Answer 3:

Step 1: Add Spring AOP Dependency

Update the pom.xml file to include Spring AOP dependency:

<dependencies>

<!-- existing dependencies -->

<dependency>

<groupId>org.springframework</groupId>

<artifactId>spring-aop</artifactId>

<version>5.3.22</version>

</dependency>

<dependency>

<groupId>org.aspectj</groupId>

<artifactId>aspectjweaver</artifactId>

<version>1.9.7</version>

</dependency>

</dependencies>

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(\* \*(..))")

public Object logExecutionTime(ProceedingJoinPoint joinPoint) throws Throwable {

long start = System.currentTimeMillis();

Object result = joinPoint.proceed();

long end = System.currentTimeMillis();

LOGGER.info("Method {} executed in {} ms", joinPoint.getSignature(), end - start);

return result;

}

}

In the above code, we have created an aspect LoggingAspect with a method logExecutionTime that logs the execution time of any method using the @Around annotation.

Step 3: Enable AspectJ Support

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

<?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"

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">

<!-- existing beans -->

<aop:aspectj-autoproxy/>

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

</beans>

In the above configuration, we have enabled AspectJ support using the aop:aspectj-autoproxy element and registered the LoggingAspect bean.

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

bookService.addBook("Java Programming", "John Doe");

}

}

When you run the LibraryManagementApplication class, you should see log messages indicating the execution time of the addBook method, for example:

INFO com.library.aspect.LoggingAspect - Method void com.library.service.BookService.addBook(String,String)