# **CRUD Implementation with Thymeleaf & MySQL**

**Step-by-Step Implementation**

1. **Project Setup**
   * Use [Spring Initializr](https://start.spring.io/) with dependencies:
     + Spring Web, Thymeleaf, Spring Data JPA, MySQL Driver.
2. **Entity Class**

@Entity

public class Book {

@Id

@GeneratedValue(strategy = GenerationType.IDENTITY)

private Long id;

private String title;

private String author;

// Getters, setters, constructors

}

**Repository Interface**

@Repository

public interface BookRepository extends JpaRepository<Book, Long> {}

**Service Layer**

@Service

public class BookService {

@Autowired

private BookRepository repo;

public List<Book> listAll() { return repo.findAll(); }

public void save(Book book) { repo.save(book); }

public Book get(Long id) { return repo.findById(id).get(); }

public void delete(Long id) { repo.deleteById(id); }

}

**Controller**

@Controller

public class BookController {

@Autowired

private BookService service;

@GetMapping("/books")

public String listBooks(Model model) {

model.addAttribute("books", service.listAll());

return "books";

}

@GetMapping("/books/new")

public String createBookForm(Model model) {

model.addAttribute("book", new Book());

return "create\_book";

}

@PostMapping("/books")

public String saveBook(@ModelAttribute("book") Book book) {

service.save(book);

return "redirect:/books";

}

// Add edit/delete endpoints

}

**Thymeleaf Templates**

* books.html:

<tr th:each="book : ${books}">

<td th:text="${book.title}"></td>

<td th:text="${book.author}"></td>

<td><a th:href="@{/books/edit/{id}(id=${book.id})}">Edit</a></td>

</tr>

**MySQL Configuration**

# application.properties

spring.datasource.url=jdbc:mysql://localhost:3306/library\_db

spring.datasource.username=root

spring.datasource.password=root

spring.jpa.hibernate.ddl-auto=update

**Real-World CRUD Examples**

1. **Library Management System**
   * Entities: Book, Member, BorrowRecord.
   * Use Case: Track book inventory, borrowing, and returns.
2. **Employee Directory**
   * Entities: Employee, Department, Project.
   * Use Case: Manage employee records and assignments.
3. **E-Commerce Product Catalog**
   * Entities: Product, Category, Order.
   * Use Case: Admin dashboard to CRUD products.

# **🧠 Spring Boot + Thymeleaf + MySQL (CRUD) MCQs with Answers**

**1. What annotation is used to define a controller in Spring Boot MVC (non-REST)?**  
A) @Service  
B) @Component  
C) @RestController  
D) @Controller  
  
✅ **Answer: D) @Controller**

**2. Which of the following Thymeleaf attributes is used to bind an object to a form?**  
A) form:object  
B) th:object  
C) data:object  
D) form:bind  
  
✅ **Answer: B) th:object**

**3. What interface should a repository extend to provide full CRUD functionality with pagination and sorting?**  
A) CrudRepository  
B) JpaRepository  
C) PagingAndSortingRepository  
D) HibernateRepository

✅ **Answer: B) JpaRepository**

**4. Which annotation binds form data to a model object in a controller method?**  
A) @RequestBody  
B) @ModelAttribute  
C) @RequestParam  
D) @BindParam

✅ **Answer: B) @ModelAttribute**

**5. Which file should you use to define MySQL database connection settings in Spring Boot?**  
A) application.cfg  
B) settings.xml  
C) application.properties  
D) config.yml

✅ **Answer: C) application.properties**

**6. What annotation is used on a class to make it a JPA entity?**  
A) @Table  
B) @MappedClass  
C) @Entity  
D) @Repository

✅ **Answer: C) @Entity**

**7. In Thymeleaf, how do you iterate over a list of records?**  
A) th:for  
B) th:loop  
C) th:each  
D) th:repeat

✅ **Answer: C) th:each**

**8. What annotation is used to validate form data in Spring Boot?**  
A) @Validated  
B) @FormCheck  
C) @Valid  
D) @FormValidate

✅ **Answer: C) @Valid**

**9. Which HTTP method is used for updating a resource in RESTful Spring Boot apps?**  
A) POST  
B) PUT  
C) GET  
D) DELETE

✅ **Answer: B) PUT**

**10. What is the role of BindingResult in a form-handling method?**  
A) To bind HTML form values to objects  
B) To display the form in Thymeleaf  
C) To hold validation errors after submitting the form  
D) To hold database errors

✅ **Answer: C) To hold validation errors after submitting the form**

**11. Which Spring Boot annotation enables automatic configuration and component scanning?**  
A) @SpringScan  
B) @EnableAutoConfiguration  
C) @SpringBootApplication  
D) @ComponentAutoScan

✅ **Answer: C) @SpringBootApplication**

**12. What does @GeneratedValue do in a JPA entity?**  
A) Prevents manual updates to a field  
B) Automatically generates and increments the primary key  
C) Sets a default value for the field  
D) Prevents null values

✅ **Answer: B) Automatically generates and increments the primary key**

**13. What is the purpose of the th:value attribute in Thymeleaf?**  
A) To define JavaScript variables  
B) To bind a value from the backend into an input field  
C) To display a dropdown  
D) To validate user input

✅ **Answer: B) To bind a value from the backend into an input field**

**14. What method in JpaRepository would you use to delete a record by its ID?**  
A) delete()  
B) removeById()  
C) deleteById()  
D) dropById()

✅ **Answer: C) deleteById()**

**15. In a typical Spring Boot CRUD flow, which layer is responsible for calling repository methods and handling business logic?**  
A) Controller  
B) Repository  
C) Entity  
D) Service

✅ **Answer: D) Service**