Exercise 1: Configuring a Basic Spring Application

Scenario:

Your company is developing a web application for managing a library. You need to use the Spring Framework to handle the backend operations.

Steps:

1. **Set Up a Spring Project:**
   - Create a Maven project named **LibraryManagement**.
   - Add Spring Core dependencies in the **pom.xml** file.
2. **Configure the Application Context:**
   - Create an XML configuration file named **applicationContext.xml** in the **src/main/resources** directory.
   - Define beans for **BookService** and **BookRepository** in the XML file.
3. **Define Service and Repository Classes:**
   - Create a package **com.library.service** and add a class **BookService**.
   - Create a package **com.library.repository** and add a class **BookRepository**.
4. **Run the Application:**
   - Create a main class to load the Spring context and test the configuration.

In Exercise 1, I set up a basic Spring application using Maven in Eclipse by creating the project structure, adding Spring Core dependency, defining beans (BookService and BookRepository) in applicationContext.xml, and successfully loading the Spring container through a main class.

Exercise 2: Implementing Dependency Injection

Scenario:

In the library management application, you need to manage the dependencies between the BookService and BookRepository classes using Spring's IoC and DI.

Steps:

1. **Modify the XML Configuration:**
   - Update **applicationContext.xml** to wire **BookRepository** into **BookService**.
2. **Update the BookService Class:**
   - Ensure that **BookService** class has a setter method for **BookRepository**.
3. **Test the Configuration:**
   - Run the **LibraryManagementApplication** main class to verify the dependency injection.

CODE :

MainApp.java

```
package com.library;

import com.library.service.BookService;

import org.springframework.context.ApplicationContext;

import org.springframework.context.support.ClassPathXmlApplicationContext;


public class MainApp {

   public static void main(String[] args) {

      ApplicationContext context = new
ClassPathXmlApplicationContext("applicationContext.xml");


      BookService bookService = context.getBean("bookService", BookService.class);

      bookService.addBook("Spring in Action");

   }

}
```

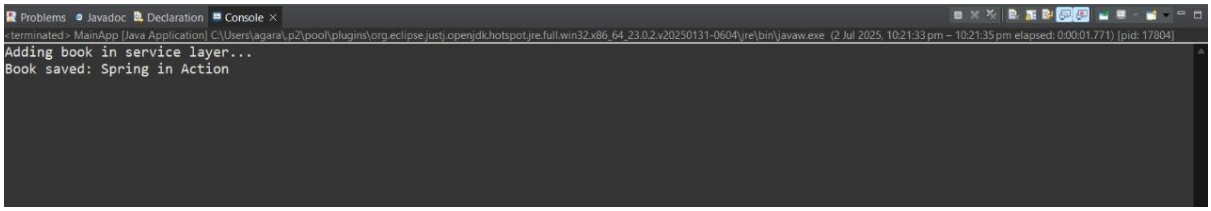
BookRepository.java

```
package com.library.repository;
public class BookRepository {
    public void saveBook(String bookName) {
        System.out.println("Book saved: " + bookName);
    }
}
```

BookService.java

```
package com.library.service;
import com.library.repository.BookRepository;
public class BookService {

    private BookRepository bookRepository;

    public void setBookRepository(BookRepository bookRepository) {
        this.bookRepository = bookRepository;
    }

    public void addBook(String bookName) {
        System.out.println("Adding book in service layer...");
        bookRepository.saveBook(bookName);
    }
}
```

OUTPUT :



Exercise 4: Creating and Configuring a Maven Project

Scenario:

You need to set up a new Maven project for the library management application and add Spring dependencies.

Steps:

1. **Create a New Maven Project:**
    - Create a new Maven project named **LibraryManagement**.
2. **Add Spring Dependencies in pom.xml:**
    - Include dependencies for Spring Context, Spring AOP, and Spring WebMVC.
3. **Configure Maven Plugins:**
    - Configure the Maven Compiler Plugin for Java version 1.8 in the pom.xml file.

In Exercise 4, I created a complete Maven-based Spring project in Eclipse by configuring Spring Core, AOP, and WebMVC dependencies along with the Maven Compiler Plugin for Java 1.8 compatibility, ensuring a properly structured and build-ready application environment.

Exercise 5: Configuring the Spring IoC Container

Scenario:

The library management application requires a central configuration for beans and dependencies.

Steps:

1. **Create Spring Configuration File:**
   - Create an XML configuration file named **applicationContext.xml** in the **src/main/resources** directory.
   - Define beans for **BookService** and **BookRepository** in the XML file.
2. **Update the BookService Class:**
   - Ensure that the **BookService** class has a setter method for **BookRepository**.
3. **Run the Application:**
   - Create a main class to load the Spring context and test the configuration.

CODE:

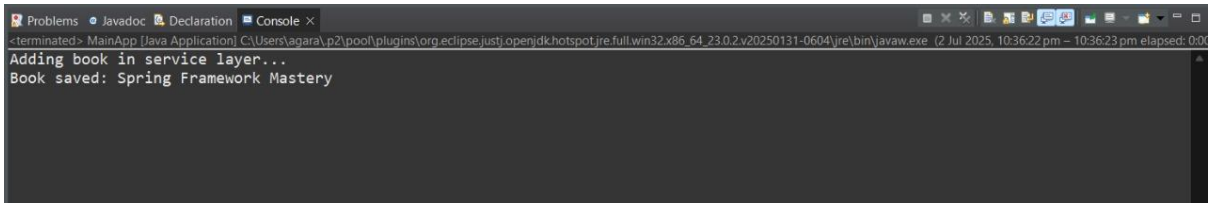
BookService.java

```
package com.library.service;

import com.library.repository.BookRepository;

public class BookService {


   private BookRepository bookRepository;


   // Setter for Dependency Injection

   public void setBookRepository(BookRepository bookRepository) {

      this.bookRepository = bookRepository;

   }


   public void addBook(String bookName) {

      System.out.println("Adding book in service layer...");

      bookRepository.saveBook(bookName);

   }}
```

MainApp.java

```
package com.library;

import com.library.service.BookService;

import org.springframework.context.ApplicationContext;

import org.springframework.context.support.ClassPathXmlApplicationContext;


public class MainApp {

    public static void main(String[] args) {

        ApplicationContext context = new
ClassPathXmlApplicationContext("applicationContext.xml");


        BookService bookService = context.getBean("bookService", BookService.class);

        bookService.addBook("Spring Framework Mastery");

    }

}
```

OUTPUT :



Exercise 7: Implementing Constructor and Setter Injection

Scenario:

The library management application requires both constructor and setter injection for better control over bean initialization.

Steps:

1. **Configure Constructor Injection:**
   - Update applicationContext.**xml** to configure constructor injection for **BookService**.
2. **Configure Setter Injection:**
   - Ensure that the **BookService** class has a setter method for **BookRepository** and configure it in **applicationContext.xml**.
3. **Test the Injection:**
   - Run the **LibraryManagementApplication** main class to verify both constructor and setter injection.

CODE:

BookService.java

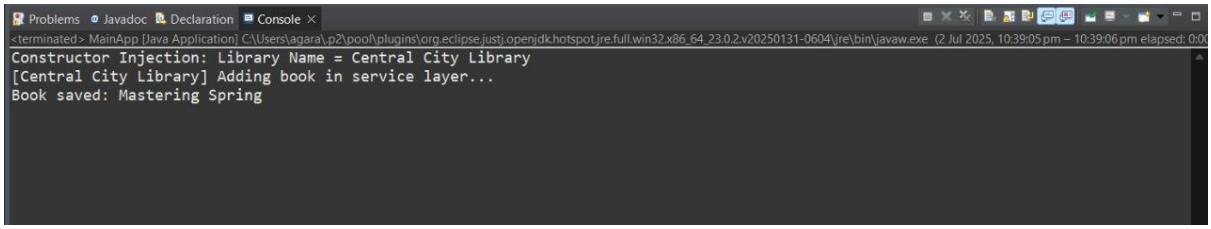
```
package com.library.service;

import com.library.repository.BookRepository;

public class BookService {


    private BookRepository bookRepository;

    private String libraryName;


    // Constructor for constructor injection

    public BookService(String libraryName) {

        this.libraryName = libraryName;

        System.out.println("Constructor Injection: Library Name = " + libraryName);

    }


    // Setter for BookRepository (Setter Injection)

    public void setBookRepository(BookRepository bookRepository) {
```

```
        this.bookRepository = bookRepository;
    }

    public void addBook(String bookName) {
        System.out.println("[" + libraryName + "] Adding book in service layer...");
        bookRepository.saveBook(bookName);
    }
}
```

MainApp.java

```
package com.library;
import com.library.service.BookService;
import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class MainApp {
    public static void main(String[] args) {
        ApplicationContext context = new
ClassPathXmlApplicationContext("applicationContext.xml");

        BookService bookService = context.getBean("bookService", BookService.class);
        bookService.addBook("Mastering Spring");
    }
}
```

OUTPUT:



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.

CODE :

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);
```

```
        }
}
```

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.web.bind.annotation.*;

import java.util.List;
import java.util.Optional;

@RestController
@RequestMapping("/books")
public class BookController {

    @Autowired
    private BookRepository bookRepository;

    // Get all books
    @GetMapping
    public List<Book> getAllBooks() {
        return bookRepository.findAll();
    }

    // Get book by ID
    @GetMapping("/{id}")
    public Book getBookById(@PathVariable Long id) {
        Optional<Book> book = bookRepository.findById(id);
```

```
        return book.orElse(null);
    }

    // Add a new book
    @PostMapping
    public Book addBook(@RequestBody Book book) {
        return bookRepository.save(book);
    }

    // Update an existing book
    @PutMapping("/{id}")
    public Book updateBook(@PathVariable Long id, @RequestBody Book updatedBook) {
        Optional<Book> optionalBook = bookRepository.findById(id);
        if (optionalBook.isPresent()) {
            Book book = optionalBook.get();
            book.setTitle(updatedBook.getTitle());
            book.setAuthor(updatedBook.getAuthor());
            return bookRepository.save(book);
        } else {
            return null;
        }
    }

    // Delete a book
    @DeleteMapping("/{id}")
    public void deleteBook(@PathVariable Long id) {
        bookRepository.deleteById(id);
    }
}
```

Book.java

```
package com.library.entity;

import jakarta.persistence.*;

@Entity
public class Book {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private Long id;

    private String title;
    private String author;

    // 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;
```

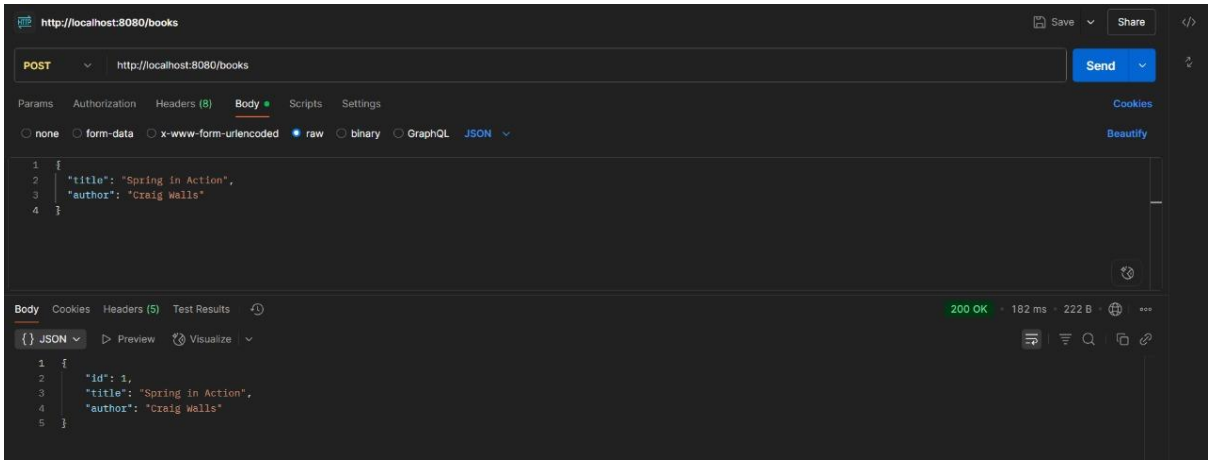
```
    }

    public String getAuthor() {
        return author;
    }

    public void setAuthor(String author) {
        this.author = author;
    }
}
```

BookRepository.java

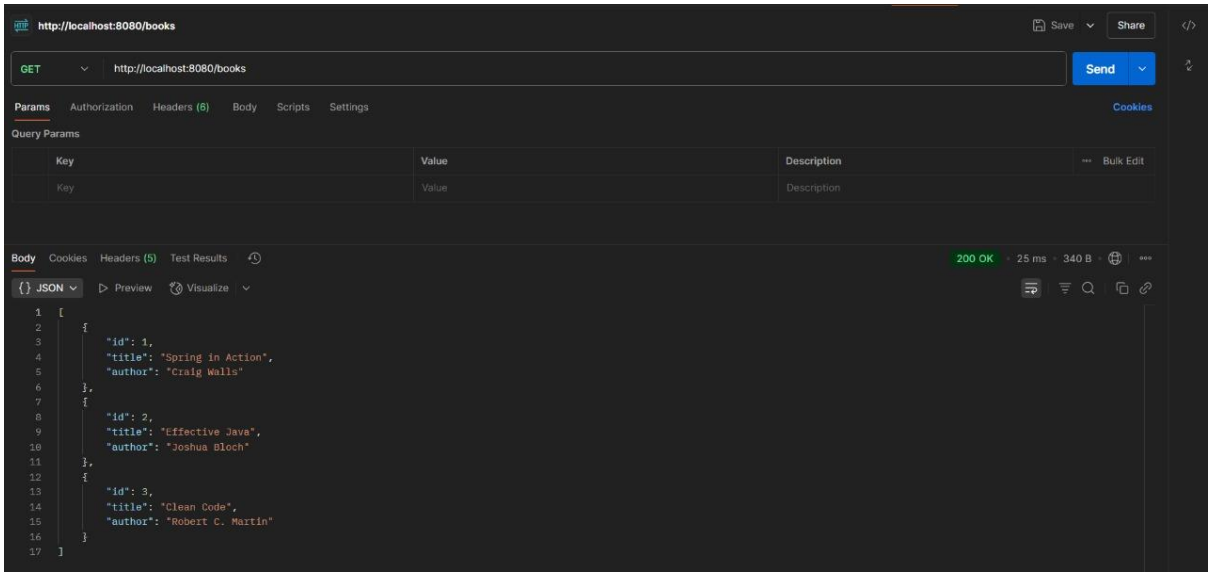
```
package com.library.repository;

import com.library.entity.Book;
import org.springframework.data.jpa.repository.JpaRepository;

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

OUTPUT:

POST METHOD :



GET METHOD: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GET
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Body
Scripts
Settings
Cookies
Query Params
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Description
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Cookies
Headers (5)
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340 B
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