Problem Set 4, Part a

Due: Thursday, October 30, 2003

Reading:

Self-Stabilization, Chapter 6.
Distributed Algorithms, Chapter 15.5 and 16.

Reading for next week:

Chapter 18
Mattern paper
Chapter 19
Chapter 9 (skim)
Sections 10.1-10.5

Problems:

1. Complete the proof of the impossibility for constant number of states self-stabilizing clock synchronization in an undirected ring communication topology.
   The proof from the book is attached. If you downloaded this handout, you must get a copy from the course cabinet.

2. Design an algorithm for self-stabilizing clock synchronization that uses 0(1) states per a processor in a chain system (i.e., the network is based on a line graph).
   Give a convincing argument for why it works and is self-stabilizing (no formal proof is required).

3. Exercise 16.9.

4. Exercise 16.13

5. Exercise 16.14.

Optional open problem (not graded).

Is there a self-stabilizing (randomized and non-silent) leader election algorithm in a uniform ring with 0(1) states per a processor.