



Android

Objective

This exercise is designed to allow the students to get a first experience on the programming of software for advanced mobile devices. *Android* (<http://developer.android.com/index.html>) will be used as the application environment for this purpose. Android is an advanced Operating System for mobile devices, which has been initiated by Google.

The student is fully free to implement the application he/she considers. The student should show his/her ability to work independently by using the provided documentation and trying to solve the problems by himself /herself. The necessary bibliography is included in this manual.

Tools

This practice can be developed on any equipment where the Android Software Development Kit (Android-SDK) is installed. The Android-SDK can be downloaded from:

<http://developer.android.com/sdk/index.html>

The Android platform is implemented in JAVA, thus it works on all the Operating Systems. You can program your application using any code editor (e.g. e.g. [Xemacs](#), [Eclipse](#), [NetBeans](#), etc). Furthermore you can compile and run your application by using the standard JAVA tools (javac and java respectively). However, we highly recommend the use of [Eclipse](#). Eclipse is a programming IDE that has an Android plugin. Therefore, the use of Eclipse eases the creation of Android projects and the compilation and execution of the code.

In a nutshell, you need to install in your computer one version of the Android-SDK and the Eclipse (with the Android plug-in) Please note that new Android-SDK versions are frequently released.

The Android-SDK includes an emulator where you can run your application and test it.

Android Overview

This section presents the basic concepts to understand how Android works. Please consider that this is just an overview and that it is the student's responsibility to scrutinize the Android documentation in order to develop his/her application.

The complete Android Documentation can be found at:

<http://developer.android.com/guide/index.html>

The API with the Java packages and classes can be found at:

<http://developer.android.com/reference/packages.html>

Furthermore, you can find further information (manuals, Android code, video-manuals,etc) at different Web Portals and Forums. For example: <http://www.android-spa.com/> or <http://androidforums.com/>.



Recommendations/Hints to Approach this Exercise

It is highly recommended to follow the next steps in order to develop the lab exercise:

1. You should read the Android Documentation and understand how Android works
2. You should implement the “Hello, Android!” example.
3. You should analyze the Android Application Samples included in the Android-SDK (<http://developer.android.com/guide/samples/index.html>).
4. You should design your application.
5. You should discuss with the lab professors your application in order to check if it fits the minimum requirements.
6. You might consider that there are lots of Android applications already implemented. Maybe some pieces of code from them are useful for you. Please note: it is mandatory to document the sources of the code that is taken from other applications.

Android-SDK Installation

You can find the instructions for the Android Installation at:

<http://developer.android.com/sdk/installing.html>

The first Android Program: “Hello, Android!”

You can find a tutorial to create the first Android application in

<http://developer.android.com/guide/tutorials/hello-world.html>

This is the well-know “Hello World” but in this occasion it is named “Hello, Android!”.

Android Project Scheme

Every Android project has 4 types of files to work with:

- **.java files:** These are placed in the src directory under the package with the same name of the new project.
Among them you can find: the java files created by you and a special one called R.java. This file includes the references to every element existing in our application. It should not be modified.
- **Layout files:** These are xml files. They include the definition of the different screens (or layouts) that form our application. They are located in the res/layout directory.
- **strings.xml file:** It includes the definition of the different strings used in our application. It is placed on the res/values directory.
- **AndroidManifest.xml file:** This xml file describes our application. It describes the different “sub-applications” forming our application.
- **Image files (jpg, png...):** They are stored in the res/drawable directory.



Evaluation Criteria

It is not necessary to deliver a report. The software will be evaluated on the Android Emulator.

The code must be properly commented. This means, it must be possible to generate your application's API with the Javadoc tool.

The evaluation comprises the presentation of the application to the lab professors using the Android Emulator. During this presentation the lab professors will ask some question regarding the implementation and the functionality of the application.

Some of the criteria used to grade the practice are:

- Application originality
- Application dynamics (it is not enough to develop an application which simply switches from one to other screen).
- Personalization of application (the application has to offer different behavior to different users depending on the user profile).
- Performance (the application should be properly implemented, and it should not have problems slow execution, etc.)

References

- <http://www.android.com/>
- <http://developer.android.com/>
- <http://www.android-spa.com/>
- <http://androidforums.com/>
- www.eclipse.org/