Spring Core_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.

Code :

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.springcoreandmaven</groupId>
```

```
<artifactId>LibraryManagement</artifactId>
<version>0.0.1-SNAPSHOT</version>

<name>LibraryManagement</name>
<description>A simple LibraryManagement.</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>
  <dependency>
        <groupId>org.springframework</groupId>
        <artifactId>spring-context</artifactId>
        <version>5.3.32</version>
     </dependency>
      <dependency>
        <groupId>org.springframework</groupId>
        <artifactId>spring-aop</artifactId>
        <version>5.3.30</version>
     </dependency>
```

```
        <!-- Spring Web MVC -->
        <dependency>
            <groupId>org.springframework</groupId>
            <artifactId>spring-webmvc</artifactId>
            <version>5.3.30</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>
        <configuration>
                <source>1.8</source>
                <target>1.8</target>
            </configuration>
      </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">

    <!-- BookRepository Bean -->
    <bean id="bookRepository"
class="com.springcoreandmaven.LibraryManagement.repository.BookRepository" />

    <!-- BookService Bean and Inject BookRepository -->
    <bean id="bookService"
class="com.springcoreandmaven.LibraryManagement.service.BookService">
        <property name="bookRepository" ref="bookRepository" />
    </bean>

</beans>
```

BookService.java :

```
package com.springcoreandmaven.LibraryManagement.service;

import com.springcoreandmaven.LibraryManagement.repository.BookRepository;
```

```
public class BookService {
    private BookRepository bookRepository;

    // Setter for DI
    public void setBookRepository(BookRepository bookRepository) {
        this.bookRepository = bookRepository;
    }

    public void addBook(String name) {
        System.out.println("BookService: Adding book...");
        bookRepository.save(name);
    }
}
```

BookRepository.java :

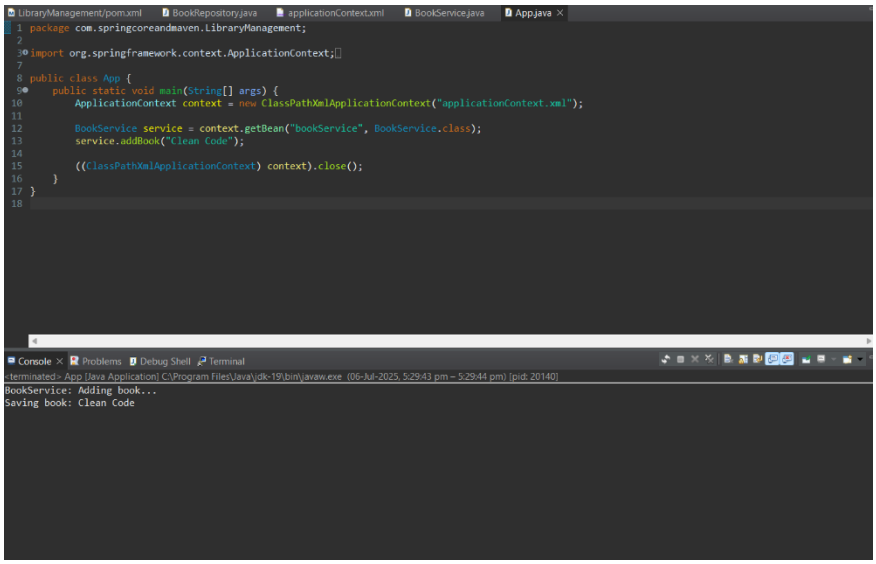
```
package com.springcoreandmaven.LibraryManagement.repository;

public class BookRepository {
    public void save(String bookName) {
        System.out.println("Saving book: " + bookName);
    }
}
```

App.java :

```
package com.springcoreandmaven.LibraryManagement;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;
```

```
import com.springcoreandmaven.LibraryManagement.service.BookService;


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


        BookService service = context.getBean("bookService", BookService.class);
        service.addBook("Clean Code");


        ((ClassPathXmlApplicationContext) context).close();
    }
}
```

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.

Code :

```
<?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.springcoreandmaven</groupId>

  <artifactId>ImplementingDependencyInjection</artifactId>

  <version>0.0.1-SNAPSHOT</version>


  <name>ImplementingDependencyInjection</name>

  <description>A simple ImplementingDependencyInjection.</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>
    <dependency>
        <groupId>org.springframework</groupId>
        <artifactId>spring-context</artifactId>
        <version>5.3.30</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.java :

```
<?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">

    <!-- Define BookRepository Bean -->
    <bean id="bookRepository"
class="com.springcoreandmaven.ImplementingDependencyInjection.repository.BookReposit
ory" />

    <!-- Define BookService Bean with Dependency Injection -->
    <bean id="bookService"
class="com.springcoreandmaven.ImplementingDependencyInjection.service.BookService">
        <property name="bookRepository" ref="bookRepository" />
    </bean>
```

```
</beans>
```

BookService.java :

```
package com.springcoreandmaven.ImplementingDependencyInjection.service;


import
com.springcoreandmaven.ImplementingDependencyInjection.repository.BookRepository;


public class BookService {
   private BookRepository bookRepository;


   // Setter method for Spring to inject
   public void setBookRepository(BookRepository bookRepository) {
      this.bookRepository = bookRepository;
   }


   public void addBook(String name) {
      System.out.println("BookService: Adding book...");
      bookRepository.save(name);
   }
}
```

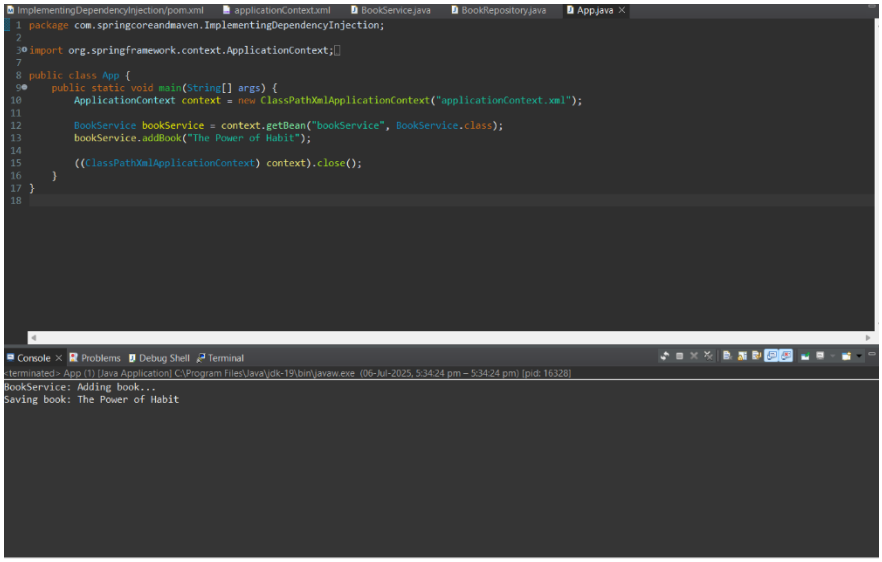
BookRepository.java :

```
package com.springcoreandmaven.ImplementingDependencyInjection.repository;


public class BookRepository {
   public void save(String bookName) {
      System.out.println("Saving book: " + bookName);
   }
}
```

App.java :

```
package com.springcoreandmaven.ImplementingDependencyInjection;

import org.springframework.context.ApplicationContext;

import org.springframework.context.support.ClassPathXmlApplicationContext;


import com.springcoreandmaven.ImplementingDependencyInjection.service.BookService;


public class App {

    public static void main(String[] args) {

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


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

        bookService.addBook("The Power of Habit");


        ((ClassPathXmlApplicationContext) context).close();

    }

}
```

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.

Code :

pom.xml :

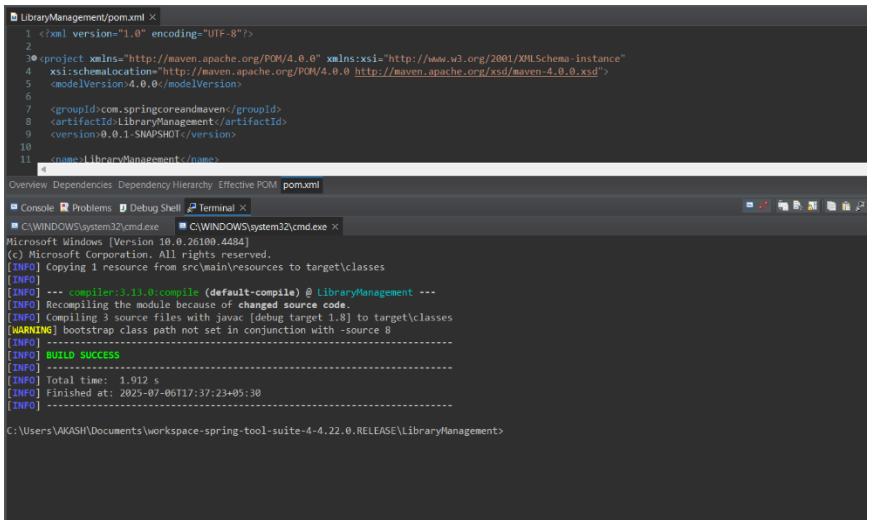
```
<?xml version="1.0" encoding="UTF-8"?>


<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.springcoreandmaven</groupId>

  <artifactId>LibraryManagement</artifactId>

  <version>0.0.1-SNAPSHOT</version>


  <name>LibraryManagement</name>

  <description>A simple LibraryManagement.</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>
  <dependency>
        <groupId>org.springframework</groupId>
        <artifactId>spring-context</artifactId>
        <version>5.3.32</version>
    </dependency>
     <dependency>
        <groupId>org.springframework</groupId>
        <artifactId>spring-aop</artifactId>
        <version>5.3.30</version>
    </dependency>

    <!-- Spring Web MVC -->
    <dependency>
        <groupId>org.springframework</groupId>
        <artifactId>spring-webmvc</artifactId>
        <version>5.3.30</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>
          <configuration>
                <source>1.8</source>
                <target>1.8</target>
            </configuration>
```

```
        </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 :


LibraryManagement/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.springcoreandmaven</groupId>
<artifactId>LibraryManagement</artifactId>
<version>0.0.1-SNAPSHOT</version>
<name>LibraryManagement</name>
Overview Dependencies Dependency Hierarchy Effective POM pom.xml
Console Problems Debug Shell Terminal
C:\WINDOWS\system32\cmd.exe
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.26100.4484]
(c) Microsoft Corporation. All rights reserved.
[INFO] Copying 1 resource from src\main\resources to target\classes
[INFO]
[INFO] --- compiler:3.13.0:compile (default-compile) @ LibraryManagement ---
[INFO] Recompiling the module because of changed source code.
[INFO] Compiling 3 source files with javac [debug target 1.8] to target\classes
[WARNING] bootstrap class path not set in conjunction with -source 8
[INFO] --
[INFO] BUILD SUCCESS
[INFO] --
[INFO] Total time: 1.912 s
[INFO] Finished at: 2025-07-06T17:37:23+05:30
[INFO] --
C:\Users\AKASH\Documents\workspace-spring-tool-suite-4-4.22.0.RELEASE\LibraryManagement>