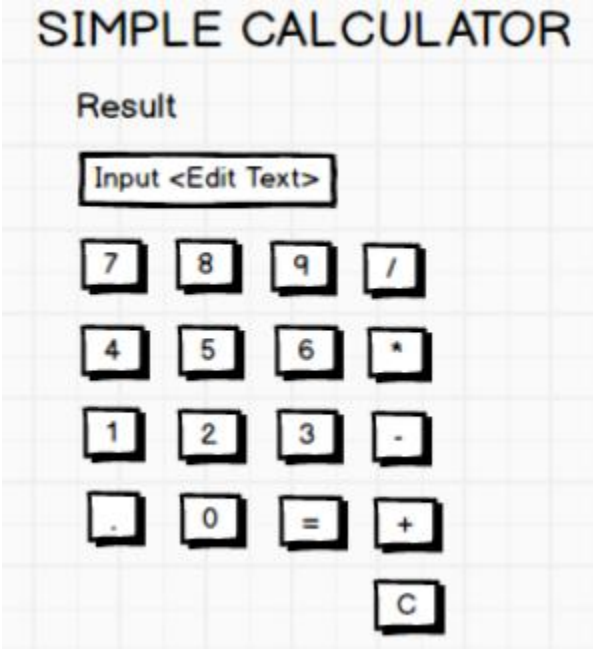
Program 2: Develop an Android application using controls like Button, TextView, EditText for designing a calculator having basic functionality like Addition, Subtraction, Multiplication, and Division.



Design:

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:textAlignment="center"
    tools:context=".MainActivity">

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Simple Calculator"
        android:textAlignment="center"
        android:textAllCaps="true"
        android:textColor="#E91E63"
        android:textSize="34sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.789"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
```

```
        app:layout_constraintVertical_bias="0.023" />

<EditText
        android:id="@+id/textbox"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:ems="10"
        android:inputType="textPersonName"
        android:text="Edit"
        android:textColor="#FF5722"
        android:textSize="24sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.496"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.262" />

    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="1"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.049"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.383" />

    <Button
        android:id="@+id/button5"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="5"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.049"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.499" />
…
```

main_activity.Java

```
package com.example.lab2;
import static java.lang.String.valueOf;
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
btn1,btn2,btn3,btn4,btn5,btn6,btn7,btn8,btn9,btn0,btnc;
    Button btnadd,btnsub,btnmul,btndiv,btneq,btndot;
    EditText txtresult;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        btn1=(Button) findViewById(R.id.button);
        btn1.setOnClickListener(this);

        btn2=(Button) findViewById(R.id.button2);
        btn2.setOnClickListener(this);

        btn3=(Button) findViewById(R.id.button3);
        btn3.setOnClickListener(this);

        btn4=(Button) findViewById(R.id.button4);
        btn4.setOnClickListener(this);

        btn5=(Button) findViewById(R.id.button5);
        btn5.setOnClickListener(this);

        btn6=(Button) findViewById(R.id.button6);
        btn6.setOnClickListener(this);

        btn7=(Button) findViewById(R.id.button7);
        btn7.setOnClickListener(this);

        btn8= (Button) findViewById(R.id.button8);
        btn8.setOnClickListener(this);

        btn9=(Button) findViewById(R.id.button9);
        btn9.setOnClickListener(this);
```

```
    btn0=(Button) findViewById(R.id.button10);
    btn0.setOnClickListener(this);

    btnc=(Button) findViewById(R.id.button17);
    btnc.setOnClickListener(this);

    btnadd=(Button) findViewById(R.id.button13);
    btnadd.setOnClickListener(this);

    btnsub=(Button) findViewById(R.id.button14);
    btnsub.setOnClickListener(this);

    btnmul=(Button) findViewById(R.id.button12);
    btnmul.setOnClickListener(this);

    btndiv=(Button) findViewById(R.id.button16);
    btndiv.setOnClickListener(this);

    btndot=(Button) findViewById(R.id.button11);
    btndot.setOnClickListener(this);

    btneq=(Button) findViewById(R.id.button15);
    btneq.setOnClickListener(this);


    txtresult=(EditText) findViewById(R.id.textbox);
    txtresult.setText("");
}

@Override
public void onClick(View view) {
    if(view.equals(btn1))
        txtresult.append("1");
    if(view.equals(btn2))
        txtresult.append("2");
    if(view.equals(btn3))
        txtresult.append("3");
    if(view.equals(btn4))
        txtresult.append("4");
    if(view.equals(btn5))
        txtresult.append("5");
    if(view.equals(btn6))
        txtresult.append("6");
    if(view.equals(btn7))
        txtresult.append("7");
    if(view.equals(btn8))
        txtresult.append("8");
    if(view.equals(btn9))
        txtresult.append("9");
```

```
      if(view.equals(btn0))
            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(btnc))
            txtresult.setText("");
        if(view.equals(btneq))
            try {
                String data=txtresult.getText().toString();
                if(data.contains("/")) {
                    divide(data);
                }else if(data.contains("*")) {
                    multiplication(data);
                } else if(data.contains("+")) {
                    addition(data);
                } else if(data.contains("-")) {
                    subtraction(data);
                }
            }
        catch (Exception e){
                displayInvalidMessage("Invalid operator");
        }
    }

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

    private void divide(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(valueOf(result)));
        }
    }
    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(valueOf(result)));
    } }
      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(valueOf(result)));
        }
    }
    private void subtraction(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(valueOf(result)));

        }

    }
}
```

Output: