CS 314-002 Operating Systems
Fall 2018
Quiz #2 (SOLUTIONS) on September 5, 2018

Your Last Three Digits: ________________
(please do NOT write all of your student ID or your name)

Grade: ______

************************************************************

(1) Describe how processes differ from programs by mentioning at least three differences between them.

① Their locations: programs are found in storage devices (mostly in hard drives), while processes are usually found in the main memory.

② Their internal components: each program mainly consists of “program codes”, which are binary machine codes, while each process consists of program codes and its necessary extra data space, such as heap and stack areas.

③ State-less vs. state-full: programs are static (they do not change as time goes) and therefore, each program is not associated with its own state (“state-less”). Processes are dynamic.

Note: other solutions are possible.

(2) Mention at least five different information contained in a PCB (you do not have to describe them).

I. Those that are used for identifying each process:
   • Process ID
   • The name of the program a process originated
   • The memory address (where in the memory this process is loaded)
   • User ID (UID)

II. Those that are used for managing each process
   • Processor time (the total processor time used by this process)
   • Memory space currently allocated (the amount of the memory)
   • Execution priority
   • The current short-term state (ready, running or blocked) of this process

Other solutions are possible.
(3) What is “the medium-term process scheduling”?

The medium-term process scheduling controls (by removing some processes under the short-term scheduler to the blocked state in the long-term scheduler) the degree of the multitasking to make sure that a computer system does not load too many processes to its memory at a time to prevent context-switching dominate the processor power.

(4) What is “Blocked” state in “the short-term process scheduling”?

The blocked state in the short term scheduler is the state for the processes that have been started and executed, but those that are currently waiting for some event (such as inputs from keyboard and hard drive or output to a printer).

(5) Show a sketch of the integration of the short-term, medium-term, and long-term process scheduling as a directed state-transition diagram.