CSCI 4500 / 8506
Sample Questions for Quiz 3

1. In the dining philosophers problem, the philosophers spend their lives alternating between thinking and
   a. serving customers.
   b. eating.
   c. working.

2. The shared resource(s) in the dining philosophers problem is(are)
   a. food.
   b. forks.
   c. food and forks.

3. The processes in the dining philosophers problem correspond to the behavior of
   a. the philosophers.
   b. the philosophers seating.
   c. the food supply.

4. Suppose there are 7 philosophers in the dining philosophers problem. At most how many of these could
   be eating at the same time?
   a. 3
   b. 7
   c. 2

5. Suppose there are 8 philosophers in the dining philosophers problem. What is the minimum number of
   these that may be eating at the same time?
   a. 0
   b. 4
   c. 2

6. When all that is impossible is eliminated, then whatever remains, however improbable,
   a. must be eliminated.
   b. must be the truth.
   c. is not worth considering.

7. One way to find potential problems with a proposed solution to an IPC problem is to
   a. rewrite the solution using a different IPC mechanism.
   b. consider all possible execution sequences and eliminate those that are not causing problems.
   c. run the proposed solution on a system with one processor for each process.

8. One sequence of actions that must not be allowed in the dining philosophers problem is
   a. for all philosophers to be thinking at the same time.
   b. for the first philosopher to eat, then for the second, third, fourth philosophers to eat, and so forth.
   c. for each philosopher to pick up the fork to their left and then, while holding it, wait for the fork to
      their right.

9. A good solution to the dining philosophers problem must provide a reasonable measure of assurance that
   a. once a philosopher has indicated a desire to eat that he or she will be eventually allowed to do so.
   b. no more than three other philosophers will be allowed to eat before a philosopher that is hungry will
      be allowed to eat.
   c. no more than two other philosophers will be allowed to eat before a philosopher that is hungry will
      be allowed to eat.
10. Suppose in a proposed solution to the dining philosopher problem that a philosopher has indicated it is hungry, but it is forever denied the opportunity to eat. In this case, we say that the solution exhibits
   a. deadlock.
   b. indefinite postponement.
   c. temporal instability.

11. In the solution to the dining philosophers problem presented, a third state is associated with each philosopher. This additional state is called
   a. full.
   b. hungry.
   c. right fork.

12. How many classes of processes are there in the readers/writers problem?
   a. 3
   b. more than 4
   c. 2

13. Each process in the readers/writers problem is involved with reading or writing what?
   a. three objects: one unique to the readers, one unique to the writers, and one shared by the readers and the writers
   b. a shared object, like a database
   c. one or more objects, none of which may be accessed by more than one reader at a time

14. How many reader processes can be accessing an object in the readers/writers problem at the same time?
   a. NR - NW, where NR is the number of reader processes and NW is the number of writer processes
   b. as many as desired
   c. at most one

15. How many writer processes can be accessing an object in the readers/writers problem at the same time?
   a. as many as desired
   b. at most one
   c. as many as there are reader processes

16. In total, how many reader and writer processes may be accessing an object in the readers/writers problem at the same time?
   a. An arbitrarily large number of readers and at most one writer may be accessing an object at the same time.
   b. An equal number of readers and writers may be accessing an object at the same time.
   c. Readers and writers may not both access the shared object at the same time.

17. Which of the following are common variants of the reader/writer problem?
   a. static writer and dynamic writer
   b. reader priority and writer priority
   c. maximum priority and minimum priority

18. Assume we allow reader processes to continually gain access to the shared object in the reader/writer problem, even if writers are waiting to access it. Which of the following is true?
   a. Indefinite postponement of readers and writers could occur.
   b. Indefinite postponement of writers could occur.
   c. None of the other answer choices is correct.
19. The solution presented for the reader/writer problem uses two semaphores. What resources have their access controlled by these semaphores?
   a. the variable that indicates the number of active reader processes, and the variable that indicates the number of active writer processes
   b. the variable that indicates the number of active writer processes, and the shared object
   c. the variable that indicates the number of active reader processes, and the shared object

20. Assume there is a semaphore DB used to control access to the shared object in the reader/writer problem. Also assume there are four readers currently accessing the shared object. How many of those readers did a down operation on the DB semaphore to obtain their current access to the shared object?
   a. four
   b. one or none
   c. three

21. Assume there is a semaphore used to control access to the shared object in the reader/writer problem. Also assume five write operations have been performed on the shared object. How many successful down operations were performed by writer processes on the semaphore?
   a. exactly one
   b. at least two but no more than five
   c. five

22. The term batch processing historically refers to
   a. allowing one job to create additional jobs in batches.
   b. the processing of multiple system calls at the same time.
   c. the processing of a set of jobs that were all submitted as a group.

23. Batch processing today is most likely referred to as
   a. background processing.
   b. interactive processing.
   c. embedded processing.

24. Jobs processed in batches
   a. usually do not perform I/O on terminals or other interactive devices.
   b. are always run in the same order they were submitted.
   c. must all have been submitted from the same interactive terminal.

25. Interactive jobs
   a. utilize terminals, mice, and other devices designed for human input and output.
   b. are run one at a time in an arbitrary order.
   c. can use only text-mode devices, as opposed to devices capable of doing multimedia input/output.

26. Interactive processes
   a. are always started by batch processes.
   b. typically require timely response from the system after user input occurs.
   c. have little dependence on the speed with which their disk input/output is handled.

27. The term scheduling refers to
   a. all activities of a system associated with determining when various actions are to be performed.
   b. the processing of requests from processes in an order that is strictly the same as the order in which the requests were submitted.
   c. None of the other answer choices is correct.
28. If a typical process is executed several times with the same data
   a. it will produce output that is dependent on the number of times the same code is being executed; that is, how many processes are executing the same text editor, for example.
   b. it should execute exactly the same sequence of instructions.
   c. None of the other answer choices is correct.

29. Regardless of the number of processes being executed, or the code that processes are executing
   a. each process will receive the same amount of CPU time.
   b. each possible execution sequence of each process is finite.
   c. None of the other answer choices is correct.

30. The term *job scheduling* refers to
   a. the scheduling of a job, or sequence of individual sequential steps.
   b. the determination of when individual jobs are submitted to a pool, or queue, of jobs from which individual jobs may be selected for execution by the CPU.
   c. the detailed scheduling of the individual instructions of individual processes.

31. Job scheduling is done using
   a. the number of times the job has been run over the past several time intervals in which scheduling decisions are made.
   b. a special hardware device that estimates the length of time a process will take to execute.
   c. information about the resources required by the entire job, and the currently available system resources.

32. Which of the following would be characterized as *high-level scheduling*?
   a. thread scheduling
   b. job scheduling
   c. all of the above can be characterized as high-level scheduling.

33. Which of the following would be characterized as *low-level scheduling*?
   a. instruction scheduling
   b. job scheduling
   c. process scheduling

34. To what does the term *turnaround time* apply?
   a. the time at which a half-duplex communication line has the direction of communication changed.
   b. the time between submitting a non-interactive, or batch, job and receiving the results.
   c. None of the other answer choices is correct.

35. Which of the following is *not* a goal of scheduling?
   a. keep the CPU as idle as possible, reflecting effective use of the processor.
   b. process as many jobs in a given time period as possible.
   c. give each process a fair share of the processor time.

36. When preemptive scheduling is used
   a. a process can continue to use the processor as long as it wishes, or is capable of using it.
   b. a running process can have the CPU taken away from it, and it can be returned to the ready state.
   c. None of the other answer choices is correct.

37. The term *non-preemptive scheduling* is also called
   a. interactive scheduling.
   b. run-to-completion scheduling.
   c. priority scheduling.
38. A clock in a computer system operates by
   a. measuring the rate at which the CPU is executing processes.
   b. effectively sending what appears to be input from a terminal with a constant, but programmable,
      interval.
   c. providing periodic interrupts.

39. Which of the following actions might be taken each time the primary system clock ticks?
   a. The currently-running process is moved to the ready state and another process is selected for execution.
   b. If any actions are scheduled to occur at the current time, then steps are taken to start those actions.
   c. None of the other answer choices is correct.

40. Suppose there are only three processes in a system, and they are compute-bound (that is, they do no
    input/output at all). Assume the processes are using round-robin scheduling with a quantum size of 10
    milliseconds. Suppose each process needs 1 second (1000 milliseconds) of CPU time to complete its work.
   Ignoring the time required to switch the CPU between processes, after how long will the first process
    complete its work?
    a. 2980 milliseconds
    b. 3000 milliseconds
    c. 1020 milliseconds

41. The maximum amount of time a process may use the CPU before it is returned to the ready state in a
    round-robin system is called
    a. the clock period for the system.
    b. the quantum size of the process.
    c. the user limit for the system.

42. If the quantum size in a system is very small, then most of the time in the system is spent
    a. performing input/output.
    b. performing context switches between processes.
    c. executing the idle process.

43. If the quantum size in a system is very large,
    a. the CPU will spend most of its time in the idle state.
    b. the system effectively appears to be doing non-preemptive scheduling.
    c. a process will retain use of the CPU even while it is blocked.

44. In a system that uses priority scheduling
    a. it is not also possible to use round-robin scheduling.
    b. the process currently using the CPU is one of those that has the highest priority.
    c. None of the other answer choices is correct.

45. In a system that uses priority scheduling
    a. processes with the same priority can be run in a round-robin fashion.
    b. processes with the same priority are not allowed.
    c. None of the other answer choices is correct.

46. In a UNIX system, when a process blocks for an input/output operation,
    a. the system assumes it is I/O bound (that is, spending most of its time performing input/output), and
       its priority is increased.
    b. its priority is changed to the lowest of all ready processes.
    c. None of the other answer choices is correct.
47. Suppose a system is using the inverse remainder of quantum variant of round-robin scheduling. A process uses 30 percent of its quantum before blocking. When it is eventually returned to the ready queue,
   a. it is placed at the front of the ready queue.
   b. it is placed behind 30 percent of the processes in the ready queue, not at the rear.
   c. its priority is increased by 30 percent.

48. The batch scheduling algorithm called shortest job first always selects the job with the smallest execution time to run next. This has the result of
   a. always yielding the smallest average turnaround time of any job scheduling algorithm.
   b. yielding the smallest standard deviation of the job turnaround times of any job scheduling algorithm.
   c. None of the other answer choices is correct.

49. Since the shortest job first algorithm cannot be used directly on interactive processes, a variation called aging is used. In this algorithm
   a. the estimated execution time for a process is a weighted sum of the previous execution time estimate and the last execution time.
   b. the estimated execution times for all processes are adjusted based on the ratio of the last actual execution time divided by the average execution time of all processes.
   c. the estimated execution time for each process is increased by a fixed percentage each time the process enters the running state.

50. For many systems, the only criteria associated with the correct execution of a process is whether the process yields the correct results. Systems in which it is also required that actions be taken in a specified amount of time or at specified times are called
   a. priority-based systems.
   b. post-time systems.
   c. real-time systems.

51. A system in which failing to meet a deadline can result in total system failure or death is
   a. called a distributed system.
   b. called a hard real-time system.
   c. permitted only if multiple processors are available.

52. Suppose a real-time system is going to process only two types of events. The first type of event occurs once every 10 milliseconds and requires 4 milliseconds of CPU time to process. The second event occurs once every 20 milliseconds. What is the most CPU time each 20-millisecond event can require if the system is to be considered schedulable?
   a. 12 milliseconds
   b. 10 milliseconds
   c. 14 milliseconds

53. In the rate-monotonic scheduling algorithm
   a. the system runs the process that has the greatest time before it must begin execution in order to meet its deadline.
   b. each process gets a priority that is proportional to the frequency of occurrence of its triggering event.
   c. each process gets a priority that is inversely proportional to the frequency of occurrence of its triggering event.

54. The term swapping describes a system that
   a. handles both real-time and non-real-time processes.
   b. moves the memory content of processes between primary memory and secondary storage if insufficient memory is available.
   c. None of the other answer choices is correct.
55. Which of the following statements regarding the terms *policy* and *mechanism* is correct?
   a. A policy is a set of rules, or parameters associated with a set of rules, that are implemented using the available mechanisms in a system.
   b. Policies are rules governing which mechanisms may be used in implementing a particular system.
   c. None of the other answer choices is correct.