

Problem Set 7

CS 311

Due at the beginning of class the following Monday in hardcopy.
Sections 4.1–3

1. Which of the following components of program state are shared across threads in a multi-threaded process?
 - (a) Register values
 - (b) Heap memory
 - (c) Global variables
 - (d) Stack memory
2. In Chapter 3, we discussed Google’s Chrome browser and its practice of opening each new website in a separate process. Would the same benefits have been achieved if instead Chrome had been designed to open each new website in a separate thread? Explain.
3. A system with two dual-core processors has four processors available for scheduling. A CPU-intensive application is running on this system. All input is performed at program start-up, when a single file must be opened. Similarly, all output is performed just before the program terminates, when the program results must be written to a single file. Between start-up and termination, the program is entirely CPU-bound. Your task is to improve the performance of this application by multithreading it. The application runs on a system that uses the one-to-one threading model (each user thread maps to a kernel thread).
 - How many threads will you create to perform the input and output? Explain.
 - How many threads will you create for the CPU-intensive portion of the application. Explain.