ECT362 Homework #4

This assignment looks at how interprocess communications (IPC) can be used to provide mutual exclusion among concurrent Linux processes. The problem to be solved is a variant of the producer consumer problem, first posed by Dijkstra. Consider a producer which is responsible for gathering data about up to the minute stock prices at the stock market to create a ticker as shown in Figure 1. Also consider a consumer which gets the stock information from the producer via the ticker. The stock market ticker is a critical resource in which only one producer or consumer may access at a time. Likewise, care must be taken to ensure that the consumer does not try to consume ticker information before it exists.

Create a design for a producer and consumer process that share information using an anonymous pipe for communications. Use the code examples shown in class from LSN 13 as a starting point in your design. The producer process is responsible for obtaining randomly generated 4-character stock symbols, their associated randomly generated valuations in the form "XXX.XX" and change amount showing either positive or negative change in the form "±XX.XX". The consumer process is responsible for retrieving the stock information from the anonymous pipe. The output of the code must indicate all interactions with the shared ticker and the nature and element of the interaction (produces X / consumes Y). Your program should run for a user determined amount of time which is to be read in as a command line argument (you will want to use the *time()* function).

Full credit for this assignment will be based upon a concise PowerPoint presentation that includes five things: the problem statement clearly explained, a diagram representing the structural design of the system, a flowchart documenting the functional design of the software program, the analysis method and results and the fully commented code. The selection process of the storage mechanism(s) used for the ticker information (symbol, value and change) and the design of the timer controlled program termination must be described. Additionally, it must be described how the Linux pipe mechanism is able to provide mutual exclusive use of the ticker.

Figure 1: Stock market ticker information