

Advanced Programming (OOP) Lab

Assignment–8

Report Instructions

This document specifies the mandatory structure and assignment-specific questionnaires for the handwritten report corresponding to Assignment–8: GUI Development with Swing. The report will be evaluated for understanding of event-driven programming, GUI component interaction, and separation of interface logic from application logic.

General Submission Rules

- The report must be handwritten and submitted individually.
- Do not redraw full GUI code; include only selective and relevant code fragments.
- Explanations must focus on event flow, component responsibilities, and design decisions.
- All implemented requirements and attempted exercises or bonus tasks must be discussed.
- Purely descriptive UI explanations without reasoning will be penalized.

Section A: GUI Architecture Overview

Describe the overall structure of your Swing application. Identify the main window, input components, display components, and data storage structures. Explain how control flows between the user interface and application logic.

Section B: Swing Component Selection

For the components used (JFrame, JTextField, JComboBox, JButton, JTextArea or JTable):

1. State the purpose of each component.
2. Explain why this component type is appropriate for the task.
3. Describe one limitation of each component.

Section C: Event Handling and Listener Logic

Explain how event handling is implemented in your application.

- Identify the events generated by user actions
- Describe how ActionListener processes these events
- Explain how data is transferred from input fields to storage or display

Section D: Validation and Error Handling

Explain how input validation is implemented. Describe what happens when invalid or empty input is provided. Justify why validation is necessary in GUI-based applications.

Section E: Layout Management Reasoning

Describe the layout manager(s) used in your GUI. Explain how component placement and resizing are handled. If a custom or advanced layout is used, justify the choice.

Section F: Data Handling and Persistence

Explain how student data is stored and displayed in the application. If persistence is implemented:

- Describe the file format and I/O process
- Explain how consistency between UI and stored data is maintained

Section G: What-If Design Analysis

Answer any two of the following:

1. What problems arise if all logic is written inside event handlers?
2. How would the design change if the application grows to hundreds of records?
3. What breaks if layout managers are replaced with absolute positioning?
4. How would responsiveness change if long tasks run on the Event Dispatch Thread?

Section H: Individual Extension Explanation

Describe one individual enhancement you implemented, such as:

- Menu-based actions
- Search functionality
- Table-based display

Explain how this extension affects UI flow and user interaction.

Section I: Debugging and Learning Reflection

Describe one GUI-related issue encountered (event misfires, layout problems, data inconsistency). Explain how it was diagnosed and what conceptual understanding improved.

Section J: AI Usage Disclosure

Declare whether AI or online tools were used. Clearly specify:

- Which part of the GUI or event logic was assisted
- How correctness and usability were validated