

Web API Design with Spring Boot Week 13 Coding Assignment


Points possible: 75

URL to GitHub Repository: <https://github.com/McKinney93/SpringBoot.git>


URL to Public Link of your Video: <https://youtu.be/hIE15VfzW4E>

Instructions :

1. Follow the **Coding Steps** below to complete this assignment.

- In Spring Tool Suite (STS), or an IDE of your choice, write the code that accomplishes the objectives listed below. Ensure that the code compiles and runs as directed.
- Create a new repository on GitHub for this week's assignment and push your completed code to this dedicated repo, including your entire Maven Project Directory (e.g., jeep-sales) and any additional files (e.g. .sql files) that you create. In addition, screenshot your ERD and push the screenshot to your GitHub repo.
- Include the screenshots into this Assignment Document indicated by: 
- Create a video showcasing your work:
 - In this video: record and present your project verbally while showing the results of the working project.
 - Easy way to Create a video: Start a meeting in Zoom, share your screen, open Eclipse with the code and your Console window, start recording & record yourself describing and running the program showing the results.
 - Your video should be a maximum of 5 minutes.
 - Upload your video with a public link.
 - Easy way to Create a Public Video Link: Upload your video recording to YouTube with a public link.


2. In addition, please include the following in your Coding Assignment Document:

- The requested screenshots, indicated by: 
- The URL for this week's GitHub repository.
- The URL of the public link of your video.

3. Save the Coding Assignment Document as a .pdf and do the following:

- Push the .pdf to the GitHub repo for this week.
 - Upload the .pdf to the LMS in your Coding Assignment Submission.
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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.

Here's a hint: make sure you are running a version of Java that is 11+. To get the version, open a Windows Command Prompt window or a Mac Terminal window and type `java -version`. If you need to upgrade, go here: <https://docs.aws.amazon.com/corretto/latest/corretto-11-ug/downloads-list.html>. Pick the .msi installer version (Windows) or the .pkg version (Mac).

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

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Coding Steps:

- 1) Create a Maven project named `JeepSales` as described in the video.
 - a) In Spring Tool Suite, click the "File" menu. Select "New/Project...". In the popup, expand "Maven" and select "Maven Project". Click "Next".
 - b) Check "Create a simple project (skip archetype selection)". Click "Next".
 - c) Enter the following:

Group Id	<code>com.promineotech</code>
Artifact Id	<code>jeep-sales</code>

- d)
Click "Finish".

- 2) Navigate to the Spring Initializr (<https://start.spring.io/>).

- a) Confirm the following settings:

Project	Maven Project
Language	Java
Spring Boot	Select the latest stable version (not SNAPSHOT or RC)
Group	<code>com.promineotech</code>
Artifact	<code>jeep-sales</code>
Name	<code>jeep-sales</code>
Description	Jeep Sales
Package name	<code>com.promineotech</code>
Packaging	Jar
Java	11 (or whatever your version is)

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- b) Add the dependencies from the Initializr:
 - i) Web
 - ii) Devtools
 - iii) Lombok
- c) Click "Explore" at the bottom of the page.
- d) Click "Copy" to copy the pom.xml generated by the Initializr to the clipboard.
- 3) In **Spring Tool Suite**, open pom.xml (in the project root directory). Select all the text in the editor and replace it with the XML copied to the clipboard in the prior step.
- 4) Navigate to <https://mvnrepository.com/>. Search for springdoc-openapi-ui. Select the latest version and add the entry to the POM file in the <dependencies> section.
- 5) Create a package in src/main/java named com.promineotech.jeeep. In this package:
 - a) Create a Java class with a main method named JeepSales.
 - b) Add a class-level annotation: @SpringBootApplication and the import statement.
 - c) In the main() method, add a call to SpringApplication.run();. Use JeepSales.class as the first parameter, and the args parameter that was passed into the main() method as the second. The entire class should look like this:

```
package com.promineotech.jeeep;
```

```
import org.springframework.boot.SpringApplication;
```

```
import org.springframework.boot.autoconfigure.SpringBootApplication;
```

```
@SpringBootApplication
```

```
public class JeepSales {
```

```
    public static void main(String[] args) {
```

```
        SpringApplication.run(JeepSales.class, args);
```

```
    }
```

```
}
```

- 6) Refer to README.docx in the supplied project resources. Copy all files in the Files folder in the resources to your project as described in the README. **Do not copy the files in the Entity or Source folders at this time.**

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- a) Load the files that were added: right-click on the project in Package Explorer and select "Refresh".
- b) Update the project with the new POM dependencies: right-click on the project in Package Explorer, select "Maven/Update Project". When the "Update Maven Project" panel appears, click "OK".
- 7) Using the MySQL Workbench or MySQL command line client (CLI), create a database named "jeep".
- 8) Using DBeaver, or the MySQL client of choice, load the supplied .sql files (V1.0__Jeep_Schema.sql, and V1.1__Jeep_Data.sql) into the MySQL database to create the tables and populate them with data. These files are found in the project folder src/test/resources/flyway/migrations.
- 9) Create a new package in src/test/java named com.promineotech.jeep.controller. Create a Spring Boot integration test named FetchJeepTest using the techniques shown in the video.
 - a) Add the @SpringBootTest, @ActiveProfiles, and @Sql annotations as described in the video.
 - b) The class must not be public. It should have package-level access (i.e., not public, private, or protected).
 - c) The video extended FetchJeepTestSupport, but you don't need to do that for the homework. Just put everything in FetchJeepTest. It should look like this:

```
@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 {
}
```

- d) Create a test method in FetchJeepTest. The method must have the following method signature:
- e) Inject a TestRestTemplate in the test class. Name the variable restTemplate. Inject the port used in the test using the @LocalServerPort annotation. Name the variable serverPort. The variables and annotations should look like this:

```
@Autowired
```

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```
private TestRestTemplate restTemplate;
```

```
@LocalServerPort
```

```
private int serverPort;
```

- 10) Create a new package in `src/main/java` named `com.promineotech.jeeep.entity`. In that package, create an enum named `JeepModel`. Add all the jeep models from the `model_id` column in the `models` table in the database. You can use this query in dBeaver: `SELECT DISTINCT model_id FROM models`.
- 11) Create a `Jeep` class in the `com.promineotech.jeeep.entity` package. Add the columns from the `models` table into this class as instance variables. Annotate the class with the Lombok annotations `@Data`, `@Builder` (and optionally both `@NoArgsConstructor` and `@AllArgsConstructor`). Note that `modelId` should be of type `JeepModel` and `basePrice` should be of type `BigDecimal`. The class should look like this (remember to add the appropriate import statements):

```
@Data
```

```
@Builder
```

```
@NoArgsConstructor
```

```
@AllArgsConstructor
```

```
public class Jeep {  
    private Long modelPK;  
    private JeepModel modelId;  
    private String trimLevel;  
    private int numDoors;  
    private int wheelSize;  
    private BigDecimal basePrice;  
}
```

- 12) In the supplied resources, copy all files in the `Entities` folder to the `src/main/java/com/-promineotech/jeeep/entity` folder. **Do not copy anything from the Source folder at this time.**

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- 13) Back in the test method that you were writing, create local variables for `JeepModel`, `trim`, and `uri`. Set them appropriately like this:

Variable Type	Variable Name	Variable Value
JeepModel	<code>model</code>	<code>JeepModel.WRANGLER</code>
String	<code>trim</code>	<code>"Sport"</code>
String	<code>uri</code>	<code>String.format("http://localhost:%d/jeeps?model=%s&trim=%s", serverPort, model, trim);</code>

14)

- a) Send an HTTP request to the REST service that passes a `JeepModel` and trim level as URI parameters (as shown in the video). Use this method call:

```
ResponseEntity<List<Jeep>> response = restTemplate.exchange(uri,
    HttpMethod.GET, null, new ParameterizedTypeReference<>() {});
```

Make sure to use the import `java.util.List` and `org.springframework.http.HttpMethod`.


- b) Using [AssertJ](#), test that the response that comes back from the server is 200 (success) – or as is shown in the video: `HttpStatus.OK`. The code should look like this:

```
assertThat(response.getStatusCode()).isEqualTo(HttpStatus.OK);
```

Use the import statements:

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

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c) Produce a screenshot showing the completed test class. 

```
1 package com.promineotech.jeep.controller;
2
3 import static org.assertj.core.api.Assertions.assertThat;
4 import static org.junit.jupiter.api.Assertions.*;
5 import java.util.List;
6 import org.junit.jupiter.api.Test;
7 import org.springframework.beans.factory.annotation.Autowired;
8 import org.springframework.boot.test.context.SpringBootTest;
9 import org.springframework.boot.test.context.SpringBootTest.WebEnvironment;
10 import org.springframework.boot.test.web.client.TestRestTemplate;
11 import org.springframework.boot.test.web.server.LocalServerPort;
12 import org.springframework.core.ParameterizedTypeReference;
13 import org.springframework.http.HttpStatus;
14 import org.springframework.http.ResponseEntity;
15 import org.springframework.test.context.ActiveProfiles;
16 import org.springframework.test.context.jdbc.Sql;
17 import org.springframework.test.context.jdbc.SqlConfig;
18 import com.promineotech.jeep.entity.Jeep;
19 import com.promineotech.jeep.entity.JeepModel;
20 import org.springframework.http.HttpMethod;
21 import lombok.Getter;
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
30 class FetchJeepTest{
31
32     @Test
33     void testThatJeepsAreReturnedWhenAValidModelAndTrimAreSupplied() {
34         //Given: a valid model, trim and URI
35         JeepModel model = JeepModel.WRANGLER;
36         String trim = "Sport";
37         String uri =
38             String.format("%s?model=%s&trim=%s", getBaseUri(), model, trim);
39         //When: a connection is made to URI
40         ResponseEntity<List<Jeep>> response = restTemplate.exchange(uri, HttpMethod.GET, null, new ParameterizedTypeReference<>() {});
41         //Then: a success (OK - 200) status code is returned
42         assertThat(response.getStatusCode()).isEqualTo(HttpStatus.OK);
43     }
44
45     //BaseTest
46     @LocalServerPort
47     private int serverPort;
48
49     @Autowired
50     @Getter
51     private TestRestTemplate restTemplate;
52
53     protected String getBaseUri() {
54
55
56
57     }
58 }
```

15) In src/main/java, create a new package com.promineotech.jeep.controller. In this package, create an interface named JeepSalesController.

- a) Add the class-level annotation @RequestMapping("/jeeps").
- b) Add the fetchJeeps method in a controller interface with the following signature:

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

Make sure you use the List from java.util.List.

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- c) Add OpenAPI documentation to document the four possible outcomes: 200 (success), 400 (bad input), 404 (not found) and 500 (unplanned error) as shown in the video.
- d) Add the parameter annotations in the OpenAPI documentation to describe the `model` and `trim` parameters.
- e) Add the `@GetMapping` annotation and the `@ResponseStatus(code = HttpStatus.OK)` annotation as method-level annotations to the `fetchJeeps` method.
- f) Add the `@RequestParam` annotations to the parameters as described in the video. The interface should look like this (omitting the OpenAPI annotations):

```
@RequestMapping("/jeeps")  
  
public interface JeepSalesController {  
  
    @GetMapping  
  
    @ResponseStatus(code = HttpStatus.OK)  
  
    List<Jeep> fetchJeeps(@RequestParam JeepModel model,  
                        @RequestParam String trim);  
  
}
```

- g) Produce a screenshot showing the interface and OpenAPI documentation. 

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```
1 package com.promineotech.jeepp.controller;
2
3 import java.util.List;
4 import org.springframework.http.HttpStatus;
5 import org.springframework.web.bind.annotation.GetMapping;
6 import org.springframework.web.bind.annotation.RequestMapping;
7 import org.springframework.web.bind.annotation.RequestParam;
8 import org.springframework.web.bind.annotation.ResponseStatus;
9 import com.promineotech.jeepp.entity.Jeepp;
10 import com.promineotech.jeepp.entity.JeeppModel;
11 import io.swagger.v3.oas.annotations.OpenAPIDefinition;
12 import io.swagger.v3.oas.annotations.Operation;
13 import io.swagger.v3.oas.annotations.Parameter;
14 import io.swagger.v3.oas.annotations.info.Info;
15 import io.swagger.v3.oas.annotations.media.Content;
16 import io.swagger.v3.oas.annotations.media.Schema;
17 import io.swagger.v3.oas.annotations.responses.ApiResponse;
18 import io.swagger.v3.oas.annotations.servers.Server;
19
20
21 @OpenAPIDefinition(info = @Info(title = "Jeep Sales Service"), servers = {
22     @Server(url = "http://localhost:8080", description = "Local server")})
23
24 @RequestMapping("/jeepps")
25 public interface JeppSalesController {
26     // @formatter:off
27     @Operation(
28         summary = "Returns a list of Jeeps",
29         description = "Returns a list of Jeeps given an optional model and/or trim",
30         responses = {
31             @ApiResponse(
32                 responseCode = "200",
33                 description = "A list of Jeeps is returned",
34                 content = @Content(
35                     mediaType = "application/json",
36                     schema = @Schema(implementation = Jepp.class))),
37             @ApiResponse(
38                 responseCode = "400",
39                 description = "The request parameters are invalid",
40                 content = @Content(mediaType = "application/json")),
41             @ApiResponse(
42                 responseCode = "404",
43                 description = "No Jeeps were found with the input criteria",
44                 content = @Content(mediaType = "application/json")),
45             @ApiResponse(
46                 responseCode = "500",
47                 description = "An unplanned error occurred",
48                 content = @Content(mediaType = "application/json"))
49         },
50         parameters = {
51             @Parameter(name = "model",
52                 allowEmptyValue = false,
53                 required = false,
54             ),
55             @Parameter(name = "trim",
56                 allowEmptyValue = false,
57                 required = false,
58                 description = "The trim name (i.e., 'Sport')")
59         }
60     )
61
62     @GetMapping
63     @ResponseStatus(code = HttpStatus.OK)
64     List<Jepp> fetchJeeps(
65         @RequestParam(required = false)
66         JeppModel model,
67         @RequestParam(required = false)
68         String trim);
69
70     // @formatter:on
71 }
72
73
```

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- 16) Add the controller implementation class named `DefaultJeepSalesController`. Don't forget the `@RestController` annotation.
- 17) Run the application within the IDE and show the resulting OpenAPI (Swagger) documentation produced in the browser. Produce a screenshot of the documentation showing all four possible outcomes. 🖥️

Jeep Sales Service

v3/api-docs

Servers

http://localhost:8080 - Local server

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	The model name (i.e., 'WRANGLER')
trim	The trim name (i.e., 'Sport')

string
(query)

WRANGLER

string
(query)

Sport

Execute

Clear

Responses

Responses

Curl

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

Request URL

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

Server response

Code	Details
200	Response headers

200

Response headers

```
connection: keep-alive
content-length: 0
date: Thu, 05 Jan 2023 02:55:48 GMT
keep-alive: timeout=60
```

Responses

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Responses		
Code	Description	Links
200	<p>A list of Jeeps is returned</p> <p>Media type application/json</p> <p>Controls Accept header.</p> <p>Example Value Schema</p> <pre>{}</pre>	No links
400	<p>The request parameters are invalid</p> <p>Media type application/json</p>	No links
404	<p>No Jeeps were found with the input criteria</p> <p>Media type application/json</p>	No links
500	<p>An unplanned error occurred</p> <p>Media type application/json</p>	No links