

Programming 2 - Assignment 1 (5EC) - Group 20

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1 Exercise 1

In Exercise 1 we are being asked to code a BMI calculator, as well as displaying related information on screen. In order to calculate this value, the program requests input from the user for the values of the weight and height of interest.

Both the height and weight variables are declared as *float* to allow the user for decimal precision input. *Float* instead of *double* was the type chosen as the size of the latter is not required in this case. Variable assigned to the BMI calculation is also a *float*.

Three additional functions were defined to perform the requested operations:

- **calculateBMI**: this function takes as input the weight and height and returns the calculated value for the BMI.
- **evaluateAndPrintBMI**: takes as input the obtained BMI and identifies the corresponding category according to the ranges provided.
- **printInfo**: function to print the information regarding the BMI ranges.

2 Exercise 2

In this exercise, we were first asked to create a class with several attributes. The attributes corresponding to the name (name and last name) are defined as a *string*, while those corresponding to the date of birth are defined as *int* (day, month and year).

Along with the function corresponding to the constructor, the following functions are defined within the class:

- **setName, getName**: *set* and *get* functions corresponding to the name
- **setDateOfBirth, getDayOfBirth, getMonthOfBirth, getYearOfBirth, getBirthDate**: *set* and *get* functions corresponding to the date of birth
- **getAge**: function that allows calculation of the subject's age according to the data provided.

In order to perform the requested operations, two functions are defined along with the previous class:

- **calculateMaximumHeartRate**: This function takes as input an object of the type Human and returns its Maximum Heart Rate in relation to its age.

- **calculateTargetHeartRates:** This function uses the previous one to obtain the maximum HR, which is then used to calculate the Minimum and Maximum Target Heart Rates. An object of the type *tuple* is used to return both values from the function.

Lastly, the program begins by requesting input from the user in order to obtain the necessary information to create an object of the type *Human*. The previous functions are used to obtain the relevant HR values, which are finally displayed along with the remaining information of the subject.

3 Questions

a. Why did you have to include `<iostream>` in your code?

Iostream means standard input and output. Having this class defined at the top of the code allows for inputs and outputs to it. For example, without it you cannot use `cin`, `cout`, ...

b. What is the difference between private and public access specifiers in a C++ class?

Private and public specifiers allow us to define whether the members of the class can be accessed from outside. In a class with a public specifier the members can be accessed and in one with a private one they cannot.

c. Explain the purpose of data hiding.

Data hiding is a technique that allows to preserve the data safely. It prevents the data within a class from being accessed from outside the class, thereby preventing unwanted changes.

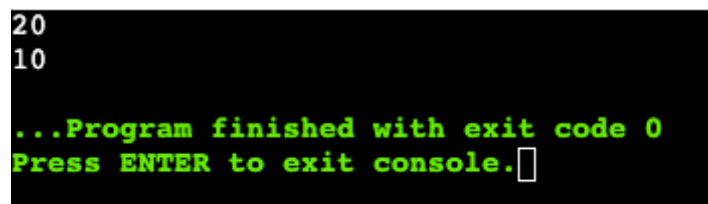
d. How can a program use the standard library class `string` without using a `using namespace` directive? What is problematic about putting a `using namespace` directive at the start of your code?

The “using namespace” directive allows to call functions from different libraries. However, it does not give the specification of from which library is each function. Therefore, if you end up with two functions from different libraries called the same, it is difficult to know which one is running.

A way to do this same thing in a non-problematic manner is to prefix everything with the library you are using (e.g `std::`). This allows for the functions to be identified within the library itself.

e. Give the output of the following code and explain.

The code provided outputs first a 20 and then a 10 (see Fig 1). This is because the void function, does not have a return, but it prints the value of `a` that was defined outside of the scope of the function `main`. Afterwards, the value of `a` defined within `main` is also printed; hence we get the two values of `a`.



```
20
10

...Program finished with exit code 0
Press ENTER to exit console.█
```

Figure 1: Output of the code provided