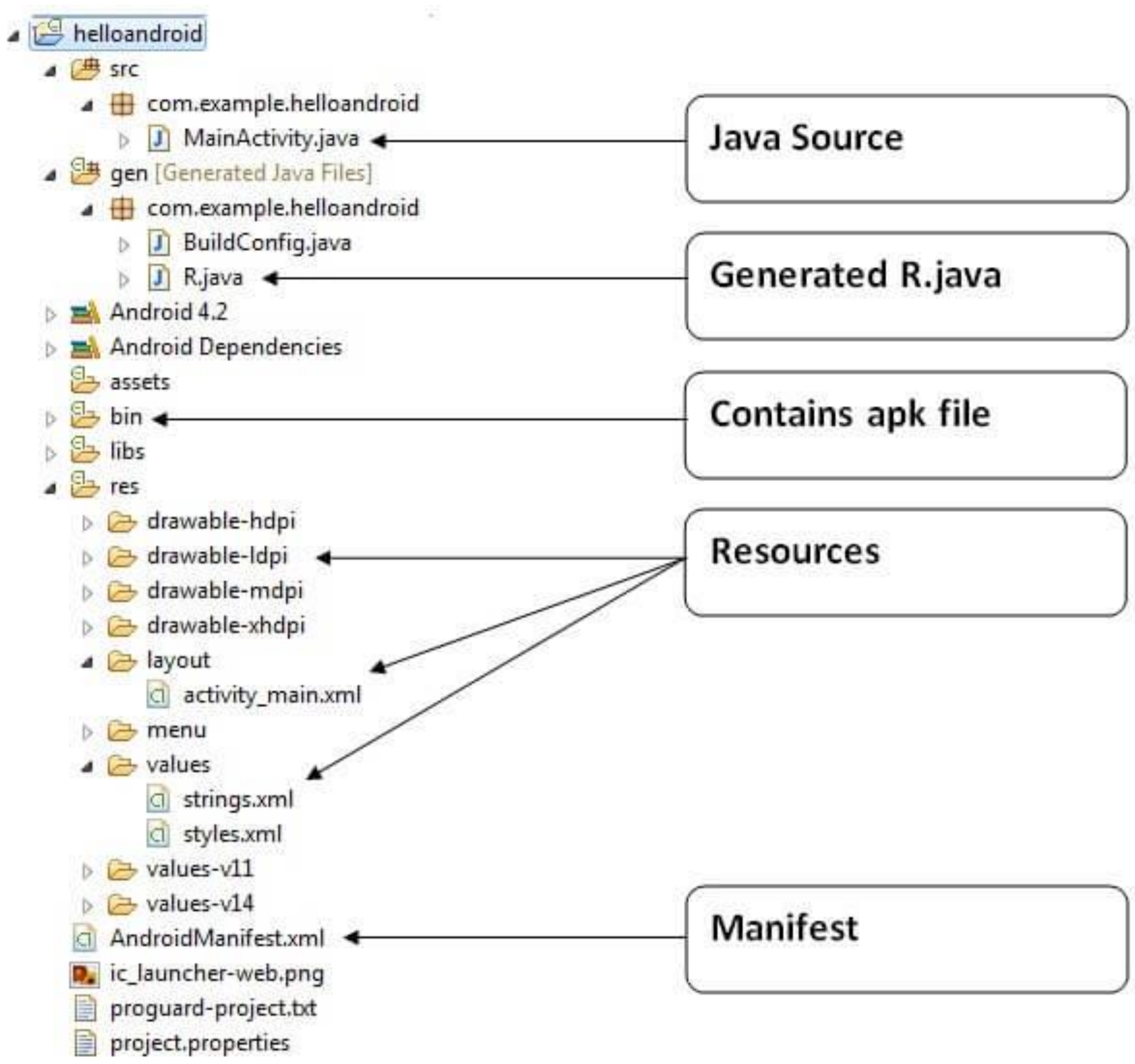
Internal Details Of Android Application

We are going to learn the internal details or working of hello android example.

Android application contains different components such as java source code, string resources, images, manifest file, apk file etc. Let's understand the project structure of android application.



Java Source Code

Let's see the java source file created by the Eclipse IDE:

File: MainActivity.java

```
package com.example.helloandroid;
import android.os.Bundle;
import android.app.Activity;
import android.view.Menu;
import android.widget.TextView;
public class MainActivity extends Activity {//(1)
    @Override
    protected void onCreate(Bundle savedInstanceState) {//(2)
        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);//(3)
    }
    @Override
    public boolean onCreateOptionsMenu(Menu menu) {//(4)
        // Inflate the menu; this adds items to the action bar if it is present
.
        getMenuInflater().inflate(R.menu.activity_main, menu);
        return true;
    }
}
```

(1) Activity is a java class that creates and default window on the screen where we can place different components such as Button, EditText, TextView, Spinner etc. It is like the Frame of Java AWT.

It provides life cycle methods for activity such as onCreate, onStop, OnResume etc.

(2) The **onCreate method** is called when Activity class is first created.

(3) The **setContentView(R.layout.activity_main)** gives information about our layout resource. Here, our layout resources are defined in activity_main.xml file.

File: activity_main.xml

```
<RelativeLayout xmlns:androclass="http://schemas.android.com/apk/res/and
roid"
```

```
        xmlns:tools="http://schemas.android.com/tools"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        tools:context=".MainActivity" >
        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_centerHorizontal="true"
            android:layout_centerVertical="true"
            android:text="@string/hello_world" />
    </RelativeLayout>
```

As you can see, a textview is created by the framework automatically. But the message for this string is defined in the strings.xml file. The **@string/hello_world** provides information about the textview message. The value of the attribute hello_world is defined in the strings.xml file.

File: strings.xml

```
<?xml version="1.0" encoding="utf-8"?>
<resources>
   <string name="app_name">helloandroid</string>
   <string name="hello_world">Hello world!</string>
   <string name="menu_settings">Settings</string>
</resources>
```

You can change the value of the hello_world attribute from this file.

R.java file

Being an auto-generated file that is generated by AAPT (Android Asset Packaging Tool), Android R.java contains resource IDs for all the resources of res/ directory. The id for the created component is automatically generated in the R.java whenever a component is created in the android activity_main.xml file. The life cycle methods for an activity such as onCreate, onStop, OnResume, etc is provided by the Activity java class. The created ID can later be used in the Java Source file. To act on a component, the corresponding id can be used in the activity source file. The android creates the R.jar file automatically in case the R.jar file is deleted. The android R.java file contains many static nested classes such as menu, id, layout, attr, drawable, string, etc. Now we will see the code of the android R.java file. The code will look something like this:

File: R.java

```java
/* AUTO-GENERATED FILE.  DO NOT MODIFY.
 *
 * This class was automatically generated by the
 * aapt tool from the resource data it found.  It
 * should not be modified by hand.
 */
package com.example.helloandroid;
public final class R {
    public static final class attr {
    }
    public static final class drawable {
        public static final int ic_launcher=0x7f020000;
    }
    public static final class id {
        public static final int menu_settings=0x7f070000;
    }
    public static final class layout {
        public static final int activity_main=0x7f030000;
    }
    public static final class menu {
        public static final int activity_main=0x7f060000;
    }
    public static final class string {
        public static final int app_name=0x7f040000;
        public static final int hello_world=0x7f040001;
        public static final int menu_settings=0x7f040002;
    }
```

1.

```
        public static final class style {  /**
      Base application theme, dependent on API level. This theme is replaced
      by AppBaseTheme from res/values-vXX/styles.xml on newer devices.
          Theme customizations available in newer API levels can go in
          res/values-vXX/styles.xml, while customizations related to
          backward-compatibility can go here.
       Base application theme for API 11+. This theme completely replaces
      AppBaseTheme from res/values/styles.xml on API 11+ devices.
 API 11 theme customizations can go here.
      Base application theme for API 14+. This theme completely replaces
      AppBaseTheme from BOTH res/values/styles.xml and
      res/values-v11/styles.xml on API 14+ devices.
API 14 theme customizations can go here.
       */
      public static final int AppBaseTheme=0x7f050000;
      /**  Application theme.
All customizations that are NOT specific to a particular API-level can go here.
       */
      public static final int AppTheme=0x7f050001;
    }
}
```

APK File

An apk file is created by the framework automatically. If you want to run the android application on the mobile, transfer and install it.

Resources

It contains resource files including activity_main, strings, styles etc.

Manifest file

It contains information about package including components such as activities, services, content providers etc.

AndroidManifest.xml file in android

The **AndroidManifest.xml file** *contains information of your package*, including components of the application such as activities, services, broadcast receivers, content providers etc.

It performs some other tasks also:

- It is **responsible to protect the application** to access any protected parts by providing the permissions.
- It also **declares the android api** that the application is going to use.
- It **lists the instrumentation classes**. The instrumentation classes provides profiling and other information's. These information's are removed just before the application is published etc.

This is the required xml file for all the android application and located inside the root directory.

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
   package="com.hello"
   android:versionCode="1"
   android:versionName="1.0" >

   <uses-sdk
      android:minSdkVersion="8"
      android:targetSdkVersion="15" />

   <application
      android:icon="@drawable/ic_launcher"
      android:label="@string/app_name"
      android:theme="@style/AppTheme" >
      <activity
         android:name=".MainActivity"
         android:label="@string/title_activity_main" >
         <intent-filter>
            <action android:name="android.intent.action.MAIN" />

            <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

</manifest>
```

Elements of the AndroidManifest.xml file

The elements used in the above xml file are described below.

<manifest>

manifest is the root element of the AndroidManifest.xml file. It has **package** attribute that describes the package name of the activity class.

<application>

application is the subelement of the manifest. It includes the namespace declaration. This element contains several subelements that declares the application component such as activity etc.

The commonly used attributes are of this element are **icon**, **label**, **theme** etc.

android:icon represents the icon for all the android application components.

android:label works as the default label for all the application components.

android:theme represents a common theme for all the android activities.

<activity>

activity is the subelement of application and represents an activity that must be defined in the AndroidManifest.xml file. It has many attributes such as label, name, theme, launchMode etc.

android:label represents a label i.e. displayed on the screen.

android:name represents a name for the activity class. It is required attribute.

<intent-filter>

intent-filter is the sub-element of activity that describes the type of intent to which activity, service or broadcast receiver can respond to.

<action>

It adds an action for the intent-filter. The intent-filter must have at least one action element.

<category>

It adds a category name to an intent-filter.

Android R.java file

Android R.java is *an auto-generated file by aapt* (Android Asset Packaging Tool) that contains resource IDs for all the resources of res/ directory.

If you create any component in the activity_main.xml file, id for the corresponding component is automatically created in this file. This id can be used in the activity source file to perform any action on the component.

Note: If you delete R.jar file, android creates it automatically.

Let's see the android R.java file. It includes a lot of static nested classes such as menu, id, layout, attr, drawable, string etc.

```
/* AUTO-GENERATED FILE.  DO NOT MODIFY.
 *
 * This class was automatically generated by the
 * aapt tool from the resource data it found.  It
 * should not be modified by hand.
 */

package com.example.helloandroid;

public final class R {
    public static final class attr {
    }
    public static final class drawable {
        public static final int ic_launcher=0x7f020000;
    }
    public static final class id {
        public static final int menu_settings=0x7f070000;
    }
    public static final class layout {
        public static final int activity_main=0x7f030000;
    }
    public static final class menu {
        public static final int activity_main=0x7f060000;
    }
    public static final class string {
        public static final int app_name=0x7f040000;
        public static final int hello_world=0x7f040001;
        public static final int menu_settings=0x7f040002;
    }
    public static final class style {
        /**
        Base application theme, dependent on API level. This theme is replaced
        by AppBaseTheme from res/values-vXX/styles.xml on newer devices.


            Theme customizations available in newer API levels can go in
            res/values-vXX/styles.xml, while customizations related to
            backward-compatibility can go here.


        Base application theme for API 11+. This theme completely replaces
        AppBaseTheme from res/values/styles.xml on API 11+ devices.

  API 11 theme customizations can go here.

        Base application theme for API 14+. This theme completely replaces
        AppBaseTheme from BOTH res/values/styles.xml and
        res/values-v11/styles.xml on API 14+ devices.

  API 14 theme customizations can go here.
         */
        public static final int AppBaseTheme=0x7f050000;
        /**  Application theme.
  All customizations that are NOT specific to a particular API-level can go here.
         */
```

```
            public static final int AppTheme=0x7f050001;
        }
    }
```

Dalvik Virtual Machine | DVM

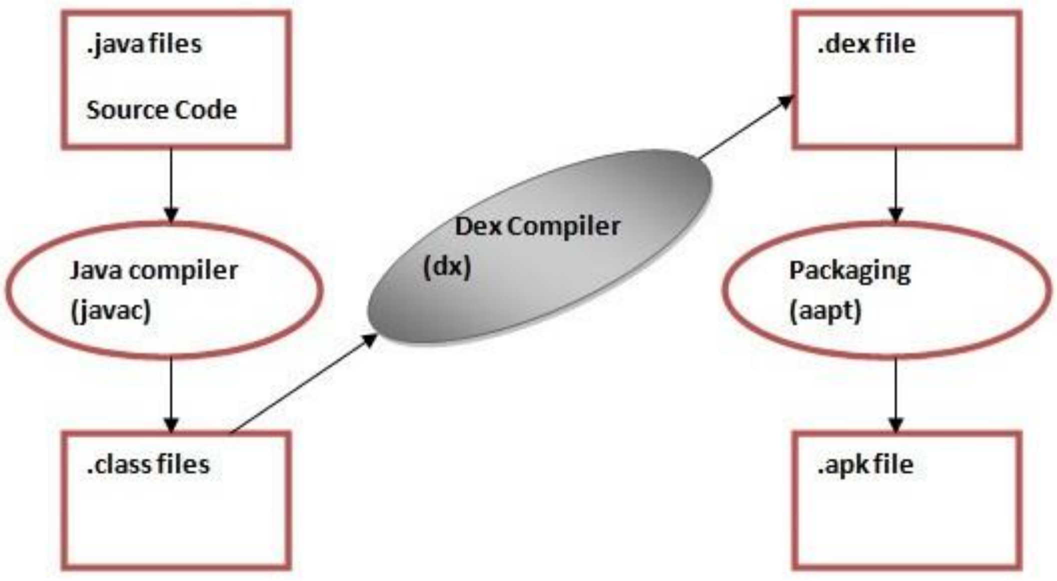
As we know the modern JVM is high performance and provides excellent memory management. But it needs to be optimized for low-powered handheld devices as well.

The **Dalvik Virtual Machine (DVM)** is an android virtual machine optimized for mobile devices. It optimizes the virtual machine for *memory*, *battery life* and *performance*.

Dalvik is a name of a town in Iceland. The Dalvik VM was written by Dan Bornstein.

The Dex compiler converts the class files into the .dex file that run on the Dalvik VM. Multiple class files are converted into one dex file.

Let's see the compiling and packaging process from the source file:



The **javac tool** compiles the java source file into the class file.

The **dx tool** takes all the class files of your application and generates a single .dex file. It is a platform-specific tool.

The **Android Assets Packaging Tool (aapt)** handles the packaging process.

Android Hide Title Bar and Full Screen Example

In this example, we are going to explain how to hide the title bar and how to display content in full screen mode.

The **requestWindowFeature(Window.FEATURE_NO_TITLE)** method of Activity must be called to hide the title. But, it must be coded before the setContentView method.

Code that hides title bar of activity

The **getSupportActionBar()** method is used to retrieve the instance of ActionBar class. Calling the hide() method of ActionBar class hides the title bar.

```
requestWindowFeature(Window.FEATURE_NO_TITLE);//will hide the title
getSupportActionBar().hide(); //hide the title bar
```

Code that enables full screen mode of activity

The **setFlags()** method of Window class is used to display content in full screen mode. You need to pass the **WindowManager.LayoutParams.FLAG_FULLSCREEN** constant in the setFlags method.

```
this.getWindow().setFlags(WindowManager.LayoutParams.FLAG_FULLSCREEN,  WindowManager.LayoutParams.FLAG_FULLSCREEN); //show the activity in full screen
```

Android Hide Title Bar and Full Screen Example

Let's see the full code to hide the title bar in android.

activity_main.xml

File: activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<android.support.constraint.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
```

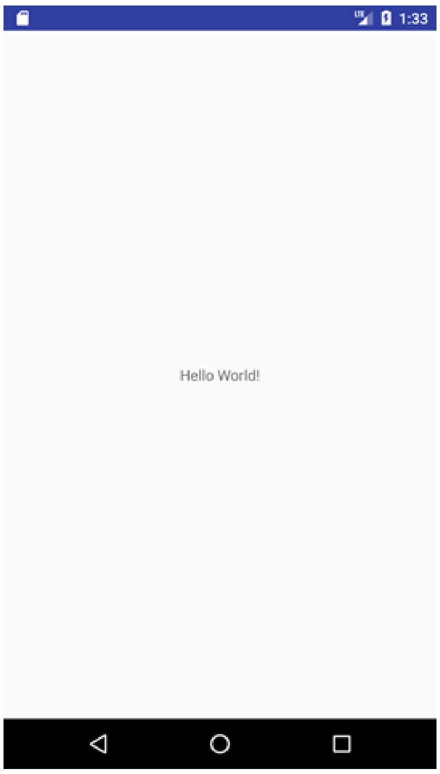
```
   android:layout_height="match_parent"
   tools:context=" MainActivity">

   <TextView
       android:layout_width="wrap_content"
       android:layout_height="wrap_content"
       android:text="Hello World!"
       app:layout_constraintBottom_toBottomOf="parent"
       app:layout_constraintLeft_toLeftOf="parent"
       app:layout_constraintRight_toRightOf="parent"
       app:layout_constraintTop_toTopOf="parent" />

</android.support.constraint.ConstraintLayout>
```

Activity class

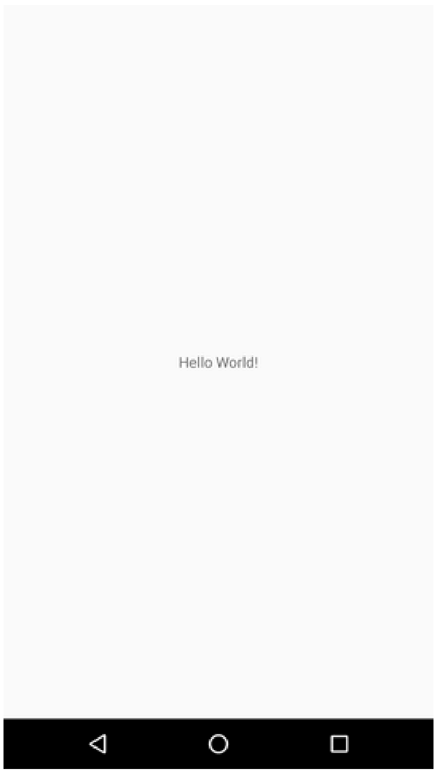
File: MainActivity.java

```
public class MainActivity extends AppCompatActivity {


    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        requestWindowFeature(Window.FEATURE_NO_TITLE); //will hide the title
        getSupportActionBar().hide(); // hide the title bar
        this.getWindow().setFlags(WindowManager.LayoutParams.FLAG_FULLSCREEN,
                WindowManager.LayoutParams.FLAG_FULLSCREEN); //enable full screen
        setContentView(R.layout.activity_main);


    }
}
```

Output: Hiding the Title Only



Output: Hiding the TitleBar and enabling FullScreen



Android Screen Orientation Example

The **screenOrientation** is the attribute of activity element. The orientation of android activity can be portrait, landscape, sensor, unspecified etc. You need to define it in the AndroidManifest.xml file.

Syntax:

```
<activity android:name="package_name.Your_ActivityName"
      android:screenOrientation="orirntation_type">
</activity>
```

Example:

```
<activity android:name=" example.javatpoint.com.screenorientation.MainActivity"
     android:screenOrientation="portrait">
</activity>
<activity android:name=".SecondActivity"
     android:screenOrientation="landscape">
</activity>
```

The common values for screenOrientation attribute are as follows:

Value	Description
unspecified	It is the default value. In such case, system chooses the orientation.
portrait	taller not wider
landscape	wider not taller
sensor	orientation is determined by the device orientation sensor.

Android Portrait and Landscape mode screen orientation example

In this example, we will create two activities of different screen orientation. The first activity (MainActivity) will be as "portrait" orientation and second activity (SecondActivity) as "landscape" orientation type.

activity_main.xml

File: activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<android.support.constraint.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="example. MainActivity">


    <Button
        android:id="@+id/button1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginBottom="8dp"
        android:layout_marginTop="112dp"
        android:onClick="onClick"
        android:text="Launch next activity"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.612"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/editText1"
        app:layout_constraintVertical_bias="0.613" />

    <TextView
        android:id="@+id/editText1"
        android:layout_width="wrap_content"
```

```
            android:layout_height="wrap_content"
            android:layout_centerHorizontal="true"
            android:layout_marginEnd="8dp"
            android:layout_marginStart="8dp"
            android:layout_marginTop="124dp"
            android:ems="10"
            android:textSize="22dp"
            android:text="This activity is portrait orientation"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintHorizontal_bias="0.502"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toTopOf="parent" />
    </android.support.constraint.ConstraintLayout>
```

Activity class

File: MainActivity.java

```
import android.content.Intent;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;

public class MainActivity extends AppCompatActivity {

    Button button1;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        button1=(Button)findViewById(R.id.button1);
    }
    public void onClick(View v) {
        Intent intent = new Intent(MainActivity.this,SecondActivity.class);
        startActivity(intent);   }}
```

activity_second.xml

File: activity_second.xml

```
<?xml version="1.0" encoding="utf-8"?>
<android.support.constraint.ConstraintLayout xmlns:android="http://schemas.android.co
m/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="example.SecondActivity">

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginEnd="8dp"
        android:layout_marginStart="8dp"
        android:layout_marginTop="180dp"
        android:text="this is landscape orientation"
        android:textSize="22dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.502"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />
</android.support.constraint.ConstraintLayout>
```

SecondActivity class

File: SecondActivity.java

```
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;

public class SecondActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_second);

    }
}
```

AndroidManifest.xml

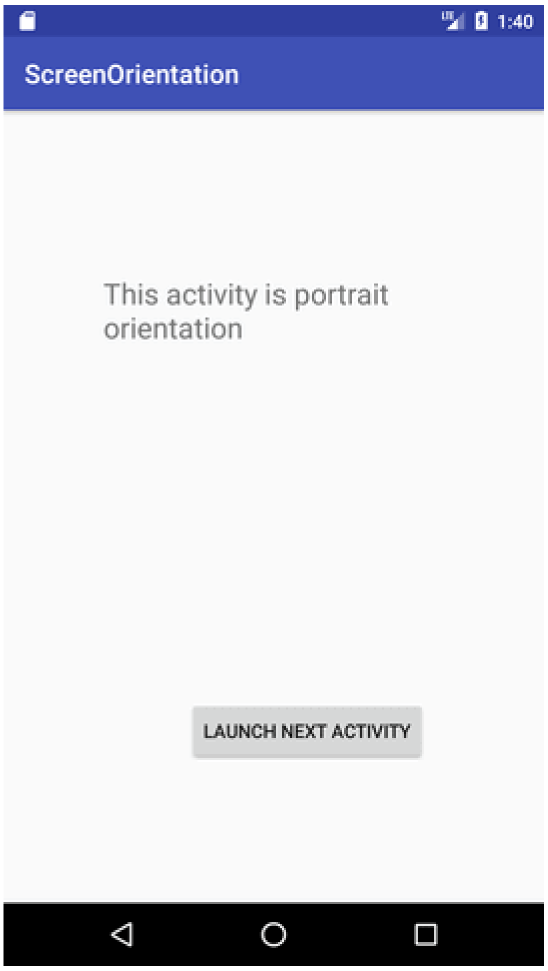
File: AndroidManifest.xml

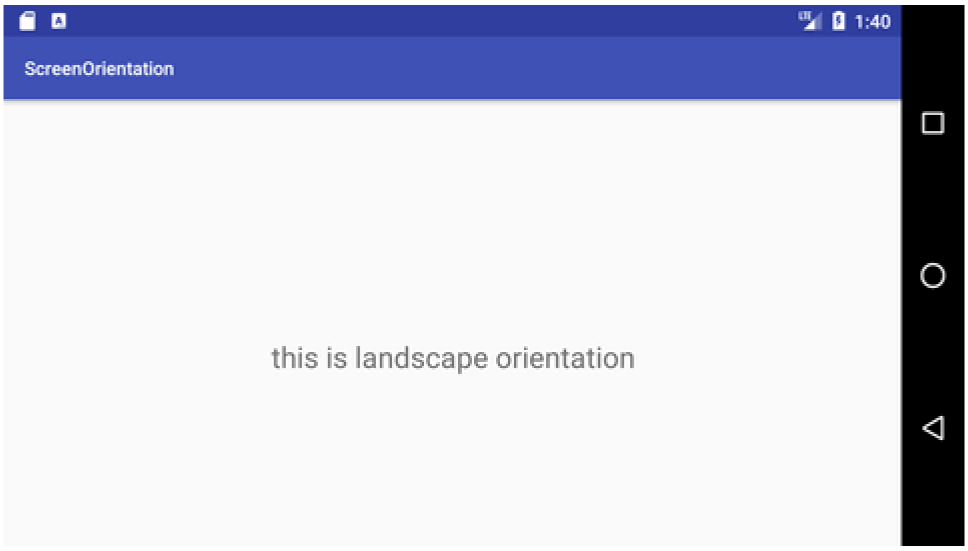
In AndroidManifest.xml file add the screenOrientation attribute in activity and provides its orientation. In this example, we provide "portrait" orientation for MainActivity and "landscape" for SecondActivity.

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="example.screenorientation">

    <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="example.javatpoint.com.screenorientation.MainActivity"
            android:screenOrientation="portrait">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                    <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <activity android:name=".SecondActivity"
            android:screenOrientation="landscape">
        </activity>
    </application>
```

```
</manifest>
```

Output:





Android Widgets

There are given a lot of **android widgets** with simplified examples such as Button, EditText, AutoCompleteTextView, ToggleButton, DatePicker, TimePicker, ProgressBar etc.

Android widgets are easy to learn. The widely used android widgets with examples are given below:

Android Button

Let's learn how to perform event handling on button click.

Android Toast

Displays information for the short duration of time.

Custom Toast

We are able to customize the toast, such as we can display image on the toast

ToggleButton

It has two states ON/OFF.

CheckBox

Let's see the application of simple food ordering.

AlertDialog

AlertDialog displays a alert dialog containing the message with OK and Cancel buttons.

Spinner

Spinner displays the multiple options, but only one can be selected at a time.

AutoCompleteTextView

Let's see the simple example of AutoCompleteTextView.

RatingBar

RatingBar displays the rating bar.

DatePicker

Datepicker displays the datepicker dialog that can be used to pick the date.

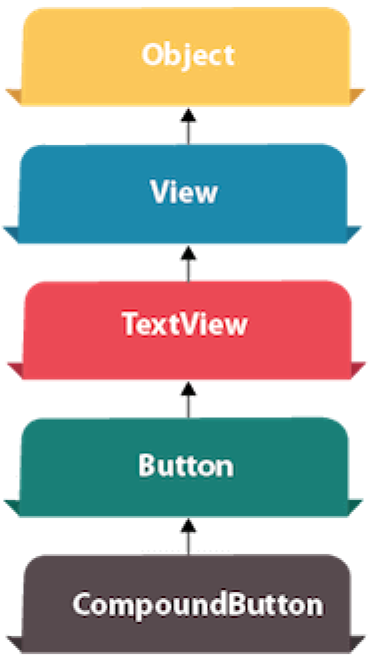
TimePicker

TimePicker displays the timepicker dialog that can be used to pick the time.

ProgressBar

ProgressBar displays progress task.

Android Button Example



Android Button represents a push-button. The android.widget.Button is subclass of TextView class and CompoundButton is the subclass of Button class.

There are different types of buttons in android such as RadioButton, ToggleButton, CompoundButton etc.

Android Button Example with Listener

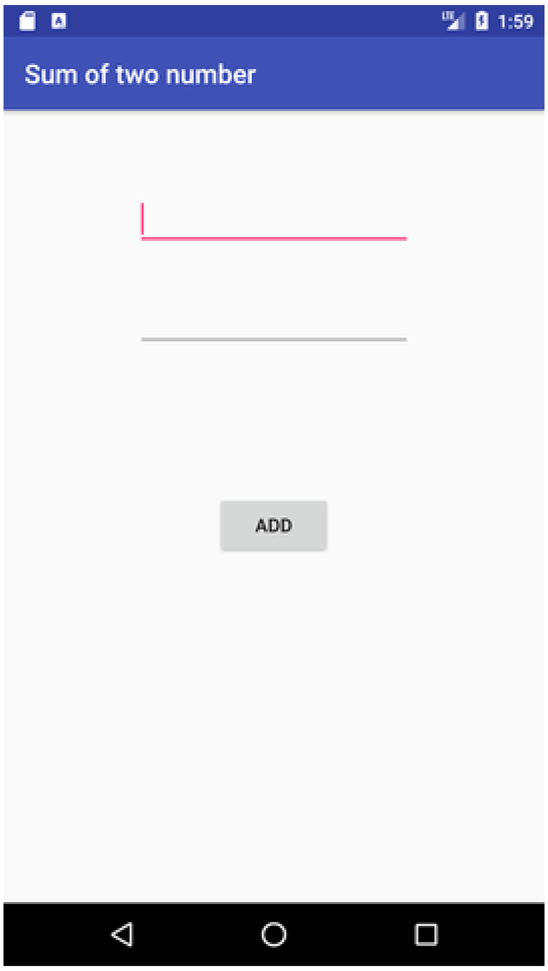
Here, we are going to create two textfields and one button for sum of two numbers. If user clicks button, sum of two input values is displayed on the Toast.

We can perform action on button using different types such as calling listener on button or adding onClick property of button in activity's xml file.

```
button.setOnClickListener(new View.OnClickListener() {
            @Override
             public void onClick(View view) {
               //code
             }
});
<Button
        android:onClick="methodName"
/>
```

Drag the component or write the code for UI in activity_main.xml

First of all, drag 2 textfields from the Text Fields palette and one button from the Form Widgets palette as shown in the following figure.



The generated code for the ui components will be like this:

File: activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="example.MainActivity">

    <EditText
        android:id="@+id/editText1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentTop="true"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="61dp"
        android:ems="10"
        android:inputType="number"
        tools:layout_editor_absoluteX="84dp"
        tools:layout_editor_absoluteY="53dp" />

    <EditText
        android:id="@+id/editText2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/editText1"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="32dp"
        android:ems="10"
        android:inputType="number"
        tools:layout_editor_absoluteX="84dp"
        tools:layout_editor_absoluteY="127dp" />

    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/editText2"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="109dp"
        android:text="ADD"
        tools:layout_editor_absoluteX="148dp"
        tools:layout_editor_absoluteY="266dp" />
</RelativeLayout>
```

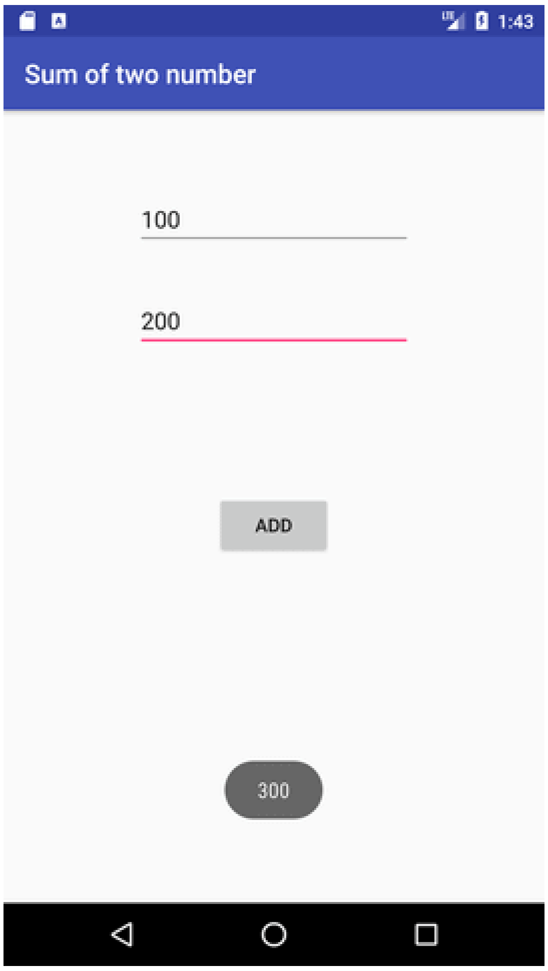
Activity class

Now write the code to display the sum of two numbers.

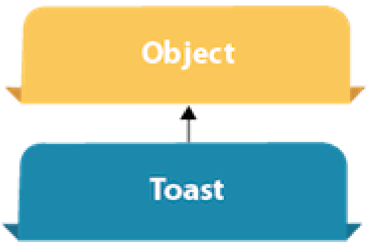
File: MainActivity.java

```
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.Toast;

public class MainActivity extends AppCompatActivity {
    private EditText edittext1, edittext2;
    private Button buttonSum;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        addListenerOnButton();
    }

    public void addListenerOnButton() {
        edittext1 = (EditText) findViewById(R.id.editText1);
        edittext2 = (EditText) findViewById(R.id.editText2);
        buttonSum = (Button) findViewById(R.id.button);
        buttonSum.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                String value1=edittext1.getText().toString();
                 String value2=edittext2.getText().toString();
                int a=Integer.parseInt(value1);
                 int b=Integer.parseInt(value2);
                int sum=a+b;
                 Toast.makeText(getApplicationContext(),String.valueOf(sum), Toast.LENGT
H_LONG).show();
            }
        });
    }
}
```

Output:



Android Toast Example



Andorid Toast can be used to display information for the short period of time. A toast contains message to be displayed quickly and disappears after sometime.

The android.widget.Toast class is the subclass of java.lang.Object class.

You can also create custom toast as well for example toast displaying image. You can visit next page to see the code for custom toast.

Toast class

Toast class is used to show notification for a particular interval of time. After sometime it disappears. It doesn't block the user interaction.

Constants of Toast class

There are only 2 constants of Toast class which are given below.

Constant	Description
public static final int LENGTH_LONG	displays view for the long duration of time.
public static final int LENGTH_SHORT	displays view for the short duration of time.

Methods of Toast class

The widely used methods of Toast class are given below.

Method	Description
public static Toast makeText(Context context, CharSequence text, int duration)	makes the toast containing text and duration.
public void show()	displays toast.
public void setMargin (float horizontalMargin, float verticalMargin)	changes the horizontal and vertical margin difference.

Android Toast Example

```
Toast.makeText(getApplicationContext(),"Hello ",Toast.LENGTH_SHORT).show();
```

Another code:

```
Toast toast=Toast.makeText(getApplicationContext(),"Hello  ",Toast.LENGTH_SHORT);

toast.setMargin(50,50);
toast.show();
```

Here, getApplicationContext() method returns the instance of Context.

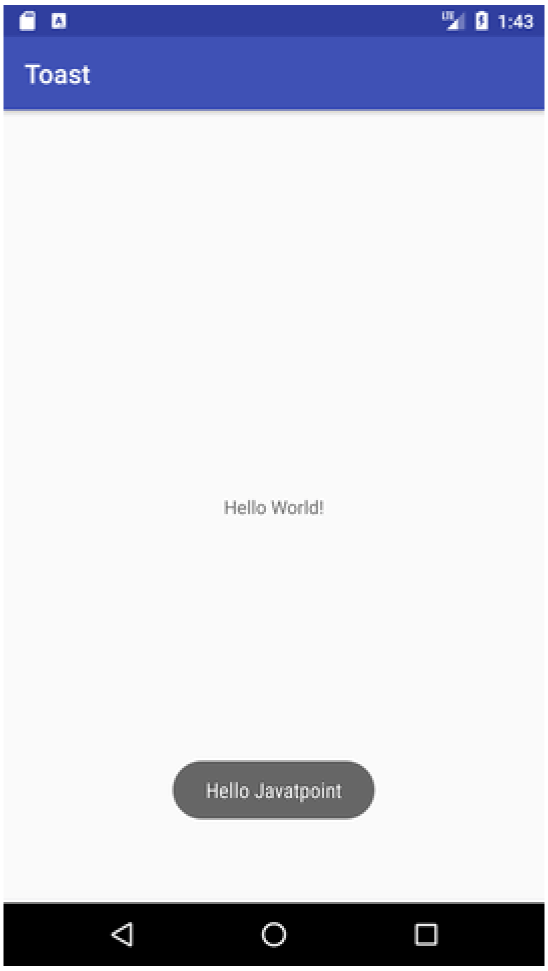
Full code of activity class displaying Toast

Let's see the code to display the toast.

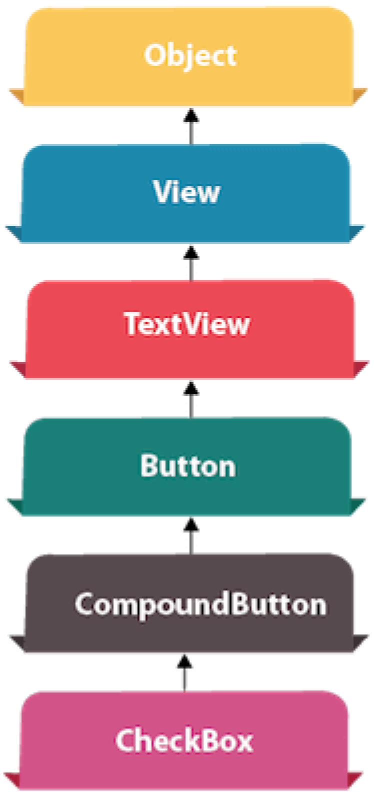
File: MainActivity.java

```
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

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

         //Displaying Toast with Hello  message
          Toast.makeText(getApplicationContext(),"Hello  ",Toast.LENGTH_SHORT).s
how();
    }
}
```

Output:



Android CheckBox Example



Android CheckBox is a type of two state button either checked or unchecked.

There can be a lot of usage of checkboxes. For example, it can be used to know the hobby of the user, activate/deactivate the specific action etc.

Android CheckBox class is the subclass of CompoundButton class.

Android CheckBox class

The android.widget.CheckBox class provides the facility of creating the CheckBoxes.

Methods of CheckBox class

There are many inherited methods of View, TextView, and Button classes in the CheckBox class. Some of them are as follows:

Method	Description
public boolean isChecked()	Returns true if it is checked otherwise false.
public void setChecked(boolean status)	Changes the state of the CheckBox.

Android CheckBox Example

activity_main.xml

Drag the three checkboxes and one button for the layout. Now the activity_main.xml file will look like this:

File: activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<android.support.constraint.ConstraintLayout xmlns:android="http://schemas.and
roid.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="example.com.checkbox.MainActivity">

    <CheckBox
        android:id="@+id/checkBox"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="144dp"
        android:layout_marginTop="68dp"
        android:text="Pizza"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <CheckBox
        android:id="@+id/checkBox2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="144dp"
        android:layout_marginTop="28dp"
        android:text="Coffee"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/checkBox" />

    <CheckBox
        android:id="@+id/checkBox3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="144dp"
        android:layout_marginTop="28dp"
        android:text="Burger"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/checkBox2" />

    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="144dp"
        android:layout_marginTop="184dp"
        android:text="Order"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/checkBox3" />

</android.support.constraint.ConstraintLayout>
```

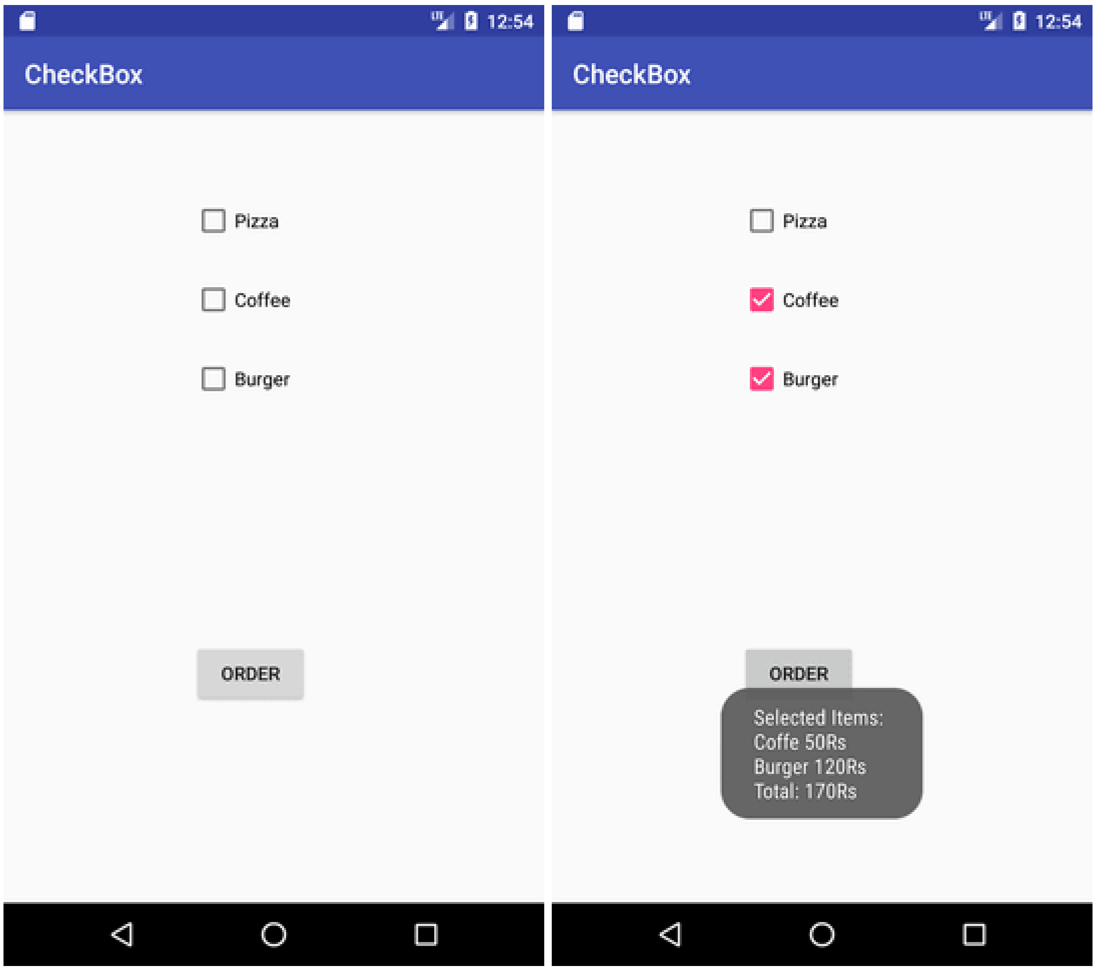
Activity class

Let's write the code to check which toggle button is ON/OFF.

File: MainActivity.java

```
package example.com.checkbox;
 import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.CheckBox;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
    CheckBox pizza,coffe,burger;
    Button buttonOrder;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        addListenerOnButtonClick();
    }
    public void addListenerOnButtonClick(){
        //Getting instance of CheckBoxes and Button from the activty_main.xml file
        pizza=(CheckBox)findViewById(R.id.checkBox);
        coffe=(CheckBox)findViewById(R.id.checkBox2);
        burger=(CheckBox)findViewById(R.id.checkBox3);
        buttonOrder=(Button)findViewById(R.id.button);

        //Applying the Listener on the Button click
        buttonOrder.setOnClickListener(new View.OnClickListener(){

            @Override
            public void onClick(View view) {
                int totalamount=0;
                StringBuilder result=new StringBuilder();
                result.append("Selected Items:");
                if(pizza.isChecked()){
                    result.append("\nPizza 100Rs");
                  totalamount+=100;
                 }
                if(coffe.isChecked()){
                    result.append("\nCoffe 50Rs");
                  totalamount+=50;
                 }
                if(burger.isChecked()){
                    result.append("\nBurger 120Rs");
                  totalamount+=120;
                 }
                result.append("\nTotal: "+totalamount+"Rs");
                 //Displaying the message on the toast
                Toast.makeText(getApplicationContext(), result.toString(), Toast.LENGTH_LONG).sh
ow();
              }
           });
    }
}
```

Output:



```
Selected Items:
Coffe 50Rs
Burger 120Rs
Total: 170Rs
```

Android Custom CheckBox

Android provides facility to customize the UI of view elements rather than default.

You are able to create custom CheckBox in android. So, you can add some different images of checkbox on the layout.

Example of Custom CheckBox

In this example, we create both default as well as custom checkbox. Add the following code in activity_main.xml file.

activity_main.xml

File: activity_main.xml

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

```
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="example.com.customcheckbox.MainActivity">


    <TextView
        android:id="@+id/textView1"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:gravity="center_horizontal"
        android:textSize="25dp"
        android:text="Default Check Box"
        android:layout_alignParentTop="true"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true" />

    <CheckBox
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="New CheckBox"
        android:id="@+id/checkBox"
        android:layout_below="@+id/textView1"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="46dp" />

    <CheckBox
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="New CheckBox"
        android:id="@+id/checkBox2"
        android:layout_below="@+id/checkBox"
        android:layout_alignLeft="@+id/checkBox"
        android:layout_alignStart="@+id/checkBox" />
```

```
<View
   android:layout_width="fill_parent"
   android:layout_height="1dp"
   android:layout_marginTop="200dp"
   android:background="#B8B894"
   android:id="@+id/viewStub" />

<CheckBox
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:text="CheckBox 1"
   android:id="@+id/checkBox3"
   android:button="@drawable/customcheckbox"
   android:layout_below="@+id/viewStub"
   android:layout_centerHorizontal="true"
   android:layout_marginTop="58dp" />

<CheckBox
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:text="CheckBox 2"
   android:id="@+id/checkBox4"
   android:button="@drawable/customcheckbox"
   android:layout_below="@+id/checkBox3"
   android:layout_alignLeft="@+id/checkBox3"
   android:layout_alignStart="@+id/checkBox3" />

<TextView
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:textAppearance="?android:attr/textAppearanceSmall"
   android:textSize="25dp"
   android:text="Custom Check Box"
   android:id="@+id/textView"
   android:layout_alignTop="@+id/viewStub"
   android:layout_centerHorizontal="true" />
```

```
        <Button
          android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Show Checked"
          android:id="@+id/button"
          android:layout_alignParentBottom="true"
          android:layout_centerHorizontal="true" />

      </RelativeLayout>
```

Now implement a selector in another file (checkbox.xml) under drawable folder which customizes the checkbox.

checkbox.xml

File: checkbox.xml

```
<?xml version="1.0" encoding="utf-8"?>
<selector xmlns:android="http://schemas.android.com/apk/res/android">
   <item android:state_checked="true" android:drawable="@drawable/checked" />
<item android:state_checked="false" android:drawable="@drawable/unchecked"/>
</selector>
```

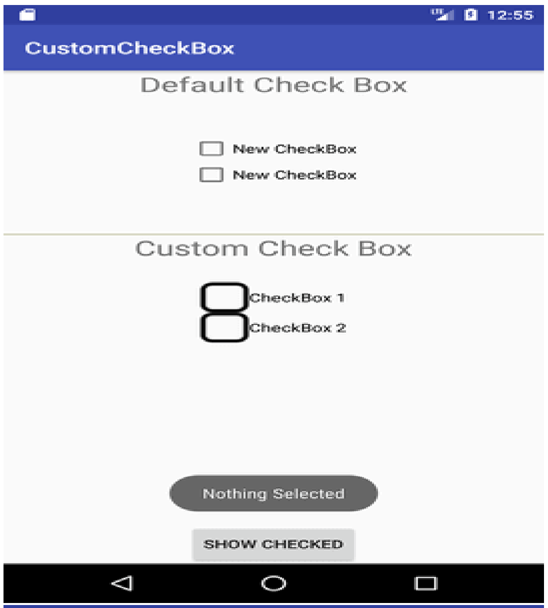
Activity class

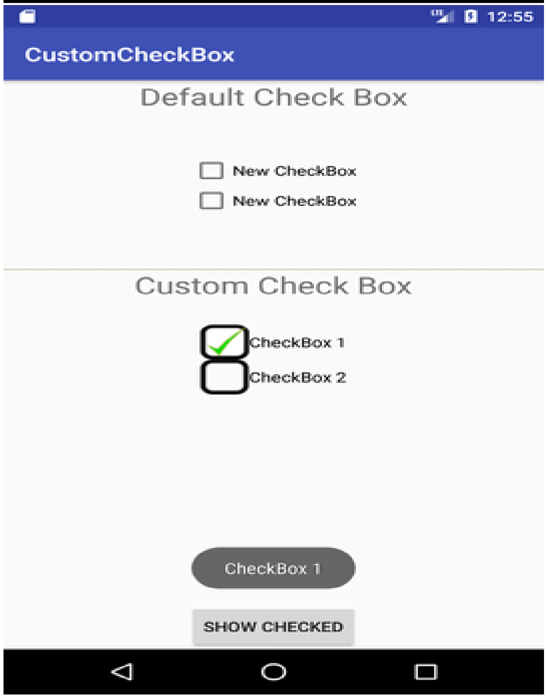
File: MainActivity.java

```
package example.com.customcheckbox;
 import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.CheckBox;
import android.widget.Toast;
 public class MainActivity extends AppCompatActivity {
   CheckBox cb1,cb2;
   Button button;
   @Override
```

```
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        cb1=(CheckBox)findViewById(R.id.checkBox3);
        cb2=(CheckBox)findViewById(R.id.checkBox4);
        button=(Button)findViewById(R.id.button);

        button.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                StringBuilder sb=new StringBuilder("");

                if(cb1.isChecked()){
                    String s1=cb1.getText().toString();
                    sb.append(s1);
                }

                if(cb2.isChecked()){
                    String s2=cb2.getText().toString();
                    sb.append("\n"+s2);

                }
                if(sb!=null && !sb.toString().equals("")){
                    Toast.makeText(getApplicationContext(), sb, Toast.LENGTH_LONG).show(
);                  }
                else{
                    Toast.makeText(getApplicationContext(),"Nothing Selected", Toast.LENG
TH_LONG).show();
                }
            }
        });
    }
}
```

Output





Android RadioButton

RadioButton is a two states button which is either checked or unchecked. If a single radio button is unchecked, we can click it to make checked radio button. Once a radio button is checked, it cannot be marked as unchecked by user.

RadioButton is generally used with *RadioGroup*. RadioGroup contains several radio buttons, marking one radio button as checked makes all other radio buttons as unchecked.

Example of Radio Button

In this example, we are going to implement single radio button separately as well as radio button in **RadioGroup**.

activity_main.xml

File: 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="example.com.radiobutton.MainActivity">

   <TextView
      android:id="@+id/textView1"
      android:layout_width="fill_parent"
      android:layout_height="wrap_content"
      android:layout_marginTop="30dp"
      android:gravity="center_horizontal"
      android:textSize="22dp"
      android:text="Single Radio Buttons" />

   <!--   Default RadioButtons  -->

   <RadioButton
      android:id="@+id/radioButton1"
      android:layout_width="fill_parent"
      android:layout_height="wrap_content"
      android:layout_gravity="center_horizontal"
      android:text="Radio Button 1"
      android:layout_marginTop="20dp"

      android:textSize="20dp" />
```

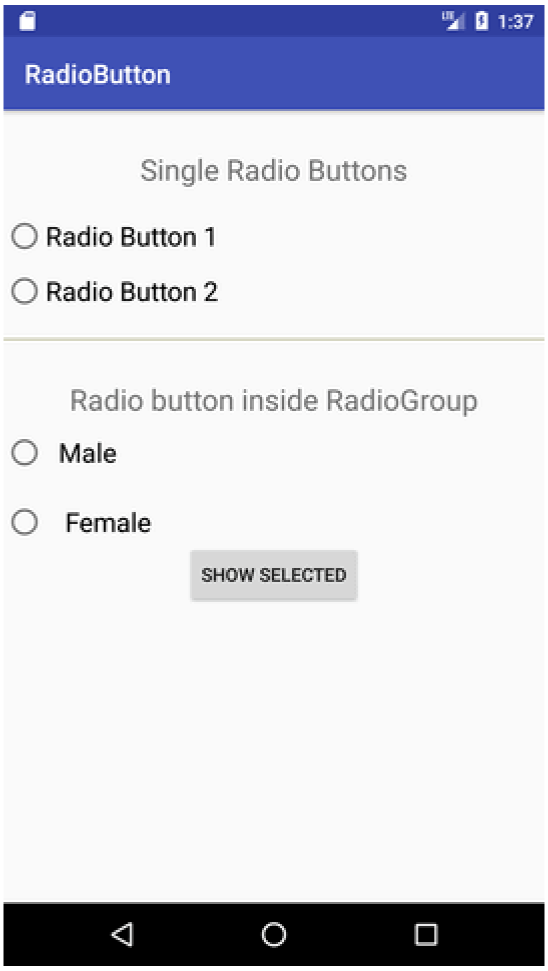
```xml
<RadioButton
    android:id="@+id/radioButton2"
   android:layout_width="fill_parent"
    android:layout_height="wrap_content"
   android:text="Radio Button 2"
    android:layout_marginTop="10dp"

    android:textSize="20dp" />

<View
    android:layout_width="fill_parent"
   android:layout_height="1dp"
    android:layout_marginTop="20dp"
   android:background="#B8B894" />

<TextView
    android:id="@+id/textView2"
   android:layout_width="fill_parent"
    android:layout_height="wrap_content"
   android:layout_marginTop="30dp"
    android:gravity="center_horizontal"
   android:textSize="22dp"
    android:text="Radio button inside RadioGroup" />
  <!--   Customized RadioButtons  -->
  <RadioGroup
   android:layout_width="wrap_content"
    android:layout_height="wrap_content"
   android:id="@+id/radioGroup">
      <RadioButton
        android:id="@+id/radioMale"
       android:layout_width="fill_parent"
        android:layout_height="wrap_content"
       android:text="  Male"
        android:layout_marginTop="10dp"
       android:checked="false"
        android:textSize="20dp" />
        <RadioButton
          android:id="@+id/radioFemale"
           android:layout_width="fill_parent"
          android:layout_height="wrap_content"
           android:text="   Female"
          android:layout_marginTop="20dp"
           android:checked="false"

           android:textSize="20dp" />
    </RadioGroup>

    <Button
        android:layout_width="wrap_content"
       android:layout_height="wrap_content"
        android:text="Show Selected"
       android:id="@+id/button"
        android:onClick="onclickbuttonMethod"
       android:layout_gravity="center_horizontal" />
  </LinearLayout>
```

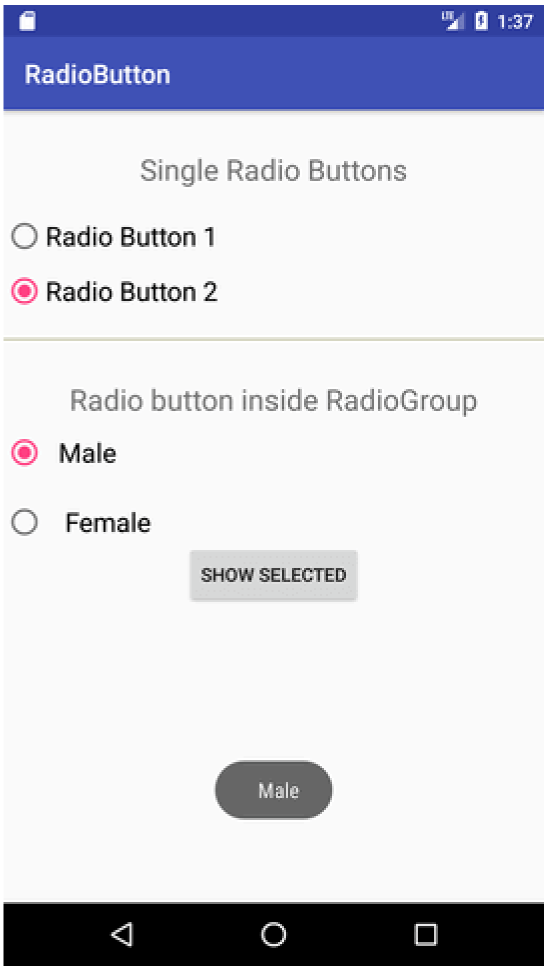
Activity class

File: MainActivity.java

```
package example.com.radiobutton;
  import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.RadioButton;
import android.widget.RadioGroup;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
    Button button;
    RadioButton genderradioButton;
    RadioGroup radioGroup;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        radioGroup=(RadioGroup)findViewById(R.id.radioGroup);
    }
    public void onclickbuttonMethod(View v){
        int selectedId = radioGroup.getCheckedRadioButtonId();
        genderradioButton = (RadioButton) findViewById(selectedId);
        if(selectedId==-1){
            Toast.makeText(MainActivity.this,"Nothing selected", Toast.LENGTH_SHORT).sho
w();
        }
        else{
            Toast.makeText(MainActivity.this,genderradioButton.getText(), Toast.LENGTH_SHORT).sh
ow();
        }

    }
}
```

Output


1:37
RadioButton
Single Radio Buttons
Radio Button 1
Radio Button 2
Radio button inside RadioGroup
Male
Female
SHOW SELECTED



Android Dynamic RadioButton

Instead of creating RadioButton through drag and drop from palette, android also facilitates you to create it programmatically (dynamically). For creating dynamic RadioButton, we need to use **android.view.ViewGroup.LayoutParams** which configures the width and height of views and implements *setOnCheckedChangeListener()* method of *RadioGroup* class.

Example of Dynamic RadioButton

Let's see an example of Dynamic RadioButton.

activity_main.xml

File: activity_main.xml

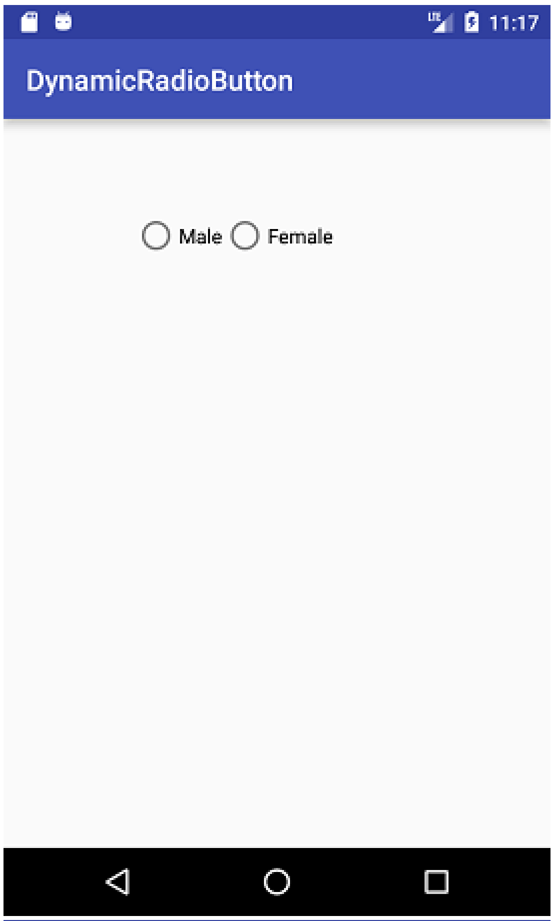
```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/andro
id"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity"
    android:id="@+id/rd1">

</androidx.constraintlayout.widget.ConstraintLayout>
```

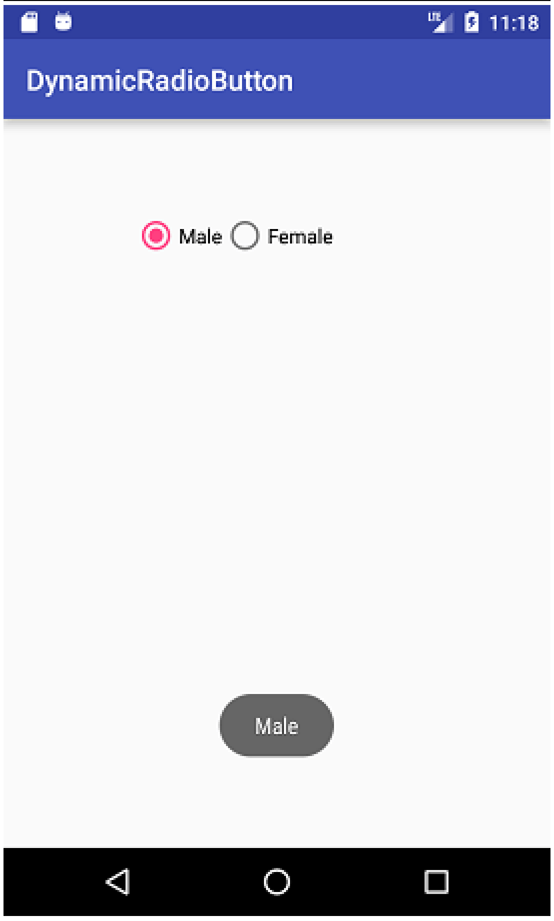
Activity class

File: MainActivity.java

```
package com.example.test.dynamicradiobutton;

import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.RadioButton;
import android.widget.RadioGroup;
import android.widget.RelativeLayout;

import android.widget.RelativeLayout.LayoutParams;
import android.widget.Toast;

RadioGroup rg;
ConstraintLayout rl;
RadioButton rb1,rb2;
```

```
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);


    setContentView(R.layout.activity_main);
    rg = new RadioGroup(this);
    rl = (ConstraintLayout) findViewById(R.id.rd1);
    rb1 = new RadioButton(this);
    rb2 = new RadioButton(this);

    rb1.setText("Male");
    rb2.setText("Female");
    rg.addView(rb1);
    rg.addView(rb2);
    rg.setOrientation(RadioGroup.HORIZONTAL);

    ConstraintLayout.LayoutParams params = new
ConstraintLayout.LayoutParams((int)
WRAP_CONTENT,(int)WRAP_CONTENT);
    params.leftMargin =150;
    params.topMargin = 100;

    rg.setLayoutParams(params);
    rl.addView(rg);
    rg.setOnCheckedChangeListener(new
RadioGroup.OnCheckedChangeListener() {
        @Override
        public void onCheckedChanged(RadioGroup group,
int checkedId) {
            RadioButton radioButton = (RadioButton)
findViewById(checkedId);

Toast.makeText(getApplicationContext(),radioButton.getT
ext(),Toast.LENGTH_LONG).show();
        }
    });


}
}
```


11:17
DynamicRadioButton
Male
Female


11:18
DynamicRadioButton
Male
Female
Male

Android Custom RadioButton

Rather than default user interface of android RadioButton, we can also implement a custom radio button. Custom RadioButton makes user interface more attractive.

Example of Custom RadioButton

Let's see an example of custom RadioButton.

activity_main.xml

File: 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:paddingBottom="@dimen/activity_vertical_margin"
    android:paddingLeft="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin"
    android:orientation="vertical"
    tools:context="com.example.test.customradiobutton.MainActivity">



    <TextView
        android:id="@+id/tv"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="30dp"
        android:gravity="center_horizontal"
        android:textSize="25dp"
        android:text="Customized Radio Buttons" />
```

```xml
<!--   Customized RadioButtons  -->


<RadioGroup
   android:layout_width="wrap_content"
    android:layout_height="wrap_content"
   android:id="@+id/radioGroup">

   <RadioButton
        android:id="@+id/radioMale"
       android:layout_width="fill_parent"
        android:layout_height="wrap_content"
       android:text="  Male"
        android:layout_marginTop="10dp"
       android:checked="false"
        android:button="@drawable/custom_radio_button"
       android:textSize="20dp" />

   <RadioButton
        android:id="@+id/radioFemale"
       android:layout_width="fill_parent"
        android:layout_height="wrap_content"
       android:text="   Female"
        android:layout_marginTop="20dp"
       android:checked="false"
        android:button="@drawable/custom_radio_button"
       android:textSize="20dp" />
</RadioGroup>

<Button
   android:layout_width="wrap_content"
    android:layout_height="wrap_content"
   android:text="Show Selected"
    android:id="@+id/button"
   android:onClick="onclickbuttonMethod"
```

```
        android:layout_gravity="center_horizontal" />

</LinearLayout>
```

custom_radio_button.xml

Now implement a selector in another file (custom_radio_button.xml) in drawable and place two different checked and unchecked button images.

File: checkbox.xml

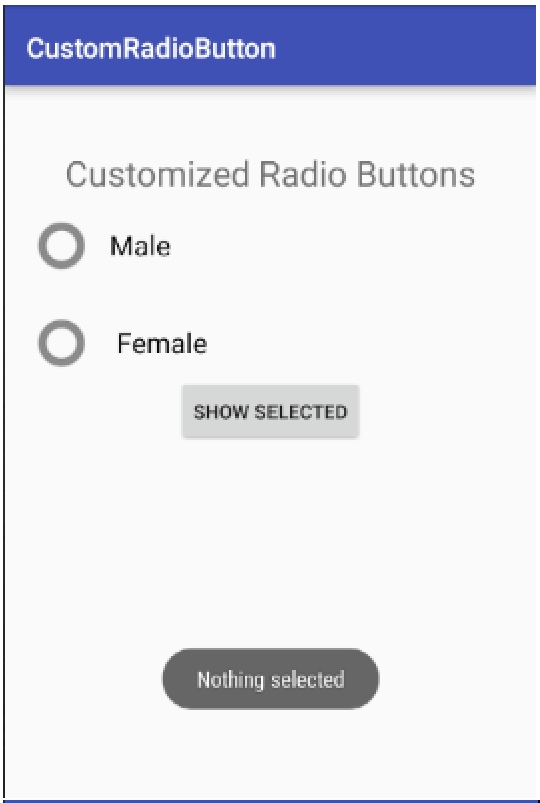
```
<?xml version="1.0" encoding="utf-8"?>
<selector xmlns:android="http://schemas.android.com/apk/res/android">
<item android:state_checked="true" android:drawable="@drawable/checkedradiobutton" />
 <item android:state_checked="false" android:drawable="@drawable/unchekedradiobutton" />
 </selector>
```

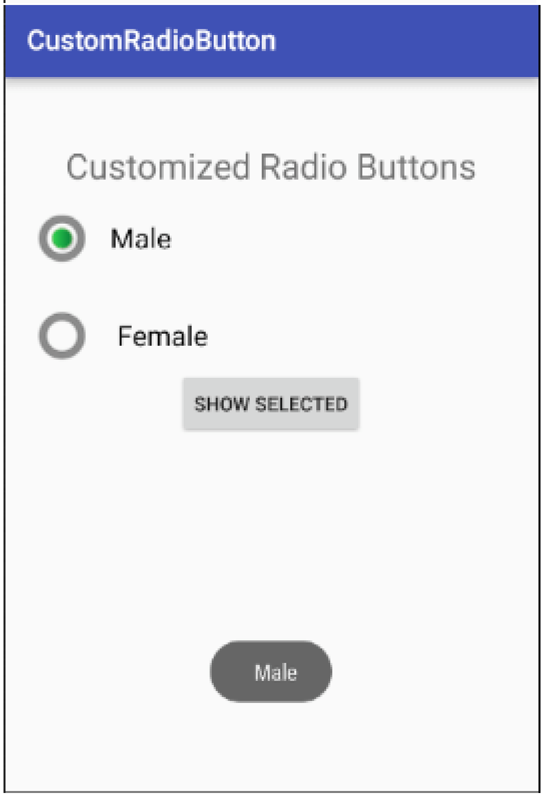
Activity class

File: MainActivity.java

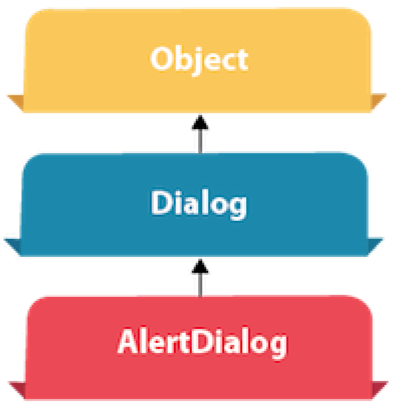
```
public class MainActivity extends AppCompatActivity {
    Button button;
    RadioButton genderradioButton;
    RadioGroup radioGroup;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        radioGroup=(RadioGroup)findViewById(R.id.radioGroup);
    }



    public void onclickbuttonMethod(View v){
        int selectedId = radioGroup.getCheckedRadioButtonId();
        genderradioButton = (RadioButton) findViewById(selectedId);
        if(selectedId==-1){
            Toast.makeText(MainActivity.this,"Nothing selected", Toast.LENGTH_SHORT).show();
        }
        else{
            Toast.makeText(MainActivity.this,genderradioButton.getText(), Toast.LENGTH
_SHORT).show();
        }

    }
}
```

Output





Android AlertDialog Example



Android AlertDialog can be used to display the dialog message with OK and Cancel buttons. It can be used to interrupt and ask the user about his/her choice to continue or discontinue.

Android AlertDialog is composed of three regions: title, content area and action buttons.

Android AlertDialog is the subclass of Dialog class.

Methods of AlertDialog class

Method	**Description**
public AlertDialog.Builder setTitle(CharSequence)	This method is used to set the title of AlertDialog.
Public AlertDialog.Builder setMessage(CharSequence)	This method is used to set the message for AlertDialog.
public AlertDialog.Builder setIcon(int)	This method is used to set the icon over AlertDialog.

Android AlertDialog Example

You can have multiple components, here we are having only a textview.

File: activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<android.support.constraint.ConstraintLayout xmlns:android="http://schemas.android.co
m/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="example.com.alertdialog.MainActivity">
    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/button"
        android:text="Close app"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

</android.support.constraint.ConstraintLayout>
```

strings.xml

Optionally, you can store the dialog message and title in the strings.xml file.

File: strings.xml

```
<resources>
    <string name="app_name">AlertDialog</string>
    <string name="dialog_message">Welcome to Alert Dialog</string>
    <string name="dialog_title">SYBCA DIV D Alert Dialog</string>
</resources>
```

Activity class

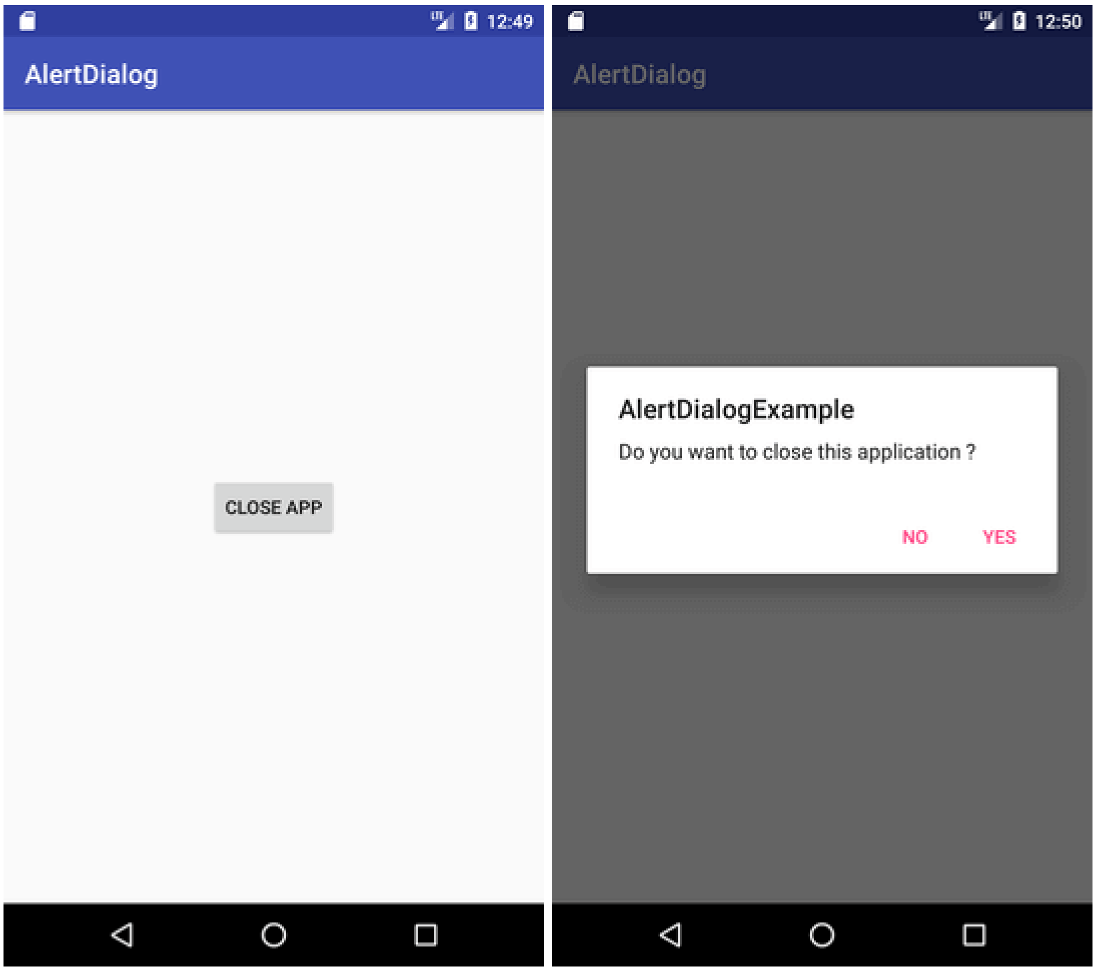
Let's write the code to create and show the AlertDialog.

File: MainActivity.java

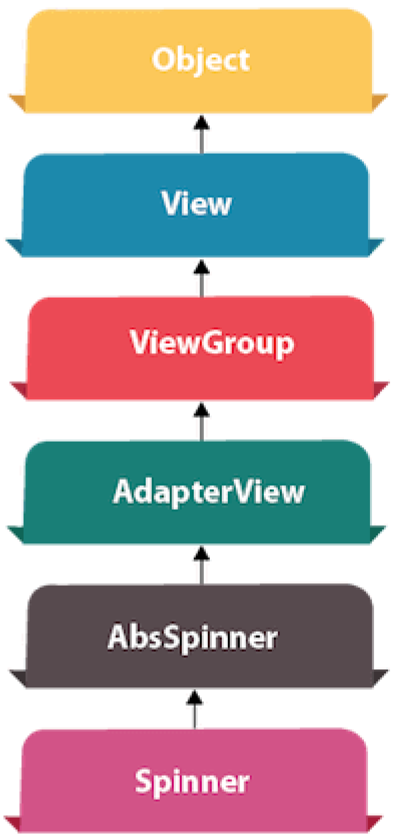
```
public class MainActivity extends AppCompatActivity {
    Button closeButton;
    AlertDialog.Builder builder;
    @Override
```

```
                  });


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

        closeButton = (Button) findViewById(R.id.button);
        builder = new AlertDialog.Builder(this);
        closeButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {

                //Uncomment the below code to Set the message and title from the strings.xm
l file
                builder.setMessage(R.string.dialog_message) .setTitle(R.string.dialog_title);

                //Setting message manually and performing action on button click
                builder.setMessage("Do you want to close this application ?")
                        .setCancelable(false)
                        .setPositiveButton("Yes", new DialogInterface.OnClickListener() {
                            public void onClick(DialogInterface dialog, int id) {
                                finish();
                                Toast.makeText(getApplicationContext(),"you choose yes action for alertbox"
,
                                Toast.LENGTH_SHORT).show();
                            }
                        })
                        .setNegativeButton("No", new DialogInterface.OnClickListener() {
                            public void onClick(DialogInterface dialog, int id) {
                                //  Action for 'NO' Button
                                dialog.cancel();
                                Toast.makeText(getApplicationContext(),"you choose no action for alertbox",

                                Toast.LENGTH_SHORT).show();
                            }
                        });
                //Creating dialog box
                AlertDialog alert = builder.create();
                //Setting the title manually
            alert.setTitle("AlertDialogExample");
           alert.show();
        }
    });
  }
}
```

Output:



Android Spinner Example



Android Spinner is like the combox box of AWT or Swing. It can be used to display the multiple options to the user in which only one item can be selected by the user.

Android spinner is like the drop down menu with multiple values from which the end user can select only one value.

Android spinner is associated with AdapterView. So you need to use one of the adapter classes with spinner.

Android Spinner class is the subclass of AsbSpinner class.

Android Spinner Example

In this example, we are going to display the country list. You need to use **ArrayAdapter** class to store the country list.

Let's see the simple example of spinner in android.

activity_main.xml

Drag the Spinner from the pallete, now the activity_main.xml file will like this:

File: activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<android.support.constraint.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="example.com.spinner.MainActivity">

    <Spinner
        android:id="@+id/spinner"
        android:layout_width="149dp"
        android:layout_height="40dp"
        android:layout_marginBottom="8dp"
        android:layout_marginEnd="8dp"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.502"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.498" />

</android.support.constraint.ConstraintLayout>
```

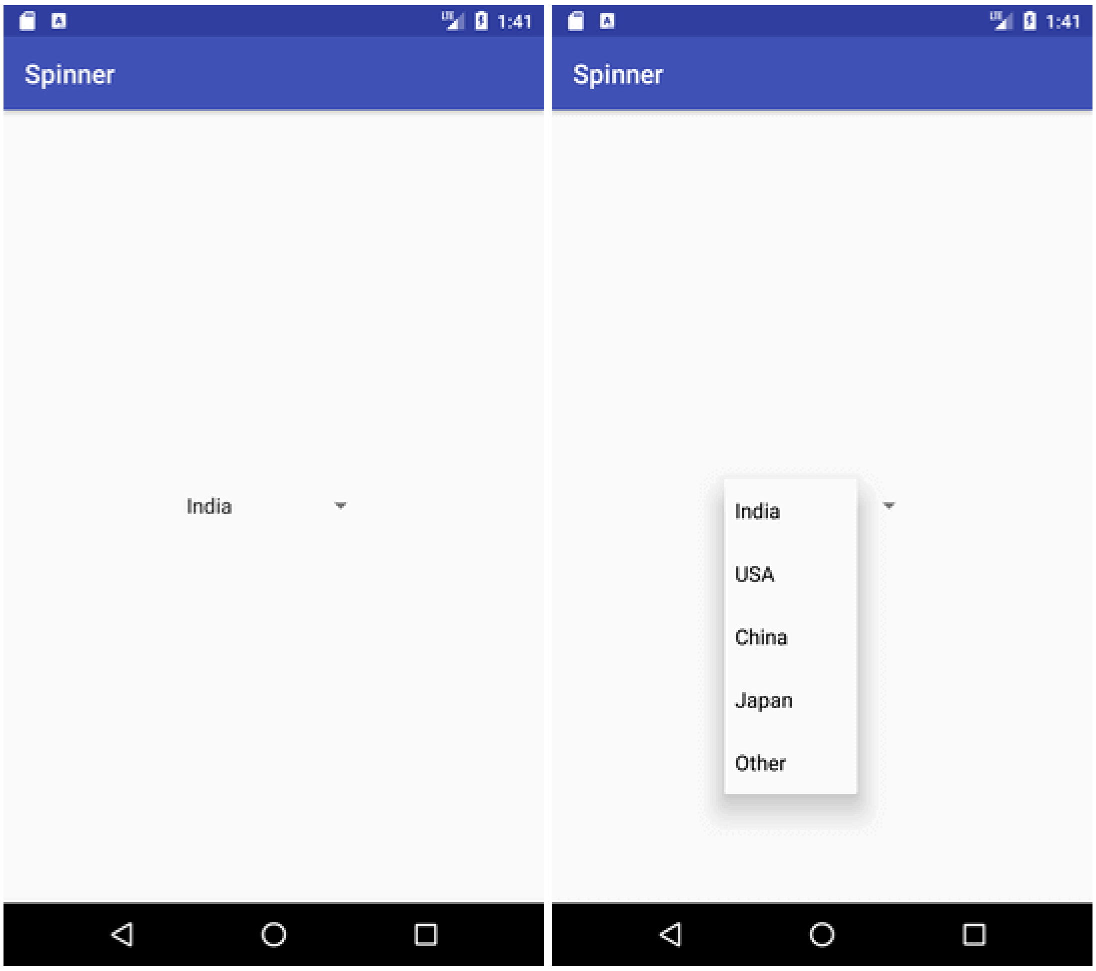
Activity class

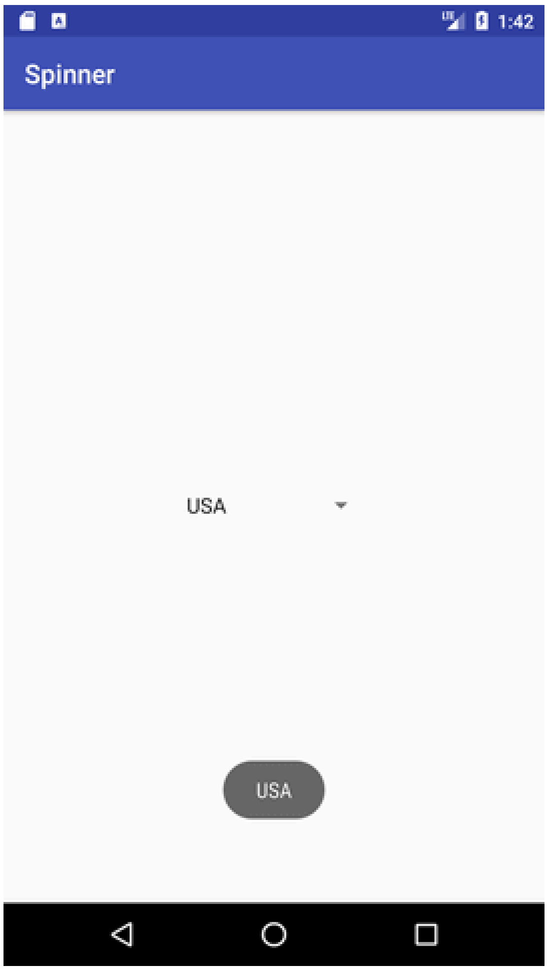
Let's write the code to display item on the spinner and perform event handling.

File: MainActivity.java

```
public class MainActivity extends AppCompatActivity implements
        AdapterView.OnItemSelectedListener {
    String[] country = { "India", "USA", "China", "Japan", "Other"};

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        //Getting the instance of Spinner and applying OnItemSelectedListener on it
        Spinner spin = (Spinner) findViewById(R.id.spinner);
        spin.setOnItemSelectedListener(this);

        //Creating the ArrayAdapter instance having the country list
        ArrayAdapter aa = new ArrayAdapter(this,android.R.layout.simple_spinner_item,country
);
        aa.setDropDownViewResource(android.R.layout.simple_spinner_dropdown_item)
;
        //Setting the ArrayAdapter data on the Spinner
        spin.setAdapter(aa);

    }

    //Performing action onItemSelected and onNothing selected
    @Override
    public void onItemSelected(AdapterView<?> arg0, View arg1, int position, long i
d) {
        Toast.makeText(getApplicationContext(),country[position] , Toast.LENGTH_LONG).show(
);
    }
    @Override
    public void onNothingSelected(AdapterView<?> arg0) {
        // TODO Auto-generated method stub
    }
}
```

Output:


1:41
Spinner
India
1:41
Spinner
India
USA
China
Japan
Other


1:42
Spinner
USA
USA