**Exercise 3: Implementing Logging with Spring AOP**

**Scenario:**

The library management application requires logging capabilities to track method execution times.

**LibraryAppMain.java :-**

package org.example1;  
  
import org.example1.service.BookService;  
import org.springframework.context.ApplicationContext;  
import org.springframework.context.support.ClassPathXmlApplicationContext;  
  
public class LibraryAppMain {  
 public static void main(String[] args) {  
 ApplicationContext context = new ClassPathXmlApplicationContext("applicationContext.xml");  
  
 BookService bookService = context.getBean(BookService.class);  
 bookService.getAllBooks();  
 bookService.addBook("Spring AOP");  
 }  
}

**BookService.java :-**

package org.example1.service;  
  
import org.springframework.stereotype.Service;  
  
@Service  
public class BookService {  
  
 public void getAllBooks() {  
 System.*out*.println("Fetching all books...");  
 try {  
 Thread.*sleep*(500); // simulate delay  
 } catch (InterruptedException e) {  
 e.printStackTrace();  
 }  
 }  
  
 public void addBook(String name) {  
 System.*out*.println("Adding book: " + name);  
 }  
}

**LoggingAspect.java :-**

package org.example1.aspect;  
  
import org.aspectj.lang.ProceedingJoinPoint;  
import org.aspectj.lang.annotation.Around;  
import org.aspectj.lang.annotation.Aspect;  
  
@Aspect  
public class LoggingAspect {  
  
 @Around("execution(\* org.example1.service.\*.\*(..))")  
 public Object logExecutionTime(ProceedingJoinPoint joinPoint) throws Throwable {  
 long start = System.*currentTimeMillis*();  
  
 Object result = joinPoint.proceed(); // actual method execution  
  
 long timeTaken = System.*currentTimeMillis*() - start;  
 System.*out*.println("Executed " + joinPoint.getSignature() + " in " + timeTaken + "ms");  
  
 return result;  
 }  
}

**applicationContext.xml :-**

<?xml version="1.0" encoding="UTF-8"?>  
<beans xmlns="http://www.springframework.org/schema/beans"  
 xmlns:context="http://www.springframework.org/schema/context"  
 xmlns:aop="http://www.springframework.org/schema/aop"  
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"  
 xsi:schemaLocation="  
 http://www.springframework.org/schema/beans  
 https://www.springframework.org/schema/beans/spring-beans.xsd  
 http://www.springframework.org/schema/context  
 https://www.springframework.org/schema/context/spring-context.xsd  
 http://www.springframework.org/schema/aop  
 https://www.springframework.org/schema/aop/spring-aop.xsd">  
  
 <!-- Scan all components -->  
 <context:component-scan base-package="org.example1"/>  
  
 <!-- Enable Spring AOP with AspectJ -->  
 <aop:aspectj-autoproxy />  
  
 <!-- Register the LoggingAspect manually -->  
 <bean id="loggingAspect" class="org.example1.aspect.LoggingAspect"/>  
  
</beans>

**Pom.xml :-**

<project xmlns="http://maven.apa

che.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>org.example1</groupId>  
 <artifactId>LibraryManagementSystem</artifactId>  
 <version>1.0-SNAPSHOT</version>  
 <packaging>war</packaging>  
  
 <properties>  
 <java.version>1.8</java.version>  
 <spring.version>5.3.30</spring.version>  
 <aspectj.version>1.9.21</aspectj.version>  
 <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>  
 </properties>  
 <dependencies>  
 <!-- Spring Context -->  
 <dependency>  
 <groupId>org.springframework</groupId>  
 <artifactId>spring-context</artifactId>  
 <version>5.3.30</version>  
 </dependency>  
  
 <!-- Spring AOP -->  
 <dependency>  
 <groupId>org.springframework</groupId>  
 <artifactId>spring-aop</artifactId>  
 <version>5.3.30</version>  
 </dependency>  
  
 <!-- AspectJ Weaver (Required for AOP) -->  
 <dependency>  
 <groupId>org.aspectj</groupId>  
 <artifactId>aspectjweaver</artifactId>  
 <version>1.9.21</version>  
 </dependency>  
 </dependencies>  
  
  
 <build>  
 <finalName>LibraryManagementSystem</finalName>  
 <plugins>  
  
 <!-- Compiler plugin -->  
 <plugin>  
 <artifactId>maven-compiler-plugin</artifactId>  
 <version>3.8.1</version>  
 <configuration>  
 <source>${java.version}</source>  
 <target>${java.version}</target>  
 </configuration>  
 </plugin>  
  
 <!-- WAR packaging plugin -->  
 <plugin>  
 <artifactId>maven-war-plugin</artifactId>  
 <version>3.3.2</version>  
 <configuration>  
 <failOnMissingWebXml>false</failOnMissingWebXml>  
 </configuration>  
 </plugin>  
 <plugin>  
 <groupId>org.apache.maven.plugins</groupId>  
 <artifactId>maven-compiler-plugin</artifactId>  
 <configuration>  
 <source>9</source>  
 <target>9</target>  
 </configuration>  
 </plugin>  
  
 </plugins>  
 </build>  
  
</project>

**Output :-**

