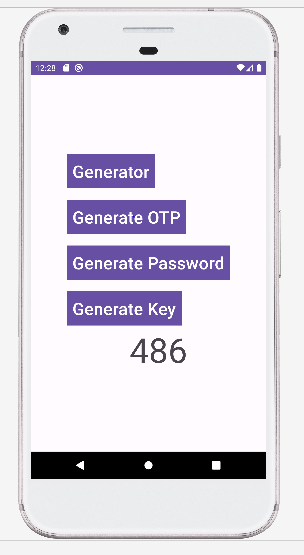
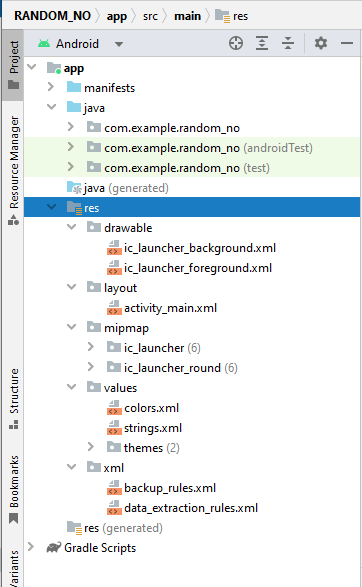
**Lab Exercise-6: Generating Random Numbers (Password, OTP, Keys etc.)**

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>**

**Ic\_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**>

**Ic\_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**>  
 <**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"**)  
**}**