NOVA SCHOOL OF SCIENCE & TECHNOLOGY
DEPARTAMENTO DE INFORMÁTICA

Concurrent Programming with Pthreads

LAB 5

Introduction and Lab objective

The objective of this lab is the utilization of the *Pthreads* library for concurrent and parallel programming in the C language, using mutexs and conditional variables mechanisms.

Correct Parallel Execution

Modify the code from the previous Lab to fix the concurrency problem but using a mutex (see examples from theoretical classes). See if it performs better or worse than your previous solution (use the *time* command).

Producer-Consumer

In demo.c you can find an example of two threads communicating over a shared buffer, working as a bounded queue. That's a common pattern where a thread produces some data that the other thread must read. There is a concurrency problem as both read and write the same object and so corruption can occur. That is usually called the producer-consumer problem. Also, the consumer can only read when there is some new data in the shared buffer and the producer must wait when the buffer is full. See the discussion and solution in section 30.2 from your book OSTEP Chapter 30. Implement that producer-consumer solution using conditional variables in demo.c (note that the correct solution is not the book's first one ☺). Teste your solutions and see if it works correctly.

Bibliography

- Concurrency from FSO recommended book OSTEP from Chapter 25 to Chapter 30.
- Slides from the last theoretical classes (Aula 8, 9).
- On-line manual pages (*man*) for the *Pthreads* library (man pthreads)