CS304 Database System Concepts

Assignment 9

Due: April 17, 2012
(Please submit hard copies to class or to Zheng on due date.)

Name: Matric No:

Q1. (2 points) For each of the following requirements, identify the best choice of degree of durability in a remote backup system:
a) Data loss must be avoided but some loss of availability may be tolerated.
b) Transaction committed must be accomplished quickly, even at the cost of loss of some committed transactions in a disaster.
c) A high degree of availability and durability is required, but a longer running time for the transaction commit protocol is acceptable.

Q2. (2 points) Compare the deferred- and immediate-modification versions of the log-based recovery scheme in terms of ease of implementation and overhead cost.

Q3. (2 points) Explain the purpose of the checkpoint mechanism. How often should checkpoints be performed? How does the frequency of checkpoints affect:
a) System performance when no failure occurs?
b) The time it takes to recover from a system crash?
c) The time it takes to recover from a disk crash?

Q4. (2 points) When the system recovers from a crash, it constructs an undo-list and a redo-list. Explain why log records for transactions on the undo-list must be processed in reverse order, while those log records for transactions on the redo-list are processed in a forward direction.(You can use examples.)

Q5. (2 points) Transaction-server architectures are popular for client-server relational databases, where transactions are short. On the other hand, data-server architectures are popular for client-server object-oriented database systems, where transactions are expected to be relatively long. Give two reasons why data servers may be popular for object-oriented databases but not for relational databases.