**Exercise 9: Creating a Spring Boot Application**

**Scenario:**

You need to create a Spring Boot application for the library management system to simplify configuration and deployment.

**Steps:**

1. **Create a Spring Boot Project:**
   * Use **Spring Initializr** to create a new Spring Boot project named **LibraryManagement**.
2. **Add Dependencies:**
   * Include dependencies for **Spring Web, Spring Data JPA, and H2 Database**.
3. **Create Application Properties:**
   * Configure database connection properties in **application.properties**.
4. **Define Entities and Repositories:**
   * Create **Book** entity and **BookRepository** interface.
5. **Create a REST Controller:**
   * Create a **BookController** class to handle CRUD operations.
6. **Run the Application:**
   * Run the Spring Boot application and test the REST endpoints.

**pom.xml**

<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">

<modelVersion>4.0.0</modelVersion>

<groupId>com.library</groupId>

<artifactId>LibraryManagement</artifactId>

<version>0.0.1-SNAPSHOT</version>

<packaging>jar</packaging>

<name>LibraryManagement</name>

<description>Library Management System</description>

<parent>

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

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

<version>2.7.5</version>

<relativePath/> <!-- lookup parent from repository -->

</parent>

<properties>

<java.version>11</java.version>

</properties>

<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.h2database</groupId>

<artifactId>h2</artifactId>

<scope>runtime</scope>

</dependency>

<dependency>

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

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

<scope>test</scope>

</dependency>

</dependencies>

<build>

<plugins>

<plugin>

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

<artifactId>spring-boot-maven-plugin</artifactId>

</plugin>

</plugins>

</build>

</project>

**Application.properties**

spring.datasource.url=jdbc:h2:mem:testdb

spring.datasource.driverClassName=org.h2.Driver

spring.datasource.username=sa

spring.datasource.password=password

spring.h2.console.enabled=true

spring.jpa.database-platform=org.hibernate.dialect.H2Dialect

spring.jpa.hibernate.ddl-auto=update

**LibraryManagementApplication.java**

package com.library;

import org.springframework.boot.SpringApplication;

import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication

public class LibraryManagementApplication {

public static void main(String[] args) {

SpringApplication.run(LibraryManagementApplication.class, args);

}

}

**Book.java**

package com.library.entity;

import javax.persistence.Entity;

import javax.persistence.GeneratedValue;

import javax.persistence.GenerationType;

import javax.persistence.Id;

@Entity

public class Book {

@Id

@GeneratedValue(strategy = GenerationType.IDENTITY)

private Long id;

private String title;

private String author;

private String isbn;

// Getters and Setters

public Long getId() {

return id;

}

public void setId(Long id) {

this.id = id;

}

public String getTitle() {

return title;

}

public void setTitle(String title) {

this.title = title;

}

public String getAuthor() {

return author;

}

public void setAuthor(String author) {

this.author = author;

}

public String getIsbn() {

return isbn;

}

public void setIsbn(String isbn) {

this.isbn = isbn;

}

}

**BookRepository.java**

package com.library.repository;

import com.library.entity.Book;

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

import org.springframework.stereotype.Repository;

@Repository

public interface BookRepository extends JpaRepository<Book, Long> {

}

**BookController.java**

package com.library.controller;

import com.library.entity.Book;

import com.library.repository.BookRepository;

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

import org.springframework.http.ResponseEntity;

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

import java.util.List;

import java.util.Optional;

@RestController

@RequestMapping("/books")

public class BookController {

@Autowired

private BookRepository bookRepository;

@GetMapping

public List<Book> getAllBooks() {

return bookRepository.findAll();

}

@GetMapping("/{id}")

public ResponseEntity<Book> getBookById(@PathVariable Long id) {

Optional<Book> book = bookRepository.findById(id);

return book.map(ResponseEntity::ok).orElseGet(() -> ResponseEntity.notFound().build());

}

@PostMapping

public Book createBook(@RequestBody Book book) {

return bookRepository.save(book);

}

@PutMapping("/{id}")

public ResponseEntity<Book> updateBook(@PathVariable Long id, @RequestBody Book bookDetails) {

Optional<Book> book = bookRepository.findById(id);

if (book.isPresent()) {

Book existingBook = book.get();

existingBook.setTitle(bookDetails.getTitle());

existingBook.setAuthor(bookDetails.getAuthor());

existingBook.setIsbn(bookDetails.getIsbn());

Book updatedBook = bookRepository.save(existingBook);

return ResponseEntity.ok(updatedBook);

} else {

return ResponseEntity.notFound().build();

}

}

@DeleteMapping("/{id}")

public ResponseEntity<Void> deleteBook(@PathVariable Long id) {

Optional<Book> book = bookRepository.findById(id);

if (book.isPresent()) {

bookRepository.delete(book.get());

return ResponseEntity.ok().build();

} else {

return ResponseEntity.notFound().build();

}

}

}