

EVENT - DRIVEN PROGRAMMING

AIM:

To write a java program to design a calculator using event-driven programming paradigm of Java with the following options. a) Decimal manipulations

b) Scientific manipulations

ALGORITHM:

1. Import the java packages.
2. Create the class calculator by implementing the class JFrame and interface ActionListener.
3. Declare the buttons required using JButton.
4. Design the layout of the calculator using the setLayout, textpanel(), Panel(), Jtextfield(), setfont() methods.
5. Define the actions to be performed for each key using ActionListener.
6. Enable the scientific or standard calculator using the method method add().
7. Define the mathematical operations to be performed for the mathematical symbols.
8. Select the required mathematical operations using switch as the calculator.
9. Pass the parameters for the methods used.
10. Make the frame visible by using the method setVisible().

PROGRAM:

//File Name should be ScientificCalculator.java

```
import java.awt.*; import
javax.swing.*; import
java.awt.event.*; import
javax.swing.event.*;
public class ScientificCalculator extends JFrame implements ActionListener {
    JTextField tfield;    double
temp, temp1, result, a;    static
double m1, m2;    int k = 1, x = 0, y
= 0, z = 0;
    char ch;
    JButton b1, b2, b3, b4, b5, b6, b7, b8, b9, zero, clr, pow2, exp, plus, min, div, log, rec,
mul, eq, dot, sqrt, sin, cos, tan;
```

```

Container cont;
JPanel textPanel, buttonpanel;

ScientificCalculator()
{
    cont = getContentPane();
    cont.setLayout(new BorderLayout());
    JPanel textpanel = new JPanel();          tfield = new
JTextField(25);
    tfield.setHorizontalAlignment(SwingConstants.RIGHT);
    tfield.addKeyListener(new KeyAdapter() {      public
void keyTyped(KeyEvent keyevent) {              char c
= keyevent.getKeyChar();                        if (c >= '0' && c <=
'9') {
                                } else {
                                    keyevent.consume();
                                }
                            }
    });

    textpanel.add(tfield);
    buttonpanel = new JPanel();
    buttonpanel.setLayout(new GridLayout(8, 4, 2, 2));
    boolean t = true;

    b1 = new JButton("1");
    buttonpanel.add(b1);
    b1.addActionListener(this);

    b2 = new JButton("2");
    buttonpanel.add(b2);
    b2.addActionListener(this);

    b3 = new JButton("3");
    buttonpanel.add(b3);
    b3.addActionListener(this);

    b4 = new JButton("4");
    buttonpanel.add(b4);
    b4.addActionListener(this);

```

```
        b5 = new JButton("5");
        buttonpanel.add(b5);
        b5.addActionListener(this);

        b6 = new JButton("6");
        buttonpanel.add(b6);
        b6.addActionListener(this); b7 = new JButton("7");
        buttonpanel.add(b7);
        b7.addActionListener(this);

        b8 = new JButton("8");
        buttonpanel.add(b8);
        b8.addActionListener(this);

        b9 = new JButton("9");
        buttonpanel.add(b9);
        b9.addActionListener(this);

        zero = new JButton("0");
        buttonpanel.add(zero);
        zero.addActionListener(this);

        plus = new JButton("+");
        buttonpanel.add(plus);
        plus.addActionListener(this);

        min = new JButton("-");
        buttonpanel.add(min);
        min.addActionListener(this);

        mul = new JButton("*");
        buttonpanel.add(mul);
        mul.addActionListener(this);

        div = new JButton("/");
        div.addActionListener(this);        buttonpanel.add(div);
```

```
dot = new JButton(".");  
buttonpanel.add(dot);  
dot.addActionListener(this);
```

```
eq = new JButton("=");  
buttonpanel.add(eq);  
eq.addActionListener(this);
```

```
rec = new JButton("1/x");  
buttonpanel.add(rec);  
rec.addActionListener(this); sqrt = new JButton("Sqrt"); buttonpanel.add(sqrt);  
sqrt.addActionListener(this);
```

```
log = new JButton("log");  
buttonpanel.add(log);  
log.addActionListener(this);
```

```
sin = new JButton("SIN");  
buttonpanel.add(sin);  
sin.addActionListener(this);
```

```
cos = new JButton("COS");  
buttonpanel.add(cos);  
cos.addActionListener(this);
```

```
tan = new JButton("TAN");  
buttonpanel.add(tan);  
tan.addActionListener(this);
```

```
pow2 = new JButton("x^2");  
buttonpanel.add(pow2);  
pow2.addActionListener(this);
```

```
exp = new JButton("Exp");  
exp.addActionListener(this);  
buttonpanel.add(exp);
```

```
clr = new JButton("AC");  
buttonpanel.add(clr);  
clr.addActionListener(this);
```

```
        cont.add("Center", buttonpanel);
    cont.add("North", textpanel);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    }

    public void actionPerformed(ActionEvent e) {
        String s = e.getActionCommand();

        if (s.equals("1")) {
            if (z == 0) {
                tfield.setText(tfield.getText() + "1");
            } else {
                tfield.setText("");
                tfield.setText(tfield.getText() + "1");
                z = 0;
            }
        }

        if (s.equals("2")) {
            if (z == 0) {
                tfield.setText(tfield.getText() + "2");
            } else {
                tfield.setText("");
                tfield.setText(tfield.getText() + "2");
                z = 0;
            }
        }

        if (s.equals("3")) {
            if (z == 0) {
                tfield.setText(tfield.getText() + "3");
            } else {
                tfield.setText("");
                tfield.setText(tfield.getText() + "3");
                z = 0;
            }
        }
    }
}
```

```
if (s.equals("4")) {  
    if (z == 0) {  
        tfield.setText(tfield.getText() + "4");  
    } else {  
        tfield.setText("");  
        tfield.setText(tfield.getText() + "4");  
        z = 0;  
    }  
}
```

```
if (s.equals("5")) {  
    if (z == 0) {  
        tfield.setText(tfield.getText() + "5");  
    } else {  
        tfield.setText("");  
        tfield.setText(tfield.getText() + "5");  
        z = 0;  
    }  
}
```

```
if (s.equals("6")) {  
    if (z == 0) {  
        tfield.setText(tfield.getText() + "6");  
    } else {  
        tfield.setText("");  
        tfield.setText(tfield.getText() + "6");  
        z = 0;  
    }  
}
```

```
if (s.equals("7")) {  
    if (z == 0) {  
        tfield.setText(tfield.getText() + "7");  
    } else {  
        tfield.setText("");  
        tfield.setText(tfield.getText() + "7");  
        z = 0;  
    }  
}
```

```

        if (s.equals("8")) {
            if (z == 0) {
                tfield.setText(tfield.getText() + "8");
            } else {
                tfield.setText("");
                tfield.setText(tfield.getText() + "8");
                z = 0;
            }
        }

        if (s.equals("9")) {
            if (z == 0) {
                tfield.setText(tfield.getText() + "9");
            } else {
                tfield.setText("");
                tfield.setText(tfield.getText() + "9");
                z = 0;
            }
        }

        if (s.equals("0")) {
            if (z == 0) {
                tfield.setText(tfield.getText() + "0");
            } else {
                tfield.setText("");
                tfield.setText(tfield.getText() + "0");
                z = 0;
            }
        }

        if (s.equals("AC")) {
            tfield.setText("");
            x = 0;
            y = 0;
            z = 0;
        }

        if (s.equals("log")) {
            if
            (tfield.getText().equals("")) {
                tfield.setText("");
            } else {

```

```

        a = Math.log(Double.parseDouble(tfield.getText()));
        tfield.setText("");
        tfield.setText(tfield.getText() + a);
    }
}

if (s.equals("1/x")) {
    if (tfield.getText().equals("")) {
        tfield.setText("");
    } else {
        a = 1 / Double.parseDouble(tfield.getText());
        tfield.setText("");
        tfield.setText(tfield.getText() + a);
    }
}

if (s.equals("Exp")) {
    if (tfield.getText().equals("")) {
        tfield.setText("");
    } else {
        a = Math.exp(Double.parseDouble(tfield.getText()));
        tfield.setText("");
        tfield.setText(tfield.getText() + a);
    }
}

if (s.equals("x^2")) {
    if (tfield.getText().equals("")) {
        tfield.setText("");
    } else {
        a = Math.pow(Double.parseDouble(tfield.getText()), 2);
        tfield.setText("");
        tfield.setText(tfield.getText() + a);
    }
}

if (s.equals(".")) {
    if (y == 0) {

```



```

        tfield.setText(tfield.getText() + ".");
y = 1;
    } else {
        tfield.setText(tfield.getText());
    }
}

    if (s.equals("+")) {                                if
(tfield.getText().equals("")) {
        tfield.setText("");
        temp = 0;
        ch = '+';
    } else {
        temp = Double.parseDouble(tfield.getText());
tfield.setText("");
        ch = '+';
        y = 0;
        x = 0;
    }
    tfield.requestFocus();
}

    if (s.equals("-")) {                                if
(tfield.getText().equals("")) {
        tfield.setText("");
        temp = 0;
        ch = '-';
    } else {
x = 0; y = 0;
        temp = Double.parseDouble(tfield.getText());
tfield.setText("");
        ch = '-';
    }
    tfield.requestFocus();
}

    if (s.equals("/")) {                                if
(tfield.getText().equals("")) {
        tfield.setText("");

```

```

        temp = 1;
        ch = '/';
    } else {
x = 0;    y = 0;

        temp = Double.parseDouble(tfield.getText());
        ch = '/';
        tfield.setText("");
    }
    tfield.requestFocus();
}

        if (s.equals("*")) {                                if
(tfield.getText().equals("")) {
            tfield.setText("");
            temp = 1;
            ch = '*';
        } else {
x = 0;    y = 0;

            temp = Double.parseDouble(tfield.getText());
            ch = '*';
            tfield.setText("");
        }
        tfield.requestFocus();
    }

        if (s.equals("Sqrt")) {
if (tfield.getText().equals("")) {
            tfield.setText("");
        } else {
            a = Math.sqrt(Double.parseDouble(tfield.getText()));
            tfield.setText("");
            tfield.setText(tfield.getText() + a);
        }
    }
        if (s.equals("SIN")) {
            if (tfield.getText().equals("")) {
                tfield.setText("");
            } else {                                a =
Math.sin(Double.parseDouble(tfield.getText()));
                tfield.setText("");
            }
        }
    }

```

```

        tfield.setText(tfield.getText() + a);
    }
}

    if (s.equals("COS")) {
if (tfield.getText().equals("")) {
        tfield.setText("");
    } else {
        a = Math.cos(Double.parseDouble(tfield.getText()));
tfield.setText("");
        tfield.setText(tfield.getText() + a);
    }
}

    if (s.equals("TAN")) {
if (tfield.getText().equals("")) {
        tfield.setText("");
    } else {
        a = Math.tan(Double.parseDouble(tfield.getText()));
tfield.setText("");
        tfield.setText(tfield.getText() + a);
    }
}

    if (s.equals("=")) {
        if
(tfield.getText().equals("")) {
        tfield.setText("");
    } else {
        temp1 = Double.parseDouble(tfield.getText());
        switch (ch) {
            case '+':
                result = temp + temp1;
                break;
            case '-':
                result = temp - temp1;
                break; case '/':
                result = temp / temp1;
                break; case
            '*':
                result = temp * temp1;
                break;
        }
    }
}

```

```

        }
        tfield.setText("");
        tfield.setText(tfield.getText() + result);
        z = 1;
    }
}
tfield.requestFocus();
}

public static void main(String args[]) { try
{
    UIManager.setLookAndFeel("com.sun.java.swing.plaf.windows.WindowsLookAndFeel");
}
catch (Exception e)
{
}

    ScientificCalculator f = new ScientificCalculator();
    f.setTitle("ScientificCalculator");
    f.pack();
    f.setVisible(true);
}
}

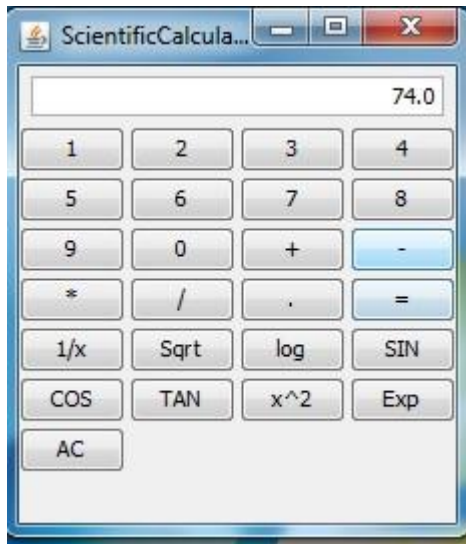
```

NOTE:

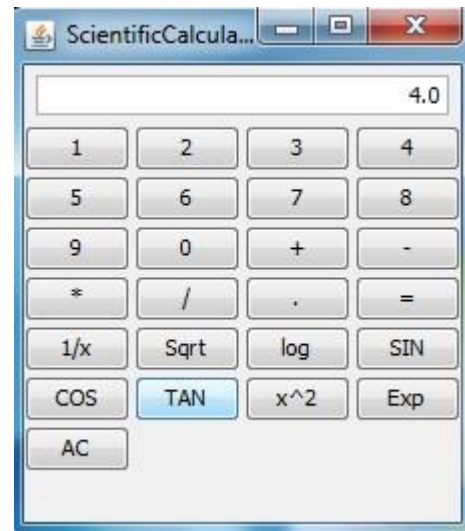
To Compile: *javac*
ScientificCalculator.java To Run:
java ScientificCalculator

OUTPUT:

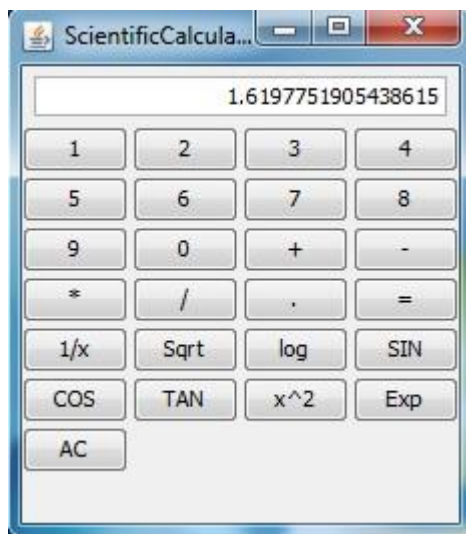
Addition [12+64]



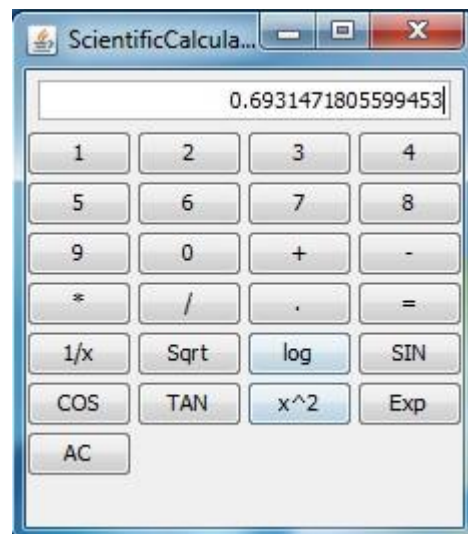
Square Root [16]



Tan 45



Log 2



RESULT:

Thus the Implementation for designing the scientific calculator has been successfully executed.