CS39002: Operating Systems Lab
Spring 2013

Assignment 2
Due: February 5, 2013, 1 pm

Consider a file containing a maximum of 100 student records. The record for each student is kept in one line in the file and contains the following, seperated by one or more spaces: First_name (ascii string, one word with no spaces in between, max. 20 characters), Last_Name (ascii string, one word with no spaces in between, max 20 charaters), Roll_No (integer), CGPA (float). Roll no. is unique for a student, but others may be the same for two students.

A process X, when started, first loads all the records in shared memory from a file whose name is passed to it as a command line argument. It then goes to sleep, waking up periodically (say every 5 seconds) to check if any of the data have been modified (how will it know that?). If yes, it writes the entire content of the shared memory back to the file. The process X runs forever.

Any number of other processes can query and update the data by reading/writing the shared memory. Specifically, a querying process Y is allowed to do the following operations on the data:

- Search for a student record by roll no. (should show all data for that student)
- Update the CGPA of a particular student (the student is identified by the roll no., which is unique for each student)
- Exit

The process Y will keep on doing the above two in a loop until the exit option is chosen. Note that any number of copies of Y can be started at one time (think of this as multiple people searching/updating student records at the same time). Also, the following criterions must be ensured:

- If any copy of Y is started before X is started, it should wait for X to be started first.
- Only X should create and initialize all necessary shared memory.

Write two C programs, X.c for the process X and Y.c for the process Y. Your programs must be well-commented to make it easier for anyone to understand what semaphores you are using and how they are used.

Submit the files X.c and Y.c.