Title: Homework 2 - Peer Assessment

Instructions

Homework 2 based on Ch 10 (13th Ed.) or Ch 12 (3rd Ed.) - Transaction Management

Complete the questions below and submit the completed assignment here before the due date.

***After the Due date, each student will Peer review the work of 2x other students.**

It will be an anonymous peer review, therefore do NOT add your name to your answer sheet / document. Number the questions clearly.

Reviewer:

Each student will Peer review the work of 2x other students.

Please use the recommended answer / memo as a guide to award marks. The answers are not set in stone, nor should it contain the exact wording, please also use your intuition and knowledge on the subject to determine if the answer is correct or not.

Recommended answers / memo below:

1. **Explain what a transaction log is and describe what its function is. [2 marks]**

   The transaction log keeps track of all transactions that update / execute in the DB ✓ (special DBMS table that contains a description of all the database transactions executed by the DBMS).

   The database transaction log plays a crucial role in maintaining database concurrency control and integrity. ✓

2. **Explain what Two-Phase Locking entails and briefly describe the two phases. [4 marks]**

   Defines how transactions acquire (get) and relinquish (release) locks ✓
   Guarantees serializability but does not prevent deadlocks ✓

   Two Phases:

   - **Growing phase** - transaction acquires all required locks without unlocking any data ✓
   - **Shrinking phase** - transaction releases all locks and cannot obtain any new lock ✓

3. **Name and briefly explain the FIVE levels at which locking can take place in a DBMS (lock granularity). [10 marks]**

Database-level lock ✓ - The DBMS locks the entire database. If transaction T1 locks the database, transaction T2 cannot access any database tables until T1 releases the lock. ✓

Table-level lock ✓ - The DBMS locks an entire table within a database. This lock level prevents access to any row by a transaction T2 while transaction T1 is using the table. However, two transactions can access the database as long as they access different tables. ✓

Page-level lock ✓ - The DBMS will lock an entire disk-page. A disk page or page is the equivalent of a disk block, which may be described as a (referenced) section of a disk. A table may span several pages, and a page may contain several rows of one or more tables. ✓

Row-level lock ✓ - Row level locks permit the DBMS to allow concurrent transactions to access different rows of the same table, even if these rows are located on the same page. Although the row level locking approach improves the availability of data, its management requires high overhead cost because a lock exists for each row in each table of the database. ✓

Field-level lock ✓ - The field-level locking approach allows concurrent transactions to access the same row as long as they use different attributes within that row. Although field level locking clearly yields the most flexible multi user data access, it requires too much computer overhead to be practical at this point. ✓