CS550 Written Assignment 2 (WA#2)

Submission:

- ***Due by 11:59pm of 03/01/2017 (Wed.).***
- ***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_WA2.***
- ***Please do NOT email your assignment to the instructor and TA!***

Chapter 3

1. Would it make sense to limit the number of threads in a server process?
2. In this problem you are to compare reading a file using a single-threaded file server and a multithreaded server. It takes 8 msec to get a request for work, dispatch it, and do the rest of the necessary processing, assuming that the data needed are in a cache in main memory. If a disk operation is needed, as is the case one-third of the time, an additional 40 msec is required, during which time the thread sleeps. How many requests/sec can the server handle if it is single threaded? If it is multithreaded?
3. Consider a process P that requires access to file F which is locally available on the machine where P is currently running. When P moves to another machine, it still requires access to F. If the file-to-machine binding is fixed, how could the system-wide reference to F be implemented?

Chapter 5

4. The root node in hierarchical location services may become a potential bottleneck. How can this problem be effectively circumvented?
5. In a hierarchical location service with a depth of k, how many location records need to be updated at most when a mobile entity changes its location?
6. High-level name servers in DNS, that is, name servers implementing nodes in the DNS name space that are close to the root, generally do not support recursive name resolution. Can we expect much performance improvement if they did?

Chapter 6

7. Consider the behavior of two machines in a distributed system. Both have clocks that are supposed to tick 2000 times per millisecond. One of them actually does, but the other ticks only 1900 times per millisecond. If UTC updates come in once a minute, what is the maximum clock skew that will occur?
8. To achieve totally-ordered multicasting with Lamport timestamps, is it strictly necessary that each message is acknowledged?
9. Many distributed algorithms require the use of a coordinating process. To what extent can such algorithms actually be considered distributed? Discuss.
10. A distributed system may have multiple, independent resources. Imagine that process 0 wants to access resource A and process 1 wants to access resource B. Can Ricart and Agrawalas algorithm lead to deadlocks? Explain your answer.