B4X Booklets

B4X IDE

Integrated **D**evelopment **E**nvironment

Edition 2.5

Last update: 2024.01.05

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To search for a given word or sentence use the Search function in the Edit menu.

All the source code and files needed (layouts, images etc.) of the example projects in this guide are included in the SourceCode folder.

Updated for following versions:
B4A version 12.80
B4i version 8.50
B4J version 10.00
B4R version 4.00

B4X Booklets:
B4X Getting Started
B4X Language
B4X IDE Integrated Development Environment
B4X Visual Designer
B4X Help tools

B4XPages Cross-platform projects
B4X CustomViews
B4X Graphics
B4X XUI B4X User Interface
B4X SQLite Database
B4X JavaObject NativeObject
B4X Cross-platform projects

B4R Example Projects

You can consult these booklets online in this link [B4X] Documentation Booklets.
Be aware that external links don’t work in the online display.

1 B4X platforms

B4X is a suite of programming languages for different platforms.

B4X suite supports more platforms than any other tool
ANDROID | IOS | WINDOWS | MAC | LINUX | ARDUINO | RASPBERRY PI | ESP8266 | AND MORE...

- **B4A** **Android**

  B4A is a **100% free** development tool for Android applications, it includes all the features needed to quickly develop any type of Android app.

- **B4i** **iOS**

  B4i is a development tool for native iOS applications.
  B4i follows the same concepts as B4A, allowing you to reuse most of the code and build apps for both Android and iOS.

- **B4J** **Java / Windows / Mac / Linux / Raspberry PI**

  B4J is a **100% free** development tool for desktop, server and IoT solutions.
  With B4J you can easily create desktop applications (UI), console programs (non-UI) and server solutions.
  The compiled apps can run on Windows, Mac, Linux and ARM boards (such as Raspberry Pi).

- **B4R** **Arduino / ESP8266**

  B4R is a **100% free** development tool for native Arduino and ESP8266 programs.
  B4R follows the same concepts of the other B4X tools, providing a simple and powerful development tool.
  B4R, B4A, B4J and B4i together make the best development solution for the Internet of Things (IoT).

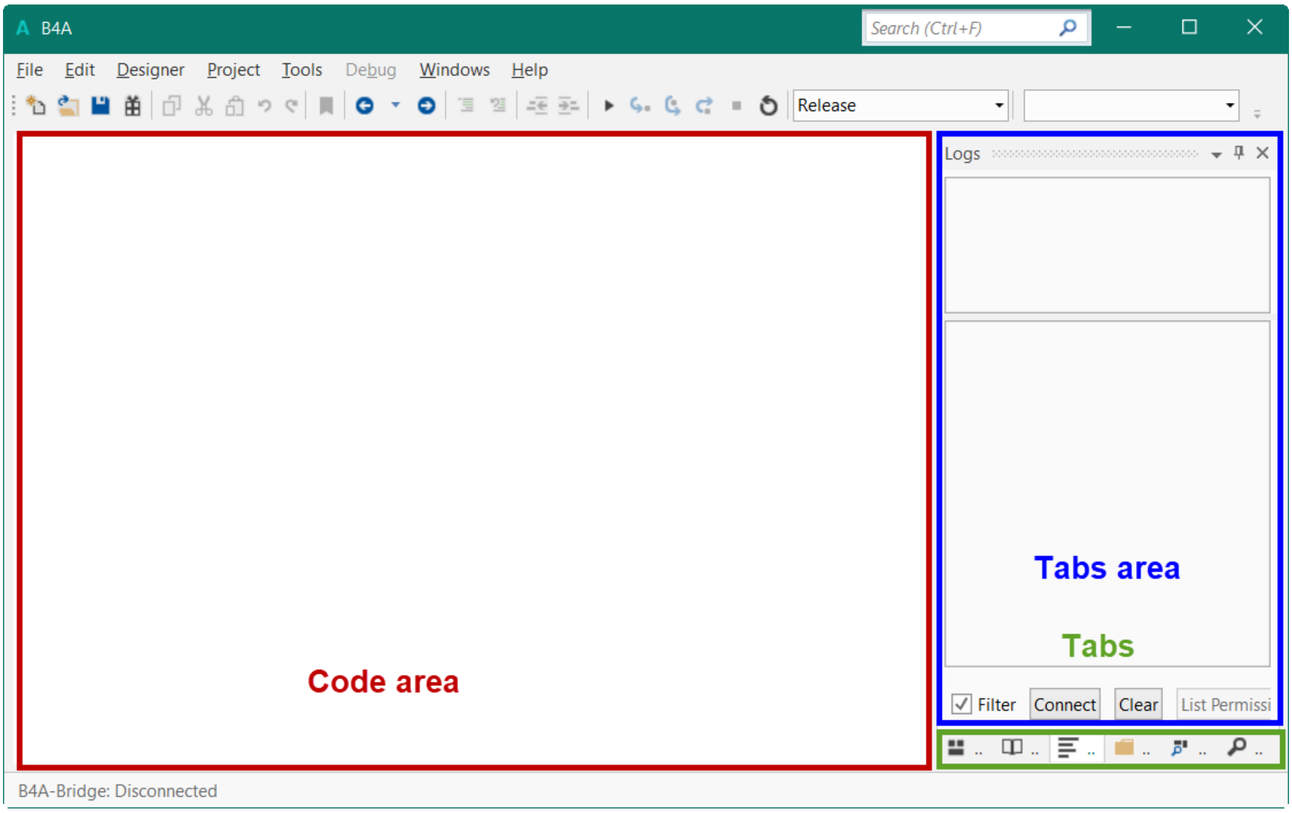
- **B4XPages**

  B4XPages is an internal library for B4A, B4i and B4J allowing to develop easily cross-platform programs.
  B4XPages is explained in detail in the B4XPages Cross-platform projects booklet.
  Even, if you want to develop only in one platform it is interesting to use the B4XPages library it makes the program flow simpler especially for B4A.

2 IDE General

The **I**ntegrated **D**evelopment **E**nvironment.

When you run the IDE you will get a form like the image below.



B4A-Bridge: Disconnected

All the images are made with the B4A IDE.
The IDEs of the other products look similar with different themes.
Specific images are shown if needed.

You see 3 main areas:

Code area	The code editor
Tab area	The content of this area depends on the selected Tab.
Tabs	Tabs for different settings.

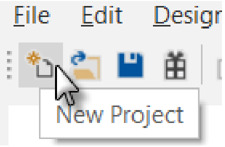
Everything is empty, you can:

- Create a new project.
- Open an existing project.

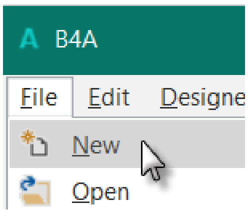
2.1 Create a new project

To start a new project, you must click on:

The New Project icon



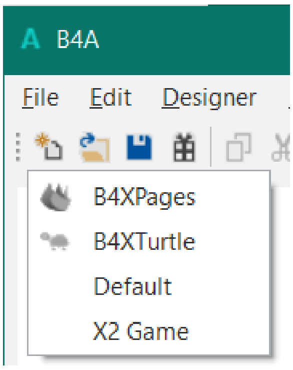
or New in the



File menu.

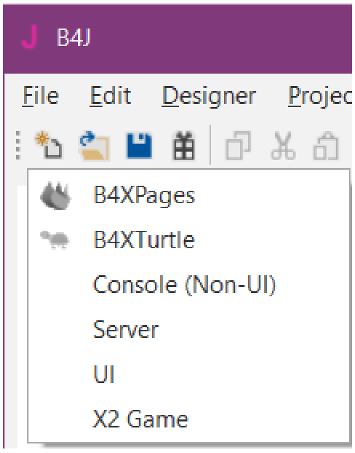
You will be asked what kind of project you want to create.
Specific templates will be loaded depending on the kind or project.

2.1.1 Create a new B4A or B4i project



- B4XPages Explained in the B4X Cross-platform booklet
- B4XTurtle
- Default Default Android project.
- X2 Game X2 Game project

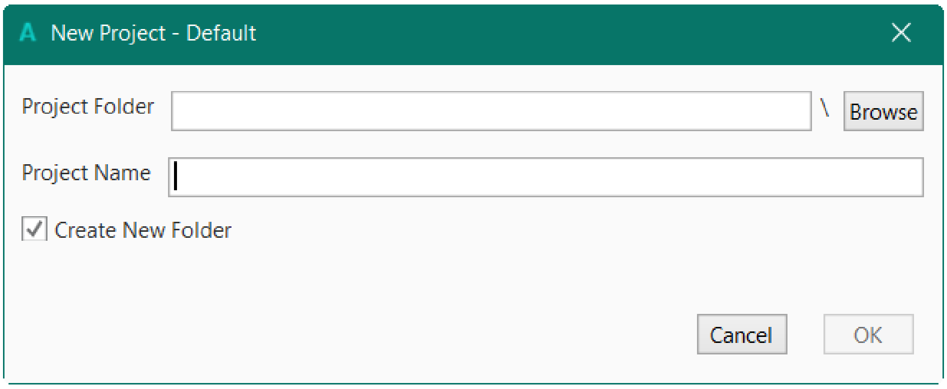
2.1.2 Create a new B4J project



- B4XPages Explained in the B4X Cross-platform booklet.
- B4XTurtle Explained in the Forum tutorial.
- Console (non-User Interface).
- Server Server project.
- UI User Interface project.
- X2 Game X2 Game project

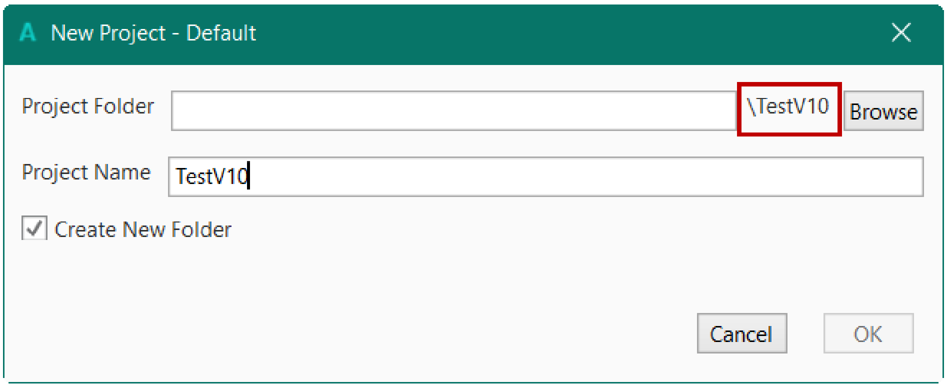
The window below will be shown:

The project type is recalled in the title bar.



☑ Create New Folder

Enter the Project Name.

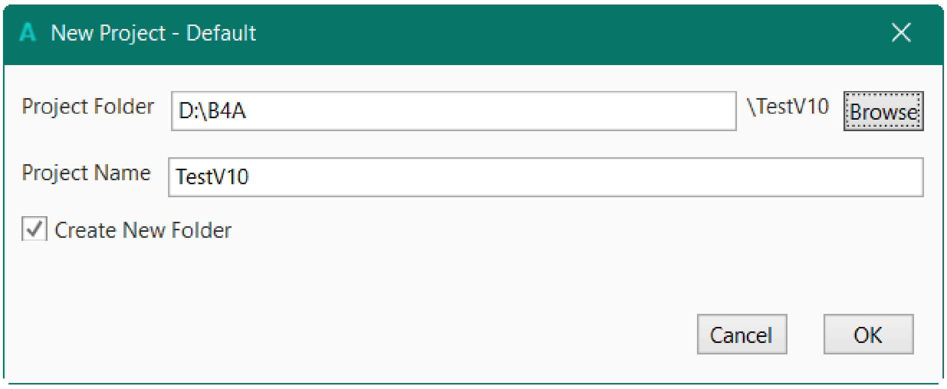


Project Folder \TestV10

Project Name TestV10

☑ Create New Folder

As soon as you type the Project Name it is replicated at the end of the Project Folder name.



Project Folder D:\B4A \TestV10

Project Name TestV10

☑ Create New Folder

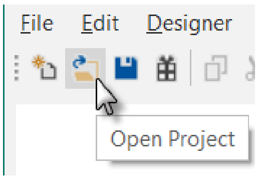
Enter the Project Folder name or use the Browse button to select it.

The Project Folder name is memorized for future projects.
To create a new folder for the project check: ☑ Create New Folder.

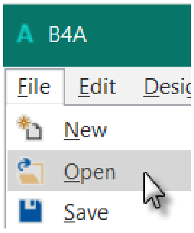
2.2 Open existing project

To open an existing project, click on:

The Open Project icon

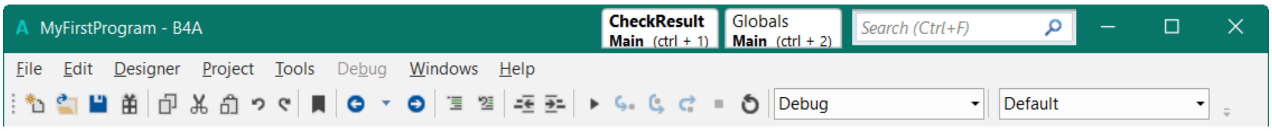


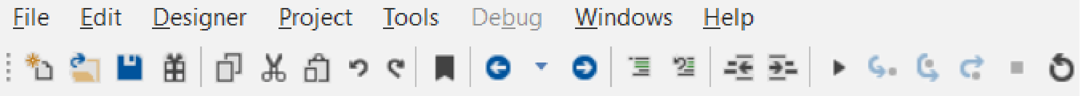
or click on Open in

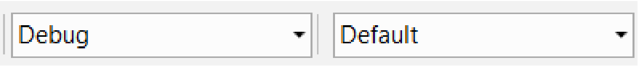


the File menu.

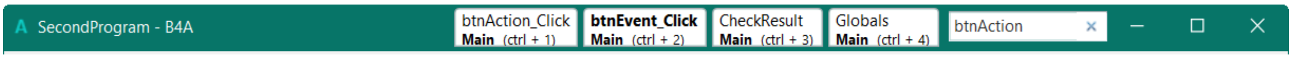
3 Titlebar, Menu and Toolbar


MyFirstProgram - B4A
CheckResult Main (ctrl + 1)
Globals Main (ctrl + 2)
Search (Ctrl+F)
File Edit Designer Project Tools Debug Windows Help
Debug
Default





3.1 Titlebar

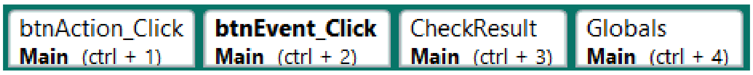

SecondProgram - B4A
btnAction_Click Main (ctrl + 1)
btnEvent_Click Main (ctrl + 2)
CheckResult Main (ctrl + 3)
Globals Main (ctrl + 4)
btnAction

In the Titlebar you find:

- Recent code positions and designer layouts.
- The search field for Quick Search.

3.1.1 Recent code positions (AutoBookmarks)

Recent code positions and designer layouts appear as tabs in the window title.
The IDE decides on the list of tabs based on several factors (recency, modifications and others).
The list is saved together with the project and restored when the project is loaded.


btnAction_Click Main (ctrl + 1)
btnEvent_Click Main (ctrl + 2)
CheckResult Main (ctrl + 3)
Globals Main (ctrl + 4)

Each field contains the name of the routine btnAction_Click and the module **Main**.
In the example above, to move to the third position you can either:

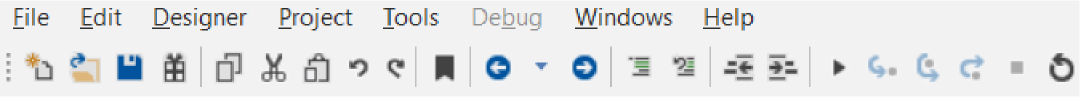
- Click on the third rectangle.
- Press Ctrl + 3

To disable the AutoBookmarks:
1. Close the IDE.
2. Edit either:
C:\Users\<username>\AppData\Roaming\Anywhere Software\Basic4andriod\b4xV5.ini
C:\Users\<username>\AppData\Roaming\Anywhere Software\B4i\b4xV5.ini
C:\Users\<username>\AppData\Roaming\Anywhere Software\B4J\b4xV5.ini
C:\Users\<username>\AppData\Roaming\Anywhere Software\B4R\b4xV5.ini
3. Set ShowAutoBookmarks to False.

3.1.2 Quick Search field

Quick search is explained in the Quick Search chapter.

3.2 Toolbar



Generates a new empty project [Ctrl + N].

Loads a project.

Saves the current project [Ctrl + S].

Export As Zip.

Copies the selected text to the clipboard [Ctrl + C].

Cuts the selected text and copies it to the clipboard [Ctrl + X].

Pastes the text in the clipboard at the cursor position [Ctrl + V].

Undoes the last operation [Ctrl + Z].

Redoes the previous operation [Ctrl + Shift + Z].

Toggle Bookmark

Navigate backwards [Alt + Left].

Navigation history [Alt + N].

Navigate forwards [Alt + Right].

Block Comment [Ctrl + Q].

Block Uncomment [Ctrl + W].

Decrease the indentation of the selected lines.

Increase the indentation of the selected lines.

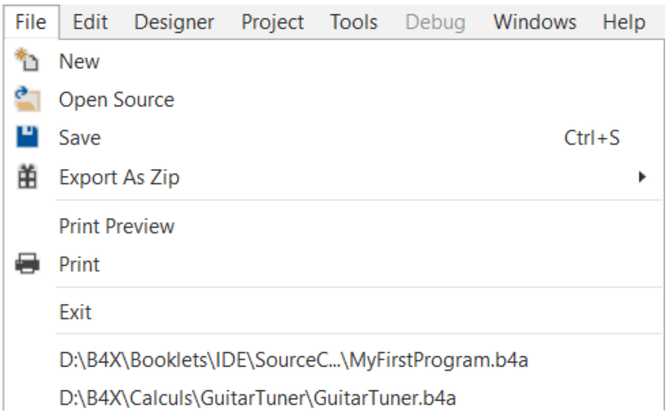
Runs the compiler [F5].

Step In [F8].
Step Over [F9].
Step Out [F10]. These 5 functions are active only when the debugger is active.
Stop.
Restart [F11].

Compiler options list and Debugging.

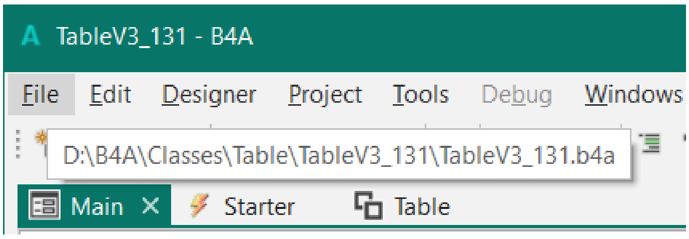
Conditional compiling options.

3.3 File menu



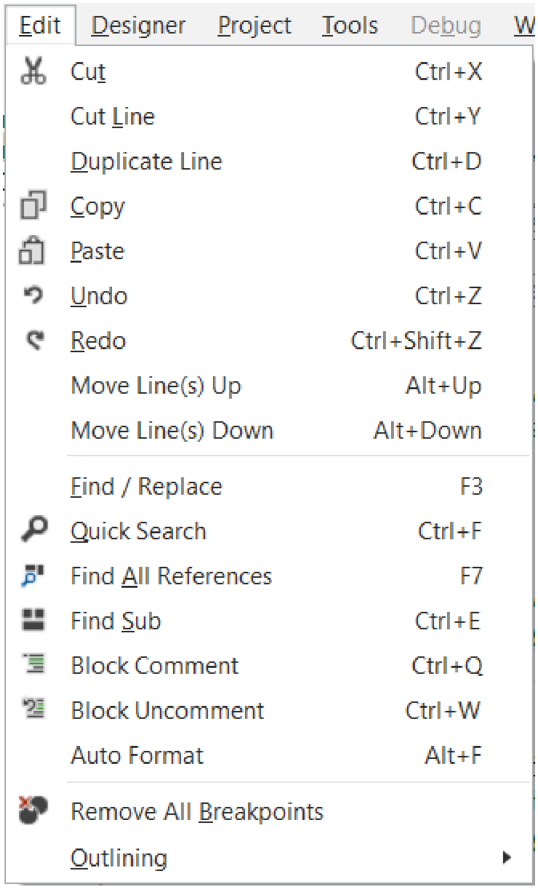
New Generates a new empty project.
Open Source Loads a project.
Save Saves the current project.
Export As Zip Exports the whole project in a zip file.
Print Preview Preview of the print.
Print Prints the whole code of the selected Module.
Exit Leaves the IDE.

List of last loaded programs.



When you hover over the File menu, you'll see the full file name.

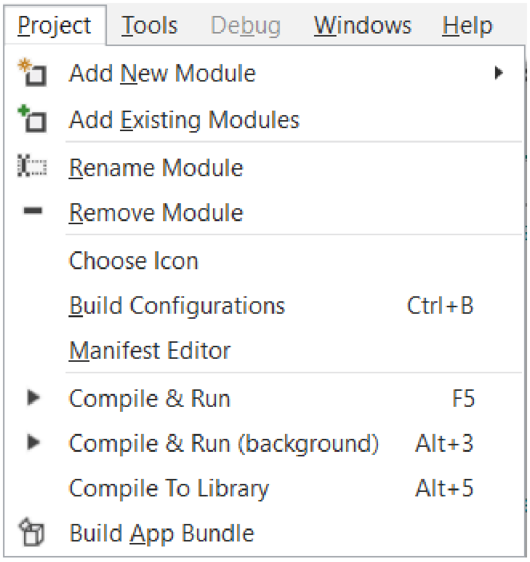
3.4 Edit menu



Cut Cuts the selected text and copies it to the clipboard.
Cut Line Cuts the line at the cursor position.
Duplicate Line Duplicates the line at the cursor position
Copy Copies the selected text to the clipboard.
Paste Pastes the text in the clipboard at the cursor position.
Undo Undoes the last operation.
Redo Redoes the previous operation.
Move Line(s) Up Moves the selected lines upwards.
Move Line(s) Down Moves the selected lines downwards.
Find / Replace Activates the Find and Replace function.
Quick Search Quick Search
Find All References Find All References
Find Sub Find Sub
Block Comment
Block Uncomment
Comment / Uncomment the selected lines.
Auto Format Auto Format
Remove All Breakpoints Breakpoints.
Outlining Collapse the whole code.

3.5 Project menu

B4A



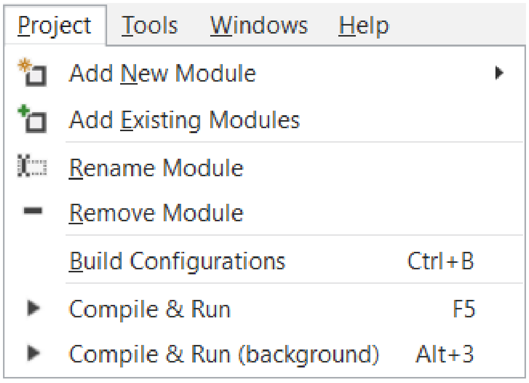
Adds a new module
Adds an existing module

Changes the module name
Removes the current module

Chooses an icon for the program.
Changes the package name.
Runs the Manifest Editor.

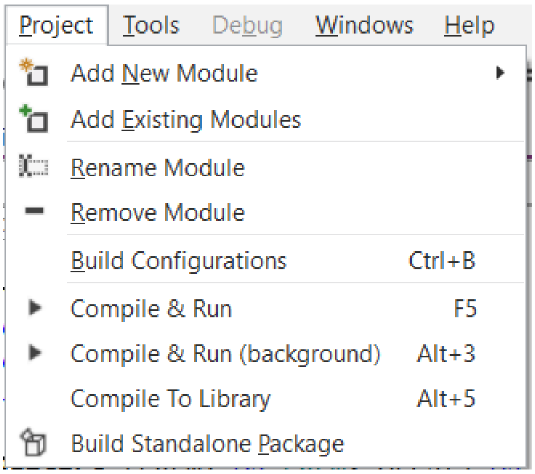
Compile and run the project.
Compile and run the project in the background.
Compile to a library.
Build App Bundle.

B4i, B4R



Adds a new module
Adds an existing module
Changes the module name
Removes the current module
Changes the package name.
Compile and run the project.
Compile and run the project in the background.

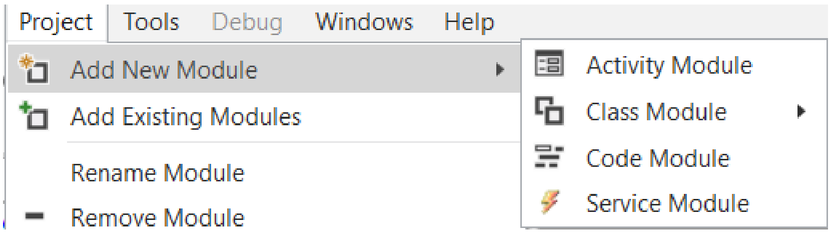
B4J



Adds a new module
Adds an existing module
Changes the module name
Removes the current module
Changes the package name.
Compile and run the project.
Compile and run the project in the background.
Compile to a library.
Build Standalone Package

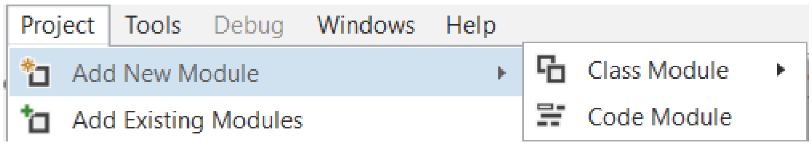
3.5.1 Add a new module

B4A



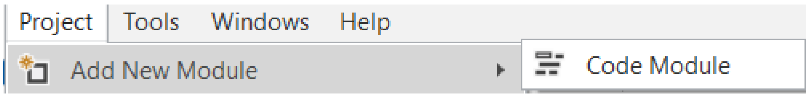
Activity module
Class module
Code module
Service module

B4i, B4J



Class module
Code module

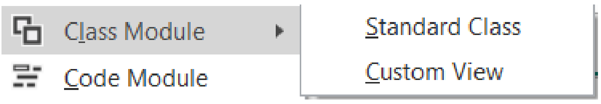
B4R



Only Code module

3.5.1.1 Class modules

There exist two Class modules:

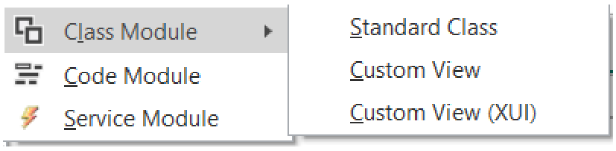


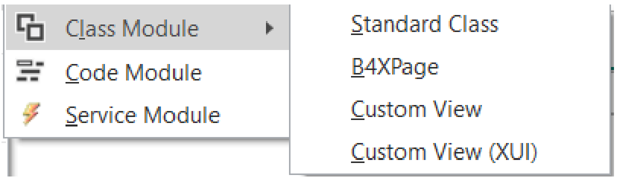
- Standard Class
- Custom View

Custom Views are explained in detail in the B4X CustomViews Booklet.

If you have selected the
XUI, jXUI or the iXUI library,
then you get another option
Custom View (XUI).

If you have selected the
B4XPage library
then you get another option
B4XPage

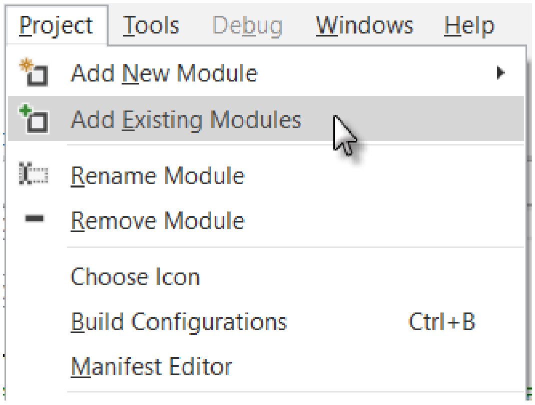


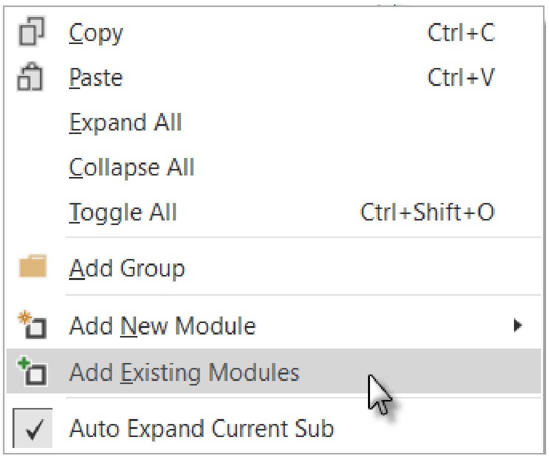


CustomViews XUI are explained in detail in the B4X CustomViews Booklet.
The XUI library is explained in the B4X XUI Booklet.
The B4XPage library is explained in the B4X Cross-platform projects Booklet.

3.5.2 Add an existing module

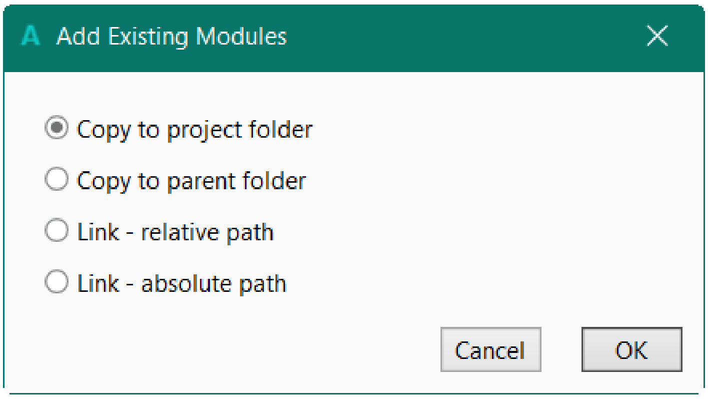
Click on Add Existing Modules in the Project menu, or right click in the Module Tab.





The file chooser will be shown, select the module(s) and click Open.

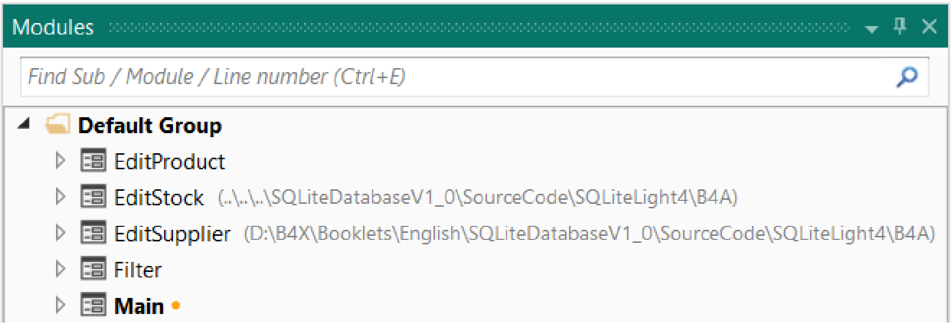
Then, you will be asked the following:


Add Existing Modules

● Copy to project folder
○ Copy to parent folder
○ Link - relative path
○ Link - absolute path

- Copy to project folder. Copies the file(s) to the Files folder of the project.
- Copy to parent folder. Copies to the parent folder of the project, useful for B4XPages projects.
- Link – relative path.
  Links the file(s) to a path belonging to the project path. The files are not copied.
- Link – absolute path. Links the file(s) to any path,

In the Files Tab you will see the difference, for linked modules their path is added.

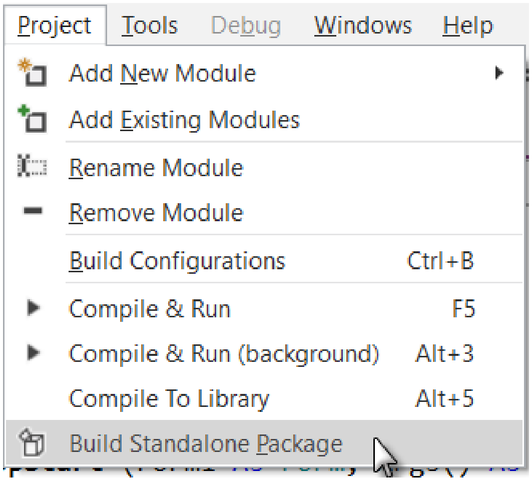


Default Group
EditProduct
EditStock (..\..\..\SQLiteDatabaseV1_0\SourceCode\SQLiteLight4\B4A)
EditSupplier (D:\B4X\Booklets\English\SQLiteDatabaseV1_0\SourceCode\SQLiteLight4\B4A)
Filter
Main •

Copied
Relative path
Absolute path
Copied

3.5.3 B4J Build Standalone Package

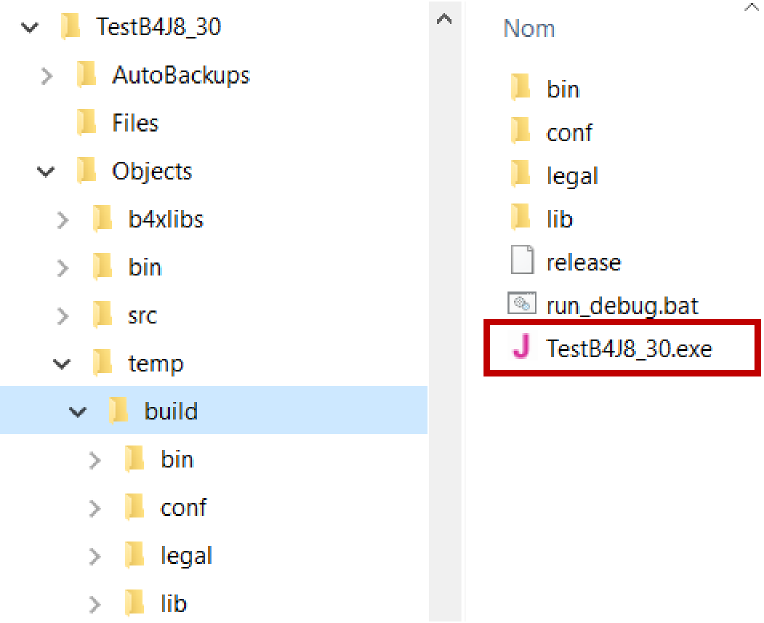
You can generate a standalone package for your project. It needs Java 11 or Java 14.
If you don't have installed Java 11or Java 14 yet, nor set it in the Tools/Configure Paths menu, you need to do it before being able to build a standalone package.



Click on Build Standalone Package.

The *.exe file is saved in the project folder in the Objects\temp\build folder.

Example with a TestB4J8_30 project:



You need to distribute the executable together with the 4 folders.
The run_debug.bat batch file is useful to test the program and see the logs.

An Inno Script template is created in the parent folder. You can use it together with Inno Script to build a single file installer.

The integrated packager creates a Windows package. You can however use the external tool with the generated json file (in the project folder) to create Linux and Mac packages.

The packager supports all kinds of settings. You can set them with the new #PackagerProperty attribute.

For example to set the icon file, assuming that the icon file is in the Files tab and is named turtle.ico:

```
#PackagerProperty: IconFile = ..\Files\turtle.ico
```

Also set the executable name:

```
#PackagerProperty: IconFile = ..\Files\turtle.ico
#PackagerProperty: ExeName = Turtle
```

3.5.3.1 Tips and special cases

- If using jPOI library add:
  ```
  #PackagerProperty: AdditionalModuleInfoString = opens
  schemaorg_apache_xmlbeans.system.sD023D6490046BA0250A839A9AD24C443;
  #PackagerProperty: IncludedModules = jdk.charsets
  ```

- If using WebView add:
  ```
  #PackagerProperty: IncludedModules = javafx.web
  ```

- If using jGoogleMaps add:
  ```
  #PackagerProperty: IncludedModules = javafx.web
  #PackagerProperty: AdditionalModuleInfoString = exports
  com.lynden.gmapsfx.javascript.event;
  ```
  There is an issue with Java 14 and Google Maps. Use Java 11 for now if using jGoogleMaps.

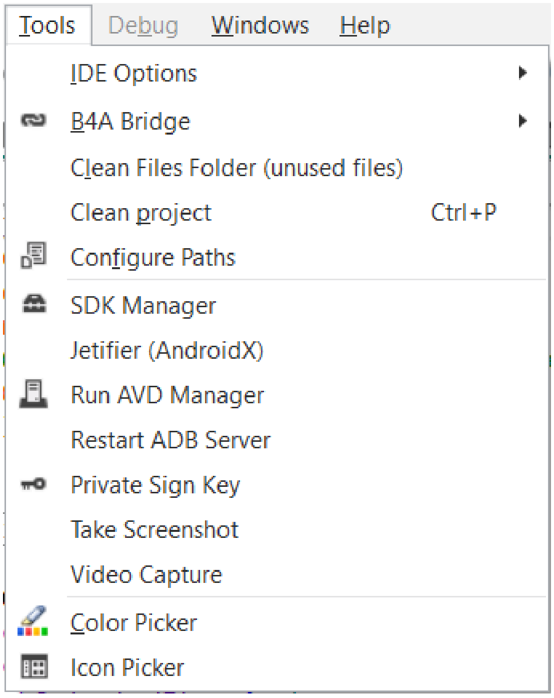
- You can use #CustomBuildAction with the new After Packager step to copy files after the package is built. The default target folder should be: temp\build\bin\

- If using jSerial put the attached jssc.dll file in the project folder and add:
  ```
  #CustomBuildAction: After Packager, %WINDIR%\System32\robocopy.exe, ..\
  temp\build\bin\ jssc.dll
  ```
  Note that it is a Windows 64 bit dll.

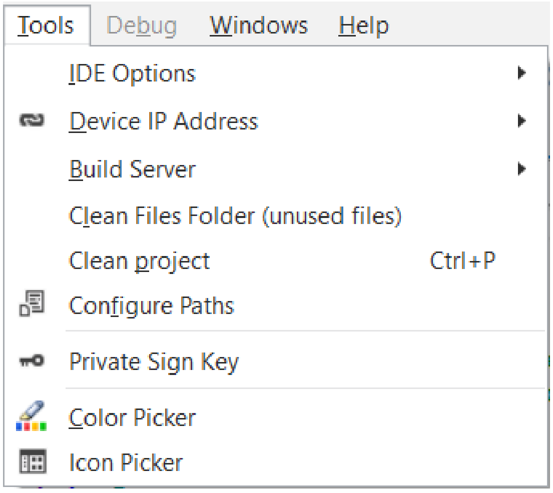
- Each key should appear at most once. So for example if using both WebView and jPOI add:
  ```
  #PackagerProperty: IncludedModules = jdk.charsets, javafx.web
  ```

3.6 Tools menu

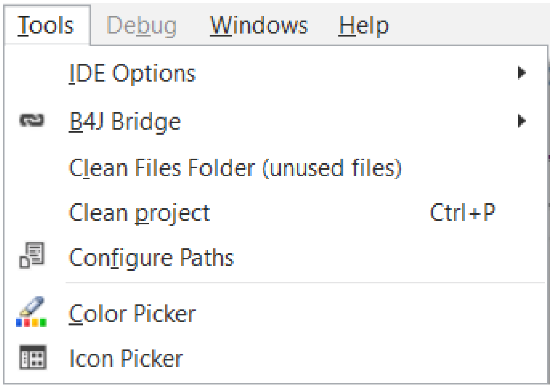
B4A



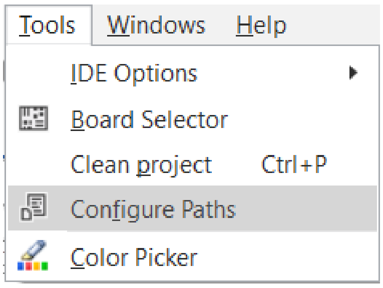
B4i



B4J



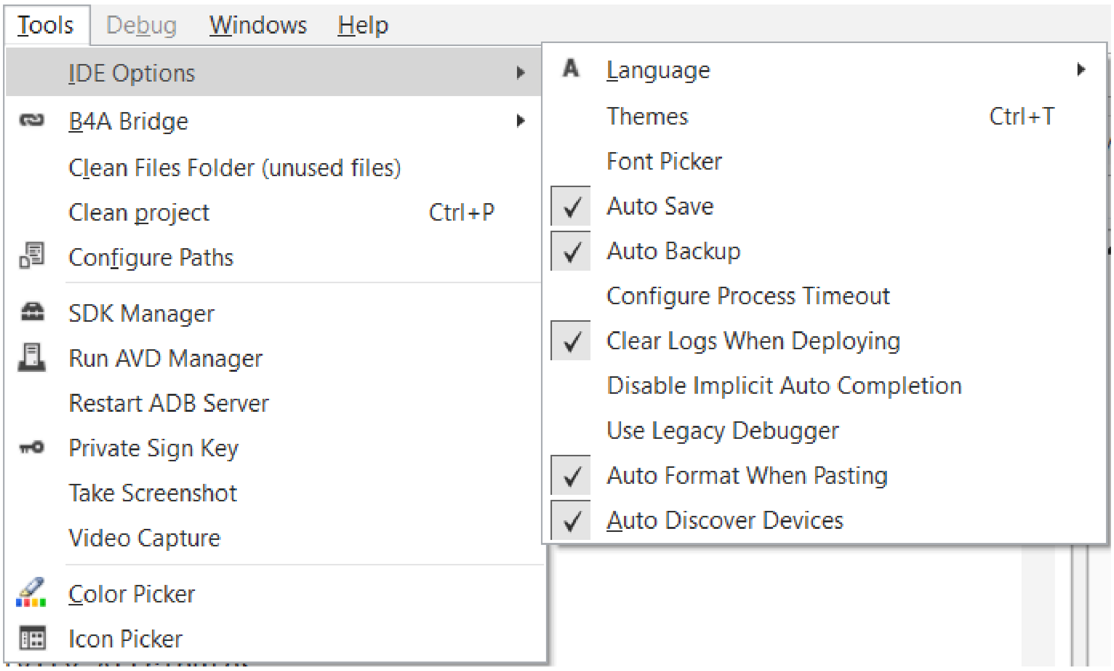
B4R



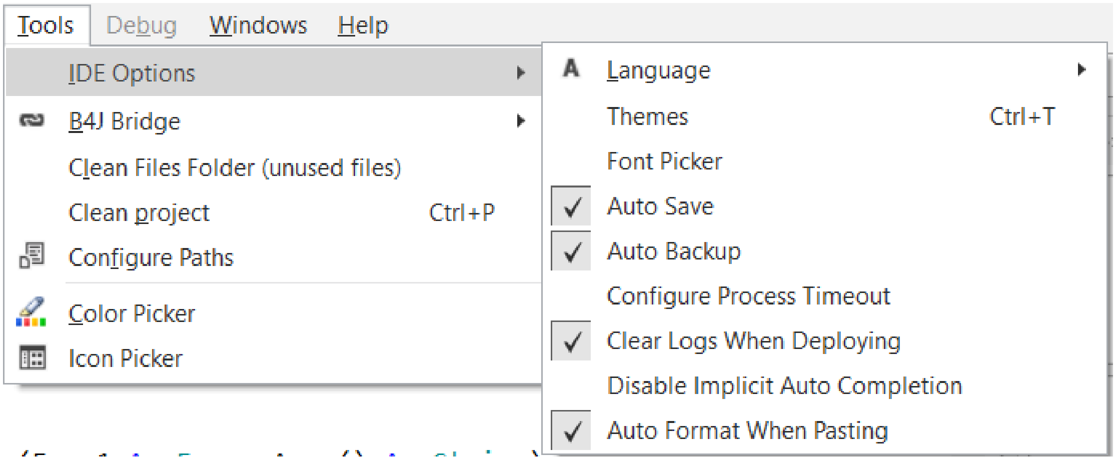
IDE Options	see below	
B4A Bridge, connection with Wifi	B4A	
Clean Files Folder (unused files)	B4A, B4i, B4J	
Clean Project	All	
Configure Paths	All	
SDK Manager	B4A	
Jetifier AndroidX	B4A	
Run ADB Manager	B4A	Used to create Android Emulators, not recommended.
Take Screenshot	B4A	
Capture a video	B4A	
Show the Color Picker	All	
Show the Icon Picker	B4A, B4i, B4J	
Board Selector	B4R	

3.6.1 IDE Options

B4A



B4i, B4J, B4R



All

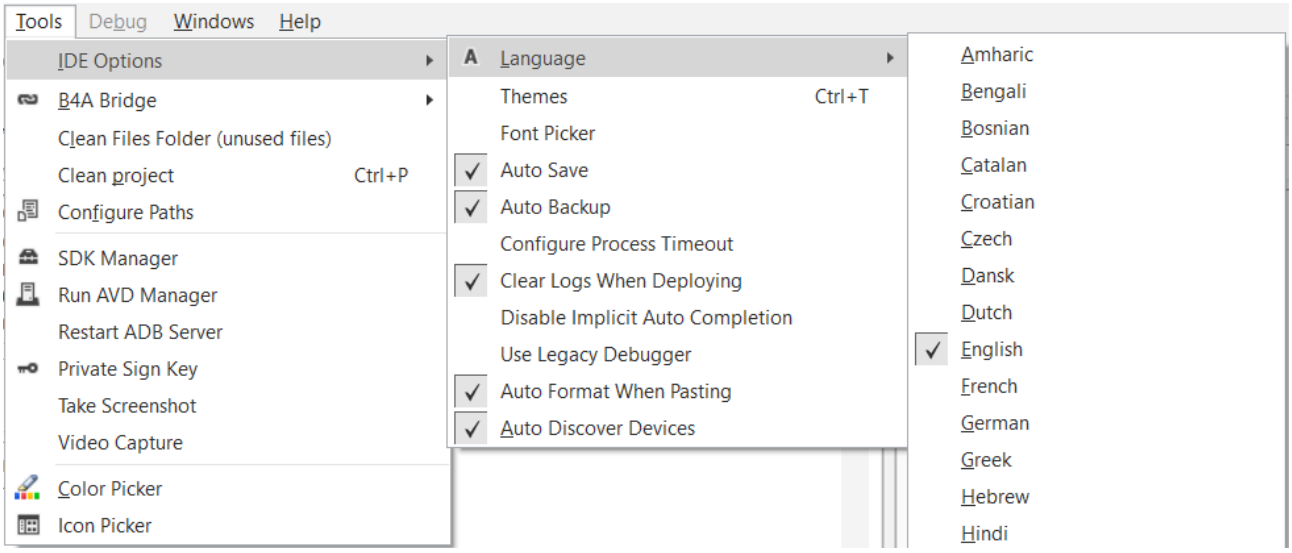
Language.	
Themes.	
Font Picker.	
Auto Save	Saves the program every time you run it.
Auto Backup	
Configure Process Timeout	
Clear Logs When Deploying	Removes all Log statements when compiled in Release mode.
Disable Implicit Auto Completion.	
Auto Format When Pasting	

B4A only

Use Legacy Debugger	Use the legacy Debugger instead of the rapid Debugger.
Auto Discover Devices	Detects automatically the connected devices.

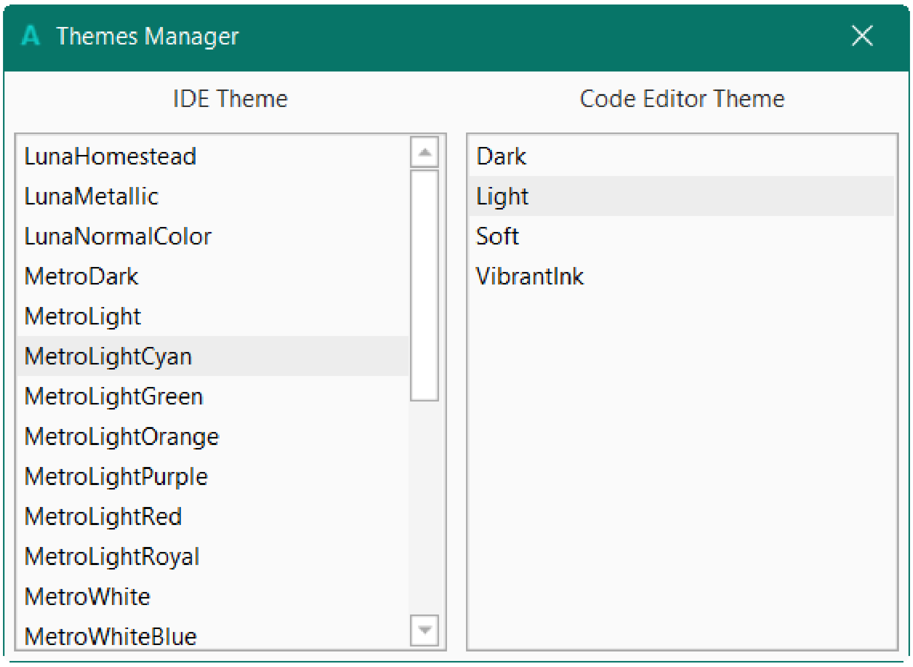
3.6.1.1 Language

You can select the language of the IDE in the menu Tools / IDE Options / Language.



Select the desired language in the list of the currently available languages.

3.6.1.2 Themes

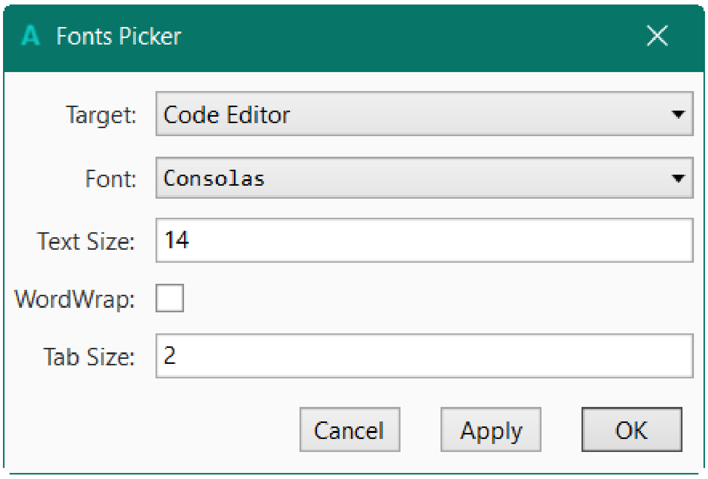


You can select different themes for the IDE.

The default theme is different for the different B4X products.

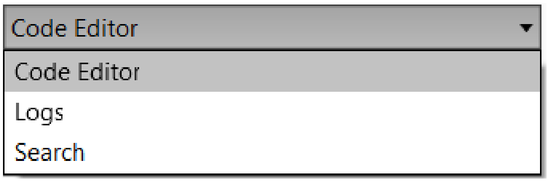
When you select one you see directly the new colors.

3.6.1.3 Font Picker



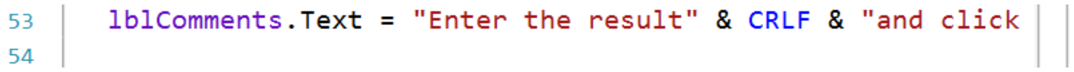
Target: Code Editor
Font: Consolas
Text Size: 14
WordWrap: ☐
Tab Size: 2

You can select the target Code Editor, Logs or Search.



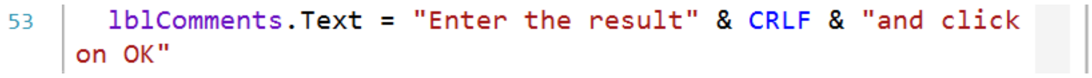
Different fonts.
Enter the text size.
Select WordWrap
Enter the Tab size.

3.6.1.3.1 Word wrap



```
  lblComments.Text = "Enter the result" & CRLF & "and click
```

Without word wrap. The end of the line is hidden.



```
  lblComments.Text = "Enter the result" & CRLF & "and click
on OK"
```

With word wrap. The end of the line is wrapped to the next line.

3.6.1.4 Auto Save

Saves the project at each run when checked.

3.6.1.5 Auto Backup

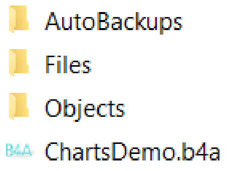
Auto Backup saves a backup project as a zip file.

The zip file created is the same zip that you will get with File - Export as zip.
It creates a new zip every 10 minutes (when there are changes).
It automatically deletes older backups based on a set of internal rules.

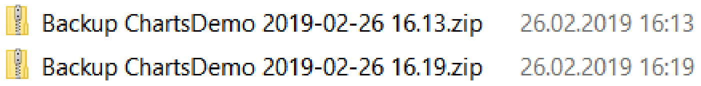
The frequency of kept files is lowered based on the files age. It starts with one file per 10 minutes and ends with one file every two months after 6 months.

It can be disabled if needed.

These backup files are saved in the AutoBackups folder in the project folder.
The folder name includes the program name and the update date.

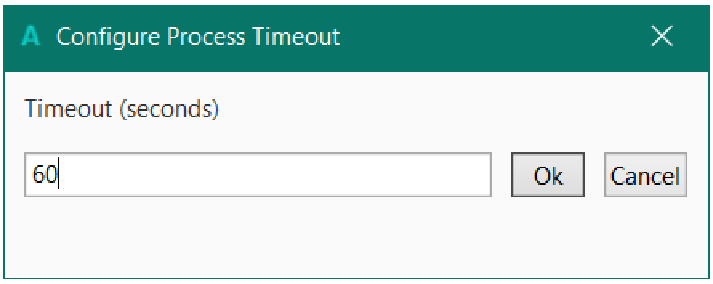


AutoBackups
Files
Objects
ChartsDemo.b4a



Backup ChartsDemo 2019-02-26 16.13.zip	26.02.2019 16:13
Backup ChartsDemo 2019-02-26 16.19.zip	26.02.2019 16:19

3.6.1.6 Configure Process Timeout



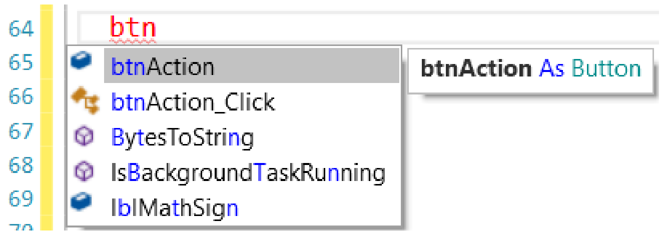
Configure Process Timeout

Timeout (seconds)

60

Sometimes the compilation needs more time. If you get a message ‘Process timeout’ you can increase the time.

3.6.1.7 Disable Implicit Auto Completion



btn

btnAction
btnAction_Click
BytesToString
IsBackgroundTaskRunning
lblMathSign

btnAction As Button

If Disable Implicit Auto Completion is unchecked you will see a drop-down list with possible words during typing.

If checked, ☑ Disable Implicit Auto Completion you won’t see the auto completion list.

3.6.2 Take Screenshot B4A only

The Take Screenshot function can be called from the:

- Tools menu when the IDE is in edit mode
- Debug menu when the IDE is in debug mode

Note: This function works only with USB connection not with B4A-Bridge!

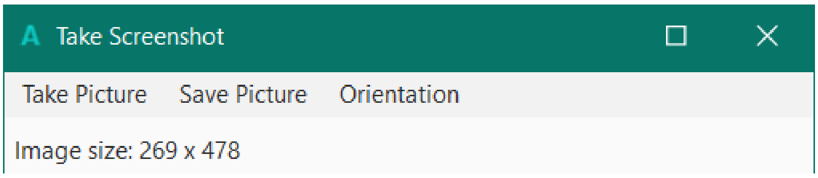


Image size: 269 x 478

Clicking on Take Screenshot shows this window.

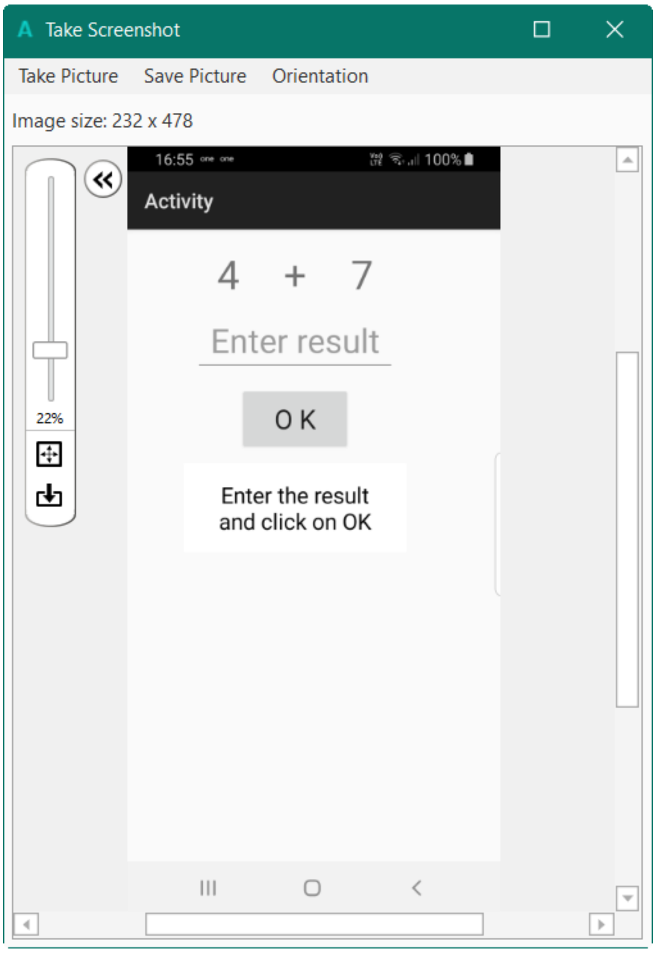
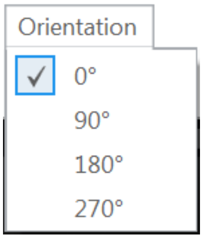


Image size: 232 x 478

Click on Take Picture to take the screenshot picture from the device.

You can resize the image with the cursor on the left side.

You can save the image with Save Picture as a PNG file.



And you can change the orientation of the picture.

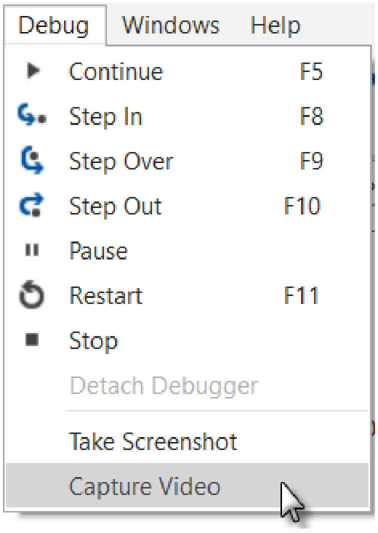
Copy To Clipboard

Right click on the image to copy the image to the clipboard.

3.6.3 Create Video B4A only

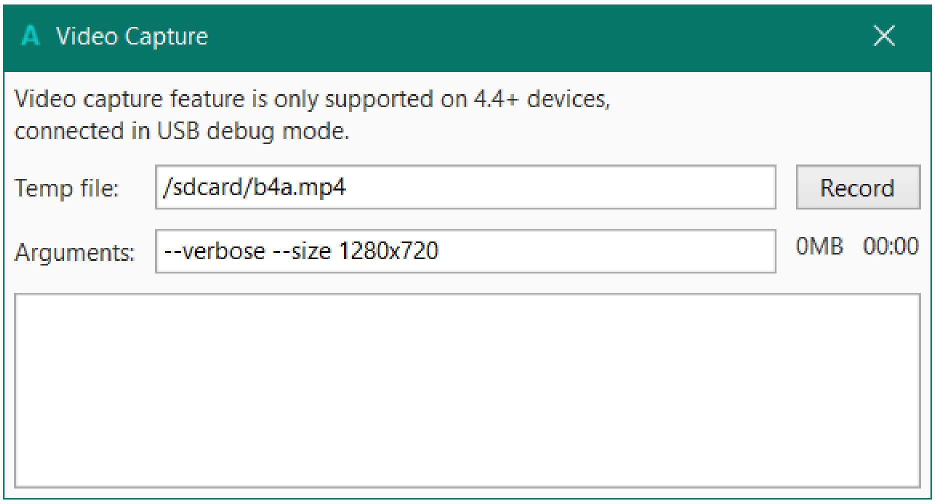
You can run your program and record a video when you use it.

Note: This function works only with USB connection not with B4A-Bridge!



In the Debug menu click on Capture Video.

The screen below will be displayed:



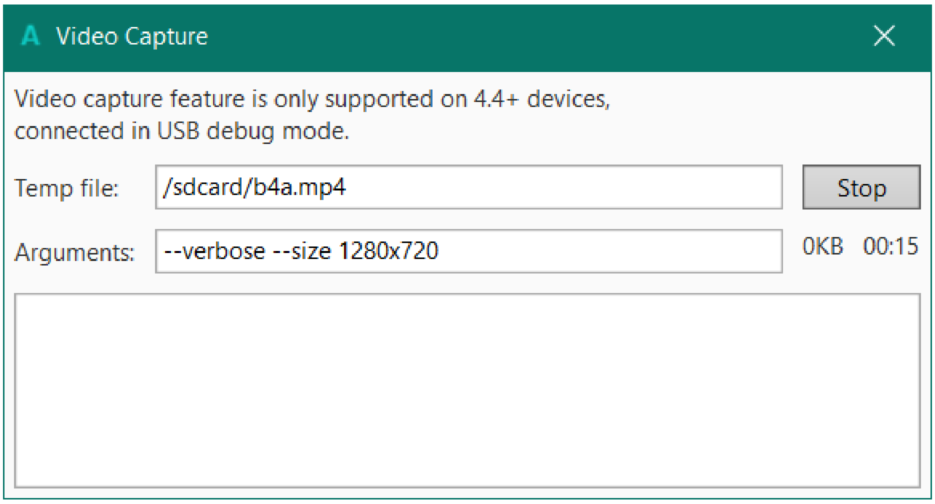
Video capture feature is only supported on 4.4+ devices, connected in USB debug mode.

Temp file: /sdcard/b4a.mp4

Arguments: --verbose --size 1280x720

Click on Record to begin recording.

A screen like this one will be displayed:



Video capture feature is only supported on 4.4+ devices, connected in USB debug mode.

Temp file: /sdcard/b4a.mp4

Arguments: --verbose --size 1280x720

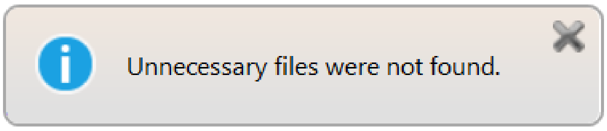
Click on Stop to stop recording.

You will be asked where you want to save the file on the computer.

3.6.4 Clean Files Folder (unused files)

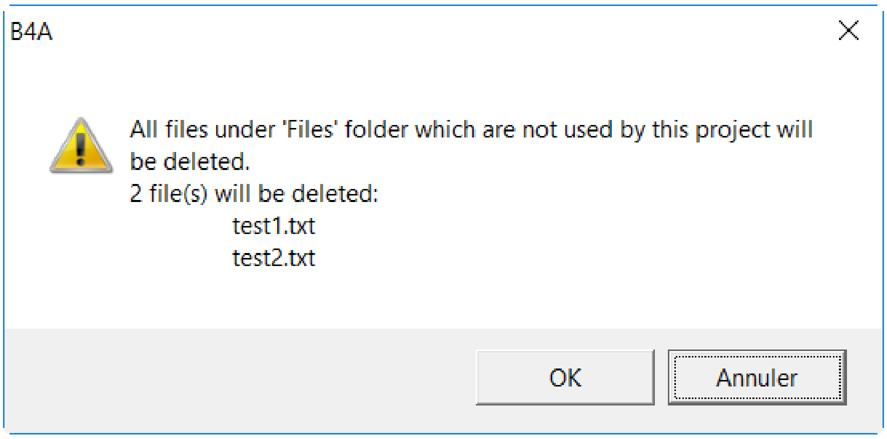
Deletes files that are located under the Files folder but are not used by the project (it will not delete any file referenced by any of the project layouts). A list of unused files will be displayed before deletion (and you may cancel the operation).

If there are no unused files, the message below will be displayed.



Unnecessary files were not found.

If there are unused files, a window like the one below will be displayed.



B4A

All files under 'Files' folder which are not used by this project will be deleted.
2 file(s) will be deleted:
test1.txt
test2.txt

3.6.5 Clean Project

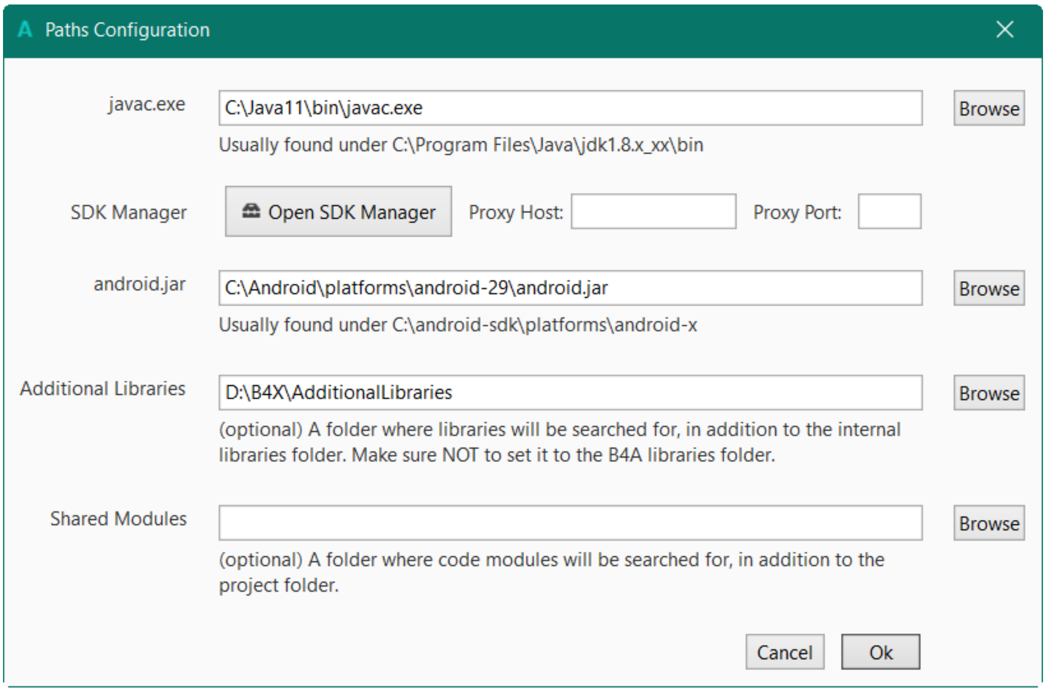
Deletes all files that are generated during compilation in Debug mode.

Sometimes it is useful to ‘clean’ the project if the compilation or the program slows down.
Or if you have two or more IDEs open at the same time and want to run the projects on the same device.

3.6.6 Configure Paths

You need to configure several paths for the IDE to run.

3.6.6.1 B4A



javac.exe: C:\Java11\bin\javac.exe
Usually found under C:\Program Files\Java\jdk1.8.x_xx\bin

Proxy Host:
Proxy Port:

android.jar: C:\Android\platforms\android-29\android.jar
Usually found under C:\android-sdk\platforms\android-x

Additional Libraries: D:\B4X\AdditionalLibraries
(optional) A folder where libraries will be searched for, in addition to the internal libraries folder. Make sure NOT to set it to the B4A libraries folder.

Shared Modules:
(optional) A folder where code modules will be searched for, in addition to the project folder.

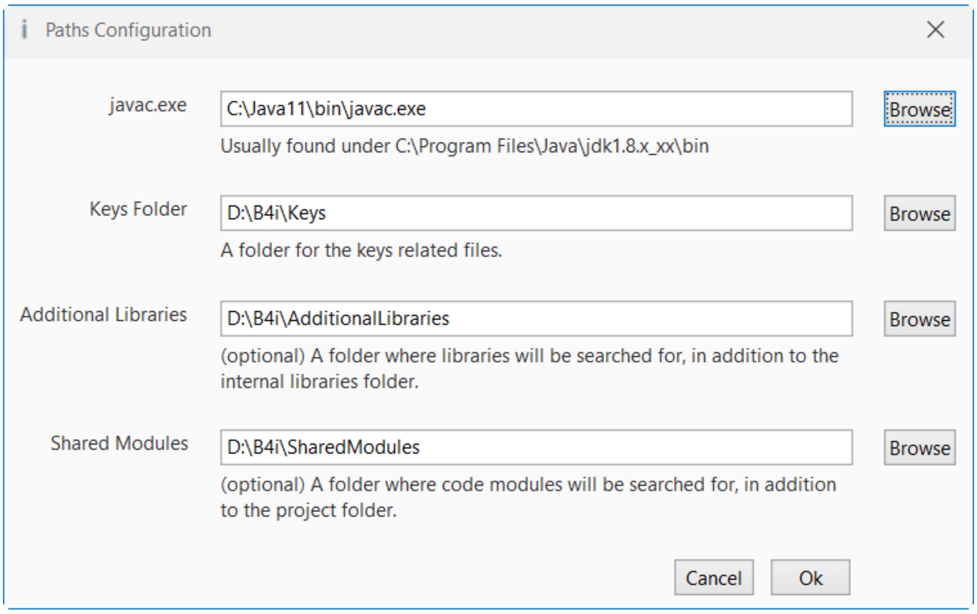
java.exe

Explained in the B4X Getting Started Booklet.

Additional Libraries

Shared Modules

3.6.6.2 B4i



javac.exe: C:\Java11\bin\javac.exe
Usually found under C:\Program Files\Java\jdk1.8.x_xx\bin

Keys Folder: D:\B4i\Keys
A folder for the keys related files.

Additional Libraries: D:\B4i\AdditionalLibraries
(optional) A folder where libraries will be searched for, in addition to the internal libraries folder.

Shared Modules: D:\B4i\SharedModules
(optional) A folder where code modules will be searched for, in addition to the project folder.

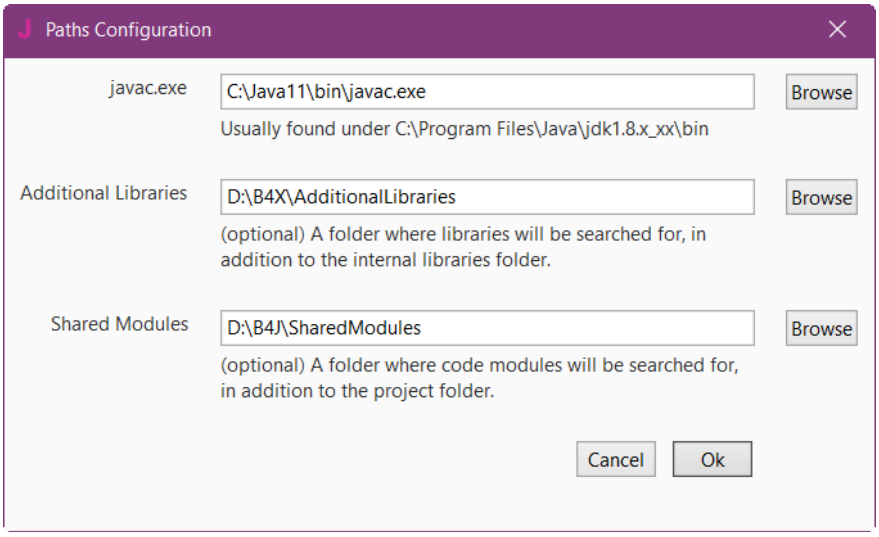
java.exe

Explained in the B4X Getting Started Booklet.

Additional Libraries

Shared Modules

3.6.6.3 B4J



javac.exe: C:\Java11\bin\javac.exe
Usually found under C:\Program Files\Java\jdk1.8.x_xx\bin

Additional Libraries: D:\B4X\AdditionalLibraries
(optional) A folder where libraries will be searched for, in addition to the internal libraries folder.

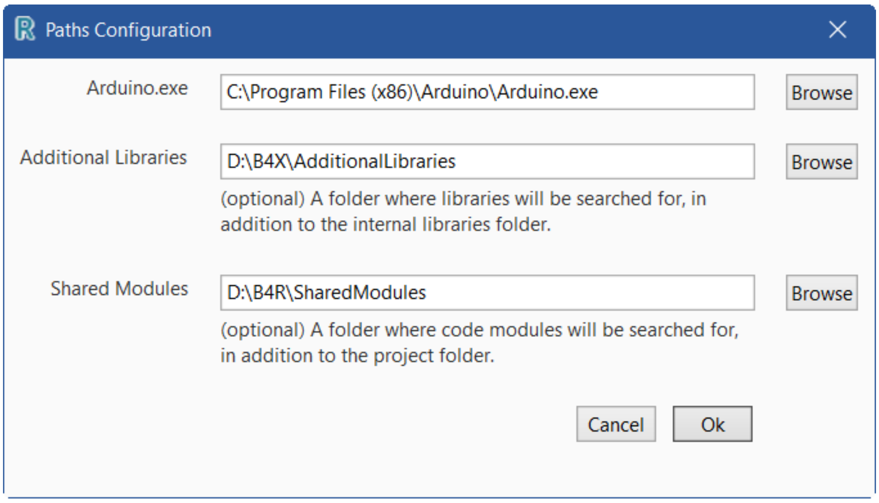
Shared Modules: D:\B4J\SharedModules
(optional) A folder where code modules will be searched for, in addition to the project folder.

java.exe

Additional Libraries

Shared Modules

3.6.6.4 B4R



Arduino.exe: C:\Program Files (x86)\Arduino\Arduino.exe

Additional Libraries: D:\B4X\AdditionalLibraries
(optional) A folder where libraries will be searched for, in addition to the internal libraries folder.

Shared Modules: D:\B4R\SharedModules
(optional) A folder where code modules will be searched for, in addition to the project folder.

Explained in the
B4X Getting Started Booklet.

Additional Libraries

Shared Modules

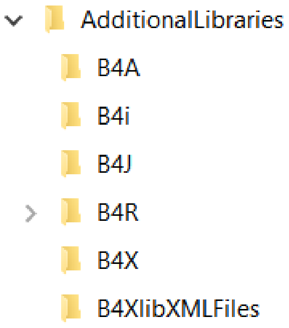
3.6.6.4.1 java.exe B4A / B4i / B4J

This is the location of the java.exe file.
This has already been done when you installed one of the products.
Depending on which version of Java you installed (8 or 11), it should look similar to this:
Java 11:
C:\Java11\bin\javac.exe,
or *C:\java\bin\javac.exe* depending in which folder you installed Java 11.
Java 8:
C:\Program Files\Java\jdk1.8.x.xxx\bin, 64 bit version.
or *C:\Program Files\Java\jdk1.8.x.xxx\bin* 32 bit version.

3.6.6.4.2 Additional Libraries

You must define a folder for additional libraries.

This folder must have followed structure:



AdditionalLibraries	
B4A	Folder for B4A additional libraries.
B4i	Folder for B4i additional libraries.
B4J	Folder for B4J additional libraries.
B4R	Folder for B4R additional libraries.
B4X	Folder for B4X libraries.
B4XlibXMLFiles	Folder for B4X libraries XML files.

One subfolder for each product: B4A, B4i, B4J, B4R and another B4X for B4X libraries.

When you install a new version of a B4X product, all standard libraries are automatically updated, but the additional libraries are not included. The advantage of the special folder is that you don't need to care about them because this folder is not affected when you install the new version of B4X. The additional libraries are not systematically updated with new version of B4X.

When the IDE starts, it looks first for the available libraries in the Libraries folder of B4X and then in the additional libraries folders.

In my system, I added a B4XlibXMLFiles folder for XML help files for B4X libraries (b4xlib). The standard and additional libraries have an XML file. B4X Libraries not.

But, if you use the B4X Help Viewer you would be interested in having these help files if they are available. The B4X Help Viewer is explained in the B4X Help tools booklet.

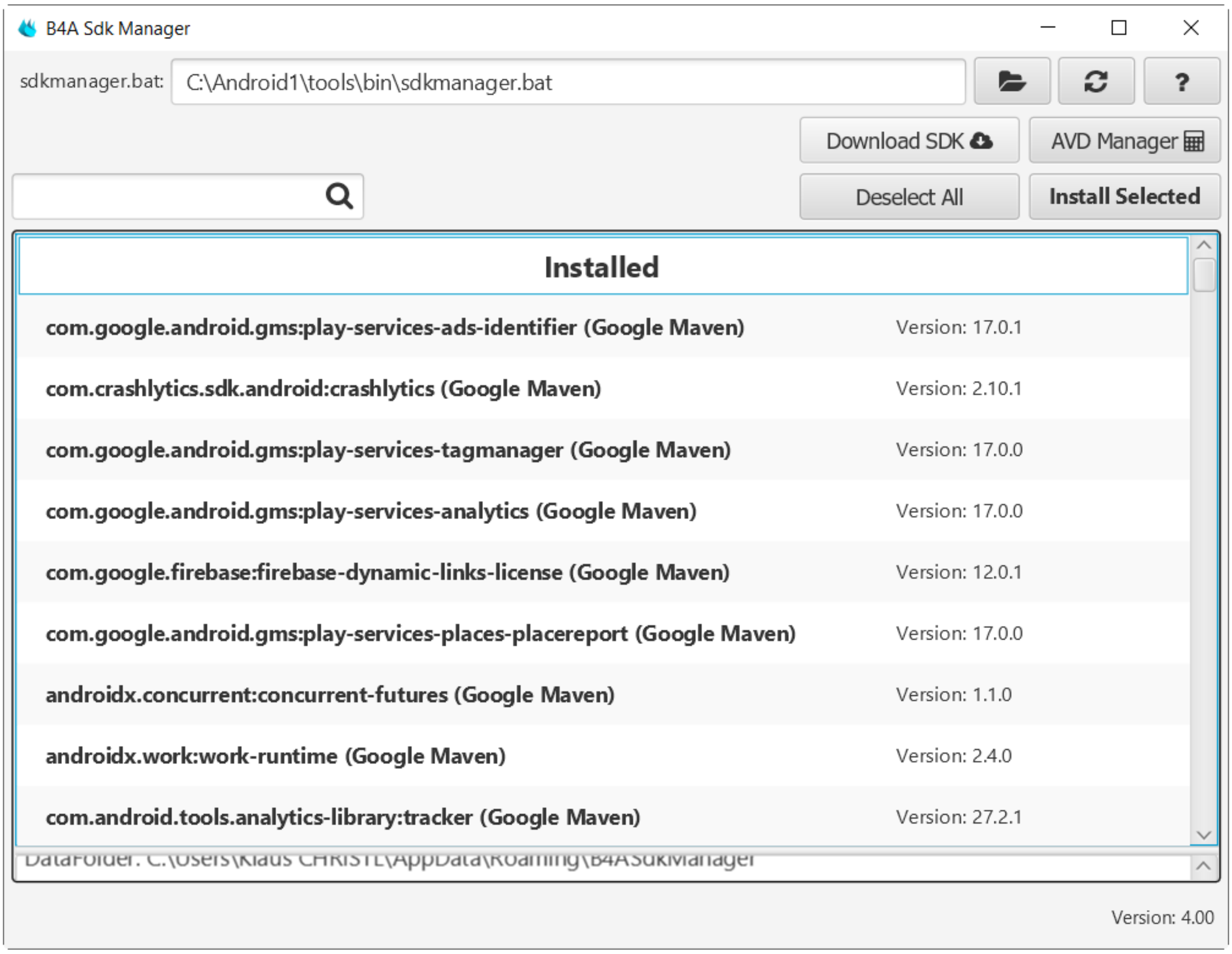
3.6.6.4.3 Shared Modules

You can add a folder for Shared Modules.
Shared Modules are almost not needed anymore.
This can be better replaced with classes or CustomViews.

3.6.7 SDK Manager B4A only

The SDK Manager can be used to update the Android SDK.

Click on SDK Manager to show the SDK Manager window, which can look like the image below:



sdkmanager.bat: C:\Android1\tools\bin\sdkmanager.bat

Installed	
com.google.android.gms:play-services-ads-identifier (Google Maven)	Version: 17.0.1
com.crashlytics.sdk.android:crashlytics (Google Maven)	Version: 2.10.1
com.google.android.gms:play-services-tagmanager (Google Maven)	Version: 17.0.0
com.google.android.gms:play-services-analytics (Google Maven)	Version: 17.0.0
com.google.firebase:firebase-dynamic-links-license (Google Maven)	Version: 12.0.1
com.google.android.gms:play-services-places-placereport (Google Maven)	Version: 17.0.0
androidx.concurrent:concurrent-futures (Google Maven)	Version: 1.1.0
androidx.work:work-runtime (Google Maven)	Version: 2.4.0
com.android.tools.analytics-library:tracker (Google Maven)	Version: 27.2.1

DataFolder: C:\Users\Klaus CHRISTL\AppData\Roaming\B4ASdkManager

Version: 4.00

If you see **Installed** on top, it means that your SDK is up to date.

Even if you see on top Recommended, do not click on Install Selected to install the recommended files, until Erel does recommend it in the Forum!

3.6.8 Jetifier AndroidX B4A only

Android Support Library was implemented and maintained in the last 8 years by Google. It includes a wide range of features, and it hides many of the differences between the various Android versions.

Android Support Library was replaced by AndroidX SDK. It is no longer maintained and new versions of Firebase SDK depend on AndroidX. This is a good time to switch to AndroidX.

It is simple to switch to AndroidX as the IDE takes care of most of the things:

- Libraries references (DependsOn / #AdditionalJar) are updated automatically.
- The compiler automatically chooses the androidx libraries if such are available.
- References to support classes in #Extends declarations, JavaObject calls and to a less extent in the manifest editor code are converted during compilation.

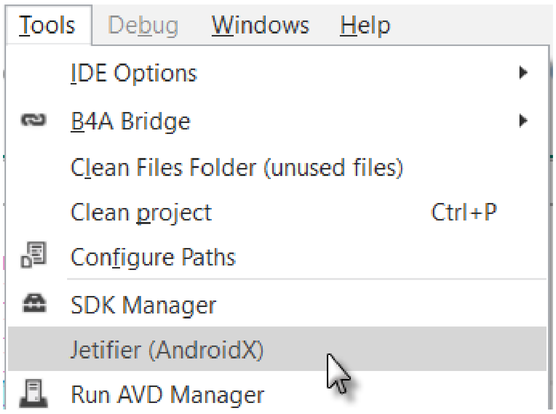
Most of the libraries will work as-is, however libraries that directly call methods from the support library need to be "jetified". This is done with the Jetifier tool (Tools - Jetifier). It will go over all the additional libraries and will jetify all the libraries that need to be jetified. The output of this tool is libraries with androidx.jar (or .androidx.aar) extension.
The B4A compiler will then use those libraries automatically.

Note that the internal libraries already include the jetified versions.

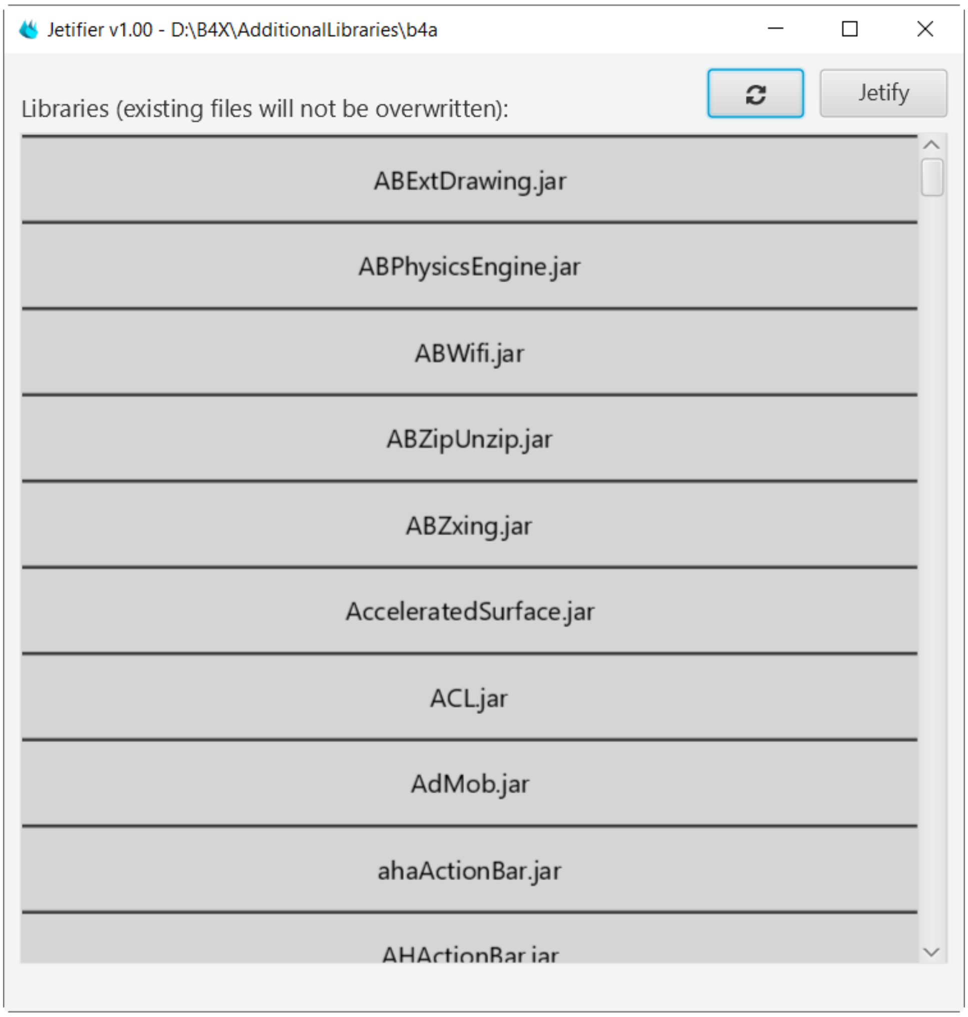
To conclude:

1. Open Tools - B4A Sdk manager.
2. Install all recommended items. This will make the switch to AndroidX. You can always go back to the previous SDK.
3. Open Tools - Jetifier.
4. Click on Jetify. It is possible that the jetifier will fail to jetify a few libraries. In most cases you can ignore it as those libraries don't need to be jetified.
5. Run your project. The compilation dialog will tell you which SDK was used:

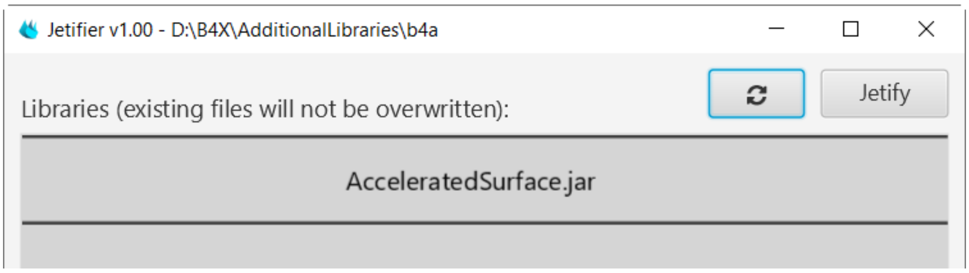
```
B4A Version: 9.30 BETA #2
Java Version: 11
Parsing code. (0.00s)
Building folders structure. (0.01s)
Compiling code. (0.02s)
Compiling layouts code. (0.01s)
Organizing libraries. (0.00s)
(AndroidX SDK)
Generating R file. (0.96s)
Compiling debugger engine code. (0.73s)
Compiling generated Java code. (1.36s)
Convert byte code - optimized dex. (1.06s)
Packaging files. (0.83s)
Copying libraries resources (0.01s)
Signing package file (private key). (0.61s)
ZipAlign file. (0.04s)
Installing file to device. (0.03s)
Installing with B4A-Bridge.
Completed successfully.
```



When you click on Jetifier (AndroidX), you will be shown the window below.

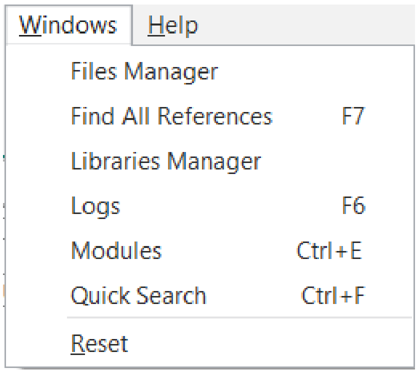


After clicking on , Jetify I got this, the AcceleratedSurface.jar was not 'jetified' because of its length.


Jetifier v1.00 - D:\B4X\AdditionalLibraries\b4a
Jetify
Libraries (existing files will not be overwritten):
AcceleratedSurface.jar

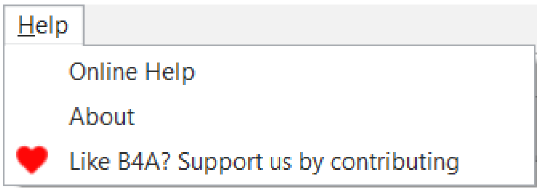
3.7 Windows menu

The windows menu shows the Tabs.



Click on Reset to get the default setting.

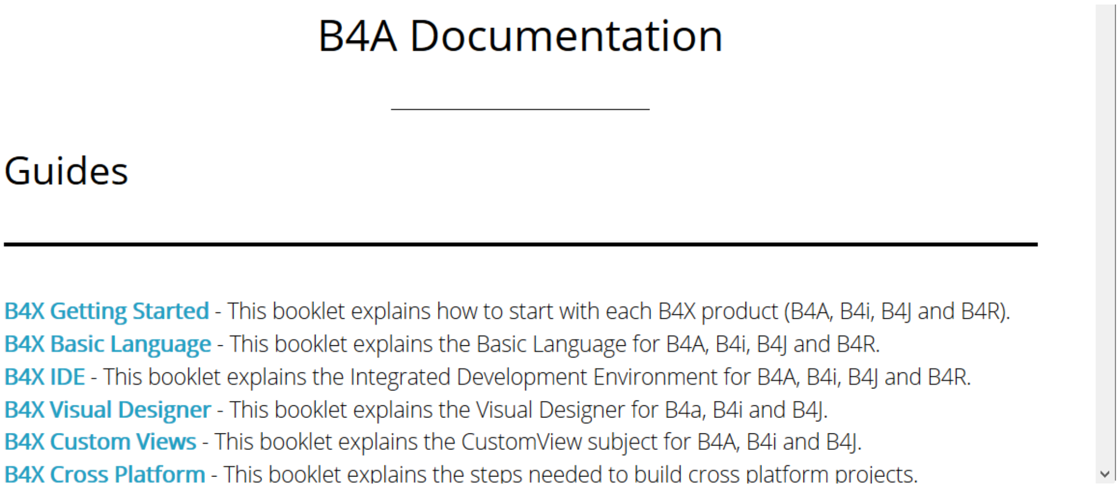
3.8 Help menu



Online Help.
About.
Like B4A? Support us by contributing.

3.8.1 Online Help

Leads you to the Documentation page of B4X site.



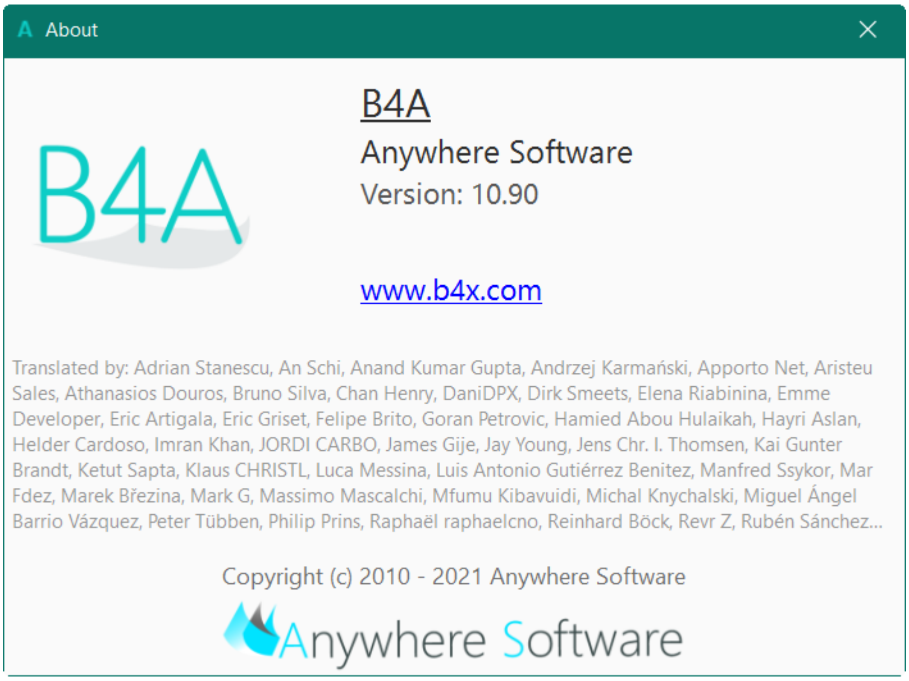
B4A Documentation

Guides

B4X Getting Started - This booklet explains how to start with each B4X product (B4A, B4i, B4J and B4R).
B4X Basic Language - This booklet explains the Basic Language for B4A, B4i, B4J and B4R.
B4X IDE - This booklet explains the Integrated Development Environment for B4A, B4i, B4J and B4R.
B4X Visual Designer - This booklet explains the Visual Designer for B4a, B4i and B4J.
B4X Custom Views - This booklet explains the CustomView subject for B4A, B4i and B4J.
B4X Cross Platform - This booklet explains the steps needed to build cross platform projects.

3.8.2 About

Shows the About window with the Version number and a link to the B4X site.



B4A
Anywhere Software
Version: 10.90

www.b4x.com

Translated by: Adrian Stanescu, An Schi, Anand Kumar Gupta, Andrzej Karmański, Apporto Net, Aristeu Sales, Athanasios Douros, Bruno Silva, Chan Henry, DaniDPX, Dirk Smeets, Elena Riabinina, Emme Developer, Eric Artigala, Eric Griset, Felipe Brito, Goran Petrovic, Hamied Abou Hulaikah, Hayri Aslan, Helder Cardoso, Imran Khan, JORDI CARBO, James Gije, Jay Young, Jens Chr. I. Thomsen, Kai Gunter Brandt, Ketut Sapta, Klaus CHRISTL, Luca Messina, Luis Antonio Gutiérrez Benitez, Manfred Ssykor, Mar Fdez, Marek Březina, Mark G, Massimo Mascalchi, Mfumu Kibavuidi, Michal Knychalski, Miguel Ángel Barrio Vázquez, Peter Tübben, Philip Prins, Raphaël raphaelcno, Reinhard Böck, Revr Z, Rubén Sánchez...

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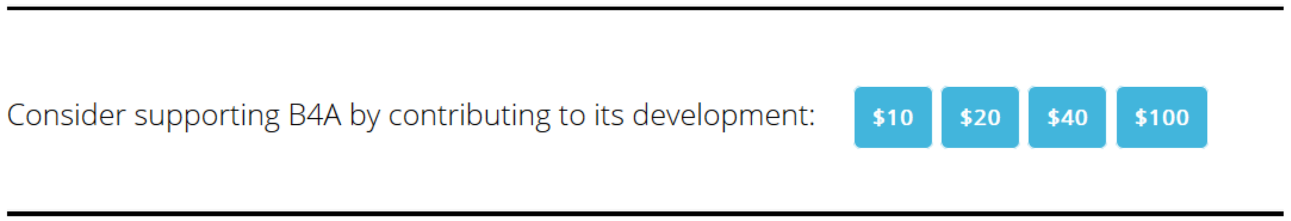
Anywhere Software

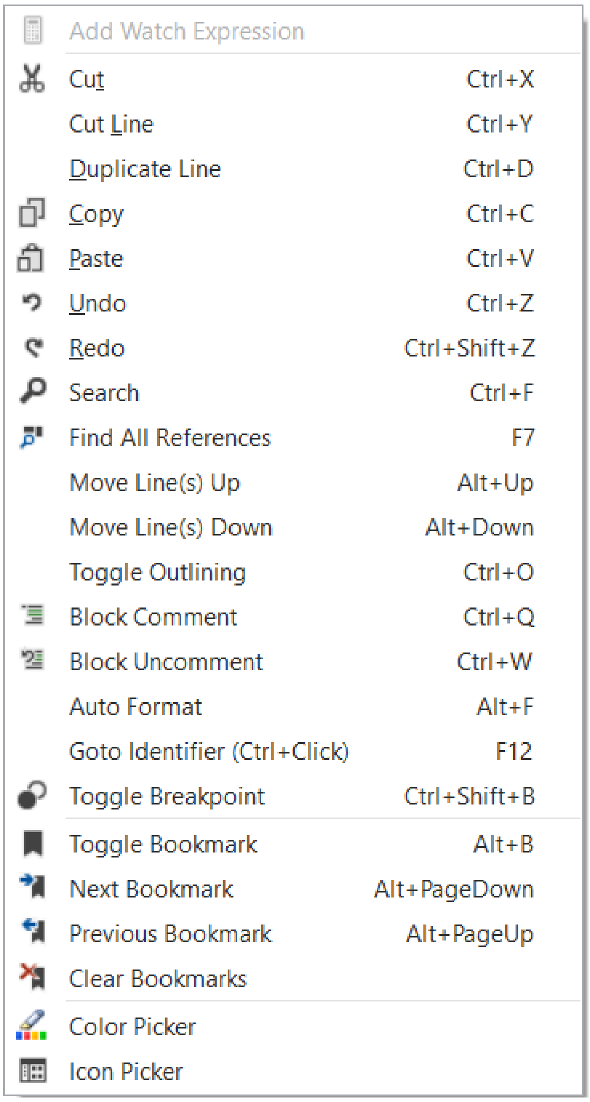
3.8.3 Like B4A? Support us by contributing

Leads you to the main platform page of the B4X site where you can contribute to help Anywhere Software continuing the development of the B4X products.


Consider supporting B4A by contributing to its development:

3.9 Right click menu

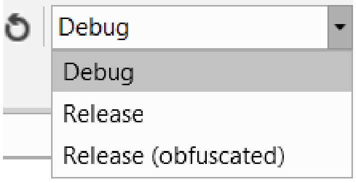
When you right click in the code area the menu below is displayed.



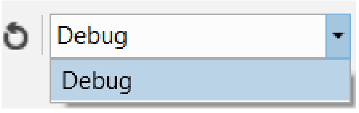
Cut
Cut Line
Duplicate Line
Copy
Paste
Undo
Redo
Search
Find All References
Move Line(s) Up
Move Line(s) Down
Toggle Outlining
Block Comment
Block Uncomment
Auto Format
Goto identifier
Toggle Breakpoint
Toggle Bookmark
Previous Bookmark
Next Bookmark
Clear Bookmark
Color Picker
Icon Picker Not in B4R.

3.10 Compiler mode

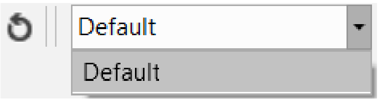
Besides the toolbar there is a drop-down list to select the compiler mode.



B4A / B4J



B4i



B4R

Debugging is explained in detail in the Debugging chapter.

3.10.1 B4A and B4J

Compiling modes:

- Debug
- Release
- Release (obfuscated)

3.10.1.1 Release and Release (obfuscated) modes B4A and B4J

To distribute your project, you must compile it with:

- Release
  The debugger code will not be added to the apk file.
- Release (obfuscated)
  The debugger code will not be added to the apk file,
  but the program file will be modified. See below.

During compilation B4A generates Java code which is then compiled with the Java compiler and converted to Dalvik (Android byte code format).
There are tools that allow decompilation of Dalvik byte code into Java code.

The purpose of obfuscation is to make the decompiled code less readable, harder to understand and make it more difficult to extract strings like developer account keys.

It is important to understand how the obfuscator works.
The obfuscator does two things:

Strings obfuscation
Any string written in Process_Globals sub (and only in this sub) will be obfuscated, making it much harder to extract important keys. The strings are deobfuscated at runtime.
Note that several keys are used during obfuscation including the package name, version name and version code. Modifying these values with the manifest editor will break the deobfuscation process.

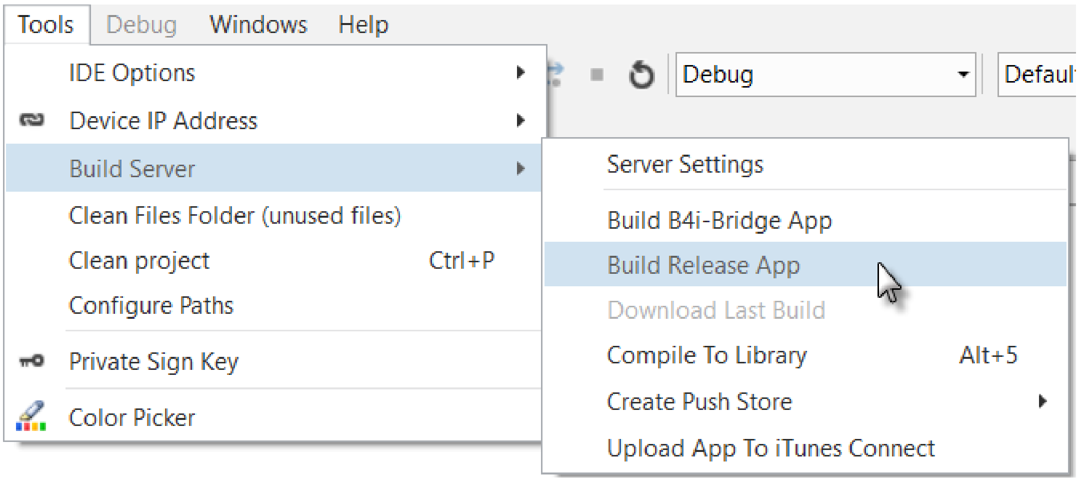
Variables renaming
The names of global variables and subs are converted to meaningless strings. Local variables are not affected as their names are lost anyway during the compilation.
The following identifiers are **not** renamed:
- Identifiers that contain an underscore (required for the events handlers).
- Subs that appear in CallSub statements. When a sub name appears as a static string, the identifier be kept as it is.
- Designer views names.

Tip: If, for some reason, you wish to prevent obfuscation of an identifier, include an underscore character in the name.

A file named ObfuscatorMap.txt will be created under the Objects folder. This file maps the original identifiers names to the obfuscated names. This mapping can be helpful in analysing crash reports.

3.10.2 B4i

To distribute a project, you must compile it in Release mode.
Click on Build Release App in the Tools / Build Server menu.



3.10.3 B4R

Only Default mode.

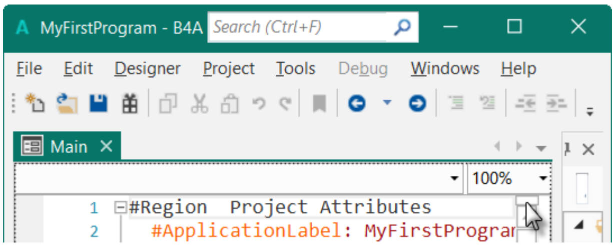
4 Code area

The code of the selected module is displayed in this area and can be edited.
The examples below are based on the code of the SecondProgram in the GettingStarted booklet.

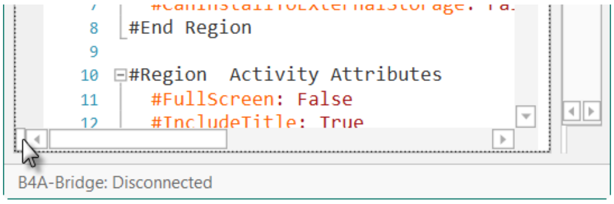
4.1 Split the code area

It is possible to split the code area into two or four parts allowing to edit two or four different code parts at the same time.

Move the small rectangle below the zoom level or in the lower left corner.

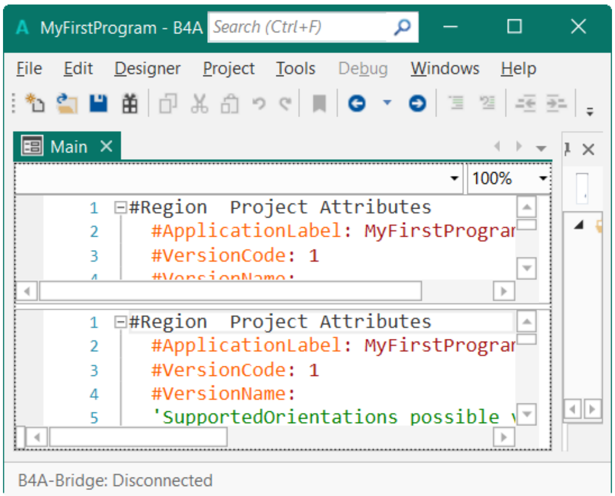


```
#Region  Project Attributes
    #ApplicationLabel: MyFirstProgra
```



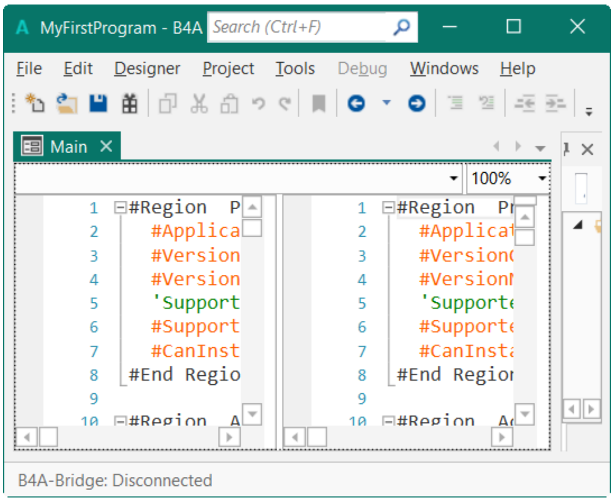
```
#End Region

#Region  Activity Attributes
    #FullScreen: False
    #IncludeTitle: True
```

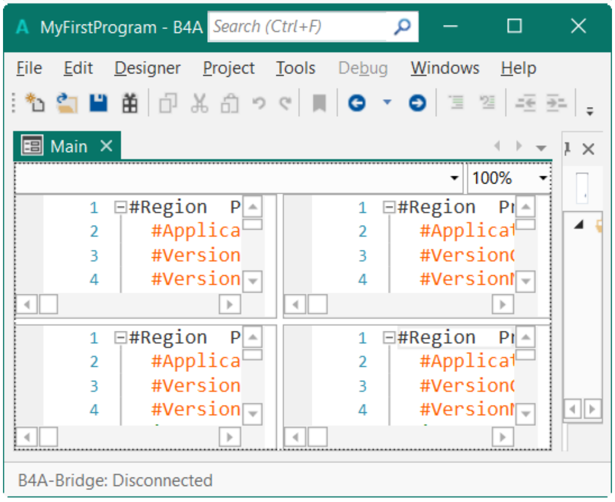
And the result.



```
#Region  Project Attributes
    #ApplicationLabel: MyFirstProgra
    #VersionCode: 1
```

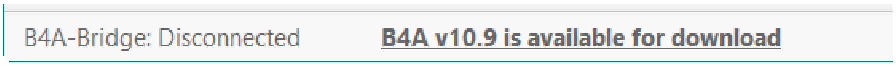
```
#Region  Project Attributes
    #ApplicationLabel: MyFirstProgra
    #VersionCode: 1
    #VersionName:
    'SupportedOrientations possible v
```





4.2 New version available

When a new version is available you are informed at the bottom of the IDE.
If you click on **B4A v10.0 is available for download**, and you will be led to the download page in the B4X site.

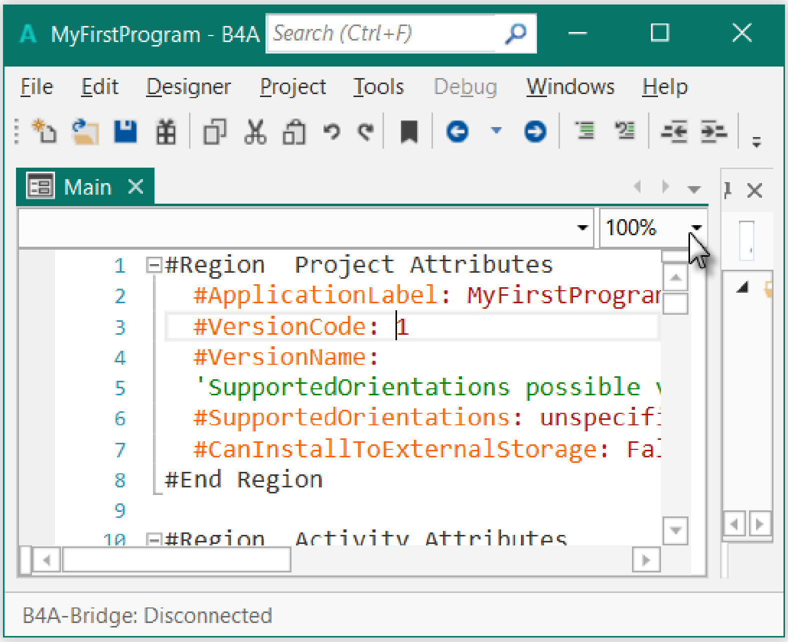


B4A-Bridge: Disconnected

B4A v10.9 is available for download

4.3 IDE text size

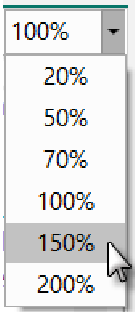
The IDE text size can be changed with the FontPicker or directly in the IDE:

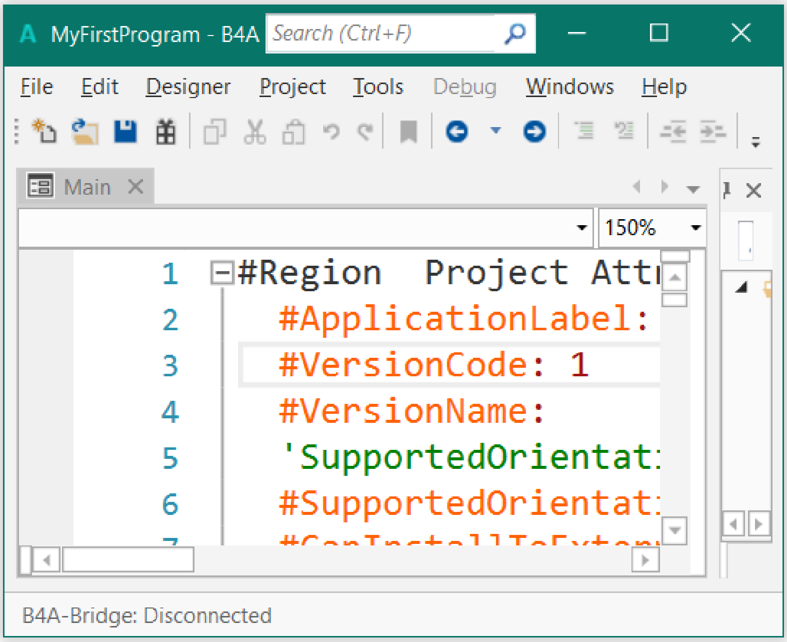


```
#Region  Project Attributes
	#ApplicationLabel: MyFirstProgra
	#VersionCode: 1
	#VersionName:
	'SupportedOrientations possible v
	#SupportedOrientations: unspecifi
	#CanInstallToExternalStorage: Fal
#End Region

#Region  Activity Attributes
```

B4A-Bridge: Disconnected

Click on 100% and select one of the zoom values.





```
#Region  Project Atti
	#ApplicationLabel:
	#VersionCode: 1
	#VersionName:
	'SupportedOrientat
	#SupportedOrientat
```

B4A-Bridge: Disconnected

4.4 Code header Project Attributes / Activity Attributes

A code header, with general settings, is added at the beginning of the code.

4.4.1 B4A

4.4.1.1 Project Attributes

Attributes that are valid for the whole project. Displayed only in the Main module.

```
#Region  Project Attributes
   #ApplicationLabel: SecondProgram
   #VersionCode: 1
   #VersionName:
   'SupportedOrientations possible values: unspecified, landscape or portrait.
   #SupportedOrientations: unspecified
   #CanInstallToExternalStorage: False
#End Region
```

`#ApplicationLabel:` The name which will be displayed below the program icon on the device.
`#VersionCode:` The version of the code, it is not displayed.
`#VersionName:` You can add a name for the version.
`#SupportedOrientations:` You can limit the whole program to a given orientation.
`#CanInstallToExternalStorage:` If you want to install the program on an external storage card you must set this attribute to True.

You can add or change the values to your needs.

4.4.1.2 Activity Attributes

Valid for the current activity.

```
#Region  Activity Attributes
   #FullScreen: False
   #IncludeTitle: True
#End Region
```

When you add a new Activity, you'll find the Activity Attributes region on top.

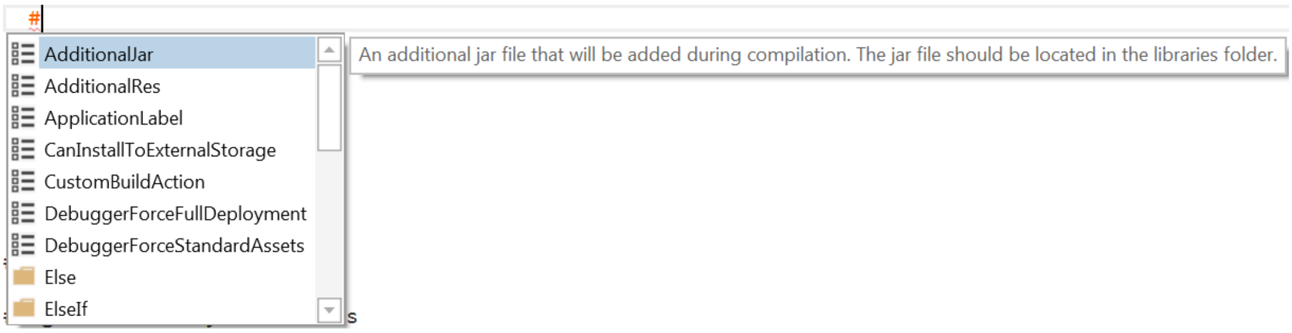
```
#Region  Activity Attributes
   #FullScreen: False
   #IncludeTitle: True
#End Region
```

4.4.1.3 Service Attributes

When you add a new Service, you will find the Service Attributes header.

```
#Region  Service Attributes
   #StartAtBoot: False
#End Region
```

When you want to add a new Attribute, you can just write # and the inline help shows all possibilities.



```
#
```

- AdditionalJar
- AdditionalRes
- ApplicationLabel
- CanInstallToExternalStorage
- CustomBuildAction
- DebuggerForceFullDeployment
- DebuggerForceStandardAssets
- Else
- ElseIf

An additional jar file that will be added during compilation. The jar file should be located in the libraries folder.

Note the two different icons:

☰ Attributes.

📁 Conditional compilation and region keywords.

When you load a project saved with a version of B4A older than 2.5 then the header will look like this:

```
#Region Module Attributes
  #FullScreen: False
  #IncludeTitle: True
  #ApplicationLabel: MyFirstProgram
  #VersionCode: 1
  #VersionName:
  #SupportedOrientations: unspecified
  #CanInstallToExternalStorage: False
#End Region
```

4.4.2 B4i

Only the Attributes below. No other Attributes in modules.

```
 'Code module
#Region  Project Attributes
   #ApplicationLabel: B4i Example
   #Version: 1.0.0
   'Orientation possible values: Portrait, LandscapeLeft, LandscapeRight and
PortraitUpsideDown
   #iPhoneOrientations: Portrait, LandscapeLeft, LandscapeRight
   #iPadOrientations: Portrait, LandscapeLeft, LandscapeRight, PortraitUpsideDown
   #Target: iPhone, iPad
   #ATSEnabled: True
   #MinVersion: 7
#End Region
```

4.4.3 B4J

Only the two Attributes below. No other Attributes in modules.

```
#Region Project Attributes
   #MainFormWidth: 600
   #MainFormHeight: 600
#End Region
```

4.4.4 B4R

Only the Attributes below. No other Attributes in modules.

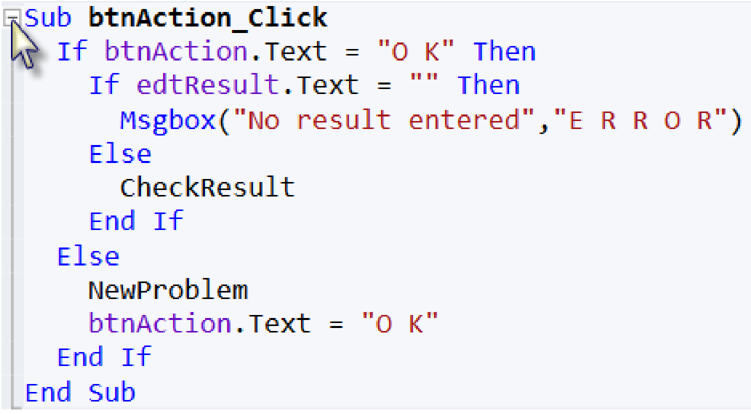
```
#Region Project Attributes
   #AutoFlushLogs: True
   #CheckArrayBounds: True
   #StackBufferSize: 300
#End Region
```

4.5 Undo – Redo ↶ ↷

In the IDE it is possible to undo the previous operations and redo undone operations.
Click on ↶ to undo and on ↷ to redo.

4.6 Collapse a subroutine

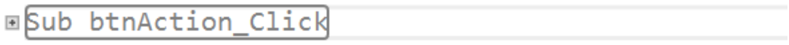
A subroutine can be collapsed to minimize the number of lines displayed.



```
Sub btnAction_Click
  If btnAction.Text = "O K" Then
    If edtResult.Text = "" Then
      Msgbox("No result entered","E R R O R")
    Else
      CheckResult
    End If
  Else
    NewProblem
    btnAction.Text = "O K"
  End If
End Sub
```

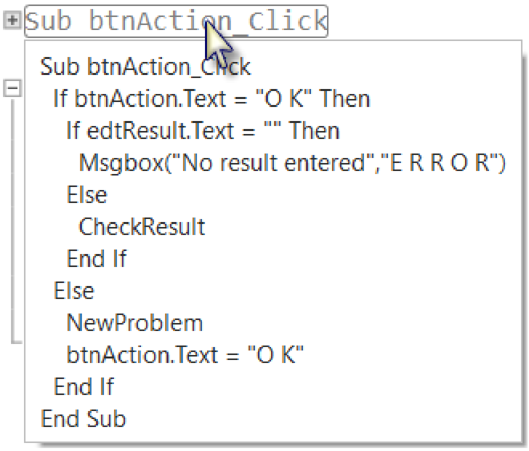
The btnAction_Click routine expanded.

Click on ⊟ to collapse the subroutine.



```
Sub btnAction_Click
```

The btnAction_Click routine collapsed.

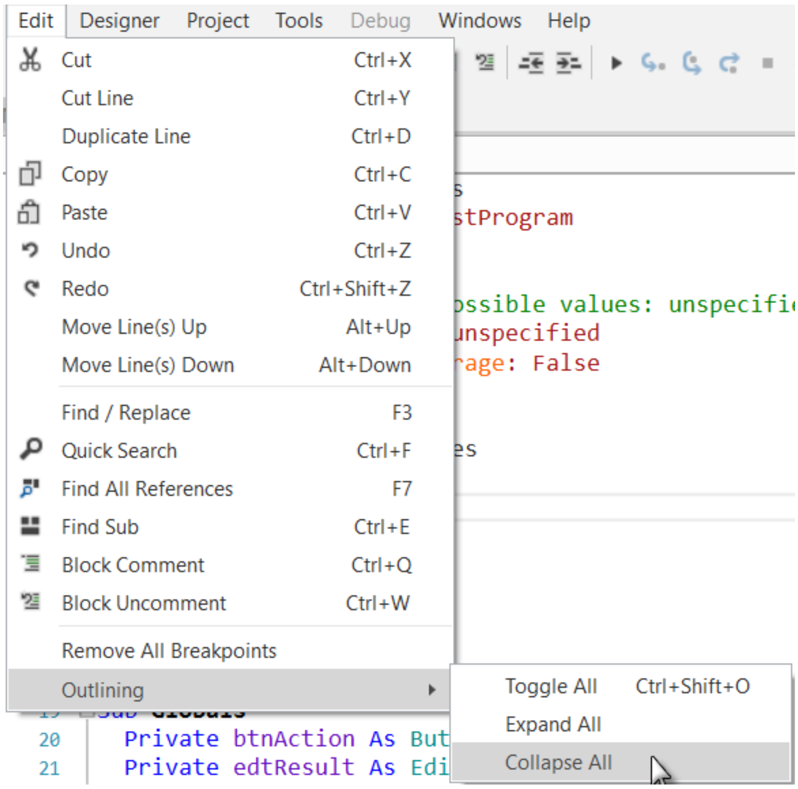


```
Sub btnAction_Click
```

```
Sub btnAction_Click
 If btnAction.Text = "O K" Then
  If edtResult.Text = "" Then
   Msgbox("No result entered","E R R O R")
  Else
   CheckResult
  End If
 Else
  NewProblem
  btnAction.Text = "O K"
 End If
End Sub
```

Hovering with the mouse over the collapsed routine name shows its content.

4.7 Collapse the entire code



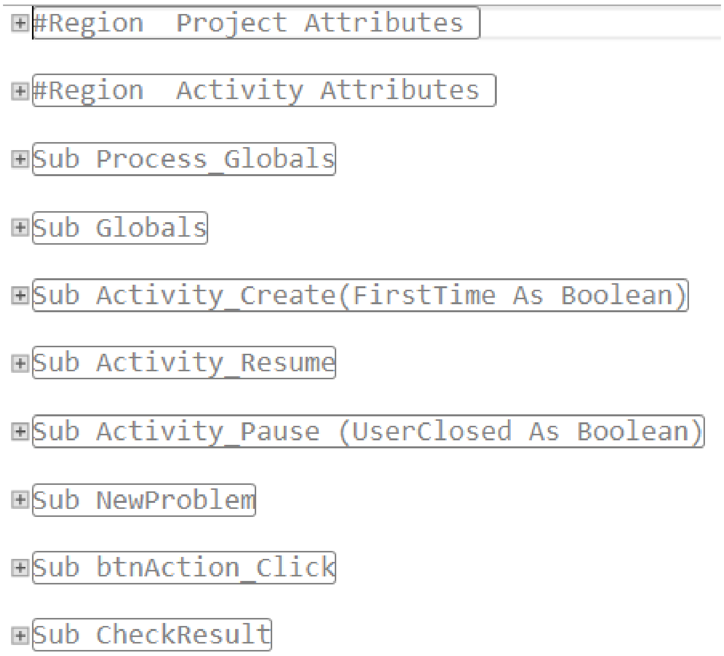
In the Edit / Outlining menu there are three functions:

- Toggle All
Expands the collapsed routines and collapses the expanded routines and regions.

- Expand All
Expands the entire code.

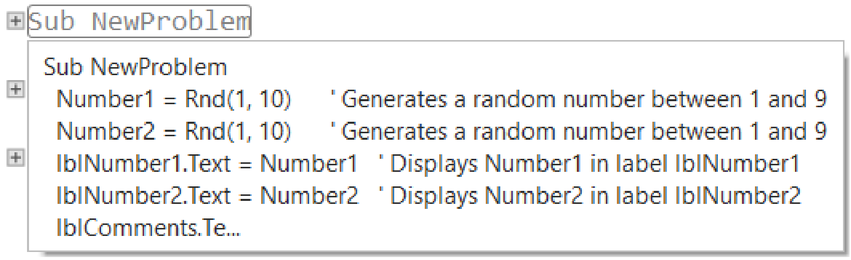
- Collapse All
Collapses the entire code.

Click on Collapse All.



```
#Region  Project Attributes
#Region  Activity Attributes
Sub Process_Globals
Sub Globals
Sub Activity_Create(FirstTime As Boolean)
Sub Activity_Resume
Sub Activity_Pause (UserClosed As Boolean)
Sub NewProblem
Sub btnAction_Click
Sub CheckResult
```

The whole code collapsed.



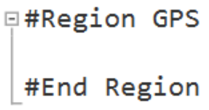
```
Sub NewProblem
Sub NewProblem
  Number1 = Rnd(1, 10)    ' Generates a random number between 1 and 9
  Number2 = Rnd(1, 10)    ' Generates a random number between 1 and 9
  lblNumber1.Text = Number1   ' Displays Number1 in label lblNumber1
  lblNumber2.Text = Number2   ' Displays Number2 in label lblNumber2
  lblComments.Te...
```

Hovering with the mouse over a subroutine shows the beginning of its content.

4.8 #Regions

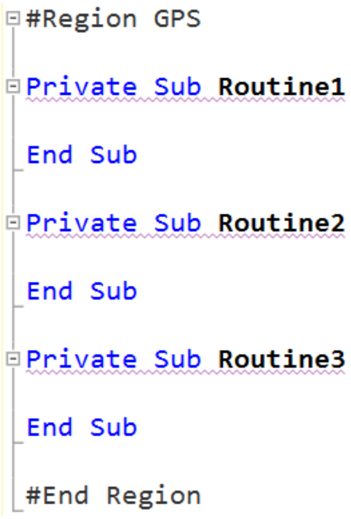
You can define ‘Regions’ in the code, which can be collapsed.

Example:



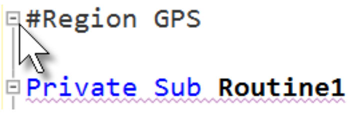
```
#Region GPS

#End Region
```

`#Region GPS` sets the beginning of a region and
`#End Region` the end.



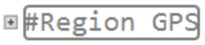
```
#Region GPS

Private Sub Routine1

End Sub

Private Sub Routine2

End Sub

Private Sub Routine3

End Sub

#End Region
```

Then you can add subroutines between the two limits.



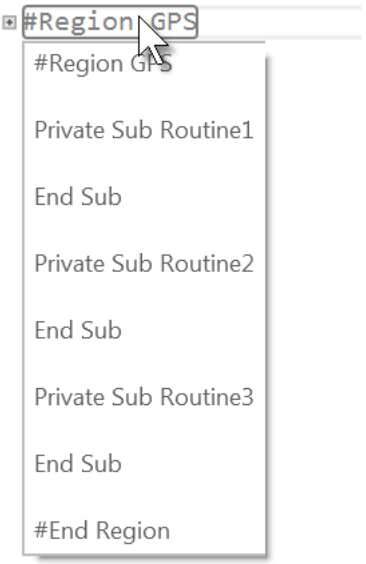
```
#Region GPS

Private Sub Routine1
```

Then click on ⊟ to collapse the whole region.



```
#Region GPS
```

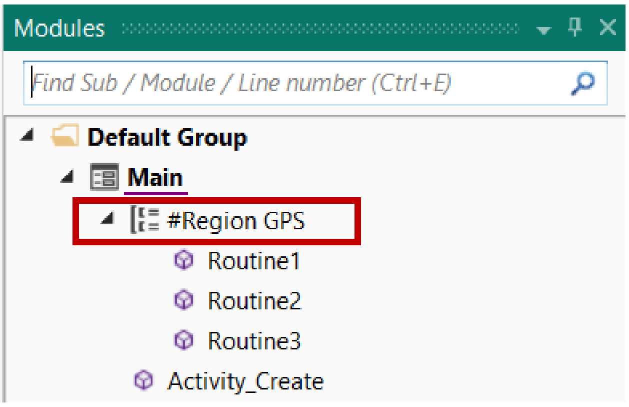
Hovering over #Region GPS



```
#Region GPS
#Region GPS

Private Sub Routine1

End Sub

Private Sub Routine2

End Sub

Private Sub Routine3

End Sub

#End Region
```

shows the code. For big regions not all the code is displayed.

The regions are also displayed in the Modules Tab.



4.9 Toggle Outlining Ctrl + 0

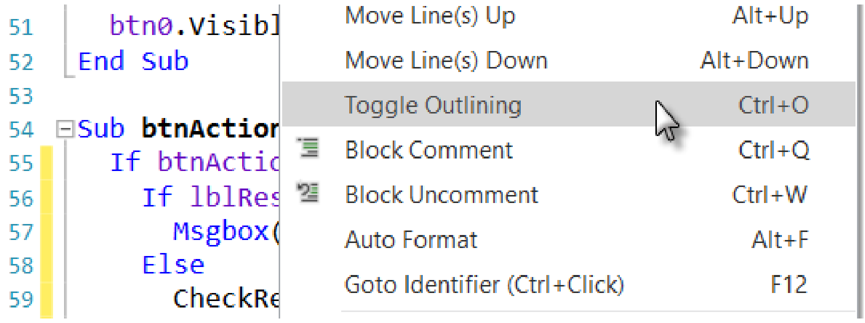
You can toggle code outlining.

Example:

```
Sub btnAction_Click
   If btnAction.Text = "O K" Then
      If lblResult.Text="" Then
        Msgbox("No result entered","E R R O R")
      Else
        CheckResult
      End If
   Else
      NewProblem
      btnAction.Text = "O K"
      lblResult.Text = "" & Chr(0xE632)
   End If
End Sub
```

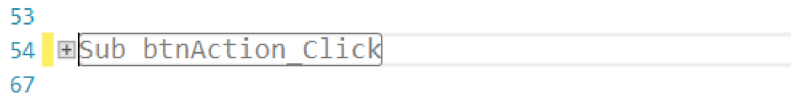
Click insides the routine and press Ctrl + 0.

Or right click insides the routine to show the pop-up menu and click on Toggle Outlining to collapse the routine.



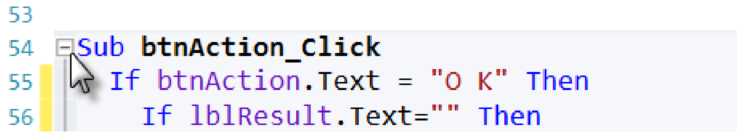
```
    btn0.Visibl
End Sub

Sub btnActior
    If btnActic
       If lblRes
          Msgbox(
       Else
          CheckRe
```

And the result.



```
Sub btnAction_Click
```

It is the same as clicking on ⊟.

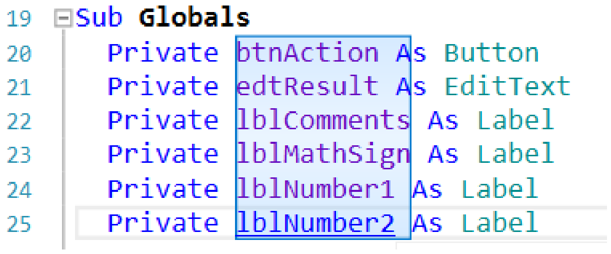


```
Sub btnAction_Click
   If btnAction.Text = "O K" Then
      If lblResult.Text="" Then
```

4.10 Copy a selected bloc of text

It is possible to copy a selected bloc of text to the clipboard, not only entire lines.

To select the bloc press Alt and move the mouse cursor.



```
Sub Globals
    Private btnAction As Button
    Private edtResult As EditText
    Private lblComments As Label
    Private lblMathSign As Label
    Private lblNumber1 As Label
    Private lblNumber2 As Label
```

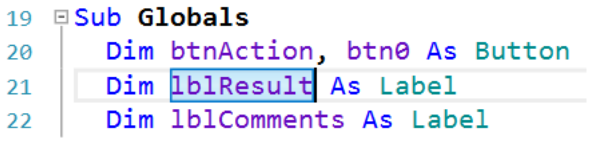
4.11 Move line(s) up / down Alt + Up / Alt + Down

You can move selected lines up or down.
Either with Alt + Up or Alt + Down.
Or right click on the selected lines and select Move Line(s) Up or Move Line(s) Down.

4.12 Find / Replace

The example uses the code from the SecondProgram project.

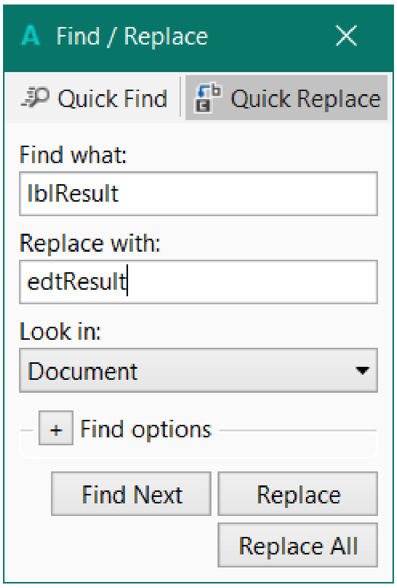
Let's replace `lblResult` by `edtResult`.



```
Sub Globals
    Dim btnAction, btn0 As Button
    Dim lblResult As Label
    Dim lblComments As Label
```

In the code select `lblResult`.

Press F3 or click on Find / Replace in the Edit menu.



Find what: lblResult

Replace with: edtResult

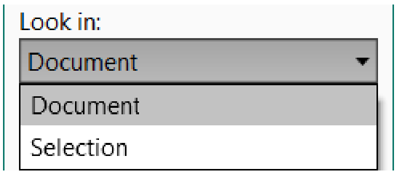
Look in: Document

This window will be displayed

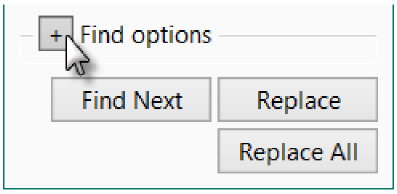
Enter `edtResult` in the 'Replace with' field.

Now, you can either:

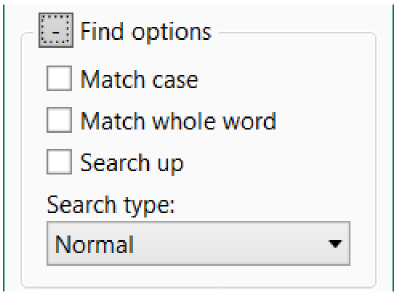
- Find Next find the next occurrence.
- Replace replace the current occurrence and find the next one.
- Replace All replace all occurrences.



You can search either in a Selection or in the Document, which means in the selected module not the whole document.



You can select Find options, click on +.

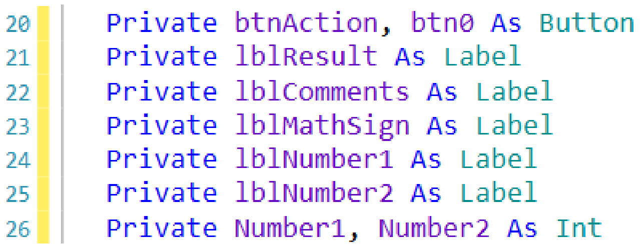


☐ Match case
☐ Match whole word
☐ Search up
Search type: Normal

These options are self-explanatory.

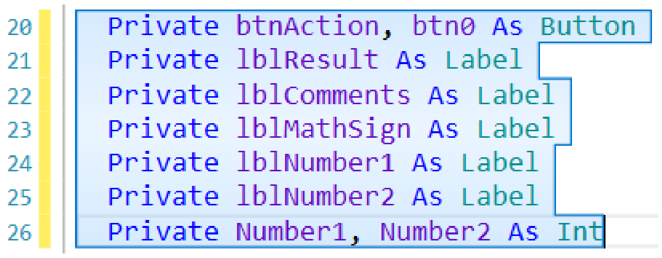
4.13 Commenting and uncommenting code

A selected part of the code can be set to comment lines or set to normal.



```
Private btnAction, btn0 As Button
Private lblResult As Label
Private lblComments As Label
Private lblMathSign As Label
Private lblNumber1 As Label
Private lblNumber2 As Label
Private Number1, Number2 As Int
```

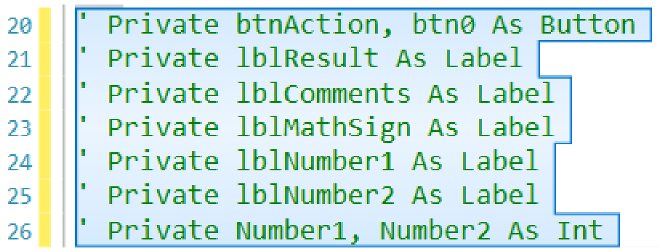
Original code



```
Private btnAction, btn0 As Button
Private lblResult As Label
Private lblComments As Label
Private lblMathSign As Label
Private lblNumber1 As Label
Private lblNumber2 As Label
Private Number1, Number2 As Int
```

Select the code.

Click on or Ctrl + Q.



```
' Private btnAction, btn0 As Button
' Private lblResult As Label
' Private lblComments As Label
' Private lblMathSign As Label
' Private lblNumber1 As Label
' Private lblNumber2 As Label
' Private Number1, Number2 As Int
```

The selected lines set as comments.

To set the lines to normal,
select the lines and click on or Ctrl + W.

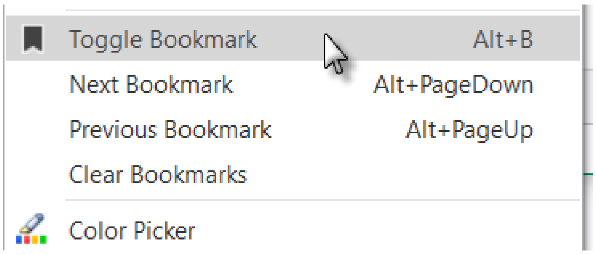
Or right click on the selected code and select Block Comment or Block Uncomment.

4.14 Bookmarks

You can set 'bookmarks' anywhere in the code and jump forward and backwards between these bookmarks.

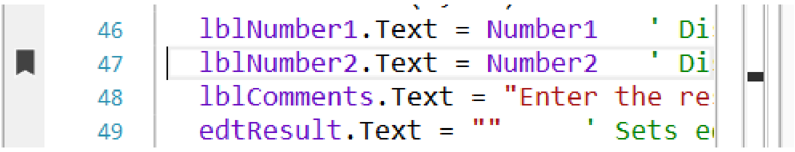
To set or clear a bookmark, select the line and press Alt + B.

Click on in the toolbar, or right click on the line where you want to set a bookmark.



You will get a pop-up menu, click on Toggle Bookmark to activate or deactivate a bookmark.

You will see this mark on the left of the line and a small black line in the right slider:



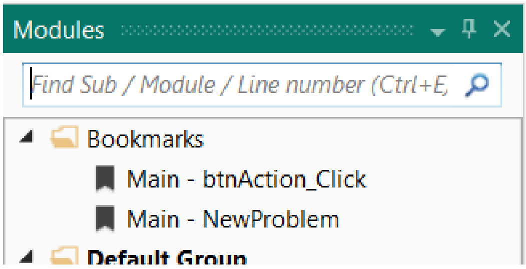
```
lblNumber1.Text = Number1    ' Di
lblNumber2.Text = Number2    ' Di
lblComments.Text = "Enter the re
edtResult.Text = ""       ' Sets e
```

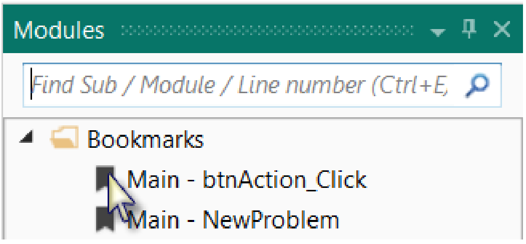
To jump to the next bookmark press Alt + PageDown
or right click and click on Next Bookmark Alt+PageDown

To jump to the previous bookmark press on Alt + PageUp
or right click and click on Previous Bookmark Alt+PageUp

To clear all bookmarks, click on in the toolbar or right click and click on Clear Bookmarks

You find the bookmarks also in the Modules Tab.



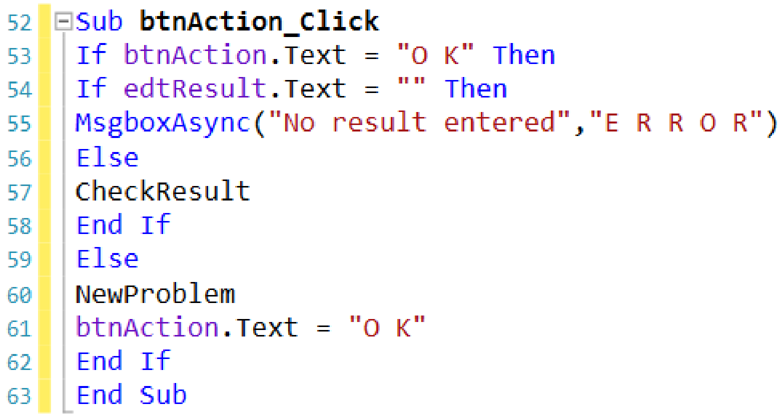


Click on a bookmark to jump to its line.

4.15 Indentation

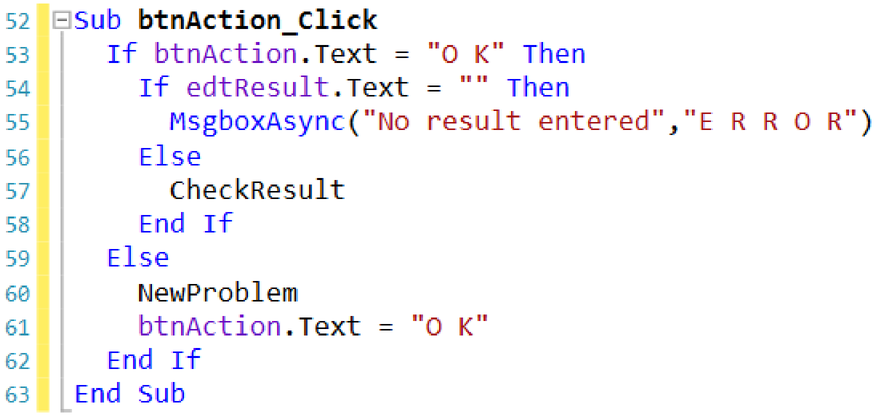
A good practice is to use indentation of code parts.
For example, for subroutines, loops, structures etc.

You should also have a look at Auto Format.



```
Sub btnAction_Click
If btnAction.Text = "O K" Then
If edtResult.Text = "" Then
MsgboxAsync("No result entered","E R R O R")
Else
CheckResult
End If
Else
NewProblem
btnAction.Text = "O K"
End If
End Sub
```

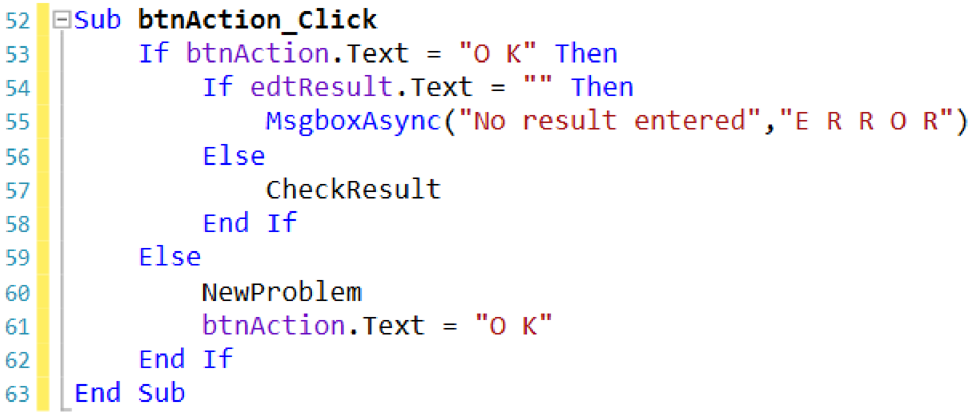
This code is difficult to read because the structure of the code is not obvious.



```
Sub btnAction_Click
  If btnAction.Text = "O K" Then
    If edtResult.Text = "" Then
      MsgboxAsync("No result entered","E R R O R")
    Else
      CheckResult
    End If
  Else
    NewProblem
    btnAction.Text = "O K"
  End If
End Sub
```

This code is much easier to read, the structure of the code is in evidence.

A tabulation value of 2 for the indentation is a good value.

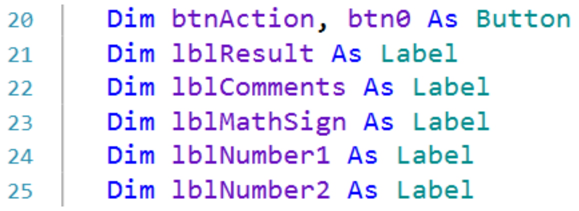


```
Sub btnAction_Click
    If btnAction.Text = "O K" Then
        If edtResult.Text = "" Then
            MsgboxAsync("No result entered","E R R O R")
        Else
            CheckResult
        End If
    Else
        NewProblem
        btnAction.Text = "O K"
    End If
End Sub
```

Example with an indentation of 4.

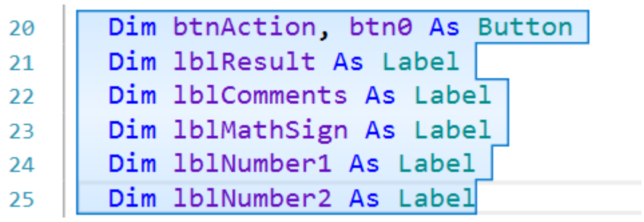
Personally,
I prefer a value of 2.

Whole blocks of code can be indented forth and back at once.



```
Dim btnAction, btn0 As Button
Dim lblResult As Label
Dim lblComments As Label
Dim lblMathSign As Label
Dim lblNumber1 As Label
Dim lblNumber2 As Label
```

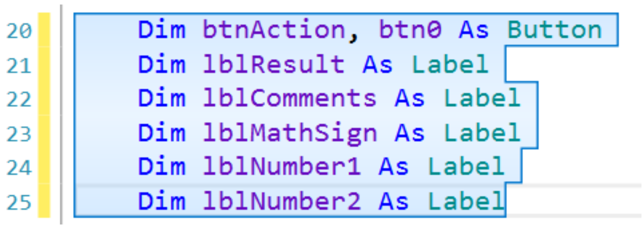
Original code.



```
Dim btnAction, btn0 As Button
Dim lblResult As Label
Dim lblComments As Label
Dim lblMathSign As Label
Dim lblNumber1 As Label
Dim lblNumber2 As Label
```

Select the code block.

Click on ⇥.

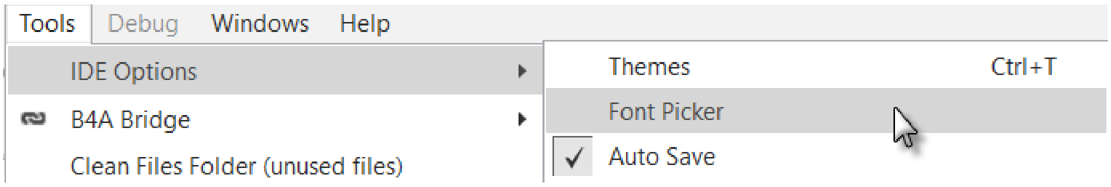


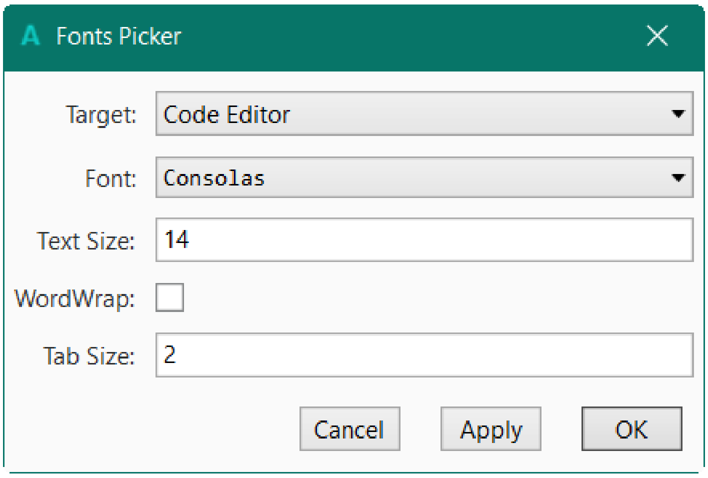
```
    Dim btnAction, btn0 As Button
    Dim lblResult As Label
    Dim lblComments As Label
    Dim lblMathSign As Label
    Dim lblNumber1 As Label
    Dim lblNumber2 As Label
```

The whole block has moved one tabulation to the right.

To move a block to the left.
Select the code block and click on ⇤ .

The indentation value can be changed in the Tools menu IDE Options / Font Picker.





Target: Code Editor

Font: Consolas

Text Size: 14

WordWrap: ☐

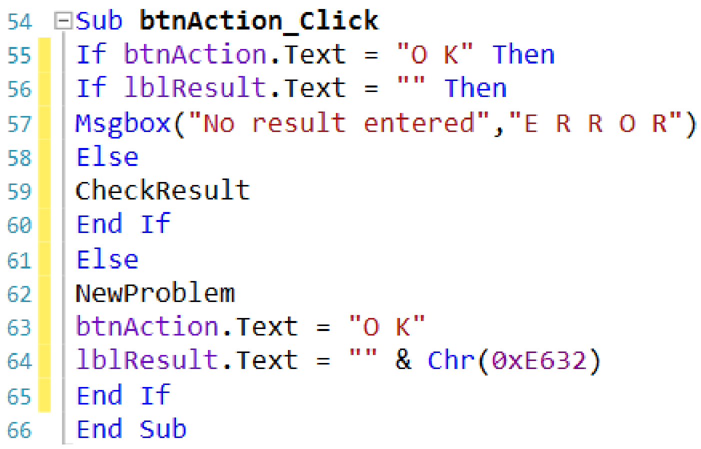
Tab Size: 2

Enter the value and click on OK.

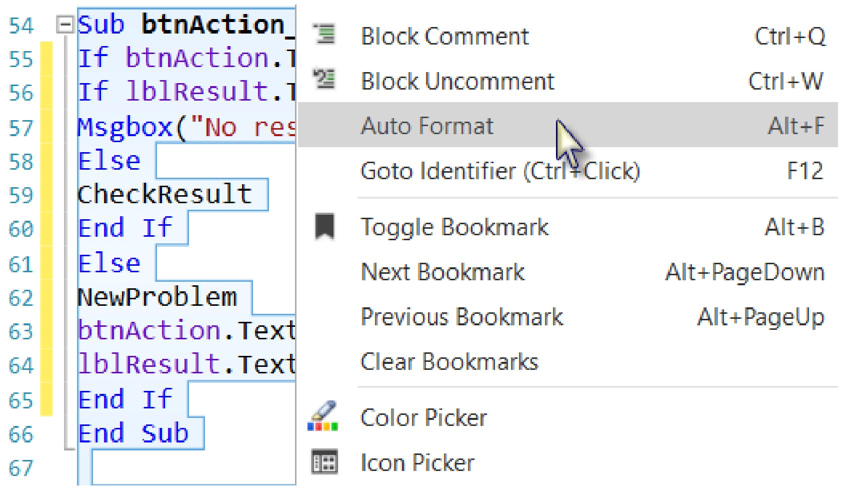
4.16 Auto format

You can auto format the code.

This code is not easy to read.



```
Sub btnAction_Click
If btnAction.Text = "O K" Then
If lblResult.Text = "" Then
Msgbox("No result entered","E R R O R")
Else
CheckResult
End If
Else
NewProblem
btnAction.Text = "O K"
lblResult.Text = "" & Chr(0xE632)
End If
End Sub
```

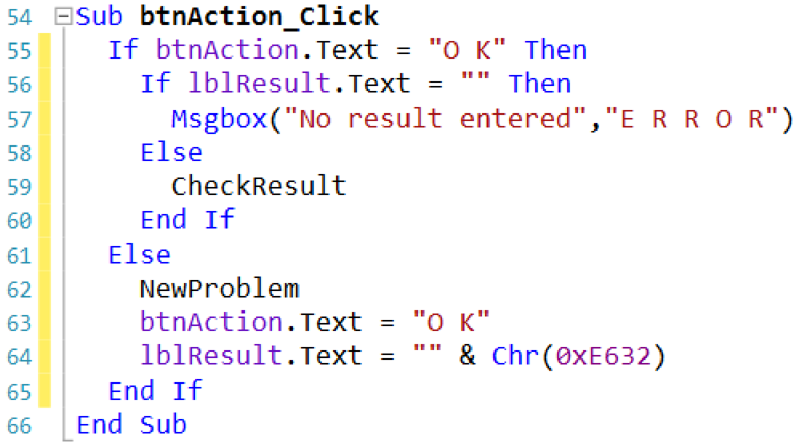


```
Sub btnAction_
If btnAction.T
If lblResult.T
Msgbox("No res
Else
CheckResult
End If
Else
NewProblem
btnAction.Text
lblResult.Text
End If
End Sub
```

Select the code.

Right click in the code area to show this pop-up menu.

And click on Auto Format.



```
Sub btnAction_Click
  If btnAction.Text = "O K" Then
    If lblResult.Text = "" Then
      Msgbox("No result entered","E R R O R")
    Else
      CheckResult
    End If
  Else
    NewProblem
    btnAction.Text = "O K"
    lblResult.Text = "" & Chr(0xE632)
  End If
End Sub
```

And the result.
The Tab size depends on your settings, see previous page.

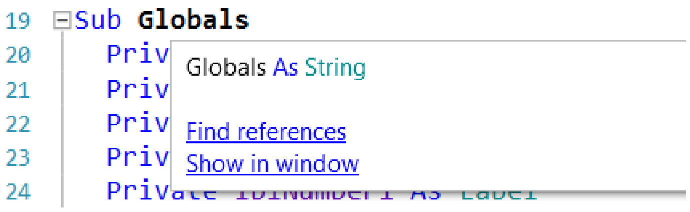
4.17 Documentation tool tips while hovering over code elements

When you hover over code elements the on-line help and other options are displayed.

Examples with the MyFirstProgram code:

4.17.1 Hovering over a subroutine name

Hovering over **Globals**:

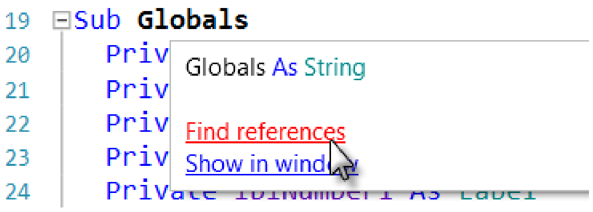


```
Sub Globals
    Priv
    Priv
    Priv
    Priv
    Private lblNumber1 As Label
```

Globals As String

Find references
Show in window

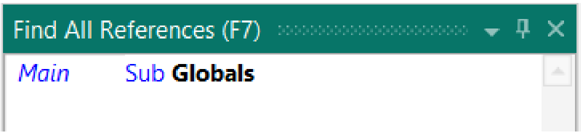
Hovering over Find references or Show in window highlights the link.



```
Sub Globals
    Priv
    Priv
    Priv
    Priv
    Private lblNumber1 As Label
```

Globals As String

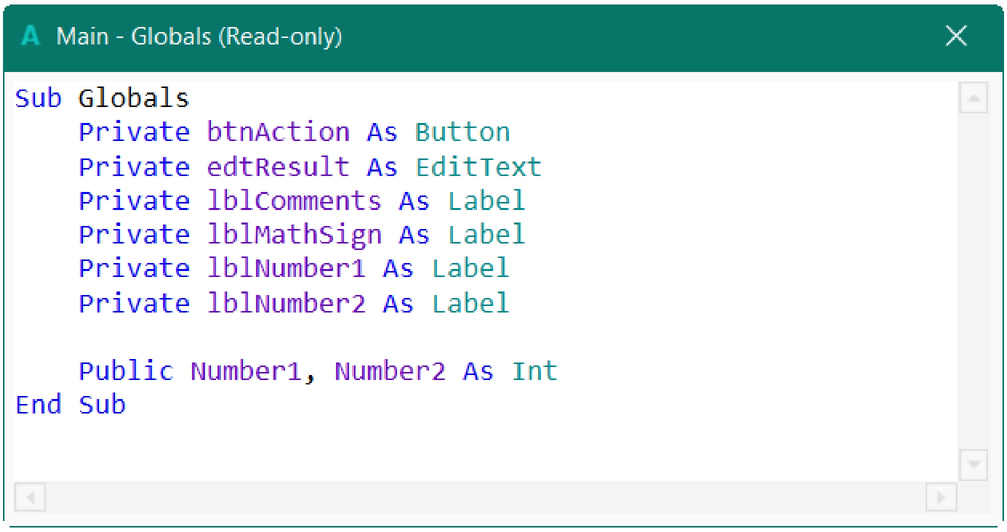
Find references
Show in window



Main	Sub **Globals**

Find references

Shows all references in the *Find All References* Tab:



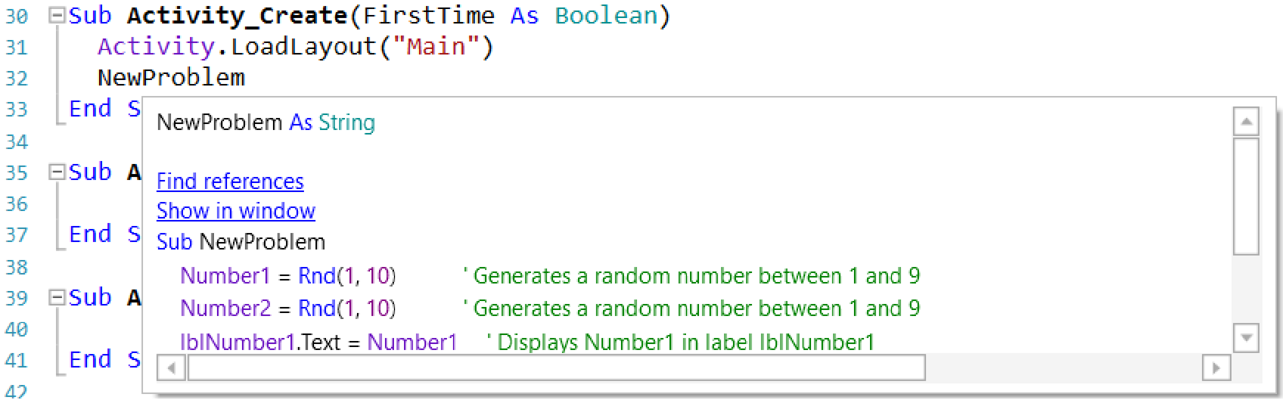
```
Sub Globals
    Private btnAction As Button
    Private edtResult As EditText
    Private lblComments As Label
    Private lblMathSign As Label
    Private lblNumber1 As Label
    Private lblNumber2 As Label

    Public Number1, Number2 As Int
End Sub
```

Show in window

Sows the routine in a window:

4.17.2 Hovering over a subroutine call

Hovering over **NewProblem**:
Shows Find references and Show in window and shows the content of the routine in the same window.



```
Sub Activity_Create(FirstTime As Boolean)
    Activity.LoadLayout("Main")
    NewProblem
End S

Sub A

End S

Sub A

End S
```

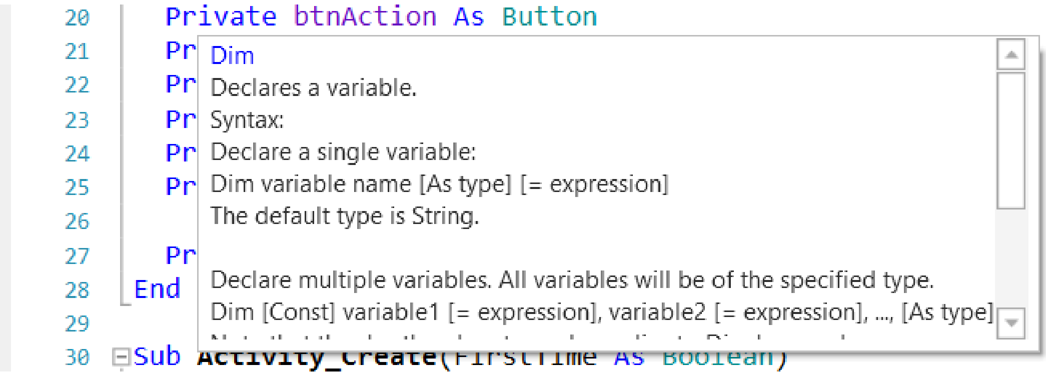
NewProblem As String

Find references
Show in window
Sub NewProblem

```
    Number1 = Rnd(1, 10)        ' Generates a random number between 1 and 9
    Number2 = Rnd(1, 10)        ' Generates a random number between 1 and 9
    lblNumber1.Text = Number1    ' Displays Number1 in label lblNumber1
```

4.17.3 Hovering over a keyword

Hovering over **Private** shows the help from the documentation:



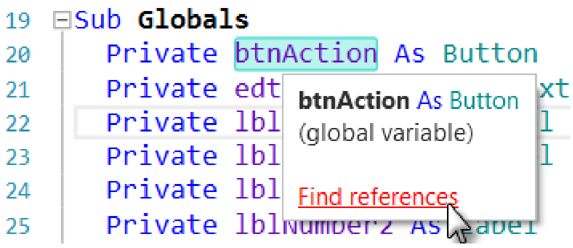
```
    Private btnAction As Button
    Pr
    Pr
    Pr
    Pr
    Pr

    Pr
End
Sub Activity_Create(FirstTime As Boolean)
```

Dim
Declares a variable.
Syntax:
Declare a single variable:
Dim variable name [As type] [= expression]
The default type is String.

Declare multiple variables. All variables will be of the specified type.
Dim [Const] variable1 [= expression], variable2 [= expression], ..., [As type]

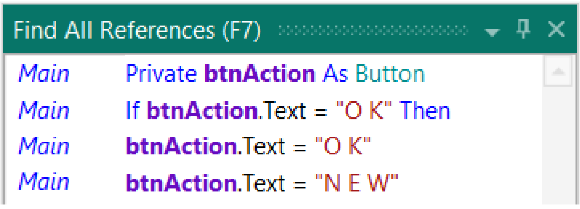
4.17.4 Hovering over an object name

Hovering over **btnAction**:



```
Sub Globals
    Private btnAction As Button
    Private edt                 xt
    Private lbl                 l
    Private lbl                 l
    Private lbl
    Private lblNumber2 As  abel
```

btnAction As Button
(global variable)



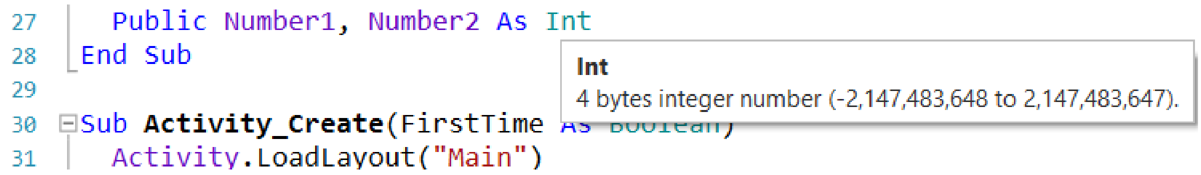
Main	Private **btnAction** As Button
Main	If **btnAction**.Text = "O K" Then
Main	**btnAction**.Text = "O K"
Main	**btnAction**.Text = "N E W"

Find references

Shows all lines where btnAction is used.

4.17.5 Hovering over a variable type

Hovering over **Int** shows the help:

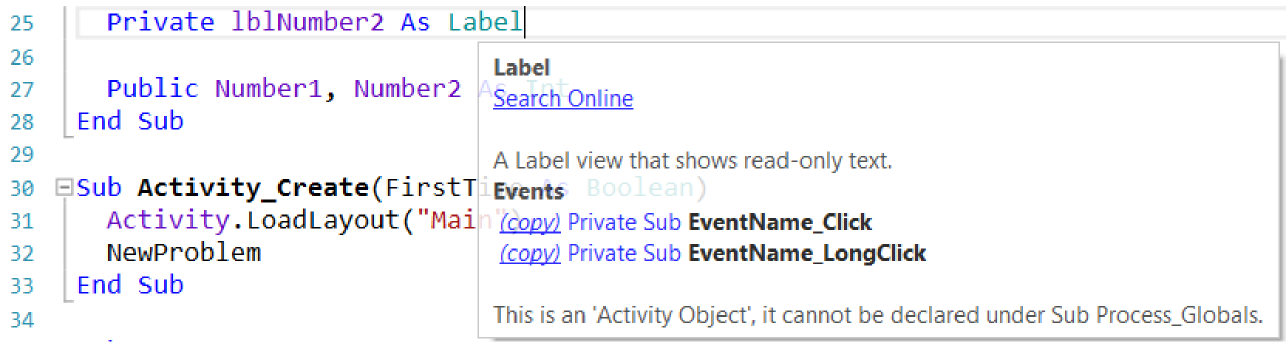


```
    Public Number1, Number2 As Int
End Sub

Sub Activity_Create(FirstTime As Boolean)
    Activity.LoadLayout("Main")
```

Int
4 bytes integer number (-2,147,483,648 to 2,147,483,647).

4.17.6 Hovering over a View type

Hovering over **Label** shows the window below:



```
    Private lblNumber2 As Label

    Public Number1, Number2 As Int
End Sub

Sub Activity_Create(FirstTime As Boolean)
    Activity.LoadLayout("Main")
    NewProblem
End Sub
```

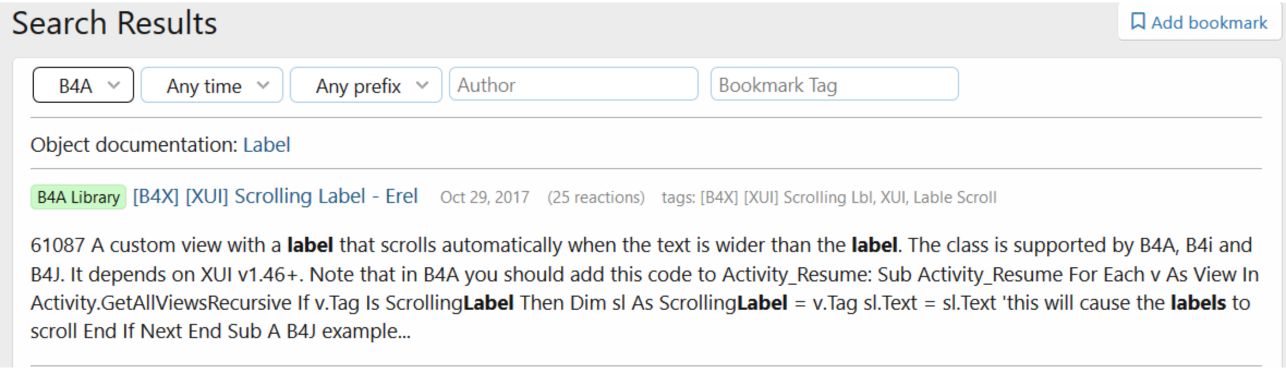
Label
Search Online

A Label view that shows read-only text.
Events
(copy) Private Sub **EventName_Click**
(copy) Private Sub **EventName_LongClick**

This is an 'Activity Object', it cannot be declared under Sub Process_Globals.

Search Online:

Shows the search result with Label:



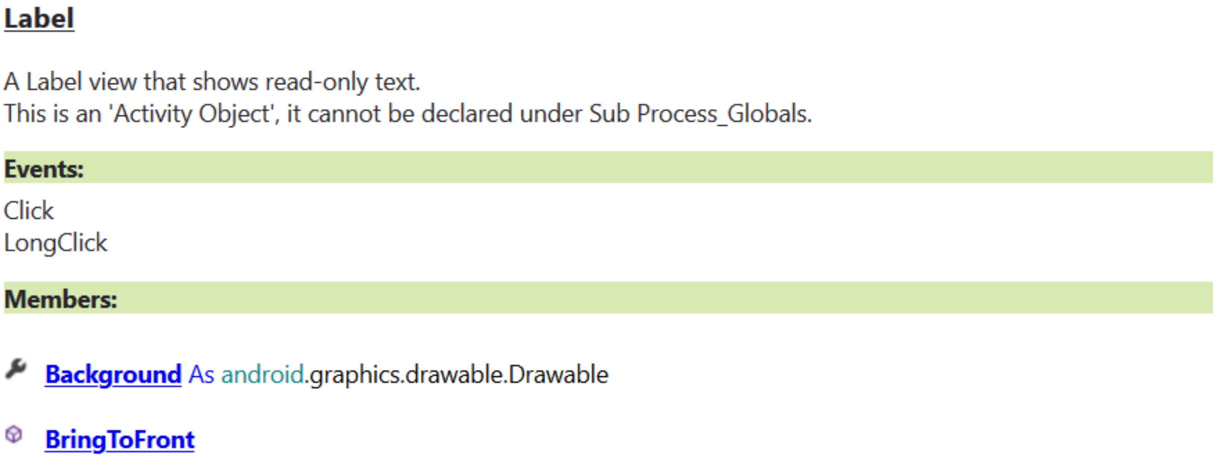
Search Results

Object documentation: Label

B4A Library [B4X] [XUI] Scrolling Label - Erel Oct 29, 2017 (25 reactions) tags: [B4X] [XUI] Scrolling Lbl, XUI, Lable Scroll

61087 A custom view with a **label** that scrolls automatically when the text is wider than the **label**. The class is supported by B4A, B4i and B4J. It depends on XUI v1.46+. Note that in B4A you should add this code to Activity_Resume: Sub Activity_Resume For Each v As View In Activity.GetAllViewsRecursive If v.Tag Is Scrolling**Label** Then Dim sl As Scrolling**Label** = v.Tag sl.Text = sl.Text 'this will cause the **labels** to scroll End If Next End Sub A B4J example...

Clicking on Object documentation: Label shows the online Help:



Label

A Label view that shows read-only text.
This is an 'Activity Object', it cannot be declared under Sub Process_Globals.

Events:

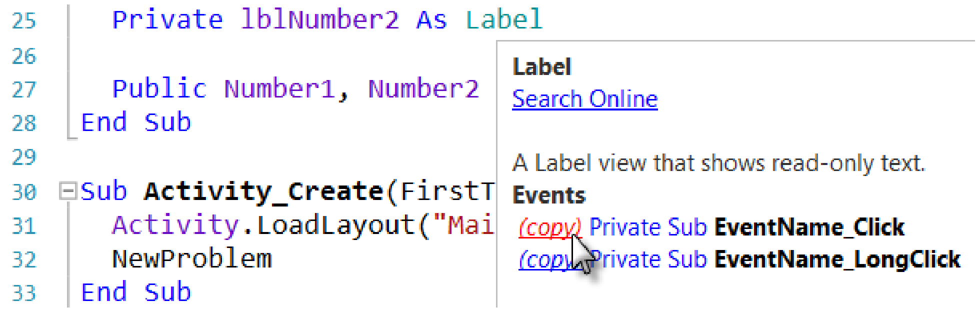
Click
LongClick

Members:

Background As android.graphics.drawable.Drawable

BringToFront

Clicking on *(copy)*:



```
    Private lblNumber2 As Label

    Public Number1, Number2
End Sub

Sub Activity_Create(FirstT
    Activity.LoadLayout("Mai
    NewProblem
End Sub
```

Label
Search Online

A Label view that shows read-only text.
Events
(copy) Private Sub **EventName_Click**
(copy) Private Sub **EventName_LongClick**

Puts `Private Sub EventName_Click` into the clipboard, which you can copy to the code.

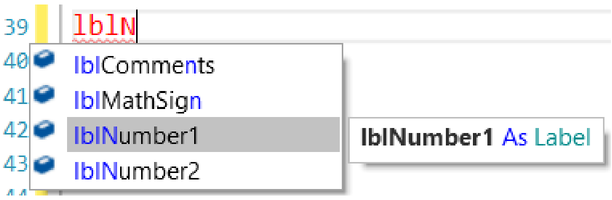
The best way to discover all the options is to test this functionality.

4.18 Auto Completion

A very useful tool is the Auto Completion function.

Attention: Make sure that Disable Implicit Auto Completion, in the Tools / IDE Options menu, is not checked!

Example with the MyFirtsProgram code:

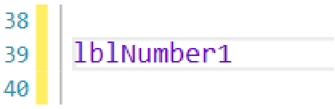


```
lblN
```

Let us write lblN.

All variables, views and property names beginning with the letters already written are shown in a popup menu with the online help for the highlighted variable, view or property name.

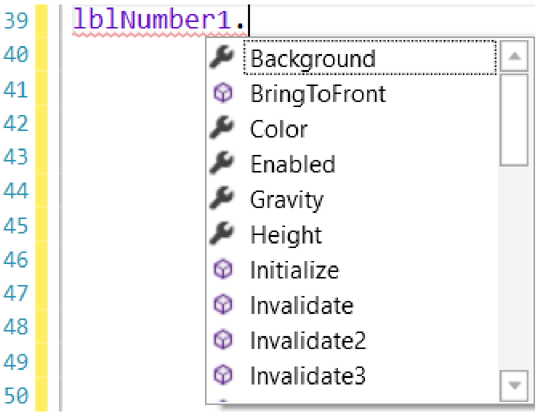
To choose lblNumber1 press Return.



```
lblNumber1
```

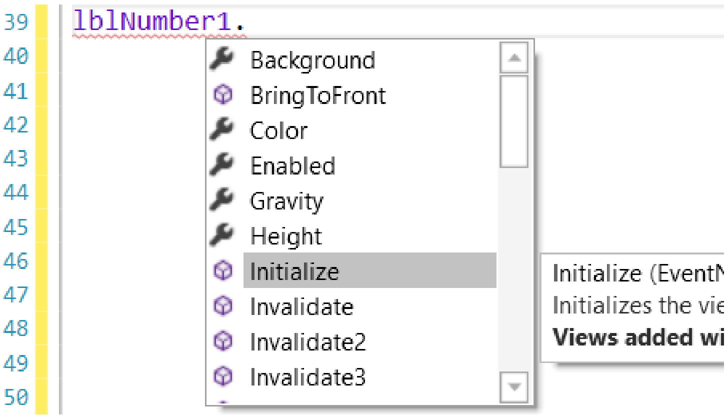
The selected name is completed.

To choose lblNumber2 double click on it or press the down arrow and press Return.



```
lblNumber1.
```

After pressing "." all properties and methods of the view are displayed in a popup menu.



```
lblNumber1.
```

Initialize (EventN
Initializes the vie
Views added wi

When selecting an item, the internal help is displayed

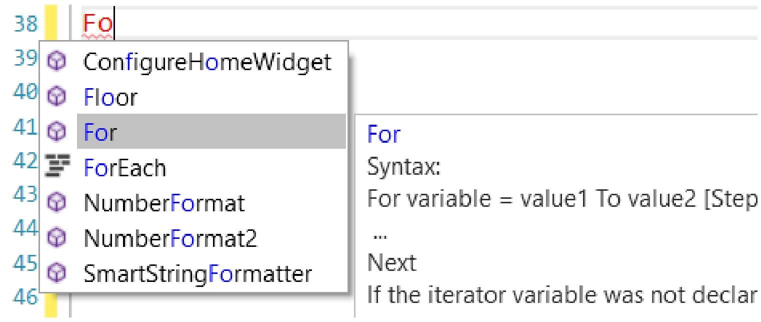
Pressing on the up / down arrows selects the previous or next item with its help.

Pressing a character updates the list and shows the parameter beginning with that character.

Structures are also completed.

Examples:

For / Next



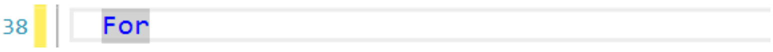
```
Fo
```

For
Syntax:
For variable = value1 To value2 [Step
...
Next
If the iterator variable was not declar

Type Fo

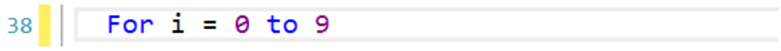
You get For with the help.

Press Return.



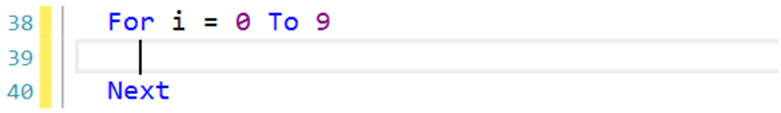
```
For
```

For is completed.



```
For i = 0 to 9
```

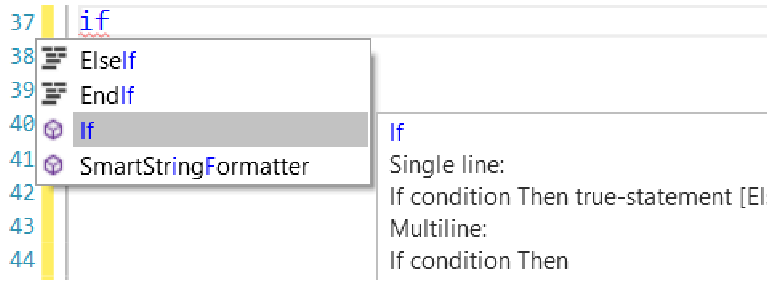
Write the rest of the instruction.
And press Return.



```
For i = 0 To 9

Next
```

Next is automatically added and the cursor is in the next line idented.

If / Then



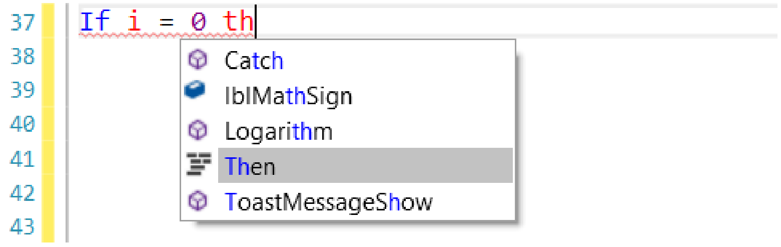
```
if
```

If
Single line:
If condition Then true-statement [El
Multiline:
If condition Then

Type 'if'.

You get If with the help.

Press Return and continue typing like in the example.

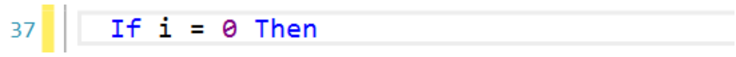


```
If i = 0 th
```

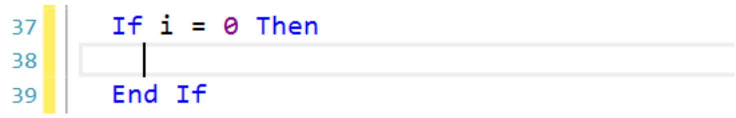
After th you get Then with its help.

Press Return.

And press Return again.



```
If i = 0 Then
```



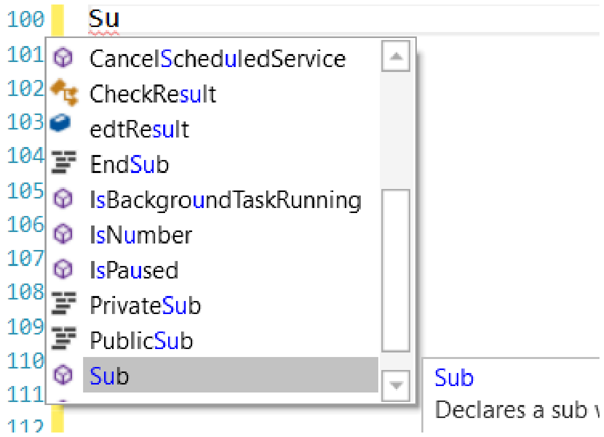
```
If i = 0 Then

End If
```

`End If` is automatically added
and the cursor is in the next line idented.

The best way to learn it is to 'play' with it.

Another very powerful Autocomplete function allows you to create event subroutines.

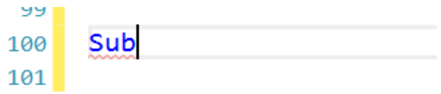
In the example below we want to create the Click event for the `bntOK` button.
Write ’`Su`’ and the Auto Completion displays all keywords containing the two characters.



```
Su
```

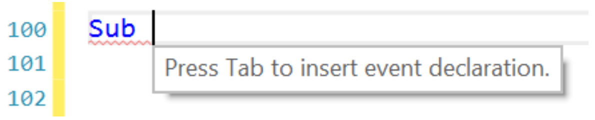
Sub
Declares a sub

Press Return to select `Sub`.



```
Sub
```

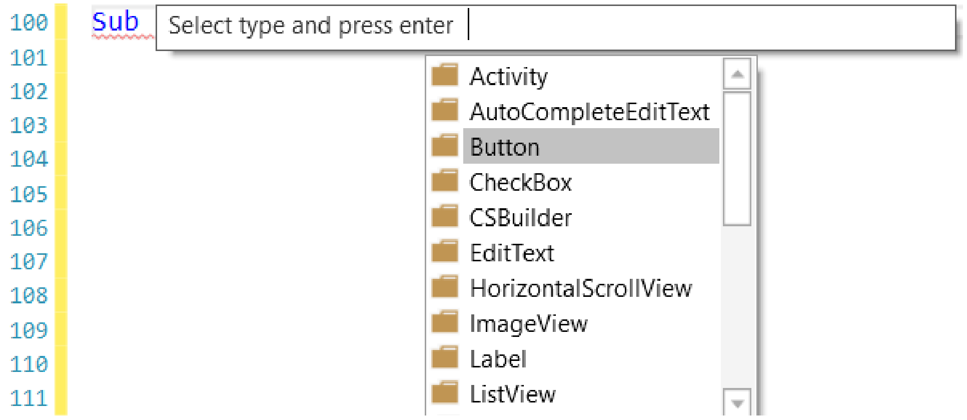
Press blank.



```
Sub
```

Press Tab to insert event declaration.

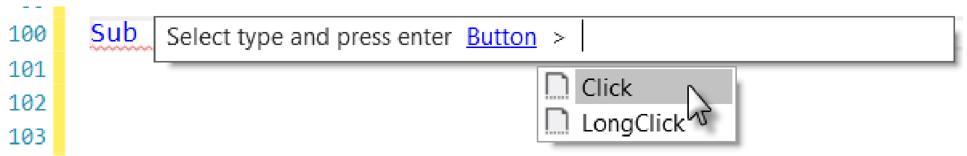
Press Tab and select the view type, select `Button`.



```
Sub
```

Select type and press enter

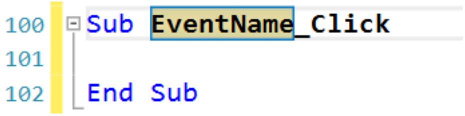
All events for a Button are displayed, select Click.



```
Sub
```

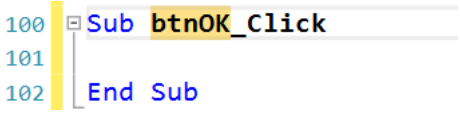
Select type and press enter Button >

The subroutine frame is generated.



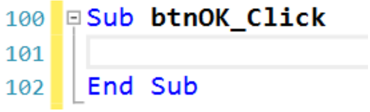
```
Sub EventName_Click

End Sub
```

Modify 'EventName' to the event name of the button, in our example `btnOK`.



```
Sub btnOK_Click

End Sub
```

Press Return and the routine is ready.



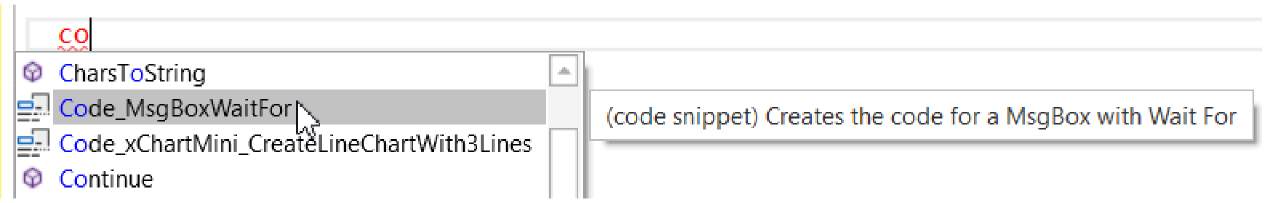
```
Sub btnOK_Click

End Sub
```

4.19 Copy Code Snippets

When you type ‘co’ in the IDE you may see several items in the list beginning with Code_.

These items are code snippets.

When you click on them you will see a comment if there is one.

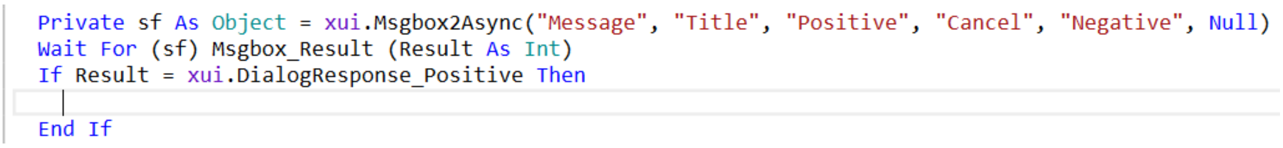


(code snippet) Creates the code for a MsgBox with Wait For

In the example above, you see two snippets.

- Code_MsgBoxWaitFor
  A code in the AdditionalLibraries\B4X\Snippets folder.
- Code_xChartMini_CreateLineChartWith3Lines
  A code snippet in the xChartMini b4xlib library.

When you click on Code_MsgBoxWaitFor the code snippet is copied in the editor.



```
Private sf As Object = xui.Msgbox2Async("Message", "Title", "Positive", "Cancel", "Negative", Null)
Wait For (sf) Msgbox_Result (Result As Int)
If Result = xui.DialogResponse_Positive Then
    
End If
```

Code snippets are explained in detail in the B4X Language booklet.

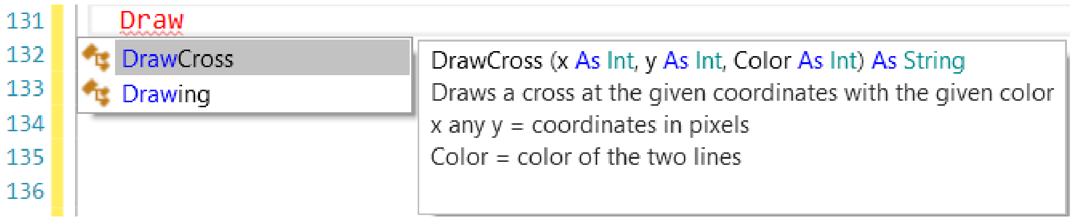
4.20 Built-in documentation

Another useful function is the built-in documentation.

Comments above subs, such as:

```
'Draws a cross at the given coordinates with the given color
'x any y = coordinates in pixels
'Color = color of the two lines
Sub DrawCross(x As Int, y As Int, Color As Int)
   Private d = 3dip As Int

   cvsLayer.DrawLine(x - d, y, x + d, y, Color, 1)
   cvsLayer.DrawLine(x, y - d, x, y + d, Color, 1)
End Sub
```

Will automatically appear in the auto complete pop-up window:

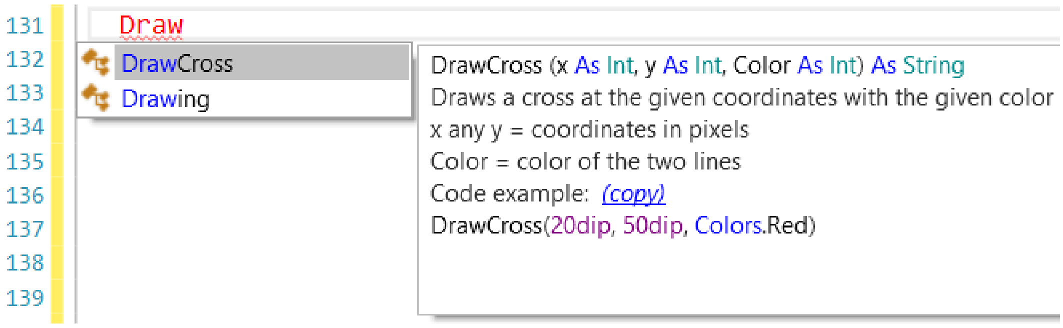


DrawCross (x As Int, y As Int, Color As Int) As String
Draws a cross at the given coordinates with the given color
x any y = coordinates in pixels
Color = color of the two lines

If you want to add a code example you can use <code> </code> tags:

```
'Draws a cross at the given coordinates with the given color
'x any y = coordinates in pixels
'Color = color of the two lines
'Code example: <code>
'DarwCross(20dip, 50dip, Colors.Red)
'</code>
Sub DrawCross(x As Int, y As Int, Color As Int)
   Private d = 3dip As Int

   cvsLayer.DrawLine(x - d, y, x + d, y, Color, 1)
   cvsLayer.DrawLine(x, y - d, x, y + d, Color, 1)
End Sub
```

The code will be syntax highlighted:

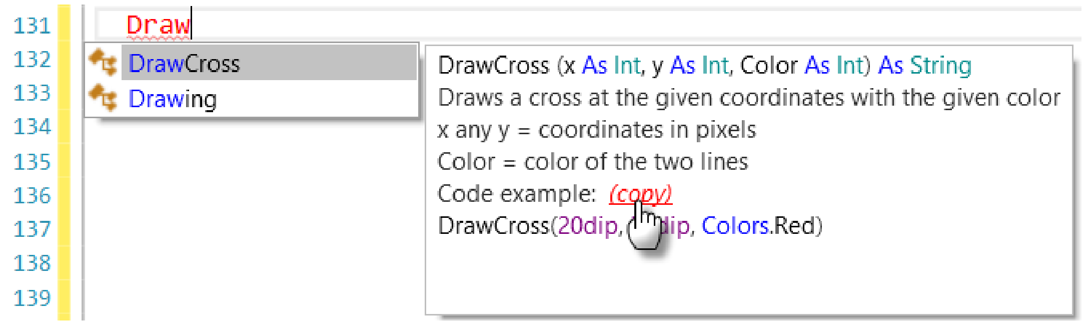


DrawCross (x As Int, y As Int, Color As Int) As String
Draws a cross at the given coordinates with the given color
x any y = coordinates in pixels
Color = color of the two lines
Code example: (copy)
DrawCross(20dip, 50dip, Colors.Red)

4.20.1 Copy code examples

You can copy the code example in your code.

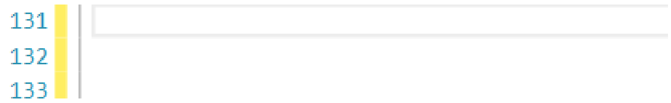
When hovering over (copy) you can copy the code example to the clipboard.



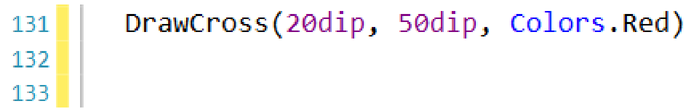
DrawCross (x As Int, y As Int, Color As Int) As String
Draws a cross at the given coordinates with the given color
x any y = coordinates in pixels
Color = color of the two lines
Code example: *(copy)*

```
DrawCross(20dip, [illegible]dip, Colors.Red)
```

Remove `Draw`



And copy.

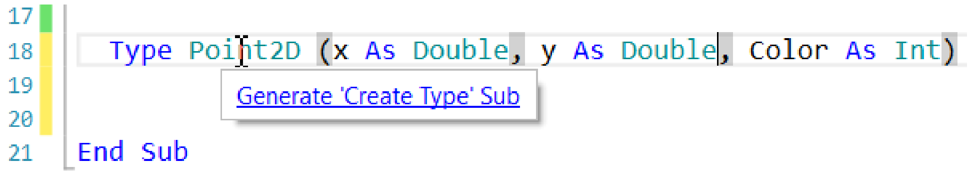


```
DrawCross(20dip, 50dip, Colors.Red)
```

4.20.2 Create Type routine

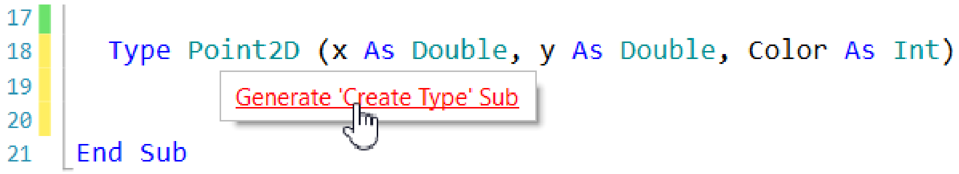
If you have a Type variable declaration, you can create a routine to generate a variable with its content.

When you hover over the Type declaration, you will see the link below.



```
  Type Point2D (x As Double, y As Double, Color As Int)


End Sub
```

When you click on the link the CreatePoint3D routine below will be created.



```
  Type Point2D (x As Double, y As Double, Color As Int)


End Sub
```

```
Public Sub CreatePoint2D (x As Double, y As Double, Color As Int) As Point2D
   Dim t1 As Point2D
   t1.Initialize
   t1.x = x
   t1.y = y
   t1.Color = Color
   Return t1
End Sub
```

And in the code:

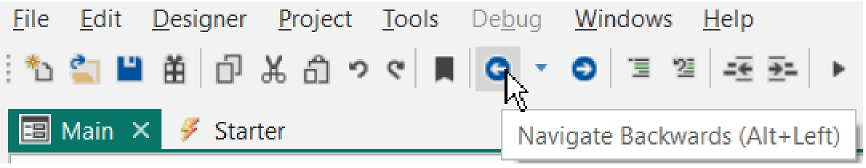
```
Private Point0  As Point2D = CreatePoint2D (10dip, 20dip, xui.Color_Red)
```

4.20.3 Navigate in the IDE, jump to recent positions of the cursor

You can easily navigate in the IDE to recent positions.

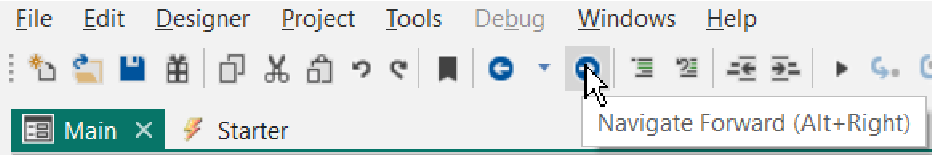
4.20.3.1 Navigate back

In the toolbar click on to jump to the previous position of the cursor.



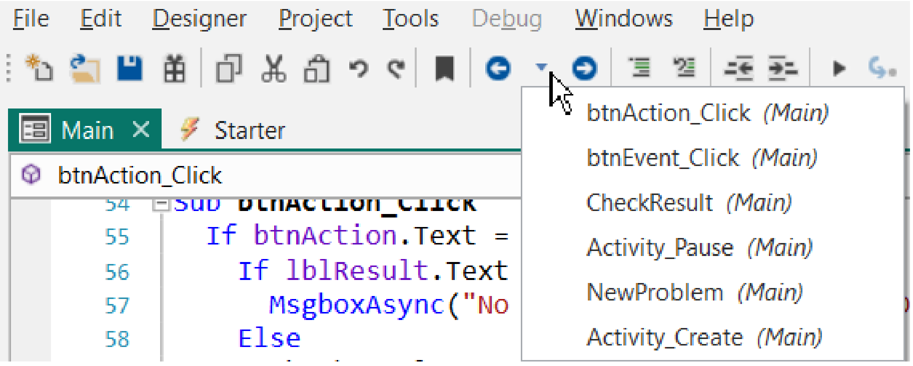
4.20.3.2 Navigate forward

In the toolbar click on to jump to the next position of the cursor.



4.20.3.3 Jump to a given location

In the toolbar, click on to show the latest positions of the cursor in the IDE.

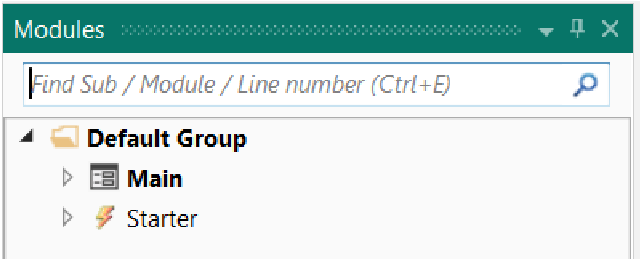


```
Sub btnAction_Click
    If btnAction.Text =
        If lblResult.Text
            MsgboxAsync("No
        Else
```

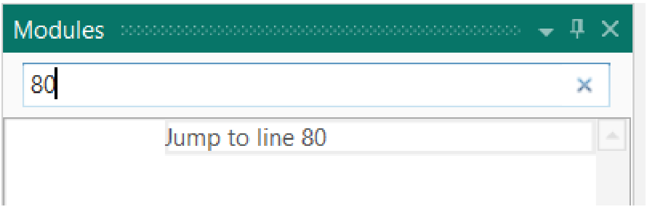
Click on the position where you want to jump.

4.21 Jump to a code line

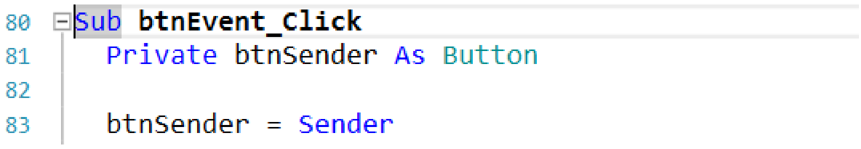
Press Ctrl and E.



Enter the line number:



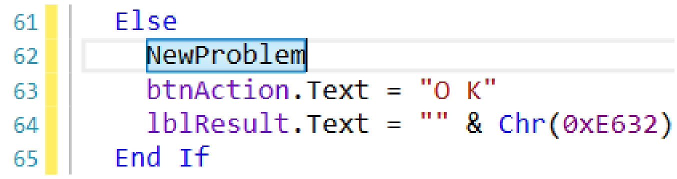
And press Return.



```
80 Sub btnEvent_Click
81     Private btnSender As Button
82 
83     btnSender = Sender
```

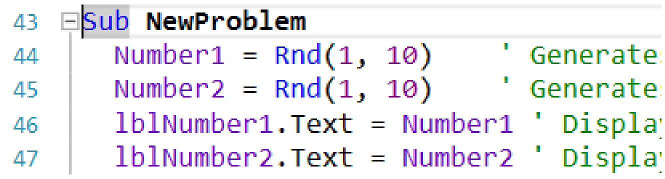
4.22 Jump to a subroutine

Sometimes it is useful to jump from a subroutine call to the subroutine definition.
This can easily be done:



```
Else
    NewProblem
    btnAction.Text = "O K"
    lblResult.Text = "" & Chr(0xE632)
End If
```

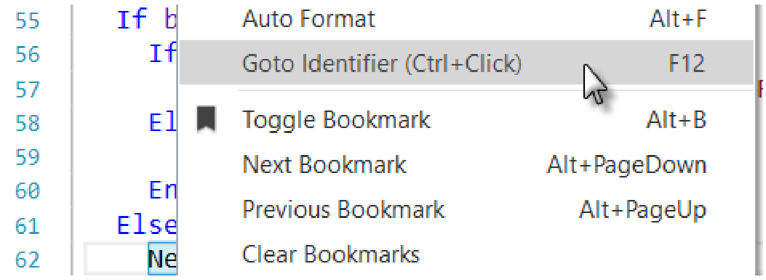
Hover over the text of the subroutine call or select it.
Press Ctrl and Click.



```
Sub NewProblem
    Number1 = Rnd(1, 10)     ' Generate
    Number2 = Rnd(1, 10)     ' Generate
    lblNumber1.Text = Number1 ' Displa
    lblNumber2.Text = Number2 ' Displa
```

And you are there.

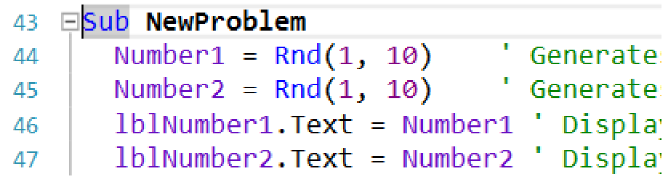
Another method.


If b
If
El
En
Else
Ne
Auto Format Alt+F
Goto Identifier (Ctrl+Click) F12
Toggle Bookmark Alt+B
Next Bookmark Alt+PageDown
Previous Bookmark Alt+PageUp
Clear Bookmarks

Select the text of the subroutine call.

Right click on the selected text.

Click on Goto Identifier (Ctrl+Click).

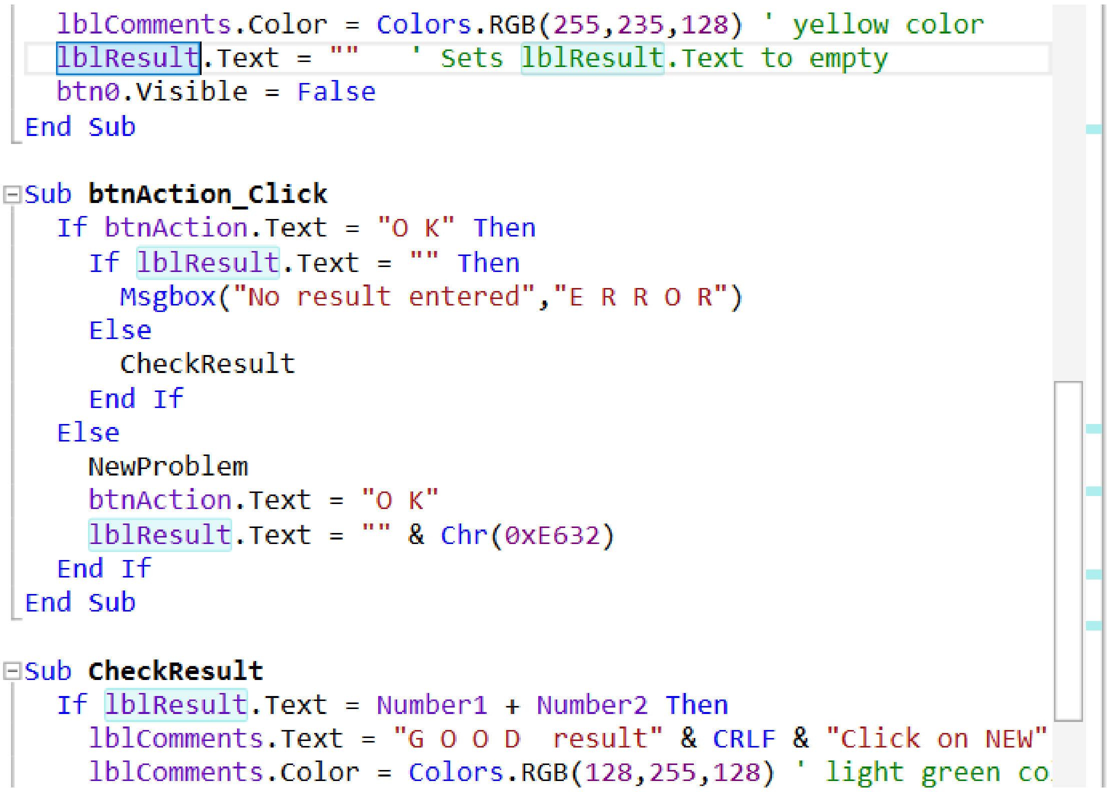


```
Sub NewProblem
    Number1 = Rnd(1, 10)     ' Generate
    Number2 = Rnd(1, 10)     ' Generate
    lblNumber1.Text = Number1 ' Displa
    lblNumber2.Text = Number2 ' Displa
```

And you are there.

4.23 Highlighting occurrences of words

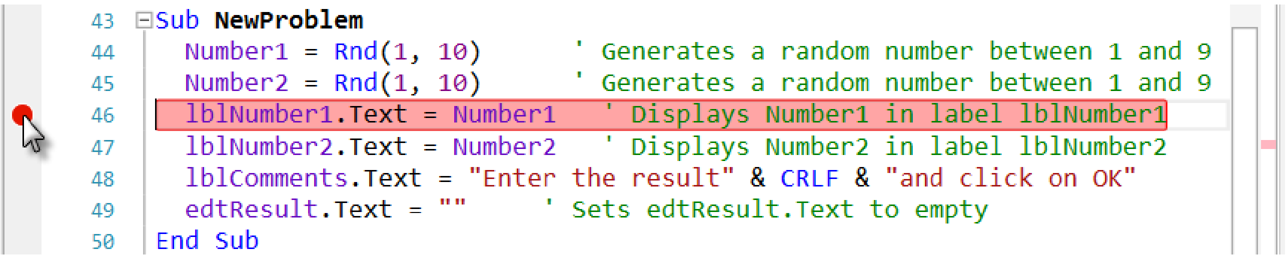
When you select a single word, it is highlighted in dark blue and all the other occurrences in the code are highlighted in light blue and in the scroll view on the right side.
With the slider you can move up or down the code to go to the other occurrences.



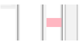
```
  lblComments.Color = Colors.RGB(255,235,128) ' yellow color
  lblResult.Text = ""    ' Sets lblResult.Text to empty
  btn0.Visible = False
End Sub

Sub btnAction_Click
  If btnAction.Text = "O K" Then
    If lblResult.Text = "" Then
      Msgbox("No result entered","E R R O R")
    Else
      CheckResult
    End If
  Else
    NewProblem
    btnAction.Text = "O K"
    lblResult.Text = "" & Chr(0xE632)
  End If
End Sub

Sub CheckResult
  If lblResult.Text = Number1 + Number2 Then
    lblComments.Text = "G O O D  result" & CRLF & "Click on NEW"
    lblComments.Color = Colors.RGB(128,255,128) ' light green co
```

4.24 Breakpoints

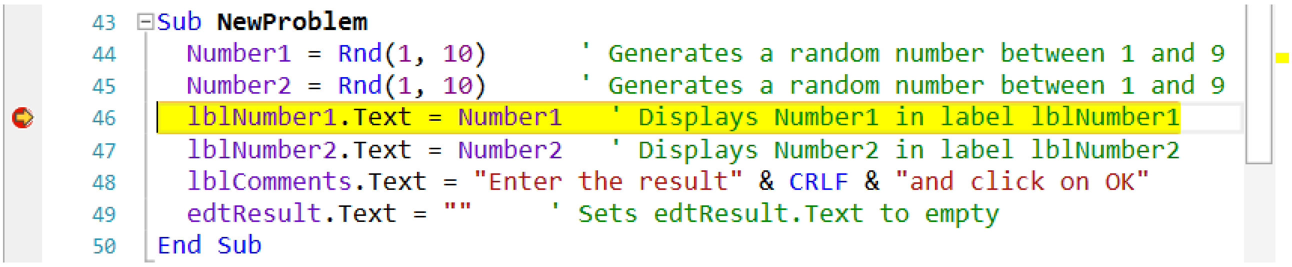
Clicking on a line in the left margin adds a breakpoint. When the program is running it stops at the first breakpoint.
Breakpoints are ignored in Globals, Process_Globals and Activity_Pause.



```
43 Sub NewProblem
44   Number1 = Rnd(1, 10)       ' Generates a random number between 1 and 9
45   Number2 = Rnd(1, 10)       ' Generates a random number between 1 and 9
46   lblNumber1.Text = Number1    ' Displays Number1 in label lblNumber1
47   lblNumber2.Text = Number2    ' Displays Number2 in label lblNumber2
48   lblComments.Text = "Enter the result" & CRLF & "and click on OK"
49   edtResult.Text = ""      ' Sets edtResult.Text to empty
50 End Sub
```

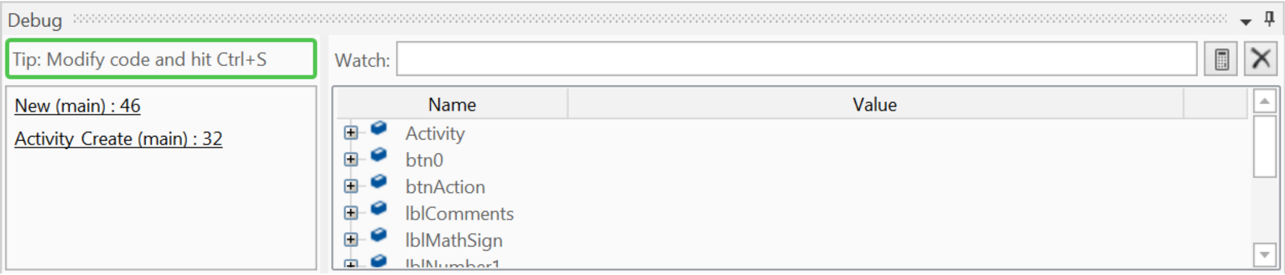
The position of the breakpoints is shown on the right side with a light red bar: 

Run the program, the program stops at the breakpoint and the IDE looks like below. The line where the program stops is highlighted in yellow.

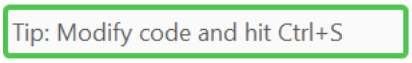
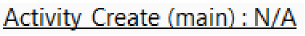


```
43 Sub NewProblem
44   Number1 = Rnd(1, 10)       ' Generates a random number between 1 and 9
45   Number2 = Rnd(1, 10)       ' Generates a random number between 1 and 9
46   lblNumber1.Text = Number1    ' Displays Number1 in label lblNumber1
47   lblNumber2.Text = Number2    ' Displays Number2 in label lblNumber2
48   lblComments.Text = "Enter the result" & CRLF & "and click on OK"
49   edtResult.Text = ""      ' Sets edtResult.Text to empty
50 End Sub
```

At the bottom of the IDE you find other information.

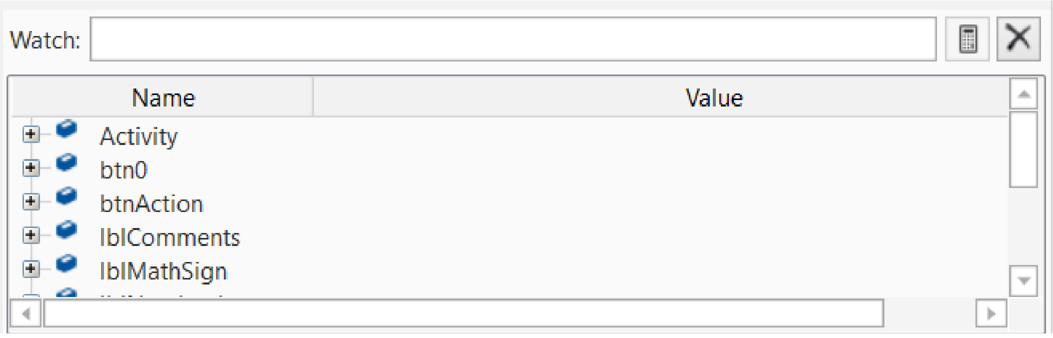


The Debugger is connected. In the left part of the Debugger window, we find:

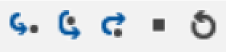
-  Tip: Modify code and hit Ctrl+S A button to update the program after a code modification.
- NewProblem (main) : 46 The name of the routine where the Debugger stopped the program. New in the module Main in line 46.
-  Activity Create (main) : N/A Caller of the "New" routine:
Activity_Create in the module Main routine in line 32.

Clicking on these links moves the cursor to the given line.

In the right part of the Debugger window, we find the list of all Views and Variables with their values.



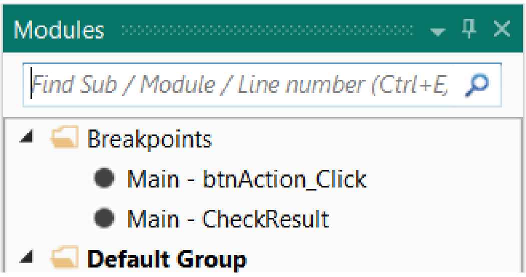
In the Toolbar, at the top of the IDE the navigation buttons are enabled.

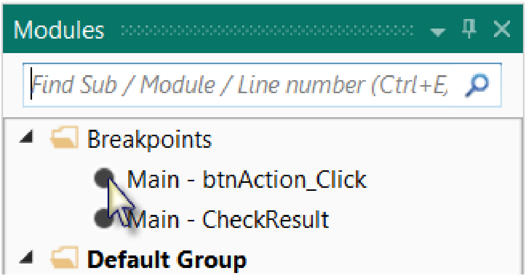


	Step In	F8	Executes the next statement.
	Step Over	F9	Steps over the subroutine call but executes its code.
	Step Out	F10	Executes the rest of the routine and leaves it.
■	Stop		Stops the program.
	Restart	F11	Restarts the program.

More details in chapter Debugging.

The Breakpoints are listed in the Modules Tab.

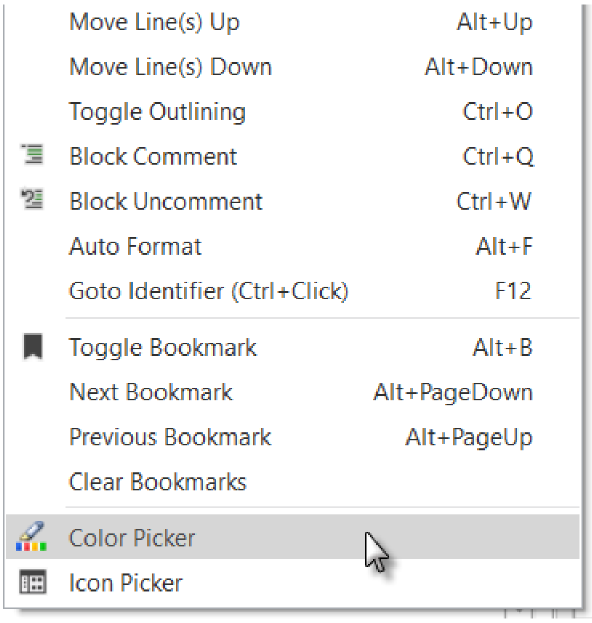




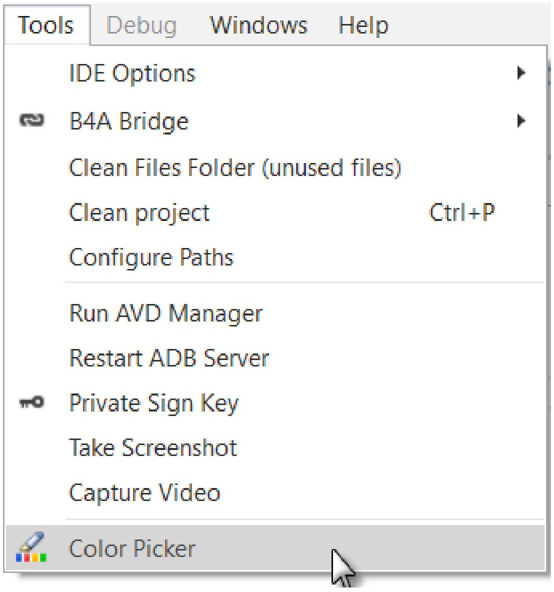
Click on a Breakpoint to jump to its line.

4.25 Color Picker

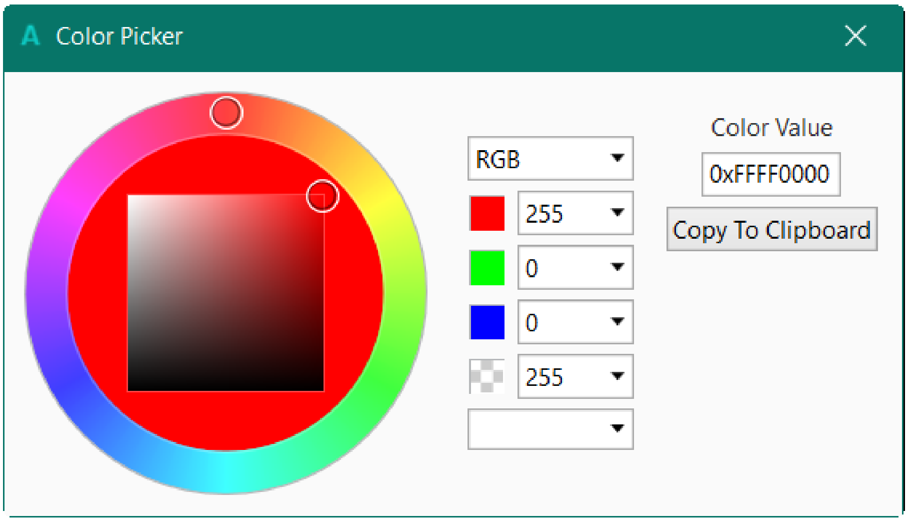
In the code, right click to show the popup menu below.



Or, in the menu Tools.



Click on to show the Color Picker.

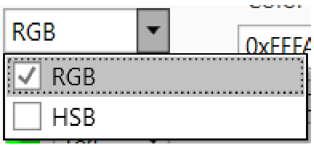


You can:
- Move the cursor in the outer circle and in the square to select the color.

- Enter directly
  A R G B values or
  A H S B values.

- Copy the value to the Clipboard.

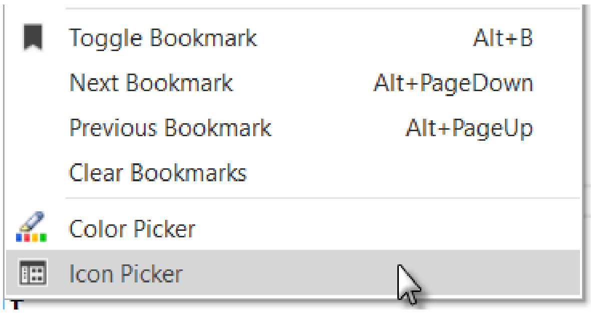
You can then paste the value into the code.



You can select either RGB or HSB values.

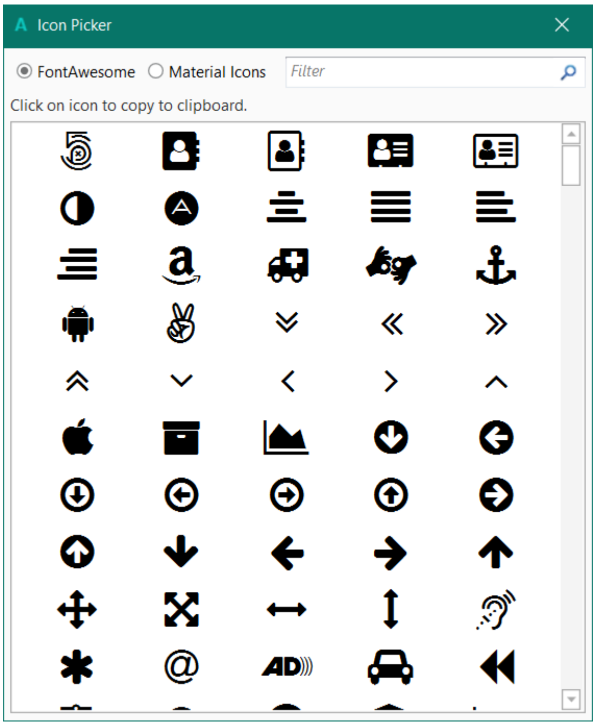
RGB	Red, Green, Blue
HSB	Hue, Saturation, Lightness

4.26 Icon Picker



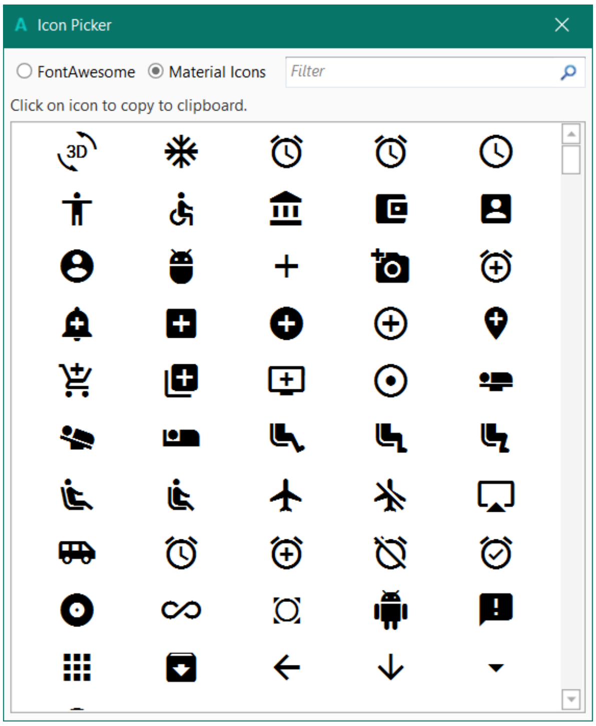
Right click in the IDE code area to show the pop-up menu and click on Icon Picker.

You can choose between Font Awesome and Material icons.



● FontAwesome ○ Material Icons Filter

Click on icon to copy to clipboard.



○ FontAwesome ● Material Icons Filter

Click on icon to copy to clipboard.

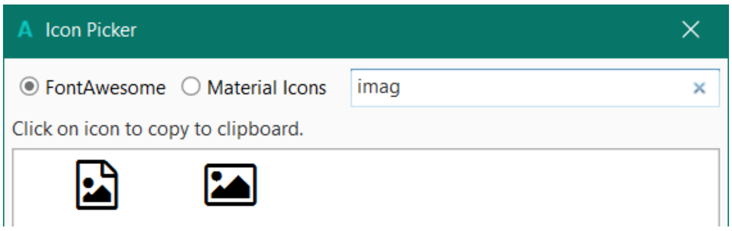
Font Awesome icons. Material icons.

Click on an icon to copy it to the clipboard.
Then you can paste it into the code like below.
The icon is given with its character number, `Chr(0xE632)`.

```
lblResult.Text = Chr(0xE632)
```

We need also to change the font type to:

```
lblResult.Typeface = Typeface.FONTAWESOME
or  lblResult.Typeface = Typeface.MATERIALICONS
```



● FontAwesome ○ Material Icons imag

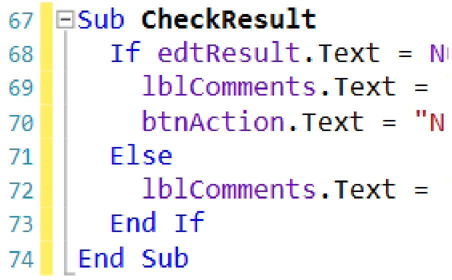
Click on icon to copy to clipboard.

You can filter the icons.

4.27 Colors in the left side

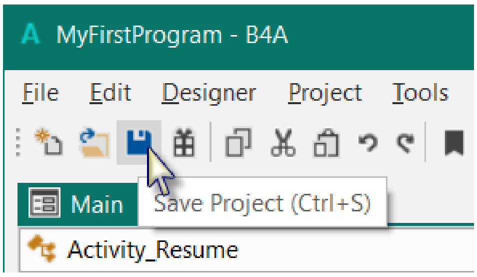
Sometimes, you will see yellow or green vertical lines in the left side of the IDE.

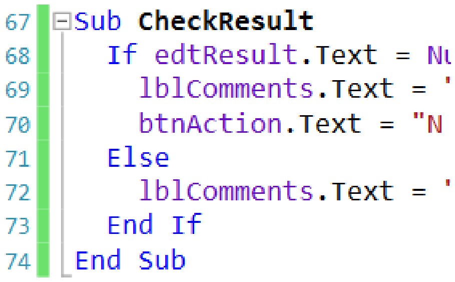
As soon as you modify a line it will be marked with a yellow vertical line on the right of the line number meaning that this line was modified.



```
Sub CheckResult
  If edtResult.Text = N
    lblComments.Text =
    btnAction.Text = "N
  Else
    lblComments.Text =
  End If
End Sub
```

If we click on 💾 to save the project the yellow lines become green showing a modified code but already saved. You can also press Ctrl + S to save the project.





```
Sub CheckResult
  If edtResult.Text = Nu
    lblComments.Text = '
    btnAction.Text = "N
  Else
    lblComments.Text = '
  End If
End Sub
```

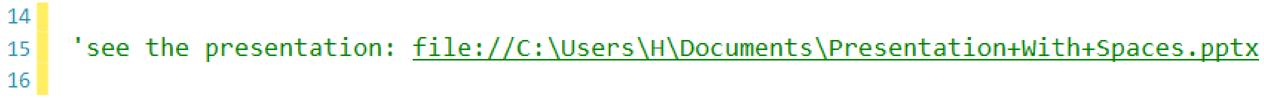
If we leave the IDE and load the project again the green lines disappear.

4.28 Comment links (ctrl-clickable)

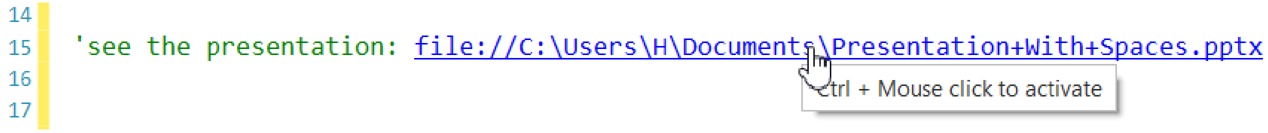
Code comments can include clickable links.

When you hover over one of these links, they are highlighted in blue.

Example with this comment:



```
'see the presentation: file://C:\Users\H\Documents\Presentation+With+Spaces.pptx
```



```
'see the presentation: file://C:\Users\H\Documents\Presentation+With+Spaces.pptx
```

The following schemes are supported:

- http(s)://
- file://
- ide://
    - goto:
    - run:

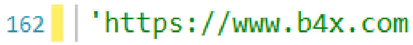
Notes:

- Spaces should be replaced with +.
- The parameters values are url decoded.
- The parameter values can include the following case sensitive aliases:$
    - %B4X% - installation folder.
    - %PROJECT% - project folder (location of the project .B4? file).
    - %PROJECT_NAME% - project name.
    - %JAVABIN% - configured java bin folder (not available in beta #1)
    - %ADDITIONAL% - Platform specific additional libraries folder.
    - Any other environment variable.
    -

4.28.1 http(s):// - Link will be opened with the browser

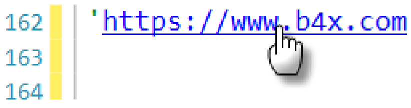
Link will be opened with the browser.

In a comment:



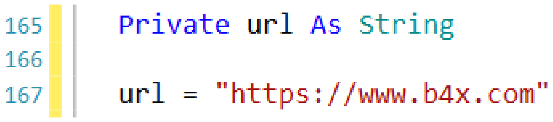
```
'https://www.b4x.com
```

If the cursor is on the line and you press Ctrl the url is highlighted in blue and if you click on it the url it is executed. Hovering over the line with Ctrl pressed does also highlight the url.



```
'https://www.b4x.com
```

In a String:



```
Private url As String

url = "https://www.b4x.com"
```

The cursor must be over the String variable and not over text.

4.28.2 file:// - Link will be opened with the default program

Link will be opened with the default program.

Example:

```
'see the presentation: file://C:\Users\H\Documents\Presentation+With+Spaces.pptx
```

4.28.3 ide:// - Link will be handled by the IDE

Link will be handled by the IDE.

There are currently two types of methods:

4.28.3.1 goto :

Clicking on link will move the cursor to the specified target.

Example:

```
'called from: ide://goto?Module=B4XMainPage&Sub=Button1_Click
```

Module is optional, the current module is set by default.
Line can be used instead of Sub to jump to a specific line.

4.28.3.2 run :

Runs an external program.
It can be a batch file, a B4J jar file (UI or non-UI) or an executable.
You can pass arguments with the Args parameter, which can be used multiple times.
For example the B4XPages templates includes this line:

```
'Ctrl + click to export as zip: ide://run?File=%B4X%\Zipper.jar&Args=ZoomIVExample.zip
```

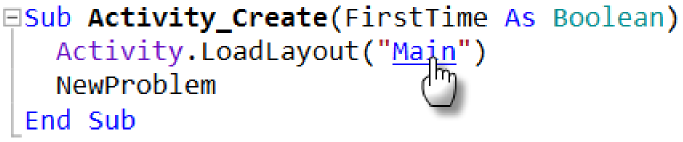
It calls a B4J program from the internal installation folder named Zipper.jar. It is similar to the built-in 'export as zip' feature but works with cross platform projects.
Note that the external program working directory will be the current project Objects folder.

The ide://run method supports these additional arguments:

- FilesSync=True - Causes the IDE to sync the Files folder after operation completes.
- CleanProject=True - Causes the IDE to clean the project after operation completes.
- VMArgs - Similar to Args but added as a JVM argument.
- You can add: VMArgs=-DZeroSharedFiles%3DTrue to a zipper call to delete the content of the platform specific copies of shared files (the content will be added back when the program runs, because of the custom build action).

4.29 Ctrl + Click on layout file name opens the Designer

When you hover over a layout filename in the code, with CTRL key pressed like this:

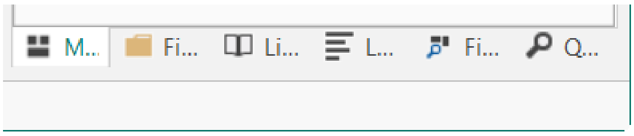


```
Sub Activity_Create(FirstTime As Boolean)
  Activity.LoadLayout("Main")
  NewProblem
End Sub
```

The layout filename color is changed to blue, the mouse cursor becomes a hand and if you click on it, the Designer is opened with that layout file.

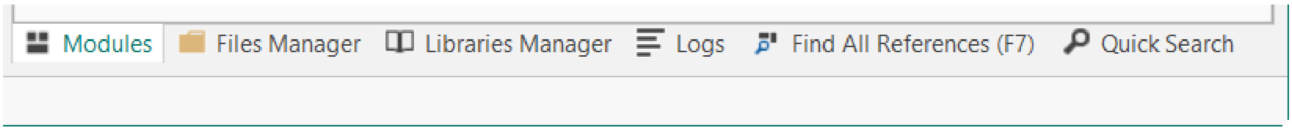
5 Tabs

There are 6 tabs at the bottom right corner of the IDE that displays different windows.



The short version.

The wide version.

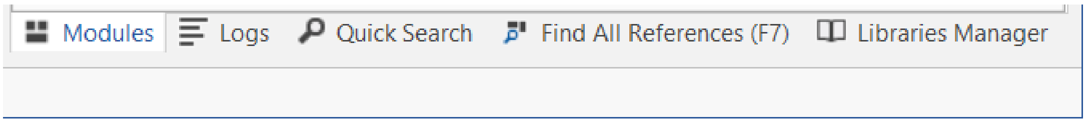


The 6 Tabs are:

- Modules
- Files Manager
- Libraries Manager
- Logs
- Find All References
- Quick Search

Each Tab has its own window.
By default, they are displayed in the Tab area on the right side of the IDE, only one at the same time.
These windows can be closed, hidden or floating, see next chapter.

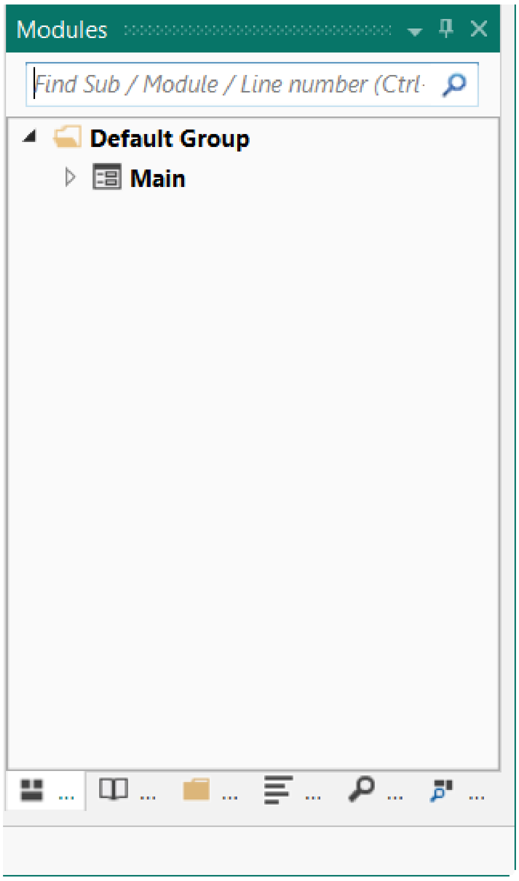
B4R

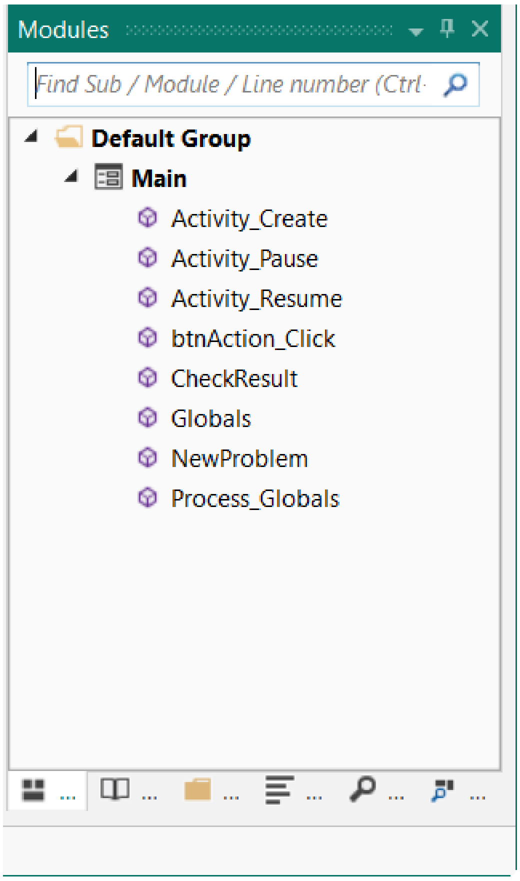


Only 5 Tabs, no Files Manager Tab

5.1 Floating Tab windows

When you start the default IDE all Tab windows are docked in the Tab area.

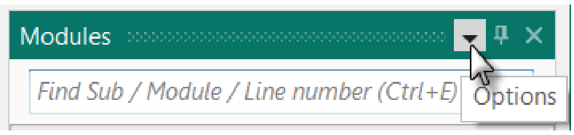




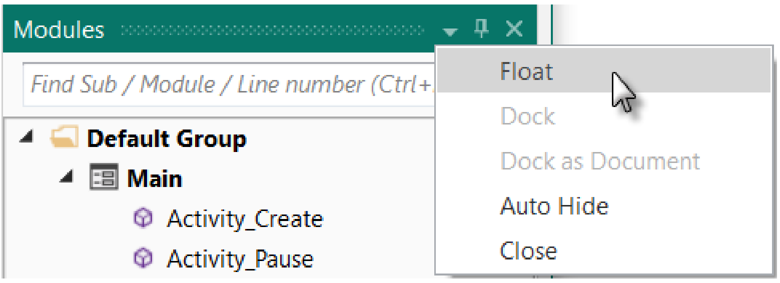
You can set each Tab window as a separate floating window.

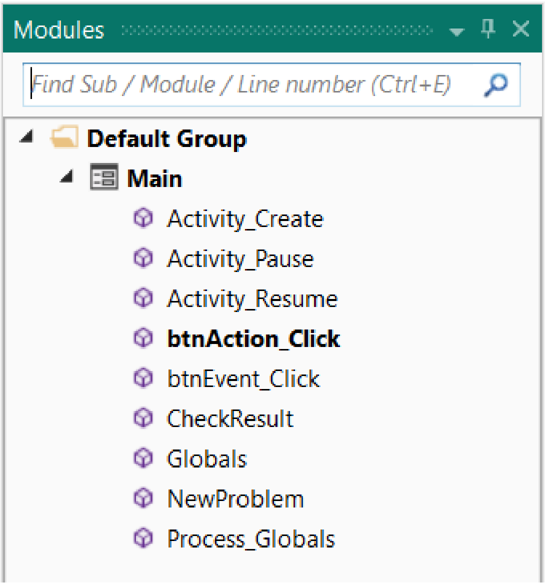
5.2 Float

To set the Modules Tab window to floating click in the title on .



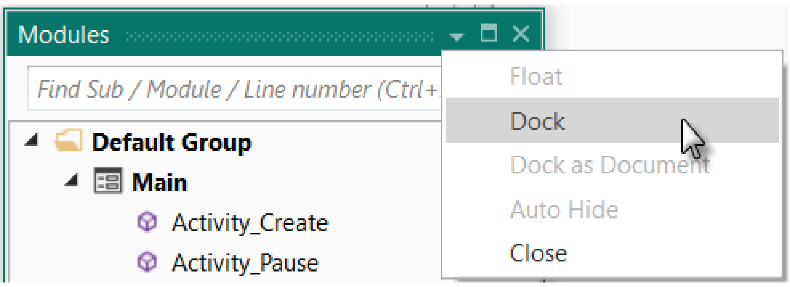
Click on Float.





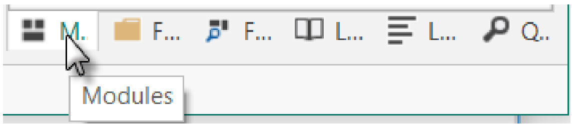
The Modules Tab Window is now floating, you can place it where you want on the screen even on a second monitor.

To dock it back to the Tab area, click on Dock.

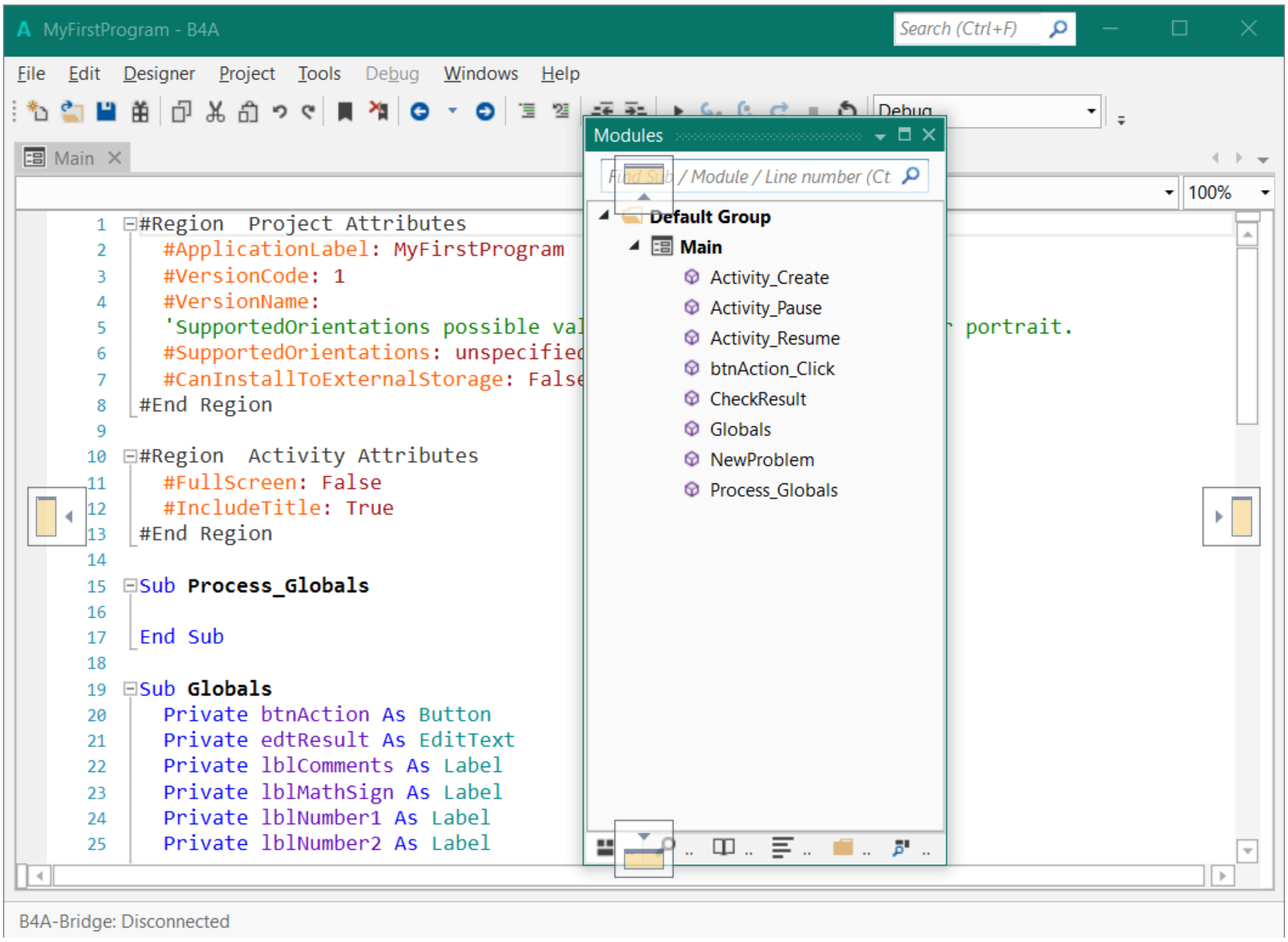


To show the Tabs again click either on Dock in the Options or on Reset in the IDE Window menu.

You can also click on a Tab and while maintaining the mouse down, move the Tab.

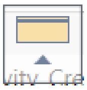


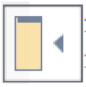
This will show you all the possible 'docking' areas.

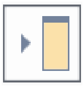


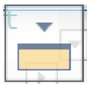
```
#Region  Project Attributes
    #ApplicationLabel: MyFirstProgram
    #VersionCode: 1
    #VersionName:
    'SupportedOrientations possible val                                  portrait.
    #SupportedOrientations: unspecified
    #CanInstallToExternalStorage: False
#End Region

#Region  Activity Attributes
    #FullScreen: False
    #IncludeTitle: True
#End Region

Sub Process_Globals

End Sub

Sub Globals
    Private btnAction As Button
    Private edtResult As EditText
    Private lblComments As Label
    Private lblMathSign As Label
    Private lblNumber1 As Label
    Private lblNumber2 As Label
```

Docking areas:

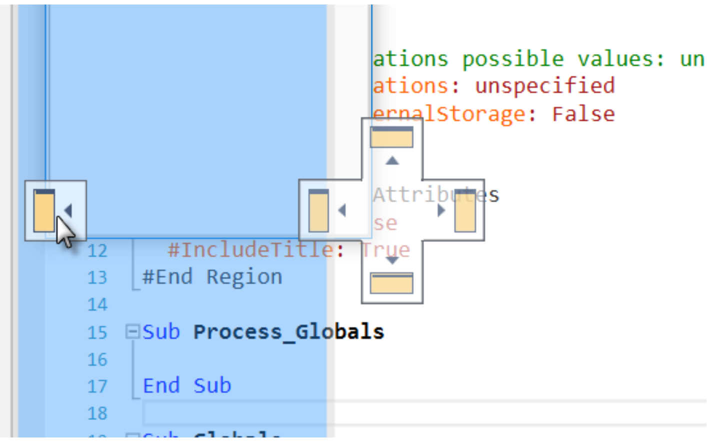

Top


Left


Right

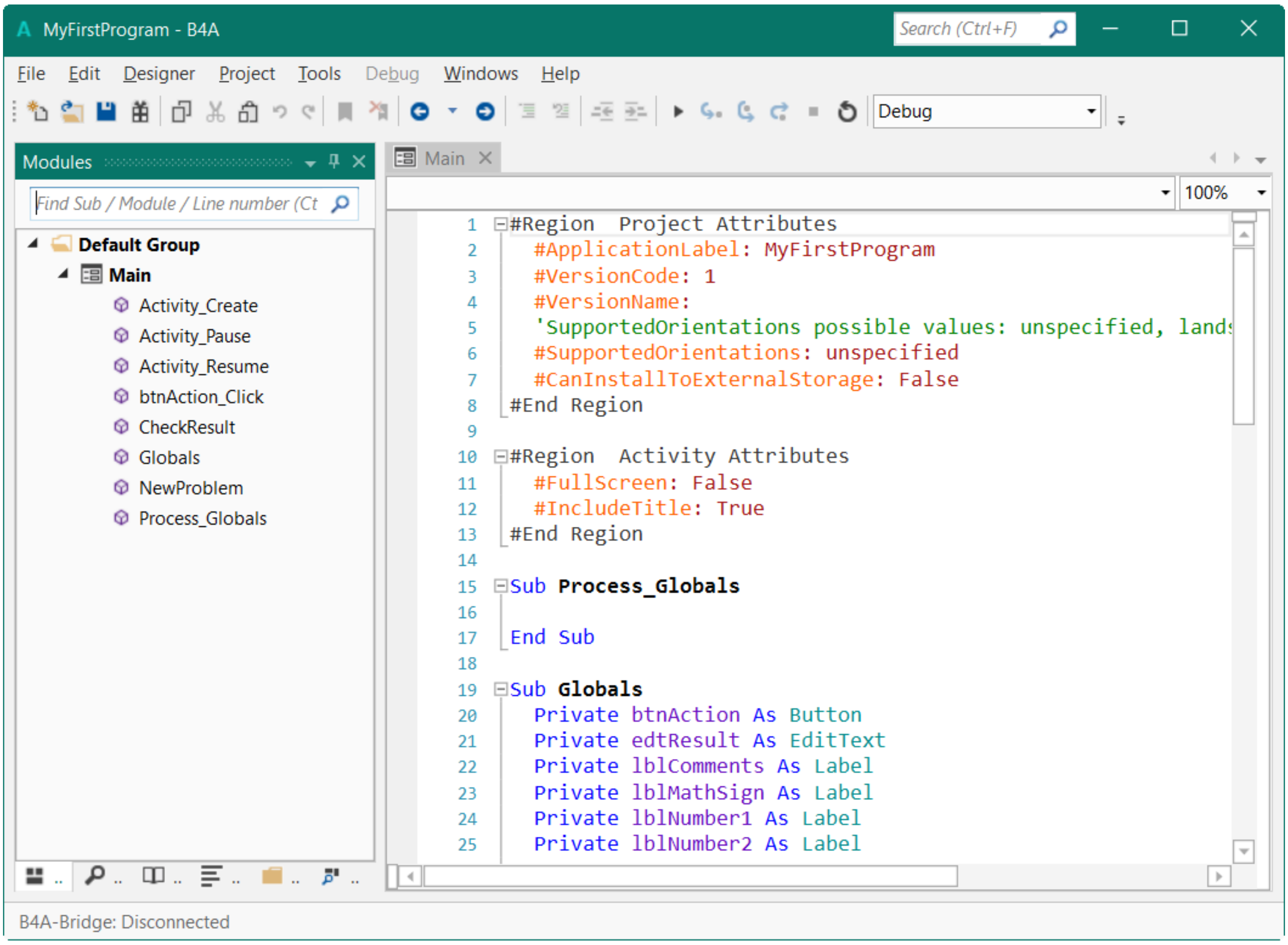

Bottom

If you move the mouse onto one of the docking area symbol, the Tab window will be either on top, on the left, the right or on the bottom.

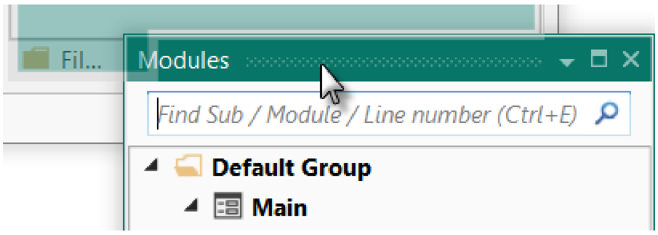


```
ations possible values: un
ations: unspecified
ernalStorage: False

Attributes
se
   #IncludeTitle: True
#End Region

Sub Process_Globals

End Sub
```

And the result.



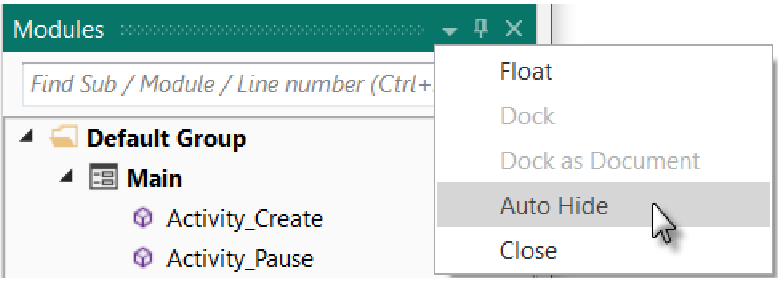
```
#Region  Project Attributes
    #ApplicationLabel: MyFirstProgram
    #VersionCode: 1
    #VersionName:
    'SupportedOrientations possible values: unspecified, lands
    #SupportedOrientations: unspecified
    #CanInstallToExternalStorage: False
#End Region

#Region  Activity Attributes
    #FullScreen: False
    #IncludeTitle: True
#End Region

Sub Process_Globals

End Sub

Sub Globals
    Private btnAction As Button
    Private edtResult As EditText
    Private lblComments As Label
    Private lblMathSign As Label
    Private lblNumber1 As Label
    Private lblNumber2 As Label
```

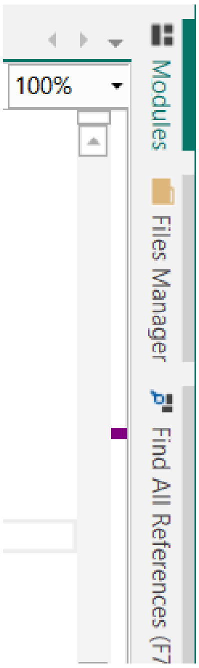


To bring it back to the Tabs, click on the window title and move it back to the Tabs.

5.3 Auto Hide 📌

Click on 📌 in the title or click on Auto Hide in the Options.

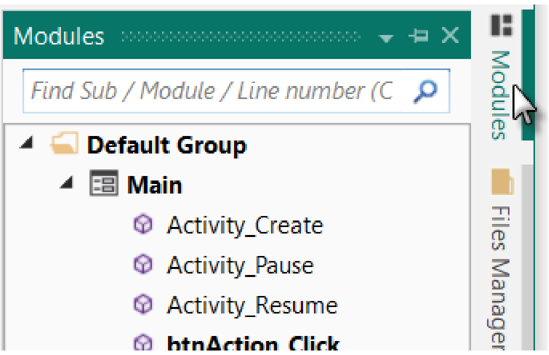




The Tabs move from the bottom of the screen vertically on the right side of the screen and the Tab window is hidden.

Hovering over a Tab highlights it in green.

Click on a Tab to show it.

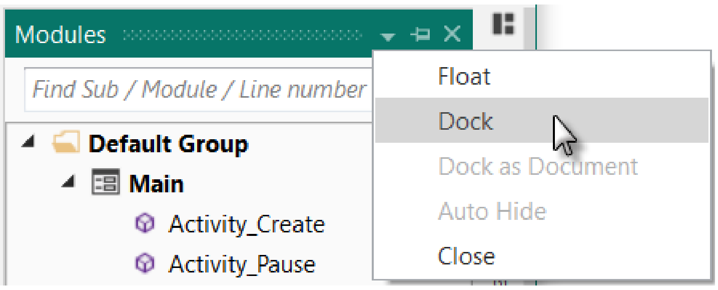


The selected Tab is displayed.

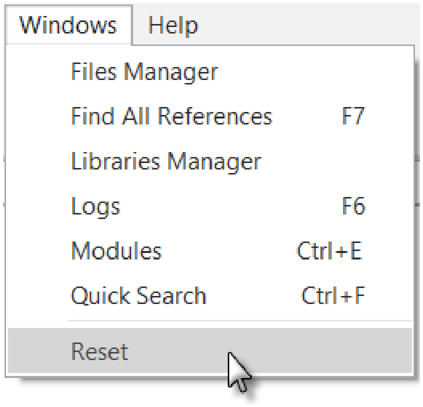
As soon as you click somewhere else in the IDE the Tab is hidden again.

To move the Tabs back to the lower right corner:

Click on Dock in the Options.



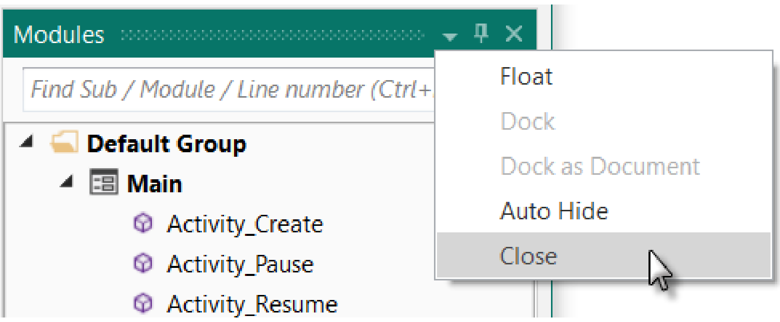
Or click on Reset in the IDE Windows menu.

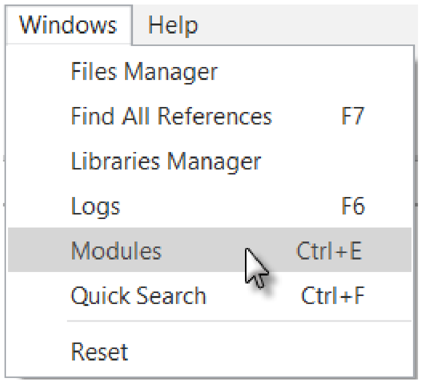


5.4 Close

You can close a window, hide it.

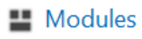
Click on ✕ in the title or on Close in the Options.



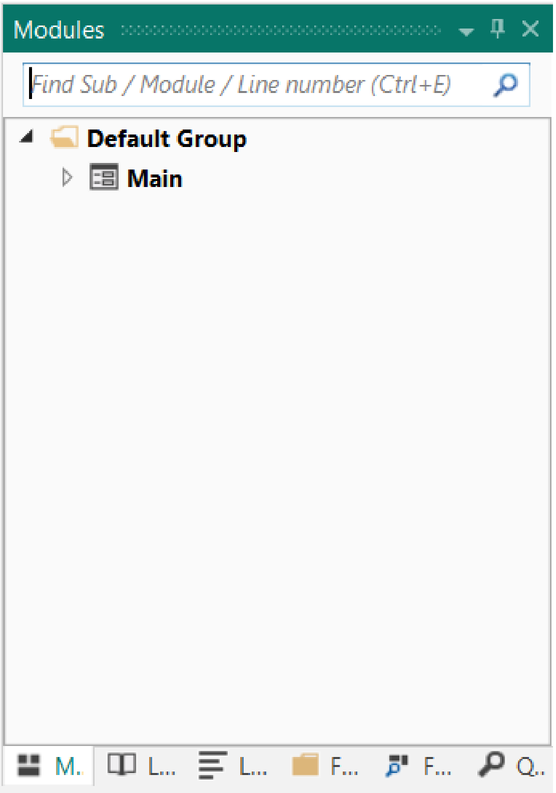


To show it again, in the Windows menu click on the module name you want to show, Modules in our example.

5.5 Modules and subroutine lists

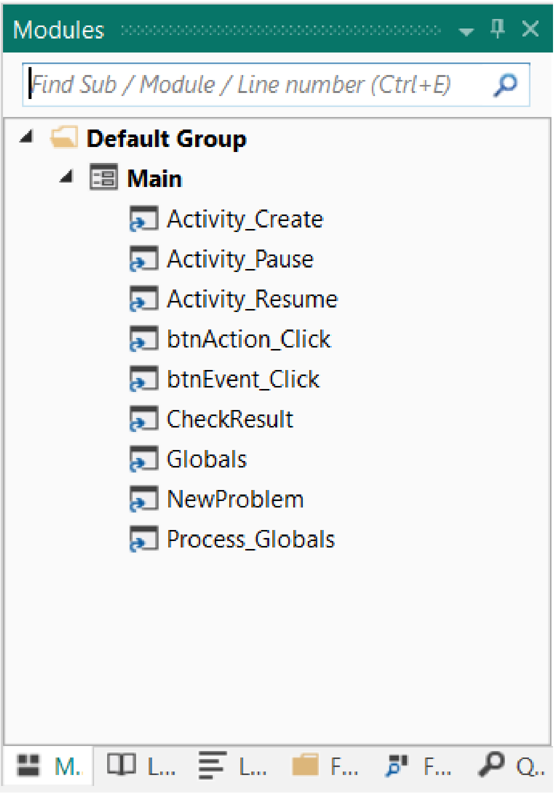


All the modules of the project and all subroutines of the selected module are listed in the Modules window. The picture below has been reduced in height.



Find Sub / Module / Line number (Ctrl+E)

- Default Group
  - Main



Find Sub / Module / Line number (Ctrl+E)

- Default Group
  - Main
    - Activity_Create
    - Activity_Pause
    - Activity_Resume
    - btnAction_Click
    - btnEvent_Click
    - CheckResult
    - Globals
    - NewProblem
    - Process_Globals

On top you see Default Group and Main. Click on Main to show the routines contained in Main.

Find Sub / Module / Line number (Ctrl + E)

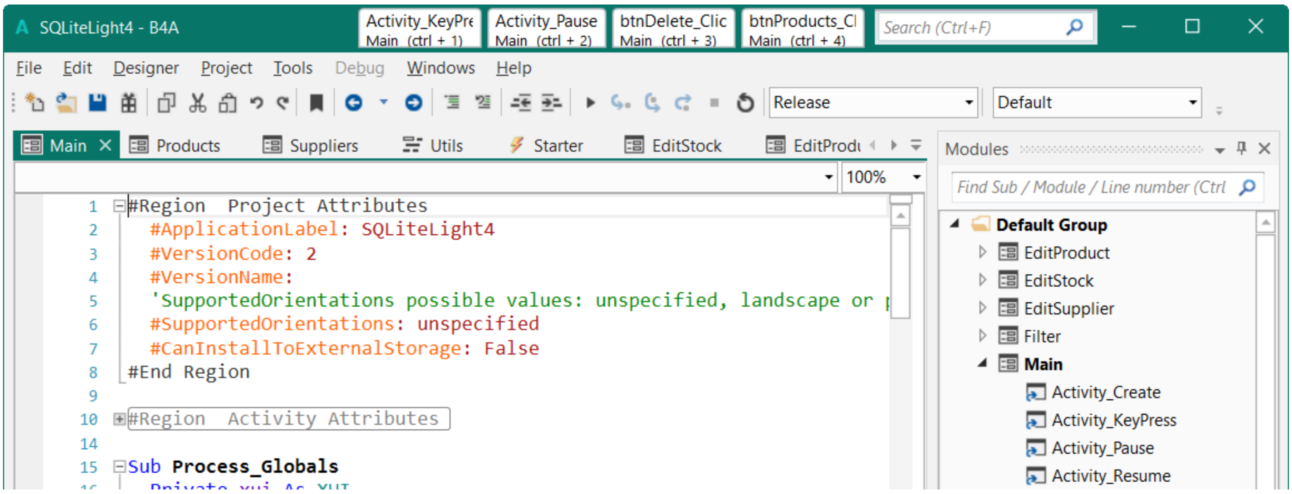
Module list on top.
Clicking on a module shows its code in the code area.

Find Sub Tool (Ctrl + E) see below

Subroutine list of the selected module.
Clicking on a subroutine shows its code in the middle of the code area.

To show a hidden module, click on the module name in the module list.

Example with several Modules:

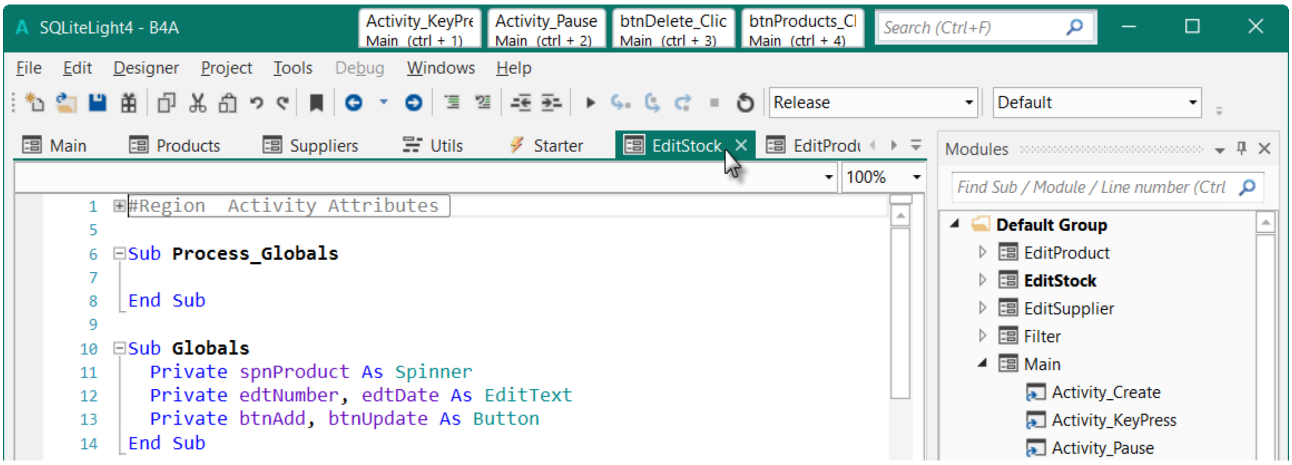

SQLiteLight4 - B4A
Activity_KeyPre Main (ctrl + 1)
Activity_Pause Main (ctrl + 2)
btnDelete_Clic Main (ctrl + 3)
btnProducts_Cl Main (ctrl + 4)
Search (Ctrl+F)
File Edit Designer Project Tools Debug Windows Help
Release
Default
Main Products Suppliers Utils Starter EditStock EditProdu
100%
Modules
Find Sub / Module / Line number (Ctrl
Default Group
EditProduct
EditStock
EditSupplier
Filter
Main
Activity_Create
Activity_KeyPress
Activity_Pause
Activity_Resume

```
#Region  Project Attributes
	#ApplicationLabel: SQLiteLight4
	#VersionCode: 2
	#VersionName:
	'SupportedOrientations possible values: unspecified, landscape or
	#SupportedOrientations: unspecified
	#CanInstallToExternalStorage: False
#End Region

#Region  Activity Attributes

Sub Process_Globals
	Private xui As XUI
```

In the Modules Tab you find all the modules listed.

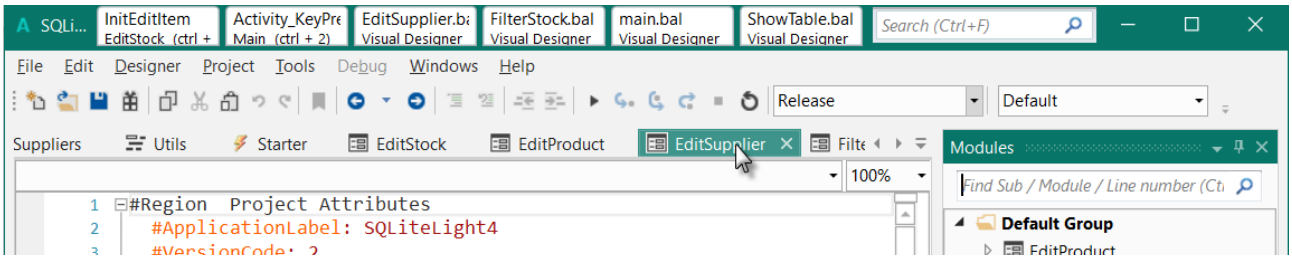
The active module is highlighted.

Clicking on a module shows it in the code area.

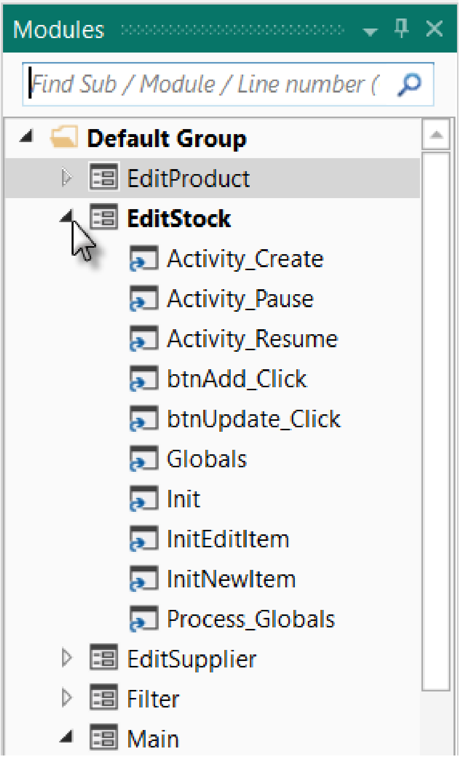

SQLiteLight4 - B4A
Activity_KeyPre Main (ctrl + 1)
Activity_Pause Main (ctrl + 2)
btnDelete_Clic Main (ctrl + 3)
btnProducts_Cl Main (ctrl + 4)
Search (Ctrl+F)
File Edit Designer Project Tools Debug Windows Help
Release
Default
Main Products Suppliers Utils Starter EditStock EditProdu
100%
Modules
Find Sub / Module / Line number (Ctrl
Default Group
EditProduct
EditStock
EditSupplier
Filter
Main
Activity_Create
Activity_KeyPress
Activity_Pause

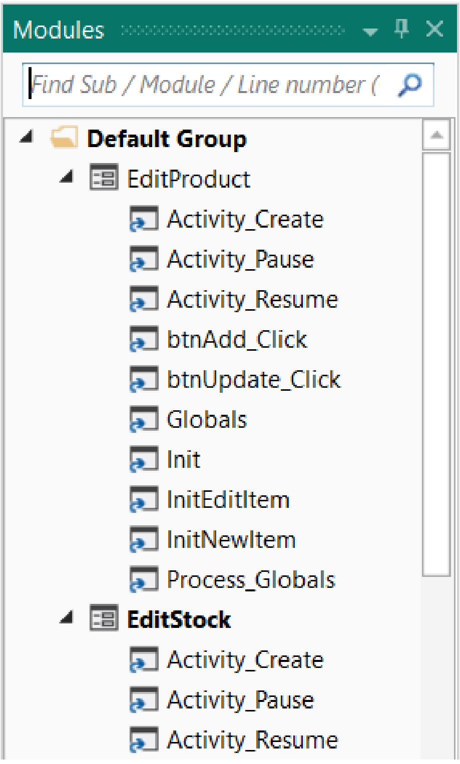
```
#Region  Activity Attributes

Sub Process_Globals

End Sub

Sub Globals
	Private spnProduct As Spinner
	Private edtNumber, edtDate As EditText
	Private btnAdd, btnUpdate As Button
End Sub
```

When the cursor is on top of a Tab like in the picture above and you move the mouse wheel, the Tabs scroll horizontally.


SQLi...
InitEditItem EditStock (ctrl +
Activity_KeyPre Main (ctrl + 2)
EditSupplier.ba Visual Designer
FilterStock.bal Visual Designer
main.bal Visual Designer
ShowTable.bal Visual Designer
Search (Ctrl+F)
File Edit Designer Project Tools Debug Windows Help
Release
Default
Suppliers Utils Starter EditStock EditProduct EditSupplier Filte
100%
Modules
Find Sub / Module / Line number (Ct
Default Group
EditProduct

```
#Region  Project Attributes
	#ApplicationLabel: SQLiteLight4
	#VersionCode: 2
```

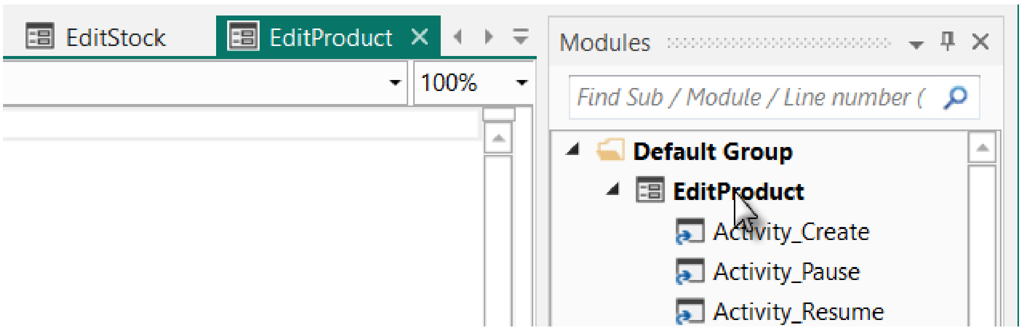




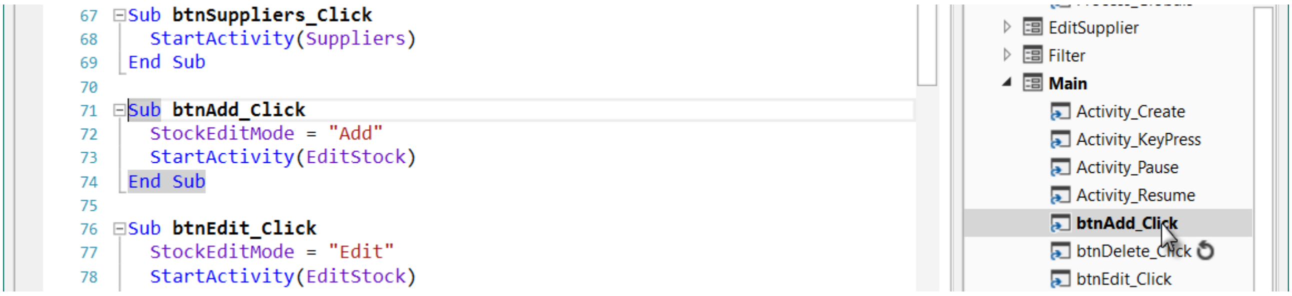
Click on ▷ , to show the routines in a given module.

Once you ‘opened’ a module, it remains open. You can scroll through the list.

A double click on a module, sets this module as the active one and shows its content.



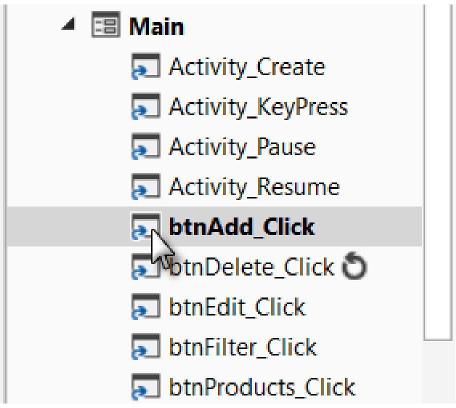
Clicking on a routine, even in a nonactive module, sets the module as the active one and shows the routine in the editor.

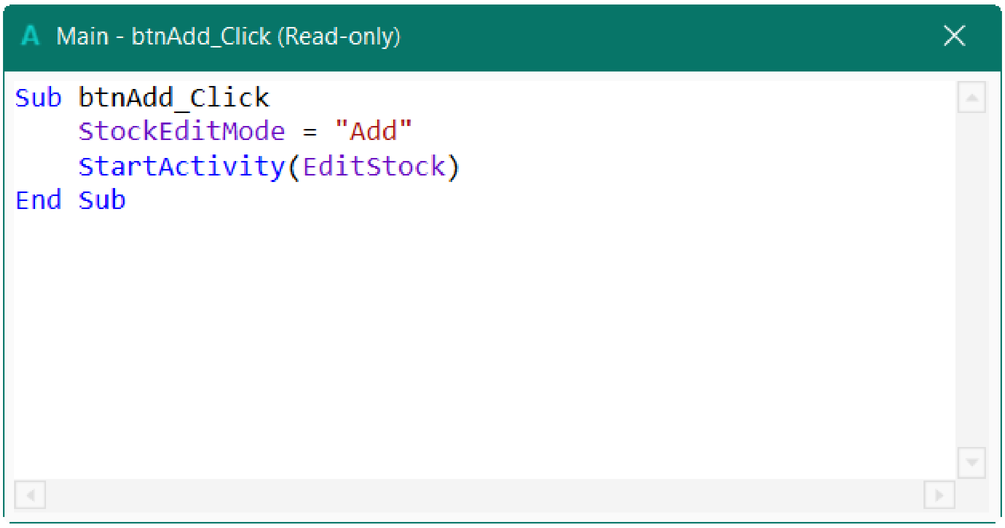


```
Sub btnSuppliers_Click
	StartActivity(Suppliers)
End Sub

Sub btnAdd_Click
	StockEditMode = "Add"
	StartActivity(EditStock)
End Sub

Sub btnEdit_Click
	StockEditMode = "Edit"
	StartActivity(EditStock)
```

Show a routine in a separate window.

Click on the small icon near the routine name to display it.



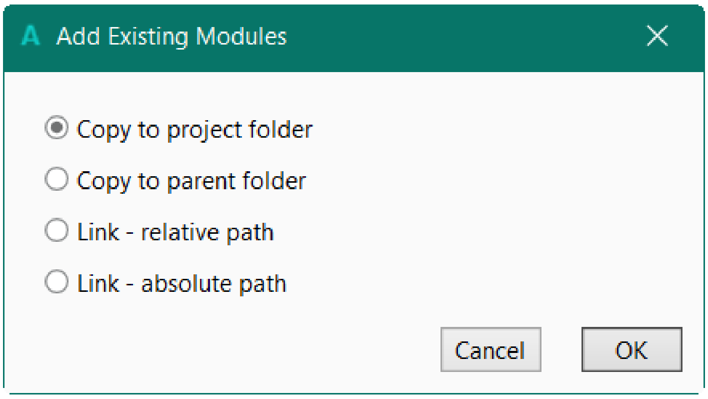


```
Sub btnAdd_Click
    StockEditMode = "Add"
    StartActivity(EditStock)
End Sub
```

You can modify the code in this window, it will also be modified in the main window.

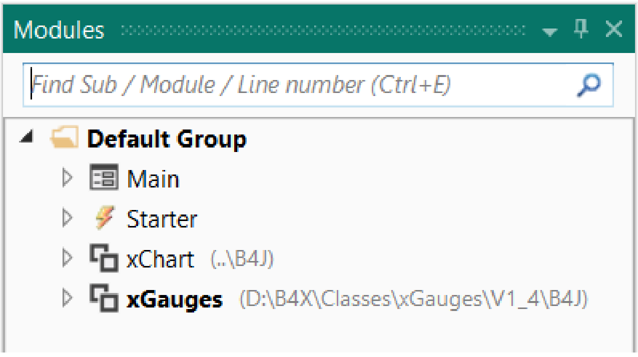
5.5.1 Modules with relative or absolute links

When you add an existing module, you will be asked what kind of link you want.

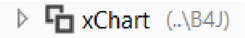

Add Existing Modules

● Copy to project folder
○ Copy to parent folder
○ Link - relative path
○ Link - absolute path

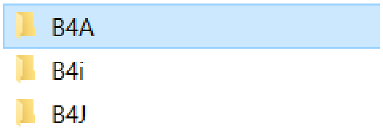
Three options are available.
If you choose one of the links, you will see it in the Modules Tab.



Default Group
Main
Starter
xChart (..\B4J)
xGauges (D:\B4X\Classes\xGauges\V1_4\B4J)


xChart (..\B4J)

Is a relative link. In the example, another folder at the same level as the project.



The project is in the B4A folder.

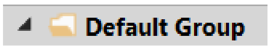
The xChart Module is in the B4J folder.

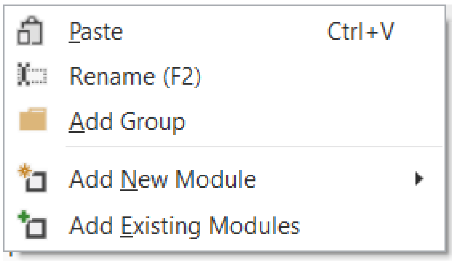
xGauges (D:\B4X\Classes\xGauges\V1_4\B4J)

Is an absolute link, with the full name.

5.5.2 Context menus

What you can do:

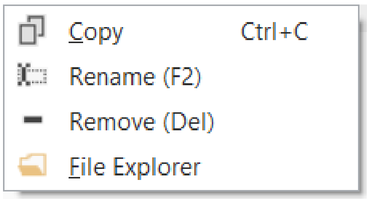
- Right click on a Group  :



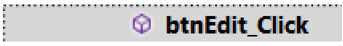
Paste a selected Module.
Rename the Group.
Add a Group.

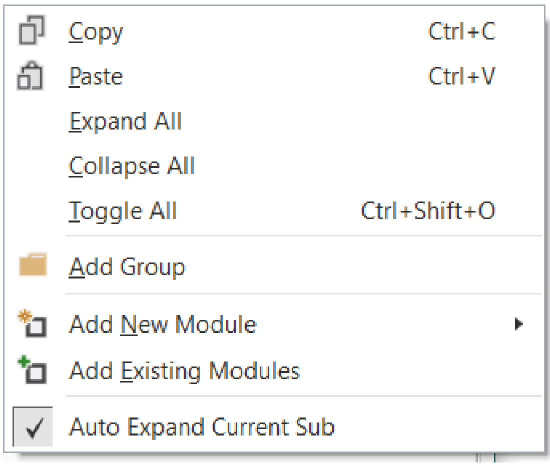
Add a new Module (same as in the Project menu).
Add an existing Module (same as in the Project menu).

- Right click on a Module :



Copy the Module.
Rename the Module.
Remove the Module.
Open the File Explorer to select any Module.

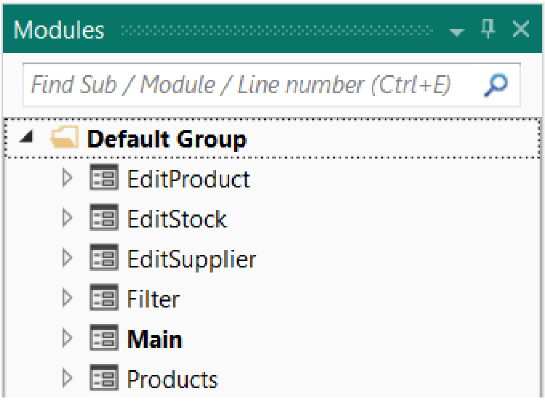
- Right click on a Subroutine  , or somewhere else:



Copy the Subroutine
Paste a Subroutine from the clipboard.
Expand all the Tab content.
Collapse all the Tab content.
Toggle all the Tab content.

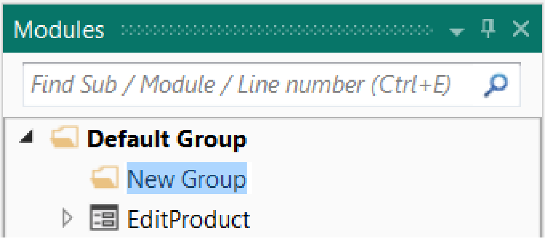
Add a Group
Add a new Module (as in the Project menu).
Add an existing Module (as in the Project menu).
Auto expand the current sub.
Expands automatically the sub when you click on it.

5.5.2.1 Add a Group

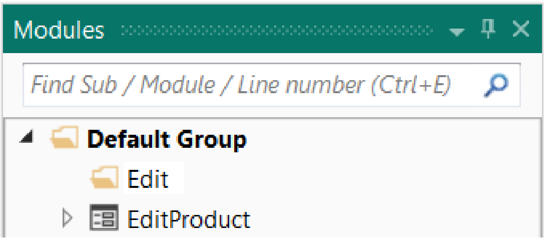


There are several modules for the ‘Edit’ function.

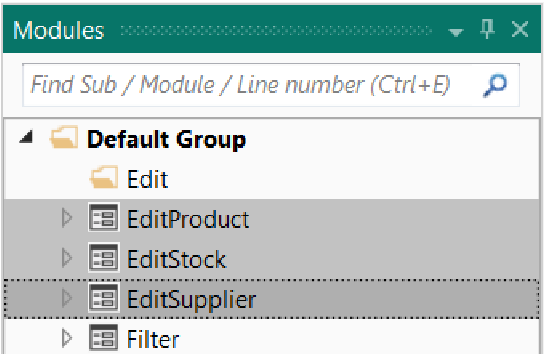
We want to create a group for these modules.



Right click on Default Group and click on Add Group.

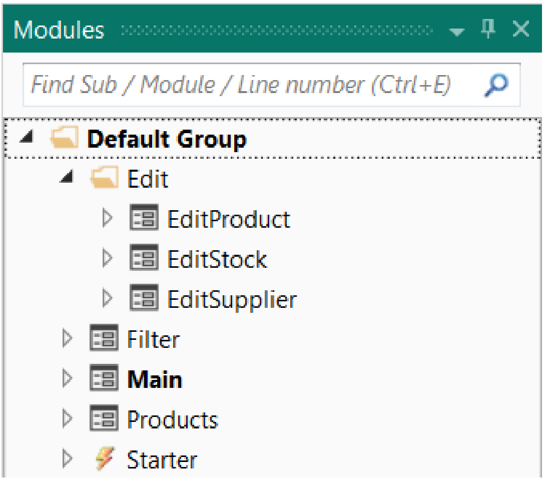


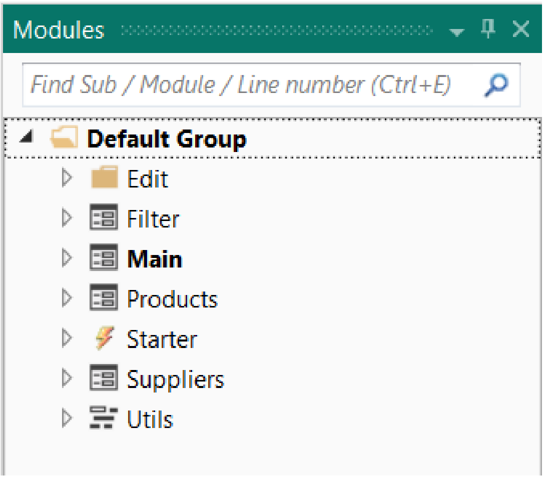
Enter ‘Edit’.



Select the three ‘Edit…’ modules and move them to the Edit Group.

The files remain in the Files folder of the project, they are not moved somewhere else.





The result expanded and collapsed.

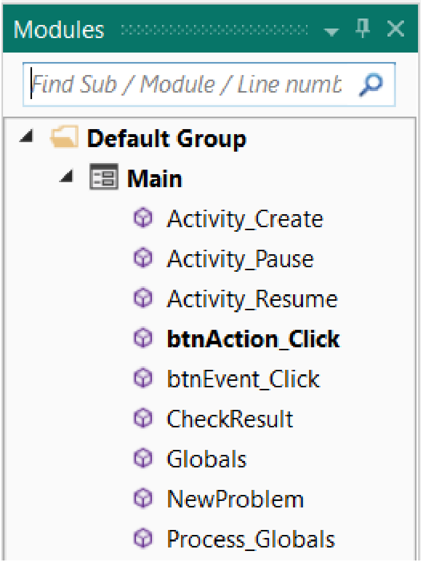
5.5.3 Find Sub / Module / Line number (Ctrl + E)

The *Find Sub / Module / Line number* function is a search engine, on the Top of the Modules Tab, to find subroutines or Modules with a given name or with a given part of the name.

You can press Ctrl + E in the code to select the Modules Tab with the *Find Sub / Module* function.

Example with the code of the SecondProgram example.

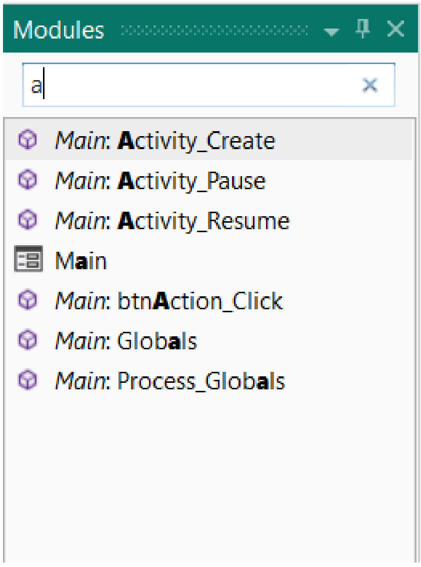
No text



Default Group
Main
Activity_Create
Activity_Pause
Activity_Resume
btnAction_Click
btnEvent_Click
CheckResult
Globals
NewProblem
Process_Globals

Shows all modules and all routines of the selected Module.

only the character ‘a’

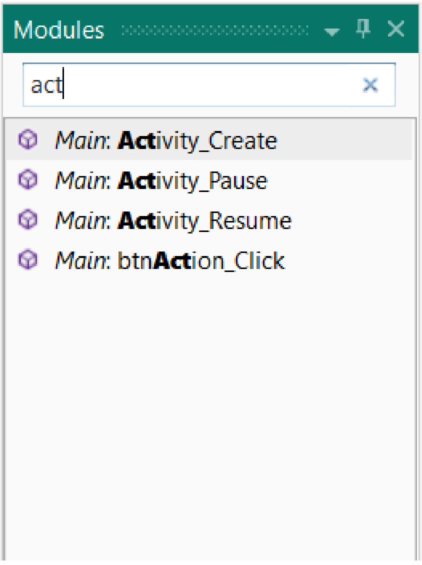


a

Main: **A**ctivity_Create
Main: **A**ctivity_Pause
Main: **A**ctivity_Resume
M**a**in
Main: btn**A**ction_Click
Main: Glob**a**ls
Main: Process_Glob**a**ls

Shows all modules and routines containing ‘a’.

text ‘act’



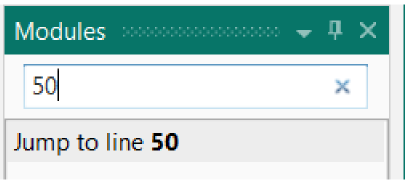
act

Main: **Act**ivity_Create
Main: **Act**ivity_Pause
Main: **Act**ivity_Resume
Main: btn**Act**ion_Click

Shows all modules and routines containing ‘act’.

Clicking on one item shows the code of the selected module or routine.

To jump to a given line number, enter the line number:



50

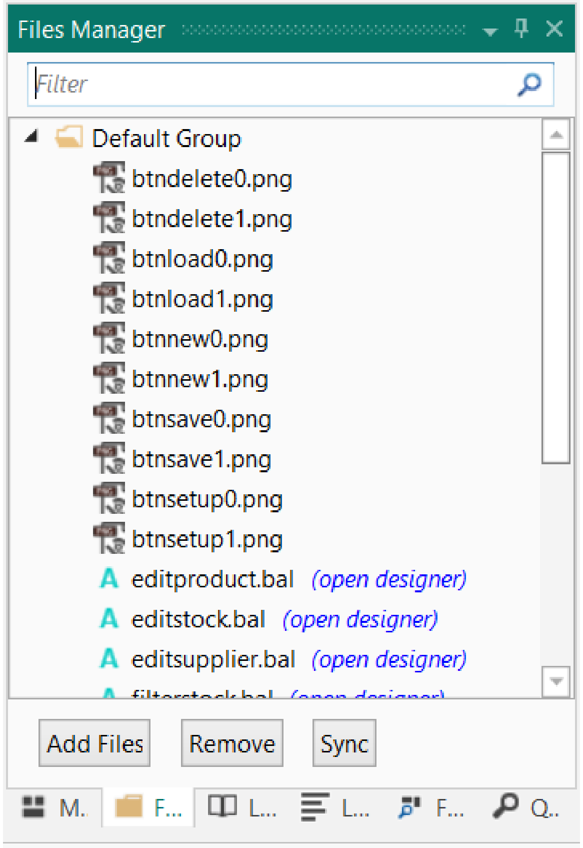
Jump to line **50**

Then, press Return or click on Jump to line **50** .

5.6 Files Manager Files Manager B4A, B4i and B4J only

This window lists all the files that have been added to the project with the Add Files button.
These files are saved in the 'Files' subfolder under your main project folder.
These can be any kind of files: layouts, images, texts, etc.

All files you need in your project must be added with the Add Files button, just copying any file in the projects Files folder is not enough.

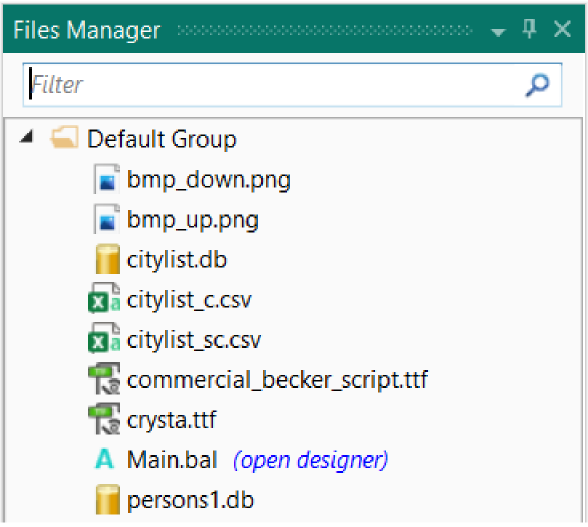


You can add, remove, synchronize or filter files.

Or click on Sync to add all the files from the projects Files folder into the File Tab.

For layout files, you can click on (open designer) to open the Designer with the selected file.

Different file types have different file icons.



png file
db database file

csv file

ttf font file

bal layout file

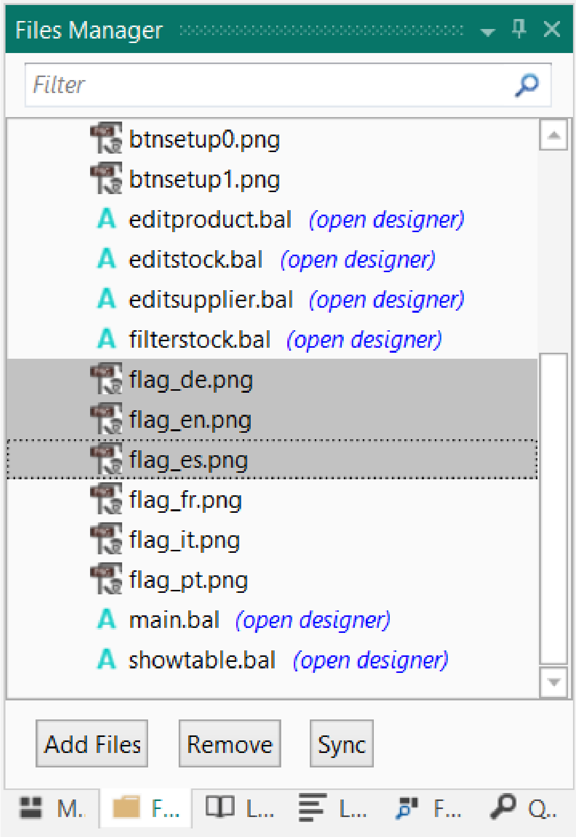
5.6.1 Add files

Click on Add Files to add files to the list.

The files in that subfolder can be accessed from your program by using the reference File.DirAssets.

The file chooser will be shown. Select one or more files and click on Open.

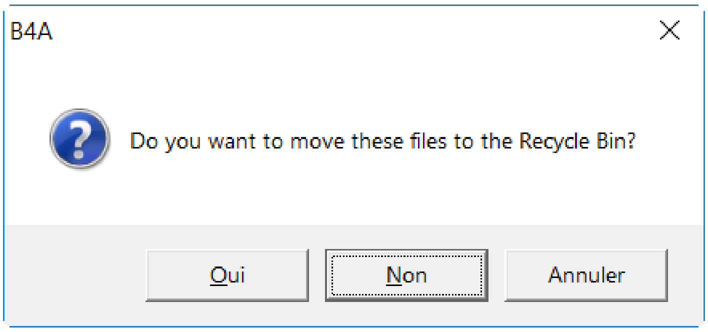
5.6.2 Remove files



btnsetup0.png
btnsetup1.png
editproduct.bal (open designer)
editstock.bal (open designer)
editsupplier.bal (open designer)
filterstock.bal (open designer)
flag_de.png
flag_en.png
flag_es.png
flag_fr.png
flag_it.png
flag_pt.png
main.bal (open designer)
showtable.bal (open designer)

To delete files, select the files you want to delete and click on the Remove button.

Clicking on this button removes the selected files from the list and, if you want, from the Files folder of the project.



Do you want to move these files to the Recycle Bin?

You are asked if you want to move the files from the 'Files' folder to the Recycle Bin.
Oui = Yes
Non = No
Annuler = Cancel

The removed files are moved to the Recycle Bin and, if necessary, can be recuperated from there.

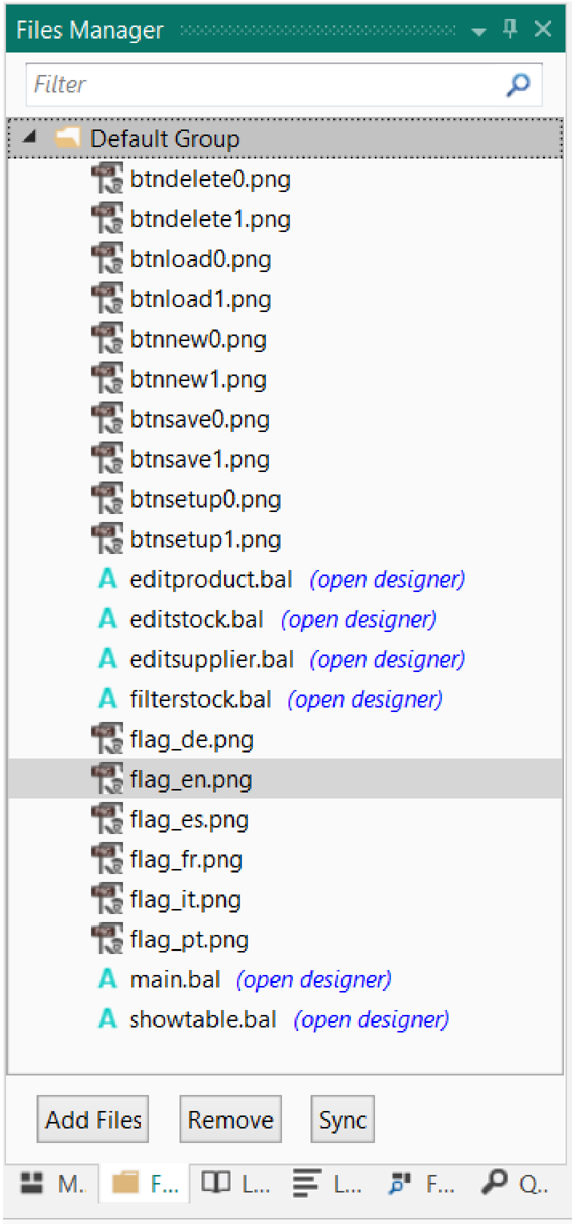
5.6.3 Synchronize files.

If you have added files into the projects Files folder from outsides the IDE, you can add those to the IDE Files Tab with the Sync button.

All files in the projects Files folder will be added to the Files Tab of the IDE.

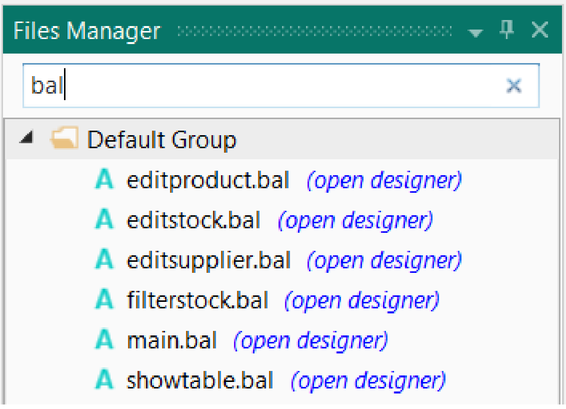
5.6.4 Filter files.

On top of the Files Manager window, you can filter the files list.



Default Group
btndelete0.png
btndelete1.png
btnload0.png
btnload1.png
btnnew0.png
btnnew1.png
btnsave0.png
btnsave1.png
btnsetup0.png
btnsetup1.png
editproduct.bal (open designer)
editstock.bal (open designer)
editsupplier.bal (open designer)
filterstock.bal (open designer)
flag_de.png
flag_en.png
flag_es.png
flag_fr.png
flag_it.png
flag_pt.png
main.bal (open designer)
showtable.bal (open designer)

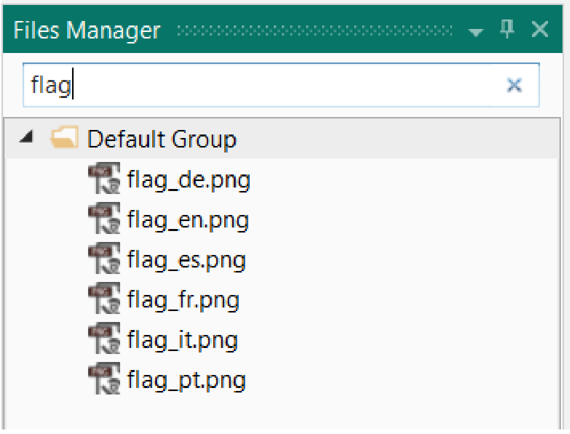
Enter ‘bal’ to filter all layout files, and the result:



bal

Default Group
editproduct.bal (open designer)
editstock.bal (open designer)
editsupplier.bal (open designer)
filterstock.bal (open designer)
main.bal (open designer)
showtable.bal (open designer)

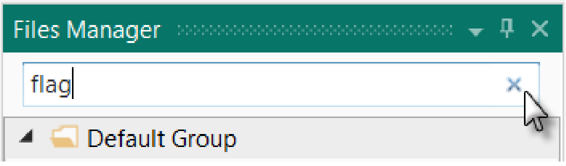
Or enter ‘flag’, and the result:



flag

Default Group
flag_de.png
flag_en.png
flag_es.png
flag_fr.png
flag_it.png
flag_pt.png

To remove the filter, click on ×.

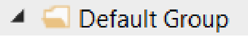


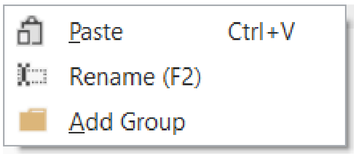
flag

Default Group

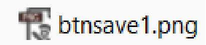
5.6.5 Context menus

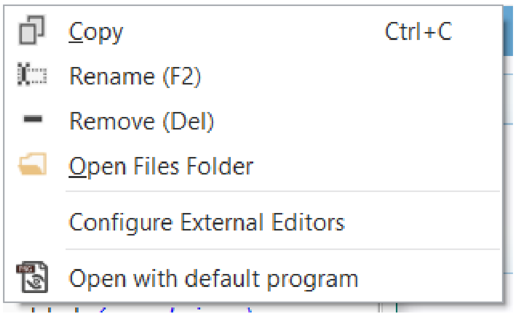
What you can do:

- Right click on a Group  :



Paste a selected Module.
Rename the Group.
Add a Group. Adds a new group into the selected group.

- Right click on a file  :

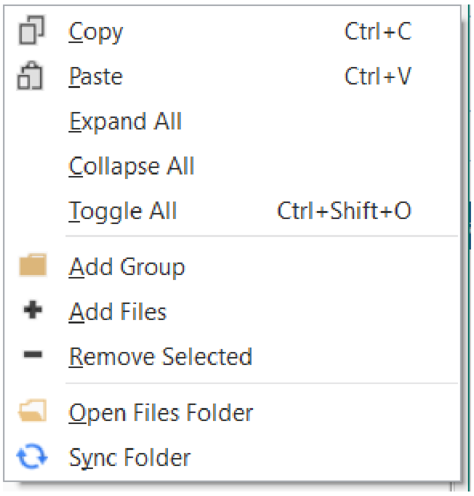


Copy the file.
Rename the file.
Remove the file.
Open the File Explorer to select any files.

Configure external editors.

Open the file with its default program

- Right click on an empty area of the Files Tab



- :

Copy the Subroutine
Paste a Subroutine from the clipboard.
Expand all the Tab content.
Collapse all the Tab content.
Toggle all the Tab content.

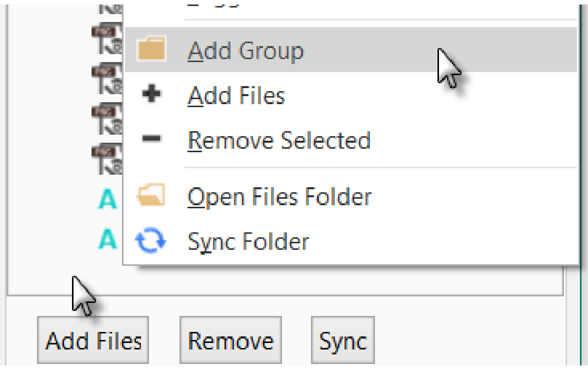
Add a Group. Adds a new group on the top level.
Add Files
Remove Selected Remove the selected files.

Open the projects Files folder.
Sync Folder.

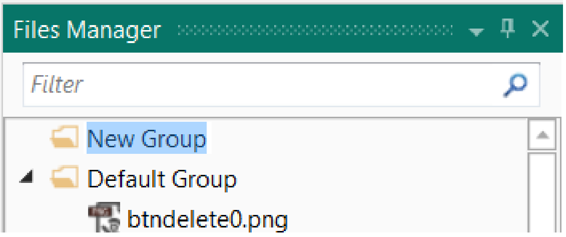
5.6.6 Add a Group

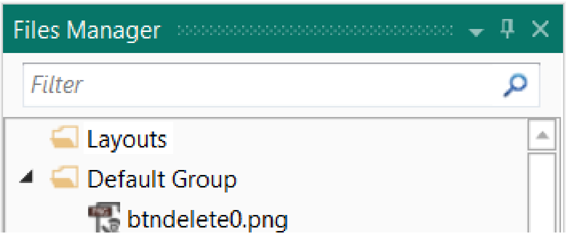
To add a group:

- Right click in an empty part of the Files Tab to add a group at the top level.
- Right click on a Group inside the Tab to add a 'subgroup' in the selected group.



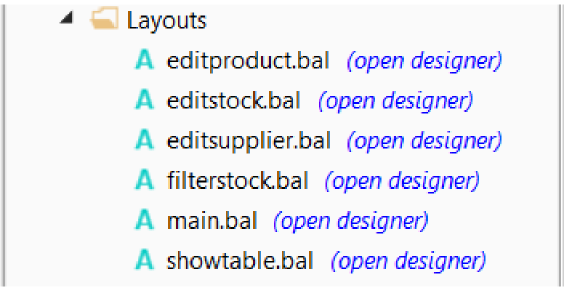
Example:
Right click on an empty area of the Files Tab and click on Add Group.

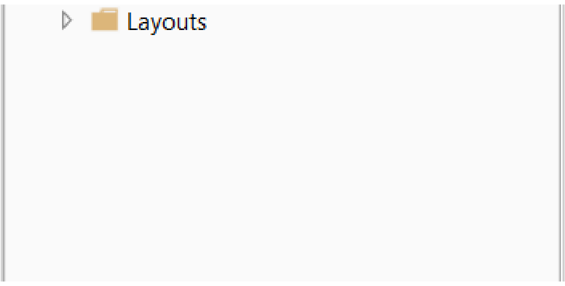




Enter 'Layouts' and move all the layout files into the Layout group.

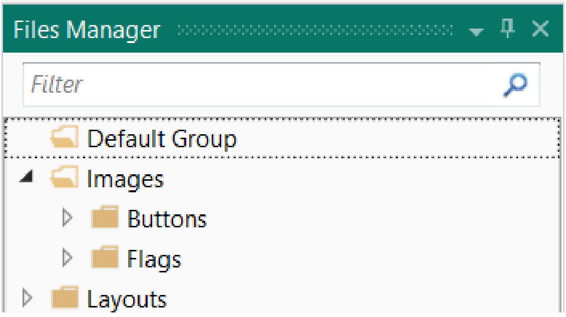
And the result:


Layouts
editproduct.bal (open designer)
editstock.bal (open designer)
editsupplier.bal (open designer)
filterstock.bal (open designer)
main.bal (open designer)
showtable.bal (open designer)



Expanded and collapsed.

Example with several groups:



Images, on the top level with two subgroups

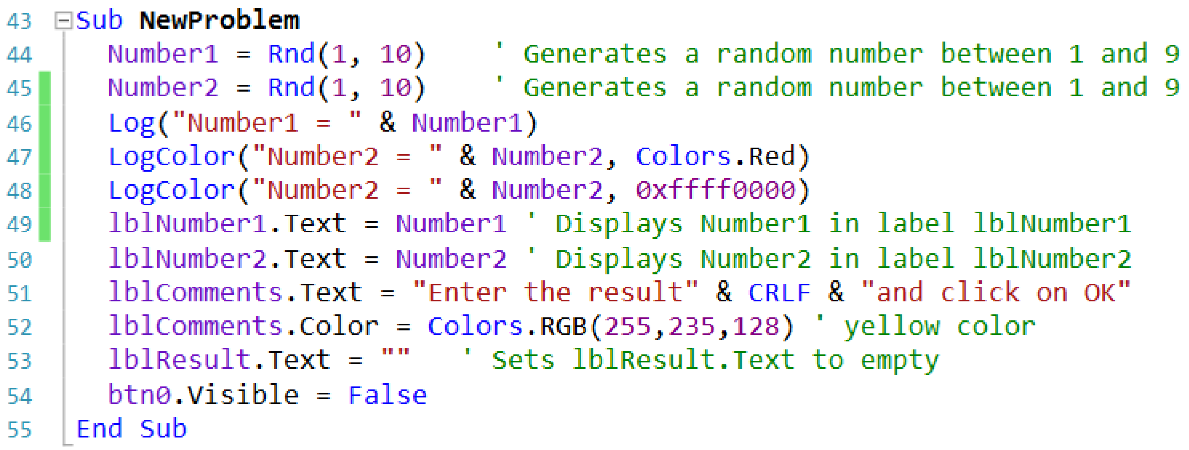
Layouts, on the top level.

5.7 Logs

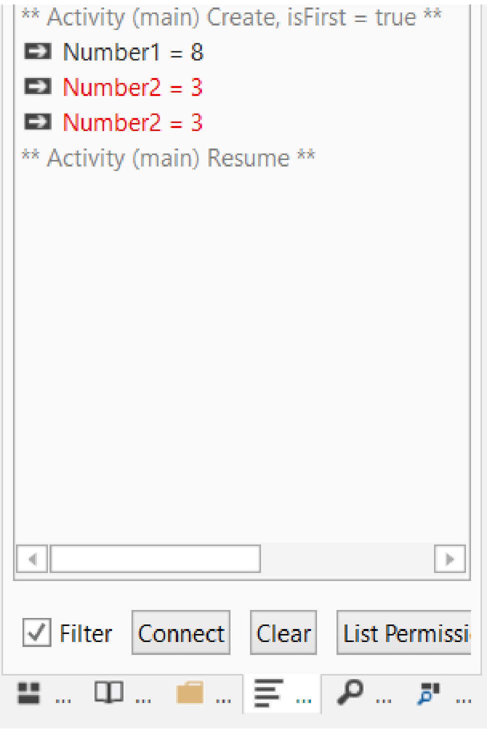
Display of Log comments generated by the program when it is running.

`Log(Message)` displays the message in black.
`LogColor(Message, Color)` displays the message in the given color.
The color can be given with different formats.

We add the three lines 46, 47 and 48 in the program 'SecondProgram' in the 'New' routine.
The number of the lines may be different from yours.



```
43 Sub NewProblem
44     Number1 = Rnd(1, 10)     ' Generates a random number between 1 and 9
45     Number2 = Rnd(1, 10)     ' Generates a random number between 1 and 9
46     Log("Number1 = " & Number1)
47     LogColor("Number2 = " & Number2, Colors.Red)
48     LogColor("Number2 = " & Number2, 0xffff0000)
49     lblNumber1.Text = Number1 ' Displays Number1 in label lblNumber1
50     lblNumber2.Text = Number2 ' Displays Number2 in label lblNumber2
51     lblComments.Text = "Enter the result" & CRLF & "and click on OK"
52     lblComments.Color = Colors.RGB(255,235,128) ' yellow color
53     lblResult.Text = ""    ' Sets lblResult.Text to empty
54     btn0.Visible = False
55 End Sub
```



```
** Activity (main) Create, isFirst = true **
⇨ Number1 = 8
⇨ Number2 = 3
⇨ Number2 = 3
** Activity (main) Resume **
```

Run the program.

Click on Connect to connect the logger.

The top area of the window shows [Compile Warnings] see next page.

In the lower area of the window, we see the flow of the program.

** Activity (main) Create, isFirst = true **
⇨ Number1 = 9 First log message
⇨ Number2 = 1 Second log message
⇨ Number2 = 1 Second log message
** Activity (main) Resume **

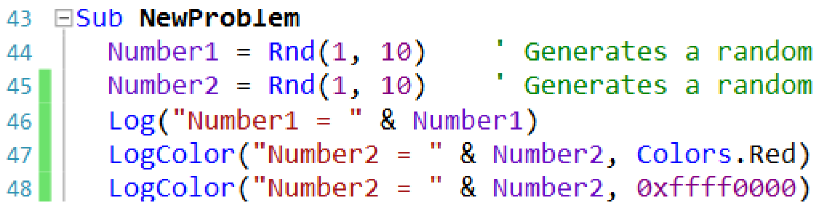
☑ Filter When *Filter* is checked you will only see messages related to your program. When it is unchecked, you will see all the messages running in the system. If you are encountering an error and do not see any relevant message in the log, it is worth unchecking the filter option and looking for an error message

Click on Clear to clear the Logs window.

The arrow ⇨ at the beginning of the Log allows to jump to the code line of the Log, see next page.

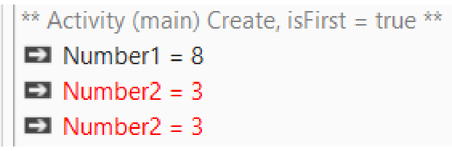
5.7.1 Jump to …

Logs in the code:



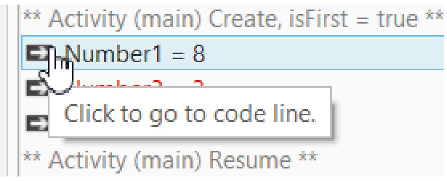
```
Sub NewProblem
    Number1 = Rnd(1, 10)     ' Generates a random
    Number2 = Rnd(1, 10)     ' Generates a random
    Log("Number1 = " & Number1)
    LogColor("Number2 = " & Number2, Colors.Red)
    LogColor("Number2 = " & Number2, 0xffff0000)
```

And in the Logs you will see this:

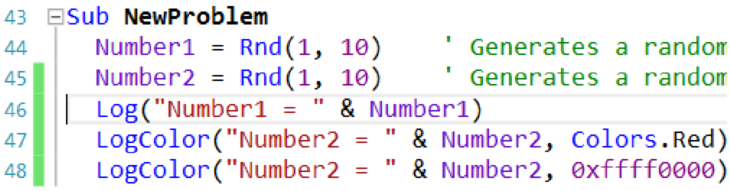


```
** Activity (main) Create, isFirst = true **
➡ Number1 = 8
➡ Number2 = 3
➡ Number2 = 3
```

Click on an arrow ➡ to jump to the Log line in the code.

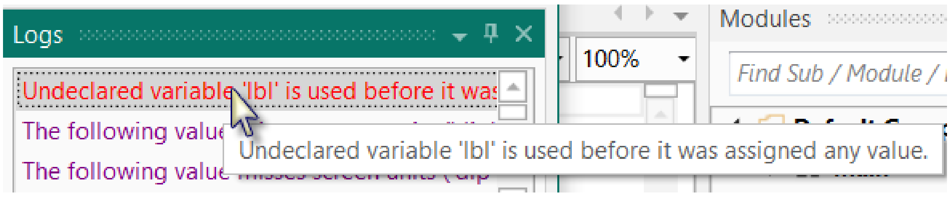


```
** Activity (main) Create, isFirst = true **
➡ Number1 = 8
Click to go to code line.
** Activity (main) Resume **
```



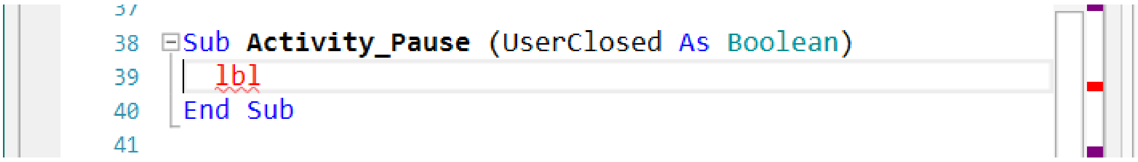
```
Sub NewProblem
    Number1 = Rnd(1, 10)     ' Generates a random
    Number2 = Rnd(1, 10)     ' Generates a random
    Log("Number1 = " & Number1)
    LogColor("Number2 = " & Number2, Colors.Red)
    LogColor("Number2 = " & Number2, 0xffff0000)
```

On top of the Logs Tab, if there are warnings or errors, hovering over a line shows the full message and clicking on it jumps to the concerned code line in the editor.



```
Undeclared variable 'lbl' is used before it was
The following value
The following value
```

Undeclared variable 'lbl' is used before it was assigned any value.

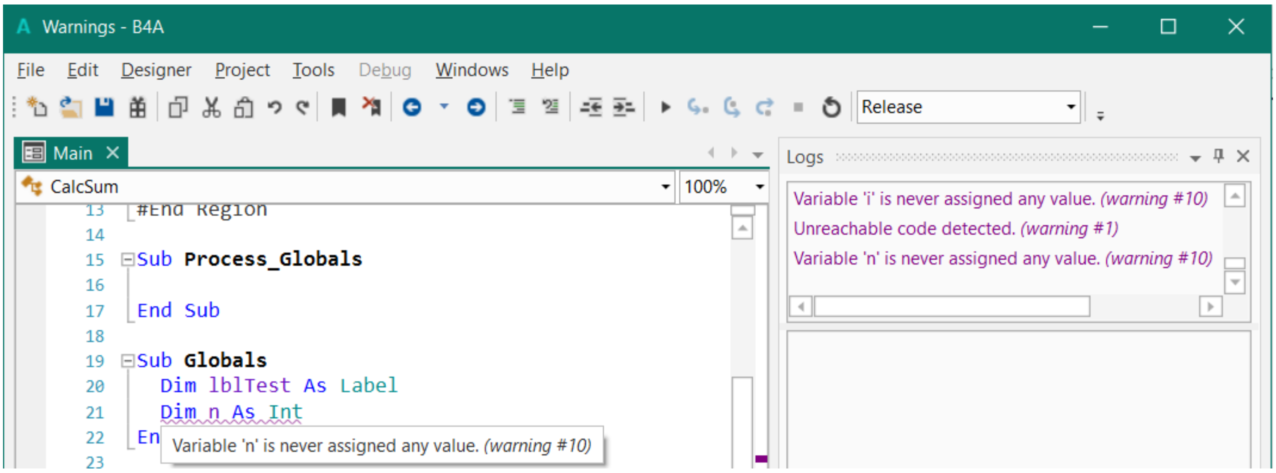


```
Sub Activity_Pause (UserClosed As Boolean)
    lbl
End Sub
```

5.7.2 Compile Warnings

B4X includes a warning engine. The purpose of the warning engine is to find potential programming mistakes as soon as possible. The examples are from the Warnings project.

The compile-time warnings appear above the logs and in the code itself when hovering with the cursor above the code line.
The code lines which cause a warning are underlined like this `Dim i As Int` .



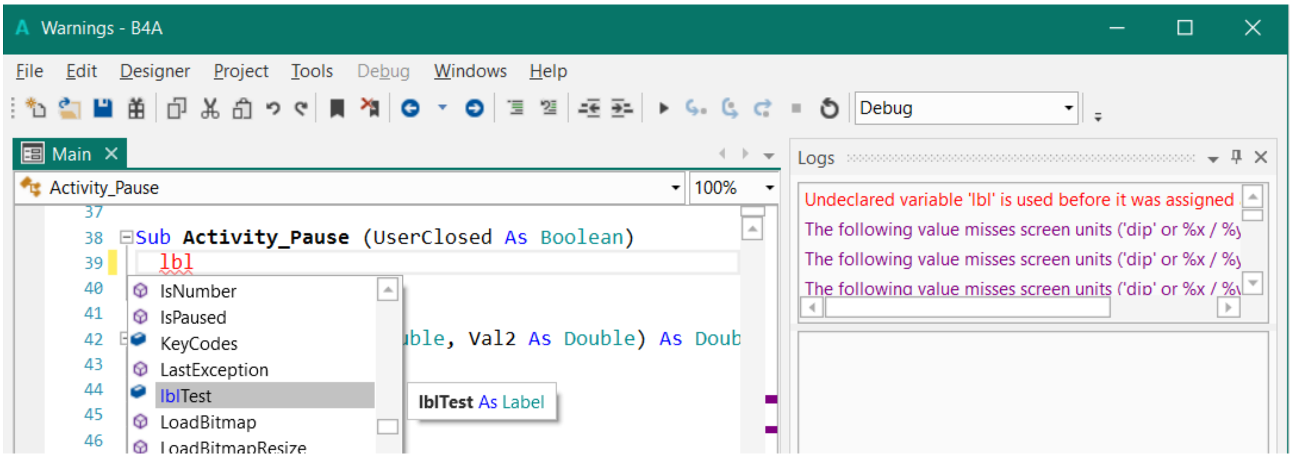
```
#End Region

Sub Process_Globals

End Sub

Sub Globals
    Dim lblTest As Label
    Dim n As Int
En
```

Variable 'n' is never assigned any value. (warning #10)

```
Variable 'i' is never assigned any value. (warning #10)
Unreachable code detected. (warning #1)
Variable 'n' is never assigned any value. (warning #10)
```

Clicking on the warning in the list will take you to the relevant code.

The warning engine runs as soon as you type.



```
Sub Activity_Pause (UserClosed As Boolean)
    lbl

ble, Val2 As Double) As Doub
```

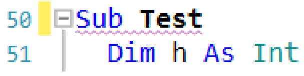
```
Undeclared variable 'lbl' is used before it was assigned
The following value misses screen units ('dip' or %x / %y
The following value misses screen units ('dip' or %x / %y
The following value misses screen units ('dip' or %x / %y
```

Typing for example ‘lbl’ at the beginning of a line shows immediately:

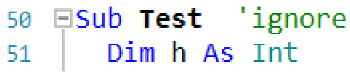
- `lbl` in red, because lbl was not declared.
- a warning Undeclared variable 'lbl' is used before it was assigned any value.
- the auto complete pop-up window with suggestion containing the written characters.

5.7.2.1 Ignoring warnings

You, as the developer, can choose to ignore any warning. Adding an "ignore" comment will disable all the warnings for that specific line:



```
Sub Test
    Dim h As Int
```



```
Sub Test   'ignore
    Dim h As Int
```

You can also disable warnings from a specific type in the module by adding the #IgnoreWarning on the top in one of the codes in the Attribute regions.

For example, to disable warnings #10 and #12:

```
#Region  Activity Attributes
   #FullScreen: False
   #IncludeTitle: True
   #IgnoreWarnings: 10, 12
#End Region
```

You find the warning numbers at the end of each warning line.

5.7.2.2 List of warnings

The warning may be different in the four products, the list is not exhaustive.

1: Unreachable code detected.
2: Not all code paths return a value.
3: Return type (in Sub signature) should be set explicitly.
4: Return value is missing. Default value will be used instead.
5: Variable declaration type is missing. String type will be used.
6: The following value misses screen units ('dip' or %x / %y): {1}.
7: Object converted to String. This is probably a programming mistake.
8: Undeclared variable '{1}'.
9: Unused variable '{1}'.
10: Variable '{1}' is never assigned any value.
11: Variable '{1}' was not initialized.
12: Sub '{1}' is not used.
13: Variable '{1}' should be declared in Sub Process_Globals.
14: File '{1}' in Files folder was not added to the Files tab. You should either delete it or add it to the project. You can choose Tools - Clean unused files.
15: File '{1}' is not used.
16: Layout file '{1}' is not used. Are you missing a call to Activity.LoadLayout?
17: File '{1}' is missing from the Files tab.
18: TextSize value should not be scaled as it is scaled internally.
19: Empty Catch block. You should at least add Log(LastException.Message).
20: View '{1}' was added with the designer. You should not initialize it.
21: Cannot access view's dimension before it is added to its parent.
22: Types do not match.
23: Modal dialogs are not allowed in Sub Activity_Pause. It will be ignored.
24: Accessing fields from other modules in Sub Process_Globals can be dangerous as the initialization order is not deterministic.
25: Sub '{0}' not found.
26: Add android:targetSdkVersion="19" to the manifest editor (after minSdkVersion).
27: AndroidManifest.xml is read-only or do not overwrite manifest file option is checked. Use the manifest editor instead.
28: It is recommended to use a custom theme or the default theme.
Remove SetApplicationAttribute(android:theme, “@android:style/Theme.Holo”) from the manifest editor.
32: Library '{0}' is not used.
33: DoEvents is deprecated. It can lead to stability issues. Use Sleep(0) instead (if really needed).
34: Msgbox and other modal dialogs are deprecated. Use the async methods instead.
35: Comparison of Object to other types will fail if exact types do not match. Better to put the object on the right side of the comparison.

Runtime warnings
1001: Panel.LoadLayout should only be called after the panel was added to its parent.
1002: The same object was added to the list. You should call Dim again to create a new object.
1003: Object was already initialized.
1004: FullScreen or IncludeTitle properties in layout file do not match the activity attributes settings.

1: Unreachable code detected.

There is some code which will never be executed.
This can happen if you have some code in a Sub after a Return statement.

2: Not all code paths return a value.

```
Sub Calc(Val1 As Double, Val2 As Double, Operation As String) As Double
   Select Operation
   Case "Add"
     Return (Val1 + Val2)
   Case "Sub"
     Return (Val1 - Val2)
   Case "Mult"
     Return (Val1 * Val2)
   Case "Div"

   End Select
End Sub
```

In the `Case "Div"` path no value is returned!

Another example:
Wrong code

```
Sub Activity_KeyPress(KeyCode As Int) As Boolean
   Private Answ As Int
   Private Txt As String

   If KeyCode = KeyCodes.KEYCODE_BACK Then' Checks if the KeyCode is BackKey
     Txt = "Do you really want to quit the program ?"
     Answ = Msgbox2(Txt,"A T T E N T I O N","Yes","","No",Null) ' MessageBox
     If Answ = DialogResponse.POSITIVE Then  ' If return value is Yes then
      Return False ' Return = False  the Event will not be consumed
     Else                 ' we leave the program
      Return True         ' Return = True    the Event will be consumed to avoid
     End If               ' leaving the program
   End If
End Sub
```

Correct code

```
Sub Activity_KeyPress(KeyCode As Int) As Boolean
   Private Answ As Int
   Private Txt As String

   If KeyCode = KeyCodes.KEYCODE_BACK Then' Checks if the KeyCode is BackKey
     Txt = "Do you really want to quit the program ?"
     Answ = Msgbox2(Txt,"A T T E N T I O N","Yes","","No",Null) ' MessageBox
     If Answ = DialogResponse.POSITIVE Then  ' If return value is Yes then
      Return False ' Return = False  the Event will not be consumed
     Else                 ' we leave the program
      Return True         ' Return = True    the Event will be consumed to avoid
     End If               ' leaving the program
   Else
     Return True          ' Return = True    the Event will be consumed to avoid
   End If                 ' leaving the program
End Sub
```

3: Return type (in Sub signature) should be set explicitly.

Wrong code
```
Sub Calc(Val1 As Double, Val2 As Double, Operation As String)
```

Correct code
```
Sub Calc(Val1 As Double, Val2 As Double, Operation As String) As Double
```
The return type must be declared!

4: Return value is missing. Default value will be used instead.

Wrong code
```
Sub CalcSum(Val1 As Double, Val2 As Double) As Double
   Private Sum As Double

   Sum = Val1 + Val2
   Return
End Sub
```

Correct code
```
Sub CalcSum(Val1 As Double, Val2 As Double) As Double
   Private Sum As Double

   Sum = Val1 + Val2
   Return Sum
End Sub
```

5: Variable declaration type is missing. String type will be used.

Wrong code
```
Sub Calc(Val1, Val2 As Double, Operation As String) As Double
```

Correct code
```
Sub Calc(Val1 As Double, Val2 As Double, Operation As String) As Double
```

In sub declarations each variable needs its own Type declaration.
But in Private, Public or Dim declarations it's allowed, in the line below both variables are Doubles:
```
Private Val1, Val2 As Double
```

6: The following value misses screen units ('dip' or %x / %y): {1}.

Wrong code
```
Activity.AddView(lblTest, 10, 10, 150, 50)
```

Correct code
```
Activity.AddView(lblTest, 10dip, 10dip, 150dip, 50dip)
```

In the example above you will get four warnings, one for each value.
For view dimensions you should use dip, %x or %y values.

7: Object converted to String. This is probably a programming mistake.

8: Undeclared variable '{1}'.

Wrong code

```
Sub SetHeight
   h = 10dip
End Sub
```

Correct code

```
Sub SetHeight
   Private h As Int
   h = 10dip
End Sub
```

The variable `h` was not declared. You see it also with the red color.

9: Unused variable '{1}'.

```
Sub SetHeight
   Private h As Int
   h = 10dip
End Sub
```

This warning tells that the variable `h` is not used.
It is declared and assigned a value, but it is not used!

This code gives no warning because variable `h` is used:

```
Sub SetHeight
   Private h As Int
   h = 10dip
   lblTest.Height = h
End Sub
```

10: Variable '{1}' is never assigned any value.

```
Sub Test
   Private h As Int

End Sub
```

This warning shows that the variable `h` is declared but not assigned any value.
Correct code, see above.

11: Variable '{1}' was not initialized.

Wrong code

```
   Private lst As List
   lst.Add("Test1")
```

Correct code

```
   Private lst As List
   lst.Initialize
   lst.Add("Test1")
```

Variables (objects) like List or Map must be initialized before they can be used.
Views added by code must also be initialized before they can be added to a parent view.

12: Sub '{1}' is not used.

This warning is displayed if a Sub routine is never used.

13: Variable '{1}' should be declared in Sub Process_Globals.

Wrong code:

```
Sub Globals
   Public Timer1 As Timer
   Public GPS1 As GPS
```

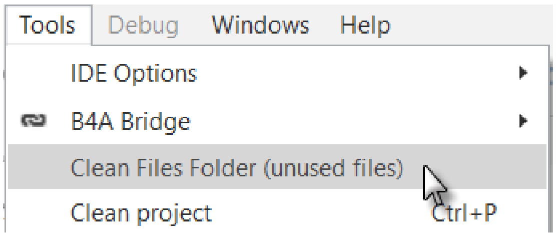
Correct code:

```
Sub Process_Globals
   Public Timer1 As Timer
   Public GPS1 As GPS
```

Certain objects like Timers and GPS should be declared in Process_Globals, not in Globals.

14: File '{1}' in Files folder was not added to the Files tab.

You are using a file which is in the Files folder, but was not added to the Files tab.
You should:
- Delete it from the Files subfolder. Don’t forget to make a backup copy before deleting it.
- Add it to the project in the Files tab.
- Use Clean Files Folder (unused files) in the Tools menu.

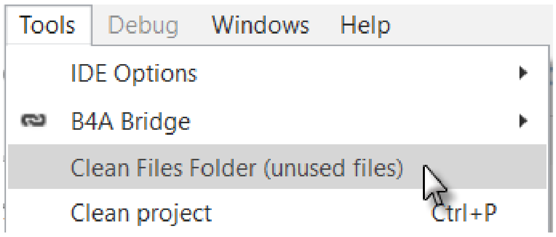


15: File '{1}' is not used.

You have files in the Files folder that are not used.
You should remove them from the Files folder.
Or you can clean the Files folder from within the Tools menu (see above).

16: Layout file '{1}' is not used. Are you missing a call to Activity.LoadLayout?

You have a layout file in the Files folder that is not used.
You should add LoadLayout or you can remove the layout file from the Files folder.
Or you can clean the Files folder in the Tools menu.



17: File '{1}' is missing from the Files tab.

The given file is in the Files tab but is missing in the Files folder. You should add it.
See chapter Add Files

18: TextSize value should not be scaled as it is scaled internally.

Wrong code
```
lblTest.TextSize = 16dip
```

Correct code
```
lblTest.TextSize = 16
```

TextSize values are pixel and density independent. Their unit is the typographic point, a typographic unit, and must be given absolute values and not dip values.

19: Empty Catch block. You should at least add Log(LastException.Message).

Wrong code
```
  Try
     imvImage.Bitmap = LoadBitmap(File.DirRootExternal, "image.jpg")
  Catch

  End Try
```

Correct code
```
  Try
     imvImage.Bitmap = LoadBitmap(File.DirRootExternal, "image.jpg")
  Catch
     Log(LastException.Message)
  End Try
```

It is recommended to add at least `Log(LastException.Message)` in the Catch block instead of leaving it empty.

20: View '{1}' was added with the designer. You should not initialize it.

A View defined with the Designer in a layout file must not be initialized!
Only views added by code need to be initialized.

21: Cannot access view's dimension before it is added to its parent.

You must add a view to a parent view before you can access its dimensions.
When you add a view by code its dimensions are defined when you add it with AddView.

22: Types do not match.

23: Modal dialogs are not allowed in Sub Activity_Pause. It will be ignored.

Modal dialogs like MessageBox should not be used in the Activity_Pause routine.

24: Accessing fields from other modules in Sub Process_Globals can be dangerous as the initialization order is not deterministic.

25: Sub '{0}' not found.

The specified sub has not been found.

26: Add android:targetSdkVersion="19" in the ManifestEditor (after minSdkVersion).

```
<uses-sdk android:minSdkVersion="5" android:targetSdkVersion="19"/>
```

Instead of:

```
<uses-sdk android:minSdkVersion="5""/>
```

27: AndroidManifest.xml is read only. Use the Manifest Editor.

28: It is recommended to use a custom theme or the default theme.
Remove SetApplicationAttribute(android:theme, “@android:style/Theme.Holo”) from the manifest editor.

This was set automatically in older versions of B4A. No more needed.

32: Library ‘xxxx’ is not used.

Remove the unused library.

33: DoEvents is deprecated.

It can lead to stability issues. Use Sleep(0) instead (if really needed).

34: Msgbox and other modal dialogs are deprecated.

Use the async methods instead.

35: Comparison of Object to other types will fail if exact types do not match.

Better to put the object on the right side of the comparison.

Runtime warnings:

1001: Panel.LoadLayout should only be called after the panel was added to its parent.

1002: The same object was added to the list. You should call Dim again to create a new object.

1003: Object was already initialized.

1004: FullScreen or IncludeTitle properties in layout file do not match the activity attributes settings.

5.8 Libraries Manager

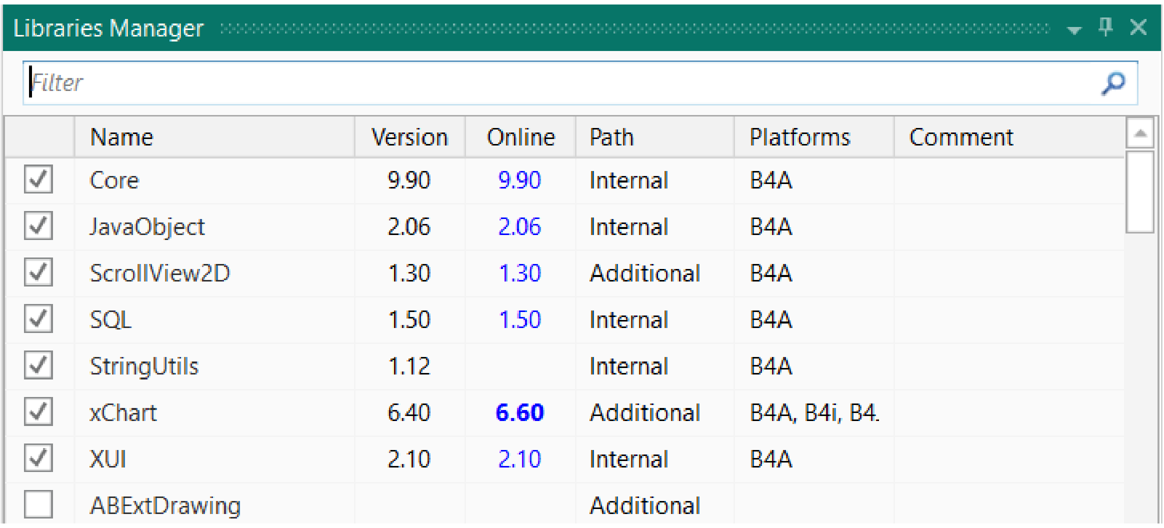
Libraries Manager

The “Libraries Manager” Tab contains a list of the available libraries that can be used in the project.

The content of the list depends on the available libraries in the given IDE.
The images are an example with B4A.

Libraries are explained in detail in the
B4X Language Booklet.

Check the libraries you need for your project.
Make sure that you have the latest version of the libraries.
If there does exist a newer version in the forum, the version number in the Online column is displayed in bold characters, like the xChart library in the image.



	Name	Version	Online	Path	Platforms	Comment
☑	Core	9.90	9.90	Internal	B4A	
☑	JavaObject	2.06	2.06	Internal	B4A	
☑	ScrollView2D	1.30	1.30	Additional	B4A	
☑	SQL	1.50	1.50	Internal	B4A	
☑	StringUtils	1.12		Internal	B4A	
☑	xChart	6.40	**6.60**	Additional	B4A, B4i, B4.	
☑	XUI	2.10	2.10	Internal	B4A	
☐	ABExtDrawing			Additional		

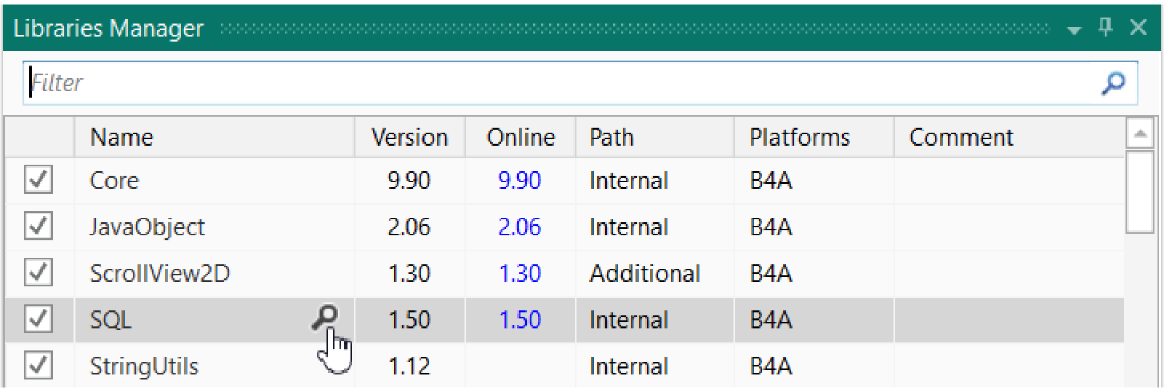
The used libraries are shown on top of the list.
As soon as you select one it moves to the top of the list.

Additional information is provided for all selected libraries:

- Name Name of the library.
- Version Version number of the library on your computer.
- Online Shows the number of the latest version in the forum.
- Path Path of the library.
  - Internal Internal library, shipped with the platform.
  - Additional Additional library you copied to your AdditionalLibraries folder.
- Platforms The library is valid for the given platforms.
- Comment Comment of the library.
  Comments can be added by the library developers.

5.8.1 Search function

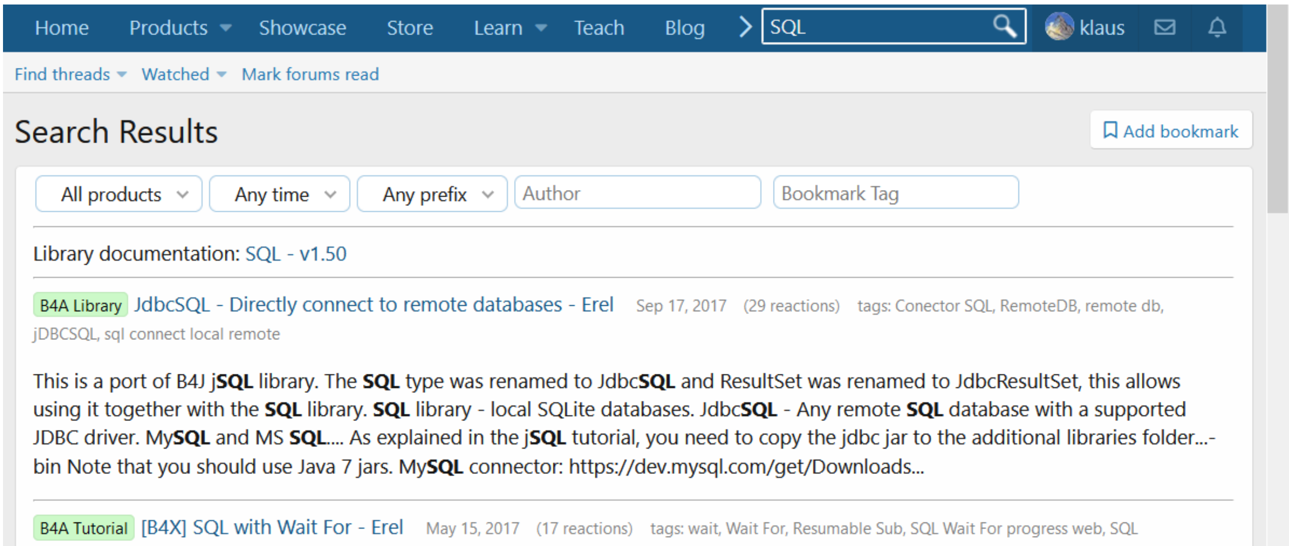
When you hover over the library names you see this:



	Name	Version	Online	Path	Platforms	Comment
☑	Core	9.90	9.90	Internal	B4A	
☑	JavaObject	2.06	2.06	Internal	B4A	
☑	ScrollView2D	1.30	1.30	Additional	B4A	
☑	SQL	1.50	1.50	Internal	B4A	
☑	StringUtils	1.12		Internal	B4A	

When you click on , the search function of the forum is launched.

The result is the same as if you searched in the forum with:



Search Results

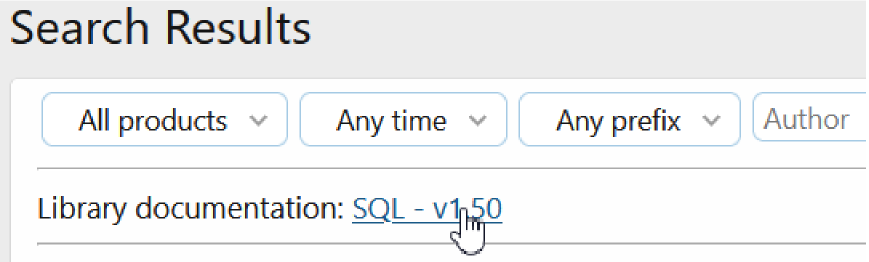
Library documentation: SQL - v1.50

B4A Library JdbcSQL - Directly connect to remote databases - Erel Sep 17, 2017 (29 reactions) tags: Conector SQL, RemoteDB, remote db, jDBCSQL, sql connect local remote

This is a port of B4J j**SQL** library. The **SQL** type was renamed to Jdbc**SQL** and ResultSet was renamed to JdbcResultSet, this allows using it together with the **SQL** library. **SQL** library - local SQLite databases. Jdbc**SQL** - Any remote **SQL** database with a supported JDBC driver. My**SQL** and MS **SQL**.... As explained in the j**SQL** tutorial, you need to copy the jdbc jar to the additional libraries folder...-bin Note that you should use Java 7 jars. My**SQL** connector: https://dev.mysql.com/get/Downloads...

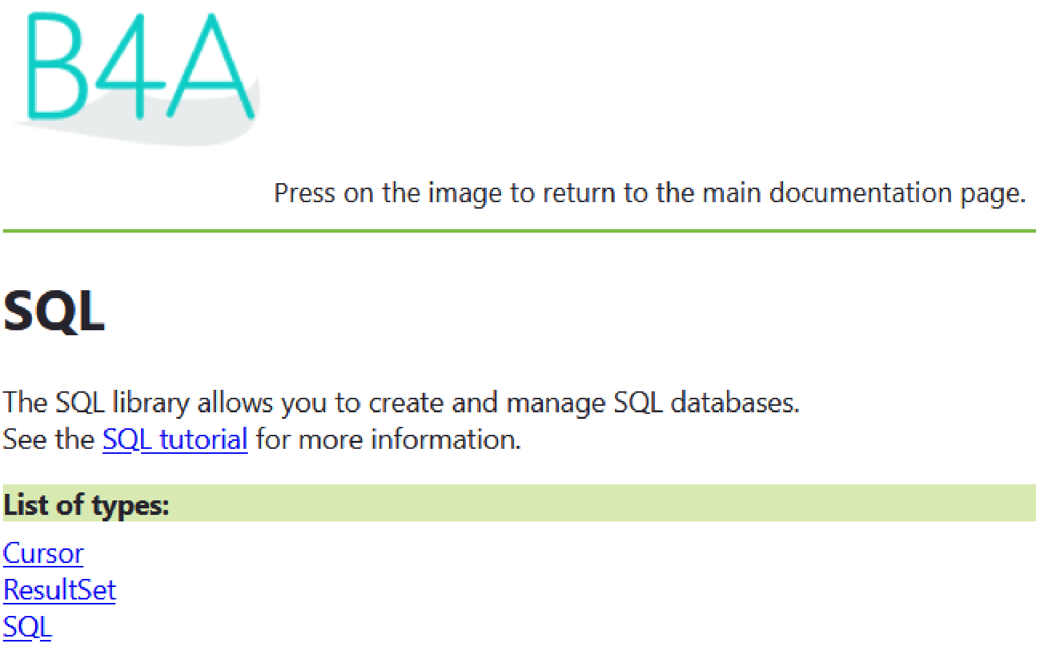
B4A Tutorial [B4X] SQL with Wait For - Erel May 15, 2017 (17 reactions) tags: wait, Wait For, Resumable Sub, SQL Wait For progress web, SQL

You may see on top of the list: Library documentation: Library name



Library documentation: SQL - v1.50

Click on the link to show to the online documentation of the library.



Press on the image to return to the main documentation page.

SQL

The SQL library allows you to create and manage SQL databases.
See the SQL tutorial for more information.

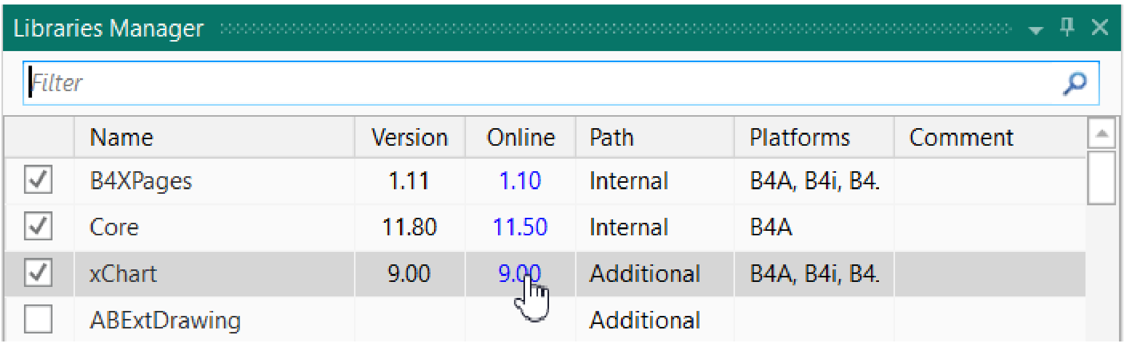
List of types:

Cursor
ResultSet
SQL

5.8.2 Online version number

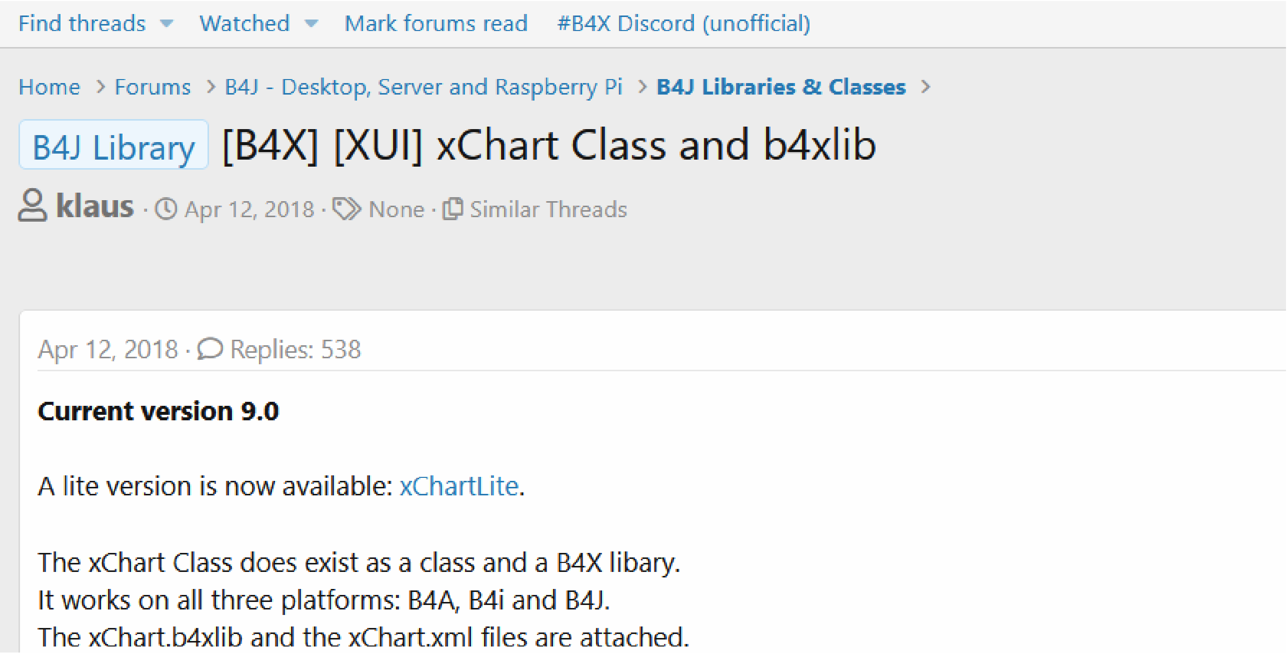
When you see an Online version number in bold characters, this means that there is a newer version in forum!

Click on the version number.



	Name	Version	Online	Path	Platforms	Comment
☑	B4XPages	1.11	1.10	Internal	B4A, B4i, B4.	
☑	Core	11.80	11.50	Internal	B4A	
☑	xChart	9.00	9.00	Additional	B4A, B4i, B4.	
☐	ABExtDrawing			Additional		

You get directly to the first post of the library thread where you can download the new version from.


Find threads
Watched
Mark forums read
#B4X Discord (unofficial)
Home > Forums > B4J - Desktop, Server and Raspberry Pi > B4J Libraries & Classes >

B4J Library [B4X] [XUI] xChart Class and b4xlib

klaus · Apr 12, 2018 · None · Similar Threads

Apr 12, 2018 · Replies: 538

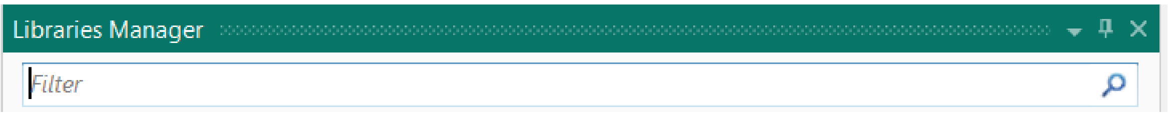
Current version 9.0

A lite version is now available: xChartLite.

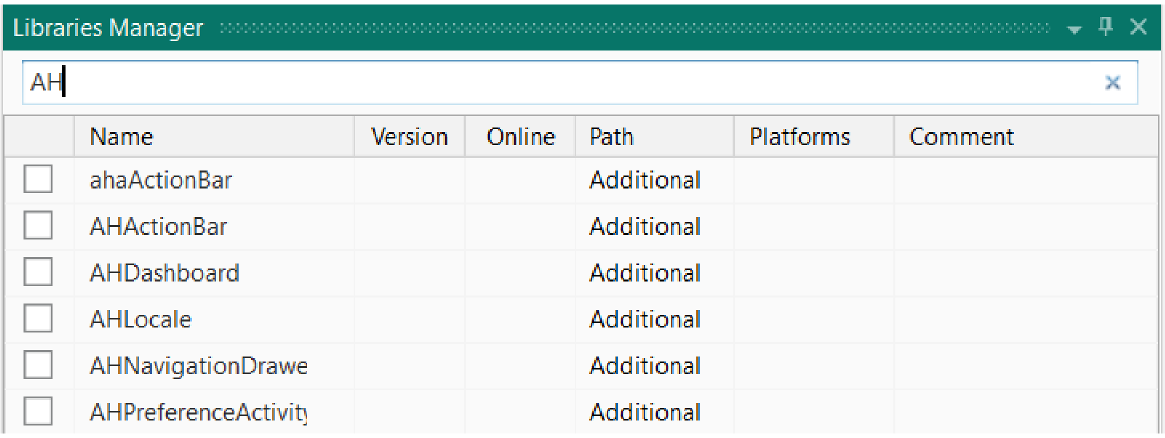
The xChart Class does exist as a class and a B4X libary.
It works on all three platforms: B4A, B4i and B4J.
The xChart.b4xlib and the xChart.xml files are attached.

5.8.3 Filter function

On the top of the Tab you find a field to filter the libraries.



Enter 'AH' and you get all libraries containing the text AH.

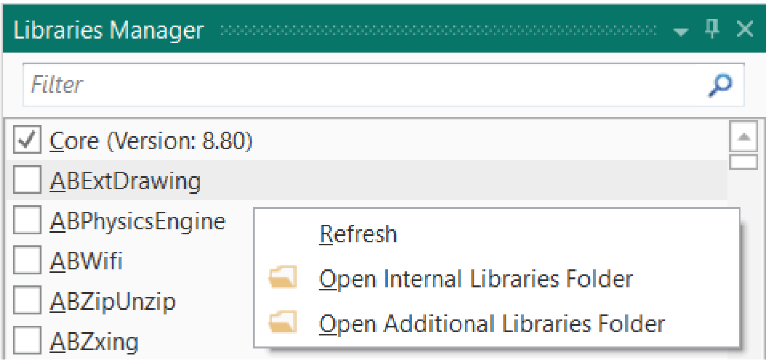


	Name	Version	Online	Path	Platforms	Comment
☐	ahaActionBar			Additional		
☐	AHActionBar			Additional		
☐	AHDashboard			Additional		
☐	AHLocale			Additional		
☐	AHNavigationDrawe			Additional		
☐	AHPreferenceActivity			Additional		

Clicking on a link in the list shows the documentation.

5.8.4 Context menu

Right click in the Libraries Manager Tab:



You can:

- Refresh the Tab content. Useful if you updated an internal or additional library.
- Open the Internal Libraries Folder.
- Open the Additional Libraries Folder.

5.8.5 Where do I find libraries?

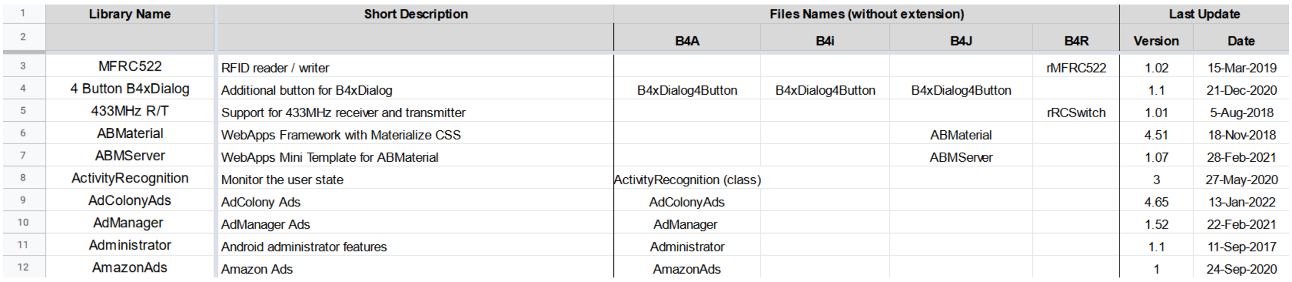
To find libraries you can either:

- Search in the forum with its name.
- Or look at the online libraries index.

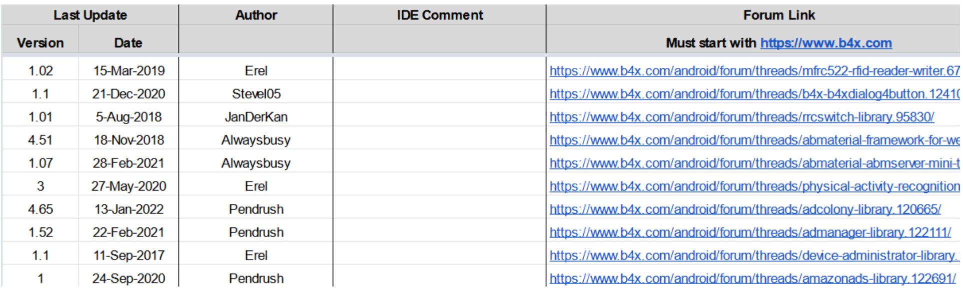
5.8.5.1 Online libraries index

You can look at the online libraries index with this link:
https://docs.google.com/spreadsheets/d/1qFvc3Q70RriJS3m_ywBoJvZ47gSTVAuN_X04SI0_XBw/edit#gid=0

Screen shot:



1	Library Name	Short Description	Files Names (without extension)				Last Update	
2			B4A	B4i	B4J	B4R	Version	Date
3	MFRC522	RFID reader / writer				rMFRC522	1.02	15-Mar-2019
4	4 Button B4xDialog	Additional button for B4xDialog	B4xDialog4Button	B4xDialog4Button	B4xDialog4Button		1.1	21-Dec-2020
5	433MHz R/T	Support for 433MHz receiver and transmitter				rRCSwitch	1.01	5-Aug-2018
6	ABMaterial	WebApps Framework with Materialize CSS			ABMaterial		4.51	18-Nov-2018
7	ABMServer	WebApps Mini Template for ABMaterial			ABMServer		1.07	28-Feb-2021
8	ActivityRecognition	Monitor the user state	ActivityRecognition (class)				3	27-May-2020
9	AdColonyAds	AdColony Ads	AdColonyAds				4.65	13-Jan-2022
10	AdManager	AdManager Ads	AdManager				1.52	22-Feb-2021
11	Administrator	Android administrator features	Administrator				1.1	11-Sep-2017
12	AmazonAds	Amazon Ads	AmazonAds				1	24-Sep-2020



Last Update		Author	IDE Comment	Forum Link
Version	Date			Must start with https://www.b4x.com
1.02	15-Mar-2019	Erel		https://www.b4x.com/android/forum/threads/mfrc522-rfid-reader-writer.67
1.1	21-Dec-2020	Stevel05		https://www.b4x.com/android/forum/threads/b4x-b4xdialog4button.1241
1.01	5-Aug-2018	JanDerKan		https://www.b4x.com/android/forum/threads/rrcswitch-library.95830/
4.51	18-Nov-2018	Alwaysbusy		https://www.b4x.com/android/forum/threads/abmaterial-framework-for-we
1.07	28-Feb-2021	Alwaysbusy		https://www.b4x.com/android/forum/threads/abmaterial-abmserver-mini-t
3	27-May-2020	Erel		https://www.b4x.com/android/forum/threads/physical-activity-recognition
4.65	13-Jan-2022	Pendrush		https://www.b4x.com/android/forum/threads/adcolony-library.120665/
1.52	22-Feb-2021	Pendrush		https://www.b4x.com/android/forum/threads/admanager-library.122111/
1.1	11-Sep-2017	Erel		https://www.b4x.com/android/forum/threads/device-administrator-library.
1	24-Sep-2020	Pendrush		https://www.b4x.com/android/forum/threads/amazonads-library.122691/

You find:

- Library Name.
- Short Description.
- File Names (without extension) and the relevant platforms.
- Last update: With the latest Version and update date.
- Author
- IDE Comment this comment will appear in the IDE in the Libraries Manager.
- Forum Link: This link leads you to the forum thread where you find the library.

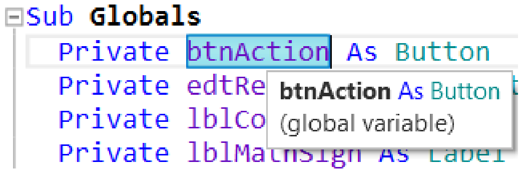
5.9 Quick Search Quick Search

Quick Search allows to search for any text occurrences in the code of the whole project.
Examples with the SecondProgram code.

Several possibilities to select the Quick Search function:

- Ctrl + F, the easiest and most efficient way.
- Click on the Quick Search Tab in the lower right corner of the IDE.
- Click on Quick Search Ctrl+F in the Edit menu.

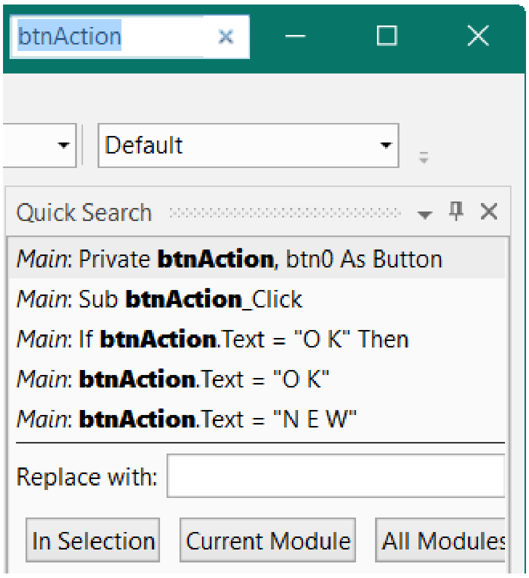
Example:



```
Sub Globals
    Private btnAction As Button
    Private edtRe
    Private lblCo
    Private lblMathSign As Label
```

In the code double click on `btnAction` to select it and press Ctrl + F.

You get the window below in the Tab area.



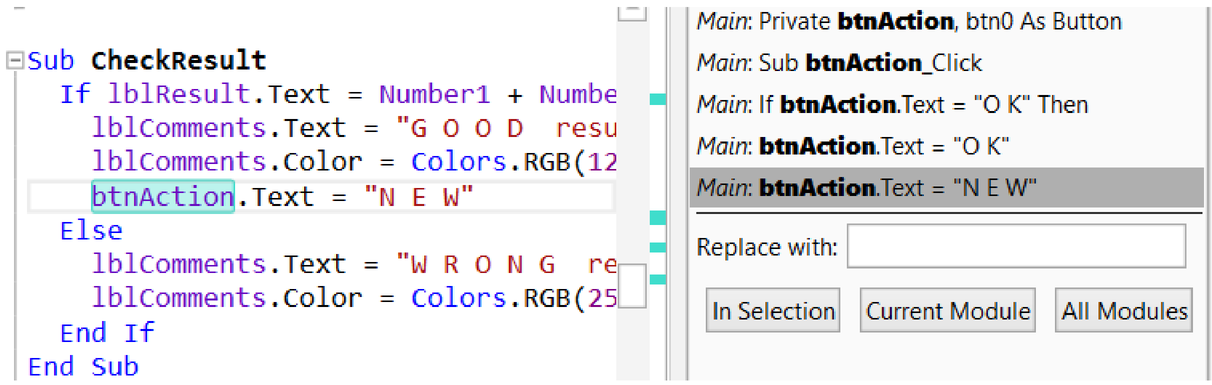
Main: Private **btnAction**, btn0 As Button
Main: Sub **btnAction**_Click
Main: If **btnAction**.Text = "O K" Then
Main: **btnAction**.Text = "O K"
Main: **btnAction**.Text = "N E W"

The selected text is shown in the title bar.

The list shows the occurrences in all Modules.

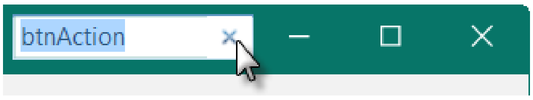
In each line you find the Module name and the line content.

Clicking on a line in the list moves the cursor directly to the selected occurrence in the code.



```
Sub CheckResult
    If lblResult.Text = Number1 + Numbe
        lblComments.Text = "G O O D  resu
        lblComments.Color = Colors.RGB(12
        btnAction.Text = "N E W"
    Else
        lblComments.Text = "W R O N G  re
        lblComments.Color = Colors.RGB(25
    End If
End Sub
```

Main: Private **btnAction**, btn0 As Button
Main: Sub **btnAction**_Click
Main: If **btnAction**.Text = "O K" Then
Main: **btnAction**.Text = "O K"
Main: **btnAction**.Text = "N E W"



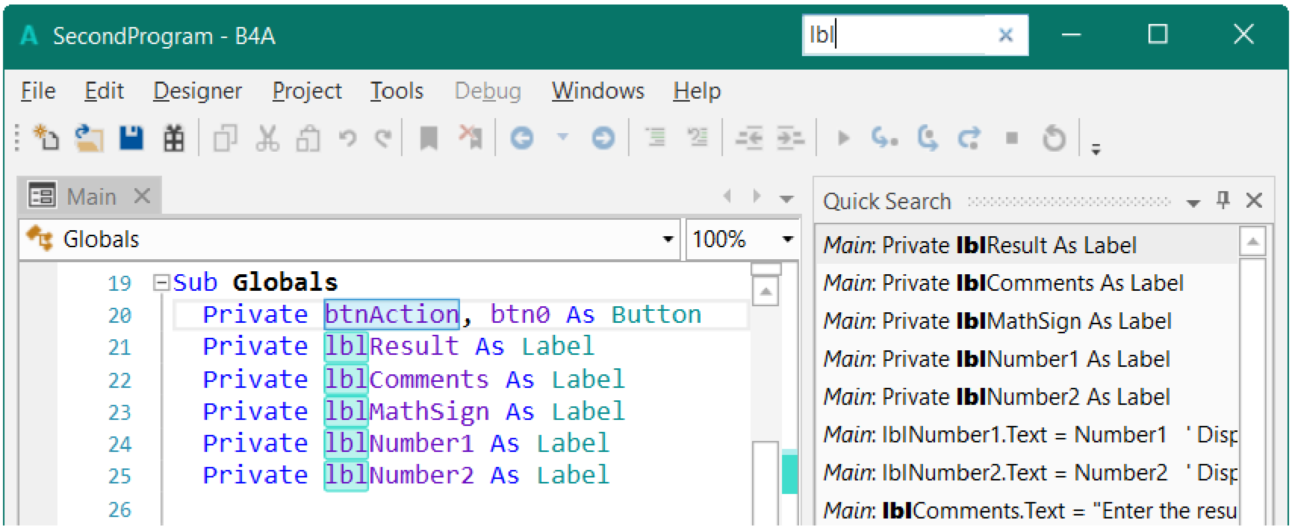
To remove the selection, click on × on the top right of the title bar.

You can also enter any text in the search field:

As an example, enter *lbl* in the Search field and you get the window below where you find all lines containing the text you entered, *lbl* in this example.

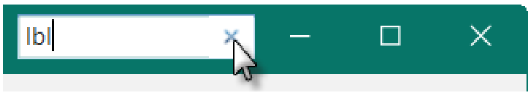
The search text is highlighted in all code lines containing this text.

Clicking on one of the lines in the list jumps directly to this line in the IDE.

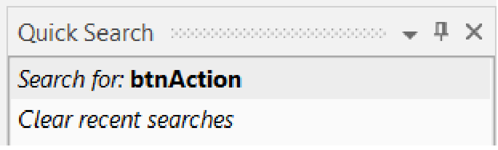


```
Sub Globals
    Private btnAction, btn0 As Button
    Private lblResult As Label
    Private lblComments As Label
    Private lblMathSign As Label
    Private lblNumber1 As Label
    Private lblNumber2 As Label
```

Main: Private **lbl**Result As Label
Main: Private **lbl**Comments As Label
Main: Private **lbl**MathSign As Label
Main: Private **lbl**Number1 As Label
Main: Private **lbl**Number2 As Label
Main: lblNumber1.Text = Number1 ' Disp
Main: lblNumber2.Text = Number2 ' Disp
Main: **lbl**Comments.Text = "Enter the resu

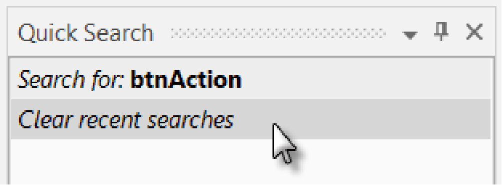


Click on × to remove a search.



Search for: **btnAction**
Clear recent searches

You will see a list of the last searches.

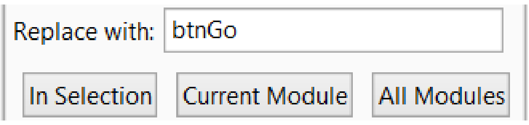


Search for: **btnAction**
Clear recent searches

Click on *Clear recent searches* to remove all recent searches.

Items are added to the recent items when:
1. You select one of the results or you click Return which selects the first result.
2. You select text in your code and click on Ctrl + F to search for it.

You can replace a text either in the selected code, in the current module or in all modules.
Enter the new name and click either on In Selection, Current Module or All Modules.



Replace with: btnGo

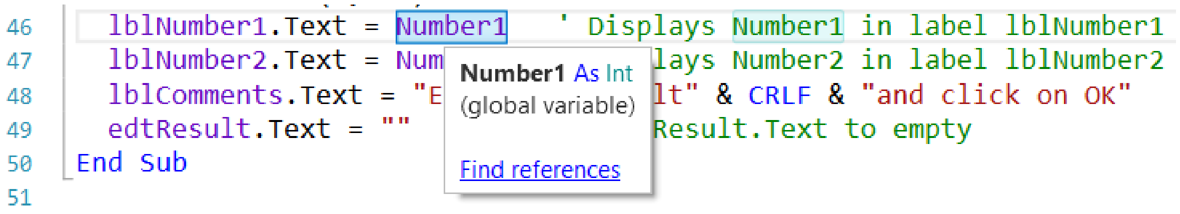
5.10 Find All References (F7) Find All References (F7)

This is a search engine to find all references for a given object (view, variable).

Click on the Find All References (F7) Tab or press F7 to get the screen below showing a list of all code lines with the selected reference or the first object in the current line.

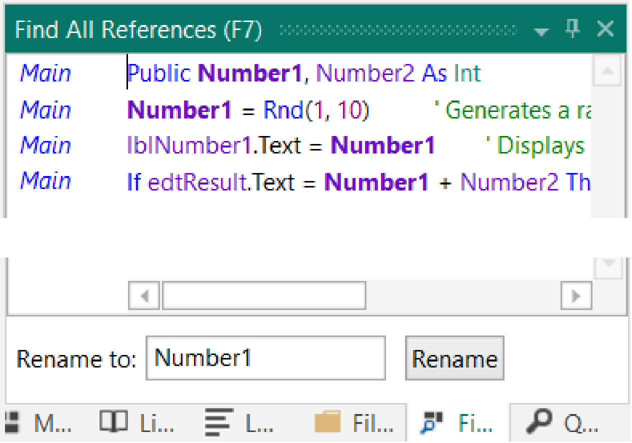
Example with the code of SecondProgram.

Select in the code in line 46 `Number1`.



```
46      lblNumber1.Text = Number1    ' Displays Number1 in label lblNumber1
47      lblNumber2.Text = Num                 lays Number2 in label lblNumber2
48      lblComments.Text = "E                 lt" & CRLF & "and click on OK"
49      edtResult.Text = ""                   Result.Text to empty
50  End Sub
51
```

Click on Find references or press F7 and you get the list below with all code lines containing the selected object.
The first words are the module name. Clicking on it, jumps to that line in the IDE code area.



```
Main    Public Number1, Number2 As Int
Main    Number1 = Rnd(1, 10)        ' Generates a ra
Main    lblNumber1.Text = Number1      ' Displays
Main    If edtResult.Text = Number1 + Number2 Th
```

Rename to: Number1

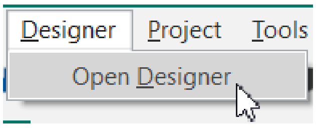
Clicking on a line in the list shows that line in the middle of the IDE code area.

At the bottom of the Tab, you can Rename the selected object.

Enter a new name and click on Rename.

6 Open a layout file directly from the IDE

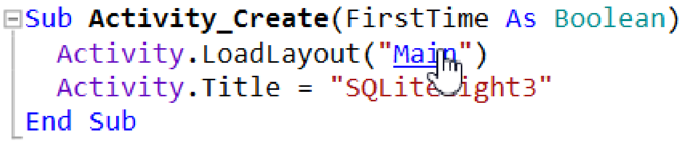
The ‘normal’ way to open the Designer is to click on Open Designer in the Designer menu.



Two other methods exist to open a specific layout file directly from the IDE.

6.1 Directly in the code

When you hover over a layout name, in the code with the Ctrl key pressed, the layout name is highlighted like a link.

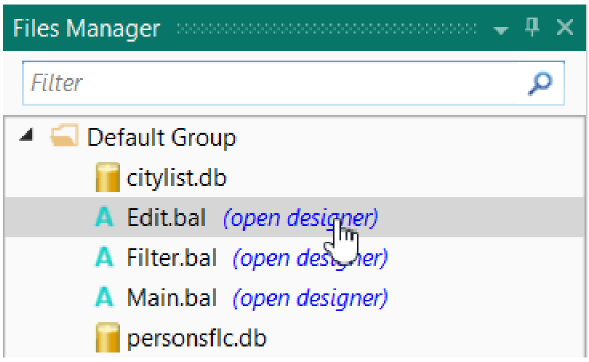


```
Sub Activity_Create(FirstTime As Boolean)
    Activity.LoadLayout("Main")
    Activity.Title = "SQLiteLight3"
End Sub
```

When you click on it, the Designer will be opened with the selected layout.

6.2 From the Files Manager Tab

In the Files Manager Tab, you see at the end of each layout filename (open designer).
When you hover over it, the mouse cursor changes to the hand and when you click on it the Designer is opened with the selected layout file.



7 Navigation in the IDE

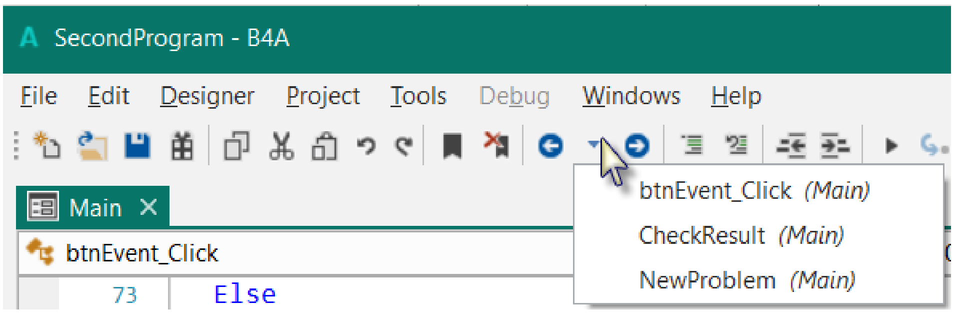
Advices given by Erel in the forum

7.1 Alt + Left / Alt + Right Move backwards and forwards

Moves backwards and forwards based on the navigation stack. This is useful to jump back and forth between the last recent subs.

7.2 Alt + N Navigation stack menu

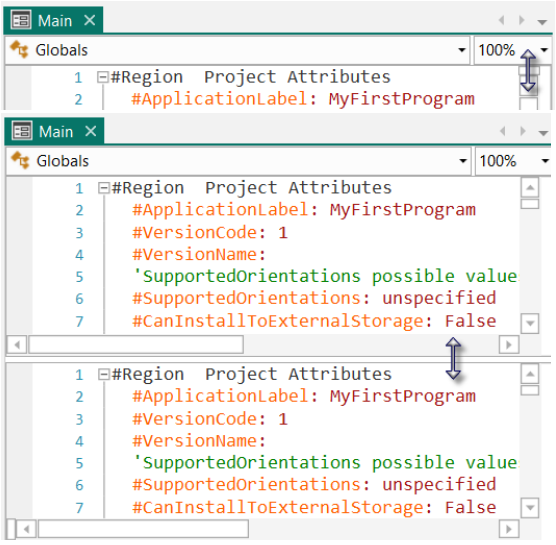
Opens the navigation stack menu. You can then choose the location with the up and down keys.



```
73  Else
```

7.3 Split the screen

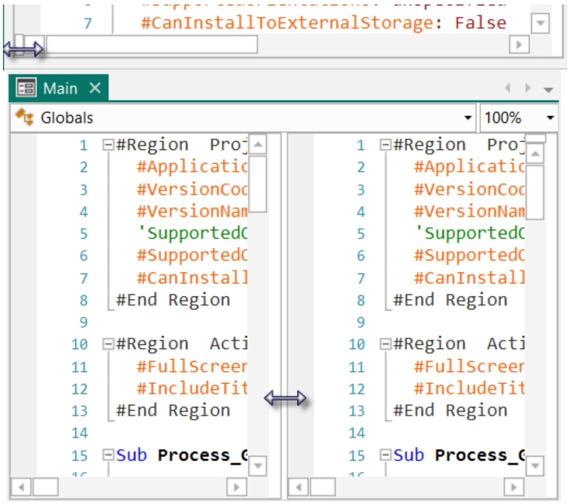
If you are working on two locations in the same module then you can split the code editor (it can be split again vertically):



```
#Region  Project Attributes
    #ApplicationLabel: MyFirstProgram
```

```
#Region  Project Attributes
    #ApplicationLabel: MyFirstProgram
    #VersionCode: 1
    #VersionName:
    'SupportedOrientations possible value
    #SupportedOrientations: unspecified
    #CanInstallToExternalStorage: False
```

```
#Region  Project Attributes
    #ApplicationLabel: MyFirstProgram
    #VersionCode: 1
    #VersionName:
    'SupportedOrientations possible value
    #SupportedOrientations: unspecified
    #CanInstallToExternalStorage: False
```



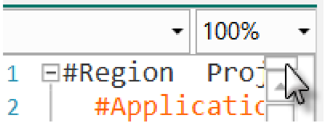
```
    #CanInstallToExternalStorage: False
```

```
#Region  Pro
    #Applicatio
    #VersionCod
    #VersionNam
    'SupportedO
    #SupportedO
    #CanInstall
#End Region

#Region  Acti
    #FullScreen
    #IncludeTit
#End Region

Sub Process_G
```

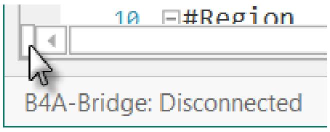
```
#Region  Pro
    #Applicatio
    #VersionCod
    #VersionNam
    'SupportedO
    #SupportedO
    #CanInstall
#End Region

#Region  Acti
    #FullScreen
    #IncludeTit
#End Region

Sub Process_G
```

Horizontally Vertically

You can also double click on the small rectangles to split the screen.

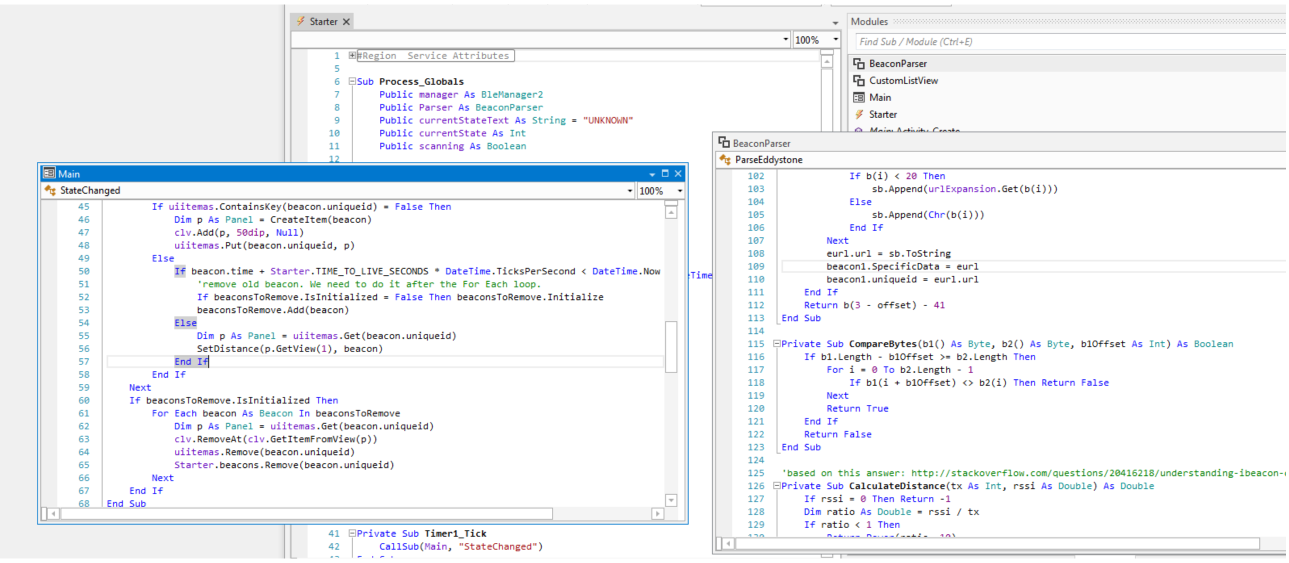


```
#Region  Proj
    #Applicatio
```



7.4 Multiple windows

If you are working with multiple modules, you can move the modules out of the main IDE as separate windows.



```
⊞#Region  Service Attributes

⊟Sub Process_Globals
    Public manager As BleManager2
    Public Parser As BeaconParser
    Public currentStateText As String = "UNKNOWN"
    Public currentState As Int
    Public scanning As Boolean
```

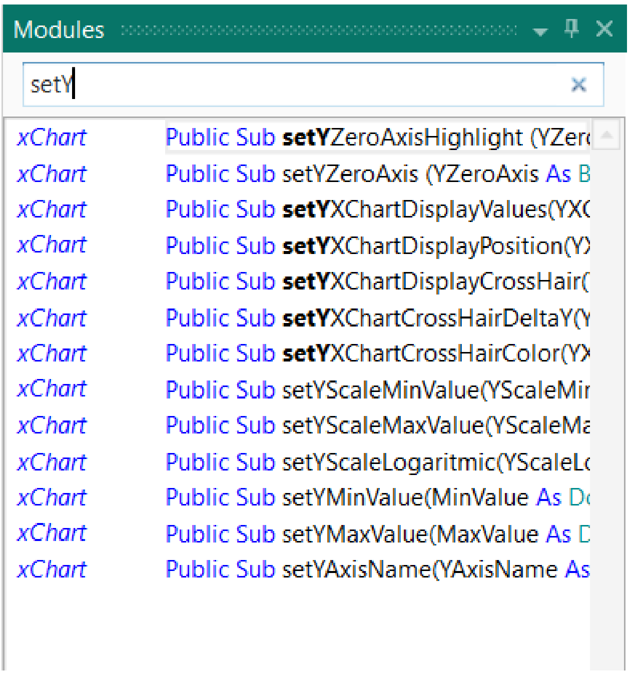
```
        If uiitemas.ContainsKey(beacon.uniqueid) = False Then
            Dim p As Panel = CreateItem(beacon)
            clv.Add(p, 50dip, Null)
            uiitemas.Put(beacon.uniqueid, p)
        Else
            If beacon.time + Starter.TIME_TO_LIVE_SECONDS * DateTime.TicksPerSecond < DateTime.Now
                'remove old beacon. We need to do it after the For Each loop.
                If beaconsToRemove.IsInitialized = False Then beaconsToRemove.Initialize
                beaconsToRemove.Add(beacon)
            Else
                Dim p As Panel = uiitemas.Get(beacon.uniqueid)
                SetDistance(p.GetView(1), beacon)
            End If
        End If
    Next
    If beaconsToRemove.IsInitialized Then
        For Each beacon As Beacon In beaconsToRemove
            Dim p As Panel = uiitemas.Get(beacon.uniqueid)
            clv.RemoveAt(clv.GetItemFromView(p))
            uiitemas.Remove(beacon.uniqueid)
            Starter.beacons.Remove(beacon.uniqueid)
        Next
    End If
End Sub
```

```
⊟Private Sub Timer1_Tick
    CallSub(Main, "StateChanged")
```

```
                If b(i) < 20 Then
                    sb.Append(urlExpansion.Get(b(i)))
                Else
                    sb.Append(Chr(b(i)))
                End If
            Next
            eurl.url = sb.ToString
            beacon1.SpecificData = eurl
            beacon1.uniqueid = eurl.url
        End If
        Return b(3 - offset) - 41
End Sub

⊟Private Sub CompareBytes(b1() As Byte, b2() As Byte, b1Offset As Int) As Boolean
    If b1.Length - b1Offset >= b2.Length Then
        For i = 0 To b2.Length - 1
            If b1(i + b1Offset) <> b2(i) Then Return False
        Next
        Return True
    End If
    Return False
End Sub

'based on this answer: http://stackoverflow.com/questions/20416218/understanding-ibeacon-
⊟Private Sub CalculateDistance(tx As Int, rssi As Double) As Double
    If rssi = 0 Then Return -1
    Dim ratio As Double = rssi / tx
    If ratio < 1 Then
```

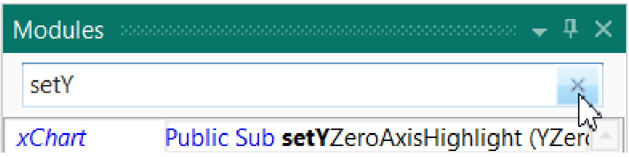
7.5 Ctrl + E Search for sub or module

Ctrl + E - searches for sub or module. Very useful when working with large projects.
On top of the Modules Tab enter characters to search for subroutines.
In the list you find the module name and the subroutines containing the characters you entered.



setY

xChart	Public Sub **setY**ZeroAxisHighlight (YZer
xChart	Public Sub setYZeroAxis (YZeroAxis As B
xChart	Public Sub **setY**XChartDisplayValues(YX(
xChart	Public Sub **setY**XChartDisplayPosition(Y)
xChart	Public Sub **setY**XChartDisplayCrossHair(
xChart	Public Sub **setY**XChartCrossHairDeltaY(Y
xChart	Public Sub **setY**XChartCrossHairColor(Y)
xChart	Public Sub setYScaleMinValue(YScaleMir
xChart	Public Sub setYScaleMaxValue(YScaleMa
xChart	Public Sub setYScaleLogaritmic(YScaleL(
xChart	Public Sub setYMinValue(MinValue As D(
xChart	Public Sub setYMaxValue(MaxValue As D
xChart	Public Sub setYAxisName(YAxisName As



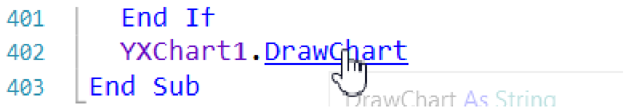
setY

xChart	Public Sub **setY**ZeroAxisHighlight (YZer(

Click on ✕ to unfilter.

7.6 Ctrl + Click on any sub or variable

Ctrl + Click on any sub or variable to jump to the declaration location.



```
    End If
    YXChart1.DrawChart
End Sub
```

In the example above, YXChart1 is a CustomView Class module xChart and DrawChart is a subroutine in this module, and the editor jumps directly to the DrawChart subroutine in the xChart module.

7.7 F7 - Find all references

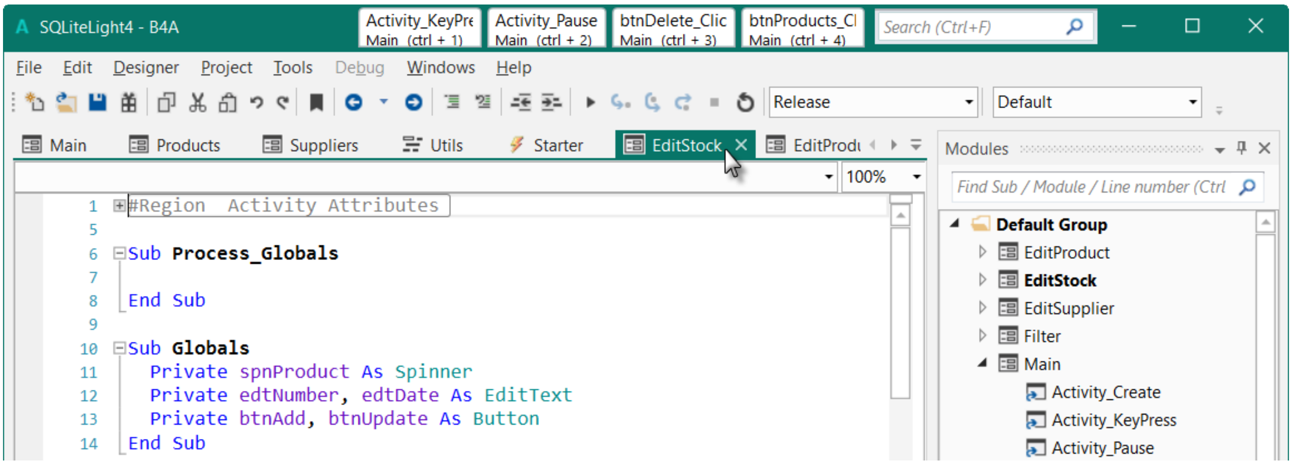
Not exactly related to navigation but is also useful when working with large projects.
Details in Find all references.

7.8 Ctrl + F Quick Search

Ctrl + F - Index based quick search. Details in Quick Search.

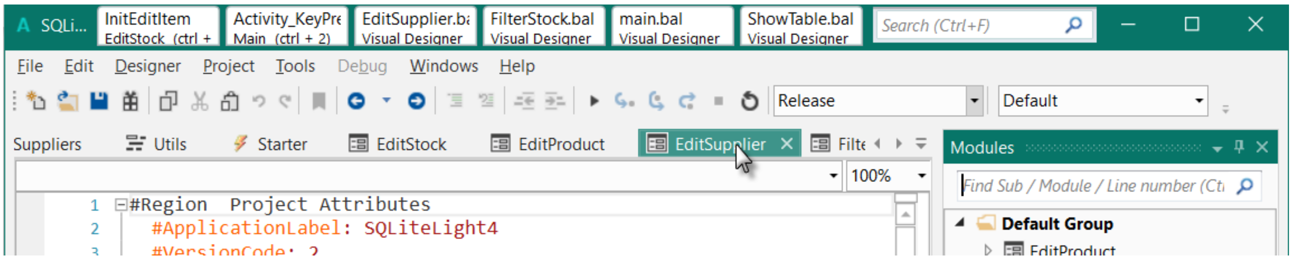
7.9 Scrolling module Tabs

In a project with a certain number of modules, not all are visible at the same time.
Point the mouse cursor on a module Tab like in the picture.


SQLiteLight4 - B4A
Activity_KeyPre Main (ctrl + 1)
Activity_Pause Main (ctrl + 2)
btnDelete_Clic Main (ctrl + 3)
btnProducts_Cl Main (ctrl + 4)
Search (Ctrl+F)
File Edit Designer Project Tools Debug Windows Help
Release
Default
Main Products Suppliers Utils Starter EditStock EditProdu
100%
Modules
Find Sub / Module / Line number (Ctrl
Default Group
EditProduct
EditStock
EditSupplier
Filter
Main
Activity_Create
Activity_KeyPress
Activity_Pause

```
#Region  Activity Attributes

Sub Process_Globals

End Sub

Sub Globals
	Private spnProduct As Spinner
	Private edtNumber, edtDate As EditText
	Private btnAdd, btnUpdate As Button
End Sub
```

Then move the mouse wheel, the Tabs will scroll horizontally.


SQLi...
InitEditItem EditStock (ctrl +
Activity_KeyPre Main (ctrl + 2)
EditSupplier.ba Visual Designer
FilterStock.bal Visual Designer
main.bal Visual Designer
ShowTable.bal Visual Designer
Search (Ctrl+F)
File Edit Designer Project Tools Debug Windows Help
Release
Default
Suppliers Utils Starter EditStock EditProduct EditSupplier Filte
100%
Modules
Find Sub / Module / Line number (Ct
Default Group
EditProduct

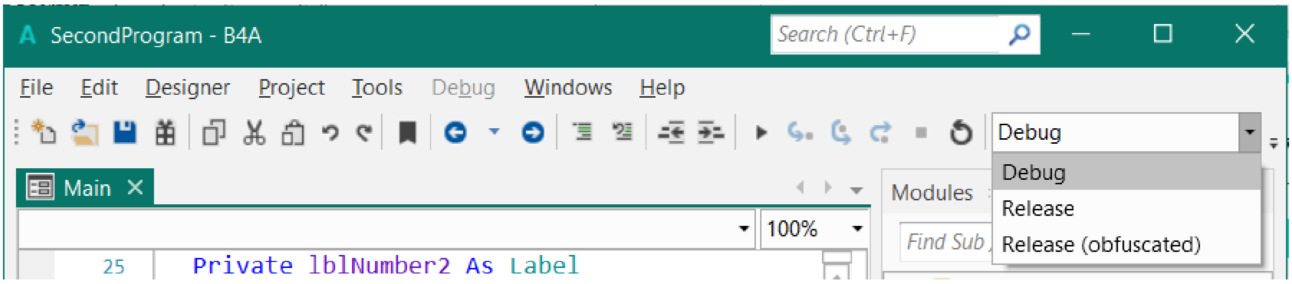
```
#Region  Project Attributes
	#ApplicationLabel: SQLiteLight4
	#VersionCode: 2
```

8 Debugging B4A, B4i, B4J

Debugging is an important part when developing.
Debugging is different in B4R than in B4A, B4i and B4J.

8.1 B4A, B4i, B4J

To allow debugging you must activate the debugging mode *Debug* on top of the IDE.



```
Private lblNumber2 As Label
```

Notes about the debugger (B4A only):

- Breakpoints in the following subs will be ignored: Globals, Process_Globals and Activity_Pause.
- Services - Breakpoints that appear after a call to StartService will be ignored. Breakpoints set in Service_Create and Service_Start will pause the program for up to a specific time (about 12 seconds). This is to prevent the OS from killing the Service.
- Events that fire when the program is paused will be executed. Breakpoints in the event code will be ignored (only when the program is already paused).
- The data sent from the device to the IDE is limited in size. Long strings may be truncated.

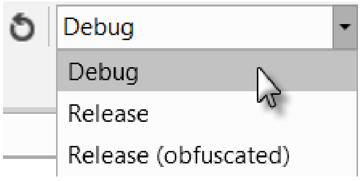
The two major utilities for debugging are:

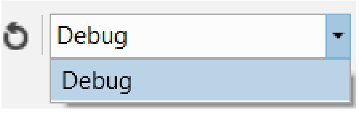
Breakpoints - You can mark lines of codes as breakpoints. This is done by pressing on the grey area left of the line.
The program will pause when it reaches a breakpoint and will allow you to inspect the current state.

Logging - The Logs tab at the right pane is very useful. It shows messages related to the components life cycle and it can also show messages that are printed with the Log keyword. You should press on the Connect button to connect to the device logs. Note that there is a Filter checkbox. When it is checked you will only see messages related to your program. When it is unchecked, you will see all the messages running in the system. If you are encountering an error and do not see any relevant message in the log, it is worth unchecking the filter option and looking for an error message.
Note that the log is maintained by the device. When you connect to a device you will also see previous messages.

8.1.1 Debug mode

The debugging modes are different in the in the products:

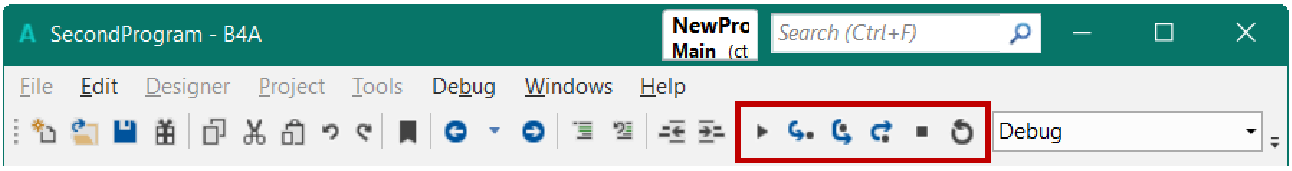




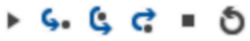
B4A, B4J B4i, only Debug

8.1.1.1 Debug Toolbar

The debug toolbar is at the right side of the IDE toolbar.



Debug Toolbar:



▶	Run the program	F5	Runs the program, no action in Debug (rapid)
↴	Step In	F8	Executes the next statement.
↷	Step Over	F9	Executes a routine without jumping in it.
↱	Step Out	F10	Finishes executing the rest of a routine.
■	Stop		Stops the program.
↻	Restart	F11	Restarts the program.

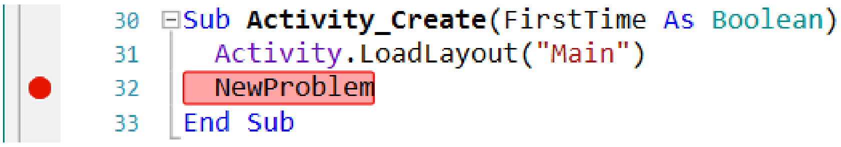
The examples below are shown in the SecondProgram project.

8.1.1.1.1 Run ▶ F5

Runs the program.
If the program is stopped at a breakpoint the program runs until the next breakpoint or completes running.

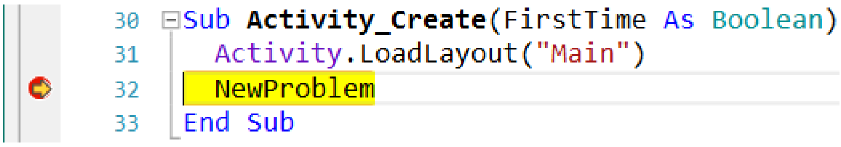
8.1.1.1.2 Step In F8

The debugger executes the code step by step.



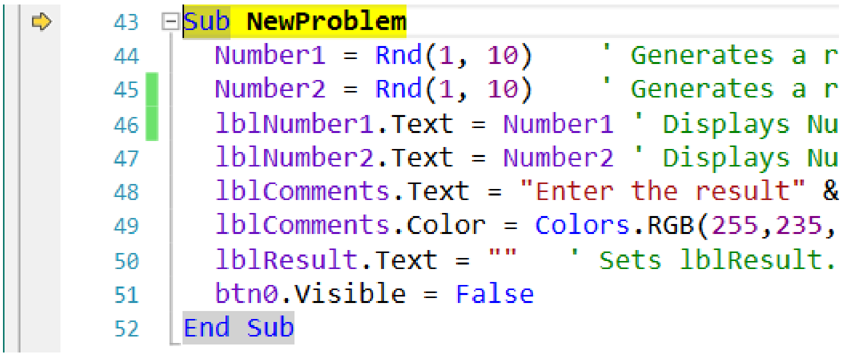
```
30 Sub Activity_Create(FirstTime As Boolean)
31     Activity.LoadLayout("Main")
32     NewProblem
33 End Sub
```

In the SecondProgram project we set a Breakpoint at line 32 `New`.



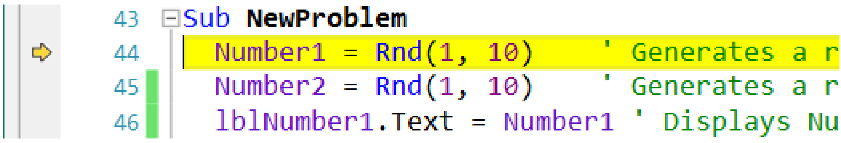
```
30 Sub Activity_Create(FirstTime As Boolean)
31     Activity.LoadLayout("Main")
32     NewProblem
33 End Sub
```

We run the program; it will stop executing at line 32 `New`.



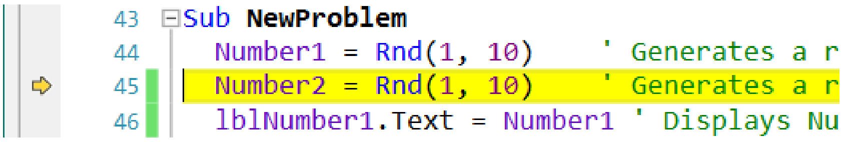
```
43 Sub NewProblem
44     Number1 = Rnd(1, 10)     ' Generates a r
45     Number2 = Rnd(1, 10)     ' Generates a r
46     lblNumber1.Text = Number1 ' Displays Nu
47     lblNumber2.Text = Number2 ' Displays Nu
48     lblComments.Text = "Enter the result" &
49     lblComments.Color = Colors.RGB(255,235,
50     lblResult.Text = ""    ' Sets lblResult.
51     btn0.Visible = False
52 End Sub
```

Click on ↪.
The debugger executes the next line, `Sub New` in this case.



```
43 Sub NewProblem
44     Number1 = Rnd(1, 10)     ' Generates a r
45     Number2 = Rnd(1, 10)     ' Generates a r
46     lblNumber1.Text = Number1 ' Displays Nu
```

Click once more on ↪.
The debugger executes the next line, `Number1 =…`

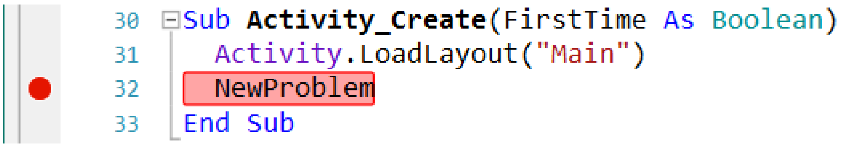


```
43 Sub NewProblem
44     Number1 = Rnd(1, 10)     ' Generates a r
45     Number2 = Rnd(1, 10)     ' Generates a r
46     lblNumber1.Text = Number1 ' Displays Nu
```

Click once more on ↪.
The debugger executes the next line, `Number2 =…`

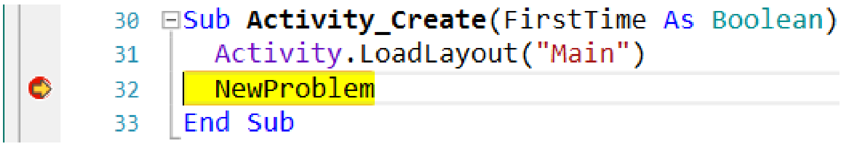
8.1.1.1.3 Step Over ↷ F9

If the current line is a sub calling line the debugger executes the code in this subroutine and jumps to the line after the calling line.



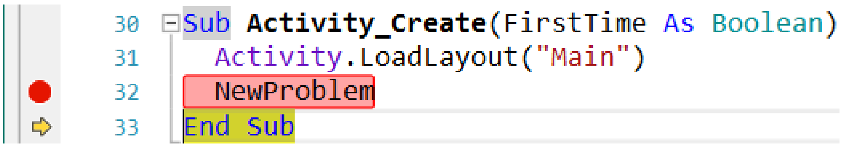
```
30 Sub Activity_Create(FirstTime As Boolean)
31     Activity.LoadLayout("Main")
32     NewProblem
33 End Sub
```

In the SecondProgram project we set a Breakpoint at line 32 `New`.



```
30 Sub Activity_Create(FirstTime As Boolean)
31     Activity.LoadLayout("Main")
32     NewProblem
33 End Sub
```

We run the program; it will stop executing at line 32 `New`.

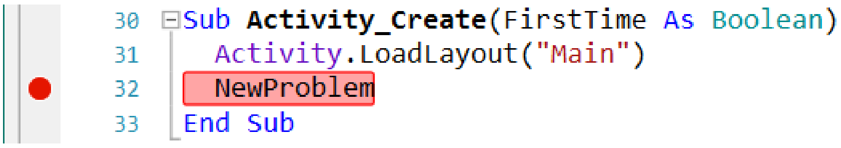


```
30 Sub Activity_Create(FirstTime As Boolean)
31     Activity.LoadLayout("Main")
32     NewProblem
33 End Sub
```

Click on ↷.
The debugger executes the code in `New` and jumps directly to the next line which is `End Sub` of `Activity_Create`.

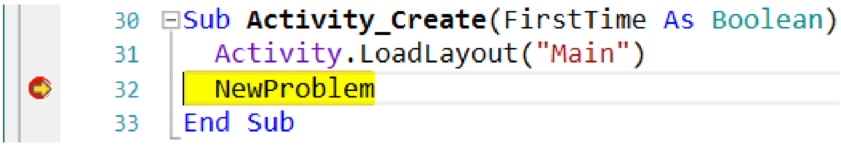
8.1.1.1.4 Step Out ↰ F10

If the current line is in a subroutine the debugger finishes executing the rest of the code and jumps to the next line after the subs' calling line.



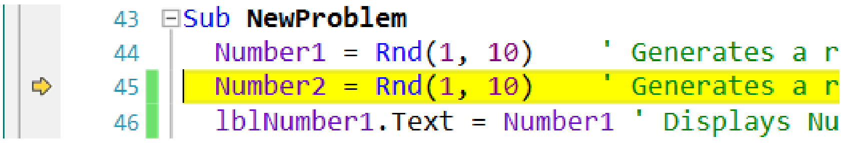
```
30 Sub Activity_Create(FirstTime As Boolean)
31     Activity.LoadLayout("Main")
32     NewProblem
33 End Sub
```

In the SecondProgram project we set a Breakpoint at line 32 `New`.



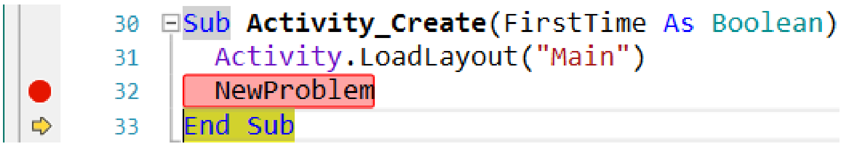
```
30 Sub Activity_Create(FirstTime As Boolean)
31     Activity.LoadLayout("Main")
32     NewProblem
33 End Sub
```

We run the program; it will stop executing at line 32 `New`.



```
43 Sub NewProblem
44     Number1 = Rnd(1, 10)      ' Generates a r
45     Number2 = Rnd(1, 10)      ' Generates a r
46     lblNumber1.Text = Number1 ' Displays Nu
```

We go step by step with ↓ to a line in the subroutine.



```
30 Sub Activity_Create(FirstTime As Boolean)
31     Activity.LoadLayout("Main")
32     NewProblem
33 End Sub
```

Click on ↰.
The debugger executes the rest of the code in the subroutine and jumps to the next line which is `End Sub` of `Activity_Create`.

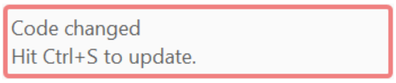
8.1.1.1.5 Stop ■

Stops the program and leaves the Rapid Debugger.

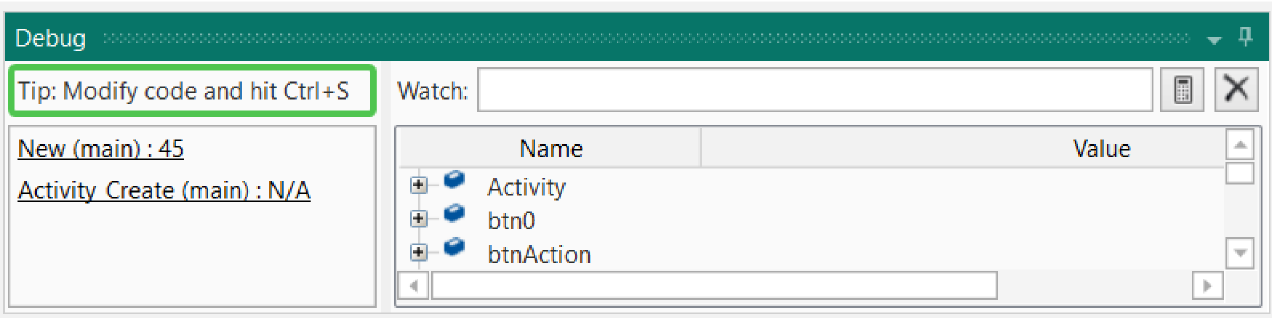
8.1.1.1.6 Restart ↺ F11

Restarts the program remaining in the Rapid Debugger.
Executes:
B4A Process_Globals, Globals, Activity_Create and reloads the layout.
B4i Process_Globals,
B4J Process_Globals,

This is useful if you changed a layout file.

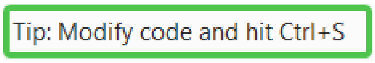
It is different from  Code changed
Hit Ctrl+S to update.
explained in the next chapter.

8.1.2 Debug window



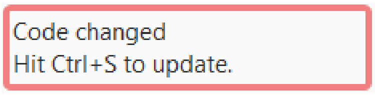
In the debug window we have, example with the SecondProgram, and a breakpoint in line 45:

8.1.2.1 The status button



Tip: Modify code and hit Ctrl+S

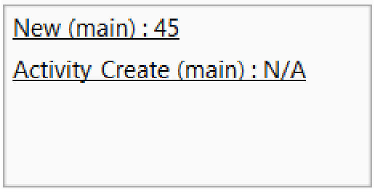
Shows that the program is running, the button border is green.



Code changed
Hit Ctrl+S to update.

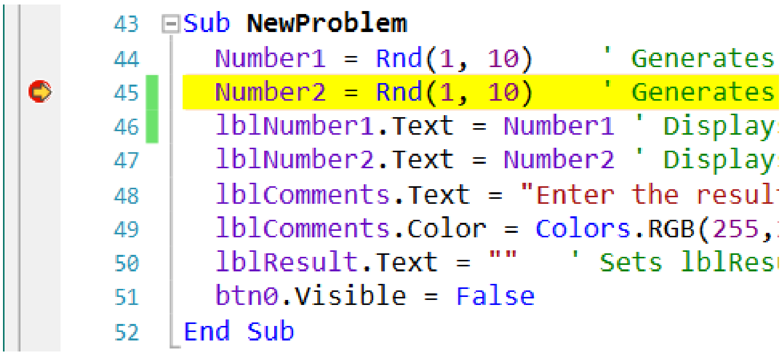
When you change the code the button border changes to red.
To update the code click on the button or hit Ctrl + S.

8.1.2.2 The breakpoint window

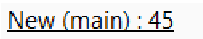


New (main) : 45
Activity_Create (main) : N/A

The breakpoint window shows where the program has stopped.

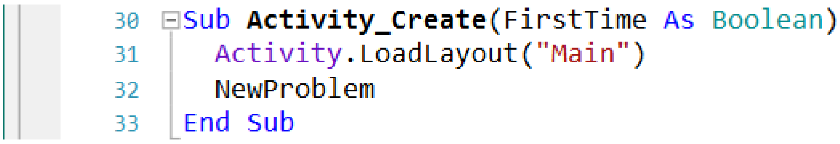


```
43 Sub NewProblem
44     Number1 = Rnd(1, 10)      ' Generates
45     Number2 = Rnd(1, 10)      ' Generates
46     lblNumber1.Text = Number1 ' Display
47     lblNumber2.Text = Number2 ' Display
48     lblComments.Text = "Enter the resul
49     lblComments.Color = Colors.RGB(255,
50     lblResult.Text = ""    ' Sets lblRes
51     btn0.Visible = False
52 End Sub
```

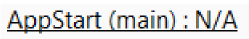


New (main) : 45

The program stopped in line 45,
in routine New in the main module.

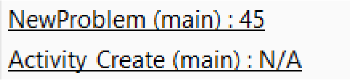


```
30 Sub Activity_Create(FirstTime As Boolean)
31     Activity.LoadLayout("Main")
32     NewProblem
33 End Sub
```



AppStart (main) : N/A

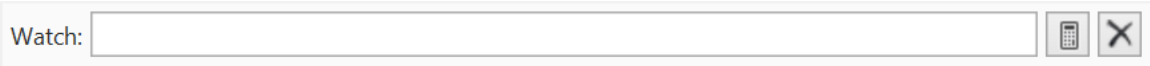
The calling routine is AppStart,
and the calling line is not shown.



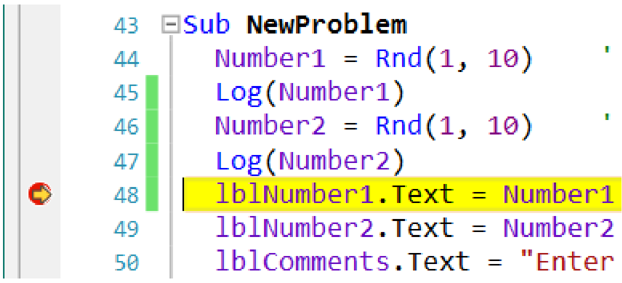
NewProblem (main) : 45
Activity_Create (main) : N/A

When you click on one of the lines the cursor jumps to that line.

8.1.2.3 The Watch window



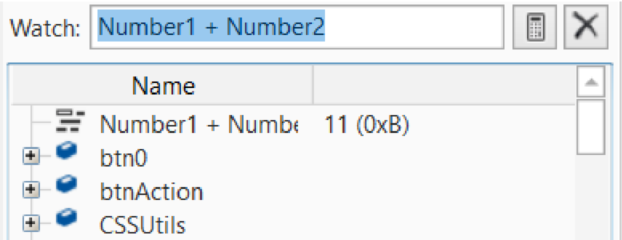
The Watch window allows to check more complex functions for testing and debugging.



```
43 ⊟Sub NewProblem
44      Number1 = Rnd(1, 10)      '
45      Log(Number1)
46      Number2 = Rnd(1, 10)      '
47      Log(Number2)
48      lblNumber1.Text = Number1
49      lblNumber2.Text = Number2
50      lblComments.Text = "Enter
```

In the SecondProgram code add two Log lines and set a breakpoint in line 47.

Run the program.



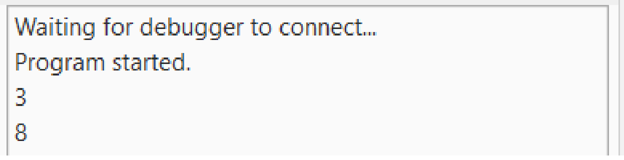
Number1 + Number2

Name	
Number1 + Numbe	11 (0xB)
btn0	
btnAction	
CSSUtils	

In the Add Watch field enter:

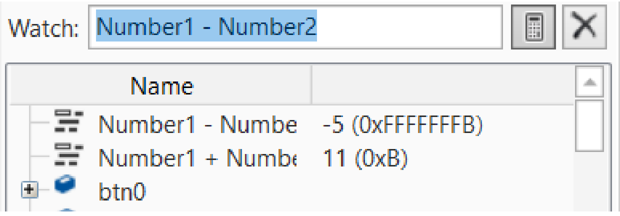
`Number1 + Number2`

Click on 🖩 to show the result on top of the list.



```
Waiting for debugger to connect...
Program started.
3
8
```

As we left the two Log lines in the code, we still see the values of Number1 and Number2.



Number1 - Number2

Name	
Number1 - Numbe	-5 (0xFFFFFFFB)
Number1 + Numbe	11 (0xB)
btn0	

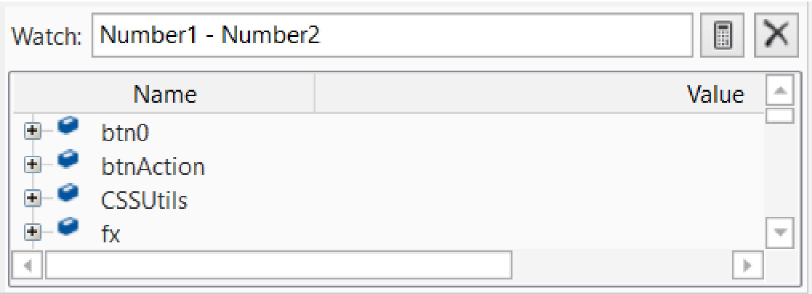
You can enter a new watch line
`Number1 - Number2`
and show it.

Click on ✕ to remove the watch functions. This removes all the functions.

We could, of course, also have done this test with Logs:

```
Log(Number2 + Number2)
Log(Number2 - Number2)
```

8.1.2.4 The object window



Watch: Number1 - Number2

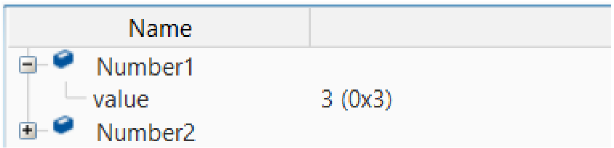
Name	Value
⊞ btn0	
⊞ btnAction	
⊞ CSSUtils	
⊞ fx	

Shows all variables and objects in the list ordered by alphabetical order.

Click on ⊞ to show the details of the object:

Examples:

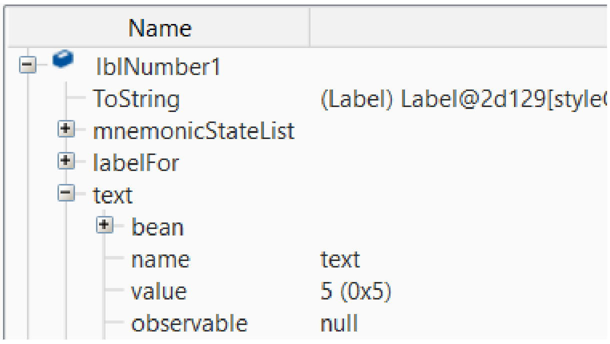
- Number1



Name	
⊟ Number1	
value	3 (0x3)
⊞ Number2	

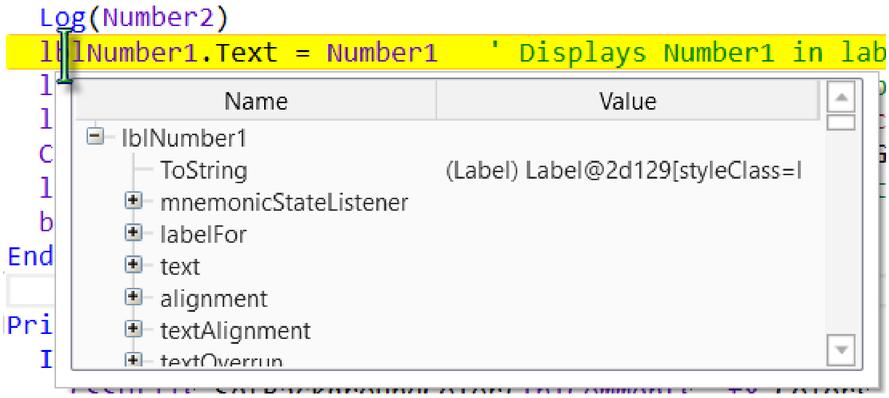
Shows the current value (3).

- lblNumber1



Name	
⊟ lblNumber1	
ToString	(Label) Label@2d129[style(
⊞ mnemonicStateList	
⊞ labelFor	
⊟ text	
⊞ bean	
name	text
value	5 (0x5)
observable	null

Shows all properties of the object, a Label in the example.

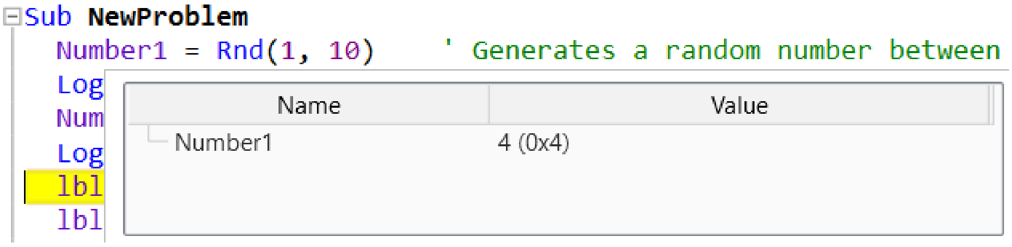


```
Log(Number2)
lblNumber1.Text = Number1    ' Displays Number1 in lab
```

Name	Value
⊟ lblNumber1	
ToString	(Label) Label@2d129[styleClass=l
⊞ mnemonicStateListener	
⊞ labelFor	
⊞ text	
⊞ alignment	
⊞ textAlignment	
⊞ textOverrun	

You get the same information when you hover over the object in the code:

lblNumber1



```
Sub NewProblem
    Number1 = Rnd(1, 10)    ' Generates a random number between
    Log
    Num
    Log
    lbl
    lbl
```

Name	Value
Number1	4 (0x4)

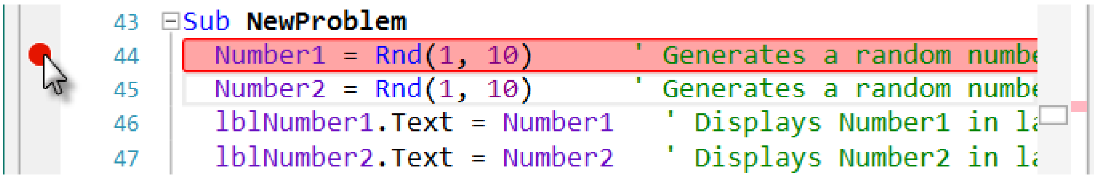
Number1

8.1.3 Breakpoints

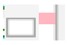
One important feature to make debugging easier are breakpoints. You can set breakpoint almost wherever you want in the code.

Breakpoints, in Process_Globals are ignored.

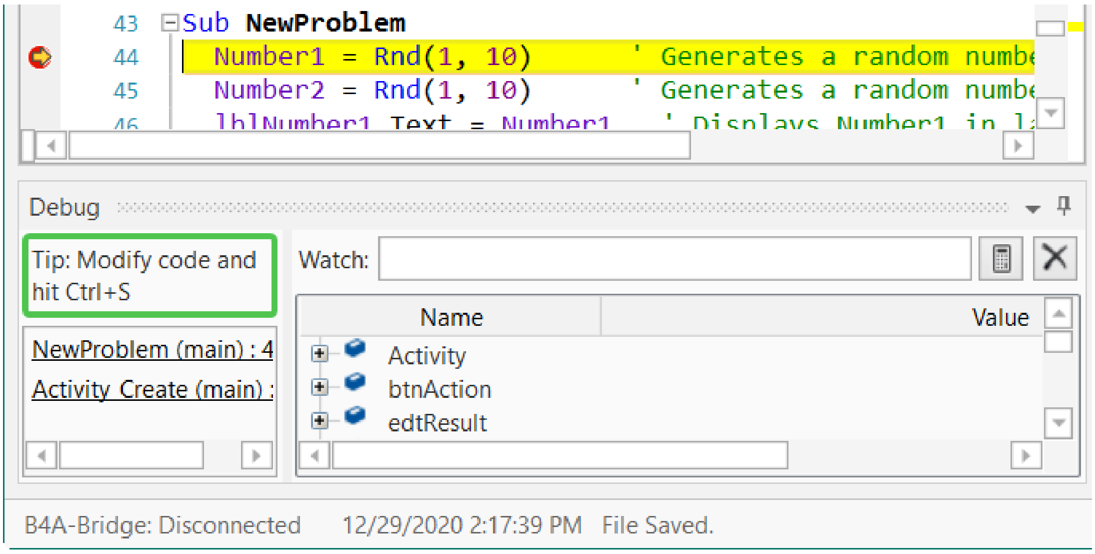
Clicking on a line in the left margin adds a breakpoint. When the program is running it stops at the first encountered breakpoint.



```
Sub NewProblem
    Number1 = Rnd(1, 10)        ' Generates a random numbe
    Number2 = Rnd(1, 10)        ' Generates a random numbe
    lblNumber1.Text = Number1    ' Displays Number1 in la
    lblNumber2.Text = Number2    ' Displays Number2 in la
```

The breakpoints are shown on the right side with a small light red line: 

Run the program, the program stops at the breakpoint and the IDE looks like below. The breakpoint line is highlighted in yellow.



```
Sub NewProblem
    Number1 = Rnd(1, 10)        ' Generates a random numbe
    Number2 = Rnd(1, 10)        ' Generates a random numbe
    lblNumber1.Text = Number1    ' Displays Number1 in la
```

Tip: Modify code and hit Ctrl+S

NewProblem (main) : 4

Activity_Create (main) :

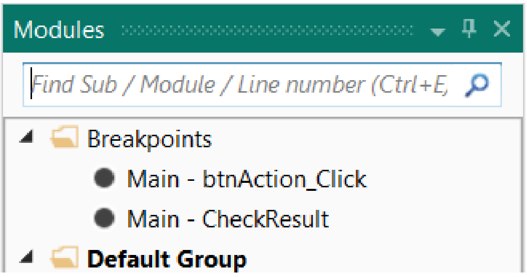
Watch:

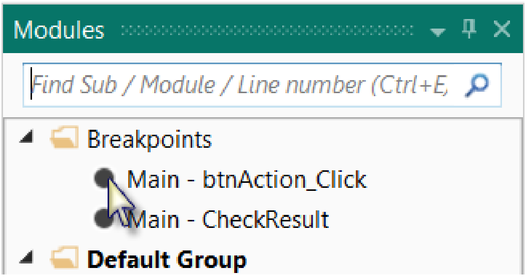
Name	Value
Activity	
btnAction	
edtResult	

B4A-Bridge: Disconnected 12/29/2020 2:17:39 PM File Saved.

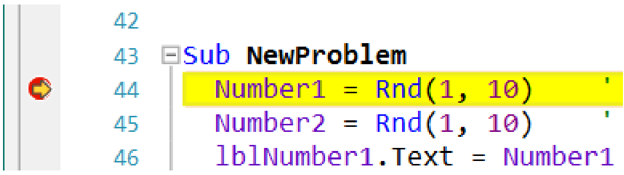
On the bottom of the window, you see the debug window.

The Breakpoints are listed in the Modules Tab.





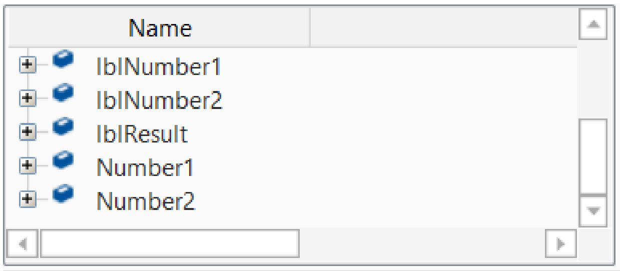
Click on a Breakpoint to jump to its line.



```
42
43 Sub NewProblem
44     Number1 = Rnd(1, 10)     '
45     Number2 = Rnd(1, 10)     '
46     lblNumber1.Text = Number1
```

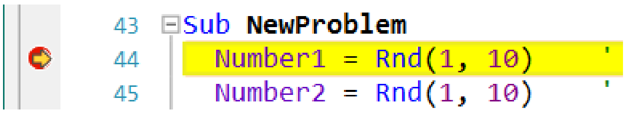
Example with the SecondProgram:

Set a breakpoint in line 44 and run the program.

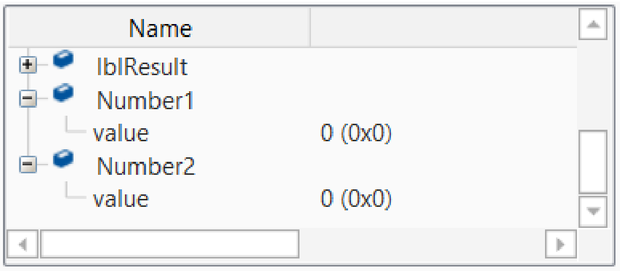


Name	
⊞ lblNumber1	
⊞ lblNumber2	
⊞ lblResult	
⊞ Number1	
⊞ Number2	

In the variable window look at Number1 and Number2:



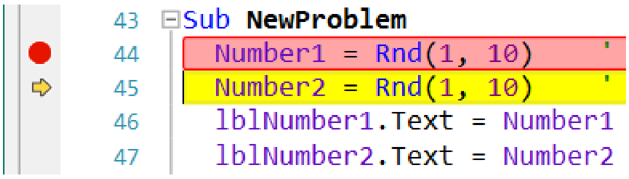
```
43 Sub NewProblem
44     Number1 = Rnd(1, 10)     '
45     Number2 = Rnd(1, 10)     '
```



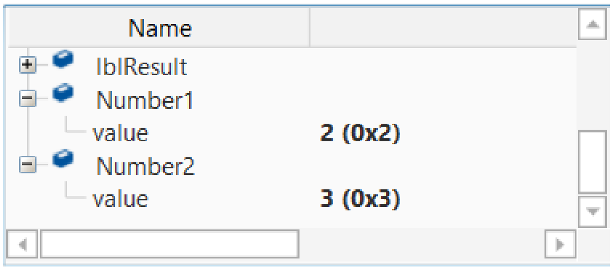
Name	
⊞ lblResult	
⊟ Number1	
value	0 (0x0)
⊟ Number2	
value	0 (0x0)

The values are 0 for both.
If you see this ⊞ at the left side of Number1 or Number2 click on it to show the details.
Click on ↷.
The program jumps to the next line.

Click on ⊞.
You see that the value of Number1 has changed.



```
43 Sub NewProblem
44     Number1 = Rnd(1, 10)     '
45     Number2 = Rnd(1, 10)     '
46     lblNumber1.Text = Number1
47     lblNumber2.Text = Number2
```



Name	
⊞ lblResult	
⊟ Number1	
value	**2 (0x2)**
⊟ Number2	
value	**3 (0x3)**

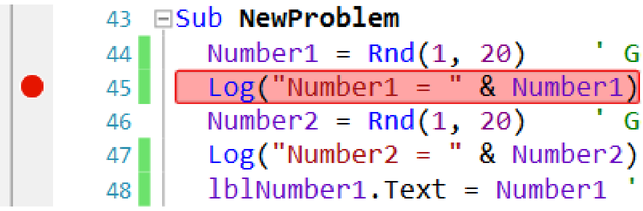
Click on ↷ again.
The program jumps to the next line.

Click on ⊞.
You see that the value of Number2 has changed.

The best way to learn debugging is testing, testing and testing!

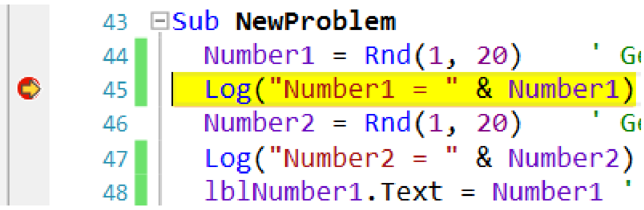
8.1.4 With Logs

Example with the SecondProgram.



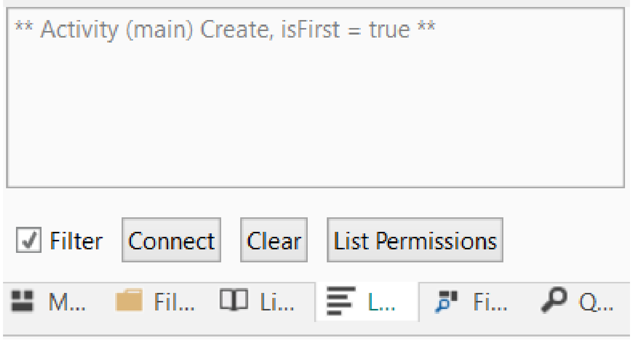
```
43 ⊟Sub NewProblem
44      Number1 = Rnd(1, 20)      ' G
45      Log("Number1 = " & Number1)
46      Number2 = Rnd(1, 20)      ' G
47      Log("Number2 = " & Number2)
48      lblNumber1.Text = Number1 '
```

We add the two lines with the Log keyword to display the two numbers in the Log Tab.
We and add a breakpoint in line 44 to watch what happens.



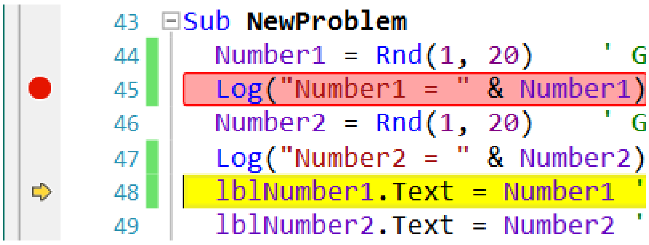
```
43 ⊟Sub NewProblem
44      Number1 = Rnd(1, 20)      ' G
45      Log("Number1 = " & Number1)
46      Number2 = Rnd(1, 20)      ' G
47      Log("Number2 = " & Number2)
48      lblNumber1.Text = Number1 '
```

Run the program, it stops at line 44.



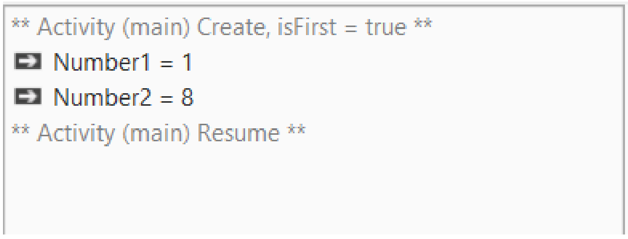
```
** Activity (main) Create, isFirst = true **
```

In the Log Tab we see at the moment only
`Waiting for debugger to connect...`
and ** Activity (main) Create, isFirst = true ** saying that the program has started.



```
43 ⊟Sub NewProblem
44      Number1 = Rnd(1, 20)      ' G
45      Log("Number1 = " & Number1)
46      Number2 = Rnd(1, 20)      ' G
47      Log("Number2 = " & Number2)
48      lblNumber1.Text = Number1 '
49      lblNumber2.Text = Number2 '
```

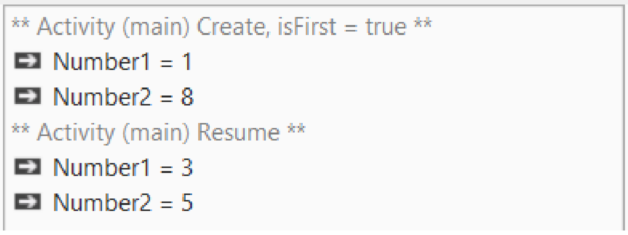
Click four times on ↪ till the program reaches line 48.



```
** Activity (main) Create, isFirst = true **
⇨ Number1 = 1
⇨ Number2 = 8
** Activity (main) Resume **
```

In the Log Tab we see the values of the two variables.

Click on ▶ to run to the end.
Nothing new is displayed



```
** Activity (main) Create, isFirst = true **
⇨ Number1 = 1
⇨ Number2 = 8
** Activity (main) Resume **
⇨ Number1 = 3
⇨ Number2 = 5
```

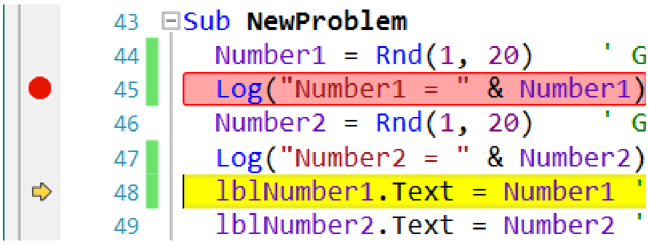
When you are using the program the two new values will be shown every time the program runs the New routine.

The arrow ⇨ at the beginning of the Log allows to jump to the code line of the Log, see Jump to.

8.1.5 Modifying code in the Debugger

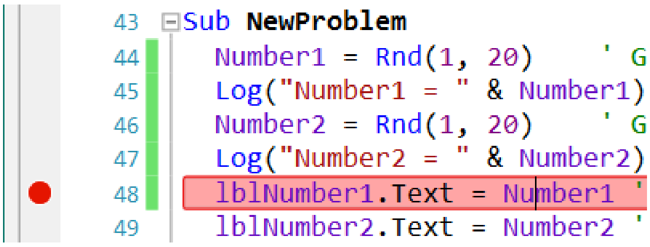
It is possible to change the code in the Debugger and see the new behaviour without restarting the program.

Still with SecondProgram and the two Logs and the breakpoint in line 47.



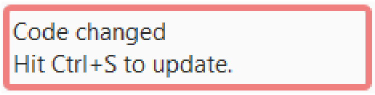
```
43 Sub NewProblem
44     Number1 = Rnd(1, 20)      ' G
45     Log("Number1 = " & Number1)
46     Number2 = Rnd(1, 20)      ' G
47     Log("Number2 = " & Number2)
48     lblNumber1.Text = Number1 '
49     lblNumber2.Text = Number2 '
```

Run the program till it stops at the breakpoint.



```
43 Sub NewProblem
44     Number1 = Rnd(1, 20)      ' G
45     Log("Number1 = " & Number1)
46     Number2 = Rnd(1, 20)      ' G
47     Log("Number2 = " & Number2)
48     lblNumber1.Text = Number1 '
49     lblNumber2.Text = Number2 '
```

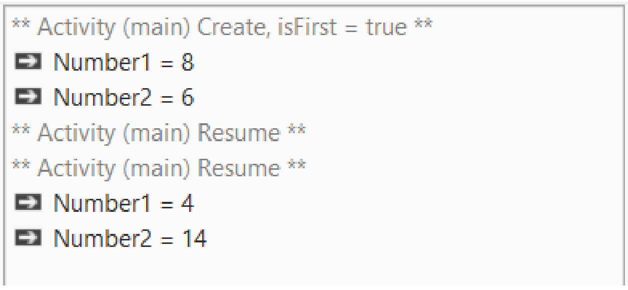
In the two lines with `Rnd(1, 10)` we change the numbers from 10 to 20.



Code changed
Hit Ctrl+S to update.

The status button color has changed confirming a code change.
To rerun the program, click on Ctrl + S.

Using the program, we see now that the numbers can be between 1 and 19.

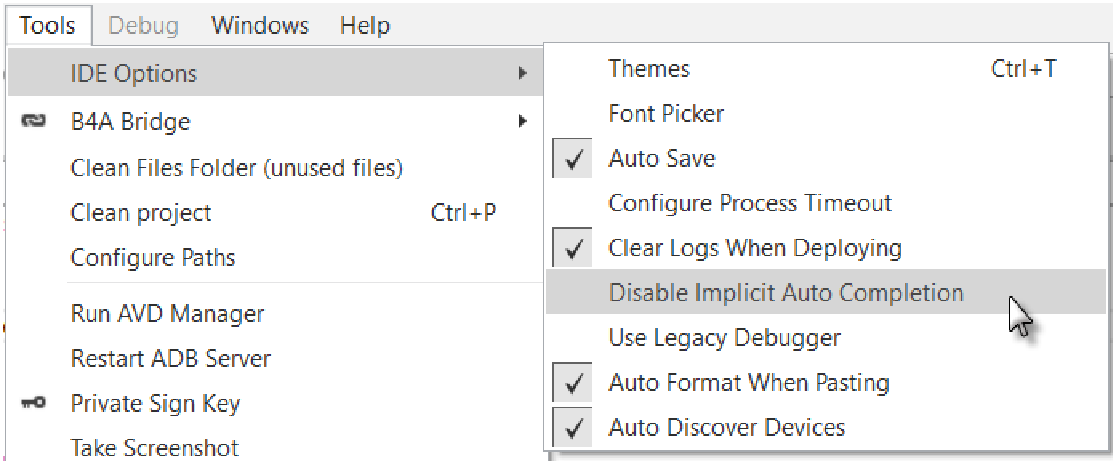


```
** Activity (main) Create, isFirst = true **
➡ Number1 = 8
➡ Number2 = 6
** Activity (main) Resume **
** Activity (main) Resume **
➡ Number1 = 4
➡ Number2 = 14
```

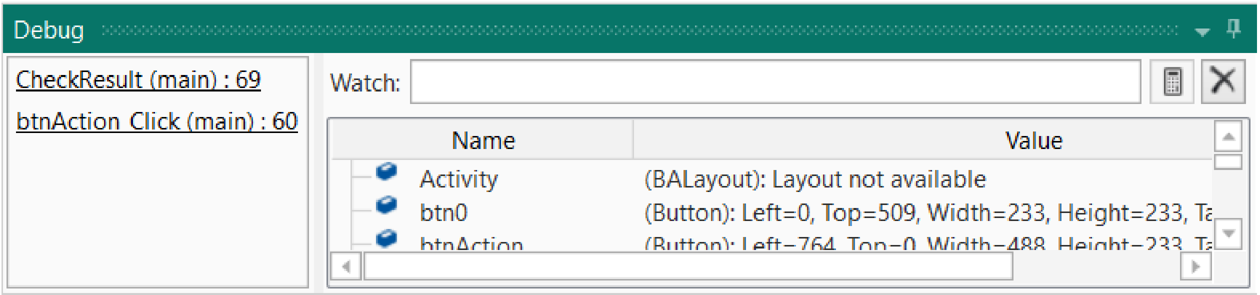
The arrow ➡ at the beginning of the Log allows to jump to the code line of the Log, see Jump to.

8.1.6 Debug (legacy) mode B4A only

In some cases, the legacy Debugger can be useful, you can select it in the Tools menu under IDE options.



Debug(legacy): When this option is selected then the compiled code will contain debugging code. The debugging code allows the IDE to connect to the program and inspect it while it runs.
The name of the compiled APK file will end with _DEBUG.apk. You should not distribute this apk file as it contains the debugging code which adds a significant overhead.
To distribute files, you must select the *Release* or the *Release (obfuscated)* option.



Name	Value
Activity	(BALayout): Layout not available
btn0	(Button): Left=0, Top=509, Width=233, Height=233, Ta
btnAction	(Button): Left=764, Top=0, Width=488, Height=233, Ta

The navigation buttons in the Toolbar are enabled ▶ ⤵ ⤓ ⤴ ■ ↻ .
They work similar to the Debug (rapid) mode.

8.2 Debugging B4R

Debugging is an important part when developing.

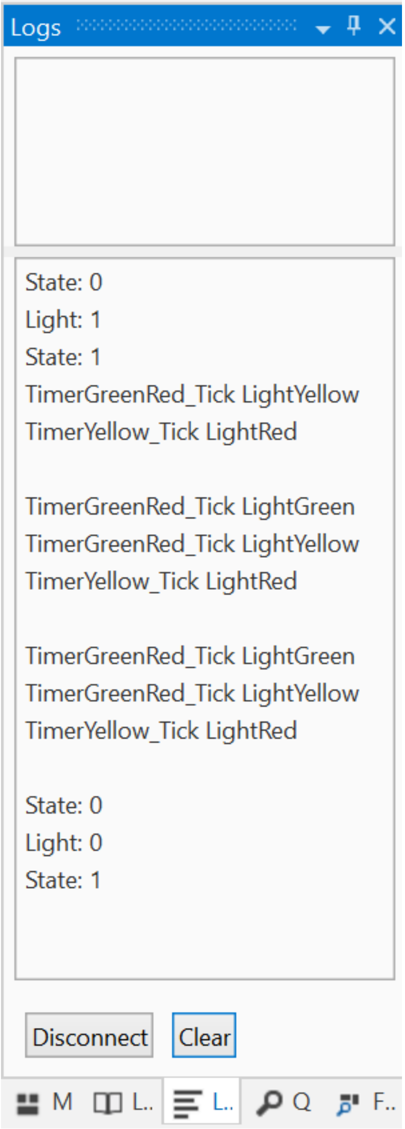
In B4R there is no Debug mode like in the other B4X languages.

Debugging can only be done with Logs.

The Logs tab in the right pane shows messages related to the components life cycle and it can also show messages that are printed with the Log keyword. You should press on the Connect button to connect to the device logs.

8.2.1 Debug example with the TrafficLight project

In the TrafficLight project I added several Log statements which show the evolution of the program.



```
State: 0
Light: 1
State: 1
TimerGreenRed_Tick LightYellow
TimerYellow_Tick LightRed

TimerGreenRed_Tick LightGreen
TimerGreenRed_Tick LightYellow
TimerYellow_Tick LightRed

TimerGreenRed_Tick LightGreen
TimerGreenRed_Tick LightYellow
TimerYellow_Tick LightRed

State: 0
Light: 0
State: 1
```

When we run the program, the Logs is empty.

Then:
We press the button > `State: 0`
The light is set to ON > `Light: 1` red light ON
We release the button > `State: 1`

The logs of the timers:
In TimerGreenRed_Tick change from red to green:
> `TimerGreenRed_Tick LightGreen`
We set the light to yellow and enable TimerYellow:
> `TimerGreenRed_Tick LightYellow`
In TimerYellow_Tick we set yellow OFF and red ON
> `TimerYellow_Tick LightRed`
End of first cycle
Begin of next cycle: > `TimerGreenRed_Tick LightGreen`

We press the button > `State: 0`
The light is set to OFF > `Light: 0`
We release the button > `State: 1`