QUIZ 8 – Concurrent Programming

Write C code for each of the questions below.

Q1. Please see example of Master-Slave implementation slide 33 in Process Management PDF (attached). Instead of using processes to perform addition of two numbers each from command line arguments, you need to implement the same with thread functions and return the sum to main function to printed in main.

Q2. Lets assume that you need to sort 100 random numbers. Assume that you have 4 cores/processors in the computer so you can create 4 threads to take advantage of all the cores you have avaiable and sort 25 numbers in each thread. Write C code to do to have 4 threads call sorting function to sort 1-25, 26-50, 51-75 and 76-100 indexed numbers respectively. You do not have to implement this part but once you have all 4 parts of 25 numbers sorted you can use merge algorith from mergesort to create a a single sorted array of 100 numbers.

Q3. Assuming that at random time between 1 to 5 seconds a parent generates data and sends to child process through pipe. Similarly child also generated data at random time of 1 to 5 seconds and sends to parent (you can use two text files with several lines; one for parent to sent to child the other for child to send to parent). Because reading from pipe is a blocking opeartion, it should be done in a seperate thread function while main process thread does the writing every 1 to 5 secs.

Q4. A child process uses two pipes to send data to parent. A child process has 6 threads. Thread 1, 2 and 3 will send data to parent process using the first pipe and thread 4, 5 and 6 will use second pipe. You need to ensure using semaphore that at a time first pipe can be used only by one of the three threads 1, 2 or 3. Similarly, second pipe can be used only by one of three threads 4, 5 or 6.