

CS2313 Homework 1: Introduction to C++ Classes and Objects

Due Date: 12th September, 11:59 pm

This homework is designed to help you practice basic Object-Oriented Programming (OOP) concepts in C++. You will create a simple class to model a student, add validation logic, and include methods that demonstrate both conditionals and loops.

Part A: Student Class (Student.h)

Create a class called **Student** with the following:

Private Data Members:

- string name
- int age
- double gpa

Public Member Functions:

1. Parameterized constructor:

Student (string n, int a, double g)

- Initialize the student's name, age, and gpa.
- Apply **validation**:
 - If the provided age is invalid (e.g., negative), set it to 0.
 - If the provided gpa is invalid (not in the range 0.0–4.0), set it to 0.0.

2. Setters/Getters:

- setName(string) and getName() const
- setAge(int) and getAge() const
- setGpa(double) and getGpa() const

◆ Add validation inside setAge and setGpa.

3. Other Methods:

- bool isAdult() const – returns true if age is 18 or older.
- void printInfo() const – prints all info in one line.
- bool eligibleForScholarship() const – returns true if gpa \geq 3.5 **and** age \leq 25. (*Conditional logic*)
- void calculateWeeklyStudyAverage() const – asks the user to enter study hours for **5 days**, then uses a **loop** to calculate and print the average hours per day. (*Loop usage*)

Part B: Main Program (main.cpp)

In main.cpp:

1. Create **at least two** Student objects using the parameterized constructor.
 - o One with valid values.
 - o One with invalid values.
2. Display student information using printInfo().
3. Display whether each student is an adult using isAdult().
4. Check and display whether each student is eligible for a scholarship using eligibleForScholarship().
5. Call calculateWeeklyStudyAverage() for at least one student.
6. Prompt the user to enter a student's name and GPA, then create a third Student object with age = 18 and display it.

Submission Requirements

At the **top of each file**, include a comment block with:

```
// Name: Your Full Name  
// Student ID: YourID  
// Assignment: CS2313 Homework 1
```

Submit the following files in a zipped folder:

- Student.h
- main.cpp

Additionally, include:

- **A screenshot of your program run** that shows:
 - Output for at least **two students** created with the parameterized constructor (one valid, one invalid).
 - Output for the **third student** created from user input.
 - Results of the `isAdult()` method for each student.
 - Results of the `eligibleForScholarship()` method for each student.
 - Results of the `calculateWeeklyStudyAverage()` method (with 5 days of study hours entered).
- **Naming convention:** Submit your zipped folder as
 - `Lastname_hw1.zip` (Example: `Smith_hw1.zip`)

Make sure your code includes comments and follows good indentation practices.