DEVELOP 10 TIMES FASTER

WINDEV Mobile 21
Documentation version 21 - 1 - 0416

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INTRODUCTION

Preliminary points

Caution: This manual is a tutorial. We advise you to check the online help when you are using WINDEV Mobile.

The aim of the tutorial is to help you discover WINDEV Mobile, become familiar with the editors and teach you the concepts of WINDEV Mobile. This manual does not cover all the features of WINDEV Mobile.

This manual is intended for the developers who are already familiar with WINDEV. This manual only presents the main concepts required to develop an application for a mobile device (operating in Android, iPhone, iPad, Windows Mobile, ...).

If you are not familiar with WINDEV, we recommend that you to read the WINDEV tutorial beforehand.

Note: To receive the WINDEV tutorial, get in touch with the sales department of PC SOFT.

You should plan on spending a few hours to follow this course and to learn WINDEV Mobile: you'll find it well worth it!

WINDEV Mobile evolving all the time, the screen shots found in this course may differ from the windows displayed in your product.

Overview of the tutorial

The tutorial was intended to help you develop on the main mobile platforms:

- Android.
- iOS (iPhone/iPad).
- Windows Mobile/CE.

This tutorial includes the following parts:

- Part 1: Overview of WINDEV Mobile.
- Part 2: Creating and deploying a first Android application.
- Part 3: Creating and deploying a first iOS application.
- Part 4: Quick reminder of the main concepts of WINDEV Mobile and WLanguage.
- Part 5: Creating an application for data management for Android and iOS. This part is common to Android and iOS and it allows you de create management windows for these two platforms.
- Part 6: Creating applications for Windows Mobile.

Notes

WINDEV Mobile can also be used to develop Windows Universal apps applications (that operate in Windows 10: Windows 10 tablets and PCs running Windows 10).

See the online help for more details.

The tutorial was designed to progressively teach you how to use WINDEV Mobile. By following this course:

- you will discover the main concepts explained informally ; these are the concepts you must learn and understand.
- you will also be asked to perform operations that illustrate the concepts just explained.

As you progress through the tutorial, if you want to take a closer look at a concept or if you want to get more details about a programming function, see the online help (accessible from the editors).

The size of a lesson is not necessarily proportional to its relevance...

And don't forget to take a look at the examples supplied with WINDEV Mobile: they are very instructive!

Tip

The tutorial may have evolved since this document was published. Don't forget to check the online version of the tutorial. The PDF file is accessible from the menu of WINDEV Mobile: on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "Tutorial (PDF)".

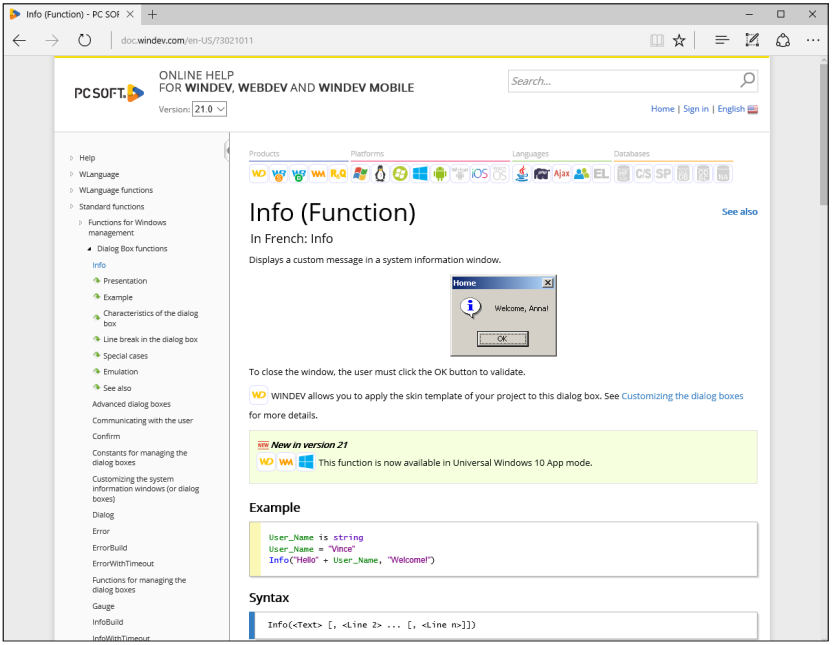
How to access the online help?

The online help of WINDEV Mobile allows you to get detailed information about the 2500 WLanguage functions. The online help also contains the help about the editors and the controls, tips, ...

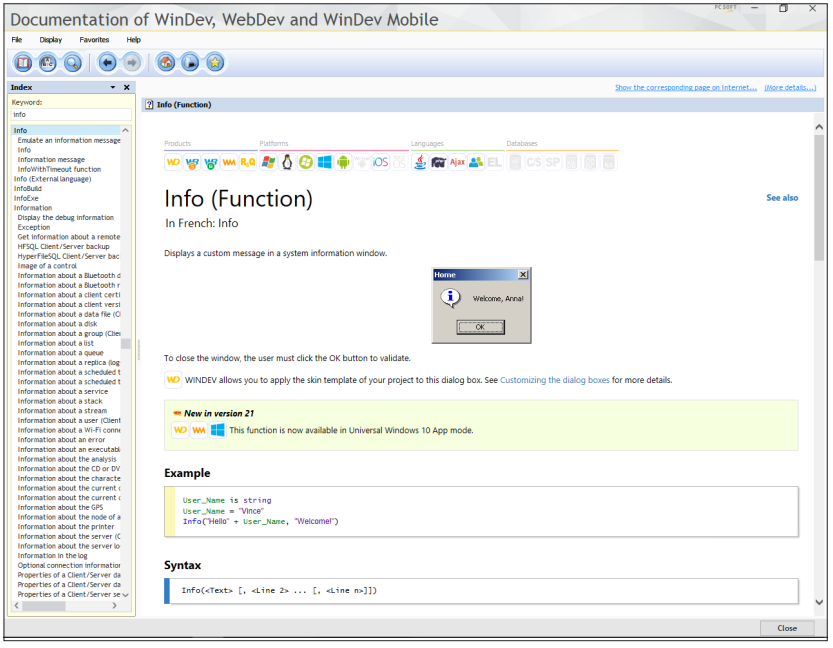
The online help is available at any time in WINDEV Mobile:

- In the code editor, a specific help is available for each function via the [F1] key.
- Each dialog box displayed by WINDEV Mobile proposes a button allowing you to access the corresponding help page.
- The help menu of the editors ("Help" option available on the "Home" pane, in the "Online help" group of the WINDEV Mobile menu) allows you to start the online help.

- The help can be displayed:
  - in an Internet browser, if you have access to Internet:



  - in a specific "help browser":



Notes

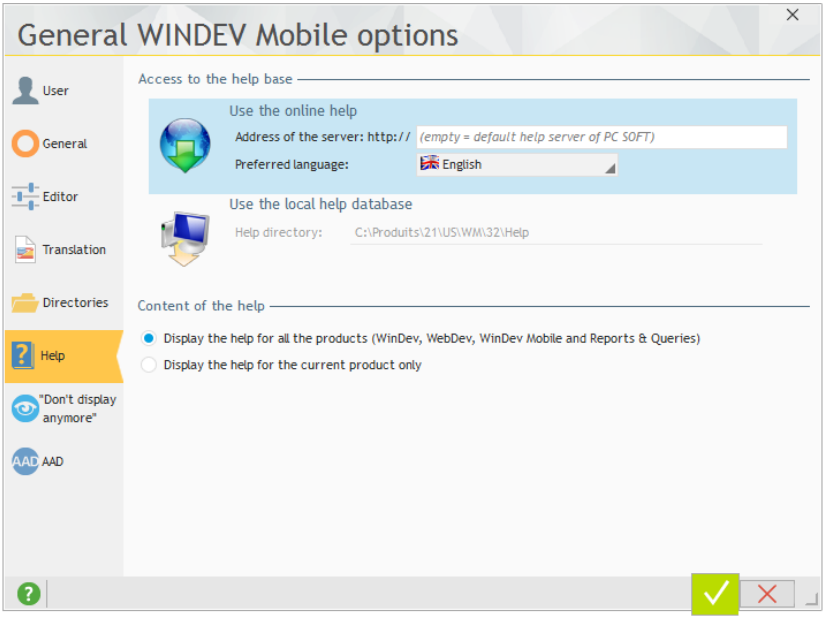
The online help of WINDEV, WEBDEV and WINDEV Mobile on Internet is available from any computer equipped with an Internet access, without the product being necessarily installed. This help is updated on a regular basis.

Each Web user can add comments about the documentation pages: personal notes, examples, links and so on.

Note: If you have no access to Internet, you have the ability to start the local help from the product:

1. On the "Home" pane, in the "Environment" group, expand "Options" and select "General options of WINDEV Mobile".
2. In the "Help" tab, select:

- the access mode to the help database.



- the content of the help: help common to WINDEV, WEBDEV and WINDEV Mobile or help about the product currently used.

Legend of symbols


This symbol indicates the duration of the lesson. Please note that the actual time may vary according to your level of experience.


An example is available to complement the lesson. The examples are available in the home window of WINDEV Mobile.


This symbol introduces a "Tip": we strongly advise you to read the associated text.


This symbol introduces a "Warning": reading the associated text is extremely important.


This symbol introduces a "Note": we recommend that you read the associated text.

If you are familiar with WINDEV Mobile 20...

If you are familiar with WINDEV Mobile 20, following this tutorial will do no harm: it's a good opportunity to "review" the features of WINDEV Mobile!

What is WINDEV Mobile used for?

WINDEV Mobile is an IDE (Integrated Development Environment). It allow you to develop applications in many fields:

- Management of stocks
- Inventories, tracking of goods
- Adjustment and monitoring of machines on an assembly line
- Taking orders for fast processing in a temporary outlet (fairs, schools, booth, ...)
- Customer forms
- Help with making snap decisions on a cell phone
- Checking the identity of visitors at an event: trade fair, presentation of products, ...
- On-call doctors or vets
- Taking information in a temporary outlet: trade fair, street poll, stadium, ...
- Returning leased heavy equipment (tools, vehicles, ...) to a parking lot
- ...

WINDEV Mobile is a development environment that includes all the tools required to develop an application.

Unlike other programming languages, there is no need to find and add modules to be able to design, check and install an application.

The 5GL (5th Generation Language) of WINDEV Mobile, named WLanguage, will surprise you by its simplicity: a few hours are all you need to get the hang of it, a week is usually all it takes to fully master its potential!

No more programming hassle, WLanguage is available in English and in French!


DEVELOP 10 TIMES FASTER
PART 1
Overview of
WINDEV Mobile
21

Lesson 1.1. Discover WINDEV Mobile

This lesson will teach you the following concepts...

- Starting WINDEV Mobile

Estimated time: 10 min

Overview

WINDEV Mobile is an IDE (Integrated Development Environment) allowing you to develop applications for Android, iOS, Windows Phone, Windows Mobile, ... in a wide variety of fields: business, industrial, medical, hospitality, ... The developed applications can give access to information stored in the databases.

This tutorial will explain how to create your applications (with or without database) and how to improve them by using the different features proposed by WINDEV Mobile.

Starting WINDEV Mobile

- Start WINDEV Mobile 21 (if not already done).
- **If WINDEV Mobile 21 was never started before**, a welcome wizard is displayed. This wizard is used to:
  - If you own an earlier version of WINDEV Mobile, retrieve the existing configurations.
  - If you are a new user, configure your environment. See the online help for more details.
- **If WINDEV Mobile 21 was already started**, identify yourself il necessary. The development environment is started. The home window is displayed. This home window is used to:
  - create a project,
  - open an existing project,
  - open an example,
  - open one of the projects found in the tutorial.
- Let's take a look at the development environment of WINDEV Mobile. To do so, from the home window:
  - Click "Tutorial".
  - Click "iOS/Android application (Answer)".
  - The corresponding project is opened in the editor.

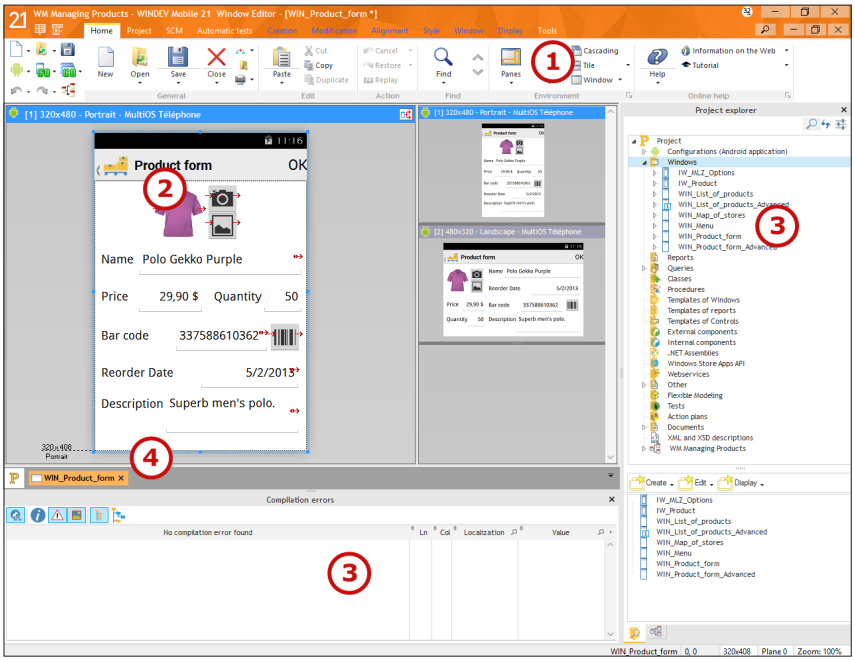
Development environment

The editor

The development environment of WINDEV Mobile includes a specific interface and several editors allowing you to create the different elements of your applications.

For example, the window editor is used to create windows, the report editor is used to create reports, ...

All the editors are using the same environment:



1. Menu of editors, displayed in the shape of a ribbon (we'll see how to use it in the next paragraph).

2. Current editor (window editor here). This space allows you to view the element currently created or modified in WYSIWYG (What You See Is What You Get).

3. Panes. The interface of WINDEV Mobile includes several panes allowing you to quickly access different types of information.

Some examples:

- the "Project explorer" pane (displayed on the right) is used to list all the project elements by category.
- the search pane (displayed at the bottom) is used to perform searches in the entire project and in its elements.

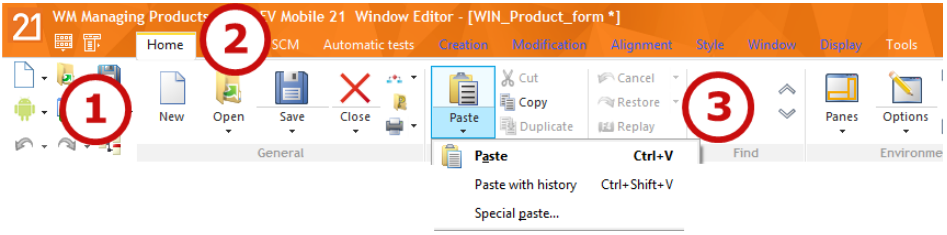
These panes can be hidden by pressing [CTRL] + [W] if necessary.

4. Bar of opened documents. This bar is used to quickly view all the opened elements. A simple click on the button corresponding to the element displays it in its own editor.

The menu bar (ribbon) in details

The menu bar of WINDEV Mobile is presented in the shape of a ribbon. This ribbon includes panes in which the options of the editors are grouped.

We are going to take a closer look at the main elements of the ribbon, as well as how we will be using it in this tutorial.



The different ribbon elements

The ribbon includes 3 areas:

- the button area, on the left (1).
- the pane area, at the top (2).
- the option area (3).

Let's take a closer look at these areas.

The button area

The button area groups the **quick access buttons**. These buttons are used to perform the most usual operations, common to all the editors: save, open, create, ...

The 3 logos found at the top of this area are specific:

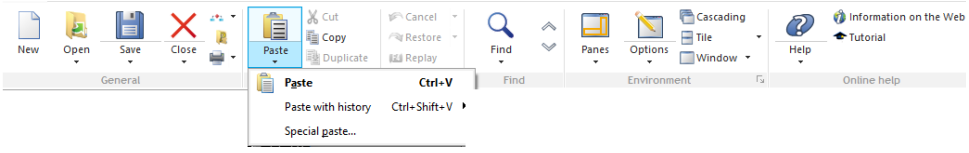
- The product logo is used to display the "About" window, the custom menus and the drop-down menus found in the former interface of the editors (version 17 and earlier).
- The 2 other logos are used to restore the toolbars and the drop-down menus found in the former interface of the editors (version 17 and earlier).

The pane area

The different ribbon panes are used to access the options of the different editors for the current project. Several types of panes are available:

- the current pane: The name of the current pane is displayed on a white background and an orange line is displayed above the name.
- the popup panes, specific to the current element: The name of the pane is displayed in orange.
- the available panes: The name of the pane is displayed in white.

The option area



The options displayed in the ribbon differ according to the selected pane. Several types of options are available:

- Options to check,
- Buttons to click,
- Button with arrow used to expand the options. Two types of buttons with arrow are available:
  - the buttons with arrow used to expand a menu
  - the buttons with arrow used either to expand a menu (click on the arrow), or to perform a default action (click on the button icon).

The options are organized by group. Each group of options has a name and it can also include a group button . This button is used to perform a specific action according to the current group: displaying the description of the current element, displaying the help, ...

In this tutorial, to identify a menu option, we will be talking about panes and groups.

For example:

To display the help, on the "Home" pane, in the "Online help" group, click "Help".


DEVELOP 10 TIMES FASTER
PART 2
Android application
21

Lesson 2.1. My first Android project

This lesson will teach you the following concepts...

- Required configuration
- Creating an Android project
- My first window
- My first test
- First deployment

Estimated time: 1 h

Overview

To start working with WINDEV Mobile, we are going to create a first project. This project will contain a window used to display a message.

This first example will present the main concepts of development with WINDEV Mobile.

Before creating our first project for Android, a configuration of the development computer is required.

Necessary configuration for Android

To develop an application for the Android platform, the following elements must be installed on the development computer:

- The JDK: The JDK (Java Development Kit) distributed by Oracle is used to compile the generated Java files.
- The Android SDK of Google: The Android SDK (Software Development Kit) is a set of files and applications distributed by Google in order to allow the compilation of applications for the Android operating system.
  Caution: The Android SDK includes sections corresponding to the versions of device platforms (2.2, 2.3, 4, ...).
- Gradle tool: This tool is required to compile and to generate Android applications. Gradle can be downloaded and installed if necessary when generating the Android application from WINDEV Mobile.

See the online help for more details (download addresses, ...).

We advise you to restart the computer once JDK and SDK have been installed.

My first project

Creating the project

We are now going to create our first project for Android.

Answer

A corrected project is available. To open this project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "My Android project (Answer)".

▶ To create a project:

1. Start WINDEV Mobile 21 (if not already done). Close (if necessary) the current project in order to display the home window.

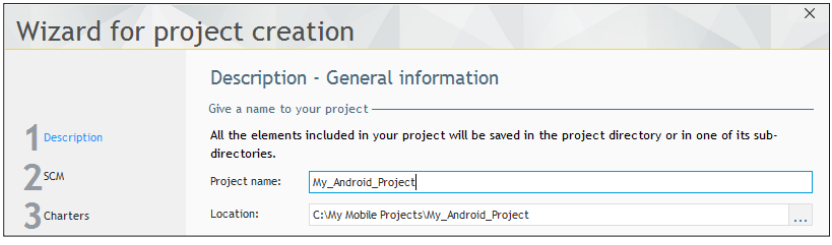
2. In the home window, click "Create a project" then "Android application".

3. The wizard for project creation starts. The different wizard steps help you create your project. The information specified in this wizard can be modified later.

Notes

Tip: Other method for creating a project:
1. Click among the quick access buttons of the WINDEV Mobile menu.
2. The window for creating a new element is displayed: click "Project".

4. The first wizard step is used to enter the name of the project, its location and its description. In our case, this project will be named "My_Android_Project". WINDEV Mobile proposes to create this project in the "\My Mobile projects\My_Android_Project" directory. You can keep this location or modify it via the [...] button.



5. Go to the next step via the arrows found at the bottom.
6. The wizard proposes to add documents. Keep the default options and go to the next step.

7. The wizard proposes to choose the type of Android devices affected by the project:
- Generate an application for phones and tablets.
- Generate an application for phones only.
- Generate an application for tablets only.
- Generate an application for a specific device.

Note

If the application is intended to operate on several Android devices (phones with different sizes or resolutions for example), we advise you to use one of the following options: "Generate an application for phones and tablets", "Generate an application for phones only" or "Generate an application for tablets only".

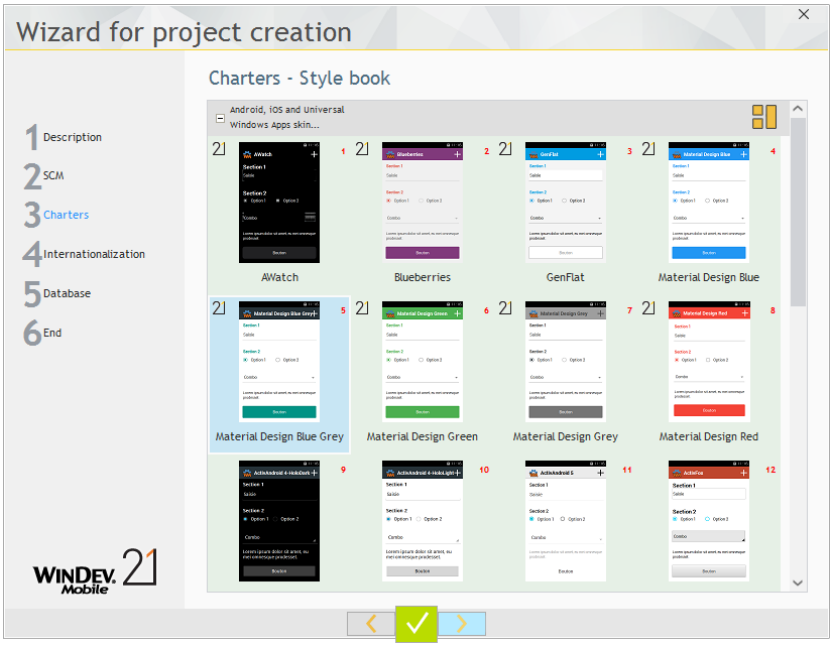
In this case, WINDEV Mobile proposes the smallest resolution to create the application windows. Using anchors (see page 43 and page 125) will allow the application to operate on all the devices.

8. In this example, we are going to generate an application for phones. Select "Generate an application for phones only" and go to the next step.

Note

You own an Android device and you want to run the test of the created application on this device? Select "Generate an application for a specific device". The wizard next step is used to select the requested device.

9. In the left section of the wizard, click "Charters". This step is used to define the programming charter. Don't modify the suggested options. Go to the next step.
10. This step is used to define the style book of the application. We will keep "Material Design Blue Grey".



11. The other wizard steps not being important for our first project, click "End" in the left section of the wizard.
12. Click the validation button at the bottom of the wizard. The project is automatically created.
13. The window for creating a new element is displayed. This window is used to create all the elements that can be associated with a project.

My first window

Overview

The first window allows the user to display a welcome message via the "Display" button.

You may think this is too basic but we advise you to create this window. You may be surprised by how intuitive and how easy it is to use the editor of WINDEV Mobile. Furthermore, this window will allow you to discover concepts that are fundamental for the rest of this tutorial and to see the entire process for developing an Android application with WINDEV Mobile.

Creating the window

▶ To create the window:

1. In the window for creating a new element, click "Window" then "Window".

Note

As a new project was created, the window for creating a new element is automatically displayed.

To display the window for creating a new element, all you have to do is click among the quick access buttons of the WINDEV Mobile:

2. The wizard for window creation starts.

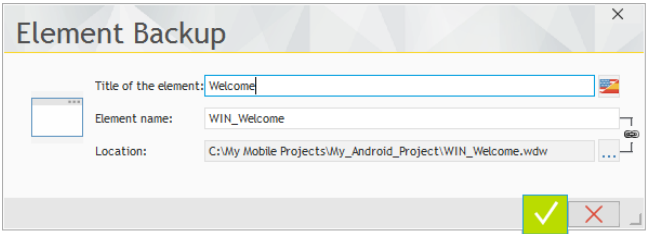
3. Select "Blank" in the list of windows displayed on the left. In the list of skin templates found on the right, the "Material Design Blue Grey" skin template that was selected when creating the project is selected by default.

Note

The skin templates allow you to quickly create outstanding interfaces. A skin template defines the style of the window but also the style of all the controls that will be used in this window. No ugly interface anymore.

4. Validate. The window is automatically created in the editor.

- Save the window by clicking among the quick access buttons. During the first backup, a specific window is displayed. This window proposes to enter:



  - the title of the element: enter "Welcome". In our case, this title will be displayed in the Action Bar of the window.
  - the name of the element that corresponds to the name of the window. This name will be used in programming. By default, this name includes "WIN_" that corresponds to the programming charter and "Welcome" that corresponds to the title of the window.

Note

Let's take a look at the window name proposed by WINDEV Mobile: this name starts with the letters "WIN_". This prefix is automatically added because the project is using a programming charter.

The programming charter is used to define a prefix for each type of object, allowing you to quickly identify the element:

- a window starts with "WIN_",
- a button starts with "BTN_",
- etc.

If you do not want to use this charter, all you have to do is disable it: on the "Project" pane, in the "Other actions" group, expand "Charter" and uncheck "Use the charter".

  - the location that corresponds to the file name created for the window. The window is a file whose extension is "WDW", saved in the project directory.

- Click the green button to validate the backup of the window.

Display a message

You are now going to create a button used to display a message.

- To create the "Display" button:

1. On the "Creation" pane, in the "Usual controls" group, click Ok. The button appears in creation under the mouse.

2. Move the mouse toward the position where the control must be created in the window (at the top of the window for example). To drop the control in the window, all you have to do is perform a click in the window.

3. Perform a right mouse click on the control that was just created. The popup menu of the control is displayed. Select "Description" from this popup menu. The description window of the button is displayed.

- Modify the characteristics of the control by entering the following information:

1. Name of this control: "BTN_Display".
2. Caption of this control: "Display"

Notes

To modify the name and caption of the button, we have been using the description window of the control (also called "7-tab window").
The name and caption of the button can also be modified from the window currently in edit:

1. Click the control to select it.
2. Press the [ENTER] key or the [SPACE] key: the caption becomes editable.
3. Type the new caption and validate.

- Validate the description window of the control (green button). The new control caption appears in the window editor.
- We are going to display a message in a dialog box (a small window proposed by the system). To do so, we will be using our first WLanguage function: ***Info***.

Notes

The programming language supplied with WINDEV Mobile is named WLanguage. It is a 5th generation language (5GL) that includes highly sophisticated commands.

1. Select the "Display" button with the mouse: all you have to do is click it.
2. Display the popup menu of the control (right mouse click).
3. Select "Code". This option opens the code editor of WINDEV Mobile, where all the WLanguage statements can be entered.

Notes

The code editor proposes different processes for each type of control. These processes correspond to the events linked to the control.
Therefore, two processes are displayed for the "Button" control:
• Initialization, run when displaying the window.
• Click on the button, run when the user clicks the button.
Note: Additional processes can be added if necessary.

4. Enter the following code in the "Click BTN_Display" process:

```
Info("Hello")
```

Note about the assisted input: As soon as the first two characters are typed, WINDEV Mobile proposes all the words of the WLanguage vocabulary containing these characters. The assisted development is a very powerful feature. No more mistake when typing the name of an element: the syntax errors are reduced. All you have to do is select the requested word and validate by pressing [ENTER]. You can focus on the algorithm.

Notes

When typing this code in the code editor, you have noticed that different colors are used by the different elements. This is the syntactic coloring. The code editor allows you to easily identify the different elements handled by the code:

- the WLanguage functions are colored in blue,
- the character strings (between quotes) are colored in purple,
- the names of controls are colored in cyan.

These colors can be modified element by element in the code editor options (on the "Home" pane, in the "Environment" group, expand "Options" and select "Options of the code editor").

Info displays the message passed in parameter.

- Save the modifications by clicking  among the quick access buttons or by pressing [CTRL]+[S].
- Close the code editor (cross at the top right of the code editor). The window editor is redisplayed.

First test

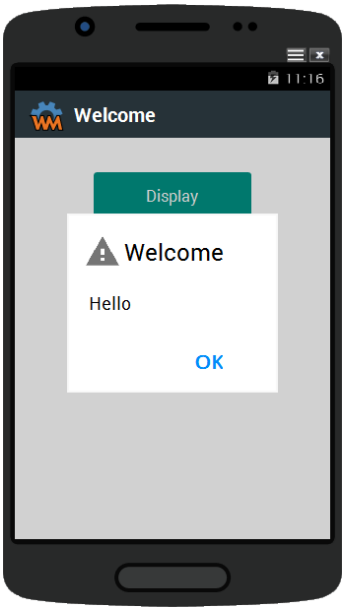
For an Android application, WINDEV Mobile allows you to run the test of the application on the development computer via the simulation mode. This test simulates an Android device on the development computer. This test is useful when the developer has no Android device. However, this test does not allow you to use the hardware components of the device (GPS, SMS, camera, ...).

Notes

WINDEV Mobile also allows you to run a test of the application via the Android emulator (AVD) supplied with the SDK.
See the online help for more details.

- Let's now run the test of the window in simulation mode.
  1. Click  among the quick access buttons (or press [F9]).
  2. Validate (if necessary) the information message regarding the simulator mode.
  3. Choose (if necessary) the management mode of the editor during the test (editor minimized or not).
  4. The created window is started in execution.

5. Click the "Display" button.
6. Validate the system window that is displayed.



- Any developer knows that running a program test can be a long and tiresome job. In WINDEV Mobile, a SINGLE CLICK allows you to run the test of the window, report or procedure while you are creating it. This is both simple and fast!
- Click the "x" button found in the simulator shell to close the window.
- The editor of WINDEV Mobile is redisplayed.

First deployment on the device

Principle

To run the application in stand-alone mode on the Android device, you must:

- Connect the device via a USB port.
- Generate the application. An "apk" file will be created. This file contains all the elements required to run the application on an Android device.
- Select your device at the end of generation. Copying the application ("apk" file) can take several seconds.

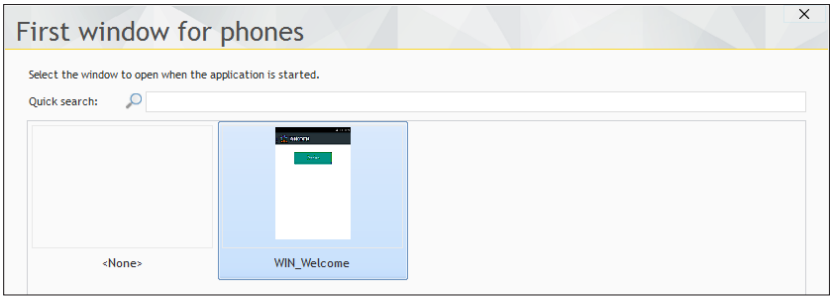
Let's take a look at these different steps.

Implementation

To generate the Android application:

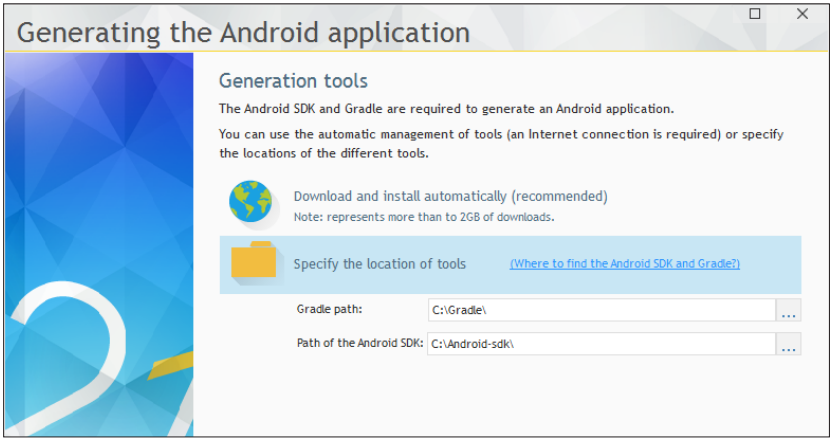
1. On the "Project" pane, in the "Generation" group, click "Generate" (you also have the ability to click among the quick access buttons).

2. WINDEV Mobile proposes to select the first project window. In our example, select "WIN_Welcome" and validate (green button at the bottom of the screen).



3. The wizard for generating an Android application starts.

4. The first wizard step consists in checking the tools required to generate the Android application.



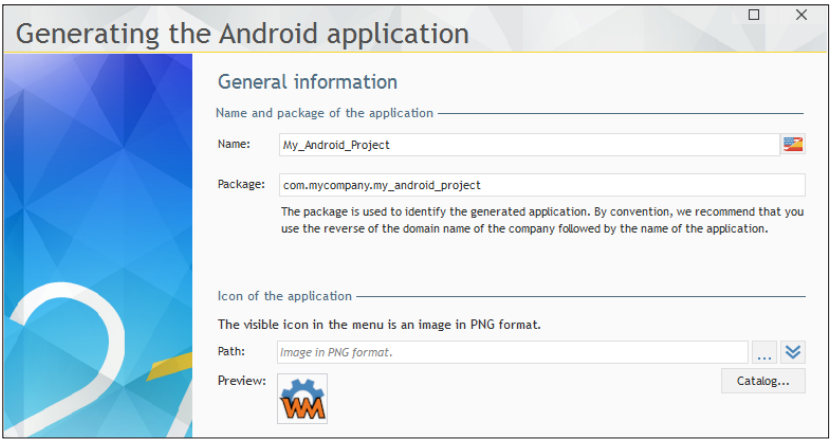
The wizard proposes to:

- **download and install the Android SDK and Gradle**: in this case, you will only have to validate the license. WINDEV Mobile takes care of everything. If an update is available, the generation wizard will automatically propose to perform the necessary updates. Only an Internet connection is required.
- **Use the tools automatically installed**. This option is available if the tools have been downloaded and installed during a previous generation.
- **Specify the location of the tools already installed on your computer**. In this case, all you have to do is specify the setup paths of Gradle and Android SDK.

5. Select the option corresponding to your configuration and go to the next step.

Note: If you have chosen to download and install the tools, going to the next step may be quite long and you may have to validate the license.

6. The next wizard step is used to:
- define the name of the application (displayed below the icon used to start the application) and the corresponding package.
- select the icon of the application in the image catalog of WINDEV Mobile.



7. Go to the next step by clicking the arrow keys at the bottom of the window. This step is used to define:
- the splash screen of the application,
- the information saved in the manifest,
- the start mode of the application (when the device is started or not).

8. Go to the next step. The wizard is used to define the version number of the application.

9. Go to the next step. This step is used to sign the application. The wizard proposes a generic signature that can be used for the tests of the application. A specific signature is required to distribute the application. See the online help for more details.

10. Go to the next step. The wizard allows you to include specific files (data files, images, ...). This possibility will not be used in our example. Keep the default options.

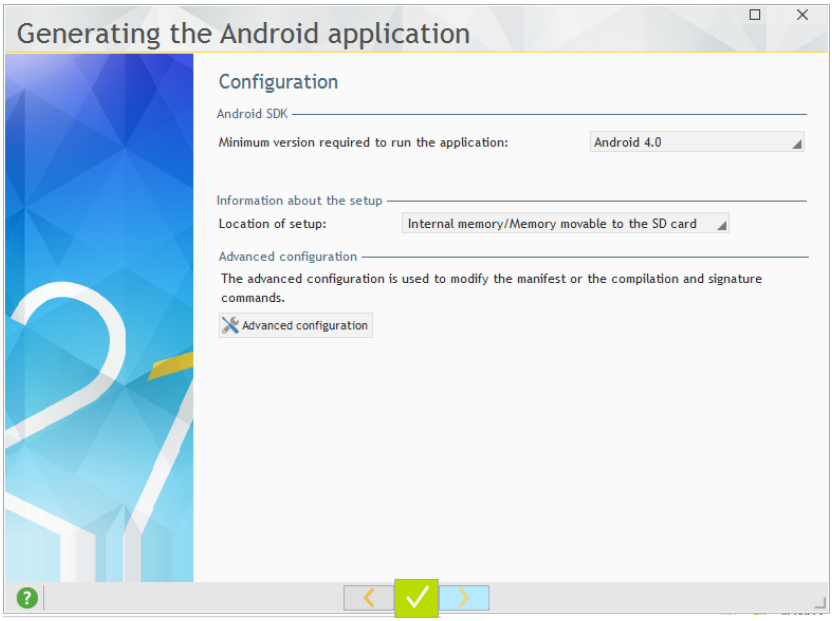
11. Go to the next step. The wizard allows you to include specific libraries. Keep the default options.

12. Go to the next step. The wizard allows you to include Maven libraries used by the project. Keep the default options.

13. Go to the next step. The wizard is used to define the permissions of the application. By default, according to the WLanguage functions used in the application, WINDEV Mobile detects the necessary permissions.

14. Go to the next step. You have the ability to restrict the download of the application on Google Play store to the devices equipped with the features used. This possibility will not be used in our example. Keep the default options.

15. Go to the next step. The wizard is used to configure the options of Android SDK. Keep the default options.



Notes

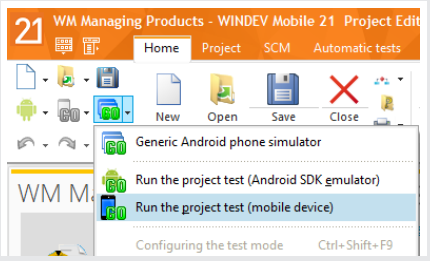
The generation of an Android application requires to install the Gradle engine. If this engine is not installed on the current computer, this wizard plane is used to download it and to install it.
See the online help for a manual setup.

16. Go to the next step. The wizard is used to specify whether the application must be copied and run on the device connected to the computer or on an emulator.
If this option is checked, a new window is displayed at the end of generation. This window allows you to select the runtime device.

That's it, our first application is generated and run on the Android device.

Notes

To run the test of your application on the cell phone, select "GO - Run the project test (mobile device)": the generation will be performed and the application will be copied and run on the cell phone connected to the current computer.



Caution: The USB debugging must be enabled in order to run the tests on the phone. If this operation is not performed, the phone will not be detected by WINDEV Mobile.

To enable the USB debugging:

1. On the phone, select the "Parameters" menu.
2. Select "About the device".
3. Click "Build number" several times to enable the developer mode.
4. Move one level up.
5. The "Development option" choice appears. Select this option.
6. Check "USB debugging".

Note: The operations to perform may change according to the version of the phone and to its make. For example, for a Samsung Galaxy Notes 3, you must "tap" several times the "Version number" control found in the "About the device" option in order to enable "Development option". In any case, a Google search with "usb debugging <device name>" allows you to get the operating mode adapted to the device used.

LESSON 2.2. INTERFACE (GUI)

This lesson will teach you the following concepts...

- Choosing the resolution according to the device
- Orientation of the window
- Management of touchscreen

Estimated time: 30 min

Overview

The Android system is available on the phones and on the tablets. WINDEV Mobile allows you to easily create interfaces that adapt to the device used.

Choosing the resolution according to the device

When creating a project, you will have to choose the resolution that will be used for the project windows. Two cases may occur:

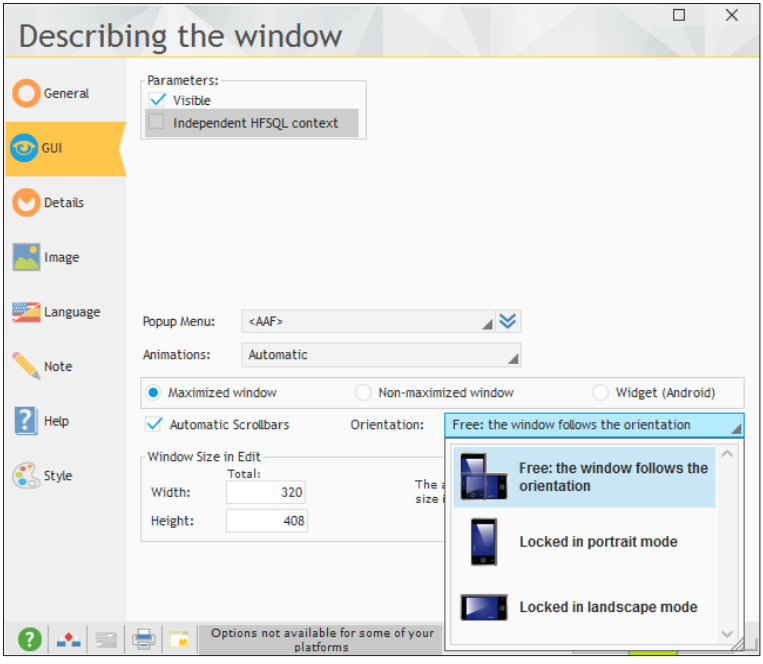
- **You are developing for a single target device**: in this case, all you have to do is select this device in the list proposed by the wizard.
- **You are developing for several target devices with different screen resolutions**: in this case, you must choose the smallest resolution common to all these devices. Via the anchoring of controls in the window, the content will be adapted to the resolution.

Orientation of the window

In Android, a window can have one of the following orientations:

- Locked in portrait mode,
- Locked in landscape mode,
- Free: the window follows the orientation of the device.

This orientation is defined in the "IHM" tab of the description window of the window ("Description" from the popup menu of the window).



No specific operation must be performed in the two first cases.

For a free window, the organization of controls and their size must adapt to the orientation. The anchoring mechanism must be used to get a proper result.

Practical example

- Open (if necessary) the "My_Android_Project" project that was created in the previous lesson.

Answer

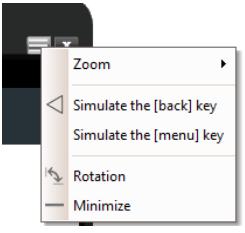
A corrected project is available. To open this project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "My Android project (Answer)".

In our example, the project was created for a phone and its test was run in portrait mode in the simulator.

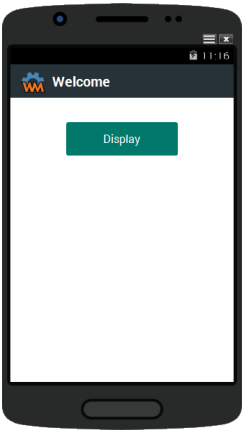
We are now going to run its test in landscape mode in the simulator.

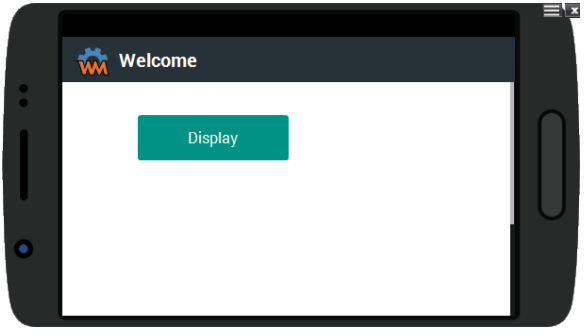
- Run the project test (among the quick access buttons).

1. The window is displayed in portrait mode.
2. In the simulator, click the menu in the shell ( ).
3. A popup menu appears. Change the orientation of the window with the “Rotation” option.

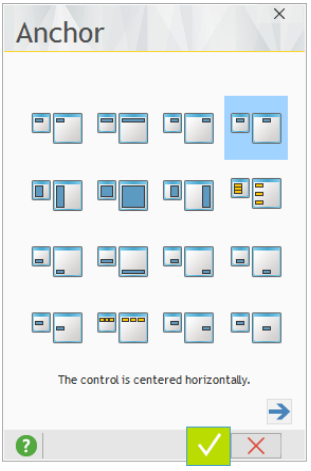


4. The orientation of the window changes on the screen. In our example, the location of the button does not change: it does not adapt to the orientation of the screen.





- We are now going to modify our window in order for the "Display" button to be centered in the window and to remain centered regardless of the device orientation.
- Stop the test and go back to the editor.
- To center the button in the window:
  1. Select the button (click the button).
  2. On the "Alignment" pane, in the "Centering and distribution" group, click "Center in the parent (horz)".
- In order for the button to remain centered in the window, we are going to use the control anchoring:
  1. Select the button (click the button).
  2. Display the popup menu (right mouse click).
  3. Select "Anchor": the window for defining anchors is displayed:



  4. Select "Horizontally centered" and validate (green button).

Notes

In the window displayed in the editor, you will notice the little red arrows in the control. These arrows indicate that the control is anchored.

- Run the project test (among the quick access buttons):
  - The button is centered in portrait mode.
  - Change the orientation of the simulator.
  - The button remains centered in landscape mode.

Management of touchscreen

One of the most important aspects of the interface for a mobile application is the management of the touchscreen feature.

A "multitouch" feature is a technique allowing the user to interact with a device via several contact points.

Handling images is one of the most common features of the multi-touch. The display size on a phone being reduced, it is often necessary to perform a zoom and/or to move in an image.

This allows you to perform a zoom on an image via the contact of 2 fingers moving apart.

To manage the "multi-touch", WINDEV Mobile proposes:

- Specific options available in the Image control.
- Specific WLanguage functions.
- Specific optional processes.

See the online help for more details.

Practical example

▶ Open (if necessary) the "My_Android_Project" project that was created in the previous lesson.

Answer

A corrected project is available. To open this project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "My Android project (Answer)".

▶ In the "WIN_Welcome" window, create an Image control:

1. On the "Creation" pane, in the "Usual controls" group, click "Image".

2. The Image control appears in creation under the mouse.

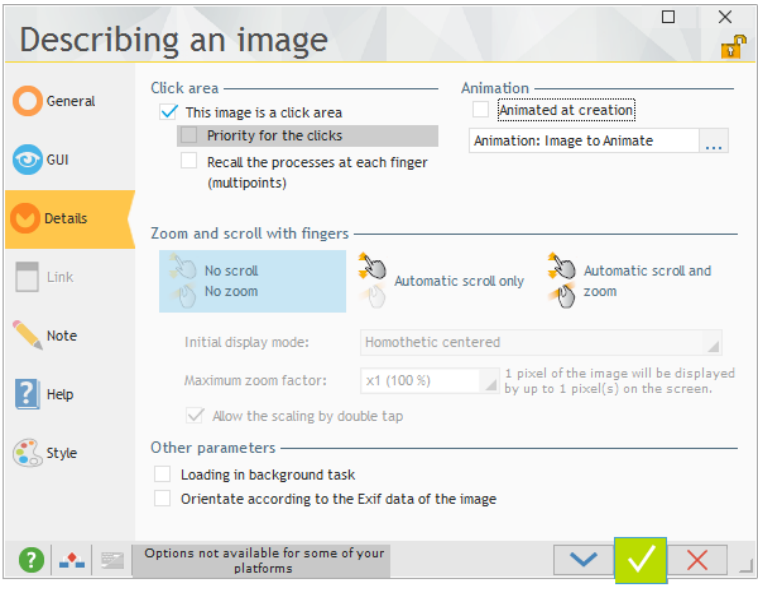
3. Move the mouse in the window toward the position where the control must be created. To drop the control in the window, all you have to do is perform a new left mouse click.

4. Double-click the Image control: the description window of the control is displayed.

5. In the "General" tab, select an image found on your disk in the "Image" edit control via the file picker([...] button).

6. If the image is found in a directory other than the project directory, WINDEV Mobile proposes to copy the image file into the project directory. Accept by clicking the "Copy the file into the suggested directory" button.

7. Display the "Details" tab: the options for managing the multi-touch are displayed:



8. Select "Automatic scroll and zoom".
9. Validate the description window of the control.
10. Save the window (click among the quick access buttons).
11. A GUI error appears in the error pane: the automatic scrollbars of the window are in conflict with the scroll features of the Image control.
12. To avoid this GUI error, disable the scrollbars of the window:
- Display the description window of the window ("Description" from the popup menu).
- In the "GUI" tab, uncheck "Automatic scrollbars".
- Validate the description window.

13. Save the window (click among the quick access buttons). The GUI error disappears.

Notes

Multi-touch support cannot be tested in the simulator. To check this feature, you need to deploy the application on the mobile device.

14. Close the project.

The different types of controls

WINDEV Mobile proposes several controls. These controls are used to display or enter data. Some controls are specifically intended for a mobile interface.

To develop your applications, you can use the standard controls (edit controls, images, radio buttons and check boxes) but also more specific controls such as:

- the multiline zones to create GUI similar to the native Android windows,
- the Map control to view a position on a map or an itinerary,
- the Ad control to display an advertising banner,
- the menu in the shape of "Action bar".

Some of these controls will be presented in the "Developing an Android and iOS application" lesson.

Lesson 2.3. Distributing the application

This lesson will teach you the following concepts...

- Generating the APK
- Available distribution modes

Estimated time: 20 min

Overview

WINDEV Mobile allows you to develop applications for the Android operating system.

Once the applications are created, developed and checked, all you have to do is deploy them. Several deployment modes are available:

- Deployment via Android Market/Google Play (or another market).
- Deployment on a Web server.
- Deployment from the PC via ADB.
- Deployment by copy.

Deployment via Android Market/Google Play

Google Play (formerly Android Market) is an online service used to download applications (free of charge or not) on mobiles devices compatible with Android.

Once published, the application can be downloaded by the users all around the world via the Google Play application installed on their phone.

The publication of applications on Google Play must comply with specific rules:

- During the first publication, you must register beside the Google Play service via a Google account. Once registered, you have the ability to publish or update as many applications as you want as many times as necessary.
- The published application must be signed with a private cryptographic key. You have the ability to sign your own application: using a third-party organism is not mandatory. The validity period of the certificate must end after October 23, 2033.
  The applications generated by WINDEV Mobile are automatically signed by using the information specified in the generation wizard ("Signature of the application" screen) with a sufficient validity period.
  Caution: The published application must not be signed with a generic key (whose use must be limited to the tests in GO mode).
- An icon must be associated with the application. The generation wizard of WINDEV Mobile allows you to define the icon to use.

Note: Google Play is the most common application but other ones are available.

Deployment via a Web server

You have the ability to propose Android applications for download from a link on a Web page.

To do so, you must:

1. Copy the "apk" file of the application onto the Web server that hosts the page proposing the download of the application.
   Reminder: the "apk" file is created by WINDEV Mobile when generating the Android application.

2. Add a link into the Web page for download. This link has the following format:

```
<a href='Path of apk file on the server'>Link</a>
```

3. On the server, add the following MIME type: application/vnd.android.package-archive

The user will only have to display the page with the browser of the phone. The application will be downloaded when the link is clicked. Then, all you have to do is click the downloaded file (in the download manager) to install the application.

Caution: The "Unknown sources" option must be enabled on the phone to allow this setup mode. To enable this option, go to the "Parameters" menu of the phone, in the "Applications" sub-menu.

Deployment from the PC via ADB (advanced mode)

ADB (Android Debug Bridge) is a tool supplied with the Android SDK. It is used, among other things, to install or uninstall from the PC an Android application (APK file) on a mobile device compatible with Android.

This setup mode is an advanced mode. We recommend that you see in the online help the specific commands used to install an application (http://developer.android.com/intl/fr/guide/developing/tools/adb.html)

Caution: The "Unknown sources" option must be enabled on the phone to allow this setup mode. To enable this option, go to the "Parameters" menu of the phone, in the "Applications" sub-menu.

Copying the application onto the Mobile device

The easiest way to install an Android application on a mobile device is to copy the apk file onto the device and to run it. The following operations must be performed:

1. Connect the device to the PC by USB.
2. Copy the apk file of the application onto the device (external memory for example). Reminder: the "apk" file is created by WINDEV Mobile when generating the Android application.
3. On the device, use a file explorer to go to the directory where the apk file was copied and click the file to start its setup.

Note: Some devices do not propose a file explorer but several ones are available for free.

Caution: The "Unknown sources" option must be enabled on the phone to allow this setup mode. To enable this option, go to the "Parameters" menu of the phone, in the "Applications" sub-menu.


DEVELOP 10 TIMES FASTER
PART 3
iOS
application
21

LESSON 3.1. MY FIRST iOS PROJECT

This lesson will teach you the following concepts...

- Required configuration
- Creating an iOS project (iPhone or iPad)
- My first window
- My first test
- First deployment

Estimated time: 40 min

Overview

To start working with WINDEV Mobile, we are going to create a first project. This project will contain a window used to display a message.

This first example will present the main concepts of development with WINDEV Mobile.

Before creating our first project for iOS, a configuration of the development computer is required.

Required configuration for iOS

To develop a WINDEV Mobile application for iPhone/iPad, you must own:

- 1 PC,
- 1 Mac,
- 1 iPhone and/or iPad (optional).

Why a PC?

WINDEV Mobile 21 is a Windows application that can be used in Windows Vista, 10, ...

The application will be created on the PC before it is compiled on a Mac (project, analysis, windows, ...).

This PC requires no setup of Mac/Apple tools.

Why a Mac?

A Mac is required because the project generated on the PC must be compiled in a specific compiler to generate the iOS applications. The minimum version of the operating system must be version 10.8 (Mountain Lion).

Xcode is a development environment that is used to develop iOS applications (iPhone and iPad). This tool will be used to compile the applications generated with WINDEV Mobile.

The minimum recommended version of Xcode is version 5.

See the online help for more details (download addresses, ...).

My first project

Create the project

We are now going to create our first project for iOS.

Answer

A corrected project is available. To open this project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "My iOS project (Answer)".

To create a project:

1. Start WINDEV Mobile 21 (if not already done). Close (if necessary) the current project in order to display the home window.

2. In the home window, click the "Create a project" icon then "iOS application".

3. The wizard for project creation starts. The different wizard steps help you create your project. The information specified in this wizard can be modified later.

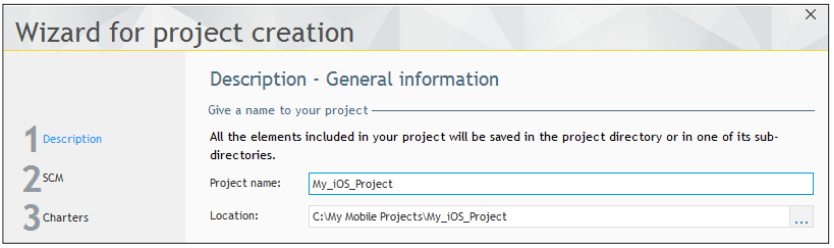
Notes

Tip: Other method for creating a project:

1. Click among the quick access buttons of the WINDEV Mobile menu.

2. The window for creating a new element is displayed: click "Project".

4. The wizard proposes to enter the name of the project, its location and its description.



In our case, this project will be named "My_iOS_Project". WINDEV Mobile proposes to create this project in the "\My Mobile projects\My_iOS_Project" directory. You can keep this location or modify it via the [...] button.

5. Go to the next step via the arrows found at the bottom.
6. The wizard proposes to add documents. Keep the default options and go to the next step.
7. The wizard proposes to choose the type of devices affected by the project:

- Generate an application for iPhone and iPad.
- Generate an application for iPhone only.
- Generate an application for iPad only.
- Generate an application for a specific device.

Note

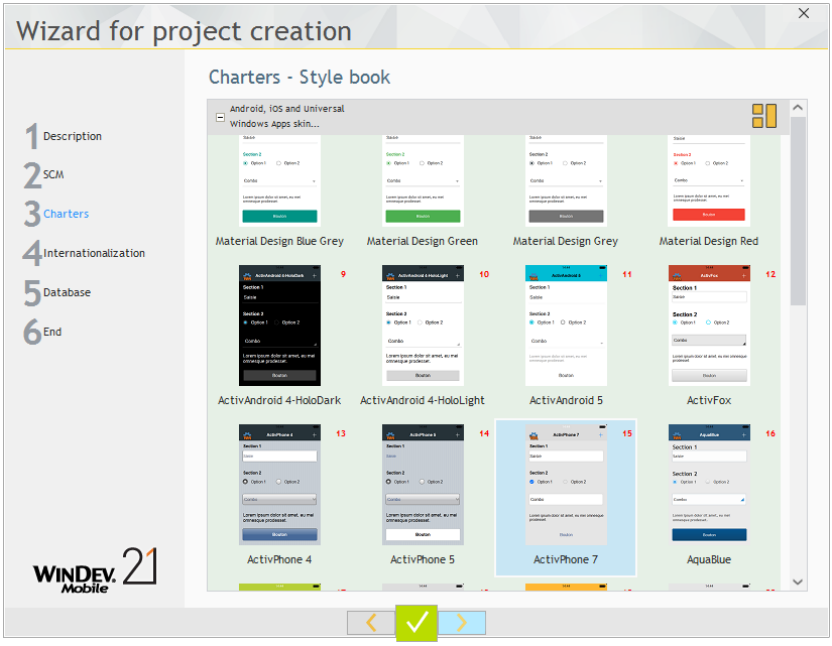
If the application is intended to operate on several iOS devices (phones with different sizes or with different resolutions for example), we advise you to use one of the following options: "Generate an application for iPhone and iPad", "Generate an application for iPhone only" or "Generate an application for iPad only".

In this case, WINDEV Mobile proposes the smallest resolution to create the application windows. Using anchors (see page 69 and page 125) will allow the application to operate on all the devices.

8. For this example, select "Generate an application for iPhone only".

9. In the left section of the wizard, click "Charters". This step is used to define the programming charter. Don't modify the suggested options. Go to the next screen via the arrows found at the bottom.

10. This step is used to define the style book of the application. We will choose "ActivePhone 7".



11. The other wizard steps not being important for our first project, click "End" in the left section of the wizard.

12. Click the validation button at the bottom of the wizard. The project is automatically created.

13. The window for creating a new element is displayed. This window is used to create all the elements that can be associated with a project.

My first window

Overview

The first window allows the user to display a welcome message via the "Display" button.

You may think this is too basic but we advise you to create this window. You may be surprised by how intuitive and how easy it is to use the editor of WINDEV Mobile. Furthermore, this window will allow you to discover concepts that are fundamental for the rest of this tutorial and to see the entire process for developing an iOS application with WINDEV Mobile.

Creating the window

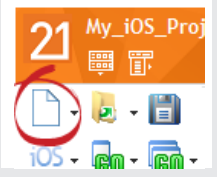
▶ To create the window:

1. In the window for creating a new element, click "Window" then "Window".

Note

As a new project was created, the window for creating a new element is automatically displayed.

To display the window for creating a new element, all you have to do is click among the quick access buttons of the WINDEV Mobile:



2. The wizard for window creation starts.

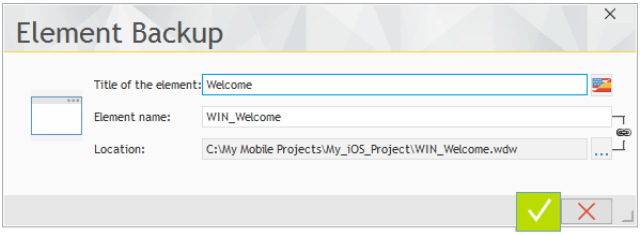
3. Select "Blank" in the list of windows displayed on the left. In the list of skin templates found on the right, the "ActivPhone 7" skin template is selected by default. You can choose another skin template proposed in the list.

Note

The skin templates allow you to quickly create outstanding interfaces. A skin template defines the style of the window but also the style of all the controls that will be used in this window. No ugly interface anymore.

4. Validate. The window is automatically created in the editor.

- Save the window by clicking among the quick access buttons. During the first backup, a specific window is displayed. This window proposes to enter:



  - the title of the element: enter "Welcome". In our case, this title will be displayed in the title bar of the window.
  - the name of the element that corresponds to the name of the window. This name will be used in programming. By default, this name includes "WIN_" that corresponds to the programming charter and "Welcome" that corresponds to the title of the window.

Note

Let's take a look at the window name proposed by WINDEV Mobile: this name starts with the letters "WIN_". This prefix is automatically added because the project is using a programming charter.

The programming charter is used to define a prefix for each type of object, allowing you to quickly identify the element:

- a window starts with "WIN_",
- a button starts with "BTN_",
- etc.

If you don't want to use this charter, all you have to do is disable it: on the "Project" pane, in the "Other actions" group, expand "Charter" and uncheck "Use the charter".

  - the location that corresponds to the file name created for the window. The window is a file whose extension is "WDW", saved in the project directory.

- Click the green button to validate the backup of the window.

Display a message

You are now going to create a button used to display a message.

- To create the "Display" button:
  1. On the "Creation" pane, in the "Usual controls" group, click Ok. The button appears in creation under the mouse.
  2. Move the mouse toward the position where the control must be created in the window (at the top of the window for example). To drop the control in the window, all you have to do is perform a new left mouse click.
  3. Perform a right mouse click on the control that was just created. The popup menu of the control is displayed. Select "Description" from this popup menu. The description window of the button is displayed.

- Modify the characteristics of the control by entering the following information:

1. Name of this control: "BTN_Display".
2. Caption of this control: "Display".

Notes

To modify the name and caption of the button, we have been using the description window of the control (also called "7-tab window").

The name and caption of the button can also be modified from the window currently in edit:

1. Click the control to select it.
2. Press the [ENTER] key or the [SPACE] key: the caption becomes editable.
3. Type the new caption and validate.

- Validate the description window of the control (green button). The control appears in the window editor.
- We are going to display a message in a dialog box (a small window proposed by the system). To do so, we will be using our first WLanguage function: ***Info***.

Notes

The programming language supplied with WINDEV Mobile is named WLanguage. It is a 5th generation language (5GL) that includes highly sophisticated commands.

1. Select the "Display" button with the mouse: all you have to do is click it.
2. Display the popup menu of the control (right mouse click).
3. Select "Code". This option opens the code editor of WINDEV Mobile, where all the WLanguage statements can be entered.

Notes

The code editor proposes different processes for each type of control. These processes correspond to the events linked to the control.

Therefore, two processes are displayed for the "Button" control:

- Initialization, run when displaying the window.
- Click the button, run when the user clicks the button.

Note: Additional processes can be added if necessary.

4. Enter the following code in the "Click BTN_Display" process:

```
Info("Hello")
```

Note about the assisted input: As soon as the first two characters are typed, WINDEV Mobile proposes all the words of the WLanguage vocabulary containing these characters. The assisted development is a very powerful feature. No more mistake when typing the name of an element: the syntax errors are reduced. All you have to do is select the requested word and validate by pressing [ENTER]. You can focus on the algorithm.

Notes

When typing this code in the code editor, you have noticed that different colors are used by the different elements. This is the syntactic coloring. The code editor allows you to easily identify the different elements handled by the code:

- the WLanguage functions are colored in blue,
- the character strings (between quotes) are colored in purple,
- the names of controls are colored in cyan.

These colors can be modified element by element in the code editor options (on the "Home" pane, in the "Environment" group, expand "Options" and select "Options of the code editor").

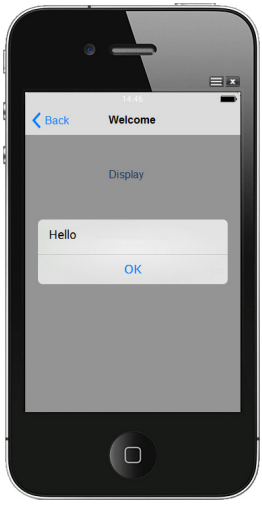
Info displays the message passed in parameter.

- Save the modifications by clicking  among the quick access buttons (on the left of ribbon) or by pressing [CTRL]+[S].
- Close the code editor (cross at the top right of the code editor). The window re-appears.

First test

For an iOS application, WINDEV Mobile allows you to run the test of the application on the development computer via the simulation mode. This test simulates an iOS device on the development computer. This test is useful when the developer has no Mac device to compile the application. However, this test does not allow you to use the hardware components of the device (GPS, SMS, camera, ...).

- Let's now run the test of the window in simulation mode.
  1. Click  among the quick access buttons (or press [F9]).
  2. Validate (if necessary) the information message regarding the simulator mode.
  3. The created window is started in execution, in a shell corresponding to the selected device (iPad or iPhone).
  4. Click the "Display" button.
  5. Validate the system window that is displayed.



- Any developer knows that running a program test can be a long and tiresome job. In WINDEV Mobile, a SINGLE CLICK allows you to run the test of the window, report or procedure while you are creating it. This is both simple and fast!
- Click the "x" button found in the simulator shell to close the window.
- The editor of WINDEV Mobile is redisplayed.

First deployment on the device

Principle

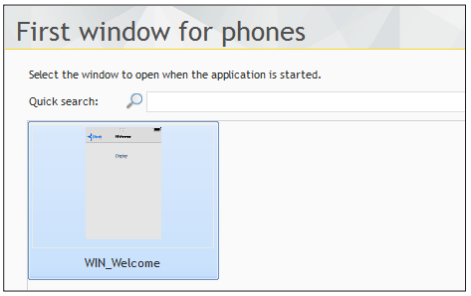
To run the application in stand-alone mode on the device, you must:

- Generate the iOS application (or Xcode project) in WINDEV Mobile.
- Transfer the generated Xcode project onto the Mac in order to compile it.
- Connect your device to your Mac and compile the Xcode project in order to generate the program for the connected device.
- Then, the program will be installed on the device. It will run in stand-alone mode.

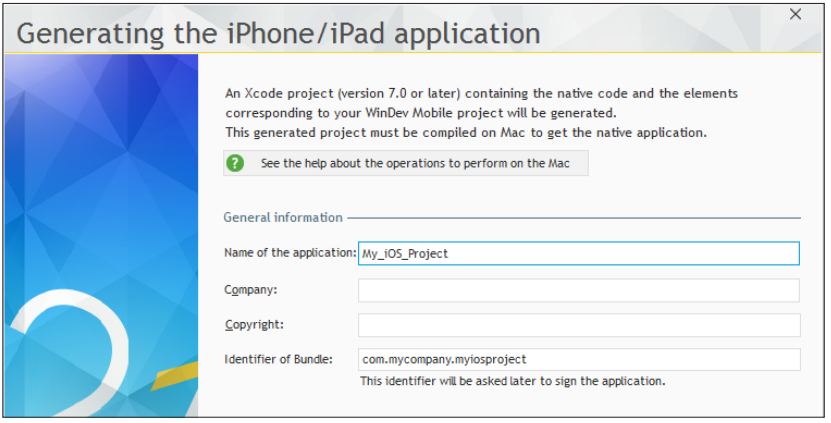
Let's take a look at these different steps.

Implementation

- To generate the iOS application:
  1. On the "Project" pane, in the "Generation" group, click "Generate" (you also have the ability to click iOS among the quick access buttons).
  2. WINDEV Mobile proposes to select the first project window. In our example, select the "WIN_Welcome" window and validate (green button at the bottom of the screen).



3. The wizard for generating an iPhone/iPad application starts.



4. The first wizard step is used to:
- define the name of the application, the company and the copyright.
- enter the bundle identifier.

Notes

This identifier is the unique identifier of your application beside Apple. It is defined and saved on the Apple developer account.

This identifier will be used to save your application in order to run its test and to deploy it. By default, WINDEV Mobile automatically proposes an identifier that respects the development standards of Apple. This identifier can be modified.

5. Go to the next step. Specify the path of the different icons found in the application. Several icons must be supplied:
- icons for iPad and iPad Retina,
- icons for all the models of iPhone (the iPhone 4 has a different resolution with the Retina screen).

6. Go to the next step. Specify the path of the different images used when starting the application for iPad and for iPhone (images in PNG format). Default images are automatically created for your application.

7. Go to the next step. Specify the version number of the generated application.

8. Go to the next step. This step is used to include specific files (data files, images, ...). This possibility will not be used in our example. Keep the default options.
9. Go to the next step. This step is used to specify:
- the minimum iOS version required to run the application.
- whether files can be shared with iTunes. If this option is checked, you will have the ability to retrieve the application files on Mac during the synchronization. For example, if data files have been supplied with the application, the iTunes application will allow you to retrieve these files.

10. Validate the wizard. The generation is performed in the EXE folder of the project directory. The directory containing the source code that will be used on Mac is named "Project_name.xcode.gen" ("My_iOS_Project.xcode.gen" in our example). This is the directory that must be copied onto Mac. Click the "Open the generation directory" button.

The other operations must be performed on the Mac. You must:
- Transfer the WINDEV Mobile project onto Mac.
- Compile the project in Xcode.

Transfer the WINDEV Mobile project onto Mac

▶ To transfer the WINDEV Mobile project onto MAC:
1. Copy the entire folder generated in the EXE directory onto an external media (USB key, external hard disk, shared directory with MAC on network). This directory is named <Project Name>.xcode.gen.
2. Paste this folder onto the MAC where the application will be compiled.
3. Open the folder on MAC and double-click the folder named "Project_name.xcodeproj".
4. The project is opened in Xcode.

Compile the project in Xcode

WINDEV Mobile automatically generates an Xcode project for your iOS compilations. To simplify the implementation of applications, WINDEV Mobile generates a "Scheme" for Xcode.

▶ To compile the project in Xcode:
1. In the drop-down list found in the top left corner, select the compilation options. Select the scheme corresponding to your application then the compilation target (device currently connected or a simulator).
2. To start the compilation, select "Product .. Clean" then "Product .. Build".
3. A status report of compilation is displayed at the top ("Succeeded" or the number of warnings and errors otherwise). You have the ability to click these symbols to see the list of errors/warnings.
4. Once the program is compiled without error, you can start the simulation ("Product .. Run"). The simulation window appears with the application.

Then, you have the ability to run the test of your application on your iPhone or iPad.

LESSON 3.2. INTERFACE (GUI)

This lesson will teach you the following concepts...

- Choosing the resolution according to the device
- Orientation of the window
- Management of touchscreen

Estimated time: 20 min

Overview

The iOS system is available on the phones (iPhone), on the tablets (iPad) and on the iPod. WINDEV Mobile allows you to easily create interfaces that adapt to the device used.

Choosing the resolution according to the device

When creating a project, you must choose the device on which the application will be deployed:

- iPhone,
- iPad,
- iPhone and iPad.

Two cases may occur:

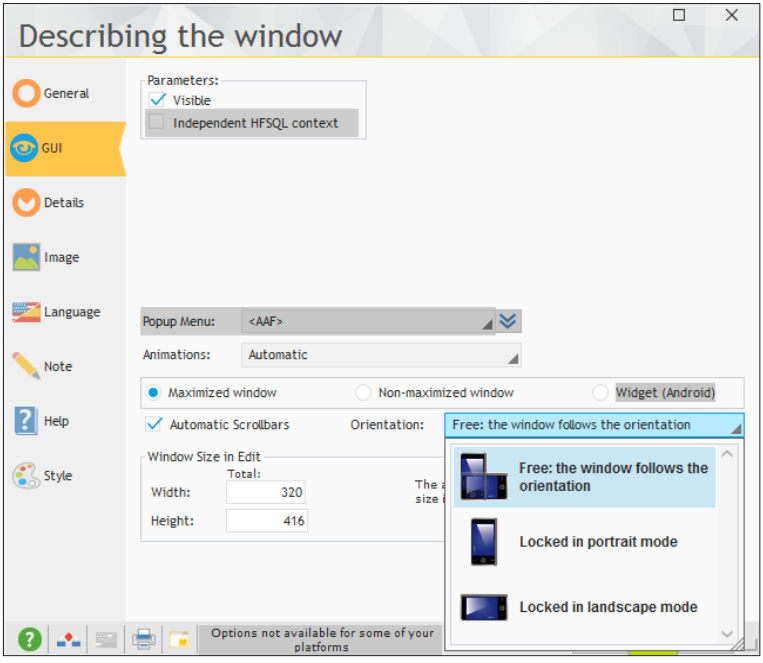
- **You know the target device**: in this case, all you have to do is select it. The wizard for window creation will allow you to create windows for this target device.
- **You do not know the target devices**: in this case, in the wizard for project creation, select "iPhone and iPad". When creating the windows, you can:
  - develop your windows for iPhone. Via the anchoring of controls in the window, the content will be adapted to the iPad (recommended solution).
  - use the layouts to create different interfaces according to the runtime platform and to its resolution.
  - develop 2 sets of windows, one for iPhone, one for iPad.

Orientation of the window

In iPhone or iPad, a window can have one of the following orientations:

- Locked in portrait mode,
- Locked in landscape mode,
- Free: the window follows the orientation of the device.

This orientation is defined in the "IHM" tab of the description window of the window ("Description" from the popup menu of the window).



No specific operation must be performed in the two first cases.

For a free window, the organization of controls and their size must adapt to the orientation. The anchoring mechanism must be used to get a proper result.

Practical example

- Open (if necessary) the "My_iOS_Project" project that was created in the previous lesson.

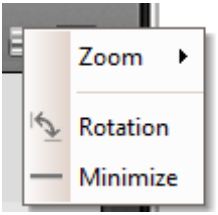
Answer

A corrected project is available. This project contains the different windows created in this lesson. To open the corrected project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "My iOS project (Answer)".

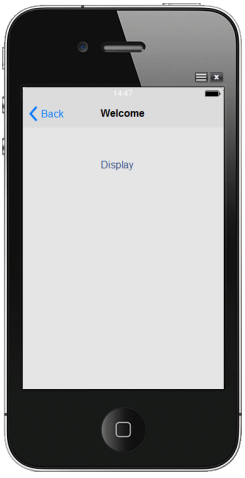
In our example, the project was created for a phone and its test was run in portrait mode in the simulator.

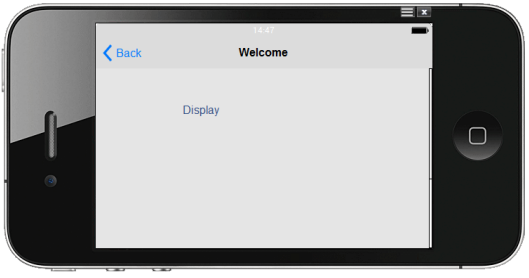
We are now going to run its test in landscape mode in the simulator.

- Run the project test (among the quick access buttons).
  1. The window is displayed in portrait mode.
  2. In the simulator, click the menu in the shell ( ).
  3. A popup menu appears. Change the orientation of the window with the “Rotation” option.



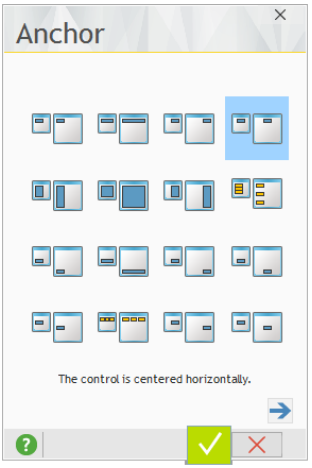
  4. The orientation of the window changes on the screen.
  5. In our example, the location of the button does not change: it does not adapt to the orientation of the screen.





- We are now going to modify our window in order for the "Display" button to be centered in the window and to remain centered regardless of the device orientation.
- Stop the test and go back to the editor.
- To center the button in the window:
  1. Select the button (click the button).
  2. On the "Alignment" pane, in the "Centering and distribution" group, click "Center in the parent (horz)".
- In order for the button to remain centered in the window, we are going to use the control anchoring:
  1. Select the button (click the button).
  2. Display the popup menu (right mouse click).

3. Select "Anchor": the window for defining anchors is displayed:



4. Select "Horizontally centered" and validate (green button).

Notes

In the window displayed in the editor, you will notice the little red arrows in the control. These arrows indicate that the control is anchored.

Run the project test (among the quick access buttons):
- The button is centered in portrait mode.
- Change the orientation of the simulator.
- The button remains centered in landscape mode.

Management of touchscreen

One of the most important aspects of the interface for a mobile application is the management of the touchscreen feature.

A "multitouch" feature is a technique allowing the user to interact with a device via several contact points.

Handling images is one of the most common features of the multi-touch. The display size on a phone being reduced, it is often necessary to perform a zoom and/or to move in an image.

This allows you to perform a zoom on an image via the contact of 2 fingers moving apart.

To manage the "multi-touch", WINDEV Mobile proposes:
- Specific options available in the Image control.
- Specific WLanguage functions.
- Specific optional processes.

See the online help for more details.

Practical example

- Open (if necessary) the "My_iOS_Project" project that was created in the previous lesson.

Answer

A corrected project is available. To open this project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "My iOS project (Answer)".

- In the "WIN_Welcome" window, create an Image control:

1. On the "Creation" pane, in the "Usual controls" group, click "Image".
2. The Image control appears in creation under the mouse.
3. Move the mouse in the window toward the position where the control must be created. To drop the control in the window, all you have to do is perform a new left mouse click.
4. Double-click the Image control: the description window of the control is displayed.
5. In the "General" tab, select an image found on your disk in the "Image" edit control via the file picker([...] button).
6. If the image is found in a directory other than the project directory, WINDEV Mobile proposes to copy the image file into the project directory. Accept by clicking the "Copy the file into the suggested directory" button.
7. Display the "Details" tab: the options for managing the multi-touch are displayed:

8. Select "Automatic scroll and zoom".
9. Validate the description window of the control.
10. Save the window (click among the quick access buttons).

11. A GUI error appears in the error pane: the automatic scrollbars of the window are in conflict with the scroll features of the Image controls.

12. To avoid this GUI error, disable the scrollbars of the window:

- Display the description window of the window ("Description" from the popup menu).
- In the "GUI" tab, uncheck "Automatic scrollbars".
- Validate the description window.

13. Save the window (click  among the quick access buttons). The GUI error disappears.

Notes

Multi-touch support cannot be tested in the simulator. To check this feature, you need to deploy the application on the mobile device. We'll see how to do this in “Android and iOS: Developing an application”, page 95.

14. Close the project.

The different types of controls

WINDEV Mobile proposes several controls. These controls are used to display or enter data. Some controls are specifically intended for a mobile interface.

To develop your applications, you can use the standard controls (edit controls, images, radio buttons and check boxes) but also more specific controls such as:

- the multiline zones to create GUI similar to the native iOS windows.
- the Map control to view a position on a map or an itinerary.

Some of these controls will be presented in the lesson ”Android and iOS: Developing an application”, page 95.

Lesson 3.3. Distributing the application

This lesson will teach you the following concepts...

- Available distribution modes

Estimated time: 5 min

Overview

WINDEV Mobile allows you to develop applications for the iOS operating system.
Once the applications are created, developed and checked, all you have to do is deploy them.

Deployment

Three methods can be used to deploy the application on a device (iPhone or iPad).

- Via App Store: This type of distribution allows you to distribute your application without any restrictions via the sales network of App Store. Your application will include the signature linked to your certificate but it will not be linked to a single device.
- Via an In-House network: This type of distribution allows you to distribute your application via a Web server to a group of users working for the same company. To use this type of distribution, you must register to the iOS Developer Enterprise program. Your application will include the signature linked to your certificate but it will not be linked to a single device.
- Via an Ad Hoc network: This type of distribution allows you to install the application on a network containing up to 100 devices (iPhone or iPad). The application must be recompiled for the target device by including the certificate for the signature as well as the unique identifier of the device.

Caution: To run the test of the application and/or to deploy the application on a device (iPhone or iPad), you must register toward the iOS Developer Program. This registration is not free of charge. The list of registration programs is available from the following address:

http://developer.apple.com/programs/which-program/

Three types of registration are available:

- iOS Developer Program - Individuals
- iOS Developer Program - Organizations
- iOS Developer Enterprise Program

This registration is used to get a developer certificate allowing you to sign your applications in order to compile them and to distribute them. This certificate is not free of charge. This developer certificate is required even for a simple setup for test (debug) on a device.

DEVELOP 10 TIMES FASTER

PART 4

Programming concepts

21

Lesson 4.1. Concepts and terminology

This lesson will teach you the following concepts...

- Main concepts of WINDEV Mobile.
- Terminology used by WINDEV Mobile.

Estimated time: 10 min

Overview

In the previous parts, we have created our first Android application and/or our first iOS application. After these exercises, let's talk about the main concepts of WINDEV Mobile and about the terminology specific to WINDEV Mobile.

Main concepts

WINDEV Mobile allows you to easily create an application. But what is an **Application**?
An **application** is a tool used to automatically perform tasks, actions.

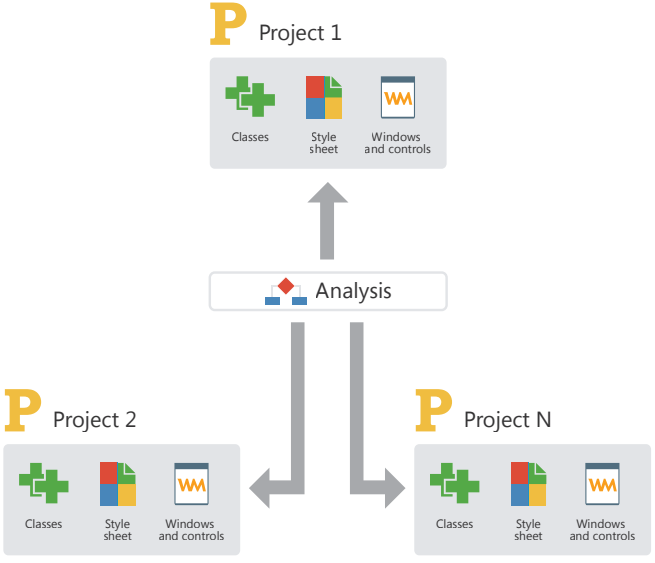
To create an application, WINDEV Mobile proposes to create a **project**. A project links and organizes the different program elements. The program corresponding to the application will be created from the project.

If your application is using data, WINDEV Mobile allows you to define the structure of the database via **the analysis**. The WINDEV Mobile analysis contains the description of the files (also called "Tables" in several databases). These files will contain the application data.

Notes

Describing the data files in the analysis does not mean that they are created. The data files are physically created when running the application.

One or more WINDEV Mobile projects can be linked to the same analysis. In this case, we talk of shared analysis. For example, an application for business management can be divided into several modules. Each module is using the same analysis (at run time, each application can also use the same data files).



Terminology

As already seen, a WINDEV Mobile project (linked to an analysis if necessary) is used to create an application. Before we actually start working with WINDEV Mobile, let's go back to the vocabulary used in WINDEV Mobile. Indeed, several terms are specific to WINDEV Mobile and they may differ from the ones used in other tools.

In the analysis, the terms used are as follows:

- **File**: The analysis is used to describe the structure of the database files. A "File" may correspond to a "table" in other databases.
  In WINDEV Mobile, "***Table***" is a term that defines a graphic object used to view the content of a data file in table format and/or to enter rows. A table can be used to enter the details of an order for example.
- **Record**: A record is sometimes called row. A file record corresponds to all the items defined for the file.
- **Item**: In the analysis, an item represents a section of a data file. All the items found in a data file are used to define the structure of a record.
- **Key/Index**: With WINDEV Mobile and its HFSQL database, the concept of index is linked to the concept of key. The concept of key is part of the characteristics of an item. The keys are used to improve the speed for accessing the data and to simplify the browse operations performed on the data files. In WINDEV Mobile, if a HFSQL data file includes several key items, a single index file will be created at run time.

In the windows and reports, the terms used are as follows:

- **Window**: The windows are used to display or enter information. The windows are also called "Screens" or "Dialog boxes". The user can directly act on the windows via controls, buttons, ...
- **Report**: The reports are used to get a custom view of information. This information can come from the database, from text files, from controls found in the windows, ... The reports can be generated in PDF in the mobile applications.
- **Control**: "Control" is the term used to identify the different graphic objects displayed in a window or in a report.
- **Skin template**: The skin template is used to define the "appearance" of the application: visual appearance of windows, buttons, controls, ...
- **Style**: The style groups the graphic characteristics of an element: background image, border, font, ... The styles of the different elements found in the interface of a WINDEV Mobile application are grouped in a style sheet.

Lesson 4.2. Programming concepts

This lesson will teach you the following concepts...

- The different types of variables
- Main statements of WLanguage
- The main operators of WLanguage
- Procedures and functions
- Processing the strings, numeric values and currencies

Estimated time: 1 hour

Introduction

In the previous lesson, we have worked with the code editor of WINDEV Mobile and its language named WLanguage. This lesson allows you to discover the programming concepts of WLanguage by presenting the following topics:

- Declaring the different types of variables,
- Main statements of WLanguage,
- Procedures and functions,
- Processing strings,
- Processing numeric values.

Declaring the different types of variables

The different types of variables

WINDEV Mobile proposes several types of variables (boolean, integer, real, currency, string, date, time, duration, datetime, variant, array, structure, ...).

The syntax for declaring a variable is very simple: all you have to do is specify the name of the variable and its type:

```
VariableName IS VariableType
```

Some examples:

```
Subscript is int
SupplierName is string
PriceTable is array of 10 currencies
I, J, K are ints
Counter is int = 120
B1 is boolean = False
```

Notes

Format of character strings

In a WINDEV Mobile application, the character strings are character strings in Unicode format. No specific declaration is required. The code:

```
SupplierName is string
```

automatically creates a Unicode string.

See the online help (keyword: "Data types") for more details.

Declaring the variables and their scope

Two types of variables can be handled in WLanguage:
- The global variables.
- The local variables.

The global variables can be global to the project, to a window or to a report. All you have to do is declare these variables:
- in the initialization code of the project, to declare the global variables of the project. These variables can be used in all the processes of the project and project elements (windows, reports, ...)
- in the declaration code of the global variables of the window, to declare the global variables of the window. These variables can be used in all the processes of the window and window elements.
- in the declaration code of the global variables of the report, to declare the global variables of the report. These variables can be used in all the processes of the report and report elements.

All the variables declared elsewhere are local variables.

Caution!

Most developers are tempted to declare all their variables as "global variables" in a project. This type of programming is quite "easy". All the variables being global variables, they can be handled from any process.

But this type of programming often causes overwritten variables and exception problems.

Therefore, we advise you to declare a limited number of global variables and to declare local variables when necessary.

If you want to share values between 2 windows, we highly recommend that you use the method for "passing parameters" that will be presented later in this tutorial.

Main statements of WLanguage

WLanguage is a 5GL made of:
- WLanguage functions.
- WLanguage properties.
- WLanguage keywords.
- WLanguage statements.

You will discover all these statements as you progress through this tutorial.

The main statements (used to create conditions and loops or to enter comments) will be presented in this lesson.

Conditional statements

WLanguage allows you to manage the conditional statements such as:

- **IF, THEN, ELSE, END** to run a test on a condition.
- **SWITCH, CASE, END** to perform one or more actions according to the result of a test on a condition.

Some examples

```
IF EDT_Maximum > Random(1, 999) THEN
  Info("Congratulations, you won!")
ELSE
  Info("Bad luck, you've lost!")
END
```

```
SWITCH day
  CASE "Monday"
  // First day of the week
  CASE "Wednesday"
  // Third day of the week
  CASE "Friday"
  // Fifth day of the week
  CASE "Saturday", "Sunday"
  // It's the weekend
  OTHER CASE
      // It's another day
END
```

Loop statements

WLanguage proposes several methods for managing the loops:

- **FOR, END** for a given number of iterations.
- **WHILE, END** for an undefined number of iterations whose exit condition is checked at the beginning of the loop.
- **LOOP, END** for an undefined number of iterations whose exit condition is checked inside the loop. The BREAK statement is used to exit from this loop.

Notes

WLanguage also proposes FOR EACH and END loops used to browse the control elements, the character strings, the records of a data file...

Some examples

```
FOR i = 1 TO 100    // There is no need to declare i
  Ctr ++   // Equivalent to Ctr=Ctr+1
END
```

```
i is int = 0
WHILE i < EDT_Maximum
  i ++   // Equivalent to i=i+1
END
```

```
i is int = 0
LOOP
  i ++   // Equivalent to i=i+1
  IF i > EDT_Maximum THEN BREAK
END
```

Comments

To enter comments in the code, the code line must start with // (two "/" characters).
Example:

```
// This is a comment line
```

Tip

Several code lines can be set in comment ; to do so, select the code lines with the keyboard (or with the mouse) and press the [CTRL] / keys (on the numeric keypad).

To perform the reverse operation (to remove the comments), select the code lines with the keyboard (or with the mouse) and press the [CTRL] [SHIFT] / keys (on the numeric keypad).

Main WLanguage operators

WLanguage includes several types of operators:

- the logical operators (AND, OR, NOT, ...),
- the arithmetic operators that are used to add, subtract, ...
- the comparison operators that are used to compare values. Some of them have been used in the previous paragraph (>, <, =, ...),
- the binary operators that are used to perform operations on the binary values,
- the assignment and exchange operators (=, <=>),
- the indirection operators that are used to build the name of a control from an expression.
- the operators on the character strings.
- ...

We are going to present the logical operators and the comparison operators. See the online help (keyword: "Operators") for more details.

The logical operators

WLanguage includes 5 logical operators that are used to perform logical operations and to build conditions:

- AND and _AND_ that correspond to the logical multiplication.
- OR and _OR_ that correspond to the logical addition.
- NOT that corresponds to the logical negation.

The comparison operators

WLanguage includes several comparison operators that are used to perform several processes:

- equality operators: equality (=), flexible equality (~=) or very flexible equality (~~).
- comparison operators: different (<>), less and greater than (<, <=, >, >=) or starts with ([=, [=~, [=~~).

Procedures and functions

Definition

When a process is called several times in a project or in a window, it may be interesting to create a procedure containing this process. Then, all you have to do is call the procedure whenever required.

The procedures and the functions are available in programming:

- The **functions** return a result.
- The **procedures** are used to run a specific process.

WINDEV Mobile allows you to easily manage the two types of processes: there is no difference between a procedure and a function. This is the reason why we shall talk about "procedure" in the rest of this lesson.

You have the ability to create "local" procedures and "global" procedures.

Local procedure

A "local" procedure is linked to a single window.

A local procedure can only be used in the processes of the window in which it was declared (and in the processes of the controls found in this window). It is part of the window.

Global procedure and set of procedures

The "global" procedures are stored in "sets of procedures". Each "set of procedures" is a file that contains all the global procedures that are associated with it. The extension of this file is ".WDG". For example, a set is used to group the procedures according to a topic: CalcVAT, CalcShippingCost, ...

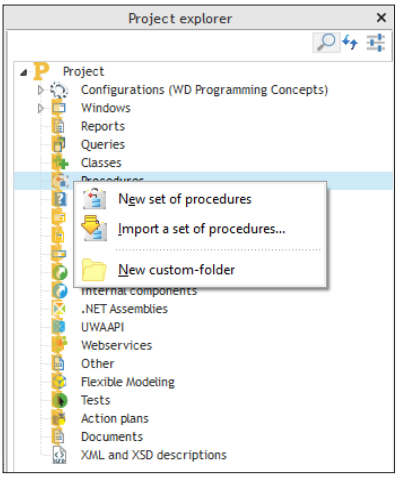
You can create as many sets of procedures as necessary in a project.

A set of procedures is used to:

- share the global procedures between several developers, for the same project.
- share the global procedures between several projects. Indeed, the same set of procedures can be used in several projects.

▶ To create a set of procedures:

1. Select the "Project explorer" pane.
2. Select "Procedures".
3. In the popup menu (right mouse click), select "New set of procedures".



4. In the window that is displayed, specify the name of the set of procedures and validate.
5. The processes associated with the set of procedures are displayed in the code editor.

Then, you will have the ability to create global procedures (this creation is presented in details in the rest of this lesson).

How to decide whether a procedure is global or local?

To decide" whether a procedure must be global or local, ask yourself the following question: "Will the procedure be used in this window only or can it be called from another window?"

- If the procedure is called "from this window only", the procedure can be "local".
- If the procedure can be called "from other windows", the procedure must be "global".

About passing parameters

A procedure can manage parameters. The parameters can be mandatory or optional parameters.

The "mandatory" parameters are always defined before the "optional" parameters. The declaration of an "optional" parameter is performed by assigning a default value when declaring the parameter. For example:

```
PROCEDURE MyProcedure (Param1, OptionParam = "Default value")
```

A window can also return a value to the process that called it (value by address by default). See the online help about **..ReturnedValue** for more details.

Calling a procedure

To call a procedure in a process, all you have to do is write its name in the code editor and specify parameters if necessary.

WINDEV Mobile manages the calls to nested procedures.

Tip

In the code editor, when you are positioned on a procedure name, press the [F2] key if you want to view the code of this procedure. Press [CTRL]+[F2] to go back to the name of the procedure in the previous code.

Creating a procedure

A procedure can be created from the main editor of WINDEV Mobile. All you have to do is use the "Project explorer" pane.

▶ To create a local procedure:

1. In the "Project explorer" pane, select the name of the window associated with the local procedure.
2. Click the arrow on the left to display the different elements.
3. Select "Local procedures".
4. Select "New local procedure" from the popup menu of "Local procedures".
5. In the window that is displayed, specify the name of the procedure and validate.
6. The procedure appears in the code editor. Enter the code of the procedure.

▶ To create a global procedure:

1. Select the "Project explorer" pane.
2. Select "Procedures".
3. Create (if necessary) the set of procedures where the global procedure must be created. If this set exists, select it.
4. Select "New global procedure" from the popup menu.
5. In the window that is displayed, specify the name of the procedure and validate.
6. The procedure appears in the code editor. Enter the code of the procedure.

Reminder: A procedure can also be created from the code selected in the code editor ("New .. Create a procedure containing the selected code" from the popup menu). That's what we've done in the previous lesson.

Tip

When should the procedures be used?

- When a process is used several times in the same window, we recommend that you use a procedure local to the window that will contain this process.
- When a process is used several times in a set of windows, we recommend that you use a procedure global to the project that will contain this process.

Processing strings

The ability to handle character strings is one of the most important features of a programming language.

Several WLanguage features can be used to handle the character strings: WLanguage functions, extraction operators, concatenation operators, ...

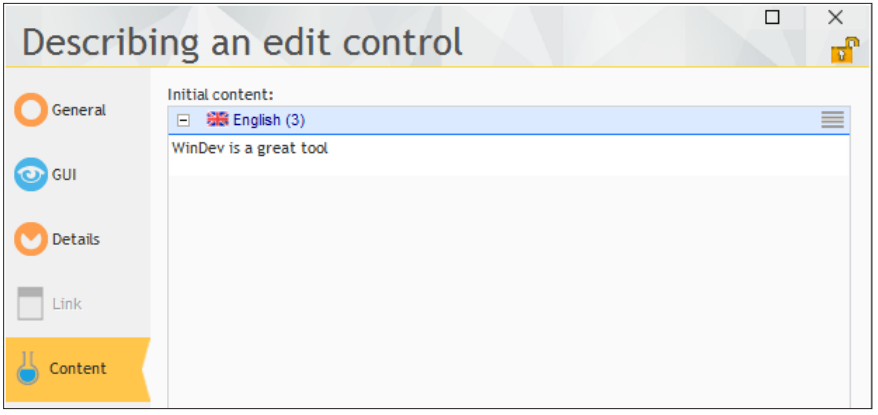
The most common functions for handling the character strings will be presented in this tutorial. See the online help (keyword: "Character string") for more details.

Main operations performed on a character string

Initialization

A text control (a Static control or an edit control for example) can be initialized by one of the following methods:

- in the "Content" tab of the description window of the control:



- by programming, by assigning the string to the name of the control:

```
EDT_Text = "WinDev Mobile is a great tool"
```

- by programmation, by using a string variable:

```
str is string
str = "WinDev Mobile is a great tool"
EDT_Text = str
```

Concatenation

A string can be built from several other strings. We talk of **string concatenation**. To concatenate two strings, all you have to do is use the "+" operator.

```
// Info is used to display the result on the screen
Info(EDT_Text1 + EDT_Text2)
```

Extracting sections from a string

A section can be extracted from a string by:

- the [[and]] operators (caution, no space character must be found between the two opening square brackets "[[" and between the two closing square brackets "]]").

```
Info(EDT_Text[[1 A 6]])   // Displays "WinDev"
```

- ***ExtractString***, that extracts a sub-string from a string:

```
Info(ExtractString(EDT_Text,1," "))   // Displays "WinDev"
```

- ***Middle***, that extracts a section of string from a string:

```
Info(Middle(EDT_Text,4,2))  // Displays "De"
```

- ***Left***, that returns the left section of a string:

```
Info(Left(EDT_Text,6))  // Displays "WinDev"
```

- ***Right***, that returns the right section of a string:

```
Info(Right(EDT_Text,3))  // Displays "ool"
```

Various operations

The size of a string is returned by ***Length***:

```
Info(Length(EDT_Text))   // Displays the size of the string
```

A string can be changed into uppercase characters with ***Upper*** or to lowercase characters with ***Lower***:

```
Info(Upper(EDT_Text))
Info(Lower(EDT_Text))
```

A string can be sought in another string by ***Position***:

```
StringToFind is string = "WinDev"
Pos is int
Pos = Position(EDT_Text, StringToFind)
IF Pos = 0 THEN
  InfoBuild("%1 not found in the text", StringToFind)
ELSE
  InfoBuild("%1 found in the text", StringToFind)
END
```

You can also find the position of a character string inside another one while ignoring the case. To do so, ***Position*** must be associated with the **IgnoreCase** constant:

```
Pos = Position(EDT_Text, StringToFind, 1, IgnoreCase)
```

To find out the number of occurrences of a given character string inside another character string, use ***StringCount***:

```
NbOccurrences is int
NbOccurrences = StringCount("anastasia", "a")  // Returns 4
```

You also have the ability to find a string and to replace it in a single operation via ***Replace***:

```
Replace(EDT_Text, "WinDev", "WinDev Mobile")
```

Tip

To build a string from a string and from the result of a function, we recommend that you use **InfoBuild**. This function is used to build the text displayed according to parameters (%1, %2, ...):

```
InfoBuild("%1 not found in the text", ...
      StringToFind)
```

You also have the ability to use the simple concatenation:

```
Info(StringToFind + " not found in the text")
```

Using ***InfoBuild*** presents the following benefits:

- the readability of the code: the string is easier to read
- the translation: a string can be entirely translated. The words and the parameters can be reversed. The translator has a single obligation: include %1, %2, %3.

According to the same principle, WLanguage also proposes ***StringBuild***, ***ErrorBuild***, ...

Processing numeric values

The calculations on numeric values can be performed from numeric edit controls or by using the typed variables (integer, real, numeric, currency, ...).

Main operations performed on the numeric values

Initialization

A numeric edit control can be initialized by one of the following methods:

- the "Content" tab in the description window of the control.
- by programming, by assigning the numeric value to the name of the control:

```
EDT_InitialValue = 3.14
```

- by programmation, by using a numeric variable:

```
int1 is int
int1 = 1234
EDT_InitialValue = int1
```

The "+" operator is used to concatenate a string and a numeric value:

```
Info("The EDT_InitialValue control contains the value: " + ...
      EDT_InitialValue)
```

Tip

If you run the following code:

```
Info("A calculation: " + 1 + 2)
```

The dialog box will display "A calculation: 12".
To display the result of the calculation, you must use the following code:

```
Info("A calculation: " + (1 + 2))
```

The dialog box will display "A calculation: 3".

Various operations

Some examples of numeric operations performed in WLanguage:

- The integer part of a number is returned by ***IntegerPart*** and the decimal part of a number is returned by ***DecimalPart***:

```
InfoBuild("Integer part of %1: %2" + CR + ...
  "Decimal part of %1: %3", EDT_SignedReal, ...
  IntegerPart(EDT_SignedReal), ...
  DecimalPart(EDT_SignedReal))
```

- The absolute value of a number is returned by ***Abs***:

```
InfoBuild("Absolute value of %1: %2", ...
  EDT_SignedReal, Abs(EDT_SignedReal))
```

- The rounded value of a number is returned by ***Round***:

```
InfoBuild("Rounded value of %1: %2", ...
  EDT_SignedReal, Round(EDT_SignedReal, 1))
```

- ***Root*** is used to calculate the Nth root of a number:

```
InfoBuild("Square root of %1: %2", ...
  EDT_Reference_Root, Root(EDT_Reference_Root, 2))
```

- ***Power*** is used to raise a number to the power of N:

```
InfoBuild("Power 2 of %1: %2", ...
  EDT_Reference_Power, Power(EDT_Reference_Power, 2))
```

Note: the type of the numeric edit controls

When a control is defined as a numeric control, its type may be undefined (integer, real, double real, ...). Its type is automatically defined according to the mask selected for the control.
To force the type of a control, all you have to do is use a typed variable. For example:

```
Val1 is int
Val1 = 123456789
EDT_NUM = Val1     // Assign the control
Val1 = EDT_NUM     // Retrieve the control
```

Processing currencies

Details

The reals are used to handle the decimal numbers by programming.

The currencies can also be used to manage these decimal numbers but with a better precision.

When using reals, the rounding is performed by the operating system and these rounding operations may induce calculation errors.

For example:

```
// The calculation is false with a Double Real variable
MyReal is real
MyReal = 18.6 - 8.6 - 10
Error("18.6 - 8.6 - 10 = " + MyReal)
```

With currency variables, the calculation is performed by WLanguage.

WLanguage guarantees 23 significant digits which allows for more precise calculations.

With the following code, the calculation is correct:

```
// The calculation is correct with a Currency variable
myCurrency is currency
myCurrency = 18.6 - 8.6 - 10
Info ("18.6 - 8.6-10 = " + myCurrency)
```

To perform divisions on currencies, we recommend that you use intermediate variables of "Currency" type.

```
Currency1, Currency2, Result are currencies
// Assigns a number to the two currency variables
Currency1 = "12 345 678 901 234 567,123456"
Currency2 = "12 345 678 901 234 567,123456"
// Divide Currency1 by Currency2
Result = Currency1/Currency2
// Displays the result of the division
Info("12 345 678 901 234 567,123456", " divided by ",...
  "12 345 678 901 234 567,123456", " =  "+Result)
```

Note

To perform advanced calculations, WLanguage proposes the **Numeric** type. By default, the Numeric type corresponds to 32 digits for the integer part and to 6 digits for the decimal part (like the currency type). The numeric type allows you to configure the number of digits that will be used for the integer part and the number of digits that will be used for the decimal part.

See the online help (keyword: "Numeric") for more details.

Mixing strings and numeric values

WINDEV Mobile is very flexible when assigning variables. For example, a string of digits can be assigned in a numeric variable (and conversely). For example:

```
i is int
c is string
i = 123
c = i    // the variable c contains the string "123"
c = "456"
i = c    // the variable i contains the value 456
```

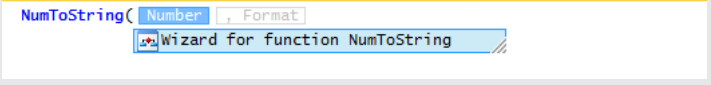
To transform a number into a character string while respecting a specific format, all you have to do is use ***NumToString***. For example:

```
NumToString(1234.567,"012,3f") // returns "00001234,567"
```

The code wizard proposed by WINDEV Mobile can be used whenever you want to call ***NumToString*** without exactly knowing which parameters to use: this wizard will inform you of the syntax to use according to the requested result.

Notes

In the code editor, various information can be displayed when typing the name of a function followed by the opening bracket:



- the name of the wizard corresponding to the function. A wizard starts if this option is selected. Via simple questions, this wizard automatically writes the requested syntax.
- the name of an example that is using this function. The example is automatically opened in the editor if this option is selected.

The "reverse" function of ***NumToString*** is ***Val***. This function is used to convert a string into a numeric value.


DEVELOP 10 TIMES FASTER
PART 5
Android and iOS:
Developing an
application
21

Lesson 5.1. Overview

This lesson will teach you the following concepts...

- What is a multi-platform project?
- Which project is used for this part?
- How to enable a platform?

Overview

Two distinct projects have been created in the previous parts: an iOS project and an Android project.

This new part will allow you to develop an Android and/or iOS application that is using a HFSQL Classic database.

Note

This part can be followed both by the developers of Android applications and by the developers of iOS applications. The operations performed are identical, no matter whether the project is developed for Android only or for iOS only.

We are going to develop a multi-platform project that can be used both on an Android platform and on an iOS platform.

Most of the time, when developing an application for Mobile, this application must operate both on Android and on iOS.

With WINDEV Mobile, there is no need to develop two different projects, to maintain them and to make them evolve in parallel. All you have to do is create a single project associated with several platforms, Android and iOS for example: this is called a **multi-platform project**.

Each project element (windows, queries, ...) can be associated with one or more platforms.

If a window is common to several platforms, the specific features of the platform can be managed via the **layouts**. The layout is used to define several views of a window in the same project without duplicating this window.

When the project is developed, all you have to do is select the requested configuration to create and deploy the application on the selected platform.

The sample project used

In this lesson, we are going to develop an Android and iOS application that is using a HFSQL Classic database. The creation of projects was already presented in the previous part therefore we will be working on an existing project, containing the database and the data used by the application.

Note

In iOS and Android, only the HFSQL database is accessible in native mode. Both the Classic mode and the Client/Server mode are available.

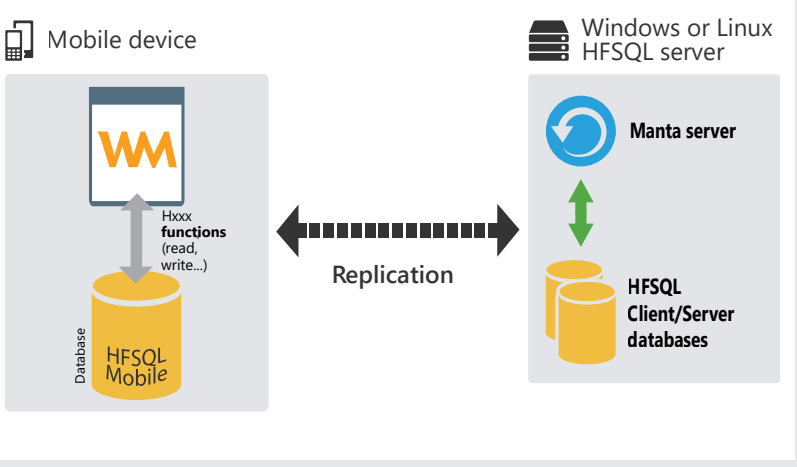
HFSQL Classic

In HFSQL Classic mode, the data files are stored on the device (iPhone, iPad, Android phones or tablets).

In this case, the application is stand-alone. No Wi-Fi or 4G connection is required.

The data is stored in the memory of the device. The maximum storage size depends on the amount of memory on the device.

If the data entered on the mobile device must be synchronized with a database found on a server (HFSQL or other), the replication must be implemented (see the online help).

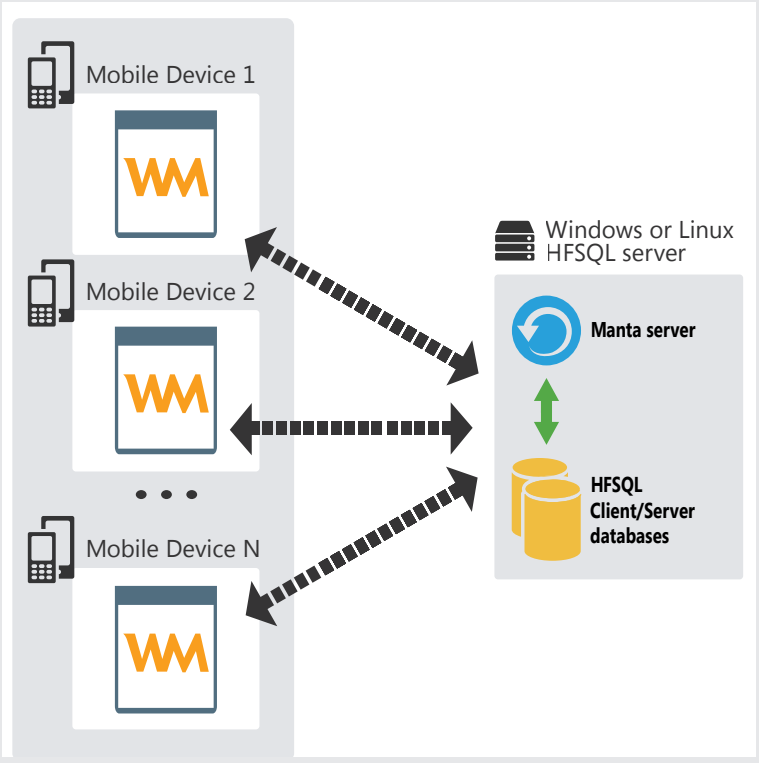


In this part, we will develop an application that is using a HFSQL Classic database.

Note

HFSQL Client/Server

In HFSQL Client/Server mode, no data is stored on the device. The data is stored on a computer on which a HFSQL server is installed.



To access this computer and this database, a method for communicating with the server must be enabled in the mobile application (Wi-Fi or 4G) in order to connect via the network or Internet.

The response times depend on the quality of the Wi-Fi or Internet network and on the amount of requested data.

The access to the data will be performed by the Hxxx functions of WLanguage and/or by SQL queries.

Opening the project

- Start WINDEV Mobile 21 (if not already done). Close (if necessary) the current project in order to display the home window.
- Open the "WM Managing Products" project.
  To do so, in the home window, click "Tutorial" and select the "iOS/Android application (Exercise)" project.
  Tip: if the home window is not displayed, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "iOS/Android application (Exercise)".

Answer

A corrected project is available. This project contains the different windows created in this lesson. To open the corrected project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "iOS/Android application (with windows)".

Choosing the platform

If you want to develop the application for the Android platform, go to Part 5.2 - Developing the application.

If you want to follow this part for iOS only, you must add the iOS platform (see the next paragraph, "Enabling the iOS platform").

Note

All the operations performed in this part can be performed on a project associated with an Android platform, on a project associated with an iOS platform or on a multi-platform project.

Enabling the iOS platform

- To enable the iOS platform, all you have to do is create a project configuration:
  1. On the "Project" pane, in the "Project configuration" group, expand "New configuration" and select "iPhone/iPad application".

Note

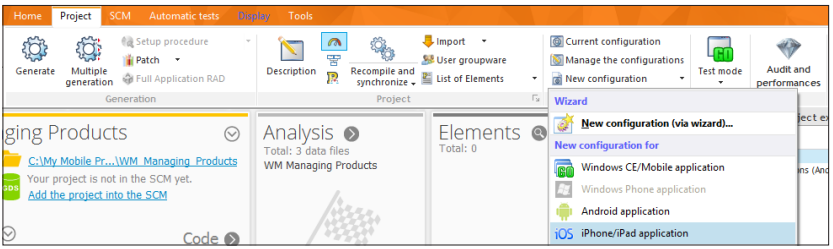
The project configurations are used to define the different types of generation supported by the project: Android, iOS, component, ...

The project elements can be:

- common to several configurations (a window used in iOS and Android for example).
- specific to a configuration (a class used by a component for example).

You can work on a specific configuration at any time: the elements that do not belong to this configuration are grayed in the project editor.

See the online help for more details.



2. The wizard for creating a project configuration starts. The wizard proposes to create an iOS platform. Go to the next step.

3. You can enter information regarding the platform. Keep the default options and go to the next step.

4. The wizard proposes to choose the type of devices affected by the project:

- Generate an application for iPhone and iPad.
- Generate an application for iPhone only.
- Generate an application for iPad only.
- Generate an application for a specific device.

Note

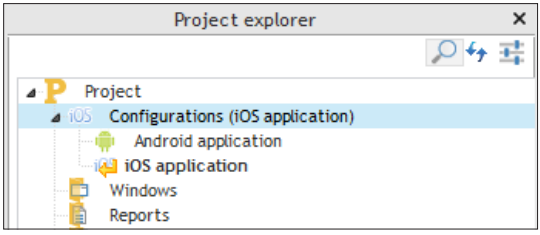
If the application is intended to operate on several iOS devices (phones with different sizes or with different resolutions for example), we advise you to use one of the following options: "Generate an application for iPhone and iPad", "Generate an application for iPhone only" or "Generate an application for iPad only".

In this case, WINDEV Mobile proposes the smallest resolution to create the application windows. Using anchors (see page 68 and page 125) will allow the application to operate on all the devices.

5. For this example, select "Generate an application for iPhone only".

6. Go to the next step and validate the wizard. The iOS configuration is automatically created.

- The presence of the new project configuration can be checked in the project explorer:
  1. Expand "Configuration (iOS application)" at the top of the project explorer
  2. The two configurations are displayed:



  3. To select a specific configuration, all you have to do is double-click the name of the requested configuration.
  4. The iOS configuration that was just created is automatically selected.

Let's now start developing the application.

Lesson 5.2. Developing the application

This lesson will teach you the following concepts...

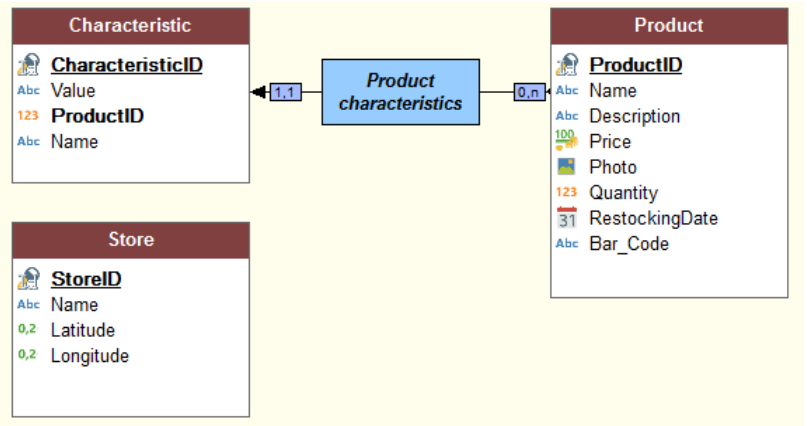
- Creating a window containing a looper via RAD.
- Specific controls: Looper control, Multiline Zone control, Map control, ...
- Handling the database
- Features specific to the device used (GPS, Photo, ...)

Project analysis

Let's take a look at our initial project. This project contains no window. It only contains the analysis describing the HFSQL Classic data files that will be used. The corresponding data files are supplied with data in order to run the different tests.

▶ To view the analysis associated with the project:

1. Click among the quick access buttons of the WINDEV Mobile menu.
2. The data model editor is displayed.



3. This analysis includes 3 data files:
   - A "Product" file, that contains the description of the product: name, price, quantity, ...
   - A "Characteristic" file, that contains the different characteristics of the product. For example, if the product is a tee-shirt, its characteristics will correspond to the size, the color, ... Therefore, the "Characteristic" file is linked to the "Product" file.
   - A "Store" file, that contains the GPS coordinates of each store.
4. Close the data model editor (click the cross at the top right of the editor).

Display the list of products

We are going to create a window used to list the different products. These products will be displayed in a "Looper" control.

This window will be created via the wizard for creating RAD windows (Rapid Application Development).

Notes

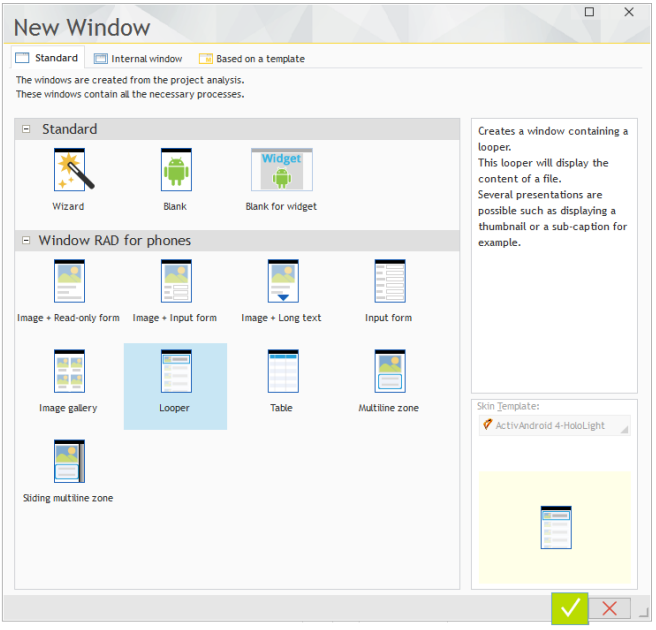
The wizard for window creation proposes several windows generated by RAD. These windows, generated from your data, propose modern interfaces for your applications and they can be immediately used.

Creating the window

▶ To create the window used to list the products:

1. Click  among the quick access buttons. The window for creating a new element is displayed: click "Window" then "Window".

2. In the wizard, select the "Standard" tab. In the "Window RAD for phones" area, choose "Looper" and validate.



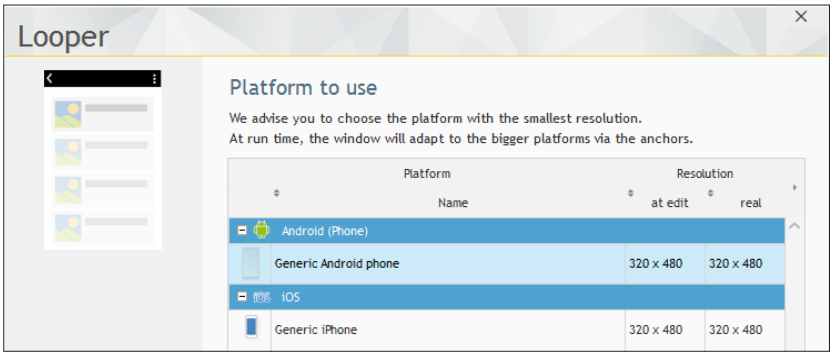
Notes

If you are using an iOS configuration, the window for creating a new window contains additional options, specific to iOS.

You have the ability to create a RAD window whose type is "Looper" on an iOS platform and on an Android platform.

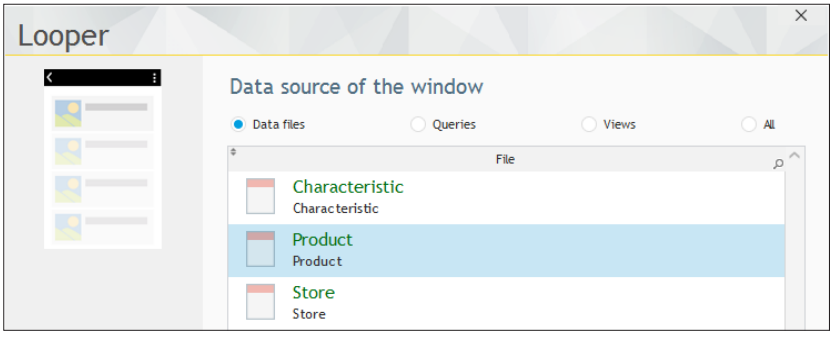
3. The wizard for creating a RAD window starts.

4. If the iOS platform was added, choose the platform with the smallest resolution. Go to the next wizard step by clicking the arrow buttons at the bottom of the window.



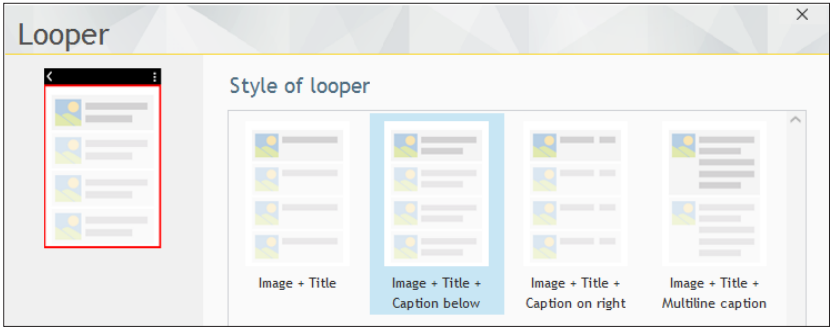
5. The wizard proposes to choose the data source associated with the window. In our case, it will be the "Product" data file:

- The "Data files" option is selected by default.
- Select the Product file.



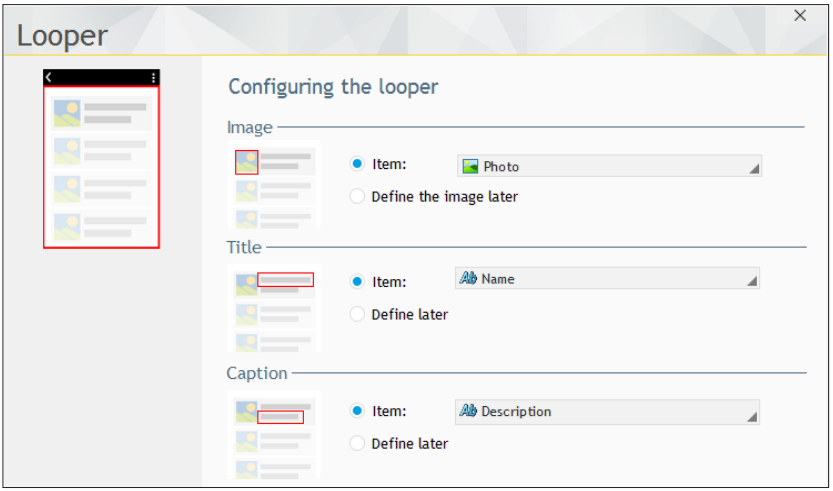
6. Go to the next step.

7. Select the style of the looper: "Image + Title + Caption below". This template is used to get an interface containing the image of the product, its name and its description.

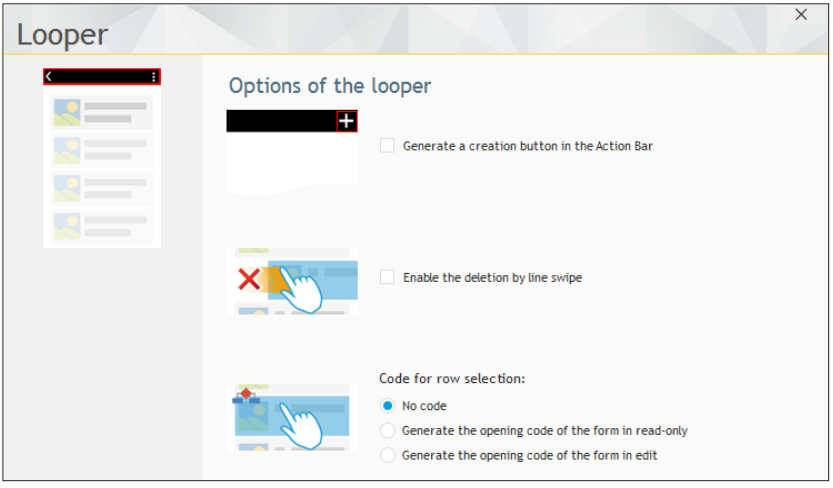


8. Go to the next step.

9. The wizard automatically proposes the items of the data file corresponding to the generated looper.

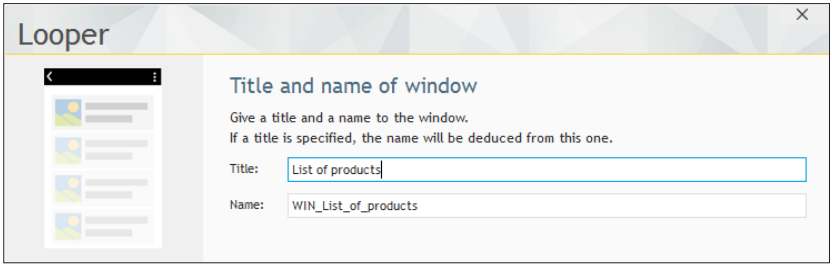


10. Keep the proposed items and go to the next step.
11. Keep the suggested sort on the "ProductID" item. Go to the next step.
12. The wizard proposes several options for generating the Looper window:

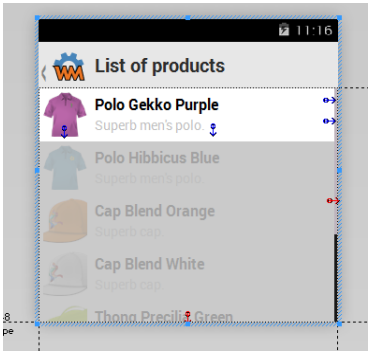


- **Generate a creation button in the Action Bar**: If this option is selected, the wizard proposes to generate a form window in edit.
- **Enable the deletion by row swipe**: If this option is selected, the user will have the ability to delete a looper element by swiping the corresponding row.
- **Generate the opening code of the form in XXX**: If this option is selected, the wizard proposes to generate a form window in edit or in read-only.

13. In our example, keep the default options. Go to the next step.
14. Give a title and a name to the generated window. Enter the title of the window: "List of products". The name of the window is automatically filled.



15. Validate the wizard. The window is automatically created, displayed in the editor and saved.

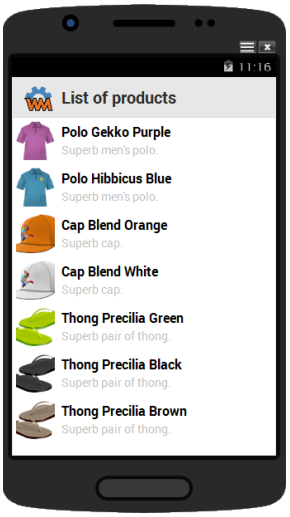


Notes

The data automatically appears in the window displayed in the editor. This concept is called "Live Data": you see the data found in your files in real time!
This feature is very useful to adapt the size of controls to their content.

▶ Save the window by clicking  among the quick access buttons.

- We are going to run a first test in the simulator to view the result. Click among the quick access buttons (or press [F9]).



- Close the simulator to go back to the window editor.

Notes

When a project is associated with several platforms, the test of the current window is run with the current platform. The shell used for the simulator is also adapted to the current platform.

To run the test on another platform, all you have to do is enable this platform by double-clicking its name in the project explorer.

Note: In this part, the images representing the tests correspond to an Android shell.

Creating the form window

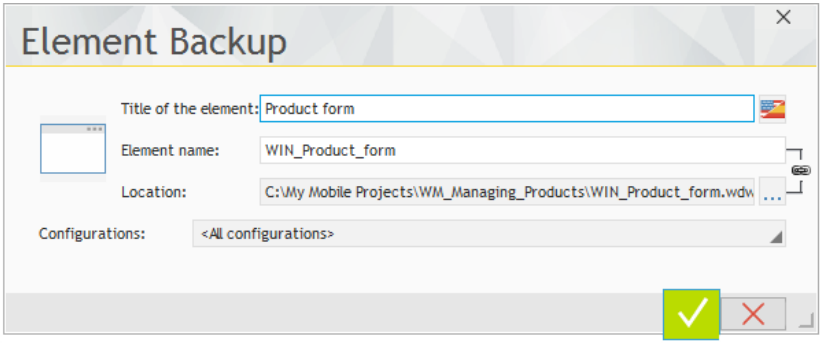
We are now going to create a new window used to display the product form. Then, this window will be started from the list of products to display the details of the selected product.

Creating the window

- To create the form window:

1. Create a new blank window.
   - Click among the quick access buttons.
   - The window for creating a new element is displayed: click "Window" then "Window".
   - In the wizard, select the "Standard" tab, choose "Blank" and validate.

2. Save the window. Specify the title of the window: "Product form". Its name is automatically proposed: "WIN_Product_form". Validate.

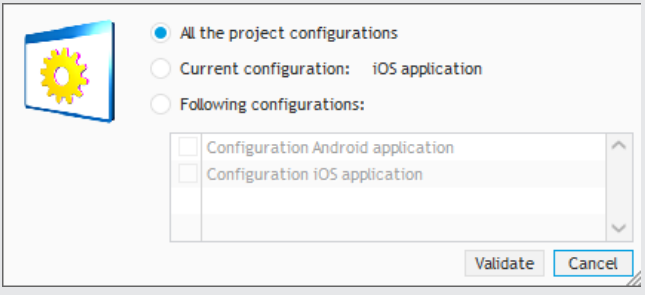


3. The window is added to the project, for all the configurations.

Note

If several platforms are defined in the project, the widow for element backup proposes to associate the new element to all the platforms.

To associate the element to a single platform, all you have to do is expand "Configurations" in the backup window and choose the requested platform:



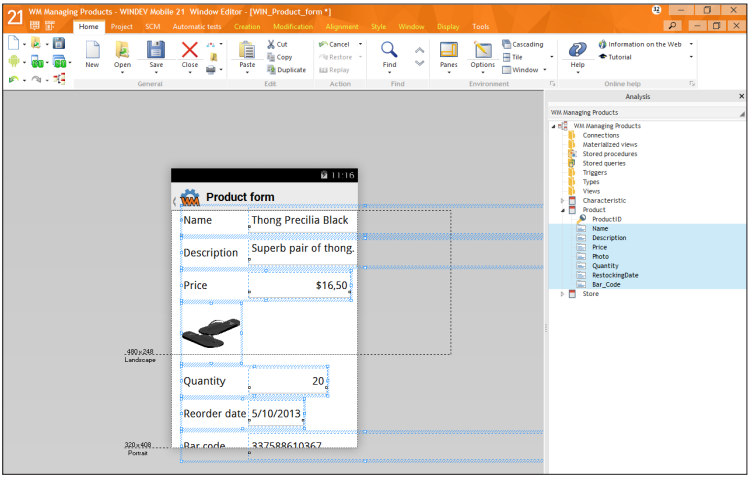
Creating the controls

To create the different edit controls used to display information about the product:

1. Display the "Analysis" pane if necessary: on the "Home" pane, in the "Environment" group, expand "Panes" and select "Analysis". The different data files described in the "WM Managing Products" analysis appear in the pane.

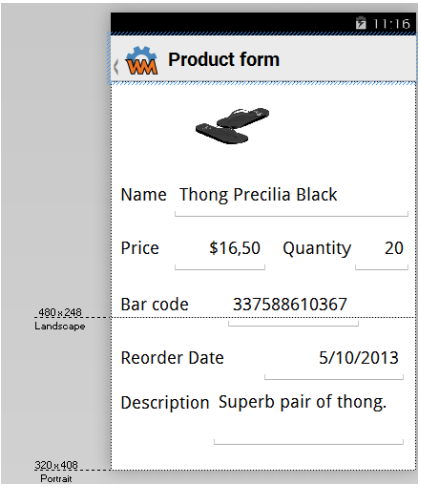
2. With the mouse, select the items of the "Product" file displayed in the pane (except for the "ProductID" item).

3. Drag and Drop these items to the window that was just created.



4. Resize the controls ("Name", "Bar code", "Reorder date" and "Description") so that they are visible in the window.

5. Reorganize the controls in the window. Respect the following order: "Photo", "Name", "Price", "Quantity", "Bar code", "Reorder date", "Description".



6. We are going to view the navigation order in the window:

- Press the [F5] key. The numbers that are displayed represent the navigation order in the window. Press [F5] again to make the numbers disappear.
- The navigation order is automatically adapted to the order of the controls in the window.

7. Save the window.

- Run the test of the "WIN_Product_form" (among the quick access buttons). The window is displayed with empty controls.
- To display the product data:

1. Display the processes associated with the window:
   - Perform a right mouse click in the area beside the window.
   - Select "Code" from the popup menu.
   - The code editor appears.
2. Enter the following code in the "End of initialization of WIN_Product_form" process:

```
FileToScreen()
```

FileToScreen is used to display in the controls the data found in the data file, for the current record. In our case, the current record will be the record selected in the Looper control of the "WIN_List_of_products" window. This looper is linked to the Product file.

3. Close the code window.
4. Save the window.

Displaying the form from the list of products

Let's see how to display the form of the selected product in the list of products.

- Perform the following operations:

1. Position on the "List of products" window: click the "WIN_List_of_products" button in the bar of opened elements:

2. Right-click the Looper control and select "Code" from the popup menu.
3. In the code window that is displayed, enter the following code in the "Selecting a row of..." process:

```
OpenMobileWindow(WIN_Product_form)
```

Notes

The assisted code input is going to help you: as soon as you type the opening bracket "(", a drop-down list proposes the name of all the existing windows found in the project. All you have to do is select the window with the keyboard or with the mouse.

If the name of the window is not displayed in the list, it means that this window was not saved beforehand.

4. Save the modifications by clicking among the quick access buttons.
5. Close the code window (click the cross in the top right corner of the code editor).

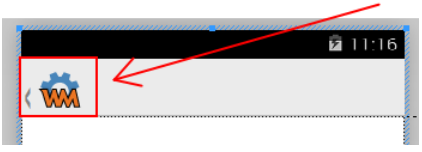
- Re-run the test of the "WIN_List_of_products" window in the simulator (among the quick access buttons).
  - In the list of products, click one of the products with the mouse.
  - The detailed window of the product is displayed.
- Close the simulator.

Managing the creation and the modification of a product

We are now going to modify our two windows in order to manage the addition and the modification of a product.

Modifying the product form

When creating the form window, an Action Bar was automatically created. This Action Bar contains a left button used to cancel the current input and to go back to the previous screen. In our case, this button will be used to go back to the list of products.



There is no modification to perform.

We are going to add a validation button into the Action Bar of the "WIN_Product_form" window in order to manage the validation of modifications.

- First of all, display (if necessary) the "WIN_Product_form" window in the editor: click the corresponding button in the bar of opened elements.
- To add a validation option into the Action Bar of the window:
  1. Select the Action Bar (at the top of the window).
  2. Display the description window of the Action Bar: right-click and select "Description" from the popup menu.

Notes

The description window of the Action Bar is adapted to the platforms used in the project. Indeed, the Action Bar used in an Android application differs from the Action Bar used in an iOS application.

If your project is using an Android configuration, only the options corresponding to the Action Bar for Android are displayed.

Similarly, **for an iOS configuration**, only the options corresponding to the Action Bar for iOS are displayed.

If your project is using both an Android configuration and an iOS configuration, the window displays a preview of the Action Bar for the two platforms.

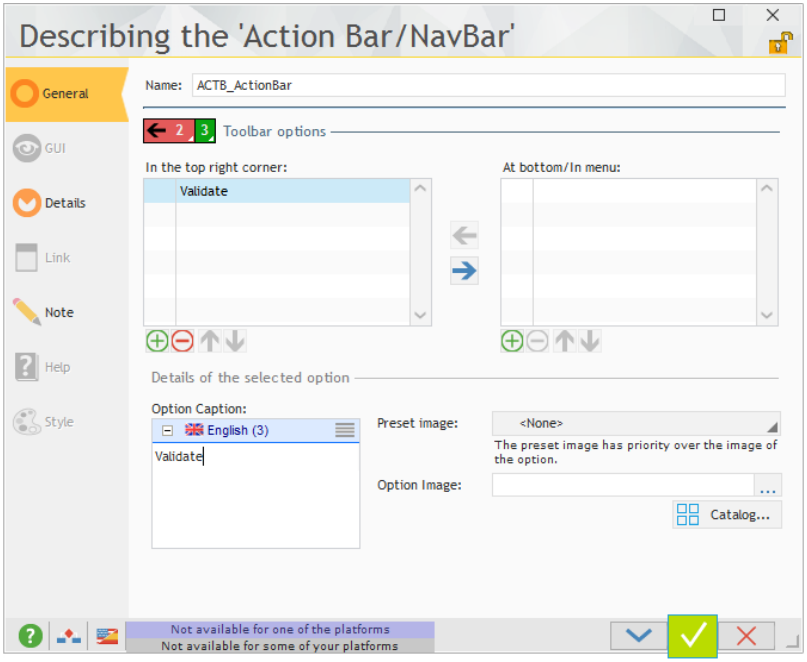
Numbers allow you to access the options to configure.

We are going to present the options required by our example. See the online help for more details.

3. Click number 2. The interface for entering an option in the toolbar is displayed.
4. Click the "+" button to add an option. A new default option is created at the top right.

5. Modify the characteristics of this option:

- In the "Caption" area, type "Validate".

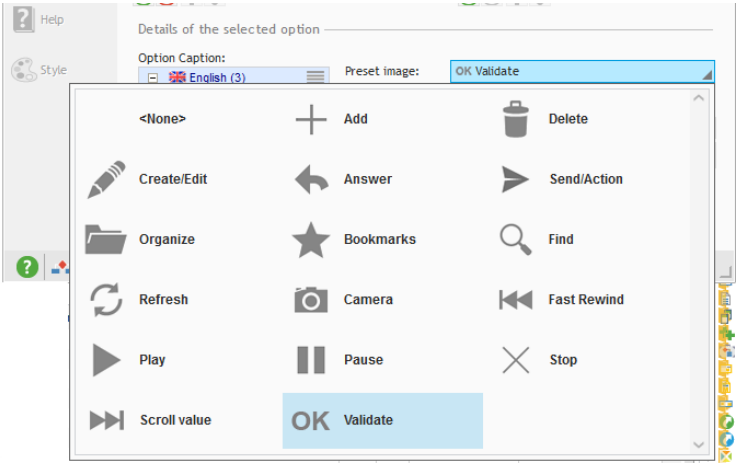


Notes

At run time, the caption of the option appears in the Action Bar:

- If no image is associated with the option.
- If the option is transferred into menu at the bottom.

- In the "Preset image" area, expand the list and select "Validate".



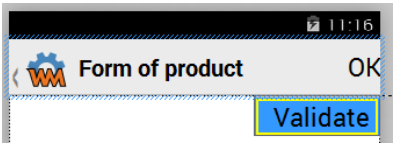
- Validate the description window.

Notes

To go back to the interface for describing the Action Bar, all you have to do is click the button 2.

6. The code of this option will be used to save the modifications performed in the "WIN_Product_form" window. To enter this code:

- Select (if necessary) the Action Bar control of the window.
- Click "OK".
- A drop-down menu with the "Validate" option is displayed.



Notes

This drop-down menu is visible in edit to enter the WLanguage code associated with the option. This drop-down menu will not be displayed at run time.

- Right-click the option.
- Select "Code" from the popup menu.

- In the "Selecting the menu" process, enter the following code:

```
ScreenToFile()
HSave(Product)
Close()
```

Let's study this code:

- ***ScreenToFile*** is used to initialize the items with the values of linked controls, for the current record.
- ***HSave*** is used to update the file data for the current record.

7. Save the modifications by clicking among the quick access buttons.
8. Close the code window (click the cross in the top right corner of the code editor).

▶ When closing the product form, the content of the product list found in the "WIN_List_of_products" window must be refreshed to take into account the modifications performed in the form. To do so, use the "Closing a child window" process of the "WIN_List_of_products" window.

1. Click the "WIN_List_of_products" button in the bar of opened elements:

2. Right-click the window background and select "Code" from the popup menu. The following code is automatically displayed in the "Closing a child window" process:

```
LooperDisplay(LOOP_Product,taCurrentSelection)
```

Let's study this code:

- The "Closing a child window" process is run whenever a child window of the current window is closed. In our case, it is run when the "WIN_Product_form" window is closed.
- ***LooperDisplay*** is used to update the data found in the Looper control of the "WIN_List_of_products" window. The ***taCurrentSelection*** constant is used to update the data from the selection bar.

This code was automatically generated when creating the window by RAD.

3. Close the code window (click the cross in the top right corner of the code editor).

▶ Run the test of the "WIN_List_of_products" window in the simulator (among the quick access buttons).

- In the list of products, click one of the products with the mouse: for example, the "Polo Hibiscus Blue" product.
- The detailed window of the product is displayed. Modify the name of the product and type"Polo Hibicus Light blue" then click the "OK" button.
- When going back to the list of products, you will notice that the name of this article was updated.

▶ Close the simulator. The editor of WINDEV Mobile is displayed.

Creating a new product

The principle for creating a product is as follows:

- In the window for the list of products, we are going to add option into the Action Bar of the window in order to open the "Product form" window.
- Then, we will modify the code of the "Product form" window to manage the addition into the Product data file.

▶ To add an option into the Action Bar of the window:

1. Display (if necessary) the "WIN_List_of_products" window in the editor: click the corresponding button in the bar of opened elements.

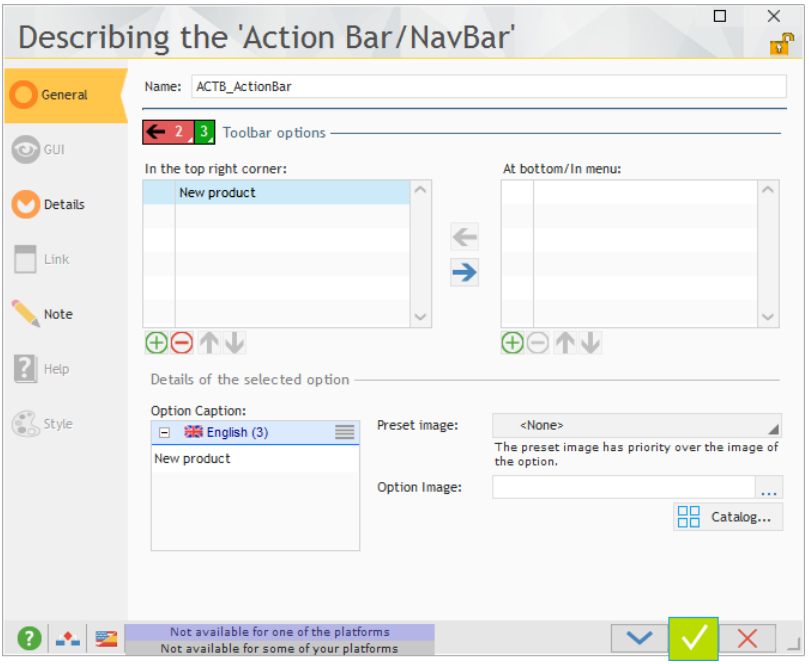
2. Select the Action Bar (at the top of the window).

3. Display the description window of the Action Bar: right-click and select "Description" from the popup menu.

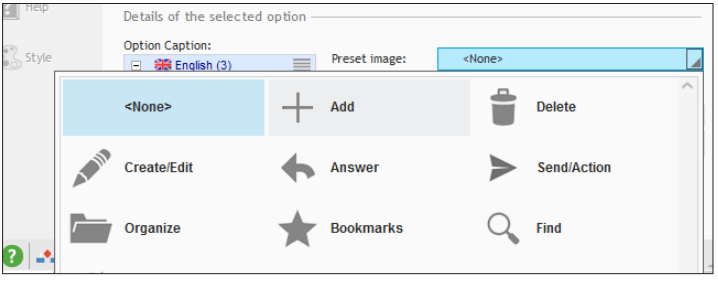
4. Click number 2. The interface for entering an option in the toolbar is displayed.

5. Click the "+" button to add an option. A new default option is created at the top right. Modify the characteristics of this option:

- In the "Caption" area, type "New product".



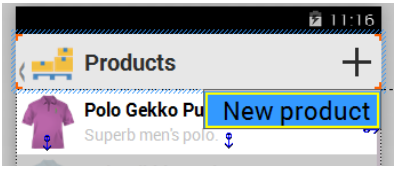
- In the "Preset image" area, expand the list and select "Add".



- Validate the description window.

6. The code of this option is used to open the "Product form" window and to reset its controls. To enter this code:

- Select (if necessary) the Action Bar control of the window.
- Click the "+" button.
- A drop-down menu with the "New product" option is displayed.



- Right-click the option.
- Select "Code" from the popup menu.
- In the "Selecting the menu" process, enter the following code:

```
HReset(Product)
OpenMobileWindow(WIN_Product_form)
```

HReset initializes the variables of the items found in the "Product" data file with the default values to manage a new record.

7. Save the modifications by clicking among the quick access buttons.

8. Close the code window (click the cross in the top right corner of the code editor).

▶ Let's now check the management of the addition of a new record into the window of the product form.

1. Display the "WIN_Product_form" window in the editor: click the corresponding button in the bar of opened elements.

2. Display the code of the validation option in the Action Bar:

- Select the Action Bar.
- Click "OK".
- A drop-down menu with the "Validate" option is displayed.
- Select "Code" from the popup menu of the "Validate" option (right mouse click).
- The "Click" process does not change:

```
ScreenToFile()
HSave(Product)
Close()
```

Let's study this code:

- By default, ***HSave*** is equivalent to ***HModify*** (current record modified in the data file).
- If ***HReset*** was called beforehand, ***HSave*** adds a record into the data file (equivalent to ***HAdd***).

3. Close the code window (click the cross in the top right corner of the code editor).

▶ Display the "WIN_List_of_products" window in the window editor and run its test in the simulator (among the quick access buttons).

- Click the "+" button found in the Action Bar.
- Enter a new product.
- Validate. The new product is displayed in the list of products.
- Close the simulator.

Notes

If your project is using several platforms, run a GO for each one of the platforms. The differences regarding the display and the operating modes will appear in the simulator.

Using the camera and displaying an image

Caution!

This paragraph requires a device equipped with a camera. If this is not the case, go to the next paragraph directly.

Furthermore, this paragraph requires the setup of the application on the device because it is using hardware resources that are not accessible in Simulation mode.

Overview

We are going to manage the photo of the product by using the camera of the device.

To do so, we are going to:

- create a button to start the camera. The photo will be retrieved in the format of an image in memory and displayed in the Image control of the product.
- create a button used to select a photo in the album found on the mobile.

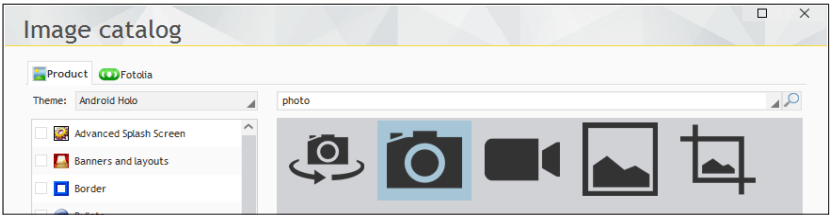
Creating the button for taking photos

▶ To create the button for taking photos:

1. Display the "WIN_Product_form" window in the editor.
2. Add a button into the window:
   - On the "Creation" pane, in the "Usual controls" group, click Ok: the shape of the button appears under the mouse.
   - Then, click at the top right of the product image to create the button.

▶ We are going to modify the button in order to associate it with an image representing a camera:

1. Select the button and display its popup menu (right mouse click).
2. Select "Description". The description window of the control is displayed.
3. In the "General" tab, position on the "Image" edit zone and click the "Catalog" button.
4. The image catalog of WINDEV Mobile is opened. This catalog contains hundreds of images in different fields, formats and sizes.
5. In the "Find" area at the top, type the word "photo" then select the "Android Holo" theme and validate. Several images are displayed:



6. Select the second image for example by double-clicking it.

7. In the next screen, you have the ability to choose the size of the image, the color, the orientation, its format and its name.
8. Keep all the default options and specify the name of the image ("Camera").
9. Validate the window.
10. The path of the image is displayed in the button description.
11. Give a name to the button: "BTN_Camera".
12. Clear the caption of the button.
13. Validate the description window.
14. In the editor, reduce the size of the button.

Taking photos

We are going to enter the code used to take a photo and to display it in the Image control of the product form.

▶ To manage the taking of photos:
1. Select "Code" from the popup menu of the button (right mouse click).
2. Enter the following code in the "Click" process:

```
// Local variable
sPhoto is string
// Start the camera
sPhoto = VideoStartApp(viPictureCapture)
IF sPhoto <> "" THEN
  IMG_Photo = sPhoto
END
```

In this code, ***VideoStartApp*** is used to start the native camera application of the device in order to save a video or to take a photo.

3. Save the modifications by clicking  among the quick access buttons.
4. Close the code window (click the cross in the top right corner of the code editor).

Selecting a photo in the photo album

We are going to add a button used to select a photo in the album of the device and to associate it with the product.

▶ To create the button for selecting the photo, we are going to "Copy - Paste" the button for taking photos that was just created:
1. Select the "BTN_Camera" button that was juste created.
2. Press [CTRL] + [C]: the button is copied into the clipboard.
3. Press [CTRL] + [V]: the mouse cursor changes and the button shadow appears under the cursor.
4. Click in the window beside the "BTN_Camera" button: the new button is automatically created.
5. Display the description window of the button (double-click the control):
- Give a name to the button: "BTN_Photo_Album".
- Select an image in the image catalog.
6. Validate the description window.

▶ The code of this button is used to open the photo album of the device and to select an image in order to display it in the Image control of the product form.

1. Select "Code" from the popup menu of the button (right mouse click).
2. Replace the code of the "Click" process by the following code:

```
// Local variable
sPhoto is string
// Start the selection
sPhoto = AlbumPicker(albumImage)
IF sPhoto <> "" THEN
  IMG_Photo = sPhoto
END
```

In this code, ***AlbumPicker*** is used to retrieve the photo selected in the photo album.

3. Save the modifications by clicking among the quick access buttons.
4. Close the code window (click the cross in the top right corner of the code editor).

Managing the bar code of the product

Caution!

This paragraph requires a device equipped with a camera.
Otherwise, you willl not be able to test its use.
Furthermore, this paragraph requires the setup of the application on the device because it is using hardware resources that are not accessible in Simulation mode.

Overview

The "Product" data file contains a "Bar_Code" item. This item is used to store the value of a bar code. Some devices (especially the ones equipped with a camera) can scan a bar code to retrieve its value.

The bar code will be managed via the camera of the device and by a specific WLanguage function.

Implementation

▶ To create the button for managing the bar codes:

1. Display (if necessary) the "WIN_Product_form" window in the editor.
2. Add a button into the window:
   - On the "Creation" pane, in the "Usual controls" group, click OK.
   - The shape of the button appears under the mouse.
   - Create the button beside the "Bar Code" control (resize the edit control if necessary).

3. Display the description window of the button (double-click the control):
- Give a name to the button: "BTN_Bar_Code".
- Clear the caption of the button.
- Select an image of bar code in the image catalog (type the "Code" keyword for example).

4. Validate the description window.
5. In the editor, reduce the size of the button.

▶ The code of this button is used to scan the bar code.

1. Select "Code" from the popup menu of the button (right mouse click).
2. Enter the following code in the "Click" process:

```
// Local variable
bc is BarCodes
// Start the scan
bc = BCCapture()
IF bc..Content <> "" THEN
  EDT_Bar_Code = bc..Content
END
```

In this code, ***BCCapture*** is used to decode the information stored in a bar code by using the camera of the device.

3. Save the modifications by clicking  among the quick access buttons.
4. Close the code window (click the cross in the top right corner of the code editor).

Managing anchors in the Product form

All the controls have been positioned in the Product form. The vertical and horizontal resolution may differ according to the devices.

The anchoring is used to adapt the size of controls to the resolution and to avoid displaying "empty" areas in the window (especially at the bottom right).

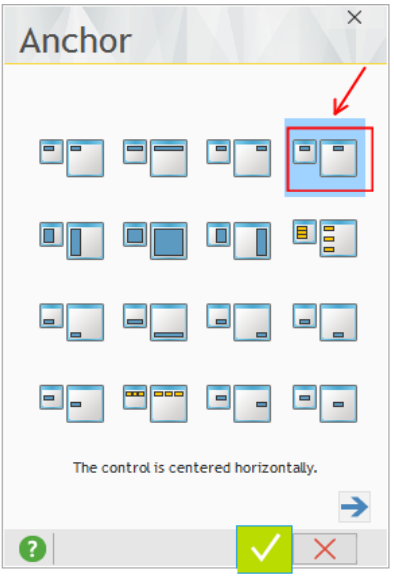
If the target device of the application is known as soon as the project creation, the widows have the size of the target device. No anchoring is required.

If the target device of the application is not known or if several devices are used, the smallest common resolution must be chosen as soon as the project creation. The anchoring is required in this case.

▶ To define the anchoring that will be applied the different window controls:

1. Select the following controls (click each control while keeping the CTRL key down):
- the photo of the product,
- the button for taking photos,
- the button for selecting a photo in the album.

2. Display the popup menu of the selection (right mouse click) and select "Anchor".
3. Select "Centered horizontally" ( ).



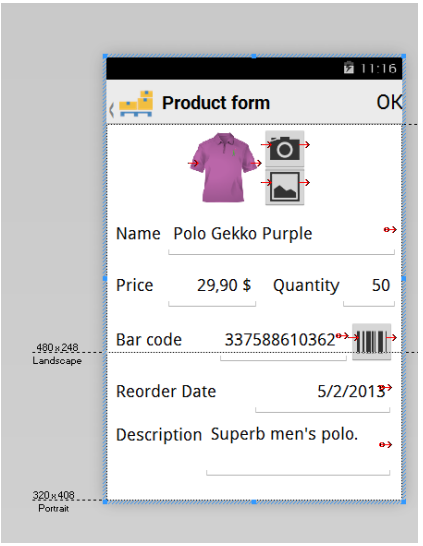
4. Validate.

▶ To define the anchoring that will be applied the edit controls:

1. Select the following edit controls (click each control while keeping the CTRL key down):
   - Name
   - Bar Code
   - Reorder date
   - Description
2. Display the popup menu of the selection (right mouse click) and select "Anchor".
3. Select "Width" ( ).
4. Validate.

▶ Repeat this operation for the button used to manage the bar codes. In this case, select "Right" ( ).

- All the anchors have been defined in the window. The red arrows indicating the orientation of anchors are displayed:



Using the Map control

We will now present the Map control and the GPS functions of WLanguage.
Our database contains a "Store" data file. This data file contains the addresses of the stores that will be localized on a map via the mapping functions.

Creating the window

We are going to create a new window and add a Map control into it.

- To create the window:

  1. Create a new blank window. Click among the quick access buttons. The window for creating an element is displayed: click "Window" then "Window". In the wizard, choose "Blank" and validate.

  2. Save the window. Specify the title of the window: "Map of stores". Its name is automatically proposed: "WIN_Map_of_stores". Validate.

Creating the Map control

▶ To create the Map control:

1. On the "Creation" pane, in the "Graphic controls" group, click "Map". The shape of the control appears under the mouse.
2. Click in the window to create the control.
3. A message regarding the management of scrollbars in the window is displayed. Indeed, both the window and the Map control include their own scrollbar. Therefore, a conflict occurs. A single scrollbar must be enabled. We advise you to:
   - disable the scrollbar in the window because the window has a fixed size,
   - keep the scrollbar enabled in the Map control.
4. Click "Disable the automatic scrollbar". The Map control appears in the window editor.
5. Display the description window of the "Map" control (double-click the control for example).
6. In the description window of the control, specify the name of the control ("MAP_Store") and validate.
7. Save the modifications by clicking  among the quick access buttons.

Displaying the stores on the map

Principle

We are now going to add the code used to display on a map all the stores found in the "Store" file.

To do so, the "Store" file will be browsed by a FOR EACH loop. Then, the Marker variables will be used. A Marker variable is used to define a marker that will be displayed on a map.

A marker contains different information. We will be using the following information:

- Name,
- Latitude,
- Longitude.

MapAddMarker is used to add a marker onto the map. Then, all you have to do is define a sufficient zoom level to see all the markers on the map. If the zoom is not set properly, some markers may not be visible or they may overlap on the map.

Implementation

- To enter the code used to display the stores:
  1. Right-click outside the window. Select "Code" from the popup menu. The processes associated with the window are displayed.
  2. Enter the following code in the "Global declarations of..." process.

```
// Global variables
gMarker     is Marker
// Load the stores
FOR EACH Store
  // Coordinates of marker
  gMarker.Position.Latitude = Store.Latitude
  gMarker.Position.Longitude = Store.Longitude
  // Name of marker
  gMarker.Name = Store.Name
  // Add the marker
  MapAddMarker(MAP_STORE,gMarker)
END
// Best zoom to view all the markers of the map
MAP_Store..Zoom = zoomAdaptSize
```

  3. Save the modifications by clicking  among the quick access buttons.
  4. Close the code window (click the cross in the top right corner of the code editor).
- Re-run the test of the "WIN_Map_of_stores" window in the simulator ( among the quick access buttons). Then, close the simulator.

Using a Multiline Zone control

The "Multiline zone" control is often used on the mobile platforms.

This control is used to group several controls:

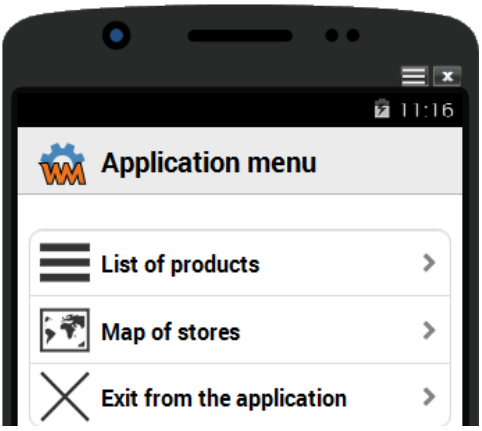
- options on a category,
- group of information about a contact, ...

This control can contain at the same time:

- lines defined in edit (static lines),
- lines defined at run time, by programming (dynamic lines).

A Multiline Zone control will be used to create the main menu of our application. We are going to create a new window and insert a Multiline Zone control into it.

The window that will be created is as follows:



Creating the window

We are going to create a window and add a Multiline Zone control into it.

▶ To create the window:

1. Create a new blank window:
   - Click among the quick access buttons.
   - The window for creating a new element is displayed: click "Window" then "Window". In the wizard, choose "Blank" and validate.
2. Save the window. Specify the title of the window: "Menu". Its name is automatically proposed: "WIN_Menu". Validate.

Creating the Multiline Zone control

▶ To create the Multiline Zone control:

1. On the "Creation" pane, in the "Data" group, click "Multiline Zone". The shape of the control appears under the mouse.
2. Click in the window to create the control.
3. Display the description window of the control (double-click the control for example).
4. In the description window, specify the name of the control ("MZ_Menu") and validate.

The Multiline Zone control contains an empty line. We are going to add as many lines as the number of options found in our menu.
Our menu will include 3 options:

- List of products.
- Map of stores.
- Exit from the application.

Modifying the Multiline Zone control

To modify the Multiline Zone control:

1. Display the description window of the control (double-click the control for example).
2. Click the "New line" button. A window is opened: this window contains all the preset line templates.
3. Select the "Simple line with picto" template and validate. Repeat this operation twice. Now, the multiline zone contains:
   - a "blank" line,
   - 3 "simple lines with picto".

4. We are going to delete the blank line that is useless in our example:
   - Select the blank line (the first line) with the mouse.
   - Click the "Delete" button.
5. Validate the description window. Your menu is created.

Each line includes an Image control, a Static control and an arrow image. We are now going to modify the Image control and the Static control of each line in order to represent the action of the menu.

Modifying the 1st line: access to the list of products

To modify the image of the first line found in the Multiline Zone control:

1. Click the first line and select the Image control.
2. Display the description window of the image (double-click the control).
3. In the description window:
   - Give a name to the image ("IMG_ListOfProducts" for example).
   - Click the "Catalog" button in order to choose an image representing the action.

- In the window of the image catalog, type "List" in the search control and press [ENTER].
- Select an image via a double click.
- In the window for configuring the generated image, select a size (80 for example), give a name to the image ("ListOfProducts" for example) and validate.

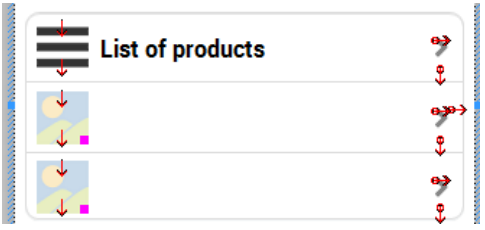
Notes

The image used in a Multiline Zone control is in "Homothetic extended centered" mode by default. The image will be automatically "resized" to the proper dimensions.

4. Validate the description window.

▶ To modify the Static control of the first line found in the Multiline Zone control:

1. Click the first line and select the Static control.
2. Display the description window (double-click the control).
3. In the "General" tab of the description window:
   - Give a name to the control ("STC_ListOfProducts" for example).
   - Change the caption ("List of products" for example).
4. Validate the description window.



Modifying the 2nd line: access to the map of stores

▶ To modify the image of the second line found in the Multiline Zone control:

1. Click the second line and select the Image control.
2. Display the description window of the image (double-click the control).
3. In the description window:
   - Give a name to the image ("IMG_MapOfStores" for example).
   - Click the "Catalog" button in order to choose an image representing the action.
   - In the window of the image catalog, type "Map" in the search control and press [ENTER].
   - Select an image via a double click.
   - In the window for configuring the generated image, select a size (80 for example), give a name to the image ("MapOfStores" for example) and validate.
4. Validate the description window.

▶ To modify the Static control of the second line found in the Multiline Zone control:
1. Click the second line and select the Static control.
2. Display the description window (double-click the control).
3. In the "General" tab of the description window:
- Give a name to the control ("STC_MapOfStores" for example).
- Change the caption ("Map of stores" for example).
4. Validate the description window.

Modifying the 3rd line: exit from the application

▶ To modify the image of the third line found in the Multiline Zone control:
1. Click the third line and select the Image control.
2. Display the description window of the image (double-click the control).
3. In the description window:
- Give a name to the image ("IMG_Exit" for example).
- Click the "Catalog" button in order to choose an image representing the action.
- In the window of the image catalog, type "Close" in the search control and press [ENTER].
- Select an image via a double click.
- In the window for configuring the generated image, select a size (80 for example), give a name to the image ("Close" for example) and validate.
4. Validate the description window.

▶ To modify the Static control of the third line found in the Multiline Zone control:
1. Click the third line and select the Static control.
2. Display the description window (double-click the control).
3. In the "General" tab of the description window:
- Give a name to the control ("STC_Exit" for example).
- Change the caption ("Exit from the application" for example).
4. Validate the description window.

Programming the menu

▶ We are now going to write the code used to perform each menu action:
1. Right-click the Multiline Zone control and select "Code".
Caution: make sure you select the Multiline Zone control and not one of the controls included in it.In the code editor, enter the following code in the "Selection (click) of a line in..." section:

```
SWITCH MZ_MENU
  CASE 1 // List of products
      OpenMobileWindow(WIN_List_of_products)
  CASE 2 // Map of stores
      OpenMobileWindow(WIN_Map_of_stores)
  CASE 3 // Exit from the application
      EndProgram()
END
```

2. Save the modifications by clicking among the quick access buttons.
3. Close the code window (click the cross in the top right corner of the code editor).

Test of the application

The last step consists in specifying that the menu window is the first application window. To do so, we are going to run a full test of the project and define the first project window.

▶ To define the first project window:
1. Select the "WIN_Menu" window in the project explorer.
2. Display the popup menu.
3. Select "First project window". A specific icon (with a small 1) is displayed in front of the name of the window, in the project explorer.

Until now, the test of windows was run individually by clicking among the quick access buttons.

▶ To run the test of the project:
1. Click among the quick access buttons.
2. Your project starts with the menu window. Click an option of your menu to check whether the different links are correct.

Lesson 5.3. Managing the orientation of windows with the layouts

This lesson will teach you the following concepts...

- The benefit of anchors
- Creating a layout
- Using a layout

Overview

In most cases, an application for mobile can be used in portrait mode and in landscape mode.

The interface of a window used in portrait mode can be changed to be used in landscape mode.

WINDEV Mobile manages the change of device orientation via the anchors.

Most of the time, the anchors are sufficient to adapt the display to the different orientations.

However, if the interface must change according to the orientation (different positioning of controls in portrait mode and in landscape mode for example), the anchors are not sufficient.

To manage a different interface in portrait mode and in landscape mode, WINDEV Mobile gives you the ability to use the layouts.

▶ To follow this lesson, open (if necessary) the "WM Managing Products" project that was created in the previous lesson.

Answer

If the "WM Managing Products" application was not created, a sample project is available. This project allows you to follow this lesson.

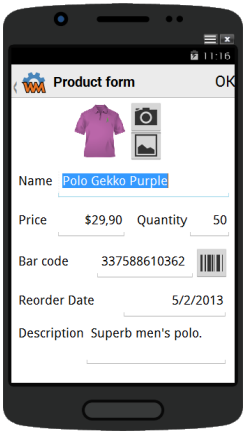
To open this intermediate project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "iOS/Android application (with windows)".

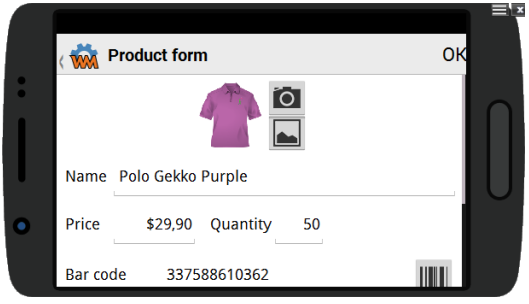
A corrected project is also available. This project groups all the window developed in this lesson.

To open this corrected project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "iOS/Android application (Answer)".

Using anchors

- The anchors have already been used in the "WIN_Product_form" window. In test mode, we get the following interfaces:





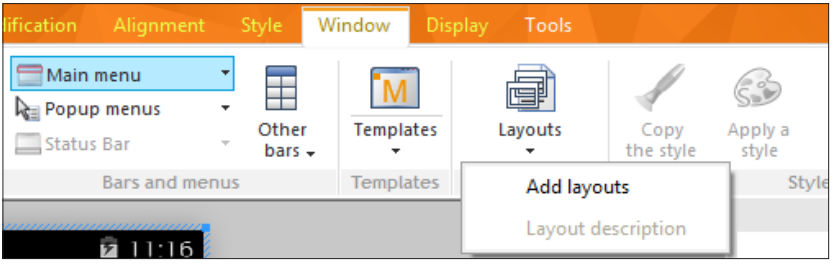
All the controls found in portrait mode are also displayed in landscape mode but a lot of space is not used and the window must be scrolled to access all the controls.
We are going to improve the display in landscape mode via the layouts.

Notes

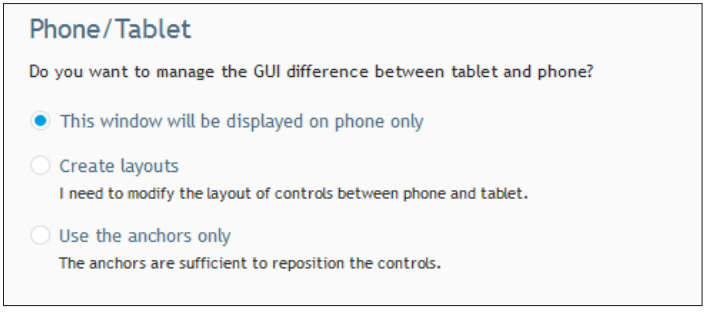
The layout is used to define several views of a window in the same project without duplicating this window.
This gives you the ability to define:
- a specific view for the portrait mode,
- a specific view for the landscape mode,
- a view specific to the phone,
- a view specific to the tablet,
- ...

To create a new layout:

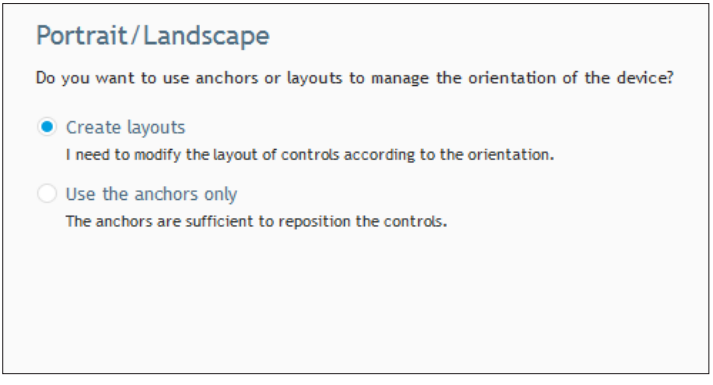
1. Open the "WIN_Product_form" window if necessary.
2. On the "Window" pane, in the "Layouts" group, expand "Layouts" and select "Add layouts".



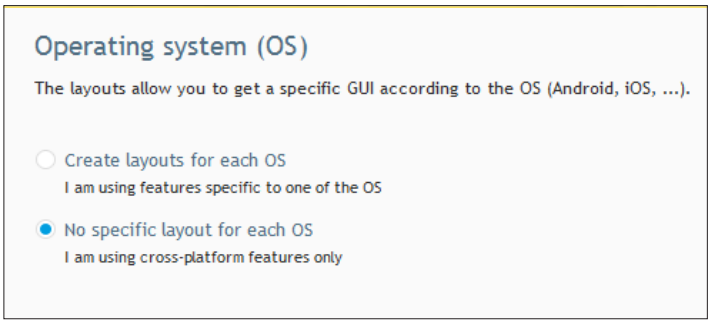
3. The wizard for creating a layout starts.
4. The wizard proposes to manage the differences between the phone and the tablet. The tablets are not used in our example. Keep "This window will be displayed on phone only".



5. Go to the next wizard step.
6. The wizard proposes to manage the Portrait/Landscape orientation of the application. That's what we are going to do in this example: check "Create layouts, I need to modify the layout of controls according to the orientation".

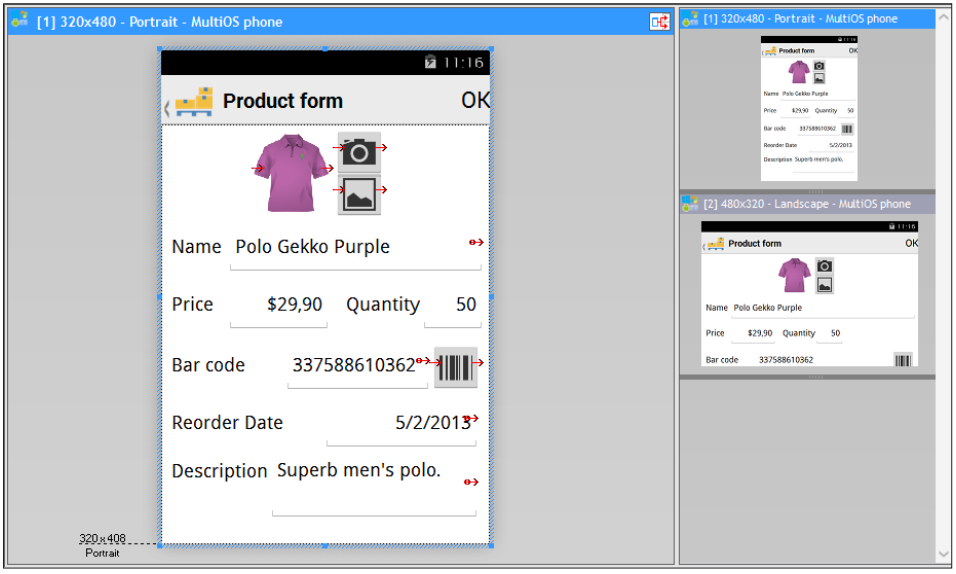


7. Go to the next wizard step.
8. The wizard proposes to use a different presentation for each platform used. In this example, the same presentation will be used for the Android platform and for the iOS platform. Select "No specific layout for each OS".



9. Validate the wizard.

- Two layouts are created in our example. These layouts are displayed in thumbnail format, on the right of the "WIN_Product_form" window.



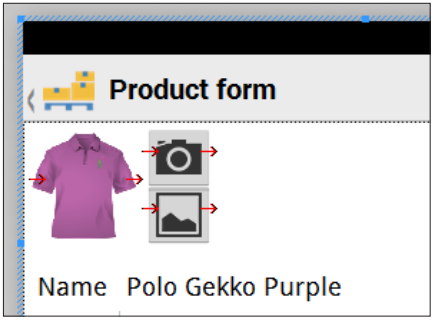
- We are going to modify the layout of the landscape mode:

1. Double-click the thumbnail of the "Landscape - MultiOS Phone" layout: the window corresponding to this layout is displayed in the middle of the editor.

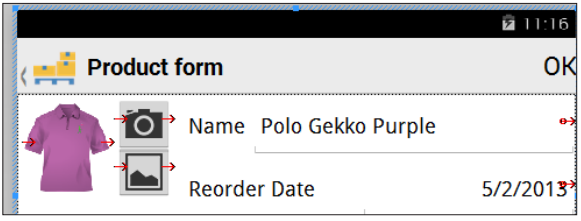
2. Click  (top right corner of the main window, in the title bar) to enable the "automatic dissociation" mode. Via this option, any modification performed on one of the specific windows of the layout will not be applied to the other ones.

3. We are going to modify the position of the controls in the layout:

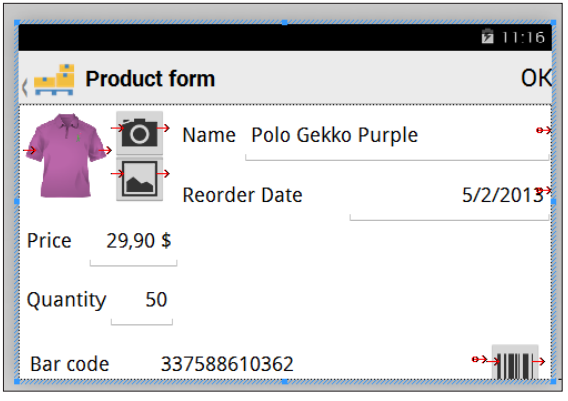
- Select the control corresponding to the photo of the product as well as the two buttons and move them to the left of the window.



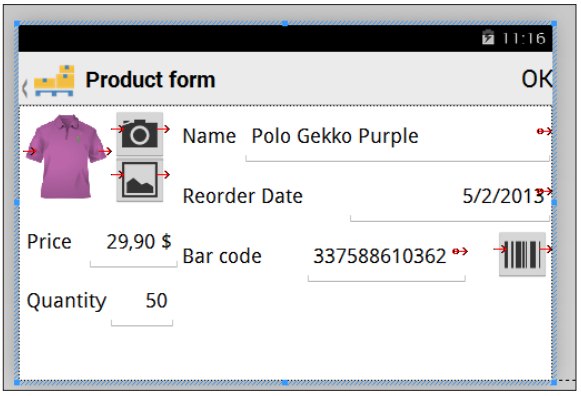
- Select the "Name" and "Reorder date" controls and position them on the right of the photo and buttons.



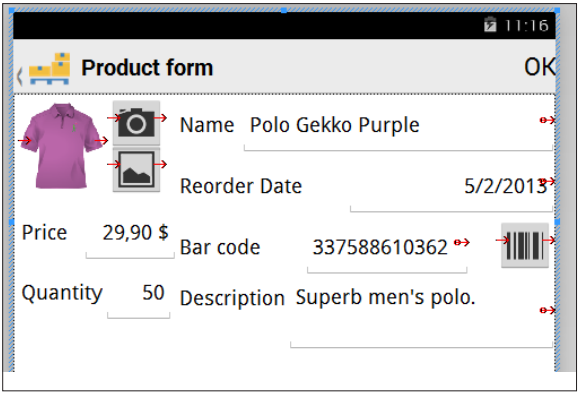
- Select the "Price" and "Quantity" controls and move them below the photo of the product on the left.



- Select the "Bar code" control as well as its button and position them on the right of the price.

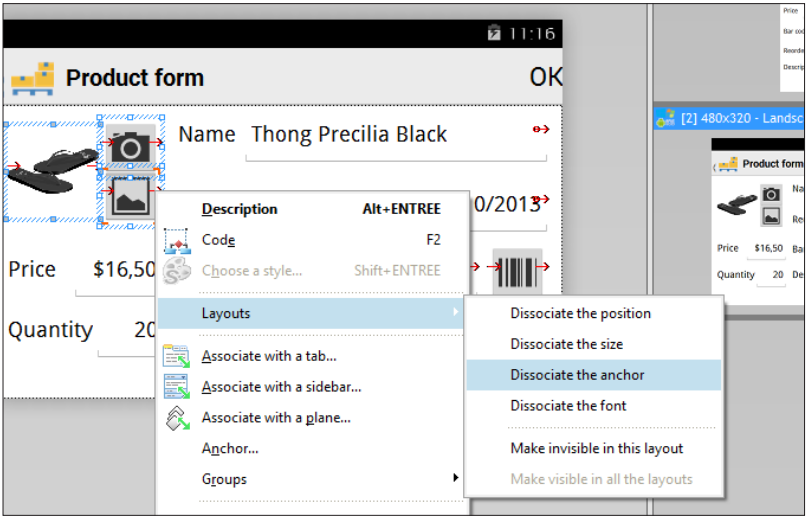


- Select the "Description" control and position it on the right of the quantity. Reduce the height of the control if necessary.



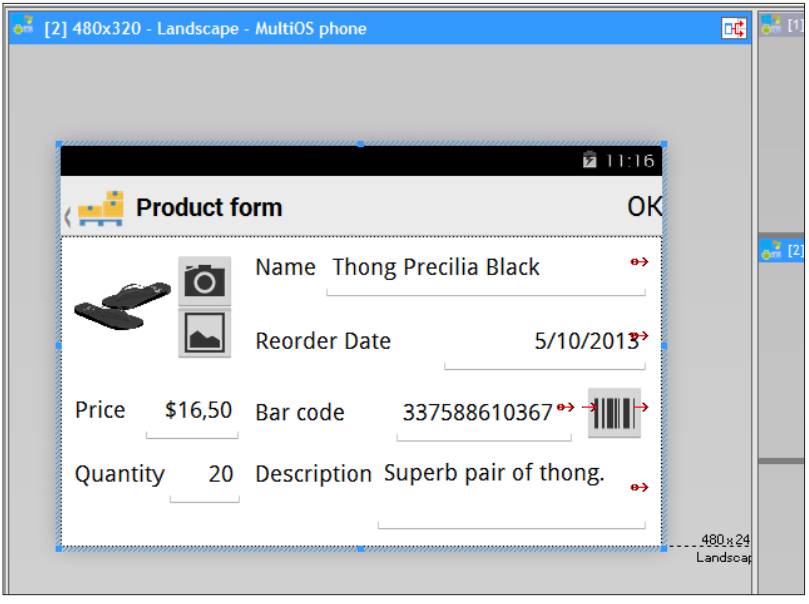
▶ Select the Image control. The Image control as well as the two buttons are enclosed by a red line. Indeed, an anchoring conflilct occurs with the Name control.

- Therefore, we are going to modify the anchor of these controls:
  1. Select the Image control and the two buttons.
  2. Display the popup menu and select "Layouts .. Dissociate the anchor".



  3. Define the new anchor that will be applied to the controls:
  - Display the popup menu of the controls and select "Anchor".
  - In the window that is displayed, select .

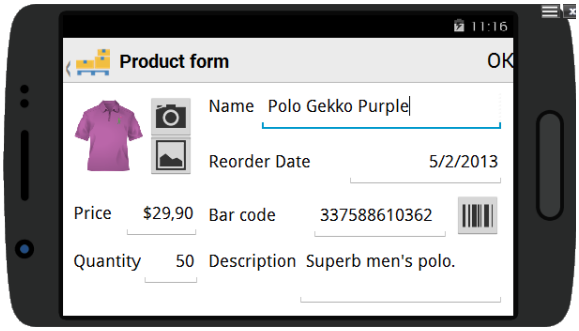
- You get the following interface:



Running the test of the application

To run the test of the project:

1. Click GO among the quick access buttons.
2. Your project starts with the menu window.
3. Click the list of products.
4. Double-click a product. The product form appears in portrait mode.
5. Change the orientation of the window in the simulator by clicking and select “Rotation”.
6. The layout that was defined for the landscape mode is automatically displayed:



7. Close the test window of the application.

Lesson 5.4. Window with search

This lesson will teach you the following concepts...

- Creating a query with parameters.
- Creating a window via RAD.
- Implementing the search
- Managing the "Pull to refresh" feature
- Adding a sliding menu

Estimated time: 30 min

Overview

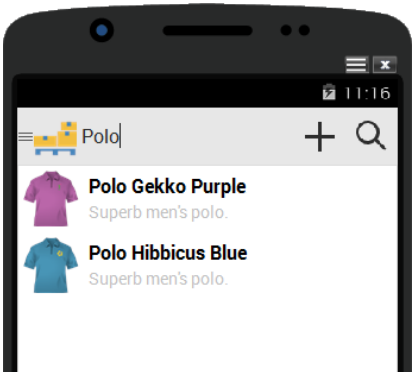
In the lesson 5.2, we have explained how to create a window used to list the products in a looper.

We are going to create a window based on the same principle but proposing a search on the product name:

- the window displays the list of products in a looper.
- when the user types the name of a product in the search area, the corresponding products are displayed in the looper.

In our example, this search will be performed on the "Product" file.

The interface of the "WIN_Menu" window is as follows:



To create this window, we are going to:

- Create the query for selecting records in the Product file.
- Create and configure the search window.

Notes

What is a select query?

A select query is a query that will only "choose" the records that match the criteria.

This type of query is called a select query because the SELECT command is used in SQL language.

Answer

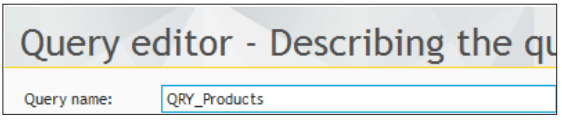
If the "WM Managing Products" application was not created in the previous part:

- an intermediate project is available. This project contains the windows created in the previous parts. This project allows you to follow this lesson and to create the new windows.
  To open this project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "iOS/Android application (with windows)".
- a corrected project is available. This project contains all the windows created in this part and it allows you to check your operations.
  To open this corrected project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "iOS/Android application (Answer)".

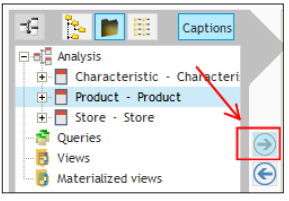
Creating the query used to find the products

Creating the query

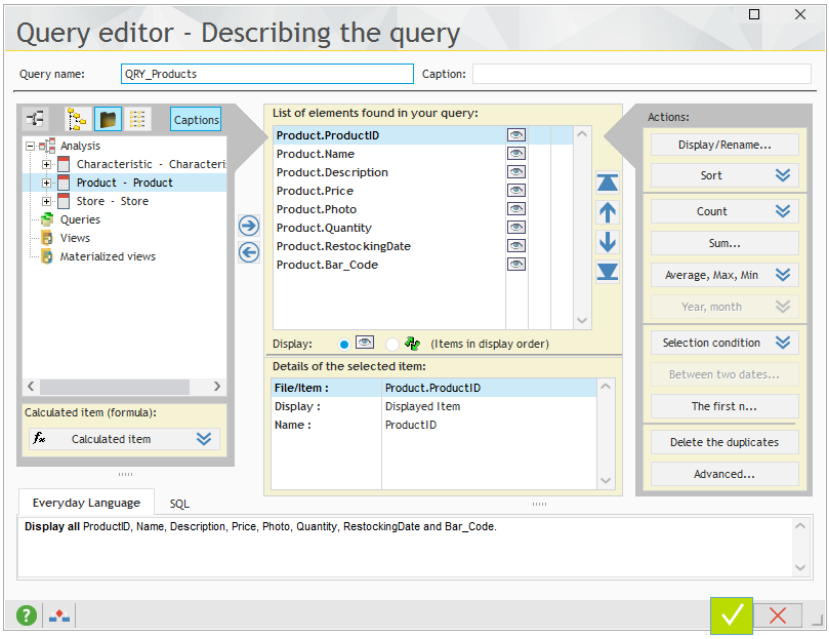
▶ The query editor will be used to create the query.
1. Click  among the quick access buttons. The window for creating a new element is displayed: click "Query". The wizard for query creation starts.
2. Select "Select".
Indeed, the query that will be created will allow us to select records. Go to the next step.
3. The description window of the query is displayed.
4. Give a name and caption to your query: enter "QRY_Products" instead of "QRY_NoName1" in the "Query name" area and "Finding products on the name" in the "Caption" area:



▶ To build the query, we are going to select the elements that will be displayed in the result.
1. The query must be used to display the characteristics of the selected product:
- Select the "Product" file in the "Analysis" area of the window.
- Click the arrow to select all the file items in the query.



2. The description window of the query is as follows:

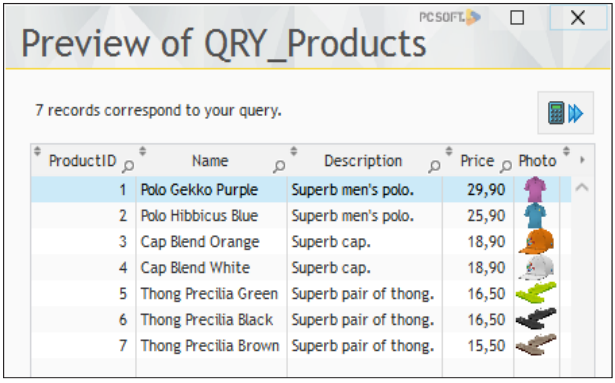


3. Validate the description window of the query (green button at the bottom of the screen).
4. The graphic representation of the query is displayed.
5. Save the query by clicking among the quick access buttons.
6. Validate (if necessary) the backup window of the query.

Test of the query

Like all the elements found in a WINDEV Mobile project, you have the ability to run the test of the query that was just created:

1. Click GO.
2. The result is displayed in a window:



The result lists ALL the products.

In our case, we want to display the products corresponding to the search criteria, the name of the product. To do so, we must use a query with parameters.

3. Close the window.

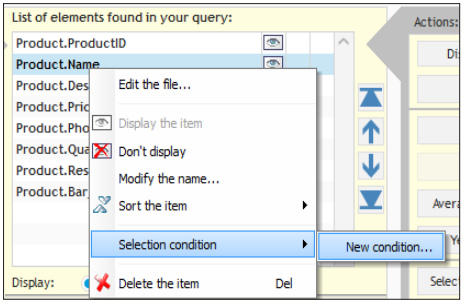
Adding a selection condition

In our example, the user will be able to select a value for the product name. We must modify the query in order for this search criterion to correspond to a query parameter.

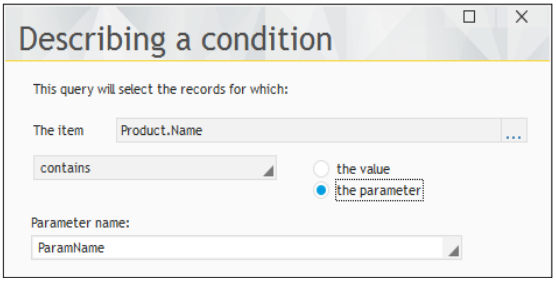
- To define a query parameter, display the description window of the query: double-click the background of the graphic representation of the query (or select "Query description" from the popup menu).

To manage the "Product name" parameter:

1. Select the Product.Name item (in the middle of the screen).
2. Display the popup menu and select "Selection condition .. New condition".

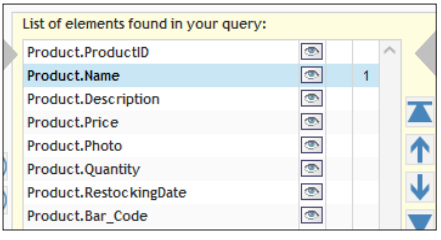


3. In the window that is displayed, we are going to specify that the selection condition corresponds to a parameter:



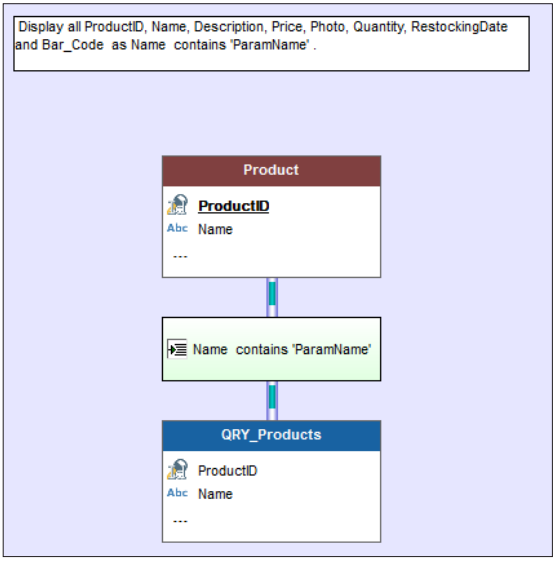
- Select "contains".
- Select "the parameter".
- Keep the parameter name automatically proposed: "ParamName".

4. Validate the description window of the condition. The number "1" appears on the right of the "Product.Name" item, indicating that a selection condition was defined.



5. Validate the description window of the query.

6. The query graph is modified to take into account the selection condition that was defined.

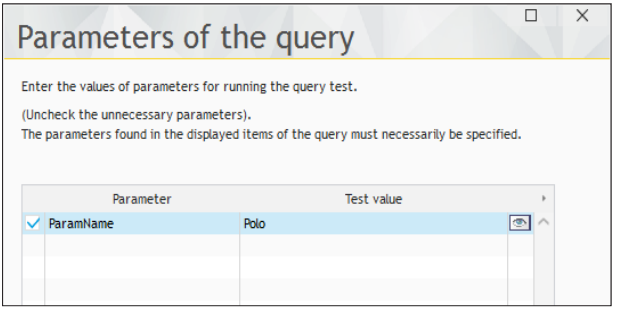


7. Save the query by clicking among the quick access buttons.

Test of the query with parameters

▶ To run the test of the query with parameters:

1. Click .
2. A window is displayed, allowing you to enter the different parameters of the query.
3. Select the ParamName parameter. In the bottom section of the screen, type "Polo".



4. Validate the window. The query result corresponding to the specified parameters is displayed.
5. Close the window.

We are now going to create the interface of our window based on this query.

Creating the interface

The search window will be created via the wizard for creating RAD windows (Rapid Application Development).

Notes

The wizard for window creation proposes several windows generated by RAD. These windows, generated from your data, propose modern interfaces for your applications and they can be immediately used.

Creating the window

▶ To create the search window:

1. Click  among the quick access buttons. The window for creating a new element is displayed: click "Window" then "Window".

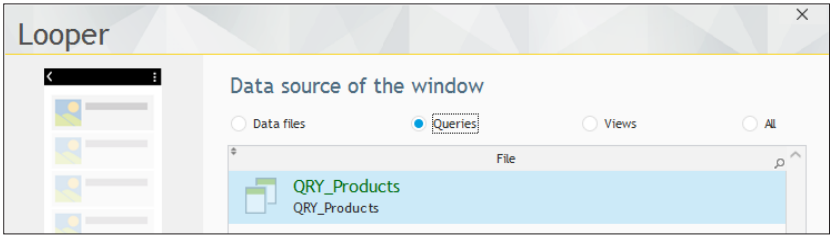
2. In the wizard, select the "Standard" tab, choose "Looper" and validate.

3. The wizard for creating a RAD window starts.

4. Choose the platform to use: "Generic Android phone". Go to the next wizard step.

5. The wizard proposes to choose the data source associated with the window. In our case, it is a query:

- Click "Queries".
- Select the query that was just created: "QRY_Products".



6. Go to the next step.

7. Select the style of the looper: "Image + Title + Caption below". Go to the next step.

8. The wizard automatically proposes the query items corresponding to the generated looper. Keep the proposed options and go to the next step.

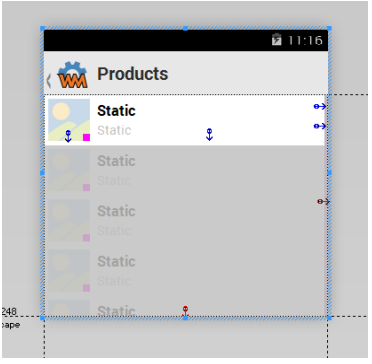
9. Change the suggested sort and choose the "Name" item. Go to the next step.

10. The wizard proposes several options for generating the Looper window. In our example, keep the default options. Go to the next step.

11. Give a title and a name to the generated window. In our case:

- For the title, type "Products".
- For the name, type "WIN_List_of_products_Advanced".

12. Validate the wizard. The window is automatically created, displayed in the editor and saved.



We are now going to modify the "WIN_List_of_products_Advanced" window in order to display the Product form that was created in a previous lesson.

1. Right-click the Looper control and select "Code".

Caution: make sure you select the Looper control and not one of the controls included in it. In the code editor, enter the following code in the "Initializing..." section:

```
QRY_Products.ParamName = Null
```

2. This code line is used to initialize the value of the parameter found in the "QRY_Products" query used by the Looper control. By default, the value of this parameter is set to "Null", allowing you to ignore the parameter. Therefore, all the products will be displayed in the window.

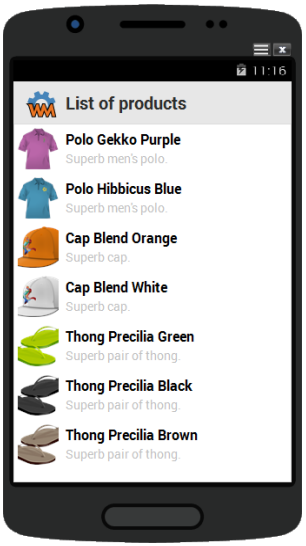
3. In the code editor, enter the following code in the "Selecting a row..." section:

```
HReadSeek(Product,ProductID,QRY_Products.ProductID)
OpenMobileWindow(WIN_Product_form)
```

Let's study this code:

- The Looper control is based on the QRY_Product query. When selecting the product in the looper, the selected record is the one found in the query.
- During a click on the control row, we want to open the form window that was created beforehand. This window is based on the Product file.
- The record selected by the query must be found in the "Product" file in order to load the buffer of selected data in memory. The operation is performed by **HReadSeek**.
- Then, the form window named "WIN_Product_form" is opened by **OpenMobileWindow**.

4. Save the modifications by clicking among the quick access buttons.
5. Close the code window (click the cross in the top right corner of the code editor).
6. Run the test of the window that was just created in the simulator (among the quick access buttons).

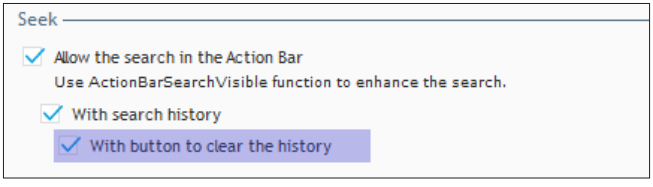


7. Click one of the products: the form window is displayed.
8. End the test.

Managing the search

We are now going to manage the search. To do so, we are going to:
- Allow the search in the Action Bar.
- Create a search button in the Action Bar.

▶ To allow the search in the Action Bar:
1. Display (if necessary) the "WIN_List_of_products_Advanced" window in the editor.
2. Display the description window of the Action Bar (double-click the Action Bar).
3. In the "Details" tab, check "Allow the search in the Action Bar".



To create a search button in the Action Bar:

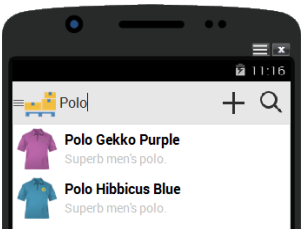
1. In the "General" tab of the description window of the Action Bar:
2. Click number 2. The interface for entering an option in the toolbar is displayed.
3. Click the "+" button to add an option. A new default option is created at the top right. Modify the characteristics of this option:
   - In the "Caption" area, type "Find".
   - In the "Preset image" area, expand the list and select "Find".
   - Validate the description window.
4. The code of this option is used to make the search area visible. To enter this code:
   - Select (if necessary) the Action Bar of the window.
   - Click the search button.
   - A drop-down menu with the "Find" option is displayed.
   - Right-click the option.
   - Select "Code" from the popup menu.
   - In the "Selecting the menu" process, enter the following code:

```
ActionBarSearchVisible(True)
```

5. Save the modifications by clicking among the quick access buttons.
6. Close the code window (click the cross in the top right corner of the code editor).
7. Select the Action Bar and display the associated code (press F2 or select "Code" from the popup menu).
8. In the code editor, enter the following code in the "Validating the search..." section:

```
QRY_Products.ParamName = ACTB_ActionBar..SearchValue
LooperDisplay(LOOP_QRY_Products,taReExecuteQuery)
```

9. Let's study this code:
   - The query parameter is initialized with the search value entered in the Action Bar.
   - Then, the Looper control is redisplayed by **LooperDisplay**. The ***taReExecuteQuery*** constant is used to re-run the base query of the Looper control and therefore to take the new parameter into account.
10. Save the modifications by clicking among the quick access buttons.
11. Close the code window (click the cross in the top right corner of the code editor).
12. Run the test of the window that was just created in the simulator (among the quick access buttons).
    - Click the magnifier.
    - Type "Polo" in the search area.
    - Validate (ENTER key).
    - The list of products containing "Polo" is displayed.



13. Close the simulator.

Improving the window

Managing the "Pull to refresh" feature

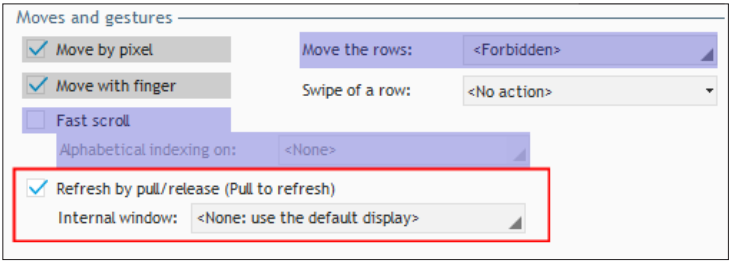
A new feature will be added to our window: the management of the "Pull to refresh" feature. This feature allows the user to "pull" a Table or Looper control in order to refresh its content.

During this action, a refresh bar automatically appears in the exposed area:

- The bar indicates that you must pull to refresh.
- Then, the bar indicates that you must release to refresh.
- The bar indicates that the refresh operation is in progress. A progress bar is displayed during the refresh duration.
- The control is updated.

▶ To use the "Pull to Refresh" feature:

1. Display (if necessary) the "WIN_List_of_products_Advanced" window in the editor.
2. Select the Looper control and display the description window of the control.
3. In the "Details" tab of the description window of the control, in the "Moves and gestures" area, check "Refreshing by pull/release".



Notes

A specific internal window can be used to manage the "Pull to refresh" feature. In this example, we will be using the default window. See the online help for more details.

4. Validate the description window of the control.

- The setting of "Pull to refresh" has added:
  - the refresh bar that will be displayed to the user during the operation.
  - the "Refreshing by pull/release" process among the processes of the Looper control. This process is automatically called during the refresh gesture. We are now going modify this process in order to manage the control update.

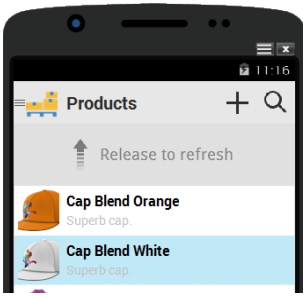
- To modify the "Refreshing by pull/release" process:

1. Select the Looper control and display the associated process (press F2 for example).
2. In the code editor, enter the following code in the "Refreshing by pull/release..." section:

```
LooperDisplay(LOOP_QRY_Products,taReExecuteQuery)
```

3. As already seen for the management of the search, **LooperDisplay** is used to redisplay the Looper control. The ***taReExecuteQuery*** constant is used to re-run the base query of the Looper control and therefore to take into account the new records entered in the database.
4. Save the modifications by clicking among the quick access buttons.
5. Close the code window (click the cross in the top right corner of the code editor).

- Run the test of the window that was just modified in the simulator (among the quick access buttons).
  - Click the top of the looper with the mouse and move the mouse to the bottom.
  - Release the mouse. The looper is updated.



6. Close the simulator.

This example allows you to understand the implementation of the "Pull to refresh" feature.

This feature can be used for example in the same application in HFSQL Client/Server where other users would update or add products. These modifications could be displayed by the "Pull to refresh" feature.

Using a sliding menu

In several mobile applications, the menu does not correspond to a "static" window. It corresponds to a sliding window displayed via an option of the Action Bar and/or via a swipe of the window.

We are going to modify the "WIN_List_of_products_Avanced" window in order to add a "sliding menu". This menu will be using the Multiline Zone control of the "WIN_Menu" window that was created beforehand.

▶ To create a sliding menu, we are going to:
- Create an internal window. This internal window will contain the menu options.
- Modify the "WIN_List_of_products_Advanced" window to display the menu.

Notes

An internal window is a simple window with no Action Bar and no toolbar. An internal window is used to easily include a set of controls in another window.

▶ To create the internal window containing the menu:

1. Click  among the quick access buttons. The window for creating a new element is displayed: click "Window" then "Internal window".

2. The internal window is automatically opened in the editor.

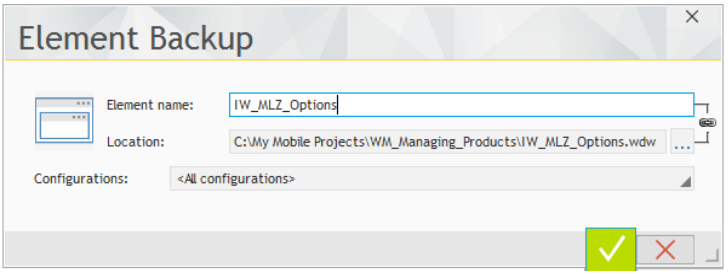
3. Display the description window of the internal window ("Description" from the popup menu).

4. In the "GUI" tab, specify the dimensions of this internal window:
- Width: the one that suits you. It must be sufficient to entirely see the controls of the drop-down menu. Practically, the width of the sliding menu must be smaller than the width of the window above which it is displayed (260 for example).
- Height: This height must correspond to the height of the window above which the sliding menu is displayed. In our case, this height is set to 248.

5. Validate.

6. Save the window by clicking  among the quick access buttons.

7. In the window that is displayed, enter the name of the internal window: "IW_MLZ_Options".



8. Validate.

To add the menu options into the internal window:

1. Open the "WIN_Menu" window that was created beforehand (double-click its name in the project explorer for example).

2. Copy the controls found in the "WIN_Menu" window to the "IW_MLZ_Options" internal window:

- Select all the elements found in the "WIN_Menu" window (CTRL A).
- Copy the elements (CTRL C).
- Display the "IW_MLZ_Options" window (click its name in the bar of opened elements).
- Paste the elements (CTRL V).

3. Via the selection handles, modify the width of the Multiline Zone control so that it is entirely displayed in the internal window. Via the anchors, all the controls found in the Multiline Zone are also modified. You get the following window:

We are now going to modify the WLanguage code used to open the list of products. Indeed:
- we work with the "WIN_List_of_products_Advanced" window and not with the "WIN_List_of_products" window anymore.
- the "WIN_List_of_products_Advanced" window contains the sliding menu. Therefore, the "List of products" option must not re-open this window.

We are going to change the selection code of the Multiline Zone control.

1. Select the Multiline Zone control.

2. Display the associated processes ([F2] key).

3. Replace the line:

```
CASE 1 // List of products
    OpenMobileWindow(WIN_List_of_products)
```

by:

```
CASE 1 // List of products
    WinSlidingVisible(swLeft,False)
```

In this code, **WinSlidingVisible** is used to make the sliding window displayed from the left invisible. Therefore, the list of products is displayed.

4. Save the modifications by clicking  among the quick access buttons.

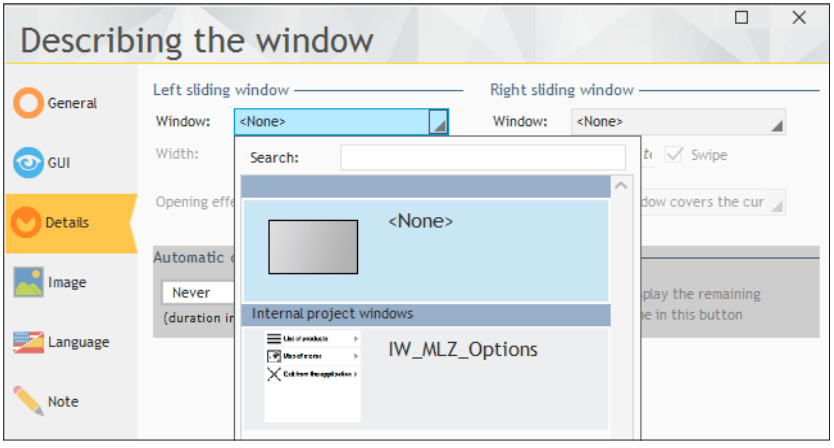
5. Close the code window (click the cross in the top right corner of the code editor).

To associate the internal window with the "WIN_List_of_products_Advanced" window:

1. Display the "WIN_List_of_products_Advanced" window (click its name in the bar of opened elements).

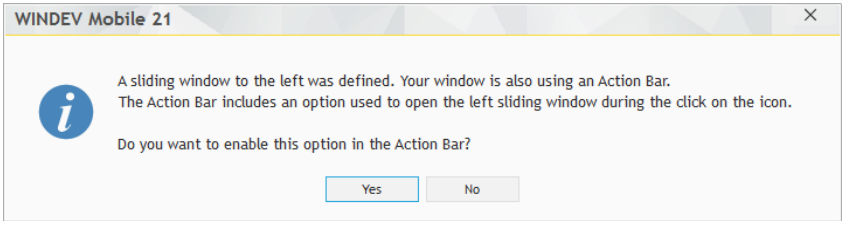
2. Display the description window.

3. In the "Details" tab, in the "Left sliding window" area, select the "IW_MLZ_Options" window. The "Swipe" option is used to automatically manage the display of the sliding window during the swipe.



4. Validate.

5. The window being associated with an Action Bar, the editor proposes to enable the option used to open the sliding window.



6. Accept.

We are going to check the operating mode of the sliding menu in the simulator:

1. In the project explorer, define the "WIN_List_of_products_Advanced" window as first project window (indeed, the "WIN_Menu" window is now useless).

- Select the "WIN_List_of_products_Advanced" window in the project explorer.
- Display the popup menu.
- Select "First project window". A specific icon (with a small 1) is displayed in front of the name of the window, in the project explorer.

2. Click among the quick access buttons.

3. When clicking the menu of the Action Bar, the sliding window of the menu appears.

Lesson 5.5. Window with scroll

This lesson will teach you the following concepts...

- Creating an internal window by refactoring.
- Changing the content of a window by swipe

Estimated time: 20 min

Overview

In the Windows applications, all the operations are performed via the mouse or the keyboard.

In mobile, the interfaces must be configured differently. With the touchdown screens, all the operations are performed with the fingers.

In the applications for mobile devices, WINDEV Mobile proposes several features to manages the specific moves of fingers (pull to refresh, double touch, sliding, ...).

In this lesson, we are going to create a new form window, used to view the products.

In this window, you will have the ability to go from a product form to another one by swipe.

Answer

If the "WM Managing Products" application was not created in the previous part, a corrected project is available. This project contains all the windows created in this part and it allows you to check your operations. To open this corrected project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "iOS/Android application (Answer)".

Creating the Form window with swipe

Creating the Form window

▶ To create the form window:

1. Create a new blank window.
   - Click  among the quick access buttons.
   - The window for creating a new element is displayed: click "Window" then "Window".
   - In the wizard, select the "Standard" tab, choose "Blank" and validate.
2. Save the window. Specify:
   - the title of the window: "Product form".
   - the name of the window: "WIN_Product_form_Advanced".
3. Validate.

We are now going to create an Internal Window control in the "WIN_Product_form_Advanced" window. This control will host an internal window that will display the data to scroll.

▶ To create the Internal Window control:

1. On the "Creation" pane, in the "Containers" group, expand "Internal window" and select "Swipe area (Internal window)".
2. Click the position where the control must be created in the window (top left corner).
3. Resize the Internal Window control so that it occupies the entire available space in the window.

4. Modify the anchor of the Internal Window control ("Anchoring" option from the popup menu): anchor the control in height and in width ( ).
5. Validate.

Creating the internal window

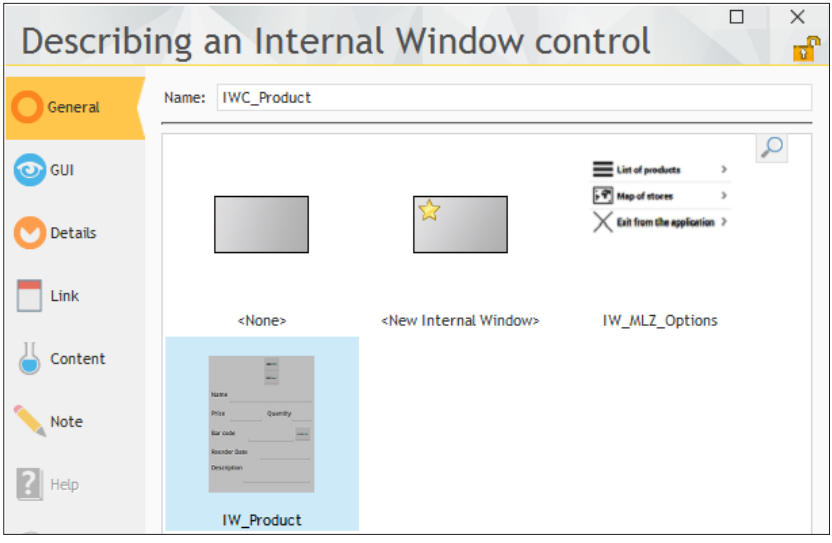
To simplify the creation of the internal window, we are going to create it from the "WIN_Product_form" window found in our project:

1. Open (if necessary) the "WIN_Product_form" window in the editor (double-click its name in the project explorer for example).
2. Select all the controls found in the portrait layout (CTRL A).
3. Display the popup menu and select "Refactoring .. Create an internal window from the selection".
4. The internal window is automatically created and the backup window is displayed. Give the "IW_Product" name and validate.
5. Display the description window of the internal window and, in the "GUI" tab, modify the width of the window: 320. This width corresponds to the width of the Internal Window control that was created in the "WIN_Product_form_Advanced" window.
6. Validate.

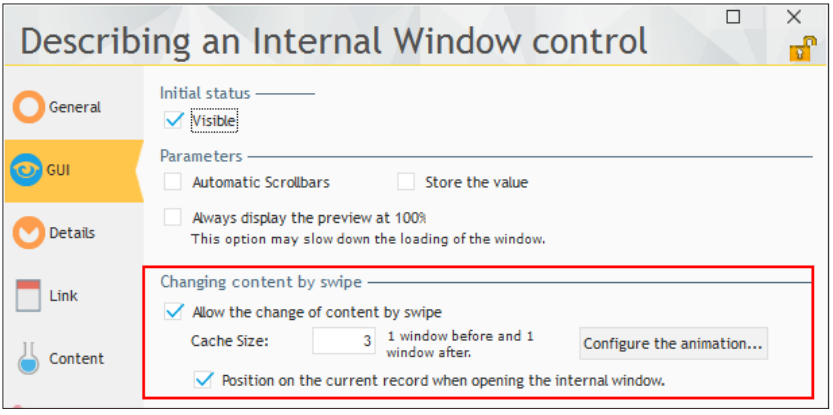
Managing the swipe in the form window

To associate the internal window with the Form window:

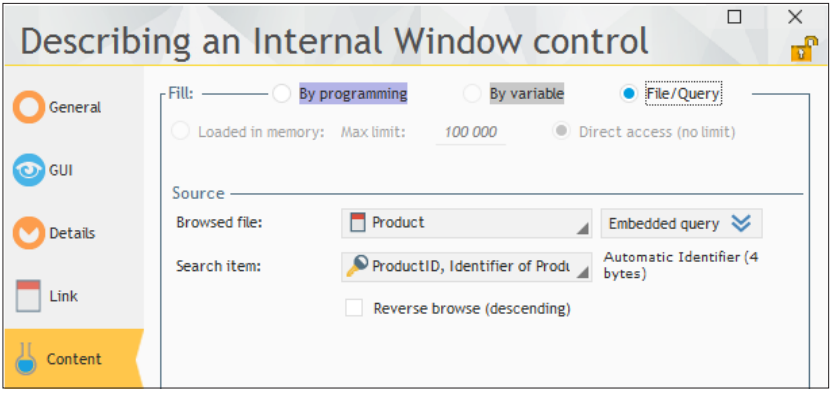
1. Display the "WIN_Product_form_Advanced" window in the editor (click its name in the bar of opened elements).
2. Select the Internal Window control and display its description ("Description" from the popup menu).
3. In the "General" tab, select the internal window that was just created ("IW_Product").



4. In the "GUI" tab, in the "Changing content by swipe" area:
- The option "Allow the change of content by swipe" is already checked because the Internal Window control was chosen for swipe.
- Check "Position on the current record when opening the internal window".



5. In the "Content" tab, we are going to configure the mode for filling the internal window. This window will display the data found in the Product file:
- Click "File/Query".
- In the source, select the "Product" file.



6. Validate the description window.

The swipe is implemented.

- In order not to be bothered by the keyboard appearance during the swipe, we are going to use **SIPVisible**:

1. In the "WIN_Product_form_Advanced" window, display the processes of the Internal Window control.

2. In the "Selection by swipe..." process, enter the following code:

```
SIPVisible(False)
```

3. Close the code editor.

- To end this window, we are going to add the validation option into the Action Bar of the window (this operation was already performed before page 114, we will present the important points only):

1. Select the Action Bar (at the top of the window).

2. Display the description window of the Action Bar.

3. Click number 2. The interface for entering an option in the toolbar is displayed.

4. Click the "+" button to add an option. A new default option is created at the top right.

5. Modify the characteristics of this option:

- In the "Caption" area, type "Validate".
- In the "Preset image" area, expand the list and select "Validate".
- Validate the description window.

6. To enter the code used to save the modifications performed in the "WIN_Product_form_Advanced" window:

- Select (if necessary) the Action Bar control of the window.
- Click "OK".
- A drop-down menu with the "Validate" option is displayed.
- Right-click the option.
- Select "Code" from the popup menu.
- In the "Selecting the menu" process, enter the following code:

```
ScreenToFile()
HSave(Product)
Close()
```

7. Save the modifications by clicking  among the quick access buttons.

8. Close the code window (click the cross in the top right corner of the code editor).

Test of the window

Before running the test of the window, we are going to modify the "WIN_List_of_products_Advanced" window to directly open the from window that was just created.

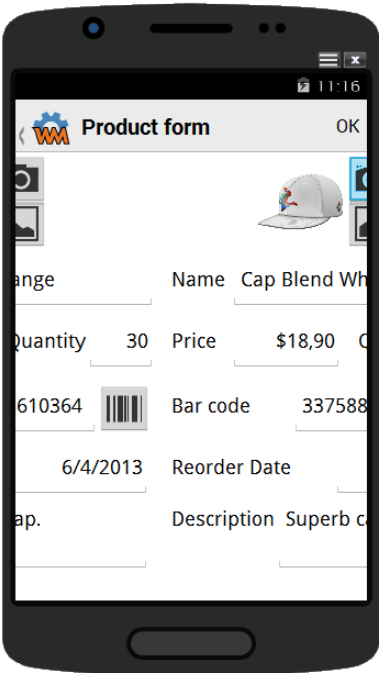
- To open the window with swipe from the list of products:
  1. Display the window "WIN_List_of_products_Advanced" in the editor (click its name in the bar of opened elements).
  2. Display the processes linked to the Looper control.
  3. In the process "Selecting a row... ", replace the code:

```
HReadSeek(Product,ProductID,QRY_Products.ProductID)
OpenMobileWindow(WIN_Product_form)
```

  by

```
HReadSeek(Product,ProductID,QRY_Products.ProductID)
OpenMobileWindow(WIN_Product_form_Advanced)
```

- We are going to check the operating mode of the project in the simulator:
  1. Click GO among the quick access buttons.
  2. In the looper that is displayed, click a product to display its form.
  3. Click the product form and move the mouse to the right or to the left. The product form automatically changes.



Conclusion

This part explained the main concepts for developing Android or iOS applications.

Several themes have not been presented in this part:
- managing the emails,
- managing the notifications,
- using visualization panel,
- using the debugger,
- ...

Don't hesitate to see the online help to discover and check new features.

Lesson 5.6. Deploy the application

This lesson will teach you the following concepts...

- Generating the Android application.
- Generating the iOS application.

Estimated time: 20 min

Overview

That's it, our application is created, we must now compile it and install it on the device in order to run its test.

If you have chosen to develop the application for Android only, you can follow the generation of the Android application.

If you have chosen to develop the application for iOS, follow the generation of the iOS application, page 173.

If you want to develop the application for the two platforms, follow the generation for Android then the generation for iOS.

Generating the Android application

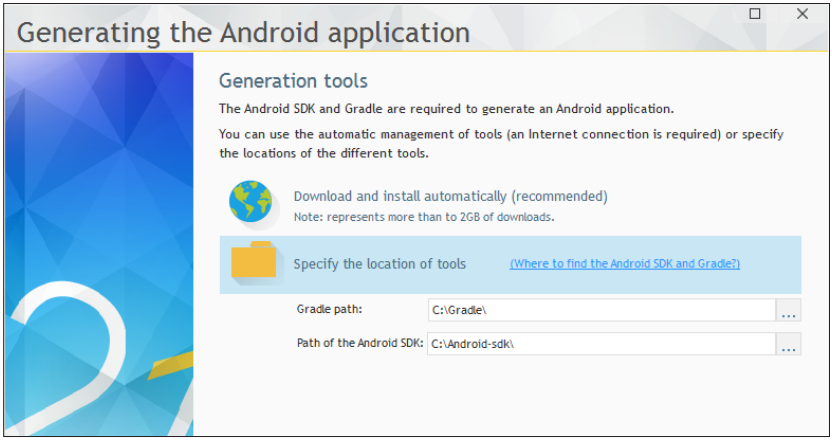
▶ To generate the Android application:

1. Select (if necessary) the Android platform in the project explorer.

2. On the "Project" pane, in the "Generation" group, click "Generate" (you also have the ability to click among the quick access buttons).

3. The wizard for generating an Android application starts.

4. The first wizard step consists in checking the tools required to generate the Android application.



The wizard proposes to:

- **download and install the Android SDK and Gradle**: in this case, you will only have to validate the license. WINDEV Mobile takes care of everything. If an update is available, the generation wizard will automatically propose to perform the necessary updates. Only an Internet connection is required.
- **Use the tools automatically installed**. This option is available if the tools have been downloaded and installed during a previous generation.
- **Specify the location of the tools already installed on your computer**. In this case, all you have to do is specify the setup paths of Gradle and Android SDK.

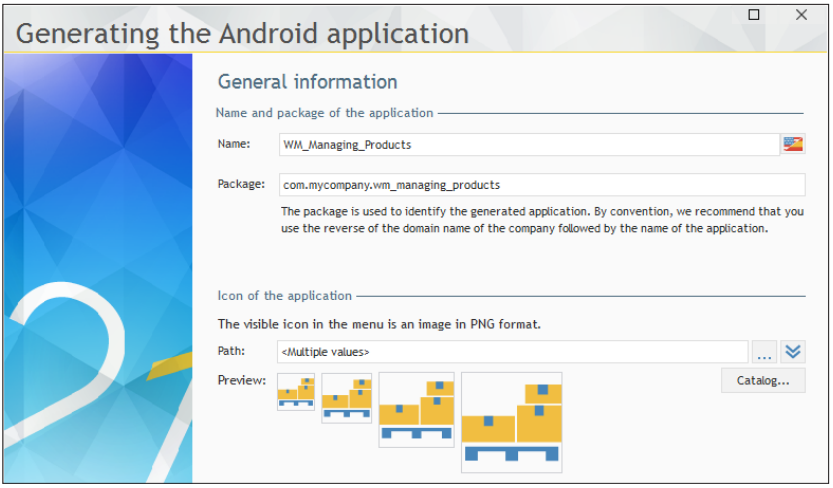
5. Select the option corresponding to your configuration and go to the next step.

Note: If you have chosen to download and install the tools, going to the next step may be quite

long and you may have to validate the license.

6. Go to the next step by clicking the arrow keys at the bottom of the window. The next wizard step is used to:

- define the name of the application (displayed below the icon used to start the application) and the corresponding package.
- select the icon of the application in the image catalog of WINDEV Mobile ("stock" in the "Flat Soft" theme for example).



7. Go to the next step. This step is used to define:

- the splash screen of the application,
- the information saved in the manifest,
- the start mode of the application (when the device is started or not).

8. Go to the next step. The wizard is used to define the version number of the application.

9. Go to the next step. This step is used to sign the application. The wizard proposes a generic signature that can be used for the tests of the application. A specific signature is required to distribute the application. See the online help for more details.

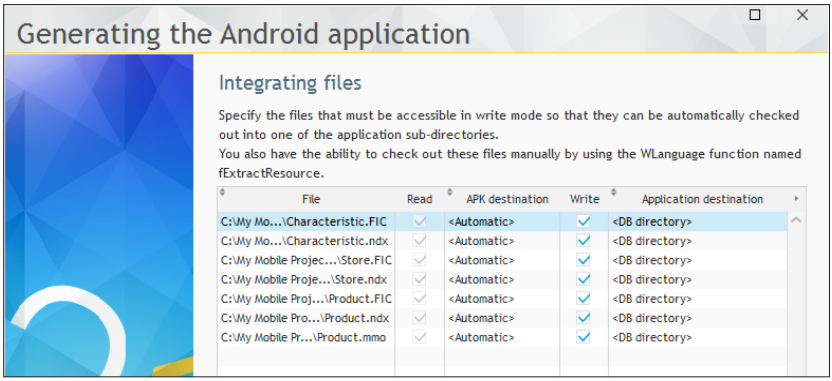
10. The next step is used to include the data files in the application. For our example, pre-filled HFSQL data files are available. They will be supplied with the application. In this case, they must be specified in the "Integrating files" screen.

- Click the "Add" button.
- Select the data files (.fic, .ndx and .mmo) found in the "EXE\Android application" directory of the project. The list of files is displayed.

Notes

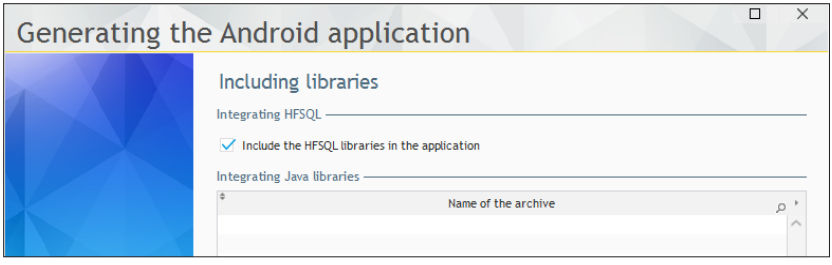
If your project is using the Android platform only, the files must be selected in the EXE directory of the project.

11. Check the "Write" box for each file (required to be able to modify the data from the application).



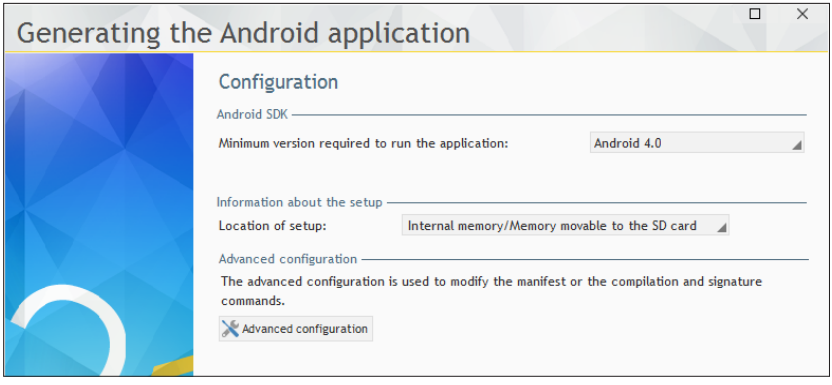
12. Go to the next step.

13. The "Including libraries" screen is used to include specific libraries (HFSQL and Java).



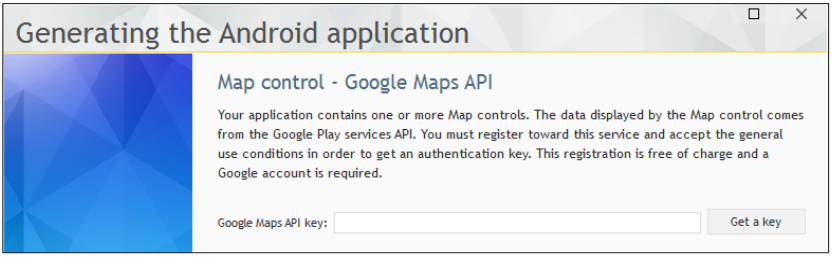
Check "Include the HFSQL libraries in the application".

14. Validate the other steps until you reach the "Configuration" screen. This screen is used to configure the options of Android SDK and the setup location.

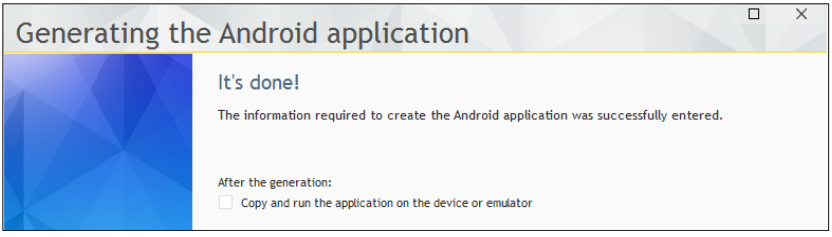


15. Go to the next step.

16. This screen is specific to the use of the Map control. This screen allows you to enter the key required to use the Map control. If you own a Google Maps API key, enter it. Otherwise, click "Get a key".



17. The last wizard screen is used to specify whether the application must be copied and run on the device connected to the computer or on an emulator. If you own an Android device connected to the development computer, check this option.



18. A new screen allows you to select the runtime device. If you own an Android device connected to the development computer, select the device connected to the PC.
19. The generation of the Android application is performed.

Notes

If the device is not connected to the development computer, you must:
1. Connect the device to the development computer.
2. In the explorer, open the generation directory of the apk file corresponding to the Android application.
3. Copy the apk file into the "Download" directory of the device.
4. Unplug the device.
5. Start the application for file management on the device.
6. Go to the "Download" directory and run the apk file. The application is automatically installed.

Generating the iOS application

▶ To generate the iOS application:
1. Select (if necessary) the iOS platform via the project explorer.
2. On the "Project" pane, in the "Generation" group, click "Generate" (you also have the ability to click iOS among the quick access buttons).
3. The wizard for generating an iOS application starts.
4. The wizard is used to:
- define the name of the application, the company and the copyright.
- enter the bundle identifier.

Notes

This identifier is the unique identifier of your application beside Apple. It is defined and saved on the Apple developer account.
This identifier will be used to save your application in order to run its test and to deploy it. By default, WINDEV Mobile automatically proposes an identifier that respects the development standards of Apple. This identifier can be modified.

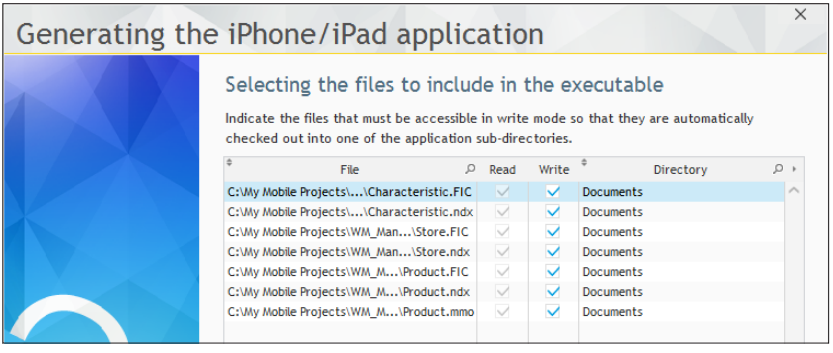
5. Go to the next step. Specify the path of the different icons found in the application for each type of device.

6. Go to the next step. Specify the path of the different images used when starting the application for iPad and for iPhone (images in PNG format). Default images are automatically created for your application.

7. Go to the next step. Specify the version number of the generated application.

8. Go to the next step. This step is used to include specific files (data files, images, ...).

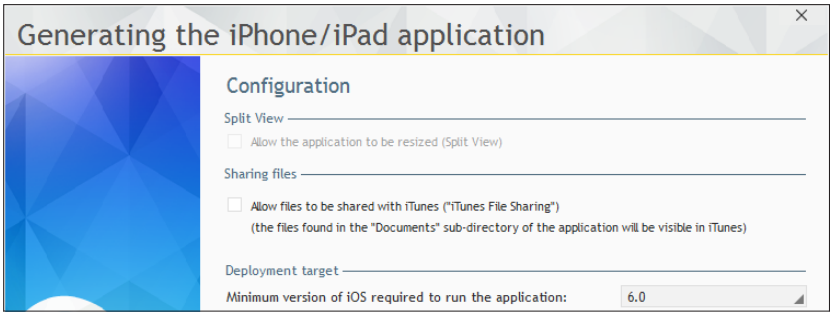
- Click the "Add" button.
- Select the data files (.fic, .ndx and .mmo) found in the "EXE\iOS application" directory of the project. The list of files is displayed.



9. Indicate that these data files must be in write mode: check the "Write" box.

10. Go to the next step.

11. The wizard allows you to specify:
- the minimum iOS version required to run the application.
- whether files can be shared with iTunes. If this option is checked, you will have the ability to retrieve the application files on Mac during the synchronization. For example, if data files have been supplied with the application, the iTunes application will allow you to retrieve these files.



12. Validate the wizard.

13. The generation is performed in the EXE folder of the project directory. The directory containing the source code that will be used on Mac is named "Project_name.xcode.gen" ("WM Managing Products.xcode.gen" in our example). This is the directory that must be copied onto Mac. Click the "Open the generation directory" button.

The other operations must be performed on Mac. You must:
- Transfer the WINDEV Mobile project onto Mac.
- Compile the project in Xcode

Transfer the WINDEV Mobile project onto Mac

▶ To transfer the WINDEV Mobile project onto MAC:

1. Copy the entire folder generated in the EXE directory onto an external media (USB key, external hard disk, shared directory with MAC on network). This directory is named <Project Name>.xcode.gen.

2. Paste this folder onto the MAC where the application will be compiled.

3. Open the folder on MAC and double-click the folder named "Project_name.xcodeproj".

4. The project is opened in Xcode.

Compile the project in Xcode

WINDEV Mobile automatically generates an Xcode project for your iOS compilations. To simplify the implementation of applications, WINDEV Mobile generates a "Scheme" for Xcode.

▶ To compile the project in Xcode:

1. In the drop-down list found in the top left corner, select the compilation options. Select the scheme corresponding to your application then the compilation target (device currently connected or a simulator).

2. To start the compilation, select "Product .. Clean" then "Product .. Build".

3. A status report of compilation is displayed at the top ("Succeeded" or the number of warnings and errors otherwise). You have the ability to click these symbols to see the list of errors/warnings.

4. Once the program is compiled without error, you can start the simulation ("Product .. Run"). The simulation window appears with the application.

Then, you have the ability to run the test of your application on your iPhone or iPad.


DEVELOP 10 TIMES FASTER
PART 6
Windows
Mobile
application
21

Lesson 6.1. My first Windows Mobile project

This lesson will teach you the following concepts...

- Creating Windows Mobile project
- My first window
- My first test
- First deployment

Estimated time: 1 h

Overview

To start working with WINDEV Mobile, we are going to create a first project. This project will contain a window used to display a message.
This first example will present the main concepts of development with WINDEV Mobile.

My first project

Create the project

We are going to create our first project for Windows Mobile. If you own the mobile device (Smartphone or Pocket PC) on which the application must be run, we advise you to connect this device to the development computer. Therefore, the characteristics of the device will be automatically detected and proposed when creating the Windows Mobile project.

Answer

A corrected project is available. To open this project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "My Pocket project (Answer)".

▶ To create a project:

1. Start WINDEV Mobile 21 (if not already done). Close (if necessary) the current project in order to display the home window.

2. In the home window, click the "Create a project" icon then "Windows Mobile application".

The wizard for project creation starts. The different wizard screens help you create your project. The information specified in this wizard can be modified later.

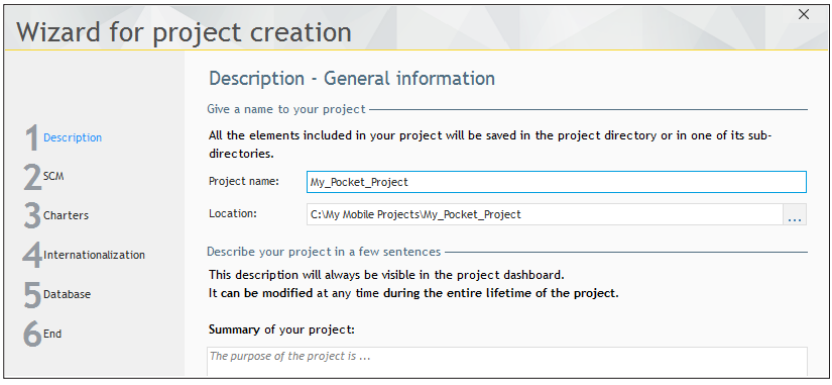
Notes

Tip: Other method for creating a project:

1. Click among the quick access buttons of the WINDEV Mobile menu.

2. The window for creating a new element is displayed: click "Project".

3. The first wizard screen is used to enter the name of the project, its location and its description. In our case, this project will be named "My_Pocket_Project". WINDEV Mobile proposes to create this project in the "\My Mobile Projects\My_Pocket_Project" directory. You can keep this location or modify it via the [...] button.

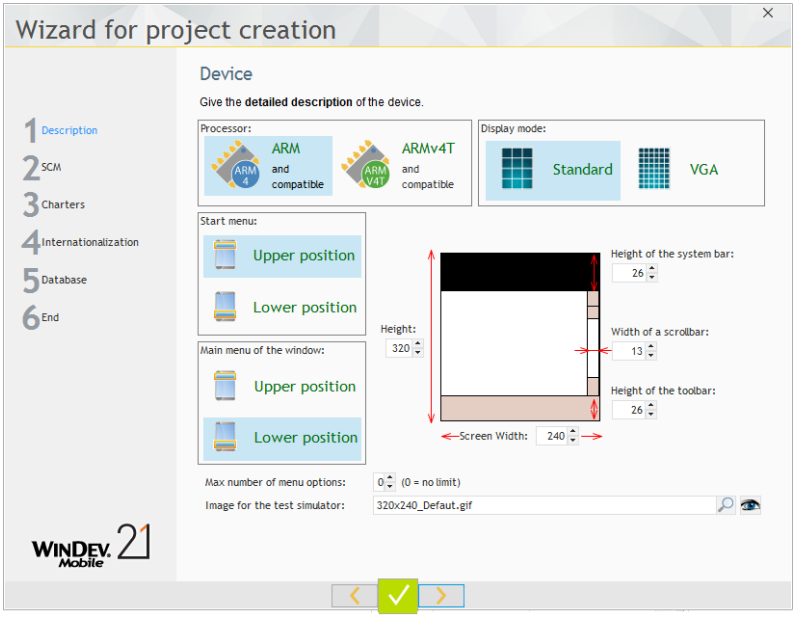


4. Go to the next screen via the arrows found at the bottom.
5. The wizard proposes to add documents. Keep the default options and go to the next screen.
6. The next screen is used to detect the parameters of the device connected to the PC.

- **If your device is connected**, click "Click here to automatically detect the device".
- **If no device is connected**, go to the next screen to manually define the characteristics of the device used.

7. If you have no device, the next screen allows you to choose the device that will be used to develop your application.
Caution: this screen is important because the size of your windows will depend on this choice. For our example, select "Windows Mobile 5/6". Go to the next screen.

8. The description window of your device is displayed.



Go to the next screen.

9. In the left section of the wizard, click "Charters". This step is used to define the programming charter. Don't modify the suggested options. Go to the next screen via the arrows found at the bottom.

10. This step is used to define the style book. Select "Elegant".

11. The other wizard steps not being important for our first project, click "End" in the left section of the wizard.

12. Click the validation button at the bottom of the wizard. The project is automatically created.

13. The window for creating a new element is displayed. This window is used to create all the elements that can be associated with a project.

My first window

Overview

The first window allows the user to display a welcome message via the "Display" button.

You may think this is too basic but we advise you to create this window. You may be surprised by how intuitive and how easy it is to use the editor of WINDEV Mobile. Furthermore, this window will allow you to discover concepts that are fundamental for the rest of this tutorial and to see the entire process for developing a Windows Mobile application with WINDEV Mobile.

Creating the window

▶ To create the window:

1. In the window for creating a new element, click "Window" then "Window".

Note

As a new project was created, the window for creating a new element is automatically displayed.

To display the window for creating a new element, all you have to do is click among the quick access buttons of the WINDEV Mobile:

2. The wizard for window creation starts.

3. Select "Blank" in the list of windows displayed on the left. In the list of skin templates found on the right, the "Elegant" skin template is selected by default. You can choose another skin template proposed in the list.

Note

The skin templates allow you to quickly create outstanding interfaces. A skin template defines the style of the window but also the style of all the controls that will be used in this window. No ugly interface anymore.

4. Validate. The window is automatically created in the editor.

▶ Save the window by clicking among the quick access buttons. During the first backup, a specific window is displayed. This window proposes to enter:

- the title of the element: enter "Welcome". In our case, this title will be displayed in the title bar of the window.
- the name of the element that corresponds to the name of the window. This name will be used in programming. By default, this name includes "WIN_" that corresponds to the programming charter and "Welcome" that corresponds to the title of the window.

Note

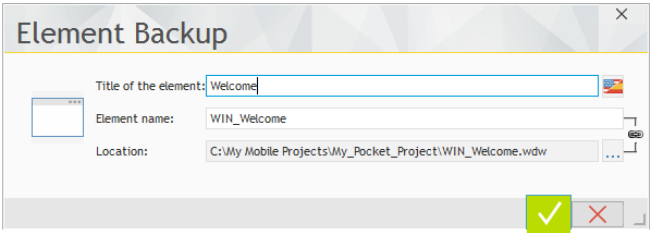
Let's take a look at the window name proposed by WINDEV Mobile: this name starts with the letters "WIN_". This prefix is automatically added because the project is using a programming charter.

The programming charter is used to define a prefix for each type of object, allowing you to quickly identify the element:

- a window starts with "WIN_",
- a button starts with "BTN_",
- etc.

If you don't want to use this charter, all you have to do is disable it: on the "Project" pane, in the "Other actions" group, expand "Charter" and uncheck "Use the charter".

- the location that corresponds to the file name created for the window. The window is a file whose extension is "WDW", saved in the project directory.



▶ Click the green button to validate.

Display a message

You are now going to create a button used to display a message.

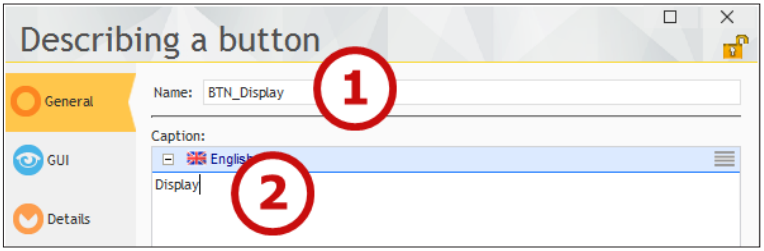
▶ To create the "Display" button:

1. On the "Creation" pane, in the "Usual controls" group, click Ok. The button appears in creation under the mouse.

2. Move the mouse toward the position where the control must be created in the window (at the top of the window for example). To drop the control in the window, all you have to do is perform a new left mouse click.

3. Perform a right mouse click on the control that was just created. The popup menu of the control is displayed. Select "Description" from this popup menu. The description window of the button is displayed.

- Modify the characteristics of the control by entering the following information:



1. Name of this control: "BTN_Display".
2. Caption of this control: "Display"

- Validate the description window of the control (green button). The control appears in the window editor.
- We are going to display a message in a dialog box (a small window proposed by the system). To do so, we will be using our first WLanguage function: ***Info***.

Notes

The programming language supplied with WINDEV Mobile is named WLanguage. It is a 5th generation language (5GL) that includes highly sophisticated commands.

1. Select the "Display" button with the mouse: all you have to do is click it.
2. Display the popup menu of the control (right mouse click).
3. Select "Code". This option opens the code editor of WINDEV Mobile, where all the WLanguage statements can be entered.
4. Enter the following code in the "Click BTN_Display" process:

```
Info("Hello")
```

Note about the assisted input: As soon as the first two characters are typed, WINDEV Mobile proposes all the words of the WLanguage vocabulary containing these characters. The assisted development is a very powerful feature. No more mistake when typing the name of an element: the syntax errors are reduced. All you have to do is select the requested word and press the [ENTER] key to validate. You can focus on the algorithm.

Notes

When typing this code in the code editor, you have noticed that different colors are used by the different elements. This is the syntactic coloring. The code editor allows you to easily identify the different elements handled by the code:

- the WLanguage functions are colored in blue,
- the character strings (between quotes) are colored in purple,
- the names of controls are colored in cyan.

These colors can be modified element by element in the code editor options (on the "Home" pane, in the "Environment" group, expand "Options" and select "Options of the code editor").

Info displays the message passed in parameter.

- To save the modifications, click among the quick access buttons (on the left of ribbon) or by pressing [CTRL] + [S].
- Close the code window (cross at the top right of the code editor). The window re-appears.

First test

For a Windows Mobile application, WINDEV Mobile allows you to run the application test on the development computer via the simulation mode. This test simulates a Windows Mobile device on the development computer. This test is useful when the developer is not equipped with a Windows Mobile device. However, this test does not allow you to use the hardware components of the device (SMS, ...).

- Let's now run the test of the window in simulation mode.
  1. Click among the quick access buttons (or press [F9]).
  2. Validate (if necessary) the information message regarding the simulator mode.
  3. The created window is started in execution. The simulator shell corresponds to:
     - the device connected to the development computer,
     - the device chosen in the wizard for project creation.
  4. Click the "Display" button.
  5. Validate the system window that is displayed.

- Any developer knows that running a program test can be a long and tiresome job. In WINDEV Mobile, a SINGLE CLICK allows you to run the test of the window, report or procedure while you are creating it. This is both simple and fast!
- Click the "x" button found in the simulator shell to close the window.
- The editor of WINDEV Mobile is redisplayed.

First deployment on the device

Principle

To run the application in stand-alone mode on the mobile device, you must:

- Connect the device via a USB port.
- Generate the application.
- Choose to copy and start the executable on the connected mobile. Copying the application can take several seconds.

Implementation

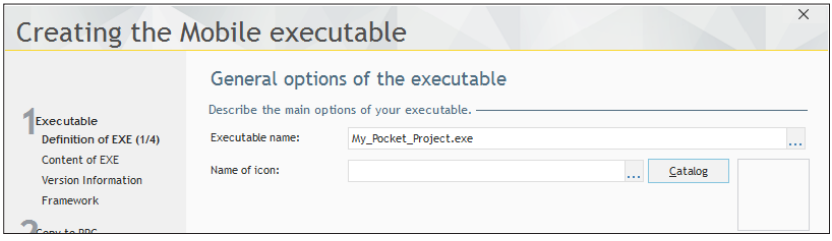
▶ To generate the Windows Mobile application:

1. On the "Project" pane, in the "Generation" group, click "Generate" (you also have the ability to click among the quick access buttons).

2. WINDEV Mobile proposes to select the first project window. In our example, select "WIN_Welcome" and validate (green button at the bottom of the screen).

3. The wizard for creating a mobile executable starts.

4. The first wizard screen is used to define the name and icon of the application.



The icon of the executable can be chosen in the image catalog of WINDEV Mobile ("Catalog" button).

Notes

As soon as an image can be used (in a control, in a window, in a report, ...), the "Catalog" button is displayed in the description window of the control. This button allows you to select an image among the images supplied in the image catalog of WINDEV, WEBDEV and WINDEV Mobile.

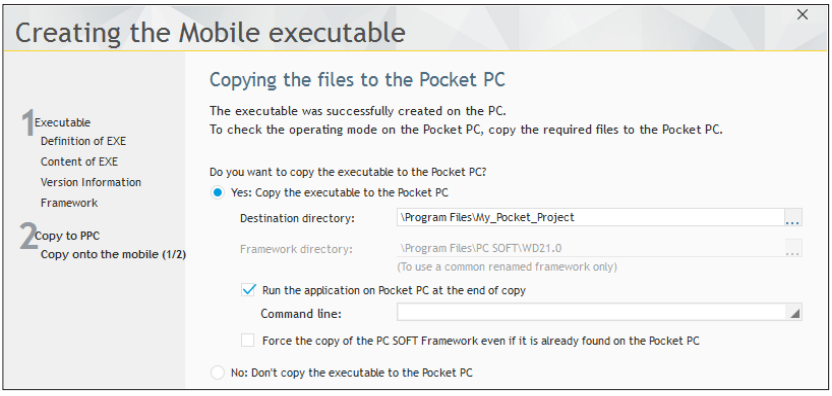
To perform a search in the image catalog:

- specify the keyword corresponding to the search,
- validate. The images found are automatically displayed.

By double-clicking the requested image, this one is generated and included in your project.

5. The other screens are not required by our application. Click the "2- Copy onto the mobile" link found on the left of the wizard.

6. This screen is used to define the options for copying files onto the mobile:



7. The options depend on your configuration:

- If a mobile is connected, select "Yes: Copy the executable to the Pocket PC" as well as "Run the application on Pocket PC at the end of copy". In this case, once the executable is generated, the application will be automatically copied and started on the mobile.
- If no mobile is connected, select "No: Don't copy the executable to the Pocket PC". In this case, the application can be deployed on the mobile devices via a setup procedure.

8. Validate.

That's it, our first application is generated and run on the Windows Mobile device.

Lesson 6.2. Databases

This lesson will teach you the following concepts...

- Available databases
- Synchronization

Estimated time: 30 min

Format of the databases

A Windows Mobile application can handle data. The format of these databases can be:

- **HFSQL** (in Classic or Client/Server mode), database system supplied with WINDEV Mobile.
- **CEDB**, database system that can be used on mobile device (Pocket PC).
- **AS/400**, AS/400 database that can be used on mobile device (Pocket PC).
- ...

HFSQL database

HFSQL Classic

In HFSQL Classic mode, the data files are stored on the device (iPhone or iPad).

In this case, the application is stand-alone. No Wi-Fi or 3G connection is required.

The data is stored in the memory of the device. The maximum storage size depends on the amount of memory on the device.

In the "Advanced programming" lesson, we will develop an application that uses a HFSQL Classic database.

HFSQL Client/Server

In HFSQL Client/Server mode, no data is stored on the device. The data is stored on a computer on which a HFSQL server is installed.

To access this computer (and therefore the database), a method for communicating with the server must have been enabled in the mobile application (Wi-Fi or 3G) in order to connect via the network or Internet.

The response times depend on the quality of the Wi-Fi or Internet network and on the amount of requested data.

The access to the data will be performed by the Hxxx functions of WLanguage and/or by SQL queries.

Example

The "Pocket Notes" and "Pocket Telephony" examples (supplied with WINDEV Mobile) are using HFSQL data files.

These examples are accessible from the home windows.

Notes

During the test (in simulation mode) of a WINDEV Mobile application that handles HFSQL data files, the data files used are the ones found on the **PC**.

CEDB

The CEDB format is a database format that can be used on the mobile devices (Pocket PC).

A CEDB database corresponds to a ".CDB" file. A CEDB database can contain several data files (also called "tables").

Two types of CEDB databases are available:

- **the standard CEDB databases**, that correspond to the databases found by default on the mobile device. These databases contain the following data files: "Tasks", "Contacts", "Appointments", ...
- **the other CEDB databases** (called custom databases), that correspond to Access databases (".MDB" files) previously exported from a PC.

Note: When an Access database (".MDB" file) is copied onto a mobile device (via the file explorer), this database is automatically transformed into a CEDB database (".CDB" file).

A CEDB database can be handled:

- from a WINDEV Mobile application.
- from a WINDEV application.

These operations are performed by the ***cdbXXX functions*** of WLanguage.

Notes

Caution: From Windows Mobile 5, the access to a standard database (tasks, contacts, appointments, ...) is no longer possible from a Windows application (and therefore from a WINDEV application).

The CDB databases can be accessed from the PC, from the simulator, from the mobile device.

The standard databases can be accessed from the mobile device only.

Notes

Caution: The structure of the CEDB databases is not intended to process a large amount of data. Therefore, we recommend that you use HFSQL databases. Furthermore, HFSQL allows you to benefit from all the features available in WINDEV Mobile (RAD, file link, ...).

Notes

During the test (in simulation mode) of a WinDev Mobile application that handles a CEDB database, the database used is found on the **Pocket PC**.

AS/400

This database format is accessible via a Native Access by the Windows Mobile applications. To use this Native Access, an additional module is required in addition to WINDEV Mobile.

Contact PC SOFT Sales Department for more details.

Sharing data between two applications

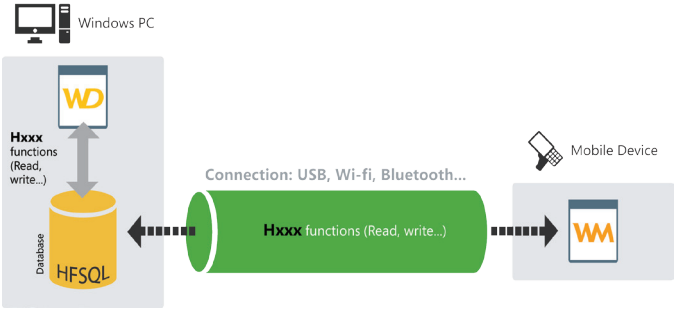
A WINDEV Mobile application for Windows Mobile can share data with a WINDEV application.

You have the ability to use:

- a WINDEV application used to handle the entire database.
- a WINDEV Mobile application used to handle the entire database or part of this database.

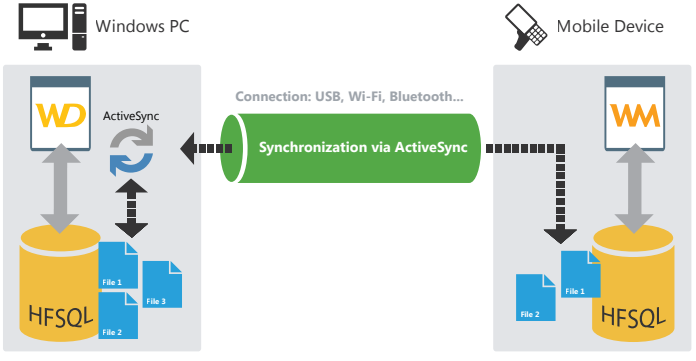
When two applications share the same data, the data files can be managed according to two different methods:

- ***Handling the same data files***:
  The two applications handle the same data files. These data files are found on the PC. The WINDEV Mobile application accesses the data files by Wi-Fi, by infrared, by GPRS, ...
  HSubstDir allows you to specify the data directory to use.



For example: application for taking orders in a restaurant. The new orders are automatically sent to the database found on the PC.

- ***Copying the data files onto the mobile device***:
  All the data files (or some of them) are copied onto each mobile device beforehand (Pocket PC for example). Each application handles its own files. To take into account the modifications performed in each application, the data files must be synchronized (automatically or not).



For example: application for opinion survey in the street. The answers will be available in the WINDEV application once the data files have been synchronized.

Handling the same data files

To allow the WINDEV Mobile application to access the data files found on the PC:

- the mobile devices must have network access (Ethernet card, Wi-Fi, etc.)
- the data found on the PC must be accessible in read/write via a UNC path (the directory used must be a shared directory).

Then, the data can be handled (addition, modification and deletion) by the HFSQL functions.

Example

Databases in HFSQL format (on the Pocket PC and on the PC)

The "Network tasks" example (supplied with WINDEV Mobile) includes a project that can be used on a Windows Mobile device (Pocket Network tasks) and a project that can be used on PC (PC Network tasks). These two examples handle the data files found on the PC.

Copying the data files onto the mobile device (Pocket PC for example)

To update the data files found on the PC with the data entered on the mobile devices, all you have to do is synchronize the files.

If the data files used are in HFSQL format, all the mobile devices must be connected one by one to the PC. The automatic HFSQL synchronization via ActiveSync takes everything in charge.

If the data files used are not in HFSQL format, you must program the synchronization between the WINDEV Mobile application and the WINDEV application. See the examples supplied with WINDEV Mobile for more details.

Example

Databases in HFSQL format (on the mobile device and on the PC)

The "Sending SMS", "Managing lists of purchases" and "Stocks" examples (supplied with WINDEV Mobile) include a project that can be used on mobile device (Pocket PC for example) and a project that can be used on PC. These examples present the synchronization of data entered in the two projects.

Lesson 6.3. Advanced programming

This lesson will teach you the following concepts...

- Creating a management application
- Handling the database

Estimated time: 1 h

Overview

In this lesson, we are going to develop a Windows Mobile application that is using a HFSQL Classic database.

This application will allow us to present some specific features of the programming for Windows Mobile.

Opening the project

- Start WINDEV Mobile 21 (if not already done). Close (if necessary) the current project in order to display the home window.
- Open the "Pocket Managing Products" project.
  To do so, in the home window, click "Tutorial" and select the "Pocket Managing Products (Exercise)" project.
  Tip: if the home window is not displayed, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "Pocket Managing Products (Exercise)".

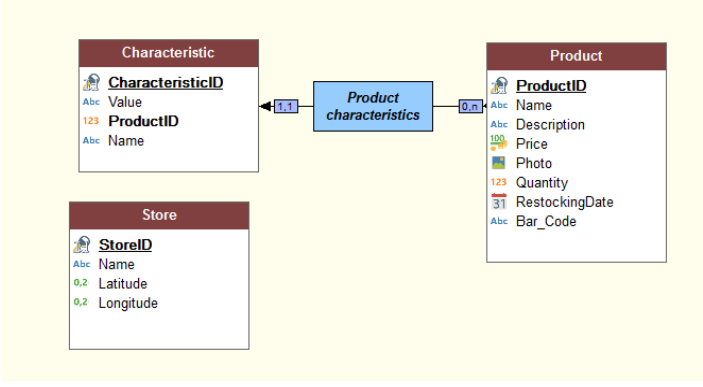
Answer

A corrected project is available. This project contains the different windows created in this lesson. To open the corrected project, on the "Home" pane, in the "Online help" group, expand "Tutorial" and select "Pocket Managing Products (Answer)".

Project description

Let's take a look at our initial project. This project is an existing project. It contains no window. It only contains the analysis describing the HFSQL Classic data files that will be used. In the EXE directory, the corresponding data files are supplied with data in order to run the different tests.

- To view the analysis associated with the project:
  1. Click among the quick access buttons of the WINDEV Mobile menu.
  2. The data model editor is displayed.



3. This analysis includes 3 data files:
- A "Product" file, that contains the description of the product: name, price, quantity, ...
- A "Characteristic" file, that contains the different characteristics of the product. For example, if the product is a tee-shirt, its characteristics will correspond to the size, the color, ... Therefore, the "Characteristic" file is linked to the "Product" file.
- A "Store" file, that contains the GPS coordinates of each store.

4. Close the data model editor (click the cross at the top right of the editor).

We are now going to develop our application.

Display the list of products

We are going to create a window used to list the different products. These products will be displayed in a "Table" control.

Creating the window

▶ To create a new window:

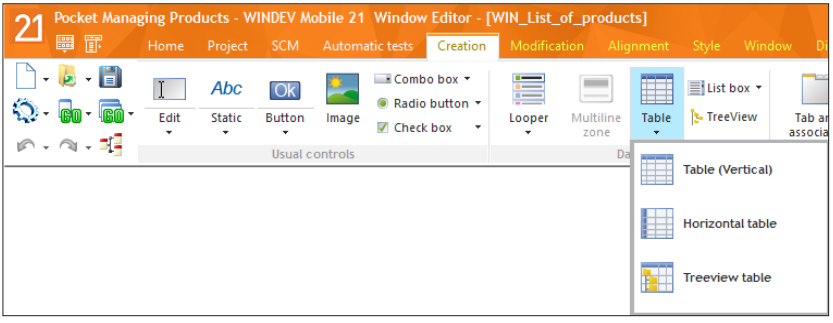
1. Click among the quick access buttons. The window for creating a new element is displayed: click "Window" then "Window".
2. In the wizard, display the "Standard" tab, choose "Blank" and validate.
3. Save the window by clicking among the quick access buttons.
4. In the window that is displayed, enter the title of the window: "List of products". The name and location of the window are automatically filled. Keep the default values and validate (green button at the bottom of the dialog window).
5. The window is added to the project.

Creating the Table control

To display the list of products, we are going to use a "Table" control. The main information about the products will be displayed in this control.

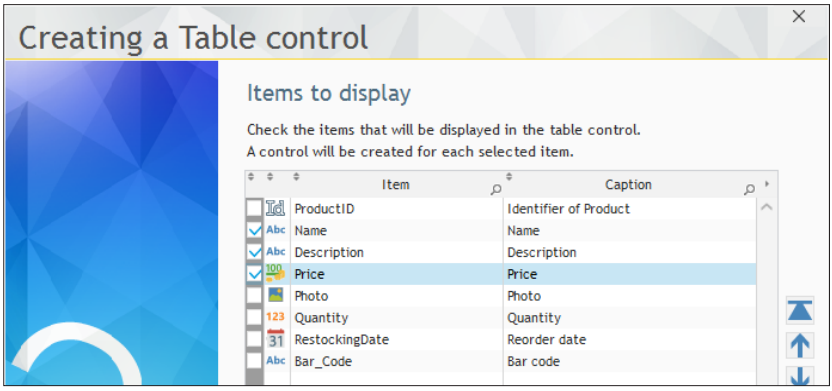
▶ To create the "Table" control:

1. On the "Creation" pane, in the "Data" group, expand "Table" and select "Table (Vertical)".

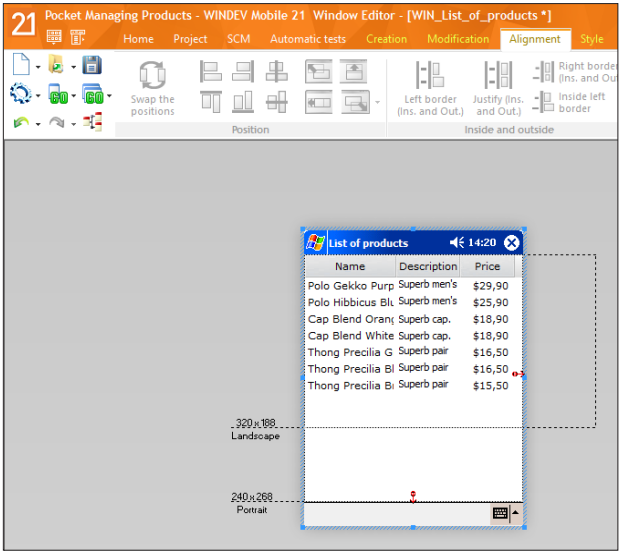


2. The control appears under the mouse.
3. Click the position where the control must be created in the window (at the top for example). The wizard for creating a Table control starts.

4. In the wizard, select "Display the data found in a file or in an existing query". Go to the next screen.
5. Select the "Product" file. Go to the next screen.
6. Select the items to display:



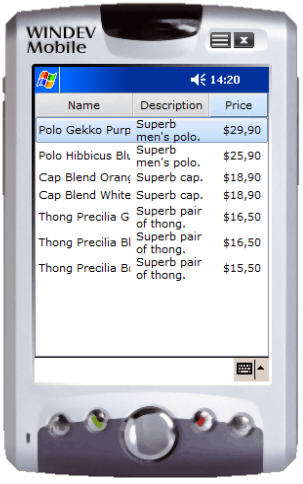
7. Keep the "Name", "Description" and "Price" items (a checkmark must be found in front of these items). Go to the next screen.
8. Keep the proposed sort item (ProductID). The products will be sorted in the Table control according to this item. Go to the next screen.
9. In the "Additional parameters" screen, keep the default options. Go to the next screen.
10. Select the "Vertical" orientation and go to the next screen.
11. Keep the default name ("TABLE_Product") and validate.
12. The Table control appears in the window editor.
13. Resize the control and its columns via the handles in order for the content to be displayed in the window.



Notes

The data automatically appears in the window displayed in the editor. This concept is called "Live Data": you see the data found in your files in real time! This feature is very useful to adapt the size of controls to their content.

- Save the window by clicking among the quick access buttons.
- We are going to run a first test in the simulator to view the result. Click among the quick access buttons (or press [F9]).



- Close the simulator to go back to the window editor.

Creating the form window

We are now going to create a new window used to display the product form. Then, this window will be started from the list of products to display the details of the selected product.

Creating the window

- To create the form window:

1. Create a new blank window. Click among the quick access buttons. The window for creating a new element is displayed: click "Window" then "Window".

2. In the wizard that starts:

- Select the "Standard" tab.
- Choose "Blank".

3. Validate the wizard.

4. Save the window. Specify the title of the window: "Product form". Its name is automatically proposed: "WIN_Product_form". Validate.

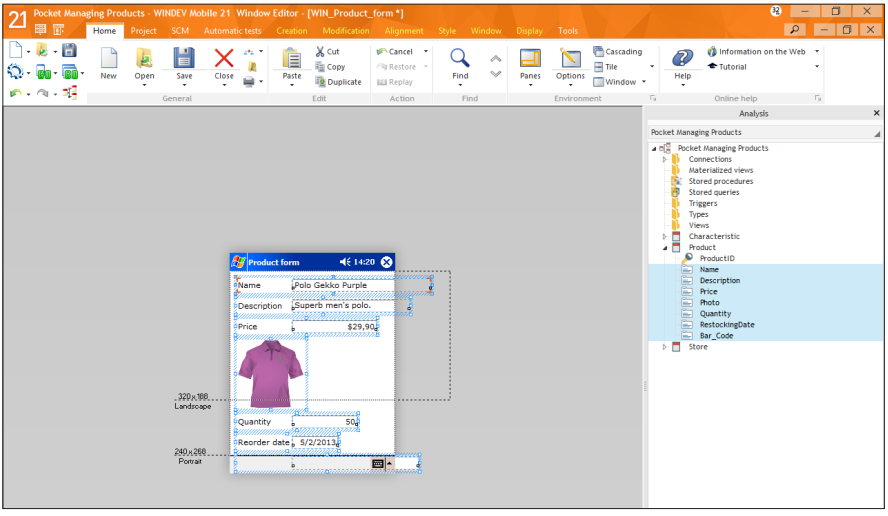
Creating the controls

To create an edit control:

1. Display the "Analysis" pane if necessary (on the "Home" pane, in the "Environment" group, expand "Panes" and select "Analysis"). The different data files described in the "Pocket Managing Products" analysis appear in the pane.

2. With the mouse, select the items of the "Product" file displayed in the pane (except for the "ProductID" item).

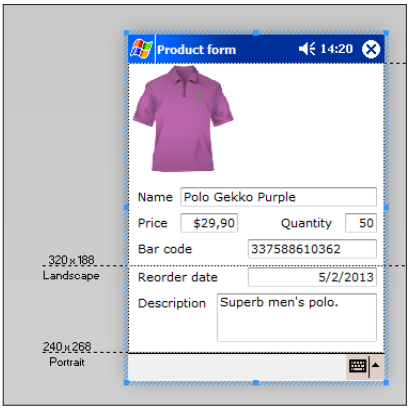
3. Drag and Drop these items to the window that was just created.



4. Resize the controls ("Name", "Bar Code", "Reorder Date" and "Description") so that they are visible in the window:

- Select the requested control.
- Use the sizing handles (blue squares) to modify the size of the control.

5. Reorganize the controls in the window.



Respect the following order: "Photo", "Name", "Price", "Quantity", "Bar Code", "Reorder Date", "Description".

6. We are going to view the navigation order in the window: press the [F5] key. The numbers that are displayed represent the navigation order in the window. Press [F5] again in order for the numbers to disappear. The navigation order is automatically adapted to the order of the controls in the window.

7. Save the window.

- Run the test of the window (among the quick access buttons). The window is displayed with empty controls.
- Close the test window to go back to the editor.
- To display the product data:

1. Display the processes associated with the window:
   - Perform a right mouse click in the area beside the window
   - Select "Code" from the popup menu.
   - The code editor appears.
2. Enter the following code in the "End of initialization of WIN_Product_form" process:

```
FileToScreen()
```

FileToScreen is used to display in the controls the data found in the data file, for the current record.

3. Close the code window (click the cross in the top right corner of the code editor).
4. Save the window.

Displaying the form from the list of products

Let's see how to display the form of the selected product in the list of products.

- Perform the following operations:

1. Position on the "List of products" window: click the "WIN_List_of_products" button found in the button bar:

2. On the "Creation" pane, in the "Usual controls" group, click OK : the shape of the button appears under the mouse. Then, click at the bottom of the window to create the button.
3. Select the control and press the [ENTER] key on the keyboard. The button caption becomes editable. Type "Modify the element" and press [ENTER] on the keyboard.
4. Resize the button if necessary (with the handles) in order for the caption to be entirely displayed in the button.
5. Right-click the button and select "Code" from the popup menu.
6. In the code window that is displayed, enter the following code in the "Click" process:

```
Open(WIN_Product_form)
TableDisplay(TABLE_Product,taCurrentSelection)
```

Notes

The assisted code input is going to help you: as soon as you type the opening bracket "(", a drop-down list proposes the name of all the existing windows found in the project. All you have to do is select the window with the keyboard or with the mouse.

If the name of the window is not displayed in the list, it means that this window was not saved beforehand.

7. Save the modifications by clicking among the quick access buttons.
8. Close the code window (click the cross in the top right corner of the code editor).

- Re-run the test of the window in the simulator (among the quick access buttons).
  - In the list of products, click one of the products with the mouse.
  - Click the "Modify the element" button.
  - The detailed window of the product is displayed.
- Close the simulator.

Managing the creation and the modification of a product

We are now going to modify our two windows in order to manage the addition and the modification of a product.

Modifying the product form

We are going to add a button into the "WIN_Product_form" window: a "Validate" button to manage the validation of modifications.

Notes

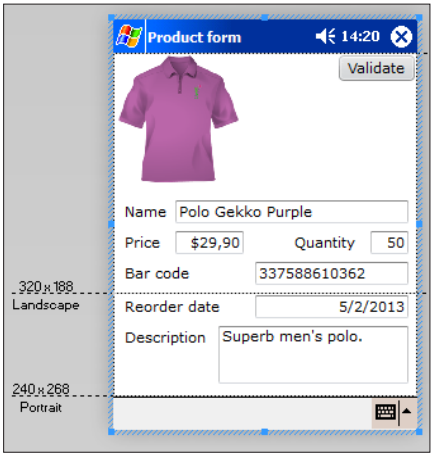
In the applications for Windows Mobile, the use of a "Cancel" button is not required. Indeed, the user can just click the cross (top right of the window) to cancel the input performed.

▶ To create the "Validate" button in the "WIN_Product_form" window:

1. Display (if necessary) the "WIN_Product_form" window in the editor: click the corresponding button in the button bar.

2. On the "Creation" pane, in the "Usual controls" group, click Ok : the shape of the button appears under the mouse. Then, click inside the window to create the button (beside the image for example).

3. Select the control and press the [ENTER] key on the keyboard. The button caption becomes editable. Type "Validate" and press the [ENTER] key on the keyboard.



4. Resize the button if necessary (with the handles) in order for the caption to be entirely displayed in the button.

▶ We are now going to enter the code of the "Validate" button.

1. Right-click the button and select "Code" from the popup menu.

2. In the "Click" process, enter the following code:

```
ScreenToFile()
HModify(Product)
Close()
```

Let's study this code:

- ***ScreenToFile*** is used to initialize the items with the values of linked controls, for the current record.
- ***HModify*** is used to update the file data for the current record.
- ***Close*** is used to close the form and to go back to the "WIN_List_of_products" window.

3. Save the modifications by clicking among the quick access buttons.
4. Close the code window (click the cross in the top right corner of the code editor).

▶ Display the "WIN_List_of_products" window in the window editor and run its test in the simulator (among the quick access buttons).

- In the list of products, click one of the products with the mouse: for example, the "Polo Hibiscus Blue" product whose price is 25.90 Dollars.
- Click "Modify the element".
- The detailed window of the product is displayed. Modify the price of 25.90 Dollars and enter 19.90 Dollars, then click the "Validate" button.
- When going back to the list of products, you will notice that the price was updated for this article.

▶ Close the simulator. The editor of WINDEV Mobile is displayed.

Creating a new product

The principle for creating a product is as follows:

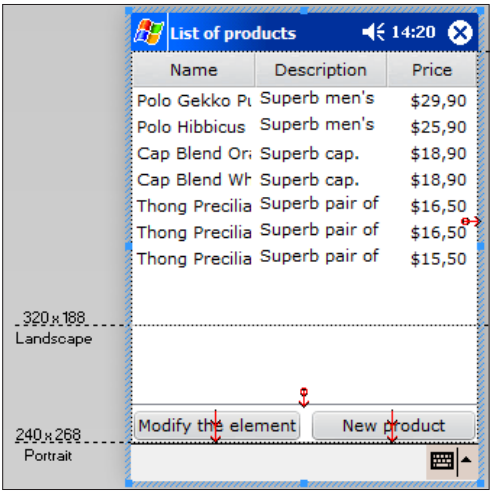
- In the window for the list of products, we are going to add a "New product" button that will be used to open the "Product form" window.
- Then, we will modify the code of the "Product form" window to manage the addition into the Product data file.

▶ Display (if necessary) the "WIN_List_of_products" window in the editor: click the corresponding button in the button bar.

▶ To create a new button:

1. On the "Creation" pane, in the "Usual controls" group, click Ok: the shape of the button appears under the mouse. Then, click inside the window to create the button (beside the "Modify the element" button for example).

2. Select the control and press the [ENTER] key on the keyboard. The button caption becomes editable. Type "New product" and press the [ENTER] key.



3. Resize the button if necessary (with the handles) in order for the caption to be entirely displayed in the button.

4. The code of this option is used to open the "Product form" window and to reset its controls. To enter this code:

- Right-click the "New product" button.
- Select "Code" from the popup menu.
- In the "Click" process, enter the following code:

```
HReset(Product)
Open(WIN_Product_form)
TableDisplay(TABLE_Product)
```

HReset initializes the variables of the items found in the Product file with the default values to manage a new record.
Open is used to open the form window.
TableDisplay is used to update the content of the Table control: the new record will be displayed in the control.

5. Save the modifications by clicking among the quick access buttons.

6. Close the code window (click the cross in the top right corner of the code editor).

We are now going to modify the window of the product form to manage the addition of a new record.

1. Display the "WIN_Product_form" window in the editor.

2. We are going to modify the code of the validation button:

- Right-click the button and select "Code" from the popup menu.

- In the "Click" process, replace the existing code by the following code:

```
ScreenToFile()
IF Product..NewRecord THEN
  HAdd(Product)
ELSE
  HModify(Product)
END
Close()
```

Let's study this code:

- ***..NewRecord*** is used to find out whether the current record must be created.
- If ***HReset*** was called beforehand, the property returns True (case of the click on "New product") and the record must be created by ***HAdd***.
- Otherwise, the current record already exists and it must be modified by ***HModify***.

Notes

The test code of the new record can be replaced by ***HSave***. This function is used to check whether the record is already found in the data file, and it allows you to add it or to modify it. The code becomes:

```
ScreenToFile()
HSave(Product)
Close()
```

3. Save the modifications by clicking  among the quick access buttons.
4. Close the code window (click the cross in the top right corner of the code editor).

▶ Display the "WIN_List_of_products" window in the window editor and run its test in the simulator (among the quick access buttons).

- In the list of products, click the "New product" button.
- Enter a new product.
- Validate. The new product is displayed in the list of products.
- Close the simulator.

Creating a menu window

We are now going to create a window for implementing the menu of the application.

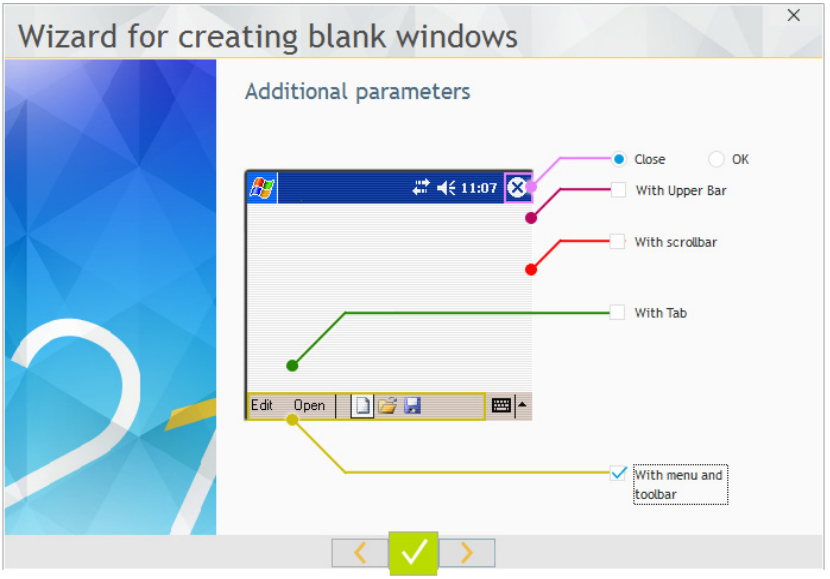
Creating the window

First, we are going to create a blank window with a menu.

▶ To create the window:

1. Create a new blank window. Click  among the quick access buttons. The window for creating a new element is displayed: click "Window" then "Window".
2. In the wizard for window creation, click the "Standard" tab.
3. Choose "Wizard" and validate.

4. The wizard for creating a Windows Mobile window starts.
5. Select "Maximized" and go to the next screen.
6. In the screen of advanced parameters, select "With menu and toolbar".



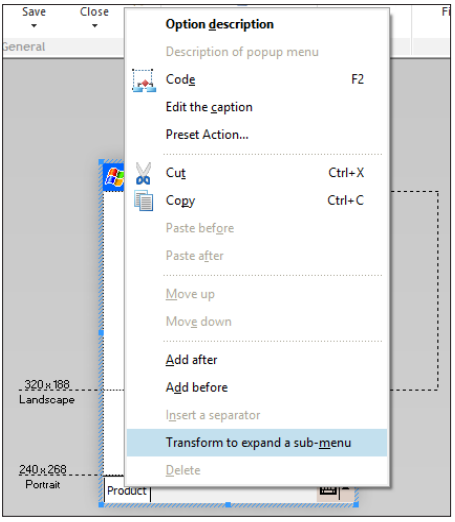
Go to the next screen.
7. Specify the title of the window: "Menu".
8. Validate the wizard. The window is displayed in the editor.
9. Save the window. The name entered in the wizard is automatically proposed in the backup window. Validate.

Customizing the menu

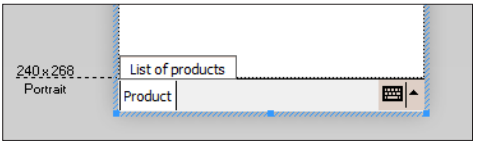
We are going to modify the menu in order to call the window of list of products and to exit from the application.

▶ To modify the menu option:
1. Right-click the "Menu" option to display the popup menu.
Note: This "Menu" option is found at the bottom left of the window.
2. Select "Option description". The description window is displayed.
3. Modify the caption of the option that becomes "Product". Validate the description window.
4. Select the menu option again.

5. Display the popup menu (right mouse click):



6. Select "Transform to expand a sub-menu".
7. In the input area that is displayed, type "List of products" and validate.



8. Right-click the new option and select "Add before" from the popup menu.
9. In the input area that is displayed, type "Exit" and validate.

Programming the menu

We are now going to enter the code of these two menu options.

- To define the WLanguage code of the "Exit" option:
  1. In the window editor, display the "Exit" option. All you have to do is expand the menu, just like you did at run time.
  2. Display the popup menu of the "Exit" option (right mouse click) and select "Code".
  3. Enter the following code:

```
Close()
```

Close is used to close the current window. The "Menu" window being the only window, the application is automatically closed.

- To define the WLanguage code of the "List of products" option:
  1. In the window editor, display the "List of products" option. All you have to do is expand the menu, just like you did at run time.
  2. Display the popup menu of the "List of products" option (right mouse click) and select "Code".

3. Enter the following code:

```
Open(WIN_List_of_products)
```

4. Save the modifications by clicking  among the quick access buttons.
5. Close the code window (click the cross in the top right corner of the code editor).

Running the test of the application

The last step consists in specifying that the menu window is the first application window. To do so, we are going to define the first project window and run a full test of the project.

▶ To define the first project window:
1. Select the "WIN_Menu" window in the project explorer.
2. Display the popup menu.
3. Select "First project window". A specific icon (with a small 1) is displayed in front of the name of the window, in the project explorer.

Until now, the test of windows was run individually by clicking  among the quick access buttons.

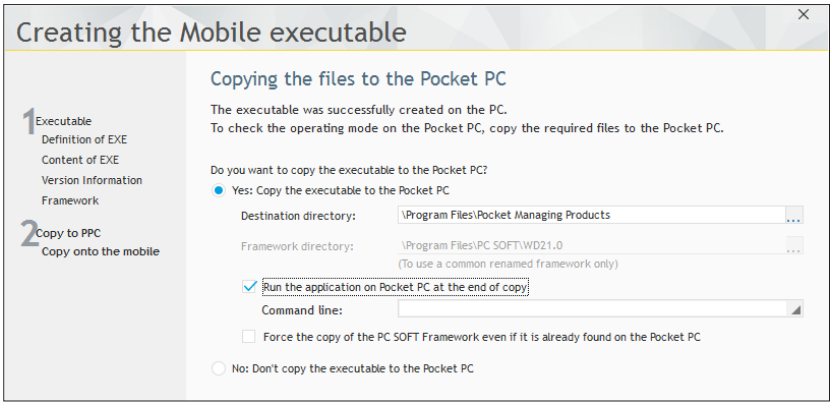
▶ To run the test of the project:
1. Click  among the quick access buttons.
2. Your project starts with the menu window. Click an option of your menu to check whether the different links are correct.

That's it, our application is created, we must now compile it and install it on the device in order to run its test.

Creating the executable

▶ To generate the Windows Mobile application:
1. On the "Project" pane, in the "Generation" group, click "Generate" (you also have the ability to click  among the quick access buttons).
2. The wizard for creating a mobile executable starts.
3. The first wizard screen is used to define the name and icon of the application. The icon of the executable can be chosen in the image catalog of WINDEV Mobile ("Catalog" button).
4. The other screens are not required by our application. Click the "2- Copy onto the mobile" link found on the left of the wizard.

5. This screen is used to define the options for copying files onto the mobile:

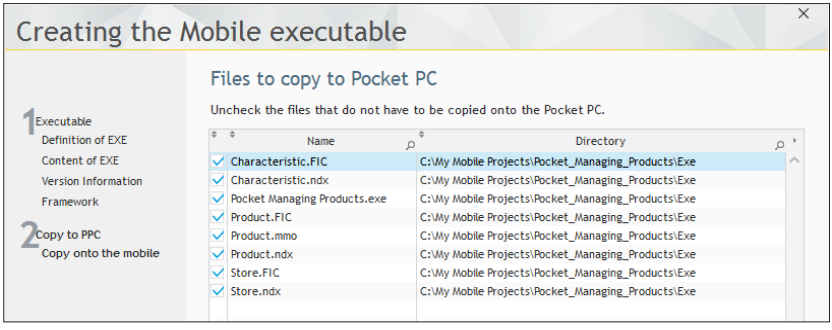


6. The options depend on your configuration:

- If a mobile is connected, select "Yes: Copy the executable to the Pocket PC" as well as "Run the application on Pocket PC at the end of copy". In this case, once the executable is generated, the application will be automatically copied and started on the mobile.
- If no mobile is connected, select "No: Don't copy the executable to the Pocket PC". In this case, the application can be deployed on the mobile devices via a setup procedure.

7. Go to the next screen.

8. If "Yes: Copy the executable to the Pocket PC" was selected, the wizard proposes the files that must be copied onto the Pocket PC:



9. Validate the selection of suggested files.

That's it, your application is generated and run on the Windows Mobile device.

Lesson 6.4. Distributing the application

This lesson will teach you the following concepts...

- Available distribution modes

Estimated time: 20 min

Overview

WINDEV Mobile allows you to develop applications for Windows Mobile.

Several methods can be used to install a WINDEV Mobile application on a device running Windows Mobile (Pocket PC for example):

- **setup in CAB format**. This setup program is run on the mobile device directly.
- **setup in MSI format**. This setup program is run on a PC running Windows connected to a mobile device (Pocket PC for example).
- **setup by direct copy** of the executable from the PC to the Pocket PC (as already seen in the previous lessons).

These different setup modes are available via the wizard for setup creation.

Caution: The setup program of a Windows Mobile application can be created with a 32-bit editor only.

▶ To start the setup wizard:

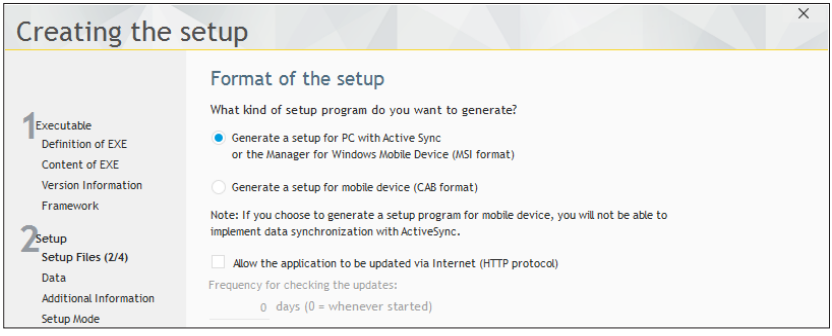
1. On the "Project" pane, in the "Generation" group, click "Setup procedure". The wizard for creating the executable and the setup starts.

2. The executable being already created, click "2-Setup" on the left of the wizard.

3. In the message box that is displayed, click "Access the setup options".

4. The description screen of the application is displayed. Go to the next screen via the arrow buttons.

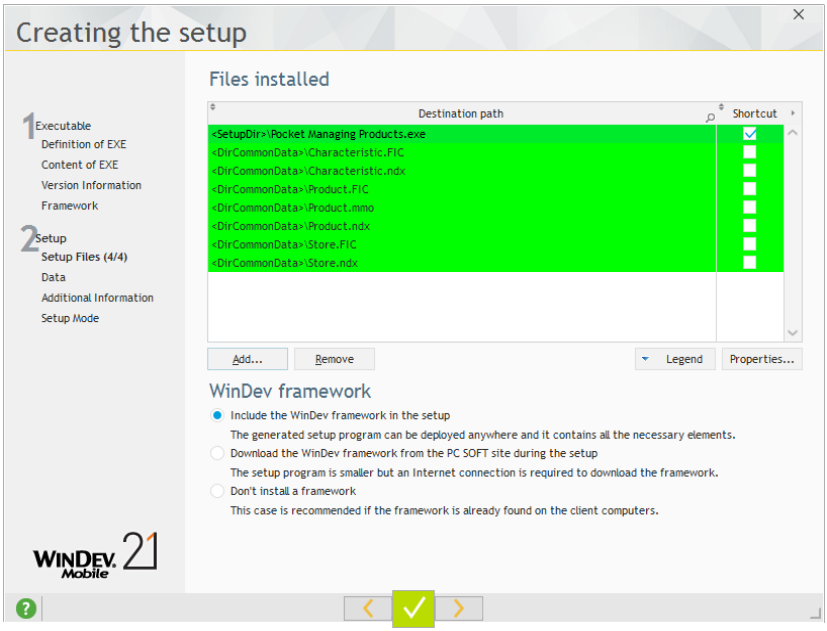
5. You can choose the setup mode of your mobile application:



6. For our example, we are going to choose a setup by ActiveSync: check the corresponding option and go to the next screen.

7. The wizard asks for the setup directory of the application. Keep the default option. Go to the next screen.

8. Specify the files to install. The wizard proposes the executable. You also have to install the data files of the application. Click the "Add" button and select the HFSQL files (.fic, .ndx and .mmo files) found in the EXE directory of your project.



9. Go to the next screen.
10. Uncheck the options for configuring the databases. Go to the next screen.
11. The wizard proposes to install additional modules. We won't select any. Go to the next screen.
12. The generation directory of the setup is proposed.
13. Validate. The setup is generated.
14. WINDEV Mobile proposes to start the setup or to open the generation directory.

Setup in MSI format

Initial setup

This setup consists in:

- creating the executable of the application on the development computer via WINDEV Mobile.
- generating the setup program of the application on the development computer via WINDEV Mobile. This program corresponds to a ".MSI" file.
- distributing this setup program to the end users.
- running this setup program on the PCs. The application will be automatically installed on the mobile device connected to the current computer, via ActiveSync.

Note: If no mobile device is connected, the setup will be performed during the next synchronization between the PC and the mobile device.

To use this application, start the application on the mobile device (double-click the ".EXE" file for example).

Update in MSI format

The MSI format proposes two types of updates:

- update by entirely re-installing the application . In this case, the update is identical to an initial setup.
- update by Internet (HTTP protocol) in CAB format. This update consists in:
  - creating the executable of the application on the development computer via WINDEV Mobile.
  - generating the setup program of the application on the development computer via WINDEV Mobile. This setup program corresponds to a ".CAB" file.
  - copying this setup program onto a Web directory by FTP.
  - retrieving and installing the update on the mobile device.

Setup in CAB format

Initial setup

This setup consists in:

- creating the executable of the application on the development computer via WINDEV Mobile.
- generating the setup program of the application on the development computer via WINDEV Mobile. This setup program corresponds to a ".CAB" file.
- copying this setup program onto the mobile devices of the end users (via a memory card, by GPRS from an Internet site or via the file explorer).
- running this setup program on the mobile devices. This program installs all the files required by the application. At the end of setup, the ".CAB" file is automatically deleted from the device.

To use this application, start the application on the mobile device (double-click the ".EXE" file for example).

Update in CAB format

The CAB format proposes two types of updates:

- update by entirely re-installing the application. In this case, the update is identical to the initial setup. See the previous paragraph.
- update by Internet (HTTP protocol). This update consists in:
  - creating the executable of the application on the development computer via WINDEV Mobile.
  - generating the setup program of the application on the development computer via WINDEV Mobile. This setup program corresponds to a ".CAB" file.
  - copying this setup program onto a Web directory by FTP.
  - retrieving and installing the update on the mobile device.

CONCLUSION

The tutorial is over now!

This course has discussed a variety of subjects, but not all the features of WINDEV Mobile, far from it!

You are now familiar with the main concepts.

We recommend that you spend another day exploring the menu options of WINDEV Mobile, for each one of the modules.

You can also explore the examples supplied with WINDEV Mobile: some are simple and only address one topic, while others are more complex. These examples will show you the different aspects of WINDEV Mobile as well as the development for the different platforms. Reading the source code is also a good way to learn.

It would take too much time to discuss all the available topics (there are hundreds, even thousands!). WINDEV Mobile proposes several features that were not presented in this tutorial:

- sockets and HTTP functions...
- queries, queries with parameters, ...
- printing, ...

See the online help for more details.

We wish you great development experiences with **WINDEV Mobile 21**!