

Computer Operating Systems

Problem #1

Describe the concept of a process. Explain what process control block (PCB) is and how it is used. List the contents of a PCB. Explain what scheduling queues are, specifically ready queue and device I/O queue. Explain how and why a PCB of a process migrates from one of these queues to another. Describe the process creation (either Unix or Windows). In case of Unix, explain the operation of `fork()` system call. In case of Windows, explain the operation of `CreateProcess()` system call.

Problem #2

Describe the operation of a CPU scheduler (dispatcher). Define CPU burst time of a process. Explain how operating system determines the CPU burst time of a process. Describe Shortest Job First (SJF) and Shortest Remaining Time (SRT) scheduling algorithms and explain how these two algorithms use process burst time. Give an example of SRT and SJF scheduling.

Problem #3

Explain why the OS schedules disk head movement. Explain why First Come First Served (FCFS) disk head scheduling algorithm is inadequate and suggest an alternative that is more suitable. Give an example of head scheduling that would demonstrate the advantage of your suggested algorithm over FCFS.