**Spring Boot Course Project Documentation**

**Overview**

This Spring Boot project is designed as a demo for managing course-related information. It includes RESTful endpoints to perform CRUD operations on courses and is integrated with a MySQL database for data persistence. The project also includes basic configurations and dependencies required to run a Spring Boot application.

**Project Structure**

```

src/main/java

|-- com/springrest

|-- controller

|-- MyController.java

|-- dao

|-- CourseDao.java

|-- entities

|-- Course.java

|-- services

|-- CourseService.java

|-- CourseServiceImpl.java

|-- SpringrestApplication.java

src/main/resources

|-- application.properties

pom.xml

```

**Maven Configuration**

`pom.xml`

The `pom.xml` file manages project dependencies and plugins. Key dependencies include:

- \*\*Spring Boot Starter Data JPA\*\*: For integrating JPA with the Spring Boot application.

- \*\*Spring Boot Starter Web\*\*: To build web, including RESTful, applications using Spring MVC.

- \*\*MySQL Connector Java\*\*: For connecting the application to a MySQL database.

- \*\*Springdoc OpenAPI\*\*: To generate API documentation.

- \*\*Spring Boot Starter Test\*\*: For testing the application.

- \*\*Spring Boot Starter Actuator\*\*: For adding production-ready features to help monitor and manage the application.

```xml

<dependencies>

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-data-jpa</artifactId>

</dependency>

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-web</artifactId>

</dependency>

<dependency>

<groupId>com.mysql</groupId>

<artifactId>mysql-connector-j</artifactId>

<scope>runtime</scope>

</dependency>

<dependency>

<groupId>org.springdoc</groupId>

<artifactId>springdoc-openapi-starter-webmvc-ui</artifactId>

<version>2.5.0</version>

</dependency>

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-test</artifactId>

<scope>test</scope>

</dependency>

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-actuator</artifactId>

</dependency>

</dependencies>

```

### Application Properties

#### `application.properties`

This file contains the configuration for connecting to the MySQL database.

```properties

spring.datasource.url=jdbc:mysql://localhost:3306/yourdatabase

spring.datasource.username=yourusername

spring.datasource.password=yourpassword

spring.jpa.hibernate.ddl-auto=update

spring.jpa.show-sql=true

spring.jpa.properties.hibernate.dialect=org.hibernate.dialect.MySQL5Dialect

```

### Application Entry Point

#### `SpringrestApplication.java`

The main entry point for the Spring Boot application.

```java

package com.springrest;

import org.springframework.boot.SpringApplication;

import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication

public class SpringrestApplication {

public static void main(String[] args) {

SpringApplication.run(SpringrestApplication.class, args);

}

}

```

**Controllers**

`MyController.java`

This controller handles HTTP requests related to courses.

```java

package com.springrest.controller;

import com.springrest.entities.Course;

import com.springrest.services.CourseService;

import org.springframework.beans.factory.annotation.Autowired;

import org.springframework.web.bind.annotation.\*;

import java.util.List;

@RestController

@RequestMapping("/api/courses")

public class MyController {

@Autowired

private CourseService courseService;

@GetMapping

public List<Course> getCourses() {

return courseService.getCourses();

}

@GetMapping("/{courseId}")

public Course getCourse(@PathVariable Long courseId) {

return courseService.getCourse(courseId);

}

@PostMapping

public Course addCourse(@RequestBody Course course) {

return courseService.addCourse(course);

}

@PutMapping("/{courseId}")

public Course updateCourse(@RequestBody Course course, @PathVariable Long courseId) {

return courseService.updateCourse(course, courseId);

}

@DeleteMapping("/{courseId}")

public void deleteCourse(@PathVariable Long courseId) {

courseService.deleteCourse(courseId);

}

}

```

**Services**

#### `CourseService.java`

Interface for course services.

```java

package com.springrest.services;

import com.springrest.entities.Course;

import java.util.List;

public interface CourseService {

List<Course> getCourses();

Course getCourse(Long courseId);

Course addCourse(Course course);

Course updateCourse(Course course, Long courseId);

void deleteCourse(Long courseId);

}

```

#### `CourseServiceImpl.java`

Implementation of the `CourseService` interface.

```java

package com.springrest.services;

import com.springrest.dao.CourseDao;

import com.springrest.entities.Course;

import org.springframework.beans.factory.annotation.Autowired;

import org.springframework.stereotype.Service;

import java.util.List;

@Service

public class CourseServiceImpl implements CourseService {

@Autowired

private CourseDao courseDao;

@Override

public List<Course> getCourses() {

return courseDao.findAll();

}

@Override

public Course getCourse(Long courseId) {

return courseDao.findById(courseId).orElse(null);

}

@Override

public Course addCourse(Course course) {

return courseDao.save(course);

}

@Override

public Course updateCourse(Course course, Long courseId) {

Course existingCourse = courseDao.findById(courseId).orElse(null);

if (existingCourse != null) {

existingCourse.setTitle(course.getTitle());

existingCourse.setDescription(course.getDescription());

return courseDao.save(existingCourse);

}

return null;

}

@Override

public void deleteCourse(Long courseId) {

courseDao.deleteById(courseId);

}

}

```

**DAO (Data Access Object)**

#### `CourseDao.java`

Repository interface for course entities.

```java

package com.springrest.dao;

import com.springrest.entities.Course;

import org.springframework.data.jpa.repository.JpaRepository;

public interface CourseDao extends JpaRepository<Course, Long> {

}

```

**Entities**

#### `Course.java`

Entity class representing the Course.

```java

package com.springrest.entities;

import javax.persistence.Entity;

import javax.persistence.GeneratedValue;

import javax.persistence.GenerationType;

import javax.persistence.Id;

@Entity

public class Course {

@Id

@GeneratedValue(strategy = GenerationType.IDENTITY)

private Long id;

private String title;

private String description;

// Getters and Setters

}

```

**Running the Application**

1. \*\*Set Up MySQL Database\*\*: Ensure you have a MySQL database set up and configured as per the `application.properties` file.

2. \*\*Build the Project\*\*: Run `mvn clean install` to build the project.

3. \*\*Run the Application\*\*: Use `mvn spring-boot:run` to start the application.

4. \*\*Access API\*\*: The API can be accessed at `http://localhost:8080/api/courses`.

**API Endpoints**

- \*\*GET /api/courses\*\*: Retrieve all courses.

- \*\*GET /api/courses/{courseId}\*\*: Retrieve a specific course by ID.

- \*\*POST /api/courses\*\*: Add a new course.

- \*\*PUT /api/courses/{courseId}\*\*: Update an existing course.

- \*\*DELETE /api/courses/{courseId}\*\*: Delete a course by ID.