CS 460 Programming Language Design

Midterm Exam 03/10/15

REVIEW QUESTIONS

(closed book, closed note)

Student Name: ……..

1. How does an OS get started?

2. How can the CPU give the control back to the Kernel?

3. What happens if we don't have user and kernel modes?

4. How does a program in user mode invoke operations in kernel mode?

5. Draw and describe roles of each component in the address space of a process?

6. Thread versus process, kernel-level vs. user-level threads

7. Memory-footprint (address space) for two kernel-level threads versus two user-level threads

8. What is the difference between preemptive and non-preemptive scheduling?

9. What causes the scheduler to run?

10. Execution models
    a. CPU-bound vs. I/O bound

11. Scheduling goals

12. FCFS, RR, SJF, SRTF, Priority-based, Multi-queue

13. Avoid starvation
    a. Aging
    b. Lottery
    c. Promotion/demotion techniques

14. Hyper threading

15. Sharing -> critical section
    a. Mutual exclusion
    b. Progress (overall)
    c. Bounded waiting (individual)

16. Lock, pros and cons of each implentation
    a. Disable interrupt
    b. Test-and-set
    c. Spinning lock
    d. Blocking lock -> queue (semaphore)

17. Semaphore
    a. Binary semaphore – lock
    b. Mutual exclusion + ordering

18. Monitor/conditional variable
    a. More than data, block of code to be mutually excluded
    b. Allow waiting within monitor
        i. Wait/notify/notifyall

19. Solving classic synchronization problems (more next lecture)
20. Apply to solve specific problems in scheduling/synchronization (more next lecture)