

## Series of 4th supervised exercises

### Exercise 1

Consider the following algorithms:

```
Algorithm Algo_1 ;
  Var i : integer ;
Begin
  i ← 1;
  while (i ≤ 10) do
    write (i) ;
    i ← i+1 ;
  Endwhile
End.
```

```
Algorithm Algo_2 ;
  Var i : integer;
Begin
  i ← 1;
  while (i ≤ 10) do
    i ← i+1 ;
    write (i) ;
  Endwhile
End.
```

```
Algorithm Algo_3 ;
  Var i,n : integer;
Begin
  Read (n);
  i ← 1;
  while (i ≤ n) do
    write (i) ;
    i ← i+2 ;
  Endwhile
End.
```

```
Algorithm Algo_4 ;
  Var i,n : integer;
Begin
  Read (n);
  i ← 1;
  while (i ≤ n) do
    i ← i+2 ;
    write (i) ;
  Endwhile
End.
```

```
Algorithm Algo_5;
  Var i,n, S : integer;
Begin
  Read (n);
  S ← 0;
  i ← 1;
  while (i ≤ n) 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 ← 1;
  while (i ≤ n) do
    Read (x);
    S ← S+x;
    i ← i+1 ;
  Endwhile
  write (S) ;
End.
```

```
Algorithm Algo_7;
  Var i,n,Nbre,x : integer
Begin
  Read (n);
  Nbre ← 0;
  i ← 1;
  while (i ≤ n) do
    Read (x);
    If (x mod 2=0) Then
      Nbre ← Nbre +1;
    Endif;
    i ← i+1 ;
  Endwhile
  write (Nbre) ;
End.
```

```
Algorithm Algo_8;
  Var i,n,Nbre,x : integer
Begin
  Read (n);
  Nbre ← 0;
  i ← 1;
  while (i ≤ n) do
    Read (x);
    If (x ≥ 0) Then
      Nbre ← Nbre +1;
    Endif;
    i ← i+1 ;
  Endwhile
  write (Nbre) ;
End.
```

- 1- Make the trace and say what each of the above algorithms does.
- 2- Choose one of the previous algorithms and rewrite its while loop using the Repeat loop.
- 3- Choose one of the previous algorithms and rewrite its while loop using the For loop.

### Exercise 2 (use while loop )

Write the algorithm that asks for a starting number n, and calculates the sum of the integers up to this number. For example, if you enter n=5, the program should calculate:  $1 + 2 + 3 + 4 + 5 = 15$

### Exercise 3 (use while loop )

Write an algorithm to calculate the average of N given real numbers (n1, n2, ...n20).

### Exercise 4 ( use repeat loop)

Write an algorithm that asks the user for a number n between 0 and 20 until the answer is correct.

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**Exercise 5 ( use for loop)**

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Write the algorithms to calculate the following sums:

1)  $\sum_{i=1}^n \sum_{j=1}^i i + j$       2)  $\prod_{i=1}^n x^i$  ( n and x are integers)

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**Exercise 6**

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Write the algorithm that calculates the Nth term  $U_N$  of the FIBONACCI sequence given by the recurrence relation :

- $U_1=1$
- $U_2=1$
- $U_N=U_{N-1} + U_{N-2}$  (for  $N>2$ ).

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**Exercise 7 ( use repeat loop)**

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Write the algorithm that successively asks the user for  $N$  ( $N \geq 1$ ) numbers, and then tells the user which of these  $N$  numbers is the greatest.