1. Project Overview

Domain: e-commerce
Client: Wayfair

Summary & Domain: I worked on developing an e-commerce platform for a B2C (Business-to-Consumer), The purpose of the project was to provide an online shopping solution that allowed customers to browse, search, and purchase products directly from websites. The application featured a user-friendly front-end interface, enabling customers to explore products, manage shopping carts, and complete orders.

Key Stakeholders:
Key stakeholders included the **business owners and management team, infrastructure**, **marketing team**, focused on driving traffic to the site and analyzing customer behavior; the **product management team**, tasked with managing product listings, pricing, and promotions; and the **customer support team**, who handled post-purchase queries and returns. Additionally, **end users** comprised all customers interacting with the platform to browse and purchase products.

2. Problem Statement

Main Challenges:

- **Problem:** In the e-commerce platform, we encountered issues during the **checkout process**, particularly when multiple users tried to purchase the same product simultaneously. This led to inventory discrepancies and overselling, as the system couldn't handle high concurrency effectively. The lack of proper synchronization mechanisms caused race conditions, where multiple users would check out at the same time, leading to incorrect inventory counts.
- **Solution:** To resolve this, we implemented a **distributed locking mechanism** using **Redis**. The lock ensured that only one user could proceed with a checkout for a specific product at any given time, preventing overselling.

3. Roles and Responsibilities:

- As a developer, my role involved enhancing the existing e-commerce system based on user stories assigned during sprint planning.
- I concentrated on improving key modules such as user management and product browsing, addressing bugs, and integrating new features as needed by the business.
- Developed Apis for fetching the product details, updating and also to create new products.
- Worked on Hibernate to store the persistence data into MySQL database and written HQL to access the data from the database.

User Stories:

- Developed custom error handling for Spring Boot applications using Response Entity, providing meaningful error messages for client requests, such as custom "Product Not Found" messages along with product details when searching for non-existent product IDs in the database.
- Built a feature to show personalized product recommendations based on items each user recently viewed or purchased, helping boost sales and keep users engaged.
- Developed a Spring Boot API to enable users to browse products by various categories through a GET request, enhancing the e-commerce platform's product discovery experience.
- Optimized the response time of APIs from ~500 ms to ~50 ms by implementing Redis caching for static data.

4. Technical Details:

We utilized technologies such as Java Spring Boot for backend services, MySQL for database management, React for the frontend. We also integrated with third-party systems through REST APIs.

5. Outcome & Results:

This project aims to create a secure, efficient, and scalable e-commerce platform that improves product management, ordering, and delivery processes. By automating manual tasks and maintaining high code quality, the platform supports sustainable growth, allowing the business to expand and adapt with ease.

6. Learning Experience

Skills Gained: Through this project, I enhanced my skills in **backend development** using **Java Spring Boot**, focusing on optimizing performance with technologies like **Redis caching**. I gained hands-on experience in **database optimization** and **REST API integration**, improving system scalability and response times. Additionally, I learned the importance of effective **stakeholder communication** when gathering requirements and delivering features that aligned with business needs. This project also deepened my understanding of **scalability solutions** and **system performance tuning** in high-traffic environments.