

University of Science and Technology of Hanoi *** Retake Examination Subject: Algorithms and Data Structures Sheet: 02 No of pages: 01		Intake: BIII Academic year: 2021–2022 Date: 12/01/2022 Time: 90 minutes <u>Important instructions</u> <i>(according to lecturer's decision)</i> 1. Only the course slides and your own exercises' code are allowed in the examination venue. 2. Copy or using Internet will lead to heavy penalty.	
Pathway coordinator		Lecturer (or Head of Subject)	Dr. Đoàn Nhật Quang
Student name		Student's ID	

Follow this instruction:

- Create a folder "ADS_YOURNAME_STUDENTID" in the Desktop.
- Create the source files **question1.c** (or **cpp**) and **question2.c** for the corresponding problems.
- **Remove the executable files (.exe) and zip all your source codes, submit to the Google classroom:** <https://classroom.google.com/c/MzgyODQxMzI1Mzky?cjc=6khijwf>
- *Verify your name in the files and mails, un-named or incorrect-name files lead to 0.*

Problem:

Given a positive natural number $N = 3450$, we would like to study numbers by:

- Count the number of odd, even digits of N . Note that 0 is even.

Example:

- The number of odd digits of $N = 3450$ is 2 with odd digits = {3, 5};
- The number of even digits of $N = 3450$ is 2 with even digits = {4, 0}.
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Question 1: (12 pts)

- Propose only one pseudo-code function to count the number of odd and even digits of N . (2 pts)
- Implement the proposed function (only one function) that returns the number of odd and even digits at the same time using Pass-by-Reference in C/C++. (8pts)
- Calculate the complexity of your program (Best scenario, Worst scenario, Average). Justify your answer. (2 pts)

Question 2: (8 pts)

- Implement the Question 1 using a **Linked List** data structure. (8pts)

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