2025

4Geeks Academy: data science cohort 12

DAY 5: INTRO TO SQL

TOPICS

01 TODO

02 SQL

03 SQL: TOOLS

04 SQL: ANATOMY OF A QUERY

TODO

INTRO TO SQL	Use case, tools and query basics.
VISUALIZATION EXERCISES	Submit data visualization exercises with matplotlib and seaborn (Data Visualization module).
SQL PROJECT	Work on SQL project: Global Life Institute Data Detectives (Intro to SQL module) plan to finish before class next Monday.

SQL

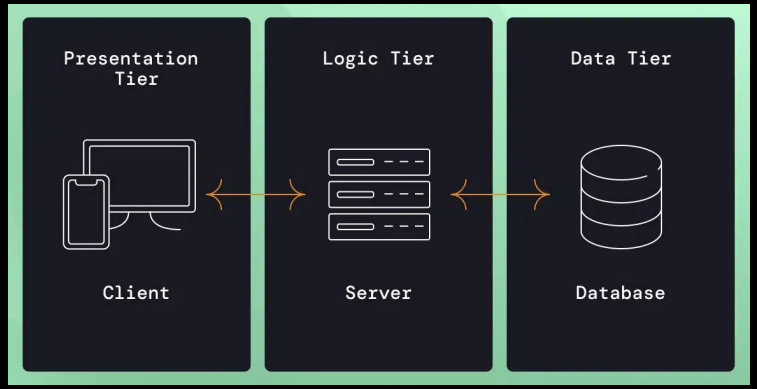
WHAT

‘Structured Query Language’ - a language and standard for interacting with relational database systems.

WHY

- Easy to query and retrieve/insert data
- Scalable, handles large amounts of data and multiple clients
- Security/redundancy
- Omnipresent, language/stack independent (everyone uses it)

HOW



SQL: TOOLS

DATABASES

- **SQLite**: file based, no server. Lightweight and easy to set up
- **MySQL**: simple, easy to maintain server implementation
- **PostgreSQL**: production grade industry standard implementation

PYTHON LIBRARIES

- **Sqlite3**: Python's standard library SQLite wrapper
- **PyMySQL**: Python client library for MySQL
- **psycopg2**: Python database adapter for PostgreSQL

PYTHON ORM

SQLAlchemy: 'object relational mapper', translates SQL queries and database operations into Python object & methods - you don't have to write SQL directly.

SQL: ANATOMY OF A QUERY

STATEMENTS

Declarative operation followed by one or more clauses. Operations include `SELECT`, `INSERT`, `UPDATE`, `DELETE`, etc.

QUERIES

`SELECT` is most common operation - used to 'query' and retrieve data from a database.

CLAUSES

SELECT statement followed by one or more clauses can be used to subset and filter data. Common clauses include: `FROM`, `WHERE`, `GROUP BY`, `HAVING`, `ORDER BY` and `LIMIT`.

```
SELECT column1, column2 FROM table1 WHERE column1 = 3 ORDER BY column2 LIMIT 100;
```