Date: Friday, May 5  
1:05pm to 3:05pm; please be there by 1pm  
Location: PM 31 (usual classroom)  

Format:

The final exam will consist of 5-8 questions.  

It will be closed book, closed notes, closed computer/without wireless access. However, you are allowed to bring one letter-sized sheet of paper with prepared notes (you may use front and back of that sheet.)  

The Wednesday, May 3 lecture will be dedicated to a review for the final. Bring your questions.  

You are responsible for the content of lectures 1 through 41. This includes, among others:  

- Introduction to OS: general goals & principles of operating systems.  
- Threads & processes: context switching, mode switching, procedure switching, context management, threading & process APIs.  
- Concurrency & Synchronization: critical section problem, race conditions, approaches for guaranteeing mutual exclusion, including locks, semaphores, monitors, spinlocks & disabling interrupts.  
- Deadlock: conditions, detection & recovery.  
- Scheduling: general goals & constraints, priority scheduling, FCFS, RR, SPN, MLFQS, Lottery Scheduling. Real-time Scheduling: RMA & EDF.  
- Virtual memory basics: address translation, memory protection, page table & TLB management; physical memory management: buddy systems and bitmap-based allocation; virtual page replacement strategies, working set & thrashing; segmentation.  
- Threading models: user-level threads, kernel-level threads, hybrid models.  
- Disks & Filesystems: disk characteristics, buffer cache, general design of filesystems, file allocation & layout strategies including indexed files, directory representation and lookup, consistency in filesystems, write-ordering & journaling, virtual filesystem interfaces, volume management, RAID.  
- Security & Protection: basic models and goals.


The final may contain questions related to projects 0-4.