

Computer Operating Systems

Problem#1

Define process control block. Explain its typical contents and how it is used. Define ready queue and I/O devices queues. Explain how these queues are used. Highlight the major difference between the states of processes in ready queue and I/O device queues.

Problem #2

Motivate the need for process synchronization in OS design. Define semaphores. Describe two operations that are available for semaphores. Explain why the operations need to be atomic. Define the bounded buffer problem and provide a semaphore-based solution to this problem.

Problem#3

Define virtual memory and explain why it is needed. Briefly explain how page-based virtual memory is organized. Explain why page replacement policy is needed. Explain why a FIFO page replacement policy is inadequate and suggest an alternative policy. Explain how your alternative policy operates and why it is superior to FIFO.