

Home work - Set1

August 10, 2018

1. In a multiprogramming and time-sharing environment, several users share the system simultaneously. This situation can result in various security problems.
 - (a) What are two such problems?
 - (b) Can we ensure the same degree of security in a time-shared machine as in a dedicated machine? Explain your answer.
2. What is the main difficulty that a programmer overcomes in writing an operating system for real time environment?
3. Which of the following instructions should be privileged?
 - (a) Set value of timer
 - (b) Read the clock
 - (c) Clear memory
 - (d) Issue a trap instruction
 - (e) Access I/O device
4. What is the purpose of interrupts? What are the differences between a trap and an interrupt? Can traps be generated intentionally by a user program? If so, for what purpose?
5. An OS provides a system call for requesting allocation of memory. An experienced programmer offers the following advice : “ If your program contains many requests for memory, you can speed up the execution by combining all these requests into a single system call”. Explain the reason.
6. Programs being serviced in a multiprogramming system are named P_1, \dots, P_m , where m is the degree of multiprogramming, such that priority of program $P_i >$ priority of program P_{i+1} . All programs are cyclic in nature, with each cycle containing a burst of CPU activity and a burst of I/O activity. Let b_{cpu}^i and b_{cpu}^{io} be the CPU and I/O bursts of program P_i . Comment on the validity of the following statement:
 - (a) CPU idling occurs if $b_h^{io} > \sum_{j \neq h} b_{cpu}^j$, where P_h is the highest priority of the program.

7. A time-sharing system services n processes. It uses a time slice of δ CPU seconds, and requires t_s CPU seconds to switch between processes. A real-time application requires t_c seconds of CPU time, followed by an I/O operation that lasts for t_{io} seconds, and has to produce a response within t_d seconds. What is the largest value of δ for which the time-sharing system can satisfy the response requirements of the real time application?