Practical 1

Aim: Introduction to Android and Create a "Custom Message" application. That will display "Custom Message" in the middle of the screen in the Black color with the yellow background.

Code:

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"
   android:background="@android:color/holo_orange_light"
   tools:context=".MainActivity"
   android:background="#99ccff">

   <TextView
     android:layout_width="wrap_content"
     android:layout_height="wrap_content"
     android:text="17IT024"
     android:textSize="20sp"
     android:textColor="#00000"
     app:layout_constraintBottom_toBottomOf="parent"
     app:layout_constraintLeft_toLeftOf="parent"
     app:layout_constraintRight_toRightOf="parent"
     app:layout_constraintTop_toTopOf="parent" />


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

MainActivitiy.java

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

import android.os.Bundle;

public class customMessage extends AppCompatActivity {

   @Override

   protected void onCreate(Bundle savedInstanceState) {

      super.onCreate(savedInstanceState);

      setContentView(R.layout.MainActivity);

   }
```

```
}
```

OUTPUT:

Practical 2

Aim: Create an android application to calculate the sum of two numbers and gives result in Toast Message.

Code:

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">

   <EditText
      android:id="@+id/num2"
      android:layout_width="500px"
      android:layout_height="wrap_content"
      android:layout_marginTop="36dp"
      android:hint="Value 2"
      android:inputType="number"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toBottomOf="@+id/textView3" />

   <TextView
      android:id="@+id/textView3"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_marginTop="24dp"
      android:text="Number 2"
      android:textColor="#D31B351C"
      android:textSize="18sp"
      android:textStyle="bold"
      app:fontFamily="serif"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toBottomOf="@+id/num1" />

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

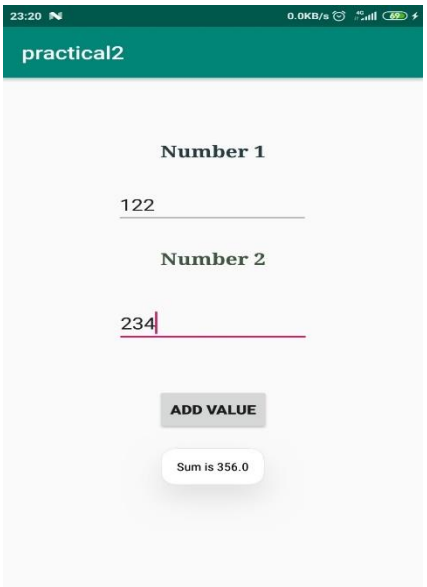
```
    android:layout_height="wrap_content"
    android:layout_marginTop="68dp"
    android:text="Number 1"
    android:textColor="#DF0A2025"
    android:textSize="18sp"
    android:textStyle="bold"
    app:fontFamily="serif"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent" />

  <EditText
    android:id="@+id/num1"
    android:layout_width="500px"
    android:layout_height="wrap_content"
    android:layout_marginTop="24dp"
    android:hint="Value 1"
    android:inputType="number"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.497"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/textView" />

  <Button
    android:id="@+id/button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="48dp"
    android:onClick="onClick"
    android:text="Add Value"
    android:textStyle="bold"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/num2" />

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

MainActivity.java

```
package myapp.example.com.practical2;

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 {

   Button button;
   EditText num1,num2;

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

      button = findViewById(R.id.button);
      num1 = findViewById(R.id.num1);
      num2 = findViewById(R.id.num2);
   }

   public void onClick(View V){
      double a = Double.parseDouble(num1.getText().toString());
      double b = Double.parseDouble(num2.getText().toString());

      double sum = a + b ;
      Toast.makeText(this,"Sum is "+sum,Toast.LENGTH_SHORT).show();
      //toast.show();
   }
}
```

Output:



Practical 3

Aim: Create an application that will display Toast (Message) on a specific interval of time.

Code:

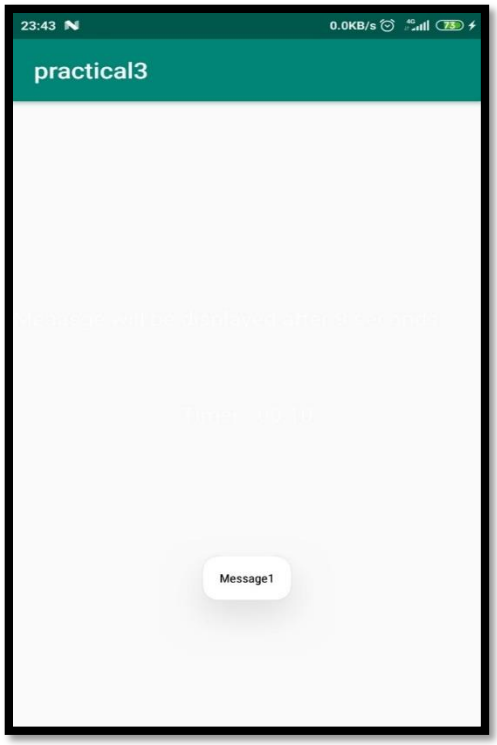
Activity_main.xml

```
<?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">

   <TextView
      android:id="@+id/tv"
      android:layout_width="match_parent"
      android:layout_height="wrap_content"
      android:textAppearance="@android:style/TextAppearance.DeviceDefault.Medium"
      android:textColor="#fff"
      android:textSize="20sp"
      app:layout_constraintBottom_toTopOf="@+id/cnm"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintHorizontal_bias="0.0"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toTopOf="parent"
      app:layout_constraintVertical_bias="0.744" />

   <Chronometer
      android:id="@+id/cnm"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_centerHorizontal="true"
      android:layout_centerVertical="true"
      android:format="Timer : %s"
      android:textColor="#fff"
      android:textSize="20sp"
      app:layout_constraintBottom_toBottomOf="parent"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toTopOf="parent" />

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

MainActivity.java

```
package myapp.example.com.practical3;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.widget.Chronometer;
import android.widget.TextView;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

   Chronometer c;
   int i=0;
   int duration=10;
   TextView tv;

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

      c=(Chronometer)findViewById(R.id.cnm);
      tv=(TextView)findViewById(R.id.tv);
      c.start();
      c.setOnChronometerTickListener(new Chronometer.OnChronometerTickListener() {
         @Override
         public void onChronometerTick(Chronometer arg0) {

            tv.setText("Meaasge will be displayed after " + (duration - (i + 1)) + " seconds");
            i++;
            if (i >= duration)
            {
               Toast.makeText(getApplicationContext(),"Message"+(i/10),
Toast.LENGTH_LONG).show();
               duration=duration+10;
            }

         }
      });
   }
}
```

Output:


23:43
0.0KB/s
practical3
Message1


23:43
0.2KB/s
practical3
Message5

Practical 4

Aim: Create a temperature converter Application. (Fahrenheit-Celsius).

Code:

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">

   <TextView
      android:id="@+id/textView"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Fahrenheit"
      android:textColor="#BF0B3D1C"
      android:textSize="24sp"
      android:textStyle="bold"
      app:layout_constraintBottom_toBottomOf="parent"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintHorizontal_bias="0.216"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toTopOf="parent"
      app:layout_constraintVertical_bias="0.309" />

   <TextView
      android:id="@+id/textView2"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Celsius"
      android:textColor="#BF0B3D1C"
      android:textSize="24sp"
      android:textStyle="bold"
      app:layout_constraintBottom_toBottomOf="parent"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintHorizontal_bias="0.477"
      app:layout_constraintStart_toEndOf="@+id/textView"
      app:layout_constraintTop_toTopOf="parent"
      app:layout_constraintVertical_bias="0.309" />
```

```
<EditText
   android:id="@+id/fe"
   android:layout_width="180dp"
   android:layout_height="50dp"
   app:layout_constraintBottom_toBottomOf="parent"
   app:layout_constraintEnd_toEndOf="parent"
   app:layout_constraintHorizontal_bias="0.069"
   app:layout_constraintStart_toStartOf="parent"
   app:layout_constraintTop_toBottomOf="@+id/textView"
   app:layout_constraintVertical_bias="0.078" />

<EditText
   android:id="@+id/ce"
   android:layout_width="180dp"
   android:layout_height="50dp"
   app:layout_constraintBottom_toBottomOf="parent"
   app:layout_constraintEnd_toEndOf="parent"
   app:layout_constraintHorizontal_bias="0.542"
   app:layout_constraintStart_toEndOf="@+id/fe"
   app:layout_constraintTop_toBottomOf="@+id/textView2"
   app:layout_constraintVertical_bias="0.078" />

<Button
   android:id="@+id/convert"
   android:layout_width="188dp"
   android:layout_height="45dp"
   android:background="#F0040904"
   android:text="Convert"
   android:textColor="#B4BFE9D2"
   android:textStyle="bold"
   app:layout_constraintBottom_toBottomOf="parent"
   app:layout_constraintEnd_toEndOf="parent"
   app:layout_constraintHorizontal_bias="0.498"
   app:layout_constraintStart_toStartOf="parent"
   app:layout_constraintTop_toTopOf="parent"
   app:layout_constraintVertical_bias="0.576" />

<Spinner
   android:id="@+id/spinner"
   android:layout_width="274dp"
   android:layout_height="44dp"
   app:layout_constraintBottom_toTopOf="@+id/convert"
   app:layout_constraintEnd_toEndOf="parent"
```

```
    app:layout_constraintHorizontal_bias="0.496"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.344" />

  <TextView
    android:id="@+id/textView3"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Temperature in "
    android:textColor="#BF0B3D1C"
    android:textSize="24sp"
    android:textStyle="bold"
    app:layout_constraintBottom_toTopOf="@+id/spinner"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.852" />

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

Strings.xml

```
<resources>
  <string name="app_name">practical4</string>
  <string-array name="spinner">
    <item>None</item>
    <item>Fahrenheit</item>
    <item>Celsius</item>
  </string-array>
</resources>
```

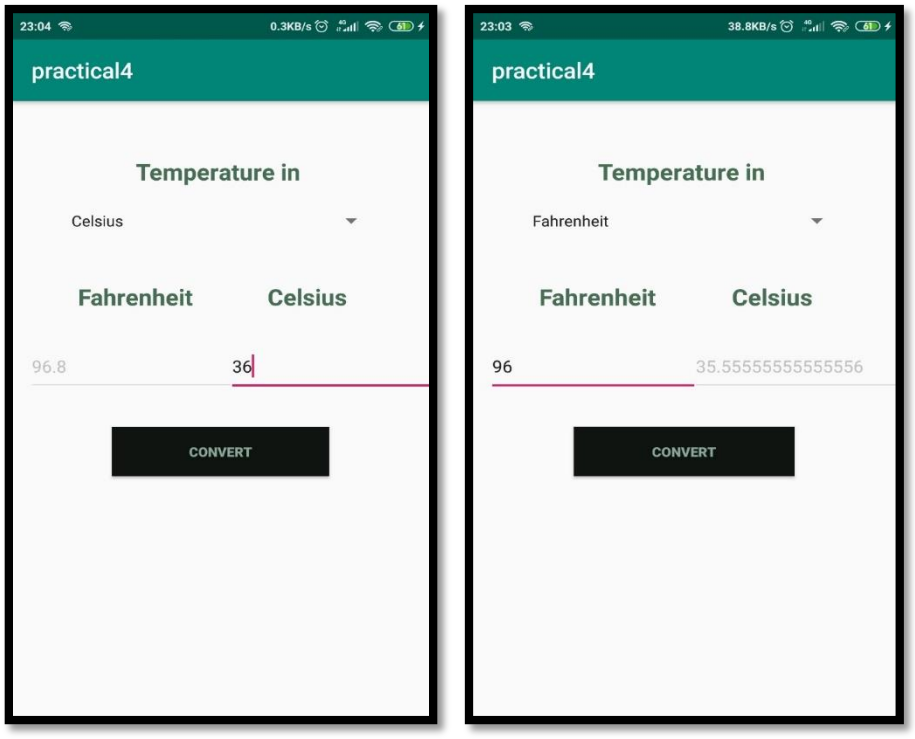
Mainactivity.java

```
package myapp.example.com.practical4;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.ArrayAdapter;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Spinner;
```

```
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

   EditText fe,ce ;
   Button convert ;
   Spinner spinner ;
   String text ;
   Double fed,ced;
   Double fece,cefe;

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

      fe = findViewById(R.id.fe);
      ce = findViewById(R.id.ce);
      convert = findViewById(R.id.convert);
      spinner = findViewById(R.id.spinner);

      ArrayAdapter<CharSequence> adapter = ArrayAdapter.createFromResource(this,
            R.array.spinner, android.R.layout.simple_spinner_item);
      adapter.setDropDownViewResource(android.R.layout.simple_spinner_dropdown_item);
      spinner.setAdapter(adapter);

      spinner.setOnItemSelectedListener(new AdapterView.OnItemSelectedListener() {
         @Override
         public void onItemSelected(AdapterView<?> parent, View view, int position, long id) {
            text = spinner.getSelectedItem().toString() ;
            if(text.equals("Fahrenheit")){
               ce.setEnabled(false);
               fe.setEnabled(true);
            }else if(text.equals("Celsius")){
               fe.setEnabled(false);
               ce.setEnabled(true);
            }else if(text.equals("None")){
               fe.setEnabled(false);
               ce.setEnabled(false);
            }
         }

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

```
        }
    });


        convert.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if(text.equals("Fahrenheit")) {
                    fed = Double.parseDouble(fe.getText().toString());
                    fece = (fed - 32) * 5 / 9;
                    ce.setText(fece.toString());
                }else if(text.equals("Celsius")) {
                    ced = Double.parseDouble(ce.getText().toString());
                    cefe = ((ced * 9) / 5) + 32;
                    fe.setText(cefe.toString());
                }else if(text.equals("None")){
                    Toast.makeText(MainActivity.this,"Enter Value",Toast.LENGTH_SHORT).show();
                }
            }
        });
    }
}
```

Output:



Practical 5

Aim: Create a login application with the following features:
1. Successful Login message in TextView with Green background if Username & password is correct
2. Failure message in TextView with Red background if Username or password is incorrect.
3. Disable Login Button after three wrong log in attempts.
4. Close application if the user selects Cancel Button.

Code:
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"
   android:background="#32689ED8"
   tools:context=".MainActivity">

   <TextView
      android:id="@+id/textView"
      android:layout_width="120dp"
      android:layout_height="40dp"
      android:gravity="center"
      android:text="User Name"
      android:textColor="#BF0F1D4E"
      android:textSize="24sp"
      android:textStyle="bold"
      app:layout_constraintBottom_toBottomOf="parent"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintHorizontal_bias="0.498"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toTopOf="parent"
      app:layout_constraintVertical_bias="0.105" />

   <TextView
      android:id="@+id/textView2"
      android:layout_width="120dp"
      android:layout_height="40dp"
      android:gravity="center"
      android:text="Password"
```

```
    android:textColor="#C4132542"
    android:textSize="24sp"
    android:textStyle="bold"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.498"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/username"
    app:layout_constraintVertical_bias="0.022" />

  <EditText
    android:id="@+id/username"
    android:layout_width="320dp"
    android:layout_height="45dp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.498"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/textView"
    app:layout_constraintVertical_bias="0.019" />

  <Button
    android:id="@+id/cancel"
    android:layout_width="120dp"
    android:layout_height="wrap_content"
    android:background="#DA0A0F41"
    android:text="@android:string/cancel"
    android:textColor="#AAC3F0"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.176"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/password"
    app:layout_constraintVertical_bias="0.105" />

  <Button
    android:id="@+id/login"
    android:layout_width="120dp"
    android:layout_height="wrap_content"
    android:background="#DA0A0F41"
    android:text="Login"
    android:textColor="#AAC3F0"
    android:textStyle="bold"
    app:layout_constraintBottom_toBottomOf="parent"
```

```
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.827"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/password"
    app:layout_constraintVertical_bias="0.105" />

  <EditText
    android:id="@+id/password"
    android:layout_width="320dp"
    android:layout_height="45dp"
    android:layout_marginTop="12dp"
    android:ems="10"
    android:inputType="textPassword"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.505"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/textView2"
    app:layout_constraintVertical_bias="0.0" />

  <TextView
    android:id="@+id/message"
    android:layout_width="0dp"
    android:layout_height="27dp"
    android:gravity="center"
    android:textColor="#FAFCF7F7"
    android:textSize="18sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/login"
    app:layout_constraintVertical_bias="0.13" />

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

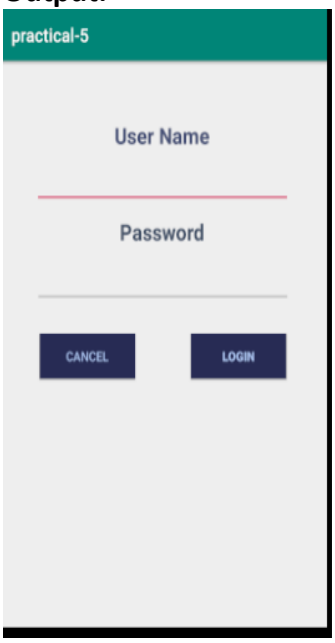
MainActivity.java

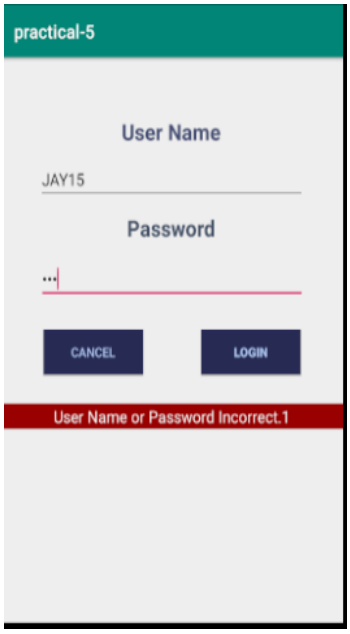
```
package myapp.example.com.practical5;

import androidx.appcompat.app.AppCompatActivity;

import android.graphics.Color;
import android.graphics.ColorFilter;
import android.os.Bundle;
import android.provider.CalendarContract;
```

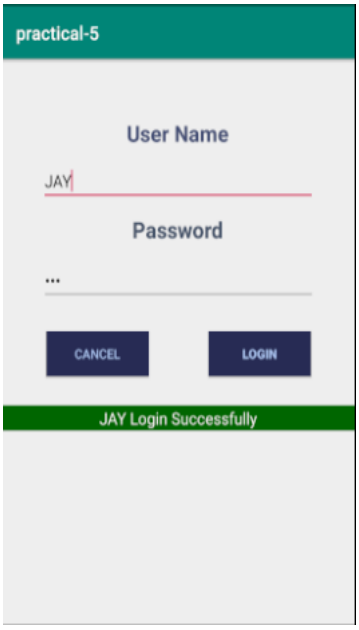
```
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity {

   EditText username,password;
   TextView message;
   Button cancel,login;
   String user,pass;
   int count = 1 ;

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

      username = findViewById(R.id.username);
      password = findViewById(R.id.password);
      cancel = findViewById(R.id.cancel);
      login = findViewById(R.id.login);
      message = findViewById(R.id.message)
      login.setOnClickListener(new View.OnClickListener() {
         @Override
         public void onClick(View v) {

            user = username.getText().toString();
            pass = password.getText().toString();

            if(user.equals("JAY") && pass.equals("JAY")){
               message.setText(user+" Login Success Fully.");
               message.setBackgroundColor(Color.parseColor("#006600"));
            }else{
               message.setText("User Name or Password Incorrect."+count);
               message.setBackgroundColor(Color.parseColor("#990000"));
               count = count + 1;
               if (count==4){
                  login.setEnabled(false);
                  login.setBackgroundColor(Color.BLACK);
               }
            }
         }
      });
```

```
        cancel.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                System.exit(0);
            }
        });
    }
}
```

Output:







Practical 6

Aim: Create an application which turns ON or OFF Torch/Flashlight of Camera.

Code:

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">

   <Button
      android:id="@+id/on"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="ON"
      app:layout_constraintBottom_toTopOf="@+id/off"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintHorizontal_bias="0.501"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toTopOf="parent"
      app:layout_constraintVertical_bias="0.877" />

   <Button
      android:id="@+id/off"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="OFF"
      app:layout_constraintBottom_toBottomOf="parent"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toTopOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

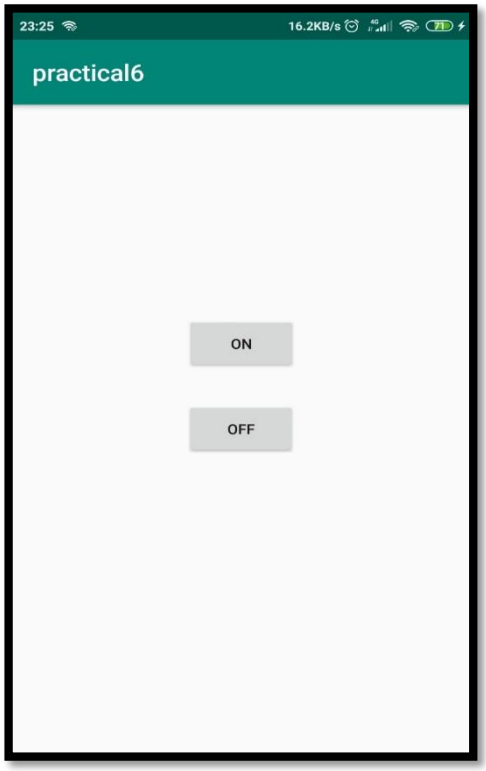
MainActivity.java

```
package myapp.example.com.practical6;

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

```
import android.content.Context;
import android.hardware.camera2.CameraAccessException;
import android.hardware.camera2.CameraManager;
import android.os.Build;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;

public class MainActivity extends AppCompatActivity {

   Button on,off;

   @RequiresApi(api = Build.VERSION_CODES.LOLLIPOP)
   @Override
   protected void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.activity_main);

      on = findViewById(R.id.on);
      off = findViewById(R.id.off);

      final CameraManager camManager = (CameraManager)
getSystemService(Context.CAMERA_SERVICE);
      final String[] cameraId = {null};

      on.setOnClickListener(new View.OnClickListener() {
         @Override
         public void onClick(View v) {
            if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.M) {
               try {
                  cameraId[0] = camManager.getCameraIdList()[0];
                  camManager.setTorchMode(cameraId[0], true);   //Turn ON
               } catch (CameraAccessException e) {
                  e.printStackTrace();
               }
            }
         }
      });

      off.setOnClickListener(new View.OnClickListener() {
         @RequiresApi(api = Build.VERSION_CODES.M)
         @Override
         public void onClick(View v) {
            try {
```

```
                camManager.setTorchMode(cameraId[0], false);
            } catch (CameraAccessException e) {
                e.printStackTrace();
            }
        }
    });
  }
}
```

Output:



Practical 7

Aim: Create an application that will change the color of the screen, based on selected options from the menu.

Code:

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"
android:id="@+id/con"
tools:context=".MainActivity">

<include layout="@layout/toolbar"
   android:id="@+id/toolbar"></include>

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

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

Strings.xml

```
<resources>
   <string name="app_name">practical7</string>
   <string name="Red">Red</string>
   <string name="Yellow">Yellow</string>
   <string name="Blue">Blue</string>
</resources>
```

Toolbar.xml

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

```
   android:layout_width="match_parent"
   android:layout_height="wrap_content">
</androidx.appcompat.widget.Toolbar>
```

Menu.xml

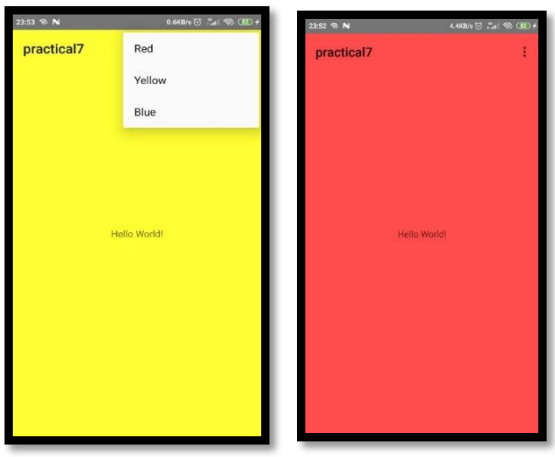
```
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/apk/res/android">
   <item
      android:id="@+id/red"
      android:title="@string/Red"></item>
   <item
      android:id="@+id/yellow"
      android:title="@string/Yellow"></item>
   <item
      android:id="@+id/blue"
      android:title="@string/Blue"></item>

</menu>
```

MainActivity.java

```
package com.example.practical7;

import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import androidx.appcompat.widget.Toolbar;
import androidx.constraintlayout.widget.ConstraintLayout;

import android.graphics.Color;
import android.os.Bundle;
import android.view.Menu;
import android.view.MenuInflater;
import android.view.MenuItem;

public class MainActivity extends AppCompatActivity {

   ConstraintLayout con ;

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

      con = findViewById(R.id.con);

      Toolbar toolbar = findViewById(R.id.toolbar);
```

```
        setSupportActionBar(toolbar);
    }

    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        MenuInflater inflater = getMenuInflater();
        inflater.inflate(R.menu.menu,menu);
        return super.onCreateOptionsMenu(menu);
    }

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

        switch (item.getItemId()){
            case R.id.red:

                con.setBackgroundColor(Color.parseColor("#ff4d4d"));
                break;

            case R.id.yellow:
                con.setBackgroundColor(Color.parseColor("#ffff33"));
                break;

            case R.id.blue:
                con.setBackgroundColor(Color.parseColor("#9999ff"));
                break;

        }
        return super.onOptionsItemSelected(item);
    }
}
```

Output:



Practical 8

Aim: Create an application that will change the color of the screen, based on selected options from the menu.

Code:

Activity_main.xml

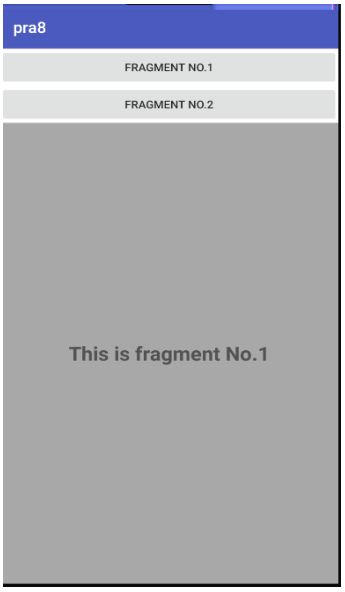
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".MainActivity">
    <Button
        android:id="@+id/button1"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text="Fragment No.1"
        android:onClick="selectFrag" />
    <Button
        android:id="@+id/button2"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:onClick="selectFrag"
        android:text="Fragment No.2" />
    <fragment
        android:name="com.example.dell.pra8.fragments.fragmentOne"
        android:id="@+id/fragment_place"
        android:layout_width="match_parent"
        android:layout_height="match_parent"/>
</LinearLayout>
```

MainActivity.java

```
package com.example.pra8;

import android.app.Fragment;
import android.app.FragmentManager;
import android.app.FragmentTransaction;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import com.example.dell.pra8.fragments.fragentTwo;
import com.example.dell.pra8.fragments.fragmentOne;

public class MainActivity extends AppCompatActivity {

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

    public void selectFrag(View view) {
        Fragment fr;
```

```
        if(view == findViewById(R.id.button2)) {
            fr = new fragentTwo();

        }else {
            fr = new fragmentOne();
        }
        FragmentManager fm = getFragmentManager();
        FragmentTransaction fragmentTransaction = fm.beginTransaction();
        fragmentTransaction.replace(R.id.fragment_place, fr);
        fragmentTransaction.commit();
    }
}
```

Output:



Practical 9

Aim: Create an application with the help of web view.

Code:

Activity_main.xml

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

AndroidMainfest.xml

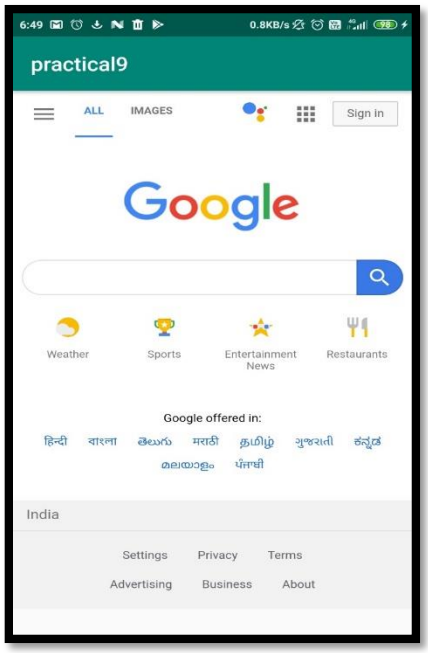
```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
   package="com.example.practical9">

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

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

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

</manifest>
```

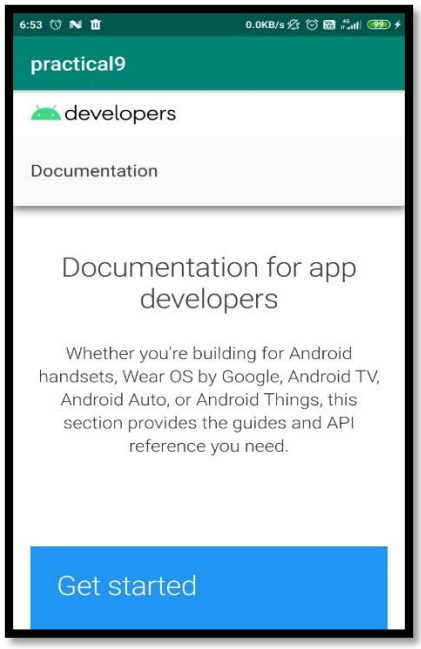
MainActivity.java

```
package com.example.practical9;
```

```
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.webkit.WebView;
import android.webkit.WebViewClient;

public class MainActivity extends AppCompatActivity {
   WebView webview;

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

      webview = findViewById(R.id.webview);
      webview.setWebViewClient(new WebViewClient());
      webview.loadUrl("http://www.google.com");
   }
   @Override
   public void onBackPressed() {
      if (webview.canGoBack()){
         webview.goBack();
      }else {
         super.onBackPressed();
      }
   }
}
```

Output:





Practical 10

Aim: Create an application with the help of the database.

Code:

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"
   android:background="#fff"
   >

   <Button
      android:id="@+id/button5"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_marginStart="161dp"
      android:layout_marginLeft="161dp"
      android:layout_marginTop="283dp"
      android:layout_marginEnd="162dp"
      android:layout_marginRight="162dp"
      android:layout_marginBottom="64dp"
      android:background="#FFE5E5"
      android:text="Insert"
      android:textColor="#000"
      app:layout_constraintBottom_toTopOf="@+id/button6"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toTopOf="parent" />

   <Button
      android:id="@+id/button6"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_marginStart="161dp"
      android:layout_marginLeft="161dp"
      android:layout_marginTop="64dp"
      android:layout_marginEnd="162dp"
      android:layout_marginRight="162dp"
      android:layout_marginBottom="64dp"
```

```
    android:background="#FFE5E5"
    android:text="Delete"
    android:textColor="#000"
    app:layout_constraintBottom_toTopOf="@+id/button7"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/button5" />

  <Button
    android:id="@+id/button7"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="161dp"
    android:layout_marginLeft="161dp"
    android:layout_marginTop="64dp"
    android:layout_marginEnd="162dp"
    android:layout_marginRight="162dp"
    android:layout_marginBottom="148dp"
    android:background="#FFE5E5"
    android:text="View All"
    android:textColor="#000"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/button6" />

  <TextView
    android:id="@+id/textView3"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="159dp"
    android:layout_marginLeft="159dp"
    android:layout_marginTop="95dp"
    android:layout_marginEnd="159dp"
    android:layout_marginRight="159dp"
    android:layout_marginBottom="144dp"
    android:text="Database Data"
    app:layout_constraintBottom_toTopOf="@+id/button5"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    android:textColor="#B53160"
    android:textSize="30sp"
    />
```

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

Activit_insert.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=".Insert"
   android:background="#fff"
   >

   <EditText
      android:id="@+id/editText"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_marginTop="156dp"
      android:layout_marginEnd="30dp"
      android:layout_marginRight="30dp"
      android:layout_marginBottom="60dp"
      android:ems="10"
      android:hint="Name"
      android:inputType="textPersonName"
      app:layout_constraintBottom_toTopOf="@+id/editText2"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintTop_toTopOf="parent" />

   <TextView
      android:id="@+id/textView"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_marginStart="58dp"
      android:layout_marginLeft="58dp"
      android:layout_marginTop="96dp"
      android:layout_marginEnd="56dp"
      android:layout_marginRight="56dp"
      android:text="Name"
      android:textColor="#B53160"
      android:textSize="20sp"
      app:layout_constraintEnd_toStartOf="@+id/editText"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toTopOf="parent" />
```

```
<EditText
    android:id="@+id/editText2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="60dp"
    android:layout_marginEnd="30dp"
    android:layout_marginRight="30dp"
    android:layout_marginBottom="425dp"
    android:ems="10"
    android:hint="Roll No"
    android:inputType="textPersonName"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/editText" />

<TextView
    android:id="@+id/textView2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="58dp"
    android:layout_marginLeft="58dp"
    android:layout_marginTop="145dp"
    android:layout_marginEnd="20dp"
    android:layout_marginRight="20dp"
    android:layout_marginBottom="437dp"
    android:text="Roll No"
    android:textColor="#B53160"
    android:textSize="20sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toStartOf="@+id/editText2"
    app:layout_constraintHorizontal_bias="1.0"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/textView" />

<Button
    android:id="@+id/button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="180dp"
    android:layout_marginLeft="180dp"
    android:layout_marginTop="58dp"
    android:layout_marginEnd="92dp"
    android:layout_marginRight="92dp"
    android:layout_marginBottom="299dp"
```

```
    android:background="#FFE5E5"
    android:text="Insert"
    android:textColor="#000"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/editText2" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

activity_delete.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=".Delete"
  android:background="#fff"
  >

  <EditText
    android:id="@+id/editText"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="156dp"
    android:layout_marginEnd="30dp"
    android:layout_marginRight="30dp"
    android:layout_marginBottom="60dp"
    android:ems="10"
    android:hint="Name"
    android:inputType="textPersonName"
    app:layout_constraintBottom_toTopOf="@+id/editText2"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintTop_toTopOf="parent" />

  <TextView
    android:id="@+id/textView"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="58dp"
    android:layout_marginLeft="58dp"
    android:layout_marginTop="96dp"
    android:layout_marginEnd="56dp"
    android:layout_marginRight="56dp"
```

```
    android:text="Name"
    android:textColor="#B53160"
    android:textSize="20sp"
    app:layout_constraintEnd_toStartOf="@+id/editText"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent" />

  <EditText
    android:id="@+id/editText2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="60dp"
    android:layout_marginEnd="30dp"
    android:layout_marginRight="30dp"
    android:layout_marginBottom="425dp"
    android:ems="10"
    android:hint="Roll No"
    android:inputType="textPersonName"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/editText" />

  <TextView
    android:id="@+id/textView2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="58dp"
    android:layout_marginLeft="58dp"
    android:layout_marginTop="145dp"
    android:layout_marginEnd="20dp"
    android:layout_marginRight="20dp"
    android:layout_marginBottom="437dp"
    android:text="Roll No"
    android:textColor="#B53160"
    android:textSize="20sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toStartOf="@+id/editText2"
    app:layout_constraintHorizontal_bias="1.0"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/textView" />

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

```
    android:layout_height="wrap_content"
    android:layout_marginStart="180dp"
    android:layout_marginLeft="180dp"
    android:layout_marginTop="58dp"
    android:layout_marginEnd="92dp"
    android:layout_marginRight="92dp"
    android:layout_marginBottom="299dp"
    android:background="#FFE5E5"
    android:text="Delete"
    android:textColor="#000"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/editText2" />

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

activity.viewa.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=".Viewa"
  android:background="#fff"
  >

  <TextView
    android:id="@+id/textView4"
    android:layout_width="259dp"
    android:layout_height="498dp"
    android:layout_marginStart="48dp"
    android:layout_marginLeft="48dp"
    android:layout_marginTop="35dp"
    android:layout_marginEnd="56dp"
    android:layout_marginRight="56dp"
    android:layout_marginBottom="48dp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    android:textSize="10sp"
```

```
    android:textColor="#FFE5E5"
    />
</androidx.constraintlayout.widget.ConstraintLayout>
```

Mainactivit.java:

```
package com.example.practical10;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Context;
import android.content.Intent;
import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.provider.ContactsContract;
import android.view.View;
import android.widget.Button;
import android.database.Cursor;

public class MainActivity extends AppCompatActivity {

  Button in,del,viewa;
  SQLiteDatabase db;

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

    in=findViewById(R.id.button5);
    del=findViewById(R.id.button6);
    viewa=findViewById(R.id.button7);

    db=openOrCreateDatabase("myDb", Context.MODE_PRIVATE,null);
    db.execSQL("CREATE TABLE IF NOT EXISTS student(name VARCHAR,rollno VARCHAR);");
    in.setOnClickListener(new View.OnClickListener() {
      @Override
      public void onClick(View v) {
        startActivity(new Intent(MainActivity.this, Insert.class));
      }
    });

    del.setOnClickListener(new View.OnClickListener() {
      @Override
      public void onClick(View v) {
```

```
            startActivity(new Intent(MainActivity.this, Delete.class));
        }
    });

    viewa.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            startActivity(new Intent(MainActivity.this,Viewa.class));
        }
    });
  }
}
```

Insert.java:

```
package com.example.practical10;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Context;
import android.database.SQLException;
import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.view.View;
import android.widget.EditText;
import android.widget.Toast;
import android.widget.Button;


public class Insert extends AppCompatActivity {

  EditText name,rollno;
  Button insert;
  SQLiteDatabase db;

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

    name=findViewById(R.id.editText);
    rollno=findViewById(R.id.editText2);
    insert=findViewById(R.id.button);

    db=openOrCreateDatabase("myDb", Context.MODE_PRIVATE,null);
```

```
      insert.setOnClickListener(new View.OnClickListener() {
         @Override
         public void onClick(View v) {

            if (name.getText().toString().trim().length()==0 ||
rollno.getText().toString().trim().length()==0){
               Toast.makeText(getApplicationContext(),"Please Enter Details",
Toast.LENGTH_SHORT).show();
            }
            else
            {
               try{
                  db.execSQL("INSERT INTO student
VALUES('"+name.getText()+"','"+rollno.getText()+"');");
                  Toast.makeText(getApplicationContext(),"Inserted
Successfully",Toast.LENGTH_SHORT).show();
               }
               catch (SQLException e){
                  Toast.makeText(getApplicationContext(),"Operation Not
Successful",Toast.LENGTH_SHORT).show();
               }
            }
         }
      });
   }
}
```

Delete.java:

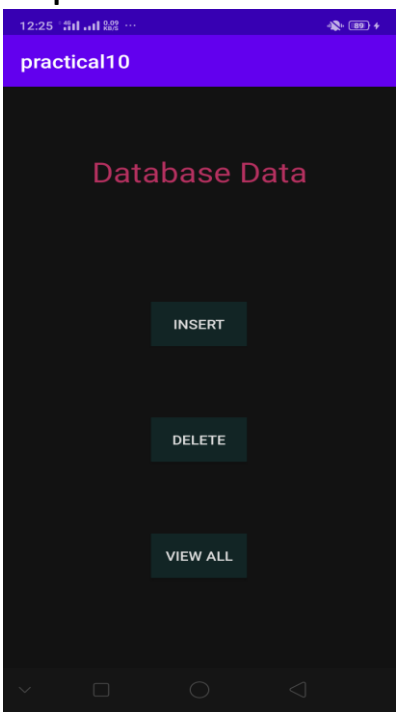
```
package com.example.practical10;

import androidx.appcompat.app.AppCompatActivity;
import android.content.Context;
import android.database.Cursor;
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;


public class Delete extends AppCompatActivity {

   EditText name,rollno;
```

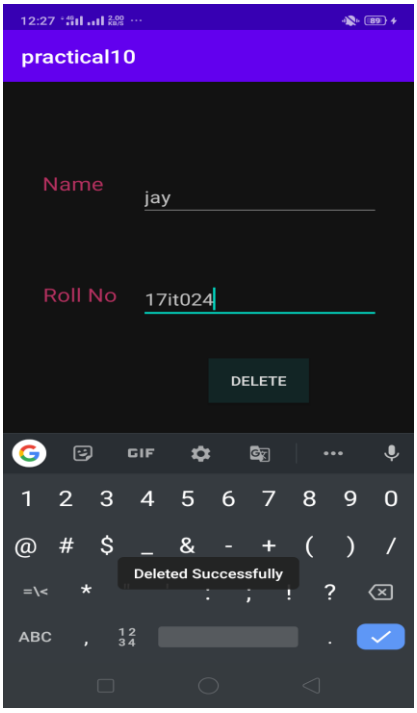
```
   Button delete;
   SQLiteDatabase db;

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

      name=findViewById(R.id.editText);
      rollno=findViewById(R.id.editText2);
      delete=findViewById(R.id.button);

      db=openOrCreateDatabase("myDb", Context.MODE_PRIVATE,null);

      delete.setOnClickListener(new View.OnClickListener() {
         @Override
         public void onClick(View v) {

            if (name.getText().toString().trim().length()==0 ||
rollno.getText().toString().trim().length()==0){
               Toast.makeText(getApplicationContext(),"Please Enter Details",
Toast.LENGTH_SHORT).show();
            }

            Cursor c=db.rawQuery("SELECT * FROM student WHERE
name='"+name.getText()+"'", null);
            if(c.moveToFirst())
            {
               db.execSQL("DELETE FROM student WHERE name='"+name.getText()+"'");
               Toast.makeText(getApplicationContext(),"Deleted
Successfully",Toast.LENGTH_SHORT).show();
            }
            else
            {
               Toast.makeText(getApplicationContext(),"Operation Not
Successful",Toast.LENGTH_SHORT).show();
            }

         }
      });

   }
}
```

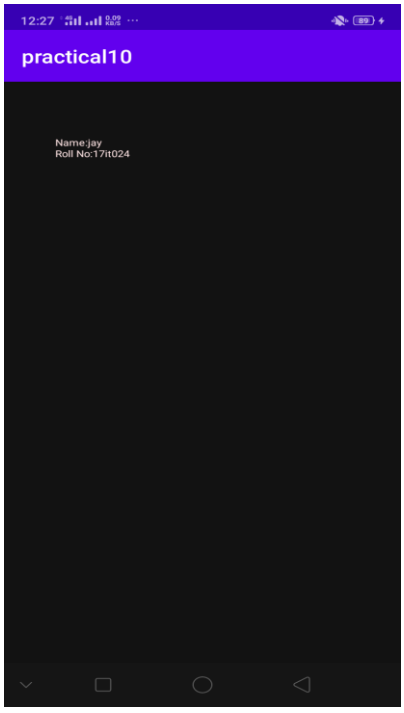
Viewa.java:

```
package com.example.practical10;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Context;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

public class Viewa extends AppCompatActivity {

   TextView t1;
   SQLiteDatabase db;

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

      t1=findViewById(R.id.textView4);

      db=openOrCreateDatabase("myDb", Context.MODE_PRIVATE,null);

      Cursor c=db.rawQuery("SELECT * FROM student",null);
      if (c.getCount()==0){
         Toast.makeText(getApplicationContext(),"No Data
Found",Toast.LENGTH_SHORT).show();
      }

      StringBuffer result=new StringBuffer();
      while (c.moveToNext()){
         result.append("Name:"+c.getString(0)+"\n");
         result.append("Roll No:"+c.getString(1)+"\n\n");
      }
      t1.setText(result.toString());

   }
}
```

Output:


practical10
Database Data
INSERT
DELETE
VIEW ALL


practical10
Name
jay
Roll No
17it024
DELETE
Deleted Successfully


practical10
Name:jay
Roll No:17it024


practical10
Name:jay
Roll No:17it024

Practical 11

Aim: Creating an application that provides Single Sign-on (SSO) with Chrome Custom Tabs via the AppAuth library, and optionally push managed configuration to provide a user login hint.

CODE:

Activicty_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">

   <Button
      android:id="@+id/signin"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Sign In with Google"
      app:layout_constraintBottom_toBottomOf="parent"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toTopOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

Mainactivity.java

```
package com.example.practical11;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.Button;

import com.google.android.gms.auth.api.signin.GoogleSignIn;
import com.google.android.gms.auth.api.signin.GoogleSignInAccount;
import com.google.android.gms.auth.api.signin.GoogleSignInClient;
import com.google.android.gms.auth.api.signin.GoogleSignInOptions;
import com.google.android.gms.common.api.ApiException;
```

```
import com.google.android.gms.tasks.Task;

public class MainActivity extends AppCompatActivity {

   Button signin;
   GoogleSignInClient mGoogleSignInClient;
   int RC_SIGN_IN=0;

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

      signin = findViewById(R.id.signin);

      signin.setOnClickListener(new View.OnClickListener() {
         @Override
         public void onClick(View view) {
            switch (view.getId()) {
               case R.id.signin:
                  signIn();
                  break;
               // ...
            }
         }
      });

      GoogleSignInOptions gso = new
GoogleSignInOptions.Builder(GoogleSignInOptions.DEFAULT_SIGN_IN)
            .requestEmail()
            .build();

      mGoogleSignInClient = GoogleSignIn.getClient(this, gso);
   }

   private void signIn() {
      Intent signInIntent = mGoogleSignInClient.getSignInIntent();
      startActivityForResult(signInIntent, RC_SIGN_IN);
   }
   @Override
   public void onActivityResult(int requestCode, int resultCode, Intent data) {
      super.onActivityResult(requestCode, resultCode, data);

      // Result returned from launching the Intent from GoogleSignInClient.getSignInIntent(...);
```

```
        if (requestCode == RC_SIGN_IN) {
            // The Task returned from this call is always completed, no need to attach
            // a listener.
            Task<GoogleSignInAccount> task = GoogleSignIn.getSignedInAccountFromIntent(data);
            handleSignInResult(task);
        }
    }

    private void handleSignInResult(Task<GoogleSignInAccount> completedTask) {
        try {
            GoogleSignInAccount account = completedTask.getResult(ApiException.class);

            // Signed in successfully, show authenticated UI.
            Intent intent = new Intent(MainActivity.this,secondActivity.class);
            startActivity(intent);
        } catch (ApiException e) {
            // The ApiException status code indicates the detailed failure reason.
            // Please refer to the GoogleSignInStatusCodes class reference for more information.
            Log.w("Error", "signInResult:failed code=" + e.getStatusCode());
        }
    }
}
```

Activity_second.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=".secondActivity">

    <ImageView
        android:id="@+id/imageView"
        android:layout_width="200dp"
        android:layout_height="200dp"
        android:layout_marginTop="124dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.498"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:srcCompat="@drawable/ic_launcher_background"
        tools:ignore="VectorDrawableCompat" />
```

```
  <TextView
     android:id="@+id/name"
     android:layout_width="wrap_content"
     android:layout_height="wrap_content"
     android:layout_marginTop="36dp"
     android:text="Name"
     android:textColor="#040B39"
     android:textSize="18sp"
     app:layout_constraintEnd_toEndOf="parent"
     app:layout_constraintStart_toStartOf="parent"
     app:layout_constraintTop_toBottomOf="@+id/imageView" />

  <TextView
     android:id="@+id/email"
     android:layout_width="wrap_content"
     android:layout_height="wrap_content"
     android:layout_marginTop="40dp"
     android:text="Email Address"
     android:textColor="#040B39"
     android:textSize="18sp"
     app:layout_constraintEnd_toEndOf="parent"
     app:layout_constraintStart_toStartOf="parent"
     app:layout_constraintTop_toBottomOf="@+id/name" />

  <Button
     android:id="@+id/signout"
     android:layout_width="wrap_content"
     android:layout_height="wrap_content"
     android:text="sign out"
     app:layout_constraintBottom_toBottomOf="parent"
     app:layout_constraintEnd_toEndOf="parent"
     app:layout_constraintHorizontal_bias="0.498"
     app:layout_constraintStart_toStartOf="parent"
     app:layout_constraintTop_toBottomOf="@+id/email"
     app:layout_constraintVertical_bias="0.389" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

Secondactivicty.java

```
package myapp.janak.com.practical11;

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

```
import android.net.Uri;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.ImageView;
import android.widget.TextView;
import android.widget.Toast;

import com.bumptech.glide.Glide;
import com.google.android.gms.auth.api.signin.GoogleSignIn;
import com.google.android.gms.auth.api.signin.GoogleSignInAccount;
import com.google.android.gms.auth.api.signin.GoogleSignInClient;
import com.google.android.gms.auth.api.signin.GoogleSignInOptions;
import com.google.android.gms.tasks.OnCompleteListener;
import com.google.android.gms.tasks.Task;

public class secondActivity extends AppCompatActivity {

   TextView name,email;
   ImageView imageView;
   GoogleSignInClient mGoogleSignInClient;
   Button signout;

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

      name = findViewById(R.id.name);
      email = findViewById(R.id.email);
      imageView = findViewById(R.id.imageView);
      signout = findViewById(R.id.signout);

      GoogleSignInOptions gso = new
GoogleSignInOptions.Builder(GoogleSignInOptions.DEFAULT_SIGN_IN)
            .requestEmail()
            .build();

      signout.setOnClickListener(new View.OnClickListener() {
         @Override
         public void onClick(View view) {
            switch (view.getId()) {
               // ...
               case R.id.signout:
```

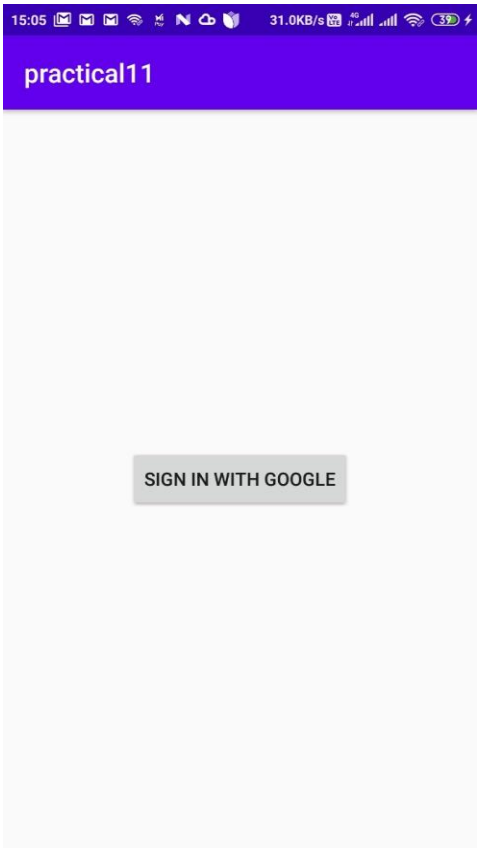
```
                signOut();
                break;
            // ...
        }
      }
    });
    GoogleSignInAccount acct = GoogleSignIn.getLastSignedInAccount(this);
    if (acct != null) {
      String personName = acct.getDisplayName();
      String personEmail = acct.getEmail();
      Uri personPhoto = acct.getPhotoUrl();

      name.setText(personName);
      email.setText(personEmail);
      Glide.with(this).load(String.valueOf(personPhoto)).into(imageView);
    }

  }

  private void signOut() {
      mGoogleSignInClient.signOut()
          .addOnCompleteListener(this, new OnCompleteListener<Void>() {
            @Override
            public void onComplete(@NonNull Task<Void> task) {
              Toast.makeText(secondActivity.this,"SignOut",Toast.LENGTH_LONG).show();
              finish();
            }
          });
  }
}
```

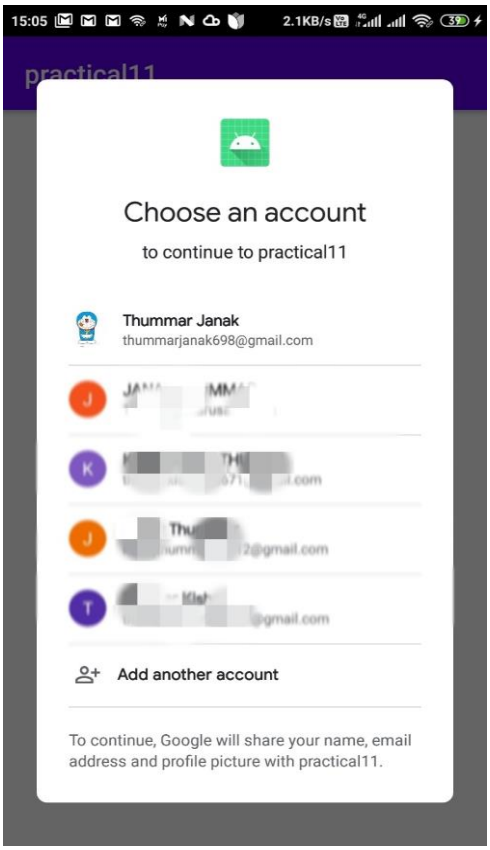
Androidmanifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
  package="com.example.practical11">

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

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

```
    android:theme="@style/AppTheme">
    <activity android:name=".secondActivity"></activity>
    <activity android:name=".MainActivity">
      <intent-filter>
        <action android:name="android.intent.action.MAIN" />

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

OUTPUT





Practical 12

Aim: Create an application to handle support voice interaction.

Code:

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"
   android:orientation="vertical">

   <TextView
      android:id="@+id/txvResult"
      android:layout_width="match_parent"
      android:layout_height="wrap_content"
      android:layout_alignParentTop="true"
      android:layout_alignParentBottom="true"
      android:layout_centerHorizontal="true"
      android:textColor="#000"
      android:textSize="26sp"
      android:textStyle="normal"
      app:layout_constraintBottom_toBottomOf="parent"
      app:layout_constraintEnd_toEndOf="parent"
      app:layout_constraintHorizontal_bias="0.0"
      app:layout_constraintStart_toStartOf="parent"
      app:layout_constraintTop_toTopOf="parent"
      app:layout_constraintVertical_bias="0.103" />

   <ImageView
      android:id="@+id/btnSpeak"
```

```
        android:layout_width="100dp"
        android:layout_height="100dp"
        android:layout_alignParentTop="true"
        android:layout_alignParentBottom="true"
        android:layout_centerHorizontal="true"
        android:gravity="center"
        android:onClick="getSpeechInput"
        android:src="@drawable/ic_mic"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.498"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.908" />

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

AndroidMainfest.xml

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

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

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

</manifest>
```

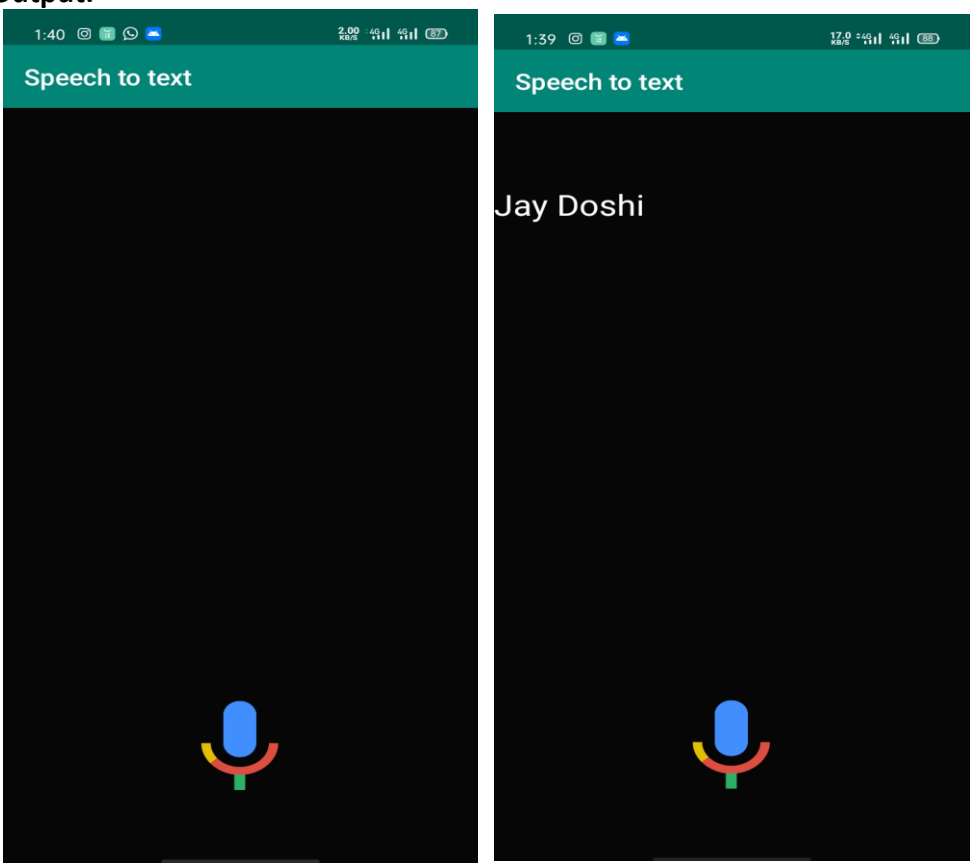
MainActivity.java

```
package com.example.speechtotext;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
```

```
import android.content.Intent;
import android.os.Bundle;
import android.speech.RecognizerIntent;
import android.view.View;
import android.widget.TextView;
import android.widget.Toast;

import java.util.ArrayList;
import java.util.Locale;
public class MainActivity extends AppCompatActivity {

   TextView txvResult;

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

      txvResult = findViewById( R.id.txvResult );
   }
   public void getSpeechInput(View view) {

      Intent intent = new Intent(RecognizerIntent.ACTION_RECOGNIZE_SPEECH);
      intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE_MODEL,
RecognizerIntent.LANGUAGE_MODEL_FREE_FORM);
      intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE, Locale.getDefault());

      if (intent.resolveActivity(getPackageManager()) != null) {
         startActivityForResult(intent, 10);
      } else {
         Toast.makeText(this, "Your Device Don't Support Speech Input",
Toast.LENGTH_SHORT).show();
      }
   }
   @Override
   protected void onActivityResult(int requestCode, int resultCode, Intent data) {
      super.onActivityResult(requestCode, resultCode, data);

      switch (requestCode) {
         case 10:
            if (resultCode == RESULT_OK && data != null) {
               ArrayList<String> result =
data.getStringArrayListExtra(RecognizerIntent.EXTRA_RESULTS);
               txvResult.setText(result.get(0));
```

```
            }
            break;
        }
    }

}
```

Output:



Practical 13

Aim: Create an application to play video using the YouTube API in PIP mode.

Code:

Activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
   xmlns:android="http://schemas.android.com/apk/res/android"
   xmlns:app="http://schemas.android.com/apk/res-auto"
   xmlns:tools="http://schemas.android.com/tools"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   tools:context=".MainActivity">
   <VideoView
      android:layout_width="match_parent"
      android:layout_height="match_parent"
      android:id="@+id/video"
      android:layout_above="@id/pipbtn"/>
   <Button
      android:layout_width="match_parent"
      android:layout_height="wrap_content"
      android:text="Enter PIP mode"
      android:layout_alignParentBottom="true"
      android:id="@+id/pipbtn"/>
</RelativeLayout>
```

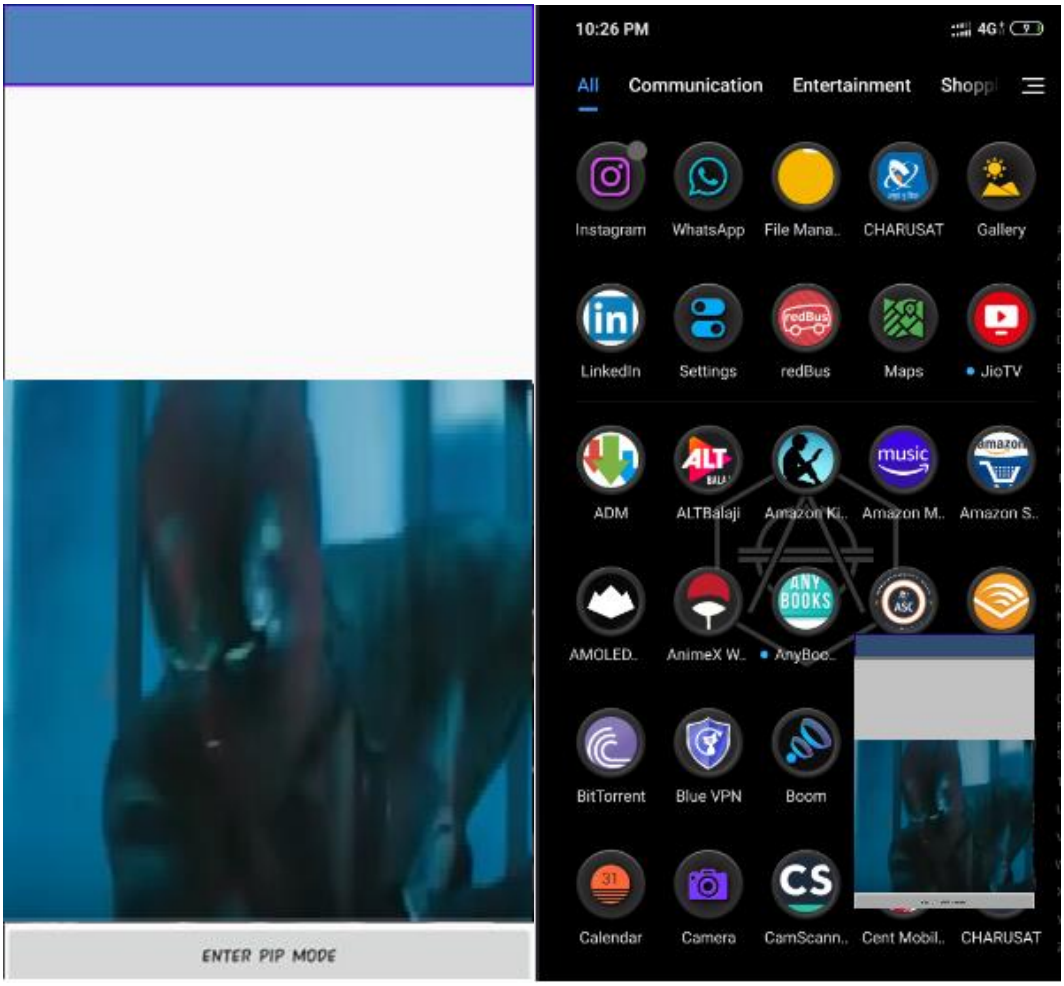
Mainactivity.java

```
package com.example.practical13;
import androidx.appcompat.app.AppCompatActivity;

import android.app.ActionBar;
import android.app.Notification;
```

```
import android.app.PictureInPictureParams;
import android.drm.DrmStore;
import android.graphics.Point;
import android.net.Uri;
import android.os.Build;
import android.os.Bundle;
import android.util.Rational;
import android.view.Display;
import android.view.View;
import android.widget.Button;
import android.widget.MediaController;
import android.widget.VideoView;

public class MainActivity extends AppCompatActivity {

   Button pipbtn;
   String path = "/storage/DCIM/Camera/movie.mp4";
   ActionBar actionBar;
   VideoView video;

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

      video = (VideoView)findViewById(R.id.video);
      actionBar = getActionBar();
      MediaController mediaController= new MediaController(this);
      mediaController.setAnchorView(video);
      video.setMediaController(mediaController);
      video.setVideoURI(Uri.parse(path));
      video.requestFocus();
      video.start();

      pipbtn = (Button)findViewById(R.id.pipbtn);

      pipbtn.setOnClickListener(new View.OnClickListener() {
         @Override
         public void onClick(View view) {
            Display display = getWindowManager().getDefaultDisplay();
            Point point = new Point();
            display.getSize(point);
            int width = point.x;
            int height = point.y;
```

```
            Rational ratio = null;
            if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.LOLLIPOP) {
               ratio = new Rational(width,height);
            }
            PictureInPictureParams.Builder pip_builder = null;
            if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.O) {
               pip_builder = new PictureInPictureParams.Builder();
            }
            if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.O) {
               pip_builder.setAspectRatio(ratio).build();
            }
            pipbtn.setVisibility(View.INVISIBLE);
            if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.O) {
               enterPictureInPictureMode(pip_builder.build());
            }

         }
      });
   }
}
```

OUTPUT:



Practical 14

Aim: Create an application that uses the end-to-end process of training a machine learning model that can recognize handwritten characters images with TensorFlow and deploy it to an Android app.

Code:

Activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
   xmlns:tools="http://schemas.android.com/tools"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   android:orientation="vertical"
   android:padding="16dp"
   tools:context=".MainActivity">

   <TableLayout
      android:layout_width="match_parent"
      android:layout_height="wrap_content">

      <TextView
         style="@style/ResultText"
         android:text="@string/prediction"/>

      <TextView
         android:id="@+id/tv_prediction"
         style="@style/ResultText"
         android:textSize="24sp"
         android:textColor="@android:color/black"
         android:text="@string/empty"
         tools:text="1"/>

      <TableRow>

         <TextView
            style="@style/ResultText"
            android:text="@string/probability"/>

         <TextView
            style="@style/ResultText"
            android:text="@string/timecost"/>

      </TableRow>

      <TableRow>

         <TextView
            android:id="@+id/tv_probability"
            style="@style/ResultText"
```

```
            android:textColor="@android:color/black"
            android:text="@string/empty"
            tools:text="0.9"/>


        <TextView
            android:id="@+id/tv_timecost"
            style="@style/ResultText"
            android:textColor="@android:color/black"
            android:text="@string/empty"
            tools:text="10ms"/>

    </TableRow>

</TableLayout>

<com.nex3z.fingerpaintview.FingerPaintView
    android:id="@+id/fpv_paint"
    android:layout_width="200dp"
    android:layout_height="200dp"
    android:layout_gravity="center"
    android:layout_marginTop="16dp"
    android:foreground="@drawable/shape_rect_border"/>

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="16dp"
    android:orientation="horizontal">

    <Button
        android:id="@+id/btn_detect"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="@string/detect"/>

    <Button
        android:id="@+id/btn_clear"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="@string/clear"/>
</LinearLayout>
```

```
</LinearLayout>
```

MainActivity.java

```
package com.example.practical14;

import android.graphics.Bitmap;
import android.os.Bundle;

import android.util.Log;
import android.widget.TextView;
import android.widget.Toast;

import com.nex3z.fingerpaintview.FingerPaintView;


import java.io.IOException;

import androidx.appcompat.app.AppCompatActivity;
import butterknife.BindView;
import butterknife.ButterKnife;
import butterknife.OnClick;

public class MainActivity extends AppCompatActivity {
   private static final String LOG_TAG = "lele";

   @BindView(R.id.fpv_paint) FingerPaintView mFpvPaint;
   @BindView(R.id.tv_prediction) TextView mTvPrediction;
   @BindView(R.id.tv_probability) TextView mTvProbability;
   @BindView(R.id.tv_timecost) TextView mTvTimeCost;

   private Classifier mClassifier;

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

   @OnClick(R.id.btn_detect)
   void onDetectClick() {
      if (mClassifier == null) {
         Log.e(LOG_TAG, "onDetectClick(): Classifier is not initialized");
```

```
            return;
        } else if (mFpvPaint.isEmpty()) {
            Toast.makeText(this, R.string.please_write_a_digit, Toast.LENGTH_SHORT).show();
            return;
        }

        Bitmap image = mFpvPaint.exportToBitmap(
                Classifier.IMG_WIDTH, Classifier.IMG_HEIGHT);
        Result result = mClassifier.classify(image);
        renderResult(result);
    }

    @OnClick(R.id.btn_clear)
    void onClearClick() {
        mFpvPaint.clear();
        mTvPrediction.setText(R.string.empty);
        mTvProbability.setText(R.string.empty);
        mTvTimeCost.setText(R.string.empty);
    }

    private void init() {
        try {
            mClassifier = new Classifier(MainActivity.this);
        } catch (IOException e) {
            Toast.makeText(this, e.getMessage().toString(), Toast.LENGTH_LONG).show();
            Log.e(LOG_TAG, "init(): Failed to create Classifier", e);
        }
    }

    private void renderResult(Result result) {
        mTvPrediction.setText(String.valueOf(result.getNumber()));
        mTvProbability.setText(String.valueOf(result.getProbability()));
        mTvTimeCost.setText(String.format(getString(R.string.timecost_value),
                result.getTimeCost()));
    }

}
```

Classifier.java

```
package com.example.practical14;

import android.app.Activity;
import android.content.res.AssetFileDescriptor;
import android.graphics.Bitmap;
```

```
import android.os.SystemClock;
import android.util.Log;

import org.tensorflow.lite.Interpreter;

import java.io.FileInputStream;
import java.io.IOException;
import java.nio.ByteBuffer;
import java.nio.ByteOrder;
import java.nio.MappedByteBuffer;
import java.nio.channels.FileChannel;
import java.util.Arrays;

public class Classifier {
   private static final String LOG_TAG = Classifier.class.getSimpleName();

   private static final String MODEL_NAME = "mnist.tflite";

   private static final int BATCH_SIZE = 1;
   public static final int IMG_HEIGHT = 28;
   public static final int IMG_WIDTH = 28;
   private static final int NUM_CHANNEL = 1;
   private static final int NUM_CLASSES = 10;

   private final Interpreter.Options options = new Interpreter.Options();
   private final Interpreter mInterpreter;
   private final ByteBuffer mImageData;
   private final int[] mImagePixels = new int[IMG_HEIGHT * IMG_WIDTH];
   private final float[][] mResult = new float[1][NUM_CLASSES];

   public Classifier(MainActivity activity) throws IOException {
      mInterpreter = new Interpreter(loadModelFile(activity), options);
      mImageData = ByteBuffer.allocateDirect(
            4 * BATCH_SIZE * IMG_HEIGHT * IMG_WIDTH * NUM_CHANNEL);
      mImageData.order(ByteOrder.nativeOrder());
   }

   public Result classify(Bitmap bitmap) {
      convertBitmapToByteBuffer(bitmap);
      long startTime = SystemClock.uptimeMillis();
      mInterpreter.run(mImageData, mResult);
      long endTime = SystemClock.uptimeMillis();
      long timeCost = endTime - startTime;
      Log.v(LOG_TAG, "classify(): result = " + Arrays.toString(mResult[0])
```

```
            + ", timeCost = " + timeCost);
        return new Result(mResult[0], timeCost);
    }

    private MappedByteBuffer loadModelFile(Activity activity) throws IOException {
        AssetFileDescriptor fileDescriptor = activity.getAssets().openFd(MODEL_NAME);
        FileInputStream inputStream = new FileInputStream(fileDescriptor.getFileDescriptor());
        FileChannel fileChannel = inputStream.getChannel();
        long startOffset = fileDescriptor.getStartOffset();
        long declaredLength = fileDescriptor.getDeclaredLength();
        return fileChannel.map(FileChannel.MapMode.READ_ONLY, startOffset, declaredLength);
    }

    private void convertBitmapToByteBuffer(Bitmap bitmap) {
        if (mImageData == null) {
            return;
        }
        mImageData.rewind();

        bitmap.getPixels(mImagePixels, 0, bitmap.getWidth(), 0, 0,
                bitmap.getWidth(), bitmap.getHeight());

        int pixel = 0;
        for (int i = 0; i < IMG_WIDTH; ++i) {
            for (int j = 0; j < IMG_HEIGHT; ++j) {
                int value = mImagePixels[pixel++];
                mImageData.putFloat(convertPixel(value));
            }
        }
    }

    private static float convertPixel(int color) {
        return (255 - (((color >> 16) & 0xFF) * 0.299f
                + ((color >> 8) & 0xFF) * 0.587f
                + (color & 0xFF) * 0.114f)) / 255.0f;
    }
}
```

Result.java

```
package com.example.practical14;

public class Result {

    private final int mNumber;
```

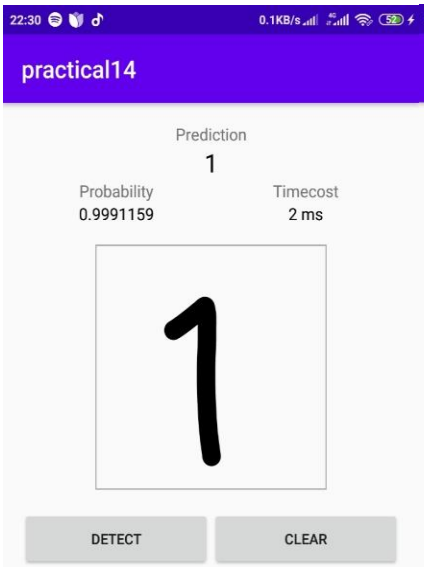
```
    private final float mProbability;
    private final long mTimeCost;

    public Result(float[] probs, long timeCost) {
        mNumber = argmax(probs);
        mProbability = probs[mNumber];
        mTimeCost = timeCost;
    }

    public int getNumber() {
        return mNumber;
    }

    public float getProbability() {
        return mProbability;
    }

    public long getTimeCost() {
        return mTimeCost;
    }

    private static int argmax(float[] probs) {
        int maxIdx = -1;
        float maxProb = 0.0f;
        for (int i = 0; i < probs.length; i++) {
            if (probs[i] > maxProb) {
                maxProb = probs[i];
                maxIdx = i;
            }
        }
        return maxIdx;
    }
}
```

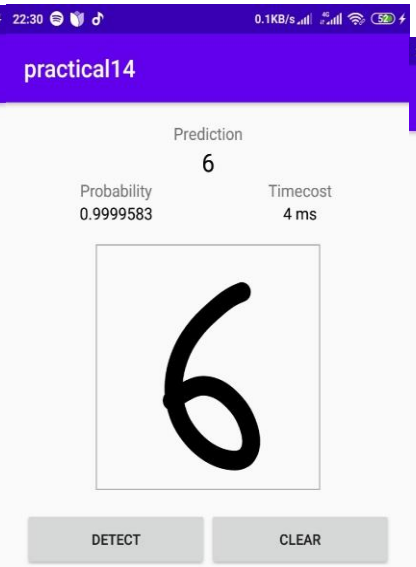
App.gradle

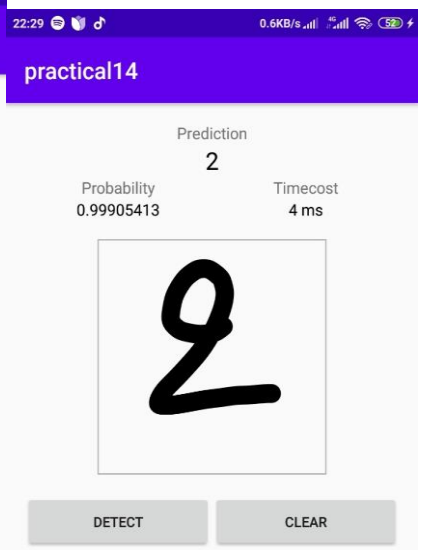
```
apply plugin: 'com.android.application'

android {
    compileSdkVersion 28
    defaultConfig {
        applicationId "com.example.practical14"
        minSdkVersion 15
        targetSdkVersion 28
        versionCode 1
```

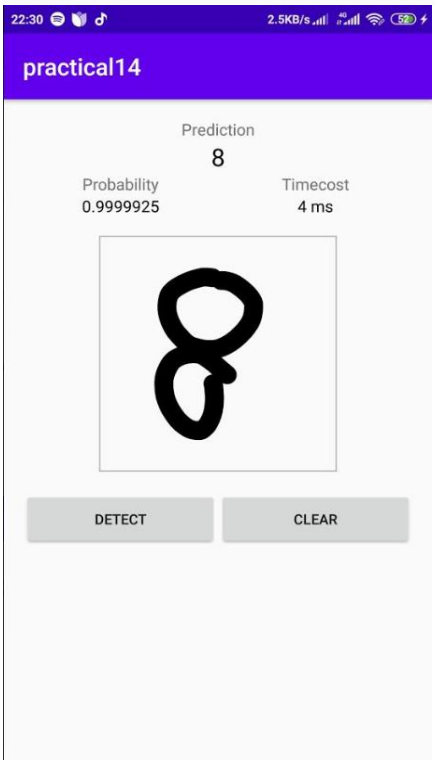
```
        versionName "1.0.0"
        testInstrumentationRunner "android.support.test.runner.AndroidJUnitRunner"
    }
    buildTypes {
        release {
            minifyEnabled false
            proguardFiles getDefaultProguardFile('proguard-android.txt'), 'proguard-rules.pro'
        }
    }
    aaptOptions {
        noCompress "tflite"
        noCompress "lite"
    }

    compileOptions {
        sourceCompatibility JavaVersion.VERSION_1_8
        targetCompatibility JavaVersion.VERSION_1_8
    }
}

dependencies {
    implementation fileTree(dir: 'libs', include: ['*.jar'])
    implementation 'com.android.support:appcompat-v7:28.0.0'
    implementation 'com.android.support:support-v4:28.0.0'

    implementation 'com.nex3z:finger-paint-view:0.1.0'
    implementation 'org.tensorflow:tensorflow-lite:1.13.1'

    implementation 'com.jakewharton:butterknife:10.0.0'
    annotationProcessor 'com.jakewharton:butterknife-compiler:10.0.0'

    testImplementation 'junit:junit:4.12'
    androidTestImplementation 'com.android.support.test:runner:1.0.2'
    androidTestImplementation 'com.android.support.test.espresso:espresso-core:3.0.2'
}
```

OUTPUT:


22:30
0.1KB/s
practical14
Prediction
1
Probability
0.9991159
Timecost
2 ms
DETECT
CLEAR


22:30
0.1KB/s
practical14
Prediction
6
Probability
0.9999583
Timecost
4 ms
DETECT
CLEAR


22:29
0.6KB/s
practical14
Prediction
2
Probability
0.99905413
Timecost
4 ms
DETECT
CLEAR


22:30
2.5KB/s
practical14
Prediction
8
Probability
0.9999925
Timecost
4 ms
DETECT
CLEAR

GitHub Link for Project Reference

https://github.com/jvd2010/WCMC/blob/master/WCMC-project-master.zip