Collective Java IntelliJ GitHub Copilot Training

Activity: we have an old-webservice that managed the creation of movies, this must be migrate with Help of Copilot to a Spring Boot Application, adding unit testing and documentation.

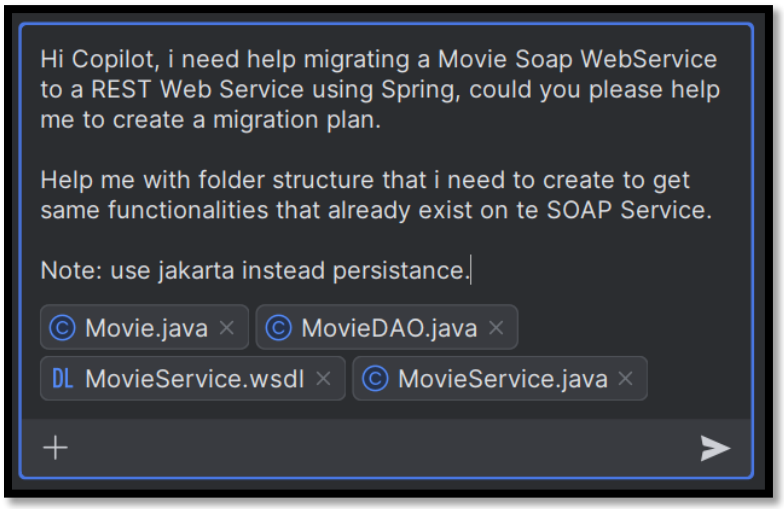
First, we need to clone the repository:

Every step has a branch with the solved step.

The goal is to practice using the features that GH Copilot has for IntelliJ JetBrains today. (9/23/2024)

Step 1: Folder Structure

We start by creating our folder structure based on the following prompt.



First Prompt

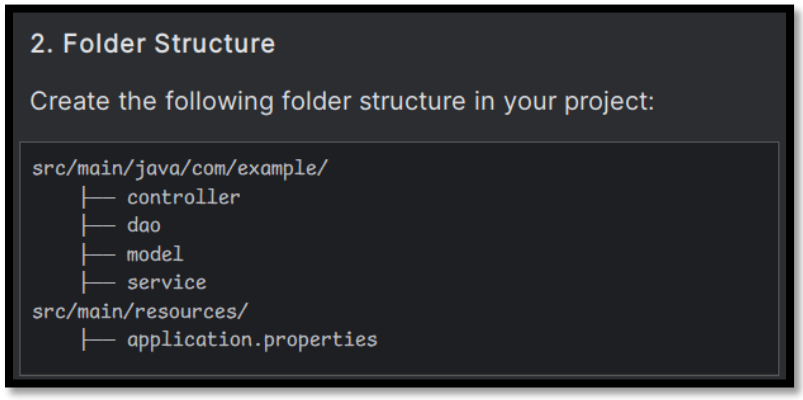
Hi Copilot, I need help to migrate a Movie Soap Webservice to a REST Web Service using Spring Boot, could you please help me to create a migration strategy plan.

- *Help me with folder structure that I need to create to have the same functionalities that already exist on the SOAP Service.*
- *Note: use Jakarta instead of Javax*

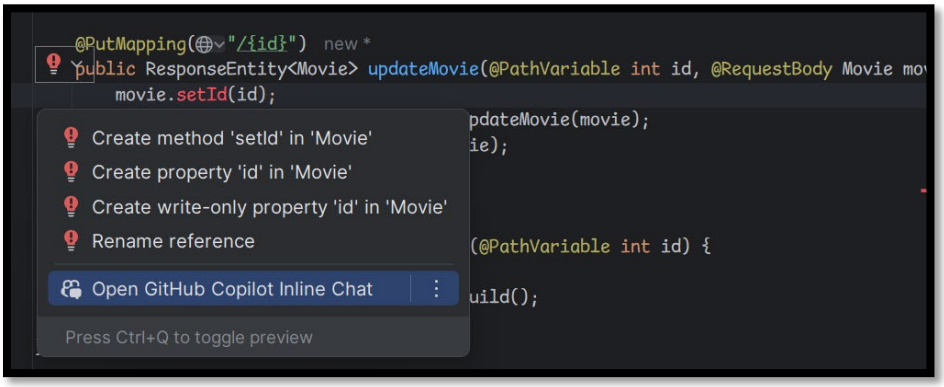
Copilot will show what folder structure to create

Perform the steps

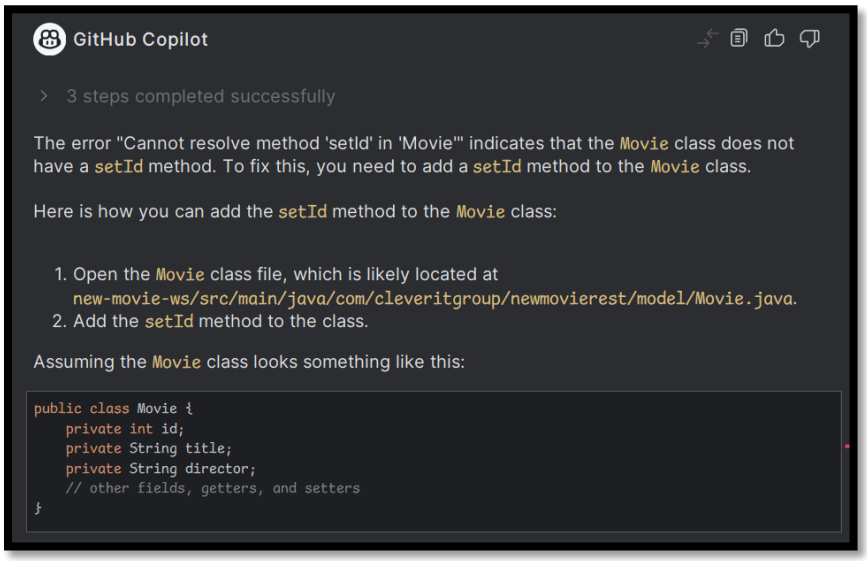
Create packages; to get the folder structure and needed classes.



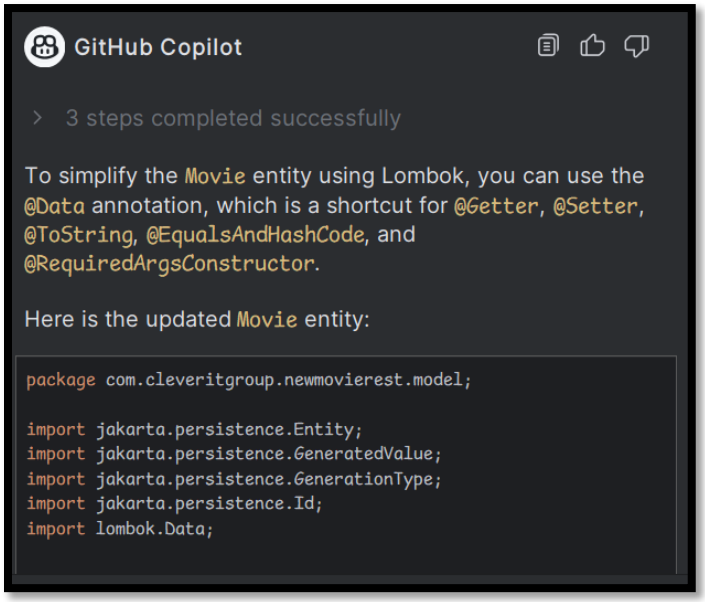
Go to **Movie.java** entity have some problems, lets use Copilot Inline to Fix the errors.



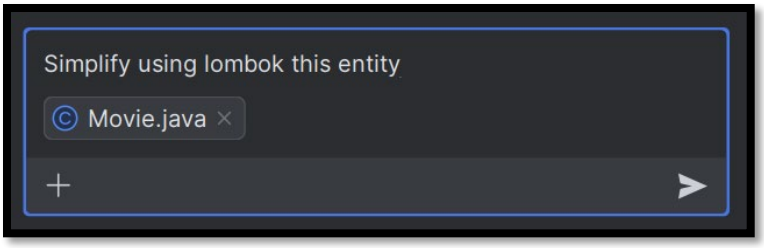
Fix usage on Copilot Inline (**Ctrl/Cmd + Shift + G**)



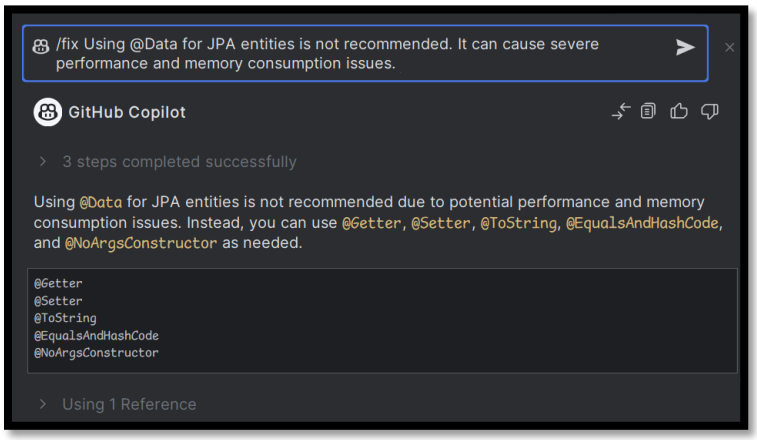
Add the changes on the entity, ask Copilot to fix using Lombok.



Using **Copilot Chat Simplify** the **Entity** using **Lombok**.



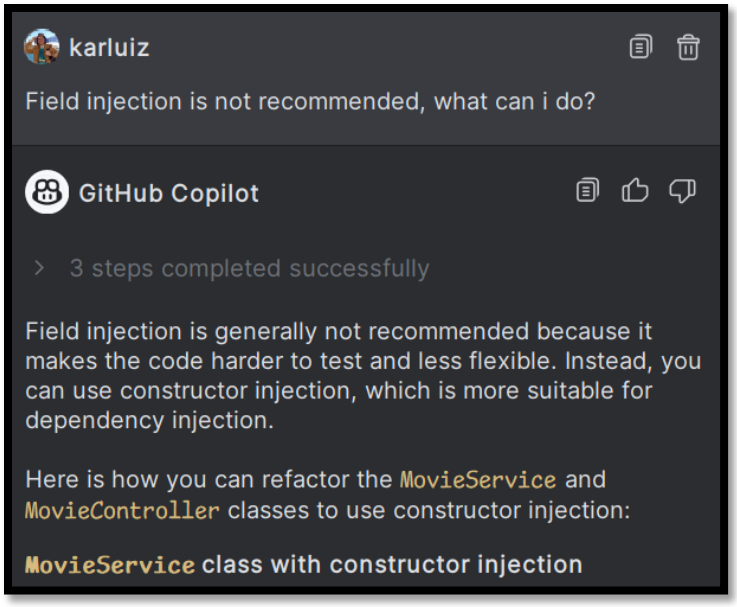
This gave us the update entity but using Data, which has a lint we can use Copilot Inline again to ask for a /fix.



Using Copilot Inline.

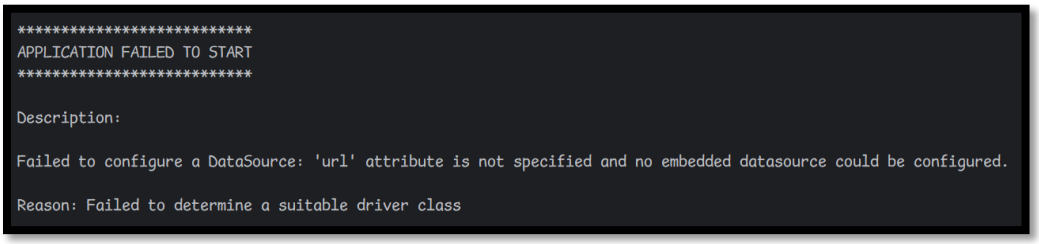
```java
package com.cleveritgroup.newmovierest.model;

import jakarta.persistence.Entity;
import jakarta.persistence.GeneratedValue;
import jakarta.persistence.GenerationType;
import jakarta.persistence.Id;
import lombok.*;

@Entity  17 usages   new *
@Getter
@Setter
@ToString
@NoArgsConstructor
public class Movie {
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private int id;
    private String title;
    private String director;
}
```

On the service we can use Copilot to understand some lints using ***@Autowired***.

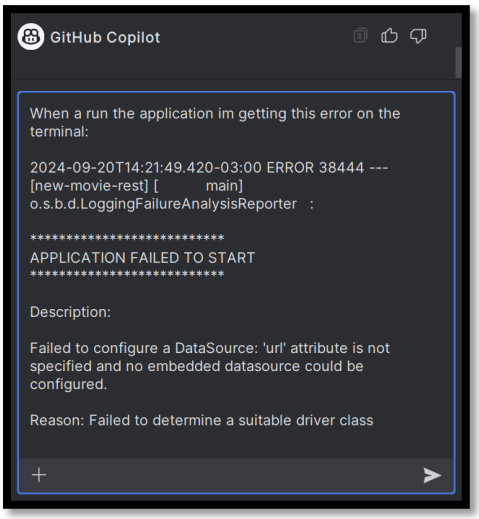


Make the changes in ***MovieController*** and ***MovieService*** to not use **@Autowired**.

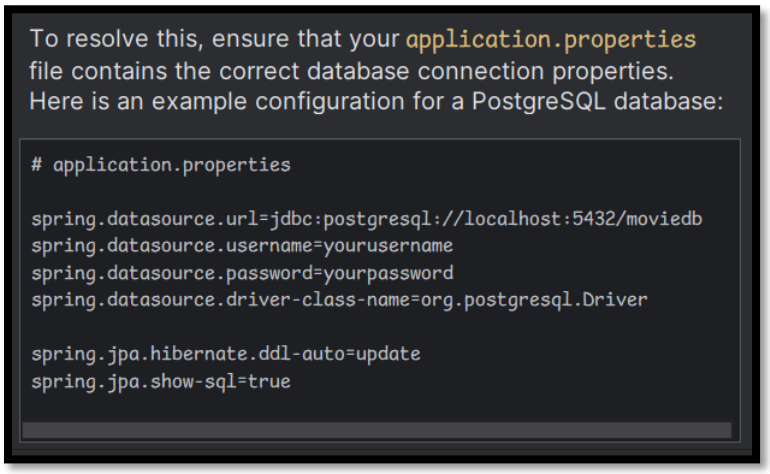
🎃 Troubleshooting



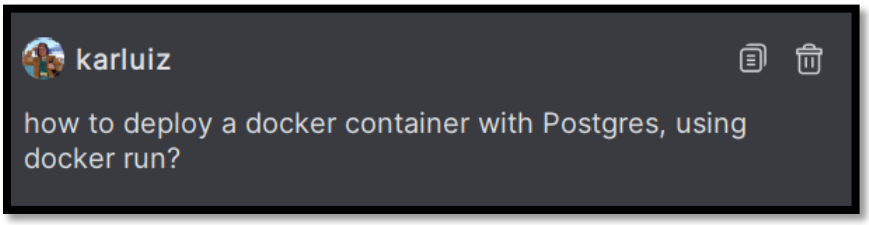
Ask to **Copilot how to Fix this problem**.



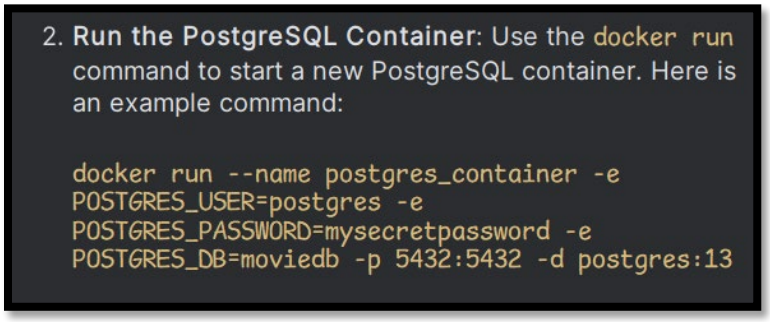
To solve this problem, add the changes that Copilot suggests.



The problem still because we need to also create a *Postgres container*, we can use **Copilot CLI** to how to run a container, if you don't have installed yet, do it 😊 later, we can also use the Chat so no problem.



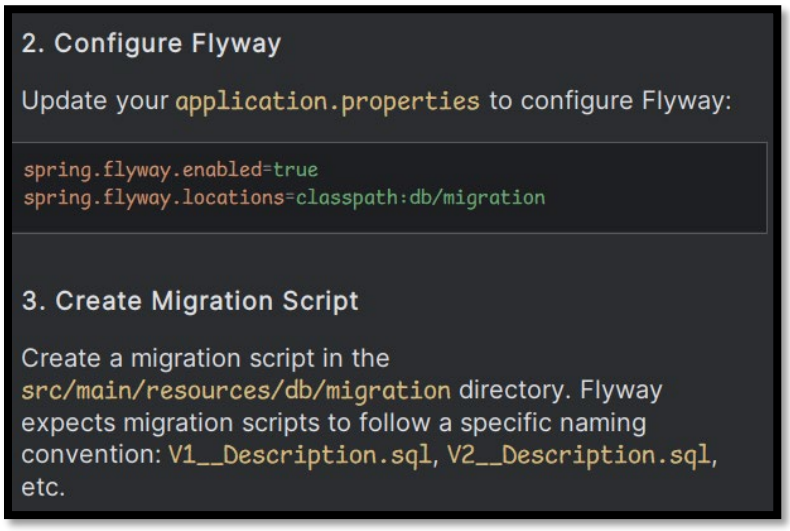
We can add **application.properties** as context to get password, port and other stuff ready.



Step 2: Flyway Support for Seeder

As we can see in the old Solution, we have a **Seeder.sql** with some information about the movies that we need to load.

Perform the steps.



Create the ***V1__Initial_Setup.sql*** for Seed the Database.

For example, create a file named V1__Initial_Setup.sql:

```sql
-- src/main/resources/db/migration/V1__Initial_Setup.sql

CREATE TABLE Movie (
    id INT PRIMARY KEY,
    name VARCHAR(255),
    year INT,
    description TEXT,
    score DECIMAL(3, 1),
    director VARCHAR(255),
    producer VARCHAR(255),
    languages VARCHAR(255)
);

INSERT INTO Movie (id, name, year, description, score, director, |
(1, 'The Great Adventure', 2021, 'An epic journey of discovery an
(2, 'Mystery of the Lost City', 2019, 'A thrilling mystery set in
(3, 'Space Odyssey', 2022, 'A breathtaking voyage through the cos
(4, 'The Last Stand', 2020, 'A gripping tale of survival and cour
(5, 'Romance in Paris', 2018, 'A heartwarming love story set in t
```

Run the application and check the seed migration is working.

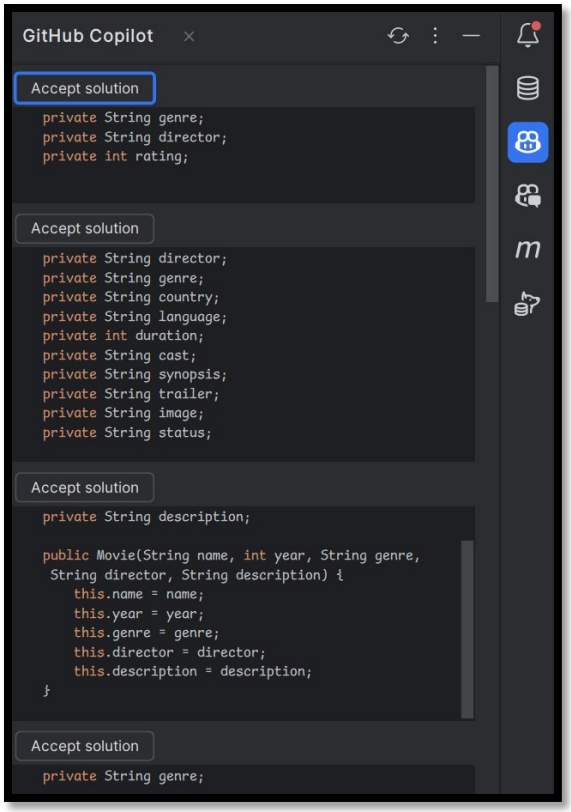
🎃 Troubleshooting

Flyways have some problems with the latest PostgresSQL Database, so you need to use this dependency to load beans that are needed.

```
<dependency>
   <groupId>org.flywaydb</groupId>
   <artifactId>flyway-database-postgresql</artifactId>
</dependency>
```

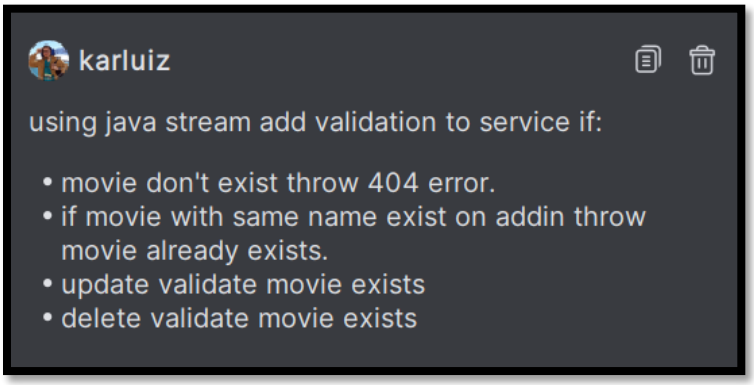
Also make sure the entity has the same properties using the chat and adding as a reference the SQL initial file on migrations.

- Try adding by using Copilot Chat or Suggestions.



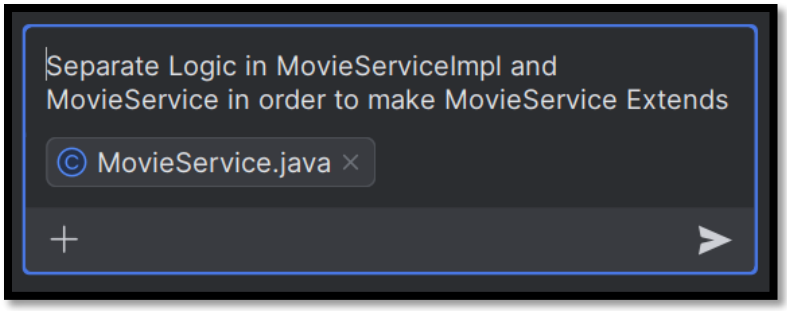
Step 3: Add Validations and Using Java Stream on Service

We will be going to add Java Stream support to make validations to our methods.

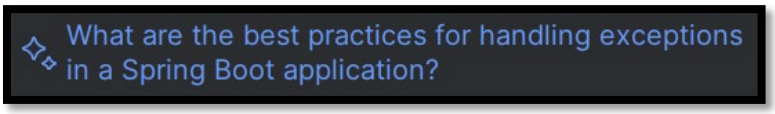


Add the modifications to have the validations on our MovieService.

Separate Logic in **MovieServiceImpl** and **MovieService**.

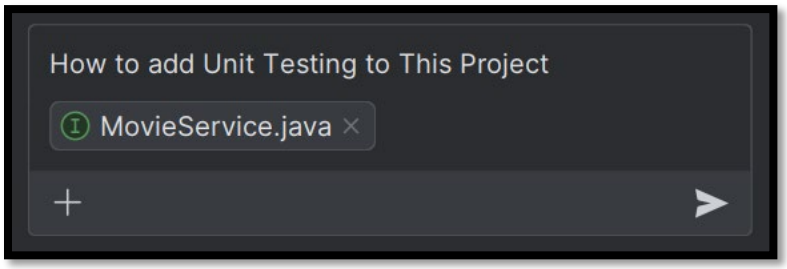


You also will see some follow-up questions like.



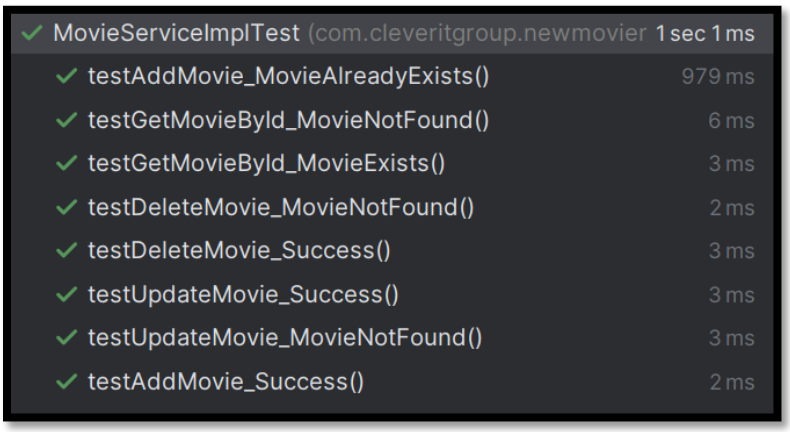
Step 4: Add Junit Testing

We are going to ask Copilot how to add Junit Support for MovieService.

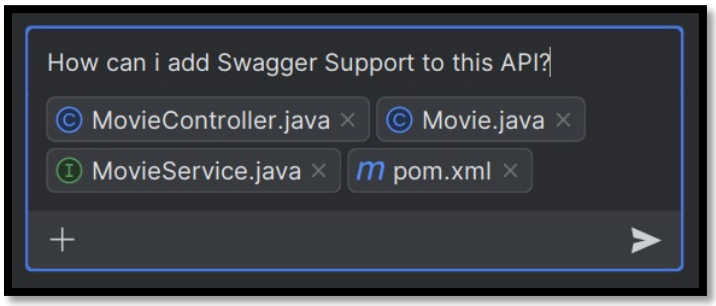


Follow the instructions to add Junit Support and Run the Test.

- **Dependencies**: Add JUnit and Mockito dependencies to pom.xml.
- **Test Class**: Create a test class **MovieServiceImplTest** with unit tests for each method in MovieServiceImpl.
- **Mocking**: Use Mockito to mock the **MovieRepository** and inject it into MovieServiceImpl.
- **Assertions**: Use JUnit assertions to verify the behavior of the service methods.



Step 5: Adding Swagger



This example is intended to fail, we see here how copilot *doesn't have updated the spring-doc documentation* and tries to use old version of swagger; in fact, I must google it to fix the error of dependencies.

🎃 Troubleshooting

We only must add this dependency to have already defined our Swagger.

```
<dependency>
  <groupId>org.springdoc</groupId>
  <artifactId>springdoc-openapi-starter-webmvc-ui</artifactId>
  <version>2.5.0</version>
</dependency>
```

And we can see our Swagger doc at:

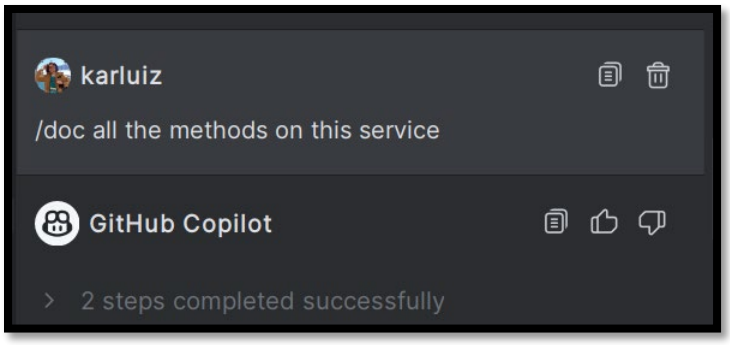
- http://localhost:8080/swagger-ui/index.html

Step 6: Add Documentation using Inline & Chat

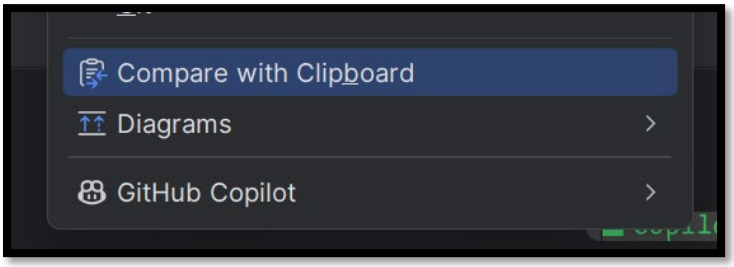
We will be going to add Java Stream support to make validations to our methods.

Using Copilot Inline **Ctrl/Cmd + Shift + G**

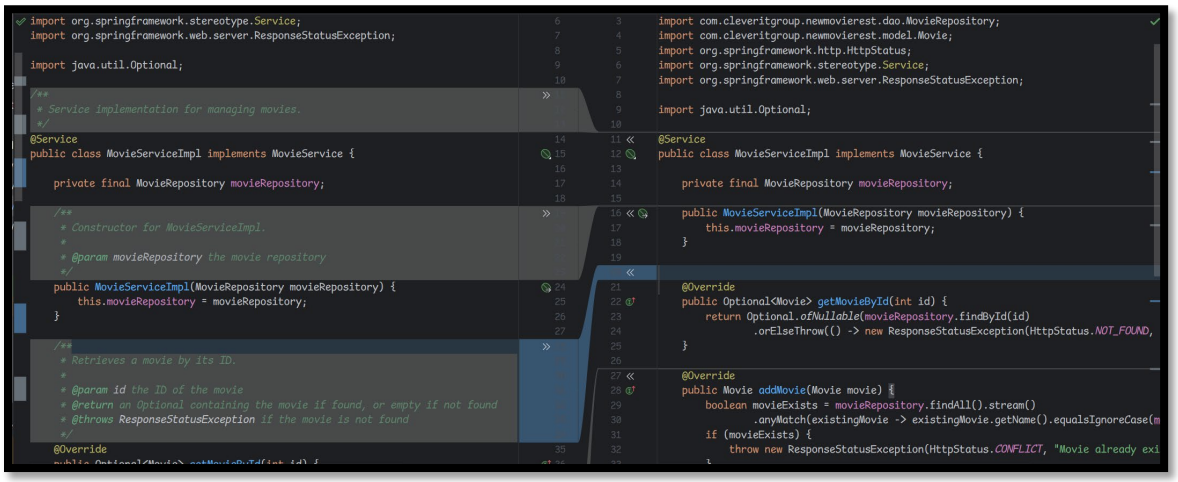
Or using the chat, grab the **MovieServiceImpl** to the Chat and make a prompt using /doc.



Copy the result and compare with the Clipboard by doing right click.



This is very useful to accept the changes one by one.

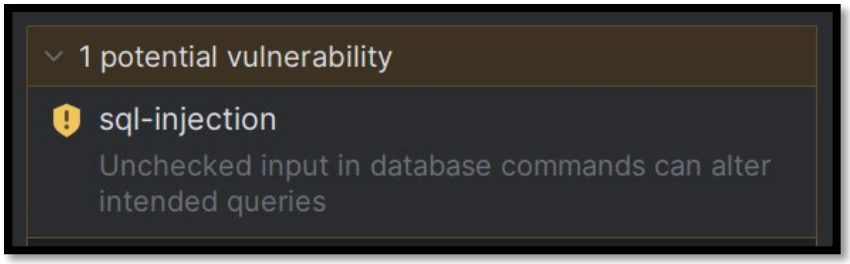


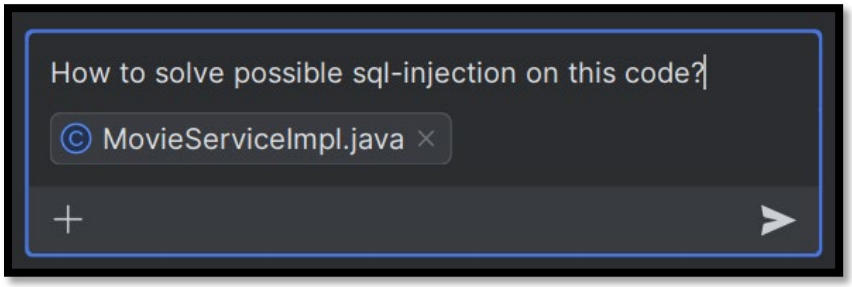
Add getAllMovies method and Add Test

Try using mostly copilot add the method getAllMovies and add unit testing.

⚠️ Security Issues

Copilot can also give information about security Issues on our Code





By using the repository methods provided by Spring Data JPA, you ensure that your queries are parameterized and safe from SQL injection.

Useful Tips

- **REGX**: It will generate REGX for Validation. You just need to specify criteria. vice versa will help to understand existing REGX meaning
- **Transpose DTO**: Write code to transpose One DTO to Another.
- **Post error** and will get solution in copilot chat window.
- Provide dummy data and object mocking for you to simplify Unit Tests
- **Sonar bug free code** (try-with-resources for efficient handling of resources, Optional to avoid null pointer exceptions)
- **Generating Boilerplate Code**: creating a new class with getters, setters, equals(), hashCode(), and toString() methods
- Writing **SQL Queries**
- **Multithreading:** GitHub Copilot can suggest appropriate Java code for creating and managing threads, handling synchronization, and avoiding common concurrency issues
- **Working with Files and I/O**: GitHub Copilot can provide code snippets for common tasks related to files and I/O in Java, such as reading a file line by line, or writing to a file.
- **Working with JSON**: code snippets for parsing JSON, creating JSON objects, or converting between JSON and Java objects using libraries like Jackson or Gson.
- **Code Review:** Just need to mention method name over chat.