CIS 345/545 – Homework 4

Write and run a C program on Linux that creates four new processes: A, B, C, and D. When the original process creates the new processes, it passes them all the same pipe that they can use to send data to the original process, which will serve as a logging process, displaying each line it receives along with a time stamp. A pipeline is to exist between A and B, another between B and C, and another between B and D. Including the shared pipe back to the logging process and these three pipes (A-B, B-C, B-D) there are a total of four pipes.

Process A generates 10 records consisting of the letter C or D (picked at random for each record) along with the record number (1 byte ASCII) issued sequentially from 0 to 9 and sends it to process B. Process A also sends a log message something like: **A sent process B 'D1'** to the logging process.

Process B reads from the pipe connecting it to A. For each record it reads, it will send it to the process indicated by the first character, along with sending an appropriate log message to the logging process. For example, if it receives a message containing 'C2', it sends the message to process C and sends a log message like **B sent process C 'C2'**. After sending the logging message, **process B waits 1 second**.

Process C reads its pipe and for each message received it sends the logging process a proper message.

Process D reads its pipe and for each message received it sends the logging process an appropriate message. **Process D then waits 5 seconds** after every time it receives a message.

The logging process should terminate when it receives 30 messages, which is 10 messages from A to B, a total of 10 messages from either B to C or B to D, and then a total of 10 more messages from either C or D indicating receipt. Implement some way to terminate the other processes at appropriate times.

Put all your code into a single source file. Turn in a listing of that file along with a script recording the execution of your program. **Also, turn in answers to the following two questions**:

- Analyze and discuss the order and timing of events shown in the log display.
- Is there any clear evidence of independent processes being executed?