

Practical work Serie 2

Exercise 1

Let's consider the following algorithms :

```
Algorithm Algo_1 ;
  Var i : integer ;
Begin
  i ← 1;
  While (i ≤ 5) do
    write (i) ;
    i ← i+1 ;
  EndWhile
End.
```

```
Algorithm Algo_2 ;
  Var i : integer ;
Begin
  i ← 1;
  While (i ≤ 5) do
    i ← i+1 ;
    write (i) ;
  EndWhile
End.
```

```
Algorithm Algo_3 ;
  Var i,n : integer ;
Begin
  read (n);
  i ← 0;
  While (i ≤ n) do
    write (i) ;
    i ← i+3 ;
  EndWhile
End.
```

```
Algorithm Algo_4 ;
  Var i,n : integer ;
Begin
  read (n);
  i ← 0;
  While (i ≤ n) do
    i ← i+3 ;
    write (i) ;
  EndWhile
End.
```

```
Algorithm Algo_5;
  Var i,n, S : integer ;
Begin
  read (n);
  S ← 0;
  i ← n;
  While (i ≥ 1) do
    S ← S+i;
    i ← i-1 ;
  EndWhile
  write (S) ;
End.
```

```
Algorithm Algo_6;
  Var i,n,S,x : integer
Begin
  read (n);
  S ← 0;
  i ← n;
  While (i ≥ 1) do
    read (x);
    S ← S+x;
    i ← i-1 ;
  EndWhile
  write (S) ;
End.
```

```
Algorithm Algo_7;
  Var i,n,Nber,x : integer
Begin
  read (n);
  Nber ← 0;
  i ← 1;
  While (i ≤ n) do
    read (x);
    if (x % 3=0) then
      Nber ← Nber +1;
    Endif;
    i ← i+1 ;
  EndWhile
  write (Nber) ;
End.
```

```
Algorithm Algo_8;
  Var i,n,Nber,x,y:integer
Begin
  read (n,x);
  Nber ← 0;
  i ← 1;
  While (i ≤ n) do
    read (y);
    if (y ≥ x) then
      Nber ← Nber +1;
    Endif;
    i ← i+1 ;
  EndWhile
  write (Nber) ;
End.
```

1- Translate the above algorithms into **C programs**.

2- Trace the execution of Program1 and Program2 step by step, and describe what does these programs.

Exercise 2

Write a **C program** that displays all divisors of a strictly positive integer «N» read from the keyboard.
 (Note : display an error message if $N \leq 0$).

Exercise 3

1- Write a **C program** that calculates the factorial of a positive integer "n".

2- Write a **C program** that calculates " x^n " where n is an integer and x is a nonzero real number.

3- Write two **C programs** that calculate the values of the following expressions:

- $\sum_{i=1}^n (i + 1)!$ // n is a positive integer.
- $\sum_{i=1}^n \frac{x^{i+1}}{(i-1)!}$ // n is a positive integer, and x is a nonzero real number.