

Study Guide for Final

This is simply a guide of topics that I consider fair game for the final. 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. Anything from the midterm study guide
2. Input and Output
 - a. device drivers and transparency
 - b. structure of a device driver
 - c. character code independence, device independence, uniform treatment of devices
 - d. hardware characteristics of disks, magnetic tape, communications lines
 - e. escape characters, buit stuffing
 - f. device interfaces
 - g. device drivers: lower, upper parts
 - h. disk scheduling algorithms: FCFS, pick-up, SSTF, SCAN, LOOK, N-Step SCAN, C-SCAN, C-LOOK
 - i. file, system calls for I/O
 - j. blocking vs. non-blocking I/O
3. Memory management
 - a. bare machine, resident monitor, fence addresses, and fence registers
 - b. relocation and address binding
 - c. bounds registers, base and limit registers
 - d. internal vs. external fragmentation
 - e. compaction
 - f. paging and page tables
 - g. segmentation and segment tables
 - h. optimizations: cache, hit ratio, effective memory access time
 - i. views of memory: program vs. operating system, address translation
 - j. protection
 - k. segmented paging (segment the page table)
 - l. paged segmentation (page the segments)
 - m. virtual memory: demand paging, page faults, pure demand paging
 - n. page replacement and victims and dirty bits: FIFO, OPT, LRU, stack algorithms
 - o. minimum number of pages per process
 - p. global vs. local allocation
 - q. working set: thrashing, principle of locality, working set model: working set, window size, working set principle
 - r. prepaging, I/O interlock, choosing page size, restructuring program
4. File Systems
 - a. virtual vs. physical; names; directory structures
 - b. access control: rights, ACLs, UNIX abbreviations
 - c. access via create, open, close, read, write, rewind, delete system calls or commands
 - d. access methods: sequential, direct mapped, structured
 - e. disk directory: free list implementations, allocation methods (contiguous, linked, indexed)
5. Deadlock
 - a. resource manager, request, release
 - b. what is deadlock; difference between it and starvation
 - c. resource types: reusable, consumable
 - d. how to deal with deadlock: ignore, detection and recovery, prevention (mutual exclusion, no preemption, circular wait, hold and wait), avoidance
 - e. deadlock recovery: breaking circular wait, break no preemption (*i.e.*, allow preemption)
 - f. Deadlock Prevention: hierarchical ordering (ordered resource) policy, acquire all resources before running
 - g. deadlock avoidance: banker's algorithm

6. Computer Security
 - a. Saltzer's and Schroeder's Design Principles
 - b. access control: subjects, objects, access control matrix, access control lists, capability lists, Multics protection rings,
 - c. logging actions and auditing
 - d. verification of user identity; the UNIX/MINIX method
 - e. keeping data private (*confidentiality*)
 - f. keeping data unaltered (*integrity*)
 - g. attacks: ciphertext only, known plaintext, chosen plaintext
 - h. classical ciphers: Cæsar cipher, Data Encryption Standard
 - i. key distribution problem
 - j. public key ciphers: requirements, RSA cryptosystem