**CS550 “Advanced Operating Systems”**

**Spring 2020 - Homework 4**

***Submission:***

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

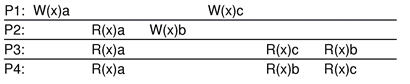
***Due by 11:59 pm of 11/5/2020***

***Total points 110 - Late penalty: 10% penalty for each day late***

***Please upload your assignment on Blackboard with the following name: CS550\_SectionNumber\_LastName\_FirstName\_HW4.***

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

1. **Read Chapter 6, 7, 8**
2. **(5 points)** What are the design issues of distributed scheduling?
3. **(5 points)** Why is message logging useful in Checkpointing? Discuss.
4. **(5 points)** In Fig. 7.7 of the text, is signature 001001 valid for sequential consistent memory? Explain your answer.
5. **(5 points)** Suppose that two processes detect the demise of the coordinator simultaneously and both decide to hold an election using the bull algorithm. What happens?
6. **(10 points)** Explain in your own words what the main reason is for considering weak consistency models.
7. **(10 points)** For active replication to work in general, it is necessary that all operations be carried out in the same order at each replica. Is this ordering always necessary?
8. **(10 points)** What kind of consistency would you use to implement an electronic stock market? Explain your answer.
9. **(10 points)** Give an example where client-centric consistency can easily lead to write-write conflicts.
10. **(10 points)** A file is replicated on 10 servers. List all the combinations of read quorum and write quorum that are permitted by the voting algorithm.
11. **(10 points)** Explain the difference between linearizability and sequential consistency, and why the latter is more practical to implement, in general.
12. **(10 points)** During the discussion of consistency models, we often referred to the contract between the software and data store. Why is such a contract needed?
13. **(10 points)** Describe a simple implementation of read-your-writes consistency for displaying Web pages that have just been updated.
14. **(10 points)** Is the following sequence of events allowed with a sequentially-consistentstore? What about a causally-consistent data store? Explain your answer.



**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!**