



Laboratorio 4

Middleware- gestión de planos.

url repositorio:

https://github.com/ARSW2023-2/ARSW_Lab04.git

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Curso:

ARSW – 1

Fecha De Entrega:

15-09-2023

I. Introducción

El laboratorio propuesto se centra en la aplicación de principios fundamentales de desarrollo de software, específicamente el Principio de Inversión de Dependencias, el uso de Contenedores Livianos como Spring y la práctica de la Inyección de Dependencias. Para ello, se divide en dos partes.

En la primera parte, se aborda la configuración de una aplicación de análisis de textos que requiere un verificador gramatical con un corrector ortográfico. A través del uso de Spring y anotaciones, se ilustra cómo gestionar dependencias y seleccionar implementaciones específicas en tiempo de ejecución.

La segunda parte se enfoca en la construcción de un modelo de clases para una aplicación de gestión de planos arquitectónicos. Aquí, se profundiza en la implementación de un esquema de inyección de dependencias y se introduce la capacidad de aplicar filtros a los planos antes de su consulta, demostrando cómo la Inyección de Dependencias puede mejorar la adaptabilidad de una aplicación a diferentes requisitos.

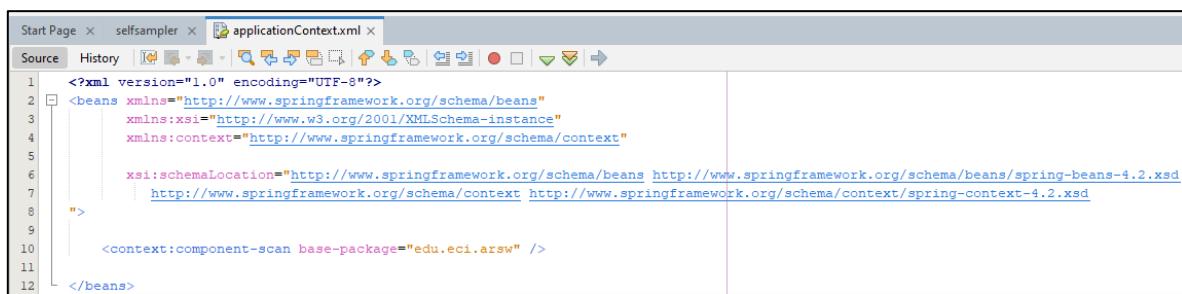
II. Desarrollo del laboratorio

Taller – Principio de Inversión de dependencias, Contenedores Livianos e Inyección de dependencias.

Parte I. Ejercicio básico.

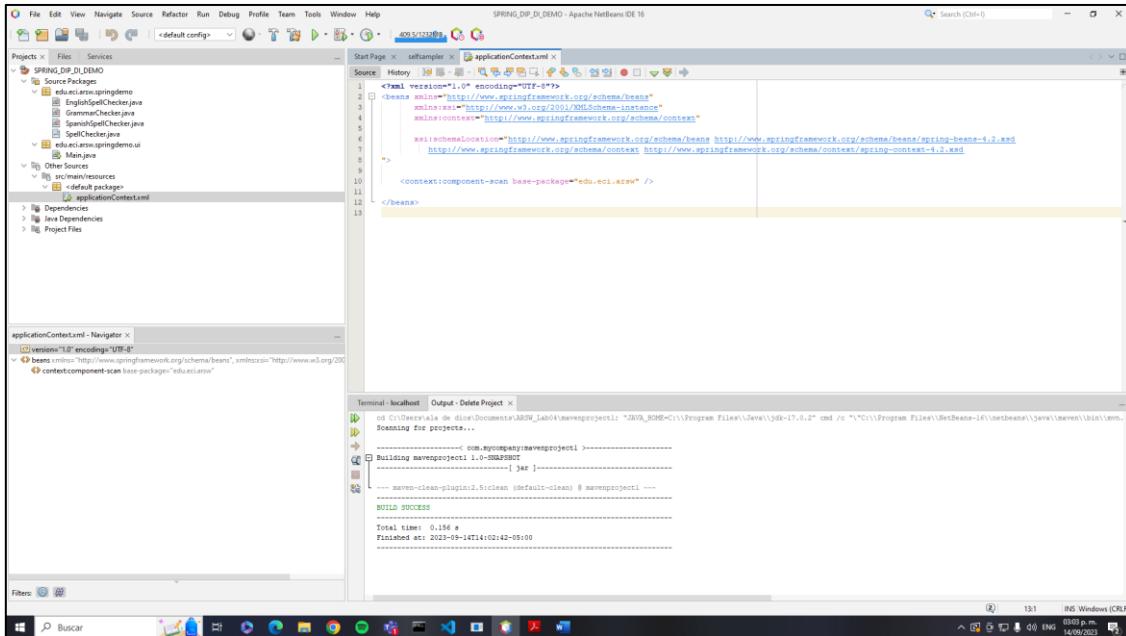
Para ilustrar el uso del framework Spring, y el ambiente de desarrollo para el uso del mismo a través de Maven (y NetBeans), se hará la configuración de una aplicación de análisis de textos, que hace uso de un verificador gramatical que requiere de un corrector ortográfico. A dicho verificador gramatical se le inyectará, en tiempo de ejecución, el corrector ortográfico que se requiera (por ahora, hay dos disponibles: inglés y español).

1. Abra las fuentes del proyecto en NetBeans.
2. Revise el archivo de configuración de Spring ya incluido en el proyecto (src/main/resources). El mismo indica que Spring buscará automáticamente los 'Beans' disponibles en el paquete indicado.



The screenshot shows the NetBeans IDE interface with the 'applicationContext.xml' file open in the editor. The code is an XML configuration for a Spring application. It defines a beans element with various namespaces and schema locations. It includes a component-scan tag to look for beans in the 'edu.eci.arsw' package. The code is as follows:

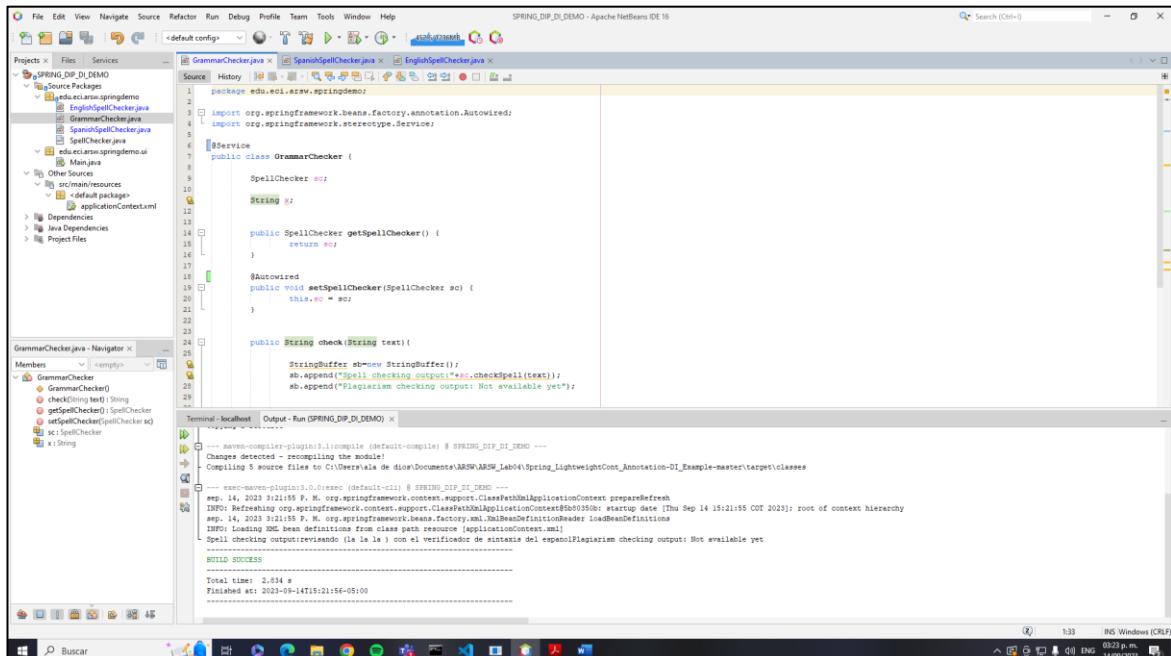
```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xmlns:context="http://www.springframework.org/schema/context"
       xsi:schemaLocation="http://www.springframework.org/schema/beans http://www.springframework.org/schema/beans/spring-beans-4.2.xsd
                           http://www.springframework.org/schema/context http://www.springframework.org/schema/context/spring-context-4.2.xsd">
    <context:component-scan base-package="edu.eci.arsw" />
</beans>
```



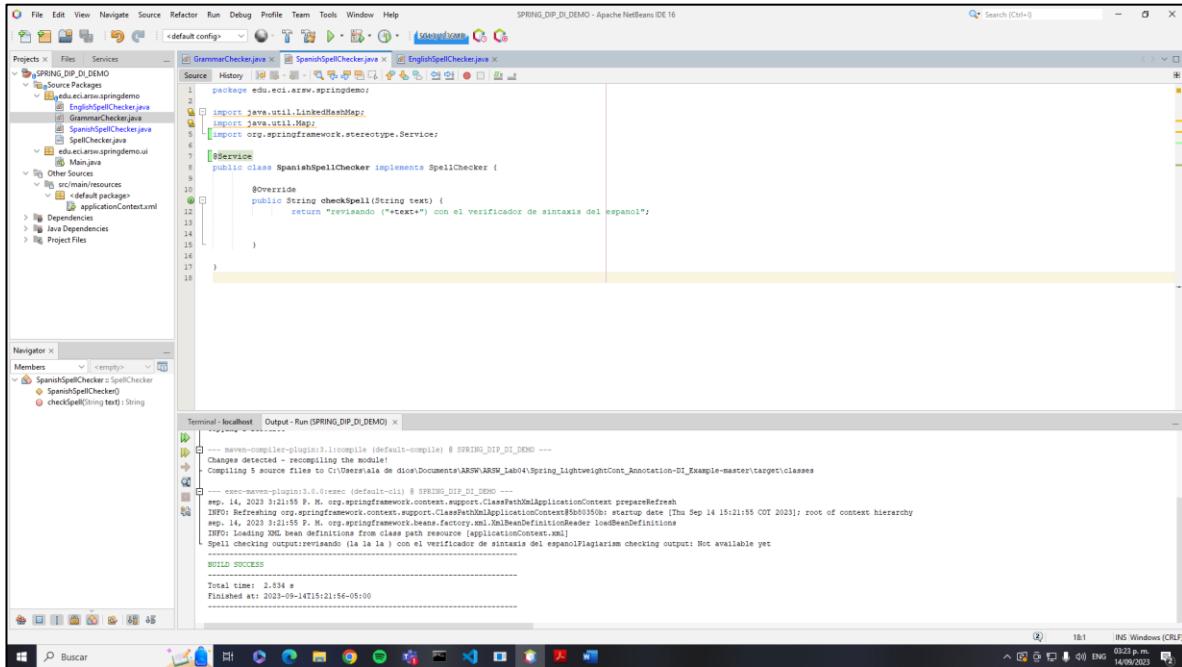
3. Haciendo uso de la [configuración de Spring basada en anotaciones](#) marque con las anotaciones @Autowired y @Service las dependencias que deben inyectarse, y los 'beans' candidatos a ser inyectadas -respectivamente-:

- GrammarChecker será un bean, que tiene como dependencia algo de tipo 'SpellChecker'.
- EnglishSpellChecker y SpanishSpellChecker son los dos posibles candidatos a ser inyectados. Se debe seleccionar uno, u otro, más NO ambos (habría conflicto de resolución de dependencias). Por ahora haga que se use EnglishSpellChecker.

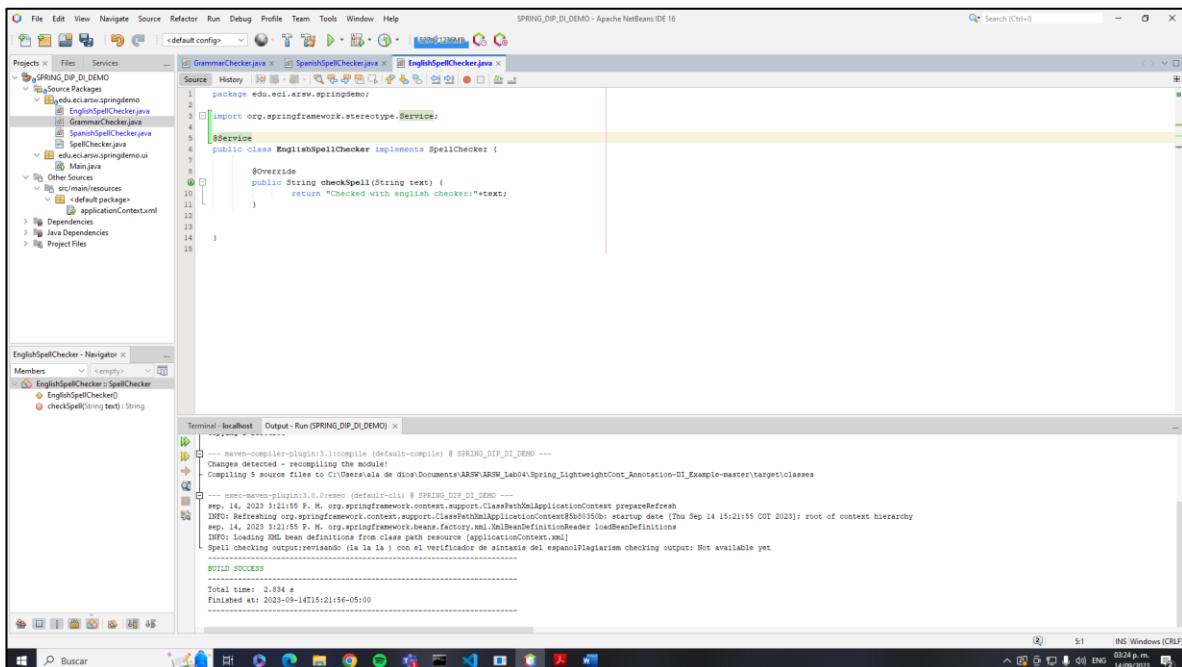
➤ Modificación de la clase GrammarChecker



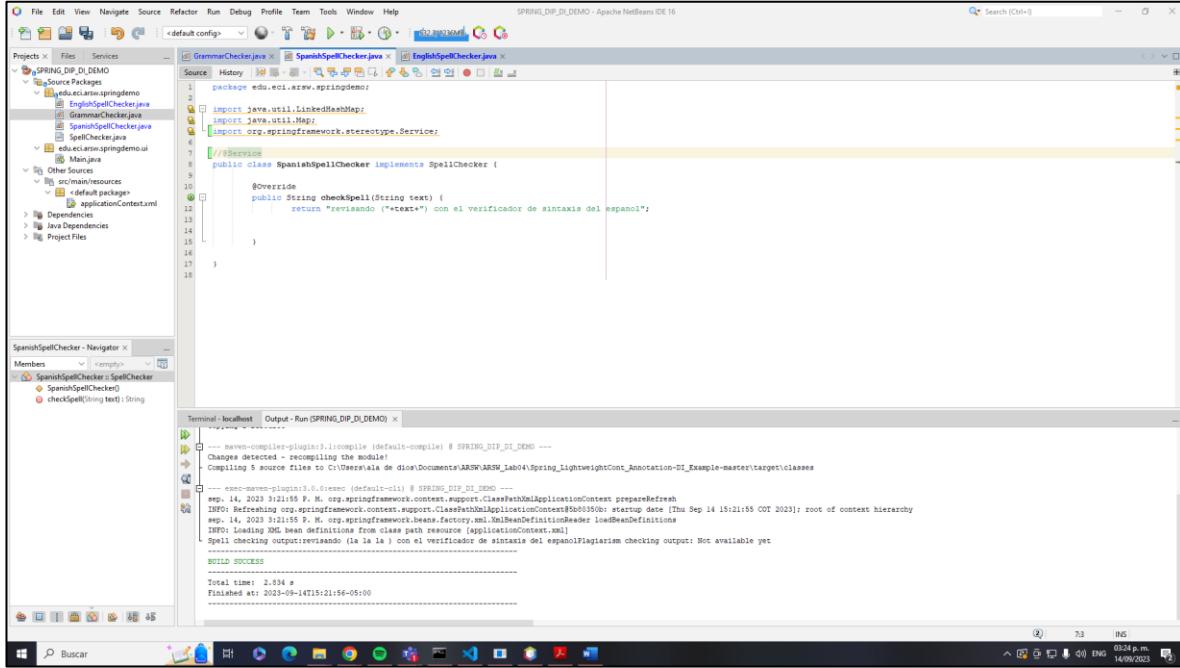
➤ Modificación de la clase SpanishSpellChecker



➤ Modificación de la clase EnglishSpellChecker



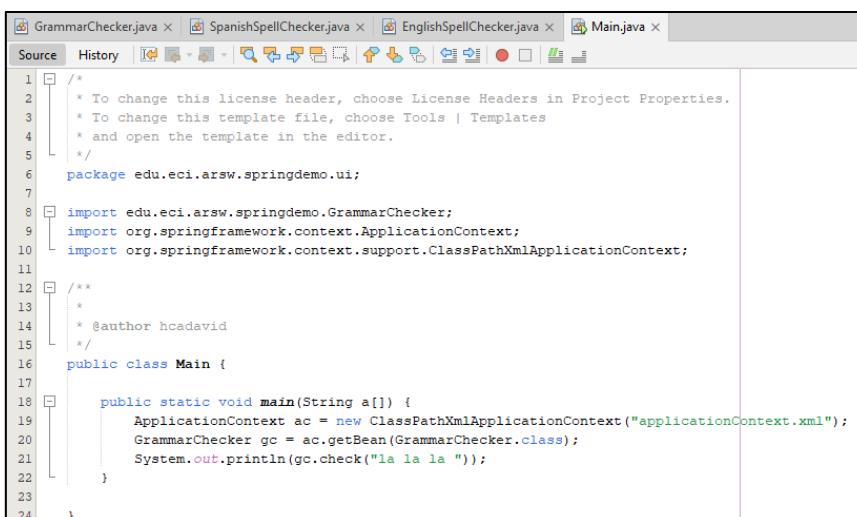
Para que no haya un conflicto de resolución de dependencias cometamos el @Service de la clase SpanishSpellChecker.



4. Haga un programa de prueba, donde se cree una instancia de GrammarChecker mediante Spring, y se haga uso de la misma:

```
public static void main(String[] args) {
    ApplicationContext ac=new ClassPathXmlApplicationContext("applicationContext.xml");
    GrammarChecker gc=ac.getBean(GrammarChecker.class);
    System.out.println(gc.check("la la la "));
}
```

Como podemos observar la clase Main ya cuenta con el programa de prueba donde se crea la instancia de GrammarChecker mediante Spring



➤ Resultados de ejecución:

```

File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
SPRING_DIP_DI_DEMO - Apache NetBeans IDE 16
Source History GrammarChecker.java SpanishSpellChecker.java EnglishSpellChecker.java Main.java
Project X Files Services SPRING_DIP_DI_DEMO < default config > ...
Source Packages edu.educar.springframework
edu.educar.springframework EnglishSpellChecker
GrammarChecker
SpanishSpellChecker
SpellChecker
edu.educar.springframework Manager
Other Sources applicationC Dependencies Java Dependencies Project Files
Main.java - Navigator x
Main Members Main main(String[])
Terminal - localhost Output - Run (SPRING_DIP_DI_DEMO) x
Building SPRING_DIP_DI_DEMO 1.0
[jar] ...
--- exec-maven-plugin:3.0.0:exec (default-cli) @ SPRING_DIP_DI_DEMO ---
mp. 14, 2023 3:33:18 P. M. org.springframework.context.support.ClassPathXmlApplicationContext prepareRefresh
INFO: Refreshing org.springframework.context.support.ClassPathXmlApplicationContext@75b0350b: startup date [Thu Sep 14 15:33:18 COT 2023]; root of context hierarchy
INFO: Loading XML bean definitions from class path resource [applicationContext.xml]
INFO: Loading XSD bean definitions from class path resource [applicationContext.xml]
INFO: Bean check completed with english checker: Is Is Is Plagiarism checking output: Not available yet
BUILD SUCCESS
Total time: 0.098 s
Finished at: 2023-09-14T15:33:18-05:00

```

- Modifique la configuración con anotaciones para que el Bean ‘GrammarChecker’ ahora haga uso de la clase SpanishSpellChecker (para que a GrammarChecker se le inyecte EnglishSpellChecker en lugar de SpanishSpellChecker). Verifique el nuevo resultado.

➤ Modificación de la clase GrammarChecker

```

File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
SPRING_DIP_DI_DEMO - Apache NetBeans IDE 16
Source History GrammarChecker.java SpanishSpellChecker.java EnglishSpellChecker.java Main.java
Project X Files Services SPRING_DIP_DI_DEMO < default config > ...
Source Packages edu.educar.springframework
edu.educar.springframework EnglishSpellChecker
GrammarChecker
SpanishSpellChecker
SpellChecker
edu.educar.springframework Manager
Other Sources applicationC Dependencies Java Dependencies Project Files
GrammarChecker Members GrammarChecker checkString(text) String getSpellChecker() SpellChecker setSpellChecker(SpellChecker sc) sc: SpellChecker x: String
Terminal - localhost Output - Run (SPRING_DIP_DI_DEMO) x
>>>

```

```

package edu.educar.arzw.springdemo;

import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;

import org.springframework.beans.factory.annotation.Qualifier;

@Service
public class GrammarChecker {

    SpellChecker sc;

    String ss;

    public SpellChecker getSpellChecker() {
        return sc;
    }

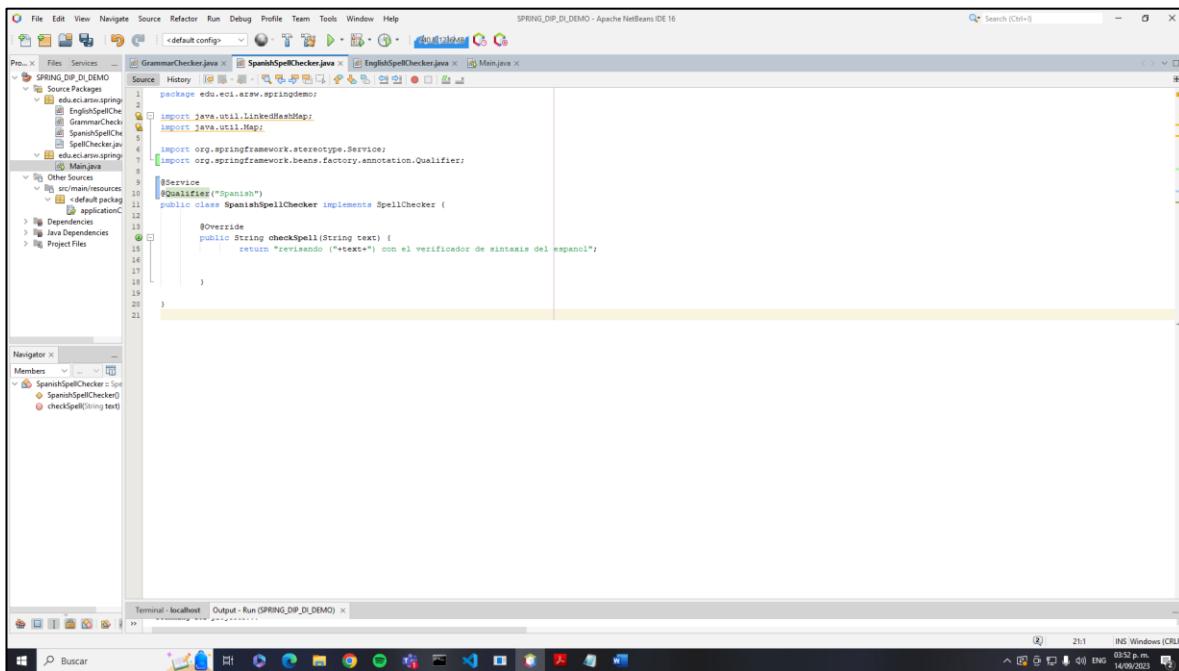
    @Autowired
    @Qualifier("Spanish")
    public void setSpellChecker(SpellChecker sc) {
        this.sc = sc;
    }

    public String check(String text) {
        StringBuffer sb=new StringBuffer();
        sb.append("Spell checking output:"+sc.checkSpell(text));
        sb.append("Plagiarism checking output: Not available yet");

        return sb.toString();
    }
}

```

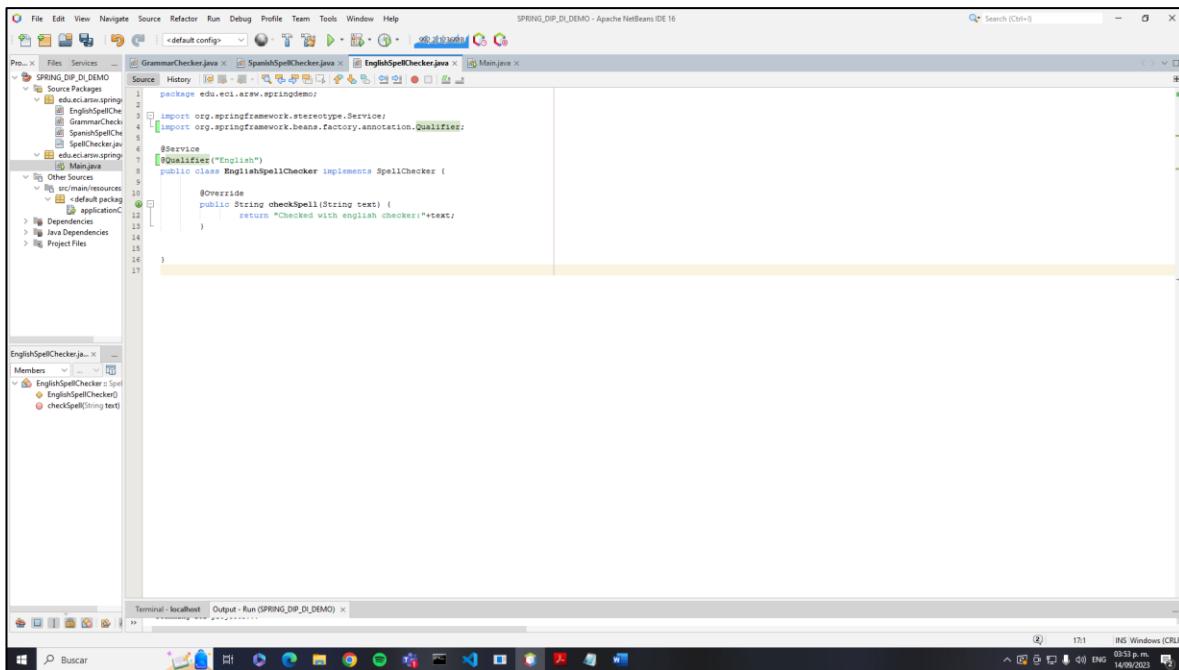
➤ Modificación de la clase SpanishSpellChecker



The screenshot shows the Apache NetBeans IDE 16 interface with the project 'SPRING_DIP_DI_DEMO' open. The 'Source Packages' tree view shows the package structure under 'edu.eci.arez.spring'. The 'SpanishSpellChecker.java' file is selected in the central editor pane. The code implements the SpellChecker interface with a checkSpell method that returns a string indicating the text was checked by the Spanish checker.

```
package edu.eci.arez.springdemo;
import java.util.LinkedHashMap;
import java.util.Map;
import org.springframework.stereotype.Service;
import org.springframework.beans.factory.annotation.Qualifier;
@Service
@Qualifier("Spanish")
public class SpanishSpellChecker implements SpellChecker {
    @Override
    public String checkSpell(String text) {
        return "revisado (*text*) con el verificador de sintaxis del español";
    }
}
```

➤ Modificación de la clase EnglishSpellChecker



The screenshot shows the Apache NetBeans IDE 16 interface with the project 'SPRING_DIP_DI_DEMO' open. The 'Source Packages' tree view shows the package structure under 'edu.eci.arez.spring'. The 'EnglishSpellChecker.java' file is selected in the central editor pane. The code implements the SpellChecker interface with a checkSpell method that returns a string indicating the text was checked by the English checker.

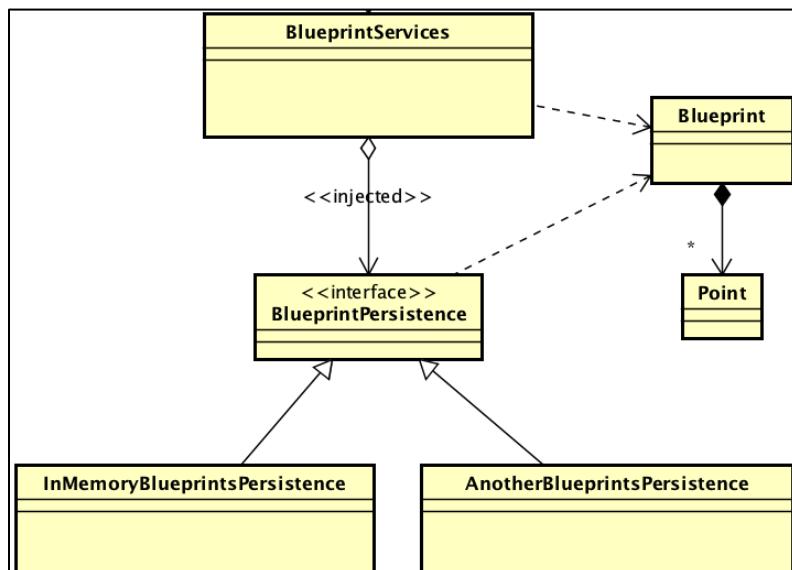
```
package edu.eci.arez.springdemo;
import org.springframework.stereotype.Service;
import org.springframework.beans.factory.annotation.Qualifier;
@Service
@Qualifier("English")
public class EnglishSpellChecker implements SpellChecker {
    @Override
    public String checkSpell(String text) {
        return "Checked with english checker:" + text;
    }
}
```

- #### ➤ Resultados de ejecución:

Componentes y conectores - Parte I.

Middleware- gestión de planos.

En este ejercicio se va a construir un modelo de clases para la capa lógica de una aplicación que permita gestionar planos arquitectónicos de una prestigiosa compañía de diseño.



- Configure la aplicación para que funcione bajo un esquema de inyección de dependencias, tal como se muestra en el diagrama anterior.

Lo anterior requiere:

- Agregar las dependencias de Spring.
- Agregar la configuración de Spring.
- Configurar la aplicación -mediante anotaciones- para que el esquema de persistencia sea inyectado al momento de ser creado el bean 'BlueprintServices'.

```

<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>

  <groupId>edu.eci.pdsw.examples</groupId>
  <artifactId>blueprints-middleware</artifactId>
  <version>0.0.1-SNAPSHOT</version>
  <packaging>jar</packaging>

  <name>Blueprints_Middleware</name>

  <properties>
    <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
    <project.reporting.outputEncoding>UTF-8</project.reporting.outputEncoding>
    <java.version>17</java.version>
    <maven.compiler.source>17</maven.compiler.source>
    <maven.compiler.target>17</maven.compiler.target>
  </properties>

  <dependencies>
    <!-- https://mvnrepository.com/artifact/org.springframework.boot/spring-boot-starter-parent -->
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-parent</artifactId>
      <version>3.1.3</version>
      <type>pom</type>
    </dependency>
  </dependencies>

```

```

<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>

  <groupId>edu.eci.pdsw.examples</groupId>
  <artifactId>blueprints-middleware</artifactId>
  <version>0.0.1-SNAPSHOT</version>
  <packaging>jar</packaging>

  <name>Blueprints_Middleware</name>

  <properties>
    <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
    <project.reporting.outputEncoding>UTF-8</project.reporting.outputEncoding>
    <java.version>17</java.version>
    <maven.compiler.source>17</maven.compiler.source>
    <maven.compiler.target>17</maven.compiler.target>
  </properties>

  <dependencies>
    <!-- https://mvnrepository.com/artifact/org.springframework.boot/spring-boot-starter-parent -->
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-parent</artifactId>
      <version>3.1.3</version>
      <type>pom</type>
    </dependency>

    <dependency>
      <groupId>org.springframework</groupId>
      <artifactId>spring-core</artifactId>
      <version>6.0.11</version>
    </dependency>

    <dependency>
      <groupId>org.springframework</groupId>
      <artifactId>spring-context</artifactId>
      <version>4.2.4.RELEASE</version>
    </dependency>

    <!-- https://mvnrepository.com/artifact/org.springframework/spring-context -->
    <dependency>
      <groupId>org.springframework</groupId>
      <artifactId>spring-context</artifactId>
      <version>6.0.11</version>
    </dependency>
  </dependencies>

```

The screenshot shows the Eclipse IDE interface with the ARSW_Lab04 project selected in the Explorer view. The pom.xml file is open in the editor, displaying Maven dependency declarations. The terminal window shows the command PS C:\Users\luisa\OneDrive\Documentos\ARSW-2\LAB04\ARSW_Lab04. The status bar at the bottom right indicates the date as 14/09/2023.

```

<dependency>
    <version>6.0.11</version>
</dependency>
<dependency>
    <groupId>junit</groupId>
    <artifactId>junit</artifactId>
    <version>4.13.2</version>
    <scope>test</scope>
</dependency>
</dependencies>
</project>

```

- Complete las operaciones getBlueprint() y getBlueprintsByAuthor(). Implemente todo lo requerido de las capas inferiores (por ahora, el esquema de persistencia disponible 'InMemoryBlueprintPersistence') agregando las pruebas correspondientes en 'InMemoryPersistenceTest'.

➤ Modificación de la clase BlueprintsPersistence

The screenshot shows the Eclipse IDE interface with the BlueprintsPersistence.java file open in the editor. The code defines an interface for blueprint persistence, including methods for saving a blueprint and getting all blueprints by author. The status bar at the bottom right indicates the date as 14/09/2023.

```

public interface BlueprintsPersistence {
    /**
     * @param bp the new blueprint
     * @throws BlueprintPersistenceException if a blueprint with the same name already exists,
     * or any other low-level persistence error occurs.
     */
    public void saveBlueprint(Blueprint bp) throws BlueprintPersistenceException;

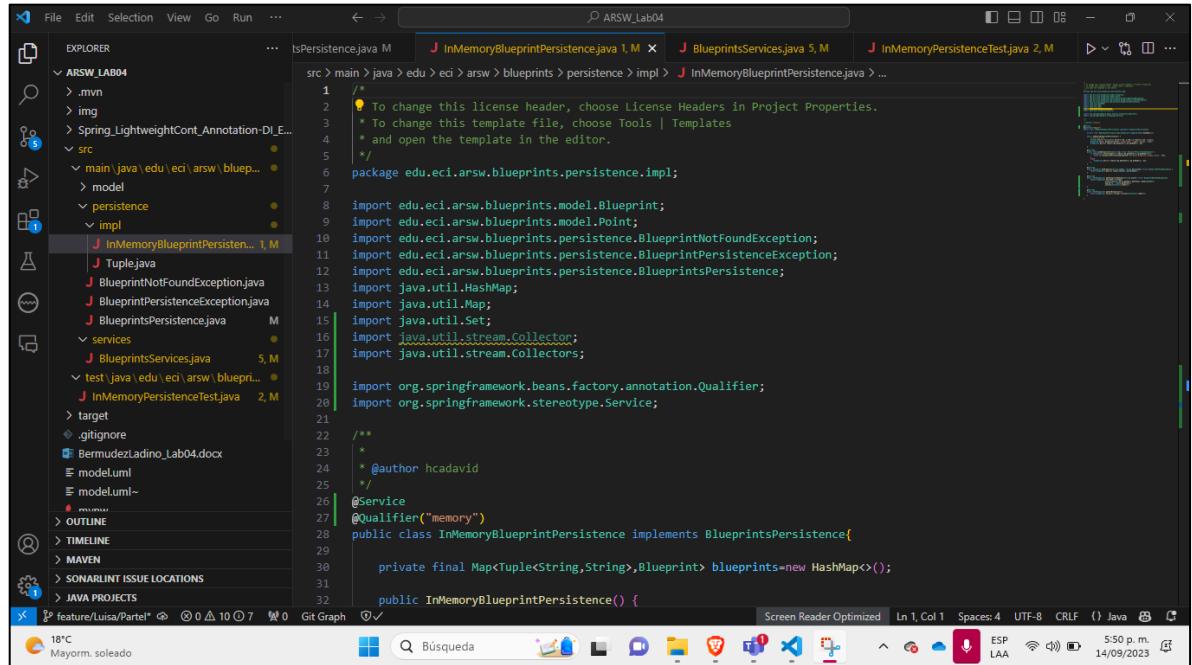
    public Set<Blueprint> getAllBlueprints();

    /**
     * @param author blueprint's author
     * @param bprintname blueprint's author
     * @return the blueprint of the given name and author
     * @throws BlueprintNotFoundException if there is no such blueprint
     */
    public Blueprint getBlueprint(String author, String bprintname) throws BlueprintNotFoundException;

    public Set<Blueprint> getBlueprintsByAuthor(String author) throws BlueprintNotFoundException;
}

```

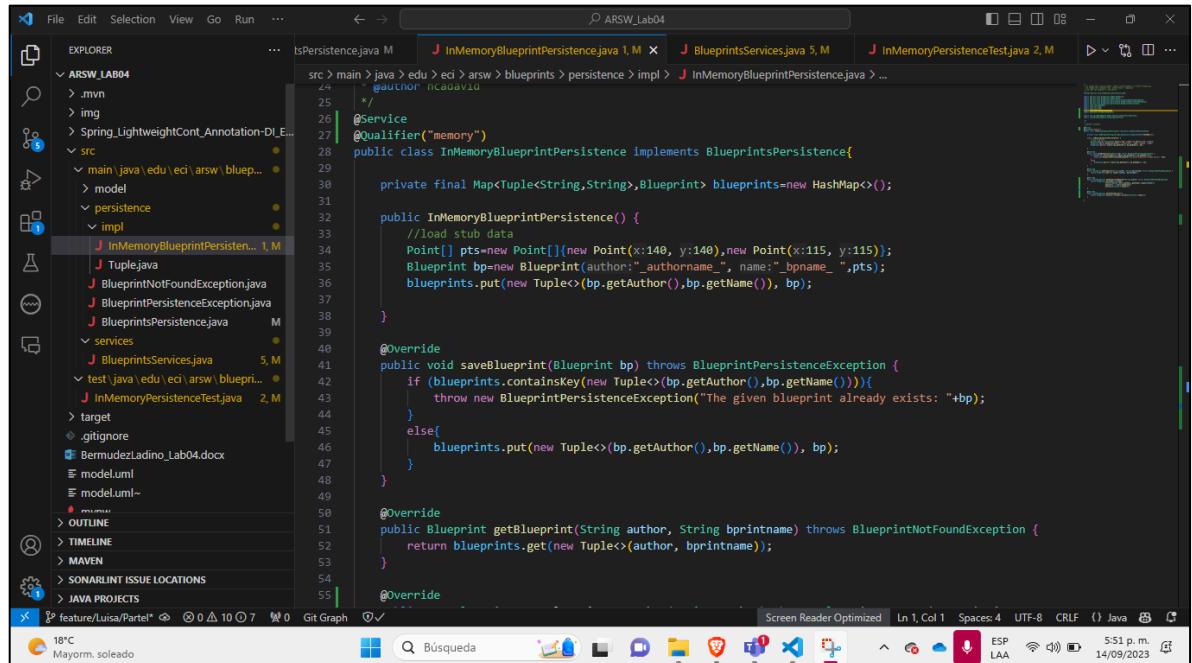
➤ Modificación de la clase InMemoryBlueprintPersistence



```

1  /*
2  * To change this license header, choose License Headers in Project Properties.
3  * To change this template file, choose Tools | Templates
4  * and open the template in the editor.
5  */
6  package edu.eci.arsw.blueprints.persistence.impl;
7
8  import edu.eci.arsw.blueprints.model.Blueprint;
9  import edu.eci.arsw.blueprints.model.Point;
10 import edu.eci.arsw.blueprints.persistence.BlueprintNotFoundException;
11 import edu.eci.arsw.blueprints.persistence.BlueprintPersistenceException;
12 import edu.eci.arsw.blueprints.persistence.BlueprintsPersistence;
13 import java.util.HashMap;
14 import java.util.Map;
15 import java.util.Set;
16 import java.util.stream.Collectors;
17 import java.util.stream.Collectors;
18
19 import org.springframework.beans.factory.annotation.Qualifier;
20 import org.springframework.stereotype.Service;
21
22 /**
23 *
24 * @author hcadavid
25 */
26 @Service
27 @Qualifier("memory")
28 public class InMemoryBlueprintPersistence implements BlueprintPersistence{
29
30     private final Map<Tuple<String, String>, Blueprint> blueprints=new HashMap<>();
31
32     public InMemoryBlueprintPersistence() {
33
34     }
35
36     @Override
37     public void saveBlueprint(Blueprint bp) throws BlueprintPersistenceException {
38         if (blueprints.containsKey(new Tuple<>(bp.getAuthor(),bp.getName()))){
39             throw new BlueprintPersistenceException("The given blueprint already exists: "+bp);
40         }
41         else{
42             blueprints.put(new Tuple<>(bp.getAuthor(),bp.getName()), bp);
43         }
44     }
45
46     @Override
47     public Blueprint getBlueprint(String author, String bprintname) throws BlueprintNotFoundException {
48         return blueprints.get(new Tuple<>(author, bprintname));
49     }
50
51     @Override
52
53
54
55

```



```

1  /*
2  * To change this license header, choose License Headers in Project Properties.
3  * To change this template file, choose Tools | Templates
4  * and open the template in the editor.
5  */
6  package edu.eci.arsw.blueprints.persistence.impl;
7
8  import edu.eci.arsw.blueprints.model.Blueprint;
9  import edu.eci.arsw.blueprints.model.Point;
10 import edu.eci.arsw.blueprints.persistence.BlueprintNotFoundException;
11 import edu.eci.arsw.blueprints.persistence.BlueprintPersistenceException;
12 import edu.eci.arsw.blueprints.persistence.BlueprintsPersistence;
13 import java.util.HashMap;
14 import java.util.Map;
15 import java.util.Set;
16 import java.util.stream.Collectors;
17 import java.util.stream.Collectors;
18
19 import org.springframework.beans.factory.annotation.Autowired;
20 import org.springframework.stereotype.Service;
21
22 /**
23 *
24 * @author hcadavid
25 */
26 @Service
27 @Qualifier("memory")
28 public class InMemoryBlueprintPersistence implements BlueprintPersistence{
29
30     private final Map<Tuple<String, String>, Blueprint> blueprints=new HashMap<>();
31
32     public InMemoryBlueprintPersistence() {
33
34     }
35
36     @Override
37     public void saveBlueprint(Blueprint bp) throws BlueprintPersistenceException {
38         if (blueprints.containsKey(new Tuple<>(@Author(bp.getAuthor()),@Bprintname(bp.getName())))){
39             throw new BlueprintPersistenceException("The given blueprint already exists: "+bp);
40         }
41         else{
42             blueprints.put(new Tuple<>(@Author(bp.getAuthor()),@Bprintname(bp.getName())), bp);
43         }
44     }
45
46     @Override
47     public Blueprint getBlueprint(@Author(String author), @Bprintname(String bprintname)) throws BlueprintNotFoundException {
48         return blueprints.get(new Tuple<>(author, bprintname));
49     }
50
51     @Override
52
53
54
55

```

The screenshot shows the Eclipse IDE interface with the following details:

- Title Bar:** ARSW_Lab04
- Left Sidebar (EXPLORER):** Shows the project structure under ARSW_LAB04, including src, test, target, and various Java files like BlueprintPersistence.java, BlueprintNotFoundException.java, etc.
- Central Area:** Displays the code for `InMemoryBlueprintPersistence.java`. The code implements the `BlueprintPersistence` interface, using a map to store blueprints by author and blueprint name. It includes methods for getting a blueprint by author and name, getting blueprints by author, and getting all blueprints.
- Bottom Status Bar:** Shows system information like temperature (18°C), battery level (Mayorm. soleado), and system time (5:51 p.m. 14/09/2023).

➤ Modificación de la clase BlueprintsServices

The screenshot shows the Eclipse IDE interface with the following details:

- Title Bar:** ARSW_Lab04
- Left Sidebar (EXPLORER):** Shows the project structure under ARSW_LAB04, including src, test, target, and various Java files like BlueprintPersistence.java, BlueprintNotFoundException.java, etc.
- Central Area:** Displays the code for `BlueprintsServices.java`. The class is annotated with `@Service` and `@Autowired`. It contains a method `addNewBlueprint` that saves a blueprint to the persistence layer.
- Bottom Status Bar:** Shows system information like temperature (17°C), battery level (Parc. soleado), and system time (6:14 p.m. 14/09/2023).

```

File Edit Selection View Go Run ...
ARSW_Lab04
EXPLORER
src > main > java > edu > eci > arsw > blueprints > services > J BlueprintsServices.java ...
src/main/java/edu/eci/arsw/blueprints/services/BlueprintsServices.java
32     public Set<Blueprint> getAllBlueprints(){
33         return bpp.getAllBlueprints();
34     }
35
36 /**
37 * @param author blueprint's author
38 * @param name blueprint's name
39 * @return the blueprint of the given name created by the given author
40 * @throws BlueprintNotFoundException if there is no such blueprint
41 */
42 public Blueprint getBlueprint(String author, String name) throws BlueprintNotFoundException{
43     //throw new UnsupportedOperationException("Not supported yet.");
44     return bpp.getBlueprint(author, name);
45 }
46
47 /**
48 * @param author blueprint's author
49 * @return all the blueprints of the given author
50 * @throws BlueprintNotFoundException if the given author doesn't exist
51 */
52 public Set<Blueprint> getBlueprintsByAuthor(String author) throws BlueprintNotFoundException{
53     //throw new UnsupportedOperationException("Not supported yet.");
54     return bpp.getBlueprintsByAuthor(author);
55 }
56
57 }
58
59
60
61

```

Screen Reader Optimized Ln 1, Col 1 Spaces: 4 UTF-8 CRLF () Java ESP LAA 6:15 p.m. 14/09/2023

➤ Modificación de la clase Test InMemoryPersistenceTest

```

File Edit Selection View Go Run ...
ARSW_Lab04
EXPLORER
src > test > java > edu > eci > arsw > blueprints > persistence > impl > J InMemoryPersistenceTest.java > J InMemoryPersistenceTest > J InMemoryPersistenceTest.java 2, M
src/test/java/edu/eci/arsw/blueprints/persistence/impl/InMemoryPersistenceTest.java
1 /**
2  * To change this license header, choose License Headers in Project Properties.
3  * To change this template file, choose Tools | Templates
4  * and open the template in the editor.
5 */
6 package edu.eci.arsw.blueprints.test.persistence.impl;
7
8 import edu.eci.arsw.blueprints.model.Blueprint;
9 import edu.eci.arsw.blueprints.model.Point;
10 import edu.eci.arsw.blueprints.persistence.BlueprintNotFoundException;
11 import edu.eci.arsw.blueprints.persistence.BlueprintPersistenceException;
12 import edu.eci.arsw.blueprints.persistence.impl.InMemoryBlueprintPersistence;
13 import java.util.logging.Level;
14 import java.util.logging.Logger;
15 import org.junit.Test;
16 import static org.junit.Assert.*;
17
18 /**
19 *
20 * @author hcadavid
21 */
22 public class InMemoryPersistenceTest {
23
24     @Test
25     public void saveNewAndLoadTest() throws BlueprintPersistenceException, BlueprintNotFoundException{
26         InMemoryBlueprintPersistence ibpp=new InMemoryBlueprintPersistence();
27
28         Point[] pts0=new Point[]{new Point(x:40, y:40),new Point(x:15, y:15)};
29         Blueprint bp0=new Blueprint(author:"mack", name:"mypaint", pts0);
30
31         ibpp.saveBlueprint(bp0);
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33     }
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35 }
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```

The screenshot shows an IDE interface with the title bar "ARSW_Lab04". The left sidebar displays a project structure under "EXPLORER" for "ARSW LAB04", including "src", "test", "target", ".gitignore", and several Java files like "InMemoryBlueprintPersistence.java", "BlueprintsServices.java", and "InMemoryPersistenceTest.java". The main editor window shows the Java code for "InMemoryPersistenceTest.java". The code includes annotations for testing (@Test) and exception handling (@catch). It defines methods to get blueprints by author and to get blueprints by author ID. The code uses the InMemoryBlueprintPersistence class to interact with a Blueprint object. The status bar at the bottom right indicates the date and time as "14/09/2023 6:18 p.m.".

```
public void getBlueprint() {
    InMemoryBlueprintPersistence ibpp=new InMemoryBlueprintPersistence();

    Point[] pts=new Point[]{new Point(x:0, y:0),new Point(x:10, y:10)};
    Blueprint bp=new Blueprint(@author:"Luisa", name:"CasaAzul",pts);

    try {
        ibpp.getBlueprint(bp.getAuthor(), bp.getName());
    } catch (BlueprintNotFoundException ex) {
        fail(message:"Blueprint Not Found");
    }

    Point[] pts2=new Point[]{new Point(x:10, y:10),new Point(x:20, y:20)};
    Blueprint bp2=new Blueprint(@author:"Daniela", name:"CasaMorada",pts2);

    try{
        ibpp.getBlueprint(bp2.getAuthor(), bp2.getName());
    }catch (BlueprintNotFoundException ex){
        fail(message:"Blueprint Not Found");
    }
}

@Test
public void getBlueprintsByAuthor() {
    InMemoryBlueprintPersistence ibpp=new InMemoryBlueprintPersistence();
}
```

This screenshot is nearly identical to the one above, showing the same IDE interface, project structure, and Java code for "InMemoryPersistenceTest.java". The only difference is in the code itself, where the second test method has been partially completed. The new code adds a try block to handle BlueprintNotFoundException and a catch block to fail the test if the exception is thrown. The status bar at the bottom right indicates the date and time as "14/09/2023 6:18 p.m.".

```
    try {
        ibpp.getBlueprintsByAuthor(bp.getAuthor());
    } catch (BlueprintNotFoundException ex) {
        fail(message:"Blueprint Not Found");
    }

    Point[] pts2=new Point[]{new Point(x:10, y:10),new Point(x:50, y:50)};
    Blueprint bp2=new Blueprint(@author:"Karol", name:"Finca",pts2);

    try{
        ibpp.getBlueprintsByAuthor(bp2.getAuthor());
    }catch (BlueprintNotFoundException ex){
        fail(message:"Blueprint Not Found");
    }
}
```

➤ Resultados ejecución:

```

tsPersistence.java M J InMemoryBlueprintPersistence.java 1, M J BlueprintsServices.java 5, M J InMemoryPersistenceTestJava 2, M
src > test > java > edu > eci > arsw > blueprints > test > persistence > impl > J InMemoryPersistenceTestJava > InMemoryPersistenceTest > getBlueprintsByAuthor()
96
97
98
99
100 @Test
101     public void getBlueprintsByAuthor() {
102         InMemoryBlueprintPersistence ibpp=new InMemoryBlueprintPersistence();
103     }

[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ blueprints-middleware ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\luisa\OneDrive\Documentos\ARWS-2\LAB04\ARSW_Lab04\src\test\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:testCompile (default-testCompile) @ blueprints-middleware ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-surefire-plugin:2.12.4:test (default-test) @ blueprints-middleware ---
[INFO] Surefire report directory: C:\Users\luisa\OneDrive\Documentos\ARWS-2\LAB04\ARSW_Lab04\target\surefire-reports

T E S T S
-----
Running edu.eci.arsw.blueprints.test.persistence.impl.InMemoryPersistenceTest
Tests run: 4, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.075 sec

Results :

Tests run: 4, Failures: 0, Errors: 0, Skipped: 0

[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 1.634 s
-----
```

- Haga un programa en el que cree (mediante Spring) una instancia de BlueprintServices, y rectifique la funcionalidad del mismo: registrar planos, consultar planos, registrar planos específicos, etc.

➤ Creación de la clase Main

```

src > main > java > edu > eci > arsw > blueprints > services > J Main.java > Main > main(String[])
1
2 import java.util.Set;
3
4 import org.springframework.context.ApplicationContext;
5 import org.springframework.context.support.ClassPathXmlApplicationContext;
6
7 import edu.eci.arsw.blueprints.model.Blueprint;
8 import edu.eci.arsw.blueprints.model.Point;
9 import edu.eci.arsw.blueprints.persistence.BlueprintNotFoundException;
10 import edu.eci.arsw.blueprints.persistence.BlueprintPersistenceException;
11
12 public class Main {
13     Run | Debug
14     public static void main(String[] args) {
15         ApplicationContext application = new ClassPathXmlApplicationContext(configLocation:"applicationContext.xml");
16         BlueprintServices bps = application.getBean(BlueprintServices.class);
17         Point[] puntos = new Point[]{new Point(x:0, y:0), new Point(x:10, y:10), new Point(x:4, y:3)};
18         Blueprint bp1 = new Blueprint(author:"Luisa", name:"Casa1", puntos);
19
20         Blueprint bp2 = new Blueprint(author:"Karol", name:"Casa2", puntos);
21
22         Blueprint bp3 = new Blueprint(author:"Fernanda", name:"Casa3", puntos);
23
24         try{
25             bps.addNewBlueprint(bp1);
26             bps.addNewBlueprint(bp2);
27             bps.addNewBlueprint(bp3);
28
29             Blueprint getBlue = bps.getBlueprint(author:"Karol", name:"Casa2");
30             System.out.println("-----");
31             System.out.println(getBlue);
32             System.out.println("-----");
33         }
34     }
35 }
```

```

try{
    bps.addNewBlueprint(bp1);
    bps.addNewBlueprint(bp2);
    bps.addNewBlueprint(bp3);

    Blueprint getBlue = bps.getBlueprint(author:"Karol", name:"Casa2");
    System.out.println("-----");
    System.out.println(getBlue);
    System.out.println("-----");

    Set<Blueprint> getAllBlue = bps.getAllBlueprints();
    getAllBlue.forEach((entry)>{
        System.out.println(entry);
    });
    System.out.println("-----");

    Set<Blueprint> getAuthorBlue = bps.getBlueprintsByAuthor(author:"Luisa");
    getAuthorBlue.forEach((entry)>{
        System.out.println(entry);
    });
    System.out.println("-----");

}catch(BlueprintPersistenceException e){
    e.printStackTrace();
}

}catch(BlueprintNotFoundException e){
    e.printStackTrace();
}
}

```

➤ Archivo de configuración de Spring applicationContext.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"
       xmlns:context="http://www.springframework.org/schema/context"
       xsi:schemaLocation="http://www.springframework.org/schema/beans http://www.springframework.org/schema/beans/
                           http://www.springframework.org/schema/context http://www.springframework.org/schema/context/spring-context.xsd">

    <context:component-scan base-package="edu.eci.arsw" />

    <bean id="blueprint" class="edu.eci.arsw.blueprints.services.BlueprintsServices" />
    <bean id="Memory" class="edu.eci.arsw.blueprints.persistence.impl.InMemoryBlueprintPersistence" />

</beans>

```

➤ Resultados ejecución

```

src > main > java > edu > eci > arsw > blueprints > services > J Main.java > ↗ Main > main(String[])
try{
    bps.addNewBlueprint(bp1);
}

Blueprint[author=Karol, name=Casa2]
Blueprint[author=authname_, name=bpname_]
Blueprint[author=Luisa, name=Casa1]
Blueprint[author=Fernanda, name=Casa3]
Blueprint[author=Karol, name=Casa2]

Blueprint[author=Luisa, name=Casa1]
Blueprint[author=authname_, name=bpname_]
Blueprint[author=Luisa, name=Casa1]
Blueprint[author=Fernanda, name=Casa3]
Blueprint[author=Karol, name=Casa2]

Blueprint[author=Luisa, name=Casa1]
Blueprint[author=authname_, name=bpname_]
Blueprint[author=Luisa, name=Casa1]
Blueprint[author=Fernanda, name=Casa3]
Blueprint[author=Karol, name=Casa2]

```

4. Se quiere que las operaciones de consulta de planos realicen un proceso de filtrado, antes de retornar los planos consultados. Dichos filtros lo que buscan es reducir el tamaño de los planos, removiendo datos redundantes o simplemente submuestreando, antes de retornarlos. Ajuste la aplicación (agregando las abstracciones e implementaciones que considere) para que a la clase BlueprintServices se le inyecte uno de dos posibles 'filtros' (o eventuales futuros filtros). No se contempla el uso de más de uno a la vez:

- (A) Filtrado de redundancias: suprime del plano los puntos consecutivos que sean repetidos.
- (B) Filtrado de submuestreo: suprime 1 de cada 2 puntos del plano, de manera intercalada.

➤ Modificación de la clase Blueprint

```

public class Blueprint {
    private String author=null;
    private List<Point> points=null;
    private String name=null;

    public Blueprint(String author,String name,List<Point> pts){
        this.author=author;
        this.name=name;
        points=Arrays.asList(pts);
    }

    public Blueprint(String author, String name, Point[] pts){
        this.author=author;
        this.name=name;
        points=new ArrayList<>();
        for(int i=0;i<pts.length;i+=2)
            points.add(pts[i]);
    }

    public Blueprint() {
    }

    public String getName() {
        return name;
    }

    public String getAuthor() {
        return author;
    }

    public List<Point> getPoints() {
        return points;
    }
}

```

➤ Creación de la clase BlueprintFilters

```

src > main > java > edu > eci > arsw > blueprints > services > J BlueprintFilters.java > ...
1 package edu.eci.arsw.blueprints.services;
2
3 import edu.eci.arsw.blueprints.model.Blueprint;
4
5 public interface BlueprintFilters {
6
7     public Blueprint filtrar(Blueprint bp);
8
9 }

```

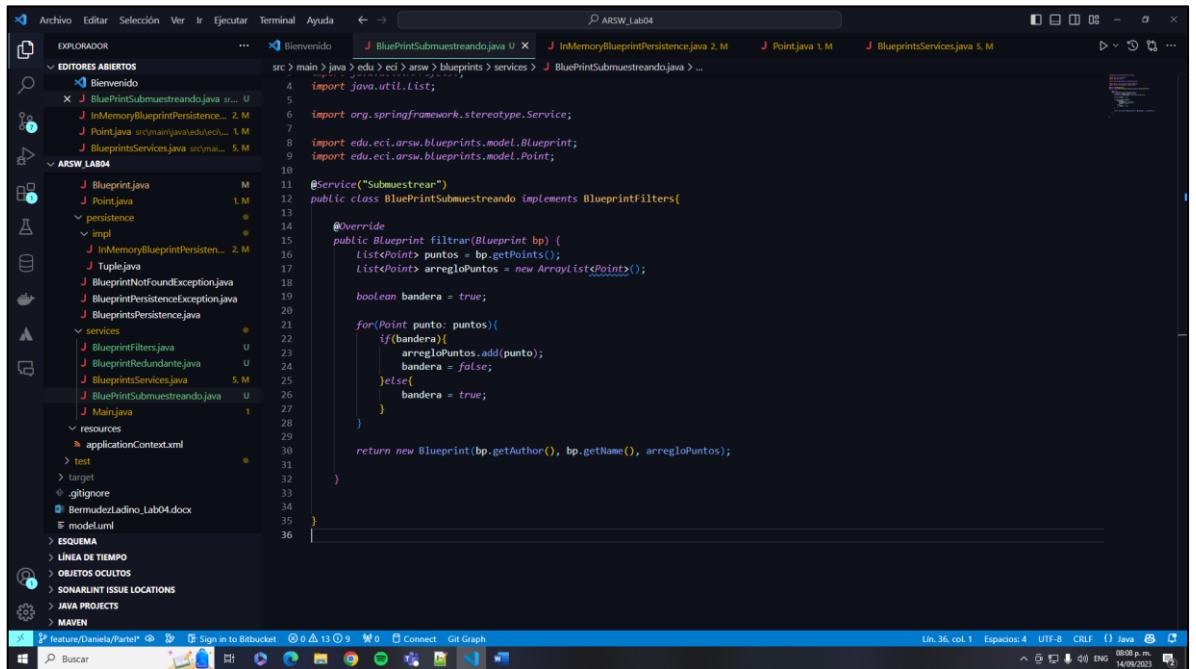
➤ Creación de la clase BlueprintRedundante

```

src > main > java > edu > eci > arsw > blueprints > services > J BlueprintRedundante.java > ...
4 import java.util.List;
5
6 import org.springframework.stereotype.Service;
7
8 import edu.eci.arsw.blueprints.model.Blueprint;
9 import edu.eci.arsw.blueprints.model.Point;
10
11 @Service("Redundante")
12 public class BlueprintRedundante implements BlueprintFilters{
13
14     @Override
15     public Blueprint filtrar(Blueprint bp) {
16         List<Point> puntos = bp.getPoints();
17         List<Point> arregloPuntos = new ArrayList<Point>();
18
19         for(Point punto: puntos){
20             boolean bandera = false;
21
22                 for(Point puntoAr: arregloPuntos){
23                     if(punto.equals(puntoAr)){
24                         bandera = true;
25                         break;
26                     }
27                 }
28
29                 if(!bandera){
30                     arregloPuntos.add(punto);
31                 }
32             }
33
34         return new Blueprint(bp.getAuthor(), bp.getName(), arregloPuntos);
35     }
36
37 }

```

➤ Creación de la clase BluePrintSubmuestreando

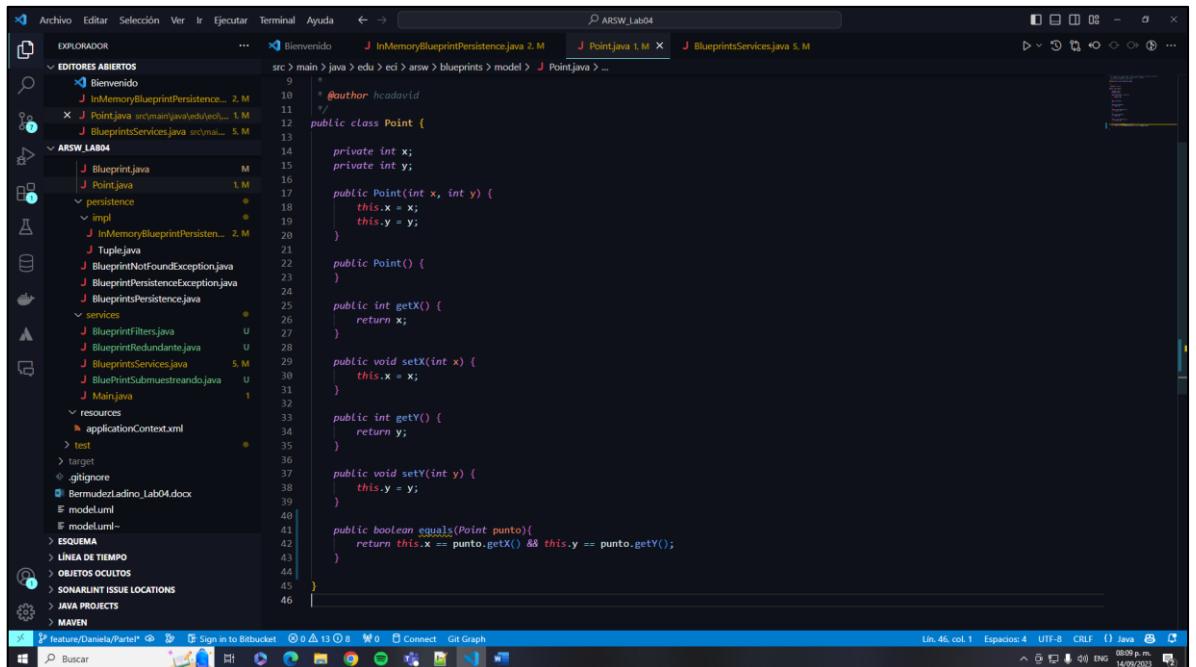


```

src > main > java > edu > eci > arsw > blueprints > services > J BluePrintSubmuestreando.java > ...
4   import java.util.List;
5
6   import org.springframework.stereotype.Service;
7
8   import edu.eci.arsw.blueprints.model.Blueprint;
9   import edu.eci.arsw.blueprints.model.Point;
10
11  @Service("Submuestrear")
12  public class BluePrintSubmuestreando implements BlueprintFilters{
13
14      @Override
15      public Blueprint filtrar(Blueprint bp) {
16          List<Point> puntos = bp.getPoints();
17          List<Point> arregloPuntos = new ArrayList<Point>();
18
19          boolean bandera = true;
20
21          for(Point punto: puntos){
22              if(bandera){
23                  arregloPuntos.add(punto);
24                  bandera = false;
25              }else{
26                  bandera = true;
27              }
28
29          }
30
31          return new Blueprint(bp.getAuthor(), bp.getName(), arregloPuntos);
32
33      }
34
35  }

```

➤ Modificación de la clase Point



```

src > main > java > edu > eci > arsw > blueprints > model > J Point.java > ...
9
10     * @author hcadavid
11     */
12  public class Point {
13
14      private int x;
15      private int y;
16
17      public Point(int x, int y) {
18          this.x = x;
19          this.y = y;
20      }
21
22      public Point() {
23      }
24
25      public int getX() {
26          return x;
27      }
28
29      public void setX(int x) {
30          this.x = x;
31      }
32
33      public int getY() {
34          return y;
35      }
36
37      public void setY(int y) {
38          this.y = y;
39      }
40
41      public boolean equals(Point punto){
42          return this.x == punto.getX() && this.y == punto.getY();
43      }
44
45  }

```

➤ Modificación de la clase InMemoryBlueprintPersistence

```

src > main > java > edu > eci > arsw > blueprints > persistence > impl > InMemoryBlueprintPersistence.java > InMemoryBlueprintPersistence
15 import java.util.Set;
16 import java.util.stream.Collectors;
17 import java.util.stream.Collectors;
18
19 import org.springframework.beans.factory.annotation.Qualifier;
20 import org.springframework.stereotype.Service;
21
22 /**
23 * @author hcadavid
24 */
25
26 @Service("Memory")
27 //@Qualifier("memory")
28 public class InMemoryBlueprintPersistence implements BlueprintPersistence{
29
30     private final Map<Tuple<String, String>, Blueprint> blueprints=new HashMap<>();
31
32     /**
33      * Load stub data
34      */
35     Point[] pts=new Point[]{new Point(x:140, y:140),new Point(x:115, y:115)};
36     Blueprint bp=new Blueprint(author:_authorname_, name:_pname_, pts);
37     blueprints.put(new Tuple<>(bp.getAuthor(),bp.getName()), bp);
38
39 }
40
41 @Override
42 public void saveBlueprint(Blueprint bp) throws BlueprintPersistenceException {
43     if (blueprints.containsKey(new Tuple<>(bp.getAuthor(),bp.getName()))){
44         throw new BlueprintPersistenceException("The given blueprint already exists: "+bp);
45     }
46     else{
47         blueprints.put(new Tuple<>(bp.getAuthor(),bp.getName()), bp);
48     }
49 }
50
51 @Override
52 public Blueprint getBlueprint(String author, String bprintname) throws BlueprintNotFoundException {
53     return blueprints.get(new Tuple<>(author, bprintname));
54 }
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5. Agregue las pruebas correspondientes a cada uno de estos filtros, y pruebe su funcionamiento en el programa de prueba, comprobando que sólo cambiando la posición de las anotaciones -sin cambiar nada más-, el programa retorne los planos filtrados de la manera (A) o de la manera (B).

➤ Creación de la clase BlueprintRedundanteTest

```

src > test > java > edu > eci > arsw > blueprints > test > services > BlueprintRedundanteTest.java > BlueprintRedundanteTest.java
1 package edu.eci.arsw.blueprints.test.services;
2
3 import static org.junit.Assert.assertEquals;
4
5 import org.junit.Test;
6 import org.junit.runner.RunWith;
7 import org.springframework.beans.factory.annotation.Autowired;
8 import org.springframework.beans.factory.annotation.Qualifier;
9 import org.springframework.boot.test.context.SpringBootTest;
10 import org.springframework.context.annotation.ComponentScan;
11 import org.springframework.test.context.junit4.SpringJUnit4ClassRunner;
12
13 import edu.eci.arsw.blueprints.model.Blueprint;
14 import edu.eci.arsw.blueprints.model.Point;
15 import edu.eci.arsw.blueprints.services.BlueprintRedundante;
16
17 @ComponentScan("edu.eci.arsw")
18 @SpringBootTest(classes = BlueprintRedundante.class)
19 @RunWith(SpringJUnit4ClassRunner.class)
20 public class BlueprintRedundanteTest {
21     @Autowired
22     @Qualifier("Redundante")
23     BlueprintRedundante bpr;
24
25     @Test
26     public void filtrarTest() {
27         Point[] puntos1= new Point[]{{
28             new Point(x:40,y:40),
29             new Point (x:40,y:40)
30         }};
31
32         Blueprint bp1 = new Blueprint(author:"Luisa", name:"Plano1", puntos1);
33
34         Point[] puntos2 = new Point[]{{
35             new Point(x:15,y:15),
36             new Point(x:10, y:10)
37         }};
38
39         Blueprint bp2 = new Blueprint(author:"Luisa", name:"Plano1", puntos2);
40         Blueprint bprAux1 = bpr.filtrar(bp1);
41
42         assertEquals(expected:1,bprAux1.getPoints().size());
43         assertEquals(expected:2,bprAux2.getPoints().size());
44
45     }
46
47 }

```

```

src > test > java > edu > eci > arsw > blueprints > test > services > BlueprintRedundanteTest.java > BlueprintRedundanteTest.java
1 package edu.eci.arsw.blueprints.test.services;
2
3 import static org.junit.Assert.assertEquals;
4
5 import org.junit.Test;
6 import org.junit.runner.RunWith;
7 import org.springframework.beans.factory.annotation.Autowired;
8 import org.springframework.beans.factory.annotation.Qualifier;
9 import org.springframework.boot.test.context.SpringBootTest;
10 import org.springframework.context.annotation.ComponentScan;
11 import org.springframework.test.context.junit4.SpringJUnit4ClassRunner;
12
13 import edu.eci.arsw.blueprints.model.Blueprint;
14 import edu.eci.arsw.blueprints.model.Point;
15 import edu.eci.arsw.blueprints.services.BlueprintRedundante;
16
17 @ComponentScan("edu.eci.arsw")
18 @SpringBootTest(classes = BlueprintRedundante.class)
19 @RunWith(SpringJUnit4ClassRunner.class)
20 public class BlueprintRedundanteTest {
21     @Autowired
22     @Qualifier("Redundante")
23     BlueprintRedundante bpr;
24
25     @Test
26     public void filtrarTest() {
27         Point[] puntos1= new Point[]{{
28             new Point(x:40,y:40),
29             new Point (x:40,y:40)
30         }};
31
32         Blueprint bp1 = new Blueprint(author:"Luisa", name:"Plano1", puntos1);
33
34         Point[] puntos2 = new Point[]{{
35             new Point(x:15,y:15),
36             new Point(x:10, y:10)
37         }};
38
39         Blueprint bp2 = new Blueprint(author:"Luisa", name:"Plano1", puntos2);
40         Blueprint bprAux1 = bpr.filtrar(bp1);
41
42         assertEquals(expected:1,bprAux1.getPoints().size());
43         assertEquals(expected:2,bprAux2.getPoints().size());
44
45     }
46
47 }

```

➤ Creación de la clase BlueprintSubmuestreandoTest

```

File Edit Selection View Go Run ...
ARSW_Lab04
src > test > java > edu > eci > arsw > blueprints > test > services > BlueprintSubmuestreandoTest.java
1 package edu.eci.arsw.blueprints.test.services;
2
3 import static org.junit.Assert.assertEquals;
4
5 import org.junit.Test;
6 import org.junit.runner.RunWith;
7 import org.springframework.beans.factory.annotation.Autowired;
8 import org.springframework.beans.factory.annotation.Qualifier;
9 import org.springframework.boot.test.context.SpringBootTest;
10 import org.springframework.context.annotation.ComponentScan;
11 import org.springframework.test.context.junit4.SpringJUnit4ClassRunner;
12
13 import edu.eci.arsw.blueprints.model.Blueprint;
14 import edu.eci.arsw.blueprints.model.Point;
15 import edu.eci.arsw.blueprints.services.BluePrintSubmuestreando;
16
17 @ComponentScan("edu.eci.arsw")
18 @SpringBootTest(classes = BlueprintSubmuestreandoTest.class)
19 @RunWith(SpringJUnit4ClassRunner.class)
public class BlueprintSubmuestreandoTest {
20
21     @Autowired
22     @Qualifier("Submuestream")
23     BluePrintSubmuestreando bps;
24
25     @Test
26     public void filtrarTest(){
27         Point[] puntos1 = new Point[]{
28             new Point(x:49,y:49),
29             new Point (x:48,y:49),
30             new Point (x:50,y:39),
31             new Point (x:39,y:99)
32         };
33
34         Blueprint bp1 = new Blueprint(author:"Luisa", name:"Plano1", puntos1);
35         Blueprint bprAux1 = bps.filtrar(bp1);
36
37         Point[] puntos2 = new Point[]{
38             new Point(x:15,y:15),
39             new Point(x:10, y:10),
40             new Point (x:25, y:8),
41             new Point(x:29, y:80),
42             new Point(x:5, y:5)
43         };
44
45         Blueprint bp2 = new Blueprint(author:"Luisa", name:"Plano1", puntos2);
46         Blueprint bprAux2 = bps.filtrar(bp2);
47
48         assertEquals(expected:2, bprAux1.getPoints().size());
49         assertEquals(expected:3, bprAux2.getPoints().size());
50     }
51
52
53
54 }
```

```

File Edit Selection View Go Run ...
ARSW_Lab04
src > test > java > edu > eci > arsw > blueprints > test > services > BlueprintSubmuestreandoTest.java
1 package edu.eci.arsw.blueprints.test.services;
2
3 import static org.junit.Assert.assertEquals;
4
5 import org.junit.Test;
6 import org.junit.runner.RunWith;
7 import org.springframework.beans.factory.annotation.Autowired;
8 import org.springframework.beans.factory.annotation.Qualifier;
9 import org.springframework.boot.test.context.SpringBootTest;
10 import org.springframework.context.annotation.ComponentScan;
11 import org.springframework.test.context.junit4.SpringJUnit4ClassRunner;
12
13 import edu.eci.arsw.blueprints.model.Blueprint;
14 import edu.eci.arsw.blueprints.model.Point;
15 import edu.eci.arsw.blueprints.services.BluePrintSubmuestreando;
16
17 @ComponentScan("edu.eci.arsw")
18 @SpringBootTest(classes = BlueprintSubmuestreandoTest.class)
19 @RunWith(SpringJUnit4ClassRunner.class)
public class BlueprintSubmuestreandoTest {
20
21     @Autowired
22     @Qualifier("Submuestream")
23     BluePrintSubmuestreando bps;
24
25     @Test
26     public void filtrarTest(){
27         Point[] puntos1 = new Point[]{
28             new Point(x:49,y:49),
29             new Point (x:48,y:49),
30             new Point (x:50,y:39),
31             new Point (x:39,y:99)
32         };
33
34         Blueprint bp1 = new Blueprint(author:"Luisa", name:"Plano1", puntos1);
35         Blueprint bprAux1 = bps.filtrar(bp1);
36
37         Point[] puntos2 = new Point[]{
38             new Point(x:15,y:15),
39             new Point(x:10, y:10),
40             new Point (x:25, y:8),
41             new Point(x:29, y:80),
42             new Point(x:5, y:5)
43         };
44
45         Blueprint bp2 = new Blueprint(author:"Luisa", name:"Plano1", puntos2);
46         Blueprint bprAux2 = bps.filtrar(bp2);
47
48         assertEquals(expected:2, bprAux1.getPoints().size());
49         assertEquals(expected:3, bprAux2.getPoints().size());
50     }
51
52
53
54 }
```

➤ Resultados ejecución:

The screenshot shows the Visual Studio Code interface with the following details:

- Explorer View:** Shows the project structure under "ARSW_Lab04".
- Terminal View:** Displays the output of a Spring Boot application running with Java 17.0.2 and PID 9616. The logs indicate the application is starting, no active profile is set, and it has run 1 test.
- Status Bar:** Shows the current file is "feature/Luisa/Partel-5.java", the Git status is "Git Graph", the screen reader is optimized, the cursor is at Ln 20, Col 15 (26 selected), and the language is Java.

III. Conclusiones

- Este laboratorio proporciona una comprensión sólida de cómo aplicar los principios de inversión de dependencias y la inyección de dependencias en aplicaciones del mundo real utilizando Spring.
 - Aprendimos a utilizar el framework Spring y su configuración basada en anotaciones para gestionar dependencias en una aplicación. Las anotaciones `@Autowired` y `@Service` se utilizaron para marcar las dependencias que deben inyectarse y los candidatos a ser inyectados, respectivamente.
 - Aplicamos el principio de Inversión de Dependencias al configurar la aplicación para que funcione bajo un esquema de inyección de dependencias. Utilizamos Spring para administrar las dependencias y configurar el esquema de persistencia en la clase `BlueprintServices`. Implementamos operaciones para registrar y consultar planos, y agregamos la capacidad de aplicar filtros a los planos antes de retornarlos.