University of Biskra
Mathematics Department
Module: Algorithmics and Data Structures 2
1st year 2023/2024

TD N° : 01

Reminder exercice :

A medical center in Biskra decides to digitize its archive. For this it wants to develop a software to record their patients' files. The files contain the following information:

- The patient identifier
- The first and last name of the patient
- The age of the patient.
- The insurance number
- The address
- Description of the disease

Write an Algorithm that allows to:

1. Fill the forms of N patients.
2. Calculate the number of patients who are > 50 years old.

Exercise 1:

Using sub-algorithms (procedures without passing parameters/arguments), write the algorithm which allows carrying a mathematical calculation according to the user's choice.

1. The average of four real numbers.
2. The multiplication table of an integer X.
3. The cube of an integer A.
4. The factorial of an integer B.

Exercise 2:

Using sub-algorithms (procedures/functions without passing parameters/arguments), write the algorithm which allows :

1. Fill an array T[N] with integers.
2. Swap the values between the maximum and minimum in the table.
3. Display the new table.

Exercise 3:

Write sub-algorithms with passing parameters/arguments which allows:

1. Swap two integer values.
2. Check if an integer is even.
3. Calculate the PGCD of two integers X and Y.
4. Check whether or not an array is made up of elements arranged in ascending order.
5. Sort an array using the permutation sub-algorithm.

Exercise 4:

Using sub-algorithms (functions/procedures), write algorithms that allows calculating:

1. $f = e^y + e^z$, knowing that: $e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots + \frac{x^n}{n!}$ (y, z, n asked to the user, n>0)

2. $C_{n,p} = \frac{n!}{p! * (n-p)!}$ (n, p asked to the user, n>p and p≠0)

Exercise 5:

1. Write a sub-algorithm that returns the number of vowels contained in a character string sent as a parameter.

2. Write a sub-algorithm that purges a string from character. Both the string and the character are passed as arguments. For example: Purge("Hello","o") will return "Bnjur"