ECE 526 (Spring 2013) Distributed Algorithms
Homework 4 Due: 2 p.m., April 1, 2013 (Monday)

Please type your answers (e.g., using Latex, or Word).

See the policy of 48-hour extension described in the course handout.

1. Theorem 10.3 in the textbook shows that in any wait-free simulation of a single-writer multi-reader register from any number of single-writer single-reader registers, at least one reader must write. Can this proof be extended to show that at least $n/2$ readers must write, where n is the total number of readers? Explain briefly (If you answer no, explain why. If you answer yes, you need not reproduce the entire proof – just provide a brief explanation.)

2. This question relates to Byzantine vector consensus. Suppose that each processor has a 2-dimensional vector input. The processors use a scalar Byzantine consensus algorithm on each of their vector components separately. In general, this approach does not satisfy the validity requirement stated in that paper by Vaidya and Garg.

   Determine a suitable constraint on the input vectors at fault-free nodes under which the above approach will satisfy the validity condition in [Vaidya and Garg].

   (One such constraint is that all input vectors must be identical. Try to develop a more relaxed constraint than this.)