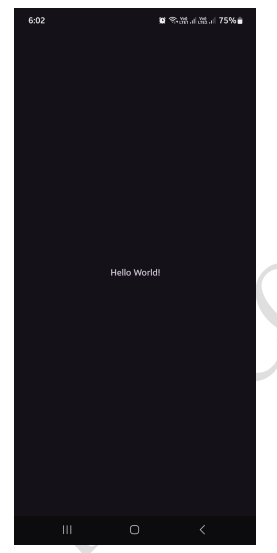
1. **Create a simple Android application to display a "Hello M S Ramaiah" message.**
2. **Design an Android application to demonstrate the use of LinearLayout, RelativeLayout, and ConstraintLayout.**
3. **Develop an app to implement UI components like Buttons, TextViews, Checkboxes, and Radio Buttons.**
4. **Implement event handling for various UI components such as clicks and toggle switches.**
5. **Create an application to demonstrate Explicit and Implicit Intents with data transfer between Activities.**
6. **Create a sample application with login module (check user name and password) on successful login change Textview “Login Successful”. On login fail alert using Toast “login fail”**
7. **Build an application to send an SMS or make a phone call using Native Actions with Intents.**
8. **Develop an application to showcase the use of Fragments and Fragment Lifecycle.**
9. Create a multi-screen application with communication between Fragments and Activities.
10. Design an application to integrate Google Maps and display the user's current location.
11. **Create an Android application to play and record audio or video using Android Media APIs.**
12. Create an app to persist data using SQLite by creating a table, inserting, updating, and deleting records.
13. **Build an application to save and retrieve data from internal and external storage.**
14. Implement Mini project based on the concept learnt in Theory
15. Create a simple Android application to display a "Hello M S Ramaiah" message.

Solution:

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:id="@+id/main"  
 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="Hello M S Ramaiah"  
 app:layout\_constraintBottom\_toBottomOf="parent"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toTopOf="parent" />  
  
</androidx.constraintlayout.widget.ConstraintLayout>

**Output:**



1. Design an Android application to demonstrate the use of LinearLayout, RelativeLayout, and ConstraintLayout.

### Solution:Project Structure:

We’ll create **three activities**:

1.MainActivity.java – LinearLayout

2. RelativeActivity.java – RelativeLayout

3. ConstraintActivity.java – ConstraintLayout

Each activity will show a basic layout example and a button to move to the next layout.

1. **MainActivity.java** – LinearLayout

activity\_main.xml

<?xml version="1.0" encoding="utf-8"?>  
<LinearLayout  
 xmlns:android="http://schemas.android.com/apk/res/android"  
 android:orientation="vertical"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
 <LinearLayout  
 android:layout\_width="match\_parent"  
 android:layout\_height="119dp"  
 android:orientation="horizontal">  
  
 <Button  
 android:id="@+id/btnFirst"  
 android:layout\_width="0dp"  
 android:layout\_height="94dp"  
 android:layout\_weight="1"  
 android:onClick="loadFirstFragment"  
 android:text="First Fragment"  
  
  
 />  
  
 <Button  
 android:id="@+id/btnSecond"  
 android:layout\_width="0dp"  
 android:layout\_height="88dp"  
 android:layout\_weight="1"  
 android:onClick="loadSecondFragment"  
 android:text="Second Fragment" />  
  
 </LinearLayout>  
  
 <FrameLayout  
 android:id="@+id/fragment\_container"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"/>  
  
</LinearLayout>

MainActivity.java

package com.example.prog2;  
import android.content.Intent;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import androidx.appcompat.app.AppCompatActivity;  
  
public class MainActivity extends AppCompatActivity {  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.activity\_main);  
  
 Button btnLinear = findViewById(R.id.button\_linear);  
 btnLinear.setOnClickListener(new View.OnClickListener() {  
 private View v;  
  
 @Override  
 public void onClick(View v) {  
 this.v = v;  
 Intent intent = new Intent(MainActivity.this, RelativeActivity.class);  
 startActivity(intent);  
 }  
 });  
 }  
}

### 2. ****RelativeActivity.java**** – RelativeLayout

#### ✅ activity\_relative.xml

<?xml version="1.0" encoding="utf-8"?>  
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:padding="16dp">  
  
 <TextView  
 android:id="@+id/relative\_text"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="This is RelativeLayout"  
 android:textSize="20sp" />  
  
 <Button  
 android:id="@+id/button\_relative"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_below="@id/relative\_text"  
 android:layout\_marginTop="20dp"  
 android:text="Go to ConstraintLayout" />  
</RelativeLayout>

**✅ RelativeActivity.java**

package com.example.prog2;  
import android.content.Intent;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import androidx.appcompat.app.AppCompatActivity;  
  
public class RelativeActivity extends AppCompatActivity {  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.activity\_relative);  
  
 Button btnRelative = findViewById(R.id.button\_relative);  
 btnRelative.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 Intent intent = new Intent(RelativeActivity.this, ConstraintActivity.class);  
 startActivity(intent);  
 }  
 });  
 }  
}

### 3. ****ConstraintActivity.java**** – ConstraintLayout

#### ✅ activity\_constraint.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"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:padding="16dp">  
  
 <TextView  
 android:id="@+id/constraint\_text"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="This is ConstraintLayout"  
 android:textSize="20sp"  
 app:layout\_constraintTop\_toTopOf="parent"  
 app:layout\_constraintLeft\_toLeftOf="parent"  
 app:layout\_constraintRight\_toRightOf="parent"  
 android:layout\_marginTop="100dp"/>  
  
 <Button  
 android:id="@+id/button\_constraint"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Back to LinearLayout"  
 app:layout\_constraintTop\_toBottomOf="@id/constraint\_text"  
 app:layout\_constraintLeft\_toLeftOf="parent"  
 app:layout\_constraintRight\_toRightOf="parent"  
 android:layout\_marginTop="20dp"/>  
</androidx.constraintlayout.widget.ConstraintLayout>

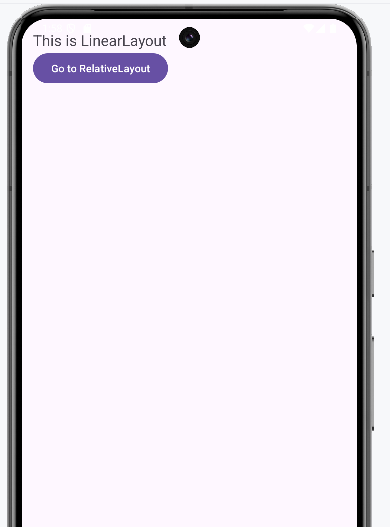
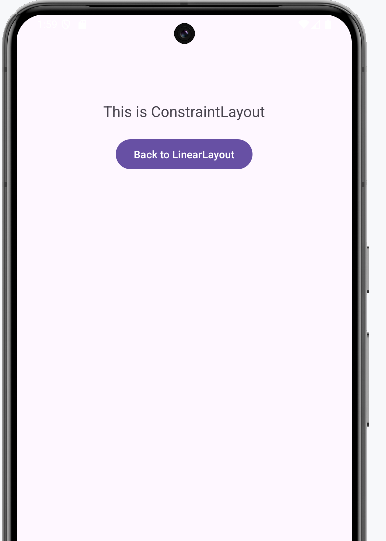
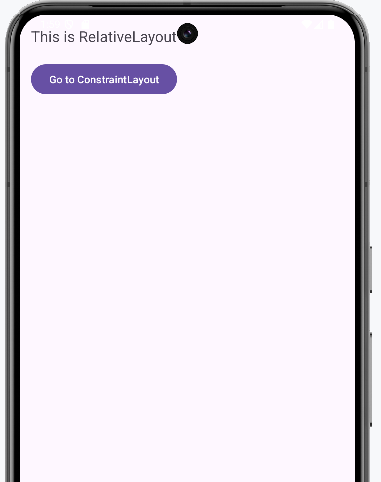
#### ✅ RelativeActivity.java

package com.example.prog2;  
import android.content.Intent;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import androidx.appcompat.app.AppCompatActivity;  
  
public class RelativeActivity extends AppCompatActivity {  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.activity\_relative);  
  
 Button btnRelative = findViewById(R.id.button\_relative);  
 btnRelative.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 Intent intent = new Intent(RelativeActivity.this, ConstraintActivity.class);  
 startActivity(intent);  
 }  
 });  
 }  
}

### ****AndroidManifest.xml:**** Make sure you register all three activities:

<?xml version="1.0" encoding="utf-8"?>  
<manifest xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:tools="http://schemas.android.com/tools">  
  
 <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.Prog2"  
 tools:targetApi="31">  
 <activity android:name=".ConstraintActivity"/>  
 <activity android:name=".RelativeActivity"/>  
 <activity  
 android:name=".MainActivity"  
 android:exported="true">  
 <intent-filter>  
 <action android:name="android.intent.action.MAIN" />  
  
 <category android:name="android.intent.category.LAUNCHER" />  
 </intent-filter>  
 </activity>  
 </application>  
  
</manifest>

Output:

**3. Develop an app to implement UI components like Buttons, TextViews, Checkboxes, and Radio Buttons.**

**Solution:**

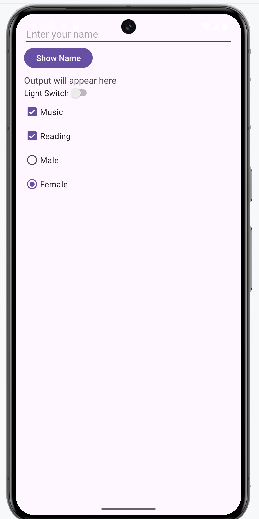
**MainActivity.Java**

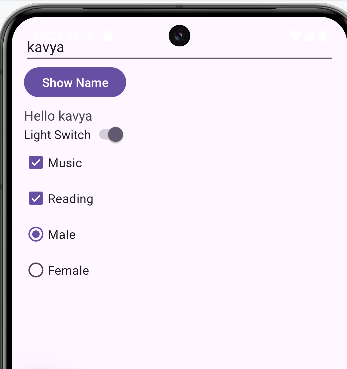
package com.example.prog4;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.\*;  
import androidx.appcompat.app.AppCompatActivity;  
  
public class MainActivity extends AppCompatActivity {  
  
 EditText etName;  
 Button btnShow;  
 TextView tvOutput;  
 Switch switchLight;  
 CheckBox cbMusic, cbReading;  
 RadioGroup rgGender;  
 RadioButton rbMale, rbFemale;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.activity\_main);  
  
 // Initialize UI components  
 etName = findViewById(R.id.etName);  
 btnShow = findViewById(R.id.btnShow);  
 tvOutput = findViewById(R.id.tvOutput);  
 switchLight = findViewById(R.id.switchLight);  
 cbMusic = findViewById(R.id.cbMusic);  
 cbReading = findViewById(R.id.cbReading);  
 rgGender = findViewById(R.id.rgGender);  
 rbMale = findViewById(R.id.rbMale);  
 rbFemale = findViewById(R.id.rbFemale);  
  
 // Handle Button click  
 btnShow.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View view) {  
 String name = etName.getText().toString();  
 tvOutput.setText("Hello " + name);  
 }  
 });  
  
 // Handle Switch toggle  
 switchLight.setOnCheckedChangeListener((compoundButton, isChecked) -> {  
 if (isChecked) {  
 Toast.makeText(this, "Light is ON", Toast.LENGTH\_SHORT).show();  
 } else {  
 Toast.makeText(this, "Light is OFF", Toast.LENGTH\_SHORT).show();  
 }  
 });  
  
 // Handle CheckBox events  
 cbMusic.setOnCheckedChangeListener((buttonView, isChecked) -> {  
 if (isChecked) {  
 Toast.makeText(this, "You like Music", Toast.LENGTH\_SHORT).show();  
 }  
 });  
  
 cbReading.setOnCheckedChangeListener((buttonView, isChecked) -> {  
 if (isChecked) {  
 Toast.makeText(this, "You like Reading", Toast.LENGTH\_SHORT).show();  
 }  
 });  
  
 // Handle RadioGroup (Gender) selection  
 rgGender.setOnCheckedChangeListener((group, checkedId) -> {  
 RadioButton selected = findViewById(checkedId);  
 Toast.makeText(this, "Gender: " + selected.getText(), Toast.LENGTH\_SHORT).show();  
 });  
 }  
}

**activity\_main.xml**

<?xml version="1.0" encoding="utf-8"?>  
<LinearLayout  
 xmlns:android="http://schemas.android.com/apk/res/android"  
 android:orientation="vertical"  
 android:padding="16dp"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
 <EditText  
 android:id="@+id/etName"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:hint="Enter your name" />  
  
 <Button  
 android:id="@+id/btnShow"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Show Name" />  
  
 <TextView  
 android:id="@+id/tvOutput"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Output will appear here"  
 android:textSize="16sp"  
 android:paddingTop="8dp" />  
  
 <Switch  
 android:id="@+id/switchLight"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Light Switch" />  
  
 <CheckBox  
 android:id="@+id/cbMusic"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Music" />  
  
 <CheckBox  
 android:id="@+id/cbReading"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Reading" />  
  
 <RadioGroup  
 android:id="@+id/rgGender"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content">  
  
 <RadioButton  
 android:id="@+id/rbMale"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Male" />  
  
 <RadioButton  
 android:id="@+id/rbFemale"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Female" />  
 </RadioGroup>  
  
</LinearLayout>

Output:





**4.Implement event handling for various UI components such as clicks and toggle switches.**

Solution:

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">  
  
 <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.Pro3"  
 tools:targetApi="31">  
 <activity  
 android:name=".MainActivity"  
 android:exported="true">  
 <intent-filter>  
 <action android:name="android.intent.action.MAIN" />  
  
 <category android:name="android.intent.category.LAUNCHER" />  
 </intent-filter>  
 </activity>  
 </application>  
  
</manifest>

**mainActivity.java**

package com.example.pro3;  
import android.os.Bundle;  
import androidx.appcompat.app.AppCompatActivity;  
import android.view.View;  
import android.widget.\*;  
  
  
public class MainActivity extends AppCompatActivity {  
  
 TextView tvResult;  
 RadioGroup rgGender;  
 RadioButton rbMale, rbFemale;  
 CheckBox cbJava, cbPython, cbAndroid;  
 Button btnSubmit;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.activity\_main);  
  
 tvResult = findViewById(R.id.tvResult);  
 rgGender = findViewById(R.id.rgGender);  
 rbMale = findViewById(R.id.rbMale);  
 rbFemale = findViewById(R.id.rbFemale);  
  
 cbJava = findViewById(R.id.cbJava);  
 cbPython = findViewById(R.id.cbPython);  
 cbAndroid = findViewById(R.id.cbAndroid);  
  
 btnSubmit = findViewById(R.id.btnSubmit);  
  
 btnSubmit.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
  
 StringBuilder result = new StringBuilder("You selected:\n");  
  
 // Gender  
 int selectedId = rgGender.getCheckedRadioButtonId();  
 if (selectedId != -1) {  
 RadioButton selectedRadio = findViewById(selectedId);  
 result.append("Gender: ").append(selectedRadio.getText()).append("\n");  
 }  
  
 // Skills  
 result.append("Skills: ");  
 if (cbJava.isChecked()) result.append("Java ");  
 if (cbPython.isChecked()) result.append("Python ");  
 if (cbAndroid.isChecked()) result.append("Android ");  
  
 tvResult.setText(result.toString());  
 }  
 });  
 }  
}

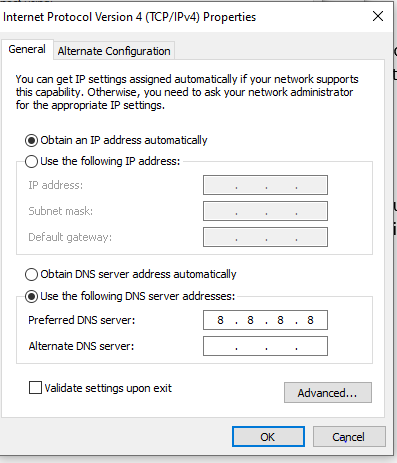
activity\_main.xml

<?xml version="1.0" encoding="utf-8"?>  
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:orientation="vertical">  
  
  
 <!-- TextView -->  
 <TextView  
 android:id="@+id/tvResult"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:paddingBottom="10dp"  
 android:text="Your Selection:"  
 android:textAlignment="center"  
 android:textSize="18sp" />  
  
 <!-- RadioGroup for Gender -->  
 <RadioGroup  
 android:id="@+id/rgGender"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content">  
  
 <RadioButton  
 android:id="@+id/rbMale"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Male"/>  
  
 <RadioButton  
 android:id="@+id/rbFemale"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Female"/>  
 </RadioGroup>  
  
 <!-- CheckBoxes for Skills -->  
 <CheckBox  
 android:id="@+id/cbJava"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Java"/>  
  
 <CheckBox  
 android:id="@+id/cbPython"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Python"/>  
  
 <CheckBox  
 android:id="@+id/cbAndroid"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Android"/>  
  
 <!-- Button -->  
 <Button  
 android:id="@+id/btnSubmit"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Submit"  
 android:layout\_marginTop="16dp"/>  
</LinearLayout>

**5.**Create an application to demonstrate Explicit and Implicit Intents with data transfer between Activities.

/\* Explicit Intent: This involves navigating from one activity to another within the same application. Implicit Intent: This involves triggering an action that can be handled by another application. \*/

NOTE:.Goto device manager->select the emulator and wipe out data) and set DNS server IP as 8.8.8.8



**Mainactivity.java**

package com.example.program4;

import android.content.Intent;

import android.net.Uri;

import android.os.Bundle;

import android.view.View;

import androidx.activity.EdgeToEdge;

import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

EdgeToEdge.enable(this);

setContentView(R.layout.activity\_main);

}

public void onImplicitButtonClicked(View view)

{

Uri url=Uri.parse("https://www.google.com");

Intent i=new Intent(Intent.ACTION\_VIEW, url);

startActivity(i);

}

public void onExplicitButtonClicked(View view )

{

Intent i=new Intent(MainActivity.this, SecondActivity.class);

startActivity(i);

}

}

**SecondActivity.java**

package com.example.program4;

import android.os.Bundle;

import android.widget.Button;

import androidx.appcompat.app.AppCompatActivity;

public class SecondActivity extends AppCompatActivity {

Button btnImplicitContent;

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.activity\_second);

}

}

**Activity\_main.xml**

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

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

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

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

android:id="@+id/main"

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

android:gravity="center"

tools:context=".MainActivity">

<Button

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:text="@string/implicit\_intent"

android:onClick="onImplicitButtonClicked"

style="?android:attr/buttonBarButtonStyle" />

<Button

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:text="@string/explicit\_intent"

android:onClick="onExplicitButtonClicked"

style="?android:attr/buttonBarButtonStyle" />

</LinearLayout>

**Activity\_second.xml**

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

<androidx.constraintlayout.widget.ConstraintLayout

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

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

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

android:id="@+id/main"

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

tools:context=".SecondActivity">

<TextView

android:id="@+id/textView"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:text="@string/welcome\_to\_explicit\_intent"

android:textSize="28sp"

app:layout\_constraintBottom\_toBottomOf="parent"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toTopOf="parent" />

</androidx.constraintlayout.widget.ConstraintLayout>

**Manifest file**

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

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

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

<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.PRogram4"

tools:targetApi="31">

<activity

android:name=".SecondActivity"

android:exported="false">

</activity>

<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>

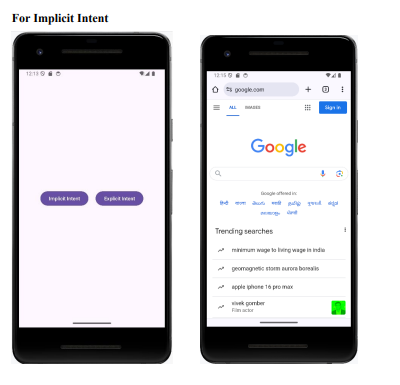
</activity>

</application>

</manifest>

**Output**:

On click of implicit intent button appears below screen



On click of Explicit intent button appears below screen



1. **Create a sample application with login module (check user name and password) on successful login change Textview “Login Successful”. On login fail alert using Toast “login fail”**
2. **XML Layout (activity\_main.xml)**

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

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

android:orientation="vertical"

android:padding="20dp"

android:layout\_width="match\_parent"

android:layout\_height="match\_parent">

<EditText

android:id="@+id/etUsername"

android:hint="Username"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content" />

<EditText

android:id="@+id/etPassword"

android:hint="Password"

android:inputType="textPassword"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:layout\_marginTop="10dp" />

<Button

android:id="@+id/btnLogin"

android:text="Login"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginTop="20dp" />

<TextView

android:id="@+id/tvStatus"

android:text=""

android:textSize="18sp"

android:textColor="#008000"

android:layout\_marginTop="30dp"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content" />

</LinearLayout>

1. **Java Code (MainActivity.java)**

public class MainActivity extends AppCompatActivity {

EditText etUsername, etPassword;

Button btnLogin;

TextView tvStatus;

final String validUsername = "admin";

final String validPassword = "1234";

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.activity\_main);

etUsername = findViewById(R.id.etUsername);

etPassword = findViewById(R.id.etPassword);

btnLogin = findViewById(R.id.btnLogin);

tvStatus = findViewById(R.id.tvStatus);

btnLogin.setOnClickListener(v -> {

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

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

if (username.equals(validUsername) && password.equals(validPassword)) {

tvStatus.setText("Login Successful");

Toast.makeText(this, "Welcome " + username, Toast.LENGTH\_SHORT).show();

} else {

Toast.makeText(this, "Login Failed", Toast.LENGTH\_SHORT).show();

tvStatus.setText("");

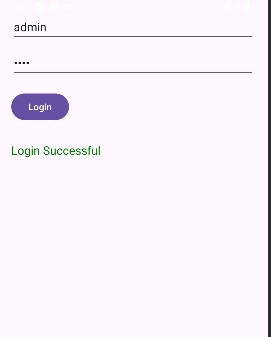
}

});

}

}

Output:



#### 7.Build an application to send an SMS or make a phone call using Native Actions with Intents.

Solution:

**Mainactivity.java**

package com.example.sms;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import androidx.core.app.ActivityCompat;

import androidx.core.content.ContextCompat;

import android.content.BroadcastReceiver;

import android.content.Context;

import android.content.Intent;

import android.content.IntentFilter;

import android.content.pm.PackageManager;

import android.telephony.SmsManager;

import android.telephony.SmsMessage;

import android.view.View;

import android.widget.EditText;

import android.widget.TextView;

import android.widget.Toast;

import android.Manifest;

public class MainActivity extends AppCompatActivity {

private static final int SMS\_PERMISSION\_CODE = 101;

private EditText editTextPhoneNumber;

private EditText editTextMessage;

private TextView textViewReceivedMessages;

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.activity\_main);

editTextPhoneNumber = findViewById(R.id.editTextPhoneNumber);

editTextMessage = findViewById(R.id.editTextMessage);

textViewReceivedMessages = findViewById(R.id.textViewReceivedMessages);

// Request SMS permissions if not granted

if (!checkSMSPermission()) {

requestSMSPermission();

}

// Register SMS receiver

IntentFilter intentFilter = new IntentFilter();

intentFilter.addAction("android.provider.Telephony.SMS\_RECEIVED");

registerReceiver(smsReceiver, intentFilter);

}

@Override

protected void onDestroy() {

super.onDestroy();

unregisterReceiver(smsReceiver);

}

// Button click listener for sending SMS

public void sendMessage(View view) {

String phoneNumber =

editTextPhoneNumber.getText().toString().trim();

String message = editTextMessage.getText().toString();

if (phoneNumber.isEmpty()) {

Toast.makeText(this, "Please enter a valid phone number",

Toast.LENGTH\_SHORT).show();

return;

}

try {

SmsManager smsManager = SmsManager.getDefault();

smsManager.sendTextMessage(phoneNumber, null, message, null, null);

Toast.makeText(this, "Message sent", Toast.LENGTH\_SHORT).show();

} catch (IllegalArgumentException e) {

Toast.makeText(this, "Invalid phone number format",

Toast.LENGTH\_SHORT).show();

} catch (Exception e) {

Toast.makeText(this, "Failed to send message",

Toast.LENGTH\_SHORT).show();

e.printStackTrace();

}

}

// Check if SMS permission is granted

private boolean checkSMSPermission() {

return ContextCompat.checkSelfPermission(this,

Manifest.permission.SEND\_SMS) == PackageManager.PERMISSION\_GRANTED;

}

// Request SMS permission

private void requestSMSPermission() {

ActivityCompat.requestPermissions(this, new

String[]{Manifest.permission.SEND\_SMS}, SMS\_PERMISSION\_CODE);

}

// SMS receiver

private final BroadcastReceiver smsReceiver = new BroadcastReceiver() {

@Override

public void onReceive(Context context, Intent intent) {

Bundle bundle = intent.getExtras();

if (bundle != null) {

Object[] pdus = (Object[]) bundle.get("pdus");

if (pdus != null) {

for (Object pdu : pdus) {

SmsMessage smsMessage = SmsMessage.createFromPdu((byte[]) pdu);

String senderPhoneNumber = smsMessage.getDisplayOriginatingAddress();

String messageBody = smsMessage.getMessageBody();

textViewReceivedMessages.append("From: " +

senderPhoneNumber + "\n");

textViewReceivedMessages.append("Message: " +

messageBody + "\n\n");

}

}

}

}

};

}

**Activity\_main.xml**

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

<RelativeLayout

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

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

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

android:background="@color/white"

tools:context=".MainActivity">

<EditText

android:id="@+id/editTextPhoneNumber"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:layout\_marginStart="16dp"

android:layout\_marginTop="16dp"

android:layout\_marginEnd="16dp"

android:layout\_marginBottom="16dp"

android:autofillHints="Enter phone number"

android:hint="Enter phone number"

android:inputType="phone" />

<EditText

android:id="@+id/editTextMessage"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:layout\_below="@id/editTextPhoneNumber"

android:layout\_marginStart="16dp"

android:layout\_marginTop="16dp"

android:layout\_marginEnd="16dp"

android:layout\_marginBottom="16dp"

android:autofillHints="Enter Message"

android:hint="Enter Message" />

<Button

android:id="@+id/buttonSend"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:text="Send"

android:layout\_below="@id/editTextMessage"

android:layout\_alignParentEnd="true"

android:layout\_marginEnd="16dp"

android:onClick="sendMessage"

tools:ignore="HardcodedText,UsingOnClickInXml" />

<TextView

android:id="@+id/textViewReceivedMessages"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:layout\_below="@id/buttonSend"

android:layout\_marginStart="16dp"

android:layout\_marginTop="16dp"

android:layout\_marginEnd="16dp"

android:layout\_marginBottom="16dp"

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

</RelativeLayout>

AndroidManifest.xml File

<?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"/>

<uses-permission android:name="android.permission.RECEIVE\_SMS"/>

<uses-permission android:name="android.permission.READ\_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.SMS"

tools:targetApi="31">

<activity

android:name=".MainActivity"

android:exported="true">

<intent-filter>

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

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

</intent-filter>

</activity>

</application>

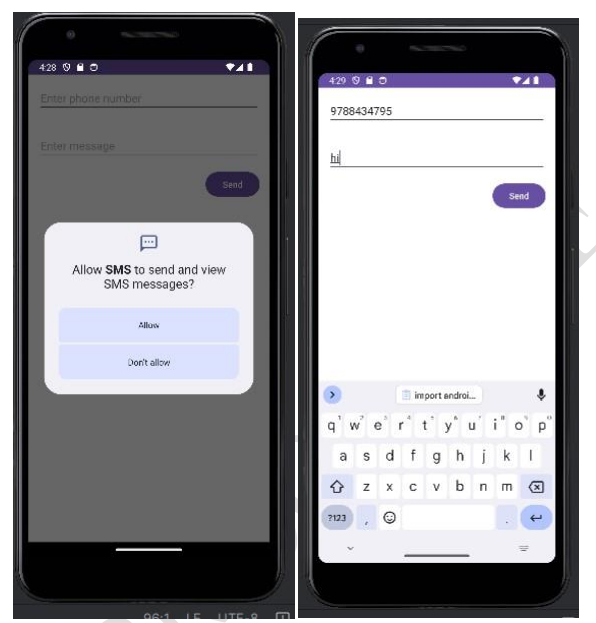
</manifest>

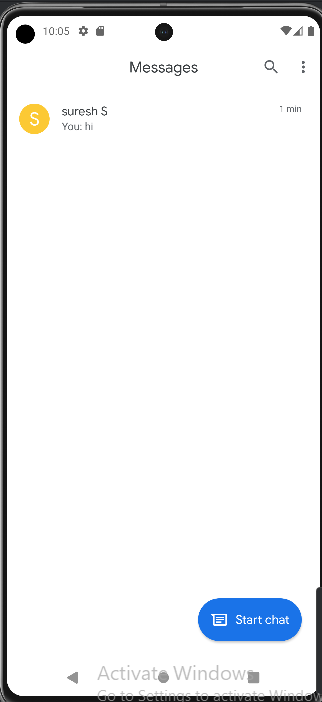
**Output:**

1.Goto Emulator Contact -> Store some contacts

2. Send sms to those contacts

3. Goto message in emulator and check sms





Program 14

9.Create a multi-screen application with communication between Fragments and Activities.

**Solution:**

The app has:

* **Fragment A** with an EditText and Button.
* When the Button is clicked, the entered text is sent to **MainActivity**.
* MainActivity receives the data and passes it to **Fragment B** to display it.

**Project Structure**

* MainActivity.java
* SenderFragment.java (Fragment A)
* ReceiverFragment.java (Fragment B)
* XML Layouts for each

**Key Concepts Demonstrated:**

| **Concept** | **Use** |
| --- | --- |
| **Fragments** | Modular screens inside activity |
| **Interface Callback** | To communicate Fragment → Activity |
| **Activity Logic** | Transfers data between fragments |

MainActivity.Java

package com.example.fra;

import android.os.Bundle;

import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity implements SenderFragment.OnDataPass {

ReceiverFragment receiverFragment;

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.activity\_main);

// Add SenderFragment

getSupportFragmentManager().beginTransaction()

.replace(R.id.fragmentContainerA, new SenderFragment())

.commit();

// Add ReceiverFragment

receiverFragment = new ReceiverFragment();

getSupportFragmentManager().beginTransaction()

.replace(R.id.fragmentContainerB, receiverFragment)

.commit();

}

// Interface method called from SenderFragment

@Override

public void onDataPass(String data) {

receiverFragment.updateText(data);

}

}

**ReceiverFragment.java**

package com.example.fra;

import android.os.Bundle;

import android.view.LayoutInflater;

import android.view.View;

import android.view.ViewGroup;

import android.widget.\*;

import androidx.annotation.NonNull;

import androidx.annotation.Nullable;

import androidx.fragment.app.Fragment;

public class ReceiverFragment extends Fragment {

TextView textView;

@Nullable

@Override

public View onCreateView(@NonNull LayoutInflater inflater,

@Nullable ViewGroup container,

@Nullable Bundle savedInstanceState) {

View view = inflater.inflate(R.layout.fragment\_receiver, container, false);

textView = view.findViewById(R.id.tvResult);

return view;

}

public void updateText(String data) {

if (textView != null) {

textView.setText(data);

}

}

}

**SenderFragment.Java**

package com.example.fra;

import android.content.Context;

import android.os.Bundle;

import android.view.LayoutInflater;

import android.view.View;

import android.view.ViewGroup;

import android.widget.\*;

import androidx.annotation.NonNull;

import androidx.annotation.Nullable;

import androidx.fragment.app.Fragment;

public class SenderFragment extends Fragment {

EditText editText;

Button button;

OnDataPass dataPasser;

public interface OnDataPass {

void onDataPass(String data);

}

@Override

public void onAttach(@NonNull Context context) {

super.onAttach(context);

dataPasser = (OnDataPass) context;

}

@Nullable

@Override

public View onCreateView(@NonNull LayoutInflater inflater,

@Nullable ViewGroup container,

@Nullable Bundle savedInstanceState) {

View view = inflater.inflate(R.layout.fragment\_sender, container, false);

editText = view.findViewById(R.id.etInput);

button = view.findViewById(R.id.btnSend);

button.setOnClickListener(v -> {

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

dataPasser.onDataPass(text);

});

return view;

}

}

**activity\_main.xml**

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

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

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

android:orientation="horizontal">

<FrameLayout

android:id="@+id/fragmentContainerA"

android:layout\_width="0dp"

android:layout\_weight="1"

android:layout\_height="match\_parent"/>

<FrameLayout

android:id="@+id/fragmentContainerB"

android:layout\_width="0dp"

android:layout\_weight="1"

android:layout\_height="match\_parent"/>

</LinearLayout>

**fragment\_receiver.xml**

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

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

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

android:padding="16dp">

<TextView

android:id="@+id/tvResult"

android:text="Waiting for data..."

android:layout\_gravity="center"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:textSize="18sp"/>

</FrameLayout>

**fragment\_sender.xml**

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

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

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

android:orientation="vertical"

android:padding="16dp">

<EditText

android:id="@+id/etInput"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:hint="Enter something" />

<Button

android:id="@+id/btnSend"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:text="Send to Fragment B" />

</LinearLayout>

10.Create an Android application to play and record audio or video using Android Media APIs. a activity with one record, stop and play button

Here is a **simple Android app** that allows you to **record, stop, and play audio** using Android’s Media APIs. This example is written in **Java** and includes:

* Record button to start recording audio.
* Stop button to stop recording or playing.
* Play button to play the recorded audio.

### AndroidManifest.xml (Step 1: ****Permissions )****

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

package="com.example.audiorecorder">

<uses-permission android:name="android.permission.RECORD\_AUDIO"/>

<uses-permission android:name="android.permission.WRITE\_EXTERNAL\_STORAGE"/>

<uses-permission android:name="android.permission.READ\_EXTERNAL\_STORAGE"/>

<application

android:allowBackup="true"

android:label="Audio Recorder"

android:supportsRtl="true"

android:theme="@style/Theme.AppCompat.Light.DarkActionBar">

<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

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

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

android:orientation="vertical"

android:gravity="center"

android:padding="20dp">

<Button

android:id="@+id/btnRecord"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:text="Record"/>

<Button

android:id="@+id/btnStop"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:text="Stop"/>

<Button

android:id="@+id/btnPlay"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:text="Play"/>

</LinearLayout>

MainActivity.java

package com.example.audiorecorder;

import android.Manifest;

import android.media.MediaPlayer;

import android.media.MediaRecorder;

import android.os.Bundle;

import android.os.Environment;

import android.view.View;

import android.widget.Button;

import android.widget.Toast;

import androidx.appcompat.app.AppCompatActivity;

import androidx.core.app.ActivityCompat;

import java.io.IOException;

public class MainActivity extends AppCompatActivity {

private Button btnRecord, btnStop, btnPlay;

private MediaRecorder mediaRecorder;

private MediaPlayer mediaPlayer;

private String audioFilePath;

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.activity\_main);

// Request permissions

ActivityCompat.requestPermissions(this,

new String[]{Manifest.permission.RECORD\_AUDIO,

Manifest.permission.WRITE\_EXTERNAL\_STORAGE,

Manifest.permission.READ\_EXTERNAL\_STORAGE},

1);

btnRecord = findViewById(R.id.btnRecord);

btnStop = findViewById(R.id.btnStop);

btnPlay = findViewById(R.id.btnPlay);

audioFilePath = getExternalFilesDir(Environment.DIRECTORY\_MUSIC).getAbsolutePath() + "/recording.3gp";

btnRecord.setOnClickListener(v -> {

startRecording();

});

btnStop.setOnClickListener(v -> {

stopRecordingOrPlayback();

});

btnPlay.setOnClickListener(v -> {

startPlaying();

});

}

private void startRecording() {

mediaRecorder = new MediaRecorder();

mediaRecorder.setAudioSource(MediaRecorder.AudioSource.MIC);

mediaRecorder.setOutputFormat(MediaRecorder.OutputFormat.THREE\_GPP);

mediaRecorder.setOutputFile(audioFilePath);

mediaRecorder.setAudioEncoder(MediaRecorder.AudioEncoder.AMR\_NB);

try {

mediaRecorder.prepare();

mediaRecorder.start();

Toast.makeText(this, "Recording started...", Toast.LENGTH\_SHORT).show();

} catch (IOException e) {

e.printStackTrace();

}

}

private void stopRecordingOrPlayback() {

if (mediaRecorder != null) {

mediaRecorder.stop();

mediaRecorder.release();

mediaRecorder = null;

Toast.makeText(this, "Recording stopped", Toast.LENGTH\_SHORT).show();

}

if (mediaPlayer != null && mediaPlayer.isPlaying()) {

mediaPlayer.stop();

mediaPlayer.release();

mediaPlayer = null;

Toast.makeText(this, "Playback stopped", Toast.LENGTH\_SHORT).show();

}

}

private void startPlaying() {

mediaPlayer = new MediaPlayer();

try {

mediaPlayer.setDataSource(audioFilePath);

mediaPlayer.prepare();

mediaPlayer.start();

Toast.makeText(this, "Playing audio...", Toast.LENGTH\_SHORT).show();

} catch (IOException e) {

e.printStackTrace();

}

}

}

**8.Develop an application to showcase the use of Fragments and Fragment Lifecycle.**

**Solution:**

### 🧱 Project Structure

app/

├── java/

│ └── com.example.fragmentdemo/

│ ├── MainActivity.java

│ ├── FirstFragment.java

│ └── SecondFragment.java

├── res/

│ └── layout/

│ ├── activity\_main.xml

│ ├── fragment\_first.xml

│ └── fragment\_second.xml

### 1. MainActivity.java

package com.example.fragmentdemo;

import android.os.Bundle;  
  
import androidx.appcompat.app.AppCompatActivity;  
  
import androidx.fragment.app.Fragment;  
import androidx.fragment.app.FragmentManager;  
import androidx.fragment.app.FragmentTransaction;  
  
import android.view.View;  
import android.widget.Button;  
  
public class MainActivity extends AppCompatActivity {  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.*activity\_main*);  
  
 *// Load the default fragment* loadFragment(new FirstFragment());  
 }  
  
 *// Called by android:onClick="loadFirstFragment"* public void loadFirstFragment(View view) {  
 loadFragment(new FirstFragment());  
 }  
  
 *// Called by android:onClick="loadSecondFragment"* public void loadSecondFragment(View view) {  
 loadFragment(new SecondFragment());  
 }  
  
 private void loadFragment(Fragment fragment) {  
 FragmentManager fm = getSupportFragmentManager();  
 FragmentTransaction ft = fm.beginTransaction();  
 ft.replace(R.id.*fragment\_container*, fragment);  
 ft.commit();  
 }  
 }

### FirstFragment.java

package com.example.fragmentdemo;

import android.os.Bundle;

import android.util.Log;

import androidx.fragment.app.Fragment;

import android.view.LayoutInflater;

import android.view.View;

import android.view.ViewGroup;

public class FirstFragment extends Fragment {

public FirstFragment() {}

@Override

public void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

Log.d("FragmentLifecycle", "FirstFragment - onCreate");

}

@Override

public View onCreateView(LayoutInflater inflater, ViewGroup container,

Bundle savedInstanceState) {

Log.d("FragmentLifecycle", "FirstFragment - onCreateView");

return inflater.inflate(R.layout.fragment\_first, container, false);

}

@Override

public void onStart() {

super.onStart();

Log.d("FragmentLifecycle", "FirstFragment - onStart");

}

@Override

public void onResume() {

super.onResume();

Log.d("FragmentLifecycle", "FirstFragment - onResume");

}

@Override

public void onPause() {

super.onPause();

Log.d("FragmentLifecycle", "FirstFragment - onPause");

}

@Override

public void onStop() {

super.onStop();

Log.d("FragmentLifecycle", "FirstFragment - onStop");

}

@Override

public void onDestroyView() {

super.onDestroyView();

Log.d("FragmentLifecycle", "FirstFragment - onDestroyView");

}

@Override

public void onDestroy() {

super.onDestroy();

Log.d("FragmentLifecycle", "FirstFragment - onDestroy");

}

}

### SecondFragment.java

package com.example.fragmentdemo;

import android.os.Bundle;

import android.util.Log;

import androidx.fragment.app.Fragment;

import android.view.LayoutInflater;

import android.view.View;

import android.view.ViewGroup;

public class SecondFragment extends Fragment {

public SecondFragment() {}

@Override

public View onCreateView(LayoutInflater inflater, ViewGroup container,

Bundle savedInstanceState) {

Log.d("FragmentLifecycle", "SecondFragment - onCreateView");

return inflater.inflate(R.layout.fragment\_second, container, false);

}

}

### activity\_main.xml

<LinearLayout  
 xmlns:android="http://schemas.android.com/apk/res/android"  
 android:orientation="vertical"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
 <LinearLayout  
 android:layout\_width="match\_parent"  
 android:layout\_height="119dp"  
 android:orientation="horizontal">  
  
 <Button  
 android:id="@+id/btnFirst"  
 android:layout\_width="0dp"  
 android:layout\_height="94dp"  
 android:layout\_weight="1"  
 android:onClick="loadFirstFragment"  
 android:text="First Fragment"  
  
  
 />  
  
 <Button  
 android:id="@+id/btnSecond"  
 android:layout\_width="0dp"  
 android:layout\_height="88dp"  
 android:layout\_weight="1"  
 android:onClick="loadSecondFragment"  
 android:text="Second Fragment" />  
  
 </LinearLayout>  
  
 <FrameLayout  
 android:id="@+id/fragment\_container"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"/>  
  
</LinearLayout>

### fragment\_first.xml

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

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

android:background="#C8E6C9"

android:layout\_width="match\_parent"

android:layout\_height="match\_parent">

<TextView

android:text="This is First Fragment"

android:textSize="20sp"

android:layout\_gravity="center"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"/>

</FrameLayout>

### fragment\_second.xml

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

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

android:background="#FFCDD2"

android:layout\_width="match\_parent"

android:layout\_height="match\_parent">

<TextView

android:text="This is Second Fragment"

android:textSize="20sp"

android:layout\_gravity="center"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"/>

</FrameLayout>

## 📲 Output

* App starts with **FirstFragment**
* User can switch between First and Second Fragments using buttons
* **Logcat** will show lifecycle callbacks like onCreateView, onStart, onStop etc.

## Fragment Lifecycle :

| **Method** | **Description** |
| --- | --- |
| onAttach() | Fragment is attached to activity |
| onCreate() | Initialize fragment |
| onCreateView() | Create UI for fragment |
| onStart() | Fragment becomes visible |
| onResume() | Fragment is interacting with user |
| onPause() | Fragment is partially hidden |
| onStop() | Fragment no longer visible |
| onDestroyView() | Remove UI elements |
| onDestroy() | Final cleanup |
| onDetach() | Fragment is detached from activity |



1. Build an application to save and retrieve data from internal and external storage.

Solution:

**Save and retrieve data using:**

**Internal Storage**: Private to your app.

**External Storage**: Shared/public (e.g., Downloads folder).

## Prerequisites:

Android Studio

Target SDK >= 29

Permissions for external storage (handled for Android 10+ using MediaStore or SAF)

## File Structure:

MainActivity.java

activity\_main.xml

**AndroidManifest.xml**

*<?*xml version="1.0" encoding="utf-8"*?>*<manifest xmlns:android="http://schemas.android.com/apk/res/android" package="com.example.storageapp">  
  
 <uses-permission android:name="android.permission.READ\_EXTERNAL\_STORAGE"  
 android:maxSdkVersion="32" />  
 <uses-permission android:name="android.permission.WRITE\_EXTERNAL\_STORAGE"  
 android:maxSdkVersion="28"/> *<!-- Needed only up to Android 9 -->* <application  
 android:allowBackup="true"  
 android:label="StorageApp"  
 android:supportsRtl="true"  
 android:theme="@style/Theme.StorageApp">  
 <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>

#### ****Define**** Theme.StorageApp ****in**** themes.xml

If you want to keep a custom theme, define it in:

res/values/themes.xml:

<resources xmlns:tools="http://schemas.android.com/tools">  
 <style name="Theme.StorageApp" parent="Theme.AppCompat.Light.DarkActionBar">  
 <!-- Customize your theme  
 <item name="colorPrimary">@color/purple\_500</item>  
 <item name="colorPrimaryDark">@color/purple\_700</item>  
 <item name="colorAccent">@color/teal\_200</item>here -->  
 </style>  
</resources>

**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">  
  
 <EditText  
 android:id="@+id/editTextData"  
 android:layout\_width="360dp"  
 android:layout\_height="70dp"  
 android:layout\_marginStart="24dp"  
 android:layout\_marginTop="144dp"  
 android:layout\_marginEnd="24dp"  
 android:hint="Enter data to save"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toTopOf="parent" />  
  
 <Button  
 android:id="@+id/btnSaveInternal"  
 android:layout\_width="match\_parent"  
 android:layout\_height="40dp"  
 android:layout\_marginTop="64dp"  
 android:text="Save to Internal"  
 app:layout\_constraintTop\_toBottomOf="@+id/editTextData"  
 tools:layout\_editor\_absoluteX="0dp" />  
  
 <Button  
 android:id="@+id/btnLoadInternal"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginStart="16dp"  
 android:layout\_marginTop="28dp"  
 android:layout\_marginEnd="16dp"  
 android:text="Load from Internal"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@+id/btnSaveInternal" />  
  
 <Button  
 android:id="@+id/btnSaveExternal"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginTop="24dp"  
 android:text="Save to External"  
 app:layout\_constraintTop\_toBottomOf="@+id/btnLoadInternal"  
 tools:layout\_editor\_absoluteX="0dp" />  
  
 <Button  
 android:id="@+id/btnLoadExternal"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginStart="16dp"  
 android:layout\_marginTop="48dp"  
 android:layout\_marginEnd="16dp"  
 android:text="Load from External"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@+id/btnSaveExternal" />  
  
 <TextView  
 android:id="@+id/textViewOutput"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginStart="16dp"  
 android:layout\_marginTop="16dp"  
 android:layout\_marginEnd="16dp"  
 android:paddingTop="16dp"  
 android:text="Output will be shown here"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@+id/btnLoadExternal" />  
</androidx.constraintlayout.widget.ConstraintLayout>

**MainActivity.java**

package com.example.storageapp;  
import android.os.Bundle;  
import androidx.appcompat.app.AppCompatActivity;  
import android.os.Environment;  
import android.widget.\*;  
import java.io.\*;  
  
public class MainActivity extends AppCompatActivity {  
  
 EditText editTextData;  
 TextView textViewOutput;  
  
 final String internalFile = "internal\_data.txt";  
 final String externalFile = "external\_data.txt";  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.activity\_main);  
  
 editTextData = findViewById(R.id.editTextData);  
 textViewOutput = findViewById(R.id.textViewOutput);  
  
 findViewById(R.id.btnSaveInternal).setOnClickListener(view -> saveToInternal());  
 findViewById(R.id.btnLoadInternal).setOnClickListener(view -> loadFromInternal());  
 findViewById(R.id.btnSaveExternal).setOnClickListener(view -> saveToExternal());  
 findViewById(R.id.btnLoadExternal).setOnClickListener(view -> loadFromExternal());  
 }  
  
 private void saveToInternal() {  
 String data = editTextData.getText().toString();  
 try {  
 FileOutputStream fos = openFileOutput(internalFile, MODE\_PRIVATE);  
 fos.write(data.getBytes());  
 fos.close();  
 showToast("Saved to internal storage");  
 } catch (Exception e) {  
 e.printStackTrace();  
 }  
 }  
  
 private void loadFromInternal() {  
 try {  
 FileInputStream fis = openFileInput(internalFile);  
 BufferedReader reader = new BufferedReader(new InputStreamReader(fis));  
 StringBuilder sb = new StringBuilder();  
 String line;  
 while((line = reader.readLine()) != null){  
 sb.append(line).append("\n");  
 }  
 textViewOutput.setText(sb.toString());  
 reader.close();  
 } catch (Exception e) {  
 e.printStackTrace();  
 }  
 }  
  
 private void saveToExternal() {  
 if (isExternalStorageWritable()) {  
 File file = new File(getExternalFilesDir(null), externalFile);  
 try {  
 FileOutputStream fos = new FileOutputStream(file);  
 fos.write(editTextData.getText().toString().getBytes());  
 fos.close();  
 showToast("Saved to external storage");  
 } catch (Exception e) {  
 e.printStackTrace();  
 }  
 }  
 }  
  
 private void loadFromExternal() {  
 File file = new File(getExternalFilesDir(null), externalFile);  
 try {  
 FileInputStream fis = new FileInputStream(file);  
 BufferedReader reader = new BufferedReader(new InputStreamReader(fis));  
 StringBuilder sb = new StringBuilder();  
 String line;  
 while((line = reader.readLine()) != null){  
 sb.append(line).append("\n");  
 }  
 textViewOutput.setText(sb.toString());  
 reader.close();  
 } catch (Exception e) {  
 e.printStackTrace();  
 }  
 }  
  
 private boolean isExternalStorageWritable() {  
 return Environment.getExternalStorageState().equals(Environment.MEDIA\_MOUNTED);  
 }  
  
 private void showToast(String message) {  
 Toast.makeText(this, message, Toast.LENGTH\_SHORT).show();  
 }  
}

**Program 12. Create an app to persist data using SQLite by creating a table, inserting, updating, and deleting records.**

**colors.xml (res/values/colors.xml)**

<?xml version="1.0" encoding="utf-8"?>  
<resources>  
  
  
<color name="colorAccent">#FF6200EE</color>  
<color name="colorPrimary">#FF3700B3</color>  
<color name="colorPrimaryDark">#FF3700B3</color>  
  
</resources>

**activity\_main.xml**

<?xml version="1.0" encoding="utf-8"?>  
 <LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:app="http://schemas.android.com/apk/res-auto"  
 xmlns:tools="http://schemas.android.com/tools"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:orientation="vertical"  
 android:gravity="center"  
 tools:context=".MainActivity">  
 <LinearLayout  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:orientation="vertical"  
 android:gravity="center">  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Course Registation"  
 android:textColor="@color/colorAccent"  
 android:textSize="30dp"  
 />  
 </LinearLayout>  
 <LinearLayout  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal"  
 android:gravity="center">  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Name"  
 />  
  
 <EditText  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:ems="10"  
 android:id="@+id/name"  
 android:textAlignment="center"  
 />  
 </LinearLayout>  
 <LinearLayout  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal"  
 android:gravity="center">  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Course"  
  
 />  
 <EditText  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:ems="10"  
 android:id="@+id/course"  
 android:textAlignment="center"  
 />  
 </LinearLayout>  
 <LinearLayout  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal"  
 android:gravity="center">  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Fee"  
 />  
 <EditText  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:ems="10"  
 android:id="@+id/fee"  
 android:textAlignment="center"  
 />  
 </LinearLayout>  
 <LinearLayout  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal"  
 android:gravity="center">  
  
 <Button  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:id="@+id/bt1"  
 android:text="Ok"  
 android:background="@color/colorPrimary"  
 />  
  
 <Button  
 android:id="@+id/bt2"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:background="@color/colorAccent"  
 android:text="View" />  
 </LinearLayout>  
</LinearLayout>

**MainActiviy.java**

package com.example.sqlprogram;  
import androidx.appcompat.app.AppCompatActivity;  
import android.content.Context;  
import android.content.Intent;  
import android.database.sqlite.SQLiteDatabase;  
import android.database.sqlite.SQLiteStatement;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import android.widget.EditText;  
import android.widget.Toast;  
public class MainActivity extends AppCompatActivity {  
 EditText ed1,ed2,ed3;  
 Button b1,b2;  
 @Override  
  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.activity\_main);  
 ed1 = findViewById(R.id.name);  
 ed2 = findViewById(R.id.course);  
 ed3 = findViewById(R.id.fee);  
 b1 = findViewById(R.id.bt1);  
 b2 = findViewById(R.id.bt2);  
  
 b2.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v)  
 {  
 Intent i = new Intent(getApplicationContext(),ViewActivity.class);  
 startActivity(i);  
 }  
 });  
  
 b1.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 insert();  
 }  
 });  
 }  
  
 public void insert()  
 {  
 try  
 {  
 String name = ed1.getText().toString();  
 String course = ed2.getText().toString();  
 String fee = ed3.getText().toString();  
 SQLiteDatabase db = openOrCreateDatabase("SliteDb", Context.MODE\_PRIVATE,null);  
 db.execSQL("CREATE TABLE IF NOT EXISTS records(id INTEGER PRIMARY KEY AUTOINCREMENT,name VARCHAR,course VARCHAR,fee VARCHAR)");  
 String sql = "insert into records(name,course,fee)values('" +  
 name + "','" + course + "','" + fee + "')";  
 SQLiteStatement statement = db.compileStatement(sql);  
 statement.execute();  
 Toast.makeText(this,"Record addded",Toast.LENGTH\_LONG).show();  
 ed1.setText("");  
  
 ed2.setText("");  
 ed3.setText("");  
 ed1.requestFocus();  
 }  
 catch (Exception ex)  
 {  
 Toast.makeText(this,"Record Fail",Toast.LENGTH\_LONG).show();  
 }  
 }  
}

/\* Add Student.class file (Right click on package name \*/

**Student.class**

package com.example.sqlprogram;  
public class Student {  
 String id;  
 String name;  
 String course;  
 String fee;  
 String titles;  
}

**activity\_view.xml**

<?xml version="1.0" encoding="utf-8"?>  
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:app="http://schemas.android.com/apk/res-auto"  
 xmlns:tools="http://schemas.android.com/tools"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 tools:context=".ViewActivity"  
 android:orientation="vertical">  
 <ListView  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:id="@+id/lst1"  
 />  
</LinearLayout>

**ViewActivity.java**

package com.example.sqlprogram;  
import androidx.appcompat.app.AppCompatActivity;  
import android.content.Context;  
import android.content.Intent;  
import android.database.Cursor;  
import android.database.sqlite.SQLiteDatabase;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.AdapterView;  
import android.widget.ArrayAdapter;  
import android.widget.ListView;  
import java.util.ArrayList;  
public class ViewActivity extends AppCompatActivity {  
 ListView lst1;  
 ArrayList<String> titles = new ArrayList<String>();  
  
 ArrayAdapter arrayAdapter;  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.activity\_view);  
 SQLiteDatabase db = openOrCreateDatabase("SliteDb", Context.MODE\_PRIVATE,null);  
 lst1 = findViewById(R.id.lst1);  
 final Cursor c = db.rawQuery("select \* from records",null);  
 int id = c.getColumnIndex("id");  
 int name = c.getColumnIndex("name");  
 int course = c.getColumnIndex("course");  
 int fee = c.getColumnIndex("fee");  
 titles.clear();  
 arrayAdapter = new ArrayAdapter(this,  
 androidx.appcompat.R.layout.support\_simple\_spinner\_dropdown\_item,titles);  
 lst1.setAdapter(arrayAdapter);  
 final ArrayList<Student> stud = new ArrayList<Student>();  
 if(c.moveToFirst())  
 {  
  
 do{  
 Student stu = new Student();  
 stu.id = c.getString(id);  
 stu.name = c.getString(name);  
 stu.course = c.getString(course);  
 stu.fee = c.getString(fee);  
 stud.add(stu);  
 titles.add(c.getString(id) + " \t " + c.getString(name) + " \t " + c.getString(course) + " \t " + c.getString(fee) );  
 } while(c.moveToNext());  
 arrayAdapter.notifyDataSetChanged();  
 lst1.invalidateViews();  
 }  
 lst1.setOnItemClickListener(new AdapterView.OnItemClickListener() {  
 @Override  
 public void onItemClick(AdapterView<?> parent, View view, int  
 position, long id) {  
 String aa = titles.get(position).toString();  
 Student stu = stud.get(position);  
 Intent i = new Intent(getApplicationContext(),EditActivity.class);  
  
 i.putExtra("id",stu.id);  
 i.putExtra("name",stu.name);  
 i.putExtra("course",stu.course);  
 i.putExtra("fee",stu.fee);  
 startActivity(i);  
 }  
 });  
 }  
}

**activity\_edit.xml**

<?xml version="1.0" encoding="utf-8"?>  
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:app="http://schemas.android.com/apk/res-auto"  
 xmlns:tools="http://schemas.android.com/tools"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 tools:context=".EditActivity"  
 android:orientation="vertical">  
  
 <LinearLayout  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:orientation="vertical"  
 android:gravity="center">  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Course Registation"  
 android:textColor="@color/colorAccent"  
 android:textSize="30dp"  
 />  
 </LinearLayout>  
 <LinearLayout  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal"  
 android:gravity="center">  
 <TextView  
 android:layout\_width="wrap\_content"  
  
 android:layout\_height="wrap\_content"  
 android:text="ID"  
 />  
 <EditText  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:ems="10"  
 android:id="@+id/id"  
 android:textAlignment="center"  
 />  
 </LinearLayout>  
 <LinearLayout  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal"  
 android:gravity="center">  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
  
 android:text="Name"  
 />  
 <EditText  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:ems="10"  
 android:id="@+id/name"  
 android:textAlignment="center"  
 />  
 </LinearLayout>  
 <LinearLayout  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal"  
 android:gravity="center">  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Course"  
  
 />  
 <EditText  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:ems="10"  
 android:id="@+id/course"  
 android:textAlignment="center"  
 />  
 </LinearLayout>  
 <LinearLayout  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal"  
 android:gravity="center">  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Fee"  
 />  
  
 <EditText  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:ems="10"  
 android:id="@+id/fee"  
 android:textAlignment="center"  
 />  
 </LinearLayout>  
 <LinearLayout  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal"  
 android:gravity="center">  
 <Button  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:id="@+id/bt1"  
 android:text="Edit"  
  
 android:background="@color/colorPrimary"  
 />  
 <Button  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:id="@+id/bt2"  
 android:text="Delete"  
 android:background="@color/colorAccent"  
 />  
 <Button  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:id="@+id/bt3"  
 android:text="Back"  
 android:background="@color/colorPrimaryDark"  
 />  
 </LinearLayout>  
</LinearLayout>

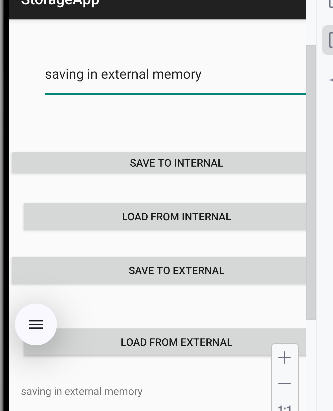
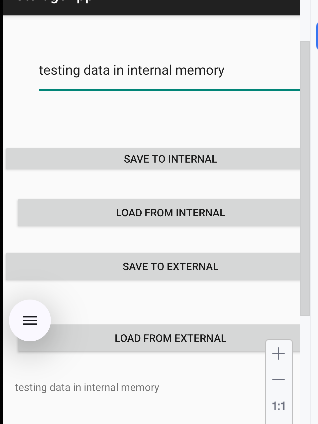
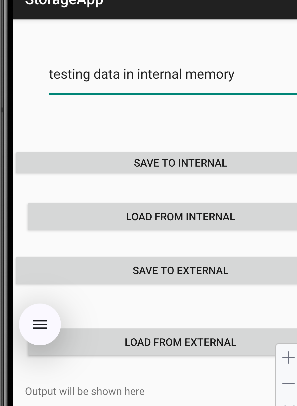
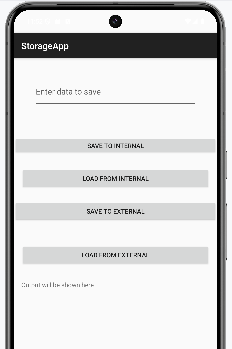
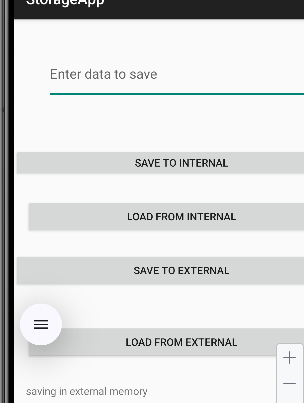
**EditActivity.java**

package com.example.sqlprogram;  
  
import androidx.appcompat.app.AppCompatActivity;  
import android.content.Context;  
import android.content.Intent;  
import android.database.sqlite.SQLiteDatabase;  
import android.database.sqlite.SQLiteStatement;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import android.widget.EditText;  
import android.widget.Toast;  
public class EditActivity extends AppCompatActivity {  
 EditText ed1,ed2,ed3,ed4;  
 Button b1,b2,b3;  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.activity\_edit);  
 ed1 = findViewById(R.id.name);  
 ed2 = findViewById(R.id.course);  
 ed3 = findViewById(R.id.fee);  
 ed4 = findViewById(R.id.id);  
 b1 = findViewById(R.id.bt1);  
 b2 = findViewById(R.id.bt2);  
 b3 = findViewById(R.id.bt3);  
 Intent i = getIntent();  
 String t1 = i.getStringExtra("id").toString();  
 String t2 = i.getStringExtra("name").toString();  
 String t3 = i.getStringExtra("course").toString();  
 String t4 = i.getStringExtra("fee").toString();  
 ed4.setText(t1);  
 ed1.setText(t2);  
 ed2.setText(t3);  
 ed3.setText(t4);  
  
 b2.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 try  
 {  
 String id = ed4.getText().toString();  
 SQLiteDatabase db = openOrCreateDatabase("SliteDb",Context.MODE\_PRIVATE,null);  
 String sql = "delete from records where id = " + id + "";  
 SQLiteStatement statement = db.compileStatement(sql);  
 statement.execute();  
 Toast.makeText(EditActivity.this,"Record Deleted",Toast.LENGTH\_LONG).show();  
 ed1.setText("");  
 ed2.setText("");  
 ed3.setText("");  
 ed1.requestFocus();  
 }  
 catch (Exception ex)  
 {  
  
 Toast.makeText(EditActivity.this,"Record Fail",Toast.LENGTH\_LONG).show();  
 }  
 }  
 });  
 b3.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 Intent i = new Intent(getApplicationContext(),ViewActivity.class);  
 startActivity(i);  
 }  
 });  
 b1.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 try {  
 String name = ed1.getText().toString();  
 String course = ed2.getText().toString();  
 String fee = ed3.getText().toString();  
 String id = ed4.getText().toString();  
  
 SQLiteDatabase db = openOrCreateDatabase("SliteDb",  
 Context.MODE\_PRIVATE, null);  
 String sql = "update records set name = '" + name + "',course='" +  
 course + "',fee='" + fee + "' where id= " + id + "";  
 SQLiteStatement statement = db.compileStatement(sql);  
 statement.execute();  
 Toast.makeText(EditActivity.this, "Record Updated",  
 Toast.LENGTH\_LONG).show();  
 ed1.setText("");  
 ed2.setText("");  
 ed3.setText("");  
 ed1.requestFocus();  
 } catch (Exception ex) {  
 Toast.makeText(EditActivity.this, "Record Fail",  
 Toast.LENGTH\_LONG).show();  
 }  
 }  
 });  
 }  
}

**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">  
  
 <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.SQLprogram"  
 tools:targetApi="31">  
  
 <activity  
 android:name=".ViewActivity"  
 android:exported="false" />  
  
  
 <activity  
 android:name=".EditActivity"  
 android:exported="false" />  
  
 <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:**



### 1. ****Where is**** internal\_data.txt ****stored?****

This file is stored in your app's **internal storage directory**, which is:

/data/data/com.example.storageapp/files/internal\_data.txt

#### Important:

* This directory is **private to your app**.
* **You cannot see it directly** using the **file manager** on a non-rooted device.
* But you can see it:
  + Via **Android Studio → Device File Explorer**:
    1. Go to View > Tool Windows > Device File Explorer
    2. Navigate to: data/data/com.example.storageapp/files/
    3. You will find internal\_data.txt there.

### 2. ****Where is**** external\_data.txt ****stored?****

This file is stored in your app's **external files directory**, which is:

/storage/emulated/0/Android/data/com.example.storageapp/files/external\_data.txt

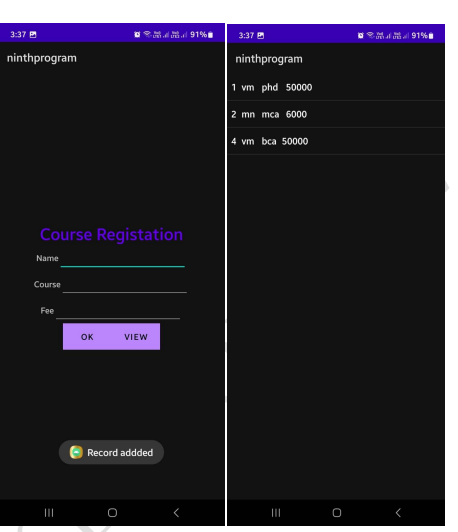
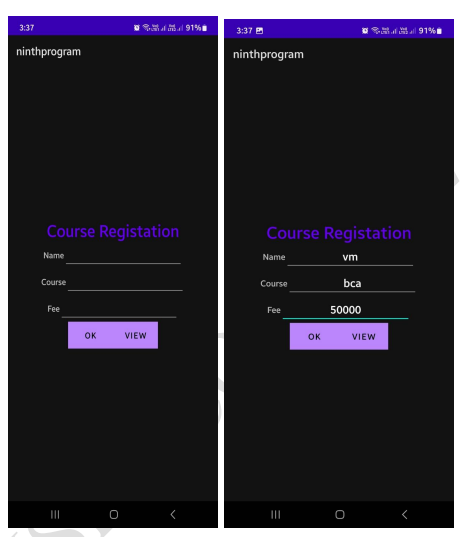
#### To access this:

* Open **any File Manager** on your phone
* Go to:

Android > data > com.example.storageapp > files

* You should see external\_data.txt inside.

**Note**: On Android 11+ (API 30+), file managers might **not show this folder** due to scoped storage restrictions. Use:

* **Android Studio’s Device File Explorer**, or
* Connect phone via USB → Enable **"File Transfer" mode** → Use adb shell or adb pull
* **colors.xml (res/values/colors.xml)**
* <?xml version="1.0" encoding="utf-8"?>  
  <resources>  
    
    
  <color name="colorAccent">#FF6200EE</color>  
  <color name="colorPrimary">#FF3700B3</color>  
  <color name="colorPrimaryDark">#FF3700B3</color>  
    
  </resources>
* **activity\_main.xml**
* <?xml version="1.0" encoding="utf-8"?>  
   <LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
   xmlns:app="http://schemas.android.com/apk/res-auto"  
   xmlns:tools="http://schemas.android.com/tools"  
   android:layout\_width="match\_parent"  
   android:layout\_height="match\_parent"  
   android:orientation="vertical"  
   android:gravity="center"  
   tools:context=".MainActivity">  
   <LinearLayout  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:orientation="vertical"  
   android:gravity="center">  
   <TextView  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:text="Course Registation"  
   android:textColor="@color/colorAccent"  
   android:textSize="30dp"  
   />  
   </LinearLayout>  
   <LinearLayout  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:orientation="horizontal"  
   android:gravity="center">  
   <TextView  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:text="Name"  
   />  
    
   <EditText  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:layout\_weight="1"  
   android:ems="10"  
   android:id="@+id/name"  
   android:textAlignment="center"  
   />  
   </LinearLayout>  
   <LinearLayout  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:orientation="horizontal"  
   android:gravity="center">  
   <TextView  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:text="Course"  
    
   />  
   <EditText  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:layout\_weight="1"  
   android:ems="10"  
   android:id="@+id/course"  
   android:textAlignment="center"  
   />  
   </LinearLayout>  
   <LinearLayout  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:orientation="horizontal"  
   android:gravity="center">  
   <TextView  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:text="Fee"  
   />  
   <EditText  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:layout\_weight="1"  
   android:ems="10"  
   android:id="@+id/fee"  
   android:textAlignment="center"  
   />  
   </LinearLayout>  
   <LinearLayout  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:orientation="horizontal"  
   android:gravity="center">  
    
   <Button  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:layout\_weight="1"  
   android:id="@+id/bt1"  
   android:text="Ok"  
   android:background="@color/colorPrimary"  
   />  
    
   <Button  
   android:id="@+id/bt2"  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:layout\_weight="1"  
   android:background="@color/colorAccent"  
   android:text="View" />  
   </LinearLayout>  
  </LinearLayout>
* **MainActiviy.java**
* package com.example.sqlprogram;  
    
  import androidx.appcompat.app.AppCompatActivity;  
  import android.content.Context;  
  import android.content.Intent;  
  import android.database.sqlite.SQLiteDatabase;  
  import android.database.sqlite.SQLiteStatement;  
  import android.os.Bundle;  
  import android.view.View;  
  import android.widget.Button;  
  import android.widget.EditText;  
  import android.widget.Toast;  
  public class MainActivity extends AppCompatActivity {  
   EditText ed1,ed2,ed3;  
   Button b1,b2;  
   @Override  
    
   protected void onCreate(Bundle savedInstanceState) {  
   super.onCreate(savedInstanceState);  
   setContentView(R.layout.activity\_main);  
   ed1 = findViewById(R.id.name);  
   ed2 = findViewById(R.id.course);  
   ed3 = findViewById(R.id.fee);  
   b1 = findViewById(R.id.bt1);  
   b2 = findViewById(R.id.bt2);  
    
   b2.setOnClickListener(new View.OnClickListener() {  
   @Override  
   public void onClick(View v)  
   {  
   Intent i = new Intent(getApplicationContext(),ViewActivity.class);  
   startActivity(i);  
   }  
   });  
    
   b1.setOnClickListener(new View.OnClickListener() {  
   @Override  
   public void onClick(View v) {  
   insert();  
   }  
   });  
   }  
    
   public void insert()  
   {  
   try  
   {  
   String name = ed1.getText().toString();  
   String course = ed2.getText().toString();  
   String fee = ed3.getText().toString();  
   SQLiteDatabase db = openOrCreateDatabase("SliteDb", Context.MODE\_PRIVATE,null);  
   db.execSQL("CREATE TABLE IF NOT EXISTS records(id INTEGER PRIMARY KEY AUTOINCREMENT,name VARCHAR,course VARCHAR,fee VARCHAR)");  
   String sql = "insert into records(name,course,fee)values('" +  
   name + "','" + course + "','" + fee + "')";  
   SQLiteStatement statement = db.compileStatement(sql);  
   statement.execute();  
   Toast.makeText(this,"Record addded",Toast.LENGTH\_LONG).show();  
   ed1.setText("");  
    
   ed2.setText("");  
   ed3.setText("");  
   ed1.requestFocus();  
   }  
   catch (Exception ex)  
   {  
   Toast.makeText(this,"Record Fail",Toast.LENGTH\_LONG).show();  
   }  
   }  
  }
* /\* Add Student.class file (Right click on package name \*/
* **Student.class**
* package com.example.sqlprogram;  
  public class Student {  
   String id;  
   String name;  
   String course;  
   String fee;  
   String titles;  
  }
* **activity\_view.xml**
* <?xml version="1.0" encoding="utf-8"?>  
  <LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
   xmlns:app="http://schemas.android.com/apk/res-auto"  
   xmlns:tools="http://schemas.android.com/tools"  
   android:layout\_width="match\_parent"  
   android:layout\_height="match\_parent"  
   tools:context=".ViewActivity"  
   android:orientation="vertical">  
   <ListView  
   android:layout\_width="match\_parent"  
   android:layout\_height="match\_parent"  
   android:id="@+id/lst1"  
   />  
  </LinearLayout>
* **ViewActivity.java**
* package com.example.sqlprogram;  
  import androidx.appcompat.app.AppCompatActivity;  
  import android.content.Context;  
  import android.content.Intent;  
  import android.database.Cursor;  
  import android.database.sqlite.SQLiteDatabase;  
  import android.os.Bundle;  
  import android.view.View;  
  import android.widget.AdapterView;  
  import android.widget.ArrayAdapter;  
  import android.widget.ListView;  
  import java.util.ArrayList;  
  public class ViewActivity extends AppCompatActivity {  
   ListView lst1;  
   ArrayList<String> titles = new ArrayList<String>();  
    
   ArrayAdapter arrayAdapter;  
   @Override  
   protected void onCreate(Bundle savedInstanceState) {  
   super.onCreate(savedInstanceState);  
   setContentView(R.layout.activity\_view);  
   SQLiteDatabase db = openOrCreateDatabase("SliteDb", Context.MODE\_PRIVATE,null);  
   lst1 = findViewById(R.id.lst1);  
   final Cursor c = db.rawQuery("select \* from records",null);  
   int id = c.getColumnIndex("id");  
   int name = c.getColumnIndex("name");  
   int course = c.getColumnIndex("course");  
   int fee = c.getColumnIndex("fee");  
   titles.clear();  
   arrayAdapter = new ArrayAdapter(this,  
   androidx.appcompat.R.layout.support\_simple\_spinner\_dropdown\_item,titles);  
   lst1.setAdapter(arrayAdapter);  
   final ArrayList<Student> stud = new ArrayList<Student>();  
   if(c.moveToFirst())  
   {  
    
   do{  
   Student stu = new Student();  
   stu.id = c.getString(id);  
   stu.name = c.getString(name);  
   stu.course = c.getString(course);  
   stu.fee = c.getString(fee);  
   stud.add(stu);  
   titles.add(c.getString(id) + " \t " + c.getString(name) + " \t " + c.getString(course) + " \t " + c.getString(fee) );  
   } while(c.moveToNext());  
   arrayAdapter.notifyDataSetChanged();  
   lst1.invalidateViews();  
   }  
   lst1.setOnItemClickListener(new AdapterView.OnItemClickListener() {  
   @Override  
   public void onItemClick(AdapterView<?> parent, View view, int  
   position, long id) {  
   String aa = titles.get(position).toString();  
   Student stu = stud.get(position);  
   Intent i = new Intent(getApplicationContext(),EditActivity.class);  
    
   i.putExtra("id",stu.id);  
   i.putExtra("name",stu.name);  
   i.putExtra("course",stu.course);  
   i.putExtra("fee",stu.fee);  
   startActivity(i);  
   }  
   });  
   }  
  }
* **activity\_edit.xml**
* <?xml version="1.0" encoding="utf-8"?>  
  <LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
   xmlns:app="http://schemas.android.com/apk/res-auto"  
   xmlns:tools="http://schemas.android.com/tools"  
   android:layout\_width="match\_parent"  
   android:layout\_height="match\_parent"  
   tools:context=".EditActivity"  
   android:orientation="vertical">  
    
   <LinearLayout  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:orientation="vertical"  
   android:gravity="center">  
   <TextView  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:text="Course Registation"  
   android:textColor="@color/colorAccent"  
   android:textSize="30dp"  
   />  
   </LinearLayout>  
   <LinearLayout  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:orientation="horizontal"  
   android:gravity="center">  
   <TextView  
   android:layout\_width="wrap\_content"  
    
   android:layout\_height="wrap\_content"  
   android:text="ID"  
   />  
   <EditText  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:layout\_weight="1"  
   android:ems="10"  
   android:id="@+id/id"  
   android:textAlignment="center"  
   />  
   </LinearLayout>  
   <LinearLayout  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:orientation="horizontal"  
   android:gravity="center">  
   <TextView  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
    
   android:text="Name"  
   />  
   <EditText  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:layout\_weight="1"  
   android:ems="10"  
   android:id="@+id/name"  
   android:textAlignment="center"  
   />  
   </LinearLayout>  
   <LinearLayout  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:orientation="horizontal"  
   android:gravity="center">  
   <TextView  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:text="Course"  
    
   />  
   <EditText  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:layout\_weight="1"  
   android:ems="10"  
   android:id="@+id/course"  
   android:textAlignment="center"  
   />  
   </LinearLayout>  
   <LinearLayout  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:orientation="horizontal"  
   android:gravity="center">  
   <TextView  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:text="Fee"  
   />  
    
   <EditText  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:layout\_weight="1"  
   android:ems="10"  
   android:id="@+id/fee"  
   android:textAlignment="center"  
   />  
   </LinearLayout>  
   <LinearLayout  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:orientation="horizontal"  
   android:gravity="center">  
   <Button  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:layout\_weight="1"  
   android:id="@+id/bt1"  
   android:text="Edit"  
    
   android:background="@color/colorPrimary"  
   />  
   <Button  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:layout\_weight="1"  
   android:id="@+id/bt2"  
   android:text="Delete"  
   android:background="@color/colorAccent"  
   />  
   <Button  
   android:layout\_width="wrap\_content"  
   android:layout\_height="wrap\_content"  
   android:layout\_weight="1"  
   android:id="@+id/bt3"  
   android:text="Back"  
   android:background="@color/colorPrimaryDark"  
   />  
   </LinearLayout>  
  </LinearLayout>
* **EditActivity.java**
* package com.example.sqlprogram;  
    
  import androidx.appcompat.app.AppCompatActivity;  
  import android.content.Context;  
  import android.content.Intent;  
  import android.database.sqlite.SQLiteDatabase;  
  import android.database.sqlite.SQLiteStatement;  
  import android.os.Bundle;  
  import android.view.View;  
  import android.widget.Button;  
  import android.widget.EditText;  
  import android.widget.Toast;  
  public class EditActivity extends AppCompatActivity {  
   EditText ed1,ed2,ed3,ed4;  
   Button b1,b2,b3;  
   @Override  
   protected void onCreate(Bundle savedInstanceState) {  
   super.onCreate(savedInstanceState);  
   setContentView(R.layout.activity\_edit);  
   ed1 = findViewById(R.id.name);  
   ed2 = findViewById(R.id.course);  
   ed3 = findViewById(R.id.fee);  
   ed4 = findViewById(R.id.id);  
   b1 = findViewById(R.id.bt1);  
   b2 = findViewById(R.id.bt2);  
   b3 = findViewById(R.id.bt3);  
   Intent i = getIntent();  
   String t1 = i.getStringExtra("id").toString();  
   String t2 = i.getStringExtra("name").toString();  
   String t3 = i.getStringExtra("course").toString();  
   String t4 = i.getStringExtra("fee").toString();  
   ed4.setText(t1);  
   ed1.setText(t2);  
   ed2.setText(t3);  
   ed3.setText(t4);  
    
   b2.setOnClickListener(new View.OnClickListener() {  
   @Override  
   public void onClick(View v) {  
   try  
   {  
   String id = ed4.getText().toString();  
   SQLiteDatabase db = openOrCreateDatabase("SliteDb",Context.MODE\_PRIVATE,null);  
   String sql = "delete from records where id = " + id + "";  
   SQLiteStatement statement = db.compileStatement(sql);  
   statement.execute();  
   Toast.makeText(EditActivity.this,"Record Deleted",Toast.LENGTH\_LONG).show();  
   ed1.setText("");  
   ed2.setText("");  
   ed3.setText("");  
   ed1.requestFocus();  
   }  
   catch (Exception ex)  
   {  
    
   Toast.makeText(EditActivity.this,"Record Fail",Toast.LENGTH\_LONG).show();  
   }  
   }  
   });  
   b3.setOnClickListener(new View.OnClickListener() {  
   @Override  
   public void onClick(View v) {  
   Intent i = new Intent(getApplicationContext(),ViewActivity.class);  
   startActivity(i);  
   }  
   });  
   b1.setOnClickListener(new View.OnClickListener() {  
   @Override  
   public void onClick(View v) {  
   try {  
   String name = ed1.getText().toString();  
   String course = ed2.getText().toString();  
   String fee = ed3.getText().toString();  
   String id = ed4.getText().toString();  
    
   SQLiteDatabase db = openOrCreateDatabase("SliteDb",  
   Context.MODE\_PRIVATE, null);  
   String sql = "update records set name = '" + name + "',course='" +  
   course + "',fee='" + fee + "' where id= " + id + "";  
   SQLiteStatement statement = db.compileStatement(sql);  
   statement.execute();  
   Toast.makeText(EditActivity.this, "Record Updated",  
   Toast.LENGTH\_LONG).show();  
   ed1.setText("");  
   ed2.setText("");  
   ed3.setText("");  
   ed1.requestFocus();  
   } catch (Exception ex) {  
   Toast.makeText(EditActivity.this, "Record Fail",  
   Toast.LENGTH\_LONG).show();  
   }  
   }  
   });  
   }  
  }
* **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">  
    
   <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.SQLprogram"  
   tools:targetApi="31">  
    
   <activity  
   android:name=".ViewActivity"  
   android:exported="false" />  
    
    
   <activity  
   android:name=".EditActivity"  
   android:exported="false" />  
    
   <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:**
* 

Top of Form

Bottom of Form