

# Web API Design with Spring Boot Week 2 Coding Assignment

Points possible: 70

Category	Criteria	% of Grade
Functionality	Does the code work?	25
Organization	Is the code clean and organized? Proper use of white space, syntax, and consistency are utilized. Names and comments are concise and clear.	25
Creativity	Student solved the problems presented in the assignment using creativity and out of the box thinking.	25
Completeness	All requirements of the assignment are complete.	25


**Instructions:** In Eclipse, or an IDE of your choice, write the code that accomplishes the objectives listed below. Ensure that the code compiles and runs as directed. Take screenshots of the code and of the running program (make sure to get screenshots of all required functionality) and paste them in this document where instructed below. Create a new repository on GitHub for this week's assignments and push this document, with your Java project code, to the repository. Add the URL for this week's repository to this document where instructed and submit this document to your instructor when complete.



**Here's a friendly tip:** as you watch the videos, code along with the videos. This will help you with the homework. When a screenshot is required, look for the icon:  You will keep adding to this project throughout this part of the course. When it comes time for the final project, use this project as a starter.

**Project Resources:** <https://github.com/promineotech/Spring-Boot-Course-Student-Resources>

## Coding Steps:


- 1) In the project you started last week, use Lombok to add an info-level logging statement in the controller implementation method that logs the parameters that were input to the method. Remember to add the `@Slf4j` annotation to the class.
- 2) Start the application (not an integration test). Use a browser to navigate to the application passing the parameters required for your selected operation. (A browser, used in this manner, sends an HTTP GET request to the server.) Produce a screenshot showing the browser

navigation bar and the log statement that is in the IDE console showing that the controller method was reached (as in the video). 


- 3) With the application still running, use the browser to navigate to the OpenAPI documentation. Use the OpenAPI documentation to send a GET request to the server with a valid model and trim level. (You can get the model and trim from the provided `data.sql` file.) Produce a screenshot showing the `curl` command, the request URL, and the response headers. 
- 4) Run the integration test and show that the test status is green. Produce a screenshot of the test class and the status bar. 
- 5) Add a method to the test to return a list of expected Jeep (`model`) objects based on the model and trim level you selected. You can get the expected list of Jeeps from the file `src/test/resources/flyway/migrations/V1.1__Jeep_Data.sql`. So, for example, using the model Wrangler and trim level "Sport", the query should return two rows:

	Row 1	Row 2
Model ID	WRANGLER	WRANGLER
Trim Level	Sport	Sport
Num Doors	2	4
Wheel Size	17	17
Base Price	\$28,475.00	\$31,975.00

The method should be named `buildExpected()`, and it should return a `List` of `Jeep`. The video put this method into a support superclass but you can include it in the main test class if you want.


- 6) Write an `AssertJ` assertion in the test to assert that the actual list of jeeps returned by the server is the same as the expected list. Run the test. Produce a screenshot showing...
  - a) The test with the assertion.
  - b) The JUnit status bar (should be red).
  - c) The method returning the expected list of Jeeps. 
- 7) Add a service layer in your application as shown in the videos:
  - a) Add a package named `com.promineotech.jeep.service`.
  - b) In the new package, create an interface named `JeepSalesService`.
  - c) In the same package (service), create a class named `DefaultJeepSalesService` that implements the `JeepSalesService` interface. Add the class-level annotation, `@Service`.

- d) Inject the service interface into DefaultJeepSalesController using the @Autowired annotation. The instance variable should be private, and the variable should be named jeepSalesService.
  - e) Define the fetchJeeps method in the interface. Implement the method in the service class. Call the method from the controller (make sure the controller returns the list of Jeeps returned by the service method). The method signature looks like this:  

```
List<Jeep> fetchJeeps(JeepModel model, String trim);
```
  - f) Add a Lombok info-level log statement in the service implementation showing that the service was called. Print the parameters passed to the method. Let the method return null for now.
  - g) Run the test again. Produce a screenshot showing the service class implementation, the log line in the console, and the red status bar. 
- 8) Add the database dependencies described in the video to the POM file (MySQL driver and Spring Boot Starter JDBC). To find them, navigate to <https://mvnrepository.com/>. Search for mysql-connector-j and spring-boot-starter-jdbc. In the POM file you don't need version numbers for either dependency because the version is included in the Spring Boot Starter Parent.
- 9) Create application.yaml in src/main/resources. Add the spring.datasource.url, spring.datasource.username, and spring.datasource.password properties to application.yaml. The url should be the same as shown in the video (jdbc:mysql://localhost:3306/jeep). The password and username should match your setup. If you created the database under your root user, the username is "root", and the password is the root user password. If you created a "jeep" user or other user, use the correct username and password.

Be careful with the indentation! YAML allows hierarchical configuration but it reads the hierarchy based on the indentation level. The keyword "spring" MUST start in the first column. It should look similar to this when done:


```
spring:
  datasource:
    username: username
    password: password
    url: jdbc:mysql://localhost:3306/jeep
```

- 10) Start the application (the real application, not the test). Produce a screenshot that shows application.yaml and the console showing that the application has started with no errors. 
- 11) Add the H2 database as dependency. Search for the dependency in the Maven repository like you did above. Search for "h2" and pick the latest version. Again, you don't need the version number, but the scope should be set to "test".

12) Create application-test.yaml in src/test/resources. Add the setting spring.datasource.url that points to the H2 database. It should look like this:

```
spring:
  datasource:
    url: jdbc:h2:mem:jeep
```

You do not need to set the username and password because the in-memory H2 database does not require them.

Produce a screenshot showing application-test.yaml. 

**Screenshots of Code:**

1<sup>st</sup> Screenshots:

← → ↻ ⓘ localhost:8080/jeeps?model=WRANGLER&trim=Sport

---

```
JeepSales.java × JeepSalesController.java DefaultJeepSalesController.java
1 package com.promineotech.jeep;
2
3 import org.springframework.boot.SpringApplication;
4
5
6 @SpringBootApplication
7 public class JeepSales {
8
9     public static void main(String[] args) {
10         SpringApplication.run(JeepSales.class, args);
11     }
12 }
13
14 }
15
```

Console × Problems × Debug Shell

jeep-sales - JeepSales [Spring Boot App] C:\Users\thepa\Development\Tools\STS\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86\_64

```
com.promineotech.jeep.JeepSales : Starting JeepSales using Java 17.0.4.1 on DESKTOP-NK7HVCB
com.promineotech.jeep.JeepSales : No active profile set, falling back to 1 default profile:
org.springframework.boot.devtools.PropertyDefaultsPostProcessor : Devtools property defaults active! Set 'spring.devtools.ad
org.springframework.boot.devtools.PropertyDefaultsPostProcessor : For additional web related logging consider setting the 'l
org.apache.tomcat.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8080 (http)
org.apache.catalina.core.StandardService : Starting service [Tomcat]
org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.65]
org.apache.catalina.core.StandardContext : Initializing Spring embedded WebApplicationContext
C.[Tomcat].[localhost].[/] : Root WebApplicationContext: initialization completed in 83
org.springframework.boot.web.servlet.WebServerApplicationContext : LiveReload server is running on port 35729
org.apache.tomcat.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8080 (http) with context path '/'
com.promineotech.jeep.JeepSales : Started JeepSales in 1.616 seconds (JVM running for 2.3)
C.[Tomcat].[localhost].[/] : Initializing Spring DispatcherServlet 'dispatcherServlet'
org.springframework.web.servlet.DispatcherServlet : Initializing Servlet 'dispatcherServlet'
org.springframework.web.servlet.DispatcherServlet : Completed initialization in 0 ms
com.promineotech.jeep.DefaultJeepSalesController : model=WRANGLER, trim=Sport
```

## 2<sup>nd</sup> Screenshots:

localhost:8080/swagger-ui/index.html#/default-jeep-sales-controller/fetchJeeps

### default-jeep-sales-controller

**GET** /jeeps Returns a list of Jeeps

Returns a list of Jeeps given an optional model and/or trim

**Parameters** Cancel

Name	Description
<b>model</b> <small>required</small> string (query)	The model name (i.e. 'WRANGLER')
<b>trim</b> <small>required</small> string (query)	The trim level (i.e., 'Sport')

Execute Clear

**Responses**

```
JeepSales.java x JeepSalesController.java DefaultJeepSalesController.java
1 package com.promineotech.jeep;
2
3 import org.springframework.boot.SpringApplication;
4
5
6 @SpringBootApplication
7 public class JeepSales {
8
9     public static void main(String[] args) {
10         SpringApplication.run(JeepSales.class, args);
11     }
12 }
13
14 }
15
```

Console x Problems x Debug Shell

2022-09-25 16:30:48.943 INFO 9024 --- [io-8080-exec-10] c.p.j.c.DefaultJeepSalesController : model=GRAND\_CHEROKEE, trim=Sport

localhost:8080/swagger-ui/index.html#/default-jeep-sales-controller/fetchJeeps

### Curl

```
curl -X 'GET' \
  'http://localhost:8080/jeeps?model=GRAND_CHEROKEE&trim=Sport' \
  -H 'accept: application/json'
```

Request URL

http://localhost:8080/jeeps?model=GRAND\_CHEROKEE&trim=Sport

Server response

Code	Details
200	<p>Response headers</p> <pre>connection: keep-alive content-length: 0 date: Sun, 25 Sep 2022 20:30:48 GMT keep-alive: timeout=60</pre>

Responses

Code	Description	Links
200	A list of Jeeps is returned	No links

Media type

application/json

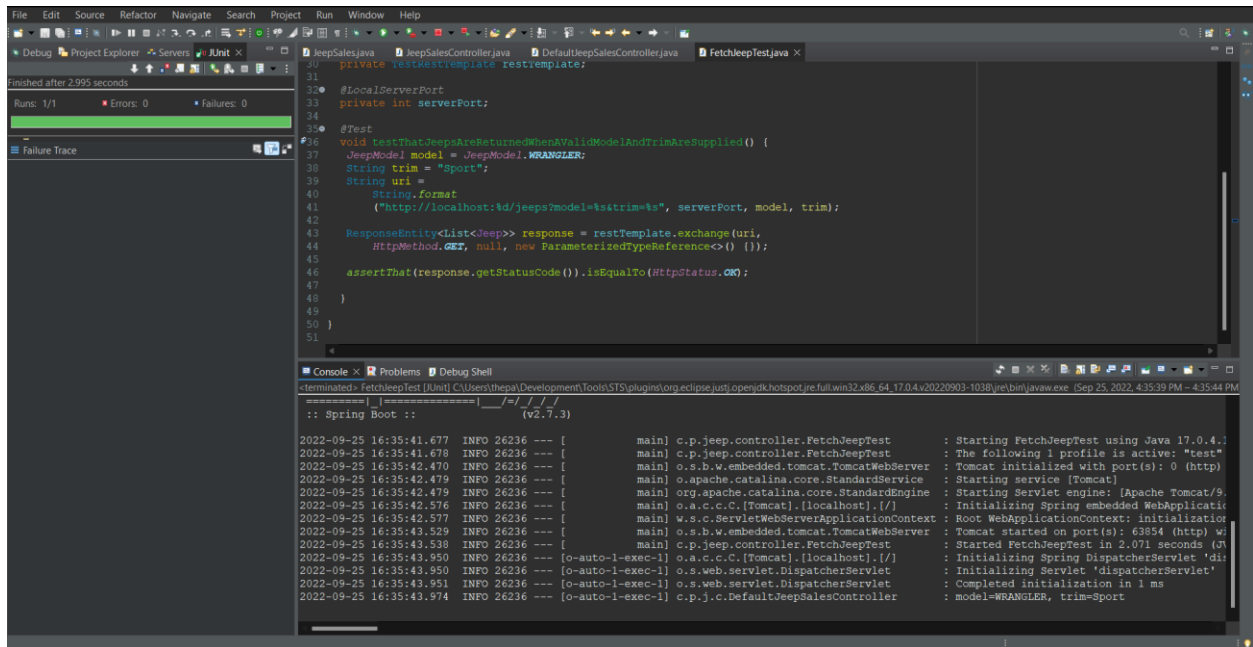
Controls Accept header

Example Value | Schema

```
{
  "modelPK": 0,
  "modelId": "WRANGLER",
  "trimLevel": "string",
  "numDoors": 0,
  "wheelSize": 0,
  "basePrice": 0
}
```

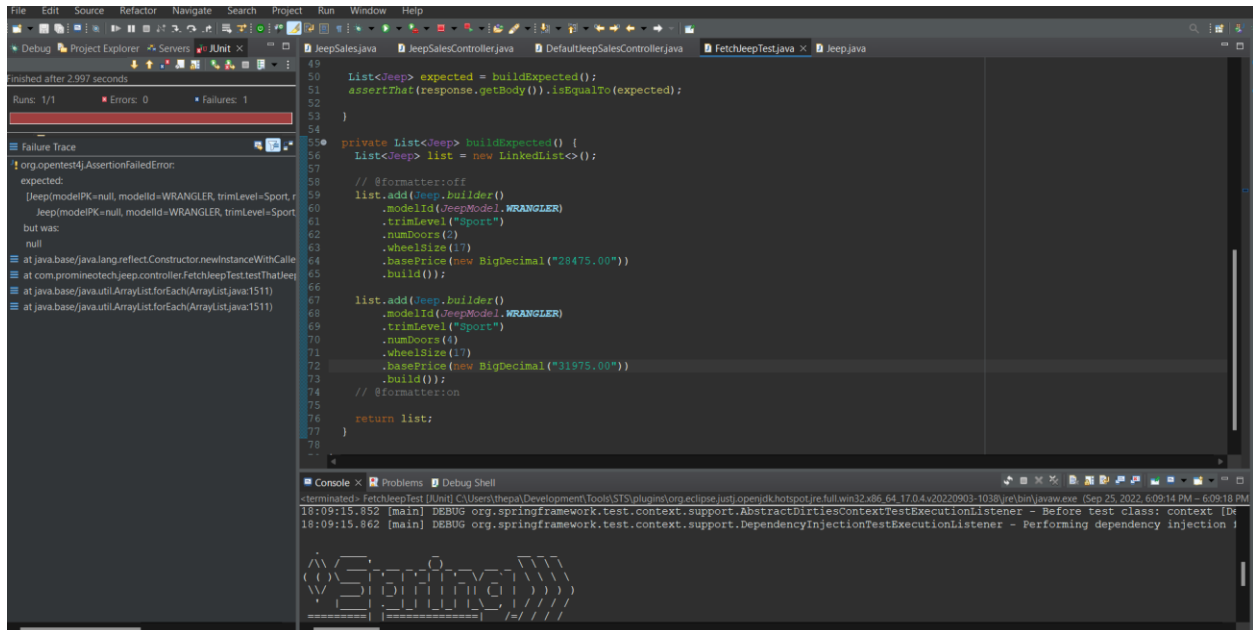


### 3<sup>rd</sup> Screenshot:



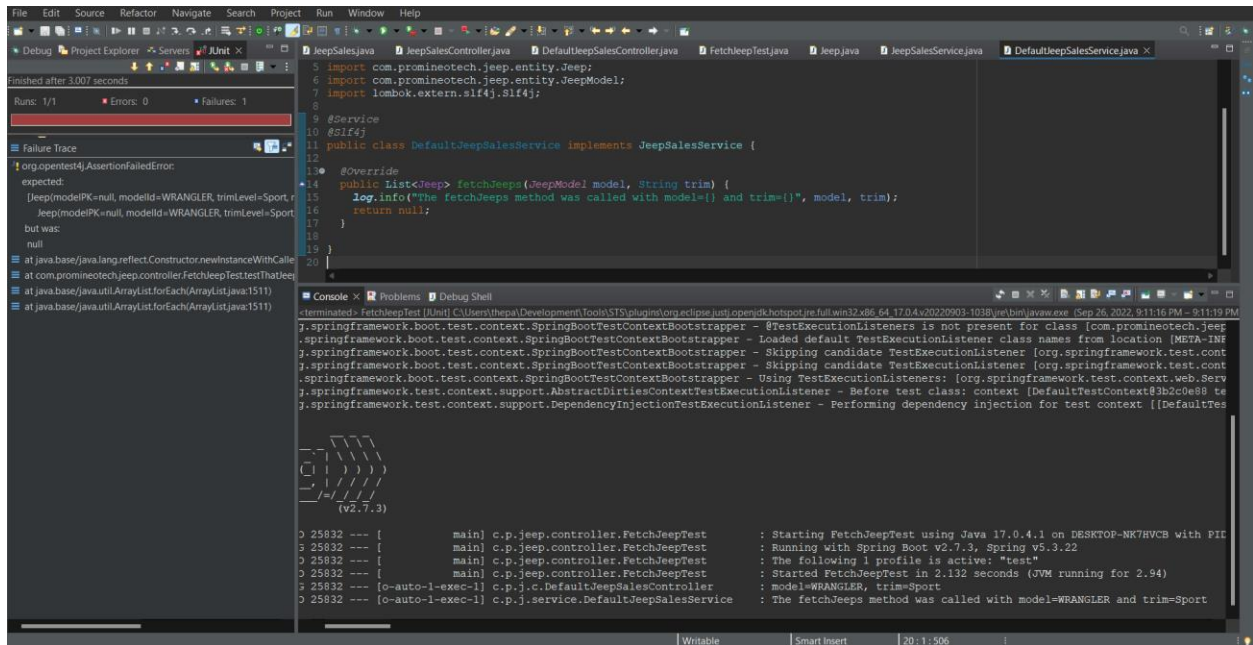
```
File Edit Source Refactor Navigate Search Project Run Window Help
Debug Project Explorer Servers JUnit X
Finished after 2.995 seconds
Runs: 1/1 Errors: 0 Failures: 0
Failure Trace
JeepSales.java JeepSalesController.java DefaultJeepSalesController.java FetchJeepTest.java
31
32 @LocalServerPort
33 private int serverPort;
34
35
36 @Test
37 void testThatJeepsAreReturnedWhenValidModelAndTrimAreSupplied() {
38     JeepModel model = JeepModel.WRANGLER;
39     String trim = "Sport";
40     String uri =
41         String.format(
42             "http://localhost:%d/jeeps?model=%s&trim=%s", serverPort, model, trim);
43     ResponseEntity<List<Jeep>> response = restTemplate.exchange(uri,
44         HttpMethod.GET, null, new ParameterizedTypeReference<>() {});
45     assertThat(response.getStatusCode()).isEqualTo(HttpStatus.OK);
46 }
47
48 }
49
50 }
51
Console Problems Debug Shell
<terminated> FetchJeepTest [JUnit] C:\Users\thepa\Development\Tools\STS\plugins\org.eclipse.jdt.openjdk.hotspot.jre.full.win32.x86_64.17.0.4.v20220903-1038\jre\bin\java.exe (Sep 25, 2022, 4:35:44 PM)
:: Spring Boot ::
2022-09-25 16:35:41.677 INFO 26236 --- [main] c.p.jee.controller.FetchJeepTest : Starting FetchJeepTest using Java 17.0.4.
2022-09-25 16:35:41.678 INFO 26236 --- [main] c.p.jee.controller.FetchJeepTest : The following 1 profile is active: "test"
2022-09-25 16:35:42.470 INFO 26236 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 0 (http)
2022-09-25 16:35:42.479 INFO 26236 --- [main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.
2022-09-25 16:35:42.576 INFO 26236 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicatio
2022-09-25 16:35:42.577 INFO 26236 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initializatio
2022-09-25 16:35:43.539 INFO 26236 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 63854 (http) w
2022-09-25 16:35:43.538 INFO 26236 --- [main] c.p.jee.controller.FetchJeepTest : Started FetchJeepTest in 2.071 seconds (Ja
2022-09-25 16:35:43.950 INFO 26236 --- [o-auto-1-exec-1] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring DispatcherServlet 'di
2022-09-25 16:35:43.950 INFO 26236 --- [o-auto-1-exec-1] o.s.web.servlet.DispatcherServlet : Initializing Servlet 'dispatcherServlet'
2022-09-25 16:35:43.951 INFO 26236 --- [o-auto-1-exec-1] o.s.web.servlet.DispatcherServlet : Completed initialization in 1 ms
2022-09-25 16:35:43.974 INFO 26236 --- [o-auto-1-exec-1] c.p.j.c.DefaultJeepSalesController : model=WRANGLER, trim=Sport
```

### 4<sup>th</sup> Screenshot:

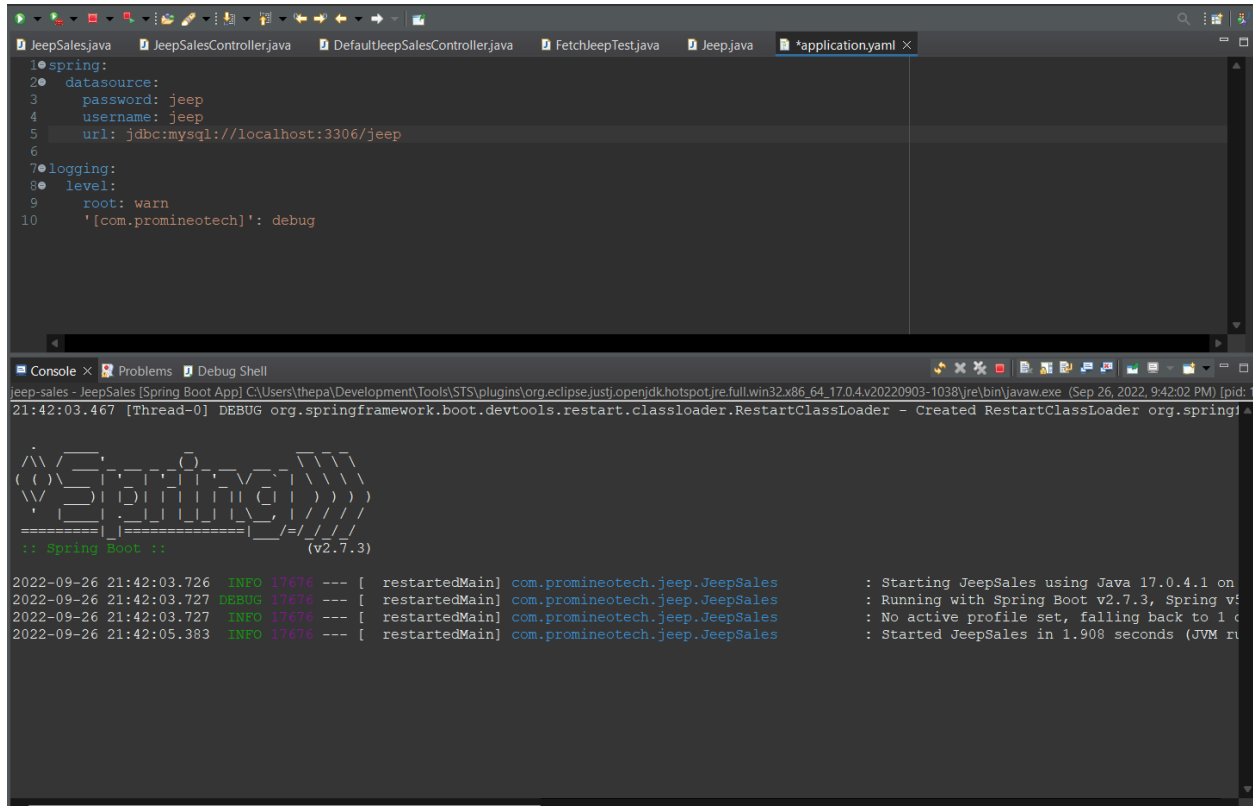


```
File Edit Source Refactor Navigate Search Project Run Window Help
Debug Project Explorer Servers JUnit X
Finished after 2.997 seconds
Runs: 1/1 Errors: 0 Failures: 1
Failure Trace
org.opentest4j.AssertionFailedError:
expected:
[Jeep(modelPK=null, modelId=WRANGLER, trimLevel=Sport,
Jeep(modelPK=null, modelId=WRANGLER, trimLevel=Sport,
but was:
null
at java.base/java.lang.reflect.Constructor.newInstanceWithCaller
at com.promineotech.jee.controller.FetchJeepTest.testThatJeep
at java.base/java.util.ArrayList.forEach(ArrayList.java:1511)
at java.base/java.util.ArrayList.forEach(ArrayList.java:1511)
JeepSales.java JeepSalesController.java DefaultJeepSalesController.java FetchJeepTest.java Jeep.java
49
50 List<Jeep> expected = buildExpected();
51 assertThat(response.getBody()).isEqualTo(expected);
52
53 }
54
55 private List<Jeep> buildExpected() {
56     List<Jeep> list = new LinkedList<>();
57
58     // @formatter:off
59     list.add(Jeep.builder()
60         .modelId(JeepModel.WRANGLER)
61         .trimLevel("Sport")
62         .numDoors(2)
63         .wheelSize(17)
64         .basePrice(new BigDecimal("28475.00"))
65         .build());
66
67     list.add(Jeep.builder()
68         .modelId(JeepModel.WRANGLER)
69         .trimLevel("Sport")
70         .numDoors(4)
71         .wheelSize(17)
72         .basePrice(new BigDecimal("31975.00"))
73         .build());
74     // @formatter:on
75
76     return list;
77 }
78
Console Problems Debug Shell
<terminated> FetchJeepTest [JUnit] C:\Users\thepa\Development\Tools\STS\plugins\org.eclipse.jdt.openjdk.hotspot.jre.full.win32.x86_64.17.0.4.v20220903-1038\jre\bin\java.exe (Sep 25, 2022, 6:09:14 PM - 6:09:18 PM)
18:09:15.852 [main] DEBUG org.springframework.test.context.support.AbstractDirtiesContextTestExecutionListener - Before test class: context [D
18:09:15.862 [main] DEBUG org.springframework.test.context.support.DependencyInjectionTestExecutionListener - Performing dependency injection !
```

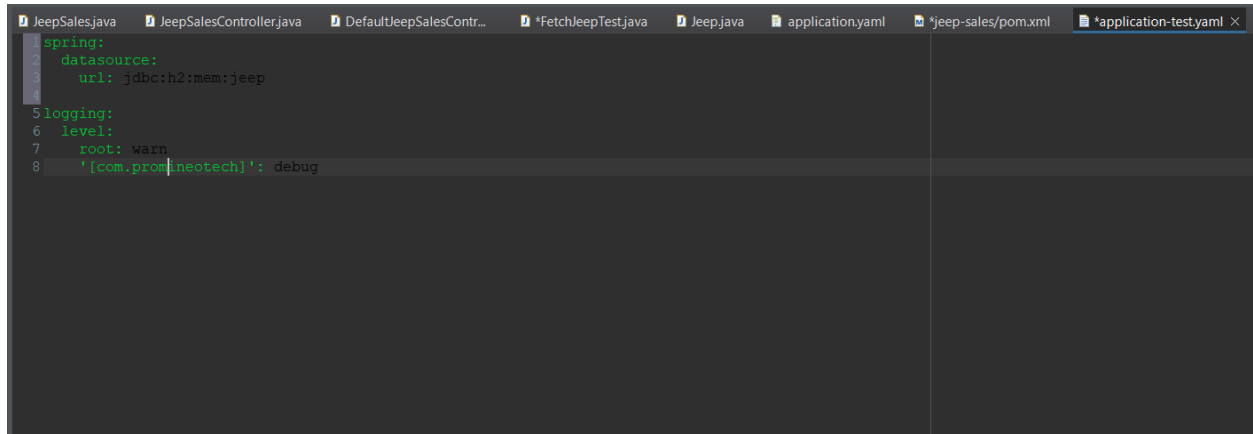
## 5<sup>th</sup> Screenshot:



## 6<sup>th</sup> Screenshot:



7<sup>th</sup> Screenshot:

A screenshot of an IDE window showing a configuration file named application-test.yml. The file is open in a tab labeled '\*application-test.yml'. The code is as follows:

```
1 spring:
2   datasource:
3     url: jdbc:h2:mem:jeep
4
5 logging:
6   level:
7     root: warn
8   '[com.prom|neotech]': debug
```

The IDE has a dark theme. The top of the window shows several tabs: JeepSales.java, JeepSalesController.java, DefaultJeepSalesContr..., \*FetchJeepTest.java, Jeep.java, application.yml, \*jeep-sales/pom.xml, and the active tab \*application-test.yml. The code is color-coded: 'spring:' is green, 'datasource:' is green, 'url:' is green, 'jdbc:h2:mem:jeep' is green, 'logging:' is green, 'level:' is green, 'root: warn' is green, and '[com.prom|neotech]': debug' is green.

URL to GitHub Repository: <https://github.com/JustinPayne96/SpringBootProject>