Sporty Shoes Shopping Writeup

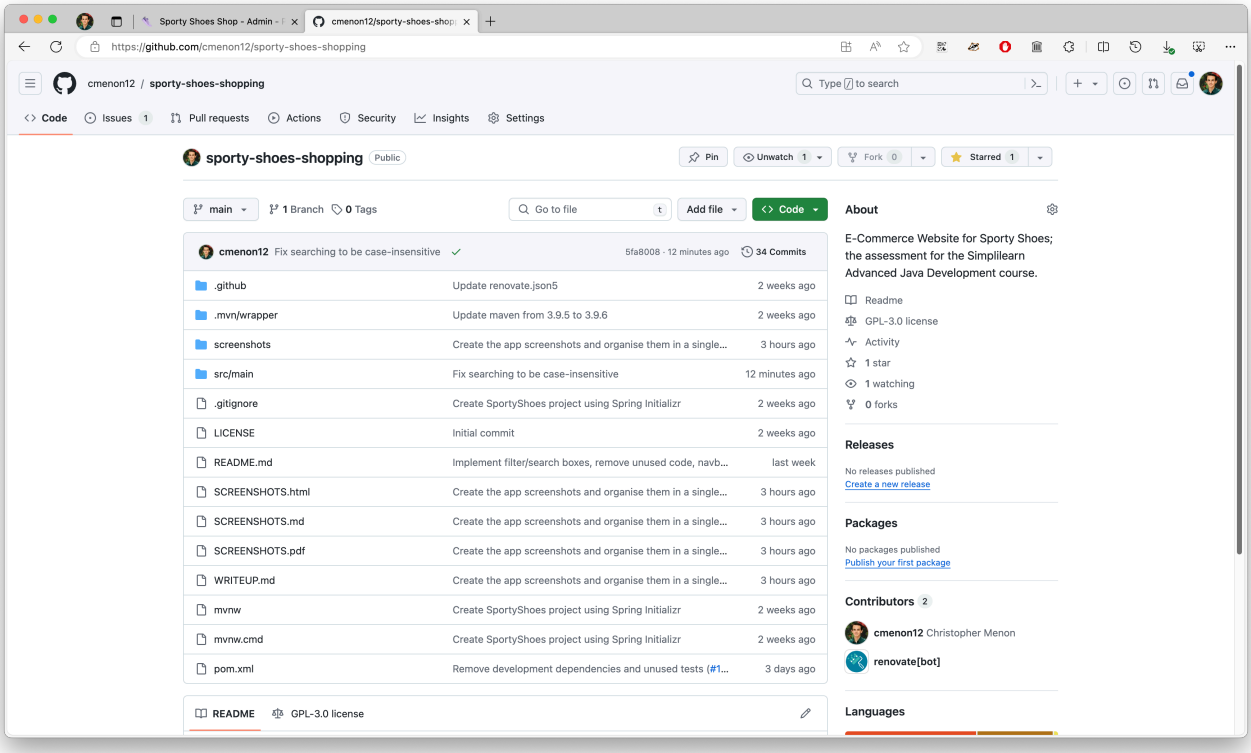
By Christopher Menon

This is the writeup for the Sporty Shoes Shopping project. The project is a web application that allows users to browse and purchase shoes. The application is built using the Spring Boot framework and the Thymeleaf templating engine, with a Bootstrap front-end.

Screenshots of the application are in a separate file.

How to Use

All the source code can be found on GitHub at https://github.com/cmenon12/sporty-shoes-shopping.



This application runs on Java 17 and Maven.

The MySQL database is required to run this application. The database configuration can be found in the `src/main/resources/application.properties` file. The default database configuration is:

```
spring.datasource.driver-class-name=com.mysql.cj.jdbc.Driver
spring.datasource.url=jdbc:mysql://localhost:3306/SportyShoes
spring.datasource.username=root
```

```
spring.datasource.password=root
```

The database `SportyShoes` is created when the application is first run.

Project Structure

The project is structured as follows:

- All Java source code is in the `com.sportyshoes` package, with several sub-packages.
  - The main application class is `SportyShoesApplication.java`, which is the entry point for the application.
  - The entities are in the `entity` package. These are the objects that are stored in the database.
  - The repositories are in the `repository` package. These are the classes that interact with the database.
  - The services are in the `service` package. These are the classes that handle the business logic of the application.
  - The controllers are in the `controller` package. The `ShoppingController` handles the shopping web requests, and the `UserController` handles the user web requests. There are also three admin controllers.
  - The `config` package contains the security and web configuration.
- In the `resources` folder, the `application.properties` file contains the database configuration, and the `templates` folder contains the HTML templates for the application. The `static` folder contains some JavaScript and the logo.

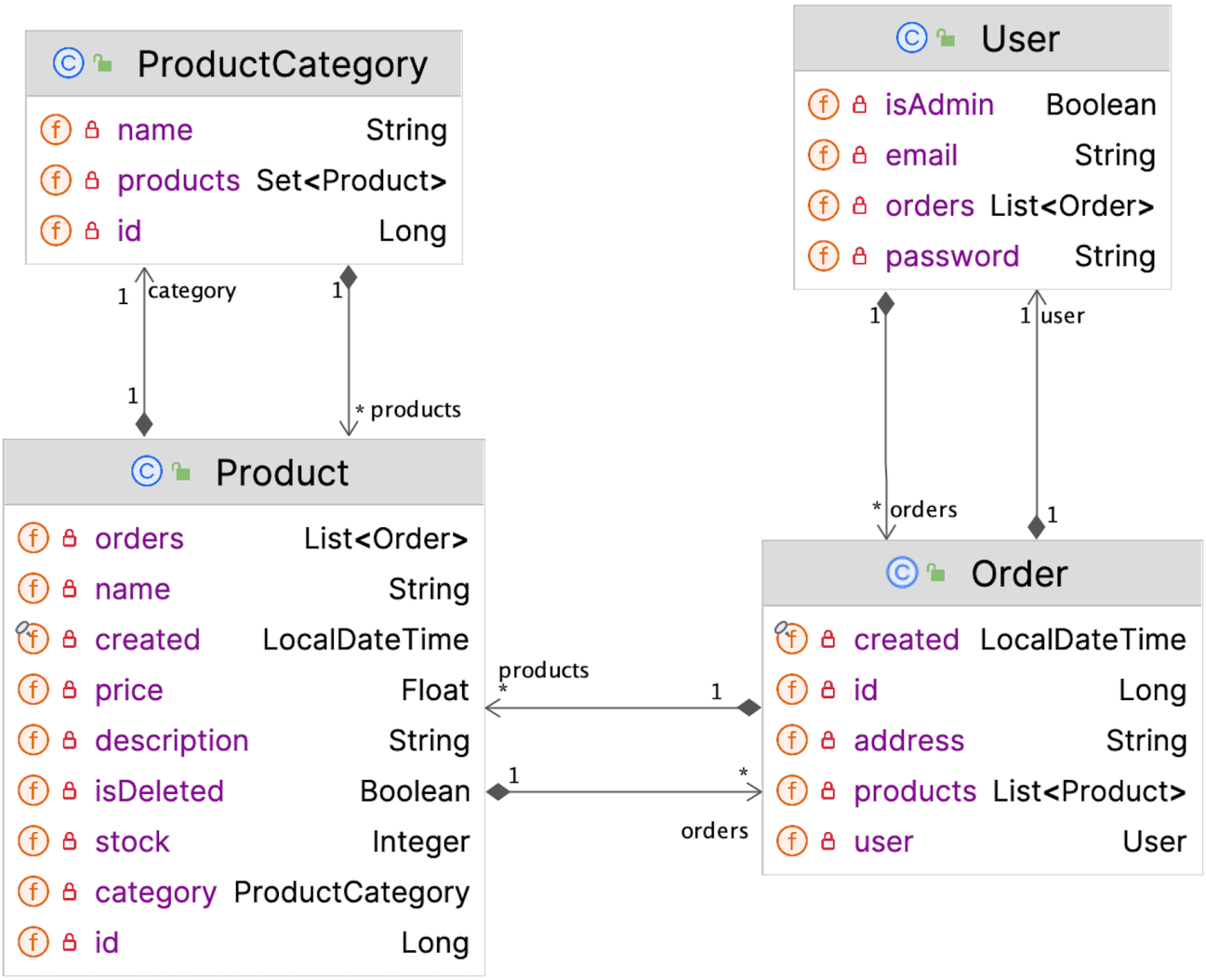
A tree diagram of the project structure is below.

```
.
└── main
    ├── java
    │   └── com
    │       └── sportyshoes
    │           ├── SportyShoes
    │           │   └── SportyShoesApplication.java
    │           ├── config
    │           │   ├── MySecurityConfig.java
    │           │   ├── MySuccessHandler.java
    │           │   ├── MyWebConfig.java
    │           │   └── TrailingSlashRedirectFilter.java
    │           ├── controller
    │           │   ├── AdminController.java
    │           │   ├── AdminProductCategoryController.java
    │           │   ├── AdminProductController.java
    │           │   ├── ShoppingController.java
    │           │   └── UserController.java
    │           ├── entity
    │           │   ├── Order.java
    │           │   ├── Product.java
```

```
│           │   ├── ProductCategory.java
│           │   └── User.java
│           ├── repository
│           │   ├── OrderRepository.java
│           │   ├── ProductCategoryRepository.java
│           │   ├── ProductRepository.java
│           │   └── UserRepository.java
│           └── service
│               ├── OrderService.java
│               ├── PasswordEncoderService.java
│               ├── ProductCategoryService.java
│               ├── ProductService.java
│               └── UserService.java
└── resources
    ├── application.properties
    ├── static
    │   ├── favicon.ico
    │   ├── filters.js
    │   ├── logo.png
    │   └── logo_navbar.png
    └── templates
        ├── admin_product_categories.html
        ├── admin_product_categories_edit.html
        ├── admin_products.html
        ├── admin_products_edit.html
        ├── admin_users.html
        ├── change_password.html
        ├── fragments
        │   └── base.html
        ├── login.html
        ├── orders.html
        ├── register.html
        └── shop.html
```

Object Entities

The application has four entities: `User`, `Product`, `ProductCategory`, and `Order`. The diagram below shows the entities, their attributes, and their relationships.



The three entity relationships are:

- One `User` can have many `Order`s, and one `Order` can have one `User` (one-to-many).
- One `ProductCategory` can have many `Product`s, and one `Product` can have one `ProductCategory` (one-to-many).
- One `Product` can be in many `Order`s, and one `Order` can have many `Product`s (many-to-many).

Website Structure

The website has the following pages:

- Registration page to create a user.
- Login page to log in a user.
- Shopping page to view products and create an order.
- User dashboard to view orders.
- Change password page to change the user's password.

Four admin pages exist to:

- Manage products.

- Manage product categories.
- View all orders.
- View all users.

Product Capabilities

End-user capabilities include:

- User registration, login, and logout using an email address and password.
- Viewing the products in the store, including filtering them by category and searching them.
- Creating an order of one or more products with an address.
- Viewing the user's own orders.
- Changing the user's password.

Admin capabilities include:

- Viewing the products in the store, including filtering them by category and searching them.
- Managing the products in the store (creating, editing, deleting) including categorising them.
- Viewing the product categories in the store, including searching them and listing how many products each category has.
- Managing the product categories in the store (creating and editing).
- Viewing all purchase reports (orders) in the store, including filtering them by user, category, and date & time.
- Viewing all users who have signed up, including searching them and listing how many orders each user has.

Application security capabilities include:

- Only the admin user can access the admin pages.
- The user must log in to access the shopping pages.
- Passwords are encoded using the BCrypt strong hashing function.
- The user must enter their existing password to change their password.
- CSRF protection is enabled on all forms to prevent cross-site request forgery attacks.
- The latest versions of Spring Boot and Spring Security are used.

Development History

The project was created using JetBrains IntelliJ IDE. The full development history can be found in the commit history of the GitHub repository.

1. I first created the Java Maven project using the Spring Initializr, and opened it in IntelliJ IDE.
2. I created the four entity classes, along with their respective repository and service classes.
3. I then created the controllers and HTML templates for the user signup, login, and logout. I added the Bootstrap CSS and JavaScript to the project for styling.

4. I then created the shopping controllers and HTML page, and controllers for creating an order.
5. I then created the admin dashboard to view products and orders, and the user dashboard to view their own orders. I used the same HTML template for the two orders dashboards.
6. Next I implemented the Product Categories functionality, including on the user and admin pages.
7. I then added the Spring Security starter to the project, and migrated from managing user sessions manually to using Spring Security for user authentication.
8. I then added the ability for users to change their password, and an admin page to view all users.
9. I then added the search boxes and filters when looking at products, product categories, users, and orders, and improved the look and feel of the application.
10. Finally, I tested that the application fully met the requirements, removed the development dependencies, and applied several small fixes whilst creating the writeup and screenshots.