**Exercise 8: Implementing Basic AOP with Spring**

**Scenario:**

The library management application requires basic AOP functionality to separate cross-cutting concerns like logging and transaction management.

**Steps:**

1. **Define an Aspect:**
   * Create a package **com.library.aspect** and add a class **LoggingAspect**.
2. **Create Advice Methods:**
   * Define advice methods in **LoggingAspect** for logging before and after method execution.
3. **Configure the Aspect:**
   * Update **applicationContext.xml** to register the aspect and enable **AspectJ** auto-proxying.
4. **Test the Aspect:**
   * Run the **LibraryManagementApplication** main class to verify the AOP functionality.

**Solution:**

**1. Define an Aspect**

package com.library.aspect;

import org.aspectj.lang.JoinPoint;

import org.aspectj.lang.annotation.After;

import org.aspectj.lang.annotation.Before;

import org.aspectj.lang.annotation.Aspect;

import org.springframework.stereotype.Component;

@Aspect

@Component

public class LoggingAspect {

@Before("execution(\* com.library.service.\*.\*(..))")

public void logBefore(JoinPoint joinPoint) {

System.out.println("Before executing: " + joinPoint.getSignature());

}

@After("execution(\* com.library.service.\*.\*(..))")

public void logAfter(JoinPoint joinPoint) {

System.out.println("After executing: " + joinPoint.getSignature());

}

}

**2. Create Advice Methods**

Advice methods are already included in the LoggingAspect class. They are logBefore and logAfter methods.

**3. Configure the Aspect**

Update applicationContext.xml to Register the Aspect and Enable AspectJ Auto-Proxying:

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

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

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

xmlns:aop="http://www.springframework.org/schema/aop"

xmlns:context="http://www.springframework.org/schema/context"

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

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

http://www.springframework.org/schema/aop

http://www.springframework.org/schema/aop/spring-aop.xsd

http://www.springframework.org/schema/context

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

<context:component-scan base-package="com.library" />

<aop:aspectj-autoproxy/>

</beans>

**4. Test the Aspect**

package com.library;

import com.library.service.BookService;

import org.springframework.context.ApplicationContext;

import org.springframework.context.support.ClassPathXmlApplicationContext;

public class Main {

public static void main(String[] args) {

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

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

bookService.manageBooks();

}

}