MULTITHREADING CONCEPTS PUZZLE

Multiple-Choice Quiz

1. **Which of the following is used to ensure that only one thread accesses a critical section of code at a time?**

   - A. Semaphore
   - B. Mutex
   - C. Monitor
   - D. Barrier

2. **What is the main cause of a race condition?**

   - A. Deadlock
   - B. Concurrent access to shared resources
   - C. Thread starvation
   - D. Resource exhaustion

3. **Which technique involves managing threads to prevent deadlock by ensuring they acquire resources in a specific order?**

   - A. Resource Allocation Graph
   - B. Lock Ordering
   - C. Wait-Die Scheme
   - D. Priority Scheduling

4. **What is the purpose of a semaphore in multithreading?**

   - A. To signal a thread to stop
   - B. To manage mutual exclusion
   - C. To control access to a shared resource
   - D. To create new threads

5. **In which scenario is using a thread pool advantageous?**

   - A. When you need to handle a small number of tasks sequentially
   - B. When tasks are long-running and require a lot of memory
   - C. When you have a large number of short-lived tasks
   - D. When tasks are dependent on each other

Thread Scheduling Puzzle

Instructions:

Consider a scheduler that uses a round-robin approach to schedule threads. Each thread gets a fixed time slice to run before the scheduler switches to the next thread.

Questions:

1. If you have 4 threads and each time slice is 10 milliseconds, how long will it take for each thread to get one full turn if there are no other factors affecting scheduling?
2. How does a round-robin scheduling approach differ from a priority-based scheduling approach?
3. What are some advantages and disadvantages of using round-robin scheduling in a multithreaded environment?