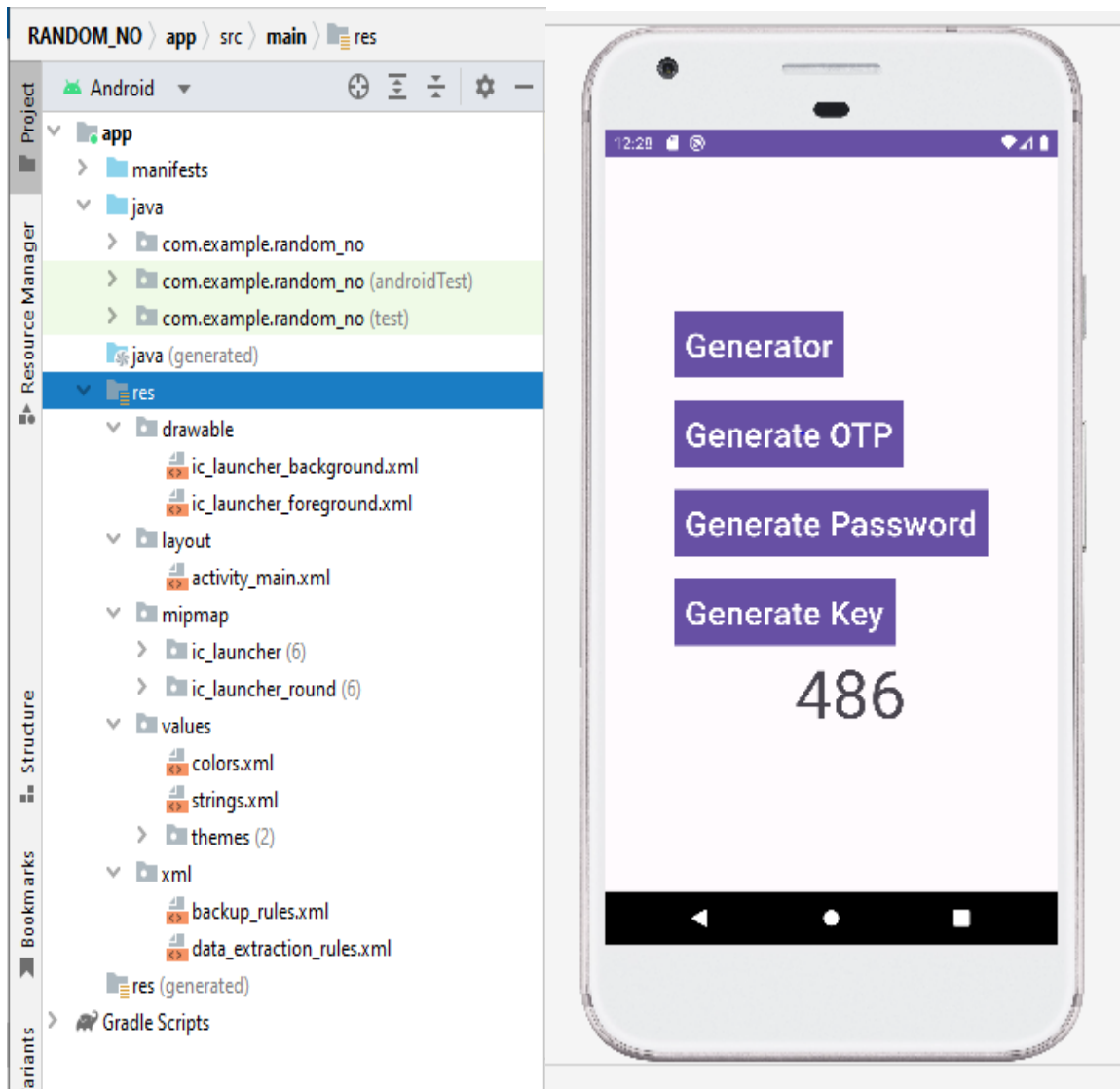


Lab Exercise-6: Generating Random Numbers (Password, OTP, Keys etc.)

Project Structure (Example)



Open `app > res > layout > activity_main.xml`. This file defines the layout for the user interface (UI). A UI in Android is defined in XML files.

activity_main.xml

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

```
android:layout_height="match_parent"
tools:context=".MainActivity">
```

```
<LinearLayout
```

```
    android:id="@+id/contentLayout"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_centerInParent="true"
    android:orientation="vertical">
```

```
<Button
```

```
    android:id="@+id/button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_centerHorizontal="true"
    android:layout_centerVertical="true"
    android:background="#FF5622"
    android:paddingHorizontal="10dp"
    android:text="Generator"
    android:textColor="#fff"
    android:textSize="30sp"
```

```
</>
```

```
<Button
```

```
    android:id="@+id/buttonGenerateOTP"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@id/button"
    android:layout_centerHorizontal="true"
    android:layout_marginTop="20dp"
    android:background="#FF5622"
    android:paddingHorizontal="10dp"
    android:text="Generate OTP"
    android:textColor="#fff"
    android:textSize="30sp" />
```

```
<Button
```

```
    android:id="@+id/buttonGeneratePassword"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@id/buttonGenerateOTP"
    android:layout_centerHorizontal="true"
    android:layout_marginTop="20dp"
    android:background="#FF5622"
    android:paddingHorizontal="10dp"
    android:text="Generate Password"
    android:textColor="#fff"
    android:textSize="30sp" />
```

```
<Button
```

```
    android:id="@+id/buttonGenerateKey"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@id/buttonGeneratePassword"
    android:layout_centerHorizontal="true"
    android:layout_marginTop="20dp"
```

```
        android:background="#FF5622"
        android:paddingHorizontal="10dp"
        android:text="Generate Key"
        android:textColor="#fff"
        android:textSize="30sp" />
```

```
<TextView
    android:id="@+id/gen"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@id/buttonGeneratePassword"
    android:layout_centerHorizontal="true"
    android:layout_marginTop="2dp"
    android:layout_marginLeft="110dp"
    android:text="0"
    android:textSize="60sp"

/>
```

```
</LinearLayout>
</RelativeLayout>
```

Open app > res > drawable>

lc_launcher_background.xml

```
<?xml version="1.0" encoding="utf-8" ?>
<vector xmlns:android="http://schemas.android.com/apk/res/android"
    android:width="108dp"
    android:height="108dp"
    android:viewportWidth="108"
    android:viewportHeight="108">
    <path
        android:fillColor="#3DDC84"
        android:pathData="M0,0h108v108h-108z" />
    <path
        android:fillColor="#00000000"
        android:pathData="M9,0L9,108"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M19,0L19,108"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M29,0L29,108"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M39,0L39,108"
```

```

        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M49,0L49,108"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M59,0L59,108"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M69,0L69,108"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M79,0L79,108"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M89,0L89,108"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M99,0L99,108"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M0,9L108,9"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M0,19L108,19"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M0,29L108,29"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M0,39L108,39"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M0,49L108,49"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />

```

```

<path
    android:fillColor="#00000000"
    android:pathData="M0,59L108,59"
    android:strokeWidth="0.8"
    android:strokeColor="#33FFFFFF" />
<path
    android:fillColor="#00000000"
    android:pathData="M0,69L108,69"
    android:strokeWidth="0.8"
    android:strokeColor="#33FFFFFF" />
<path
    android:fillColor="#00000000"
    android:pathData="M0,79L108,79"
    android:strokeWidth="0.8"
    android:strokeColor="#33FFFFFF" />
<path
    android:fillColor="#00000000"
    android:pathData="M0,89L108,89"
    android:strokeWidth="0.8"
    android:strokeColor="#33FFFFFF" />
<path
    android:fillColor="#00000000"
    android:pathData="M0,99L108,99"
    android:strokeWidth="0.8"
    android:strokeColor="#33FFFFFF" />
<path
    android:fillColor="#00000000"
    android:pathData="M19,29L89,29"
    android:strokeWidth="0.8"
    android:strokeColor="#33FFFFFF" />
<path
    android:fillColor="#00000000"
    android:pathData="M19,39L89,39"
    android:strokeWidth="0.8"
    android:strokeColor="#33FFFFFF" />
<path
    android:fillColor="#00000000"
    android:pathData="M19,49L89,49"
    android:strokeWidth="0.8"
    android:strokeColor="#33FFFFFF" />
<path
    android:fillColor="#00000000"
    android:pathData="M19,59L89,59"
    android:strokeWidth="0.8"
    android:strokeColor="#33FFFFFF" />
<path
    android:fillColor="#00000000"
    android:pathData="M19,69L89,69"
    android:strokeWidth="0.8"
    android:strokeColor="#33FFFFFF" />
<path
    android:fillColor="#00000000"
    android:pathData="M19,79L89,79"
    android:strokeWidth="0.8"
    android:strokeColor="#33FFFFFF" />
<path
    android:fillColor="#00000000"

```

```

        android:pathData="M29,19L29,89"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M39,19L39,89"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M49,19L49,89"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M59,19L59,89"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M69,19L69,89"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
    <path
        android:fillColor="#00000000"
        android:pathData="M79,19L79,89"
        android:strokeWidth="0.8"
        android:strokeColor="#33FFFFFF" />
</vector>

```

lc_launcher_foreground.xml

```

<vector xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:aapt="http://schemas.android.com/aapt"
    android:width="108dp"
    android:height="108dp"
    android:viewportWidth="108"
    android:viewportHeight="108">
    <path android:pathData="M31,63.928c0,0 6.4,-11 12.1,-13.1c7.2,-2.6 26,-
1.4 26,-1.4l38.1,38.1L107,108.928l-32,-1L31,63.928z">
        <aapt:attr name="android:fillColor">
            <gradient
                android:endX="85.84757"
                android:endY="92.4963"
                android:startX="42.9492"
                android:startY="49.59793"
                android:type="linear">
                <item
                    android:color="#44000000"
                    android:offset="0.0" />
                <item
                    android:color="#00000000"
                    android:offset="1.0" />
            </gradient>
        </aapt:attr>
    </path>
</vector>

```

```

</path>
<path
    android:fillColor="#FFFFFF"
    android:fillType="nonZero"
    android:pathData="M65.3,45.828l3.8,-6.6c0.2,-0.4 0.1,-0.9 -0.3,-1.1c-
0.4,-0.2 -0.9,-0.1 -1.1,0.3l-3.9,6.7c-6.3,-2.8 -13.4,-2.8 -19.7,0l-3.9,-6.7c-
0.2,-0.4 -0.7,-0.5 -1.1,-0.3C38.8,38.328 38.7,38.828
38.9,39.228l3.8,6.6C36.2,49.428 31.7,56.028 31,63.928h46C76.3,56.028
71.8,49.428 65.3,45.828zM43.4,57.328c-0.8,0 -1.5,-0.5 -1.8,-1.2c-0.3,-0.7 -
0.1,-1.5 0.4,-2.1c0.5,-0.5 1.4,-0.7 2.1,-0.4c0.7,0.3 1.2,1
1.2,1.8C45.3,56.528 44.5,57.328 43.4,57.328L43.4,57.328zM64.6,57.328c-0.8,0 -
1.5,-0.5 -1.8,-1.2s-0.1,-1.5 0.4,-2.1c0.5,-0.5 1.4,-0.7 2.1,-0.4c0.7,0.3
1.2,1 1.2,1.8C66.5,56.528 65.6,57.328 64.6,57.328L64.6,57.328z"
    android:strokeWidth="1"
    android:strokeColor="#00000000" />
</vector>

```

Open app > res > values> colors.xml

colors.xml

```

<?xml version="1.0" encoding="utf-8"?>
<resources>
    <color name="black">#FF000000</color>
    <color name="white">#FFFFFFFF</color>
</resources>

```

strings.xml

```

<resources>
    <string name="app_name">RANDOM_NO</string>
</resources>

```

Root folder of the application

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.RANDOM_NO"
        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>

```

Application root folder → java →

MainActivity.java

```

package com.example.random_no;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

import java.security.SecureRandom;
import java.util.Random;

public class MainActivity extends AppCompatActivity {
    Button button, buttonGenerateOTP, buttonGeneratePassword,
    buttonGenerateKey;
    TextView textView;

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

        button = findViewById(R.id.button);
        textView = findViewById(R.id.gen);
        buttonGenerateOTP = findViewById(R.id.buttonGenerateOTP);
        buttonGeneratePassword = findViewById(R.id.buttonGeneratePassword);
        buttonGenerateKey = findViewById(R.id.buttonGenerateKey);

        button.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                generateRandomNumber();
            }
        });
    }
}

```



```

    }
});

buttonGenerateOTP.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        generateOTP();
    }
});

buttonGeneratePassword.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        generatePassword();
    }
});

buttonGenerateKey.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        generateKey();
    }
});
}

private void generateRandomNumber() {
    Random random = new Random();
    int num = random.nextInt(1000);
    textView.setText(String.valueOf(num));
}

private void generateOTP() {
    SecureRandom secureRandom = new SecureRandom();
    // Generating a 6-digit OTP
    int otp = secureRandom.nextInt(900000) + 100000;
    textView.setText(String.valueOf(otp));
}

private void generatePassword() {
    // Generate a simple 8-character password (for demonstration
    // purposes)
    String password = generateRandomString(8);
    textView.setText(password);
}

private void generateKey() {
    // Generate a 16-character key (for demonstration purposes)
    String key = generateRandomString(16);
    textView.setText(key);
}

private String generateRandomString(int length) {
    String characters =
"ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789";
    StringBuilder stringBuilder = new StringBuilder();
    SecureRandom secureRandom = new SecureRandom();

```

```

        for (int i = 0; i < length; i++) {
            int randomIndex = secureRandom.nextInt(characters.length());
            stringBuilder.append(characters.charAt(randomIndex));
        }

        return stringBuilder.toString();
    }
}

```

build.gradle

```

plugins {
    id("com.android.application")
}

android {
    namespace = "com.example.random_no"
    compileSdk = 34

    defaultConfig {
        applicationId = "com.example.random_no"
        minSdk = 24
        targetSdk = 34
        versionCode = 1
        versionName = "1.0"

        testInstrumentationRunner = "androidx.test.runner.AndroidJUnitRunner"
    }

    buildTypes {
        release {
            isMinifyEnabled = false
            proguardFiles(getDefaultProguardFile("proguard-android-optimize.txt"), "proguard-rules.pro")
        }
    }
    compileOptions {
        sourceCompatibility = JavaVersion.VERSION_1_8
        targetCompatibility = JavaVersion.VERSION_1_8
    }
}

dependencies {
    implementation("androidx.appcompat:appcompat:1.6.1")
    implementation("com.google.android.material:material:1.10.0")
    implementation("androidx.constraintlayout:constraintlayout:2.1.4")
    testImplementation("junit:junit:4.13.2")
    androidTestImplementation("androidx.test.ext:junit:1.1.5")
    androidTestImplementation("androidx.test.espresso:espresso-core:3.5.1")
}

```