CS550 Written Assignment 3 (WA#3)

Submission:

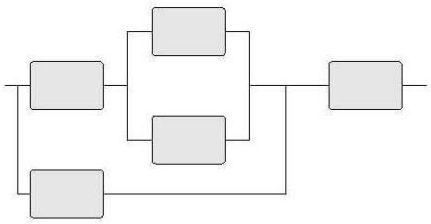
- ***Due by 11:59pm of 03/26/2017 (Sunday).***
- ***Late penalty: 20% penalty for each day late.***
- ***This is an individual assignment.***
- ***Please upload your assignment on the Blackboard with the following name: Section_ LastName_FirstName_WA3.***
- ***Please do NOT email your assignment to the instructor and TA!***

Chapter 7

1. A file is replicated on 8 servers. List all the combinations of read quorum and write quorum that are permitted by the voting algorithm.
2. Explain the difference between linearizability and sequential consistency, and why the latter is more practical to implement, in general.
3. Consider a system that combines read-your-writes consistency with writes-follow-reads consistency. Is this system also sequentially consistent? Explain your answer.

Chapter 8

4. Suppose we have a system with 99.9999% availability, how much downtime a year can it have?
5. Write the reliability expression $R_{system}(t)$ of the following series/parallel system, assuming that each of the five modules has a reliability of $R(t)$.



Chapter 9

6. Devise a simple authentication protocol using signatures in a public-key crypto-system.
7. How are ACLs implemented in a UNIX file system?

Chapter 11

8. Explain whether or not NFS is to be considered a distributed file system.
9. In UNIX-based operating systems, opening a file using a file handle can be done only in the kernel. Give a possible implementation of an NFS file handle for a user-level NFS server for a UNIX system.
10. Despite that GFS (Google File System) scales well, it could be argued that the master is still a potential bottleneck. What would be a reasonable alternative to replace it?