


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...
 - 6.a) The test with the assertion.
 - 6.b) The JUnit status bar (should be red).
 - 6.c) The method returning the expected list of Jeeps. 
- 7) Add a service layer in your application as shown in the videos:
 - 7.a) Add a package named `com.promineotech.jeep.service`.
 - 7.b) In the new package, create an interface named `JeepSalesService`.


- 7.c) In the same package (service), create a class named `DefaultJeepSalesService` that implements the `JeepSalesService` interface. Add the class-level annotation, `@Service`.
- 7.d) Inject the service interface into `DefaultJeepSalesController` using the `@Autowired` annotation. The instance variable should be private, and the variable should be named `jeepSalesService`.
- 7.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);
```

- 7.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.
- 7.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.yml in src/test/resources. Add the setting spring.datasource.url that points to the H2 database. It should look like this:

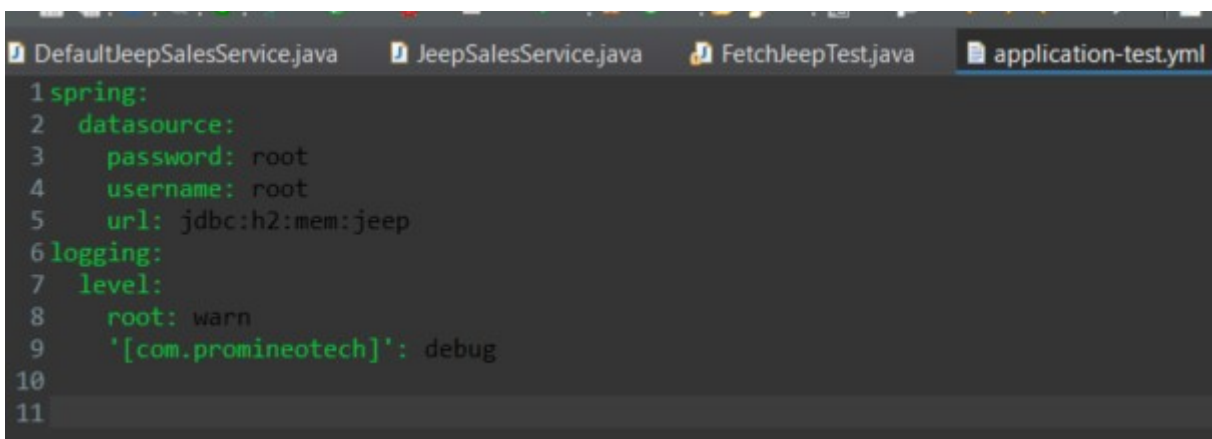
```
spring:
  datasource:
    url: jdbc:h2:mem:jeep
```

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.yml. 🖨️

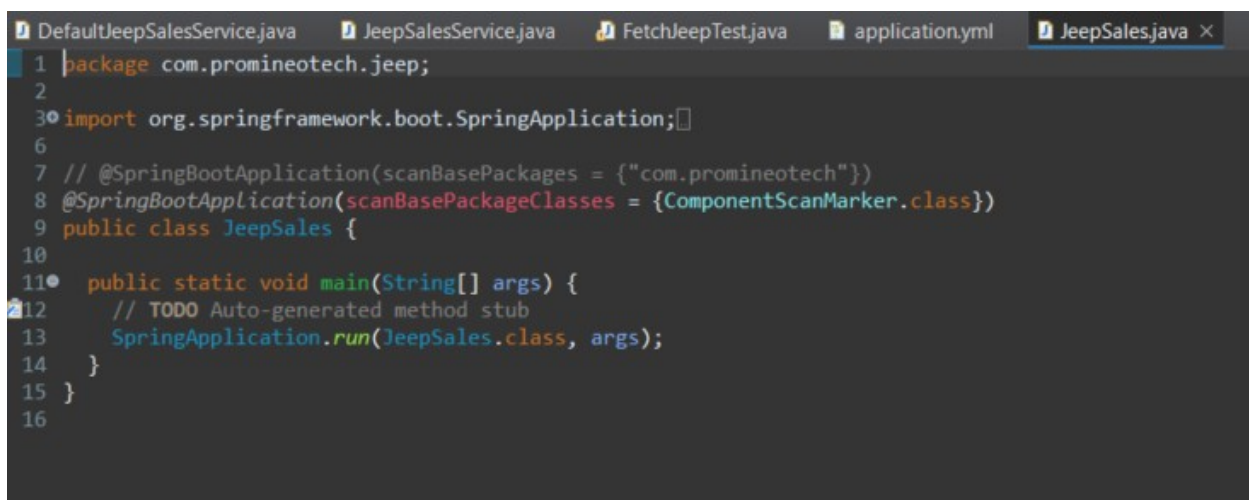
Screenshots of Code:

(#12) Application-test.yml

A screenshot of an IDE showing the file application-test.yml. The file contains the following YAML configuration:

```
1 spring:
2   datasource:
3     password: root
4     username: root
5     url: jdbc:h2:mem:jeep
6 logging:
7   level:
8     root: warn
9     '[com.promineotech]': debug
10
11
```

JeepSales.java

A screenshot of an IDE showing the file JeepSales.java. The file contains the following Java code:

```
1 package com.promineotech.jeep;
2
3 import org.springframework.boot.SpringApplication;
4
5
6 // @SpringBootApplication(scanBasePackages = {"com.promineotech"})
7 @SpringBootApplication(scanBasePackageClasses = {ComponentScanMarker.class})
8 public class JeepSales {
9
10   public static void main(String[] args) {
11     // TODO Auto-generated method stub
12     SpringApplication.run(JeepSales.class, args);
13   }
14 }
15
16
```

DefaultJeepSalesController.java

```
DefaultJeepSal... JeepSalesServi... FetchJeepTestj... application.yml JeepSales.java DefaultJeepSal... x
1 package com.promineotech.jeep.controller;
2
3 import java.util.List;
4
5
6
7
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10
11 @RestController
12 @Slf4j
13 public class DefaultJeepSalesController implements JeepSalesController {
14
15     @Autowired
16     private JeepSalesService jeepSalesService;
17
18     @Override
19     public List<Jeep> fetchJeeps(JeepModel model, String trim){
20         log.info("model = {}, trim = {}", model, trim);
21         return jeepSalesService.fetchJeeps(model, trim);
22     }
23
24
25 }
26
```

JeepSalesController.java

```
1 package com.promineotech.jeepp.controller;
2 import com.promineotech.jeepp.entity.Jeepp;
19
20 @RequestMapping("/jeepps")
21 @OpenAPIDefinition(info = @Info(title = "Jeep Sales Service"), servers =
22     {@Server(url = "http://localhost:8080", description = "Local server.")})
23 public interface JeepSalesController {
24     // @formatter:off
25     @Operation(
26         summary = "Returns a list of Jeepps",
27         description = "Returns a list of Jeepps given an optional model and/or trim",
28         responses = {
29             @ApiResponse(responseCode = "200",
30                 description = "A list of Jeepps is returned",
31                 content = @Content(
32                     mediaType = "application/json",
33                     schema = @Schema(implementation = Jeep.class))),
34             @ApiResponse(responseCode = "400",
35                 description = "Request Parameters Invalid",
36                 content = @Content(mediaType = "application/json")),
37             @ApiResponse(responseCode = "404",
38                 description = "No Jeepps Found with Criteria",
39                 content = @Content(mediaType = "application/json")),
40             @ApiResponse(responseCode = "500",
41                 description = "An unplanned error occurred",
42                 content = @Content(mediaType = "application/json"))
43         },
44         parameters = {
45             @Parameter(name = "model",
46                 allowEmptyValue = false,
47                 required = false,
48                 description = "The model name"),
49             @Parameter(name = "trim",
50                 allowEmptyValue = false,
51                 required = false,
52                 description = "The trim level")
53         }
54     )
55     // @formatter:on
56     @GetMapping
57     @ResponseStatus(code = HttpStatus.OK)
58     List<Jeep> fetchJeepps(@RequestParam JeepModel model,
59         @RequestParam String trim);
60 }
61
```

DefaultJeepSalesService.java

```
DefaultJeepSalesService.java x JeepSalesService.java FetchJeepTest.java application-test.yml
1 package com.promineotech.jeepproject.service;
2
3 import java.util.List;
4
5
6
7
8
9 @Service
10 @Slf4j
11 public class DefaultJeepSalesService implements JeepSalesService {
12
13     public List<Jeep> fetchJeeps(JeepModel model, String trim){
14         log.info("The fetchJeeps method was called with model = {} and trim = {}",
15             model, trim);
16         return null;
17     }
18 }
19
```

JeepSalesService.java

```
DefaultJeepSalesService.java JeepSalesService.java x FetchJeepTest.java
1 package com.promineotech.jeepproject.service;
2
3 import com.promineotech.jeepproject.entity.Jeep;
4
5
6
7 public interface JeepSalesService {
8     List<Jeep> fetchJeeps(JeepModel model, String trim);
9 }
10
```


Jeep.java

```
DefaultJeepSalesService.java  JeepSalesService.java  FetchJeepTest.java  application.yml  Jeep.java x
1 package com.promineotech.jeep.entity;
2
3 import java.math.BigDecimal;
4
5
6
7
8
9 @Data
10 @Builder
11 @NoArgsConstructor
12 @AllArgsConstructor
13 public class Jeep {
14     private Long modelPK;
15     private JeepModel modelId;
16     private String trimLevel;
17     private int numDoors;
18     private int wheelSize;
19     private BigDecimal basePrice;
20 }
21
```

FetchJeepTest.java

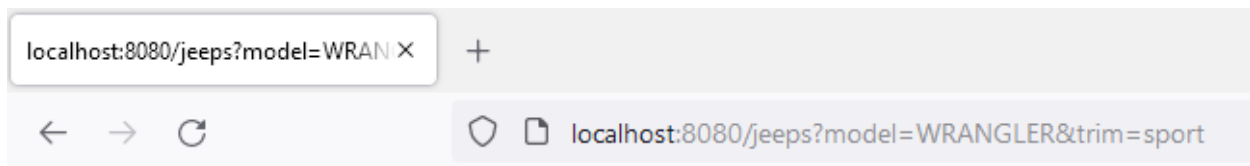
```
workspace-spring-tool-suite-4-12.0.RELEASE - jeep-sales/rvc/test/java/com/promineotech/jeep/controller/FetchJeepTest.java - Spring Tool Suite 4
File Edit Source Refactor Navigate Search Project Run Window Help
1 package com.promineotech.jeep.entity;
2 import com.promineotech.jeep.entity.Jeep;
3
4 @SpringBootTest(webEnvironment = WebEnvironment.RANDOM_PORT)
5 @ActiveProfiles("test")
6 @Sql(scripts = {
7     "classpath:flyway/migrations/V1_0_jeep_schema.sql",
8     "classpath:flyway/migrations/V1_1_jeep_data.sql",
9     config = @SqlConfig(encoding = "utf-8")
10 })
11 class FetchJeepTest {
12     @Autowired
13     @Getter
14     private TestRestTemplate restTemplate;
15     @MockServerPort
16     private int serverPort;
17     JeepModel model = JeepModel.WRANGLER;
18     String trim = "Sport";
19     String url = String.format(
20         "http://localhost:%d/jeeps/model-%s&trim=%s", serverPort, model, trim);
21
22     /*
23     @Autowired
24     private JdbcTemplate jdbcTemplate;
25
26     @Test
27     void testDB() {
28         int numCus = jdbcTestUtils.countRowsInTable(jdbcTemplate, "customers");
29         System.out.println("num=" + numCus);
30     }
31
32     @Disabled
33     /*
34     @Test
35     void testThatJeepsReturnedFromValidModelAndTrimAreSupplied() {
36         JeepModel model = JeepModel.WRANGLER;
37         String trim = "Sport";
38         String url = String.format(
39             "http://localhost:%d/jeeps/model-%s&trim=%s", serverPort, model, trim);
40
41         ResponseEntity<List<Jeep>> response =
42             restTemplate.exchange(url, HttpMethod.GET, null, new ParameterizedTypeReference<>());
43
44         // HTTP Code = 200 = OK
45         assertThat(response.getStatusCode(), equalTo(HttpStatus.OK));
46         // test if expected and actual list are the same.
47         List<Jeep> expected = buildExpected();
48         assertThat(response.getBody(), equalTo(expected));
49
50     /*
51     protected List<Jeep> buildExpected() {
52         List<Jeep> list = new LinkedList<>();
53
54         // @formatter:off
55         list.add(new Builder()
56             .modelId(JeepModel.WRANGLER)
57             .trimLevel("Sport")
58             .numDoors(4)
59             .wheelSize(17)
60             .basePrice(new BigDecimal("28479.00"))
61             .build());
62
63         list.add(new Builder()
64             .modelId(JeepModel.WRANGLER)
65             .trimLevel("Sport")
66             .numDoors(4)
67             .wheelSize(17)
68             .basePrice(new BigDecimal("31975.00"))
69             .build());
70         // @formatter:on
71         return list;
72     }
73 }
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75 @formatter:off
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```


application.yml

```
DefaultJeepSalesService.java  JeepSalesService.java  FetchJeepTest.java  application-test.yml  application.yml x
1 • spring:
2   datasource:
3     password: root
4     username: root
5     url: jdbc:mysql://localhost:3306/jeep
6
7
```

Screenshots of Running Application:

(#2) Browser Bar



(#2) Console

```
jeep-sales - JeepSales [Spring Boot App] C:\Users\da3mo\Downloads\sts-4.12.0.RELEASE\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\ja
Picked up _JAVA_OPTIONS: -Xmx1g -Xms1g

:: Spring Boot :: (v2.5.5)

2021-10-29 15:17:22.330 INFO 10156 --- [ restartedMain] com.promineotech.jeep.JeepSales : Starting JeepSales using Java 16.0.2
2021-10-29 15:17:22.333 INFO 10156 --- [ restartedMain] com.promineotech.jeep.JeepSales : No active profile set, falling back to default profile
2021-10-29 15:17:22.393 INFO 10156 --- [ restartedMain] .e.DevToolsPropertyDefaultsPostProcessor : Devtools property defaults active! See https://www.spring.io/pages/devtools-property-defaults/ for additional web related logging configuration
2021-10-29 15:17:23.479 INFO 10156 --- [ restartedMain] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8080
2021-10-29 15:17:23.490 INFO 10156 --- [ restartedMain] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2021-10-29 15:17:23.490 INFO 10156 --- [ restartedMain] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.45]
2021-10-29 15:17:23.589 INFO 10156 --- [ restartedMain] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2021-10-29 15:17:23.589 INFO 10156 --- [ restartedMain] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed
2021-10-29 15:17:24.376 INFO 10156 --- [ restartedMain] o.s.b.d.a.OptionalLiveReloadServer : LiveReload server is running on port 8080
2021-10-29 15:17:24.435 INFO 10156 --- [ restartedMain] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8080 (http)
2021-10-29 15:17:24.445 INFO 10156 --- [ restartedMain] com.promineotech.jeep.JeepSales : Started JeepSales in 2.581 seconds (JVM running for 2.601s)
2021-10-29 15:18:20.701 INFO 10156 --- [nio-8080-exec-1] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring DispatcherServlet
2021-10-29 15:18:20.702 INFO 10156 --- [nio-8080-exec-1] o.s.web.servlet.DispatcherServlet : Initializing Servlet 'dispatcherServlet'
2021-10-29 15:18:20.734 WARN 10156 --- [nio-8080-exec-1] .w.s.m.s.DefaultHandlerExceptionResolver : Resolved [org.springframework.web.bind.MissingServletRequestParameterException: Missing request parameter 'model']
2021-10-29 15:19:58.303 INFO 10156 --- [nio-8080-exec-5] c.p.j.c.DefaultJeepSalesController : model = WRANGLER, trim = sport
2021-10-29 15:20:04.871 INFO 10156 --- [nio-8080-exec-6] c.p.j.c.DefaultJeepSalesController : model = WRANGLER, trim = sport
```

(#3) Swagger.UI Response

default-jeep-sales-controller

GET /jeeps Returns a list of Jeeps

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

Parameters

Name	Description
model * required string (query)	The model name
trim * required string (query)	The trim level

Execute Clear

Responses

Curl

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

Request URL

```
http://localhost:8080/jeeps?model=CHEROKEE&trim=Sport
```

Server response

Code Details

200

Response headers

```
connection: keep-alive
content-length: 0
date: Fri, 29 Oct 2021 22:26:01 GMT
keep-alive: timeout=60
```

(#4) Integration Test

Project Explorer JUnit X

Finished after 6.324 seconds

Runs: 1/1 Errors: 0 Failures: 0

FetchJeepTest [Runner: JUnit 5] (0.995 s)

testThatJeepsAreReturnedWhenAValidModelAndTrimAreSupplied() (0.995 s)

Failure Trace

```
1 package com.promineotech.jeep.controller;
2 import com.promineotech.jeep.entity.Jeep;
3
4
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22
23 @SpringBootTest(webEnvironment = WebEnvironment.RANDOM_PORT)
24 @ActiveProfiles("test")
25 @Sql(scripts = {
26     "classpath:flyway/migrations/V1.0__Jeep_Schema.sql",
27     "classpath:flyway/migrations/V1.1__Jeep_Data.sql"},
28     config = @SqlConfig(encoding = "utf-8"))
29 class FetchJeepTest {
30     @Autowired
31     @Getter
32     private TestRestTemplate restTemplate;
33     @LocalServerPort
34     private int serverPort;
35     JeepModel model = JeepModel.WRANGLER;
36     String trim = "Sport";
37     String url = String.format
38         ("http://localhost:%d/jeeps?model=%s&trim=%s", serverPort, model, trim);
39
40
41     @Test
42     void testThatJeepsAreReturnedWhenAValidModelAndTrimAreSupplied() {
43         JeepModel model = JeepModel.WRANGLER;
44         String trim = "Sport";
45         String url = String.format
46             ("http://localhost:%d/jeeps?model=%s&trim=%s", serverPort, model, trim);
47
48         ResponseEntity<List<Jeep>> response =
49             restTemplate.exchange(url, HttpMethod.GET, null, new ParameterizedTypeReference<>());
50
51         restTemplate.getForEntity(url, Jeep.class);
52         assertNotNull(response.getStatusCode());
53     }
54
55
56
57 }
```

(#6) Expected List and Failed Test

Project Explorer | JUnit | FetchJeepTest [Runner: JUnit 5] (1.208 s)

Runs: 1/1 | Errors: 0 | Failures: 1

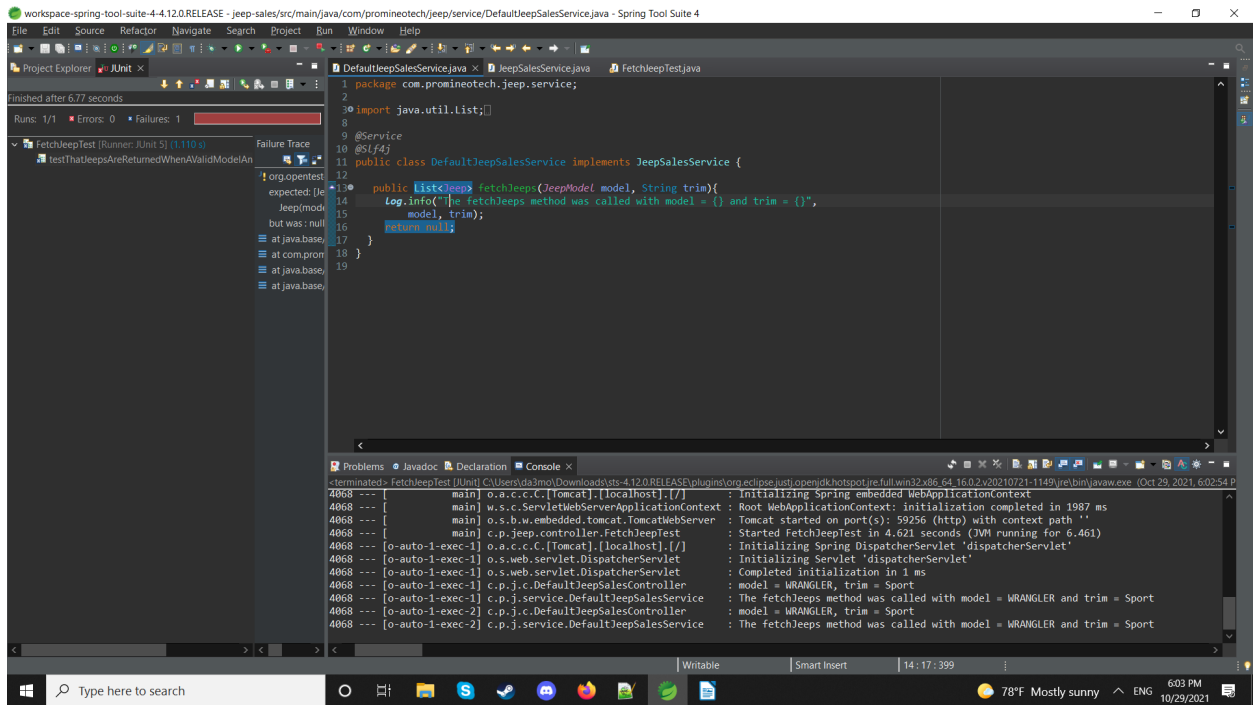
Failure Trace

org.opentest4j.AssertionFailedError: expected: [Jeep(modelPK: ...)] but was: null

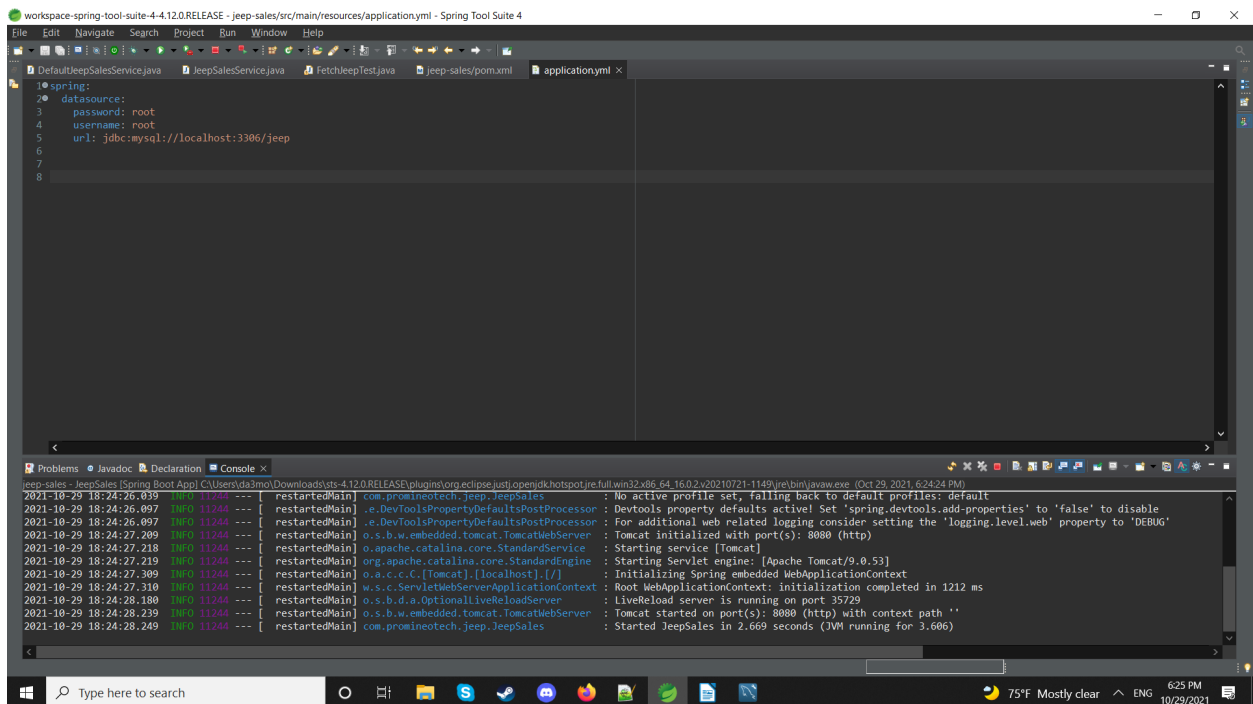
at java.base/java.lang.AssertionError.
at com.promineer.jeeps.FetchJeepTest.
at java.base/java.lang.
at java.base/java.lang.

```
35
36 class FetchJeepTest {
37     String DB_URL = "jdbc:mysql://localhost:3306/";
38     String USER = "root";
39     String PASS = "root";
40
41     @Autowired
42     @Getter
43     private TestRestTemplate restTemplate;
44     @LocalServerPort
45     private int serverPort;
46     JeepModel model = JeepModel.WRANGLER;
47     String trim = "Sport";
48     String uri = String.format
49         ("http://localhost:%d/jeeps?model=%s&trim=%s", serverPort
50
51     @Test
52     void testThatJeepsAreReturnedWhenAValidModelAndTrimAreSupplie
53         JeepModel model = JeepModel.WRANGLER;
54         String trim = "Sport";
55         String uri = String.format
56             ("http://localhost:%d/jeeps?model=%s&trim=%s", serverPo
57
58         ResponseEntity<List<Jeep>> response =
59             restTemplate.exchange(uri, HttpMethod.GET, null, new Pa
60
61         restTemplate.getForEntity(uri, Jeep.class);
62         // HTTP Code = 200 = OK
63         assertThat(response.getStatusCode()).isEqualTo(HttpStatus.O
64         // Test if Expected and Actual List are the same.
65         List<Jeep> expected = buildExpected();
66         assertThat(response.getBody()).isEqualTo(expected);
67     }
68
69     protected List<Jeep> buildExpected(){
70         List<Jeep> list = new LinkedList<>();
71
72         // @formatter:off
73         list.add(Jeep.builder()
74             .modelId(JeepModel.WRANGLER)
75             .trimLevel("Sport")
76             .numDoors(2)
77             .wheelSize(17)
78             .basePrice(new BigDecimal("28475.00"))
79             .build());
80
81         list.add(Jeep.builder()
82             .modelId(JeepModel.WRANGLER)
83             .trimLevel("Sport")
84             .numDoors(4)
85             .wheelSize(17)
86             .basePrice(new BigDecimal("31975.00"))
87             .build());
88         // @formatter:on
89
90         return list;
91     }
92 }
```

(#7) Jeep Service Test



(#10) Application.yml & Functioning Program



URL to GitHub Repository:

<https://github.com/JDu8Du8/CSN-BE-Week14-CHW>