Università degli studi "Roma Tre"

A.Y: 2021/2022
Teaching: Sistemi Operativi
Course: Ingegneria Informatica
Exam session: 24/06/2022
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 the concepts of load sharing and load balancing in the context of CPU scheduling highlighting their pros and cons.

Question 2 (6 points).
Describe the static and dynamic memory partitioning, discussing their goals and drawbacks.

Question 3 (9 points).
Describe the contiguous, linked and indexed allocation for secondary storage.

Consider a file that occupies 16×2^{20} records on a disk, whose blocks store 4×2^{10} records. Compute the worst-case latency for accessing a record while considering the three above-mentioned allocation schemes. Additionally, assume that: the average access time to a block is equal to 10ms; b) a reference to a block requires 8 records; c) indexes are allocated according to a linked scheme.

Programming problem (10 points)
Write a C program such that the main thread read continuously from standard input a string P that is a path of a file. For each file, it creates a new thread which reads the file looking for the character 'a'.

The program terminates if the main thread gets either a non-valid path or a number of paths equal to N (at your pleasure).

Warning: the read from standard input by main thread must be concurrent with the file reading by child threads.