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, nagivate 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:

FetchJeepTe... | FetchJeepTe... | BaseTest.java | JeepSales.java | DefaultJeep... | JeepSalesCon... | JeepSalesSe...

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

import java.util.List;

public interface JeepSalesService {

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

}
```

```java
      parameters = {

          @Parameter(
              name = "model",
              allowEmptyValue = false,
              required = false,
              description = "The model name (i.e., 'Wrangler')"),

          @Parameter(
              name = "trim",
              allowEmptyValue = false,
              required = false, description = "The trim level (i.e., 'sport')")})


  @GetMapping
  @ResponseStatus(code = HttpStatus.OK)
  List<Jeep> fetchJeeps(
      @RequestParam JeepModel model,
      @RequestParam String trim);
  // @formatter: on
}
```

FetchJeepTe... FetchJeepTe... BaseTest.java JeepSales.java DefaultJeep... JeepSalesCon... JeepSalesS

```java
package com.promineotech.jeep.controller;

import java.util.List;

@RequestMapping("/jeeps")
  @OpenAPIDefinition(info = @Info(title = "jeep Sales Service"),
    servers = {@Serve                                    8080", description = "Local server.")})

public interface JeepSalesController {
  // @formatter: off
  @Operation(
      summary = "Returns a list of Jeeps",
      description = "Returns a list of Jeeps given an optional model and/or trim",
      responses = {
          @ApiResponse(
              responseCode = "200",
              description = "A list of Jeeps is returned",
              content = @Content(
              mediaType = "application/json",
              schema = @Schema(implementation = Jeep.class ))),
          @ApiResponse(
              responseCode = "400",
              description = "The request parameters are invalid",
              content = @Content(mediaType = "application/json")),
          @ApiResponse(
              responseCode = "404",
              description = "No Jeeps were found with the input criteria",
              content = @Content(mediaType = "application/json")),
          @ApiResponse(
              responseCode = "500",
              description = "An unplanned error occurred",
              content = @Content(mediaType = "application/json"))
      },
```

Info info() default @Info;
Press 'F2' for focus

FetchJeepTe... FetchJeepTe... BaseTest.java JeepSales.java DefaultJeep... JeepSalesCon... JeepS

```java
package com.promineotech.jeep.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.debug("model={}, trim={}", model, trim);
    return jeepSalesService.fetchJeeps(model, trim);
  }

}
```

FetchJeepTe... FetchJeepTe... BaseTest.java JeepSales.java DefaultJeep... JeepSalesCon... Je

```java
package com.promineotech.jeep;

import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication(scanBasePackageClasses = { ComponentScanMarker.class})

public class JeepSales implements CommandLineRunner{

  public static void main(String[] args) {
    SpringApplication.run(JeepSales.class, args);

    }

  @Override
  public void run(String... args) throws Exception {
    }

}
```

FetchJeepTe... FetchJeepTe... BaseTest.java JeepSales.java DefaultJeep... JeepSalesCon... JeepSalesSe...

```java
package com.promineotech.jeep.controller.support;

import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.boot.test.web.client.TestRestTemplate;
import org.springframework.boot.test.web.server.LocalServerPort;
import lombok.Getter;

public class BaseTest {
  @LocalServerPort
  private int serverPort;

  @Autowired
  @Getter
  private TestRestTemplate restTemplate;

  protected String getBaseUri() {
    return String.format("http://localhost:%d/jeeps", serverPort);
  }

}
```

FetchJeepTe... | FetchJeepTe... | BaseTest.java | JeepSales.java | DefaultJeep... | JeepSalesCon... | JeepSalesSe...

```java
package com.promineotech.jeep.controller.support;

import java.math.BigDecimal;

public class FetchJeepTestSupport extends BaseTest {
protected List<Jeep> buildExpected() {
  List<Jeep> list = new LinkedList<>();
    // @formatter:off
    list.add(Jeep.builder()
        .modelId(JeepModel.WRANGLER)
        .trimLevel("Sport")
        .numDoors(2)
        .wheelSize(17)
        .basePrice(new BigDecimal("28475.00"))
        .build());

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

    return list;
  }
}
```

```java
        getRestTemplate().exchange(uri, HttpMethod.GET, null,
            new ParameterizedTypeReference<>() {});
       // HttpMethod.GET, null, new ParameterizedTypeReference<>(){});

    //Then: a success (OK - 200) status code is returned
    assertThat(response.getStatusCode()).isEqualTo(HttpStatus.OK);
    // And: the actual list returned is the same as the expected list
    List<Jeep> expected = buildExpected();
    assertThat(response.getBody()).isEqualTo(expected);
  }

  protected List<Jeep> buildExpected() {

      return null;

  }



}
```

FetchJeepTe... | FetchJeepTe... | BaseTest.java | JeepSales.java | DefaultJeep... | JeepSalesCon... | JeepSalesSe... | De

```java
package com.promineotech.jeep.controller;

import static org.assertj.core.api.Assertions.assertThat;


@SpringBootTest(webEnvironment = WebEnvironment.RANDOM_PORT)
@ActiveProfiles("test")
@Sql(scripts = {
    "classpath:flyway/migrations/V1.0__Jeep_Schema.sql",
    "classpath:flyway/migrations/V1.1__Jeep_Data.sql"},
    config = @SqlConfig(encoding = "utf-8"))

class FetchJeepTest {

@Autowired
@Getter
private TestRestTemplate restTemplate;

@LocalServerPort
private int serverPort;


  @Test
  void testThatJeepsAreReturnedWhenAvalidModelAndTrimAreSupplied() {

    //Given: a valid model, trim and URI
    JeepModel model = JeepModel.WRANGLER;
    String trim = "Sport";
    String uri = String.format("http://localhost:%d/jeeps?model=%s&trim=%s", serverPort, model, trim);

    //When: a connection is made to the URI

    ResponseEntity<List<Jeep>> response =
        getRestTemplate().exchange(uri, HttpMethod.GET, null,
```

FetchJeepTest.j... | FetchJeepTestS... | BaseTest.java | JeepSales.java | DefaultJeepSale... | JeepSalesContro...

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

logging:
  level:
    root: warn
    '[com.promineotech]': debug
```

FetchJeepTe... FetchJeepTe... BaseTest.java JeepSales.java DefaultJeep... JeepSalesCon... JeepSalesSe...

```
spring:
  datasource:
    url: jdbc:h2:mem:jeep;mode=MYSQL
logging:
  level:
   root: warn
   '[com.promineotech]': debug

```

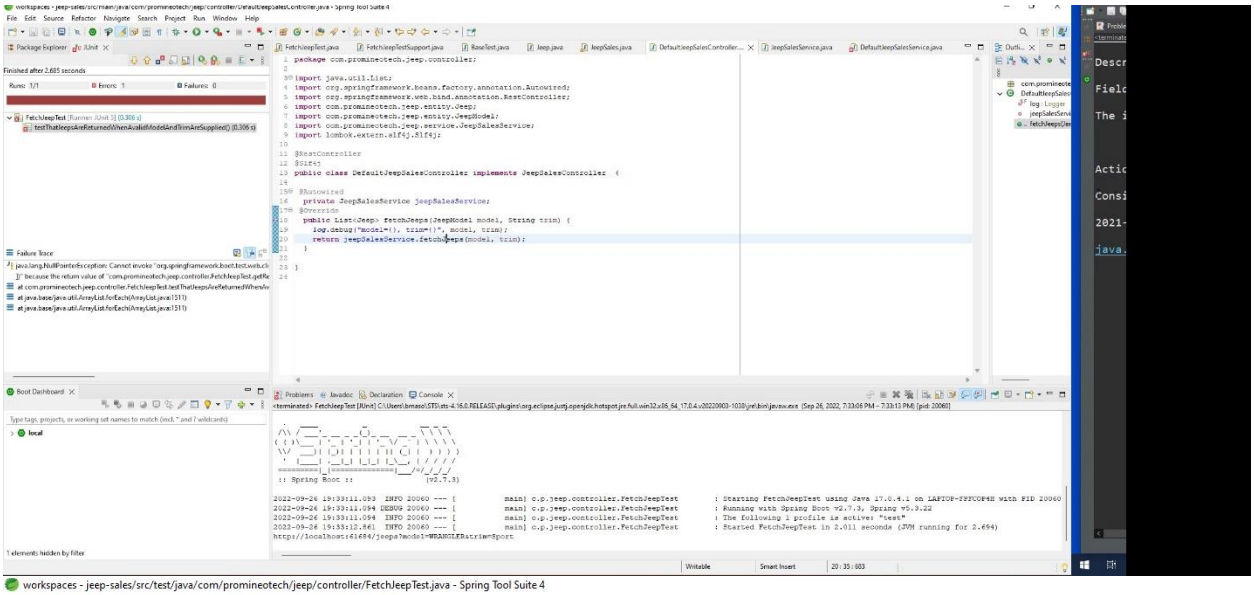
FetchJeepTe... FetchJeepTe... BaseTest.java JeepSales.java DefaultJeep... JeepSalesCon... JeepSalesSe...

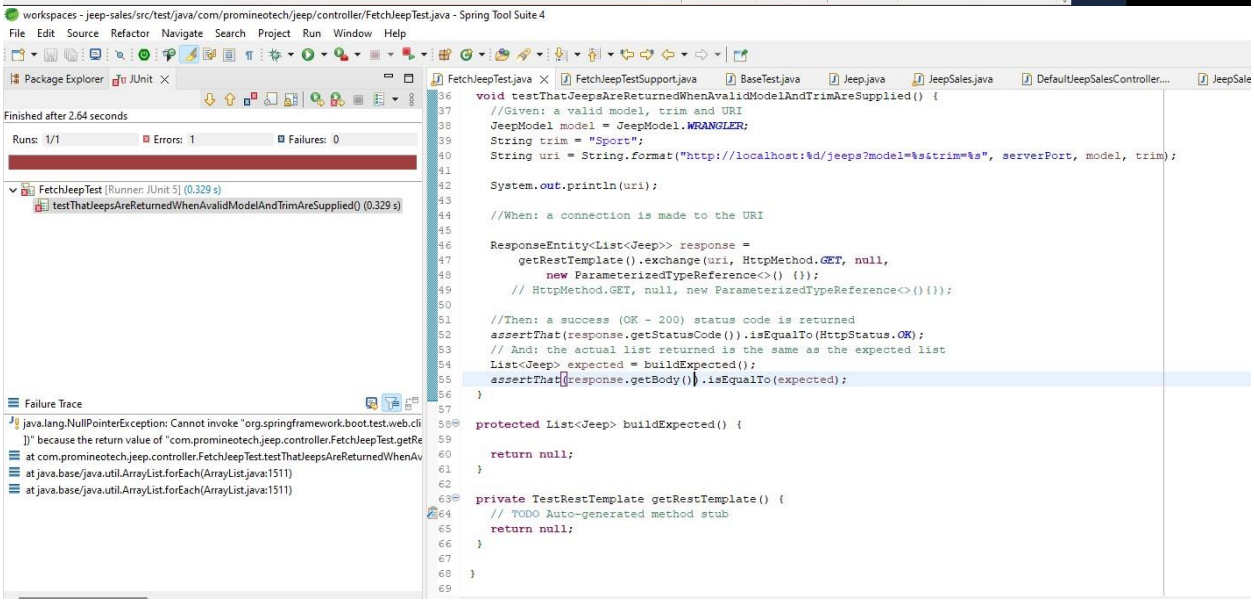
```
package com.promineotech;

public interface ComponentScanMarker {

}

```

FetchJeepTe... FetchJeepTe... BaseTest.java JeepSales.java DefaultJeep... JeepSalesCon... JeepSalesSe...

```
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("The fetchJeeps method was called with model={} and trim={}", model, trim);

    return null;
  }

}

```

Screenshots of Running Application:





FetchJeepTe... DefaultJeep... application.... application-... 7

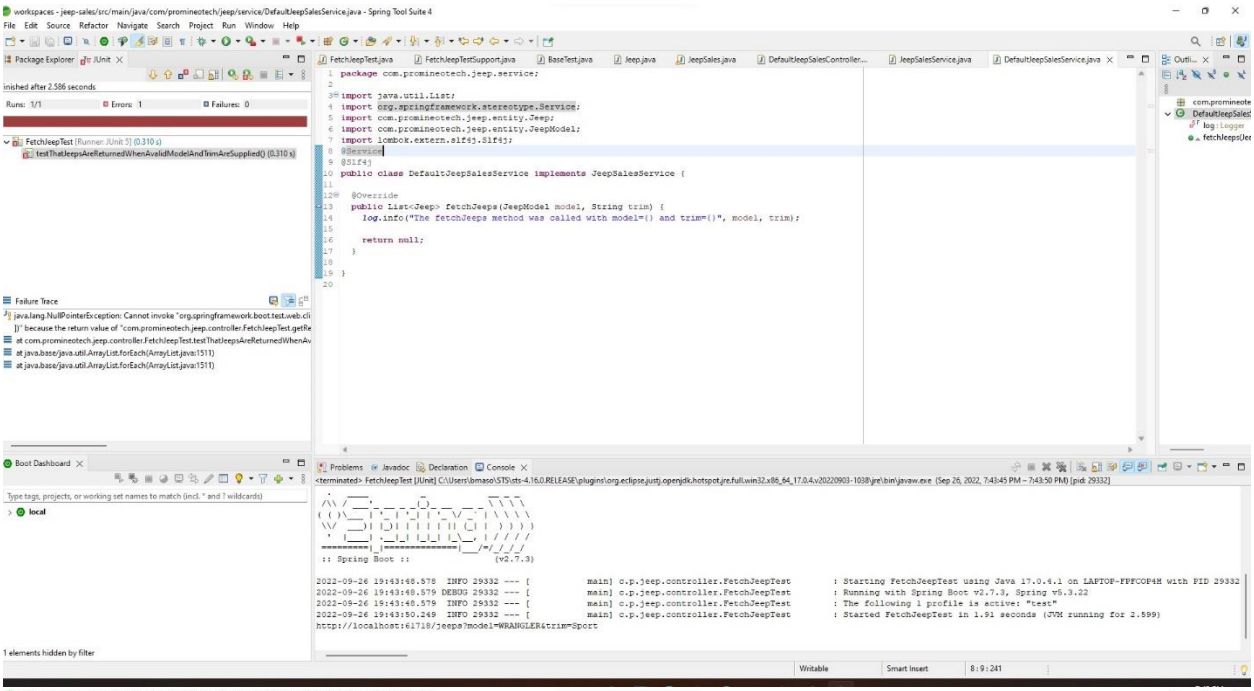
```
spring:
  datasource:
    url: jdbc:h2:mem:jeep
logging:
  level:
   root: warn
   '[com.promineotech]': debug

```

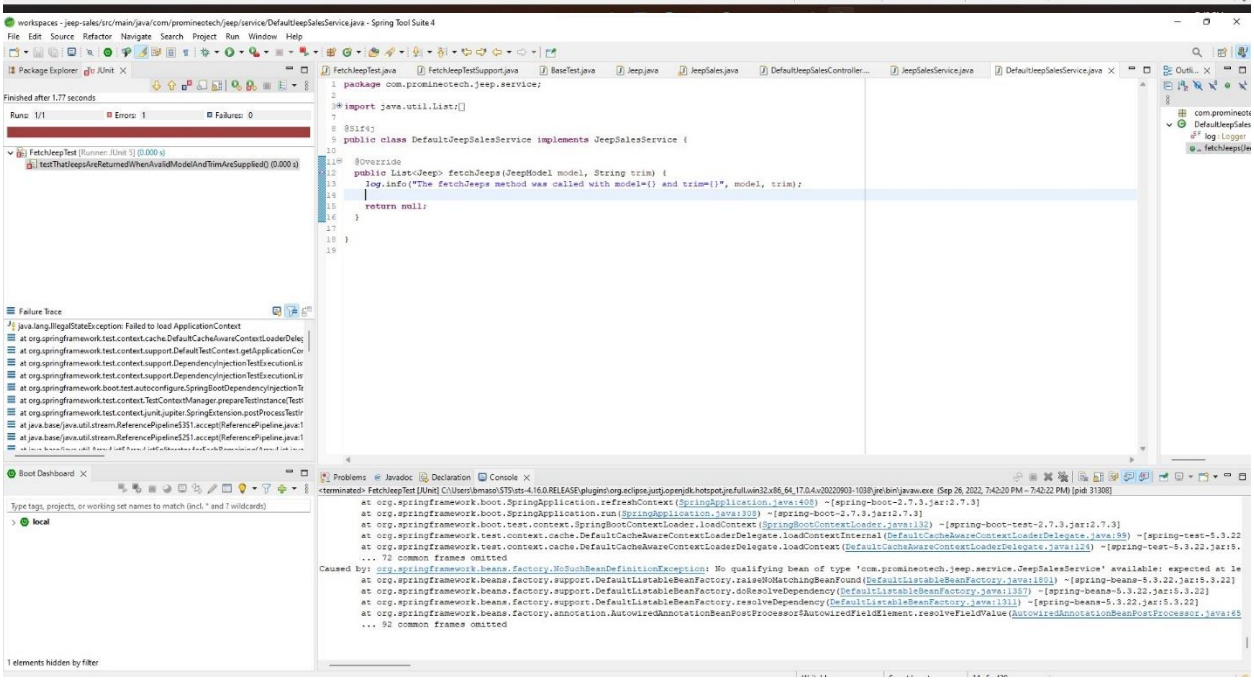
```yaml
spring:
  datasource:
   password: jeep
   username: jeep
   url: jdbc:mysql://localhost:3306/jeep

logging:
  level:
   root: warn
   '[com.promineotech]': debug
```

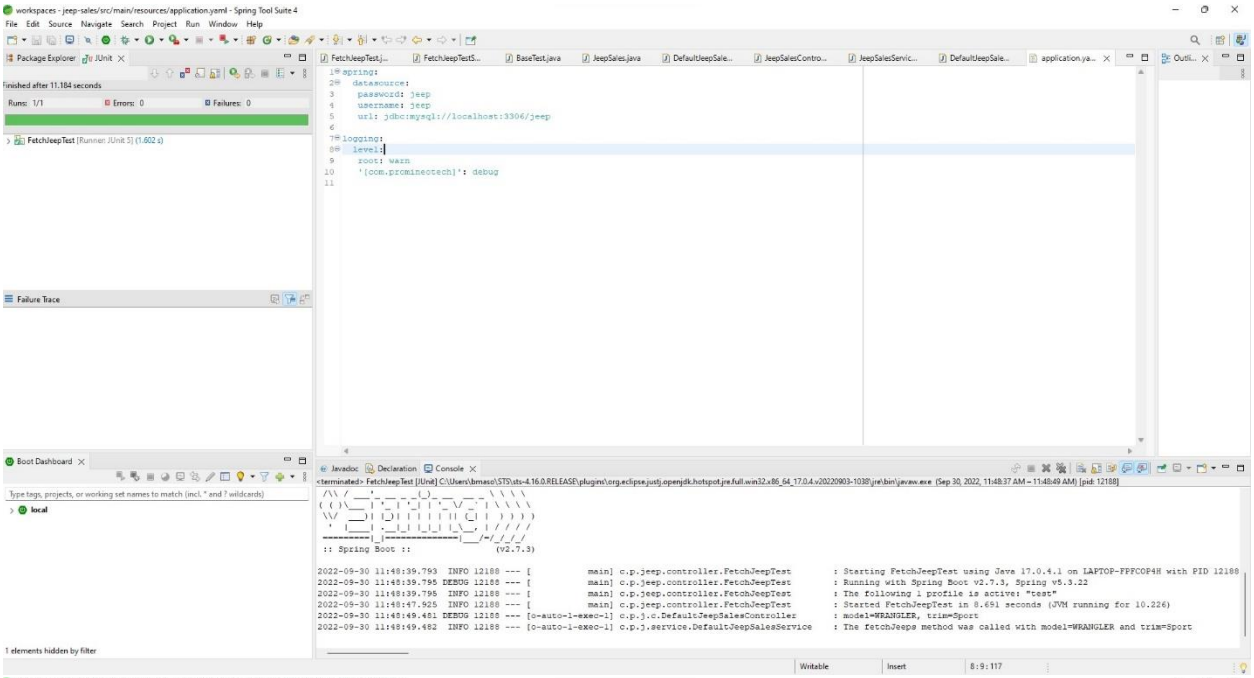
Problems @ Javadoc Declaration Console

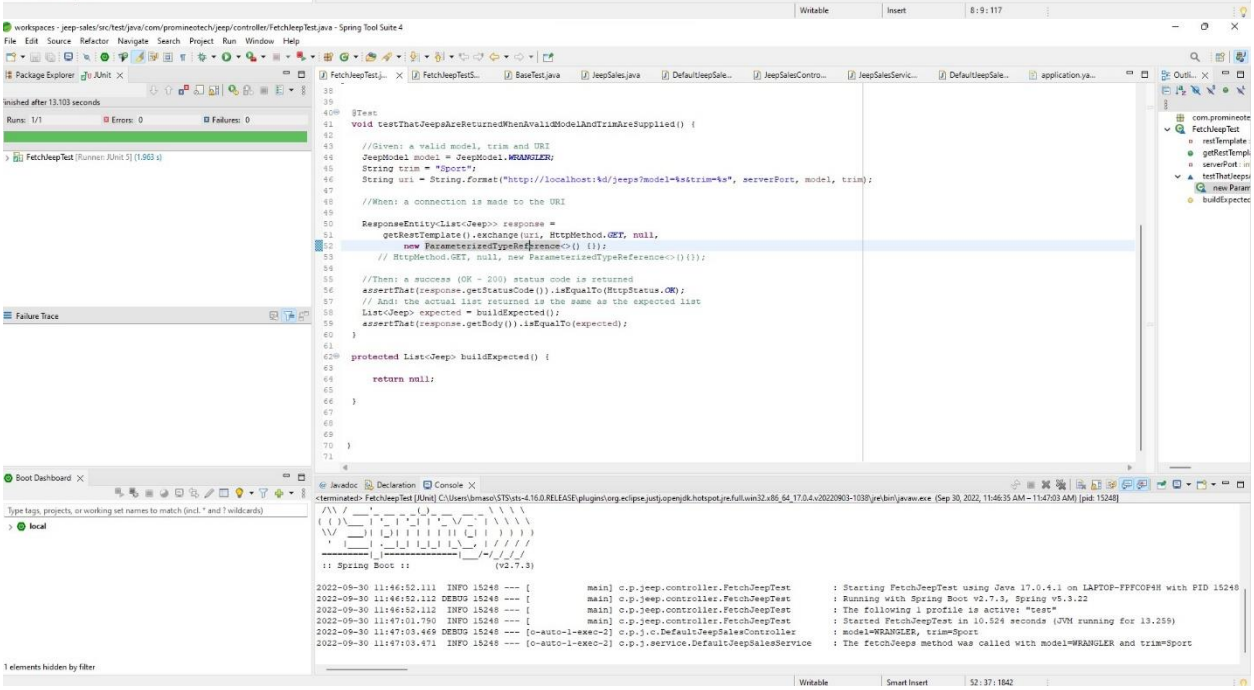
<terminated> FetchJeepTest [JUnit] C:\Users\bmaso\STS\sts-4.16.0.RELEASE\plugins\org.eclipse.justj.openjdk

```
        at org.eclipse.jdt.internal.junit.runner.RemoteTestRunner.main(R
Caused by: java.io.FileNotFoundException: class path resource [flyway/mi
        at org.springframework.core.io.ClassPathResource.getInputStream
        at org.springframework.core.io.support.EncodedResource.getReader
        at org.springframework.jdbc.datasource.init.ScriptUtils.readScri
        at org.springframework.jdbc.datasource.init.ScriptUtils.executeS
        ... 68 common frames omitted
```


workspaces - jeep-sales/src/main/java/com/promineotech/jeep/service/DefaultJeepSalesService.java - Spring Tool Suite 4
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer JUnit
inished after 2.586 seconds
Runs: 1/1 Errors: 1 Failures: 0
FetchJeepTest [Runner: JUnit 5] (0.310 s)
testThatJeepsAreReturnedWhenAvalidModelAndTrimAreSupplied() (0.310 s)
Failure Trace
java.lang.NullPointerException: Cannot invoke "org.springframework.boot.test.web.cli
])" because the return value of "com.promineotech.jeep.controller.FetchJeepTest.getRe
at com.promineotech.jeep.controller.FetchJeepTest.testThatJeepsAreReturnedWhenAv
at java.base/java.util.ArrayList.forEach(ArrayList.java:1511)
at java.base/java.util.ArrayList.forEach(ArrayList.java:1511)
FetchJeepTest.java
FetchJeepTestSupport.java
BaseTest.java
Jeep.java
JeepSales.java
DefaultJeepSalesController....
JeepSalesService.java
DefaultJeepSalesService.java
1 package com.promineotech.jeep.service;
2
3 import java.util.List;
4 import org.springframework.stereotype.Service;
5 import com.promineotech.jeep.entity.Jeep;
6 import com.promineotech.jeep.entity.JeepModel;
7 import lombok.extern.slf4j.Slf4j;
8 @Service
9 @Slf4j
10 public class DefaultJeepSalesService implements JeepSalesService {
11
12 @Override
13 public List<Jeep> fetchJeeps(JeepModel model, String trim) {
14 log.info("The fetchJeeps method was called with model={} and trim={}", model, trim);
15
16 return null;
17 }
18
19 }
20
Boot Dashboard
Type tags, projects, or working set names to match (incl. * and ? wildcards)
local
1 elements hidden by filter
Problems Javadoc Declaration Console
<terminated> FetchJeepTest [JUnit] C:\Users\bmaso\STS\sts-4.16.0.RELEASE\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.4.v20220903-1038\jre\bin\javaw.exe (Sep 26, 2022, 7:43:45 PM – 7:43:50 PM) [pid: 29332]
:: Spring Boot :: (v2.7.3)
2022-09-26 19:43:48.578 INFO 29332 --- [main] c.p.jeep.controller.FetchJeepTest : Starting FetchJeepTest using Java 17.0.4.1 on LAPTOP-FPFCOP4H with PID 29332
2022-09-26 19:43:48.579 DEBUG 29332 --- [main] c.p.jeep.controller.FetchJeepTest : Running with Spring Boot v2.7.3, Spring v5.3.22
2022-09-26 19:43:48.579 INFO 29332 --- [main] c.p.jeep.controller.FetchJeepTest : The following 1 profile is active: "test"
2022-09-26 19:43:50.249 INFO 29332 --- [main] c.p.jeep.controller.FetchJeepTest : Started FetchJeepTest in 1.91 seconds (JVM running for 2.599)
http://localhost:61718/jeeps?model=WRANGLER&trim=Sport
Writable
Smart Insert
8 : 9 : 241


workspaces - jeep-sales/src/main/java/com/promineotech/jeep/service/DefaultJeepSalesService.java - Spring Tool Suite 4
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer JUnit
Finished after 1.77 seconds
Runs: 1/1 Errors: 1 Failures: 0
FetchJeepTest [Runner: JUnit 5] (0.000 s)
testThatJeepsAreReturnedWhenAvalidModelAndTrimAreSupplied() (0.000 s)
Failure Trace
java.lang.IllegalStateException: Failed to load ApplicationContext
at org.springframework.test.context.cache.DefaultCacheAwareContextLoaderDeleg
at org.springframework.test.context.support.DefaultTestContext.getApplicationCon
at org.springframework.test.context.support.DependencyInjectionTestExecutionLis
at org.springframework.test.context.support.DependencyInjectionTestExecutionLis
at org.springframework.boot.test.autoconfigure.SpringBootDependencyInjectionTe
at org.springframework.test.context.TestContextManager.prepareTestInstance(Test
at org.springframework.test.context.junit.jupiter.SpringExtension.postProcessTestIn
at java.base/java.util.stream.ReferencePipeline$3$1.accept(ReferencePipeline.java:1
at java.base/java.util.stream.ReferencePipeline$2$1.accept(ReferencePipeline.java:1
FetchJeepTest.java
FetchJeepTestSupport.java
BaseTest.java
Jeep.java
JeepSales.java
DefaultJeepSalesController....
JeepSalesService.java
DefaultJeepSalesService.java
1 package com.promineotech.jeep.service;
2
3 import java.util.List;
7
8 @Slf4j
9 public class DefaultJeepSalesService implements JeepSalesService {
10
11 @Override
12 public List<Jeep> fetchJeeps(JeepModel model, String trim) {
13 log.info("The fetchJeeps method was called with model={} and trim={}", model, trim);
14
15 return null;
16 }
17
18 }
19
Boot Dashboard
Type tags, projects, or working set names to match (incl. * and ? wildcards)
local
1 elements hidden by filter
Problems Javadoc Declaration Console
<terminated> FetchJeepTest [JUnit] C:\Users\bmaso\STS\sts-4.16.0.RELEASE\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.4.v20220903-1038\jre\bin\javaw.exe (Sep 26, 2022, 7:42:20 PM – 7:42:22 PM) [pid: 31308]
at org.springframework.boot.SpringApplication.refreshContext(SpringApplication.java:408) ~[spring-boot-2.7.3.jar:2.7.3]
at org.springframework.boot.SpringApplication.run(SpringApplication.java:308) ~[spring-boot-2.7.3.jar:2.7.3]
at org.springframework.boot.test.context.SpringBootContextLoader.loadContext(SpringBootContextLoader.java:132) ~[spring-boot-test-2.7.3.jar:2.7.3]
at org.springframework.test.context.cache.DefaultCacheAwareContextLoaderDelegate.loadContextInternal(DefaultCacheAwareContextLoaderDelegate.java:99) ~[spring-test-5.3.22
at org.springframework.test.context.cache.DefaultCacheAwareContextLoaderDelegate.loadContext(DefaultCacheAwareContextLoaderDelegate.java:124) ~[spring-test-5.3.22.jar:5.
... 72 common frames omitted
Caused by: org.springframework.beans.factory.NoSuchBeanDefinitionException: No qualifying bean of type 'com.promineotech.jeep.service.JeepSalesService' available: expected at le
at org.springframework.beans.factory.support.DefaultListableBeanFactory.raiseNoMatchingBeanFound(DefaultListableBeanFactory.java:1801) ~[spring-beans-5.3.22.jar:5.3.22]
at org.springframework.beans.factory.support.DefaultListableBeanFactory.doResolveDependency(DefaultListableBeanFactory.java:1357) ~[spring-beans-5.3.22.jar:5.3.22]
at org.springframework.beans.factory.support.DefaultListableBeanFactory.resolveDependency(DefaultListableBeanFactory.java:1311) ~[spring-beans-5.3.22.jar:5.3.22]
at org.springframework.beans.factory.annotation.AutowiredAnnotationBeanPostProcessor$AutowiredFieldElement.resolveFieldValue(AutowiredAnnotationBeanPostProcessor.java:65
... 92 common frames omitted





URL to GitHub Repository:

https://github.com/bmason1969/week-14.git