Chapter 1: OS Introduction / Overview

1. OS main functions
2. kernel space and user space
3. Batching
4. multi-programming
5. OS Zoo, PC OS vs. mainframe OS
6. program protection and relocation
7. memory management unit
8. OS responsibilities in I/O operations
9. Interrupts, interrupt controllers, interrupt handling
10. system calls and the multi-step procedure in making a system call
11. pipes, pipe() call
12. I/O redirection, dup() and dup2() calls

Chapter 2: Process, threads, IPC, Scheduling

1. process concept and elements of constructing a process
2. the sequential process model
3. three main process states and their transitions
4. an event-triggered two-queue system
5. process table with three main entry categories
6. context switching
7. thread concept; user-level and kernel-level threads
8. process model vs. thread model
9. multi-processing vs. multi-threading
10. thread usage with a performance study
11. concurrency and parallelism
12. alternatives to multi-threading: finite-state machine
13. advantages and disadvantages discussions of multi-threading
14. IPC (Inter process communication) concepts and methods
15. Race conditions, examples / code
16. mutual exclusion and critical regions
17. busy waiting with strict alternation, code
18. atomic operations
19. Peterson’s approach for busy waiting, code
20. TSL, code
21. sleep and wait, priority inversion problem
22. producer-consumer problem, code
23. semaphores and mutexes, code
24. dining philosophers, code
25. scheduling and goals
26. scheduling: FCFS, shortest first, shortest remaining first, R-R, priority, and performance
27. thread scheduling