

Date: Monday, Dec 10
7:45am to 9:45am; please be there by 7:40am

Location: MCB 230 (usual classroom)

Format:

The final exam will consist of 4-7 questions.

It will be **closed book, closed notes, closed computer/without wireless access**. However, you are **allowed to bring one letter-sized sheet of paper with prepared notes** (you may use front and back of that sheet.) In addition, you may also bring the sheet of notes you previously prepared for the midterm.

You are responsible for the content of lectures 1 through 27. This includes, among others:

- Introduction to OS: general goals & principles of operating systems.
- Threads & processes: context switching, mode switching, procedure switching, context management, threading & process APIs. User-level vs. Kernel-level threading models.
- Concurrency & Synchronization: critical section problem, race conditions, approaches for guaranteeing mutual exclusion, including locks, semaphores, monitors, spinlocks & disabling interrupts.
- Deadlock: conditions, detection & recovery.
- Scheduling: general goals & constraints, priority scheduling, FCFS, RR, SPN, MLFQS, Lottery Scheduling.
- Virtual memory basics: address translation, memory protection, page table & TLB management; physical memory management: buddy systems and bitmap-based allocation; virtual page replacement strategies, working set & thrashing; segmentation.
- Disks & File systems: disk characteristics, buffer cache, general design of file systems, file allocation & layout strategies including indexed files, directory representation and lookup, consistency in file systems, write-ordering & journaling, virtual file system interfaces, volume management, RAID.
- Security and Protection: principles of protection, authentication, authorization, and models for access enforcements.

More weight will be given to material covered since the midterm.

Silberschatz covers this material in Chapters 1-12, 14-15.

The final may contain questions related to projects 0-4.