Algorithms and data structures

Labwork 3 - Stacks and Queues

November 14, 2023

After each labwork session:

- You will have one week (or 7 days) to complete the remaining exercises and upload your files to the "Labwork X " assignment in Google Classroom.
- Compress all code source files in a zip file and rename it as FULLNAME-ID-Lab#no.zip (e.g NguyenVanA-BI10-070-Lab1.zip). Save your files according to the exercise number i.e Ex1.cpp, Ex2.c, etc. Incorrect filenames will result in no score for the respective exercises.
- Only code source files (.c or .cpp) should be in the zip files. Other files (.exe, .o) MUST be removed from the zip file.
- - Copy/Paste from any source is not tolerated. Penalty will be applied for late submissions.

NOTE: You must follow the guide. Incorrect zip file names, zip files containing other files (.exe), and copy/paste lead to heavy penalties.

Exercise 1 : In this problem, we would like to implement the algorithm to calculate the digit sum of a given natural number to detect errors in message transmission or data storage.

For example:
N = 103509, the digit sum = 1 + 0 + 3 + 5 + 0 + 9 = 18.
N = 9512, the digit sum = 9 + 5 + 1 + 2 = 17

- Write a pseudo-code to solve the above problem using Iteration.
- Write a program from the pseudo-code and solve the Problem using Iteration.
- Calculate the complexity. Justify your answer.
- Write a program to solve the Problem using **Recursion** (with Iteration if necessary).

- Calculate the complexity. Justify your answer.

Exercise 2 :
Write a program in C to verify whether a given array is a palindrome using a recursion. Calculate the complexity of your program.
Note: An array, read the same forward or backward, is called a palindrome. An example of a palindrome is [1, 2, 3, 2, 1].