**Task 03 || Spring Boot, ORM (JPA, Hibernate)**

1. **Duration:** 3 working days
2. **Description:**

* It’s time to replace your List/Map in service layer with database.
* We will use an in-memory database (H2) in this task.

If you are curious about what is H2 DB: <https://www.h2database.com/html/main.html>

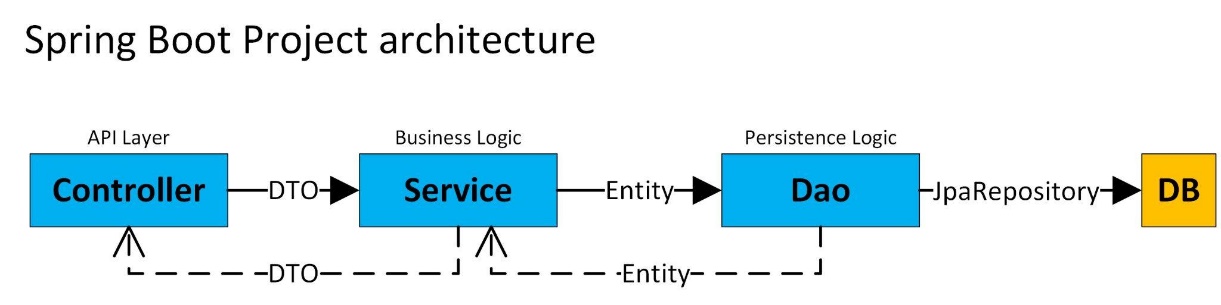
*[No need to read all the documentation, we will figure it out eventually]*

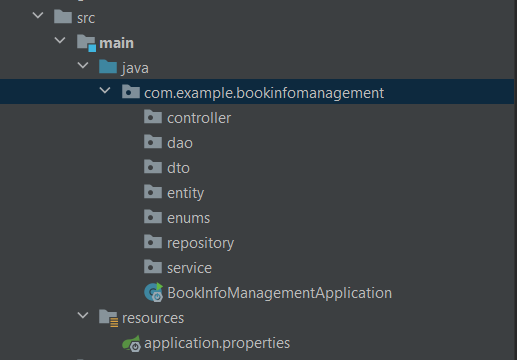
* create feature branch for task 03 from release branch:

go to release branch terminal and execute,

*git checkout -b feature/bim/atique-202015/task-03*

*[Note: use your nick name and emp\_id in place of “atique-202015”]*

* Migrate the CRUD from task 02 in *Controller→Service→Dao→Repository* layeyrs.
* Access H2 DB using JPA, Hibernate in Dao layer.
* Create and Use DTO’s in *Controller→Service* layer
* Create and use Domain Models/JPA-Entities in *Service→Dao* layer
* What is Domain model? Read: <https://stackoverflow.com/questions/1863537/what-is-a-domain-model>, In this Task your domain model will be the BookEntity object.
* What is DAO pattern? Read: <https://www.baeldung.com/java-dao-pattern>]
* Create bellow directories under *src/main/java/com.example.bookinfomanagement*

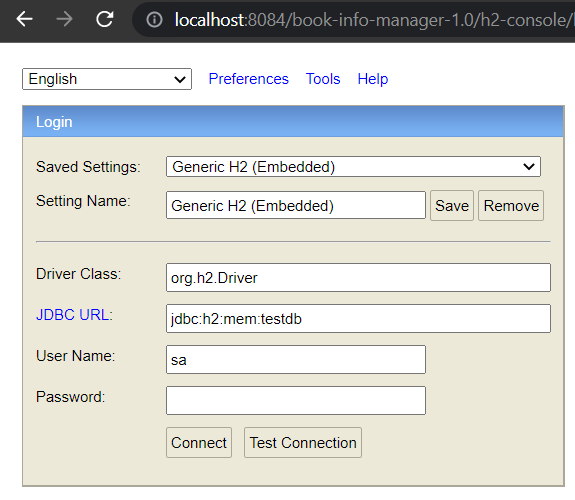
*dao* for DAO (Data Access Object) layer, *entity* for JPA-Entities, *repository* for JPA Repositories like:

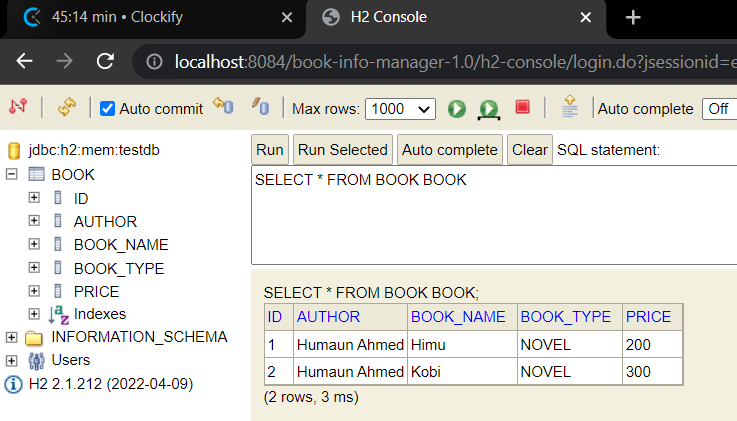
* Add below properties in *application.properties* file

spring.datasource.url=jdbc:h2:mem:testdb  
 spring.datasource.driverClassName=org.h2.Driver  
 spring.datasource.username=sa  
 spring.datasource.password=  
 spring.jpa.database-platform=org.hibernate.dialect.H2Dialect  
 spring.h2.console.enabled=true

* Add Below dependency in *build.gradle → dependencies*

implementation 'org.springframework.boot:spring-boot-starter-data-jpa'  
 runtimeOnly 'com.h2database:h2'

* After implementation run your application. Save some book using POST API
* Hit the URL: <http://localhost:8084/book-info-manager-1.0/h2-console>
* Below console will be displayed on browser:
* Press the **Connect** button and see your database like:



1. **Learning metatrails**
2. <https://www.baeldung.com/spring-boot-h2-database>
3. <https://www.baeldung.com/jpa-entities>
4. <https://www.baeldung.com/learn-jpa-hibernate>
5. **Helper Project**

* Simple CRUD operations to manage student info is done in this project using H2 Database and JPA in 4 layers.
* You have already cloned this project in task 02
* open terminal & fetch branches: *git fetch*
* checkout branch: *git checkout hp/student-info-manage-h2-jpa*
* Description can be found in README.md file.
* Postman collection kept in *documents* package.
* You can see the project structure and browse the code.

1. **What to submit**

Prepare a doc with the answer of these two questions:

* What is ORM?
* Why JPA?
* Why Hibernate?
* Describe Hibernate Persistence Life Cycle.

Ref: <https://www.geeksforgeeks.org/hibernate-lifecycle/>

* How Builder Pattern work?
* Write about the newly added dependencies in *build.gradle* file.
* Write about the newly added properties in *application.properties* file.
* Write about new annotations we used:

@Builder, @Repository, @Entity, @Table, @Id, @Column, @Enumerated

* Submit your code for task 03 in GitHub. See how to submit section.

1. **How to submit**

* Name your doc/pptx as: <nick name>\_<emp\_id>\_<task id>.

Ex: atique\_202015\_task\_03.docx

* Upload your doc/pptx in documents folder
* commit your changes in your task 03 feature branch:

*git commit -m "[bim] task 03"*

* Push the changes to your feature branch: *git push*
* Create a merge req in GitHub [your feature branch→ your release branch]

Ex: *feature/bim/atique-202015/task-03 → bim/atique-202015/release-1.0*

* Follow up instructors’ feedback on GitHub merge request.