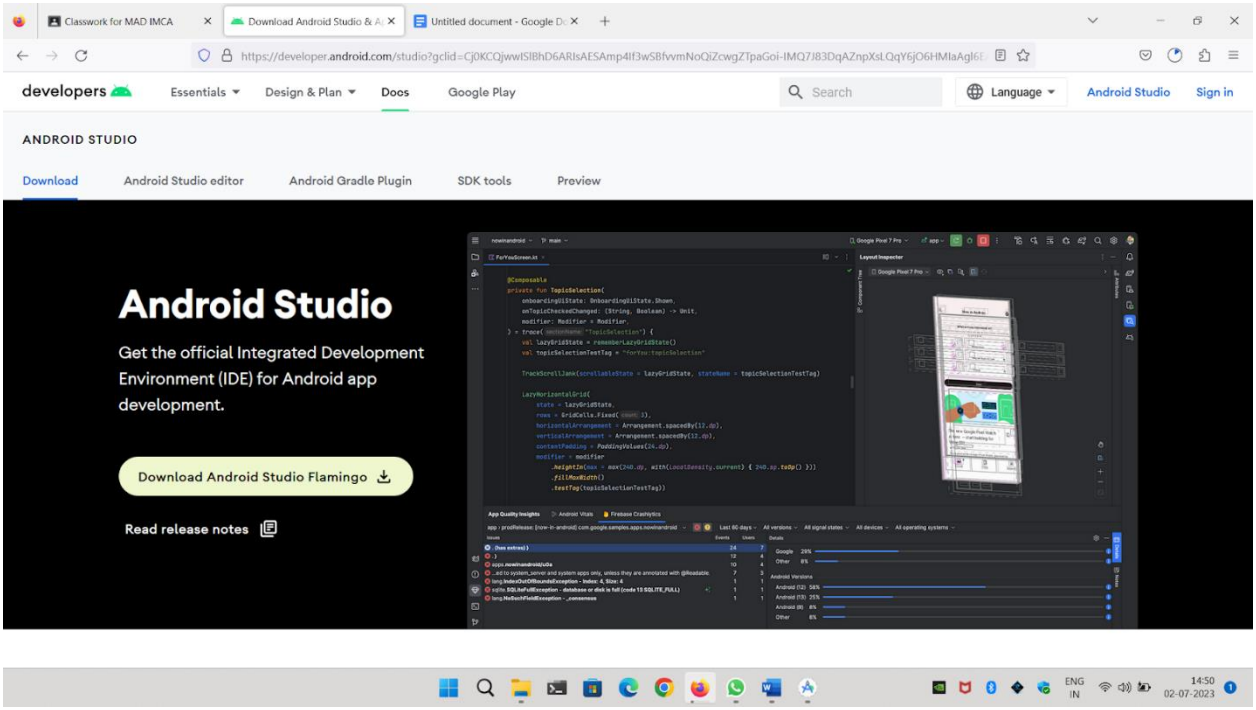
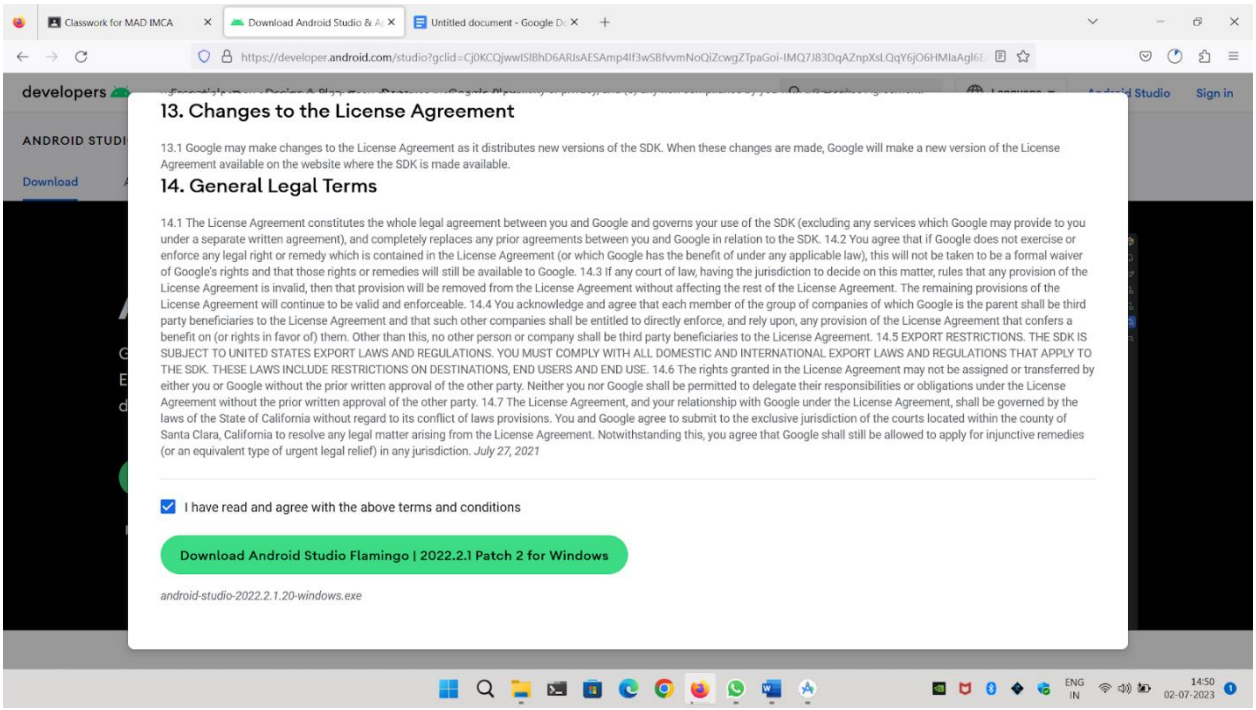
1.Installing of necessary components and software

Step 1: Head over to this link to get the Android Studio executable or zip file.

Step 2: Click on the Download Android Studio Button.

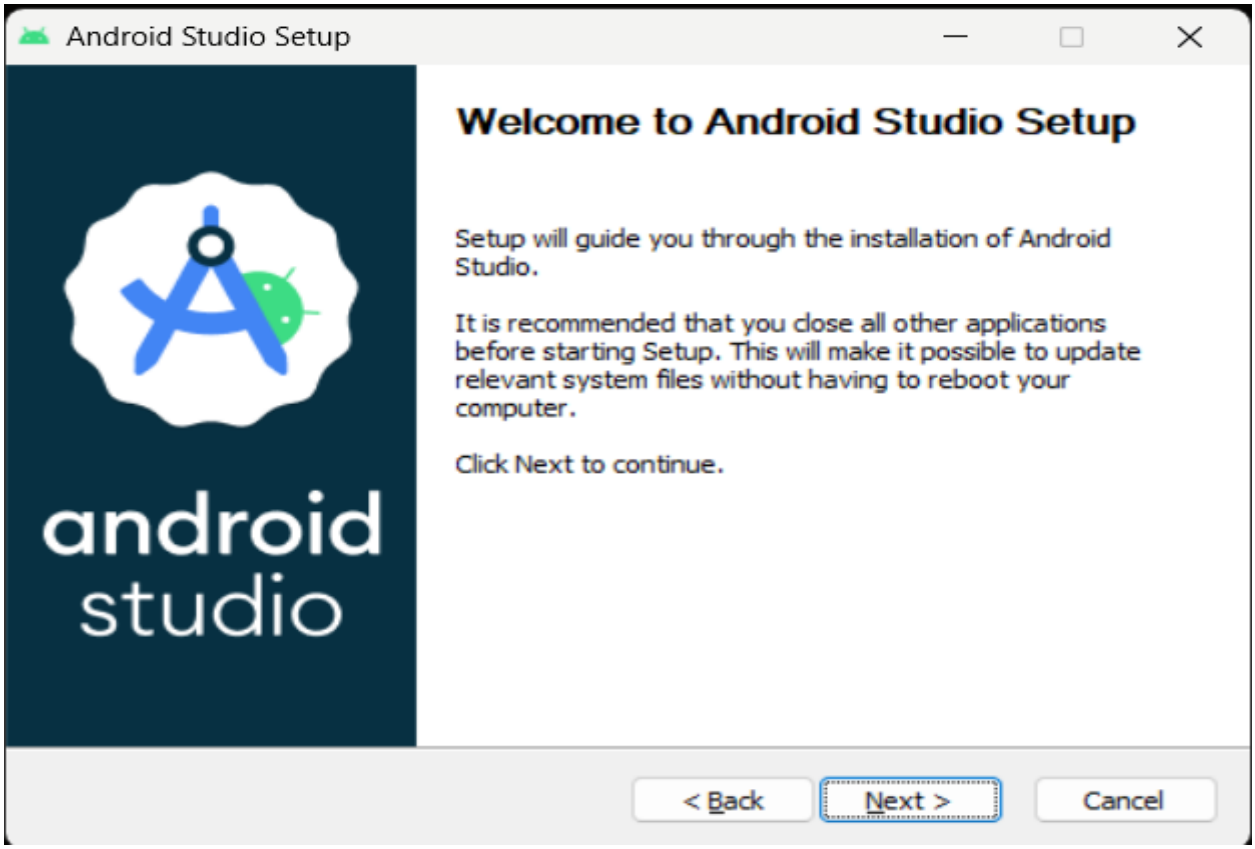


Click on the **“I have read and agree with the above terms and conditions”** checkbox followed by the download button.



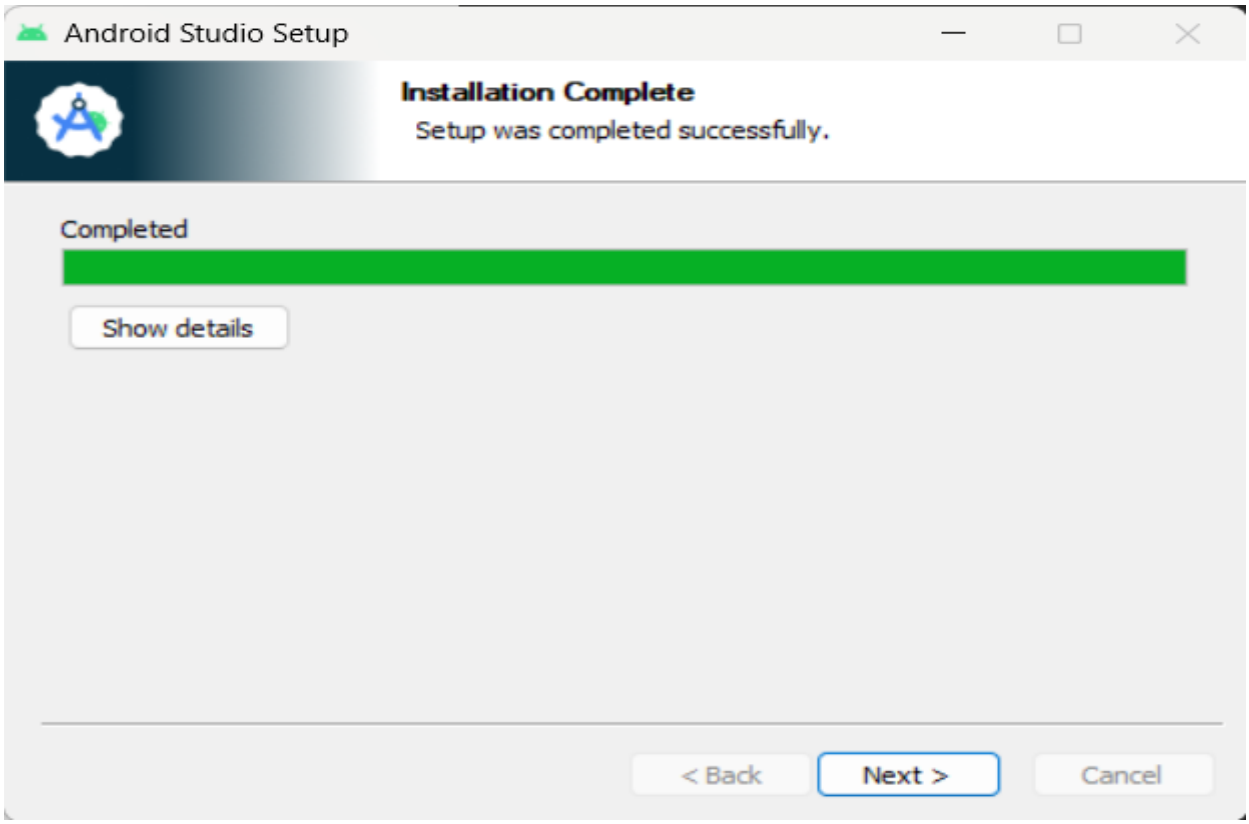
Click on the Save file button in the appeared prompt box and the file will start downloading.

Step 3: After the downloading has finished, open the file from downloads and run it. It will prompt the following dialog box.



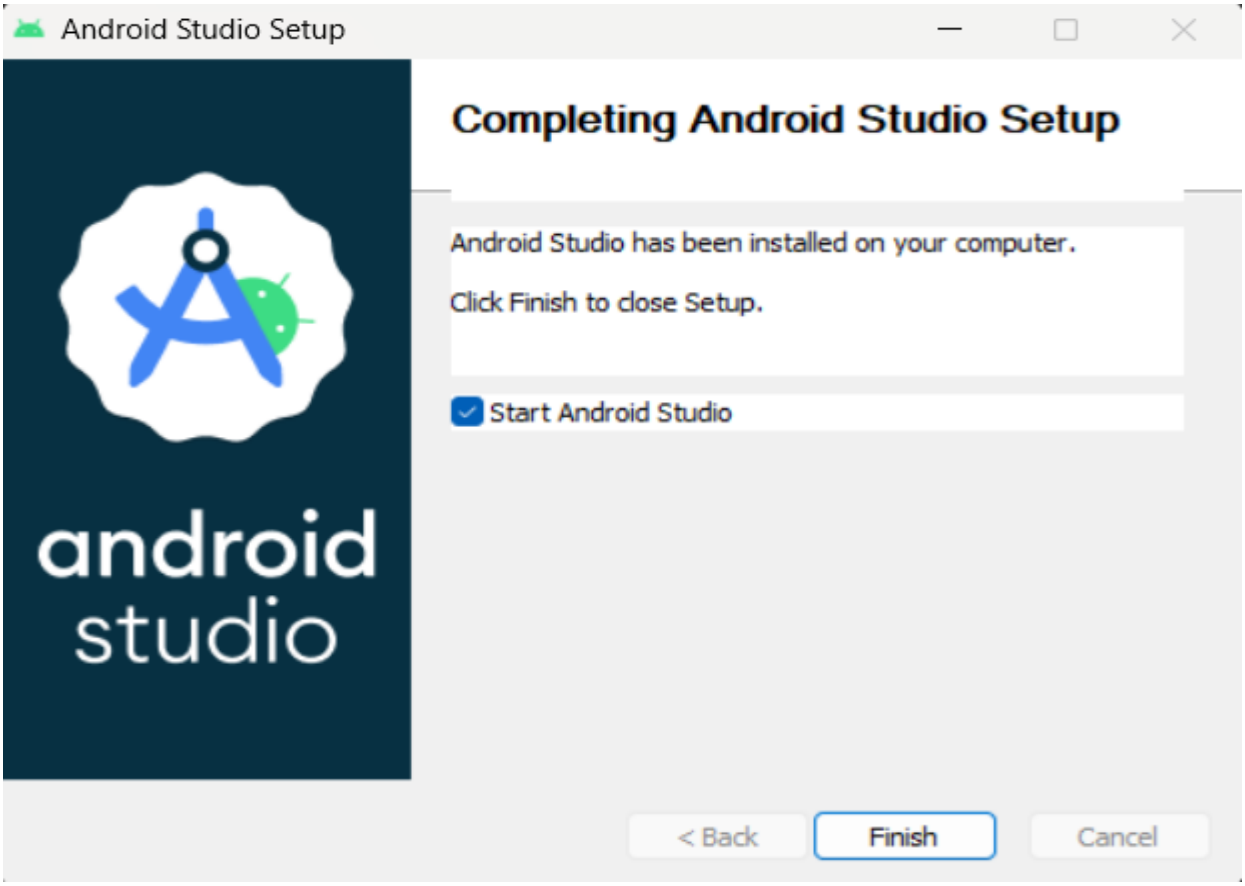
Click on next. In the next prompt, it'll ask for a path for installation. Choose a path and hit next.

Step 4: It will start the installation, and once it is completed, it will be like the image shown below.



Click on next.

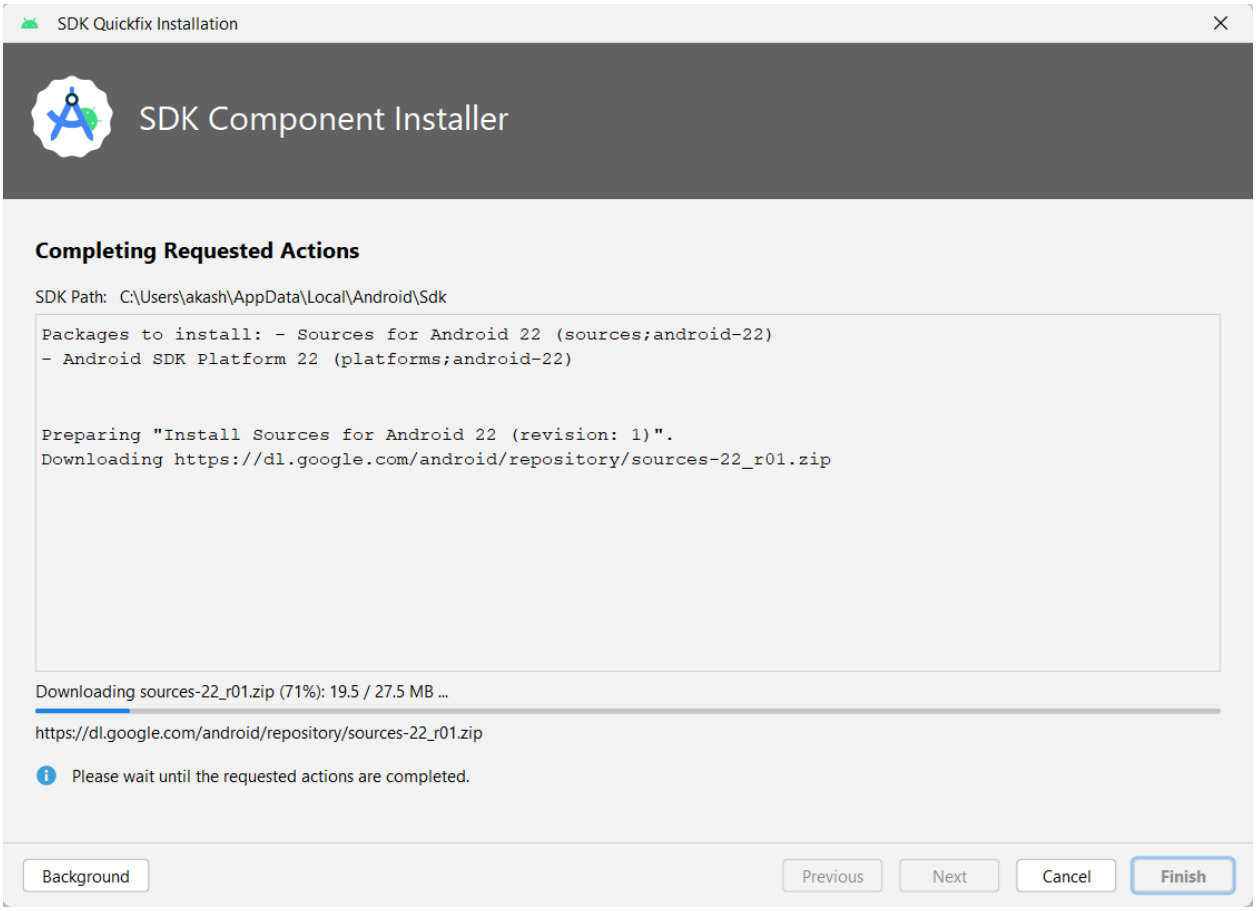
Step 5: Once "Finish" is clicked, it will ask whether the previous settings need to be imported [if the android studio had been installed earlier], or not. It is better to choose the 'Don't import Settings option'.



Click the OK button.

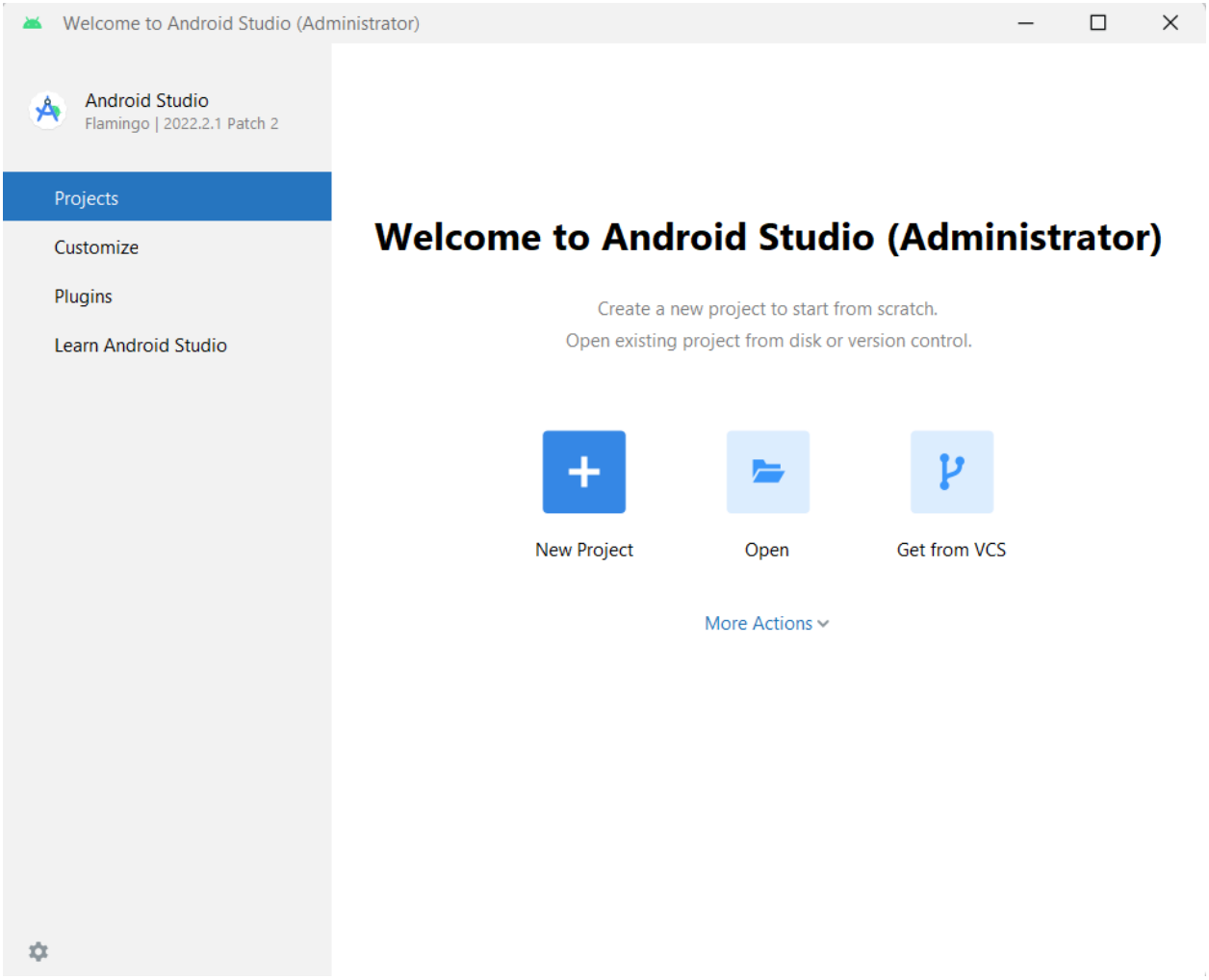
Step 6: This will start the Android Studio. Meanwhile, it will be finding the available SDK components.

Step 7: After it has found the SDK components, it will redirect to the Welcome dialog box.



The Android Studio has been successfully configured. Now it’s time to launch and build apps. Click on the Finish button to launch it.

Step 8: Click on Start a new Android Studio project to build a new app.



2. Develop an application using Eventlisterner

activity_main.xml

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

    <EditText
        android:id="@+id/txt_content"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textSize="20sp"
        android:inputType="text"
        android:hint="Enter the Name"
        android:layout_centerInParent="true"
        android:textAlignment="center"/>

    <Button
        android:id="@+id/button"
        android:background="@color/black"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Next Page"
        android:layout_centerInParent="true"
        android:layout_below="@id/txt_content"
        android:onClick="nextpage"/>

</RelativeLayout>
```

MainActivity.java

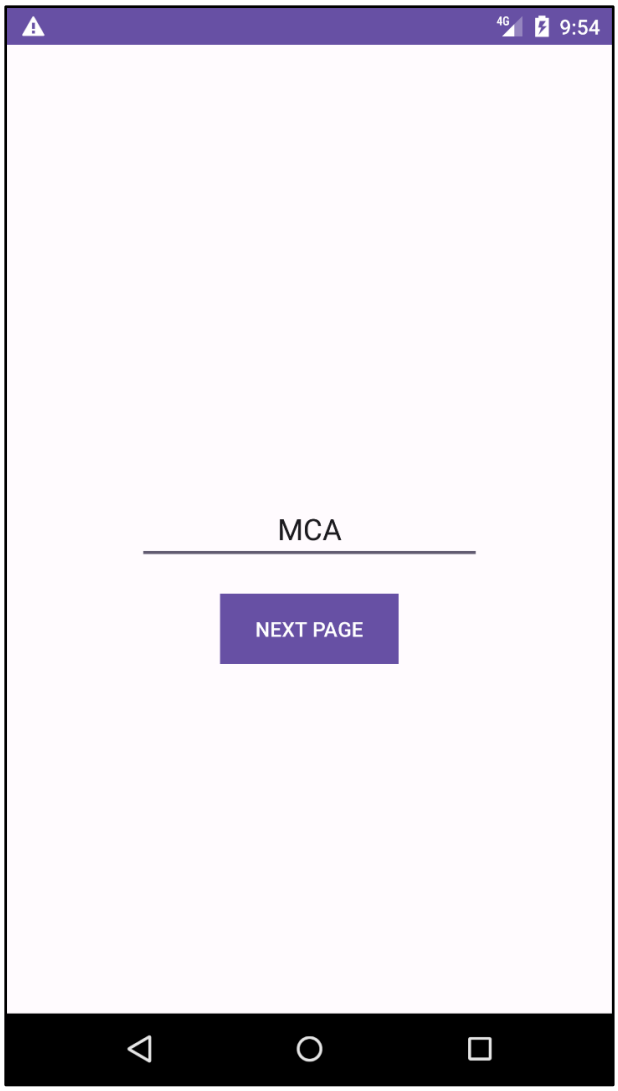
```
package com.example.program;
import androidx.appcompat.app.AppCompatActivity;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.EditText;

public class MainActivity extends AppCompatActivity {
    public final static String ss_msg =null;
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }
    public void nextpage(View view) {
        Intent i = new Intent(this, MainActivity2.class);
        EditText txt_msg = (EditText)findViewById(R.id.txt_content);
        String str = txt_msg.getText().toString();
        i.putExtra(ss_msg,str);
        startActivity(i);
    }
}
```

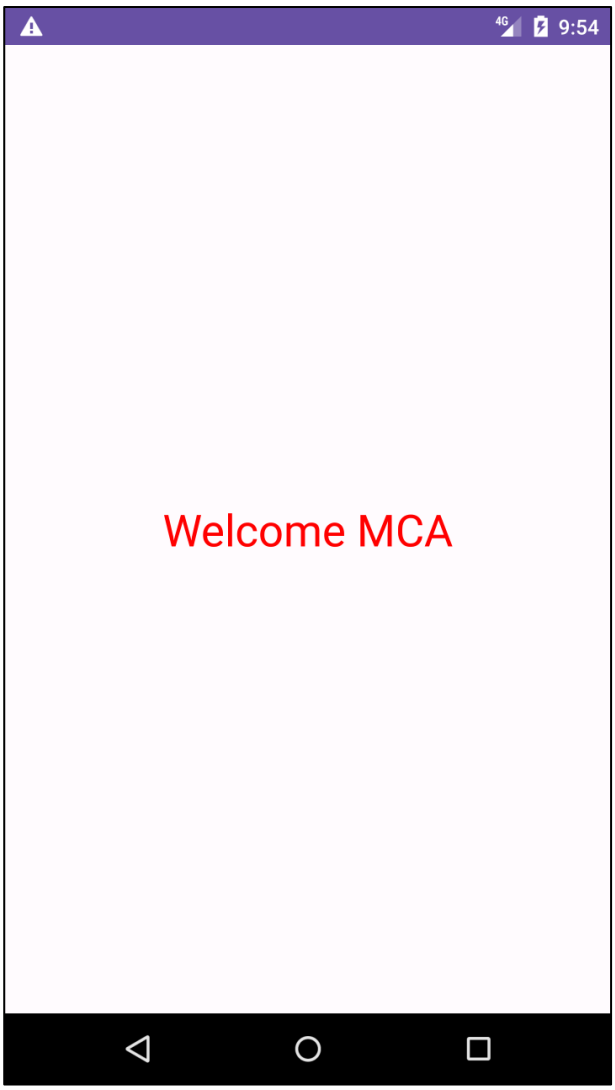
activity_main2.xml

```
<?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=".MainActivity2">


    <TextView
        android:id="@+id/textView3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerInParent="true"
        android:text="@string/text_name"
        android:textColor="#FF0000"
        android:textSize="30sp" />

</RelativeLayout>
```

MainActivity2.java

```
package com.example.program;
import androidx.appcompat.app.AppCompatActivity;
import android.content.Intent;
import android.os.Bundle;
import android.widget.TextView;

public class MainActivity2 extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main2);

        Intent i = getIntent();
        String txt_msg = i.getStringExtra(MainActivity.ss_msg);
        TextView te = (TextView) findViewById(R.id.textView3);
        te.setText("Welcome "+txt_msg);


    }
}
```


9:54
MCA
NEXT PAGE


9:54
Welcome MCA

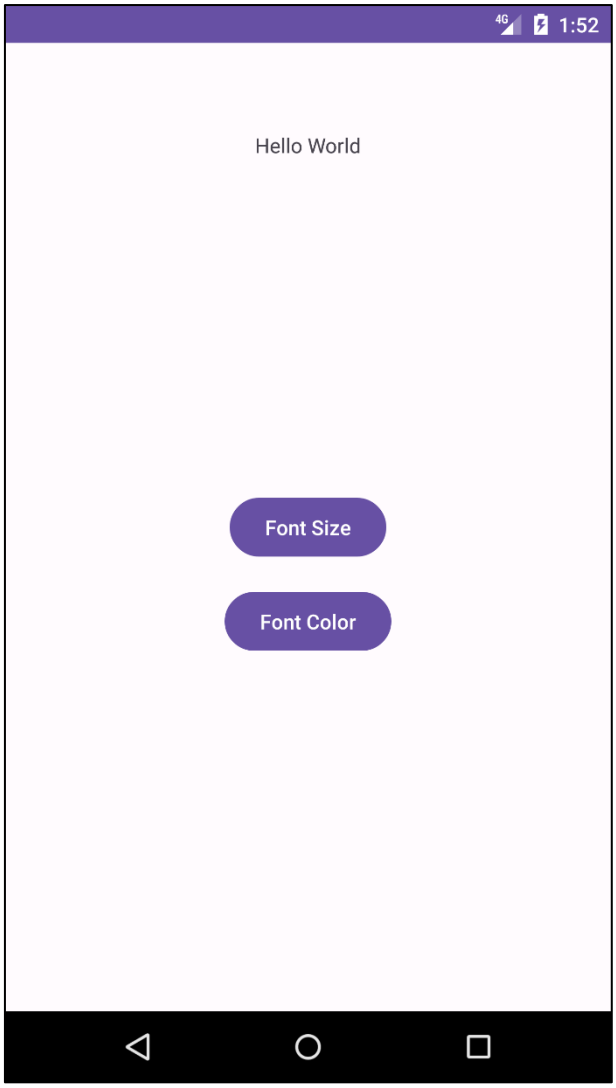
3. Develop an application that uses GUI components, fonts and colors

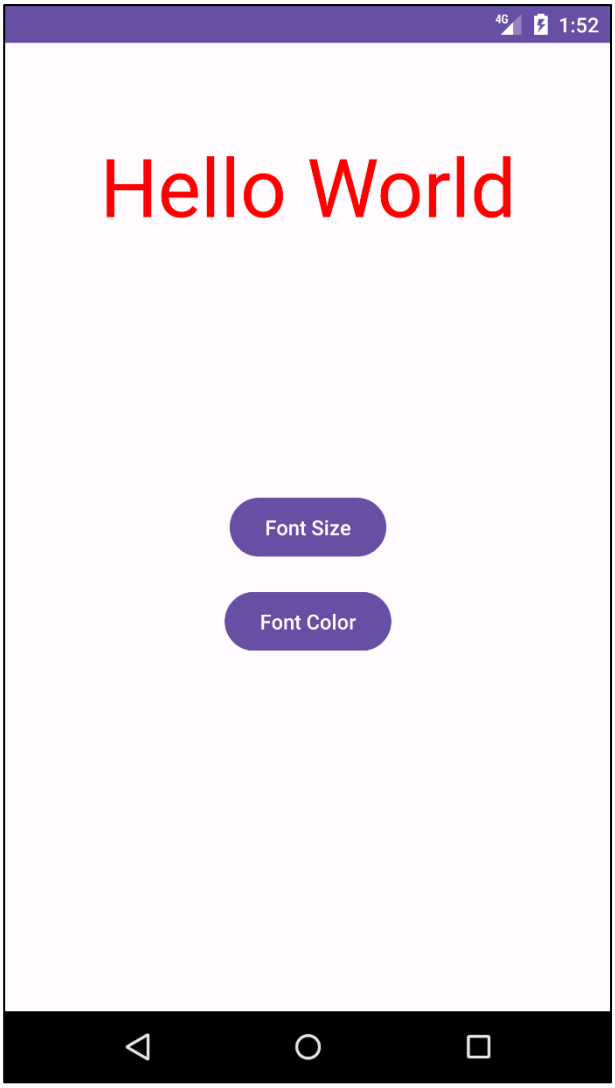
activity_main.xml

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

    <Button
        android:id="@+id/button1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Font Size"
        android:layout_centerInParent="true"
        android:onClick="changeSize"/>

    <Button
        android:id="@+id/button2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button1"
        android:layout_centerInParent="true"
        android:layout_marginTop="16dp"
        android:text="Font Color"
        android:onClick="changeColor"/>

    <TextView
        android:id="@+id/display"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello World"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="60sp"/>
</RelativeLayout>
```

MainActivity.java

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

import android.graphics.Color;
import android.os.Bundle;
import android.view.View;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity {
    int fontSize = 30;
    int color =1;

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

    public void changeSize(View view) {
        TextView showText = (TextView)findViewById(R.id.display);
        if(fontSize >= 70){
            fontSize =30;
        }
        showText.setTextSize(fontSize);
        fontSize +=5;
    }

    public void changeColor(View view) {
        TextView showText = (TextView)findViewById(R.id.display);
        switch (color){
            case 1 : showText.setTextColor(Color.BLUE);
                break;
            case 2 : showText.setTextColor(Color.RED);
                break;
            case 3 : showText.setTextColor(Color.GREEN);
                break;
            case 4 : showText.setTextColor(Color.YELLOW);
                break;
            case 5 : showText.setTextColor(Color.GRAY);
                break;
        }
        color++;
        if(color >6) {
            color = 1;
        }
    }
}
```


1:52
Hello World
Font Size
Font Color


1:52
Hello World
Font Size
Font Color

4. Implement an application that write data through the SD Card.

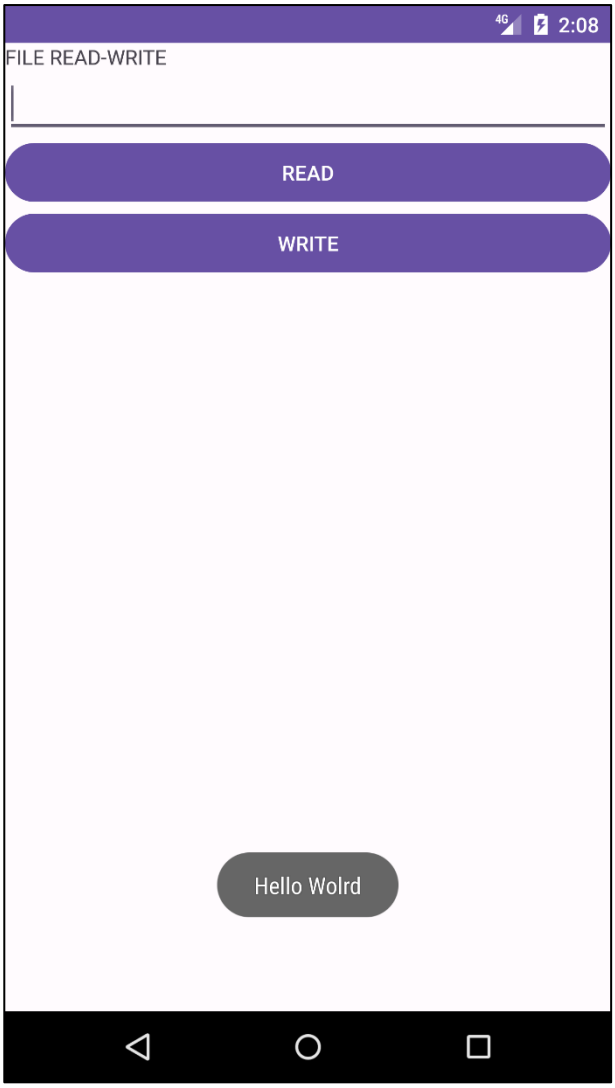
activity_main.xml

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

    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <TableLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent">
        <TableRow
            android:layout_width="match_parent"
            android:layout_height="match_parent" />
        <TextView
            android:id="@+id/textView"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="FILE READ-WRITE" />

        <TableRow
            android:layout_width="match_parent"
            android:layout_height="match_parent" />
        <EditText
            android:id="@+id/write"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:ems="10"
            android:inputType="textPersonName" />
        <TableRow
            android:layout_width="match_parent"
            android:layout_height="match_parent" />
        <Button
            android:id="@+id/button"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="READ"

            android:onClick="read"/>
        <TableRow
            android:layout_width="match_parent"
            android:layout_height="match_parent" />
        <Button
            android:id="@+id/button2"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="WRITE"
            android:onClick="write"/>
    </TableLayout>
</RelativeLayout>
```

MainActivity.java

```
package com.example.sdcard;
import android.os.Bundle;
import android.view.View;
import android.widget.EditText;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
import java.io.FileInputStream;
import java.io.FileOutputStream;
import java.io.InputStreamReader;
import java.io.OutputStreamWriter;
public class MainActivity extends AppCompatActivity {
    EditText text;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        text = (EditText) findViewById(R.id.write);
    }

    public void write(View view) {
        try {
            FileOutputStream fout = openFileOutput("MCA.txt", MODE_PRIVATE);
            OutputStreamWriter writer = new OutputStreamWriter(fout);
            writer.write(text.getText().toString());
            writer.close();
            Toast.makeText(getBaseContext(), "file Saved Succcessfully",
                    Toast.LENGTH_LONG).show();
        } catch (Exception e) {
        }
    }
    public void read(View view) {
        try {
            FileInputStream filein = openFileInput("MCA.txt");
            InputStreamReader reader = new InputStreamReader(filein);
            char[] inputbuffer = new char[1000];
            String txt = "";
            int charread;
            while ((charread = reader.read(inputbuffer)) > 0) {
                String read = String.copyValueOf(inputbuffer, 0, charread);
                txt += read;
            }
            reader.close();
            Toast.makeText(getBaseContext(), txt,
                    Toast.LENGTH_LONG).show();
        } catch (Exception e) {
        }
    }
}
```


2:07
FILE READ-WRITE
Hello Wolrd
READ
WRITE
file Saved Succcessfully


2:08
FILE READ-WRITE
READ
WRITE
Hello Wolrd

5. Develop an application that makes use of database.

activity_main.xml

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


    <TextView
        android:id="@+id/textView"
        android:textStyle="bold"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="20dp"
        android:text="@string/app_name"
        android:textSize="30sp" />

    <LinearLayout
        android:id="@+id/layout1"
        android:layout_marginTop="20dp"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal"
        android:layout_below="@id/textView">

        <EditText
            android:id="@+id/sname"
            android:layout_width="186dp"
            android:layout_height="50dp"
            android:layout_marginLeft="10sp"
            android:layout_marginRight="10sp"
            android:ems="10"
            android:hint="Your Name"
            android:inputType="text" />

        <EditText

            android:layout_marginLeft="10sp"
            android:layout_marginRight="10sp"
            android:id="@+id/sroll"
            android:layout_width="wrap_content"
            android:layout_height="50dp"
            android:ems="10"
            android:inputType="text"
            android:hint="Roll Number" />
    </LinearLayout>

    <LinearLayout
        android:id="@+id/layout2"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal"
        android:layout_marginTop="20dp"
        android:layout_below="@id/layout1">
```

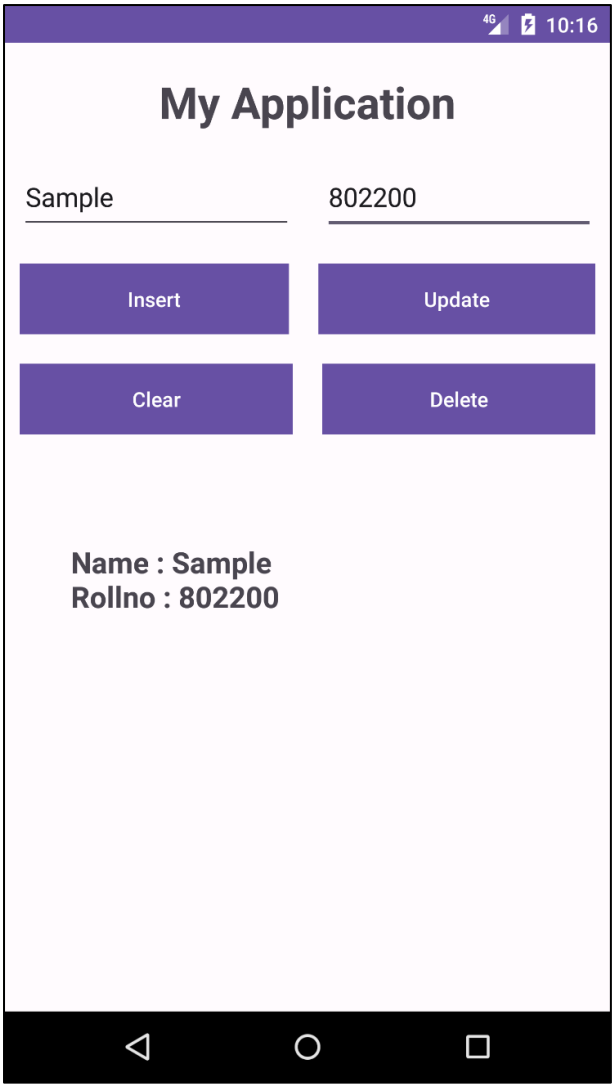
```
    <Button
        android:onClick="insert"
        android:id="@+id/Insert"
        android:background="@color/black"
        android:layout_marginLeft="10sp"
        android:layout_marginRight="10sp"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="Insert" />

    <Button
        android:id="@+id/Update"
        android:background="@color/black"
        android:layout_marginLeft="10sp"
        android:layout_marginRight="10sp"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="Update"
        android:onClick="update"/>
</LinearLayout>

<LinearLayout
    android:layout_marginTop="20dp"
    android:id="@+id/layout3"
    android:layout_below="@id/layout2"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="horizontal"
     android:layout_marginBottom="20sp">

    <Button
        android:background="@color/black"
        android:layout_marginLeft="10sp"
        android:layout_marginRight="10sp"
        android:id="@+id/Clear"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="Clear"
        android:onClick="clear"/>

    <Button
        android:background="@color/black"
        android:layout_marginLeft="10sp"
        android:layout_marginRight="10sp"
        android:id="@+id/Delete"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_weight="1"
        android:text="Delete"
        android:onClick="delete"/>
</LinearLayout>

<TextView
    android:id="@+id/textBox"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_below="@id/layout3"
```

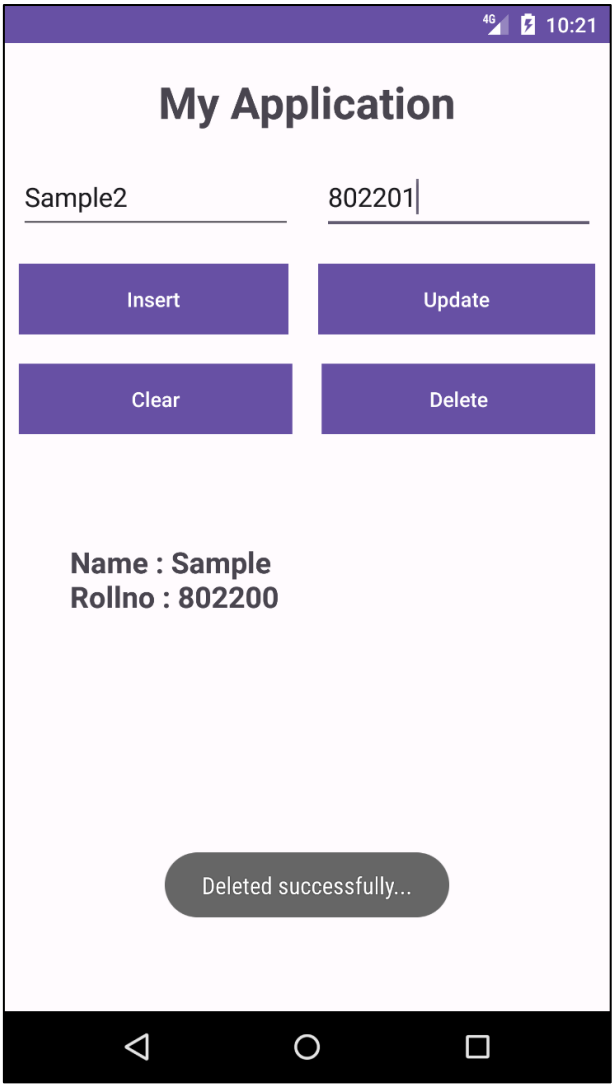
```
        android:layout_centerInParent="true"
        android:layout_marginLeft="70sp"
        android:layout_marginTop="30dp"
        android:layout_marginRight="10sp"
        android:text="Insert Data"

        android:textSize="20sp"
        android:textStyle="bold" />

</RelativeLayout>
```

MainActivity.java

```
package com.example.sql;
import androidx.appcompat.app.AppCompatActivity;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.view.View;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;
import java.sql.SQLData;

public class MainActivity extends AppCompatActivity {
    EditText sname,sroll;
    TextView textView;
    String name,roll;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        sname = findViewById(R.id.sname);
        sroll = findViewById(R.id.sroll);
        textView = findViewById(R.id.textBox);
    }

    public void insert(View view) {
        name = sname.getText().toString();
        roll = sroll.getText().toString();
        SQLiteDatabase DB = this.openOrCreateDatabase("Student",MODE_PRIVATE,null);
        DB.execSQL("CREATE TABLE IF NOT EXISTS STUDENT_DETAILS(NAME VARCHAR,ROLL
VARCHAR)");
        DB.execSQL("INSERT INTO STUDENT_DETAILS(NAME,ROLL) VALUES
('"+name+"','"+roll+"')");
        Cursor C = DB.rawQuery("SELECT * FROM STUDENT_DETAILS", null);
        C.moveToLast();
      textView.setText("\n Name : " + C.getString(0) + "\n Rollno : " + C.getString(1) +
"\n");
    }

    public void update(View view) {
        name = sname.getText().toString();
        roll = sroll.getText().toString();
        SQLiteDatabase DB = this.openOrCreateDatabase("Student",MODE_PRIVATE,null);
        DB.execSQL("UPDATE STUDENT_DETAILS SET NAME='"+name+"' WHERE ROLL='"+roll+"'");
        Cursor C = DB.rawQuery("SELECT * FROM STUDENT_DETAILS", null);
        C.moveToLast();
```

```
      textView.setText("\n Name : " + C.getString(0) + "\n Rollno : " + C.getString(1) +
"\n");
    }

    public void clear(View view) {
        sname.getText().clear();
        sroll.getText().clear();
    }

    public void delete(View view) {
        name = sname.getText().toString();
        roll = sroll.getText().toString();
        SQLiteDatabase DB = this.openOrCreateDatabase("Student",MODE_PRIVATE,null);
        DB.execSQL("DELETE FROM STUDENT_DETAILS WHERE ROLL='"+roll+"'");
        Cursor C = DB.rawQuery("SELECT * FROM STUDENT_DETAILS", null);
        C.moveToLast();
      textView.setText("\n Name : " + C.getString(0) + "\n Rollno : " + C.getString(1) +
"\n");
        Toast.makeText(getBaseContext(),"Deleted
successfully...",Toast.LENGTH_LONG).show();
    }
}
```


10:16
My Application
Sample
802200
Insert
Update
Clear
Delete
Name : Sample
Rollno : 802200


10:21
My Application
Sample2
802201
Insert
Update
Clear
Delete
Name : Sample
Rollno : 802200
Deleted successfully...

6. Implement an application that create an alert upon receiving

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Service Has Started!"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java

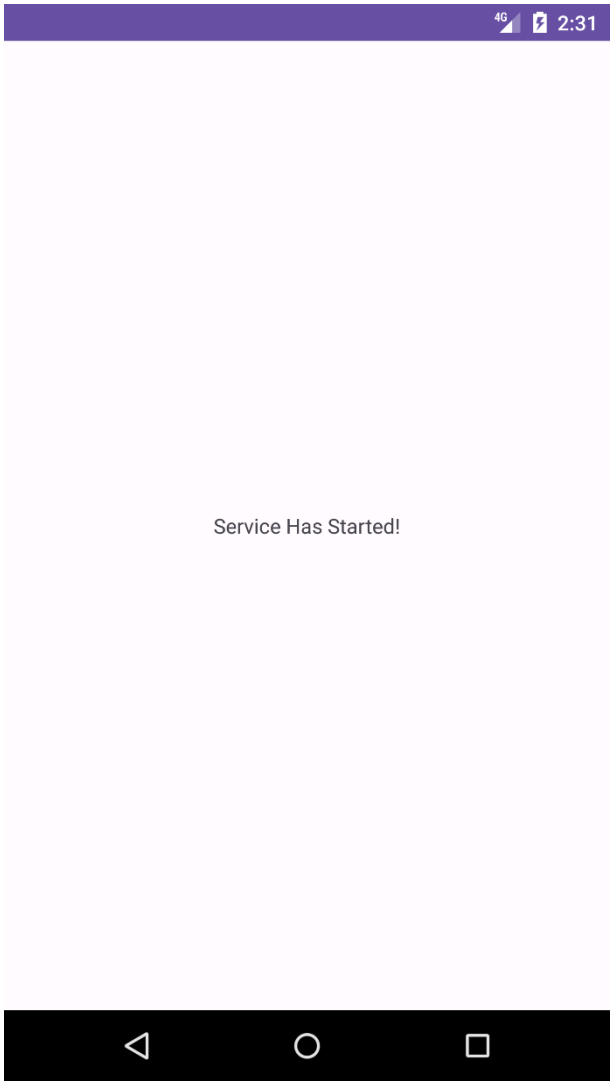
```
package com.example.alert;
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import androidx.annotation.NonNull;
import android.Manifest;
import android.content.pm.PackageManager;
import android.os.Build;
import android.widget.Toast;
public class MainActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        if(Build.VERSION.SDK_INT >= Build.VERSION_CODES.M
                && checkSelfPermission(Manifest.permission.RECEIVE_SMS) !=
                PackageManager.PERMISSION_GRANTED){

            requestPermissions(new String []{Manifest.permission.RECEIVE_SMS}, 1000);
        }
    }
    @Override
    public void onRequestPermissionsResult(int requestCode, @NonNull String[]
permissions,
                                           @NonNull int[] grantResults) {
        super.onRequestPermissionsResult(requestCode, permissions, grantResults);
        if (requestCode == 1000) {
            if (grantResults[0] == PackageManager.PERMISSION_GRANTED) {
                Toast.makeText(this, "Permission Granted", Toast.LENGTH_SHORT).show();
            } else {
                Toast.makeText(this, "Permission Denied", Toast.LENGTH_SHORT).show();
            }
        }
    }
}
```

smsreceiver.java

```
package com.example.alert;

import android.app.NotificationManager;
import android.content.BroadcastReceiver;
import android.content.Context;
import android.content.DialogInterface;
import android.content.Intent;
import android.os.Build;
import android.os.Bundle;
import android.provider.Telephony;
import android.telephony.SmsMessage;
import android.widget.Toast;
public class smsreceiver extends BroadcastReceiver {
    @Override
    public void onReceive(Context context, Intent intent) {
        if(intent.getAction().equals("android.provider.Telephony.SMS_RECEIVED")){
            String sender;
            SmsMessage message;
            SmsMessage[] messages = Telephony.Sms.Intents.getMessagesFromIntent(intent);
            message = messages[0];
            sender = message.getOriginatingAddress();
            Toast.makeText(context, "SMS RECEIVED\n\n" + "Sender: " + sender +
"\nMessage Body: " + message.getDisplayMessageBody(), Toast.LENGTH_SHORT).show();
        }
    }
}
```

AndroidManifest.xml

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

    <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.Alert">
        <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>
        <receiver android:name=".smsreceiver"
            android:exported="true">
            <intent-filter android:priority="100">
                <action android:name="android.provider.Telephony.SMS_RECEIVED"/>
            </intent-filter>
        </receiver>
    </application>
</manifest>
```


2:31
Service Has Started!

7. Develop a native application that uses GPS Location

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <TableLayout android:layout_width="match_parent"
        android:layout_height="match_parent">
        <TableRow android:layout_width="match_parent"
            android:layout_height="match_parent" >
            <TextView android:id="@+id/textView2"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:text="GPS Location" />
        </TableRow>
        <TableRow android:layout_width="match_parent"
            android:layout_height="match_parent" >
            <TextView
                android:id="@+id/lat"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:text="Longitude:"
                android:textSize="20sp" />
        </TableRow>
        <TableRow>
            <TextView
                android:id="@+id/lon"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:text="Latitude:"
                android:textSize="20sp" />
        </TableRow>
    </TableLayout>
</RelativeLayout>
```

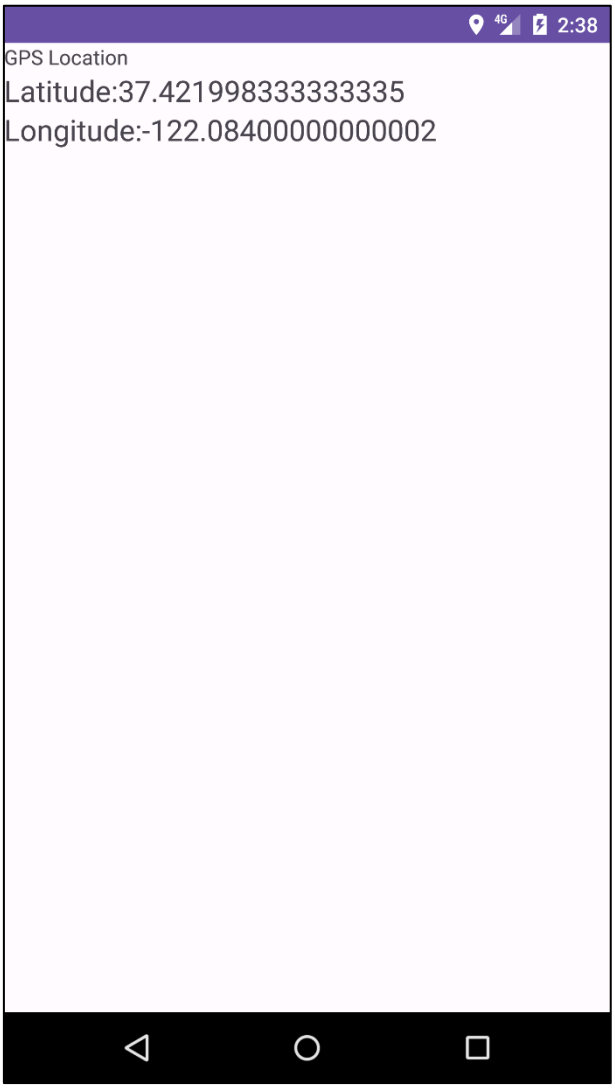
MainActivity.java

```
package com.example.gps;
import android.os.Bundle;
import android.Manifest;
import android.annotation.SuppressLint;
import android.content.Context;
import android.content.pm.PackageManager;
import android.location.Location;
import android.location.LocationListener;
import android.location.LocationManager;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;
import android.os.Bundle;
import android.widget.TextView;
public class MainActivity extends AppCompatActivity {
    LocationManager locationManager;
    LocationListener locationListener;
    TextView latitude, longitude;
    @Override
```

```
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        latitude = (TextView) findViewById(R.id.lat);
        longitude = (TextView) findViewById(R.id.lon);
        locationManager = (LocationManager)
this.getSystemService(Context.LOCATION_SERVICE);
        locationListener = new LocationListener() {
            @Override
            public void onLocationChanged(Location location) {
                latitude.setText("Latitude:" + location.getLatitude());
                longitude.setText("Longitude:" + location.getLongitude());
            }
            @Override
            public void onStatusChanged(String s, int i, Bundle bundle) {
            }
            @Override
            public void onProviderEnabled(String s) {
            }
            @Override

            public void onProviderDisabled(String s) {
            }
        };
        if (ActivityCompat.checkSelfPermission(this,
Manifest.permission.ACCESS_FINE_LOCATION) !=
                PackageManager.PERMISSION_GRANTED &&
ActivityCompat.checkSelfPermission(this,
                Manifest.permission.ACCESS_COARSE_LOCATION) !=
PackageManager.PERMISSION_GRANTED) {
            return;
        }
        locationManager.requestLocationUpdates(LocationManager.GPS_PROVIDER, 0, 0,
locationListener);
    }
}
```

AndroidManifest.xml

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


2:38
GPS Location
Latitude:37.421998333333335
Longitude:-122.08400000000002

8. Develop an application using telephony to send SMS

activity_main.xml

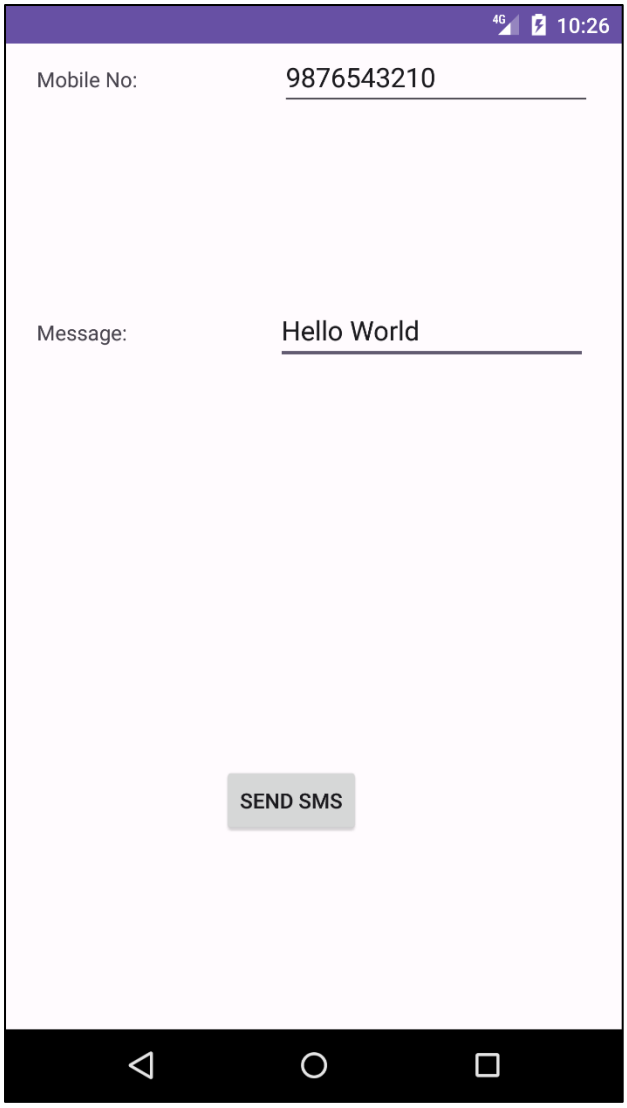
```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <EditText
        android:id="@+id/editText1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentTop="true"
        android:layout_alignParentRight="true"
        android:layout_marginRight="20dp"
        android:ems="10" />

    <EditText
        android:id="@+id/editText2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/editText1"
        android:layout_alignLeft="@+id/editText1"
        android:layout_marginLeft="-3dp"
        android:layout_marginTop="124dp"
        android:ems="10"
        android:inputType="textMultiLine" />

    <TextView android:id="@+id/textView1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignBaseline="@+id/editText1"
        android:layout_alignBottom="@+id/editText1"
        android:layout_marginRight="95dp"
        android:layout_marginBottom="11dp"
        android:layout_toLeftOf="@+id/editText1"
        android:text="Mobile No:" />

    <TextView android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignBaseline="@+id/editText2"
        android:layout_alignBottom="@+id/editText2"
        android:layout_alignLeft="@+id/textView1"
        android:text="Message:" />

    <Button
        android:id="@+id/button1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/editText2"
        android:layout_alignLeft="@+id/editText2"
        android:layout_marginLeft="-36dp"
        android:layout_marginTop="267dp"
        android:text="Send SMS" />

</RelativeLayout>
```

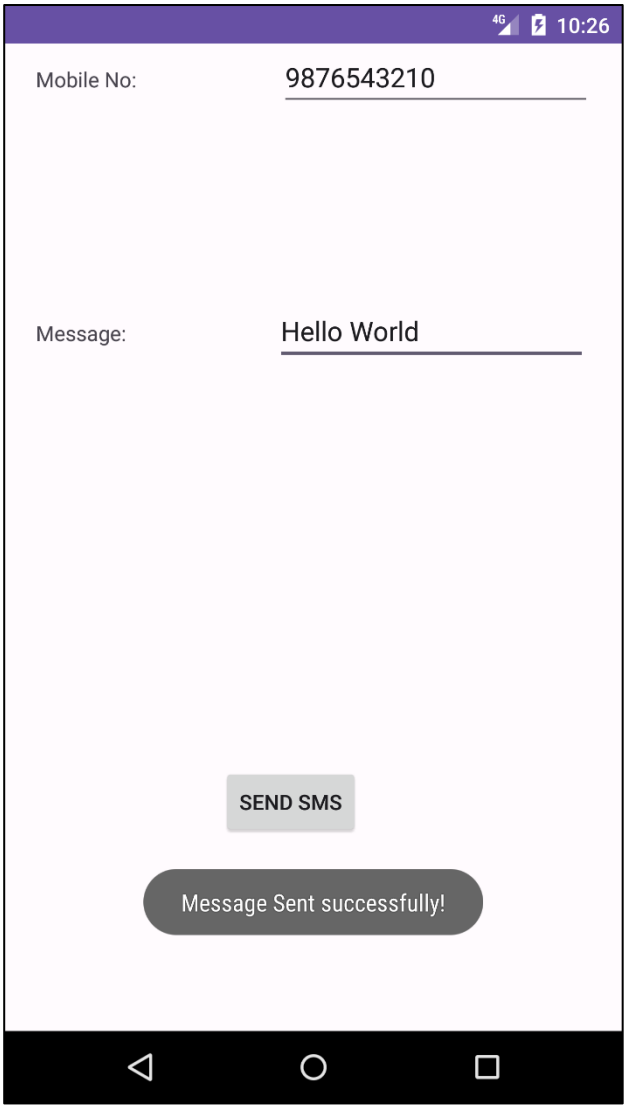
MainActivity.java

```
package com.example.myapplication5;

import android.os.Bundle;
import android.app.Activity;
import android.app.PendingIntent;
import android.content.Intent;
import android.telephony.SmsManager;
import android.view.Menu;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
public class MainActivity extends Activity {
    EditText mobileno,message;
    Button sendsms;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        mobileno=(EditText)findViewById(R.id.editText1);
        message=(EditText)findViewById(R.id.editText2);
        sendsms=(Button)findViewById(R.id.button1);
//Performing action on button click
        sendsms.setOnClickListener(new OnClickListener() {
            public void onClick(View arg0) {
                String no=mobileno.getText().toString();
                String msg=message.getText().toString();

//Getting intent and PendingIntent instance
              Intent intent=new Intent(getApplicationContext(),MainActivity.class);
              PendingIntent pi=PendingIntent.getActivity(getApplicationContext(), 0,
intent,0);

//Get the SmsManager instance and call the sendTextMessage method to send message

                SmsManager sms=SmsManager.getDefault();
                sms.sendTextMessage(no, null, msg, pi,null);
                Toast.makeText(getApplicationContext(), "Message Sent successfully!",
                        Toast.LENGTH_LONG).show();
            }
        });
    }
    public boolean onCreateOptionsMenu(Menu menu) {
// Inflate the menu; this adds items to the action bar if it is present.
        getMenuInflater().inflate(R.menu.activity_main, menu);
        return true;
    }
}
```

AndroidManifest.xml

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

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

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

</manifest>
```


10:26
Mobile No:
9876543210
Message:
Hello World
SEND SMS


10:26
Mobile No:
9876543210
Message:
Hello World
SEND SMS
Message Sent successfully!