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 <u>does not share</u> 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 <u>single</u> 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 <u>multiple</u> 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?