Lab and Homework #6

Introduction to Operating Systems CS-UY 3224 | CS-UY 3224G

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Due date for the Homework problems : October 16th, 2023 by 5 PM, Paris time

Please hand in through the *Assignments* option on *Brightspace*.

Question 1: *A simple application of phtreads*

Write a C program that creates 4 threads using pthreads. Each thread should print a distinct message and then terminate. Ensure proper thread creating and termination using pthread functions.

To do at home and hand in: Your C program.

Question 2: *Consumers and producers. The producer-consumer problem is a classic synchronization problem in computer science and concurrent programming.*

In the producer-consumer problem, there are two main roles:

- *Producers*: These are entities responsible for producing data and adding them to a shared buffer.
- *Consumers*: These are entities that consume the data or items from the shared buffer. Their task is to retrieve and process the data.

The key constraints are as follows:

1. Producers cannot add items to the buffer if it is full, as this would lead to overwriting existing data.
2. Consumers cannot retrieve items from the buffer if it is empty, as there is nothing to consume.
3. Producers and consumers must coordinate to avoid race conditions, ensuring that the buffer is accessed safely to prevent data corruption.

To do at home and hand in: Your C program.

Question 3: *Consumers and producers again.*

Redo Q3 but without using pthreads. Use process and pipes instead.

To do at home and hand in: Your C program.

Question 4: *Threads versus processes.*

Compare your solutions to the two previous questions and discuss the advantages and disadvantages of each.

To do at home and hand in: A couple of paragraphs summarizing your answer to this question.