COSC 1436 Introduction to Problem Solving with Computers I

Homework Assignment 1

Total points = 100

* Arrays / Vectors
* Functions

**Programming Problem**

Make sure that you follow a good programming style. In each program, include a header comment with the following information:

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//Name:

//Class: COSC 1435 Spring 21

//Instructor: Marwa Hassan

//Assignment x Problem x

//Date:

//Program description: **WRITE what this program actually does**

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Also, include a header comment for every function in your code (function documentation) using the following format\*\*:

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// addTwoNums function

// This function adds two integer values

//

// Return Value

// ------------

// int sum of the two numbers

//

// Parameters

// ------------

// int num1 first number

// int num2 second number

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

int addTwoNums (int num1, int num2)

{

int sum;

sum = num1 + num2;

return sum;

}

 Problem 1: (50 points)

The name of the C++ file: **grocery.cpp**

The daily sales of a grocery store, reported over a year, are saved in the file **sales.dat**. The first value represents the daily sales for January 1, 2020 and the last value represents the sales for December 31, 2020.

Write a program that reads from the file into an array of 12 elements that stores the average for each month (i.e., the first element of the array stores January average, the second element stores February average and so on). Hint: use the DAYS array.

Perform statistical operations on the array using the following functions (the averages array and the size are passed as arguments to each function):

* a function that displays the average for each month (along with the name of the month)
* a function that returns the average of monthly averages (main will display it)
* a function that displays the month with the highest average (display the name of the month and its average)
* a function that displays the month with the lowest average (display the name of the month and its average)

Format the values to two decimal places.

Make sure to use the const keyword with the array parameter in functions where appropriate.

Use these two **“global”** arrays:

const string MONTH[12] = {"January", "February", "March", "April", "May",

"June", "July", "August", "September",

"October", "November", "December"};

const int DAYS[12] = {31,28,31,30,31, 30, 31, 31, 30, 31, 30, 31};

Problem 2 (50 points)

The name of the C++ file: **gradesCount.cpp**

Download the file **grades.txt**

Write a program that reads letter grades (A, B, C, D, and F) from a file and store them into a vector. Display the number of grades and prompt the user to enter a letter grade to show statistics. main function will call the function gradeCount. The function accepts two arguments; the vector and the letter category (entered by the user) and will return the total number of grades in that category.

main function will display the count and the percentage of the letter grade category.

*Input validation: accept only uppercase letter grades A, B, C, D or F*

The user should control when to terminate the program.

Sample Run (*User’s input in bold)*:

The number of grades in file is 69

-----------------------------------------------------

Please enter a letter grade category A B C D or F (q to quit): **a**

Invalid! Please enter a valid letter grade: **A**

Number of As in file = 15 that is 21.74%

-----------------------------------------------------

Please enter a letter grade category A B C D or F (q to quit): **B**

Number of Bs in file = 14 that is 20.29%

-----------------------------------------------------

Please enter a letter grade category A B C D or F (q to quit): **q**

Thank you!

**What to submit**

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Submit **grocery.cpp and gradesCount.cpp (no zipped files)** to Blackboard by the due date.

**Grading criteria for submitted code**

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|  |  |
| --- | --- |
|  | Grading |
| Program correctness | 70 |
| Programming Style | 10 |
| User Interface | 10 |
| Documentation | 10 |
| **Total** | 100 |

\*Two points will be deducted from the total assignment grade for every instruction that is not followed.

\*\*One point will be deducted from the total assignment grade for every function header comment that is missing or not followed.

**Late work penalty:** 25% if one day late (up to 24 hours late); 50% if two days late (from 24 to 48 hours late); zero credit if more than two days.