CSE5306, Distributed Systems
Fall 2023, Project 3
Due date: 11:59pm, Dec. 8, submission through Canvas.

Please read this:

1) Project assignments are to be completed by teams.
2) Total points possible: 100 pts.
3) Please add the following statement in the beginning of your submission.
   I have neither given or received unauthorized assistance on this work
   Signed: *Date:*

Assignment-1 (50pts): We have discussed the basic Paxos protocol that selects a single proposed value from multiple proposers. In this assignment, research on the multi-value extension of the basic Paxos protocol, i.e., multi-paxos, by reading tutorials, online postings, technical papers and answer the following questions.

1. How does the multi-paxos protocol ensure multiple nodes to agree on a consistent ordering of a sequence of values and how is it different from running the basic Paxos protocol for multiple rounds?
2. What are the performance and scalability issues of the multi-paxos protocol?

List all the references you used in your answer.

Assignment-2 (50pts): Implement a basic single decree (value) Paxos protocol. Follow the workflow described in Slide 62 in Lecture 8 and assume that each node acts as both a proposer and acceptor. Use the environment you set up for the previous projects and employ communicating processes to emulate nodes on a single machine. Evaluate your implementation of the Paxos protocol by studying whether it can correctly choose a value for the three different scenarios listed on Slide 63-65 in Lecture 8. To evaluate your Paxos protocol in a controlled environment given the uncertainties in message passing, consider implementing a centralized coordinator to collect from individual proposers. The centralized coordinator then can send votes to acceptors in the order specified in the three scenarios to test the Paxos implementation. You may use the 5 proposers and acceptors configuration for evaluation, though your Paxos implementation should work for any number of proposers/acceptors.