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

**Step 1: Add Spring AOP Dependency**

Update pom.xml to include Spring AOP dependency:

<dependency>

<groupId>org.springframework</groupId>

<artifactId>spring-aop</artifactId>

<version>5.3.23</version>

</dependency>

<dependency>

<groupId>aspectj</groupId>

<artifactId>aspectjweaver</artifactId>

<version>1.9.7</version>

</dependency

**Step 2: Create an Aspect for Logging**

Create a package com.library.aspect and add a class LoggingAspect with a method to log execution times:

package com.library.aspect;

import org.aspectj.lang.ProceedingJoinPoint;

import org.aspectj.lang.annotation.Around;

import org.aspectj.lang.annotation.Aspect;

import org.slf4j.Logger;

import org.slf4j.LoggerFactory;

@Aspect

public class LoggingAspect {

private static final Logger logger = LoggerFactory.getLogger(LoggingAspect.class);

@Around("execution(\* com.library.service.BookService.\*(..))")

public Object logExecutionTime(ProceedingJoinPoint joinPoint) throws Throwable {

long startTime = System.currentTimeMillis();

Object result = joinPoint.proceed();

long endTime = System.currentTimeMillis();

logger.info("Method {} executed in {} ms", joinPoint.getSignature(), endTime - startTime);

return result;

}

}

**Step 3: Enable AspectJ Support**

Update applicationContext.xml to enable AspectJ support and register the aspect:

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

<beans xmlns="(link unavailable)"

xmlns:xsi="(link unavailable)"

xmlns:aop="(link unavailable)"

xsi:schemaLocation="(link unavailable)

(link unavailable)

(link unavailable)">

<aop:aspectj-autoproxy/>

<bean id="loggingAspect" class="com.library.aspect.LoggingAspect"/>

</beans>

**Step 4: Test the Aspect**

Run the LibraryManagementApplication main class and observe the console for log messages indicating method execution times:

package com.library;

import org.springframework.context.ApplicationContext;

import org.springframework.context.support.ClassPathXmlApplicationContext;

public class LibraryManagementApplication {

public static void main(String[] args) {

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

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

bookService.someMethod(); // This will trigger the logging aspect

}

}

**Output:**

Method void com.library.service.BookService.someMethod() executed in 10 ms