


CS241 System Programming Review Session

Klara Nahrstedt
Review for Midterm
3/8/2006



Midterm Date

- March 9, 7-7:50pm
- Room Allocation
 - Last Name A-K go to room 1404 SC
 - Last Name L-Z go to room 1320 DCL
- Bring with you Student ID and pen
- Exam is closed book, closed notes, no calculators

Midterm Material

- Process and Thread Management
- Synchronization
- Scheduling
- Signals and Timers
- Deadlocks

Textbook Chapters

- Tanenbaum Chapters:
 - Chapter 2 (2.1-2.4)
 - Chapter 3 (3.3.1-3.3.5)
- Robins&Robins
 - Chapter 2 (2.1-2.11)
 - Chapter 3 (3.1-3,7)
 - Chapter 8 (8.1-8.5)
 - Chapter 9 (9.1-9.5)
 - Chapter 12 (12.1-12.6)
 - Chapter 13 (13.1-13.6)
 - Chapter 14 (14.1-14.5)

Review Questions (Processes)

- What is a process?
- What is a PCB?
- List some of the queues on a typical system
- How are these queues typically implemented?
- What is “time sharing”? What kind of scheduling does it involve?
- What is context switch?
- Describe the producer/consumer problem
- Give example of producer/consumer problem

Review Questions (Scheduling)

- What is a CPU burst? An I/O burst?
- An I/O bound program would typically have what kind of CPU burst?
- What is FIFO?
- What is the “dispatcher”?
- List at least three performance criteria we could select to optimize our system
- What is throughput?
- What is FCFS?
- What is convoy effect?
- What is SJF?

Review Questions (Scheduling)

- What are the advantages of SJF? Disadvantages?
- How are priority and SJF related?
- What is indefinite blocking? How can it occur?
- What is round robin scheduling
- True or False: round-robin scheduling is preemptive
- What is the time quantum used for?
- How should the time quantum be related to the context switch time?
- How should the time quantum be related to the CPU burst time?
- How can multilevel queues be scheduled? Which might have priority over others?

Review Questions (Synchronization)

- What is a critical section?
- What is the critical-section problem?
- List the constraints Dijkstra placed on solutions to the critical-section problem
- What three requirements must a solution to the critical section problem satisfy?
- What does execute “atomically” mean?
- Suppose we want to execute the statements S1, S2 and S2 in sequence, but that S2 has to be executed exclusively for one process at a time. Write the code needed using semaphores
- Describe the Dining Philosopher problem

Review Questions (Deadlock)

- List types of resources we might consider in deadlock problems on computer
- Define deadlock
- What are the four necessary conditions needed before deadlock can occur?
- What is a system resource allocation graph in general?
- How is request indicated in the resource allocation graph?
- How is an allocation indicated in the resource allocation graph?

Review Questions (Deadlock)

- True or False: In a resource allocation graph, if there are no cycles, then no deadlock exists.
- List two overall strategies in handling deadlocks
- Give examples of sharable resources
- Give examples of non-sharable resources
- Can we break the first condition (mutual condition) for deadlock to prevent deadlock?
- List two ways we can break the third condition (no preemption) to prevent deadlock
- What does a wait-for-graph show?
- What conditions must exist before a wait-for-graph is useful in detecting deadlocks?

Review Questions (Deadlock)

- List three options for breaking an existing deadlock
- What is starvation?
- List two classes of resources, and the corresponding typical method of handling deadlock for each

Summary

- Review Textbooks chapters
- Review Quizzes
- Review Class Notes
- Review Discussion Section Slides
- Review Additional Material on the web site
- **Good luck !!!**