Computer Operating Systems

Problem #1

Answer the following questions about process and thread:

a. Why might threads be particularly useful in writing an application such as a web browser with multiple tabs?

b. What process resources are associated with each thread that it does not share with other threads?

c. How can a process with multiple threads execute more efficiently on a multicore processor?

Problem #2

The four conditions that characterize deadlock are mutual exclusion, no preemption, hold and wait, and circular wait.

a) If the system is deadlocked, will all four of these conditions hold? Answer Yes or No, and then explain.

b) If all four of these conditions hold, will the system always be deadlocked if there are single instances of all resources? Answer Yes or No, and then explain.

c) If all four of these conditions hold, will the system always be deadlocked if there are multiple instances of all resources? Answer Yes or No, and then explain.

Problem #3

Consider the Optimal page replacement algorithm and the Least-Recently-Used page replacement algorithm.

a) What page/frame does the Optimal page replacement algorithm replace?

b) What page/frame does the Least-Recently-Used page replacement algorithm replace?

c) Why is the Least-Recently-Used page replacement algorithm generally considering a good approximation of the Optimal page replacement algorithm?