Computer Programming 1

Basic Concepts

Exercise 1: Social Distance (task)

Context

You are in a room, and you want to be sure that you have enough space around you to distance yourself from other persons.

Task: write a simple C++ program with that:

1. assigns to a variable a radius,
2. computes the area and the circumference of a circle

$$C = 2\pi r \qquad A = \pi r^2$$

3. prints in the screen: the value of the radius, the computed area and circumference

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Constraint: use float as datatype of the radius variable

Exercise 2: American thermometer (task)

Context

You have been instructed to take the temperature of all participants in the programming course of the University of Trento. Unfortunately, the supplied thermometer is set only in Fahrenheit!

Task: write a simple C++ program with that:

1. defines a variable with the temperature in Fahrenheit,
2. computes the corresponding value of the temperature in Celsius degrees.

$$T_C = \frac{T_F - 32}{1.8}$$

Exercise 3: Convert (task)

Task

Given an uppercase set of characters stored in different variables (one variable for one character), the program needs to convert it return it as lowercase character (by printing it in the monitor)

Constraint: do not use any libraries or function to automatically convert uppercase to lowercase characters

Exercise 4: seconds from midnight

- Write a program that given three numbers (hours, minutes and seconds), stored in three distinct variables, calculates the seconds from the last midnight.

- (hours:23 minutes:59 seconds:59 => 86399)

Constraint: print the value of the three variables and the computes seconds

Exercise 5: seconds from midnight and back

- Extend the previous program (i.e., “seconds from midnight”) by writing a new program that given the seconds from midnight, stored in a variable, returns the hourly equivalent in hours, minutes and seconds to the screen.

- (hours:23 minutes:59 seconds:59 => seconds from m. = 86399)
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Additional Exercises (opt.)

- Variant #1. Given the radius of a circle as input, the program needs to calculate the volume of the corresponding sphere
- Variant #2. Define two variables with two numbers (dividend and divisor), the program needs to calculate the quotient and the remainder of the division operation