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 >= 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

You just reviewed 70+ Concepts.

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THE END