CSCI325 Exam Study Guide (Work in Progress)

Rules and Logistics

- 2 hour time limit, on Sakai
- Open notes, textbook, papers/Perusall (the book is there too)
    - Closed internet
    - Don't download Wikipedia or other articles into your notes
- Write your answers in Word and then copy to Sakai to avoid issues with the site timing out

Topics

Distributed Systems Fundamentals

- Motivation
- What are they?
- Goals
- Common design challenges

Networks

- OSI Model (Layers)
- End to End Principle
- LAN vs WAN
- Protocols: TCP, UDP, IP
- Sockets

Routing

- Challenges, Solutions
- LAN vs WAN routing
- IP

Processes

- Threads vs processes
- Synchronization
    - Motivation, Challenges, Solutions, tradeoffs
    - Identifying critical section

Communication Protocols

- HTTP
    - Request
    - Response
- RPC

    - Challenges, solutions
    - XML-RPC

Naming

- Motivation
- Challenges
- Solutions: Flat, Hierarchical, DNS, LDAP

Storage

- RAID
    - Motivation
    - Challenges
    - Variations, tradeoffs, evaluation
- Distributed File Systems
    - Motivation
    - Challenges
    - NFS – design, problems/solutions

Coordination

- Timing: clocks and consensus

Fault Tolerance

- Replication
- Failure recovery

Distributed Architectures/Applications/Domains

- For each of the below domains, understand the motivation, goals, challenges, solutions, tradeoffs to those solutions, including how the above fit into these applications.
- GitHub
- Web servers
- Internet services
- Grids, Clusters
- WAN: PlanetLab
- Cloud Computing
- MapReduce/Hadoop

What I expect from you on exam:

- To know the material well and just need your notes as backup/clarification
- To be able to synthesize the material: What are the common issues/challenges? What are common solutions and their tradeoffs? Why are certain tradeoffs made? What caused the tradeoff to be deemed okay?
- To be able to state many of these ideas relatively succinctly, hitting on the salient points.
- Analyzing problems, suggesting solutions, and articulating tradeoffs/limitations

What I do not expect from you:

- Writing code

Suggestions on how to prepare:

- Review your notes and the research papers; the textbook may be helpful for claricication
    - What are common threads/issues/challenges/solutions and their tradeoffs?