Lesson 2

Android Workbenches: Android Studio & Eclipse

Victor Matos
Cleveland State University

Android App's Anatomy

Android Applications (Just Apps)

- Android applications are usually created using the **Java** programming language [1]
- Apps must import various **Android Libraries** (such as android.jar, maps.jar, etc) to gain the functionality needed to work inside the Android OS.
- Android apps are made of multiple elements such as: user-defined classes, android jars, third-party libraries, XML files defining the UIs or views, multimedia resources, data assets such as disk files, external arrays and strings, databases, and finally a *Manifest* summarizing the 'anatomy' and permissions requested by the app.
- The various app components are given to the compiler to obtain a single signed and deployable **Android Package** (an **.apk** file).
- Like ".class" files in Java, ".apk" files are the **byte-code** version of the app that finally will be 'executed' by interpretation inside either a **Dalvik Virtual Machine** (DVM) or an Android-Runtime Engine (**ART**).

[1] Visit http://xamarin.com/monoforandroid for a commercial iOS and Android IDE that works with C# and Windows .NET

Android's Byte-Code Execution

Dalvik Virtual Machine vs. Android Runtime (ART)

The **Dalvik Virtual Machine** is a Just-in-Time (**JIT**) runtime environment (similar to the Oracle's Java Virtual Machine JVM) that interprets Android byte-code only when it's needed (however it will be phased out soon).

The newer **ART** (introduced as an option in Android 4.4 KitKat) is an anticipatory or Ahead-of-Time (AOT) environment that compiles code before it is actually needed.

ART promises:

- enhanced performance and battery efficiency,
- improved garbage collection,
- better debugging facilities,
- Improved diagnostic detail in exceptions and crash reports.

Quoting from
https://source.android.com/devices/tech/dalvik/art.html (Aug-27-2014)

> ***Important:*** *Dalvik must remain the default runtime or you risk breaking your Android implementations and third-party applications.*

Setting up Eclipse + ADT + SDK

You are a developer - Which is your SDK audience?

SDKs are named after types of desserts. Available versions at the time of writing are:

1.5	**Cupcake,**
1.6	**Donut,**
2.1	**Eclair,**
2.2	**Froyo,**
2.3	**Gingerbread ,**
3.x	**Honeycomb,**
4.0	**Ice Cream Sandwich**
4.3	**Jelly Bean**
4.4	**Kitkat**
5.x	**Lollipod**
6.X	**Marshmallow**

Android SDK version	Current market share
4.4 (KitKat)	42.0 %
4.1-4.3 (Jelly Bean)	34.4 %
5.0-5.1 (Lollipop)	16.5 %
2.3 (Gingerbread)	3.5 %
4.0.x (ICS)	3.3 %
2.2 (Froyo)	0.2 %
3.0-3.2 (Honeycomb)	0.1 %
2.0-2.1 (Eclair)	0.0 %

Statistics accessed on **Sept 3, 2015** from AppBrain at http://www.appbrain.com/stats/top-android-sdk-versions

Tools for Constructing Android Apps

Development Workbenches

Android apps are made out of many components. The use of an IDE is *strongly* suggested to assist the developer in creating an Android solution. There are various options including:

- **Eclipse+ADT.** The classic general purpose Eclipse IDE can be enhanced (with the ADT plugin) to provide a 'conventional' way to create and debug Android Apps. The associated **SDK Manager** allows you to reach the various API libraries needed by the apps.

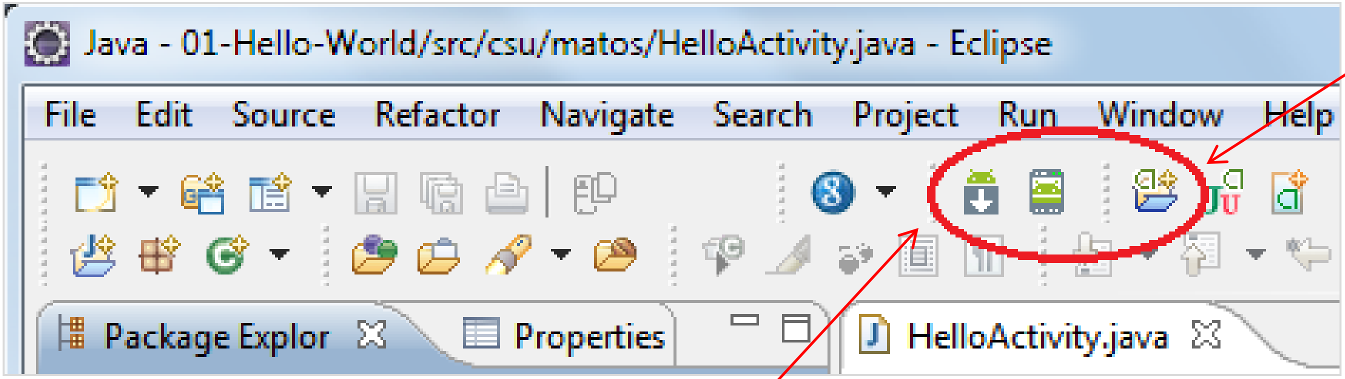
- **Android Studio** is a new Android-only development environment based on IntelliJ IDEA. It is still on Beta form, but as soon as finished, it will be used as the 'preferred' IDE platform for Android development.

- **Netbeans+Android.** Similar to Eclipse+ADT. Soon to be deprecated(?)

Eclipse + ADT + SDK

Typical Layout of the Eclipse-ADT IDE for Android Development

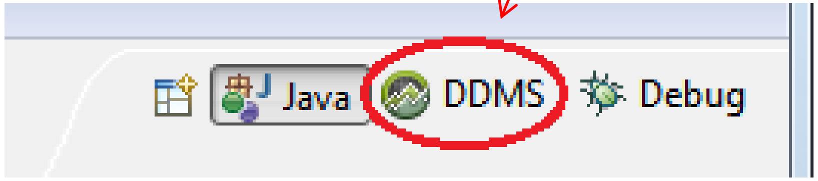
These icons are added to Eclipse by the ADT plugin


Java - 01-Hello-World/src/csu/matos/HelloActivity.java - Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explor
Properties
HelloActivity.java

Opens Android SDK manager

Opens Android AVD Virtual Device Manager

Wizard creates a new Android Project

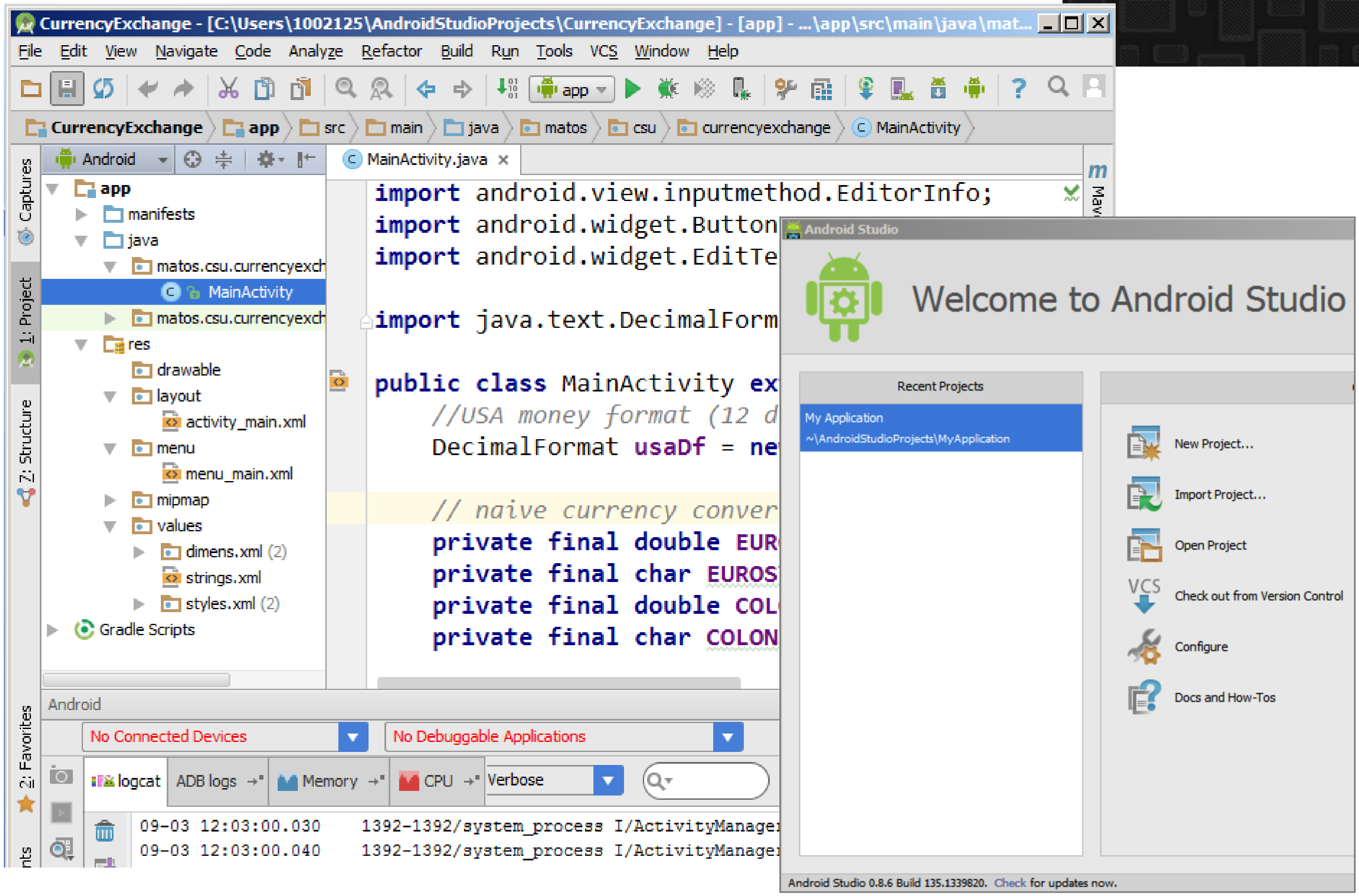


Opens DDMS Perspective
Dalvik Debugging Monitoring System

***Note**: The **DDMS** and **Hierarchy View** can be manually added by the user to Eclipse's tool bar*

Android Studio

Typical Layout of Android-Studio IDE


CurrencyExchange - [C:\Users\1002125\AndroidStudioProjects\CurrencyExchange] - [app] - ...\app\src\main\java\mat...
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
app
CurrencyExchange app src main java matos csu currencyexchange MainActivity
Android
MainActivity.java
app
manifests
java
matos.csu.currencyexch
MainActivity
matos.csu.currencyexch
res
drawable
layout
activity_main.xml
menu
menu_main.xml
mipmap
values
dimens.xml (2)
strings.xml
styles.xml (2)
Gradle Scripts
Captures
1: Project
7: Structure
2: Favorites
Maven
Android
No Connected Devices
No Debuggable Applications
logcat
ADB logs
Memory
CPU
Verbose
Android Studio
Welcome to Android Studio
Recent Projects
My Application
~\AndroidStudioProjects\MyApplication
New Project...
Import Project...
Open Project
Check out from Version Control
Configure
Docs and How-Tos
Android Studio 0.8.6 Build 135.1339820. Check for updates now.

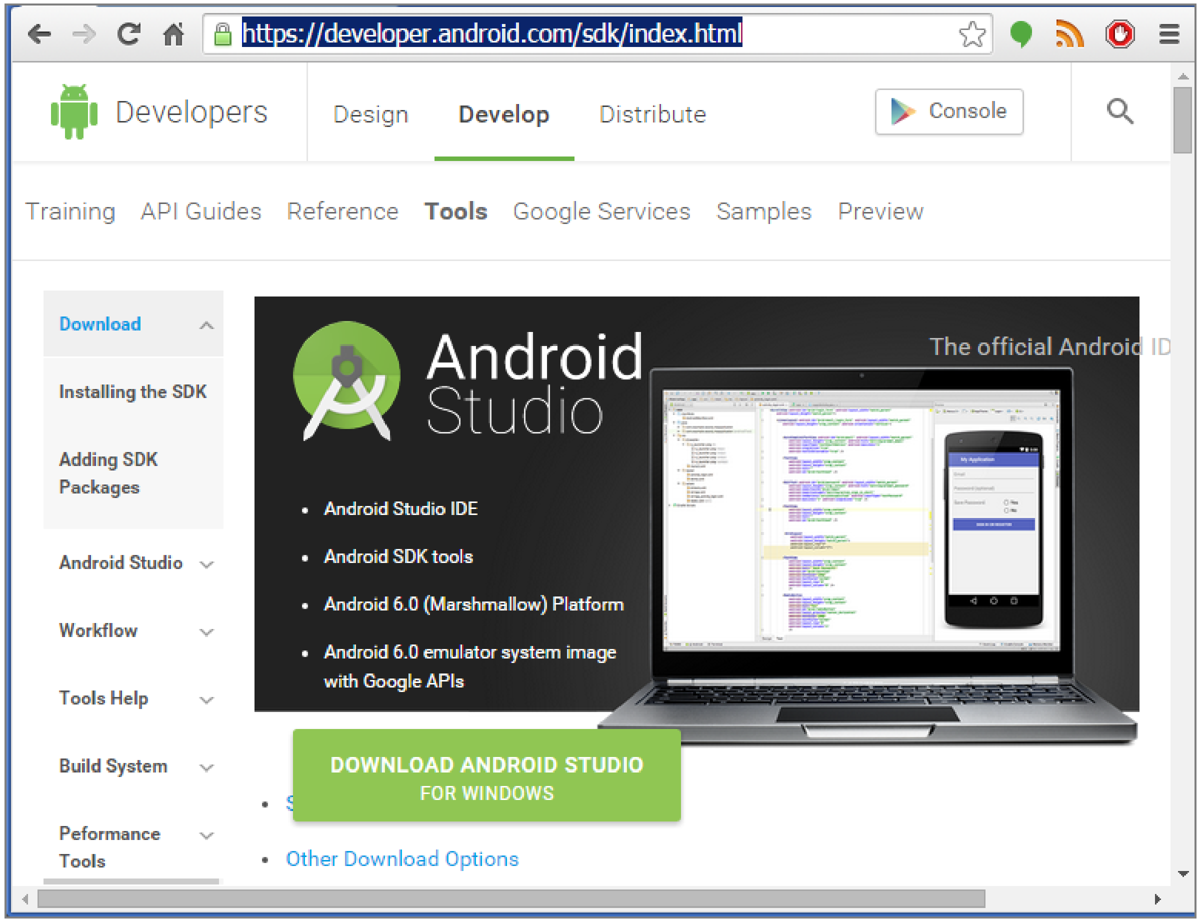
```
import android.view.inputmethod.EditorInfo;
import android.widget.Button
import android.widget.EditTe

import java.text.DecimalForm

public class MainActivity ex
    //USA money format (12 d
    DecimalFormat usaDf = ne

    // naive currency conver
    private final double EUR
    private final char EUROS
    private final double COL
    private final char COLON
```

```
09-03 12:03:00.030    1392-1392/system_process I/ActivityManage
09-03 12:03:00.040    1392-1392/system_process I/ActivityManage
```

Setting up Android Studio

Downloading Android Studio IDE

Download IDE from: https://developer.android.com/sdk/index.html
Run the executable, you are (*almost*) done!



- Android Studio IDE
- Android SDK tools
- Android 6.0 (Marshmallow) Platform
- Android 6.0 emulator system image with Google APIs

Setting up Eclipse + ADT + SDK

ECLIPSE SETUP
Prepare your computer – Install SDK: Windows, Mac, Linux

We assume you have already installed the most recent Java JDK and Eclipse IDE in your computer

- Java JDK is available at:
  http://www.oracle.com/technetwork/java/javase/downloads/index.html

- Eclipse IDE for Java EE Developers is available at:
  http://www.eclipse.org/downloads/

The next instructions are given to:

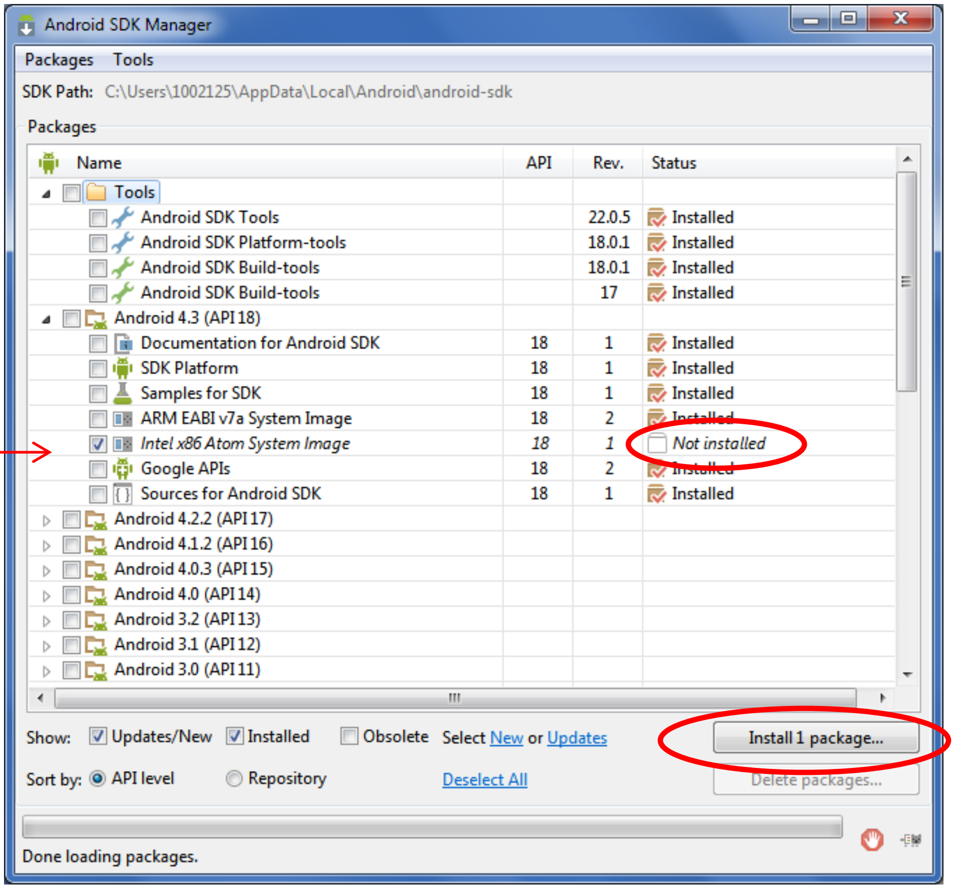
(a) User wanting to add a newer SDK to their existing collection,
(b) First time users (who may or not be Eclipse users).

Setting up Eclipse + ADT + SDK

(a) Users Wanting to Update an Older Android Workbench

If you are currently using the Android SDK, you just need to *update* to the latest tools or platform using the already installed *Android SDK Manager.*

1. Click on the *SDK Manager* icon.
2. You will see a form similar to the one on the right.
3. Select the SDK packages and independent components you want to install (click 'Install' button and wait until they are setup in your machine…)



Android SDK Manager

SDK Path: C:\Users\1002125\AppData\Local\Android\android-sdk

Name	API	Rev.	Status
☐ Tools			
☐ Android SDK Tools		22.0.5	Installed
☐ Android SDK Platform-tools		18.0.1	Installed
☐ Android SDK Build-tools		18.0.1	Installed
☐ Android SDK Build-tools		17	Installed
☐ Android 4.3 (API 18)			
☐ Documentation for Android SDK	18	1	Installed
☐ SDK Platform	18	1	Installed
☐ Samples for SDK	18	1	Installed
☐ ARM EABI v7a System Image	18	2	Installed
☑ *Intel x86 Atom System Image*	*18*	*1*	*Not installed*
☐ Google APIs	18	2	Installed
☐ Sources for Android SDK	18	1	Installed
☐ Android 4.2.2 (API 17)			
☐ Android 4.1.2 (API 16)			
☐ Android 4.0.3 (API 15)			
☐ Android 4.0 (API 14)			
☐ Android 3.2 (API 13)			
☐ Android 3.1 (API 12)			
☐ Android 3.0 (API 11)			

Show: ☑ Updates/New ☑ Installed ☐ Obsolete Select New or Updates

Sort by: ● API level ○ Repository Deselect All

Done loading packages.

Setting up Eclipse + ADT + SDK

(b) First Time Android Users who have Eclipse already installed

1. Obtain the appropriate (Windows, Max, Linux) **Stand-alone SDK Tools for Windows** from the page http://developer.android.com/sdk/index.html
   Execute the program, *remember the folder's name and location* in which the SDK is stored, you will have to supply this path to Eclipse.

2. Install the **ADT Plugin** for Eclipse (it must be already available in your machine)
   1. Start Eclipse, then select **Help** > **Install New Software....**
   2. Click **Add** button (top-right corner)
   3. In the next dialog-box enter "**ADT Plugin**" for the *Name* and the following URL for the *Location*: **https://dl-ssl.google.com/android/eclipse/**
   4. Click **OK**
   5. Select the checkbox next to Developer Tools and click **Next** > **Next**
   6. Accept the license agreements, then click **Finish**.
   7. After the installation end you need to restart Eclipse.

3. Add **Android platforms** and other components to your SDK (see previous option (a))

Setting up Eclipse + ADT + SDK

Configure the ADT Plugin

4. The next step is to inform your Eclipse+ADT workbench of the **android-sdk** directory's location (this is the path you saved on Step1)

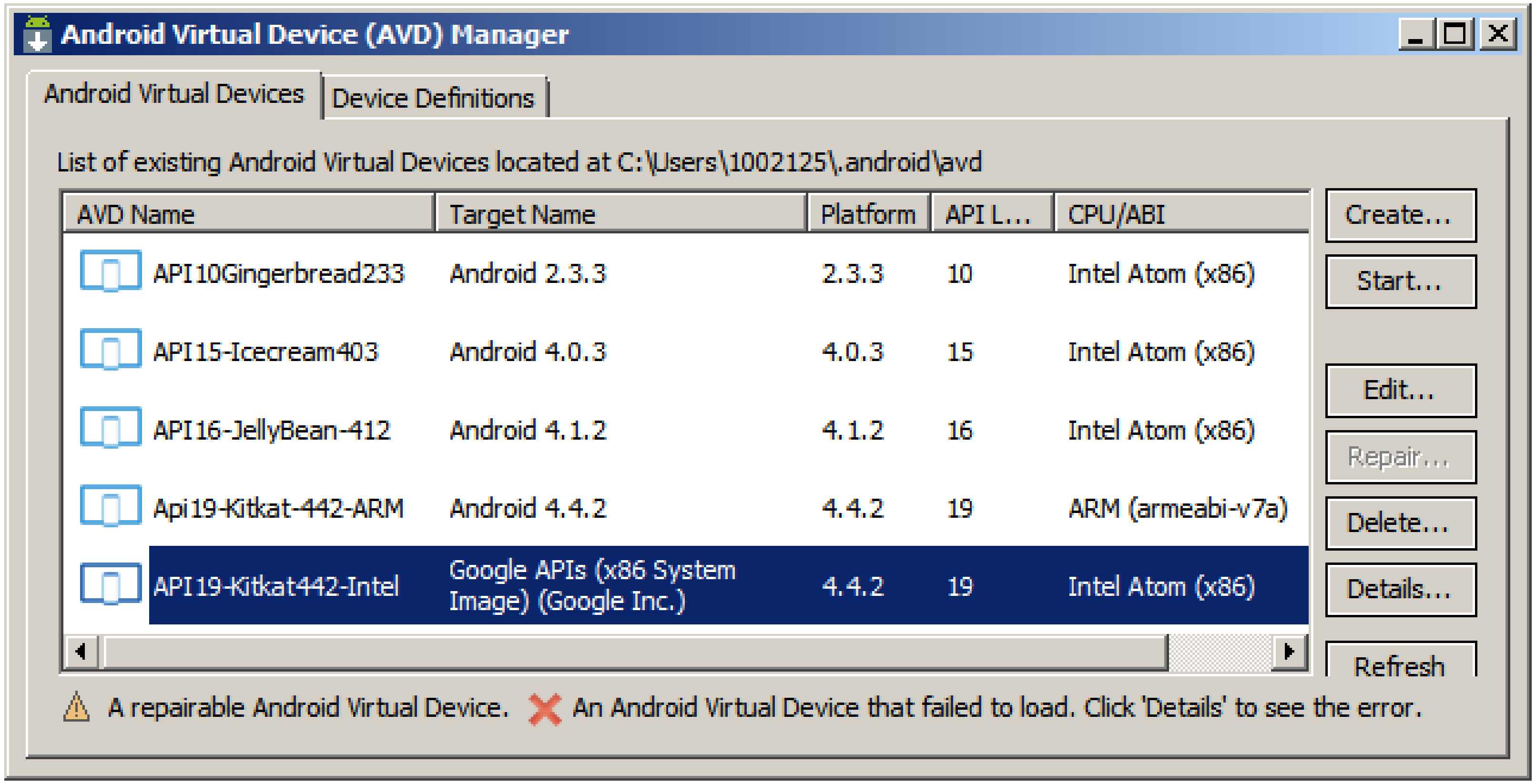
1. In Eclipse, select **Window** > **Preferences...** to open the Preferences panel (Mac OS X: **Eclipse** > **Preferences**).
2. Select **Android** from the left panel.
3. To set the box *SDK Location* that appears in the main panel, click **Browse...** and locate your downloaded SDK directory (usually C:\Program Files (x86)\Android\android-sdk)
4. Click **Apply**, then **OK**.

Done!

Setting up Eclipse + ADT + SDK

Working with Virtual Devices (AVDs)

Ideally you should test your applications on a device (a physical phone or tablet). However, the SDK allows you to create realistic virtual devices on which your applications could be executed/debugged before they are deployed on actual hardware..



List of existing Android Virtual Devices located at C:\Users\1002125\.android\avd

AVD Name	Target Name	Platform	API L...	CPU/ABI
API10Gingerbread233	Android 2.3.3	2.3.3	10	Intel Atom (x86)
API15-Icecream403	Android 4.0.3	4.0.3	15	Intel Atom (x86)
API16-JellyBean-412	Android 4.1.2	4.1.2	16	Intel Atom (x86)
Api19-Kitkat-442-ARM	Android 4.4.2	4.4.2	19	ARM (armeabi-v7a)
API19-Kitkat442-Intel	Google APIs (x86 System Image) (Google Inc.)	4.4.2	19	Intel Atom (x86)

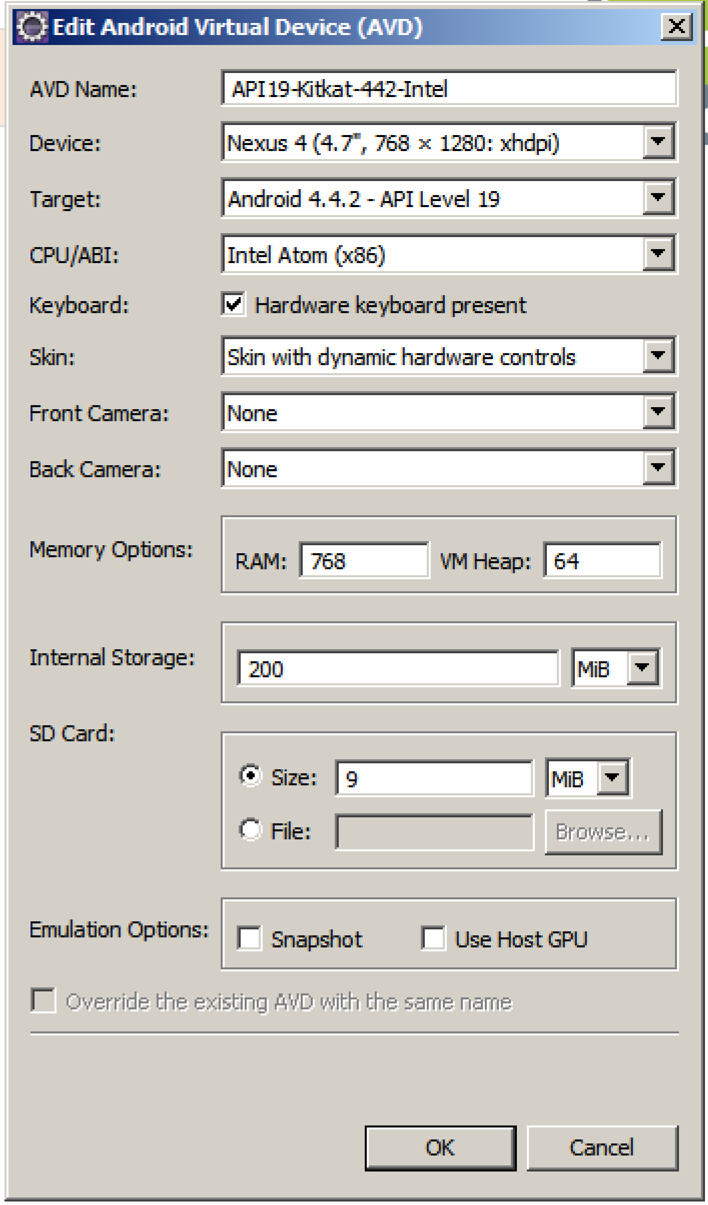
⚠ A repairable Android Virtual Device. ✗ An Android Virtual Device that failed to load. Click 'Details' to see the error.

Setting up Eclipse + ADT + SDK

Creating a Virtual Device (AVD)

An AVD allows you to simulated devices and prototype your solution on a variety of SDKs. To create a virtual unit follow the next steps:

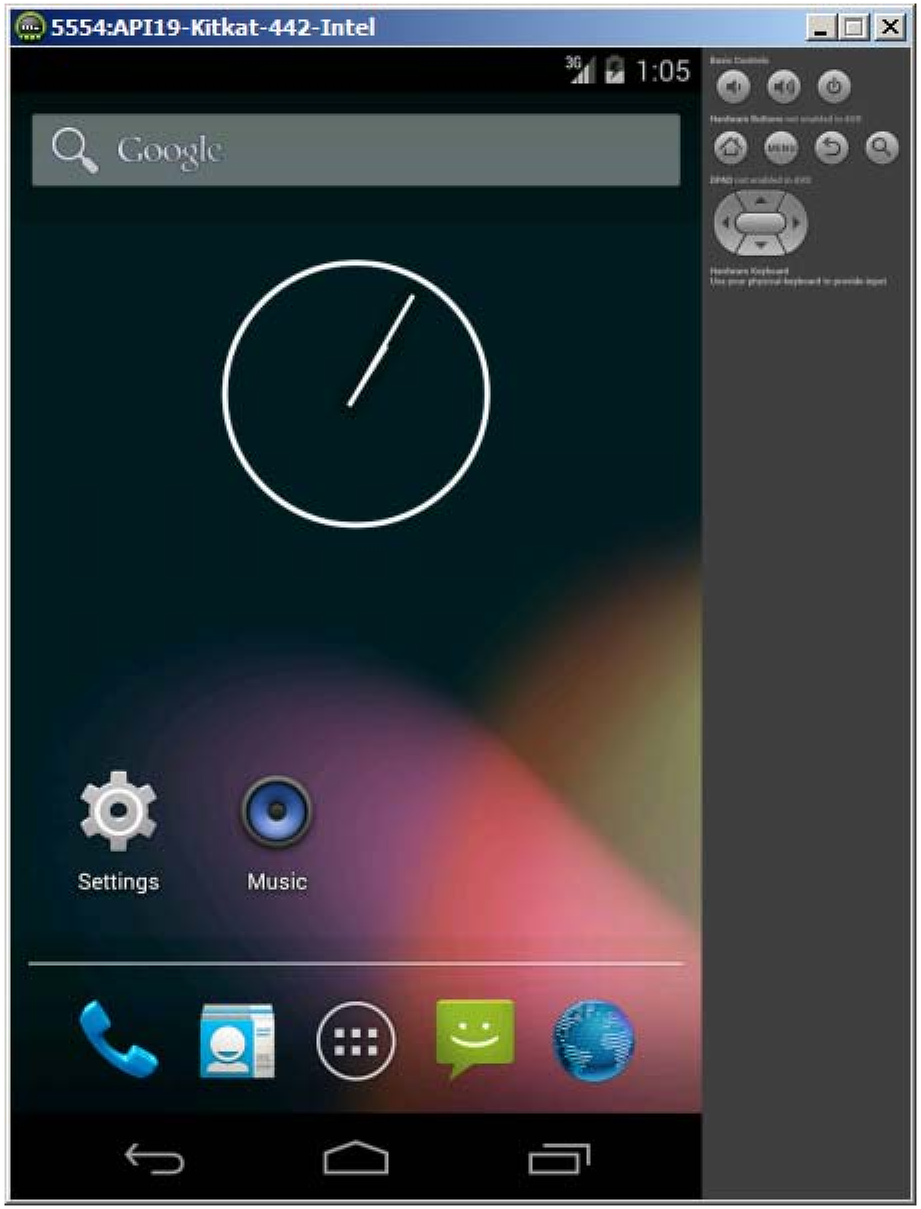
1. Click on the *AVD Manager* > Create. The **Create New AVD** wizard appears requesting your input.
2. Type the name of the emulator, enter a value such as "API19-Kitkat-442-Intel" (see figure on the right)
3. Select from the drop-downlist a Device (Nexus 4…) and CPU/ABI such as Intel Atom (x86)
4. Choose a target from the already installed SDKs (eg. "Android 4.4.2 - API Level19").
5. Tick the *Keyboard* box to enable your PC's keyboard.
6. Choose a skin of your preference (…dynamic hard …)
7. Set memory RAM to no more than 768 MB
8. Indicate how much internal storage the simulator will use (200MB).
9. Add a small SD card (9MB)
9. Click **OK** to create the **AVD**.


Edit Android Virtual Device (AVD)

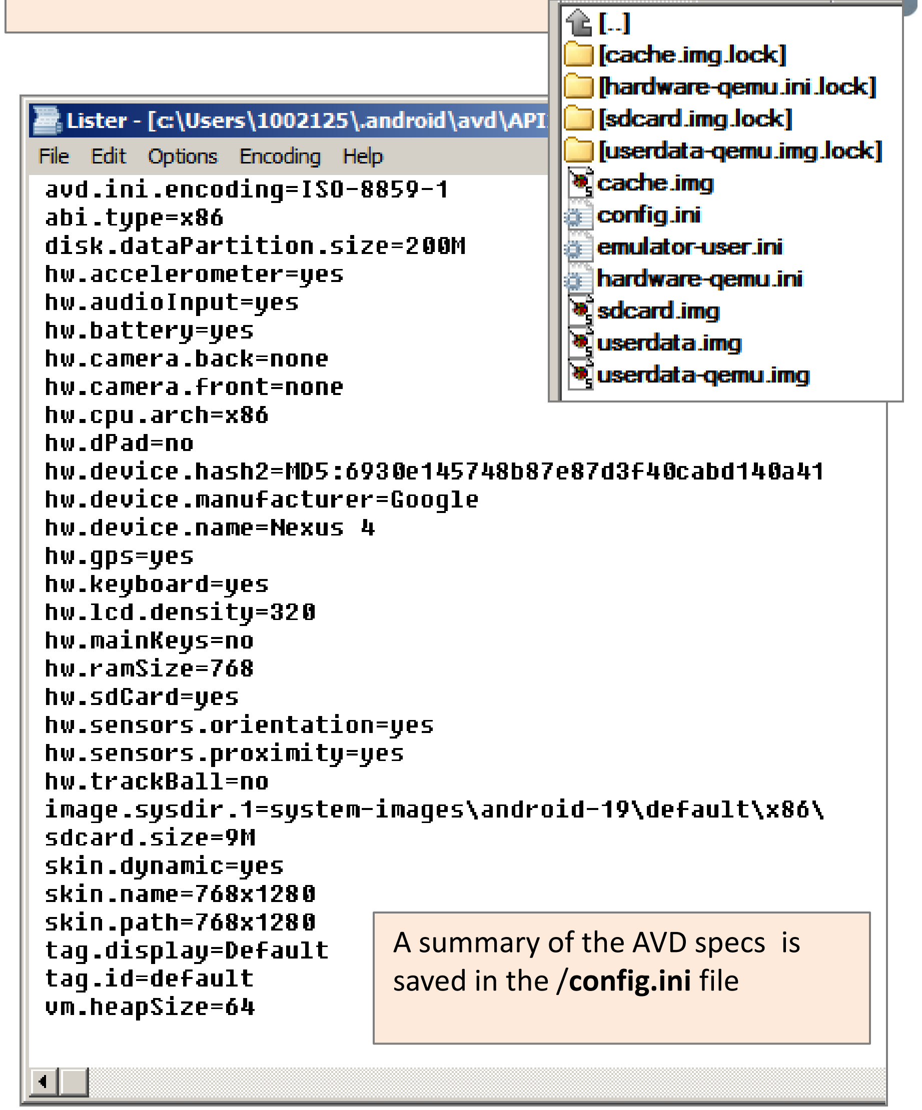
AVD Name:	API19-Kitkat-442-Intel
Device:	Nexus 4 (4.7", 768 × 1280: xhdpi)
Target:	Android 4.4.2 - API Level 19
CPU/ABI:	Intel Atom (x86)
Keyboard:	☑ Hardware keyboard present
Skin:	Skin with dynamic hardware controls
Front Camera:	None
Back Camera:	None
Memory Options:	RAM: 768 VM Heap: 64
Internal Storage:	200 MiB
SD Card:	● Size: 9 MiB; ○ File:
Emulation Options:	☐ Snapshot ☐ Use Host GPU

☐ Override the existing AVD with the same name

Setting up Eclipse + ADT + SDK



AVDs are saved in the folder:
c:\Users\yourName\.android\avd\API19-Kitkat-442-Intel.avd


Lister - [c:\Users\1002125\.android\avd\API

File Edit Options Encoding Help

```
avd.ini.encoding=ISO-8859-1
abi.type=x86
disk.dataPartition.size=200M
hw.accelerometer=yes
hw.audioInput=yes
hw.battery=yes
hw.camera.back=none
hw.camera.front=none
hw.cpu.arch=x86
hw.dPad=no
hw.device.hash2=MD5:6930e145748b87e87d3f40cabd140a41
hw.device.manufacturer=Google
hw.device.name=Nexus 4
hw.gps=yes
hw.keyboard=yes
hw.lcd.density=320
hw.mainKeys=no
hw.ramSize=768
hw.sdCard=yes
hw.sensors.orientation=yes
hw.sensors.proximity=yes
hw.trackBall=no
image.sysdir.1=system-images\android-19\default\x86\
sdcard.size=9M
skin.dynamic=yes
skin.name=768x1280
skin.path=768x1280
tag.display=Default
tag.id=default
vm.heapSize=64
```

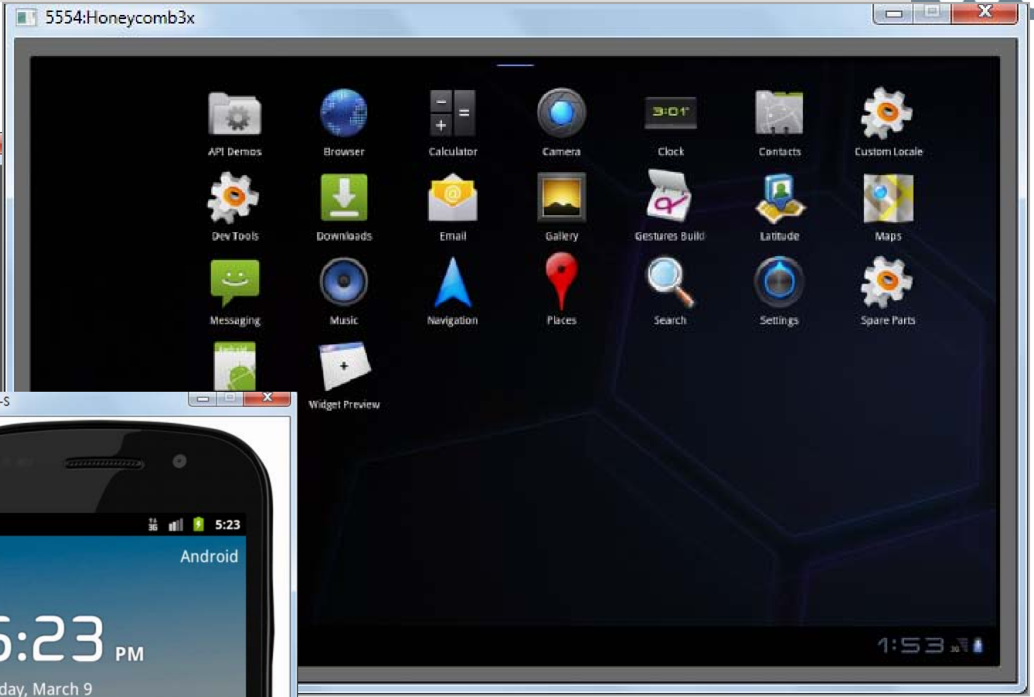
```
[..]
[cache.img.lock]
[hardware-qemu.ini.lock]
[sdcard.img.lock]
[userdata-qemu.img.lock]
cache.img
config.ini
emulator-user.ini
hardware-qemu.ini
sdcard.img
userdata.img
userdata-qemu.img
```

A summary of the AVD specs is saved in the /**config.ini** file

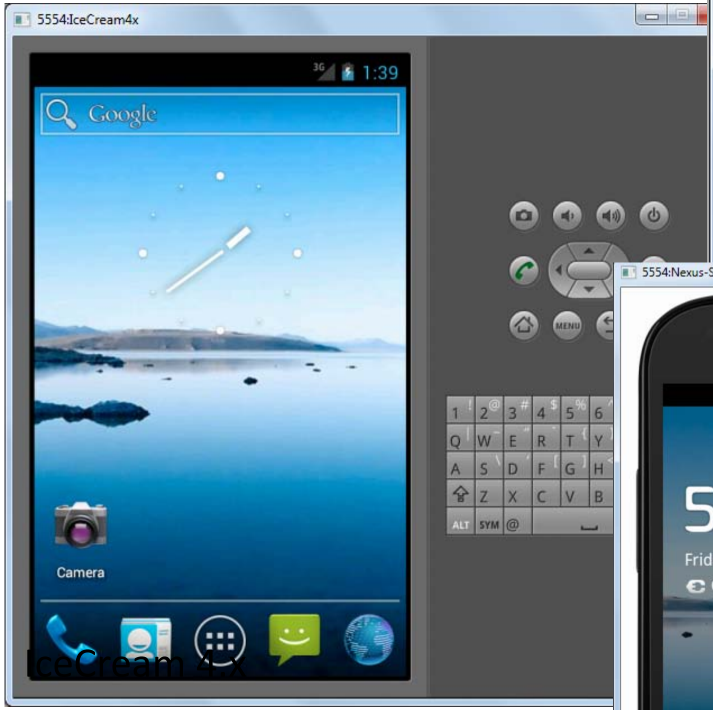
Setting up Eclipse + ADT + SDK

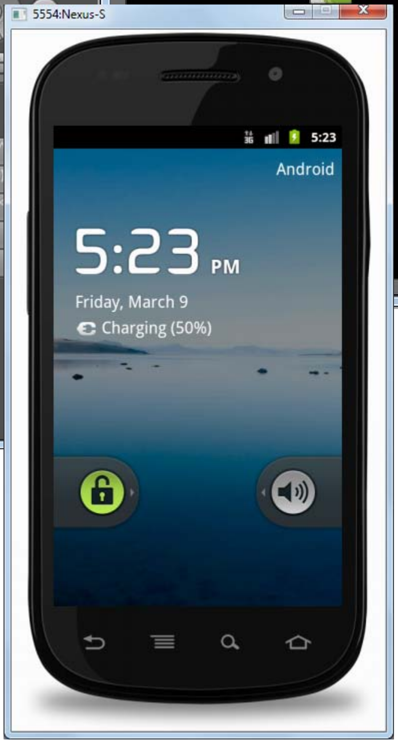
Creating a Virtual Device (AVD)

Some examples:



Tablet showing **Honeycomb 3.x**





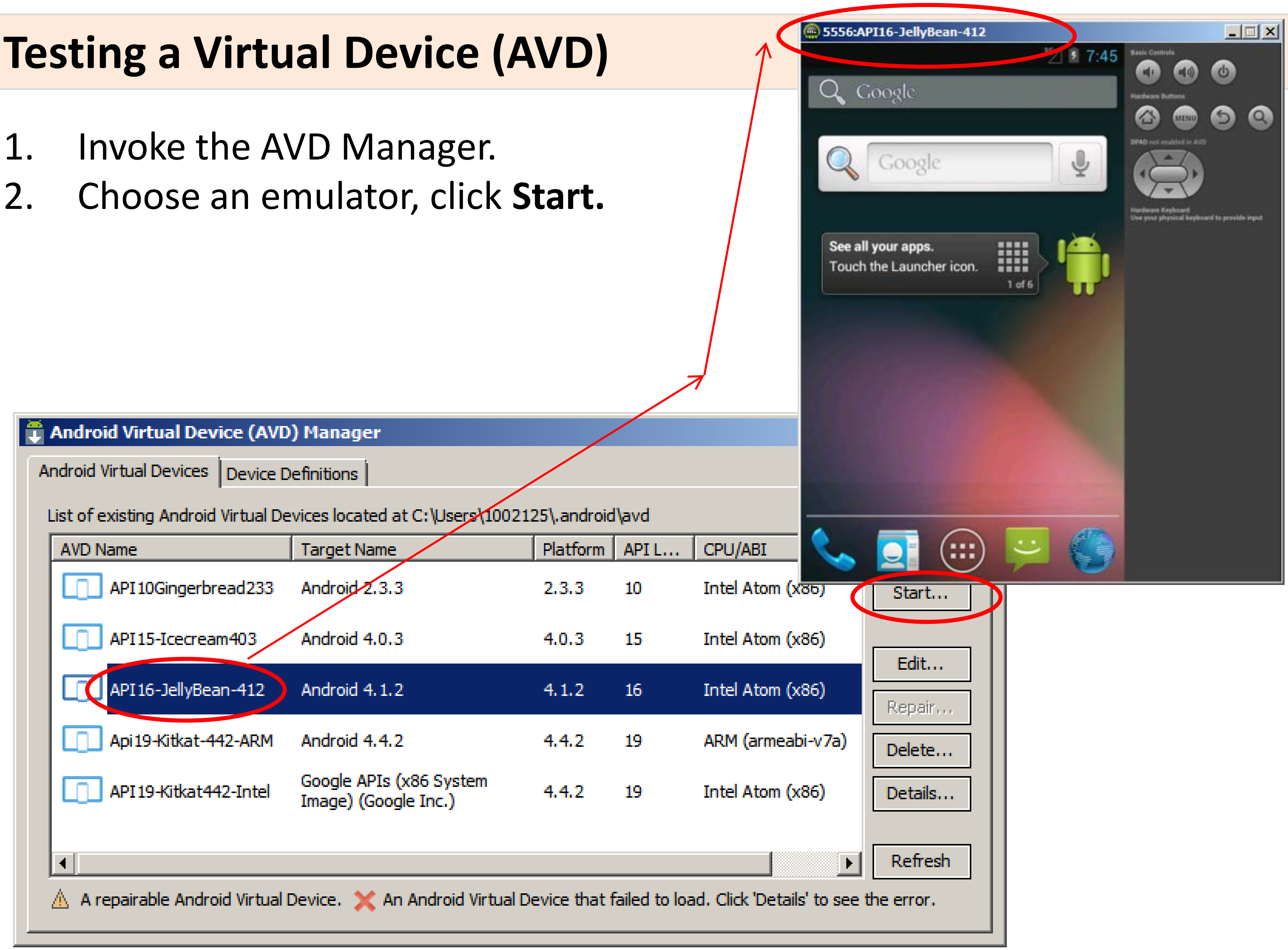
On top, a phone emulator running **IceCream 4.x** wearing a HVGA skin

Gingerbread 2.3 running on a custom skin for Nexus-S. See page: http://heikobehrens.net/2011/03/15/android-skins/

Setting up Eclipse + ADT + SDK

Testing a Virtual Device (AVD)

1. Invoke the AVD Manager.
2. Choose an emulator, click **Start.**



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API16-JellyBean-412	Android 4.1.2	4.1.2	16	Intel Atom (x86)
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API19-Kitkat442-Intel	Google APIs (x86 System Image) (Google Inc.)	4.4.2	19	Intel Atom (x86)

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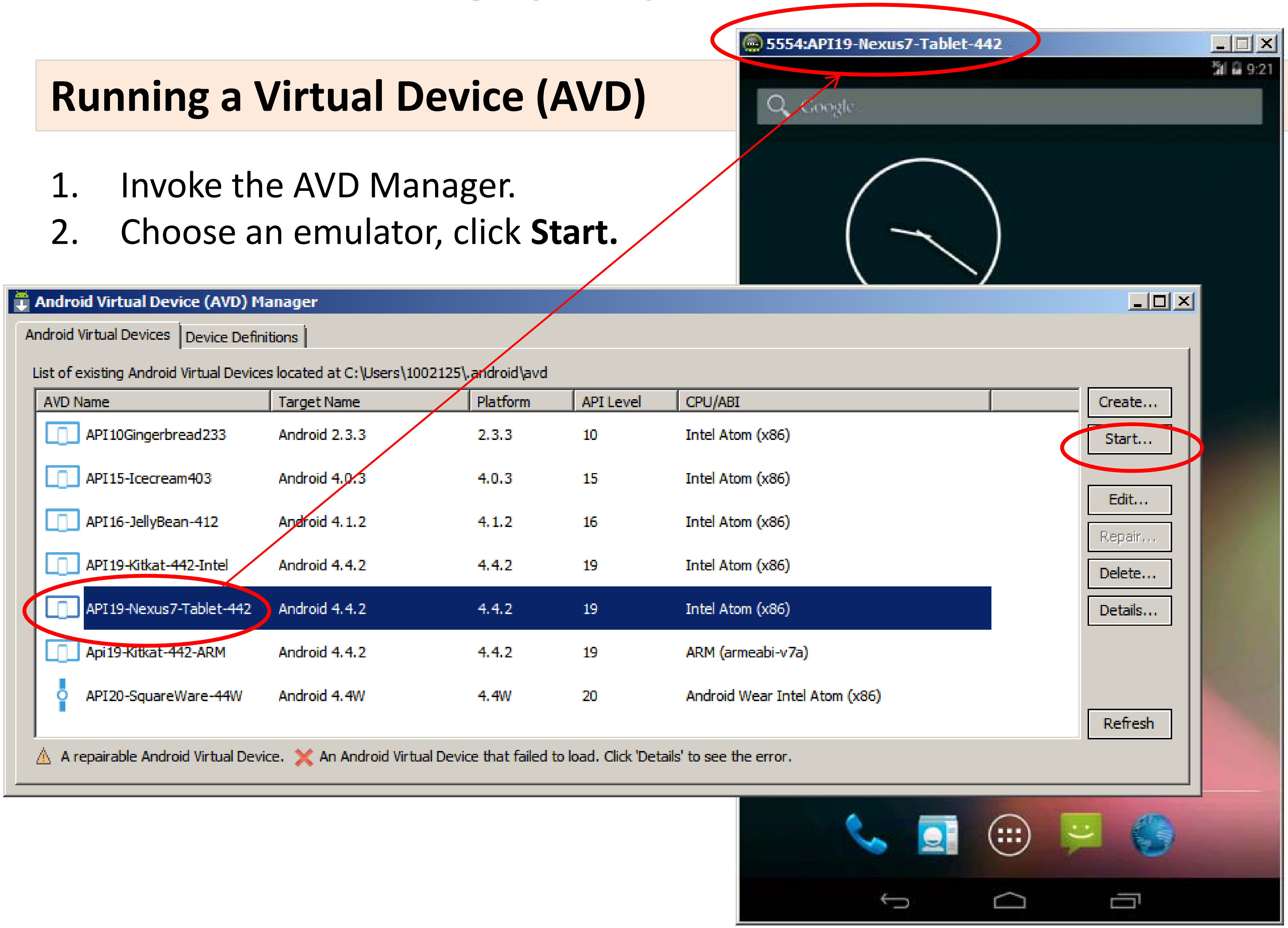
Setting up Eclipse + ADT + SDK

Running a Virtual Device (AVD)

1. Invoke the AVD Manager.
2. Choose an emulator, click **Start.**



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API15-Icecream403	Android 4.0.3	4.0.3	15	Intel Atom (x86)
API16-JellyBean-412	Android 4.1.2	4.1.2	16	Intel Atom (x86)
API19-Kitkat-442-Intel	Android 4.4.2	4.4.2	19	Intel Atom (x86)
API19-Nexus7-Tablet-442	Android 4.4.2	4.4.2	19	Intel Atom (x86)
Api19-Kitkat-442-ARM	Android 4.4.2	4.4.2	19	ARM (armeabi-v7a)
API20-SquareWare-44W	Android 4.4W	4.4W	20	Android Wear Intel Atom (x86)

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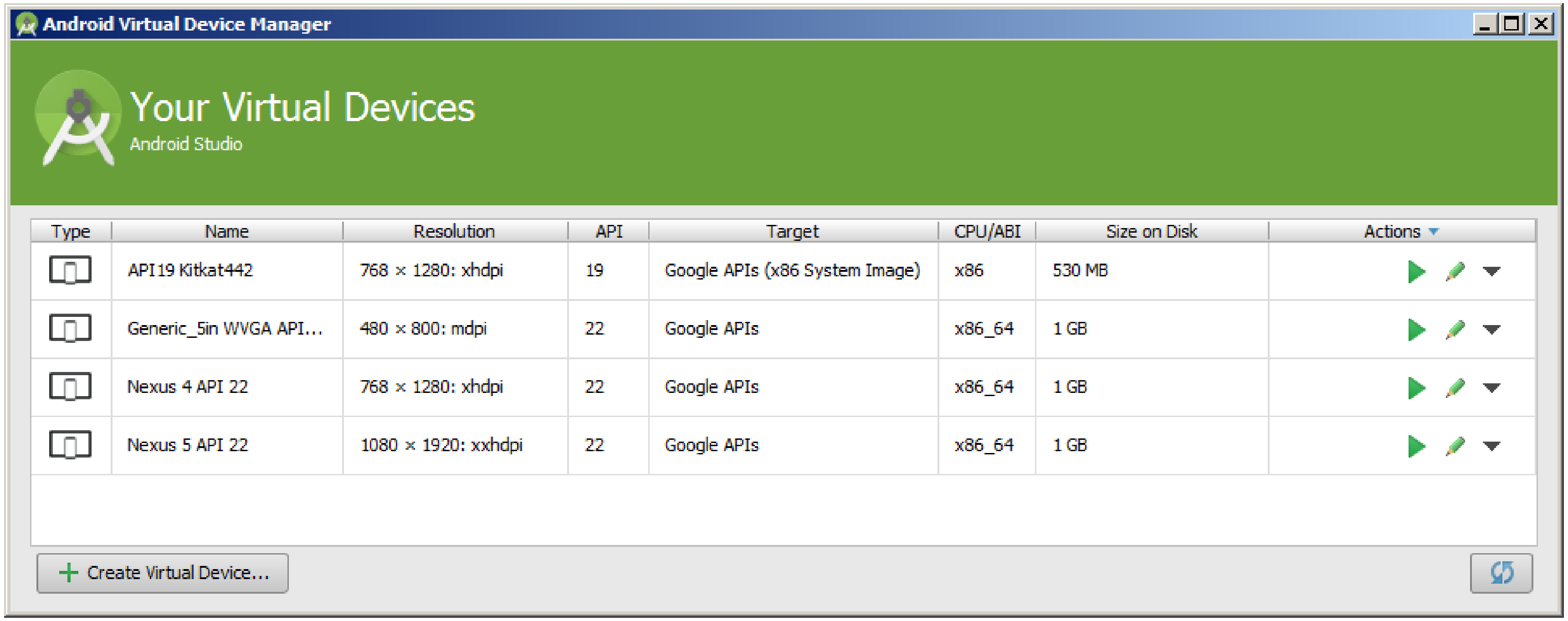
Setting up Android Studio

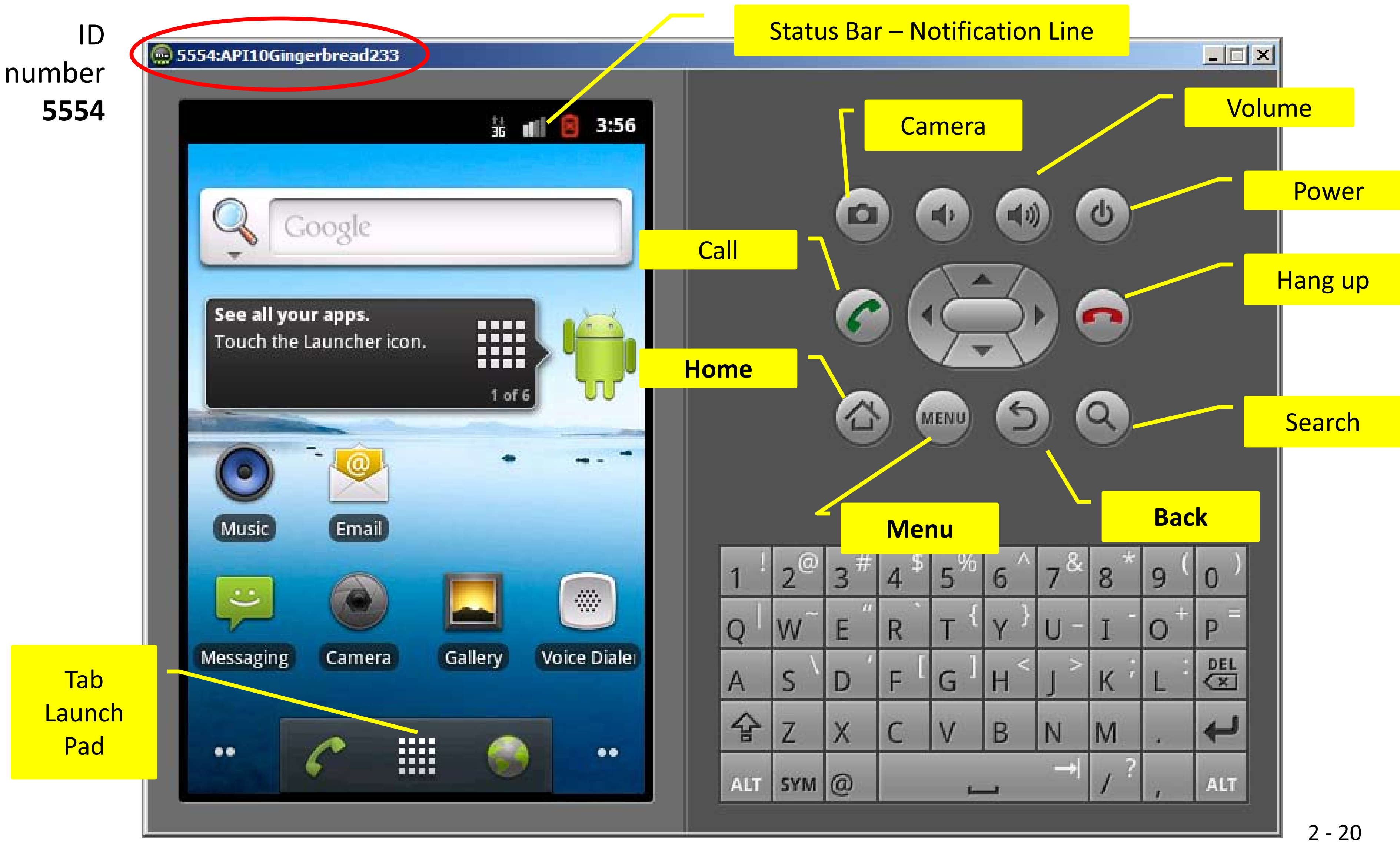
Working with Virtual Devices (AVDs)



Type	Name	Resolution	API	Target	CPU/ABI	Size on Disk	Actions
	API19 Kitkat442	768 × 1280: xhdpi	19	Google APIs (x86 System Image)	x86	530 MB	
	Generic_5in WVGA API...	480 × 800: mdpi	22	Google APIs	x86_64	1 GB	
	Nexus 4 API 22	768 × 1280: xhdpi	22	Google APIs	x86_64	1 GB	
	Nexus 5 API 22	1080 × 1920: xxhdpi	22	Google APIs	x86_64	1 GB	

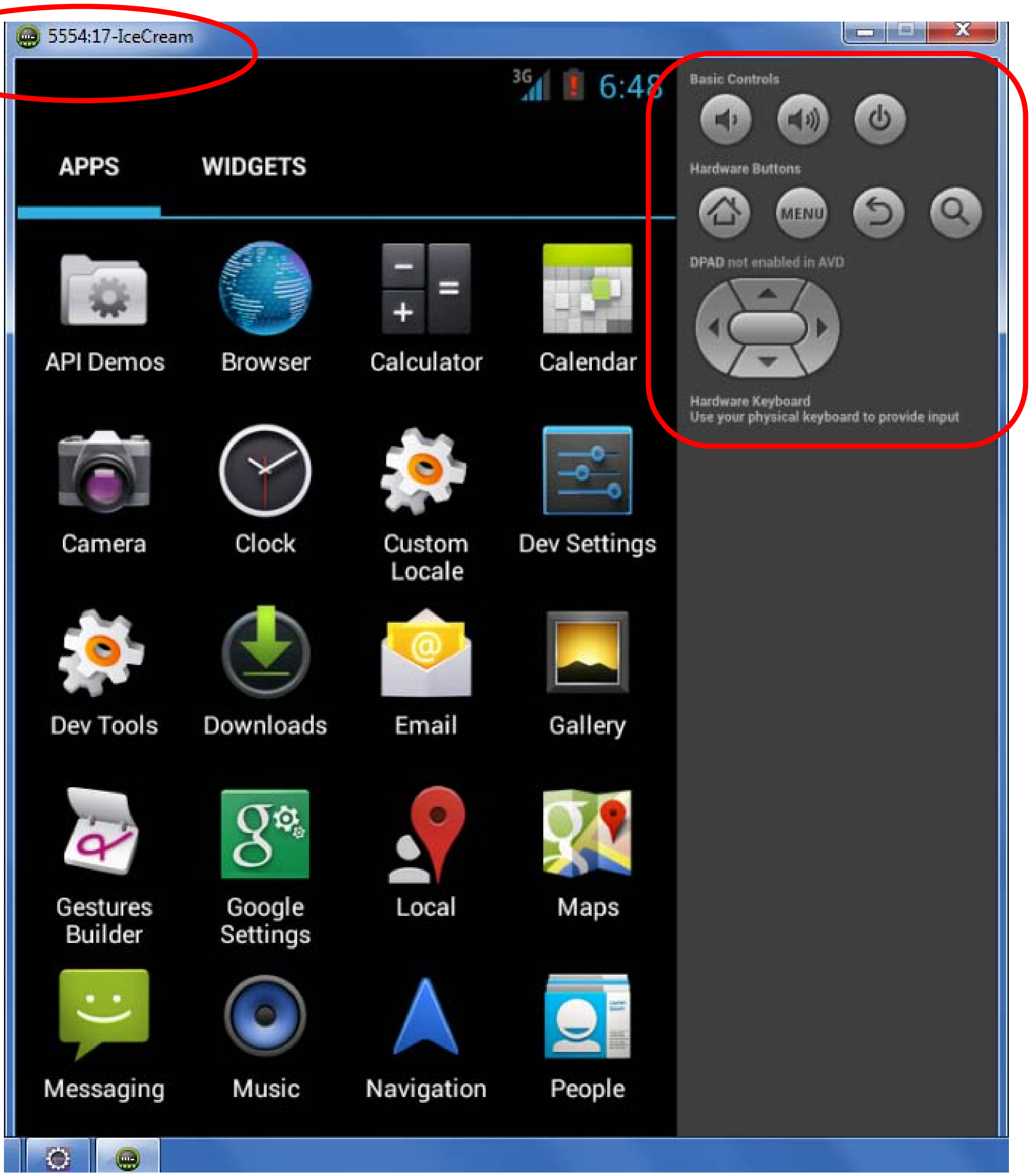
The Android Studio process to create, edit, remove, and execute AVDs is similar to the strategy already discussed for Eclipse-ADT (only cosmetic differences on the GUI)

Example of an AVD Emulator wearing a HVGA Skin



AVD – Emulator wearing: Skin with dynamic hardw. controls

Numeric ID:
5554

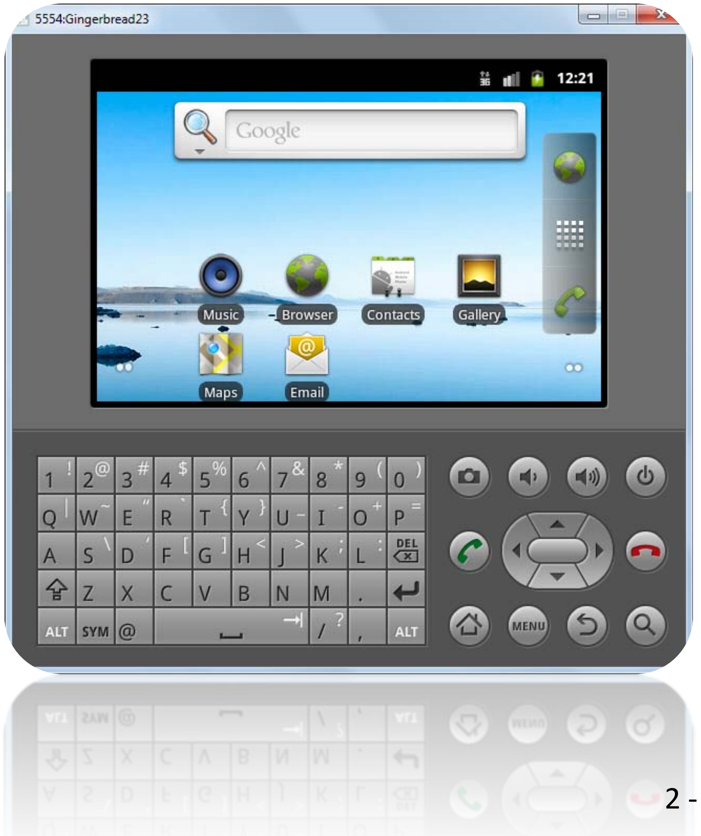


Controlling the AVD Operations

Keyboard	OS function
Escape	Back button
Home	Home button
F2, PageUp	Menu (Soft-Left) button
Shift-F2, PageDown	Start (Soft-Right) button
F3	Call/Dial button
F4	Hangup / EndCall button
F5	Search button
F7	Power button
Ctrl-F3, Ctrl-KEYPAD_5	Camera button
Ctrl-F5, KEYPAD_PLUS	Volume up button
Ctrl-F6, KEYPAD_MINUS	Volume down button
KEYPAD_5	DPad center
KEYPAD_4	DPad left
KEYPAD_6	DPad right
KEYPAD_8	DPad up
KEYPAD_2	DPad down
F8	toggle cell network on/off
F9	toggle code profiling
Alt-ENTER	toggle FullScreen mode
Ctrl-T	toggle trackball mode
Ctrl-F11, KEYPAD_7	switch to previous layout
Ctrl-F12, KEYPAD_9	switch to next layout

Controlling an Android Emulator through *your computer's* keyboard

Note: Keypad keys only work when *NumLock* is deactivated.



AVD – Emulator : Disk Images

Working with Emulator Disk Images

- *The Android simulator uses QEMU technology* [Website: www.qemu.org]
- *QEMU is an open source machine emulator which allows the operating system and programs made for one machine (e.g. an ARM CPU) run efficiently on a different machine (e.g. your Windows PC).*

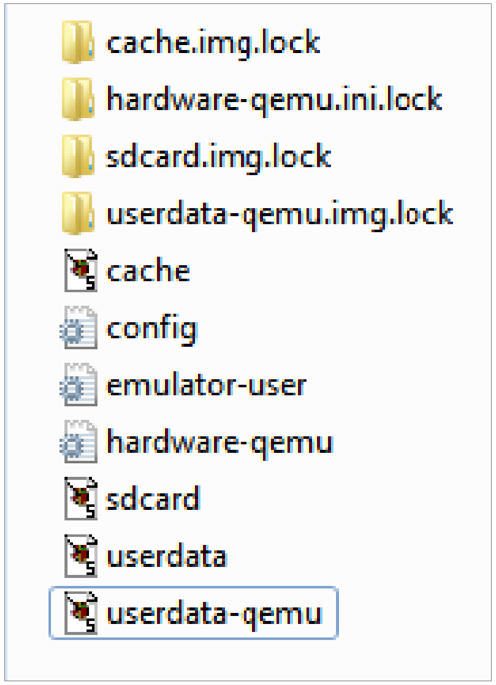
When you create a Virtual Device, the SDK Makes several **disk images** containing among others:

(1) OS kernel,
(2) the Android system,
(3) user data (userdata-qemu.img)
(4) simulated SD card (sdcard.img).

*By default, the Emulator searches for the disk images in the private storage area of the AVD in use, for instance the "*API16-JellyBean-412*" AVD is at:*
C:\Users\yourFolder\.android\avd\API16-JellyBean-412

Mac OS users should look into **~/.android/avd**

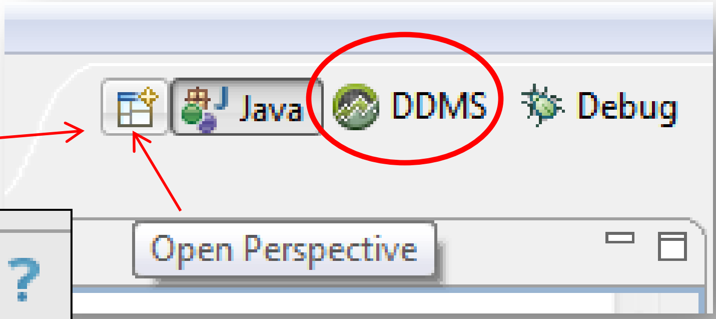
C:\Users\yourFolder\.android\avd\API16-JellyBean-412

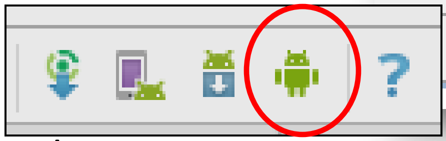


cache.img.lock
hardware-qemu.ini.lock
sdcard.img.lock
userdata-qemu.img.lock
cache
config
emulator-user
hardware-qemu
sdcard
userdata
userdata-qemu

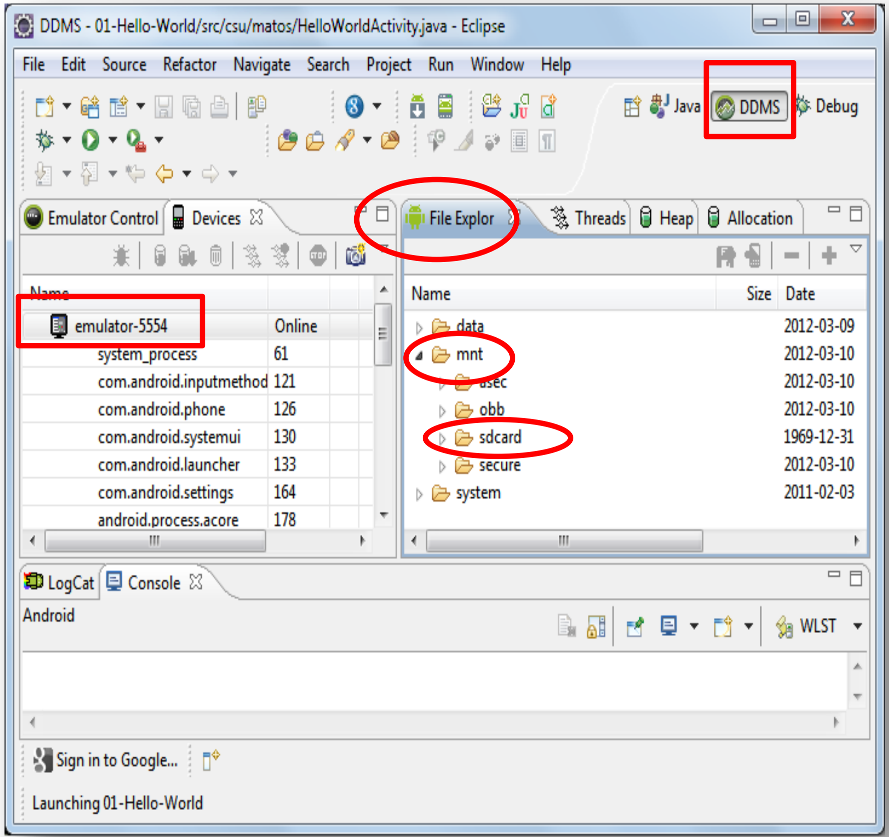
Transferring Files to/from Emulator's SD Card

Upload/download Data, Music and Picture files to the Emulator's SDcard





1. Eclipse developers needs to add the **DDMS** perspective.
2. Android-Studio uses the equivalent '**Android Device Monitor**' button.
3. Change to the DDMS perspective. Make sure your AVD has started (You will see a layout similar to the figure on the lower right side)
4. Click on the **File Explorer** tab.
5. Expand the **mnt** (mounted devices) folder.
6. Expand the **sdcard** folder
7. Open your Window's **Explorer**.
8. Choose a file stored in your PC. Transfer a copy to the emulator by dragging and dropping it on top of the **sdcard** folder.

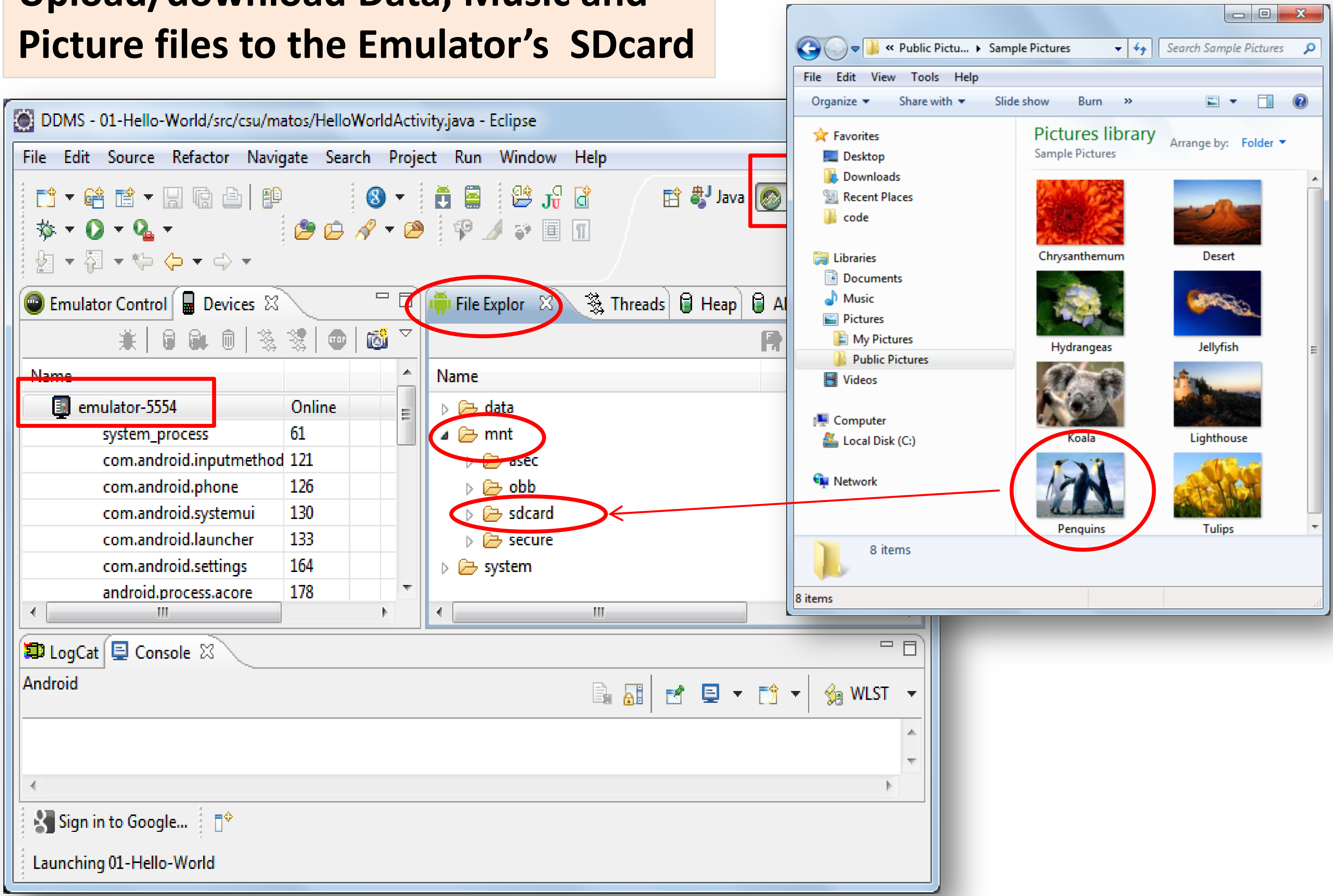


Name	Online
emulator-5554	Online
system_process	61
com.android.inputmethod	121
com.android.phone	126
com.android.systemui	130
com.android.launcher	133
com.android.settings	164
android.process.acore	178

Name	Size	Date
data		2012-03-09
mnt		2012-03-10
asec		2012-03-10
obb		2012-03-10
sdcard		1969-12-31
secure		2012-03-10
system		2011-02-03

Transferring Files to/from Emulator's SD Card

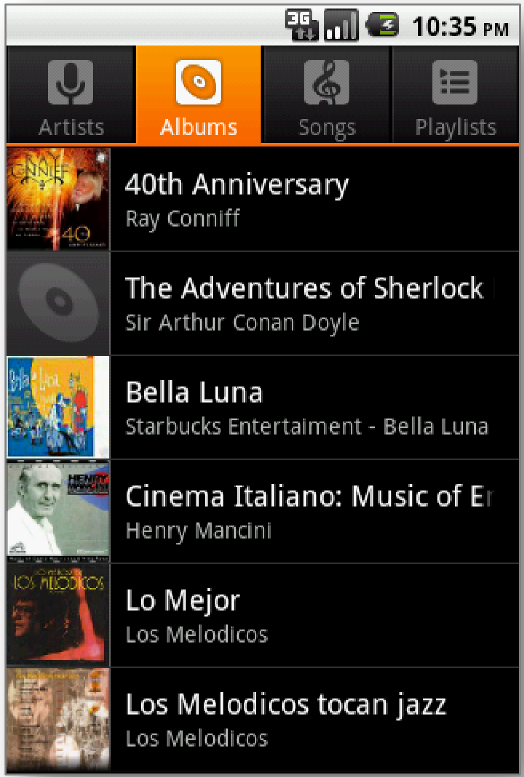
Upload/download Data, Music and Picture files to the Emulator's SDcard



Transferring Files to/from Emulator's SD Card

Upload/download Data, Music and Picture files to the Emulator's SDcard

8. Return to the emulator. This time you may use native apps such as 'Music' and 'Gallery' to see your recently uploaded multimedia files. For instance…



40th Anniversary
Ray Conniff

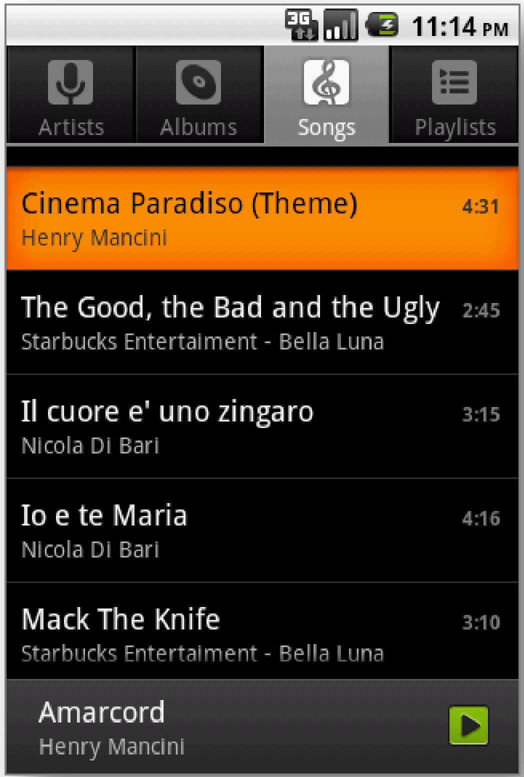
The Adventures of Sherlock
Sir Arthur Conan Doyle

Bella Luna
Starbucks Entertaiment - Bella Luna

Cinema Italiano: Music of E
Henry Mancini

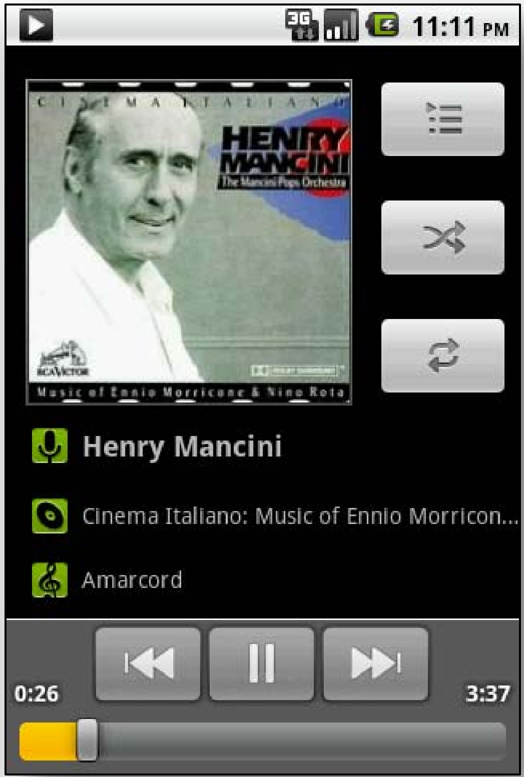
Lo Mejor
Los Melodicos

Los Melodicos tocan jazz
Los Melodicos



Cinema Paradiso (Theme) Henry Mancini	4:31
The Good, the Bad and the Ugly Starbucks Entertaiment - Bella Luna	2:45
Il cuore e' uno zingaro Nicola Di Bari	3:15
Io e te Maria Nicola Di Bari	4:16
Mack The Knife Starbucks Entertaiment - Bella Luna	3:10

Amarcord
Henry Mancini

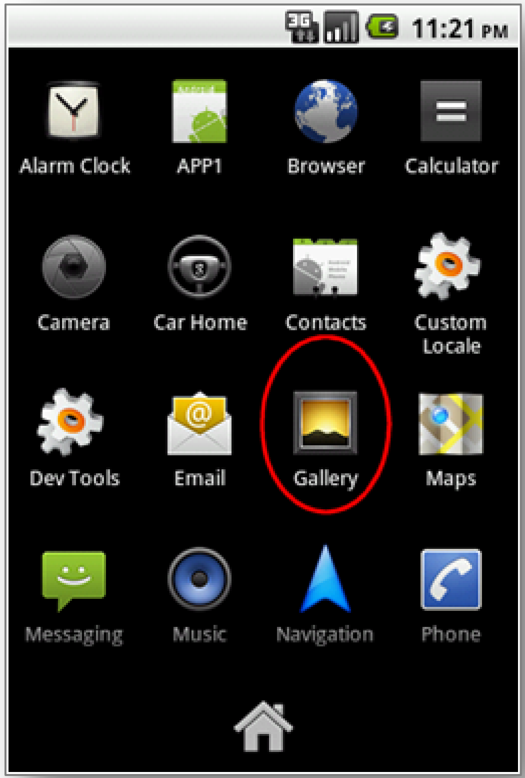


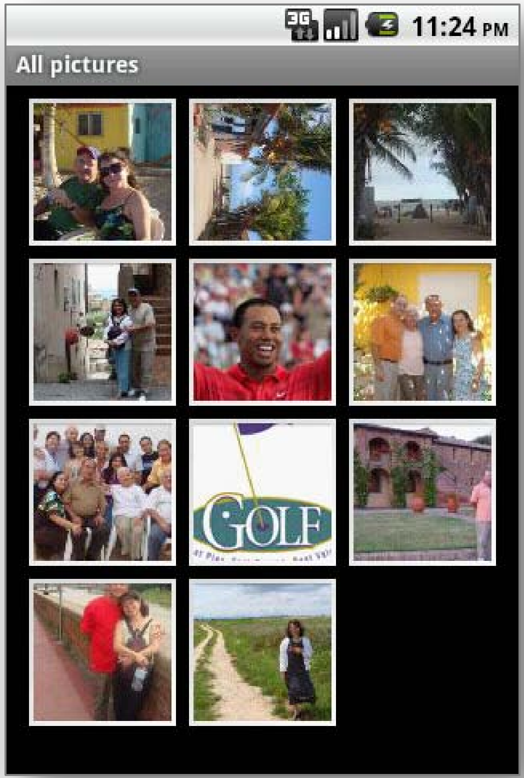
Henry Mancini
Cinema Italiano: Music of Ennio Morricon...
Amarcord

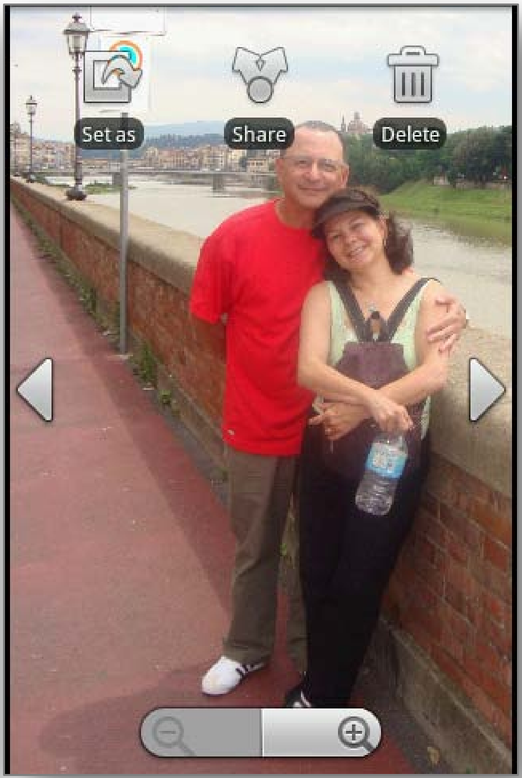
Transferring Files to/from Emulator's SD Card

Upload/download Data, Music and Picture files to the Emulator's SDcard

9. Pictures may be displayed by clicking the *Application Pad* and invoking the **Gallery** application





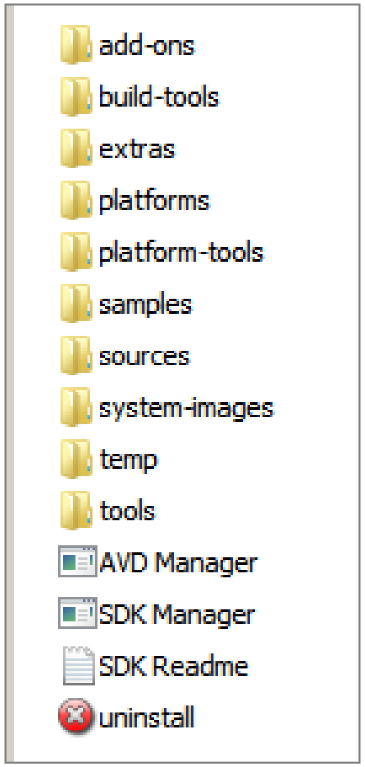


Setting up Eclipse + ADT + SDK

Locate your 'android-sdk' & AVD folder

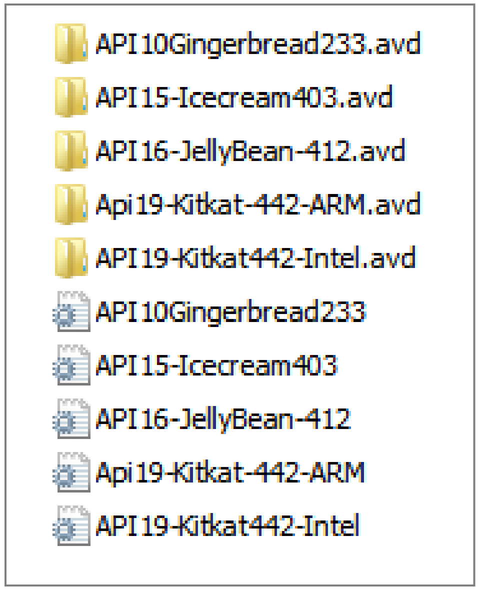
After you complete your setup look for the following two subdirectories in your PC's file system

C:\Program Files (x86)\Android\android-sdk



add-ons
build-tools
extras
platforms
platform-tools
samples
sources
system-images
temp
tools
AVD Manager
SDK Manager
SDK Readme
uninstall

C:\Users\yourWindowsUserName\.android\avd



API10Gingerbread233.avd
API15-Icecream403.avd
API16-JellyBean-412.avd
Api19-Kitkat-442-ARM.avd
API19-Kitkat442-Intel.avd
API10Gingerbread233
API15-Icecream403
API16-JellyBean-412
Api19-Kitkat-442-ARM
API19-Kitkat442-Intel

This folder contains your Android SDK, tools, and platforms

This directory holds your Virtual Devices (AVDs)

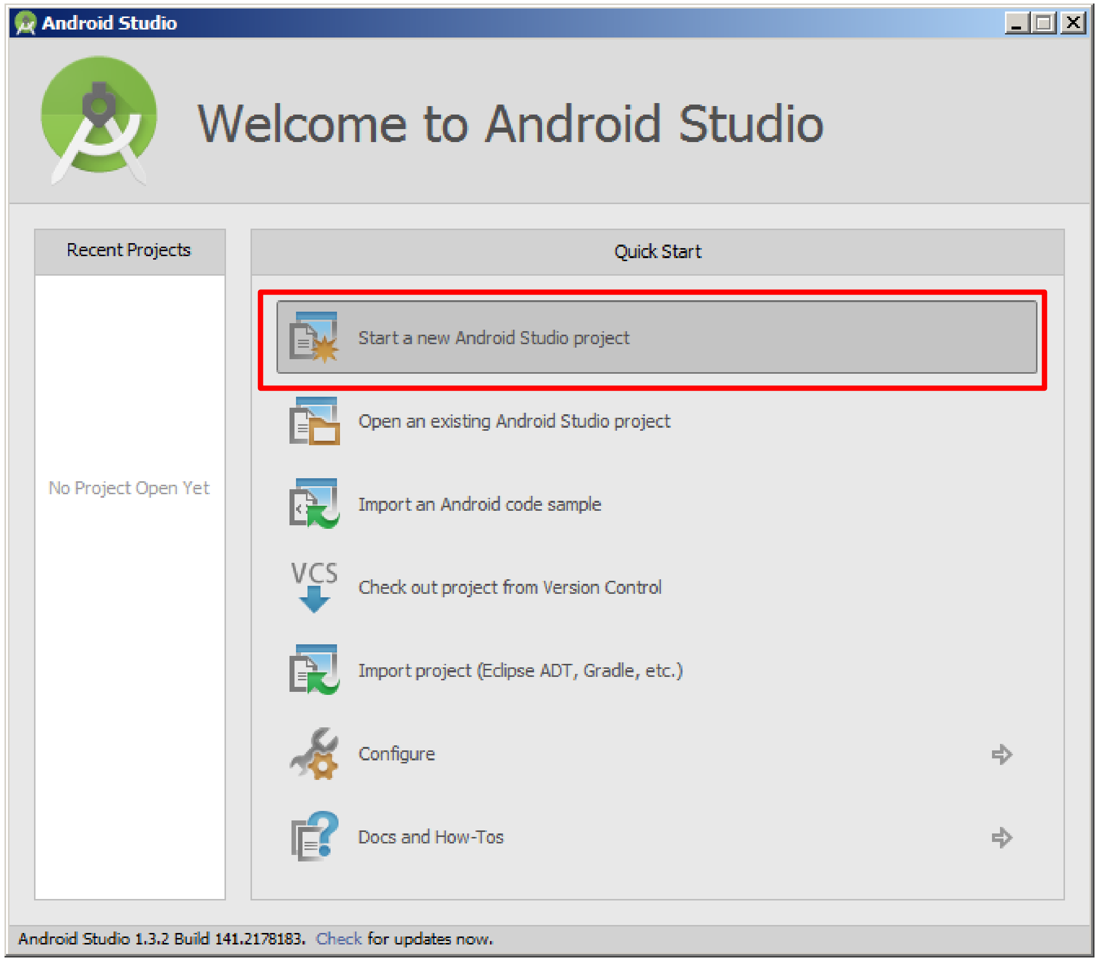
Android Studio: Hello World App

Example 2.1 : HelloWorld App

We will use **Android Studio IDE** to create a bare bone app.

Click on the entry: *'Start new Android Studio Project' .*
A wizard will guide you providing a sequence of menu driven selections.

The final product is the skeleton of your Android app.


Android Studio
Welcome to Android Studio
Recent Projects
No Project Open Yet
Quick Start
Start a new Android Studio project
Open an existing Android Studio project
Import an Android code sample
Check out project from Version Control
Import project (Eclipse ADT, Gradle, etc.)
Configure
Docs and How-Tos
Android Studio 1.3.2 Build 141.2178183. Check for updates now.

Android apps are usually made of a rich collection of various type of components including Java code, multimedia resources, XML files, etc. The *New Android Studio Project* Wizard facilitates the assembly of those parts and organizes the components in various sub-directories.

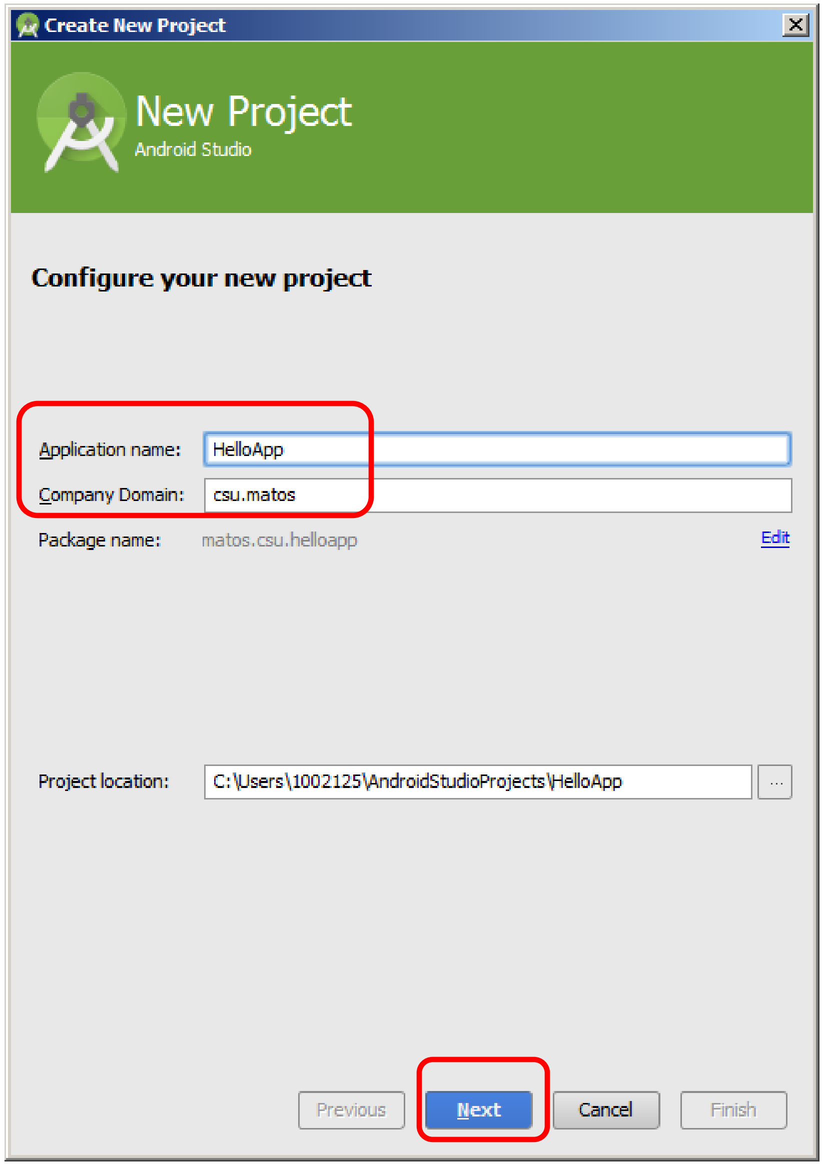
Android Studio: Hello World App

Example 2.1 : HelloWorld App

1. Enter in the *Application Name* box: **HelloApp**

2. Enter *Company Domain*: **csu.matos** (usually a dot-separated string consisting of company and programmer's name)

3. Click **Next**



Configure your new project

Application name: HelloApp
Company Domain: csu.matos
Package name: matos.csu.helloapp
Project location: C:\Users\1002125\AndroidStudioProjects\HelloApp

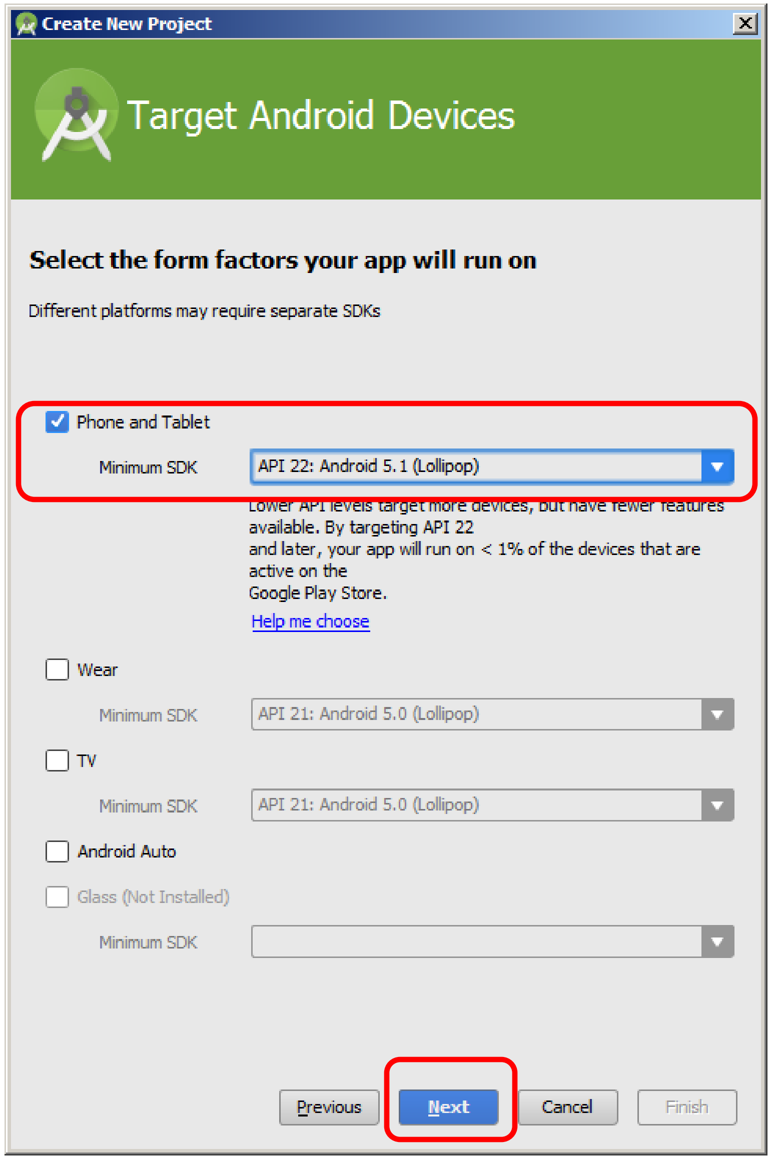
Android Studio: Hello World App

Example 2.1 : HelloWorld App

4. Select Target Android Device. In this example **Phone and Table** is already checked. Other options are: Wear, TV, Auto, Glasses.

5. Choose from drop-down list the Minimum SDK on which the app will work. In this example we have selected: **API22 Android 5.1 (Lollipod)**

6. Click **Next**



Create New Project

Target Android Devices

Select the form factors your app will run on

Different platforms may require separate SDKs

[✓] Phone and Tablet
Minimum SDK: API 22: Android 5.1 (Lollipop)

Lower API levels target more devices, but have fewer features available. By targeting API 22 and later, your app will run on < 1% 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

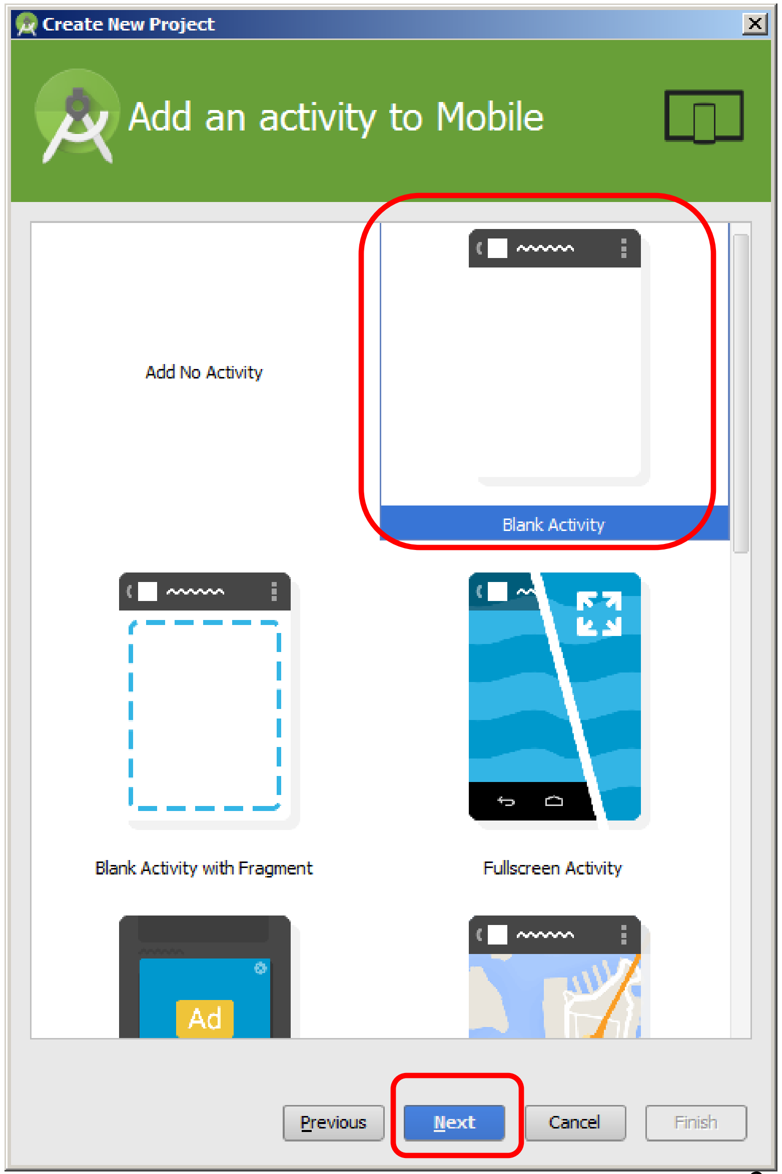
[ ] Glass (Not Installed)
Minimum SDK:

Android Studio: Hello World App

Example 2.1 : HelloWorld App

7. Select the pre-defined app template to apply. In this example we choose: **Blank Activity**

8. Click **Next**



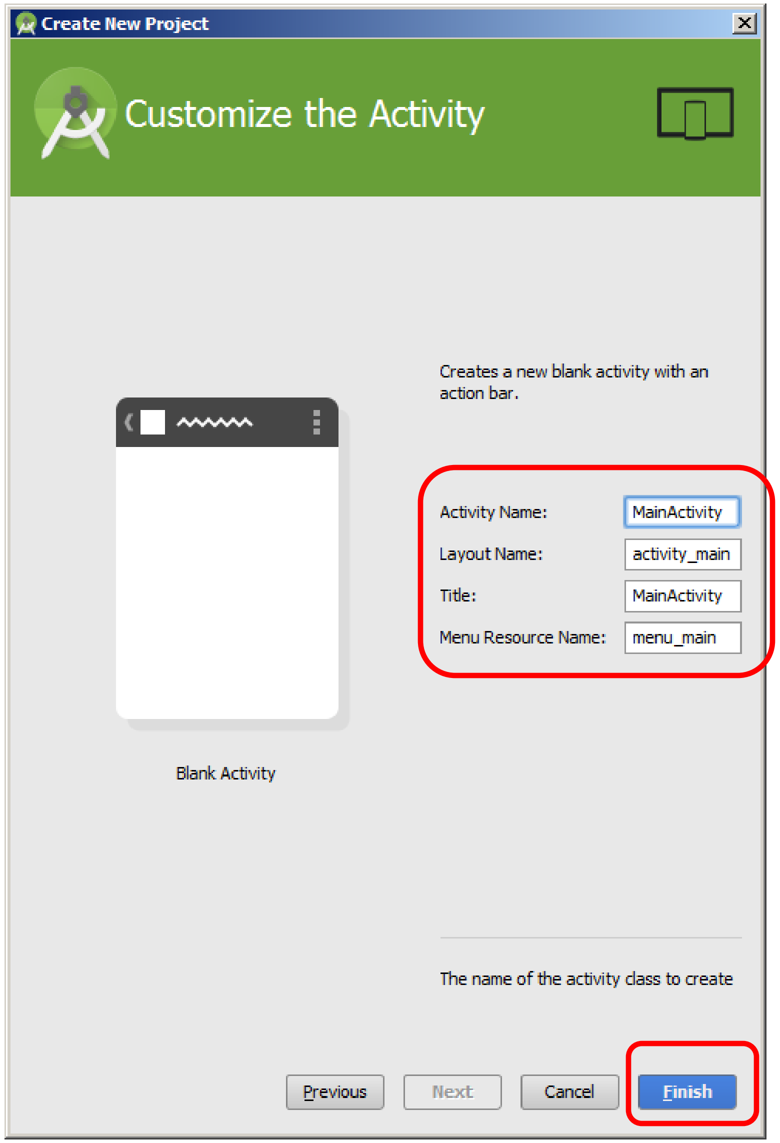
Android Studio: Hello World App

Example 2.1 : HelloWorld App

9. The wizard is ready to construct the solution. The text-boxes give you an opportunity to change any of the default names given to the main activity, the app's layout, its title, and menu. *Please do not change anything now*.

10. Click **Finish**

11. You are done! (your next step is to try the app on the emulator – explained later in this lesson)



Creates a new blank activity with an action bar.

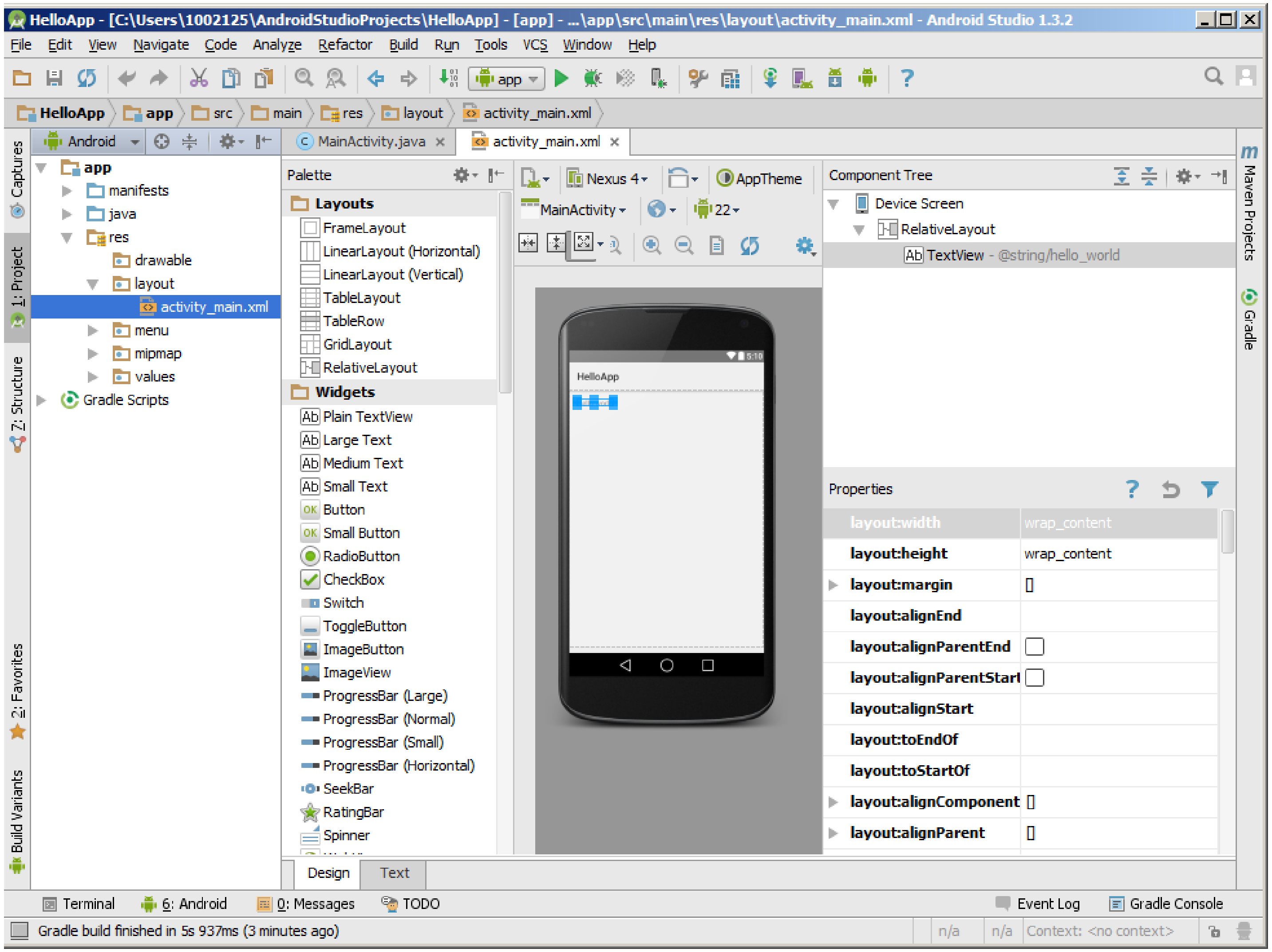
Activity Name:	MainActivity
Layout Name:	activity_main
Title:	MainActivity
Menu Resource Name:	menu_main

The name of the activity class to create

Android Studio: Hello World App

Example 2.1 : HelloWorld App

The app's GUI and the Palette (graphical toolbox) are shown. On the left pane, the Project Explorer shows the application's file structure.



layout:width	wrap_content
layout:height	wrap_content
layout:margin	[]
layout:alignEnd	
layout:alignParentEnd	☐
layout:alignParentStart	☐
layout:alignStart	
layout:toEndOf	
layout:toStartOf	
layout:alignComponent	[]
layout:alignParent	[]

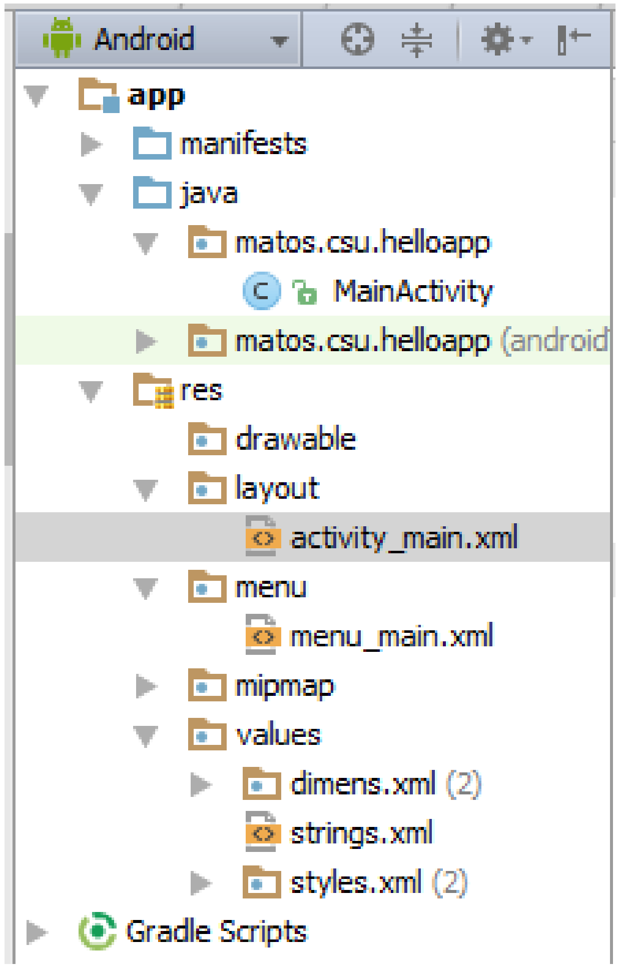
Gradle build finished in 5s 937ms (3 minutes ago)   n/a   n/a   Context: <no context>

Android Studio: Hello World App

Example 2.1 : HelloWorld App

- **Java/** Holds your Main-Activity Java code. All other Java files for your application go here.

- **res/** This folder stores application resources such as *drawable* files, UI *layout* files, *string* values, *menus*, multimedia, etc.
- **manifests** The Android Manifest for your project.



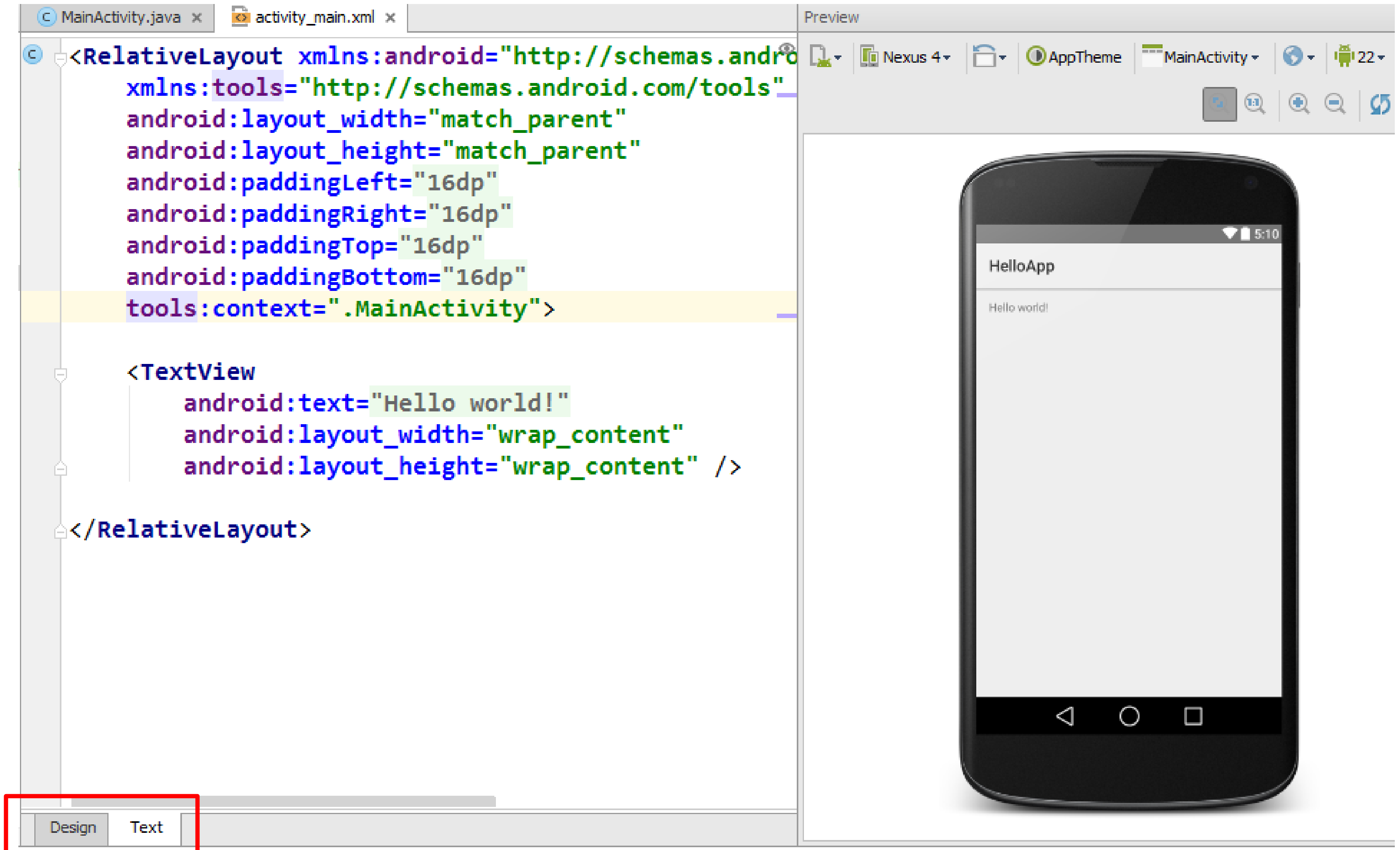
Android Studio: Hello World App

Example 2.1 : HelloWorld App – Java Code: MainActivity.java

```java
package matos.csu.helloapp;
import …

public class MainActivity extends Activity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }

    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        // Inflate the menu; this adds items to the action bar if it is present.
        getMenuInflater().inflate(R.menu.menu_main, menu);
        return true;
    }

    @Override
    public boolean onOptionsItemSelected(MenuItem item) {
        // Handle action bar item clicks here. The action bar will
        // automatically handle clicks on the Home/Up button, so long
        // as you specify a parent activity in AndroidManifest.xml.
        int id = item.getItemId();

        //noinspection SimplifiableIfStatement
        if (id == R.id.action_settings) {
            return true;
        }

        return super.onOptionsItemSelected(item);
    }
}
```

Android Studio: Hello World App

Example 2.1 : HelloWorld App - Layout: activity_main.xml



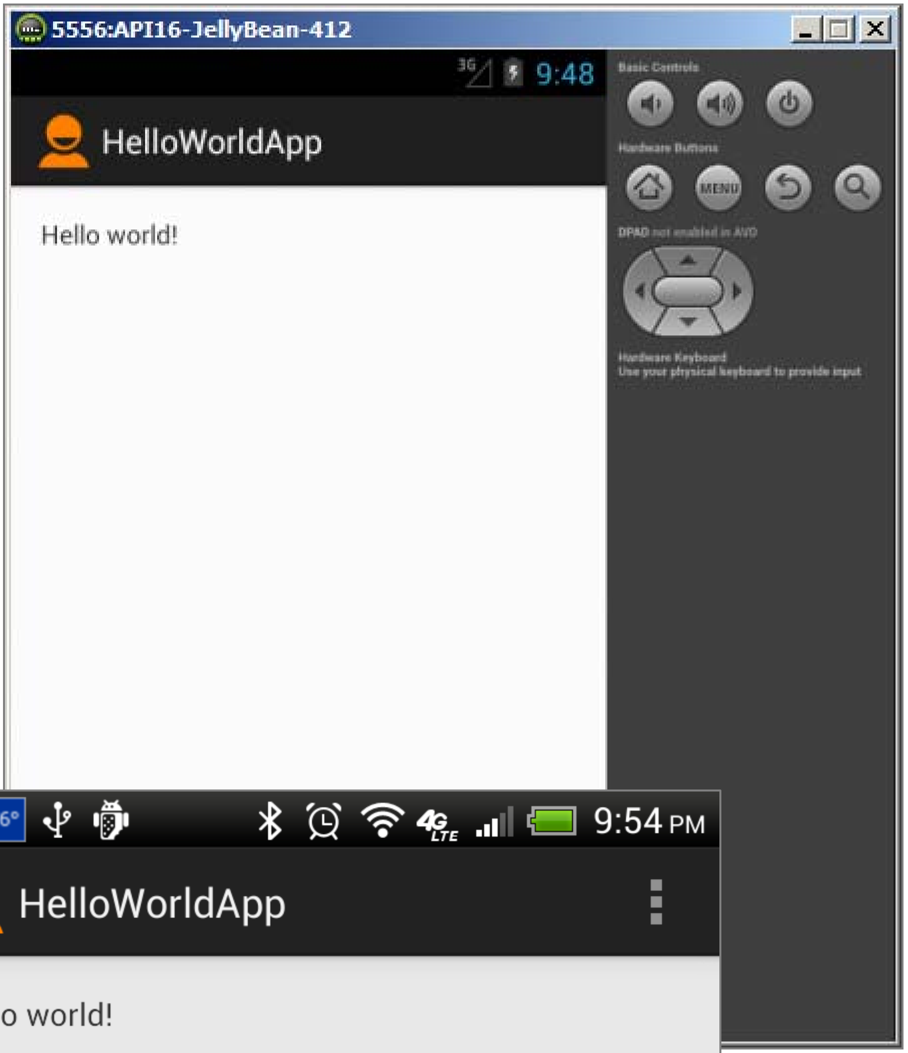
```
<RelativeLayout xmlns:android="http://schemas.andro
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:paddingLeft="16dp"
    android:paddingRight="16dp"
    android:paddingTop="16dp"
    android:paddingBottom="16dp"
    tools:context=".MainActivity">

    <TextView
        android:text="Hello world!"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content" />

</RelativeLayout>
```

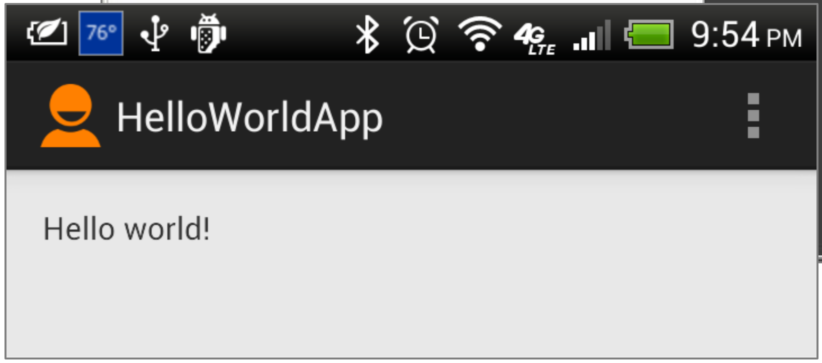
Eclipse: Using the 'New Android Application' Wizard

Example2.1 *(again…)* : HelloWorld App

We will use **Eclipse + ADT** to create a bare bone app. All it is needed from the developer is to feed the *New Android Application* wizard with a few selections (*no extra code will be added to the default app skeleton generated by the IDE+SDK*).

The adjacent figures show the solution made by the wizard running on a *Jelly Bean* emulator and device.

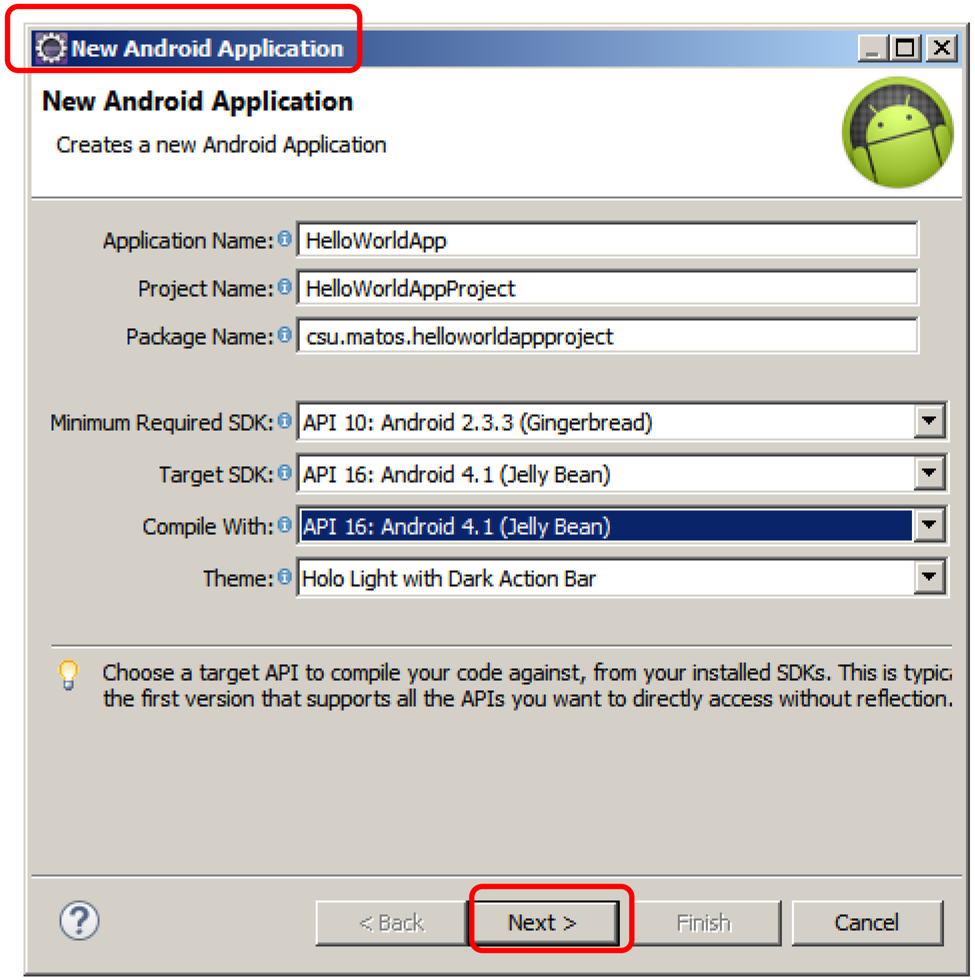




Eclipse: Using the 'New Android Application' Wizard

Example : HelloWorld App

1. Start **Eclipse**
2. From menu choose **File** > **New** > **Android Application Project**
3. Enter in the *Application Name* box: **HelloWorldApp**
4. Enter Project name: **HelloWorldAppProject**
5. Modify *Package Name* prefix to: **csu.matos.helloworldappproject**
6. For *Minimum Required SDK* choose: **API 10: Android 2.3.3 (Gingerbread)**
7. For *Target SDK* select the option: **API 16:Android 4.1 (Jelly Bean)**
8. Select for *Compile With* the option: **API 16:Android 4.1 (Jelly Bean)**
9. Click **Next**
10. Click **Next**



New Android Application

Creates a new Android Application

Application Name: HelloWorldApp

Project Name: HelloWorldAppProject

Package Name: csu.matos.helloworldappproject

Minimum Required SDK: API 10: Android 2.3.3 (Gingerbread)

Target SDK: API 16: Android 4.1 (Jelly Bean)

Compile With: API 16: Android 4.1 (Jelly Bean)

Theme: Holo Light with Dark Action Bar

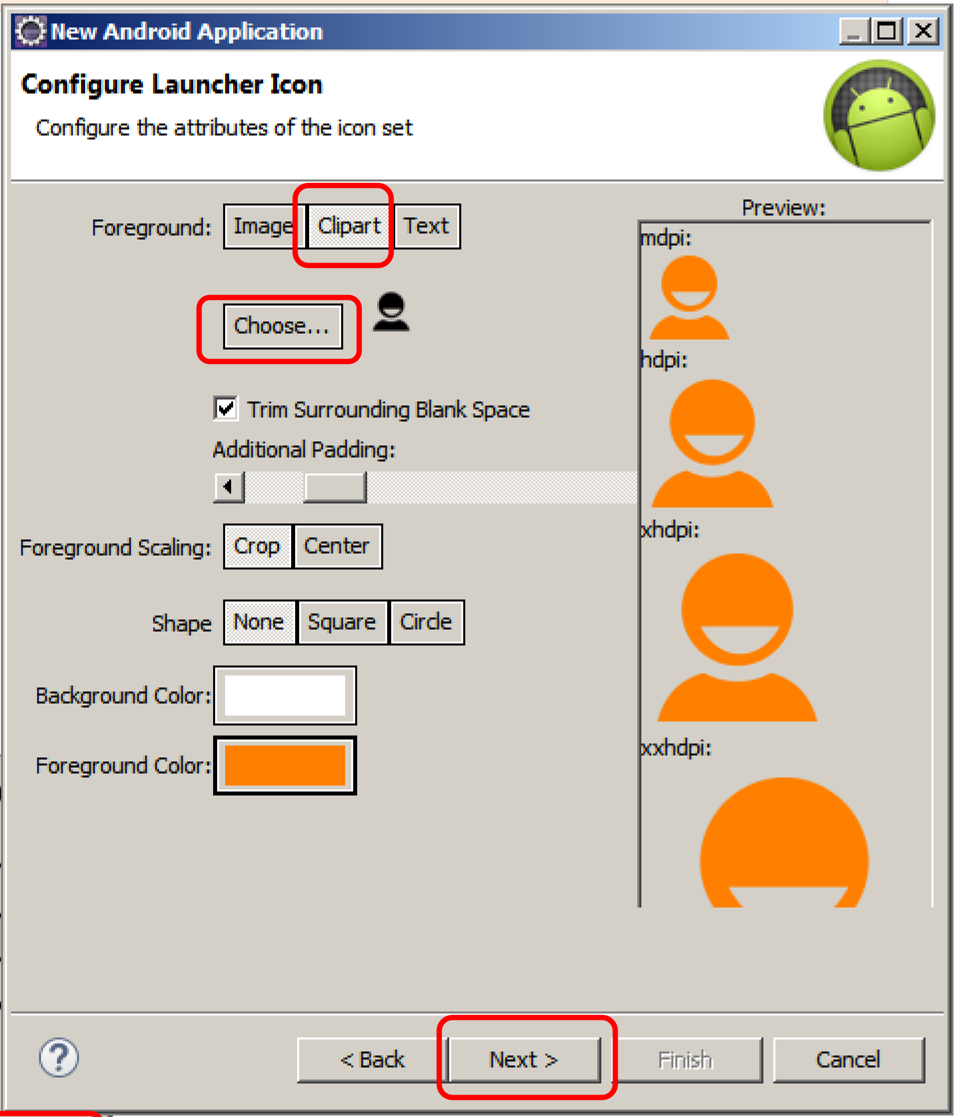
Choose a target API to compile your code against, from your installed SDKs. This is typic
the first version that supports all the APIs you want to directly access without reflection.

Eclipse: Using the ‘New Android Application’ Wizard

Example : HelloWorld App

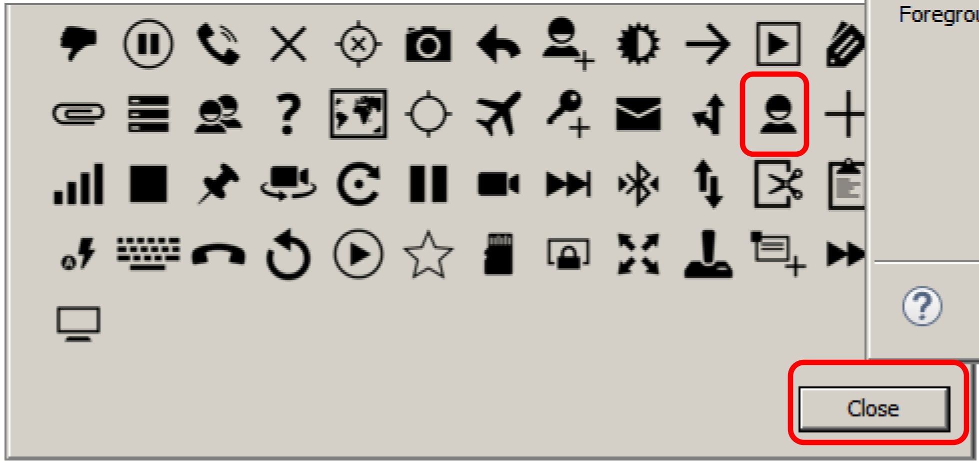
On the form **Configure Launcher Icon** do the following:

11. Foreground > Clipart > Choose
12. Select an icon from the set of available images > Close
13. Pick a *Foreground Color*
14. Click **Next**


New Android Application

Configure Launcher Icon

Configure the attributes of the icon set

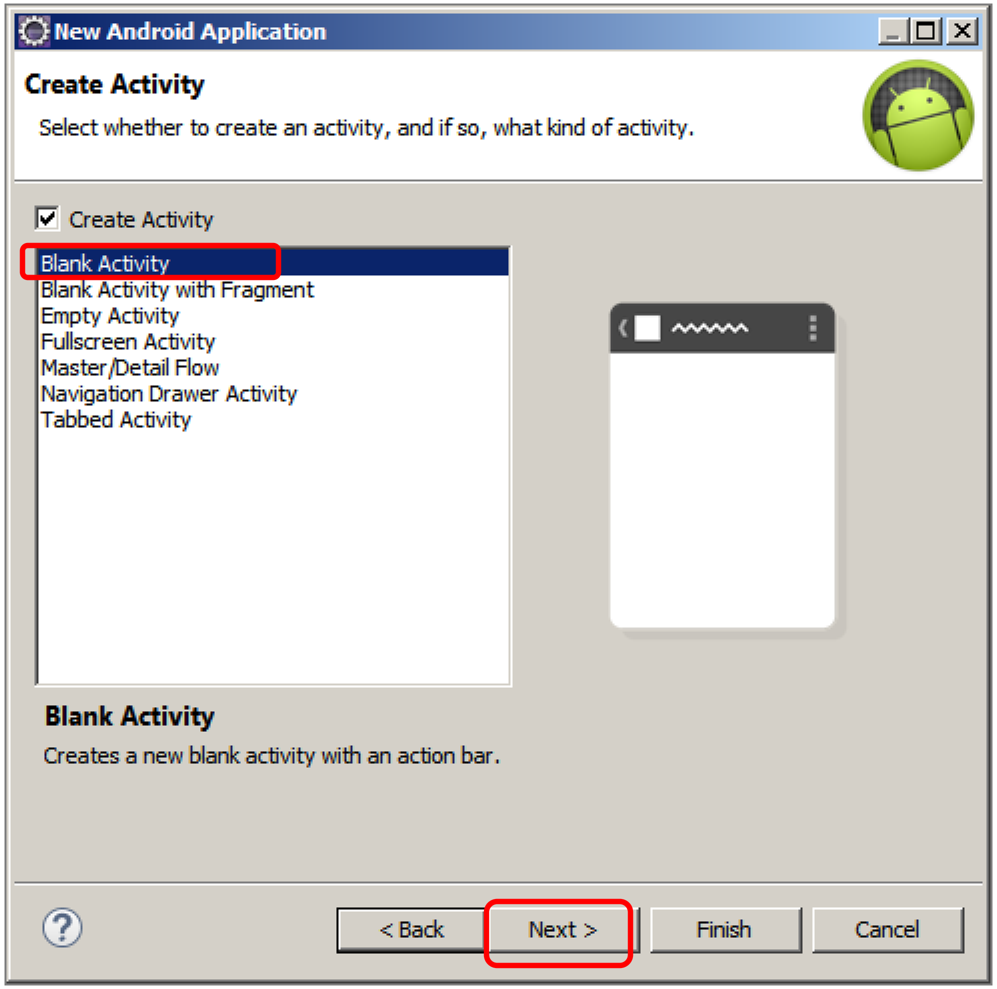


Eclipse: Using the 'New Android Application' Wizard

Example : HelloWorld App

The **Create Activity** form provides a number of basic templates from which your application could be constructed.

15. Select the **Blank Activity** template.
16. Click **Next**.


New Android Application

Create Activity

Select whether to create an activity, and if so, what kind of activity.

☑ Create Activity

- Blank Activity
- Blank Activity with Fragment
- Empty Activity
- Fullscreen Activity
- Master/Detail Flow
- Navigation Drawer Activity
- Tabbed Activity

Blank Activity

Creates a new blank activity with an action bar.

Eclipse: Using the ‘New Android Application’ Wizard

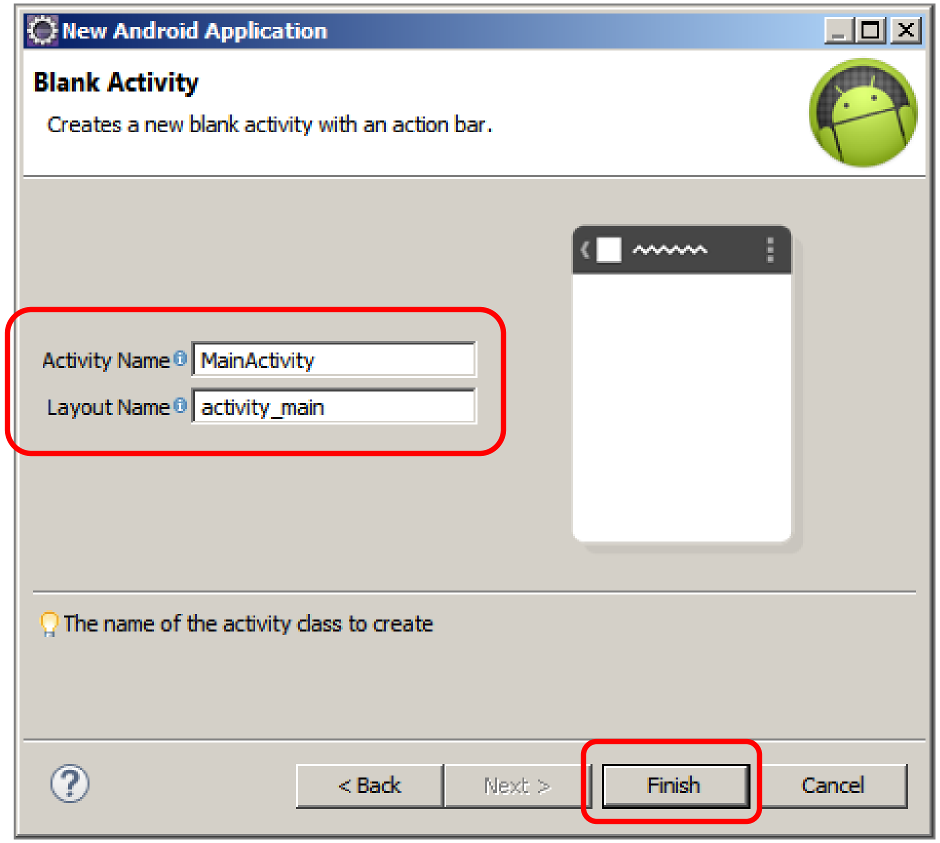
Example : HelloWorld App

The **Blank Activity** form provides a way to name the main Activity and Layout name.

17. Leave the default values shown in the form (Activity Name and Layout Name).
18. Click **Finish**.

At this point the wizard has completed all the steps required to make the app.

After a few seconds the Eclipse perspective shows the app’s UI. The Java solution is shown in the PackageExplorer pane (see next pages)



Blank Activity

Creates a new blank activity with an action bar.

Activity Name: MainActivity

Layout Name: activity_main

The name of the activity class to create

Eclipse: Using the 'New Android Application' Wizard

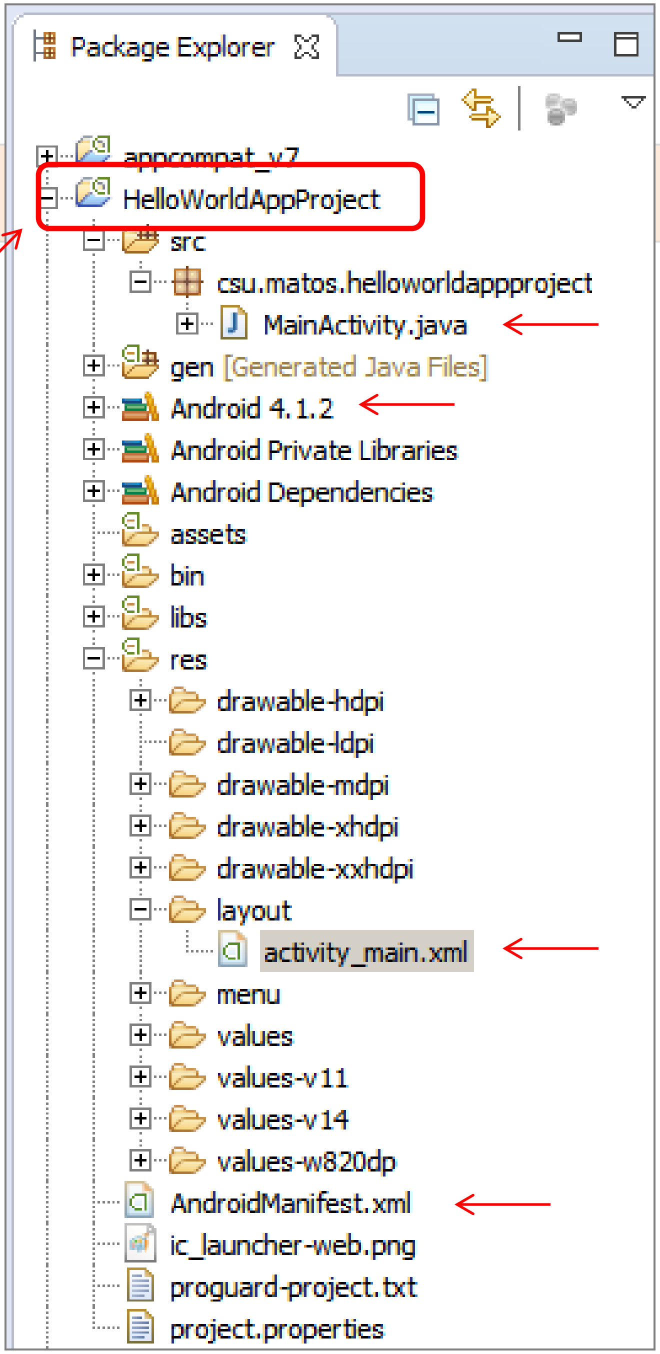
Example : HelloWorld App

File Structure

The folders and files shown on the figure are part of the newly created app.

Here we are using Eclipse's *Package Explorer* facility to navigate inside the folder holding the app.

To test the application, position the cursor on the code panel, and then click on the *Run* menu button.



```
appcompat_v7
HelloWorldAppProject
  src
    csu.matos.helloworldappproject
      MainActivity.java
  gen [Generated Java Files]
  Android 4.1.2
  Android Private Libraries
  Android Dependencies
  assets
  bin
  libs
  res
    drawable-hdpi
    drawable-ldpi
    drawable-mdpi
    drawable-xhdpi
    drawable-xxhdpi
    layout
      activity_main.xml
    menu
    values
    values-v11
    values-v14
    values-w820dp
  AndroidManifest.xml
  ic_launcher-web.png
  proguard-project.txt
  project.properties
```

Eclipse: Using the ‘New Android Application’ Wizard

File Structure of a Typical Android App

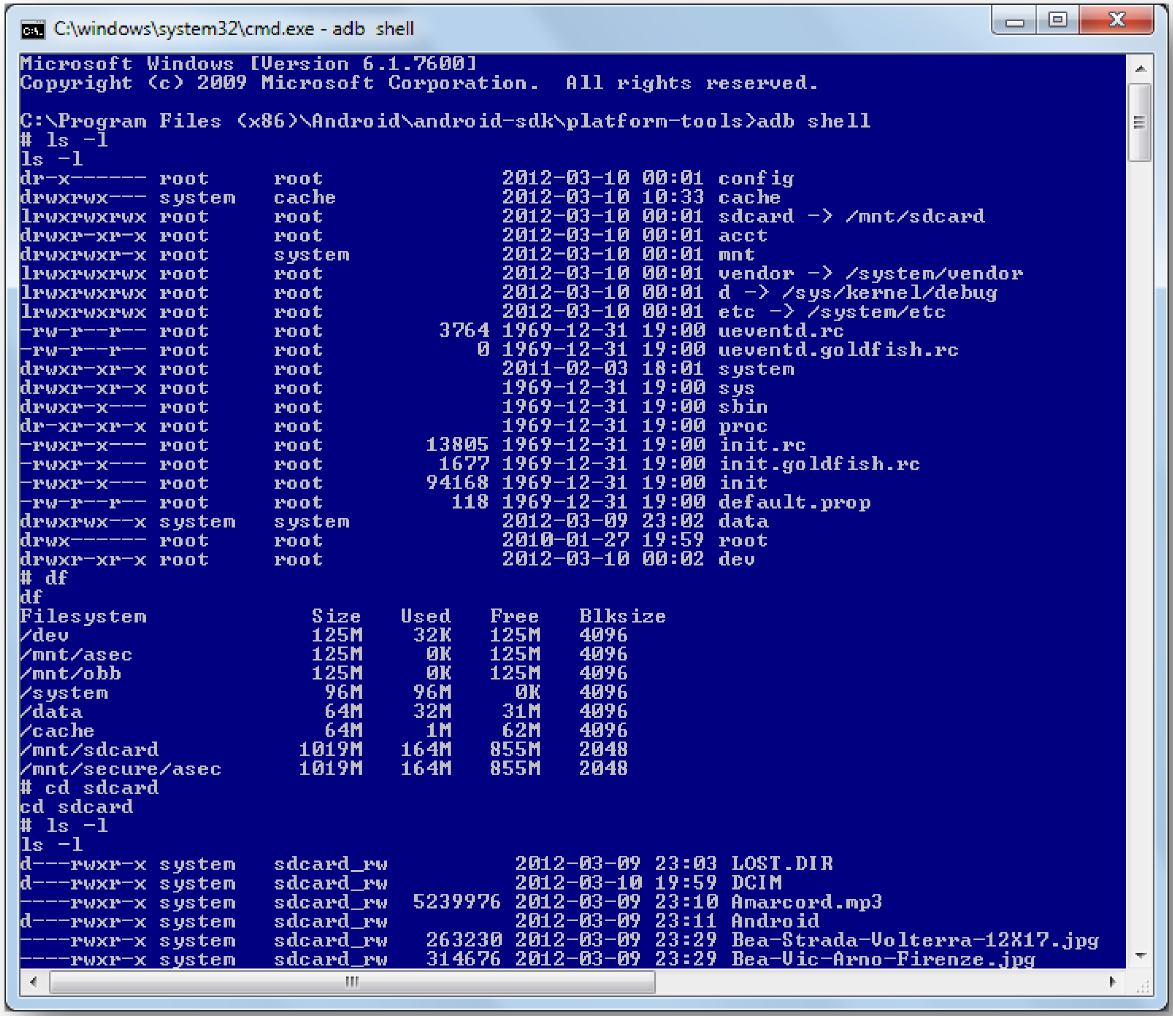
- **src/** Includes your skeleton Activity Java file. All other Java files for your application go here.
- ***<Android Version>/*** (e.g., Android 4.1/) Includes the android.jar file that your application will build against.
- **gen/** This contains the Java files generated by ADT, such as your R.java file
- **assets/** This is empty. You can use it to store raw asset files.
- **res/** This folder holds application resources such as *drawable* files, UI *layout* files, *string* values, etc.
- **bin/** The bytecode (.apk) version of your app is stored here
- **AndroidManifest.xml** The Android Manifest for your project.
- **default.properties** This file contains project settings, such as the build target.

Android Emulator – Looking Under the Hood

Login into the Android OS shell

- Although it is *not* necessary, a developer may gain access to some of the innermost parts of the Android OS.

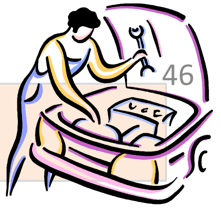
- For a Unix-like experience you can log into the system by executing the emulator and issuing selected shell commands.



C:\windows\system32\cmd.exe - adb shell

```
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

C:\Program Files (x86)\Android\android-sdk\platform-tools>adb shell
# ls -l
ls -l
dr-x------ root     root              2012-03-10 00:01 config
drwxrwx--- system   cache             2012-03-10 10:33 cache
lrwxrwxrwx root     root              2012-03-10 00:01 sdcard -> /mnt/sdcard
drwxr-xr-x root     root              2012-03-10 00:01 acct
drwxrwxr-x root     system            2012-03-10 00:01 mnt
lrwxrwxrwx root     root              2012-03-10 00:01 vendor -> /system/vendor
lrwxrwxrwx root     root              2012-03-10 00:01 d -> /sys/kernel/debug
lrwxrwxrwx root     root              2012-03-10 00:01 etc -> /system/etc
-rw-r--r-- root     root         3764 1969-12-31 19:00 ueventd.rc
-rw-r--r-- root     root            0 1969-12-31 19:00 ueventd.goldfish.rc
drwxr-xr-x root     root              2011-02-03 18:01 system
drwxr-xr-x root     root              1969-12-31 19:00 sys
drwxr-x--- root     root              1969-12-31 19:00 sbin
dr-xr-xr-x root     root              1969-12-31 19:00 proc
-rwxr-x--- root     root        13805 1969-12-31 19:00 init.rc
-rwxr-x--- root     root         1677 1969-12-31 19:00 init.goldfish.rc
-rwxr-x--- root     root        94168 1969-12-31 19:00 init
-rw-r--r-- root     root          118 1969-12-31 19:00 default.prop
drwxrwx--x system   system            2012-03-09 23:02 data
drwx------ root     root              2010-01-27 19:59 root
drwxr-xr-x root     root              2012-03-10 00:02 dev
# df
df
Filesystem             Size   Used   Free   Blksize
/dev                   125M    32K   125M   4096
/mnt/asec              125M     0K   125M   4096
/mnt/obb               125M     0K   125M   4096
/system                 96M    96M     0K   4096
/data                   64M    32M    31M   4096
/cache                  64M     1M    62M   4096
/mnt/sdcard           1019M   164M   855M   2048
/mnt/secure/asec      1019M   164M   855M   2048
# cd sdcard
cd sdcard
# ls -l
ls -l
d---rwxr-x system   sdcard_rw           2012-03-09 23:03 LOST.DIR
d---rwxr-x system   sdcard_rw           2012-03-10 19:59 DCIM
----rwxr-x system   sdcard_rw   5239976 2012-03-09 23:10 Amarcord.mp3
d---rwxr-x system   sdcard_rw           2012-03-09 23:11 Android
----rwxr-x system   sdcard_rw    263230 2012-03-09 23:29 Bea-Strada-Volterra-12X17.jpg
----rwxr-x system   sdcard_rw    314676 2012-03-09 23:29 Bea-Vic-Arno-Firenze.jpg
```

Android Emulator – Looking Under the Hood



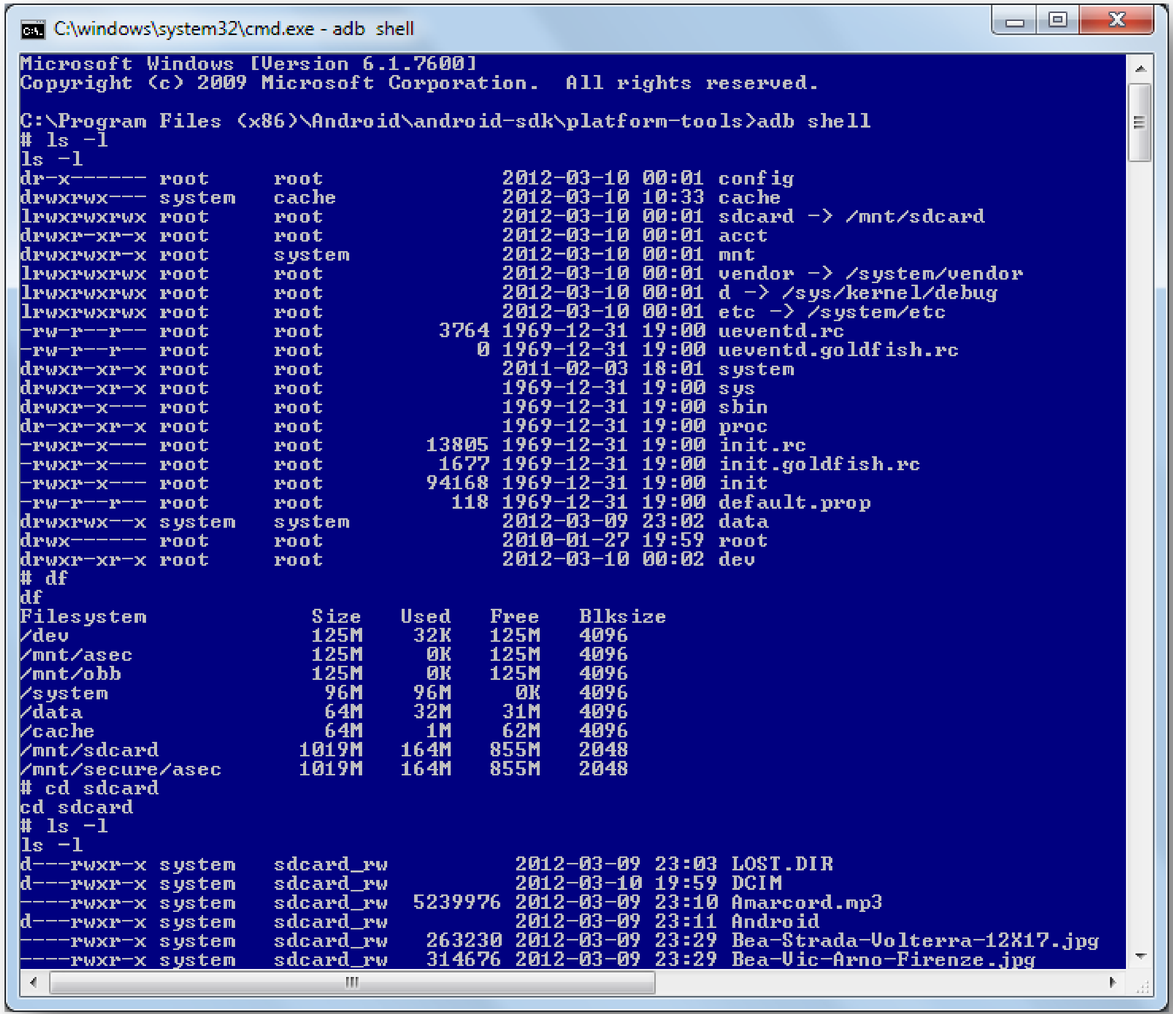
Login into the Android OS shell

STEPS

1. Use the Eclipse **AVD Manager** to start one of your AVDs (say Gingerbread23)

2. At the DOS command prompt level run the Android Debug Bridge **(adb)** application

   adb shell



C:\windows\system32\cmd.exe - adb shell

```
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

C:\Program Files (x86)\Android\android-sdk\platform-tools>adb shell
# ls -l
ls -l
dr-x------ root     root              2012-03-10 00:01 config
drwxrwx--- system   cache             2012-03-10 10:33 cache
lrwxrwxrwx root     root              2012-03-10 00:01 sdcard -> /mnt/sdcard
drwxr-xr-x root     root              2012-03-10 00:01 acct
drwxrwxr-x root     system            2012-03-10 00:01 mnt
lrwxrwxrwx root     root              2012-03-10 00:01 vendor -> /system/vendor
lrwxrwxrwx root     root              2012-03-10 00:01 d -> /sys/kernel/debug
lrwxrwxrwx root     root              2012-03-10 00:01 etc -> /system/etc
-rw-r--r-- root     root         3764 1969-12-31 19:00 ueventd.rc
-rw-r--r-- root     root            0 1969-12-31 19:00 ueventd.goldfish.rc
drwxr-xr-x root     root              2011-02-03 18:01 system
drwxr-xr-x root     root              1969-12-31 19:00 sys
drwxr-x--- root     root              1969-12-31 19:00 sbin
dr-xr-xr-x root     root              1969-12-31 19:00 proc
-rwxr-x--- root     root        13805 1969-12-31 19:00 init.rc
-rwxr-x--- root     root         1677 1969-12-31 19:00 init.goldfish.rc
-rwxr-x--- root     root        94168 1969-12-31 19:00 init
-rw-r--r-- root     root          118 1969-12-31 19:00 default.prop
drwxrwx--x system   system            2012-03-09 23:02 data
drwx------ root     root              2010-01-27 19:59 root
drwxr-xr-x root     root              2012-03-10 00:02 dev
# df
df
Filesystem             Size   Used   Free   Blksize
/dev                   125M    32K   125M   4096
/mnt/asec              125M     0K   125M   4096
/mnt/obb               125M     0K   125M   4096
/system                 96M    96M     0K   4096
/data                   64M    32M    31M   4096
/cache                  64M     1M    62M   4096
/mnt/sdcard           1019M   164M   855M   2048
/mnt/secure/asec      1019M   164M   855M   2048
# cd sdcard
cd sdcard
# ls -l
ls -l
d---rwxr-x system   sdcard_rw          2012-03-09 23:03 LOST.DIR
d---rwxr-x system   sdcard_rw          2012-03-10 19:59 DCIM
----rwxr-x system   sdcard_rw  5239976 2012-03-09 23:10 Amarcord.mp3
d---rwxr-x system   sdcard_rw          2012-03-09 23:11 Android
----rwxr-x system   sdcard_rw   263230 2012-03-09 23:29 Bea-Strada-Volterra-12X17.jpg
----rwxr-x system   sdcard_rw   314676 2012-03-09 23:29 Bea-Vic-Arno-Firenze.jpg
```

adb is a tool located in the directory:
C:\Your-SDK-Folder\Android\android-sdk\platform-tools\

Android Emulator – Looking Under the Hood

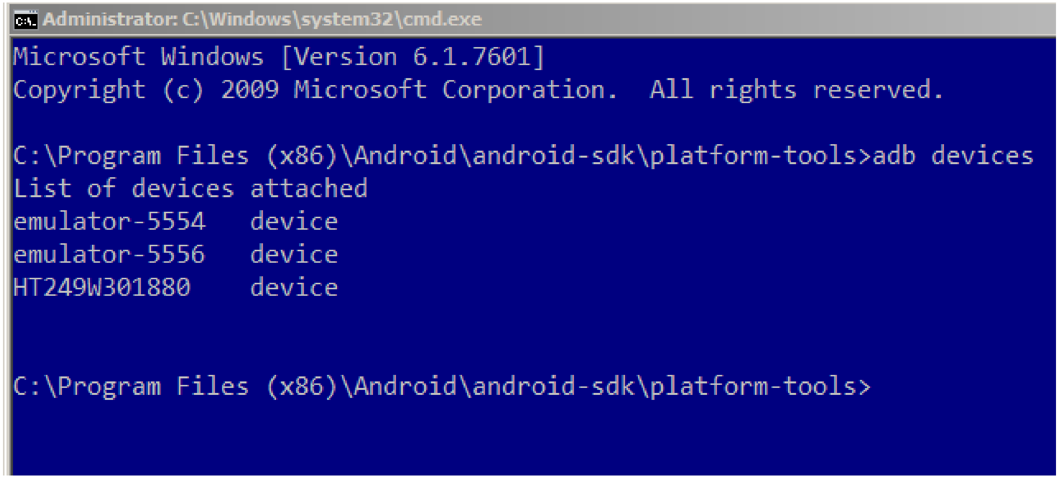
Login into the Android OS shell

If more than one emulator is running (or your phone is physically connected to the computer using the USB cable) you need to identify the target.

Follow the next steps:

1. Get a list of attached devices

```
adb devices

List of devices attached
emulator-5554   device
emulator-5556   device
HT845GZ45737    device
```



Administrator: C:\Windows\system32\cmd.exe

```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

C:\Program Files (x86)\Android\android-sdk\platform-tools>adb devices
List of devices attached
emulator-5554   device
emulator-5556   device
HT249W301880    device


C:\Program Files (x86)\Android\android-sdk\platform-tools>
```

2. Run the **adb** application as follows:

```
adb  -s emulator-5554  shell
```

Remember, the **adb** tool is located at **C:\Program Files (x86)\Android\android-sdk\platform-tools\**

Android Emulator – Looking Under the Hood

Login into the Android OS shell

Android accepts a number of Linux shell commands including the useful set below

```
    ls ................. show directory (alphabetical order)
    mkdir .............. make a directory
    rmdir .............. remove directory
    rm -r .............. to delete folders with files
    rm ................. remove files
    mv ................. moving and renaming files
    cat ................ displaying short files
    cd ................. change current directory
    pwd ................ find out what directory you are in
    df ................. shows available disk space
    chmod .............. changes permissions on a file
    date ............... display date
    exit ............... terminate session
```

There is no copy (**cp**) command in Android, but you could use **cat** instead.
For instance:

```
  # cat data/app/theInstalledApp.apk > cache/theInstalledApp.apk
```

Android Emulator – Looking Under the Hood

Hacking: Moving an app from a Rooted Phone to the Emulator

If you want to transfer an app that is currently installed in your rooted developer's phone to the emulator, follow the next steps:

1. Run command shell: > **adb devices** (find out your hardware's id, say **HT096P800176**)
2. Pull the file from the device to your computer's file system. Enter the command **adb -s HT096P800176 pull data/app/theInstalledApp.apk c:\theInstalledApp.apk**
3. Disconnect your Android phone
4. Run an instance of the Emulator
5. Now install the app on the emulator using the command
   adb -s emulator-5554 install c:\theInstalledApp.apk
   adb -s emulator-5554 uninstall data/app/theInstalledApp.apk ⟵ *to uninstall*

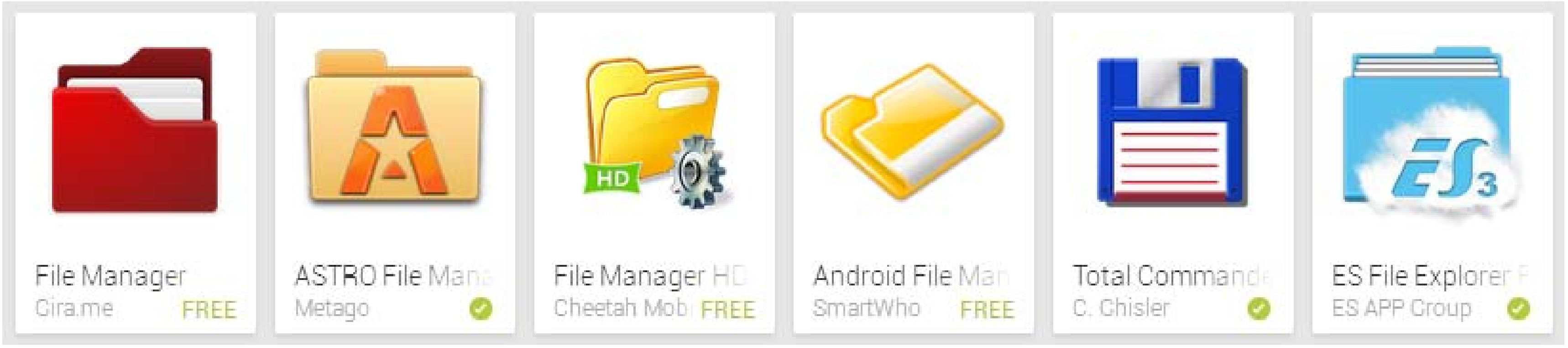
You should see a message indicating the size of the installed package, and finally: *Success*.

Android Emulator – Looking Under the Hood

Simpler than Hacking: Install a File Manager for Android

Visit **Google Play Store** and choose a user-friendly file manager app from the various (usually very good) options available.

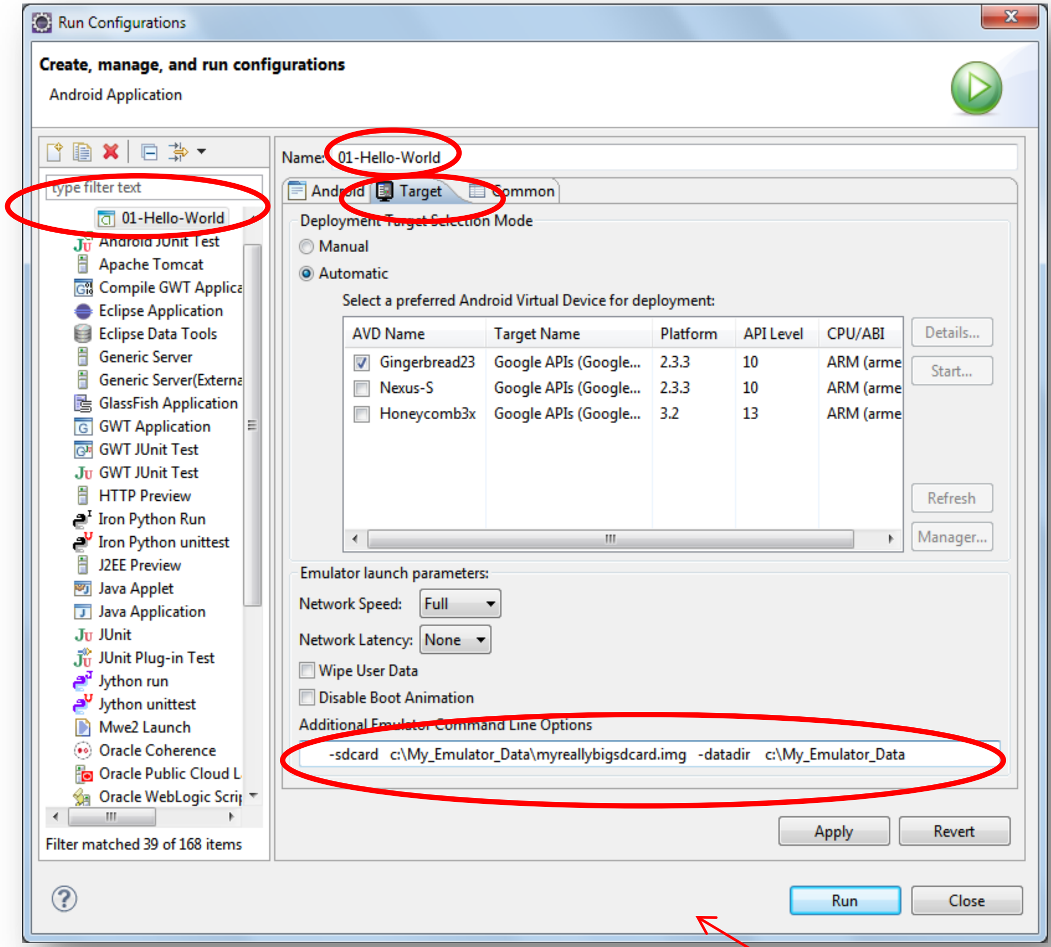
A file manager app allows you to easily administer the folders and files in the system's flash memory and SD card of your Android device (or emulator).



A sample of *File-Management* apps seen at https://play.google.com on Aug-27th -2014

Android Emulator – Looking Under the Hood

Using an alternate SD card & userData Image



Run Configurations

Create, manage, and run configurations

Android Application

type filter text

- 01-Hello-World
- Android JUnit Test
- Apache Tomcat
- Compile GWT Applica
- Eclipse Application
- Eclipse Data Tools
- Generic Server
- Generic Server(Externa
- GlassFish Application
- GWT Application
- GWT JUnit Test
- GWT JUnit Test
- HTTP Preview
- Iron Python Run
- Iron Python unittest
- J2EE Preview
- Java Applet
- Java Application
- JUnit
- JUnit Plug-in Test
- Jython run
- Jython unittest
- Mwe2 Launch
- Oracle Coherence
- Oracle Public Cloud L
- Oracle WebLogic Scrip

Filter matched 39 of 168 items

Name: 01-Hello-World

Android | Target | Common

Deployment Target Selection Mode

( ) Manual
(●) Automatic

Select a preferred Android Virtual Device for deployment:

	AVD Name	Target Name	Platform	API Level	CPU/ABI
✓	Gingerbread23	Google APIs (Google...	2.3.3	10	ARM (arme
	Nexus-S	Google APIs (Google...	2.3.3	10	ARM (arme
	Honeycomb3x	Google APIs (Google...	3.2	13	ARM (arme

Details... Start... Refresh Manager...

Emulator launch parameters:

Network Speed: Full

Network Latency: None

☐ Wipe User Data

☐ Disable Boot Animation

Additional Emulator Command Line Options

```
-sdcard  c:\My_Emulator_Data\myreallybigsdcard.img  -datadir  c:\My_Emulator_Data
```

Apply Revert

Run Close

From the Eclipse menu create a new launch configuration:

Run >
Run Configurations >
New icon

On the **Target** panel:

1. Select existing AVD (Gingerbread in this example)
2. Enter additional Command Line Options (see caption below)
3. Click on **Apply** > **Run**

Additional Emulator Command Line Options:
-sdcard c:\My_Emulator_Data\myreallybigsdcard.img **-datadir** c:\My_Emulator_Data

Android Emulator – Simulate Texting

Sending Text Messages from your Window’s PC to the Emulator

1. Start the emulator.

2. Open a new DOS command shell and type :
   c:> adb devices
   this way you get to know the emulator’s numeric port id (usually **5554**, **5556**, and so on)

3. Initiate a Telnet session with the sender at localhost, port 5556 identifies an active (receiving) Android emulator. Type the command:
   c:> telnet localhost 5554

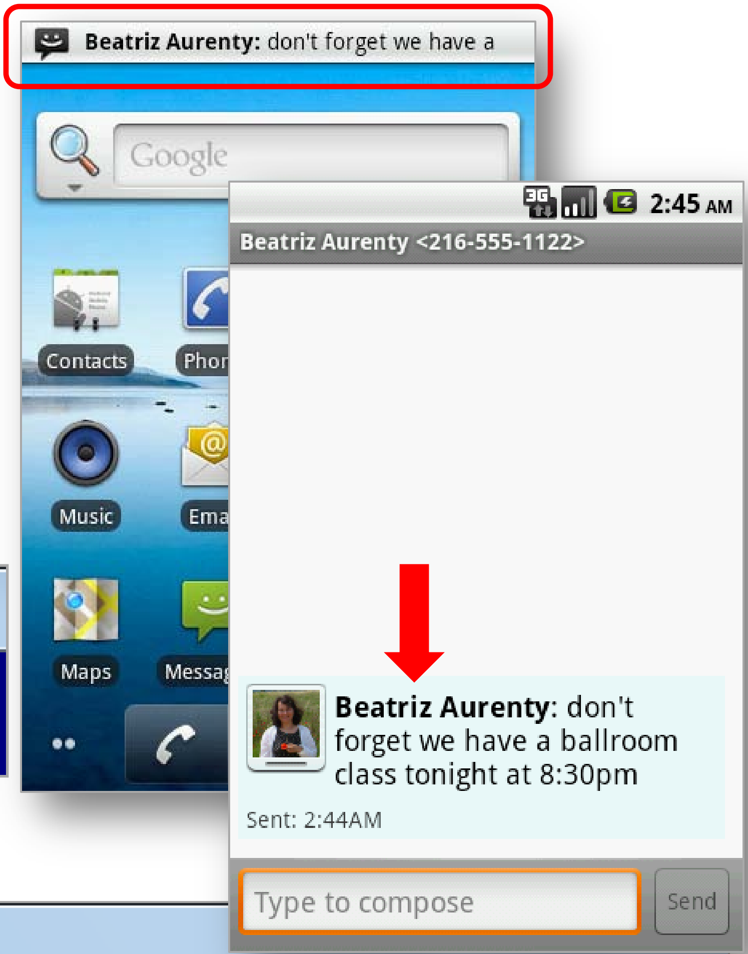
4. After receiving the telnet prompt, you can send a text message to the emulator on port 5554 (no quotes needed for the message)
   sms send <Sender’s phone number> <text message>

Windows7 – temporarily install Telnet Client by using a command line

1. Click **Start** button, type **cmd** in the **‘search programs and files’** box, and then press **ENTER**.
2. Type the following command: `pkgmgr /iu:"TelnetClient”`

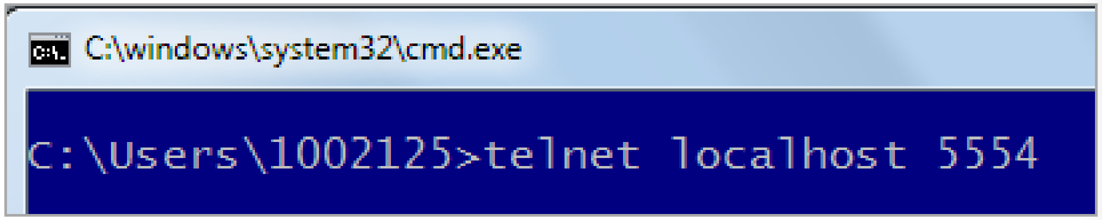
Android Emulator – Simulate Texting

Sending a text Message (SMS) from your PC to the Emulator


Beatriz Aurenty: don't forget we have a
Google
Contacts
Phon
Music
Ema
Maps
Messa
2:45 AM
Beatriz Aurenty <216-555-1122>
Type to compose
Send

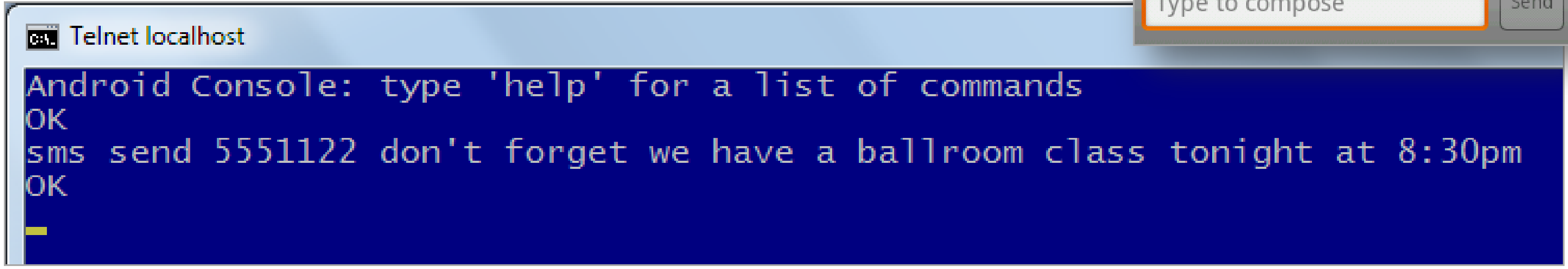
Beatriz Aurenty: don't forget we have a ballroom class tonight at 8:30pm

Sent: 2:44AM



C:\windows\system32\cmd.exe

```
C:\Users\1002125>telnet localhost 5554
```



Telnet localhost

```
Android Console: type 'help' for a list of commands
OK
sms send 5551122 don't forget we have a ballroom class tonight at 8:30pm
OK
_
```

Android Emulator – Simulate Phone Calls

Making a Phone Call from your PC to the Emulator

1. Start the emulator.

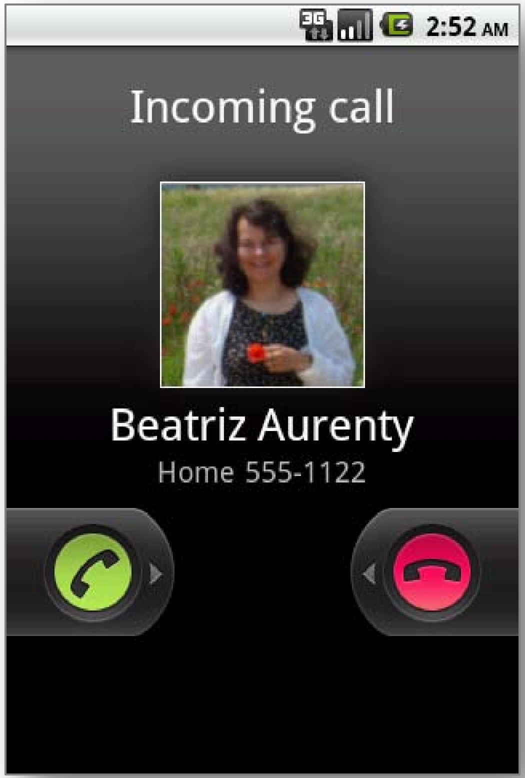
2. Open a new shell and type :
   adb devices
   to know the emulator's numeric port id (usually **5554**, **5556**, and so on)

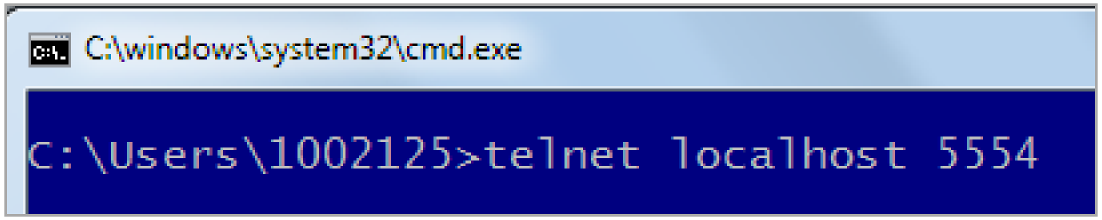
3. Connect to the console using telnet command like:
   telnet localhost 5554 (5554 is the 'phone number' to be called)

4. After receiving the telnet prompt you can place a call (voice) with the command
   gsm call <caller's phone number>

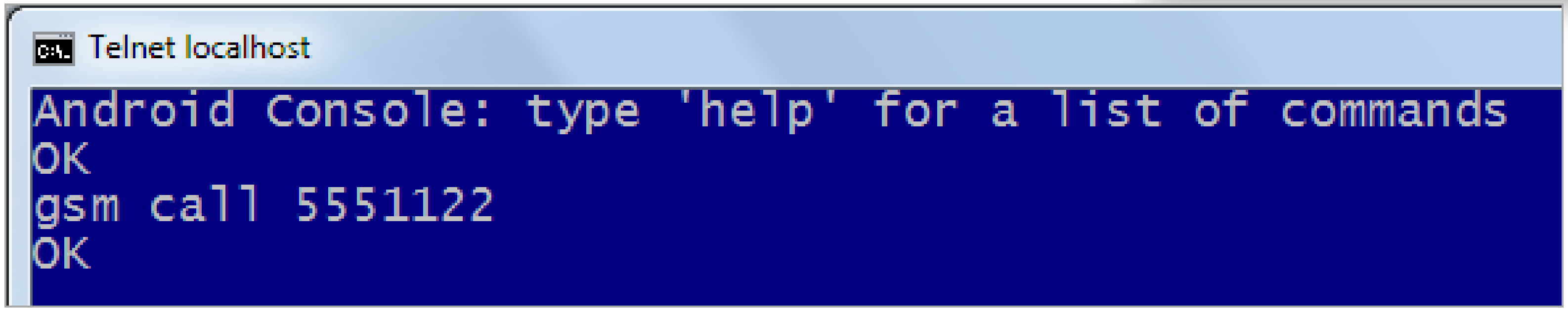
Android Emulator – Simulate Phone Calls

Example:
Making a Phone from your PC to the Emulator




C:\windows\system32\cmd.exe

```
C:\Users\1002125>telnet localhost 5554
```


Telnet localhost

```
Android Console: type 'help' for a list of commands
OK
gsm call 5551122
OK
```

Using: Android Studio Manager

It is *much simpler* to test telephony operations (SMS/Voice) as well as GPS services using the controls included in the IDE (both AS and Eclipse)

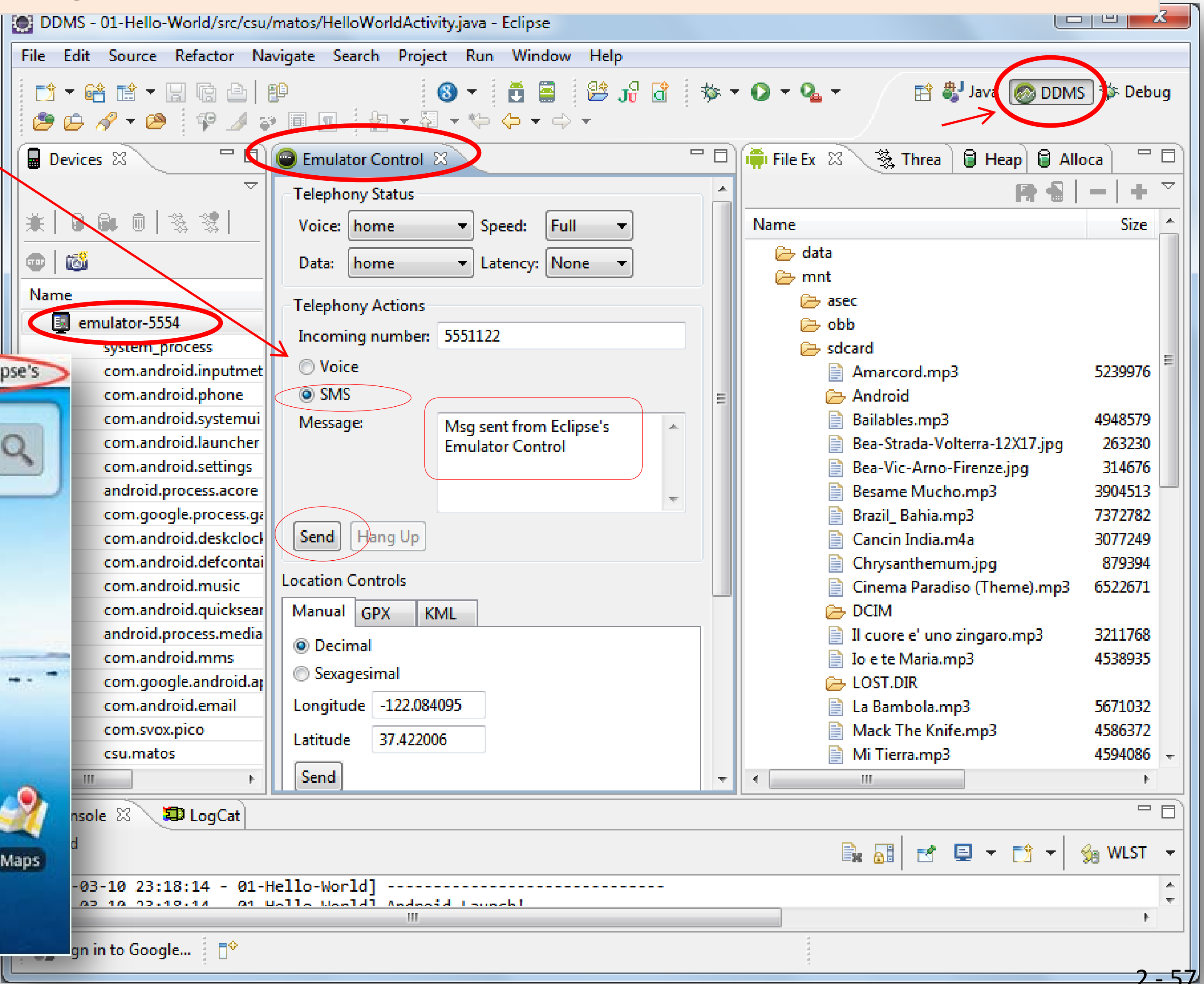
1. **Telephony Status** - change the state of the phone's Voice and Data plans (home, roaming, searching, etc.), and simulate different kinds of network Speed and Latency (GPRS, EDGE, UTMS, etc.).
2. **Telephony Actions** - perform simulated phone calls and SMS messages to the emulator.
3. **Location Controls** - send mock location data to the emulator so that you can perform location-aware operations like GPS mapping.
   - Manually send individual longitude/latitude coordinates to the device.   Click **Manual**, select the coordinate format, fill in the fields and click **Send**.
   - Use a **GPX file** describing a route for playback to the device.
   - Use a **KML** file to place multiple *placemarker points* on a map

Note: DDMS stands for 'Dalvik Debug Monitor Server'

Using Eclipse's DDMS facility

DDMS Telephony Services

Send text-messages
Make a phone call


DDMS - 01-Hello-World/src/csu/matos/HelloWorldActivity.java - Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help
Java
DDMS
Debug
Devices
Emulator Control
File Ex
Threa
Heap
Alloca
Name
emulator-5554
Size
Console
LogCat
WLST

Name
emulator-5554
system_process
com.android.inputmet
com.android.phone
com.android.systemui
com.android.launcher
com.android.settings
android.process.acore
com.google.process.g
com.android.deskclock
com.android.defcontai
com.android.music
com.android.quicksear
android.process.media
com.android.mms
com.google.android.a
com.android.email
com.svox.pico
csu.matos

Telephony Status
Voice: home Speed: Full
Data: home Latency: None

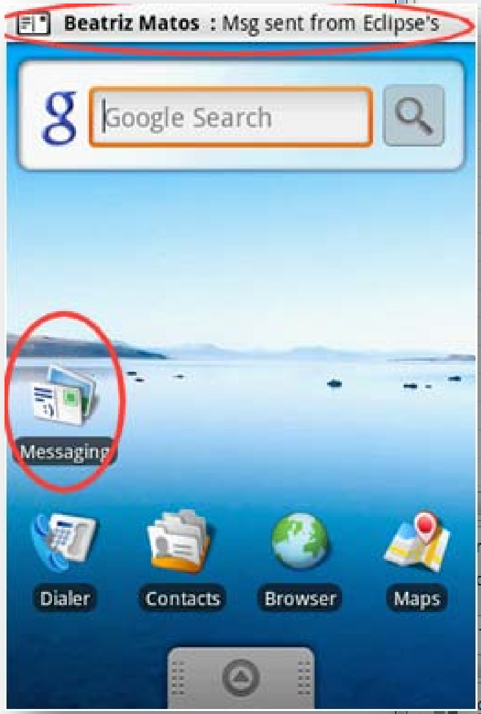
Telephony Actions
Incoming number: 5551122
Voice [✓ SMS]
Message: Msg sent from Eclipse's Emulator Control
Send Hang Up

Location Controls
Manual GPX KML
[✓ Decimal] Sexagesimal
Longitude -122.084095
Latitude 37.422006
Send

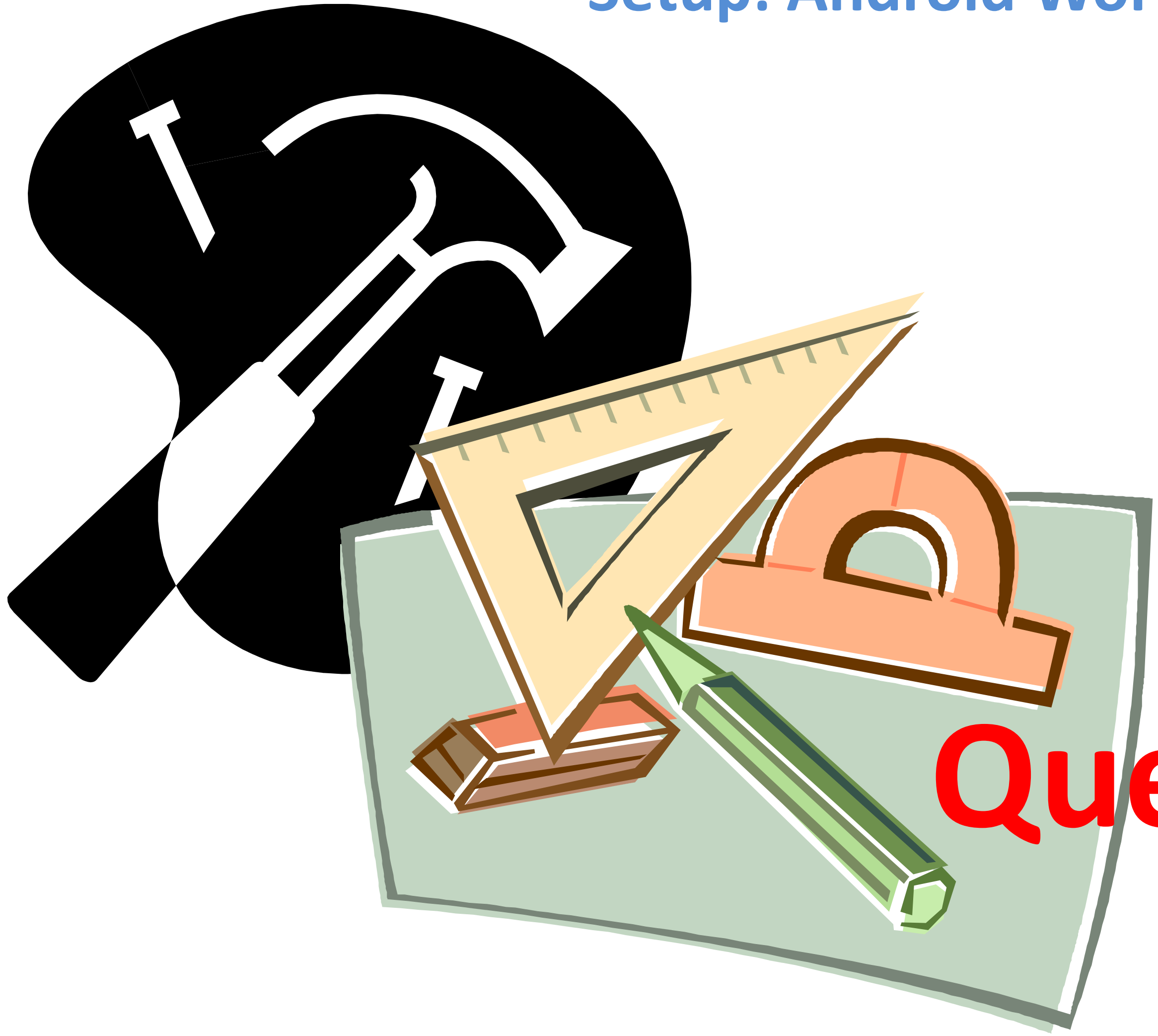
Name	Size
data	
mnt	
asec	
obb	
sdcard	
Amarcord.mp3	5239976
Android	
Bailables.mp3	4948579
Bea-Strada-Volterra-12X17.jpg	263230
Bea-Vic-Arno-Firenze.jpg	314676
Besame Mucho.mp3	3904513
Brazil_ Bahia.mp3	7372782
Cancin India.m4a	3077249
Chrysanthemum.jpg	879394
Cinema Paradiso (Theme).mp3	6522671
DCIM	
Il cuore e' uno zingaro.mp3	3211768
Io e te Maria.mp3	4538935
LOST.DIR	
La Bambola.mp3	5671032
Mack The Knife.mp3	4586372
Mi Tierra.mp3	4594086

```
-03-10 23:18:14 - 01-Hello-World] ------------------------------
```

gn in to Google...



Lesson 2:
Setup: Android Workbench & Emulator

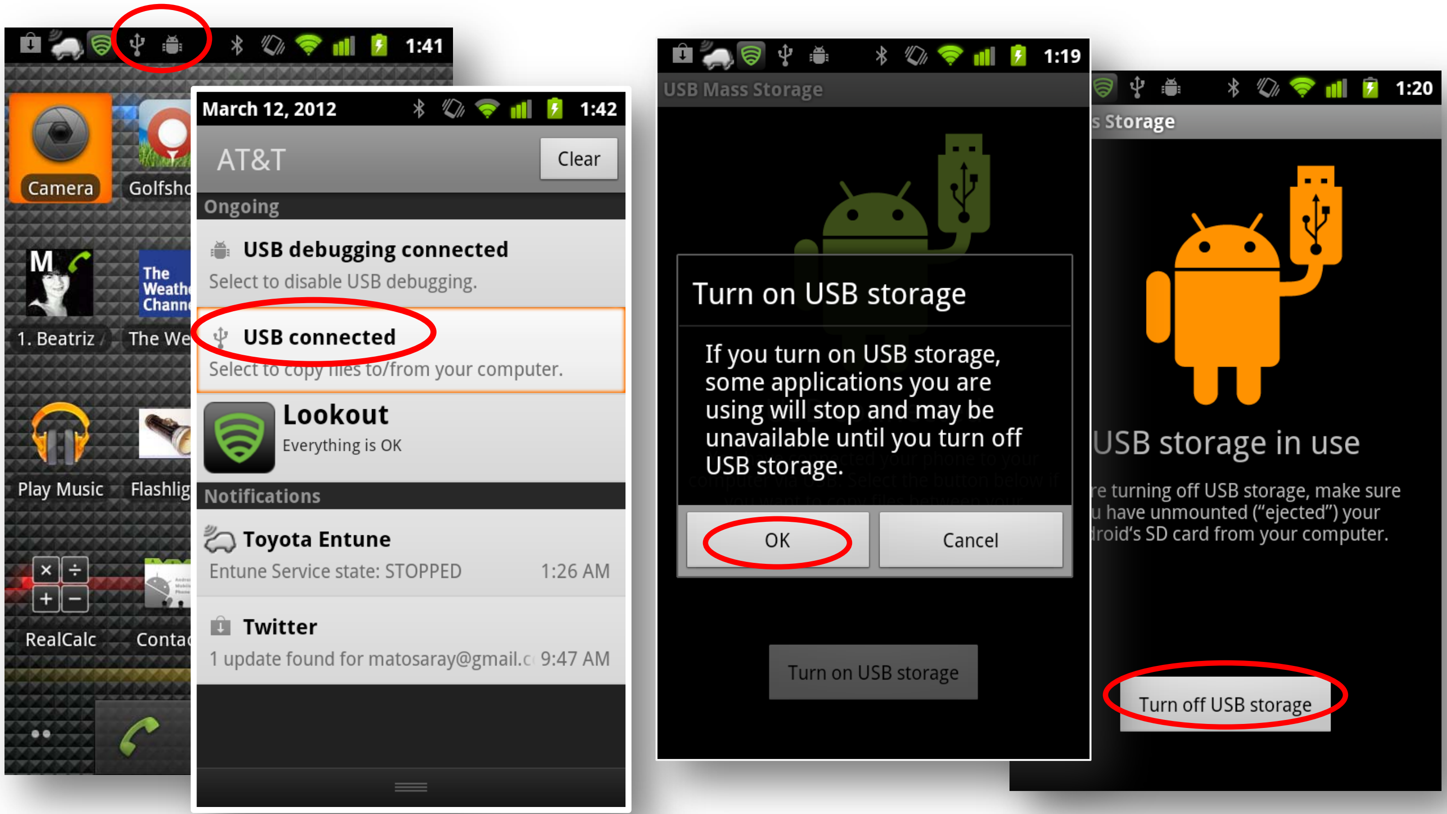


Questions ?

Appendix 1 - Using a Hardware Device

Connecting your Physical Device to the Computer

1. Make sure the USB driver has been installed in your PC (click SDK Manager > Extras > check box [*Google USB driver package*] to install)
2. Use a mini-USB cable to connect the device to your computer.
3. Expand the Notification bar. Click on [*USB connected*] option.
4. Click on [*Turn on USB storage*] to mount the device.
5. Now you could now use the Eclipse-ADT-File Explorer and your Window's Explorer tool to pull/push/delete/rename files to the device.



USB debugging connected
Select to disable USB debugging.

USB connected
Select to copy files to/from your computer.

Toyota Entune
Entune Service state: STOPPED 1:26 AM

Twitter
1 update found for matosaray@gmail.c 9:47 AM

Turn on USB storage

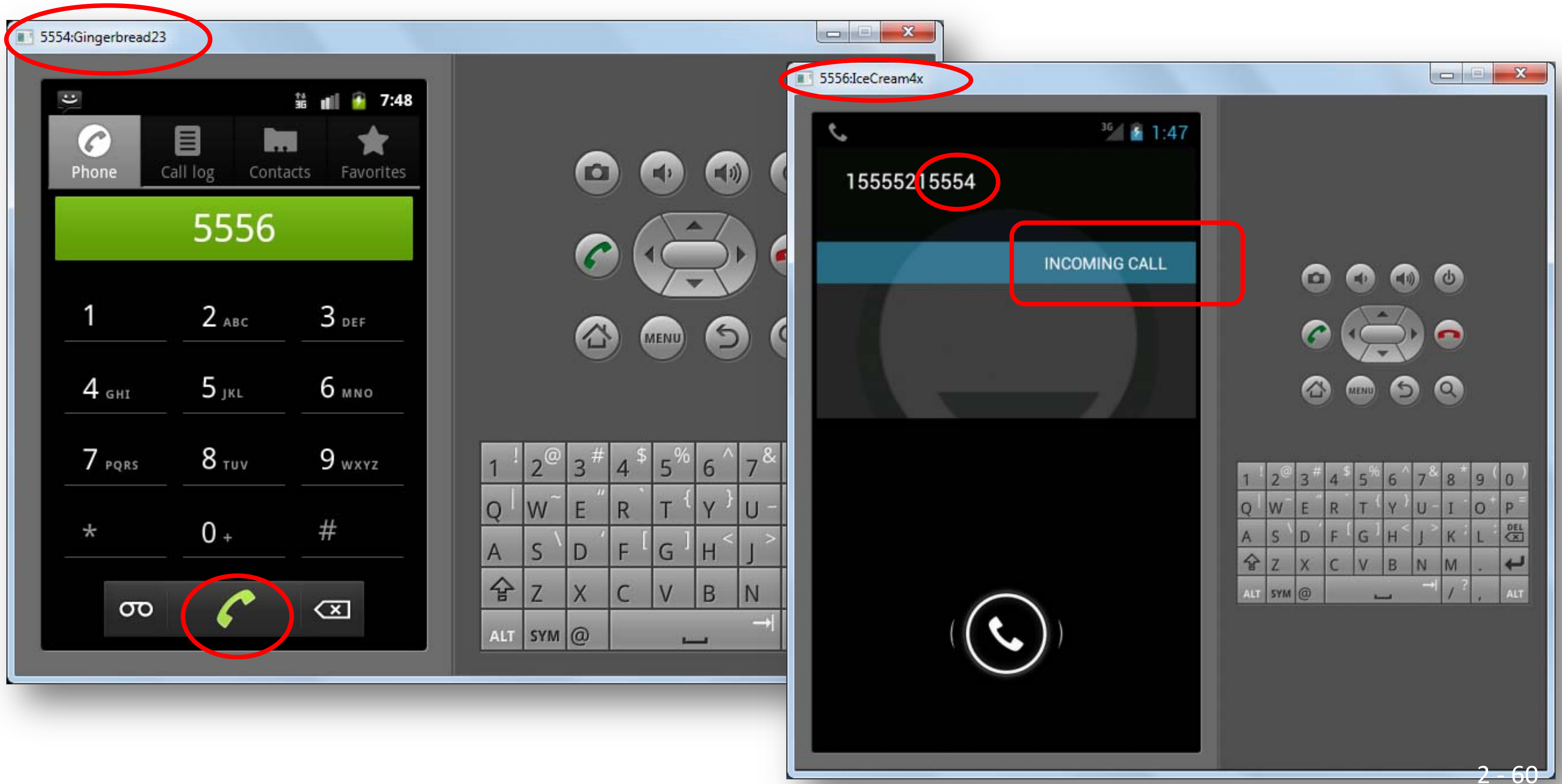
If you turn on USB storage, some applications you are using will stop and may be unavailable until you turn off USB storage.

USB storage in use

re turning off USB storage, make sure u have unmounted ("ejected") your lroid's SD card from your computer.

Appendix 2 – Emulator-to-Emulator Interaction

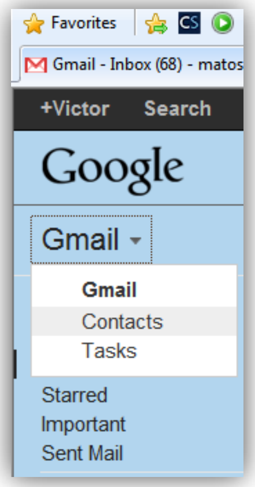
1. Run **two** instances of the emulator (typical IDs are: 5554, 5556, …)
2. Dial (or send SMS) from one of them (say 5554) to the other (5556)
3. Press the Green/Red call buttons to accept/terminate the call
4. Try sending SMS (use numbers 5554 and 5556)



Appendix 3 – Sync your Contacts

How to Transfer Your Google Contacts into the Emulator

1. o to your Gmail account using a web browser, click on **Gmail** > **Contacts** on the left sidebar.



2. Select all the contacts you want on your emulator/phone. Then click on **More > Export** and select **vCard** format. Download the "contacs.vcf" file to your PC.

3. Push the contacs.vcf file from the PC to the emulator's **SD card**.

4. Open the emulator's **Contacts** app hit **Menu** > **Import**.

5. Choose the option *Import from SD card*.

Source visited on July 2009, link:
http://stackoverflow.com/questions/1114052/importing-gmail-contacts-on-android-emulator

Appendix 4

Shortcuts: Android-Studio IDE

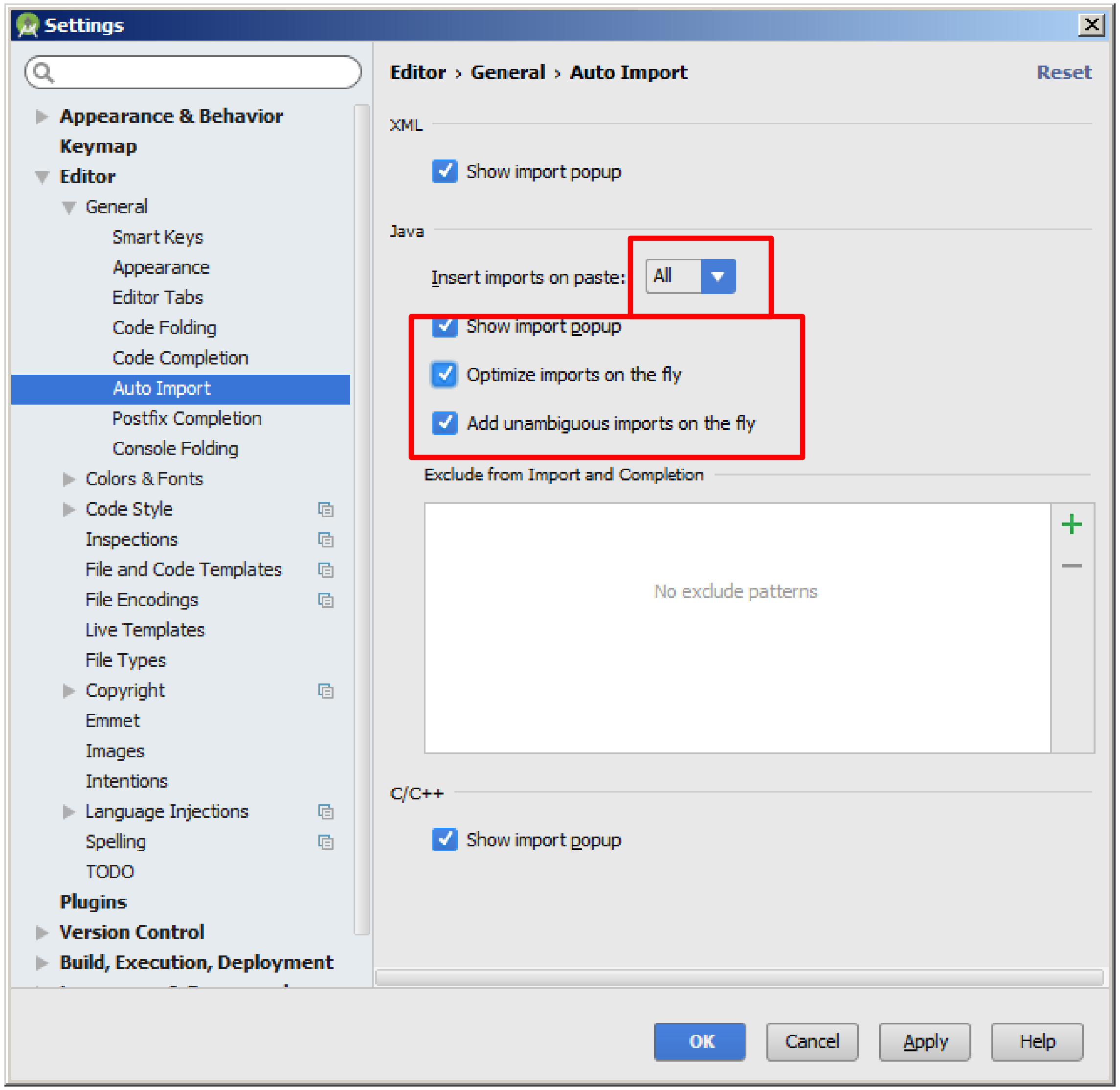
Eclipse developers are used to typing

Ctrl + Shift + O

To **Organize ALL imports**.

To automatically accomplish the same effect, modify your Android Studio Workbench as indicated on the figure to the right.

File > Settings > Editor > General > Auto Import



Editor › General › Auto Import

XML

✓ Show import popup

Java

Insert imports on paste: All

✓ Show import popup

✓ Optimize imports on the fly

✓ Add unambiguous imports on the fly

Exclude from Import and Completion

No exclude patterns

C/C++

✓ Show import popup

Appendix 4

Shortcuts: Android-Studio IDE

Operation	Android Studio Shortcut
Reformat code	CTRL + ALT + L
Optimize imports	CTRL + ALT + O
Code Completion	CTRL + SPACE
Issue quick fix	ALT + ENTER
Surround code block	CTRL + ALT + T
Line Comment or Uncomment	CTRL + /
Block Comment or Uncomment	CTRL + SHIFT + /
Close Active Tab	CTRL + F4
Build and run	SHIFT + F10
Build	CTRL + F9
All Options	Ctrl + Shift + A