


# 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
<b>Model ID</b>	WRANGLER	WRANGLER
<b>Trim Level</b>	Sport	Sport
<b>Num Doors</b>	2	4
<b>Wheel Size</b>	17	17
<b>Base Price</b>	\$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:

#### Step 5)

```
private List<Jeep> buildExpected() {
    List<Jeep> jeeps = new LinkedList<Jeep>();

    // @formatter:off
    jeeps.add(Jeep.builder()
        .model(JeepModel.WRANGLER)
        .trimLevel("Sport")
        .numDoors(2)
        .wheelSize(17)
        .basePrice(new BigDecimal("28475.00"))
        .build());

    jeeps.add(Jeep.builder()
        .model(JeepModel.WRANGLER)
        .trimLevel("Sport")
        .numDoors(4)
        .wheelSize(17)
        .basePrice(new BigDecimal("31975.00"))
        .build());
    // @formatter:on

    return jeeps;
}
```

## Step 6)

```
@Test
void testThatJeepsAreReturnedWhenAValidModelAndTrimAreSupplied() {
    // Given: a model and trim and REST URI
    JeepModel model = JeepModel.WRANGLER;
    String trim = "Sport";
    String uri = String.format(
        "http://localhost:%d/jeeps?model=%s&trim=%s", serverPort, model, trim);

    // When: an HTTP (REST) request is sent to the service
    ResponseEntity<List<Jeep>> response =
        restTemplate.exchange(
            uri, HttpMethod.GET, null, new ParameterizedTypeReference<>() {});

    // Then: the response status is 200 (OK)
    assertThat(response.getStatusCode()).isEqualTo(HttpStatus.OK);

    // And: the returned Jeep objects are what I expected
    assertThat(response.getBody()).isEqualTo(buildExpected());
}
```

## Step 7)

```
package com.promineotech.jeep.service;

import java.util.List;

public interface JeepSalesService {

    List<Jeep> fetchJeeps(JeepModel model, String trim);

}
```

```
package com.promineotech.jeep.service;

import java.util.List;

@Service
@Slf4j
public class DefaultJeepSalesService implements JeepSalesService {

    @Override
    public List<Jeep> fetchJeeps(JeepModel model, String trim) {
        log.info("Service: model={}, trim={}", model, trim);
        return null;
    }

}
```

```

package com.promineotech.jee.controller;

import java.util.List;

@RestController
@Slf4j
public class DefaultJeepSalesController implements JeepSalesController {

    @Autowired
    private JeepSalesService jeepSalesService;

    @Override
    public List<Jeep> fetchJeeps(JeepModel model, String trim) {
        log.info("Controller: model={}, trim={}", model, trim);
        return jeepSalesService.fetchJeeps(model, trim);
    }
}

```

## Screenshots of Running Application:

### Step 2)

```

jeep-sales - JeepSales [Spring Boot App] /Library/Java/JavaVirtualMachines/amazon-corretto-11.jdk/Contents/Home/bin/java (Jan
in] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8080 (http)
in] o.apache.catalina.core.StandardService : Starting service [Tomcat]
in] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.56]
in] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
in] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed
in] o.s.b.d.a.OptionalLiveReloadServer : LiveReload server is running on port 35729
in] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8080 (http) with context path=/
in] com.promineotech.jee.JeeSales : Started JeepSales in 10.942 seconds (JVM running for 12.111s)
-3] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring DispatcherServlet 'dispatcherServlet'
-3] o.s.web.servlet.DispatcherServlet : Initializing Servlet 'dispatcherServlet'
-3] o.s.web.servlet.DispatcherServlet : Completed initialization in 3 ms
-5] o.springdoc.api.AbstractOpenApiResource : Init duration for springdoc-openapi is: 540 ms
-6] c.p.j.c.DefaultJeepSalesController : Controller: model=GRAND_CHEROKEE, trim=Sahara

```

### Step 3)

## 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
model string (query)	The model name (i.e., 'WRANGLER') <div>GRAND_CHEROKEE</div>
trim string (query)	The trim level (i.e., 'Sport') <div>Sahara</div>

Execute

Clear

Responses

Curl

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

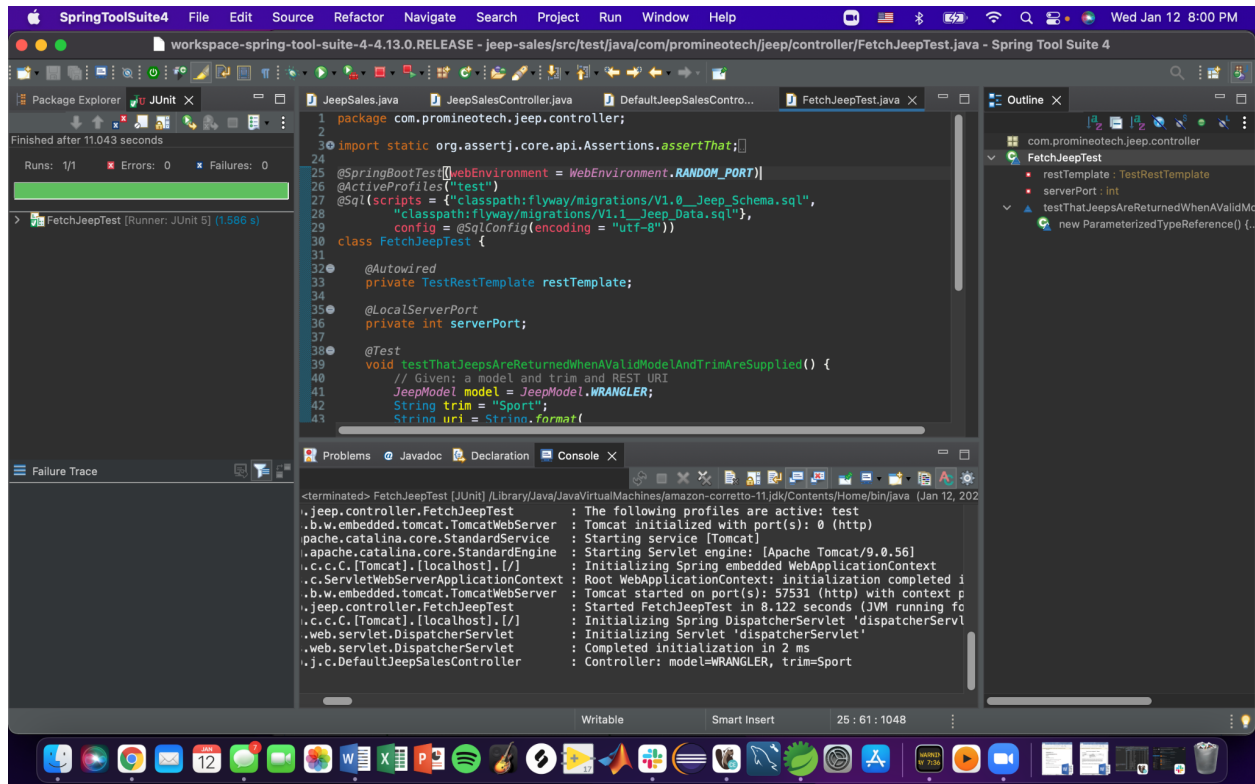
Request URL

```
http://localhost:8080/jeeps?model=GRAND_CHEROKEE&trim=Sahara
```

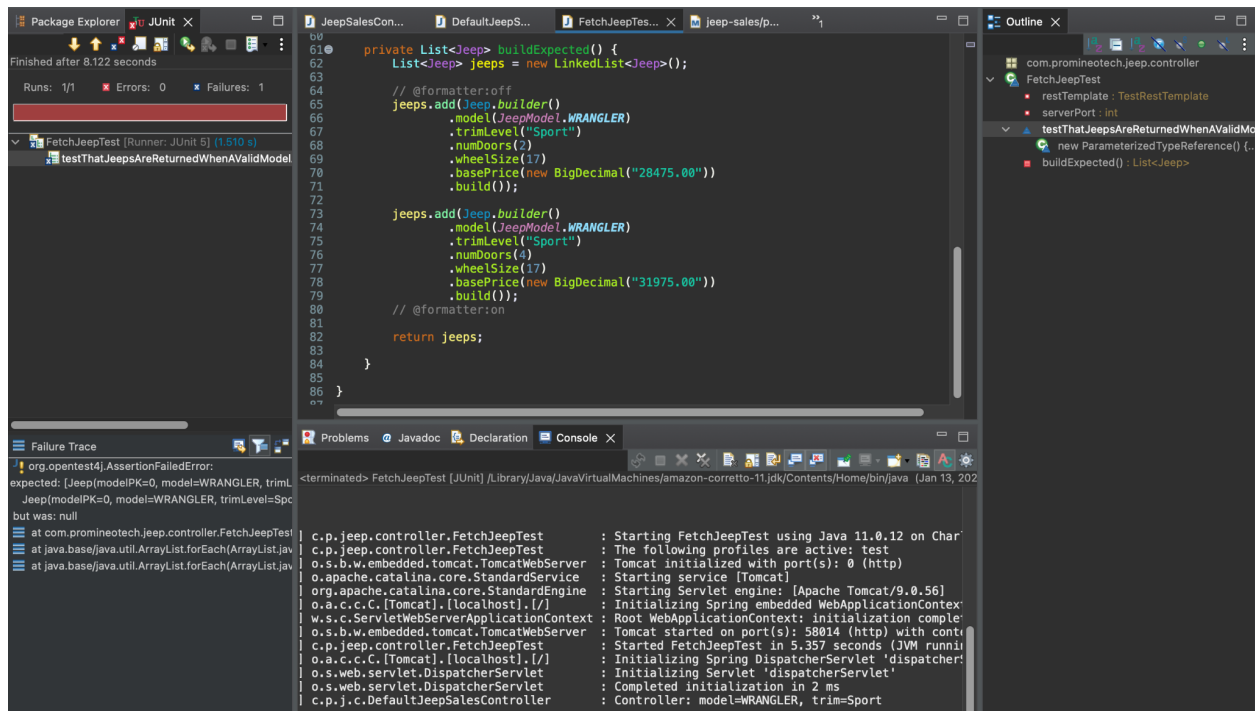
Server response

Code	Details
200	<div>Response headers<div>connection: keep-alive content-length: 0 date: Thu, 13 Jan 2022 02:57:29 GMT keep-alive: timeout=60</div></div>

## Step 4)

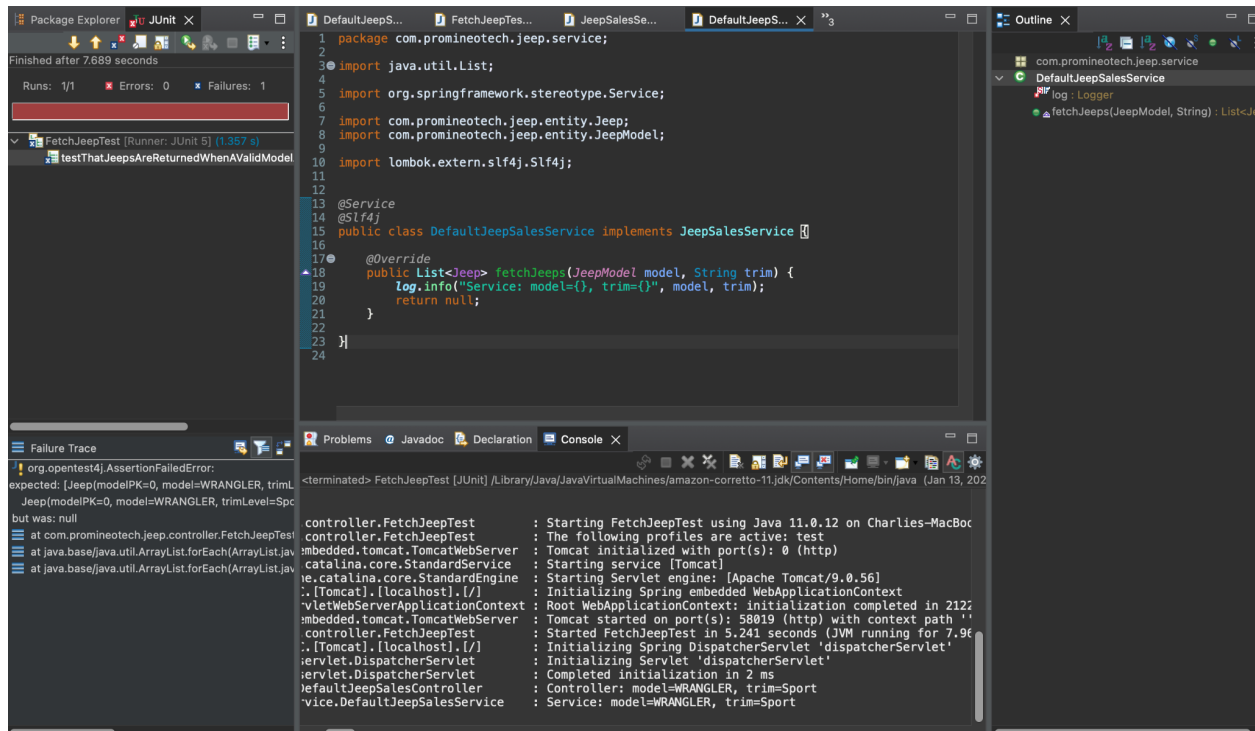


## Step 6)

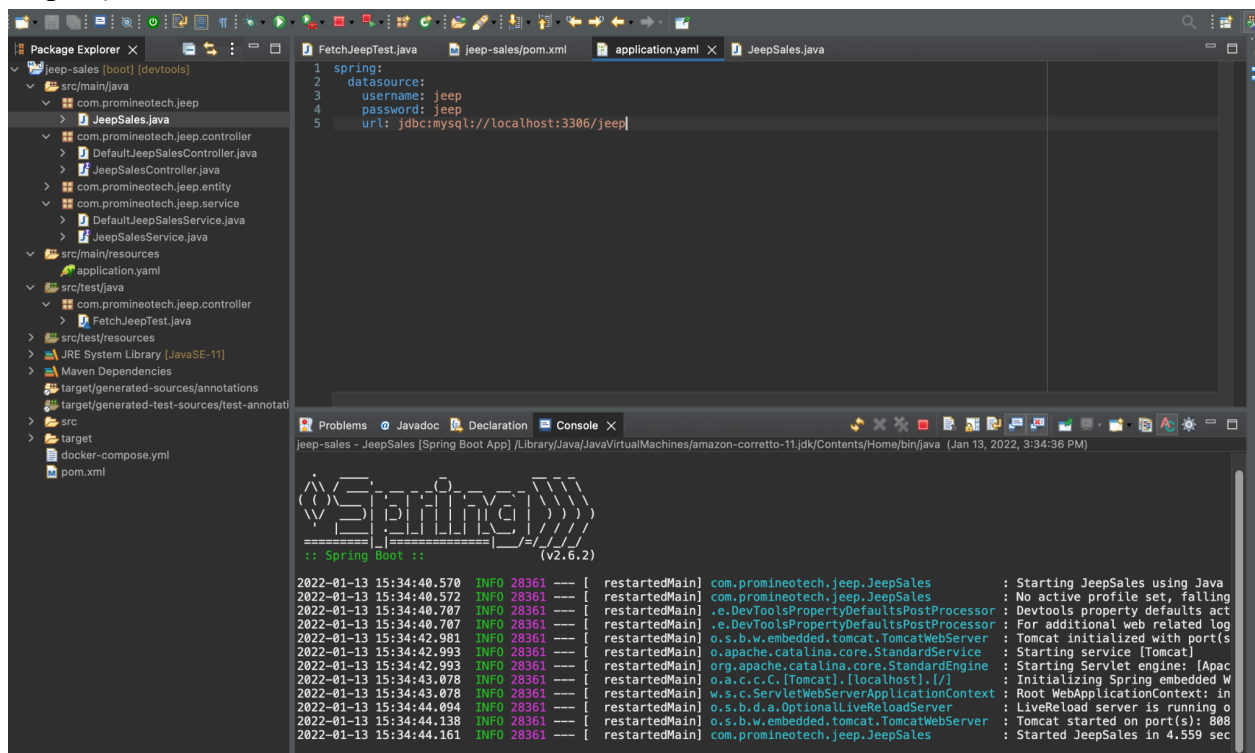




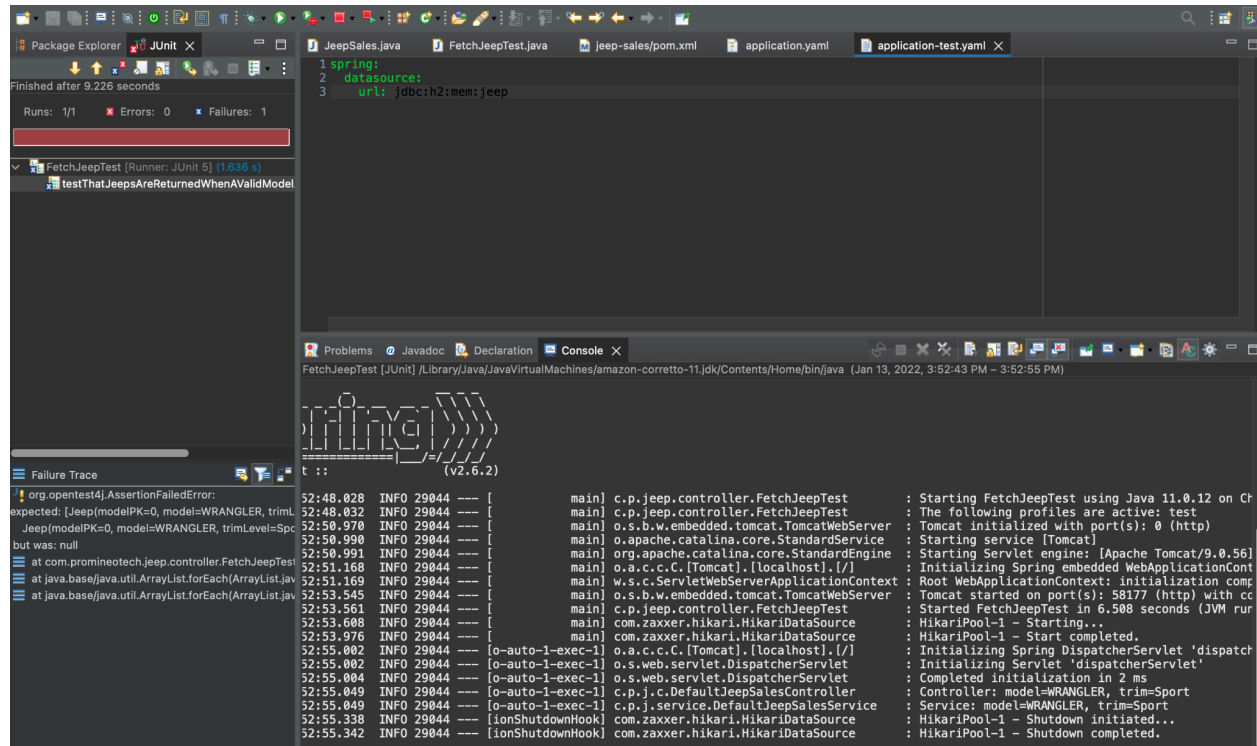
## Step 7)



## Step 10)



## Step 12)



The screenshot shows an IDE with the following components:

- Package Explorer:** Shows the project structure with files like `JeepSales.java`, `FetchJeepTest.java`, `jeep-sales/pom.xml`, `application.yml`, and `application-test.yml`.
- JUnit Runner:** Shows the test `FetchJeepTest` with a failure trace.
- Console:** Displays the application logs and test output.

**Failure Trace:**

```
org.opentest4j.AssertionFailedError:
expected: [Jeep(modelPK=0, model=WRANGLER, trim=
Jeep(modelPK=0, model=WRANGLER, trimLevel=Spc
but was: null
at com.promineotech.jeepp.controller.FetchJeepTest
at java.base/java.util.ArrayList.forEach(ArrayList.jav
at java.base/java.util.ArrayList.forEach(ArrayList.jav
```

**Console Output:**

```
52:48.028 INFO 29044 --- [main] c.p.jeepp.controller.FetchJeepTest : Starting FetchJeepTest using Java 11.0.12 on CP
52:48.032 INFO 29044 --- [main] c.p.jeepp.controller.FetchJeepTest : The following profiles are active: test
52:50.970 INFO 29044 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 0 (http)
52:50.990 INFO 29044 --- [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
52:50.991 INFO 29044 --- [main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.56]
52:51.168 INFO 29044 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationCont
52:51.169 INFO 29044 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization comp
52:53.545 INFO 29044 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 58177 (http) with cc
52:53.561 INFO 29044 --- [main] c.p.jeepp.controller.FetchJeepTest : Started FetchJeepTest in 6.508 seconds (JVM run
52:53.608 INFO 29044 --- [main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Starting...
52:53.976 INFO 29044 --- [main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Start completed.
52:55.002 INFO 29044 --- [o-auto-1-exec-1] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring DispatcherServlet 'dispatch
52:55.002 INFO 29044 --- [o-auto-1-exec-1] o.s.web.servlet.DispatcherServlet : Initializing Servlet 'dispatcherServlet'
52:55.004 INFO 29044 --- [o-auto-1-exec-1] o.s.web.servlet.DispatcherServlet : Completed initialization in 2 ms
52:55.049 INFO 29044 --- [o-auto-1-exec-1] c.p.j.c.DefaultJeepSalesController : Controller: model=WRANGLER, trim=Sport
52:55.049 INFO 29044 --- [o-auto-1-exec-1] c.p.j.service.DefaultJeepSalesService : Service: model=WRANGLER, trim=Sport
52:55.338 INFO 29044 --- [ionShutdownHook] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Shutdown initiated...
52:55.342 INFO 29044 --- [ionShutdownHook] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Shutdown completed.
```

URL to GitHub Repository:

<https://github.com/DukesGuy/SpringBoot>