



Android Development

Lecture 1b

Android SDK & Development Environment



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Lecture Summary

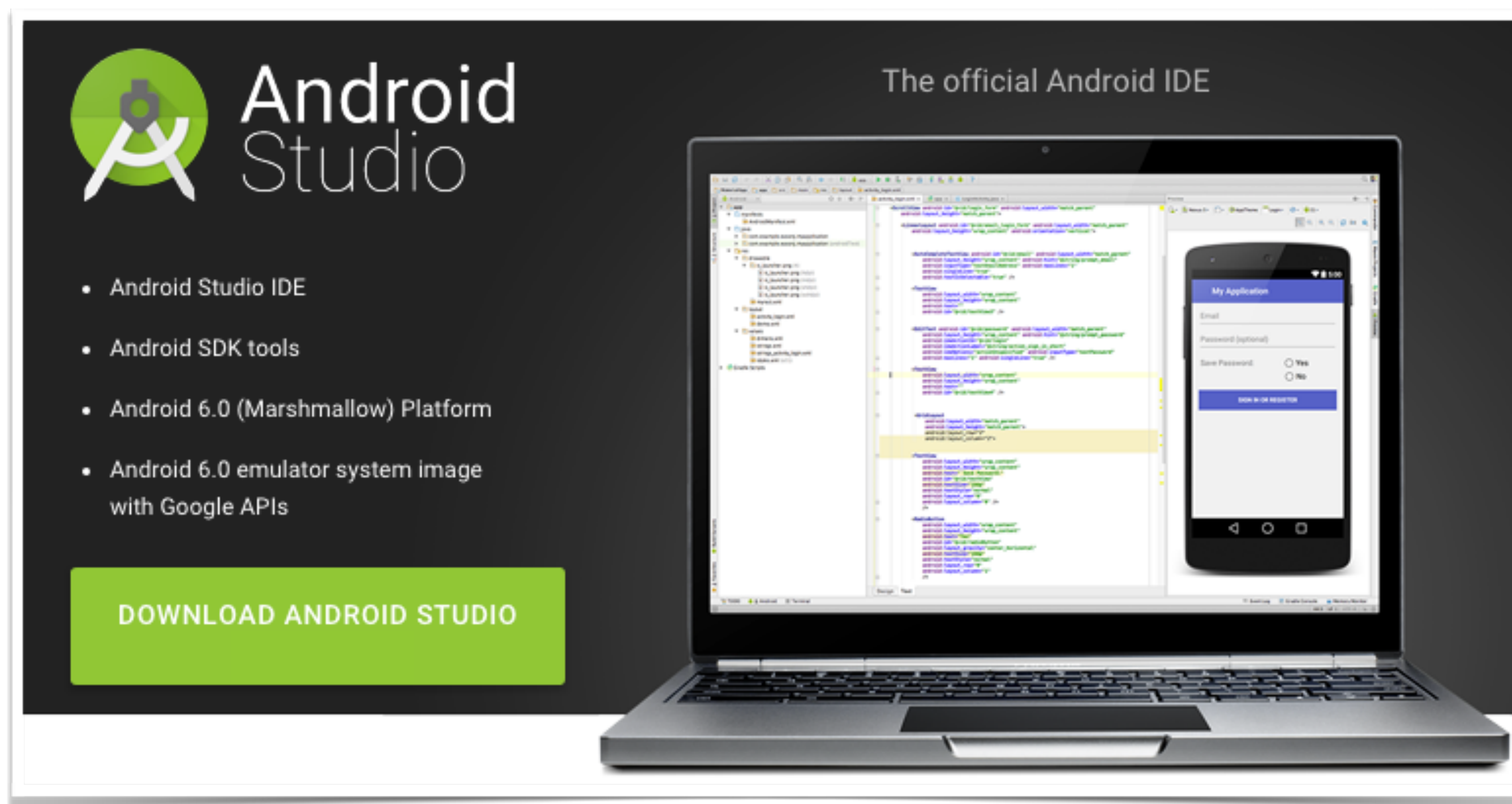
- The Android SDK
- Android Environment Setup
 - SDK
 - Android Studio
 - SDK Manager
 - Android Emulator
- First Android Application



Android SDK



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



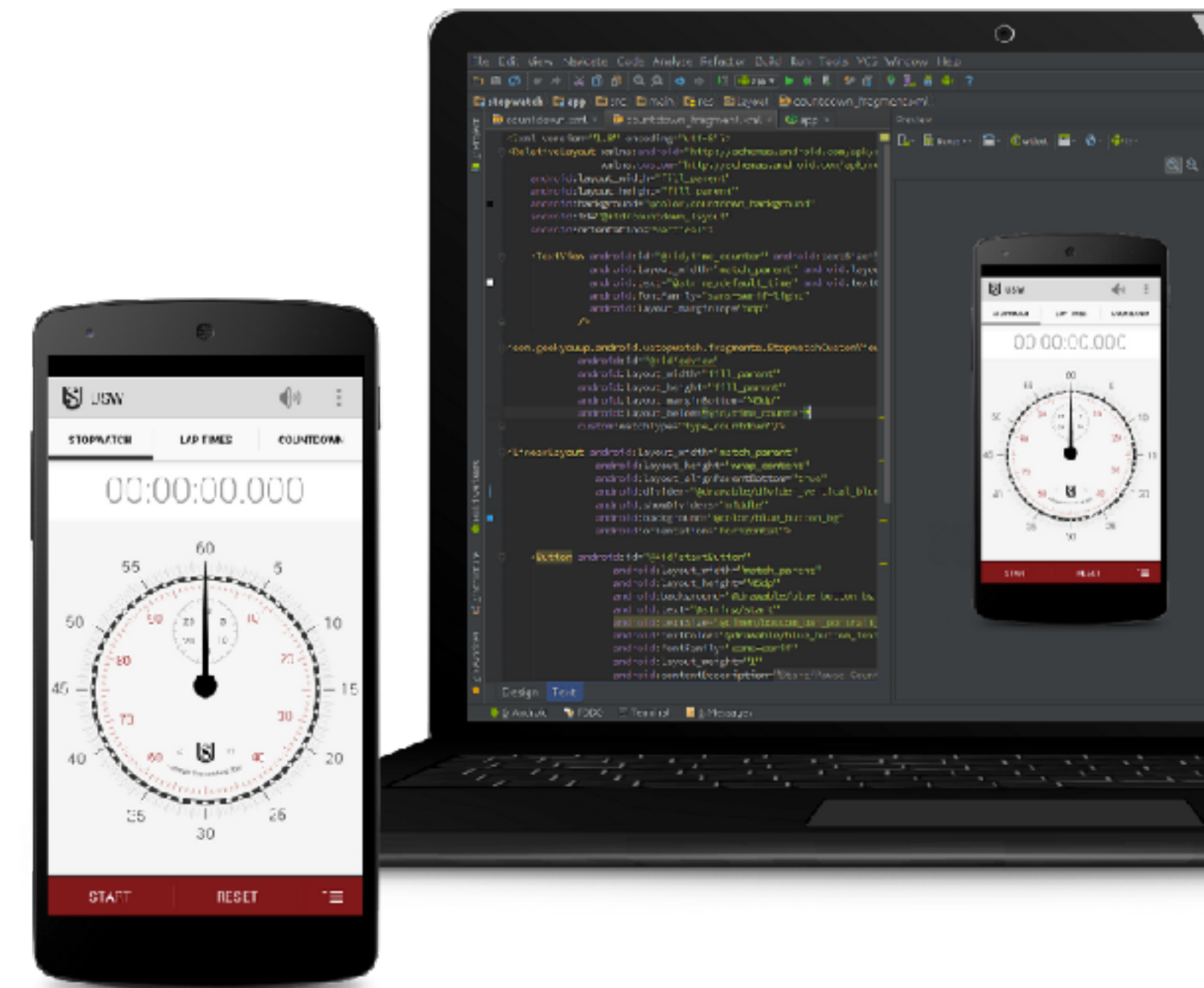
Prepare Your Development Computer

- Operating System:
 - Windows
 - Mac OS X
 - Linux
- Oracle Java Runtime Environment (JRE) 6
- Oracle Java Development Kit (JDK) 7

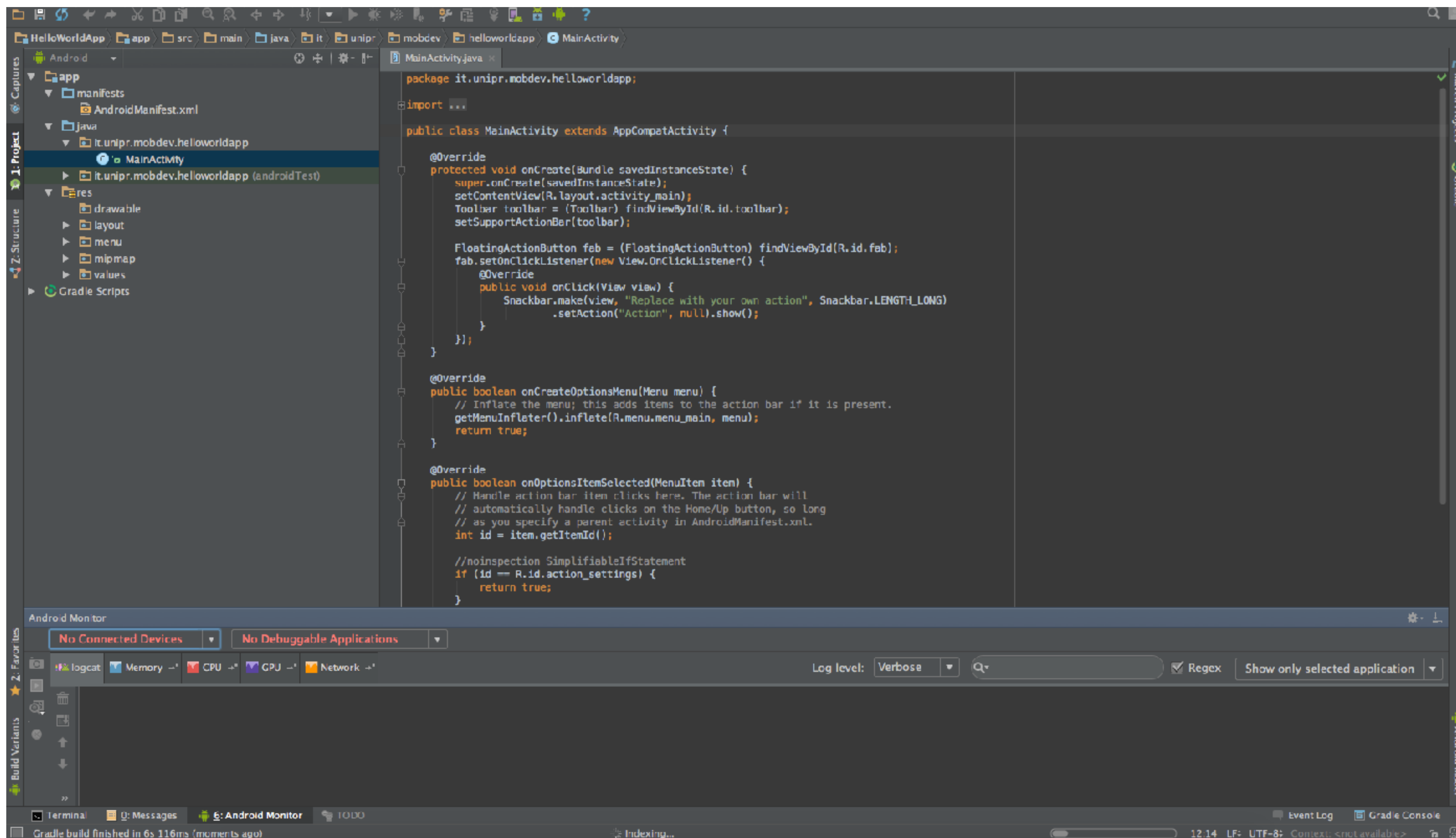


Android Studio

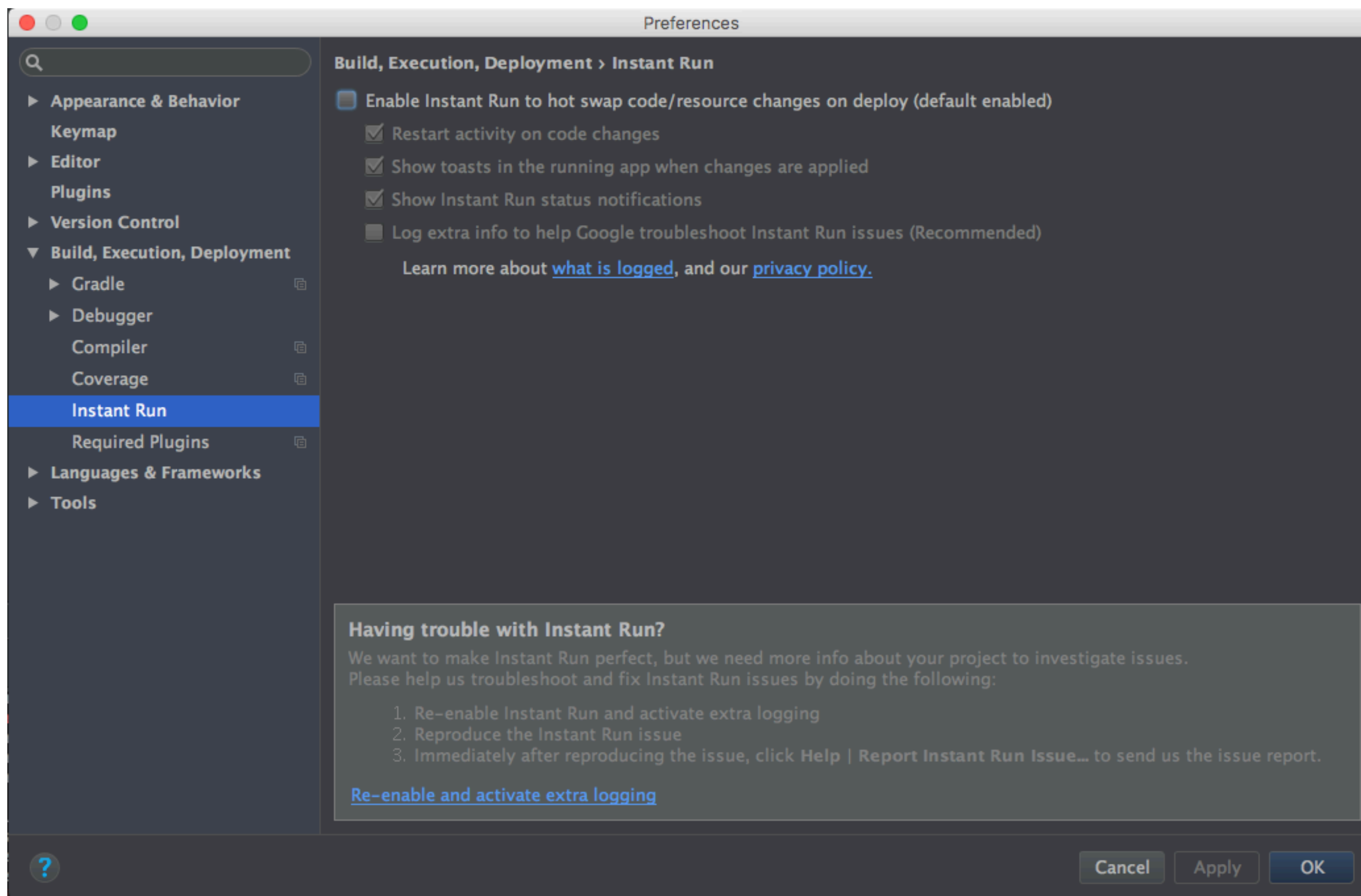
- Android Studio is the new Android development
- It is based on **IntelliJ IDEA** (<https://www.jetbrains.com/idea/>).
- Provides new features and improvements over Eclipse ADT
- Main features are:
 - Flexible Gradle-based build system.
 - Build variants and multiple APK generation.
 - Expanded template support for Google Services and various device types.
 - Rich layout editor with support for theme editing.
 - Lint tools to catch performance, usability, version compatibility, and other problems.
 - ProGuard and app-signing capabilities.
 - Built-in support for Google Cloud Platform, making it easy to integrate Google Cloud Messaging and App Engine.



Android Studio

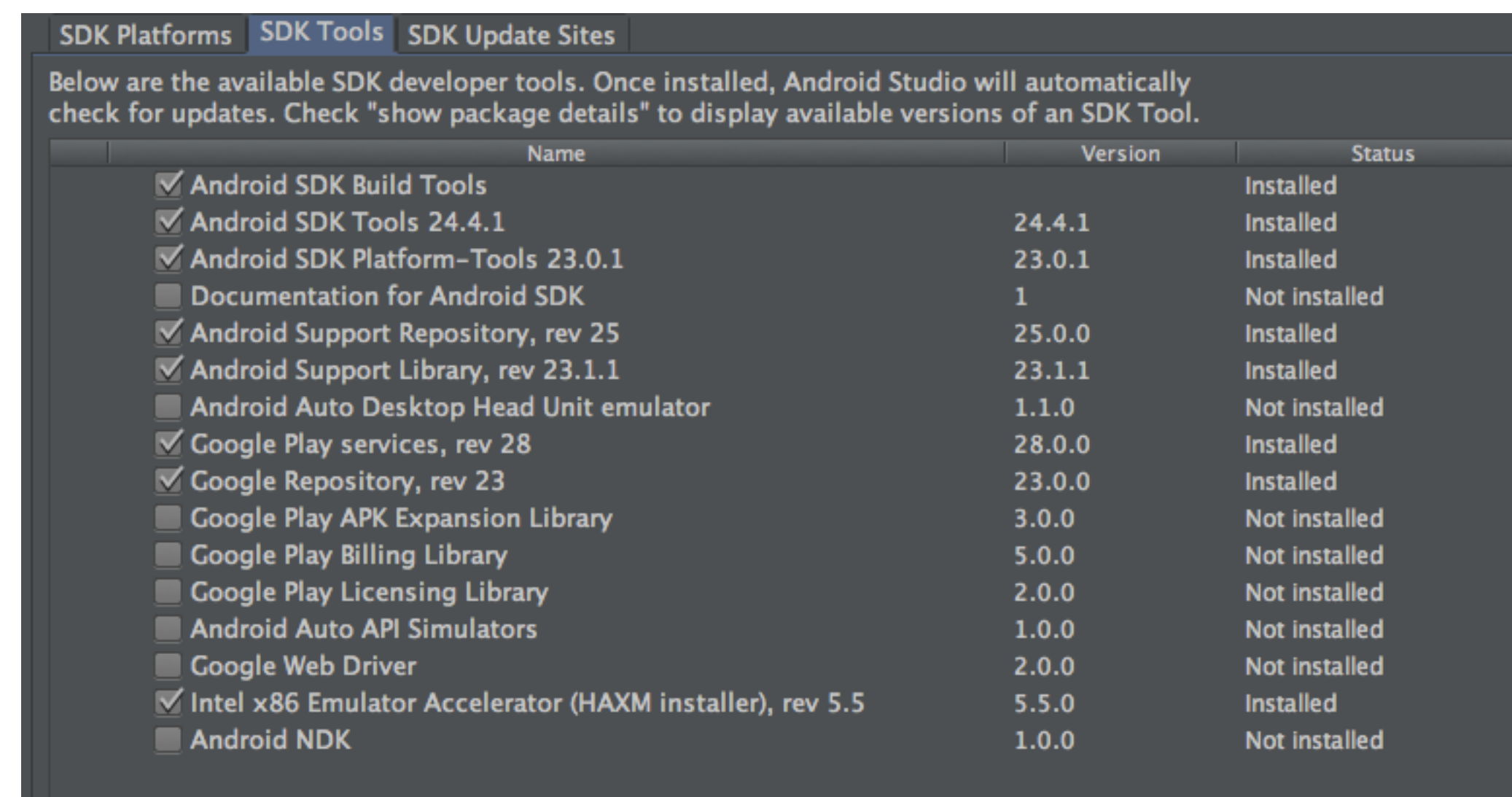
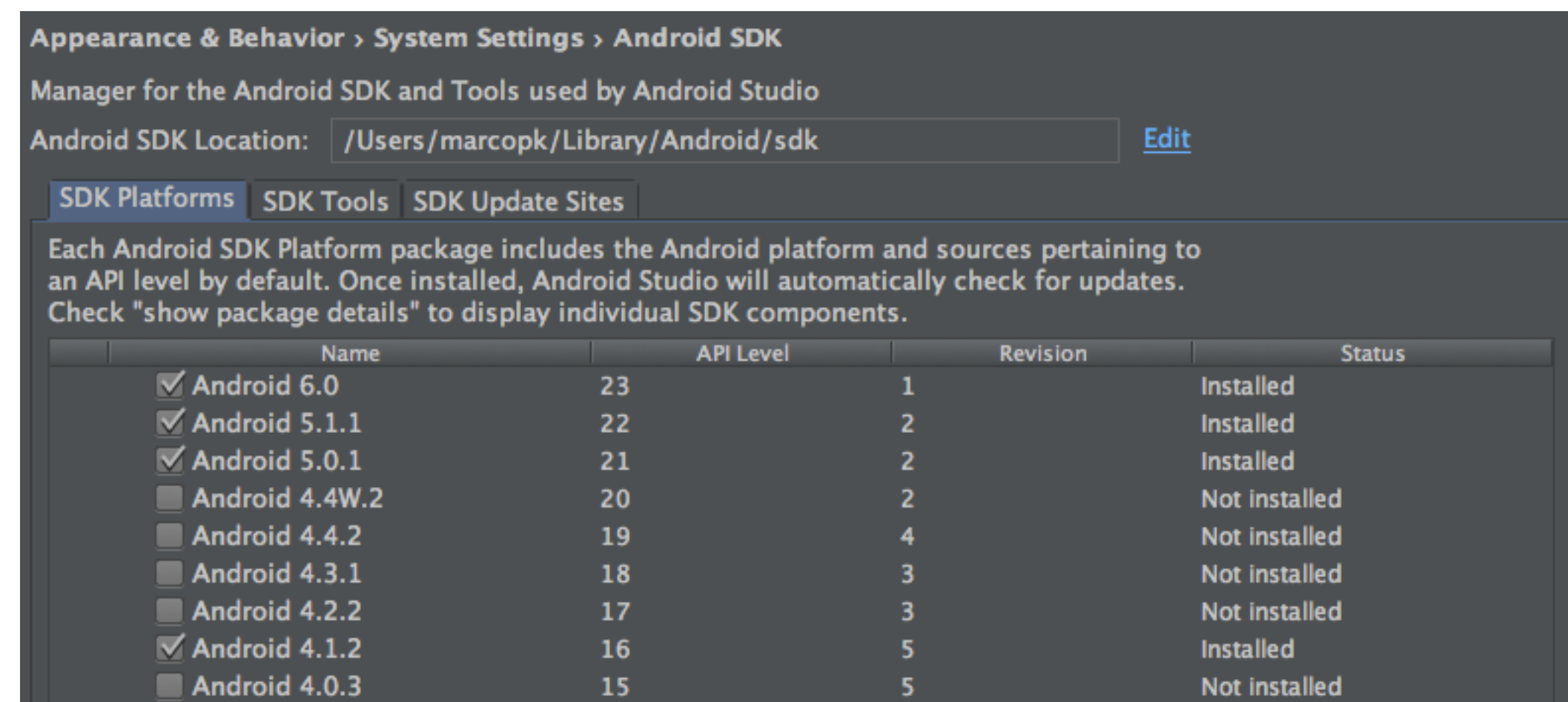


Instant Run

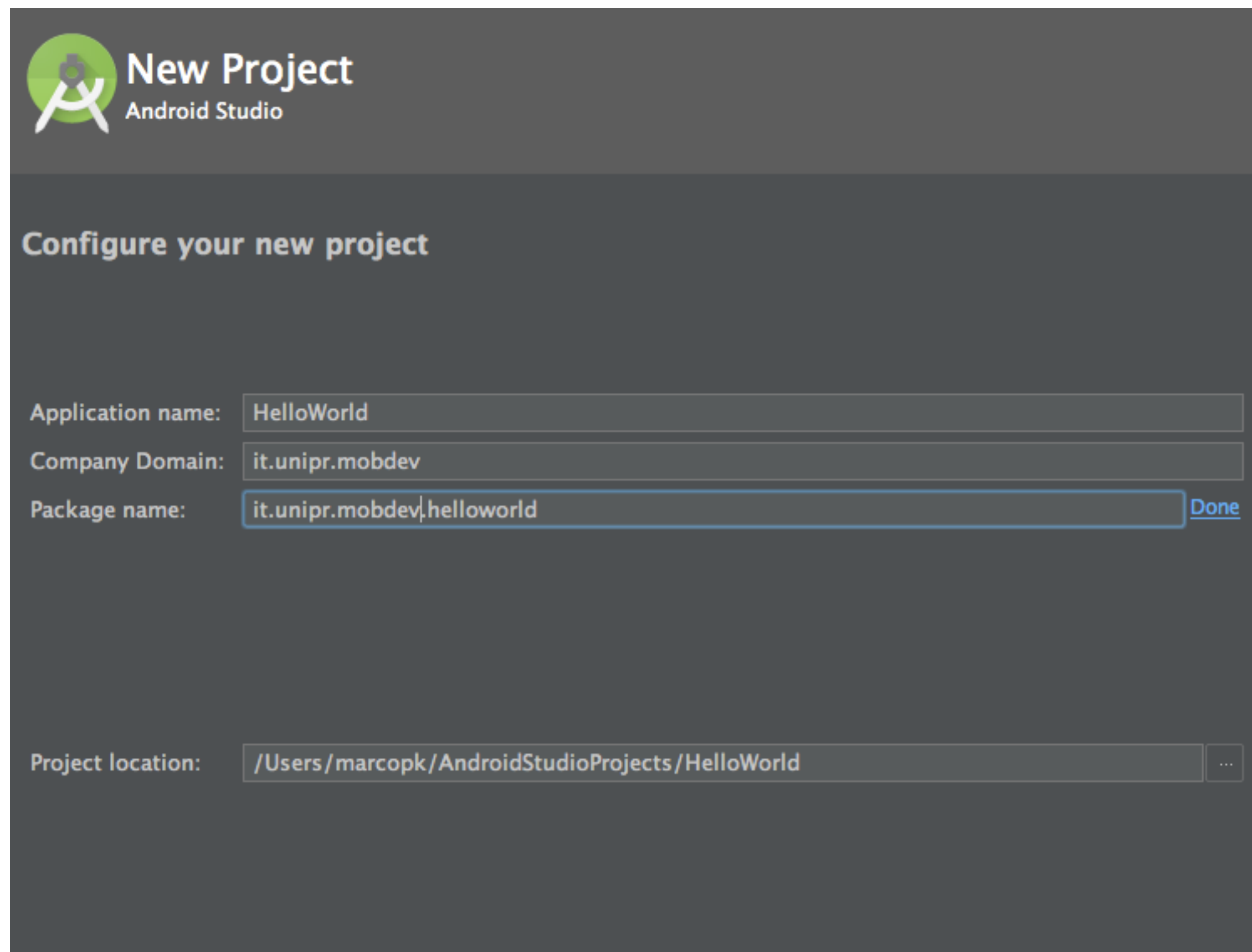


Android SDK Manager

- Before you can build an Android application, or even create a project you must install one or more building target.
- Using the Android SDK Manager you can select platforms' components that you would like to install on your development machine.
- There are several packages related to different API levels.
- In our course we will use API level 6, 5, and 4.x in order to see latest platform release and compile developed application for available real devices.
- For the MobDev Course You should download:**
 - Android 7.1 (API 25)
 - Android 4.x > 4.1.2 (API 16)
 - Extras:
 - Android Support Library
 - Google Play Services



Hello World Application



New Project
Android Studio

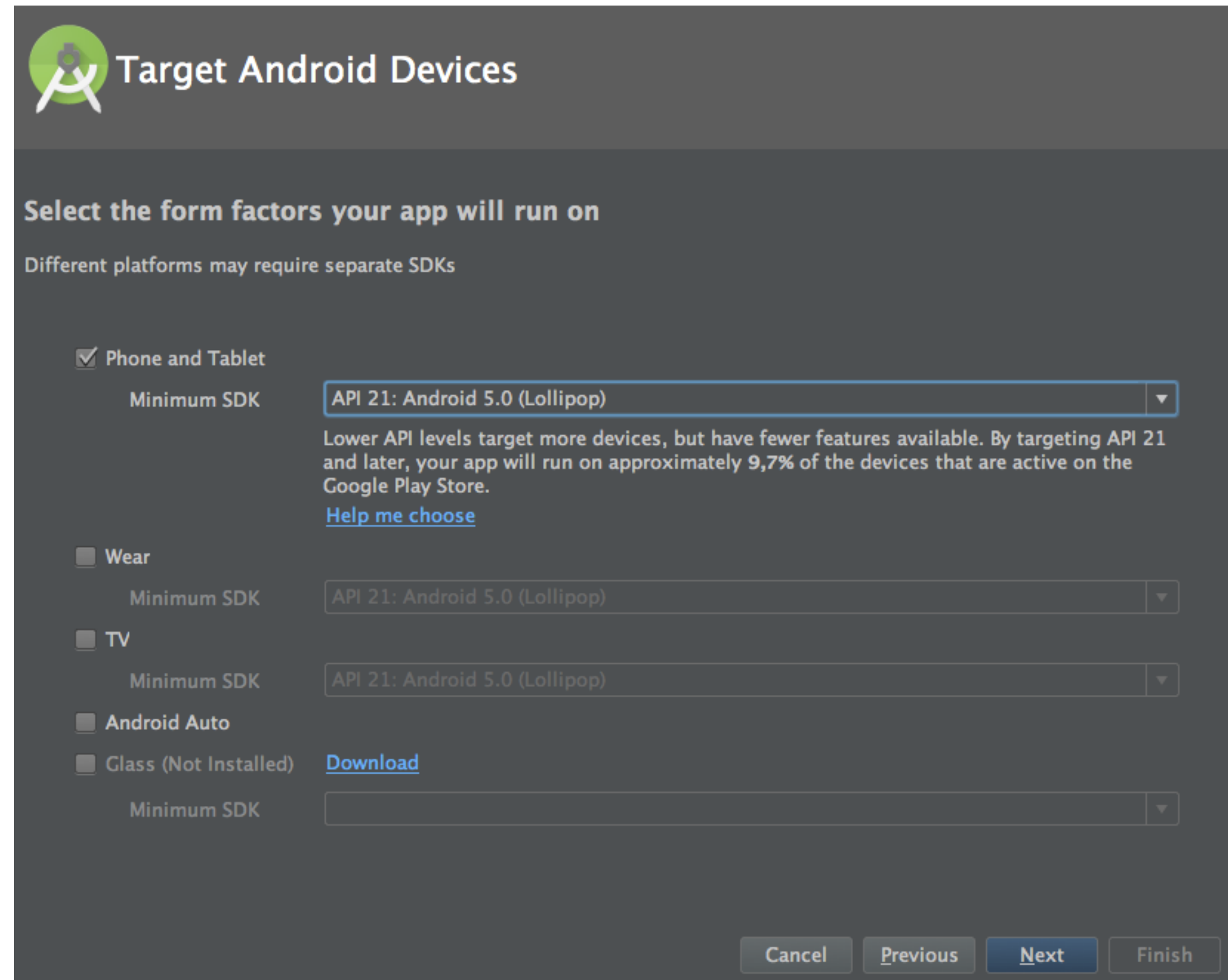
Configure your new project

Application name: HelloWorld

Company Domain: it.unipr.mobdev

Package name: it.unipr.mobdev.helloworld [Done](#)

Project location: /Users/marcopk/AndroidStudioProjects/HelloWorld ...



Target Android Devices

Select the form factors your app will run on

Different platforms may require separate SDKs

☒ Phone and Tablet
Minimum SDK: API 21: Android 5.0 (Lollipop) [Help me choose](#)
Lower API levels target more devices, but have fewer features available. By targeting API 21 and later, your app will run on approximately 9,7% of the devices that are active on the Google Play Store.

☐ Wear
Minimum SDK: API 21: Android 5.0 (Lollipop)

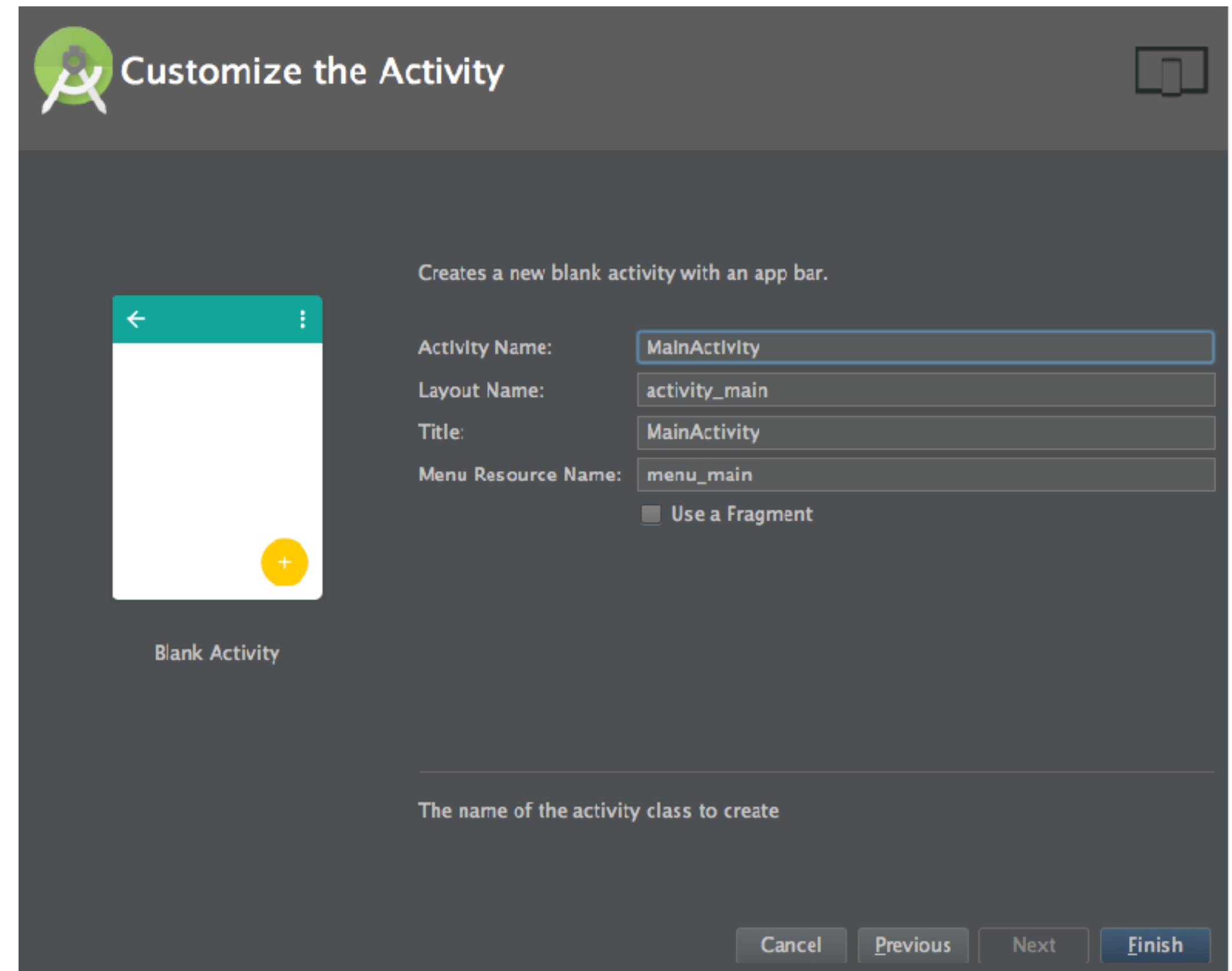
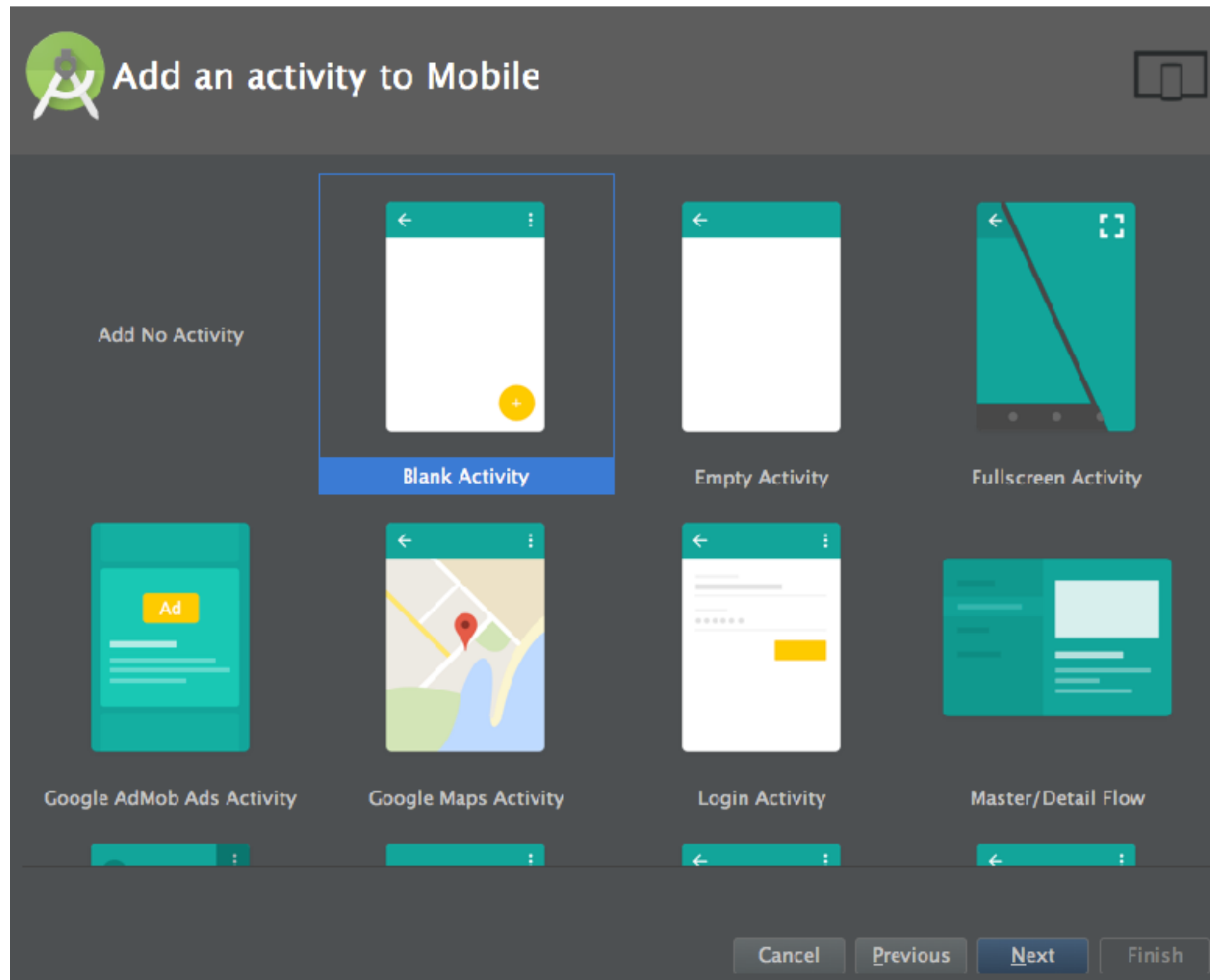
☐ TV
Minimum SDK: API 21: Android 5.0 (Lollipop)

☐ Android Auto

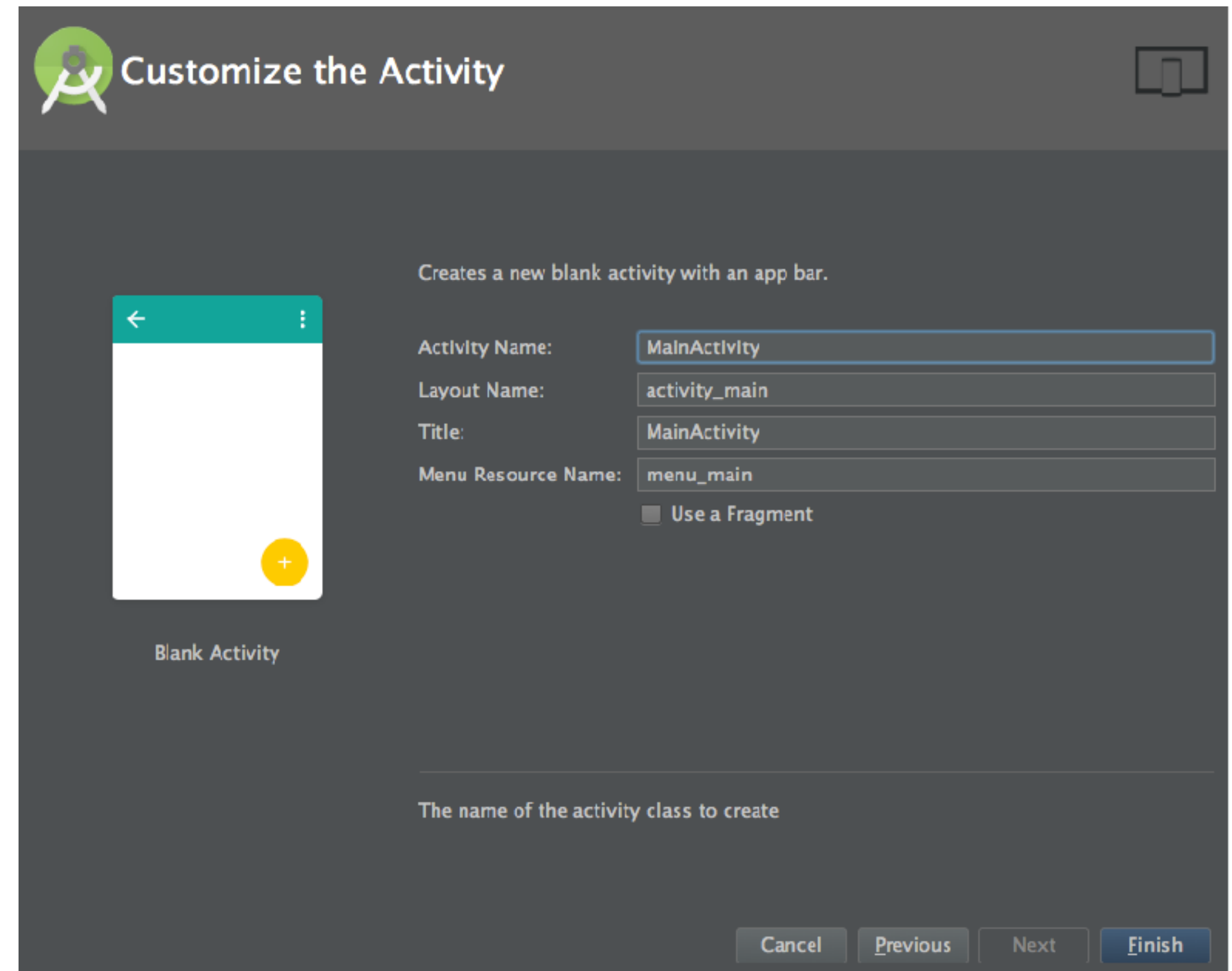
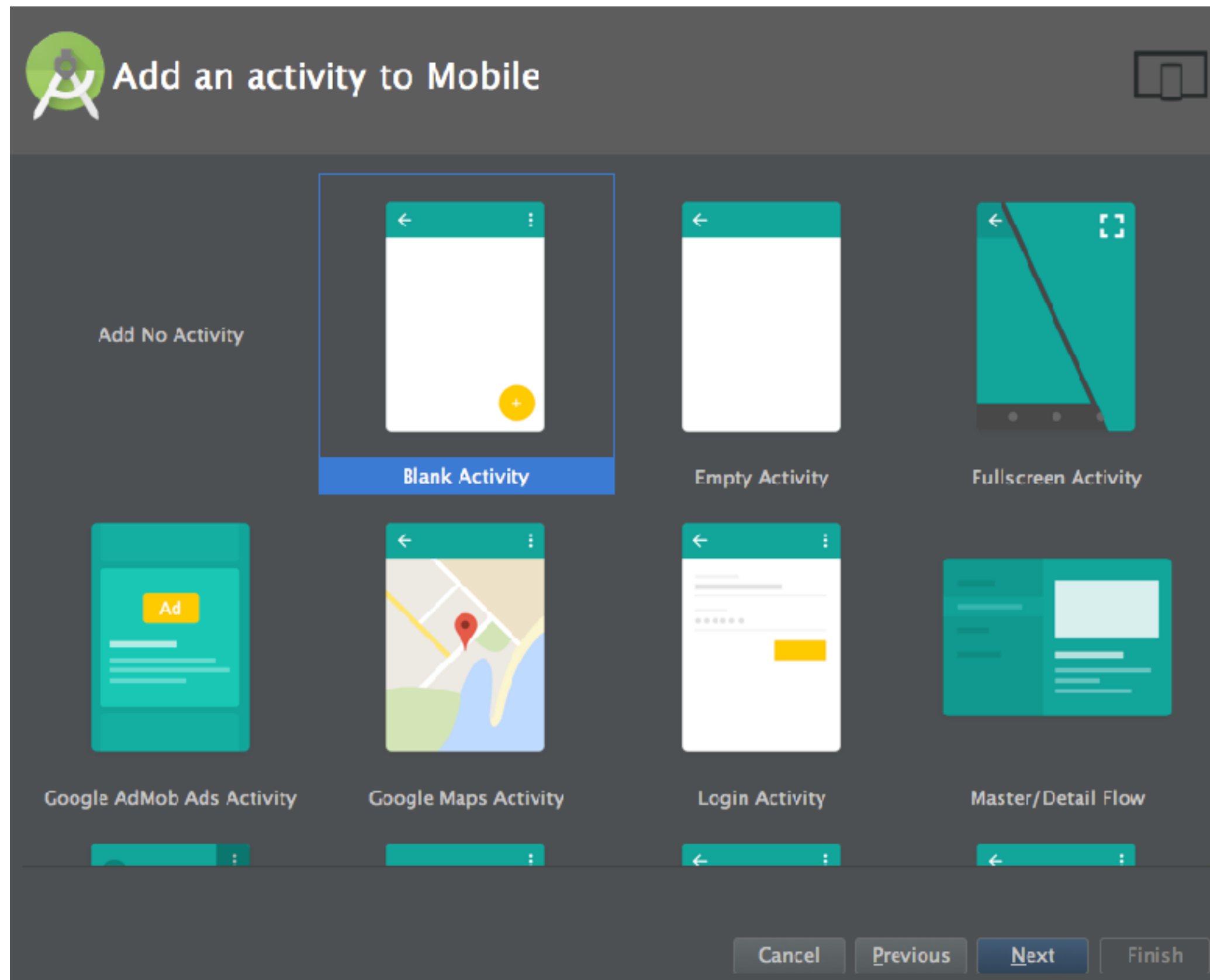
☐ Glass (Not Installed) [Download](#)
Minimum SDK:

[Cancel](#) [Previous](#) [Next](#) [Finish](#)

Hello World Application

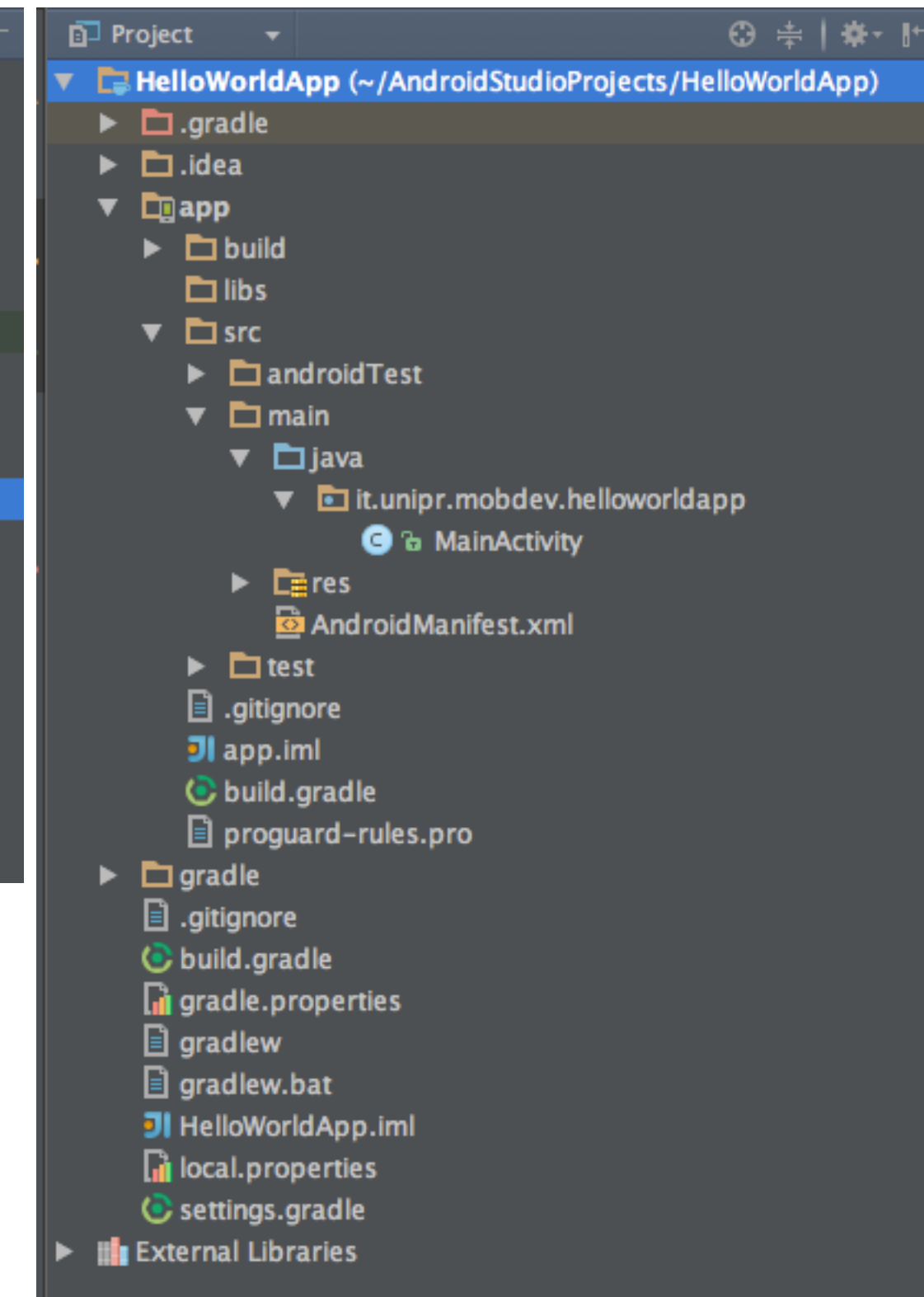
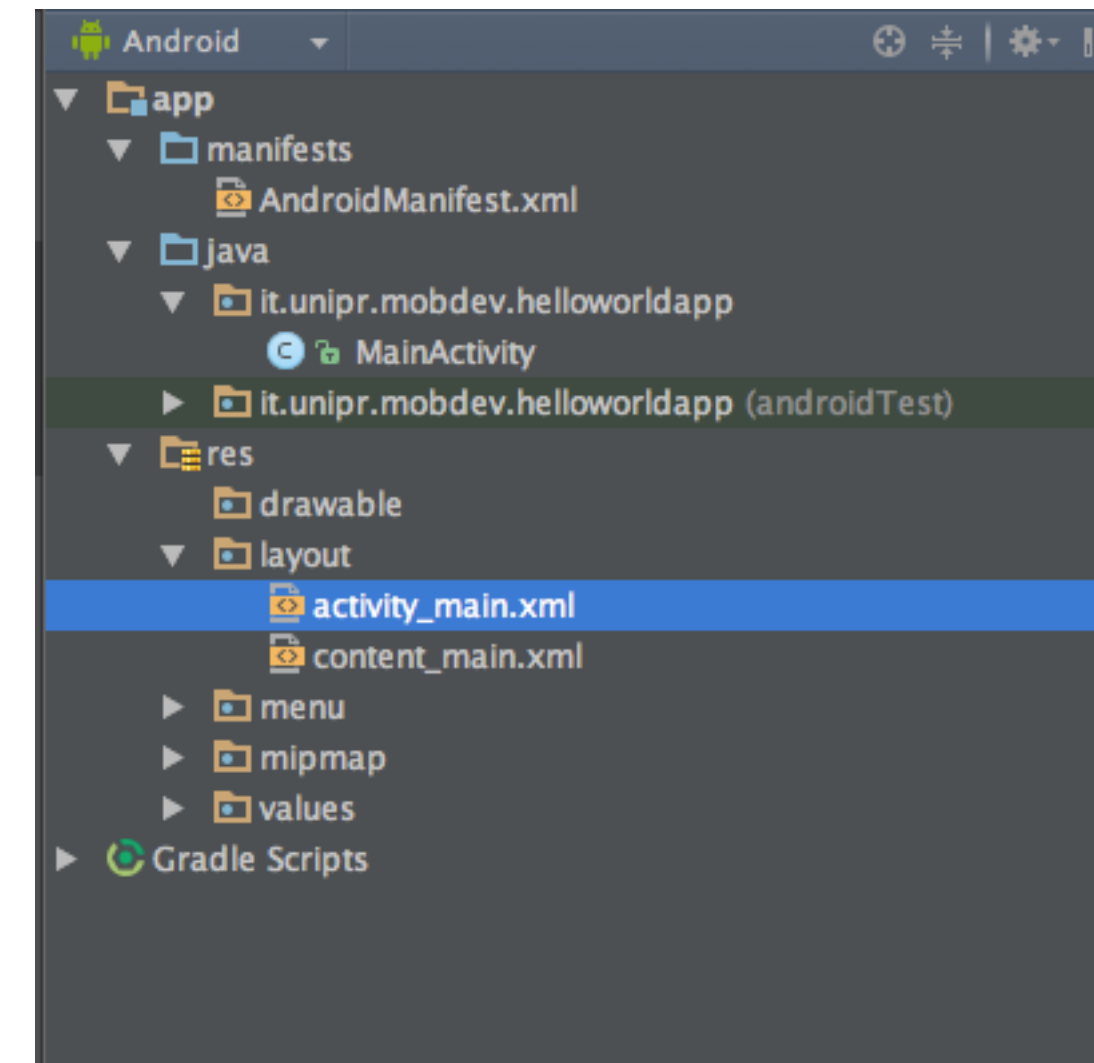


Hello World Application



Android Application Structure

- *AndroidManifest.xml*
- *res/*
 - *layout/* [application layout files]
 - *drawable/*
[images, patches, drawable, xml]
 - *raw/*
[data files that can be loaded as streams]
 - *values/* [xml files with strings, number values used in the code for example to *localize* the application in difference languages]
- *src/*
 - *java/package/directories*
- *gen/* [directory generated by Eclipse and Android SDK]

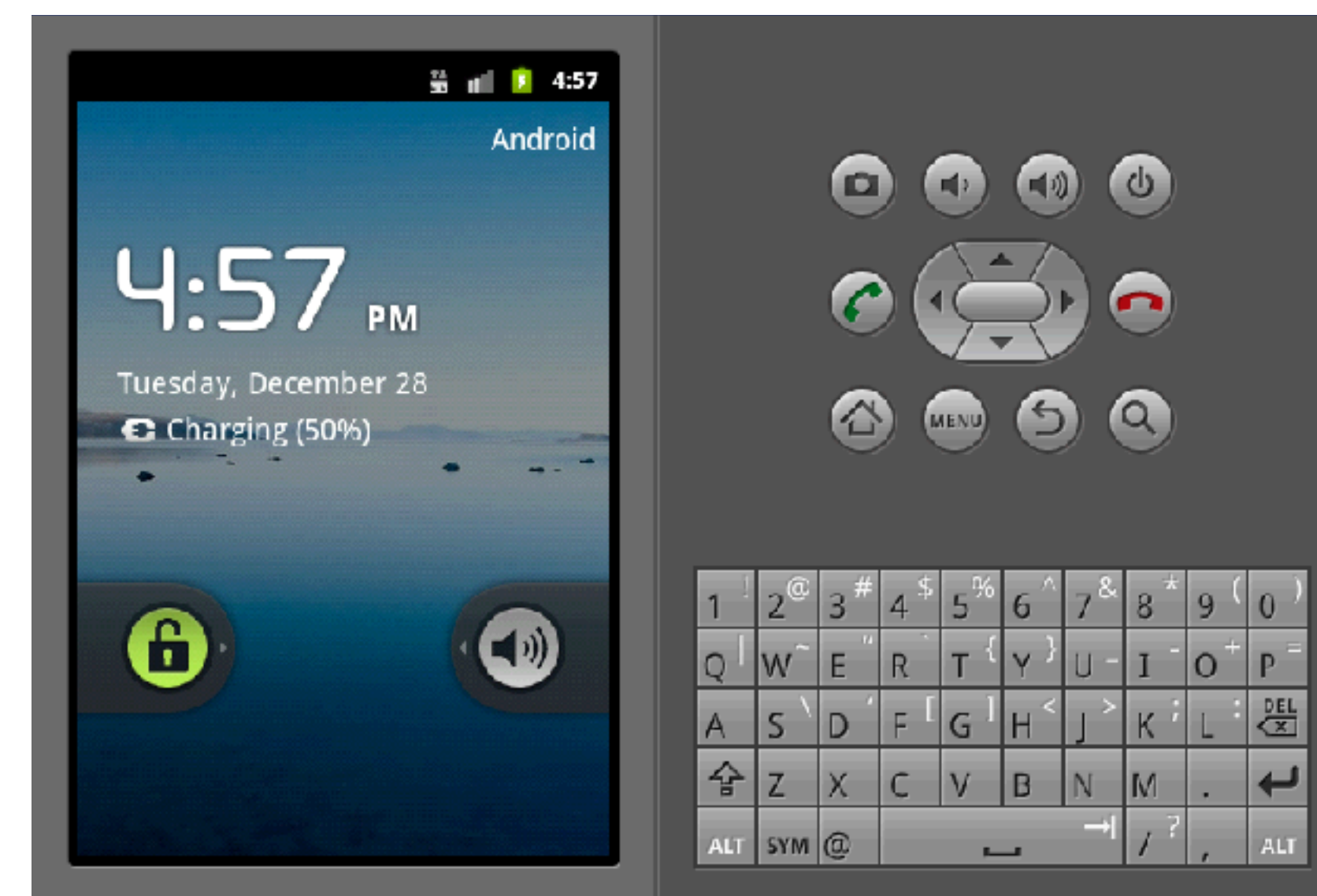


Android Emulator

- The Android SDK includes a virtual mobile device emulator that runs on your computer. The emulator lets you prototype, develop, and test Android applications without using a physical device.
- The Android emulator emulates all of the hardware and software features of a typical mobile device, except that it cannot place actual phone calls. It provides a variety of navigation and control keys, which you can "press" using your mouse or keyboard to generate events for your application. It also provides a screen in which your application is displayed, together with any other Android applications running.
- To let you model and test your application more easily, the emulator utilizes Android Virtual Device (AVD) configurations. AVDs let you define certain hardware aspects of your emulated phone and allow you to create many configurations to test many Android platforms and hardware permutations. Once your application is running on the emulator, it can use the services of the Android platform to invoke other applications, access the network, play audio and video, store and retrieve data, notify the user, and render graphical transitions and themes.
- The emulator also includes a variety of debug capabilities, such as a console from which you can log kernel output, simulate application interrupts (such as arriving SMS messages or phone calls), and simulate latency effects and dropouts on the data channel.

Android Emulator

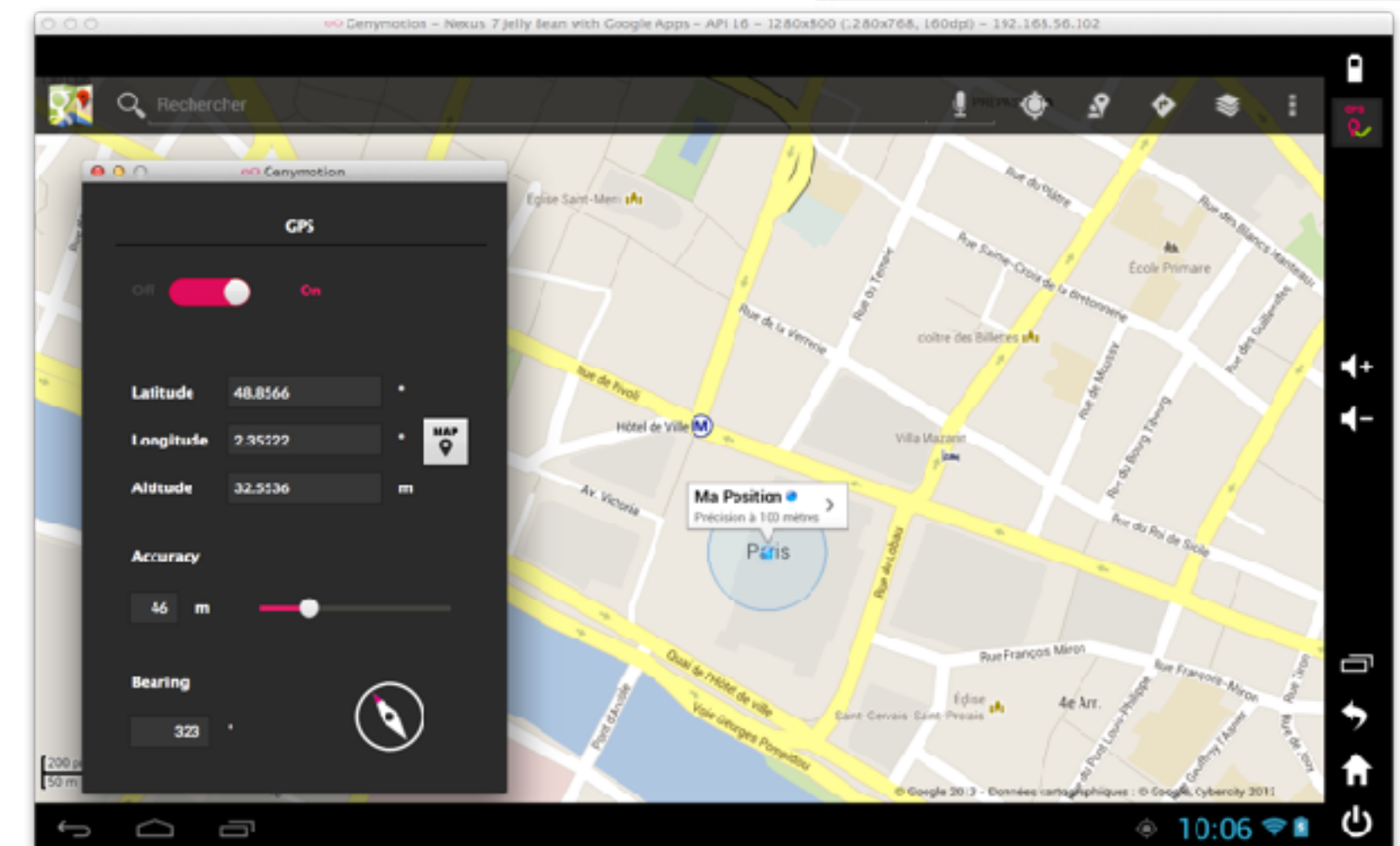
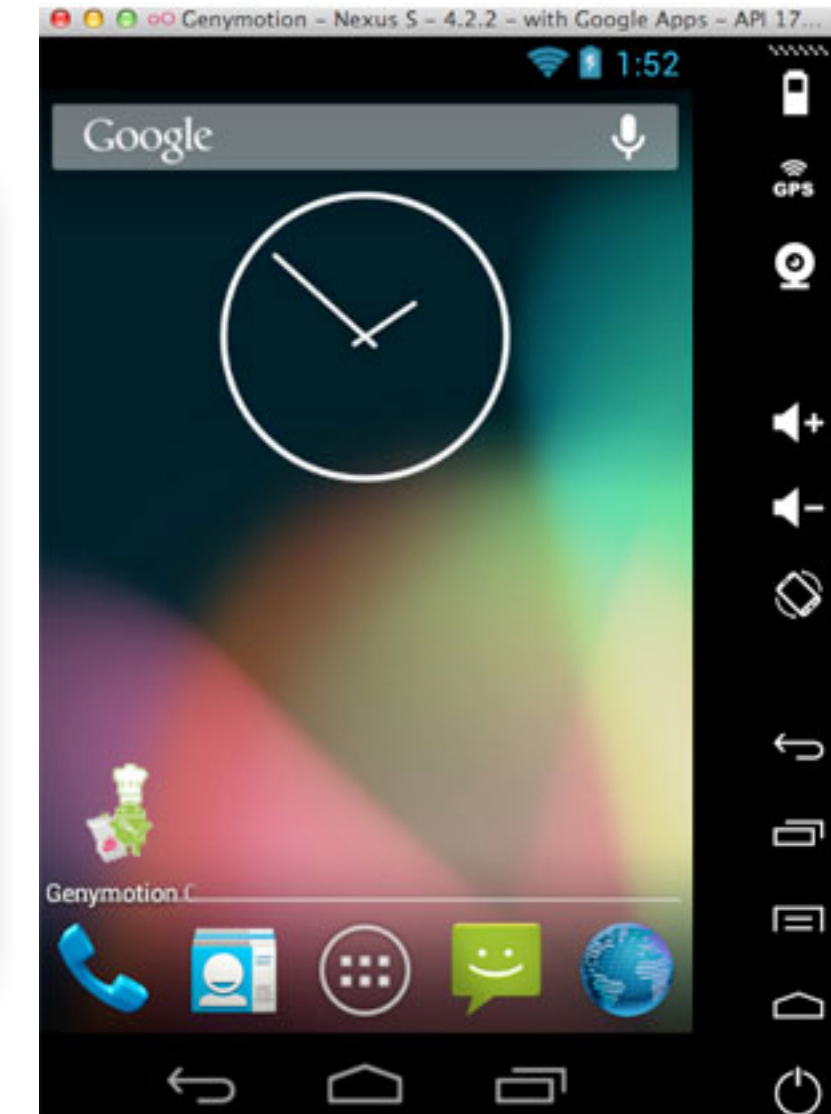
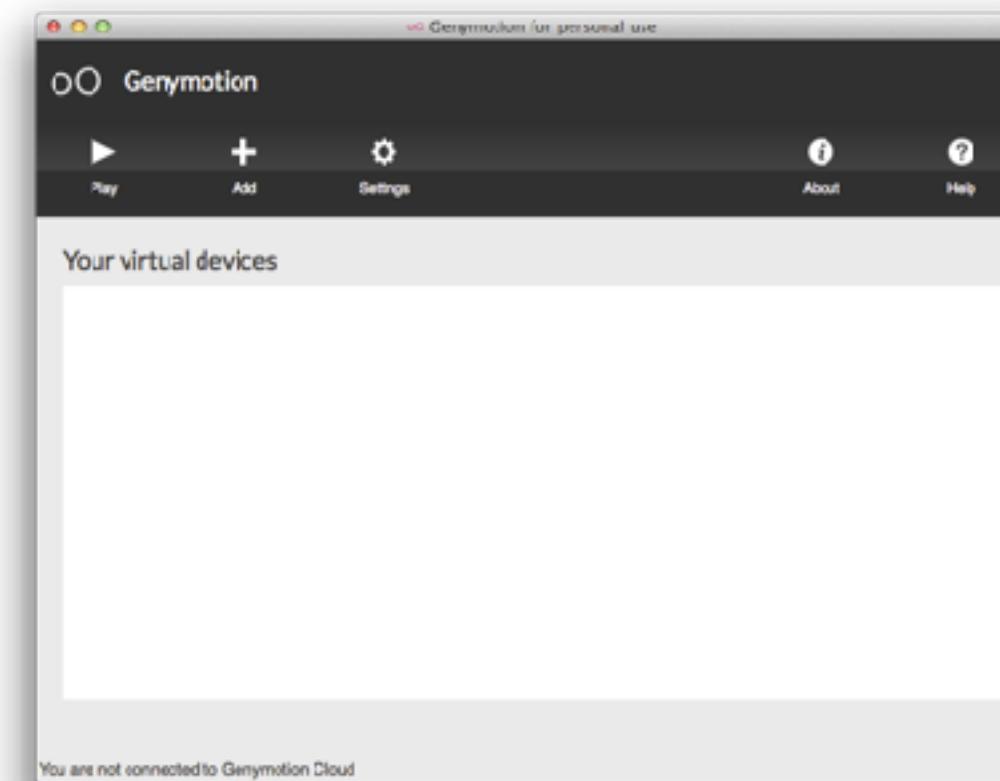
- Android emulator supports many hardware features likely to be found on mobile devices, including:
 - An ARMv5 CPU and the corresponding memory-management unit (MMU)
 - A 16-bit LCD display
 - One or more keyboards (a Qwerty-based keyboard and associated Dpad/Phone buttons)
 - A sound chip with output and input capabilities
 - Flash memory partitions (emulated through disk image files on the development machine)
 - A GSM modem, including a simulated SIM Card



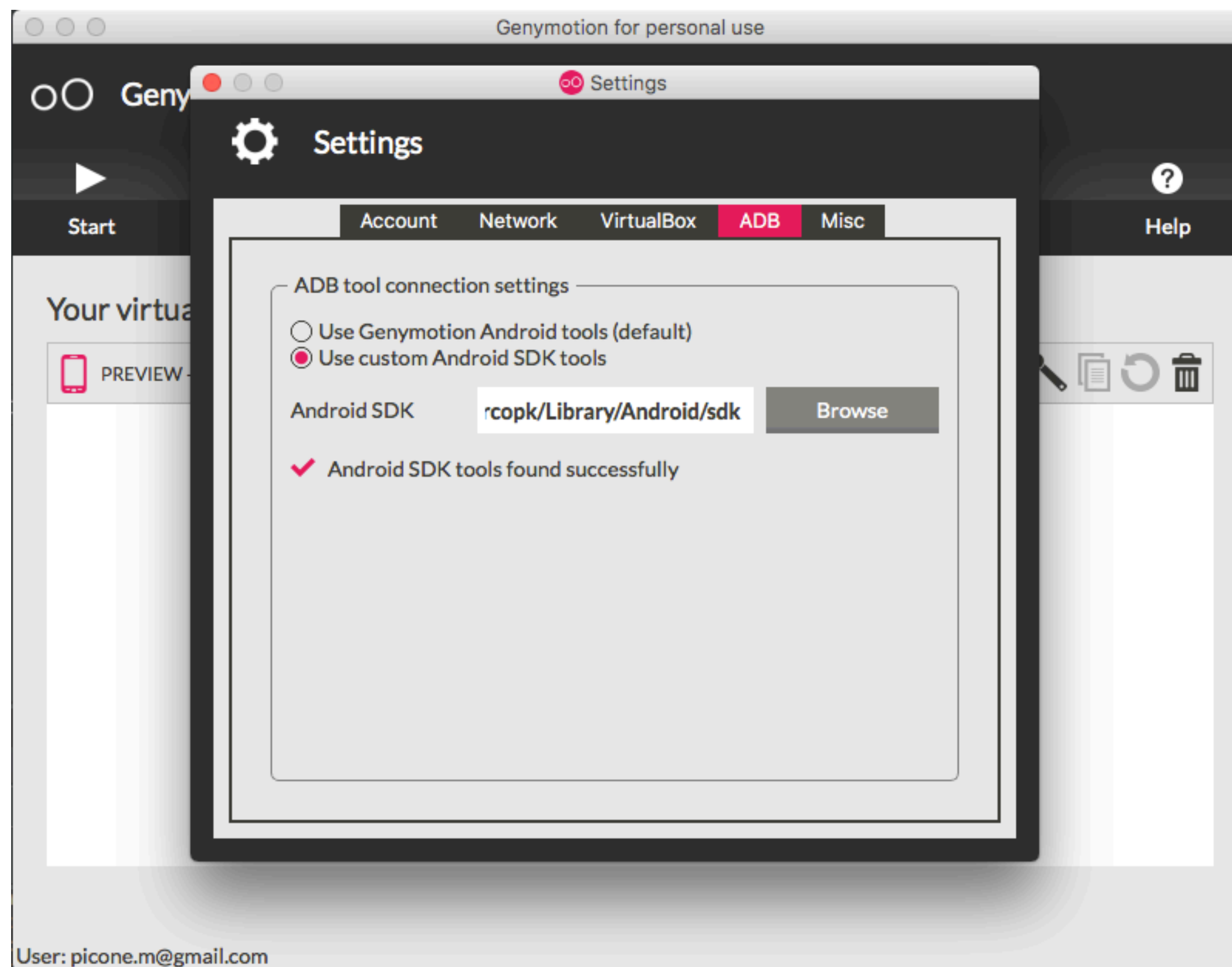
GenyMotion Emulator GENYMOTION

- GenyMotion is an Android simulator that allows you create “fast” virtual replicas of Android systems.
- It is based on VirtualBox and allows an improved management of:
 - WiFi (IP Addressing)
 - GPS
 - Open GL acceleration
 - Multiscreen
 - Full screen display
 - Sensors: Battery, Gyroscope, Light, Temperature, Rotation Vector, ...
- Free for non-commercial use:
 - Android 2.3, 4.1, 4.2, 4.3 and 4.4, 5, 6
 - GPS Widget
 - Camera Widget

<http://www.genymotion.com/>



GenyMotion Emulator





Android Development

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