

Mobile Application Development

Course Code:

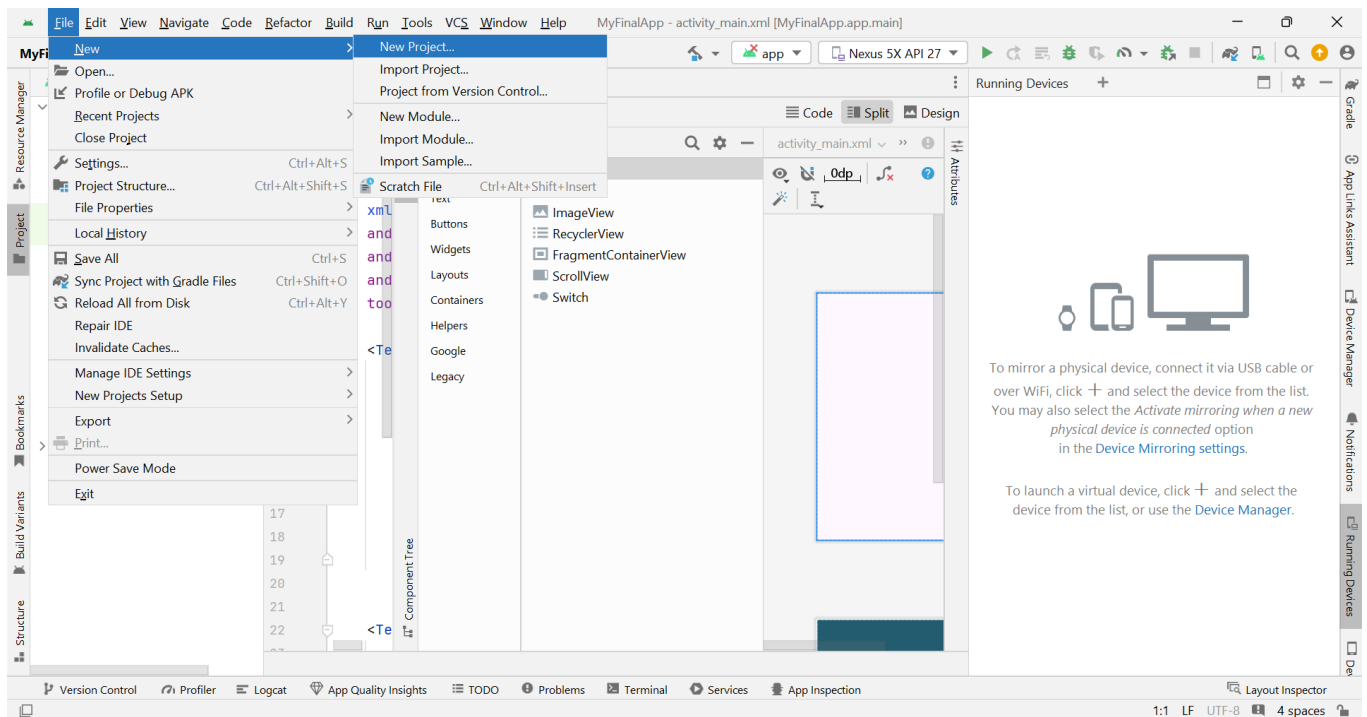
Q1. Design an application to use the Android user interface library.

- Gain insight into the concepts of Views, View Groups, Layouts, and Widgets and their relationships.
- Declare and reference resources in code.
- Navigate between multiple activities.
- Share data between activities.

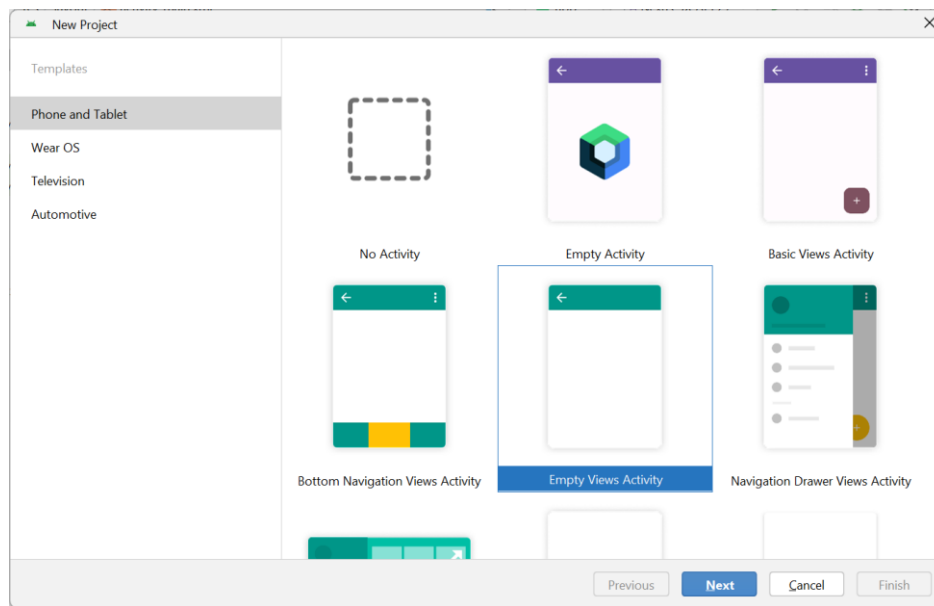
Create your first project

Step 1: Create a new project

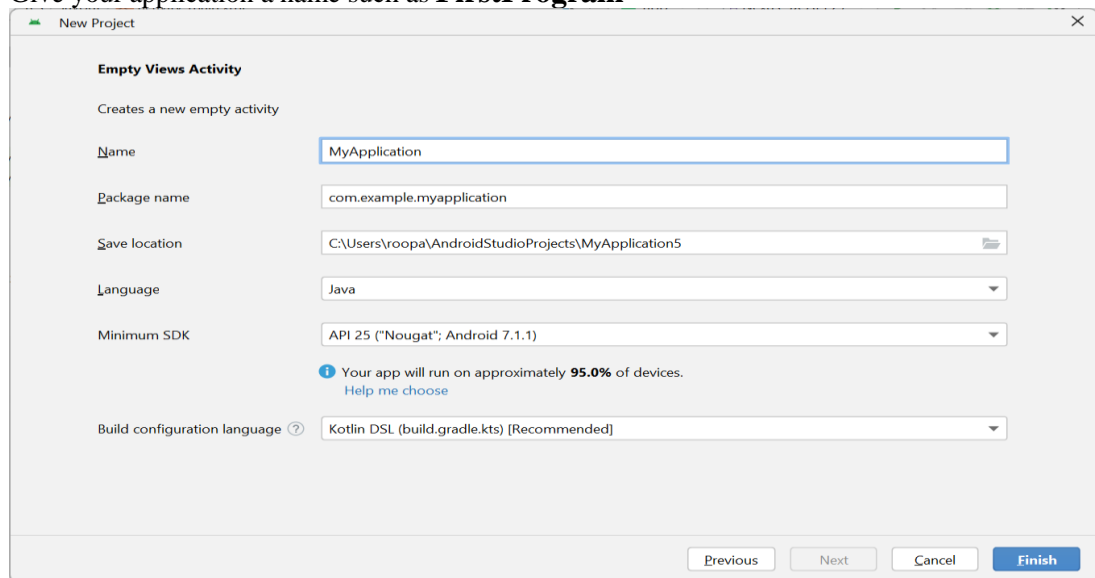
- Open Android Studio.
- In the **Welcome to Android Studio** dialog, click **New Project**.



3. Select **Empty Views Activity** (not the default). Click **Next**.



4. Give your application a name such as **FirstProgram**



5. Make sure the **Language** is set to **Java** .

6. Leave the defaults for the other fields.

7. Click **Finish**.

After these steps, Android Studio:

- Creates a folder for your Android Studio project called **FirstProgram**. This is usually in a folder called **AndroidStudioProjects** below your home directory.

- Builds your project (this may take a few moments). Android Studio uses [Gradle](#) as its build system. You can follow the build progress at the bottom of the Android Studio window.
- Opens the code editor showing your project.

a) Gain insight into the concepts of Views, View Groups, Layouts, and Widgets and their relationships.

Code:

activity_main.xml

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

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Edit Text Demo"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

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

MainActivity.java

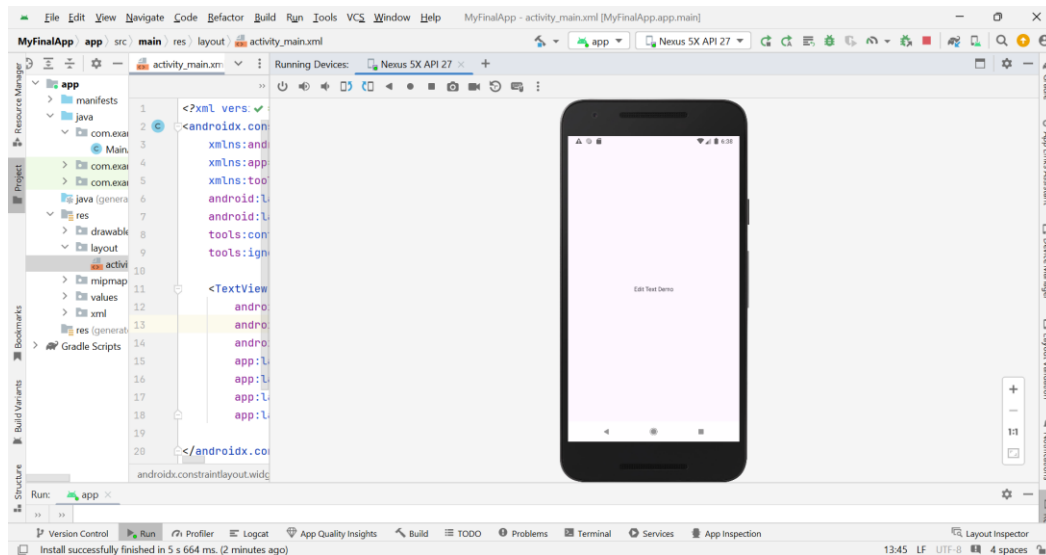
```
package com.example.FirstProgram;
import android.os.Bundle;

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);
    }
}
```

Output:



Login Page with Textview, EditText and Button Views

Try for Radio Button, Checkbox, Image button

Code:

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"
    tools:context=".MainActivity">

    <!--text view for heading-->
    <TextView
        android:id="@+id/idTVHeader"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="30dp"
        android:gravity="center_horizontal"
        android:padding="5dp"
        android:text="My Login Form"
        android:textAlignment="center"
        android:textSize="18sp" />

    <!--edit text for user name-->
    <EditText
        android:id="@+id/idEdtUserName"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/idTVHeader"
        android:layout_marginStart="10dp"
        android:layout_marginTop="50dp"
        android:layout_marginEnd="10dp"
        android:hint="Enter UserName"
        android:inputType="textEmailAddress" />
```

```

        <!--edit text for user password-->
        <EditText
            android:id="@+id/idEdtPassword"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_below="@id/idEdtUserName"
            android:layout_marginStart="10dp"
            android:layout_marginTop="20dp"
            android:layout_marginEnd="10dp"
            android:hint="Enter Password"
            android:inputType="textPassword" />

        <!--button to register our new user-->
        <Button
            android:id="@+id/idBtnLogin"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_below="@id/idEdtPassword"
            android:layout_marginStart="10dp"
            android:layout_marginTop="20dp"
            android:layout_marginEnd="10dp"
            android:text="Login"
            android:textAllCaps="false" />

    </RelativeLayout>

```

MainActivity.java

```

package com.example.FirstProgram;
import android.os.Bundle;

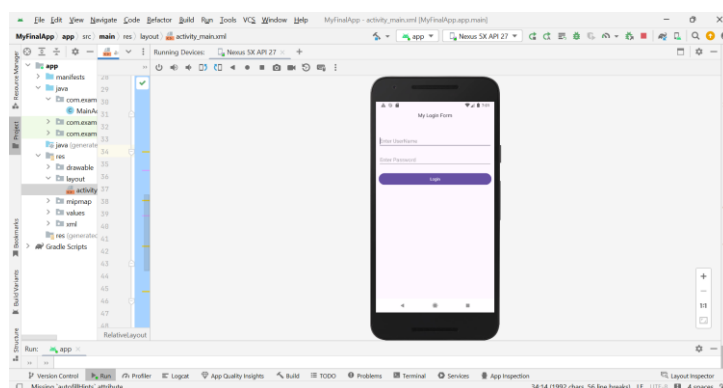
import androidx.activity.EdgeToEdge;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {

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

```

Output:



c) Navigate between multiple activities.

Code:

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"
    tools:context=".MainActivity">

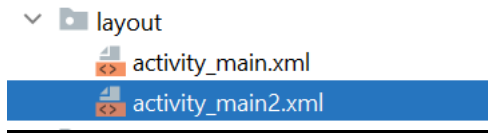
    <!--text view for heading-->
    <TextView
        android:id="@+id/idTVHeader"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="30dp"
        android:gravity="center_horizontal"
        android:padding="5dp"
        android:text="My Login Form"
        android:textAlignment="center"
        android:textSize="18sp" />

    <!--edit text for user name-->
    <EditText
        android:id="@+id/idEdtUserName"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/idTVHeader"
        android:layout_marginStart="10dp"
        android:layout_marginTop="50dp"
        android:layout_marginEnd="10dp"
        android:hint="Enter UserName"
        android:inputType="textEmailAddress" />

    <!--edit text for user password-->
    <EditText
        android:id="@+id/idEdtPassword"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/idEdtUserName"
        android:layout_marginStart="10dp"
        android:layout_marginTop="20dp"
        android:layout_marginEnd="10dp"
        android:hint="Enter Password"
        android:inputType="textPassword" />

    <!--button to register our new user-->
    <Button
        android:id="@+id/idBtnLogin"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/idEdtPassword"
        android:layout_marginStart="10dp"
        android:layout_marginTop="20dp"
        android:layout_marginEnd="10dp"
        android:text="Login"
        android:textAllCaps="false" />

</RelativeLayout>
```



Create activity_main2.xml under layout folder

activity_main2.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <TextView
        android:text="Second Activity"
        android:textSize="24sp"
        android:textStyle="bold"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="40dp"/>
    <Button
        android:id="@+id/btnOpenMain"
        android:text="Go back to MainActivity"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerInParent="true"/>
</RelativeLayout>
```

MainActivity.java

```
package com.example.myfinalapp;

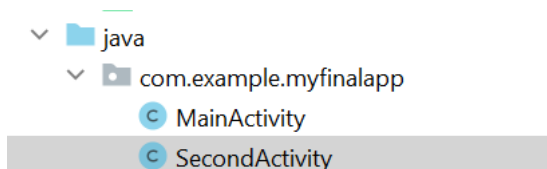
import android.os.Bundle;

import androidx.activity.EdgeToEdge;
import androidx.appcompat.app.AppCompatActivity;
import android.widget.Button;
import android.content.Intent;
import android.view.View;

public class MainActivity extends AppCompatActivity {
    Button button;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        EdgeToEdge.enable(this);
        setContentView(R.layout.activity_main);
        button = findViewById(R.id.idBtnLogin);
        button.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent intent = new Intent(MainActivity.this, SecondActivity.class);
                startActivity(intent);
            }
        });
    }
}
```

```
}  
}
```

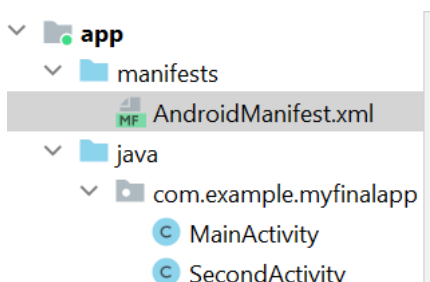
Create Java file SecondActivity.java



SecondActivity.java

```
package com.example.myfinalapp;  
  
import android.os.Bundle;  
  
import androidx.appcompat.app.AppCompatActivity;  
import android.widget.Button;  
import android.view.View;  
import android.content.Intent;  
  
public class SecondActivity extends AppCompatActivity {  
    Button button;  
    @Override  
    protected void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        setContentView(R.layout.activity_main2);  
        button = findViewById(R.id.btnOpenMain);  
        button.setOnClickListener(new View.OnClickListener() {  
            @Override  
            public void onClick(View v) {  
                Intent i = new Intent(SecondActivity.this, MainActivity.class);  
                startActivity(i);  
            }  
        });  
    }  
}
```

Add the following code to androidManifest.xml



```
<activity android:name=".SecondActivity"></activity>
```


androidManifest.xml

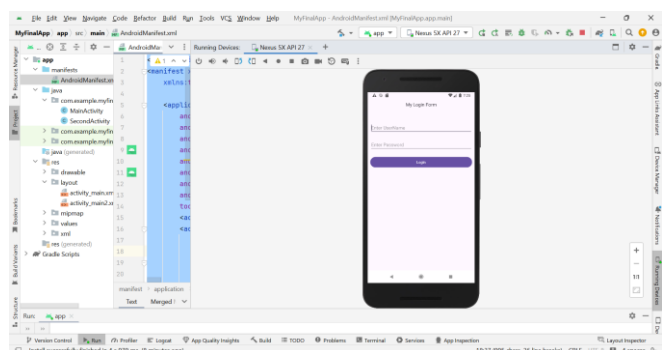
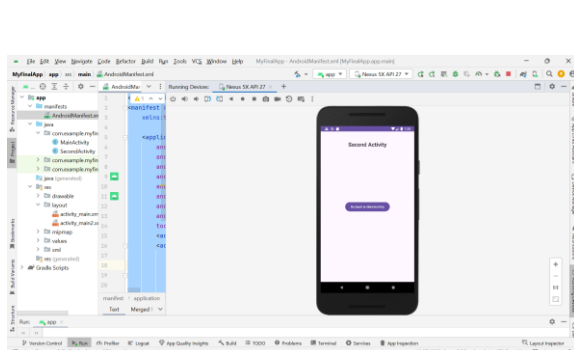
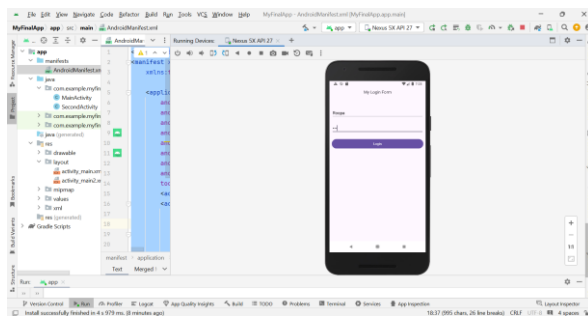
```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">

    <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:supportRtl="true"
        android:theme="@style/Theme.MyFinalApp"
        tools:targetApi="31">
        <activity android:name=".SecondActivity"></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:



d) Share data between activities.

To Send Data From One Activity to Second Activity

Code:

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"
    tools:context=".MainActivity">

    <EditText
        android:id="@+id/send_text_id"
        android:layout_width="300dp"
        android:layout_height="wrap_content"
        android:layout_marginLeft="40dp"
        android:layout_marginTop="20dp"
        android:hint="Input"
        android:textSize="25dp"
        android:textStyle="bold" />

    <Button
        android:id="@+id/send_button_id"
        android:layout_width="wrap_content"
        android:layout_height="40dp"
        android:layout_marginLeft="150dp"
        android:layout_marginTop="150dp"
        android:text="send"
        android:textStyle="bold" />

</RelativeLayout>
```

activity_main2.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <TextView
        android:id="@+id/received_value_id"
        android:layout_width="300dp"
        android:layout_height="50dp"
        android:layout_marginLeft="40dp"
        android:layout_marginTop="20dp"
        android:textSize="40sp"
        android:textStyle="bold"
        android:layout_marginStart="40dp" />
</RelativeLayout>
```

MainActivity.java

```

package com.example.myfinalapp;

import android.os.Bundle;

import androidx.activity.EdgeToEdge;
import androidx.appcompat.app.AppCompatActivity;
import android.widget.Button;
import android.content.Intent;
import android.widget.EditText;

public class MainActivity extends AppCompatActivity {
    // define the variable
    Button send_button;
    EditText send_text;

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

        send_button = findViewById(R.id.send_button_id);
        send_text = findViewById(R.id.send_text_id);

        // add the OnClickListener in sender button after clicked this button
        following instruction will run
        send_button.setOnClickListener(v -> {
            // get the value which input by user in EditText and convert it to
            string
            String str = send_text.getText().toString();
            // Create the Intent object of this class Context() to Second_activity
            class
            Intent intent = new Intent(getApplicationContext(),
            SecondActivity.class);
            // now by putExtra method put the value in key, value pair key is
            // message_key by this key we will receive the value, and put the string
            intent.putExtra("message_key", str);
            // start the Intent
            startActivity(intent);
        });
    }
}

```

SecondActivity.java

```

package com.example.myfinalapp;

import android.os.Bundle;

import androidx.appcompat.app.AppCompatActivity;
import android.content.Intent;
import android.widget.TextView;

public class SecondActivity extends AppCompatActivity {
    TextView receiver_msg;

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

        receiver_msg = findViewById(R.id.received_value_id);
        // create the get Intent object
        Intent intent = getIntent();
        // receive the value by getStringExtra() method and

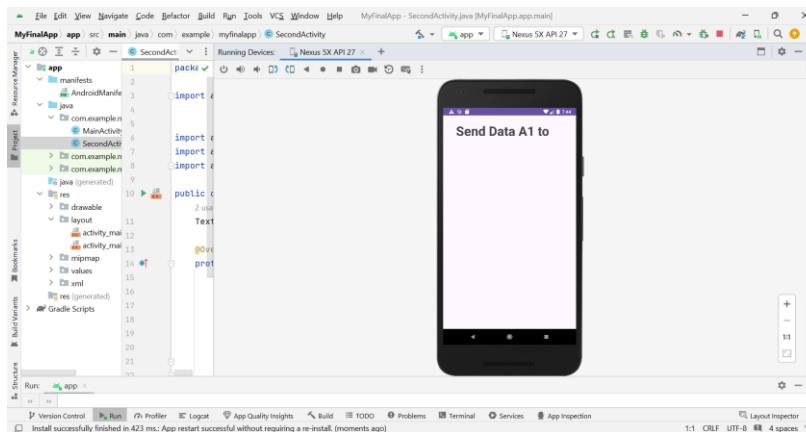
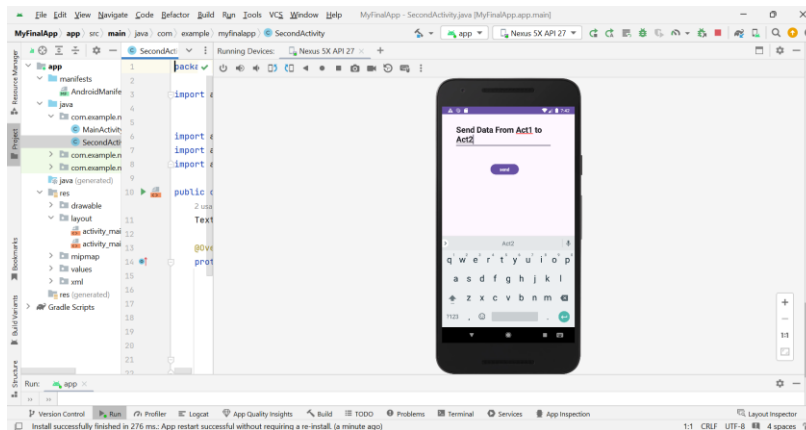
```

```

// key must be same which is send by first activity
String str = intent.getStringExtra("message_key");
// display the string into textView
receiver_msg.setText(str);
}
}

```

Output:



Q2. Develop an application aimed at enhancing and extending the functionalities offered by the Android user interface library.

- a) Explore the life-cycle methods of an activity.
- b) Utilize Events and Event Listeners.
- c) Create Toast Notifications.

Code:

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android: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="Activity LifeCycle Demo"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

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

MainActivity.java

```
package com.example.activitylifecycledemo;

import android.os.Bundle;

import androidx.activity.EdgeToEdge;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.graphics.Insets;
import androidx.core.view.ViewCompat;
import androidx.core.view.WindowInsetsCompat;
import android.util.Log;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Toast toast = Toast.makeText(getApplicationContext(), "onCreate Called",
        Toast.LENGTH_SHORT);
        toast.show();
        Log.d("lifecycle", "onCreate invoked");
    }

    @Override
    protected void onStart() {
        super.onStart();
        Toast toast = Toast.makeText(getApplicationContext(), "onStart Called",
        Toast.LENGTH_LONG);
        toast.show();
        Log.d("lifecycle", "onStart invoked");
    }

    @Override
    protected void onResume() {
```

```

        super.onResume();
        Toast toast = Toast.makeText(getApplicationContext(), "onResume Called",
Toast.LENGTH_LONG);
        toast.show();
        Log.d("lifecycle", "onResume invoked");
    }
    @Override
    protected void onPause() {
        super.onPause();
        Toast toast = Toast.makeText(getApplicationContext(), "onPause Called",
Toast.LENGTH_LONG);
        toast.show();
        Log.d("lifecycle", "onPause invoked");
    }
    @Override
    protected void onStop() {
        super.onStop();
        Toast toast = Toast.makeText(getApplicationContext(), "onStop Called",
Toast.LENGTH_LONG);
        toast.show();
        Log.d("lifecycle", "onStop invoked");
    }
    @Override
    protected void onRestart() {
        super.onRestart();
        Toast toast = Toast.makeText(getApplicationContext(), "onRestart Called",
Toast.LENGTH_LONG);
        toast.show();
        Log.d("lifecycle", "onRestart invoked");
    }
    @Override
    protected void onDestroy() {
        super.onDestroy();
        Toast toast = Toast.makeText(getApplicationContext(), "onDestroy Called",
Toast.LENGTH_LONG);
        toast.show();
        Log.d("lifecycle", "onDestroy invoked");
    }
}

```

