Multi-threading Models: User, Kernel, and Combined Threads Quiz

1. What is the primary characteristic of user threads?

- ☐ A) Managed by the operating system kernel
- ☐ B) Managed entirely by the application using a thread library
- ☐ C) Managed through both the kernel and the application
- ☐ D) Non-blocking system calls are used by default

2. What is a major disadvantage of user threads?

- ☐ A) They have high context switching overhead.
- ☐ B) User threads can only run on multi-core systems.
- ☐ C) If one thread blocks, the entire process is blocked.
- ☐ D) They cannot communicate with other threads within the same process.

3. How do kernel threads differ from user threads in terms of blocking?

- ☐ A) Kernel threads block the entire process when one thread is blocked.
- ☐ B) Kernel threads do not block other threads in the process if one thread is blocked.
- ☐ C) Kernel threads never block.
- ☐ D) Kernel threads are always faster than user threads.

4. What is a key advantage of using kernel threads?

- ☐ A) They are faster to create than user threads.
- ☐ B) They can be used on systems with only a single processor.
- ☐ C) They allow threads to run on different CPUs in multi-processor systems.
- ☐ D) They have lower context switching overhead than user threads.

5. Which threading model allows threads to map to multiple kernel threads?

- ☐ A) Many-to-one
- ☐ B) One-to-one
- ☐ C) Many-to-many
- ☐ D) One-to-many

6. Which system call is used to create a new thread in the POSIX thread library?

- ☐ A) `Pthread_exit`
- ☐ B) `Pthread_create`
- ☐ C) `Pthread_join`
- ☐ D) `Pthread_yield`

7. In a many-to-one threading model, how are user threads mapped to kernel threads?

- ☐ A) One user thread maps to multiple kernel threads.
- ☐ B) Multiple user threads map to a single kernel thread.
- ☐ C) One user thread maps directly to one kernel thread.
- ☐ D) All user threads map to all kernel threads.

8. How does the SELECT system call improve thread execution efficiency?

- ☐ A) It prevents blocking by avoiding page faults.
- ☐ B) It predicts whether a subsequent operation, such as `READ`, would block.
- ☐ C) It increases the number of kernel threads available to a process.
- ☐ D) It speeds up context switching between user threads.

9. What happens when a page fault occurs within a multi-threaded process?

- ☐ A) Only the thread that caused the page fault is blocked.
- ☐ B) The entire process is blocked, even if other threads could continue.
- ☐ C) The system immediately terminates the thread causing the fault.
- ☐ D) The fault is ignored, and the thread continues execution.

10. What is the purpose of wrapper code in thread management?

- ☐ A) To handle errors in thread creation.
- ☐ B) To manage thread execution before and after a system call.
- ☐ C) To create threads faster.
- ☐ D) To terminate threads that are no longer needed.

11. What is the main disadvantage of using kernel threads compared to user threads?

- ☐ A) Kernel threads are slower to create and manage.
- ☐ B) Kernel threads cannot use multiple CPUs.
- ☐ C) Kernel threads do not allow blocking calls.
- ☐ D) Kernel threads are less efficient at managing resources.

12. Which threading model offers the most flexibility for utilizing multi-core processors?

- ☐ A) Many-to-one model
- ☐ B) One-to-one model
- ☐ C) Many-to-many model
- ☐ D) User-level threading only

13. What system feature helps prevent global blocking in kernel threads?

- ☐ A) Thread library management
- ☐ B) Non-blocking system calls
- ☐ C) Kernel-level scheduling
- ☐ D) Predictive thread state management

14. Which of the following is not a feature of user threads?

- ☐ A) Faster context switching than kernel threads
- ☐ B) Managed by the operating system kernel
- ☐ C) Portable across different platforms
- ☐ D) Prone to global blocking during I/O operations

15. What is the major benefit of the combined threading model?

- ☐ A) It eliminates the need for kernel threads.
- ☐ B) It balances the fast context switching of user threads with the multi-processing capabilities of kernel threads.
- ☐ C) It allows more user threads to be created than kernel threads.
- ☐ D) It uses less memory than user or kernel threads.

Answers:

1. B
2. C
3. B
4. C
5. C
6. B
7. B
8. B
9. B
10. B

11. A

12. C

13. C

14. B

15. B