COSC120 Fall 2022 – Project # 2 **Due: 11/11/2022 11:59PM**

Grade Calculation Program

Project Specification

Write a program to generate the grade report for COSC 120 students. The final grade is calculated based on a student's grades 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

The final letter grade will be based on the standard formula (0 <= F < 60, 60 <= D < 70, 70 <= C< 80, 80 <= B < 90, 90 <= A <= 100). Attendance is super important part. Poor attendance will be penalized by up to 10% of the final total grade (e.g. if the ATT is 0.05, 0.05 *100 = 5 points should be taken off from the final total grade). The grades of all the students and attendance penalty are stored in an external file called **COSC120Grades.txt**, which will be given to you by your instructor.

Program Requirements

Your program will read the grades of all the students from the file **COSC120Grades.txt**. 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 (for 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 minimum grade (for quizzes and labs).
e. define a function to calculate and return the maximum grade (for projects and midterms).
f. define a function to calculate and return the final letter grade of this student based on the final grade. The final grade is calculated based on: 1) the average grades for quizzes, labs, projects, midterms, respectively, and the final exam grade; and 2) the percentages of each part; 3) note that the attendance will be taken into consideration when the final grade is calculated.
g. output each student's first name, last name, minimum grade of quizzes (Min_Quiz), minimum grade of labs (Min_Lab), maximum grade of projects (Max_Project), maximum grade of midterms (Max_MidT), final grade, and final letter grade in a nice format. The format should be as following:

First Name	Last Name	Min_Quiz	Min_Lab	Max_Project	Max_MidT	Final Grade	Final Letter
Nick	Johnson	77.0	85.5	91.5	99.0	90.5	A
Anne	Lewis	65.5	72.0	88.5	87.0	84.7	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 results are calculated correctly and outputs are generated properly.

3) (20%) Testing

a. Test your program using the provided data file **COSC120Grades.txt**

What to hand in

You will upload the source code file (.cpp file) and 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 outputs (may use screenshot).