Exam Review

Monitors

Deadlocks

Memory Management

Monitors

• What is a monitor?

• What is a condition variable?

• Hoare vs Mesa style monitors.

• Dining philosophers, readers and writers
Deadlocks

• What is a deadlock? Difference from starvation
• Necessary conditions for a deadlock
• Deadlock detection, avoidance, prevention
• Resource allocation graph - deadlock detection
• Concept of a safe state

• [skip] Banker’s algorithm
  – Problem solving with banker’s algorithm

Memory Management

Topics you should understand:
1. What is virtual memory and why do we use it?
2. Memory allocation strategies:
   – Relocation and Contiguous allocation (first-fit and best-fit algorithms)
   – Paging
   – Segmentation
   – Paged segmentation
   – Demand paging
Memory Management (cont.)

For each strategy, understand these concepts:

- Address translation
- Hardware support required
- Coping with fragmentation
- Ability to grow processes
- Ability to share memory with other processes
- Ability to move processes
- Memory protection
- What needs to happen on a context switch to support memory management

Memory Management (cont.)

Things you should be able to do:

- Given a request for memory, determine how the request can be satisfied using contiguous allocation.

- Given a virtual address and the necessary tables, determine the corresponding physical address.
Memory management strategies

- Contiguous allocation
  - static versus dynamic allocation
  - Base and limit registers
  - Best, first, worst-fit strategies

Paging and Segmentation

Topics you should understand:

- What is paging, a page, a page frame?
- What does the OS store in the page table?
- What is a TLB? How is one used?
  - Effective memory access times using a TLB
- What is segmentation? where are segment tables stored?
- How to combine segmentation and paging?
- What is demand paging?
- 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?
Demand Paging

- What is demand paging?
- What is a page fault?
- How are page faults handled?

Paging (cont.)

- Page replacement algorithms. For each understand how they work, advantages, disadvantages, and hardware requirements.
  1. FIFO
  2. MIN
  3. LRU
- What is temporal locality? What is spatial locality? What effect do these have on the performance of paging?
- What is a working set?