Multi-Tenant E-Commerce Marketplace

"Bazario"

Software Requirements Specification

Submitted To

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1. Introduction

This document is the Software Requirements Specification (SRS) for "Multi-Vendor E-Commerce Marketplace". It contains detailed functional, non-functional, and extraordinary requirements and establishes a requirements baseline for the development of the system. In today's digital world, online shopping has become the norm. A multi-vendor e-commerce marketplace is a platform where different sellers can sign up, showcase their products, and reach a wide range of audiences from one platform. This project aims to build a modern, user-friendly, and fully functional multi-vendor marketplace that supports vendors, buyers, and admins with features tailored to their needs.

Project Overview (Requirements as User Stories)

- **As a customer**, I want to browse products from different sellers, sort them by price or category, add items to my cart, and safely check out. This way, I can shop easily and safely.
- **As a vendor**, I want to register, log in, manage my products, track orders, and assess my sales success to enhance my business on the platform.
- **As an admin**, I want to manage users (vendors/customers), review vendor products, handle transactions, and monitor platform performance to ensure a smooth and secure experience for everyone.

Purpose and Scope

Purpose:

The purpose of this project is to create a reliable and scalable online platform that allows multiple vendors to sell products and customers to purchase from different sellers in a single place. It combines features like real-time product updates, secure payments and user reviews. This ensures a trustworthy and convenient online shopping experience for customers.

Scope:

- Build a full-stack, multi-tenant e-commerce marketplace.
- Implement secure user and vendor features.
- Enable powerful content and product management.
- Design a responsive and modern UI.

- Integrate a scalable backend with database optimization and incorporate a machine learning model.
- Features will be displayed on the homepage.
- Provide customer features like previous searches, reviews, and order tracking.
- Support vendor-specific dashboards with sales analytics and inventory tracking.

Stakeholders

Any individual or group that will be directly or indirectly impacted by the system is considered a stakeholder. Stakeholders include end-users who engage with the system and everyone else in an organization that may be affected by its installation.

- **Vendors**: Independent sellers who register to showcase and sell their products on the platform. They manage storefronts, upload listings, track orders, and handle inventory. Vendors rely on the marketplace to reach a broader customer base without building their own site. They benefit from tools like analytics, promotions, and product recommendations.
- **Customers**: Shoppers who visit the platform to browse, compare, and purchase products from multiple vendors in one place. They expect a smooth shopping experience with secure payments, product reviews, and fast delivery. Customers benefit from features like search filters and order tracking. Their satisfaction directly impacts the success and growth of the marketplace.
- **Admin**: The individual or team responsible for overseeing the entire marketplace operation. They manage users, approve vendors, monitor product listings, and handle disputes or policy violations. Admins ensure platform security, uptime, and smooth financial transactions. They also analyze performance data and implement strategies for growth and user engagement.
- **Software Developers/Designers:** The technical team that designs the user interface and builds the core functionality. They ensure the system is secure, scalable, and bug-free through continuous testing and updates. Their work is essential for delivering a smooth, attractive, and reliable marketplace experience. They will be responsible for the outcomes of the software.
- **Payment Gateway Providers**: Third-party services that enable secure, fast, and reliable financial transactions on the platform. They handle payment processing for customers and ensure vendors receive their earnings safely. These providers support various payment methods like credit/debit cards, mobile wallets, and bank transfers. Their role is crucial in building trust and ensuring smooth checkout experiences.

- **Marketing & SEO Team**: The team responsible for increasing the platform's visibility through digital marketing, social media, and targeted ad campaigns. They use SEO strategies to improve search engine rankings and attract organic traffic. Their efforts directly impact brand awareness, customer acquisition, and platform growth.
- **Courier Service**: Courier service plays a vital role in delivering products to the customer. Products are delivered through a courier service for those customers who are far from the business area. In this system, SA Paribahan serves the task. They ensure timely, safe, and reliable delivery, which directly affects customer satisfaction and trust in the platform.

2. Requirements Engineering Process

2.1 Stakeholder Needs & Analysis

The Primary and Secondary Stakeholders for our Multi-Vendor E-Commerce Marketplace project are categorized as follows:

Primary Stakeholders:

Primary Stakeholder refers to any person or group who will be directly involved in the core operation and use of the system.

- **Vendors**: Sell products, manage listings, and rely on the platform for business.
- **Customers**: Purchase products, leave reviews, and engage with the marketplace.
- **Admin**: Manages the platform's users, transactions, and operations.
- **Software Developers/Designers**: Build and maintain the platform's technical infrastructure.

Secondary Stakeholders:

Secondary Stakeholder refers to any person or group who will be support the primary stakeholders and influence platform success indirectly –

- **Payment Gateway Providers** : Facilitate secure financial transactions.
- **Courier/Delivery Services** : Handle product delivery logistics.
- **Marketing & SEO Team** : Promote the platform and attract users.

Requirements Elicitation:

Requirements Elicitation is the process of obtaining requirements from users, customers, and other stakeholders as part of requirements engineering. The main task of this phase is to combine the elements of problem solving, elaboration, negotiation and specification. Many difficulties were faced, like understanding the problems, making questions for the stakeholders, limited communication with the stakeholders due to a short amount of time and volatility. Here are the methods for requirement elicitation for our Multi-Vendor E-Commerce Marketplace project:

- **Surveys** : We created simple, focused questionnaires to collect feedback from potential customers and vendors about their expectations, preferences, and pain points in online shopping.
- **Interviews** : We had one-on-one conversations with vendors, admins, and developers to dive deeper into their needs, challenges, and what features would make the platform more useful for them.
- **Focus Groups** : Small group discussions with a mix of users helped us explore real-world scenarios and get honest opinions about proposed features.
- **Observation** : Watching how users interact with similar platforms to identify behavior patterns, usability issues, and improvement areas.
- **Brainstorming** : Generating ideas in a team setting to explore potential features or improvements.
- **Prototyping** : Creating mockups or early versions to get user reactions and refine requirements.
- **Use Case/Scenario Analysis** : Describing how users will interact with the system to uncover hidden needs. It helps identify functional requirements by outlining real-world scenarios, ensuring the system meets user expectations in different situations.

2.2 List of Requirements

Functional Requirements :

Functional Requirements (FRs) describe what a system should do. The specific features, actions, and responses it must support to meet user needs and allow users to complete their tasks effectively. Here are some Functional Requirements (FRs) for our Multi-Vendor E-Commerce Marketplace project:

- User authentication for secure registration, login, and logout.

- Vendor store management including product creation, editing, and deletion.

- Product browsing, search, and filtering to help customers easily find items.

- Payment method options including online payment and cash on delivery.

- Shopping cart functionality for adding, updating, and removing items.

- Order management system for confirm or cancel the order before delivery.

- Role-based access control for customers, vendors, and admins.

- Product review and rating system for post-purchase customer feedback.

- Admin dashboard for user management, transaction monitoring, and content moderation.

- Contact and notification system through emails, SMS, and helpline support.

Non-Functional Requirements:

Non-Functional Requirements (NFRs) describe how the system should perform, not just what it should do. They focus on the overall quality of the system like how fast it runs, how secure it is, how easy it is to use, and whether it can handle growth. These requirements help make sure the system works smoothly, stays reliable, and gives users a good experience. Here are some Non-Functional Requirements (NFRs) for our Multi-Vendor E-Commerce Marketplace project:

- Security for protecting user data, authentication, and preventing cyber threats.

- Performance to ensure fast loading and smooth operation under heavy traffic.

- Scalability to support growth in users, products, and transactions over time.

- Availability to keep the system accessible 24/7 with minimal downtime.

- Usability to provide an intuitive and user-friendly experience for all users.

- Data integrity to maintain accuracy and consistency in all stored information.

- Internet accessibility to allow users to access the platform from anywhere.

Extraordinary requirements:

Extra-Ordinary Requirements refer to features or expectations that go beyond the standard functional and non-functional requirements. These are not essential, but they add real value if included. Here are some Extra-Ordinary Requirements for our Multi-Vendor E-Commerce Marketplace project:

- Product browsing and search by name, category, price, discount, rating, and availability.

- Order management system for viewing history, tracking orders, and delivery updates.

- Wishlist and favorites feature for saving products for later purchase.

2.3 House of Quality (QFD Integration)

Customer Requirements (CRs)

Easy Product Search and Filtering

For our multi-vendor e-commerce platform, customers must be able to search and filter thousands of products efficiently. Our website will include an intuitive search bar with category filters, price ranges, ratings, availability, and vendor-specific filtering to enhance discoverability and reduce user effort.

Secure Payment Process

Given that our platform handles transactions across multiple vendors, secure payment is a top priority. Customers expect encrypted transactions, multiple payment gateways (Stripe, PayPal), and compliance with global standards (e.g., PCI-DSS). The platform will also manage payment splitting between the vendor and admin securely.

Fast Delivery Options

As our site hosts products from various vendors in different regions, it's essential to display real-time shipping estimates. The system will integrate with third-party logistics APIs to offer multiple delivery speeds, such as standard and express shipping, depending on vendor availability.

Vendor Profile and Reviews

To foster trust in a multi-vendor environment, each vendor will have a dedicated profile page that displays their name, logo, contact information, product listings, and customer reviews. Users can view ratings and feedback, which helps build vendor credibility and enables customers to make informed decisions.

Mobile Responsiveness

Our site will be fully mobile-responsive to support users on smartphones and tablets. The responsive design ensures consistent UI/UX across all screen sizes, enabling convenient shopping and checkout on any device.

Customer Support Availability

The platform will feature live chat and chatbot integration, allowing customers to get quick answers about orders, returns, and general inquiries. Support will be accessible 24/7, improving user satisfaction and reducing bounce rates.

Easy Return and Refund Process

A simple, transparent return/refund system will be implemented. Customers can easily initiate return

requests through their order history, and the system will route these to the relevant vendor while updating status in real-time. Policies will be standardized but flexible enough to accommodate vendor-specific rules.

Engineering Requirements (TRs)

Advanced Search Algorithm

The site will implement an optimized search engine that supports keyword-based search, autocomplete suggestions, and relevance ranking. Elasticsearch or Alogia may be used for speed and scalability, especially when handling large datasets from many vendors.

Integration with Stripe/PayPal

We will integrate reliable payment processors such as Stripe and PayPal to manage customer transactions securely. These tools allow for easy handling of multi-vendor payment splits, recurring payments, and fraud detection.

Logistic API Integration

Real-time shipping data will be handled via logistics API integration (e.g., Ship Rocket, FedEx, DHL). This enables customers to get accurate delivery estimates and tracking updates. It also streamlines vendor-side shipping label generation and fulfillment tracking.

Vendor Management Module

Each vendor will have access to a dedicated dashboard where they can manage products, orders, inventory, and pricing. The module will also allow setting individual shipping policies, offers, and return preferences. This ensures vendors can operate semi-independently within the shared marketplace.

Responsive Web Design

The front-end of the site will follow mobile-first, responsive design principles using frameworks like Tailwind CSS or Bootstrap. This ensures fast load times, adaptive layouts, and optimized performance across devices and browsers.

Return Management System

The system will include an automated return center accessible via user dashboards. Vendors will be notified of return requests, and admins can monitor compliance. The system will also support partial refunds, exchanges, and automatic restocking.

QFD Matrix

Customer Requirements (CRs)	Search Algo	Payment Integration	Logistics API	Vendor Module	Chat System	Chat System	Return System
1. Easy search/filtering	Strong				Weak		
2. Secure payment		Strong					
3. Fast delivery options			Strong				
4. Vendor profile/reviews				Strong			
5. Mobile responsiveness	Weak	Weak	Weak	Weak	Strong	Weak	Weak
6. Customer support availability						Strong	
7. Easy return/refund process							Strong

3. Requirements Modeling

Requirement Modeling is the process of visually or structurally representing the system requirements to understand, analyze, and communicate what the system should do. It helps developers, designers, and stakeholders see the functional and non-functional needs of a system before development begins.

Use case diagram:
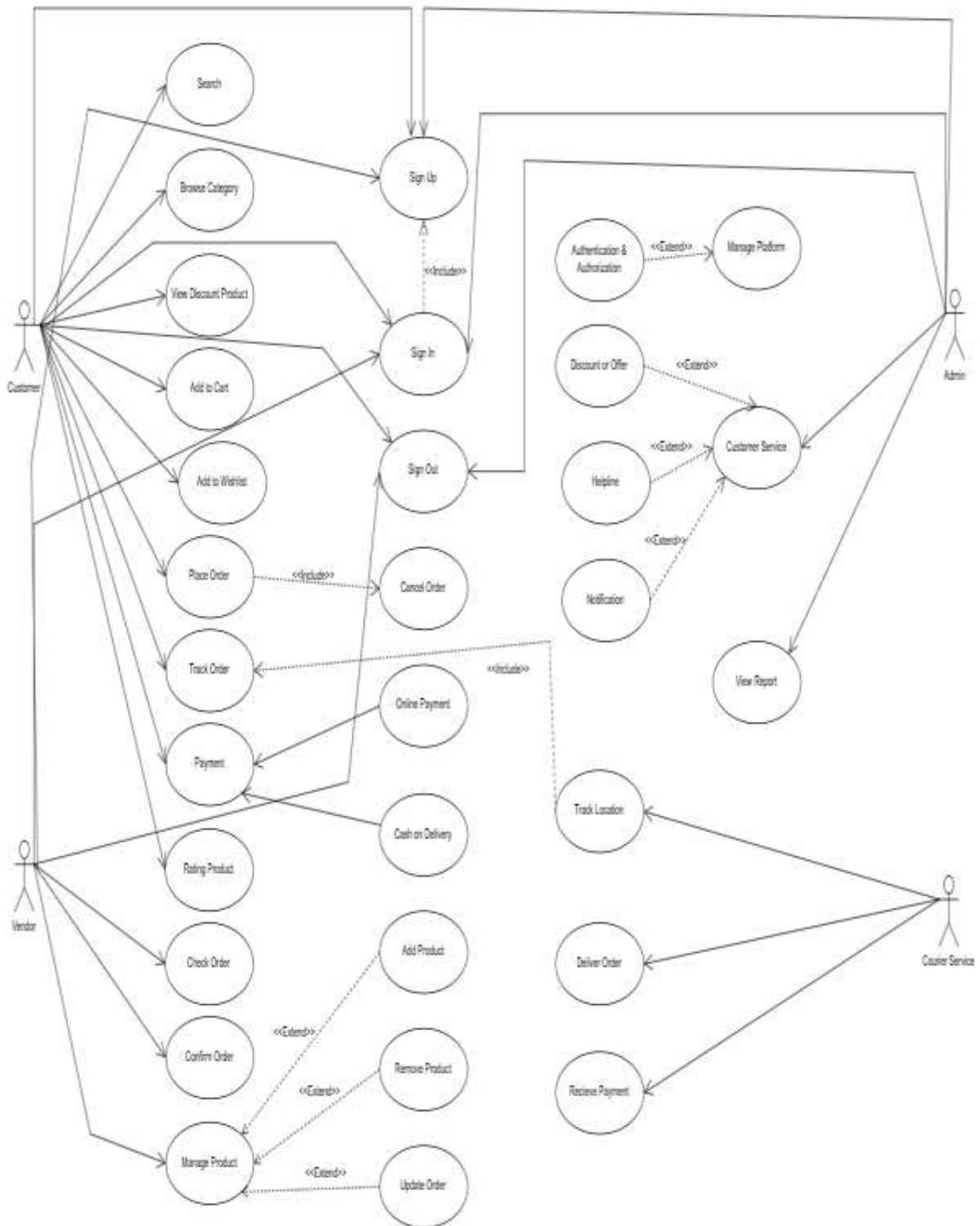
Use case diagram Step by Step:

Figure 1: Level 0 for Multi-Vendor E-Commerce Marketplace
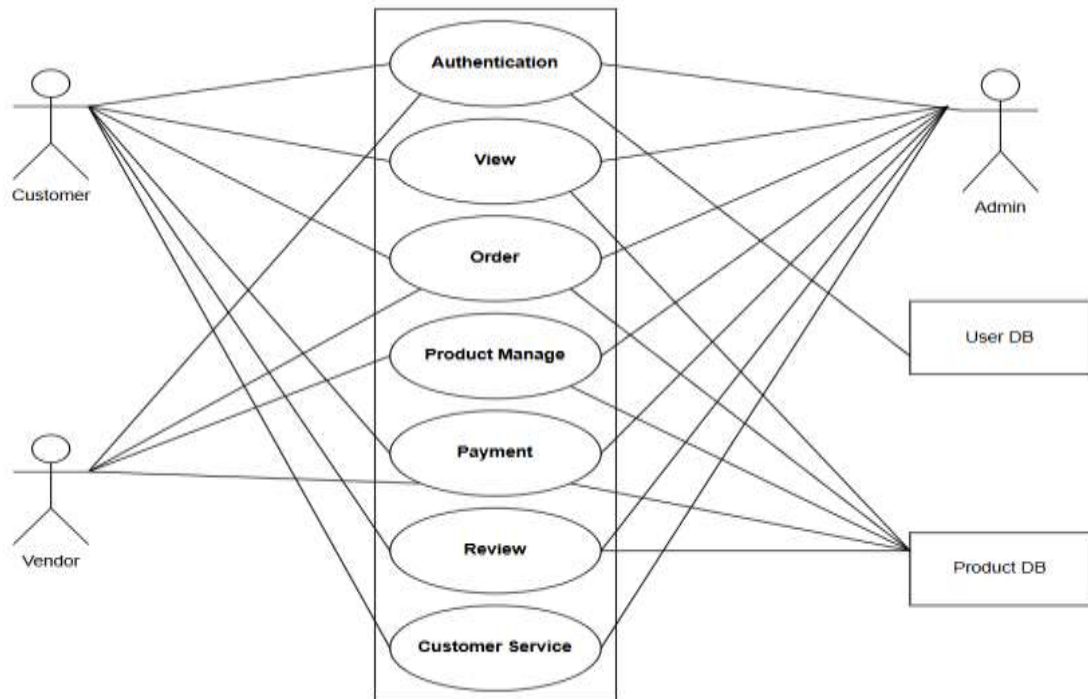
Figure 2: Level 1 for Multi-Vendor E-Commerce Marketplace
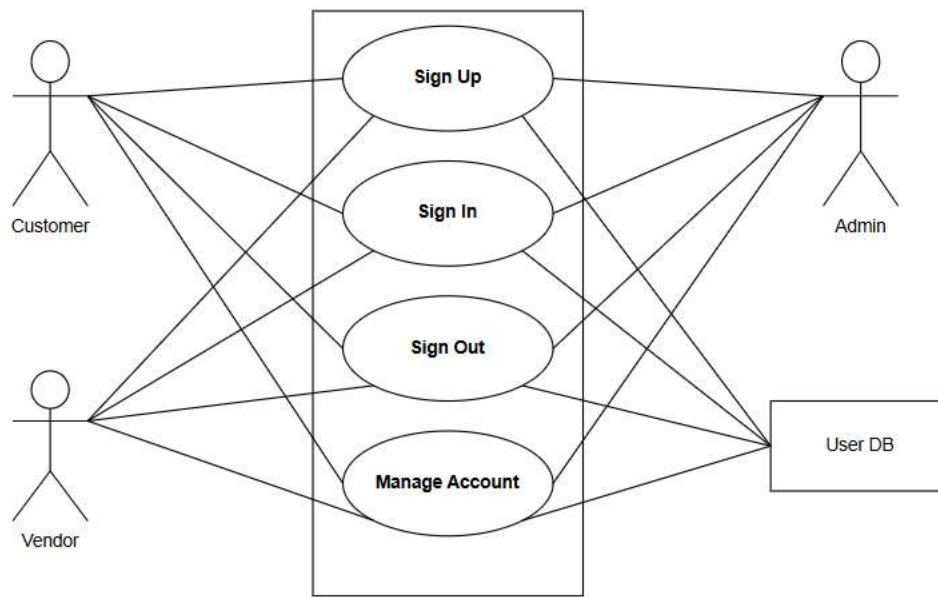
Figure 3: Level 2.1 for Multi-Vendor E-Commerce Marketplace
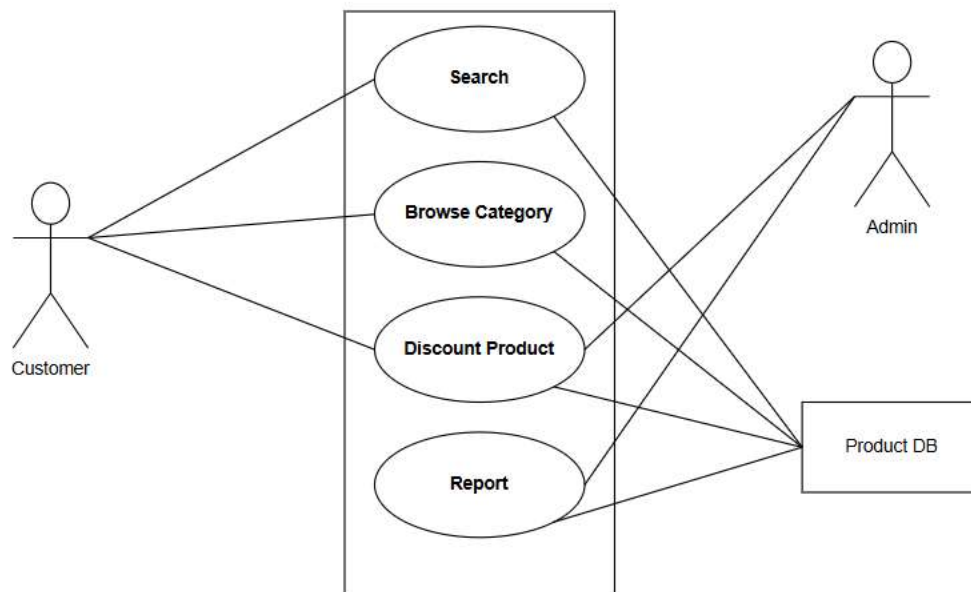
Figure 4: Level 2.2 for Multi-Vendor E-Commerce Marketplace
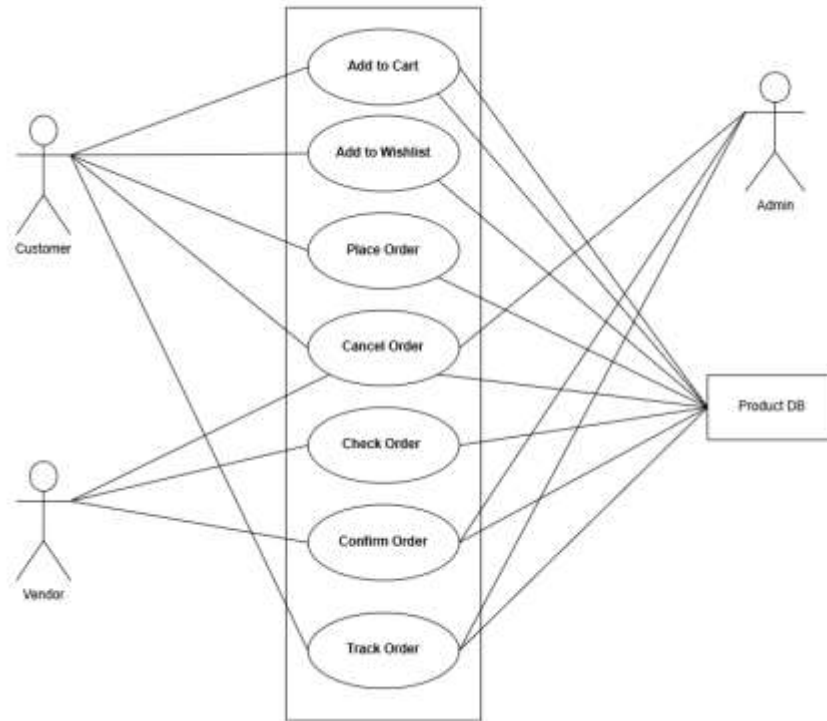
Figure 5: Level 2.3 for Multi-Vendor E-Commerce Marketplace
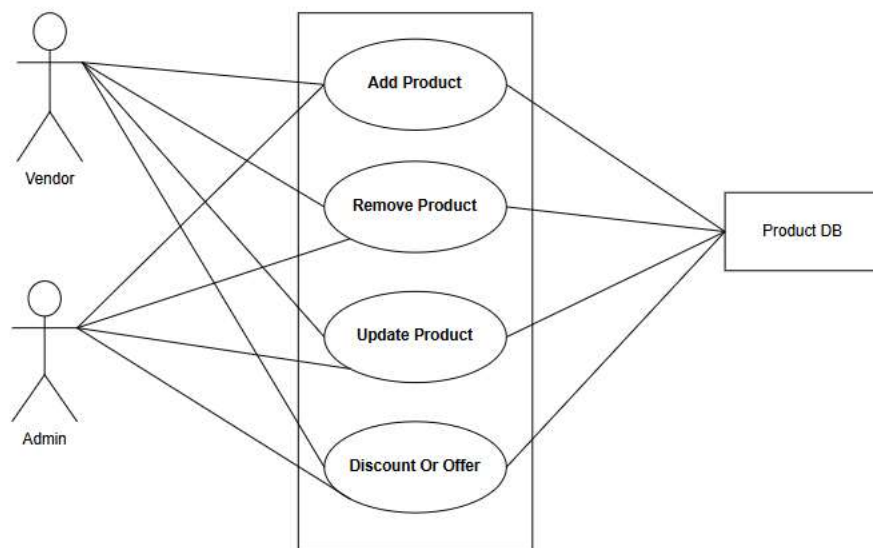
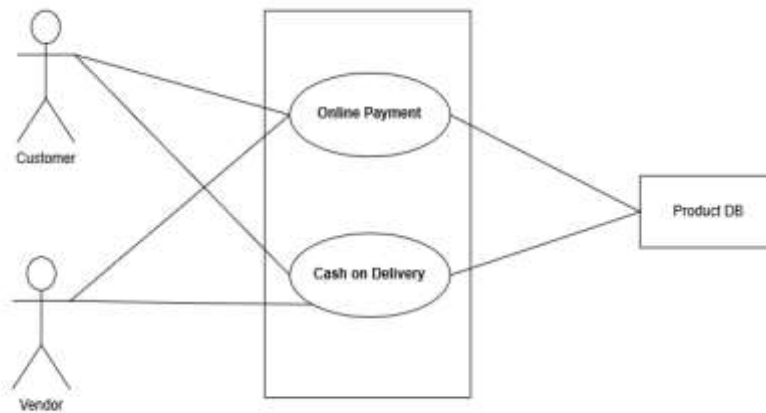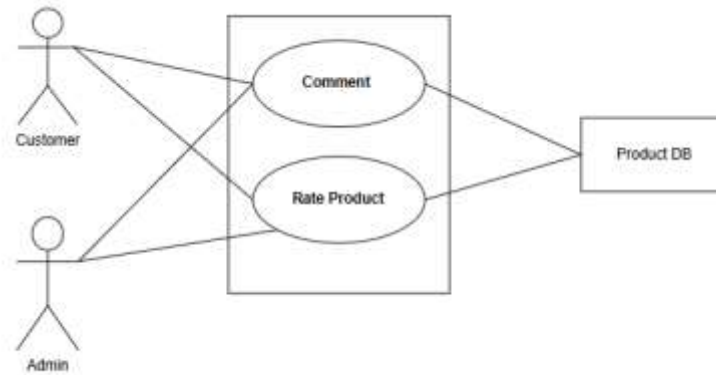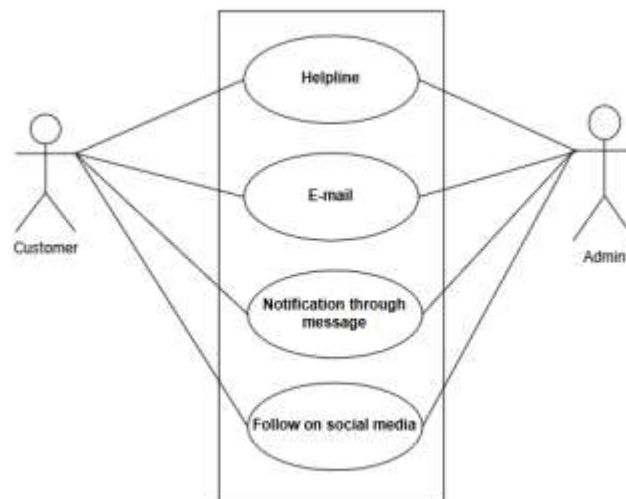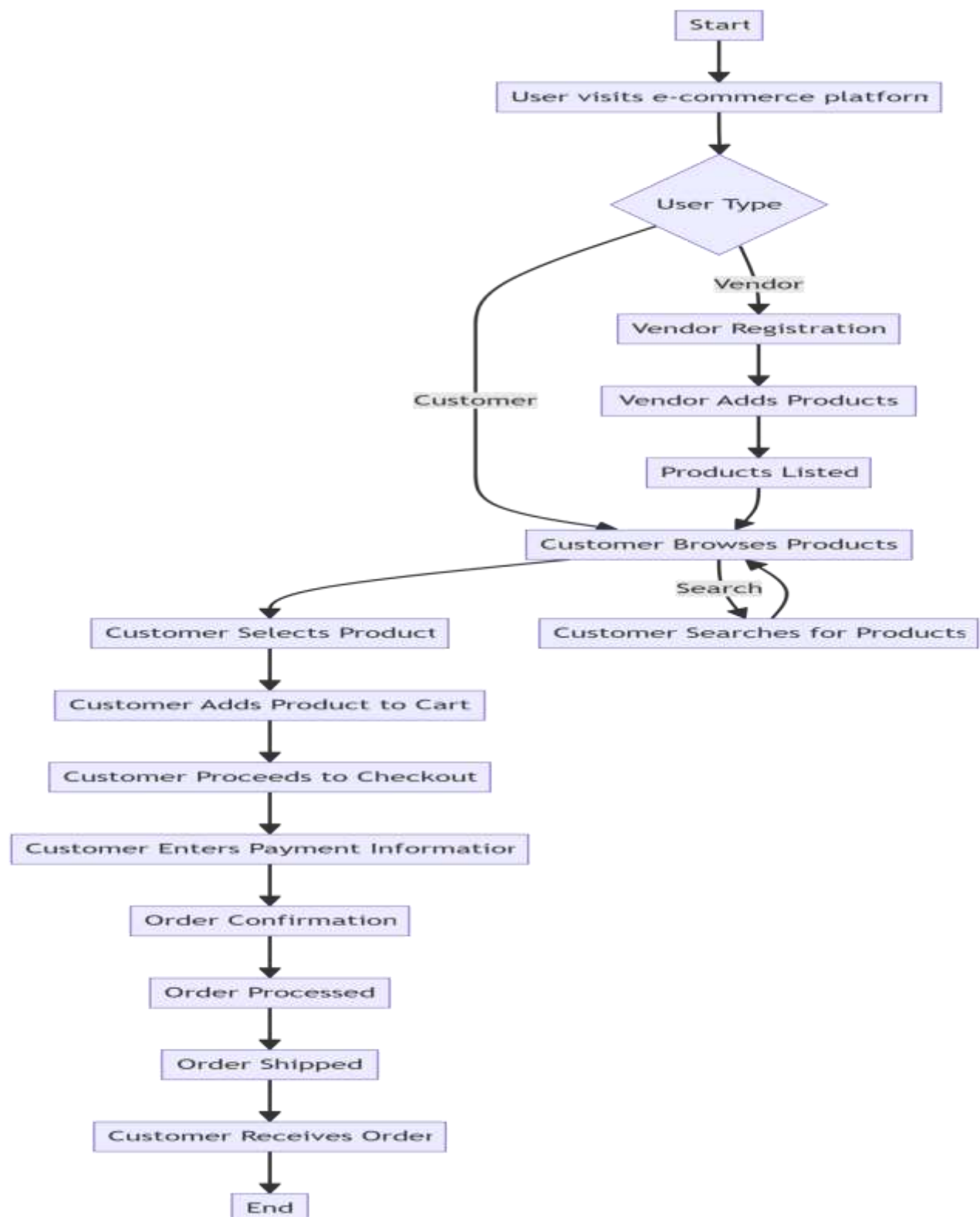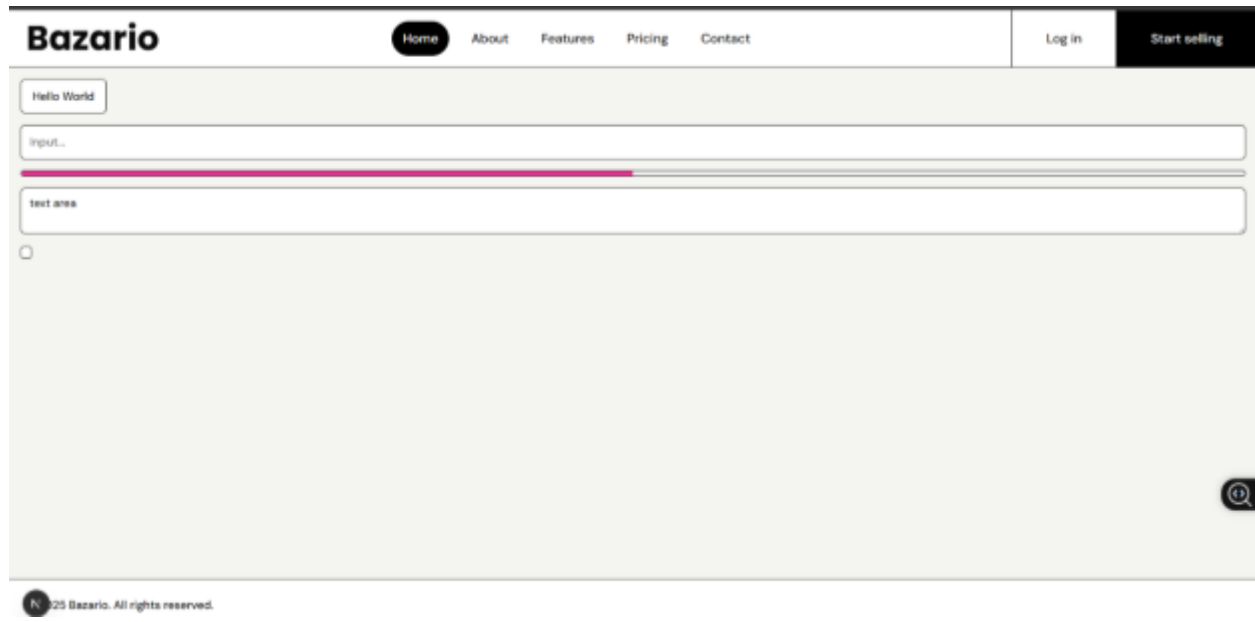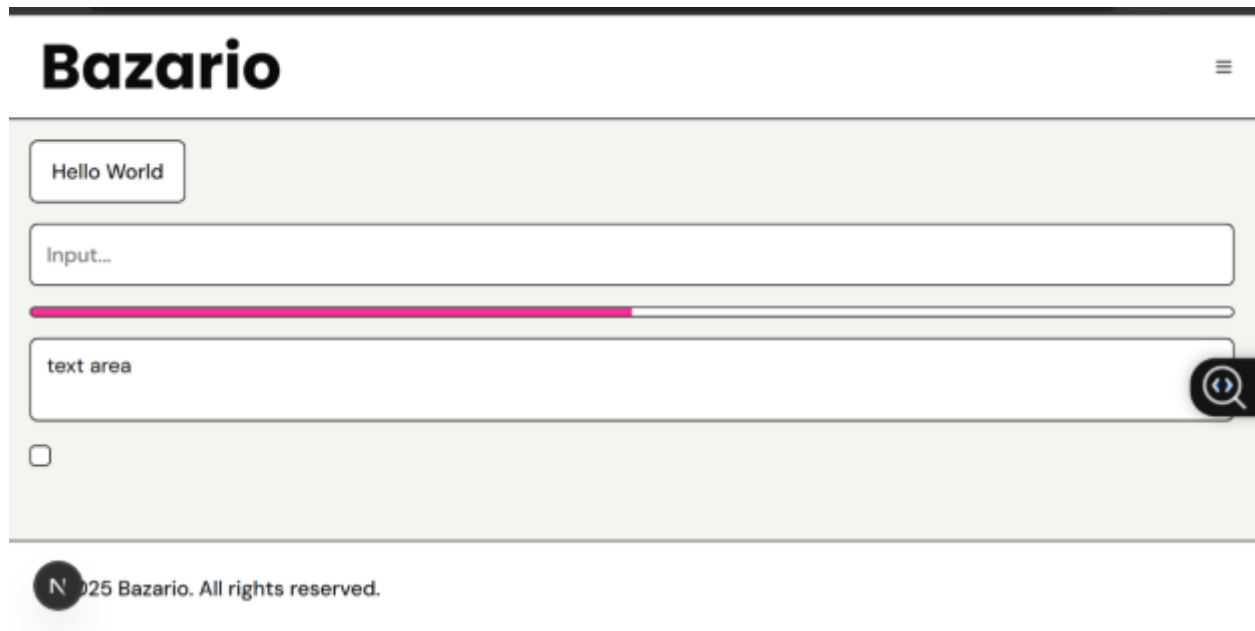Figure 6: Level 2.4 for Multi-Vendor E-Commerce Marketplace

Figure 7: Level 2.5 for Multi-Vendor E-Commerce Marketplace

Figure 8: Level 2.6 for Multi-Vendor E-Commerce Marketplace

Figure 9: Level 2.7 for Multi-Vendor E-Commerce Marketplace

<u>Activity diagram:</u>

Prototyping Screen Shots:

1. Homepage Layout PC format

2. Homepage Layout Mobile format

3. Menu Layout Mobile format
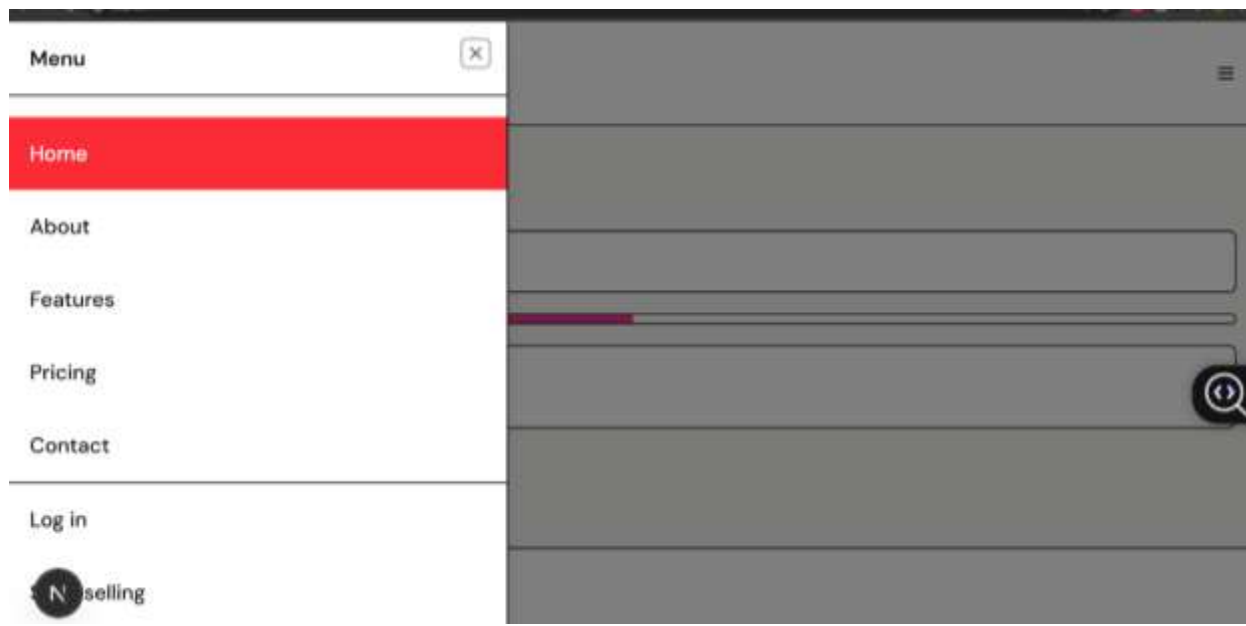
4. About us, Contact, Pricing, Features, etc, pages

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Features
Welcome to our features page!

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Pricing
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Contact Us
Welcome to our contact page!