<div align="center">

Deccan Education Society's

Navinchandra Mehta Institute of Technology and Development

CERTIFICATE

</div>

This is to certify that Mr. **Pratik Vilas Mestry** of M.C.A. Semester III with Roll No. **C22078** has completed __All__ practicals of MCAL34 **Skill based Lab Mobile Computing Lab** under my supervision in this college during the year 2022-2023.

CO	R1 (Attendance)	R2 (Performance during lab session)	R3 (Innovation in problem solving technique)	R4 (Mock Viva)	R5 (Variation in implementation of learnt topics on projects)
CO1					
CO2					
CO3					
CO4					

Practical-in-charge

Head of Department
MCA Department

(NMITD)

INDEX

	2. Create an Android application to read and write content in external storage	19/10/23		
	3. Write an android program for shared preference to store value in name-value pairs.	23/10/23		
	4. Create a login form with a remember me checkbox. Save the username and password if the checkbox is checked using shared preference and show the welcome page when the login button is clicked.	23/10/23		
	5. Create an Android application to insert, update, select, and delete records from the Student table using SQLite Database.	23/10/23		
	6. Write a program to create a user registration form, after registration data will be inserted in the SQLite database, and design an activity that displays that information.	27/10/23		
	7. Create an Android application that reads all contacts stored in the device using a content provider.	27/10/23		
4	**Graphics and animation, Multimedia:** 1. Write an Android application to play, pause, and stop an audio file. 2. Write an Android application to play a video with Media controller. 3.Create an Android application to draw graphics(different shapes) on canvas. Include an option menu to display various graphics options. 4. Create an android application that applies different animations on an image. 5. Create an Android application to implement frame animation.	31/10/23 31/10/23 31/10/23 01/11/23 01/11/23		**CO2**
5	**Location Based Services:** 1. Create an Android application to display the current location of your device (display longitude and latitude values). 2. Create an Android application that displays the current location of your device from longitude and latitude values(Reverse Geocoding). 3. Create an Android application that accepts longitude and latitude from the user and marks that location on google map. 4. Create an Android application that enables and disables Wi-Fi of the phone. 5. Create an Android application that enables and disables Bluetooth of the phone.	02/11/23 02/11/23 20/11/23 20/11/23 20/11/23		**CO2**
6	**REST API integration:** 1. Create an Android application to demonstrate JSON data parsing using HTTPUrlConnection (you can use https://api.github.com/users JSON data).	21/11/23		**CO3**

	2. Create an Android application to demonstrate JSON data parsing using OkHttp (you can use https://api.github.com/users JSON data).	21/11/23		
	3. Create an Android application to demonstrate JSON data parsing using Volley(you can use https://api.github.com/users JSON data).	23/11/23		
	4. Create an Android application to demonstrate JSON data parsing using Retrofit(you can use https://api.github.com/users JSON data).	23/11/23		
7	**Introduction to Dart and Flutter:** 1. Write a Flutter program to demonstrate Text widget and its properties.	28/11/23		**CO4**
	2. Write a Flutter program to display dog names(demonstrate stateless widget and column widgets).	28/11/23		
	3. Write a Flutter program that allows the user to enter a city in a text field and displays city name(demonstrate stateful widget).	28/11/23		
	4. Write a Flutter program to change the background color(demonstrate stateful widget).	28/11/23		
	5. Write a Flutter program to demonstrate navigation(user should be navigated from first screen to second screen).	28/11/23		
	6. Write a Flutter program to design a Login form.	28/11/23		
8	**Data Handling:** 1. Write a Flutter program based on RestAPI to fetch data.	29/11/23		**CO4**
	2. Write a flutter program to demonstrate JSON serialization and Deserialization.	29/11/23		

1. Introduction to Android and it's components

1. Write a program to demonstrate activity life cycle.

The Android activity lifecycle is a series of states that an activity goes through from its creation to its destruction. The Android system manages the activity lifecycle, and developers can use callback methods to respond to state changes.

Activity lifecycle states

An activity can be in one of the following states:

- Created: The activity has been created but is not yet visible to the user.

- Started: The activity is visible to the user but has not yet received focus.

- Resumed: The activity has focus and is interacting with the user.

- Paused: The activity is still visible to the user but has lost focus.

- Stopped: The activity is not visible to the user.

- Destroyed: The activity has been destroyed and is no longer in use.

Activity lifecycle callback methods

The following callback methods are called at different points in the activity lifecycle:

- onCreate() : This method is called when the activity is first created.

- onStart() : This method is called when the activity is becoming visible to the user.

- onResume() : This method is called when the activity is gaining focus and becoming interactive with the user.

- onPause() : This method is called when the activity is losing focus or becoming non-interactive with the user.

- onStop() : This method is called when the activity is becoming invisible to the user.

- onDestroy() : This method is called when the activity is being destroyed.

Program:

MainActivity.java

package com.example.activity_life_cycle;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import android.util.Log;

public class MainActivity extends AppCompatActivity {

   @Override

```java
protected void onCreate(Bundle savedInstanceState) {

    super.onCreate(savedInstanceState);

    setContentView(R.layout.activity_main);

    Log.d("lifecycle","onCreate invoked");

}
@Override
protected void onStart() {

    super.onStart();

    Log.d("lifecycle","onStart invoked");

}
@Override
protected void onResume() {

    super.onResume();

    Log.d("lifecycle","onResume invoked");

}
@Override
protected void onPause() {

    super.onPause();

    Log.d("lifecycle","onPause invoked");

}
@Override
protected void onStop() {

    super.onStop();

    Log.d("lifecycle","onStop invoked");

}
@Override
protected void onRestart() {

    super.onRestart();

    Log.d("lifecycle","onRestart invoked");
```

```
    }
    @Override
    protected void onDestroy() {
        super.onDestroy();
        Log.d("lifecycle","onDestroy invoked");
    }
}
```

Output:

Logcat messages

When the Application has started

When the application is running in background

```
2023-10-29 22:08:08.808 14030-14063 eglCodecCommon      com.example.activity_life_cycle   E  glUtilsParamSize: unknow param 0x000082da
2023-10-29 22:08:08.933 14030-14063 EGL_emulation       com.example.activity_life_cycle   D  eglMakeCurrent: 0xe9104120: ver 3 1 (tinfo 0xe91032b0)
2023-10-29 22:08:21.883 14030-14045 zygote              com.example.activity_life_cycle   I  Debugger is no longer active
2023-10-29 22:11:42.095 14030-14030 lifecycle           com.example.activity_life_cycle   D  onPause invoked
2023-10-29 22:11:42.245 14030-14063 EGL_emulation       com.example.activity_life_cycle   D  eglMakeCurrent: 0xe9104120: ver 3 1 (tinfo 0xe91032b0)
2023-10-29 22:11:42.306 14030-14030 lifecycle           com.example.activity_life_cycle   D  onStop invoked
```

When the application is opened again

```
2023-10-29 22:13:04.718 14030-14030 lifecycle           com.example.activity_life_cycle   D  onRestart invoked
2023-10-29 22:13:04.752 14030-14030 lifecycle           com.example.activity_life_cycle   D  onStart invoked
2023-10-29 22:13:04.799 14030-14030 lifecycle           com.example.activity_life_cycle   D  onResume invoked
2023-10-29 22:13:05.473 14030-14063 EGL_emulation       com.example.activity_life_cycle   D  eglMakeCurrent: 0xe9104120: ver 3 1 (tinfo 0xe91032b0)
```

When the application is closed completely

```
2023-10-29 22:19:18.710 14362-14362 lifecycle           com.example.activity_life_cycle   D  onStop invoked
2023-10-29 22:19:18.722 14362-14362 lifecycle           com.example.activity_life_cycle   D  onDestroy invoked
```

2. Design the User Interface using Linear Layout.

Program:

activity_main.xml

```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"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="10dp"
    tools:context=".MainActivity">
    <EditText
        android:inputType="text"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="@string/to"
        android:paddingLeft="10dp"/>
    <EditText
        android:inputType="text"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="@string/subject"
        android:paddingLeft="10dp"/>
    <EditText
        android:inputType="textMultiLine"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="@string/message"
```

```xml
        android:layout_weight="1"

        android:paddingLeft="10dp"

        android:gravity="top"/>

    <Button

        android:layout_width="100dp"

        android:layout_height="wrap_content"

        android:layout_gravity="right"

        android:text="@string/button"

        app:cornerRadius="25dp"

        app:strokeColor="@color/white" app:strokeWidth="1dp"/>

</LinearLayout>
```

strings.xml

```xml
<resources>

    <string name="app_name">Linear_Layout</string>

    <string name="to">To</string>

    <string name="subject">Subject</string>

    <string name="message">Message</string><string name="button">SEND</string>

</resources>
```

Output:
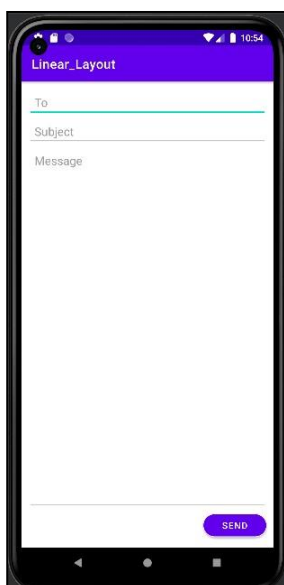
3. Design the User Interface using Relative Layout.

Program:

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:gravity="center"
    tools:context=".MainActivity">
    <ImageButton
        android:id="@+id/imageButton"
        android:layout_width="100dp"
        android:layout_height="50dp"
        android:background="@color/teal_200"
        app:srcCompat="@drawable/ic_music_play" />
    <ImageButton
        android:id="@+id/imageButton2"
        android:layout_width="100dp"
        android:layout_height="50dp"
        android:layout_above="@id/imageButton"
        android:layout_marginBottom="20dp"
        android:background="@color/teal_200"
        app:srcCompat="@drawable/ic_music_next" />
    <ImageButton
        android:id="@+id/imageButton3"
        android:layout_width="100dp"
        android:layout_height="50dp"
```

```xml
            android:layout_below="@id/imageButton"

            android:background="@color/teal_200"

            android:layout_marginTop="20dp"

            app:srcCompat="@drawable/ic_music_previous"/>

    <ImageButton

        android:id="@+id/imageButton4"

        android:layout_width="100dp" android:layout_height="50dp"

        android:layout_toLeftOf="@id/imageButton"

        android:layout_marginRight="20dp" android:background="@color/teal_200"

        app:srcCompat="@drawable/ic_music_fast_rewind"/>

    <ImageButton

        android:id="@+id/imageButton5"

        android:layout_width="100dp" android:layout_height="50dp"

        android:layout_toRightOf="@id/imageButton"

        android:layout_marginLeft="20dp"

        android:background="@color/teal_200"

        app:srcCompat="@drawable/ic_music_fast_forward"/>

</RelativeLayout>
```

Output:

4. Design the User Interface using Table Layout.
Program:

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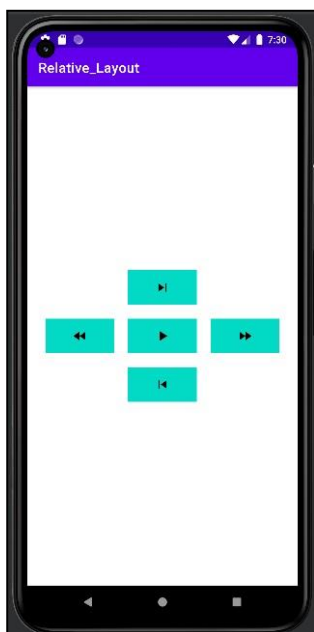
```xml
<?xml version="1.0" encoding="utf-8"?>

<TableLayout 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:layout_margin="40dp"

    tools:context=".MainActivity">

    <TableRow>

        <TextView android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:text="@string/caption"

            android:textSize="26dp"

            android:textColor="@color/purple_200"

            android:fontFamily="sans-serif-condensed-medium"/>

    </TableRow>

    <TableRow android:background="@color/teal_200">

        <TextView android:layout_width="0dp" android:padding="10dp"

            android:layout_height="wrap_content"

            android:text="Student ID"

            android:textSize="20dp"

            android:textColor="@color/purple_200"

            android:gravity="center"

            android:layout_weight="1"

            android:fontFamily="sans-serif-condensed-medium"/>

        <TextView android:layout_width="0dp" android:padding="10dp"

            android:layout_height="wrap_content"
```

```xml
            android:text="Student Name"

            android:textSize="20dp"

            android:layout_weight="1" android:gravity="center"

            android:textColor="@color/purple_200"

            android:fontFamily="sans-serif-condensed-medium"/>

        <TextView android:layout_width="0dp" android:padding="10dp"

            android:layout_height="wrap_content"

            android:text="Marks"

            android:layout_weight="1"

            android:textSize="20dp" android:gravity="center"

            android:textColor="@color/purple_200"

            android:fontFamily="sans-serif-condensed-medium"/>

</TableRow>

<TableRow>

<TextView android:layout_width="0dp" android:padding="10dp"

    android:layout_height="wrap_content"

    android:text="1"

    android:textSize="20dp"

    android:textColor="@color/purple_200"

    android:gravity="center"

    android:layout_weight="1"

    android:fontFamily="sans-serif-condensed-medium"/>

<TextView android:layout_width="0dp" android:padding="10dp"

    android:layout_height="wrap_content"

    android:text="Atharva"

    android:textSize="20dp"

    android:layout_weight="1" android:gravity="center"

    android:textColor="@color/purple_200"

    android:fontFamily="sans-serif-condensed-medium"/>
```

```xml
        <TextView android:layout_width="0dp" android:padding="10dp"

            android:layout_height="wrap_content"

            android:text="95"

            android:layout_weight="1"

            android:textSize="20dp" android:gravity="center"

            android:textColor="@color/purple_200"

            android:fontFamily="sans-serif-condensed-medium"/>

    </TableRow>

    <TableRow>

        <TextView android:layout_width="0dp" android:padding="10dp"

            android:layout_height="wrap_content"

            android:text="2"

            android:textSize="20dp"

            android:textColor="@color/purple_200"

            android:gravity="center"

            android:layout_weight="1"

            android:fontFamily="sans-serif-condensed-medium"/>

        <TextView android:layout_width="0dp" android:padding="10dp"

            android:layout_height="wrap_content"

            android:text="Deep"

            android:textSize="20dp"

            android:layout_weight="1" android:gravity="center"

            android:textColor="@color/purple_200"

            android:fontFamily="sans-serif-condensed-medium"/>

        <TextView android:layout_width="0dp" android:padding="10dp"

            android:layout_height="wrap_content"

            android:text="97"

            android:layout_weight="1"

            android:textSize="20dp" android:gravity="center"
```

```xml
            android:textColor="@color/purple_200"

            android:fontFamily="sans-serif-condensed-medium"/>

    </TableRow>

    <TableRow>

    <TextView android:layout_width="0dp" android:padding="10dp"

        android:layout_height="wrap_content"

        android:text="3"

        android:textSize="20dp"

        android:textColor="@color/purple_200"

        android:gravity="center"

        android:layout_weight="1"

        android:fontFamily="sans-serif-condensed-medium"/>

    <TextView android:layout_width="0dp" android:padding="10dp"

        android:layout_height="wrap_content"

        android:text="Jay"

        android:textSize="20dp"

        android:layout_weight="1" android:gravity="center"

        android:textColor="@color/purple_200"

        android:fontFamily="sans-serif-condensed-medium"/>

        <TextView android:layout_width="0dp" android:padding="10dp"

            android:layout_height="wrap_content"

            android:text="85"

            android:layout_weight="1"

            android:textSize="20dp" android:gravity="center"

            android:textColor="@color/purple_200"

            android:fontFamily="sans-serif-condensed-medium"/>

    </TableRow>

    <TableRow>

        <TextView android:layout_width="0dp" android:padding="10dp"
```

```xml
        android:layout_height="wrap_content"

        android:text="4"

        android:textSize="20dp"

        android:textColor="@color/purple_200"

        android:gravity="center"

        android:layout_weight="1"

        android:fontFamily="sans-serif-condensed-medium"/>

    <TextView android:layout_width="0dp" android:padding="10dp"

        android:layout_height="wrap_content"

        android:text="Yash"

        android:textSize="20dp"

        android:layout_weight="1" android:gravity="center"

        android:textColor="@color/purple_200"

        android:fontFamily="sans-serif-condensed-medium"/>

    <TextView android:layout_width="0dp" android:padding="10dp"

        android:layout_height="wrap_content"

        android:text="87"

        android:layout_weight="1"

        android:textSize="20dp" android:gravity="center"

        android:textColor="@color/purple_200"

        android:fontFamily="sans-serif-condensed-medium"/>

</TableRow>

<TableRow>

<TextView android:layout_width="0dp" android:padding="10dp"

    android:layout_height="wrap_content"

    android:text="5"

    android:textSize="20dp"

    android:textColor="@color/purple_200"

    android:gravity="center"
```

```xml
            android:layout_weight="1"

            android:fontFamily="sans-serif-condensed-medium"/>
    <TextView android:layout_width="0dp" android:padding="10dp"

            android:layout_height="wrap_content"

            android:text="Priya"

            android:textSize="20dp"

            android:layout_weight="1" android:gravity="center"

            android:textColor="@color/purple_200"

            android:fontFamily="sans-serif-condensed-medium"/>

        <TextView android:layout_width="0dp" android:padding="10dp"

            android:layout_height="wrap_content"

            android:text="99"

            android:layout_weight="1"

            android:textSize="20dp" android:gravity="center"

            android:textColor="@color/purple_200"

            android:fontFamily="sans-serif-condensed-medium"/>

    </TableRow>

    <TableRow>

        <TextView android:layout_width="0dp" android:padding="10dp"

            android:layout_height="wrap_content"

            android:text="6"

            android:textSize="20dp"

            android:textColor="@color/purple_200"

            android:gravity="center"

            android:layout_weight="1"

            android:fontFamily="sans-serif-condensed-medium"/>

        <TextView android:layout_width="0dp" android:padding="10dp"

            android:layout_height="wrap_content"

            android:text="Vaidehi" android:textSize="20dp"
```

```
          android:layout_weight="1" android:gravity="center"

          android:textColor="@color/purple_200"

          android:fontFamily="sans-serif-condensed-medium"/>

      <TextView android:layout_width="0dp" android:padding="10dp"

          android:layout_height="wrap_content"

          android:text="75" android:layout_weight="1"

          android:textSize="20dp" android:gravity="center"

          android:textColor="@color/purple_200"

          android:fontFamily="sans-serif-condensed-medium"/>

    </TableRow>

</TableLayout>
```

strings.xml

```
<resources>

    <string name="app_name">Table_Layout</string>

    <string name="caption">Student Details</string>

</resources>
```

Output:

5. Create an android application that displays an image using frame layout and when the user clicks on that image another image should be displayed on the screen.

Program:

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<FrameLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <ImageView
        android:id="@+id/img1"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:src="@drawable/img1"
        android:scaleType="fitXY"/>
    <ImageView
        android:id="@+id/img2"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:src="@drawable/img2"
        android:scaleType="fitXY"/>
</FrameLayout>
```

MainActivity.java

```java
package com.example.frame_layout1;
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.ImageView;
```

```java
public class MainActivity extends AppCompatActivity {

  ImageView img1,img2;

  @Override

  protected void onCreate(Bundle savedInstanceState) {

    super.onCreate(savedInstanceState);

    setContentView(R.layout.activity_main);

    img1=findViewById(R.id.img1);

    img2=findViewById(R.id.img2);

    img1.setOnClickListener(new View.OnClickListener() {

      @Override

      public void onClick(View view) {

        img1.setVisibility(View.GONE);

        img2.setVisibility(View.VISIBLE);

      }

    });

    img2.setOnClickListener(new View.OnClickListener() {

      @Override

      public void onClick(View view) {

        img2.setVisibility(View.GONE);

        img1.setVisibility(View.VISIBLE);

      }

    });

  }

}
```

Output:

6. Create an android application to add two numbers and display result in Toast Message.

Program:

activity_main.xml

```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"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".MainActivity">
    <EditText
        android:id="@+id/editNumber1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Number 1"/>
    <EditText
        android:id="@+id/editNumber2"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Number 2"/>
    <Button
        android:id="@+id/btnAdd"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="ADD"
        android:layout_gravity="center_horizontal"/>
</LinearLayout>
```

MainActivity.java

```java
package com.example.display_addition_using_toast;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

    EditText num1,num2;

    Button add;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        num1=findViewById(R.id.editNumber1);

        num2=findViewById(R.id.editNumber2);

        add=findViewById(R.id.btnAdd);

        add.setOnClickListener(new View.OnClickListener() {

            @Override

            public void onClick(View view) {

                double no1=Double.parseDouble(num1.getText().toString());

                double no2=Double.parseDouble(num2.getText().toString());

                double sum=no1+no2;

Toast.makeText(getApplicationContext(),"Addition:"+Double.toString(sum),Toast.LENGTH
_LONG).show();

            }

        });
```

}

        }

Output:

7. Write a program to implement Intent to pass data from one activity to another activity(Explicit Intent).

Program:

activity_main.xml

```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"
  xmlns:tools="http://schemas.android.com/tools"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:orientation="vertical"
  tools:context=".MainActivity">
  <EditText
    android:id="@+id/edT1"
    android:layout_width="match_parent"
    android:layout_gravity="center_horizontal"
    android:layout_height="wrap_content"
    android:hint="Enter Name" />
<EditText
    android:id="@+id/edT2"
    android:layout_width="match_parent"
    android:layout_gravity="center_horizontal"
    android:layout_height="wrap_content"
    android:hint="Enter Email" />
  <EditText
    android:id="@+id/edT3"
    android:layout_width="match_parent"
    android:layout_gravity="center_horizontal"
    android:layout_height="wrap_content"
```

```xml
        android:hint="Enter Phone Number" />
    <Button
        android:id="@+id/btnsend"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:text="SEND"/>
</LinearLayout>
```

MainActivity.java

```java
package com.example.intent_explicit;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;

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);
     EditText name,email,phone;
     name=findViewById(R.id.edT1);
     email=findViewById(R.id.edT2);
     phone=findViewById(R.id.edT3);
     findViewById(R.id.btnsend).setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view) {
           Intent i=new Intent(MainActivity.this,MainActivity2.class);
           i.putExtra("uname",name.getText().toString());
```

```java
            i.putExtra("email",email.getText().toString());

            i.putExtra("phoneno",phone.getText().toString());

            startActivity(i);

        }

    });

  }

}
```

activity_main2.xml

```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"

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

  android:layout_width="match_parent"

  android:layout_height="match_parent"

  tools:context=".MainActivity2">

  <TextView

    android:id="@+id/displaydata"

    android:layout_width="wrap_content"

    android:layout_height="wrap_content"

    android:textSize="38dp"/>

</LinearLayout>
```

MainActivity2.java

```java
package com.example.intent_explicit;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import android.widget.TextView;

public class MainActivity2 extends AppCompatActivity {

TextView display;

  @Override
```

```
protected void onCreate(Bundle savedInstanceState) {

    super.onCreate(savedInstanceState);

    setContentView(R.layout.activity_main2);

    display=findViewById(R.id.displaydata);

    String name=getIntent().getStringExtra("uname");

    String email=getIntent().getStringExtra("email");

    String phone=getIntent().getStringExtra("phoneno");

    display.setText("User name:"+name+"\nEmail:"+email+"\nPhone no:"+phone);

    }

}
```

Output:
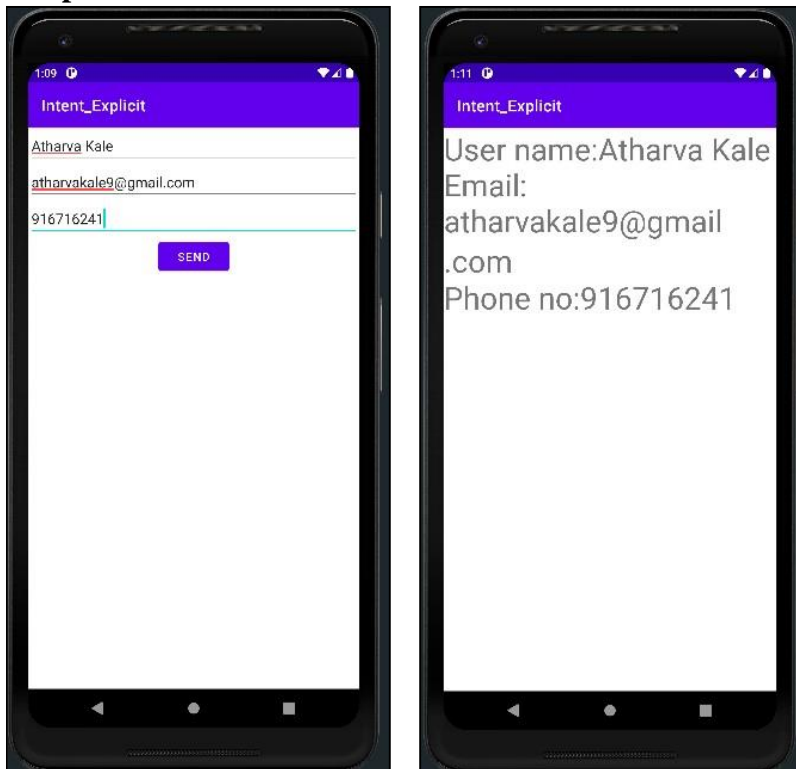
8. Create an application to implement implicit intent with following functionality.

Program:

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<GridLayout 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:columnCount="2"
    android:padding="50dp"
    tools:context=".MainActivity">
    <EditText
        android:id="@+id/editTextText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_columnSpan="2"
        android:ems="10"
        android:inputType="text"
        android:text="Name" />
    <Button
        android:id="@+id/button1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_column="0"
        android:text="Camera" />
    <Button
        android:id="@+id/button2"
        android:layout_width="wrap_content"
```

```xml
        android:layout_height="wrap_content"

        android:layout_column="1"

        android:text="Gallery" />

    <Button

        android:id="@+id/button3"

        android:layout_width="wrap_content"

        android:layout_column="0"

        android:layout_height="wrap_content"

        android:text="Contacts" />

    <Button

        android:id="@+id/button4"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:layout_column="1"

        android:text="Dial" />

    <Button

        android:id="@+id/button5"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:layout_gravity="center_horizontal"

        android:layout_columnSpan="2"

        android:text="Browser" />

</GridLayout>
```

MainActivity.java

```java
package com.example.intentimplicit;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;

import android.net.Uri;

import android.os.Bundle;
```

```java
import android.provider.MediaStore;

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);

    findViewById(R.id.button1).setOnClickListener(new View.OnClickListener() {

      @Override

      public void onClick(View view) {

        Intent i=new Intent(MediaStore.ACTION_IMAGE_CAPTURE);

        startActivity(i);

      }

    });

    findViewById(R.id.button2).setOnClickListener(new View.OnClickListener() {

      @Override

      public void onClick(View view) {

        Intent i=new Intent(Intent.ACTION_VIEW);

        i.setData(Uri.parse("content://media/external/images/media/"));

        startActivity(i);

      }

    });

    findViewById(R.id.button3).setOnClickListener(new View.OnClickListener() {

      @Override

      public void onClick(View view) {

        Intent i=new Intent(Intent.ACTION_VIEW);

        i.setData(Uri.parse("content://contacts/people/"));

        startActivity(i);
```

```java
            }
        });
        EditText phone=findViewById(R.id.editTextText);
        findViewById(R.id.button4).setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent i=new Intent(Intent.ACTION_DIAL);
                i.setData(Uri.parse("tel:"+phone.getText()));
                startActivity(i);
            }
        });
        findViewById(R.id.button5).setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent i=new Intent(Intent.ACTION_VIEW);
                i.setData(Uri.parse("http://www.google.com"));
                startActivity(i);
            }
        });
    }
}
```

Output:
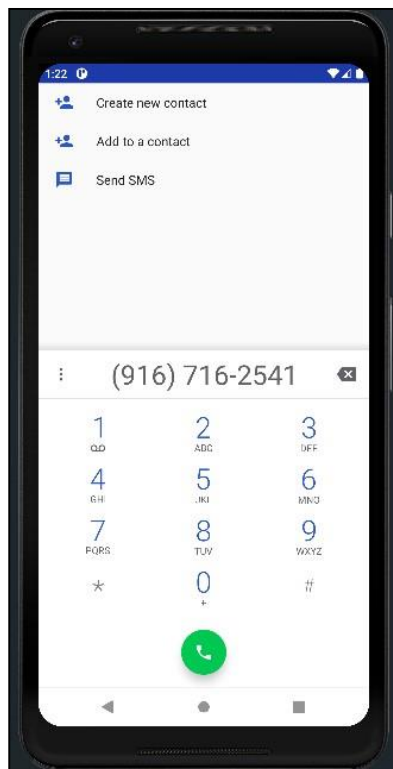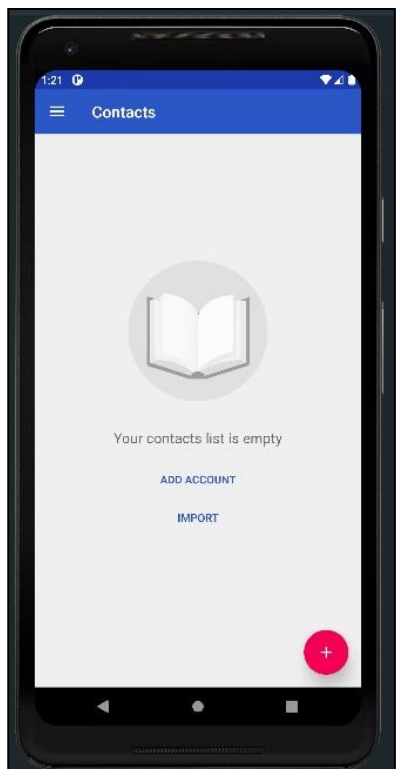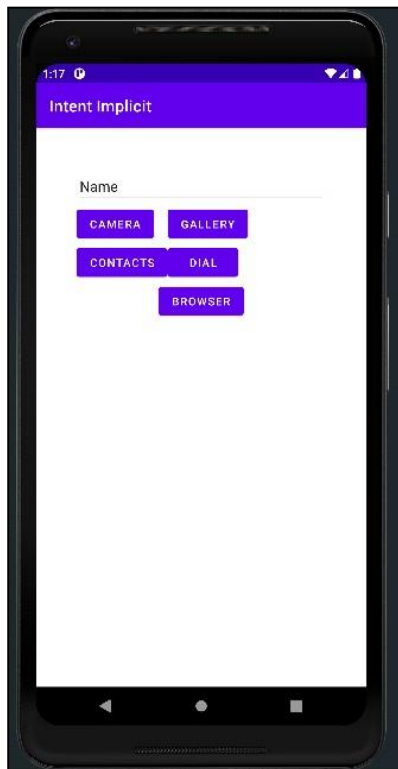
9. Design a option menu (use whatsapp option menu as reference)

Program:

option_menu.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto">
    <item
        android:id="@+id/search"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:icon="@drawable/baseline_search_24"
        app:showAsAction="ifRoom"
        android:title="Search" />
    <item
        android:id="@+id/group"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:title="New Group" />
    <item
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:title="Settings" >
        <menu
            android:layout_width="match_parent"
            android:layout_height="match_parent" >
            <item
                android:id="@+id/account"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
```

```
            android:title="Account" />

        <item

            android:id="@+id/chats"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:title="Chats" />

        <item

            android:id="@+id/notifications"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:title="Notification" />

    </menu>

  </item>

</menu>
```

MainActivity.java

```java
package com.example.optionmenudemo;

import androidx.annotation.NonNull;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import android.view.Menu;

import android.view.MenuInflater;

import android.view.MenuItem;

import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

  @Override

  protected void onCreate(Bundle savedInstanceState) {

    super.onCreate(savedInstanceState);

    setContentView(R.layout.activity_main);

  }
```

```java
@Override
public boolean onCreateOptionsMenu(Menu menu) {

    MenuInflater inflater=getMenuInflater();

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

    return true;

}
@Override
public boolean onOptionsItemSelected(@NonNull MenuItem item) {

    int id=item.getItemId();

    if(id==R.id.search){

        Toast.makeText(getApplicationContext(),"Search
clicked",Toast.LENGTH_LONG).show();

    } else if(id==R.id.group){

        Toast.makeText(getApplicationContext(),"New                        Group
clicked",Toast.LENGTH_LONG).show();

    } else if(id==R.id.account){

        Toast.makeText(getApplicationContext(),"Account
clicked",Toast.LENGTH_LONG).show();

    }else if(id==R.id.chats){

        Toast.makeText(getApplicationContext(),"Chats
clicked",Toast.LENGTH_LONG).show();

    }else if(id==R.id.notifications){

        Toast.makeText(getApplicationContext(),"Notifications
clicked",Toast.LENGTH_LONG).show();

    }

    return super.onOptionsItemSelected(item);

}
}
```

10. Create an application which has a button and displays a popup menu when the user clicks that button.

Program:

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"

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

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

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    tools:context=".MainActivity">

    <Button

        android:id="@+id/button1"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:layout_marginStart="162dp"

        android:layout_marginTop="318dp"

        android:layout_marginEnd="162dp"

        android:layout_marginBottom="365dp"

        android:text="Show"

        app:layout_constraintBottom_toBottomOf="parent"

        app:layout_constraintEnd_toEndOf="parent"

        app:layout_constraintStart_toStartOf="parent"

        app:layout_constraintTop_toTopOf="parent"

        tools:text="Show" />

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

MainActivity.java

```java
package com.example.popupmenudemo;

import androidx.appcompat.app.AppCompatActivity;
```

```java
import android.os.Bundle;

import android.view.MenuItem;

import android.view.View;

import android.widget.PopupMenu;

import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

  @Override

  protected void onCreate(Bundle savedInstanceState) {

    super.onCreate(savedInstanceState);

    setContentView(R.layout.activity_main);

    findViewById(R.id.button1).setOnClickListener(new View.OnClickListener() {

      @Override

      public void onClick(View view) {

        PopupMenu popupMenu = new PopupMenu(MainActivity.this,view);

        popupMenu.inflate(R.menu.popup_menu);

        popupMenu.show();

        popupMenu.setOnMenuItemClickListener(new
PopupMenu.OnMenuItemClickListener() {

          @Override

          public boolean onMenuItemClick(MenuItem menuItem) {

            Toast.makeText(getApplicationContext(),"Selected
Item:"+menuItem.getTitle(),Toast.LENGTH_LONG).show();

            return false;

          }

        });

      }

    });

  }

}
```

popup_menu.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/apk/res/android">
  <item
     android:id="@+id/mail"
     android:layout_width="wrap_content"
     android:layout_height="wrap_content"
     android:title="Mail" />
  <item
     android:id="@+id/upload"
     android:layout_width="wrap_content"
     android:layout_height="wrap_content"
     android:title="Upload" />
  <item
     android:id="@+id/share"
     android:layout_width="wrap_content"
     android:layout_height="wrap_content"
     android:title="Share" />
</menu>
```

Output:
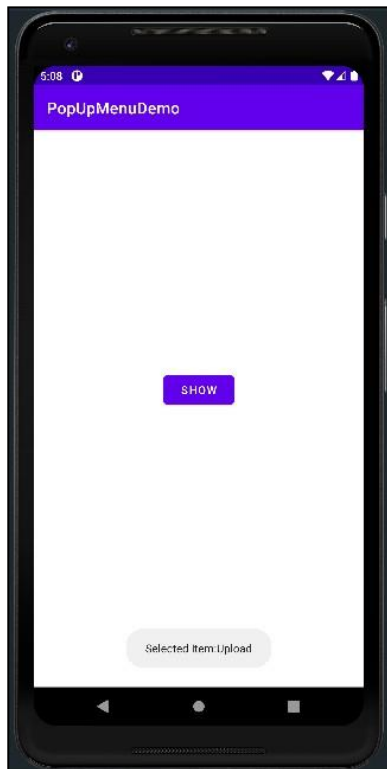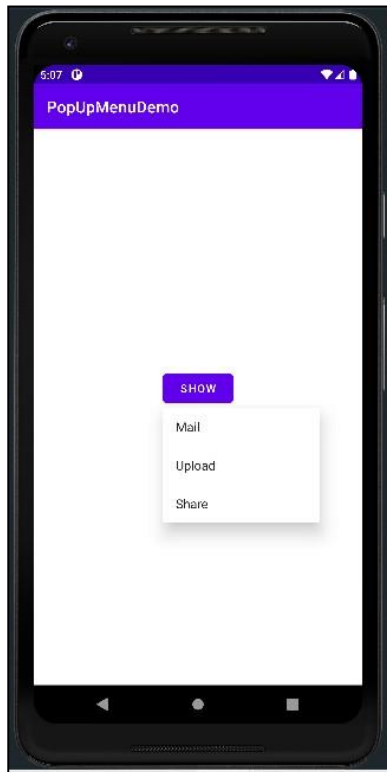
11. Design an application which has an Image and display context menu on that image and also create and redirect to different activities.
Program:

MainActivity.java

```java
package com.example.contextmenudemo;

import androidx.annotation.NonNull;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;

import android.os.Bundle;

import android.view.ContextMenu;

import android.view.MenuInflater;

import android.view.MenuItem;

import android.view.View;

import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

  @Override

  protected void onCreate(Bundle savedInstanceState) {

    super.onCreate(savedInstanceState);

    setContentView(R.layout.activity_main);

    registerForContextMenu(findViewById(R.id.imageView));

  }

  @Override

  public void onCreateContextMenu(ContextMenu menu, View v,
ContextMenu.ContextMenuInfo menuInfo) {

    MenuInflater inflater = getMenuInflater();

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

  }

  @Override

  public boolean onContextItemSelected(@NonNull MenuItem item) {

    int id=item.getItemId();

    if(id==R.id.open_menu){
```

```java
        Intent i = new Intent(MainActivity.this,MainActivity2.class);

        startActivity(i);

    }

    else if (id==R.id.cancel){

        Toast.makeText(getApplicationContext(),"Cancel
clicked",Toast.LENGTH_LONG).show();

    }

    return super.onContextItemSelected(item);

  }

}
```

activitymain.xml

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

<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"

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

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

  android:layout_width="match_parent"

  android:layout_height="match_parent"

  tools:context=".MainActivity">

  <ImageView

    android:id="@+id/imageView"

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    android:src="@drawable/img2"

    tools:layout_editor_absoluteX="0dp"

    tools:layout_editor_absoluteY="-16dp" />

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

contextmenu.xml

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

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

```xml
        <item
            android:id="@+id/open_menu"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:title="Open in new window" />
        <item
            android:id="@+id/cancel"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:title="Cancel" />
</menu>
```

activitymain2.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity2">
    <FrameLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent">
        <ImageView
            android:id="@+id/imageView2"
            android:layout_width="match_parent"
```

```xml
                android:layout_height="match_parent"

                android:src="@drawable/img2" />

        <TextView

                android:id="@+id/textView"

                android:layout_width="wrap_content"

                android:layout_height="wrap_content"

                android:layout_gravity="center_horizontal"

                android:text="Lalbaugcha Raja"

                android:textSize="30dp" />

    </FrameLayout>

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

MainActivity2.java

```java
package com.example.contextmenudemo;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

public class MainActivity2 extends AppCompatActivity {

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main2);

    }

}
```

Output:
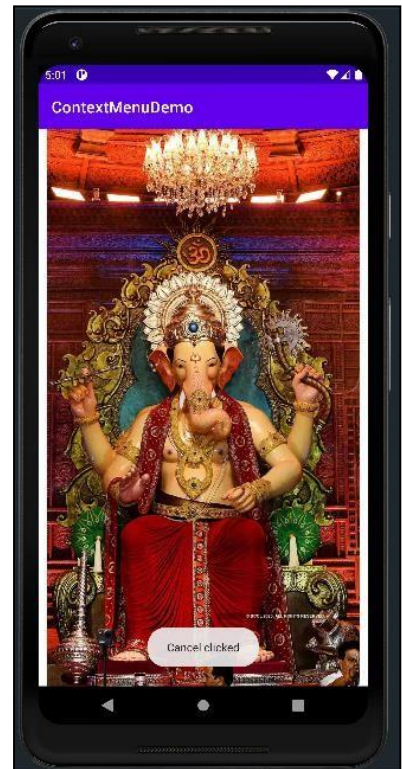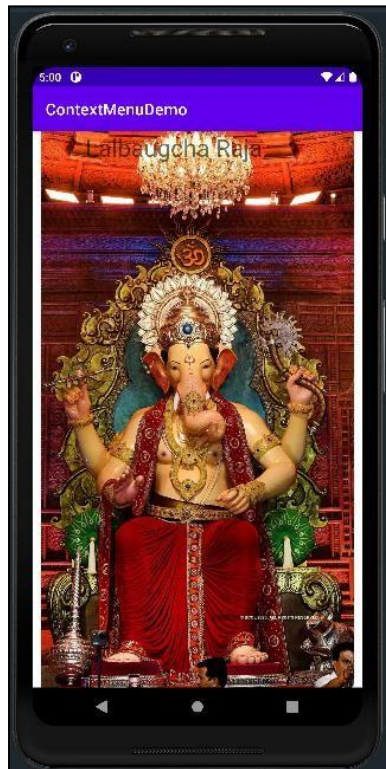
12. Create an application which has two buttons. When the user clicks on the first button the first fragment will be displayed and when the user clicks on the second button the second fragment will be displayed.

Program:

colors.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<resources>
  <color name="purple_200">#FFBB86FC</color>
  <color name="purple_500">#FF6200EE</color>
  <color name="purple_700">#FF3700B3</color>
  <color name="teal_200">#FF03DAC5</color>
  <color name="teal_700">#FF018786</color>
  <color name="black">#FF000000</color>
  <color name="white">#FFFFFFFF</color>
  <color name="button1Color">#FFBC38</color>
  <color name="buttton2Color">#BFA9A9</color>
  <color name="fragmenttwocolor">#00BCD4</color>
</resources>
```

activity_main.xml

```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"
  xmlns:tools="http://schemas.android.com/tools"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:background="#57A5A5"
  android:orientation="vertical"
  tools:context=".MainActivity">
  <LinearLayout
    android:layout_width="match_parent"
```

```xml
    android:layout_height="wrap_content"

    android:orientation="horizontal">

    <Button

        android:id="@+id/button1"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:backgroundTint="@color/button1Color"

        android:layout_weight="1"

        android:text="First" />

    <Button

        android:id="@+id/button2"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:layout_weight="1"

        android:text="Second"

        android:backgroundTint="@color/buttton2Color"/>

    </LinearLayout>

    <FrameLayout

        android:id="@+id/fl"

        android:layout_width="match_parent"

        android:layout_height="match_parent"

        android:layout_weight="1">

</FrameLayout>

</LinearLayout>
```

MainActivity.java

```java
package com.example.fragmentdemo;

import androidx.appcompat.app.AppCompatActivity;

import androidx.fragment.app.FragmentTransaction;

import android.os.Bundle;
```

```java
import android.view.View;
public class MainActivity extends AppCompatActivity {
  @Override
  protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
    findViewById(R.id.button1).setOnClickListener(new View.OnClickListener() {
      @Override
      public void onClick(View view) {
        FirstFragment firstFragment = new FirstFragment();
        FragmentTransaction
transaction=getSupportFragmentManager().beginTransaction();
        transaction.replace(R.id.fl,firstFragment);
        transaction.commit();
      }
    });
    findViewById(R.id.button2).setOnClickListener(new View.OnClickListener() {
      @Override
      public void onClick(View view) {
        SecondFragment secondFragment = new SecondFragment();
        FragmentTransaction
transaction=getSupportFragmentManager().beginTransaction();
        transaction.replace(R.id.fl,secondFragment);
        transaction.commit();
      }
    });
  }
}
```

fragment_first.xml

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

```xml
<FrameLayout 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"
    tools:context=".FirstFragment">
    <!-- TODO: Update blank fragment layout -->
    <ImageView
        android:id="@+id/imageView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:scaleType="fitXY"
        android:src="@drawable/img2" />
    <TextView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:text="First Fragment"
        android:textSize="30dp"
        android:layout_gravity="center_horizontal"
        android:textColor="@color/black"/>
</FrameLayout>
```

fragment_second.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<FrameLayout 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"
    tools:context=".SecondFragment">
    <!-- TODO: Update blank fragment layout -->
    <ImageView
```

```xml
        android:id="@+id/imageView2"

        android:layout_width="match_parent"

        android:layout_height="match_parent"

        android:scaleType="fitXY"

        android:src="@drawable/img4" />

    <TextView

        android:layout_width="match_parent"

        android:layout_height="match_parent"

        android:textSize="30dp"

        android:textColor="@color/teal_200"

        android:layout_gravity="center_horizontal"

        android:text="Second Fragment" />

</FrameLayout>
```

FirstFragmant.java

```java
package com.example.fragmentdemo;

import android.os.Bundle;

import androidx.fragment.app.Fragment;

import android.view.LayoutInflater;

import android.view.View;

import android.view.ViewGroup;

/**
 * A simple {@link Fragment} subclass.
 * Use the {@link FirstFragment#newInstance} factory method to
 * create an instance of this fragment.
 */
public class FirstFragment extends Fragment {

    public FirstFragment() {

        // Required empty public constructor

    }
```

```java
    @Override

    public View onCreateView(LayoutInflater inflater, ViewGroup container,

                    Bundle savedInstanceState) {

        // Inflate the layout for this fragment

        return inflater.inflate(R.layout.fragment_first, container, false);

    }

}
```

SecondFragmant.java

```java
package com.example.fragmentdemo;

import android.os.Bundle;

import androidx.fragment.app.Fragment;

import android.view.LayoutInflater;

import android.view.View;

import android.view.ViewGroup;

/**

* A simple {@link Fragment} subclass.

* Use the {@link SecondFragment#newInstance} factory method to

* create an instance of this fragment.

*/

public class SecondFragment extends Fragment {

    public SecondFragment() {

        // Required empty public constructor

    }

    @Override

    public View onCreateView(LayoutInflater inflater, ViewGroup container,

                    Bundle savedInstanceState) {

        // Inflate the layout for this fragment

        return inflater.inflate(R.layout.fragment_second, container, false);

    }
```

}

Output:
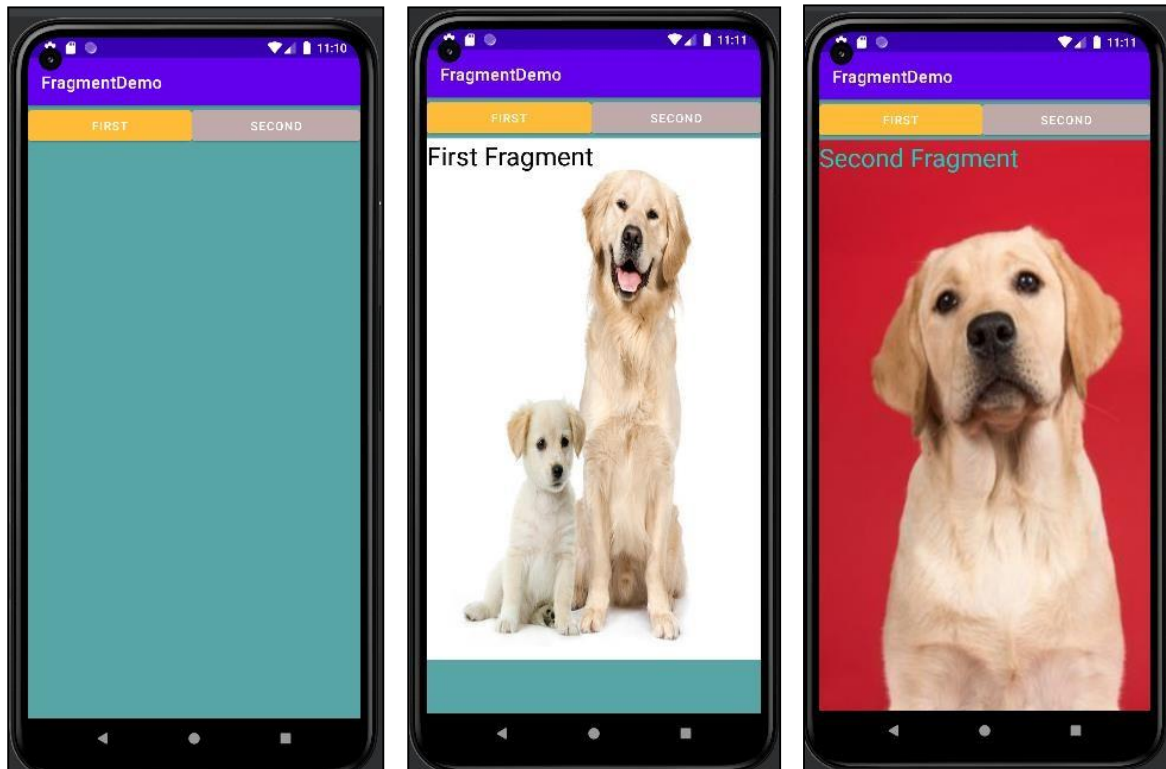
13. Create an application to demonstrate Android Service (Playing music in background).

Program:

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="@drawable/img"
    tools:context=".MainActivity">
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_marginTop="100dp"
        android:padding="10dp"
        android:orientation="horizontal">
        <Button
            android:id="@+id/btnPlay"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:backgroundTint="#8BC34A"
            android:layout_marginRight="10dp"
            android:textColor="#000"
            android:text="PLAY" />
        <Button
            android:id="@+id/btnPause"
            android:layout_width="wrap_content"
```

```xml
            android:layout_height="wrap_content"

            android:layout_marginRight="10dp"

            android:layout_weight="1"

            android:textColor="#000"

            android:backgroundTint="#FFC107"

            android:text="PAUSE" />

        <Button

            android:id="@+id/btnStop"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:layout_weight="1"

            android:textColor="#000"

            android:backgroundTint="#E8190A"

            android:text="STOP" />

    </LinearLayout>

</RelativeLayout>
```

MainActivity.java

```java
package com.example.myaudioapplication;

import androidx.appcompat.app.AppCompatActivity;

import android.media.MediaPlayer;

import android.os.Bundle;

import android.provider.MediaStore;

import android.view.View;

public class MainActivity extends AppCompatActivity {

MediaPlayer mp;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);
```

```java
        findViewById(R.id.btnPlay).setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if(mp==null){
                    mp= MediaPlayer.create(getApplicationContext(),R.raw.song);
                }
                mp.start();
            }
        });
        findViewById(R.id.btnPause).setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if(mp!=null){
                    mp.pause();
                }
            }
        });
        findViewById(R.id.btnStop).setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
            if (mp!=null){
                mp.release();
            }
            }
        });
    }
}
```

Output:

14. Design a screen which displays the frame image and write a quote on that.

Program:

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <ImageView
        android:id="@+id/frameImageView"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:scaleType="centerCrop"
        android:src="@drawable/img"
        android:contentDescription="@string/frame_image_description"/>
    <TextView
        android:id="@+id/quoteTextView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerInParent="true"
        android:text="Finish what you have Started!"
        android:textColor="#000000"
        android:textSize="18sp" />
</RelativeLayout>
```

strings.xml

```xml
<resources>
    <string name="app_name">Quote_on_Image</string>
    <string name="frame_image_description">Frame Image</string>
</resources>
```

MainActivity.java

```java
package com.example.quote_on_image;

import androidx.appcompat.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);

    }

}
```

Output:

2. Basic Controls and UI Components:

1. Write an application to increase font size using seekbar.
Program:

activity_main.xml

```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"
  xmlns:tools="http://schemas.android.com/tools"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:orientation="vertical"
  tools:context=".MainActivity">
  <TextView
    android:id="@+id/textView"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="TextView" />
  <SeekBar
    android:id="@+id/seekBar"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:min="10"
    android:max="100"/>
</LinearLayout>
```

MainActivity.java

```java
package com.example.seekbardemo;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import android.widget.SeekBar;

import android.widget.TextView;
```

```java
public class MainActivity extends AppCompatActivity {
TextView txt;
SeekBar sb;
  @Override
  protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
    txt = findViewById(R.id.textView);
    sb = findViewById(R.id.seekBar);
    sb.setOnSeekBarChangeListener(new SeekBar.OnSeekBarChangeListener() {
      @Override
      public void onProgressChanged(SeekBar seekBar, int i, boolean b) {
        txt.setTextSize(i);
      }
      @Override
      public void onStartTrackingTouch(SeekBar seekBar) {
      }
      @Override
      public void onStopTrackingTouch(SeekBar seekBar) {
      }
    });
  }
}
```

Output:

2. Demonstrate different shapes of control.
Program:

activity_main.xml

```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"

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

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    tools:context=".MainActivity"

    android:orientation="vertical"

    android:gravity="center_horizontal"

    android:layout_marginTop="30dp">

    <TextView

        android:id="@+id/text1"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:layout_margin="15dp"

        android:background="@drawable/rect"

        android:text="Rectangle"

        android:textColor="@color/white"/>

    <TextView

        android:id="@+id/text2"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:layout_margin="15dp"

        android:background="@drawable/square"

        android:text="Square"

        android:gravity="center"/>

    <TextView

        android:id="@+id/text3"
```

```xml
        android:layout_width="118dp"

        android:layout_height="123dp"

        android:layout_margin="15dp"

        android:background="@drawable/ring"

        android:gravity="center"

        android:text="Ring" />

    <TextView

        android:id="@+id/text4"

        android:layout_width="140dp"

        android:layout_height="60dp"

        android:layout_margin="15dp"

        android:background="@drawable/withgradient"

        android:text="With gradient"

        android:gravity="center"

        android:textColor="@color/white" />

    <TextView

        android:layout_width="140dp"

        android:layout_height="60dp"

        android:layout_margin="15dp"

        android:background="@drawable/withborder"

        android:text="With border"

        android:gravity="center"/>

    <Button

        android:layout_width="60dp"

        android:layout_height="wrap_content"

        android:layout_margin="15dp"

        android:background="@drawable/circle"

        android:textColor="@color/white"

        android:text="GO"/>

</LinearLayout>
```

square.xml

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

  <corners android:radius="4dp" />

  <stroke android:width="4dp" android:color="#800080" />

  <solid android:color="#ffbde7"/>

  <padding android:left="20dp" android:top="20dp"

    android:right="20dp" android:bottom="20dp" />

  <size android:width="100dp"

    android:height="100dp"/>

</shape>
```

circle.xml

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

  android:shape="oval" >

  <size android:width="60dp" android:height="60dp"/>

</shape>
```

withborder.xml

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

  <stroke android:width="3dp" android:color="#79B4B7"/>

</shape>
```

withgradient.xml

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

  <gradient         android:startColor="#A5F1E9"         android:endColor="#7FBCD2"
android:centerColor="#EBC7E8"

    android:angle="45"/>

  <corners android:topRightRadius="15dp" android:bottomLeftRadius="15dp"/>
```

```xml
    <stroke android:width="2dp" android:color="#E91E63"/>
</shape>
```

rect.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<shape                           xmlns:android="http://schemas.android.com/apk/res/android"
android:shape="rectangle">
    <solid android:color="#51C2D5"/>
    <padding        android:left="20dp"        android:top="20dp"        android:right="20dp"
android:bottom="20dp" />
</shape>
```

ring.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<shape  xmlns:android="http://schemas.android.com/apk/res/android"  android:shape="ring"
android:innerRadius="30dp" android:thickness="25dp" android:useLevel="false">
    <stroke
        android:color="#A77979"
        android:width="3dp"></stroke>
    <solid android:color="#E94560"></solid>
</shape>
```

MainActivity.java

```java
package com.example.shapes_of_control;
import androidx.appcompat.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);
    }
}
```

Output:
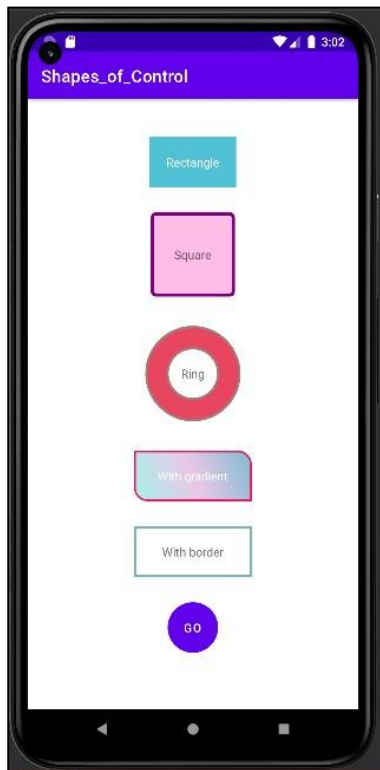
3. Create android Application that displays selected values from radio buttons and checkboxes.

Program:

activity_main.xml

```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"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".MainActivity">
    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:textStyle="bold"
        android:text="Gender" />
    <RadioGroup
        android:id="@+id/radioGrp"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_weight="1">
        <RadioButton
            android:id="@+id/radioButton"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Male" />
        <RadioButton
```

```xml
        android:id="@+id/radioButton2"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:text="Female" />

    </RadioGroup>

    <TextView

        android:id="@+id/textView2"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:text="Hobbies"

        android:textStyle="bold"/>

    <CheckBox

        android:id="@+id/checkBox1"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:layout_weight="1"

        android:text="Cricket" />

    <CheckBox

        android:id="@+id/checkBox2"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:layout_weight="1"

        android:text="Football" />

    <CheckBox

        android:id="@+id/checkBox3"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:layout_weight="1"

        android:text="Dance" />
```

```xml
    <Button

        android:id="@+id/button"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:layout_weight="1"

        android:text="Submit" />

    <TextView

        android:id="@+id/textView3"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:layout_weight="1"

        android:text="" />

</LinearLayout>
```

MainActivity.java

```java
package com.example.radioandcheckboxdemo;

import androidx.appcompat.app.AppCompatActivity;

import android.annotation.SuppressLint;

import android.os.Bundle;

import android.view.View;

import android.widget.CheckBox;

import android.widget.RadioButton;

import android.widget.RadioGroup;

import android.widget.TextView;

public class MainActivity extends AppCompatActivity {

CheckBox cricket,football,dance;

RadioGroup radio;

@SuppressLint("MissingInflatedId")

    @Override

    protected void onCreate(Bundle savedInstanceState) {
```

```java
        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        cricket = findViewById(R.id.checkBox1);

        football = findViewById(R.id.checkBox2);

        dance = findViewById(R.id.checkBox3);

        radio = findViewById(R.id.radioGrp);

        findViewById(R.id.button).setOnClickListener(new View.OnClickListener() {

            @Override

            public void onClick(View view) {

                int radioId = radio.getCheckedRadioButtonId();

                RadioButton selectedRadio = findViewById(radioId);

                String result="";

                if(cricket.isChecked()){

                    result+="Cricket\t";

                }

                if(football.isChecked()){

                    result+="Football\t";

                }

                if(dance.isChecked()){

                    result+="Dance\t";

                }

                TextView data= findViewById(R.id.textView3);

                data.setText("Gender: "+selectedRadio.getText().toString()+"\nHobbies: "+result);

            }

        });

    }

}
```

Output:
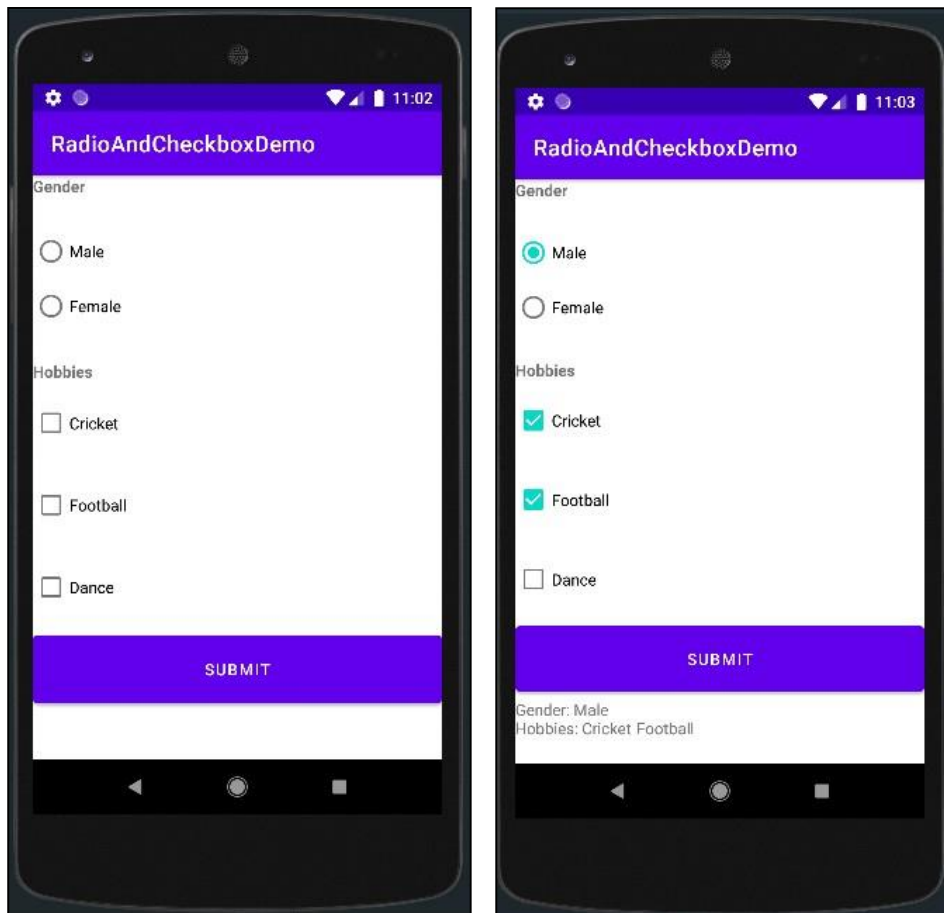
3. Database Connectivity

1. Create an Android application to read and write content in internal storage.

Program:

activity_main.xml

```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"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:gravity="center"
    android:orientation="vertical"
    android:padding="10dp"
    tools:context=".MainActivity">
    <TextView
        android:id="@+id/write"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"/>
    <EditText
        android:id="@+id/edit_text"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="16dp"
        android:hint="Enter text"
        android:lineHeight="20sp"
        android:textColor="@color/black"/>
    <Button
        android:id="@+id/btn_write"
        android:layout_width="wrap_content"
```

```
        android:layout_height="wrap_content"

        android:text="Write"/>

    <Button

        android:id="@+id/btn_load"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:text="Load"/>

</LinearLayout>
```

MainActivity.java

```java
package com.example.myinternalstorageapp;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import android.widget.TextView;

import android.widget.Toast;

import java.io.BufferedReader;

import java.io.FileInputStream;

import java.io.FileNotFoundException;

import java.io.FileOutputStream;

import java.io.IOException;

import java.io.InputStreamReader;

public class MainActivity extends AppCompatActivity {

private EditText editText;

private Button btnWrite,btnLoad;

TextView textView;

private String FILENAME="data.txt";

    @Override
```

```java
protected void onCreate(Bundle savedInstanceState) {

    super.onCreate(savedInstanceState);

    setContentView(R.layout.activity_main);

    editText=findViewById(R.id.edit_text);

    btnWrite=findViewById(R.id.btn_write);

    btnLoad=findViewById(R.id.btn_load);

    textView=findViewById(R.id.write);

    btnWrite.setOnClickListener(new View.OnClickListener() {

        @Override

        public void onClick(View v) {

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

            try {

                FileOutputStream fos=openFileOutput(FILENAME,MODE_PRIVATE);

                fos.write(data.getBytes());

                Toast.makeText(getApplicationContext(),"Data                              Written
Successfully...!",Toast.LENGTH_LONG).show();

                editText.getText().clear();

                fos.close();

            } catch (IOException e) {

Toast.makeText(getApplicationContext(),e.getMessage(),Toast.LENGTH_LONG).show();

            }

        }

    });

    btnLoad.setOnClickListener(new View.OnClickListener() {

        @Override

        public void onClick(View v) {

            try {

                FileInputStream fis=openFileInput(FILENAME);

                InputStreamReader isr=new InputStreamReader(fis);
```

```java
            BufferedReader br=new BufferedReader(isr);

            StringBuilder data=new StringBuilder();

            String line;

            while ((line=br.readLine())!=null){

                data.append("\n").append(line);

            }

            data.deleteCharAt(0);

            textView.setText(data);

            Toast.makeText(getApplicationContext(),"Data                          Loaded
Successfully...!",Toast.LENGTH_LONG).show();

            fis.close();

        }

        catch (IOException e){

    Toast.makeText(getApplicationContext(),e.getMessage(),Toast.LENGTH_LONG).show();

        }

      }

    });

  }

}
```

Output:
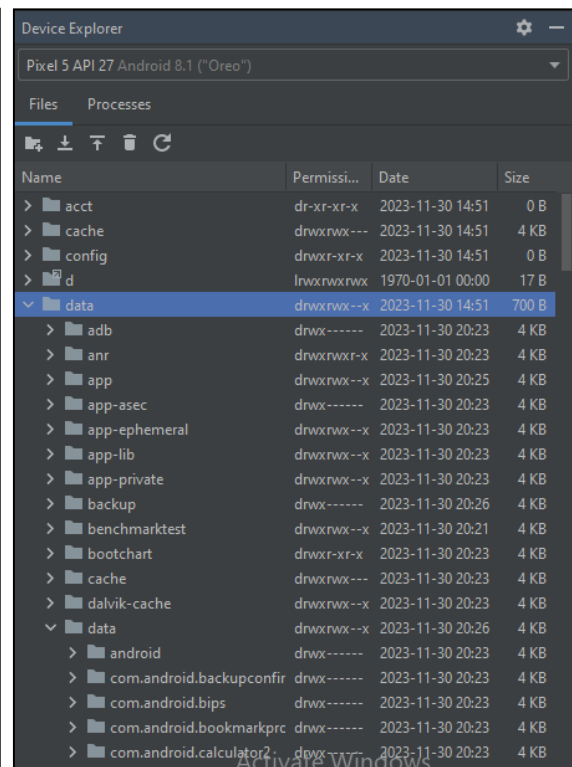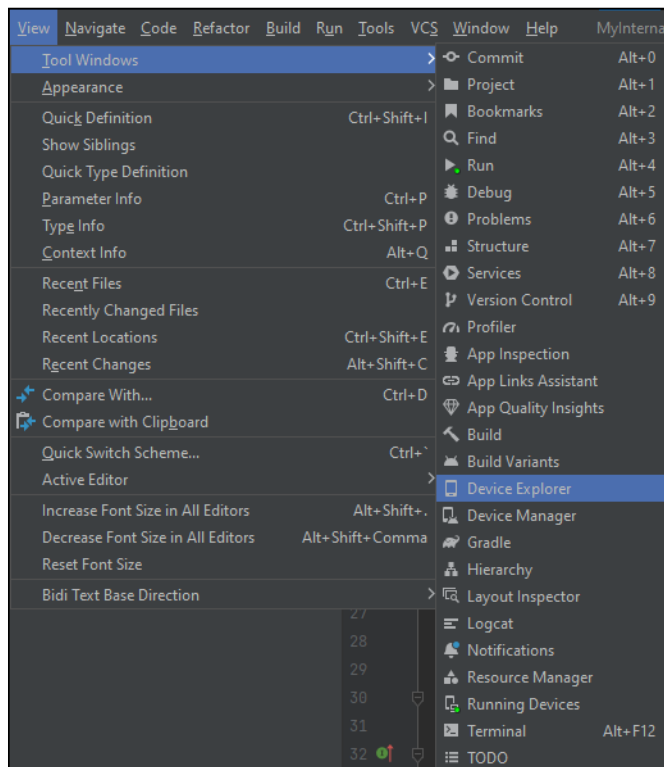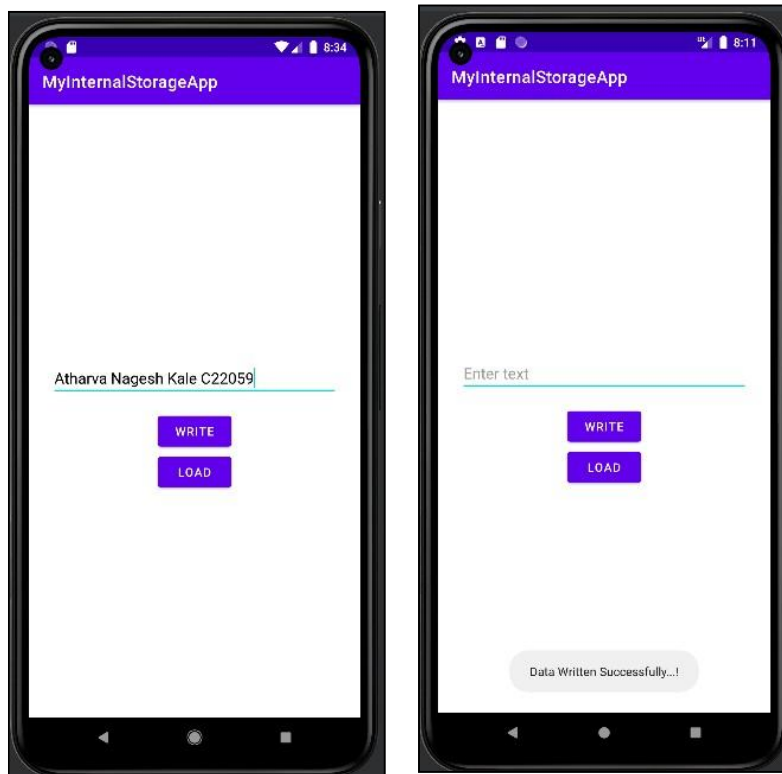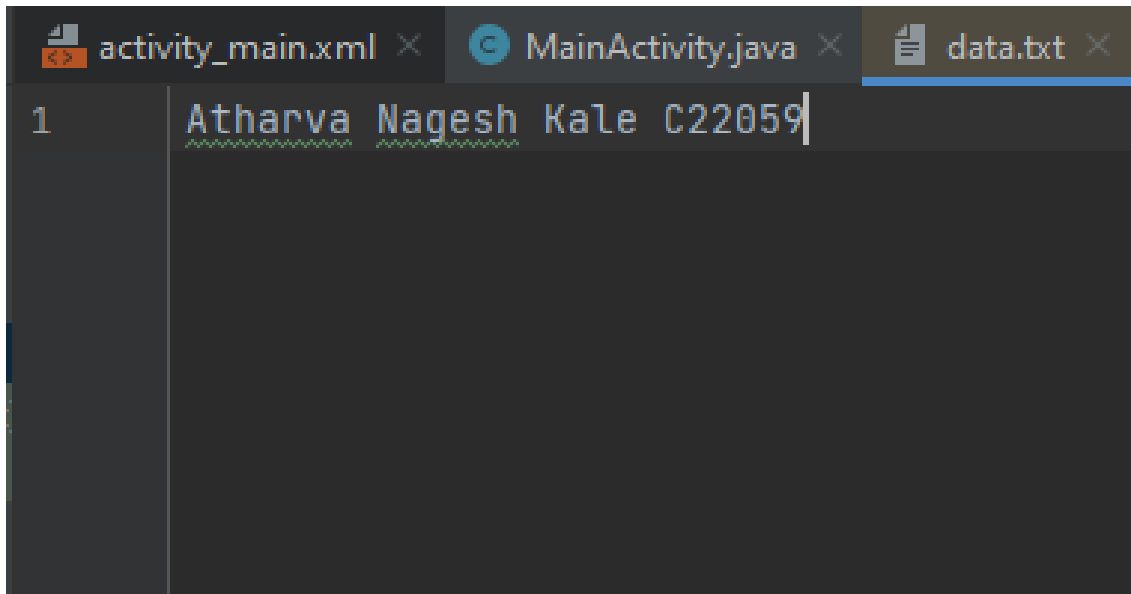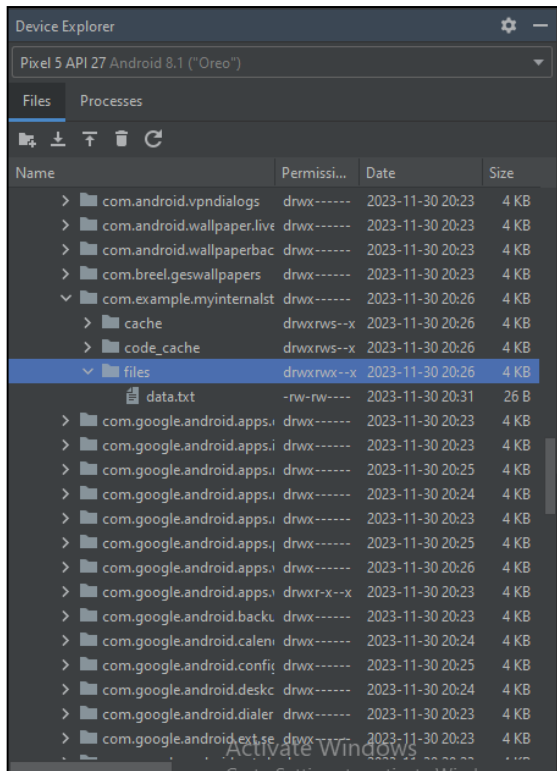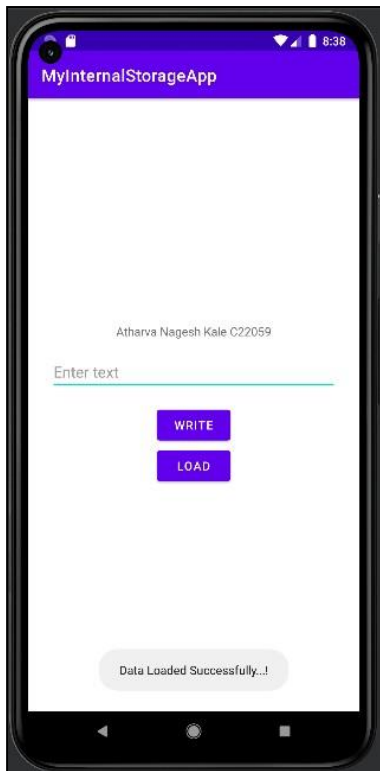
2. Create an Android application to read and write content in external storage.

Program:

AndroidManifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">
    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.MyExternalStorageApp"
        tools:targetApi="31">
        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>
```

activity_main.xml

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

```xml
<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"
    android:gravity="center"
    android:padding="16dp"
    tools:context=".MainActivity">
    <TextView
        android:id="@+id/dir"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"/>
    <EditText
        android:id="@+id/input_text"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="16dp"
        android:hint="Enter text"
        android:lineHeight="25sp"
        android:textColor="@color/black"/>
    <Button
        android:id="@+id/btn_write"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Write"/>
    <Button
        android:id="@+id/btn_load"
        android:layout_width="wrap_content"
```

android:layout_height="wrap_content"

        android:text="Load"/>

</LinearLayout>

MainActivity.java

```java
package com.example.myexternalstorageapp;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import android.os.Environment;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import android.widget.TextView;

import android.widget.Toast;

import  org.w3c.dom.Text;

import java.io.BufferedReader;

import java.io.File;

import java.io.FileInputStream;

import java.io.FileNotFoundException;

import java.io.FileOutputStream;

import java.io.IOException;

import java.io.InputStreamReader;

public class MainActivity extends AppCompatActivity {

private EditText inputText;

private Button btnWrite,btnLoad;

private TextView dir;

private String filename="hello.txt";

private String filepath="MyFileStorage";

private File extFile;

private String data="";
```

```java
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        inputText=findViewById(R.id.input_text);
        btnWrite=findViewById(R.id.btn_write);
        btnLoad=findViewById(R.id.btn_load);
        dir=findViewById(R.id.dir);
        if (!isExternalStorageAvailable() || isExternalStorageReadOnly()){
            btnWrite.setEnabled(false);
        }
        else {
            extFile=new File(getExternalFilesDir(filepath), filename);
        }
        getDir();
        btnWrite.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                data=inputText.getText().toString();
                try{
                    FileOutputStream fos=new FileOutputStream(extFile);
                    fos.write(data.getBytes());
                    inputText.getText().clear();
                    Toast.makeText(getApplicationContext(),filename+"    saved    to    External
Storage...!",Toast.LENGTH_LONG).show();
                    fos.close();
                }
                catch (IOException e) {
                    e.printStackTrace();
                }
```

```java
                }
            });
        btnLoad.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                try {
                    FileInputStream fis = new FileInputStream(extFile);
                    InputStreamReader isr = new InputStreamReader(fis);
                    BufferedReader br = new BufferedReader(isr);
                    StringBuilder data = new StringBuilder();
                    String line;
                    while ((line=br.readLine())!=null){
                        data.append("\n").append(line);
                    }
                    inputText.setText(data);
                    Toast.makeText(getApplicationContext(),"Data retrieved from External File
Successfully...!",Toast.LENGTH_LONG).show();
                    fis.close();
                }
                catch (IOException e) {
                    e.printStackTrace();
                }
            }
        });
    }
    private boolean isExternalStorageReadOnly() {
        String extStorageState = Environment.getExternalStorageState();
        return  Environment.MEDIA_MOUNTED_READ_ONLY.equals(extStorageState);
    }
    private boolean isExternalStorageAvailable() {
```

```
    String extStorageState = Environment.getExternalStorageState();

    return  Environment.MEDIA_MOUNTED.equals(extStorageState);

}

private void getDir(){

    StringBuilder builder=new StringBuilder();

    builder.append("External                                                    File
Directories:").append(getExternalFilesDir(filepath).getAbsolutePath()).append("\n");

    dir.setText(builder.toString());

}

}
```

Output:

Name	Permissi...	Date	Size
> ▣ proc	dr-xr-xr-x	2023-11-30 20:21	0 B
> ▣ root	drwx------	2018-01-25 08:13	40 B
> ▣ sbin	drwxr-x---	1970-01-01 05:30	100 B
> ▣ sdcard	lrwxrwxrwx	1970-01-01 05:30	21 B
⌄ ▣ storage	drwxr-xr-x	2023-11-30 20:23	80 B
⌄ ▣ emulated	drwx--x--x	2023-11-30 20:23	4 KB
⌄ ▣ 0	drwxrwx--x	2023-11-30 20:24	4 KB
> ▣ Alarms	drwxrwx--x	2023-11-30 20:24	4 KB
⌄ ▣ Android	drwxrwx--x	2023-11-30 20:23	4 KB
⌄ ▣ data	drwxrwx--x	2023-11-30 22:27	4 KB
⌄ ▣ com.example.m	drwxrwx--x	2023-11-30 22:27	4 KB
⌄ ▣ files	drwxrwx--x	2023-11-30 22:27	4 KB
> ▣ MyFileSto	drwxrwx--x	2023-11-30 22:41	4 KB
> ▣ com.google.and	drwxrwx--x	2023-11-30 20:25	4 KB
> ▣ com.google.and	drwxrwx--x	2023-11-30 20:23	4 KB
> ▣ com.google.and	drwxrwx--x	2023-11-30 20:25	4 KB
> ▣ com.google.and	drwxrwx--x	2023-11-30 20:25	4 KB
> ▣ com.google.and	drwxrwx--x	2023-11-30 20:25	4 KB
▣ .nomedia	-rw-rw----	2023-11-30 20:23	0 B
> ▣ DCIM	drwxrwx--x	2023-11-30 20:24	4 KB
> ▣ Download	drwxrwx--x	2023-11-30 20:24	4 KB
> ▣ Movies	drwxrwx--x	2023-11-30 20:24	4 KB
> ▣ Music	drwxrwx--x	2023-11-30 20:24	4 KB

Atharva Nagesh Kale C22059

External File Directories:/storage/emulated/0/Android/data/com.example.myexternalstorageapp/files/MyFileStorage

Atharva Nagesh Kale C22059

WRITE

LOAD

Data retrieved from External File Successfully...!

3. Write an android program for shared preference to store value in name-value pairs.

Program:

activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity"
    tools:ignore="HardcodedText">
    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="32dp"
        android:text="Shared Preferences Demo"
        android:textColor="@color/black"
        android:textSize="24sp"/>
    <EditText
        android:id="@+id/edit1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/textView"
        android:layout_marginStart="16dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="16dp"
        android:hint="Enter your Name"
```

```xml
        android:padding="10dp"/>
    <EditText
        android:id="@+id/edit2"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/edit1"
        android:layout_marginStart="16dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="16dp"
        android:hint="Enter your Age"
        android:padding="10dp"/>
</RelativeLayout>
```

MainActivity.java:

```java
package com.example.mysharedpreferenceapp;

import androidx.appcompat.app.AppCompatActivity;

import android.content.SharedPreferences;

import android.os.Bundle;

import android.widget.EditText;

public class MainActivity extends AppCompatActivity {

private EditText name,age;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        name=findViewById(R.id.edit1);

        age=findViewById(R.id.edit2);

    }

    @Override

    protected void onResume() {
```

```java
    super.onResume();

    SharedPreferences                    sh                    =
getSharedPreferences("MySharedPreference",MODE_PRIVATE);

    String s1=sh.getString("name","");

    int a=sh.getInt("age",0);

    name.setText(s1);

    age.setText(String.valueOf(a));

  }

  @Override

  protected void onPause() {

    super.onPause();

    SharedPreferences                    sh                    =
getSharedPreferences("MySharedPreference",MODE_PRIVATE);

    SharedPreferences.Editor myEdit=sh.edit();

    myEdit.putString("name",name.getText().toString());

    myEdit.putInt("age", Integer.parseInt(age.getText().toString()));

    myEdit.apply();

  }

}
```

Output:
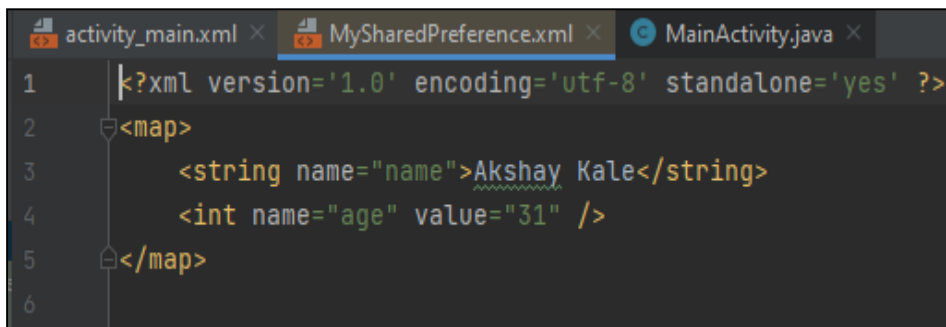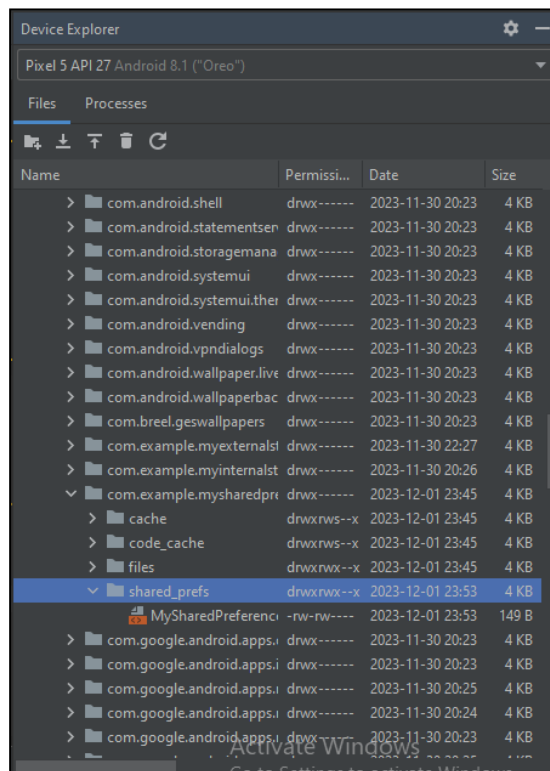

```xml
<?xml version='1.0' encoding='utf-8' standalone='yes' ?>
<map>
    <string name="name">Akshay Kale</string>
    <int name="age" value="31" />
</map>
```

4. Create a login form with a remember me checkbox. Save the username and password if the checkbox is checked using shared preference and show the welcome page when the login button is clicked.

Program:

activity_home_screen.xml

```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"

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

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    android:gravity="center"

    android:orientation="vertical"

    tools:context=".Home_Screen">

    <TextView

        android:id="@+id/tv_display"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:padding="24dp"

        android:text="You are logged In"

        android:textStyle="bold"

        android:textSize="24sp"

        android:textColor="#000000"/>

    <Button

        android:id="@+id/btn_logout"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:textColor="#FFFFFF"

        android:background="#000000"

        android:text="Logout"/>
```

</LinearLayout>

Home_Screen.java

```java
package com.example.login_form_shared_preference;

import  androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;

import android.content.SharedPreferences;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.TextView;

public class Home_Screen extends AppCompatActivity {

TextView tv_display;

Button btn_logout;

SharedPreferences prf;

Intent intent;

  @Override

  protected void onCreate(Bundle savedInstanceState) {

    super.onCreate(savedInstanceState);

    setContentView(R.layout.activity_home_screen);

    tv_display=findViewById(R.id.tv_display);

    btn_logout=findViewById(R.id.btn_logout);

    prf=getSharedPreferences("User_Details",MODE_PRIVATE);

    tv_display.setText("Hello, "+prf.getString("username",null));

    btn_logout.setOnClickListener(new View.OnClickListener() {

      @Override

      public void onClick(View v) {

        SharedPreferences.Editor editor=prf.edit();

        editor.clear();

        editor.commit();
```

```
            intent = new Intent(Home_Screen.this,MainActivity.class);

            startActivity(intent);

        }

    });

    }

}
```

activity_main.xml

```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"

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

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    android:orientation="vertical"

    android:gravity="center_horizontal"

    android:layout_margin="20dp"

    tools:context=".MainActivity">

    <EditText

        android:id="@+id/editTextText"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:ems="10"

        android:inputType="text"

        android:hint="Enter Username"/>

    <EditText

        android:id="@+id/editTextNumberPassword"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:ems="10"
```

```xml
            android:inputType="numberPassword"

            android:hint="Enter Password"/>

        <CheckBox

            android:id="@+id/checkbox"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:text="Remember Me"/>

        <Button

            android:id="@+id/button"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:text="login"/>

</LinearLayout>
```

MainActivity.java

```java
package com.example.login_form_shared_preference;

import  androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;

import android.content.SharedPreferences;

import android.os.Bundle;

import  android.view.View;

import android.widget.Button;

import android.widget.CheckBox;

import android.widget.EditText;

import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

Button login;

EditText name,pwd;

CheckBox remember;

SharedPreferences pref;
```

```java
Intent intent;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        login=findViewById(R.id.button);
        name=findViewById(R.id.editTextText);
        pwd=findViewById(R.id.editTextNumberPassword);
        remember=findViewById(R.id.checkbox);
        pref=getSharedPreferences("User_Details",MODE_PRIVATE);
        intent=new Intent(MainActivity.this,Home_Screen.class);
        if (pref.contains("username") && pref.contains("password")){
            startActivity(intent);
        }
        login.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String username=name.getText().toString();
                String password=pwd.getText().toString();
                if    (username.equals("admin")    &&    password.equals("1234")    &&
remember.isChecked()){
                    SharedPreferences.Editor editor = pref.edit();
                    editor.putString("username",username);
                    editor.putString("password",password);
                    editor.commit();
                    Toast.makeText(getApplicationContext(),"Login
Successful",Toast.LENGTH_LONG).show();
                    startActivity(intent);
                }
                else if (username.equals("admin") && password.equals("1234")){
```

```java
                Toast.makeText(getApplicationContext(),"Login
Successful",Toast.LENGTH_LONG).show();

                startActivity(intent);

            }

            else{

                Toast.makeText(getApplicationContext(),"Invalid
credentials",Toast.LENGTH_LONG).show();

            }

        }

    });

  }

}
```

Output:

When Username and Password are correct and Checkbox is checked
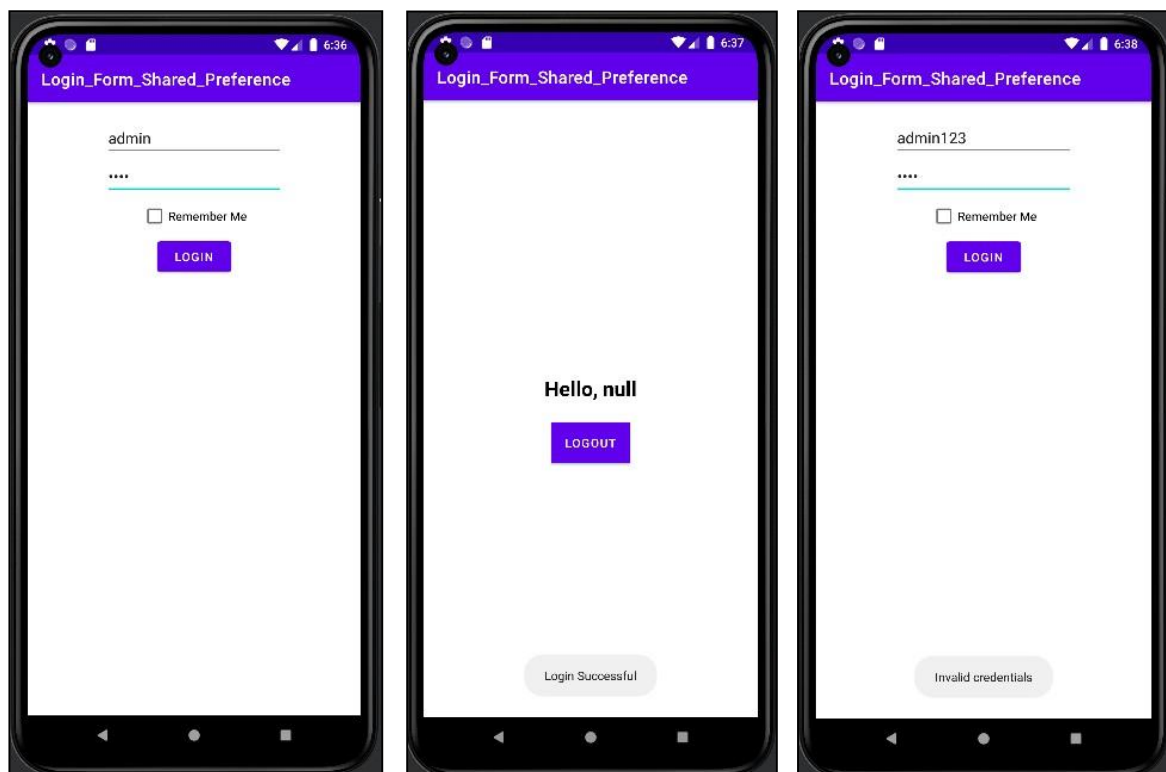
When Username and Password are correct

and Checkbox is't checked

Invalid Credentials entered

5. Create an Android application to insert, update, select, and delete records from the Student table using SQLite Database.

Program:

activity_main.xml

```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"

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

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    android:orientation="vertical"

    android:padding="16dp"

    android:gravity="center_horizontal"

    tools:context=".MainActivity">

    <EditText

        android:id="@+id/et_id"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:layout_marginVertical="8dp"

        android:hint="Student ID"/>

    <EditText

        android:id="@+id/et_name"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:layout_marginVertical="8dp"

        android:hint="Student Name"/>

    <EditText

        android:id="@+id/et_surname"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"
```

```xml
        android:layout_marginVertical="8dp"

        android:hint="Surname"/>

    <EditText

        android:id="@+id/et_marks"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:layout_marginVertical="8dp"

        android:inputType="number"

        android:hint="Marks"/>

    <LinearLayout

        android:id="@+id/btns_add_clear"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:orientation="horizontal"

        android:gravity="center">

        <Button

            android:id="@+id/btn_add"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:layout_margin="12dp"

            android:background="#4CAF50"

            android:textColor="#FFFFFF"

            android:text="Add"/>

        <Button

            android:id="@+id/btn_view"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:layout_margin="12dp"

            android:background="#4CAF50"
```

```xml
            android:textColor="#FFFFFF"

            android:text="View"/>

        <Button

            android:id="@+id/btn_search"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:layout_margin="12dp"

            android:background="#CCF44336"

            android:textColor="#FFFFFF"

            android:text="Search"/>

    </LinearLayout>

    <LinearLayout

        android:id="@+id/btns_update_cancel"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:visibility="visible"

        android:orientation="horizontal"

        android:gravity="center">

        <Button

            android:id="@+id/btn_update"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:layout_margin="12dp"

            android:background="#2196F3"

            android:textColor="#FFFFFF"

            android:text="Update"/>

        <Button

            android:id="@+id/btn_delete"

            android:layout_width="wrap_content"
```

```xml
            android:layout_height="wrap_content"

            android:layout_margin="12dp"

            android:background="#CCF44336"

            android:textColor="#FFFFFF"

            android:text="Delete"/>

        <Button

            android:id="@+id/btn_clear"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:layout_margin="12dp"

            android:background="#4CAF50"

            android:textColor="#FFFFFF"

            android:text="Clear"/>

    </LinearLayout>

</LinearLayout>
```

DatabaseHelper.java

```java
package com.example.crud_operation_using_sqlite;

import android.content.ContentValues;

import android.content.Context;

import android.database.Cursor;

import android.database.sqlite.SQLiteDatabase;

import android.database.sqlite.SQLiteOpenHelper;

import androidx.annotation.Nullable;

public class DatabaseHelper extends SQLiteOpenHelper {

    private SQLiteDatabase sqLiteDatabase;

    public static final String DATABASE_NAME="Student.db";

    public static final String TABLE_NAME="Student";

    public static final String COL_2="NAME";

    public static final String COL_3="SURNAME";
```

```java
    public DatabaseHelper(@Nullable Context context) {

        super(context, DATABASE_NAME, null, 1);



    }
    @Override
    public void onCreate(SQLiteDatabase sqLiteDatabase) {

        sqLiteDatabase.execSQL("create table "+TABLE_NAME+"(ID Integer Primary key
Autoincrement, " +

                "NAME Text, SURNAME Text, MARKS integer)");
    }
    @Override
    public void onUpgrade(SQLiteDatabase sqLiteDatabase,int i, int i1) {

        sqLiteDatabase.execSQL("drop table if exists "+TABLE_NAME);

        onCreate(sqLiteDatabase);
    }
    public boolean insertData(String name, String surname, String marks){

        sqLiteDatabase=getWritableDatabase();

        ContentValues contentValues=new ContentValues();

        contentValues.put(COL_2,name);

        contentValues.put(COL_3,surname);

        contentValues.put("MARKS",marks);

        long result = sqLiteDatabase.insert(TABLE_NAME,null,contentValues);

        if (result==-1)

            return false;

        else

            return true;
    }
    public Cursor getAllStudents(){

        sqLiteDatabase=getReadableDatabase();

        String query = "select * from "+TABLE_NAME;
```

```java
        return sqLiteDatabase.rawQuery(query,null);

    }
    public Cursor getStudentById(Integer id){
        sqLiteDatabase=getReadableDatabase();
        String query = "select * from "+TABLE_NAME+" where ID = "+id;
        return sqLiteDatabase.rawQuery(query,null);
    }
    public void updateData(String id, String name, String surname, String marks){
        sqLiteDatabase=getWritableDatabase();
        ContentValues contentValues=new ContentValues();
        contentValues.put(COL_2,name);
        contentValues.put(COL_3,surname);
        contentValues.put("MARKS",marks);
        sqLiteDatabase.update(TABLE_NAME,contentValues,"ID=? ",new String[]{id});
    }
    public Integer deleteStudent(String id){
        sqLiteDatabase=getWritableDatabase();
        return sqLiteDatabase.delete(TABLE_NAME,"ID=? ",new String[]{id});
    }
}
```

MainActivity.java:

```java
package com.example.crud_operation_using_sqlite;

import androidx.appcompat.app.AlertDialog;

import androidx.appcompat.app.AppCompatActivity;

import android.database.Cursor;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;
```

```java
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

DatabaseHelper databaseHelper;

EditText Id,Name,Surname,marks;

Button btnAdd,btnView,btnSearch,btnUpdate,btnDelete,btnClear;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        databaseHelper=new DatabaseHelper(this);

        Id=findViewById(R.id.et_id);

        Name=findViewById(R.id.et_name);

        Surname=findViewById(R.id.et_surname);

        marks=findViewById(R.id.et_marks);

        btnAdd=findViewById(R.id.btn_add);

        btnView=findViewById(R.id.btn_view);

        btnSearch=findViewById(R.id.btn_search);

        btnUpdate=findViewById(R.id.btn_update);

        btnDelete=findViewById(R.id.btn_delete);

        btnClear=findViewById(R.id.btn_clear);

        btnAdd.setOnClickListener(new View.OnClickListener() {

          @Override

          public void onClick(View v) {

            if
(databaseHelper.insertData(Name.getText().toString(),Surname.getText().toString()

                , marks.getText().toString())){

              Toast.makeText(getApplicationContext(),"Data inserted Successfully...!"

                  ,Toast.LENGTH_SHORT).show();

            }

            else{
```

```java
                    Toast.makeText(getApplicationContext(),"Failed to insert data."

                            ,Toast.LENGTH_SHORT).show();

                }

            }

        });

        btnView.setOnClickListener(new View.OnClickListener() {

            @Override

            public void onClick(View v) {

                Cursor result=databaseHelper.getAllStudents();

                if (result.getCount()==0){

                    Toast.makeText(getApplicationContext(),"No entry exists"

                            ,Toast.LENGTH_SHORT).show();

                    return;

                }

                StringBuffer buffer=new StringBuffer();

                while (result.moveToNext()){

                    buffer.append("ID"+result.getString(0)+"\n");

                    buffer.append("Name"+result.getString(1)+"\n");

                    buffer.append("Surname"+result.getString(2)+"\n");

                    buffer.append("Marks"+result.getString(3)+"\n");

                }

                AlertDialog.Builder builder=new AlertDialog.Builder(MainActivity.this);

                builder.setCancelable(true);

                builder.setMessage(buffer).toString();

                builder.setTitle("Student Data");

                builder.show();

            }

        });

        btnSearch.setOnClickListener(new View.OnClickListener() {
```

```java
        @Override
        public void onClick(View v) {

            Cursor
result=databaseHelper.getStudentById(Integer.parseInt(Id.getText().toString()));

            if (result.getCount()==0){

                Toast.makeText(getApplicationContext(),"No                    Entry
exists.",Toast.LENGTH_SHORT).show();

                return;

            }

            StringBuffer buffer=new StringBuffer();

            while (result.moveToNext()){

                buffer.append("ID"+result.getString(0)+"\n");

                buffer.append("Name"+result.getString(1)+"\n");

                buffer.append("Surname"+result.getString(2)+"\n");

                buffer.append("Marks"+result.getString(3)+"\n");

            }

            AlertDialog.Builder builder=new AlertDialog.Builder(MainActivity.this);

            builder.setCancelable(true);

            builder.setMessage(buffer).toString();

            builder.setTitle("Student"+Id.getText().toString()+"Data");

            builder.show();

            result.moveToFirst();

            Name.setText(result.getString(1));

            Surname.setText(result.getString(2));

            marks.setText(result.getString(3));

        }

    });

    btnUpdate.setOnClickListener(new View.OnClickListener() {

        @Override

        public void onClick(View v) {
```

```java
            databaseHelper.updateData(Id.getText().toString(),Name.getText().toString()
                ,Surname.getText().toString(),marks.getText().toString());
            Toast.makeText(getApplicationContext(),"Student "+Id.getText().toString()
                +" Updated.",Toast.LENGTH_SHORT).show();
        }
    });
    btnDelete.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            if(databaseHelper.deleteStudent(Id.getText().toString())>0){
                Toast.makeText(MainActivity.this,"Student"+Id.getText().toString()
                    +" Deleted.",Toast.LENGTH_SHORT).show();
            }
        }
    });
    btnClear.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            Id.getText().clear();
            Name.getText().clear();
            Surname.getText().clear();
            marks.getText().clear();
        }
    });
    }
}
```

Output:

6. Write a program to create a user registration form, after registration data will be inserted in the SQLite database, and design an activity that displays that information.

Program:

activity_display.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<TextView xmlns:android="http://schemas.android.com/apk/res/android"
    android:id="@+id/tvDisplay"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:gravity="center"
    android:textSize="18sp"/>
```

DisplayActivity.java

```java
package com.example.registration_form_using_sqlite;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;
public class DisplayActivity extends AppCompatActivity {
    private TextView tvDisplay;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_display);
        tvDisplay = findViewById(R.id.tvDisplay);
        displayUserData();
    }
    private void displayUserData() {
        SQLiteDatabase db = new DatabaseHelper(this).getReadableDatabase();
        String[] projection = {
```

```java
                DatabaseContract.UserEntry.COLUMN_USERNAME,

                DatabaseContract.UserEntry.COLUMN_EMAIL

        };

        Cursor cursor = db.query(

                DatabaseContract.UserEntry.TABLE_NAME,

                projection,

                null,

                null,

                null,

                null,

                null

        );

        StringBuilder userData = new StringBuilder();

        while (cursor.moveToNext()) {

            String username = cursor.getString(cursor.getColumnIndexOrThrow(DatabaseContract.UserEntry.COLUMN_USERNAME));

            String email = cursor.getString(cursor.getColumnIndexOrThrow(DatabaseContract.UserEntry.COLUMN_EMAIL));

            userData.append("Username: ").append(username).append("\nEmail: ").append(email).append("\n\n");

        }

        cursor.close();

        tvDisplay.setText(userData.toString());

    }

}
```

DatabaseContract.java

```java
package com.example.registration_form_using_sqlite;

import android.provider.BaseColumns;

public final class DatabaseContract {
```

```java
    private DatabaseContract() {

    }

    public static class UserEntry implements BaseColumns {

        public static final String TABLE_NAME = "users";

        public static final String COLUMN_USERNAME = "username";

        public static final String COLUMN_EMAIL = "email";

        public static final String COLUMN_PASSWORD = "password";

    }

}
```

DatabaseHelper.java

```java
package com.example.registration_form_using_sqlite;

import android.content.Context;

import android.database.sqlite.SQLiteDatabase;

import android.database.sqlite.SQLiteOpenHelper;

public class DatabaseHelper extends SQLiteOpenHelper {

    private static final String DATABASE_NAME = "user.db";

    private static final int DATABASE_VERSION = 1;

    public DatabaseHelper(Context context) {

        super(context, DATABASE_NAME, null, DATABASE_VERSION);

    }

    @Override

    public void onCreate(SQLiteDatabase db) {

        final String SQL_CREATE_USER_TABLE = "CREATE TABLE " +

                DatabaseContract.UserEntry.TABLE_NAME + " (" +

                DatabaseContract.UserEntry._ID + " INTEGER PRIMARY KEY
AUTOINCREMENT, " +

                DatabaseContract.UserEntry.COLUMN_USERNAME + " TEXT NOT NULL, " +

                DatabaseContract.UserEntry.COLUMN_EMAIL + " TEXT NOT NULL, " +

                DatabaseContract.UserEntry.COLUMN_PASSWORD + " TEXT NOT NULL);";
```

```java
        db.execSQL(SQL_CREATE_USER_TABLE);

    }

    @Override

    public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {

        db.execSQL("DROP        TABLE       IF      EXISTS      "        +
DatabaseContract.UserEntry.TABLE_NAME);

        onCreate(db);

    }

}
```

activity_main.xml

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

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

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

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    android:gravity="center_horizontal"

    tools:context=".MainActivity">

    <EditText

        android:id="@+id/etUsername"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:layout_marginTop="16dp"

        android:hint="Username"/>

    <EditText

        android:id="@+id/etEmail"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:layout_below="@id/etUsername"

        android:layout_marginTop="16dp"

        android:hint="Email"/>
```

```xml
    <EditText
        android:id="@+id/etPassword"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/etEmail"
        android:layout_marginTop="16dp"
        android:inputType="textPassword"
        android:hint="Password"/>
    <Button
        android:id="@+id/btnRegister"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@id/etPassword"
        android:layout_marginTop="16dp"
        android:layout_marginLeft="150dp"
        android:text="Register"/>
</RelativeLayout>
```

MainActivity.java

```java
package com.example.registration_form_using_sqlite;

import android.content.ContentValues;

import android.content.Intent;

import android.database.sqlite.SQLiteDatabase;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import android.widget.Toast;

import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {
```

```java
private EditText etUsername, etEmail, etPassword;

private Button btnRegister;

private DatabaseHelper dbHelper;

@Override

protected void onCreate(Bundle savedInstanceState) {

    super.onCreate(savedInstanceState);

    setContentView(R.layout.activity_main);

    etUsername = findViewById(R.id.etUsername);

    etEmail = findViewById(R.id.etEmail);

    etPassword = findViewById(R.id.etPassword);

    btnRegister = findViewById(R.id.btnRegister);

    dbHelper = new DatabaseHelper(this);

    btnRegister.setOnClickListener(new View.OnClickListener() {

        @Override

        public void onClick(View view) {

            registerUser();

        }

    });

}

private void registerUser() {

    String username = etUsername.getText().toString().trim();

    String email = etEmail.getText().toString().trim();

    String password = etPassword.getText().toString().trim();

    if (username.isEmpty() || email.isEmpty() || password.isEmpty()) {

        Toast.makeText(this, "Please fill in all fields", Toast.LENGTH_SHORT).show();

        return;

    }

    SQLiteDatabase db = dbHelper.getWritableDatabase();

    ContentValues values = new ContentValues();
```

```
    values.put(DatabaseContract.UserEntry.COLUMN_USERNAME, username);

    values.put(DatabaseContract.UserEntry.COLUMN_EMAIL, email);

    values.put(DatabaseContract.UserEntry.COLUMN_PASSWORD, password);

    long newRowId = db.insert(DatabaseContract.UserEntry.TABLE_NAME, null, values);

    if (newRowId != -1) {

        Toast.makeText(this, "Registration successful!", Toast.LENGTH_SHORT).show();

        Intent intent=new Intent(getApplicationContext(),DisplayActivity.class);

        startActivity(intent);

    } else {

        Toast.makeText(this, "Registration failed", Toast.LENGTH_SHORT).show();

    }

  }

}
```

Output:
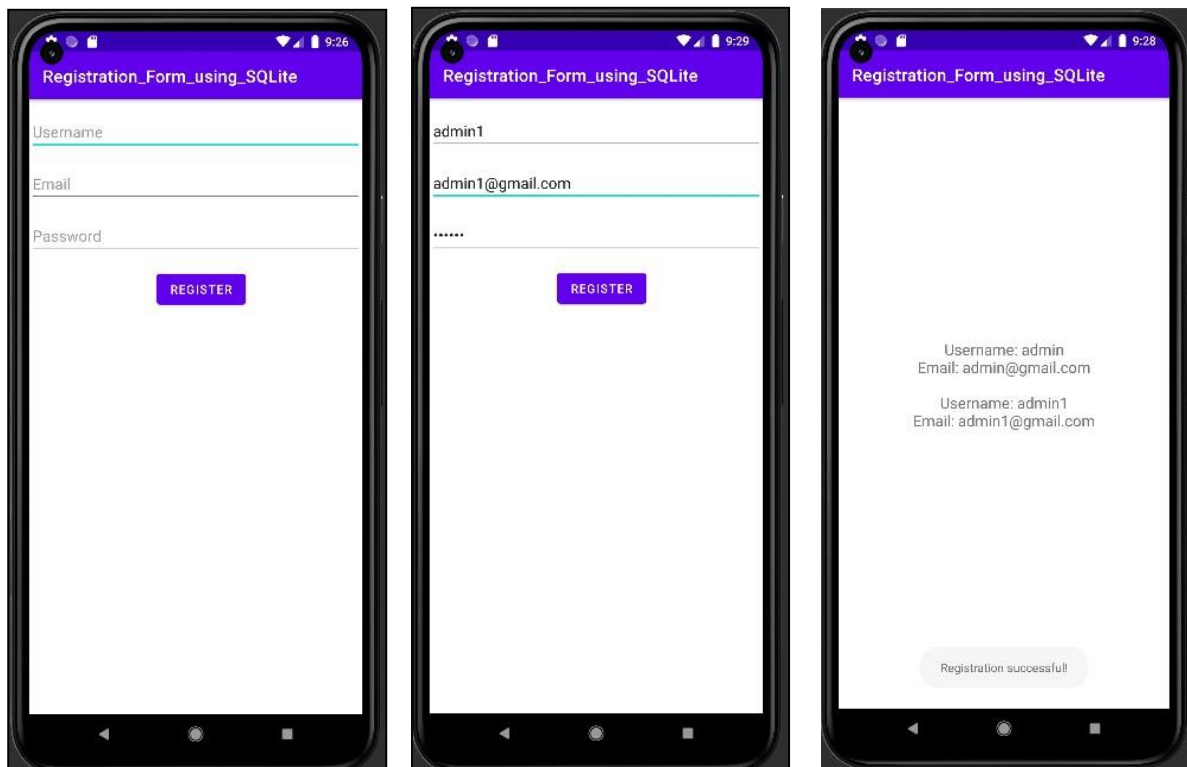
7. Create an Android application that reads all contacts stored in the device using a content provider.

Program:

activity_main.xml

```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"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="20dp"
    tools:context=".MainActivity">
    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:scrollbars="vertical"/>
    <Button
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Get Contacts"
        android:onClick="GetContact"/>
</LinearLayout>
```

MainActivity.java

```java
package com.example.my_content_provider;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;
import android.Manifest;
```

```java
import android.annotation.SuppressLint;

import android.content.ContentResolver;

import android.content.pm.PackageManager;

import android.database.Cursor;

import android.net.Uri;

import android.os.Bundle;

import android.provider.ContactsContract;

import android.text.method.ScrollingMovementMethod;

import android.view.View;

import android.widget.TextView;

import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

TextView tv;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        tv=findViewById(R.id.textView);

    }

    @SuppressLint("Range")

    public void GetContact(View view){

        if(ContextCompat.checkSelfPermission(this,
Manifest.permission.READ_CONTACTS)!= PackageManager.PERMISSION_GRANTED){

            ActivityCompat.requestPermissions(this,new String[]{

                Manifest.permission.READ_CONTACTS

            },10);

        }

        ContentResolver contentResolver=getContentResolver();

        Uri uri= ContactsContract.CommonDataKinds.Phone.CONTENT_URI;

        Cursor cursor=contentResolver.query(uri,null,null,null);
```

```java
        if(cursor.getCount()>0){

            while (cursor.moveToNext()){

                String contactName;

contactName=cursor.getString(cursor.getColumnIndex(ContactsContract.CommonDataKinds.Phone.DISPLAY_NAME));

                String
contactNumber=cursor.getString(cursor.getColumnIndex(ContactsContract.CommonDataKinds.Phone.NUMBER));

                tv.append("Name - "+contactName+" Number - "+contactNumber+" \n ");

            }

            tv.setMovementMethod(new ScrollingMovementMethod());

        }

        else

            Toast.makeText(getApplicationContext(),"No          Contacts     in     device
...",Toast.LENGTH_LONG).show();

    }

}
```

AndroidManifest.xml

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

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

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

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

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

    <application

        android:allowBackup="true"

        android:dataExtractionRules="@xml/data_extraction_rules"

        android:fullBackupContent="@xml/backup_rules"

        android:icon="@mipmap/ic_launcher"

        android:label="@string/app_name"

        android:roundIcon="@mipmap/ic_launcher_round"
```

```xml
        android:supportsRtl="true"

        android:theme="@style/Theme.My_Content_Provider"

        tools:targetApi="31">

        <activity

            android:name=".MainActivity"

            android:exported="true">

            <intent-filter>

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

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

            </intent-filter>

        </activity>

    </application>

</manifest>
```
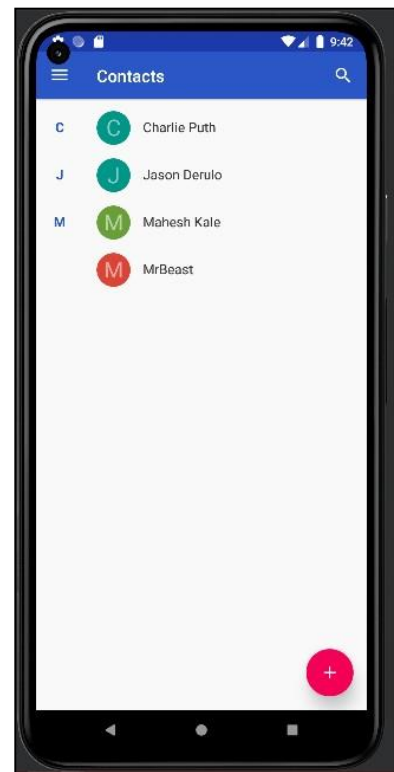
Output:
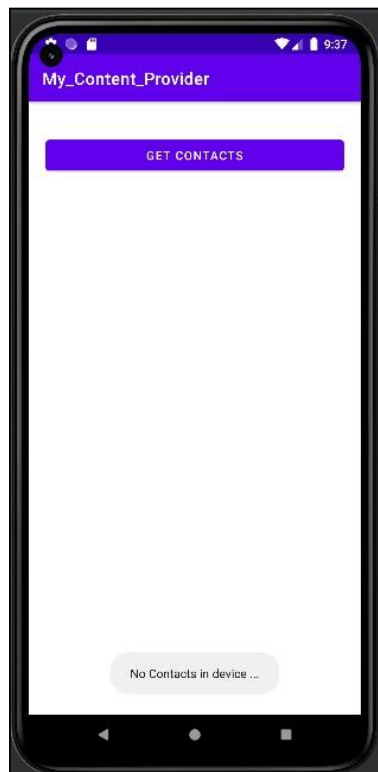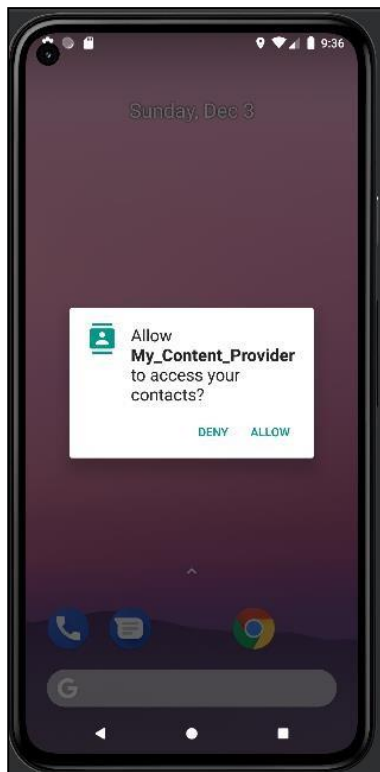
When no contacts are Stored

in Device

Saving Contact Details in Phone
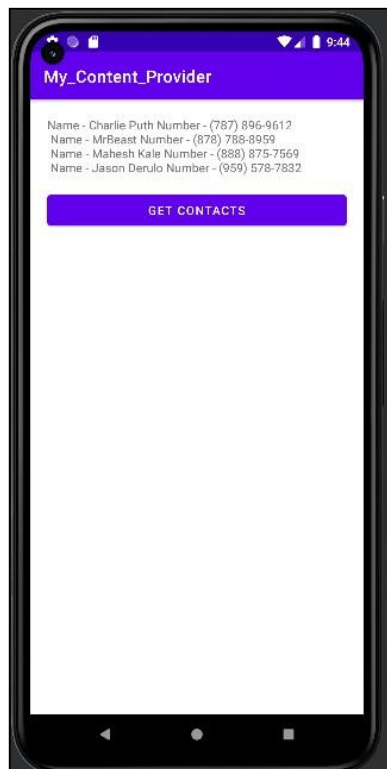
4. Graphics and animation, Multimedia

1. Write an Android application to play, pause, and stop an audio file.

Program:

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="@drawable/img"
    tools:context=".MainActivity">
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_marginTop="100dp"
        android:padding="10dp"
        android:orientation="horizontal">
        <Button
            android:id="@+id/btnPlay"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:backgroundTint="#8BC34A"
            android:layout_marginRight="10dp"
            android:textColor="#000"
            android:text="PLAY" />
        <Button
            android:id="@+id/btnPause"
```

```xml
            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:layout_marginRight="10dp"

            android:layout_weight="1"

            android:textColor="#000"

            android:backgroundTint="#FFC107"

            android:text="PAUSE" />

        <Button

            android:id="@+id/btnStop"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:layout_weight="1"

            android:textColor="#000"

            android:backgroundTint="#E8190A"

            android:text="STOP" />

    </LinearLayout>

</RelativeLayout>
```

MainActivity.java

```java
package com.example.audio_application;

import androidx.appcompat.app.AppCompatActivity;

import android.media.MediaPlayer;

import android.os.Bundle;

import android.view.View;

public class MainActivity extends AppCompatActivity {

MediaPlayer mp;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);
```

```java
        setContentView(R.layout.activity_main);
        findViewById(R.id.btnPlay).setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if(mp==null){
                    mp= MediaPlayer.create(getApplicationContext(),R.raw.song);
                }
                mp.start();
            }
        });
        findViewById(R.id.btnPause).setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if(mp!=null){
                    mp.pause();
                }
            }
        });
        findViewById(R.id.btnStop).setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (mp!=null){
                    mp.release();
                }
            }
        });
    }
}
```

Output:

2. Write an Android application to play a video with Media controller.
Program:

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<FrameLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <VideoView
        android:id="@+id/videoView"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"/>
</FrameLayout>
```

MainActivity.java

```java
package com.example.video_application;
import androidx.appcompat.app.AppCompatActivity;
import android.annotation.SuppressLint;
import android.net.Uri;
import android.os.Bundle;
import android.widget.MediaController;
import android.widget.VideoView;
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        @SuppressLint({"MissingInflatedID","LocalSuppress"}) VideoView videoView =
findViewById(R.id.videoView);
```

```java
        String videoPath = "android.resource://"+getPackageName()+"/"+R.raw.video;

        Uri uri = Uri.parse(videoPath);

        videoView.setVideoURI(uri);

        MediaController mediaController = new MediaController(this);

        videoView.setMediaController(mediaController);

        mediaController.setAnchorView(videoView);

    }

}
```

Output:
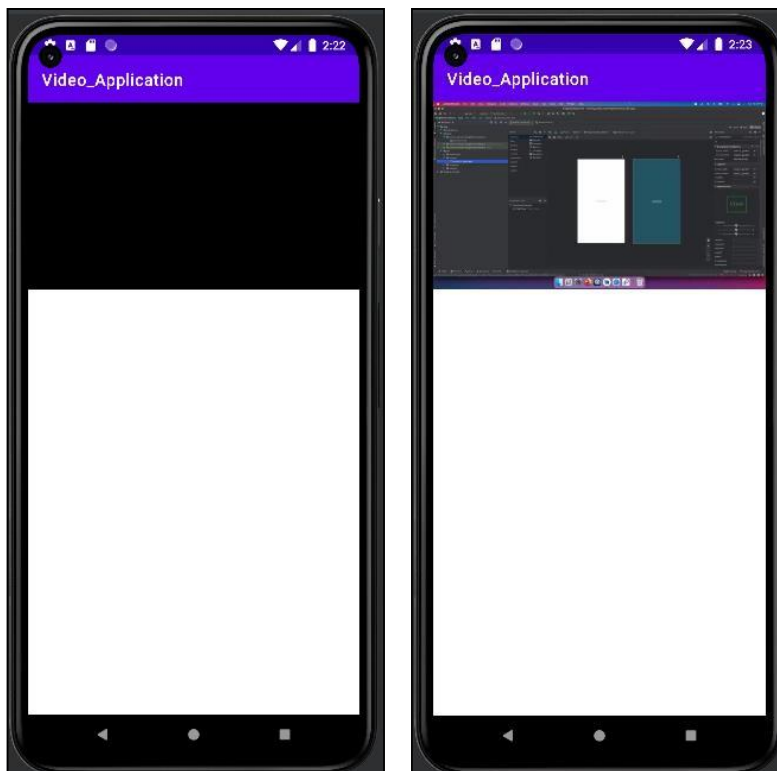
3. Create an Android application to draw graphics(different shapes) on canvas. Include an option menu to display various graphics options.

Program:

activity_main.xml:

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

<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"

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

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

   android:layout_width="match_parent"

   android:layout_height="match_parent"

   tools:context=".MainActivity">

</androidx.constraintlayout.widget.ConstraintLayout>

menu.xml:

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

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

   <item

     android:id="@+id/draw_item1"

     android:title="Draw Line" />

   <item

     android:id="@+id/draw_item2"

     android:title="Draw Rectangle" />

   <item

     android:id="@+id/draw_item3"

     android:title="Draw Circle" />

   <item

     android:id="@+id/draw_item4"

     android:title="Draw Arc" />

   <item

     android:id="@+id/draw_item5"

```
                  android:title="Draw Image" />
```

```xml
</menu>
```

DrawRectangle.java:

```java
package com.example.graphics_on_canvas;

import android.content.Context;

import android.graphics.Canvas;

import android.graphics.Color;

import android.graphics.Paint;

import android.view.View;

public class DrawRectangle extends View {

    private Paint paint;

    public DrawRectangle(Context context) {

        super(context);

        init();

    }

    private void init() {

        // Initialize Paint

        paint = new Paint();

        paint.setColor(Color.MAGENTA);

        paint.setStrokeWidth(25);

        paint.setStyle(Paint.Style.STROKE); // Set the style to Stroke for drawing the outline of
the rectangle

    }

    @Override

    protected void onDraw(Canvas canvas) {

        super.onDraw(canvas);

        // Draw Rectangle

        canvas.drawRect(60, 60, 600, 1000, paint);

    }

}
```

DrawLine.java

```java
package com.example.graphics_on_canvas;

import android.content.Context;

import android.graphics.Canvas;

import android.graphics.Color;

import android.graphics.Paint;

import android.view.View;

public class DrawLine extends View {

    private Paint paint;

    public DrawLine(Context context) {

        super(context);

        init();

    }

    private void init() {

        // Initialize Paint

        paint = new Paint();

        paint.setColor(Color.BLACK);

        paint.setStrokeWidth(20);

    }

    @Override

    protected void onDraw(Canvas canvas) {

        super.onDraw(canvas);

        // Draw Line

        //canvas.drawLine(50, 100, 900, 600, paint);

        canvas.drawLine(50, 550, 770, 0, paint);

    }

}
```

DrawCircle.java:

```java
package com.example.graphics_on_canvas;
```

```java
import android.content.Context;

import android.graphics.Canvas;

import android.graphics.Color;

import android.graphics.Paint;

import android.view.View;

public class DrawCircle extends View {

    private Paint paint;

    public DrawCircle(Context context) {

        super(context);

        init();

    }

    private void init() {

        // Initialize Paint

        paint = new Paint();

        paint.setColor(Color.BLUE);

        paint.setStrokeWidth(35);

        paint.setStyle(Paint.Style.STROKE); // Set the style to Stroke for drawing the circle outline

    }

    @Override

    protected void onDraw(Canvas canvas) {

        super.onDraw(canvas);

        // Draw Circle

        canvas.drawCircle(400, 400, 300, paint);

    }

}
```

DrawArc.java:

```java
package com.example.graphics_on_canvas;

import android.content.Context;

import android.graphics.Canvas;
```

```java
import android.graphics.Color;

import android.graphics.Paint;

import android.view.View;

public class DrawArc extends View {

    private Paint paint;

    public DrawArc(Context context) {

        super(context);

        init();

    }

    private void init() {

        // Initialize Paint

        paint = new Paint();

        paint.setColor(Color.RED);

        paint.setStyle(Paint.Style.STROKE); // Set the style to Stroke for drawing the arc outline

        paint.setStrokeWidth(15);

    }

    @Override

    protected void onDraw(Canvas canvas) {

        super.onDraw(canvas);

        // Draw Arc

        paint.setColor(Color.RED);

        canvas.drawArc(50, 200, 400, 400, 30, 100, true, paint);

        //paint.setColor(Color.CYAN); // Setting a different color for the second arc

        //canvas.drawArc(50, 450, 900, 900, 30, 100, false, paint);

    }

}
```

DrawImage.java:

package com.example.graphics_on_canvas;

import android.content.Context;

```java
import android.graphics.Bitmap;

import android.graphics.BitmapFactory;

import android.graphics.Canvas;

import android.graphics.Paint;

import android.view.View;

public class DrawImage extends View {

    private Paint paint;

    public DrawImage(Context context) {

        super(context);

        init();

    }

    private void init() {

        // Initialize Paint

        paint = new Paint();

    }

    @Override

    protected void onDraw(Canvas canvas) {

        super.onDraw(canvas);

        // Draw Image

        Bitmap bitmap = BitmapFactory.decodeResource(getResources(), R.drawable.img);

        canvas.drawBitmap(bitmap, 50, 75, paint);

    }

}
```

MainActivity.java:

```java
package com.example.graphics_on_canvas;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import android.view.Menu;

import android.view.MenuInflater;
```

```java
import android.view.MenuItem;
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }
    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        MenuInflater inflater = getMenuInflater();
        inflater.inflate(R.menu.menu, menu);
        return super.onCreateOptionsMenu(menu);
    }
    @Override
    public boolean onOptionsItemSelected(MenuItem item) {
        if (item.getItemId() == R.id.draw_item1) {
            DrawLine drawLine = new DrawLine(this);
            setContentView(drawLine);
        } else if (item.getItemId() == R.id.draw_item2) {
            DrawRectangle drawRectangle = new DrawRectangle(this);
            setContentView(drawRectangle);
        } else if (item.getItemId() == R.id.draw_item3) {
            setContentView(new DrawCircle(this));
        } else if (item.getItemId() == R.id.draw_item4) {
            setContentView(new DrawArc(this));
        } else if (item.getItemId() == R.id.draw_item5) {
            setContentView(new DrawImage(this));
        }
        return super.onOptionsItemSelected(item);
```
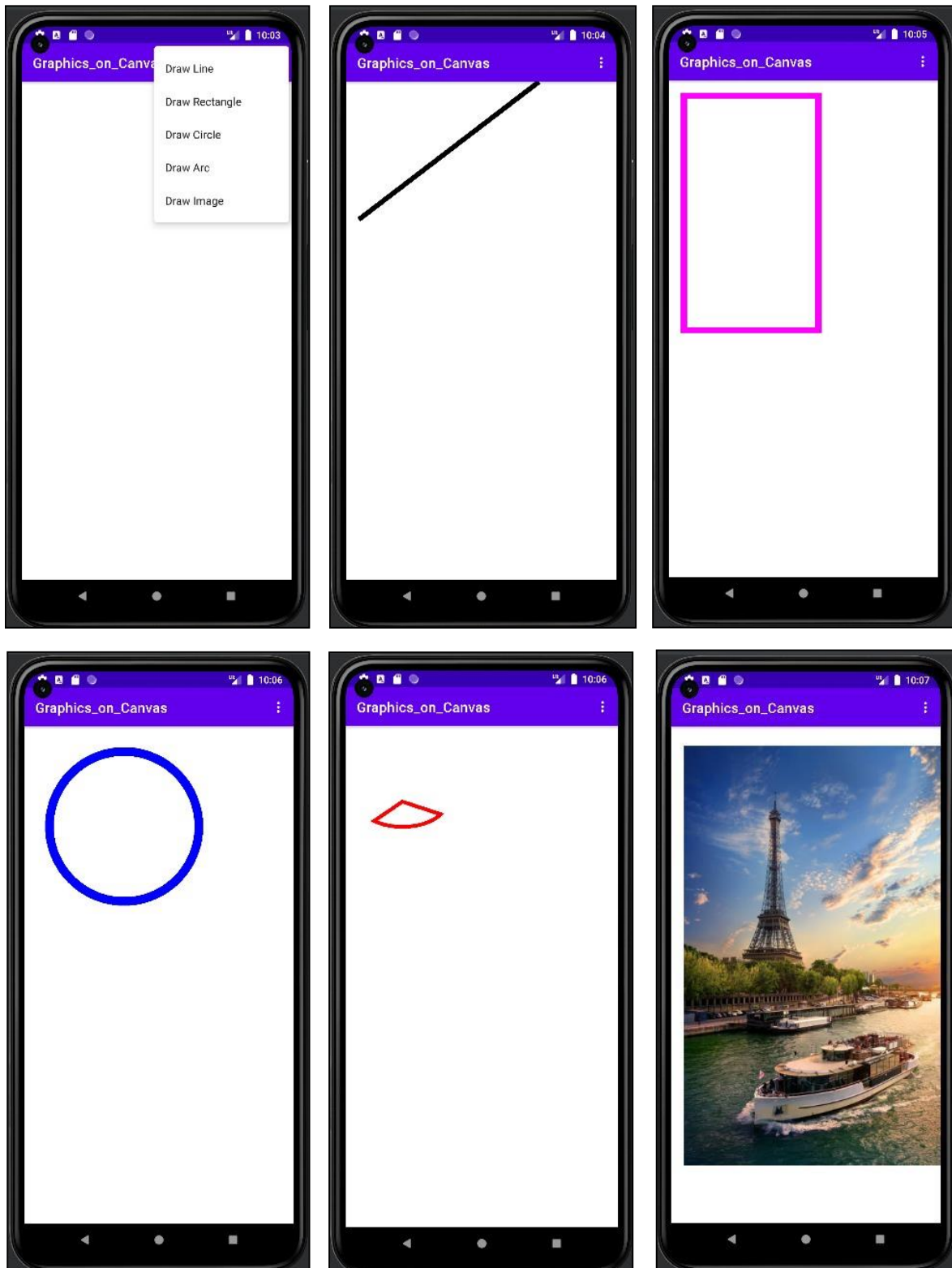
```
        }

}
```

Output:

4. Create an android application that applies different animations on an image.
Program:

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <ImageView
        android:id="@+id/imageView"
        android:layout_width="350dp"
        android:layout_height="350dp"
        android:layout_alignParentEnd="true"
        android:layout_marginStart="20dp"
        android:layout_marginEnd="25dp"
        android:layout_marginBottom="20dp"
        android:src="@drawable/img" />
    <Button
        android:id="@+id/animStart"
        android:layout_width="150dp"
        android:layout_height="wrap_content"
        android:layout_marginTop="25dp"
        android:layout_below="@id/imageView"
        android:layout_marginLeft="25dp"
        android:text="Start Animation" />
    <Button
        android:id="@+id/animStop"
        android:layout_width="150dp"
```

```xml
            android:layout_marginLeft="5dp"

            android:layout_height="wrap_content"

            android:layout_marginRight="25dp"

            android:layout_below="@+id/imageView"

            android:layout_toRightOf="@+id/animStart"

            android:layout_marginTop="25dp"

            android:text="Clear Animation" />

    <LinearLayout

        android:layout_width="match_parent"

        android:layout_height="match_parent"

        android:orientation="vertical"

        android:gravity="bottom|center_horizontal"

        android:layout_marginBottom="90dp">

        <Button

            android:id="@+id/button5"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:text="Fade In" />

        <Button

            android:id="@+id/button6"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:text="Blink" />

        <Button

            android:id="@+id/button7"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:text="Expand" />

        <Button
```

```xml
        android:id="@+id/button8"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:text="Expand with Rotation" />

    </LinearLayout>

</RelativeLayout>
```

fade_in.xml:

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

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

    android:fillAfter="true">

    <alpha android:fromAlpha="0.0"

        android:toAlpha="1.0"

        android:interpolator="@android:anim/accelerate_interpolator"

        android:duration="5000"/>

</set>
```

blink.xml:

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

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

    <alpha android:fromAlpha="0.0"

        android:toAlpha="1.0"

        android:interpolator="@android:anim/accelerate_interpolator"

        android:duration="600"

        android:repeatMode="reverse"

        android:repeatCount="infinite"/>

</set>
```

expand.xml:

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

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

    <scale android:fromXScale="0"
```

```
        android:toXScale="2"

        android:fromYScale="0"

        android:toYScale="2"

        android:pivotX="70%"

        android:pivotY="70%"

        android:repeatCount="infinite"

        android:duration="2000"/>

</set>
```

expand_with_rotation.xml:

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

    <scale android:fromXScale="0"

        android:toXScale="1"

        android:fromYScale="0"

        android:toYScale="1"

        android:pivotX="50%"

        android:pivotY="50%"

        android:duration="2000"/>

    <rotate

        android:fromDegrees="0"

        android:toDegrees="360"

        android:pivotX="50%"

        android:pivotY="50%"

        android:repeatCount="0"

        android:duration="25000"/>

</set>
```

MainActivity.java:

```java
package com.example.animation_on_image;

import androidx.appcompat.app.AppCompatActivity;
```

```java
import android.os.Bundle;

import android.view.View;

import android.view.animation.Animation;

import android.view.animation.AnimationUtils;

import android.widget.ImageView;

public class MainActivity extends AppCompatActivity {

    ImageView img;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        img=findViewById(R.id.imageView);

        findViewById(R.id.animStart).setOnClickListener(new View.OnClickListener() {

            @Override

            public void onClick(View view) {Animation animation = AnimationUtils.loadAnimation(MainActivity.this,R.anim.fade_in);img.startAnimation(animation);

            }

        });

        findViewById(R.id.animStop).setOnClickListener(new View.OnClickListener() {

            @Override

            public void onClick(View view) { img.clearAnimation();}

        });

        findViewById(R.id.button5).setOnClickListener(new View.OnClickListener() {

            @Override

            public void onClick(View view) {Animation animation = AnimationUtils.loadAnimation(MainActivity.this,R.anim.fade_in);img.startAnimation(animation);

            }

        });

        findViewById(R.id.button6).setOnClickListener(new View.OnClickListener() {
```

```java
        @Override

        public        void        onClick(View        view)        {Animation        animation        =
AnimationUtils.loadAnimation(MainActivity.this,R.anim.blink);img.startAnimation(animati
on);

        }

    });

    findViewById(R.id.button7).setOnClickListener(new View.OnClickListener() {

        @Override

        public        void        onClick(View        view)        {Animation        animation        =
AnimationUtils.loadAnimation(MainActivity.this,R.anim.expand);img.startAnimation(anima
tion);

        }

    });

    findViewById(R.id.button8).setOnClickListener(new View.OnClickListener() {

        @Override

        public        void        onClick(View        view)        {Animation        animation        =
AnimationUtils.loadAnimation(MainActivity.this,R.anim.expand_with_rotation);img.startAn
imation(animation);

        }

    });

  }

}
```
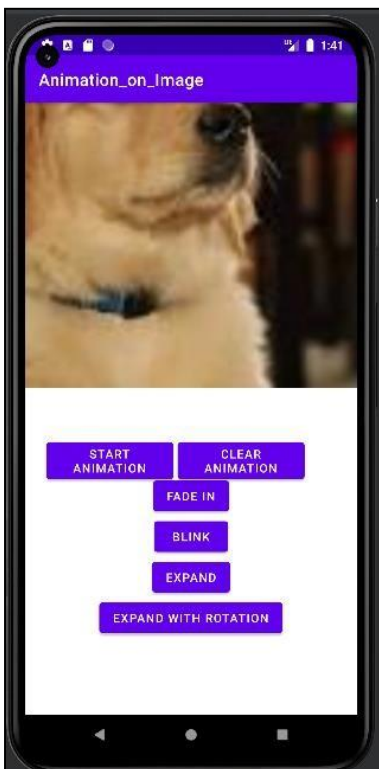
Output:

Fade In

Blink

Expand

Expand with rotation

5. Create an Android application to implement frame animation.

Program:

activity_main.xml:

```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"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="vertical"
    android:gravity="center"
    tools:context=".MainActivity">
    <ImageView
        android:id="@+id/imageView"
        android:layout_width="match_parent"
        android:layout_height="200dp"
        android:src="@drawable/running"/>
    <Button
        android:id="@+id/btn"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:backgroundTint="#8BC34A"
        android:textColor="#000"
        android:text="Start" />
</LinearLayout>
```

running.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<animation-list xmlns:android="http://schemas.android.com/apk/res/android">
    <item android:drawable="@drawable/one" android:duration="100"/>
```

```xml
    <item android:drawable="@drawable/two" android:duration="100"/>

    <item android:drawable="@drawable/three" android:duration="100"/>

    <item android:drawable="@drawable/four" android:duration="100"/>

</animation-list>
```

MainActivity.java:

```java
package com.example.framebyframeanimation;

import androidx.appcompat.app.AppCompatActivity;

import android.graphics.drawable.AnimationDrawable;

import android.os.Bundle;

import android.view.View;

import android.view.animation.Animation;

import android.widget.Button;

import android.widget.ImageView;

public class MainActivity extends AppCompatActivity {

    ImageView img;

    Button btnStartStop;

    AnimationDrawable animation;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        img=findViewById(R.id.imageView);

        btnStartStop=findViewById(R.id.btn);

        animation=(AnimationDrawable) img.getDrawable();

        btnStartStop.setOnClickListener(new View.OnClickListener() {

            @Override

            public void onClick(View view) {

                if(animation.isRunning()){

                    animation.stop();
```
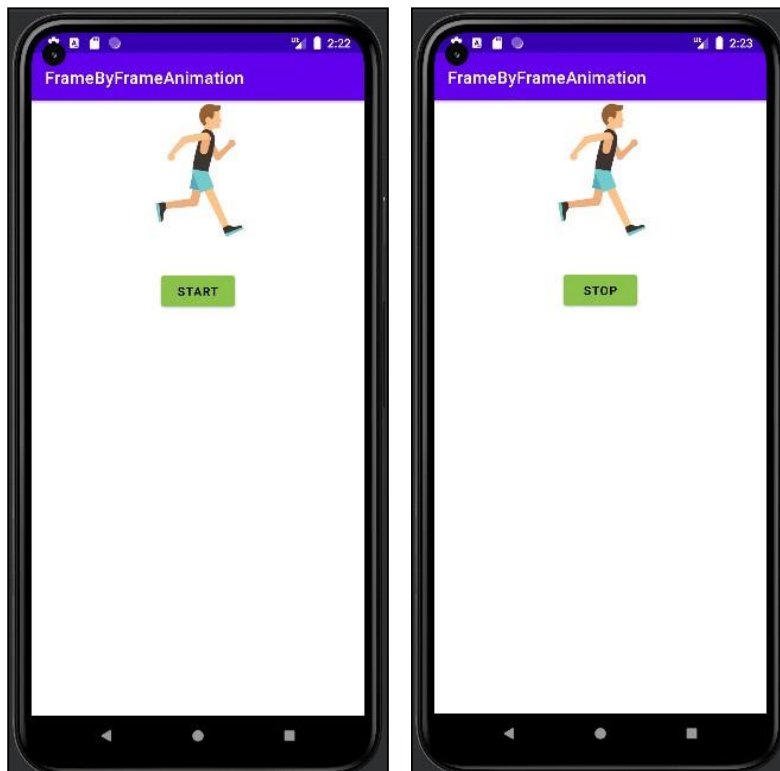
```
            btnStartStop.setText("Start");

            return;

        }

        animation.start();

        btnStartStop.setText("Stop");

        //btnStartStop.setBackgroundColor();

    }

  });

  }

}
```

Output:

5. Location Based Services

1. Create an Android application to display the current location of your device (display longitude and latitude values).
Program:

activity_main.xml

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

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

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

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

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    tools:context=".MainActivity">

    <TextView

        android:id="@+id/textView"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:height="50dp"

        android:text="" />

    <Button

        android:id="@+id/button"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:layout_marginTop="100dp"

        android:layout_marginLeft="150dp"

        android:layout_weight="1"

        android:text="Button" />

</RelativeLayout>
```

AndroidManifest.xml

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

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

```xml
    xmlns:tools="http://schemas.android.com/tools">

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

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

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

    <application

        android:allowBackup="true"

        android:dataExtractionRules="@xml/data_extraction_rules"

        android:fullBackupContent="@xml/backup_rules"

        android:icon="@mipmap/ic_launcher"

        android:label="@string/app_name"

        android:roundIcon="@mipmap/ic_launcher_round"

        android:supportsRtl="true"

        android:theme="@style/Theme.Location_Tracking"

        tools:targetApi="31">

        <activity

            android:name=".MainActivity"

            android:exported="true">

            <intent-filter>

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

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

            </intent-filter>

        </activity>

    </application>

</manifest>
```

MainActivity.java

```java
package com.example.location_tracking;

import androidx.annotation.NonNull;

import androidx.appcompat.app.AppCompatActivity;

import androidx.core.app.ActivityCompat;
```

```java
import androidx.core.content.ContextCompat;

import android.Manifest;

import android.annotation.SuppressLint;

import android.content.pm.PackageManager;

import android.location.Location;

import android.location.LocationListener;

import android.location.LocationManager;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.TextView;

public class MainActivity extends AppCompatActivity implements LocationListener {

    Button button;

    TextView textview;

    LocationManager locationManager;

    @SuppressLint("MissingInflatedId")

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        textview=findViewById(R.id.textView);

        button=findViewById(R.id.button);

        if(ContextCompat.checkSelfPermission(MainActivity.this,

            Manifest.permission.ACCESS_FINE_LOCATION)!=
PackageManager.PERMISSION_GRANTED)

        {

            ActivityCompat.requestPermissions(MainActivity.this, new String[]{

                Manifest.permission.ACCESS_FINE_LOCATION,

                Manifest.permission.ACCESS_COARSE_LOCATION,

            },100);
```

```java
        }
        button.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                getLocation();


            }
        });
    }
    @SuppressLint("MissingPermission")
    private void getLocation()
    {
        try {
            locationManager=(LocationManager)
getApplicationContext().getSystemService(LOCATION_SERVICE);

locationManager.requestLocationUpdates(LocationManager.NETWORK_PROVIDER,
5000, 5, (LocationListener) this);
        }
        catch (Exception e){
            e.printStackTrace();
        }
    }
    @SuppressLint("SetTextI18n")
    @Override
    public void onLocationChanged(@NonNull Location location) {
        textview.setText("Latitude:"              +              location.getLatitude()+"\nLongitude:
"+location.getLongitude());
    }
}
```
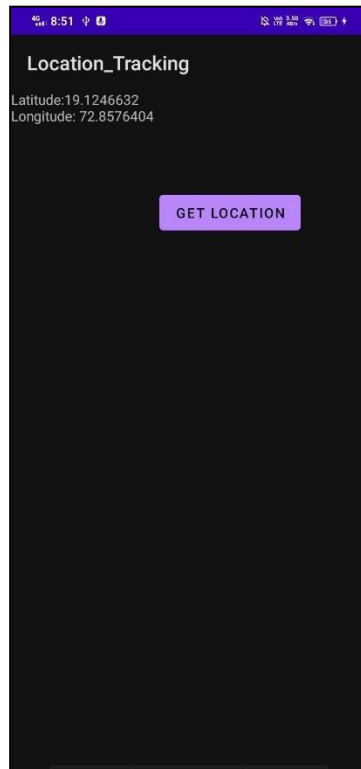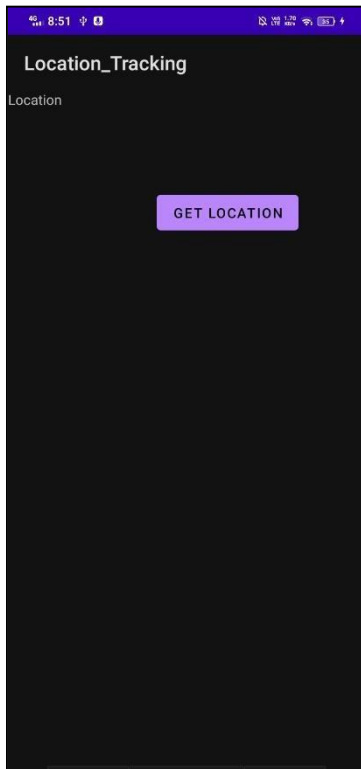
Output:

2. Create an Android application that displays the current location of your device from longitude and latitude values(Reverse Geocoding).
Program:

activity_main.xml

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

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

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

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    android:paddingLeft="16dp"

    android:paddingTop="16dp"

    android:paddingRight="16dp"

    android:paddingBottom="16dp"

    tools:context=".MainActivity">

    <TextView

        android:id="@+id/locationTextView"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:text="Location: "

        android:textSize="18sp"

        android:textStyle="bold"/>

</RelativeLayout>
```

MainActivity.java

```java
package com.example.currentlocation;

import android.Manifest;

import android.content.pm.PackageManager;

import android.location.Address;

import android.location.Geocoder;

import android.location.Location;

import android.os.Bundle;
```

```java
import android.widget.TextView;

import android.widget.Toast;

import androidx.annotation.NonNull;

import androidx.appcompat.app.AppCompatActivity;

import androidx.core.app.ActivityCompat;

import androidx.core.content.ContextCompat;

import java.io.IOException;

import java.util.List;

import java.util.Locale;

public class MainActivity extends AppCompatActivity {

    private static final int LOCATION_PERMISSION_REQUEST_CODE = 1;

    private TextView locationTextView;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        locationTextView = findViewById(R.id.locationTextView);

        // Check for location permissions

        if                                    (ContextCompat.checkSelfPermission(this,
Manifest.permission.ACCESS_FINE_LOCATION)

                != PackageManager.PERMISSION_GRANTED) {

            // Permission is not granted, request it

            ActivityCompat.requestPermissions(

                    this,

                    new String[]{Manifest.permission.ACCESS_FINE_LOCATION},

                    LOCATION_PERMISSION_REQUEST_CODE

            );

        } else {

            // Permission is granted, get the location

            getLocation();
```

```java
        }
    }
    private void getLocation() {
        // TODO: Get the current location (latitude and longitude)
        // Example: Assume latitude and longitude are known
        double latitude = 18.992012;
        double longitude = 75.776138;
        // Display the location
        displayLocation(latitude, longitude);
    }
    private void displayLocation(double latitude, double longitude) {
        // Reverse geocode the location to get address
        Geocoder geocoder = new Geocoder(this, Locale.getDefault());
        try {
            List<Address> addresses = geocoder.getFromLocation(latitude, longitude, 1);
            if (!addresses.isEmpty()) {
                Address address = addresses.get(0);
                String location = "Location: " + address.getAddressLine(0);
                locationTextView.setText(location);
            } else {
                locationTextView.setText("Location not found");
            }
        } catch (IOException e) {
            e.printStackTrace();
            Toast.makeText(this, "Error getting location", Toast.LENGTH_SHORT).show();
        }
    }
    @Override
    public void onRequestPermissionsResult(int requestCode, @NonNull String[] permissions,
@NonNull int[] grantResults) {
```

```java
        super.onRequestPermissionsResult(requestCode, permissions, grantResults);

        if (requestCode == LOCATION_PERMISSION_REQUEST_CODE) {

            if (grantResults.length > 0 && grantResults[0] ==
PackageManager.PERMISSION_GRANTED) {

                // Permission granted, get the location

                getLocation();

            } else {

                Toast.makeText(this, "Location permission denied",
Toast.LENGTH_SHORT).show();

            }

        }

    }

}
```
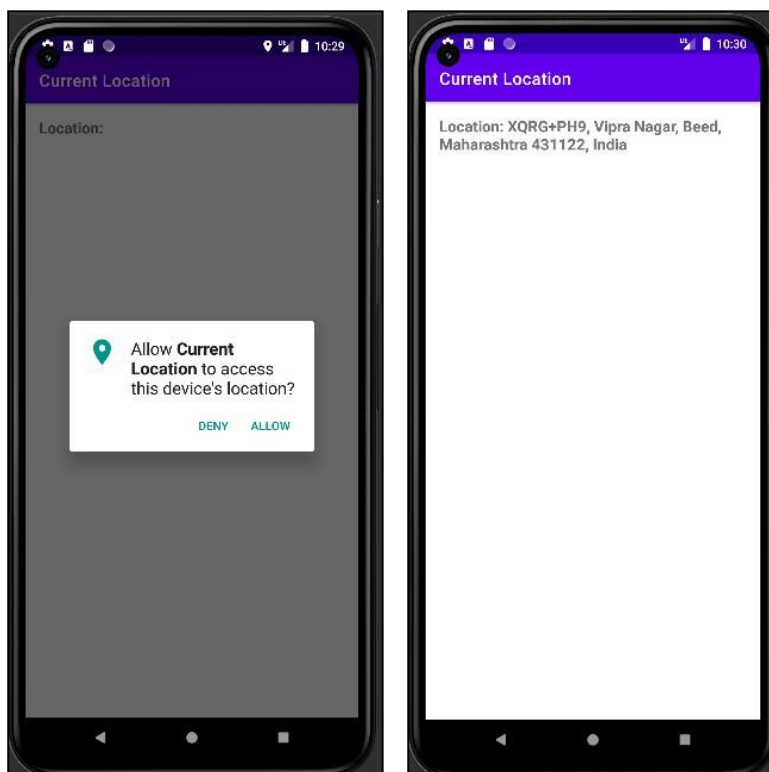
AndroidManifest.xml

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

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

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

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

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

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

    <application

        android:allowBackup="true"

        android:dataExtractionRules="@xml/data_extraction_rules"

        android:fullBackupContent="@xml/backup_rules"

        android:icon="@mipmap/ic_launcher"

        android:label="@string/app_name"

        android:roundIcon="@mipmap/ic_launcher_round"

        android:supportsRtl="true"

        android:theme="@style/Theme.CurrentLocation"
```

```
    tools:targetApi="31">

    <activity

      android:name=".MainActivity"

      android:exported="true">

      <intent-filter>

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

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

      </intent-filter>

    </activity>

  </application>

</manifest>
```

Output:

3. Create an Android application that accepts longitude and latitude from the user and marks that location on google map.
Program:

activity_main.xml

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

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

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

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    android:paddingLeft="16dp"

    android:paddingTop="16dp"

    android:paddingRight="16dp"

    android:paddingBottom="16dp"

    tools:context=".MainActivity">

    <EditText

        android:id="@+id/latitudeEditText"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:hint="Latitude"/>

    <EditText

        android:id="@+id/longitudeEditText"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"

        android:layout_below="@id/latitudeEditText"

        android:layout_marginTop="16dp"

        android:hint="Longitude"/>

    <Button

        android:id="@+id/showLocationButton"

        android:layout_width="match_parent"

        android:layout_height="wrap_content"
```

```xml
        android:layout_below="@id/longitudeEditText"

        android:layout_marginTop="16dp"

        android:text="Show Location on Map"/>

</RelativeLayout>
```

MainActivity.java

```java
package com.example.map_location;

import  android.content.Intent;

import android.net.Uri;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {

    private EditText latitudeEditText;

    private EditText longitudeEditText;

    private Button showLocationButton;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        latitudeEditText = findViewById(R.id.latitudeEditText);

        longitudeEditText = findViewById(R.id.longitudeEditText);

        showLocationButton = findViewById(R.id.showLocationButton);

        showLocationButton.setOnClickListener(new View.OnClickListener() {

            @Override

            public void onClick(View view) {

                showLocationOnMap();

            }
```

```java
        });
    }

    private void showLocationOnMap() {

        String latitudeStr = latitudeEditText.getText().toString();

        String longitudeStr = longitudeEditText.getText().toString();

        if (!latitudeStr.isEmpty() && !longitudeStr.isEmpty()) {

            double latitude = Double.parseDouble(latitudeStr);

            double longitude = Double.parseDouble(longitudeStr);

            // Create a Uri to open Google Maps at the specified location

            Uri gmmIntentUri = Uri.parse("geo:" + latitude + "," + longitude + "?q=" + latitude +
"," + longitude);

            // Create an Intent to open Google Maps

            Intent mapIntent = new Intent(Intent.ACTION_VIEW, gmmIntentUri);

            mapIntent.setPackage("com.google.android.apps.maps");

            // Check if there is an app to handle the intent

            if (mapIntent.resolveActivity(getPackageManager()) != null) {

                startActivity(mapIntent);

            } else {

                // Handle the case where Google Maps is not installed

                // You may choose to open the location in a web browser or inform the user

            }

        }

    }

}
```

google_maps_api.xml

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

<resources>

    <string          name="google_maps_key"          templateMergeStrategy="preserve"
translatable="false">AIzaSyAJc-QYRmwJ83HDtbRvAG9V7nfFjJogJ9A</string>

</resources>
```

Output:

4. Create an Android application that enables and disables Wi-Fi of the phone.

Program:

activity_main.xml

```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"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:gravity="center"
    tools:context=".MainActivity">
    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Enable Wifi" />
</LinearLayout>
```

MainActivity.java

```java
package com.example.wifi_application;
import androidx.appcompat.app.AppCompatActivity;
import android.net.wifi.WifiManager;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;
public class MainActivity extends AppCompatActivity {
    Button btn;
    WifiManager wifiManager;
    @Override
```

```java
    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

wifiManager=(WifiManager)getApplicationContext().getSystemService(WIFI_SERVICE);

        btn=findViewById(R.id.button);

        btn.setOnClickListener(new View.OnClickListener() {

            @Override

            public void onClick(View v) {

                if (wifiManager.isWifiEnabled()){

                    wifiManager.setWifiEnabled(false);

                    Toast.makeText(MainActivity.this,"Wifi                              is
Disabled",Toast.LENGTH_LONG).show();

                    btn.setText("Enable Wifi");

                }

                else {

                    wifiManager.setWifiEnabled(true);

                    Toast.makeText(MainActivity.this,"Wifi                              is
Enabled",Toast.LENGTH_LONG).show();

                    btn.setText("Disable Wifi");

                }

            }

        });

    }

}
```

AndroidManifest.xml

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

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

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

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

```xml
    <uses-permission android:name="android.permission.CHANGE_WIFI_STATE"/>
    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.Wifi_Application"
        tools:targetApi="31">
        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

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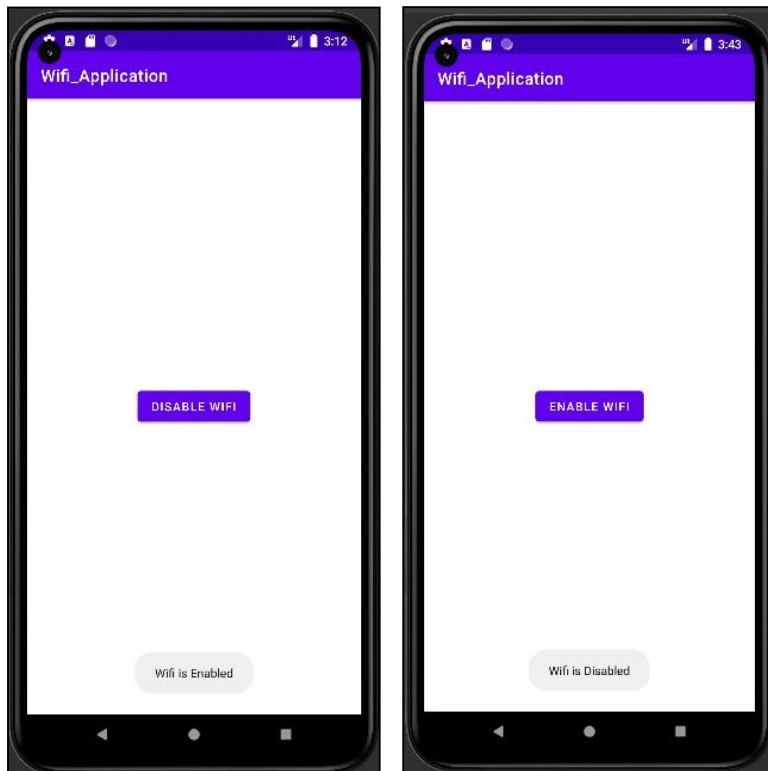
Output:

5. Create an Android application that enables and disables Bluetooth of the phone.

Program:

activity_main.xml

```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"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:gravity="center"
    tools:context=".MainActivity">
    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Enable Bluetooth" />
</LinearLayout>
```

AndroidManifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">
    <uses-permission android:name="android.permission.BLUETOOTH_ADMIN"/>
    <uses-permission android:name="android.permission.BLUETOOTH_CONNECT"/>
    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
```

```xml
            android:roundIcon="@mipmap/ic_launcher_round"

            android:supportsRtl="true"

            android:theme="@style/Theme.Bluetooth_Application"

            tools:targetApi="31">

            <activity

                android:name=".MainActivity"

                android:exported="true">

                <intent-filter>

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

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

                </intent-filter>

            </activity>

        </application>

</manifest>
```

MainActivity.java

```java
package com.example.bluetooth_application;

import androidx.appcompat.app.AppCompatActivity;

import android.annotation.SuppressLint;

import android.bluetooth.BluetoothAdapter;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

    Button btn;

    BluetoothAdapter bluetoothAdapter;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);
```

```java
        setContentView(R.layout.activity_main);

        btn=findViewById(R.id.button);

        bluetoothAdapter=BluetoothAdapter.getDefaultAdapter();

        if (bluetoothAdapter==null){

            Toast.makeText(getApplicationContext(),      "Bluetooth     Not     Supported",
Toast.LENGTH_LONG).show();

            btn.setEnabled(false);

            return;

        }

        btn.setOnClickListener(new View.OnClickListener() {

            @SuppressLint("MissingPermission")

            @Override

            public void onClick(View view) {

                if(bluetoothAdapter.isEnabled()){

                    bluetoothAdapter.disable();

                    btn.setText("Enable Bluetooth");

                    Toast.makeText(getApplicationContext(),      "Bluetooth     Disabled",
Toast.LENGTH_LONG).show();

                }

                else {

                    bluetoothAdapter.enable();

                    btn.setText("Disable Bluetooth");

                    Toast.makeText(getApplicationContext(),      "Bluetooth     Enabled",
Toast.LENGTH_LONG).show();

                }

            }

        });

    }

}
```
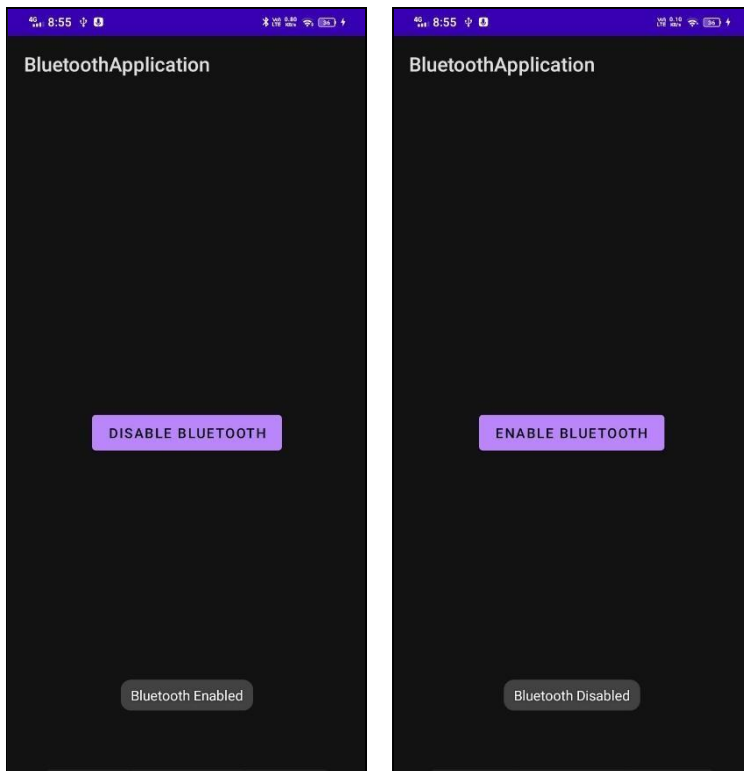
Output:

6. REST API integration

1. Create an Android application to demonstrate JSON data parsing using HTTPUrlConnection (you can use https://api.github.com/users JSON data).

Program:

activity_main.xml

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

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

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

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

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    tools:context=".MainActivity">

    <LinearLayout

        android:layout_width="match_parent"

        android:layout_height="match_parent"

        android:paddingHorizontal="16dp"

        android:orientation="vertical">

        <Button

            android:id="@+id/btn"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:layout_gravity="center_horizontal"

            android:text="Fetch Data"/>

        <TextView

            android:id="@+id/txtView"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content" />

    </LinearLayout>

</ScrollView>
```

build.gradle.kts (:app)

```
plugins {
    id("com.android.application")
}
android {
    namespace = "com.example.json_parsing_http"
    compileSdk = 34
    defaultConfig {
        applicationId = "com.example.json_parsing_http"
        minSdk = 24
        targetSdk = 33
        versionCode = 1
        versionName = "1.0"
        testInstrumentationRunner = "androidx.test.runner.AndroidJUnitRunner"
    }
    buildTypes {
        release {
            isMinifyEnabled = false
            proguardFiles(
                getDefaultProguardFile("proguard-android-optimize.txt"),
                "proguard-rules.pro"
            )
        }
    }
    compileOptions {
        sourceCompatibility = JavaVersion.VERSION_1_8
        targetCompatibility = JavaVersion.VERSION_1_8
    }
}
dependencies {
```

```java
    implementation("androidx.appcompat:appcompat:1.6.1")

    implementation("com.google.android.material:material:1.10.0")

    implementation("androidx.constraintlayout:constraintlayout:2.1.4")

    testImplementation("junit:junit:4.13.2")

    androidTestImplementation("androidx.test.ext:junit:1.1.5")

    androidTestImplementation("androidx.test.espresso:espresso-core:3.5.1")
}
```

MainActivity.java

```java
package com.example.json_parsing_http;

import androidx.appcompat.app.AppCompatActivity;

import android.os.AsyncTask;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.TextView;

import java.io.BufferedReader;

import java.io.IOException;

import  java.io.InputStream;

import java.io.InputStreamReader;

import java.net.HttpURLConnection;

import java.net.MalformedURLException;

import java.net.URL;

public class MainActivity extends AppCompatActivity {

Button btnFetchData;

TextView tv;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);
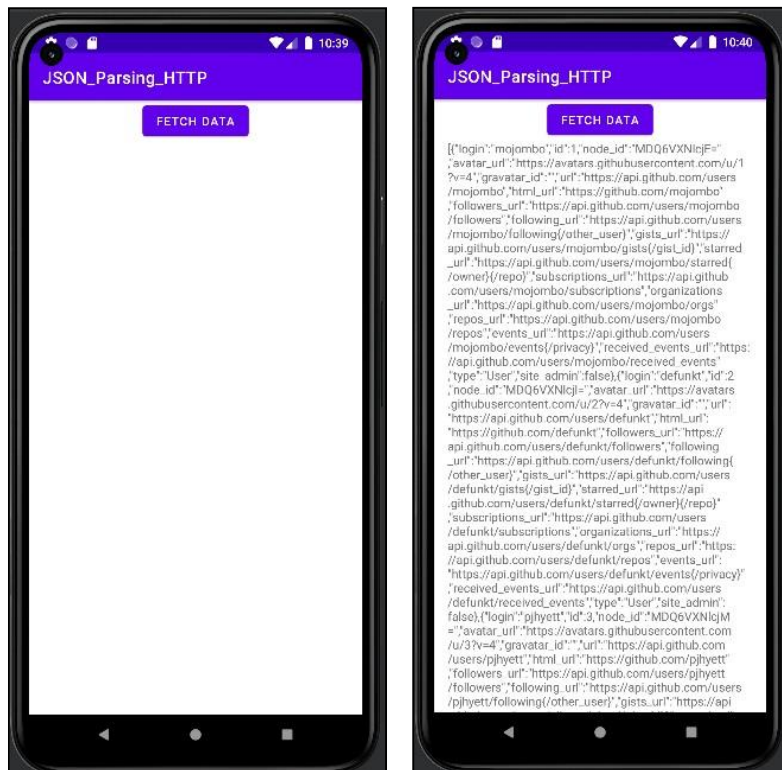```

```java
        btnFetchData=findViewById(R.id.btn);

        tv=findViewById(R.id.txtView);

        btnFetchData.setOnClickListener(new View.OnClickListener() {

            @Override

            public void onClick(View view) {

                Users users=new Users();

                users.execute();

            }

        });

    }

    class Users extends AsyncTask<String, String, String >{

        @Override

        protected String doInBackground(String... strings) {

            try{

                URL url=new URL("https://api.github.com/users");

                HttpURLConnection        httpURLConnection=        (HttpURLConnection)
url.openConnection();

                httpURLConnection.connect();

                InputStream stream=httpURLConnection.getInputStream();

                BufferedReader reader=new BufferedReader(new InputStreamReader(stream));

                StringBuffer buffer=new StringBuffer();

                String line;

                while ((line=reader.readLine())!=null){

                    buffer.append(line).append("\n");

                }

                return buffer.toString();

            }

            catch (MalformedURLException e){

                e.printStackTrace();

            }
```

```java
        catch (IOException e) {

            throw new RuntimeException(e);

        }

        return null;

    }

    @Override

    protected void onPreExecute() {

        super.onPreExecute();

        btnFetchData.setEnabled(false);

    }

    @Override

    protected void onProgressUpdate(String... values) {

        super.onProgressUpdate(values);

        tv.setText("Loading ..."+values+" % done");

    }

    @Override

    protected void onPostExecute(String s) {

        super.onPostExecute(s);

        tv.setText(s);

        btnFetchData.setEnabled(true);

    }

  }

}
```

Output:

2. Create an Android application to demonstrate JSON data parsing using OkHttp (you can use https://api.github.com/users JSON data).
Program:

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<ScrollView xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:paddingHorizontal="16dp"
        android:orientation="vertical">
        <Button
            android:id="@+id/btn"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginTop="30dp"
            android:layout_gravity="center_horizontal"
            android:text="Fetch Data"/>
        <TextView
            android:id="@+id/txtView"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content" />
    </LinearLayout>
</ScrollView>
```

build.gradle.kts (:app)

```
plugins {
    id("com.android.application")
}
android {
    namespace = "com.example.json_parsing_okhttp"
    compileSdk = 34
    defaultConfig {
        applicationId = "com.example.json_parsing_okhttp"
        minSdk = 24
        targetSdk = 33
        versionCode = 1
        versionName = "1.0"
        testInstrumentationRunner = "androidx.test.runner.AndroidJUnitRunner"
    }
    buildTypes {
        release {
            isMinifyEnabled = false
            proguardFiles(
                getDefaultProguardFile("proguard-android-optimize.txt"),
                "proguard-rules.pro"
            )
        }
    }
    compileOptions {
        sourceCompatibility = JavaVersion.VERSION_1_8
        targetCompatibility = JavaVersion.VERSION_1_8
    }
}
dependencies {
```

```
    implementation("com.squareup.okhttp3:okhttp:5.0.0-alpha.2")

    implementation("androidx.appcompat:appcompat:1.6.1")

    implementation("com.google.android.material:material:1.10.0")

    implementation("androidx.constraintlayout:constraintlayout:2.1.4")

    testImplementation("junit:junit:4.13.2")

    androidTestImplementation("androidx.test.ext:junit:1.1.5")

    androidTestImplementation("androidx.test.espresso:espresso-core:3.5.1")

}
```

MainActivity.java

```java
package com.example.json_parsing_okhttp;

import androidx.annotation.NonNull;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.TextView;

import android.widget.Toast;

import java.io.IOException;

import okhttp3.Call;

import okhttp3.Callback;

import okhttp3.OkHttp;

import okhttp3.OkHttpClient;

import okhttp3.Request;

import okhttp3.Response;

public class MainActivity extends AppCompatActivity {

Button btnFetchData;

TextView tv;

OkHttpClient client;

    @Override
```

```java
    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        btnFetchData=findViewById(R.id.btn);

        tv=findViewById(R.id.txtView);

        client=new OkHttpClient();

        btnFetchData.setOnClickListener(new View.OnClickListener() {

            @Override

            public void onClick(View v) {

                getWebService();

            }

        });

    }

    private void getWebService() {

        String url=("https://reqres.in/api/users/2");

        Request request=new Request.Builder().url(url).build();

        client.newCall(request).enqueue(new Callback() {

            @Override

            public void onFailure(@NonNull Call call, @NonNull IOException e) {

Toast.makeText(getApplicationContext(),e.getMessage(),Toast.LENGTH_LONG).show();

            }

            @Override

            public void onResponse(@NonNull Call call, @NonNull Response response) throws
IOException {

                if(response.isSuccessful()){

                    final String result=response.body().string();

                    MainActivity.this.runOnUiThread(()->tv.setText(result));

                }

            }
```
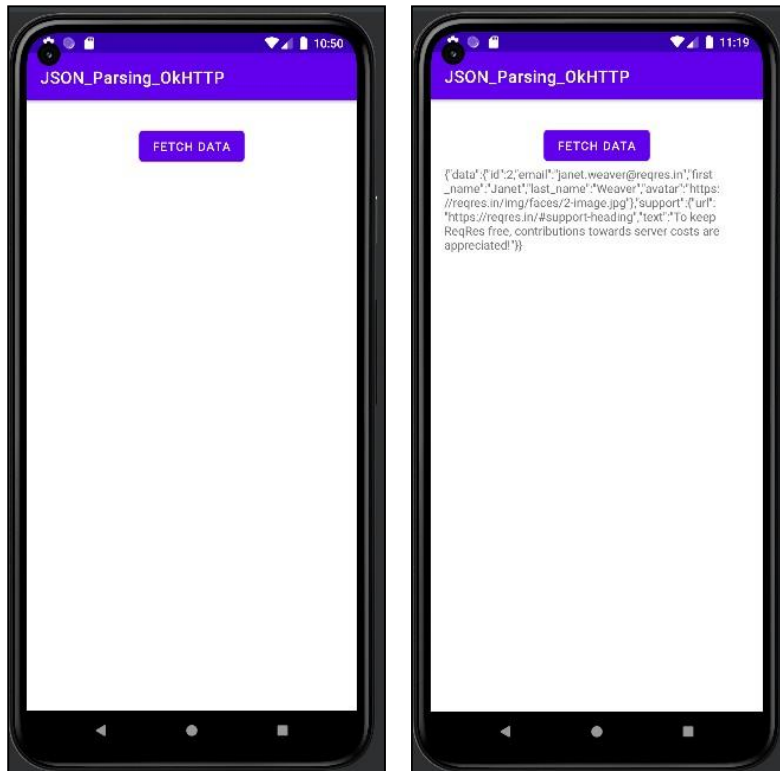
```
        });

    }

}
```

Output:

3. Create an Android application to demonstrate JSON data parsing using Volley(you can use https://api.github.com/users JSON data).
Program:

activity_main.xml

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

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

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

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

    android:layout_width="match_parent"

    android:layout_height="match_parent"

    tools:context=".MainActivity">

    <LinearLayout

        android:layout_width="match_parent"

        android:layout_height="match_parent"

        android:orientation="vertical"

        android:paddingHorizontal="16dp">

        <EditText

            android:id="@+id/user_input"

            android:layout_width="match_parent"

            android:layout_height="wrap_content"

            android:layout_gravity="center"

            android:hint="Enter User Name"/>

        <Button

            android:id="@+id/btn_fetch_data"

            android:layout_width="wrap_content"

            android:layout_height="wrap_content"

            android:layout_gravity="center_horizontal"

            android:text="Fetch Data"/>

        <TextView

            android:id="@+id/result_view"
```

```
            android:layout_width="match_parent"

            android:layout_height="wrap_content"

            android:text="result"/>

        <ImageView

            android:id="@+id/image_view"

            android:layout_width="match_parent"

            android:layout_height="match_parent"/>

    </LinearLayout>

</ScrollView>
```

AndroidManifest.xml

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

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

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

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

    <application

        android:allowBackup="true"

        android:dataExtractionRules="@xml/data_extraction_rules"

        android:fullBackupContent="@xml/backup_rules"

        android:icon="@mipmap/ic_launcher"

        android:label="@string/app_name"

        android:roundIcon="@mipmap/ic_launcher_round"

        android:supportsRtl="true"

        android:theme="@style/Theme.JSON_Parsing_using_Volley"

        tools:targetApi="31">

        <activity

            android:name=".MainActivity"

            android:exported="true">

            <intent-filter>

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

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

        </intent-filter>

      </activity>

   </application>

</manifest>
```

build.gradle.kts (:app)

```kotlin
plugins {

   id("com.android.application")

}

android {

   namespace = "com.example.json_parsing_using_volley"

   compileSdk = 34

   defaultConfig {

      applicationId = "com.example.json_parsing_using_volley"

      minSdk = 24

      targetSdk = 33

      versionCode = 1

      versionName = "1.0"

      testInstrumentationRunner = "androidx.test.runner.AndroidJUnitRunner"

   }

   buildTypes {

      release {

         isMinifyEnabled = false

         proguardFiles(

            getDefaultProguardFile("proguard-android-optimize.txt"),

            "proguard-rules.pro"

         )

      }

   }
```

```
    compileOptions {

        sourceCompatibility = JavaVersion.VERSION_1_8

        targetCompatibility = JavaVersion.VERSION_1_8

    }

}

dependencies {

    implementation("com.android.volley:volley:1.2.1")

    implementation("com.squareup.picasso:picasso:2.71828")

    implementation("androidx.appcompat:appcompat:1.6.1")

    implementation("com.google.android.material:material:1.10.0")

    testImplementation("junit:junit:4.13.2")

    androidTestImplementation("androidx.test.ext:junit:1.1.5")

    androidTestImplementation("androidx.test.espresso:espresso-core:3.5.1")

}
```

MainActivity.java

```java
package com.example.json_parsing_using_volley;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import android.widget.ImageView;

import android.widget.TextView;

import  android.widget.Toast;

import com.android.volley.Request;

import com.android.volley.RequestQueue;

import com.android.volley.toolbox.JsonObjectRequest;

import com.android.volley.toolbox.Volley;

import com.squareup.picasso.Picasso;
```

```java
import org.json.JSONException;

import org.w3c.dom.Text;

public class MainActivity extends AppCompatActivity {

    RequestQueue queue;

    EditText userInput;

    Button btnFetchData;

    TextView resultView;

    ImageView imgView;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        queue= Volley.newRequestQueue(this);

        userInput=findViewById(R.id.user_input);

        btnFetchData=findViewById(R.id.btn_fetch_data);

        resultView=findViewById(R.id.result_view);

        imgView=findViewById(R.id.image_view);

        btnFetchData.setOnClickListener(new View.OnClickListener() {

            @Override

            public void onClick(View v) {

                String url="https://api.github.com/users/"+userInput.getText();

                JsonObjectRequest                                    request=new
JsonObjectRequest(Request.Method.GET,url,null,response -> {

                    try {

                        String login=response.getString("login");

                        String id=response.getString("id");

                        String nodeId=response.getString("node_id");

                        String avatarUrl=response.getString("avatar_url");

                        resultView.setText("Login: "+login+"\nId: "+"\nNode id: "+nodeId);

                        Picasso.get().load(avatarUrl).into(imgView);
```

```
            }

         catch (JSONException e){

            e.printStackTrace();

            Toast.makeText(getApplicationContext(),"Something          went
wrong!",Toast.LENGTH_SHORT).show();

            }

      },error -> {

         Toast.makeText(getApplicationContext(),"User            not
found!",Toast.LENGTH_SHORT).show();

         resultView.setText("");

         imgView.setImageDrawable(null);

      });

      queue.add(request);

    }

  });   }}
```

Output:

4. Create an Android application to demonstrate JSON data parsing using Retrofit(you can use https://api.github.com/users JSON data).

Program:

activity_main.xml

```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"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <TextView
        android:id="@+id/textView"
        android:layout_width="match_parent"
        android:layout_height="wrap_content" />
</LinearLayout>
```

AndroidManifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">
    <uses-permission android:name="android.permission.INTERNET"/>
    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.JSON_Parsing_using_Retrofit"
```

```
        tools:targetApi="31">
        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>
```

build.gradle.kts (:app)

```
plugins {
    id("com.android.application")
}
android {
    namespace = "com.example.json_parsing_using_retrofit"
    compileSdk = 34
    defaultConfig {
        applicationId = "com.example.json_parsing_using_retrofit"
        minSdk = 24
        targetSdk = 33
        versionCode = 1
        versionName = "1.0"
        testInstrumentationRunner = "androidx.test.runner.AndroidJUnitRunner"
    }
    buildTypes {
        release {
            isMinifyEnabled = false
```

```
        proguardFiles(

            getDefaultProguardFile("proguard-android-optimize.txt"),

            "proguard-rules.pro"

        )

      }

    }

    compileOptions {

        sourceCompatibility = JavaVersion.VERSION_1_8

        targetCompatibility = JavaVersion.VERSION_1_8

    }

}

dependencies {

    implementation("com.squareup.retrofit2:retrofit:2.7.2")

    implementation("com.squareup.retrofit2:converter-gson:2.7.2")

    implementation("androidx.appcompat:appcompat:1.6.1")

    implementation("com.google.android.material:material:1.10.0")

    testImplementation("junit:junit:4.13.2")

    androidTestImplementation("androidx.test.ext:junit:1.1.5")

    androidTestImplementation("androidx.test.espresso:espresso-core:3.5.1")

}
```

API.java

```java
package com.example.json_parsing_using_retrofit;

import java.util.List;

import retrofit2.Call;

import retrofit2.http.GET;

public interface API {

    String BASE_URL="https://api.github.com/";

    @GET("users")

    Call<List<User>> getRecords();
```

```
}
```

User.java

```java
package com.example.json_parsing_using_retrofit;

public class User {

    String login;

    String node_id;

    public String getLogin() {

        return login;

    }

    public void setLogin(String login) {

        this.login = login;

    }

    public String getNode_id() {

        return node_id;

    }

    public void setNode_id(String node_id) {

        this.node_id = node_id;

    }

}
```

MainActivity.java

```java
package com.example.json_parsing_using_retrofit;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import android.widget.TextView;

import android.widget.Toast;

import java.util.List;

import retrofit2.Call;

import retrofit2.Callback;

import retrofit2.Response;
```

```java
import retrofit2.Retrofit;

import retrofit2.converter.gson.GsonConverterFactory;

public class MainActivity extends AppCompatActivity {

    TextView tv;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_main);

        tv=findViewById(R.id.textView);

        Retrofit retrofit=new Retrofit.Builder()

                .baseUrl(API.BASE_URL)

                .addConverterFactory(GsonConverterFactory.create()).build();

        API api=retrofit.create(API.class);

        Call<List<User>> call=api.getRecords();

        call.enqueue(new Callback<List<User>>() {

            @Override

            public void onResponse(Call<List<User>> call, Response<List<User>> response) {

                List<User> user=response.body();

                for (int i=0;i<user.size();i++){

                    tv.append("Login"+user.get(i).getLogin()+" Node id"+user.get(i).getNode_id());

                }

            }

            @Override

            public void onFailure(Call<List<User>> call, Throwable t) {

                Toast.makeText(getApplicationContext(),"Error    |    Failed    to    fetch
data",Toast.LENGTH_LONG).show();

            }

        });

    }

}
```

Output:

7. Introduction to Dart and Flutter

1. Write a Flutter program to demonstrate Text widget and its properties.
Program:

main.dart

```dart
import 'package:flutter/material.dart';

void main() => runApp(MyApp());

class MyApp extends StatelessWidget {

const MyApp({super.key});

 @override

 Widget build(BuildContext context) {

  return MaterialApp(

    title: 'My Flutter app',

    home: Scaffold(

      appBar: AppBar(

       title: Text('Dashboard'.toUpperCase()),

       backgroundColor: Colors.deepOrangeAccent,

      ),

      body: Center(

       child: Text.rich(

         TextSpan(text: 'First', style: TextStyle(fontSize: 35.0),children: [

          TextSpan(

            text: 'flutter',style: TextStyle(fontSize: 60.0,color: Colors.amberAccent)

          ),

          TextSpan(

            text: 'app',style: TextStyle(fontSize: 40.0,fontWeight: FontWeight.bold)

          )

         ])

       ),

      ),

      backgroundColor: Colors.lightBlue),
```
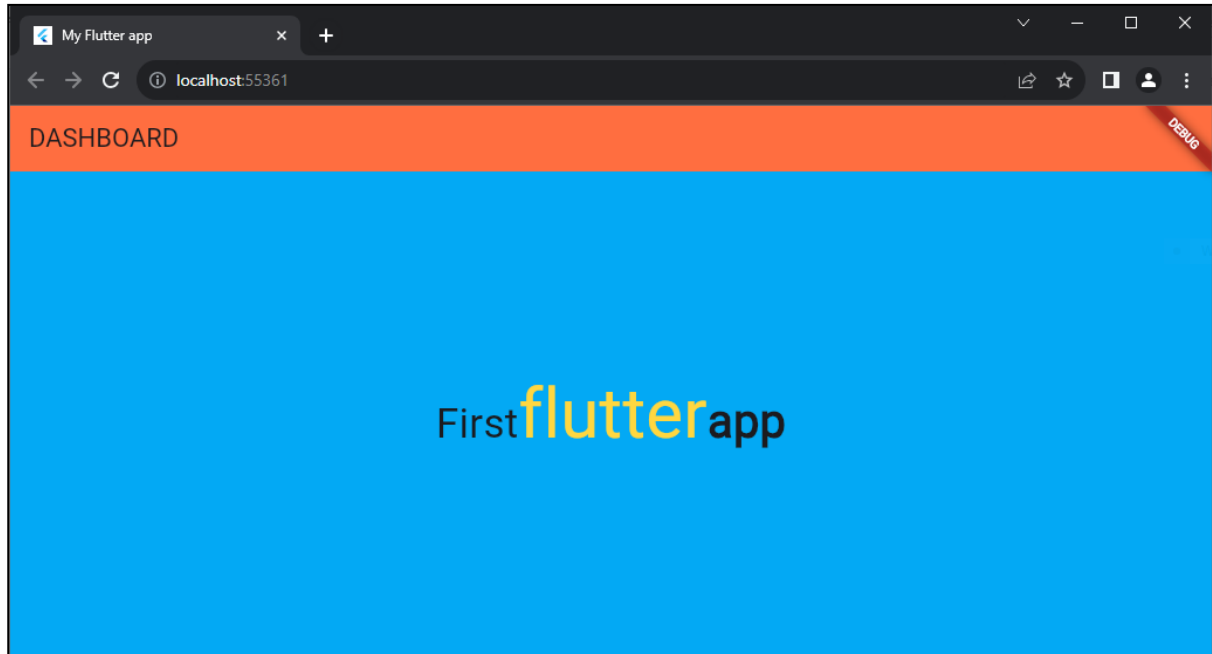
```
    );
  }
}
```

Output:

2. Write a Flutter program to display dog names(demonstrate stateless widget and column widgets).
Program:

main.dart

```
import 'package:flutter/material.dart';

void main() =>
   runApp(DogApp());

class DogApp extends StatelessWidget {
  const DogApp({super.key});

  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'My Dog App',
      home: Scaffold(
        backgroundColor: Colors.blueGrey,
        appBar: AppBar(
          backgroundColor: Colors.lightGreenAccent,
          title: Text('Yellow lab'),
        ),
        body: Center(
          child: Column(
            crossAxisAlignment: CrossAxisAlignment.stretch,
            children: [
              const DogName('Rockey'),
              const SizedBox(height: 10.0,),
              const DogName('Bruno'),
              const SizedBox(height: 10.0,),
              const DogName('Cooper'),
              const SizedBox(height: 10.0,)
            ],
```

```dart
            ),
          ),
        floatingActionButton: FloatingActionButton(
          child: Icon(Icons.add),onPressed: (){},
        ),
        drawer: Drawer(child: Text('Demo'),),
        bottomNavigationBar: BottomNavigationBar(
        items: [
          BottomNavigationBarItem(icon: Icon(Icons.home),label: 'Home'),
          BottomNavigationBarItem(icon: Icon(Icons.alarm),label: 'Alarm')
        ],
        ),
      ),
    );
  }
}
class DogName extends StatelessWidget {
  final String name;
  const DogName(this.name);
  @override
  Widget build(BuildContext context) {
    return DecoratedBox(decoration: const BoxDecoration(color: Colors.deepOrangeAccent),
      child: Padding(
        padding: EdgeInsets.all(10.0),
        child: Text(
          name
        ),
      ),);
  }
```
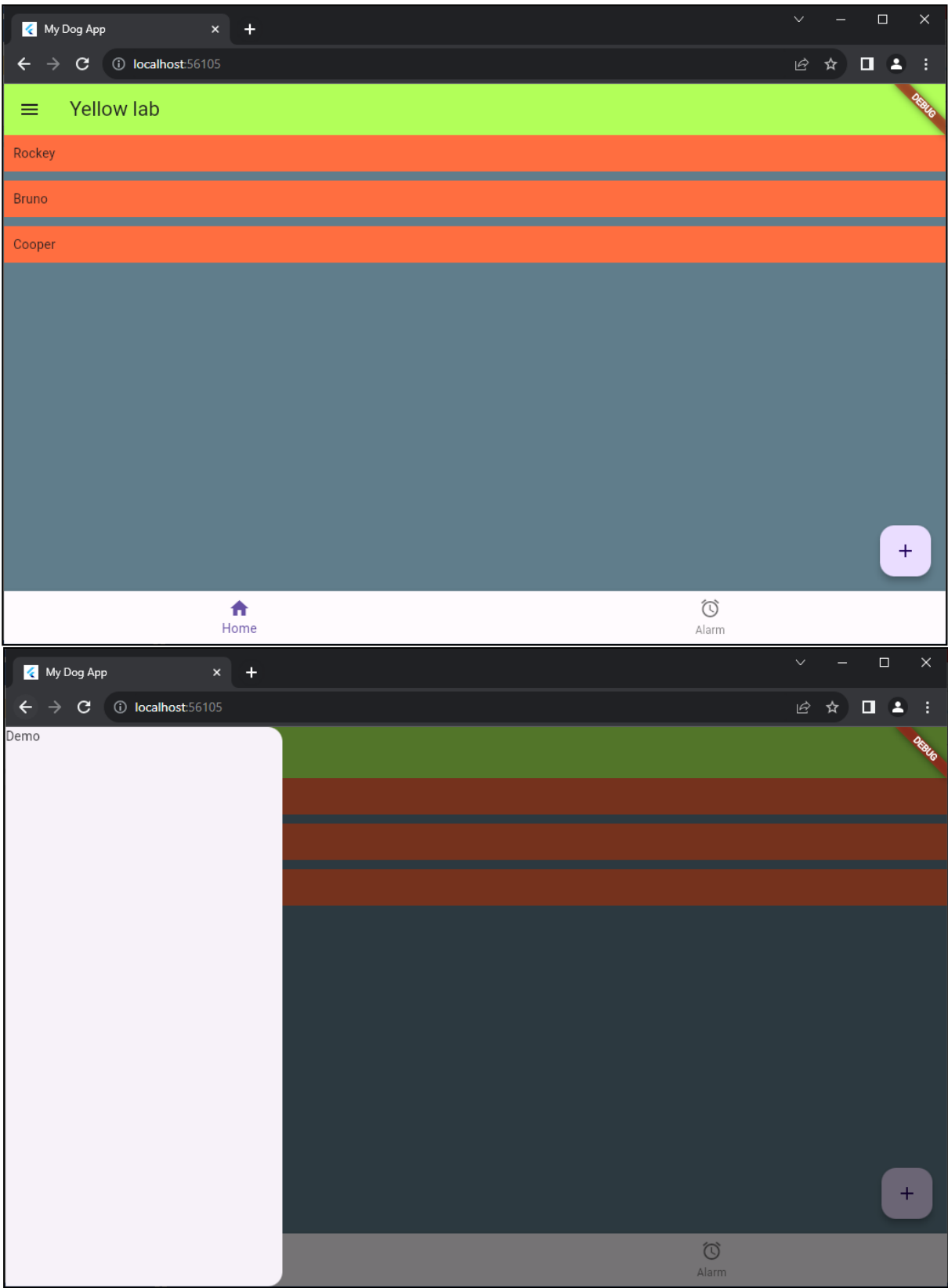
```
    }
```

Output:

3. Write a Flutter program that allows the user to enter a city in a text field and displays city name(demonstrate stateful widget).
Program:

main.dart

```
import 'package:flutter/material.dart';

void main() =>

  runApp(FavouriteCity());

class FavouriteCity extends StatefulWidget {

 @override

 State<StatefulWidget> createState() {

  return _FavouriteCityState();

 }

}

class _FavouriteCityState extends State<FavouriteCity> {

 @override

 String nameCity="";

 Widget build(BuildContext context) {

  return MaterialApp(

   title: 'Stateful Widget',

   home: Scaffold(

   appBar: AppBar(

    title: Text('Stateful Widget app'),

   ),

    body: Container(

     margin: EdgeInsets.all(20.0),

     child: Column(

      children:  <Widget>[

       TextField(onChanged: (String userInput){

       setState(() {

         nameCity=userInput;
```
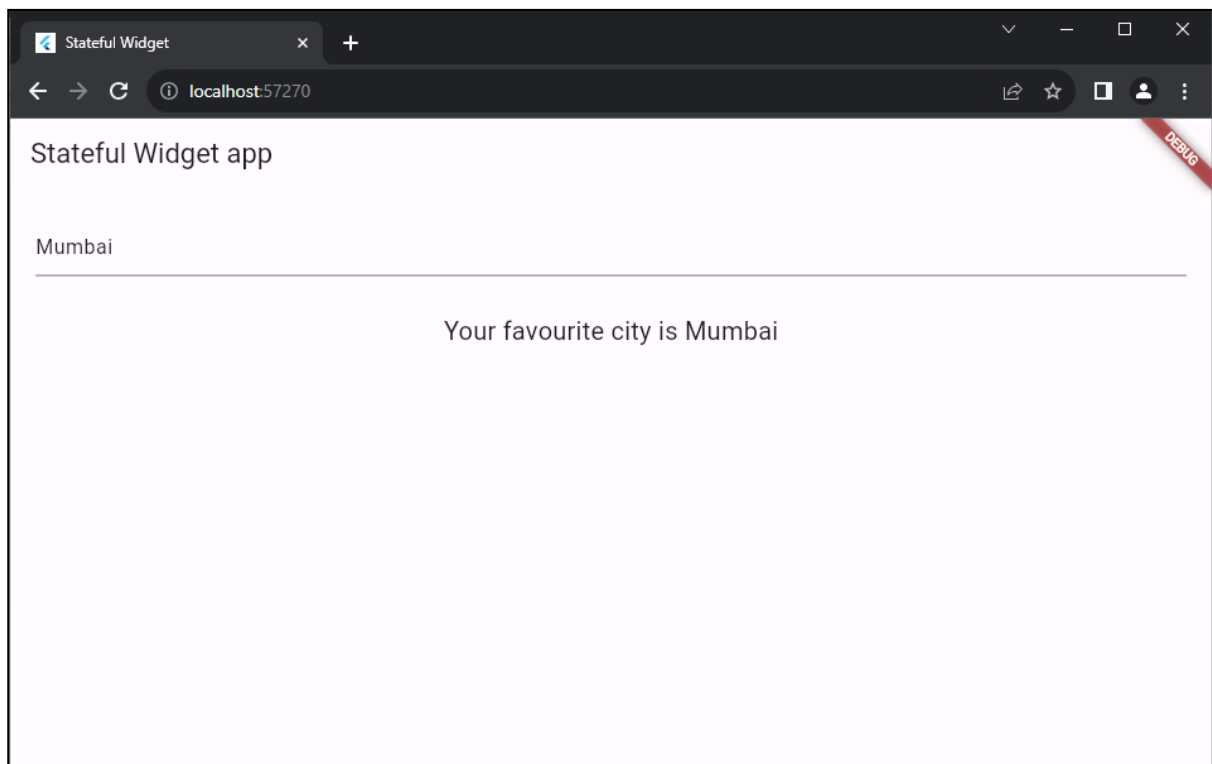
```
        });
      },),
      Padding(padding: EdgeInsets.all(30.0),
        child: Text('Your favourite city is $nameCity',style: TextStyle(fontSize: 20.0),
        ))
    ],
  ),
 ),
 ),
 );
 }
}
```

Output:

4. Write a Flutter program to change the background color(demonstrate stateful widget).
Program:

main.dart

```
package com.example.login_form_shared_preference;

import  androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;

import android.content.SharedPreferences;

import android.os.Bundle;

import  android.view.View;

import android.widget.Button;

import android.widget.CheckBox;

import android.widget.EditText;

import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

Button login;

EditText name,pwd;

CheckBox remember;

SharedPreferences pref;

Intent intent;

  @Override

  protected void onCreate(Bundle savedInstanceState) {

    super.onCreate(savedInstanceState);

    setContentView(R.layout.activity_main);

    login=findViewById(R.id.button);

    name=findViewById(R.id.editTextText);

    pwd=findViewById(R.id.editTextNumberPassword);

    remember=findViewById(R.id.checkbox);

    pref=getSharedPreferences("User_Details",MODE_PRIVATE);

    intent=new Intent(MainActivity.this,Home_Screen.class);

    if (pref.contains("username") && pref.contains("password")){
```

```java
            startActivity(intent);

        }

    login.setOnClickListener(new View.OnClickListener() {

        @Override

        public void onClick(View v) {

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

            String password=pwd.getText().toString();

            if    (username.equals("admin")    &&    password.equals("1234")    &&
remember.isChecked()){

                SharedPreferences.Editor editor = pref.edit();

                editor.putString("username",username);

                editor.putString("password",password);

                editor.commit();

                Toast.makeText(getApplicationContext(),"Login
Successful",Toast.LENGTH_LONG).show();

                startActivity(intent);

            }

            else if (username.equals("admin") && password.equals("1234")){

                Toast.makeText(getApplicationContext(),"Login
Successful",Toast.LENGTH_LONG).show();

                startActivity(intent);

            }

            else{

                Toast.makeText(getApplicationContext(),"Invalid
credentials",Toast.LENGTH_LONG).show();

            }

        }

    });

  }

}
```

Output:
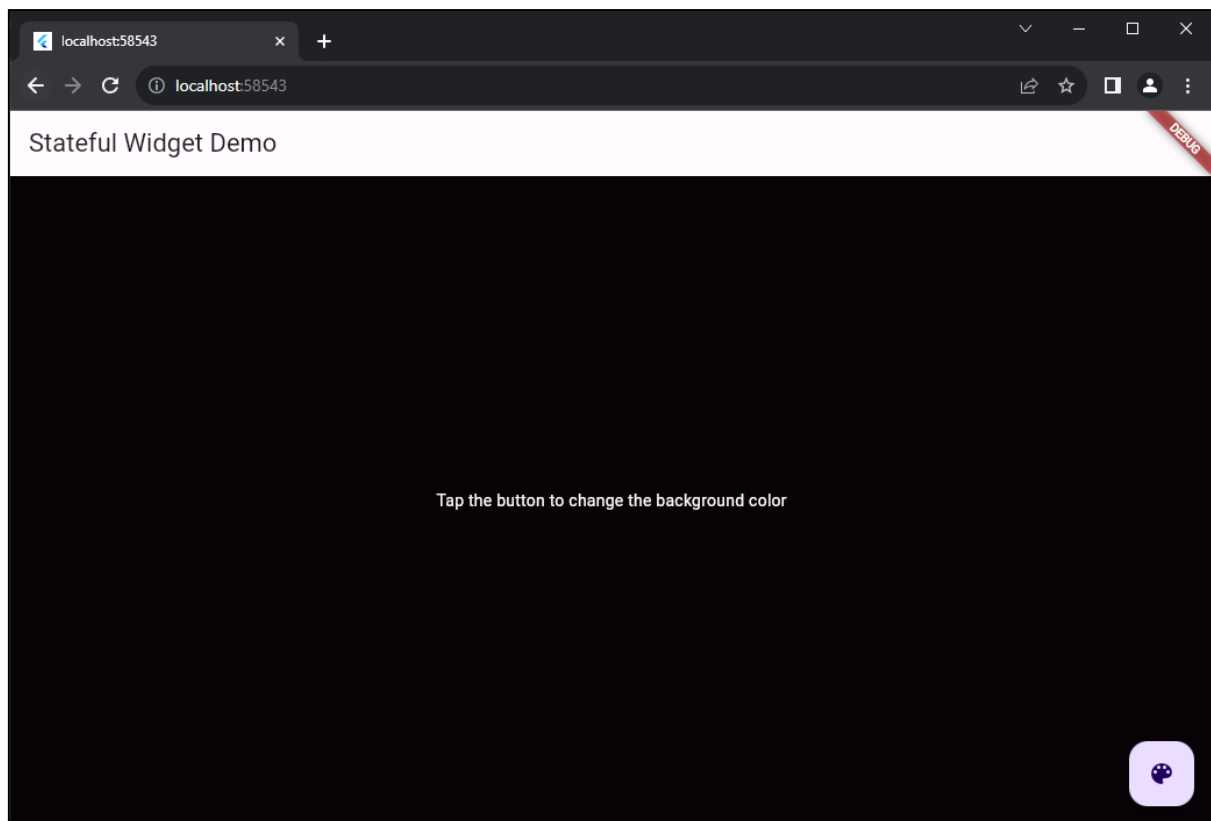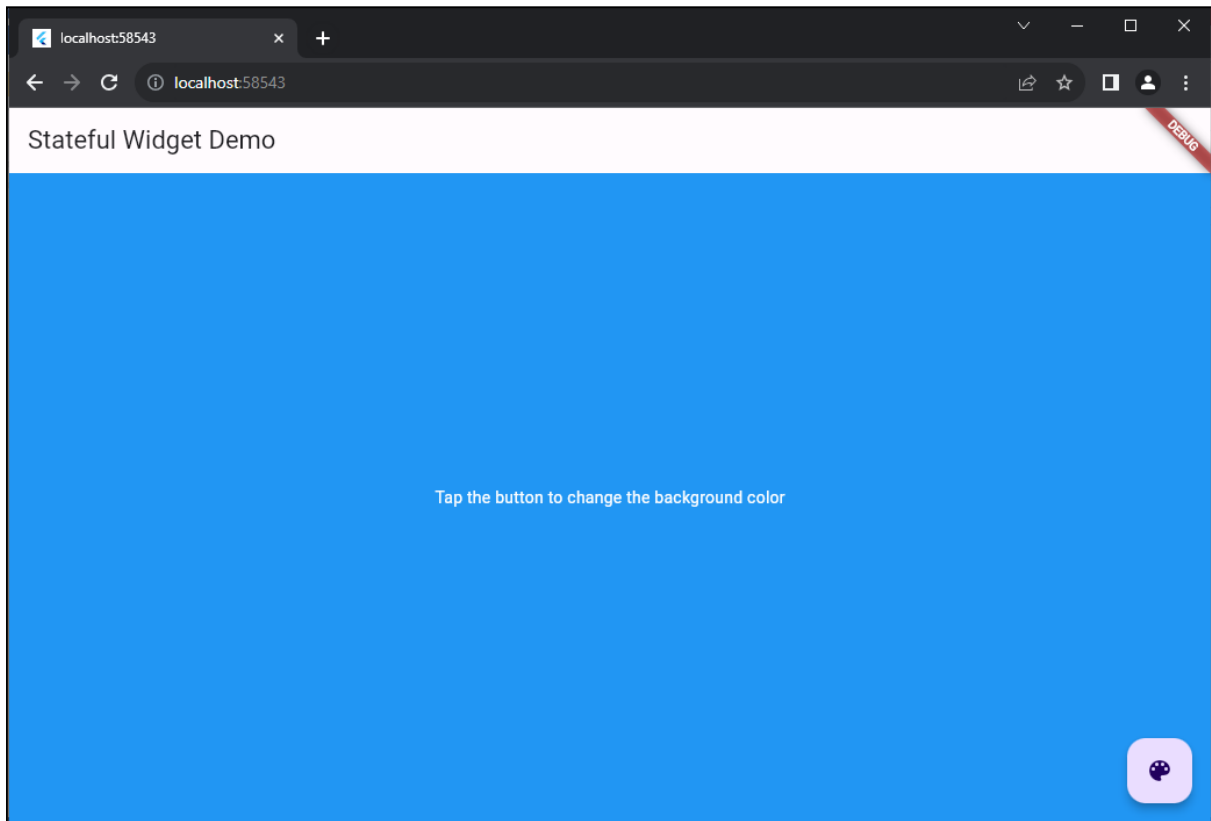
5. Write a Flutter program to demonstrate navigation(user should be navigated from first screen to second screen).
Program:

main.dart

```
import 'package:flutter/material.dart';

void main() {
 runApp(MyApp());
}

class MyApp extends StatelessWidget {
 @override
 Widget build(BuildContext context) {
  return MaterialApp(
   home: FirstScreen(),
  );
 }
}

class FirstScreen extends StatelessWidget {
 @override
 Widget build(BuildContext context) {
  return Scaffold(
   appBar: AppBar(
    title: Text('First Screen'),
   ),
   body: Center(
    child: ElevatedButton(
     onPressed: () {
      // Navigate to the second screen when the button is pressed
      Navigator.push(
       context,
       MaterialPageRoute(builder: (context) => SecondScreen()),
```
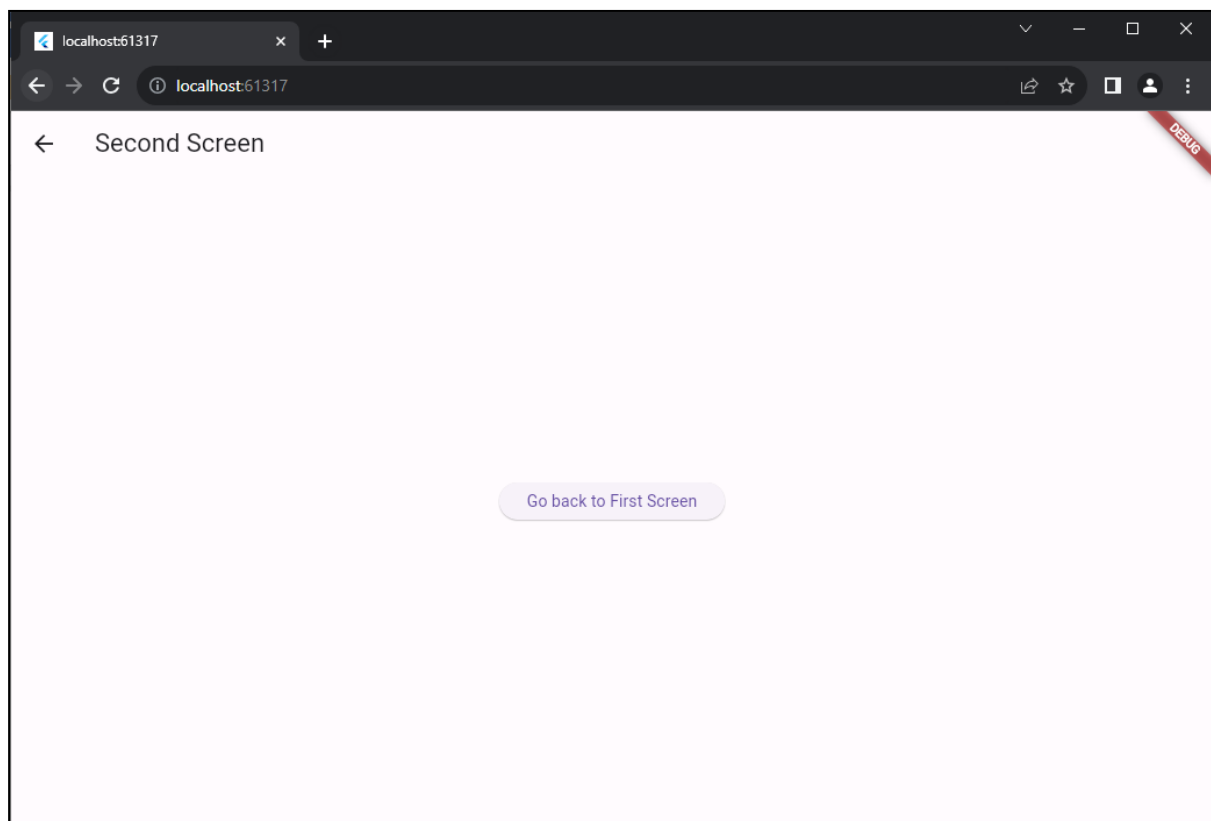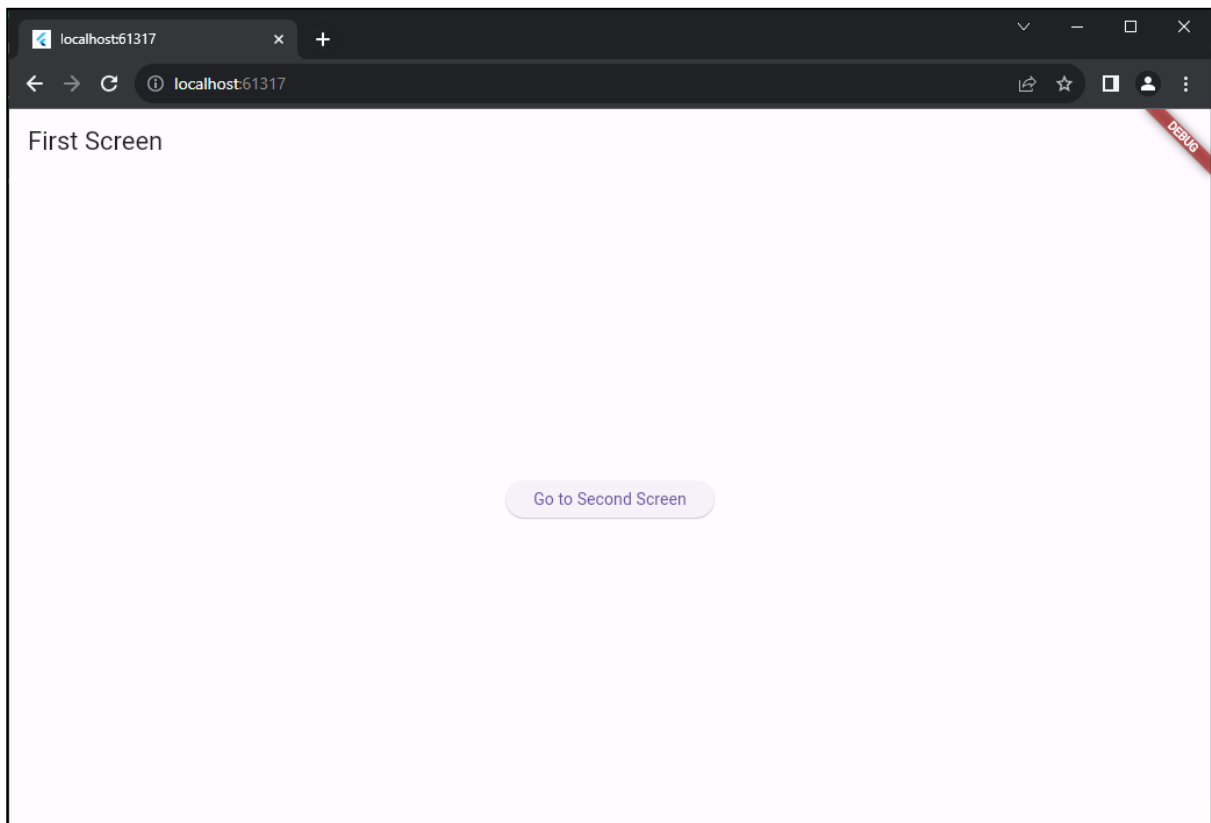
```
          );
        },
        child: Text('Go to Second Screen'),
      ),
    ),
  );
 }
}
class SecondScreen extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(
        title: Text('Second Screen'),
      ),
      body: Center(
        child: ElevatedButton(
          onPressed: () {
            // Navigate back to the first screen when the button is pressed
            Navigator.pop(context);
          },
          child: Text('Go back to First Screen'),
        ),
      ),
    );
  }
}
```

Output:

6. Write a Flutter program to design a Login form.

Program:

main.dart

```dart
import 'package:flutter/material.dart';

import 'login_screen.dart';

void main() {

  runApp( MyApp());

}

class MyApp extends StatelessWidget {

  @override

  Widget build(BuildContext context) {

    return MaterialApp(

      title: 'Flutter Login UI',

      debugShowCheckedModeBanner: false,

      home: LoginPage(),

    );

  }

}
```

login_screen.dart

```dart
import 'dart:html';

import 'package:flutter/foundation.dart';

import 'package:flutter/material.dart';

class LoginPage extends StatelessWidget {

  @override

  Widget build(BuildContext context) {

    return SafeArea(child: Scaffold(

    body: Container(

      margin: EdgeInsets.all(24),

      child: Column(
```

```dart
          mainAxisAlignment: MainAxisAlignment.spaceEvenly,

          children: [

            _header(context),

            _inputField(context),

            _forgotPassword(context),

            _signup(context),

          ],

        ),

      ),

    ));

  }

  _header(context){

    return Column(children: [

      Text(

        "Welcome back",

        style: TextStyle(fontSize: 40,fontWeight: FontWeight.bold),

      ),

      Text('Enter your credentials to login')

    ],

    );}

  _inputField(context){

    return Column(

      crossAxisAlignment: CrossAxisAlignment.stretch,

      children: [

    TextField(

    decoration: InputDecoration(

    hintText: 'Username',

      border: OutlineInputBorder(

        borderRadius: BorderRadius.circular(18),
```
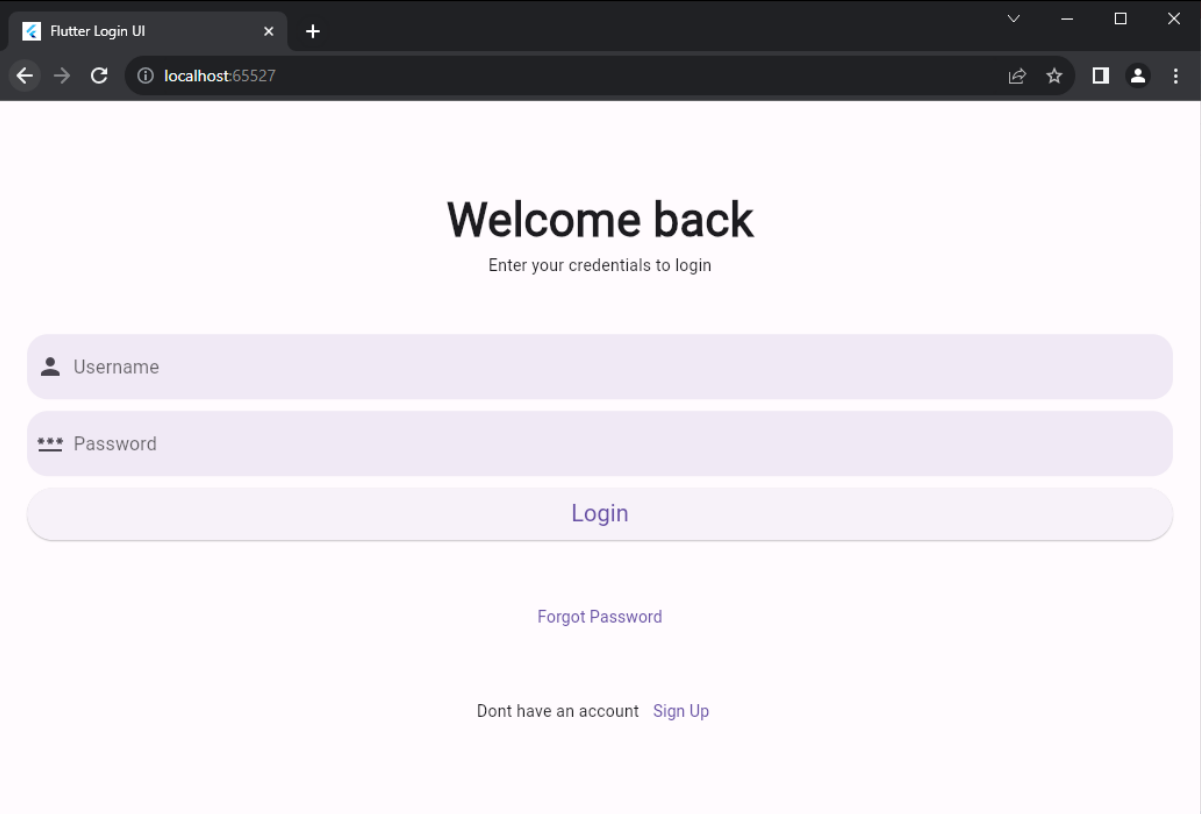
```dart
        borderSide: BorderSide.none
    ),
    fillColor: Theme.of(context).primaryColor.withOpacity(0.1),
    filled: true,
    prefixIcon: Icon(Icons.person)
),
),
SizedBox(height: 10),
TextField(
decoration: InputDecoration(
hintText: 'Password',
border: OutlineInputBorder(
borderRadius: BorderRadius.circular(18),
borderSide: BorderSide.none
),
fillColor: Theme.of(context).primaryColor.withOpacity(0.1),
filled: true,
prefixIcon: Icon(Icons.password)
),
 obscureText: true,
),
    SizedBox(height: 10),
    ElevatedButton(onPressed: (){}, child: Text('Login',style: TextStyle(fontSize: 20),
    ),
     style: ElevatedButton.styleFrom(
      shape: StadiumBorder(),
      padding: EdgeInsets.all(16),
     ),
    )
```

```dart
      ],
    );
  }
  _forgotPassword(context){
    return TextButton(onPressed: (){}, child: Text('Forgot Password'));
  }
  _signup(context){
    return Row(
      mainAxisAlignment: MainAxisAlignment.center,
      children: [
        Text('Dont have an account'),
        TextButton(onPressed: (){}, child: Text('Sign Up'))
      ],
    );
  }
}
```

Output:

8. Data Handling

1. Write a Flutter program based on RestAPI to fetch data.
Program:

main.dart

```dart
import 'package:flutter/material.dart';

import 'dart:async';

import 'dart:convert';

import 'package:http/http.dart' as http;

void main() => runApp( MaterialApp(

  home: HomePage())

);

class HomePage extends StatefulWidget {

 @override

 State<StatefulWidget> createState() => _HomePageState();

}

class _HomePageState extends State<HomePage> {

 late final List data;

 Future<String> getData()async{

  var response=await http.get(

    Uri.parse("https://jsonplaceholder.typicode.com/posts"),

    headers: {

     "Accept":"application/json"

    }

  );

  setState(() {

   data=json.decode(response.body);

  });

  return "Success";

 }

 @override
```

```dart
 void initState() {
  // TODO: implement initState
  getData();
 }
 @override
 Widget build(BuildContext context) {
  return Scaffold(
   appBar: AppBar(title: Text('ListView'),backgroundColor: Colors.blue,),
   body: ListView.builder(
     itemCount: data.length,
     itemBuilder: (BuildContext context,int index){
      return Card(
       child: Text(data[index]["title"]),
      );
     }),
  );
 }
}
```

pubspec.yaml

name: restapi_app

description: "A new Flutter project."

The following line prevents the package from being accidentally published to

pub.dev using `flutter pub publish`. This is preferred for private packages.

publish_to: 'none' # Remove this line if you wish to publish to pub.dev

The following defines the version and build number for your application.

A version number is three numbers separated by dots, like 1.2.43

followed by an optional build number separated by a +.

Both the version and the builder number may be overridden in flutter

build by specifying --build-name and --build-number, respectively.

```
# In Android, build-name is used as versionName while build-number used as versionCode.

# Read more about Android versioning at
https://developer.android.com/studio/publish/versioning

# In iOS, build-name is used as CFBundleShortVersionString while build-number is used as
CFBundleVersion.

# Read more about iOS versioning at

#
https://developer.apple.com/library/archive/documentation/General/Reference/InfoPlistKeyR
eference/Articles/CoreFoundationKeys.html

# In Windows, build-name is used as the major, minor, and patch parts

# of the product and file versions while build-number is used as the build suffix.

version: 1.0.0+1

environment:

  sdk: '>=3.2.1 <4.0.0'

# Dependencies specify other packages that your package needs in order to work.

# To automatically upgrade your package dependencies to the latest versions

# consider running `flutter pub upgrade --major-versions`. Alternatively,

# dependencies can be manually updated by changing the version numbers below to

# the latest version available on pub.dev. To see which dependencies have newer

# versions available, run `flutter pub outdated`.

dependencies:

  http: ^0.13.3

  flutter:

    sdk: flutter

  # The following adds the Cupertino Icons font to your application.

  # Use with the CupertinoIcons class for iOS style icons.

  cupertino_icons: ^1.0.2

dev_dependencies:

  flutter_test:

    sdk: flutter

  # The "flutter_lints" package below contains a set of recommended lints to
```

```yaml
    # encourage good coding practices. The lint set provided by the package is
    # activated in the `analysis_options.yaml` file located at the root of your
    # package. See that file for information about deactivating specific lint
    # rules and activating additional ones.
    flutter_lints: ^2.0.0
# For information on the generic Dart part of this file, see the
# following page: https://dart.dev/tools/pub/pubspec

# The following section is specific to Flutter packages.
flutter:
  # The following line ensures that the Material Icons font is
  # included with your application, so that you can use the icons in
  # the material Icons class.
  uses-material-design: true

  # To add assets to your application, add an assets section, like this:
  # assets:
  #  - images/a_dot_burr.jpeg
  #  - images/a_dot_ham.jpeg

  # An image asset can refer to one or more resolution-specific "variants", see
  # https://flutter.dev/assets-and-images/#resolution-aware

  # For details regarding adding assets from package dependencies, see
  # https://flutter.dev/assets-and-images/#from-packages

  # To add custom fonts to your application, add a fonts section here,
  # in this "flutter" section. Each entry in this list should have a
  # "family" key with the font family name, and a "fonts" key with a
  # list giving the asset and other descriptors for the font. For
  # example:
  # fonts:
  #  - family: Schyler
  #    fonts:
```

- asset: fonts/Schyler-Regular.ttf

- asset: fonts/Schyler-Italic.ttf

style: italic

- family: Trajan Pro

fonts:

- asset: fonts/TrajanPro.ttf
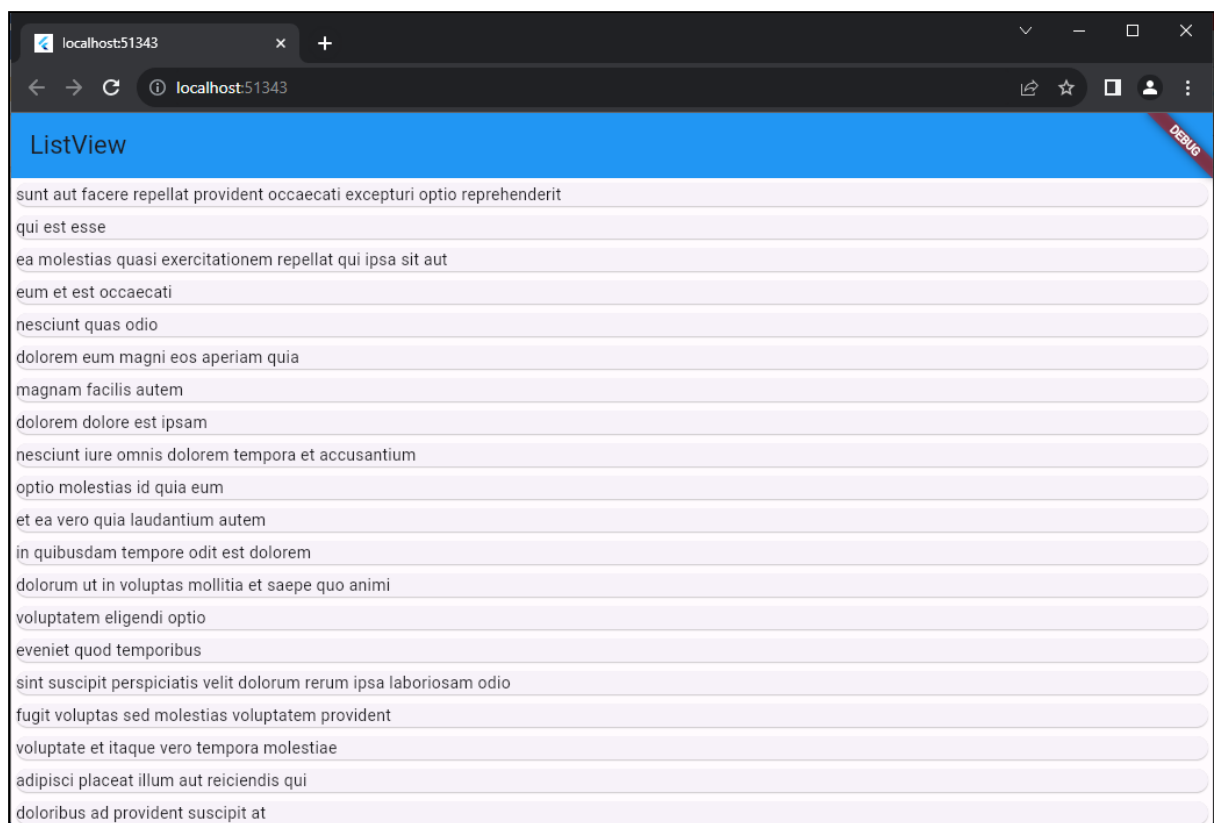
- asset: fonts/TrajanPro_Bold.ttf

weight: 700

#

For details regarding fonts from package dependencies,

see https://flutter.dev/custom-fonts/#from-packages

Output:

2. Write a flutter program to demonstrate JSON serialization and Deserialization.

Program:

main.dart

```dart
import 'package:flutter/material.dart';

import 'UserModel.dart';

import 'dart:convert';

void main() => runApp(const MyApp());

class MyApp extends StatelessWidget {

const MyApp({super.key});

  @override

  Widget build(BuildContext context) {

   return MaterialApp(

    title: 'Flutter Demo',

    theme: ThemeData(

      primarySwatch: Colors.blue

    ),

    home: HomePage(),

   );

  }

}

class HomePage extends StatefulWidget {

 @override

 State<StatefulWidget> createState() => _HomePageState();

}

class _HomePageState extends State<HomePage> {

 UserModel userModel=new UserModel(id: "1", fullname: "ABC", email: "abc@gmail.com");

 String userJson='{"id":"1","fullname":"abc","email":"abc@gmail.com"}';

 @override

 Widget build(BuildContext context) {
```

```dart
    return Scaffold(
      body: Center(
        child: Row(
          mainAxisAlignment: MainAxisAlignment.center,
          children: <Widget>[
            ElevatedButton(onPressed: (){
              Map<String,dynamic> userMap=userModel.toMap();
              var json=jsonEncode(userMap);
              print(json.toString());
            }, child: Text("Serialize")),
            SizedBox(width: 20,),
            ElevatedButton(onPressed: (){
              var decode=jsonDecode(userJson);
              Map<String,dynamic> userMap=decode;
              UserModel user=new UserModel.fromMap(userMap);
              print(user.fullname.toString());
              print(user.id.toString());
            }, child: Text("Deserialize"))
          ],
        ),
      ),
    );
  }
}
```

UserModel.dart

```dart
class UserModel{
late String id;
 late String fullname;
 late String email;
```

```dart
  //Map to object
  UserModel({required this.id, required this.fullname, required this.email});
  UserModel.fromMap(Map<String,dynamic> map){
    this.id=map["id"];
    this.fullname=map["fullname"];
    this.email=map["email"];
  }
  //object to map
  Map<String, dynamic> toMap(){
    return {
      "id":this.id,
      "fullname":this.fullname,
      "email":this.email,
    };
  }
}
```

Output:

Launching lib\main.dart on Chrome in debug mode...
Waiting for connection from debug service on Chrome...
This app is linked to the debug service: ws://127.0.0.1:61842/l7hrKtxAe-c=/ws
Debug service listening on ws://127.0.0.1:61842/l7hrKtxAe-c=/ws
Debug service listening on ws://127.0.0.1:61842/l7hrKtxAe-c=/ws
{"id":"1","fullname":"ABC","email":"abc@gmail.com"}
abc
1