Project 2: Object-oriented Programming

Assignment Objectives:
This assignment provides experience in the new programming paradigm -- **object-oriented programming**. In other words, you need to design classes with an appropriate interface (i.e. the set of public functions (methods)), and make them work together to accomplish the specified task. This assignment also provides the experience to work with multiple classes in one project.

Description:
The application problem this assignment addresses is similar to that of the first project. In this assignment, write a program that provides a way for you to search and display information of students in the class. Student records including c# and scores of multiple categories are provided in the file grades.dat. Your program should:

- First, read all student information from the text file and store them in an array of Student objects.
- Calculate total score and final letter grade. The total score is the sum of CLA, OLA, Quiz, Homework, Exam and Bonus. There will be five letter grades, A(>=90), B(>=80), C(>=70), D(>=60), and F(<60). The letter grade is determined based on the total score. For example, if the term grade is 79, then the letter grade is C, and if the term grade is 89, then the letter grade is B.
- Display information of all the students in a table format
- Prompt user to input a valid c#, and the program display all information of the student with the given c#, including the total score and final letter grade.

Requirements:
You are required to:

- Design and implement the class **Student**, which represents ID, name, and score information of a student. You will store instances of this class in the Roster class.
    - It is strongly recommended that you thoroughly test this class and make sure all aspects of the class works properly before moving on to the next part of the project
    - You may write a simple main.cpp program to read information of one student from the provided data file "oneStudent.dat"; invoke each of the method, as well as the friend methods, defined with Student class to test if each method works as intended.

- Next, design and implement the class **Roster**, which represents class roster and provides approaches to manage the roster.
    - Once this class is implemented, thoroughly test the methods in this class before writing the client program for this project.

- Write the client program (main.cpp) to address the project problem.
    - An object of the Roster class should be declared
    - Methods defined in the Roster class can be used to solve the problem

- You are required to use C++ classes for this program. You should have a "Student"

class, and a “Roster” class. Skeleton header files for Student and Roster classes are provided. In skeleton files, all member data and methods are defined. Do not modify the code in the provided header files. However, you may choose to add additional functions as needed to accomplish the task.

Example program output:

```
Here is the information for the 17 students in Class CSCI3110
   ClassID           Name       CLA       OLA      Quiz  Homework      Exam     Bonus

     c0801           Tony        10        15         4        15        56         3
     c0802            Sam         9        12         2        11        46         2
     c0803         Bradly         8        10         3        12        50         1
     c0804            Joy         5         5         3        10        53         3
     c0805       Kimberly         3        11         1        10        45         0
     c0806           Mike         8        14         2        11        40         1
     c0807          Henry         4        12         2        12        48         2
     c0808           Katy        10        10         3        11        36         0
     c0809        Charles         8         8         3        11        39         0
     c0810           Noah         6         9         4         9        47         3
     c0811          Henry         8         7         3        13        41         3
     c0812      Alexander         4        11         3        11        37         1
     c0813        Rihanna         9        15         2         8        50         2
     c0814         Sophia         8        12         2        10        48         3
     c0815         Jordan         6         8         1         7        45         1
     c0816        Natalie         7         7         2         6        51         2
     c0817        Matthew         8         9         2        12        38         2

Enter a valid class ID:c3402

Enter a valid class ID:c1085

Enter a valid class ID:c0807
Information for student with ID c0807
Here is the information for student with ID : c0807
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Name : Henry
CLA : 4
OLA : 12
Quiz : 2
Homework : 12
Exam : 48
Bonus : 2
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Total Score : 80
Final Grade : B
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