Università degli studi "Roma Tre"

A.Y: 2021/2022
Teaching: Sistemi Operativi
Course: Ingegneria Informatica
Exam session: 20/07/2022 – 14:00
Lecturer: Romolo Marotta
Maximum score: 31 points

STUDENT ID_____**Last Name**_____**First Name**_____

It is recommended that you write your surname and name on this sheet and use it as a folder to contain the answer sheets. If you consider a question ambiguous, write down your interpretation and respond accordingly.

Question 1 (6 points)
Descrivere il concetto di directory in un file system ed illustrarne le rappresentazioni ad albero e a grafo.

Question 2 (6 points)
Descrivere lo schema di partizionamento della memoria Buddy System evidenziandone vantaggi e svantaggi.

Question 3 (6 points)
Describe the Multilevel Feedback Queue (MFQ) policy for CPU scheduling and highlight pros and cons.

Consider a scenario with 4 processes {P1,…, P4}, created in sequence from P1 to P4 with negligible delays. P1 and P3 are CPU-bound processes and require 1 second of CPU time to complete. P2 and P4 are I/O-bound and both need 1ms to activate I/O, whose completion time is equal to 10ms.

Compute the time of the first CPU access for each process and the completion time for each CPU-bound process (P1 and P3) in the case of MFQ CPU-scheduling policy. Assume that:

- The context switch delay and the scheduler execution time are negligible;
- There are 4 queues Qi, whose time slice is equal to $5*2^{i+1}$ms for $i \in [0,3]$;
- Processes are initially enqueued into Q0.

Programming problem (10 points)
Write a C program whose arguments are a sequence of file paths.
For each pair of files, the program creates a new thread/process that:

- Checks if the files can be read and have the same size;
- Prints on stdout both strings and the result of the check.

After the check of each pair has been completed, the main thread/process writes on standard output the number of pairs that passed the check.

Warning: the analysis of distinct pairs must be concurrent to each other.

The publication of the result via Web will take place anonymously using the serial number. To have your exam grade published on the course website, you must sign the following authorization.

The undersigned, pursuant to law 675 of 31/12/96, authorizes the lecturer to publish the results of the exam on the bulletin board and / or on the Web. In faith

Legible signature: _____