Spring-AOP

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

Solution :

beforeaop.java

```
package bvimit.edu;

import org.aspectj.lang.JoinPoint;
import   org.aspectj.lang.annotation.Aspect;
import   org.aspectj.lang.annotation.Before;
import org.aspectj.lang.annotation.Pointcut;

@Aspect
public class beforeaop {

        @Pointcut("execution(int beforeoperation.*(..))")
        public void p(){}

        @Before("p()")
        public void myadvice(JoinPoint jp)
        {
                System.out.println("before advice");
        }
}
```

beforeoperation.java

```
package bvimit.edu;

public class beforeoperation {
    public void msg() {System.out.println("method 1");}
    public int m(){System.out.println("method 2 with return");return 2;}
    public int k(){System.out.println("method 3 with return");return 3;}
    }
```

aopctx1.xml

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

<beans xmlns="http://www.springframework.org/schema/beans"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="http://www.springframework.org/schema/bea
        ns
```

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

    <bean id="opBean" class="bvimit.edu.beforeoperation"> </bean>


    <bean id="trackMyBean" class="bvimit.edu.beforeaop"></bean>
    <bean
class="org.springframework.aop.aspectj.annotation.AnnotationAwareAspectJAutoProxyCreator"></bean>

</beans>
```

beforetest.java

```
package bvimit.edu;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class beforetest {

        public static void main(String[] args) {
                ApplicationContext context = new ClassPathXmlApplicationContext("aopctx1.xml");
                beforeoperation e = (beforeoperation) context.getBean("opBean");
                System.out.println("calling m1. .... ");
                e.msg();
                System.out.println("calling m2. .... ");
                e.m();
                System.out.println("calling m3. .... ");
                e.k();


        }
}
```

Output :

```
Markers  Properties  Servers  Data Source Explorer  Snippets  Console
<terminated> beforetest [Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.exe (06-Dec-2024, 10:38:11 pm)
calling m1......
method 1
calling m2......
before advice
method 2 with return
calling m3......
before advice
method 3 with return
```

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

Solution :

Afteraopdata.java

```
package bvimit.edu;

import  org.aspectj.lang.JoinPoint;
import org.aspectj.lang.annotation.After;
import org.aspectj.lang.annotation.Aspect;
import org.aspectj.lang.annotation.Pointcut;

@Aspect
public class afteraopdata {

        @Pointcut("execution(int afteroperation.*(..))")
        public void p(){}

        @After("p()")
        public void myadvice(JoinPoint jp)
        {
                System.out.println("after advice");
        }
}
```

afteroperation.java

```
package bvimit.edu;

public class afteroperation {
    public void msg() {System.out.println("method 1");}
    public int m(){System.out.println("method 2 with return");return 2;}
    public int k(){System.out.println("method 3 with return");return 3;}
    }
```

aopctx.xml

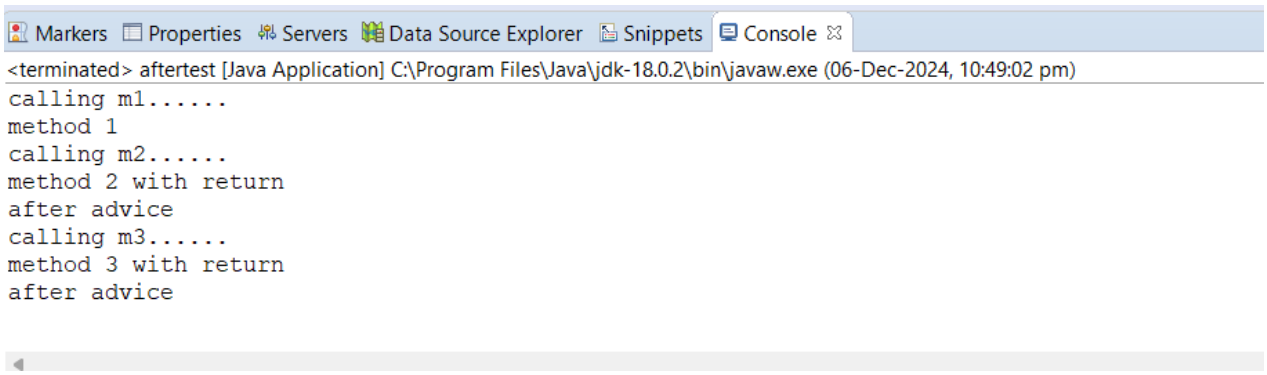
```
<?xml version="1.0" encoding="UTF-8"?>

<beans xmlns="http://www.springframework.org/schema/beans"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="http://www.springframework.org/schema/bea
        ns

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


  <bean id="opBean" class="bvimit.edu.afteroperation">  </bean>
```

```
    <bean id="trackMyBean" class="bvimit.edu.afteraopdata"></bean>

    <bean
class="org.springframework.aop.aspectj.annotation.AnnotationAwareAspectJAutoProxyCreator"></bean>

</beans>
```

aftertest.java

```
package bvimit.edu;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class aftertest {

        public static void main(String[] args) {
                ApplicationContext context = new ClassPathXmlApplicationContext("aopctx.xml");
                afteroperation e = (afteroperation) context.getBean("opBean");
                System.out.println("calling m1. .... ");
                e.msg();
                System.out.println("calling m2. .... ");
                e.m();
                System.out.println("calling m3. .... ");
                e.k();


        }

}
```

Output :



Problem Statement 3 : Write a program to demonstrate Spring AOP – around advice.

Solution :

Bankaopdata.java

```
package bvimit.edu;

import org.aspectj.lang.ProceedingJoinPoint;
import org.aspectj.lang.annotation.Around;
import org.aspectj.lang.annotation.Aspect;
import org.aspectj.lang.annotation.Pointcut;

@Aspect
public class Bankaopdata {

	@Pointcut("execution(* Bank.*(..))")
	public void a() {}

	@Around("a()")
	public Object myadvice(ProceedingJoinPoint p)throws Throwable
	{
		System.out.println("Around concern Before calling actual method");
		Object obj=p.proceed();
		System.out.println("Around Concern After calling actual method");
		return obj;
	}
}
```

Bank.java

```
package bvimit.edu;

public class Bank {
	public void welcome() {System.out.println("welcome to bank");}
	public int icici() {System.out.println("icici bank interest rate");return 7;}
	public int pnb() {System.out.println("pnb bank interest rate");return 6;}

}
```

Bankaopdata.xml

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

<beans xmlns="http://www.springframework.org/schema/beans"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="http://www.springframework.org/schema/bea
        ns

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


<bean id="opBean" class="bvimit.edu.Bank"> </bean>

<bean id="trackMyBean" class="bvimit.edu.Bankaopdata"></bean>


<bean
class="org.springframework.aop.aspectj.annotation.AnnotationAwareAspectJAutoProxyCreator"></bean>

</beans>
```

Banktest.java

```
package bvimit.edu;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class Banktest {

        private static ApplicationContext context;

        public static void main(String[] args) {
                context = new ClassPathXmlApplicationContext("Bankaopdata.xml");

                Bank e =(Bank) context.getBean("opBean");
                System.out.println("Calling welcome method...");
                e.welcome();
                System.out.println("Calling icici method...");
                e.icici();
                System.out.println("Calling pnb method...");
                e.pnb();
        }

}
```

Output :

Markers Properties Servers Data Source Explorer Snippets Console

<terminated> Banktest (1) [Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.exe (06-Dec-2024, 10:33:02 pm)

```
Calling welcome method...
Around concern Before calling actual method
welcome to bank
Around Concern After calling actual method
Calling icici method...
Around concern Before calling actual method
icici bank interest rate
Around Concern After calling actual method
Calling pnb method...
Around concern Before calling actual method
pnb bank interest rate
Around Concern After calling actual method
```

Problem Statement 4 : Write a program to demonstrate Spring AOP – after returning advice.

Solution :

Bankaopdata.java

```
package bvimit.edu;

import org.aspectj.lang.JoinPoint;
import org.aspectj.lang.ProceedingJoinPoint;
import org.aspectj.lang.annotation.AfterReturning;
import org.aspectj.lang.annotation.Around;
import org.aspectj.lang.annotation.Aspect;
import org.aspectj.lang.annotation.Pointcut;

@Aspect
public class Bankaopdata {

	@AfterReturning(
				pointcut ="execution(* Bank.*(..))",
				returning="result")
public void myadvice(JoinPoint jp,Object result)
{
	System.out.println("AfterReturning concern");
	System.out.println("Result in advice" +result);
	}
}
```

Bank.java

```
package bvimit.edu;

public class Bank {
	public void welcome() {System.out.println("welcome to bank");}
	public int icici() {System.out.println("icici bank interest rate");return 7;}
	public int pnb() {System.out.println("pnb bank interest rate");return 6;}

}
```

Bankaopdata.xml

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

<beans xmlns="http://www.springframework.org/schema/beans"
	xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
	xsi:schemaLocation="http://www.springframework.org/schema/bea
	ns

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

```
<bean id="opBean" class="bvimit.edu.Bank"> </bean>

<bean id="trackMyBean" class="bvimit.edu.Bankaopdata"></bean>

<bean
class="org.springframework.aop.aspectj.annotation.AnnotationAwareAspectJAutoProxyCreator"></bean>

</beans>
```

Banktest.java

```
package bvimit.edu;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class Banktest {

	private static ApplicationContext context;

	public static void main(String[] args) {
		context = new ClassPathXmlApplicationContext("Bankaopdata.xml");

		Bank e =(Bank) context.getBean("opBean");
		//System.out.println("Calling welcome method...");
		e.welcome();
		//System.out.println("Calling icici method...");
		e.icici();
		//System.out.println("Calling pnb method...");
		e.pnb();
	}

}
```

Output :

```
Markers  Properties  Servers  Data Source Explorer  Snippets  Console
<terminated> Banktest (1) [AspectJ/Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.exe (06-Dec-2024, 10:24:38 pm)
welcome to bank
AfterReturning concern
Result in advicenull
icici bank interest rate
AfterReturning concern
Result in advice7
pnb bank interest rate
AfterReturning concern
Result in advice6
```

Problem Statement 5 : Write a program to demonstrate Spring AOP – after throwing advice.

Solution :

Operationaop_at.java

```
package bvimit.edu;
import org.aspectj.lang.JoinPoint;
import org.aspectj.lang.annotation.AfterThrowing;
import org.aspectj.lang.annotation.Aspect;

@Aspect
public class Operationaop_at {
@AfterThrowing(
                        pointcut = "execution(* Operation_at.*(..))", throwing = "error")
        public void myadvice(JoinPoint jp, Throwable error)
        {
                System.out.println("AfterThrowing concern");
                System.out.println("Exception is: "+error);
                System.out.println("end of after throwing advice... ");
        }
        }
```

Operation_at.java

```
package bvimit.edu;
public class Operation_at {

        public void validate(int att)throws Exception{
                if(att<75) {
                        throw new ArithmeticException("Not eligible for exam");
                }
                else {
                        System.out.println("Eligible for exam");
                }
        }
}
```

validctx.xml

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

<beans xmlns="http://www.springframework.org/schema/beans"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="http://www.springframework.org/schema/bea
        ns

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



<bean id="opBean" class="bvimit.edu.Operation_at"></bean>


<bean id="trackMyBean" class="bvimit.edu.Operationaop_at"></bean>


<bean
class="org.springframework.aop.aspectj.annotation.AnnotationAwareAspectJAutoProxyCreator"></bean></be
ans>
```

TestValidation.java

```
package bvimit.edu;
import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class OperationTest_at {
private static ApplicationContext context;
                public static void main(String[] args) {
ApplicationContext context = new ClassPathXmlApplicationContext("validctx.xml");
                        Operation_at op = (Operation_at) context.getBean("opBean");
                        System.out.println("calling validate. ");
                         try {
                                op.validate(85);
                         }catch(Exception e){System.out.println(e);}

                         System.out.println("calling validate again... ");

                         try {
                                op.validate(25);
                         }catch(Exception e){System.out.println(e);}
                         }
```

}

OutPut:-

```
Markers  Properties  Servers  Data Source Explorer  Snippets  Console
<terminated> TestValidation [AspectJ/Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.exe (06-Dec-2024, 10:23:51 pm)
calling validate....
Eligible for exam
calling validate again....
AfterThrowing concern
Exception is: java.lang.ArithmeticException: Not eligible for exam
end of after throwing advice....
java.lang.ArithmeticException: Not eligible for exam
```

Problem Statements 6: Write a program to demonstrate Spring AOP –pointcuts.

Solution:

Operation_pc.java

```
package bvimit.edu;
publicclass Operation_pc {


        publicvoid msg() {System.out.println("method 1");}
        publicint m() {System.out.println("method 2 with return");return 2;}
        publicint k() {System.out.println("method 3 with return");return 3;}
        }
```

Aopdata_pc.java

```
package bvimit.edu;

import  org.aspectj.lang.JoinPoint;

import org.aspectj.lang.annotation.After;

import org.aspectj.lang.annotation.Pointcut;

import org.aspectj.lang.annotation.Aspect;

import org.aspectj.lang.annotation.Before;

@Aspect

public class Aopdata_pc {


    @Pointcut("execution(int Operation.*(..))")

    public void p(){}
```

```
        @After("p()")
        public void myadvice(JoinPoint jp)
        {
                System.out.println("After advice");
        }
        @Pointcut("execution(* Operation.*(..))")
        public void i(){}

        @Before("i()")
        public void myadvice1(JoinPoint jp)
        {
                System.out.println("Before advice");
}
}
```

Test_pc.java

```
package bvimit.edu;
import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class Test_pc {
public static void main(String[] args) {

ApplicationContext context = new ClassPathXmlApplicationContext("aopctx_pc.xml");
                Operation_pc e=(Operation_pc)context.getBean("opBean");
                System.out.println("calling m1...");
                e.msg();
                System.out.println("calling m2...");
                e.m();
```

```
System.out.pr
intln("calling
m3...");e.k();
}
}
```

aopctx_pc.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<beans
        xmlns="http://www.springframework.org/sche
        ma/beans"
        xmlns:xsi="http://www.w3.org/2001/XMLSche
        ma-instance"
        xsi:schemaLocation="http://www.springframe
        work.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

<bean id="opBean" class="bvimit.edu.Operation_pc"></bean>

<bean id="trackMyBean" class="bvimit.edu.Aopdata_pc"></bean>

<bean
class="org.springframework.aop.aspectj.annotation.AnnotationAwareAspectJAutoProxyCr
eator"></bean>

</beans>
```

Output: