CSE 7343 - Operating Systems and System Software

Assignment #3
Due Date: 2/19/2009

Text Book Problems

Answer review questions (optional): 7.2, 7.6, 7.9, 8.3, 8.7, 8.10
Solve problems: 7.7, 7.11, 8.2, 8.6

Programming Assignment: Multithreaded application
(requires mutual exclusion)

Implement the multiple producer-consumer problem as a multithreaded application. The main thread opens `produced.txt` for reading, and `consumed.txt` for writing. Next, it creates two producer and two consumer threads. The two producers read characters from `produced.txt` and write them to a shared bounded-buffer area with a predefined buffer size. The two consumers read the characters from the shared buffer and write them to `consumed.txt`. Use mutual exclusion (semaphores or mutex and condition variables) to make sure that the order of characters in `consumed.txt` is exactly the same as in `produced.txt`.
The main thread terminates the producers when all characters are read from `produced.txt` and put into the buffer and It will terminate the consumers when the producers are terminated and the buffer is empty.

Required: You have to use POSIX Pthread library.

Helpful URLs:
- http://www.csc.villanova.edu/~mdamian/threads/posixsem.html (POSIX Semaphores)
- http://users.actcom.co.il/~choo/lupg/tutorials/handling-files/handling-files.html (File handling)
- http://www.elook.org/programming/c/putc.html (Reading/writing characters)
- https://computing.llnl.gov/tutorials/pthreads/ (Pthreads)
- http://users.actcom.co.il/~choo/lupg/tutorials/multi-thread/multi-thread.html (Pthreads)