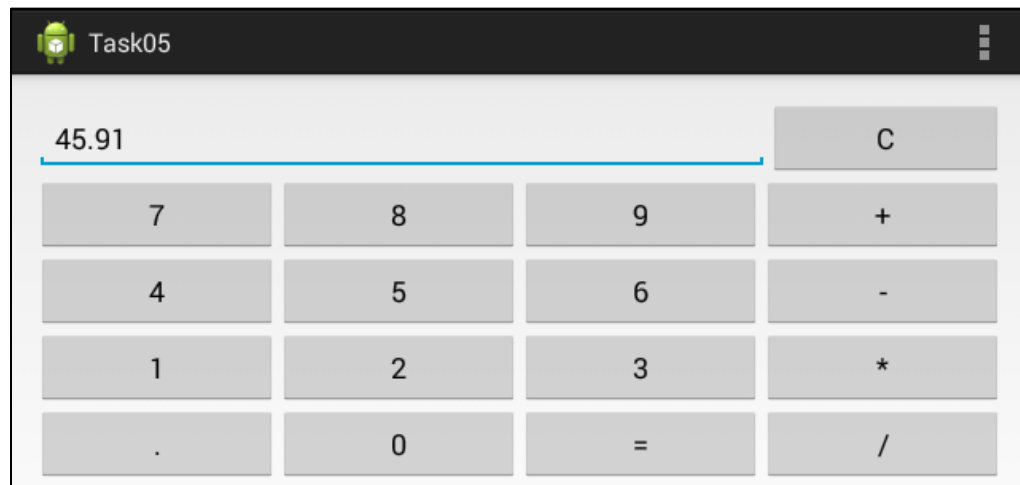1. Implement a full functional calculator using appropriate layout and event handling technique.

XML CODE

```xml
<?xml version="1.0" encoding="utf-8"?>
<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:id="@+id/relative1"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <EditText
        android:id="@+id/edt1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginHorizontal="20dp"
        android:layout_marginTop="20dp"/>


    <Button
        android:id="@+id/button1"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignEnd="@+id/button4"
        android:layout_alignRight="@+id/button4"
        android:layout_below="@+id/edt1"
        android:layout_marginTop="94dp"
        android:text="1" />

    <Button
        android:id="@+id/button2"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
```

```xml
        android:layout_alignTop="@+id/button1"
        android:layout_toLeftOf="@+id/button3"
        android:layout_toStartOf="@+id/button3"
        android:text="2" />

    <Button
        android:id="@+id/button3"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignTop="@+id/button2"
        android:layout_centerHorizontal="true"
        android:text="3" />

    <Button
        android:id="@+id/button4"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button1"
        android:layout_toLeftOf="@+id/button2"
        android:text="4" />

    <Button
        android:id="@+id/button5"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignBottom="@+id/button4"
        android:layout_alignLeft="@+id/button2"
        android:layout_alignStart="@+id/button2"
        android:text="5" />

    <Button
        android:id="@+id/button6"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/button3"
        android:layout_alignStart="@+id/button3"
        android:layout_below="@+id/button3"
        android:text="6" />

    <Button
        android:id="@+id/button7"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button4"
        android:layout_toLeftOf="@+id/button2"
        android:text="7" />

    <Button
        android:id="@+id/button8"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
```

```xml
        android:layout_alignLeft="@+id/button5"
        android:layout_alignStart="@+id/button5"
        android:layout_below="@+id/button5"
        android:text="8" />

<Button
    android:id="@+id/button9"
    style="?android:attr/buttonStyleSmall"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignLeft="@+id/button6"
    android:layout_alignStart="@+id/button6"
    android:layout_below="@+id/button6"
    android:text="9" />

<Button
    android:id="@+id/buttonadd"
    style="?android:attr/buttonStyleSmall"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignTop="@+id/button3"
    android:layout_alignEnd="@+id/edt1"
    android:layout_alignRight="@+id/edt1"
    android:layout_marginStart="46dp"
    android:layout_marginLeft="46dp"
    android:layout_toRightOf="@+id/button3"
    android:layout_marginRight="20dp"
    android:text="+" />

<Button
    android:id="@+id/buttonsub"
    style="?android:attr/buttonStyleSmall"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/buttonadd"
    android:layout_alignStart="@+id/buttonadd"
    android:layout_alignLeft="@+id/buttonadd"
    android:layout_alignEnd="@+id/buttonadd"
    android:layout_alignRight="@+id/buttonadd"
    android:text="-" />

<Button
    android:id="@+id/buttonmul"
    style="?android:attr/buttonStyleSmall"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/buttonsub"
    android:layout_alignStart="@+id/buttonsub"
    android:layout_alignLeft="@+id/buttonsub"
    android:layout_alignParentEnd="true"
    android:layout_alignParentRight="true"
    android:layout_marginRight="20dp"
    android:text="*" />

<Button
    android:id="@+id/button10"
    style="?android:attr/buttonStyleSmall"
```

```xml
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/button7"
        android:layout_toLeftOf="@+id/button2"
        android:text="." />

    <Button
        android:id="@+id/button0"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/button8"
        android:layout_alignStart="@+id/button8"
        android:layout_below="@+id/button8"
        android:text="0" />

    <Button
        android:id="@+id/buttonC"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/button9"
        android:layout_alignStart="@+id/button9"
        android:layout_below="@+id/button9"
        android:text="C" />

    <Button
        android:id="@+id/buttondiv"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignEnd="@+id/buttonmul"
        android:layout_alignLeft="@+id/buttonmul"
        android:layout_alignRight="@+id/buttonmul"
        android:layout_alignStart="@+id/buttonmul"
        android:layout_below="@+id/buttonmul"
        android:text="/" />

    <Button
        android:id="@+id/buttoneql"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignEnd="@+id/buttondiv"
        android:layout_alignLeft="@+id/button10"
        android:layout_alignRight="@+id/buttondiv"
        android:layout_alignStart="@+id/button10"
        android:layout_below="@+id/button0"
        android:layout_marginTop="37dp"
        android:layout_marginRight="20dp"
        android:text="=" />

</RelativeLayout>
```

JAVA CODE

```java
package com.example.lab;

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

public class MainActivity extends AppCompatActivity {

    Button button0, button1, button2, button3, button4, button5, button6,
            button7, button8, button9, buttonAdd, buttonSub, buttonDivision,
            buttonMul, button10, buttonC, buttonEqual;
    EditText editText;

    float mValueOne, mValueTwo;

    boolean Addition, Subtract, Multiplication, Division;

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

        button0 = (Button) findViewById(R.id.button0);
        button1 = (Button) findViewById(R.id.button1);
        button2 = (Button) findViewById(R.id.button2);
        button3 = (Button) findViewById(R.id.button3);
        button4 = (Button) findViewById(R.id.button4);
        button5 = (Button) findViewById(R.id.button5);
        button6 = (Button) findViewById(R.id.button6);
        button7 = (Button) findViewById(R.id.button7);
        button8 = (Button) findViewById(R.id.button8);
        button9 = (Button) findViewById(R.id.button9);
        button10 = (Button) findViewById(R.id.button10);
        buttonAdd = (Button) findViewById(R.id.buttonadd);
        buttonSub = (Button) findViewById(R.id.buttonsub);
        buttonMul = (Button) findViewById(R.id.buttonmul);
        buttonDivision = (Button) findViewById(R.id.buttondiv);
        buttonC = (Button) findViewById(R.id.buttonC);
        buttonEqual = (Button) findViewById(R.id.buttoneql);
        editText = (EditText) findViewById(R.id.edt1);


        button1.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                editText.setText(editText.getText() + "1");
            }
        });

        button2.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                editText.setText(editText.getText() + "2");
```

```java
        }
    });

    button3.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            editText.setText(editText.getText() + "3");
        }
    });

    button4.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            editText.setText(editText.getText() + "4");
        }
    });

    button5.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            editText.setText(editText.getText() + "5");
        }
    });

    button6.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            editText.setText(editText.getText() + "6");
        }
    });

    button7.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            editText.setText(editText.getText() + "7");
        }
    });

    button8.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            editText.setText(editText.getText() + "8");
        }
    });

    button9.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            editText.setText(editText.getText() + "9");
        }
    });

    button0.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            editText.setText(editText.getText() + "0");
        }
```

```java
    });

    buttonAdd.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {

            if (editText == null) {
                editText.setText("");
            } else {
                mValueOne = Float.parseFloat(editText.getText() + "");
                Addition = true;
                editText.setText(null);
            }
        }
    });

    buttonSub.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            mValueOne = Float.parseFloat(editText.getText() + "");
            Subtract = true;
            editText.setText(null);
        }
    });

    buttonMul.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            mValueOne = Float.parseFloat(editText.getText() + "");
            Multiplication = true;
            editText.setText(null);
        }
    });

    buttonDivision.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            mValueOne = Float.parseFloat(editText.getText() + "");
            Division = true;
            editText.setText(null);
        }
    });

    buttonEqual.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            mValueTwo = Float.parseFloat(editText.getText() + "");
            if (Addition == true) {
                editText.setText(mValueOne + mValueTwo + "");
                Addition = false;
            }
            if (Subtract == true) {
                editText.setText(mValueOne - mValueTwo + "");
                Subtract = false;
            }
            if (Multiplication == true) {
                editText.setText(mValueOne * mValueTwo + "");
```

```java
                    Multiplication = false;
                }
                if (Division == true) {
                    editText.setText(mValueOne / mValueTwo + "");
                    Division = false;
                }
            }
        });
        buttonC.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                editText.setText("");
            }
        });
        button10.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                editText.setText(editText.getText() + ".");
            }
        });
    }
}
```

OUTPUT