

## Advanced Programming (OOP) Lab

### Assignment–1

#### Report Instructions

This document specifies the mandatory structure and questionnaires to be followed while preparing the handwritten report for Assignment–1. The report must reflect individual understanding and reasoning. Mere reproduction of code or externally sourced explanations will not be awarded credit.

#### General Submission Rules

- The report must be handwritten and submitted individually.
- Only selective code snippets are permitted. Full programs must not be rewritten.
- All explanations must be in the student's own words.
- Use of AI tools is allowed, but unreflected copying is strictly penalized.
- Each question attempted in the assignment must be addressed in the report.

**Tip:** *Use multiple colors for highlighting your explanations, references and annotations.*

#### Section A: Problem Interpretation

For each of the six problems in Assignment–1, rewrite the problem statement in your own words. Clearly identify the objective of the program and the type of input–output behavior expected. Avoid restating the original problem verbatim.

#### Section B: Logic and Control Flow Explanation

For each problem, answer the following:

1. What decision-making or looping constructs are used, and why are they appropriate?
2. How does the program ensure correctness for all valid inputs?
3. Identify one edge case and explain how your logic handles it.

#### Section C: Selective Code Reasoning

Choose any two problems from the assignment and include:

- One critical code segment (maximum 8–10 lines)
- A line-by-line explanation of its logic in plain English

Do not include trivial input or print statements.

#### Section D: What-If Analysis

Answer any two of the following:

1. What changes are required if input values are read from a file instead of the keyboard?
2. How would the program behavior change if invalid inputs are allowed?
3. How can one of the programs be generalized to handle multiple inputs instead of two?
4. What would break if integer data types are replaced with floating-point types?

### **Section E: Pattern Generation Reasoning**

For the pattern-printing problems:

- Explain how nested loops are structured
- Describe how the number of iterations changes across rows
- Illustrate the logic using a small dry-run table

### **Section F: Bug and Learning Reflection**

Describe one logical or syntactic issue you encountered while implementing this assignment. Explain how you identified the issue and what conceptual understanding improved as a result.

### **Section G: Individual Variation Task**

Modify exactly one program from the assignment in a minor but meaningful way (for example: changing input constraints, altering output format, or extending functionality). Explain the modification and its impact on the program logic.

### **Section H: AI Usage Disclosure**

State whether any AI or external tools were used. Clearly mention:

- Which part of the assignment was assisted
- What changes you made after reviewing the generated output