Unit 3

Practice II

Algorithms

Goal of the practice
Become familiar with the writing of algorithms in pseudo code, expressions, operands, operators, assignments, conditionals and the elementary logic required to program.

1) What is the difference between the contents of a variable and its name?

2) What is the difference between a variable, a constant and a literal? What do they have in common?

3) What is an expression?

4) What are the elements in an assignment?

5) Debug the following assignments, writing the value that the variable gets in each assignment.

X ← 0
X ← X + 4
X ← X + X – X * X
X ← X mod 4
X ← (x + 4) div 2

6) Determine the operands (specifying which type of operand is), and operators (specifying their name) of the following expressions. Group with parentheses to clarify which operations are performed first.

```
var Number: x,y,a,n
const Number: PI = 3,1416
const Number: COFACTOR = 1

PI + x / 2
y
x + y - a
n mod 2 == 0
COFACTOR * x > 20
COFACTOR
```

Assuming that x ← 10, y ← 10, `n` ← 4 and a ← 1
Calculate the expressions and write the results.

7) Write an algorithm to read a number by keyboard and say if it is positive or negative.

8) Perform an algorithm to read a number and report if it is greater, equal or less than zero.

9) Write an algorithm that determines if a number is even.

10) Make an algorithm to read two real numbers and print the largest of them.

11) Given the radius of a circle, make an algorithm to calculate the value of the area.

12) Write an algorithm that determines if an "N" number is divisible by another "M".

13) Write an algorithm to translate a time expressed in days, hours, minutes and seconds to time expressed in seconds.

14) We are being informed of three environmental temperature values, and we are asked to develop an algorithm to calculate and report the sum and average of these values.

15) For our brave ones: translate a time expressed in seconds to a time expressed in days, hours, minutes and seconds.