EE 382N Vijay Garg (Nonprogramming) Assignment 1 Sp 2011

Due 11th Feb, 2011

This assignment should be done individually. You cannot discuss the assignment with anyone or look for solution on the Internet. The assignment will be due in class on 11th Feb.

1. **(10 points)** Suppose that the underlying communication system guarantees FIFO ordering of messages. How will you exploit this feature to reduce the communication complexity of the vector clock algorithm? You should use only $O(n)$ storage at each process.

2. **(10 points)** Some applications require two types of accesses to the critical section—*read* access and *write* access. For these applications, it is reasonable for multiple *read* accesses to happen concurrently. However, a *write* access cannot happen concurrently with either a *read* access or a *write* access. Modify Lamport's mutex algorithm for such applications.

3. **(10 points)** Extend Ricart and Agrawala's mutex algorithm to solve k-mutual exclusion problem, in which at most k processes can be in the critical section concurrently.