

CMRapp Web API Design w/ Spring Boot Week 13 Coding Assignment


Points possible: 75

URL to GitHub Repository: <https://github.com/CMRapp/jeep-sales>


URL to Public Link of your Video: <http://videos.cmrwebstudio.com/promineo-tech-be-videos/CMR-wk13.mp4> and <http://videos.cmrwebstudio.com/promineo-tech-be-videos/CMR-wk13-pt2.mp4>

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.jeepp. 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.jeepp;
```

```
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.**

a) Load the files that were added: right-click on the project in Package Explorer and select "Refresh".

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- 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:
void testThatJeepsAreReturnedWhenAValidModelAndTrimAreSupplied()
- 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
private TestRestTemplate restTemplate;

@LocalServerPort
private int serverPort;
```

- 10) Create a new package in src/main/java named com.promineotech.jeep.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.

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- 11) **Create** a Jeep class in the `com.promineotech.jeep.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/jeep/entity` folder. **Do not copy anything from the Source folder at this time.**

- 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)

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- 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.

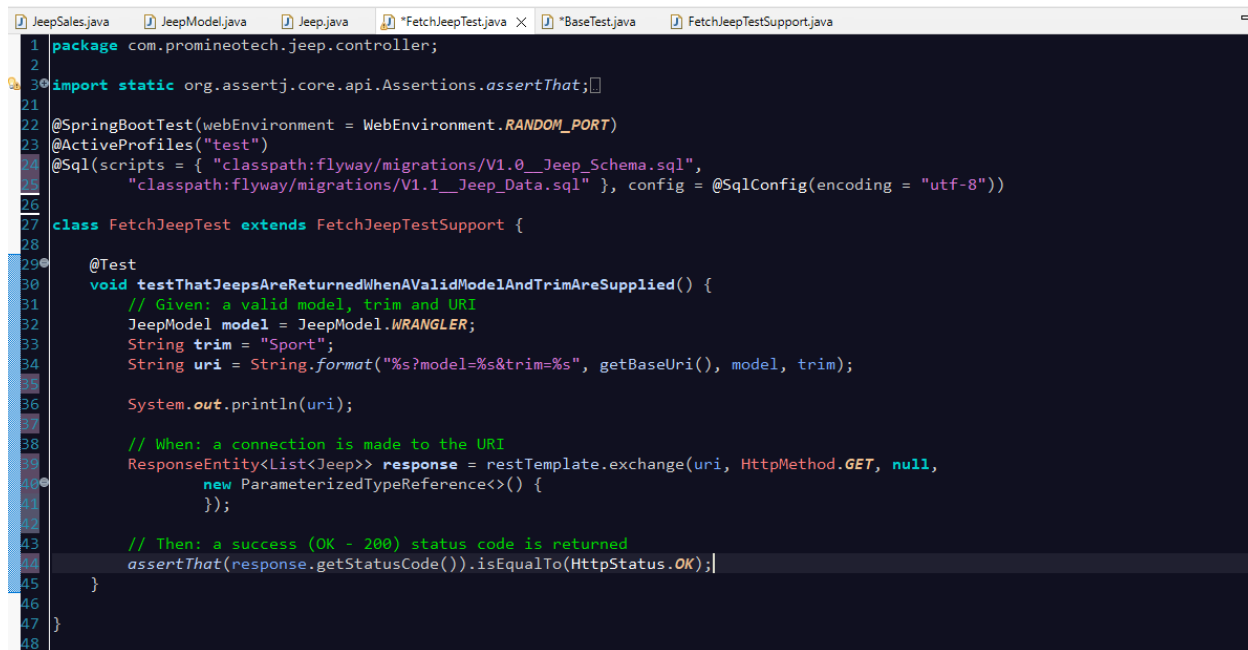
- b) Using [AssertJ](#), test that the response that comes back from the server is 200 (success) – or as is shown in the video: HttpStatus.OK. The code should look like this:

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

Use the import statements:

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

- 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
5 @SpringBootTest(webEnvironment = WebEnvironment.RANDOM_PORT)
6 @ActiveProfiles("test")
7 @Sql(scripts = { "classpath:flyway/migrations/V1.0__Jeep_Schema.sql",
8                 "classpath:flyway/migrations/V1.1__Jeep_Data.sql" }, config = @SqlConfig(encoding = "utf-8"))
9
10 class FetchJeepTest extends FetchJeepTestSupport {
11
12     @Test
13     void testThatJeepsAreReturnedWhenAValidModelAndTrimAreSupplied() {
14         // Given: a valid model, trim and URI
15         JeepModel model = JeepModel.WRANGLER;
16         String trim = "Sport";
17         String uri = String.format("%s?model=%s&trim=%s", getBaseUri(), model, trim);
18
19         System.out.println(uri);
20
21         // When: a connection is made to the URI
22         ResponseEntity<List<Jeep>> response = restTemplate.exchange(uri, HttpMethod.GET, null,
23             new ParameterizedTypeReference<>() {
24             });
25
26         // Then: a success (OK - 200) status code is returned
27         assertThat(response.getStatusCode()).isEqualTo(HttpStatus.OK);
28     }
29 }
```

- 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.

- 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.

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- 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. 



```
JeepSales.java JeepModel.java Jeep.java FetchJeepTest.java BaseTest.java FetchJeepTestSupport.java *JeepSalesController.java X
26 @Server(url = "http://localhost:8080", description = "Local server.")
27
28 public interface JeepSalesController {
29     // @formatter: off
30     @Operation(
31         summary = "Returns a list of Jeeps",
32         description = "Returns a list of Jeeps given an optional model and/or trim",
33         responses = {
34             @ApiResponse(
35                 responseCode = "200",
36                 description = "A list of Jeeps is returned.",
37                 content = @Content(mediaType = "application/json",
38                     schema = @Schema(implementation = Jeep.class)),
39             @ApiResponse(
40                 responseCode = "400",
41                 description = "The request parameters are invalid.",
42                 content = @Content(mediaType = "application/json")),
43             @ApiResponse(
44                 responseCode = "404",
45                 description = "No Jeeps were found with the input criteria.",
46                 content = @Content(mediaType = "application/json")),
47             @ApiResponse(
48                 responseCode = "500",
49                 description = "An unplanned error occurred.",
50                 content = @Content(mediaType = "application/json")),
51         },
52         parameters = {
53             @Parameter(
54                 name = "model",
55                 allowEmptyValue = false,
56                 required = false,
57                 description = "The model name (i.e., 'WRANGLER')",
58             @Parameter(
59                 name = "trim",
60                 allowEmptyValue = false,
61                 required = false,
62                 description = "The trim level (i.e., 'SPORT')",
63             )
64         }
65     )
66 }
```

- 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. 

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/v3/api-docs

Explore

Jeep Sales Service

/v3/api-docs

Servers

http://localhost:8080 - Local server. v

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 * required string (query)	The model name (i.e., 'WRANGLER')
trim * required string (query)	The trim level (i.e., 'SPORT')

Execute

Clear

Responses

Code **Details**

200

Response headers

```
connection: keep-alive
content-length: 0
date: Fri, 09 Dec 2022 19:52:23 GMT
keep-alive: timeout=60
```

200

A list of Jeeps is returned.

Media type
application/json v
Controls Accept header

Example Value Schema

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

No links

400

The request parameters are invalid.

Media type
application/json v

No links

404

No Jeeps were found with the input criteria.

Media type
application/json v

No links

500

An unplanned error occurred.

Media type
application/json v

No links

Schemas

```
Jeep v {
  modelPK integer($int64)
  modelId string
  Enum:
    > Array [ 7 ]
  trimLevel string
  numDoors integer($int32)
  wheelSize integer($int32)
  basePrice number
}
```