Relational Databases and Querying with SQL

DATABASES

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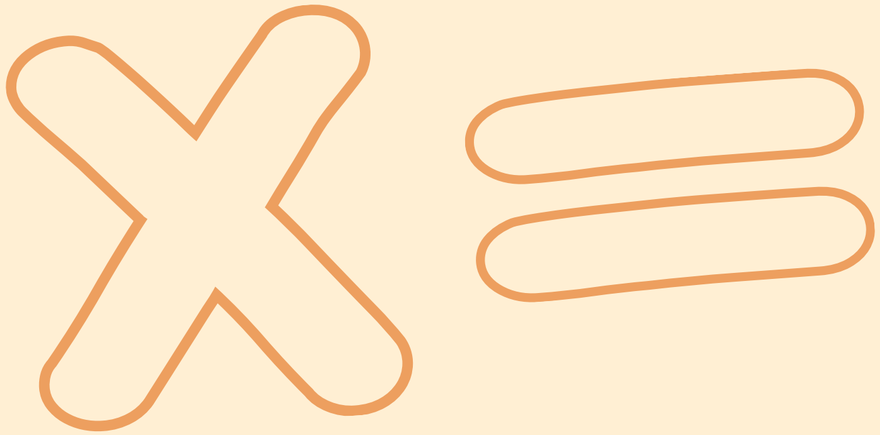
9th February 2026

In this lesson...



We will explore how to:

- Understand the **structure of relational databases,** including tables, rows, columns and keys.
- Write SQL queries to select and filter data using **SELECT, FROM and WHERE.**
- Aggregate, group and sort data using **COUNT, SUM, AVG, MIN, MAX, GROUP BY, ORDER BY and LIMIT** to derive meaningful insights

What is a Database?.

A **database** – a structured and organized collection of data stored electronically and managed by a **database management system (DBMS)** that allows users to efficiently **Create, Read, Update and Delete (CRUD) data**. It functions as a digital filing system where information can be added, retrieved, modified and removed in a controlled and reliable way to support data management and analysis.

Key Characteristics of databases.

1. **Structured Storage:** Data is organized in tables, documents or other formats with clear relationships
2. **Persistent:** Data remains stored even after programs close or systems restart
3. **Managed by Software:** Uses a Database Management System (DBMS) like MySQL, PostgreSQL or MongoDB
4. **Multi-user Access:** Allows multiple users or applications to access data simultaneously
5. **Data Integrity:** Maintains accuracy and consistency of data.

Common Type of Databases.

Type	Description	Examples
Relational	Data in tables with rows and columns, using structured relationships	MySQL, PostgreSQL, Oracle
NoSQL	Flexible schemas for unstructured/semi-structured data	MongoDB (document), Redis (key-value)
Graph	Focus on relationships between data points	Neo4j, Amazon Neptune
Time-Series	Optimized for timestamped data	InfluxDB, TimescaleDB

What is a Relational database?.

Relational Database – A database organized based on the relational model of data, where data is stored in tables (relations) and relationships are maintained through keys(Primary Key and Secondary Key)

KEY CONCEPTS OF RELATIONAL DATABASES.

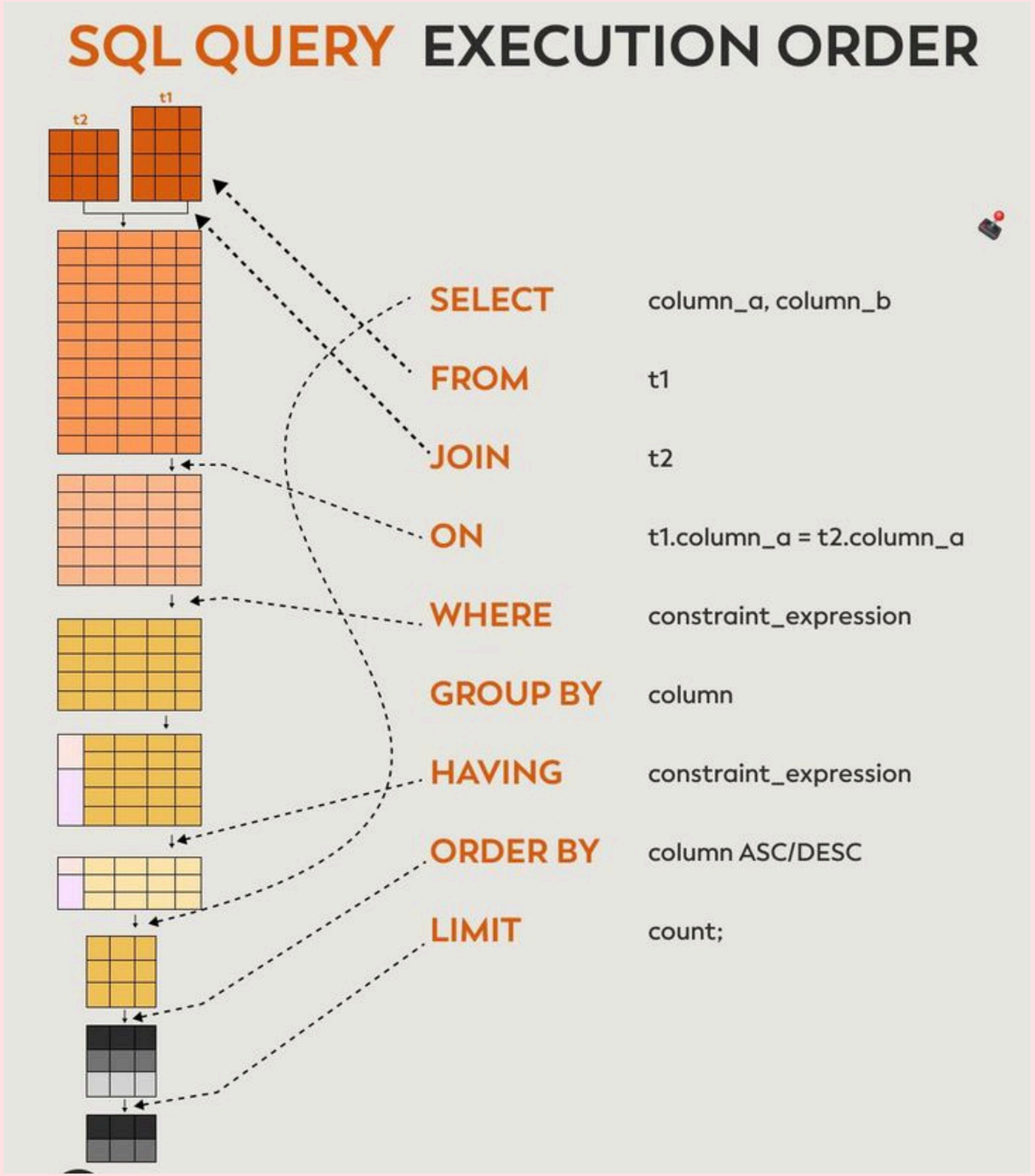
1. **Relation (Table)** – Data is stored in tables made up of rows and columns.
2. **Tuple (Row)** – A single record in a table.
3. **Attribute (Column)** – A field that describes a property of the data.
4. **Primary Key** – A unique identifier for each record in a table.
5. **Foreign Key** – An attribute that links one table to another.

What is SQL?

SQL (Structured Query Language) is a standard language used to communicate with relational databases.
SQL allows users to **create databases and tables**, insert new data, **retrieve stored data, update existing records** and **delete unwanted data.** These fundamental actions are collectively known as CRUD operations.

What SQL Is Used For??!

- Managing data stored in relational databases
- Writing queries to find specific information
- Controlling database structure and access
- Analyzing and reporting data



SQL EXECUTION ORDER

MNEMONIC

SO – SELECT

FAITH – FROM

JOINED – JOIN

ON – ON

WEDNESDAY– WHERE

GETTING – GROUP BY

HER – HAVING

OFFER – ORDER BY

LETTER – LIMIT

Any Questions?

Resources

Collab Notebook:
https://colab.research.google.com/drive/1dweiYssHNRm1-_6X-uulGfQXtUKTX7il?usp=sharing

Github Repo:
https://github.com/shammy-lp/Relational-Database-SQL

Relational Database Video:
https://youtu.be/2KCObY8ixgw?si=AgG-5nkm8JZjM7-C

SQL Video:
https://youtu.be/QNfnuK-1YYY?si=SPt3WlP460_GhRhm

THANK YOU