SUBJECT:JAVA AND SCALA

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Experiment No 6

Aim: - Write a GUI programming in JAVA using Swing components, Containers, JLabel, JButton, JCheckBox, JRadio Buttons, JTextField etc

Theory: -

Java Swing

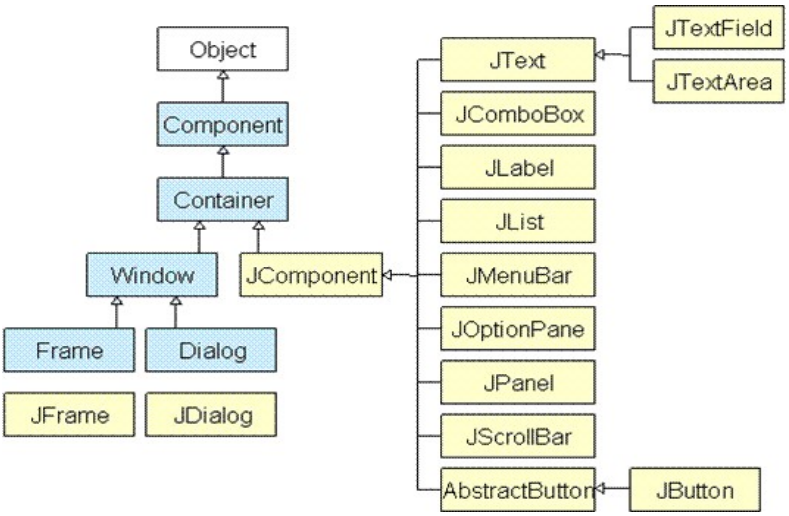
Java Swing is a GUI Framework that contains a set of classes to provide more powerful and flexible GUI components than AWT. Swing provides the look and feel of modern Java GUI. Swing library is an official Java GUI tool kit released by Sun Microsystems. It is used to create graphical user interface with Java.Swing classes are defined in javax. swing package and its sub-packages.

Swing and JFC

JFC is an abbreviation for Java Foundation classes which encompass a group of features for building Graphical User Interfaces(GUI) and adding rich graphical functionalities and interactivity to Java applications. Java Swing is a part of Java Foundation Classes (JFC).
Features of JFC

- Swing GUI components.
- Look and Feel support.
- Java 2D.

AWT and Swing Hierarchy



Introduction to Swing Classes

JPanel: JPanel is Swing's version of AWT class Panel and uses the same default layout, FlowLayout. JPanel is descended directly from JComponent.

JFrame: JFrame is Swing's version of Frame and is descended directly from Frame class. The component which is added to the Frame, is referred as its Content.

JWindow: This is Swing's version of Window and has descended directly from Window class. Like Window it uses BorderLayout by default.

JLabel: JLabel has descended from JComponent, and is used to create text labels.

JButton: JButton class provides the functioning of push button. JButton allows an icon, string or both associated with a button.

JTextField: JTextField allow editing of a single line of text.

Creating a JFrame

There are two ways to create a JFrame Window.

By instantiating JFrame class.

```
import javax.swing.*;  //importing swing package
import javax.swing.*;  //importing swing package
import java.awt.*;     //importing awt package
public class First
{
        JFrame jf;
        public First() {
        jf = new JFrame("MyWindow");            //Creating a JFrame with name MyWindow
        JButton btn = new JButton("Say Hello");//Creating a Button named Say Hello
        jf.add(btn);                            //adding button to frame
        jf.setLayout(new FlowLayout());         //setting layout using FlowLayout object
        jf.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);     //setting close  operation.
                jf.setSize(400, 400);                  //setting size
                jf.setVisible(true);                   //setting frame visibility
        }
        public static void main(String[] args)
        {
                new First();
        }
}
```

By extending JFrame class.

```
import javax.swing.*; //importing swing package
import java.awt.*; //importing awt package
public class Second extends JFrame
```

```
{
        public Second()
        {
                setTitle("MyWindow"); //setting title of frame as  MyWindow
                JLabel lb = new JLabel("Welcome to My Second Window");//Creating a label named
Welcome to My Second Window
                add(lb);                    //adding label to frame.
                setLayout(new FlowLayout()); //setting layout using FlowLayout object.
                setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE); //setting close operation.
                setSize(400, 400);            //setting size
                setVisible(true);            //setting frame visibility
        }

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

Points To Remember

Import the javax.swing and java.awt package to use the classes and methods of Swing.
While creating a frame (either by instantiating or extending Frame class), following two attributes are must for visibility of the frame:
setSize(int width, int height);

setVisible(true);

Copy
When you create objects of other components like Buttons, TextFields, etc. Then you need to add it to the frame by using the method - add(Component's Object);
You can add the following method also for resizing the frame - setResizable(true);

4. Lab Assignments to complete in this session

i. Write a program to create a window with four text fields for the name, street, city and pin code with suitable labels. Also windows contain a button MyInfo. When the user types the name, his street, city and pincode and then clicks the button, the types details must appear in Arial Font with Size 32, Italics.

ii. WA applet with 4 swing buttons with suitable texts on them. When the user presses a button a message should appear in the label as to which button was pressed by the user

iii. Write java program to create a registration form using Swing

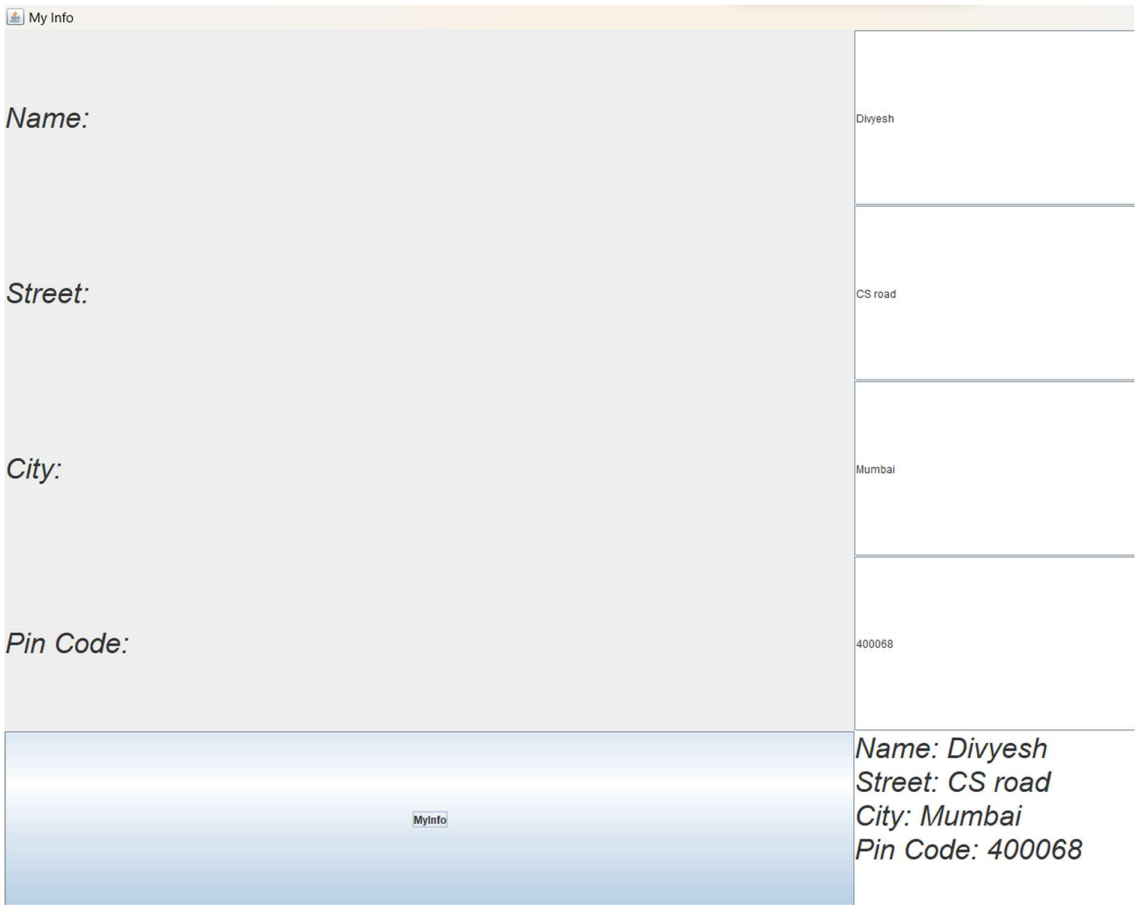
iv. Implement Scientific Calculator Using JAVA Swing

1.

q1.java > ...

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

public class q1 {
    Run | Debug
    public static void main(String[] args) {

        JFrame f = new JFrame("My Info");
        f.setSize(1000, 1000);
        f.setLayout(new GridLayout(5, 2));

        JLabel nameLabel = new JLabel("Name:");
        JLabel streetLabel = new JLabel("Street:");
        JLabel cityLabel = new JLabel("City:");
        JLabel pincodeLabel = new JLabel("Pin Code:");

        JTextField nameTextField = new JTextField();
        JTextField streetTextField = new JTextField();
        JTextField cityTextField = new JTextField();
        JTextField pincodeTextField = new JTextField();

        JButton myInfoButton = new JButton("MyInfo");
        JTextArea infoTextArea = new JTextArea();

        nameLabel.setFont(new Font("Arial", Font.ITALIC, 32));
        streetLabel.setFont(new Font("Arial", Font.ITALIC, 32));
        cityLabel.setFont(new Font("Arial", Font.ITALIC, 32));
        pincodeLabel.setFont(new Font("Arial", Font.ITALIC, 32));
        infoTextArea.setFont(new Font("Arial", Font.ITALIC, 32));
```

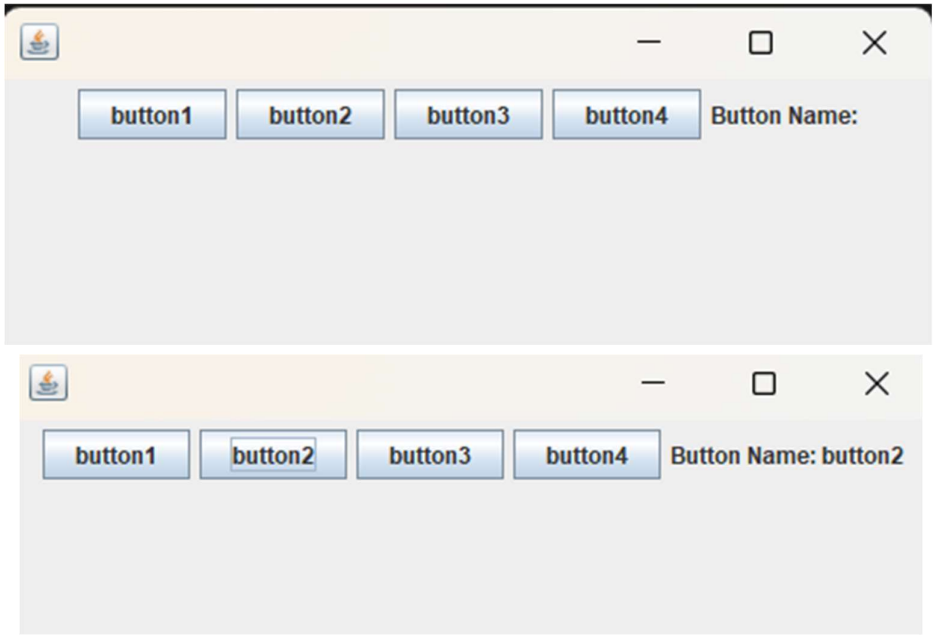
```
        nameLabel.setFont(new Font("Arial", Font.ITALIC, 32));
        streetLabel.setFont(new Font("Arial", Font.ITALIC, 32));
        cityLabel.setFont(new Font("Arial", Font.ITALIC, 32));
        pincodeLabel.setFont(new Font("Arial", Font.ITALIC, 32));
        infoTextArea.setFont(new Font("Arial", Font.ITALIC, 32));

        myInfoButton.addActionListener(new ActionListener() {
            @Override
            public void actionPerformed(ActionEvent e) {
                String name = nameTextField.getText();
                String street = streetTextField.getText();
                String city = cityTextField.getText();
                String pincode = pincodeTextField.getText();

                infoTextArea.setText(
                        "Name: " + name + "\nStreet: " + street + "\nCity: " + city + "\nPin Code: " + pincode);
            }
        });

        f.add(nameLabel);
        f.add(nameTextField);
        f.add(streetLabel);
        f.add(streetTextField);
        f.add(cityLabel);
        f.add(cityTextField);
        f.add(pincodeLabel);
        f.add(pincodeTextField);
        f.add(myInfoButton);
        f.add(infoTextArea);

        f.setVisible(true);
    }
}
```



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

public class q2 {
    Run | Debug
    public static void main(String[] args) {
        JFrame f = new JFrame();
        f.setSize(500, 500);
        f.setVisible(true);
        f.setLayout(new FlowLayout());

        JButton b1=new JButton("button1");
        f.add(b1);
        b1.setBounds(0, 0, 100, 100);
        JButton b2=new JButton("button2");
        f.add(b2);
        b2.setBounds(100, 100, 100, 100);
        JButton b3=new JButton("button3");
        f.add(b3);
        b3.setBounds(200, 200, 100, 100);
        JButton b4=new JButton("button4");
        b4.setBounds(300, 300, 100, 100);
        f.add(b4);
        JLabel Label = new JLabel("Button Name:");
        Label.setSize( 100, 500);
        f.add(Label,BorderLayout.SOUTH);

    ButtonClickListener listener = new ButtonClickListener(Label);
        b1.addActionListener(listener);
        b2.addActionListener(listener);
        b3.addActionListener(listener);
        b4.addActionListener(listener);
    }
}
```

```java
    class ButtonClickListener implements ActionListener {
        private JLabel nameLabel;
        public ButtonClickListener(JLabel nameLabel) {
            this.nameLabel = nameLabel;
        }
        public void actionPerformed(ActionEvent e) {
            JButton clickedButton = (JButton) e.getSource();
            String buttonName = clickedButton.getText();
            nameLabel.setText("Button Name: " + buttonName);
        }
}
```

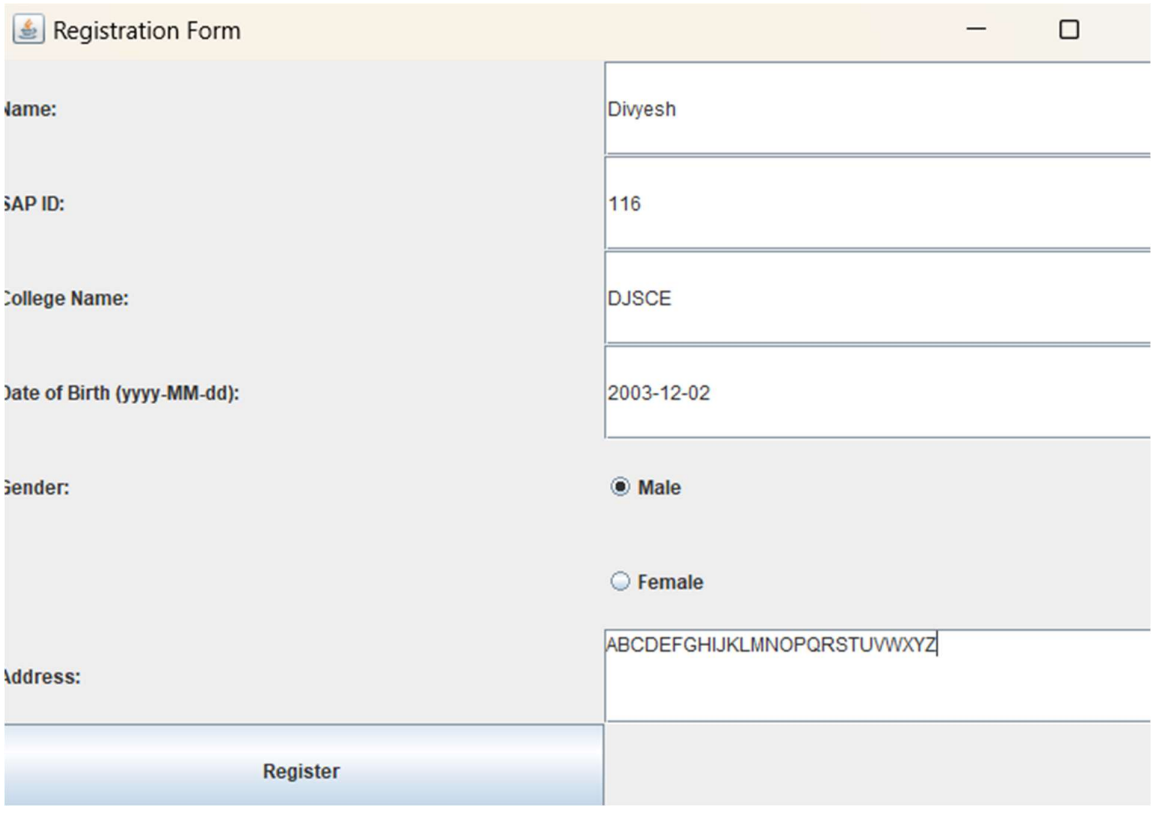
OUTPUT:

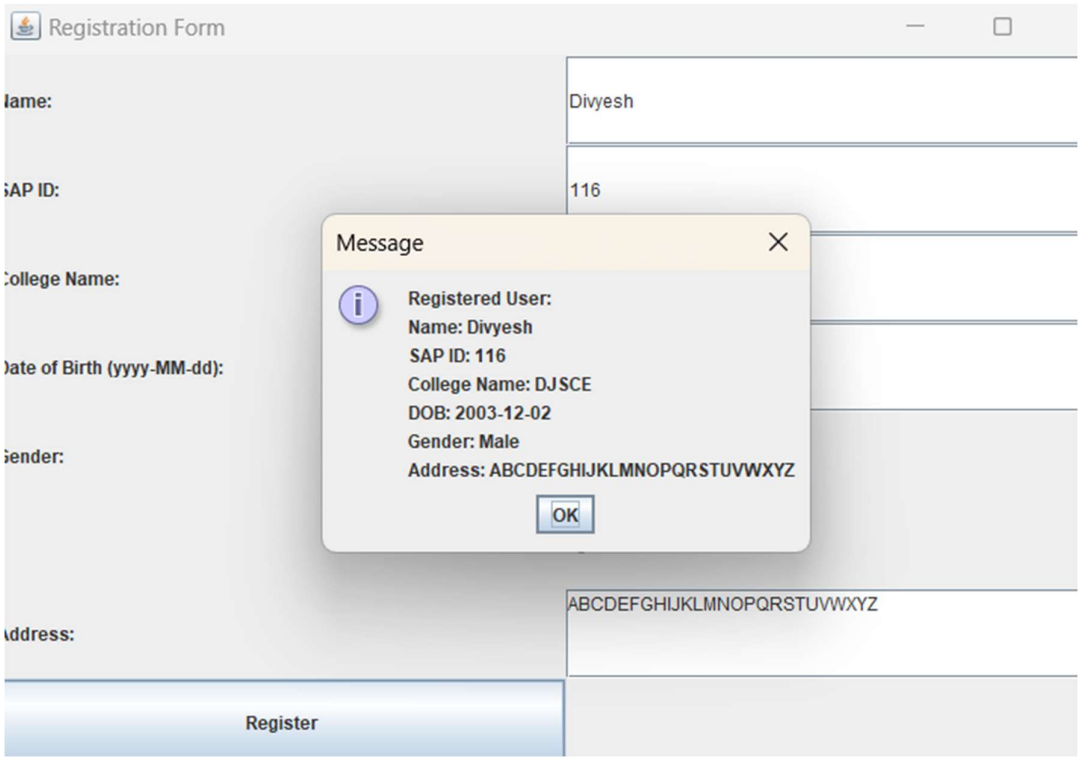

button1
button2
button3
button4
Button Name:
button1
button2
button3
button4
Button Name: button2

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

public class q3 {
    Run | Debug
    public static void main(String[] args) {
        JFrame frame = new JFrame("Registration Form");
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setSize(400, 300);
        frame.setLayout(new GridLayout(8, 2));

        JLabel nameLabel = new JLabel("Name:");
        JTextField nameTextField = new JTextField();

        JLabel sapidLabel = new JLabel("SAP ID:");
        JTextField sapidTextField = new JTextField();

        JLabel collegeLabel = new JLabel("College Name:");
        JTextField collegeTextField = new JTextField();

        JLabel dobLabel = new JLabel("Date of Birth (yyyy-MM-dd):");
        JTextField dobTextField = new JTextField();

        JLabel genderLabel = new JLabel("Gender:");
        JRadioButton maleRadioButton = new JRadioButton("Male");
        JRadioButton femaleRadioButton = new JRadioButton("Female");
        ButtonGroup genderGroup = new ButtonGroup();
        genderGroup.add(maleRadioButton);
        genderGroup.add(femaleRadioButton);

        JLabel addressLabel = new JLabel("Address:");
        JTextArea addressTextArea = new JTextArea();

        JButton registerButton = new JButton("Register");
```

```
        registerButton.addActionListener(new ActionListener() {
            @Override
            public void actionPerformed(ActionEvent e) {
                String name = nameTextField.getText();
                String sapid = sapidTextField.getText();
                String college = collegeTextField.getText();
                String dob = dobTextField.getText();
                String gender = maleRadioButton.isSelected() ? "Male" : "Female";
                String address = addressTextArea.getText();

                JOptionPane.showMessageDialog(frame, "Registered User:\nName: " + name + "\nSAP ID: " + sapid +
                        "\nCollege Name: " + college + "\nDOB: " + dob + "\nGender: " + gender + "\nAddress: " + address);
            }
        });

        frame.add(nameLabel);
        frame.add(nameTextField);
        frame.add(sapidLabel);
        frame.add(sapidTextField);
        frame.add(collegeLabel);
        frame.add(collegeTextField);
        frame.add(dobLabel);
        frame.add(dobTextField);
        frame.add(genderLabel);
        frame.add(maleRadioButton);
        frame.add(new JLabel());
        frame.add(femaleRadioButton);
        frame.add(addressLabel);
        frame.add(new JScrollPane(addressTextArea));
        frame.add(registerButton);

        frame.setVisible(true);
    }
}
```

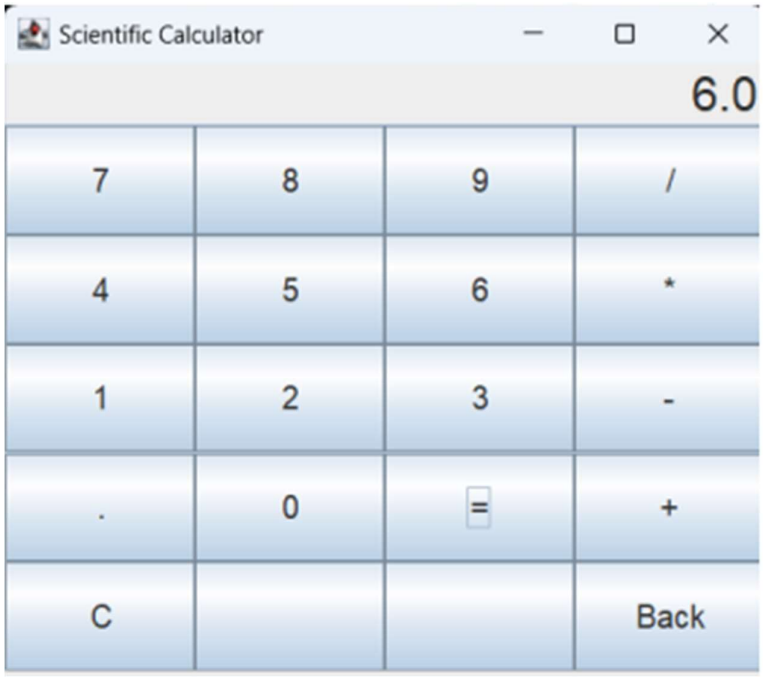
OUTPUT:




Registration Form
lame:
Divyesh
AP ID:
116
ollege Name:
ate of Birth (yyyy-MM-dd):
ender:
ddress:
ABCDEFGHIJKLMNOPQRSTUVWXYZ
Register
Message
Registered User:
Name: Divyesh
SAP ID: 116
College Name: DJSCE
DOB: 2003-12-02
Gender: Male
Address: ABCDEFGHIJKLMNOPQRSTUVWXYZ
OK

```java
import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.lang.Math;

public class fourth extends JFrame implements ActionListener {
    private JTextField textField;
    private double firstOperand, secondOperand, result;
    private String operator;

    public fourth() {
        setTitle(title:"Scientific Calculator");
        setSize(width:400, height:400);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setLayout(new BorderLayout());

        textField = new JTextField(columns:20);
        textField.setHorizontalAlignment(JTextField.RIGHT);
        textField.setFont(new Font(name:"Arial", Font.PLAIN, size:24));
        textField.setEditable(b:false);

        JPanel buttonPanel = new JPanel();
        buttonPanel.setLayout(new GridLayout(rows:6, cols:4));

        String[] buttonLabels = {
            "7", "8", "9", "/",
            "4", "5", "6", "*",
            "1", "2", "3", "-",
            ".", "0", "=", "+",
            "C", "", "", "Back"
        };

        for (String label : buttonLabels) {
            JButton button = new JButton(label);
            button.setFont(new Font(name:"Arial", Font.PLAIN, size:16));
            button.addActionListener(this);
            buttonPanel.add(button);
        }

        add(textField, BorderLayout.NORTH);
        add(buttonPanel, BorderLayout.CENTER);

        firstOperand = 0;
        secondOperand = 0;
        operator = "";
        result = 0;
    }
```

```
    @Override
    public void actionPerformed(ActionEvent e) {
        String command = e.getActionCommand();

        if ("0123456789.".contains(command)) {
            textField.setText(textField.getText() + command);
        } else if ("+-*/".contains(command)) {
            firstOperand = Double.parseDouble(textField.getText());
            operator = command;
            textField.setText(t:"");
        }
        else if ("=".equals(command)) {
            secondOperand = Double.parseDouble(textField.getText());
            calculate();
            operator = "";
        } else if ("C".equals(command)) {
            textField.setText(t:"");
        } else if ("Back".equals(command)) {
            String text = textField.getText();
            if (!text.isEmpty()) {
                textField.setText(text.substring(beginIndex:0, text.length() - 1));
            }
        }
    }

    private void calculate() {
        switch (operator) {
            case "+":
                result = firstOperand + secondOperand;
                break;
            case "-":
                result = firstOperand - secondOperand;
                break;
            case "*":
                result = firstOperand * secondOperand;
                break;
            case "/":
                if (secondOperand != 0) {
                    result = firstOperand / secondOperand;
                } else {
                    textField.setText(t:"Error");
                    return;
                }
                break;
        }
        textField.setText(String.valueOf(result));
    }

    Run | Debug
    public static void main(String[] args) {
        SwingUtilities.invokeLater(() -> {
            fourth calculator = new fourth();
            calculator.setVisible(b:true);
        });
    }
}
```


Scientific Calculator
6.0
7
8
9
/
4
5
6
*
1
2
3
-
.
0
=
+
C
Back