## Basic Android Development

Safari Online

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Link to this document: <http://bit.ly/2fmaUBB>

This document is for notes that come up during class. It's also an easy way to share code and other materials.

It is shared as a Google Doc that is available to anyone with the link. The shortened link is given above.

Relevant GitHub repositories:

<https://github.com/kousen/HelloWorldAS>

<https://github.com/kousen/ICNDB_AS>

<https://github.com/kousen/Supers>

Setup:

Android Studio, <https://developer.android.com/studio/index.html>

Main site: <https://developer.android.com/index.html>

Start here for everything :)

Android dashboards:

<https://developer.android.com/about/dashboards/index.html>

i18n → internationalization

Uses "resource bundles" for individual "locales"

Locale → country/language/variant

Also for error messages

HAXM → Hardware Accelerated Execution Manager

uses virtualization to speed up the emulator

In the Gradle build file:

Inside the "dependencies" section, the latest version of Gradle now uses "implementation" and "testImplementation" instead of "compile" and "testCompile"

Gradle 4.0 → "implementation" and "api" instead of "compile"

gravity → moves the text inside a widget around

layout\_gravity → moves the widget around inside its parent

App at the end of Day 1:

MainActivity.java:

package com.oreilly.myapplication;

import android.support.v7.app.AppCompatActivity;

import android.os.Bundle;

import android.util.Log;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import android.widget.TextView;

import butterknife.BindView;

import butterknife.ButterKnife;

import butterknife.OnClick;

public class MainActivity extends AppCompatActivity {

private static final String TAG = "XYZ";

@BindView(R.id.text\_view) TextView textView;

@BindView(R.id.name\_edit\_text) EditText editText;

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.activity\_main);

ButterKnife.bind(this);

Log.d(TAG, "onCreate");

// textView = findViewById(R.id.text\_view);

// editText = findViewById(R.id.name\_edit\_text);

//

// Button helloButton = findViewById(R.id.hello\_button);

// helloButton.setOnClickListener(new View.OnClickListener() {

// @Override

// public void onClick(View view) {

// sayHello(view);

// }

// });

}

@OnClick(R.id.hello\_button)

public void sayHello(View view) {

String name = editText.getText().toString();

textView.setText(String.format(getString(R.string.greeting), name));

}

@Override

protected void onPause() {

super.onPause();

Log.d(TAG, "onPause");

}

@Override

protected void onResume() {

super.onResume();

Log.d(TAG, "onResume");

}

@Override

protected void onStart() {

super.onStart();

Log.d(TAG, "onStart");

}

@Override

protected void onStop() {

super.onStop();

Log.d(TAG, "onStop");

}

@Override

protected void onDestroy() {

super.onDestroy();

Log.d(TAG, "onDestroy");

}

@Override

protected void onRestart() {

super.onRestart();

Log.d(TAG, "onRestart");

}

}

layout/activity\_main.xml:

<?xml version="1.0" encoding="utf-8"?>

<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"

xmlns:tools="http://schemas.android.com/tools"

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

android:orientation="vertical"

tools:context="com.oreilly.myapplication.MainActivity">

<TextView

android:id="@+id/text\_view"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:text="Hello World!"

android:textSize="24sp" />

<EditText

android:id="@+id/name\_edit\_text"

android:inputType="textCapWords"

android:hint="@string/name\_hint"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content" />

<Button

android:id="@+id/hello\_button"

android:text="@string/hello\_button\_label"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content" />

<Button

android:text="@string/hi\_button\_label"

android:onClick="sayHello"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content" />

</LinearLayout>

layout-land/activity\_main.xml:

<?xml version="1.0" encoding="utf-8"?>

<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"

xmlns:tools="http://schemas.android.com/tools"

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

android:orientation="vertical"

tools:context="com.oreilly.myapplication.MainActivity">

<TextView

android:id="@+id/text\_view"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:text="Hello World!"

android:textSize="24sp" />

<EditText

android:id="@+id/name\_edit\_text"

android:inputType="textCapWords"

android:hint="@string/name\_hint"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content" />

<LinearLayout

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

style="?android:attr/buttonBarStyle"

android:orientation="horizontal">

<Button

android:id="@+id/hello\_button"

style="?android:attr/buttonBarButtonStyle"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_weight="1"

android:text="@string/hello\_button\_label" />

<Button

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_weight="1"

style="?android:attr/buttonBarButtonStyle"

android:onClick="sayHello"

android:text="@string/hi\_button\_label" />

</LinearLayout>

</LinearLayout>

values/strings.xml

<resources>

<string name="app\_name">My Application</string>

<string name="name\_hint">Please enter your name</string>

<string name="hello\_button\_label">Say Hello</string>

<string name="greeting">Hello, %s!</string>

<string name="hi\_button\_label">Say Hi</string>

</resources>

values-es-rMX/strings.xml  
<?xml version="1.0" encoding="utf-8"?>

<resources>

<string name="app\_name">Mi aplicación</string>

<string name="name\_hint">por favor, escriba su nombre</string>

<string name="hello\_button\_label">Di hola</string>

<string name="greeting">Hola, %s!</string>

<string name="hi\_button\_label">Hola</string>

</resources>

From previous class

-----------------------

MainActivity.java:

package com.oreilly.myhelloworldapplication;

import android.support.v7.app.AppCompatActivity;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import android.widget.TextView;

public class MainActivity extends AppCompatActivity {

**private static final** String ***TAG*** = **"XYZ"**;

private TextView textView;

private EditText editText;

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.activity\_main);

textView = (TextView) findViewById(R.id.text\_view);

editText = (EditText) findViewById(R.id.edit\_text);

Button helloButton = (Button) findViewById(R.id.hello\_button);

helloButton.setOnClickListener(new View.OnClickListener() {

@Override

public void onClick(View view) {

sayHello(view);

}

});

Log.d(TAG, "onCreate");

}

@Override

**protected void** onRestart() {

**super**.onRestart();

Log.*d*(***TAG***, **"onRestart"**);

}

@Override

**protected void** onStart() {

**super**.onStart();

Log.*d*(***TAG***, **"onStart"**);

}

@Override

**protected void** onStop() {

**super**.onStop();

Log.*d*(***TAG***, **"onStop"**);

}

@Override

**protected void** onDestroy() {

**super**.onDestroy();

Log.*d*(***TAG***, **"onDestroy"**);

}

@Override

**protected void** onPause() {

**super**.onPause();

Log.*d*(***TAG***, **"onPause"**);

}

@Override

**protected void** onResume() {

**super**.onResume();

Log.*d*(***TAG***, **"onResume"**);

}

**public void** sayHello(View view) {

String user = **editText**.getText().toString();

**textView**.setText(String.*format*(**"Hello, %s!"**, user));

Toast.*makeText*(**this**, **"Greeted "** + user, Toast.***LENGTH\_LONG***).show();

Intent intent = **new** Intent(**this**, WelcomeActivity.**class**);

intent.putExtra(**"user"**, user);

startActivity(intent);

}

@Override

public boolean onCreateOptionsMenu(Menu menu) {

MenuInflater inflater = getMenuInflater();

inflater.inflate(R.menu.menu, menu);

return true;

}

@Override

public boolean onOptionsItemSelected(MenuItem item) {

switch (item.getItemId()) {

case R.id.run:

sayHello(null);

return true;

case R.id.about:

Toast.makeText(this,

"Hello, World app, v 1.0",

Toast.LENGTH\_SHORT).show();

return true;

default:

return super.onOptionsItemSelected(item);

}

}

}

WelcomeActivity.java:

**package** com.oreilly.myhelloworldapplication;

**import** android.support.v7.app.ActionBar;

**import** android.support.v7.app.AppCompatActivity;

**import** android.os.Bundle;

**import** android.widget.TextView;

**public class** WelcomeActivity **extends** AppCompatActivity {

@Override

**protected void** onCreate(Bundle savedInstanceState) {

**super**.onCreate(savedInstanceState);

setContentView(R.layout.***activity\_welcome***);

ActionBar actionBar = getSupportActionBar();

**if** (actionBar != **null**) {

actionBar.setDisplayHomeAsUpEnabled(**true**);

}

TextView welcomeTextView =

(TextView) findViewById(R.id.***welcome\_text\_view***);

String user = getIntent().getStringExtra(**"user"**);

welcomeTextView.setText(String.*format*(**"Hello, %s!"**, user));

}

}

activity\_main.xml (in src/main/res/layout):

<?xml version="1.0" encoding="utf-8"?>

<LinearLayout

xmlns:android="http://schemas.android.com/apk/res/android"

xmlns:tools="http://schemas.android.com/tools"

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

android:orientation="vertical"

tools:context="com.oreilly.myhelloworldapplication.MainActivity">

<TextView

android:id="@+id/text\_view"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:textSize="24sp"

android:text="Hello World!" />

<EditText

android:id="@+id/edit\_text"

android:hint="@string/name\_hint"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:inputType="textPersonName"/>

<Button

android:id="@+id/hello\_button"

android:text="@string/hello\_button\_label"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content" />

<Button

android:text="@string/hi\_button\_label"

android:onClick="sayHello"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content" />

</LinearLayout>

src/main/res/layout-land/activity\_main.xml

<?xml version="1.0" encoding="utf-8"?>

<LinearLayout

xmlns:android="http://schemas.android.com/apk/res/android"

xmlns:tools="http://schemas.android.com/tools"

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

android:orientation="vertical"

tools:context="com.oreilly.myhelloworldapplication.MainActivity">

<TextView

android:id="@+id/text\_view"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:textSize="24sp"

android:text="Hello World!" />

<EditText

android:id="@+id/edit\_text"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:hint="@string/name\_hint"

android:inputType="textCapWords" />

<LinearLayout

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

style="?android:attr/buttonBarStyle"

android:orientation="horizontal">

<Button

android:id="@+id/button"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_weight="2"

style="?android:attr/buttonBarButtonStyle"

android:onClick="sayHello"

android:text="@string/hi\_button\_label" />

<Button

android:id="@+id/hello\_button"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_weight="3"

style="?android:attr/buttonBarButtonStyle"

android:text="@string/hello\_button\_label" />

</LinearLayout>

</LinearLayout>

values/strings.xml

<resources>

<string name="app\_name">My Hello World Application</string>

<string name="name\_hint">Please enter your name</string>

<string name="hello\_button\_label">Say Hello</string>

<string name="hi\_button\_label">Say Hi</string>

</resources>

values-it/strings.xml

<?xml version="1.0" encoding="utf-8"?>

<resources>

<string name="app\_name">My Hello World Application</string>

<string name="name\_hint">Quale è il tuo nome</string>

<string name="hello\_button\_label">Saluta</string>

</resources>

values-ar/strings.xml

<?xml version="1.0" encoding="utf-8"?>

<resources>

<string name="app\_name">أول برنامج لي</string>

<string name="name\_hint">فضلاً قم بادخال اسمك هنا</string>

<string name="hello\_button\_label">قل مرحبا!</string>

</resources>

AndroidManifest.xml

<?xml version="1.0" encoding="utf-8"?>

<manifest xmlns:android="http://schemas.android.com/apk/res/android"

package="com.oreilly.myhelloworldapplication">

<application

android:allowBackup="true"

android:icon="@mipmap/ic\_launcher"

android:label="@string/app\_name"

android:roundIcon="@mipmap/ic\_launcher\_round"

android:supportsRtl="true"

android:theme="@style/AppTheme">

<activity android:name=".MainActivity">

<intent-filter>

<action android:name="android.intent.action.MAIN" />

<category android:name="android.intent.category.LAUNCHER" />

</intent-filter>

</activity>

<**activity android:name=".WelcomeActivity"**

**android:parentActivityName=".MainActivity"**/>

</application>

</manifest>

src/main/res/menu/menu.xml

*<?***xml version="1.0" encoding="utf-8"***?>*

<**menu xmlns:android="http://schemas.android.com/apk/res/android"**

**xmlns:app="http://schemas.android.com/apk/res-auto"**>

<**item**

android:id="@+id/run"

android:title="@string/run\_app"

app:showAsAction="ifRoom|withText"

**android:icon="@android:drawable/ic\_media\_play"** />

<**item**

android:id="@+id/about"

**android:title="@string/about\_app"** />

</**menu**>

Popular Android libraries:

Butterknife → replaces findViewById and makes it easier to attach listeners

<http://jakewharton.github.io/butterknife/>

Using ButterKnife:

build.gradle (inside dependencies)

implementation **'com.jakewharton:butterknife:8.8.1'**

annotationProcessor **'com.jakewharton:butterknife-compiler:8.8.1'**

Updated version of MainActivity.java:

public class MainActivity extends AppCompatActivity {

@BindView(R.id.text\_view)

TextView textView;

@BindView(R.id.edit\_text)

EditText editText;

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.activity\_main);

ButterKnife.bind(this);

}

@OnClick(R.id.hello\_button)

public void sayHello(View view) {

String user = editText.getText().toString();

textView.setText(String.format("Hello, %s!", user));

}

}

gravity → moves the contents of a widget

layout\_gravity → moves the widget relative to its parent container

Retrofit → accessing RESTful web services

<http://square.github.io/retrofit/>

can be used both synchronously and async

Based on another library called OkHttp → networking

Dagger 2 → dependency injection (similar to Spring framework)

<http://square.github.io/dagger/>

Testing:

Espresso: <https://developer.android.com/training/testing/espresso/index.html>

ORM tool called Room:

<https://developer.android.com/topic/libraries/architecture/room.html>

### References:

**Head First Android Development**, Dawn and Dave Griffiths, O'Reilly Media

<http://shop.oreilly.com/product/0636920029045.do>

Note: 2nd edition now available

**Busy Coder's Guide to Android Development,** Mark Murphy

<https://commonsware.com/Android/>

Subscription model; updated every four to six weeks

**Gradle Recipes for Android**, me, O'Reilly Media

<http://shop.oreilly.com/product/0636920032656.do>

Also available for free registration at <http://gradle.org>

Safari courses on Android