NOVA SCHOOL OF SCIENCE & TECHNOLOGY
DEPARTAMENTO DE INFORMÁTICA

Multi-threads

HOMEWORK 2

To be submitted for evaluation to mooshak.di.fct.unl.pt until end of 20th October 2023

This work is individual, and all solutions will be compared. Don't look at other students' code and don't show your own to others.

Objective

Implement a toy program in C/Unix that will show several sequences of integer numbers, where each sequence is written by a different thread. All messages must appear by a predefined order.

Program

Build a program, **`conta`**, that allows each thread to print a sequence of integers from 0 to N, where N and the number of threads are chosen by the user. Your program will include a counting function that prints to standard output the sequence of integers and several threads call that function so that each thread will print one sequence. Please note that the messages must appear alternated from each thread, for each integer number (see below). The messages will use the format: `"hello from %c: %i\n"`, where the first char will be A, B, C, etc corresponding to the thread and the integer is the number to print. Your program receives from the command line the number N of the last integer to print and the number of threads to run, like in **`conta 2 3`**, for two threads to count from 0 to 3.

Check the following examples.

running: **`conta 3 3`**
gives:

```
hello from A: 0
hello from B: 0
hello from C: 0
hello from A: 1
hello from B: 1
hello from C: 1
hello from A: 2
hello from B: 2
hello from C: 2
hello from A: 3
hello from B: 3
hello from C: 3
```

running: **`conta 1 5`**
gives:

```
hello from A: 0
hello from A: 1
hello from A: 2
hello from A: 3
hello from A: 4
hello from A: 5
```

Suggestions

Look at the code from Lab 04 and from theoretical classes. See also your OSTEP book, about mutexes and condition variables. Please note that several solutions exist, some based only on several mutexes, others using a mutex and a condition variable and possibly others.