**CS550 “Advanced Operating Systems”**

**Fall 2020 - Homework 5**

***Submission:***

***This is an INDIVIDUAL written assignment.***

***Due by 11:59pm of 11/5/2020***

***Total points 100 - Late penalty: 10% penalty for each day late.***

***Please upload your assignment on Blackboard with the following name: CS550\_SectionNumber\_LastName\_FirstName\_HW5.***

***Please do NOT email your assignment to the instructor and/or TA!***

1. **(5 points)** What is view synchronous? What is atomic message?
2. **(5 points)** What is coordinated checkpointing?
3. **(10 points)** What is a Byzantine failure? How many replicas are needed to survive a *k* component fail in Byzantine failure? Why?
4. **(10 points)** Consider a Web browser that returns an outdated cached page instead of more recent one that had been updated at the server. Is this a failure, and if so, what kind of failure?
5. **(10 points)** We have stated that totally ordered multicasting using Lamport’s logical clocks does not scale. Explain why.
6. **(10 points)** In reliable multicasting, is it always necessary that the communication layer keeps a copy of a message for retransmission purposes?
7. **(10 points)** In the two-phase commit protocol, why can blocking never be eliminated, even when the participants elect a new coordinator?

**Note: We encourage collaboration between you and your classmates. Discuss various approaches and techniques to better understand the questions. However, we do NOT allow copying solutions or code. This is considered as cheating and falls under IIT code of honor. Penalties will be enforced. Please make sure you write your own solutions.**

**GOOD LUCK!**