

<b>Level:</b> 1st year “Informatics”	<b>Module:</b> Algorithmic and Data Structures 2	<b>Date :</b> 15/05/2024 <b>Duration:</b> 1h30m
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## Exam n°2

### Exercise n°1

(6 pts)

A **car** is characterized by its **registration\_number**, **brand**, **model** and **price**.

- 1- Define the structured type **Car**.
- 2- Write an algorithm allowing you to record information about 20 cars and display the most expensive one.

### Exercise n°2

(8 pts)

Consider two vectors V1 and V2 of 20 integers:

1. Write a function “**Product (V1, V2: [1..20] array of integer): integer**” that allows you to calculate **P**: the scalar product of two vectors.
2. Write a procedure “**Sum (V1, V2: [1..20] array of integer)**” that allows you to calculate **S1**: the sum of the elements of the first vector V1 and **S2**: the sum of the elements of the second vector V2.
3. Write the main algorithm in which we call the previous sub-algorithms (**Product** and **Sum**).
4. In the main algorithm, is it possible to compare between **S1** and **S2**? If your answer is no give the appropriate solution.

**NB:** The scalar product of two vectors V1 and V2 of dimension  $n$  and coordinates such that:

$$V1(x_1, x_2, \dots, x_n) \quad \text{et} \quad V2(y_1, y_2, \dots, y_n)$$

$$P = V1.V2 = \sum_{i=1}^n x_i \cdot y_i = x_1y_1 + x_2y_2 + \dots + x_ny_n$$

### Exercise n°3

(6 pts)

We have T an array of integers with a maximum size of 100. Using the pointers, write an algorithm, which allows you to:

1. Read the array;
2. Print the indexes of the odd elements and calculate their sum.

**NB.** Without using any integer variables just the pointers.

