Experiment No. 7

Title: Design Graphical User Interface

Batch:SY_IT(B3) **Roll No.:16010423076** **Experiment No.:7**

Aim: Create GUI containing registration form which will accept input from the user and display it on a button click. (Form should contain textbox, checkbox, radio-button, drop down menu etc.)

Resources needed: Text Editor /IDE, JDK 1.8

Theory

Swing: Java Swing is a part of Java Foundation Classes (JFC) that is *used to create window-based applications*. It is built on the top of AWT (Abstract Windowing Toolkit) API and entirely written in java.Unlike AWT, Java Swing provides platform-independent and lightweight components.

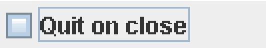
The javax.swing package provides classes for java swing API such as JButton, JTextField, JTextArea, JRadioButton, JCheckbox, JMenu, JColorChooser etc.

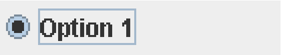
There are many differences between java awt and swing that are given below.

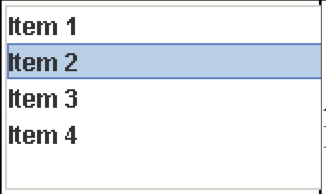
No.	**Java AWT**	**Java Swing**
1)	AWT components are platform-dependent.	Java swing components are platform-independent.
2)	AWT components are heavyweight.	Swing components are lightweight.
3)	AWT doesn't support pluggable look and feel.	Swing supports pluggable look and feel.
4)	AWT provides less components than Swing.	Swing provides more powerful components such as tables, lists, scrollpanes, colorchooser, tabbedpane etc.
5)	AWT doesn't follows MVC (Model View Controller) where model represents data, view represents presentation and controller acts as an interface between model and view.	Swing follows MVC.

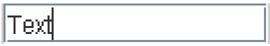
Swing Component:

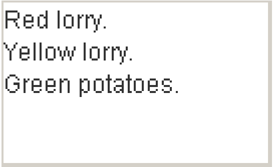
Component	Common constructor parameters	Important methods	Useful Listeners
 JButton	Text Icon Text/icon Action		ActionListener

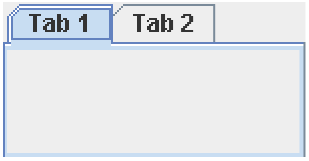

JCheckBox
	Text
	Text/selected
		setSelected()
		isSelected()
			ActionListener
			ChangeListener

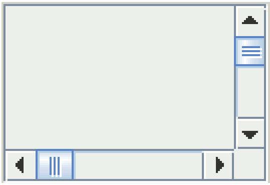
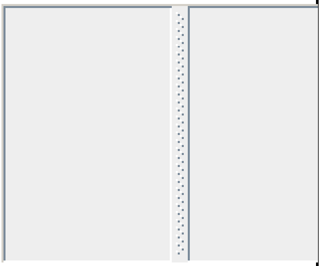

JRadioButton
	Text
	Text/selected
		setSelected()
		isSelected()
		ButtonGroup.add(...)
			ActionListener
			ChangeListener


JList
	Array of items
	ListModel
		getSelectedValue()
		getSelectedItem()
			ListSelectionListener

Text
JTextField
	No columns
	Initial text
		getText()
		setText()
		getDocument()
			DocumentListener (Added to Document object returned by getDocument().)

Red lorry. Yellow lorry. Green potatoes. JTextArea	No rows/columns Rows/cols/text		


JTabbedPane
	Tab placement	addTab()
		insertTab()
		getSelectedComponent()
		setSelectedComponent()
			ChangeListener

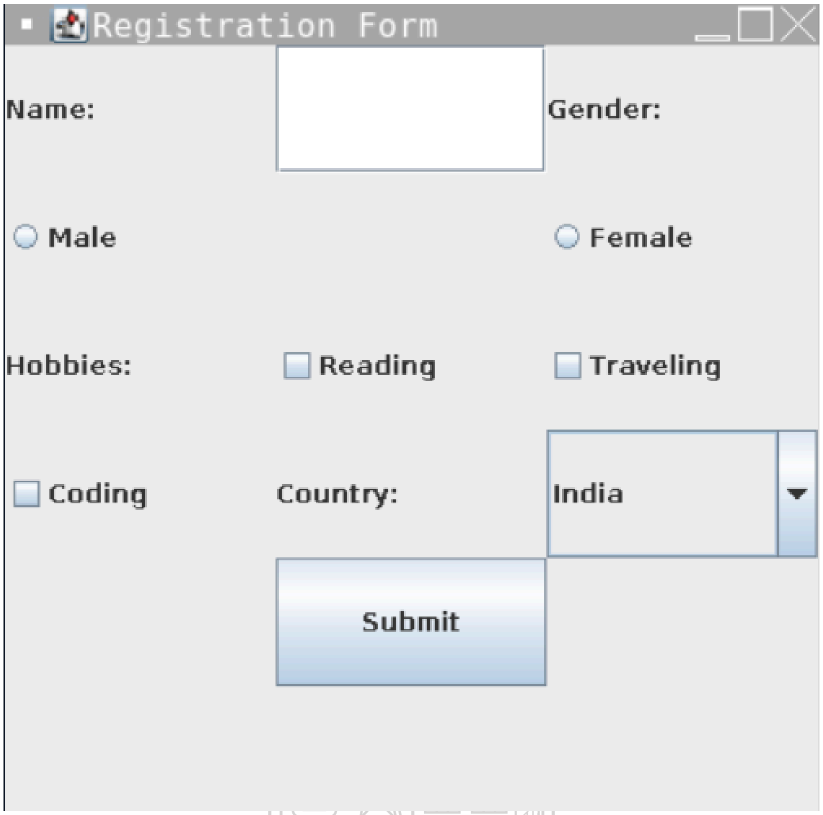
 JScrollPane	Component Component, scrollbar options	setViewportView()	
 JSplitPane	Orientation, 2 components For orientation, use JScrollPane.HORIZONTAL_SPLIT or JScrollPane.VERTICAL_SPLIT.	setDividerLocation()	
JComponent			MouseListener

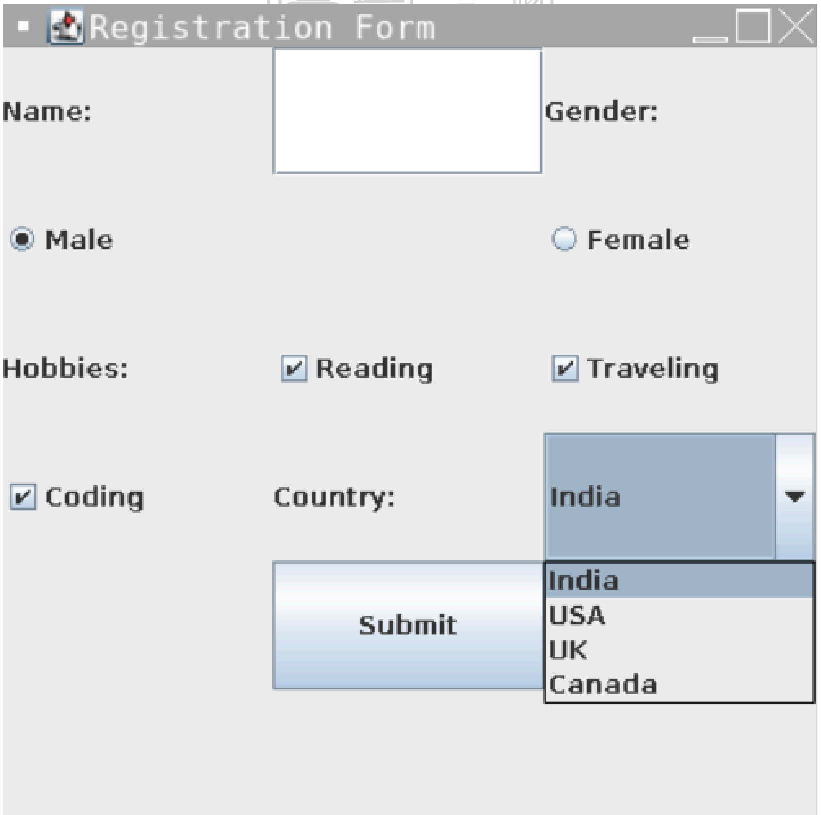
Results: (Code and Screen shots of GUI developed with Output)

Code :

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

public class Main {
    public static void main(String[] args) {
        JFrame frame = new JFrame("Registration Form");
        frame.setSize(400, 400);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setLayout(new GridLayout(6, 2));

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

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

        JLabel hobbyLabel = new JLabel("Hobbies:");
        JCheckBox reading = new JCheckBox("Reading");
        JCheckBox traveling = new JCheckBox("Traveling");
        JCheckBox coding = new JCheckBox("Coding");

        JLabel countryLabel = new JLabel("Country:");
        String[] countries = {"India", "USA", "UK", "Canada"};
        JComboBox<String> countryDropdown = new JComboBox<>(countries);

        JButton submitButton = new JButton("Submit");


        submitButton.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e) {
                String name = nameField.getText();
                String gender = male.isSelected() ? "Male" : (female.isSelected() ? "Female" : "Not
selected");

                String hobbies = "";
                if (reading.isSelected()) hobbies += "Reading ";
                if (traveling.isSelected()) hobbies += "Traveling ";
                if (coding.isSelected()) hobbies += "Coding ";

                String country = (String) countryDropdown.getSelectedItem();


                JOptionPane.showMessageDialog(frame, "Name: " + name + "\nGender: " + gender +
                                                "\nHobbies: " + hobbies + "\nCountry: " + country);
            }
        });

        frame.add(nameLabel);
        frame.add(nameField);
        frame.add(genderLabel);
        frame.add(male);
        frame.add(new JLabel());
        frame.add(female);
        frame.add(hobbyLabel);
        frame.add(reading);
        frame.add(traveling);
        frame.add(coding);
        frame.add(countryLabel);
        frame.add(countryDropdown);
        frame.add(new JLabel());
        frame.add(submitButton);


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

Output :





● Male

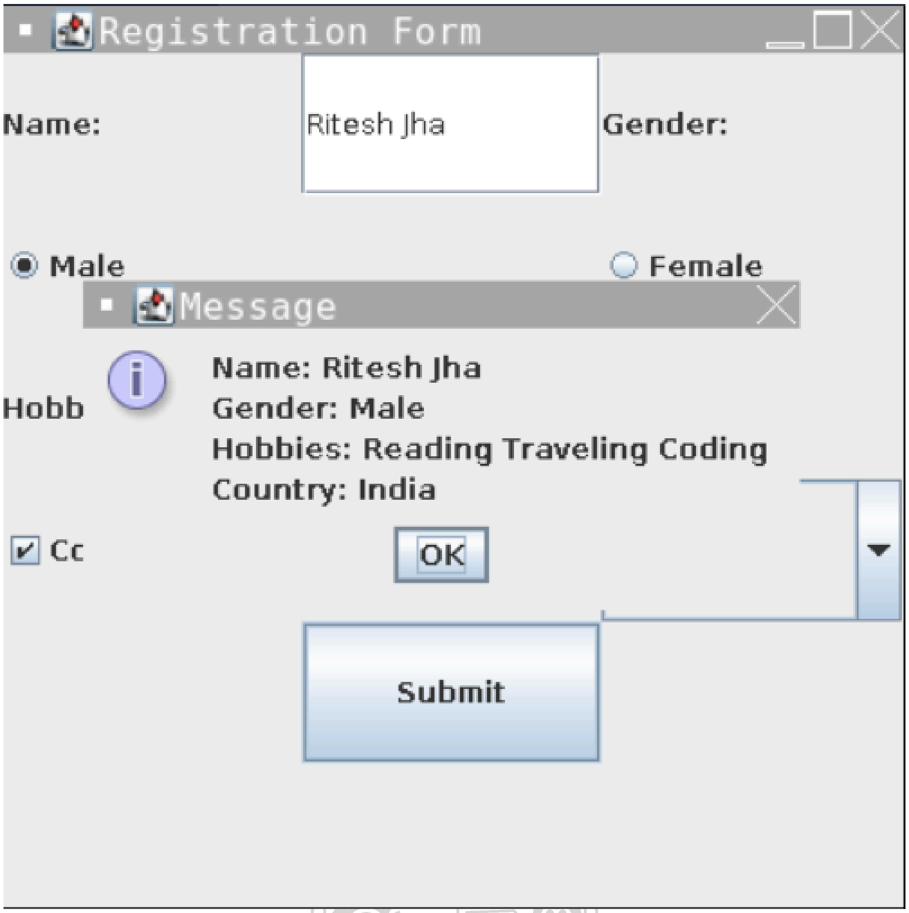
○ Female

☑ Reading

☑ Traveling

☑ Coding

Country: India



Name: Ritesh Jha

Gender: ● Male ○ Female

Name: Ritesh Jha
Gender: Male
Hobbies: Reading Traveling Coding
Country: India

☑ Cc

Questions:

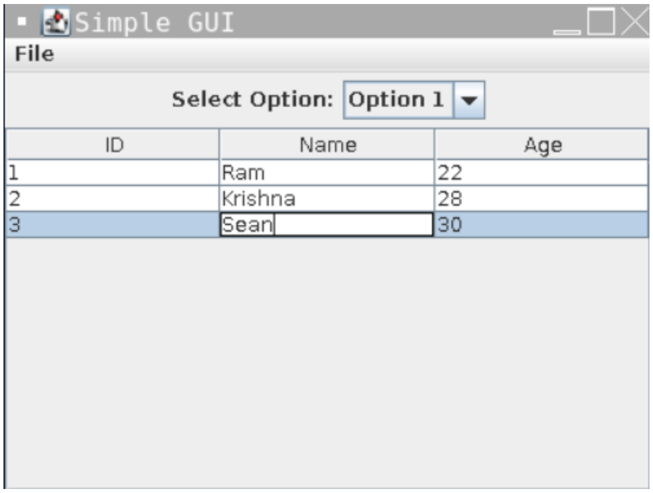
1. Write a program for demonstration of JMenu, JTable and JComboBox

Code :

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

public class Main {
   public static void main(String[] args) {
      JFrame frame = new JFrame("Simple GUI");
      frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
```

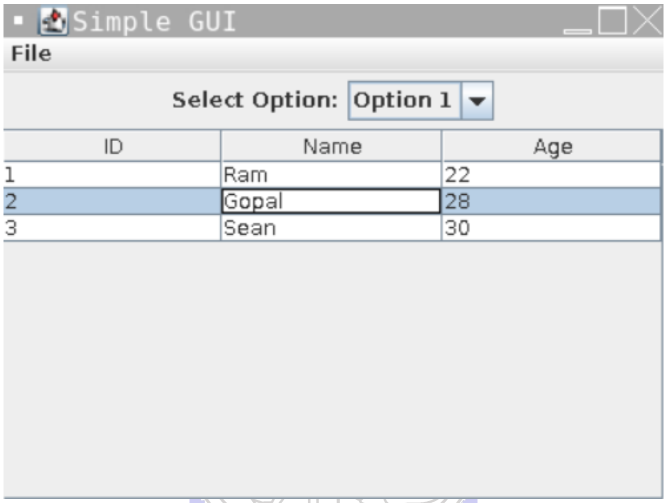
```
        frame.setSize(400, 300);

        JMenuBar menuBar = new JMenuBar();
        JMenu fileMenu = new JMenu("File");
        JMenuItem exitItem = new JMenuItem("Exit");
        exitItem.addActionListener(e -> System.exit(0));
        fileMenu.add(exitItem);
        menuBar.add(fileMenu);
        frame.setJMenuBar(menuBar);

        String[][] data = {
            { "1", "Alice", "22" },
            { "2", "Bob", "28" },
            { "3", "Charlie", "30" }
        };
        String[] columns = { "ID", "Name", "Age" };
        JTable table = new JTable(data, columns);
        JScrollPane scrollPane = new JScrollPane(table);
        frame.add(scrollPane, BorderLayout.CENTER);

        JPanel comboPanel = new JPanel();
        JLabel comboLabel = new JLabel("Select Option:");
        JComboBox<String> comboBox = new JComboBox<>(new String[]{"Option 1",
"Option 2", "Option 3"});
        comboPanel.add(comboLabel);
        comboPanel.add(comboBox);
        frame.add(comboPanel, BorderLayout.NORTH);

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

Output :



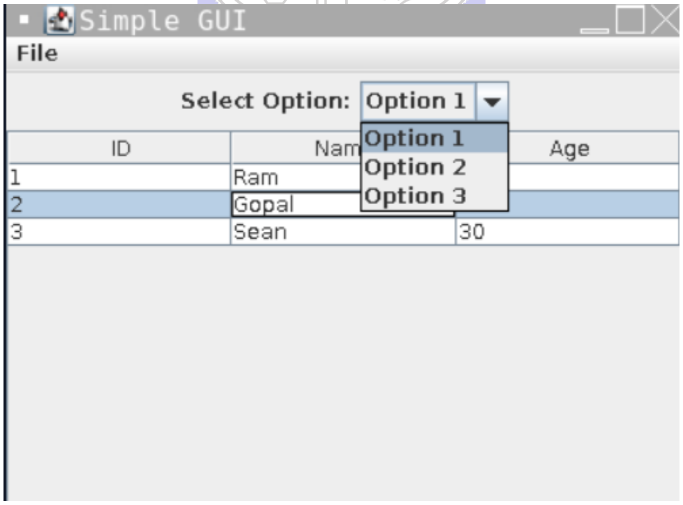
Select Option: Option 1

ID	Name	Age
1	Ram	22
2	Krishna	28
3	Sean	30



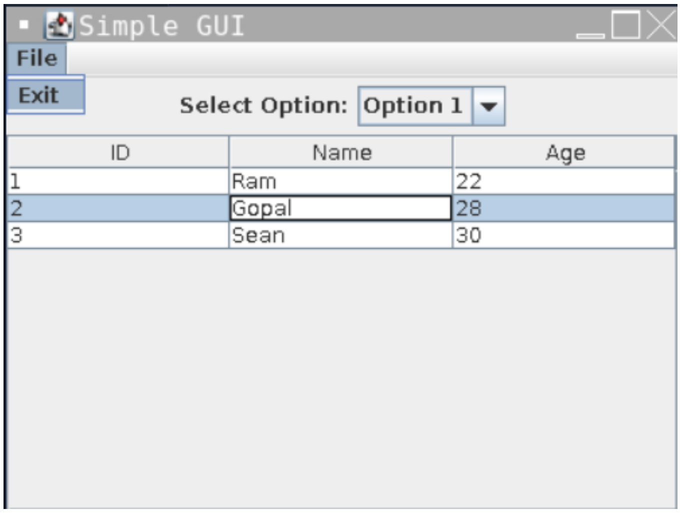
Select Option: Option 1

ID	Name	Age
1	Ram	22
2	Gopal	28
3	Sean	30



Select Option: Option 1

ID	Nam	Age
1	Ram	
2	Gopal	
3	Sean	30



ID	Name	Age
1	Ram	22
2	Gopal	28
3	Sean	30

Outcomes: CO4: Illustrate the use of collection classes ,functional programming and GUI programming with java

Conclusion: (Conclusion to be based on the objectives and outcomes achieved)

From this article, I learned how to create basic GUI applications in Java using Swing, including how to implement a registration form with text fields, radio buttons, checkboxes, drop-down menus, and how to build interfaces with tables, menus, and combo boxes for user interaction.

Grade: AA / AB / BB / BC / CC / CD/DD

Signature of faculty in-charge with date

References:

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2. Sachin Malhotra, Saurab Choudhary, “Programming in Java” Oxford University Press Second Edition, 2018 3.
3. D.T. Editorial Services, “Java 8 Programming Black Book” Dream tech Press Edition 2015
4. https://examples.javacodegeeks.com/desktop-java/swing/java-swing-tutorial-beginners/