

Mobile Application Development

Lab Assignments 1-4

1) Android App Life Cycle

MainActivity.java

```
package com.example.lifecycle;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        Toast.makeText(getApplicationContext(), "Created", Toast.LENGTH_SHORT).show();
    }

    @Override
    protected void onStart() {
        super.onStart();
        Toast.makeText(getApplicationContext(), "Started", Toast.LENGTH_SHORT).show();
    }

    @Override
    protected void onResume() {
        super.onResume();
        Toast.makeText(getApplicationContext(), "Resumed", Toast.LENGTH_SHORT).show();
    }

    @Override
    protected void onPause() {
        super.onPause();
        Toast.makeText(getApplicationContext(), "Paused", Toast.LENGTH_SHORT).show();
    }
}
```

```

@Override
protected void onStop() {
    super.onStop();
    Toast.makeText(getApplicationContext(), "Stopped", Toast.LENGTH_SHORT).show();
}

@Override
protected void onRestart() {
    super.onRestart();
    Toast.makeText(getApplicationContext(), "Re-started", Toast.LENGTH_SHORT).show();
}

@Override
protected void onDestroy() {
    super.onDestroy();
    Toast.makeText(getApplicationContext(), "Destroyed", Toast.LENGTH_SHORT).show();
}
}

```

activity_main.xml

```

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

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello World!"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintHorizontal_bias="0.526"
        app:layout_constraintLeft_toLeftOf="parent"

```

```
app:layout_constraintRight_toRightOf="parent"
```

```
app:layout_constraintTop_toTopOf="parent"
```

```
app:layout_constraintVertical_bias="0.431" />
```

```
<Button
```

```
android:id="@+id/button"
```

```
android:layout_width="94dp"
```

```
android:layout_height="85dp"
```

```
android:text="Button"
```

```
app:layout_constraintBottom_toBottomOf="parent"
```

```
app:layout_constraintEnd_toEndOf="parent"
```

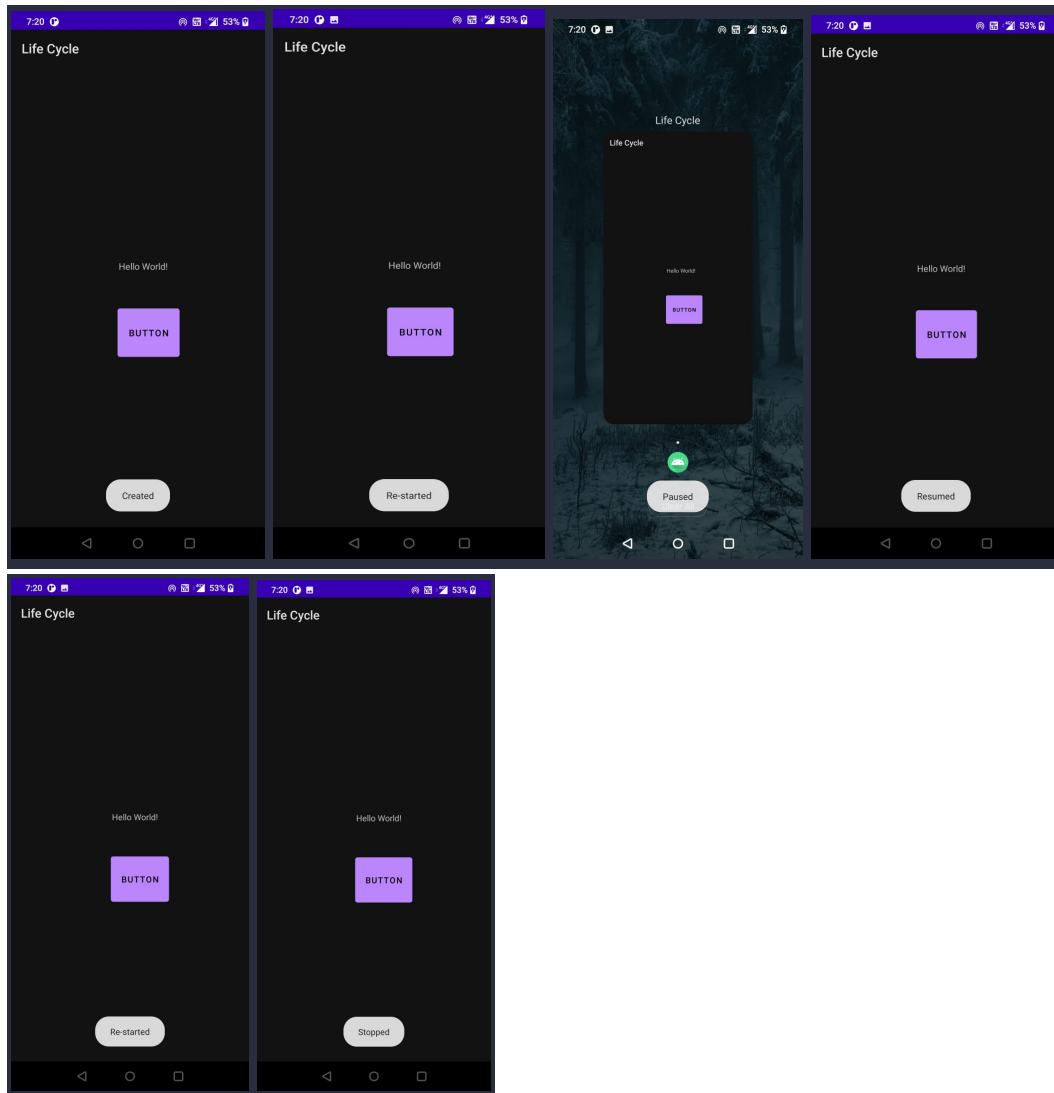
```
app:layout_constraintHorizontal_bias="0.555"
```

```
app:layout_constraintStart_toStartOf="parent"
```

```
app:layout_constraintTop_toTopOf="parent"
```

```
app:layout_constraintVertical_bias="0.588" />
```

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



2)Linear layout App - 1

MainActivity.java

```
package com.example.ll_1;
```

```
import androidx.appcompat.app.AppCompatActivity;
```

```
import android.os.Bundle;
```

```
import android.view.View;
```

```
import android.widget.EditText;
```

```
import android.widget.TextView;
```

```
import android.widget.Toast;
```

```
public class MainActivity extends AppCompatActivity {
```

```
@Override
```

```
protected void onCreate(Bundle savedInstanceState) {
```

```
    super.onCreate(savedInstanceState);
```

```
    setContentView(R.layout.activity_main);
```

```
}
```

```
public void showName(View view){
```

```
    EditText edit = (EditText) findViewById(R.id.editTextTextPersonName);
```

```
    String name = edit.getText().toString();
```

```
    String res = "Hello " + name;
```

```
    Toast.makeText(getApplicationContext(), res, 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:layout_width="match_parent"
```

```
    android:layout_height="match_parent"
```

```
    android:paddingLeft="16dp"
```

```
    android:paddingRight="16dp"
```

```
    android:orientation="vertical"
```

```
    android:layout_gravity="center"
```

```
>
```

```
<TextView
```

```
    android:id="@+id/textView"
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="wrap_content"
```

```
    android:layout_marginTop="48dp"
```

```
    android:layout_marginBottom="20dp"
```

```
    android:text="Welcome to the app"
```

```
android:textAlignment="center"  
android:textColor="@color/purple_700"  
android:textSize="36dp" />
```

<TextView

```
android:id="@+id/textView3"  
android:layout_width="match_parent"  
android:layout_height="57dp"  
android:text="First Linear Layout App"  
android:textAlignment="center"  
android:textColor="@color/purple_700"  
android:textSize="30sp" />
```

<LinearLayout

```
android:layout_width="match_parent"  
android:layout_height="wrap_content"  
android:layout_gravity="center"  
android:orientation="horizontal"  
android:layout_marginVertical="48dp"  
android:paddingLeft="36dp"  
android:paddingRight="36dp">
```

<TextView

```
android:id="@+id/textView2"  
android:layout_width="wrap_content"  
android:layout_height="wrap_content"  
android:layout_marginHorizontal="12dp"  
android:layout_marginVertical="36dp"  
android:text="Name"  
android:textColor="@color/design_default_color_secondary_variant"  
android:textSize="24dp" />
```

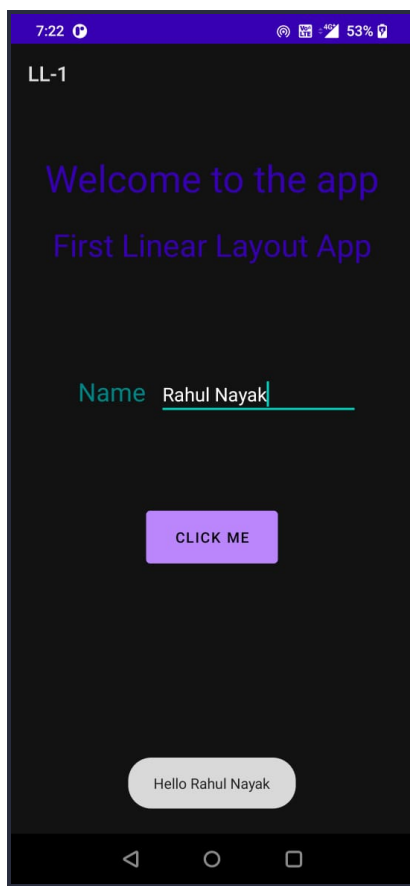
<EditText

```
android:id="@+id/editTextTextPersonName"  
android:layout_width="wrap_content"  
android:layout_height="wrap_content"  
android:layout_marginVertical="36dp"
```

```
        android:ems="10"  
        android:hint="Enter Name"  
        android:inputType="textPersonName"  
        android:paddingVertical="10dp"  
        android:textColor="@color/white" />  
    </LinearLayout>
```

```
<Button  
    android:id="@+id/button"  
    android:layout_width="126dp"  
    android:layout_height="62dp"  
    android:layout_gravity="center"  
    android:onClick="showName"  
    android:text="Click Me" />
```

```
</LinearLayout>
```



3)Linear layout App – 2 Calculator

MainActivity.java

```
package com.example.linearlayout_calculator;
```

```
import androidx.appcompat.app.AppCompatActivity;
```

```
import android.os.Bundle;
```

```
import android.view.View;
```

```
import android.widget.EditText;
```

```
import android.widget.Toast;
```

```
public class MainActivity extends AppCompatActivity {
```

```
    @Override
```

```
    protected void onCreate(Bundle savedInstanceState) {
```

```
        super.onCreate(savedInstanceState);
```

```
        setContentView(R.layout.activity_main);
```

```
    }
```

```
    public void add(View view)
```

```
    {
```

```
        EditText num1 = (EditText) findViewById(R.id.editTextNumber3);
```

```
        EditText num2 = (EditText) findViewById(R.id.editTextNumber4);
```

```
        int a = Integer.parseInt(num1.getText().toString());
```

```
        int b = Integer.parseInt(num2.getText().toString());
```

```
        int res = a+b;
```

```
        Toast.makeText(getApplicationContext(), "Sum = "+res, Toast.LENGTH_SHORT).show();
```

```
    }
```

```
    public void sub(View view)
```

```
    {
```

```
        EditText num1 = (EditText) findViewById(R.id.editTextNumber3);
```



```

    EditText num2 = (EditText) findViewById(R.id.editTextNumber4);
    int a = Integer.parseInt(num1.getText().toString());
    int b = Integer.parseInt(num2.getText().toString());
    int res = a-b;
    Toast.makeText(getApplicationContext(), "Difference = "+res,
    Toast.LENGTH_SHORT).show();
}

```

```

public void multiply(View view)
{
    EditText num1 = (EditText) findViewById(R.id.editTextNumber3);
    EditText num2 = (EditText) findViewById(R.id.editTextNumber4);
    int a = Integer.parseInt(num1.getText().toString());
    int b = Integer.parseInt(num2.getText().toString());
    int res = a*b;
    Toast.makeText(getApplicationContext(), "Product = "+res,
    Toast.LENGTH_SHORT).show();
}

```

```

public void divide(View view)
{
    EditText num1 = (EditText) findViewById(R.id.editTextNumber3);
    EditText num2 = (EditText) findViewById(R.id.editTextNumber4);
    float a = Integer.parseInt(num1.getText().toString());
    float b = Integer.parseInt(num2.getText().toString());
    float res = a/b;
    Toast.makeText(getApplicationContext(), "Quotient = "+res,
    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:layout_width="match_parent"
android:layout_height="match_parent"
android:paddingLeft="16dp"
android:paddingRight="16dp"
android:orientation="vertical"
android:layout_gravity="center"
android:layout_centerHorizontal="true"
android:layout_centerVertical="true"
android:background="@color/celeste">
```

<TextView

```
android:id="@+id/textView4"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:layout_marginTop="24dp"
android:gravity="center"
android:textSize="36sp"
android:textColor="@color/purple_700"
android:text="Mini Calculator" />
```

<TextView

```
android:id="@+id/textView5"
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:layout_marginVertical="24dp"
android:layout_marginHorizontal="75dp"
android:padding="8sp"
android:gravity="center"
android:textSize="20dp"
android:textColor="@color/purple_700"
android:textAlignment="center"
android:text="Number 1" />
```

<EditText

```
android:id="@+id/editTextNumber3"
android:layout_width="288dp"
android:layout_height="wrap_content"
android:layout_gravity="center"
android:ems="10"
```

```
android:gravity="center"  
android:inputType="number"  
android:textColor="@color/black"  
android:textAlignment="center" />
```

```
<TextView  
    android:id="@+id/textView6"  
    android:layout_width="match_parent"  
    android:layout_height="wrap_content"  
    android:layout_marginVertical="24dp"  
    android:layout_marginHorizontal="75dp"  
    android:padding="8sp"  
    android:gravity="center"  
    android:textSize="20dp"  
    android:textColor="@color/purple_700"  
    android:textAlignment="center"  
    android:text="Number 2" />
```

```
<EditText  
    android:id="@+id/editTextNumber4"  
    android:layout_width="288dp"  
    android:layout_height="wrap_content"  
    android:layout_gravity="center"  
    android:ems="10"  
    android:textColor="@color/black"  
    android:inputType="number"  
    android:gravity="center" />
```

```
<LinearLayout  
    android:layout_width="382dp"  
    android:layout_height="wrap_content"  
    android:layout_marginVertical="20dp"  
    android:orientation="horizontal"  
    android:paddingLeft="16dp"  
    android:paddingRight="16dp">
```

```
<Button  
    android:id="@+id/button"  
    android:layout_width="117dp"
```

```
android:layout_height="65dp"  
android:layout_marginHorizontal="20dp"  
android:layout_marginVertical="24dp"  
android:gravity="center"  
android:onClick="add"  
android:text="add" />
```

```
<Button
```

```
android:id="@+id/button7"  
android:layout_width="117dp"  
android:layout_height="65dp"  
android:layout_marginHorizontal="36dp"  
android:layout_marginVertical="24dp"  
android:onClick="sub"  
android:text="Subtract" />
```

```
</LinearLayout>
```

```
<LinearLayout
```

```
android:layout_width="382dp"  
android:layout_height="match_parent"  
android:paddingLeft="16dp"  
android:paddingRight="16dp"  
android:orientation="horizontal"  
android:layout_marginVertical="0dp">
```

```
<Button
```

```
android:id="@+id/button4"  
android:layout_width="117dp"  
android:layout_height="65dp"  
android:layout_marginHorizontal="24dp"  
android:layout_marginVertical="24dp"  
android:gravity="center"  
android:text="Multiply"  
android:onClick="multiply"/>
```

```
<Button
```

```
android:id="@+id/button5"  
android:layout_width="117dp"  
android:layout_height="65dp"
```

```
android:layout_marginHorizontal="30dp"
```

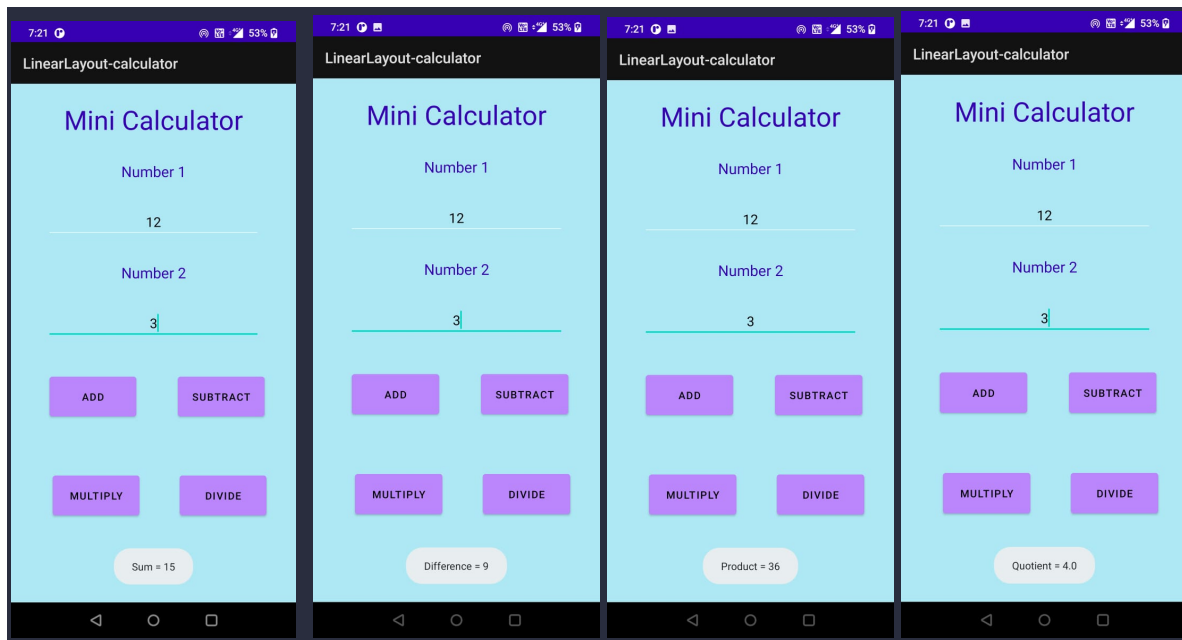
```
android:layout_marginVertical="24dp"
```

```
android:text="Divide"
```

```
android:onClick="divide"/>
```

```
</LinearLayout>
```

```
</LinearLayout>
```



4)Relative Layout App – 1 buttons

MainActivity.java

```
package com.example.rl_1;
```

```
import androidx.appcompat.app.AppCompatActivity;
```

```
import android.os.Bundle;
```

```
public class MainActivity extends AppCompatActivity {
```

```
    @Override
```

```
    protected void onCreate(Bundle savedInstanceState) {
```

```
        super.onCreate(savedInstanceState);
```

```
    setContentView(R.layout.activity_main);  
}  
}
```

activity_main.xml

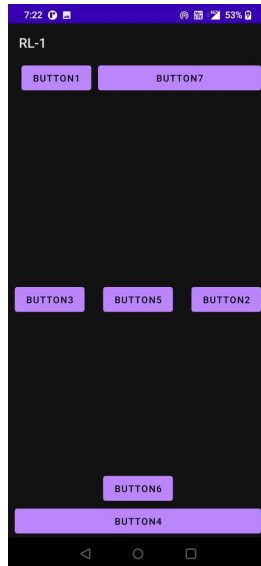
```
<?xml version="1.0" encoding="utf-8"?>  
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"  
    android:layout_width="match_parent"  
    android:layout_height="match_parent"  
    android:paddingLeft="10dp"  
    android:paddingRight="10dp">  
    <Button  
        android:id="@+id/btn1"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content"  
        android:layout_alignParentLeft="true"  
        android:layout_marginHorizontal="10dp"  
        android:text="Button1" />  
    <Button  
        android:id="@+id/btn2"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content"  
        android:layout_alignParentRight="true"  
        android:layout_centerVertical="true"  
        android:text="Button2" />  
    <Button  
        android:id="@+id/btn3"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content"  
        android:layout_alignParentLeft="true"  
        android:layout_centerVertical="true"  
        android:text="Button3" />  
  
    <Button  
        android:id="@+id/btn4"
```

```
android:layout_width="match_parent"
android:layout_height="wrap_content"
android:layout_alignParentBottom="true"
android:text="Button4" />
```

```
<Button
    android:id="@+id/btn5"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBottom="@+id/btn2"
    android:layout_centerHorizontal="true"
    android:text="Button5" />
```

```
<Button
    android:id="@+id/btn6"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/btn4"
    android:layout_centerHorizontal="true"
    android:text="Button6" />
```

```
<Button
    android:id="@+id/btn7"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentRight="true"
    android:layout_toEndOf="@+id/btn1"
    android:layout_toRightOf="@+id/btn1"
    android:text="Button7" />
</RelativeLayout>
```



5)Relative Layout App – 2 Course Registration

MainActivity.java

```
package com.example.rl_2;
```

```
import androidx.appcompat.app.AppCompatActivity;
```

```
import android.os.Bundle;
```

```
import android.view.View;
```

```
import android.widget.EditText;
```

```
import android.widget.Toast;
```

```
public class MainActivity extends AppCompatActivity {
```

```
    @Override
```

```
    protected void onCreate(Bundle savedInstanceState) {
```

```
        super.onCreate(savedInstanceState);
```

```
        setContentView(R.layout.activity_main);
```

```
    }
```

```
    public void submitForm(View view)
```

```
    {
```

```
        EditText cn = (EditText) findViewById(R.id.editTextTextPersonName);
```

```
        EditText cid = (EditText) findViewById(R.id.editTextTextPersonName2);
```

```
        EditText name = (EditText) findViewById(R.id.editTextTextPersonName3);
```



```

    EditText usn = (EditText) findViewById(R.id.editTextTextPersonName4);
    String a = cn.getText().toString();
    String b = cid.getText().toString();
    String c = name.getText().toString();
    String d = usn.getText().toString();
    String res = "Course Name : "+a + "\nCourse Code : "+b + "\nName : "+c + "\nUSN : "+d;
    Toast.makeText(getApplicationContext(), res, Toast.LENGTH_LONG).show();
}
}

```

activity_main.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:paddingLeft="10dp"
    android:paddingRight="10dp"
    android:layout_marginVertical="36dp"
    android:background="@color/sky_gray"
    >

```

```

    <EditText
        android:id="@+id/editTextTextPersonName"
        android:layout_width="161dp"
        android:layout_height="wrap_content"
        android:layout_marginHorizontal="10dp"
        android:layout_marginVertical="20dp"
        android:ems="10"
        android:textColor="@color/dark_navy"
        android:hint="Course Name"
        android:inputType="textPersonName" />

```

```

    <EditText
        android:id="@+id/editTextTextPersonName2"
        android:layout_width="184dp"
        android:layout_height="wrap_content"
        android:layout_alignParentRight="true"

```

```
android:layout_marginHorizontal="10dp"  
android:layout_marginVertical="20dp"  
android:layout_marginRight="14dp"  
android:ems="10"  
android:textColor="@color/dark_navy"  
android:inputType="textPersonName"  
android:hint="Course Code" />
```

```
<EditText
```

```
android:id="@+id/editTextTextPersonName3"  
android:layout_width="wrap_content"  
android:layout_height="wrap_content"  
android:layout_alignBottom="@+id/editTextTextPersonName2"  
android:layout_centerInParent="true"  
android:layout_marginBottom="-108dp"  
android:textColor="@color/dark_navy"  
android:ems="10"  
android:inputType="textPersonName"  
android:hint="Enter Name" />
```

```
<EditText
```

```
android:id="@+id/editTextTextPersonName4"  
android:layout_width="wrap_content"  
android:layout_height="wrap_content"  
android:layout_alignBottom="@+id/editTextTextPersonName3"  
android:layout_centerHorizontal="true"  
android:layout_marginBottom="-111dp"  
android:textColor="@color/dark_navy"  
android:ems="10"  
android:inputType="textPersonName"  
android:hint="Enter USN" />
```

```
<Button
```

```
android:id="@+id/button"  
android:layout_width="116dp"  
android:layout_height="80dp"  
android:layout_alignParentBottom="true"
```

```
android:layout_centerInParent="true"
android:layout_marginBottom="219dp"
android:backgroundTint="@color/peach"
android:text="Submit Form"
android:textColor="@color/dark_navy"
android:onClick="submitForm"/>
```

```
</RelativeLayout>
```

The screenshot shows an Android application interface. At the top, there is a black header bar with the text "RL-2". Below the header, the form is displayed on a light green background. It contains four text input fields: "MAD", "20IS5PWMAD", "Rahul Anil Nayak", and "1BM19IS212". Below these fields is an orange button labeled "SUBMIT FORM". At the bottom of the form, there is a white rounded rectangle containing the following text: "Course Name : MAD", "Course Code : 20IS5PWMAD", "Name : Rahul Anil Nayak", and "USN : 1BM19IS212". The status bar at the top of the phone shows the time as 7:22, signal strength, and 53% battery. The bottom of the screen shows the standard Android navigation bar.