FPT Software

JAVA SPRING FRAMEWORK

Lab Guides

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RECORD OF CHANGES

No	Effective Date	Change Description	Reason	Reviewer	Approver
1	06/08/2024	Create a new Lab	Create new		VinhNV

Contents

CODE:	JSFW_Lab_01_Opt3
TYPE:	SHORT
LOC:	200
DURATION:	60 MINUTES

Java Spring Framework Introduction

Objectives:

- Use XML-based configuration for Spring beans.
- Understand dependency injection and autowiring in XML-based configuration.
- Configure and use beans with dependencies.

Lab Specifications:

Develop a simple Employee and Department Management System where departments and employees can be managed. This system will use XML-based configuration for Spring beans.

Problem Description:

- Trainees must write scripts to test the methods they have developed.

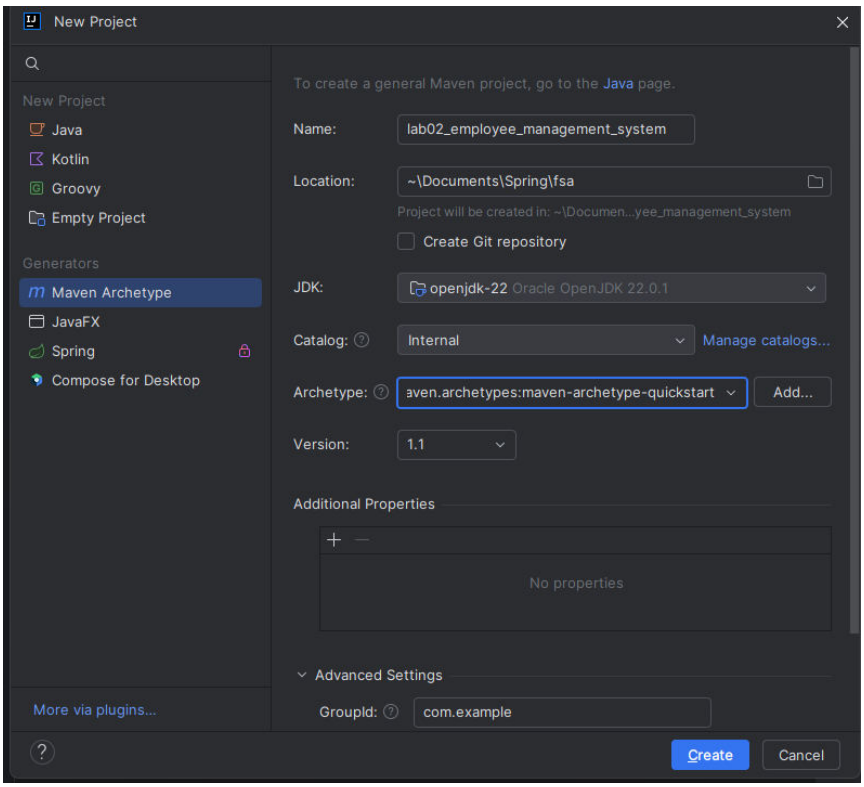
Prerequisites:

- Using Java SDK version 8.0 at least.
- Using Maven.
- Using Spring Framework 5.0 or higher version.

Guidelines:

Step 1: Extend the previous project to include dependency injection:

- Open IntelliJ IDEA.
- Click on File -> New -> Project....
- Select Maven from the project types.
- Click Next and set the project name to lab02_spring_annotations.
- Set the groupId to com.example and artifactId to spring_annotations.
- Click Create.



Step 2: Add dependencies and configuration into pom.xml file: Add the Spring Core dependency to your pom.xml file.

```
<dependency>
  <groupId>org.springframework</groupId>
  <artifactId>spring-context</artifactId>
  <version>5.3.20</version>
</dependency>
```

And add this to your pom.xml:

```
<parent>
  <groupId>org.springframework.boot</groupId>
  <artifactId>spring-boot-starter-parent</artifactId>
  <version>2.7.5</version>
  <relativePath/>
</parent>
```

Step 3: Create Entity Classes

1. Create Department class:

```
package com.example;


public class Department {
    private String deptName;

    // Getter and Setter
    public String getDeptName() {
        return deptName;
    }

    public void setDeptName(String deptName) {
        this.deptName = deptName;
    }
```

```
    @Override
    public String toString() {
        return "Department{deptName='" + deptName + "'}";
    }
}
```

2. Create a Employee class with dependency on Department:

```
package com.example;

public class Employee {
    private int eid;
    private String ename;
    private Department department;

    // Getters and Setters
    public int getEid() {
        return eid;
    }

    public void setEid(int eid) {
        this.eid = eid;
    }

    public String getEname() {
        return ename;
    }

    public void setEname(String ename) {
        this.ename = ename;
    }

    public Department getDepartment() {
        return department;
    }

    public void setDepartment(Department department) {
        this.department = department;
    }

    @Override
    public String toString() {
        return "Employee{eid=" + eid + ", ename='" + ename + "',
department=" + department + "}";
    }
}
```

Step 4: Configure Beans in beans.xml

Create beans.xml configuration file:

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

    <!-- Department bean -->
    <bean id="department" class="com.example.Department">
        <property name="deptName" value="Information Technology"/>
    </bean>
```

```
    <!-- Employee bean with autowiring by name -->
    <bean id="employee" class="com.example.Employee" autowire="byName">
        <property name="eid" value="100"/>
        <property name="ename" value="John Doe"/>
        <!-- No need to explicitly set department here, it will be
autowired by name -->
    </bean>
</beans>
```

Step 5: Create a Main Class

Create App class to load the context and use the Employee bean:

```
package com.example;

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

public class App
{
    public static void main( String[] args )
    {
        ApplicationContext context = new
ClassPathXmlApplicationContext("beans.xml");
        Employee employee = (Employee) context.getBean("employee");
        System.out.println(employee);
    }
}
```

Step 6: Write a JUnit Test Case

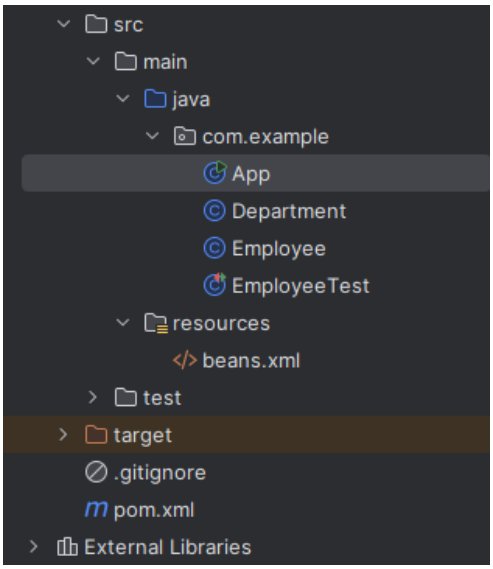
1. **Create EmployeeTest class:**

```
package com.example;


import org.junit.jupiter.api.Test;
import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

import static org.junit.jupiter.api.Assertions.assertEquals;
import static org.junit.jupiter.api.Assertions.assertNotNull;

public class EmployeeTest {

    @Test
    public void testEmployeeBean() {
        ApplicationContext context = new
ClassPathXmlApplicationContext("beans.xml");
        Employee employee = (Employee) context.getBean("employee");
        assertNotNull(employee);
        assertEquals(100, employee.getEid());
        assertEquals("John Doe", employee.getEname());
        assertNotNull(employee.getDepartment());
        assertEquals("Information Technology",
employee.getDepartment().getDeptName());
    }
}
```

2. **Run the test and verify it passes.**

Notes:

- The autowire="byName" attribute in the employee bean configuration will automatically inject the Department bean into the Employee bean based on the property name.
- Ensure that all Java files are located within the com.example package.



- Make sure the XML configuration file is correctly placed in the classpath so that it can be loaded by Spring.

This exercise will help you understand how to use XML-based configuration for beans, dependency injection, and autowiring in a Spring application.

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THE END