

Study Guide for Midterm

This is simply a guide of topics that I consider fair game for the midterm. I don't promise to ask you about them all, or about any of these in particular; but I may very well ask you about any of these.

1. Beginnings and basics
 - a. first generation: open shop
 - b. second generation: batch, buffering, device independence, interrupts
 - c. third generation: multiprogramming, basic protection, time sharing, layers of abstraction, virtual machines
 - d. fourth generation: mini- and microcomputers, networking
 - e. functions of an operating system: process, memory, secondary storage, user interface, efficiency, reliability, maintainability, small size
 - f. I/O: polling vs. interrupt-driven, DMA
 - g. types of operating systems: monolithic, kernel, process hierarchy, object oriented, client server
 - h. command interpreters and user environments for invoking programs
 - i. basic parts of kernel: first-level interrupt handler, dispatcher, interprocess communications primitives
 - j. process control block
2. Synchronization and Communication
 - a. parbegin, parend
 - b. Bernstein conditions
 - c. critical section problem
 - d. evaluating proposed software solutions to the critical section problem
 - e. software solutions: Peterson's solution, bakery algorithm
 - f. hardware solutions: test and set
 - g. semaphores: down, up; solving synchronization problems
 - h. abstract data types, monitors; wait, signal; solving synchronization problems
 - i. differences between Hoare's signals, Lamson and Redell's signals, Brinch Hansen's signals
 - j. priority waiting
 - k. interprocess communication: send, receive
 - l. explicit vs. implicit naming
 - m. blocking (synchronous) vs. non-blocking (asynchronous) send, receive
 - n. link capacity
 - o. remote procedure calls
3. Scheduling
 - a. short-term, medium-term, long-term schedulers
 - b. metrics for scheduling: turnaround time, response ratio, waiting time, response time, external factors
 - c. first come first serve algorithm
 - d. Shortest process next, pre-emptive shortest process next (shortest remaining time next) algorithms
 - e. Highest response ratio next algorithm
 - f. Round robin algorithm, quantum
 - g. Multilevel feedback queue algorithm
 - h. External priority methods: worst service next, deadline scheduling, fair share scheduling