

EA Project Description – May 2023

Goal

The goal of this project is to give you hands-on, practical experience with building a RESTful system of microservices using Spring, Spring MVC, Spring Boot, Spring Data JPA and Spring Cloud Services.

Working as a team

You are required to work with your team to create a project. But you should be aware that everyone still must give their own presentation. There are no “team” presentations, although I do ask that member of the same team present consecutively (no gaps / other people in between). You need to work together and share responsibilities and workload.

Online Retail System

We are trying to create a RESTful application (you only need to write the backend part of it; no UI is necessary) for an Online Retail System. Imagine an Amazon-like store where you can browse and search for items, add them to your shopping cart and finally place an order. During the first phase of the project, understand the requirements and design a class diagram for it.

Step 1 – Requirements (Domain Driven Design)

Create a UML class diagram of the domain based on the concepts below:

- Your company sells Items. Each Item has an id, name, description, price, image (imagine either a binary blob or serialized string), barcode number, quantity in stock and a list of reviews.
- Each review has a title, description (main text of the reviewer), number of stars, date and a buyer who has left the review (only buyers of an item can review the item)
- Buyers or Customers have first and last, email address, billing address, multiple shipping addresses (one of them is a default or preferred shipping address) and a list of credit cards
- What distinguishes a billing address from a shipping address is the AddressType
- A credit card has a number, expiration date and security code
- An Item can be added to an Order, an Order is associated with a customer and one of his shipping addresses and has a list of Line Items. Each line Item is an Item, quantity and a possible discount value for the Item.
- An Order can be in multiple states: New, Placed, Processed (payment is processed), Shipped, Delivered or Returned
- Once an Order is placed, then it can no longer be edited
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- Every Item can be an individual Item or a composite Item (Composite Design Pattern)

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Step 2 - Architectural Analysis and Design

Sit with your team and agree on a high-level architecture for your application. Your decision should include your choice of technologies. How do you secure the application? What methodology do you use for software development? Do a proof of concept (POC).

Step 4 – Divide and Conquer

Carefully read the requirements and divide the tasks (use-cases) among team members. Each team member is responsible for designing, developing, and testing his/her use-case.

Step 5 – Integration Testing

At least once a day sit together and integrate your code and test together and iterate (correct mistakes and refactor your design and development).

Extra Credit

Here are some ideas for extra credit:

- Deploy your application to the cloud
- See if you can use Spring Security using JWT or the Spring Authorization Server
- Create an automated pipeline for CI/CD (continuous integration/continuous delivery)

Presentation Delivery

I will schedule your presentations from 9:30-12:30 and 1:30 – 4:30 on Thursday. You will have to present individually. Each group will have one hour, which means each member of the group gets to present for about 5 minutes and I get to ask questions for a couple of more minutes.

I will evaluate you based on the following factors:

1. Clarity of Speech – Your presentation should be coherent and understandable. It is ok if you have an accent. It is ok if your English is not as fluent as a native speaker. However, it is **not** ok if you talk too fast! Enunciate and speak clearly.
2. Knowledge of Your Application – You are expected to be knowledgeable about the overall design of your app. All layers and all use-cases, not just yours.
3. Ability to Answer Questions – You need to be able to answer questions about the design and coding of your app. It always shows when your team members have done all the work and you have been mostly observing. Try to be an active participant and you will get full grade for this category.
4. Working Demo – Your app needs to work (obviously!). So, if you succeed to show me working features, you will get maximum grade.

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5. Code quality – You need to write readable, good quality code. Hint: use “Sonar Lint” or similar plug-ins for your IDE to check the quality of your code.
6. Extra credit – you can get up to 10% of extra credit based on how well you design your application and how well you integrate it.