Figure 1: Oxvsys Logo

Oxvsys Spring Boot Exercise 1

Spring Boot CRUD Operations with Project-Task Management

In this coding exercise, you will be creating a Spring Boot application that demonstrates CRUD (Create, Read, Update, Delete) operations on two entities: Projects and Tasks. The objective is to establish a one-to-many relationship between Projects and Tasks, where a single Project can have multiple associated Tasks. You will build RESTful APIs that allow users to manage both projects and their associated tasks.

Entities:

1. **Project:**
   - Attributes: Title, Description, Image, Created At, Updated At
   - A project can have multiple associated tasks.
2. **Task:**
   - Attributes: Name, Is Completed (boolean)
   - Each task belongs to a specific project.

Functionalities to Implement:

1. **Create a Project:**
   - Implement an API to create a new project with its title, description, and optional image.
2. **Update a Project:**
   - Create an API to update the details of an existing project, including its title, description, and image.
3. **Delete a Project:**
   - Develop an API to delete a project along with all its associated tasks.
4. **Retrieve Projects:**

- Implement an API to fetch a list of all projects. Each project object should include its associated tasks.

5. **Create a Task:**
   - Create an API to add a new task to a specific project. The task should have a name and an initial completion status.
6. **Update Task Status:**
   - Implement an API to update the completion status of a task within a project.
7. **Delete Task:**
   - Develop an API to delete a task from a project.

Guidelines:

- Use Spring Boot to build the RESTful APIs.
- Implement proper error handling and validation for input data.
- Utilize a relational database (such as MySQL, PostgreSQL) to persist the data.
- Define appropriate endpoints for each API operation.
- Implement the one-to-many relationship between projects and tasks using JPA/Hibernate annotations.
- Consider optimizing the queries for fetching projects and their associated tasks efficiently.
- You have **4 days** from **today's date** to complete and submit the task.
- Send an email to [**hr@oxvsys.com**] with the subject line "**Spring Boot Project-Task Management - Submission.**" Include the following information:
  - Your full name
  - Link to your GitHub repository
  - Any additional notes or comments you'd like to share

Additional Challenges (Optional):

- Implement pagination and sorting for the list of projects and tasks.
- Add authentication and authorization mechanisms to protect the APIs.
- Implement exception handling using custom exception classes.
- Provide API documentation using Swagger or similar tools.

This exercise aims to enhance your proficiency in building Spring Boot applications, handling relational data, and implementing CRUD operations with a focus on complex relationships between entities. It will also give you valuable experience in designing and developing RESTful APIs that adhere to best practices.