

LAST MINUTE REVISION 

## THE MEGA GUIDE

# 70+ SQL CONCEPTS IN 9 SLIDES

From "What is a Key?" to "Query Optimization"

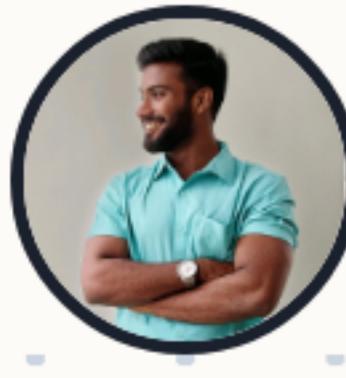
KEYS &  
RULES

FUNCTIONS  
& TRIGGERS

JOINS &  
UNIONS

ACID &  
INDEXES

INTERVIEW READY



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START 

# 01. DATA INTEGRITY

## PRIMARY KEY

Unique ID for a row. No duplicates. No **NULLs**. The heart of the table.

## FOREIGN KEY

Connects tables. Links to another table's Primary Key.

## UNIQUE

Ensures values are different. Allows **One NULL**.

## NOT NULL

The column **MUST** have a value. No empties allowed.

## CHECK

Ensures data meets condition (e.g., Age  $\geq$  18).

## DEFAULT

Auto-fills a value if none is provided.

## CONSTRAINT VIOLATION

Error when data breaks a rule (e.g. duplicate PK).

## REFERENTIAL INTEGRITY

Ensures relationships between tables stay consistent (no orphans).



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# 02. STRUCTURE + OBJECTS

## SCHEMA

The blueprint/container of the database structure.

## VIEW

A virtual table saved as a query. **Dynamic data.**

## INDEX

Speeds up **SELECT** (reads) but slows down **INSERT** (writes). Like a book index.

## MATERIALIZED VIEW

Physically stored view. Faster reads, needs refreshing.

## TEMP TABLE

Exists only for the current session/query.

## STORED PROC

Saved batch of SQL commands executed together.

## TRIGGER

Auto-runs code when data changes (Insert/Update).

## FUNCTION

A reusable piece of code that returns a specific value.



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# 03. THE COMMANDS

## DDL (DEFINITION)

Defines structure: CREATE, ALTER, DROP, TRUNCATE.

## DML (MANIPULATION)

Manages data: INSERT, UPDATE, DELETE.

## DQL (QUERY)

Fetching data: SELECT.

## DCL (CONTROL)

Permissions: GRANT, REVOKE.

## TRUNCATE

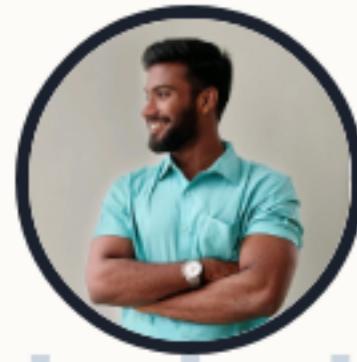
Fast wipe of all rows. Resets identity. No rollback.

## DROP

Deletes the table and structure entirely.

## ALTER

Modifies existing table structure (add/remove columns).



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# 04. DATA OPERATIONS

## SELECT

Used to fetch data. Can select specific columns or \* (all).

## INSERT

Adds new rows into a table.

## UPDATE

Modifies existing data. **Always use WHERE!**

## DELETE

Removes specific rows. Slower than Truncate. Can be rolled back.

## AUTO INCREMENT

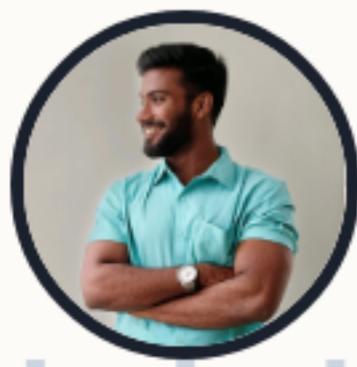
Automatically increases number for new rows.

## DATA TYPE

Defines storage: INT, VARCHAR, DATE, BOOLEAN.

## METADATA

Data about data (Table names, Column types).



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# 05. TRANSACTIONS + SETS

## TRANSACTION

Group of ops. All succeed or all fail (ACID).

## COMMIT

Permanently saves transaction changes.

## ROLLBACK

Reverts changes if an error occurs.

## SAVEPOINT

A marker to rollback partially to.

## SET OPERATORS

Combine result sets: UNION, INTERSECT, EXCEPT.

## UNION

Combines results. Removes duplicates.

## UNION ALL

Combines results. Keeps duplicates (Faster).



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# 06. FILTERING + JOINS

## CROSS JOIN

Cartesian Product. Every row x Every row.  
Returns all combinations.

## EXISTS

Checks if subquery returns any rows. Fast.

## IN

Checks if value matches a list.

## BETWEEN

Selects values within a range (Inclusive).

## LIKE

Pattern matching with % and \_.

## DISTINCT

Removes duplicate rows from result.

## CASE

If-Else logic for conditional columns.

## ALIAS

Temporary name for table/column (AS).



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# 07. RANKING + ANALYSIS

## WINDOW FUNCTIONS

Calculations across a set of rows related to current row. **OVER()** clause.

### RANK

Rank with gaps (1, 1, 3).

### DENSE RANK

Rank without gaps (1, 1, 2).

### ROW NUMBER

Unique sequential number (1, 2, 3).

### CURSOR

Process rows one by one. (Avoid if possible).

## NULL FUNCTIONS

COALESCE (First non-null), ISNULL/NVL (Replace null).



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# 08. ADVANCED QUERYING

## SUBQUERY

A query nested inside another. Inner query runs first.

## SCALAR SUBQUERY

Returns exactly one value (one row, one col).

## DERIVED TABLE

Subquery in the FROM clause.

## CORRELATED SUBQUERY

Inner query depends on Outer query. Runs once for **every row**. Slow.

## EXECUTION PLAN

Shows how the DB engine executes a query. Essential for performance tuning.



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# 09. DESIGN + MODELING

## NORMALIZATION

Organizing data to reduce redundancy. (1NF, 2NF, 3NF).

## DENORMALIZATION

Adding redundancy to improve read performance.

## SURROGATE KEY

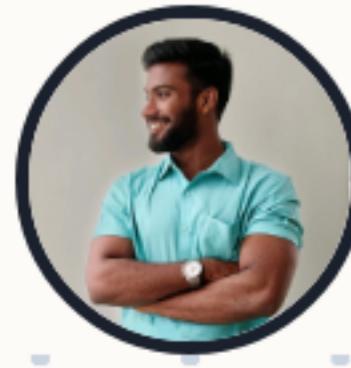
Artificial key (usually auto-increment ID).

## COMPOSITE KEY

A primary key made of two or more columns combined.

## NULL HANDLING

Special logic for Unknown values (Unknown + 1 = Unknown).



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# MISSION ACCOMPLISHED

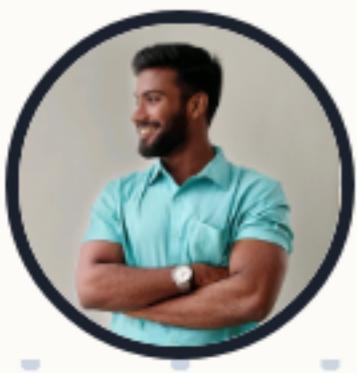
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THE END