



題目1至題目10為多選題，每題5分。每題需全部答對才給分，答錯倒扣1分。

1. Which are correct for traps?
 - (A) Events are almost always signaled by the occurrence of an interrupt or a trap.
 - (B) A trap is a hardware-generated interrupt caused by an error.
 - (C) A trap could be an interrupt caused by a specific request from a user program.
 - (D) Invalid memory access would cause a trap.
2. Which are correct for system boot?
 - (A) The procedure of starting a computer by loading the kernel is known as booting the system.
 - (B) Booting is definitely a one-step process in which a bootstrap loader locates the kernel and loads it into main memory.
 - (C) When a CPU receives a reset event, the instruction register is loaded with a predefined memory location where the initial bootstrap program is located.
 - (D) The bootstrap program must be stored in the boot block.
3. What information would a process control block contain?
 - (A) CPU registers
 - (B) I/O status information
 - (C) memory-management information
 - (D) accounting information
4. Which are correct for threads?
 - (A) In UNIX systems, if `exec()` is called immediately after `forking()`, duplicating all threads is necessary.
 - (B) Pthreads refers to the POSIX standard defining an API for thread creation and synchronization.
 - (C) For delivering signals to threads, the signal that terminates a process should be sent to all threads.
 - (D) Windows XP uses the many-to-one model for mapping between user-level threads and kernel threads.



5. What would the criteria include for comparing CPU scheduling algorithms?
- (A) throughput
 - (B) turnaround time
 - (C) context-switch time
 - (D) waiting time
6. Which are correct for synchronization?
- (A) Both TestAndSet() and Swap() instructions can be used to solve the critical-section problem.
 - (B) The main disadvantage of spinlock semaphores is that they require busy waiting.
 - (C) The solution to the dining-philosophers problem guarantees that no two neighbors are eating simultaneously also solves the deadlock problem.
 - (D) A deadlock-free solution must eliminate the possibility of starvation.
7. For deadlock prevention, which necessary conditions would we try to remove?
- (A) mutual exclusion
 - (B) hold and wait
 - (C) no preemption
 - (D) circular wait
8. Which are correct for memory management?
- (A) The algorithm best-fit is generally the fastest among three dynamic allocation strategies.
 - (B) No fragmentation exists in a paging system.
 - (C) We have one page table for each process using the inverted page table technique.
 - (D) Segmentation is a memory-management scheme that supports the user view of memory.
9. Which are correct for page-replacement algorithms?
- (A) The FIFO page-replacement algorithm is a stack algorithm.
 - (B) The optimal page-replacement algorithm is the best one and usually implemented in a commercial system.
 - (C) The LFU and MFU page-replacement algorithms keep a counter of the number of references that have been made to each page.
 - (D) The LRU page-replacement algorithm can be thought as the optimal page-replacement one looking backward in time, rather than forward.



10. Which are correct for disk free-space management?

- (A) The main advantage of the bit vector approach is its efficiency in finding the first free block.
- (B) The linked-list approach is not efficient to traverse the list, which requires substantial I/O time.
- (C) The grouping approach modifying the free-list one can find a large number of free blocks quickly.
- (D) The counting approach is not good when space is allocated with the contiguous-allocation algorithm or through clustering.

題目11至題目20為簡答題，每題5分。

- 11. Explain the difference between sharing a resource and multiplexing a resource.
- 12. Give the relative advantages and disadvantages of load time dynamic linking and run time dynamic linking.
- 13. Give two advantages of a DMA device controller over a non-DMA device controller.
- 14. What do real-time operating systems often use fixed scheduling?
- 15. What is the use of mounting?
- 16. What are the advantages and disadvantages of compressed files?
- 17. Explain the terms: race condition, atomic action and critical section.
- 18. Give an analogy between messages and semaphores.
- 19. Compare local and global page replacement. What are the advantages of each?
- 20. What are the main problems with the linked block method?