



TP2 Conditional Structures

Ex 2.1 Product

Write a program that asks the user for two numbers and informs them whether their product is negative, positive, or zero. *Caution:* do not calculate the product of the two numbers.

Ex 2.2 Package

Write a program that calculates the shipping cost according to the weight of the package. Shipping rates are as follows:

- weight \leq 2 kg : 500 DA
- 2 kg < weight \leq 5 kg : 800 DA
- 5 kg < weight \leq 10 kg : 1000 DA
- weight > 10 kg : 1500 DA

Ex 2.3 Photocopy

A photocopy shop charges 5 DA for the first ten photocopies, 4 DA for the next twenty, and 3 DA thereafter. Write a program that asks the user for the number of photocopies made and displays the total price of the corresponding invoice.

Ex 2.4 Number of days

1. *Leap year:* Ask the user to enter a year and determine whether that year is a leap year or not. A leap year is divisible by 4 unless it is divisible by 100, in which case it must be divisible by 400.
2. Create a program that asks the user to enter a year and a month (as a number from 1 to 12) and display the number of days in this month for this specific year, taking into account leap years for February (question 1).

Ex 2.5 Discount

Write a program that asks for a unit price and quantity of an item ordered and calculates:

1. The net price of the quantity ordered.
2. VAT on the quantity ordered, knowing that the VAT rate is 12%.
3. The discount and the total price of the quantity ordered, bearing in mind that the discount is calculated as shown in table:

Quantity	Discount
between 1 and 5 (excluded)	0%
between 5 and 10 (excluded)	5%
between 10 and 30 (excluded)	10%
between 30 and 60 (excluded)	15%
from 60	20%

Note: Take care to present your executable in the form of a bill.

Ex 2.6 Triangle

In Euclidean geometry, a triangle can be determined by the data of its three vertices. So we can say that a triangle is **valid** (i.e. can be constructed) if the length of each side is less than the sum of the lengths of the other two sides:

$$a < c+b, c < b+a, \text{ and } b < c+a.$$

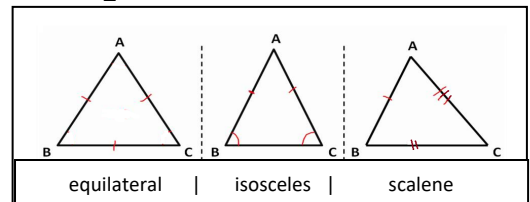
Heron's formula allows us to calculate the area S of any triangle knowing only the lengths a , b , and c of its three sides:

$$S = \sqrt{p(p-a)(p-b)(p-c)} \quad \text{with} \quad p = \frac{a+b+c}{2}$$

An **isosceles** triangle is a triangle with at least two sides of the same length.

An **equilateral** triangle is a triangle whose three sides have the same length.

A triangle with no side equal to another is said to be **scalene**.



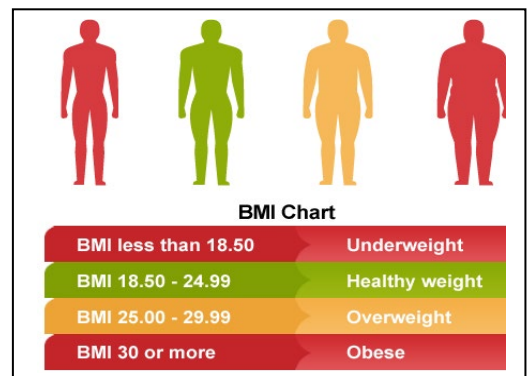
Write a program that asks the user to enter the lengths of all three sides of a triangle and then displays the type and area of the triangle if the triangle is valid. Otherwise, a message indicating that the triangle is invalid should be displayed.

Ex 2.7 BMI (Body Mass Index)

BMI is an index used to estimate a person's corpulence; it is calculated as a function of size and mass by the following formula:

$$BMI = Weight/Height^2$$

Write a program that asks the user to enter their weight (in kg) and height (in meters), calculate and display their BMI, then indicate whether the person is underweight, healthy weight, overweight, or obese according to their BMI value.



Ex 2.8 Areas

Write a program that calculates the area of different geometric shapes, including squares, circles, triangles, rectangles, and parallelograms. The program should work as follows:

1. The user is invited to choose the geometric shape whose area they want to calculate by entering the number corresponding to the shape.
2. Depending on the user's choice, the program then asks for the appropriate dimensions, such as the side of the square, the radius of the circle, etc...
3. The program then calculates the area of the chosen shape using a "switch structure".
4. Finally, the program displays the calculated area to two decimal places.

Execution example :

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Calculating Geometric Surface Shapes:
1. Square
2. Circle
3. Triangle
4. Rectangle
5. Parallelogram
Enter the number of the selected shape: 3
Enter the base of the triangle: 6
Enter the height of the triangle: 8
The area of the triangle is: 24.00 cm2
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