Midterm Exam Review

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Operating Systems

COP 4610

Coverage

- Total: 100 points;
- Attendance: 18 points;
- 5 points based on OS Introduction and Structure
- 50 points based on CPU Scheduling
- 19 points based on Mutual Exclusion
- 6 points based on Synchronization
- 2 points based on Deadlocks

Introduction and History

- Four phases of OS history
  - OS design goals
    - Time Sharing System
    - Batch System
  - Today’s design trends

OS Architecture

- Dual-Mode Operation
- Address space

CPU Scheduling

- Creation of The First Process
  - Booting sequence
- Per-thread State Diagram

CPU Scheduling

- Scheduling Strategy
  - FIFO
  - RR
  - SJF
  - SRTF
- Definition
  - Response Time
  - Turnaround Time
  - Wait Time

Mutual Exclusion

- Definitions
  - Atomic Operation
  - Race Condition
  - Race Condition
  - Mutual Exclusion
  - Synchronization
  - Critical Section
  - Busy Waiting

Mutual Exclusion

- Multi-Threaded Race Condition Problem

Mutual Exclusion

- The Working Mechanism, Advantages, and Disadvantages
  - Lock
  - Spinlock
  - Mutex
    - 80% of the exam questions will be based on assignments
    - 20% of the questions will test your ability to apply principles learned specifically in this section

Sychronization

- Producer-Consumer problem
  - Condition Variables
  - Pthread_cond_wait
  - P operation and V operation
- Semaphore
  - Advantages
  - Disadvantages

Deadlocks

- Deadlocks
  - Condition
- Defensive Programming
  - assertion