Tutorial 1

Basic concepts (types, operations, algorithms)

Exercise 1:

a. What is the type of each variable: A=1, B=TRUE, test= 12.23, specialite = 'm'
b. Give examples of **variables**' **identifiers** with their **types**, and possible **values**.

Exercise 2:

a. Given A=3, B=4, X=3.0, Y= -1.0

Specify the evaluation order as well as the value of each of the following expressions:

- X*A+Y
- B-A/Y+2

b. Given a = 4, b = 5, c = -1 et d = 0, evaluate the following logical expressions:
   - (a < b) AND (c ≥ d)
   - NOT (a < b) OR (c ≠ b)

Exercise 3:

Trace the execution of the following algorithm

```
Algorithm Algo_01 ;
Var     A, B, C : integer ;
        D : boolean ;
begin
        Read (A) ;
        Read (B) ;
        C ← A + B*2 + 3 ;
        D ← (C mod A) < (C div B) ;
        write (A,B,C,D) ;
End.
```

Exercise 4:

Consider the two following algorithms

```
Algorithm Algo_02 ;
Var A : integer ;
Begin
        A ← 10 ;
        Write (A*A) ;
        Write (A*2) ;
End.
```

```
Algorithm Algo_03 ;
Var A : integer ;
Begin
        Read (A) ;
        Write (A*A) ;
        Write (A*2) ;
End.
```

a. What results does algorithm Algo_02 produce?
b. What results does algorithm Algo_03 produce?
c. What is the difference between them?

Tutorial 2

Basic instructions (assign, read, write)

Exercise 1:

Consider the following algorithm:

```
Algorithm Algo_04 ;
Var     A, B : integer ;
Begin
        Read (A) ;
        Read (B) ;
        A ← B ;
        B ← A ;
        Write (A,B) ;
End.
```

a. Trace Algo_04 algorithm, introducing 5 and 10 as the values of A and B.
b. Do the instructions in the algorithm allow you to exchange the two values of B and A?
c. If the problem of exchanging the values of A and B is not solved, propose an algorithm to solve this problem using an intermediate variable.

Exercise 2:

1. Write an algorithm that asks the user to enter a number, then it computes and displays its double and its half.
2. Draw the flowchart corresponding to the previous question.
3. Write an algorithm that computes the distance between two points in two-dimensional space.

Exercise 3:

Write the C program that converts a given number of seconds into hours, minutes, and seconds.

Exercise 4:

Consider again Exercise 1, and write the algorithm that allows swapping the two numbers A and B without using an intermediate variable.