Massachusetts Institute of Technology — Handout 8
6.852: Distributed Algorithms
Prof. Nancy Lynch — September 25, 2003

Problem Set 2, Part b

Due: Thursday, October 2, 2003

Reading:

Sections 6.3-6.6.
Section 7.1-7.3 (skip 7.3.4)
Chapter 8.

Reading for next week: Finish or review Chapter 8.
Chapter 14, 15.

Problems:

1. In class, we proved a simple special case of the Keidar-Rajsbaum lower bound on the number of rounds for early-stopping consensus: For $2 \leq f < n$, no f-fault-tolerant uniform stopping consensus algorithm can guarantee that, in all failure-free executions, all nonfaulty processes decide within one round.

   For this problem, extend these ideas (borrowing as needed from the proof of the general Keidar-Rajsbaum result), to obtain the special case for 1 failure: For $3 \leq f < n$, no f-fault-tolerant uniform stopping consensus algorithm can guarantee that, in all executions with at most one failure, all nonfaulty processes decide within two communication rounds.

2. Exercise 7.8.

3. Exercise 7.17.

4. Exercise 8.4.