Tutorial Serie N° 2

Ex 01

1. Let X, Y, and Z be three integer variables. Express the following situations in the form of an expression:
   a. The values of X, Y, and Z are identical
   b. The value of X is even
   c. The values of X and Y are identical but different from that of Z
   d. The value of X is strictly between the values of Y and Z
   e. The value of X is different from that of Y or equal to that of Z

   For example, to the situation: "the values of X and Y are both greater than 3" corresponds the expression: X > 3 and Y > 3."

2. What will be the values of the different variables after execution of the instructions in each case?

a ←7 ; b ←a*8 ; a ←27 ;	a ← 15 ; b ← 7 ; a ← b ; b ← a ;	a ←22 ; b ←3 ; c ←a+b ; b ← a+b ; a ←c ; b ← a+b ;

3. The following sequence of instructions contains errors, underline them

read (a,b) ; 2*a←3 ; b←a ;	1a←3 ; b1←a ; read (a,b) ;	Var a : integer ; x : real ; begin read (x) ; a←x ;	begin a←a+1 ; read (a) ;

Ex 02

Write an algorithm that asks the user for the radius ***R*** of the base of a cylinder and its height **H**, and that calculates:

- Its area knowing that the total area is the sum of the lateral surface area and the surface area of the two-cylinder bases.
- Its volume knowing that the volume of a cylinder is equal to the base area multiplied by the height.

Ex 03

The World Health Organization (WHO) defined the body mass index (BMI) in 1997 as a standard to assess the risks associated with overweight and obesity in adults. BMI is a measure of a person's body fat, calculated based on their weight and height. The formula for BMI is as follows:

$$BMI = weight / height^2$$

Write an algorithm to calculate the body mass index.

Ex 04

Write an algorithm that calculates the equivalent resistance Req of three resistances R1, R2 and R3 connected in parallel. Knowing that:

$$\frac{1}{Req} = \frac{1}{R1} + \frac{1}{R2} + \frac{1}{R3}$$

Ex 05

Write an algorithm that calculates and displays the flight duration in hours and minutes, given the departure time and arrival time. It is assumed that the departure and arrival take place on the same day.

Ex 06

1. It is well known that to swap the values of two variables, we need a third temporary variable. However, for integer data, there is a way to do it without using an additional variable.

   Write an algorithm that swaps the values of two integers without using an additional variable.

2. Write an algorithm that performs a circular permutation of the integer values of three variables x, y, z (i.e. the value of y in x, the value of z in y and the value of x in z).