

COSC3380: Exam on Transaction Processing and Query Processing

Name (Last name, first):

Test score:

Instructions

Write short answers. You can do scratch work in the back page.

Questions

1. In which concurrency control mechanisms is it possible to have a (nasty) deadlock? In which mechanisms can we have process starvation (transaction may never be executed)?
2. If a ROLLBACK of transaction T_1 triggers a ROLLBACK of transaction T_2 and then a ROLLBACK of transaction T_3 ..what is this process called? How can it be avoided?
3. Explain how to read a value of X assuming MVCC is used.
4. Answer Y/N. The textbook assumes transactions can work on a multicore CPU. The textbook assumes RAM is limited (not enough to store the load tables in RAM), but disk space is not. The textbook carefully considers how new storage technologies like SSD, SD cards, USB drives can accelerate SQL processing.
5. Consider a large table T_1 joined with a very small table T_2 . Explain different algorithms to evaluate $T_1 \bowtie T_2$.
6. What type of data structure is created by the SQL query optimizer to parse and evaluate a relational expression? What type of grammar and automaton are used to parse and translate a SELECT statement for evaluation?
7. Answer Y/N for these transaction processing assertions. Some statement between START/END must be INSERT or UPDATE. A query (SELECT) cannot be used inside a transaction. It is preferable a transaction block (sequence) of statements between START/END TRANSACTION contain a COMMIT statement.
8. Draw an example diagram that shows the behavior of 2PL for a transaction updating 4 integers (A,B,C,D)
9. Consider timestamping to process transactions. Explain when a transaction T must be aborted and restarted and when it can proceed.
10. Give an example of a query with nested SELECTs, 3 levels.