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Introduction to Transactions

Mastering Transactions: The Backbone of Reliable Databases

DEFINITION

> Transactions are sequences of operations performed as a single logical unit of work. They ensure data integrity by following the ACID properties.

KEY CONCEPTS

ACID Properties

ACID stands for Atomicity, Consistency, Isolation, and Durability, which are essential for reliable transactions.

Atomicity

Atomicity ensures that all operations in a transaction are completed successfully or none at all.

Consistency

Consistency guarantees that a transaction brings the database from one valid state to another.

Isolation

Isolation ensures that transactions do not interfere with each other, maintaining data integrity.

Durability

Durability means that once a transaction is committed, it remains so even in case of a system failure.

EXAMPLES

→ Transferring money between bank accounts as a single transaction.

→ Updating inventory levels in a store database after a sale.

→ Booking a flight and confirming payment in one seamless operation.

MEMORY TIPS

★ Remember ACID: Atomicity, Consistency, Isolation, Durability.

★ Think of transactions like a light switch: it's either on (completed) or off (not completed).

★ Visualize a bank transfer as a locked box: it either opens for the full amount or not at all.

COMMON MISTAKES

✗ Confusing isolation with independence of transactions.

✗ Overlooking the importance of durability in case of failures.

✗ Assuming all operations in a transaction are automatically reversible.

QUICK RECAP

Transactions are crucial for maintaining data integrity in databases. They rely on the ACID properties to ensure reliable operations. Remember the key concepts and avoid common pitfalls for a solid understanding.