Swetha Saseendran
CSE-C
185001183

UCS1711- Mobile Application Development

Exercise 1: Application using GUI components, Font and Colour Question:

Generate a registration form for a hospital to register new patient details as below:

1. **Assign a title for the registration form**(TextView- textSize, textStyle , typeface)
2. **Name. Specify some font and colour.** (use TextView, EditText-standard)
3. **Address** (use TextView, EditText-standard)
4. **Age** (TextView, EditText)
5. **Date of Birth** (DatePicker)
6. **Gender** (RadioButton)
7. **Marital Status** (Spinner)
8. **Contact Number** (EditText- inputType, phoneNumber)
9. **Registration time** (TimePicker)
10. **Addiction** (Smoking, Alcohol) (CheckBox)
11. **Submit** (Button)
12. **Reset** (Button)

Activity_main.xml

```xml
<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:background="#AF93CE"
android:layout_height="match_parent" tools:context=".MainActivity">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical"
        tools:context=".MainActivity">

        <TextView
            android:id="@+id/textView"
            android:layout_marginTop="100px"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:textSize="30dp"
            android:gravity="center"
            android:text="Register Patient"
            android:typeface="monospace"
            android:textColor="@android:color/black"
            android:background="#d966ff"
            />

        <ScrollView
            android:layout_width="match_parent"
            android:layout_height="match_parent">

            <LinearLayout
                android:layout_width="match_parent"
                android:layout_height="match_parent"
                android:orientation="vertical">

                <LinearLayout
                    android:layout_width="match_parent"
```

```xml
        android:layout_height="match_parent">

        <TextView
            android:id="@+id/textView2"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dp"
            android:layout_marginTop="100px"
            android:text="Name"
            android:textColor="@android:color/black"
            android:textSize="18dp"
            android:typeface="monospace" />

        <EditText
            android:id="@+id/name"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="20dp"
            android:layout_marginTop="100px"
            android:layout_marginRight="50px"
            android:layout_weight="1"
            android:ems="10"
            android:inputType="textPersonName"
            android:text="" />

    </LinearLayout>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="86dp">

        <TextView
            android:id="@+id/textView3"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dp"
            android:layout_marginTop="100px"
            android:text="Address"
            android:textColor="@android:color/black"
            android:textSize="18dp"
```

```xml
            android:typeface="monospace" />

        <EditText
            android:id="@+id/address"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dp"
            android:layout_marginTop="100px"
            android:layout_marginRight="50px"
            android:layout_weight="1"
            android:ems="10"
            android:inputType="textPersonName"
            android:text="" />
    </LinearLayout>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="86dp">

        <TextView
            android:id="@+id/textView4"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dp"
            android:layout_marginTop="100px"
            android:text="Age"
            android:textColor="@android:color/black"
            android:textSize="18dp"
            android:typeface="monospace" />

        <EditText
            android:id="@+id/age"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="120dp"
            android:layout_marginTop="70px"
            android:layout_marginRight="50px"
            android:layout_weight="1"
            android:ems="10"
            android:inputType="textPersonName"
```

```xml
            android:text="" />
    </LinearLayout>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="86dp">

        <TextView
            android:id="@+id/textView11"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dp"
            android:layout_marginTop="100px"
            android:text="Addiction"
            android:textColor="@android:color/black"
            android:textSize="18dp"
            android:typeface="monospace" />

        <CheckBox
            android:id="@+id/Alcohol"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="40dp"
            android:layout_marginTop="100px"
            android:layout_weight="1"
            android:text="Alcohol" />

        <CheckBox
            android:id="@+id/smoking"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginTop="100px"
            android:layout_weight="1"
            android:text="Smoking" />
    </LinearLayout>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="86dp">
```

```xml
        <TextView
            android:id="@+id/textView9"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dp"
            android:layout_marginTop="100px"
            android:text="Phone"
            android:textColor="@android:color/black"
            android:textSize="18dp"
            android:typeface="monospace" />

        <EditText
            android:id="@+id/phone"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="20dp"
            android:layout_marginTop="100px"
            android:layout_marginRight="50px"
            android:layout_weight="1"
            android:ems="10"
            android:inputType="phone"
            android:text="" />
    </LinearLayout>

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="486dp"
        android:orientation="vertical">

        <TextView
            android:id="@+id/textView10"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="0dp"
            android:layout_marginTop="100px"
            android:text="Registration Time"
            android:textColor="@android:color/black"
            android:textSize="18dp"
            android:typeface="monospace" />
```

```xml
            <TimePicker
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_marginLeft="10dp"
                android:id="@+id/time"
                android:layout_marginTop="20dp"
                android:layout_marginRight="20dp"
                android:layout_marginBottom="10dp"
                android:amPmTextColor="@android:color/black"

android:numbersInnerTextColor="@android:color/black"
                android:numbersTextColor="@android:color/black" />
        </LinearLayout>

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="86dp">

            <TextView
                android:id="@+id/textView8"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_marginLeft="50dp"
                android:layout_marginTop="70px"
                android:text="Martial Status"
                android:textColor="@android:color/black"
                android:textSize="18dp"
                android:typeface="monospace" />
            <Spinner
                android:id="@+id/martial"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_marginLeft="70dp"
                android:layout_marginTop="70px" />
        </LinearLayout>


        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="486dp"
```

```xml
        android:layout_marginTop="20dp"
        android:orientation="vertical">


        <TextView
            android:id="@+id/textView5"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dp"
            android:layout_marginTop="100px"
            android:text="DOB"
            android:textColor="@android:color/black"
            android:textSize="18dp"
            android:typeface="monospace" />

        <DatePicker
            android:id="@+id/simpleDatePicker"
            android:layout_width="wrap_content"
            android:layout_height="575dp"
            android:layout_marginTop="20dp"
            android:layout_marginLeft="40dp"
            android:layout_marginRight="20dp"
            android:layout_marginBottom="10dp"
            android:datePickerMode="calendar" />
    </LinearLayout>

    <LinearLayout
        android:layout_width="423dp"
        android:layout_height="159dp">

        <TextView
            android:id="@+id/textView6"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dp"
            android:layout_marginTop="100px"
            android:text="Gender"
            android:textColor="@android:color/black"
            android:textSize="18dp"
            android:typeface="monospace" />
```

```xml
<RadioGroup
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:id="@+id/gender"
    android:orientation="horizontal">

    <RadioButton
        android:id="@+id/male"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginLeft="20dp"
        android:layout_marginTop="70px"
        android:layout_weight="1"
        android:text="Male" />

    <RadioButton
        android:id="@+id/female"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="70px"
        android:layout_marginLeft="20dp"
        android:layout_weight="1"
        android:text="Female" />
</RadioGroup>
</LinearLayout>

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

    <Button
        android:id="@+id/submit"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:layout_marginTop="100px"
        android:layout_marginLeft="40dp"
```

```xml
                    android:layout_marginRight="40dp"
                    android:text="Submit"
                    />

            <Button
                    android:id="@+id/reset"
                    android:layout_width="wrap_content"
                    android:layout_height="wrap_content"
                    android:layout_weight="1"
                    android:layout_marginTop="100px"
                    android:layout_marginRight="40dp"
                    android:text="Reset"
                    />
        </LinearLayout>
    </LinearLayout>
  </ScrollView>
 </LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java

```java
package com.example.test;
import androidx.appcompat.app.AppCompatActivity;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.DatePicker;
import android.widget.EditText;
import android.widget.RadioButton;
import android.widget.RadioGroup;
import android.widget.TimePicker;

public class MainActivity extends AppCompatActivity {

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

```java
        Button b1 = (Button) findViewById(R.id.submit);
        b1.setOnClickListener(new View.OnClickListener() {

            public void onClick(View v) {
                EditText e1 = (EditText) findViewById(R.id.name);
                EditText e2 = (EditText) findViewById(R.id.address);
                EditText e3 = (EditText) findViewById(R.id.age);
                DatePicker d = (DatePicker)
findViewById(R.id.simpleDatePicker);
                TimePicker t = (TimePicker) findViewById(R.id.time);
                RadioGroup rg = (RadioGroup) findViewById(R.id.gender);
                RadioButton male = (RadioButton) findViewById(R.id.male);
                RadioButton female = (RadioButton)
findViewById(R.id.female);
                int ch = rg.getCheckedRadioButtonId();
                RadioButton selected = (RadioButton) findViewById(ch);

                person p = new person();
                p.name =  e1.getText().toString();
                p.address = e2.getText().toString();
                p.age = e3.getText().toString();
                p.d = d;
                p.t = t;
                p.gender = selected.getText().toString();

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

                submit.setOnClickListener(new View.OnClickListener() {
                    @Override
                    public void onClick(View v) {
                        Intent i = new
Intent(getApplicationContext(),MainActivity2.class);
                        i.putExtra("name",e1.toString());
                        startActivity(i);
                    }
                });
            }
        });
    }
}
```

Output:

Swetha Saseendran
CSE-C
185001183

UCS1711- Mobile Application Development

Exercise 2: Develop an application to simulate a Keyboard and a Calculator

Keyboard:

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="com.example.a021_aravind_keyboard.MainActivity">
    <TextView
        android:layout_width="match_parent"
        android:layout_height="80dp"
        android:text="Virtual Keyboard"
        android:textStyle="bold"
        android:fontFamily="sans-serif-black"
        android:background="@color/purple_500"
        android:textColor="@color/white"
        android:textAlignment="center"
        android:gravity="center_horizontal"
        android:textSize="35dp" />

    <EditText
        android:id="@+id/editText"

        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_alignParentTop="true"
        android:layout_marginTop="106dp"
```

```xml
        android:layout_marginBottom="50dp"
        android:background="#c9c9f1"
        android:padding="10dp" />


    <LinearLayout
        android:layout_width="match_parent"
        android:layout_alignParentBottom="true"
        android:layout_height="wrap_content"
        android:orientation="vertical">

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

            <Button
                android:id="@+id/q"
                android:layout_width="0dp"
                android:textAllCaps="false"
                android:layout_height="wrap_content"
                android:layout_weight="1"
                android:text="q"/>

            <Button
                android:id="@+id/w"
                android:layout_width="0dp"
                android:textAllCaps="false"
                android:layout_height="wrap_content"
                android:layout_weight="1"
                android:text="w"/>


            <Button
                android:id="@+id/e"
                android:layout_width="0dp"
                android:layout_height="wrap_content"
                android:layout_weight="1"
                android:textAllCaps="false"
                android:text="e"/>
```

```xml
<Button
    android:id="@+id/r"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_weight="1"
    android:textAllCaps="false"
    android:text="r"/>
<Button
    android:id="@+id/t"
    android:layout_width="0dp"
    android:textAllCaps="false"
    android:layout_height="wrap_content"
    android:layout_weight="1"
    android:text="t"/>
<Button
    android:id="@+id/y"
    android:textAllCaps="false"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_weight="1"
    android:text="y"/>
<Button
    android:id="@+id/u"
    android:layout_width="0dp"
    android:textAllCaps="false"
    android:layout_height="wrap_content"
    android:layout_weight="1"
    android:text="u"/>
<Button
    android:id="@+id/i"
    android:textAllCaps="false"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:layout_weight="1"
    android:text="i"/>

<Button
    android:id="@+id/o"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
```

```xml
        android:textAllCaps="false"
        android:layout_weight="1"
        android:text="o"/>

    <Button
        android:id="@+id/p"
        android:layout_width="0dp"
        android:textAllCaps="false"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="p"/>

</LinearLayout>

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

    <Button
        android:id="@+id/a"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:textAllCaps="false"
        android:text="a"/>

    <Button
        android:id="@+id/s"
        android:layout_width="0dp"
        android:textAllCaps="false"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="s"/>

    <Button
        android:id="@+id/d"
        android:layout_width="0dp"
        android:textAllCaps="false"
        android:layout_height="wrap_content"
```

```xml
        android:layout_weight="1"
        android:text="d"/>


    <Button
        android:id="@+id/f"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:textAllCaps="false"
        android:text="f"/>


    <Button
        android:id="@+id/g"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:textAllCaps="false"
        android:layout_weight="1"
        android:text="g"/>
    <Button
        android:id="@+id/h"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:textAllCaps="false"
        android:layout_weight="1"
        android:text="h"/>
    <Button
        android:id="@+id/j"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:textAllCaps="false"
        android:layout_weight="1"
        android:text="j"/>
    <Button
        android:id="@+id/k"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:textAllCaps="false"
        android:text="k"/>
```

```xml
        <Button
            android:id="@+id/l"
            android:layout_width="0dp"
            android:textAllCaps="false"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text="l"/>
    </LinearLayout>
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal">

        <Button
            android:id="@+id/caps"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:textAllCaps="false"
            android:text="^"/>

        <Button
            android:id="@+id/z"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"

            android:textAllCaps="false"
            android:text="z"/>

        <Button
            android:id="@+id/x"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"

            android:textAllCaps="false"
            android:text="x"/>

        <Button
```

```xml
        android:id="@+id/c"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_weight="1"

        android:textAllCaps="false"
        android:text="c"/>

    <Button
        android:id="@+id/v"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_weight="1"

        android:textAllCaps="false"
        android:text="v"/>
    <Button
        android:id="@+id/b"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_weight="1"

        android:textAllCaps="false"
        android:text="b"/>
    <Button
        android:id="@+id/n"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_weight="1"

        android:textAllCaps="false"
        android:text="n"/>

    <Button
        android:id="@+id/m"
        android:layout_width="0dp"
        android:layout_height="wrap_content"

        android:textAllCaps="false"
```

```xml
            android:layout_weight="1"
            android:text="m"/>


    <Button
        android:id="@+id/del"
        android:layout_width="10dp"
        android:layout_height="50dp"

        android:textAllCaps="false"

        android:layout_weight="1"
        android:text="del"/>



</LinearLayout>

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

    <Button
        android:id="@+id/nums"
        android:layout_width="10dp"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="123"/>
    <Button
        android:id="@+id/dot"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="."/>
    <Button
        android:id="@+id/space"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_weight="3"
```

```xml
            android:text="space"/>
        <Button
            android:id="@+id/comma"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:text=","/>
        <Button
            android:id="@+id/enter"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="2"
            android:text="enter"/>




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

MainActivity.java

```java
package com.example.a021_aravind_keyboard;
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;
public class MainActivity extends AppCompatActivity {
    TextView displaytext;
    String text ;
    boolean Caps_on = false;
    boolean Nums_on = false;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Button letter_q = findViewById(R.id.q);
        Button letter_w = findViewById(R.id.w);
        Button letter_e = findViewById(R.id.e);
        Button letter_r = findViewById(R.id.r);
        Button letter_t = findViewById(R.id.t);
        Button letter_y = findViewById(R.id.y);
        Button letter_u = findViewById(R.id.u);
        Button letter_i = findViewById(R.id.i);
        Button letter_o = findViewById(R.id.o);
        Button letter_p = findViewById(R.id.p);
        Button letter_a = findViewById(R.id.a);
        Button letter_s = findViewById(R.id.s);
        Button letter_d = findViewById(R.id.d);
        Button letter_f = findViewById(R.id.f);
        Button letter_g = findViewById(R.id.g);
        Button letter_h = findViewById(R.id.h);
        Button letter_j = findViewById(R.id.j);
        Button letter_k = findViewById(R.id.k);
        Button letter_l = findViewById(R.id.l);
        Button letter_z = findViewById(R.id.z);
        Button letter_x = findViewById(R.id.x);
        Button letter_c = findViewById(R.id.c);
        Button letter_v = findViewById(R.id.v);
```

```java
        Button letter_b = findViewById(R.id.b);
        Button letter_n = findViewById(R.id.n);
        Button letter_m = findViewById(R.id.m);
        Button caps = findViewById(R.id.caps);
        Button backspace = findViewById(R.id.del);
        Button space = findViewById(R.id.space);
        Button dot = findViewById(R.id.dot);
        Button comma = findViewById(R.id.comma);
        Button number = findViewById(R.id.nums);
        Button enter = findViewById(R.id.enter);
        displaytext= findViewById(R.id.editText);
        letter_q.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_q.g
etText().toString()).toString()));
        letter_w.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_w.g
etText().toString()).toString()));
        letter_e.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_e.g
etText().toString()).toString()));
        letter_r.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_r.g
etText().toString()).toString()));
        letter_t.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_t.g
etText().toString()).toString()));
        letter_y.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_y.g
etText().toString()).toString()));
        letter_u.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_u.g
etText().toString()).toString()));
        letter_i.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_i.g
etText().toString()).toString()));
        letter_o.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_o.g
etText().toString()).toString()));
```

```java
        letter_p.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_p.g
etText().toString()).toString()));
        letter_a.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_a.g
etText().toString()).toString()));
        letter_s.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_s.g
etText().toString()).toString()));
        letter_d.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_d.g
etText().toString()).toString()));
        letter_f.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_f.g
etText().toString()).toString()));
        letter_g.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_g.g
etText().toString()).toString()));
        letter_h.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_h.g
etText().toString()).toString()));
        letter_j.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_j.g
etText().toString()).toString()));
        letter_k.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_k.g
etText().toString()).toString()));
        letter_l.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_l.g
etText().toString()).toString()));
        letter_z.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_z.g
etText().toString()).toString()));
        letter_x.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_x.g
etText().toString()).toString()));
        letter_c.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_c.g
etText().toString()).toString()));
```

```java
        letter_v.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_v.g
etText().toString()).toString()));
        letter_b.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_b.g
etText().toString()).toString()));
        letter_n.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_n.g
etText().toString()).toString()));
        letter_m.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(letter_m.g
etText().toString()).toString()));
        space.setOnClickListener((View view) ->displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append("
").toString()));
        dot.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(dot.getTex
t().toString()).toString()));
        comma.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append(comma.getT
ext().toString()).toString()));
        enter.setOnClickListener((View view) -> displaytext.setText(new
StringBuilder().append(displaytext.getText().toString()).append("\n")));
        caps.setOnClickListener((View view) -> {
            if (!Caps_on) {
                Caps_on= true;

letter_q.setText(letter_q.getText().toString().toUpperCase());

letter_w.setText(letter_w.getText().toString().toUpperCase());

letter_e.setText(letter_e.getText().toString().toUpperCase());

letter_r.setText(letter_r.getText().toString().toUpperCase());

letter_t.setText(letter_t.getText().toString().toUpperCase());

letter_y.setText(letter_y.getText().toString().toUpperCase());

letter_u.setText(letter_u.getText().toString().toUpperCase());
```

```
letter_i.setText(letter_i.getText().toString().toUpperCase());

letter_o.setText(letter_o.getText().toString().toUpperCase());

letter_p.setText(letter_p.getText().toString().toUpperCase());

letter_a.setText(letter_a.getText().toString().toUpperCase());

letter_s.setText(letter_s.getText().toString().toUpperCase());

letter_d.setText(letter_d.getText().toString().toUpperCase());

letter_f.setText(letter_f.getText().toString().toUpperCase());

letter_g.setText(letter_g.getText().toString().toUpperCase());

letter_h.setText(letter_h.getText().toString().toUpperCase());

letter_j.setText(letter_j.getText().toString().toUpperCase());

letter_k.setText(letter_k.getText().toString().toUpperCase());

letter_l.setText(letter_l.getText().toString().toUpperCase());

letter_z.setText(letter_z.getText().toString().toUpperCase());

letter_x.setText(letter_x.getText().toString().toUpperCase());

letter_c.setText(letter_c.getText().toString().toUpperCase());

letter_v.setText(letter_v.getText().toString().toUpperCase());

letter_b.setText(letter_b.getText().toString().toUpperCase());

letter_n.setText(letter_n.getText().toString().toUpperCase());

letter_m.setText(letter_m.getText().toString().toUpperCase());
                }
            else {
```

```java
                Caps_on= false;

letter_q.setText(letter_q.getText().toString().toLowerCase());

letter_w.setText(letter_w.getText().toString().toLowerCase());

letter_e.setText(letter_e.getText().toString().toLowerCase());

letter_r.setText(letter_r.getText().toString().toLowerCase());

letter_t.setText(letter_t.getText().toString().toLowerCase());

letter_y.setText(letter_y.getText().toString().toLowerCase());

letter_u.setText(letter_u.getText().toString().toLowerCase());

letter_i.setText(letter_i.getText().toString().toLowerCase());

letter_o.setText(letter_o.getText().toString().toLowerCase());

letter_p.setText(letter_p.getText().toString().toLowerCase());

letter_a.setText(letter_a.getText().toString().toLowerCase());

letter_s.setText(letter_s.getText().toString().toLowerCase());

letter_d.setText(letter_d.getText().toString().toLowerCase());

letter_f.setText(letter_f.getText().toString().toLowerCase());

letter_g.setText(letter_g.getText().toString().toLowerCase());

letter_h.setText(letter_h.getText().toString().toLowerCase());

letter_j.setText(letter_j.getText().toString().toLowerCase());

letter_k.setText(letter_k.getText().toString().toLowerCase());

letter_l.setText(letter_l.getText().toString().toLowerCase());
```

```java
letter_z.setText(letter_z.getText().toString().toLowerCase());

letter_x.setText(letter_x.getText().toString().toLowerCase());

letter_c.setText(letter_c.getText().toString().toLowerCase());

letter_v.setText(letter_v.getText().toString().toLowerCase());

letter_b.setText(letter_b.getText().toString().toLowerCase());

letter_n.setText(letter_n.getText().toString().toLowerCase());

letter_m.setText(letter_m.getText().toString().toLowerCase());
                }

        });
        backspace.setOnClickListener((View view) -> {
                text = displaytext.getText().toString();
                if (text.length() > 1)
                    displaytext.setText(text.substring(0, text.length() -
1));

                else
                    displaytext.setText("");

        });
        number.setOnClickListener((View view) -> {
                if(!Nums_on){
                    Nums_on = true;
                    letter_q.setText("1");
                    letter_w.setText("2");
                    letter_e.setText("3");
                    letter_r.setText("4");
                    letter_t.setText("5");
                    letter_y.setText("6");
                    letter_u.setText("7");
                    letter_i.setText("8");
                    letter_o.setText("9");
                    letter_p.setText("0");
                    letter_a.setText("@");
```

```java
            letter_s.setText("#");
            letter_d.setText("$");
            letter_f.setText("_");
            letter_g.setText("&");
            letter_h.setText("-");
            letter_j.setText("+");
            letter_k.setText("(");
            letter_l.setText(")");
            letter_z.setText("*");
            letter_x.setText("\"");
            letter_c.setText("'");
            letter_v.setText(":");
            letter_b.setText(";");
            letter_n.setText("!");
            letter_m.setText("?");
        }
        else{
            Nums_on=false;
            letter_q.setText("q");
            letter_w.setText("w");
            letter_e.setText("e");
            letter_r.setText("r");
            letter_t.setText("t");
            letter_y.setText("y");
            letter_u.setText("u");
            letter_i.setText("i");
            letter_o.setText("o");
            letter_p.setText("p");
            letter_a.setText("a");
            letter_s.setText("s");
            letter_d.setText("d");
            letter_f.setText("f");
            letter_g.setText("g");
            letter_h.setText("h");
            letter_j.setText("j");
            letter_k.setText("k");
            letter_l.setText("l");
            letter_z.setText("z");
            letter_x.setText("x");
            letter_c.setText("c");
```

```
                letter_v.setText("v");
                letter_b.setText("b");
                letter_n.setText("n");
                letter_m.setText("m");
            }

        });
    }
}
```

Output

Calculator:

Activity_main.xml

```xml
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent" android:layout_height="match_parent"
android:orientation="vertical" tools:context=".MainActivity">
<LinearLayout android:layout_width="match_parent"
android:layout_height="wrap_content" android:layout_weight="0.3"
android:orientation="horizontal">
    <TextView android:id="@+id/display"
android:layout_width="match_parent" android:layout_height="match_parent"
android:background="#ecf0f1" android:textSize="30sp"/>
</LinearLayout>
<LinearLayout android:layout_width="match_parent"
android:layout_height="18dp" android:layout_weight="0.2"
android:orientation="horizontal">
<Button android:id="@+id/buttonDel" android:layout_width="wrap_content"
android:layout_height="123dp" android:layout_margin="1dp"
android:layout_weight="0.5" android:background="@drawable/button"
android:text="Del" android:textColor="#ecf0f1" android:textSize="20sp"
android:visibility="visible"/>
<Button android:id="@+id/buttoneql" android:layout_width="wrap_content"
android:layout_height="match_parent" android:layout_margin="1dp"
android:layout_weight=".5" android:background="@drawable/button"
android:text="=" android:textColor="#ecf0f1" android:textSize="30sp"/>
</LinearLayout>
<LinearLayout android:layout_width="match_parent"
android:layout_height="5dp" android:layout_weight="0.2"
android:orientation="horizontal">
<Button android:id="@+id/button1" android:layout_width="wrap_content"
android:layout_height="86dp" android:layout_margin="1dp"
android:layout_weight="0.25" android:background="@drawable/selector"
android:text="1" android:textColor="#ecf0f1" android:textSize="20sp"/>
<Button android:id="@+id/button2" android:layout_width="wrap_content"
android:layout_height="86dp" android:layout_margin="1dp"
android:layout_weight="0.25" android:background="@drawable/selector"
android:text="2" android:textColor="#ecf0f1" android:textSize="20sp"/>
```

```xml
<Button android:id="@+id/button3" android:layout_width="wrap_content"
android:layout_height="86dp" android:layout_margin="1dp"
android:layout_weight="0.25" android:background="@drawable/selector"
android:text="3" android:textColor="#ecf0f1" android:textSize="20sp"/>
<Button android:id="@+id/buttondiv" android:layout_width="wrap_content"
android:layout_height="86dp" android:layout_margin="1dp"
android:layout_weight="0.25"
android:background="@drawable/operator_selector" android:text="/"
android:textColor="#ecf0f1" android:textSize="30sp"/>
</LinearLayout>
<LinearLayout android:layout_width="match_parent"
android:layout_height="17dp" android:layout_weight="0.2"
android:orientation="horizontal">
<Button android:id="@+id/button4" android:layout_width="wrap_content"
android:layout_height="match_parent" android:layout_margin="1dp"
android:layout_weight="0.25" android:background="@drawable/selector"
android:text="4" android:textColor="#ecf0f1" android:textSize="20sp"/>
<Button android:id="@+id/button5" android:layout_width="wrap_content"
android:layout_height="104dp" android:layout_margin="1dp"
android:layout_weight="0.25" android:background="@drawable/selector"
android:text="5" android:textColor="#ecf0f1" android:textSize="20sp"/>
<Button android:id="@+id/button6" android:layout_width="wrap_content"
android:layout_height="match_parent" android:layout_margin="1dp"
android:layout_weight="0.25" android:background="@drawable/selector"
android:text="6" android:textColor="#ecf0f1" android:textSize="20sp"/>
<Button android:id="@+id/buttonsub" android:layout_width="wrap_content"
android:layout_height="match_parent" android:layout_margin="1dp"
android:layout_weight="0.25"
android:background="@drawable/operator_selector" android:text="-"
android:textColor="#ecf0f1" android:textSize="30sp"/>
</LinearLayout>
<LinearLayout android:layout_width="match_parent"
android:layout_height="16dp" android:layout_weight="0.2"
android:orientation="horizontal">
<Button android:id="@+id/button7" android:layout_width="wrap_content"
android:layout_height="match_parent" android:layout_margin="1dp"
android:layout_weight="0.25" android:background="@drawable/selector"
android:text="7" android:textColor="#ecf0f1" android:textSize="20sp"/>
<Button android:id="@+id/button8" android:layout_width="wrap_content"
android:layout_height="97dp" android:layout_margin="1dp"
```

```xml
            android:layout_weight="0.25" android:background="@drawable/selector"
            android:text="8" android:textColor="#ecf0f1" android:textSize="20sp"/>
    <Button android:id="@+id/button9" android:layout_width="wrap_content"
            android:layout_height="match_parent" android:layout_margin="1dp"
            android:layout_weight="0.25" android:background="@drawable/selector"
            android:text="9" android:textColor="#ecf0f1" android:textSize="20sp"/>
    <Button android:id="@+id/buttonmul" android:layout_width="wrap_content"
            android:layout_height="match_parent" android:layout_margin="1dp"
            android:layout_weight="0.25"
            android:background="@drawable/operator_selector" android:text="x"
            android:textColor="#ecf0f1" android:textSize="30sp"/>
</LinearLayout>
<LinearLayout android:layout_width="match_parent"
        android:layout_height="28dp" android:layout_weight="0.2"
        android:orientation="horizontal">
    <Button android:id="@+id/buttonDot" android:layout_width="wrap_content"
            android:layout_height="115dp" android:layout_margin="1dp"
            android:layout_weight="0.25" android:background="@drawable/selector"
            android:text="." android:textColor="#ecf0f1" android:textSize="20sp"/>
    <Button android:id="@+id/button0" android:layout_width="wrap_content"
            android:layout_height="match_parent" android:layout_margin="1dp"
            android:layout_weight="0.25" android:background="@drawable/selector"
            android:text="0" android:textColor="#ecf0f1" android:textSize="20sp"/>
    <Button android:id="@+id/Remainder" android:layout_width="wrap_content"
            android:layout_height="match_parent" android:layout_margin="1dp"
            android:layout_weight="0.25"
            android:background="@drawable/operator_selector" android:text="%"
            android:textColor="#ecf0f1" android:textSize="30sp"/>
    <Button android:id="@+id/buttonadd" android:layout_width="wrap_content"
            android:layout_height="match_parent" android:layout_margin="1dp"
            android:layout_weight="0.25"
            android:background="@drawable/operator_selector" android:onClick="onClick"
            android:text="+" android:textColor="#ecf0f1" android:textSize="30sp"
            tools:ignore="OnClick"/>
</LinearLayout>
    </LinearLayout>
```

MainActivity.java

```java
package com.example.calc;
import androidx.appcompat.app.AppCompatActivity;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;
import android.os.Bundle;

public class MainActivity extends AppCompatActivity {

    double input1 = 0, input2 = 0;
    TextView edt1;
    boolean Addition, Subtract, Multiplication, Division, mRemainder,
decimal;
    Button button0, button1, button2, button3, button4, button5, button6,
button7, button8, button9, buttonAdd, buttonSub,
            buttonMul, buttonDivision, buttonEqual, buttonDel, buttonDot,
Remainder;

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

        button0 = (Button) findViewById(R.id.button0);
        button1 = (Button) findViewById(R.id.button1);
        button2 = (Button) findViewById(R.id.button2);
        button3 = (Button) findViewById(R.id.button3);
        button4 = (Button) findViewById(R.id.button4);
        button5 = (Button) findViewById(R.id.button5);
        button6 = (Button) findViewById(R.id.button6);
        button7 = (Button) findViewById(R.id.button7);
        button8 = (Button) findViewById(R.id.button8);
        button9 = (Button) findViewById(R.id.button9);
        buttonDot = (Button) findViewById(R.id.buttonDot);
        buttonAdd = (Button) findViewById(R.id.buttonadd);
        buttonSub = (Button) findViewById(R.id.buttonsub);
        buttonMul = (Button) findViewById(R.id.buttonmul);
        buttonDivision = (Button) findViewById(R.id.buttondiv);
```

```java
        Remainder = (Button) findViewById(R.id.Remainder);
        buttonDel = (Button) findViewById(R.id.buttonDel);
        buttonEqual = (Button) findViewById(R.id.buttoneql);

        edt1 = (TextView) findViewById(R.id.display);

        button1.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                edt1.setText(edt1.getText() + "1");
            }
        });

        button2.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                edt1.setText(edt1.getText() + "2");
            }
        });

        button3.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                edt1.setText(edt1.getText() + "3");
            }
        });

        button4.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                edt1.setText(edt1.getText() + "4");
            }
        });

        button5.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                edt1.setText(edt1.getText() + "5");
            }
        });
```

```java
button6.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        edt1.setText(edt1.getText() + "6");
    }
});

button7.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        edt1.setText(edt1.getText() + "7");
    }
});

button8.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        edt1.setText(edt1.getText() + "8");
    }
});

button9.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        edt1.setText(edt1.getText() + "9");
    }
});

button0.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        edt1.setText(edt1.getText() + "0");
    }
});

buttonAdd.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        if (edt1.getText().length() != 0) {
```

```java
                input1 = Float.parseFloat(edt1.getText() + "");
                Addition = true;
                decimal = false;
                edt1.setText(null);
            }
        }
    });

    buttonSub.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            if (edt1.getText().length() != 0) {
                input1 = Float.parseFloat(edt1.getText() + "");
                Subtract = true;
                decimal = false;
                edt1.setText(null);
            }
        }
    });

    buttonMul.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            if (edt1.getText().length() != 0) {
                input1 = Float.parseFloat(edt1.getText() + "");
                Multiplication = true;
                decimal = false;
                edt1.setText(null);
            }
        }
    });

    buttonDivision.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            if (edt1.getText().length() != 0) {
                input1 = Float.parseFloat(edt1.getText() + "");
                Division = true;
                decimal = false;
                edt1.setText(null);
```

```java
                }
            }
        });


        Remainder.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (edt1.getText().length() != 0) {
                    input1 = Float.parseFloat(edt1.getText() + "");
                    mRemainder = true;
                    decimal = false;
                    edt1.setText(null);
                }
            }
        });


        buttonEqual.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (Addition || Subtract || Multiplication || Division ||
mRemainder) {
                    input2 = Float.parseFloat(edt1.getText() + "");
                }

                if (Addition) {

                    edt1.setText(input1 + input2 + "");
                    Addition = false;
                }

                if (Subtract) {

                    edt1.setText(input1 - input2 + "");
                    Subtract = false;
                }

                if (Multiplication) {
                    edt1.setText(input1 * input2 + "");
                    Multiplication = false;
                }
```

```java
                if (Division) {
                    edt1.setText(input1 / input2 + "");
                    Division = false;
                }
                if (mRemainder) {
                    edt1.setText(input1 % input2 + "");
                    mRemainder = false;
                }
            }
        });

        buttonDel.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                edt1.setText("");
                input1 = 0.0;
                input2 = 0.0;
            }
        });

        buttonDot.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (decimal) {
                    //do nothing or you can show the error
                } else {
                    edt1.setText(edt1.getText() + ".");
                    decimal = true;
                }

            }
        });

    }
}
```

Swetha Saseendran
CSE-C
185001183

UCS1711- Mobile Application Development

Exercise 3: Primitive Shapes and Animations

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="com.example.animations.MainActivity">

    <Button
        android:id="@+id/bt_animate"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerHorizontal="true"
        android:text="Animate"
        app:backgroundTint="#EC3737" />

    <Button
        android:id="@+id/bt_forward"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/bt_animate"
        android:layout_centerHorizontal="true"
        android:text="Rotate"
        app:backgroundTint="#AA2121" />

    <Button
        android:id="@+id/bt_backward"
```

```xml
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/bt_forward"
        android:layout_centerHorizontal="true"
        android:text="Zoom"
        app:backgroundTint="#AF1313" />

    <ImageView
        android:id="@+id/iv_animate"
        android:layout_width="255dp"
        android:layout_height="181dp"
        android:layout_below="@+id/bt_backward"
        android:layout_marginLeft="30dp"
        android:layout_marginTop="94dp"
        android:layout_marginRight="30dp"
        android:background="@drawable/car" />

    <Button
        android:id="@+id/next"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/iv_animate"
        android:layout_marginLeft="150dp"
        android:layout_marginTop="205dp"
        android:layout_marginRight="30dp"
        android:text="Next"
        app:backgroundTint="#3DB143" />

</RelativeLayout>
```

activity_draw_car.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">
    <Button
        android:id="@+id/bt_animate"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerHorizontal="true"
        android:text="Animate"
        app:backgroundTint="#EC3737" />
    <ImageView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_below="@+id/bt_animate"
        android:id="@+id/imageView"/>
</RelativeLayout>
```

activity_primitive.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:layout_width="match_parent"
        android:layout_height="400dp"
        android:layout_marginLeft="30dp"
```

```
            android:layout_marginRight="30dp"
            android:id="@+id/imageView"/>
    <Button
            android:id="@+id/next"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_below="@+id/imageView"
            android:layout_marginTop="200dp"
            android:text="Next"
            android:layout_marginLeft="160dp"
            android:layout_marginRight="30dp"
            app:backgroundTint="#3DB143" />
</RelativeLayout>
```

anim/ fade_in.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:duration="2000"/>
</set>
```

anim/ rotate_in.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<set xmlns:android="http://schemas.android.com/apk/res/android">
    <rotate
        android:fromDegrees="0"
        android:toDegrees="360"
        android:pivotX="50%"
        android:pivotY="50%"
        android:duration="1000" />
</set>
```

anim/ zoom_in.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<set xmlns:android="http://schemas.android.com/apk/res/android">
    <scale xmlns:android="http://schemas.android.com/apk/res/android"
        android:fromXScale="0.5"
        android:fromYScale="0.5"
        android:toXScale="1.0"
        android:toYScale="1.0"
        android:duration="3000"
        android:pivotX="50%"
        android:pivotY="50%"/>
</set>
```

MainActivity.java

```java
package com.example.ex3;
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.content.Intent;
import android.view.View;
import android.view.animation.AnimationUtils;
import android.widget.Button;
import android.widget.ImageView;


public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Button bt_animate=findViewById(R.id.bt_animate);
        Button bt_forward=findViewById(R.id.bt_forward);
        Button bt_backward=findViewById(R.id.bt_backward);
        final ImageView iv_animate=findViewById(R.id.iv_animate);
        bt_animate.setOnClickListener(new View.OnClickListener() {
            @Override
```

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


iv_animate.startAnimation(AnimationUtils.loadAnimation(getApplicationConte
xt(),R.anim.fade_in));
                }
            });
            bt_forward.setOnClickListener(new View.OnClickListener() {
                @Override
                public void onClick(View v) {


iv_animate.startAnimation(AnimationUtils.loadAnimation(getApplicationConte
xt(),R.anim.rotate_in));
                }
            });
            bt_backward.setOnClickListener(new View.OnClickListener() {
                @Override
                public void onClick(View v) {


iv_animate.startAnimation(AnimationUtils.loadAnimation(getApplicationConte
xt(),R.anim.zoom_in));
                }
            });
            Button next= findViewById(R.id.next);
            next.setOnClickListener(new View.OnClickListener() {
                @Override
                public void onClick(View v) {
                    Intent i = new
Intent(MainActivity.this,PrimitiveShapes.class);
                    startActivity(i);
                }
            });
    }
}
```

DrawCar.java

```java
package com.example.ex3;
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.graphics.Bitmap;
import android.graphics.Canvas;
import android.graphics.Color;
import android.graphics.Paint;
import android.graphics.RectF;
import android.graphics.drawable.BitmapDrawable;
import android.view.View;
import android.view.animation.AnimationUtils;
import android.widget.Button;
import android.widget.ImageView;
public class DrawCar extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_draw_car);
        Button bt_animate=findViewById(R.id.bt_animate);
        ImageView imageView=findViewById(R.id.imageView);
        Bitmap b=Bitmap.createBitmap(720,480, Bitmap.Config.ARGB_8888);
        imageView.setBackgroundDrawable(new BitmapDrawable(b));
        Canvas canvas=new Canvas(b);
        Paint p=new Paint();
        p.setStrokeWidth(5);
        p.setColor(Color.YELLOW);
        RectF r=new RectF(170,220,520,270);
        canvas.drawRect(r,p);
        r=new RectF(270,170,420,220);
        canvas.drawRect(r,p);
        p.setColor(Color.BLACK);
        canvas.drawCircle(220,270,20,p);
        canvas.drawCircle(470,270,20,p);
        bt_animate.setOnClickListener(new View.OnClickListener() {
            @Override
```

```
            public void onClick(View v) {


imageView.startAnimation(AnimationUtils.loadAnimation(getApplicationContex
t(),R.anim.rotate_in));
            }
        });
    }
}
```

PrimitiveShapes.java

```java
package com.example.ex3;
import android.app.Activity;
import android.content.Intent;
import android.graphics.Bitmap;
import android.graphics.Canvas;
import android.graphics.Color;
import android.graphics.Paint;
import android.graphics.RectF;
import android.graphics.drawable.BitmapDrawable;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.ImageView;
public class PrimitiveShapes extends Activity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_primitive);
        Bitmap bg = Bitmap.createBitmap(720, 1280,
Bitmap.Config.ARGB_8888);
        ImageView i = (ImageView) findViewById(R.id.imageView);
        i.setBackgroundDrawable(new BitmapDrawable(bg));
        Canvas canvas = new Canvas(bg);
        Paint paint = new Paint();
        paint.setColor(Color.BLACK);
        paint.setTextSize(50);
        //To draw a Rectangle
```

```java
        canvas.drawText("Rectangle", 420, 150, paint);
        canvas.drawRect(400, 200, 650, 700, paint);
        //To draw a Circle
        canvas.drawText("Circle", 120, 150, paint);
        canvas.drawCircle(200, 350, 150, paint);
        //To draw a Square
        paint.setColor(Color.BLUE);
        paint.setTextSize(50);
        RectF rectF = new RectF(80, 850, 350, 1150);

        canvas.drawText("Arc", 120, 800, paint);
        canvas.drawArc (rectF, 180, 60, true,  paint);
        //To draw a Line
        canvas.drawText("Line", 480, 800, paint);
        canvas.drawLine(520, 850, 520, 1150, paint);

        Button next= findViewById(R.id.next);
        next.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent i = new Intent(PrimitiveShapes.this,DrawCar.class);
                startActivity(i);
            }
        });
    }
}
```
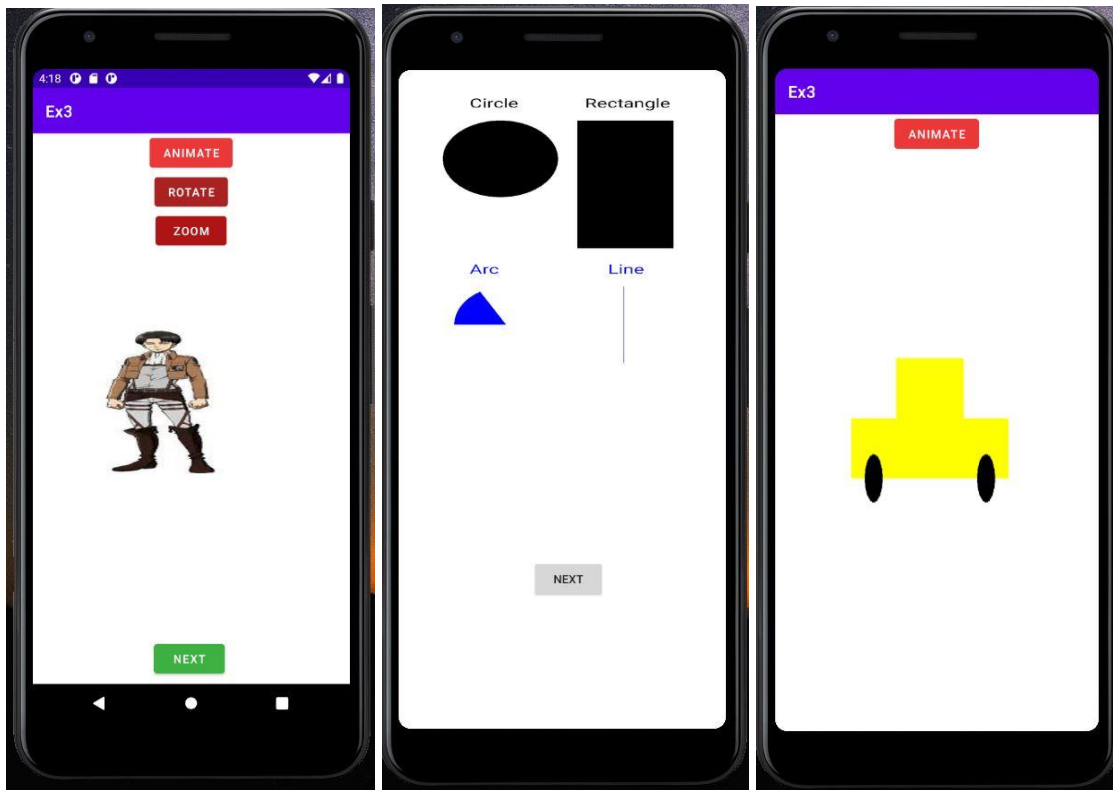
Swetha Saseendran
CSE-C
185001183

UCS1711- Mobile Application Development
Exercise 4: Android Application Development Using Database

AndroidManifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.ex4">

    <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/Theme.Ex4">
        <activity android:name=".InsertActivity" />
        <activity android:name=".RetrieveActivity" />
        <activity android:name=".UpdateActivity" />
        <activity android:name=".DeleteActivity" />
        <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>
```

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">

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="228dp"
        android:text="Employee Database Management"
        android:textColor="#3F51B5"
        android:textSize="24sp"
        android:textStyle="bold"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.495"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/createButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="40dp"
        android:text="Create Database"
        app:backgroundTint="#2196F3"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView" />

    <Button
        android:id="@+id/insertButton"
        android:layout_width="176dp"
```

```xml
        android:layout_height="46dp"
        android:layout_marginTop="32dp"
        android:text="Insert Record"
        app:backgroundTint="#2196F3"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.497"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/createButton" />

    <Button
        android:id="@+id/deleteButton"
        android:layout_width="180dp"
        android:layout_height="49dp"
        android:layout_marginTop="32dp"
        android:text="DELETE RECORD"
        app:backgroundTint="#2196F3"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/insertButton" />

    <Button
        android:id="@+id/updateButton"
        android:layout_width="177dp"
        android:layout_height="50dp"
        android:layout_marginTop="32dp"
        android:text="UPDATE RECORD"
        app:backgroundTint="#2196F3"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/deleteButton" />

    <ImageView
        android:id="@+id/imageView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="72dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.51"
```

```xml
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        tools:src="@tools:sample/avatars" />

    <Button
        android:id="@+id/retrieveButton"
        android:layout_width="172dp"
        android:layout_height="50dp"
        android:layout_marginTop="32dp"
        android:text="RETRIEVE RECORD"
        app:backgroundTint="#2196F3"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/updateButton" />

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

activity_insert.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=".InsertActivity">

    <TextView
        android:id="@+id/textView2"
        android:layout_width="236dp"
        android:layout_height="38dp"
        android:layout_marginTop="88dp"
        android:text="Insert Record"
        android:textColor="#3F51B5"
        android:textSize="36sp"
        android:textStyle="bold"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
```

```xml
        app:layout_constraintTop_toTopOf="parent" />

    <TextView
        android:id="@+id/textView3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="32dp"
        android:layout_marginLeft="32dp"
        android:layout_marginTop="208dp"
        android:text="EID"
        android:textColor="#2196F3"
        android:textSize="24sp"
        android:textStyle="bold"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <TextView
        android:id="@+id/textView4"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="32dp"
        android:layout_marginLeft="32dp"
        android:layout_marginTop="44dp"
        android:text="Name"
        android:textColor="#2196F3"
        android:textSize="24sp"
        android:textStyle="bold"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView3" />

    <TextView
        android:id="@+id/textView5"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="32dp"
        android:layout_marginLeft="32dp"
        android:layout_marginTop="76dp"
        android:text="Gender"
        android:textColor="#2196F3"
        android:textSize="24sp"
```

```xml
        android:textStyle="bold"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="@+id/textView4" />

    <TextView
        android:id="@+id/textView6"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="32dp"
        android:layout_marginLeft="32dp"
        android:layout_marginTop="128dp"
        android:text="Department"
        android:textColor="#2196F3"
        android:textSize="24sp"
        android:textStyle="bold"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="@+id/textView5" />

    <TextView
        android:id="@+id/textView7"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="32dp"
        android:layout_marginLeft="32dp"
        android:layout_marginTop="88dp"
        android:text="Salary"
        android:textColor="#2196F3"
        android:textSize="24sp"
        android:textStyle="bold"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="@+id/textView6" />

    <EditText
        android:id="@+id/eidText"
        android:layout_width="95dp"
        android:layout_height="50dp"
        android:layout_marginStart="100dp"
        android:layout_marginLeft="100dp"
        android:layout_marginTop="220dp"
        android:ems="10"
```

```xml
        android:hint="E01"
        android:inputType="textPersonName"
        android:textSize="20sp"
        app:layout_constraintStart_toEndOf="@+id/textView3"
        app:layout_constraintTop_toTopOf="parent" />

    <EditText
        android:id="@+id/nameText"
        android:layout_width="222dp"
        android:layout_height="40dp"
        android:layout_marginStart="72dp"
        android:layout_marginLeft="72dp"
        android:layout_marginTop="28dp"
        android:ems="10"
        android:inputType="textPersonName"
        app:layout_constraintStart_toEndOf="@+id/textView4"
        app:layout_constraintTop_toBottomOf="@+id/eidText" />

    <RadioGroup
        android:id="@+id/genderRadioGroup"
        android:layout_width="182dp"
        android:layout_height="82dp"
        android:layout_marginTop="20dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.487"
        app:layout_constraintStart_toEndOf="@+id/textView5"
        app:layout_constraintTop_toBottomOf="@+id/nameText">

        <RadioButton
            android:id="@+id/maleRadioButton"
            android:layout_width="76dp"
            android:layout_height="37dp"
            android:text="Male" />

        <RadioButton
            android:id="@+id/femaleRadioButton"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Female" />
    </RadioGroup>
```

```xml
    <Spinner
        android:id="@+id/deptSpinner"
        android:layout_width="199dp"
        android:layout_height="41dp"
        android:layout_marginStart="136dp"
        android:layout_marginLeft="136dp"
        android:layout_marginTop="48dp"
        android:entries="@array/departments"
        android:spinnerMode="dropdown"
        app:layout_constraintStart_toStartOf="@+id/textView6"
        app:layout_constraintTop_toBottomOf="@+id/genderRadioGroup" />

    <EditText
        android:id="@+id/salaryText"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="64dp"
        android:layout_marginLeft="64dp"
        android:layout_marginTop="32dp"
        android:ems="10"
        android:inputType="numberDecimal"
        app:layout_constraintStart_toEndOf="@+id/textView7"
        app:layout_constraintTop_toBottomOf="@+id/deptSpinner" />

    <Button
        android:id="@+id/addButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="36dp"
        android:text="INSERT"
        app:backgroundTint="#3F51B5"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.52"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/salaryText" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

activity_retrieve.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=".RetrieveActivity">

    <TextView
        android:id="@+id/textView47"
        android:layout_width="272dp"
        android:layout_height="53dp"
        android:layout_marginTop="88dp"
        android:text="Retrieve Record"
        android:textColor="#3F51B5"
        android:textSize="36sp"
        android:textStyle="bold"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/delButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="632dp"
        android:text="RETRIEVE"
        app:backgroundTint="#3F51B5"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <TextView
        android:id="@+id/textView46"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
```

```xml
        android:layout_marginStart="36dp"

        android:layout_marginLeft="36dp"

        android:layout_marginTop="44dp"

        android:text="Salary"

        android:textColor="#2196F3"

        android:textSize="24sp"

        android:textStyle="bold"

        app:layout_constraintStart_toStartOf="parent"

        app:layout_constraintTop_toBottomOf="@+id/textView45" />


    <TextView

        android:id="@+id/textView45"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:layout_marginStart="36dp"

        android:layout_marginLeft="36dp"

        android:layout_marginTop="52dp"

        android:text="Department"

        android:textColor="#2196F3"

        android:textSize="24sp"

        android:textStyle="bold"

        app:layout_constraintStart_toStartOf="parent"

        app:layout_constraintTop_toBottomOf="@+id/textView44" />



    <TextView

        android:id="@+id/textView44"

        android:layout_width="wrap_content"

        android:layout_height="wrap_content"

        android:layout_marginStart="36dp"

        android:layout_marginLeft="36dp"

        android:layout_marginTop="48dp"

        android:text="Gender"

        android:textColor="#2196F3"

        android:textSize="24sp"

        android:textStyle="bold"

        app:layout_constraintStart_toStartOf="parent"

        app:layout_constraintTop_toBottomOf="@+id/textView43" />


    <TextView
```

```xml
        android:id="@+id/textView43"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="36dp"
        android:layout_marginLeft="36dp"
        android:layout_marginTop="40dp"
        android:text="Name"
        android:textColor="#2196F3"
        android:textSize="24sp"
        android:textStyle="bold"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView42" />

    <EditText
        android:id="@+id/empCodeText4"
        android:layout_width="95dp"
        android:layout_height="47dp"
        android:layout_marginStart="32dp"
        android:layout_marginLeft="32dp"
        android:layout_marginTop="56dp"
        android:ems="10"
        android:fontFamily="sans-serif"
        android:hint="E01"
        android:inputType="textPersonName"
        android:textColor="?android:attr/textColorPrimary"
        android:textSize="20sp"
        app:layout_constraintStart_toEndOf="@+id/textView45"
        app:layout_constraintTop_toBottomOf="@+id/textView47" />

    <TextView
        android:id="@+id/textView42"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="100dp"
        android:layout_marginLeft="100dp"
        android:layout_marginTop="68dp"
        android:text="EID"
        android:textColor="#2196F3"
        android:textSize="24sp"
        android:textStyle="bold"
```

```xml
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView47" />

    <TextView
        android:id="@+id/empCodeTextView5"
        android:layout_width="211dp"
        android:layout_height="29dp"
        android:layout_marginStart="20dp"
        android:layout_marginLeft="20dp"
        android:layout_marginTop="40dp"
        android:textColor="?android:attr/textColorPrimary"
        android:textSize="20sp"
        app:layout_constraintStart_toEndOf="@+id/textView45"
        app:layout_constraintTop_toBottomOf="@+id/empCodeText4" />

    <TextView
        android:id="@+id/nameTextView5"
        android:layout_width="211dp"
        android:layout_height="33dp"
        android:layout_marginStart="20dp"
        android:layout_marginLeft="20dp"
        android:layout_marginTop="40dp"
        android:textColor="?android:attr/textColorPrimary"
        android:textSize="20sp"
        app:layout_constraintStart_toEndOf="@+id/textView45"
        app:layout_constraintTop_toBottomOf="@+id/empCodeTextView5" />

    <TextView
        android:id="@+id/genderTextView5"
        android:layout_width="206dp"
        android:layout_height="32dp"
        android:layout_marginStart="20dp"
        android:layout_marginLeft="20dp"
        android:layout_marginTop="52dp"
        android:textColor="?android:attr/textColorPrimary"
        android:textSize="20sp"
        app:layout_constraintStart_toEndOf="@+id/textView45"
        app:layout_constraintTop_toBottomOf="@+id/nameTextView5" />

    <TextView
```

```xml
        android:id="@+id/salaryTextView5"
        android:layout_width="202dp"
        android:layout_height="35dp"

        android:layout_marginStart="20dp"
        android:layout_marginLeft="20dp"
        android:layout_marginTop="52dp"
        android:textColor="?android:attr/textColorPrimary"
        android:textSize="20sp"
        app:layout_constraintStart_toEndOf="@+id/textView45"
        app:layout_constraintTop_toBottomOf="@+id/genderTextView5" />


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

activity_update.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=".UpdateActivity">

    <Button
        android:id="@+id/changeButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="576dp"
        android:text="UPDATE"
        app:backgroundTint="#3F51B5"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.476"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <EditText
        android:id="@+id/salaryText3"
        android:layout_width="230dp"
        android:layout_height="wrap_content"
```

```xml
        android:layout_marginStart="28dp"
        android:layout_marginLeft="28dp"
        android:layout_marginTop="28dp"
        android:ems="10"
        android:hint="100000"
        android:inputType="numberDecimal"
        android:textColor="?android:attr/textColorPrimary"
        app:layout_constraintStart_toEndOf="@+id/textView13"
        app:layout_constraintTop_toBottomOf="@+id/deptSpinner3" />

    <Spinner
        android:id="@+id/deptSpinner3"
        android:layout_width="230dp"
        android:layout_height="wrap_content"
        android:layout_marginStart="28dp"
        android:layout_marginLeft="28dp"
        android:layout_marginTop="24dp"
        android:entries="@array/departments"
        android:textSize="20sp"
        app:layout_constraintStart_toEndOf="@+id/textView13"
        app:layout_constraintTop_toBottomOf="@+id/genderRadioGroup3" />

    <RadioGroup
        android:id="@+id/genderRadioGroup3"
        android:layout_width="230sp"
        android:layout_height="wrap_content"
        android:layout_marginTop="32dp"
        android:orientation="horizontal"
        app:layout_constraintStart_toEndOf="@+id/textView13"
        app:layout_constraintTop_toBottomOf="@+id/nameText3">

        <RadioButton
            android:id="@+id/maleRadioButton3"
            android:layout_width="70dp"
            android:layout_height="wrap_content"
            android:fontFamily="sans-serif"
            android:text="Male"
            android:textColor="?android:attr/textColorPrimary"
            android:textSize="16sp"
            android:typeface="normal" />
```

```xml
        <RadioButton
            android:id="@+id/femaleRadioButton3"
            android:layout_width="85dp"
            android:layout_height="wrap_content"
            android:fontFamily="sans-serif"
            android:text="Female"
            android:textColor="?android:attr/textColorPrimary"
            android:textSize="16sp"
            android:typeface="normal" />

    </RadioGroup>

    <EditText
        android:id="@+id/nameText3"
        android:layout_width="230dp"
        android:layout_height="wrap_content"
        android:layout_marginTop="32dp"
        android:ems="10"
        android:fontFamily="sans-serif"
        android:inputType="textPersonName"
        android:textColor="?android:attr/textColorPrimary"
        android:textSize="20sp"
        app:layout_constraintStart_toEndOf="@+id/textView13"
        app:layout_constraintTop_toBottomOf="@+id/empCodeText3" />

    <EditText
        android:id="@+id/empCodeText3"
        android:layout_width="95dp"
        android:layout_height="42dp"
        android:layout_marginStart="4dp"
        android:layout_marginLeft="4dp"
        android:layout_marginTop="64dp"
        android:ems="10"
        android:fontFamily="sans-serif"
        android:hint="E01"
        android:inputType="textPersonName"
        android:textColor="?android:attr/textColorPrimary"
        android:textSize="20sp"
        app:layout_constraintStart_toEndOf="@+id/textView13"
```

```xml
        app:layout_constraintTop_toBottomOf="@+id/textView9" />

    <TextView
        android:id="@+id/textView14"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="24dp"
        android:layout_marginLeft="24dp"
        android:layout_marginTop="36dp"
        android:text="Salary"
        android:textColor="#2196F3"
        android:textSize="20sp"
        android:textStyle="bold"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView13" />

    <TextView
        android:id="@+id/textView13"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="16dp"
        android:layout_marginLeft="16dp"
        android:layout_marginTop="44dp"
        android:text="Department"
        android:textColor="#2196F3"
        android:textSize="20sp"
        android:textStyle="bold"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView12" />

    <TextView
        android:id="@+id/textView12"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="16dp"
        android:layout_marginLeft="16dp"
        android:layout_marginTop="44dp"
        android:text="Gender"
        android:textColor="#2196F3"
        android:textSize="20sp"
```

```xml
        android:textStyle="bold"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView11" />

    <TextView
        android:id="@+id/textView11"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="16dp"
        android:layout_marginLeft="16dp"
        android:layout_marginTop="48dp"
        android:text="Name"
        android:textColor="#2196F3"
        android:textSize="20sp"
        android:textStyle="bold"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView10" />

    <TextView
        android:id="@+id/textView10"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="16dp"
        android:layout_marginLeft="16dp"
        android:layout_marginTop="64dp"
        android:text="EID"
        android:textColor="#2196F3"
        android:textSize="20sp"
        android:textStyle="bold"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView9" />

    <TextView
        android:id="@+id/textView9"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="64dp"
        android:text="Update Record"
        android:textColor="@color/purple_700"
        android:textSize="34sp"
```

```xml
            android:textStyle="bold"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

activity_delete.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=".DeleteActivity">

    <Button
        android:id="@+id/delButton"
        android:layout_width="150dp"
        android:layout_height="50dp"
        android:layout_marginTop="52dp"
        android:backgroundTint="#3F51B5"
        android:text="REMOVE"
        android:textSize="20sp"
        android:textStyle="bold"
        app:backgroundTint="#3F51B5"
        app:iconTint="#3F51B5"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/empCodeText4" />

    <EditText
        android:id="@+id/empCodeText4"
        android:layout_width="126dp"
        android:layout_height="44dp"
        android:layout_marginStart="40dp"
        android:layout_marginLeft="40dp"
        android:layout_marginTop="132dp"
        android:ems="10"
```

```xml
        android:fontFamily="sans-serif"
        android:hint="E01"
        android:inputType="textPersonName"
        android:textColor="#2196F3"
        android:textSize="20sp"
        app:layout_constraintStart_toEndOf="@+id/textView42"
        app:layout_constraintTop_toBottomOf="@+id/textView47" />

    <TextView
        android:id="@+id/textView42"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="100dp"
        android:layout_marginLeft="100dp"
        android:layout_marginTop="140dp"
        android:text="EID"
        android:textColor="#2196F3"
        android:textSize="24sp"
        android:textStyle="bold"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView47" />

    <TextView
        android:id="@+id/textView47"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="64dp"
        android:text="Delete Record"
        android:textColor="@color/purple_700"
        android:textSize="34sp"
        android:textStyle="bold"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

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

MainActivity.java

```java
package com.example.ex4;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteException;
import android.database.sqlite.SQLiteOpenHelper;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;


public class MainActivity extends AppCompatActivity {

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

        final Button createButton = findViewById(R.id.createButton);
        final Button insertButton = findViewById(R.id.insertButton);
        final Button updateButton = findViewById(R.id.updateButton);
        final Button deleteButton = findViewById(R.id.deleteButton);
        final Button retrieveButton = findViewById(R.id.retrieveButton);
        final SQLiteOpenHelper employeeDatabaseHelper = new
EmployeeDatabaseHelper(this);

        createButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                try{
                    SQLiteDatabase db =
employeeDatabaseHelper.getReadableDatabase();
                    Toast toast = Toast.makeText(MainActivity.this,
"Database Created.", Toast.LENGTH_SHORT);
                    toast.show();
```

```java
                } catch (SQLiteException e){
                    Toast toast = Toast.makeText(MainActivity.this,
"Database Unavailable.", Toast.LENGTH_SHORT);
                    toast.show();
                }
            }
        });

        insertButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent insertIntent = new Intent(getApplicationContext(),
InsertActivity.class);
                startActivity(insertIntent);
            }
        });

        retrieveButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent retrieveIntent = new
Intent(getApplicationContext(), RetrieveActivity.class);
                startActivity(retrieveIntent);
            }
        });

        deleteButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent retrieveIntent = new
Intent(getApplicationContext(), DeleteActivity.class);
                startActivity(retrieveIntent);
            }
        });

        updateButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent retrieveIntent = new
Intent(getApplicationContext(), UpdateActivity.class);
```

```
                startActivity(retrieveIntent);
            }
        });
    }
}
```

InsertActivity.java

```java
package com.example.ex4;

import androidx.appcompat.app.AppCompatActivity;

import android.database.sqlite.SQLiteException;
import android.os.Bundle;
import android.text.TextUtils;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.RadioButton;
import android.widget.RadioGroup;
import android.widget.Spinner;
import android.widget.Toast;

public class InsertActivity extends AppCompatActivity{

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

        final EditText empCodeText = findViewById(R.id.eidText);
        final EditText nameText = findViewById(R.id.nameText);
        final RadioButton maleRadioButton =
findViewById(R.id.maleRadioButton);
        final RadioButton femaleRadioButton =
findViewById(R.id.femaleRadioButton);
        final RadioGroup genderRadioGroup =
findViewById(R.id.genderRadioGroup);
        final Spinner deptSpinner = findViewById(R.id.deptSpinner);
        final EditText salaryText = findViewById(R.id.salaryText);
        final Button addButton = findViewById(R.id.addButton);
```

```java
        final EmployeeDatabaseHelper employeeDatabaseHelper = new
EmployeeDatabaseHelper(this);


    addButton.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            String eCode = empCodeText.getText().toString();
            String eName = nameText.getText().toString();
            int selectedRadioButtonID =
genderRadioGroup.getCheckedRadioButtonId();
            String department = (String)
deptSpinner.getSelectedItem();
            String salaryValue = salaryText.getText().toString();

            //Validity Checking
            if(TextUtils.isEmpty(eCode)){
                //Empty employee code field
                Toast eCodeToast = Toast.makeText(InsertActivity.this,
"EID is empty.", Toast.LENGTH_SHORT);
                eCodeToast.show();
            } else if(TextUtils.isEmpty(eName)){
                //Empty name field
                Toast nameToast = Toast.makeText(InsertActivity.this,
"Name is empty.", Toast.LENGTH_SHORT);
                nameToast.show();
            } else if(TextUtils.isEmpty(salaryValue)){
                //Empty salary field
                Toast salaryToast =
Toast.makeText(InsertActivity.this, "Salary is empty.",
Toast.LENGTH_SHORT);
                salaryToast.show();
            } else if(eCode.charAt(0) != 'E'){
                //Wrong employee code format
                empCodeText.setText("");
                Toast eCodeToast = Toast.makeText(InsertActivity.this,
"Incorrect EID format.", Toast.LENGTH_SHORT);
                eCodeToast.show();
            } else if(eName.matches(".*\\d.*")){
                //Name contains numeric characters
                nameText.setText("");
```

```java
                        Toast eNameToast = Toast.makeText(InsertActivity.this,
"Name must contain only alphabets.", Toast.LENGTH_SHORT);
                        eNameToast.show();
                } else if(selectedRadioButtonID < 0){
                        //Gender was not selected
                        Toast genderToast =
Toast.makeText(InsertActivity.this, "Please identify your gender.",
Toast.LENGTH_SHORT);
                        genderToast.show();
                }
                else{
                        //All information valid, proceed to add to database

                        RadioButton selectedRadioButton =
genderRadioGroup.findViewById(selectedRadioButtonID);
                        String gender =
selectedRadioButton.getText().toString();

                        double salary = Double.parseDouble(salaryValue);

                        try{
                            employeeDatabaseHelper.addRecord(eCode, eName,
gender, department, salary);
                            Toast insertSuccessToast =
Toast.makeText(InsertActivity.this, eCode + "'s record was added!",
Toast.LENGTH_SHORT);
                            insertSuccessToast.show();
                        } catch (SQLiteException e){
                            Toast insertFailureToast =
Toast.makeText(InsertActivity.this, e.getMessage() , Toast.LENGTH_SHORT);
                            insertFailureToast.show();
                        }
                    }
                }
            });
        }


}
```

RetrieveActivity.java

```java
package com.example.ex4;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.text.TextUtils;
import android.widget.EditText;
import android.widget.TextView;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;



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


        final EditText empCodeText = findViewById(R.id.empCodeText4);
        final TextView nameTextView = findViewById(R.id.empCodeTextView5);
        final TextView genderTextView = findViewById(R.id.nameTextView5);
        final TextView departmentTextView =
findViewById(R.id.genderTextView5);
        final TextView salaryTextView =
findViewById(R.id.salaryTextView5);
        final Button getButton = findViewById(R.id.delButton);
        final EmployeeDatabaseHelper employeeDatabaseHelper = new
EmployeeDatabaseHelper(this);


        getButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String empCode = empCodeText.getText().toString();

                if(TextUtils.isEmpty(empCode)){
                    //If the employee code hasn't been entered
```

```java
                Toast empCodeToast =
Toast.makeText(RetrieveActivity.this, "Please enter the Employee Code.",
Toast.LENGTH_SHORT);
                empCodeToast.show();
                return;
            }

            String[] results =
employeeDatabaseHelper.retrieveRecord(empCode);

            if(results == null){
                //Record does not exist
                Toast missingRecordToast =
Toast.makeText(RetrieveActivity.this, empCode + "'s record doesn't
exist!", Toast.LENGTH_SHORT);
                missingRecordToast.show();
                return;
            }

            //Record exists, set the TextViews accordingly
            nameTextView.setText(results[0]);
            genderTextView.setText(results[1]);
            departmentTextView.setText(results[2]);
            salaryTextView.setText("$ " + results[3]);
        }
    });
    }
}
```

UpdateActivity.java

```java
package com.example.ex4;

import androidx.appcompat.app.AppCompatActivity;

import android.database.sqlite.SQLiteException;
import android.os.Bundle;
import android.text.TextUtils;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.RadioButton;
import android.widget.RadioGroup;
import android.widget.Spinner;
import android.widget.Toast;

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

        final EditText empCodeText = findViewById(R.id.empCodeText3);
        final EditText nameText = findViewById(R.id.nameText3);
        final RadioButton maleRadioButton =
findViewById(R.id.maleRadioButton3);
        final RadioButton femaleRadioButton =
findViewById(R.id.femaleRadioButton3);
        final RadioGroup genderRadioGroup =
findViewById(R.id.genderRadioGroup3);
        final Spinner deptSpinner = findViewById(R.id.deptSpinner3);
        final EditText salaryText = findViewById(R.id.salaryText3);
        final Button changeButton = findViewById(R.id.changeButton);
        final EmployeeDatabaseHelper employeeDatabaseHelper = new
EmployeeDatabaseHelper(this);

        changeButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String empCode = empCodeText.getText().toString();
```

```java
                String empName = nameText.getText().toString();
                int selectedRadioButtonID =
genderRadioGroup.getCheckedRadioButtonId();
                String department = (String)
deptSpinner.getSelectedItem();
                String salaryValue = salaryText.getText().toString();

                if(TextUtils.isEmpty(empCode)){
                    //Employee code not entered
                    Toast empCodeToast =
Toast.makeText(UpdateActivity.this, "Please enter an employee ID.",
Toast.LENGTH_SHORT);
                    empCodeToast.show();
                } else if(TextUtils.isEmpty(empName)){
                    //Employee name not entered
                    Toast empNameToast =
Toast.makeText(UpdateActivity.this, "Please enter the employee name.",
Toast.LENGTH_SHORT);
                    empNameToast.show();
                } else if(TextUtils.isEmpty(salaryValue)){
                    //Empty salary field
                    Toast salaryToast =
Toast.makeText(UpdateActivity.this, "Salary must not be empty!",
Toast.LENGTH_SHORT);
                    salaryToast.show();
                } else if(empCode.charAt(0) != 'E'){
                    //Wrong employee code format
                    empCodeText.setText("");
                    Toast eCodeToast = Toast.makeText(UpdateActivity.this,
"Employee Code must be of the format E1024.", Toast.LENGTH_SHORT);
                    eCodeToast.show();
                } else if(empName.matches(".*\\d.*")){
                    //Employee name contains numeric characters
                    nameText.setText("");
                    Toast eNameToast = Toast.makeText(UpdateActivity.this,
"Employee Name must contain only alphabets.", Toast.LENGTH_SHORT);
                    eNameToast.show();
                } else if(selectedRadioButtonID < 0){
                    //Gender was not selected
```

```java
                        Toast genderToast =
Toast.makeText(UpdateActivity.this, "Please identify your gender.",
Toast.LENGTH_SHORT);
                    genderToast.show();
                } else{
                    //All information valid, proceed to update table
record

                    RadioButton selectedRadioButton =
genderRadioGroup.findViewById(selectedRadioButtonID);
                    String gender =
selectedRadioButton.getText().toString();

                    double salary = Double.parseDouble(salaryValue);

                    try{
                        //Check if an employee with the given Employee
Code exists

                        String results[] =
employeeDatabaseHelper.retrieveRecord(empCode);

                        if(results == null){
                            //Employee doesn't exist under the specified
employee code

                            Toast empNotFoundToast =
Toast.makeText(UpdateActivity.this, "Employee with code: " + empCode + "
doesn't exist!", Toast.LENGTH_SHORT);
                            empNotFoundToast.show();
                        } else{
                            //Employee exists, update the record
                            employeeDatabaseHelper.updateRecord(empCode,
empName, gender, department, salary);
                            Toast updateSuccessToast =
Toast.makeText(UpdateActivity.this, empCode + "'s record was updated!",
Toast.LENGTH_SHORT);

                            updateSuccessToast.show();
                        }

                    } catch (SQLiteException e){
```

```
                        Toast updateFailureToast =
Toast.makeText(UpdateActivity.this, e.getMessage() , Toast.LENGTH_SHORT);
                        updateFailureToast.show();
                    }
                }


            }
        });


    }
}
```

DeleteActivity.java

```java
package com.example.ex4;


import androidx.appcompat.app.AppCompatActivity;


import android.os.Bundle;
import android.text.TextUtils;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;


public class DeleteActivity extends AppCompatActivity {


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


        final EditText empCodeText = findViewById(R.id.empCodeText4);
        final TextView nameTextView = findViewById(R.id.empCodeTextView5);
        final TextView genderTextView = findViewById(R.id.nameTextView5);
        final TextView departmentTextView =
findViewById(R.id.genderTextView5);
        final TextView salaryTextView =
findViewById(R.id.salaryTextView5);
```

```java
        final Button removeButton = findViewById(R.id.delButton);
        final EmployeeDatabaseHelper employeeDatabaseHelper = new
EmployeeDatabaseHelper(this);


        removeButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String empCode = empCodeText.getText().toString();

                if(TextUtils.isEmpty(empCode)){
                    //If the employee code hasn't been entered
                    Toast empCodeToast =
Toast.makeText(DeleteActivity.this, "Please enter the Employee Code.",
Toast.LENGTH_SHORT);
                    empCodeToast.show();
                    return;
                }

                String[] results =
employeeDatabaseHelper.retrieveRecord(empCode);

                if(results == null){
                    //Record does not exist
                    Toast missingRecordToast =
Toast.makeText(DeleteActivity.this, empCode + "'s record doesn't exist!",
Toast.LENGTH_SHORT);
                    missingRecordToast.show();
                    return;
                }



                //Delete the record from the table
                int deleteStatus =
employeeDatabaseHelper.deleteRecord(empCode);

                if(deleteStatus > 0){
                    //Record purged successfully
                    Toast deleteSuccessToast =
Toast.makeText(DeleteActivity.this, empCode + "'s record has been deleted
successfully.", Toast.LENGTH_SHORT);
```

```
                    deleteSuccessToast.show();
                } else{
                    //Record purge unsuccessful
                    Toast deleteFailureToast =
Toast.makeText(DeleteActivity.this, empCode + "'s record could not be
deleted.", Toast.LENGTH_SHORT);
                    deleteFailureToast.show();
                }


            }
        });
    }
}
```

EmployeeDatabaseHelper.java

```java
package com.example.ex4;

import android.content.Context;
import android.content.ContentValues;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
import androidx.annotation.Nullable;

public class EmployeeDatabaseHelper extends SQLiteOpenHelper {
    private static final String DB_NAME = "employees";
    private static final int DB_VERSION = 1;

    public EmployeeDatabaseHelper(Context context){
        super(context, DB_NAME, null, DB_VERSION);
    }

    @Override
    public void onCreate(SQLiteDatabase db) {
        db.execSQL("CREATE TABLE IF NOT EXISTS EMPLOYEES (" +
                "ENO TEXT PRIMARY KEY, " +
                "NAME TEXT, "+
                "GENDER TEXT, " +
                "DEPARTMENT TEXT, " +
                "SALARY NUMERIC );");
```

```java
    }

    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion, int
newVersion) {
        db.execSQL("DROP TABLE IF EXISTS EMPLOYEES;");
        onCreate(db);
    }

    public void addRecord(String eid, String name, String gender, String
department, double salary){
        SQLiteDatabase db = this.getWritableDatabase();
        ContentValues record = new ContentValues();
        record.put("ENO", eid);
        record.put("NAME", name);
        record.put("GENDER", gender);
        record.put("DEPARTMENT", department);
        record.put("SALARY", salary);
        //throws SQLiteException if the insertion was unsuccessful
        db.insertOrThrow("EMPLOYEES", null, record);
        db.close();
    }

    public String[] retrieveRecord(String eid){
        SQLiteDatabase db = this.getReadableDatabase();
        Cursor cursor = db.query("EMPLOYEES", new String[] {"NAME",
"GENDER", "DEPARTMENT", "SALARY"}, "ENO = ?", new String[] {eid}, null,
null, null);
        String results[] = new String[4];

        if(cursor.moveToNext()){
            //If record exists, retrieve it into results array and return
            results[0] = cursor.getString(0);
            results[1] = cursor.getString(1);
            results[2] = cursor.getString(2);
            results[3] = Double.toString(cursor.getDouble(3));

            return results;
        } else{
            //Record doesn't exist, return null
```

```java
            return null;
        }
    }


    public void updateRecord(String eCode, String name, String gender,
String department, double salary){
        SQLiteDatabase db = this.getWritableDatabase();
        ContentValues updatedRecord = new ContentValues();

        updatedRecord.put("NAME", name);
        updatedRecord.put("GENDER", gender);
        updatedRecord.put("DEPARTMENT", department);
        updatedRecord.put("SALARY", salary);

        db.update("EMPLOYEES", updatedRecord, "ENO = ?", new String[]
{eCode});
    }

    public int deleteRecord(String eid){
        SQLiteDatabase db = this.getWritableDatabase();
        //Returns the number of rows affected
        return db.delete("EMPLOYEES", "ENO = ?", new String[] {eid});
    }


}
```
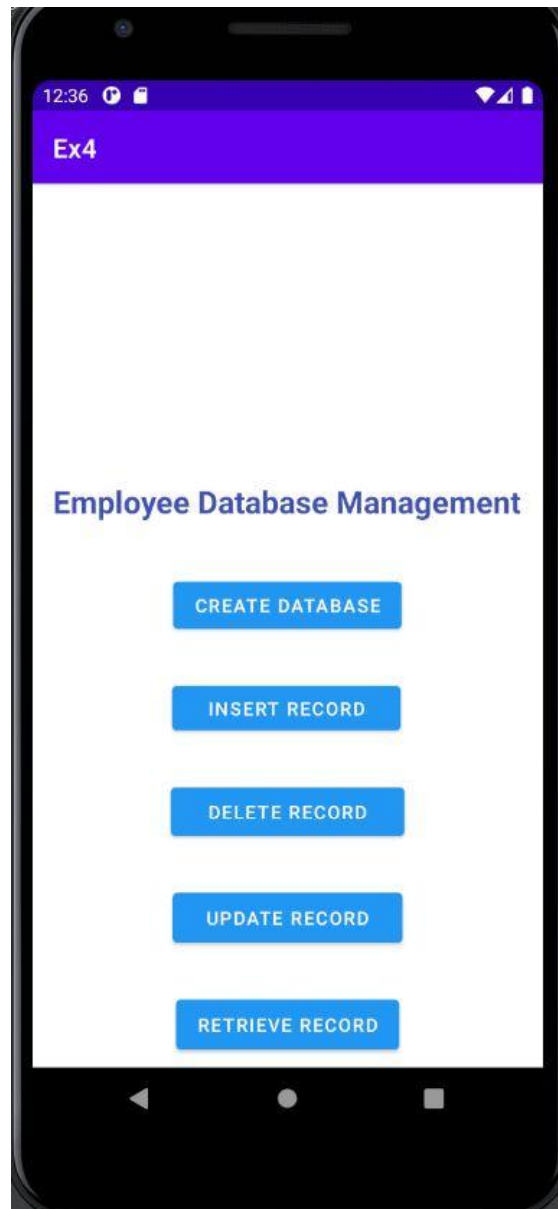
Output:

Insert Record

Retrieve Record

	ENO	NAME	GENDER	DEPARTMENT	SALARY
1	E01	Swetha Saseendran	Female	Neurology	9000000
2	E02	Sriram K	Male	General Surgery	10000000
3	E03	Swetha P	Female	Pediatric	50000

Update Record

	ENO		NAME		GENDER		DEPARTMENT		SALARY	
1	E01		Swetha Saseendran		Female		Neurology		9000000	
2	E02		Sriram K		Male		General Surgery		10000000	
3	E03		Swetha Prabakaran		Female		Pediatric		500000	

Delete Record

	ENO	NAME	GENDER	DEPARTMENT	SALARY
1	E01	Swetha Saseendran	Female	Neurology	9000000
2	E02	Sriram K	Male	General Surgery	10000000

Swetha Saseendran
CSE-C
185001183

UCS1711- Mobile Application Development
Exercise 3: Implement an application that uses Multi-threading.

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">


    <TextView
        android:id="@+id/banner"
        android:layout_width="1230dp"
        android:layout_height="200dp"
        android:background="#FF0000"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/mv_left"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Scroll Left"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintStart_toStartOf="parent"
```

```xml
        app:layout_constraintTop_toBottomOf="@+id/banner" />

    <Button
        android:id="@+id/mv_right"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Scroll Right"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/banner" />

    <TextView
        android:id="@+id/x_val"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginBottom="64dp"
        android:text="0"
        android:textSize="64sp"
        app:layout_constraintBottom_toTopOf="@+id/banner"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

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

MainActivity.java

```java
package com.example.ex5;
import androidx.appcompat.app.AppCompatActivity;

import android.animation.ArgbEvaluator;
import android.animation.ValueAnimator;
import android.graphics.Color;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

import java.util.ArrayList;
```

```java
public class MainActivity extends AppCompatActivity {
    int i=0;
    int prev=0;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Button bt_forward = (Button) findViewById(R.id.mv_right);
        Button bt_backward = (Button) findViewById(R.id.mv_left);
        TextView tv_animate = (TextView) findViewById(R.id.banner);
        TextView xVal = (TextView) findViewById(R.id.x_val);
        int arr[] = new int[5];
        arr[0]= Color.RED;
        arr[1] = Color.BLUE;
        arr[2] = Color.GREEN;
        arr[3]=Color.YELLOW;
        arr[4] = Color.MAGENTA;
        bt_forward.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                new Thread(new Runnable() {
                    public void run() {
                        // a potentially time consuming task

                        tv_animate.setTranslationX(410f);
                    }
                }).start();

                runOnUiThread(new Runnable() {
                    public void run() {
                        // a potentially time consuming task
                        int x = Integer.valueOf(xVal.getText().toString())+410;
                        xVal.setText(String.valueOf(x));

                    }
                });

                new Thread(new Runnable() {
                    public void run() {
                        // a potentially time consuming task
```

```java
                tv_animate.setBackgroundColor(arr[i]);
                i=(i+1)%5;
            }
        }).start();


    }
});
bt_backward.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        new Thread(new Runnable() {
            public void run() {
                // a potentially time consuming task

                tv_animate.setTranslationX(-410f);
            }
        }).start();


        runOnUiThread(new Runnable() {
            public void run() {
                // a potentially time consuming task
                int x = Integer.valueOf(xVal.getText().toString())-410;
                xVal.setText(String.valueOf(x));

            }
        });
        new Thread(new Runnable() {
            public void run() {
                // a potentially time consuming task

                tv_animate.setBackgroundColor(arr[i]);
                i=(i-1);
                if(i==-1) i=4;
            }
        }).start();
    }
});
    }
}
```
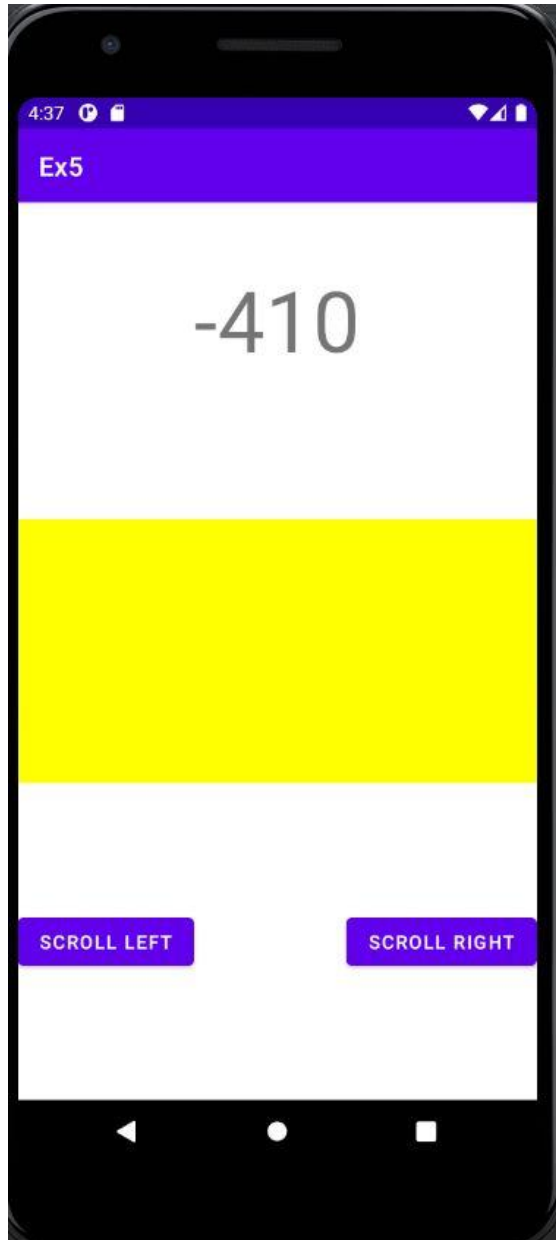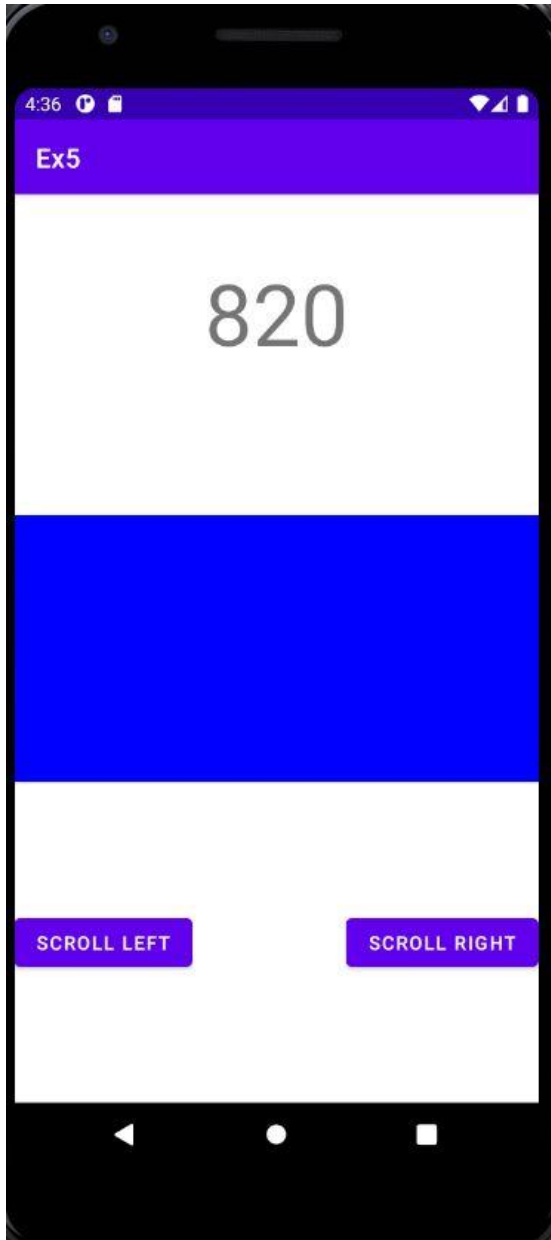
Output:

Swetha Saseendran
CSE-C
185001183
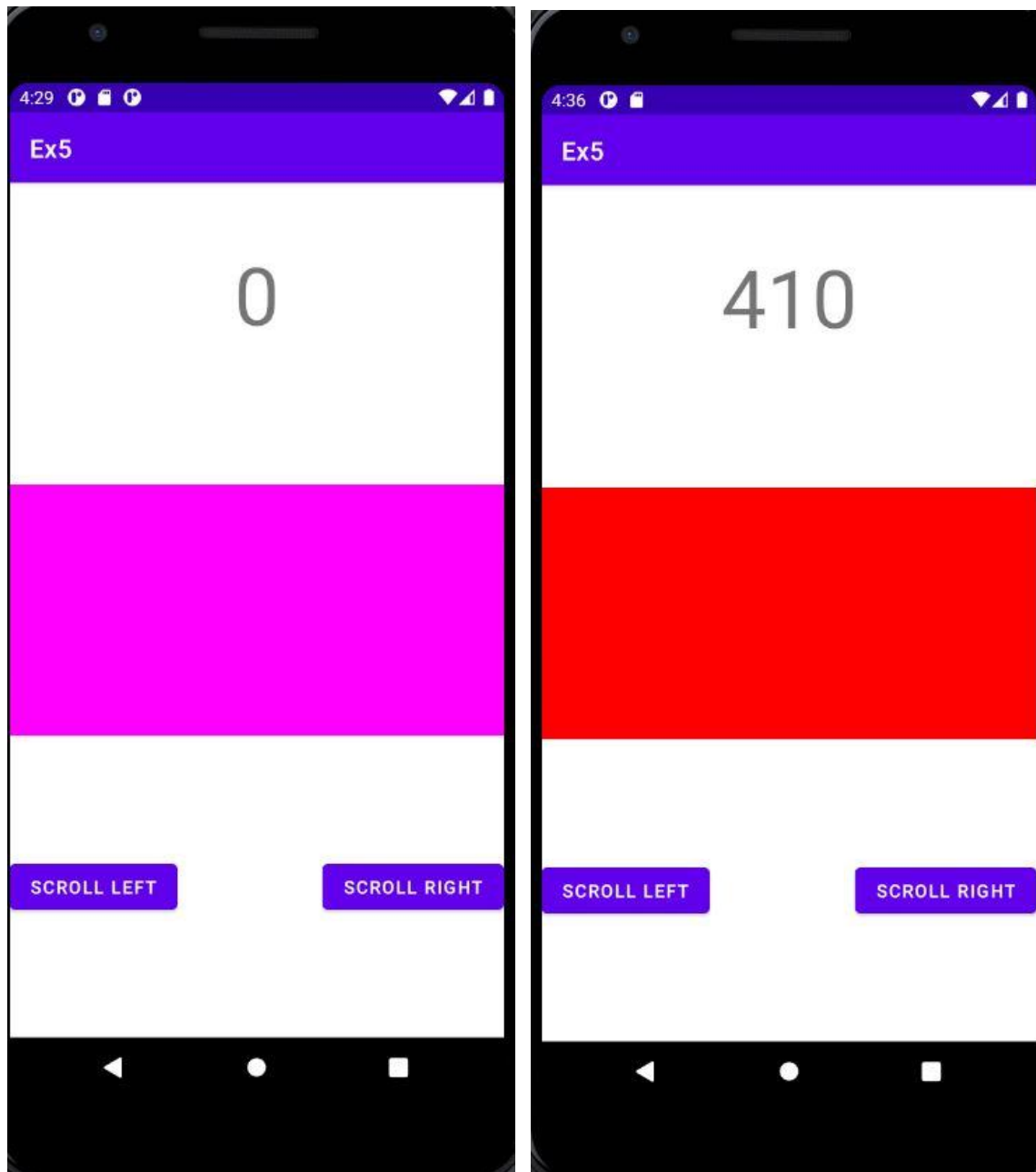
UCS1711- Mobile Application Development
Exercise 6: Develop a nativeapplication that uses GPS location information

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"
    android:orientation="vertical"
    tools:context=".MainActivity">


    <EditText
        android:id="@+id/lat"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="84dp"
        android:ems="10"
        android:inputType="textPersonName"
        android:text="Latitude"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <EditText
        android:id="@+id/lon"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="55dp"
```

```xml
        android:ems="10"
        android:inputType="textPersonName"
        android:text="Longitude"
        app:layout_constraintEnd_toEndOf="@+id/lat"
        app:layout_constraintTop_toBottomOf="@+id/lat" />

    <Button
        android:id="@+id/track_btn"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginBottom="207dp"
        android:text="Track"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java

```java
package com.example.ex6;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;

import android.Manifest;
import android.content.Context;
import android.content.pm.PackageManager;
import android.location.LocationListener;
import android.location.LocationManager;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;

import java.util.List;

public class MainActivity extends AppCompatActivity {
    EditText lat, lon;
    private GPSTracker gpsTracker;
```

```java
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
    Button track = (Button) findViewById(R.id.track_btn);
    lat = (EditText) findViewById(R.id.lat);
    lon = (EditText) findViewById(R.id.lon);

    try {
        if (ContextCompat.checkSelfPermission(getApplicationContext(),
android.Manifest.permission.ACCESS_FINE_LOCATION) !=
PackageManager.PERMISSION_GRANTED ) {
            ActivityCompat.requestPermissions(this, new
String[]{android.Manifest.permission.ACCESS_FINE_LOCATION}, 101);
        }
    } catch (Exception e){
        e.printStackTrace();
    }

    track.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view) {
            gpsTracker = new GPSTracker(MainActivity.this);
            if(gpsTracker.canGetLocation()){
                Log.i("MainActivity","Success");
                double latitude = gpsTracker.getLatitude();
                double longitude = gpsTracker.getLongitude();
                lat.setText(String.valueOf(latitude));
                lon.setText(String.valueOf(longitude));
            }else{
                Log.i("MainActivity","Failure");
                gpsTracker.showSettingsAlert();
            }
        }
    });
}
}
```

GPSTracker.java

```java
package com.example.ex6;

import android.Manifest;
import android.app.Activity;
import android.app.AlertDialog;
import android.app.Service;
import android.content.Context;
import android.content.DialogInterface;
import android.content.Intent;
import android.content.pm.PackageManager;
import android.location.Location;
import android.location.LocationListener;
import android.location.LocationManager;
import android.os.Bundle;
import android.os.IBinder;
import android.provider.Settings;
import android.util.Log;

import androidx.core.app.ActivityCompat;

public class GPSTracker extends Service implements LocationListener {
    private final Context mContext;

    // flag for GPS status
    boolean isGPSEnabled = false;

    // flag for network status
    boolean isNetworkEnabled = false;

    // flag for GPS status
    boolean canGetLocation = false;

    Location location; // location
    double latitude; // latitude
    double longitude; // longitude

    // The minimum distance to change Updates in meters
```

```java
    private static final long MIN_DISTANCE_CHANGE_FOR_UPDATES = 10; // 10
meters

    // The minimum time between updates in milliseconds
    private static final long MIN_TIME_BW_UPDATES = 1000 * 60 * 1; // 1 minute

    // Declaring a Location Manager
    protected LocationManager locationManager;

    public GPSTracker(Context context) {
        this.mContext = context;
        getLocation();
    }

    public Location getLocation() {
        try {
            locationManager = (LocationManager)
mContext.getSystemService(LOCATION_SERVICE);

            // getting GPS status
            isGPSEnabled =
locationManager.isProviderEnabled(LocationManager.GPS_PROVIDER);

            // getting network status
            isNetworkEnabled = locationManager
                    .isProviderEnabled(LocationManager.NETWORK_PROVIDER);

            if (!isGPSEnabled && !isNetworkEnabled) {
                // no network provider is enabled
            } else {
                this.canGetLocation = true;
                // First get location from Network Provider
                if (isNetworkEnabled) {
                    //check the network permission
                    if (ActivityCompat.checkSelfPermission(mContext,
Manifest.permission.ACCESS_FINE_LOCATION) !=
PackageManager.PERMISSION_GRANTED &&
ActivityCompat.checkSelfPermission(mContext,
Manifest.permission.ACCESS_COARSE_LOCATION) !=
PackageManager.PERMISSION_GRANTED) {
```

```java
            ActivityCompat.requestPermissions((Activity) mContext, new
String[]{android.Manifest.permission.ACCESS_FINE_LOCATION,
Manifest.permission.ACCESS_COARSE_LOCATION}, 101);
                }
            locationManager.requestLocationUpdates(
                    LocationManager.NETWORK_PROVIDER,
                    MIN_TIME_BW_UPDATES,
                    MIN_DISTANCE_CHANGE_FOR_UPDATES, this);

            Log.d("Network", "Network");
            if (locationManager != null) {
                location = locationManager

.getLastKnownLocation(LocationManager.NETWORK_PROVIDER);

                if (location != null) {
                    latitude = location.getLatitude();
                    longitude = location.getLongitude();
                }
            }
        }

        if (isGPSEnabled) {
            if (location == null) {
                if (ActivityCompat.checkSelfPermission(mContext,
Manifest.permission.ACCESS_FINE_LOCATION) !=
PackageManager.PERMISSION_GRANTED &&
ActivityCompat.checkSelfPermission(mContext,
Manifest.permission.ACCESS_COARSE_LOCATION) !=
PackageManager.PERMISSION_GRANTED) {
                    ActivityCompat.requestPermissions((Activity) mContext, new
String[]{android.Manifest.permission.ACCESS_FINE_LOCATION,
Manifest.permission.ACCESS_COARSE_LOCATION}, 101);
                }
            locationManager.requestLocationUpdates(
                    LocationManager.GPS_PROVIDER,
                    MIN_TIME_BW_UPDATES,
                    MIN_DISTANCE_CHANGE_FOR_UPDATES, this);

            Log.d("GPS Enabled", "GPS Enabled");
```

```java
            if (locationManager != null) {
                location = locationManager
                    .getLastKnownLocation(LocationManager.GPS_PROVIDER);

                if (location != null) {
                    latitude = location.getLatitude();
                    longitude = location.getLongitude();
                }
            }
        }

    } catch (Exception e) {
        e.printStackTrace();
    }

    return location;
}

public void stopUsingGPS(){
    if(locationManager != null){
        locationManager.removeUpdates(GPSTracker.this);
    }
}

public double getLatitude(){
    if(location != null){
        latitude = location.getLatitude();
    }

    // return latitude
    return latitude;
}

public double getLongitude(){
    if(location != null){
        longitude = location.getLongitude();
    }
```

```java
        // return longitude
        return longitude;
    }


    public boolean canGetLocation() {
        return this.canGetLocation;
    }


    public void showSettingsAlert(){
        AlertDialog.Builder alertDialog = new AlertDialog.Builder(mContext);

        // Setting Dialog Title
        alertDialog.setTitle("GPS is settings");

        // Setting Dialog Message
        alertDialog.setMessage("GPS is not enabled. Do you want to go to settings
menu?");

        // On pressing Settings button
        alertDialog.setPositiveButton("Settings", new DialogInterface.OnClickListener() {
            public void onClick(DialogInterface dialog,int which) {
                Intent intent = new
Intent(Settings.ACTION_LOCATION_SOURCE_SETTINGS);
                mContext.startActivity(intent);
            }
        });

        // on pressing cancel button
        alertDialog.setNegativeButton("Cancel", new DialogInterface.OnClickListener() {
            public void onClick(DialogInterface dialog, int which) {
                dialog.cancel();
            }
        });
        alertDialog.show();
    }

    @Override
    public void onLocationChanged(Location location) {
```

```java
    }

    @Override
    public void onProviderDisabled(String provider) {
    }

    @Override
    public void onProviderEnabled(String provider) {
    }

    @Override
    public void onStatusChanged(String provider, int status, Bundle extras) {
    }

    @Override
    public IBinder onBind(Intent arg0) {
        return null;
    }
}
```

Output:

Swetha Saseendran
CSE-C
185001183

UCS1711- Mobile Application Development
Exercise 7: Implement an application that writes data to the SD card

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">

    <TextView
        android:id="@+id/title"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="SD Card App"
        android:textAppearance="@style/TextAppearance.AppCompat.Display1"
        android:textColor="#FF000000"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintHorizontal_bias="0.497"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.064" />

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="40dp"
        android:layout_marginEnd="152dp"
```

```xml
        android:text="Write to a file"
        android:textAppearance="@style/TextAppearance.AppCompat.Medium"
        android:textColor="#FF000000"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/title" />

    <TextView
        android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="80dp"
        android:layout_marginEnd="152dp"
        android:text="File contents:"
        android:textAppearance="@style/TextAppearance.AppCompat.Medium"
        android:textColor="#FF000000"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/title" />

    <TextView
        android:id="@+id/textView3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="180dp"
        android:layout_marginEnd="256dp"
        android:text="File Name:"
        android:textAppearance="@style/TextAppearance.AppCompat.Medium"
        android:textColor="#FF000000"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/title" />

    <EditText
        android:id="@+id/content"
        android:layout_width="326dp"
        android:layout_height="44dp"
        android:layout_marginTop="16dp"
        android:layout_marginEnd="40dp"
        android:ems="10"
        android:gravity="start|top"
        android:inputType="textMultiLine"
        app:layout_constraintEnd_toEndOf="parent"
```

```xml
        app:layout_constraintTop_toBottomOf="@+id/textView2" />

    <EditText
        android:id="@+id/filename"
        android:layout_width="163dp"
        android:layout_height="38dp"
        android:layout_marginTop="76dp"
        android:layout_marginEnd="60dp"
        android:ems="10"
        android:gravity="start|top"
        android:inputType="textMultiLine"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView2" />

    <Button
        android:id="@+id/writebtn"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="32dp"
        android:layout_marginEnd="156dp"
        android:backgroundTint="#FF018786"
        android:text="Write File"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/filename" />

    <Button
        android:id="@+id/btnLoad"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="152dp"
        android:layout_marginEnd="136dp"
        android:backgroundTint="#FF018786"
        android:text="Load From File"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/filename" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

activity_read_file.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=".ReadFile">

    <EditText
        android:id="@+id/filename2"
        android:layout_width="163dp"
        android:layout_height="38dp"
        android:layout_marginTop="28dp"
        android:layout_marginEnd="52dp"
        android:ems="10"
        android:gravity="start|top"
        android:inputType="textMultiLine"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView6" />

    <TextView
        android:id="@+id/textView4"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="40dp"
        android:layout_marginEnd="152dp"
        android:text="File contents:"
        android:textAppearance="@style/TextAppearance.AppCompat.Medium"
        android:textColor="#FF000000"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/loadbtn" />

    <TextView
        android:id="@+id/title2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="44dp"
```

```xml
        android:layout_marginEnd="108dp"
        android:text="SD Card App"
        android:textAppearance="@style/TextAppearance.AppCompat.Display1"
        android:textColor="#FF000000"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <TextView
        android:id="@+id/textView5"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="100dp"
        android:layout_marginTop="28dp"
        android:text="File Name:"
        android:textAppearance="@style/TextAppearance.AppCompat.Medium"
        android:textColor="#FF000000"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView6" />

    <Button
        android:id="@+id/loadbtn"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="36dp"
        android:layout_marginEnd="148dp"
        android:backgroundTint="#FF018786"
        android:text="LOAD FILE"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/filename2" />

    <TextView
        android:id="@+id/textView6"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="28dp"
        android:layout_marginEnd="148dp"
        android:text="Read from File"
        android:textAppearance="@style/TextAppearance.AppCompat.Medium"
        android:textColor="#FF000000"
        app:layout_constraintEnd_toEndOf="parent"
```

```xml
            app:layout_constraintTop_toBottomOf="@+id/title2" />

    <TextView
        android:id="@+id/tvLoad"
        android:layout_width="283dp"
        android:layout_height="116dp"
        android:layout_marginTop="32dp"
        android:layout_marginEnd="52dp"
        android:textAppearance="@style/TextAppearance.AppCompat.Body1"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView4" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java

```java
package com.example.ex7;

import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;

import android.content.DialogInterface;
import android.content.Intent;
import android.content.pm.PackageManager;
import android.os.Build;
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 java.io.BufferedReader;
import java.io.File;
import java.io.FileNotFoundException;
import java.io.FileOutputStream;
import java.io.FileReader;
import java.io.IOException;
import java.io.OutputStreamWriter;

public class MainActivity extends AppCompatActivity {
```

```java
    // Declare the View object references
    Button btnSave, btnLoad;
    EditText content, filenamev;
    TextView tvLoad;
    // Define some String variables, initialized with empty string

    String filepath = "";
    String filename = "";
    String fileContent = "";


    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        btnSave = findViewById(R.id.writebtn);
        btnLoad = findViewById(R.id.btnLoad);
        content = findViewById(R.id.content);
        filenamev = findViewById(R.id.filename);
        filepath = "NewDirectory";


        if(!isExternalStorageAvailableForRW()){
            btnSave.setEnabled(false);
        }


        btnSave.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {


                fileContent = content.getText().toString().trim();
                filename = filenamev.getText().toString().trim();


                // Check for Storage Permission
                if(isStoragePermissionGranted()){


                    if(!fileContent.equals("")){
                        File myExternalFile = new
File(getExternalFilesDir(filepath), filename);
                        FileOutputStream fos = null;
                        try {
                            fos = new FileOutputStream(myExternalFile);
```

```java
                            fos.write(fileContent.getBytes());
                            fos.close();
                        } catch (FileNotFoundException e) {
                            e.printStackTrace();
                        } catch (IOException e) {
                            e.printStackTrace();
                        }

                        content.setText("");
                        filenamev.setText("");
                        // Show a Toast message to inform the user that
the operation has been successfully completed.
                        Toast.makeText(MainActivity.this, "File saved to
SD card.", Toast.LENGTH_SHORT).show();
                    } else{
                        // If the Text field is empty show corresponding
Toast message
                        Toast.makeText(MainActivity.this, "Text field can
not be empty.", Toast.LENGTH_SHORT).show();
                    }
                }

            }
        });

        btnLoad.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent myIntent = new Intent(MainActivity.this,
ReadFile.class);
                MainActivity.this.startActivity(myIntent);
            }
        });
    }

    public boolean isStoragePermissionGranted() {
        if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.M) {
            if
(checkSelfPermission(android.Manifest.permission.WRITE_EXTERNAL_STORAGE)
                == PackageManager.PERMISSION_GRANTED) {
```

```java
                //Permission is granted
                return true;
            } else {
                //Permission is revoked
                ActivityCompat.requestPermissions(this, new
String[]{android.Manifest.permission.WRITE_EXTERNAL_STORAGE}, 1);
                return false;
            }
        }
        else {
            //permission is automatically granted on sdk<23 upon
installation
            //Permission is granted
            return true;
        }
    }

    private boolean isExternalStorageAvailableForRW() {
        // Check if the external storage is available for read and write
by calling
        // Environment.getExternalStorageState() method. If the returned
state is MEDIA_MOUNTED,
        // then you can read and write files. So, return true in that
case, otherwise, false.
        String extStorageState = Environment.getExternalStorageState();
        if(extStorageState.equals(Environment.MEDIA_MOUNTED)){
            return true;
        }
        return false;
    }
}
```

ReadFile.java

```java
package com.example.ex7;

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 java.io.BufferedReader;
import java.io.File;
import java.io.FileNotFoundException;
import java.io.FileReader;
import java.io.IOException;

public class ReadFile extends AppCompatActivity {
    Button  btnLoad;
    TextView tvLoad;
    EditText filenamev;
    String filename = "";
    String filepath = "NewDirectory";


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

        btnLoad = findViewById(R.id.loadbtn);
        filenamev = findViewById(R.id.filename2);
        tvLoad = findViewById(R.id.tvLoad);

        btnLoad.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                filename = filenamev.getText().toString().trim();

                FileReader fr = null;
```

```java
                File myExternalFile = new
File(getExternalFilesDir(filepath), filename);
                StringBuilder stringBuilder = new StringBuilder();

                try {
                    fr = new FileReader(myExternalFile);
                    BufferedReader br = new BufferedReader(fr);
                    String line = br.readLine();

                    while(line != null){
                        stringBuilder.append(line).append('\n');
                        line = br.readLine();
                    }
                } catch (FileNotFoundException e) {
                    e.printStackTrace();
                } catch (IOException e) {
                    e.printStackTrace();
                } finally {
                    String fileContents = stringBuilder.toString();
                    tvLoad.setText(fileContents);
                }
            }
        });
    }
}
```

Android_Manifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.ex7">

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

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

```xml
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.Ex7">
        <activity
            android:name=".ReadFile"
            android:exported="true" />
        <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>
```
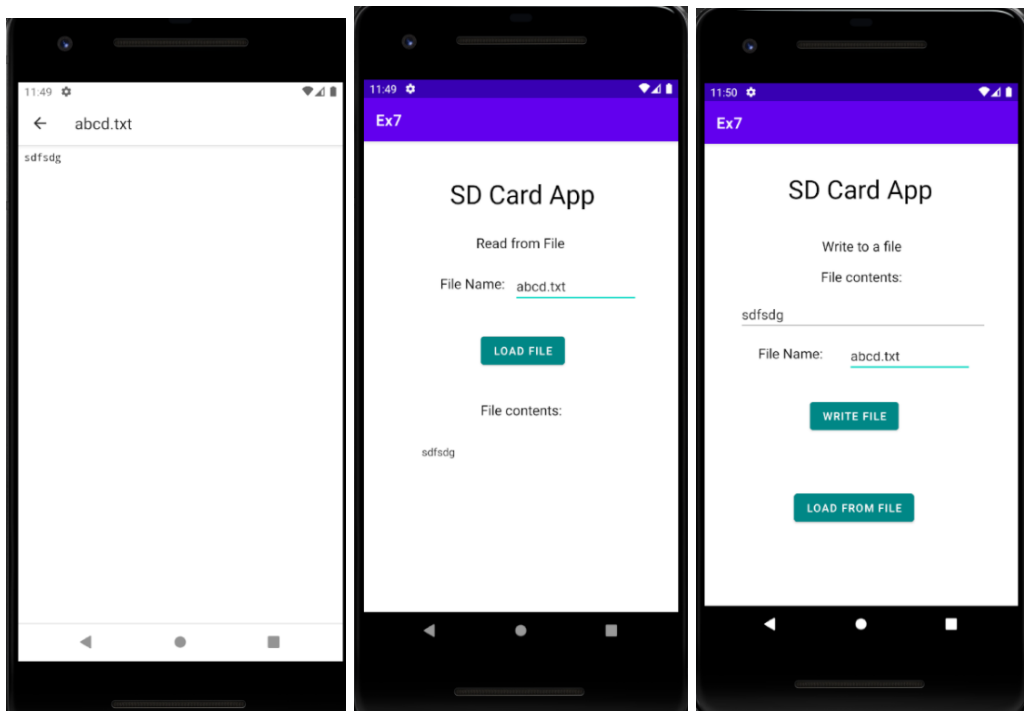
Output:

Swetha Saseendran
CSE-C
185001183

UCS1711- Mobile Application Development
Exercise 8: Create An SMS Sending Application

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">

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="18dp"
        android:layout_marginTop="61dp"
        android:text="PHONE NO."
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <EditText
        android:id="@+id/msg"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="28dp"
        android:ems="10"
        android:gravity="start|top"
        android:inputType="textMultiLine"
        app:layout_constraintBottom_toBottomOf="@+id/textView2"
```

```xml
        app:layout_constraintStart_toEndOf="@+id/textView2"
        app:layout_constraintTop_toBottomOf="@+id/textView2"
        app:layout_constraintVertical_bias="0.422" />

    <TextView
        android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="16dp"
        android:layout_marginTop="164dp"
        android:text="MESSAGE :"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/send"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginBottom="151dp"
        android:text="SEND"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent" />

    <EditText
        android:id="@+id/phno"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="24dp"
        android:ems="10"
        android:inputType="text"
        app:layout_constraintBaseline_toBaselineOf="@+id/textView"
        app:layout_constraintStart_toEndOf="@+id/textView" />

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

MainActivity.java

```java
package com.example.smsapplication;

import androidx.appcompat.app.AppCompatActivity;
import android.Manifest;
import android.content.pm.PackageManager;
import android.os.Bundle;
import android.telephony.SmsManager;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;

public class MainActivity extends AppCompatActivity {
    private static final int MY_PERMISSIONS_REQUEST_SEND_SMS =0 ;
    EditText ph;
    EditText msg;
    Button send;
    String contact,message;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        ph = (EditText) findViewById(R.id.phno);
        msg = (EditText) findViewById(R.id.msg);
        send = (Button) findViewById(R.id.send);
        send.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                sendSMSMessage();
            }
        });
    }

    protected void sendSMSMessage() {
        contact = ph.getText().toString();
        message = msg.getText().toString();
```

```java
        if (ContextCompat.checkSelfPermission(this,
                Manifest.permission.SEND_SMS)
                != PackageManager.PERMISSION_GRANTED) {
            if (ActivityCompat.shouldShowRequestPermissionRationale(this,
                    Manifest.permission.SEND_SMS)) {
            } else {
                ActivityCompat.requestPermissions(this,
                        new String[]{Manifest.permission.SEND_SMS},
                        MY_PERMISSIONS_REQUEST_SEND_SMS);
            }
        }
    }


    @Override
    public void onRequestPermissionsResult(int requestCode,String
permissions[], int[] grantResults) {
        super.onRequestPermissionsResult(requestCode, permissions,
grantResults);
        switch (requestCode) {
            case MY_PERMISSIONS_REQUEST_SEND_SMS: {
                if (grantResults.length > 0
                        && grantResults[0] ==
PackageManager.PERMISSION_GRANTED) {
                    SmsManager smsManager = SmsManager.getDefault();
                    smsManager.sendTextMessage(contact, null, message,
null, null);
                    Toast.makeText(getApplicationContext(), "SMS sent.",
                            Toast.LENGTH_LONG).show();
                } else {
                    Toast.makeText(getApplicationContext(),
                            "SMS failed, please try again.",
Toast.LENGTH_LONG).show();
                    return;
                }
            }
        }


    }
}
```

Output: