1).
dataSetName	The name of the data set to which the data point belongs.
dataItem	The data point number within the data set. The first data point is 0. The nth data point is (n-1).
dataGroup	The data group number to which the data point belongs. The first data group is 0. The nth data group is (n-1).
dataGroupName	The name of the data group to which the data point belongs.
layerId	The layer number to which the data point belongs. The first layer is 0. The nth layer is (n-1).
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using <code>Layer.addExtraField</code> , <code>Layer.addExtraField2</code> , <code>BaseChart.addExtraField</code> or <code>BaseChart.addExtraField2</code> .

diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by data set number. The Pth data set corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth data set corresponds to the Pth element of the (N + Q)th extra field.

Parameter	Description
zx	The symbol scale in the x dimension. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .
zy	The symbol scale in the y dimension. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .
z	The symbol scale without distinguishing the dimension to use. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .

Parameter	Description
slope	The slope of the trend line.
intercept	The y-intercept of the trend line.
corr	The correlation coefficient in linear regression analysis.
stderr	The standard error in linear regression analysis.

Parameter	Description
top	The value of the top edge of the box-whisker symbol.
bottom	The value of the bottom edge of the box-whisker symbol.
max	The value of the maximum mark of the box-whisker symbol.
min	The value of the minimum mark of the box-whisker symbol.
med	The value of the median mark of the box-whisker symbol.

Parameter	Description
high	The high value.
low	The low value.
open	The open value.
close	The close value.

Parameter	Description
dir	The direction of the vector.
len	The length of the vector.

Parameter	Description
radius	The radial value of the data point.
value	Same as { radius } . See above.
angle	The angular value of the data point.
x	Same as { angle } . See above.
label	The angular label of the data point.
xLabel	Same as { label } . See above.
name	The name of the layer to which the data point belongs.
dataSetName	Same as { name } . See above.
i	The data point number. The first data point is 0. The nth data point is (n-1).
dataItem	Same as { i } . See above.
z	The symbol scale. Applicable for layers with symbol scales set by Polar-Layer.setSymbolScale.
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using Layer.addExtraField, Layer.addExtraField2, BaseChart.addExtraField or BaseChart.addExtraField2.
diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by layer index. The Pth layer corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth layer corresponds to the Pth element of the (N + Q)th extra field.
Parameter	Description
dir	The direction of the vector.
len	The length of the vector.
Parameter	Description
value	The axis value at the tick position.
label	The axis label at the tick position.
Parameter	Description
[ param ]	The name of the parameter
[ a ]	If this field a number, it specifies the number of decimal places (digits to the right of the decimal point).

[ b ]	The thousand separator. Should be a non-alphanumeric character (not 0-9, A-Z, a-z). Use ' '.
textasciitilde ' for no thousand separator. The default is ' '.	
textasciitilde ', which can be modified using BaseChart.setNumberFormat.	
[ c ]	The decimal point character. The default is '.', which can be modified using BaseChart.setNumberFormat.
[ d ]	The negative sign character. Use ' '.
textasciitilde ' for no negative sign character. The default is '-', which can be modified using BaseChart.setNumberFormat.	

Parameter	Description
yyyy	The year in 4 digits (e.g. 2002)
yyy	The year showing only the least significant 3 digits (e.g. 002 for the year 2002)
yy	The year showing only the least significant 2 digits (e.g. 02 for the year 2002)
y	The year showing only the least significant 1 digits (e.g. 2 for the year 2002)
mmm	The month formatted as its name. The default is to use the first 3 characters of the english month name (Jan, Feb, Mar ...). The names can be configured using BaseChart.setMonthNames.
mm	The month formatted as 2 digits from 01 - 12, adding leading zero if necessary.
m	The month formatted using the minimum number of digits from 1 - 12.
MMM	The first 3 characters of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
MM	The first 2 characters of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
M	The first character of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
dd	The day of month formatted as 2 digits from 01 - 31, adding leading zero if necessary.
d	The day of month formatted using the minimum number of digits from 1 - 31.
w	The name of the day of week. The default is to use the first 3 characters of the english day of week name (Sun, Mon, Tue ...). The names can be configured using BaseChart.setWeekDayNames.
hh	The hour of day formatted as 2 digits, adding leading zero if necessary. The 2 digits will be 00 - 23 if the 'a' option (see below) is not specified, otherwise it will be 01 - 12.
h	The hour of day formatted using the minimum number of digits. The digits will be 0 - 23 if the 'a' option (see below) is not specified, otherwise it will be 01 - 12.
nn	The minute formatted as 2 digits from 00 - 59, adding leading zero if necessary.
n	The minute formatted using the minimum number of digits from 00 - 59.
ss	The second formatted as 2 digits from 00 - 59, adding leading zero if necessary.
s	The second formatted using the minimum number of digits from 00 - 59.
a	Display either 'am' or 'pm', depending on whether the time is in the morning or afternoon. The text 'am' and 'pm' can be modified using BaseChart.setAMPM.

Shape Id	Value	Description
SquareShape	1	Square shape. See (1, 1) above.
DiamondShape	2	Diamond shape. See (2, 1) above.
TriangleShape	3	Triangle shape pointing upwards. See (3, 1) above.
RightTriangleShape	4	Triangle shape pointing rightwards. See (4, 1) above.
LeftTriangleShape	5	Triangle shape pointing leftwards. See (5, 1) above.
InvertedTriangleShape	6	Triangle shape pointing downwards. See (1, 2) above.
CircleShape	7	Circle shape. See (2, 2) above.
StarShape	[ Method ]	Star shapes of various points. See (2, 3), (2, 4), (2, 5), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5) above for stars with 3 to 10 points.
PolygonShape	[ Method ]	Polygon shapes symmetrical about a vertical axis with a vertex at the top center position. See (4, 1), (4, 3), (4, 5), (5, 1) for polygons of 5 to 8 sides.
Polygon2Shape	[ Method ]	Polygon shapes symmetrical about a vertical axis but without any vertex at the top center position. See (4, 2), (4, 4) for polygons of 5 and 6 sides.
CrossShape	[ Method ]	'+' shapes. See (5, 2), (5, 3), (5, 4), (5, 5), (6, 1), (6, 2), (6, 3) for '+' shape with arm width of 0.1 - 0.7.
Cross2Shape	[ Method ]	'X' shapes. See (6, 4), (6, 5), (7, 1), (7, 2), (7, 3), (7, 4), (7, 5) for 'X' shapes with arm width of 0.1 - 0.7.

langEnglish	0	Roman script
langFrench	1	Roman script
langGerman	2	Roman script
langItalian	3	Roman script
langDutch	4	Roman script
langSwedish	5	Roman script
langSpanish	6	Roman script
langDanish	7	Roman script
langPortuguese	8	Roman script
langNorwegian	9	Roman script
langHebrew	10	Hebrew script
langJapanese	11	Japanese script
langArabic	12	Arabic script
langFinnish	13	Roman script
langGreek	14	Greek script using smRoman script code
langIcelandic	15	modified smRoman/Icelandic script
langMaltese	16	Roman script
langTurkish	17	modified smRoman/Turkish script
langCroatian	18	modified smRoman/Croatian script
langTradChinese	19	Chinese (Mandarin) in traditional characters
langUrdu	20	Arabic script
langHindi	21	Devanagari script
langThai	22	Thai script
langKorean	23	Korean script

Nan	Meaning
1	Invalid square root (negative number, usually)
2	Invalid addition (indeterminate such as infinity + (-infinity))
4	Invalid division (indeterminate such as 0/0)
8	Invalid multiplication (indeterminate such as 0*infinity)
9	Invalid modulo such as (a mod 0)
17	Try to convert invalid string to a number like val("x7")
33	Invalid argument in a trig function
34	Invalid argument in an inverse trig function
36	Invalid argument in a log function
37	Invalid argument in Pow function
38	Invalid argument in toolbox financial function
40	Invalid argument in hyperbolic function
42	Invalid argument in a gamma function

Symbol	Description and result
0	Digit placeholder. For example, if the value 8.9 is to be displayed as 8.90, use the format #.00
#	Digit placeholder. This symbol follows the same rules as the 0 symbol. However, the application shall not display extra zeros when the number typed has fewer digits on either side of the decimal than there are # symbols in the format. For example, if the custom format is #.##, and 8.9 is in the cell, the number 8.9 is displayed.
?	Digit placeholder. This symbol follows the same rules as the 0 symbol. However, the application shall put a space for insignificant zeros on either side of the decimal point so that decimal points are aligned in the column. For example, the custom format 0.0? aligns the decimal points for the numbers 8.9 and 88.99 in a column.
. (period)	Decimal point.
%	Percentage. If the cell contains a number between 0 and 1, and the custom format 0% is used, the application shall multiply the number by 100 and add the percentage symbol in the cell.
, (comma)	Thousands separator. The application shall separate thousands by commas if the format contains a comma that is enclosed by number signs (#) or by zeros. A comma that follows a placeholder scales the number by one thousand. For example, if the format is #.0,, and the cell value is 12,200,000 then the number 12.2 is displayed.
E- E+ e- e+	Scientific format. The application shall display a number to the right of the "E" symbol that corresponds to the number of places that the decimal point was moved. For example, if the format is 0.00E+00, and the value 12,200,000 is in the cell, the number 1.22E+07 is displayed. If the number format is #0.0E+0, then the number 12.2E+6 is displayed.
\$ -+/( ):space	Displays the symbol. If it is desired to display a character that differs from one of these symbols, precede the character with a backslash (\). Alternatively, enclose the character in quotation marks. For example, if the number format is (000), and the value 12 is in the cell, the number (012) is displayed.
\	Display the next character in the format. The application shall not display the backslash. For example, if the number format is 0\!, and the value 3 is in the cell, the value 3! is displayed.
*	Repeat the next character in the format enough times to fill the column to its current width. There shall not be more than one asterisk in one section of the format. If more than one asterisk appears in one section of the format, all but the last asterisk shall be ignored. For example, if the number format is 0*x, and the value 3 is in the cell, the value 3xxxxxx is displayed. The number of x characters that are displayed in the cell varies based on the width of the column.
_ (underline)	Skip the width of the next character. This is useful for lining up negative and positive values in different cells of the same column. For example, the number format _(0.0_);(0.0) aligns the numbers 2.3 and -4.5 in the column even though the negative number is enclosed by parentheses.
"text"	Display whatever text is inside the quotation marks. For example, the format 0.00 "dollars" displays 1.23 dollars when the value 1.23 is in the cell.
@	Text placeholder. If text is typed in the cell, the text from the cell is placed in the format where the at symbol (@) appears. For example, if the number format is "Bob "@ Smith" (including quotation marks), and the value "John" is in the cell, the value Bob John Smith is displayed.

[ Black ] [ Green ] [ White ] [ Blue ] [ Magenta ] [ Yellow ] [ Cyan ] [ Red ]

To display	As	Use this code
Months	1-12	m
Months	01-12	mm
Months	Jan-Dec	mmm
Months	January-December	mmmm
Months	J-D	mmmmm
Days	1-31	d
Days	01-31	dd
Days	Sun-Sat	ddd
Days	Sunday-Saturday	dddd
Years	00-99	yy
Years	1900-9999	yyyy
Hours	0-23	h
Hours	00-23	hh
Minutes	0-59	m
Minutes	00-59	mm
Seconds	0-59	s
Seconds	00-59	ss
Time	4 AM	h AM/PM
Time	4:36 PM	h:mm AM/PM
Time	4:36:03 P	h:mm:ss A/P
Time	4:36:03.75	h:mm:ss.00
Elapsed time	1:02	[ h ] :mm
Elapsed time	62:16	[ mm ] :ss
Elapsed time	3735.80	[ ss ] .00

To display	As	Use this code
1234.59	1234.6	#####.#
8.9	8.900	#.000
.631	0.6	0.#
12	12.0	#.0#
1234.568	1234.57	#.0#
44.398	44.398	???.???
102.65	102.65	???.???
2.8	2.8	???.???
5.25	5 1/4	# ??/??
5.3	5 3/10	# ??/??
12000	12,000	#,####
12000	12	#,
12400000	12.4	0.0,,