LOCK BASED PROTOCOLS IN DBMS

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Concurrency control

Concurrency control ensures that multiple transactions can execute simultaneously without causing data inconsistency or integrity issues.

Lock based protocols

Lock-Based :-

1. Lock based are used in database management systems (DBMS) to ensure that multiple transactions can run safely and correctly without interfering with each other.

2. Lock based protocols ensure ACID PROPERTIES (Atomicity, consistency, Isolation, Durability).

Why are locks needed?

- Multiple transactions accessing the same data can cause conflicts.
- Locks ensure safe execution of transactions by preventing interference.
- Helps maintain database integrity and consistency.

Types of Lock-Based Protocols

- Simplest Lock-Based Protocol :-

- A transaction must acquire a lock before accessing data.
- The lock must be released after the operation is completed

- Two-Phase Locking 2PL :-

- Has two phases:

-Growing Phase: Locks are acquired but not released.

- Shrinking Phase: Locks are released but no new locks are acquired.

Types of Lock-Based Protocols

- Strict Two phase locking :-

- Holds all locks until the transaction commits or rolls back.

- Rigorous Two phase locking :-

- Holds both shared and exclusive locks until the transaction end.

Problems in Lock Based Protocols

- Deadlock:

- Transactions wait indefinitely for each other's locks.

- Starvation:

- A transaction waits too long as others keep getting priority.

- Blocking:

- Transactions must wait until locks are released, slowing performance.

Solutions to Lock based protocols

- Timeouts:

If a transaction waits too long, it is aborted.

- Deadlock Detection:

Identifies cycles in waiting transactions and aborts one.

- Deadlock Prevention:

Ensures transactions do not enter a deadlock state

Conclusion

- Lock-based protocols are essential for concurrency control in DBMS.
- They help maintain data integrity and consistency.
- Challenges like deadlocks can be mitigated with proper techniques.

References

- W3 school
- GeeksforGeeks
- Google

THANK YOU