CS314 Operating Systems
Spring 2024
Exercise Questions on February 22nd, 2024

EXERCISE #1

For the following questions, answer by TRUE or FALSE (except for Question (10)). You do not have to attach any explanation to your solutions for these questions (including Question (10)).

(1) If a processor has instructions to disable and enable any interrupts and if processes running in the USER MODE could disable and enable all interrupts using the instructions, such as hardware and software interrupts, we do not need mutex semaphores to avoid race conditions.

[TRUE   FALSE]

(2) Threads improve (reduce) the inter-process communication overhead by switching TCBs, instead of switching PCBs.

[TURE   FALSE]

(3) For batch systems, FCFS and SJF scheduling algorithm can be used, while RR and SRTF should not be used.

[TRUE   FALSE]

(4) Printer spooling is a technique that improves process execution time in "batch system".

[TURE   FALSE]

(5) Thrashing is caused by short-term process scheduling algorithms, mainly when they perform poor scheduling decisions (i.e., they did not select the best process to be executed next).

[TRUE   FALSE]

(6) If process starvation happen (using semaphore(s)), process deadlock will eventually happen.

[TURE   FALSE]

(7) Suppose a system where processes progress as they interact with many I/O devices. If we compare the batch systems and multitasking operating systems, batch systems will be faster in executing all the programs submitted (let us assume that many programs are submitted by a human user for execution) since batch systems will not perform as many context switching as multitasking operating systems do.

[TRUE   FASLE]

(8) SJF process scheduling algorithm can be as good as SRTF in terms of throughput, but SJF can never be better than SRTF in terms of throughput.

[TRUE   FASLE]

(9) Critical section is a part of a program where context-switching should never happen.

[TRUE   FASLE]

(10) **A multiple-choice question**: For some short-term process scheduling algorithms, the performance of the algorithms also depends on their configuration. For example, the most important tuning parameter for the round-robin algorithm is the processor time slice. If the processor time slice for RR algorithm is set too long (relative to the execution time for average processes), the RR algorithm will behave similarly to one of the following other short-term process scheduling algorithms. Which one is it (select the one that behaves most similarly to the RR algorithm)?

      (a) FIFO

      (b) SJF

      (c) SRTF