

Letter Grade Calculation Program

Project Specification

Write a program to generate the final letter grade report for COSC 120 students. The letter grade is calculated based on a student's grade in 10 quizzes, 10 labs, 3 projects, 3 midterm exams, and final exam. The percentage of each part of grade is:

Task	Percentage
10 quizzes	10 points
10 labs	10 points
3 projects	20 points
3 midterms	30 points
Final exam	30 points

Your final letter grade will be based on the standard formula ($0 \leq F < 60$, $60 \leq D < 70$, $70 \leq C < 80$, $80 \leq B < 90$, $90 \leq A \leq 100$) **AND THE FOLLOWING IMPORTANT RULES:**

- You need to have a total grade ≥ 90 and average in projects ≥ 90 to get an A;
- You need to have a total grade ≥ 80 and < 90 , and average in projects ≥ 80 to get a B;
- You need to have a total grade is ≥ 70 and < 80 , and average in projects ≥ 70 to get a C.

Since we are doing Zoom teaching, attendance is super important part. Poor attendance will be penalized by up to 10% of the final total grade. The grades of all the students and attendance penalty are stored in an external file called **grade120.dat**, which will be given to you by your instructor.

Program Requirements

Your program will read the grades of all the students from the file **grade120.dat**. For each student's scores, your program will:

- a. define arrays to keep scores for quizzes, labs, projects, midterms.
- b. read in the grades for each student.
- c. define a function to calculate and return the average grade of quizzes, labs, projects and midterms. Sample prototype of this function:

```
float getAverage(float gradeArray[], int arraySize); // a function to calculate average of array
```

- d. define a function to calculate and return the final letter grade of this student. Note the total grade, average project grade, and the attendance will be taken into consideration when the final grade is calculated.
- e. output this student's first name, last name, and final letter grade in a nice format to a file named **letter120.dat**. Each student's data is in one line. This file should be in the same location as **grade120.dat** file. The format should be as following:

First Name	Last Name	Final Grade
Nick	Johnson	A
Anne	Lewis	B
...

This Project Consists of Three Parts

1) (20%) Design the algorithm, which must include the following:

- a. Use a few sentences to give a brief description of the problem given above.
- b. List the arrays you need for this project. For each array, specify its name, data type, size, and what information it is used to store.
- c. For each function, specify its name, return data type, input arguments, and what is the main purpose of this function.
- d. Write the pseudo code algorithm (i.e. main steps) to solve this problem.

2) (60%) C++ code

- a. Use constants to keep the percentage values in the above table.
- b. **YOU MUST COMMENT YOUR CODE.**
- c. You should give meaningful variable, array, and function names.
- d. Arrays and functions are implemented properly.
- e. The grade is calculated correctly and output file is generated properly.

3) (20%) Testing

- a. Test your program using the provided data file **grade120.dat**
- b. Include the contents of the output file **letter120.dat** in your project report.

What to hand in

You will upload a PDF document via myClasses. Your PDF document should include the following:

- a. Use a few sentences to give a brief description of the problem.
- b. List all the arrays. For each array, specify its name, data type, size, and what information it is used to store.
- c. List all the function prototypes. For each function, specify its name, return data type, input arguments, and what is the main purpose of this function.
- d. Write the pseudo code algorithm (i.e. main steps) to solve this problem.
- e. Your C++ Source Code.
- f. The contents of the output file **letter120.dat**.
- g. Write down **WHAT** help you got from **WHO** when you worked on this project.