

Laboratory Practical Report
of
Java Programming Language
(ICT ED 455)

Submitted To

TRIBHUVAN UNIVERSITY

In Partial Fulfillment of the Requirements of the course

B.Ed. ICTE 5th Semester

Submitted By

Sanam Tamang

Symbol No.: 76214020

T.U. Regd. No.: 9-2-214-54-2019

Under the guidance of

Er. Santosh Dahal

Lecturer

Sukuna Multiple Campus

SUKUNA MULTIPLE CAMPUS

Sundarharaincha-12, Morang, Nepal

2080

CERTIFICATE

This is to certify that the Laboratory Practical Report

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is a bonafide record of experiments carried out by him/her under by guidance .

Er. Santosh Dahal

Lecturer

Sukuna Multiple Campus

Sundarharaincha-12, Morang

(Internal Examiner)

Submitted for the Final Examination on: 2080/02/07

Lecturer

(External Examiner)

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Calculator app code

//CalculatorApp.java

```
package com.mycompany.calculatorapp;
```

```
/**
```

```
*
```

```
* @author Sanam
```

```
*/
```

```
public class CalculatorApp {
```

```
    public static void main(String[] args) {
```

```
        new Calculator();
```

```
    }
```

```
}
```

//Calculator.java

```
package com.mycompany.calculatorapp;
```

```
import javax.swing.*;
```

```
import java.awt.*;
```

```
import java.awt.event.ActionEvent;
```

```
import java.awt.event.ActionListener;
```

```
public final class Calculator implements ActionListener {
```

```
    double number, answer;
```

```
    int calculation;
```

```
    JFrame frame;
```

```
    JLabel label = new JLabel();
```

```
    JTextField textField = new JTextField();
```

```
    JRadioButton onRadioButton = new JRadioButton("on");
```

```
    JRadioButton offRadioButton = new JRadioButton("off");
```

```
    JButton buttonZero = new JButton("0");
```

```
    JButton buttonOne = new JButton("1");
```

```

JButton buttonTwo = new JButton("2");
JButton buttonThree = new JButton("3");
JButton buttonFour = new JButton("4");
JButton buttonFive = new JButton("5");
JButton buttonSix = new JButton("6");
JButton buttonSeven = new JButton("7");
JButton buttonEight = new JButton("8");
JButton buttonNine = new JButton("9");
JButton buttonDot = new JButton(".");
JButton buttonClear = new JButton("C");
JButton buttonDelete = new JButton("DEL");
JButton buttonEqual = new JButton("=");
JButton buttonMul = new JButton("x");
JButton buttonDiv = new JButton("/");
JButton buttonPlus = new JButton("+");
JButton buttonMinus = new JButton("-");
JButton buttonSquare = new JButton("x\u00B2");
JButton buttonReciprocal = new JButton("1/x");
JButton buttonSqrt = new JButton("\u221A");
;

```

```

Calculator() {
    prepareGUI();
    addComponents();
    addActionEvent();
}

```

```

public void prepareGUI() {
    frame = new JFrame();
    frame.setTitle("Calculator");
    frame.setSize(300, 490);
}

```

```
frame.getContentPane().setLayout(null);
frame.getContentPane().setBackground(Color.black);
frame.setResizable(false);
frame.setLocationRelativeTo(null);
frame.setVisible(true);
frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
}
```

```
public void addComponents() {
    label.setBounds(250, 0, 50, 50);
    label.setForeground(Color.white);
    frame.add(label);

    textField.setBounds(10, 40, 270, 40);
    textField.setFont(new Font("Arial", Font.BOLD, 20));
    textField.setEditable(false);
    textField.setHorizontalAlignment(SwingConstants.RIGHT);
    frame.add(textField);

    onRadioButton.setBounds(10, 95, 60, 40);
    onRadioButton.setSelected(true);
    onRadioButton.setFont(new Font("Arial", Font.BOLD, 14));
    onRadioButton.setBackground(Color.black);
    onRadioButton.setForeground(Color.white);
    frame.add(onRadioButton);

    offRadioButton.setBounds(10, 120, 60, 40);
    offRadioButton.setSelected(false);
    offRadioButton.setFont(new Font("Arial", Font.BOLD, 14));
    offRadioButton.setBackground(Color.black);
    offRadioButton.setForeground(Color.white);
}
```

```
frame.add(offRadioButton);
```

```
ButtonGroup buttonGroup = new ButtonGroup();
```

```
buttonGroup.add(onRadioButton);
```

```
buttonGroup.add(offRadioButton);
```

```
buttonSeven.setBounds(10, 230, 60, 40);
```

```
buttonSeven.setFont(new Font("Arial", Font.BOLD, 20));
```

```
frame.add(buttonSeven);
```

```
buttonEight.setBounds(80, 230, 60, 40);
```

```
buttonEight.setFont(new Font("Arial", Font.BOLD, 20));
```

```
frame.add(buttonEight);
```

```
buttonNine.setBounds(150, 230, 60, 40);
```

```
buttonNine.setFont(new Font("Arial", Font.BOLD, 20));
```

```
frame.add(buttonNine);
```

```
buttonFour.setBounds(10, 290, 60, 40);
```

```
buttonFour.setFont(new Font("Arial", Font.BOLD, 20));
```

```
frame.add(buttonFour);
```

```
buttonFive.setBounds(80, 290, 60, 40);
```

```
buttonFive.setFont(new Font("Arial", Font.BOLD, 20));
```

```
frame.add(buttonFive);
```

```
buttonSix.setBounds(150, 290, 60, 40);
```

```
buttonSix.setFont(new Font("Arial", Font.BOLD, 20));
```

```
frame.add(buttonSix);
```

```
buttonOne.setBounds(10, 350, 60, 40);
```

```
buttonOne.setFont(new Font("Arial", Font.BOLD, 20));  
frame.add(buttonOne);
```

```
buttonTwo.setBounds(80, 350, 60, 40);  
buttonTwo.setFont(new Font("Arial", Font.BOLD, 20));  
frame.add(buttonTwo);
```

```
buttonThree.setBounds(150, 350, 60, 40);  
buttonThree.setFont(new Font("Arial", Font.BOLD, 20));  
frame.add(buttonThree);
```

```
buttonDot.setBounds(150, 410, 60, 40);  
buttonDot.setFont(new Font("Arial", Font.BOLD, 20));  
frame.add(buttonDot);
```

```
buttonZero.setBounds(10, 410, 130, 40);  
buttonZero.setFont(new Font("Arial", Font.BOLD, 20));  
frame.add(buttonZero);
```

```
buttonEqual.setBounds(220, 350, 60, 100);  
buttonEqual.setFont(new Font("Arial", Font.BOLD, 20));  
buttonEqual.setBackground(new Color(239, 188, 2));  
frame.add(buttonEqual);
```

```
buttonDiv.setBounds(220, 110, 60, 40);  
buttonDiv.setFont(new Font("Arial", Font.BOLD, 20));  
buttonDiv.setBackground(new Color(239, 188, 2));  
frame.add(buttonDiv);
```

```
buttonSqrt.setBounds(10, 170, 60, 40);  
buttonSqrt.setFont(new Font("Arial", Font.BOLD, 18));
```



```
frame.add(buttonSqrt);
```

```
buttonMul.setBounds(220, 230, 60, 40);  
buttonMul.setFont(new Font("Arial", Font.BOLD, 20));  
buttonMul.setBackground(new Color(239, 188, 2));  
frame.add(buttonMul);
```

```
buttonMinus.setBounds(220, 170, 60, 40);  
buttonMinus.setFont(new Font("Arial", Font.BOLD, 20));  
buttonMinus.setBackground(new Color(239, 188, 2));  
frame.add(buttonMinus);
```

```
buttonPlus.setBounds(220, 290, 60, 40);  
buttonPlus.setFont(new Font("Arial", Font.BOLD, 20));  
buttonPlus.setBackground(new Color(239, 188, 2));  
frame.add(buttonPlus);
```

```
buttonSquare.setBounds(80, 170, 60, 40);  
buttonSquare.setFont(new Font("Arial", Font.BOLD, 20));  
frame.add(buttonSquare);
```

```
buttonReciprocal.setBounds(150, 170, 60, 40);  
buttonReciprocal.setFont(new Font("Arial", Font.BOLD, 15));  
frame.add(buttonReciprocal);
```

```
buttonDelete.setBounds(150, 110, 60, 40);  
buttonDelete.setFont(new Font("Arial", Font.BOLD, 12));  
buttonDelete.setBackground(Color.red);  
buttonDelete.setForeground(Color.white);  
frame.add(buttonDelete);
```

```
buttonClear.setBounds(80, 110, 60, 40);
buttonClear.setFont(new Font("Arial", Font.BOLD, 12));
buttonClear.setBackground(Color.red);
buttonClear.setForeground(Color.white);
frame.add(buttonClear);

}
```

```
public void addActionEvent() {
    onRadioButton.addActionListener(this);
    offRadioButton.addActionListener(this);
    buttonClear.addActionListener(this);
    buttonDelete.addActionListener(this);
    buttonDiv.addActionListener(this);
    buttonSqrt.addActionListener(this);
    buttonSquare.addActionListener(this);
    buttonReciprocal.addActionListener(this);
    buttonMinus.addActionListener(this);
    buttonSeven.addActionListener(this);
    buttonEight.addActionListener(this);
    buttonNine.addActionListener(this);
    buttonMul.addActionListener(this);
    buttonFour.addActionListener(this);
    buttonFive.addActionListener(this);
    buttonSix.addActionListener(this);
    buttonPlus.addActionListener(this);
    buttonOne.addActionListener(this);
    buttonTwo.addActionListener(this);
    buttonThree.addActionListener(this);
    buttonEqual.addActionListener(this);
    buttonZero.addActionListener(this);
}
```

```

buttonDot.addActionListener(this);

}

@Override
public void actionPerformed(ActionEvent e) {
    Object source = e.getSource();
    if (source == onRadioButton) {
        enable();
    } else if (source == offRadioButton) {
        disable();
    } else if (source == buttonClear) {
        label.setText("");
        textField.setText("");
    } else if (source == buttonDelete) {
        int length = textField.getText().length();
        int number = length - 1;

        if (length > 0) {
            StringBuilder back = new StringBuilder(textField.getText());
            back.deleteCharAt(number);
            textField.setText(back.toString());
        }

        if (textField.getText().endsWith("")) {
            label.setText("");
        }
    } else if (source == buttonZero) {
        if (textField.getText().equals("0")) {

```

```

        return;
    } else {
        textField.setText(textField.getText() + "0");
    }
} else if (source == buttonOne) {
    textField.setText(textField.getText() + "1");
} else if (source == buttonTwo) {
    textField.setText(textField.getText() + "2");
} else if (source == buttonThree) {
    textField.setText(textField.getText() + "3");
} else if (source == buttonFour) {
    textField.setText(textField.getText() + "4");
} else if (source == buttonFive) {
    textField.setText(textField.getText() + "5");
} else if (source == buttonSix) {
    textField.setText(textField.getText() + "6");
} else if (source == buttonSeven) {
    textField.setText(textField.getText() + "7");
} else if (source == buttonEight) {
    textField.setText(textField.getText() + "8");
} else if (source == buttonNine) {
    textField.setText(textField.getText() + "9");
} else if (source == buttonDot) {
    if (textField.getText().contains(".")) {
        return;
    } else {
        textField.setText(textField.getText() + ".");
    }
}

} else if (source == buttonPlus) {
    String str = textField.getText();

```

```

    number = Double.parseDouble(textField.getText());
    textField.setText("");
    label.setText(str + "+");
    calculation = 1;
} else if (source == buttonMinus) {
    String str = textField.getText();
    number = Double.parseDouble(textField.getText());
    textField.setText("");
    label.setText(str + "-");
    calculation = 2;
} else if (source == buttonMul) {
    String str = textField.getText();
    number = Double.parseDouble(textField.getText());
    textField.setText("");
    label.setText(str + "X");
    calculation = 3;
} else if (source == buttonDiv) {
    String str = textField.getText();
    number = Double.parseDouble(textField.getText());
    textField.setText("");
    label.setText(str + "/");
    calculation = 4;
} else if (source == buttonSqrt) {
    number = Double.parseDouble(textField.getText());
    Double sqrt = Math.sqrt(number);
    textField.setText(Double.toString(sqrt));

} else if (source == buttonSquare) {
    String str = textField.getText();
    number = Double.parseDouble(textField.getText());
    double square = Math.pow(number, 2);

```

```

String string = Double.toString(square);
if (string.endsWith(".0")) {
    textField.setText(string.replace(".0", ""));
} else {
    textField.setText(string);
}
label.setText("(sqr)" + str);
} else if (source == buttonReciprocal) {
    number = Double.parseDouble(textField.getText());
    double reciprocal = 1 / number;
    String string = Double.toString(reciprocal);
    if (string.endsWith(".0")) {
        textField.setText(string.replace(".0", ""));
    } else {
        textField.setText(string);
    }
} else if (source == buttonEqual) {
    switch (calculation) {
        case 1:
            answer = number + Double.parseDouble(textField.getText());
            if (Double.toString(answer).endsWith(".0")) {
                textField.setText(Double.toString(answer).replace(".0", ""));
            } else {
                textField.setText(Double.toString(answer));
            }
            label.setText("");
            break;
        case 2:
            answer = number - Double.parseDouble(textField.getText());
            if (Double.toString(answer).endsWith(".0")) {
                textField.setText(Double.toString(answer).replace(".0", ""));
            }
    }
}

```

```

        } else {
            textField.setText(Double.toString(answer));
        }
        label.setText("");
        break;
case 3:
    answer = number * Double.parseDouble(textField.getText());
    if (Double.toString(answer).endsWith(".0")) {
        textField.setText(Double.toString(answer).replace(".0", ""));
    } else {
        textField.setText(Double.toString(answer));
    }
    label.setText("");
    break;
case 4:
    answer = number / Double.parseDouble(textField.getText());
    if (Double.toString(answer).endsWith(".0")) {
        textField.setText(Double.toString(answer).replace(".0", ""));
    } else {
        textField.setText(Double.toString(answer));
    }
    label.setText("");
    break;
default:
    label.setText("");
    break;
    }
}
}
}

```

```
public void enable() {  
    onRadioButton.setEnabled(false);  
    offRadioButton.setEnabled(true);  
    textField.setEnabled(true);  
    label.setEnabled(true);  
    buttonClear.setEnabled(true);  
    buttonDelete.setEnabled(true);  
    buttonDiv.setEnabled(true);  
    buttonSqrt.setEnabled(true);  
    buttonSquare.setEnabled(true);  
    buttonReciprocal.setEnabled(true);  
    buttonMinus.setEnabled(true);  
    buttonSeven.setEnabled(true);  
    buttonEight.setEnabled(true);  
    buttonNine.setEnabled(true);  
    buttonMul.setEnabled(true);  
    buttonFour.setEnabled(true);  
    buttonFive.setEnabled(true);  
    buttonSix.setEnabled(true);  
    buttonPlus.setEnabled(true);  
    buttonOne.setEnabled(true);  
    buttonTwo.setEnabled(true);  
    buttonThree.setEnabled(true);  
    buttonEqual.setEnabled(true);  
    buttonZero.setEnabled(true);  
    buttonDot.setEnabled(true);  
  
}
```



```
public void disable() {  
    onRadioButton.setEnabled(true);  
    offRadioButton.setEnabled(false);  
    textField.setText("");  
    label.setText(" ");  
    buttonClear.setEnabled(false);  
    buttonDelete.setEnabled(false);  
    buttonDiv.setEnabled(false);  
    buttonSqrt.setEnabled(false);  
    buttonSquare.setEnabled(false);  
    buttonReciprocal.setEnabled(false);  
    buttonMinus.setEnabled(false);  
    buttonSeven.setEnabled(false);  
    buttonEight.setEnabled(false);  
    buttonNine.setEnabled(false);  
    buttonMul.setEnabled(false);  
    buttonFour.setEnabled(false);  
    buttonFive.setEnabled(false);  
    buttonSix.setEnabled(false);  
    buttonPlus.setEnabled(false);  
    buttonOne.setEnabled(false);  
    buttonTwo.setEnabled(false);  
    buttonThree.setEnabled(false);  
    buttonEqual.setEnabled(false);  
    buttonZero.setEnabled(false);  
    buttonDot.setEnabled(false);  
}  
}
```

The Code explained below

```
package com.mycompany.calculatorapp;
```

This line specifies the package name for the Java class.

```
public class CalculatorApp { }
```

This line declares the public class named `CalculatorApp`.

```
public static void main(String[] args) {  
    new Calculator();  
}
```

This is the main method that serves as the entry point of the program. It creates a new instance of the `Calculator` class.

```
public final class Calculator implements ActionListener {
```

This line declares the public final class named `Calculator`, which implements the `ActionListener` interface.

```
double number, answer;  
int calculation;
```

These lines declare two double variables `number` and `answer`, and an integer variable `calculation`. These variables are used for performing calculations.

```
JFrame frame;  
JLabel label = new JLabel();  
JTextField textField = new JTextField();  
JRadioButton onRadioButton = new JRadioButton("on");  
JRadioButton offRadioButton = new JRadioButton("off");  
JButton buttonZero = new JButton("0");
```

These lines declare various Swing components such as `JFrame`, `JLabel`, `JTextField`, `JRadioButton`, and `JButton`. These components are used to create the graphical user interface (GUI) of the calculator.

```
Calculator() {  
    prepareGUI();  
    addComponents();  
    addActionEvent();  
}
```

This is the constructor of the `Calculator` class. It calls three methods `prepareGUI()`, `addComponents()`, and `addActionEvent()` to initialize the GUI and set up event handling.

```
public void prepareGUI() {  
    // code  
}
```

This method sets up the basic properties of the JFrame, such as size, layout, background color, and visibility.

```
public void addComponents() {  
    // code  
}
```

This method adds all the Swing components to the JFrame, setting their positions, sizes, and fonts.

```
public void addActionEvent() {  
    // code  
}
```

This method adds action listeners to the buttons and radio buttons, so that their actions can be handled when they are clicked.

```
@Override  
public void actionPerformed(ActionEvent e) {  
    // code  
}
```

This method is an implementation of the `actionPerformed` method from the `ActionListener` interface. It handles the actions performed by the buttons and radio buttons. The specific actions depend on the source of the event.

```
public void enable() {  
    // code  
}
```

This method enables all the components of the calculator, allowing user interaction.

```
public void disable() {  
    // code  
}
```

This method disables all the components of the calculator, preventing user interaction.

Overall, this code represents a simple calculator application with a GUI built using Swing components. It allows users to perform basic arithmetic calculations and includes additional functionalities like square root, square, and reciprocal. The code handles user actions and updates the display accordingly.

Output:

