LAB 1:

Xml file:

```
<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"
   android:background="@drawable/a"
   android:id="@+id/wallView"
   tools:context="_MainActivity">

   <TextView
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="CHANGING WALLPAPER APPLICATION"
      android:layout_marginTop="50sp"
      android:textSize="20sp"
      android:textStyle="bold"
      android:background="@color/black"
      android:textColor="@color/white"
      android:layout_centerHorizontal="true"
      android:id="@+id/text1"/>

   <Button
      android:layout_width="match_parent"
      android:layout_height="wrap_content"
      android:layout_marginTop="350sp"
      android:layout_centerHorizontal="true"
      android:layout_centerInParent="true"
      android:text="CLICK HERE TO CHANGE WALLPAPER"
      android:textSize="25sp"
      android:background?int="@color/black"
      android:layout_marginLeft="50sp"
      android:layout_marginRight="50sp"
      android:id="@+id/button1"/>
</RelativeLayout>
```

Java file:

```
package com.example.wallpaper;

import androidx.appcompat.app.AppCompatActivity;
import androidx.core.content.ContextCompat;

import android.content.Context;
import android.content.res.Resources;
import android.graphics.drawable.Drawable;
import android.graphics.drawable.TransitionDrawable;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import java.util.Random;
import java.util.Timer;
import java.util.TimerTask;

public class MainActivity extends AppCompatActivity {
   int[] images;
   Timer timer = new Timer();
   TimerTask timetask;

   @Override
   protected void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.activity_main);
      //View wallview = findViewById(R.id.wallView2);

      Button wpButton = findViewById(R.id.button);

      images = new
int[]{R.drawable.a,R.drawable.c,R.drawable.d,R.drawable.e,R.drawable.b,R.drawable.f};

      wpButton.setOnClickListener(new View.OnClickListener() {
         @Override public void onClick(View v) {
            timer.scheduleAtFixedRate(new TimerTask() {
               @Override public void run() {
                  View walkview = findViewById(R.id.wallView);
                  int imglength = images.length;
                  Random random = new Random();
```

```
                int rNum = random.nextInt(imglength);
                runOnUiThread(new Runnable() {
                    @Override public void run() {
                        walkview.setBackground(ContextCompat.getDrawable(getApplicationCont
ext(),images[rNum]);
                    }
                });
            }
        },0,3000);
    }
  });
 }
}
```

LAB 2:

Xml file

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
   android:orientation="vertical"
   android:background="#0COA10">

   <TextView
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Counter Application"
      android:textAllCaps="true"
      android:layout_marginLeft="40dp"
      android:layout_marginTop="50dp"
      android:layout_marginBottom="40dp"
      android:textSize="30dp"
      android:textColor="#109AD9" />

   <TextView
      android:id="@+id/counter"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Counter Value"
      android:layout_marginLeft="120dp"
      android:layout_marginTop="50dp"
      android:layout_marginBottom="40dp"
      android:textSize="30dp"
      android:textColor="#B507E0" />

   <Button
      android:id="@+id/startbtn"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="START"
```

```
        android:layout_marginLeft="145dp"
        android:layout_marginTop="20dp"
        android:layout_marginBottom="40dp"
        android:textSize="30dp"
        android:textColor="#0BOA0D"
        android:background="#EDB308"
        android:padding="10dp"/>

    <Button
        android:id="@+id/stopbtn"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="STOP"
        android:layout_marginLeft="150dp"
        android:layout_marginTop="20dp"
        android:layout_marginBottom="40dp"
        android:textSize="30dp"
        android:textColor="#0BOA0D"
        android:background="#EDB308"
        android:padding="10dp"/>
</LinearLayout>
```

JAVA file:

```
package com.example.counterapp;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity {
    TextView counterValue;
    Button startButton, stopButton;
    int counter=0, yes=0;

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

```
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_main);

counterValue = findViewById(R.id.counter);
startButton = findViewById(R.id.startbtn);
stopButton = findViewById(R.id.stopbtn);

startButton.setOnClickListener(new View.OnClickListener() {
   @Override
   public void onClick(View view) {
      new Thread(new Runnable() {
         @Override
         public void run() {
            counter = 0;
            while(!stopButton.isPressed()) {
               try {
                  Thread.sleep(500);
               } catch (InterruptedException e) {
                  e.printStackTrace();
                  return;
               }
               counterValue.post(new Runnable() {
                  @Override
                  public void run() {
                     counterValue.setText("" + counter++);
                  }
               });
            }
         }
      }).start();
   }
});

stopButton.setOnClickListener(new View.OnClickListener() {
   @Override
   public void onClick(View view) {
      try {
         Thread.sleep(500);
         Thread.interrupted();
      } catch(InterruptedException e) {
         e.printStackTrace();
```

```
                return;
            }
            counterValue.setText(""+counter);
        }
    });
  }
}
```

LAB 3:

XML file:

```
<?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:padding="16dp"
    android:gravity="center"
    android:orientation="vertical">

    <EditText
        android:id="@+id/editText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:minHeight="48dp"
        android:padding="12dp"
        android:hint="Enter text here"
        android:textSize="18sp"/>

    <Button
        android:id="@+id/btnSpeak"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Convert Text to Speech"
        android:layout_marginTop="20dp"/>
</LinearLayout>
```

JAVA file:

```
package com.example.texttospeech;

import android.os.Bundle;

import android.speech.tts.TextToSpeech;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import android.widget.Toast;
```

```
import androidx.appcompat.app.AppCompatActivity;
import java.util.Locale;
public class MainActivity extends AppCompatActivity {
    private EditText editText;
    private Button btnSpeak;
    private TextToSpeech textToSpeech;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        editText = findViewById(R.id.editText);
        btnSpeak = findViewById(R.id.btnSpeak);
        // Initialize Text ToSpeech
        textToSpeech = new TextToSpeech(getApplicationContext(), new
TextToSpeech.OnInitListener() {
            @Override
            public void onInit(int status) {
                if (status == TextToSpeech.SUCCESS) {
                    textToSpeech.setLanguage(Locale.US);
                } else {
                    Toast.makeText(MainActivity.this,
                        "Text-to-Speech Initialization Failed",
                        Toast.LENGTH_SHORT).show();
                }
            }
        });
        btnSpeak.setOnClickListener(new View.OnClickListener() {
            @Override
```

```
        public void onClick(View v) {
            String text = editText.getText().toString();
            if (!text.isEmpty()) {
                textToSpeech.speak(text, TextToSpeech.QUEUE_FLUSH, null, null);
            } else {
                Toast.makeText(MainActivity.this,
                    "Please enter text",
                    Toast.LENGTH_SHORT).show();
            }
        }
    });
  }
  @Override
  protected void onDestroy() {
    if (textToSpeech != null) {
      textToSpeech.stop();
      textToSpeech.shutdown();
    }
    super.onDestroy();
  }
}
```

LAB 4:

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:padding="16dp">

    <!-- Container for centering elements -->
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical"
        android:gravity="center">

        <!-- Username for Signup and Login -->
        <EditText
            android:id="@+id/etUsername"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Username"
            android:inputType="text" />

        <!-- Password for Signup and Login -->
        <EditText
            android:id="@+id/etPassword"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Password"
            android:inputType="textPassword" />

        <!-- Sign Up Button -->
        <Button
            android:id="@+id/btnSignUp"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Sign Up" />

        <!-- Sign In Button -->
```

```
    <Button
        android:id="@+id/btnSignIn"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Sign In" />

    <!-- Toast Message or Display Success -->
    <TextView
        android:id="@+id/textView"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textColor="@android:color/holo_green_dark"
        android:textSize="18sp"
        android:visibility="gone" />
  </LinearLayout>
</RelativeLayout>
```

MainActivity.java:

```
package com.example.lab4;

import android.content.Intent;
import android.os.Bundle;
import android.text.TextUtils;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;

import java.util.regex.Pattern;

public class MainActivity extends AppCompatActivity {

  private EditText etUsername, etPassword;
  private Button btnSignUp, btnSignIn;
  private TextView tvMessage;
  private String savedUsername = "", savedPassword = "";
  private int loginAttempts = 0;
```

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

        // Initialize UI elements
        etUsername = findViewById(R.id.etUsername);
        etPassword = findViewById(R.id.etPassword);
        btnSignUp = findViewById(R.id.btnSignUp);
        btnSignIn = findViewById(R.id.btnSignIn);
//        tvMessage = findViewById(R.id.tvMessage);

        // Sign Up button click listener
        btnSignUp.setOnClickListener(v -> {
            String username = etUsername.getText().toString().trim();
            String password = etPassword.getText().toString().trim();

            if (TextUtils.isEmpty(username) || TextUtils.isEmpty(password)) {
                Toast.makeText(MainActivity.this, "Username and Password cannot be empty",
Toast.LENGTH_SHORT).show();
                return;
            }

            // Password validation
            if (isPasswordValid(password)) {
                savedUsername = username;
                savedPassword = password;
                Toast.makeText(MainActivity.this, "Sign Up Successful!",
Toast.LENGTH_SHORT).show();
                // Reset the fields
                etUsername.setText("");
                etPassword.setText("");
            } else {
                Toast.makeText(MainActivity.this, "Password does not meet the criteria",
Toast.LENGTH_SHORT).show();
            }
        });

        // Sign In button click listener
        btnSignIn.setOnClickListener(v -> {
            String enteredUsername = etUsername.getText().toString().trim();
```

```
        String enteredPassword = etPassword.getText().toString().trim();

        if (TextUtils.isEmpty(enteredUsername) || TextUtils.isEmpty(enteredPassword)) {
            Toast.makeText(MainActivity.this, "Username and Password cannot be empty",
Toast.LENGTH_SHORT).show();
            return;
        }

        // Check if credentials match
        if (enteredUsername.equals(savedUsername) &&
enteredPassword.equals(savedPassword)) {
            Toast.makeText(MainActivity.this, "Successful Login",
Toast.LENGTH_SHORT).show();
            // Proceed to the next activity
            Intent intent = new Intent(MainActivity.this, NextActivity.class);
            startActivity(intent);
            finish();
        } else {
            loginAttempts++;
            if (loginAttempts >= 2) {
                btnSignIn.setEnabled(false);
                Toast.makeText(MainActivity.this, "Failed Login Attempts",
Toast.LENGTH_SHORT).show();
            } else {
                Toast.makeText(MainActivity.this, "Login Failed", Toast.LENGTH_SHORT).show();
            }
        }
    });
  }

  // Password validation method
  private boolean isPasswordValid(String password) {
    // Regular expressions for password validation
    String upperCasePattern = ".*[A-Z].*";
    String lowerCasePattern = ".*[a-z].*";
    String numberPattern = ".*\\d.*";
    String specialCharPattern = ".*[!@#$%^&*(),.?\":{}|<>].*";

    return password.length() >= 8
            && Pattern.matches(upperCasePattern, password)
            && Pattern.matches(lowerCasePattern, password)
```

```
            && Pattern.matches(numberPattern, password)
            && Pattern.matches(specialCharPattern, password);
    }
}
```

activity_next.xml

(res > layout > activity_next.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:padding="16dp"
    android:orientation="vertical"
    android:gravity="center"> <!-- Centering content -->

    <!-- TextView for displaying successful login message -->
    <TextView
        android:id="@+id/tvSuccessMessage"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Welcome!"
        android:textSize="24sp"
        android:textColor="@android:color/holo_green_dark" />
</LinearLayout>
```

NextActivity.java

(java > com.example.filename > NextActivity.java)

```
package com.example.lab4;

import android.os.Bundle;
import android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;

public class NextActivity extends AppCompatActivity {

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

```
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_next);

        // Display a success message
        TextView successMessage = findViewById(R.id.tvSuccessMessage);
        successMessage.setText("Successful Login!");
    }
}
```

LAB 5: Develop applications that supports asynchronous task to send notification via SMS.

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:orientation="vertical"
    android:padding="16dp"
    android:gravity="center">

<Button

    android:id="@+id/buttonSendSMS"

    android:layout_width="wrap_content"

    android:layout_height="wrap_content"

    android:text="Send SMS"

    android:layout_gravity="center"

    android:layout_marginTop="100dp"/>

</LinearLayout>
```

AndroidManifest.xml:

```
<uses-permission android:name="android.permission.SEND_SMS"/>
```

MainActivity.java:

```
public class MainActivity extends AppCompatActivity {


    private ExecutorService executorService;

    private Handler mainHandler;
```

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

    executorService = Executors.newSingleThreadExecutor();
    mainHandler = new Handler(Looper.getMainLooper());

    // Request SMS permission at runtime
    if (ContextCompat.checkSelfPermission(this, Manifest.permission.SEND_SMS)
            != PackageManager.PERMISSION_GRANTED) {
        ActivityCompat.requestPermissions(this,
                new String[]{Manifest.permission.SEND_SMS}, 1);
    }

    findViewById(R.id.buttonSendSMS).setOnClickListener(v -> {
        String phoneNumber = "1234567890";  // Replace with actual number
        String message = "Hello from my app!";
        sendSMSAsync(phoneNumber, message);
    });
}

private void sendSMSAsync(String phoneNumber, String message) {
    executorService.execute(() -> {
        try {
            SmsManager smsManager = SmsManager.getDefault();
            smsManager.sendTextMessage(phoneNumber, null, message, null, null);
```

```
            // Notify success on UI thread
            mainHandler.post(() ->
                Toast.makeText(MainActivity.this, "SMS Sent Successfully!",
Toast.LENGTH_SHORT).show()
            );

        } catch (Exception e) {
            e.printStackTrace();
            // Notify failure on UI thread
            mainHandler.post(() ->
                Toast.makeText(MainActivity.this, "SMS Failed: " + e.getMessage(),
Toast.LENGTH_LONG).show()
            );
        }
    });
  }
}
```