COMP7506 Smart phone apps development
Workshop 2 Android Apps Development (Part 1)

(1) Introduction

Officially, Android Studio IDE is used develop android apps.

(2) Files to be downloaded

Before start, JDK should be installed (p.s. It should be already installed on the computers in CS labs)

http://www.oracle.com/technetwork/java/javase/downloads/index.html

The Android Studio IDE can be downloaded at the android official website:

https://developer.android.com/studio/index.html

The IDE package includes

- Android Studio development GUI
- Android SDK Tools
- Android Platform-tools
- The latest Android platform
- The latest Android system image for the emulator

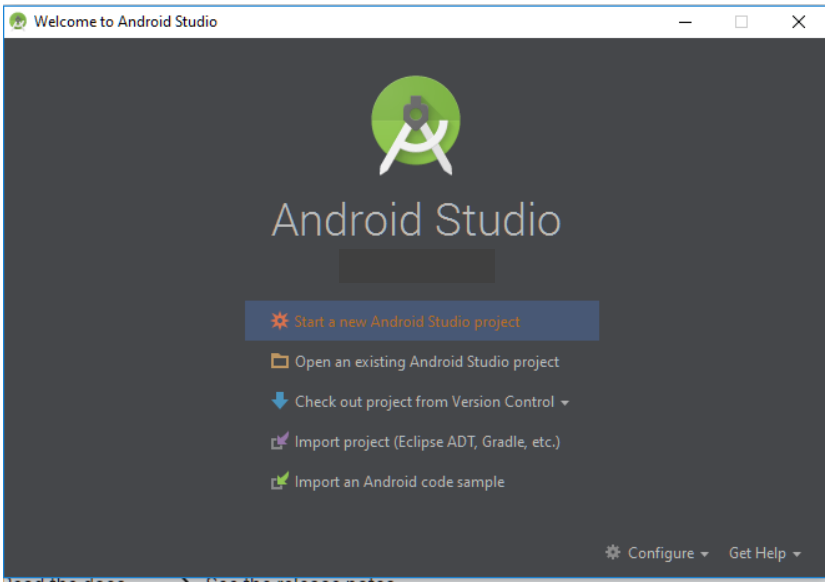
In this workshop, we will use the Android Studio 3.x.

NOTE: The Android Studio should be already installed in CS Labs. We will not discuss the detailed installation in this workshop. Students can look for more installation guideline in Google (e.g. http://www.tutorialspoint.com/android/android_studio.htm).

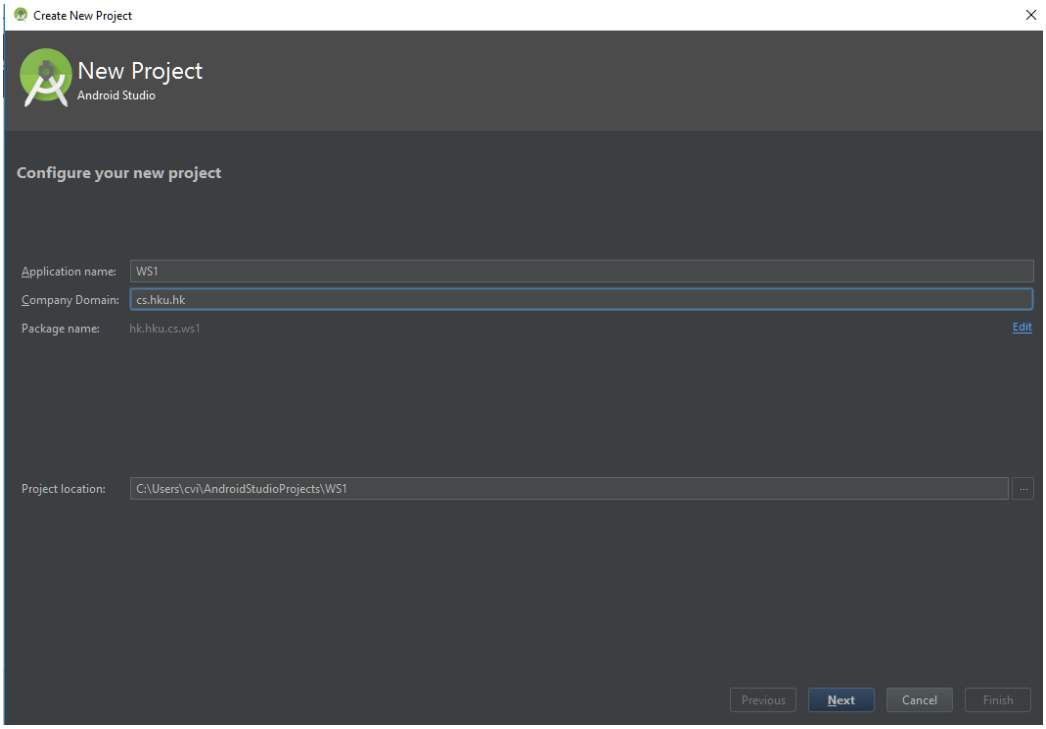
(3) 3.1**) Creating a New Project**

1. Starting the Android Studio

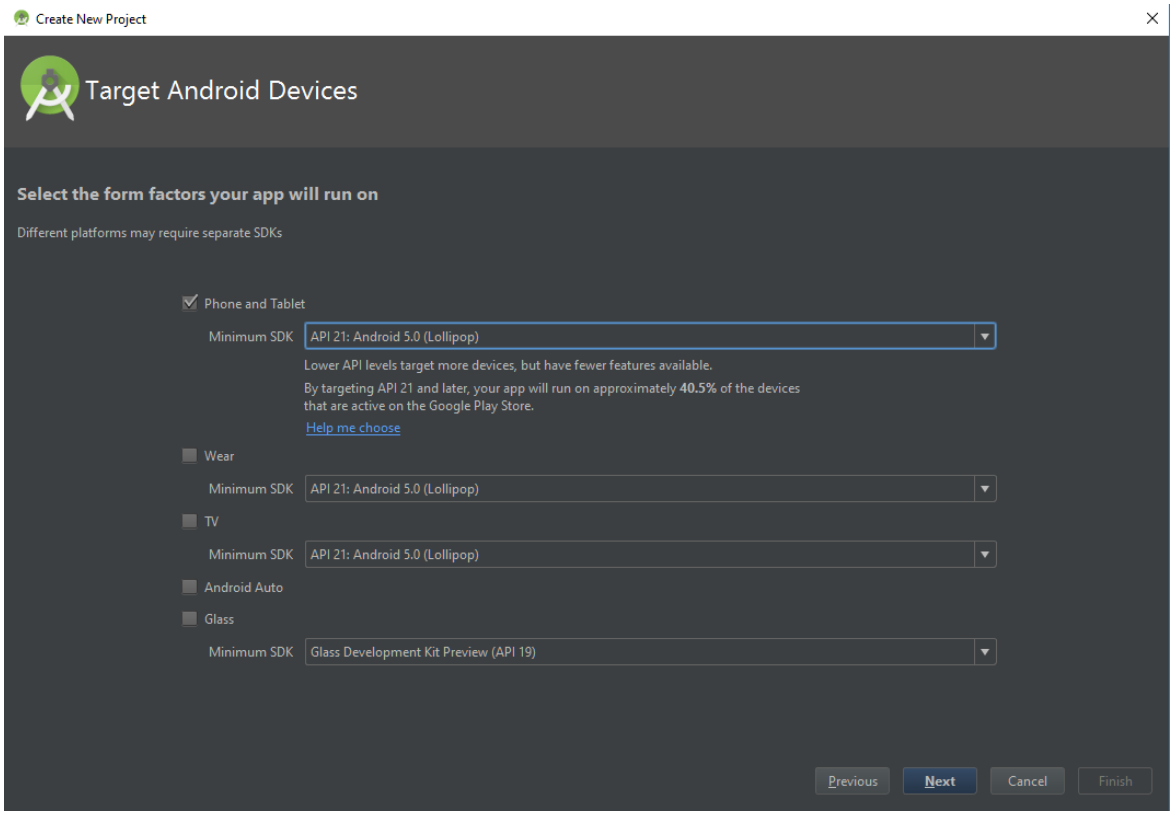
2. Click **“Start a new Android Studio Project”** under the “Quick Start” tab.



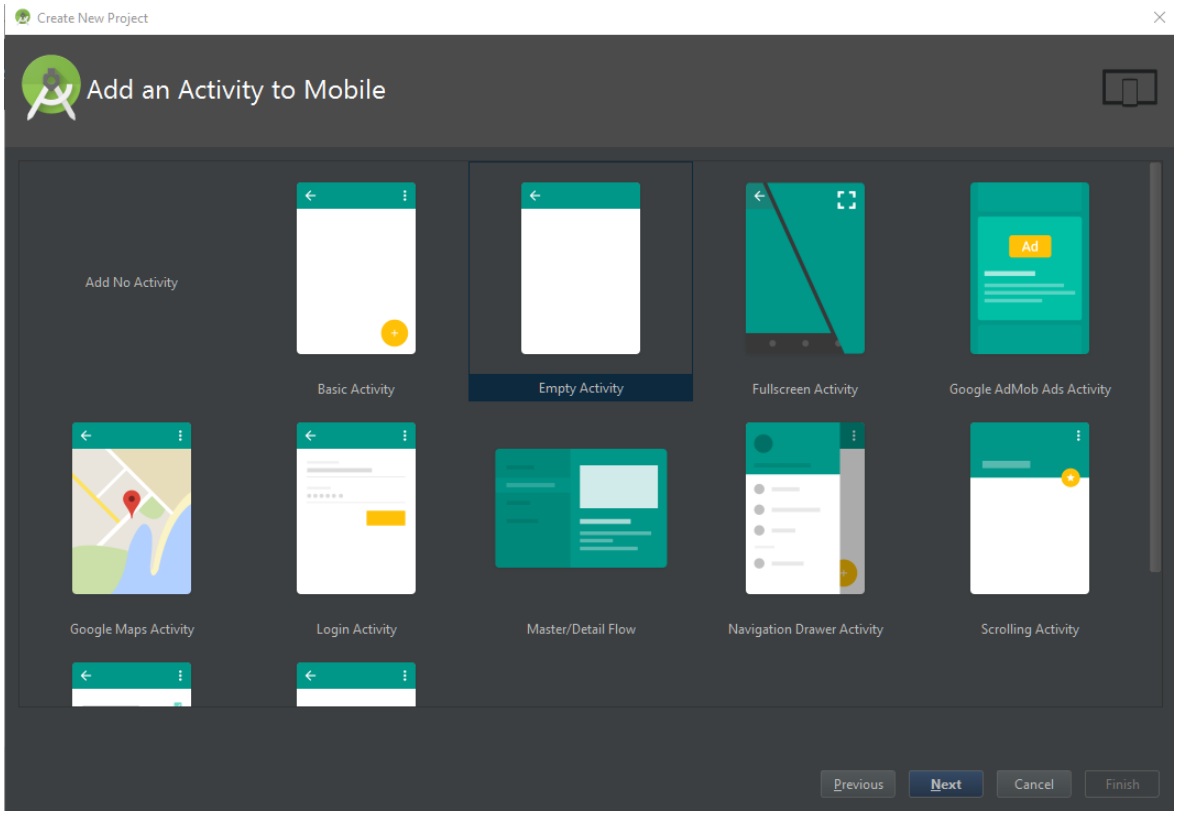
3. Fill in the application name, company domain, and project location, and click “Next”. (NOTE: Please be reminded to copy and backup your project at the “project location” at the end of this workshop).



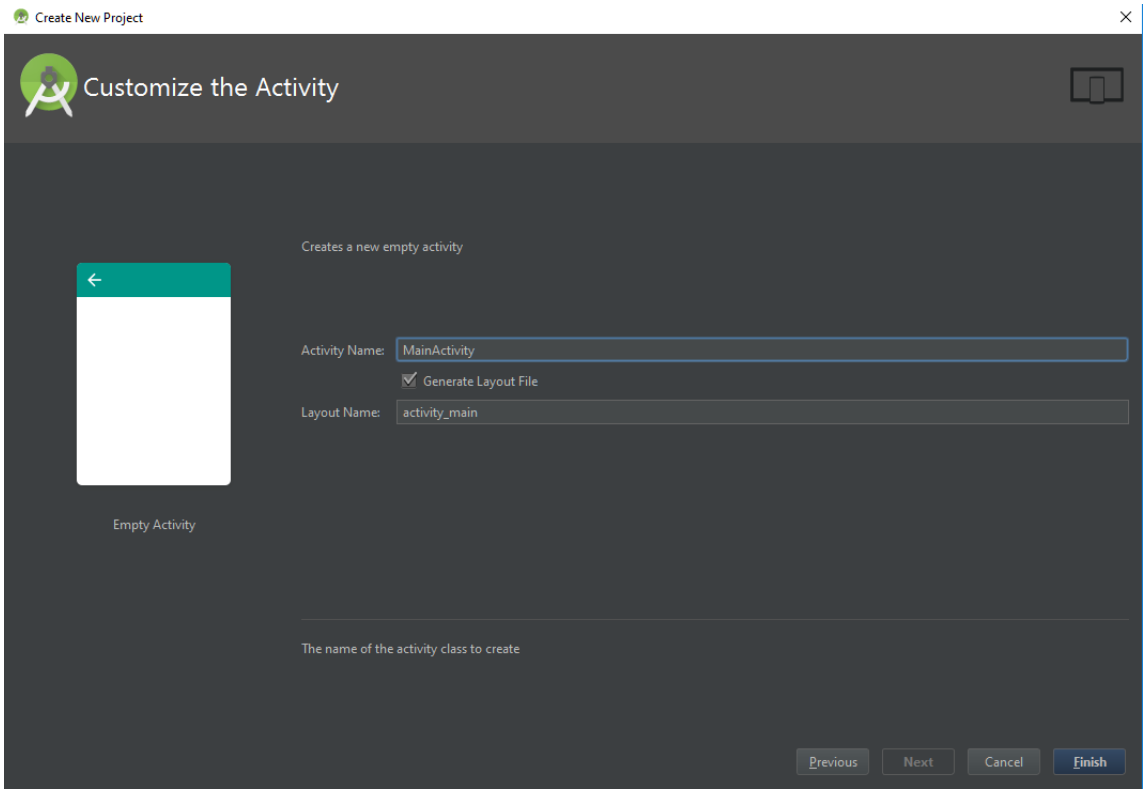
4. Choose the target build for your application. In this workshop, we will focus on phone and tablet with minimum android API21.



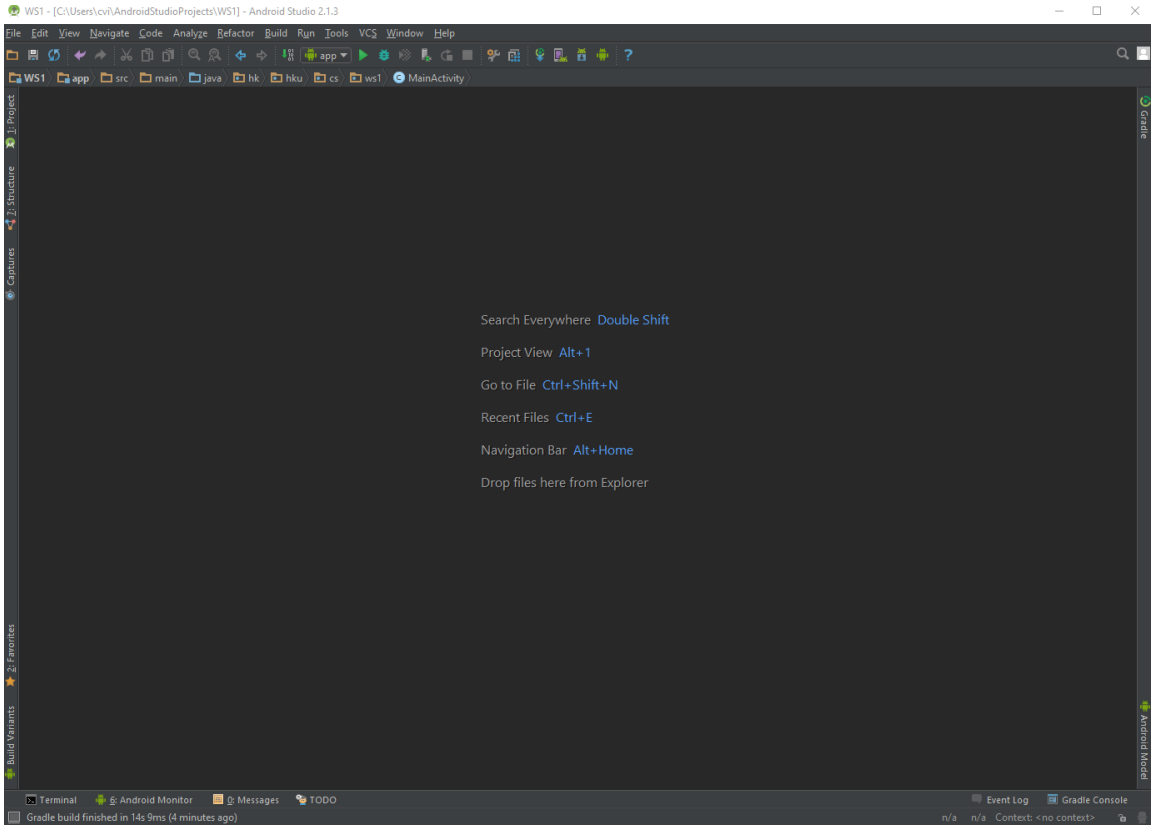
5. Choose the starting application layout activity. In this workshop, we will choose an Empty Activity as an example.



By using the default activity name and layout, and clicking “Finish”, a new blank android app is created.

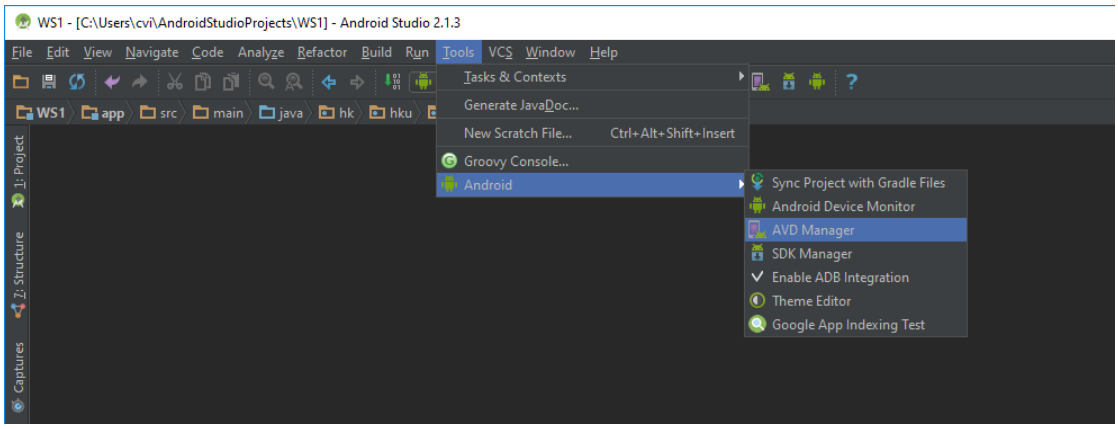


6. Wait until the Android Studio finishing the project generation. (NOTE: there are several jdk version in lab. PCs, students should set the jdk version 1.7.0 or above in order to get the project work).

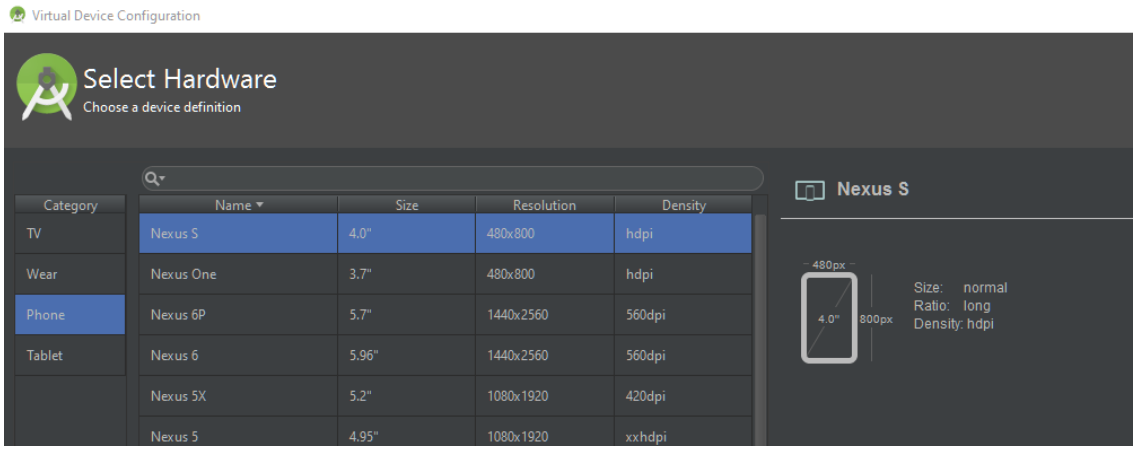


3.2) Setup the AVD

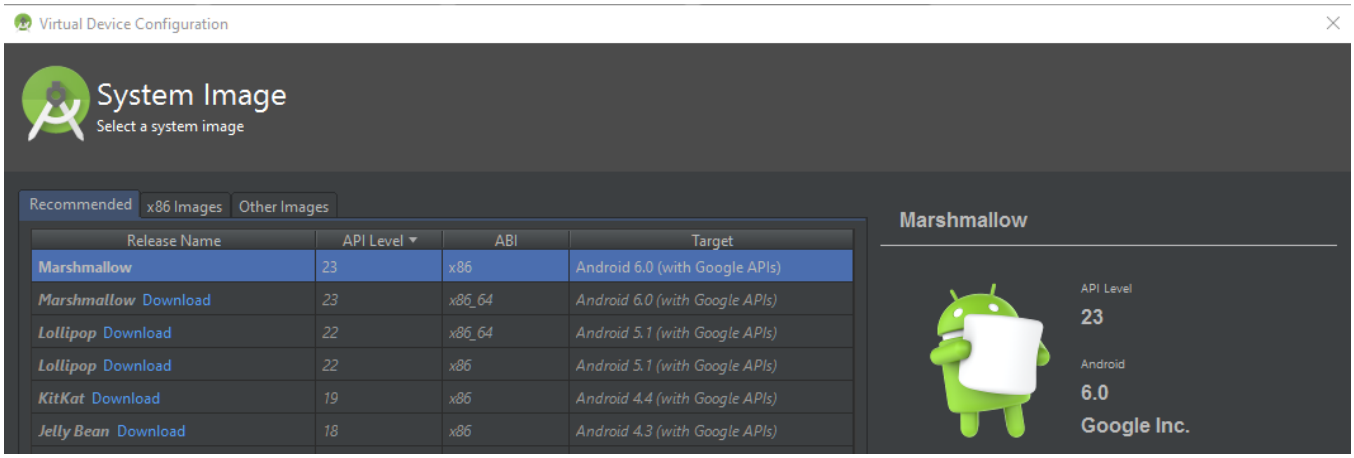
1. Setup the AVD for running the application on PC. To setup the AVD, click Tools (at the menu bar) → Android → AVD Manager.



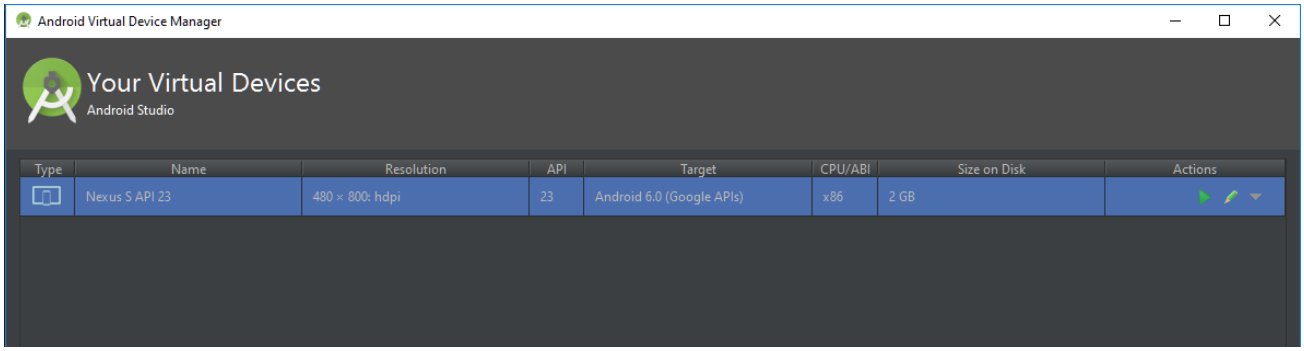
2. Click “Create Virtual Device”, choose the “Nexus S” (You may choose other type with higher resolution only if your PC has enough RAM, e.g. > 4GB).



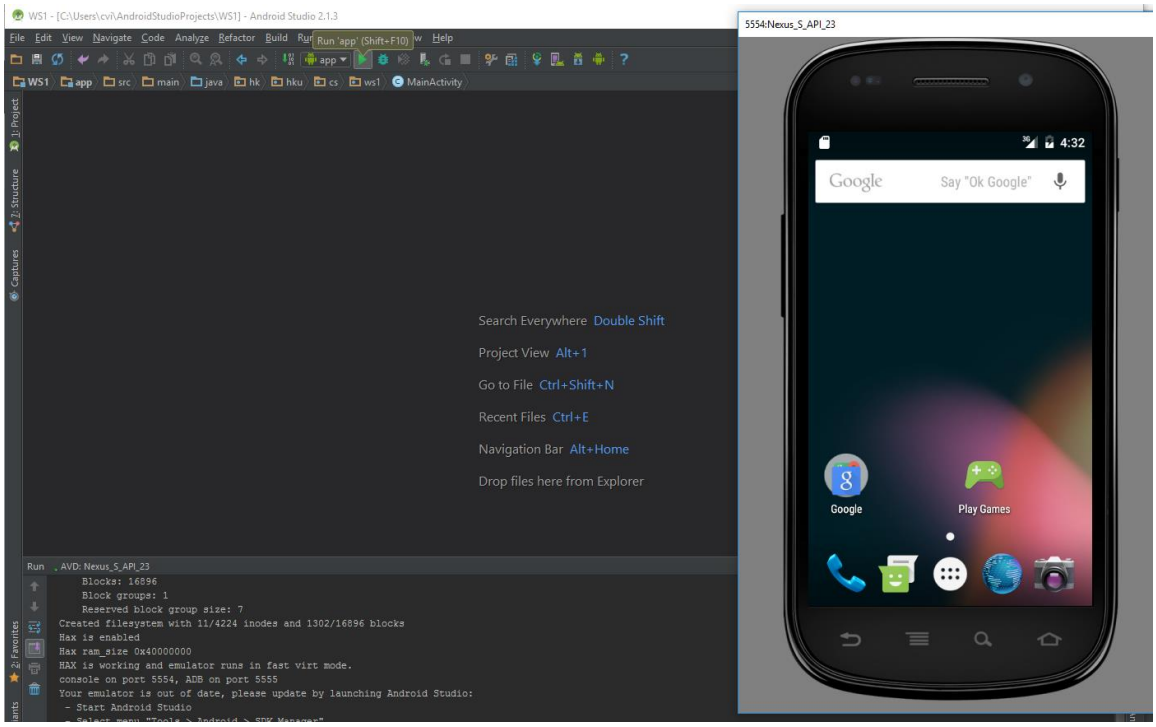
3. Select API level 23 (for android 6.0) and x86, and click Next, then click finish. (Homework: students can try the newest version API level at home, and also note if there is any API difference between these 2 versions).



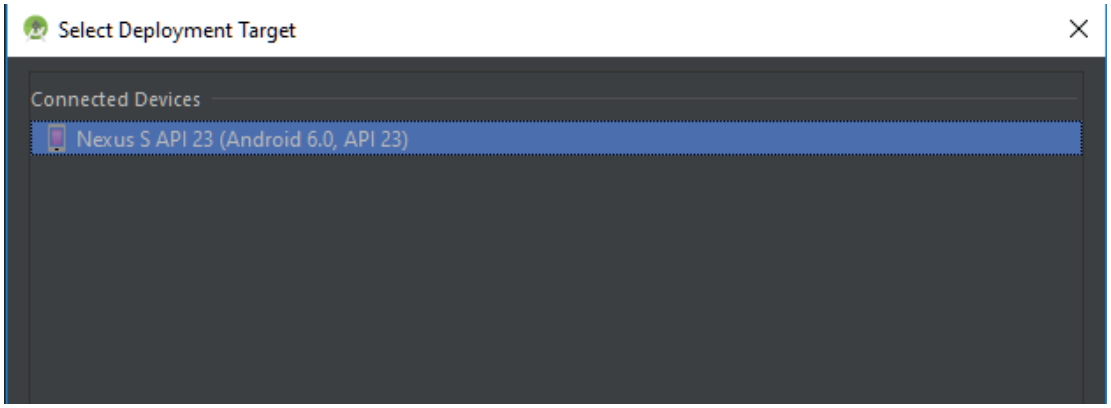
4. Try starting the AVD by double clicking the newly created AVD on the list, and there will be an android simulator running on the PC.



5. Try running your first app on the AVD by clicking the “ ” at the tool bar of Android Studio.



6. Choose the device to run the app, and the “Hello World” app will be installed and run on the selected device.

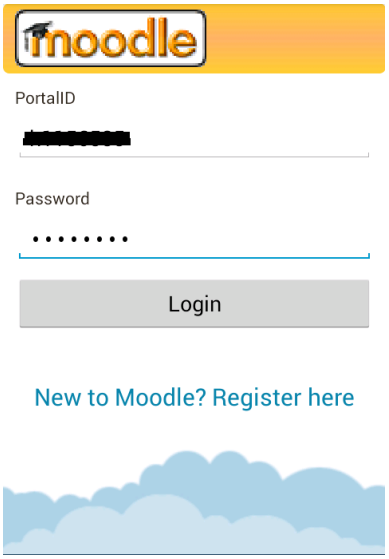


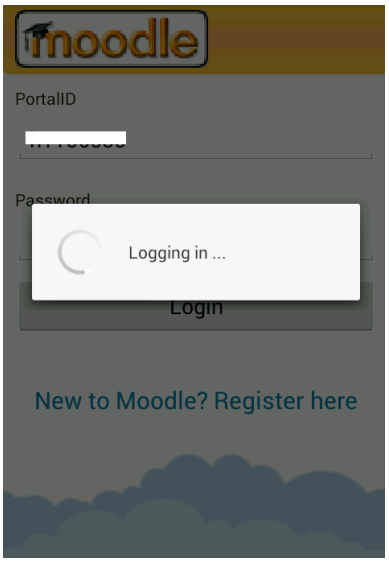
Building a Moodle App (Part 1)

1. Overview

   This project contains THREE parts. The aim of this project is to build an app to access HKU moodle, and access the course information.

   The GUI of the final product:



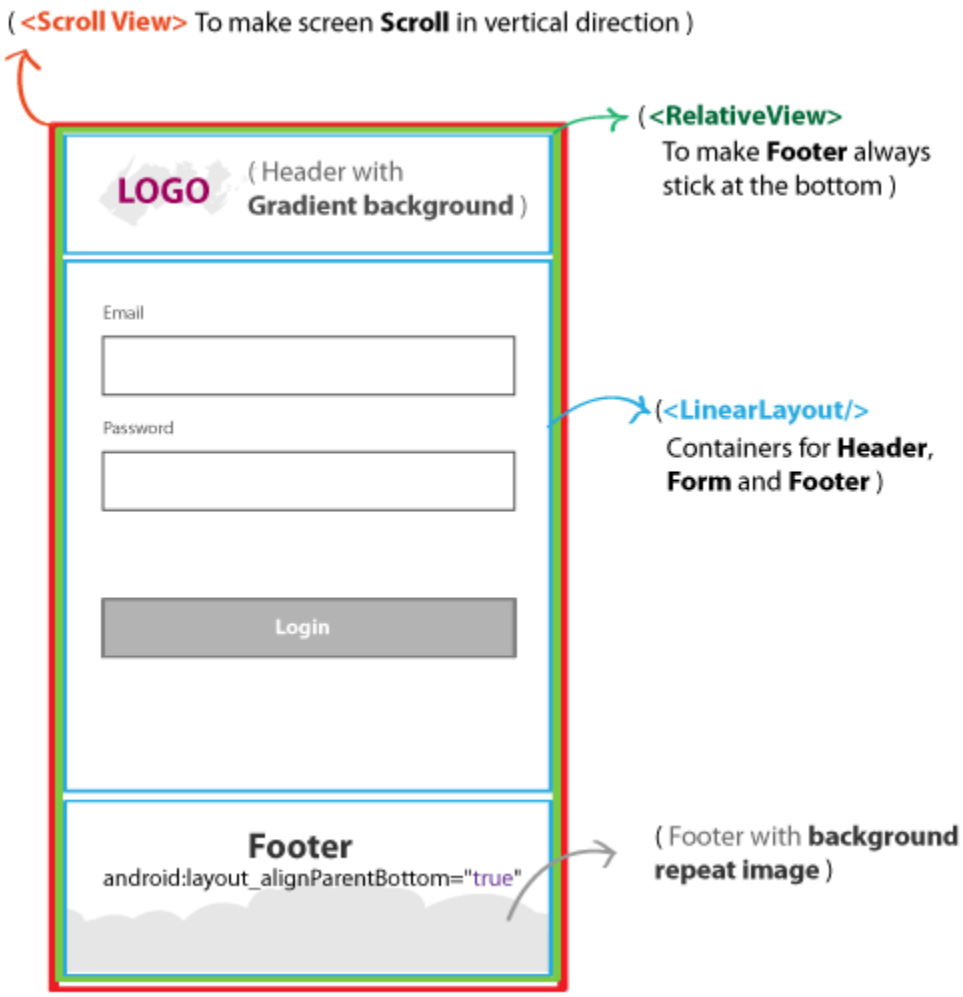


2. Graphical User Interface(GUI) - Layout

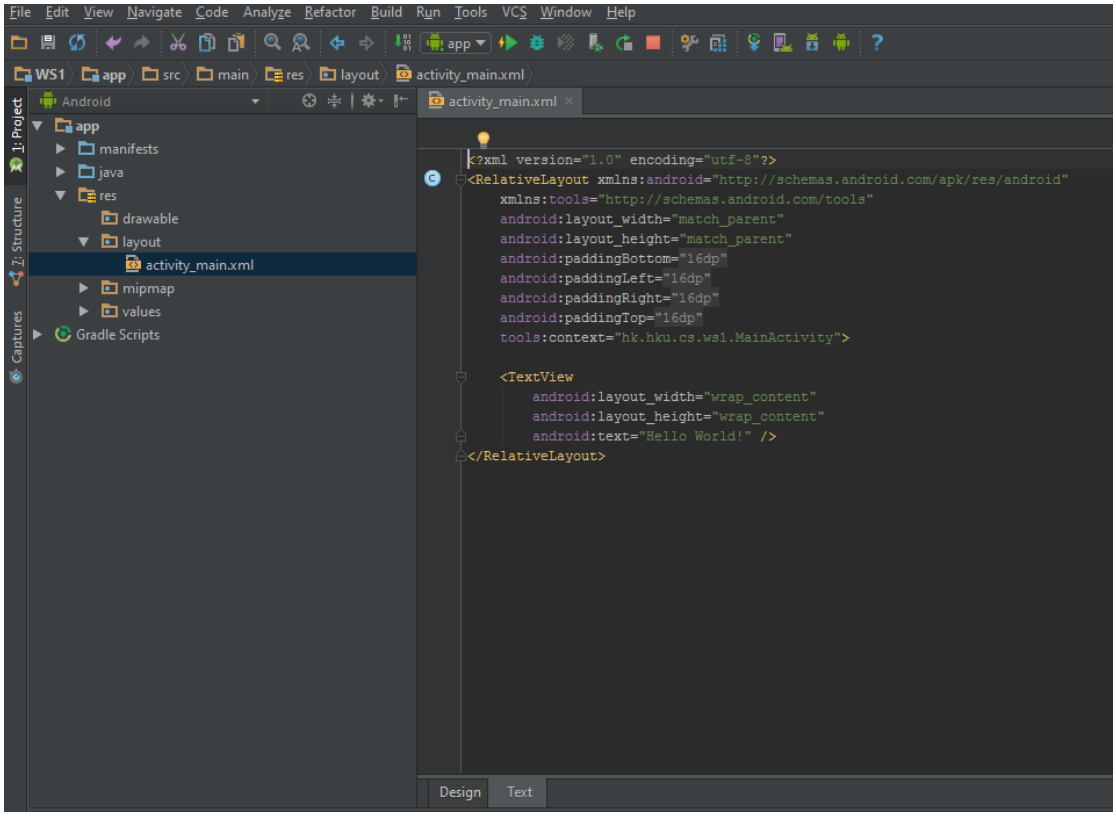
a. Introduction

To achieve login screen design, we are going to merge multiple android layouts. We will place Scroll View as a parent element. This Scroll View makes your screen scroll in vertical direction to avoid hiding exceeding objects on the screen. Inside Scroll View we place Relative View. The main reason for using Relative View is to make footer always stick at the bottom. Finally, Linear Layouts are used for placing Header, Form and Footer.

See the following diagram to get an idea about the layouts we are going to use.



b. Click “Project” at the leftmost panel and browse to the file: app → res → layout → activity_main.xml. Then choose the “Text” tag at the bottom

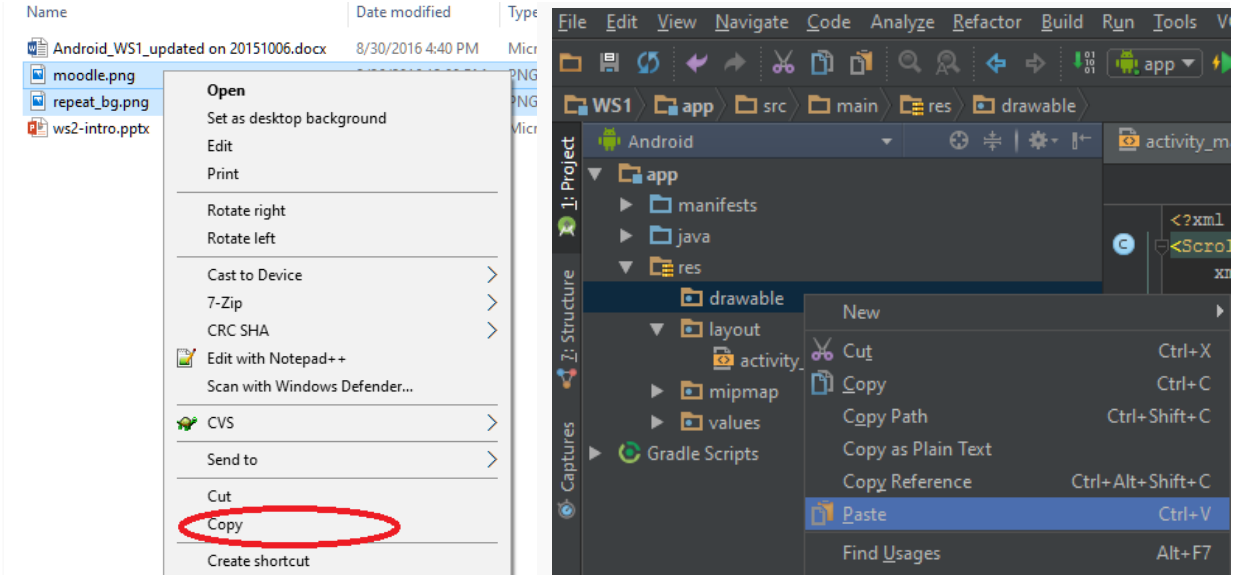


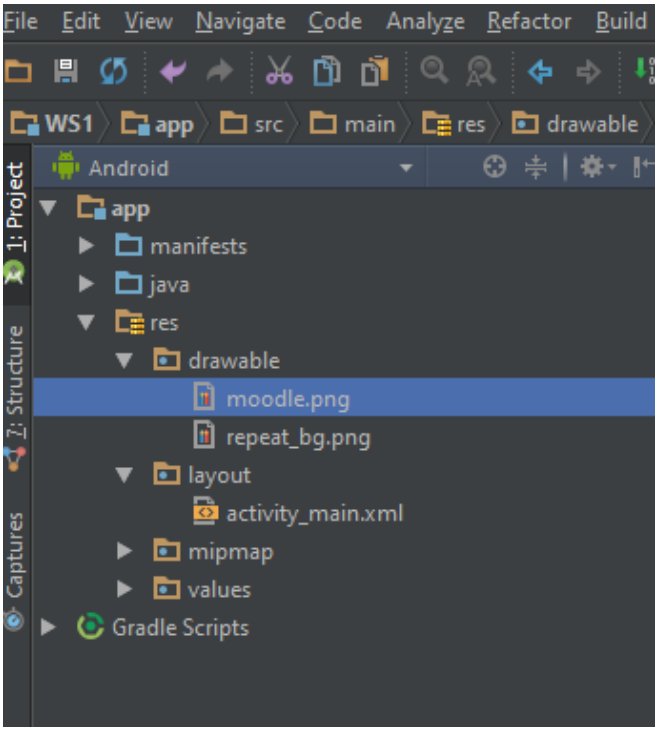
Designing Layout (**/res/layout/activity_main.xml**)
Copy and replace the original codes with the following

```
<?xml version="1.0" encoding="utf-8"?>
<ScrollView
  xmlns:android="http://schemas.android.com/apk/res/android"
  android:layout_width="fill_parent"
  android:layout_height="fill_parent"
  android:fillViewport="true">
  <RelativeLayout
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
android:background="#ffffff">

        <!--  Header Starts-->
        <!--  Header Ends -->

        <!-- Login Form -->
        <!-- Login Form Ends -->

        <!-- Footer Start -->
        <!-- Footer Ends -->

  </RelativeLayout>
</ScrollView>
```

c. Putting Moodle Logo and Cloud image into **/res/drawable**

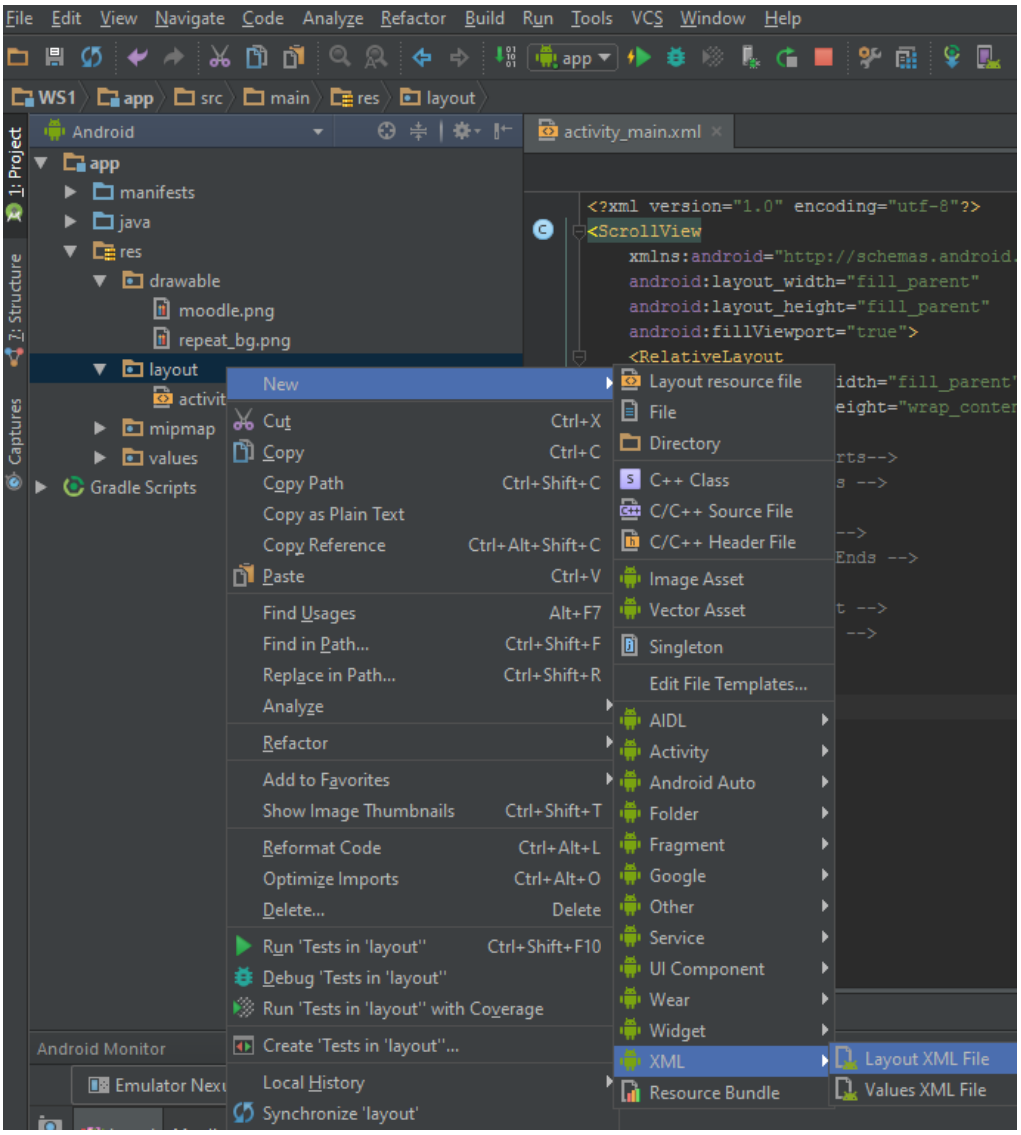
Copy the moodle.png and repeat_bg.png, and paste them into **/res/drawable**





d. Create a new xml file under **res/layout**

Right click the layout → New → XML → Layout XML File, and name it as `header_gradient.xml`



and replace the `header_gradient.xml` code with following code

i.e.

```
<?xml version="1.0" encoding="utf-8"?>
<shape
xmlns:android="http://schemas.android.com/apk/res/android"
android:layout_width="fill_parent"
android:layout_height="wrap_content">
   <gradient
      android:startColor="#FFCC33"
      android:centerColor= "#FFB366"
      android:endColor="#FFCC33"
      android:angle="270"/>
   <corners android:radius="5dp" />
</shape>
```

e. In `activity_main.xml` add the following code between the header comments

i.e. 


```
<!--  Header Starts-->
                    <LinearLayout android:id="@+id/header"
                       android:layout_width="fill_parent"
                       android:layout_height="wrap_content"
                       android:background="@layout/header_gradient"
                       android:paddingTop="5dip"
                       android:paddingBottom="5dip">
                          <!-- Logo Start-->
                          <ImageView android:src="@drawable/moodle"
                             android:layout_width="wrap_content"
                             android:layout_height="wrap_content"
                             android:layout_marginLeft="10dip" />
                          <!-- Logo Ends -->
                    </LinearLayout>
<!--  Header Ends -->
```

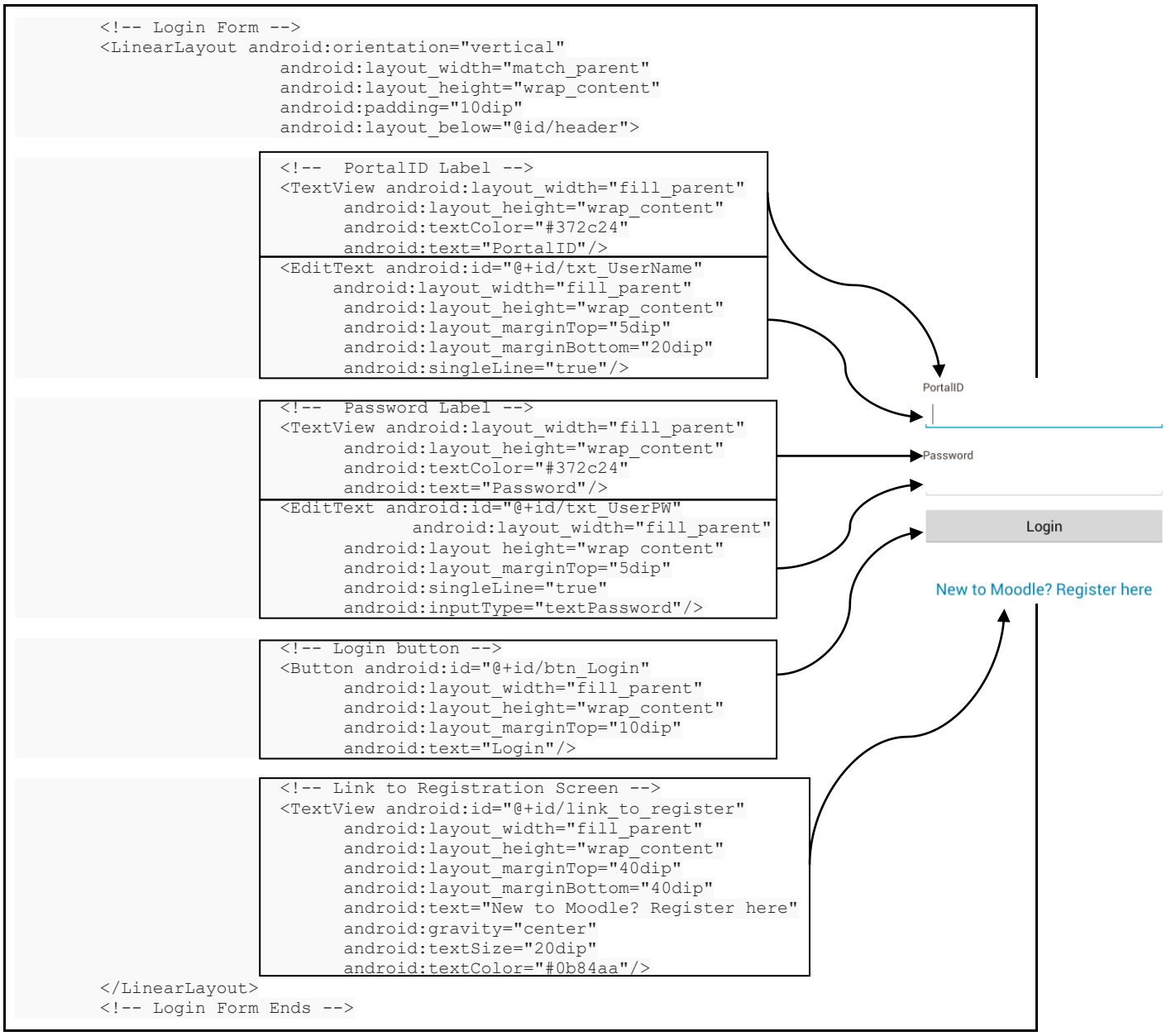
f. In `activity_main.xml` add the following code between footer comments

i.e.

```
<!-- Footer Start -->
                    <LinearLayout android:id="@+id/footer"
                       android:layout_width="fill_parent"
                       android:layout_height="90dip"
                       android:layout_alignParentBottom="true"
                       android:background="@drawable/repeat_bg"
                       android:orientation="vertical" >
                    </LinearLayout>
<!-- Footer Ends -->
```

g. Login form contains two textfields with labels and a login button. In your **activity_main.xml** file add the following code between Login Form comments

```
<!-- Login Form -->
<LinearLayout android:orientation="vertical"
                  android:layout_width="match_parent"
                  android:layout_height="wrap_content"
                  android:padding="10dip"
                  android:layout_below="@id/header">

    <!--  PortalID Label -->
    <TextView android:layout_width="fill_parent"
          android:layout_height="wrap_content"
          android:textColor="#372c24"
          android:text="PortalID"/>
    <EditText android:id="@+id/txt_UserName"
         android:layout_width="fill_parent"
          android:layout_height="wrap_content"
          android:layout_marginTop="5dip"
          android:layout_marginBottom="20dip"
          android:singleLine="true"/>

    <!--  Password Label -->
    <TextView android:layout_width="fill_parent"
          android:layout_height="wrap_content"
          android:textColor="#372c24"
          android:text="Password"/>
    <EditText android:id="@+id/txt_UserPW"
                android:layout_width="fill_parent"
          android:layout height="wrap content"
          android:layout_marginTop="5dip"
          android:singleLine="true"
          android:inputType="textPassword"/>

    <!-- Login button -->
    <Button android:id="@+id/btn_Login"
          android:layout_width="fill_parent"
          android:layout_height="wrap_content"
          android:layout_marginTop="10dip"
          android:text="Login"/>

    <!-- Link to Registration Screen -->
    <TextView android:id="@+id/link_to_register"
          android:layout_width="fill_parent"
          android:layout_height="wrap_content"
          android:layout_marginTop="40dip"
          android:layout_marginBottom="40dip"
          android:text="New to Moodle? Register here"
          android:gravity="center"
          android:textSize="20dip"
          android:textColor="#0b84aa"/>
</LinearLayout>
<!-- Login Form Ends -->
```



At this point, the layout of the login screen has been completed. You may run the app to verify the output

3. Interacting with textbox, button

a) Detect Click event of the button

i) Implement **OnClickListener** in **MainActivity.java**

```
public class MainActivity extends Activity implements View.OnClickListener {
```

(NOTE: For the following codes, if there is any missing class, e.g. OnClickListener, the Android Studio will warn you, and ask you to press “Alt-Enter”. Students can simply press “Alt-Enter” as told, and the Android Studio will automatically import the necessary class).

ii) Implement the **onClick** function

```
@Override
public void onClick(View v) {
        // TODO Auto-generated method stub
        // btn_Login is the ID of Login button defined in the layout
        if (v.getId() == R.id.btn_Login) {
                //<do something>
        }
}
```

iii) Define the class variable inside **MainActivity** Class

```
EditText txt_UserName, txt_UserPW;
Button btn_Login;
```

iv) Link the variables to the textbox and button objects inside function **onCreate**

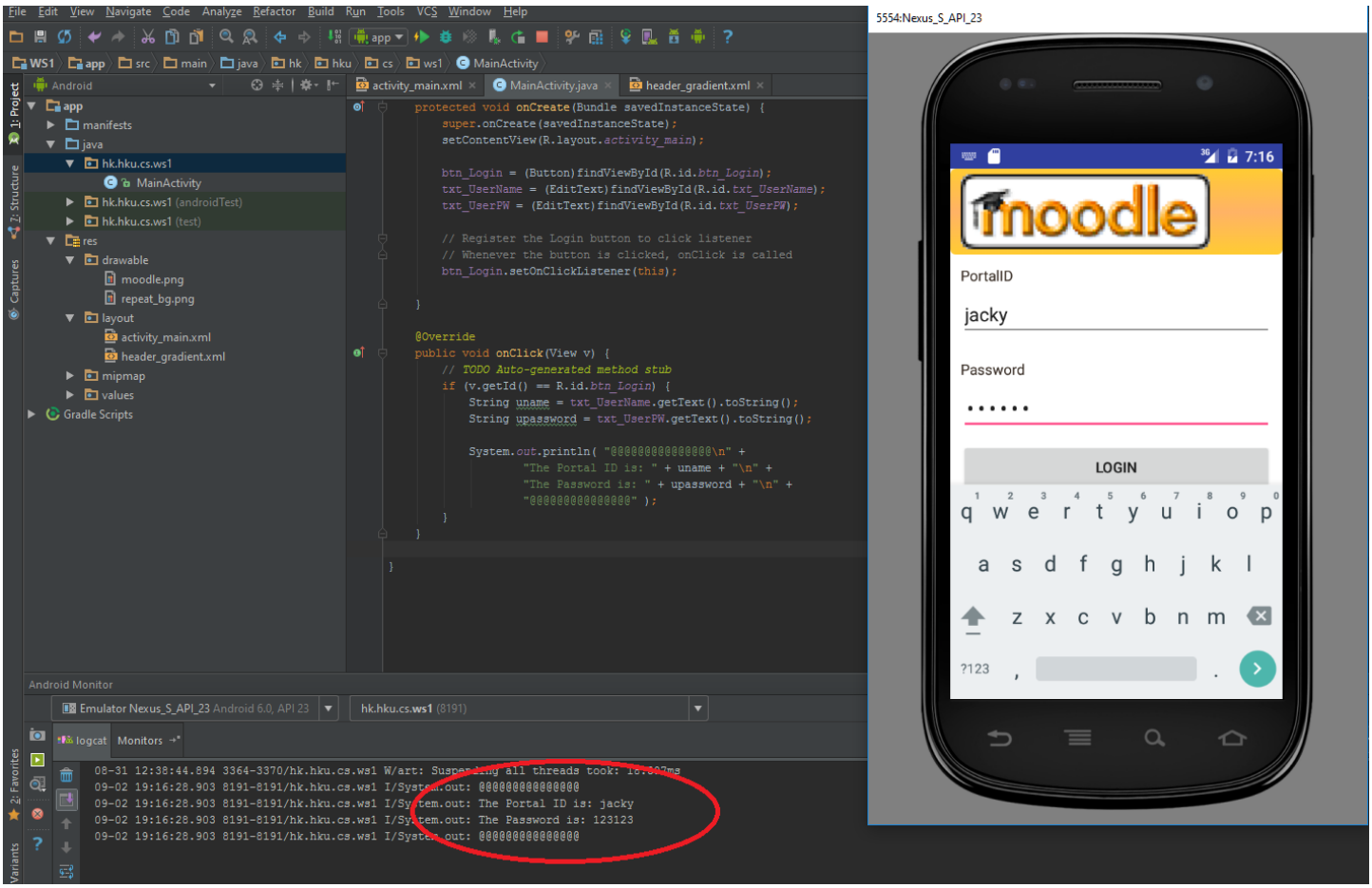
```
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);

    btn_Login = (Button)findViewById(R.id.btn_Login);
    txt_UserName = (EditText)findViewById(R.id.txt_UserName);
    txt_UserPW = (EditText)findViewById(R.id.txt_UserPW);

    // Register the Login button to click listener
    // Whenever the button is clicked, onClick is called
    btn_Login.setOnClickListener(this);
}
```

4. Testing

i) Display the user input

```
@Override
public void onClick(View v) {
        // TODO Auto-generated method stub
        if (v.getId() == R.id.btn_Login) {
                String uname = txt_UserName.getText().toString();
                String upassword = txt_UserPW.getText().toString();

                System.out.println( "@@@@@@@@@@@@@@@@\n" +
                                    "The Portal ID is: " + uname + "\n" +
                                    "The Password is: " + upassword + "\n" +
                                   "@@@@@@@@@@@@@@@@" );
        }
}
```

ii) Result (Display on LogCat*. **You need to turn on LogCat to display the result**!)



Please save and keep your work properly. We will continue in the next workshop. Also you need to submit your work after Workshop 4 as a proof of workshop participation.

Appendix

You resulting *activity_main.xml* should look like:

```
<?xml version="1.0" encoding="utf-8"?>
<ScrollView
   xmlns:android="http://schemas.android.com/apk/res/android"
   android:layout_width="fill_parent"
   android:layout_height="fill_parent"
   android:fillViewport="true">
   <RelativeLayout
      android:layout_width="fill_parent"
      android:layout_height="wrap_content" android:background="#ffffff">

      <!--  Header Starts-->
      <LinearLayout android:id="@+id/header"
         android:layout_width="fill_parent"
         android:layout_height="wrap_content"
         android:background="@layout/header_gradient"
         android:paddingTop="5dip"
         android:paddingBottom="5dip">
         <!-- Logo Start-->
         <ImageView android:src="@drawable/moodle"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dip" />
         <!-- Logo Ends -->
      </LinearLayout>
      <!--  Header Ends -->


      <!-- Login Form -->
      <LinearLayout android:orientation="vertical"
         android:layout_width="match_parent"
         android:layout_height="wrap_content"
         android:padding="10dip"
         android:layout_below="@id/header">

         <!--  PortalID Label -->
         <TextView android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:textColor="#372c24"
            android:text="PortalID"/>
         <EditText android:id="@+id/txt_UserName"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="5dip"
            android:layout_marginBottom="20dip"
            android:singleLine="true"/>

         <!--  Password Label -->
         <TextView android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:textColor="#372c24"
            android:text="Password"/>
         <EditText android:id="@+id/txt_UserPW"
```

```
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="5dip"
            android:singleLine="true"
            android:inputType="textPassword"/>

        <!-- Login button -->
        <Button android:id="@+id/btn_Login"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="10dip"
            android:text="Login"/>

        <!-- Link to Registration Screen -->
        <TextView android:id="@+id/link_to_register"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="40dip"
            android:layout_marginBottom="40dip"
            android:text="New to Moodle? Register here"
            android:gravity="center"
            android:textSize="20dip"
            android:textColor="#0b84aa"/>
    </LinearLayout>
    <!-- Login Form Ends -->


    <!-- Footer Start -->
    <LinearLayout android:id="@+id/footer"
        android:layout_width="fill_parent"
        android:layout_height="90dip"
        android:layout_alignParentBottom="true"
        android:background="@drawable/repeat_bg"
        android:orientation="vertical" >
    </LinearLayout>
    <!-- Footer Ends -->


  </RelativeLayout>
</ScrollView>
```