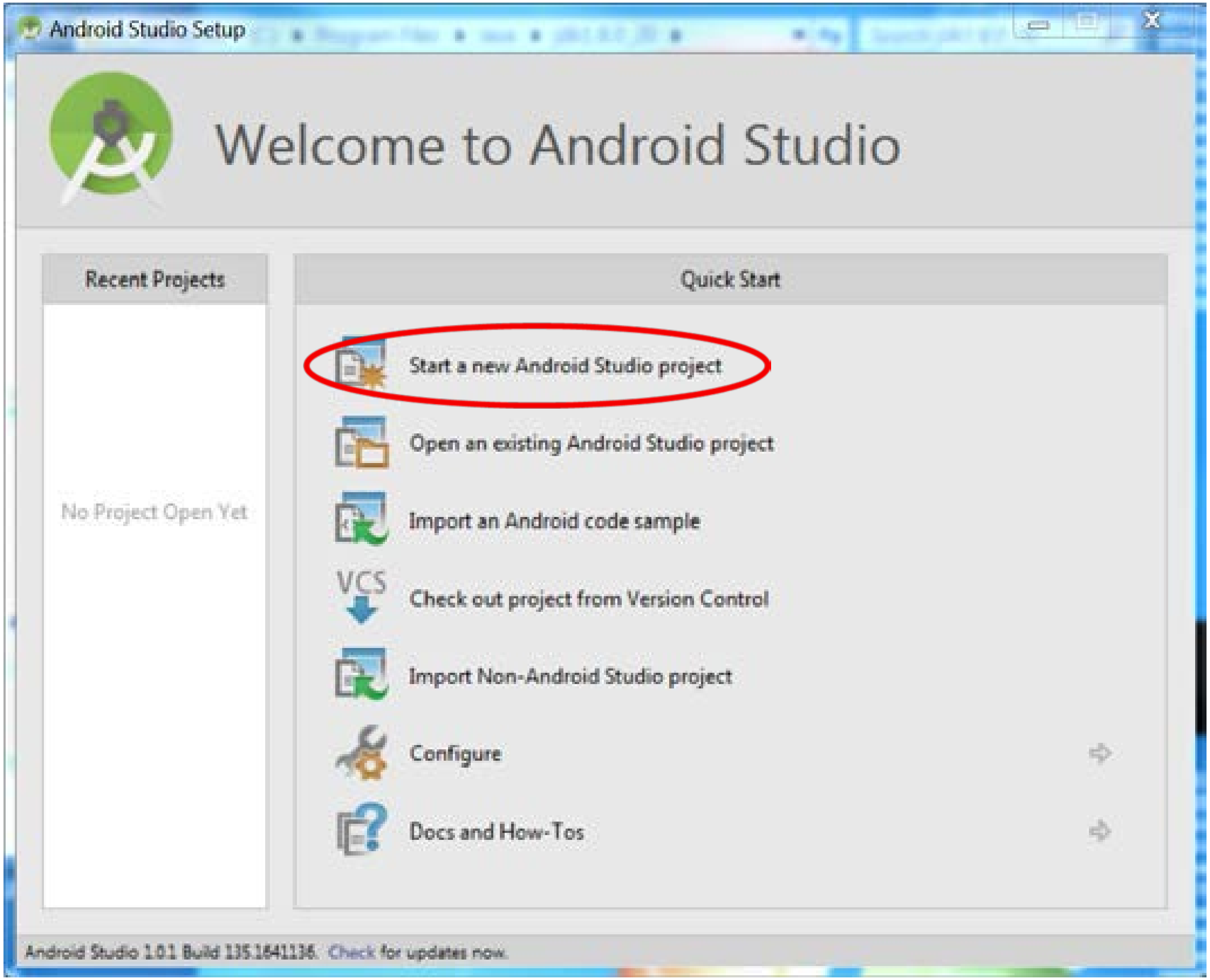
Introduction to Android Studio

- Android Studio has
  - Projects
    - These are collection of modules
    - Similar (but not exactly the same) as Workspaces in Eclipse
  - Modules
    - These correspond to the apps/libraries that we will be creating
- In real-life development you'd have one project per app with any supporting apps/libraries as modules
- We're going to use a Project as a top-level container for all of our (small-ish) apps

Let’s create our first project



Android Studio Setup

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

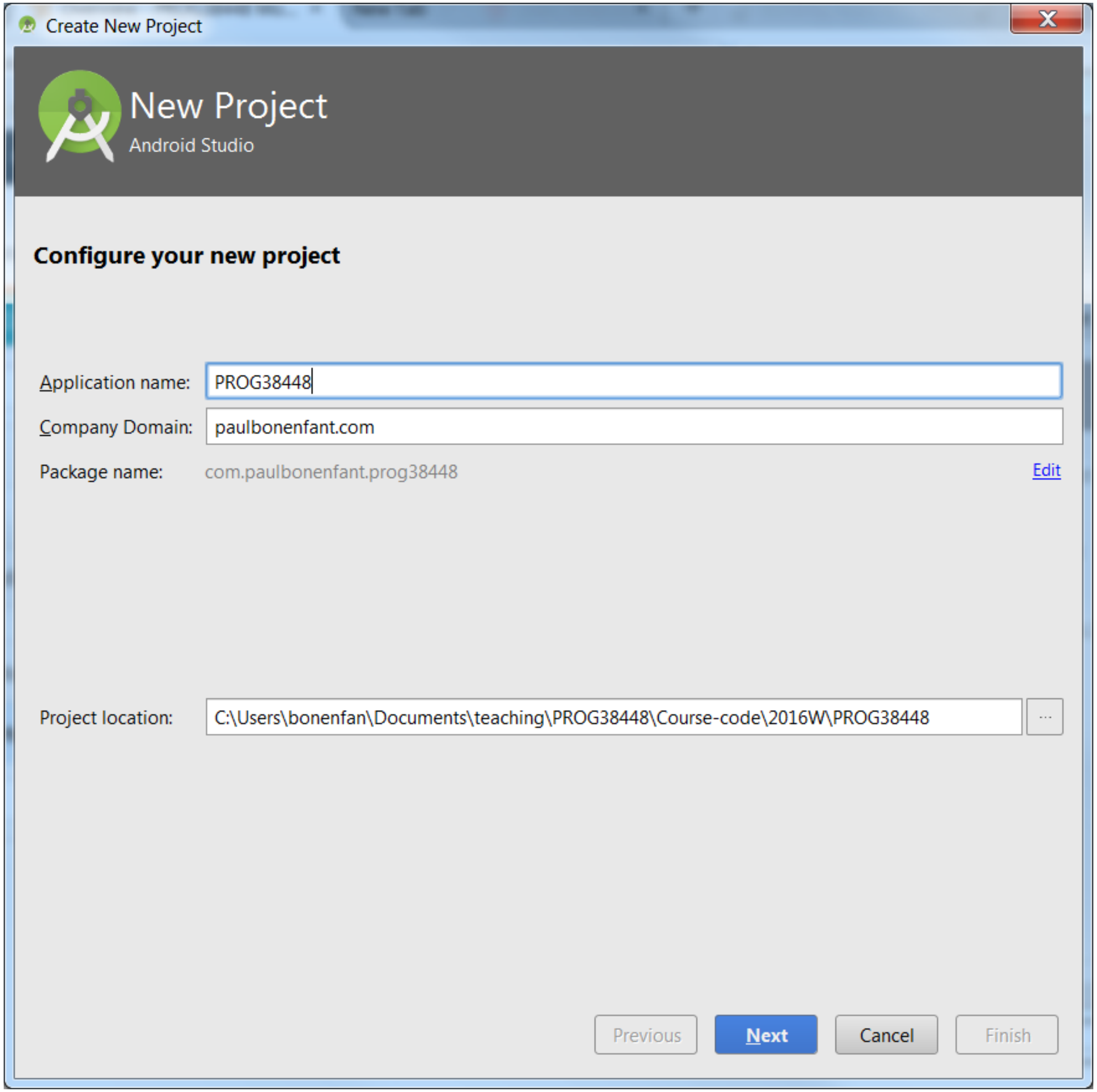
Import Non-Android Studio project

Configure

Docs and How-Tos

Android Studio 1.0.1 Build 135.1641136. Check for updates now.

Let’s create our first project



Configure your new project

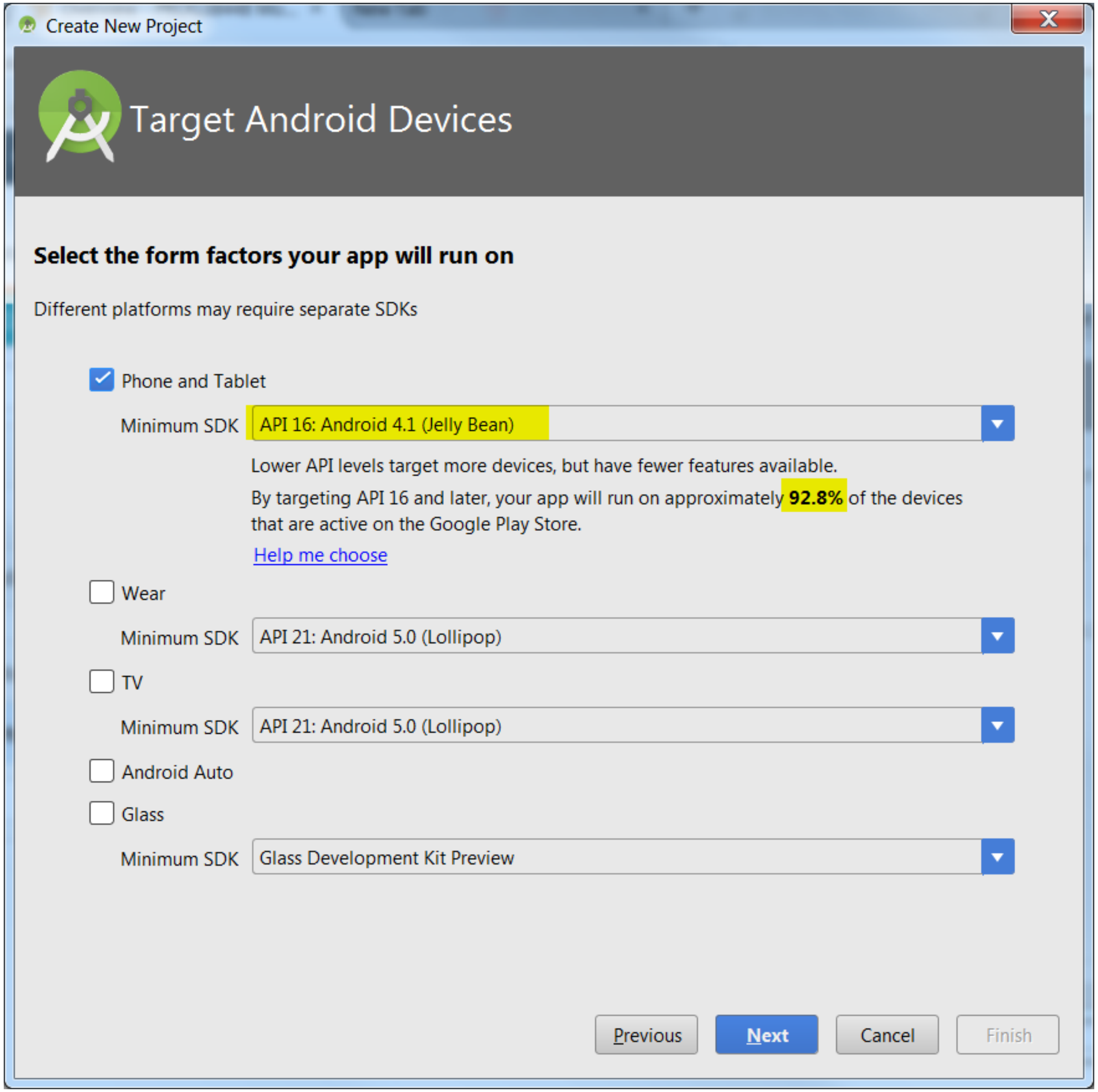
Application name: PROG38448

Company Domain: paulbonenfant.com

Package name: com.paulbonenfant.prog38448

Project location: C:\Users\bonenfan\Documents\teaching\PROG38448\Course-code\2016W\PROG38448

Let’s create our first 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 16: Android 4.1 (Jelly Bean)

Lower API levels target more devices, but have fewer features available.

By targeting API 16 and later, your app will run on approximately **92.8%** of the devices that are active on the Google Play Store.

Help me choose

□ Wear

Minimum SDK: API 21: Android 5.0 (Lollipop)

□ TV

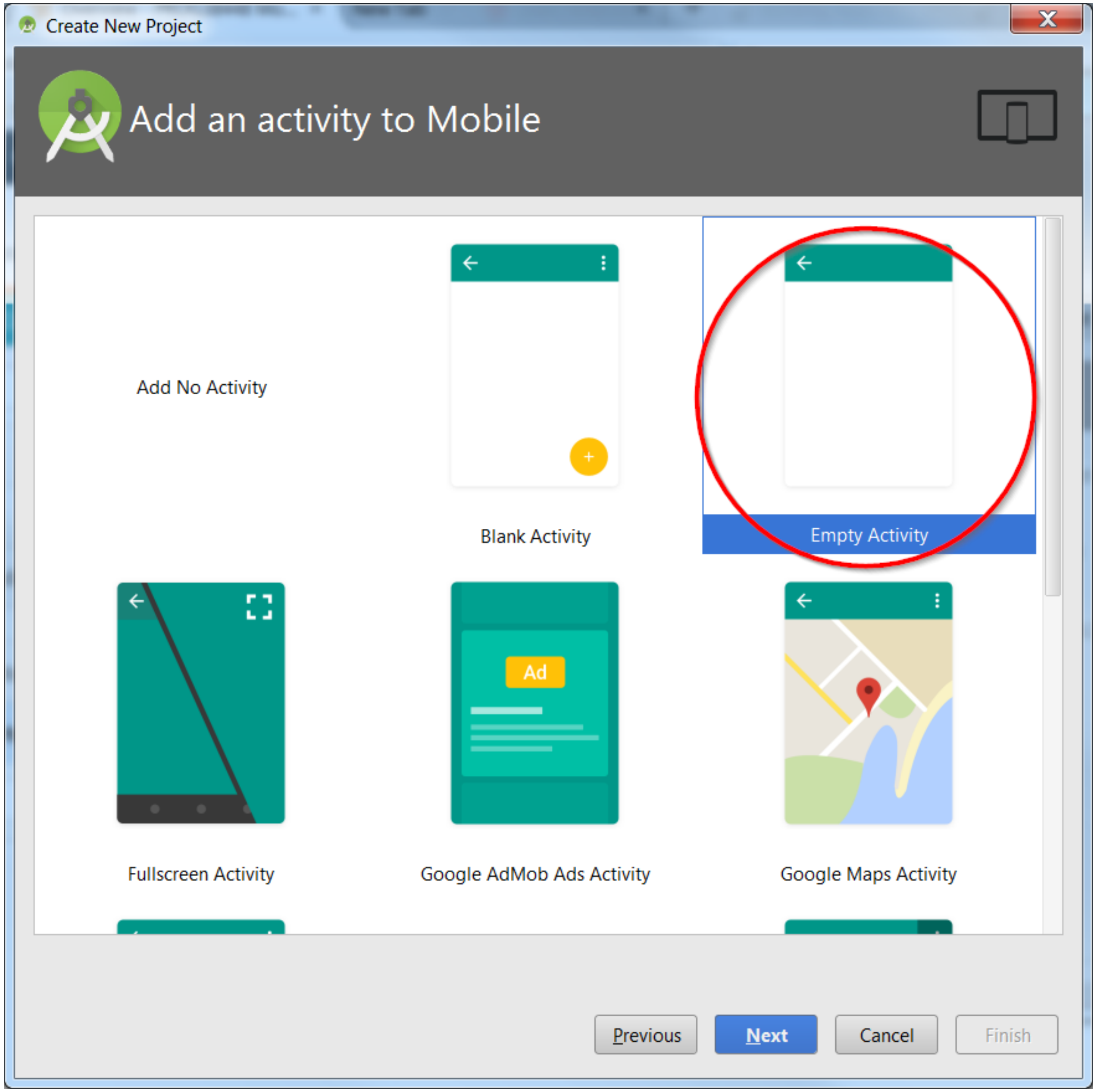
Minimum SDK: API 21: Android 5.0 (Lollipop)

□ Android Auto

□ Glass

Minimum SDK: Glass Development Kit Preview

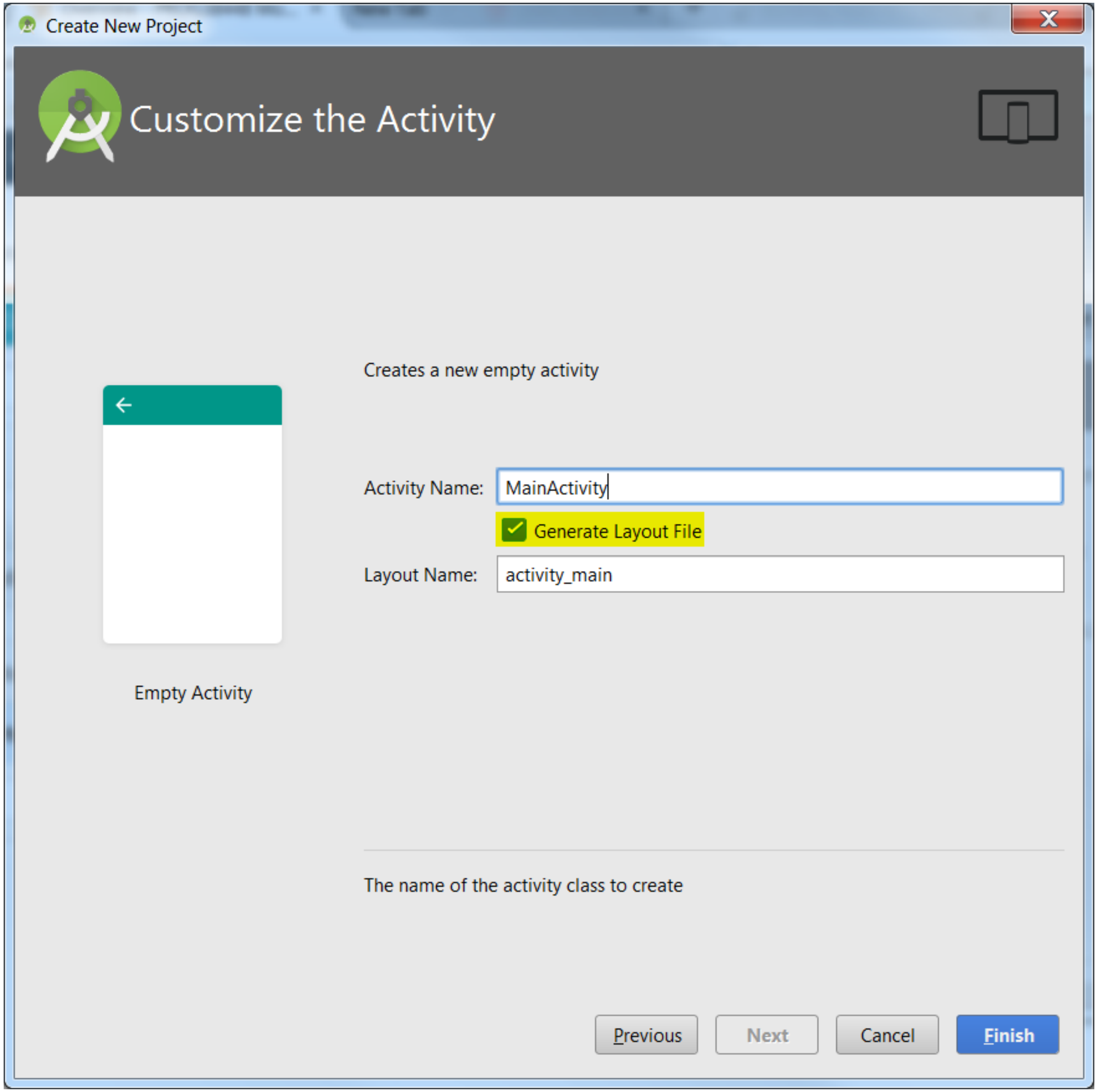
Let’s create our first project



Create New Project

Add an activity to Mobile

Let’s create our first project



Create New Project

Customize the Activity

Creates a new empty activity

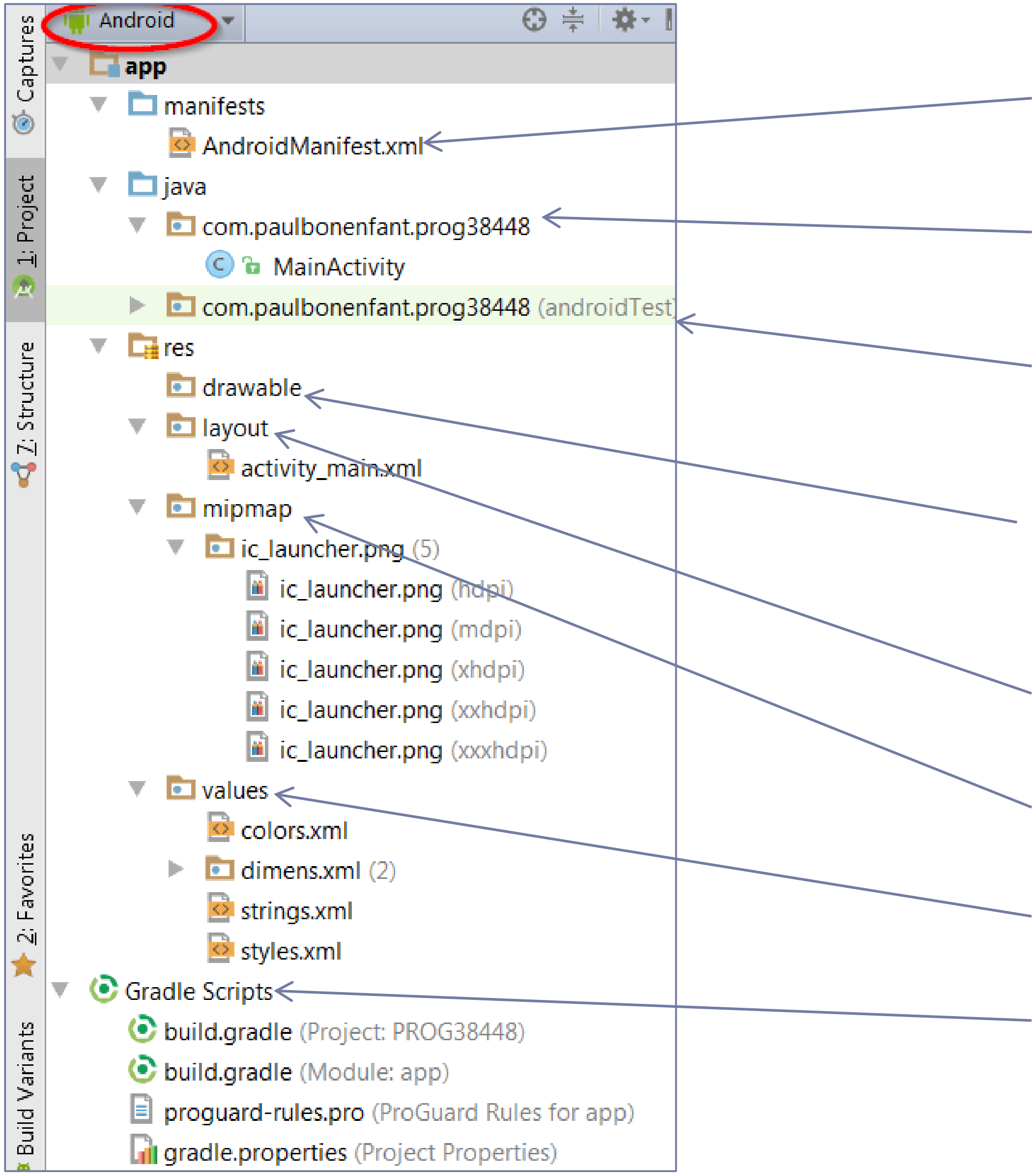
Activity Name: MainActivity

☑ Generate Layout File

Layout Name: activity_main

The name of the activity class to create

Android View of resources



```
app
  manifests
    AndroidManifest.xml
  java
    com.paulbonenfant.prog38448
      MainActivity
    com.paulbonenfant.prog38448 (androidTest)
  res
    drawable
    layout
      activity_main.xml
    mipmap
      ic_launcher.png (5)
        ic_launcher.png (hdpi)
        ic_launcher.png (mdpi)
        ic_launcher.png (xhdpi)
        ic_launcher.png (xxhdpi)
        ic_launcher.png (xxxhdpi)
    values
      colors.xml
      dimens.xml (2)
      strings.xml
      styles.xml
Gradle Scripts
  build.gradle (Project: PROG38448)
  build.gradle (Module: app)
  proguard-rules.pro (ProGuard Rules for app)
  gradle.properties (Project Properties)
```

Android Manifest File

Your packages & source code is here

Folder for unit test code (we may look at this later)

Resource folder for drawables (images, etc.)

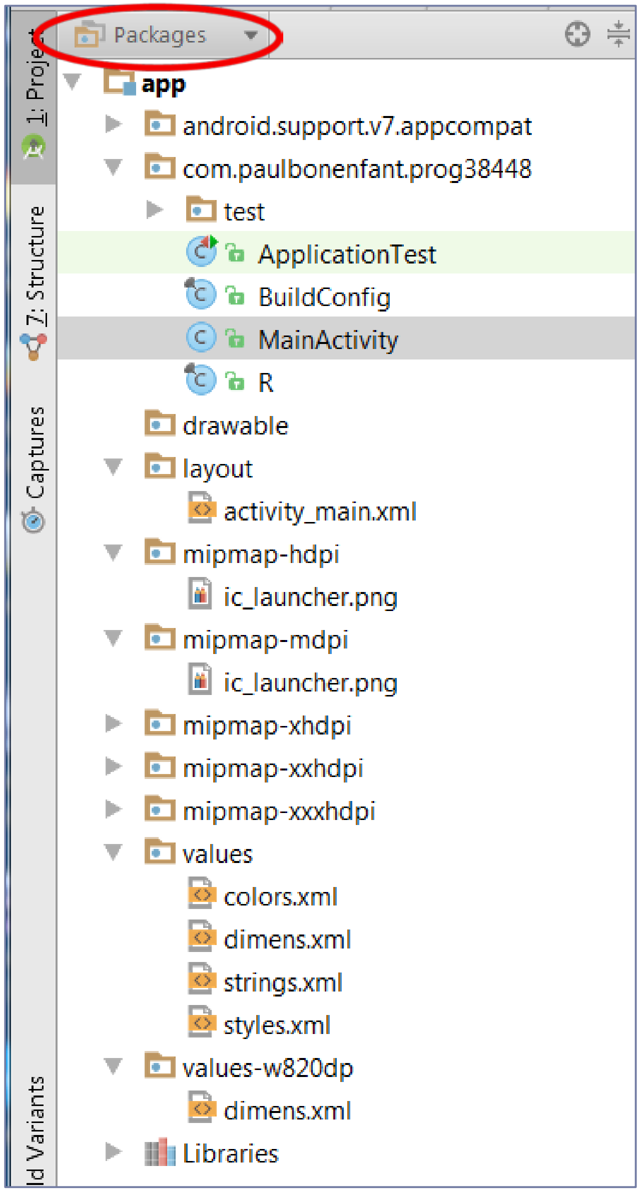
Folder for Layout Files

Mipmap folder for launcher icons

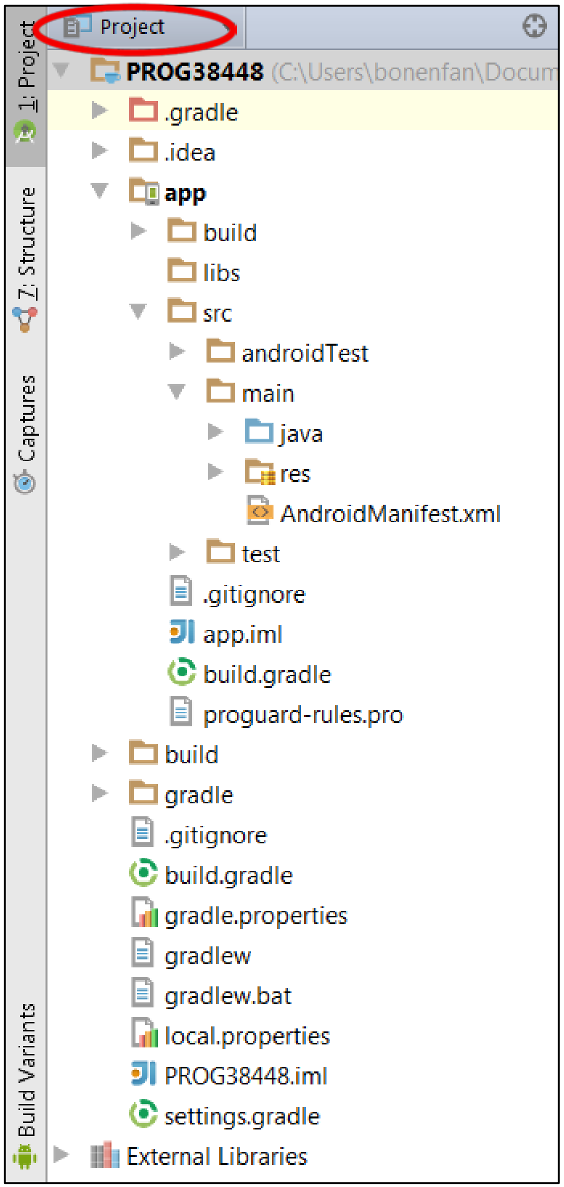
Folder for values

Gradle scripts for running and building the app

Packages and Project View of resources



```
app
  android.support.v7.appcompat
  com.paulbonenfant.prog38448
    test
      ApplicationTest
      BuildConfig
      MainActivity
      R
  drawable
  layout
    activity_main.xml
  mipmap-hdpi
    ic_launcher.png
  mipmap-mdpi
    ic_launcher.png
  mipmap-xhdpi
  mipmap-xxhdpi
  mipmap-xxxhdpi
  values
    colors.xml
    dimens.xml
    strings.xml
    styles.xml
  values-w820dp
    dimens.xml
  Libraries
```



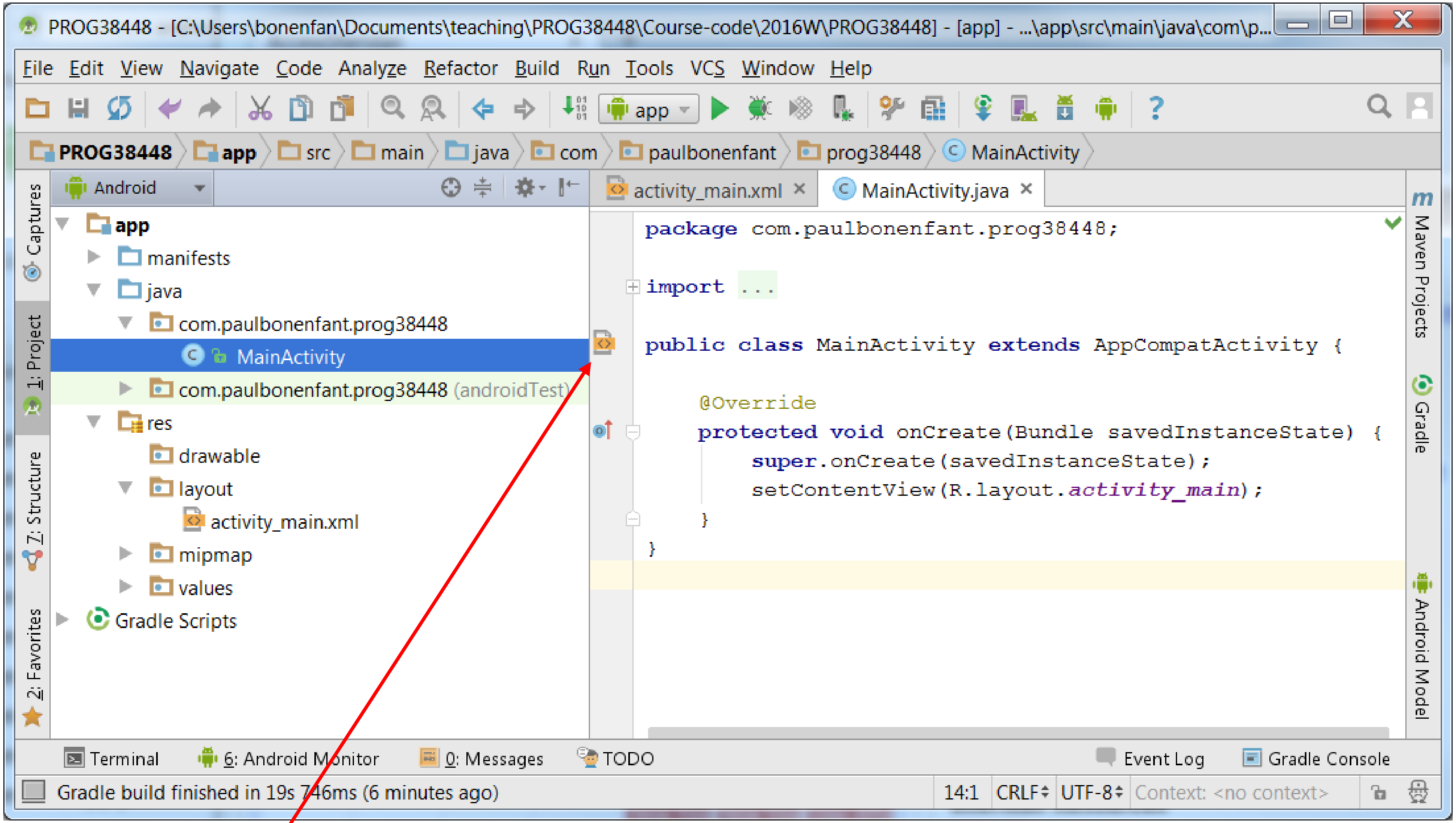
```
PROG38448 (C:\Users\bonenfan\Docum
  .gradle
  .idea
  app
    build
    libs
    src
      androidTest
      main
        java
        res
        AndroidManifest.xml
      test
    .gitignore
    app.iml
    build.gradle
    proguard-rules.pro
  build
  gradle
  .gitignore
  build.gradle
  gradle.properties
  gradlew
  gradlew.bat
  local.properties
  PROG38448.iml
  settings.gradle
External Libraries
```

Three different views of the same underlying information.

We'll see throughout the semester that each view has its own uses.

There are more views, but we'll be using these three most often.

MainActivity.java created



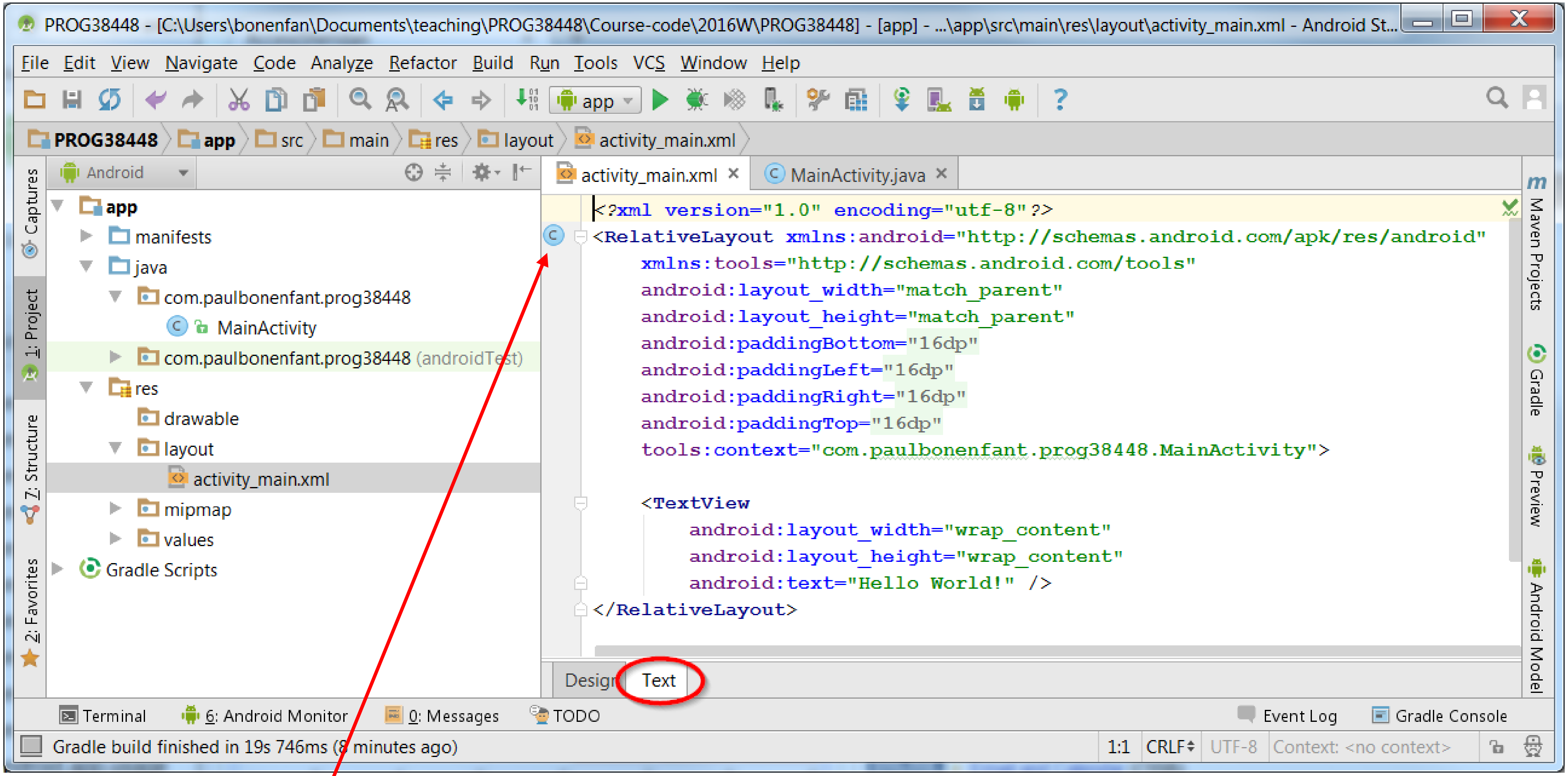
PROG38448 - [C:\Users\bonenfan\Documents\teaching\PROG38448\Course-code\2016W\PROG38448] - [app] - ...\app\src\main\java\com\p...
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
app
PROG38448 app src main java com paulbonenfant prog38448 MainActivity
Android
app
manifests
java
com.paulbonenfant.prog38448
MainActivity
com.paulbonenfant.prog38448 (androidTest)
res
drawable
layout
activity_main.xml
mipmap
values
Gradle Scripts
activity_main.xml
MainActivity.java
Captures
1: Project
7: Structure
2: Favorites
Maven Projects
Gradle
Android Model
Terminal
6: Android Monitor
0: Messages
TODO
Event Log
Gradle Console
14:1 CRLF UTF-8 Context: <no context>

```java
package com.paulbonenfant.prog38448;

import ...

public class MainActivity extends AppCompatActivity {

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

```
Gradle build finished in 19s 746ms (6 minutes ago)
```

- Click here to go to the associated xml file(s).

activity_main.xml created



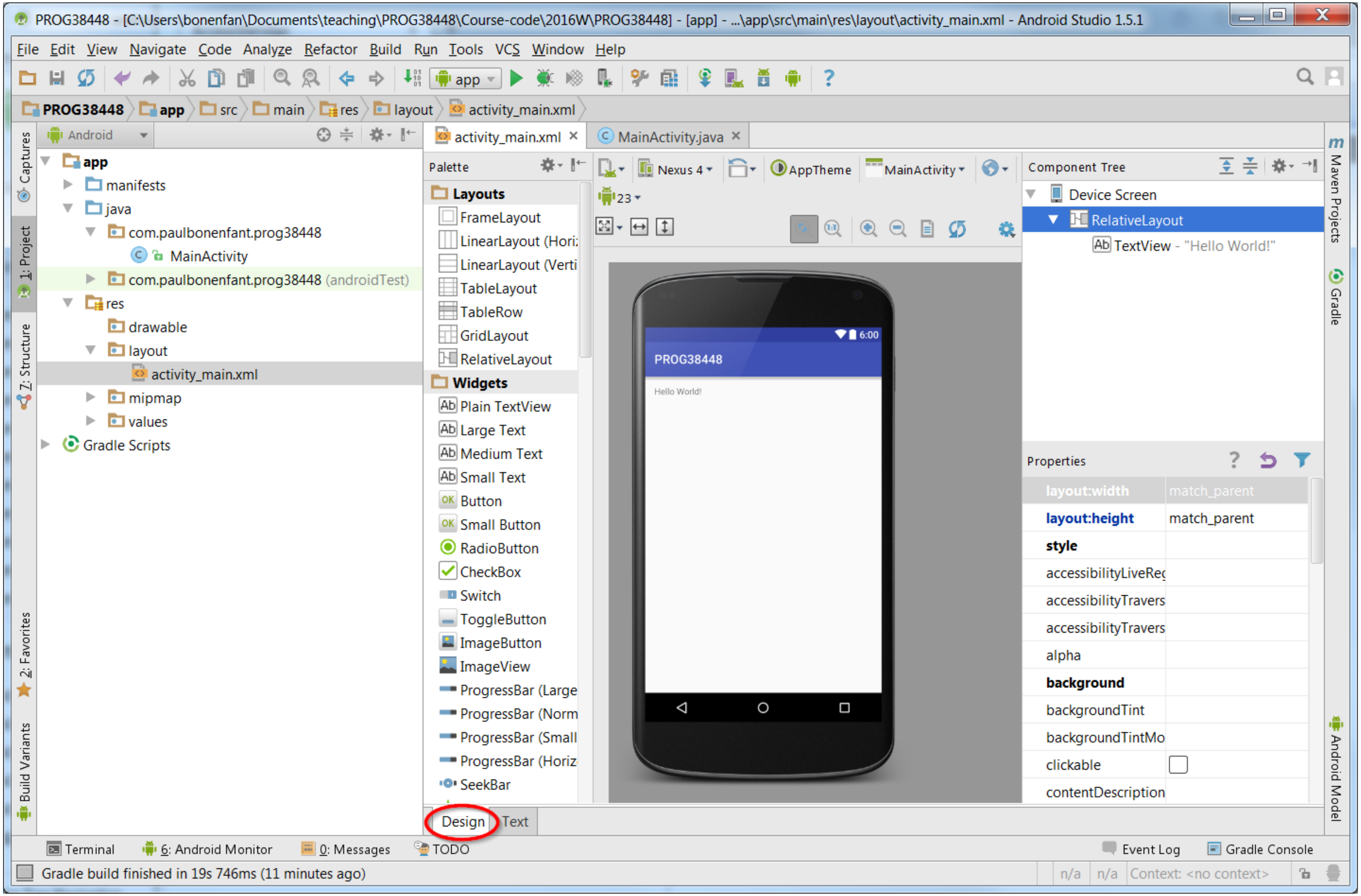
PROG38448 - [C:\Users\bonenfan\Documents\teaching\PROG38448\Course-code\2016W\PROG38448] - [app] - ...\app\src\main\res\layout\activity_main.xml - Android St...

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout 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:paddingBottom="16dp"
    android:paddingLeft="16dp"
    android:paddingRight="16dp"
    android:paddingTop="16dp"
    tools:context="com.paulbonenfant.prog38448.MainActivity">

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello World!" />
</RelativeLayout>
```

Gradle build finished in 19s 746ms (8 minutes ago) 1:1 CRLF UTF-8 Context: <no context>

- Click here to go to the associated class file.

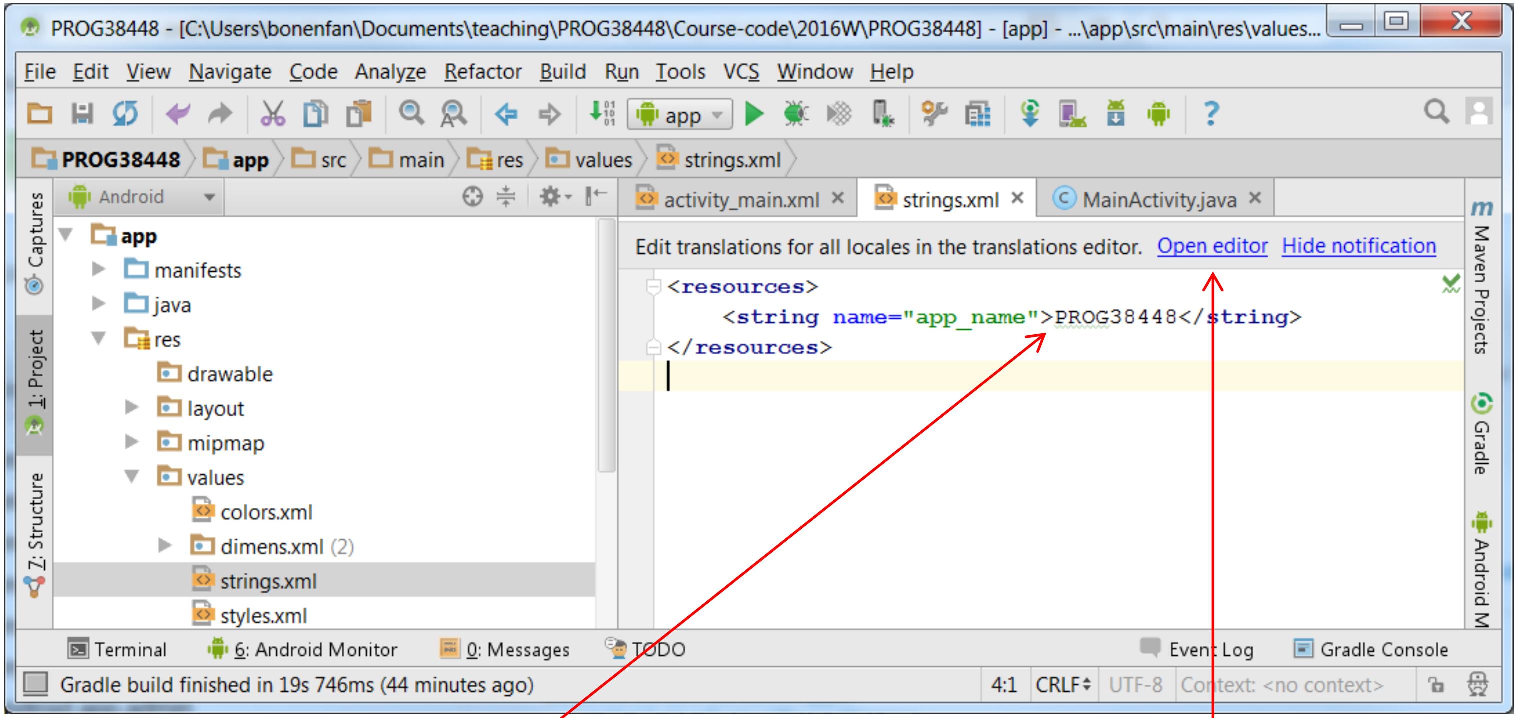
activity_main.xml created



PROG38448 - [C:\Users\bonenfan\Documents\teaching\PROG38448\Course-code\2016W\PROG38448] - [app] - ...\app\src\main\res\layout\activity_main.xml - Android Studio 1.5.1

Gradle build finished in 19s 746ms (11 minutes ago)

Values folder and strings.xml



Edit translations for all locales in the translations editor. Open editor Hide notification

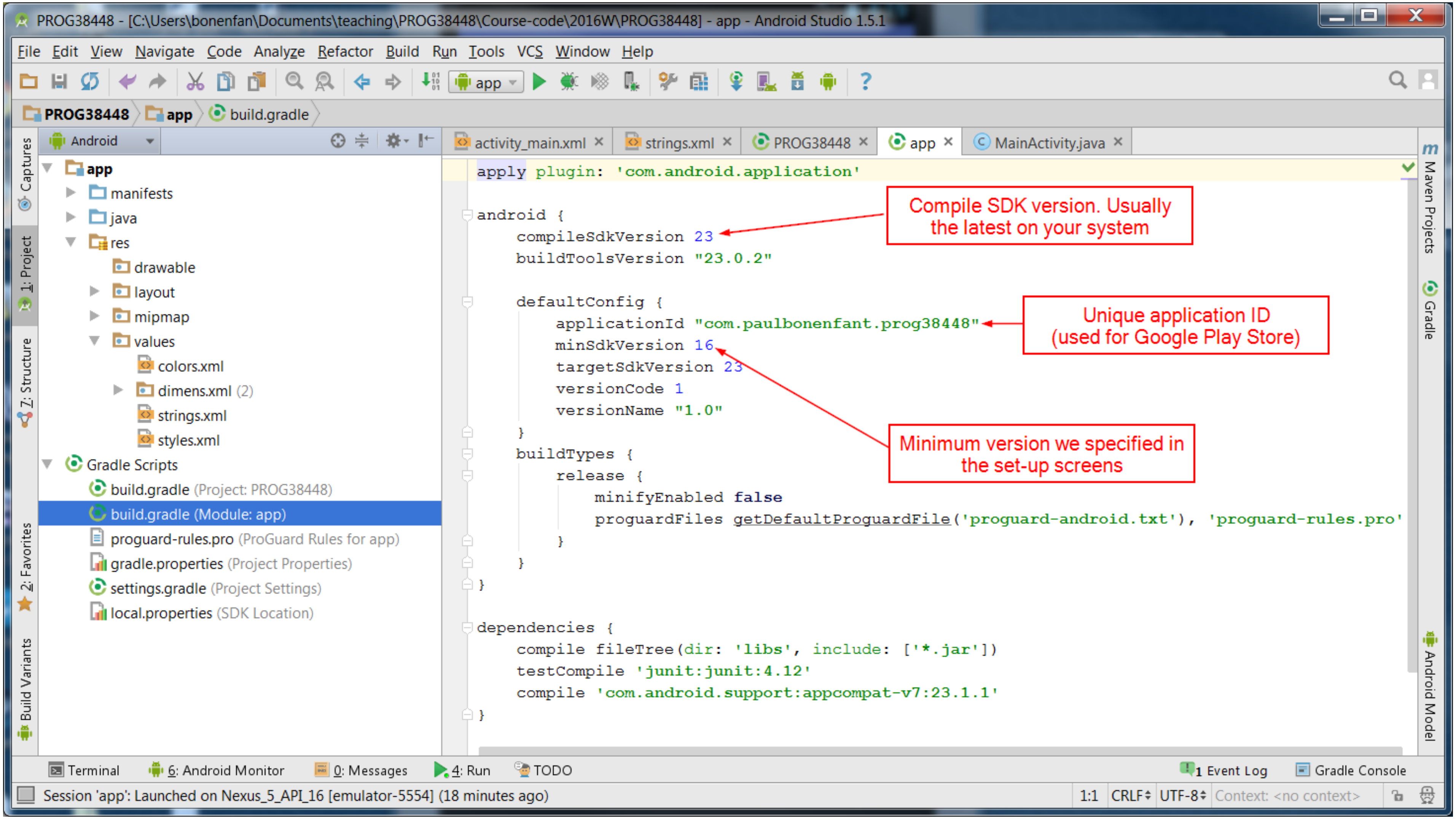
```xml
<resources>
    <string name="app_name">PROG38448</string>
</resources>
```

Gradle build finished in 19s 746ms (44 minutes ago)

Change the Value of app_name to "Hello Android!" and go back to the Design View of the activity_main.xml.

Clicking here opens up an editor window to enable entry through a GUI.

Gradle File



PROG38448 - [C:\Users\bonenfan\Documents\teaching\PROG38448\Course-code\2016W\PROG38448] - app - Android Studio 1.5.1
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
app
PROG38448 app build.gradle
Android
app
manifests
java
res
drawable
layout
mipmap
values
colors.xml
dimens.xml (2)
strings.xml
styles.xml
Gradle Scripts
build.gradle (Project: PROG38448)
build.gradle (Module: app)
proguard-rules.pro (ProGuard Rules for app)
gradle.properties (Project Properties)
settings.gradle (Project Settings)
local.properties (SDK Location)
activity_main.xml
strings.xml
PROG38448
app
MainActivity.java
Captures
1: Project
7: Structure
2: Favorites
Build Variants
Maven Projects
Gradle
Android Model
Terminal
6: Android Monitor
0: Messages
4: Run
TODO
1 Event Log
Gradle Console
1:1
CRLF
UTF-8
Context: <no context>

```
apply plugin: 'com.android.application'

android {
    compileSdkVersion 23
    buildToolsVersion "23.0.2"

    defaultConfig {
        applicationId "com.paulbonenfant.prog38448"
        minSdkVersion 16
        targetSdkVersion 23
        versionCode 1
        versionName "1.0"
    }
    buildTypes {
        release {
            minifyEnabled false
            proguardFiles getDefaultProguardFile('proguard-android.txt'), 'proguard-rules.pro'
        }
    }
}

dependencies {
    compile fileTree(dir: 'libs', include: ['*.jar'])
    testCompile 'junit:junit:4.12'
    compile 'com.android.support:appcompat-v7:23.1.1'
}
```

Compile SDK version. Usually the latest on your system

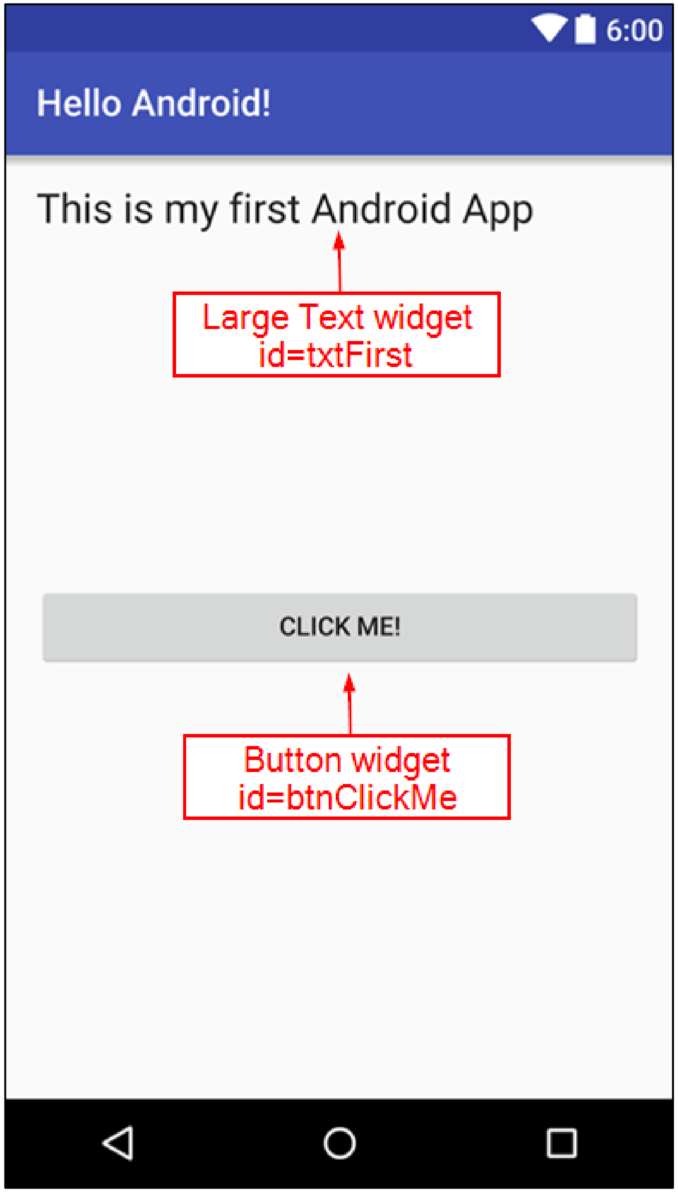
Unique application ID (used for Google Play Store)

Minimum version we specified in the set-up screens

Session 'app': Launched on Nexus_5_API_16 [emulator-5554] (18 minutes ago)

Activity

1. Play around with the UI editor in Design View to come up with a screen that looks like the following
2. Hint: You can double-click on the widget to change the text and id.
3. Run the app.



Hello Android!

This is my first Android App

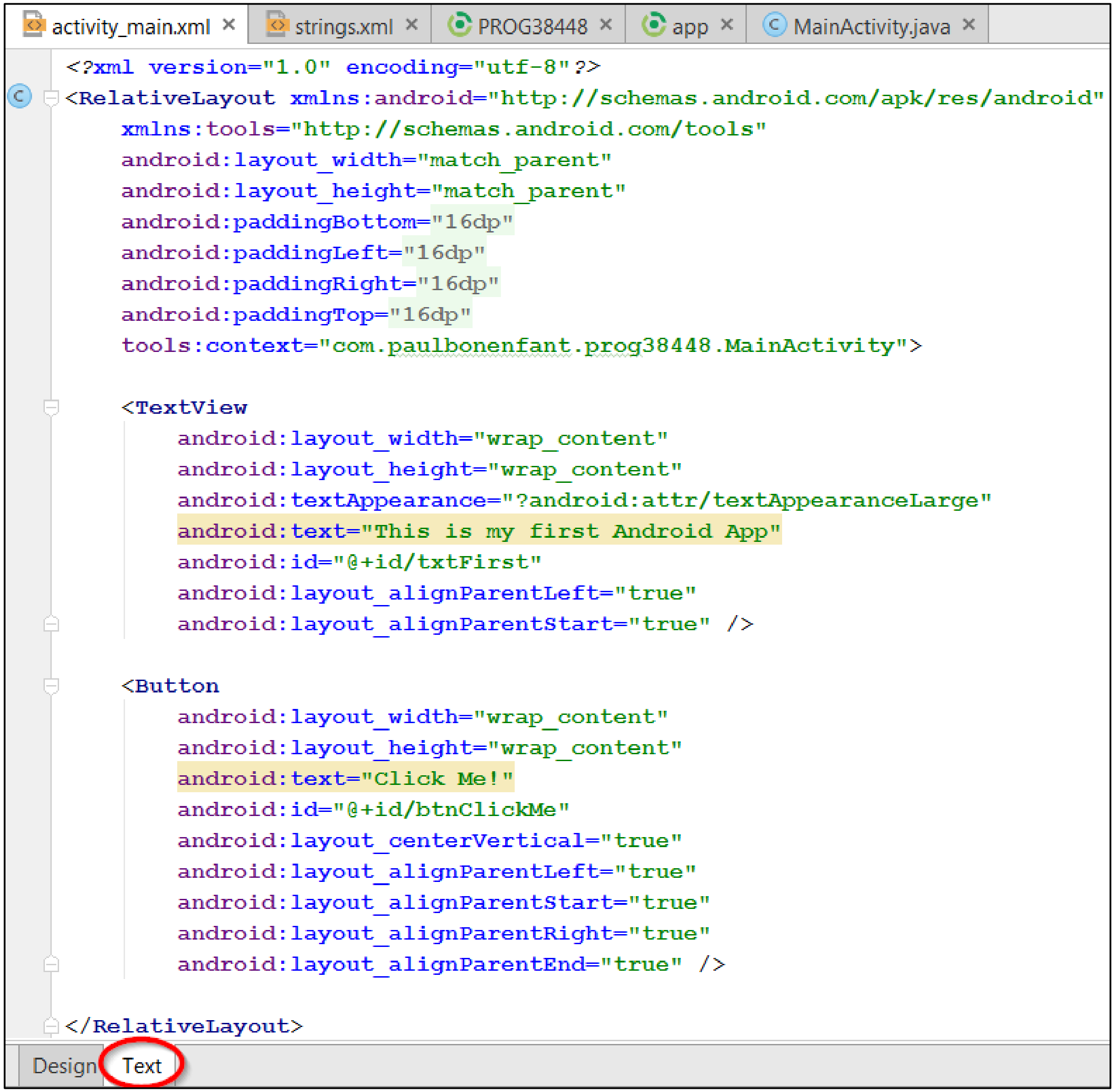
Large Text widget
id=txtFirst

CLICK ME!

Button widget
id=btnClickMe

Activity cont'd

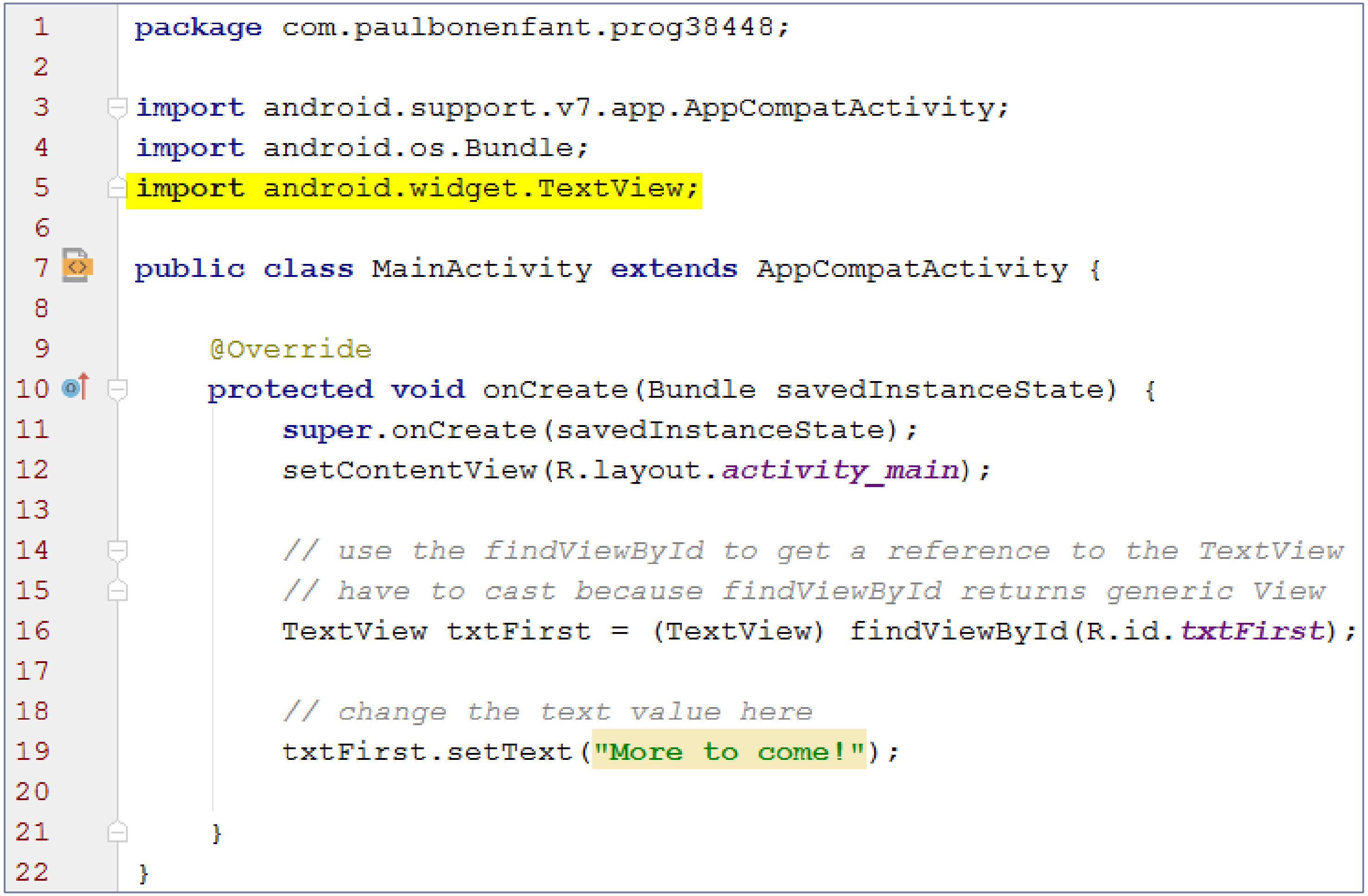
- Looking at the Text version of the screen, you should see something like:



```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout 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:paddingBottom="16dp"
    android:paddingLeft="16dp"
    android:paddingRight="16dp"
    android:paddingTop="16dp"
    tools:context="com.paulbonenfant.prog38448.MainActivity">

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textAppearance="?android:attr/textAppearanceLarge"
        android:text="This is my first Android App"
        android:id="@+id/txtFirst"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true" />

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Click Me!"
        android:id="@+id/btnClickMe"
        android:layout_centerVertical="true"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true"
        android:layout_alignParentRight="true"
        android:layout_alignParentEnd="true" />

</RelativeLayout>
```

Changing the value of a TextView in code

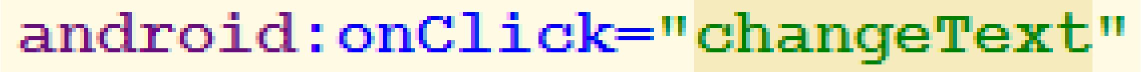
- Add the following code in the onCreate method of the MainActivity.java file and run the project again.



```java
package com.paulbonenfant.prog38448;

import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity {

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

        // use the findViewById to get a reference to the TextView
        // have to cast because findViewById returns generic View
        TextView txtFirst = (TextView) findViewById(R.id.txtFirst);

        // change the text value here
        txtFirst.setText("More to come!");

    }
}
```

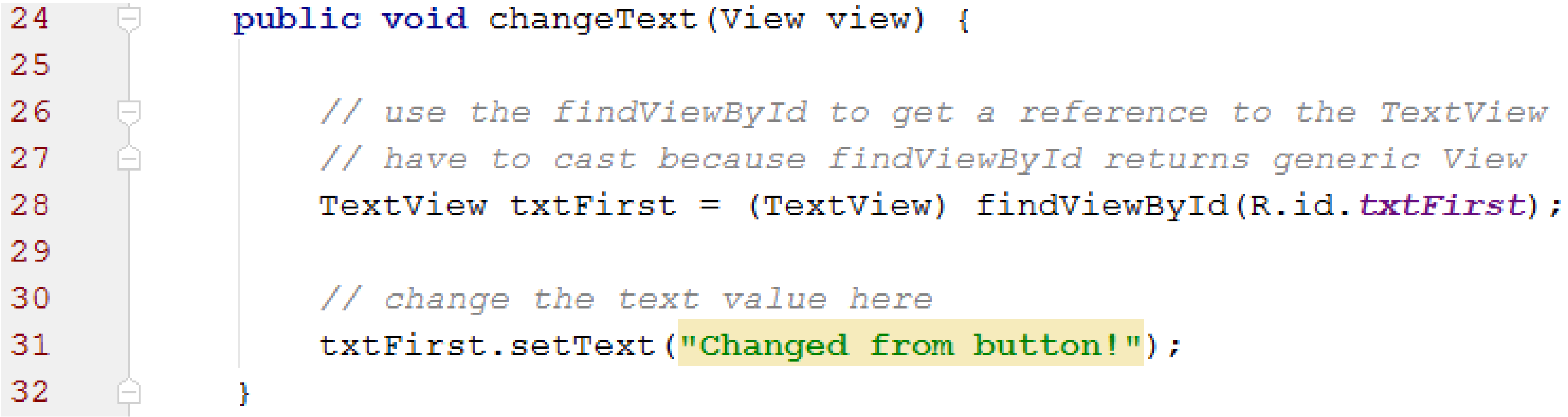
Activity 2

- Open up the activity_main.xml and add the following attribute to the <Button … /> node.



```
android:onClick="changeText"
```

- Add the following method to the MainActivity class, run the program again and try clicking the button.



```
    public void changeText(View view) {

        // use the findViewById to get a reference to the TextView
        // have to cast because findViewById returns generic View
        TextView txtFirst = (TextView) findViewById(R.id.txtFirst);

        // change the text value here
        txtFirst.setText("Changed from button!");
    }
```

- Can you think of a simple improvement we can make?

More Reading

- Installing Android Studio
  http://developer.android.com/sdk/index.html
- The file layout structure of Android projects
  http://developer.android.com/tools/projects/index.html
- String Resources
  http://developer.android.com/guide/topics/resources/string-resource.html
- Layouts in Android (xml)
  http://developer.android.com/guide/topics/ui/declaring-layout.html
- The auto-generated R file
  http://developer.android.com/reference/android/R.html