



42081 - SISTEMAS OPERATIVOS E DE TEMPO-REAL

2022-2023

Exam – P, Normal Period

Duration: 0h45m

#MEC: _____ Name: _____

- 1 - [3] Linux has real-time scheduling services. Is the programmer allowed to set such real-time services at process level, at a thread level or both? Explain briefly the steps necessary to assign real-time services to a task and/or thread. It is not necessary to write the correct API function names; you can use pseudocode. Just make clear what the steps and information is required. [10 lines + pseudo-code (not limited)]
- 2 - [2] In addition to the scheduler and priorities, there are other factors that affect the latency and determinism of Linux. Identify one of such factors and elaborate on the solutions that allow to reduce its impact. [6 lines]
- 3 - [4] One of the IPC mechanisms supported by Xenomai is Message Queue. Explain briefly what are Message Queues and the main operations that involve its use in Xenomai. Consider a typical scenario in which one periodic task sends data to another task via a Message Queue. Again, you do not need to use the correct syntax. Just define the required steps and identify the places where the corresponding API calls have to be used. [8 lines + pseudo-code (optional and not size-limited)]
- 4 - [4] Draw the state diagram of Zephyr tasks, providing a short description for each one. [12 lines + diagram]
- 5 - [4] When creating a new Zephyr RTOS application the typical structure is as follows:
 \src
 Prj.conf
 CMakeLists.txt

After selecting a target board and building the application, a new folder is automatically created. Describe the purpose of this folder (which kind of files are placed there, their purpose and necessity, etc.) [8 lines]

- 6 - [3] Two instructions commonly found in the configuration files are the following:
CONFIG_STDOUT_CONSOLE=y
CONFIG_PRINTK=y
In which file are they found and what is its purpose? [6 lines]