Homework Exercise #2
Due: October 1, 2009

1. This question considers two models of distributed systems. In both models, there are n asynchronous processes (numbered 1 to n) and there are no failures.

In Model A, processes communicate using shared atomic single-bit registers. Each register can hold a single bit (0 or 1) and is initialized with the value 0. There is an infinite supply of registers.

In Model B, processes communicate by sending messages. Each message contains a bit string of finite length, but there is no upper bound on the length of messages allowed. Between each pair of processes, there is a reliable FIFO message channel (in each direction). In other words, all messages a process P sends to another process Q are eventually delivered to Q in the order they were sent. However, there is no upper bound on the time required for a particular message to arrive at its receiver.

Show that model A is at least as strong as model B.