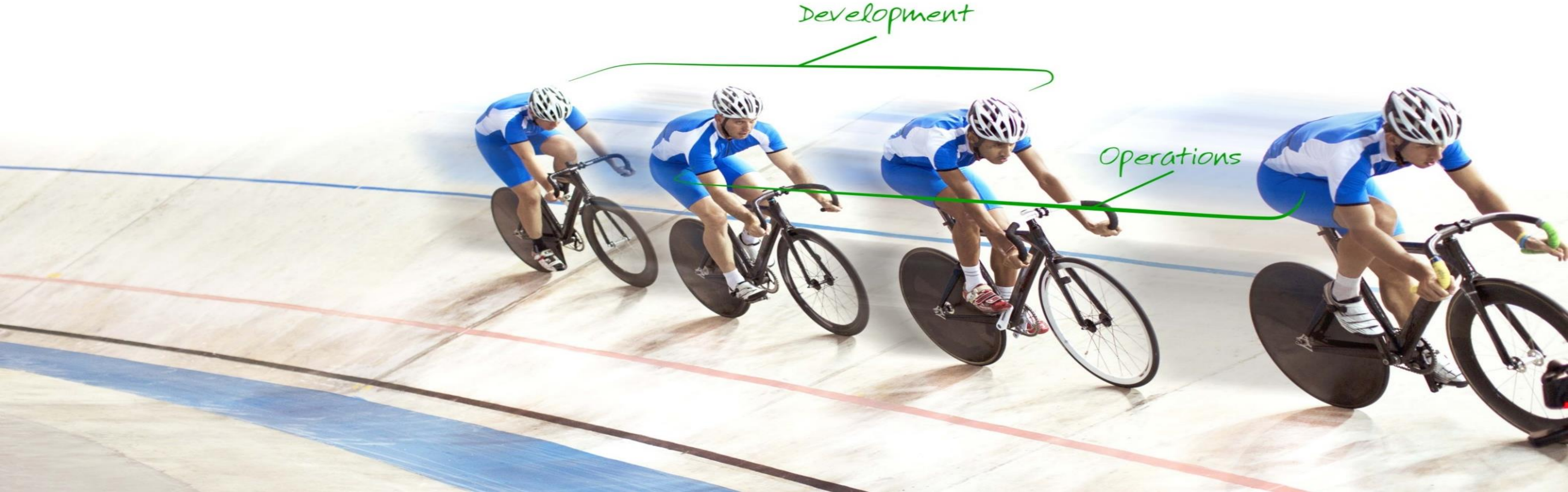
WELLS FARGO | accenture technology

Test Automation - 1

Lab #2 – Introduction to BDD

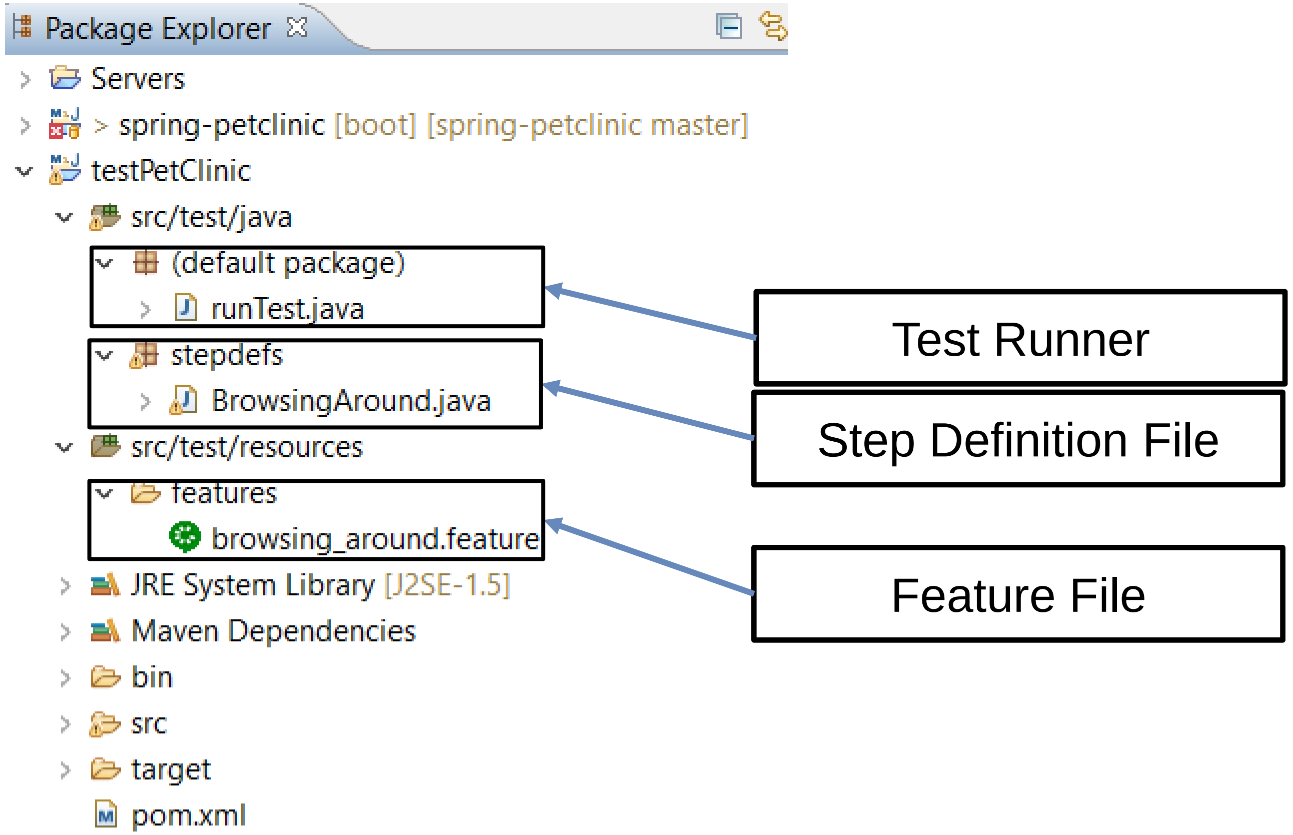


BDD Lab – Exploring Feature Files and Step Definitions

Objective: Understand the structure of a feature and step definition files

In this lab you will get experience with by BDD by:

1. Viewing the structure of a feature file
2. Viewing the structure of a step definition file
3. Learning the association between the two files using test runner
4. Understanding how both files connect to the Pet Clinic website



```
Package Explorer
> Servers
> spring-petclinic [boot] [spring-petclinic master]
v testPetClinic
  v src/test/java
    v (default package)
      > runTest.java
    v stepdefs
      > BrowsingAround.java
  v src/test/resources
    v features
        browsing_around.feature
  > JRE System Library [J2SE-1.5]
  > Maven Dependencies
  > bin
  > src
  > target
    pom.xml
```

Test Runner

Step Definition File

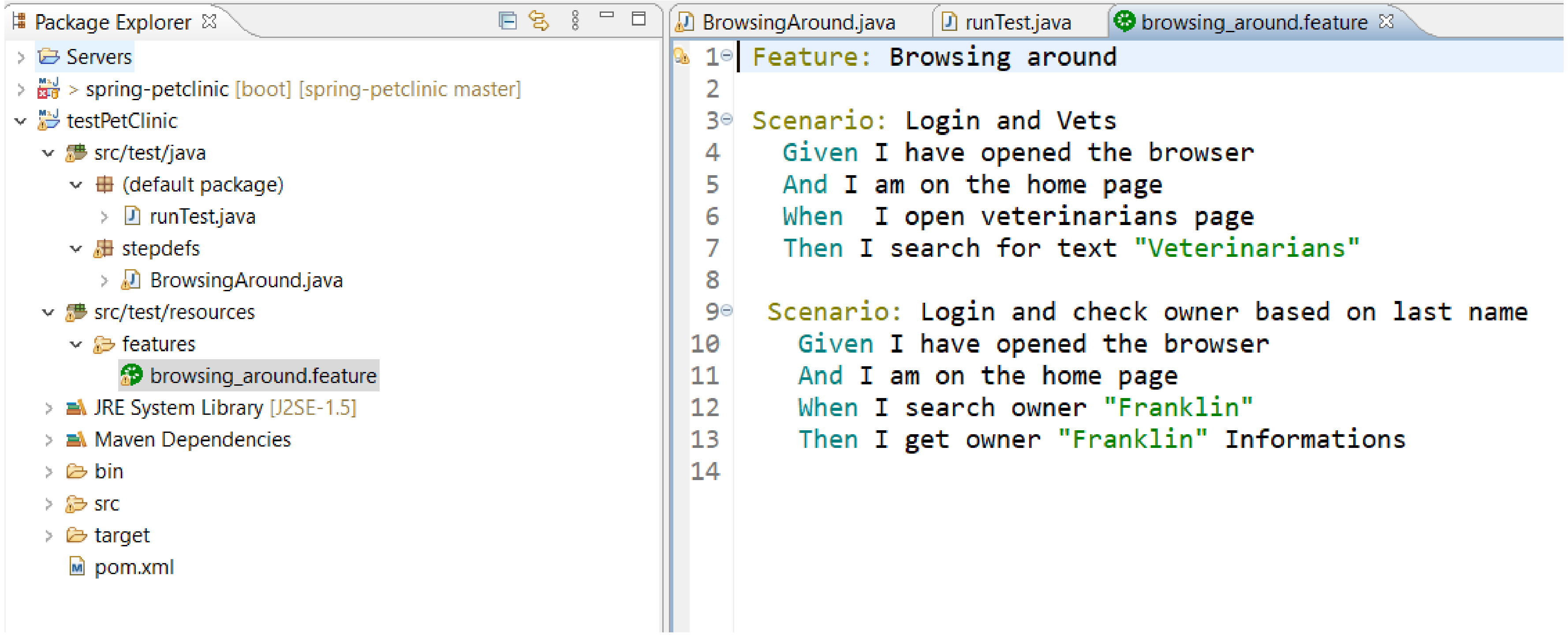
Feature File

LAB – Behavior Driven Development

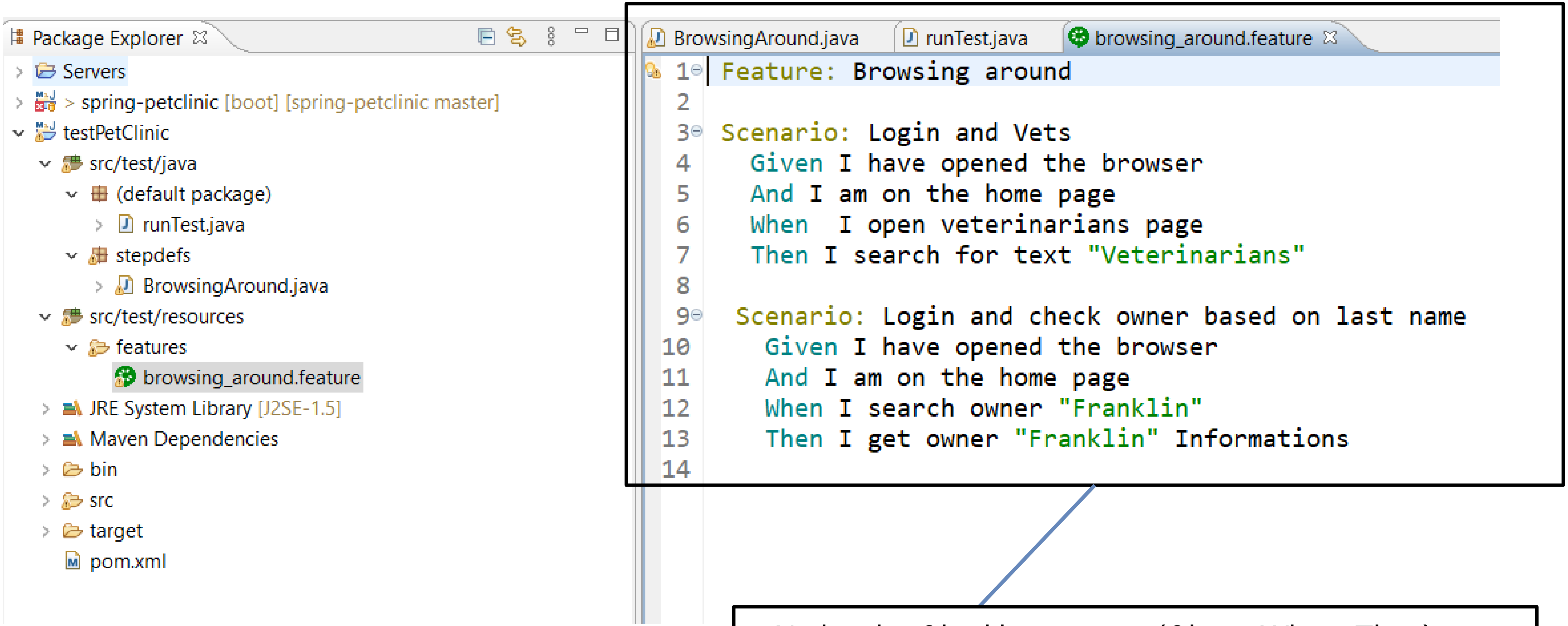
BDD Lab

Step 1 – Feature Files

1. Let’s explore a feature file - Open the “browsing_around.feature” file.
2. Your screen should now look similar to the image below.
3. Go to the next slide to see an enlarged image.



```
Feature: Browsing around

Scenario: Login and Vets
  Given I have opened the browser
  And I am on the home page
  When  I open veterinarians page
  Then I search for text "Veterinarians"

 Scenario: Login and check owner based on last name
   Given I have opened the browser
   And I am on the home page
   When I search owner "Franklin"
   Then I get owner "Franklin" Informations

```



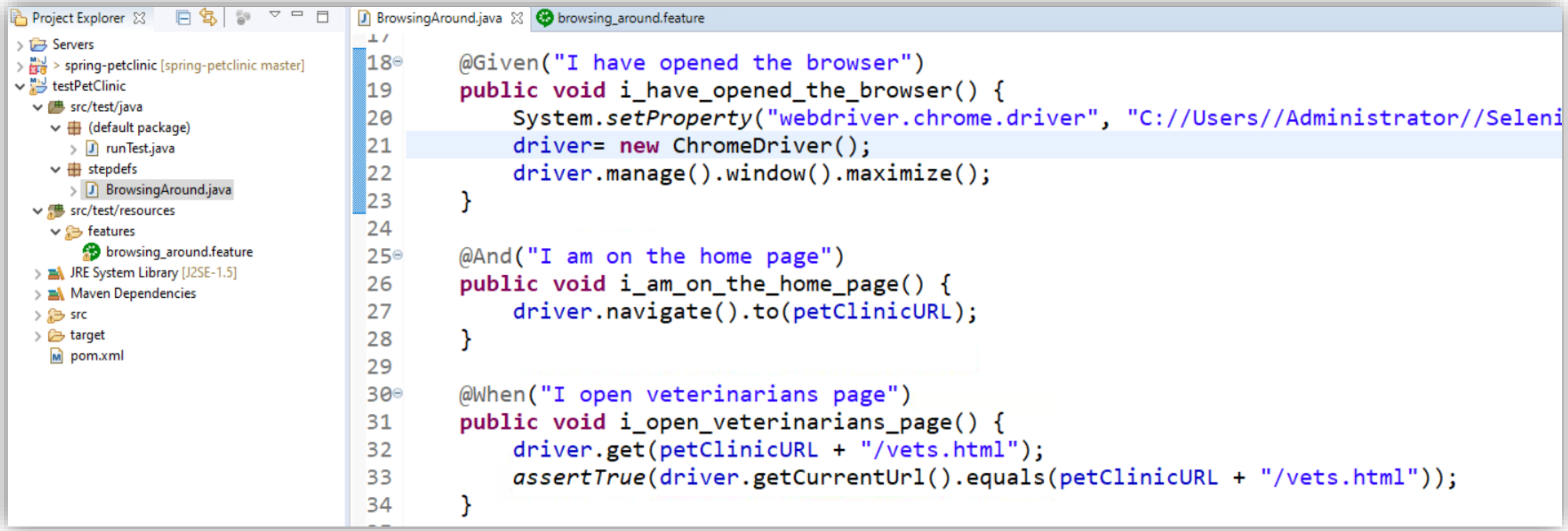
```
Feature: Browsing around

Scenario: Login and Vets
  Given I have opened the browser
  And I am on the home page
  When  I open veterinarians page
  Then I search for text "Veterinarians"

 Scenario: Login and check owner based on last name
   Given I have opened the browser
   And I am on the home page
   When I search owner "Franklin"
   Then I get owner "Franklin" Informations

```

Notice the Gherkin structure (Given, When, Then)

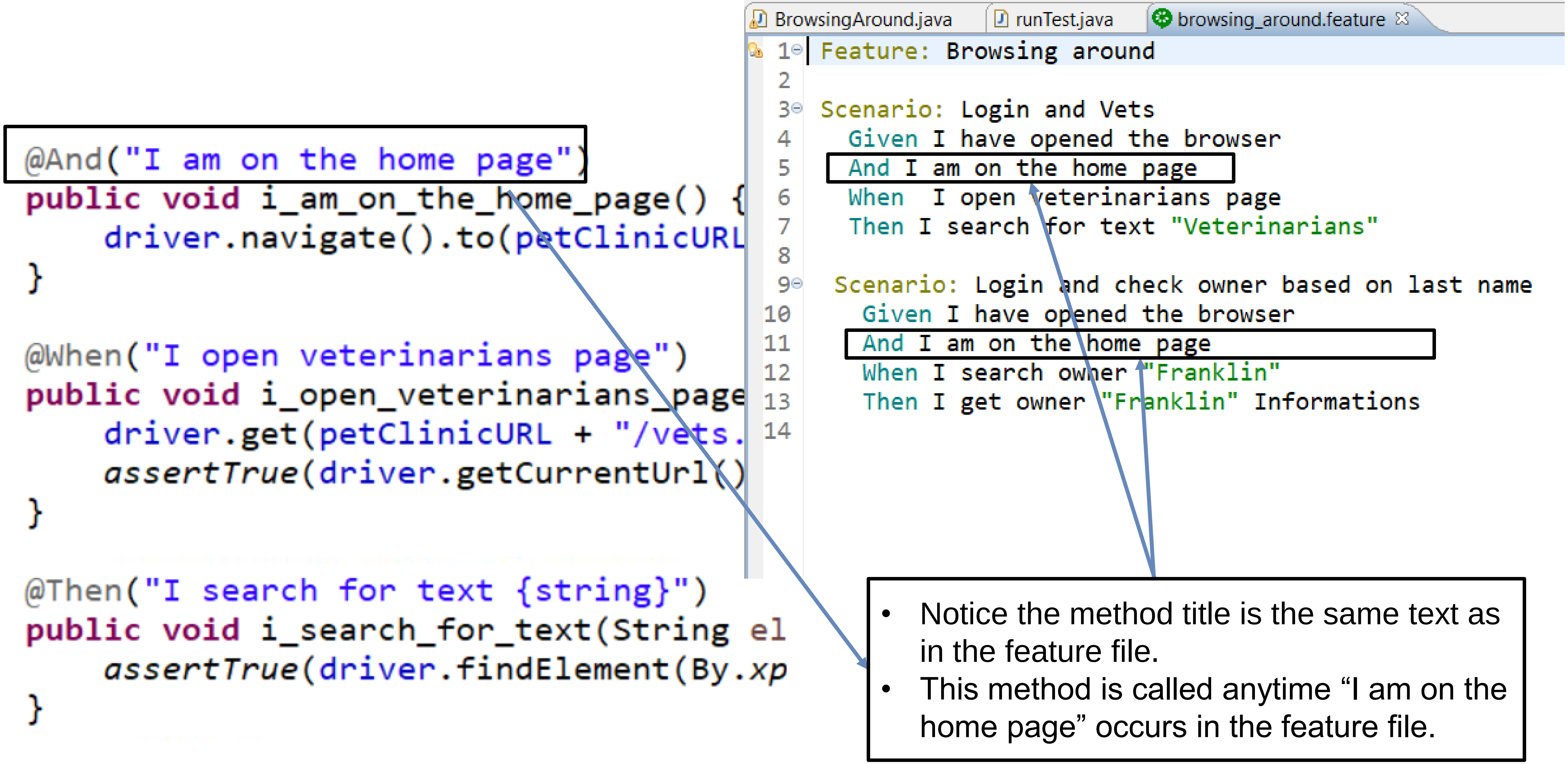
BDD Lab 1 – Exploring Feature Files and Step Definitions

Step 2 – Step Definitions

1. In “browsing_around.feature” and the matching “BrowsingAround.java” file.
2. The right image below is a step definition file, which is coded in java. Explore the java file and try to understand what is going on.



```java
    @Given("I have opened the browser")
    public void i_have_opened_the_browser() {
        System.setProperty("webdriver.chrome.driver", "C://Users//Administrator//Seleni
        driver= new ChromeDriver();
        driver.manage().window().maximize();
    }

    @And("I am on the home page")
    public void i_am_on_the_home_page() {
        driver.navigate().to(petClinicURL);
    }

    @When("I open veterinarians page")
    public void i_open_veterinarians_page() {
        driver.get(petClinicURL + "/vets.html");
        assertTrue(driver.getCurrentUrl().equals(petClinicURL + "/vets.html"));
    }
```



```java
@And("I am on the home page")
public void i_am_on_the_home_page() {
    driver.navigate().to(petClinicURL
}

@When("I open veterinarians page")
public void i_open_veterinarians_page
    driver.get(petClinicURL + "/vets.
    assertTrue(driver.getCurrentUrl()
}

@Then("I search for text {string}")
public void i_search_for_text(String el
    assertTrue(driver.findElement(By.xp
}
```

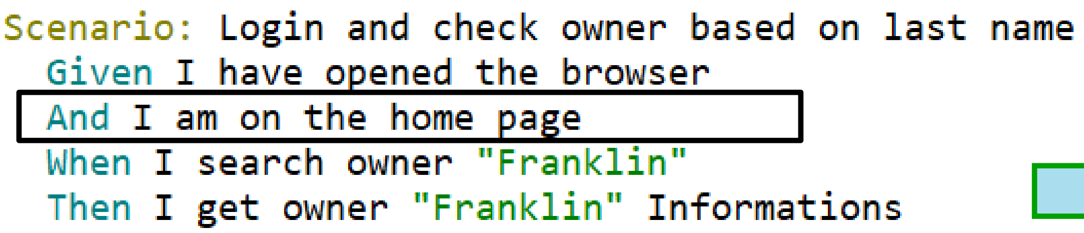
```gherkin
Feature: Browsing around

Scenario: Login and Vets
  Given I have opened the browser
  And I am on the home page
  When  I open veterinarians page
  Then I search for text "Veterinarians"

 Scenario: Login and check owner based on last name
  Given I have opened the browser
  And I am on the home page
  When I search owner "Franklin"
  Then I get owner "Franklin" Informations
```

- Notice the method title is the same text as in the feature file.
- This method is called anytime “I am on the home page” occurs in the feature file.

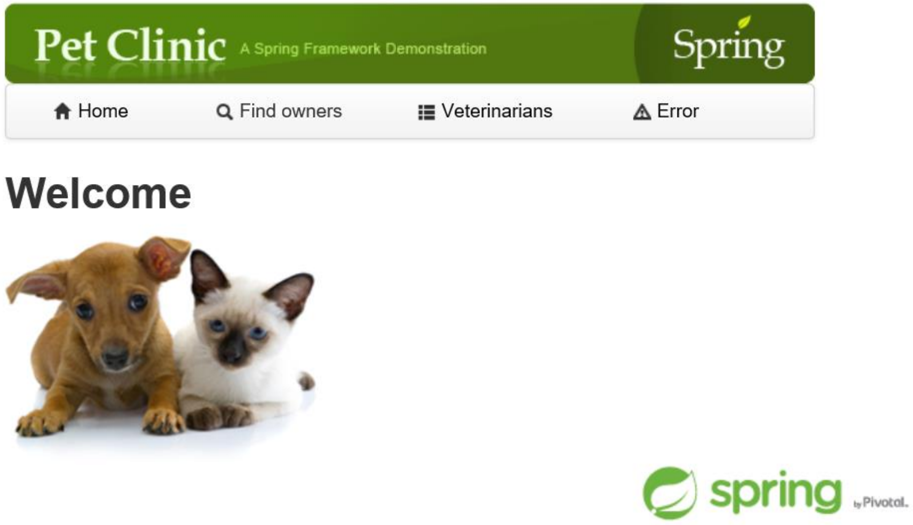
BDD Lab

Step 3 – How does it connect to Pet Clinic?

- Looking at the scenario “Owners”, here’s how each statement inspects the Pet Clinic website



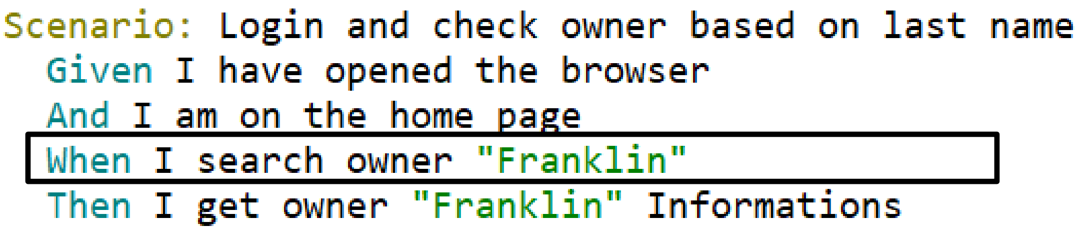
```
Scenario: Login and check owner based on last name
  Given I have opened the browser
  And I am on the home page
  When I search owner "Franklin"
  Then I get owner "Franklin" Informations
```



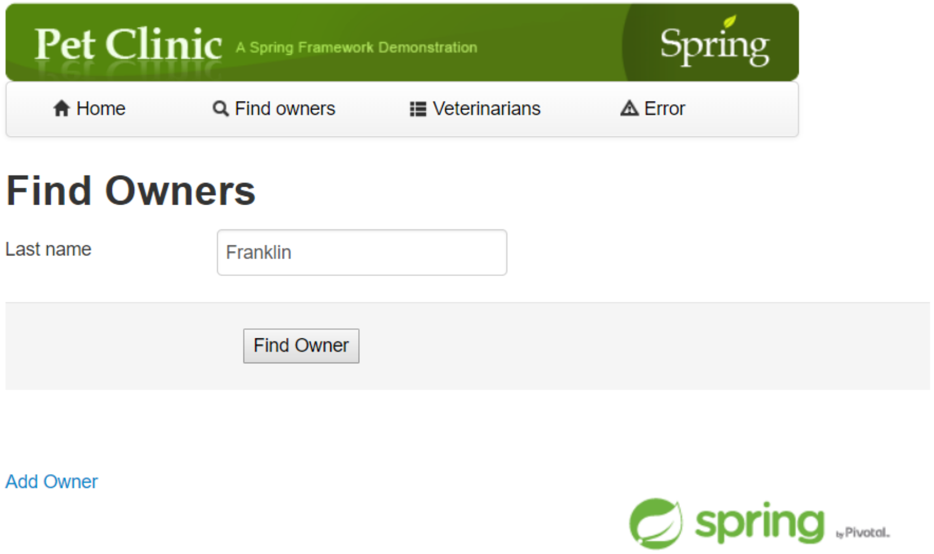
BDD Lab

Step 3 – How does it connect to Pet Clinic?

- Looking at the third scenario “Owners”, here’s how each statement inspects the Pet Clinic website



```
Scenario: Login and check owner based on last name
  Given I have opened the browser
  And I am on the home page
  When I search owner "Franklin"
  Then I get owner "Franklin" Informations
```



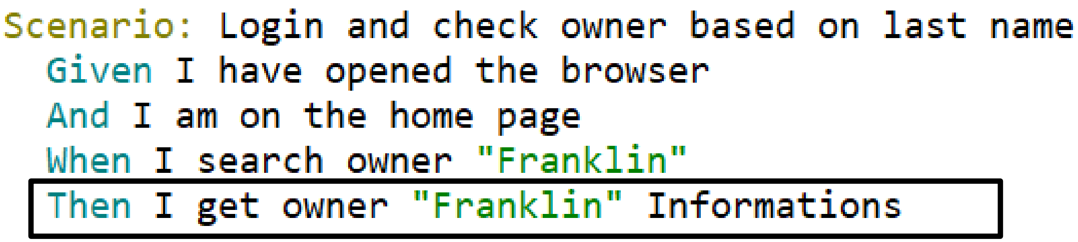
Find Owners

Last name: Franklin

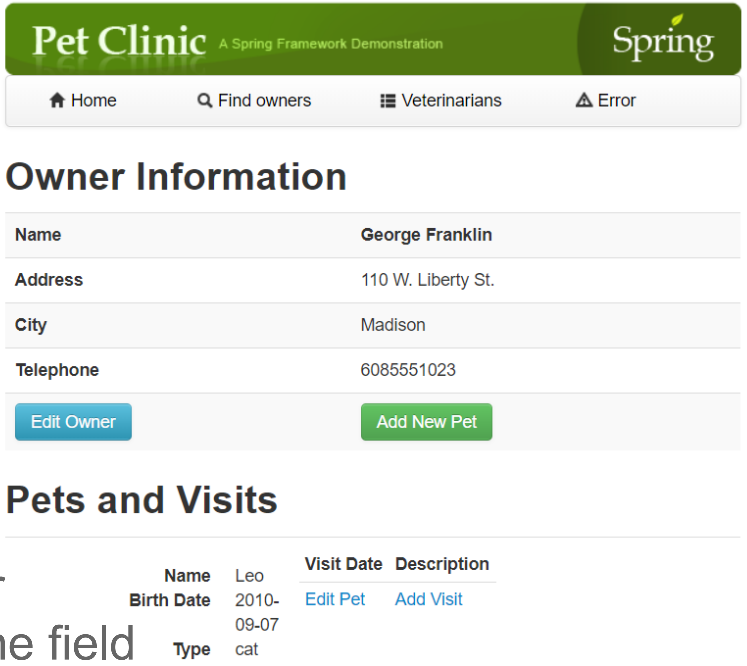
BDD Lab

Step 3 – How does it connect to Pet Clinic?

- Looking at the third scenario “Owners”, here’s how each statement inspects the Pet Clinic website



```
Scenario: Login and check owner based on last name
  Given I have opened the browser
  And I am on the home page
  When I search owner "Franklin"
  Then I get owner "Franklin" Informations
```



Owner Information

Name	George Franklin
Address	110 W. Liberty St.
City	Madison
Telephone	6085551023

Pets and Visits

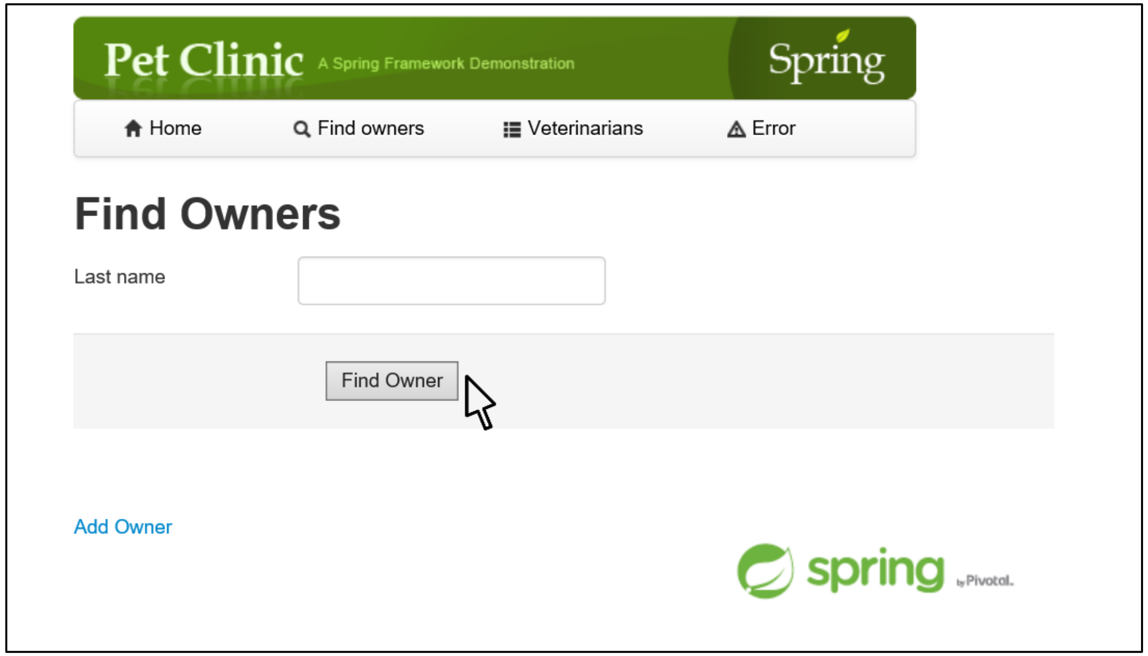
		Visit Date	Description
Name	Leo		
Birth Date	2010-09-07		
Type	cat		

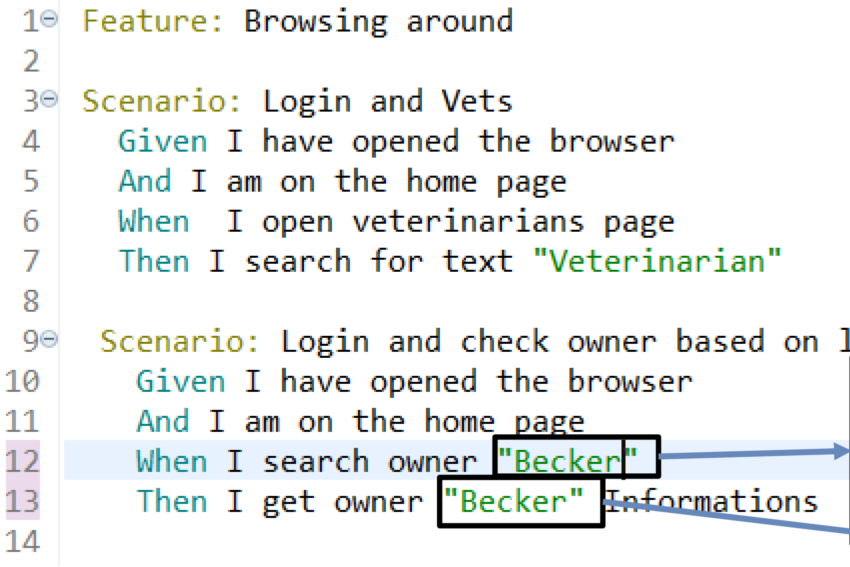
Note: If you don’t find information of “Franklin”, get list of owners on your instance by clicking “Find Owner” button in last slide by keeping last name field as blank. Now choose any last name from the list and update feature file with this new last name.

BDD Lab

Step 4 - Make a Failing Change

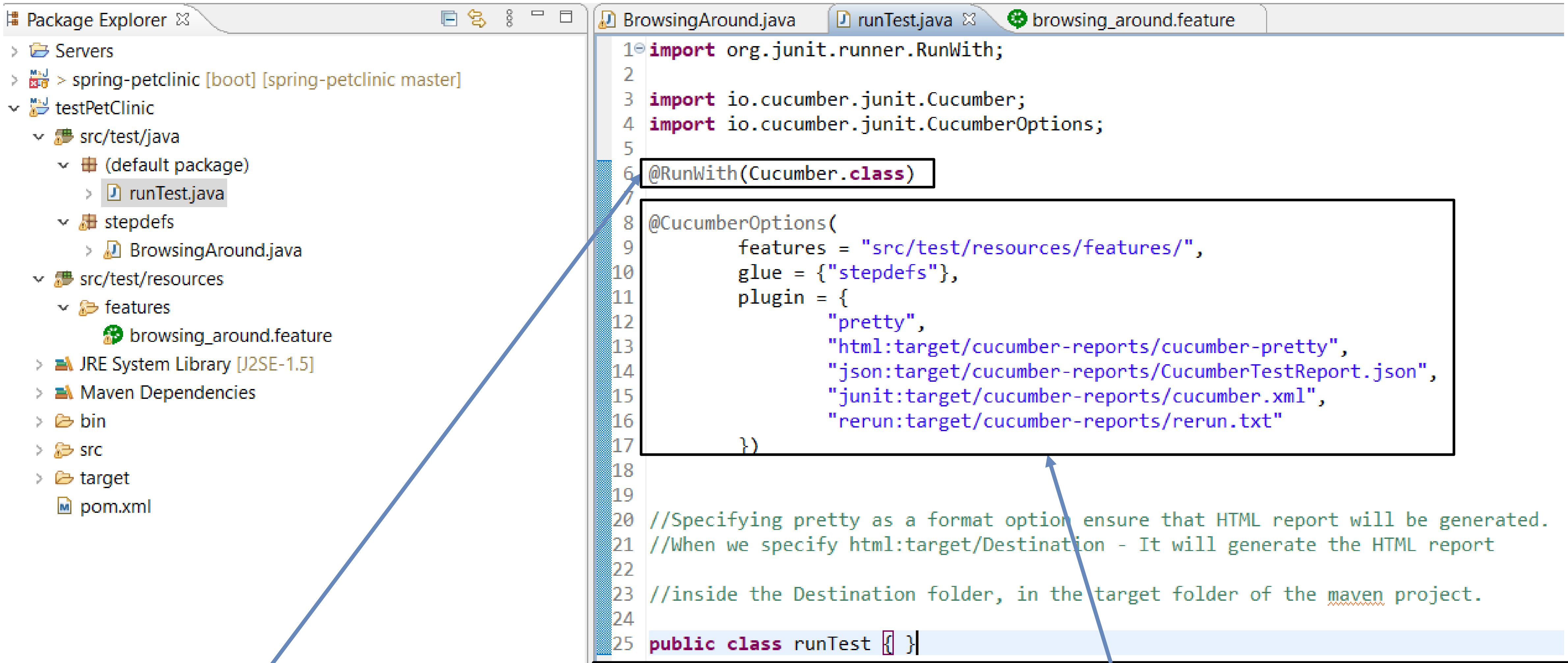
1. Now click “Find Owner” button. Leave the “Last name” field blank to retrieve all owners on the PetClinic site.
2. Update the Gherkin code with a last name that does **NOT** appear listed on the site. In our example, we are replacing “Franklin” with “Becker” last name “Becker”.





```
Feature: Browsing around

Scenario: Login and Vets
  Given I have opened the browser
  And I am on the home page
  When  I open veterinarians page
  Then I search for text "Veterinarian"

 Scenario: Login and check owner based on last name
   Given I have opened the browser
   And I am on the home page
   When I search owner "Becker"
   Then I get owner "Becker" Informations
```

Replace with your created last name



```java
import org.junit.runner.RunWith;

import io.cucumber.junit.Cucumber;
import io.cucumber.junit.CucumberOptions;

@RunWith(Cucumber.class)

@CucumberOptions(
        features = "src/test/resources/features/",
        glue = {"stepdefs"},
        plugin = {
                "pretty",
                "html:target/cucumber-reports/cucumber-pretty",
                "json:target/cucumber-reports/CucumberTestReport.json",
                "junit:target/cucumber-reports/cucumber.xml",
                "rerun:target/cucumber-reports/rerun.txt"
        })


//Specifying pretty as a format option ensure that HTML report will be generated.
//When we specify html:target/Destination - It will generate the HTML report

//inside the Destination folder, in the target folder of the maven project.

public class runTest { }
```

To run tests with Junit runner decorate with Annotation “RunWith”

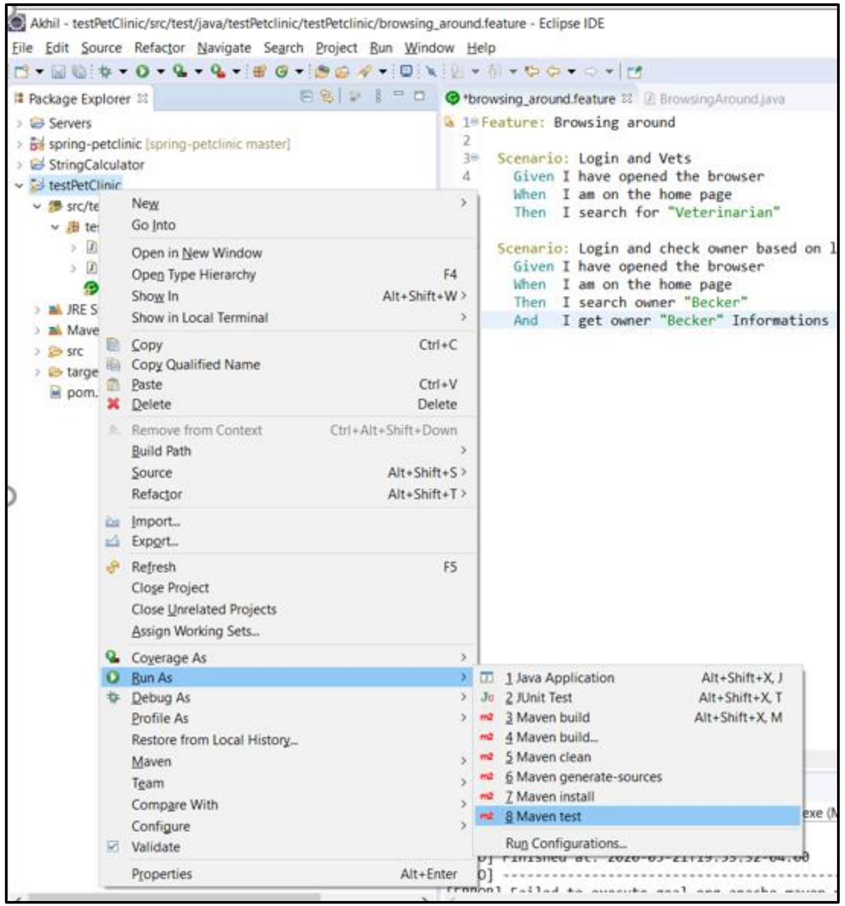
Using Annotation “CucumberOptions”:

i. Path to feature files can be defined using “features”
ii. Feature files can be glued (mapped) with Step Definitions using “glue”.
iii. Reports can be generated in different formats. E.g., Json, html or xml using “plugin”.

BDD Lab

Step 5 – Run the Report

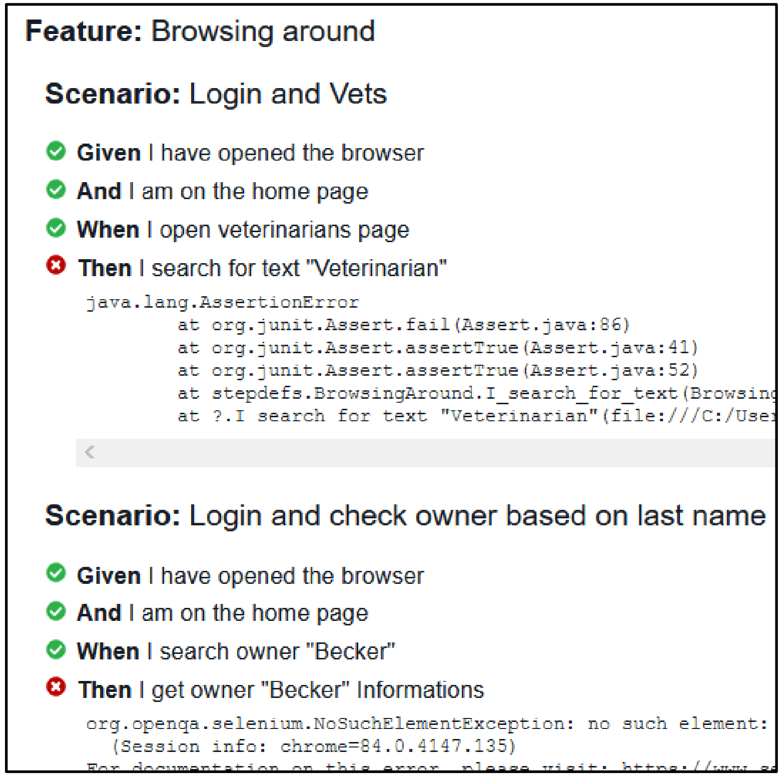
1. Right click on the project testPetClinic => “Run as” -> “Maven Test”



Akhil - testPetClinic/src/test/java/testPetclinic/testPetclinic/browsing_around.feature - Eclipse IDE

```
Feature: Browsing around

  Scenario: Login and Vets
    Given I have opened the browser
    When  I am on the home page
    Then  I search for "Veterinarian"

  Scenario: Login and check owner based on l
    Given I have opened the browser
    When  I am on the home page
    Then  I search owner "Becker"
    And   I get owner "Becker" Informations
```

2. Open “cucumber-pretty.html” located at .. *{workspace_location}*\target\cucumber-reports



Feature: Browsing around

Scenario: Login and Vets

✓ **Given** I have opened the browser

✓ **And** I am on the home page

✓ **When** I open veterinarians page

☒ **Then** I search for text "Veterinarian"

```
java.lang.AssertionError
        at org.junit.Assert.fail(Assert.java:86)
        at org.junit.Assert.assertTrue(Assert.java:41)
        at org.junit.Assert.assertTrue(Assert.java:52)
        at stepdefs.BrowsingAround.I_search_for_text(Browsinc
        at ?.I search for text "Veterinarian"(file:///C:/Use
```

Scenario: Login and check owner based on last name

✓ **Given** I have opened the browser

✓ **And** I am on the home page

✓ **When** I search owner "Becker"

☒ **Then** I get owner "Becker" Informations

```
org.openqa.selenium.NoSuchElementException: no such element:
  (Session info: chrome=84.0.4147.135)
```

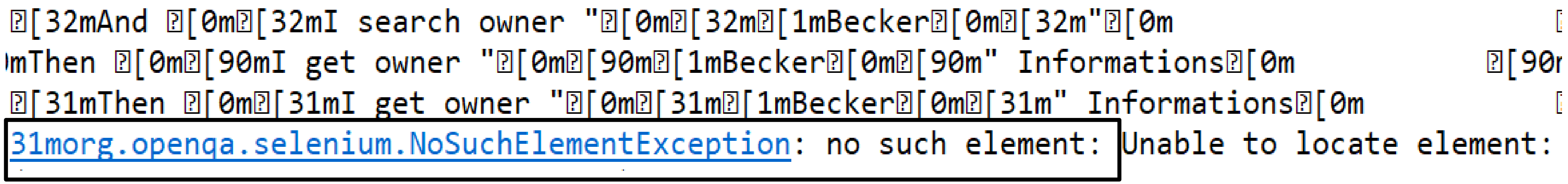
BDD Lab

Step 6 – Debugging BrowsingAround

1. One test will fail. Pull up the console tab from the bottom of your workspace to see why.

2. It failed because of an “NoSuchElementException” at the method “And I get owner ‘Becker’ Information” (this statement may differ depending on your made up last name)

3. Go back to the step definition of the “BrowsingAround” file

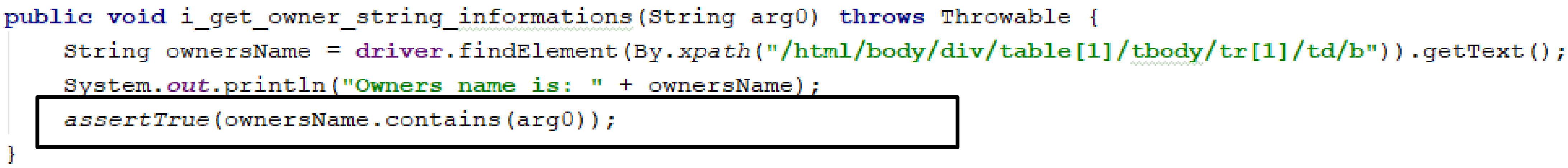


```
[32mAnd [0m[32mI search owner "[0m[32m[1mBecker[0m[32m"[0m
mThen [0m[90mI get owner "[0m[90m[1mBecker[0m[90m" Informations[0m         [90
[31mThen [0m[31mI get owner "[0m[31m[1mBecker[0m[31m" Informations[0m
31morg.openqa.selenium.NoSuchElementException: no such element: Unable to locate element:
```

BDD Lab

Step 7 – Debugging BrowsingAround

- It is the assertTrue section. “assertTrue” checks to see if the statement within is true. If it is not, the program will fail
- Within assert true, the driver finds the name from the Pet clinic site and stores it in the variable “ownersName”
- The method then compares the owners name to arg0 to see if they are the same
- “arg0” in this case is the name that is passed through in “browsing_around.feature”, or “Becker”

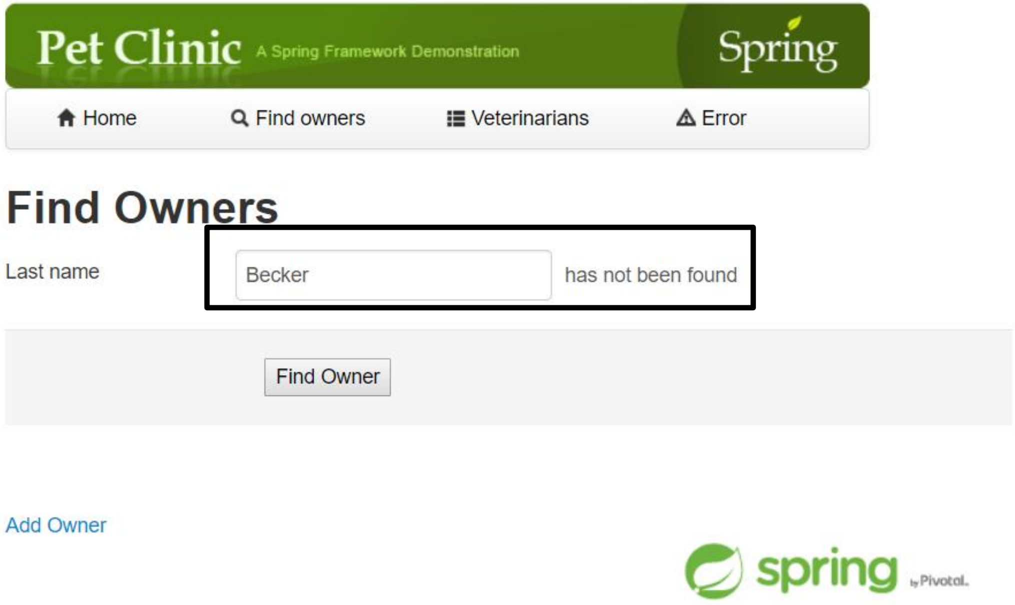


```java
public void i_get_owner_string_informations(String arg0) throws Throwable {
    String ownersName = driver.findElement(By.xpath("/html/body/div/table[1]/tbody/tr[1]/td/b")).getText();
    System.out.println("Owners name is: " + ownersName);
    assertTrue(ownersName.contains(arg0));
}
```

BDD Lab 2 – Run and Debug a Feature

Step 8 – Debugging BrowsingAround

- Go to the Pet Clinic website. From there, go the “Find Owners” section and search for your made up last name in the “browsing_around.feature” file
- A “has not been found” warning should appear
- That is why the test fails, because there is no one with that name in the database



Find Owners

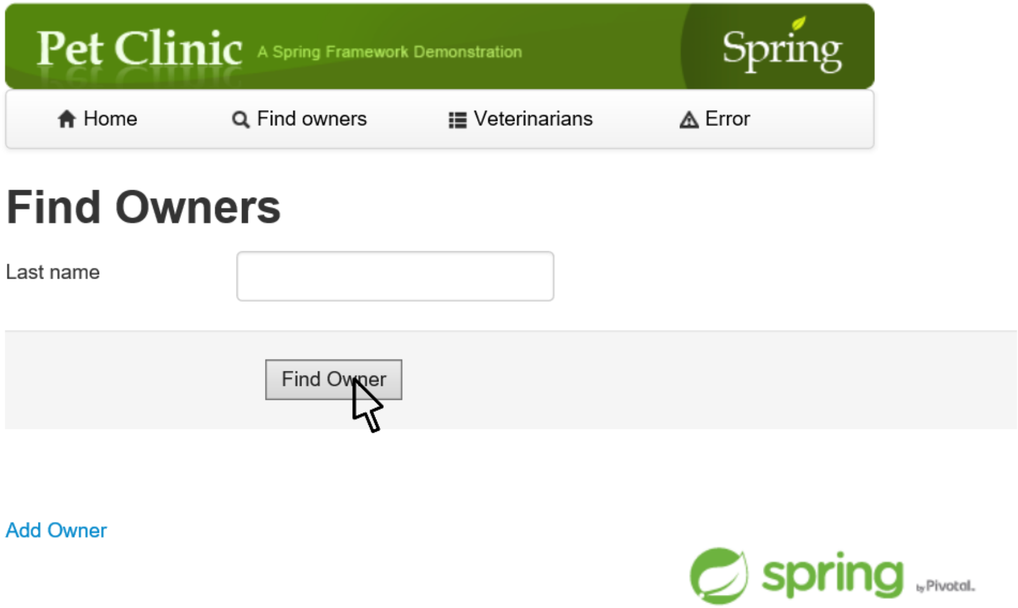
Last name: Becker has not been found

*Screenshots are based on the last name “Becker”, which is **NOT** in the database

BDD Lab 2 – Run and Debug a Feature

Step 9 – Debugging BrowsingAround

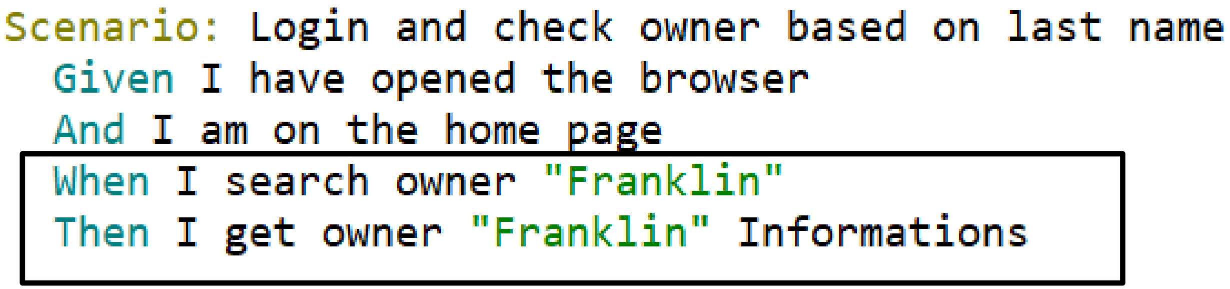
1. Now search the database on the PetClinic site for a blank name
2. This will give you a list of owners in the database. Pick one the last names that shows up
3. Go back to the “browsing_around.feature” file and replace your created name with the last name you picked that exists in the database



BDD Lab 2 – Run and Debug a Feature

Step 10 – Debugging BrowsingAround

1. In our case, “George Franklin” was picked
2. Note that the screenshots to follow are based on the last name “Franklin”
3. In any screenshots to follow, just replace “Franklin” with whatever name you picked that exists in your database



```
Scenario: Login and check owner based on last name
  Given I have opened the browser
  And I am on the home page
  When I search owner "Franklin"
  Then I get owner "Franklin" Informations
```

BDD Lab

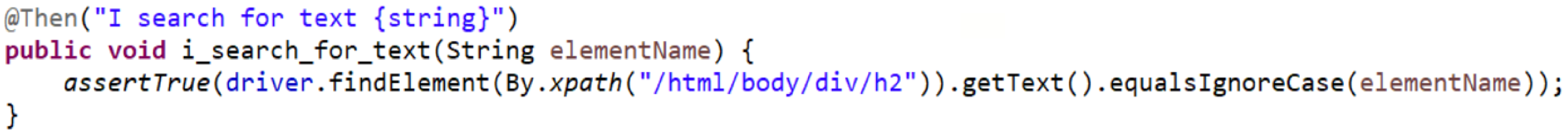
Step 11 – Running the BrowsingAround again

- Run the new “browsing_around.feature” file with the same configurations as previously i.e. by putting “Franklin” again in feature file.
- The test should now succeed. **Why does this happen?**

BDD Lab

Step 12 – Breaking Down a Different Method

- Go back into the step definition file “BrowsingAround” and find the method below
- Lets take a closer look at the details of this method to get an idea of it works

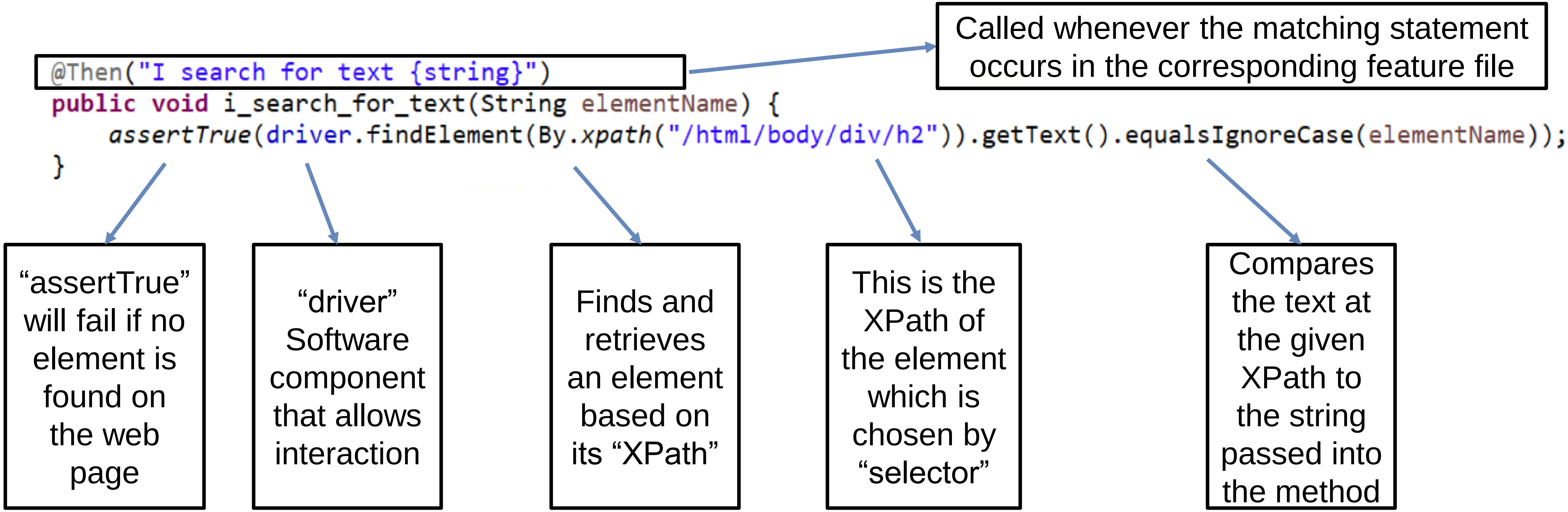


```
@Then("I search for text {string}")
public void i_search_for_text(String elementName) {
    assertTrue(driver.findElement(By.xpath("/html/body/div/h2")).getText().equalsIgnoreCase(elementName));
}
```

BDD Lab

Step 13 – Breaking Down a Different Method

- Go back into the step definition file “BrowsingAround” and find the method below
- Let’s take a closer look at the details of this method to get an idea of it works



```
@Then("I search for text {string}")
public void i_search_for_text(String elementName) {
    assertTrue(driver.findElement(By.xpath("/html/body/div/h2")).getText().equalsIgnoreCase(elementName));
}
```

Called whenever the matching statement occurs in the corresponding feature file

“assertTrue” will fail if no element is found on the web page

“driver” Software component that allows interaction

Finds and retrieves an element based on its “XPath”

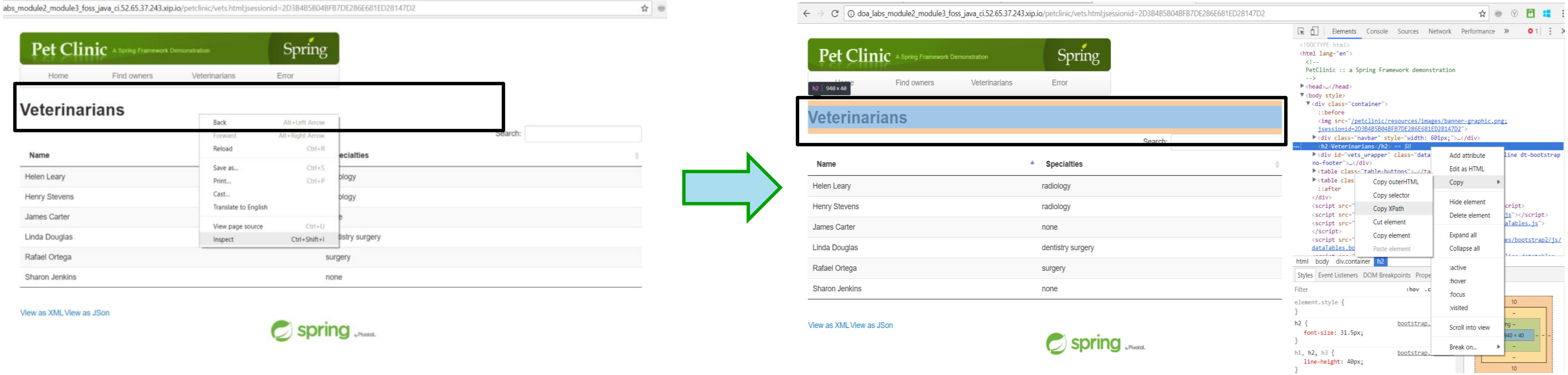
This is the XPath of the element which is chosen by “selector”

Compares the text at the given XPath to the string passed into the method

BDD Lab

Step 14 – Finding the XPath

1. Go back to the Pet Clinic website. Ensure that you are using Google Chrome.
2. Navigate to the “Veterinarians” page, right click the “Veterinarians” header and click “inspect”
3. Right click the already highlighted text and select “Copy” -> “Copy Xpath”
4. Paste this XPath into a text editor(word or notepad is fine). It should be: /html/body/div/h2
5. Notice how the XPath from the Pet Clinic matches the XPath in “browsing_around”.java



Veterinarians

Name	Specialties
Helen Leary	radiology
Henry Stevens	radiology
James Carter	none
Linda Douglas	dentistry surgery
Rafael Ortega	surgery
Sharon Jenkins	none

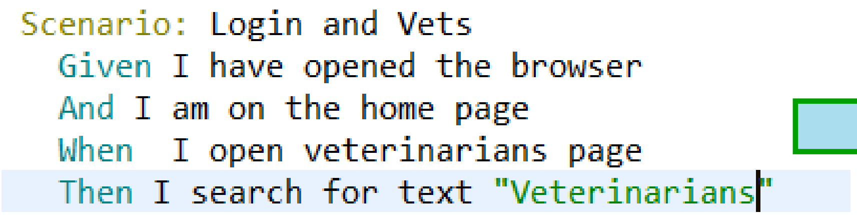
```
<!DOCTYPE html>
<html lang="en">
  <!--
  PetClinic :: a Spring Framework demonstration
  -->
▶<head>…</head>
▼<body style>
  ▼<div class="container">
      ::before
      <img src="/petclinic/resources/images/banner-graphic.png;jsessionid=2D3B4B5B04BFB7DE286E681ED28147D2">
    ▶<div class="navbar" style="width: 601px;">…</div>
      <h2>Veterinarians</h2> == $0
    ▶<div id="vets_wrapper" class="data                line dt-bootstrap
    no-footer">…</div>
    ▶<table class="table-buttons">…</ta
    ▶<table clas
      ::after
    </div>
    <script src="
    <script src="
    <script src="
    </script>
    <script src="
    dataTables.bo
```

```
element.style {
}
h2 {                    bootstrap.
  font-size: 31.5px;
}
h1, h2, h3 {            bootstrap.
  line-height: 40px;
}
```

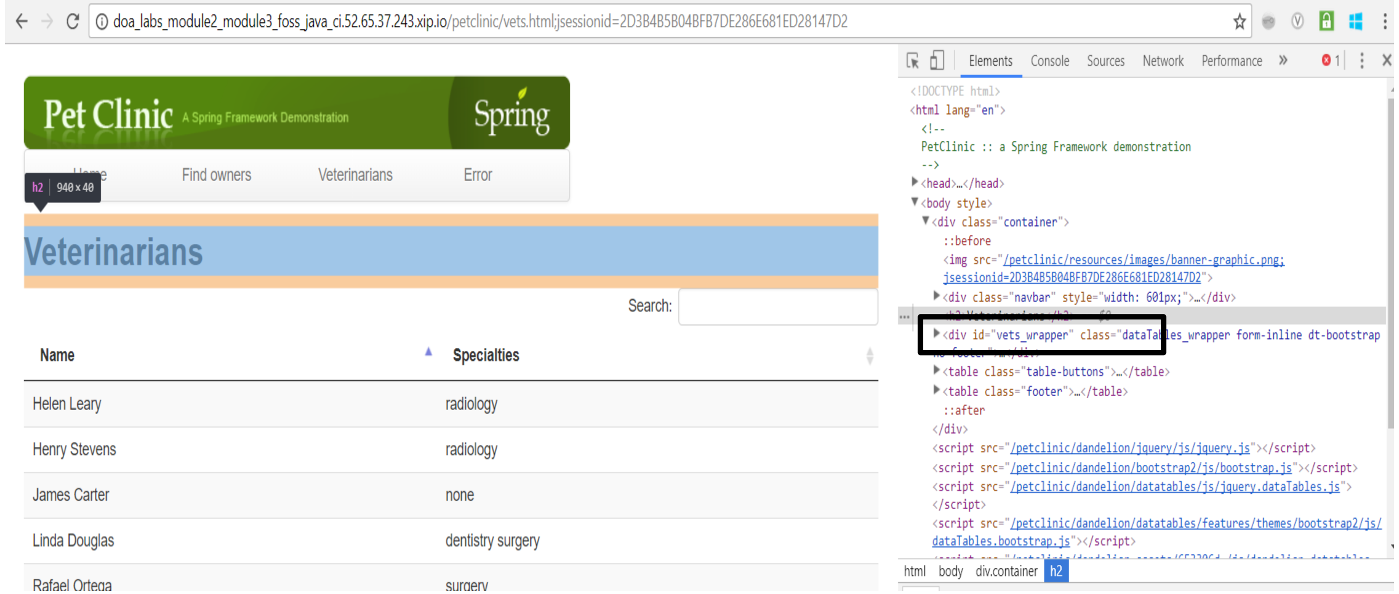
BDD Lab

Step 15 – How XPath is Used Within a Test

1. This XPath within our Step definition file directs the test to the element with the matching XPath on the current page. Each element on a given page has a different unique XPath.
2. The method then gets the text within that element and compares it to the string argument “arg1”.
3. In “browsing_around.feature”, the string “Veterinarians” is passed into the method and checked to see if it matches the string on the Pet Clinic website within the h2 header with the Xpath “/html/body/div/h2”
4. They do match, so the test passes.



```
Scenario: Login and Vets
  Given I have opened the browser
  And I am on the home page
  When  I open veterinarians page
  Then I search for text "Veterinarians"
```



doa_labs_module2_module3_foss_java_ci.52.65.37.243.xip.io/petclinic/vets.html;jsessionid=2D3B4B5B04BFB7DE286E681ED28147D2

Veterinarians

Search:

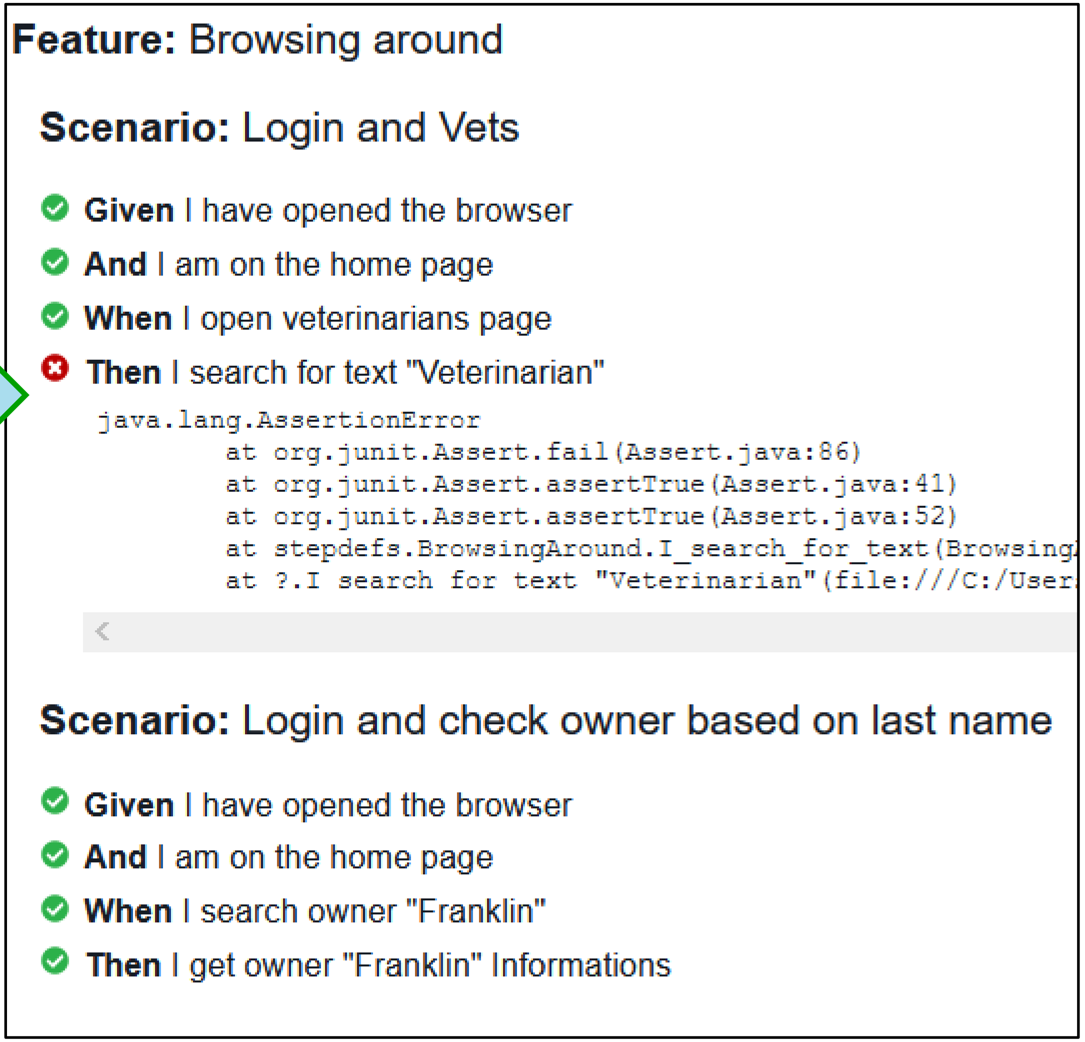
Name	Specialties
Helen Leary	radiology
Henry Stevens	radiology
James Carter	none
Linda Douglas	dentistry surgery
Rafael Ortega	surgery

```
<!DOCTYPE html>
<html lang="en">
  <!--
  PetClinic :: a Spring Framework demonstration
  -->
 ▸<head>…</head>
 ▾<body style>
   ▾<div class="container">
      ::before
      <img src="/petclinic/resources/images/banner-graphic.png;
      jsessionid=2D3B4B5B04BFB7DE286E681ED28147D2">
     ▸<div class="navbar" style="width: 601px;">…</div>
      <h2>Veterinarians</h2> == $0
     ▸<div id="vets_wrapper" class="dataTables_wrapper form-inline dt-bootstrap
     no-footer">…</div>
     ▸<table class="table-buttons">…</table>
     ▸<table class="footer">…</table>
      ::after
    </div>
    <script src="/petclinic/dandelion/jquery/js/jquery.js"></script>
    <script src="/petclinic/dandelion/bootstrap2/js/bootstrap.js"></script>
    <script src="/petclinic/dandelion/datatables/js/jquery.dataTables.js">
    </script>
    <script src="/petclinic/dandelion/datatables/features/themes/bootstrap2/js/
    dataTables.bootstrap.js"></script>
```

BDD Lab

Step 16 – Notice error in Test Report

By now you might have noticed that step – “I search for Veterinarian” fails every time we run the report



Feature: Browsing around

Scenario: Login and Vets

✓ **Given** I have opened the browser

✓ **And** I am on the home page

✓ **When** I open veterinarians page

✗ **Then** I search for text "Veterinarian"

```
java.lang.AssertionError
        at org.junit.Assert.fail(Assert.java:86)
        at org.junit.Assert.assertTrue(Assert.java:41)
        at org.junit.Assert.assertTrue(Assert.java:52)
        at stepdefs.BrowsingAround.I_search_for_text(Browsing
        at ?.I search for text "Veterinarian"(file:///C:/User
```

Scenario: Login and check owner based on last name

✓ **Given** I have opened the browser

✓ **And** I am on the home page

✓ **When** I search owner "Franklin"

✓ **Then** I get owner "Franklin" Informations

BDD Lab

Problem statement - Why do we have error in the test report? How to fix it?

Try to fix it with your group. It can be fixed by changing

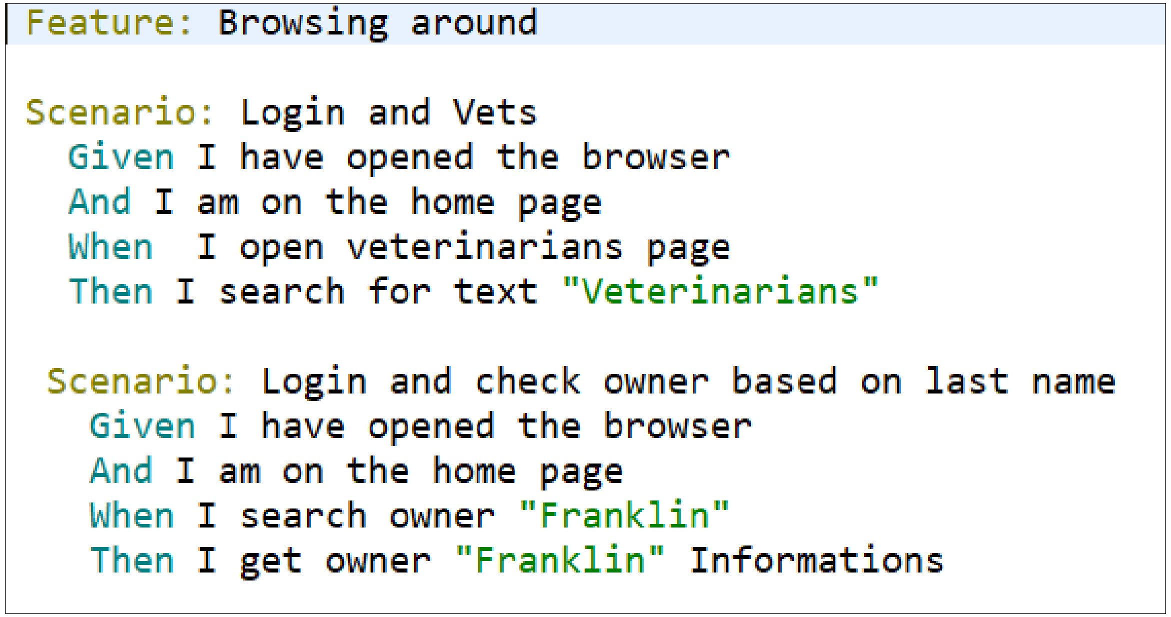
- test case in feature file **OR**
- code in JSP file.

Hint: JSP file with code is “vetList.jsp” within “spring-petclinic\src\main\webapp\WEB-INF\jsp\vets\vetList.jsp”. Use (shift+ctrl+R) and find it in eclipse.

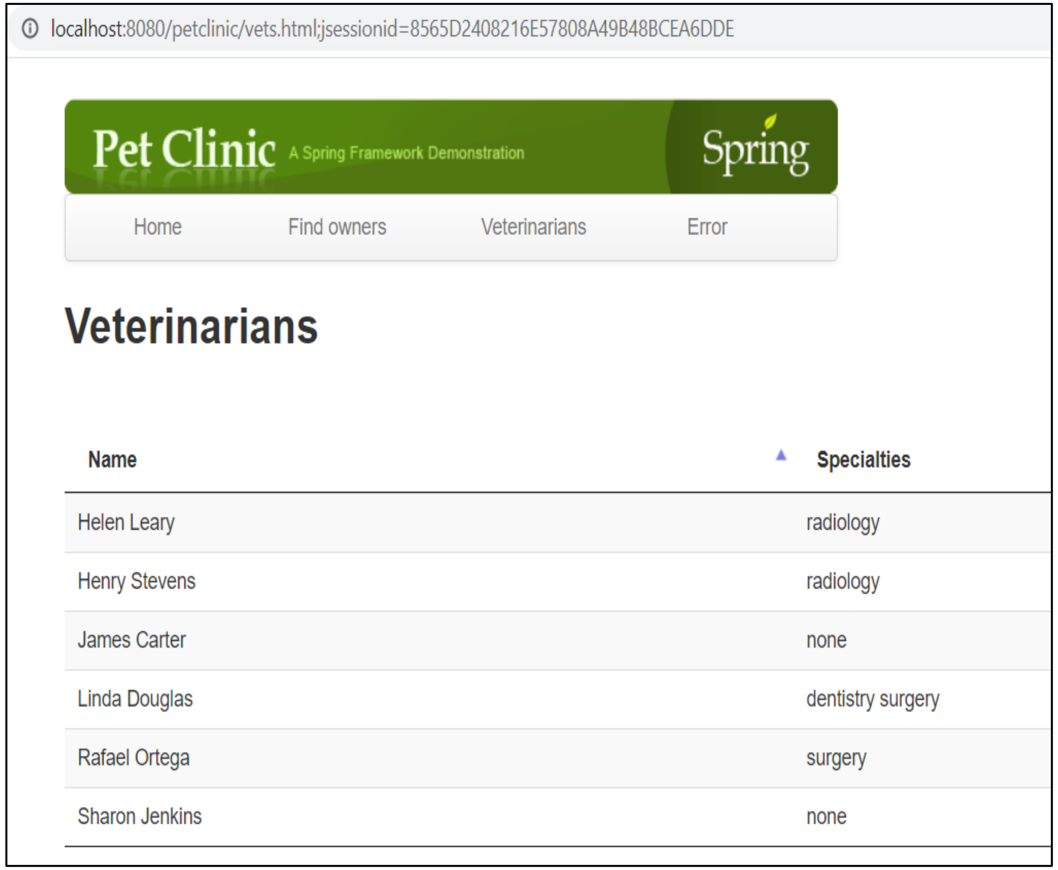
BDD Lab

Step 17 (Solution) – Check expected behavior with Product/Business owner

Expected behavior in the feature file says that it should display “Veterinarian” but it’s showing “Veterinarians”



```
Feature: Browsing around

Scenario: Login and Vets
  Given I have opened the browser
  And I am on the home page
  When  I open veterinarians page
  Then I search for text "Veterinarians"

 Scenario: Login and check owner based on last name
   Given I have opened the browser
   And I am on the home page
   When I search owner "Franklin"
   Then I get owner "Franklin" Informations
```



localhost:8080/petclinic/vets.html;jsessionid=8565D2408216E57808A49B48BCEA6DDE
Pet Clinic
A Spring Framework Demonstration
Spring
Home
Find owners
Veterinarians
Error

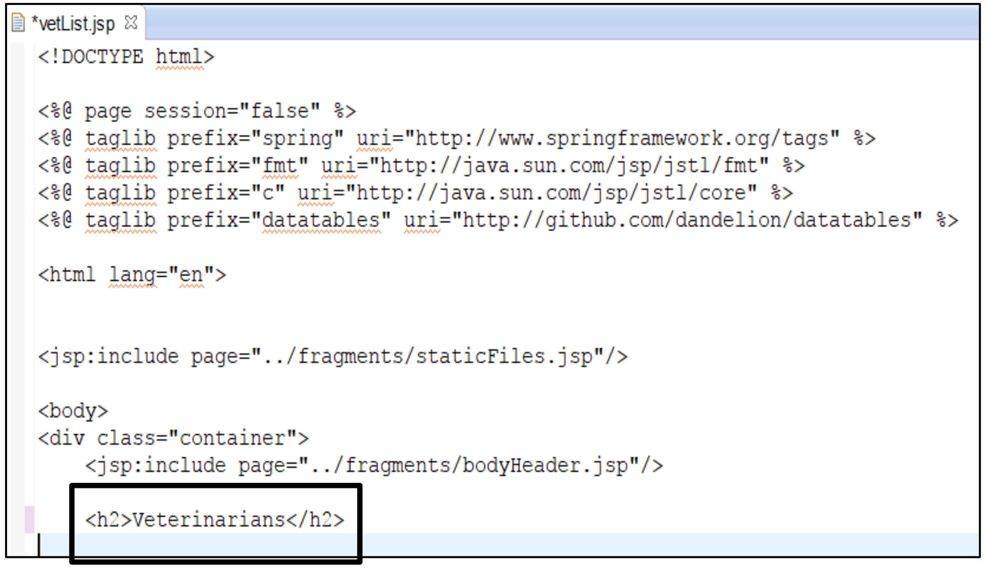
Veterinarians

Name	Specialties
Helen Leary	radiology
Henry Stevens	radiology
James Carter	none
Linda Douglas	dentistry surgery
Rafael Ortega	surgery
Sharon Jenkins	none

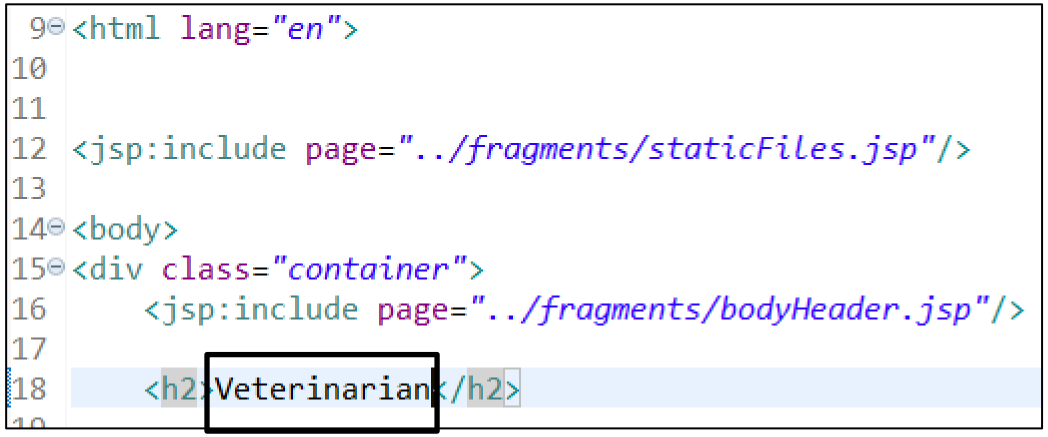
BDD Lab

Step 18 (Solution) – Find the file within Eclipse

1. Find the project “spring-petclinic” within folder and click open
2. Find the file (shift+ctrl+R) “vetList.jsp” within “spring-petclinic\src\main\webapp\WEB-INF\jsp\vets\vetList.jsp”
3. Change Line 18 from “Veterinarians” to “Veterinarian”



```
<!DOCTYPE html>

<%@ page session="false" %>
<%@ taglib prefix="spring" uri="http://www.springframework.org/tags" %>
<%@ taglib prefix="fmt" uri="http://java.sun.com/jsp/jstl/fmt" %>
<%@ taglib prefix="c" uri="http://java.sun.com/jsp/jstl/core" %>
<%@ taglib prefix="datatables" uri="http://github.com/dandelion/datatables" %>

<html lang="en">


<jsp:include page="../fragments/staticFiles.jsp"/>

<body>
<div class="container">
    <jsp:include page="../fragments/bodyHeader.jsp"/>

    <h2>Veterinarians</h2>
```

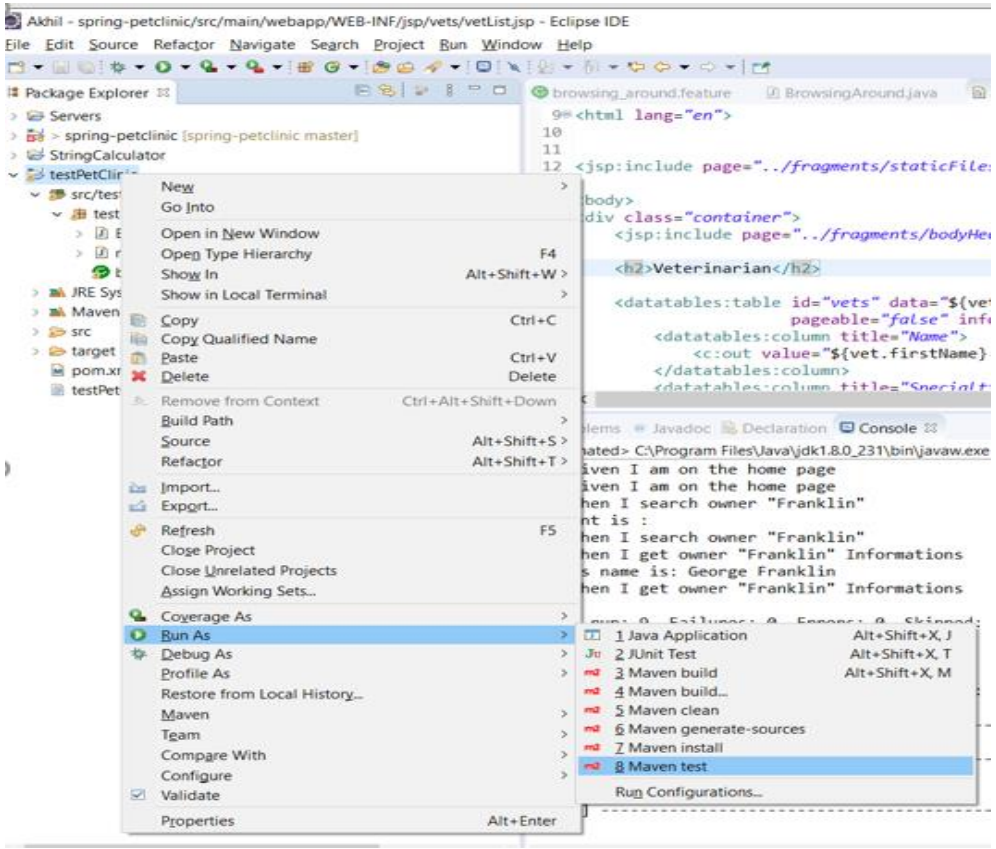


```
 9 <html lang="en">
10
11
12 <jsp:include page="../fragments/staticFiles.jsp"/>
13
14 <body>
15 <div class="container">
16     <jsp:include page="../fragments/bodyHeader.jsp"/>
17
18     <h2>Veterinarian</h2>
```

BDD Lab

Step 19 – Run the Report and observe the changes

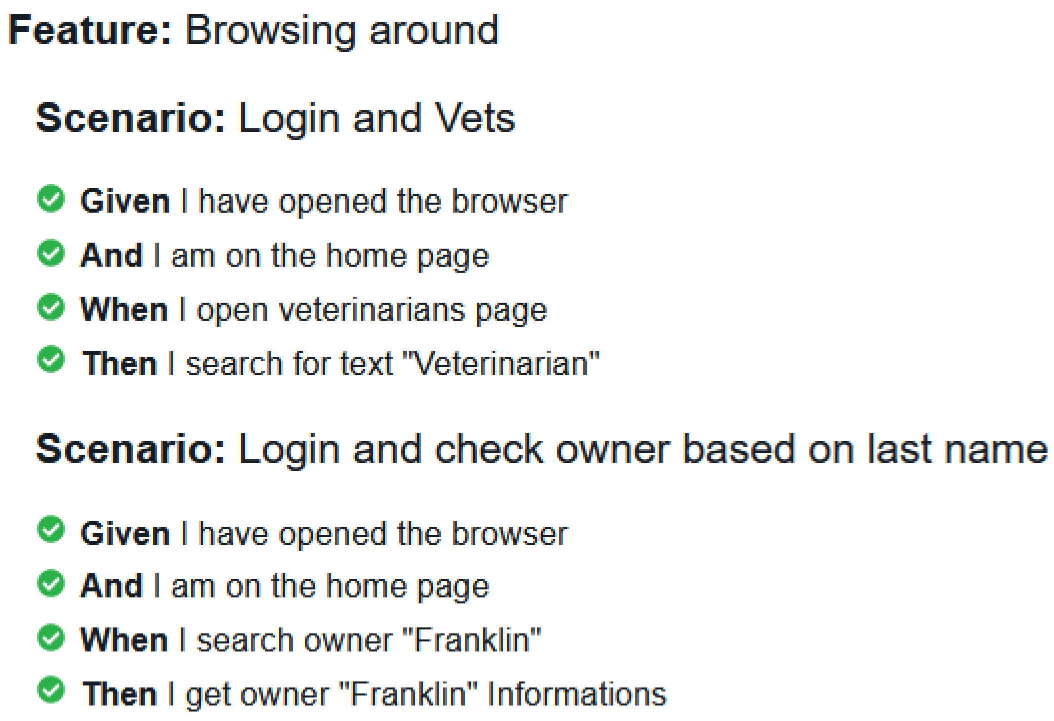
1. Right click on the project testPetClinic => “Run as” -> “Maven Test”



```
 9 <html lang="en">
10
11
12 <jsp:include page="../fragments/staticFile

body>
div class="container">
    <jsp:include page="../fragments/bodyHe

    <h2>Veterinarian</h2>

    <datatables:table id="vets" data="${ve
                      pageable="false" inf
        <datatables:column title="Name">
            <c:out value="${vet.firstName}
        </datatables:column>
        <datatables:column title="Special
```

```
ated> C:\Program Files\Java\jdk1.8.0_231\bin\javaw.exe
iven I am on the home page
iven I am on the home page
hen I search owner "Franklin"
nt is :
hen I search owner "Franklin"
hen I get owner "Franklin" Informations
s name is: George Franklin
hen I get owner "Franklin" Informations

 run: 0, Failures: 0, Errors: 0, Skipped:
```

2. Open “cucumber-pretty” located at .. *{workspace_location}*\target\cucumber-reports



Feature: Browsing around

Scenario: Login and Vets

- ✓ **Given** I have opened the browser
- ✓ **And** I am on the home page
- ✓ **When** I open veterinarians page
- ✓ **Then** I search for text "Veterinarian"

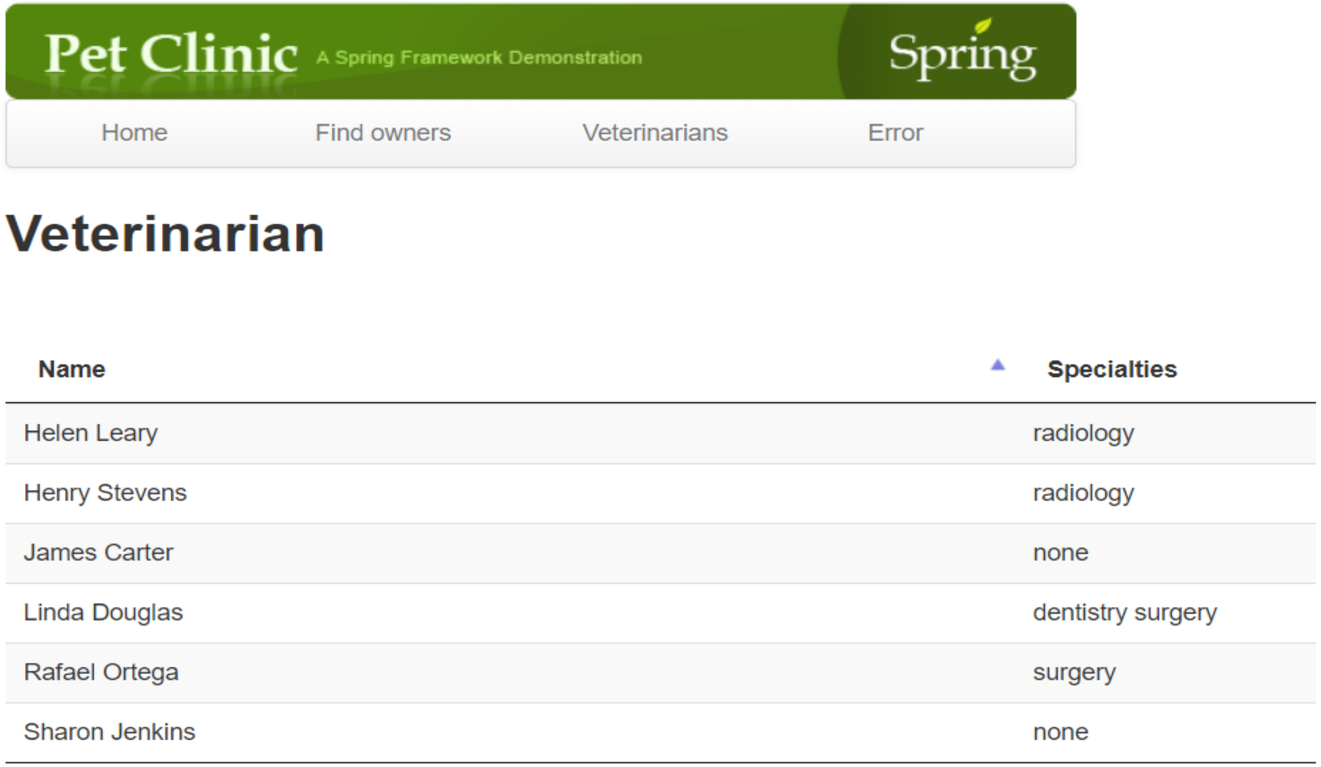
Scenario: Login and check owner based on last name

- ✓ **Given** I have opened the browser
- ✓ **And** I am on the home page
- ✓ **When** I search owner "Franklin"
- ✓ **Then** I get owner "Franklin" Informations

BDD Lab

Step 20 – See the changes on the Pet Clinic site

- Go to the Pet Clinic website and refresh the page. Then click on Veterinarians
- Notice how the header, which used to be “Veterinarians” is now “Veterinarian”



Veterinarian

Name	Specialties
Helen Leary	radiology
Henry Stevens	radiology
James Carter	none
Linda Douglas	dentistry surgery
Rafael Ortega	surgery
Sharon Jenkins	none

BDD Lab

Step 21 – Add a new feature and step definition

Business Requirement: Validate Menu Options on Home Page

```
Scenario: The home page Menu's
    Given I have opened the browser
    When I am on the home page
    Then I should see the Menu Tabs "Home" "Find owners" "Veterinarians" "Error"
```

Add above scenario to feature file and write step definitions for this scenario in browsingaround.java

LAB – BDD Challenge

BDD Lab

Summary

- Behavior Driven Development is an extension of the already existing Test Driven Development
- The steps to preform business driven development include
    1. Involve all parties to come up with desired functionality of the application based on the user story
    2. Pick a feature and define within a feature file using Gherkin format
    3. Make a step definition file that implements each step within all the scenarios
    4. Run the test an update code if it fails
    5. Repeat steps for each feature

CICD Demo