



Deal Detective

A Price Comparison Website

Software Engineering Course Project

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Acknowledgement and Apology

Dear Prof.Amjad Hudiab,

We are writing this to sincerely apologize for submitting the project poorly and it did not meet the standards you expect and deserve. Upon reflecting on your valuable feedback, we realized the areas where we fell short and have worked diligently to address those shortcomings.

Your expertise and guidance have always been invaluable to us, and we regret that our initial submission did not fully reflect the knowledge and skills you have imparted to us. We have since revisited our project, corrected our mistakes, and implemented improvements based on your insights. This revised version demonstrates a more thorough understanding of the concepts and methodologies you have taught us.

We are truly grateful for your patience and encouragement throughout this process. Your commitment to our growth has inspired us to strive for excellence, and we are confident that this updated submission better aligns with the high standards you have instilled in us.

Thank you for your understanding and for giving us the opportunity to learn from this experience. We deeply appreciate your mentorship and support.

With sincere apologies and gratitude,
Deal Detective Team

Deal Detective

Summary:

Deal Detective is a price comparison website designed to simplify the shopping process by aggregating prices and product information from local and online retailers. Its primary objective is to provide users with a comprehensive platform for finding the best deals while offering detailed product descriptions, user reviews, and price trends to support informed purchasing decisions. The website includes key features such as user account management, advanced product search with filters, wish-list functionality, notifications for price changes, multilingual support, and location-based recommendations. Retailers can integrate their product data through APIs or web scraping, enabling real-time price updates and affiliate links for user purchases. Admins are equipped with tools to manage platform content, retailers, and analytics. Built using HTML, CSS, JavaScript, PHP, MySQL, and web scraping frameworks, the platform focuses on scalability, security, and usability. The project addresses challenges like maintaining accurate data scraping, ensuring performance under high traffic, and complying with data protection regulations like GDPR. Testing methodologies, including functional, usability, performance, and security testing, ensure the platform delivers a seamless, reliable, and secure experience for users. With its modular design, featuring subsystems for user management, product handling, and analytics, Deal Detective offers a robust solution to the complexities of modern shopping, creating significant value for consumers and retailers alike.

1. Chapter One: Introduction

1.1 Overview (Idea): **Deal Detective** is a price comparison website designed to help customers find the best prices for the products they are searching for, whether from local shops or online retailers. The website compares prices and product details from multiple sources, offering users the most up-to-date pricing information. In addition to providing price comparisons and recommends places or online shopping websites to get your product, **Deal Detective** offers detailed product descriptions and user-generated reviews, helping shoppers make more informed decisions. By merging price data with valuable user insights and product details, **Deal Detective** ensures that users can find the right product at the best possible price, making it easier to shop smartly and efficiently.

1.2 Main Objectives: The primary objective of **Deal Detective** is to create an easy to use platform that not only compares product prices from a wide range of local and online retailers but also provides crucial product information and customer reviews. This project aims to streamline the shopping experience by reducing the time users spend searching across multiple platforms and giving them a comprehensive view of available deals in one place. The website will be equipped with search functionality that allows users to input the name or category of a product and immediately see the prices from different sources. Along with price comparisons, it will feature reviews and detailed product information to help users choose the right product based on price, quality, and user feedback.

1.3 Main Motivations: The motivation behind **Deal Detective** comes from the need to simplify the increasingly complex process of shopping both online and locally.

As consumers, it can be frustrating to search across multiple websites and stores to find the best price, not to mention the difficulty of choosing the right product amidst a flood of options and opinions. This project seeks to provide a single, reliable platform that solves both of these problems by presenting users with real-time price comparisons and relevant information about products, including user reviews. From a developer's perspective, the project is an opportunity to tackle real-world challenges like web scraping, data management, and user interface design, while creating a practical and valuable tool for everyday consumers.

1.4 Constraints: The main constraint will be ensuring the accuracy of the price data collected through web scraping from different websites and stores that we collaborated with. Some shops may change their layouts & prices frequently, which can break the scraping process, requiring constant maintenance. Additionally, scraping multiple websites might be slow or blocked by some platforms, so we'll need to find ways to make the process efficient without overwhelming the server or being blocked. Managing large numbers of data efficiently and keeping the website fast and responsive for users will also be key challenges.

1.5 Similar Projects:

Examples of similar projects are:

- **Google Shopping:** <https://shopping.google.com/>
- **PriceRunner:** <https://www.pricerunner.com/>
- **Shopzilla:** <https://www.shopzilla.com/>
- **Honey:** <https://www.joinhoney.com/>

-These websites also offer price comparison features, but each has different approaches to the range of stores covered, features offered, and user interface design. However, **Deal Detective** stands out because of its focus on not just online stores but also local shops, which gives users the advantage of finding deals close to their location.

Additionally, **Deal Detective** integrates product information and user reviews more thoroughly, giving consumers a well-rounded shopping experience that balances both price and quality. This approach provides a richer shopping experience, combining price comparison with meaningful insights that help users make informed choices.

1.6 Project Organization:

This project will be organized into phases: the planning phase (defining requirements, identifying key features), design (creating the user interface and backend structure), implementation (developing the web scraping mechanisms, frontend, and backend), testing (ensuring data accuracy, speed, performance, and user experience), and deployment (hosting the website, ensuring scalability, and monitoring performance). We will also be using version control to track progress, and regular maintenance will be required to keep the data updated and relevant.

2. Chapter Two (Project Management)

2.1 Feasibility Study

2.1.1 Technical Feasibility

Website Development : Website development involves the process of building the **Deal Detective** platform, a price comparison website that combines price data, product details, and user reviews to offer a seamless shopping experience.

Database Management:

The database stores and manages the website's critical data, including product information, prices, user reviews, and user profiles.

Compliance and Regulations: we need to ensure that the "Deal Detective" platform operates legally and ethically by following regulations such as **GDPR (General Data Protection Regulation)**, WCAG (Web Content Accessibility Guidelines), Local Privacy Laws and ensure the platform is secure from data breaches and unauthorized access.

Scalability: we need to ensure that our website can handle an increasing number of users, products, and data sources without compromising performance or reliability.

Security and privacy : Ensuring the security and privacy of user data is essential for **Deal Detective** to build trust and comply with legal requirements by minimizing data which is done by collecting only the data required for functionality ,avoiding storing sensitive data unless absolutely necessary. Also publishing a clear and comprehensive privacy policy helps .

User interface and experience : The success of our website heavily relies on creating a user-friendly and visually appealing interface that provides a seamless shopping experience .We can build a UI Using a clean and modern design with a professional color palette for trust and reliability ,Highlight important elements like "Best Deals" or "Add to Favorites" with accent colors and Adding a logo and consistent branding across all pages. As for the user experience we need to ensure the website is intuitive, efficient, and satisfying to use.

Testing and validation : ensure that **Deal Detective** is functional, reliable, secure, and provides an excellent user experience. We need to Verify that all features work as intended such as Search functionality, Filters and sorting. We also need to ensure the website performs well under different conditions like stress or loading, ensure the website is user-friendly and intuitive and ensure the website works across different devices, browsers, and operating systems.

2.1.2 Operational Feasibility

Customer acceptance: It refers to the final stage in the development process, where the platform is tested by the end-users to ensure it meets their expectations, needs, and requirements. This is crucial for validating that the project delivers value and is ready for deployment.

Engaging Stakeholders : is the process of involving all key parties ; individuals or groups who are affected by or can influence the project in decision-making, planning, and execution to ensure the project aligns with its objectives and stakeholders' needs such as Project Team , users, partners, supervisors, investors or sponsors:

Risk assessment : is the process of identifying, analyzing, and mitigating potential risks that could negatively impact the success of the Deal Detective project. This ensures proactive planning to minimize disruptions, financial losses,

and technical failures . As we develop strategies to address risks and ensure the project remains on schedule, within budget, and meets quality standards.

User training and support: It ensures that end users and stakeholders understand how to use the Deal Detective platform effectively. Providing accessible training and ongoing support enhances user satisfaction, reduces confusion, and promotes platform adoption.

Continuous maintenance and updates: This process ensure that the Deal Detective platform remains reliable, secure, user-friendly, and relevant over time. This involves proactively addressing technical issues, incorporating new features, and adapting to changing user needs or technological advancements.

Reliability and strength: Reliability ensures that **Deal Detective** consistently performs its intended functions under expected conditions without failures, while **strength** refers to the platform's hardiness to handle increased demands, resist vulnerabilities, and adapt to challenges.

2.1.3 Legal Feasibility

Data Privacy and Protection: Data privacy and protection are critical for building trust with users and complying with legal and ethical standards. This involves safeguarding user data from unauthorized access, misuse, and breaches while ensuring transparency about how data is collected, stored, and used.

Data Usage and Ownership: are essential considerations for platforms like **Deal Detective**, which collect, process, and manage user and product data. These concepts ensure clarity about how data is used, who controls it, and how ownership is managed, while maintaining ethical and legal compliance. As **Data usage** refers to how data is collected, processed, and utilized to achieve the platform's objectives. This includes improving functionality, personalizing user experiences,

and generating insights for decision-making. While **Data ownership** refers to the rights and responsibilities associated with the data collected by the platform. It determines who controls the data, how it can be used, and who is accountable for it.

Table 1 shows the needed Hardware and Software

	Description	Quantity	Unit Price (ID)	Total Price	Note
HD1	PC	4	800	3200	Development Machine
HD2	Backup Storage Device	2	790	1580	External Hard Drive or Cloud Storage Service
HD3	Laptop	2	500	1000	
HD4	Testing devices	2			For testing the responsiveness and user experience on mobile devices (1 iOS device, 1 Android device)
SW1	Web development				Back-end framework
SW2	<u>HTML,CSS, Java script,PHP</u>				Front-end technologies
SW3	MySQL				Database management system to store product information, pricing,

SW4	Version Control System	-	Free		Git for version control to track development progress and collaboration.
SW5	Web Hosting and Cloud Services	-	250/month	3000 (estimated/year)	Hosting platform (e.g., AWS, Azure) to deploy and scale the platform.
Total				8,780	

2.3 The Schedule and The Estimated Time

2.3.1 Schedule

Table 2 shows the project schedule

Task ID	Description	Duration Time	Dependencies	Staff	Resources
1	Define project requirements	5 days	None	Saif,Haneen, Raghad,Fares	
2	Information Gathering	10 days	T1(m1)		
3	Writing functional and nonfunctional Requirements	5 days	T2(m2)	Saif,Haneen, Raghad,Fares	
4	Training and documentation	10 days		Saif,Haneen, Raghad,Fares	Figma, StarUML

					and Word
5	Design development	30 days	T4, T3 (m3)	Saif,Haneen, Raghad,Fares	Figma , VS
6	Testing	5 days	T5(m4)	Saif,Haneen, Raghad,Fares	
7	Launch and marketing	7 days	T6 (m5)	Saif,Haneen, Raghad,Fares	

2.3.2 Pert Diagram

Figure 1 Shows presentation for Pert Diagram

The critical path T4, T5, T6, T7 It identifies the longest sequence of dependent tasks that must be completed on time for the overall project to finish within the planned schedule, and it needs 52 working days to complete it.

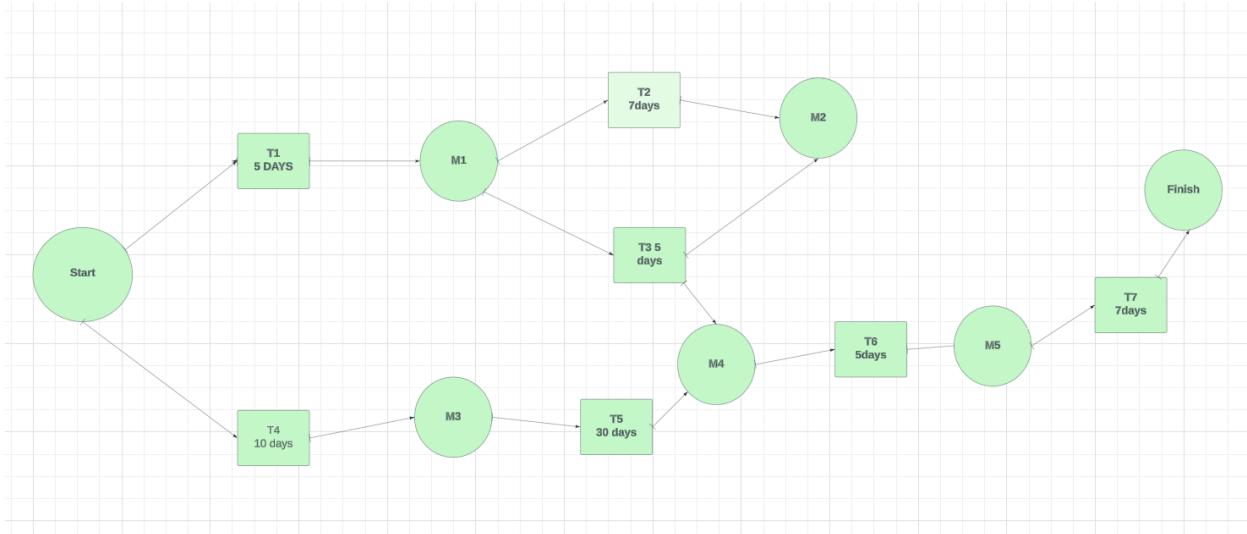


Figure 1 pert diagram

3. Chapter Three (Project Specifications)

3.1 Stakeholders

The stakeholder refers to “a person, group or company that is directly or indirectly involved in the project and who may affect or get affected by the outcome of the project”.

Table 3 shows the stakeholders

ST ID	Stakeholder	Description
ST 1	End users (Consumers)	Shoppers who use the platform to compare prices and find the best deals, they Provide feedback on usability and features and use the platform for product searches and comparisons.

ST 2	Retailers and Vendors	Online and local retailers whose products and prices are displayed on the site collaborate to share product and price data and offer deals and promotions.
ST 3	Development Team	Software engineers, web designers, and testers building and maintaining the platform. They develop, implement, and maintain platform features, address technical issues and implement improvements.
ST 4	Support Team	Customer service representatives handling user issues and queries. They assist users with platform navigation and address complaints or technical problems while also providing feedback to developers.
ST 5	Regulatory Bodies	Authorities enforcing compliance with legal and ethical standards to ensure adherence to data privacy laws and regulate ethical practices (e.g. web scraping compliance).

3.2 Data Gathering Techniques

3.2.1 Interview

For **Deal Detective**, we will conduct one-on-one interviews with various stakeholders to gather qualitative insights about their needs and experiences with searching for the best prices and shopping online in Jordan. Interviews will be recorded and analyzed to identify themes and inform the platform's development.

Target Interview Groups:

- **End Users (Consumers):** we will interview individuals to understand their shopping behaviors, preferences, and challenges when comparing product prices online or in-store.
- **Retailers and vendors:** Interviews with our different retailers and vendors to learn about their expectations from a price comparison platform, their willingness to collaborate, and any concerns they may have.

3.2.2 Asking a Business Expert

To gain insights from business experts to understand the market dynamics, competition, and revenue generation models for a price comparison platform in Jordan, we conducted interviews with business experts in this sector. This included:

- **E-commerce business owners:** An e-commerce specialist provides insights into online shopping trends, consumer behavior, and digital retail strategies. They can help identify the most popular product categories and features that resonate with online shoppers, ensuring the platform aligns with user expectations.
- **Developers and Business Owners:** These individuals provided expertise on technology trends, platform development considerations, and ensuring a user-friendly experience for both consumers and our staff.

By focusing on these experts we gained valuable information about market needs, potential challenges, and best practices for **Deal Detective's** development. Their insights helped us incorporate strategic considerations and ensure the platform's success in the Jordanian market.

3.2.3 Survey

in addition to interviews, we will utilize a survey to gather broader insights from a larger pool of potential **Deal Detective** users. This survey will help us understand:

- **Identifying User Needs and Preferences:** The survey will provide valuable insights into what users prioritize when comparing prices, such as real-time data accuracy, product

reviews, price history, or notifications for discounts. This helps shape the platform's features to align with their expectations.

- **Understanding Shopping Behavior:** By gathering information on how often users compare prices, where they shop (online or in-store), and the tools they currently use, the survey will help the team understand user habits and pain points. This ensures the platform addresses real-world challenges effectively.

The screenshot shows a Google Forms survey titled "Deal Detective's Survey". The survey consists of several questions:

- How often do you compare prices before making a purchase?** (radio button options: Always, Sometimes, Rarely, Never)
- What is the biggest challenge you face when comparing prices for the same product?** (radio button options: Finding accurate and up-to-date prices, Visiting multiple websites or stores, Lack of product reviews, Inconsistent information, Other: _____)
- What is your primary occupation? *** (radio button options: Student, Working professional, Business owner, Homemaker, Retired)
- How often do you shop online? *** (radio button options: Daily, Weekly, Monthly, Rarely, Never)
- Would you use a platform that shows prices * for the same product across multiple stores and websites to help you find the cheapest price?** (radio button options: Yes, No)

- **Evaluating Future Demand:** The survey will allow users to rank or select desired features (e.g., wishlist, filters, price tracking), helping prioritize development efforts. It also uncovers unmet needs, enabling the platform to offer unique functionalities that differentiate it from competitors.

Survey link:[<https://forms.gle/pMgzYxdXK4vbZPbo8>]

Figure 2: Survey

3.3 Functional Requirements

Functional requirements specify the functions or capabilities that a software system must perform. They describe what the system should do and define its behavior under specific conditions. Functional requirements generally detail the various

functionalities, operations, and specific tasks that the software needs to accomplish to meet the user's needs or business objectives.

Table 4 shows the functional requirements

Requirements ID	Functional Requirement	Description	Priority	Increment
FR-01	User Sign Up	Allows new users to create an account.	High	Increment 1
FR-02	User Login	User Login: Enables users to log into their existing account.	High	Increment 1
FR-03	User Log Out	Users can Log out securely terminating their session.	High	Increment 1
FR-04	Password Reset	Allows users to reset their password Or recover it incase forgotten.	High	Increment 1
FR-05	Search Functionality	Enable users to search for products by name, category, or keywords.	High	Increment 1
FR-06	Price Comparison Display	Display a list of retailers with their respective prices for a searched product.	High	Increment 1
FR-07	Product Filters and Sorting	Provide filtering options (e.g., by price, rating, location)	Medium	Increment 2

		and sorting features.		
FR-08	Retailer Integration	Aggregate product and pricing data from online and local retailers.	High	Increment 1
FR-09	User Reviews and Ratings	Allow users to view and submit reviews/ratings for products and retailers.	Medium	Increment 2
FR-10	Price History Tracking	Show historical price trends for products over time.	Low	Increment 3
FR-11	Notifications and Alerts	Notify users about price drops, new products, or deals based on their preferences.	Medium	Increment 2
FR-12	Favorites/Wishlist	Allow users to save products to a favorites or wishlist section.	Low	Increment 3
FR-13	Affiliate Link Integration	Redirect users to retailer websites for purchases through affiliate links.	High	Increment 1
FR-14	Admin Dashboard	Provide an admin interface for managing retailers, product data, and user accounts.	High	Increment 1

FR-15	Retailer Analytics Dashboard	Provide retailers with analytics about user behavior and sales performance.	Low	Increment 3
FR-16	Multi-language Support	Allow users to switch between different languages.	Low	Increment 4
FR-17	Mobile Responsiveness	Ensure the platform works seamlessly on mobile devices.	High	Increment 1
FR-18	Security and Authentication	Implement secure login, encryption, and user data protection mechanisms.	High	Increment 1
FR-19	Help and Support	Provide a help section with FAQs support contact options.	Medium	Increment 2
FR-20	Advanced Search (Voice/AI-based search)	Enable users to perform advanced or voice-based searches for convenience.	Low	Increment 4
FR-21	Geo-location Integration	Provide location-based product suggestions and retailer options.	Medium	Increment 3
FR-22	Advertisement Management	Display targeted advertisements based on user preferences and behavior.	Low	Increment 4
FR-23	Transaction Tracking	Enable users to track their	Low	Increment 3

		purchases via affiliate links.		
FR-24	User profile management	Enable users to manage their personal information and preferences	Low	Increment 1
FR-25	User Authorization	Define and manage access levels based on user roles.	High	Increment 2
FR-26	Updates Section	Displays Patch Notes When Updated	Low	Increment 4
FR-27	Email Communication	Sends Discount Offers Alerts and More Using Email	Medium	Increment 3
FR-28	Terms of Services	Displays Certain Rules Regarding the Website For legality Purposes	High	Increment 5
FR-29	Audit Trail	For Admin Purpose to View Certain Critical Cases Using the Database System	High	Increment 5
FR-30	SMS Notifications	Sends Verification Codes or Alerts Using SMS	High	Increment 3
FR-31	User Feedback	Users can keep us updated if there are bugs or errors within the website	Medium	Increment 2

3.4 Non-functional Requirements

Non-functional requirements (NFRs) represent the aspects of a system that describe its operation, capabilities, and constraints, which are not directly related to the system's functionalities or specific behavior's. These requirements usually specify the quality attributes, performance expectations, security measures, usability factors, and other characteristics that define how the system should perform rather than what it should do. The non-functional requirements are shown in The Table below.

NFR-ID	Category	Requirements	Description	Priority
NFR-01	Performance	Fast Interaction	Pages should load in under 2 seconds for most users as well as Optimized Functions	High
		Handles Many Users	The site should work smoothly even with 20,000+ people using it at the same time.	High
		Quick Searches	Search results for products and prices should appear within 1 second.	High
NFR-02	Usability	Easy to Use	The design should be clear and simple for users of all ages With Simplified UI.	High
		Mobile Friendly	The site should look and work well on smartphones and tablets.	High
		Accessible for All	Follow accessibility standards to ensure people with disabilities can use the website easily.	High

Table 5 shows the non functional requirements

NFR-03	Availability	Always Online	The site should be available 99.9% of the time, with minimal downtime.	High
		Backup Plan	Have regular backups to recover the site quickly during issues.	High
		Handle Errors Gracefully	If something goes wrong, the site should show clear error messages without crashing.	Medium
NFR-04	Maintainability	Easy to Update	The website's code should be organized so updates and fixes are simple to apply.	Medium
		Clear Instructions	Developers should have well-written documentation for working on the project.	Medium
		Regular Maintenance	The system should allow scheduled updates with minimal disruption for users.	Medium
NFR-05	Scalability	Grow with More Users	The system should be able to expand easily if the number of users or data grows.	High
NFR-06	Reliability	Accurate Price Data	Ensure that the price information displayed is always correct and updated regularly.	High
NFR-07	Security	Protects The Users Data	Ensure That Users Are Browsing Safely Through The Website	High

		Block Hackers	The system should detect and prevent unauthorized access or bots.	High
		Secure Payments	If payments are integrated, ensure all transactions are encrypted and safe	High

3.5 Domain Requirements

Domain requirements refer to the specific needs, constraints, rules, and conditions that are unique to the domain or industry in which a software system is being developed. A "domain" in this context refers to the area or field of application for the software.

Table 6 shows the domain requirements

DR-ID	Category	Requirements	Description	Priority
DR-01	Core Features	Product Search	Allow users to search for products using keywords, filters, and categories.	High
		Price Comparison	Display prices from multiple retailers for the same product in a clear and organized way.	High

		Product Details	Provide detailed information about each product, including specifications and images.	High
		Retailer Links	Include direct links to retailer websites for purchasing the products.	High
DR-02	User Interaction	User Accounts	Allow users to create accounts for saving preferences and past searches.	Medium
		Wishlist/Bookmarks	Enable users to save favorite products or comparisons for later review.	Medium
		Product Alerts	Notify users about price drops or product availability.	Medium

DR-03	Content Management	Product Categories	Organize products into categories for easy navigation (e.g., Electronics, Fashion, Home).	High
		New Products	Ensure newly added products appear quickly in relevant categories and searches.	High
		Retailer Management	Allow admins to manage retailer information, such as links, logos, and partnership terms.	High

DR-04	Customization	User Preferences	Allow users to set preferences, like preferred currency or brands, for personalized results.	Medium
		Language Support	Provide the option to display the website in multiple languages based on the user's location.	Medium
		Currency Conversion	Display product prices in the user's preferred currency with real-time exchange rates.	Medium
DR-05	Data Management	Data Accuracy	Validate all product data to ensure it is correct and consistent.	High
		Real-Time Updates	Ensure product prices and availability are updated in real-time or as frequently as possible.	High

DR-06	Legal/Compliance	Partnership Agreements	Ensure compliance with agreements between the website and retailers.	Medium
		Fair Representation	Present retailer and product information impartially without favoring specific partners.	Medium

DR-07	Customer Support	Help Center	Provide a dedicated section for FAQs, troubleshooting, and contact support.	High
		Feedback System	Allow users to submit feedback or report issues with products or retailers.	Medium

3.6 Requirements Analysis and the Architecture Design

3.6.1 Requirement analysis

The requirement analysis requires identifying and categorizing the functional requirements (FRs). It involves understanding, documenting, through a workflow and validating the features and constraints of the "Deal Detective" platform to ensure it aligns with user needs, business goals, and technical feasibility. And Where Grouped .

Group 1: User Management Subsystem

Purpose (P1): Main Purpose is for the user to Create and Manage their Accounts

Functional Requirements:

FR-01: User Sign Up

FR-02: User Login

FR-03: User Log Out

FR-04: Password Reset

FR-24: User profile management.

FR-25: User Authorization

Group 2: Product Management Subsystem

Purpose (P2): Store, organize, and manage product information. Update product details like price, stock, and descriptions in real-time. Functional requirements:

FR-06: Price Comparison Display.

FR-07: Product Filters and Sorting.

FR-10: Price History Tracking.

FR-13: Affiliate Link Integration.

FR-29: Audit Trail

Group 3: Search and Filtering Subsystem

Purpose(P3): Allow users to search for products and filter results based on various criteria or Sort results (price, popularity, rating).

Functional Requirements:

FR-05: Search Functionality.

FR-07: Product Filters and Sorting (Duplicated).

FR-12: Favorites/Wishlist.

FR-20: Advanced Search (Voice/AI-based search).

Group 4: Content and Communication Subsystem

Purpose(P4): Manage and present content to educate and communicate with Customers Using FAQs Emails and more.

Functional Requirements:

FR-19: Help and Support.

FR-30: SMS Notifications.

FR-27: Email Communication

Group 5: Analytics and Reporting Subsystem

Purpose (P5): Provide insights for Product Analytics, platform performance, user activity, and trends.

Functional Requirements:

FR-09: User Reviews and Ratings.

FR-10: Price History Tracking.

FR-13: Affiliate Link Integration.

FR-14: Admin Dashboard.

FR-12: Retailer Analytics Dashboard.

FR-23: Transaction Tracking.

Group 6: Technicality and Bilingual Subsystem

Purpose (P6): Main Purpose of this Subsystem is for it to be global in terms of deliveries Or Languages and deal with All kinds Of Technicalities.

Functional Requirements

FR-16: Multi-language Support.

FR-17: Mobile Responsiveness.

FR-21: Geo-location Integration.

FR-22: Advertisement Management.

FR-28: Terms of Services.

3.6.2 The Architecture Design

This design provides a high-level overview of how the system components interact and function together.

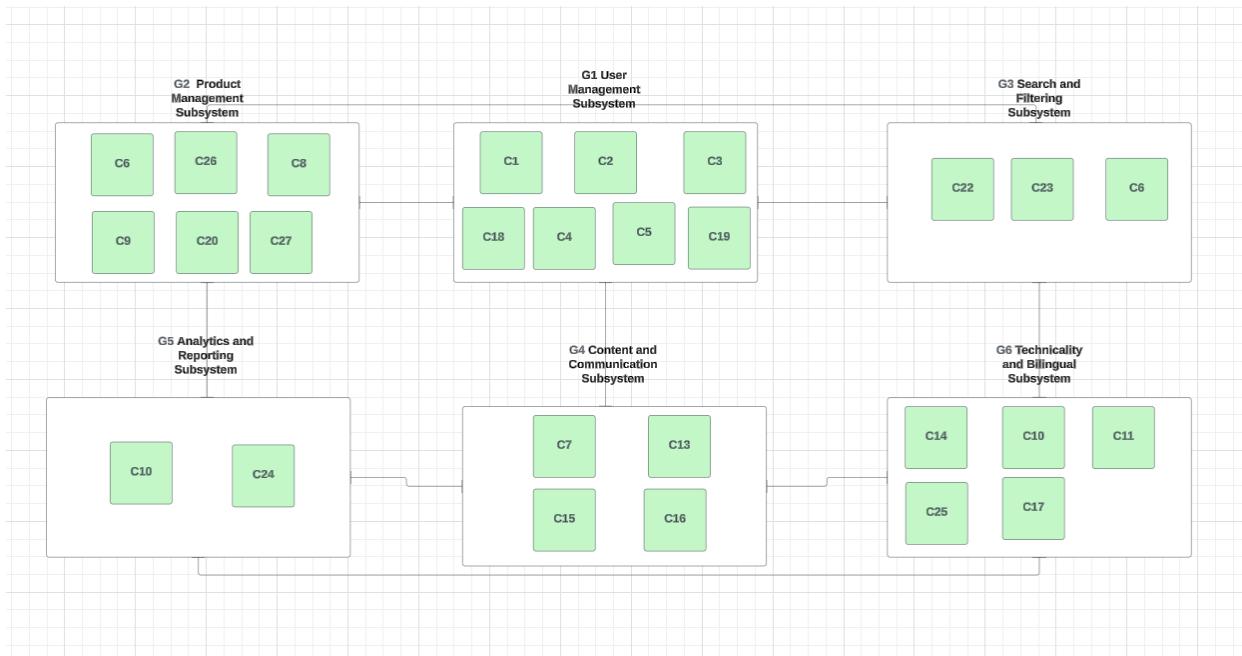


Figure 3: Architecture design

A Simplified table That Explains What each component Does

Table 7

Components	Name	Functional Requirements ID
C1	Authentication and User Management	FR01, FR02, FR03
C2	Session Management Component	FR02
C3	Password Recovery Component	FR04
C4	Secure Authentication Module	FR18
C5	User Profile Management Component	FR24, FR25
C6	Product Search and Filter Service	FR05, FR07
C7	Notification and Communication Service	FR11, FR27, FR30
C8	Wishlist Management Component	FR12
C9	Retailer Integration Component	FR08, FR13
C10	Analytics and Reporting Module	FR14, FR15, FR29
C11	Multi-language and Accessibility Module	FR16, FR17
C13	Advertisement Management Module	FR22
C14	Legal System Management	FR-28
C15	News and Updates Component	FR-26
C16	Feedback Module	FR-09, FR-31
C17	Location Of the User	FR-21

C18	Two-Factor Authentication Service	FR-19
C19	Biometric Authentication Module (FR20)	FR-20
C20	Dynamic Pricing Engine	FR-25
C22	Voice Search Capability	FR-5
C23	Image-Based Search Module	FR-5
C24	Content Moderation Module	FR-24
C25	Multi-Language Content Translation Engine	FR-16
C26	Product Comparison Tool	FR-23

3.6.3 Sub-System analysis

User Management Subsystem:

Handles user-related functionalities including registration, login, password management, and secure authentication. This subsystem ensures that user data is securely managed and that users can access and update their profiles. Each subsystem is responsible for a specific set of tasks and collectively contributes to the overall system operation.

Functional Requirements:

- FR-01: User Sign Up
- FR-02: User Login
- FR-03: User Log Out
- FR-04: Password Reset
- FR-24: Profile Management
- FR-25: User Authorization

Search and Filtering Sub-System: enables users to efficiently search for products and refine results using keywords and category-based search, voice or AI-enhanced search for personalized results and filtering and sorting options.

Functional Requirements:

- FR-05: Search Functionality
- FR-07: Product Filters and Sorting
- FR-12: Favorites/Wishlist
- FR-20: Advanced Search (Voice/AI-based search)

Product Management Subsystem: manage and maintain all product-related data and functionalities within an application. Its primary purpose is to ensure that the products, categories, images, and related data are easily accessible, and updatable to support users, administrators, and other subsystems.

FR-07: Product Filters and Sorting.

FR-10: Price History Tracking.

FR-13: Affiliate Link Integration.

FR-29: Audit Trail

Content and Communication Subsystem: responsible for managing the flow of content and facilitating communication between users, systems, or stakeholders within a platform or application.

Functional Requirements:

FR-19: Help and Support.

FR-30: SMS Notifications.

FR-27: Email Communication

Analytics and Reporting Subsystem: gather, process, analyze, and present data to provide insights into the system's performance, user behavior, and business trends.

Functional Requirements:

FR-09: User Reviews and Ratings.

FR-10: Price History Tracking.

FR-13: Affiliate Link Integration.

FR-14: Admin Dashboard.

FR-12: Retailer Analytics Dashboard.

FR-23: Transaction Tracking

Technicality and Bilingual Subsystem: handle the technical functionalities of a system while providing support for multiple languages, ensuring accessibility and usability across diverse user bases. Functional Requirements

FR-16: Multi-language Support.

FR-17: Mobile Responsiveness.

FR-21: Geo-location Integration.

FR-22: Advertisement Management.

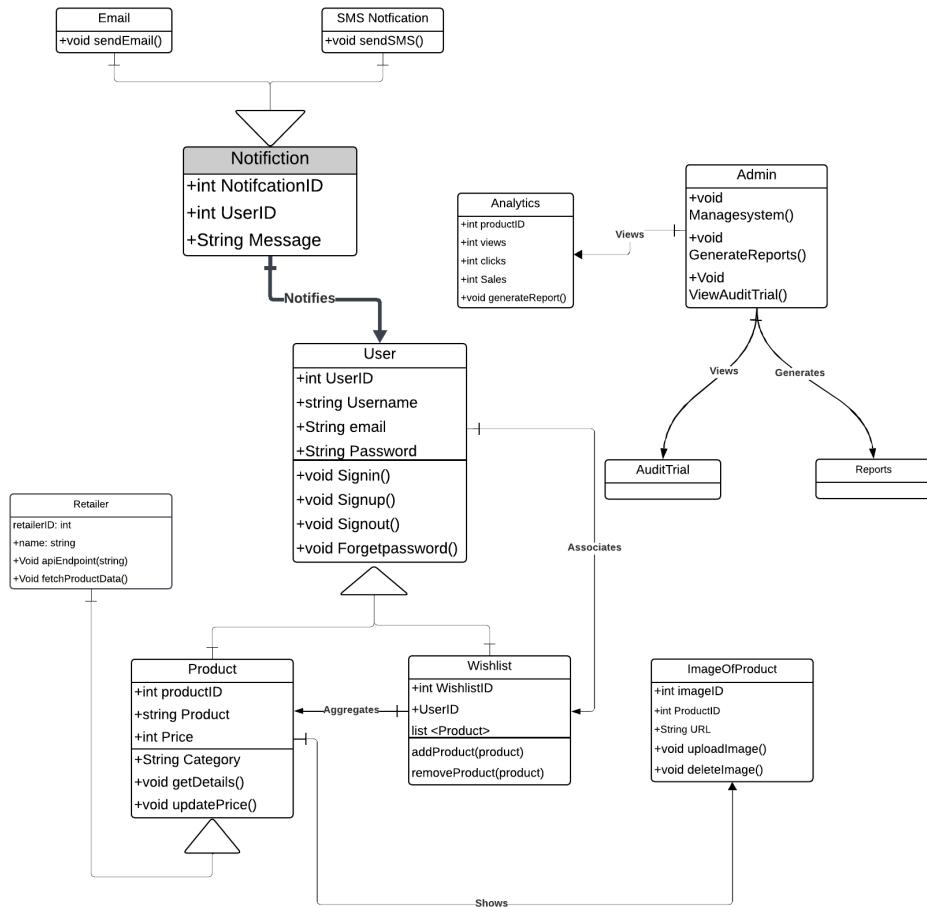
FR-28: Terms of Services.

4. Chapter Four (Project Design)

4.1 Class Diagram

The class diagram represents the structural design of a Deal Detective . It outlines the core components (classes), their attributes, methods, and relationships to define how the system operates and interacts. This diagram serves as a blueprint for developers to understand and implement the system effectively As shown Below.

Figure 4: Class diagram



The class diagram for Deal Detective illustrates the key classes involved in the system and their relationships. This diagram helps in understanding the structure and interactions within the system, particularly focusing on user management, Wishlist, Product Listing, Retailer Shopping List, and notifications.

4.1.1 Classes and Their Responsibilities

User:

Attributes:

- **userID (int)**: Unique identifier for each user.
- **username (string)**: Username for the user's account.
- **password (string)**: Password for the user's account.

- email (string): Email address of the user.

Methods:

- signUp(): Allows a new user to create an account.
- signIn(): Enables a user to log into their account.
- signOut(): Allows a user to securely log out.
- resetPassword(): Facilitates password reset for the user.

Product Class

Attributes:

- productID(int): Unique identifier for each product.
- Name(String): The name of the product.
- category: The category to which the product belongs (electronics, clothing, Accessories).
- Price(Float): The price of the product.
- retailerID(int): Identifies the retailer offering the product.

Methods:

- updatePrice(): Updates the price of a product in the system.
- getDetails(): Retrieves detailed information about the product.

Retailer Class

Attributes:

- retailerID(int): Unique identifier for each retailer.
- Name(String): Name of the retailer.
- apiEndpoint(String): API URL or endpoint for fetching product data.

Methods:

- fetchProductData(): Fetches updated product details from the retailer's system.

Wishlist Class

Attributes:

- wishlistID(int): Unique identifier for each wishlist.
- userID(int): Links the wishlist to a specific user.
- list<Product>(List): Contains a collection of saved products.

Methods:

- addProduct(): Adds a product to the user's wishlist.
- removeProduct(): Removes a product from the wishlist.
- viewWishlist(): Displays the list of saved products.

Admin Class

Attributes:

- adminID(int): Unique identifier for the administrator.
- Name(String): Name of the administrator.
- Email(String): Contact email for the admin.

Methods:

- manageRetailers(): Allows the admin to add, remove, or update retailer details.
- manageProducts(): Enables the admin to oversee product listings.
- generateReports(): Creates system usage or transaction reports

Notification:

Attributes:

- notificationID (int): Unique identifier for each notification.
- userID (int): Identifier of the user to be notified.
- message (string): Notification message content.

Methods:

- sendEmail(): Sends an email notification to the user
- sendSMS(): Sends an SMS notification to the user

4.1.1.1 Inheritance Relationships

Admin inherits from User:

Inherits general attributes and methods from User and extends them with admin-specific functionalities like managing products and retailers.

Product inherits to PhysicalProduct, DigitalProduct

Physical and digital products inherit from the Product class. Physical products deal with shipping-related details, while digital products handle file-related features.

4.1.1.2 Class Relationships and Interactions

User Associates With Wishlist: This Relationship indicates that The User Can Interact With The Wishlist Users can create a Wishlist to save items they're

interested in purchasing later. They can add or remove items from the Wishlist as they browse. Some websites allow users to organize their Wishlist into categories

Product Aggregates Wishlist: The platform pulls data from multiple e-commerce sites and stores, allowing users to add products from these various sources into a single, unified Wishlist. This enables users to track prices, availability, and details of products across different merchants in one location.

Retailer Connects Products: This Procedure Has Many Ways to Be Executed, Like Using API Integration in Which provide real-time access to their product information. This allows the aggregation platform to pull product details, prices, stock levels, and promotions Or Using XML Sheets containing detailed product information, including product name, description, price, availability, images, and more.

Admit Oversees Retailer and Product: This Relationship indicates that the admin acts as a mediator between retailers, the platform, and users, ensuring the data provided is accurate, the platform functions smoothly, and users have a seamless experience.

Admin views AuditTrail and generates Report: This relationship indicates that the admin class has functionalities to manage system operations, view audit trails, and generate reports for system performance.

Notification notifies User: This relationship signifies that the Notification class sends notifications to users via email or SMS. The Notification class interacts with the User class to deliver these messages.

4.2 Use-Case Diagram

4.2.1 Use Case Scenarios and Sequence Diagrams

4.2.1 Use Case Diagram for Customers

Stakeholder: Customer

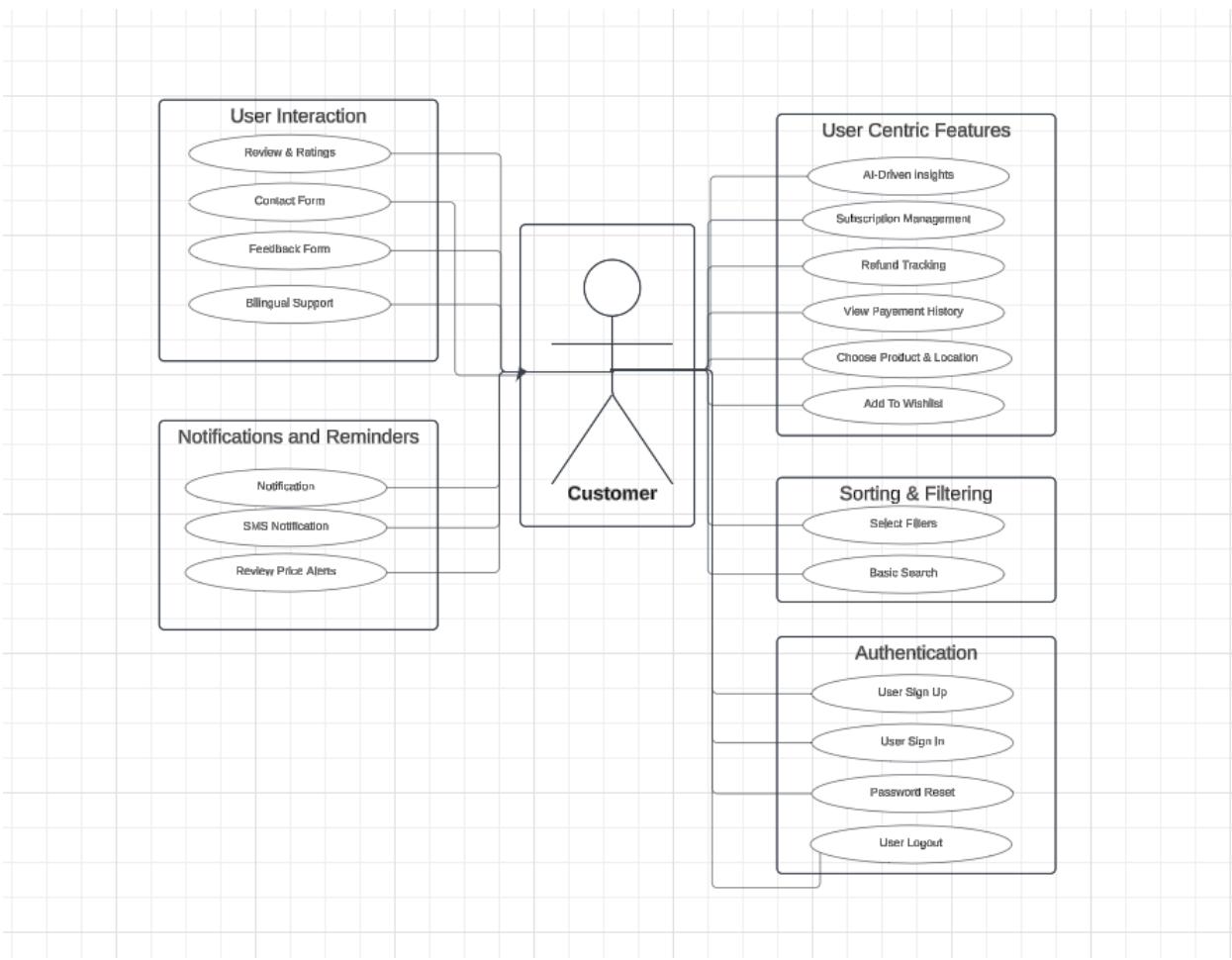
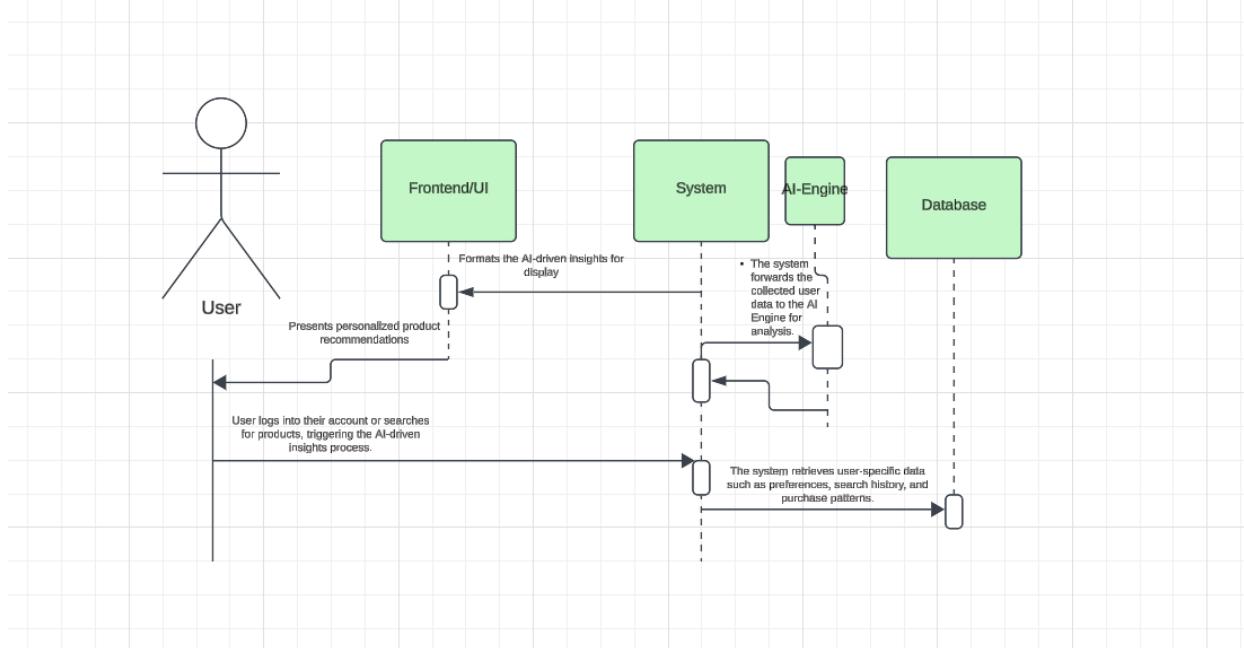


Table 8 Use case for AI driven insights

Use Case Name: AI-Driven Insights	
Actor	User (Customer), Admin, Business Expert
Description	Provides personalized product recommendations and shopping insights using AI-based analytics.

Data	User preferences, search history, purchase patterns, market trends, and retailer sales data.
Stimulus	User searches for products or logs into their account, and insights are generated based on their data.
Response	The system presents tailored recommendations, trends, and potential deals based on AI analysis.
Comments	Ensure transparency in AI decision-making and provide an option to refine or disable personalized insights.

Figure 5: AI Driven insights use case diagram



Use Case Name: Refund Tracking	
Actor	User (Customer), Admin, Retailer
Description	Enables users to track the status of their refund requests submitted through the platform.
Data	Refund request ID, user ID, purchase details, refund status, timestamps.
Stimulus	User requests the refund status via their dashboard or notification system.
Response	The system retrieves and displays the refund status, including details like "In Progress," "Approved," or "Completed."
Comments	Ensure that real-time updates are reflected and sensitive data is securely accessed.

Use Case Name: Refund Tracking

Actor	User (Customer), Admin, Retailer
Description	Enables users to track the status of their refund requests submitted through the platform.
Data	Refund request ID, user ID, purchase details, refund status, timestamps.
Stimulus	User requests the refund status via their dashboard or notification system.
Response	The system retrieves and displays the refund status, including details like "In Progress," "Approved," or "Completed."
Comments	Ensure that real-time updates are reflected and sensitive data is securely accessed.

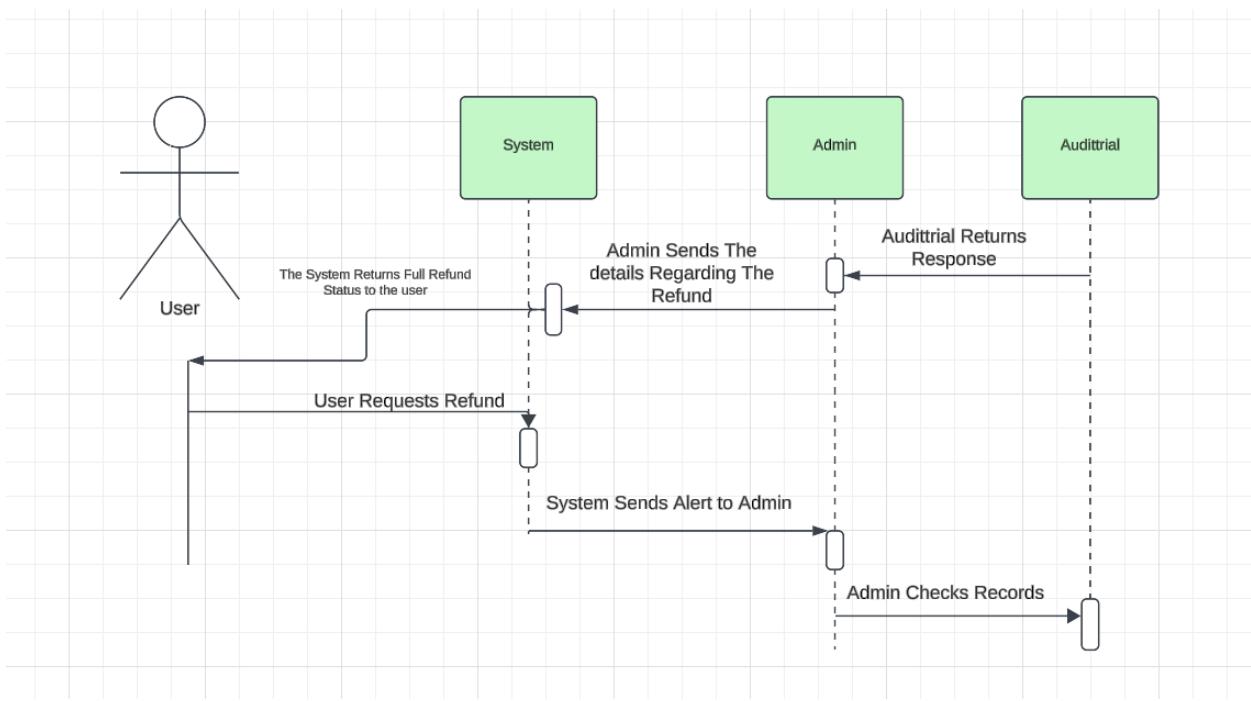


Figure 6 Refund Tracking use case diagram

Table 9: Use case for Refund tracking

Figure 7 Refund tracking use case diagram

Table 10 Subscription management use case

Use Case Name: Subscription Management	
Actor	User (Customer), Admin
Description	Allows users to manage their subscriptions (e.g., free or premium plans) and enables admins to oversee subscription settings.
Data	Subscription ID, user ID, plan details, payment information, start/end dates, and usage statistics.
Stimulus	User initiates subscription actions (e.g., new subscription, plan upgrade, or cancellation).
Response	The system processes the action, updates the database, and provides confirmation or feedback.
Comments	Ensure secure handling of payment information and provide reminders for renewal or cancellation deadlines.

Figure 8 Subscription management use case Diagram

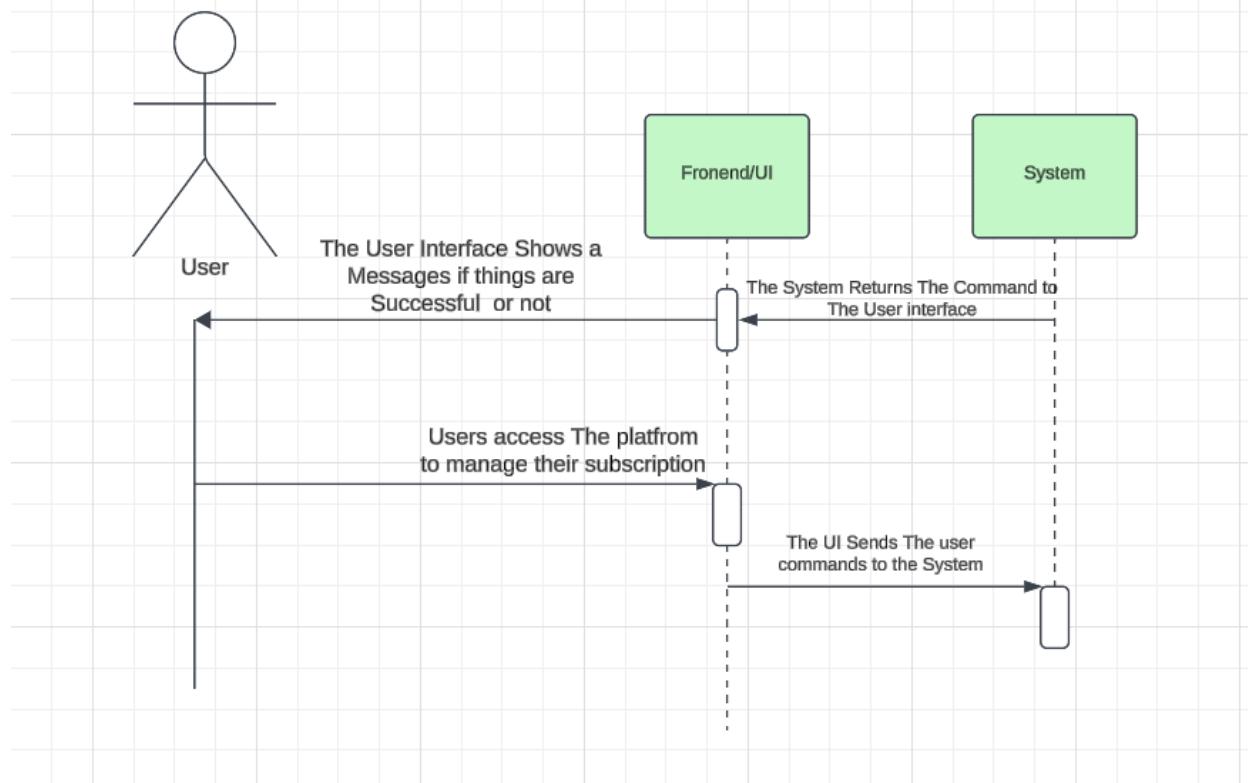


Table 11 View payment history use case

Use Case Name: View Payment History	
Actor	User (Customer), Admin
Description	Allows users to view their payment history, including transaction details and status, and enables admins to verify or resolve payment issues.
Data	Payment ID, user ID, transaction date, amount, payment method, and status (e.g., completed, pending).

Stimulus	User requests to view their payment history via their account dashboard.
Response	The system retrieves and displays the requested payment records in an organized format.
Comments	Ensure secure access to sensitive payment data and provide downloadable receipts for completed transactions.

Figure 9 View payment history use case diagram

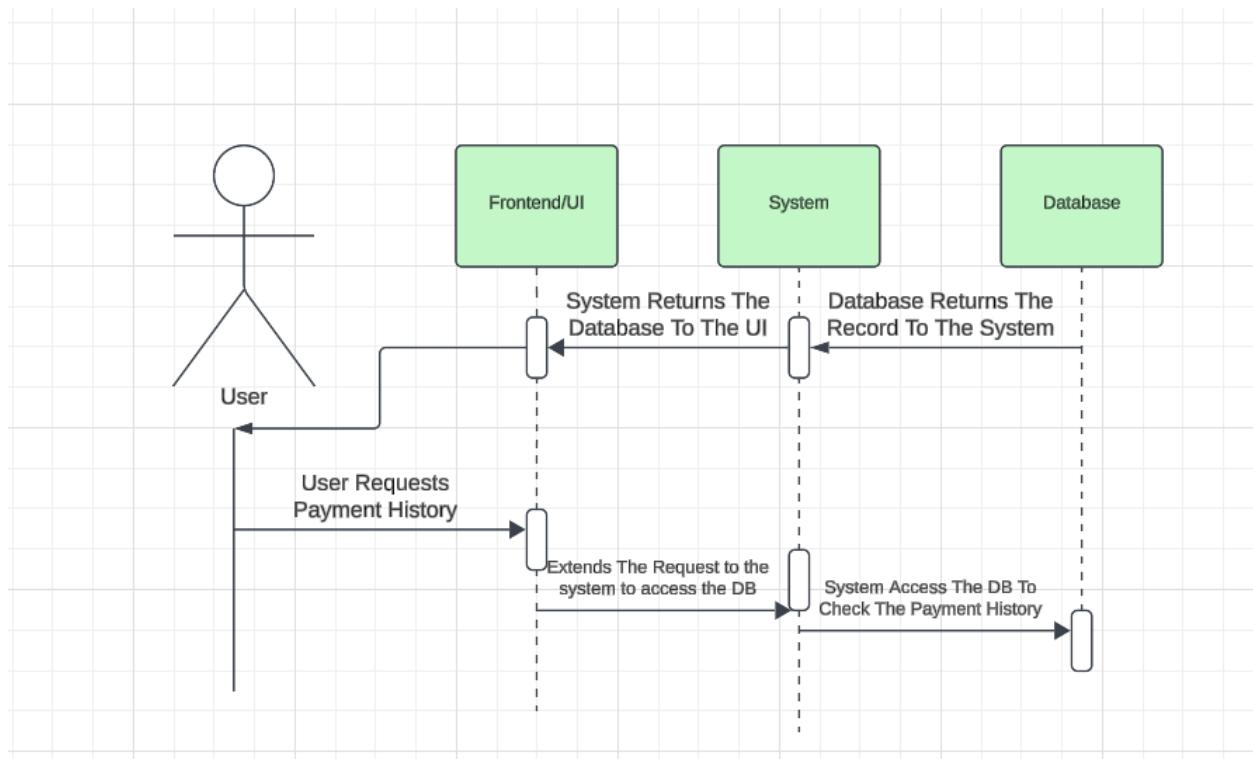


Table 12 Choose product and location use case

Use Case Name: Choose Product And Location	
Actor	User (Customer)
Description	Enables users to select a product and specify their location to display price comparisons and local availability.
Data	<p>User Input: Product name, category, or keywords; manual entry or geolocation-based location.</p> <ul style="list-style-type: none"> - System Output: Product details (name, price, retailer, availability), sorted by relevance or user preferences. - Retailer Data: Location-specific inventory and pricing information. - Filters: Options to refine results (e.g., price range, distance, product ratings).
Stimulus	User inputs product details and location information into the search field.
Response	The system processes the input, queries the database, and retrieves product and pricing details relevant to the specified location.

	<ul style="list-style-type: none"> - Results are displayed in an organized format, with options to sort or filter results further. - If no results are found, the system displays alternative suggestions or nearby locations.
Comments	<ul style="list-style-type: none"> - Ensure geolocation services are accurate and comply with privacy regulations. - Provide fallback options if location services fail (e.g., manual entry). - Include clear labels and instructions to guide users in refining their searches. - Consider incorporating features like "Products Near Me" or "Best Local Deals."

Figure 10 Production and location use case diagram

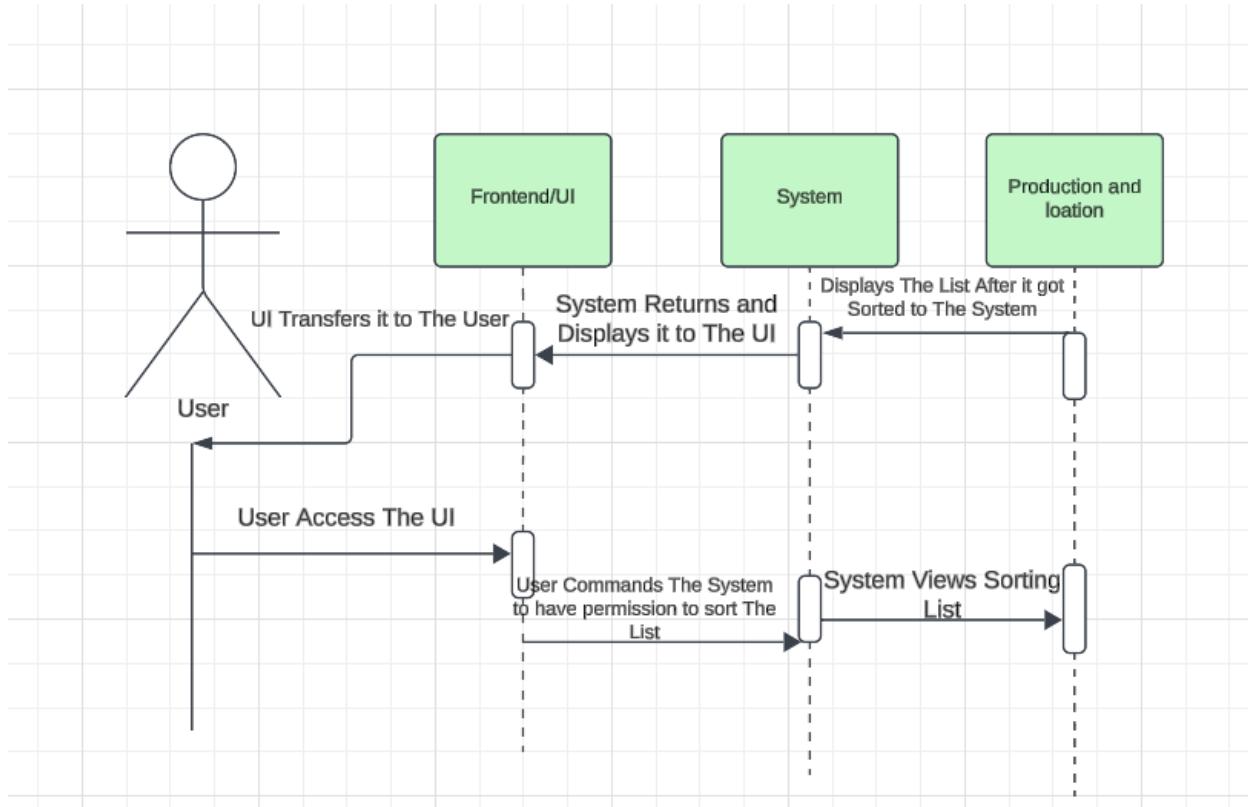


Table 13 Add to wishlist use case

Use Case Name: Add To Wish List	
Actor	User (Customer)
Description	Allows users to save a product to their wishlist for easy access and future tracking.
Data	User ID: Identifies the user who owns the wishlist. - Product ID: Identifies the product being added. - Product Details: Includes product name, price, retailer, and image URL. - Timestamp: Records the exact time the product was added.
Stimulus	User clicks the "Add to Wishlist" button on a product page.
Response	<ul style="list-style-type: none"> - The system saves the product to the user's wishlist in the database. - A confirmation message (e.g., "Product added to your wishlist!") is displayed. - If the product is already in the wishlist, a notification informs the user.
Comments	<ul style="list-style-type: none"> Ensure the user can remove items or view their wishlist at any time. - Consider adding features like sorting, categorizing, or tagging wishlist items. - Provide notifications for wishlist items when prices drop or stock is low..

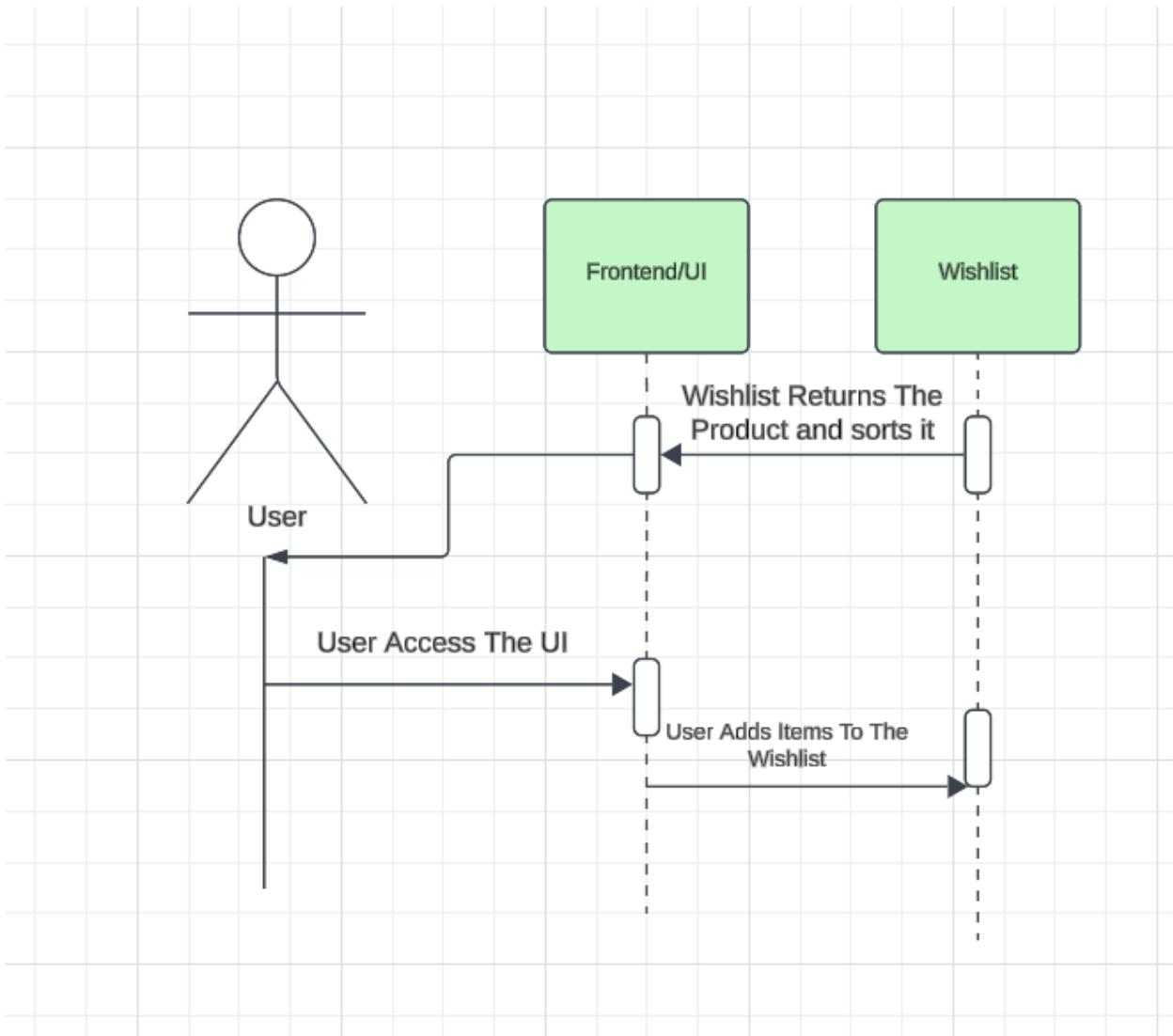


Figure 11 Add to wishlist use case diagram

Table 14 Search filters use case

Use Case Name: Search Filters	
Actor	User (Customer)
Description	Enables users to narrow down product search results using various filters such as price, brand, rating, location, and category. This helps users quickly find relevant products that match their specific preferences.
Data	<ul style="list-style-type: none"> - User Input: <ul style="list-style-type: none"> - Filter criteria (e.g., price range: \$20-\$100, brand: Nike, rating: 4+ stars, location: nearby stores). - Keywords or category for search (e.g., "smartphone," "shoes"). - System Output: <ul style="list-style-type: none"> - Filtered product list showing details like product name, price, retailer, and product image. - Total results count and available sorting options.
Stimulus	<ul style="list-style-type: none"> - User initiates a product search via a search bar or category selection. - User selects one or more filter options from a predefined list or applies custom filters (e.g., entering a specific price range or location).
Response	<ul style="list-style-type: none"> - The system processes the filter criteria and queries the product database. - Displays a refined list of products that match the filters, sorted as per user preferences (e.g., by price or rating). - If no results are found: <ul style="list-style-type: none"> - Show a "No Results Found" message.

	<ul style="list-style-type: none"> - Suggest alternative filters or categories for the user to explore.
Comments	<ul style="list-style-type: none"> - Filters should adapt dynamically based on the selected category. - Provide clear instructions or examples for each filter. - Include a "Reset Filters" option for ease of use.

Figure 12 Search filters use case diagram

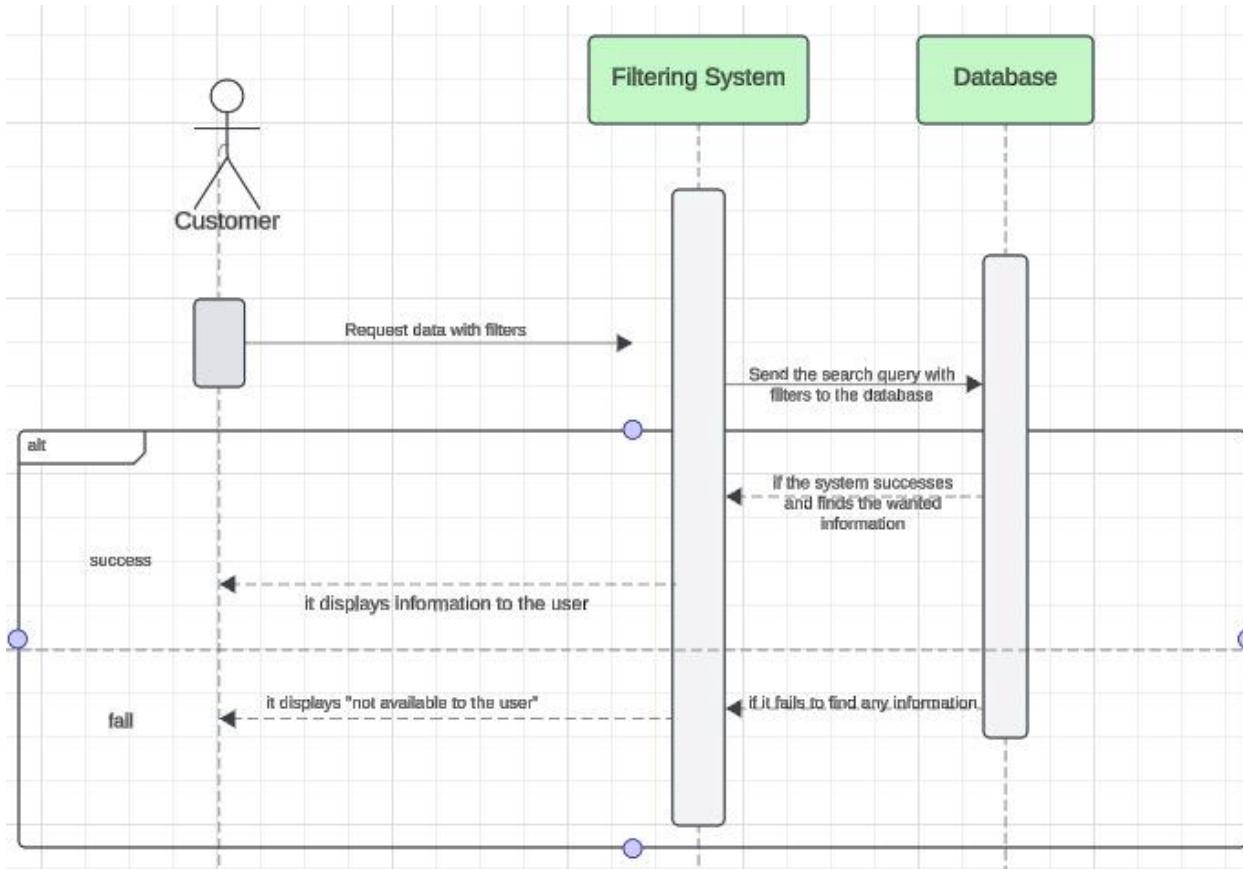


Table 15 Basic search use case

Use Case Name: Basic search	
Actor	Primary Actor: Patients - Secondary Actor: System
Description	The "Basic Search" use case allows users to quickly and easily search for products on the Deal Detective platform using simple search criteria. This feature provides users with a straightforward way to find products based on key terms like product name, quality or price.

Data	<ul style="list-style-type: none"> - Search Query: Keywords entered by the user. - Search Filters: Optional criteria like price range, category, or brand. - Search Results: Retrieved product details, including price, retailer, and ratings.
Stimulus	The user inputs a search query into the search bar and presses enter or clicks the search button.
Response	<ul style="list-style-type: none"> - The system processes the query and retrieves matching results from the database or external APIs. - Displays the results with sorting and filtering options.
Comments	<ul style="list-style-type: none"> - Ensure fast query processing for a smooth user experience. - Include autocomplete suggestions and error handling for invalid queries. - Implement caching for frequently searched items to reduce load times.

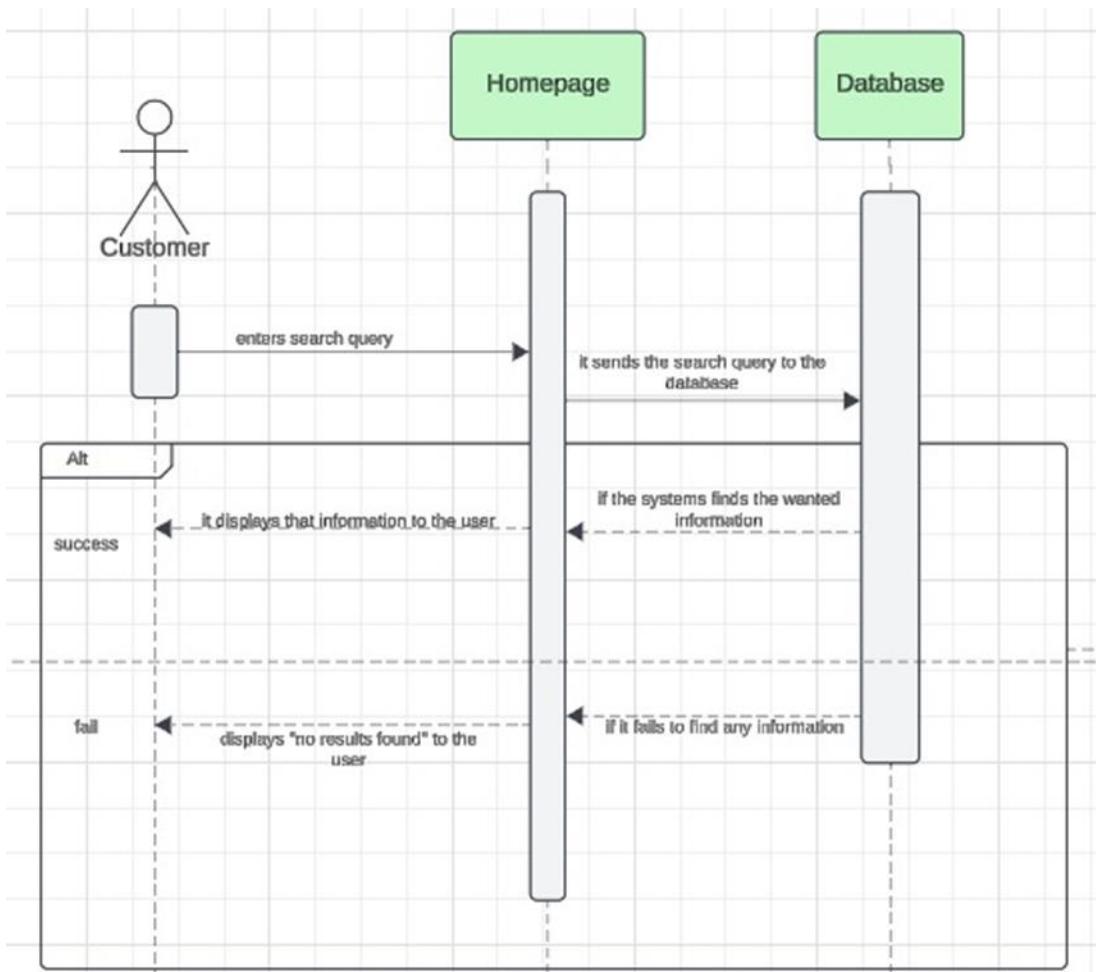


Table 16 Payment offline records use case

Use Case Name: Payment Offline Records

Actor	-Primary Actor: Customer -Secondary Actor: System
Description	This use case describes the scenario where users make payments for Products services offline, and the system records these transactions for administrative and accounting purposes.
Data	-Users Information (name, contact details) -Product Information (Name, Price, Retailer, Image) - Payment details (amount, payment method, date). - Transaction ID or reference number. - Administrator credentials (if required for updating payment records).
Stimulus	- User makes a payment for The Product offline, such as through cash On Delivery or bank transfer. - Admin/Staff: The retailer or representative who verifies and processes the offline payment. - The system needs to update the payment records accordingly
Response	-Upon receiving information about the offline payment, the staff accesses the Deal Detective platform. -The staff/admin member navigates to the payment recording section or dashboard within the system. - They input the relevant payment details, including the amount paid, payment method, date, and any additional notes. - The system updates the payment records database with the new transaction information. - Users and administrators can view the updated payment records through the platform.
Comments	- Offline payments may occur for various reasons, such as users without access to online payment methods. - It's essential to have a streamlined process for recording offline payments to maintain accurate financial records and ensure transparency for both users and The Deal Detective Platform

Figure 13 Payment offline records use case diagram

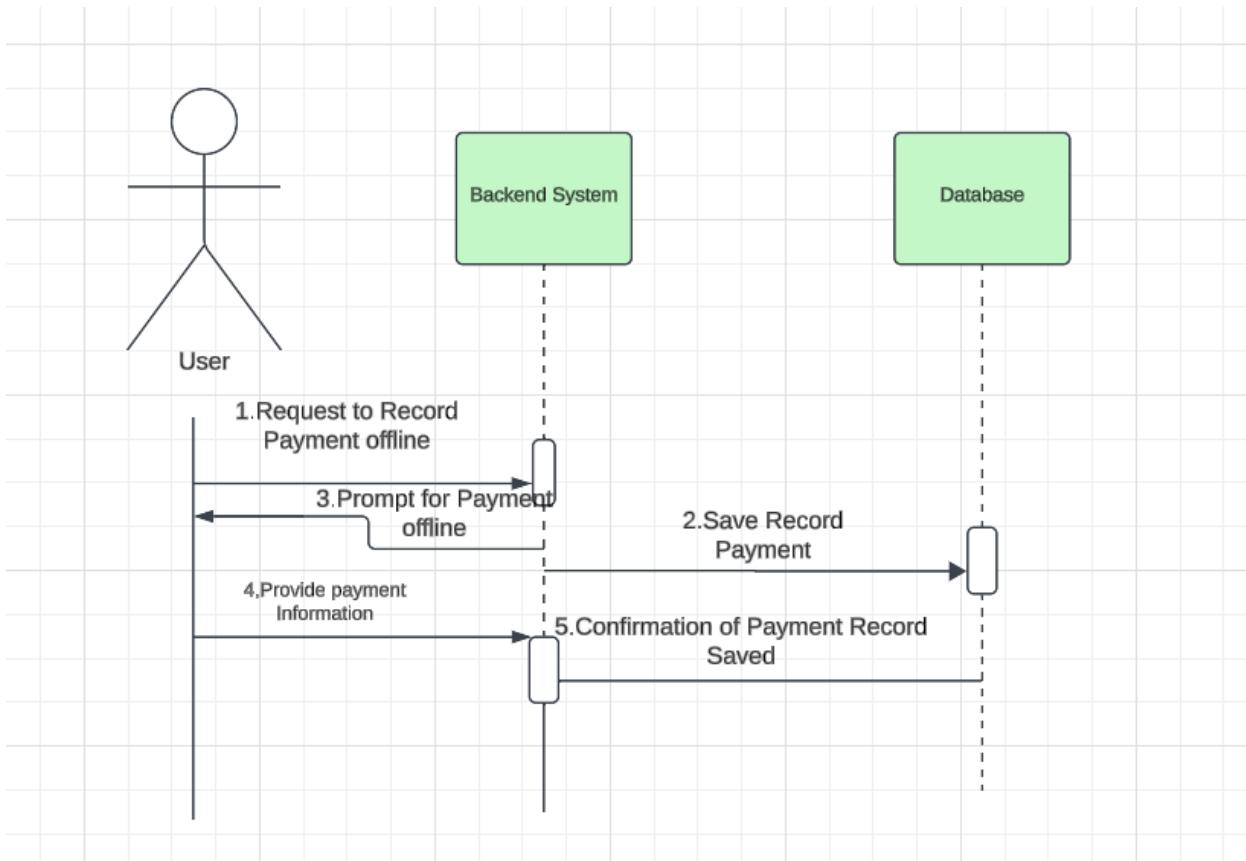


Table 17 Sign up use case

Use Case Name: Sign up

Actor	-Primary Actor: Customer -Secondary Actor: System
Description	The "Sign Up" use case involves the process by which users can create a new account on the system by providing necessary details. This includes information such as username, email, password, and phone number. The primary objective is to allow users to establish a personalized account with the system.
Data	User details: Username - Email - Password - Phone number
Stimulus	1. User navigates to the sign-up page. 2. User enters the required details into the registration form.
Response	1. System validates the entered information. 2. If validation is successful: -The system creates a new user account with the provided details. -The user is granted access to their newly created account. -The user may be redirected to the system's main page or a personalized dashboard. 3. If validation fails: -The system may display error messages indicating the specific issues with the information provided. -The user is prompted to correct the errors and re-submit the registration form.

Comments

- The registration form should be user-friendly and clearly communicate the required information.
- The system should enforce secure password policies and validate email formats.
- Error messages should be informative and guide users in correcting any issues during the sign-up process.

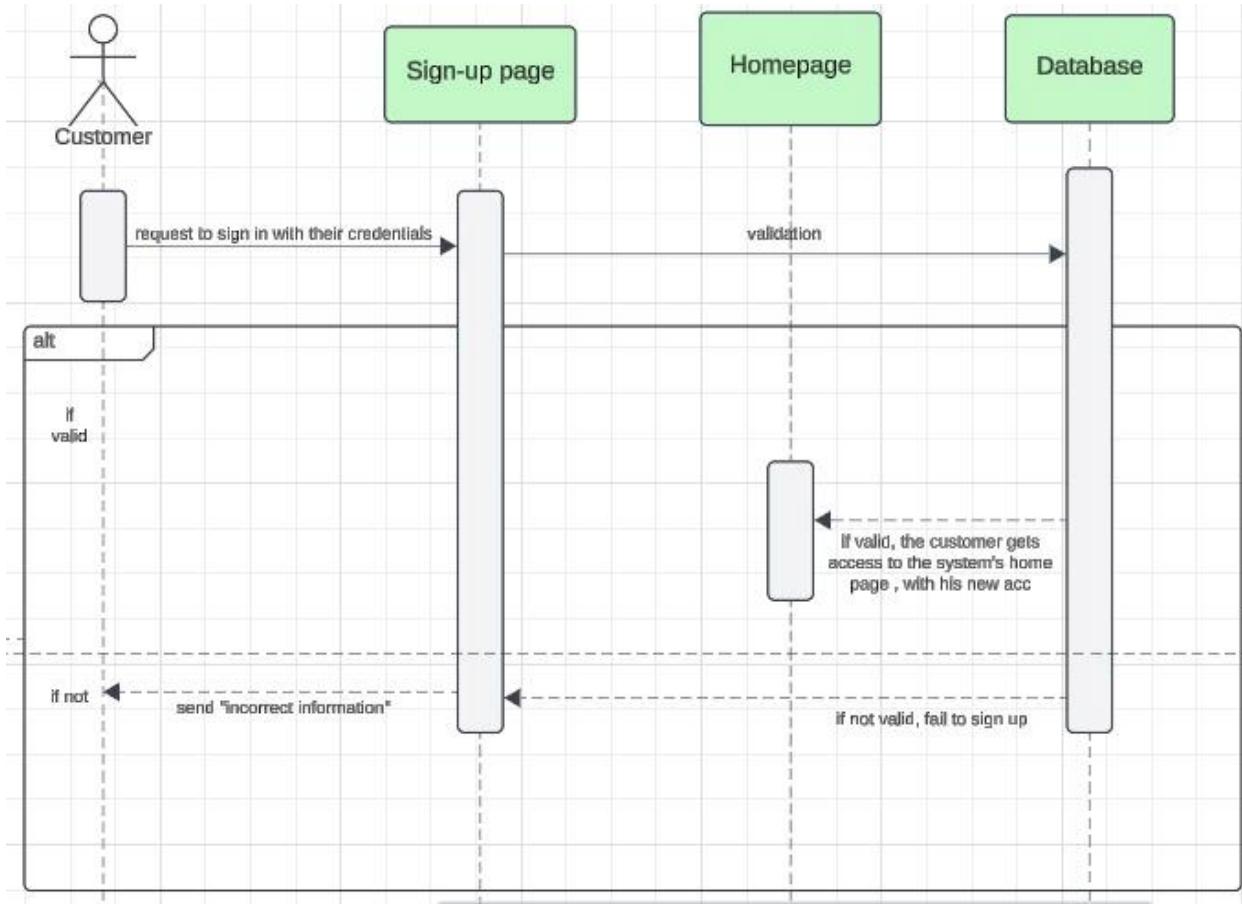


Figure 14 sign up use case diagram

Table 18 Log in use case

Use Case Name: Log in

Actor	-Primary Actor: Customer -Secondary Actor: System
Description	The "Log In" use case involves the process by which existing users securely authenticate themselves using their credentials to gain access to the system. The primary objective is to ensure a secure and seamless entry for authorized users into their accounts.
Data	User credentials: - Username - Password
Stimulus	1. User navigates to the sign-in page. 2. User enters their username and password.
Response	1. System validates the entered credentials. 2. If validation is successful: -The system grants access to the user's account. - The user is redirected to their personalized dashboard or the system's main page. 3. If validation fails: - The system denies access and may display an error message. - The user may be prompted to re-enter valid credentials or initiate the password reset process.
Comments	-The system should implement secure authentication protocols to safeguard user credentials. -It's essential to provide a user-friendly interface for entering credentials and receiving feedback on the sign-in process.

-Security measures such as account lockout after multiple unsuccessful attempts should be considered.

-In the case of failed sign-in attempts, the system should offer a clear and userfriendly error message or guidance for the user.

Figure 15 Log in use case diagram

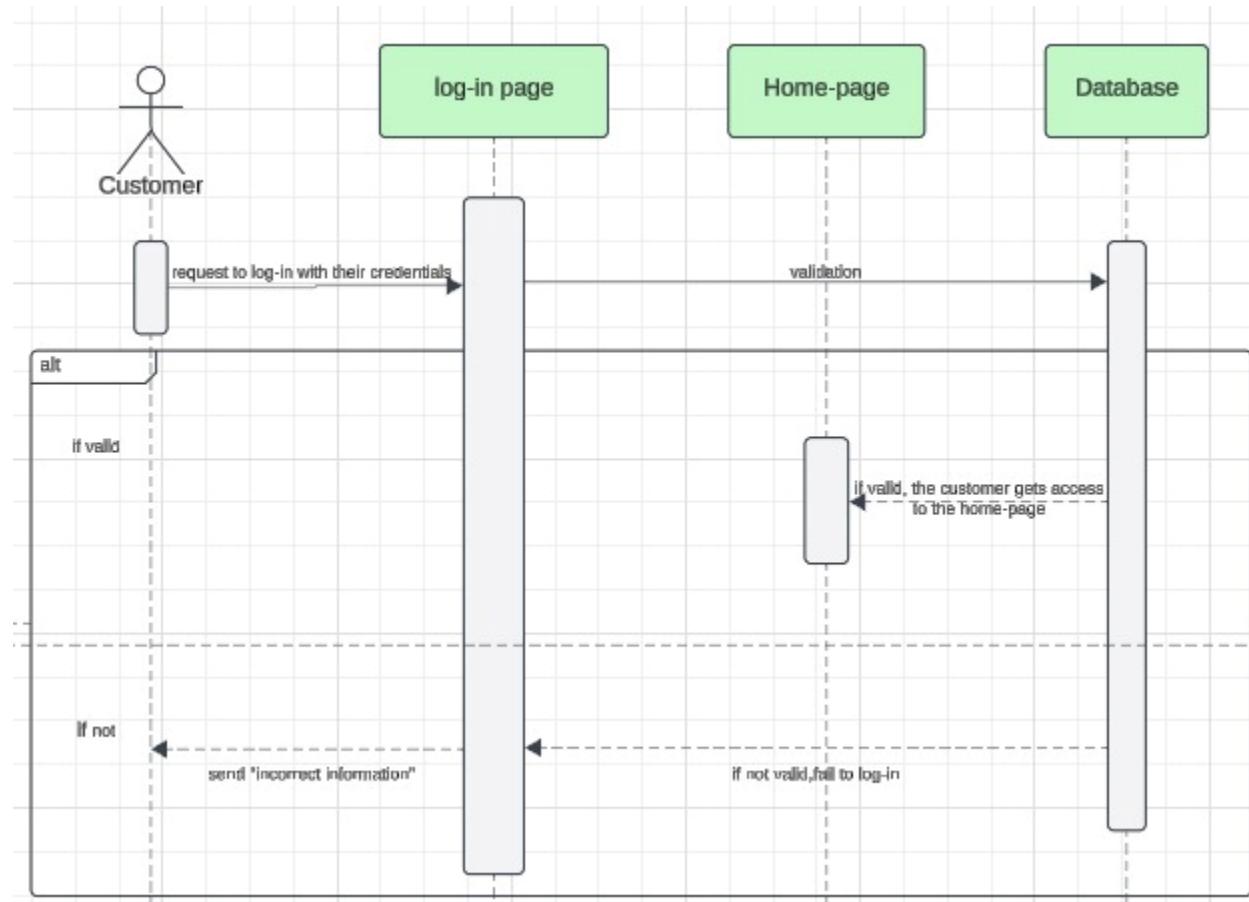


Table 19 Password and reset use case

Use Case Name: Password reset

Actor	-Primary Actor: Customer -Secondary Actor: System
Description	The "Password Reset" use case involves the process by which users can initiate a password reset for their accounts. This functionality is crucial for users who have forgotten their password or need to secure their account due to a compromised password. The primary objective is to provide a secure and user-friendly method for users to regain access to their accounts.
Data	-User information: -Email address associated with the account.
Stimulus	User initiates the password reset process by selecting the "Forgot Password" or a similar option on the login page.
Response	<ol style="list-style-type: none"> 1. The system prompts the user to provide their email address associated with the account. 2. The system verifies the provided email against existing records. 3. If the email is valid, the system sends a password reset link to the user's email address. 4. The user receives an email containing a unique link for resetting their password. 5. The user clicks on the reset link, redirecting them to a secure page for password reset. 6. The user sets a new password. 7. The system confirms the successful password reset.

Comments

- Security measures such as email verification and a unique reset link are essential for protecting the user's account.
 - The system should guide users through a clear and straightforward process during the password reset.
 - User documentation or support may be provided in case users encounter issues during the reset process.
- Priority for password reset is high due to its critical role in account security.

Figure 16 Password and reset use case diagram

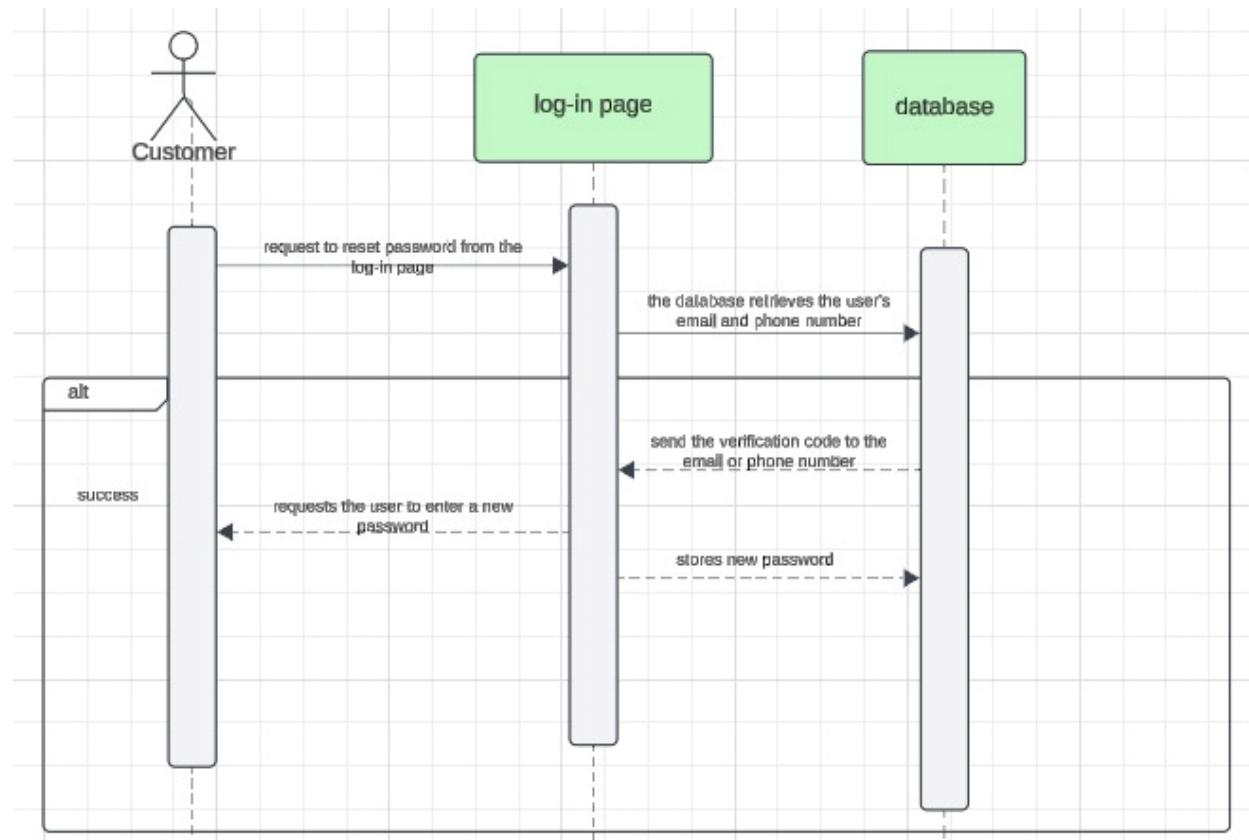


Table 20 log out use case

Use Case Name: Log out	
Actor	-Primary Actor: Customer -Secondary Actor: System
Description	The "Log Out" use case involves the process by which users can securely log out of the system. The primary goal is to provide users with a secure mechanism to end their interaction with the system while safeguarding their account information.
Data	- No specific data is provided during the sign-out process.
Stimulus	User initiates the sign-out process by selecting the sign-out option in the user interface.
Response	<ol style="list-style-type: none"> 1.The system securely terminates the user's session. 2.The user is logged out and is no longer authenticated within the system. 3. Optionally, the user may be redirected to the system's sign-in page or a landing page.

Comments	<ul style="list-style-type: none"> -The sign-out process should be easily accessible to users within the user interface. -After sign-out, the system should clear any locally stored sensitive user data to enhance security.
-----------------	---

Figure 17 Log out use case diagram

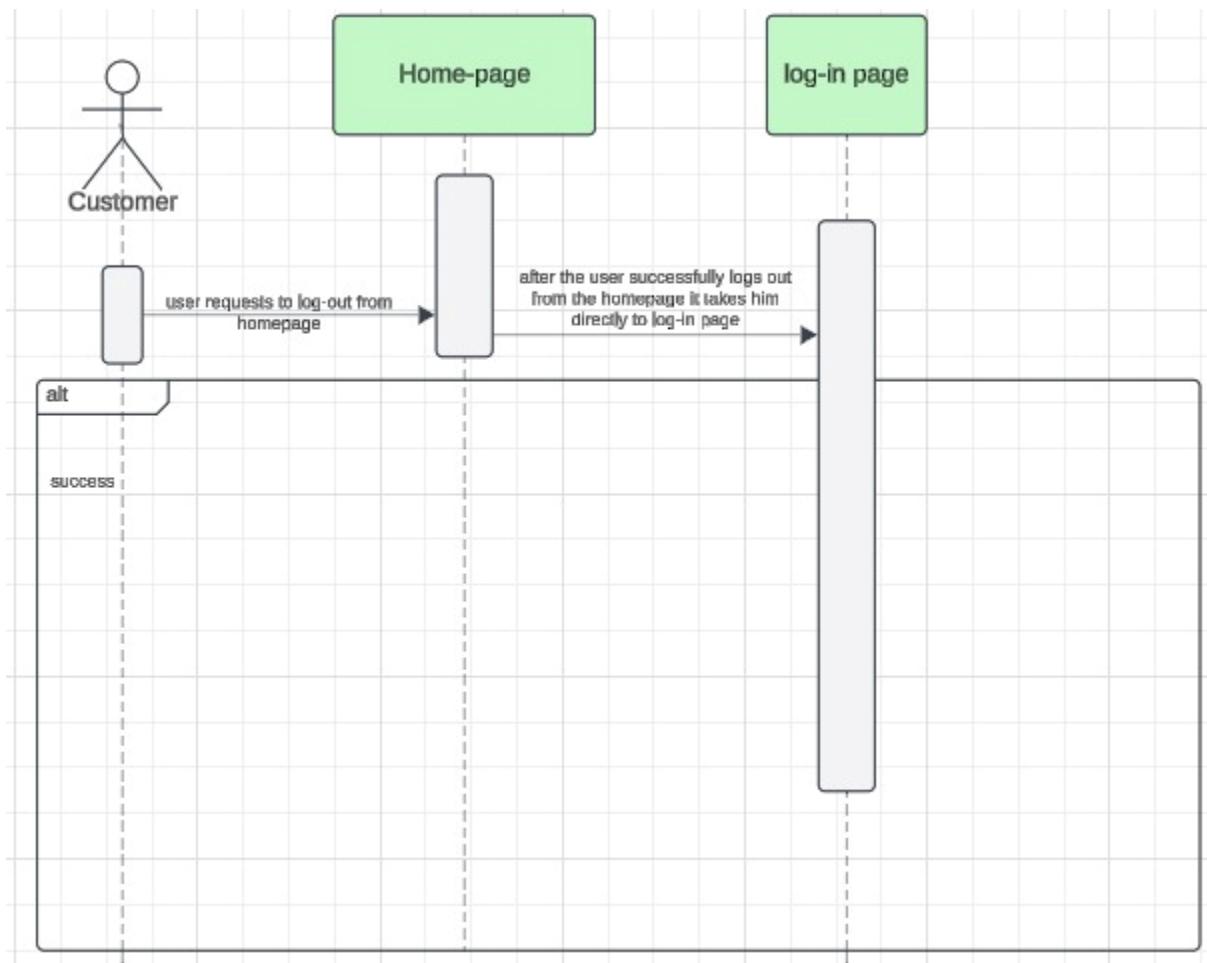


Table 21 Review and ratings use case

Use Case Name: Review and Ratings	
Actor	Customer: Submits reviews and ratings, views product feedback. Admin: Moderates reviews for inappropriate content.
Description	The system allows users to submit and view product reviews and ratings, which are validated and stored for future access. Admins manage and moderate reviews to ensure compliance with guidelines.
Data	- Reviews: Text feedback from users. - Ratings: Numeric (e.g., 1-5 stars). - Timestamps: Submission time. - User ID: To associate reviews with users.
Stimulus	The Customer submits a review or rating then the Admin reviews flagged content
Response	The system captures the review and rating, validates the content, and notifies admins of flagged reviews for moderation if necessary.
Comments	Reviews and ratings help other customers make informed decisions. Ensuring authenticity and moderating inappropriate content is crucial.

Figure 18 Review and ratings use case diagram

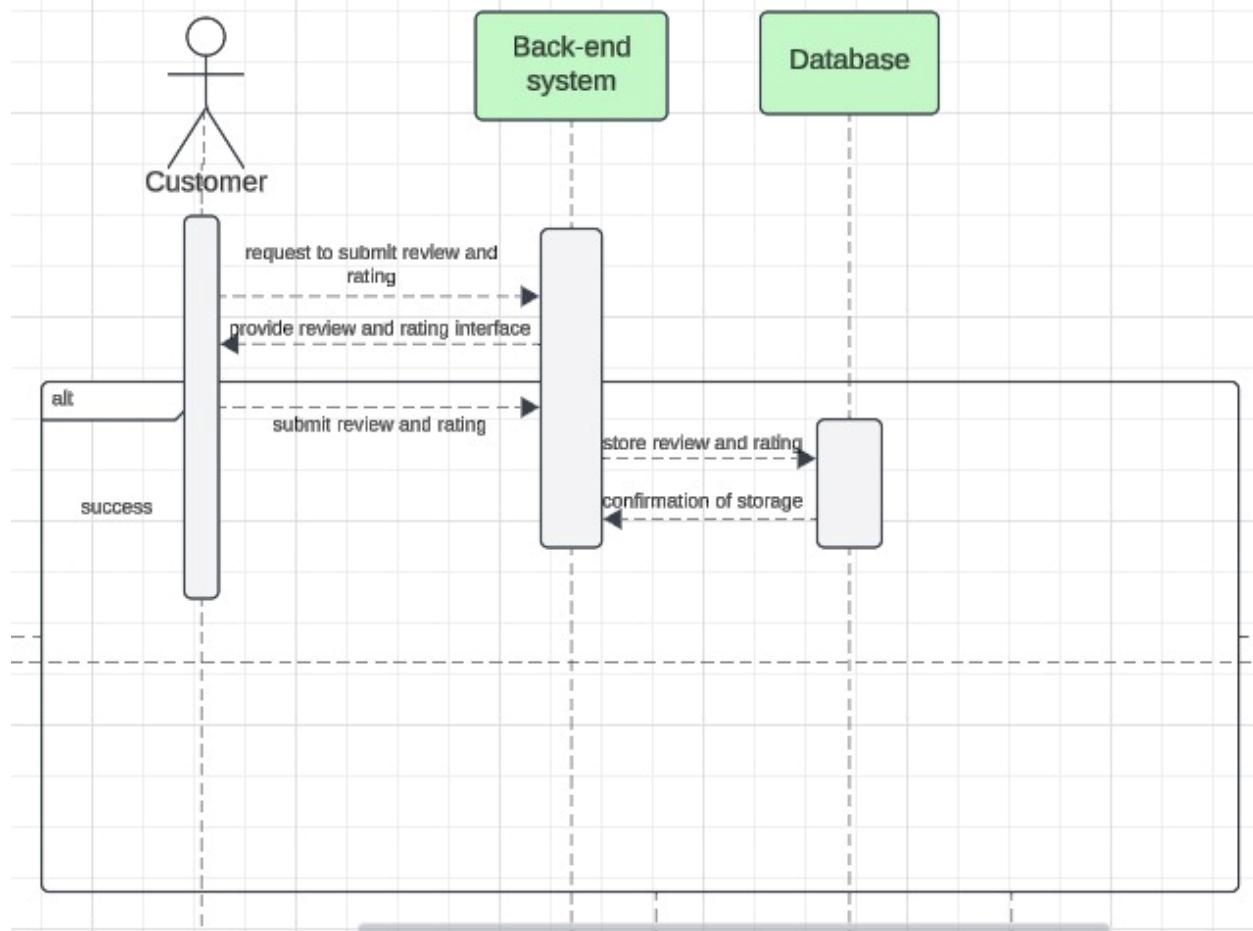


Table 22 Contact form use case

Use Case Name: Contact Form	
Actor	- Primary Actor: Customers. - Secondary Actor: System.

Description	The “Contact Form” use case describes the process whereby Deal Detective staff manually enter retailer information or updates into the system. This ensures that the platform reflects real-time availability and accurate details for users to browse and compare products effectively.
Data	Product name, retailer name, price, category, availability status, and user ratings.
Stimulus	-Deal Detective staff logs into the Deal Detective system and selects the option to manually enter or update the retailer.
Response	The system prompts the staff to enter retailer details and saves the entries to the database. The updated information is immediately reflected on the user-facing platform.
Comments	<p>This use case is essential to maintain accurate and up-to-date retailer and product information, particularly for stores not integrated with automated inventory systems. It ensures flexibility for retailers to manage their listings manually if needed.</p> <ul style="list-style-type: none"> -Implement an intuitive user interface for easy navigation and selection of products. -Consider incorporating a feature that allows users to suggest updates to product listings. -Ensure that the system maintains a comprehensive and up-to-date record of product details and retailer information. -Provide users with the option to track the availability and price changes of their favorite items in real-time, like standard product listings.

Figure 19 Contact form use case diagram

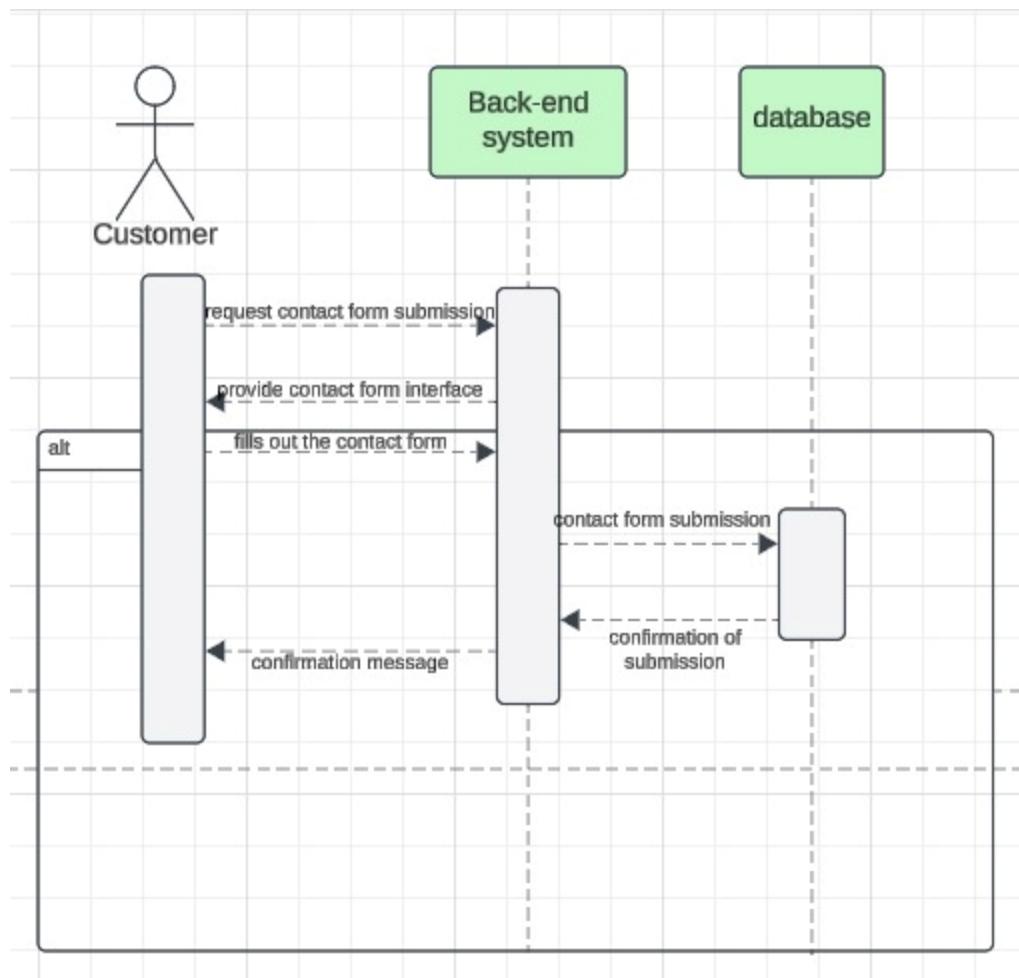


Table 23 Feedback form use case

Use Case Name: Feedback Form	
Actor	-Primary Actor: Customer -Secondary Actor: System
Description	The “Feedback Form” use case describes the process where a user submits feedback about their experience with a retailer or a specific product through the Deal Detective system. This feedback helps improve platform quality and informs other users.

Data	User (customer) name (optional), retailer name, product name, purchase date, rating, comments/feedback.
Stimulus	Customer logs into the Deal Detective system and selects the option to provide feedback on their recent purchase.
Response	The system displays a feedback form, the customer fills in the details and submits the form. The system saves the feedback and updates the retailer's profile with the new review.
Comments	This use case is crucial for gathering customer feedback to enhance service quality and provide prospective customers with reliable reviews. Ensuring ease of use and confidentiality can encourage more users to leave feedback.

Figure 20 Feedback form use case diagram

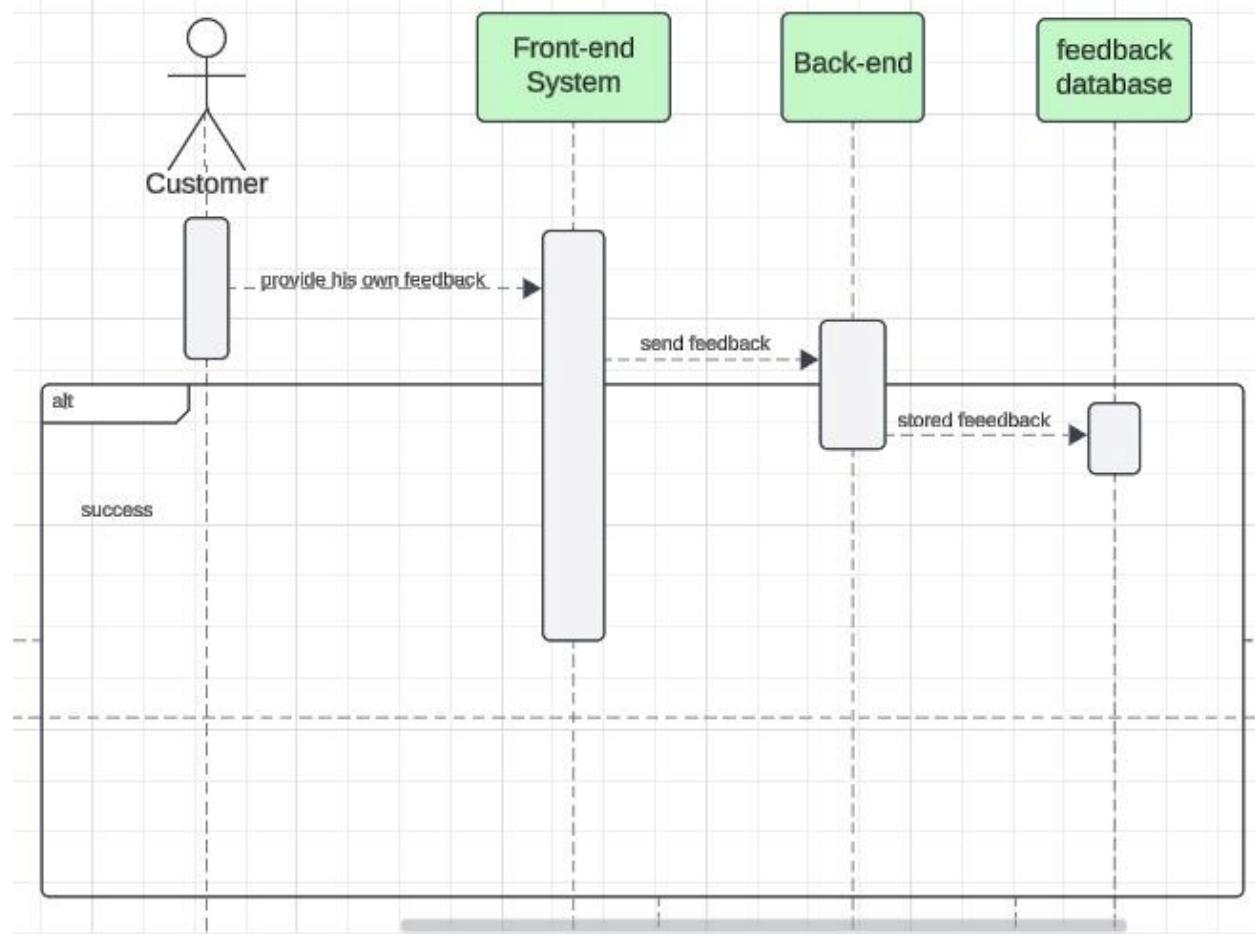


Table 24 Bilingual support use case

Use Case Name: Bilingual Support	
Actor	- Primary Actor: Customers. -Secondary Actor: System.
Description	The “Bilingual Support” use case describes the process where the Deal Detective system provides support in multiple languages to accommodate customers who are more comfortable communicating in languages other than the default language of the platform.
Data	Customer language preference, user interface elements, support documentation, communication messages.
Stimulus	Customer logs into the Deal Detective system or accesses support documentation and selects their preferred language from the available options.
Response	The system adjusts the user interface, support documentation, and communication messages to the selected language. It provides support and assistance to the customer in their preferred language.
Comments	Offering bilingual support enhances accessibility and user experience for customers from diverse linguistic backgrounds. It demonstrates inclusivity and sensitivity to the needs of multicultural user bases. Maintaining accurate translations and ensuring consistency across languages are critical considerations.

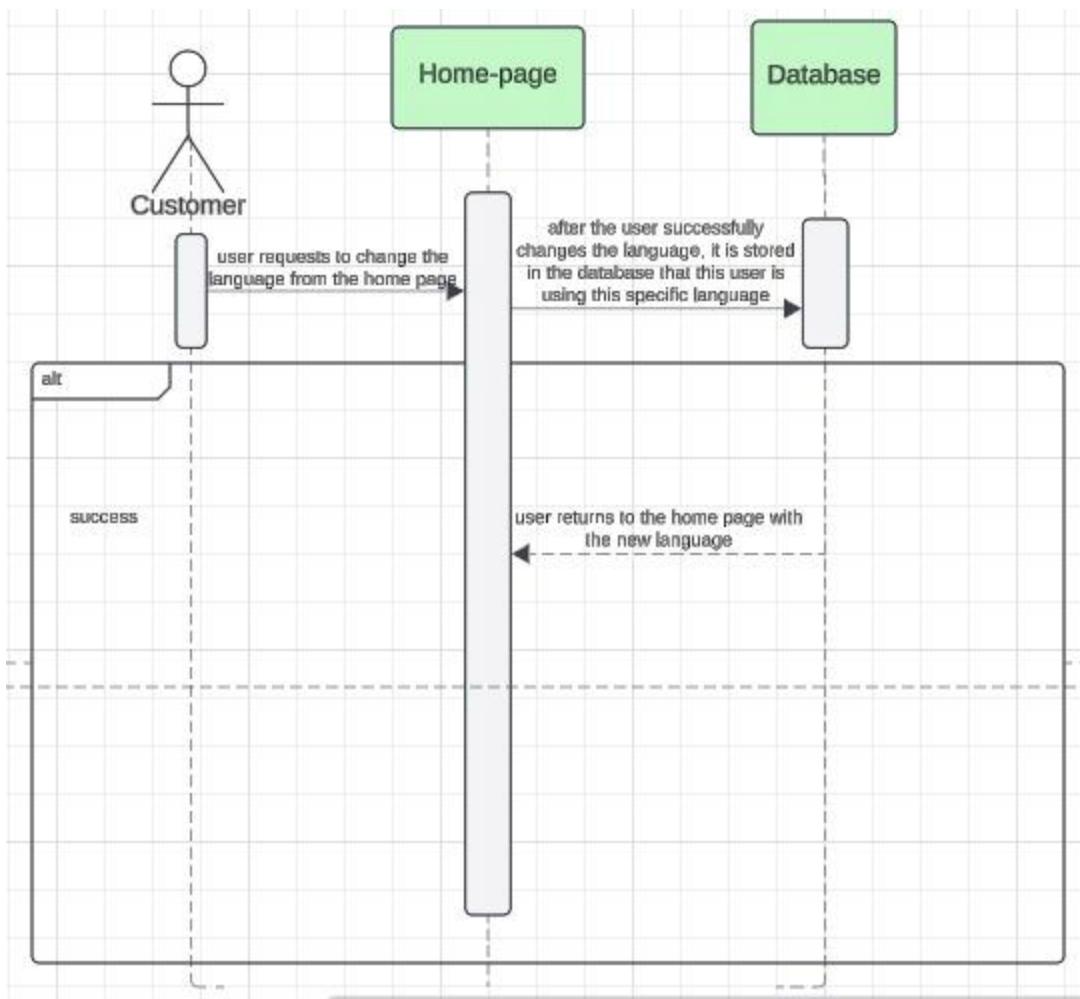


Figure 21 Bilingual support use case diagram

Table 25 Notifications use case

Use Case Name: Notifications	
Actor	- Primary Actor: Customers. -Secondary Actor: System.
Description	The “Notifications” use case describes the process where the Deal Detective system sends notifications to users to provide updates, reminders, or alerts regarding price changes, product availability, retailer-related information, or platform updates.
Data	Product details, retailer updates, platform announcements, notification preferences/settings.
Stimulus	Various triggers such as price drops, changes in product availability, retailer updates, or platform-wide announcements prompt the system to send notifications to the user.
Response	The system sends notifications to the user via preferred communication channels (e.g., email, SMS, in-app notifications). The notifications contain relevant information based on the trigger, such as price drop alerts, product availability updates, or platform announcements.
Comments	Notifications play a crucial role in keeping customers informed and engaged. Personalization and customization options for notification preferences can enhance user experience. However, ensuring that notifications are timely, relevant, and not overwhelming is essential to prevent user annoyance. Additionally, respecting customer privacy and preferences regarding communication channels is important.

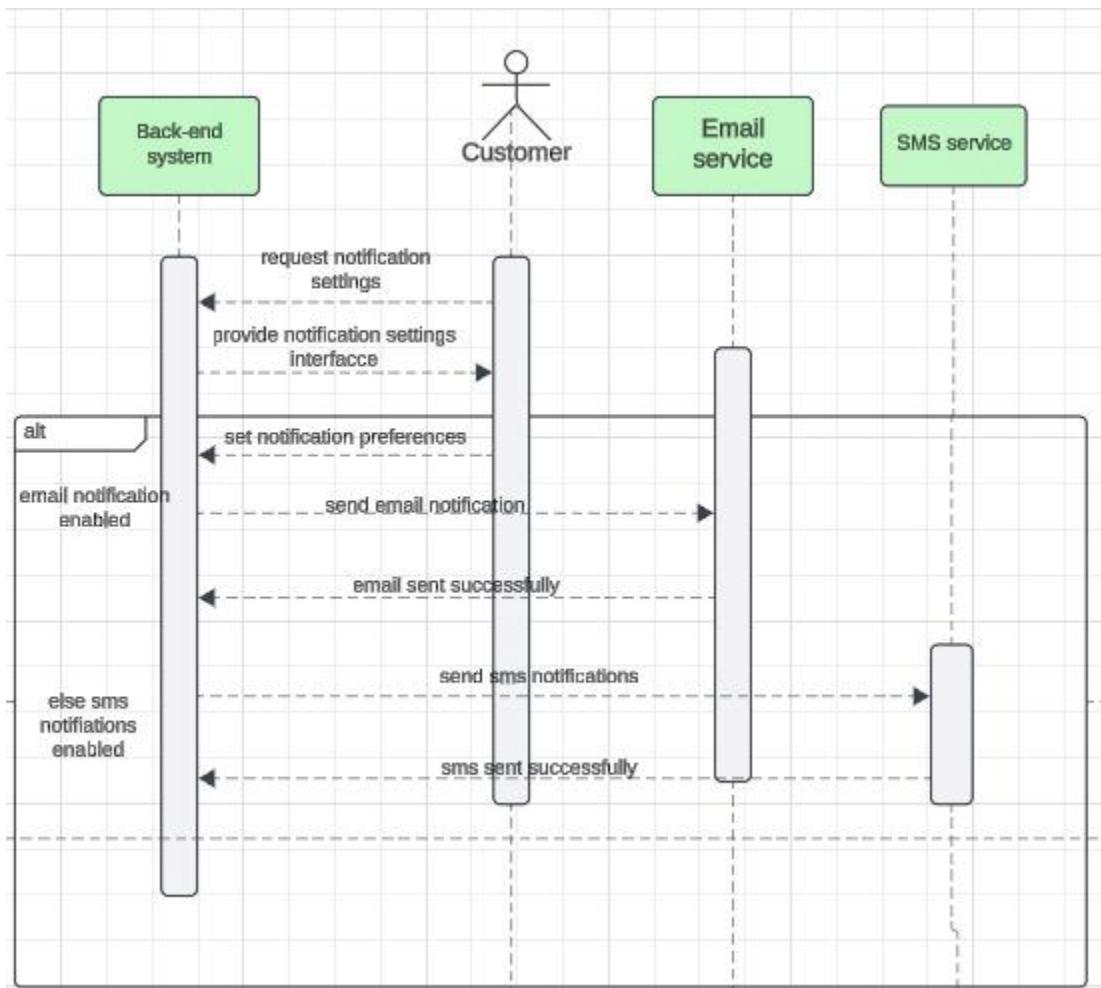
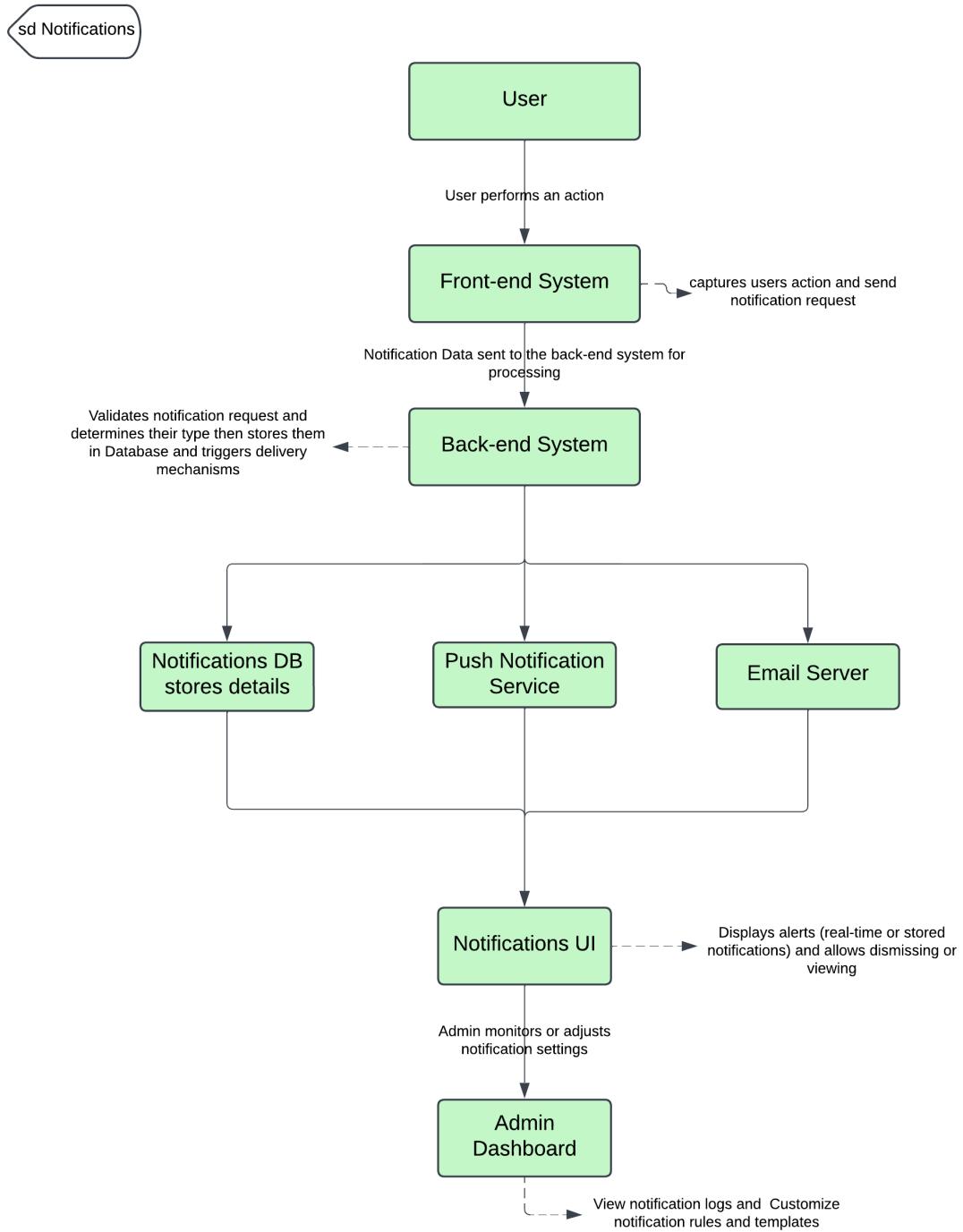


Figure 22 Notifications use case diagram

4.2.2 Use Case Diagram for Retailers



Stakeholder: Retailers

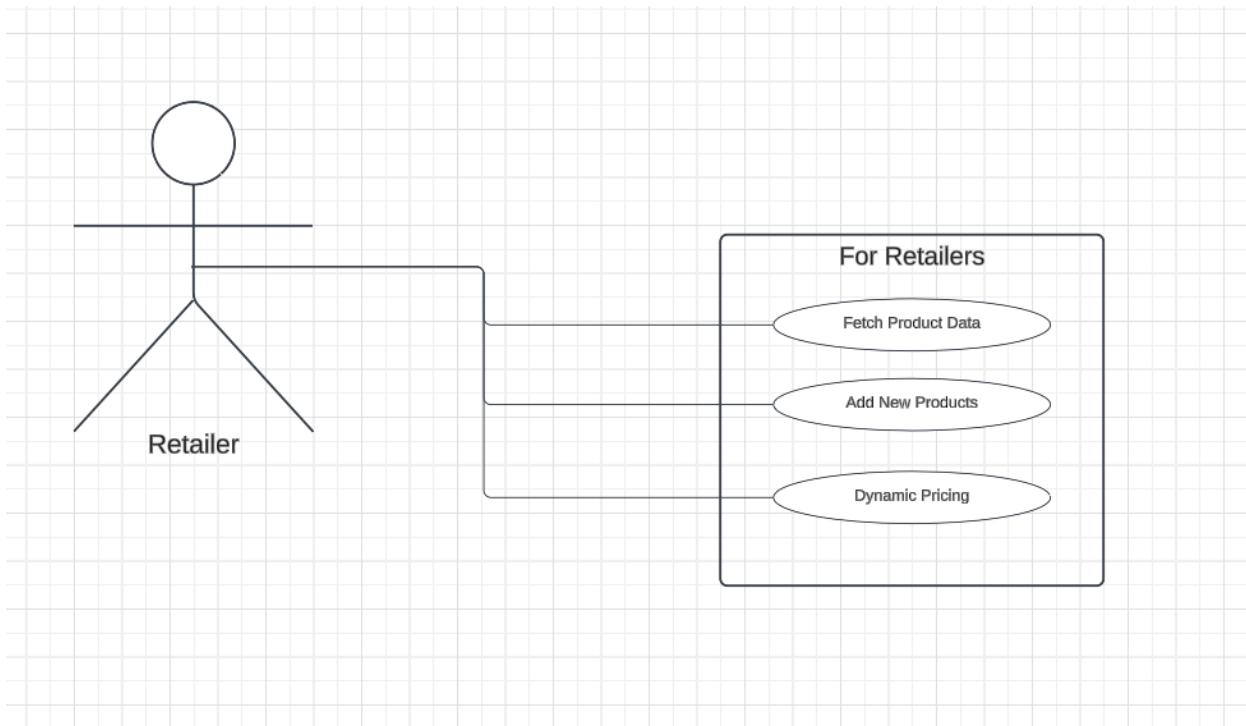


Table 26 Fetch product data use case

Use Case Name: Fetch Product Data	
Actor	<ul style="list-style-type: none"> • Primary Actor: System • Secondary Actors: Product Database, External APIs
Description	The use case focuses on retrieving relevant product information from a database or external APIs in response to user actions, such as searching for a product or browsing a category. This functionality is critical for price comparison websites as it ensures users can access up-to-date and accurate details about products, including names, prices, descriptions, and availability. Product data is fetched and displayed to the user, or an error message is shown if data retrieval fails.
Stimulus	ensure the system responds dynamically to user inputs or predefined events, initiating the process of fetching and displaying relevant product data.
Response	generates an appropriate response based on the input or action. The system's responses aim to fulfill the user's request efficiently while ensuring a seamless experience.
Comments	Ensure the system can handle multiple types of input, such as search keywords, filter applications, or category selections, without errors.

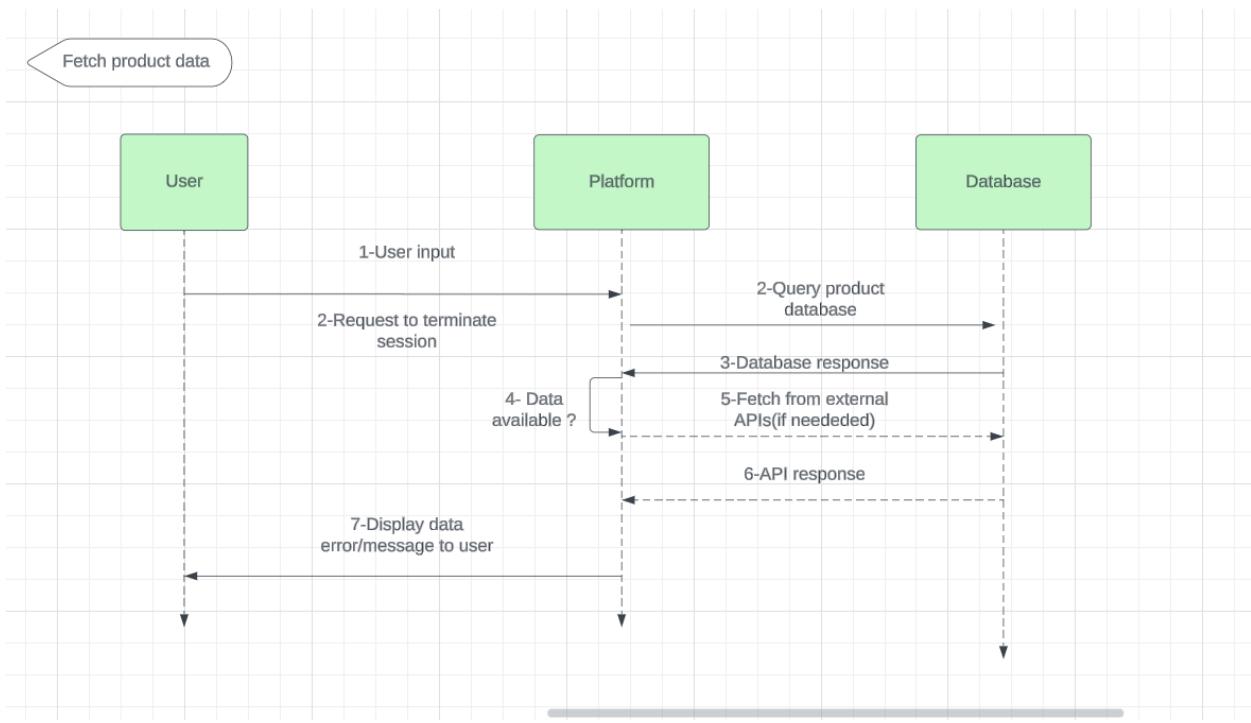


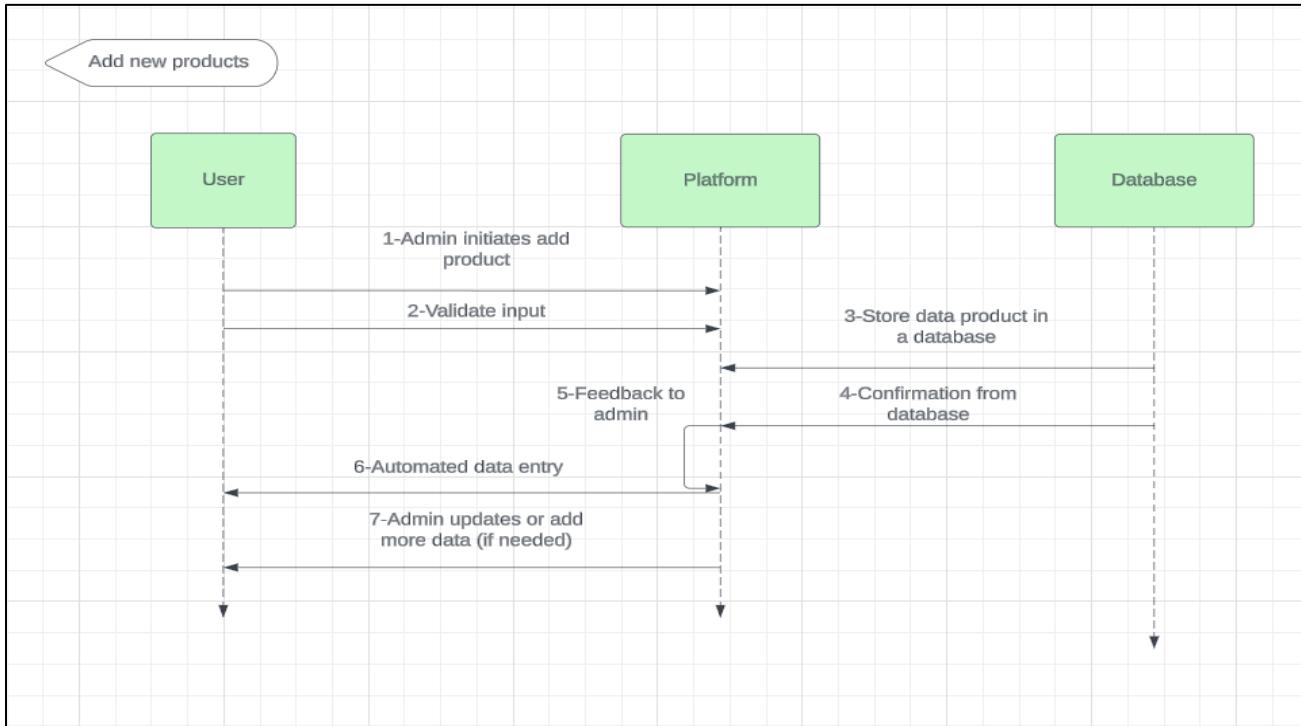
Figure 23 Fetch product data use case diagram

Table 27 Add new products use case

Use Case Name: Add New Products	
Actors	Primary Actor: Admin Secondary Actor: System and Database

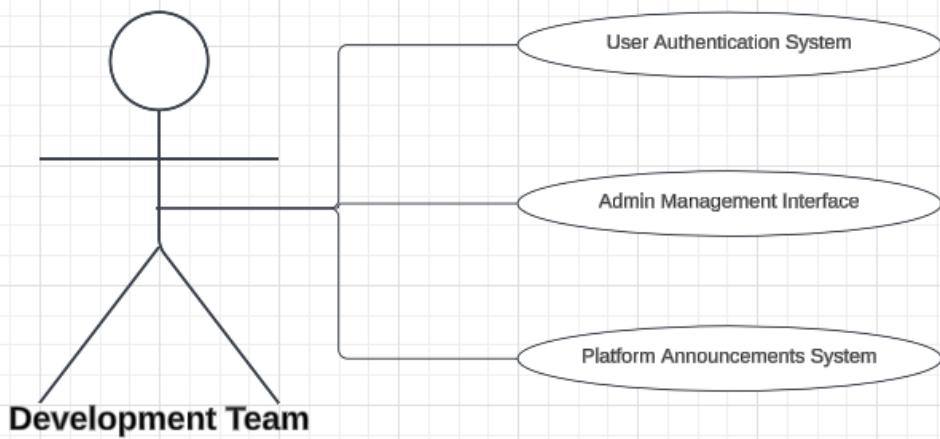
Description	This use case outlines the process for adding new products to the price comparison website's database. This can be initiated by an admin or an automated system that fetches data from external sources or APIs.
Data	Product name, Category, Brand, Price, Stock Availability, Images, Vendor Details, Description
Stimulus	Admin Action The admin manually selects the Add Product option in the system and enters the product details Or Using Automated Data Entry The system detects new data from an external API, CSV file upload.
Response	The system validates the input and successfully stores the product in the database, and it ensures the proper handling of inputs, provide feedback to the user, and maintain the integrity of the system.
Comments	The Add New Product Section plays a vital role in keeping users informed enhancements, and important announcements. Administrators should ensure that the content shared is relevant, accurate, and timely to maintain user trust and engagement. User feedback on updates can help administrators gauge user satisfaction and address any concerns or questions effectively

Figure 24 Add new products use case diagram



4.2.3 Use Case Diagram for Development Team

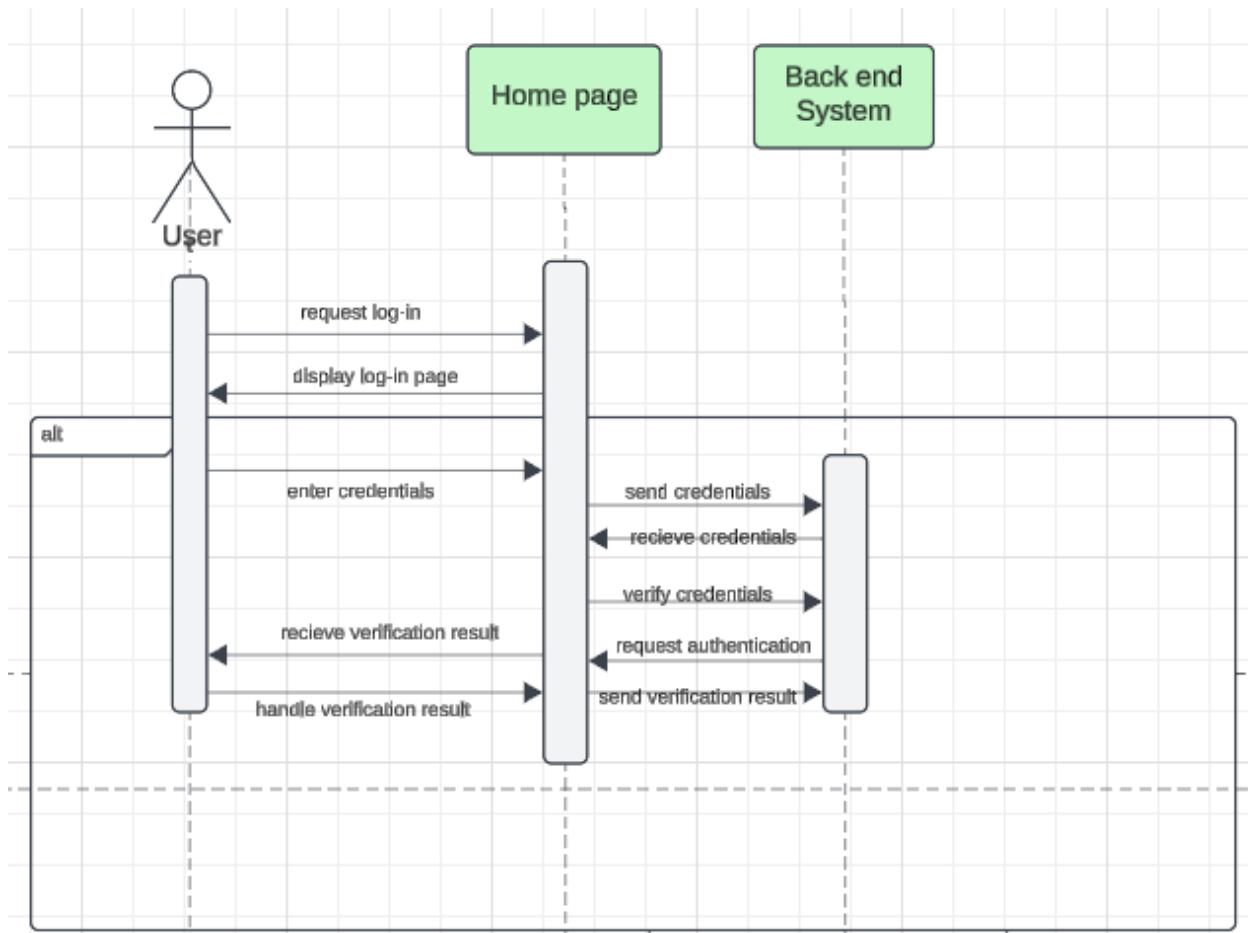
Stakeholder: Development Team



Use Case Name: User Authentication system

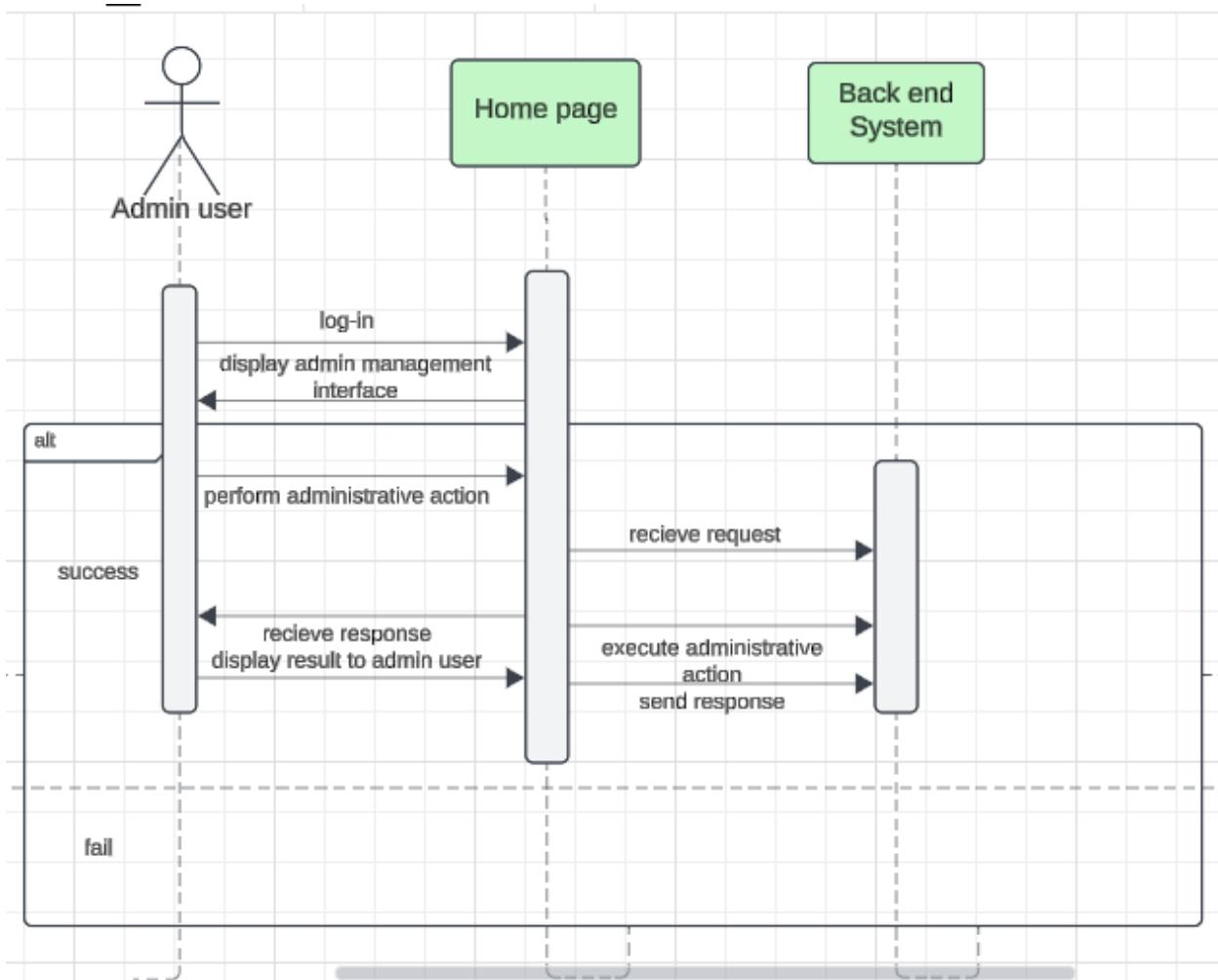
Actor	Developer
Description	This use case ensures that all users can securely log into the system using their credentials.

Data	User credentials (e.g., username, password) stored securely in the database.
Stimulus	Developer initiates the implementation of the user authentication feature within the system's codebase.
Response	Upon login attempts, the system verifies user credentials against stored data and grants access only upon successful authentication.
Comments	<ul style="list-style-type: none"> - Ensure robust password hashing and encryption. - Consider implementing multi-factor authentication for enhanced security. - Log failed login attempts for auditing and potential lockout mechanisms.



Use Case Name: Admin management interface

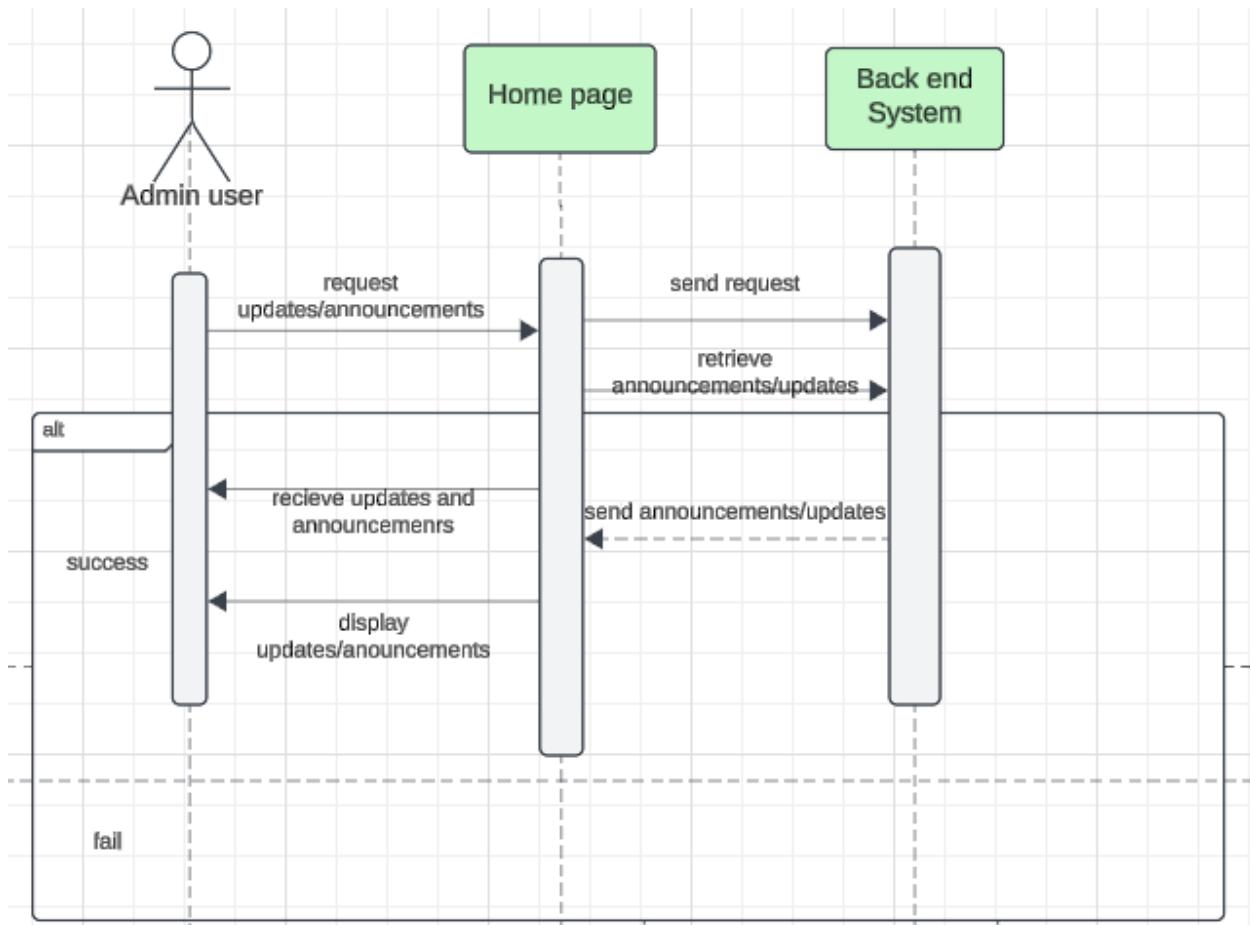
Actor	Development Team
Description	The Admin Management Interface provides authorized administrators with tools to manage users, monitor system activities, and configure platform settings efficiently.
Data	Retailer Details: Names, addresses, and contacts. Product Data: Descriptions, prices, and availability. Platform Logs: Records of system and user activities.
Stimulus	Admin logs into the interface and performs actions like updating product details or moderating reviews.
Response	The admin dashboard displays the requested information or confirms the action and the system updates are reflected in real-time.
Comments	<ul style="list-style-type: none"> - Ensure role-based access control to prevent unauthorized changes. - Include detailed audit logs for accountability. - Provide a user-friendly interface with search and filter options.



Use Case Name: Platform Announcement System

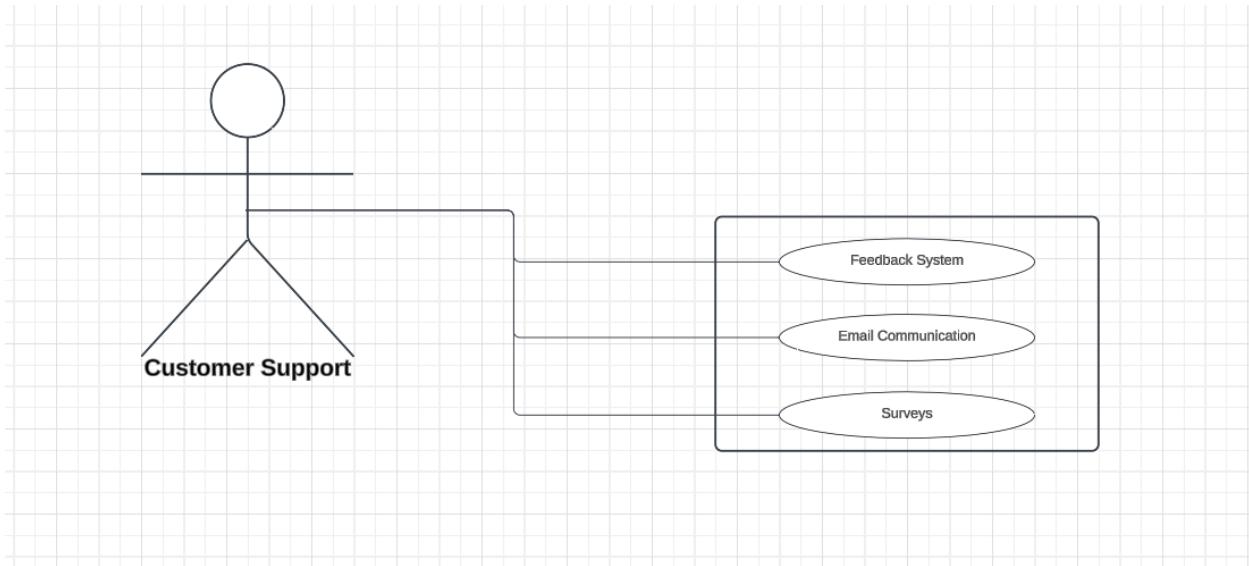
Actor	Development Team
Description	The Platform Announcement System enables admins to post updates, announcements, and notifications visible to all users.
Data	We need an Announcement Content which is a title and message body, and a target audience whom could be a specific user or all users and a schedule to specify start and end times for announcements.

Stimulus	Admin submits an announcement through the interface, specifying content and audience.
Response	The system saves and schedules the announcement then users receive the announcement on their dashboards or via notifications.
Comments	Making sure to allow urgent announcements to appear as pop-ups and to provide options for users to acknowledge or dismiss announcements. Track user engagement with announcements for analytics.

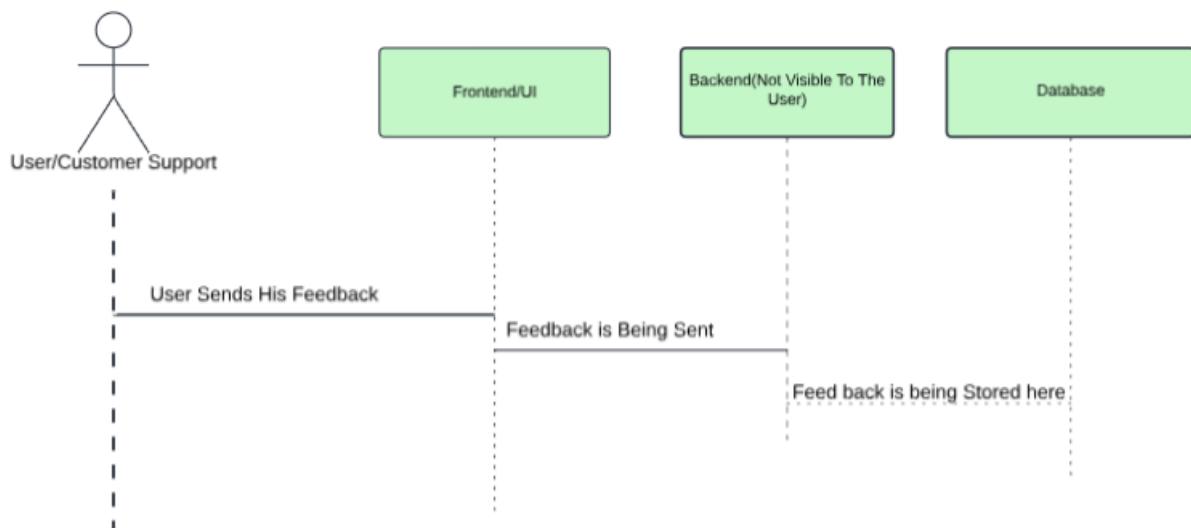


4.2.4 Use Case Diagram for Customer Support

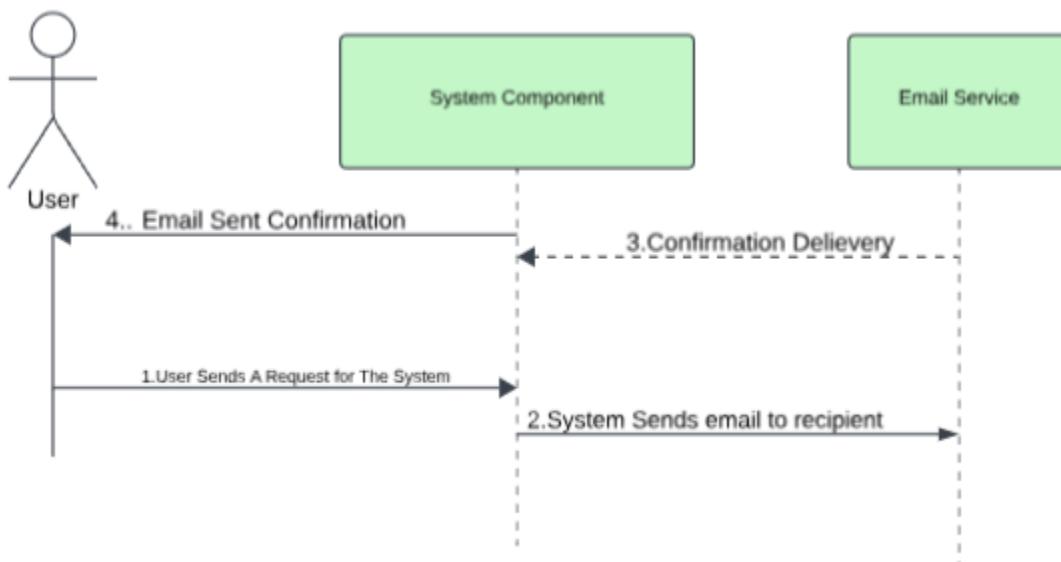
Stakeholder: Customer Support



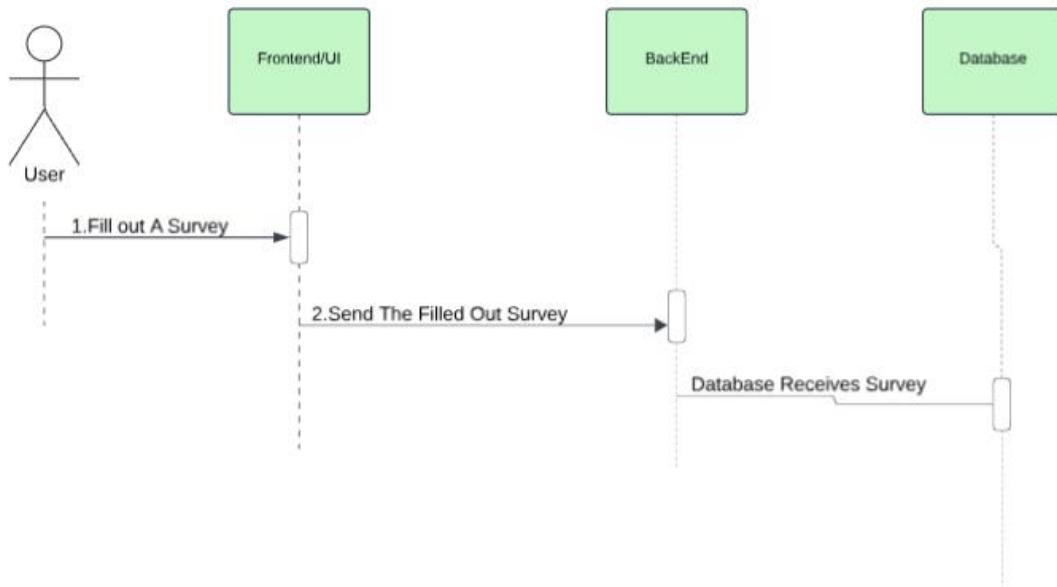
Use Case Name: Feedback System	
Actor	Customer Support
Description	Users utilize the feedback system to submit their opinions, suggestions, or complaints regarding the Deal Detective platform's functionality, features, or services. Administrators review and manage the feedback to address user concerns and improve the platform.
Data	Clinic details (name, address, services), working hours, contact information, and specializations.
Stimulus	The User Sends their feedback through The System for the Admin to respond
Response	Users access the feedback system through the platform interface or dedicated feedback form. They provide detailed descriptions of their feedback Through our website or email By Providing a text or even a photo!
Comments	The Feedback System is essential for maintaining user satisfaction and continuously improving our platform and Succeed in Delivering The User's Requirement



Use Case Name: Email Communication	
Actor	Customer Support
Description	email communication to assist users with inquiries, troubleshoot issues, and provide guidance and for Verification and Discount Purposes.
Data	User inquiries, system logs, support documentation.
Stimulus	An Automated System Sends Personalized Messages via Email or A user submits an inquiry or reports an issue
Response	The technical support team receives the email notification and accesses the support system. They review the user's inquiry, troubleshoot the reported issue, and provide a timely and relevant response
Comments	Email communication serves as a crucial channel for technical support interactions, allowing for efficient problem resolution and clear communication between users and support staff

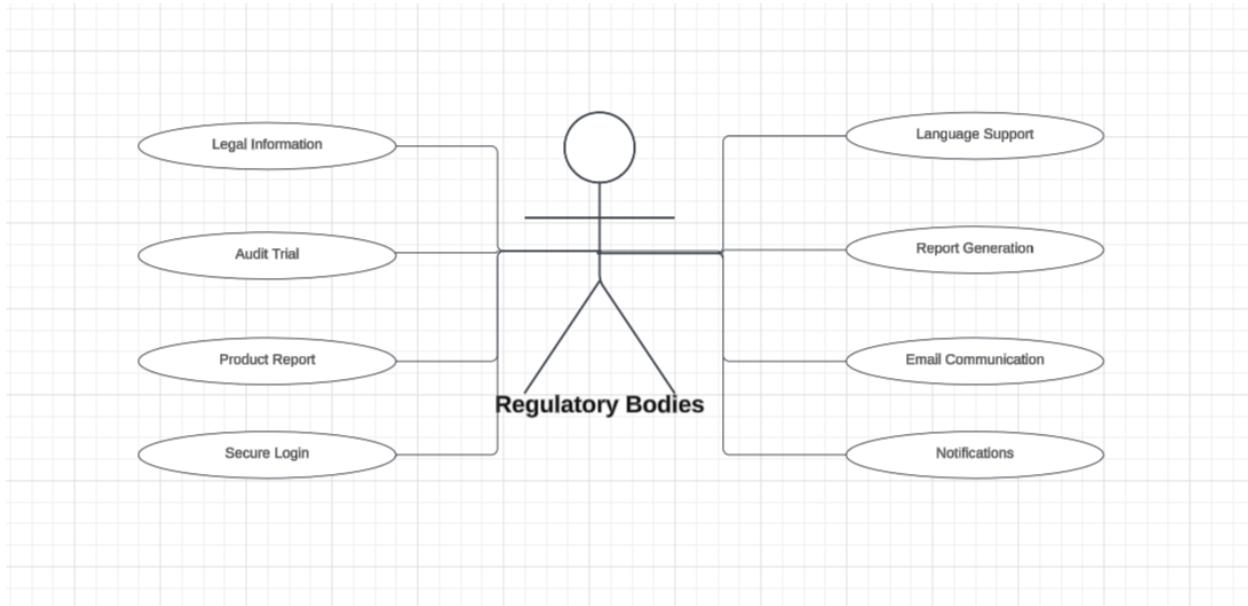


Use Case Name: Survey	
Actor	Customer Support
Description	Users Will participate surveys or questionnaires provided through the Deal Detective platform. The survey will provide valuable insights into what users prioritize when comparing prices, such as real-time data accuracy.
Data	Survey responses, Price Tracking data.
Stimulus	Users Will fill in Surveys And they will be stored in The database and later viewed With certain Analytic charts
Response	The admin receives the Surveys and accesses the support system. They review the user's inquiry, Data analysts collect and analyze survey data, looking for patterns, correlations, or areas of interest.
Comments	By encouraging user participation in surveys and ensuring data privacy and confidentiality, the platform fosters a collaborative approach to improving Usability outcomes and user experiences



4.2.5 Use Case Diagram for Regulatory Bodies

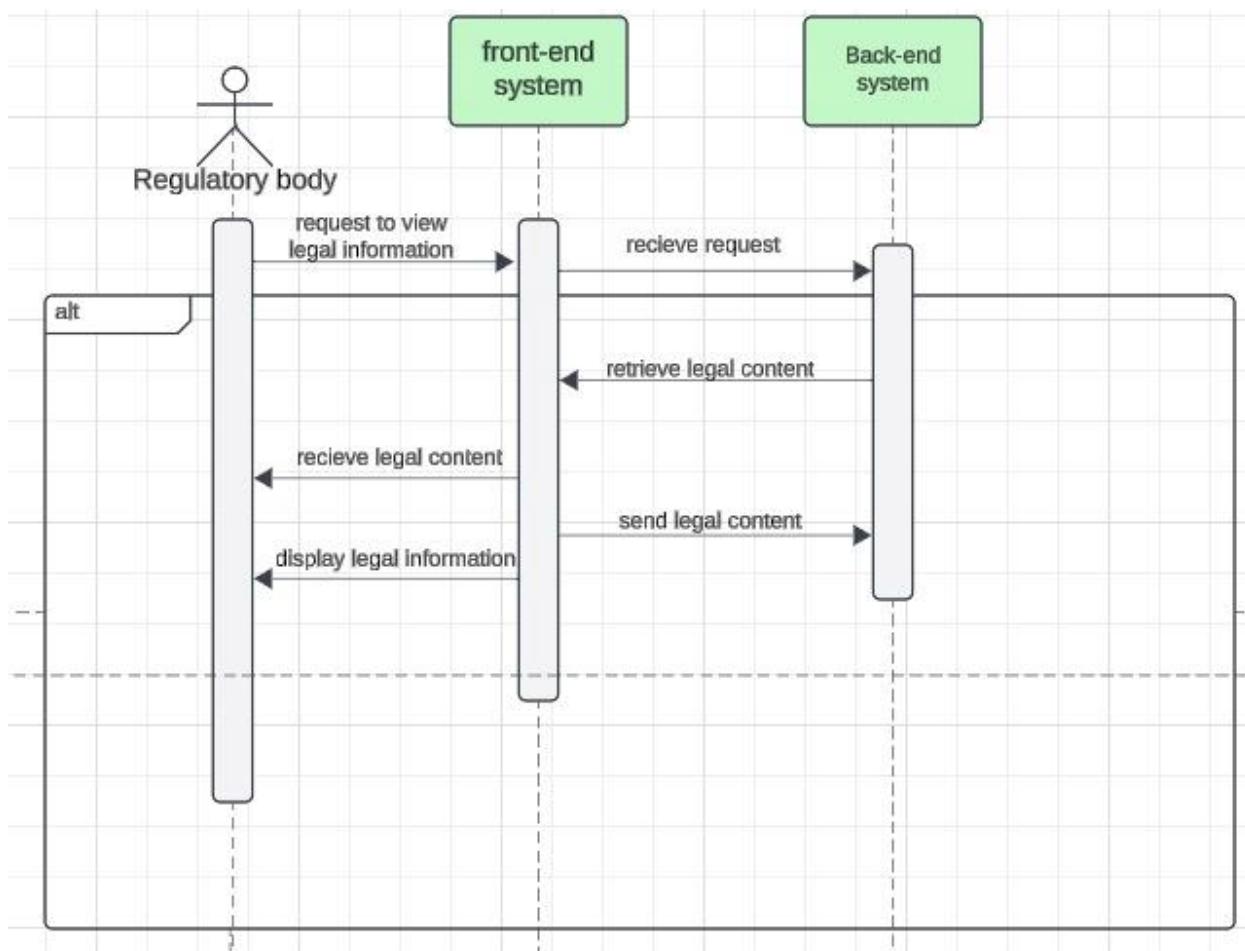
Stakeholder: Regulatory Bodies



Use Case Name: Legal Information

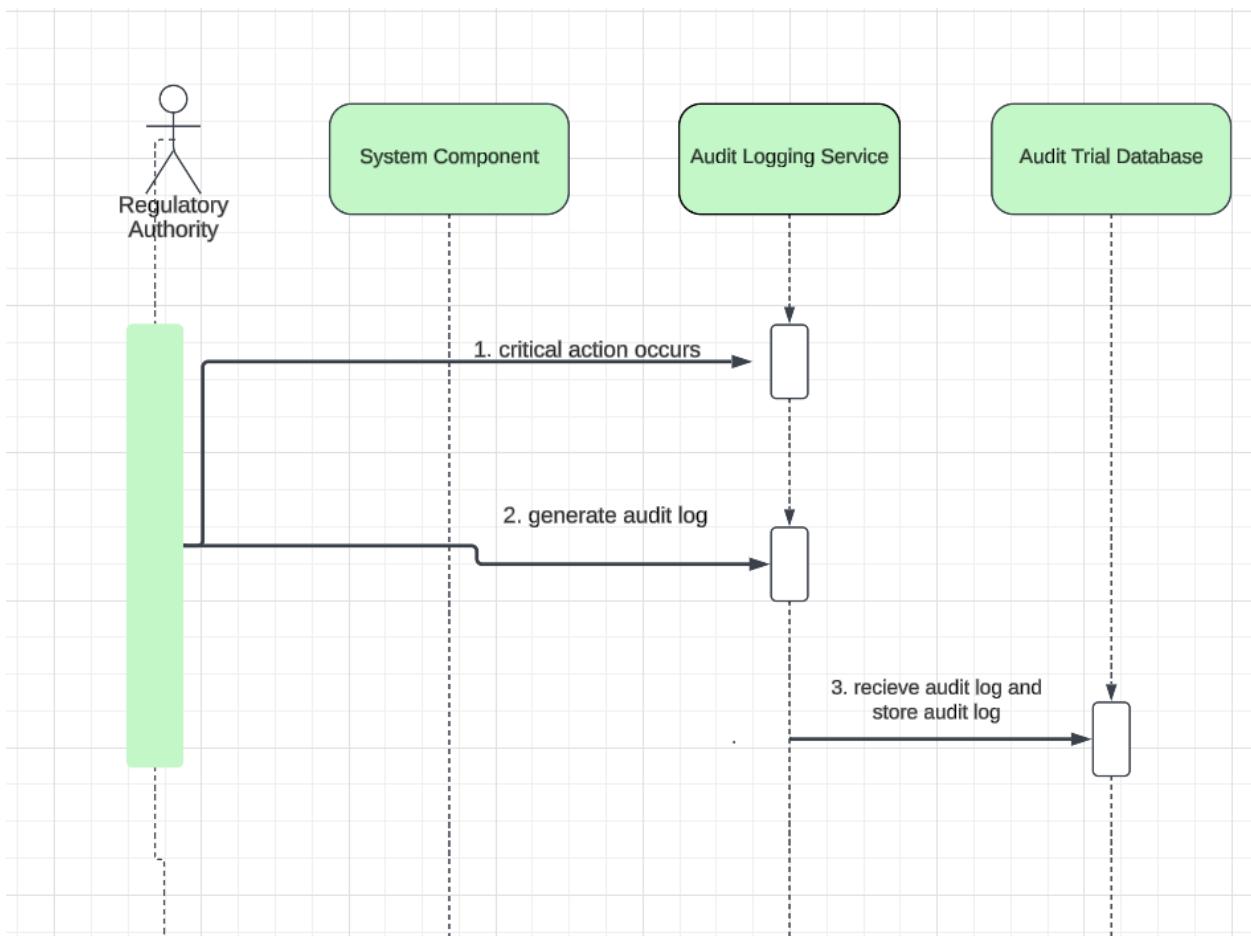
Actor	Regulatory Body, Admin, User
Description	Ensures legal information (e.g., Terms of Service, Privacy Policy) is accessible and up-to-date for users while meeting regulatory compliance.
Data	Legal documents (Terms of Service, Privacy Policy, Cookie Policy), timestamps of updates.

Stimulus	Admin updates legal documents, or a User requests to view them.
Response	The platform displays the requested legal document or updates the information for public viewing.
Comments	Documents must be clear, concise, and regularly reviewed for compliance.



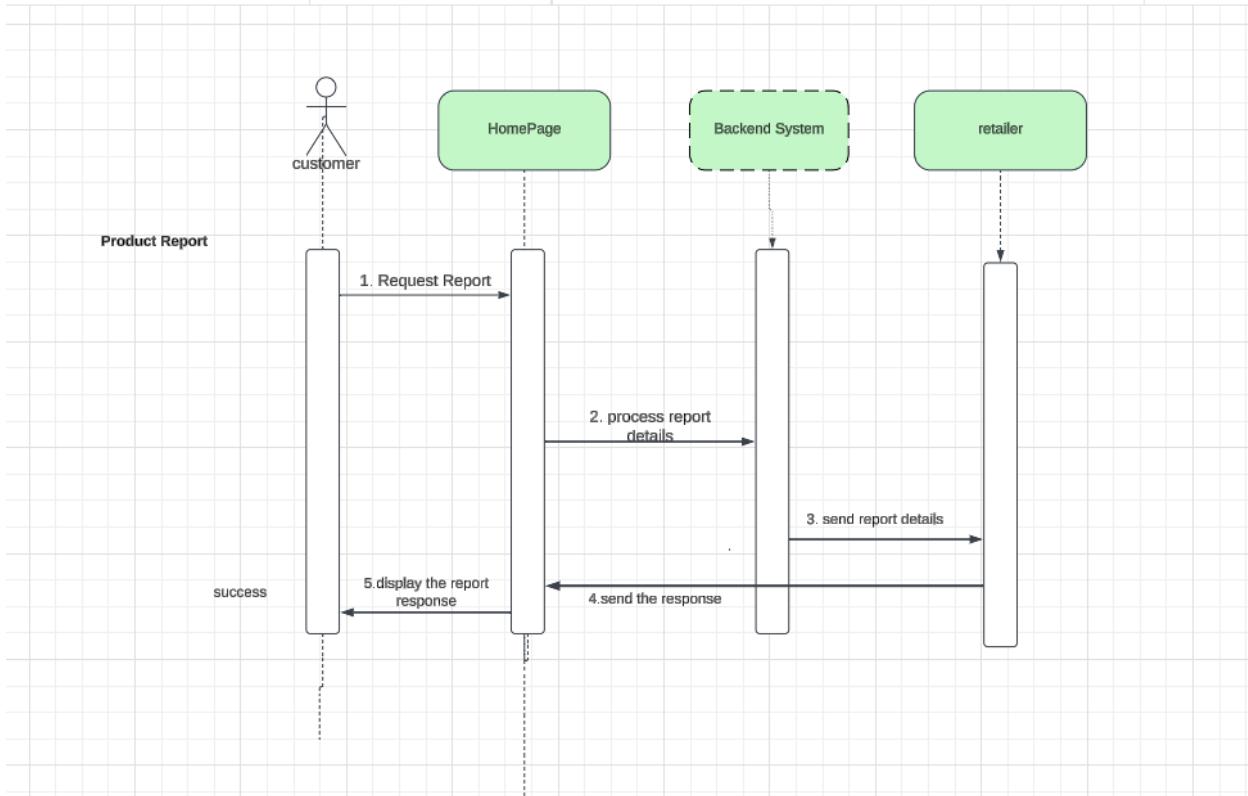
Use Case Name: Audit Trial

Actor	Admin, System, Regulatory Body
Description	Tracks and logs all user and system activities to ensure accountability and compliance.
Data	Activity logs (user actions, timestamps, system events, IP addresses).
Stimulus	Admin or Regulatory Body requests a log report, or the system logs an activity automatically.
Response	The system retrieves and displays the requested logs or stores the activity in the database.
Comments	Logs must be secure, tamper-proof, and accessible only to authorized users.



Use Case Name: Product Report

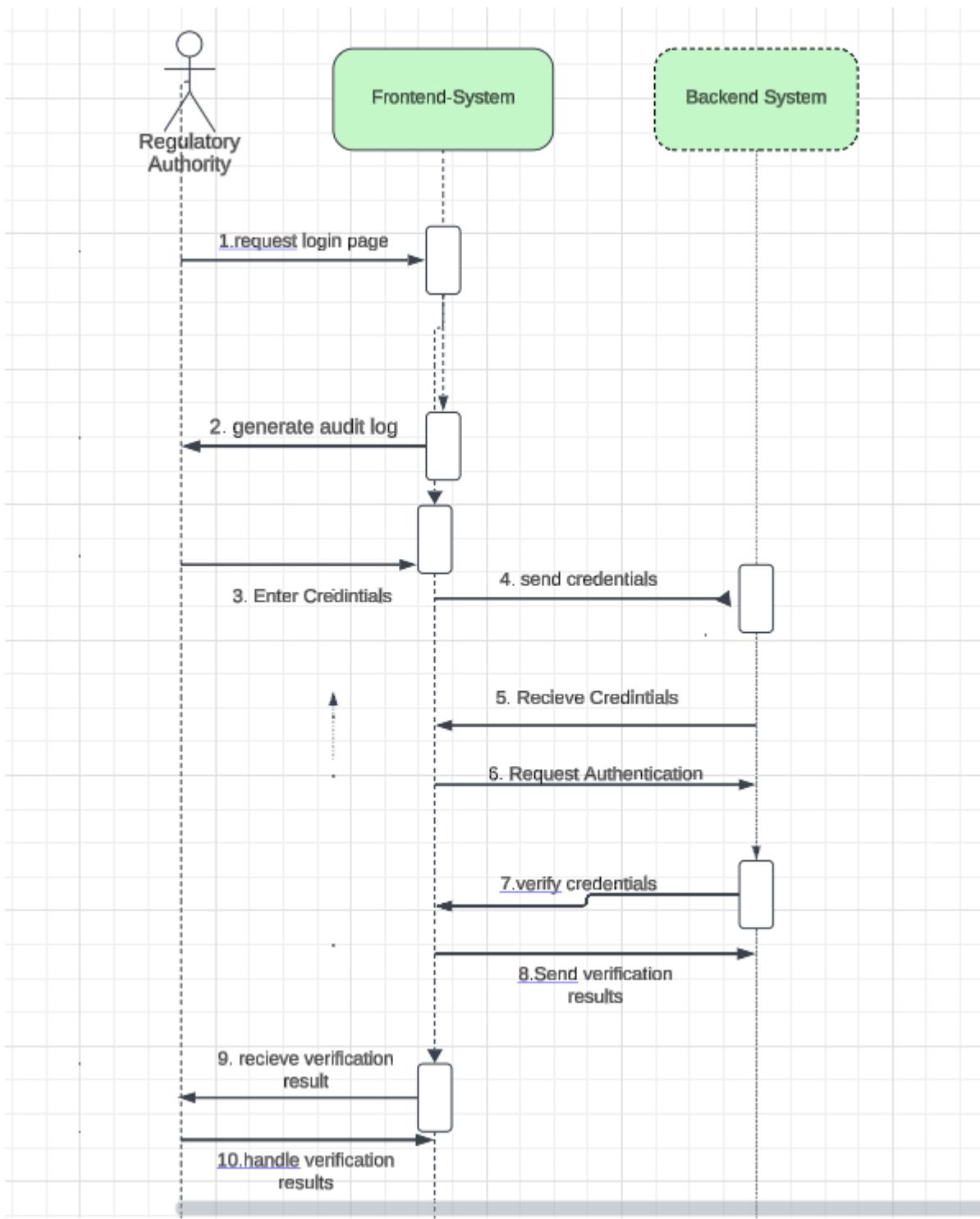
Actor	Admin, System
Description	Generates detailed reports on product performance, including sales, views, and trends.
Data	Product data (sales figures, views, ratings, price history, stock status).
Stimulus	Admin requests a product performance report, or the system generates scheduled reports automatically. report, or the system logs an activity automatically.
Response	The system retrieves the relevant data, processes it, and displays or exports the report to the admin.
Comments	Reports should be customizable, exportable, and visually clear for decision-making.



Use Case Name: Secure Login

Actor	Admin, System
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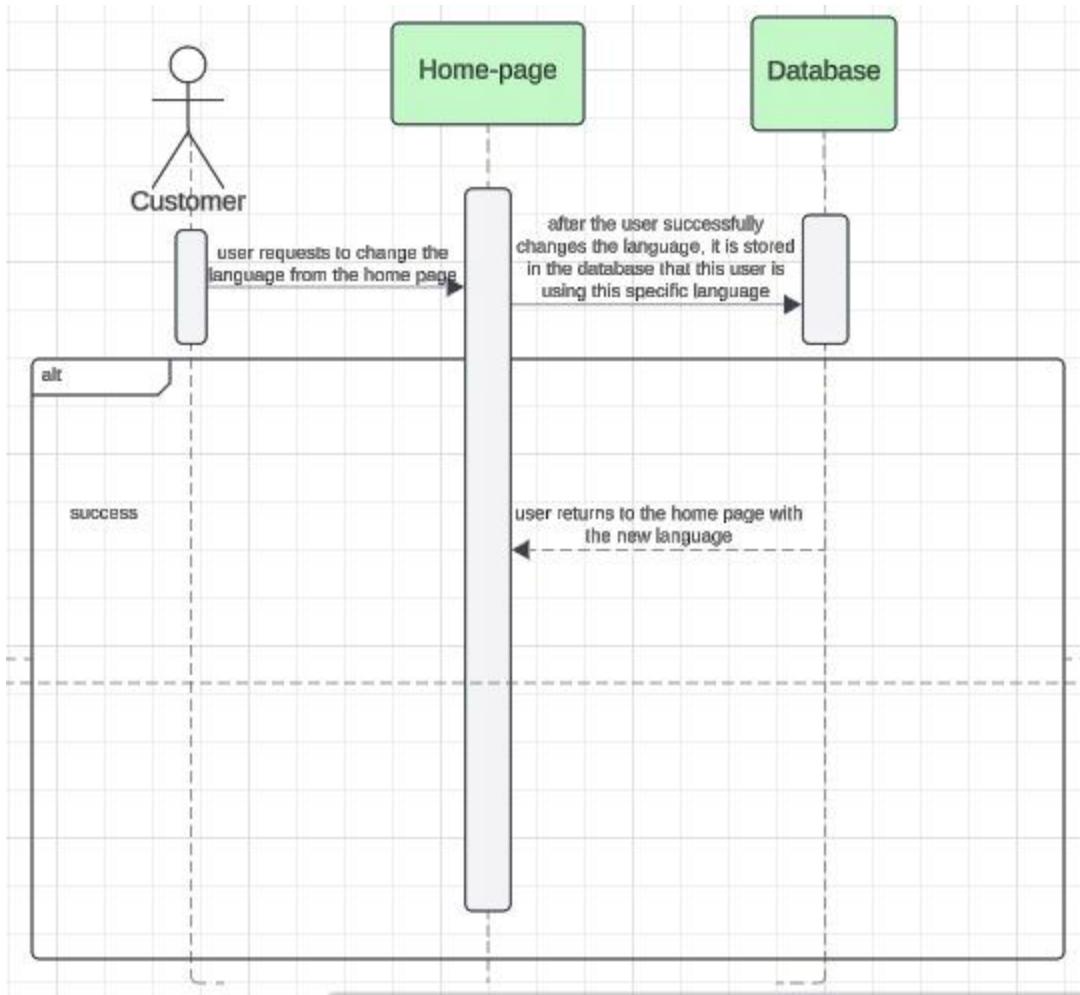
Description	Authenticates users securely to access the platform's features and functionalities.
Data	Login credentials (username, email, password), session tokens, IP address, and device information.
Stimulus	User submits login credentials via the login interface.
Response	The system validates the credentials, initiates a session, and redirects the user to their dashboard.
Comments	Implement features like encryption, Two-Factor Authentication (2FA), and account lockout after multiple failed attempts.



Use Case Name: Language Support	
Actor	User, System
Description	Provides multilingual support to allow users to view the platform in their preferred language.
Data	User language preference, localized content (text, labels, error messages).
Stimulus	User selects a preferred language from the platform's language settings.
Response	The system updates the interface and content to the selected language dynamically
Comments	Ensure proper translation and cultural relevance of content; fallback to a default language if a translation is unavailable..

Use Case Name: Language Support

Actor	User, System
Description	Provides multilingual support to allow users to view the platform in their preferred language.
Data	User language preference, localized content (text, labels, error messages).
Stimulus	User selects a preferred language from the platform's language settings.
Response	The system updates the interface and content to the selected language dynamically
Comments	Ensure proper translation and cultural relevance of content; fallback to a default language if a translation is unavailable..



Use Case Name: Report Generation

Actor	Admin, System
Description	Generates detailed reports on platform activity, user behavior, or retailer performance..
Data	User activity logs, sales data, product views, retailer performance metrics, and timestamps.

Stimulus	Admin requests a specific report, or the system generates scheduled reports automatically.
Response	The system compiles relevant data, processes it, and displays or exports the report in a user-friendly format (e.g., PDF, CSV).
Comments	Reports should be customizable, filterable by date or metrics, and visually clear with graphs and charts for easy analysis

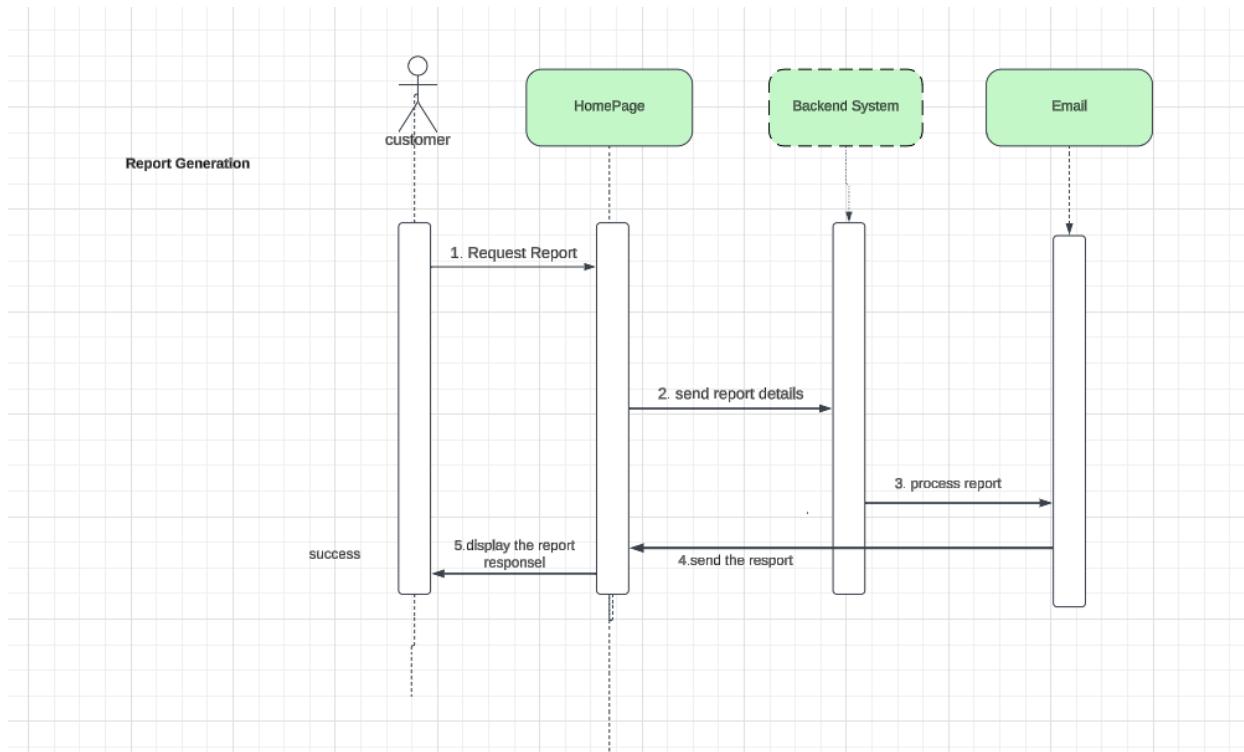


Table 28 notifications use case

Use Case Name: Notifications	
Actor	- Primary Actor: Customers. - Secondary Actor: System.

Description	The “Notifications” use case describes the process where the Deal Detective system sends notifications to users to provide updates, reminders, or alerts regarding price changes, product availability, retailer-related information, or platform updates.
Data	Product details, retailer updates, platform announcements, notification preferences/settings.
Stimulus	Various triggers such as price drops, changes in product availability, retailer updates, or platform-wide announcements prompt the system to send notifications to the user.
Response	The system sends notifications to the user via preferred communication channels (e.g., email, SMS, in-app notifications). The notifications contain relevant information based on the trigger, such as price drop alerts, product availability updates, or platform announcements.
Comments	Notifications play a crucial role in keeping customers informed and engaged. Personalization and customization options for notification preferences can enhance user experience. However, ensuring that notifications are timely, relevant, and not overwhelming is essential to prevent user annoyance. Additionally, respecting customer privacy and preferences regarding communication channels is important.

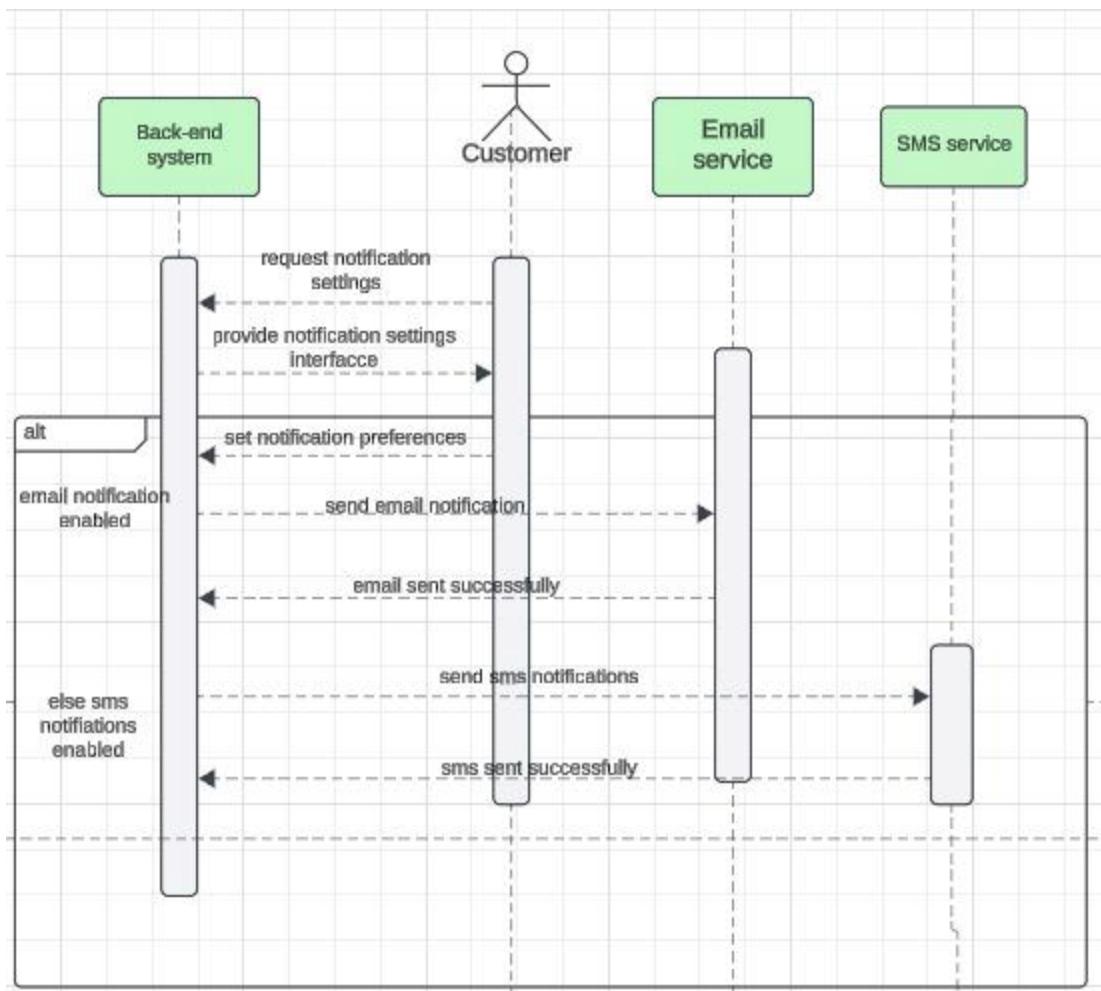


Figure 25 notification useacse diagram

5. Chapter five (Project Implementation)

In this project, we successfully developed a Web Application. In this application, we meticulously addressed and implemented the requisite project requirements, ensuring comprehensive coverage and adherence to the specified criteria.

5.1 Website Application

What We Offer

The slide has a green header with the title "What We Offer". Below the title are six icons arranged in two rows of three. The top row includes a magnifying glass icon in the top right corner. The bottom row includes a magnifying glass icon in the left position.

- Saving time**: An icon of a hand pointing at a clock.
- Consolidated information on products**: An icon showing a stack of documents and a smartphone.
- Additional advertising channel**: An icon showing a television screen, a smartphone, and a newspaper.
- Cheaper way of customer acquisition**: An icon of a person holding a large magnet attracting several small figures.
- Price and condition transparency**: An icon of a magnifying glass over a document with an eye symbol.
- Finding the best deals**: An icon of two hands shaking with a dollar sign between them.
- Facilitate market entering for brands**: An icon of three people working on a computer screen.

We have carefully developed a website using a variety of technologies to enhance its performance and visual appeal. We used Canva and Figma for design elements.

Figure 26 "What we offer" screen page

The image shows the homepage of the Deal Detective website on the left and a modal window for sorting options on the right.

Website Homepage (Left):

- Header:** Contact Us, Terms of Service, Search bar, Login / Register.
- Main Content Area:**
 - A large green banner with the text "Looking for the best price? Deal Detective will find it for you." and an illustration of a woman holding a magnifying glass.
 - The text "Compare thousands of local and global products".
 - Three buttons: Coupons, Trending, Super Deals.
 - A section titled "Who we compare ?" showing logos for TEMU, HyperMax, opensoq, AliExpress, and SmartBuy.
 - A section titled "Popular Products" displaying various items like a laptop, watches, mirrors, water bottles, and sneakers, each with a price, discount, and "Buy" button.
 - A footer with a sign-up form for 10% off first order, social media links, and copyright information.

Sort by Feature (Right):

- Header:** Sort by Featured.
- Options:**
 - Featured (selected)
 - Price-low to high
 - Price-high to low
 - Average ratings
 - Best seller
 - Newest

Figure 27 "Sort by" feature

ooo

Create new Account

Already Registered? Login

EMAIL

PASSWORD

DATE OF BIRTH

A blue magnifying glass with a circular lens. Inside the lens, two hands are shown; one hand is holding a green dollar bill while the other hand reaches for it. The text "Deal Detective" is written vertically along the handle of the magnifying glass.

sign up

Figure 28 Main page

Figure 29 Create new account

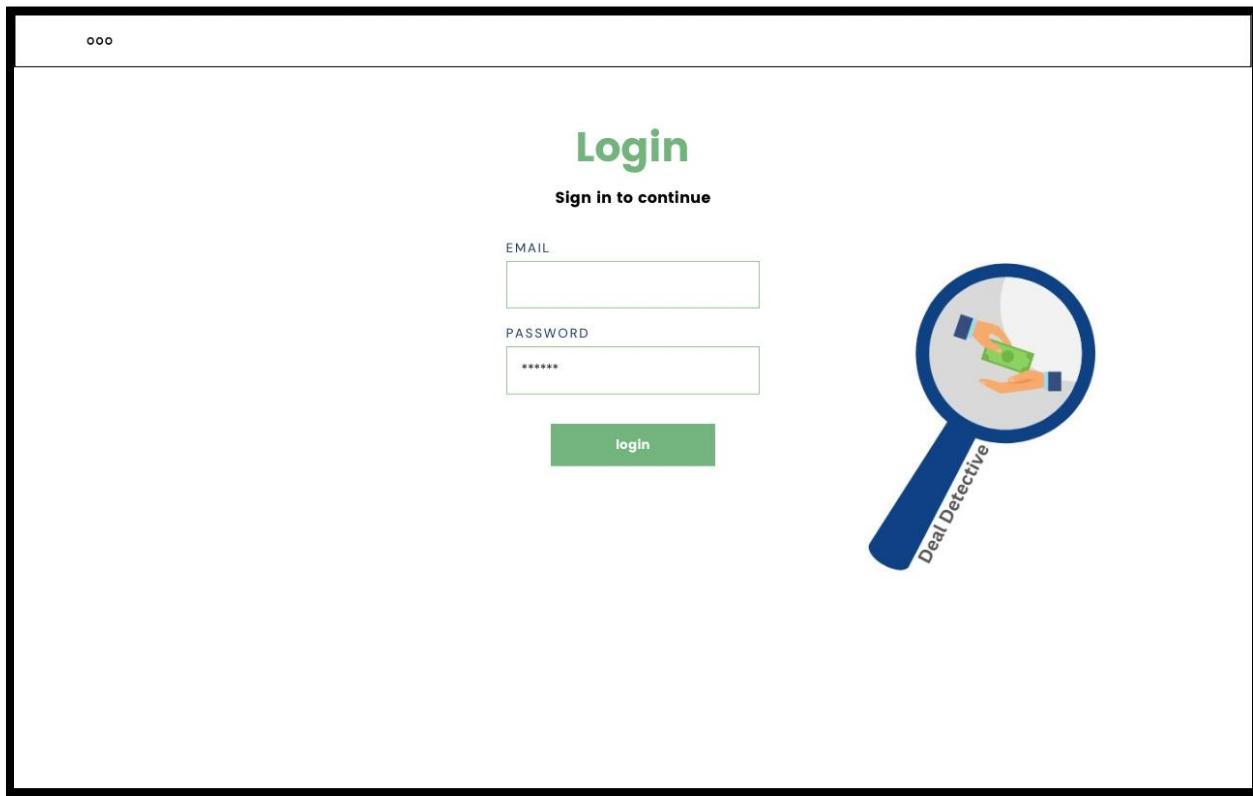
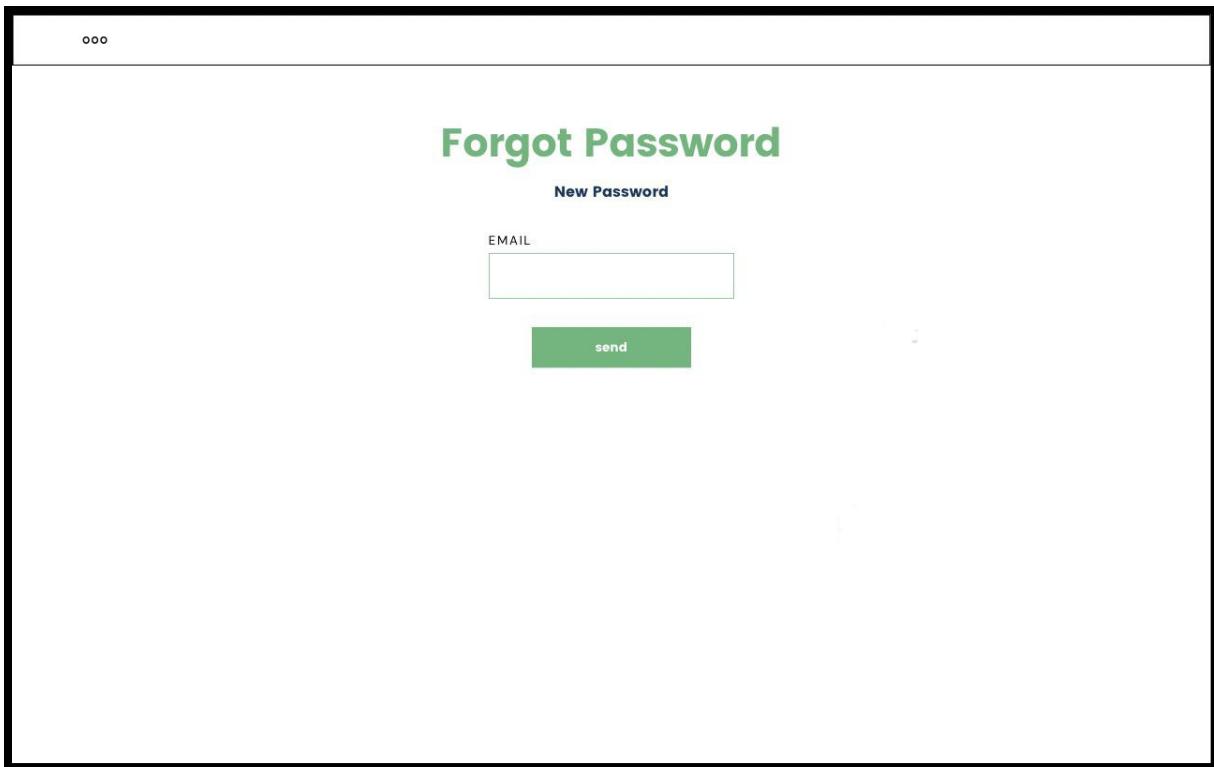


Figure 30 Log in

Figure 31 Forgot password



A screenshot of a 'Forgot Password' form. At the top center, the title 'Forgot Password' is displayed in a green font. Below it, the subtitle 'New Password' is centered. A text input field labeled 'EMAIL' is positioned below the subtitle. To the right of the input field is a small placeholder 'L...' and a magnifying glass icon. A green rectangular button labeled 'send' is located at the bottom right of the input field.

Figure 32 "Contact us" page



The contact page features a large green header with the text 'Contact Us' in white. To the right of the header is a white sidebar containing a magnifying glass icon with a hand holding a dollar bill, and the text 'Deal Detective' written vertically along the handle. The main content area is divided into four sections: 'PHONE' with the number '(123) 456-7890', 'EMAIL' with the address 'Student@ju.edu.jo', 'ADDRESS' with the location 'Amman, Jordan', and 'SOCIAL' with icons for Facebook and Instagram.

6. Chapter six (Project Testing):

6.1 Test Cases

Validated that the platform meets user expectations and provides a seamless experience With Smooth Payment Process Easy to Use Software Whilst Receiving the Best and Lowest Prices Throughout the Internet. The software has been thoroughly developed, tested, and implemented to meet the defined functional and non-functional requirements. Throughout the development lifecycle, the following key aspects were addressed to ensure the highest quality Verified the functionality of individual components to ensure accuracy. Ensured seamless interaction between all modules Confirmed the website's ability to handle high traffic and respond efficiently under load With this thorough testing and careful implementation, the **Deal Detective Website** is now fully operational and ready for deployment. The system is scalable, reliable, and equipped to provide users with a superior shopping experience while maintaining performance and security.

This project marks a significant milestone, and we are confident that it will meet user expectations and deliver exceptional value. Any future updates or enhancements will be carried out as per the defined maintenance plan.

6.2 Test Methodologies:

1. Functional Testing: Ensures the proper functioning of all features on the platform, including Search filtering, Payment Options, Product Management, and notifications.
2. Usability Testing: Evaluates the user-friendliness of the platform, ensuring that Customers can easily navigate Through the Website, Accessing Wishlist, and access relevant Content and Products For Purchase Purpose.
3. Compatibility Testing: Checks the platform's compatibility across various devices and web browsers, ensuring a consistent experience for users regardless of their device or browser choice.

4-Security Testing: Verifies the security of the platform, especially regarding the storage and handling of sensitive Customer information, to ensure protection against potential threats as it's the most Important Element Protecting Their Personal Information As well as their Payment Information One Simple Threat Can Cause Millions.

5- Performance Testing: Tests the speed, responsiveness, and stability of the platform under different conditions to ensure optimal performance for users.

6-Regression Testing: Re-tests the platform after updates or changes to ensure that new features or modifications do not introduce any issues to previously working functionalities.

7-User Acceptance Testing: Involves real users testing the platform to validate its usability, functionality, and overall user experience, helping to ensure that it meets users' needs and expectations.

Interview Script:

Introduction:

Hello, and thank you for participating in this interview. We are currently developing a price comparison platform, Deal Detective, designed to help users find the best deals from local and online retailers. Your insights are invaluable to us in making this platform as effective and user-friendly as possible.

Background:

- Can you please share your experience with searching for the best prices when shopping online or in-store?
- Have you encountered any challenges or frustrations while trying to compare prices across different retailers?

Platform Awareness:

- Have you ever used a price comparison platform before? If yes, can you share your thoughts about it?
- What features do you consider essential when using a price comparison platform?

User Experience:

- How would you describe your ideal user experience when searching for and comparing product prices?
- Are there any specific difficulties or frustrations you've experienced with existing price comparison tools?

Integration and Convenience:

- How do you feel about additional features like user reviews, product recommendations, or price drop alerts to enhance your shopping experience?

- What other functionalities would you like to see on a price comparison platform to make it more convenient for you?

Security and Privacy:

- How important is data security and privacy to you when using online platforms like Deal Detective?
- What measures or assurances would you expect from a platform to ensure the security and privacy of your personal information?

Overall Expectations:

- What are your expectations from a price comparison platform like Deal Detective?
- How do you envision such a platform fitting into your shopping habits or lifestyle?

Closing:

Thank you for sharing your insights with us today. Your feedback will play a crucial role in shaping the development of Deal Detective and ensuring it meets the needs of users like you.

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