



CL2001 – Data Structure Lab

Lab Task # 04

Note:

- Plagiarism will not be **tolerated!!**
- Variable names should be meaningful.
- Use comments wherever applicable.
- Submit a pdf file containing all of your C++ code with all possible screenshots of every task output on Google Classroom. The name of file should be your roll no followed by your name (roll-no-name.pdf) i.e., (23P-1234-Ali.pdf).

Problem: 1

Suppose you are tasked with creating a student registration system for a university using C++. Each student record includes the student's ID number, name, and GPA. You need to implement this system using a singly linked list data structure for efficient management of student records.

1. Design a class to represent a student record. It should include private members for the student's ID, name, and GPA, along with appropriate member functions.
2. Develop a class to manage the linked list of students. Include functions to add a student, remove a student by ID, display all student records, search for a student by ID and display their information, and calculate the average GPA of all students.
3. Write a sample program demonstrating the usage of your class. The program should allow users to interactively add students, remove students, search for students, display all student records, and calculate the average GPA.

Ensure that your implementation gracefully handles edge cases such as an empty list or attempting to remove a non-existent student.

Sample Output:

Welcome to the Student Registration System!

1. Add a student
2. Remove a student
3. Search for a student
4. Display all students
5. Calculate average GPA
6. Exit

Enter your choice: 1
Enter student ID: 1001
Enter student name: John Doe
Enter student GPA: 3.8

Student added successfully.

Enter your choice: 1

Enter student ID: 1002

Enter student name: Jane Smith

Enter student GPA: 3.5

Student added successfully.

Enter your choice: 1

Enter student ID: 1003

Enter student name: Alice Johnson

Enter student GPA: 3.9

Student added successfully.

Enter your choice: 4

Student Records:

ID: 1001, Name: John Doe, GPA: 3.8

ID: 1002, Name: Jane Smith, GPA: 3.5

ID: 1003, Name: Alice Johnson, GPA: 3.9

Enter your choice: 3

Enter student ID to search: 1002

Student found:

ID: 1002, Name: Jane Smith, GPA: 3.5

Enter your choice: 2

Enter student ID to remove: 1002

Student removed successfully.

Enter your choice: 4

Student Records:

ID: 1001, Name: John Doe, GPA: 3.8

ID: 1003, Name: Alice Johnson, GPA: 3.9

Enter your choice: 5

Average GPA: 3.85

Enter your choice: 6

Goodbye!