

OHJ-4106 Operating Systems

Exam _____.____.2009

Calculators, computers or literature are NOT allowed in this exam.

1. Describe shortly (as to someone not familiar with this particular software systems subject) what these concepts are:
 - a) What are the main functions of an operating system?
 - b) Pre-emptive scheduling.
 - c) Swapping
 - d) Process states READY, RUN, WAIT
 - e) Logical address space and Physical address space.
2. Which of the following operations must be prohibited when a user process is executing in the CPU (USER_MODE == true)?
 - Read from the memory region of the operating system
 - Set the value of a timer-register (TIMER)
 - Disable interrupts
 - Enable interrupts
 - Jump to execute code from the memory region of the operating system
 - Execute CPU instruction WAIT, which stops the CPU and waits for a interrupt
3. Explain the workings of **two** page replacement algorithms and compare them using a practical example. (E.g. FIFO, least-recently-used (LRU), Denning working set (DWS).)
4. A user program wants to write to a file `/home/kj/log/a.txt` What operations have to be done inside the operating system to verify that the operation can be permitted? What (how many) disk I/O operations might be needed in Unix File System to access all the necessary information? How these checks are typically optimized so that the permissions checks are not made every time the file is written into?