**Spring Core and Maven**

**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.

**Pom.xml:**

<?xml version="1.0" encoding="UTF-8"?>

<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>LibraryManagements</artifactId>

<version>0.0.1-SNAPSHOT</version>

<name>LibraryManagements</name>

<description>A simple LibraryManagements.</description>

<!-- FIXME change it to the project's website -->

<url>http://www.example.com</url>

<properties>

<project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>

<maven.compiler.source>8</maven.compiler.source>

<maven.compiler.target>8</maven.compiler.target>

</properties>

<dependencies>

<!-- JUnit (optional for testing) -->

<dependency>

<groupId>junit</groupId>

<artifactId>junit</artifactId>

<version>3.8.1</version>

<scope>test</scope>

</dependency>

<!-- Spring Core -->

<dependency>

<groupId>org.springframework</groupId>

<artifactId>spring-core</artifactId>

<version>6.2.8</version>

</dependency>

<!-- Spring Context -->

<dependency>

<groupId>org.springframework</groupId>

<artifactId>spring-context</artifactId>

<version>6.2.8</version>

</dependency>

</dependencies>

<build>

<pluginManagement><!-- lock down plugins versions to avoid using Maven defaults (may be moved to parent pom) -->

<plugins>

<plugin>

<artifactId>maven-clean-plugin</artifactId>

<version>3.4.0</version>

</plugin>

<plugin>

<artifactId>maven-site-plugin</artifactId>

<version>3.12.1</version>

</plugin>

<plugin>

<artifactId>maven-project-info-reports-plugin</artifactId>

<version>3.6.1</version>

</plugin>

<!-- see http://maven.apache.org/ref/current/maven-core/default-bindings.html#Plugin\_bindings\_for\_jar\_packaging -->

<plugin>

<artifactId>maven-resources-plugin</artifactId>

<version>3.3.1</version>

</plugin>

<plugin>

<artifactId>maven-compiler-plugin</artifactId>

<version>3.13.0</version>

</plugin>

<plugin>

<artifactId>maven-surefire-plugin</artifactId>

<version>3.3.0</version>

</plugin>

<plugin>

<artifactId>maven-jar-plugin</artifactId>

<version>3.4.2</version>

</plugin>

<plugin>

<artifactId>maven-install-plugin</artifactId>

<version>3.1.2</version>

</plugin>

<plugin>

<artifactId>maven-deploy-plugin</artifactId>

<version>3.1.2</version>

</plugin>

</plugins>

</pluginManagement>

</build>

<reporting>

<plugins>

<plugin>

<artifactId>maven-project-info-reports-plugin</artifactId>

</plugin>

</plugins>

</reporting>

</project>

**applicationContext.xml:**

<?xml version="1.0" encoding="UTF-8"?>

<beans xmlns="http://www.springframework.org/schema/beans"

xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

xsi:schemaLocation="http://www.springframework.org/schema/beans

http://www.springframework.org/schema/beans/spring-beans.xsd">

<bean id="bookRepository" class="com.library.repository.BookRepository"/>

<bean id="bookService" class="com.library.service.BookService"/>

</beans>

**BookService.java:**

package com.library.service;

public class BookService {

public void addBook(String bookName) {

System.*out*.println("Adding book: " + bookName);

}

}

**BookRepository.java:**

package com.library.repository;

public class BookRepository {

public void saveBook(String bookName) {

System.***out***.println("Book saved: " + bookName);

}

}

**App.java:**

package com.library;

import com.library.service.BookService;

import com.library.repository.BookRepository;

import org.springframework.context.ApplicationContext;

import org.springframework.context.support.ClassPathXmlApplicationContext;

/\*\*

\* Hello world!

\*

\*/

public class App {

public static void main(String[] args) {

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

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

BookRepository bookRepository = (BookRepository) context.getBean("bookRepository");

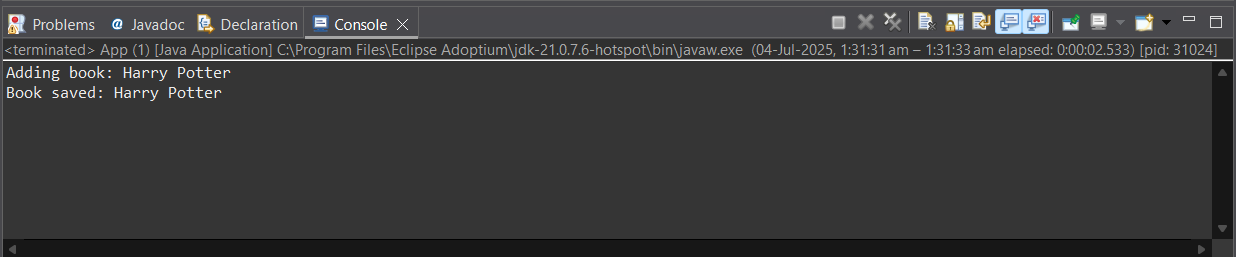
bookService.addBook("Harry Potter");

bookRepository.saveBook("Harry Potter");

}

}

**OUTPUT:**



**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.

**Pom.xml:**

<?xml version="1.0" encoding="UTF-8"?>

<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>LibraryManagements</artifactId>

<version>0.0.1-SNAPSHOT</version>

<name>LibraryManagements</name>

<description>A simple LibraryManagements.</description>

<!-- FIXME change it to the project's website -->

<url>http://www.example.com</url>

<properties>

<project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>

<maven.compiler.source>8</maven.compiler.source>

<maven.compiler.target>8</maven.compiler.target>

</properties>

<dependencies>

<!-- JUnit (optional for testing) -->

<dependency>

<groupId>junit</groupId>

<artifactId>junit</artifactId>

<version>3.8.1</version>

<scope>test</scope>

</dependency>

<!-- Spring Core -->

<dependency>

<groupId>org.springframework</groupId>

<artifactId>spring-core</artifactId>

<version>6.2.8</version>

</dependency>

<!-- Spring Context -->

<dependency>

<groupId>org.springframework</groupId>

<artifactId>spring-context</artifactId>

<version>6.2.8</version>

</dependency>

</dependencies>

<build>

<pluginManagement><!-- lock down plugins versions to avoid using Maven defaults (may be moved to parent pom) -->

<plugins>

<plugin>

<artifactId>maven-clean-plugin</artifactId>

<version>3.4.0</version>

</plugin>

<plugin>

<artifactId>maven-site-plugin</artifactId>

<version>3.12.1</version>

</plugin>

<plugin>

<artifactId>maven-project-info-reports-plugin</artifactId>

<version>3.6.1</version>

</plugin>

<!-- see http://maven.apache.org/ref/current/maven-core/default-bindings.html#Plugin\_bindings\_for\_jar\_packaging -->

<plugin>

<artifactId>maven-resources-plugin</artifactId>

<version>3.3.1</version>

</plugin>

<plugin>

<artifactId>maven-compiler-plugin</artifactId>

<version>3.13.0</version>

</plugin>

<plugin>

<artifactId>maven-surefire-plugin</artifactId>

<version>3.3.0</version>

</plugin>

<plugin>

<artifactId>maven-jar-plugin</artifactId>

<version>3.4.2</version>

</plugin>

<plugin>

<artifactId>maven-install-plugin</artifactId>

<version>3.1.2</version>

</plugin>

<plugin>

<artifactId>maven-deploy-plugin</artifactId>

<version>3.1.2</version>

</plugin>

</plugins>

</pluginManagement>

</build>

<reporting>

<plugins>

<plugin>

<artifactId>maven-project-info-reports-plugin</artifactId>

</plugin>

</plugins>

</reporting>

</project>

**applicationContext.xml:**

<?xml version="1.0" encoding="UTF-8"?>

<beans xmlns="http://www.springframework.org/schema/beans"

xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

xsi:schemaLocation="http://www.springframework.org/schema/beans

http://www.springframework.org/schema/beans/spring-beans.xsd">

<bean id="bookRepository" class="com.library.repository.BookRepository"/>

<bean id="bookService" class="com.library.service.BookService">

<property name="bookRepository" ref="bookRepository"/>

</bean>

</beans>

**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: " + bookName);

bookRepository.saveBook(bookName);

}

}

**BookRepository.java:**

package com.library.repository;

public class BookRepository {

public void saveBook(String bookName) {

System.***out***.println("Book saved: " + bookName);

}

}

**App.java:**

package com.library;

import com.library.service.BookService;

import org.springframework.context.ApplicationContext;

import org.springframework.context.support.ClassPathXmlApplicationContext;

public class App {

public static void main(String[] args) {

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

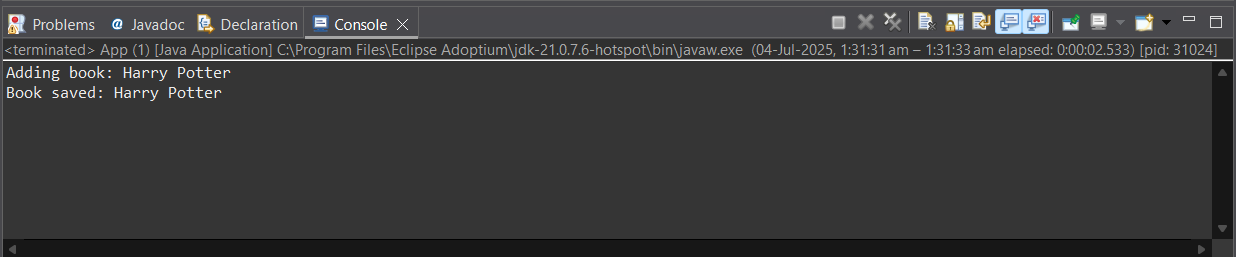
BookService bookService = context.getBean("bookService", BookService.class);

bookService.addBook("Harry Potter");

}

}

**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.

**Pom.xml:**

<?xml version="1.0" encoding="UTF-8"?>

<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.lib</groupId>

<artifactId>Library\_Management</artifactId>

<version>0.0.1-SNAPSHOT</version>

<name>Library\_Management</name>

<description>A simple Library\_Management.</description>

<!-- FIXME change it to the project's website -->

<url>http://www.example.com</url>

<properties>

<project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>

<maven.compiler.source>8</maven.compiler.source>

<maven.compiler.target>8</maven.compiler.target>

</properties>

<dependencies>

<dependency>

<groupId>junit</groupId>

<artifactId>junit</artifactId>

<version>3.8.1</version>

</dependency>

<!-- Spring Context -->

<dependency>

<groupId>org.springframework</groupId>

<artifactId>spring-context</artifactId>

<version>6.2.8</version>

</dependency>

<!-- Spring AOP -->

<dependency>

<groupId>org.springframework</groupId>

<artifactId>spring-aop</artifactId>

<version>6.2.8</version>

</dependency>

<!-- Spring WebMVC -->

<dependency>

<groupId>org.springframework</groupId>

<artifactId>spring-webmvc</artifactId>

<version>6.2.8</version>

</dependency>

</dependencies>

<build>

<pluginManagement><!-- lock down plugins versions to avoid using Maven defaults (may be moved to parent pom) -->

<plugins>

<plugin>

<groupId>org.apache.maven.plugins</groupId>

<artifactId>maven-compiler-plugin</artifactId>

<version>3.10.1</version>

<configuration>

<source>1.8</source>

<target>1.8</target>

</configuration>

</plugin>

<plugin>

<artifactId>maven-clean-plugin</artifactId>

<version>3.4.0</version>

</plugin>

<plugin>

<artifactId>maven-site-plugin</artifactId>

<version>3.12.1</version>

</plugin>

<plugin>

<artifactId>maven-project-info-reports-plugin</artifactId>

<version>3.6.1</version>

</plugin>

<plugin>

<artifactId>maven-resources-plugin</artifactId>

<version>3.3.1</version>

</plugin>

<plugin>

<artifactId>maven-compiler-plugin</artifactId>

<version>3.13.0</version>

</plugin>

<plugin>

<artifactId>maven-surefire-plugin</artifactId>

<version>3.3.0</version>

</plugin>

<plugin>

<artifactId>maven-jar-plugin</artifactId>

<version>3.4.2</version>

</plugin>

<plugin>

<artifactId>maven-install-plugin</artifactId>

<version>3.1.2</version>

</plugin>

<plugin>

<artifactId>maven-deploy-plugin</artifactId>

<version>3.1.2</version>

</plugin>

</plugins>

</pluginManagement>

</build>

<reporting>

<plugins>

<plugin>

<artifactId>maven-project-info-reports-plugin</artifactId>

</plugin>

</plugins>

</reporting>

</project>

**OUTPUT:**

