Homework Assignment: Process and IPC

(Due October 10th, 2005 before 11:59 pm)

1. Compile and run program *share.c* (available from /home/fac/witty/share directory in CSE). Notice that the result you see is not as expected. This is due to the race condition as the shared variable is accessed simultaneously by multiple threads. You are asked to fix the race conditions by using a spin-lock mechanism (hint: check function *pthread_mutex_trylo*ck and *pthread_mutex_unlock* in *cse.unl.edu*). As we have shown in class, the number of S*haredCounter* is very different than the expected value if the threads were to run in serialized fashion. I want you to set the number of threads to 16 and the maximum loop count to 1,000,000. The new program you will create will be name *share_lock.c*. Make sure you run your new program at least 10 times and each time the value of the *SharedCounter* is 0. NOTICE: you must use the following command to compile the sample program (*share.c*):

   gcc share.c –lpthread –o share

2. Based on program *share.c* (available from share directory), you are asked to fix the race conditions by using semaphores (hint: check function *pthread_mutex_lock* and *pthread_mutex_unlock* in *cse.unl.edu*). As we have shown in class, the number of S*haredCounter* is very different than the expected value if the threads were to run in serialized fashion. I want you to set the number of threads to 16 and the maximum loop count to 1,000,000. The new program you will create will be name *share_mutex.c*. Make sure you run your new program at least 10 times and each time the value of the *SharedCounter* is 0.

IMPORTANT
Both questions MUST be done on either OSAGE.UNL.EDU or CSE.UNL.EDU.

Submission procedure:

1. In your cse or osage account, create a directory called *hw2_lastname* (e.g. if your lastname is Smith then the directory will be *hw1_smith*).
2. Place *share_lock.c* and *share_mutex.c* into this directory.
3. Go one-level up from this directory and run the following command:
   tar –cvf *hw2_lastname.tar hw2_lastname*
4. submit *hw2_lastname.tar* through *handin* before the deadline.