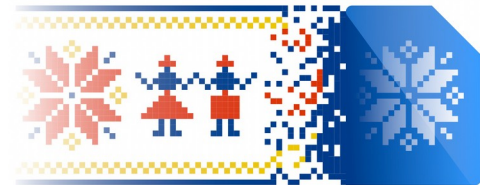


September 20 - 23, 2023



LibreOffice
The Document Foundation



Introduction to LibreOffice Development

LibreOffice automation via Scripting

Rafael Henrique Palma Lima

Why Scripting?

- ▶ Automate common and repetitive tasks
- ▶ Extend application functionalities
- ▶ Interact directly with the API
- ▶ Create custom applications tailored for your needs (integrate databases, create dialogs, forms, etc)



Supported Scripting Languages in LibreOffice

- Basic
- Python
- JavaScript
- BeanShell

Outline

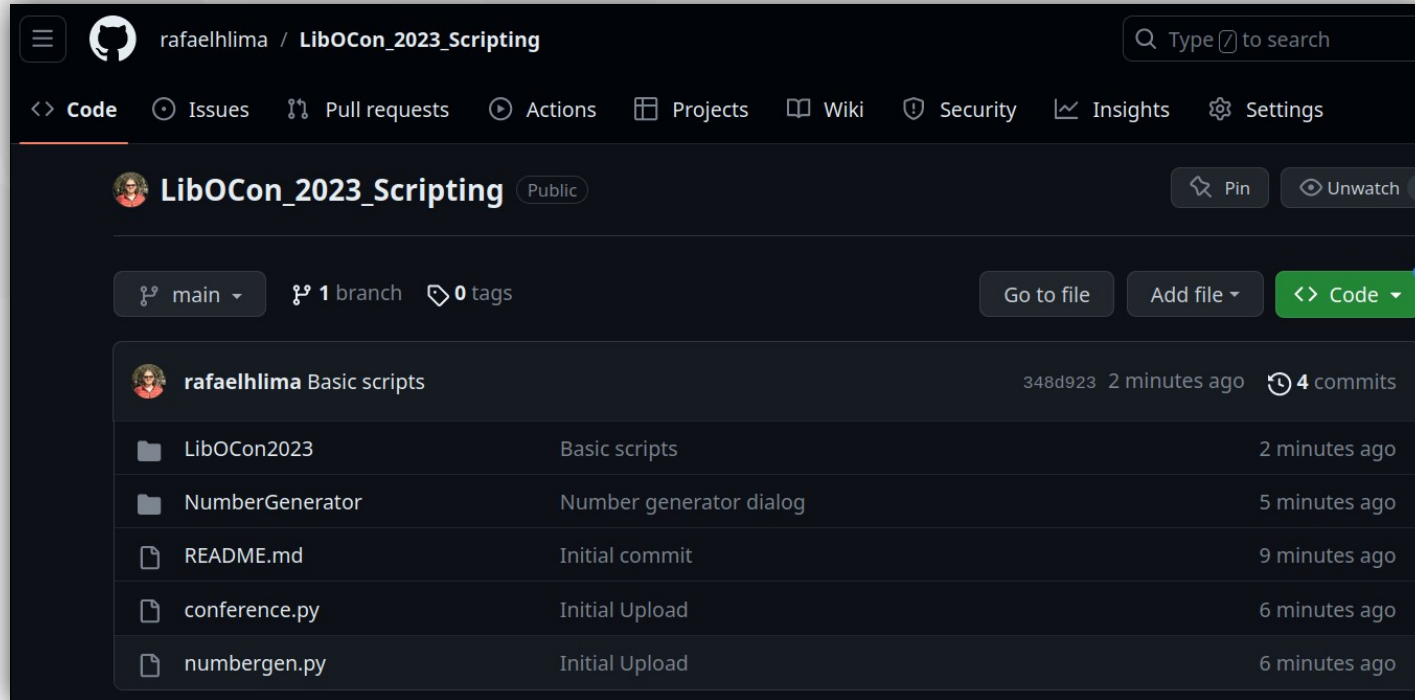
- ▼ Creating scripts in Basic
- ▼ The ScriptForge library
- ▼ Types of scripts in LibreOffice
- ▼ Creating Python scripts



BASIC

GitHub repository

- ▼ All examples are available at the following repository



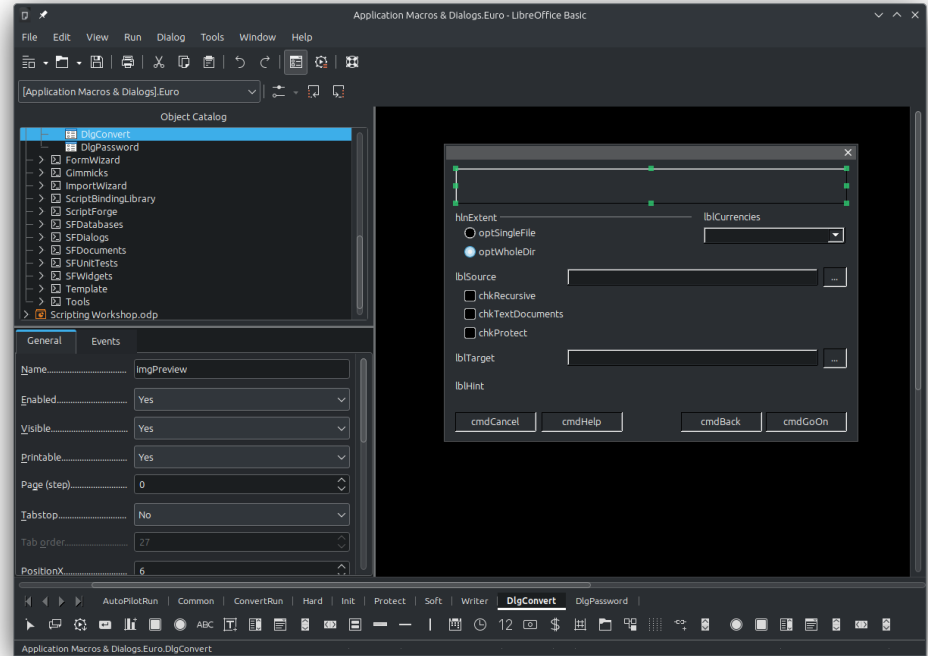
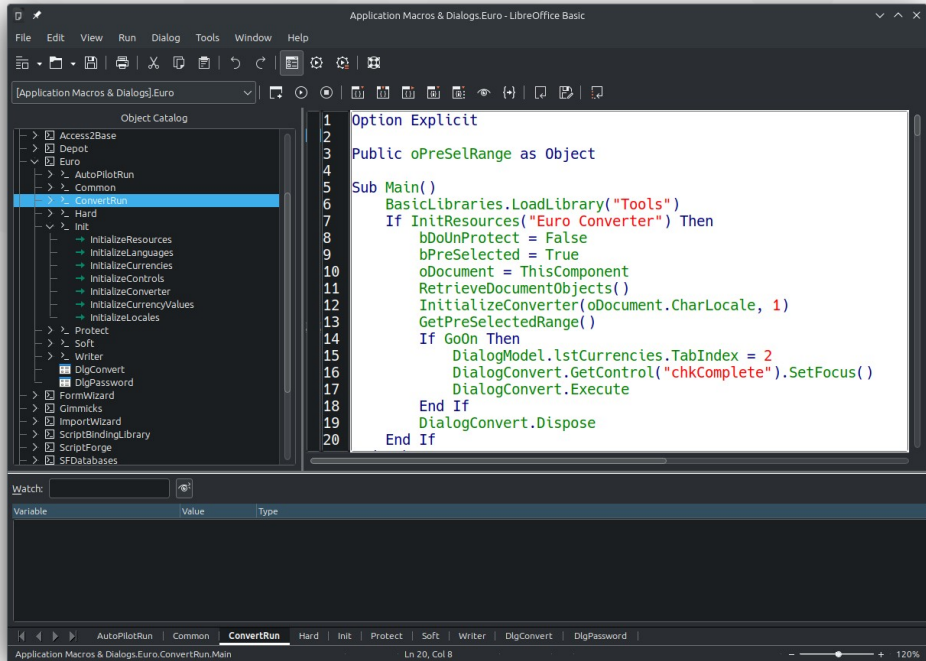
The screenshot shows the GitHub interface for the repository 'LibOCon_2023_Scripting' by user 'rafaelhlma'. The repository is public and has 1 branch (main) and 0 tags. The commit history shows 4 commits. The files listed are:

File	Description	Time
LibOCon2023	Basic scripts	2 minutes ago
NumberGenerator	Number generator dialog	5 minutes ago
README.md	Initial commit	9 minutes ago
conference.py	Initial Upload	6 minutes ago
numbergen.py	Initial Upload	6 minutes ago

Link: https://github.com/rafaelhlma/LibOCon_2023_Scripting

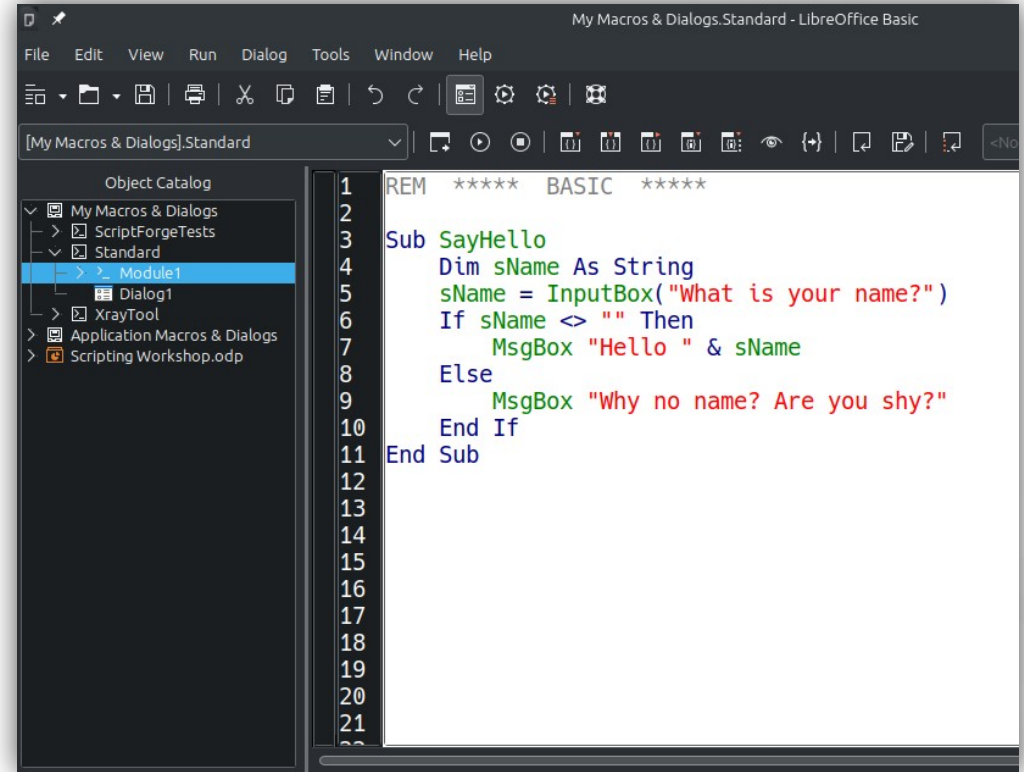
Starting with the Basics

- ▶ LibreOffice has a built-in IDE for creating scripts with the Basic language
- ▶ It can also be used to create and edit dialogs



Starting with the Basics

- Open any LibreOffice application (f.i. open Calc)
- Go to Tools – Macros – Edit Macros
- A default module named “Module 1” from the “Standard” library will be selected
- Create the sub SayHello by writing the next code
- Place the cursor anywhere inside the sub
- Click the Run button (or press F5)



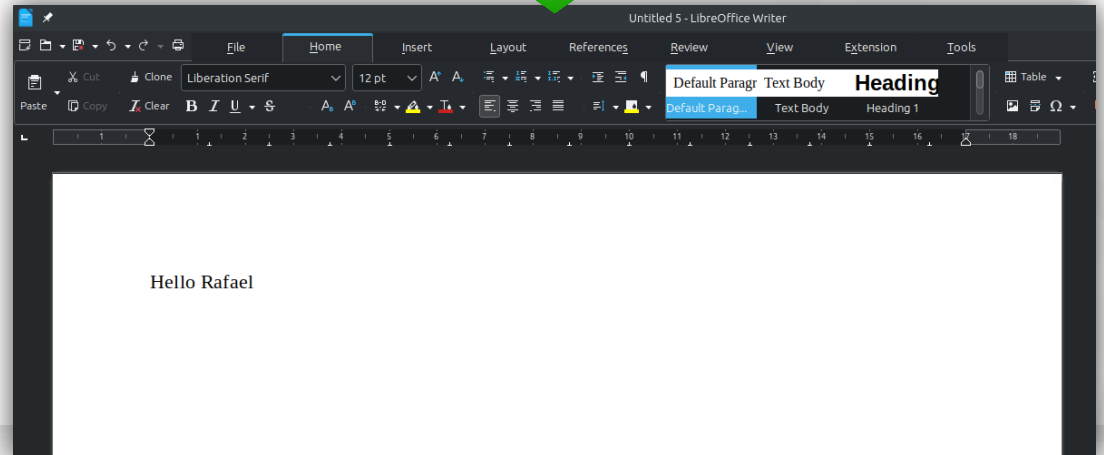
The screenshot shows the LibreOffice Basic editor window titled "My Macros & Dialogs.Standard - LibreOffice Basic". The menu bar includes File, Edit, View, Run, Dialog, Tools, Window, and Help. The toolbar contains icons for file operations and execution. The Object Catalog on the left shows a tree structure with "My Macros & Dialogs" expanded to "Standard", where "Module1" is selected. The main editor area displays the following BASIC code:

```
1 REM ***** BASIC *****
2
3
4 Sub SayHello
5   Dim sName As String
6   sName = InputBox("What is your name?")
7   If sName <> "" Then
8       MsgBox "Hello " & sName
9   Else
10      MsgBox "Why no name? Are you shy?"
11   End If
12 End Sub
13
14
15
16
17
18
19
20
21
22
```

Starting with the Basics

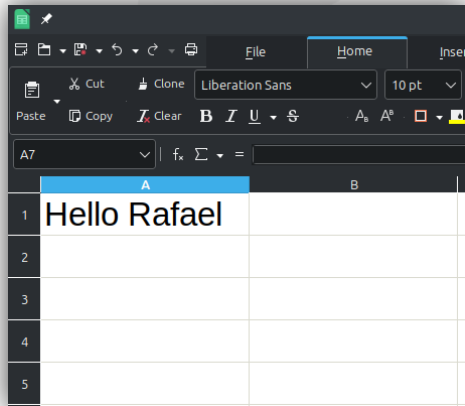
- ▶ Open any LibreOffice application
- ▶ Add the following subroutine
- ▶ This script will create a Writer document with some text in it

```
1 REM ***** BASIC *****
2
3 Option Explicit
4
5 Sub SayHelloWriter
6     Dim sName As String
7     sName = InputBox("What is your name?")
8     Dim oDoc As Object, oText As Object
9     oDoc = StarDesktop.loadComponentFromUrl("private:factory/swriter", _
10                                             "_blank", 0, Array())
11     oText = oDoc.getText()
12     oText.insertString(oText.End, "Hello " & sName & CHR$(10), False)
13 End Sub
14
15
```



Starting with the Basics

- ▼ Open LibreOffice Calc
- ▼ Create the next subroutine and run it
- ▼ It will write the provided name in cell "A1"



```
1 REM ***** BASIC *****
2
3 Option Explicit
4
5 Sub SayHelloCalc
6     Dim sName As String
7     sName = InputBox("What is your name?")
8     Dim oCell As Object
9     oCell = ThisComponent.Sheets(0).getCellRangeByName("A1")
10    oCell.SetString("Hello " & sName)
11 End Sub
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
```


Starting with the Basics

▼ What are *StarDesktop* and *ThisComponent*?

StarDesktop

Special variable available in Basic to access the desktop component

More info:

<https://help.libreoffice.org/latest/en-US/text/sbasic/shared/stardesktop.html>

ThisComponent

Special variable that provides access to the current document

More info:

<https://help.libreoffice.org/latest/en-US/text/sbasic/shared/03132200.html>

Starting with the Basics

- ▶ Open LibreOffice Calc
- ▶ Create the next subroutine and run it
- ▶ It will simply create a table with Z values (standard normal distribution) and cumulative probabilities

z-Value	P(Z<z)
-3	0,001349898
-2,5	0,006209665
-2	0,022750132
-1,5	0,066807201
-1	0,158655254
-0,5	0,308537539
0	0,5
0,5	0,691462461
1	0,841344746
1,5	0,933192799
2	0,977249868
2,5	0,993790335
3	0,998650102

```
1 REM ***** BASIC *****
2
3 Option Explicit
4
5 Sub CreateStdDistrTable
6     Dim oSheet As Object, oRange As Object, oCell As Object
7     oSheet = ThisComponent.Sheets(0)
8     oRange = oSheet.getCellRangeByName("A1:B1")
9     oRange.setDataArray(Array(Array("z-Value", "P(Z<z)")))
10    Dim zValue As Double, nRow As Integer, sAddress As String
11    nRow = 1
12    For zValue = -3 To 3 Step 0.5
13        oCell = oSheet.getCellByPosition(0, nRow)
14        sAddress = oCell.AbsoluteName
15        oCell.setValue(zValue)
16        oCell = oSheet.getCellByPosition(1, nRow)
17        oCell.setFormula("=NORM.S.DIST(" & sAddress & ";1)")
18        nRow = nRow + 1
19    Next zValue
20 End Sub
21
```



Starting with the Basics

- ▼ This code formats the table with a header and borders

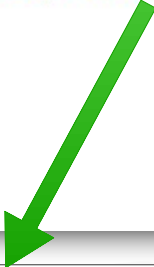
	A	B
1	z-Value	P(Z<z)
2	-3	0,001349898
3	-2,5	0,006209665
4	-2	0,022750132
5	-1,5	0,066807201
6	-1	0,158655254
7	-0,5	0,308537539
8	0	0,5
9	0,5	0,691462461
10	1	0,841344746
11	1,5	0,933192799
12	2	0,977249868
13	2,5	0,993790335
14	3	0,998650102

```
1 REM ***** BASIC *****
2
3 Option Explicit
4
5 Sub FormatRange
6   Dim oRange As Object
7   ' Format header
8   oRange = ThisComponent.Sheets(0).getCellRangeByName("A1:B1")
9   oRange.CellBackColor = RGB(200, 200, 200)
10  oRange.CharWeight = com.sun.star.awt.FontWeight.BOLD
11  'Format the entire table
12  oRange = ThisComponent.Sheets(0).getCellRangeByName("A1:B14")
13  oRange.CharFontName = "Arial"
14  ' Align contents at the center
15  Dim eAlign : eAlign = com.sun.star.table.CellHoriJustify
16  oRange.HoriJustify = eAlign.CENTER
17  ' Create a border format object
18  Dim lineFormat As New com.sun.star.table.BorderLine2
19  lineFormat.LineStyle = com.sun.star.table.BorderLineStyle.SOLID
20  lineFormat.LineWidth = 10
21  ' Set borders around all cells
22  oRange.TopBorder = lineFormat
23  oRange.BottomBorder = lineFormat
24  oRange.LeftBorder = lineFormat
25  oRange.RightBorder = lineFormat
26 End Sub
27
```

Starting with the Basics

- ▼ The code below calls both Subs and makes sure they are only executed on Calc documents

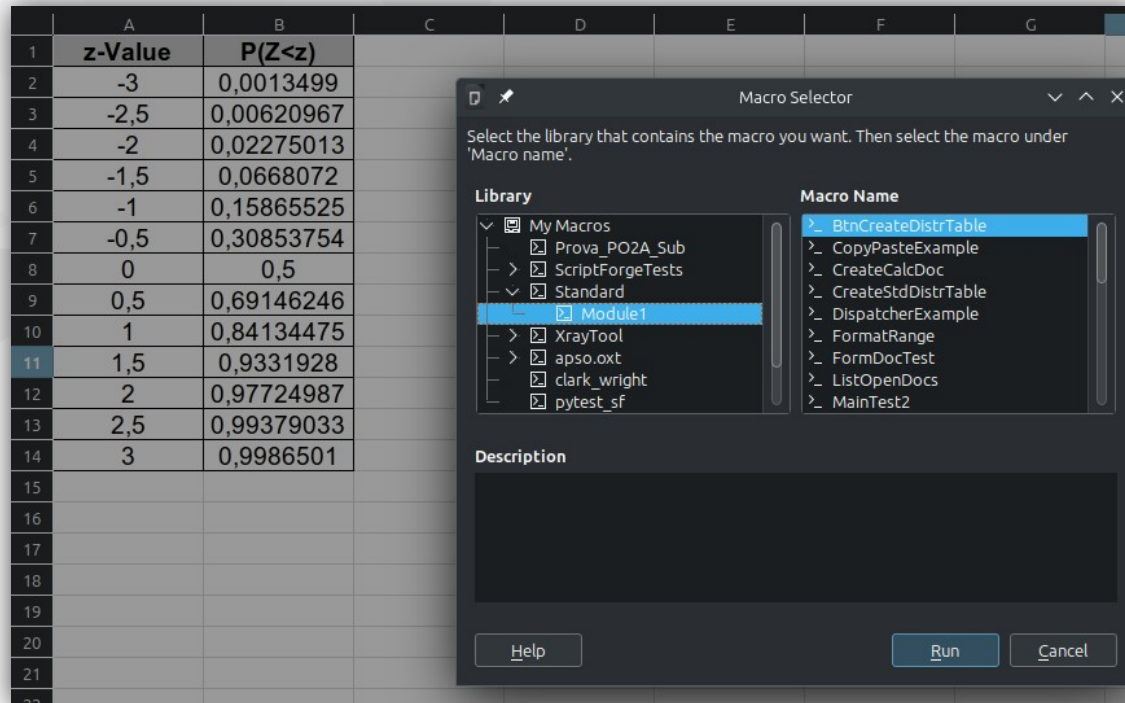
```
98 Sub BtnCreateDistrTable
99     ' Check if we are in a Calc document
100     If Not ThisComponent.SupportsService("com.sun.star.sheet.SpreadsheetDocument") Then
101         Exit Sub
102     End If
103     ' Call both sub routines
104     CreateStdDistrTable
105     FormatRange
106 End Sub
```



Calc	com.sun.star.sheet.SpreadsheetDocument
Draw	com.sun.star.drawing.DrawDocument
Impress	com.sun.star.presentation.PresentationDocument
Writer	com.sun.star.text.TextDocument
Base	com.sun.star.sdb.OfficeDatabaseDocument

Running Scripts

- ▶ The easiest way to run a script is to go to **Tools – Macros – Run Macro** and then use the Macro Selector to choose the desired macro



The screenshot displays a LibreOffice Calc spreadsheet with a table of z-values and their corresponding P(Z < z) values. The table is as follows:

	A	B	C	D	E	F	G
1	z-Value	P(Z<z)					
2	-3	0,0013499					
3	-2,5	0,00620967					
4	-2	0,02275013					
5	-1,5	0,0668072					
6	-1	0,15865525					
7	-0,5	0,30853754					
8	0	0,5					
9	0,5	0,69146246					
10	1	0,84134475					
11	1,5	0,9331928					
12	2	0,97724987					
13	2,5	0,99379033					
14	3	0,9986501					
15							
16							
17							
18							
19							
20							
21							
22							

Overlaid on the spreadsheet is the 'Macro Selector' dialog box. The dialog contains the following elements:

- Library:** A tree view showing 'My Macros' expanded, with sub-items 'Prova_PO2A_Sub', 'ScriptForgeTests', 'Standard', and 'Module1' (selected).
- Macro Name:** A list of macros including 'BtnCreateDistrTable' (selected), 'CopyPasteExample', 'CreateCalcDoc', 'CreateStdDlstrTable', 'DispatcherExample', 'FormatRange', 'FormDocTest', 'ListOpenDocs', and 'MainTest2'.
- Description:** A text area for the selected macro's description, which is currently empty.
- Buttons:** 'Help', 'Run', and 'Cancel' buttons at the bottom.

Running Scripts

- ▶ You can also add controls to the document and associate macros with control events. For instance, create a button and associate it with our macro:

The screenshot shows a LibreOffice Calc spreadsheet with a table of z-values and their corresponding P(Z < z) values. A button labeled 'Generate Table' is placed on the spreadsheet. Two dialog boxes are overlaid on the spreadsheet. The top dialog box is 'Properties: Push Button' with the 'Events' tab selected. The 'Mouse button pressed' event is selected, and a green arrow points to the ellipsis button next to it. The bottom dialog box is 'Assign Action' with the 'Assignments' tab selected. The 'Mouse button pressed' event is selected, and the 'Standard.Module1.BtnCreateDistrTa' macro is assigned to it. A green arrow points to the 'Macro...' button in the 'Assign' section.

	A	B	C	D	E	F	G	H	I
1	z-Value	P(Z<z)							
2	-3	0,0013499							
3	-2,5	0,00620967							
4	-2	0,02275013							
5	-1,5	0,0668072							
6	-1	0,15865525							
7	-0,5	0,30853754							
8	0	0,5							
9	0,5	0,69146246							
10	1	0,84134475							
11	1,5	0,9331928							
12	2	0,97724987							
13	2,5	0,99379033							
14	3	0,9986501							
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

How do I learn all of that?

API references for the previous example

▼ (service) com.sun.star.table.CellRange

https://api.libreoffice.org/docs/idl/ref/servicecom_1_1sun_1_1star_1_1table_1_1CellRange.html

▼ (service) com.sun.star.text.CellRange

https://api.libreoffice.org/docs/idl/ref/servicecom_1_1sun_1_1star_1_1text_1_1CellRange.html

▼ (service) com.sun.star.style.CharacterProperties

https://api.libreoffice.org/docs/idl/ref/servicecom_1_1sun_1_1star_1_1style_1_1CharacterProperties.html

▼ (struct) com.sun.star.table.BorderLine2

https://api.libreoffice.org/docs/idl/ref/structcom_1_1sun_1_1star_1_1table_1_1BorderLine2.html

▼ (constant group) com.sun.star.table.BorderLineStyle

https://api.libreoffice.org/docs/idl/ref/namespacecom_1_1sun_1_1star_1_1table_1_1BorderLineStyle.html

▼ (constant group) com.sun.star.awt.FontWeight

https://api.libreoffice.org/docs/idl/ref/namespacecom_1_1sun_1_1star_1_1awt_1_1FontWeight.html

How do I learn all of that?

- ▶ The learning curve may seem steep at first, but there are tools and learning resources to help smooth it
- ▶ **XRay tool:** used to inspect objects and helps to discover their properties and methods

```
1 REM ***** BASIC *****
2
3 Option Explicit
4
5 Sub XrayExample
6     ' Inspect the object ThisComponent
7     XRay ThisComponent
8 End Sub
9
```



The screenshot shows the XRay Rev 6.0 en application window. The title bar reads "Xray Rev 6.0 en". The main window displays the properties of the "ScModelObj" object. The "Properties" tab is selected, and the "Display" section has "A...Z" checked. The "Ligne Indicated by the caret" section has "API Doc", "?", and "Xray" buttons. The "Initial object" dropdown is set to "com.sun.star.uno.XInterface". Below this, a table lists the properties of the object.

Property name	Data Type	Value	Comments
Printer	[]struct		(get, set)
PropertySetInfo	object		(get), read-only
RDFRepository	object		(get), read-only
RecordChanges	boolean	False	
ReferenceDevice	object		read-only
RegularExpressions	boolean	False	
RowLabelRanges	object		
RuntimeUID	string	"14"	read-only
ScriptContainer	object		attribute, read-or
ScriptProvider	object		(get), read-only
SheetLinks	object		
Sheets	object		(get), read-only
SpellOnline	boolean	False	
StandardDecimals	integer	-1	
StringValue	string	"vnd.sun.star.tdoc:/14/"	attribute, read-or
StyleFamilies	object		(get), read-only

Download link:

https://berma.pagesperso-orange.fr/Files_en/XrayTool60_en.odt

How do I learn all of that?

LibreOffice Basic official help pages

The screenshot shows the LibreOffice 7.6 Help interface. At the top, there's a search bar and a 'Please support us!' button. The main content area is titled 'Programming with LibreOffice Basic' and contains the following text:

This is where you find general information about working with macros and LibreOffice Basic.

Basics
This section provides the fundamentals for working with LibreOffice Basic.

Syntax
This section describes the basic syntax elements of LibreOffice Basic. For a detailed description please refer to the LibreOffice Basic Guide which is available separately.

Integrated Development Environment (IDE)
This section describes the Integrated Development Environment for LibreOffice Basic.

Document Event-Driven Macros
This section describes how to assign scripts to application, document or form events.

On the left side, there's an 'Index' section with a search bar and a list of topics including 'Basic', 'Abs function', 'Access2Base', 'Alternative Python Scripts Organizer', 'ampersand symbol -- in literal notation', 'AND operator (logical)', 'API -- ActionEvent', and 'API -- awt.XControl'. On the right side, there's a 'Contents' section with a list of topics including 'Text Documents (Writer)', 'HTML Documents (Writer Web)', 'Spreadsheets (Calc)', 'Presentations (Impress)', 'Drawings (Draw)', 'Database Functionality (Base)', 'Formulas (Math)', 'Charts and Diagrams', 'Macros and Scripting', 'LibreOffice BASIC', 'General Information and User Interface Usage', 'Command Reference', 'Compiler options', 'Using Procedures and Functions', 'Libraries, Modules and Dialogs', 'How to Read Syntax Diagrams', 'Functions, Statements and Operators', 'Alphabetic List of Functions, Statements and Operators', 'Advanced Basic Libraries', 'ScriptForge Library', 'Overview of the ScriptForge Library', 'List of all ScriptForge methods and properties', 'Creating Python Scripts with ScriptForge', 'ScriptForge method signatures', 'Array service', 'Base service', 'Basic service', and 'Calc service'.

Link: <https://help.libreoffice.org/latest/en-US/text/sbasic/shared/01000000.html>

How do I learn all of that?

LibreOffice Developer's Guide

LibreOffice Developer's Guide

[Add languages](#)

[Page](#) [Discussion](#) [Read](#) [View source](#) [View history](#)

[< Documentation](#) | [DevGuide](#)

[Contributing to the Developer's Guide](#)

What This Manual Covers

This manual describes how to write programs using the component technology UNO (Universal Network Objects) with LibreOffice.

Most examples provided are written in Java. As well as Java, the language binding for C++, the UNO access for LibreOffice Basic and the OLE Automation bridge that uses LibreOffice through Microsoft's component technology COM/DCOM is described.

How This Book is Organized

Every page of this book has a Table of Contents at the right side of the page. This TOC shows the content of the current part and navigation links to browse parts and pages of this book.

First Steps

The First Steps chapter describes the setting up of a Java UNO development environment to achieve the solutions you need. At the end of this chapter, you will be equipped with the essentials required for the following chapters about the LibreOffice applications.

Professional UNO

This chapter introduces API and UNO concepts and explains the specifics of the programming languages and technologies that can be used with UNO. It will help you to write industrial strength UNO programs, use one of the languages besides Java or improve your understanding of the API reference.

LibreOffice Developer's Guide

- [First Steps](#)
- [Professional UNO](#)
- [Writing UNO Components](#)
- [Extensions](#)
- [Advanced UNO](#)
- [Office Development](#)
- [Text Documents](#)
- [Spreadsheet Documents](#)
- [Drawing Documents and Presentation Documents](#)
- [Charts](#)
- [LibreOffice Basic](#)
- [Database Access](#)
- [Forms](#)
- [Universal Content Broker](#)
- [Configuration Management](#)
- [JavaBean for Office Components](#)
- [Accessibility](#)
- [Scripting Framework](#)
- [Graphical User Interfaces](#)
- [Guidelines and](#)

Link: https://wiki.documentfoundation.org/Documentation/DevGuide/LibreOffice_Developers_Guide

How do I learn all of that?

Python LibreOffice Programming



The screenshot shows the documentation page for Python LibreOffice Programming. The page is dark-themed and features a sidebar on the left with navigation options. The main content area displays the title 'Python LibreOffice Programming' and a list of chapters and parts.

Navigation:

- Home icon / Python LibreOffice Programming
- EDIT ON GITHUB

Search: Search docs

BOOK:

- Python LibreOffice Programming
 - Preface
 - Part 1: Basics
 - Part 2: Writer
 - Part 3: Draw & Impress
 - Part 4: Calc
 - Part 5: Charts

HELP:

- Help Documentation

GUIDES:

- Guides

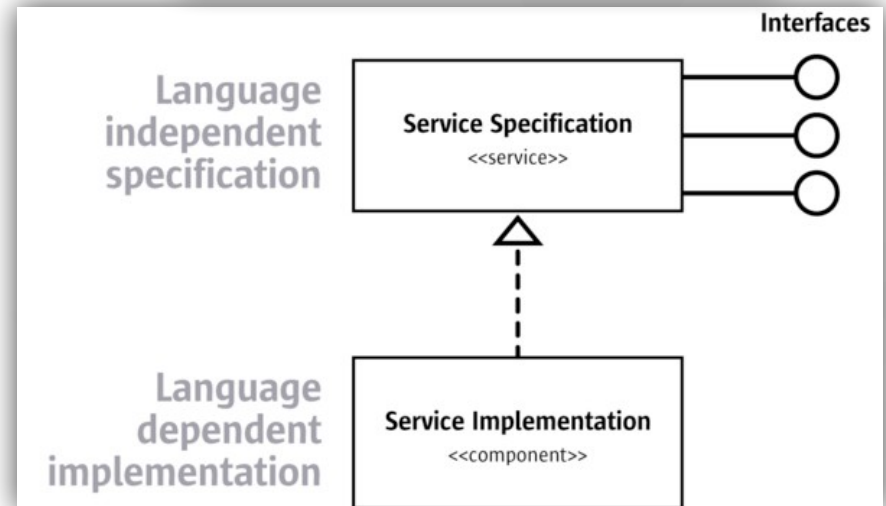
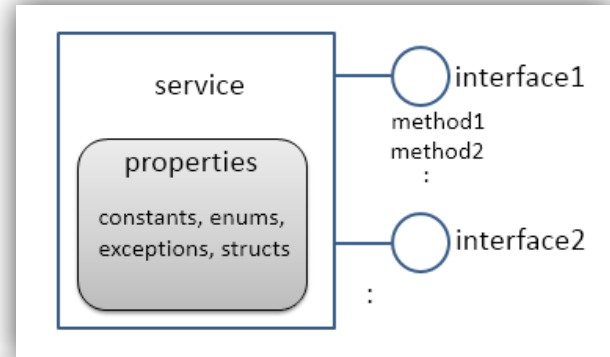
Table of Contents:

- Preface
- Part 1: Basics
 - Chapter 1. LibreOffice API Concepts
 - Chapter 2. Starting and Stopping
 - Chapter 3. Examining
 - Chapter 4. Listening, and Other Techniques
- Part 2: Writer
 - Chapter 5. Text API Overview
 - Chapter 6. Text Styles
 - Chapter 7. Text Content Other than Strings
 - Chapter 8. Graphic Content
 - Chapter 9. Text Search and Replace
 - Chapter 10. The Linguistics API

Link: <https://python-ooo-dev-tools.readthedocs.io/en/latest/odev/index.html>

The UNO API

- ▼ UNO stands for Universal Network Objects and is the base component technology for LibreOffice
- ▼ It allows to write components using multiple languages (C++, Java, Basic and Python)
- ▼ The Scripting framework allows to create scripts using Basic, Python, JavaScript and BeanShell
- ▼ Terminology in the API: interfaces, services, properties, constants and components




The UNO API

Service Manager

- Allows to instantiate UNO services and use them in scripts

```
1 REM ***** BASIC *****
2
3 Option Explicit
4
5 Sub SpellCheckerExample
6     Dim oSpellChecker As Object, bReturn As Boolean
7     Dim aLocale As New com.sun.star.lang.Locale
8     aLocale.Language = "en"
9     aLocale.Country = "US"
10    ' Create an instance of the SpellChecker service
11    oSpellChecker = CreateUnoService("com.sun.star.linguistic2.SpellChecker")
12    ' Use the service to test if a word is valid
13    Dim sWord As String
14    sWord = InputBox("Type a word")
15    bReturn = oSpellChecker.IsValid(sWord, aLocale, Array())
16    If bReturn Then
17        MsgBox "The word '" & sWord & "' is spelled correctly"
18    Else
19        MsgBox "The word '" & sWord & "' is not spelled correctly"
20    End If
21 End Sub
22
23
```



Service documentation:

https://api.libreoffice.org/docs/idl/ref/servicecom_1_1sun_1_1star_1_1linguistic2_1_1SpellChecker.html

UNO Commands

Command Dispatcher: you can also dispatch UNO commands in your scripts using the DispatchHelper service

```
5 Sub DispatcherExample
6   Dim oFrame As Object, oDispatcher As Object
7   oFrame = ThisComponent.CurrentController.Frame
8   oDispatcher = CreateUnoService("com.sun.star.frame.DispatchHelper")
9   ' Dispatch the .uno:Save command (equivalent to File - Save)
10  oDispatcher.executeDispatch(oFrame, ".uno:Save", "", , Array())
11 End Sub
```

There are various commands that can be dispatched, for a full list, see <https://wiki.documentfoundation.org/Development/DispatchCommands>

UNO Commands

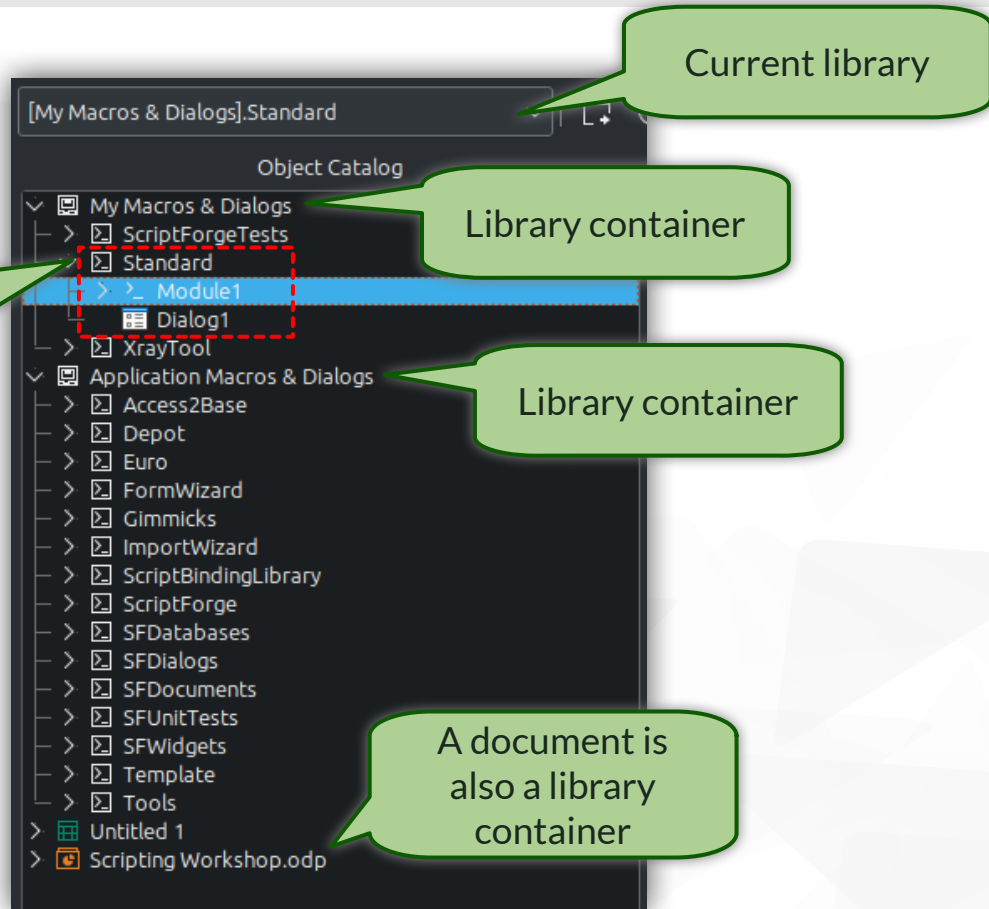
- ▼ The next example uses UNO commands to copy cell A1 and paste it into cell A2

```
1 REM ***** BASIC *****
2
3 Option Explicit
4
5 Sub CopyPasteExample
6     ' Instantiate the dispatcher
7     Dim oFrame As Object, oDispatcher As Object
8     oFrame = ThisComponent.CurrentController.Frame
9     oDispatcher = CreateUnoService("com.sun.star.frame.DispatchHelper")
10    ' Moves to cell A1
11    Dim args1(0) As New com.sun.star.beans.PropertyValue
12    args1(0).Name = "ToPoint"
13    args1(0).Value = "$A$1"
14    oDispatcher.executeDispatch(oFrame, ".uno:GoToCell", "", , args1())
15    ' Copy its contents (equivalent to Edit - Copy)
16    oDispatcher.executeDispatch(oFrame, ".uno:Copy", "", , Array())
17    ' Moves to cell A2
18    args1(0).Value = "$A$2"
19    oDispatcher.executeDispatch(oFrame, ".uno:GoToCell", "", , args1())
20    ' Paste contentx (equivalent to Edit - Paste)
21    oDispatcher.executeDispatch(oFrame, ".uno:Paste", "", , Array())
22 End Sub
23
```


Organizing Scripts

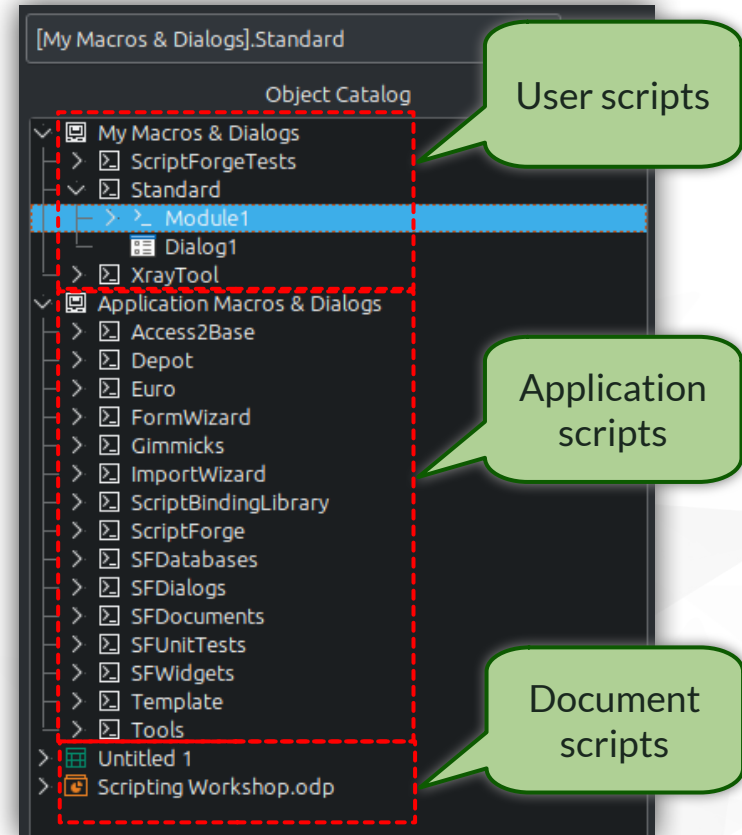
Containers, libraries, modules and dialogs

A library may contain multiple modules and dialogs



Organizing Scripts

- ▼ **My Macros & Dialogs:** available to all documents for the current user
- ▼ **Application Macros & Dialogs:** available to all users and documents (read-only)
- ▼ **Document Macros & Dialogs:** used to embed macros in a document



ScriptForge Library

- Offers a variety of services and methods to simplify the creation of Basic and Python scripts by hiding the complexity of the UNO API

Category	Services		
LibreOffice Basic	Array Dictionary	Exception FileSystem	String TextStream
Document Content	Base Calc Chart	Database Datsheet	Document Writer
User Interface	Dialog DialogControl Form	FormControl Menu	PopupMenu UI
Utilities	Basic L10N Platform	Region Services Session	Timer UnitTest

Access document contents

Utilities to simplify common tasks performed by macros

Extend the Basic API

Access dialogs and dialog controls, as well as UI elements

ScriptForge Library

- ▼ We need to load the ScriptForge library before using it

```
5 Sub ListOpenDocs
6     ' We need to make sure the ScriptForge library is loaded
7     GlobalScope.BasicLibraries.LoadLibrary("ScriptForge")
8     ' ...
9 End Sub
```

- ▼ We can create a library loader do make it easier

```
5 Sub RequiresSF
6     If Not GlobalScope.BasicLibraries.IsLibraryLoaded("ScriptForge") Then
7         GlobalScope.BasicLibraries.LoadLibrary("ScriptForge")
8     End If
9 End Sub
10
11 Sub ListOpenDocs
12     RequiresSF
13     Dim svcUI As Object
14     svcUI = CreateScriptService("UI")
15     ' ...
16 End Sub
```

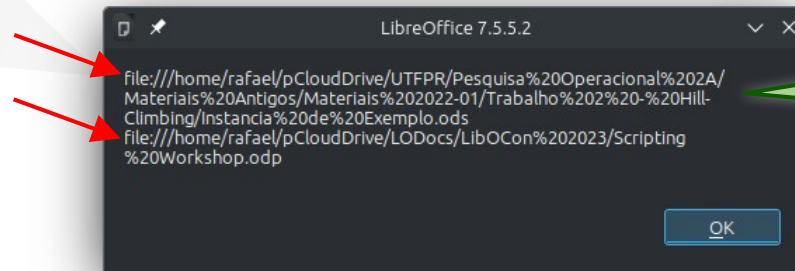
We just need to load SF just once in the same session; use this only if you're unsure SF will have already been loaded

ScriptForge Library

▼ Example: Check all open document windows

```
11 Sub ListOpenDocs
12     RequiresSF
13     Dim svcUI As Object, arrDocs As Object
14     svcUI = CreateScriptService("UI")
15     ' Array with the list of open documents
16     arrDocs = svcUI.Documents
17     ' Concatenate the names in the array
18     Dim sOpenDocs As String
19     sOpenDocs = Join(arrDocs, CHR$(13))
20     MsgBox sOpenDocs
21 End Sub
```

The UI service provides access to all open windows



The documents here are shown using URL notation

ScriptForge Library

- ▼ **Example:** Open an existing Calc document and maximize its window

```
5 Sub OpenCalcDoc
6   Dim sDocPath As String, svcUI As Object, oDoc As Object
7   sDocPath = "file:///home/rafael/Documents/mydoc.ods"
8   svcUI = CreateScriptService("UI")
9   oDoc = svcUI.OpenDocument(sDocPath)
10  svcUI.Maximize(sDocPath)
11  MsgBox "This is a " & oDoc.DocumentType & " file"
12 End Sub
```

In this macro
"oDoc" is an
instance of the
"Calc" service

ScriptForge Library

- ▼ **Example:** Creates an empty Calc document, adds some content and saves it without showing the window to the user

```
5 Sub CreateCalcDoc
6   Dim sDocPath As String, svcUI As Object, oDoc As Object
7   sDocPath = "file:///home/rafael/Documents/newdoc.ods"
8   svcUI = CreateScriptService("UI")
9   oDoc = svcUI.CreateDocument(DocumentType := "Calc", Hidden := True)
10  oDoc.SetValue("A1", "Hello")
11  oDoc.SaveAs(sDocPath, Overwrite := True)
12  oDoc.CloseDocument()
13 End Sub
```


ScriptForge Library

- Services are composed of properties and methods (see their documentation in the corresponding help pages); Below is the “Document” service:

Properties			
Name	Readonly	Type	Description
CustomProperties (*)	No	Dictionary service	Returns a <code>ScriptForge.Dictionary</code> object instance. After update, can be passed again to the property for updating the document. Individual items of the dictionary may be either strings, numbers, (Basic) dates or com.sun.star.util.Duration items.
Description (*)	No	String	Gives access to the Description property of the document (also known as "Comments")
DocumentProperties (*)	Yes	Dictionary service	Returns a <code>ScriptForge.Dictionary</code> object containing all the entries. Document statistics are included. Note that they are specific to the type of document. As an example, a Calc document includes a "CellCount" entry. Other documents do not.
DocumentType	Yes	String	String value with the document type ("Base", "Calc", "Writer", etc)
ExportFilters	Yes	String array	Returns a list with the export filter names applicable to the current document as a zero-based array of strings. Filters used for both import/export are also returned.

List of Methods in the Document Service

[Activate](#) [PrintOut](#) [SaveAs](#)
[CloseDocument](#) [RemoveMenu](#) [SaveCopyAs](#)
[CreateMenu](#) [RunCommand](#) [SetPrinter](#)
[ExportAsPDF](#) [Save](#)

ScriptForge Library

- ▼ This help page has a list of all properties and methods provided by all ScriptForge services

List of all ScriptForge methods and properties

This help page shows all methods and properties available in the ScriptForge library by service with links to the corresponding documentation.



The **Basic** source code for all ScriptForge services is available via **Application Macros and Dialogs** and is distributed in multiple libraries: ScriptForge, SFdatabases, SFDialogs, SFDocuments, SFUnitTests and SFWidgets. The **Python** portion of the source code is available in the **program\scriptforge.py** file under the LibreOffice installation directory.

ScriptForge.Array service

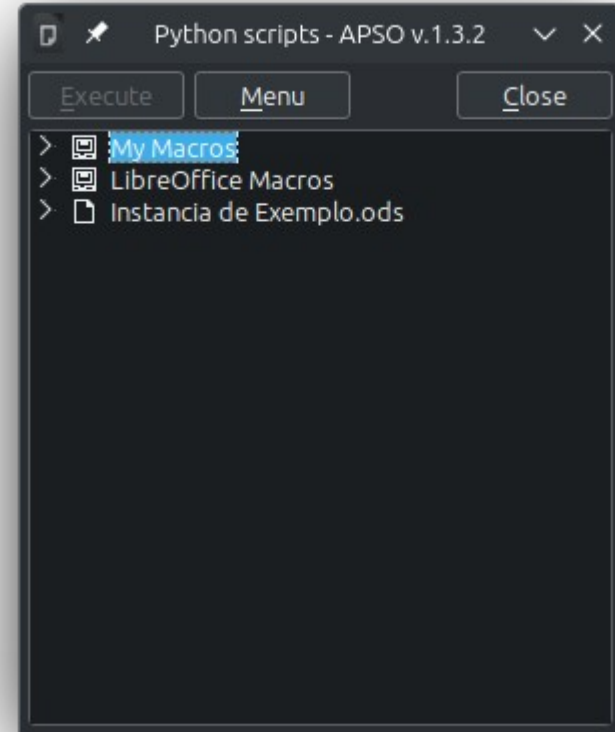
List of Methods in the Array Service

Append	Flatten	Reverse
AppendColumn	ImportFromCSVFile	Shuffle
AppendRow	IndexOf	Slice
Contains	Insert	Sort
ConvertToDictionary	InsertSorted	SortColumns
Copy	Intersection	SortRows
CountDims	Join2D	Transpose
Difference	Prepend	TrimArray
ExportToTextFile	PrependColumn	Union
ExtractColumn	PrependRow	Unique
ExtractRow	Rangelnit	

Link: https://help.libreoffice.org/latest/en-US/text/sbasic/shared/03/sf_toc.html

Creating Python Scripts

- ✔ LibreOffice has supported Python scripts since its first release in 2010
- ✔ The default LibreOffice installation comes with a bundled Python interpreter
- ✔ However, LibreOffice does not have an integrated Python IDE (yet 😊)
- ✔ To make it easier to create and run Python scripts, it is recommended to use the APSO (Alternative Script Organizer for Python) extension

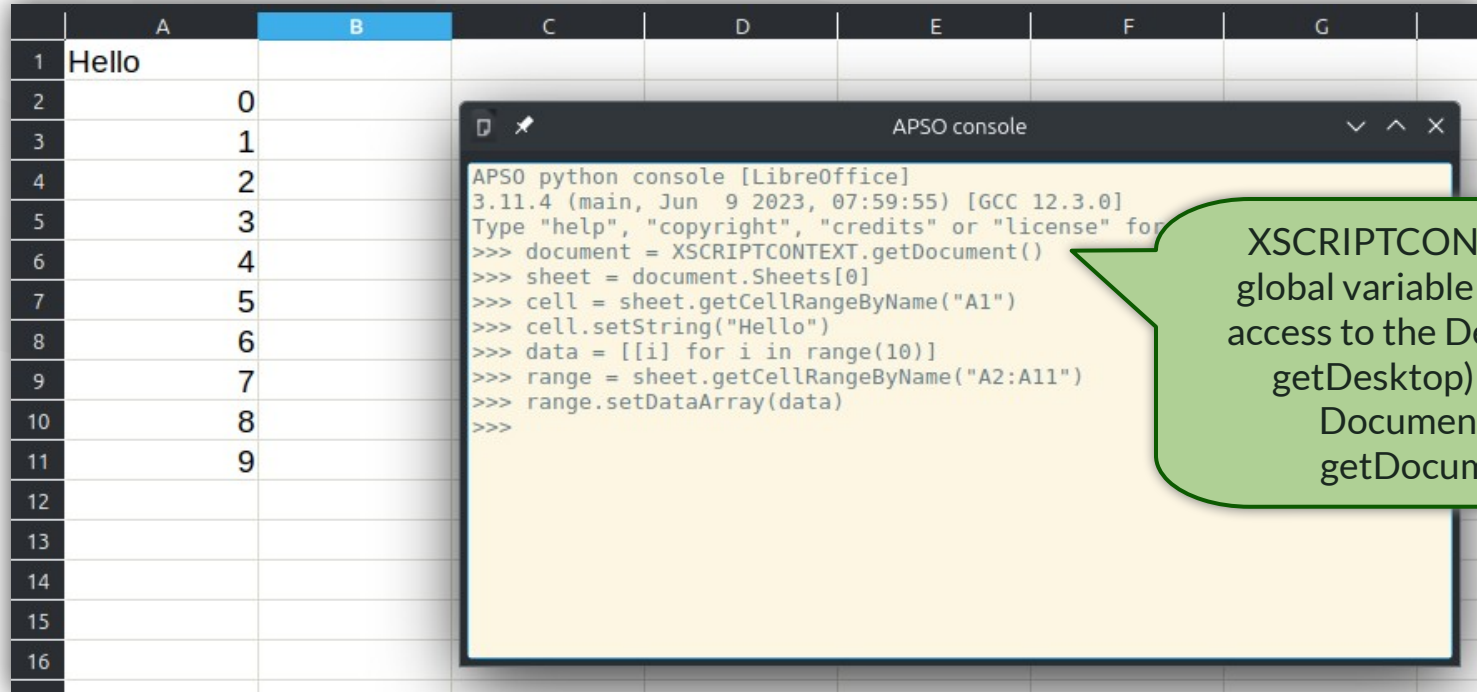


Download link:

<https://extensions.libreoffice.org/en/extensions/show/apso-alternative-script-organizer-for-python>

Creating Python Scripts

- ▶ You can use APSO's Python console to execute Python commands



The screenshot shows a spreadsheet with the following data:

	A	B	C	D	E	F	G
1	Hello						
2		0					
3		1					
4		2					
5		3					
6		4					
7		5					
8		6					
9		7					
10		8					
11		9					
12							
13							
14							
15							
16							

The APSO console window shows the following Python code:

```
APSO python console [LibreOffice]
3.11.4 (main, Jun 9 2023, 07:59:55) [GCC 12.3.0]
Type "help", "copyright", "credits" or "license" for more
>>> document = XSCRIPTCONTEXT.getDocument()
>>> sheet = document.Sheets[0]
>>> cell = sheet.getCellRangeByName("A1")
>>> cell.setString("Hello")
>>> data = [[i] for i in range(10)]
>>> range = sheet.getCellRangeByName("A2:A11")
>>> range.setDataArray(data)
>>>
```

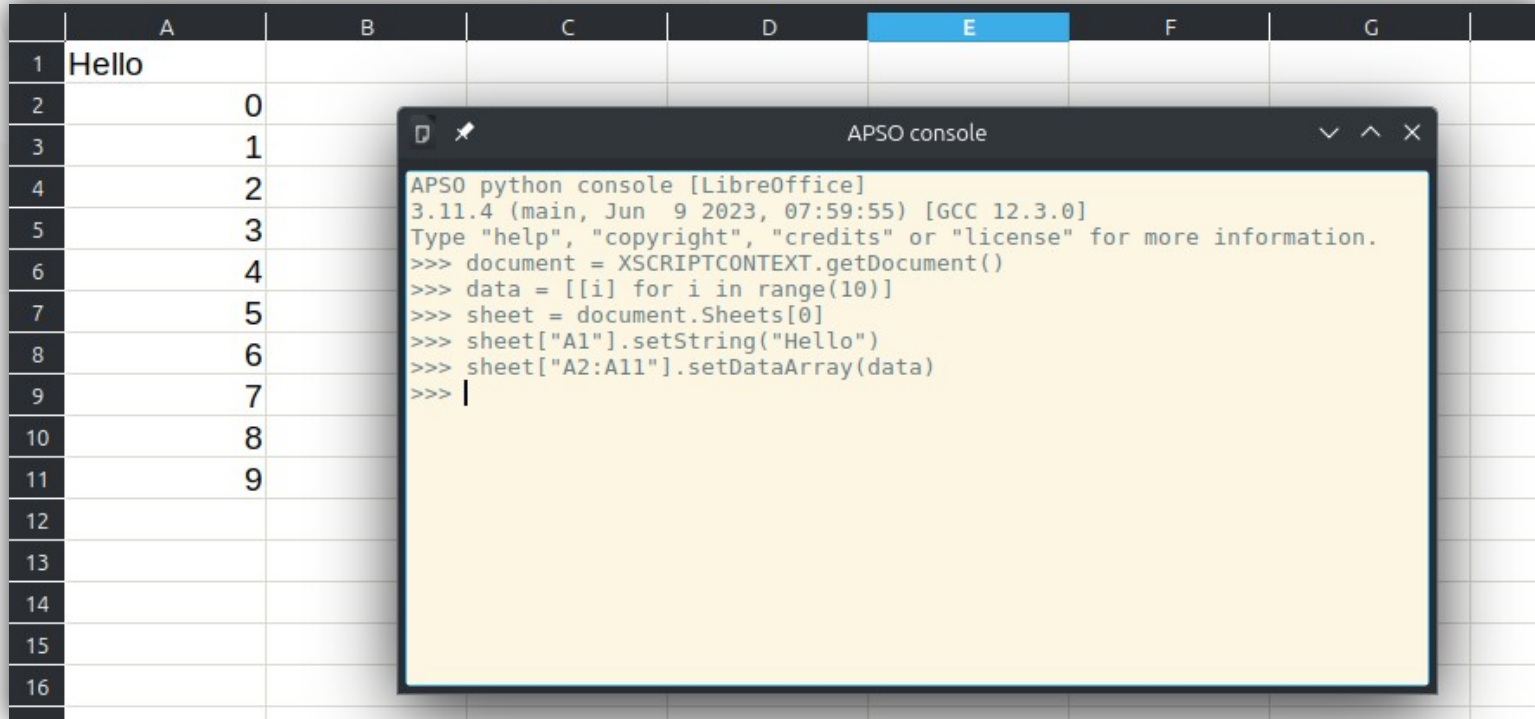
XSCRIPTCONTEXT is a global variable that gives access to the Desktop (via `getDesktop`) and the Document (via `getDocument`)

XSCRIPTCONTEXT is documented here:

https://help.libreoffice.org/latest/en-US/text/sbasic/python/python_programming.htm

Creating Python Scripts

- ▼ In Python scripts we can use a more “Pythonic” syntax:



The image shows a spreadsheet application window with a grid. The first row contains the text "Hello" in cell A1. The first column contains numbers from 0 to 9 in cells B1 through B11. A terminal window titled "APSO console" is overlaid on the spreadsheet, displaying the following Python code and its output:

```
APSO python console [LibreOffice]
3.11.4 (main, Jun 9 2023, 07:59:55) [GCC 12.3.0]
Type "help", "copyright", "credits" or "license" for more information.
>>> document = XSCRIPTCONTEXT.getDocument()
>>> data = [[i] for i in range(10)]
>>> sheet = document.Sheets[0]
>>> sheet["A1"].setString("Hello")
>>> sheet["A2:A11"].setDataArray(data)
>>> |
```

Creating Python Scripts

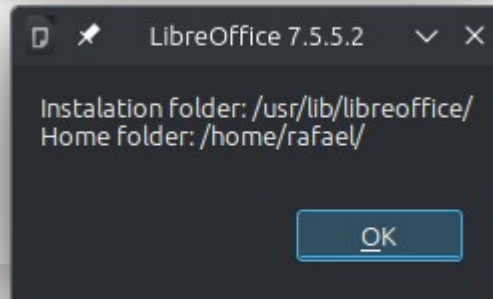
Where can we create user scripts that can be used across documents?

- ▼ Application Macros (all users)
 - ▼ **For Windows:** {Installation}\share\Scripts\python
 - ▼ **For Linux and macOS:** {Installation}/share/Scripts/python
- ▼ User Macros (current user only)
 - ▼ **For Windows:** %APPDATA%\LibreOffice\4\user\Scripts\python
 - ▼ **For Linux and macOS:** \$HOME/.config/libreoffice/4/user/Scripts/python

Creating Python Scripts

- Run the following Basic script to locate where your installation and home folder are (note that the script uses the FileSystem service from the ScriptForge library):

```
5 Sub GetFolders
6   Dim fs as Object, sMessage As String
7   fs = CreateScriptService("FileSystem")
8   ' Use native OS file naming notation
9   fs.FileNameing = "SYS"
10  sMessage = "Installation folder: " & fs.InstallFolder & CHR$(13) & _
11            "Home folder: " & fs.HomeFolder
12  MsgBox sMessage
13 End Sub
```



Creating Python Scripts

- Let's convert to Python the script that creates a Writer document with a hello message in it (using ScriptForge)

```
1 from scriptforge import CreateScriptService
2
3 bas = CreateScriptService("Basic")
4 ui = CreateScriptService("UI")
5
6 def create_writer_doc(args=None):
7     name = bas.InputBox("What is your name?")
8     doc = ui.createDocument("Writer")
9     doc_component = doc.XComponent
10    text = doc_component.getText()
11    text.insertString(text.End, f"Hello {name}\n", False)
12
13 g_exportedScripts = (create_writer_doc, )
14
```

Tells which scripts will be available via Tools - Macros - Run Macro dialog

Creating Python Scripts

- Now let's convert the "normal distribution" example using Python and ScriptForge

```
1 from scriptforge import CreateScriptService
2
3 bas = CreateScriptService("Basic")
4
5 def create_normdist_table(args=None):
6     # Get the Document service instance for the current component
7     doc = CreateScriptService("Document", bas.ThisComponent)
8     # If it is not a Calc document, do nothing
9     if not doc.isCalc:
10        return
11    # Insert the data in the sheet
12    doc.setValue("A1:B1", ["z-Value", "P(Z<z)"])
13    z_values = [-3 + z * 0.5 for z in range(13)]
14    z_range = doc.Offset("A2", height=len(z_values))
15    doc.setValue(z_range, z_values)
16    # Insert the formulas
17    formula_range = doc.Offset("B2", height=len(z_values))
18    base_formula = "=NORM.S.DIST(A2;1)"
19    doc.setFormula(formula_range, base_formula)
20
21 g_exportedScripts = (create_normdist_table, )
22
```


Creating Python Scripts

- Now let's add the table formatting code
- Note the new imports of the UNO API

Continuation of
create_normdist_table

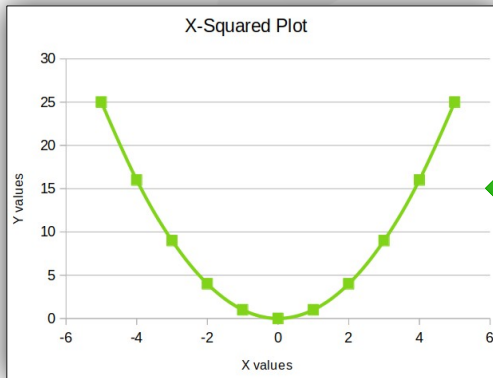
```
1 from scriptforge import CreateScriptService
2 from com.sun.star.awt import FontWeight
3 from com.sun.star.table import BorderLineStyle
4 from uno import createUnoStruct, Enum
```

```
31 # Format the header of the table
32 range_obj = doc.XCellRange("A1:B1")
33 range_obj.CellBackColor = bas.RGB(200, 200, 200)
34 range_obj.CharWeight = FontWeight.BOLD
35 # Format the remainder of the table
36 table_range = doc.Offset("A1", width=2, height=len(z_values)+1)
37 range_obj = doc.XCellRange(table_range)
38 range_obj.CharFontName = "Arial"
39 justify_center = Enum("com.sun.star.table.CellHoriJustify", "CENTER")
40 range_obj.HoriJustify = justify_center
41 # Struct that defines the line format
42 line_format = createUnoStruct("com.sun.star.table.BorderLine2")
43 line_format.LineStyle = BorderLineStyle.SOLID
44 line_format.LineWidth = 10
45 range_obj.TopBorder = line_format
46 range_obj.BottomBorder = line_format
47 range_obj.LeftBorder = line_format
48 range_obj.RightBorder = line_format
49
```

Creating Python Scripts

- ▼ This example plots a chart of the X-squared function to illustrate charting capabilities

Instance of the "Chart" service



```
51 def plot_function(args=None):
52     # Plot X and Y values for X2 function
53     data = [[x, math.pow(x, 2)] for x in range(-5, 6)]
54     doc = CreateScriptService("Calc", bas.ThisComponent)
55     doc.setValue("A1:B1", [["X", "Y"]])
56     data_range = doc.Offset("A2", width=2, height=len(data))
57     doc.setValue(data_range, data)
58     # Select the entire table
59     table_range = doc.Region("A1")
60     # Insert the chart
61     cur_sheet = doc.SheetName(doc.CurrentSelection)
62     chart = doc.CreateChart("X-Squared", cur_sheet, table_range)
63     chart.ChartType = "XY"
64     chart.Legend = False
65     chart.Title = "X-Squared Plot"
66     chart.XTitle = "X values"
67     chart.YTitle = "Y values"
68     # Set the line tip to "smooth" (using cubic splines)
69     diagram = chart.XDiagram
70     diagram.SplineType = Enum("com.sun.star.chart2.CurveStyle", "CUBIC_SPLINES")
71     # Place the Y-axis at -6 for better visualization
72     y_axis = diagram.getYAxis()
73     y_axis.CrossoverPosition = Enum("com.sun.star.chart.ChartAxisPosition", "VALUE")
74     y_axis.CrossoverValue = -6
```

Creating Python Scripts

- Now we will create a script that uses a dialog
- It will be a simple random number generator that uses the Gaussian implementation in the “random” Python module

	A	B	C	D
1	33,25127975	34,81179158		
2	32,84376781	24,12884374		
3	30,70595264	30,38977932		
4	28,95106499	31,09556823		
5	30,05400827	29,33124559		
6	31,67229623	30,51914704		
7	32,09927157	26,39350127		
8	30,15263972	32,51678632		
9	30,6738573	27,43516811		
10	28,08097843	34,08173694		

Normal Distribution

Start cell: A1

Num Columns: 2

Num Rows: 10

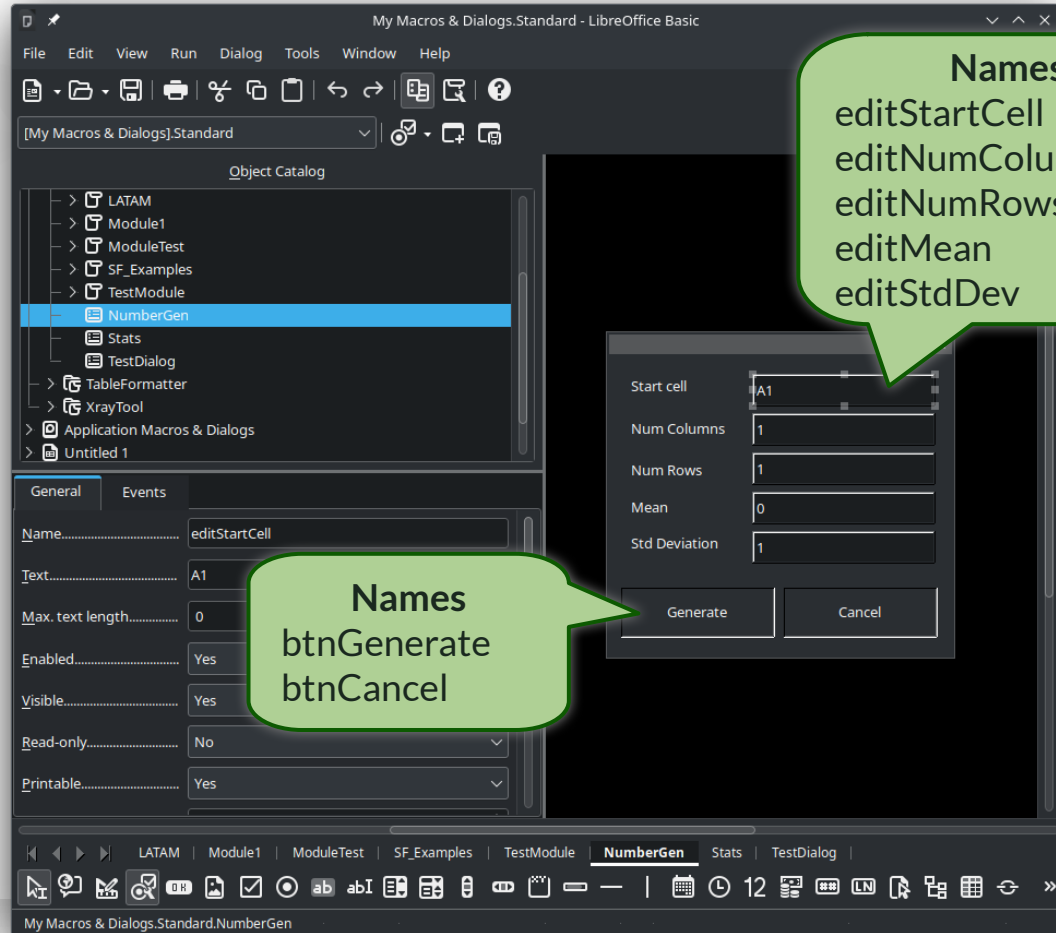
Mean: 30

Std Deviation: 2.5

Generate Cancel

Creating Python Scripts

- First we need to create the dialog using the Basic IDE
- The dialog name is NumberGenDlg
- Let's create it in a new library called NumberGenerator



Creating Python Scripts

- Now let's create a Python file *numbergen.py* with the macros that open the dialog and close it when "Cancel" is pressed

```
1  from scriptforge import CreateScriptService
2  import random as rnd
3
4  bas = CreateScriptService("Basic")
5
6  def open_dialog(args=None):
7  |     dlg = CreateScriptService("Dialog", "GlobalScope", "NumberGenerator", "NumberGenDlg")
8     dlg.Execute()
9
10 def btn_cancel_click(event=None):
11     # Get the control that was clicked
12     control = CreateScriptService("DialogEvent", event)
13     # Get the parent dialog and terminate it
14     dlg = control.Parent
15     dlg.EndExecute(bas.IDCANCEL)
16
```


Creating Python Scripts

- ▼ This macro needs to be associated with the “Generate” button

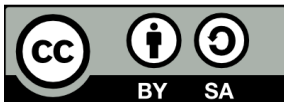
```
17 def btn_generate_click(event=None):
18     # Get the control that was clicked
19     control = CreateScriptService("DialogEvent", event)
20     dlg = control.Parent
21     # Get the parameters from the dialog
22     start_cell = dlg.Controls("editStartCell").Value
23     num_cols = int(dlg.Controls("editNumColumns").Value)
24     num_rows = int(dlg.Controls("editNumRows").Value)
25     mean = float(dlg.Controls("editMean").Value)
26     std_dev = float(dlg.Controls("editStdDev").Value)
27     # Generate the numbers
28     numbers = [[rnd.gauss(mean, std_dev) for _ in range(num_cols)] for _ in range(num_rows)]
29     # Get the document and add the data
30     doc = CreateScriptService("Document", bas.ThisComponent)
31     num_range = doc.Offset(start_cell, width=num_cols, height=num_rows)
32     doc.setValue(num_range, numbers)
```

Thank you ...



LibreOffice
The Document Foundation

- ▼ The ScriptForge team
Jean-Pierre Ledure, Rafael Lima, Alain Romedenne
- ▼ Documentation
https://help.libreoffice.org/latest/en-US/text/sbasic/shared/03/lib_ScriptForge.html
- ▼ ScriptForge Sources
<https://gitlab.com/LibreOfficiant/scriptforge>
- ▼ Type Support (typings) for ScriptForge, by Paul Moss.
<https://github.com/Amourspirit/python-types-scriptforge>
- ▼ Telegram groups
ScriptForge
LibreOffice Macros & Scripting



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