Practical No: 8

Aim: Assignment based Aspect Oriented Programming

1. Write a program to demonstrate Spring AOP – before advice.

Application Context.xml

```
<beans xmlns="http://www.springframework.org/schema/beans"
	xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
	xmlns:context="http://www.springframework.org/schema/context"
	xmlns:aop="http://www.springframework.org/schema/aop"
	xsi:schemaLocation="http://www.springframework.org/schema/beans
	http://www.springframework.org/schema/beans/spring-beans-4.3.xsd
	http://www.springframework.org/schema/context
	http://www.springframework.org/schema/context/spring-context-4.3.xsd
	http://www.springframework.org/schema/aop
	http://www.springframework.org/schema/aop/spring-aop-4.3.xsd">
<aop:aspectj-autoproxy />
<bean id="employeeService" class="com.sush.service.EmployeeService"></bean>
	<!-- Aspect -->
	<bean id="logAspect" class="com.ram.Aspect.LoggingAspect" />
</beans>
```

LoggingAspect

```
package com.sush.Aspect;
import org.aspectj.lang.JoinPoint;
import org.aspectj.lang.annotation.Aspect;
import org.aspectj.lang.annotation.Before;
@Aspect
public class LoggingAspect
{
	@Before("execution(* com.ram.service.EmployeeService.addEmployee())")
	public void logBefore(JoinPoint joinPoint)
	{
System.out.print("logBefore() is running!");
		System.out.println(", before " + joinPoint.getSignature().getName() + " method");
		System.out.println("******");
	}
}
```

APP.java

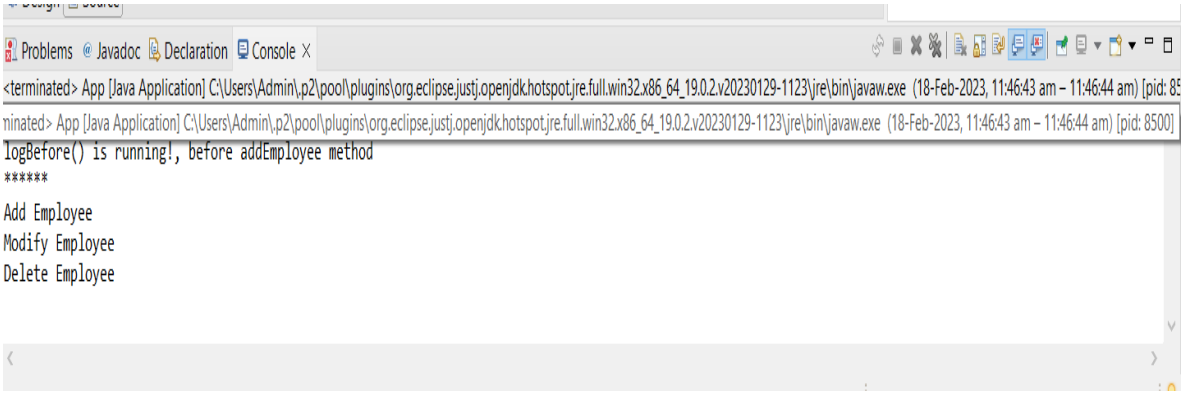
```
package com.sush.core;
import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;
import com.ram.service.EmployeeService;
public class App
```

```
{
public static void main(String[] args)
        {
                ApplicationContext context = new ClassPathXmlApplicationContext(
                                "applicationContext.xml");
System.out.println("--------------------------------------");
EmployeeService employeeService = context
                                .getBean("employeeService", EmployeeService.class);
employeeService.addEmployee();
employeeService.modifyEmployee();
employeeService.deleteEmployee();
        }
}
```

EmployeeService.java

```
package com.ram.service;
public class EmployeeService
{
        public void addEmployee()
        {
                System.out.println("Add Employee ");
        }
        public void modifyEmployee()
        {
                System.out.println("Modify Employee");
        }
        public void deleteEmployee()
        {
                System.out.println("Delete Employee");
        }
}
```

Output:



2. Write a program to demonstrate Spring AOP – after advice.

Logging Aspect.Java

```
package com.sush.Aspect;
import org.aspectj.lang.JoinPoint;
import org.aspectj.lang.annotation.After;
import org.aspectj.lang.annotation.Aspect;
@Aspect
public class LoggingAspect
{
	@After("execution(* com.sush.EmployeeService.addEmployee())")
	public void logAfter(JoinPoint joinPoint)
	{
		System.out.print("logAfter() is running!");
		System.out.println(", after "
				+ joinPoint.getSignature().getName() + " method");
		System.out.println("******");
	}
}
```

APP.java

```
package com.sush.core;
import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;
import com.sush.EmployeeService;
public class App
{
	public static void main(String[] args)
	{
		ApplicationContext context = new ClassPathXmlApplicationContext(
				"applicationContext.xml");
		System.out.println("----------------------------------------");
		EmployeeService employeeService = context
				.getBean("employeeService", EmployeeService.class);
		employeeService.addEmployee();
		employeeService.modifyEmployee();
		employeeService.deleteEmployee();
	}
}
```

EmployeeService.java

```
package com.sush;
public class EmployeeService
{
	public void addEmployee()
	{
```

```
		System.out.println("Add Employee ");
	}
	public void modifyEmployee()
	{
		System.out.println("Modify Employee");
	}
	public void deleteEmployee()
	{
		System.out.println("Delete Employee");
	}

}
```

Application Context.xml

```
<beans xmlns="http://www.springframework.org/schema/beans"
	xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
	xmlns:context="http://www.springframework.org/schema/context"
	xmlns:aop="http://www.springframework.org/schema/aop"
	xsi:schemaLocation="http://www.springframework.org/schema/beans
	http://www.springframework.org/schema/beans/spring-beans-4.3.xsd
	http://www.springframework.org/schema/context
	http://www.springframework.org/schema/context/spring-context-4.3.xsd
	http://www.springframework.org/schema/aop
	http://www.springframework.org/schema/aop/spring-aop-4.3.xsd">
	<aop:aspectj-autoproxy />
	<bean id="employeeService" class="com.sush.service.EmployeeService"></bean>
	<!-- Aspect -->
	<bean id="logAspect" class="com.sush.Aspect.LoggingAspect" />

</beans>
```

Output:

```
<terminated> App (1) [Java Application] C:\Users\Admin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_19.0.2.v20230129-1123\jre\bin\javaw.exe  (18-Feb-2023, 12:21:25 pm – 12:21:26 pm) [pid
--------------------------------------
Add Employee
logAfter() is running!, after addEmployee method
******
Modify Employee
Delete Employee
```

3. Write a program to demonstrate Spring AOP – Around advice.

LoggingAspect.java

```
package com.sush;
import java.util.Arrays;
import org.aspectj.lang.ProceedingJoinPoint;
import org.aspectj.lang.annotation.Around;
import org.aspectj.lang.annotation.Aspect;
@Aspect
public class LoggingAspect
{

	@Around("execution(* com.sush.EmployeeService.addEmployee(..))")
	public void logAround(ProceedingJoinPoint proceedingJoinPoint) throws Throwable
	{
		System.out.println("logAround() is running!");
		System.out.println("hijacked method = " +
proceedingJoinPoint.getSignature().getName());
		System.out.println("hijacked arguments = " +
Arrays.toString(proceedingJoinPoint.getArgs()));
		System.out.println("Around before is running!");
		proceedingJoinPoint.proceed(); //continue on the intercepted method
		System.out.println("Around after is running!");
		System.out.println("******");
	}
}
```

APP1.java

```
package com.sush;
import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;
public class App1
{
	public static void main(String[] args)
	{
		ApplicationContext context = new ClassPathXmlApplicationContext(
				"applicationContext.xml");
		System.out.println("----------------------------------------");
		EmployeeService employeeService = context
				.getBean("employeeService", EmployeeService.class);
		employeeService.addEmployee("Peter");
		employeeService.modifyEmployee();
		employeeService.deleteEmployee();
	}
}
```

EmployeeService.java

```
package com.sush;
public class EmployeeService
{
	public String addEmployee(String name)
	{
		System.out.println("addEmployee(String name) method is called");
		return "Employee Peter information is added successfully";
	}

	public void modifyEmployee()
	{
		System.out.println("modifyEmployee() is called");
	}

	public void deleteEmployee()
	{
		System.out.println("deleteEmployee() method is called");
	}

}
```

ApplicationContext.xml

```
<beans xmlns="http://www.springframework.org/schema/beans"
	xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
	xmlns:context="http://www.springframework.org/schema/context"
	xmlns:aop="http://www.springframework.org/schema/aop"
	xsi:schemaLocation="http://www.springframework.org/schema/beans
	http://www.springframework.org/schema/beans/spring-beans-4.3.xsd
	http://www.springframework.org/schema/context
	http://www.springframework.org/schema/context/spring-context-4.3.xsd
	http://www.springframework.org/schema/aop
	http://www.springframework.org/schema/aop/spring-aop-4.3.xsd">
	<aop:aspectj-autoproxy />
	<bean id="employeeService" class="com.sush.EmployeeService"></bean>
	<!-- Aspect -->
	<bean id="logAspect" class="com.sush.LoggingAspect" />
</beans>
```

Output:

```
<terminated> App1 [Java Application] C:\Users\Admin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_19.0.2.v20230129-1123\jre\bin\javaw.exe  (18-Feb-2023, 2:24:23 pm – 2:24:24 pm) [pid:
Around before is running!
addEmployee(String name) method is called
Around after is running!
******
modifyEmployee() is called
deleteEmployee() method is called
```

4. Write a program to demonstrate Spring AOP – AfterReturning

LoggingAspect.java

```
package com.sush;
import org.aspectj.lang.JoinPoint;
public class LoggingAspect
{
	public void logAfterReturning(JoinPoint joinPoint, Object result)
	{
		System.out.print("logAfterReturning() is running!");
		System.out.println(", after "
				+ joinPoint.getSignature().getName() + " method");
		System.out.println("Method returned value is = " + result);
		System.out.println("******");
	}
}
```

App2.Java

```
package com.sush;
import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;
public class App2
{
	public static void main(String[] args)
	{
		ApplicationContext context = new ClassPathXmlApplicationContext(
				"applicationContext.xml");
		System.out.println("----------------------------------------");
		EmployeeService employeeService = context
				.getBean("employeeService", EmployeeService.class);
		employeeService.addEmployee();
		employeeService.modifyEmployee();
		employeeService.deleteEmployee();
	}
}
```

EmployeeService.java

```
package com.sush;
public class EmployeeService
{
	public String addEmployee()
	{
		System.out.println("addEmployee() is called");
		return "Employee Peter information is added successfully";
	}
```

```
	public void modifyEmployee()
	{
		System.out.println("modifyEmployee() is called");
	}
	public void deleteEmployee()
	{
		System.out.println("deleteEmployee() is called");
	}
}
```

ApplicationContext.xml

```
<beans xmlns="http://www.springframework.org/schema/beans"
	xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
	xmlns:context="http://www.springframework.org/schema/context"
	xmlns:aop="http://www.springframework.org/schema/aop"
	xsi:schemaLocation="http://www.springframework.org/schema/beans
	http://www.springframework.org/schema/beans/spring-beans-4.3.xsd
	http://www.springframework.org/schema/context
	http://www.springframework.org/schema/context/spring-context-4.3.xsd
	http://www.springframework.org/schema/aop
	http://www.springframework.org/schema/aop/spring-aop-4.3.xsd">
	<bean id="employeeService" class="com.sush.EmployeeService"></bean>
	<!-- Aspect -->
	<bean id="logAspect" class="com.sush.LoggingAspect" />
	<aop:config>
		<aop:aspect id="aspectLoggging" ref="logAspect">
			<!-- @After -->
			<aop:pointcut id="pointCutAfterReturning"
				expression="execution(*
com.sush.EmployeeService.addEmployee()))" />
			<aop:after-returning method="logAfterReturning"
				returning="result" pointcut-ref="pointCutAfterReturning" />
			</aop:aspect>
	</aop:config>
</beans>
```

Output:

```
Problems  @ Javadoc  Declaration  Console ×
<terminated> App2 [Java Application] C:\Users\Admin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_19.0.2.v20230129-1123\jre\bin\javaw.exe  (18-Feb-2023, 2:40:14 pm – 2:40:15 pm) [pid:
addEmployee() is called
logAfterReturning() is running!, after addEmployee method
Method returned value is = Employee Peter information is added successfully
******
modifyEmployee() is called
deleteEmployee() is called
```

Practical No: 10

Aim: Assignment based Spring Boot and RESTful Web Services

1. Write a program to create a simple Spring Boot application that prints a message.

Code:

```
package com.example.demo;
import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication
public class DemoApplication {

	public static void main(String[] args) {
		SpringApplication.run(DemoApplication.class, args);
		System.out.println("Hello! We are Running Spring Boot App");
	}

}
```

Output: