California State University, San Bernardino

CSE 460 Operating Systems

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Final Exam Part I

Dear Yuan Hao,

Each question is worth 5 points. The exam questions are **confidential**. Please do **not** make any copy of it, hard or soft; it is **illegal** to do so. If there's any doubt about your final score, you can request an appointment with the instructor to review the questions.

1. This question relates to the labs you have done. What is the SDL function that ensures a parent thread not to terminate before its children ?
   A. ○ SDL_CreateThread
   B. ◉ SDL_WaitThread
   C. ○ SDL_Wait
   D. ○ SDL_Signal
   E. ○ SDL_P

2. When a process is blocked,
   A. ○ it is waiting in the ready queue.
   B. ○ it is finishing execution.
   C. ○ it is newly created.
   D. ○ it has used up its current quantum (time-slice).
   E. ◉ it is waiting for some events such as I/O processing.

3. Which of the following is **true**?
   A. ○ Operating systems manage only hardware.
   B. ○ At any given time, only one process can be executing instructions on a computer.
   C. ○ A process must have a parent process.
   D. ◉ A thread can be in only one semaphore's waiting queue at a time.
   E. ○ Nonpreemptible resources must be hardware.

4. Consider a system consisting of *m* resources of the same type, being shared by *n* processes. Resources can be requested and released by processes only one at a time. Consider the case of
   $m = 6$
   $n = 7$
   Which of the following cases is **deadlock free**?
   A. ○ The maximum need of each process is 2.
   B. ◉ The maximum need of each of 4 processes is 1; the maximum need of each of

another two processes is 2, and the maximum need of the remaining process is 4.

C. ○ Each process needs no more than 2 units of resources.

D. ○ The maximum need of each of three processes is 4 and the maximum need of each of the remaining proceses is 1.

E. ○ The maximum need of each of three processes is 3 and the maximum need of each of the remaining proceses is 2.

5. Which of the following is **not** true?
   A. ○ A thread must wait for a resource outside a monitor.
   B. ○ Processes do not deadlock as a result of contending for the processor.
   C. ○ Deadlock prevention makes deadlock impossible but results in lower resource utilization.
   D. ○ Systems using either deadlock prevention or avoidance will be free of deadlock.
   E. ◉ An unsafe state is a deadlocked state.

6. Which of the following is **true**?
   A. ○ The low cost of main memory coupled with the increase in memory capacity in most systems has obviated the need for memory management strategies.
   B. ○ The number of faults for a particular process always decreases as the number of page frames allocated to a process increases when first-in first-out (FIFO) replacement is used.
   C. ○ LRU is designed to benefit processes that exhibit spatial locality.
   D. ◉ Looping through an array exhibits both spatial and temporal locality.
   E. ○ The first-fit memory allocation strategy requires that the free memory list be sorted.

7. Which of the following is **not** a goal of CPU scheduling?
   A. ○ minimize turnaround time
   B. ○ minimize response time
   C. ◉ minimize throughput
   D. ○ maximize CPU utilization (i.e. keep CPU as busy as possible)
   E. ○ maintain fairness

8. Which of the following scheduling algorithms minimizes the average turn-around time.
   A. ○ First-come First-served
   B. ○ Round-Robin
   C. ○ Multilevel Queue
   D. ◉ Shortest Job First
   E. ○ Two-level Scheduling

9. Which of the following scheduling algorithms involves priority inversion?
   A. ◉ Real Time Scheduling
   B. ○ Multilevel Queue Scheduling
   C. ○ First-come First-served
   D. ○ Round-Robin
   E. ○ Multi-processor scheduling

10. Which of the following mutual exclusion mechanisms has been adopted by Java to achieve

synchronization (choose the **best** answer)?

A. ○ Test-and-set-lock
B. ○ Semaphore
C. ○ Disabling Interrupts
D. ◉ Monitor
E. ○ Lamport's Bakery Algorithm

11. Which of the following systems often uses a microkernel?
    A. ◉ client-server system
    B. ○ virtual machine
    C. ○ layered system
    D. ○ monolithic system
    E. ○ mainframe computer

12. What is the CPU utilization of a system with degree of multiprogramming equals 10 if the probability of a process in the waiting state is 0.5?
    A. ○ about 60%
    B. ○ about 70%
    C. ○ about 80%
    D. ○ about 90%
    E. ◉ about 99.9%

13. Which of the following memory allocation methods allocates the largest hole?
    A. ○ quick fit
    B. ○ first fit
    C. ◉ worst fit
    D. ○ best fit
    E. ○ next fit

14. Which of the following is **not** one of the disk free-space management methods?
    A. ○ linked list
    B. ◉ thrashing
    C. ○ grouping
    D. ○ bit map
    E. ○ counting

15. What is the maximum file size that the UNIX triple indirect method can handle if each block is 1K bytes?
    A. ◉ 64 G Bytes
    B. ○ 64 M Bytes
    C. ○ 256 M Bytes
    D. ○ 1024 M Bytes
    E. ○ more than 1024 M Bytes

16. Which of the following concerning access lists or capability lists is **not** true?
    A. ○ Access lists are simple, and are used in almost all file systems.

B. ○ A capability list stores a list of pairs with each user.
C. ○ In access-list systems, the default is usually for everyone to be able to access a file.
D. ◉ Access lists are preferred over capability lists if the system considered needs to be very secure.
E. ○ In capability-based systems, the default is for no-one to be able to access a file unless they have been given a capability.

17. Which of the following attacks does an **imposter** use to steal passwords from terminals? (choose the **best** answer.)
    A. ◉ login spoofing
    B. ○ logic bombs
    C. ○ buffer overflow
    D. ○ worms
    E. ○ trap doors

18. Processes in a system arrive in the order P_1,P_2,P_3 with burst time and arrival time shown below:

Process	Arrival Time	Burst Time
P_1	0	5
P_2	1	3
P_3	3	1

    If the first-come-frist-served **FCFS** scheduling algorithm is used, what is the average **waiting time** of the processes?
    A. ○ 4.33
    B. ○ 4
    C. ○ 5.33
    D. ○ 5
    E. ◉ 3
    F. ○ 3.33

19. In the above question, if the non-preemptive shortest-job-first (**SJF**) scheduling algorithm is used, what is the average **waiting time** of the processes?
    A. ◉ 2.33
    B. ○ 2
    C. ○ 3.33
    D. ○ 3
    E. ○ 4.33
    F. ○ 4

20. Suppose H, M, and L are three tasks running in a real-time system with high, medium and low priorities respectively, and priority inversion has occurred. The isssue is often resolved by the priority-inheritance protocol. Which of the following **best** describes this protocol?
    A. ○ Change the priority of H to that of L while L is executing the critical section.
    B. ◉ Change the priority of L to that of H while L is executing the critical section.
    C. ○ Change the priority of M to that of H while L is executing the critical section.
    adaptor

D. ○ Change the priority of L to that of M while L is executing the critical section.
iterator

E. ○ Change the priority of M to that of L while L is executing the critical section.

21. Consider a swapping system in which memory consists of the following hole sizes in memory order: 10K, 4K, 12K, 18K, 7K, 9K, 11K, 16K, and 8K. Successive segment requests are made in the order

    12K, 10K, 8K

    Which of the following is an incorrect order of filling the holes for the specified method? (Assume that each method is considered independently.)

    A. ○ First fit: 12K, 10K, 18K
    B. ○ Best fit: 12K, 10K, 8K
    C. ◉ Worst fit: 12K, 18k, 9k
    D. ○ Next fit: 12K, 18K, 9K
    E. ○ Quick fit: 12K, 10K, 8K (assume best fit is used and only one list has been established.)

22. This question relates to the labs you have done. What is the POSIX function that 'unlocks' a semaphore?

    A. ○ sem_open
    B. ○ sem_wait
    C. ○ sem_signal
    D. ◉ sem_post
    E. ○ sem_up

Double-check before you submit! Once you have submitted your answers, you cannot change them.

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