Ministry of Higher Education and Scientific Research HassibaBenbouali University of Chlef Faculty of Exact Sciences and Computer Science 1st year IT 2024-2025 Module: Algorithmics and data structure 1



DW Sheet N° 05 : Arrays and strings

1. Declare an array of 9 reals and initialize it with the value 0.

2. Write the algorithm that fills an array of 9 (real) notes with values requested from the user. Then display the 9 values contained in the table.

3. Write the algorithm that calculates the sum and the average of the values in an array.

4. Write the algorithm that allows you to check that two tables are identical (the elements of the two tables will be entered by the user).

5. Write the algorithm that allows you to display the number of occurrences of a given number X in an array T of N elements.

6. Write an algorithm that calculates the smurf of two arrays. To calculate the smurf, you must multiply each element of array 1 by each element of array 2, and add everything.

8

3

7

For example if we have: array 1:

Array 2:36 5 17

4

The Smurf will be: (4*5)+(5*8)+(3*5)+(7*5)+(4*17)+(8*17)+(3*17)+(7*17) = 484.

7. Consider the algorithm below which allows you to manipulate an array containing 10 integers.

Algorithme Exo8

```
Var T : tableau [10] d'entier ; i : entier ;
Début
```

Pour i <-- 0 à 9 faire Si T[i] = 0 alors Ecrire (i) ;

Fin.

1. What does this algorithm do?

2. Using the following example: $T = \{2, 0, -5, 3, 0, 4, -1, 0, 0, 15\}$, what displayed on the screen? 3. Give the equivalent C program.

8. Fill in the empty fields:

8. Fill in the emp Algorithm calcule

Var ...: array [100] of real;

```
...... : real ;
```

: integer ;

begin

write ('this algorithm calculates the average of even numbers'); write ('Please fill in the array with real numbers); for (i= 0 to i= 99 step 1)do read (T[i]); end do write ('' test the parity of numbers and calculate their average''); $S \leftarrow 0$; $n \leftarrow 0$; for (i= 0 to 99 step 1)do if (... mod 2 = 0) then $S \leftarrow S + ...;$

 $n \leftarrow n+1$;

```
endif;
end for
moy ← ... / ...;
write ('' the average of '',...., ''even numbers is :'', ....);
end.
```

9. Let M be a square matrix of size 5x5 containing integers. Write the declaration and initialization to 0 of such a data structure.

10. Write an algorithm that asks the user to fill a matrix M of size 5x5.

11. Write the algorithms which allow on a 2D matrix of size 5*5:

• To calculate the sum of the elements of a line (the line number being passed as a parameter).

12. Write an algorithm that asks the user for a **sentence** and displays on the screen the **number of vowels** contained in that sentence.

Additional Exercises

13. Write an algorithm that asks the user for a positive number less than 100. In addition, fills an array with all even numbers less than or equal this number.

For example if the user enter 15, the algorithm fills the array with 0.2.4.6.8.10.12.14.

14. Let M be a square matrix of size 5x5 containing integers. Write the declaration and initialization to 0 of such a data structure.

• To calculate the sum of the elements of a column (the column number being passed as a parameter).

• To calculate the sum of the elements of the diagonal (provided the matrix is square).

15. Write an algorithm that asks the user for a **word** and displays the **number of letters** in that word on the screen.

16. What does the following code display if we enter the two variables chaine1 and chaine2 ? #include <stdio.h>

#include <string.h>

main()

{ char chaine1[]= "my name is "; char chaine2 []="Mohamed Amine" ; gets(chaine1) ; scanf("%s",chaine2) ; printf("%s\n",strncat(chaine1,chaine2,3)) ; printf(strcpy(chaine1,chaine2)) ;

}

1. My name is Mohamed amine Mohamed amine

2. My name is Mohamed Mohamed amine

3. My name is Moh

Mohamed

- 4. My name isMoh
 - Mohamed amine