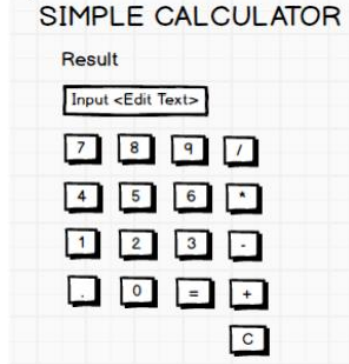**PROGRAM 2: Develop an Android application usingcontrols like Button, TextView, EditText for designing a calculatorhaving basic functionality like Addition, Subtraction, Multiplication, and Division**.

Program File Name: activity_main.xml

```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">


    <Button
        android:id="@+id/btn_div"
        android:layout_width="78dp"
        android:layout_height="53dp"
        android:background="#9C27B0"
        android:text="/"
        android:textColor="#FFFFFF"
        android:textSize="16sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.924"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.834" />

    <Button
        android:id="@+id/btn_minus"
        android:layout_width="78dp"
        android:layout_height="53dp"
        android:background="#9C27B0"
        android:text="-"
        android:textColor="#FFFFFF"
        android:textSize="16sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.351"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.834" />
```

```xml
<Button
    android:id="@+id/btn_plus"
    android:layout_width="78dp"
    android:layout_height="53dp"
    android:background="#9C27B0"
    android:text="+"
    android:textColor="#FFFFFF"
    android:textSize="16sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.081"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.834" />

<Button
    android:id="@+id/btn_clear"
    android:layout_width="78dp"
    android:layout_height="53dp"
    android:background="#9C27B0"
    android:text="C"
    android:textColor="#FFFFFF"
    android:textSize="16sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.924"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.927" />

<Button
    android:id="@+id/btn_mul"
    android:layout_width="78dp"
    android:layout_height="53dp"
    android:background="#9C27B0"
    android:text="*"
    android:textColor="#FFFFFF"
    android:textSize="16sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.636"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.834" />

<Button
    android:id="@+id/btn_0"
    android:layout_width="78dp"
    android:layout_height="53dp"
    android:background="#9C27B0"
    android:text="0"
    android:textColor="#FFFFFF"
    android:textSize="16sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.348"
```

```xml
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.725" />

    <Button
        android:id="@+id/btn_9"
        android:layout_width="78dp"
        android:layout_height="53dp"
        android:background="#9C27B0"
        android:text="9"
        android:textColor="#FFFFFF"
        android:textSize="16sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.081"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.725" />

    <Button
        android:id="@+id/btn_equals"
        android:layout_width="78dp"
        android:layout_height="53dp"
        android:background="#9C27B0"
        android:text="="
        android:textColor="#FFFFFF"
        android:textSize="16sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.924"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.725" />

    <Button
        android:id="@+id/btn_dot"
        android:layout_width="78dp"
        android:layout_height="53dp"
        android:background="#9C27B0"
        android:text="."
        android:textColor="#FFFFFF"
        android:textSize="16sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.636"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.725" />

    <Button
        android:id="@+id/btn_7"
        android:layout_width="78dp"
        android:layout_height="53dp"
        android:background="#9C27B0"
        android:text="7"
        android:textColor="#FFFFFF"
        android:textSize="16sp"
```

```xml
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.636"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.617" />

    <Button
        android:id="@+id/btn_6"
        android:layout_width="78dp"
        android:layout_height="53dp"
        android:background="#9C27B0"
        android:text="6"
        android:textColor="#FFFFFF"
        android:textSize="16sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.351"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.617" />

    <Button
        android:id="@+id/btn_8"
        android:layout_width="78dp"
        android:layout_height="53dp"
        android:background="#9C27B0"
        android:text="8"
        android:textColor="#FFFFFF"
        android:textSize="16sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.924"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.617" />

    <Button
        android:id="@+id/btn_5"
        android:layout_width="78dp"
        android:layout_height="53dp"
        android:background="#9C27B0"
        android:text="5"
        android:textColor="#FFFFFF"
        android:textSize="16sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.081"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.617" />

    <Button
        android:id="@+id/btn_4"
        android:layout_width="78dp"
        android:layout_height="53dp"
        android:background="#9C27B0"
```

```xml
        android:text="4"
        android:textColor="#FFFFFF"
        android:textSize="16sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.884"
        app:layout_constraintStart_toStartOf="@+id/btn_2"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_3"
        android:layout_width="78dp"
        android:layout_height="53dp"
        android:background="#9C27B0"
        android:text="3"
        android:textColor="#FFFFFF"
        android:textSize="16sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.442"
        app:layout_constraintStart_toStartOf="@+id/btn_2"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/btn_2"
        android:layout_width="78dp"
        android:layout_height="53dp"
        android:layout_marginStart="116dp"
        android:background="#9C27B0"
        android:text="2"
        android:textColor="#FFFFFF"
        android:textSize="16sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <TextView
        android:id="@+id/textView"
        android:layout_width="273dp"
        android:layout_height="45dp"
        android:text="SIMPLE CALCULATOR"
        android:textAlignment="center"
        android:textColor="#F44336"
        android:textSize="24sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.12" />

    <TextView
        android:id="@+id/textView2"
        android:layout_width="97dp"
        android:layout_height="39dp"
        android:text="Result"
        android:textAlignment="center"
        android:textColor="#9C27B0"
```

```xml
                android:textSize="20sp"
                app:layout_constraintBottom_toBottomOf="parent"
                app:layout_constraintEnd_toEndOf="parent"
                app:layout_constraintHorizontal_bias="0.473"
                app:layout_constraintStart_toStartOf="parent"
                app:layout_constraintTop_toTopOf="parent"
                app:layout_constraintVertical_bias="0.238" />

        <EditText
                android:id="@+id/edit_txt"
                android:layout_width="224dp"
                android:layout_height="49dp"
                android:ems="10"
                android:inputType="textPersonName"
                android:textAlignment="center"
                android:textColor="#F44336"
                android:textSize="20sp"
                app:layout_constraintBottom_toBottomOf="parent"
                app:layout_constraintEnd_toEndOf="parent"
                app:layout_constraintHorizontal_bias="0.497"
                app:layout_constraintStart_toStartOf="parent"
                app:layout_constraintTop_toTopOf="parent"
                app:layout_constraintVertical_bias="0.364"
                tools:ignore="SpeakableTextPresentCheck" />

        <Button
                android:id="@+id/btn_1"
                android:layout_width="78dp"
                android:layout_height="53dp"
                android:background="#9C27B0"
                android:text="1"
                android:textColor="#FFFFFF"
                android:textSize="16sp"
                app:layout_constraintBottom_toBottomOf="parent"
                app:layout_constraintEnd_toEndOf="parent"
                app:layout_constraintHorizontal_bias="0.081"
                app:layout_constraintStart_toStartOf="parent"
                app:layout_constraintTop_toTopOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

Program file Name: MainActivity.java

```java
package com.example.simplecalculator;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;

import java.util.regex.Pattern;

public class MainActivity extends AppCompatActivity implements View.OnClickListener {
    Button btnone,btntwo,btnthree,btnfour,btnfive,btnsix,btnseven,btneight,btnnine,btnzero;
```

```java
Button btnAdd,btnSub,btnMul,btnDiv;
Button btnclear,btnequal,btndot;
EditText txtResult;


@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
    btnone =(Button) findViewById(R.id.btn_1);
    btnone.setOnClickListener(this);

    btntwo =(Button) findViewById(R.id.btn_2);
    btntwo.setOnClickListener(this);

    btnthree =(Button) findViewById(R.id.btn_3);
    btnthree.setOnClickListener(this);

    btnfour =(Button) findViewById(R.id.btn_4);
    btnfour.setOnClickListener(this);

    btnfive =(Button) findViewById(R.id.btn_5);
    btnfive.setOnClickListener(this);

    btnsix =(Button) findViewById(R.id.btn_6);
    btnsix.setOnClickListener(this);

    btnseven =(Button) findViewById(R.id.btn_7);
    btnseven.setOnClickListener(this);

    btneight =(Button) findViewById(R.id.btn_8);
    btneight.setOnClickListener(this);

    btnnine =(Button) findViewById(R.id.btn_9);
    btnnine.setOnClickListener(this);

    btnzero =(Button) findViewById(R.id.btn_0);
    btnzero.setOnClickListener(this);

    btnAdd =(Button) findViewById(R.id.btn_plus);
    btnAdd.setOnClickListener(this);

    btnSub =(Button) findViewById(R.id.btn_minus);
    btnSub.setOnClickListener(this);

    btnMul =(Button) findViewById(R.id.btn_mul);
    btnMul.setOnClickListener(this);

    btnDiv =(Button) findViewById(R.id.btn_div);
    btnDiv.setOnClickListener(this);

    btndot =(Button) findViewById(R.id.btn_dot);
    btndot.setOnClickListener(this);
```

```java
        btnclear =(Button) findViewById(R.id.btn_clear);
        btnclear.setOnClickListener(this);

        btnequal =(Button) findViewById(R.id.btn_equals);
        btnequal.setOnClickListener(this);

        txtResult = (EditText) findViewById(R.id.edit_txt);
        txtResult.setText("");
    }

    @Override
    public void onClick(View view) {
        if(view.equals(btnone))
            txtResult.append("1");
        if(view.equals(btntwo))
            txtResult.append("2");
        if(view.equals(btnthree))
            txtResult.append("3");
        if(view.equals(btnfour))
            txtResult.append("4");
        if(view.equals(btnfive))
            txtResult.append("5");
        if(view.equals(btnsix))
            txtResult.append("6");
        if(view.equals(btnseven))
            txtResult.append("7");
        if(view.equals(btneight))
            txtResult.append("8");
        if(view.equals(btnnine))
            txtResult.append("9");
        if(view.equals(btnzero))
            txtResult.append("0");
        if(view.equals(btndot))
            txtResult.append(".");
        if(view.equals(btnAdd))
            txtResult.append("+");
        if(view.equals(btnSub))
            txtResult.append("-");
        if(view.equals(btnMul))
            txtResult.append("*");
        if(view.equals(btnDiv))
            txtResult.append("/");
        if(view.equals(btnclear))
            txtResult.setText("");
        if(view.equals(btnequal))
            try {
                String data = txtResult.getText().toString();
                    if(data.contains("/"))
                    {
                      divide(data);
                    }
                    else if(data.contains("*"))
```

```java
            {
              multiplication(data);
            } else if(data.contains("+"))
            {
              addition(data);
            } else if(data.contains("-"))
            {
              subtration(data);
            }

        } catch (Exception e)
          {
            displayInvalidMessage("Invalid Operation");
          }
          }

private void displayInvalidMessage(String mes) {
    Toast.makeText(getBaseContext(),mes,Toast.LENGTH_LONG).show();
}

private void subtration(String data) {
    String[] operands = data.split("-");
    if (operands.length == 2) {
        Double operand1 = Double.parseDouble(operands[0]);
        Double operand2 = Double.parseDouble(operands[1]);
        Double result = operand1 - operand2;
        txtResult.setText(String.valueOf(result));
    } else
    {
        displayInvalidMessage("invalid input");
    }
}

private void addition(String data) {
    String[] operands = data.split(Pattern.quote("+"));
    if (operands.length == 2) {
        Double operand1 = Double.parseDouble(operands[0]);
        Double operand2 = Double.parseDouble(operands[1]);
        Double result = operand1 + operand2;
        txtResult.setText(String.valueOf(result));
    } else
    {
        displayInvalidMessage("invalid input");
    }
}

private void divide(String data) {
    String[] operands = data.split("/");
    if (operands.length == 2) {
        Double operand1 = Double.parseDouble(operands[0]);
        Double operand2 = Double.parseDouble(operands[1]);
        Double result = operand1 / operand2;
        txtResult.setText(String.valueOf(result));
```

```
        } else
        {
            displayInvalidMessage("invalid input");
        }
    }

    private void multiplication(String data) {
        String[] operands = data.split(Pattern.quote("*"));
        if (operands.length == 2) {
            Double operand1 = Double.parseDouble(operands[0]);
            Double operand2 = Double.parseDouble(operands[1]);
            Double result = operand1 * operand2;
            txtResult.setText(String.valueOf(result));
        } else
        {
            displayInvalidMessage("invalid input");
        }
    }
}
```
OUTPUT: