Computer Programming 1

Basic Concepts
(with Inputs)

Exercise 1: Social Distance (task)

Variant with inputs

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 inserted by the user in the standard input
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

Constraint: use float as datatype of the radius variable

Question: what happens if the user types a char?

Exercise 2: American thermometer (task)

Variant with inputs

Context

You have been instructed to take the temperature of all participants in a meeting. Unfortunately, the supplied thermometer is set only in Fahrenheit!

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

1. takes the value of a variable with the temperature in Fahrenheit from the user by means of the standard input,
2. computes the corresponding value of the temperature in Celsius degrees.

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

Question: what happens if the user types a char?

Variant: make the program robust with respect to possible wrong input types inserted by the user (e.g., a char or a sequence of chars instead of a single number)

Exercise 3: Convert (task)

Variant with inputs

Task

Given an uppercase set of characters entered by the user by means of the standard inputs, the program needs to convert each value and returns 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

Variant: in case of error in the input stream, or if the user types '*' close the program.

Exercise 4: seconds to midnight

Variant with inputs

- Write a program that given three numbers (hours, minutes and seconds), entered by the user via standard inputs, stores them in three distinct variables, calculates the seconds to the last midnight.

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

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

Question: what happens if the user types a char?

Exercise 5: seconds from midnight and back

Variant with inputs

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

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