Exam 2 - CS 682 - Spring 2017

Name:

Question	Awarded Points	Maximum Points
Question 1		8
Question 2		7
Question 3		7
Question 4		8
Question 5		7
Question 6		7
Question 7		7
Question 8		7
Question 9		7
Question 10		7
Question 11		7
Question 12		7
Question 13		7
Question 14		7
Total		100

1. Give four serially equivalent interleavings for the following transactions T and U:

T: x=read(a); write(a, 44); y=read(b); write(b, 25)
U: x=read(c); y=read(b); write(c, 90); write(b, 100)

2. Which of your interleavings for Question 1 would be possible if using strict two-phase locking?

3. What is the advantage of Paxos over traditional two-phased commit?

4. In Paxos, if an acceptor has replied to a prepare with a promise message and has accepted an accept request, what will happen if it receives another prepare with a *smaller* proposal number before the paxos instance has completed? Explain why this is the case.

5. What is the purpose of snapshots in the Paxos Made Live implementation of the algorithm?

6. Spanner uses Paxos to allow a group of replicas to come to consensus on the order of operations in a replicated log. Why does the architecture also require a transaction manager and lock table?

7. Describe the main contribution of the TrueTime API.

8. TrueTime uses both GPS and atomic clocks. Why?

9. The Kraken paper describes several caveats or properties that a system must have to be able to use their methodology. Explain at least one of those caveats.

10. Explain at least one alternative to live load testing and explain its disadvantage(s).

11. Kraken uses two topline metrics to track the health of the system during load testing. Identify at least one of those metrics and explain why it is a useful metric.

12. What is the main problem solved by YARN?

13. At the time the paper was written, the YARN architects had not addressed the problem of the Resource Manager as a single point of failure. Discuss a possible solution to this problem (not necessarily the solution implemented by the current YARN implementation).

14. Consider a Project 2 implementation that assumes all data servers listen on different ports. Is this a good implementation choice? Explain your answer.