COL 380	Oct 6, 2018
Homework 2	
Instructor: Subodh Sharma	**Due: Oct 10, 23:55 hrs**

NOTE: All submissions must be made in the pdf format. Hand written assignments will not be accepted.

Problem 1: Distributed Mutual Exclusion

- Are the critical sections accessed in the increasing order of the timestamps of requests? Present formal arguments for your answer.
- Optimize Ricart-Agrawala's Algorithm using the following observation: to enter the CS, a site only needs to receive a REPLY msg fromt the site whose request just precedes its request in priority. Present the algorithm and the safety and fairness proofs for the same. Explain the message complexity of your algorithm.
- Exercise 9.2 from KshemKalyani-Singhal book.
- Let all processes be set up in a rectangular grid. A process enters its CS only if it has the permission from all the processes in its row and column. A process grants permission to another process only if it has not given permission to some other process. What properties does this algorithm satify? What is the message complexity of the algorithm? How will you ensure deadlock freedom? (Hint: Refer Maekawa's Algorithm)

Problem 2: Global Snapshots

- Modify the Chandy-Lamport snapshot algorithm so that it records strongly consistent snapshots (i.e. all channel states are recorded empty).
- In Lai-Yang's algorithm applied to FIFO channels, considering color white to be less than the color red, show that $\forall s, t : s \rightarrow t \Rightarrow s.color \leq t.color$.

Problem 3: Termination

- Design a termination detection algorithm that is based on the concept of weight-throwing and is tolerant to message losses. Assume that the processes do not fail.
- Exercise 7.1 from Kshemkalyan-Singhal book.