

SEO Tech
Developer

Databases and SQL

What you will be able to do:

- Describe what a relational database is using the correct vocabulary
- Create and navigate simple SQL databases
- Load data from a python dataframe into a SQL database
- Write SQL queries
- Update existing database

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Databases and SQL

Put in chat any definitions you know already

- Database
- SQL
- Table
- Record
- Field/Attribute

Definitions

- Database – A set of data tables
- SQL - Structured Query Language – language for Relational Database Management Systems (RDBMS)
- Table – A single set of rows and columns
- Record – One data entry – usually represented as a row
- Field/Attribute - variables associated with a record – represented as columns

Basic SQL Commands

- `mysql` - starts interactive shell
 - `sqlite3` – does same thing
 - SQL is platform independent!
- `SHOW DATABASES;` - view list of databases
- `USE database_name;` - select a database to use
- `SHOW TABLES;` - view list of tables in selected database
- `SELECT * FROM table_name;` - view records in table

Creating Databases, Tables and Records

- `CREATE DATABASE database_name;`
Creates a database

- `CREATE TABLE table_name (field types);`
Create a table in the selected database

```
CREATE TABLE icecream  
  ( id INT(8) UNSIGNED NOT NULL auto_increment,  
    flavor VARCHAR(255) default NULL,  
    PRIMARY KEY (id) ) AUTO_INCREMENT=1;
```

- `INSERT INTO table_name (fields) VALUES (values);`
Insert a record into the specified table
`INSERT INTO icecream (name) VALUES ("Chocolate");`

Altering Tables

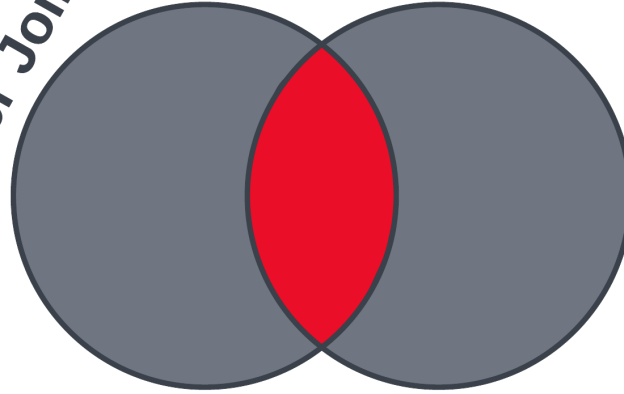
- **ALTER TABLE** can perform 3 types of operations:
 - **ADD**
Adds columns to an existing table
`ALTER TABLE table ADD field type;`
 - **CHANGE**
Updates the name of an existing table
`ALTER TABLE table
CHANGE field_old_name field_new_name type;`
 - **DROP**
Deletes or removes columns (and their data)

Joining Tables

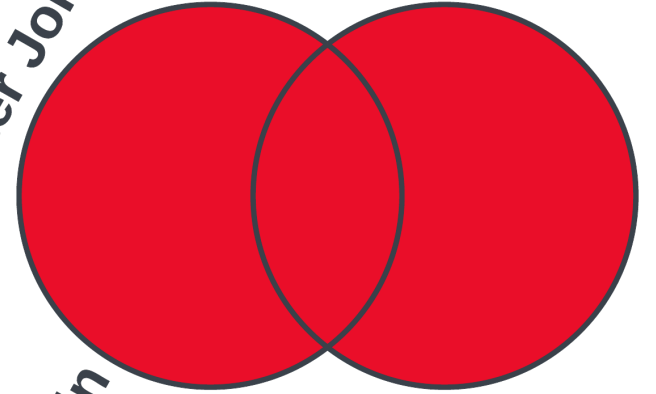
```
SELECT column_from_a  
FROM table_A  
JOIN TYPE table_B  
ON column_from_b =  
column_from_a;
```

Join Types

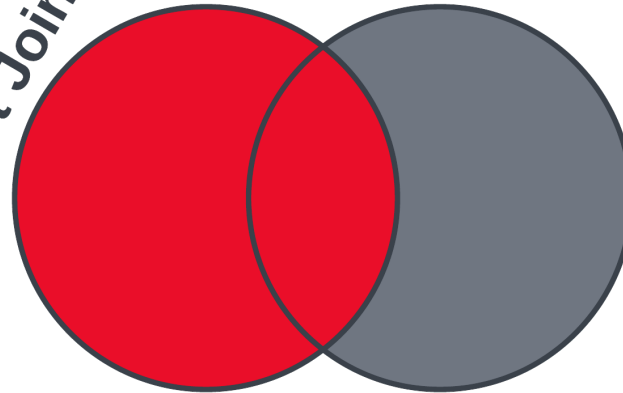
Inner Join



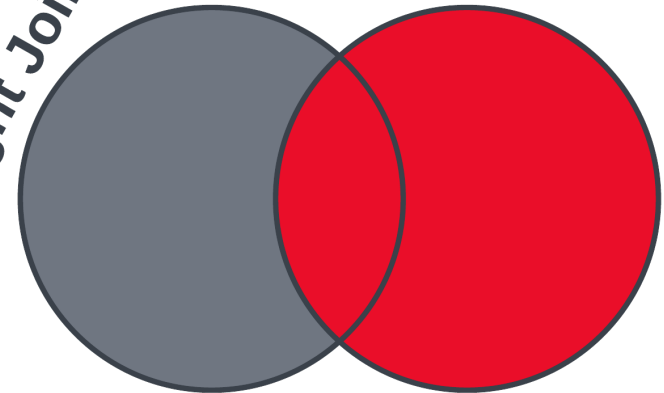
Outer Join



Left Join



Right Join



SQL Query

- Selecting Columns

- `SELECT column1, column2 FROM table_name;`

- Sorting

- `ORDER BY column_name ASC`
 - `ORDER BY column_name DESC`
 - `GROUP BY column_name`

- Filtering with WHERE

- `SELECT * FROM table_name
WHERE column OPERATOR data;`

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SQLite and SQLAlchemy

SQLite

- SQLite stores the whole database as a single cross-platform file
- `sqlite3`
Start interactive shell
- `sqlite3 file_name.db`
Start shell using specified database

SQL + Python = SQLAlchemy

- `import sqlalchemy as db`
- `engine =
db.create_engine('sqlite:///data_base_name.db')`
- `dataframe_name.to_sql('table_name', con=engine,
if_exists='replace', index=False)`
- `with engine.connect() as connection:
 query_result = connection.execute(
 db.text("SELECT * FROM table_name;"))
 print(pd.DataFrame(query_result))`

What questions do you have about...

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Thank you!