Introduction to Android Programming

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*Based on slides from Dr. Beomjoo Seo

Contents

- Introduction
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 - Create an Android Project
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 - Activity, Intent
 - UI : Layout, Menu
 - Thread
 - Misc: Media Recorder, HTTP Post, MP4Parser
- Sample Application

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

Application Fundamental

- Android apps are written in the Java
- The Android OS is a multi-user Linux system
- Android app lives in its own security sandbox
 - System assigns each app a unique Linux user ID
 - Each process has its own virtual machine
 - Every application runs in its own Linux process.
- The Android system implements the *principle of least privilege*
- How can an app share data with other apps?

http://developer.android.com/guide/components/fundamentals.html

Software Downloads

- Java Compiler
 - Latest JDK (JRE alone will not work)
 - Java SE 8u20 or Java SE 7u67
- Android Developer Tools (ADT)
 - Download ADT Bundle form <u>http://developer.android.com/sdk/index.html</u>
 - SDK for existing IDE

Environment Setup

- Three basic steps to get an application running on an Android emulator ADT (or on device)
 - Step 1: Configure the SDK
 - Step 2: Define emulator type and device
 - Step 3: Build and run your first Android App

Step-1: Configure the SDK

- Unzip ADT Bundle to a known location and give some meaningful name (say ADT)
 - Install the Eclipse ADT Bundle
 - Unpack the ZIP file (named adt-bundle-<os_platform>.zip) to ADT folder
 - Open the ADT/eclipse/ directory and launch eclipse.

– That's it!

Caution: Do not move any of the files (*i.e.* eclipse/ or sdk/) or directories from the ADT directory. If you do so, you'll need to manually update the ADT preferences.

http://developer.android.com/sdk/installing/adding-packages.html

Configure the SDK for Existing IDE

- Install Eclipse IDE
 - Eclipse 3.7.2 or above
 - Eclipse JDT plugin
 - Run Android SDK starter package
 - Install ADT plugin
 - Eclipse > Help > Install New Software ... -> Add
 - https://dl-ssl.google.com/android/eclipse/
 - Configure ADT plugin

http://developer.android.com/sdk/installing/installing-adt.html

Eclipse ADT Plugin Configuration

At Windows > Preferences > Android

Specify Android SDK location

Preferences	and the other division of the local division	Concession of Concession, Name		. O X
type filter text	Android		4	•
b General				
a Android				
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Usage Stats	Android 1.5	Android Open Source Project	1.5	3
D Ant	Google APIs	Google Inc.	1.5	3
p Help	Android 1.6	Android Open Source Project	1.6	4
Install/Opdate	Google APIs	Google Inc.	1.6	4
p Java	Android 2.0	Android Open Source Project	2.0	5
Run/Debug	Google APIs	Google Inc.	2.0	5
D Tasks	Android 2.0.1	Android Open Source Project	2.0.1	6
p Team	Google APIs	Google Inc.	2.0.1	6
Disage Data Collector	Android 2.1-update1	Android Open Source Project	2.1-update1	7
Validation	Google APIs	Google Inc.	2.1-update1	7
DAML	Android 2.2	Android Open Source Project	2.2	8
	Google APIs	Google Inc.	2.2	8
	Google APIs	Google Inc.	2.2	8
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	Android 2.5	Anarola Open Source Project	2.5	2
	Google APIs	Google Inc.	2.3	9
	EDK	Sony Ericsson Mobile Communications AB	2.3	9
	Android 2.3.3	Android Open Source Project	2.3.3	10
	Google APIs	Google Inc.	2.3.3	10
	EDK 1.1	Sony Ericsson Mobile Communications AB	2.3.3	10
	Android 3.0	Android Open Source Project	3.0	11
	Google APIs	Google Inc.	3.0	11
	Android 3.1	Android Open Source Project	3.1	12
	Google APIs	Google Inc.	3.1	12
	Android 3.2	Android Open Source Project	3.2	13
	Google APIs	Google Inc.	3.2	13
	Standard Android platform 2	3		
			Restore Defaults	Apply
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Increase ADT connection time out

Preferences		·	
type filter text	DDMS		⇔ • ⇔ • •
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Install SDK Packages

- Start your Android SDK manager
 - ADT/SDK Manager.exe or



 Installed packages

Android SDK Manager					
Packages Tools					
SDK Path: E:\Work\1.Classes\390\ADT\sdk					
Packages					
🚔 Name	API	Rev.	Status		
a 🔲 🧰 Tools					
🔲 📌 Android SDK Build-tools		19.1	👼 Installed		
Android 4.1.2 (API 16)					
🔲 📫 SDK Platform	16	4	😿 Installed		
🔲 📥 Samples for SDK	16	1	😿 Installed		
🔲 🌆 ARM EABI v7a System Image	16	3	😿 Installed		
📰 💵 Intel x86 Atom System Image	16	1	🔯 Installed	N	
🔲 🛱 Google APIs	16	3	👼 Installed	63	
Sources for Android SDK	16	2	😿 Installed		
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🔲 🔂 Android Support Library		19.1	큕 Installed		
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🔲 🔂 Intel x86 Emulator Accelerator (HAXM installer)		4	👼 Installed		
Show: 🔲 Updates/New 📝 Installed 👘 Obsolete Select <u>N</u>	lew or Up	dates		Ir	istall packages
Sort by: API level Repository Deselect	t All			D	elete packages
)one loading packages.					

Install SDK Packages

- You should install the packages in two steps:
 - Select packages in "Tools" only (Android SDK Tools, Android SDK Platform-tools, Android SDK Buildtools). Download and install these.
 - After successful installation of packages in "Tools", quit and re-start Eclipse to continue with the rest of the installations.

Step-2: Android Virtual Device (AVD)

- Define and Start your Android Emulator
 - Define a virtual device type
 - Define an instance of *virtual device* based on the type we defined
 - Start our instance of virtual device.

- Define Android Virtual Device type:
 - Start the AVD Manager



• Define Android Virtual Device type:

- Start the AVD Manager

Android Virtual Device (AVD) Manager		
Android Virtual Devices Device Definitions		
List of known device definitions. This can later be used to create Android Virtual Devices.		
Device	*	Create AVD
5.1" WVGA by Generic Screen: 5.1", 480 × 800, Large mdpi RAM: 512 MiB		Create Device
5.4" FWVGA by Generic Screen: 5.4", 480 × 854, Large mdpi RAM: 512 MiB		Clone Edit an existing der
7.0" WSVGA (Tablet) by Generic Screen: 7.0", 1024 × 600, Large mdpi RAM: 512 MiB		
10.1" WXGA (Tablet) by Generic Screen: 10.1", 1280 × 800, X-Large mdpi RAM: 512 MiB		
	4	Refresh
A user-created device definition. 🔲 A generic device definition.		



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• Define Android Virtual Device type:

- Start the AVD Manager

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Ē	Android Vir	ual Device (AVD) Manager					- 4	
A	ndroid Virtu	al Devices Device Definitions	() Clone Device	and highlight and the	C anapost		×	
	List of know	n device definitions. This can later be u	Name:	ASUSTransformer	Size:	xlarge		
	Device		Screen Size (in):	10.1	Screen Ba	tio: long		
		S.I." WVGA by Generic Screen: 5.1", 480 × 800, Large mdp RAM: 512 MiB	Resolution (px):	1280 x 800	Density:	xhdpi	•	
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() Java - ADT

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• Define Android Virtual Device type:

- Start the AVD Manager

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Android Virtual Device (AVD) Manager	O Clone Device	and the local division of		
List of known device definitions. This can later be Device 5.1" WVGA by Generic Screen: 5.1", 480 × 800, Large mdg RAM: 512 MiB	Name: Screen Size (in): Resolution (px):	ASUSTransformer 10.1 1280 x 800	Android Virtual Device (AVD) Manager Android Virtual Devices Device Definitions List of known device definitions. This can later be used to create Android Virtual Devices. Device	Create AVD
5.4" FWVGA by Generic Screen: 5.4", 480 × 854, Large mdg RAM: 512 MiB	Sensors:	 ✓ Accelerometer ✓ Gyrı ✓ GPS ✓ Prox 	ASUS Transformer by User Screen: 10.1", 1280 × 800, X-Large xhdpi RAM: 512 MiB	Creates a new AV
7.0" WSVGA (Tablet) by Generic Screen: 7.0", 1024 × 600, Large model RAM: 512 MiB	Cameras	✓ Front ✓ Re	Re Screen: 4.7", 720 × 1280, Normal xhdpi RAM: 1024 MiB	Edit Delete
10.1" WXGA (Tablet) by Generic Screen: 10.1", 1280 × 800, X-Large RAM: 512 MiB	Input:	□ Keyboard ● No Nav ● DPad ●	Android TV (1080p) by Google Screen: 55.0", 1920 × 1080, X-Large xhdpi RAM: 2 GiB	
	RAM:	512	Android TV (720p) by Google Screen: 55.0", 1280 × 720, X-Large tvdpi RAM: 2 GiB	
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Device:	ASUS Transformer (1280 × 800: xhdpi)	List of existin	g Android Virtual Devices located at C:\Us	ers\workshop\.android\avd		
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Keyboard:	Hardware keyboard present	MyG			6)	
Skin:	Skin with dynamic hardware controls	MyH	U Launch Options		6)	
Front Camera:	Emulated •	New/			6)	
Back Camera:	Emulated •		Skin: 1280x800		Delete	
			Density: 320		Details	
Memory Options:	RAM: 512 VM Heap: 128	😡 5554:My	Scale display to real	size		
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			Camera			
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SDK Version Mapping Convention

Platform Version	API Level	VERSION_CODE	Notes
Android 4.4	19	KITKAT	Platform Highlights
Android 4.3	18	JELLY_BEAN_MR2	Platform Highlights
Android 4.2, 4.2.2	17	JELLY_BEAN_MR1	Platform Highlights
Android 4.1, 4.1.1	16	JELLY_BEAN	Platform Highlights
Android 4.0.3, 4.0.4	15	ICE_CREAM_SANDWICH_MR1	Platform Highlights
Android 4.0, 4.0.1, 4.0.2	14	ICE_CREAM_SANDWICH	
Android 3.2	13	HONEYCOMB_MR2	
Android 3.1.x	12	HONEYCOMB_MR1	Platform Highlights
Android 3.0.x	11	HONEYCOMB	Platform Highlights
Android 2.3.4 Android 2.3.3	10	GINGERBREAD_MR1	Platform Highlights
Android 2.3.2 Android 2.3.1 Android 2.3	9	GINGERBREAD	
Android 2.2.x	8	FROYO	Platform Highlights
Android 2.1.x	7	ECLAIR_MR1	Platform Highlights
Android 2.0.1	6	ECLAIR_0_1	
Android 2.0	5	ECLAIR	
Android 1.6	4	DONUT	Platform Highlights
Android 1.5	3	CUPCAKE	Platform Highlights
Android 1.1	2	BASE_1_1	
Android 1.0	1	BASE	

http://developer.android.com/guide/topics/manifest/uses-sdk-element.html#ApiLevels

API Level

Home SDK	ev Guide Reference Resources Videos Blog	Filter by API Level: 13 💌
android.graphics.drawable android.graphics.drawable.shapes android.hardware android.hardware.usb android.inputmethodservice android.inputmethodservice android.location android.media.audiofx android.media.audiofx android.met android.net android.net.ntp android.net.sin	 the device supports the time tapse profile quality level <u>QUALITY_TIME_LAPSE_10B0P</u> but can playback a application might want to capture an auxiliary video of resolution 480p using this call. Parameters fd an open file descriptor to be written into. public void setCamera (Camera c) Sets a Camera to use for recording. Use this function to switch quickly between preview and capture mode the camera object. Must call before prepare(). Parameters 	It most 460p, the Since: API Level 3 without a teardown of
android.net.wifi android.nfc android.nfc.tech	c the Camera to use for recording public void setCaptureRate (double fps)	Since: API Level 11
AudioTrack CamcorderProfile CameraProfile	 Set video frame capture rate. This can be used to set a different video frame capture rate than the recorded Currently this works only for time lapse mode. Parameters 	vid∌o's playback rate.
ExifInterface FaceDetector FaceDetector.Face JetPlayer MediaMetadataRetriever MediaPlayer	fps Rate at which frames should be captured in frames per second. The fps can go as low as desi fastest fps will be limited by the hardware. For resolutions that can be captured by the video ca fps can be computed using <u>getPreviewFpsRange(int[])</u> . For higher resolutions the fast more restrictive. Note that the recorder cannot guarantee that frames will be captured at the gir camera/encoder limitations. However it tries to be as close as possible.	red. However the amera, the fastest est fps may be ven rate due to ≡
MediaRecorder MediaRecorder.AudioEncoder MediaRecorder.AudioSource MediaRecorder.OutputFormat MediaRecorder.VideoEncoder MediaRecorder.VideoSource MediaScannerConnection	public void setMaxDuration (int max_duration_ms) Sets the maximum duration (in ms) of the recording session. Call this after setOutFormat() but before prepareaches the specified duration, a notification will be sent to the <u>MediaRecorder.OnInfoListener</u> with <u>MEDIA_RECORDER_INFO_MAX_DURATION_REACHED</u> and recording will be stopped. Stopping happens a is no guarantee that the recorder will have stopped by the time the listener is notified.	Since: API Level 3 are(). After recording a 'what" code of syr chronously, there
Ringtone RingtoneManager SoundPool	Parameters max_duration_ms the maximum duration in ms (if zero or negative, disables the duration limit)	

API Level of built-in methods indicates that it work only with android version with API level equal or above that value. E.g. 13 here

Step-3: Creating a Sample App

(🕡 Java - ADT				
 "Hello CS5748" 	File Edit Refactor	Source Navigate	Search Project Run	Window Help	
	New		Alt+Shift+N ►	😫 Java Project	
	Open File			Android Application Project	
	Close		Ctrl+W	Project	
O New Android Application					
New Android Application					
Creates a new Android Application					
Application Name: HelloWorld					
Project Name: HelloWorld					
Package Name: sg.edu.nus.comp.cs5248.helloworld					
Minimum Required SDK: @ API8: Android 2.2 (Frovo)	-				
Target SDK: ¹ API16: Android 4.1 (Jelly Bean)	-				
Compile With: API16: Android 4.1 (Jelly Bean)	•]				
Theme: Holo Light with Dark Action Bar	•				
\bigcirc Choose the base theme to use for the application					
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Step-3: Creating a Sample App

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New Android Application	🕡 New Android Application	
Creates a new Android Application	New Android Application	
Application Name: HelloWorld	Configure Project	
Project Name: HelloWorld	✓ Create custom launcher icon	
Package Name: sg.edu.nus.comp.cs5248	✓ Create activity	
Minimum Required SDK: API 8: Android 2.2 (Froyo	Mark this project as a library	
Target SDK: 0 API 16: Android 4.1 (Jelly	✓ Create Project in Workspace	
Compile With: API 16: Android 4.1 (Jelly	Location: D:\adt-bundle-windows-x86-20140702\examples\HelloWorld Browse	
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Step-3: Creating a Sample App

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	Open File			Android Application Project
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Creates a new Android Application	New Android Application	O New Android Application		
Application Name: HelloWorld	Configure Project	Empty Activity Creates a new empty activity		
Project Name: HelloWorld	Create custom launcher icon			
Package Name: sg.edu.nus.comp.cs5248	Create activity			(_ :)
Minimum Required SDK: API 8: Android 2.2 (Froyo	Mark this project as a library			
Target SDK: API 16: Android 4.1 (Jelly	Create Project in Workspace	Activity Name® Activity hello world		
Compile With: API 16: Android 4.1 (Jelly	Location: D:\adt-bundle-windows-x86-20140702\exam			
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Eclipse > New > Android Project



The Manifest File

- Identify any user permissions the application requires
- Declare the minimum <u>API Level</u> required by the application
- Declare hardware and software features used or required by the application
- API libraries the application needs to be linked

The Manifest file

Java - HelloWorld/AndroidManifest.xml - Eclipse	
File Edit Refactor Source Navigate Search Project Run	Window Help
r 1 - 1 = 1 = 1 = 1 - 1 - 1 - 1 - 1 - 1 -	< 券 ▼ 🖸 ▼ 💁 ▼ 🔮 🧭 ▼ 🤔 🖋 ▼ — 🖢 ▼ 🖗 ▼ 🗢 マ 🗢 ▼ 🗃
📙 Package Explorer 🔀 📄 🖨 🗖	🚺 HelloWorldActivity.java 🔄 activity_hello_world.xml 🔄 HelloWorld Manifest 🔀
🔺 🚰 HelloWorld	1 xml version="1.0" encoding="utf-8"?
Android 4.1.2	2⊖ <manifest <="" th="" xmlns:android="http://schemas.android.com/apk/res/android"></manifest>
Android Private Libraries	3 package="sg.edu.nus.comp.cs5248.helloworld"
	<pre>4 android:versionCode="1"</pre>
	5 android:versionName="1.0" >
gen [Generated Java Files]	6
🗁 assets	7 Kuses-sdk
> 🔁 bin	8 android:minSdkVersion="8"
> 🔁 libs	9 android:targetSdkVersion="16" />
D 📴 res	
Android Manifect yml	11 Kapplication
AndroidManirest.xmi	12 android:allowBackup="true"
ic_launcher-web.png	13 android:lcon= @drdwdble/ic_iduncher
proguard-project.txt	14 android: label= @string/app_name
project.properties	15 android: theme= @style/Appineme >
	17 and noid unamer" Hell olderlight utu"
	18 android:label="Actring/app.name" >
	19 (intent-filter)
	20 <action and="" roid:name="and roid intent action MAIN"></action>
	22 <pre>22 <category android:name="android.intent.category.LAUNCHER"></category></pre>
	23
	24
	25
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	27

Default.properties



Main Activity Class



Graphical Layout Editor



XML Layout File



- proguard-project.txt
- project.properties

J	Hel	HelloWorldActivity.java 💿 strings.xml	👌 activity_main.xml 🛛	
	1	<pre>1 <relativelayout <="" th="" xmlns:android="ht</pre></th><th>tp://schemas.android.</th><th>com/apk/res/android"></relativelayout></pre>		
	2	<pre>2 xmlns:tools="http://schemas.a</pre>	ndroid.com/tools"	
	3	3 android:layout_width="match_p	arent"	
	4	4 android:layout_height="match_	parent"	
	5	5 tools:context="\${relativePack	age}.\${activityClass}	" >
	6	6		
	7	7 <textview< th=""><th></th><th></th></textview<>		
	8	8 android:layout_width="wra	p_content"	
	9	9 android:layout_height="wr	ap_content"	
1	10	IO android:text="@string/hel	lo_world" />	
1	11	11		

</RelativeLayout>

Value Resources



R.java



Building App

Building Process



No Android Device ?

	 An Select Ch 	droid Device Choos a device compatibl oose a running And	er le with target Androic Iroid device	13.2.			
ndroid AVD Error	◯ Lau	Serial Number	l Virtual Device	AVD Name	Target	Debug	State
Yes <u>No</u>		AVD Name	Target Name No AVD available	Platform 	API Level	CPU/ABI	Details Start
						ОК	

Install USB Driver !!!

USB Driver Installation

- 1. Install OEM USB Driver from ASUS website.
 - http://support.asus.com/download/ and search by Transformer
- 2. Update Driver Software from Device Manager



3. Locate USB Driver folder



4. Enable USB Debugging at Transformer

Enabling USB debugging

		📚 📑 2% 🛢 53% 5:18
Developer options		ON
L Security	Process Stats	
A Language & input	Geeky stats about running processes	
D Backup & reset		
ACCOUNTS	Debug mode when USB is connected	✓
8 Google	Revoke USB debugging authorizations	
+ Add account	Power menu bug reports	
SYSTEM	Include option in power menu for taking a bug report	
🖋 Performance	Allow mock locations Allow mock locations	
MediaScanner Filters	Select debug app	
① Date & time	No debug application set	
🖐 Accessibility	Wait for debugger Debugged application waits for debugger to attach before executing	Ū.
▲ SuperSU	Verify apps over USB Check apps installed via ADB/ADT for harmful behavior.	
🖶 Printing	Wireless display certification	
{ } Developer options	Show options for wireless display certification	
① About tablet	Show touches	

After Successful USB Driver Installation

<sdk>/tools/ddms.bat

			Info	Threads VM Heap	p Allocation Tracker	Sysinfo	Emulator Contro	Event L
lame	On	line	3.2 DDM App VM ^ Proc Supp Supp	I-aware? description: version: ess ID: corts Profiling Control: borts HPROF Control:	-			
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► 🔐 — 🕑 🛈 (Log Time 09-22 01:29:29.400	" D 📀 D	Pid 132	tag AlarmManager	Message Triggered Alarm 40b	79760 ELAPSED_REALT	TIME_WAk	EUP IntentSender	411e83
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Running Sample App.



Sample Hello World Code

```
package sg.edu.nus.comp.cs5248.helloworld;
```

```
import android.app.Activity;
```

```
public class HelloWorldActivity extends Activity {
    /** Called when the activity is first created. */
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);
    }
}
```

Editing Sample Code

<pre><?xml version="1.0" encoding="utf-0"?> <linearlayout android:layout="" android:layout_height="vrap_content" android:layout_width="fill_parent" android:orientation="vertical" xmlns:android="http://schemas.android.com/apk/res/android"> </linearlayout></pre>	Add id to main.xml "@+id/hellold"
<pre>package sg.edu.nus.comp.cs5248.helloworld; import android.app.Activity; public class HelloWorldActivity extends Activity {</pre>	Edit HelloWorldActivity.java
<pre>/** Called when the activity is first created. */ @Override public void onCreate(Bundle savedInstanceState) { super.onCreate(savedInstanceState);</pre>	Important points
<pre>TextView = (TextView) findById(R.id. setContentView(R.layout.main); } } * * * * * * * * * * * * * * * * *</pre>	 UI Element can have an Id Variables in our code <i>link</i> to UI elements update UI element content from our program code whenever we like
rs 425 warpings 0 others (Filter matched 100 of 425 items)	

BE PATIENT Since Eclipse may not be responsive for a long time !!!

.

A Sample Code

```
package sg.edu.nus.comp.cs5248.helloworld;
```

```
import android.app.Activity;
```

- import android.os.Bundle;
- import android.widget.TextView;

```
public class HelloWorldActivity extends Activity {
    /** Called when the activity is first created. */
    @Override
   public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        TextView tv = (TextView) findViewById(R.id.helloId);
        tv.setText("hello, CS5248");
                                                           Important points
        setContentView(R.layout.main);
                                                       UI Element can have an Id
                                                       Variables in our code link to
                                                       UI elements
                                                    3.) Update UI element content
                                                       from our program code
                                                       whenever we like
```

App Failure



Let's Debug the code

Always, Look at DDMS !!!

🕐 Dalvik Debug Monitor	-	-	-		\$
<u>File Edit Actions Devic</u>	e				
Image:	On	line	3.2 Info	Threads VM Heap Allocation Tracker Sysinfo Emulator Control Event Log I-aware? - <	
	<u> </u>	6	VM V Proc Supp Supp	rersion: - ess ID: - iorts Profiling Control: - iorts HPROF Control: -	
Log		• 4			
Time		pid	tag	Message	
09-27 19:25:55.400	I	1808	jdwp	Ignoring second debugger accepting and dropping	
09-27 19:25:55.420	D	88	dalvikvm	GC_EXPLICIT freed <1K, 5% free 6291K/6595K, paused 2ms+3ms	
09-27 19:25:55.450	D	1808	AndroidRunti	Shutting down VM	
09-27 19:25:55.450	W	1808	dalvikvm	threadid=1: thread exiting with uncaught exception (group=0x400dc760)	
09-27 19:25:55.450	Е	1808	AndroidRunti	FATAL EXCEPTION: main	
09-27 19:25:55.450	E	1808	AndroidRunti	java.lang.RuntimeException: Unable to start activity ComponentInfo{sg.edu.nus.comp.cs5248.helloworl	
09-27 19:25:55.450	E	1808	AndroidRunti	at android.app.ActivityThread.performLaunchActivity(ActivityThread.java:1815)	
09-27 19:25:55.450	E	1808	AndroidRunti	at android.app.ActivityThread.handleLaunchActivity(ActivityThread.java:1831)	
09-27 19:25:55.450	Е	1808	AndroidRunti	at android.app.ActivityThread.access\$500(ActivityThread.java:122)	
09-27 19:25:55.450	E	1808	AndroidRunti	at android.app.ActivityThread\$H.handleMessage(ActivityThread.java:1024)	
09-27 19:25:55.450	E	1808	AndroidRunti	at android.os.Handler.dispatchMessage(Handler.java:99)	
09-27 19:25:55.450	E	1808	AndroidRunti	at android.os.Looper.loop(Looper.java:132)	
09-27 19:25:55.450	E	1808	AndroidRunti	at android.app.ActivityThread.main(ActivityThread.java:4123)	
09-27 19:25:55.450	E	1808	AndroidRunti	at java.lang.reflect.Method.invokeNative(Native Method)	
09-27 19:25:55.450	E	1808	AndroidRunti	at java.lang.reflect.Method.invoke(Method.java:491)	
09-27 19:25:55.450	E	1808	AndroidRunti	at com.android.internal.os.ZygoteInit\$MethodAndArgsCaller.run(ZygoteInit.java:841)	
09-27 19:25:55.450	E	1808	AndroidRunti	at com.android.internal.os.ZygoteInit.main(ZygoteInit.java:599)	
09-27 19:25:55.450	Е	1808	AndroidRunti	at dalvik.system.NativeStart.main(Native Method)	
09-27 19:25:55.450	E	1808	AndroidRunti	Caused by: java.lang.NullPointerException	
09-27 19:25:55.450	Ε	1808	AndroidRunti	at sg.edu.nus.comp.cs5248.helloworld.HelloWorldActivity.onCreate(HelloWorldActivity.java:15)	
09-27 19:25:55.450	Ε	1808	AndroidRunti	at android.app.Activity.performCreate(Activity.java:4397)	
09-27 19:25:55.450	Ε	1808	AndroidRunti	at android.app.Instrumentation.callActivityOnCreate(Instrumentation.java:1048)	
09-27 19:25:55.450	Ε	1808	AndroidRunti	at android.app.ActivityThread.performLaunchActivity(ActivityThread.java:1779)	
09-27 19:25:55.450	Е	1808	AndroidRunti	11 more	
09-27 19:25:55.460	D	88	dalvikvm	GC_EXPLICIT freed <1K, 5% free 6291K/6595K, paused 2ms+3ms	
09-27 19:25:55.460	w	131	ActivityManager	Force finishing activity sq.edu.nus.comp.cs5248.helloworld/.HelloWorldActivity	
Filter:					

Correction

```
package sg.edu.nus.comp.cs5248.helloworld;
```

```
import android.app.Activity;
import android.os.Bundle;
```

ł

```
import android.widget.TextView;
```

```
public class HelloWorldActivity extends Activity {
    /** Called when the activity is first created. */
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);
        TextView tv = (TextView) findViewBvId(R.id.helloId);
        tv.setText("hello, CS5248");
    3
```



Hello, Android

Debugging via Dalvik Debug Monitor Service (DDMS)

Log.e("Hello, World", "Hello, BJ");

				_
	pid	tag	Message	-
80 E	212	dalvikvm	GC_FOR_ALLOC freed <1K, 38% free 12363K/19655K, paused 29ms	
60 E	212	dalvikvm	GC_CONCURRENT freed 33K, 38% free 12331K/19655K, paused 2	
50 E	1360	AndroidRunti	>>>>> AndroidRuntime START com.android.internal.os.Runti	
50 E	1360	AndroidRunti	CheckJNI is OFF	
90 1	1360	jdwp	Ignoring second debugger accepting and dropping	
90 E	135	AlarmManager	Removed alarm Alarm{412b5b38 type 2 com.google.android.ap	
90 E	135	AlarmManager	Added alarm Alarm{41381c98 type 2 com.google.android.apps	
00 E	1360	AndroidRunti	Calling main entry com.android.commands.am.Am	
00 E	212	dalvikvm	GC_FOR_ALLOC freed 1943K, 47% free 10478K/19655K, paused 3	
00 1	212	dalvikvm-heap	Grow heap (frag case) to 12.163MB for 1958648-byte allocation	
10 1	135	ActivityManager	Starting: Intent { act=android.intent.action.MAIN cat=[android.i	
20 E	1360	AndroidRunti	Shutting down VM	
30 1	1360	AndroidRunti	NOTE: attach of thread 'Binder Thread #3' failed	
30 E	1360	dalvikvm	GC_CONCURRENT freed 102K, 86% free 371K/2560K, paused 0m	
30 E	1360	jdwp	Got wake-up signal, bailing out of select	
30 E	1360	dalvikvm	Debugger has detached; object registry had 1 entries	
90 E	212	dalvikvm	GC_FOR_ALLOC freed <1K, 37% free 12391K/19655K, paused 79ms	
00 1	253	System.out	[INFO:5638862]: LogSource: Running flush	
00 1	253	System.out	[INFO:5638863]: LogSource: Sending payload [bytes=1084]	
00 1	135	ActivityManager	Start proc sg.edu.nus.comp.cs5248.helloworld for activity sg.edu	
30 1	1377	jdwp	Ignoring second debugger accepting and dropping	
30 E	135	WindowMana	readLidState, sw:1	
30 E	135	WindowMana	adjustConfigurationLw, config:{1.0 0mcc0mnc (no locale) sw800	
40 E	1377	dalvikvm	Debugger has detached; object registry had 1 entries	
60 E	1377	Hello, World	Hello, BJ	
90 E	1344	dalvikvm	GC_CONCURRENT freed 209K, 4% free 6594K/6855K, paused 4m	
40 E	212	dalvikvm	GC_CONCURRENT freed 6K, 37% free 12391K/19655K, paused 2	-
	80 C 660 C 550 C 550 C 90 1 90 C 30 C 330 C <td>pid 80 D 212 60 D 212 60 D 212 60 D 1360 50 D 1360 90 I 135 90 D 135 90 D 135 90 D 135 90 D 1360 90 D 122 00 I 212 00 I 1360 30 D 1360 30 D 1360 30 D 1360 90 D 212 90 I 253 90 I 135 230 I 135 240 D 1377 <t< td=""><td>pid tag 80 D 212 dalvikvm 60 D 212 dalvikvm 60 D 212 dalvikvm 60 D 212 dalvikvm 50 D 1360 AndroidRunti 50 D 1360 AndroidRunti 90 I 135 AlarmManager 90 D 135 Advikvm 90 D 1360 AndroidRunti 90 D 1360 AndroidRunti 30 D 1360 dalvikvm 90 D 1360 dalvikvm 90 D 212 dalvikvm 90 D 212 dalvikvm 90 <td< td=""><td>pidtagMessage80D212dalvikvmGC_FOR_ALLOC freed <1K, 38% free 1236K/19655K, paused 29ms</td>60D212dalvikvmGC_CONCURRENT freed 33K, 38% free 12331K/19655K, paused 250D1360AndroidRunti>>>>>> AndroidRuntime START com.android.internal.os.Runti50D1360AndroidRuntiCheckINI is OFF90I1360jdwpIgnoring second debugger accepting and dropping90D135AlarmManagerRemoved alarm Alarm(412b5b38 type 2 com.google.android.apn90D135AlarmManagerAdded alarm Alarm(41381c98 type 2 com.google.android.apn90D1360AndroidRuntiCalling main entry com.android.free 10478K/19655K, paused 390D1360AndroidRuntiCalling main entry com.android.rol 1958648-byte allocation90I135ActivityManagerStarting: Intent { act= android.intent.action.MAIN cat=[android.i90D1360AndroidRuntiShutting down VM911360AndroidRuntiNOTE: attach of thread 'Binder Thread #3' failed92D1360dalvikvmGC_CONCURRENT free 102K, 8% free 371K/2560K, paused 0m90D1360dalvikvmGC_CONCURRENT free 102K, 8% free 371K/2560K, paused 7ms90D1360dalvikvmGC_CONCURRENT free 102K, 8% free 371K/2560K, paused 7ms90D1360dalvikvmGC_CONCURRENT free 102K, 8% free 371K/2560K, paused 7ms</td<></td></t<></td>	pid 80 D 212 60 D 212 60 D 212 60 D 1360 50 D 1360 90 I 135 90 D 135 90 D 135 90 D 135 90 D 1360 90 D 122 00 I 212 00 I 1360 30 D 1360 30 D 1360 30 D 1360 90 D 212 90 I 253 90 I 135 230 I 135 240 D 1377 <t< td=""><td>pid tag 80 D 212 dalvikvm 60 D 212 dalvikvm 60 D 212 dalvikvm 60 D 212 dalvikvm 50 D 1360 AndroidRunti 50 D 1360 AndroidRunti 90 I 135 AlarmManager 90 D 135 Advikvm 90 D 1360 AndroidRunti 90 D 1360 AndroidRunti 30 D 1360 dalvikvm 90 D 1360 dalvikvm 90 D 212 dalvikvm 90 D 212 dalvikvm 90 <td< td=""><td>pidtagMessage80D212dalvikvmGC_FOR_ALLOC freed <1K, 38% free 1236K/19655K, paused 29ms</td>60D212dalvikvmGC_CONCURRENT freed 33K, 38% free 12331K/19655K, paused 250D1360AndroidRunti>>>>>> AndroidRuntime START com.android.internal.os.Runti50D1360AndroidRuntiCheckINI is OFF90I1360jdwpIgnoring second debugger accepting and dropping90D135AlarmManagerRemoved alarm Alarm(412b5b38 type 2 com.google.android.apn90D135AlarmManagerAdded alarm Alarm(41381c98 type 2 com.google.android.apn90D1360AndroidRuntiCalling main entry com.android.free 10478K/19655K, paused 390D1360AndroidRuntiCalling main entry com.android.rol 1958648-byte allocation90I135ActivityManagerStarting: Intent { act= android.intent.action.MAIN cat=[android.i90D1360AndroidRuntiShutting down VM911360AndroidRuntiNOTE: attach of thread 'Binder Thread #3' failed92D1360dalvikvmGC_CONCURRENT free 102K, 8% free 371K/2560K, paused 0m90D1360dalvikvmGC_CONCURRENT free 102K, 8% free 371K/2560K, paused 7ms90D1360dalvikvmGC_CONCURRENT free 102K, 8% free 371K/2560K, paused 7ms90D1360dalvikvmGC_CONCURRENT free 102K, 8% free 371K/2560K, paused 7ms</td<></td></t<>	pid tag 80 D 212 dalvikvm 60 D 212 dalvikvm 60 D 212 dalvikvm 60 D 212 dalvikvm 50 D 1360 AndroidRunti 50 D 1360 AndroidRunti 90 I 135 AlarmManager 90 D 135 Advikvm 90 D 1360 AndroidRunti 90 D 1360 AndroidRunti 30 D 1360 dalvikvm 90 D 1360 dalvikvm 90 D 212 dalvikvm 90 D 212 dalvikvm 90 <td< td=""><td>pidtagMessage80D212dalvikvmGC_FOR_ALLOC freed <1K, 38% free 1236K/19655K, paused 29ms</td>60D212dalvikvmGC_CONCURRENT freed 33K, 38% free 12331K/19655K, paused 250D1360AndroidRunti>>>>>> AndroidRuntime START com.android.internal.os.Runti50D1360AndroidRuntiCheckINI is OFF90I1360jdwpIgnoring second debugger accepting and dropping90D135AlarmManagerRemoved alarm Alarm(412b5b38 type 2 com.google.android.apn90D135AlarmManagerAdded alarm Alarm(41381c98 type 2 com.google.android.apn90D1360AndroidRuntiCalling main entry com.android.free 10478K/19655K, paused 390D1360AndroidRuntiCalling main entry com.android.rol 1958648-byte allocation90I135ActivityManagerStarting: Intent { act= android.intent.action.MAIN cat=[android.i90D1360AndroidRuntiShutting down VM911360AndroidRuntiNOTE: attach of thread 'Binder Thread #3' failed92D1360dalvikvmGC_CONCURRENT free 102K, 8% free 371K/2560K, paused 0m90D1360dalvikvmGC_CONCURRENT free 102K, 8% free 371K/2560K, paused 7ms90D1360dalvikvmGC_CONCURRENT free 102K, 8% free 371K/2560K, paused 7ms90D1360dalvikvmGC_CONCURRENT free 102K, 8% free 371K/2560K, paused 7ms</td<>	pidtagMessage80D212dalvikvmGC_FOR_ALLOC freed <1K, 38% free 1236K/19655K, paused 29ms

Now, everything is ready

Application Components

- Android application
 - .apk : android package
- Four Application Components
 - Activity
 - Service
 - Content Provider
 - Broadcast Receiver
- Communication among components except Content Provider
 - Intent

Activity 1

• Activity Lifecycle



Implement Lifecycle Callbacks

```
public class ExampleActivity extends Activity {
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        // The activity is being created.
    @Override
    protected void onStart() {
        super.onStart();
        // The activity is about to become visible.
    @Override
    protected void onResume() {
        super.onResume();
        // The activity has become visible (it is now "resumed").
    @Override
    protected void onPause() {
        super.onPause();
        // Another activity is taking focus (this activity is about
    @Override
    protected void onStop() {
        super.onStop();
        // The activity is no longer visible (it is now "stopped")
    @Override
    protected void onDestroy() {
        super.onDestroy();
        // The activity is about to be destroyed.
```

Activity 2

- Hierarchical View
 Architecture
 - ViewGroup (Layout)
 - View
 - View
 - ViewGroup (Layout)
 - View
 - View

- ...

- View
- ViewGroup

— ...

• Declare Activity in the manifest

```
<manifest ... >
<application ... >
<activity android:name=".ExampleActivity" />
...
</application ... >
...
</manifest >
```

Activity 3

• Start an Activity

Intent intent = new Intent(this, SignInActivity.class);
startActivity(intent);

 Start an Activity for a Result

> // Create an intent to "pick" a contact, as defined by Intent intent = new Intent(Intent.ACTION PICK, Contacts startActivityForResult(intent, PICK CONTACT REQUEST);

Cursor cursor = getContentResolver().query(data.get new String[] (Contacts.DISPLAY_NAME), null, null, r

String name = cursor.getString(columnIndex);

/ Do something with the selected contact's nam

- Caller Activity

private void pickContact()

@Override

• Activities and Stack



- Callee Activity

setResult(RESULT OK, new Intent().putExtra("key", "value"));

• finish

Services

- A service is a component that runs in the bg to perform long-running operations
- A service does not provide a user interface
- Another component, such as an activity, can start the service and let it run or bind to it in order to interact with it
- A service is implemented as a subclass of Service
- E.g a service might play music in the background while the user is in a different app

Broadcast Receivers

- A broadcast receiver is a component that responds to system-wide broadcast announcements
- Apps can also initiate broadcasts
- Although broadcast receivers don't display a UI, they may create a status bar notification to alert the user when a broadcast event occurs
- A broadcast receiver is implemented as a subclass of BroadcastReceiver and each broadcast is delivered as an Intent object.

Content Providers

- A content provider manages a shared set of app data
- Through the content provider, other apps can query or even modify the data
- Any app with the proper permissions can query part of the content provider
- A content provider is implemented as a subclass of ContentProvider and must implement a standard set of APIs that enable other apps to perform transactions.

Intent

- An intent is an abstract description of an operation to be performed
 - It can be used with <u>startActivity</u> to launch an <u>Activity</u>
 - <u>broadcastIntent</u> to send it to any interested
 <u>BroadcastReceiver</u> components
 - <u>startService(Intent)</u> or <u>bindService(Intent,</u>
 <u>ServiceConnection, int)</u> to communicate with a background <u>Service</u>

Activating Components

- Passing an <u>Intent</u> to <u>startActivity()</u> or <u>startActivityForResult()</u>
- passing an <u>Intent</u> to <u>startService()</u>. Or bind to the service by passing an <u>Intent</u> to <u>bindService()</u>.
- Passing an <u>Intent</u> to methods like <u>sendBroadcast()</u>, <u>sendOrderedBroadcast()</u>, or <u>sendStickyBroadcast()</u>.
- perform a query to a content provider by calling <u>query()</u> on a <u>ContentResolver</u>.

UI – Declaring Layout

Initiated when called setContentView() on onCreate()

public void onCreate(Bundle savedInstanceState) {
 super.onCreate(savedInstanceState);
 setContentView(R.layout.main_layout);

- Use Visual Layout Editor for initial layout design.
- Edit XML file extensively.



UI – Creating Menu

- Menu Types
 - Options Menu
 - Appears when a user touches MENU button.
 - Context Menu
 - Submenu
- How to
 - Specify menu items in a XML resource menu
 - Inflate a Menu Resource
 - Respond to user Action

At res/menu/game_menu.xml



inflate

@Override

public boolean onCreateOptionsMenu(Menu menu) {
 MenuInflater inflater = getMenuInflater();
 inflater.inflate(R.menu.game_menu, menu);
 return true;



callback

ØOverride
<pre>public boolean onOptionsItemSelected(MenuItem item) {</pre>
<pre>// Handle item selection</pre>
<pre>switch (item.getItemId()) {</pre>
case R.id.new_game:
newGame();
return true;
case R.id.help:
<pre>showHelp();</pre>
return true;
default:
return super.onOptionsItemSelected(item);
}
1

UI – Handling UI Events

onClick, onLongClick, onKey, onTouch, ...

```
// Create an anonymous implementation of OnClickListener
private OnClickListener mCorkyListener = new OnClickListener() {
    public void onClick(View v) {
        // do something when the button is clicked
    }
};
protected void onCreate(Bundle savedValues) {
    ...
    // Capture our button from layout
    Button button = (Button)findViewById(R.id.corky);
    // Register the onClick listener with the implementation above
    button.setOnClickListener(mCorkyListener);
    ...
}
```

```
public class ExampleActivity extends Activity implements OnClickListener {
    protected void onCreate(Bundle savedValues) {
        ...
        Button button = (Button)findViewById(R.id.corky);
        button.setOnClickListener(this);
    }
    // Implement the OnClickListener callback
    public void onClick(View v) {
        // do something when the button is clicked
    }
    ...
}
```

Thread

- UI Thread
 - "Main" thread per application responsible for interacting with UI components.
- "Application Not Responding" problem
 - If UI thread is blocked more than several seconds, ANR dialog appears.
 - Do not block the UI thread
 - Do not access UI components outside UI thread.



Use AsyncTask, Instead

```
public void onClick(View v) {
    new DownloadImageTask().execute("http://example.com/image.png");
}
private class DownloadImageTask extends AsyncTask<String, Void, Bitmap> {
    /** The system calls this to perform work in a worker thread and
      * delivers it the parameters given to AsyncTask.execute() */
    protected Bitmap doInBackground(String... urls) {
        return loadImageFromNetwork(urls[0]);
    /** The system calls this to perform work in the UI thread and delivers
      * the result from doInBackground() */
    protected void onPostExecute(Bitmap result) {
        mImageView.setImageBitmap(result);
```

Misc - Media Recorder

 Modify CameraPreview to see the video during recording.



Misc - HTTP Post

- Use HttpClient and HttpPost.
- Use "multi-part/form-data" to encapsulate segment.
- Do not excessively use memory.

Misc – Permission Issue

• Add following permissions to the manifest file.

<uses-permission android:name="android.permission.INTERNET"></uses-permission>
<uses-permission android:name="android.permission.ACCESS_MOCK_LOCATION"></uses-permission>
<uses-permission android:name="android.permission.ACCESS_FINE_LOCATION"></uses-permission>
<uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION"></uses-permission>
<uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION"></uses-permission>
<uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION"></uses-permission>
<uses-permission android:name="android.permission.CAMERA" />
<uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE" />
<uses-permission android:name="android.permission.RECORD_AUDIO" />
<uses-permission android:name="android.permission.WAKE_LOCK" /></uses-permission android:name="android.permission.WAKE_LOCK" /></uses-permission.WAKE_LOCK" /></uses-permission.WAKE_LOCK" /></uses-permission.WAKE_LOCK" /></uses-permission.WAKE_LOCK" /></uses-permission.WAKE_LOCK" /></uses-permission.WAKE_LOCK" /></uses-permission.WAKE_LOCK" /></uses-permission.WAKE_LOCK" /></uses-permission.WAKE_LO

<uses-feature android:name="android.hardware.camera" />
<uses-feature android:name="android.hardware.camera.autofocus" />

Sample Implementation



Upload Service

DASH Uploader

File Path: /storage/sdcard0/Pictures/VideoGallery/VID_20130911_034601.mp4

Uploading streamlet 6: 19% Completed 77.882225 % of total video uploaded.



Misc - Integration with MP4Parser

- Adding a jar file
 - Create its jar file.
 - Add jar file to the app.
 - Build Path > Configure Build Path > Libraries > Add JARs.
- If you include source files directly,
 - Put Isoparser-default.properties to assets folder
 - Change getResourceAsStream("isoparserdefault.properties") in PropertyBoxParserImpl to "/assets/isoparser-default.properties".

https://github.com/sannies/mp4parser https://code.google.com/p/mp4parser/

Misc - Adapter

- An Adapter object acts as a bridge between an AdapterView and the underlying data for that view (i.e. ListView, GridView, Gallery, etc.).
- An AdapterView is a view whose children are determined by an Adapter.

http://developer.android.com/reference/android/widget/Adapter.html http://developer.android.com/reference/android/widget/AdapterView.html

Misc - Fragments

- A Fragment represents a behavior or a portion of user interface in an Activity.
- A fragment must always be embedded in an activity and the fragment's lifecycle is directly affected by the host activity's lifecycle.



Figure 1. An example of how two UI modules defined by fragments can be combined into one activity for a tablet design, but separated for a handset design.

http://developer.android.com/guide/components/fragments.html

Misc - Connecting to NUS Wifi

	Settings (NUS	≡,
	 ♥ Wireless & networ ♥ Sound ♥ Sound ♥ Screen ♥ Location & secure ♥ Applications ♥ Accounts & synce ♥ Privacy ♥ Storage ♥ Language & input ♥ Accessibility ♥ Date & time ♥ About tablet 	Signal strength Good Security 802.1x EAP EAP method PEAP Phase 2 MSCHAPV2 authentication MSCHAPV2 CA certificate (unspecified) Identity nusstu\a0092546 Anonymous identity Password Show password	
¢		Cancel Connect	5:50 T

Final Comment: Use ApiDemo !!!

😂 New Android Project				×					
New Android Project				-					
A The API level for the sele	cted SDK target does not match the N	/lin SDK Ver	sion.						
Project name: Accelerom	eterPlayActivity								
Contents									
Create new project in w	orkspace								
Create project from exist	sting source								
Use default location									
Location: C:/Users/beomjoo seo/workspace Browse									
Create project from existing sample									
Samples: Accelerometer	Play		-						
Build Targe AccessibilitySe	Play rvice		Â.						
ApiDemos									
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And Cubal in 200	pility		=						
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Goo LunarLander > MultiResolutio	n								
And NotePad									
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RenderScript >	Balls								
Goo RenderScript >	Fountain								
Beal RenderScript >	HelloWorld								
Real SampleSuperAd	MiscSamples		-						
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GALAXY Tab Ad	Samsung Electronics Co., Ltd.	2.2	8						
GALAXY Tab Ad	Samsung Electronics Co., Ltd.	2.2	8						
Android 2.3	Android Open Source Project	2.3	9						
Google APIs	Google Inc.	2.3	9						
EDK	Sony Ericsson Mobile Communic	2.3	9						
Android 2.3.3	Android Open Source Project	2.3.3	10						
Google APIs	Google Inc.	2.3.3	10						
EDK 1.1	Sony Ericsson Mobile Communic	2.3.3	10						
Anaroia 3.0	Google Inc	3.0	11						
Android 31	Android Open Source Project	31	12						
Google APIs	Google Inc.	3.1	12						
Android 3.2	Android Open Source Project	3.2	13						
Google APIs	Google Inc.	3.2	13						
	22								
standard Android platfor	11 3.2								
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?	Back Next > Fin	ish	Cancel						

General Reference

- How to work with Android GUI layouts <u>https://www.youtube.com/watch?v=xn9KYnwIoBE</u>
- Building and running your app <u>http://developer.android.com/tools/building/building-eclipse.html</u>
- Deployment of the <u>.apk file</u> <u>http://stackoverflow.com/questions/3480201/how-do-you-install-an-apk-file-in-the-android-emulator</u>
- Find the hidden developer option <u>http://www.cnet.com/how-to/restore-the-developer-options-menu-in-android-4-2/</u>
- Rotation lock/unlock <u>http://www.howtogeek.com/howto/26715/how-to-make-your-android-phone-stop-rotating-the-screen-when-you%E2%80%99re-reading-sideways/</u>
- Video tutorials <u>http://www.youtube.com/watch?v=5RHtKIo_KDI</u>
- Load/Open an existing package (e.g., the provided ClassExamples) into your eclipse
 - File --> Import ... --> General-Tab --> Existing Projects into Workspace (and click Next)
 - Select root Directory: click Browse: select the folder the include the AndroidManifest.xml or project.properties files.
 - Click finish