CS 314 Operating Systems, Spring 2017
Quiz #3 on February 2, 2017

List of the possible questions

#1: What is “monolithic structure OS” (define the one)? Mention at least one primary advantage and disadvantage.

#2: What is “layered (or modularized) structure OS” (define the one)? Mention at least one primary advantage and disadvantage.

#3: What is “Virtual Machine” (define the concept)?

#4: What is the primary motivation(s) to use VM’s?

#5: Sketch how VM is implemented in memory.

#6: Look up the meaning of the following word using your textbook: “OS kernel”.

#7: Many operating systems use “external commands”. What are they? What is the primary reason to adopt them? What is the primary difference between “external commands” and “micro-kernel architecture”?

#8: Describe how “micro-kernel architecture” and “non micro-kernel architecture” are different in how system calls issued by user applications will be executed.

#9: What are the advantages in using “micro-kernel architecture”? What is the primary disadvantage in “micro-kernel architecture”?

#10: What are the two processor modes operating systems set?

#11: What is “kernel (system) mode” of a processor?

#12: What are “system calls”?

#13: What is “user mode” of a processor?

#14: Why do operating systems have two processor modes (what problems will happen if there is no “user mode” – all programs run in the kernel (system) mode)?

#15: What is “race condition”?

#16: How can “race condition” happen? Show “how” using an example.

#17: What is “critical section”?
#18: What is “mutual exclusion”?

#19: What does “atomic” in “atomic operations” mean?

#20: What is “a binary (or mutex) semaphore”?

#21: What are the two primary system calls for manipulating a semaphore?

#22: explain how a semaphore can prevent race condition.

#23: What are the two operations of a semaphore (just name them)?

#24: What “wait” system call to a semaphore exactly performs?

#25: What “signal” system call to a semaphore exactly performs?

#26: Why are the two system calls for semaphores (“wait” and “signal”) must be atomic operations (explain the reason)?

#27: What are “counting semaphores” (how are “counting semaphores” different from “binary (mutex) semaphores”)?

#28: Who manages semaphores?

#29: Operating systems use “queue (FIFO data structure)” for managing processes blocked on a semaphore. Why is FIFO-queue used (the best reason for using FIFO structure)?