##### Operating System Design

Homework:

* Operating System Review 2

Chapter 5 to 7

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| **NAME:** |
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# Questions

1. Explain the difference between preemptive and nonpreemptive scheduling.
2. Which of the following scheduling algorithms could result in starvation?
   1. First-come, first-served
   2. Shortest job first with preemption
   3. Shortest job first with no preemption
   4. Round robin
   5. Priority

1. Explain the differences in how much the following scheduling algorithms discriminate in favor of short processes over long processes:
2. FCFS
3. RR
4. Multilevel feedback queues
5. The following pairs of scheduling algorithms have similarities when additional criterias are applied. Describe how one algorithms is actually a subset of the other algorithm.

FCFS (with preemption) and RR scheduling algorithms:

HINT: Consider quantum and real-time clock is used for preemption.

Shortest Job First and Priority scheduling algorithms:

HINT: Consider the length of the CPU burst time as a priority and preemption.

1. Describe the critical section problem that occurs on multi-processor or multi-core computer systems. What is a solution for the critical section problem?
2. Linux implement multiple locking mechanisms. Describe the circumstances under which they use spinlocks, mutexes, and semaphores.
3. What is the meaning of the term *busy waiting*? What other kinds of waiting are there in an operating system? Can *busy waiting* be avoided altogether? Explain your answer.
4. A possible method for preventing deadlocks is to have a single, higher order resource that must be requested before any other resource. For example, if multiple threads attempt to access the synchronization objects A,B,C,D,and E, deadlock is possible (such synchronization objects maybe mutexes, semaphores, or condition variables). We can prevent the deadlock by adding a sixth object F. Whenever a thread wants to acquire the synchronization lock for any object A, B, C, D, and E, it must first acquire the lock for object F.This solution is known as containment: the locks for objects A, B, C, D, and E are contained within the lock for object F. Compare this scheme with the circular-wait scheme.

1. Is it possible to have a deadlock involving only a single process? Explain your answer.
2. Describe Priority Inversion and describe a technique that can be used to resolve Priority Inversion?

1. Describe the methods that an Operating System can use to handle Deadlock condition in a process. Which method is generally used to handle Deadlock?