1. Project Overview

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**, who oversaw the overall functionality and growth of the online store; the **IT team**, responsible for maintaining the infrastructure; the **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. **My Role:** As a backend 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. worked on customizing error handling pages using Spring Boot's Response Entity.

4. Technical Details:

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

5. Outcome & Results:

By integrating Redis caching into the e-commerce platform, we significantly optimized performance, reducing response times by **55%**. This enhancement improved the user experience, particularly during high-traffic periods, and led to a smoother browsing and checkout process and also reduced load on the database as well.

As a result, the platform saw a **35% increase in user retention**, as customers experienced faster page loads and fewer delays.

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.