

Università degli studi "Roma Tre"

A.Y: 2021/2022

Teaching: Sistemi Operativi

Course: Ingegneria Informatica

Exam session: 20/07/2022 –10:00 a.m.

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)

Describe goals and operations of I/O buffering.

Question 2 (6 points)

Describe the concept of mode switch and context/process switch.

Question 3 (9 points)

Describe the Round Robin 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.

Assuming that context-switch delay and scheduler execution time are negligible, 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 Round Robin and Virtual Round Robin CPU-scheduling policies. The time slice is equal to 50ms

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 byte at position 0;
- Print 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: _____