

## Assignment 4: Friend Classes and Friend Functions

Course Title: Object Oriented Programming

Course Code: CC-112

Credit Hours: 3 (Theory)

Total Marks: 20

Submission Deadline: 28-06-2028

CLOs Assessed: CLO-2, CLO-3

Instructor: Syed Hamed Raza

### Objective:

This assignment is designed to help students:

- Understand the purpose and usage of friend functions and friend classes.
- Apply the concept of controlled access between classes.
- Explore encapsulation and its intentional relaxation in C++.

### Instructions:

- Submit your work as a single `.cpp` file and a brief report (PDF format).
- Include proper comments in the code.
- Ensure code is well-indented and readable.
- Academic honesty must be maintained.

### Part A – Friend Functions [10 Marks]

#### 1. Theory (2 Marks):

What is a friend function? When and why is it used in object-oriented design?

#### 2. Programming (8 Marks):

Create two classes: `Box`` and `Display``.

- `Box`` should have private attributes length, width, and height.
- Define a friend function in `Display`` that can access and print the dimensions of `Box``.

### Part B – Friend Classes [10 Marks]

#### 1. Theory (2 Marks):

Explain the difference between friend functions and friend classes with an example.

#### 2. Programming (8 Marks):

Create a class `Student` with private data members `name` and `grade`.

Declare another class `Admin` as a friend of `Student` that can access and update the grade.