SCHOOL
HIGHER
MEDIA
ART
AND DESIGN
POLYTECHNIC
FROM PORTO

ALP

EXERCISE SHEET

ACADEMIC ACTIVITY

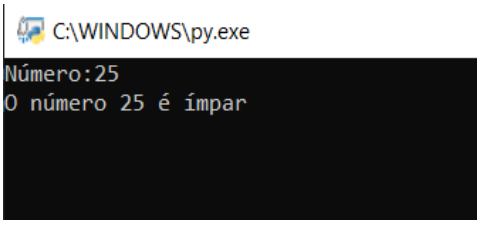
Algorithms and data Structures

CURRICULAR UNIT

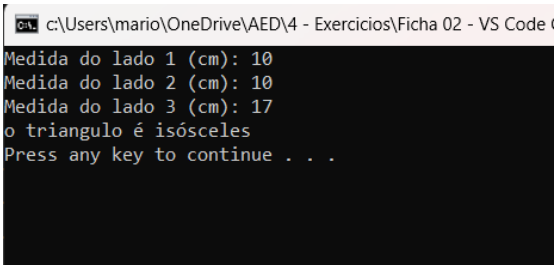
Sheet 02 – Conditional Structures

TOKEN

1. Write a program that determines whether a given number is even or odd, such the example:



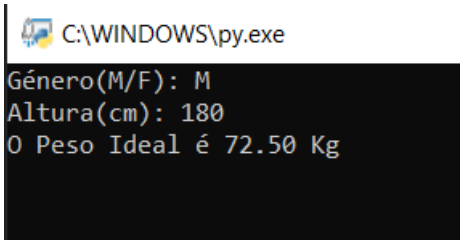
2. Write a program that allows you to classify a triangle by reading the measurements of the 3 sides (in cm).
   The triangle could be classified as:
   - equilateral: all sides are equal.
   - isosceles: two sides equal.
   - scalene: all sides are different



3. Write a program that implements an ideal weight simulator (merely indicative!). The algorithm must ask the user for their gender (**M** for male and **F** for female) and height (**in cm**).
   The ideal weight simulation is given by the following formula:

Ideal weight = (h-100) - (h-150)/k

Being that:
k = 2 for the female gender and
k = 4 for males
h is the height in cm



4. An individual's body mass index (Índice de Massa Corporal - IMC) is obtained by dividing their weight (in kg) by their height (in m) squared. So, for example, a person who is 1.67m tall and weighs 55kg has a IMC of 19.72.

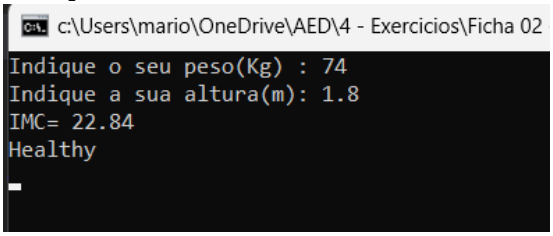
$$IMC = \frac{weight}{height^{\,2}} = \frac{55}{1.67^{\,2}} = 19.72$$

Write a program that asks the user to indicate their weight in kg and their height in meters and calculate their body mass index (IMC. This is the same exercise (4) of previous sheet.

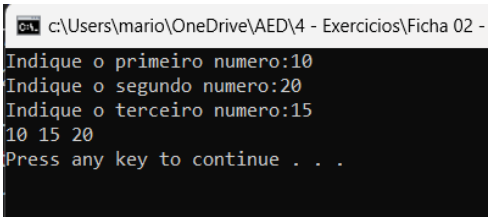
But now, your program must then classify the individual, depending on the IMC index obtained:

BMI	Classification
< 18.5	Under weight
[18.5 – 25[	Healthy
[25 – 30[	Overweight
[30 – 35[	Obesity Grade I
[35 – 40[	Obesity Grade II (severe)
≥ 40.0	Obesity Grade III (morbid)

Example of intended result:



5. Write a program that reads 3 numbers and prints them in ascending order.



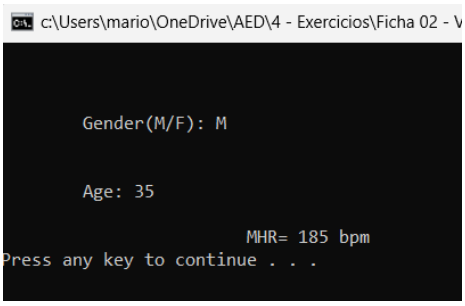
6. Implement a program that works like a small cardiac effort simulator when an athlete performs physical activity.

   The cardiac effort an athlete develops depends on their maximum heart rate (**MHR**), which is calculated as follows (depends on age and gender):

   - In women, 226 – age.
   - In men, 220 – age.

   Thus, for example, in a 35-year-old male, the **MHR** = 220-35=185 (beats per minute.

   Your simulator must calculate the MHR depending on the gender and age indicated, as in the example shown.



7. Implement a simulator of your weight on another Planet. The program must read your weight on Earth, as well as the planet identifier code, and calculate the respective weight on that planet, according to the following table:

Planet Code	*Planet*	*Relative Gravity*
1	Mercury	0.37
2	Venus	0.88
3	Mars	0.38
4	Jupiter	2.64
5	Saturn	1.15
6	Uranus	1.17

The formula for calculating the weight on another planet, considering the relative gravity of each one of them, is as follows:

Weight on the Planet = Weight on Earth * Gravity