Exercises: Conditionals

1 – Develop an algorithm that determines the greater value out of two numbers provided by the user. Display this value.

2 – Write an algorithm that determines the amount to pay as a tip to a server in a restaurant. The tip should be 15% when the bill is at least $1.

3 – A computer store sells diskettes at a price of $1 each for small orders. The store sells them at a price of 70 cents each for orders of 25+ units. Furthermore, if you are a member of Club Z, the store will give you an extra discount of 2%. Write an algorithm that determines the total price for a purchase.

4 – A print shop charges 5 cents per copy for the first 100 copies. For any subsequent copies, they charge 3 cents each. Write an algorithm that determines the price associated with a given number of copies.

5 – Write an algorithm that simulates the withdrawal of an amount of money from an ATM. The algorithm should ask for the amount of the current balance and the amount of the withdrawal. If the amount of the withdrawal is greater than the balance, display an error message; otherwise, display the new balance.

6 – An electricity bill is calculated by obtaining the number of days for which electricity is supplied and the number of kilowatt hours (kWh) consumed. The client is billed at a rate of $0.50 per day and $0.30 per kWh. For a client that has consumed more than 200 kWh, their rate is reduced from $0.30 to $0.20 for additional kWh. We want to obtain the total amount for the bill.

7 – Write an algorithm that reads an integer and determines whether it is even or odd.

8 – Write an algorithm that reads two integers *m* and *n* and determines whether *m* is a multiple of *n*.

9 – Give an algorithm that reads three numbers (*a*, *b*, *c*) and determines whether any one of the numbers is equal to the sum of the other two. If such a number exists, display it; otherwise, display the message "No solution".

10 – Improve the following algorithm by reducing the number of lines of code:

```
READ a, b, c
IF (a < b) THEN
    IF (c < 5) THEN
        WRITE "Hello"
    ENDIF
ENDIF
```

11 – Correct the error in the following algorithm:

```
IF ((number > 1) OR (number < 3)) THEN
    WRITE "The number is between 1 and 3."
ENDIF
```

12 – Correct the error:

```
READ number
IF ((number < 1) AND (number > 5)) THEN
    WRITE "The number is outside the limits."
ELSE
    WRITE "The number is inside or equal to the limits."
ENDIF
```

13 – Rewrite the following code using AND and OR.

```
VARIABLES:
    Real : number1, number2, number3

START
    READ number1, number2, number3
    IF (number1 == number2) THEN
        IF (number1 == number3) THEN
            WRITE "The three numbers are identical."
        ELSE
            WRITE "Two of the numbers are identical."
        ENDIF
    ELSE
        IF (number2 == number3) THEN
            WRITE "Two of the numbers are identical."
        ELSE
            IF (number1 == number3) THEN
                WRITE "Two of the numbers are identical."
            ENDIF
        ENDIF
    ENDIF
END
```

14 – In a game, the player tosses two coins. Let's suppose that, if the first and second coin land on heads, the player wins $10; if the first lands on heads and the second on tails, the player wins $5; otherwise, the player loses. We want a program that reads the value of the two coins (heads or tails) and determines whether the player has won. If yes, it should display the amount won.

15 – Write a program that reads 3 values, determines the greatest one, and displays it.

16 – Write a program that reads three values and displays them in ascending order.

17 – The Ministère des Finances of Québec is adopting a project aiming to reduce taxes. Develop an algorithm that calculates taxes according to the table provided below. In addition, a 2% reduction of the tax rate is granted if the person is married. Furthermore, a 0.5% reduction is granted for each child. Finally, 8% is subtracted from the tax rate for those who have newly arrived in the province. Determine the amount of tax to be paid as a function of the information provided by the user.

Table of basic tax rates:

Salary	Tax rate
$0.00 to $18,000.00	10%
$18,000.01 to $32,000.00	20%
$32,000.01 to $60,000.00	30%
$60,000.01 and more	40%

18 – We want to create a program that displays the letter grade for a student, given their grade in percentage, according to the following table:

Grade	Letter
90% – 100%	A
80% – 89%	B
70% – 79%	C
60% – 69%	D
< 60%	F

19 – Write an algorithm that reads two triplets day1, month1, year1, and day2, month2, year2, representing two dates, and that determines whether the first date comes before the second.

20 – Write an algorithm that reads three numbers and determines whether these numbers, considered as the lengths of the three sides of a triangle, would correspond to:

- An equilateral triangle (three equal sides)
- An isosceles triangle (two equal sides)
- A scalene triangle (three different sides)

21 – An automobile insurance company wants to computerize the calculation of renewals for the premiums of its clients. The increase of a client's premium is a function of the number of accidents, according to the table below:

Number of accidents	Increase
0	2%
1 or 2	5%
3	10%
4 and more	30%

You are asked to create a program that calculates the new value of a premium, according to the old premium and the number of accidents.

22 – In a competition where scores are given by 6 judges, a competitor's final score is calculated as follows: first the highest and the lowest of the initial scores are eliminated, and then one takes the average of the other 4 scores. You are asked to create a program that reads 6 scores and determines the final score according to this method.

23 – Write the algorithm of a program that reads a date (3 integers: day, month, year) and that displays the date of the next day (in numbers). Suppose that the year is not a leap year.

24 – Create an algorithm that determines whether a year provided by the user is a leap year. To be a leap year, a year must be divisible by 4 but not divisible by 100; despite this, if it is divisible by 400, it is a leap year after all.
Example: 2000 is a leap year, but 1700, 1800, and 1900 are not.