MODULE 11

DATA PERSISTENCE

INTRODUCTION

Françoise Dubisy

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Françoise Dubisy

Relational Database

- Values such as integers and strings organized within tables
- A table is a relation
  - I.e, each value in a row is related to other values in the same row

Data Persistence

- **Persistence** is the act of automatically storing data contained in Java objects into a relational database

Object Relational Mapping

- Object Relational Mapping (**ORM)**
  - For converting data from relational databases to object-oriented programming languages
  - To bridge the gap between an object-oriented model and a relational database

Persistence Framework

- Framework for Object Relational Mapping (**ORM)**

Java Persistence API

- The Java Persistence API (JPA) is a Java standards-based solution for persistence
- JPA is an object-relational mapping (ORM) technology
  - Transparent to the developer
- By creating Java classes (**Entity Beans**) that mirror the data model

  ⇨ Access these entities rather than directly accessing the DB

Hibernate

- Open source Java persistence framework
- ORM framework
- Is an implementation of the Java Persistence API (JPA) specification
  - Can be used in any environment supporting JPA
    - Including Java SE applications, Java EE application servers …

Hibernate

- For mapping an object-oriented domain model to a relational database
  - By replacing direct persistence-related database accesses with high-level object handling function
  - By mapping
    - From Java classes to database tables
    - From Java data types to SQL data types
- Provides
  - Data queries
    - Generate SQL calls
  - Retrieval facilities
    - Relieves from manual result set handling and object conversion

MySQL

- To connect to MySQL with Spring Boot
  - Add a dependency in pom.xml

```
<dependency>
        <groupId>mysql</groupId>
        <artifactId>mysql-connector-java</artifactId>
</dependency>
```

MySQL

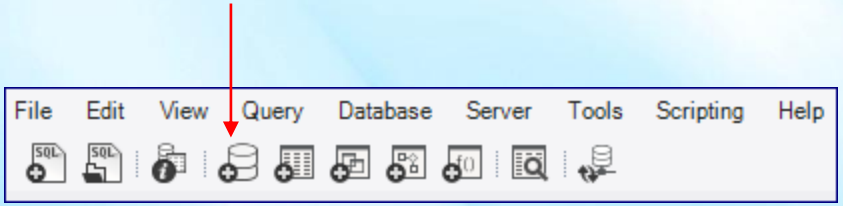
- Create an instance of MySQL
  - E.g,
    - *MySQL56*
    - Running on *localhost*
    - Port: *3306*
    - User: *root*
    - Password: … // remember it
- Start this instance of MySQL
  - Task Manager ⇨Services ⇨*MySQL56* ⇨Start

MySQL

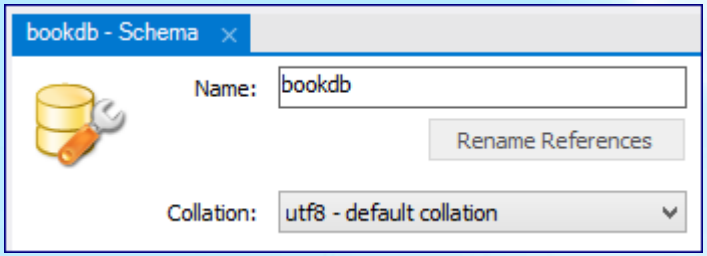
- Use a visual tool for database management
- E.g, MySQL **Workbench**
  - For DBA, developer or data architect
  - To visually design, model, generate, and manage databases

MySQL

- Create a new schema



  - E.g, ***bookdb*** schema



MySQL

- Configure Spring Boot to access MySQL database
- In **Application.yml**
  - Configure a spring datasource

```
# Local server
server:
  # port is used by spring-boot-admin
  port: 8080
  contextPath: /book

spring:
  datasource:
    password: ...
    url: jdbc:mysql://localhost:3306/bookdb?user=root
```

Root of the project

Password of the MySQL instance

User of the MySQL instance

Name of the database schema