



Programming with Android: **SDK install and initial setup**

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SDK and initial setup: **Outline**

➤ Today:

- How to setup a machine to start developing Android applications
- An overview of an Android project
- Some useful tools
- Your first Android application
 - Maybe on a real device!



Two options

- **Historically Android development was in Eclipse**
 - **Download the SDK**
 - **Install the Android plugin**

- **Now there is Android Studio**
 - **Customized environment**

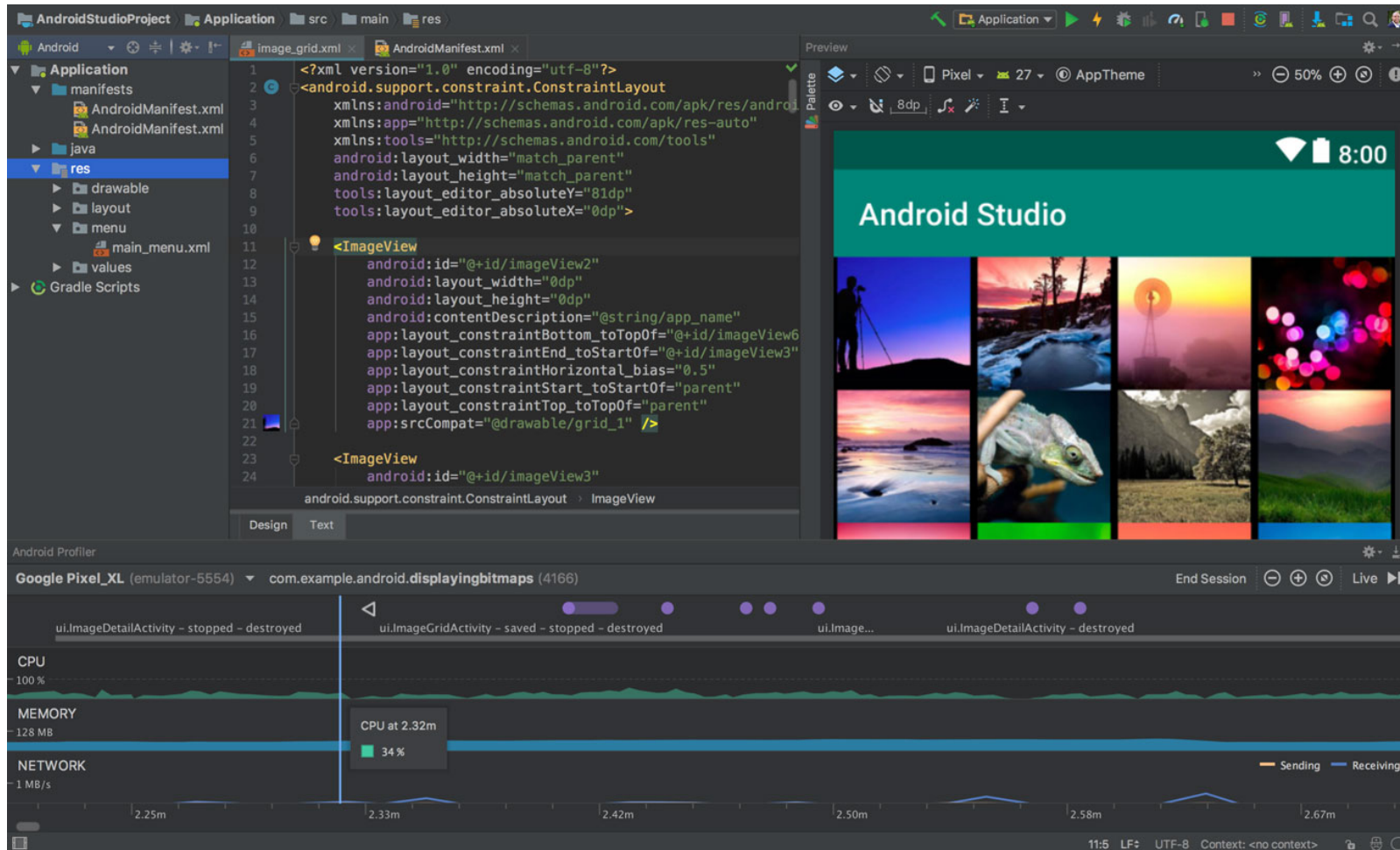


Which one?

- For LAM, it's the same
- If you already use and love Eclipse, go with it
- You might see examples done in both platforms
 - You can always import an Eclipse project into Android Studio
 - The inverse is difficult



Android Studio





Where and how to get it

➤ Go to <https://developer.android.com/studio/index.html>

➤ Download Android Studio
and the SDK

➤ Install it and
you're done!

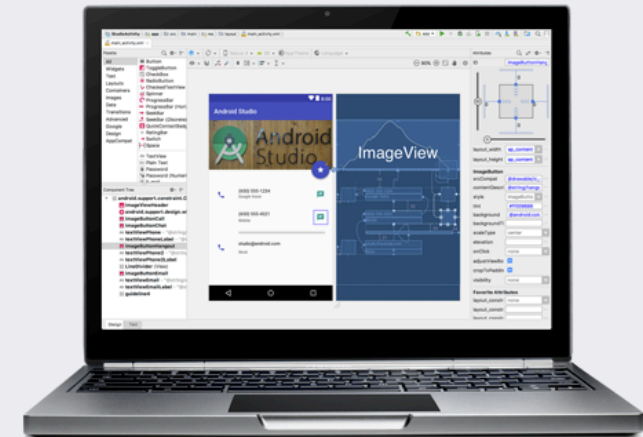
Android Studio

The Official IDE for Android

Android Studio provides the fastest tools for building apps on every type of Android device.

World-class code editing, debugging, performance tooling, a flexible build system, and an instant build/deploy system all allow you to focus on building unique and high quality apps.

DOWNLOAD ANDROID STUDIO
3.0.1 FOR MAC (738 MB)





Basic requirements

- **How to develop Android applications?**
 - **Linux/Mac OS X/Windows? Doesn't matter**
 - **A real device is not mandatory**

- **Code your application in the IDE**
 - **Test it with the emulator**
 - **Deploy it on a real device**



SDK tools

- Android tool
- Used to get APIs and add-ons
- You can also start it from Android Studio

Default Preferences

Appearance & Behavior > System Settings > Android SDK

Manager for the Android SDK and Tools used by Android Studio

Android SDK Location: [Edit](#)

SDK Platforms | SDK Tools | SDK Update Sites

Each Android SDK Platform package includes the Android platform and sources pertaining to an API level by default. Once installed, Android Studio will automatically check for updates. Check "show package details" to display individual SDK components.

Name	API Level	Revision	Status
<input type="checkbox"/> Android 6.0	23	2	Not installed
<input type="checkbox"/> Android 5.1.1	22	2	Not installed
<input checked="" type="checkbox"/> Android 5.0.1	21	2	Update available
<input type="checkbox"/> Android 4.4W.2	20	2	Not installed
<input type="checkbox"/> Android 4.4.2	19	4	Not installed
<input type="checkbox"/> Android 4.3.1	18	3	Not installed
<input type="checkbox"/> Android 4.2.2	17	3	Not installed
<input type="checkbox"/> Android 4.1.2	16	5	Not installed
<input checked="" type="checkbox"/> Android 4.0.3	15	5	Installed
<input type="checkbox"/> Android 2.3.3	10	2	Not installed
<input type="checkbox"/> Android 2.2	8	3	Not installed

Show Package Details

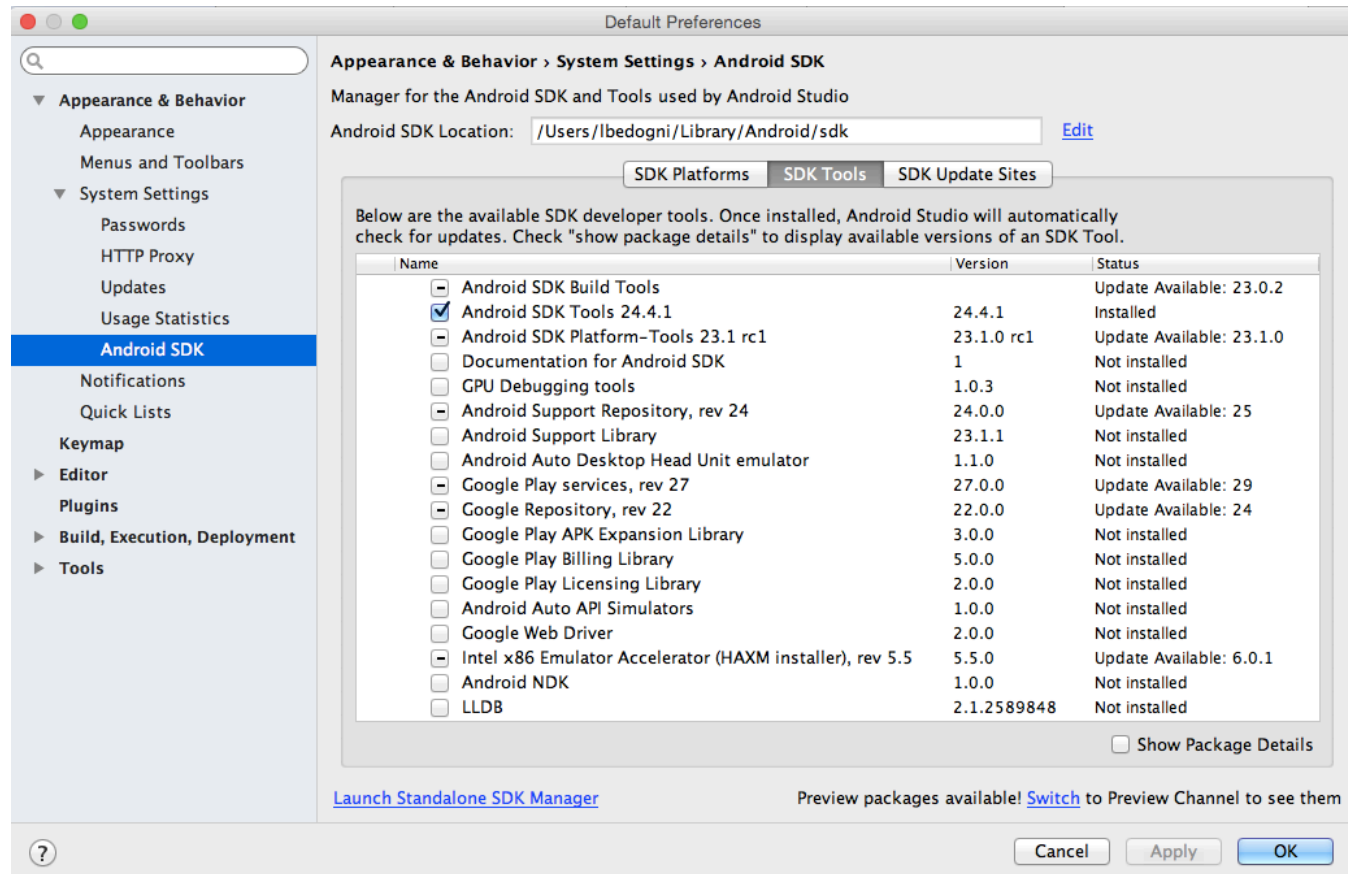
[Launch Standalone SDK Manager](#) Preview packages available! [Switch](#) to Preview Channel to see them

Cancel Apply OK



SDK tools

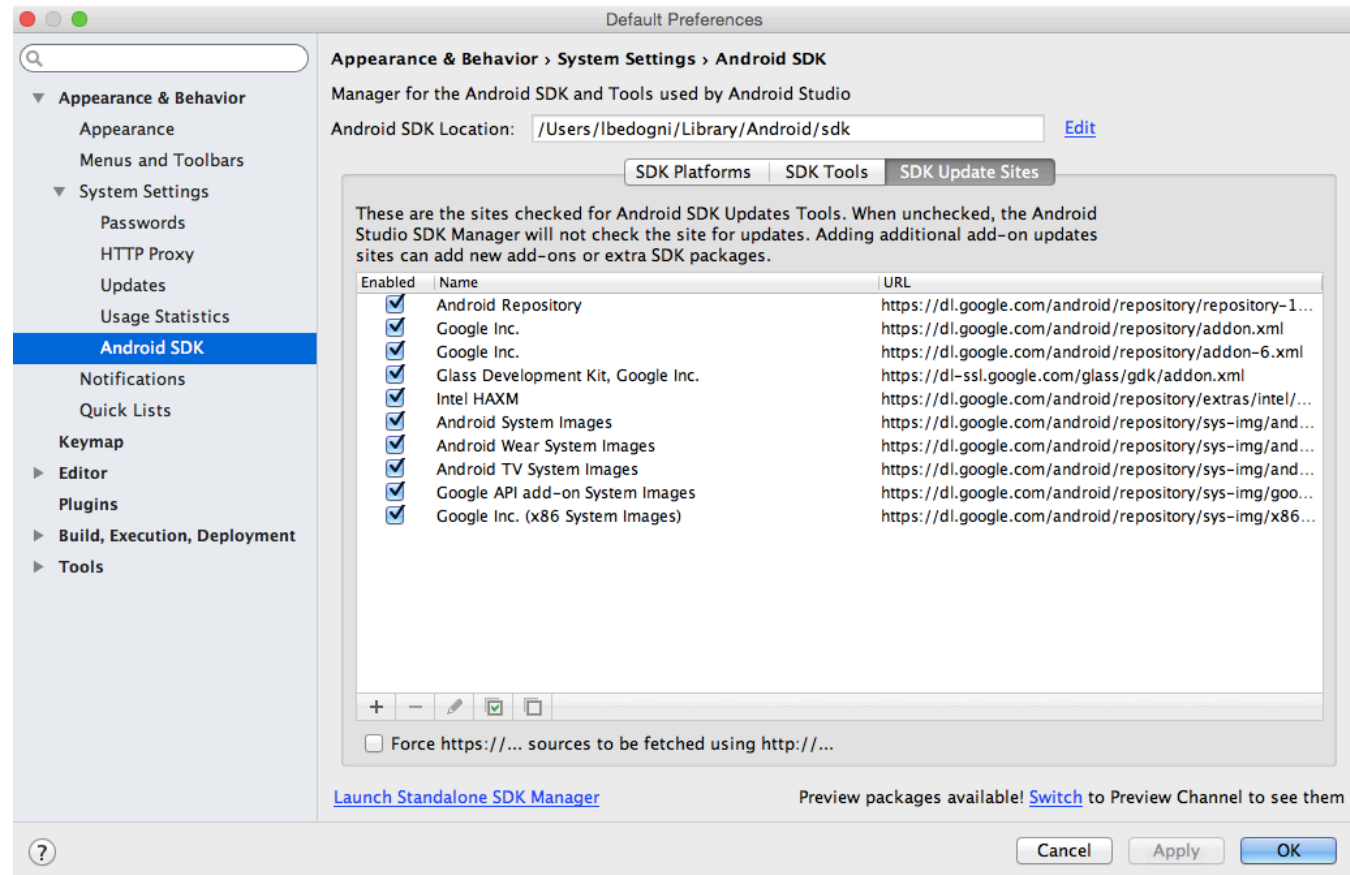
- Android tool
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SDK tools

- Android tool
- Used to get APIs and add-ons
- You can also start it from Android Studio





Your first **Android** application

➤ **Go to File > New Project**

Create New Project

New Project
Android Studio

Configure your new project

Application name:

Company Domain:

Package name: [Edit](#)

Project location: ...

Cancel Previous **Next** Finish



Your first **Android** application

➤ Go to File > New Project

The screenshot shows the 'Create New Project' dialog in Android Studio. The title bar reads 'Create New Project'. Below the title bar is the Android logo and the text 'Target Android Devices'. The main content area is titled 'Select the form factors your app will run on' and includes the subtitle 'Different platforms may require separate SDKs'. There are five options, each with a checkbox and a 'Minimum SDK' dropdown menu:

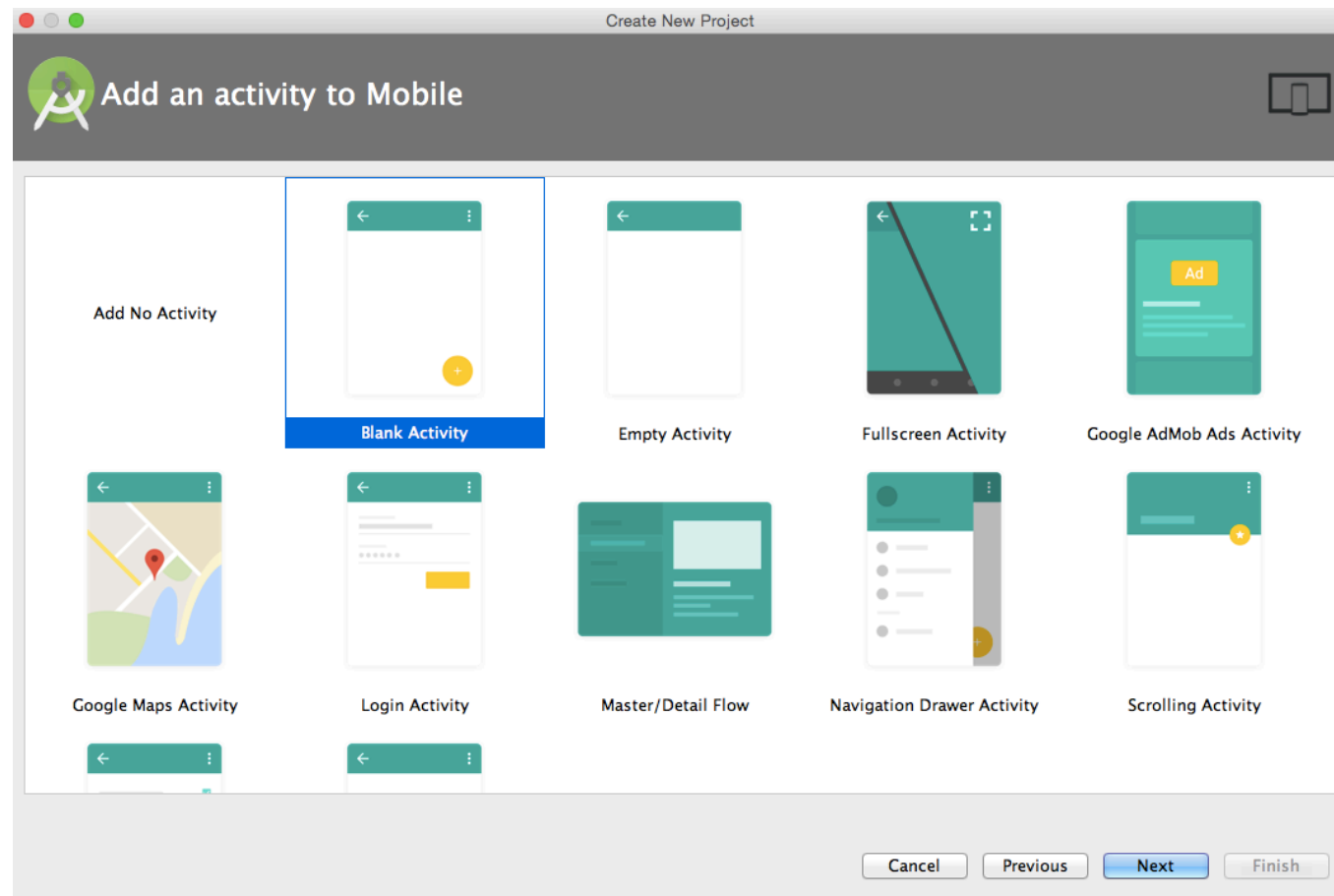
- Phone and Tablet
Minimum SDK: API 15: Android 4.0.3 (IceCreamSandwich)
Lower API levels target more devices, but have fewer features available.
By targeting API 15 and later, your app will run on approximately 97.3% of the devices that are active on the Google Play Store.
[Help me choose](#)
- Wear
Minimum SDK: API 21: Android 5.0 (Lollipop)
- TV
Minimum SDK: API 21: Android 5.0 (Lollipop)
- Android Auto
- Glass
Minimum SDK: Glass Development Kit Preview

At the bottom right, there are four buttons: 'Cancel', 'Previous', 'Next' (highlighted in blue), and 'Finish'.



Your first **Android** application

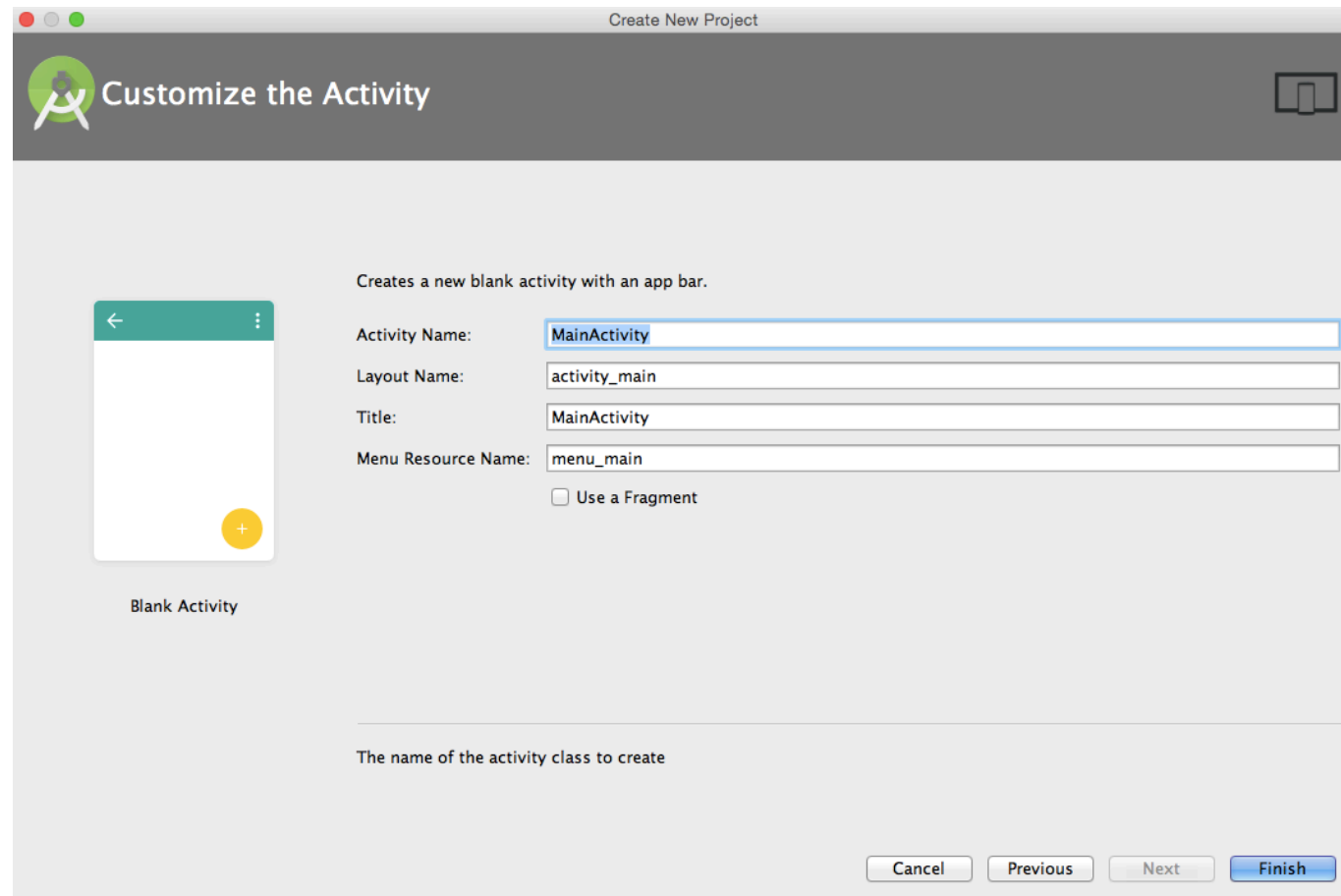
➤ Go to File > New Project





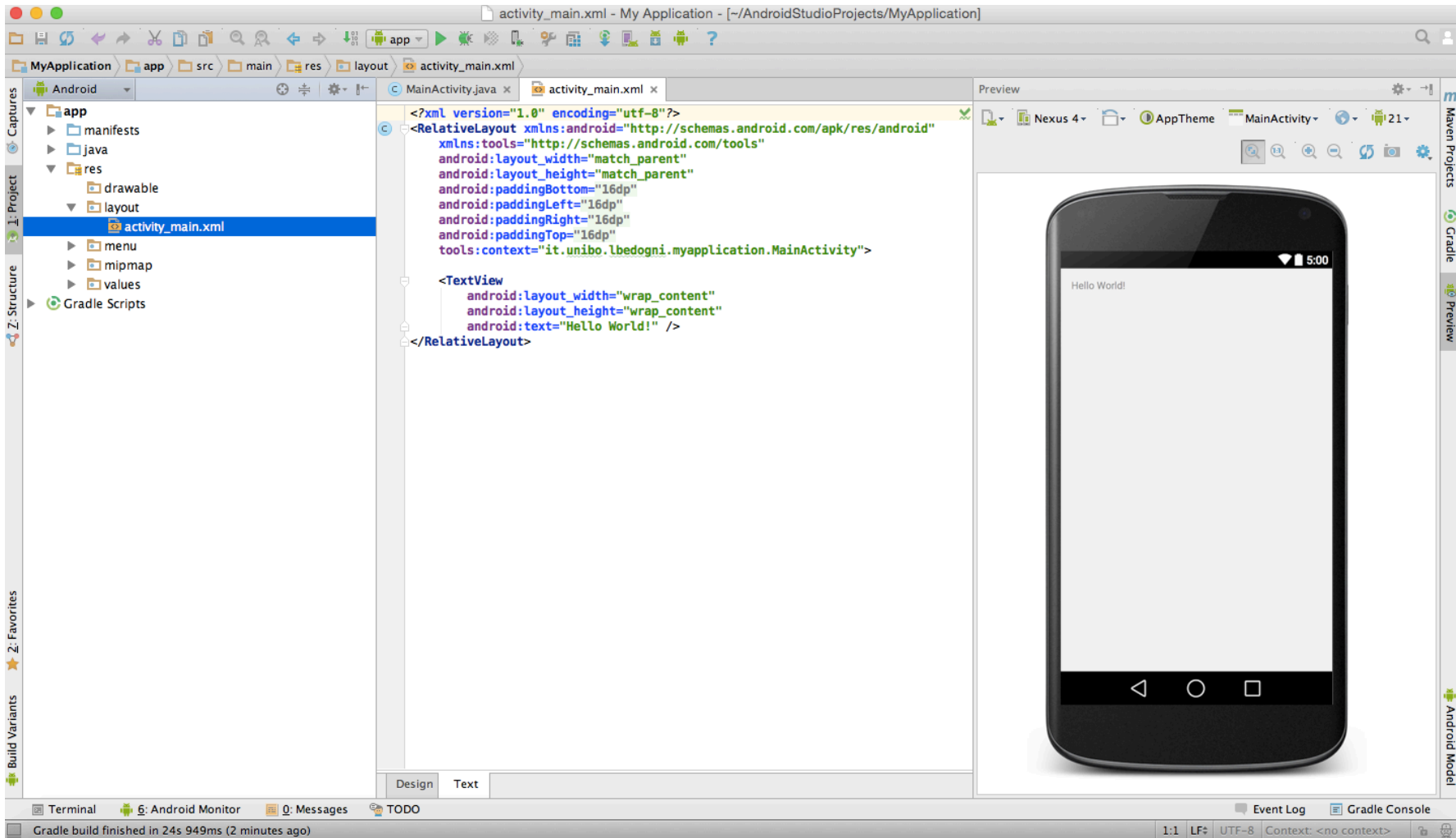
Your first **Android** application

➤ **Go to File > New Project**





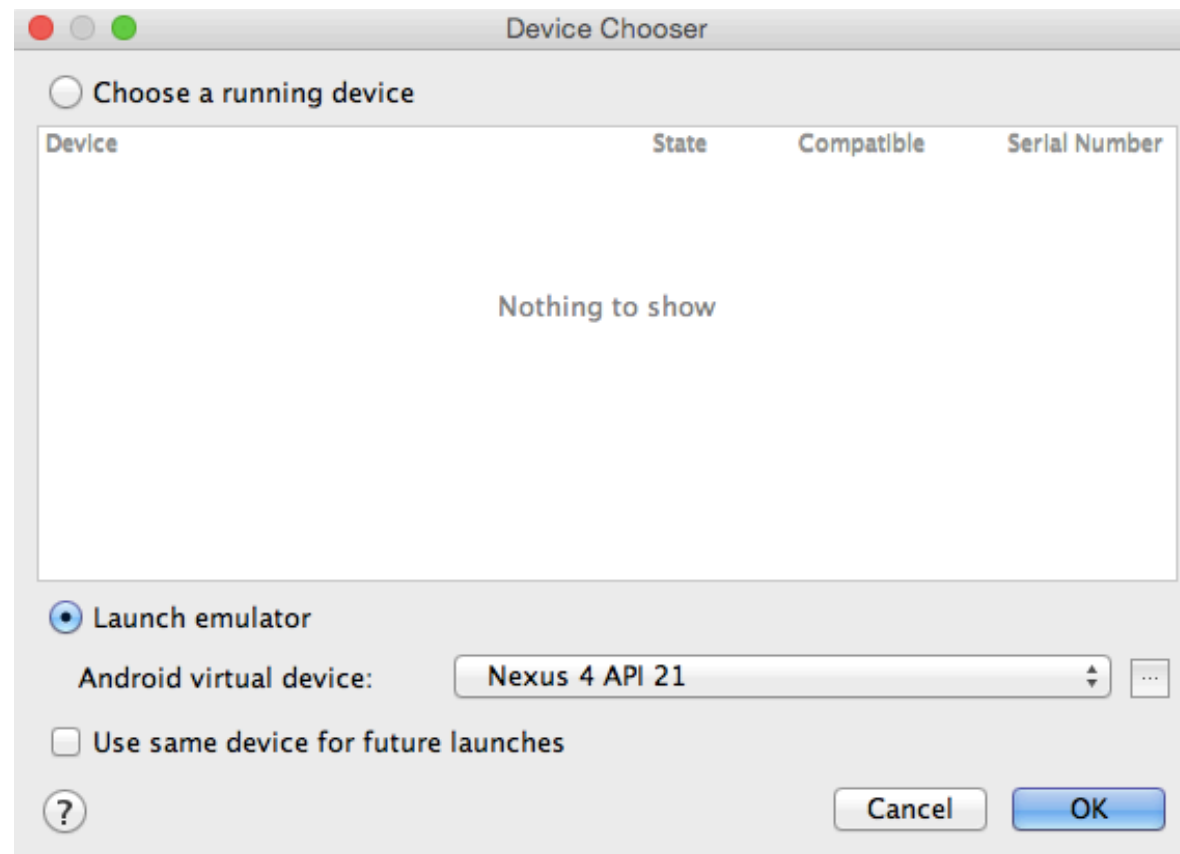
Your first **Android** application





Testing on the emulator

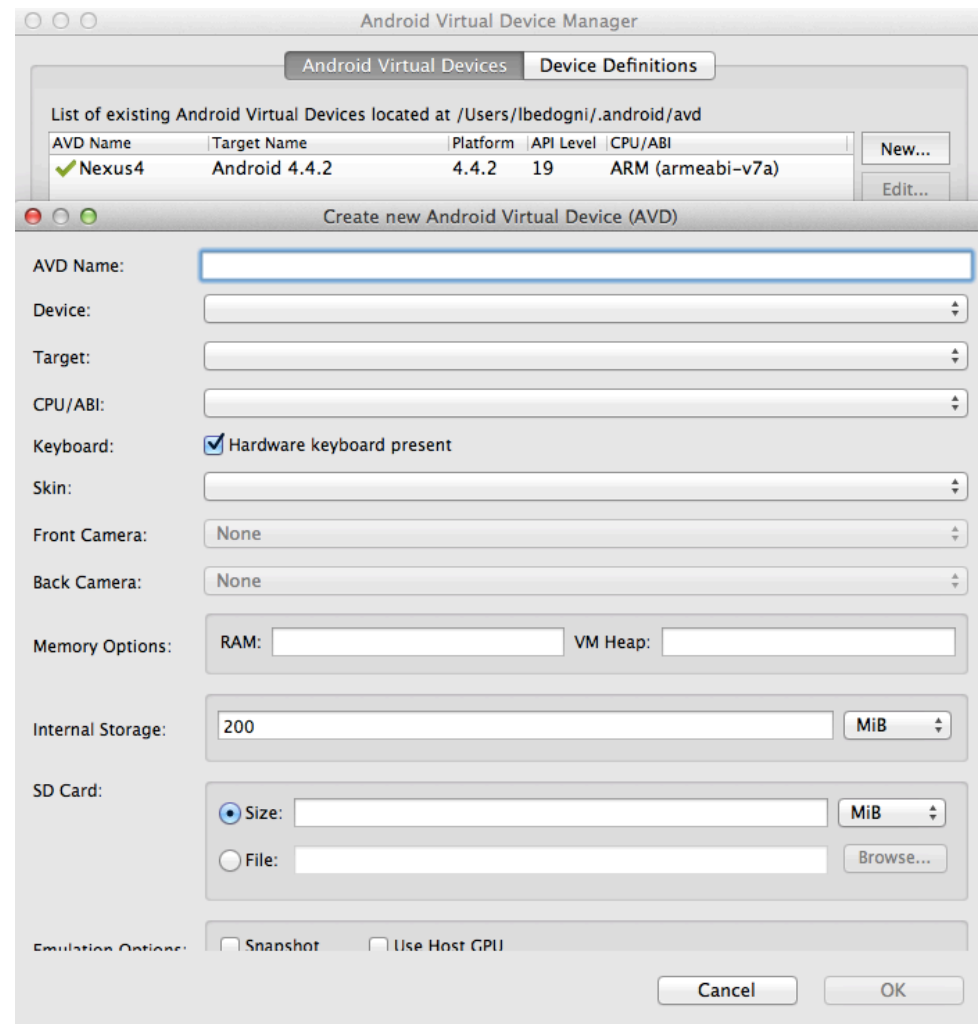
➤ Select Run > Run App





Creating an emulator

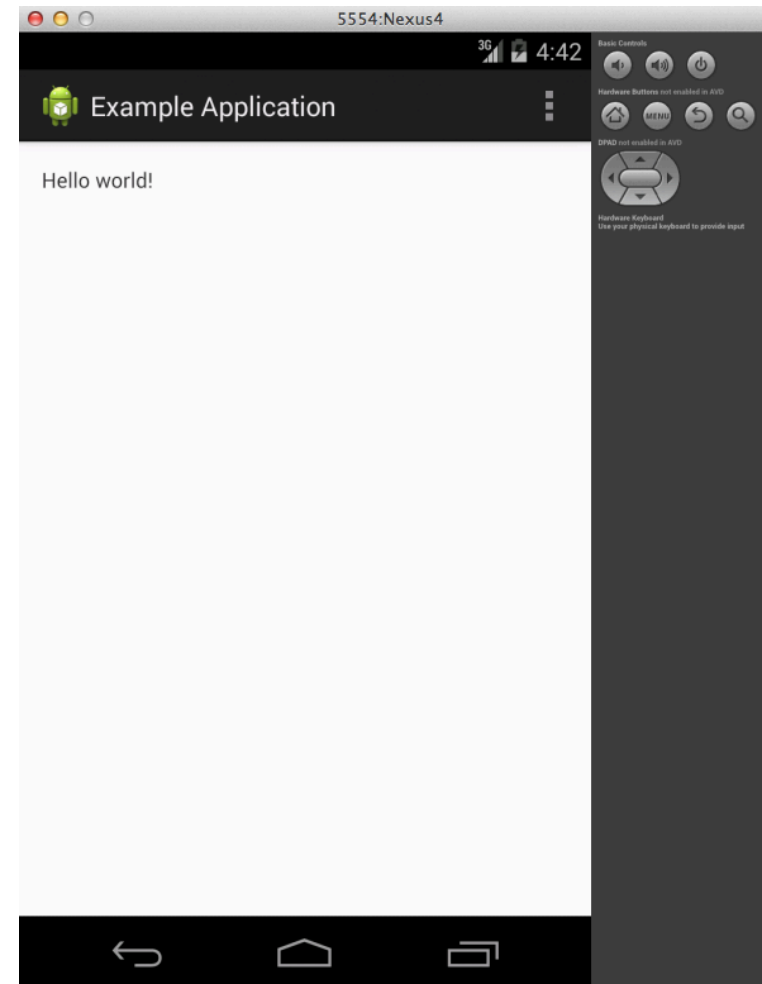
- Can configure several options
- You can create as many as you want





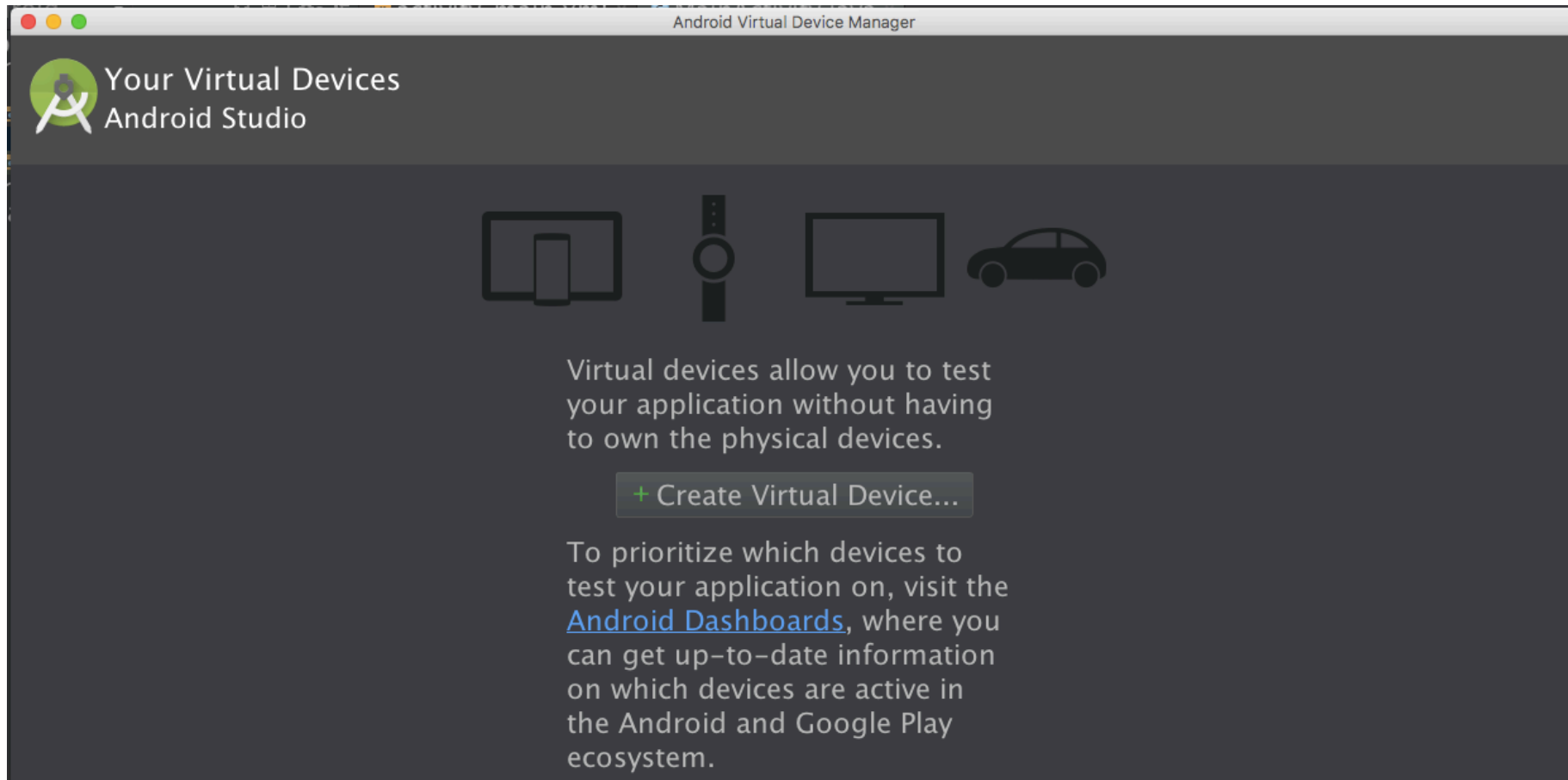
Did everything went **fine**?

- Test in on the emulator
- You should see something similar to this





Example of **AVD** Creation





Example of **AVD** Creation

Virtual Device Configuration

Select Hardware
Choose a device definition

Search:

Category	Name	Size	Resolution	Density
Phone	Nexus S	4.0"	480x800	hdpi
Tablet	Nexus One	3.7"	480x800	hdpi
Wear	Nexus 6P	5.7"	1440x2...	560dpi
TV	Nexus 6	5.96"	1440x2...	560dpi
	Nexus 5X	5.2"	1080x1...	420dpi
	Nexus 5	4.95"	1080x1...	xxhdpi
	Nexus 4	4.7"	768x12...	xhdpi
	Galaxy Nexus	4.65"	720x12...	xhdpi
	5.4" FWVGA	5.4"	480x854	mdpi
	5.1" WVGA	5.1"	480x800	mdpi


Nexus 5

Size: normal
Ratio: notlong
Density: xxhdpi


New Hardware Profile Import Hardware Profiles Clone Device...




Example of **AVD** Creation

 System Image
Select a system image

Release Name	API Le...	ABI	Target
Marshmallow Download	23	x86_64	Android 6.0 (with Google)
Marshmallow Download	23	x86	Android 6.0
Marshmallow Download	23	x86_64	Android 6.0
Lollipop Download	22	armeabi-	Android 5.1 (with Google)
Lollipop Download	22	x86	Android 5.1 (with Google)
Lollipop Download	22	x86_64	Android 5.1 (with Google)
Lollipop Download	22	armeabi-	Android 5.1
Lollipop Download	22	x86	Android 5.1
Lollipop Download	22	x86_64	Android 5.1
Lollipop Download	21	armeabi-	Android 5.0 (with Google)
Lollipop Download	21	x86	Android 5.0 (with Google)
Lollipop Download	21	x86_64	Android 5.0 (with Google)
Lollipop Download	21	armeabi-	Android 5.0
Lollipop Download	21	x86	Android 5.0

Show downloadable system images 

Lollipop



API Level
21

Android
5.0

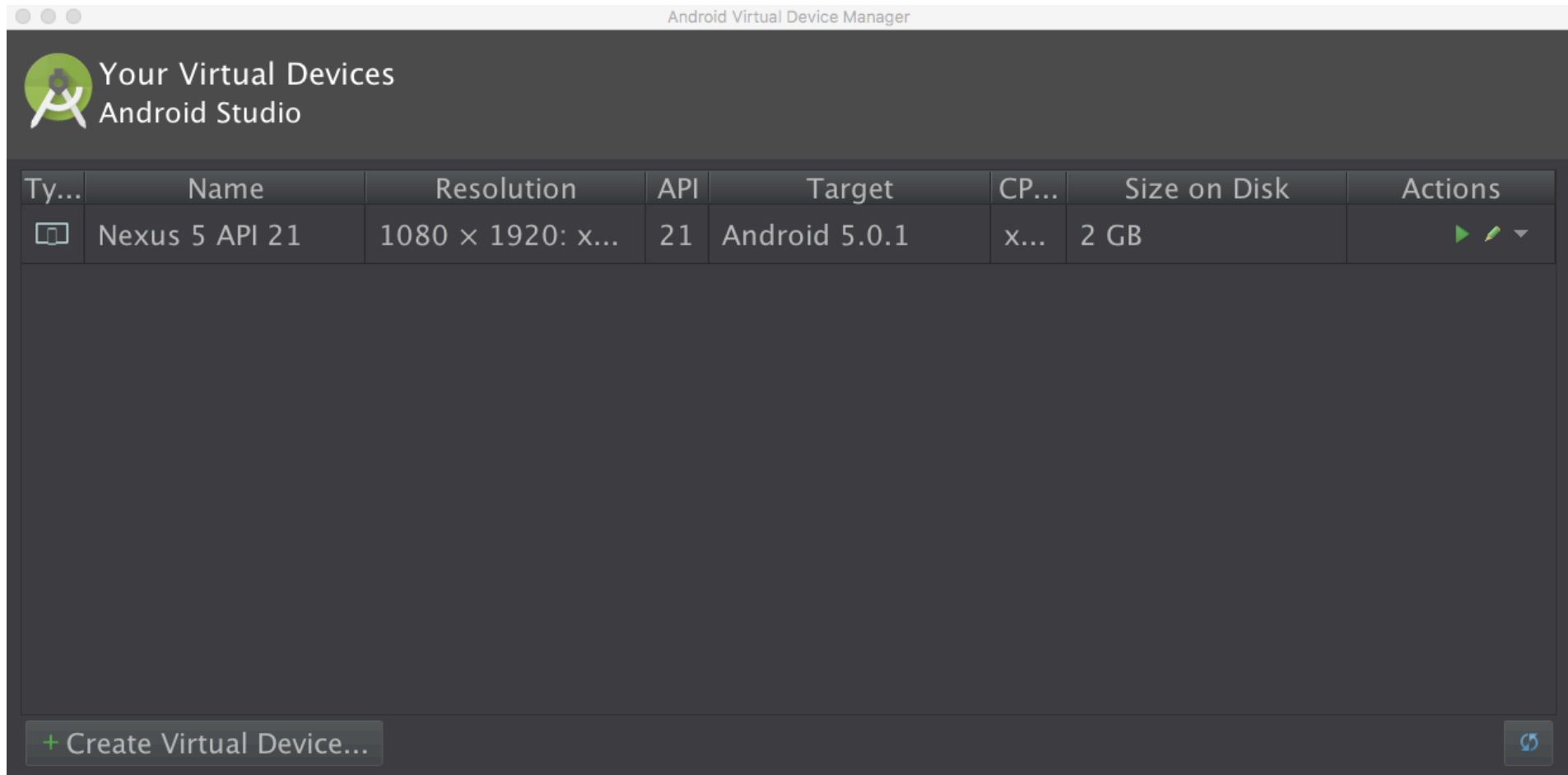
Android Open
Source Project

System Image
x86_64

Questions on API level?
See the [API level distribution ch](#)

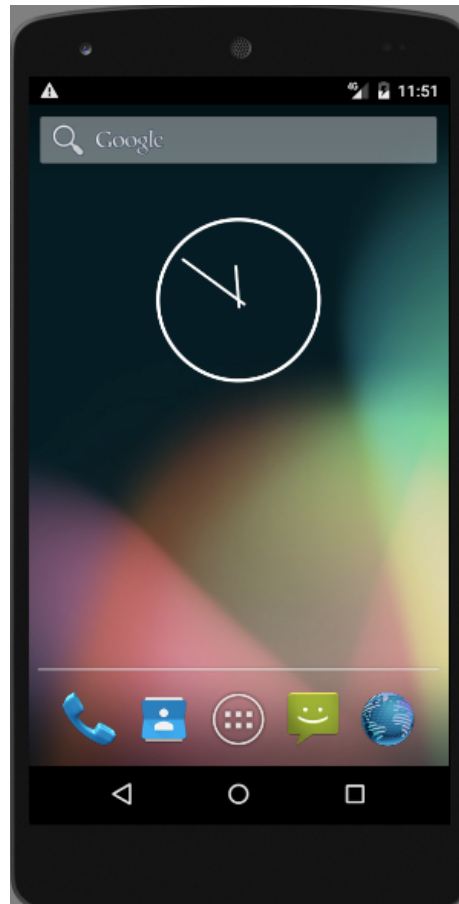


Example of **AVD** Creation





Example of **AVD** Creation





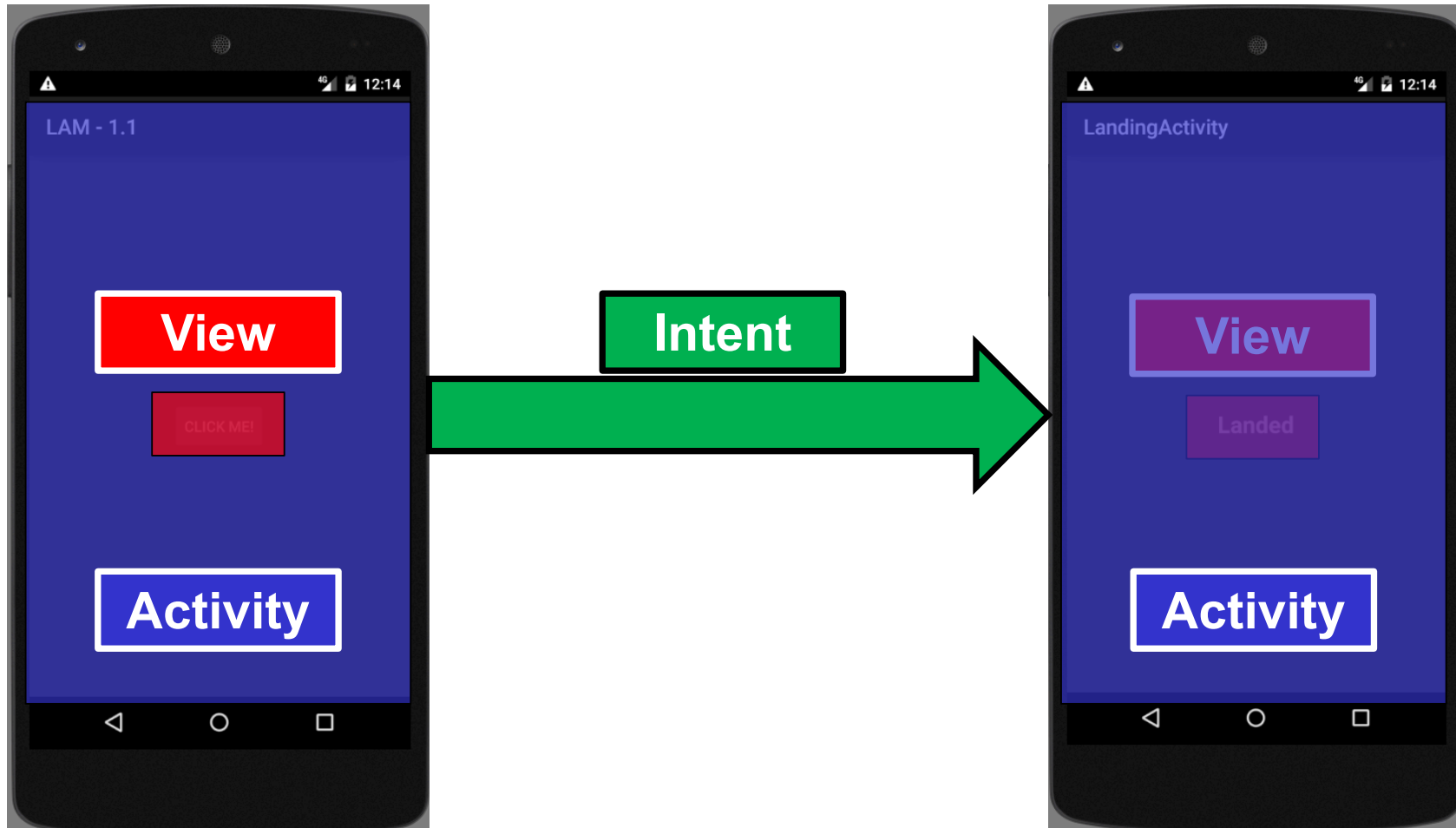
Hello world, Android!

- Anatomy of an application
 - Activity: what is started
 - View: what is seen
 - Intent: how to communicate with others

- Mix of XML and Java
 - Generally XML for layouts
 - Java for the app logic



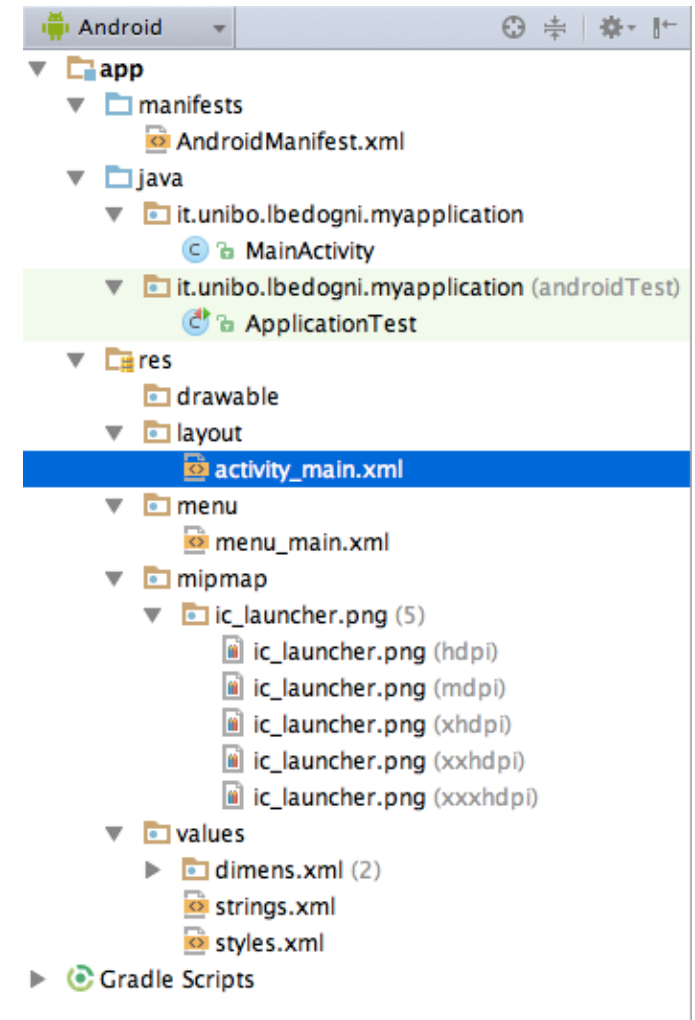
Activities, Intents and Views





The **java** and **res** folders

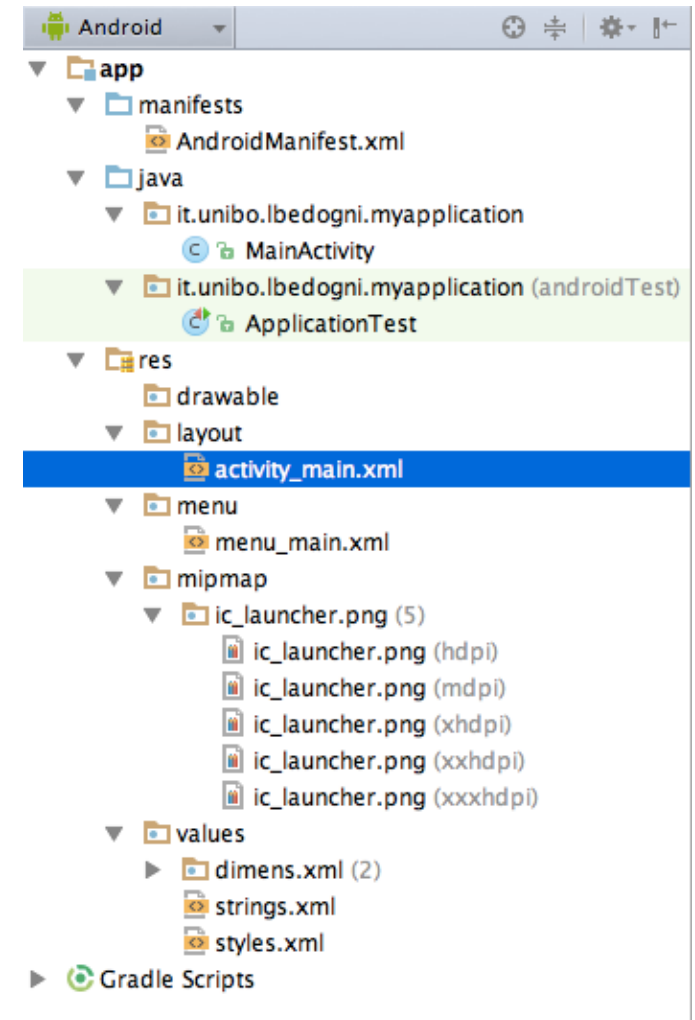
- All the code of your application
 - The java folder contains... the java code!
 - Inside res there are a lot of resources
 - Images
 - Layouts
 - Xml files
 - AndroidManifest.xml





AndroidManifest.xml

- Mandatory file for every application
 - Contains:
 - Application declaration
 - Permissions
 - Intent filters
 - Targets





How to **test**

➤ Via an AVD

✓ Fast, possible to have different resolutions, APIs

✗ Not a real device

➤ On a real device

✓ You get exactly what is deployed

✗ Must own a real device

➤ So?

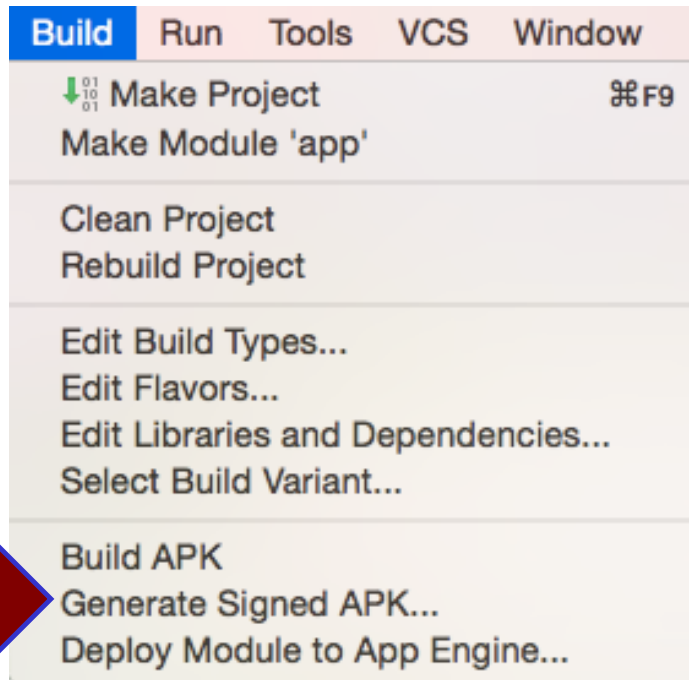
➤ Test in on AVDs.

➤ When you feel that the application is ready, go with a real device



How to **deploy**

- Android applications must be signed before installing them on a real device



You need a key for this
and you can generate one
from the menu.



How to **deploy**

- To be published on the market, you have to pay 25 Euro
 - Lifetime fee, unlimited APPs
 - Not required for the LAM class
- Upload the APK, and in few hours/days the APP is on the play store
 - Receive comments, improve, update
 - Smartphone specific bugs? AVDs



Android **Developer Console**

The screenshot shows the Google Play Developer Console interface. At the top, there is a search bar with the text "blu|". Below the search bar, a dropdown menu displays two application entries: "The big blue" with package name "com.consoledemo.bigblue" and "The little blue" with package name "com.consoledemo.littleblue". The main content area is titled "ALL APPLICATIONS" and contains a table of application details.

APP NAME	PRICE	ACTIVE INSTALLS	AVG. RATING / TOTAL	ERRORS	LAST UPDATE	STATUS
The big blue	Free	12	★ 5.00 / 1	0	Aug 15, 2012	Unpublished
The Handy Developer Guide	Free	756	★ 5.00 / 2	6	Sep 26, 2012	Published
The big green	Free				—	Draft
The big red	\$2.00	136	—	14	Dec 3, 2010	Published
The big yellow	Free	3,672,387	★ 5.00 / 1	119	Jan 18, 2012	Unpublished
The little pink	Free	7,452,652	★ 5.00 / 1,986,412	8	Jun 14, 2012	Published
The little red	Free	2,412	★ 3.33 / 335	341	Dec 8, 2010	Published

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