



Transaction Management

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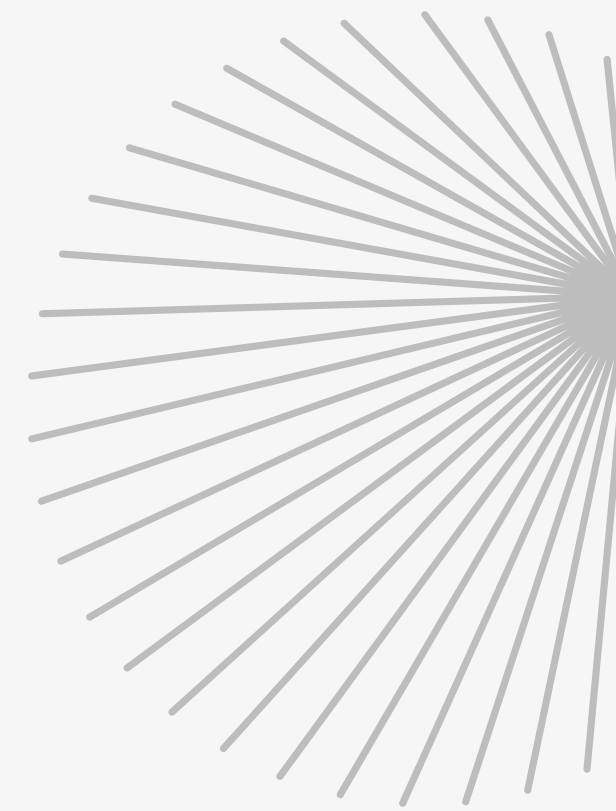
What is a Transaction?

- A transaction is a single unit of work that contains one or more SQL statements.
- A transaction ensures data integrity and consistency.
- Either all statements inside a transaction succeed (COMMIT) or none of them take effect (ROLLBACK).

Only One Whole Action

Either Action Happens Or Not

ACID Properties (must follow in transaction management)



Property	Meaning
A - Atomicity	All operations succeed or none do
C - Consistency	Data remains valid after transaction
I - Isolation	Concurrent transactions do not interfere
D - Durability	Changes are permanent after commit

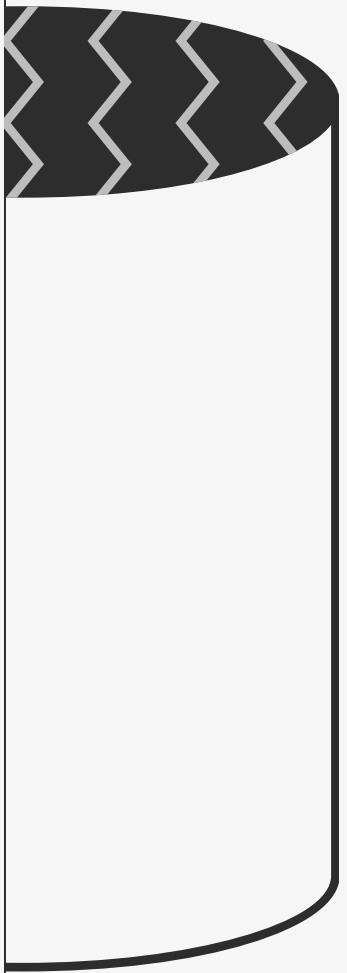


What to DO in Transaction Management

- Use transactions for critical operations (e.g. money transfer, stock updates).
- Always use `START TRANSACTION` or `BEGIN` to start.
- Use `SAVEPOINT` to create rollback points inside transaction.
- Always `COMMIT` after successful execution.
- Use `ROLLBACK` in case of failure.



What NOT to DO in Transaction Management

- Don't forget to **COMMIT** or **ROLLBACK** — leads to open transactions and locks.
 - Avoid DDL (ALTER, DROP, CREATE) inside transactions (usually auto-committed).
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Basic Syntax

START TRANSACTION;

-- Your SQL
statements

COMMIT;

-- OR

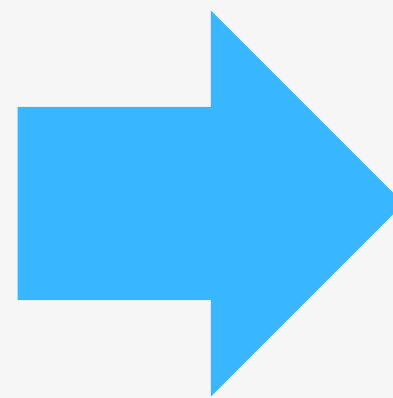
ROLLBACK;

Simple Money Transfer

```
CREATE TABLE accounts (  
  account_id INT PRIMARY KEY,  
  account_name VARCHAR(50),  
  balance DECIMAL(10,2)
```



```
INSERT INTO accounts  
VALUES (1, 'Abhi', 1000.00);  
INSERT INTO accounts  
VALUES (2, 'Ravi', 2000.00);
```



```
START TRANSACTION;
```

```
-- Deduct ₹100 from Abhi  
UPDATE accounts  
SET balance = balance - 100  
WHERE account_id = 1;
```

```
-- Add ₹100 to Ravi  
UPDATE accounts  
SET balance = balance + 100  
WHERE account_id = 2;
```

```
-- Check for error condition (Example - avoid negative balance)  
SELECT balance INTO @bal FROM accounts WHERE account_id = 1;  
IF @bal < 0 THEN  
  ROLLBACK;  
ELSE  
  COMMIT;  
END IF;
```

Explanation:

- The transfer occurs only if Abhi has sufficient balance.
- ROLLBACK if balance goes negative.
- Otherwise COMMIT finalizes the transaction.