Querying your SQL database

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Outline

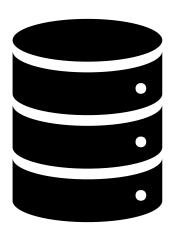
- Introduction/review of relational databases and SQLite
- Filtering for specific fields (columns) and records (rows)
- Merging related tables
- Demonstration/walkthrough
- Additional resources

Terminology

- "SQL (Structured Query Language) is a descriptive computer language designed for updating, retrieving, and calculating data in table-based databases" (MDN Web Docs)
- Table
- Database engine
- Create, Read, Update, and Delete (CRUD)
- Database management system (DBMS)

Introduction to relational databases











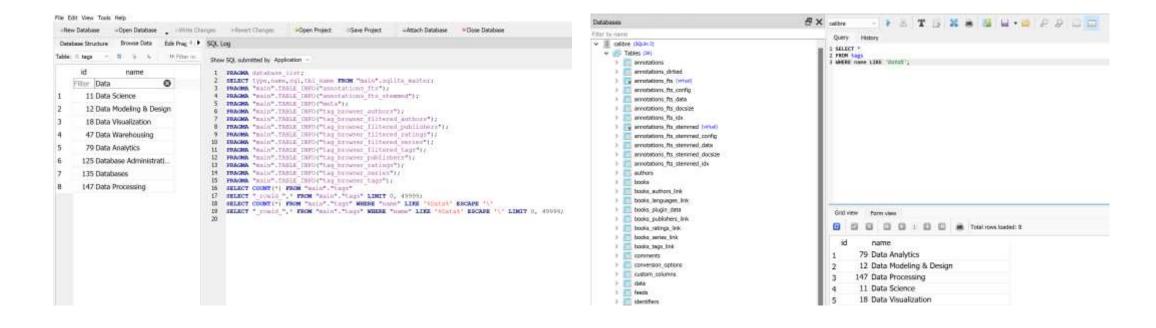
SQLite

- Embedded database and database engine
- Public domain
- Digital format <u>recommended by the Library of Congress for datasets</u>
- Major known users from among millions of applications
 - Apple: Many native applications across devices
 - Google: The Android operating system and Chrome web browser
 - Microsoft Windows 10 and other Microsoft products
 - Mozilla Firefox (web browser) and Thunderbird (email client)
 - All Python distributions since Python 2.5

Database management tools

DB Browser for SQLite

SQLiteStudio



Specifying columns

SELECT columnName FROM table_name;

You can specify multiple columns by separating each column's name with a comma

Filtering rows

SELECT *
FROM table_name
WHERE condition;

Boolean or logical operators

- TRUE or FALSE
- AND
- OR
- NOT

Patterns

- % (percentage sign)
- _ (underscore)
- ESCAPE '%'

Built-in aggregate functions

- AVG()
- COUNT()
- MIN()
- MAX()
- SUM()

Filtering groups

SELECT *
FROM table_name
GROUP BY columnName;

Filtering groups

SELECT *
FROM table_name
GROUP BY columnName
HAVING condition;

Merging tables with JOIN operators

- INNER JOIN or JOIN
- LEFT JOIN
- RIGHT JOIN
- FULL JOIN

```
SELECT table_1.column1, table_1.column2, table_2.column2
FROM table_1
INNER JOIN table2
ON table_1.column1 = table_2.column2;
```

Additional Resources

Tutorials

- Data Carpentry (uses DB Browser for SQLite)
- Khan Academy
- SQLBolt (browser-based)
- SQL Zoo (browser-based)

Documentation

- **MySQL 8.0**
- PostgreSQL 15.2
- SQLite (e.g., SELECT)