Advanced Programming with Python. Session 6

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https://slides.com/pepegar/app-6/live

Plan for today

- SQL in Python
- Using SQL in web applications

SQL refresher

We use SQL to interact with databases. The **SELECT** statement is used to get data from the database.

```
SELECT *
FROM users u
INNER JOIN invoices i
WHERE i.user_id = u.id
```

SQL refresher

The **INSERT** statement is used to add data to the database

```
INSERT INTO users
VALUES("pepe@pepegar.com", "pepegar")
```

SQL refresher

The **UPDATE** statement is used to modify data that's already in the DB

```
UPDATE users u
SET active=false
WHERE u.id = 55;
```

SQL refresher

We use the **DELETE** statement when deleting data from the DB

```
DELETE FROM users
WHERE id = 55;
```

Using plain SQL in Python

It's possible to use SQL directly in Python by using the SQLAlchemy library:

```
from sqlalchemy import create_engine

engine = create_engine("sqlite:///example-using-sql/twitter

conn = engine.connect()

results = conn.execute("SELECT * FROM users")
```

Practice

See example

session-6/example-using-sql

install

flask-sqlalchemy

Let's install flask-sqlalchemy

Object Relational Mapping

ORM is a technique we'll use to relate database records to Python objects.

```
CREATE TABLE users (
  id INTEGER PRIMARY KEY,
  username TEXT NOT NULL,
  email TEXT NOT NULL
);
```

```
class User:
    def __init__(self, id, username, email):
        self.id = id
        self.username = username
        self.email = email
```

Declaring models

Models are classes that we'll use to interact with the DB. We'll declare them by extending **db.Model**

```
class User(db.Model):
    pass
```

Adding fields to models

We'll need to make model fields have the same type as the DB columns:

```
class User(db.Model):
    id = db.Column(db.Integer, primary_key=True)
    username = db.Column(db.String, nullable=False)
    email = db.Column(db.String, nullable=False)
```

Object Relational Mapping

Using SQLAlchemy ORM, we can use methods in the class instead of raw SQL:

```
SELECT * FROM users;

SELECT * FROM users WHERE email = 'pepe@ie.edu';

SELECT * FROM users WHERE email = 'pepe@ie.edu'
                      AND username = 'pepegar;'

User.query.all()

User.query.filter(User.email == "pepe@ie.edu")

User.query.filter(User.email == "pepe@ie.edu") \
          .filter(User.username == "pepegar")
```

Practice

See example

session-6/example-using-orm

Homework

Modify your last homework so that it stores the data inside a database instead of storing it in memory