Coverage

- Total: ~50 points; 1 min / point
- Based on lectures 1-13, suggested exercises 1-4
- Multiple choice, short answer, and problem solving questions
Introduction and History

- Definitions
  - Operating system
  - Job
  - Batch system
  - Timesharing
Introduction and History

- Definitions
  - Multiprocessing
  - Multithreading
  - Multitasking
  - Multiprogramming
  - Uniprogramming
Introduction and History

- Short answers
  - Four phases of OS history
    - OS design goals
Concurrency: Threads, Address Spaces, and Processes

Definitions

- Thread
- Address space
- Process
- Context switch
Concurrency: Threads, Address Spaces, and Processes

- Short answers
  - Benefits of concurrency
  - Thread vs. process
  - Dispatching loop
  - Thread state diagram
Genesis: From Raw Hardware to Processes

Definitions

- Master boot record
- System call
- User mode
- Kernel mode
- Trap instruction
Genesis: From Raw Hardware to Processes

- Short answers
  - Booting sequence
  - System call sequence
  - Process creation
  - init process
CPU Scheduling

- Definitions
  - Starvation
CPU Scheduling

- Short answers
  - Preemptive vs. nonpreemptive scheduling
  - FIFO
  - RR
  - SJN
  - SRTF
  - Multilevel feedback queues
  - Lottery scheduling
Cooperating Threads

Definitions

- Atomic operation
- Race condition
Cooperating Threads

- Short answers
  - Independent threads
  - Cooperating threads
  - Decision tree
Synchronization

- Definitions
  - Mutual exclusion
  - Critical section
Synchronization

- Short answers
  - Code verification (e.g. how to test a locking solution)
Implementing Mutual Exclusion

- Definitions
  - Busy waiting
Implementing Mutual Exclusion

- Short answers
  - Ways to implement locks
    - Interrupt disables
    - test_and_set operation
    - Atomic memory load and store
    - Wait queues
Semaphores and Bounded Buffer

- Definitions
  - Semaphore
Short answers

- Semaphores vs. integers
- Two uses of semaphores
- P() and V() functions
More on Semaphores

- Definitions
  - Safety
  - Liveness
  - Fairness
More on Semaphores

- Short answers
  - Code verification