"DBMS Assignment"

Optimistic Approach

Optimistic concurrency control:

Optimistic concurrency control (OCC) is a concurrency control method applied to transactional systems such as relational database management systems and software transactional memory. OCC assumes that multiple transactions can frequently complete without interfering with each other.

1. **Validation Concurrency Control:**

The optimistic approach is based on the assumption that the majority of the database operations do not conflict. The optimistic approach requires neither locking nor time stamping techniques. Instead, a transaction is executed without restrictions until it is committed. Using an optimistic approach, each transaction moves through 2 or 3 phases, referred to as read, validation and write.

- **(i)** During read phase, the transaction reads the database, executes the needed computations and makes the updates to a private copy of the database values. All update operations of the transactions are recorded in a temporary update file, which is not accessed by the remaining transactions.

- **(ii)** During the validation phase, the transaction is validated to ensure that the changes made will not affect the integrity and consistency of the database. If the validation test is positive, the transaction goes to a write phase. If the validation test is negative, the transaction is restarted and the changes are discarded.

- **(iii)** During the write phase, the changes are permanently applied to the database.

2. **Multi version Concurrency Control:**

Multi version Concurrency Control (MVCC) MVCC provides concurrent access to the database without locking the data. This feature improves the performance of database applications in a multiuser environment. Applications will no longer hang because a read cannot acquire a lock.

Multi version schemes keep old versions of data item to increase concurrency.

Each successful write results in the creation of a new version of the data item written. Timestamps are used to label the versions. When a read(X) operation is issued, select an appropriate version of X based on the timestamp of the transaction.

Multi version Technique Based on Timestamp Ordering In this method, several versions of each data item X are maintained. For each version, the value of version and the following two timestamps are kept: 1. Read-Timestamping: The read timestamp of is the largest of all the timestamps of transactions that have successfully read version. 2. Write-Timestamping: The write timestamp of is the timestamp of the transaction that wrote the value of version.

Transaction T may be aborted and rolled back, If the conflict occurs, T is rolled back; otherwise, a new version of item X, written by transaction T, is created.