CSCI 3232 Systems Software Assignment 8

Upload all your files to the dropbox in Folio before the deadline --- **11:30PM Apr 23, Sunday, 2017.**

**Note: Do not start to attempt this homework until you have practiced and understood all sample codes in slides and Folio’s example codes.**

1. Write a C or C++ program that accepts one command line string parameter. Use the ***fork*** function to produce two processes. In the child process print out the lower case version of the string. In the parent process print out the upper case version of the string. You can call the toupper and tolower functions in the header <ctype.h> if you wish. Specify in the output whether the parent or child process is printing. (20 points)
2. Follow the example programs unix\_pipe.c and shm-posix-combined.c to write **two** versions (pipe version and shared memory version) of an interprocess communication program in C or C++. Each version should create two processes using ***fork***. One of them (the sender process) should send four intergers a,b,c,d (that are interpreted as the coordinates of two points A,B in the plane A(a,b) and B(c,d)) to the other (the receiver process). The sending process should print out the coordinates of the two points A(a,b) and B(c,d). The receiving process should print out the Manhattan distance between the two points A(a,b) and B(c,d). Refer to *https://en.wiktionary.org/wiki/Manhattan\_distance* for the definition of Manhattan distance d(A,B)=|a-c|+|b-d|. (30 points)
3. Write a single makefile to compile your programs in 1 and 2. (5 points)
4. Determine the ordering result of the four processes using the shortest-remaining-time-first scheduling algorithm by drawing a Gantt chart for the scheduling result. (25 points)

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| Process | Arrival Time | Burst Time |
| P1 | 0 | 14 |
| P2 | 2 | 11 |
| P3 | 4 | 8 |
| P4 | 6 | 20 |

1. Suppose we have a queue of three processes P1, P2, P3 with burst time 7, 5, 3 respectively. Suppose a scheduler uses the Round Robin algorithm to schedule these three processes with time quantum 4. What is the turnaround time of P1, P2, P3 respectively? (20 points)