

Spring Boot Based Web Application for a Simplified Online School System

1. Project Objective

Develop a Spring Boot web application to manage Courses and Students with a many-to-one relationship.

2. Course Entity

Create a Course entity with the following attributes:

- courseId (Long)
- courseName (String)
- courseDescription (String)
- credits (int)
- students (List)

Use JPA annotations to map the Course class to a database table.

3. Student Entity

Create a Student entity with the following attributes:

- studentId (Long)
- firstName (String)
- lastName (String)
- email (String)
- course (Course)

Each Student must be linked to exactly one Course.

4. Relationship Mapping

Establish a many-to-one relationship between Student and Course.

Use @ManyToOne in Student and @OneToMany in Course.

5. Course Creation API

POST /courses - Create a new course.

6. Student Creation API

POST /students/{courseId} - Create a student and assign to a course.

7. Student Retrieval API

GET /students/{studentId} - Retrieve student details.

8. Input Format

Course: courseName, courseDescription, credits

Student: firstName, lastName, email, courseId

9. Output Format

Display created records with success messages.

10. Notes

Follow standard Java naming conventions and use Spring Data JPA.

Personal Shortcuts & Revision Notes

1. The table having the foreign key is always the Many-To-One (Owning Side).

Example: Student table has `course_id` → Student is the owner.

2. The table without foreign key is One-To-Many (Inverse Side).

3. In OneToMany, use `@JsonIgnore` to avoid infinite recursion errors.

4. In the FK owning table, always use `@JoinColumn(name="course_id")`.

5. Use `mappedBy` in OneToMany to refer to the variable name in the owning entity.

Example: `@OneToMany(mappedBy="course")`.

6. Always use Wrapper class Long instead of primitive long for IDs.

Reason: long cannot hold null, Long can hold null.

7. Follow both CamelCase and Snake_Case naming conventions.

Java → `firstName`, `courseDescription`

DB → `first_name`, `course_description`

Shortcut: FK table → `ManyToOne + JoinColumn` | No FK → `OneToMany + mappedBy + JsonIgnore` | Use Long | Follow naming rules