University of Science and Technology of Hanoi *** Mid-term Subject: Algorithms and Data Structures Sheet: 01　　No of pages: 01	*Academic year*: 2024–2025 *Date*: 30/9/2024　　*Time*: 45 minutes **Important instructions** *(according to lecturer's decision)* 1. No documents or communication devices are allowed. 2. Copying 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, and submit it in Google classroom.*
- Verify your name in the files and mails, un-named or incorrect-name files lead to 0.

Problem:
In this problem, the objective is to verify whether a set of 3 values is a Pythagorean triple. A Pythagorean triple is a set of 3 positive numbers, which are expressed as $a^2 + b^2 = c^2$.
Example:
-   (3, 5, 4) is a Pythagorean triple, $3^2 + 4^2 = 5^2$.
-   (10, 8, 6) is a Pythagorean triple, $6^2 + 8^2 = 10^2$.
-   (6, 8, 13) is not a Pythagorean triple.

Question 1 (12 pts)

▪ Write a pseudo-code to find all Pythagorean triples from a given array using **Iteration**. (2pts)
▪ Implement your proposed algorithm in C/C++. You have to initialize a random array (any size ≥ 6, any value) in the main() function. (8pts)
▪ Calculate the complexity of your algorithm. Justify the answer (comment directly in your source files). (2pts)

Question 2 (8 pts)
▪ Propose another algorithm using **recursive** functions and implement in C/C++ to perform the above problem. (6pts)
▪ Calculate the complexity of your algorithm. Justify the answer (comment directly in your source files). (2pts)

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