

**Spring Semester, 2007**

PROBLEM #2

**Due Date:** Tuesday, February 27

In a network which is a chain of  $n$  processors  $p_1, p_2, \dots, p_n$ , Fan and Lynch show that the worst case clock skew between neighbors depends on the size of  $n$ , even though the distance between them is 1! Consider the following algorithm:

At real time  $t$ , neighboring nodes  $p_i$  and  $p_{i+1}$  send their local times  $L_i(t)$  and  $L_{i+1}(t)$  to each other. When they receive the message, each node sets its clock to the larger of its own clock value and the received timestamp.

**Prove that at real time  $t + 1$ , the local clocks of  $p_i$  and  $p_{i+1}$  differ by at most 1. Argue why this does not contradict the lower bound by Fan and Lynch.**