Problem Set 3.2

CS 311

Due Feb. 17, 2014

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

1. Which of the following components of program state are shared across threads in a multithreaded 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.