Assignment-3

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Assignment 3: Explain the ACID properties of a transaction in your own words. Write SQL statements to simulate a transaction that includes locking and demonstrate different isolation levels to show concurrency control.

ACID Properties of a Transaction

Atomicity:

- A transaction is an indivisible unit of work that either completes fully or does not happen at all. If one part of a transaction fails, the entire transaction is rolled back.
- Example: Transferring money from one account to another requires deducting from one account and adding to another. If either operation fails, neither should happen.

Consistency:

- A transaction must ensure that the database moves from one consistent state to another. It must respect all rules, such as constraints, triggers, and cascades.
- Example: If a bank's total balance remains constant after a transaction, the consistency is maintained.

Isolation:

- Transactions occurring simultaneously should not interfere with each other. Each transaction should appear as though it is the only transaction running.
- Example: If two people try to book the last seat on a flight, the system should ensure only one transaction succeeds.

Durability:

- Once a transaction is committed, the changes must be permanent, even in the case of a system crash.
- Example: If you deposit money at an ATM and receive a confirmation, the bank's records will reflect this change even if the system crashes immediately after.