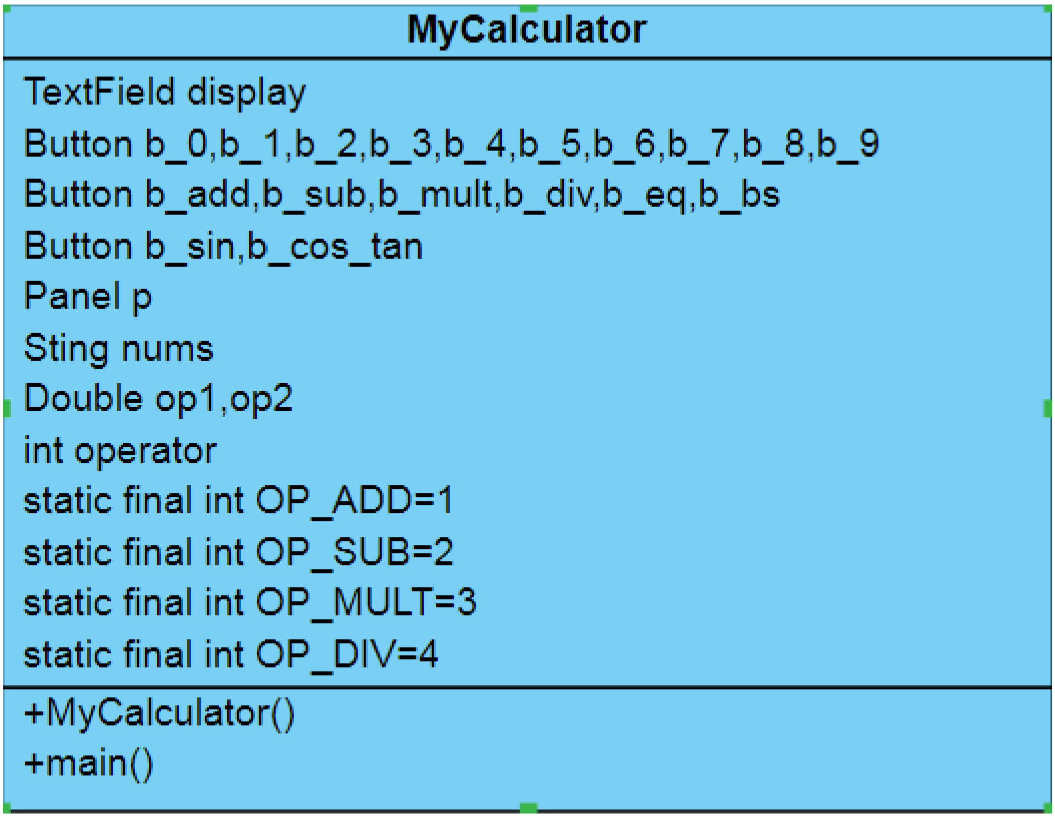
Exp.no:10	**Design of scientific calculator**
Date:12-09-19	

Aim: To design a calculator using event-driven programming paradigm of Java with Decimal and Scientific manipulations.

Algorithm:

Step 1: Declare a package calc.
Step 2: Declare the class MyCalculator that extends Frame and implements WindowListener and
Action Listener.
Step 3: Add textfield, required buttons, panel, and static members.
Step 4: In the constructor, link WindowListener, ActionListener and Panel to the class and add buttons to the panel.
Step 5: Use ActionListener to perform the required actions.

Class Diagram:



MyCalculator

TextField display
Button b_0,b_1,b_2,b_3,b_4,b_5,b_6,b_7,b_8,b_9
Button b_add,b_sub,b_mult,b_div,b_eq,b_bs
Button b_sin,b_cos_tan
Panel p
Sting nums
Double op1,op2
int operator
static final int OP_ADD=1
static final int OP_SUB=2
static final int OP_MULT=3
static final int OP_DIV=4

+MyCalculator()
+main()

Program:

```
/***
 * created by G.Nikhil EEE-A
 *
 */


package calculator;

import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.awt.event.WindowEvent;
import java.awt.event.WindowListener;

public class MyCalculator extends Frame implements
WindowListener,ActionListener{
        TextField display;
        Button b_0,b_1,b_2,b_3,b_4,b_5,b_6,b_7,b_8,b_9;
        Button b_add,b_sub,b_mul,b_div,b_eq,b_sin,b_cos,b_tan;
        Panel p;
        String nums;
        Double op1,op2;
        int operator;
        static final int OP_ADD=1;
        static final int OP_SUB=2;
        public MyCalculator()
        {
                this.addWindowListener(this);
                this.setLayout(new GridLayout(2,1));

                nums="0";

                display=new TextField("0");
                display.setEditable(false);
                this.add(display);

                p=new Panel();
                p.setLayout(new GridLayout(3,2));
                this.add(p);


                b_0=new Button("0");
                b_0.addActionListener(this);
                p.add(b_0);
```

```
b_1=new Button("1");
b_1.addActionListener(this);
p.add(b_1);

b_2=new Button("2");
b_2.addActionListener(this);
p.add(b_2);

b_3=new Button("3");
b_3.addActionListener(this);
p.add(b_3);

b_4=new Button("4");
b_4.addActionListener(this);
p.add(b_4);

b_5=new Button("5");
b_5.addActionListener(this);
p.add(b_5);

b_6=new Button("6");
b_6.addActionListener(this);
p.add(b_6);

b_7=new Button("7");
b_7.addActionListener(this);
p.add(b_7);

b_8=new Button("8");
b_8.addActionListener(this);
p.add(b_8);

b_9=new Button("9");
b_9.addActionListener(this);
p.add(b_9);


b_add=new Button("+");
b_add.addActionListener(this);
p.add(b_add);

b_sub=new Button("-");
b_sub.addActionListener(this);
p.add(b_sub);
```

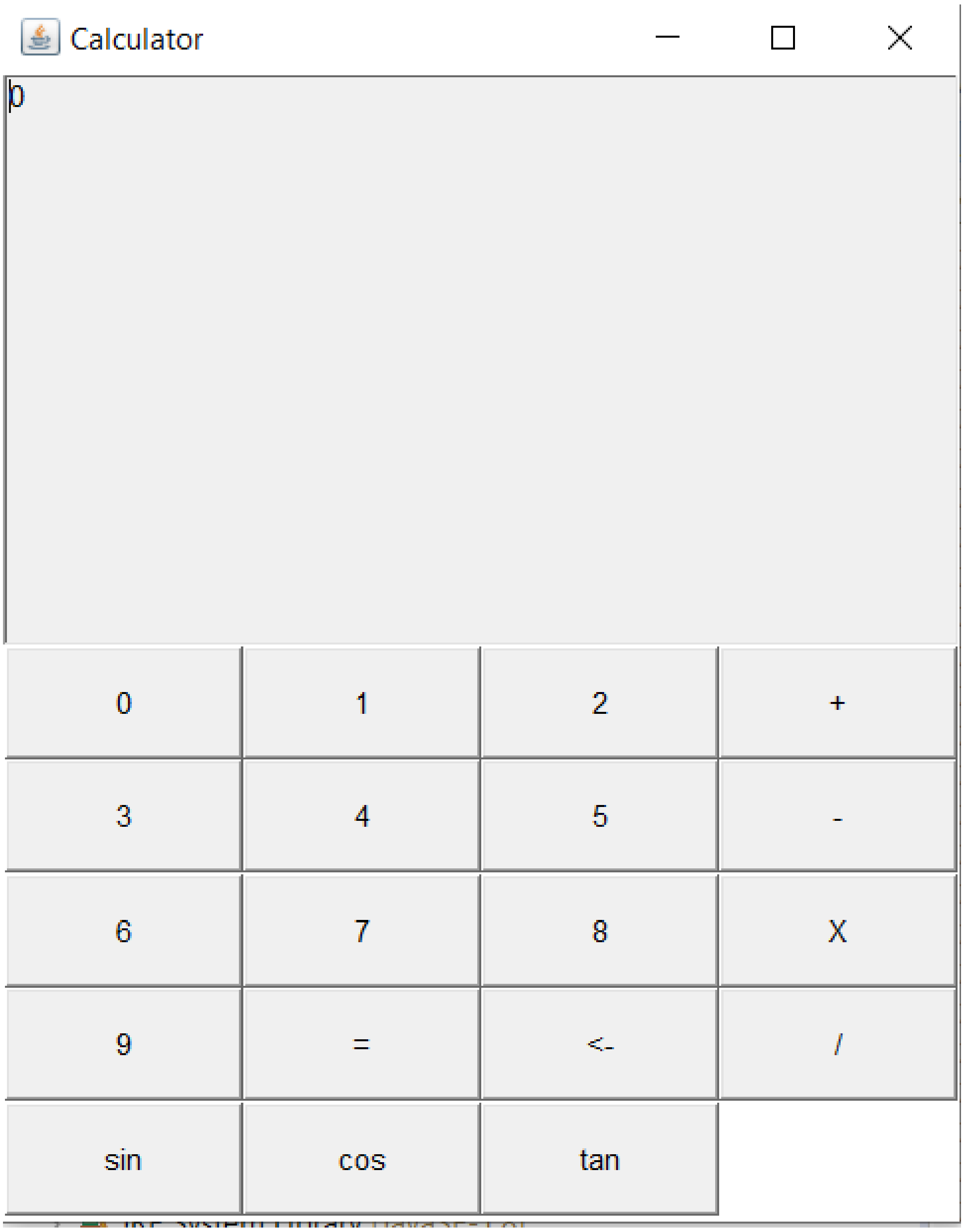
```
        b_eq=new Button("=");
        b_eq.addActionListener(this);
        p.add(b_eq);

        b_div=new Button("/");
        b_div.addActionListener(this);
        p.add(b_div);

        b_mul=new Button("*");
        b_mul.addActionListener(this);
        p.add(b_mul);

        b_sin=new Button("sin");
        b_sin.addActionListener(this);
        p.add(b_sin);

        b_cos=new Button("cos");
        b_cos.addActionListener(this);
        p.add(b_cos);

        b_tan=new Button("tan");
        b_tan.addActionListener(this);
        p.add(b_tan);
}


public static void main(String[] args) {
        MyCalculator mc;

        mc=new MyCalculator();
        mc.setSize(300,250);
        mc.setTitle("calculator");
        mc.setVisible(true);




}

@Override
public void windowOpened(WindowEvent e) {
        // TODO Auto-generated method stub

}
```

```
@Override
public void windowClosing(WindowEvent e) {
    System.exit(0);

}

@Override
public void windowClosed(WindowEvent e) {
    // TODO Auto-generated method stub

}

@Override
public void windowIconified(WindowEvent e) {
    // TODO Auto-generated method stub

}

@Override
public void windowDeiconified(WindowEvent e) {
    // TODO Auto-generated method stub

}

@Override
public void windowActivated(WindowEvent e) {
    // TODO Auto-generated method stub

}

@Override
public void windowDeactivated(WindowEvent e) {
    // TODO Auto-generated method stubb

}

@Override
public void actionPerformed(ActionEvent e) {
    // TODO Auto-generated method stub
    if(e.getSource()==b_0)
    {
        nums=nums+"0";
        display.setText(nums);

    }else if(e.getSource()==b_1)
```

```
{
        nums=nums+"1";
        display.setText(nums);
}else if(e.getSource()==b_2)
{
        nums=nums+"2";
        display.setText(nums);
}else if(e.getSource()==b_3)
{
        nums=nums+"3";
        display.setText(nums);
}else if(e.getSource()==b_4)
{
        nums=nums+"4";
        display.setText(nums);
}else if(e.getSource()==b_5)
{
        nums=nums+"5";
        display.setText(nums);
}else if(e.getSource()==b_6)
{
        nums=nums+"6";
        display.setText(nums);
}else if(e.getSource()==b_7)
{
        nums=nums+"7";
        display.setText(nums);
}else if(e.getSource()==b_8)
{
        nums=nums+"8";
        display.setText(nums);
}else if(e.getSource()==b_9)
{
        nums=nums+"9";
        display.setText(nums);
}else if(e.getSource()==b_add)
{
        op1=Double.parseDouble(nums);
        nums="0";
        display.setText(nums);
        operator=OP_ADD;

}else if(e.getSource()==b_eq)
{
        switch(operator)
{
case OP_ADD:
    op2=Double.parseDouble(nums);
    nums=""+(op1+op2);
    display.setText(nums);
    break;

}

}else if(e.getSource()==b_sub)
{
    op1=Double.parseDouble(nums);
    nums="0";
    display.setText(nums);
    operator=OP_SUB;
}else if(e.getSource()==b_eq)
{
    switch(operator)
    {
    case OP_SUB:
        op2=Double.parseDouble(nums);
        nums=""+(op1-op2);
        display.setText(nums);
        break;
    }
}else if(e.getSource()==b_sin)
{
    op1=Double.parseDouble(nums);
    nums=""+Math.sin(op1*Math.PI/180);
    display.setText(nums);

}else if(e.getSource()==b_cos)
{
    op1=Double.parseDouble(nums);
    nums=""+Math.cos(op1*Math.PI/180);
    display.setText(nums);

}else if(e.getSource()==b_tan)
{
    op1=Double.parseDouble(nums);
    nums=""+Math.tan(op1*Math.PI/180);
    display.setText(nums);

}
```

```
            }

        }
```

Output:



Result:

Thus a java console application that uses event-driven programming paradigm of Java
to design a calculator with decimal and scientific manipulations is verified.