Review Today

Final Exam covers:

- 75% of the exam is on distributed systems, distributed coordination, and transactions
- 25% of the exam is on the rest of the course

Distributed systems

1. What is the difference between a distributed system and a multiprocessor?
2. What advantages do distributed systems have over isolated systems?
3. What advantages do isolated systems have over distributed systems?

Networks

1. What is a LAN?
2. What is a WAN?
3. What is a gateway?
4. How do node failures affect the different network topologies?
5. What is an Internet domain name server?

Distributed sharing

1. What is data migration? When would you use it?
2. What is computation migration? When would you use it?
3. What is job migration? When would you use it?

RPC

1. What is RPC?
2. How does RPC differ from normal procedure call?
3. What extra computation is required to do RPC instead of a normal procedure call?
4. Would you ever use RPC to communicate between two processes on the same machine?

Distributed file systems

1. What are location transparent names?
2. What are location independent names?
3. What does it mean to say that a distributed file system has a single (global) namespace?
4. What is a cache?
5. What are the advantages of using a cache in a distributed file system? What are the disadvantages?
6. What are the advantages and disadvantages of write-back and write-through caches?
7. What variations of write-through cache are there? What are their advantages and disadvantages?

Distributed coordination

1. How can you implement semaphores in a distributed system?
2. How can you define a global ordering of events in a distributed system? Why can't you simply use the time-of-day clock to do this?

You should be able to:

1. Determine a total ordering on events in a distributed system.
2. Show message flow between processes to implement a distributed semaphore
3. Show message flow between processes to elect a new coordinator (bully election or ring election algorithms).

Highlights of Process Management

1. What is a context switch? What happens during a context switch? What causes a context switch to occur?
2. What is the difference between a process and a thread?
3. What are FCFS, Round Robin, SJF, and Multilevel Feedback Queue algorithms?
4. What is an I/O bound process? What is a CPU bound process? Is there any reason to treat them differently for scheduling purposes?
5. What is a semaphore? What are the three things a semaphore can be used for?
6. What is a monitor? What is a condition variable?
7. What is busy waiting?
8. What are the four necessary conditions for deadlock to occur?
9. What is the difference between deadlock detection and deadlock prevention?
10. After detecting deadlock, what options are conceivable for recovering from deadlock?

Highlights of Memory Management

1. What is virtual memory and why do we use it?
2. What is paging, a page
3. What does the OS store in the page table?
4. What is a TLB? How is one used?
5. What is a page fault, how does the OS know it needs to take one, and what does the OS do when a page fault occurs?
6. Page replacement algorithms: FIFO, MIN, LRU, Second chance. For each understand how they work, advantages and disadvantages.
7. How does the OS communicate with I/O devices?
8. What are I/O buffers used for?
9. What are I/O caches used for? How do they affect reading and writing to I/O devices?
10. What is seek time?
11. What is rotational latency?
12. What is transfer time?
13. Disk scheduling algorithms: FIFO, SSTF, SCAN, C-SCAN. How do they work, advantages and disadvantages.

General Skills

- You should have a good sense of how the pieces fit together and how changes in one part of the OS might impact another.
- You may be asked to read or write Java/pseudo code
- You will **not** be asked detailed questions about any specific operating system, such as Unix, Windows, or any specific file system, such as NFS, Andrew, ...