Problem 4: Basic Calculator

Exercise Objective: Create a simple Android calculator app that performs basic arithmetic operations: addition, subtraction, multiplication, and division.

Problem Statement 4: The app should have two input fields for entering numbers and buttons for each of the four arithmetic operations. Upon selecting an operation and pressing the "Calculate" button, the app should display the result.

Expected Output: The app displays the result of the arithmetic operation.

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"
    android:id="@+id/main"
    tools:context=".MainActivity">

    <!-- Row 1: 7, 8, 9, / -->
    <TextView
        android:id="@+id/tvDisplay"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_marginTop="72dp"
        android:background="@android:color/darker_gray"
        android:padding="16dp"
        android:text="0"
        android:textAlignment="textEnd"
        android:textSize="32sp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.0"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btnSeven"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="7"
        app:layout_constraintTop_toBottomOf="@id/tvDisplay"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintEnd_toStartOf="@id/btnEight"
        app:layout_constraintHorizontal_chainStyle="spread"
```

```
        android:onClick="numberEvent"/>
    <Button
        android:id="@+id/btnEight"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="8"
        app:layout_constraintTop_toTopOf="@id/btnSeven"
        app:layout_constraintStart_toEndOf="@id/btnSeven"
        app:layout_constraintEnd_toStartOf="@id/btnNine"
        android:onClick="numberEvent"/>
    <Button
        android:id="@+id/btnNine"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="9"
        app:layout_constraintTop_toTopOf="@id/btnEight"
        app:layout_constraintStart_toEndOf="@id/btnEight"
        app:layout_constraintEnd_toStartOf="@id/btnDivide"
        android:onClick="numberEvent"/>
    <Button
        android:id="@+id/btnDivide"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="/"
        app:layout_constraintTop_toTopOf="@id/btnNine"
        app:layout_constraintStart_toEndOf="@id/btnNine"
        app:layout_constraintEnd_toEndOf="parent"
        android:onClick="operationEvent"/>
    <!-- Row 2: 4, 5, 6, * -->
    <Button
        android:id="@+id/btnFour"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="4"
        app:layout_constraintTop_toBottomOf="@id/btnSeven"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintEnd_toStartOf="@id/btnEight"
        app:layout_constraintHorizontal_chainStyle="spread"
        android:onClick="numberEvent"/>
    <Button
        android:id="@+id/btnFive"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="5"
        app:layout_constraintTop_toTopOf="@id/btnFour"
        app:layout_constraintStart_toEndOf="@id/btnFour"
        app:layout_constraintEnd_toStartOf="@id/btnSix"
```

```
        android:onClick="numberEvent"/>
    <Button
        android:id="@+id/btnSix"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="6"
        app:layout_constraintTop_toTopOf="@id/btnFive"
        app:layout_constraintStart_toEndOf="@id/btnFive"
        app:layout_constraintEnd_toStartOf="@id/btnMultiply"
        android:onClick="numberEvent"/>
    <Button
        android:id="@+id/btnMultiply"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="*"
        app:layout_constraintTop_toTopOf="@id/btnSix"
        app:layout_constraintStart_toEndOf="@id/btnSix"
        app:layout_constraintEnd_toEndOf="parent"
        android:onClick="operationEvent"/>

    <!-- Row 3: 1, 2, 3, - -->
    <Button
        android:id="@+id/btnOne"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="1"
        app:layout_constraintTop_toBottomOf="@id/btnFour"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintEnd_toStartOf="@id/btnTwo"
        app:layout_constraintHorizontal_chainStyle="spread"
        android:onClick="numberEvent"/>
    <Button
        android:id="@+id/btnTwo"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="2"
        app:layout_constraintTop_toTopOf="@id/btnOne"
        app:layout_constraintStart_toEndOf="@id/btnOne"
        app:layout_constraintEnd_toStartOf="@id/btnThree"
        android:onClick="numberEvent"/>
    <Button
        android:id="@+id/btnThree"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="3"
        app:layout_constraintTop_toTopOf="@id/btnTwo"
        app:layout_constraintStart_toEndOf="@id/btnTwo"
```

```
        app:layout_constraintEnd_toStartOf="@id/btnMinus"
        android:onClick="numberEvent"/>
    <Button
        android:id="@+id/btnMinus"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="-"
        app:layout_constraintTop_toTopOf="@id/btnThree"
        app:layout_constraintStart_toEndOf="@id/btnThree"
        app:layout_constraintEnd_toEndOf="parent"
        android:onClick="operationEvent"/>

    <!-- Row 4: 0, C, =, + -->
    <Button
        android:id="@+id/btnZero"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="0"
        app:layout_constraintTop_toBottomOf="@id/btnOne"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintEnd_toStartOf="@id/btnClear"
        app:layout_constraintHorizontal_chainStyle="spread"
        android:onClick="numberEvent"/>
    <Button
        android:id="@+id/btnClear"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="C"
        app:layout_constraintTop_toTopOf="@id/btnZero"
        app:layout_constraintStart_toEndOf="@id/btnZero"
        app:layout_constraintEnd_toStartOf="@id/btnEquals"
        android:onClick="clearEvent"/>
    <Button
        android:id="@+id/btnEquals"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="="
        app:layout_constraintTop_toTopOf="@id/btnClear"
        app:layout_constraintStart_toEndOf="@id/btnClear"
        app:layout_constraintEnd_toStartOf="@id/btnAdd"
        android:onClick="equalEvent"/>
    <Button
        android:id="@+id/btnAdd"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:text="+"
        app:layout_constraintTop_toTopOf="@id/btnEquals"
```

```
        app:layout_constraintStart_toEndOf="@id/btnEquals"
        app:layout_constraintEnd_toEndOf="parent"
        android:onClick="operationEvent"/>
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java

```
package com.example.basiccalculator;
import android.os.Bundle;
import android.view.View;
import android.widget.TextView;
import androidx.activity.EdgeToEdge;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.graphics.Insets;
import androidx.core.view.ViewCompat;
import androidx.core.view.WindowInsetsCompat;

public class MainActivity extends AppCompatActivity {
    TextView tvDisplay;
    private double firstNumber = 0;
    private String operation = null;
    private boolean isNewOperation = true;

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

ViewCompat.setOnApplyWindowInsetsListener(findViewById(R.id.ma
in ), (v, insets) -> {
                Insets systemBars =

insets.getInsets(WindowInsetsCompat.Type.systemBars());
        v.setPadding(systemBars.left, systemBars.top,
                systemBars.right, systemBars.bottom);
        return insets;
        });
        tvDisplay = findViewById(R.id.tvDisplay);
    }

    public void numberEvent(View view) {
        if (isNewOperation) {
            tvDisplay.setText("");
```

```
        }
        isNewOperation = false;
        String number = tvDisplay.getText().toString();
        int id = view.getId();
        if (id == R.id.btnZero) {
            number += "0";
        } else if (id == R.id.btnOne) {
            number += "1";
        } else if (id == R.id.btnTwo) {
            number += "2";
        } else if (id == R.id.btnThree) {
            number += "3";
        } else if (id == R.id.btnFour) {
            number += "4";
        } else if (id == R.id.btnFive) {
            number += "5";
        } else if (id == R.id.btnSix) {
            number += "6";
        } else if (id == R.id.btnSeven) {
            number += "7";
        } else if (id == R.id.btnEight) {
            number += "8";
        } else if (id == R.id.btnNine) {
            number += "9";
        }
        tvDisplay.setText(number);
    }

    public void operationEvent(View view) {
        isNewOperation = true;
        firstNumber =

Double.parseDouble(tvDisplay.getText().toString());
        int id = view.getId();
        if (id == R.id.btnAdd) {
            operation = "+";
        } else if (id == R.id.btnMinus) {
            operation = "-";
        } else if (id == R.id.btnMultiply) {
            operation = "*";
        } else if (id == R.id.btnDivide) {
            operation = "/";
        }
    }

    public void equalEvent(View view) {
        if (operation == null) {
```

```
            tvDisplay.setText("No operation set");
            isNewOperation = true;
            return;
        }
        String newNumber = tvDisplay.getText().toString();
        double result = 0.0;
        switch (operation) {
            case "+":
                result = firstNumber +
                        Double.parseDouble(newNumber);
                break;
            case "-":
                result = firstNumber -
                        Double.parseDouble(newNumber);
                break;
            case "*":
                result = firstNumber *
                        Double.parseDouble(newNumber);
                break;
            case "/":
                if (Double.parseDouble(newNumber) != 0) {
                    result = firstNumber /
                            Double.parseDouble(newNumber);
                } else {
                    tvDisplay.setText("Error");
                    isNewOperation = true;
                    return;
                }
                break;
        }
        tvDisplay.setText(String.valueOf(result));
        isNewOperation = true;
    }

    public void clearEvent(View view) {
        tvDisplay.setText("0");
        isNewOperation = true;
        firstNumber = 0;
        operation = null;
    }
}
```