CSE 7343 - Operating Systems and System Software

Assignment #4 Due Date: 3/5/2009

Text Book Problems

Answer review questions (optional): 9.5, 9.11, 10.2, 10.8, 11.3, 12.11 Solve problems: 9.1, 9.11, 10.1, 11.8/11.9 (the reference in the problem is to problem 11.7 and not to 11.9), 12.1

Programming Assignment: The fair Barbershop

Appendix A.3 (pp 758ff) in the textbook introduces the barbershop problem.

- a) Implement the fair barbershop solution (pseudocode on p. 760 and as a download on the course web site) using threads and semaphores. Replace the function calls not related to mutual exclusion (e.g., *enter_shop()*) by messages printed with *printf()* (don't forget to use *fflush(stdout)* after each print so you see the unbuffered output right away). *Enqueue1()/dequeue1()* is used to communicate the customer number to the barber. You can use a simplified version of the bounded-buffer producer/consumer solution from the textbook.
- b) Use comments in the program so it is clear what the function of each semaphore is.
- c) Solve problem A.5 in the appendix's problems section (p 764) and implement fixes.

Note:

- Semaphores cannot be initialized in the declaration, they have to be initialized with *sem_init()*.
- Maybe *sem_getvalue()* can be useful.
- To finish your program in a clean way, wait for all customer threads to finish and then cancel the barbers and the cashier. Also destroy all used semaphores to prevent memory leaks.
- *True* is not a defined value in C!