

**CS 54200: Distributed Database Systems**  
**Professor Bharat Bhargava**  
**Homework 4**  
**Due date: April 19, 2020 11:59 PM (EST)**

Note: *Submit the homework via Blackboard. Answer each question briefly.*

Max. Marks: 110

- Q1:** Explain the various ideas of determining a '**unique majority partition**' that can continue to process transactions during a network partition. Consider cases where multiple partitions and merging may take place. Suggest what useful processing can be done in minority partitions so that the merge process is quick and efficient. How can the size of the partition be determined at the time of partition and how can we determine if the mutual consistency has been violated at the time of merge? (30 points)
- Q2:** How can the ideas of "degrees of commitment" be used in increasing the performance of transaction processing during network partitioning? (20 points)
- Q3:** What is view-serializability and how it can be used in network partitioning? (20 points)
- Q4:** How would you change the design and algorithms for distributed database processing if there were multiple and frequent failures (like sites failing and recovering, network partitions, variable communication delays, large number of lost messages). (30 points)
- Q5:** How can you find at the time of merge if inconsistent updates have taken place while network was partitioned? (10 points)