Karmayogi Polytechnic College, Shelve

Department of Computer Technology

Micro-Project Report

Advanced Java Programming (22517)

“Scientific Calculator”

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Abstract of project

A scientific calculator is a type of electronic calculator, usually but not always handheld, designed to calculate problems in science, engineering, and mathematics. They have completely replaced slide rules in traditional applications, and are widely used in both education and professional settings.

In certain contexts such as higher education, scientific calculators have been superseded by graphing calculators, which offer a superset of scientific calculator functionality along with the ability to graph input data and write and store programs for the device. There is also some overlap with the financial calculator market.

Introduction:

A software calculator is a calculator that has been implemented as a computer program, rather than as a physical hardware device.

They are among the simpler interactive software tools, and, as such, they:

- Provide operations for the user to select one at a time.
- Can be used to perform any process that consists of a sequence of steps each of which applies one of these operations.
- Have no purpose other than these processes, because the operations are the sole, or at least the primary, features of the calculator, rather than being secondary features that support other functionality that is not normally known simply as calculation.

As a *calculator*, rather than a computer, they usually:

- Have a small set of relatively simple operations.
- Perform short processes that are not compute intensive.
- Do not accept large amounts of input data or produce many results.

Title of the Project:

Scientific Calculator

System Specifications:

Hardware Specification

CPU	:	PENTIUM IV
PROCESSOR SPEED	:	2 GHz
COPROCESSOR	:	BUILT IN
TOTAL RAM	:	128 MB
DISKETTE A	:	1.44 MB FLOPPY 3.5”
HARD DISK	:	40 GB
KEYBOARD	:	105 KEYS
MOUSE	:	LOGITECH MOUSE
DISPLAY	:	SGVA COLOR

Software Specification:

1. jdk-15.0.2_windows-x64_bin
2. JCreator.exe

Source code:

```
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import javax.swing.event.*;

class Calculator extends JFrame
{
   private final Font BIGGER_FONT = new Font("monspaced",Font.PLAIN, 20);
   private JTextField textfield;
   private boolean number = true;
   private String equalOp = "=";
   private CalculatorOp op = new CalculatorOp();

   public Calculator()
         {
      textfield = new JTextField("", 12);
      textfield.setHorizontalAlignment(JTextField.RIGHT);
      textfield.setFont(BIGGER_FONT);
      ActionListener numberListener = new NumberListener();
      String buttonOrder = "1234567890 ";
      JPanel buttonPanel = new JPanel();
      buttonPanel.setLayout(new GridLayout(4, 4, 4, 4));
      for (int i = 0; i < buttonOrder.length(); i++)
         {
         String key = buttonOrder.substring(i, i+1);
         if (key.equals(" "))
         {
            buttonPanel.add(new JLabel(""));
```

```
        }
        else
        {
            JButton button = new JButton(key);
            button.addActionListener(numberListener);
            button.setFont(BIGGER_FONT);
            buttonPanel.add(button);
        }
    }
    ActionListener operatorListener = new OperatorListener();
    JPanel panel = new JPanel();
    panel.setLayout(new GridLayout(4, 4, 4, 4));
    String[] opOrder = {"+", "-", "*", "/","=","C","sin","cos","log"};
    for (int i = 0; i < opOrder.length; i++)
    {
        JButton button = new JButton(opOrder[i]);
        button.addActionListener(operatorListener);
        button.setFont(BIGGER_FONT);
        panel.add(button);
    }
    JPanel pan = new JPanel();
    pan.setLayout(new BorderLayout(4, 4));
    pan.add(textfield, BorderLayout.NORTH );
    pan.add(buttonPanel , BorderLayout.CENTER);
    pan.add(panel , BorderLayout.EAST);
    this.setContentPane(pan);
    this.pack();
    this.setTitle("Calculator");
    this.setResizable(false);
}
private void action()
{
    number = true;
```

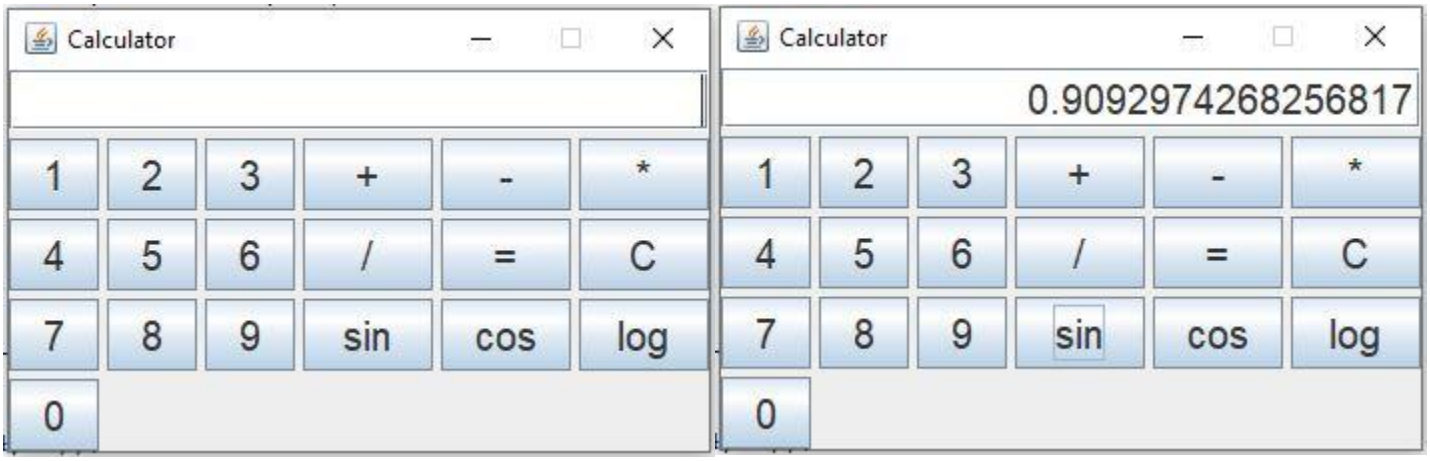
```
    textfield.setText("");
    equalOp = "=";
    op.setTotal("");
}
class OperatorListener implements ActionListener
{
    public void actionPerformed(ActionEvent e)
        {
        String displayText = textfield.getText();
        if (e.getActionCommand().equals("sin"))
        {
            textfield.setText("" + Math.sin(Double.valueOf(displayText).doubleValue()));

        }
        else

        if (e.getActionCommand().equals("cos"))
        {
            textfield.setText("" + Math.cos(Double.valueOf(displayText).doubleValue()));

        }
        else
        if (e.getActionCommand().equals("log"))
        {
            textfield.setText("" + Math.log(Double.valueOf(displayText).doubleValue()));
        }
        else if (e.getActionCommand().equals("C"))
        {
            textfield.setText("");
        }

        else
        {
```

```
if (number)
{

   action();
   textfield.setText("");
}
else
{
   number = true;
   if (equalOp.equals("="))
   {
      op.setTotal(displayText);
   }else
   if (equalOp.equals("+"))
   {
      op.add(displayText);
   }
   else if (equalOp.equals("-"))
   {
      op.subtract(displayText);
   }
   else if (equalOp.equals("*"))
   {
      op.multiply(displayText);
   }
   else if (equalOp.equals("/"))
   {
      op.divide(displayText);
   }

   textfield.setText("" + op.getTotalString());
   equalOp = e.getActionCommand();
}
```

```
        }
    }
}
class NumberListener implements ActionListener
{
    public void actionPerformed(ActionEvent event)
        {
        String digit = event.getActionCommand();
        if (number)
                {
            textfield.setText(digit);
            number = false;
        }
        else
        {
            textfield.setText(textfield.getText() + digit);
        }
    }
}
public class CalculatorOp
        {
    private int total;
    public CalculatorOp()
    {
        total = 0;
    }
    public String getTotalString()
    {
        return ""+total;
    }
    public void setTotal(String n)
    {
        total = convertToNumber(n);
```

```
        }
        public void add(String n)
        {
            total += convertToNumber(n);
        }
        public void subtract(String n)
        {
            total -= convertToNumber(n);
        }
        public void multiply(String n)
        {
            total *= convertToNumber(n);
        }
        public void divide(String n)
        {
            total /= convertToNumber(n);
        }
        private int convertToNumber(String n)
        {
            return Integer.parseInt(n);
        }
    }
}
class SwingCalculator {
    public static void main(String[] args)
    {
        JFrame frame = new Calculator();
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setVisible(true);
    }
}
```

SCREENSHOT:


Calculator
1 2 3 + - *
4 5 6 / = C
7 8 9 sin cos log
0
Calculator
0.9092974268256817
1 2 3 + - *
4 5 6 / = C
7 8 9 sin cos log
0