Mobile Application Development

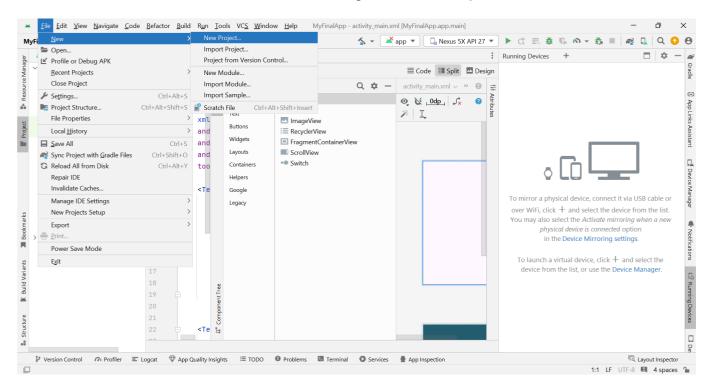
Course Code:

- Q1. Design an application to use the Android user interface library.
 - a) Gain insight into the concepts of Views, View Groups, Layouts, and Widgets and their relationships.
 - b) Declare and reference resources in code.
 - c) Navigate between multiple activities.
 - d) Share data between activities.

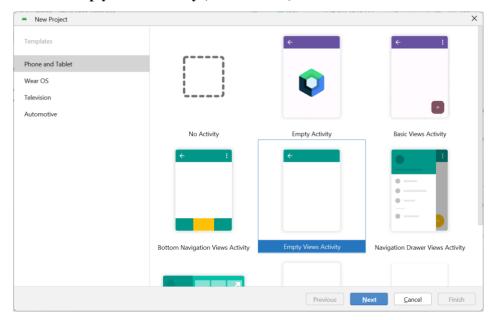
Create your first project

Step 1: Create a new project

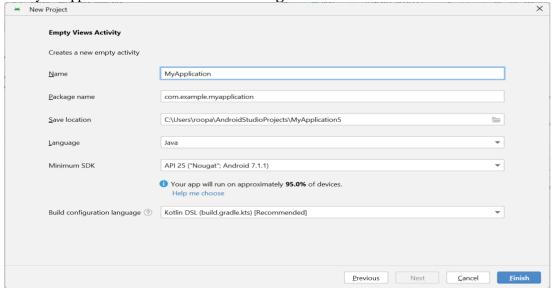
- 1. Open Android Studio.
- 2. In the Welcome to Android Studio dialog, click New Project.



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 usuallyin a folder called **AndroidStudioProjects** below your home directory.

- Builds your project (this may take a few moments). Android Studio uses <u>Gradle</u> 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</pre>
   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>
```

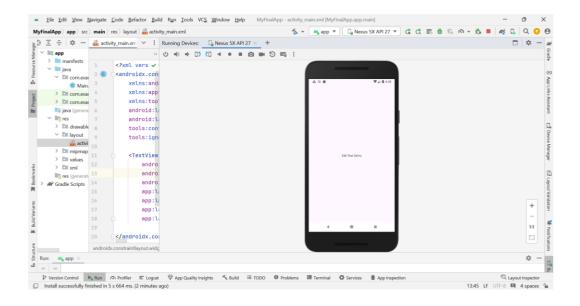
MainActivity.iava

```
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" />
```

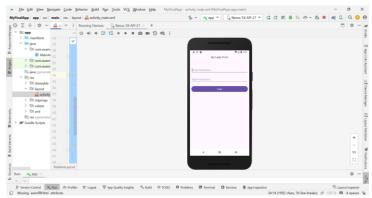
```
<!--edit text for user password-->
    <EditText
        android:id="@+id/idEdtPassword"
        android:layout width="match parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/idEdtUserName"
        android:layout_marginStart="10dp"
        android:layout_marginTop="20dp"
        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" />
```



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"</pre>
    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);
        });
```

```
ì
```

Create Java file SecondActivity.java

```
    java
    com.example.myfinalapp
    MainActivity
    SecondActivity
```

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);
        });
   }
}
```

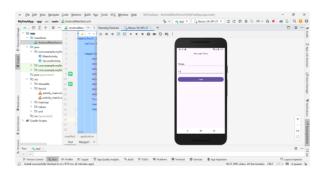
Add the following code to androidManifest.xml

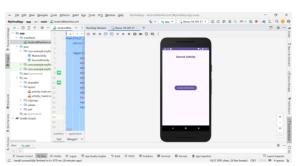
```
    ✓ app
    ✓ manifests
    ✓ AndroidManifest.xml
    ✓ java
    ✓ com.example.myfinalapp
    © MainActivity
    © SecondActivity
```

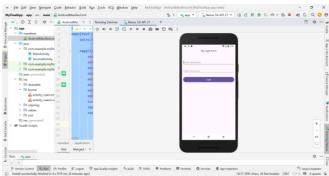
androidManifest.xml

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

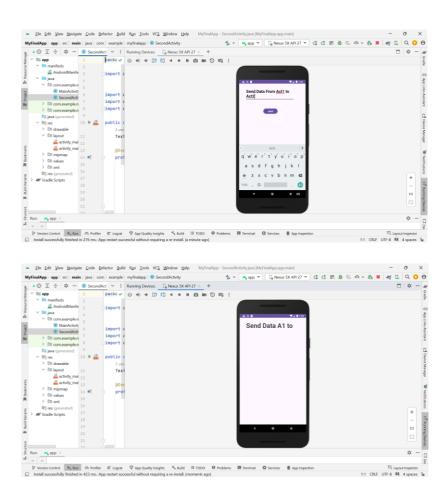
public class SecondActivity extends AppCompatActivity {
    TextView receiver_msg;

    @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</pre>
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");
    }
}
```

