III B.Tech. II-Sem (CSE) T C

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ANDROID PROGRAMMING

UNIT-I

Introduction to Android, Types of Mobile Applications, Android Architecture(About DVM, Linux kernel, Java libraries & Native libraries, application frame work), Android Framework(Activity, Service, Broadcast Receiver, Content Provider), Android Studio Environment(how to Install, install in emulator, real device) Project Structure(R.Java, res folder, manifest.xml and .apk file), Android features, History, Layout UI groups(Leaner Layout, Relative Layout, Table Layout, Frame Layout, Grid Layout), Width and height properties(Match parent, Wrap content, Pixel, Density pixel and Scaled pixel).

UNIT-II

Activity, Activity lifecycle, Life cycle Methods, Intents, Intent Methods, layout file and its child elements and attributes, Basic UI Components(Text View, Button, Edit Text, Radio Button, Check Box), Advanced UI Components (AutoCompleteTextView, Spinner, ListView) Adapters (ArrayAdapter, Custom Adapter), Toast.

UNIT-III

WebView, WebView-HTML Communication, Fragment, Fragment Life Cycle. **Storage Methods:** shared preferences, SQLite Database (insert, read, update, delete). **Telephony:** send SMS, Call, Attaching File, and Send E-Mail.

UNIT-IV

Multimedia in Android: Media Player, Video View, Audio Recording, Video recording, Camera, Gallery. **Service:** Service, Service lifecycle methods.

UNIT-V

Built-in Services (Location service, Notification service, Sensor Service, WIFI Service, Bluetooth Service, Vibrator Service), Broadcast Receivers.

UNIT-VI

Content Provider, Dialog Boxes (Custom dialog, Alert dialog, date Picker, Time Picker, Progress dialog, dialog Fragment), GoogleMaps.

TEXT BOOKS:

1. Android Application Development (with Kitkat Support), Black Book by Pradeep Kothari
2. Android Programming: Pushing the Limits by Erik Hellman

REFERENCES:

1. Beginning Android 4 Application Development by Wei-Meng Lee Android Application Development for Dummies by Michael Burton

(A0525156) ANDROID PROGRAMMING

UNIT I

UNIT-I:

Introduction to Android, Types of Mobile Applications, Android Architecture(About DVM, Linux kernel, Java libraries & Native libraries, application frame work), Android Framework(Activity, Service, Broadcast Receiver, Content Provider), Android Studio Environment(how to Install, install in emulator, real device) Project Structure(R.Java, res folder, manifest.xml and .apk file), Android features, History, Layout UI groups(Leaner Layout, Relative Layout, Table Layout, Frame Layout, Grid Layout), Width and height properties(Match parent, Wrap content, Pixel, Density pixel and Scaled pixel).

Introduction to Android

Android is mobile platform, which consists of three things. Such as operating system, Meddileware and KeyApplication.

Android is a platform for Mobile phone, Tv‟s, desktops, Wearable devices and Automobiles.

Android is a software package and Linux based operating system for mobile devices such as tablet computers and smartphones.

It is developed by Google and later the OHA (Open Handset Alliance). Java language is mainly used to write the android code even though other languages can be used.

The goal of android project is to create a successful real-world product that improves the mobile experience for end users.

There are many code names of android such as Lollipop, Kitkat, Jelly Bean, Ice cream Sandwich, Froyo, and Ecliar.

Types of Mobile Applications

There are 3 **types of apps**:

1. Native apps

- **iOS** on Objective-C or Swift
- **Android** on Java
- **Windows Phone** on Net

2. Hybrid apps for all platforms all together with **Xamarin, React Native, Ionic, Angular Mobile Sencha Touch** etc.

3. Web apps as **responsive versions of website** to work on any mobile device.

Native apps:

Such apps are developed for a single mobile operating system exclusively, therefore they are “native” for a particular platform or device. App built for systems like iOS, Android, Windows phone, Symbian, Blackberry cannot be used on a platform other than their own. In other words, you won‟t be able to use Android app on iPhone.

Main advantage of native apps is high performance and ensuring good user experience as developers use native device UI. Moreover, an access to wide range

of APIs that puts no limitation on app usage. Native applications are distinctly accessible from app stores of their kind and have the clear tendency to reach target customers.

Some icons to native apps are higher cost compared to other types of apps – due to the need of creating app duplicates for other platforms, separate support and maintenance for different types of apps resulting in bigger product price.

Hybrid apps:

They are built using multi-platform web technologies (for example HTML5, CSS and Java script). So-called hybrid apps are mainly website applications disguised in a native wrapper. Apps possess usual pros and cons of both native and web mobile applications.

Hybrid multi-platform apps are fast and relatively easy to develop – a clear advantage. Single code base for all platforms ensures low-cost maintenance and smooth updates. Widely used APIs, like gyroscope, accelerometer, and geolocation are available.

On the other hand, hybrid applications lack in performance, speed and overall optimization in comparison to native apps for instance. Also, there are certain design issues due to app inability to look in exactly same way on two or more platforms.

Web apps

These are software applications that behave in a fashion similar to native applications. Web apps use a browser to run and are usually written in HTML5, JavaScript or CSS. These apps redirect a user to URL and offer "install" option by simply creating a bookmark to their page.

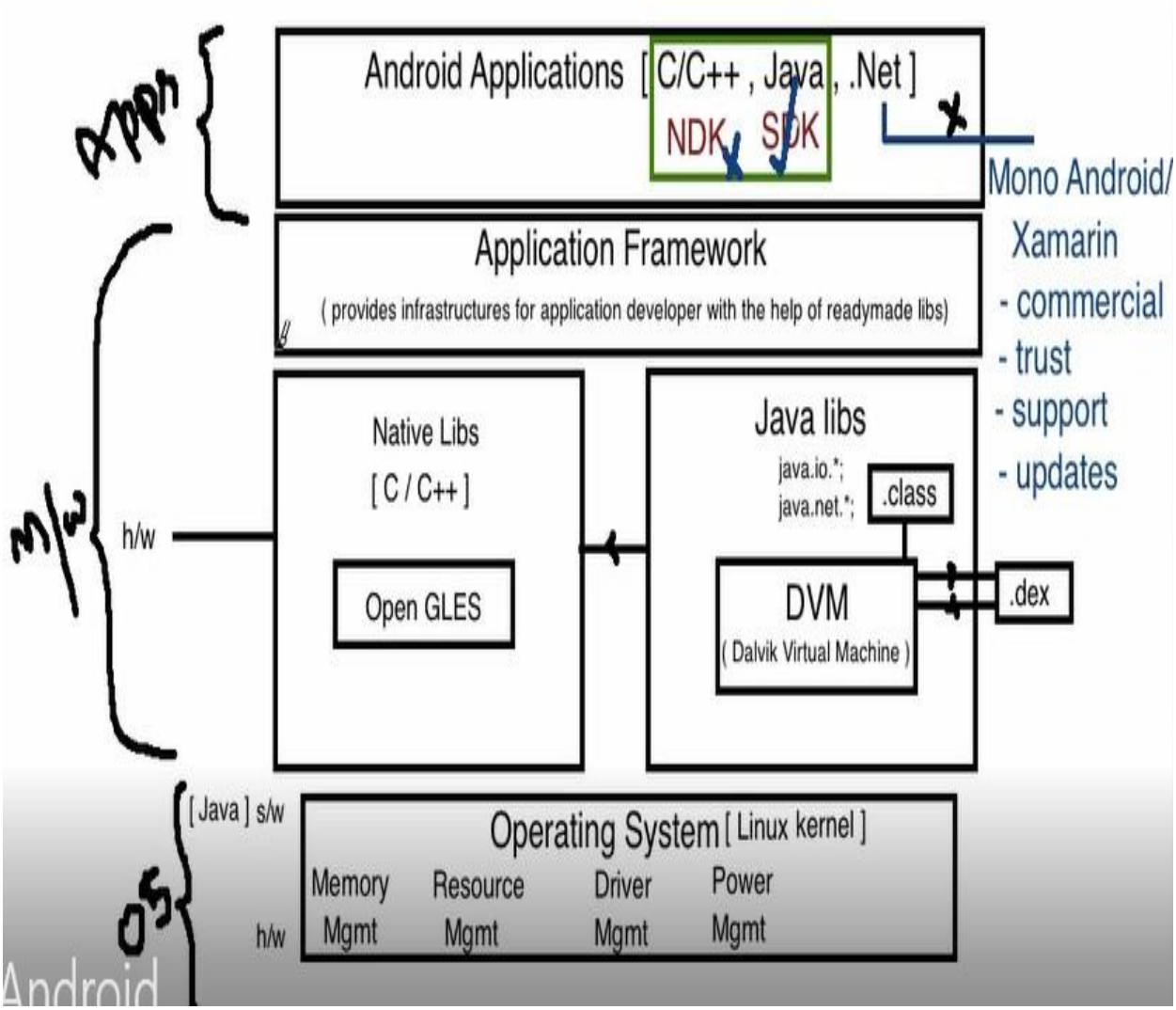
Web applications require minimum of device memory, as a rule. As all personal databases are saved on a server, users can get access from any device whenever there is internet connection. That is why the use of web apps with poor connection would result in bad user experience. The drawback is access to not that many APIs for developers, with exception of geolocation and few others.

Android Architecture

Android architecture or **Android software stack** is categorized into five parts:

1. Linux kernel(Operating System)
2. native libraries (middleware),
3. Android Runtime(middleware),
4. Application Framework(middleware),
5. Applications(Key Applications).

Let's see the android architecture first.



(OR)


APPLICATIONS
Home
Contacts
Phone
Browser
...
APPLICATION FRAMEWORK
Activity Manager
Window Manager
Content Providers
View System
Package Manager
Telephony Manager
Resource Manager
Location Manager
Notification Manager
LIBRARIES
Surface Manager
Media Framework
SQLite
OpenGL | ES
FreeType
WebKit
SGL
SSL
libc
ANDROID RUNTIME
Core Libraries
Dalvik Virtual Machine
LINUX KERNEL
Display Driver
Camera Driver
Flash Memory Driver
Binder (IPC) Driver
Keypad Driver
WiFi Driver
Audio Drivers
Power Management

1) Linux kernel

It is the heart of android architecture that exists at the root of android architecture. **Linux kernel** is responsible for device drivers, power management, memory management, device management and resource access.

2) Native Libraries

On the top of linux kernel, there are **Native libraries** such as WebKit, OpenGLES, FreeType, SQLite, Media, C runtime library (libc) etc.

The WebKit library is responsible for browser support SQLite is for database, FreeType for font support, Media for playing and recording audio and video formats.

3) Android Runtime

In android runtime, there are core libraries and DVM (Dalvik Virtual Machine) which is responsible to run android application. DVM is like JVM but it is optimized for mobile devices. It consumes less memory and provides fast performance.

4) Android Framework

On the top of Native libraries and android runtime, there is android framework. Android framework includes **Android API's** such as UI (User Interface), telephony, resources, locations, Content Providers (data) and package managers. It provides a lot of classes and interfaces for android application development.

5) Applications

On the top of android framework, there are applications. All applications such as home, contact, settings, games, browsers are using android framework that uses android runtime and libraries. Android runtime and native libraries are using linux kernal.

Android Core Building Blocks

An android **component** is simply a piece of code that has a well-defined life cycle e.g. Activity, Service, BroadCostReceiver and Content Provider.

The **core building blocks** or **fundamental components** of android are activities, views, intents, services, content providers, fragments and AndroidManifest.xml.

Activity

An activity is a class that represents a single screen. It is like a Frame in AWT.

View

A view is the UI element such as button, label, text field etc. Anything that you see is a view.

Intent

Intent is used to invoke components. It is mainly used to:

- Start the service
- Launch an activity
- Display a web page
- Display a list of contacts
- Broadcast a message
- Dial a phone call etc.

For example, you may write the following code to view the webpage.

```
Intent i=new Intent(Intent.ACTION_VIEW);
 intent.setData(Uri.parse("http://www.rgmcet.edu.in"));
        startActivity(intent);
```

Service

Service is a background processes that can run for a long time. There are two types of services local and remote. Local service is accessed from within the application whereas remote service is accessed remotely from other applications running on the same device.

Content Provider

Content Providers are used to share data between the applications.

Fragment

Fragments are like parts of activity. An activity can display one or more fragments on the screen at the same time.

AndroidManifest.xml

It contains information about activities, content providers, permissions etc. It is like the web.xml file in Java EE.

Android Virtual Device (AVD)

It is used to test the android application without the need for mobile or tablet etc. It can be created in different configurations to emulate different types of real devices.

Create your first instant app

How to build and run a very simple instant app using Android Studio. The app that you create has a simple structure similar to the structure described in Structure of a basic instant app.

Note: You must use Android Studio 3.0 to complete the procedures on this page. Also make sure that you have completed the setup instructions in Set up your development environment. This article demonstrates how to use the Android emulator to debug an instant app, so you must also complete the emulator set up steps under Set up your device or emulator.

To create a new instant app project in Android Studio 3.0, do the following:

1. Launch Android Studio and create a new project:
   - If you have not opened a project yet, in the **Welcome to Android Studio** window, click **Start a new Android Studio project**.

- If you already have a project open, select **File > New Project**.

2. In the **Create Android Project** window, do the following:
   - In the **Application name** box, enter "My First Instant App".
   - In the **Company domain** box, enter "example.com".
   - Leave the **Package name** as "com.example.myfirstinstantapp".
3. Click **Next**.
4. In the **Target Android Devices** window, do the following:
   - Ensure that **Phone and Tablet** is selected.
   - In the **Minimum SDK** list, select **API 23: Android 6.0 (Marshmallow)**.
   - Under the **Minimum SDK** list, check **Include Android Instant app support**.

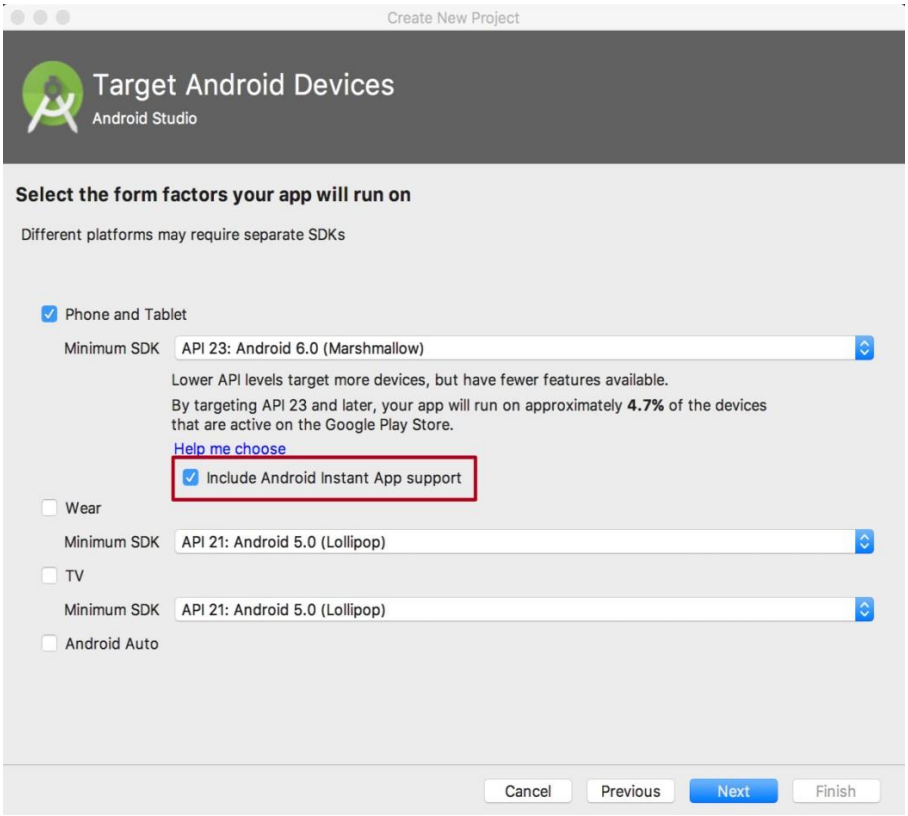


Figure : The **Target Android Devices** window.

5. Click **Next**.
6. In the **Customize Instant App Support** window, leave the default settings.
7. Click **Next**.

8. In the **Add an Activity to Phone and Tablet** window, select **Empty Activity**.
9. Click **Next**.
10. In the **Configure Activity** window, do the following:
    - In the **Instant App URL Host** box, enter'myfirstinstantapp.example.com'.
    - In the **Instant App URL** route box, enter '/hello'.

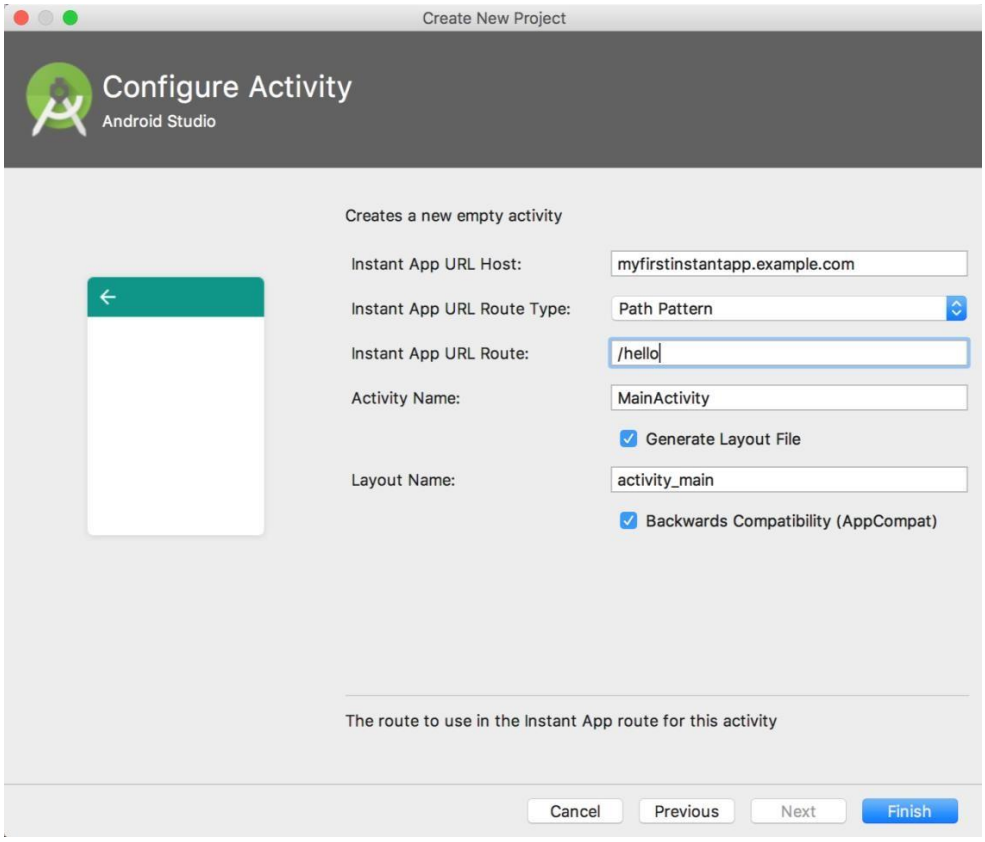


Figure: The **Configure Activity** window.

11. Click **Finish**.

After Android Studio has finished creating the project, you can run the instant app. Make sure that you have already created an emulator that can run instant apps, as described in Set up your device or emulator.

To run the project in Android Studio, do the following:

1. Click the the **instantapp** module in the **Project** window and then select **Run > Run 'instantapp'**.
2. In the **Select Deployment Target** window, select the emulator that you have set up for instant app development.

Android Studio builds and runs the app on the emulator as shown in figure

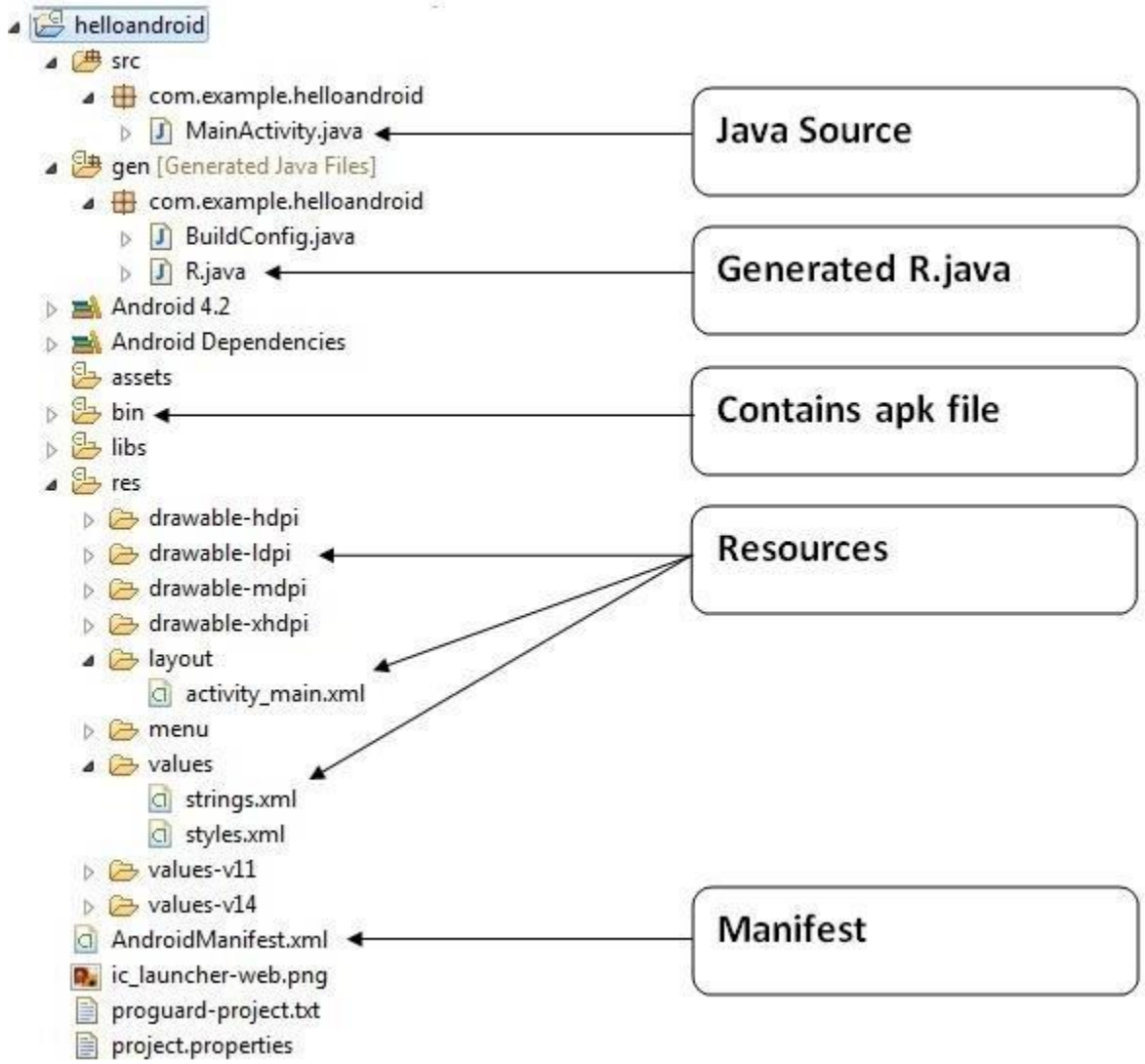
'My First Instant App' running.

Note: When you run your app locally on a device or emulator, the Android system displays the default placeholder icon for your app. Once you have deployed your Instant App APK to the Google Play Console, the appropriate icon shows up when the instant app launches.

Internal Details of Hello Android Example

Here, 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 theproject structure of android application.



Java Source Code

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

File: MainActivity.java

```
1. package com.example.helloandroid;
2. import android.os.Bundle;
3. import android.app.Activity;
4. import android.view.Menu;
5. import android.widget.TextView;
6. public class MainActivity extends Activity  {//(1)
7.    @Override
```

```
8.    protected void onCreate(Bundle savedInstanceState) {//(2)
9.        super.onCreate(savedInstanceState); 10.
11.           setContentView(R.layout.activity_main);//(3)
12.       }
13.       @Override
14.       public boolean onCreateOptionsMenu(Menu menu) {//(4)
15.         // Inflate the menu; this adds items to the action bar if it is present.
16.           getMenuInflater().inflate(R.menu.activity_main, menu);
17.           return true;
18.       }
19.    }
```

(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

```
1.  <RelativeLayout
2.      xmlns:androclass="http://schemas.android.com/apk/res/android"
3.     xmlns:tools="http://schemas.android.com/tools"
4.     android:layout_width="match_parent"
5.     android:layout_height="match_parent"
6.     tools:context=".MainActivity" >
7.
8.   <TextView
9.       android:layout_width="wrap_content"
10.          android:layout_height="wrap_content"
11.          android:layout_centerHorizontal="true"
12.          android:layout_centerVertical="true"
13.          android:text="@string/hello_world" />
14.      </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** provide information about the textview message. The value of the attribute hello_world is defined in the strings.xml file.

File: strings.xml

```
1. <?xml version="1.0" encoding="utf-8"?>
2. <resources>
3.     <string name="app_name">helloandroid</string>
4.     <string name="hello_world">Hello world!</string>
5.     <string name="menu_settings">Settings</string>
6. </resources>
```

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

Generated R.java file

It is the auto-generated file that contains IDs for all the resources of res directory. It is generated by aapt(Android Asset Packaging Tool). Whenever you create any component on activity_main, a corresponding ID is created in the R.java file which can be used in the Java Source file later.

R.java:

- R is termed as resource.
- R.java is an abstraction between the java file and different resources which are placed in „res“ folder.
- For every resource(file) in res folder it will create a static integer field in R.java, with the help of integer field we can access the resource into Activity(java file).
- Android Studio automatically will generate R.java.

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.

For more information about manifest file visit here: AndroidManifest.xml file.

Android Features

- Android is Open Source.
- Application framework is providing infrastructures for application developer.
- DVM is optimized for mobile devices to work on low power, low memory and low RAM it is a customized JVM.
- SQLite Database is used to maintain structured data.
- Open GLES native library is used to display graphics.
- Android supports GPS and different media formats.
- Android Studio provides rich development environment.
- Android is a product from OHA [Open Handset Alliance] which is lead by Google.
- Android plays a key role in IOT [Internet of Things: Machine - Machine communication]

History of Android

The history and versions of android are interesting to know. The code names of android ranges from A to N currently, such as **Aestro**, **Blender**, **Cupcake, Donut**, **Eclair**, **Froyo, Gingerbread**, **Honeycomb**, **Ice Cream Sandwitch**, **Jelly Bean**, **KitKat** and **Lollipop**. Let's understand the android history in a sequence.

1) Initially, **Andy Rubin** founded Android Incorporation in Palo Alto, California, United States in October, 2003.

2) In 17th August 2005, Google acquired android Incorporation. Since then, it is in the subsidiary of Google Incorporation.

3) The key employees of Android Incorporation are **Andy Rubin**, **Rich Miner**, **Chris White** and **Nick Sears**.

4) Originally intended for camera but shifted to smart phones later because of low market for camera only.

5) Android is the nick name of Andy Rubin given by co-workers because of his love to robots.

6) In 2007, Google announces the development of androidOS.

7) In 2008, HTC launched the first android mobile.

Android Versions, Codename and API

Let's see the android versions, codenames and API Level provided by Google. The code names of android ranges from A to N currently, such as:

- Aestro,
- Blender,
- Cupcake (April -27- 2009) API-Leveal 3
- Donut (Sept -15- 2009) API-Leveal 4
- Éclair (Oct -26- 2009) API-Leveal 5,6,7
- Froyo (May -20- 2010) API-Leveal 8
- Gingerbread (Dec -06- 2010) API-Leveal 9,10
- Honeycomb (Feb-22- 2011) API-Leveal 11,12,13
- Ice Cream Sandwich, (Oct -18- 2011) API-Leveal 14,15
- Jelly Bean (Jul -09- 2012) API-Leveal 16,17,18
- KitKat, (Oct -31- 2013) API-Leveal 19,20
- Lollipop (Nov-12- 2014) API-Leveal 21,22
- Marshmallow (Oct -05- 2015) API-Leveal 23
- Nougat(Aug-22-2016) API-Level 24,25
- Oreo(Aug-21-2017) API-Level 26
- Pie(Aug-6-2018) API-Level 28
- Android10(Sept-7-2019) API-Level 29
- Android11(Sept-8-2020) API-Level 30

Dalvik Virtual Machine | DVM

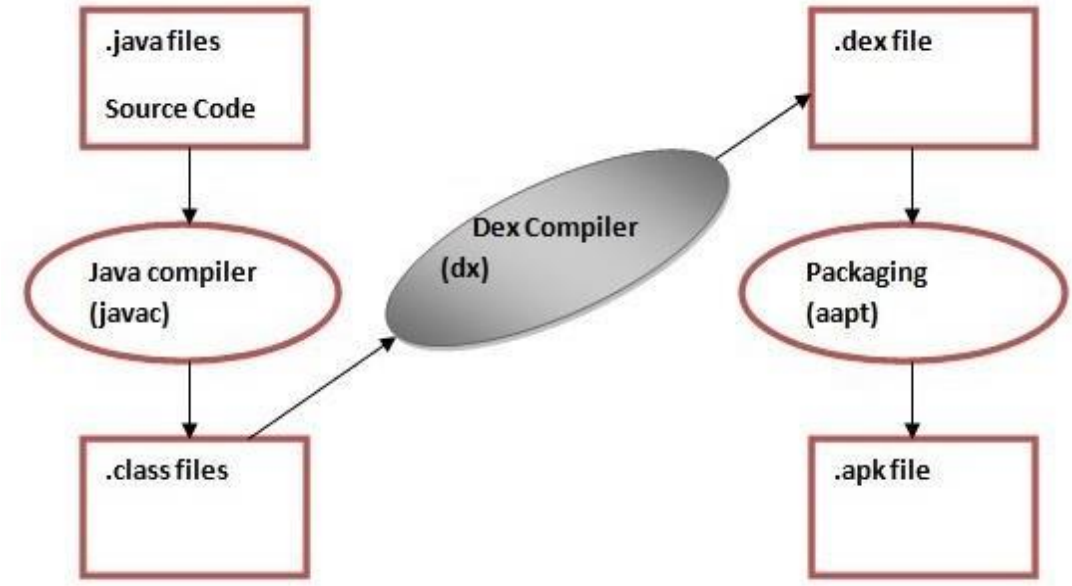
As we know the modern JVM is high performance and provides excellent memory management. But it needs to be optimized for low-powered handheld devices as well.

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 Manifest.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 class provides profiling and other informations. These informations 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.

A simple AndroidManifest.xml file looks like this:

```
1.  <manifest
2.  xmlns:android="http://schemas.android.com/apk/res/android"
3.      package="com.NIT.hello"
4.      android:versionCode="1"
5.      android:versionName="1.0" >
6.      <uses-sdk
7.          android:minSdkVersion="8"
8.          android:targetSdkVersion="15" />
9.      <application
10.             android:icon="@drawable/ic_launcher"
11.             android:label="@string/app_name"
12.             android:theme="@style/AppTheme" >
13.             <activity
14.                 android:name=".MainActivity"
15.                 android:label="@string/title_activity_main" >
16.         <intent-filter>
17.             <action android:name="android.intent.action.MAIN" />
18.         <category android:name="android.intent.category.LAUNCHER" />
19.                 </intent-filter>
20.             </activity>
21.         </application>
22.         </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 sub elements 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.

Layout UI groups

UserInterface(UI) Groups:

-UI Groiup is used to specify how to arrange the UI components.

- **LinearLayout**
- **TableLayout**
- **GridLayout**
- **RelativeLayout**
- **FrameLayout**

-LinearLayout: LinearLayout is one of the UIgroup, which is used to present the data(item) in a vertical or Horizantal format one after another (Create UI elements step by step manner).

Syntax:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android" android:layout_width=" "
    android:layout_height=" "
   android:orientation="vertical| horizontal"
                    //UI Components (here we can write Ui components with in LinearLayout.
Example: TextView, EditText, Button...etc)
</LinearLayout >
```

-TableLayout: TableLayout is one of the UIgroup, which is used to present the data(item) in different size. Here all elements are placed in Tableformat.

Syntax:

```
<?xml version="1.0" encoding="utf-8"?>
<TableLayout xmlns:android="http://schemas.android.com/apk/res/android"
   android:layout_width=" "
   android:layout_height=" "
              //UI Components (here we can write Ui components with in LinearLayout.
Example: TextView, EditText, Button...etc)
</TableLayout >
```

-GridLayout: GridLayout is one of the UIgroup, which is used to present the data(item) in columns size. Here all collumns are same size follows.

Example: Mobile Apps

Syntax:

```
<?xml version="1.0" encoding="utf-8"?>
<GridLayout xmlns:android="http://schemas.android.com/apk/res/android"
   android:layout_width=" "
   android:layout_height=" "
```

// UI Components (here we can write Ui components with in GridLayout.
Example: TextView, EditText, Button...etc)
</**GridLayout** >

-RelativeLayout: RelativeLayout is one of the UIgroup, which is used to present the data(item) in wherever you want. So, there is no specific rule in RelativeLayout. End of the Line also you can create UI elements.

Syntax:

<**RelativeLayout** xmlns:android="http://schemas.android.com/apk/res/android"
android:layout_width=" "
android:layout_height=" "
// UI Components (here we can write Ui components with in GridLayout.
Example: TextView, EditText, Button...etc)
</ **RelativeLayout** >

-FrameLayout: FrameLayout is one of the UIgroup, which is used to present the data(item) in Fixed position or other may be any position.

Syntax:

<FrameLayout xmlns:android="http://schemas.android.com/apk/res/android"
android:layout_width=" "
android:layout_height=" "
// UI Components (here we can write Ui components with in GridLayout.
Example: TextView, EditText, Button...etc)
</FrameLayout >

-- For every UI component and UI group we have to specify width and height, following are the possible parameters to specify width and height.

- **match_parent [>= 2.2]** (match_parent attribute occupying the entire Screen width and hight Position.)
- **fill_parent [< 2.2]**
- **wrap_content** (Wrap_content attribute occupying the screen upto the Content)
- **px [pixel]** (Pixel attribute can be used in the Size of UI Components have FixedSize)
- **dp[density pixel]** (Density Pixel attribute can be used based on the screen size Increase or decrease the size of UI element)
- **sp[scaled pixel]** (Scaled pixel attribute can use only increasing the textSize)

UNIT-II

UNIT-II:

Activity, Activity lifecycle, Life cycle Methods, Intents, Intent Methods, layout file and its child elements and attributes, Basic UI Components(Text View, Button, Edit Text, Radio Button, Check Box), Advanced UI Components (AutoCompleteTextView, Spinner, ListView) Adapters (ArrayAdapter, Custom Adapter), Toast

Activity:

Q: What is an Activity?

Ans: Activity is a single screen application with UI components, user can intract the device through activity.

-Activity is a Java code that supports a screen or UI. In other words, building block of the user interface is the activity.

-Activity class is a pre-defined class in Android and every application which has UI must inherit it to create window.

Steps to create an Activity:

1) Create a class as a child of android.app.Activity[why?]

Activity Life Cycle:

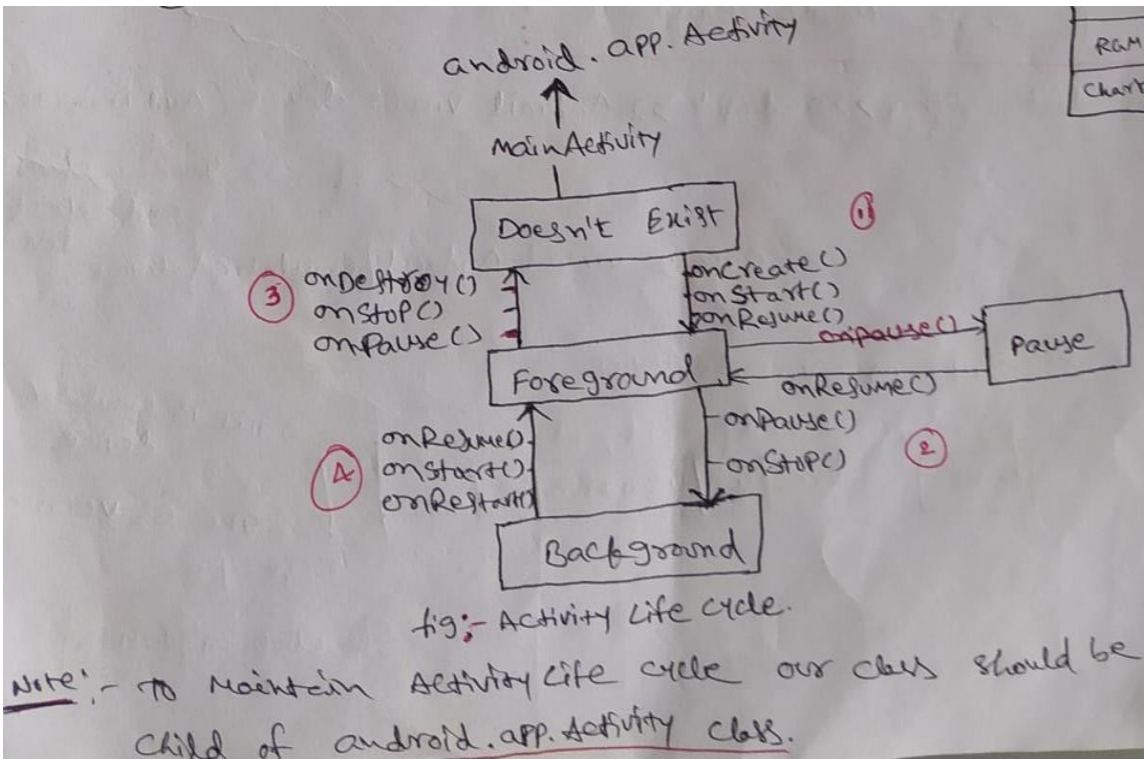
Activity is having 4 states.

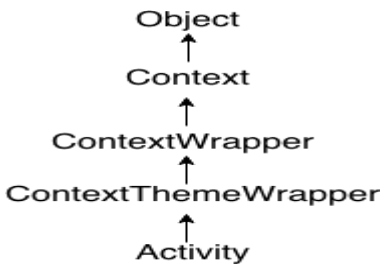
1) **Activity doesn't exist State**
2) **Foreground State**
3) **Pause State**
4) **Background State**

-Following are the major methods in Activity class.

1) **onCreate()**
2) **onStart()**
3) **onResume()**
4) **onPause()**
5) **onStop()**
6) **onRestart()**
7) **onDestroy()**

Android Activity Lifecycle:





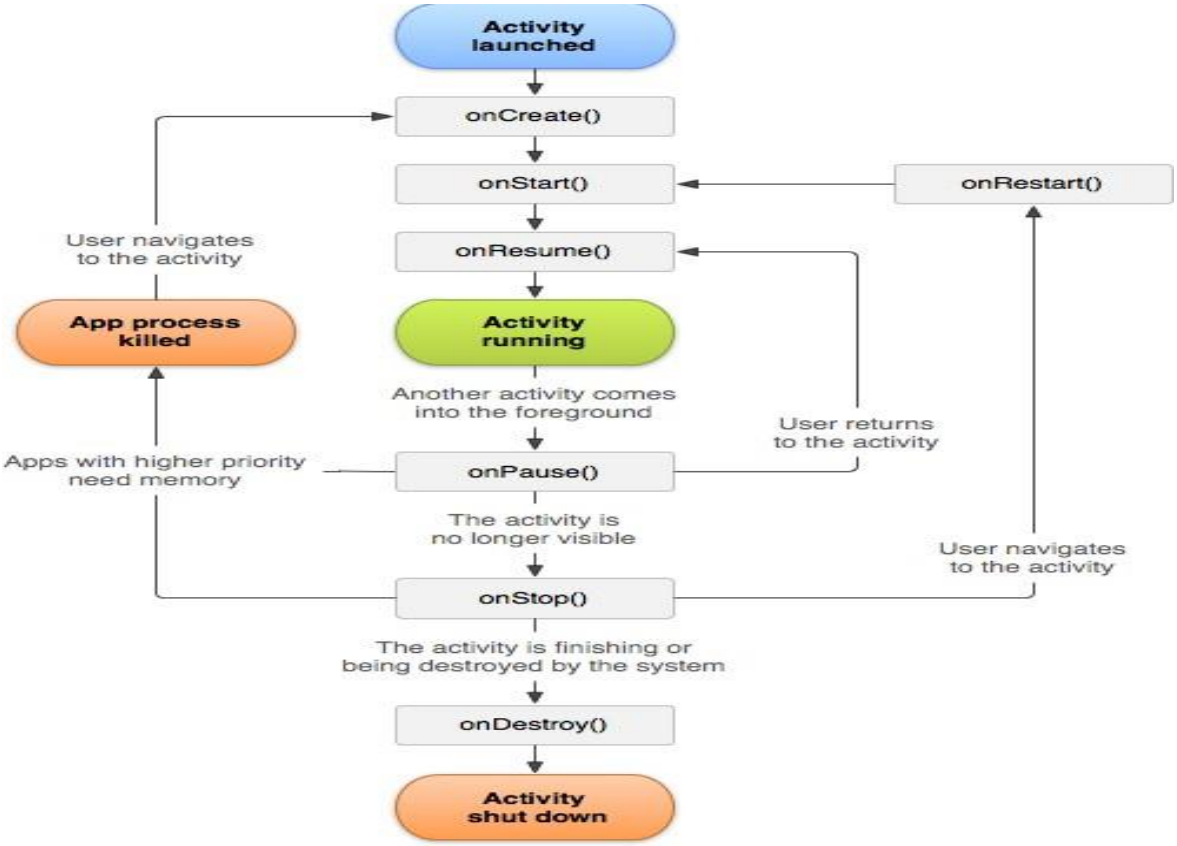
Android Activity Lifecycle is controlled by 7 methods of **android.app.Activity** class. The android Activity is the subclass of ContextThemeWrapper class. An activity is the single screen in android. It is like window or frame of Java.

By the help of activity, you can place all your UI components or widgets in a single screen. The 7 lifecycle method of Activity describes how activity will behave at different states.

Android Activity Lifecycle methods:

Let's see the 7 lifecycle methods of android activity.

Method	Description
onCreate	called when activity is first created.
onStart	called when activity is becoming visible to the user.
onResume	called when activity will start interacting with the user.
onPause	called when activity is not visible to the user.
onStop	called when activity is no longer visible to the user.
onRestart	called after your activity is stopped, prior to start.
onDestroy	called before the activity is destroyed.



To maintain the Activity Life cycle, our Activity class should be should be a subtype of android.app.Activity.

Same like main() method in C/C++/Java in Android Activity onCreate() method will be invoke first so provide the implementation/override for onCreate() method.

- Bundle class is used to get the state of an Activity.
- We designed the UI in XML, we have to set the XML to java , use the following method in java (inside onCreae() method) to set the xml file.

setContentView(R.layout.file_name);

activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"
android:layout_width="match_parent"
android:layout_height="match_parent"
android:orientation="vertical">

<TextView
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Welcome to RGMCET"
android:textSize="40sp"
android:textColor="#F000" />
</LinearLayout>
```

MainActivity.java

```
package cubexsoft.helloworld;
import android.os.Bundle;
import android.support.annotation.Nullable;
public class MainActivity extends android.app.Activity
{
@Override
protected void onCreate(@Nullable Bundle savedInstanceState){
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_main);
}
}
```

OUTPUT:

- Button is having a click event, we can configure the click event in 2 ways.
- XML
- Java

XML :

- use the following to configure the click event using XML.

android:onClick="method_name".

- if we click the button it will invoke the specified method in java, if the method is not available it will throw MethodNotFoundException.

eg : xml:

```
android:onClick="getText"
```

java:

```
public void getText(View  v)
  {
        ..........;
  }
```

- to get the UI component into java we have to configure an id for the UI component, use the following attribute to set the id.

android:id="@+id/id_name"

- use the following method in java to get the UI component from XML.

findViewById(R.id.id_name);

Configure the click event using Java:

- to configure the click event using java, get the UI component from XML to java.

```
Button b=(Button)findViewById(R.id.b1);
```

- to configure the following listener in java to configure the click event.

```
b.setOnClickListener(new View.OnClickListener()
{
    public void onClick(View v) {
        // ..............
    }
});
```

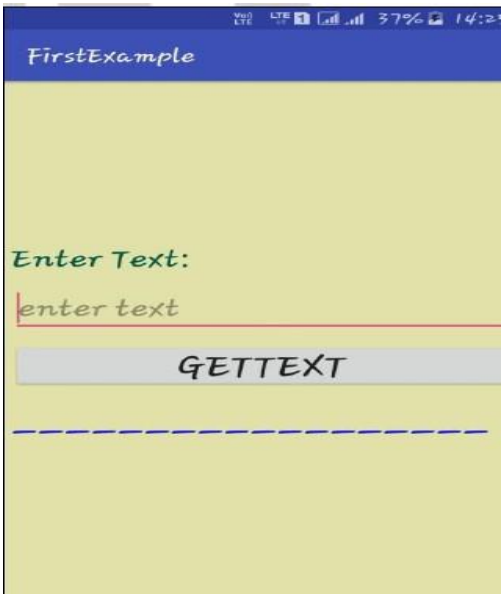
activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"
android:layout_width="match_parent"
android:layout_height="match_parent"
android:orientation="vertical">

<TextView
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="Enter Text:"
android:textSize="40sp"/>

<EditText
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:id="@+id/et1"/>

<Button
android:id="@+id/b1"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="GetText"
android:textSize="40sp"/>

<TextView
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:text="_____"
android:textSize="40sp"
android:id="@+id/tv1"/>
</LinearLayout>
```

MainActivity.java

```
package com.example.hi.welcomeApp;
import android.os.Bundle;
import android.support.annotation.Nullable;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
public class MainActivity extends android.app.Activity
{
        @Override
protected void onCreate(@Nullable Bundle savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_main);
Button b=(Button)findViewById(R.id.b1);
b.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
        EditText et1=(EditText)findViewById(R.id.et1);
        TextView tv1=(TextView)findViewById(R.id.tv1);
        tv1.setText(et1.getText());
                }
        });
}

}
```

OUTPUT:



Android Intent

Android Intent is the message that is passed between components such as activities, content providers, broadcast receivers, services etc.

- Intents are used to provide a communication between Activity - Activity, Activity -Service, Activity - Broadcast Receiver.

-It is generally used with startActivity() method to invoke activity, broadcast receivers etc.

-The **dictionary meaning** of intent is intention or purpose. So, it can be described as the intention to do action.

-The LabeledIntent is the subclass of android.content.Intentclass.

-Android intents are mainly used to:

- **Start the service**
- **Launch an activity**
- **Display a web page**
- **Display a list of contacts**
- **Broadcast a message**
- **Dial a phone call etc**.

- Intents are used to provide a communication between Activity - Activity, Activity - Service, Activity - Broadcast Receiver.

- With respect to Activity there are 2 types of intents.

- Implicit Intents

- Explicit Intents

Implicit Intents:

- Implicit Intents is used to call builtin Activities.
  e.g. : camera , browser , settings, messages..

syntax:

```
Intent i=new Intent();
i.setAction(Intent.ACTION_NAME);
startActivity(i);
```

Explicit Intents:

- Explicit Intents is used to call user-defined Activities.

Syntax:

```
Intent i=new Intent(context, Activity_name.class);
   startActivity(i);
```

-by using explicit intents we can invoke 3rd party applications(Eg:- WhatsApp, Gmail etc..) activities from our application.

Syntax:

```
Intent i=getPackageManager(). getLauchIntentForPackage("package_name");
        startActivity(i);
```

-following are the major methods in Intent class.

-setAction()	-setType()
-setData()	-putExtra()
-setComponent()	-getExtra()

- every user defined Activity has to be configure in **"Manifest.xml"** with the following tag inside <application> tag.

```
<activity android:name="package_name.class_name"/>
```

- Which activity you want to display on the initial screen in your application configure the following tag to that Activity.

```
<activity android:name=".MainActivity">
<intent-filter>
<action android:name="android.intent.action.MAIN" />
  <category android:name="android.intent.category.LAUNCHER" />
  </intent-filter>
  </activity>
  <activity android:name=".welcomeActivity"/>
```

activityMain.xml File:

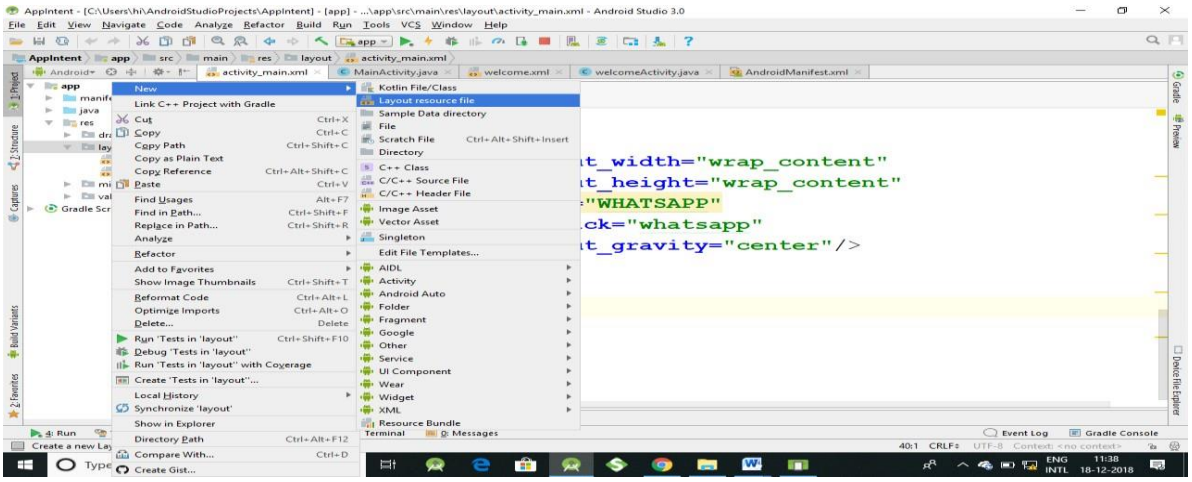
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   android:orientation="vertical" >

<EditText
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Enter Number"
    android:id="@+id/et1"
    android:inputType="phone"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="DIAL"
        android:onClick="dial"
        android:layout_gravity="center"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="DIAL1"
        android:onClick="dial1"
        android:layout_gravity="center"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="NEXT"
        android:onClick="next"
        android:layout_gravity="center"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="WHATSAPP"
        android:onClick="whatsapp"
        android:layout_gravity="center"/>

</LinearLayout>
```

MainActivity.Java File:

```
package com.example.hi.appintent; import
android.content.ComponentName; import
android.content.Intent;
import android.net.Uri;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle; import
android.view.View; import
android.widget.EditText;

public class MainActivity extends AppCompatActivity{
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }
    public void dial(View v){
        Intent i=new Intent();
        i.setAction(Intent.ACTION_DIAL);
        EditText et1=(EditText)findViewById(R.id.et1);
        i.setData(Uri.parse("tel:"+et1.getText().toString())); startActivity(i);
    }

    public void dial1(View v){
      Intent i=new Intent();
      i. setAction(Intent.ACTION_GET_CONTENT);
      i.setType("Image/*");
      startActivity(i);
    }

    public void next(View v){
        Intent i=new Intent();
        i. setComponent(new ComponentName(this,welcomeActivity.class));
        startActivity(i);
    }

public void whatsapp(View v){
  Intent i=getPackageManager().getLaunchIntentForPackage("com.whatsapp");
        startActivity(i);

    }
}
```

Creating a New Layout:

Goto**resfolder**>>**layoutfolder**.Nowrightclicklayoutfolder>>**new**>>**layout resoures file** and provide **name**(welcome)



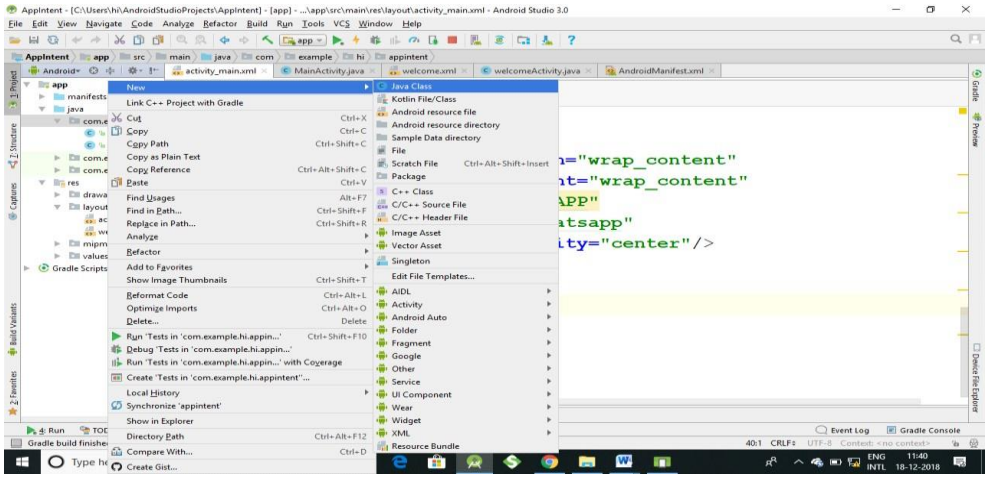
Welcome.xml :

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="WELCOME TO CSE LAB2"
        android:textSize="30sp"
        android:textColor="#FF00"/>

</LinearLayout>
```

Creating a New Java File:

-Goto **Java folder >> package folder** >> **Now right click packagefolder** >>

new >> **java class** and provide **name**(welcomeActivity).



WelcomeActivity.java

```
package com.example.hi.appintent;
import android.app.Activity; import
android.os.Bundle;
import android.support.annotation.Nullable;


public class welcomeActivity extends Activity{
    @Override
    protected void onCreate(@Nullable Bundle savedInstanceState) {
        super.onCreate(savedInstanceState); setContentView(R.layout.welcome);
    }
}
```

AndroidManifest.xml

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

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
```

```
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

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

</manifest>
```

OUTPUT:

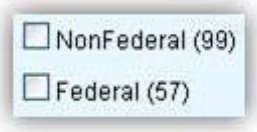
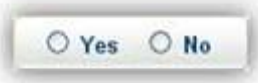
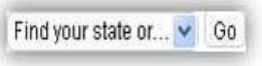
Basic User Interface Elements:

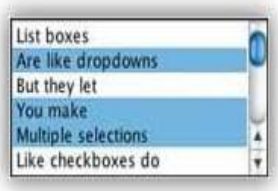
When designing your interface, try to be consistent and predictable in your choice of interface elements. Whether they are aware of it or not, users have become familiar with elements acting in a certain way, so choosing to adopt those elements when appropriate will help with task completion, efficiency, and satisfaction.

Interface elements include but are not limited to:

- **Input Controls**: checkboxes, radio buttons, dropdown lists, list boxes, buttons, toggles, text fields, date field.

Input Controls

Element	Description	Examples
Checkboxes	Checkboxes allow the user to select one or more options from a set. It is usually best to present checkboxes in a vertical list. More than one column is acceptable as well if the list is long enough that it might require scrolling or if comparison of terms might be necessary.	
Radio buttons	Radio buttons are used to allow users to select one item at a time.	
Dropdown lists	Dropdown lists allow users to select one item at a time, similarly to radio buttons, but are more compact allowing you to save space. Consider adding text to the field, such as „Select one" to help the user recognize the necessary action.	

Element	Description	Examples
List boxes	List boxes, like checkboxes, allow users to select a multiple items at a time, but are more compact and can support a longer list of options if needed.	
Buttons	A button indicates an action upon touch and is typically labeled using text, an icon, or both.	
Dropdown Button	The dropdown button consists of a button that when clicked displays a drop-down list of mutually exclusive items.	
Text fields **EditText**	Text fields allow users to enter text. It can allow either a single line or multiple lines of text. EditText is a predefined subclass of TextView that includes rich editing capabilities.	

Advanced UI Components

AutoCompleteTextView :

- ACTV is one of the UI component in Android which is used to provide an auto completion support to the user it is a subtype of EditText component.

xml:

```
<AutoCompleteTextView
android:id="@+id/actv"
        ..... />
```

Java:

```
AutoCompleteTextView  actv=(AutoCompleteTextView)findViewById(R.id.actv);
```

-To provide auto completion support we have to configure the values, in android there are 2 ways to configure the values

- XML
- Java

XML:

res >> values >> strings.xml

```
<string-array name="array_name">
<item>value1</item>
<item>value2</item>
<item>value3</item>
<item>value4</item>
      .....
</string-array>
```

-Use the following code in java to get these configured values.

```
String  []  values=getResources().getStringArray(R.array.array_name);
```

Java:

```
String[] values=new String[]{"value1","value2","value3"  };
                    (or)
`ArrayList<String> list=new ArrayList<String>();
                    list.add(value1);
                    list.add(value2);
                    list.add(value3);
                    .....
```

-To present the values we have to create an adapter, in android there are 3 types of adapters

- **Array Adapter**
- **Custom Adapter**
- **Cursor Adapter**

ArrayAdapter: By Using ArrayAdapter we can present string type of data on the screen.

Syntax:

```
ArrayAdapter<String> adapter=new ArrayAdapter<String>(context, xml_file, values);

        actv.setAdapter(adapter);

        actv.setThreshold(int);
```

activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Enter Country"
        android:textSize="40sp"
        android:textColor="#f00" />

    <AutoCompleteTextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/actv"/>

</LinearLayout>
```

Strings.xml:

```
<resources>
    <string name="app_name">ACTCApp</string>
    <string-array name="country">
        <item>India</item>
        <item>Indonasia</item>
        <item>Ierland</item>
        <item>Srilanka</item>
        <item>SouthAfrica</item>
        <item>Pakisthan</item>
        <item>Bangladesh</item>
        <item>Brezil</item>
    </string-array>
</resources>
```

MainActivity.java:

```
package com.example.hi.actcapp;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.ArrayAdapter;
import android.widget.AutoCompleteTextView;

public class MainActivity extends AppCompatActivity{

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

        AutoCompleteTextView
                actv=(AutoCompleteTextView)findViewById(R.id.actv); String[]

        values=getResources().getStringArray(R.array.country);

      //String[] values=new String[]{ “India”, “Srilanka”, “Arebia” };

      ArrayAdapter adapter=new
                        ArrayAdapter(MainActivity.this, android.R.layout.
                                simple_list_item_single_choice, values);
```

```
actv.setAdapter(adapter); actv.setThreshold(1);
    }
}
```

OUTPUT:

Spinner:

- Spinner is one of the UI component in android, which is used to present the list of configured values in a drop-down menu.

Syntax:

XML:

```
<Spinner
    android:id="@+id/sp1"
    ..... />
```

Java:

```
Spinner sp1=(Spinner)findViewById(R.id.sp1);
```

-Same like ACTV for presenting the values we have to configure the values in XML/Java.

- if the values are configured in XML, use the following attribute to set the values.

android:entries="@array/array_name"

- if the values are configured in Java we have to create an adapter to set the values.

sp.setAdapter(adapter_obj);

- Spinner is having itemselected event, to get this event configure the following listener.

```
-sp.setOnItemSelectedListener(new OnItemSelectedListener(){
                onItemSelected(){ };
                doNothingSelected() { };
        });
```

Toast:

- Toast is one of the notification method in Android which is used to display the text on the screen for few seconds.

syntax:

Toast.makeText(context, message, duration).show();

Activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Select Country"
        android:textSize="40sp" />

<Spinner
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/sp1"
        android:entries="@array/countries">
    </Spinner>
```

```
<TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Select Gender"
        android:textSize="40sp" />

    <Spinner
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/sp2">
    </Spinner>

</LinearLayout>
```

Strings.xml

```
<resources>
    <string name="app_name">SPINNERapp</string>
    <string-array name="countries">
        <item>------Select --------- </item>
        <item>India</item>
        <item>Ireland</item>
        <item>Australia</item>
        <item>China</item>
        <item>Srilanka</item>
        <item>Bangladesh</item>
    </string-array>
</resources>
```

MainActivity.java

```
package com.example.hi.spinnerapp;

import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.AdapterViewAnimator;
import android.widget.ArrayAdapter; import
android.widget.Spinner; import
android.widget.Toast;
import java.util.ArrayList;
```

```
public class MainActivity extends AppCompatActivity {

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

        final Spinner sp1 = (Spinner) findViewById(R.id.sp1); sp1.setOnItemSelectedListener(new
                                        AdapterView.OnItemSelectedListener () {
            @Override
    public void onItemSelected (AdapterView<?> parent, View view, int
                                                                    position, long id) {
                if (position > 0) {
                    Toast.makeText(MainActivity.this, sp1.getSelectedItem().toString(),
                                                Toast.LENGTH_LONG).show();
                }

            }

            @Override
            public void onNothingSelected(AdapterView<?> parent) {

            }
        });

Spinner sp2 = (Spinner) findViewById(R.id.sp2);
        ArrayList<String> List = new ArrayList<>();
        List.add("Select");
        List.add("Male");
        List.add("Female");
        List.add("TransGender");
      ArrayAdapter<String> adapter = new
            ArrayAdapter<String>(MainActivity.this,
                    R.layout.support_simple_spinner_dropdown_item, List);
        sp2.setAdapter(adapter);
    }

}
```

OUTPUT:

-ListView :

- ListView is one of the UI component which is used present the list of configured values.

syntax:

Xml:

```
<ListView
  android:id="@+id/lview1"
            ...../>
```

Java:

```
ListView lview=(ListView)findViewById(R.id.lview1);
```

-same like ACTV & Spinner for presenting the values configure the values in XML / Java, if the values are configured in XML use the following attribute to set the values.

android:entries="@array/array_name"

- if the values are configured in Java, create an adapter to set the values.

ui.setAdapter(adapter);

Internal storage path:

String path=”/storage/sdcard0/”

(OR)

String path=”/storage/emulated/0/”

External storage path:

String path=”/storage/sdcard1/”

(OR)

String path=”/storage/extSdCard/”

```
ListView lview=(ListView)findViewById(R.id.lview); String
        path="/storage/emulated/0/";
        File f=new File(path);
        String[] files=f.list();
        ArrayAdapter<String> adapter=new
                                    ArrayAdapter<String>(MainActivity.this,
                        R.layout.support_simple_spinner_dropdown_item, files);
            lview.setAdapter(adapter);
```

- if we are accessing the device storage information we have to add the following permission in Manifest.xml.

<uses-permission android:name=“android.permission.READ_EXTERNAL_STORAGE”/>

activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical" >

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="First practise of android"
        android:textSize="40sp" />

    <ListView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:id="@+id/lview">
    </ListView>

</LinearLayout>
```

MainActivity.java:

```
package com.example.hi.listviewapp;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.ArrayAdapter; import
android.widget.ListView; import java.io.File;
public class MainActivity extends AppCompatActivity{
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        ListView lview=(ListView)findViewById(R.id.lview); String
        path="/storage/emulated/0/";
        File f=new File(path);
        String[] files=f.list();
        ArrayAdapter<String> adapter=new
                                    ArrayAdapter<String>(MainActivity.this,
                        R.layout.support_simple_spinner_dropdown_item, files);
        lview.setAdapter(adapter);
    }
}
```

AndroidManifest.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.hi.listviewapp">
<uses-permission
       android:name="android.permission.READ_EXTERNAL_STORAGE"/>
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>
```

OUTPUT:

CustomAdapter:

- by using ArrayAdapter we can present only String type of data if you want to present your own UI on individual item use CustomAdapter.

Steps to create CustomAdapter :

- create a class with subtype ofandroid.widget.BaseAdapter.
- it is an abstract class, having following abstractmethods.
  - **getCount()**
  - **getItem()**
  - **getItemId()**
  - **getView()**

LayoutInflater:

- LayoutInflater class is used to convert the Xml UI into View object.

```
LayoutInflater inflater=LayoutInflater.from(context);

View v=inflater.inflate(R.layout.xml_file, view_group object);
```

- from Activity use the following code to set the custom adapter to the UI component.

```
ui.setAdapter(new CustomAdapterName());
```

activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <ListView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:id="@+id/lview">

    </ListView>
</LinearLayout>
```

Indiview.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="horizontal">

    <ImageView
        android:layout_width="0dp"
        android:layout_weight="0.2"
        android:layout_height="100dp"
        android:id="@+id/lview1"
        android:src="@drawable/ic_launcher_background" />

    <LinearLayout
        android:layout_width="0dp"
        android:layout_weight="0.6"
        android:layout_height="wrap_content"
        android:orientation="vertical">

        <TextView
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:id="@+id/tv1"
            android:text="File Name"
```

```
            android:textSize="20sp"
            android:textStyle="bold"
            android:textColor="#FF0000"  />

        <TextView
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:id="@+id/tv2"
            android:text="File Size"
            android:textSize="20sp"
            android:textStyle="bold"
            android:textColor="#0000FF" />

</LinearLayout>

 <Button
        android:layout_width="0dp"
        android:layout_weight="0.2"
        android:layout_height="wrap_content"
        android:text="Del"
        android:id="@+id/b1"/>

    </LinearLayout>
```

MainActivity.java:

```
package com.example.hi.listview_customadapter;
import android.Manifest;
import android.content.pm.PackageManager; import
android.support.annotation.NonNull; import
android.support.v4.app.ActivityCompat; import
android.support.v4.content.ContextCompat; import
android.support.v7.app.AppCompatActivity; import
android.os.Bundle;
import android.widget.ListView;
import java.io.File;

public class MainActivity extends AppCompatActivity{
    ListView lview;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        lview=(ListView)findViewById(R.id.lview);
```

```
        int status= ContextCompat.checkSelfPermission
                (this, Manifest.permission.WRITE_EXTERNAL_STORAGE);
        if(status== PackageManager.PERMISSION_GRANTED){ readFiles();
        }else{ActivityCompat.requestPermissions(this, new
                String[]{Manifest.permission.WRITE_EXTERNAL_STORAGE}, 111);
        }

    }
    @Override
    public void onRequestPermissionsResult(int requestCode, @NonNull String[] permissions, @NonNull
int[] grantResults) {
        super.onRequestPermissionsResult(requestCode, permissions, grantResults);
        if(grantResults[0]==PackageManager.PERMISSION_GRANTED); readFiles();
    }

    public void readFiles( )
    {
        String path=
                "/storage/emulated/0/WhatsApp/Media/WhatsApp Images/";
        File f=new File(path);
        File[] files=f.listFiles();
        lview.setAdapter(new MyAdapter(this, files));

    }
}
```

MyAdapater.java:

```
package com.example.hi.listview_customadapter;
import android.net.Uri;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.BaseAdapter;
import android.widget.Button; import
android.widget.ImageView; import
android.widget.TextView; import
java.io.File;
/**
 * Created by hi on 25-05-2021.
 */
```

```
public class MyAdapter extends BaseAdapter{
    MainActivity mActivity;
    File[] files;
    MyAdapter(MainActivity mActivity, File[] files){
        this.mActivity=mActivity; this.files=files;
    }
    @Override
    public int getCount() {

        return files.length;
    }

    @Override
    public Object getItem(int i) {
        return null;
    }

    @Override
    public long getItemId(int i)  {
        return 0;
    }

    @Override
    public View getView(final int i, View view, ViewGroup viewGroup) {
        LayoutInflater inflater=LayoutInflater.from(mActivity);
        View v=inflater.inflate(R.layout.indiview,null); ImageView
        iview=v.findViewById(R.id.lview1); TextView
        tv1=v.findViewById(R.id.tv1); TextView
        tv2=v.findViewById(R.id.tv2); Button
        b1=v.findViewById(R.id.b1);
        Uri u=Uri.parse(files[i].getAbsolutePath());
        iview.setImageURI(u); tv1.setText(files[i].getName());
        tv2.setText(String.valueOf(files[i].length()));
        b1.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                files[i].delete();
```

```
String path="/storage/emulated/0/WhatsApp/Media/WhatsApp Images/";
                File f=new File(path);
                files=f.listFiles();
                MyAdapter.this.notifyDataSetChanged();
            }
        });
        return v;
    }
}
```

AndroidManifest.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
package="com.example.hi.listview_customadapter">
<uses-permission
android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>

<application
    android:allowBackup="true"
    android:icon="@mipmap/ic_launcher"
    android:label="@string/app_name"
    android:roundIcon="@mipmap/ic_launcher_round"
    android:supportsRtl="true"
    android:theme="@style/AppTheme">
    <activity android:name=".MainActivity">
        <intent-filter>
            <action android:name="android.intent.action.MAIN" />
          <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    </activity>
</application>
</manifest>
```

OUTPUT:

Gallery Application By Using CustomAdapater:

-Gallery is one of the UI component in Android which is used to present the list of items in a horizontal format.

syntax:

Xml:

```
<Gallery
   android:id="@+id/gal1"
   ..... />
```

Java:

```
Gallery gal=(Gallery)findViewById(R.id.gal);
```

activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="horizontal">

    <Gallery
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:id="@+id/gal" >
    </Gallery>
</LinearLayout>
```

indiview.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:orientation="vertical"
    android:layout_margin="10dp">

    <VideoView
        android:layout_width="120dp"
        android:layout_height="120dp"
        android:id="@+id/vview1"
        android:padding="10dp"/>

   <CheckBox
        android:layout_width="120dp"
        android:layout_height="wrap_content"
        android:textSize="20sp"
        android:text="FileName"
        android:id="@+id/cb1" />

</LinearLayout>
```

MyAdapter.java:

```
package cubexsoft.gallerytest;
import android.net.Uri;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.BaseAdapter;
import android.widget.CheckBox;
import android.widget.CompoundButton; import
android.widget.VideoView; import java.io.File;

public class MyAdapter extends BaseAdapter{
    MainActivity activity;
    File[] files;

    MyAdapter(MainActivity activity, File[] files)
    {
        this.activity=activity;
        this.files=files;
    }

    @Override
    public int getCount()
    {
        return files.length;
    }
    @Override
    public Object getItem(int i)
    {
        return null;
    }
    @Override
    public long getItemId(int  i)
    {
        return 0;
    }

    @Override
    public View getView(int i, View view, ViewGroup viewGroup) { LayoutInflater
        inflater=LayoutInflater.from(activity);
        View v=inflater.inflate(R.layout.indiview,null); final
        VideoView vview=v.findViewById(R.id.vview1); CheckBox
        cb1=v.findViewById(R.id.cb1);
        Uri u=Uri.fromFile(files[i]);
```

```
        vview.setVideoURI(u);
         cb1.setText(files[i].getName());
         cb1.setOnCheckedChangeListener(new
CompoundButton.OnCheckedChangeListener() { @Override
            public void onCheckedChanged(CompoundButton compoundButton,
boolean b) {
                if(b){ vview.start();
                }else{
                    vview.stopPlayback();
                }
            }
         });

        return v;
    }
}
```

MainActivity.java:

```
package com.example.hi.gallerytest;
import android.Manifest;
import android.content.pm.PackageManager; import
android.support.annotation.NonNull; import
android.support.v4.app.ActivityCompat; import
android.support.v4.content.ContextCompat; import
android.support.v7.app.AppCompatActivity; import
android.os.Bundle;
import android.widget.Gallery; import
android.widget.GridView; import
java.io.File;

public class MainActivity extends AppCompatActivity{
    Gallery gal;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main); gal=findViewById(R.id.gal);

        int status= ContextCompat.checkSelfPermission(this,
                Manifest.permission.WRITE_EXTERNAL_STORAGE);
```

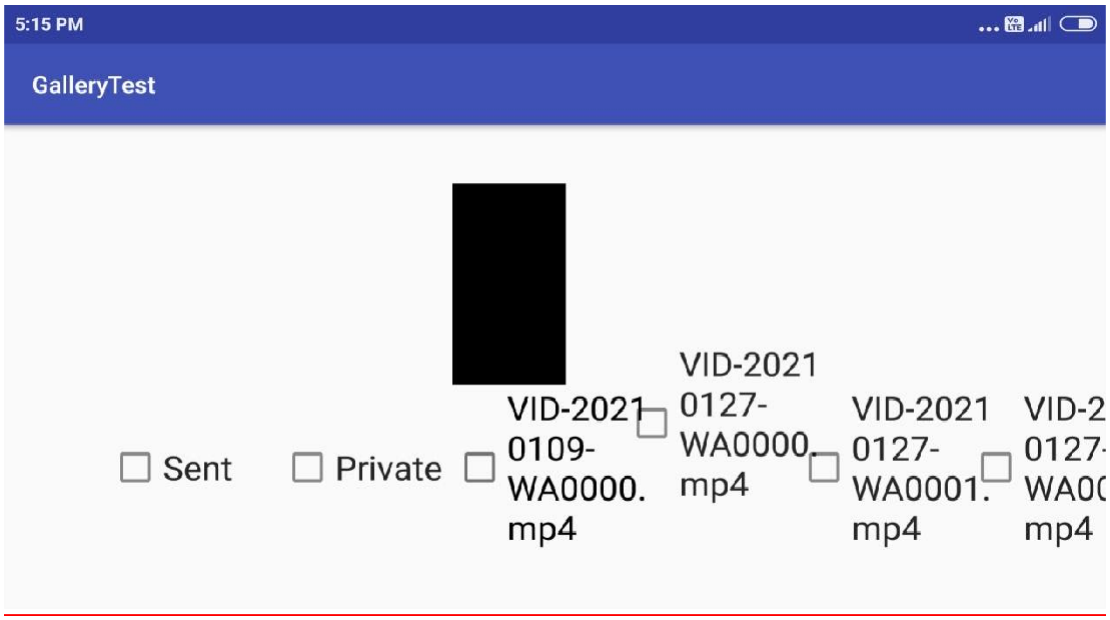
```
        if(status== PackageManager.PERMISSION_GRANTED){ readFiles( );
        }else{
            ActivityCompat.requestPermissions(this,
                    new String[]{Manifest.permission.READ_EXTERNAL_STORAGE}, 111);
        }
    }

    @Override
    public void onRequestPermissionsResult(int requestCode, @NonNull String[] permissions,
                                           @NonNull int[] grantResults) {
        super.onRequestPermissionsResult(requestCode, permissions, grantResults);
        if(grantResults[0]==PackageManager.PERMISSION_GRANTED){
            readFiles( );
        }
    }

    public void readFiles( )
    {
        String path=
                "/storage/emulated/0/WhatsApp/Media/WhatsApp Video/";
        File f=new File(path);
        File[] files=f.listFiles();
        gal.setAdapter(new MyAdapter(this,files));
    }
}
```

AndroidManifest.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.hi.gallerytest">
    <uses-permission android:name=
                        "android.permission.READ_EXTERNAL_STORAGE"/>
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
```

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

OUTPUT:



UNIT-III

UNIT-III:

WebView, WebView-HTML Communication, Fragment, Fragment Life Cycle. **Storage Methods:** shared preferences, SQLite Database (insert, read, update, delete). **Telephony:** send SMS, Call, Attaching File, and Send E-Mail.

WebView:

WebView is one of the UI component in Android, which is used to display webpages in Android application.

Syntax:

xml:

```
<WebView
    android:id="@+id/wview1"
    ...../>
```

java:

```
WebView  wview=(WebView)findViewById(R.id.wview1);
```

-By using web view we can perform the following operations:

- **call browser**
- **integrate the browser in our application.**
- **display static .html files.**
- **we can provide a communication between HTML UI and Android Activity.**
- **wview.loadUrl("url_address") method is used to display specific webpage on WebView.**

Permission:

```
<uses-permission android:name="android.permission.INTERNET"/>
```

- set the following method to web view component to display webpages on web view component.

```
wview.setWebViewClient(new WebViewClient());
```

- **Following are the major methods in WebViewClient class:**

  - **onPageStarted();**
  - **shouldOverrideUrlLoading();**
  - **onPageFinished();**

- by default web view will not enable Javascript and zoom controls, to enable java script and zoom controls set the following methods to web view component.

```
wview.getSettings().setJavaScriptEnable(true);
wview.getSettings().setBuiltinZoomControls(true);
```

- display .html files:

Goto App folder >> new >> folder

- To display html files place the .html file in assets folder, use the following code to display .html files.

wview.loadUrl("file:///android_asset/file_name.html");

- Communication between HTML UI & Android Activity:

- By using JavaScript Interface we can provide the communication between HTML UI & Android Activity.

- **wview.addJavaScriptInterface(class_object,"interface_name");**

- by using the second parameter (interface_name) we can communicate with the specified class methods from JavaScript.

- Which method you are calling from Java Script, add the following annotation on top the method.

@JavaScriptInterface

activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">


    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="0.1"
        android:orientation="horizontal">

    <EditText
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.8"
        android:id="@+id/et1"
        android:hint="Enter URL:"/>
```

```
<ImageView
    android:layout_width="0dp"
    android:layout_height="match_parent"
    android:layout_weight="0.2"
    android:src="@drawable/magnifier"
    android:id="@+id/srch"
    android:onClick="load"
    android:layout_margin="5dp"/>
</LinearLayout>

  <WebView
    android:layout_width="match_parent"
    android:layout_height="0dp"
    android:layout_weight="0.8"
    android:id="@+id/wview">
   </WebView>

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="0dp"
    android:layout_weight="0.1"
    android:orientation="horizontal">

    <ImageView
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.25"
        android:src="@drawable/fb"
        android:id="@+id/fb"
        android:onClick="load" />

    <ImageView
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.25"
        android:src="@drawable/google"
        android:id="@+id/google"
        android:onClick="load" />
    <ImageView
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.25"
        android:src="@drawable/youtube"
        android:id="@+id/youtube"
        android:onClick="load" />
```

```
    <ImageView
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.25"
        android:src="@drawable/html"
        android:id="@+id/html"
        android:onClick="load" />

  </LinearLayout>

</LinearLayout>
```

MainActivity.java:

```
package com.example.hi.webviewapp;
import android.graphics.Bitmap;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.webkit.JavascriptInterface; import
android.webkit.WebChromeClient; import
android.webkit.WebView;
import android.webkit.WebViewClient;
import android.widget.EditText; import
android.widget.Toast;
public class MainActivity extends AppCompatActivity{
WebView wview;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState); setContentView(R.layout.activity_main);

        wview=(WebView)findViewById(R.id.wview); wview.setWebViewClient(new
        WebViewClient(){
            @Override
            public void onPageStarted(WebView view, String url, Bitmap favicon) {
                super.onPageStarted(view, url, favicon);
      Toast.makeText(getApplicationContext(),"PAGE LOADING STARTED. ..... ",

                                                    Toast.LENGTH_LONG).show();
            }
```

```
        @Override
        public boolean shouldOverrideUrlLoading(WebView view, String url) {
            Toast.makeText(getApplicationContext(),url,Toast.LENGTH_LONG).show(); return
            super.shouldOverrideUrlLoading(view, url);
        }

        @Override
        public void onPageFinished(WebView view, String url) {
            super.onPageFinished(view, url);
Toast.makeText(getApplicationContext(),"PAGE LOADING FINISHED",
                                                    Toast.LENGTH_LONG).show();
        }
    });

    wview.getSettings().setJavaScriptEnabled(true); wview.getSettings().setBuiltInZoomControls(true);
    wview.addJavascriptInterface(this,"myinterface");
    }
    @JavascriptInterface
    public void displayMsg(String name,String pass){
    Toast.makeText(this, name+ "\n" +pass,Toast.LENGTH_LONG).show();

    }

  public void load(View v)
  {
     switch(v.getId())
     {
        case R.id.srch:
           EditText et1=(EditText)findViewById(R.id.et1);
           wview.loadUrl(et1.getText().toString()); break;

        case R.id.fb:
           wview.loadUrl("http://www.facebook.com");
           break;


        case R.id.google:
           wview.loadUrl("http://www.google.com"); break;

        case R.id.youtube:
           wview.loadUrl("http://www.youtube.com");
           break;
```

```
            case R.id.html:
              wview.loadUrl("file:///android_asset/login.html");
              break;
        }
    }
}
```

login.html:

```
<html>
<head>
    <script language="JavaScript">

        function login(){

        var name=document.getElementById("name").value; var
        pass=document.getElementById("pass").value;

        myinterface.displayMsg(name,pass);
        }
```

login.html:

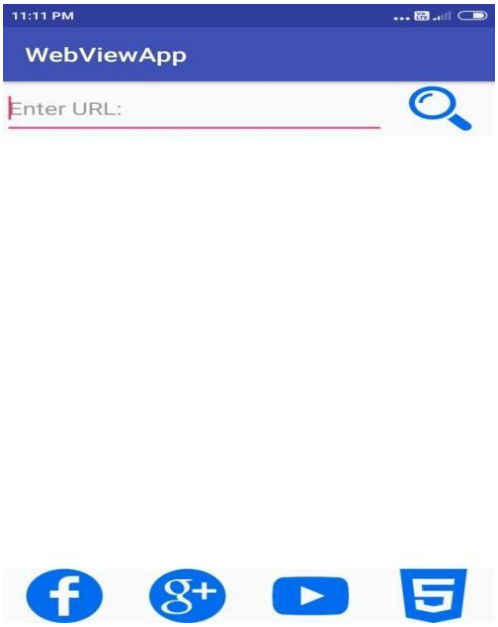
```
<html>
<head>
    <script language="JavaScript">

        function login(){
        var name=document.getElementById("name").value; var
        pass=document.getElementById("pass").value;
        myinterface.displayMsg(name,pass);
        }

    </script>
</head>
    <body bgcolor="#054" text="white">
        <center>
            <table border="1">
                <tr>
                    <td colspan="2" align="center">
                        <h3>Login Form</h3>
                    </td>
                </tr>
                <tr>
```

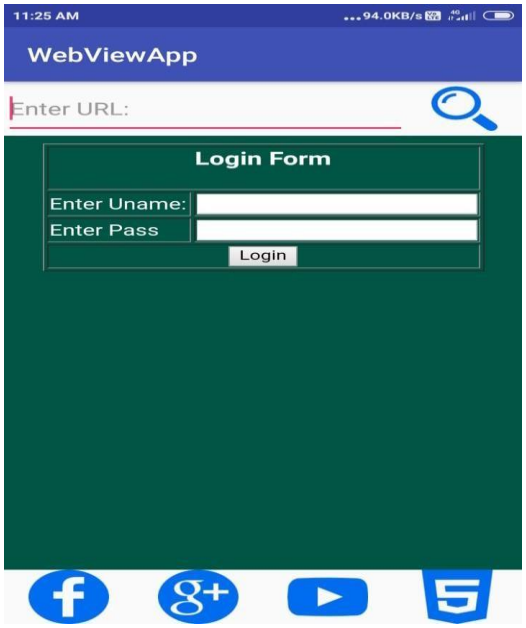
```
            <td>Enter Uname:</td>
            <td> <input type="text" id="name"/>
            </td>
        </tr>
        <tr>
            <td>Enter Pass</td>
            <td>
                <input type="password" id="pass"/>
            </td>
        </tr>
        <tr>
            <td colspan="2" align="center">
                <input type="button" value="Login" onclick="login()"/>
            </td>
        </tr>
    </table>
</center>
</body>
</html>
```

AndroidManifest.xml:

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

    <uses-permission android:name="android.permission.INTERNET"/>

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

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

OUTPUT:





Fragments:

- Fragment is one of the UI component in Android (or) fragment is a subtype of Activity.

Syntax:

```
<FrameLayout
    android:id="@+id/fram1"
    ..... />
```

- In a single Activity we can create number of fragments, each fragment is having its own lifecycle and its own UI.

Steps to create a Fragment:

- create a class with subtype of android.app.Fragment.
- Same like Activity onCreate() method in fragments onCreateView() method will be invoke first so provide the implementation for onCreateView() method.

```
public View onCreateView(LayoutInflater  inflater,
                                    ViewGroup   vgroup, Bundle b){
  View v=inflater.inflate(R.layout.xml_file, vgroup,  false);
      return v;
}
```

- we will manage fragments from Activity, use the following to code manage fragments.

```
FragmentManager    fManager=getFragmentManager();
FragmentTransaction    tx=fManager.beginTransaction();
      tx.add/replace/remove(frag_id, frag_class_obj);
      tx.commit();
```

- Fragment concept is introduced from Android 3.0 so the minimum version to use fragments is Android 3.0.

- If the UI component is available on fragment XML, we can"t configure the events using XML.

- use the View object in onCreateView() method to get the UI component from fragment XML.

-Android fragment lifecycle is affected by activity lifecycle because fragments are included in activity.

-Each fragment has its own life cycle method that is affected by activity life cycle because fragments are embedded in activity.

-The **FragmentManager** class is responsible to make interaction between fragment objects.

Android Fragment Lifecycle:

The lifecycle of android fragment is like the activity lifecycle. There are 12 lifecycle methods for fragment.

No.	Method	Description
1)	onAttach(Activity)	It is called only once when it is attached with activity.
2)	onCreate(Bundle)	It is used to initialize the fragment.

3)	onCreateView(LayoutInflater, ViewGroup, Bundle)	Creates and returns view hierarchy.
4)	onActivityCreated(Bundle)	It is invoked after the completion of onCreate() method.
5)	onViewStateRestored(Bundle)	It provides information to the fragment that all the saved state of fragment view hierarchy has been restored.
6)	onStart()	Makes the fragment visible.
7)	onResume()	Makes the fragment interactive.
8)	onPause()	Is called when fragment is no longer interactive.
9)	onStop()	Is called when fragment is no longer visible.
10)	onDestroyView()	Allows the fragment to clean up resources.
11)	onDestroy()	Allows the fragment to do final clean up of fragment state.
12)	onDetach()	It is called immediately prior to the fragment no longer being associated with its activity.

activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="0.1"
        android:text="RGMCET"
        android:textSize="30sp"
        android:gravity="center"
        android:textStyle="bold"
        android:textColor="#FFFFFF"
        android:background="#054"/>

    <FrameLayout
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="0.75"
        android:id="@+id/frag1" >
    </FrameLayout>

<HorizontalScrollView
    android:layout_width="match_parent"
    android:layout_height="0dp"
    android:layout_weight="0.15"
    android:orientation="horizontal"     >

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="horizontal"
        android:background="#054" >
```

```
<Button
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:textColor="#FFFFFF"
        android:text="HOME"
        android:onClick="home"
        android:layout_margin="5dp"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:textColor="#FFFFFF"
        android:text="COURSES"
        android:onClick="courses"
        android:layout_margin="5dp"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:textColor="#FFFFFF"
        android:text="PLACEMENTS"
        android:onClick="placements"
        android:layout_margin="5dp"/>

   <Button
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:textColor="#FFFFFF"
        android:text="FACULTIES"
        android:onClick="faculties"
        android:layout_margin="5dp"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:textColor="#FFFFFF"
        android:text="RESULTS"
        android:onClick="results"
        android:layout_margin="5dp"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
```

```
            android:textColor="#FFFFFF"
            android:text="EVENTS"
            android:onClick="events"
            android:layout_margin="5dp"/>

    </LinearLayout>

</HorizontalScrollView>

</LinearLayout>
```

Home.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="#098">


<TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textSize="30sp"
        android:text="WELCOME TO RGMCET"/>

</LinearLayout>
```

HomeFragment.java

```
package com.example.hi.fragmentapp;
import android.app.Fragment;
import android.os.Bundle;
import android.support.annotation.Nullable;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;

/**
 * Created by hi on 27-05-2021.
 */
```

```
public class HomeFragment extends Fragment{
    @Nullable
    @Override
    public View onCreateView(LayoutInflater inflater, @Nullable ViewGroup container,
Bundle savedInstanceState) {
        View v=inflater.inflate(R.layout.home, container, false); return v;
    }
}
```

courses.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="#FF0000">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textSize="30sp"
        android:text="courses"
        android:gravity="center"/>


    <Spinner
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/sp1"
        android:entries="@array/courses"
        android:layout_gravity="center">
    </Spinner>


    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="GET INFO"
```

```
        android:textSize="20sp"
        android:id="@+id/b1"
        android:textStyle="bold"
        android:layout_gravity="center"/>

</LinearLayout>
```

Strings.xml:

```
<resources>
    <string name="app_name">FragmentApp</string>
    <string-array name="courses">
        <item>-----Select --------</item>
        <item>CSE</item>
        <item>ECE</item>
        <item>EEE</item>
        <item>MCA</item>
        <item>IT</item>
        <item>CIVIL</item>
        <item>MECH</item>
        <item>MBA</item>
    </string-array>
</resources>
```

courseFragment:

```
package com.example.hi.fragmentapp;
import android.app.Fragment;
import android.os.Bundle;
import android.support.annotation.Nullable;
import android.view.LayoutInflater;
import android.view.View; import
android.view.ViewGroup; import
android.widget.Button; import
android.widget.Spinner; import
android.widget.Toast;

/**
 * Created by hi on 27-05-2021.
 */
```

```
public class CoursesFragment extends Fragment {
    @Nullable
    @Override
    public View onCreateView(LayoutInflater inflater, @Nullable ViewGroup container,
Bundle savedInstanceState) {
         View v=inflater.inflate(R.layout.courses,container,false); final
        Spinner sp1=(Spinner)v.findViewById(R.id.sp1); Button
        b1=(Button)v.findViewById(R.id.b1); b1.setOnClickListener(new
        View.OnClickListener(){
            @Override
            public void onClick(View v)  {

Toast.makeText(getActivity(),sp1.getSelectedItem().toString(),Toast.LENGTH_LONG)
.show();

            }
        });
        return v;
    }
}
```

placements.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="#941">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="placements"
        android:textSize="30sp"
        android:gravity="center"/>

</LinearLayout>
```

placementFragment:

```
package com.example.hi.fragmentapp;
import android.app.Fragment;
import android.os.Bundle;
import android.support.annotation.Nullable;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;

/**
 * Created by hi on 27-05-2021.
 */

public class PlacementFragment extends Fragment {
    @Nullable
    @Override
    public View onCreateView(LayoutInflater inflater, @Nullable ViewGroup container,
Bundle savedInstanceState) {
        View v=inflater.inflate(R.layout.placements, container, false); return v;
    }
}
```

faculties.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="#f00">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textSize="30sp"
        android:text="faculties"
        android:gravity="center"/>

</LinearLayout>
```

FacultiesFragment:

```
package com.example.hi.fragmentapp;
import android.app.Fragment;
import android.os.Bundle;
import android.support.annotation.Nullable;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;

/**
 * Created by hi on 27-05-2021.
 */

public class FacultyFragment extends Fragment {
    @Nullable
    @Override
    public View onCreateView(LayoutInflater inflater, @Nullable ViewGroup container,
Bundle savedInstanceState) {
        View v=inflater.inflate(R.layout.faculties, container, false); return v;
    }
}
```

events.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="#054">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textSize="30sp"
        android:text="events"
        android:gravity="center"/>
</LinearLayout>
```

Eventsfragment.java

```
package com.example.hi.fragmentapp;
import android.app.Fragment;
import android.os.Bundle;
import android.support.annotation.Nullable;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
/**
 * Created by hi on 27-05-2021.
 */
public class EventsFragment extends Fragment {
    @Nullable
    @Override
    public View onCreateView(LayoutInflater inflater, @Nullable ViewGroup container,
                             Bundle savedInstanceState) {
        View v=inflater.inflate(R.layout.events, container, false);
        return v;
    }
}
```

results.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="#309">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textSize="30sp"
        android:text="results"
        android:gravity="center"/>

</LinearLayout>
```

resultsFragment.java

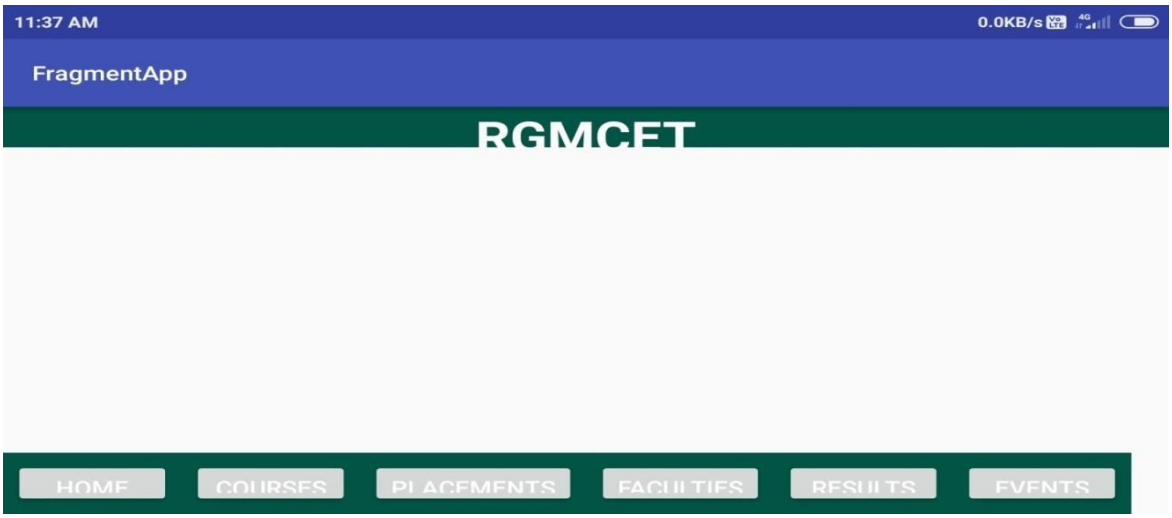
```
package com.example.hi.fragmentapp;
import android.app.Fragment;
import android.os.Bundle;
import android.support.annotation.Nullable;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
/**
 * Created by hi on 27-05-2021.
 */
public class ResultsFragment extends Fragment {
    @Nullable
    @Override
    public View onCreateView(LayoutInflater inflater, @Nullable ViewGroup container,
Bundle savedInstanceState) {

        View v=inflater.inflate(R.layout.results,container,false);
        return v;
            }
}
```

mainActivity.java

```
package com.example.hi.fragmentapp; import
android.app.FragmentManager; import
android.app.FragmentTransaction;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;

public class MainActivity extends AppCompatActivity{
FragmentManager  fManager;
FragmentTransaction tx;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main); fManager=getFragmentManager();
        /*tx=fManager.beginTransaction();
        tx.add(R.id.frag1, new HomeFragment());
        tx.commit();*/
    }
```

```
public void home(View v){ tx=fManager.beginTransaction();
        tx.replace(R.id.frag1, new HomeFragment()); tx.commit();
    }

public void courses(View v){
    tx=fManager.beginTransaction();
    tx.add(R.id.frag1, new CoursesFragment());
    tx.commit();
   }

public void faculties(View v){
    tx=fManager.beginTransaction();
    tx.add(R.id.frag1, new FacultyFragment());
    tx.commit();
}
public void results(View v){
    tx=fManager.beginTransaction();
    tx.add(R.id.frag1, new ResultsFragment());
    tx.commit();
}
public void placements(View c){
    tx=fManager.beginTransaction(); tx.add(R.id.frag1,
    new PlacementFragment()); tx.commit();
}

public void events(View v)
{
    tx=fManager.beginTransaction();
    tx.add(R.id.frag1, new EventsFragment());
    tx.commit();
   }
}
```

OUTPUT:



Storage Methods:

-Shared preferences
-SQLite DataBase
-Files[XML/JSON]

Shared Preferences:

-SPF is used to maintain the data in a **KEY, Value pairs**.
-SharedPreferences interface is used to manage SharedPreferences.
-**getSharedPreferences()** method is used to get the implementation object for Shared preferences**.**

SharedPreferences spf= getSharedPreferences("spf_name", Context.MODE_PRIVATE);

- if the SharedPreferences is not available with the specified name then it will create a new SharedPreferences.

-if the SharedPreferences is already available with the specified name then it will get the data from existing SharedPreferences.

-Following are the possible parameters to specify MODE.

Context.MODE_PRIVATE
Context.MODE_WORLD_READABLE
Context.MODE_WORLD_WRITABLE

- By using above object(spf) only we can read the data from SPF, to write the data into SPF additionally we have to create an object for SharedPreferences.Editor.

```
SharedPreferences.Editor spe=spf.edit();
spe.putXXX("key", value);          XXX-datatype
spe.commit();
```

-spf.getXXX("key","default value") method is used to read the data from SPF, if the data is available with the specified key it will return the actual value otherwise it will return the default value.

-internally SPF will maintain the data in XML file, we can explore the XML file using ADM[Android Device Monitor].

ADM >> data >> data >> pkg_name >> shared_prfs >> spf_name.xml

activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <FrameLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:id="@+id/flayout">
</FrameLayout>

</LinearLayout>
```

Login.xml:

```
<?xml  version="1.0"  encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_marginTop="5dp"
    android:layout_marginBottom="5dp"
```

```
    android:layout_marginRight="5dp"
    android:layout_marginLeft="5dp"    >

    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter username"
        android:id="@+id/l_uname" />

    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter password"
        android:id="@+id/l_pwd"
        android:inputType="textPassword"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Login"
        android:textColor="#FFFFFF"
        android:background="#054"
        android:id="@+id/l_login"
        android:layout_gravity="center"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Register"
        android:textColor="#FFFFFF"
        android:background="#054"
        android:id="@+id/l_register"
        android:layout_gravity="center"
        android:layout_marginTop="5dp"/>

</LinearLayout>
```

LoginFragment:

```
package com.android.developer.spftest; import
android.app.FragmentManager; import
android.app.FragmentTransaction; import
android.content.Context;
import android.content.SharedPreferences;
import android.os.Bundle;
```

```
import android.support.annotation.Nullable;
import android.view.LayoutInflater;
import android.view.View; import
android.view.ViewGroup; import
android.widget.Button; import
android.widget.EditText; import
android.widget.Toast;

public class LoginFragment extends android.app.Fragment { @Nullable
    @Override
    public View onCreateView(LayoutInflater inflater, @Nullable ViewGroup container,
Bundle savedInstanceState) {
        View v=inflater.inflate(R.layout.login,container,false);
        final EditText luname=(EditText)v.findViewById(R.id.l_uname); final
        EditText lupass=(EditText)v.findViewById(R.id.l_pwd); Button
        btn_login=(Button)v.findViewById(R.id.l_login);
        Button btn_register=(Button)v.findViewById(R.id.l_register); btn_login.setOnClickListener(new
        View.OnClickListener() {
            @Override
            public void onClick(View v)  {
   SharedPreferences spf=getActivity().getSharedPreferences("myspf",
                                                        Context.MODE_PRIVATE);
                String username=spf.getString("uname",null);
                String userpwd=spf.getString("upass",null);

 if(luname.getText().toString().equals(username) &&
                                        lupass.getText().toString().equals(userpwd)) { FragmentManager
                    fManager=getFragmentManager(); FragmentTransaction tx=fManager.beginTransaction();
                    tx.replace(R.id.flayout,new WelcomeFragment());
                    tx.commit();

                }
                else {
   Toast.makeText(getActivity(),"Invalid credentials", Toast.LENGTH_LONG).show();
                }

            }
        });

        btn_register.setOnClickListener(new View.OnClickListener() { @Override
            public void onClick(View v)  {
                FragmentManager fManager=getFragmentManager(); FragmentTransaction
                tx=fManager.beginTransaction();
```

```
                tx.replace(R.id.flayout,new RegisterFragment()); tx.addToBackStack("true");
                tx.commit();

            }
        });
        return v;
        //return super.onCreateView(inflater, container, savedInstanceState);
    }
}
```

register.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_marginTop="5dp"
    android:layout_marginBottom="5dp"
    android:layout_marginLeft="5dp"
    android:layout_marginRight="5dp">

    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter username"
        android:id="@+id/r_uname"
        android:textColorHint="#054"/>

    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter password"
        android:inputType="textPassword"
        android:id="@+id/r_upass"
        android:textColorHint="#054"/>

    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter email address"
        android:inputType="textEmailAddress"
        android:id="@+id/r_email"
        android:textColorHint="#054"/>
```

```
    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter mobile number"
        android:inputType="phone"
        android:id="@+id/r_mobno"
        android:textColorHint="#054"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Register"
        android:id="@+id/btn_r_register"
        android:layout_gravity="center"
        android:background="#054"
        android:textColor="#FFFFFF"/>
</LinearLayout>
```

registerFragment:

```
package com.android.developer.spftest; import
android.app.FragmentManager; import
android.app.FragmentTransaction; import
android.content.Context;
import android.content.SharedPreferences;
import android.os.Bundle;
import android.support.annotation.Nullable;
import android.view.LayoutInflater;
import android.view.View; import
android.view.ViewGroup; import
android.widget.Button; import
android.widget.EditText;

public class RegisterFragment extends android.app.Fragment { @Nullable
    @Override
    public View onCreateView(LayoutInflater inflater, @Nullable ViewGroup container,
Bundle savedInstanceState) {
        View v=inflater.inflate(R.layout.register,container,false);
        final EditText r_uname=(EditText)v.findViewById(R.id.r_uname); final
        EditText r_upass=(EditText)v.findViewById(R.id.r_upass); final EditText
        r_email=(EditText)v.findViewById(R.id.r_email); final EditText
        r_mobno=(EditText)v.findViewById(R.id.r_mobno); Button
        btn_register=(Button)v.findViewById(R.id.btn_r_register);
        btn_register.setOnClickListener(new View.OnClickListener() {
```

```
        @Override
        public void onClick(View v)  {
SharedPreferences spf=getActivity().getSharedPreferences("myspf",
                                                    Context.MODE_PRIVATE);
            SharedPreferences.Editor spe=spf.edit();
           spe.putString("uname",r_uname.getText().toString());
           spe.putString("upass",r_upass.getText().toString());
           spe.putString("email",r_email.getText().toString()); spe.putLong("mno",
           Long.parseLong(r_mobno.getText().toString())); spe.commit();
            FragmentManager fManager=getFragmentManager(); FragmentTransaction
            tx=fManager.beginTransaction(); tx.replace(R.id.flayout,new
            LoginFragment()); tx.commit();


        }
    });
    return v;
    //return super.onCreateView(inflater, container, savedInstanceState);
  }
}
```

Welcome.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="WELCOME TO"
        android:textSize="40sp"
        android:textColor="#FF00"
        android:layout_gravity="left" />

    <TextView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:text="RGMCSE DEPT"
        android:gravity="right"
        android:textSize="40sp"
        android:textColor="#708090"/>
</LinearLayout>
```

WelcomeFragment:

```
package com.android.developer.spftest;
import android.os.Bundle;
import android.support.annotation.Nullable;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;

public class WelcomeFragment extends android.app.Fragment { @Nullable
    @Override
    public View onCreateView(LayoutInflater inflater, @Nullable ViewGroup container,
Bundle savedInstanceState) {
        View v=inflater.inflate(R.layout.welcome,container,false);
        return v;
        //return super.onCreateView(inflater, container, savedInstanceState);
    }
}
```

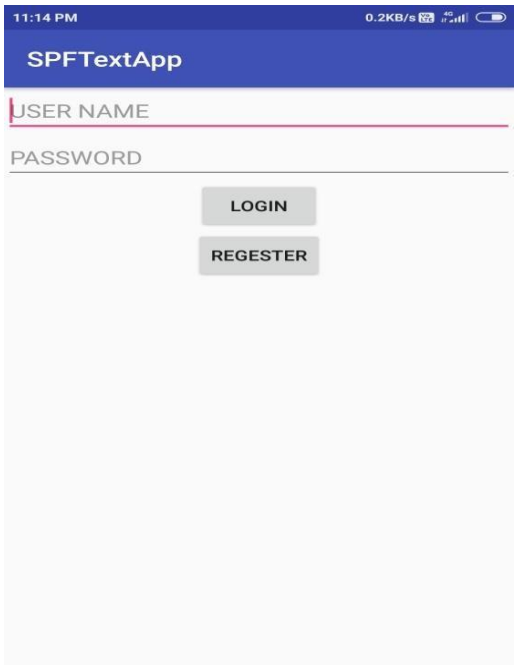
MainActivity.java:

```
package com.example.hi.spftest;
import android.app.FragmentManager;
import android.app.FragmentTransaction;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;

public class MainActivity extends AppCompatActivity{

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main); FragmentManager
        fManager=getFragmentManager(); FragmentTransaction
        tx=fManager.beginTransaction(); tx.add(R.id.flayout,new
        LoginFragment()); tx.commit();
    }
}
```

AndroidManifest.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.android.developer.spftest">
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category
                    android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

</manifest>
```

OUTPUT:



- By using SPF we can maintain huge amount of data, but for every Value we have to specify a unique key it's difficult to assign and remember the keys that's why SPF is preferred to maintain limited data (e.g. Pattern lock key, Alarm time, login credentials …), if you want to maintain the huge amount of data Android is preferred to use SQLiteDatabase.

SQLite Database:

- SQLite Database is used to maintain structured data in Android.
- SQLiteDatabase class is used to manage SQLite database.
- openOrCreateDatabase(db_name, mode, cursor_factory) method is used to get the object for SQLiteDatabase.

SQLiteDatabase dBase=openOrCreateDatabase(db_name, mode, cursor_factory);

- SQLiteDB is providing built-in methods to perform CRUD Operations.

-insert()
-query() // read
-update()
-delete()

- Apart from builtin methods we can execute native SQL Statements by using following methods.

- execSQL(sql_query) // I U D C
- rawQuery(sql_query) // READ
- We can explore the SQLite the DB file using ADM.

ADM >> file_explorer >> data >> data >> pkg_name >>database >> file_name.db

- To open the SQLite db file we use SQLite browser.

Caused by: android.database.sqlite.SQLiteException: table employee already exists (code 1):,
While compiling: create table employee (id number, name varchar (50),
desig varchar(50), dept varchar(50))

Read Operation:

```
public void read(View v){
/*query(String table, String[] columns, String selection, String[] selectionArgs, String groupBy, String having, String orderBy)*/
Cursor c=dBase.query("employee",null,null,null,null,null,null);
        while(c.moveToNext()) {
        int id=c.getInt(0);
```

```
        String   name=c.getString(1);   String
        desig=c.getString(2);           String
        dept=c.getString(3);
        Toast.makeText(MainActivity.this,id+"\n"+name+"\n"+desig+"\n" +dept,
                                                    Toast.LENGTH_LONG).show();
                }
        }
```

Update Operation:

```
public void update(View v){
/*String table, ContentValues values, String whereClause, String[] whereArgs*/ ContentValues
cv=new ContentValues(); cv.put("name",et2.getText().toString());
cv.put("desig",et3.getText().toString());
int count=dBase.update("employee", cv,"id=? and dept=?",
                        new String[]{et1.getText().toString(),et4.getText().toString()});
if(count>0){
Toast.makeText(MainActivity.this,"Record is updated..",
                                                    Toast.LENGTH_LONG).show();
et1.setText(""); et2.setText("");et3.setText(""); et4.setText("");          }
else{
Toast.makeText(MainActivity.this,"Failed to
                                        update.. ", Toast.LENGTH_LONG).show();  }
}
```

Delete Operation:

```
int count=dBase.delete("employee","id=?", new String[]{et1.getText().toString()});
```

activity_main.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
   xmlns:android="http://schemas.android.com/apk/res/android"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   android:orientation="vertical">

    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter ID"
        android:id="@+id/et1"/>
```

```
    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="ENTER NAME"
        android:id="@+id/et2"/>

    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="DESIG"
        android:id="@+id/et3" />

    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="DEPT"
        android:id="@+id/et4"/>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">

       <Button
            android:layout_width="odp"
            android:layout_height="wrap_content"
            android:text="INSERT"
            android:onClick="insert"
            android:layout_weight="0.5"/>

       <Button
            android:layout_width="odp"
            android:layout_height="wrap_content"
            android:text="READ"
            android:onClick="read"
            android:layout_weight="0.5"/>

    </LinearLayout>


<LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="horizontal">
```

```
        <Button
                android:layout_width="odp"
                android:layout_height="wrap_content"
                android:text="UPDATE"
                android:onClick="update"
                android:layout_weight="0.5"/>

            <Button
                android:layout_width="odp"
                android:layout_height="wrap_content"
                android:text="DELETE"
                android:onClick="delete"
                android:layout_weight="0.5"/>
            </LinearLayout>

    <ListView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:id="@+id/lview">

</ListView>

</LinearLayout>
```

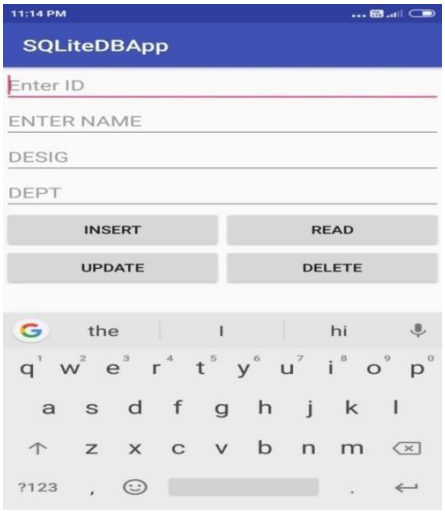
mainActivity.java:

```
package com.example.hi.sqlitedbapp; import
android.content.ContentValues; import
android.content.Context; import
android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.os.AsyncTask;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.ArrayAdapter; import
android.widget.EditText; import
android.widget.ListView; import
android.widget.Toast;
import org.w3c.dom.Text;
import java.util.ArrayList;
import static android.content.Context.MODE_PRIVATE;
```

```
public class MainActivity extends AppCompatActivity{
    EditText et1, et2, et3, et4;
    SQLiteDatabase dBase;
    ListView lview; @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        et1 = (EditText) findViewById(R.id.et1); et2 =
        (EditText)    findViewById(R.id.et2);    et3    =
        (EditText)    findViewById(R.id.et3);    et4    =
        (EditText) findViewById(R.id.et4);

       dBase = openOrCreateDatabase("empdb", Context.MODE_PRIVATE, null);
        dBase.execSQL("create table if not exists tbemp (empid number,
empname varchar(100),empdesig varchar(100),empdept varchar(100))");
        lview = (ListView) findViewById(R.id.lview);
    }
    public void insert(View v)  {
        ContentValues cv = new ContentValues();
        // dBase.insert("employee",null,Integer.parseInt(et1.getText().toString());

       cv.put("empid", et1.getText().toString());
        cv.put("empname", et2.getText().toString()); cv.put("empdesig",
        et3.getText().toString()); cv.put("empdept", et4.getText().toString());
                                                                long status=
dBase.insert("tbemp", null, cv);
        if (status != -1) {
             Toast.makeText(MainActivity.this, "Data Insereted", Toast.LENGTH_LONG).show();
            et1.setText("");
            et2.setText("");
            et3.setText("");
            et4.setText(""); read(v);
        } else {
            Toast.makeText(MainActivity.this, "Fails To Inserted", Toast.LENGTH_LONG).show();
        }
    }
    public void read(View v)  {
        Cursor c=dBase.query("tbemp",null,null,null,null,null,null); ArrayList<String> list =
        new ArrayList<>();
        while (c.moveToNext()) {
            String msg = c.getInt(0) + "|" + c.getString(1) + "|" + c.getString(2) + "|" + c.getString(3);
            list.add(msg);
        }
```

```
        ArrayAdapter<String> adapter = new ArrayAdapter<String>(this,
android.R.layout.simple_list_item_single_choice, list);

        lview.setAdapter(adapter);
    }

    public void update(View v)  {
        ContentValues cv = new ContentValues();
        cv.put("empname", et2.getText().toString());
        cv.put("empdesig", et3.getText().toString());
        cv.put("empdept",et4.getText().toString());

       int status = dBase.update("tbemp", cv, "empid=?", new String[]{et1.getText().toString()});
        if(status > 0) {
            Toast.makeText(MainActivity.this, "Success", Toast.LENGTH_LONG).show();
        } else {
             Toast.makeText(MainActivity.this, "FAIL", Toast.LENGTH_LONG).show();
        }
    }

    public void delete(View v){
        int status = dBase.delete("tbemp", "empid=?", new  String[]{et1.getText().toString()});
        if(status > 0){

Toast.makeText(MainActivity.this,"SUCCESS",Toast.LENGTH_LONG).show();
        }else{
              Toast.makeText(MainActivity.this, "UNSUCCEFUL",Toast.LENGTH_LONG).show();
        }
    }
}
```

OUTPUT:



Android Telephony:

- SMS
- Calls
- Emails
    - Builtin Activity
    - Java Mail API

SMS: - android.telephony.SmsManager class is used to send text messages in Android.

```
SmsManager sManager=SmsManager.getDefault();

sManager.sendTextMessage(rec_num, send_num, message,
                                        sent_intent, delevery_intent);
```

permission :

```
<uses-permission
        android:name="android.permission.SEND_SMS"/>
```

Call:

-for making calls android is providing builtin activity use implicit intents to call builtin Activity.

```
Intent i=new Intent();
i.setAction(Intent.ACTION_CALL);
i.setData(Uri.parse("tel:"+number)); startActivity(i);
```

permission :

```
<uses-permission
        android:name="android.permission.CALL_PHONE" />
```

E-mail (builtin Activity) :

- for sending an email android is providing a builtin activity use implicit intents to call builtin Activity.

```
Intent i=new Intent();
```

```
i.setAction(Intent.ACTION_SEND); i.putExtra(Intent.EXTRA_EMAIL,
new
                                                String[]{m1,m2,m3..});
i.putExtra(Intent.EXTRA_SUBJECT,"subject_here");
i.putExtra(Intent.EXTRA_TEXT,"text_here");
i.putExtra(Intent.EXTRA_STREAM, uri_object);
i.setType("message/rfc822");              //enable MIME .
      startActivity(i.createChooser(intent_obj,"message here"));
```

permissions :

```
<uses-permission
        android:name="android.permission. INTERNET/>
```

Attachment functionality:

- Android is providing a builtin Activity to show the list of files, use implicit intents to call builtin Activity.

```
Intent i=new Intent();
i.setAction(Intent.ACTION_GET_CONTENT);
i.setType("*/*");
startActivityForResult(intent_obj, request_code(int));
```

- In the above method if we specify the second parameter (request_code)>=0 after the next Activity is completed (after selecting a file) it will invoke onActivityResult() method in the current activity class.

```
public void onActivityResult(int req_code, int res_code, Intent i){
    Uri u=i.getData();
    }
```

By using builtin Activity we can"t send an email in the background, user has to select any one of the email client for sending an email, if you want to send an email in the background without any user interaction use JavaMail API.

First add these permissions in Manifest File:

```
<uses-permission android:name="android.permission.SEND_SMS"/>

<uses-permission
      android:name="android.permission.READ_PHONE_STATE"/>
```

```
<uses-permission android:name="android.permission.CALL_PHONE"/>

<uses-permission android:name="android.permission.INTERNET"/>

<uses-permission
        android:name="android.permission.READ_EXTERNAL_STORAGE"/>
```

Go to Activity_main.XML file:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

<EditText
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Enter Mobile Num"
    android:id="@+id/et1"/>

   <EditText
       android:layout_width="match_parent"
       android:layout_height="wrap_content"
       android:hint="Enter Message"
       android:id="@+id/et2" />

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">

        <Button
            android:layout_width="odp"
            android:layout_height="wrap_content"
            android:layout_weight="0.5"
            android:text="SEND SMS"
            android:onClick="sendSms" />

        <Button
            android:layout_width="odp"
            android:layout_height="wrap_content"
            android:layout_weight="0.5"
            android:text="CALL"
```

```
            android:onClick="call" />
    </LinearLayout>

    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/et3"
        android:hint="Enter Mail id"/>

  <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/et4"
        android:hint="Enter Subject" />

  <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/et5"
        android:hint="Enter Message"/>

 <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="ATTACH"
        android:onClick="attach"
        android:layout_gravity="right"/>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">

        <Button
            android:layout_width="odp"
            android:layout_height="wrap_content"
            android:layout_weight="0.5"
            android:text="SEND MAIL"
            android:onClick="send_mail"/>

        <Button
            android:layout_width="odp"
            android:layout_height="wrap_content"
            android:layout_weight="0.5"
            android:text="JAVA MAIL"
            android:onClick="java_mail"/>
```

```
        </LinearLayout>
</LinearLayout>
```

Now create two Activity XML files.

1) **Goto java folder and rightclick on folder →new →Activity →select Empty Activity and provide name**

Activity_delivary.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
  android:orientation="vertical">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Message Delivered"
        android:textSize="30sp"/>

</LinearLayout>
```

DelivaryActivity.java:

```
package com.example.hi.telephonetextapp;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;

public class DelivaryActivity extends AppCompatActivity {

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

2) **Goto java folder and rightclick on folder →new →Activity →select Empty Activity and provide name**

Activity_send.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
   xmlns:android="http://schemas.android.com/apk/res/android"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   android:orientation="vertical">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Message Send"
        android:textSize="30sp"/>

</LinearLayout>
```

SendActivity.java:

```
package com.example.hi.telephonetextapp;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;

public class sendActivity extends AppCompatActivity{

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

MainActivity.Java

```
package com.example.hi.telephonetextapp;
import android.app.PendingIntent; import
android.content.Intent; import
android.net.Uri;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.telephony.SmsManager;
import android.view.View;
import android.widget.EditText;
```

```
public class MainActivity extends AppCompatActivity{
    EditText et1,et2;

        @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        et1=(EditText)findViewById(R.id.et1); et2=(EditText)findViewById(R.id.et2);
    }

  public void sendSms(View v)
    {
        SmsManager sManager=SmsManager.getDefault(); Intent
        send_intent=new Intent(this,sendActivity.class); Intent
        del_intent=new Intent(this,DelivaryActivity.class); PendingIntent
                        P_Send_Intent=PendingIntent.getActivity(this,0,send_intent,0); PendingIntent
        P_Del_Intent=PendingIntent.getActivity(this,0,del_intent,0);
    sManager.sendTextMessage(et1.getText().toString(),null,et2.getText().toString(),
                                                                P_Send_Intent, P_Del_Intent);
    }

   public void call(View v)
    {
        Intent i=new Intent(); i.setAction(Intent.ACTION_CALL);
        i.setData(Uri.parse("tel:"+et1.getText().toString()));
        startActivity(i);
    }
    public void attach(View v){ Intent
        i=new Intent();
        i. setAction(Intent.ACTION_GET_CONTENT);
        i.setType("*/*"); startActivityForResult(i,123);

    }
         Uri u;
    @Override
    protected void onActivityResult(int requestCode, int resultCode, Intent data){
        super.onActivityResult(requestCode, resultCode, data); if(resultCode==RESULT_OK){
            u=data.getData();
        }
    }
```

```
public void send_mail(View v){
        EditText et3=(EditText)findViewById(R.id.et3); EditText
        et4=(EditText)findViewById(R.id.et4); EditText
        et5=(EditText)findViewById(R.id.et5); Intent i=new
        Intent(); i.setAction(Intent.ACTION_SEND);
        i.putExtra(Intent.EXTRA_EMAIL,new String[]{et3.getText().toString()});
        i.putExtra(Intent.EXTRA_SUBJECT,et4.getText().toString());
        i.putExtra(Intent.EXTRA_TEXT, et5.getText().toString());
        i.putExtra(Intent.EXTRA_STREAM, u);
        i.setType("message/rfc822"); startActivity(i.createChooser(i,"Select any
        Email Client"));
    }
}
```

OUTPUT:

UNIT-IV

UNIT-IV:

Multimedia in Android: Media Player, Video View, Audio Recording, Video recording, Camera, Gallery. **Service:** Service, Service lifecycle methods.

Android Media :

- **MediaPlayer**
- **VideoView**
- **AudioRecording**
- **VideoRecording**
- **Camera & Gallery**

Media Player:

- android.media.MediaPlayer class is used to play audio files in Android.
- we can get the audio file from 3 different sources.
  - **apk**
  - **Storage [internal / external]**
  - **network**

apk: [res >> raw >> audio_file.mp3 ..]

```
MediaPlayer mPlayer = MediaPlayer.create(context, R.raw.audio_file);
```

Storage: | network :

1)
```
MediaPlayer mPlayer=new MediaPlayer();
mPlayer.setFileUri(Context, Uri_Object);
```

2)
```
MediaPlayer mPlayer=new MediaPlayer();
mPlayer.setDataSource(Context, Uri_Object);
```

3)
```
MediaPlayer mPlayer=new MediaPlayer();
mPlayer.prepair();
```

network:

1)
```
MediaPlayer mPlayer=new MediaPlayer();
mPlayer.setDataSource ("network_url");
```

2)
```
MediaPlayer mPlayer=new MediaPlayer();
mPlayer.setDataSource(audio_file_url);
```

2)
```
MediaPlayer mPlayer=new MediaPlayer();
mPlayer.prepair();
```

-following are the major methods in MediaPlayer class:

- **-start()**
- **-seekTo(int)**
- **-setDataSource()**
- **-pause()**
- **-getCurrentPosition()**
- **-prepare()**
- **-stop()**
- **-getDuration()**
- **-reset()**

Handler:

- Android.os.Handler class is used to execute a process continuously for the specified time interval.

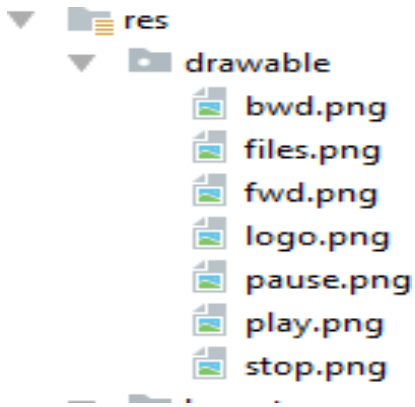
- Internally Handler is a spate thread, we can communicate with activity Thread.

```
Inside init(){
android.os.Handler handler=newHandler();
handler.postDelayed(new Runnable(){
        public void run() {
                // logic toexecute;
              Handler.postDelayed(this, duration(milli-seconds); Sbar.setprogress(mp.getcurrentPosition());
              //cycle
                    }
                        }, delay_milli_seconds);
```

Setting Image:

```
MediaMetadataRetriever  mr=new MediaMetadataRetriever();
Uri u= Uri.parse("android.resource://com.example.hi.mediaplayer/raw/dj"));
          byte[] im_data=mr.getEmbeddedPicture();
  Bitmap bmp= BitmapFactory.decodeByteArray(im_data, 0, im_data.length);
           iview.setImageBitmap(bmp);
```

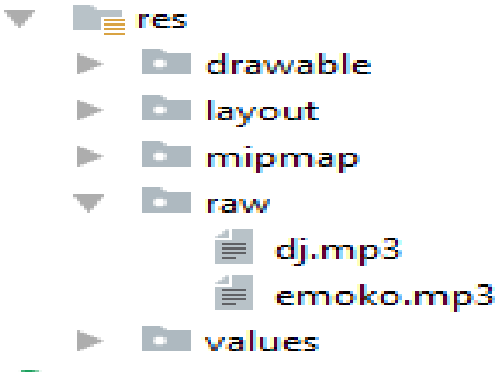
--First download the all media player images like **logo image, backword image, play image, forward image, pause image, stop image and files image. These images download with png format.**



-Next you create one folder, the folder name is "raw"

-Go to res folder >> new >> Android resource directory >> now open the dialogue box >> choose resource type to raw folder give directory name to "raw" then click on Ok Button.

-After **creating raw** folder you can copy any one mp3 file in your device and place with in raw folder.



activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

   <ImageView
        android:layout_width="match_parent"
        android:layout_height="0dp"
```

```
        android:layout_weight="0.6"
        android:src="@drawable/logo"
        android:id="@+id/iview1"/>

        <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="0.1"
        android:orientation="horizontal">

        <TextView
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:text="Cur Pos:"
            android:textSize="15sp"
            android:gravity="left"
            android:id="@+id/cp"
            android:textStyle="bold"
            android:layout_weight="0.5" />

        <TextView
            android:textStyle="bold"
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:text="Tot Dur:"
            android:textSize="15sp"
            android:gravity="right"
            android:id="@+id/td"
            android:layout_weight="0.5"/>
    </LinearLayout>

    <SeekBar
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="0.1"
        android:id="@+id/s1" />

   <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="0.2"
        android:orientation="horizontal">

        <ImageView
            android:layout_width="0dp"
            android:layout_height="match_parent"
```

```
        android:layout_weight="0.16"
        android:src="@drawable/bwd"
        android:id="@+id/bwd"
        android:onClick="media"
        android:padding="5dp" />

    <ImageView
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.16"
        android:src="@drawable/play"
        android:id="@+id/play"
        android:onClick="media"
        android:padding="5dp" />

    <ImageView
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.16"
        android:src="@drawable/pause"
        android:id="@+id/pause"
        android:onClick="media"
        android:padding="5dp" />

    <ImageView
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.16"
        android:src="@drawable/stop"
        android:id="@+id/stop"
        android:onClick="media"
        android:padding="5dp" />

    <ImageView
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.16"
        android:src="@drawable/fwd"
        android:id="@+id/fwd"
        android:onClick="media"
        android:padding="5dp" />

    <ImageView
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.16"
```

```
            android:src="@drawable/files"
            android:id="@+id/files"
            android:onClick="media"
            android:padding="5dp" />

    </LinearLayout>

</LinearLayout>
```

MainActivity.java:

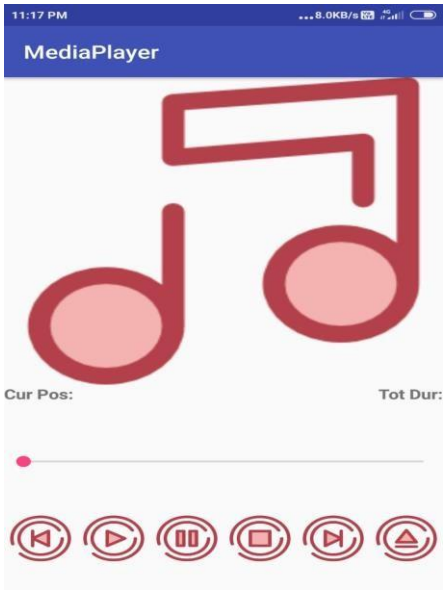
```
package com.example.hi.mediaplayer;
import android.content.Intent; import
android.graphics.Bitmap;
import android.graphics.BitmapFactory;
import android.media.MediaMetadata;
import android.media.MediaMetadataRetriever;
import android.media.MediaPlayer;
import android.net.Uri;
import android.os.Handler;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.ImageView;
import android.widget.SeekBar;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity{
    SeekBar s1;
    TextView cp,td;
    MediaPlayer mPlayer;
    Uri u;
    ImageView      iview;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        s1=(SeekBar)findViewById(R.id.s1); cp=(TextView)findViewById(R.id.cp);
        td=(TextView)findViewById(R.id.td);
        iview=(ImageView)findViewById(R.id.iview1);
    }
```

```
    void init(){
        if(mPlayer==null) {
            if(u==null) {
                mPlayer = MediaPlayer.create(MainActivity.this,R.raw.dj); MediaMetadataRetriever
mr=new MediaMetadataRetriever();
mr.setDataSource(MainActivity.this,Uri.parse("android.resource://com.ex
ample.hi.mediaplayer/raw/dj"));
                byte[] im_data=mr.getEmbeddedPicture();
   Bitmap bmp= BitmapFactory.decodeByteArray(im_data, 0, im_data.length);
                iview.setImageBitmap(bmp);
            }else{
                try{
                    mPlayer = new MediaPlayer();
                    mPlayer.setDataSource(MainActivity.this, u); MediaMetadataRetriever
                    mr=new MediaMetadataRetriever();
                    mr.setDataSource(MainActivity.this,u);
                    byte[] im_data=mr.getEmbeddedPicture();
      Bitmap bmp= BitmapFactory.decodeByteArray(im_data,0,im_data.length);
                    iview.setImageBitmap(bmp);
                    mPlayer.prepare();
                }
                catch(Exception e){ e.printStackTrace();
                }
            }
            td.setText("Tot Dur :" + mPlayer.getDuration());
            s1.setMax(mPlayer.getDuration()); s1.setProgress(0);
 s1.setOnSeekBarChangeListener(new SeekBar.OnSeekBarChangeListener() { @Override
            public void onProgressChanged(SeekBar seekBar, int i, boolean b) {
                        mPlayer.seekTo(i);
                        cp.setText("Cur pos:"+i);
                    }
                    @Override
                    public void onStartTrackingTouch(SeekBar seekBar)  {
                    }
                    @Override
                    public void onStopTrackingTouch(SeekBar seekBar)  {
                    }   });


            final Handler handler=new Handler(); handler.postDelayed(new Runnable()
            {
                @Override
                public void run() {
```

```
                s1.setProgress(mPlayer.getCurrentPosition()); cp.setText("Cur
                Pos:"+mPlayer.getCurrentPosition()); handler.postDelayed(this,5000);
            }
        },5000);
    }
}

public void media(View v){
    switch (v.getId()){
        case R.id.bwd:
    mPlayer.seekTo(mPlayer.getCurrentPosition()-mPlayer.getDuration()/10);
            cp.setText("Cur Pos:"+mPlayer.getCurrentPosition()); break;

        case R.id.play:
            init();
            mPlayer.start();
            break;

        case R.id.pause:
            mPlayer.pause();
            break;

        case R.id.stop:
            mPlayer.stop();
            mPlayer=null;
            init();
            break;

        case R.id.fwd:
mPlayer.seekTo(mPlayer.getCurrentPosition()+mPlayer.getDuration()/10); cp.setText("Cur
            Pos:"+mPlayer.getCurrentPosition());
            break;

        case R.id.files:
            Intent i=new Intent();
            i.setAction(Intent.ACTION_GET_CONTENT);
            i.setType("audio/*"); startActivityForResult(i,123);
            break;

    }

}
```

```
    @Override
    protected void onActivityResult(int requestCode, int resultCode, Intent data) {
        super.onActivityResult(requestCode, resultCode, data);

        if(resultCode==RESULT_OK && mPlayer!=null) {
            mPlayer.stop();
            mPlayer = null;
            u=data.getData(); init();
            mPlayer.start();
        }

    }
}
```

OUTPUT:



VideoView:

VideoView is one of the UI component in Android which is used to play video files.

xml:

```
<VideoView
        android:id="@+id/vview1"
        ...../>
```

java:

```
VideoView   vview=(VideoView)findViewById(R.id.vview1);
        vview.setVideoPath(file_url | network_url);
        vview.start();
```

For providing pause, forward, backward and seekbar functionality set the following object to VideoView.

```
vview.setMediaController(new MediaController(this));
```

Activity_main.XML File:

-Initially we select Landscap(this is available on xml design page with orientation editor icon).

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="horizontal">

   <VideoView
       android:layout_width="0dp"
       android:layout_height="match_parent"
       android:layout_weight="0.8"
       android:id="@+id/Vview"/>

    <LinearLayout
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.2"
        android:orientation="vertical">
        <Button
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="LIST"
            android:onClick="list"/>

        <Button
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
```

```
        android:text="START"
        android:onClick="start"/>

    </LinearLayout>

</LinearLayout>
```

MainActivity.Java:

```
package com.example.hi.videoviewapp;
import android.content.Intent;
import android.net.Uri;
import android.provider.MediaStore;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.MediaController;
import android.widget.VideoView;

public class MainActivity extends AppCompatActivity{
    VideoView Vview;
     Uri u;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Vview=(VideoView)findViewById(R.id.Vview); Vview.setMediaController(new
        MediaController(this));
    }
    public void list(View v){
        Intent i=new Intent();
        i. setAction(Intent.ACTION_GET_CONTENT);
        i.setType("video/*"); startActivityForResult(i,111);
         }
    @Override

protected void onActivityResult(int requestCode, int resultCode, Intent data){

super.onActivityResult(requestCode, resultCode, data);
        if(requestCode==RESULT_OK);
```

```
        {
            u=data.getData();
           // Vview.setVideoURI(u);
            //Vview.start();

        }
    }

    public void start(View v){
        Vview.setVideoURI(u);
        Vview.start();
    }
}
```

Manifestfile.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.hi.videoviewapp">
<uses-permission
android:name="android.permission.READ_EXTERNAL_STORAGE"/>
   <application android:allowBackup="true"
        android:icon="@mipmap/ic_launcher" android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round" android:supportsRtl="true"
        android:theme="@style/AppTheme">

       <activity android:name=".MainActivity"
                    android:screenOrientation="landscape">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER"/>
            </intent-filter>
        </activity>
    </application>
</manifest>
```

OUTPUT:

Audio Recording:

- android.media.MediaRecorder class is used to record audio and video in Android.

MediaRecorder recorder=new MediaRecorder();

- To record audio set the following properties to media recorder:

1) **recorder.setAudioSource(MediaRecorder.AudioSource.MIC);**

2) **recorder.setOutputFormat(MediaRecorder.OutputFormat.AMR_NB);**

3) **recorder.setAudioEncoder(MediaRecorder.AudioEncoder.AMR_NB);**

4) **recorder.setOutputFile("file_loc/file_name.amr");**
recorder.prepare();
recorder.start();

Permissions:

RECORD_AUDIO
WRITE_EXTERNAL_STORAGE

Note:

- Android is not providing any api support to pause record an audio, to provide pause functionality maintain the temp files and combine all these temp files into a single file when user selects stop.

Activity_main.XML File:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

<ImageView
    android:layout_width="match_parent"
    android:layout_height="0dp"
    android:layout_weight="0.7"
    android:src="@drawable/ic_keyboard_voice_black_24dp" />


<TextView
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="0.1"
        android:id="@+id/status"
        android:text="Recording status"
        android:textSize="30sp"
        android:gravity="center"
        android:textStyle="bold"
        android:textColor="#0000FF"/>

    <ImageView
        android:id="@+id/r_ivew"
        android:layout_width="60dp"
        android:layout_height="0dp"
        android:layout_weight="0.2"
        android:layout_gravity="center"
        android:src="@drawable/ic_radio_button_checked_black_24dp"
        android:onClick="record"/>

</LinearLayout>
```

MainActivity.java File:

```
import android.media.MediaRecorder;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.ImageView;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity{
    MediaRecorder recorder;
    ImageView iview;
    TextView tv1;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        iview=(ImageView)findViewById(R.id.r_ivew);
        tv1=(TextView)findViewById(R.id.status);
    }

    public void init(){
        recorder =new MediaRecorder();
        recorder.setAudioSource(MediaRecorder.AudioSource.MIC);
        recorder.setOutputFormat(MediaRecorder.OutputFormat.AMR_NB);
        recorder.setAudioEncoder(MediaRecorder.AudioEncoder.AMR_NB);
        recorder.setOutputFile("/storage/emulated/0/cse"+
                                                System.currentTimeMillis()+".amr");
        try {
            recorder.prepare();
        }catch (Exception  e){ e.printStackTrace();
        }
    }
    public void record(View v){
        if(recorder==null){ init();

iview.setImageResource(R.drawable.ic_radio_button_checked_black_24dp);
            tv1.setText("Recording is started");
            try{
                recorder.start();
            }
            catch (Exception e) {
```

```
                e.printStackTrace();
            }
        }else{
            iview.setImageResource(R.drawable.ic_brightness_1_black_24dp); tv1.setText("Record
            is stoped..");
            recorder.stop(); recorder=null;
        }

    }
}
```

Next go to APP Folder click on right -→new-→select vectorAsset

Now create three icons and paste drawable folder.

```
1 <vector xmlns:android="http://schemas.android.com/apk/res/android"
        android:width="24dp"
        android:height="24dp"
        android:viewportWidth="24.0"
        android:viewportHeight="24.0">
<path
   android:fillColor="#CC0000"
  android:pathData="M12,12m-10,0a10,10 0,1 1,20 0a10,10 0,1 1,-20 0"/>
</vector>


2 <vector xmlns:android="http://schemas.android.com/apk/res/android"
        android:width="24dp"
        android:height="24dp"
        android:viewportWidth="24.0"
        android:viewportHeight="24.0">
    <path
        android:fillColor="#0000FF"
        android:pathData="M12,15c1.66,0 2.99,-1.34 2.99,-3L15,6c0,-1.66 -
1.34,-3 -3,-3S9,4.34 9,6v6c0,1.66 1.34,3 3,3zM17.3,12c0,3 -2.54,5.1 -
5.3,5.1S6.7,15 6.7,12L5,12c0,3.42 2.72,6.23 6,6.72L11,22h2v-3.28c3.28,-
0.48 6,-3.3 6,-6.72h-1.7z"/>
</vector>


3  <vector xmlns:android="http://schemas.android.com/apk/res/android"
        android:width="24dp"
        android:height="24dp"
        android:viewportWidth="24.0"
        android:viewportHeight="24.0">
```

```
    <path
        android:fillColor="#38f820"
        android:pathData="M12,7c-2.76,0 -5,2.24 -5,5s2.24,5 5,5 5,-2.24 5,-5 -2.24,-5 -5,-5zM12,2C6.48,2 2,6.48 2,12s4.48,10 10,10 10,-4.48 10,-10S17.52,2 12,2zM12,20c-4.42,0 -8,-3.58 -8,-8s3.58,-8 8,-8 8,3.58 8,8 -3.58,8 -8,8z"/>
</vector>
```

Next add two permissions in Manifest FILE:

1) `<uses-permission android:name="android.permission.RECORD_AUDIO"/>`

2) `<uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>`

OUTPUT:

Video Recording:

- android.media.MediaRecorder class is used to record audio and video in Android.

MediaRecorder recorder=new MediaRecorder();

- To record video set the following properties to media recorder.

1) recorder.setAudioSource(MediaRecorder.AudioSource.MIC);

2) recorder.setVideoSource(MediaRecorder.VideoSource.CAMERA);

3) CamcorderProfile
profile=CamcorderProfile.get(CamcorderProfile.QUALITY_HIGH);

4)recorder.setProfile(profile);

5) recorder.setOutputFile("file_loc/file_name.mp4");

-- By using the above properties we can record video but while we are recording video we have to show the video preview to the user to show the video preview we use an advanced UI component called **SurfaceView**.

XML:

```
<SurfaceView
    android:id="@+id/sview1"
    ...../>
```

JAVA:

```
SurfaceView sview=(SurfaceView)findViewById(R.id.sview1);
```

- Directly we can't perform any operations on SurfaceView, to manage SurfaceView we have to create an object for SurfaceHolder.

```
SurfaceHolder sHolder=sview.getHolder();
recorder.setPreviewDisplay(sHolder.getSurface());
recorder.prepare()
recorder.start();
```

permissions:

-CAMERA
-RECORD_AUDIO
-WRITE_EXTERNAL_STORAGE

Activity_main.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="horizontal">

    <SurfaceView
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.8"
        android:id="@+id/sview1" />

    <LinearLayout
        android:layout_width="0dp"
        android:layout_height="match_parent"
        android:layout_weight="0.2"
        android:orientation="vertical">

        <Button
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="START"
            android:onClick="start" />

        <Button
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="STOP"
            android:onClick="stop" />

    </LinearLayout>

</LinearLayout>
```

MainActivity.java file:

```
package com.example.hi.videorecordingapp; import
android.media.CamcorderProfile; import
android.media.MediaRecorder; import
android.provider.Settings;
import android.support.v7.app.AppCompatActivity;
```

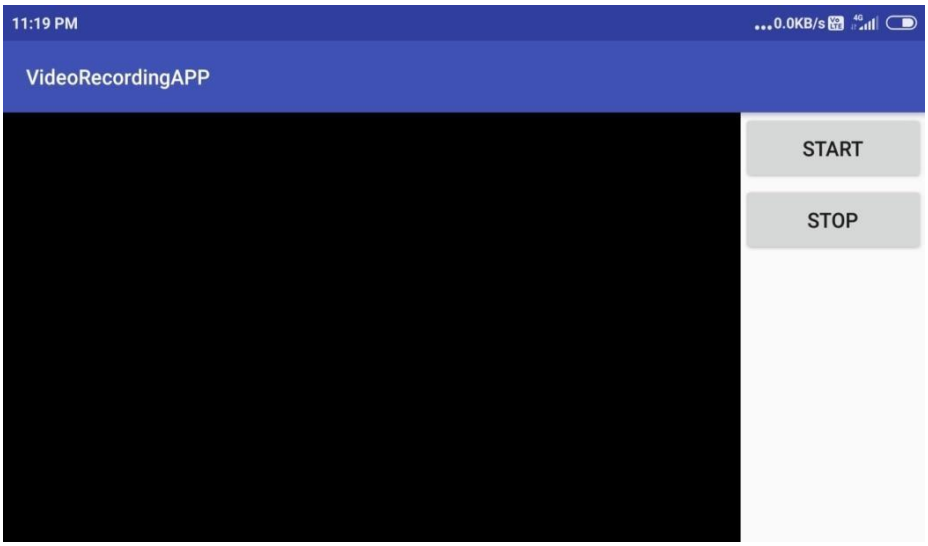
```
import android.os.Bundle;
import android.view.Surface; import
android.view.SurfaceHolder; import
android.view.SurfaceView; import
android.view.View;

public class MainActivity extends AppCompatActivity{
    MediaRecorder recorder;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }

    public void init() {
        recorder = new MediaRecorder(); recorder.setAudioSource(MediaRecorder.AudioSource.MIC);

        recorder.setVideoSource(MediaRecorder.VideoSource.CAMERA);

    CamcorderProfile profile =
                        CamcorderProfile.get(CamcorderProfile.QUALITY_HIGH);

        recorder.setProfile(profile);

recorder.setOutputFile("/storage/emulated/0/cse"+System.currentTimeMillis()
                                                                +".mp4");
SurfaceView sview=(SurfaceView)findViewById(R.id.sview1); SurfaceHolder

        sholder=sview.getHolder(); recorder.setPreviewDisplay(sholder.getSurface());

try {
            recorder.prepare();
        } catch (Exception e) { e.printStackTrace();
        }
    }

 public void start(View v)
    {
        init(); recorder.start();
    }
```

```
    public void stop(View v)
    {
        recorder.stop();
    }
}
```

AndroidMainifest.xml file:

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

    <uses-permission android:name="android.permission.CAMERA"/>
    <uses-permission
                android:name="android.permission.RECORD_AUDIO"/>
    <uses-permission
        android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity"
            android:screenOrientation="landscape">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>
```

OUTPUT:



Camera & Gallery:

Camera:

- Camera is one of the built-in Activities in Android use implicit intents to call built-in Activity.

Intent i=new Intent ("android.media.action.IMAGE_CAPTURE");

startActivityForResult(i, request_code(123));

Gallery:

- Gallery is one of the built-in Activities in Android use implicit intents to call built-in Activity.

```
Intent i=new Intent();
i.setAction(Intent.ACTION_GET_CONTENT);
i.setType("image/*"); startActivityForResult(i,
request_code(124));
```

--In the above method (SAFR()) if we specify the second parameter (request_code >=0) after the next activity is completed it will invoke onActivityResult() method in the current activity class.

```
public void onActivityResult(int request_code, int result_code)
        {
                if(request_code==123){
                        // camera capturedimage
                }else if(request_code==124)
                        {
                           // image fromgallery
                        }
        }
```

activity_main.xml file

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <ImageView
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="0.9"
        android:id="@+id/ivew1"
        android:src="@mipmap/ic_launcher_round"/>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="0.1"
        android:orientation="horizontal">

        <Button
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="0.5"
            android:text="CAMERA"
            android:onClick="camera"/>

        <Button
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="0.5"
            android:text="GALLERY"
            android:onClick="gallery"/>
```

```
    </LinearLayout>

</LinearLayout>
```

MainActivity.java file:

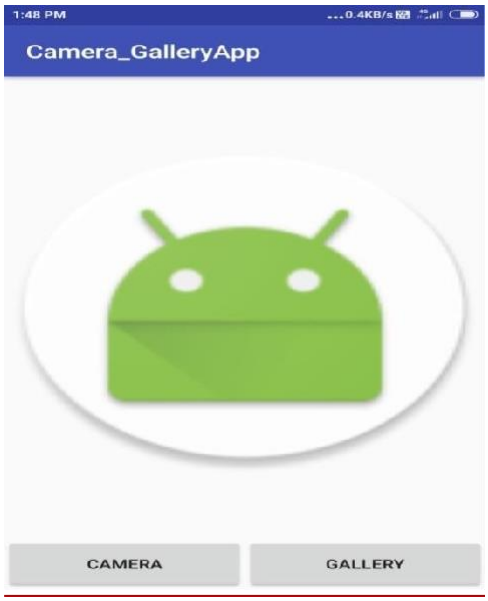
```
package com.example.hi.camera_galleryapp;
import android.content.Intent; import
android.graphics.Bitmap; import
android.net.Uri;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.ImageView;

public class MainActivity extends AppCompatActivity{

ImageView iview;

@Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        iview=(ImageView)findViewById(R.id.ivew1);
    }

public void camera(View v){
        Intent i=new Intent("android.media.action.IMAGE_CAPTURE"); startActivityForResult(i,
        111);
    }

public void gallery(View v){ Intent
        i=new Intent();
        i. setAction(Intent.ACTION_GET_CONTENT);
        i.setType("image/*");
        startActivityForResult(i,123);
    }

    @Override
    protected void onActivityResult(int requestCode, int resultCode, Intent data) {
        super.onActivityResult(requestCode, resultCode, data);
        if(requestCode==111 && resultCode==RESULT_OK){
```

```
            Object ob=data.getExtras().get("data"); Bitmap
            bmp=(Bitmap)ob;
            iview.setImageBitmap(bmp);
        }else if(requestCode==123 && resultCode==RESULT_OK){

            Uri u=data.getData();
            iview.setImageURI(u);
        }
    }
}
```

AndroidMainifest.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.hi.camera_galleryapp">
    <uses-permission android:name="android.permission.CAMERA"/>
    <uses-permission
        android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
    <application android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round" android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER"/>
            </intent-filter>
        </activity>
    </application>
</manifest>
```

OUTPUT:



Service:

- Service is one of the Component in Android.
- Service is used to used run a long background process without any user Interaction.
- Examples for service is MediaPlayer, FMPlayer, Alarm, etc..
- We can create a new service by extending android.app.Service class (or) we can access the built-in services.

Steps to create a new Service:

1. Create a class as child of android.app.Service.
2. It is an abstract class having an abstract method called onBind() so provide the implementation for onBind() method.
3. Following are the major methods in Service class.
   onCreate();
   onStartCommand();
   onDestroy();
4. When we start a service if the service is not available it will Invoke onCreate() and onStartCommand() methods.
5. If the service is already available it will invoke only onStartCommand() method.

6. When we stop service it will invoke onDestroy()method.
7. Servicedoesn‟tcontainanyUIwewillmanageservicefrom Activity using the following methods.
   i) Intent i=new Intent(context, service_name.class);
   ii) startService(i);
   iii) stopService(i);
8. Everyserviceclasswehavetoconfigureinthemanifest.xml, with the following tag inside <application> tag.

   <service android:name="pkg_name.class_name"/>

9. ByusingServiceclasswecan‟tcommunicatewithactivityUIomponents. To communicate with activity from service use IntentService.

UNIT-V

UNIT-V:

Built-in Services (Location service, Notification service, Sensor Service, WIFI Service, Bluetooth Service, Vibrator Service), Broadcast Receivers.

Builtn Services:

getSystemService(Context.SERVICE_NAME) method is used to get the builtin service into Activity.

-Location Service
-Notification Service
-Sensor Service
-WiFi Service
-Bluetooth Service
-Vibrator Service

Location Service:

- getSystemService(Context.LOCATION_SERVICE) method is used to get the builtin location service into Activity, application framework is providing a class called LocationManager to manage location service.

```
LocationManager  lManager=(LocationManager)
                 getSystemService(Context.LOCATION_SERVICE);
```

- In Android we can get the location in 2 ways.
  - GPS_Provider
  - Network_Provider

-lManager.getLastKnownLocation(LocationManager.PROVIDER_NAME)

- above method is used to get the last updated location.

-To get the current updated location we have configure the following listener to get the updated location.

```
- lManager.requestLocationUpdates(provider_name,
                min_time(ms), min_dist(meters), new LocationListener(){

        onLocationChanged(Location l)
                {
                double lati=l.getLatitude(); double
                longi=l.getLongitude();
                }
    onStatusChanged(String s, int i, Bundle bundle){ };
        onProviderEnabled(){};
        onProviderDisabled() { };
});
```

Permissions:

ACCESS_FINE_LOCATION
ACCESS_COARSE_LOCATION

Activity_Main.xml file:

```
<?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="com.example.hi.locationserviceapp.MainActivity">

    <TextView
        android:id="@+id/tv1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="TextView"
        android:textStyle="bold"
        android:textSize="30sp"
        android:gravity="center"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true"
        android:layout_marginLeft="113dp"
        android:layout_marginStart="113dp"
        android:layout_marginTop="40dp" />

    <TextView
        android:id="@+id/tv2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="TextView"
        android:gravity="center"
        android:textSize="30sp"
        android:textStyle="bold"
        android:layout_marginTop="143dp"
        android:layout_alignParentTop="true"
        android:layout_alignLeft="@+id/tv1"
        android:layout_alignStart="@+id/tv1" />

</RelativeLayout>
```

MainActivity.java:

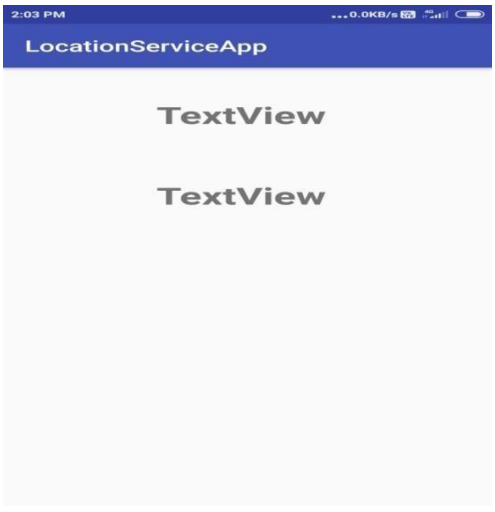
```
package com.example.hi.locationserviceapp;
import android.content.Context;
import android.location.Location;
import android.location.LocationListener;
import android.location.LocationManager;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity{
    TextView tv1, tv2;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        tv1  = (TextView) findViewById(R.id.tv1);
        tv2 = (TextView) findViewById(R.id.tv2);

        LocationManager lManager = (LocationManager)
                                    getSystemService(Context.LOCATION_SERVICE);
        lManager.getLastKnownLocation(LocationManager.NETWORK_PROVIDER);
        lManager.requestLocationUpdates(LocationManager.NETWORK_PROVIDER,
                                                    1000, 1, new LocationListener() {
            @Override
            public void onLocationChanged(Location location) {
                double lati=location.getLatitude(); double
                longi=location.getLongitude();
                tv1.setText(String.valueOf(lati));
                tv2.setText(String.valueOf(longi));
            }

            @Override
            public void onStatusChanged(String s, int i, Bundle bundle) {

            }

            @Override
            public void onProviderEnabled(String s) {

            }
            @Override
            public void onProviderDisabled(String s) {
```

```
            }
    });
    }
}
```

androidManifest.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.hi.locationserviceapp">
<uses-permission
        android:name="android.permission.ACCESS_COARSE_LOCATION"/>
 <uses-permission
            android:name="android.permission.ACCESS_FINE_LOCATION"/>
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" >
            </intent-filter>
        </activity>
    </application>
</manifest>
```

OUTPUT:



Notification Service:

- Every android device is having a notification bar/status bar we can display notifications on Notification bar using Notification Service.

- getSystemService(Context.NOTIFICATION_SERVICE) method is used to get the builtin notification service into Activity, application framework is providing a class called NotificationManager to manage notification service.

```
NotificationManager nManager=(NotificationManager)
                    getSystemService(Context.NOTIFICATION_SERVICE);

    NotificationCompact.Builder builder=new NotificationCompact.Builder(this);

     builder.setTicker("SAMPLE NOTIFICATION");
     builder.setSmallIcon(R.drawable.ic_beach_access_black_24dp);
     builder.setContentTitle("SAMPLE NOTIFICATION"); builder.setContentText("sample
     notification for RGMCET");

     Bitmap bmp= BitmapFactory.decodeResource(getResources(),
                                              R.drawable.ic_beach_access_black_24dp);
     builder.setLargeIcon(bmp);
     Intent i=new Intent(this,MainActivity.class);
     PendingIntent pIntent=PendingIntent.getActivity(this,0,i,0);
     builder.setContentIntent(pIntent); builder.setAutoCancel(true);
     //nManager.notify(1,builder.build());
    nManager.notify((int)System.currentTimeMillis(),builder.build());
```

ActivityMain.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="com.example.hi.notificationserviceapp.MainActivity">

        <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
```

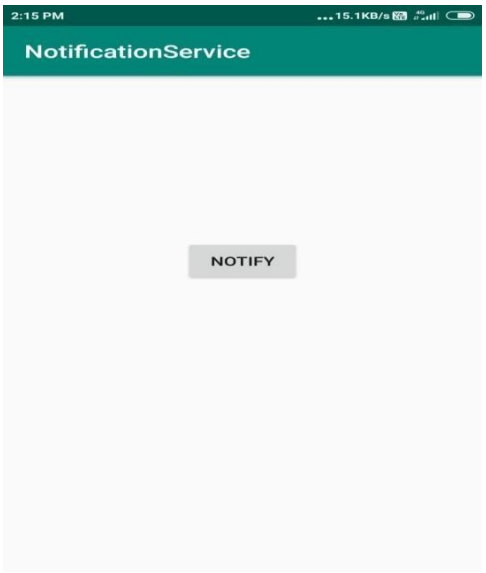
```
        android:layout_centerHorizontal="true"
        android:layout_centerVertical="true"
        android:text="NOTIFY"
        android:onClick="notify"/>

</RelativeLayout>
```

ManiActivity.java:

```
package com.example.hi.notificationserviceapp; import
android.app.NotificationManager; import
android.app.PendingIntent;
import android.content.Context; import
android.content.Intent; import
android.graphics.Bitmap;
import android.graphics.BitmapFactory;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.support.v7.app.NotificationCompat;
import android.view.View;
public class MainActivity extends AppCompatActivity {

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

    public void notify(View v){
       NotificationManager nManager=(NotificationManager)
                                        getSystemService(Context.NOTIFICATION_SERVICE);

        NotificationCompat.Builder builder=new NotificationCompat.Builder(this);

         builder.setTicker("SAMPLE NOTIFICATION");
        builder.setSmallIcon(R.drawable.ic_beach_access_black_24dp);
        builder.setContentTitle("SAMPLE NOTIFICATION"); builder.setContentText("sample
        notification for RGMCET");

        Bitmap bmp= BitmapFactory.decodeResource(getResources(),R.drawable.ic_beach_access_black_24dp);

        builder.setLargeIcon(bmp);
```

```
        Intent i=new Intent(this,MainActivity.class);
        PendingIntent pIntent=PendingIntent.getActivity(this,0,i,0);
        builder.setContentIntent(pIntent); builder.setAutoCancel(true);
        //nManager.notify(1,builder.build());
       nManager.notify((int)System.currentTimeMillis(),builder.build());

    }
}
```

OUTPUT:



SensorService:

- Based on the device capability Android supports different types of sensors like
  - **-ACCESSOLORY**
  - **-PROXIMITY**
  - **-ORIENTATION**
  - **-GYROSCOPE**
  - **-GRAVITY**

-getSystemService(Context.SENSOR_SERVICE) method is used to get the builtin sensor service into Activity, application framework is providing a class called SensorManager to manage SensorService.

```
SensorManager sManager=(SensorManager)
                    getSystemService(Context.SENSOR_SERVICE);
```

- To get the sensor events configure the following listener.

```
sManager.registerListener(new SensorListener(){ publicvoid
        onSensorChanged(float[]values){
                        }
        public void onAccuracyChanged(int accuracy){
                        }
            }, SENSOR_TYPE);
```

Activity_Main.xml file:

```
<?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="com.example.hi.sensorserviceapp.MainActivity">

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentTop="true"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="117dp"
        android:text="TextView"
        android:textSize="25sp"/>

    <TextView
        android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerHorizontal="true"
        android:layout_centerVertical="true"
        android:text="TextView"
        android:textSize="25sp"/>
</RelativeLayout>
```

MainActivity.java file:

```
package com.example.hi.sensorserviceapp;
import android.content.Context; import
android.hardware.Sensor; import
android.hardware.SensorEvent;
import android.hardware.SensorEventListener; import
android.hardware.SensorListener; import
android.hardware.SensorManager;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity{
    TextView tv1, tv2;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        tv1 = (TextView) findViewById(R.id.textView);
        tv2 = (TextView) findViewById(R.id.textView2);

SensorManager  sManager=(SensorManager)
                                        getSystemService(Context.SENSOR_SERVICE);

        sManager.registerListener(new SensorListener() { @Override
            public void onSensorChanged(int i, float[] floats) {
                tv1.setText("X Value is:"+String.valueOf(floats[0]));
                tv2.setText("Y Value is:"+String.valueOf(floats[1]));
            }
            @Override
            public void onAccuracyChanged(int i, int i1)  {

            }
        },SensorManager.SENSOR_ACCELEROMETER);
          }
    }
```

OUTPUT:

Wifi Service:

- getSystemService(Context.WIFI_SERVICE) method is used to get the built in wifi service into Activity, application framework is providing a class called WifiManager to manage wifi service.

```
WifiManager wManager=(WifiManager)getSystemService(Context.WIFI_SERVICE);
```

- wManager.getWifiState() method is used to **get the wifi state**, return type of this method is int (0- disabled, 1- disabling , 2- enabling , 3- enabled).

- wManager.setWifiEnabled(Boolean) method is used to **change the wifi state.**

- wManager.getScanResults() method is used to **get the list of available wifi devices** return type of this method is **List<ScanResult>.**

```
List<ScanResult> results=wManager.getScanResults();
for(ScanResult result:results){
        result.SSID ;          // name
         result.frequency;   // signal strength
    }
```

- wManager.getConfiguredNetworks() method is used to **get the list of connected wifi devices**.

```
List<WifiConfiguration> list=wManager.getConfiguredNetworks(); for(WifiConfiguration
    config:list)
     {
          config.SSID;        // name
          config.status;      // connected / not-connected
     }
```

permissions:

ACCESS_WIFI_STATE
CHANGE_WIFI_STATE
ACCESS_COARSE_LOCATION

Activity_Main.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    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"
    android:orientation="vertical"
    tools:context="com.example.hi.wifiapp.MainActivity">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">

        <TextView
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="0.5"
            android:text="WIFI"
            android:gravity="center"
            android:textSize="25sp"/>

        <Switch
            android:id="@+id/sw_wifi"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="0.5"/>

    </LinearLayout>
```

```
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="horizontal">

    <Button
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_weight="0.5"
        android:id="@+id/btn_get_wifi_device"
        android:text="GET_WIFI_DEVICE"
        android:onClick="getWifiDevice"/>

    <Button
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_weight="0.5"
        android:id="@+id/btn_get_paired_wifi"
        android:text="PAIRED_WIFI_DEVICE"
        android:onClick="getPairedWifiDevice"/>
</LinearLayout>

 <ListView
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:id="@+id/lview">
     </ListView>

</LinearLayout>
```

MainActivity.java file:

```
package com.example.hi.wifiapp;
import android.content.Context; import
android.net.wifi.ScanResult;
import android.net.wifi.WifiConfiguration;
import android.net.wifi.WifiManager;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.ArrayAdapter; import
android.widget.CompoundButton; import
android.widget.ListView;
import android.widget.Switch;
```

```
import java.util.ArrayList;
import java.util.List;

public class MainActivity extends AppCompatActivity{ Switch
  sw1;
    ListView lview; WifiManager
    wManager;

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

        sw1=(Switch)findViewById(R.id.sw_wifi); lview=(ListView)findViewById(R.id.lview);
        wManager=(WifiManager)getApplicationContext().getSystemService(Context.
                                                                    WIFI_SERVICE);
        int wifi_status=wManager.getWifiState();
        if(wifi_status== 0 || wifi_status== 1){
            sw1.setChecked(false);
        }
        else if(wifi_status== 2 || wifi_status== 3){
            sw1.setChecked(true);
            }

 sw1.setOnCheckedChangeListener(new
                                CompoundButton.OnCheckedChangeListener() {
              @Override
      public void onCheckedChanged(CompoundButton buttonView,
                                                        boolean isChecked) {
                  if(isChecked){
                      wManager.setWifiEnabled(true);
                  }
                  else {
                      wManager.setWifiEnabled(false);
                  }
              }
          });
    }

    public void getWifiDevice(View v){
        ArrayList<String> list=new ArrayList<>();
     ArrayAdapter adapter=new
ArrayAdapter(this,android.R.layout.simple_list_item_single_choice, list);
        lview.setAdapter(adapter); List<ScanResult>sResult=wManager.getScanResults();
```

```
        for (ScanResult item :sResult){ list.add(item.SSID +"\t\t"+
            item.frequency); adapter.notifyDataSetChanged();
        }
    }
    public void getPairedWifiDevice(View v){
        ArrayList<String>list=new ArrayList<>(); ArrayAdapter
        adapter=new ArrayAdapter(this,
                                android.R.layout.simple_list_item_single_choice, list);
                        lview.setAdapter(adapter);
        List<WifiConfiguration>wifiConfigurationList=wManager.getConfiguredNetworks(); for
        (WifiConfiguration item:wifiConfigurationList){
            list.add(item.SSID +"\t\t"+item.status); adapter.notifyDataSetChanged();
        }
    }
}
```

String.xml file:

```
<resources>
    <string name="app_name">WifiApp</string>
    <string name="wifi_name">Wifi</string>
    <string name="get_wifi_device"></string>
    <string name="paired_wifi_device"></string>
</resources>
```

androidManifest.xml file:

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

    <uses-permission
android:name="android.permission.ACCESS_WIFI_STATE"/>
    <uses-permission
android:name="android.permission.CHANGE_WIFI_STATE"/>
    <uses-permission
android:name="android.permission.ACCESS_COARSE_LOCATION"/>

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
```

```
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER">
            </intent-filter>
        </activity>
    </application>
</manifest>
```

OUTPUT:

Bluetooth:

In android there are different ways to manage Bluetooth Service one of the best approaches is manage BT service using BluetoothAdapter.

BluetoothAdapter bAdapter=BluetoothAdapter.getDefaultAdapter();

- bAdapter.isEnbaled() method is used to get the BT state, return type of this method is boolean.

- bAdapter.enable() / bAdapter.disable() methods is used to change the BT state.

- bAdapter.startDiscovery() method is used to start searching for BT devices.

- to get the list of available BT devices we have to configure a Broadcast receiver.

```
IntentFilter filter=new IntentFilter();
filter.addAction(BluetoothDevice.EXTRA_FOUND);
registerReceiver(object_of_BR, filter);
```

- If any new BT device is found it will invoke onReceive() method in BR class class MyReceiver extends BroadcastReceiver

```
{
        onReceive(Context c,Intent data){
        BluetoothDevice device=
data.getParcableExtra(BluetoothDevice.EXTRA_DEVICE); device.getName();
        device.getAddress();
    }
}
```

permissions:

-BLUETOOTH
-BLUETOOTH_ADMIN
-ACCESS_COARSE_LOCATION

Vibrate:

-getSystemService(Context. VIBRATOR_SERVICE) method is used to get the builtin Vibrator service into Activity. Application framework is providing a class called Vibrator to manage Vibrator service.

```
Vibrator vib=(Vibrator)getSystemService(Context.VIBRATOR_SERVICE);
        vib.vibrate(milli_seconds);
```

permissions:

VIBRATE

activity_Main.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical" >

    <Switch
        android:id="@+id/s1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:text="BLUETOOTH"
        android:textSize="25sp" />

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="GETBTDEVICES"
        android:onClick="getBTDevices"
        android:layout_gravity="center"
        android:textSize="25sp"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="VIBRATE"
        android:onClick="vibrate"
        android:layout_gravity="center"
        android:textSize="25sp"/>

    <ListView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:id="@+id/lview">

    </ListView>

</LinearLayout>
```

MainActivity.java file:

```
package com.example.hi.btservicesapp; import
android.bluetooth.BluetoothAdapter; import
android.bluetooth.BluetoothDevice; import
android.content.BroadcastReceiver; import
android.content.Context;
import android.content.Intent; import
android.content.IntentFilter; import
android.os.Vibrator;
import android.support.v7.app.AppCompatActivity;
import  android.os.Bundle;
import android.view.View;
import android.widget.ArrayAdapter; import
android.widget.CompoundButton; import
android.widget.ListView;
import android.widget.Switch;
import java.util.ArrayList;

public class MainActivity extends AppCompatActivity{ Switch
    s1;
    ListView lview; BluetoothAdapter
    bAdapter; @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main); s1=(Switch)findViewById(R.id.s1);
        lview=(ListView)findViewById(R.id.lview);
        bAdapter=BluetoothAdapter.getDefaultAdapter();
        s1.setChecked(bAdapter.isEnabled()); s1.setOnCheckedChangeListener(new
                                    CompoundButton.OnCheckedChangeListener() {
            @Override
            public void onCheckedChanged(CompoundButton
                                                    compoundButton, boolean b) {
                if(b) {
                    bAdapter.enable();
                }else{
                    bAdapter.disable();
                }
```

```
            }
        });
    }

    public void getBTDevices(View v){
        final ArrayList<String>list=new ArrayList<>();
        final ArrayAdapter<String>adapter=new ArrayAdapter<String>(this,
                                android.R.layout.simple_spinner_dropdown_item,list);
            lview.setAdapter(adapter);
             bAdapter.startDiscovery();
        IntentFilter filter=new IntentFilter();
        filter.addAction(BluetoothDevice.ACTION_FOUND); registerReceiver(new
        BroadcastReceiver() {
            @Override
            public void onReceive(Context context, Intent intent) {
BluetoothDevice
                    device=intent.getParcelableExtra(BluetoothDevice.EXTRA_DEVICE);
                list.add(device.getName()+"\n"+device.getAddress()); adapter.notifyDataSetChanged();
            }
        },filter);
    }

    public void vibrate(View v){
        Vibrator vib=(Vibrator)getSystemService(Context.VIBRATOR_SERVICE); vib.vibrate(10000);
    }
}
```

androidManifest.xml file

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

    <uses-permission android:name="android.permission.BLUETOOTH"/>
    <uses-permission
android:name="android.permission.BLUETOOTH_ADMIN"/>
    <uses-permission
android:name="android.permission.ACCESS_COARSE_LOCATION"/>
    <uses-permission android:name="android.permission.VIBRATE"/>

    <application android:allowBackup="true"
```

```
        android:icon="@mipmap/ic_launcher" android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round" android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER"/>
            </intent-filter>
        </activity>
    </application>
</manifest>
```

OUTPUT:

Broadcast Receiver:

- BroadcastReceiverisregisteredtogetthesystemannouncements. e.g: Charger connected/disconnected,
  Screen on/off,
  Making/receiving call,
  Headset plugin, Battery low…. etc..

Steps to work with Broadcast Receiver:

1) Create a class with subtype of android.content.BroadcastReceiver.

2) It is an abstract class having an abstract method called onReceive(), so provide the implementation for onReceive()method.

3) From Activity class for which events you want to get the broadcast announcements configure the events using IntentFilter.
(group of Intents is called as IntentFilter).

```
IntentFilter filter=new IntentFilter();
filter.addAction(Intent.ACTION_NAME);
.............
registerReceiver(obj_of_br, filter);
```

- if any one of the configured event is happened it will invoke onReceive() method in broadcast receiver.

activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<android.support.constraint.ConstraintLayout
    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" >

    <TextView
        android:id="@+id/tv1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="TEXTVIEW"
        android:textSize="40sp"
        android:textColor="#FF0000"
        tools:layout_editor_absoluteY="-2dp"
        tools:layout_editor_absoluteX="32dp" />

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

MyReceiver.java:

```
package com.example.hi.broadcastreceiverapp; import
android.content.BroadcastReceiver; import
android.content.Context;
import android.content.Intent;
import android.widget.TextView;

public class MyReceiver extends BroadcastReceiver { @Override
    public void onReceive(Context context, Intent intent) { MainActivity mActivity
        = (MainActivity) context;
        TextView tv = (TextView) mActivity.findViewById(R.id.tv1);

        if (intent.getAction().equals(Intent.ACTION_POWER_CONNECTED)) { tv.setText("POWER
                    CONNECTED");

        } else if (intent.getAction().equals(Intent.ACTION_POWER_DISCONNECTED)) {
                    tv.setText("POWER DISCONNECTED");

        } else if (intent.getAction().equals(Intent.ACTION_SCREEN_ON)) { tv.setText("SCREEN ON");

        } else if (intent.getAction().equals(Intent.ACTION_SCREEN_OFF)) { tv.setText("SCREEN OF");

        } else if (intent.getAction().equals(Intent.ACTION_AIRPLANE_MODE_CHANGED)) { tv.setText("AIRPLANE
                    MODE CHANGED");

        } else if (intent.getAction().equals(Intent.ACTION_HEADSET_PLUG)) { tv.setText("HEADSET
                    PLUGIN");
        }
    }
}
```

MainActivity.java:

```
package com.example.hi.broadcastreceiverapp;
import android.content.Intent;
import android.content.IntentFilter;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity {
```

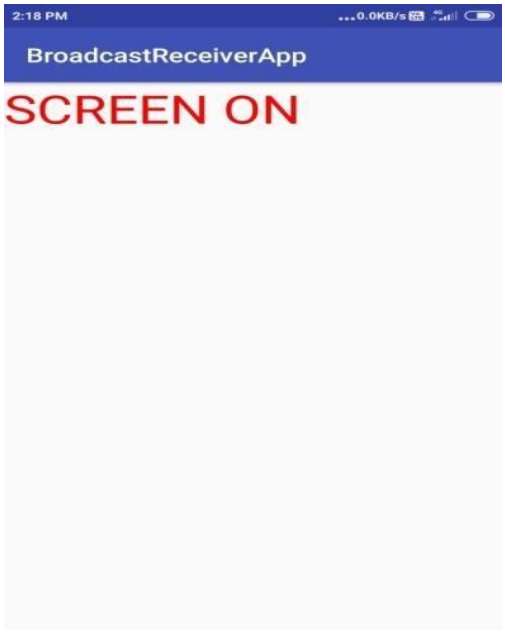
```
    TextView tv;
     @Override
     protected void onCreate(Bundle savedInstanceState) {
         super.onCreate(savedInstanceState);
         setContentView(R.layout.activity_main);
         tv=(TextView)findViewById(R.id.tv1);

         IntentFilter filter=new IntentFilter(); filter.addAction(Intent.ACTION_HEADSET_PLUG);

         filter.addAction(Intent.ACTION_POWER_CONNECTED)
;
         filter.addAction(Intent.ACTION_POWER_DISCONNECTED);

         filter.addAction(Intent.ACTION_SCREEN_ON);

         filter.addAction(Intent.ACTION_SCREEN_OFF);

         filter.addAction(Intent.ACTION_AIRPLANE_MODE_CHANGED);

         registerReceiver(new MyReceiver(), filter);
         // registerReceiver(new MyReceiver,filter);
     }
}
```

androidManifest.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.hi.broadcastreceiverapp">
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <receiver android:name="MyReceiver"/>
            <intent-filter>
                    <action android:name="android.intent.action.MAIN" />
     <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
```

```
        </activity>
    </application>
</manifest>
```

OUTPUT:



UNIT VI

UNIT-VI:

ContentProvider,DialogBoxes(Customdialog,Alertdialog,datePicker,Time Picker, Progress dialog, dialog Fragment), Google Maps.

Content Provider:

- ContentProvider is used to share the data between multiple applications [in Android one of the security feature is we can‟t access the other applications data into our application but if the application is providing content provider then we can access the data into our application, in android following builtin applications are providing content provider e.g. : contacts, callog, settings, media, calendar ..]

Steps to work with Content Provider:

1) ContentResolver class is used to get the builtin content providers into Activity, getContentResolver() method is used to get the object of ContentResolver.

```
ContentResolver resolver=getContentResolver();
```

2) resolver.query(CP_URI,…..) method is used to get the data from content provider, return type of this method is Cursor.

```
Cursor c=resolver.query(CP_URI,.....);
```

3) If the data is available in a cursor for presenting the data Android is providing an adapter called SimpleCursorAdapter.

```
SimpleCursorAdapter adapter=new SimpleCursorAdapter
                                    (context, xml_file, cursor_obj, from, to);
        ui_comp.setAdapter(adapter);
```

- **from:** String[]{DB_COLUMN1 , DB_COLUMN2}
- **to:** int[]{R.id.ui_comp1, R.id.ui_comp2}

permissions:

```
<uses-permission  android:name="android.permission.  READ_CONTACTS"/>
<uses-permission  android:name="android.permission.READ_CALLOG"/>
```

activity_Main.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
   xmlns:android="http://schemas.android.com/apk/res/android"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   android:orientation="vertical">
```

```
<ListView
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:id="@+id/lview">

</ListView>

</LinearLayout>
```

Indiview.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="NAME"
        android:id="@+id/tv1"
        android:textSize="25sp"
        android:textStyle="bold"
        android:textColor="#FF0000"
        android:gravity="center"/>

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="NUMBER"
        android:id="@+id/tv2"
        android:textSize="25sp"
        android:textStyle="bold"
        android:textColor="#F0FF"
        android:gravity="center"/>

</LinearLayout>
```

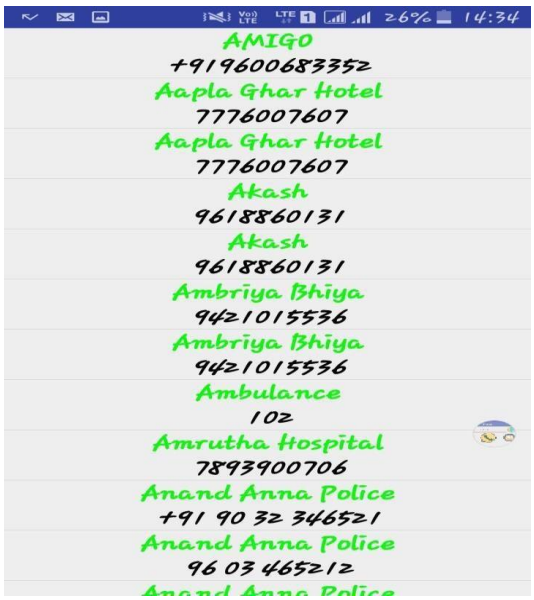
MainActivity.java file:

```
package com.example.hi.contentproviderapp; import
android.content.ContentResolver; import
android.database.Cursor;
import android.provider.ContactsContract;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.ListView;
import android.widget.SimpleCursorAdapter;

public class MainActivity extends AppCompatActivity{
     ListView lview;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        lview =(ListView)findViewById(R.id.lview);

        ContentResolver resolver=getContentResolver();
        int[] to=new int[]{R.id.tv1,R.id.tv2};
        //Cursor
c=resolver.query(ContactsContract.CommonDataKinds.Phone.CONTENT_URI,null,nul l,null,null);
        //you can test first above statement and second below statement
Cursor c=resolver.query(ContactsContract.CommonDataKinds.Phone.CONTENT_URI, null, null,
                                null, ContactsContract.CommonDataKinds.Phone.DISPLAY_NAME);

 String[] from=new String[]{ContactsContract.CommonDataKinds.Phone.DISPLAY_NAME,
                                                ContactsContract.CommonDataKinds.Phone.NUMBER}; SimpleCursorAdapter

 adapter=new SimpleCursorAdapter(this, R.layout.indiview, c, from, to);

         lview.setAdapter(adapter);
    }
}
```

androidManifest.xml file:

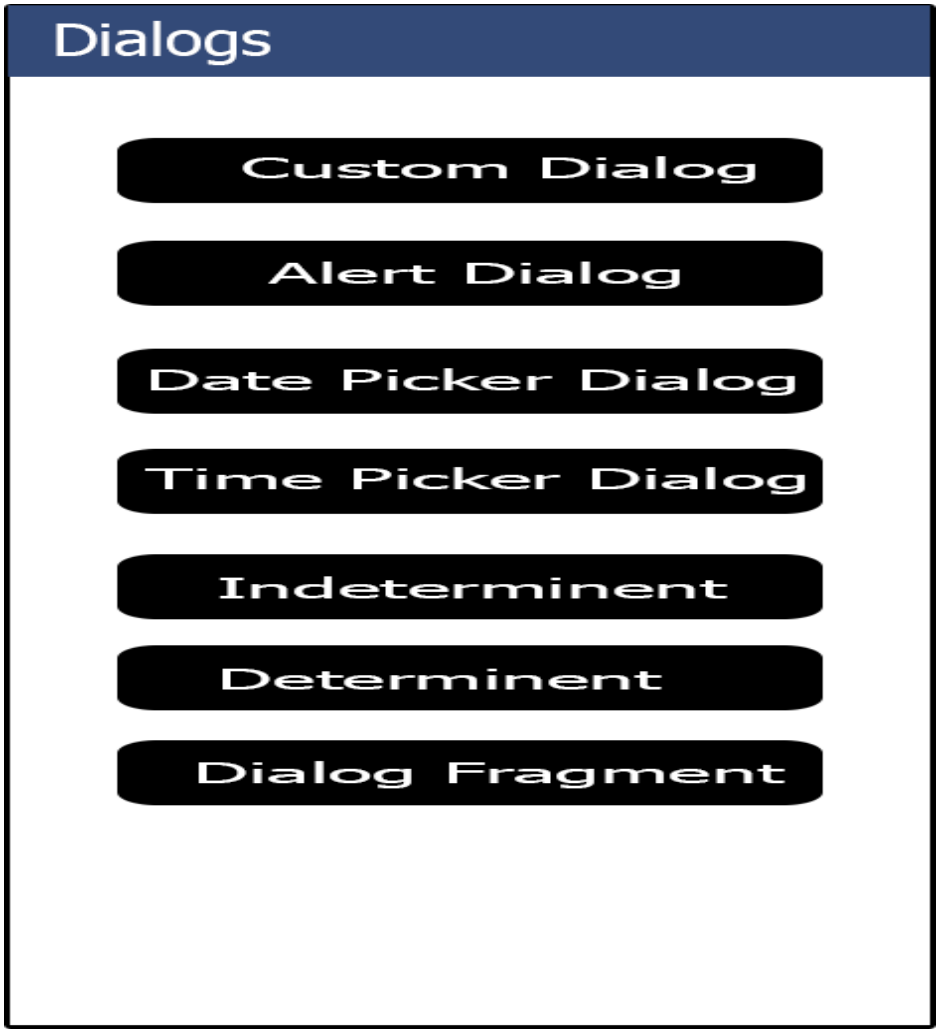
```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.hi.contentproviderapp">
<uses-permission android:name="android.permission.READ_CONTACTS"/>
    <application android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round" android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER"/>
            </intent-filter>
        </activity>
    </application>

</manifest>
```

OUTPUT:



Dialogs:

- Custom Dialog
- Alert Dialog
- DatePicker
- TimePicker
- Progress Dialog [Indeterminent / determinent]



- android.app.Dialog class is the parent for all the dialogs in Android.

Custom Dialog: - By using custom dialog we can create our own UI and we can display the UI on dialog.

Syntax:

```
Dialog d=new Dialog(activity_object);
d.setContentView(R.layout.xml_file);
d.show();
```

- If the UI component is available on Dialog XML, we can"t configure the events (e.g. : onClick) using XML, we can configure the events only by using Java.

- To get the UI component from dialog XML, use dialog object before findViewById() method.

```
Button b=(Button)d.findViewById(R.id.id_name);
```

AlertDialog:

- android.app.AlertDialog is a child of android.app.Dialog.
- AlertDialog is one of the built in dialog, with few built in functionalities like title, icon, message and max we can create 3 possible buttons [positive, negative, neutral].

```
AlertDialog.Builder builder=new AlertDialog.Builder(this);

builder.setTitle("title_here");
builder.setIcon(R.drawable.image_name);
builder.setMessage("message_here");
builder.setPositiveButton("text", listener);
builder.setNegativeButton("text", listener);
builder.setNutralButton("text", listener);
builder.show();
```

-if we click any one of the above buttons it will invoke the following listener.

```
DialogInterface.OnClickListener listener=new DialogInterface.OnClickListener(){ public void
  onClick(DialogInterface di, int what)
        {
                // what will tell the button type.
        }
};
```

DatePickerDialog:

-DatePickerDialog is a child of android.app.Dialog.
- DatePickerDialog is used to get date as input from the user.

```
DatePickerDialog dpd=new DatePickerDialog(context, listener, year, month, day); dpd.show();
```

-If we change the date it will invoke the following listener.

```
DatePickerDialog.OnDateSetListener listener=new
                                        DatePickerDialog.OnDateSetListener() {public void
    onDateChanged(int year, int month, intday)
    {
        // logic when date  changed..
    }
}
```

TimePickerDialog:

-TimePickerDialog is a child of android.app.Dialog.
- TimePickerDialog is used to get time as input from the user.

```
TimePickerDialog tpd=new TimePickerDialog(context, listener, hour,minute,
                                                    24hrs_format(Boolean));
            tpd.show();
```

-If we change the time it will invoke the following listener.

```
TimePickerDialog.OnTimeSetListener listener=new
                                        TimePickerDialog.OnTimeSetListener(){ public void
        onTimeChanged(int hour,int minute) {
                //logic when time changed..
            }
}
```

ProgressDialog:

There are 2 types of Progress dialogs.

- **Indeterminent**
- **Determinant**

- if you can‟t calculate the time, how much time it will take to complete a specific task use Indeterminent progress dialog, if you can calculate the time use determinant progress dialog.

```
ProgressDialog pDialog=new ProgressDialog(context);
pDialog.setTitle("title_here");
pDialog.setMessage("message_here");
pDialog.setIcon(R.drawble.image_name);
pDialog.setProgressStyle(ProgressDialog.STYLE_SPINNER); // Indeterminent
pDialog.setProgressStyle(ProgressDialog.STYLE_HORIZONTAL); //Determinent
      pDialog.show();
```

activity_Main.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

   <Button
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="CUSTOM DIALOG"
      android:onClick="CustomDailog"
      android:layout_gravity="center"/>

   <Button
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="ALERT DIALOG"
      android:onClick="AlertDialog"
      android:layout_gravity="center"/>

   <LinearLayout
      android:layout_width="match_parent"
      android:layout_height="wrap_content"
      android:orientation="horizontal">

     <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Date Picker Dailog"
        android:onClick="datepickerdailog"/>

     <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
```

```
        android:id="@+id/datepicker"
        android:editable="false"/>
    </LinearLayout>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">

      <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Time Picker Dailog"
        android:onClick="timepickerdailog"/>

      <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/timepicker"
        android:editable="false"/>
    </LinearLayout>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Indeterminant Progress Dailog"
        android:onClick="indeterminent"
        android:layout_gravity="center"/>

    <Button
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Determinant Progress dailog"
        android:onClick="determinent"
        android:layout_gravity="center"/>
</LinearLayout>
```

customDailog.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
```

```
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Are You Sure To Exit"
        android:textSize="25sp"/>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">

        <Button
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="0.2"
            android:id="@+id/btn_yes"
            android:text="Yes"/>

        <TextView
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="0.6"/>

        <Button
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="0.2"
            android:text="No"
            android:id="@+id/btn_no"/>
    </LinearLayout>

</LinearLayout>
```

MainActivity.java

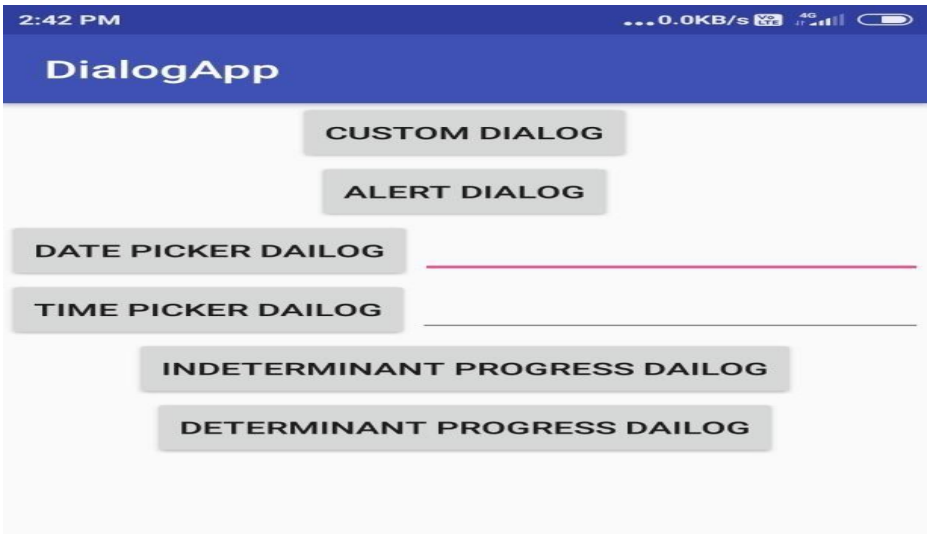
```
package com.example.hi.dialogapp; import
android.app.DatePickerDialog; import
android.app.Dialog;
import android.app.ProgressDialog; import
android.app.TimePickerDialog; import
android.content.Context; import
android.icu.util.Calendar;
```

```
import android.os.Vibrator;
import android.support.v7.app.AlertDialog;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle; import
android.view.View; import
android.widget.Button;
import android.widget.DatePicker; import
android.widget.EditText; import
android.widget.TimePicker; import
java.sql.Time;

public class MainActivity extends AppCompatActivity{

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

    public void CustomDailog(View view){
        final Dialog d=new Dialog(MainActivity.this);
        d.setTitle("Message");
        d.setContentView(R.layout.customdailog); d.show();

        Button yes_btn=(Button)d.findViewById(R.id.btn_yes); Button
        no_btn=(Button)d.findViewById(R.id.btn_no);

        yes_btn.setOnClickListener(new View.OnClickListener(){ @Override
            public void onClick(View view) {
                d.dismiss();
                System.exit(0);
            }
        });

        no_btn.setOnClickListener(new View.OnClickListener(){ @Override
            public void onClick(View view) {
                d.dismiss();
            }
        });
    }

  public void AlertDialog(View view){
      AlertDialog.Builder builder=new AlertDialog.Builder(this);
```

```
        builder.setTitle("Message"); builder.setMessage("Are You
        Suer To Exit");
        builder.setIcon(R.mipmap.ic_launcher_round);
AlertDialog.OnClickListenerlistener=new AlertDialog.OnClickListener(){ @Override
    public void onClick(DialogInterface dialogInterface, int which) {
        if(which== dialogInterface.BUTTON_POSITIVE){ dialogInterface.dismiss();
            finish();
        }else if(which== dialogInterface.BUTTON_NEGATIVE) {dialogInterface.dismiss();
        }
    }
};
            builder.setPositiveButton("YES",listener);
            builder.setNegativeButton("NO",listener);
            builder.show();

   }

  public void datepickerdailog(View view) {
DatePickerDialog.OnDateSetListener listener=new
                                                DatePickerDialog.OnDateSetListener() {
        @Overrid
 public void onDateSet(DatePicker datePicker, int year,
                                                int monthofyear, int dayofmonth) {

            EditText et=(EditText)findViewById(R.id.datepicker);
            et.setText(dayofmonth+"-"+monthofyear+"-"+year);
        }
    };

 DatePickerDialog dpd=new
                        DatePickerDialog(MainActivity.this, listener,2020,4,20);
    dpd.show();
 }
 public void timepickerdailog(View view){ java.util.Calendar
    cal=java.util.Calendar.getInstance(); final int
    hour=cal.get(java.util.Calendar.HOUR);
    final int min=cal.get(java.util.Calendar.MINUTE); TimePickerDialog
    tpd=new TimePickerDialog(this, new
                                            TimePickerDialog.OnTimeSetListener() {
        @Override
        public void onTimeSet(TimePicker timePicker, int i, int i1) { EditText
            editText2=(EditText)findViewById(R.id.timepicker); editText2.setText(i + ":"
            + i1 );
```

```
            }
        },hour,min,false); tpd.show();
    }

    public void indeterminent(View view){
        ProgressDialog pDailog=new ProgressDialog(MainActivity.this); pDailog.setTitle("Message");
        pDailog.setMessage("Please Wait while page is loading");
        pDailog.setIcon(R.mipmap.ic_launcher_round);
        pDailog.setProgressStyle(ProgressDialog.STYLE_SPINNER);
        pDailog.show();
    }

    public void determinent(View view){
        ProgressDialog pDailog=new ProgressDialog(MainActivity.this);
        pDailog.setTitle("Message"); pDailog.setMessage("Downloading");
        pDailog.setIcon(R.mipmap.ic_launcher_round);
        pDailog.setProgressStyle(ProgressDialog.STYLE_HORIZONTAL); pDailog.show();
    }
}
```

OUTPUT:



Google Maps:

1) Create a project, add google-play-services:maps as a library project.

Right click APP folder-→openmoduleSetting-→dependacy, select(+) symbol.
Clickon+symbolandchoose(Librarydependency)select
"com.google.android.gms:play-service-maps:16.1.0"

2) Create a fragment UI component in Activity xml with the following name.

```
<fragment android:name="com.google.android.gms.maps.SupportMapFragment"
……./>
```

3) Use the following code in Activity to get the SupportMapFragment into Activity.

```
SupportMapFragment frag=(SupportMapFragment)
                    getSupportFragmentManager().findFragmentById(R.id.XXX);
```

4) Get the GoogleMap object from SupportMapFragment.

```
frag.getMapAsync(new OnMapReadyCallback() { @Override
public void onMapReady(GoogleMap googleMap) {
        //write the logic, what you want to perform on GoogleMap
    }
});
```

5) To work with any Google-API we have to get an API key from Google, go through the following URL to get an API key.

http://code.google.com/apis/console

API Key:

Example Like:

AIzaSyAOeIcUosQIJD-FuZNCU0TkA-oQNWSfeZg

AIzaSyAXQpjHUvOxg97SutBJN2itPpcCBd7IwkY

6) Configure the API in manifest.xml with the following tag inside
<application> tag.

```
<meta-data
    android:name="" android:value="AIzaSyAOeIcUosQIJD-
FuZNCU0TkA-oQNWSfeZg"/>
```

7) Set the following method to GoogleMap to change the Map style.
googleMap.setMapType(GoogleMap.MAP_TYPE_SATELLITE);

8) Use the following code to place a marker (location) on a Map.

```
MarkerOptions mOption=new MarkerOptions();
mOption.position(new LatLng(lati, longi));
googleMap.addMarker(mOption);
```

9) Use the following method to apply Zoom & move the goole map to a specific location.

```
googleMap.animateCamera(CameraUpdateFactory.newLatLngZoom(new LatLng(lati,
                        longi),15f));
```

10) Use the following code to customize the icon, set the title
mOption.icon (BitmapDescriptorFactory.*fromResource*(R.drawable.***car***)); mOption.title("title here");

Activity_main.xml file:

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

<LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <fragment
        android:id="@+id/fragment"
android:name="com.google.android.gms.maps.SupportMapFragment"
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="0.9"/>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="0.1"
        android:orientation="horizontal">
```

```
 <TextView
            android:id="@+id/tv_latitude"
            android:layout_width="odp"
            android:layout_height="match_parent"
            android:layout_weight="0.5"
            android:text="Latitude"
            android:gravity="center"/>

        <TextView
            android:id="@+id/tv_longitude"
            android:layout_width="odp"
            android:layout_height="match_parent"
            android:layout_weight="0.5"
            android:text="Longitude"
            android:gravity="center"/>

    </LinearLayout>

</LinearLayout>
```

MainActivity.java:

```
package com.example.hi.googlemaptest;
import android.Manifest;
import android.content.Context;
import android.content.pm.PackageManager;
import android.location.Location;
import android.location.LocationListener; import
android.location.LocationManager; import
android.support.v4.app.ActivityCompat;
import    android.support.v4.content.ContextCompat;    import
android.support.v7.app.AppCompatActivity;                import
android.os.Bundle;
import android.widget.TextView;
import com.google.android.gms.maps.CameraUpdateFactory;
import com.google.android.gms.maps.GoogleMap;
import   com.google.android.gms.maps.OnMapReadyCallback;
import   com.google.android.gms.maps.SupportMapFragment;
import com.google.android.gms.maps.model.BitmapDescriptorFactory;
import com.google.android.gms.maps.model.LatLng;
import com.google.android.gms.maps.model.MarkerOptions;
import org.w3c.dom.Text;
public class MainActivity extends AppCompatActivity{
    SupportMapFragment smFragment;
    TextView latitude, longitude;
```

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

        latitude=(TextView)findViewById(R.id.tv_latitude);
        longitude=(TextView)findViewById(R.id.tv_longitude);

        int coarse_loc_status=
                        ContextCompat.checkSelfPermission(MainActivity.this,
                            Manifest.permission.ACCESS_COARSE_LOCATION);

    int    fine_loc_status=ContextCompat.checkSelfPermission(MainActivity.this,
                                    Manifest.permission.ACCESS_FINE_LOCATION);

    if(coarse_loc_status== PackageManager.PERMISSION_GRANTED &&
                fine_loc_status==PackageManager.PERMISSION_GRANTED) {

        }
        else { ActivityCompat.requestPermissions(MainActivity.this,
                new String[] {Manifest.permission.ACCESS_COARSE_LOCATION,
                            Manifest.permission.ACCESS_FINE_LOCATION}, 123);
        }

                        smFragment=(SupportMapFragment)     getSupportFragmentManager().
                                                        findFragmentById(R.id.fragment);

        smFragment.getMapAsync(new OnMapReadyCallback() {
            @Override
            public void onMapReady(final GoogleMap googleMap) {
    final LocationManager lManager=(LocationManager)
                                    getSystemService(Context.LOCATION_SERVICE);

lManager.getLastKnownLocation(LocationManager.NETWORK_PROVIDER);

lManager.requestLocationUpdates(LocationManager.NETWORK_PROVIDER, 1000, 1, new
                        LocationListener() {
                    @Override
          public void onLocationChanged(Location location) {
              double lati=location.getLatitude(); double
              longi=location.getLongitude();
              latitude.setText(String.valueOf(lati));
              longitude.setText(String.valueOf(longi));
```

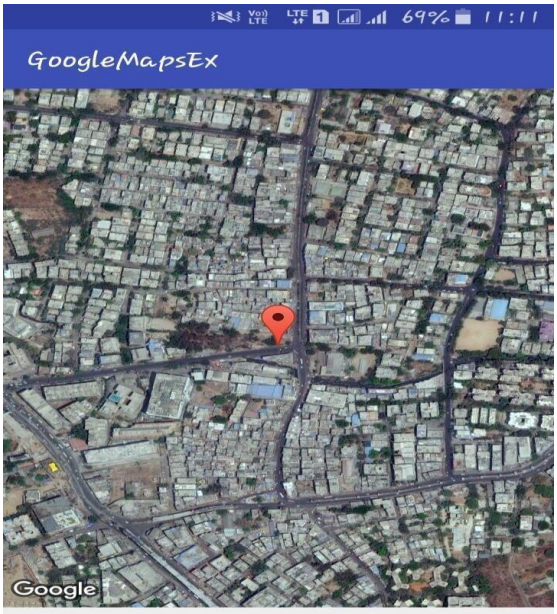
```
        MarkerOptions mOption=new MarkerOptions(); mOption.position(new
                LatLng(lati, longi));

        mOption.icon(BitmapDescriptorFactory.fromResource(R.drawable.car));
                mOption.title("Simha-9000666090"); googleMap.addMarker(mOption);

       googleMap.animateCamera(CameraUpdateFactory.newLatLngZoom(new
                                                              LatLng(lati, longi),15f));

// googleMap.setMapType(GoogleMap.MAP_TYPE_SATELLITE);

                        }

     @Override
 public void onStatusChanged(String provider, int status, Bundle extras) {

                        }

    @Override
     public void onProviderEnabled(String provider) {

                        }

      @Override
       public void onProviderDisabled(String provider) {

                        }
                    });
                }
            });
    }
}
```

androidManifest.xml file:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.android.developer.googlemaptest">
 <uses-permission
      android:name="android.permission.ACCESS_COARSE_LOCATION"/>
<uses-permission
```

```
        android:name="android.permission.ACCESS_FINE_LOCATION"/>
    <uses-permission android:name="android.permission.INTERNET"/>
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category
                    android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <meta-data
            android:name="com.google.android.geo.API_KEY"
        android:value="AIzaSyC3nGvEpq5bBVvj7ozUYx1blxFFAgY2W3Y"/>
    </application>

</manifest>
```

OUTPUT:



**********THE END **********

**********&&&&&**********