Chapter 4

Multiple Choice

1. Pthreads refers to ____.
A) the Windows standard.
B) an implementation for thread behavior.
C) a specification for thread behavior.
D) an API for process creation and synchronization.

2. The ____ multithreading model multiplexes many user-level threads to a smaller or equal number of kernel threads.
A) many-to-one model
B) one-to-one model
C) many-to-many model
D) many-to-some model

3. Cancellation points are associated with ____ cancellation.
A) asynchronous
B) deferred
C) synchronous
D) non-deferred

4. Which of the following would be an acceptable signal handling scheme for a multithreaded program?
A) Deliver the signal to the thread to which the signal applies.
B) Deliver the signal to every thread in the process.
C) Deliver the signal to only certain threads in the process.
D) All of the above

5. Thread-local storage is data that ____.
A) is not associated with any process
B) has been modified by the thread, but not yet updated to the parent process
C) is generated by the thread independent of the thread's process
D) is unique to each thread

6. Windows uses the ____.
A) one-to-one model
B) many-to-one model
C) one-to many-model
D) many-to-many model

7. _____ is not considered a challenge when designing applications for multicore systems.
A) Deciding which activities can be run in parallel
B) Ensuring there is a sufficient number of cores

C) Determining if data can be separated so that it is accessed on separate cores
D) Identifying data dependencies between tasks.

8. A ____ provides an API for creating and managing threads.
A) set of system calls
B) multicore system
C) thread library
D) multithreading model

9. The _____ model maps many user-level threads to one kernel thread.
A) many-to-many
B) two-level
C) one-to-one
D) many-to-one

10. The _____ model maps each user-level thread to one kernel thread.
A) many-to-many
B) two-level
C) one-to-one
D) many-to-one

11. In Pthreads, a parent uses the pthread_join() function to wait for its child thread to complete. What is the equivalent function in Win32?
A) win32_join()
B) wait()
C) WaitForSingleObject()
D) join()

12. A _____ uses an existing thread — rather than creating a new one — to complete a task.
A) lightweight process
B) thread pool
C) scheduler activation
D) asynchronous procedure call

13. According to Amdahl's Law, what is the speedup gain for an application that is 60% parallel and we run it on a machine with 4 processing cores?
A) 1.82
B) .7
C) .55
D) 1.43

14. _____ involves distributing tasks across multiple computing cores.
A) Concurrency
B) Task parallelism
C) Data parallelism
D) Parallelism

15. _____ is a formula that identifies potential performance gains from adding additional computing cores to an application that has a parallel and serial component.
A) Task parallelism
B) Data parallelism
C) Data splitting
D) Amdahl's Law

16. When OpenMP encounters the #pragma omp parallel directive, it
A) constructs a parallel region
B) creates a new thread
C) creates as many threads as there are processing cores
D) parallelizes for loops

17. Grand Central Dispatch handles blocks by
A) placing them on a dispatch queue
B) creating a new thread
C) placing them on a dispatch stack
D) constructing a parallel region

True/False

18. A traditional (or heavyweight) process has a single thread of control.

19. A thread is composed of a thread ID, program counter, register set, and heap.

20. Virtually all contemporary operating systems support kernel threads.

21. Linux distinguishes between processes and threads.

22. Each thread has its own register set and stack.

23. Deferred cancellation is preferred over asynchronous cancellation.

24. It is possible to create a thread library without any kernel-level support.

25. It is possible to have concurrency without parallelism.

26. OpenMP only works for C, C++, and Fortran programs.

27. The trend in developing parallel applications is to use implicit threading.

28. Task parallelism distributes threads and data across multiple computing cores.