



國立陽明交通大學
NATIONAL YANG MING CHIAO TUNG UNIVERSITY

Institute of Artificial Intelligence Innovation
Department of Computer Science

Operating System

Question Examples of Final Exam

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Wed. 10:10 - 12:00 EC115 +
Fri. 11:10 – 12:00 Online

Final Exam will

W	Date	Lecture	Online	Homework
1	Sept. 4	Lec00: Course Overview & Historical Prospective		
2	Sept. 11	Lec01: Introduction	V	
3	Sept. 18	Lec02: OS Structure	V	HW01 Due 10/5
4	Sept. 25	Lec03: Processes Concept	X	
5	Oct. 2	Typhoon – No class	V	
6	Oct. 9	Lec07: Memory Management	V	
7	Oct. 16	Lec08: Virtual Memory Management	V	HW02 Due 11/2
8	Oct. 23	Lec04: Multithreaded Programming (After midterm)	V	
9	Oct. 30	Midterm Exam		
10	Nov. 6	Lec05: Process Scheduling	V	Let's take a breath
11	Nov. 13	Lec06: Process Synchronization & Deadlocks	X	HW03
12	Nov. 20	School Event – No class	V	
13	Nov. 27	Lec09: File System Interface	V	
14	Dec. 4	Lec10: File System Implementation	V	HW04
15	Dec. 11	Lec11: Mass Storage System & Lec12: IO Systems	V	
16	Dec. 18	School Final Exam		

Example Questions 1

- Briefly **explain** the definition of the following terminologies. If they are related concept or terms, **explain** their relationship with descriptions/figure. If they are opposite concepts or terms, **compare** them in terms of their strength and weakness.
 - Hard real-time vs. Soft real-time
 - Preemptive Scheduling vs. Non-Preemptive Scheduling
 - ...

Example Questions 2

- A multilevel feedback queue (MLFQ) scheduler is designed to optimize both response time for interactive tasks and throughput for long-running tasks by dynamically adjusting each process's priority level based on its observed CPU usage characteristics. Consider a system using an MLFQ scheduler with the following rules:
 1. There are multiple ready queues, each with a distinct priority level (higher queues have higher priorities).
 2. A process that uses its entire time quantum at a given priority level is moved down to a lower-priority queue.
 3. A process that frequently yields the CPU before its time quantum expires is moved to a higher-priority queue or stays at a higher level.
 4. Aging mechanisms ensure that processes in lower-priority queues eventually receive CPU time.

Example Questions 2

Which of the following statements about MLFQ scheduling are correct? (Select all that apply.)

- A. Processes that frequently perform I/O operations tend to remain at higher priority levels.
- B. Long-running, CPU-bound processes are gradually demoted to lower-priority queues.
- C. The MLFQ scheduler never needs to reassign priorities once they are initially set.
- D. With proper aging, even low-priority processes will eventually run.
- E. MLFQ guarantees absolute fairness by giving equal CPU time to all processes.
- F. The MLFQ approach can dynamically adjust to changing workloads by promoting and demoting processes.

Example Questions 3-5

- What are the necessary conditions for a deadlock to occur? Name these conditions and provide an elaboration. Stating conditions without elaboration or stating a vague elaboration receives no credit.
- Please explain the Bakery algorithm for the general solution to the critical section problem.
- When the Shortest Seek Time First (SSTF) scheduling method is used on a hard disk drive, please give a diagram of how the following access sequence will be performed. -> Given accesses: 198, 283, 32, 238, 124, 0, 65, 869 and disk head starts at 1000.