

Università degli studi "Roma Tre"

A.Y: 2021/2022

Teaching: Sistemi Operativi

Course: Ingegneria Informatica

Exam session: 05/09/2022 – 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)

Describe the paginated segmentation and its logical-to-physical address translation..

Question 2 (6 points)

What is a system call? Describe its operating scheme.

Question 3 (6 points)

Describe the FIFO, LRU and Ottimo algorithms for page replacement.

Which of these do not suffer from the Belady anomaly and why?

Given a main memory of 4 frames, determine how many and which page faults are generated by the aforementioned algorithms given the following trace:

0,1,2,3,4,0,1,2,3,5,2,6,2,7,2

Programming problem (10 points)

Write a C program that takes an integer N and a sequence of filenames as arguments.

For each file, the program creates a new thread/process which iteratively:

- reads N bytes of the file
- counts how many characters equal to 'c' are present in the N bytes just read.

Before finishing, the created threads/processes print on standard output: the file name, the number of bytes read and the number of characters equal to 'c' read.

A child ends its execution if:

- either read the whole file
- or the total number of characters equal to 'c' read by all threads is greater than or equal to 20.

The program ends by printing on standard output the number of characters equal to 'c' overall read by all threads.

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: _____