**Experiment: 8**

PART A

(PART A: TO BE REFERRED BY STUDENTS)

**Aim: To study the container Class: Swing for designing the GUI and performing the events Learning Outcomes: Learner would be able to**

1. Understand the syntax of JAVA Swing
2. Understand the basic programming for GUI design
3. Understanding the JAVA events and event handling

**Tasks:**

For the following Problem Statements write programs **using classes, objects and methods**

|  |  |
| --- | --- |
| 1. | Develop swing program to perform addition of two numbers… [Use JLabels, JButton, JTextField etc.] |
| 2. | Implement user interface to calculate BMI and display result in Text Field. |
| 3 | Write a JavaX program with two buttons. When the first button is clicked, the label should display "Button-1 clicked." Similarly, clicking the second button should change the label to "Button-2 clicked". |
| 4. | Develop a GUI to convert temperature in Fahrenheit to Celsius |
| 5. | Design and implement user interface to find entered year is leap or not. |
| 6. | Write a JavaFX program to build a simple calculator with digit buttons (0-9) and basic arithmetic operator buttons (+, -, \*, /). Implement action listeners for each button (digits and operators) to perform calculations. |
| 7. | Create a user form using swings that contains two buttons, namely:  “SUBMIT” and “CANCEL”   * On clicking “SUBMIT” button, “submitted” should get displayed * On clicking “CANCEL” button, “cancelled” should get displayed |
| 8. | Design a GUI login form using swings that accepts username as “admin” and password as “admin123” and once the details are correct it shows a frame saying “Login Successful”. |

PART B

(PART B: TO BE COMPLETED BY STUDENTS)

Students must submit the soft copy as per following segments within two hours of the practical. The soft copy must be uploaded on the portal at the end of the practical. The filename should be **JAVA\_batch\_rollno\_experimentno Example: JAVA\_A1\_A001\_P1**

|  |  |
| --- | --- |
| **Roll No.: C126** | **Name: Rushabh Abhay Shah** |
| **Prog/Yr/Sem: BTI/4/8** | **Batch: 2021-2027** |
| **Date of Experiment: 06-04-2025** | **Date of Submission: 06-04-2025** |

Q1.

import javax.swing.\*;

import java.awt.event.\*;

public class AdditionApp {

    public static void main(String[] args) {

        // *Create a new frame*

        JFrame frame = new JFrame("Addition of Two Numbers");

        // *Create labels*

        JLabel label1 = new JLabel("Enter first number:");

        JLabel label2 = new JLabel("Enter second number:");

        JLabel resultLabel = new JLabel("Result:");

        // *Create text fields*

        JTextField textField1 = new JTextField();

        JTextField textField2 = new JTextField();

        JTextField resultField = new JTextField();

        resultField.setEditable(false); // *Result field should not be editable*

        // *Create a button*

        JButton addButton = new JButton("Add");

        // *Set component bounds (absolute positioning)*

        label1.setBounds(30, 30, 150, 30);

        textField1.setBounds(180, 30, 150, 30);

        label2.setBounds(30, 70, 150, 30);

        textField2.setBounds(180, 70, 150, 30);

        addButton.setBounds(120, 110, 100, 30);

        resultLabel.setBounds(30, 150, 150, 30);

        resultField.setBounds(180, 150, 150, 30);

        // *Add action listener to the button*

        addButton.addActionListener(new ActionListener() {

            public void actionPerformed(ActionEvent e) {

                try {

                    // *Parse numbers and compute sum*

                    int num1 = Integer.parseInt(textField1.getText());

                    int num2 = Integer.parseInt(textField2.getText());

                    int sum = num1 + num2;

                    // *Display result*

                    resultField.setText(String.valueOf(sum));

                } catch (NumberFormatException ex) {

                    JOptionPane.showMessageDialog(frame, "Please enter valid numbers!");

                }

            }

        });

        // *Add components to frame*

        frame.add(label1);

        frame.add(textField1);

        frame.add(label2);

        frame.add(textField2);

        frame.add(addButton);

        frame.add(resultLabel);

        frame.add(resultField);

        // *Frame settings*

        frame.setSize(400, 250);

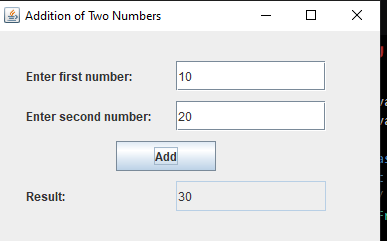
        frame.setLayout(null);

        frame.setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE);

        frame.setVisible(true);

    }

}



Q2.

import javax.swing.\*;

public class BMICalculator {

    public static void main(String[] args) {

        JFrame frame = new JFrame("BMI Calculator");

        JLabel weightLabel = new JLabel("Weight (kg):");

        JLabel heightLabel = new JLabel("Height (m):");

        JLabel resultLabel = new JLabel("BMI:");

        JTextField weightField = new JTextField();

        JTextField heightField = new JTextField();

        JTextField resultField = new JTextField();

        resultField.setEditable(false);

        JButton calcButton = new JButton("Calculate");

        weightLabel.setBounds(30, 30, 100, 25);

        weightField.setBounds(140, 30, 100, 25);

        heightLabel.setBounds(30, 70, 100, 25);

        heightField.setBounds(140, 70, 100, 25);

        calcButton.setBounds(100, 110, 100, 30);

        resultLabel.setBounds(30, 150, 100, 25);

        resultField.setBounds(140, 150, 100, 25);

        calcButton.addActionListener(e -> {

            try {

                double weight = Double.parseDouble(weightField.getText());

                double height = Double.parseDouble(heightField.getText());

                double bmi = weight / (height \* height);

                resultField.setText(String.format("%.2f", bmi));

            } catch (Exception ex) {

                JOptionPane.showMessageDialog(frame, "Enter valid inputs.");

            }

        });

        frame.add(weightLabel); frame.add(weightField);

        frame.add(heightLabel); frame.add(heightField);

        frame.add(calcButton); frame.add(resultLabel); frame.add(resultField);

        frame.setSize(300, 250);

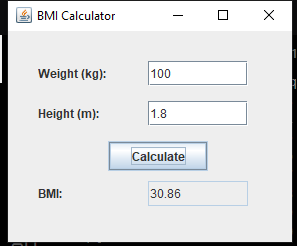
        frame.setLayout(null);

        frame.setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE);

        frame.setVisible(true);

    }

}



Q3.

import javax.swing.\*;

public class ButtonClickDemo {

    public static void main(String[] args) {

        JFrame frame = new JFrame("Button Click Demo");

        JLabel label = new JLabel("Click a button");

        JButton btn1 = new JButton("Button 1");

        JButton btn2 = new JButton("Button 2");

        label.setBounds(100, 30, 200, 30);

        btn1.setBounds(50, 80, 100, 30);

        btn2.setBounds(160, 80, 100, 30);

        btn1.addActionListener(e -> label.setText("Button-1 clicked."));

        btn2.addActionListener(e -> label.setText("Button-2 clicked."));

        frame.add(label); frame.add(btn1); frame.add(btn2);

        frame.setSize(320, 200);

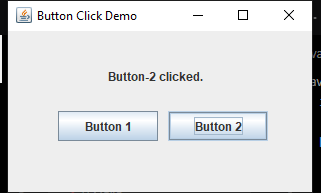
        frame.setLayout(null);

        frame.setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE);

        frame.setVisible(true);

    }

}



Q4.

import javax.swing.\*;

public class TempConverter {

    public static void main(String[] args) {

        JFrame frame = new JFrame("F to C Converter");

        JLabel fLabel = new JLabel("Fahrenheit:");

        JTextField fInput = new JTextField();

        JTextField cOutput = new JTextField();

        cOutput.setEditable(false);

        JButton convert = new JButton("Convert");

        fLabel.setBounds(30, 30, 100, 25);

        fInput.setBounds(140, 30, 100, 25);

        convert.setBounds(90, 70, 100, 30);

        cOutput.setBounds(140, 110, 100, 25);

        convert.addActionListener(e -> {

            try {

                double f = Double.parseDouble(fInput.getText());

                double c = (f - 32) \* 5 / 9;

                cOutput.setText(String.format("%.2f", c));

            } catch (Exception ex) {

                JOptionPane.showMessageDialog(frame, "Invalid input.");

            }

        });

        frame.add(fLabel); frame.add(fInput); frame.add(convert); frame.add(cOutput);

        frame.setSize(300, 200);

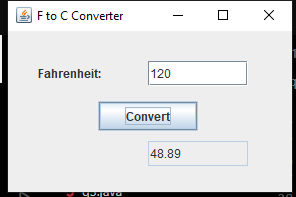
        frame.setLayout(null);

        frame.setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE);

        frame.setVisible(true);

    }

}



Q5.

import javax.swing.\*;

public class LeapYearChecker {

    public static void main(String[] args) {

        JFrame frame = new JFrame("Leap Year Checker");

        JLabel label = new JLabel("Enter Year:");

        JTextField yearField = new JTextField();

        JTextField result = new JTextField();

        result.setEditable(false);

        JButton check = new JButton("Check");

        label.setBounds(30, 30, 100, 25);

        yearField.setBounds(140, 30, 100, 25);

        check.setBounds(90, 70, 100, 30);

        result.setBounds(140, 110, 100, 25);

        check.addActionListener(e -> {

            try {

                int year = Integer.parseInt(yearField.getText());

                boolean leap = (year % 4 == 0 && year % 100 != 0) || (year % 400 == 0);

                result.setText(leap ? "Leap Year" : "Not Leap Year");

            } catch (Exception ex) {

                JOptionPane.showMessageDialog(frame, "Invalid year.");

            }

        });

        frame.add(label); frame.add(yearField); frame.add(check); frame.add(result);

        frame.setSize(300, 200);

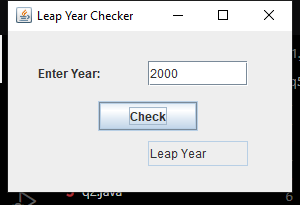
        frame.setLayout(null);

        frame.setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE);

        frame.setVisible(true);

    }

}



Q6.

import javax.swing.\*;

import java.awt.\*;

import java.awt.event.\*;

public class SwingCalculator extends JFrame {

    private JTextField display;

    private String currentInput = "";

    private double firstOperand = 0;

    private String operator = "";

    public SwingCalculator() {

        setTitle("Simple Calculator");

        setSize(300, 400);

        setDefaultCloseOperation(EXIT\_ON\_CLOSE);

        setLocationRelativeTo(null);

        setLayout(new BorderLayout());

        // *Display field*

        display = new JTextField();

        display.setEditable(false);

        display.setFont(new Font("Arial", Font.BOLD, 24));

        add(display, BorderLayout.NORTH);

        // *Panel for buttons*

        JPanel panel = new JPanel(new GridLayout(4, 4, 10, 10));

        String[] buttonLabels = {

            "7", "8", "9", "/",

            "4", "5", "6", "\*",

            "1", "2", "3", "-",

            "0", "C", "=", "+"

        };

        for (String label : buttonLabels) {

            JButton button = new JButton(label);

            button.setFont(new Font("Arial", Font.BOLD, 18));

            button.addActionListener(new ButtonClickListener());

            panel.add(button);

        }

        add(panel, BorderLayout.CENTER);

    }

    private class ButtonClickListener implements ActionListener {

        public void actionPerformed(ActionEvent e) {

            String value = ((JButton) e.getSource()).getText();

            switch (value) {

                case "C":

                    currentInput = "";

                    operator = "";

                    firstOperand = 0;

                    display.setText("");

                    break;

                case "+":

                case "-":

                case "\*":

                case "/":

                    if (!currentInput.isEmpty()) {

                        firstOperand = Double.parseDouble(currentInput);

                        operator = value;

                        currentInput = "";

                        display.setText("");

                    }

                    break;

                case "=":

                    if (!currentInput.isEmpty()) {

                        double secondOperand = Double.parseDouble(currentInput);

                        double result = 0;

                        switch (operator) {

                            case "+": result = firstOperand + secondOperand; break;

                            case "-": result = firstOperand - secondOperand; break;

                            case "\*": result = firstOperand \* secondOperand; break;

                            case "/":

                                if (secondOperand == 0) {

                                    display.setText("Error: /0");

                                    return;

                                }

                                result = firstOperand / secondOperand;

                                break;

                        }

                        currentInput = String.valueOf(result);

                        display.setText(currentInput);

                    }

                    break;

                default: // *Digits*

                    currentInput += value;

                    display.setText(currentInput);

                    break;

            }

        }

    }

    public static void main(String[] args) {

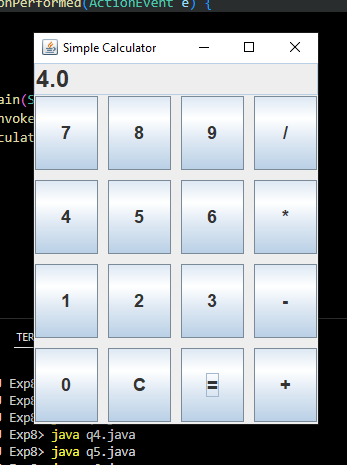
        SwingUtilities.invokeLater(() -> {

            new SwingCalculator().setVisible(true);

        });

    }

}



Q7.

import javax.swing.\*;

public class FormButtons {

    public static void main(String[] args) {

        JFrame frame = new JFrame("Form");

        JLabel label = new JLabel("");

        JButton submit = new JButton("SUBMIT");

        JButton cancel = new JButton("CANCEL");

        submit.setBounds(50, 50, 100, 30);

        cancel.setBounds(160, 50, 100, 30);

        label.setBounds(100, 100, 150, 30);

        submit.addActionListener(e -> label.setText("submitted"));

        cancel.addActionListener(e -> label.setText("cancelled"));

        frame.add(submit); frame.add(cancel); frame.add(label);

        frame.setSize(320, 200);

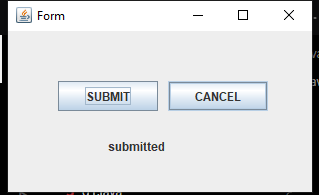
        frame.setLayout(null);

        frame.setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE);

        frame.setVisible(true);

    }

}



Q8.

import javax.swing.\*;

import java.awt.\*;

import java.awt.event.\*;

public class LoginForm extends JFrame implements ActionListener {

    private JTextField usernameField;

    private JPasswordField passwordField;

    private JButton loginButton, cancelButton;

    public LoginForm() {

        setTitle("Login Form");

        setSize(350, 200);

        setDefaultCloseOperation(EXIT\_ON\_CLOSE);

        setLocationRelativeTo(null);

        setLayout(null);

        JLabel userLabel = new JLabel("Username");

        userLabel.setBounds(30, 30, 80, 25);

        add(userLabel);

        usernameField = new JTextField();

        usernameField.setBounds(120, 30, 160, 25);

        add(usernameField);

        JLabel passLabel = new JLabel("Password");

        passLabel.setBounds(30, 70, 80, 25);

        add(passLabel);

        passwordField = new JPasswordField();

        passwordField.setBounds(120, 70, 160, 25);

        add(passwordField);

        loginButton = new JButton("Login");

        loginButton.setBounds(60, 110, 100, 30);

        loginButton.addActionListener(this);

        add(loginButton);

        cancelButton = new JButton("Cancel");

        cancelButton.setBounds(180, 110, 100, 30);

        cancelButton.addActionListener(this);

        add(cancelButton);

    }

    public void actionPerformed(ActionEvent e) {

        if (e.getSource() == loginButton) {

            String user = usernameField.getText();

            String pass = String.valueOf(passwordField.getPassword());

            if (user.equals("admin") && pass.equals("admin123")) {

                JOptionPane.showMessageDialog(this, "Login Successful");

            } else {

                JOptionPane.showMessageDialog(this, "Invalid Credentials", "Error", JOptionPane.ERROR\_MESSAGE);

            }

        } else if (e.getSource() == cancelButton) {

            usernameField.setText("");

            passwordField.setText("");

        }

    }

    public static void main(String[] args) {

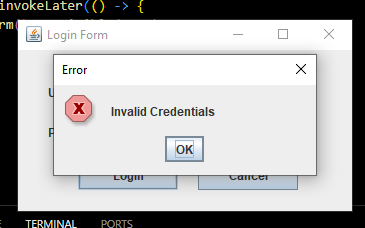
        SwingUtilities.invokeLater(() -> {

            new LoginForm().setVisible(true);

        });

    }

}



**Conclusion (Learning Outcomes):** Reflect on the questions answered by you jot down your learnings about the Topic:

Very simple experiment on Swing GUI.