Systems

ERIN KEITH

Goals

1. Review OOP and DBs
2. Introduce Model View Controller Design Pattern
3. Explore Object Relational Mapping

Example

iMDb

in-class Movie Database
- What does it mean to be a movie?

..the further we travel the more truth we can comprehend.

Hypatia of Alexandria

General Data Model

OOP

State
◦ attributes

Behavior
◦ functions

Constraints
◦ types

RDBMS

State
◦ fields

Behavior
◦ query, insert, update
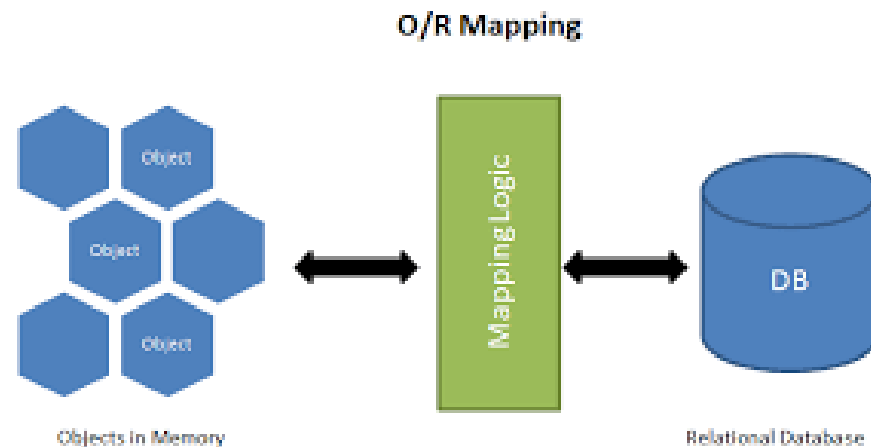
Constraints
◦ types, keys

Example

Example 2.21: Consider the two relations from our running movie database:

```
Movies(title, year, length, genre, studioName, producerC#)
MovieExec(name, address, cert#, netWorth)
```

Model View Controller

Object-Relational Mapping

a piece of software designed to translate between the data representations used by databases and those used in object-oriented programming.

O/R Mapping

Mapping Logic

Object

Object

Object

DB

Objects in Memory

Relational Database

Example

◦ Choose a "tech stack" (language, framework, IDE, etc.)
  ◦ Python Django in PyCharm
◦ Look for libraries that work with the DBMS
  ◦ Django's "database-abstraction API"
    ◦ Utilizes an ORM

Framework ORM Example

◦ Find documentation and examples to determine
  ◦ How to establish a connection
    ◦ https://docs.djangoproject.com/en/4.2/ref/databases/#postgresql-connection-settings
  ◦ How to submit queries
    ◦ https://docs.djangoproject.com/en/4.2/intro/tutorial02/#playing-with-the-api
  ◦ What's returned a the result of the queries
    ◦ https://docs.djangoproject.com/en/4.2/intro/tutorial02/#creating-models
  ◦ possible errors

https://docs.djangoproject.com/en/4.2/intro/tutorial02/

Django ORM Example

```python
from django.db import models

class Producer(models.Model):
    name = models.TextField()
    city = models.CharField(max_length=100)
    state = models.CharField(max_length=2)

    def __str__(self):
        return self.name
```

Django ORM Example

https://docs.djangoproject.com/en/4.2/topics/db/queries/

```
from producer.models import Producer

p = Producer(name="Grand Hustle Records",
             city="Atlanta",
             state="GA")
p.save()
```

Django ORM Example

https://docs.djangoproject.com/en/4.2/topics/db/queries/

```
from producer.models import Producer

p = Producer.objects.get(city="Atlanta")
```

Next Class

Module:

<u>Week 12: Databases in Software Systems</u>

Topic:

Best Practices