Lab Cycle: 01 Date:

EXPERIMENT NO: 01

AIM: Design a Login Form with username and password using Linear Layout and toast valid credentials.

Procedure:

MainActivity.java

```
package com.example.s3mca55;
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.Toast;
import android.widget.EditText;
import android.widget.Button;

public class MainActivity extends AppCompatActivity {
    private static final String VALID_USR_NAME = "user";
    private static final String VALID_PWD = "pass";
    private EditText username;
    private EditText password;
    private Button loginbtn;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        username = findViewById(R.id.uname);
        password = findViewById(R.id.pwd);

        loginbtn = findViewById(R.id.lbtn);
        loginbtn.setOnClickListener(view -> {
            String enteredUname = username.getText().toString().trim();
```

```
        String enteredPwd = password.getText().toString().trim();

        if (enteredUname.isEmpty() || enteredPwd.isEmpty()) {
            showToast("Please enter both username and password");
        } else if (isValid(enteredUname, enteredPwd)) {
            showToast("Login Success");
        } else {
            showToast("Invalid credentials");
        }
    });
}

public boolean isValid(String euname, String epwd) {
    return VALID_USR_NAME.equals(euname) && VALID_PWD.equals(epwd);
}

private void showToast(String msg) {
    Toast.makeText(this, msg, Toast.LENGTH_LONG).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">

    <LinearLayout
```

```
android:layout_width="0dp"
android:layout_height="0dp"
android:orientation="vertical"
app:layout_constraintBottom_toBottomOf="parent"
app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"
app:layout_constraintTop_toTopOf="parent"
app:layout_constraintVertical_bias="0.0">

<TextView
    android:id="@+id/textView5"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="LOGIN FORM"
    android:textAlignment="center"
    android:textSize="24sp"
    android:padding="16dp" />

<TextView
    android:id="@+id/textView6"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Username"
    android:padding="16dp" />

<EditText
    android:id="@+id/uname"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Enter username"
    android:inputType="text"
    android:padding="16dp" />
```

```
        <TextView
            android:id="@+id/textView7"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Password"
            android:padding="16dp" />

        <EditText
            android:id="@+id/pwd"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:inputType="textPassword"
            android:hint="Enter password"
            android:padding="16dp" />

        <Button
            android:id="@+id/lbtn"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Login"
            android:padding="16dp" />
    </LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

OUTPUT:

RESULT:

The program was executed successfully and the output was verified.

Lab Cycle: 01 Date:

EXPERIMENT NO: 02

AIM: Implementing basic arithmetic operations of a simple calculator.

Procedure:

MainActivity.java

```
package com.example.s3mca55;
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.TextView;
import android.widget.Button;

public class MainActivity extends AppCompatActivity {

    private TextView textView1;
    private Button button1, button2, button3, button4, button5, button6, button7, button8, button9,
button0;
    private Button buttonAdd, buttonSub, buttonMul, buttonDiv, buttonDot, buttonEqual;
    private String currentInput = "";
    private double operand1 = 0;
    private String operator = "";

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        textView1 = findViewById(R.id.text_View1);
    }
```

```
public void onDigitClick(View view) {
    Button button = (Button) view;
    currentInput += button.getText().toString();
    updateDisplay();
}

public void onOperatorClick(View view) {
    if (!currentInput.isEmpty()) {
        operand1 = Double.parseDouble(currentInput);
        operator = ((Button) view).getText().toString();
        currentInput = "";
    }
}

public void onEqualsClick(View view) {
    if (!currentInput.isEmpty()) {
        double operand2 = Double.parseDouble(currentInput);
        double result = performOperation(operand1, operand2, operator);
        currentInput = String.valueOf(result);
        updateDisplay();
    }
}

public void onClearClick(View view) {
    currentInput = "";
    operand1 = 0;
    operator = "";
    updateDisplay();
}

private double performOperation(double operand1, double operand2, String operator) {
```

```
        switch (operator) {
            case "+":
                return operand1 + operand2;
            case "-":
                return operand1 - operand2;
            case "*":
                return operand1 * operand2;
            case "/":
                if (operand2 != 0)
                    return operand1 / operand2;
                else
                    return Double.NaN;
            default:
                return 0;
        }
    }

    public void updateDisplay() {
        textView1.setText(currentInput);
    }
}
```

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">
```

```
<LinearLayout
    android:layout_width="409dp"
    android:layout_height="601dp"
    android:orientation="vertical"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent">

    <TextView
        android:id="@+id/text_View"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="SIMPLE CALCULATOR"
        android:textSize="24sp" />

    <TextView
        android:id="@+id/text_View1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="TextView"
        android:textSize="24sp" />

    <GridLayout
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:layout_marginTop="40dp"
        android:columnCount="4"
        android:rowCount="4">

        <Button
```

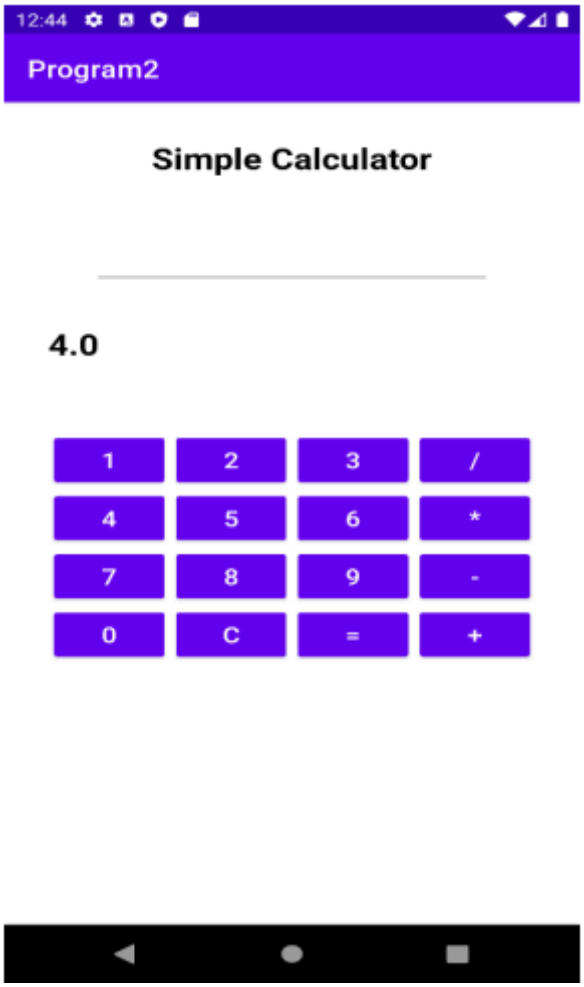
```
    android:id="@+id/button1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onDigitClick"
    android:text="1" />

<Button
    android:id="@+id/button2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onDigitClick"
    android:text="2" />

<Button
    android:id="@+id/button3"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onDigitClick"
    android:text="3" />

<Button
    android:id="@+id/buttonDiv"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onOperatorClick"
    android:text="/" />

<Button
    android:id="@+id/button4"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onDigitClick"
```

```
    android:text="4" />

<Button
    android:id="@+id/button5"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onDigitClick"
    android:text="5" />

<Button
    android:id="@+id/button6"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onDigitClick"
    android:text="6" />

<Button
    android:id="@+id/buttonMul"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onOperatorClick"
    android:text="*" />

<Button
    android:id="@+id/button7"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onDigitClick"
    android:text="7" />

<Button
    android:id="@+id/button8"
```

```
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onDigitClick"
    android:text="8" />

<Button
    android:id="@+id/button9"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onDigitClick"
    android:text="9" />

<Button
    android:id="@+id/buttonSub"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onOperatorClick"
    android:text="-" />

<Button
    android:id="@+id/button0"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onDigitClick"
    android:text="0" />

<Button
    android:id="@+id/buttonDot"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="onClearClick"
    android:text="C" />
```

```
        <Button
            android:id="@+id/buttonEqual"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:onClick="onEqualsClick"
            android:text="=" />

        <Button
            android:id="@+id/buttonAdd"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:onClick="onOperatorClick"
            android:text="+" />
    </GridLayout>
  </LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

OUTPUT:



RESULT:

The program was executed successfully and the output was verified.

Lab Cycle: 01 Date:

EXPERIMENT NO: 03

AIM: Write a program that demonstrates Activity Lifecycle

Procedure:

MainActivity.java

```
package com.example.activitylifecycle;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.Button;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

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

        // Set up onClick listeners for each button
        Button onCreateButton = findViewById(R.id.onCreateButton);
        Button onStartButton = findViewById(R.id.onStartButton);
        Button onPauseButton = findViewById(R.id.onPauseButton);
        Button onStopButton = findViewById(R.id.onStopButton);
        Button onRestartButton = findViewById(R.id.onRestartButton);
        Button onDestroyButton = findViewById(R.id.onDestroyButton);

        onCreateButton.setOnClickListener(v -> showToast("onCreate() Clicked"));
```

```
    onStartButton.setOnClickListener(v -> showToast("onStart() Clicked"));
    onPauseButton.setOnClickListener(v -> showToast("onPause() Clicked"));
    onStopButton.setOnClickListener(v -> showToast("onStop() Clicked"));
    onRestartButton.setOnClickListener(v -> showToast("onRestart() Clicked"));
    onDestroyButton.setOnClickListener(v -> showToast("onDestroy() Clicked"));
}

@Override
protected void onStart() {
    super.onStart();
    showToast("Activity Started");
}

@Override
protected void onResume() {
    super.onResume();
    showToast("Activity Resumed");
}

@Override
protected void onPause() {
    super.onPause();
    showToast("Activity Paused");
}

@Override
protected void onStop() {
    super.onStop();
    showToast("Activity Stopped");
}

@Override
```

```
    protected void onRestart() {
        super.onRestart();
        showToast("Activity Restarted");
    }

    @Override
    protected void onDestroy() {
        super.onDestroy();
        showToast("Activity Destroyed");
    }

    void showToast(String message) {
        Toast.makeText(this, message, 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:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="@string/activity_lifecycle"
        android:textAlignment="center"
        android:textSize="30sp"
        android:layout_marginTop="50dp"
```

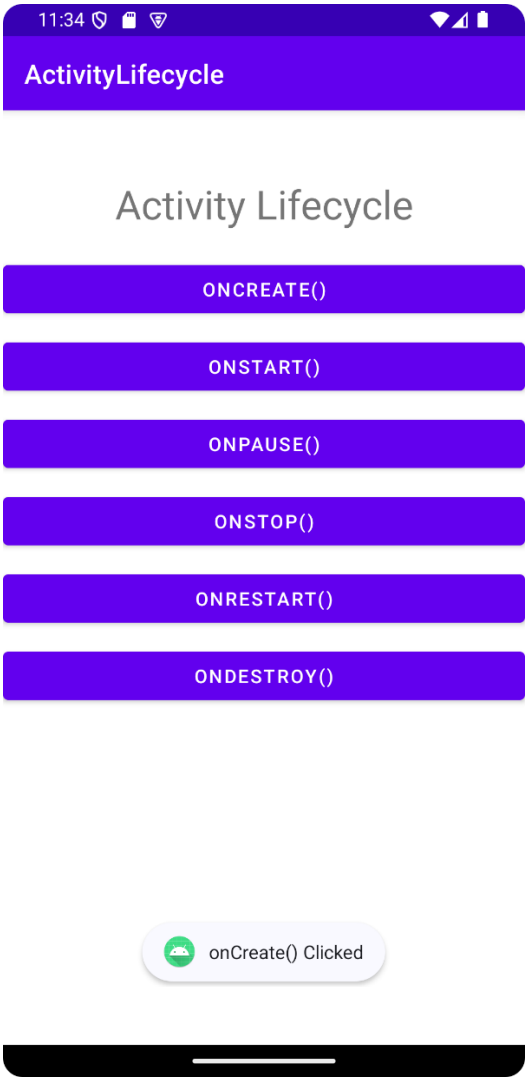
```
    android:id="@+id/activityLifecycleText"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    />
<Button
    android:id="@+id/onCreateButton"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:text="@string/onCreate"
    android:layout_marginTop="20dp"
    app:layout_constraintTop_toBottomOf="@id/activityLifecycleText"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    />
<Button
    android:id="@+id/onStartButton"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:text="@string/onStart"
    android:layout_marginTop="10dp"
    app:layout_constraintTop_toBottomOf="@id/onCreateButton"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    />
<Button
    android:id="@+id/onPauseButton"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:text="@string/onPause"
    android:layout_marginTop="10dp"
    app:layout_constraintTop_toBottomOf="@id/onStartButton"
```

```
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    />
<Button
    android:id="@+id/onStopButton"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:text="@string/onStop"
    android:layout_marginTop="10dp"
    app:layout_constraintTop_toBottomOf="@id/onPauseButton"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    />
<Button
    android:id="@+id/onRestartButton"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:text="@string/onRestart"
    android:layout_marginTop="10dp"
    app:layout_constraintTop_toBottomOf="@id/onStopButton"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    />
<Button
    android:id="@+id/onDestroyButton"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:text="@string/onDestroy"
    android:layout_marginTop="10dp"
    app:layout_constraintTop_toBottomOf="@id/onRestartButton"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
```

/>

</androidx.constraintlayout.widget.ConstraintLayout>

OUTPUT:



RESULT:

The program was executed successfully and the output was verified.

Lab Cycle: 01 Date:

EXPERIMENT NO: 04

AIM: Implement validations on various UI controls

Procedure:

MainActivity.java

```
package com.example.ui;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {

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

        Button constraintButton = findViewById(R.id.constraintButton);
        Button linearButton = findViewById(R.id.linearButton);
        Button gridButton = findViewById(R.id.gridButton);
        Button relativeButton = findViewById(R.id.relativeButton);
        Button frameButton = findViewById(R.id.frameButton);
        Button tableButton = findViewById(R.id.tableButton);

        View.OnClickListener buttonClickListener = new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String layoutName = ((Button) v).getText().toString();
```

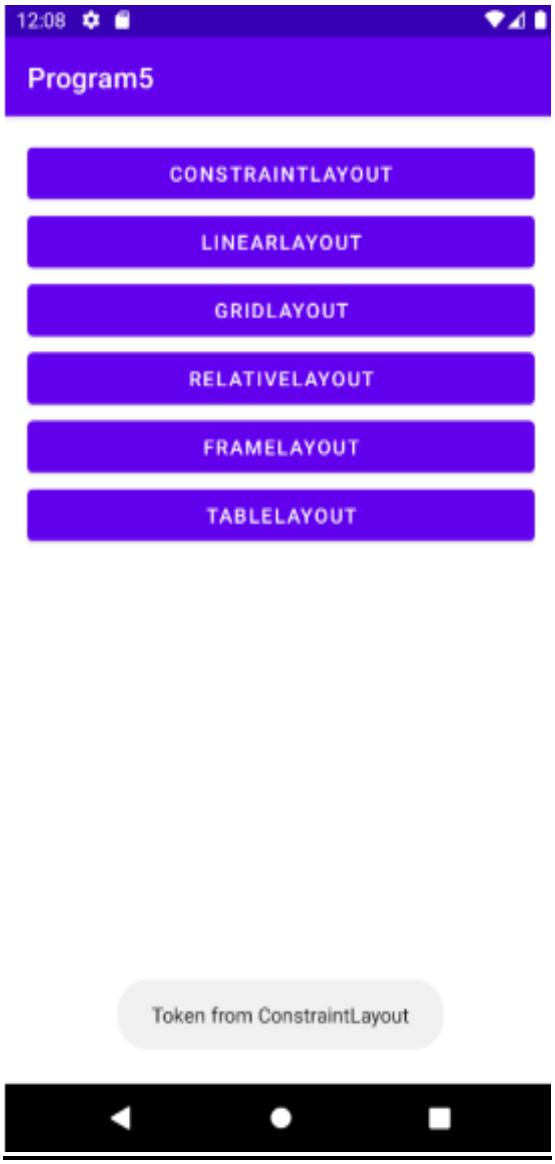
```
            displayToken(layoutName);
        }
    };
    constraintButton.setOnClickListener(buttonClickListener);
    linearButton.setOnClickListener(buttonClickListener);
    gridButton.setOnClickListener(buttonClickListener);
    relativeButton.setOnClickListener(buttonClickListener);
    frameButton.setOnClickListener(buttonClickListener);
    tableButton.setOnClickListener(buttonClickListener);
  }
  private void displayToken(String layoutName) {
    Toast.makeText(this, "Token from " + layoutName, Toast.LENGTH_SHORT).show();
  }
}
```

activity_main.xml

```
<?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"
  android:orientation="vertical"
  android:padding="16dp"
  tools:context=".MainActivity">

  <Button
    android:id="@+id/constraintButton"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="ConstraintLayout" />
```

```
    <Button
        android:id="@+id/linearButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="LinearLayout" />

    <Button
        android:id="@+id/gridButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="GridLayout" />

    <Button
        android:id="@+id/relativeButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="RelativeLayout" />

    <Button
        android:id="@+id/frameButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="FrameLayout" />

    <Button
        android:id="@+id/tableButton"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="TableLayout" />
</LinearLayout>
```

OUTPUT:



RESULT:

The program was executed successfully and the output was verified.