

Advanced Programming with Python. Session 6

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Plan for today

- SQL in Python
- Using SQL in web applications

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
```

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

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

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

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

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.db")

conn = engine.connect()

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


Practice

See example

`session-6/example-using-sql`

install

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