Problem Set 11

CS 311

Due at the beginning of class the following Monday in hardcopy.
Sections 5.7–9

1. Discuss the tradeoff between fairness and throughput of operations in the readers-writers problem. Propose a method for solving the readers-writers problem without causing starvation.

2. How does the `signal()` operation associated with monitors and condition variables differ from the corresponding operation defined for semaphores?

3. Write pseudo code for a monitor with condition variables that implements an alarm clock that enables a calling process to delay itself for a specified number of time units (ticks). You may assume the existence of a real hardware clock that invokes a `tick()` function in your monitor at one tick intervals. You may also assume the existence of a `read_clock()` syscall that returns current time in units of ticks. Finally, in addition to the typical `signal()` condition variable method, you may assume a `broadcast()` condition variable method that wakes every process waiting on the condition variable. You may not assume the existence of a timed `wait()`, `sleep()`, or any similar syscall.