

DW Sheet N° 02: Sequential Simple Algorithm

Exercise 01:

Write an algorithm called permutation which first allows you to read two integers a and b. Then, to permute their values (so that the value of a goes to b and the value of b goes to a). And finally, to display the two new values.

Exercise 02:

Write an algorithm in which you have at first to read three variables a, b and c. And then, to transfer the value of b to a, the value of c to b and the value of a to c. Obviously, display the new values.

Exercise 03:

Write an algorithm that asks the user for a number, then calculates and displays the square of that number.

Exercise 04:

Write an algorithm that asks the user for the width and the length of a rectangle and then calculates and displays the perimeter and the area of this rectangle.

printf("The average of %f and %i = %f and the sum of their squares is %f", n1,n2,average,

#include <stdio.h></stdio.h>		
main0{		
in	.t n2;	
flo	oat n1, average, sumSq;	
pr	rintf("Please enter two numbers \n");	

Exercise 05 : Consider the following C program.

scanf("%f%i",&n1,&n2);

average=(n1+n2)/2; sumSq=n1*n1+n2*n2;

```
sumSq);
```

}

- 1- If n1 is equal to 5 and n2 is equal to 2, what is displayed on the screen after running this program?
- 2- What does this program do?
- 3- If we declare n1 to be integer, what is the result in this case? And what changes should be made to the program?
- 4- Give the algorithm and the flowchart of the previous program.

Exercise 06: Write an algorithm that reads the first name and last name of a student and then displays the message "Your name is [student_last_name] [student_first_name] ".

Additional Exercises

Exercise 07:

Write an algorithm that calculates and displays the diameter, the area and the perimeter of a circle. The algorithm will ask the user to enter the value of radius r .

Diameter	$d = 2 \times r$
Circumference	$\mathbf{c} = \mathbf{\pi} \times \mathbf{d} = 2 \times \mathbf{\pi} \times \mathbf{r}$
The area of a circle	$a = \pi \times r^2$

Exercise 08:

In order to obtain a price including all taxes of an item, from a price excluding taxes, the following calculation formula shall be applied:

price including tax= price excluding tax *(VAT rate + 1),

where VAT is the Value Added Tax

Write an algorithm that reads the **price excluding tax** of an item, the **number of items** and the **VAT rate**, and which provides the corresponding total **price including tax**.

Exercise 09:

Give the algorithm, the flowchart and the C program for the following statement which allows you to calculate and display the volume of a sphere. The value of the radius r must be entered by the user. Note: $v = (4\pi/3) \times r^3$

Solution exercise 5:

```
1-
#include<stdio.h>
main(){
    int n2;
    float n1, average, sumSq;
    printf("Please enter two numbers \n");
    scanf("%f%i",&n1,&n2);
    average=(n1+n2)/2;
    sumSq=n1*n1+n2*n2;
    printf("The average of %f and %i = %f and the sum of their squares is %f", n1,n2,average, sumSq);
}
     public int __cdecl printf (const char * __restrict___Format, ...)
     C:\DonnÚes\Amel\Lavoro\Enseignement\2023-2024\Exemples\average2float.exe
    Please enter two numbers
    The average of 5.000000 and 2 = 3.500000 and the sum of their squares is 29.000000
    Process exited after 2.399 seconds with return value 0
    Appuyez sur une touche pour continuer...
```

2- This program calculate and display the average of n1 and n2, and, the sum of their squares.

```
3-
#include<stdio.h>
main(){
    int n1.n2;
    float average, sumSq;
    printf("Please enter two numbers \n");
    scanf({3}){i",&n1,&n2};
    printf("Please enter two numbers \n");
    scanf({3}){i",&n1,&n2};
    printf("The average of $\lambda and $\lambda i = $\lambda f and the sum of their squares is $\lambda f", n1,n2,average, sumSq);
    printf("The average of $\lambda and $\lambda i = $\lambda f and the sum of their squares is $\lambda f", n1,n2,average, sumSq);
    @
    C:\DonnUes\Amel\Lavoro\Enseignement\2023-2024\Exemples\average2float.exe
    Please enter two numbers
    5
    2
    The average of 5 and 2 = 3.000000 and the sum of their squares is 29.000000
------------
Process exited after 3.786 seconds with return value 0
    Appuyez sur une touche pour continuer...
```