CSCI 2170 OLA2

In this open lab assignment, you will write two C++ programs for the following two problems.

Problem 1: Write a C++ program, named **perfect.cpp** that displays all the perfect numbers that is between 0 and 10000 exclusive. A perfect number is such an integer: the sum of all its positive divisors (excludes the number itself) equals to the number itself. For example, number 6 is a perfect number. Its divisors are 1, 2, and 3. The sum of these divisors 1+2+3 equals to the number 6 itself.

In the main function, use for loop or while loop to loop through all the numbers from 1 to 9999. On each loop iteration, the program checks if that number is a perfect number. If it is perfect, display that number.

You are required to write a user defined function which takes as parameter an integer value, and it returns true or false whether the integer value is a perfect number.

Problem 2: Write a C++ program named **acronym.cpp.**
The acronym for a given string is formed by combining the first letters from a series of words, as in this example:

"self contained underwater breathing apparatus" →"SCUBA".

Your program generates and displays the acronyms for each of the strings in a data file named "acronym.dat".

Copy the data file into your project directory. Assuming you have used "cd" commands to navigate to your project directory, then use the following command to copy the data file:

$ cp ~cen/data/acronym.dat . ← notice the trailing period

You are required to use C++ file stream type, and file operation functions (open, close, assert …) for this assignment. You are not allowed to use file input redirect for this assignment.

The output of your program should be of the following format:

Self contained underwater breathing apparatus → SCUBA
White anglo saxon protestant → WASP
…..
North Atlantic Treaty Organization →NATO

The strings in the data file may have mixed upper and lower letters. You may assume that no hyphen and underscore, and no punctuation marks is present in the data file. The acronyms generated should all be in upper case letters. Your program output should have the exact format as shown above.

You are required to write a value-returning function to convert one line of characters into its corresponding acronym. This function needs to be called within a loop that reads lines of characters from the data file one line at a time, and performs the acronym conversion.

<Program evaluation sheet is on the second page>

OPEN LAB TWO EVALUATION RUBRIC

	Description	**Points**
Program Development	If program has compilation error.	-50
	If program terminates with run time error.	-50
Documentation	Main Comment Block contains: (due date (1), author name(1), course-section #(1), and program description (2)).	5
	Comments have been added to each group of logically related statements - above each decision statement (if, if/else) - above each loop statement - above one or more sequence statements that together accomplish a cohesive task - above the user-defined function	10
Style	Variable: • Meaningful variable names are used unless specified by the program description • Variable naming convention is followed • No global variable is used	5
	Indentation and white spaces are used to make the program easier to read. • All the decision statements are indented properly. • All the repetition statements (loops) are indented properly • Blank lines are used in front of each block of logically related statements	5
Program Requirements	• Value returning user defined function is used in each of the program as specified • C++ file operation steps are used correctly for problem 2.	20
Correctness	• Program outputs shown in the required format as specified in the project description (10 pts) • problem 1 : program correctly prints all the perfect numbers between 0 and 10000 (25 pts) • problem 2 : the original strings and the acronym of each string are displayed in the form specified (25 pts)	60
TOTAL		100