CEN201 Homework 1

For the following questions

- Design the algorithm, either write its pseudocode or draw its flowchart.
- Implement your algorithm in C++ as a function to print the output on the console.

After you entered algorithm number, functions will be executed as follows.

Function has to be executed according to Algorithm 1:

Sample Execution1:

Enter function number: 1

Enter digits: 5647382901

5647382910

Function has to be executed according to Algorithm 1:

Sample Execution2:

Enter function number: 1

Enter digits: 5047382961

5047386129

Function has to be executed according to Algorithm 1:

Sample Execution3:

Enter function number: 1

Enter digits: 1000

No such rearrangement exists.

Function has to be executed according to Algorithm 2:

Sample Execution3:

Enter function number: 2

Enter a positive integer: 12

Factors of 12 are:

1

2

3

4

6

12

Function has to be executed according to Algorithm 3 and (your pseudocode or flow chart):

Sample Execution4:

Enter function number: 3

Function has to be executed according to Algorithm 4:

Sample Execution5:

Enter function number: 4

Enter string and substring respectively: aaa

ax

False!

Function has to be executed according to Algorithm 4:

Sample Execution6:

Enter function number: 4

Enter string and substring respectively: klm

lm

True!

Function has to be executed according to Algorithm 5:

Sample Execution7:

Enter function number: 5

Enter a string of five distinct characters: ab

Please try with five distinct characters.

Function has to be executed according to Algorithm 5:

Sample Execution8:

Enter function number: 5

Enter a string of five distinct characters: ABCDA

Please try with five distinct characters.

Function has to be executed according to Algorithm 5:

Sample Execution9:

Enter function number: 5

Enter a string of five distinct characters: ABCDEF

Please try with five distinct characters.

- Note that, you have to create only one class and required functions in this homework. You can give any name to class and also functions. You will submit your source code **.cpp** file through Moodle (Figure:1.1). Be sure that your program is running without error and please do not forget to test your implementations with different sample inputs.

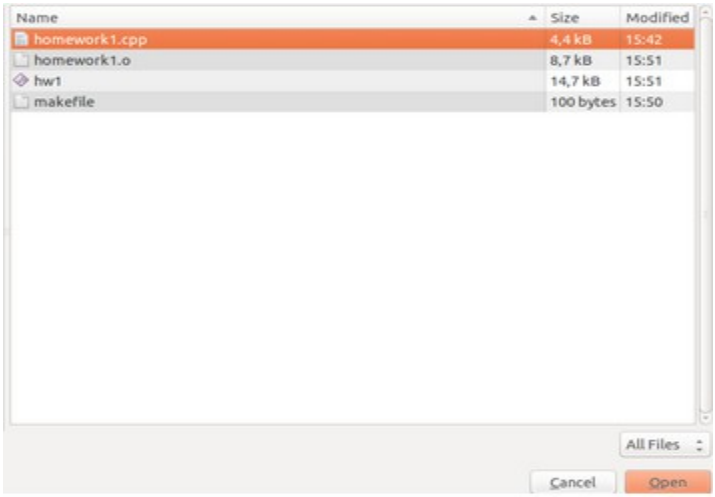

Figure1.1: File submission on Moodle

Algorithm 1: Design and implement an algorithm that, when given an arrangement of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, rearranges the digits so that the new arrangement represents the next larger value that can be represented by these digits (or reports that no such rearrangement exists if no rearrangement produces a larger value). For example 5647382901 would produce 5647382910.

Algorithm 2: Design and implement an algorithm for finding all the factors of a positive integer. For example, in the case of the integer 12, your algorithm should report the values 1, 2, 3, 4, 6, and 12.

Algorithm 3: Design and implement an algorithm to generate the sequence of positive integers (in increasing order) whose only prime divisors are 2 or 3; that is, your program should produce the sequence 2, 3, 4, 6, 8, 9, 12, 16, 18, 24, 27, ... Does your program represent an algorithm in the strict sense?

Algorithm 4: Design and implement an algorithm that, given two strings of characters, tests whether the first string appears as a substring somewhere in the second.

Algorithm 5: Design and implement an algorithm that lists all possible rearrangements of the symbols in a string of five distinct characters.