University of BATNA 2
Faculty: Mathematics and Computer
Department: Common Core in Mathematics and Computer Science
1st Year CC-MCS 2023-2024 academic year

Series of 3rd supervised exercises

Aims: *master simple, alternate, nested and choice ("according to"... "do") conditional instructions*

Exercise 1

Let us consider the following three algorithms proposed by an amateur computer scientist:

- Max_2_integers: determines the maximum of two integers a and b.
- Max_3_integers_1: the first algorithm that determines the maximum of three integers a, b and c.
- Max_3_integers_2: the second algorithm, which determines the maximum of three integers a, b and c.

```
Algorithm  Max_2_ integers
Var a,b,max : integer
Begin
  Read(a,b)
  Max ← a
  If ( b > a)  Then
    Max ← b
  Endif
  Write('maximum=', max)
End.
```

```
Algorithm  Max_3_ integers _1
 Var a,b,c,max : integer
Begin
   Read (a,b,c)
   Max ← a
   If ( b > a) Then
     Max ← b
   Endif
   If ( c > a) Then
     Max ← c
   Endif
   Write ('maximum=', max)
End.
```

```
Algorithm  Max_3_ integers _2
 Var a,b,c,max : integer
Begin
   Read (a,b,c)
   If ( b > a) Then
     If ( b > c ) Then
        Max ← b
     Else
        Max ← c
     Endif
   Else
     Max ← a
   Endif
   Write ('maximum=', max)
End.
```

1- Trace the Max_2_integers algorithm in the following cases:
2- a=10 and b=8
3- a=7 and b=9
4- a=6 and b=6
5- According to the results of the trace in the previous question (3 cases), can we say that the algorithm is general? Justify your answer.
6- Are the algorithms Max_3_integers _1 and Max_3_integers _2 general? Give a counter-example in the case where the algorithm is not general.
7- If the algorithm(s) is (are) not general, correct it (them).

Exercise 2

Write an algorithm to read an integer and :

- Check and display whether the number is positive, negative or zero.
- Check and display whether the number is even or odd.

Exercise 3

Let X be a strictly positive integer.

1- Write an algorithm to read the value of X and to check and display whether X is divisible by (5 and 7) without using logical operators.
2- Write an algorithm to read the value of X and check and display whether X is divisible by (5 and 7) using logical operators.

Exercise 4

Write an algorithm that will read a character and then indicate whether it is a vowel or a consonant by changing lowercase vowels to uppercase using the multiple-choice instruction ('according to').