



CAPSTONE PROJECT REPORT

Smart online electronics sales system

Report 4 – Software Design Document

– Can Tho, August 2024 –

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I. Software Design Document

1. System Design

1.1 System Architecture

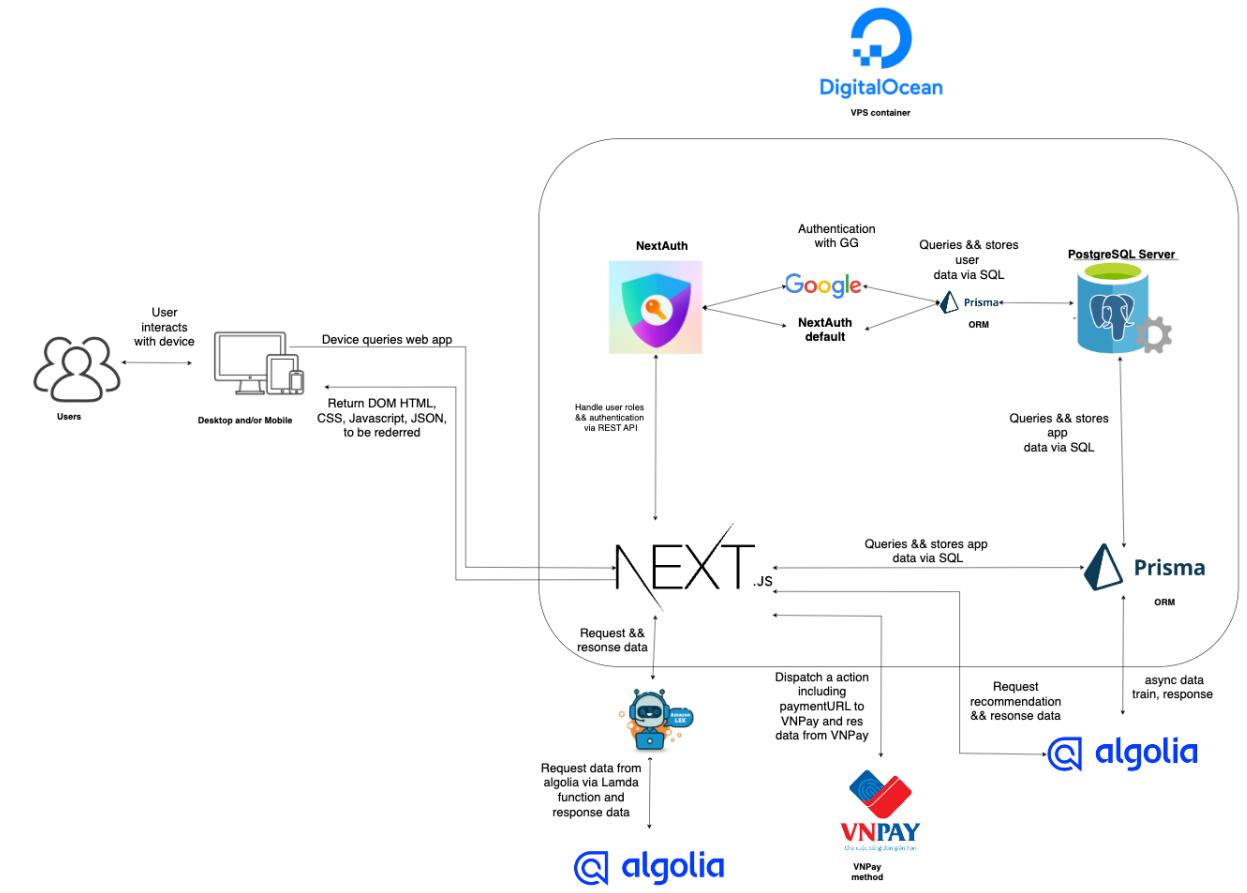


Figure 1 - System Architecture

1.2 Package Diagram

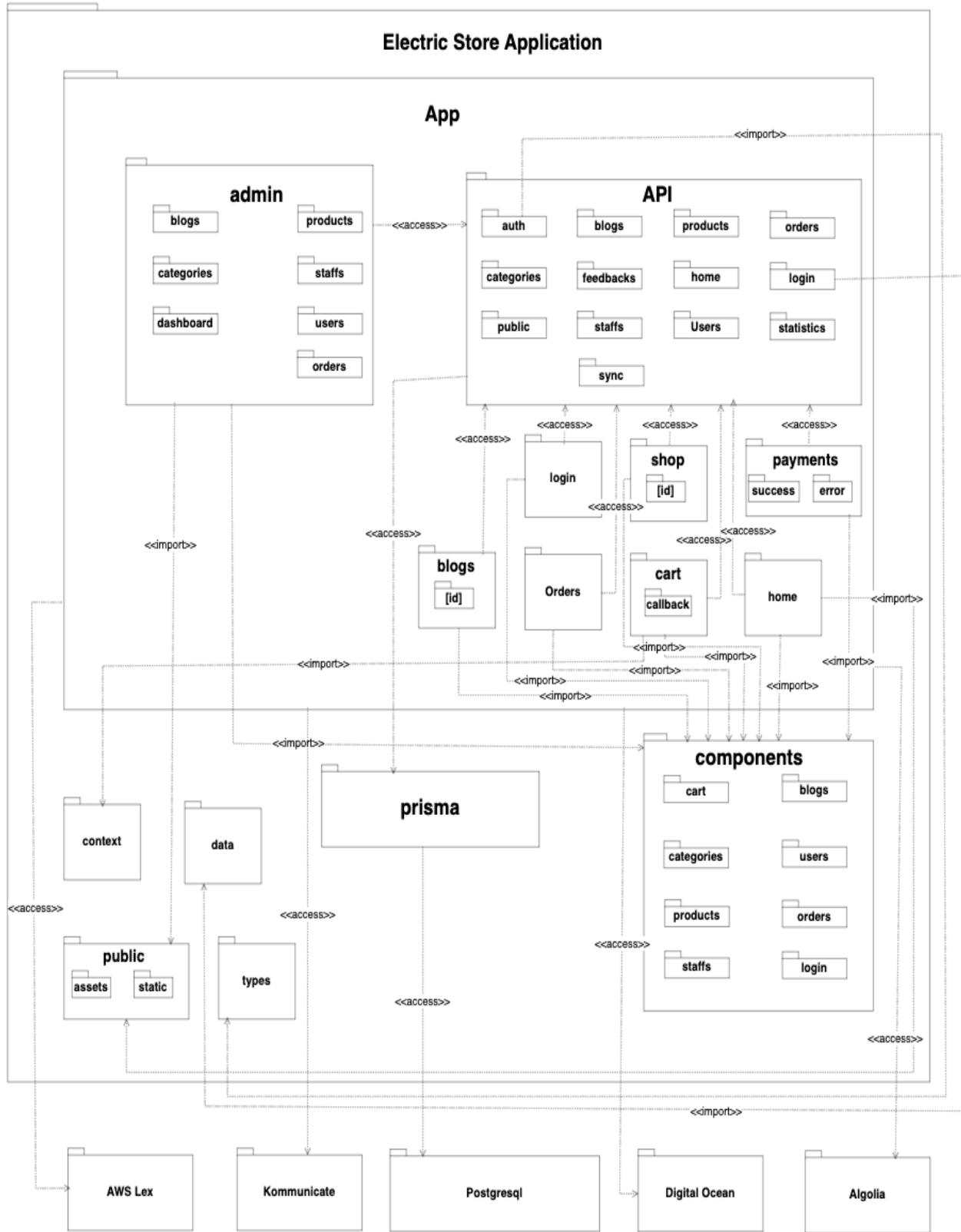


Figure 2 - Package Diagram

Package Descriptions

Table 1 - Package Descriptions

No	Package	Description
01	electric store	This package contains all sub-packages of the whole project.
02	app	This directory contains the application's source code, including pages, components, and styles. Subdirectories like admin/, API/, blogs/, etc., organize the code by function or part of the application.
03	components	Contains reusable React components in the application. These components can be used in multiple places throughout your application.
04	contexts	This directory contains definitions for React Contexts, helping to manage and share state across the entire application easily.
05	data	Typically contains files related to sample data or configurations, helping to organize the data used in the application
06	lib	This directory usually contains libraries or general support code, such as utility functions or API configurations.
07	prisma	Contains configurations and models for Prisma, an ORM for Node.js and TypeScript, making database interactions easier.
08	public	This directory contains static files like images, favicons, and robots.txt, which can be accessed directly via URL.
09	types	Contains TypeScript type definitions, helping to manage data types in your application.
10	api	This directory contains files related to APIs, which may be server-side endpoints.
11	blogs	This directory contains components or pages related to blogs within the application.

No	Package	Description
12	cart	This directory contains components or pages related to the application's shopping cart.
13	home	This directory contains components or pages related to the application's homepage.
14	login	This directory contains components or pages related to the application's login functionality
15	orders	This directory contains components or pages related to the application's orders
16	components	This directory contains reusable components within the application, such as buttons, navigation bars, footers, etc.
17	data	This directory may contain static data files or configurations, such as sample data, application configurations, etc.
18	lib	This directory contains libraries or utility functions used in the application, helping to reuse code and keep the source code clean.
19	Prisma	This directory contains configuration and migration files for Prisma, an ORM for Node.js, and TypeScript, making database interactions easier.
20	public	This directory contains static files such as images, favicons, and other static files that the browser can access directly.
21	shop	This directory may contain pages and components related to the online store where users can view and purchase products
22	categories	This directory may contain logic and user interfaces for managing product categories, helping to organize products by groups.

No	Package	Description
23	dashboard	This directory may contain pages and components for the admin dashboard, where administrators can view statistics, manage users, products, and other site functions
24	statistics	This directory may contain logic and user interfaces to collect and display statistical data, such as order quantities, revenue, and other metrics.
25	staffs	This directory may contain pages and components related to managing staff, including adding, deleting, and editing staff information.
26	users	This directory may contain pages and components related to managing the site's users, including personal information and purchase history.
27	products	This directory may contain pages and components related to managing products, including adding, editing, and deleting products
28	sync	This directory may relate to data synchronization between services or databases, or synchronizing state within the application
29	AWS Lex	This is a chatbot building service by Amazon Web Services, which can be used to create automated chat experiences for users
30	Kommunicate	This is a platform that allows the integration of chatbots and customer support into web or mobile applications.
31	PostgreSQL	This powerful relational database management system can be used to store and manage application data.
32	DigitalOcean	This is a cloud service provider that can be used to host and deploy web applications
33	Algolia	This is a search-as-a-service platform that helps improve the search experience on your application

1.3 Enhancing E-Commerce with Algolia

1.3.1 Instant Search Algolia

Instant Search Algolia is a search service provided by Algolia, a company specializing in search and data discovery technology. This service helps create instant search experiences on websites and applications. Key features of Instant Search Algolia include:

Fast and Instant Search: Algolia uses optimized algorithms to provide nearly instantaneous search results as users begin typing keywords. This improves user experience by reducing wait times.

Autocomplete Suggestions: As users type keywords, Algolia can offer autocomplete suggestions based on popular keywords or historical data, helping users search more efficiently.

Personalized Search Results: Algolia allows for customization and personalization of search results based on criteria such as user behavior, or other parameters.

Easy Integration: Algolia provides robust SDKs and APIs, making it easy for developers to integrate search technology into websites and applications.

Data Management and Analytics: Algolia offers data management and analytics tools, allowing for tracking and optimizing search performance.

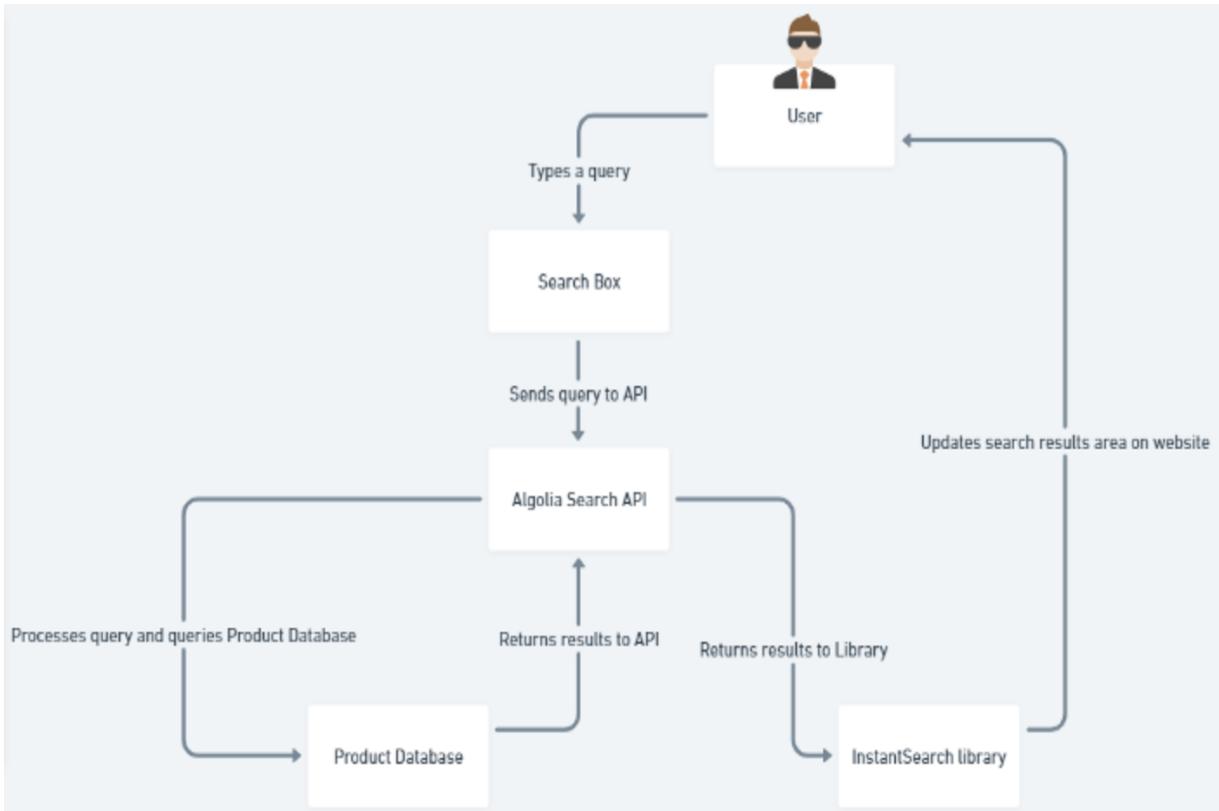


Figure 3 - Instant Search Algolia

- The process begins with the user typing a query into the search box on the website
- The search box captures the user's query and sends it to the Algolia Search API.
- The Product Database stores all the data related to the products available on the website. The Algolia Search API retrieves the necessary information from this database based on the user's query.
- Once the data is fetched from the Product Database, the Algolia Search API sends the results back to the InstantSearch library.
- The InstantSearch library processes the returned data and formats it for display. It then updates the search results area on the website, showing the user the relevant products or information corresponding to their query.

- Finally, the user sees the updated search results on the website, enabling them to explore the products or information that matches their search criteria.

1.3.2 Recommendations for behavior (Shop page)

Algolia supports product recommendation models based on user click events. Typically, these models utilize user interaction history to suggest similar or related products. When a user clicks on a specific product, the system records this event and uses it to enhance recommendation accuracy. Algolia provides APIs for building such recommendation models

Using user click data to suggest products offers several key benefits:

Enhanced user experience: By tracking mouse click behaviors, the system gains deeper insights into user preferences and needs. This improves the accuracy of product recommendations, increasing the likelihood that users find products they are genuinely interested in.

Optimized recommendation performance: Mouse click data provides insights into products users have interacted with. This information allows the system to optimize recommendation algorithms, ensuring that suggested products align well with user preferences.

Detecting trends and changes: Monitoring mouse click data helps the system identify new trends and changes in user preferences. This enables flexible updates to product recommendations, promptly adapting to shifts in the market or user interests.

In summary, leveraging mouse-click data is crucial for enhancing user experience and optimizing product recommendation performance.

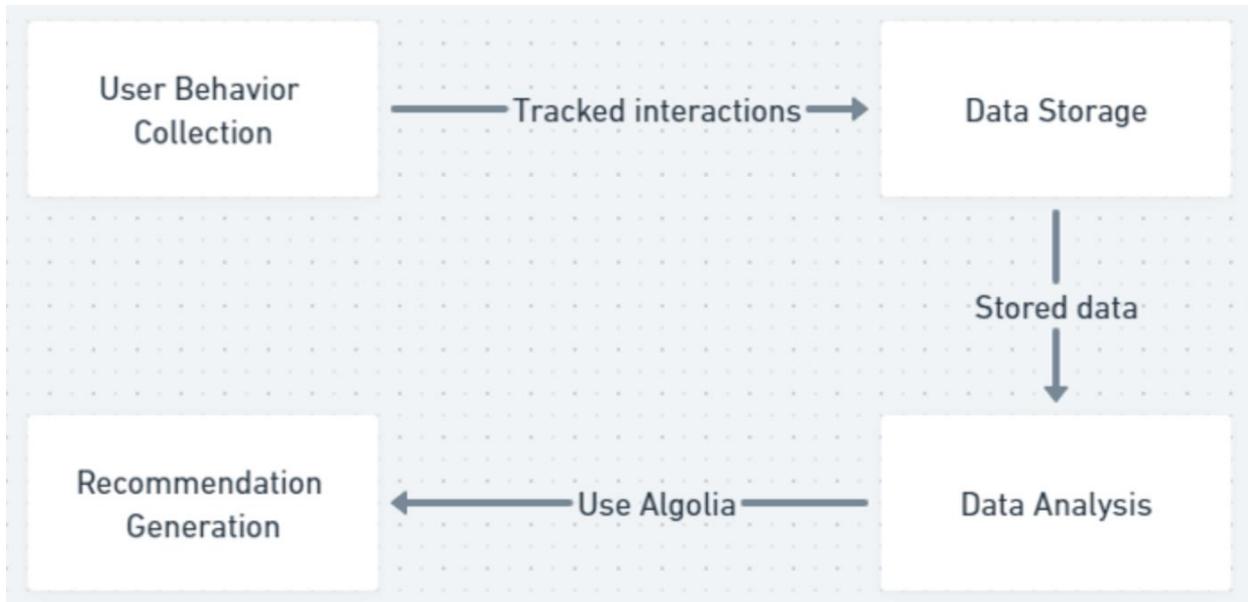


Figure 4 - Recommendations for behavior Step 1

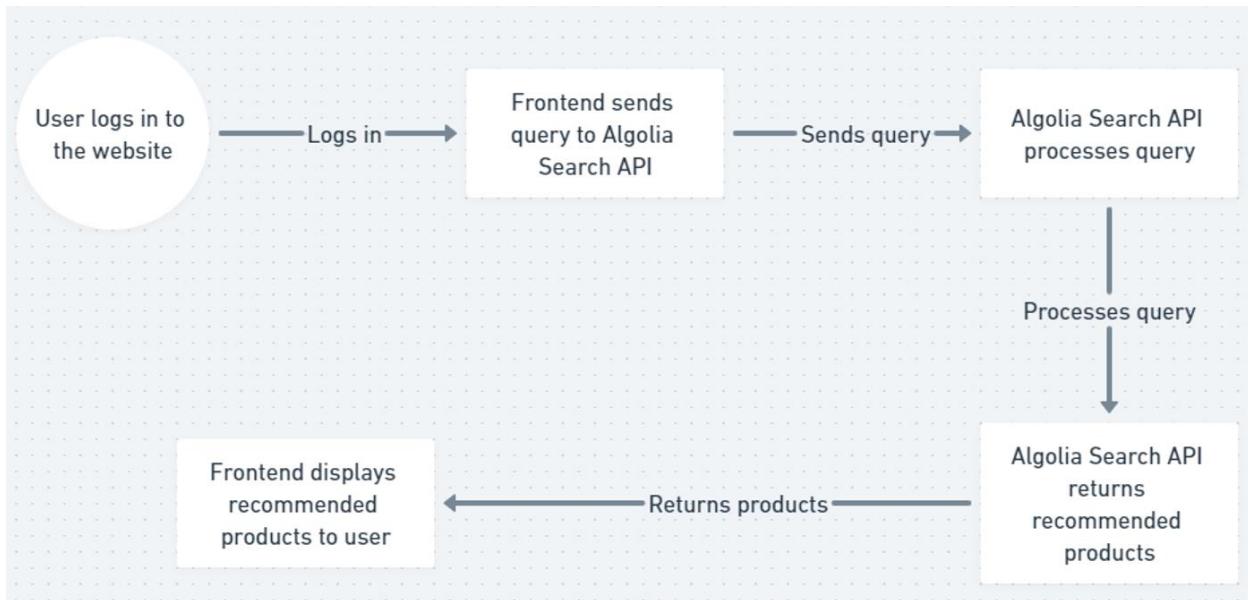


Figure 5 - Recommendations for behavior Step 2

1.3.3 Similar product (product detail page)

Algolia Recommends constructs models using data from your index and user interactions, employing supervised machine learning algorithms. This approach involves analyzing assets.0.url,

which can represent source items or items that users have viewed. Using these assets.0.url as input, the trained model generates recommendations by identifying other related assets.0.url that are likely to be of interest to the user (recommendations). This process enhances the relevance and effectiveness of product recommendations, thereby improving user engagement and satisfaction on your platform.

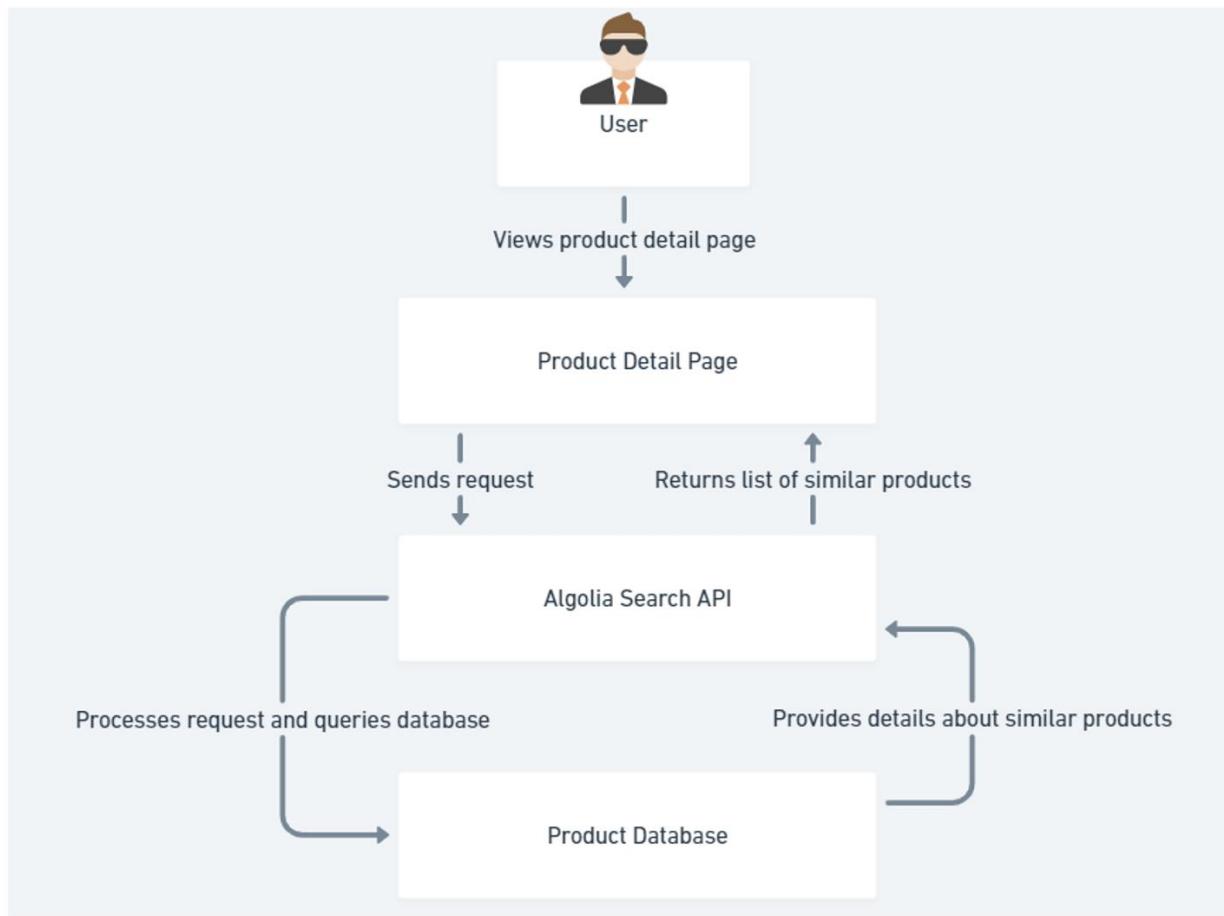


Figure 6 - Similar product

- The process begins with the user viewing a product detail page on the website.
- Upon viewing the product detail page, a request is sent to the Algolia Search API to retrieve a list of similar products.
- The Algolia Search API processes the request and queries the Product Database to find products that are similar to the one being viewed.

- The Product Database contains detailed information about all the products available on the website. The Algolia Search API queries this database to fetch details about similar products.
- After processing the request, the Algolia Search API returns a list of similar products to the Product Detail Page.
- The website then displays this list of similar products to the user, enhancing the shopping experience by providing them with more options that match their interests.

2. Database Design

- Database system

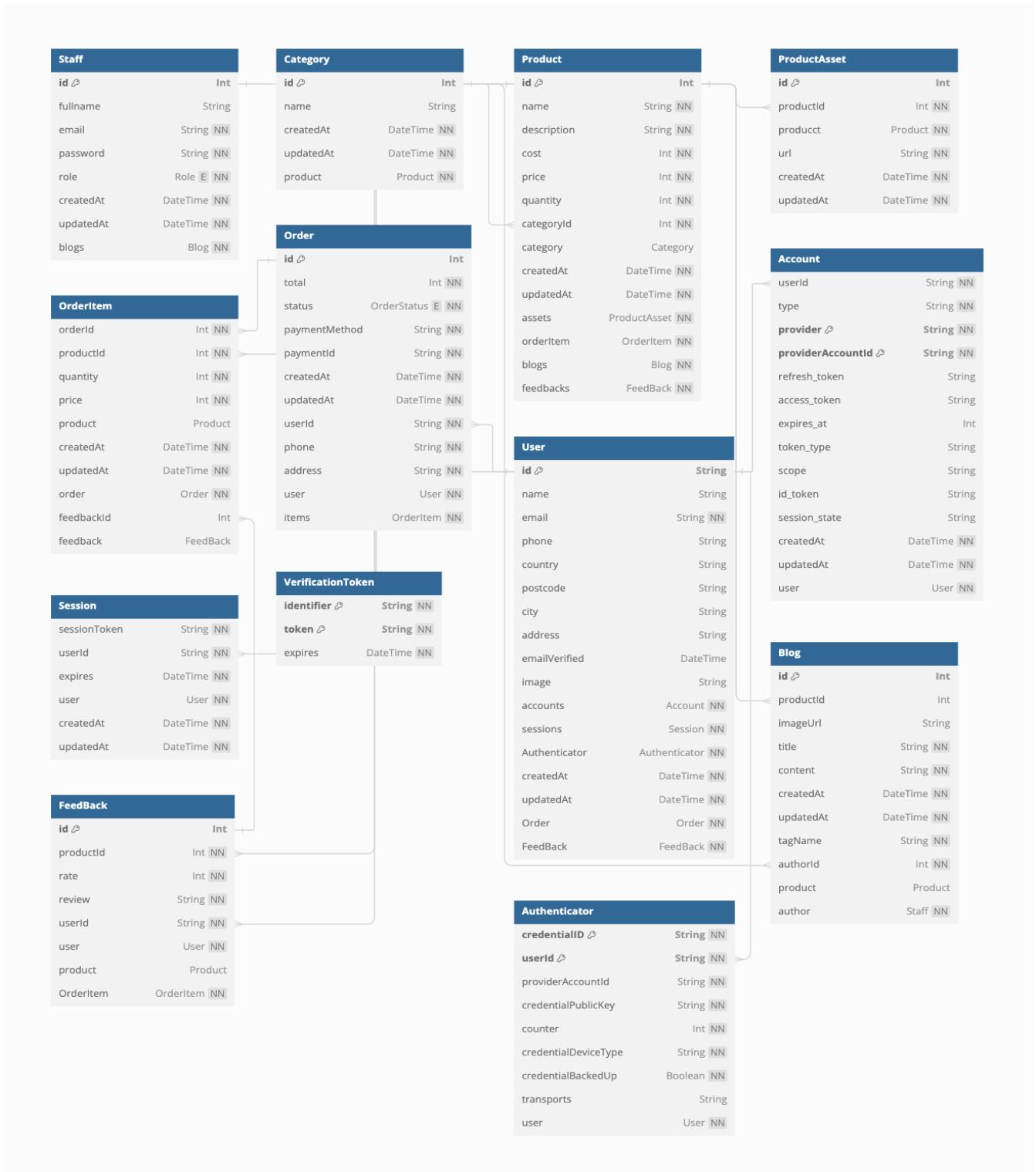


Figure 7 - Database system

Table Descriptions

Table 2 - Table Descriptions

No	Table	Description
01	Staff	<p>Description: Represents staff members, including their roles and contact information.</p> <p>Primary Key: id</p> <p>Foreign Keys: None directly in the schema, but related to Blog(authorId)</p>
02	User	<p>Description: Represents users of the system, including their contact information and authentication details.</p> <p>Primary Key: id</p> <p>Foreign Keys: None directly in the schema, but related to other tables via their foreign keys.</p>
03	Account	<p>Description: Represents user accounts, including details for third-party authentication.</p> <p>Primary Key: Composite key of provider and providerAccountId</p> <p>Foreign Keys: userId references User(id)</p>
04	Product	<p>Description: Represents products with details like name, description, cost, price, quantity, and category.</p> <p>Primary Key: id</p> <p>Foreign Keys: categoryId references Category(id)</p>
05	ProductAsset	<p>Description: Represents assets associated with a product, such as images or documents.</p> <p>Primary Key: id</p>

No	Table	Description
		Foreign Keys: productId references Product(id)
06	Order	<p>Description: Represents orders placed by users, including total cost, status, and payment information.</p> <p>Primary Key: id</p> <p>Foreign Keys: userId references User(id)</p>
07	OrderItem	<p>Description: Represents items within an order, including the product, quantity, and price.</p> <p>Primary Key: Composite key of orderId and productId</p> <p>Foreign Keys:</p> <ul style="list-style-type: none"> productId references Product(id) orderId references Order(id)
08	FeedBack	<p>Description: Represents feedback from users on products or services.</p> <p>Primary Key: id</p> <p>Foreign Keys: None directly in the schema, but related to other tables via their foreign keys.</p>
09	Category	<p>Description: Represents product categories.</p> <p>Primary Key: id</p> <p>Foreign Keys: None directly in the schema, but related to Product(categoryId)</p>
10	Blog	<p>Description: Represents blog posts, including content, author, and associated product.</p> <p>Primary Key: id</p>

No	Table	Description
		<p>Foreign Keys:</p> <p>productId references Product(id)</p> <p>authorId references Staff(id)</p>
11	VerificationToken	<p>Description: Used for account verification processes, storing tokens and their expiration.</p> <p>Primary Key: Composite key of identifier and token</p> <p>Foreign Keys: None explicitly, but related to users.</p>
12	Session	<p>Description: Represents user sessions for authentication and tracking.</p> <p>Primary Key: sessionToken</p> <p>Foreign Keys: userId references User(id)</p>
13	Authenticator	<p>Description: It supports WebAuthn authentication and stores credentials and device information.</p> <p>Primary Key: Composite key of userId and credential</p> <p>Foreign Keys: userId references User(id)</p>

3. Detailed Design

3.1 Sign In

3.1.1 Class Diagram

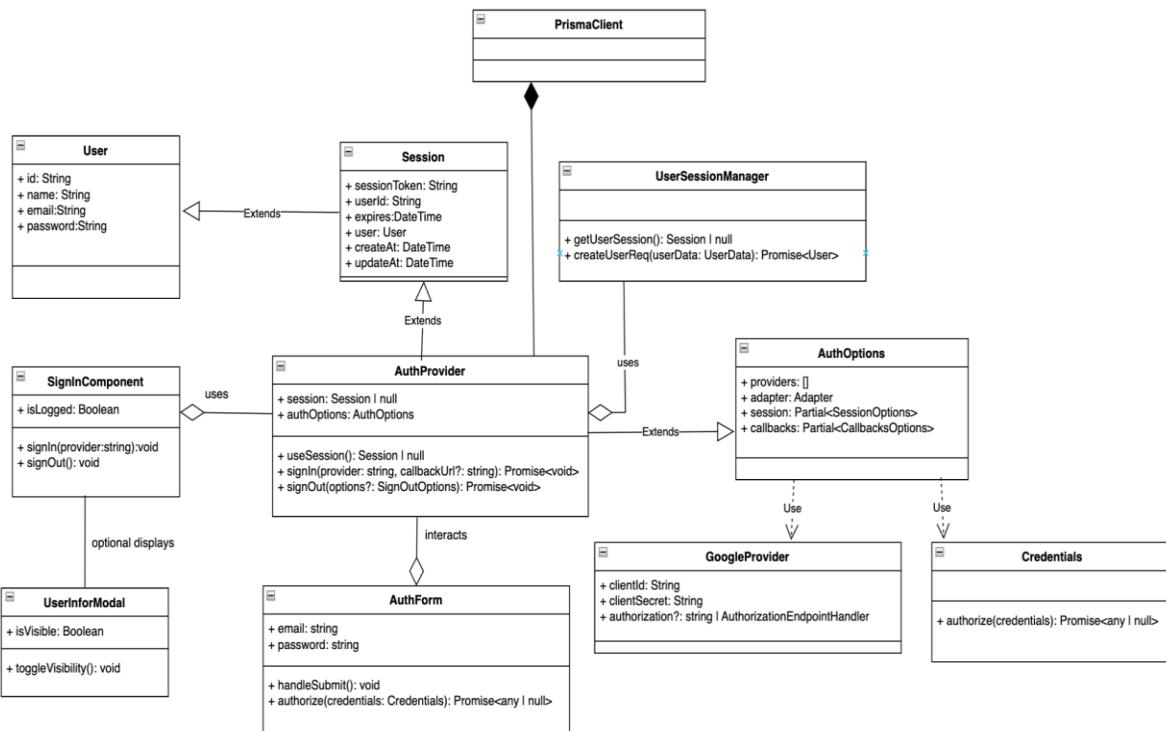


Figure 8 - Class Diagram - Sign In

3.1.2 Sequence diagram

- **Sign In with Credentials for Staff/Admin**

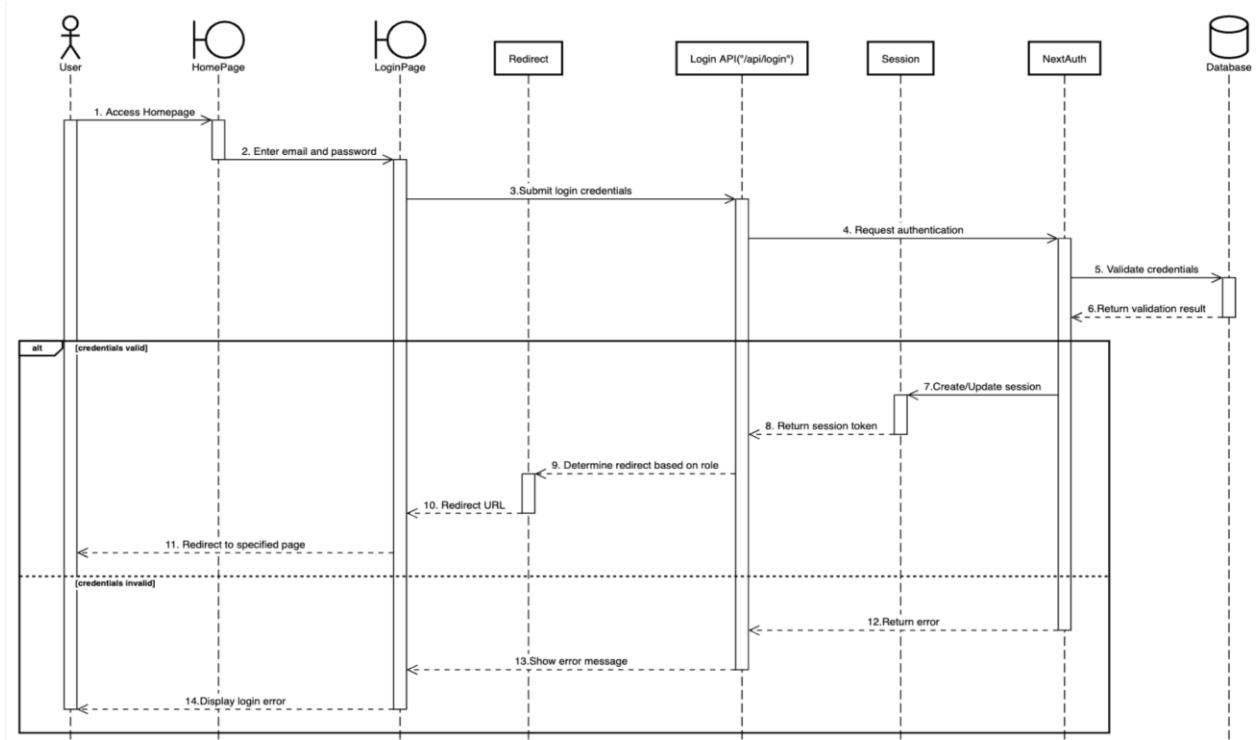


Figure 9 - Sequence Diagram - Sign In with Credentials for Staff/Admin

- **Sign in with Google for Guest/Customer**

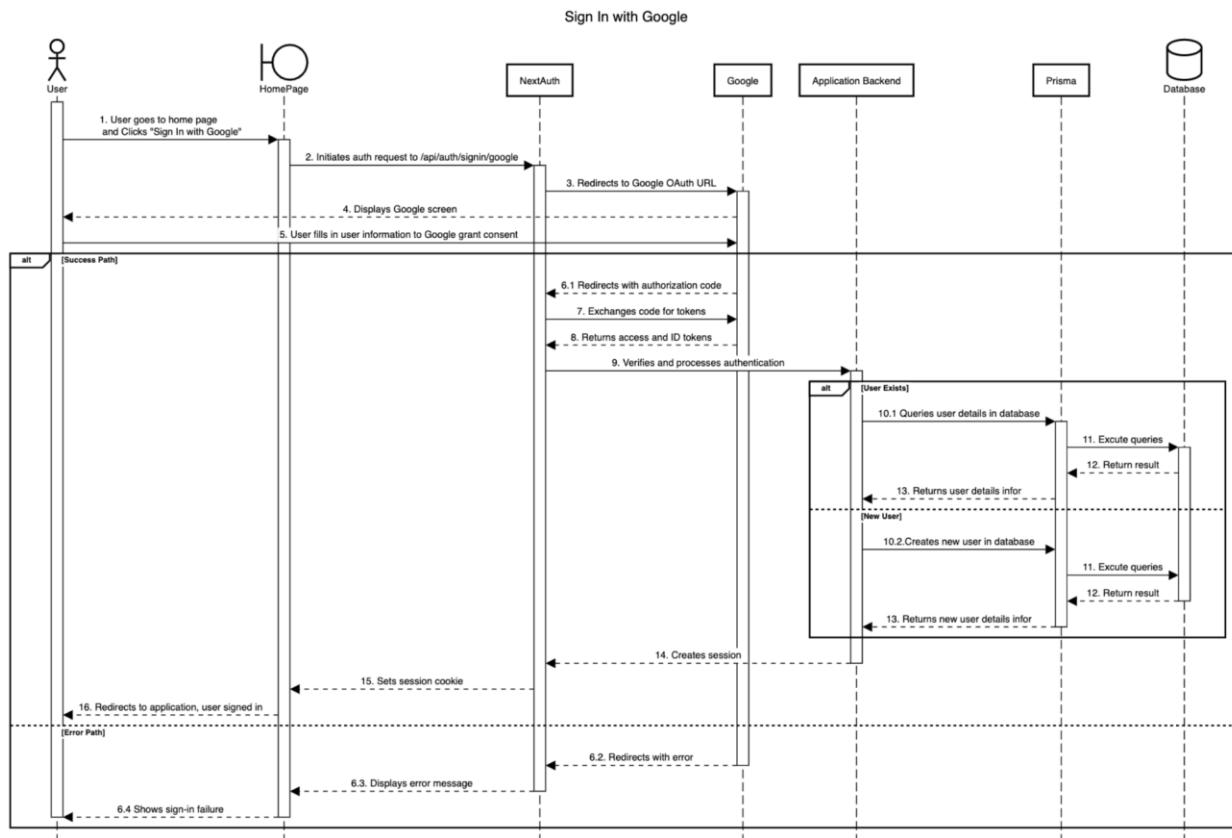


Figure 10 - Sequence Diagram - Sign in with Google for Guest/Customer

3.2 Sign Up

3.2.1 Class Diagram

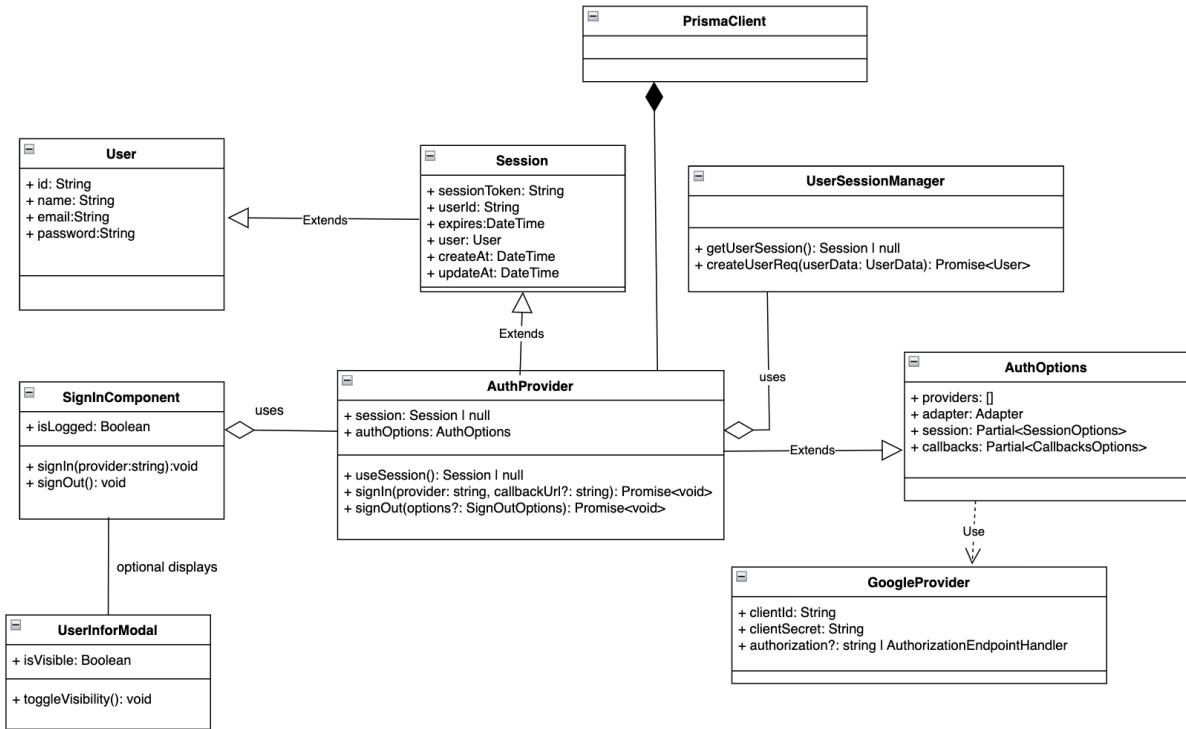


Figure 11 - Class Diagram - Sign Up

3.2.2 Sequence diagram

- **Sign Up with Google for Guest/Customer**

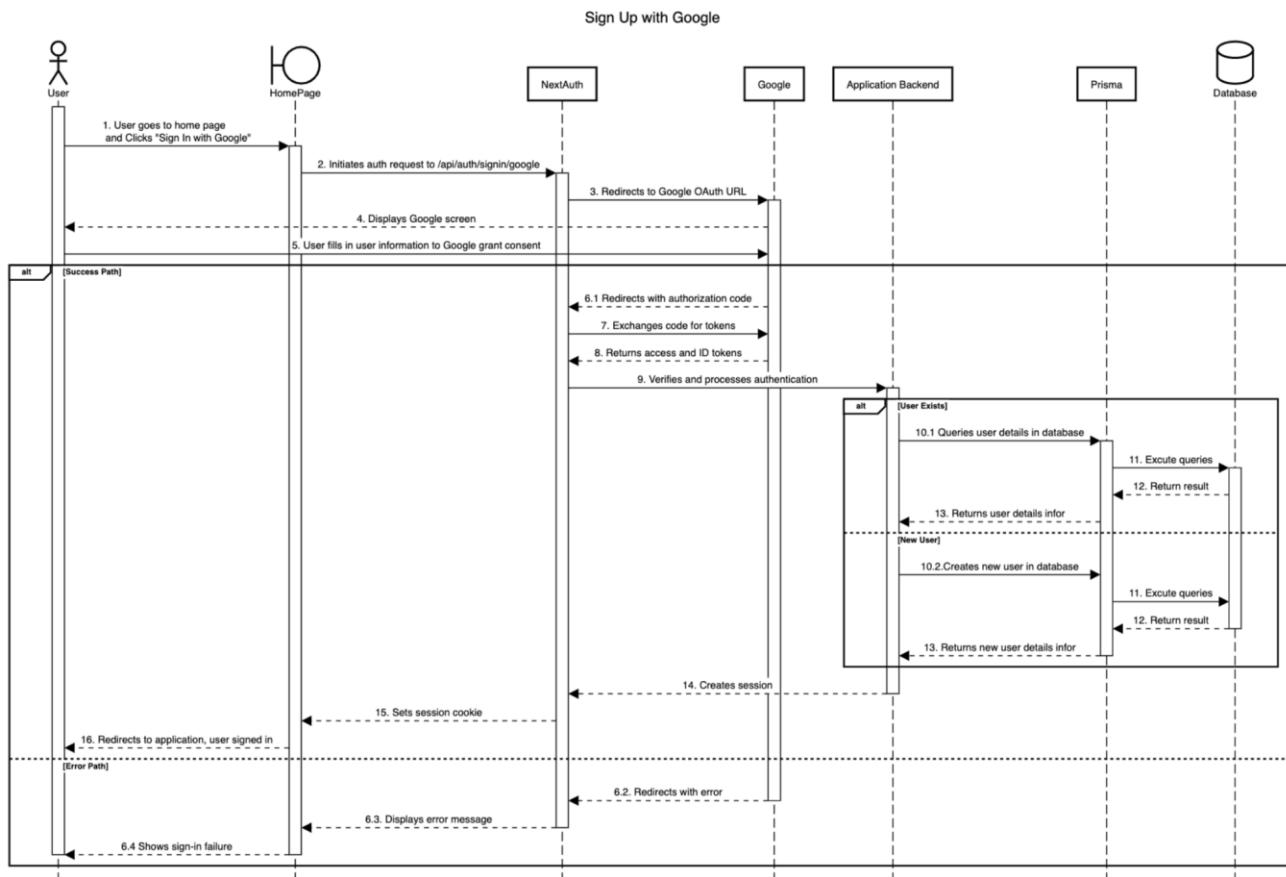


Figure 12 - Sequence Diagram - Sign Up with Google for Guest/Customer

3.3 Sign Out

3.3.1 Class Diagram

- Sign-out is performed by deleting the user's login token on the FE, so it is not shown in the class diagram.

3.3.2 Sequence diagram

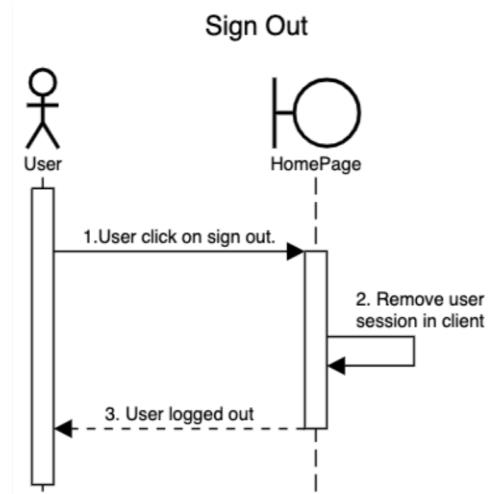


Figure 13 - Sequence Diagram - Sign Out

3.4 View all products

3.4.1 Class Diagram

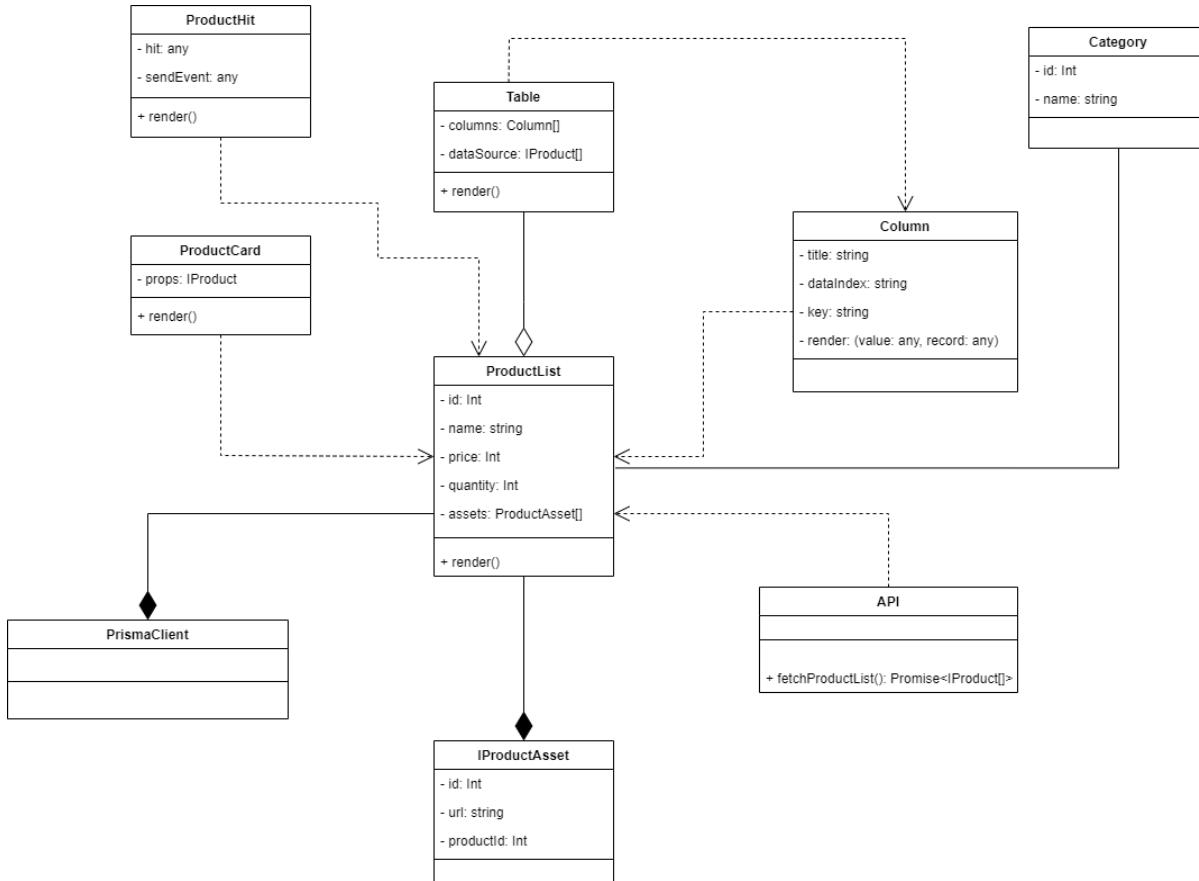


Figure 14 - Class Diagram - View all products

3.4.2 Sequence Diagram View all products

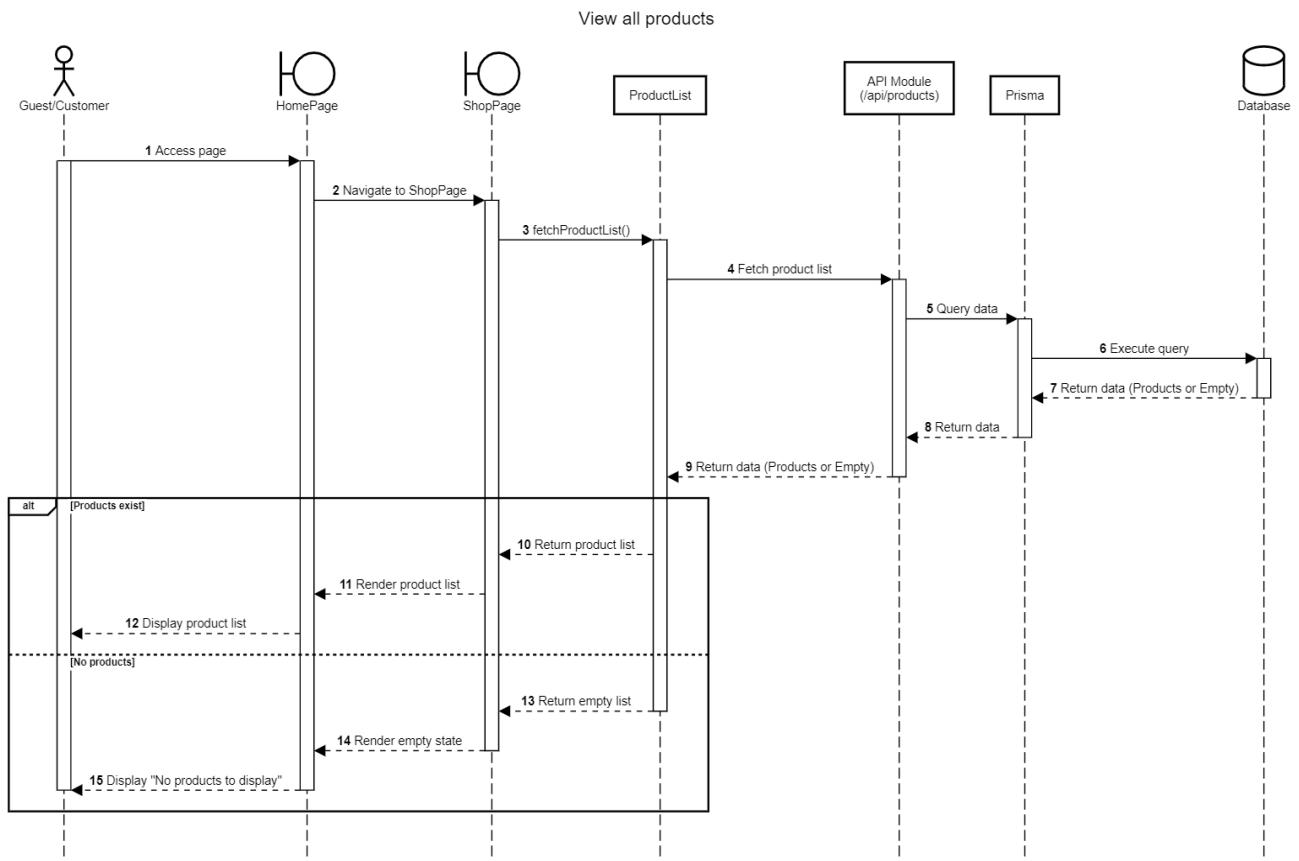


Figure 15 - Sequence Diagram - View all products

3.5 View product detail

3.5.1 Class Diagram

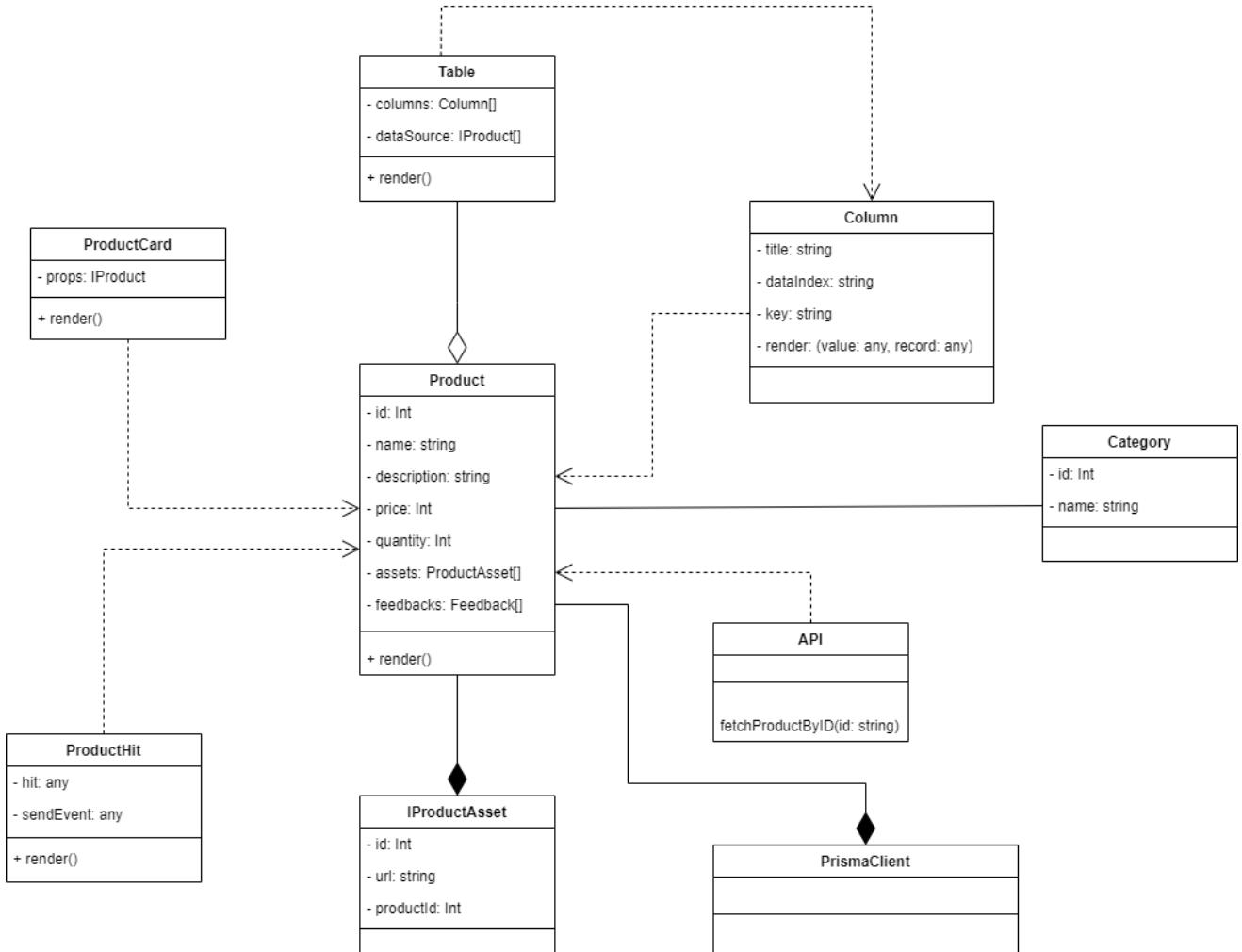


Figure 16 - Class Diagram - View product detail

3.5.2 Sequence Diagram View product detail

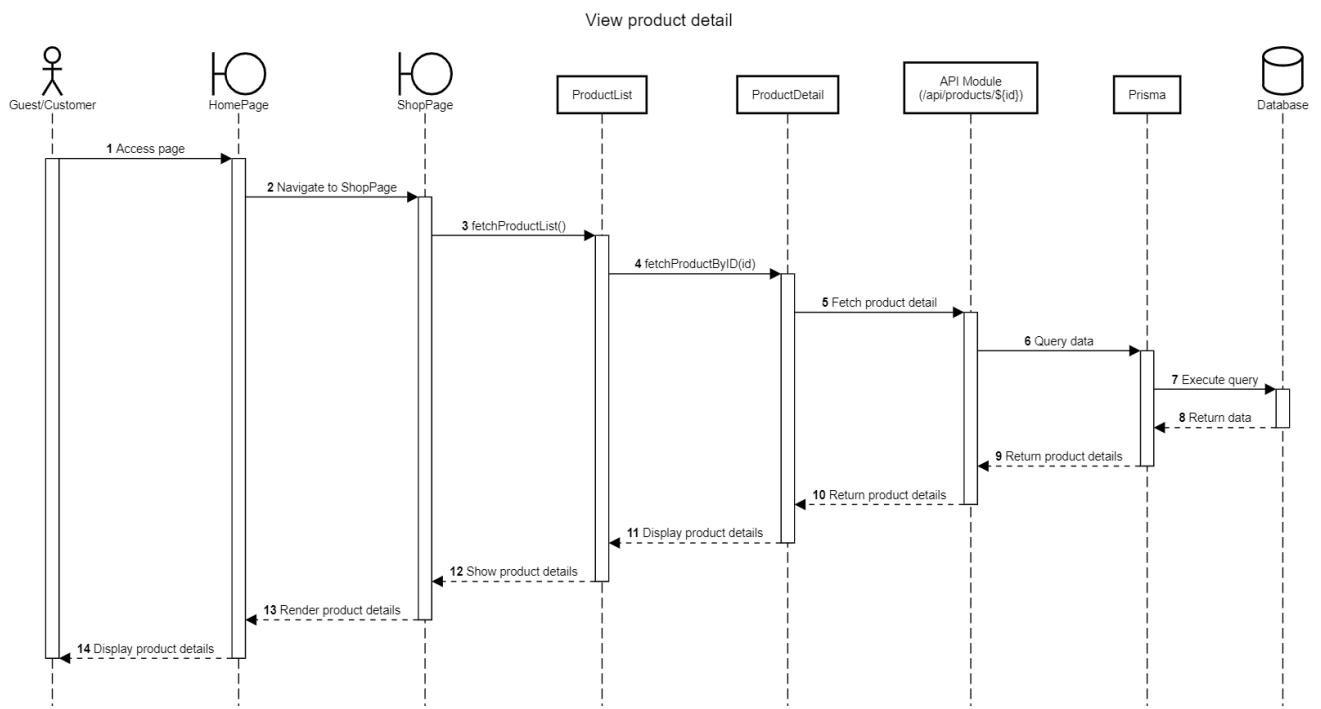


Figure 17 - Sequence Diagram - View product detail

3.6 View orders history

3.6.1 Class Diagram

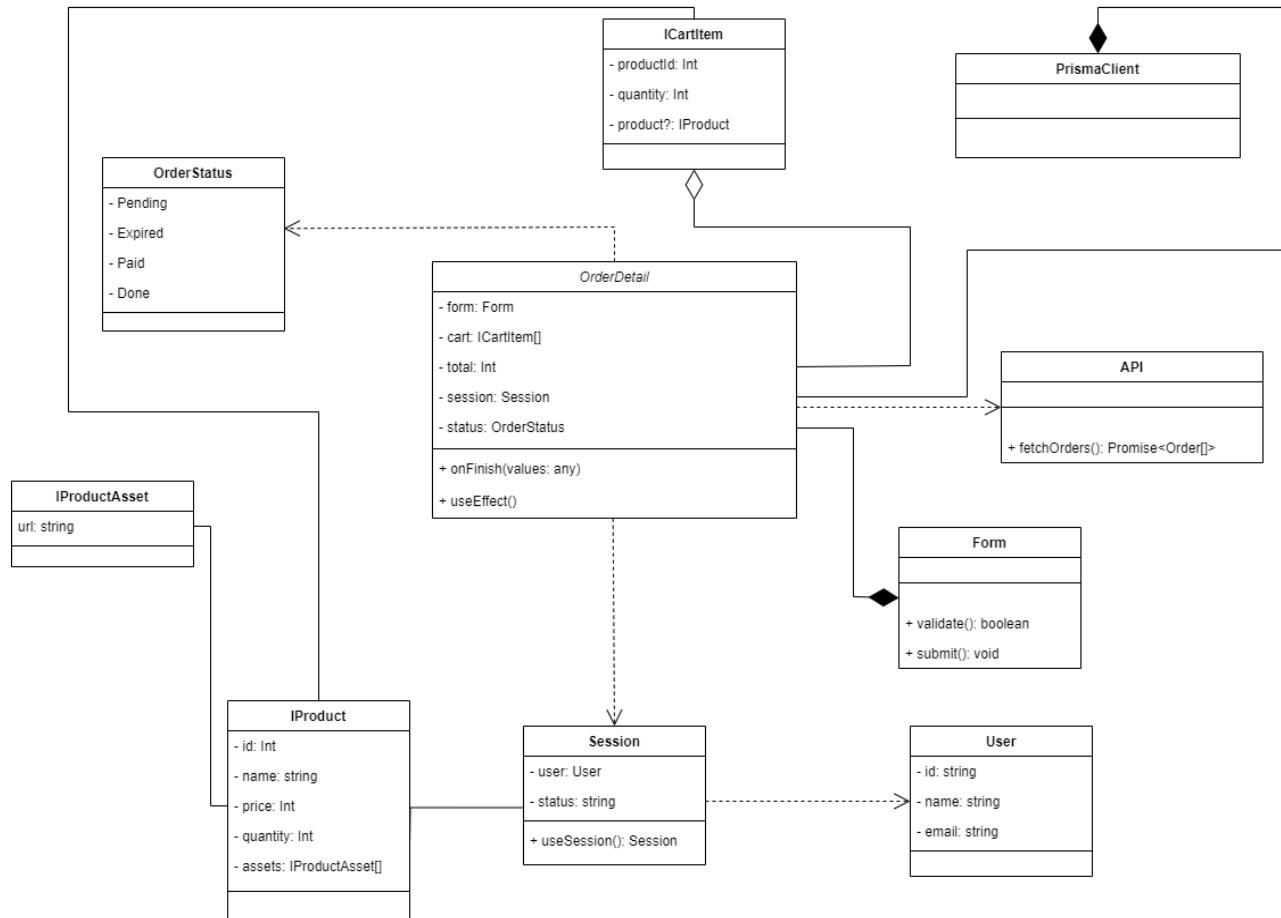
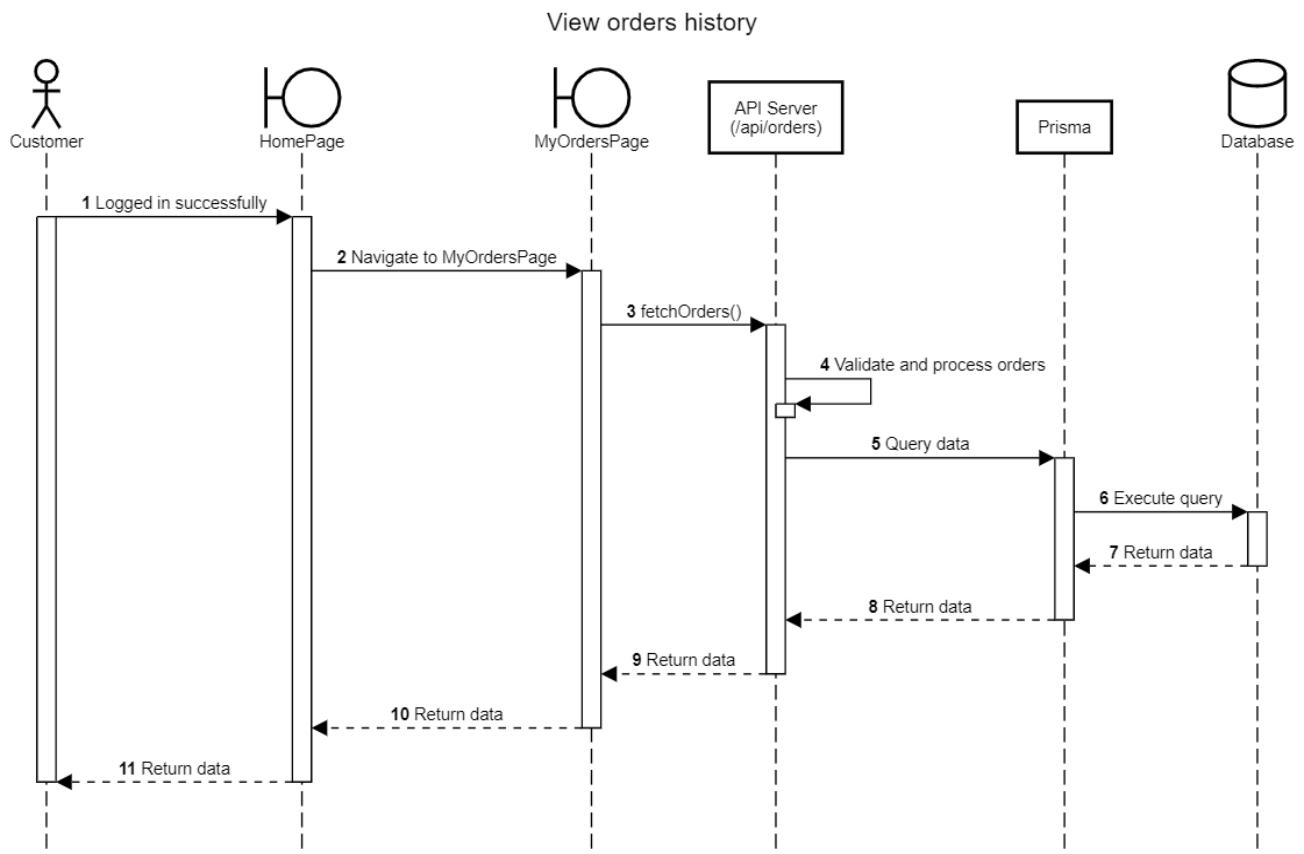


Figure 18 - Class Diagram - View orders history

3.5.2 Sequence Diagram View orders history



3.7 View all blogs

3.7.1 Class Diagram

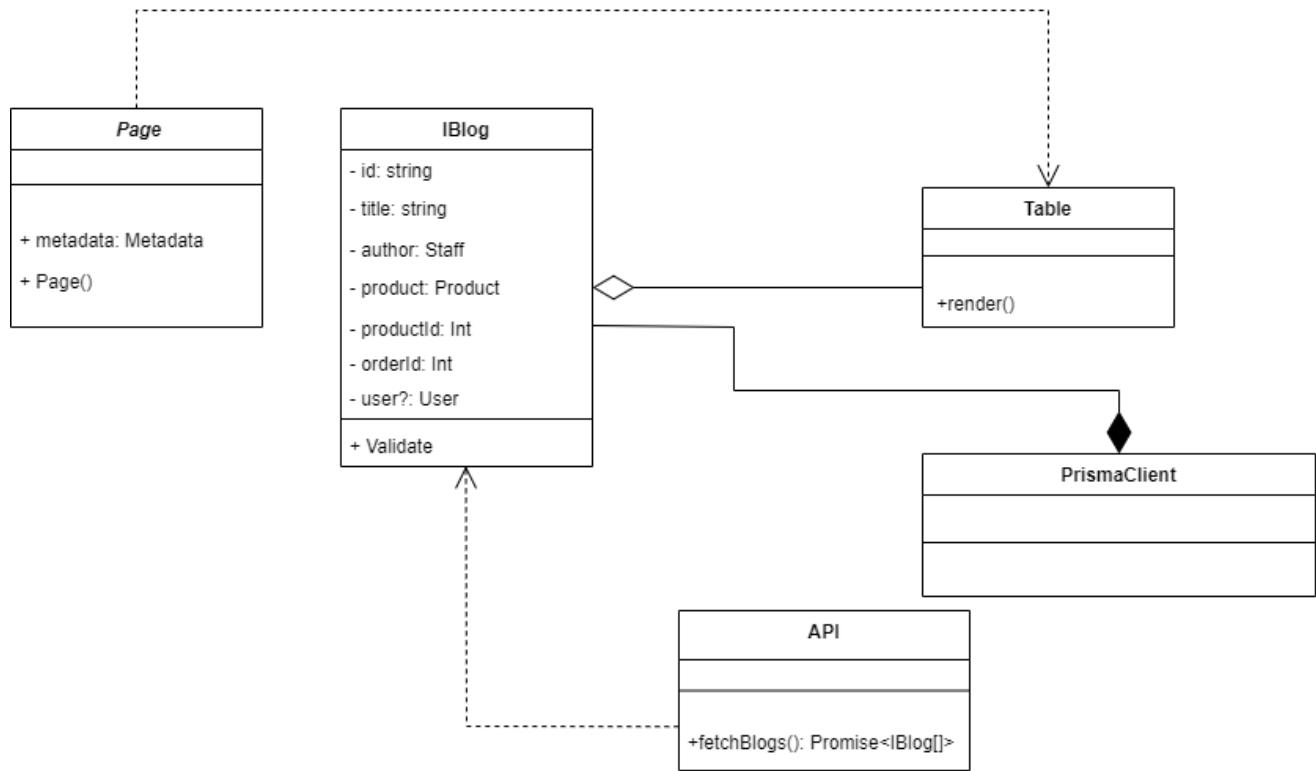


Figure 20 - Class Diagram - View all blogs

3.7.2 Sequence Diagram View all blogs

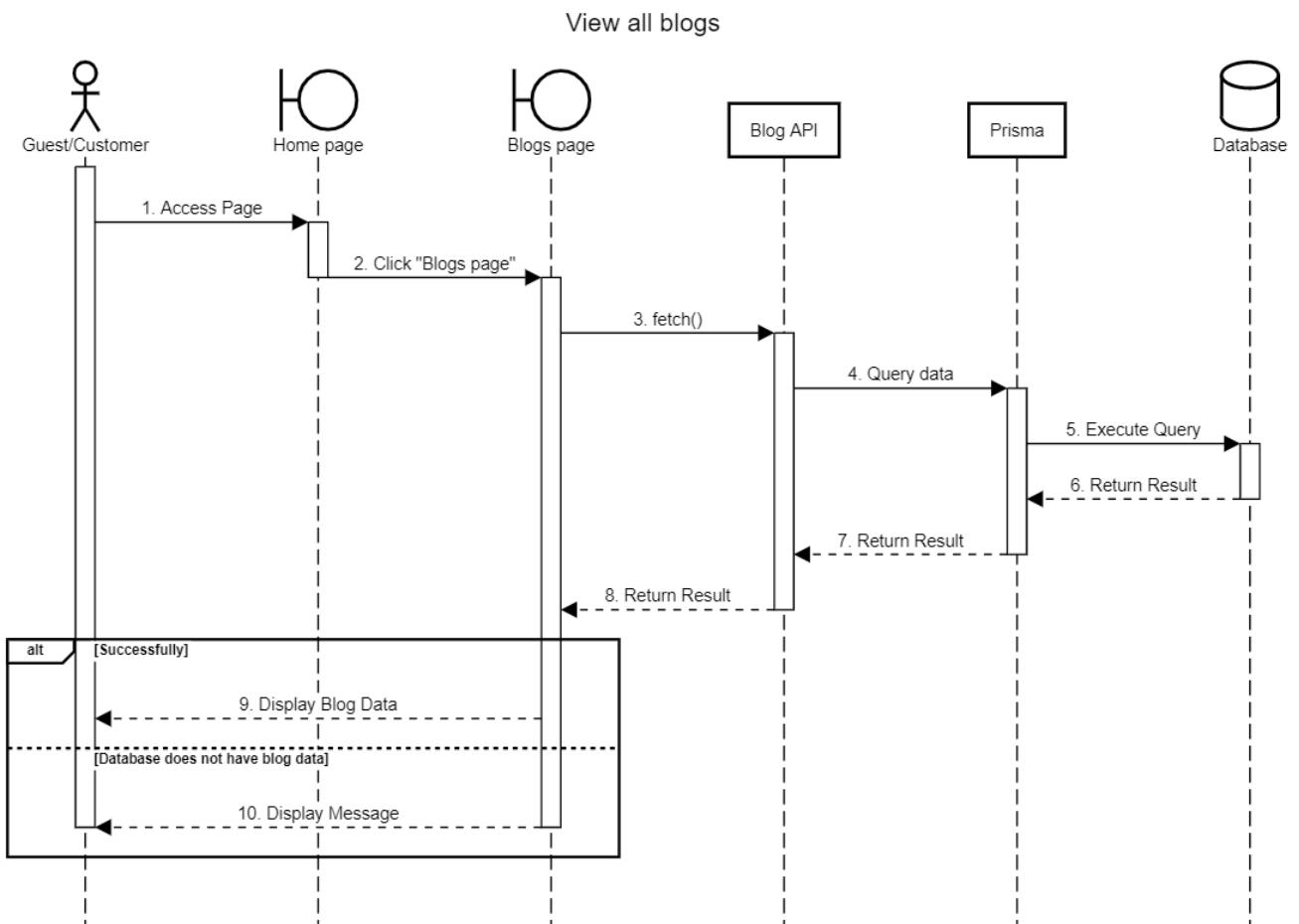


Figure 21 - Sequence Diagram View all blogs

3.8. Suggestion and search by keyword

3.8.1 Class Diagram

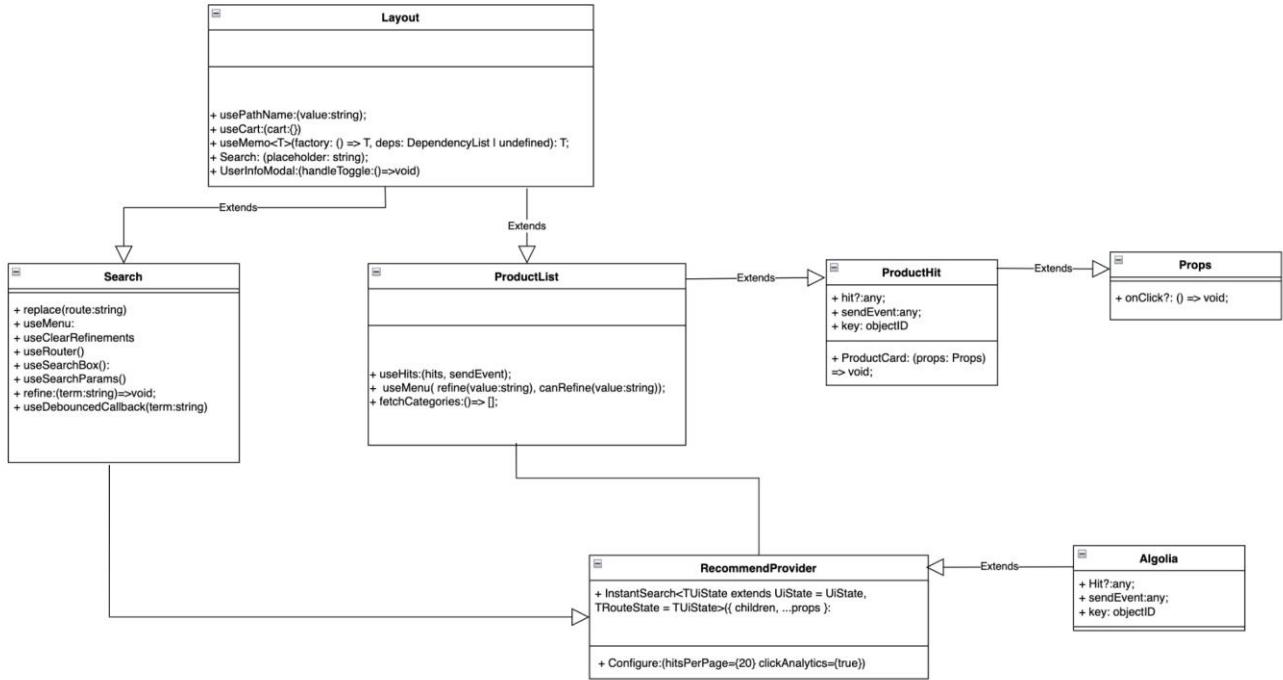


Figure 22 - Class Diagram - Suggestion and search by keyword

3.8.2 Sequence Diagram

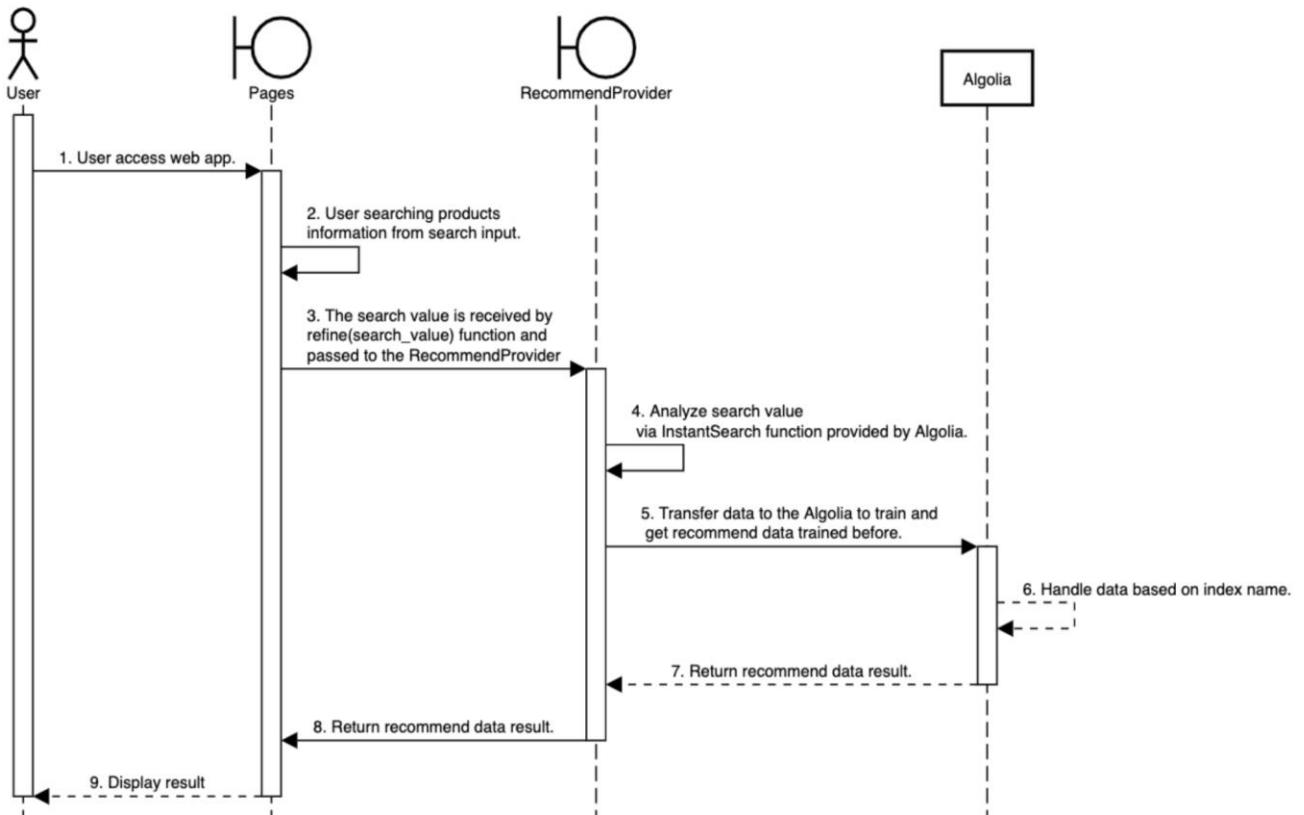


Figure 23 - Sequence Diagram - Suggestion and search by keyword

3.9. Recommendations by behavior

3.9.1 Class Diagram

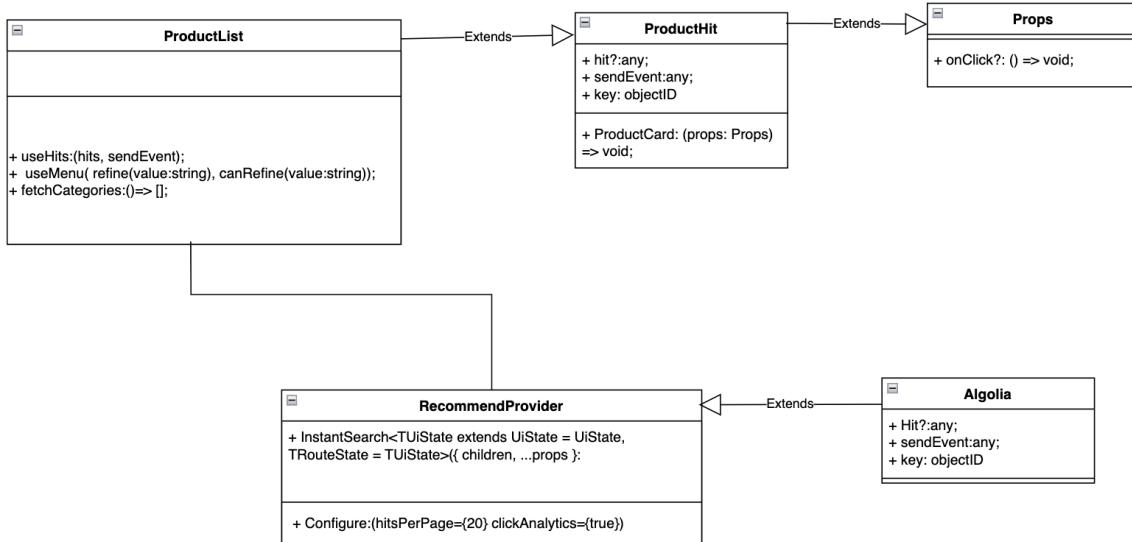


Figure 24 - Class Diagram - Recommendations by behavior

3.9.2 Sequence Diagram

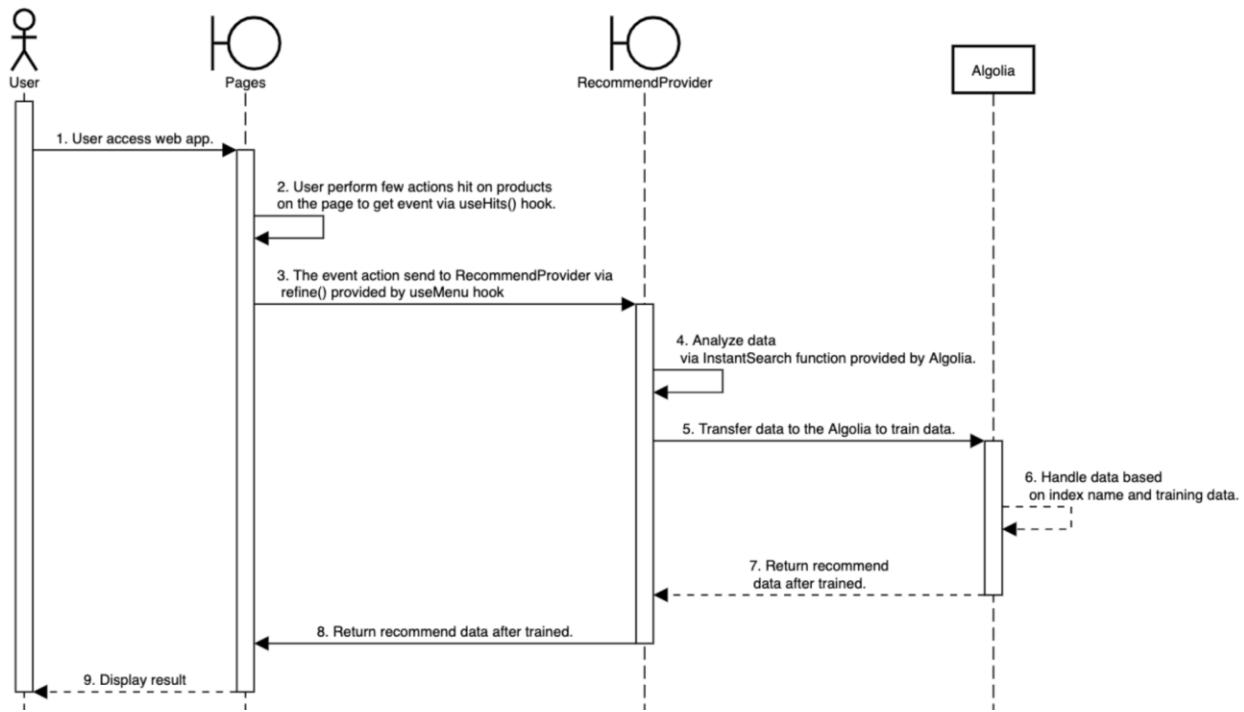


Figure 25 - Sequence Diagram - Recommendations by behavior

3.10 Manage Cart

3.10.1 Class Diagram

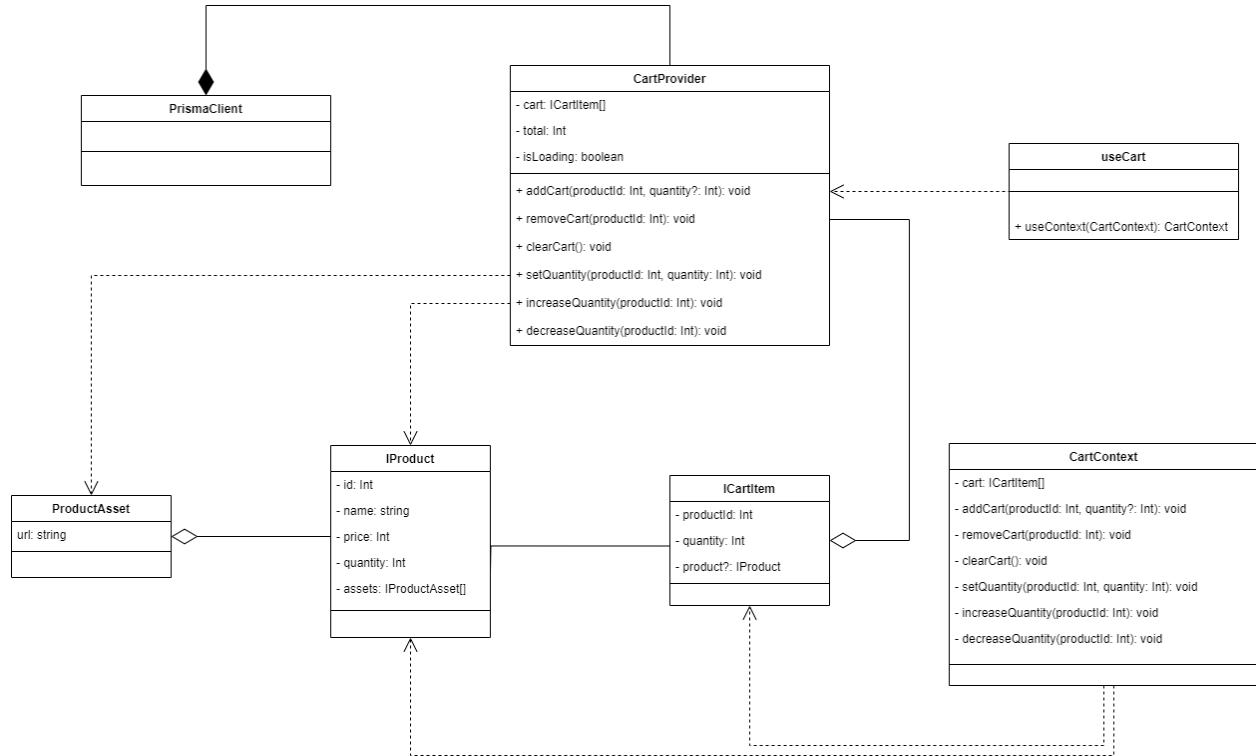


Figure 26 - Class Diagram - Manage Cart

3.10.2 Sequence Diagram Manage Cart (Create)

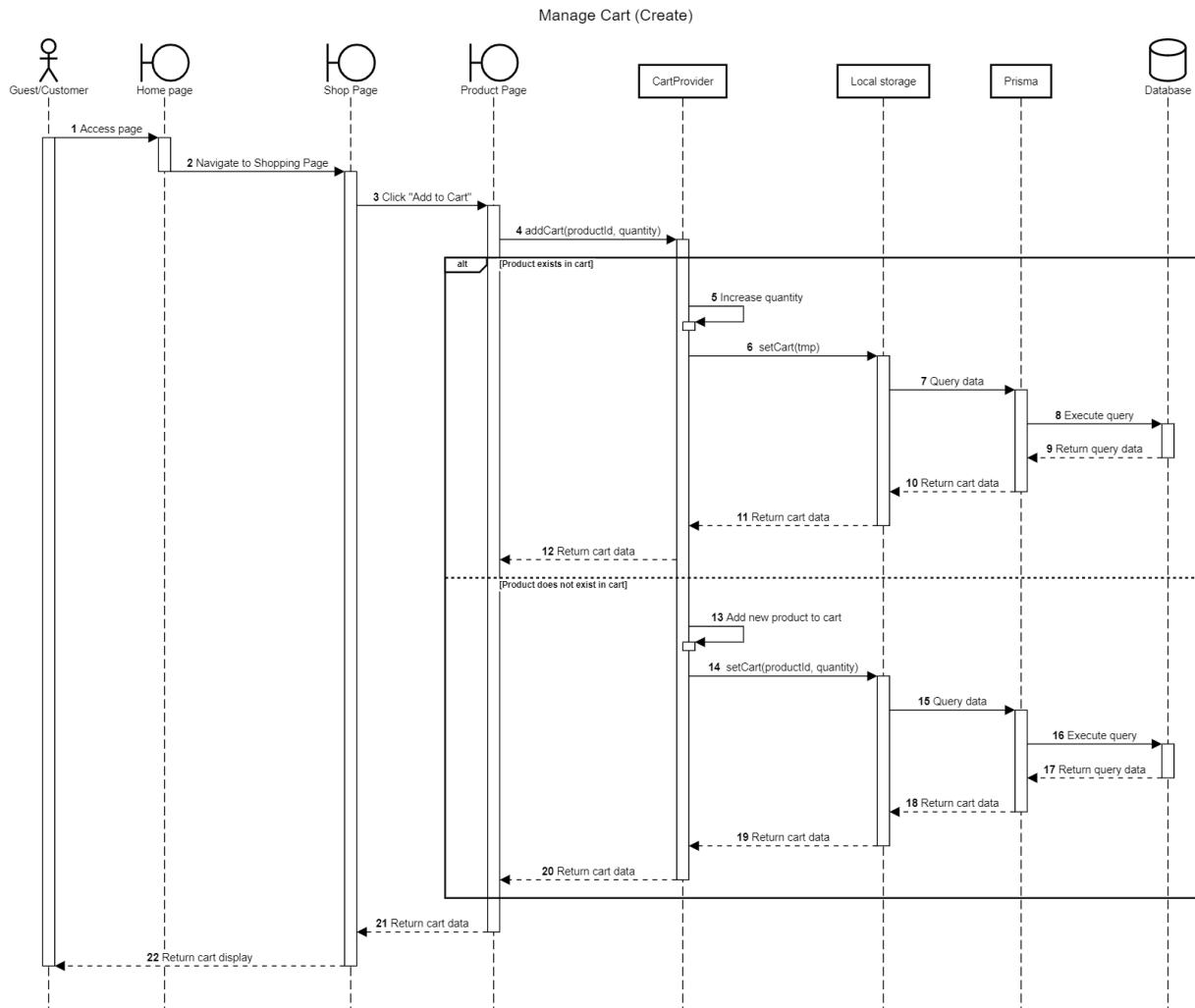


Figure 27 - Sequence Diagram Manage Cart (Create)

3.10.3 Sequence Diagram Manage Cart (UpdateQuantity)

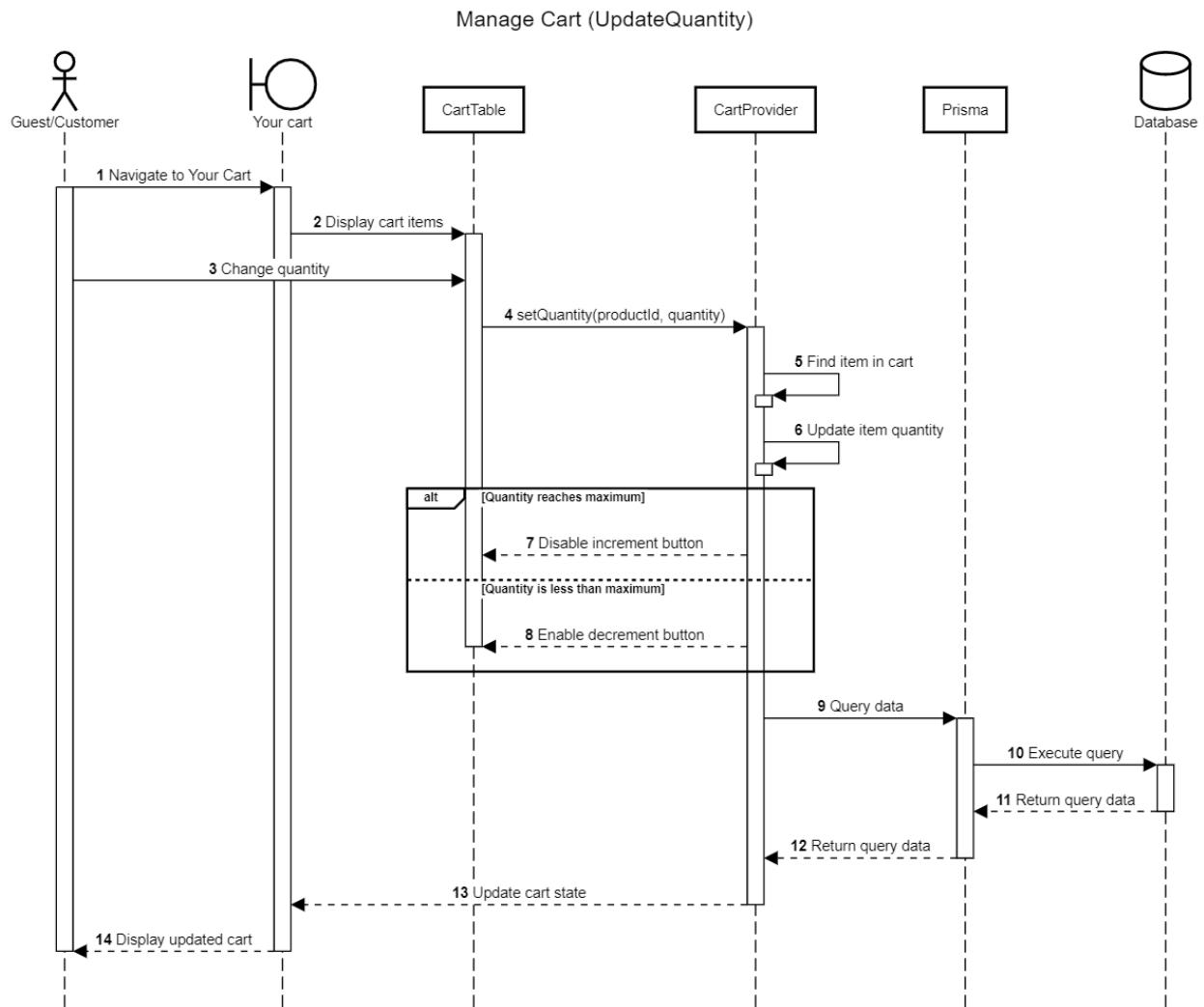


Figure 28 - Sequence Diagram Manage Cart (UpdateQuantity)

3.10.4 Sequence Diagram Manage Cart (Delete)

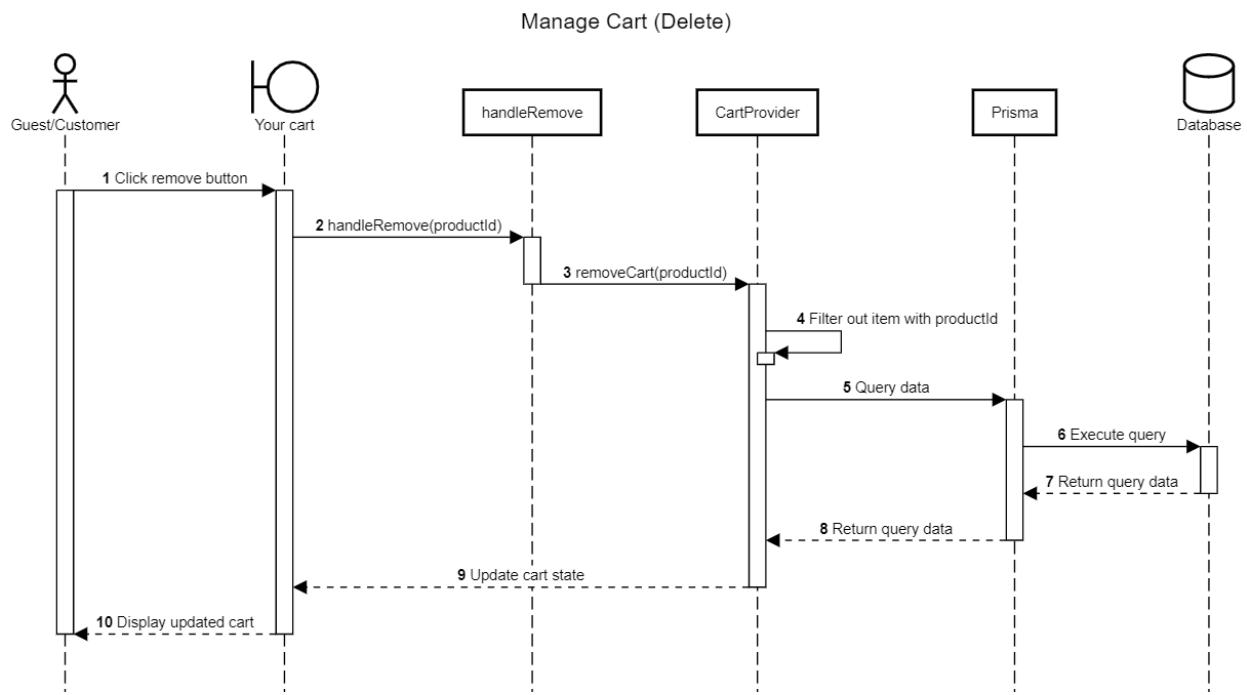


Figure 29 - Sequence Diagram Manage Cart (Delete)

3.10.5 Sequence Diagram Manage Cart (Read)

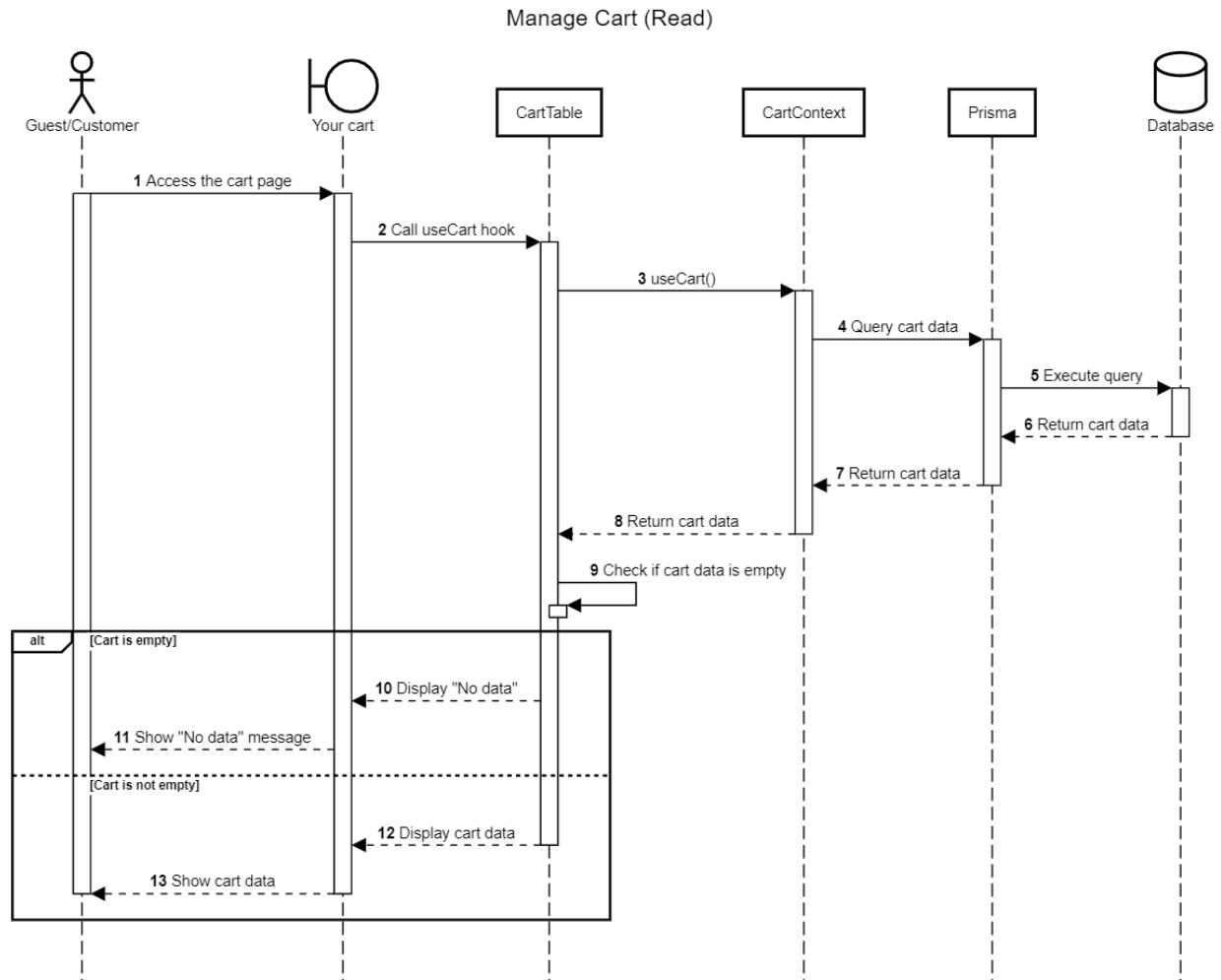


Figure 30 - Sequence Diagram Manage Cart (Read)

3.11 Check out

3.11.1 Class Diagram

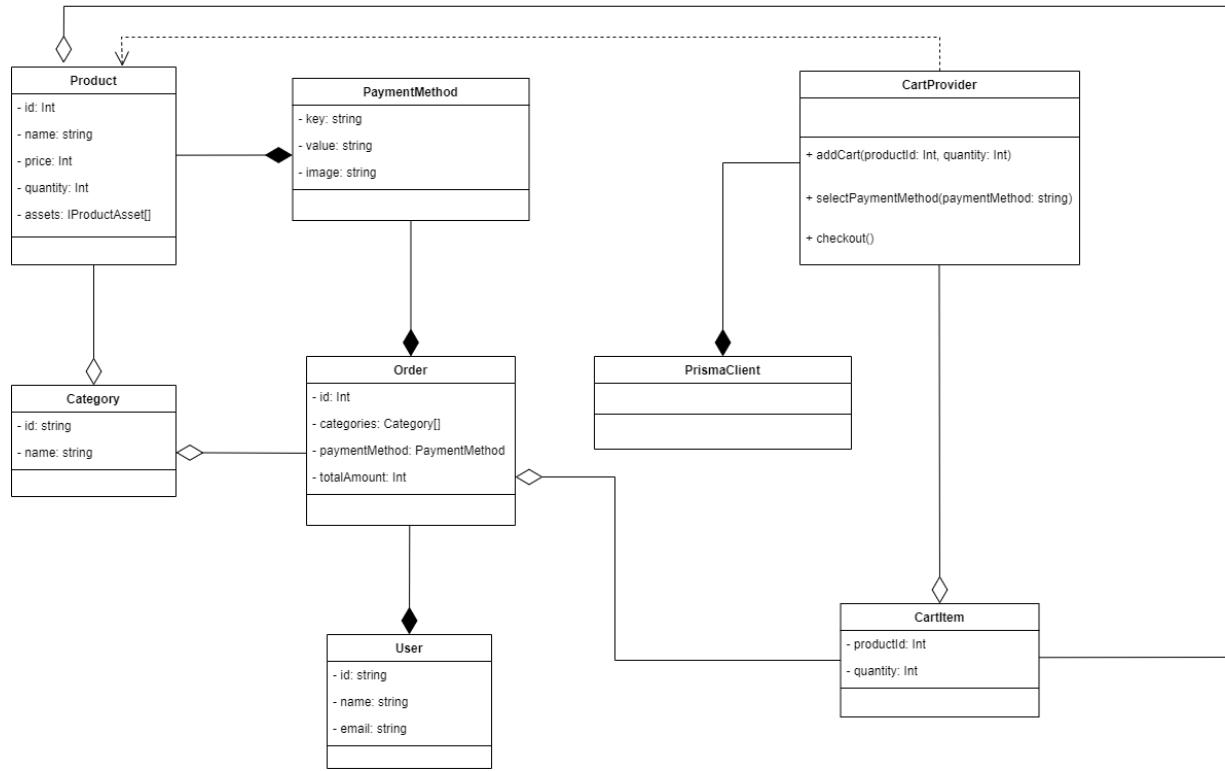


Figure 31 - Class Diagram – Check Out

3.11.2 Sequence Diagram Check out

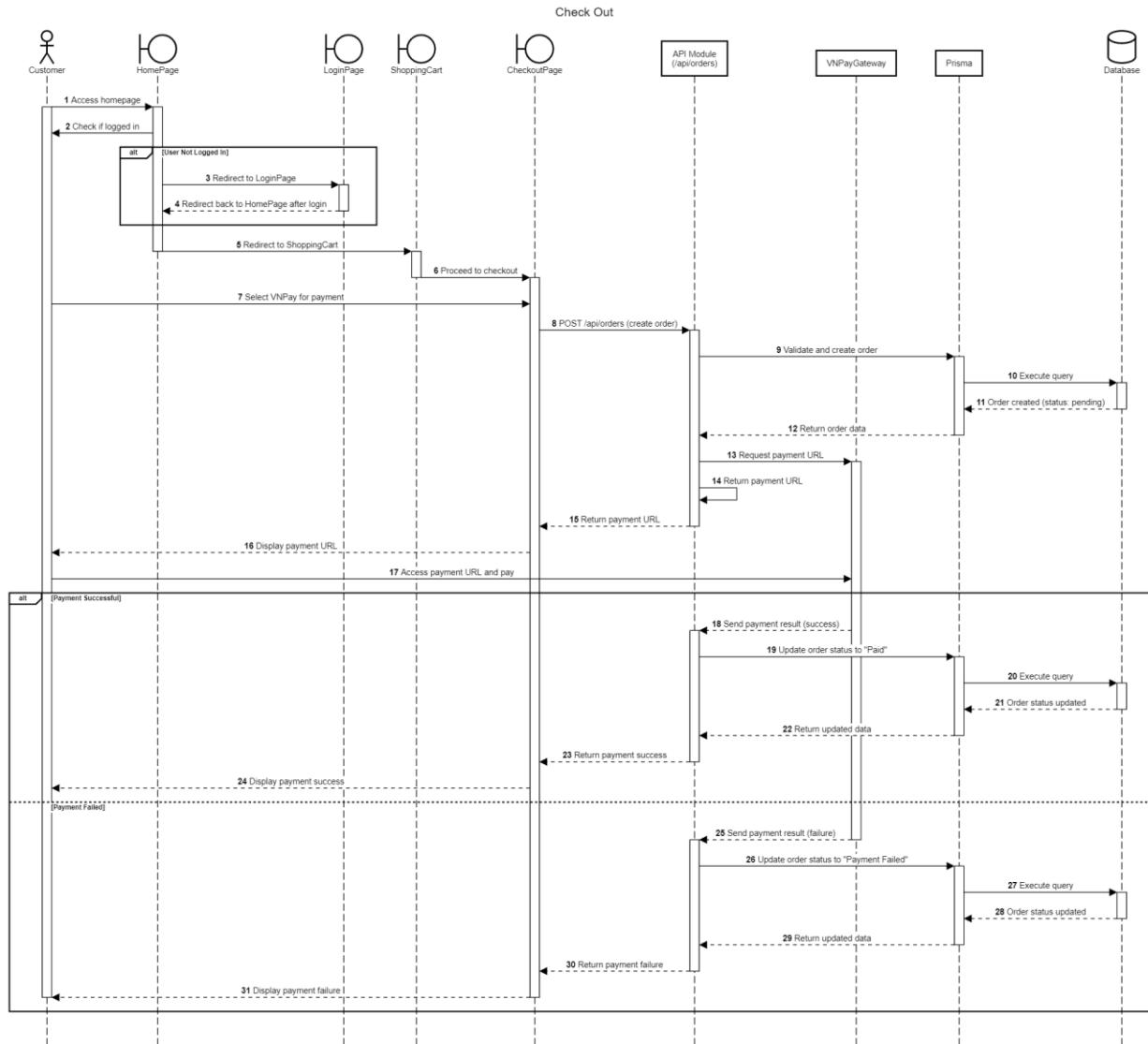


Figure 32 - Sequence Diagram Check out

3.12 Feedback

3.12.1 Class Diagram

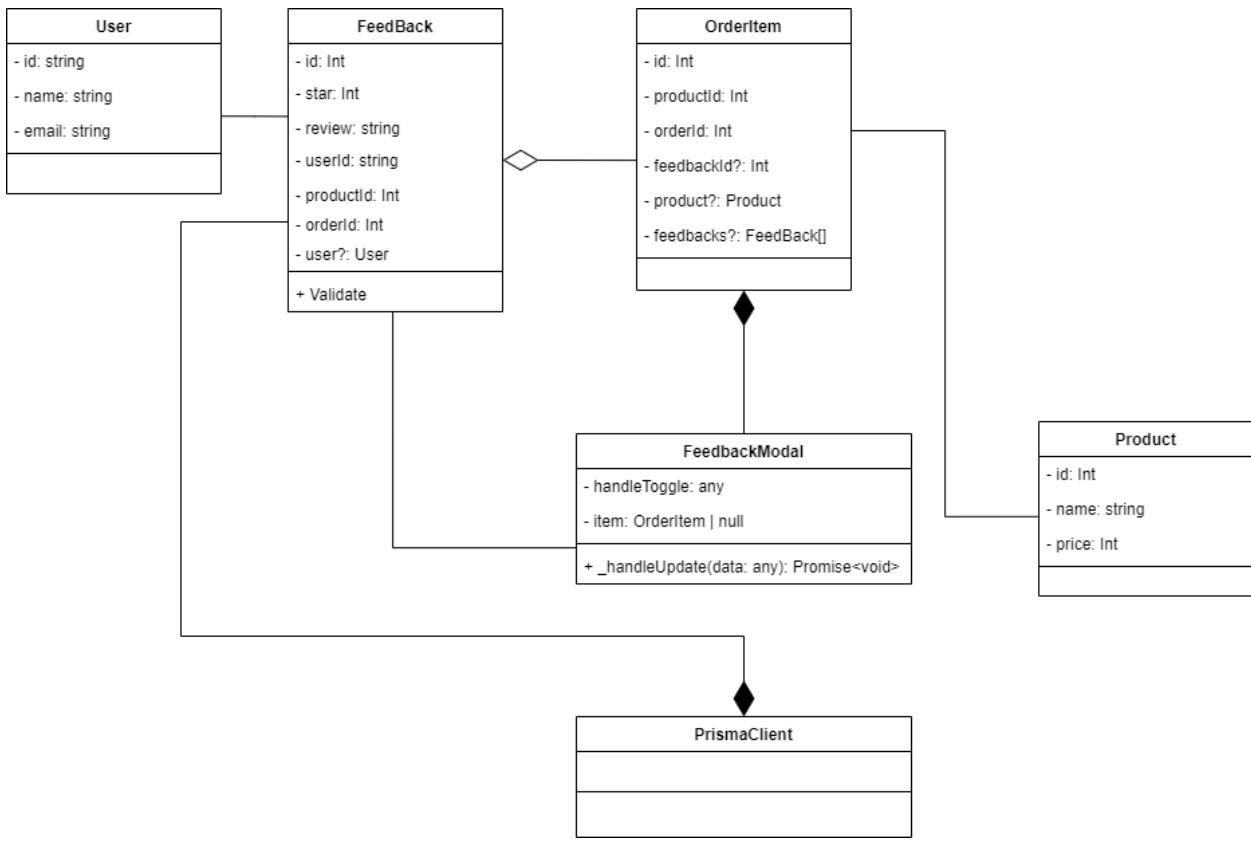


Figure 33 - Class Diagram – Feed Back

3.12.2 Sequence Diagram Feedback

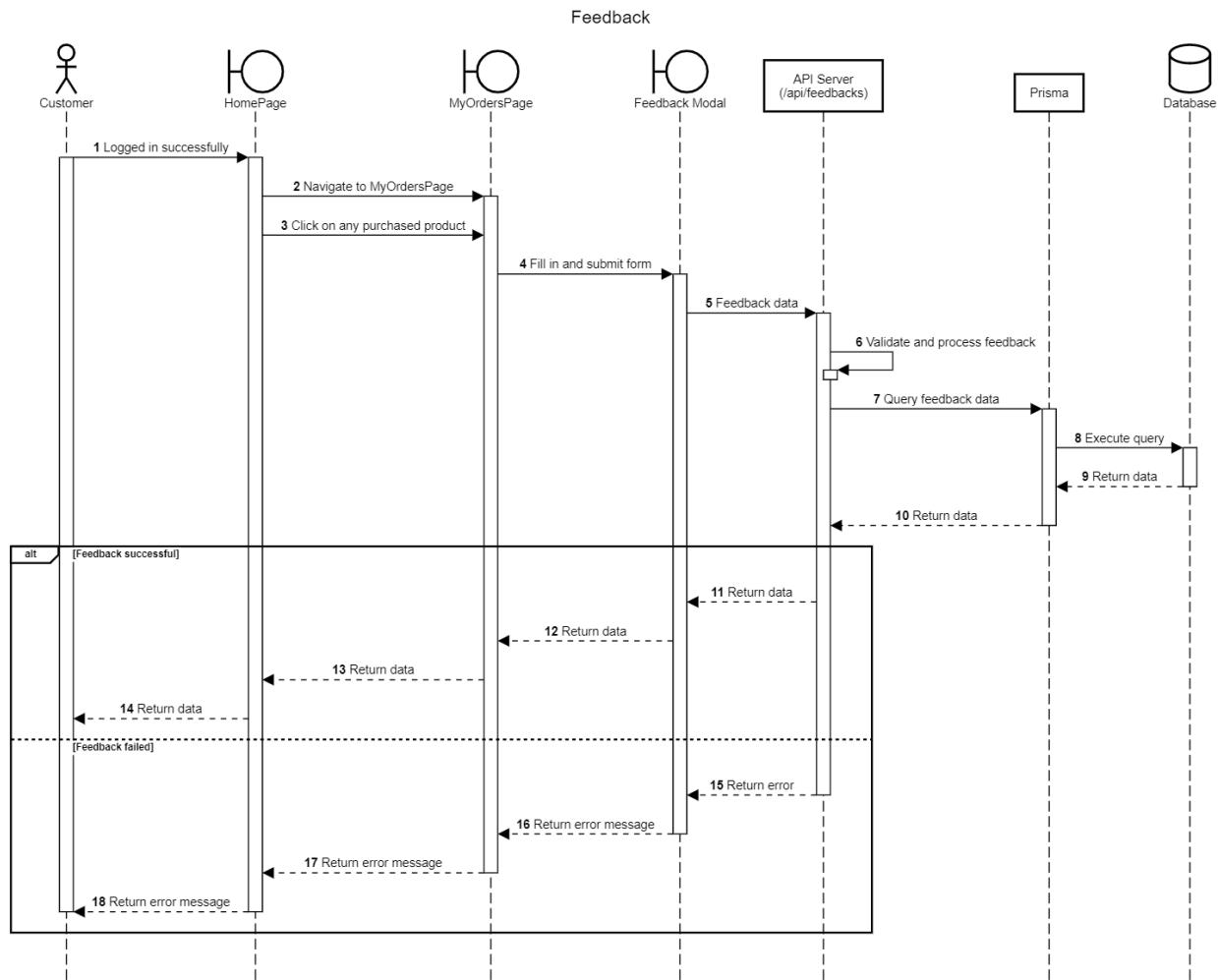


Figure 34 - Sequence Diagram Feedback

3.13 Rating

3.13.1 Class Diagram

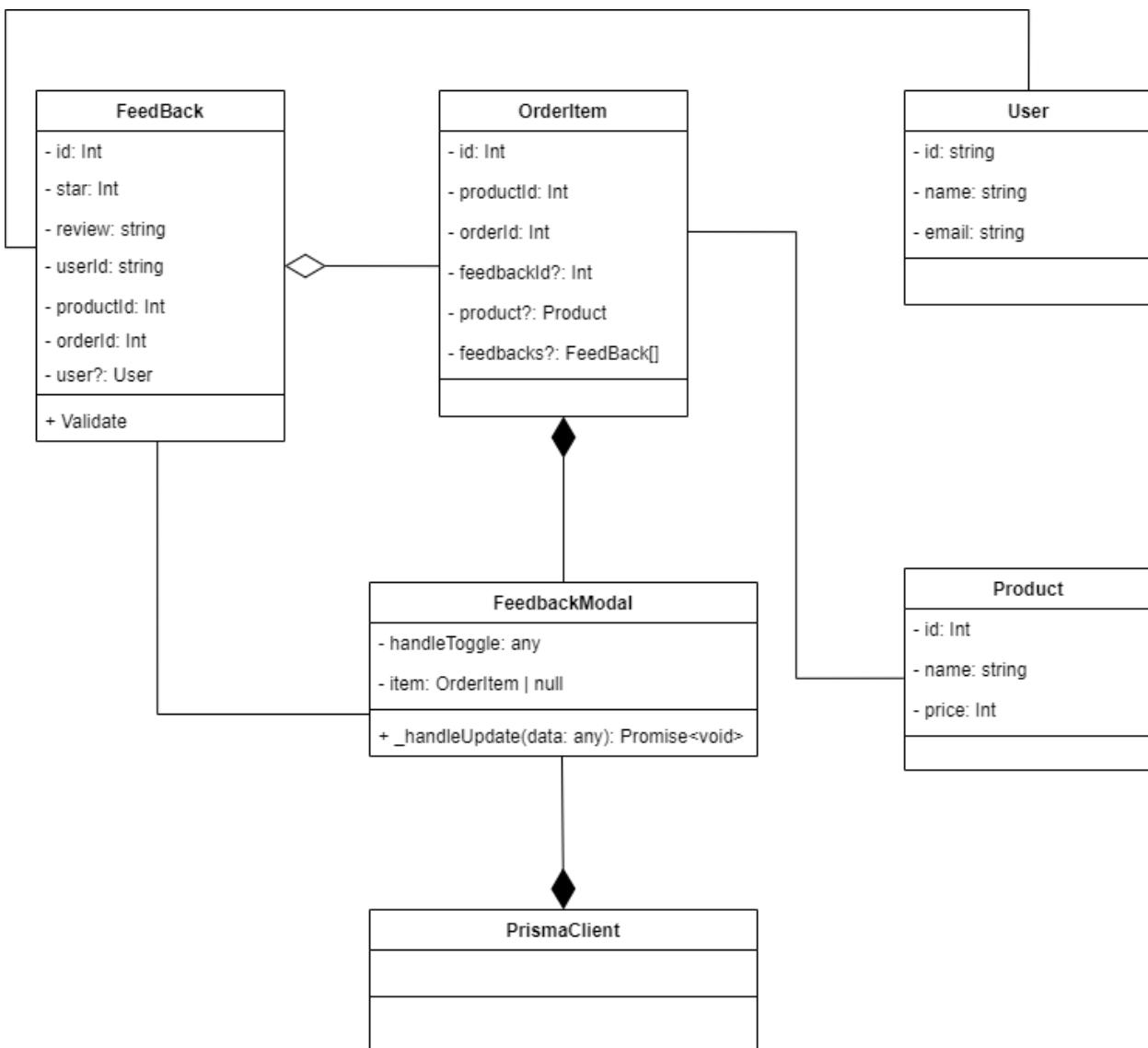


Figure 35 - Class Diagram - Rating

3.13.2 Sequence Diagram Rating

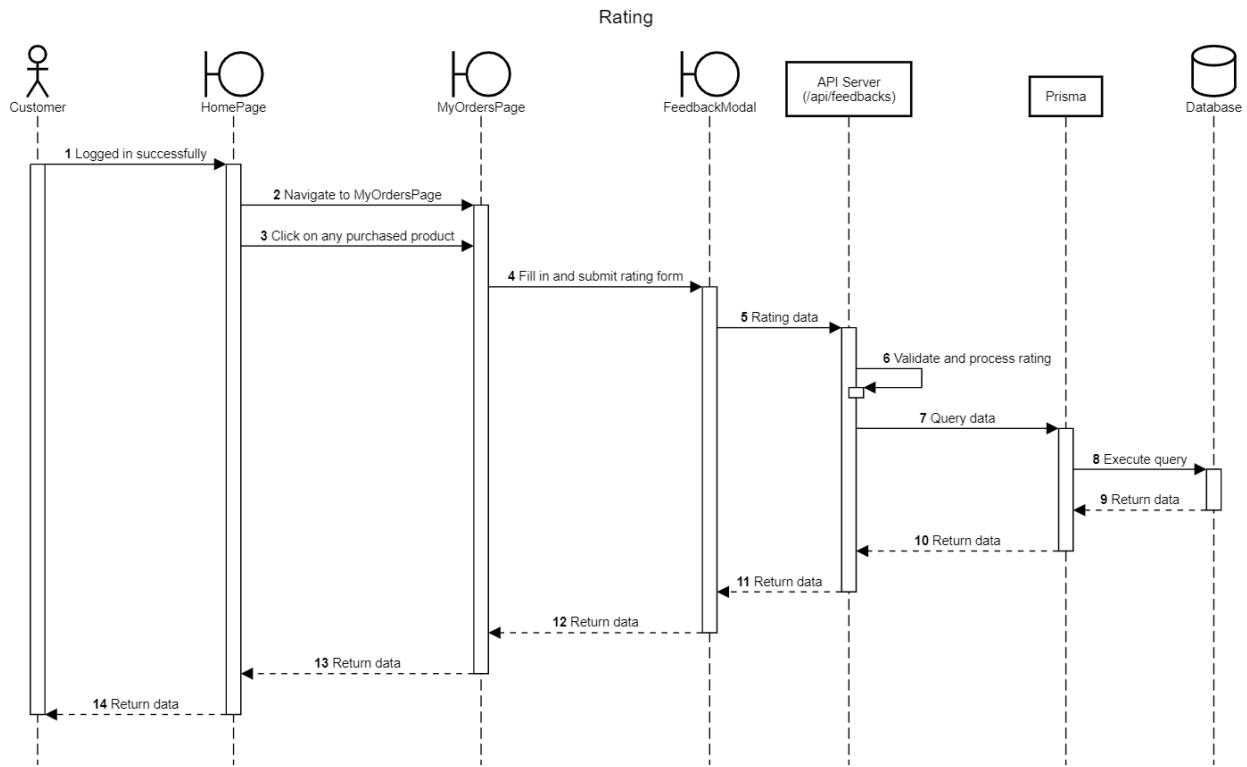


Figure 36 - Sequence Diagram Rating

3.14 Filter

3.14.1 Class Diagram

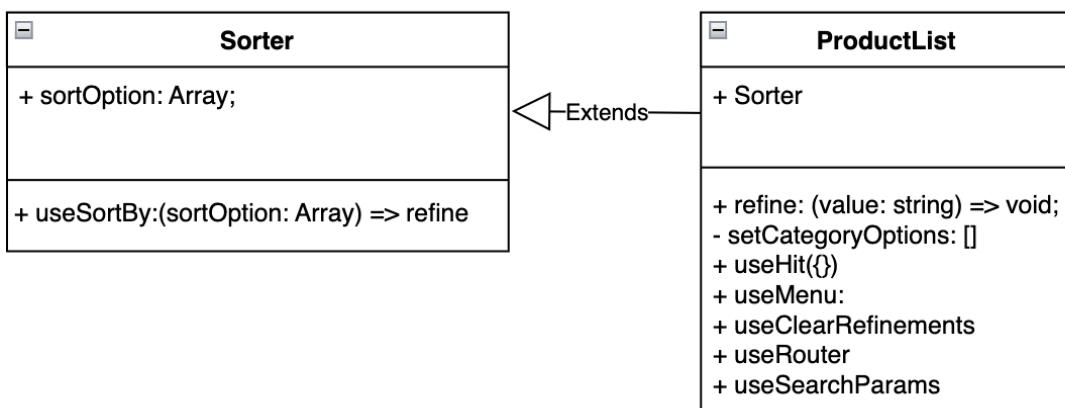


Figure 37 - Class Diagram - Filter

3.14.2 Sequence Diagram

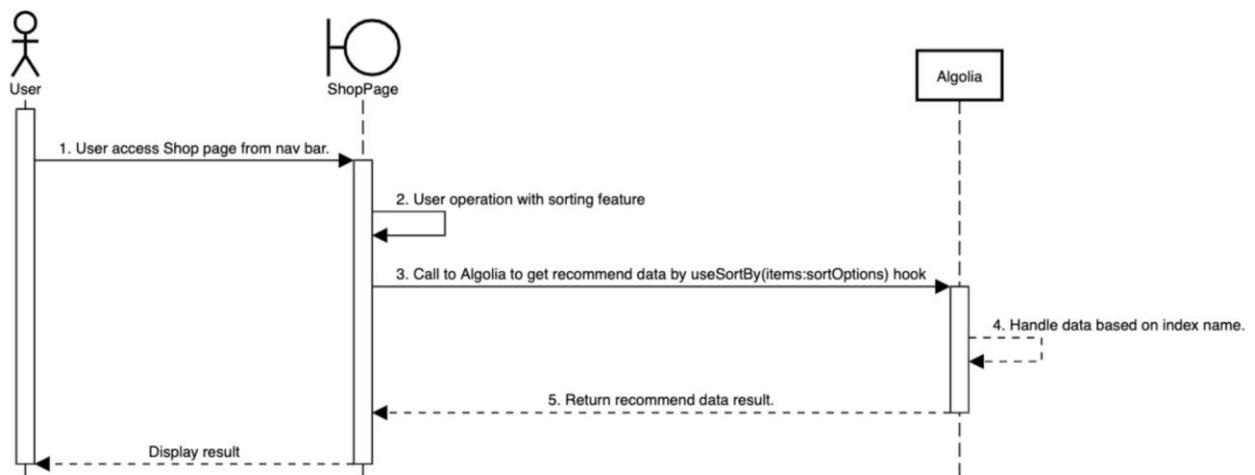


Figure 38 - Sequence Diagram - Filter

3.15 Manage Profile

3.15.1 Class Diagram

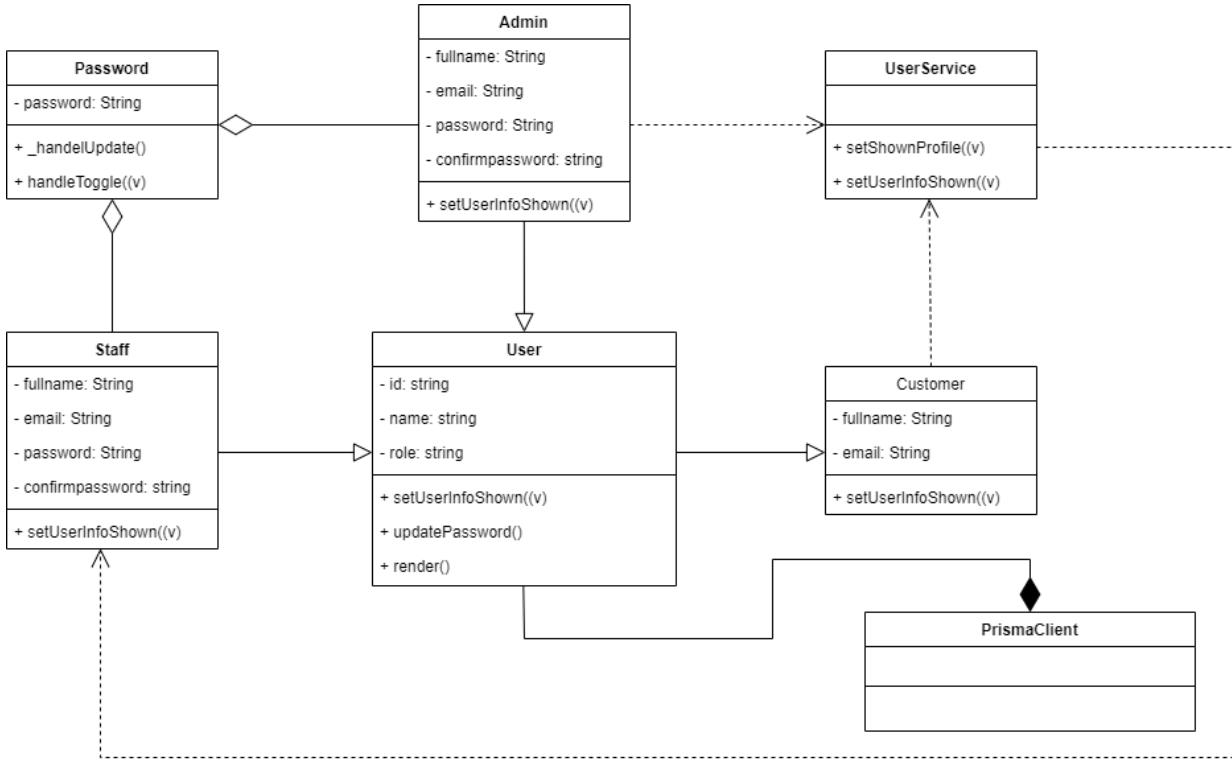


Figure 39 - Class Diagram - Manage Profile

3.15.2 Sequence Diagram Manage Profile (Customer view profile)

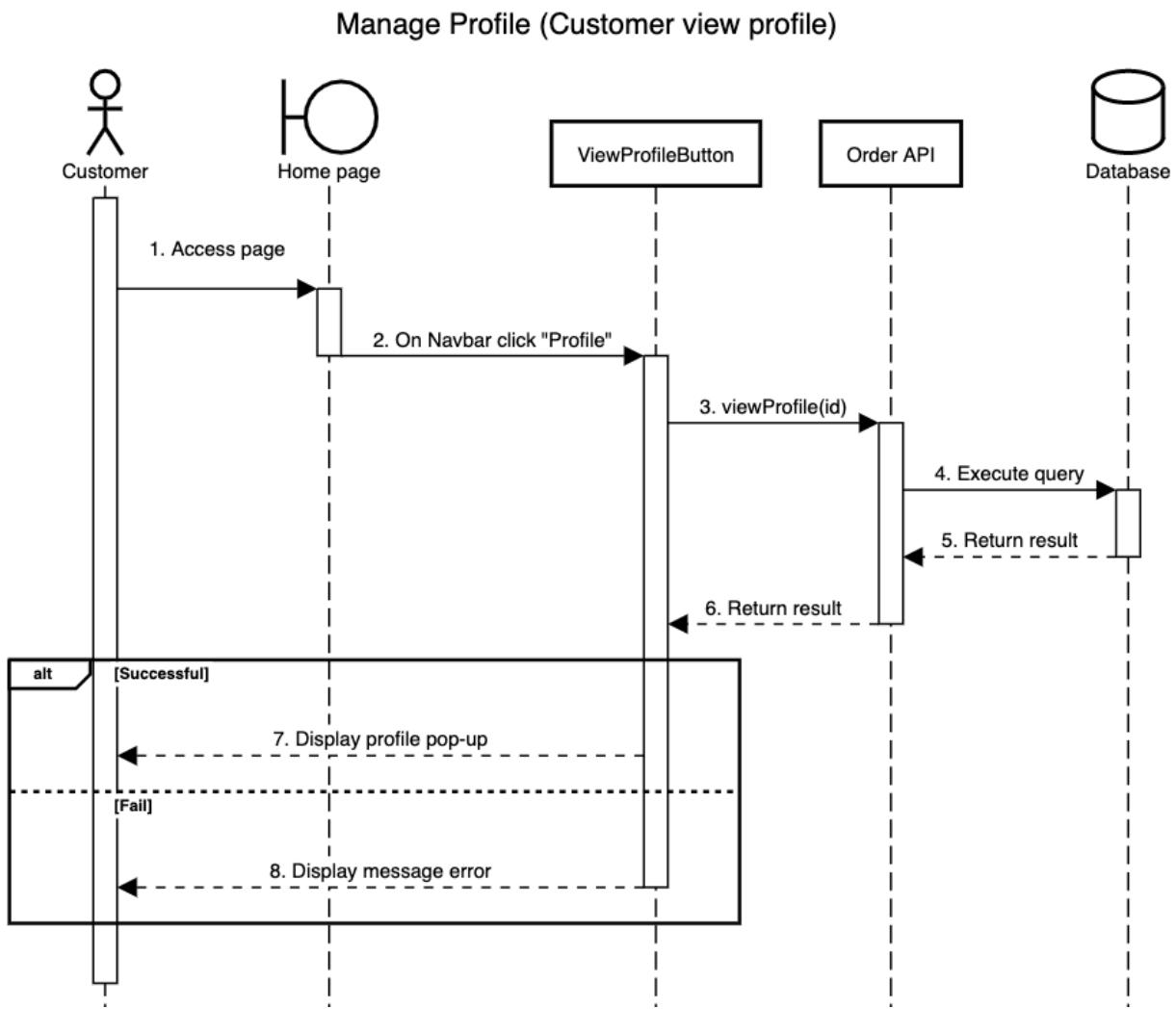


Figure 40 - Sequence Diagram Manage Profile (Customer view profile)

3.15.3 Sequence Diagram Manage Profile (Admin/Staff view profile)

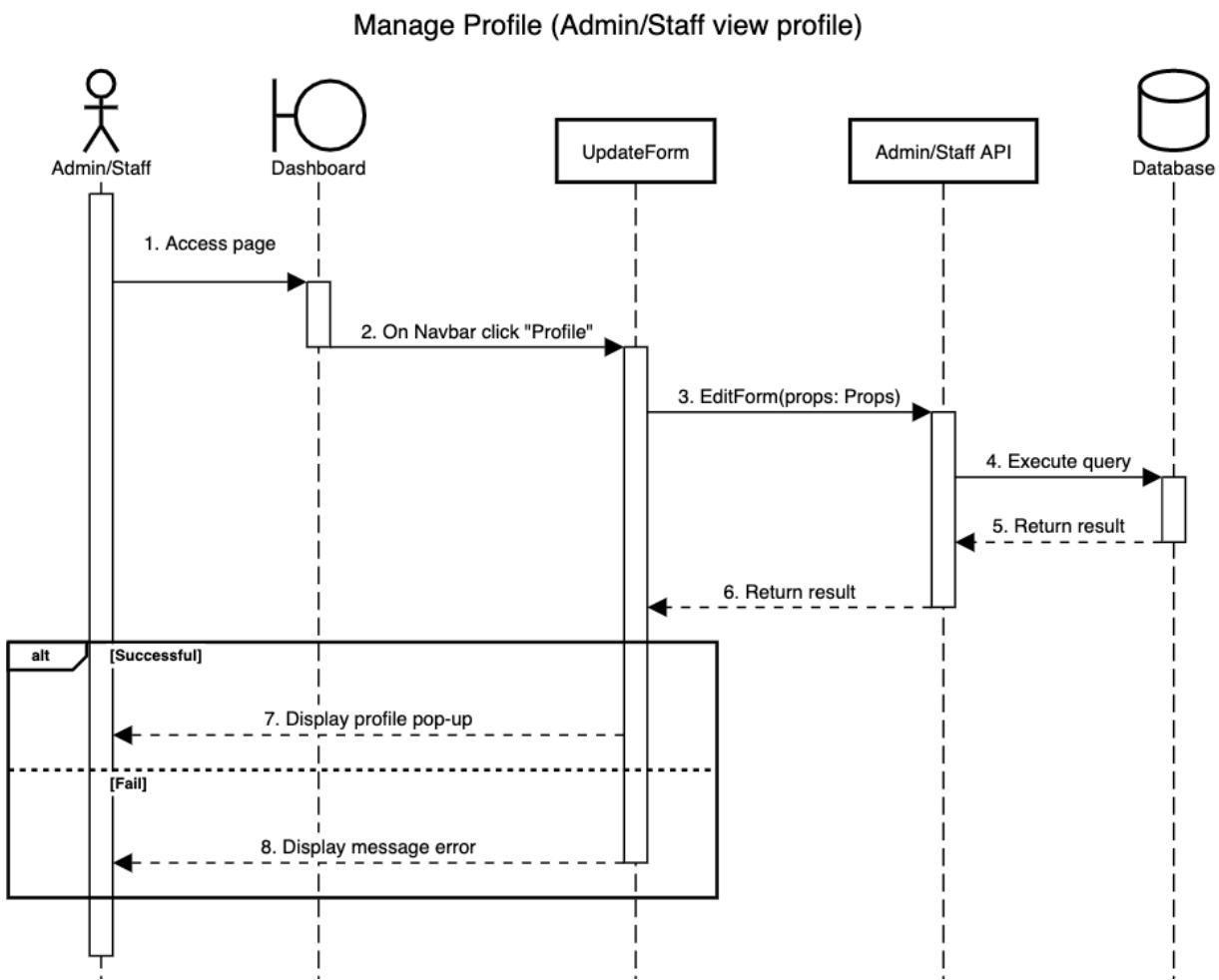


Figure 41 - Sequence Diagram Manage Profile (Admin/Staff view profile)

3.15.4 Sequence Diagram Manage Profile (Admin/Staff update profile)

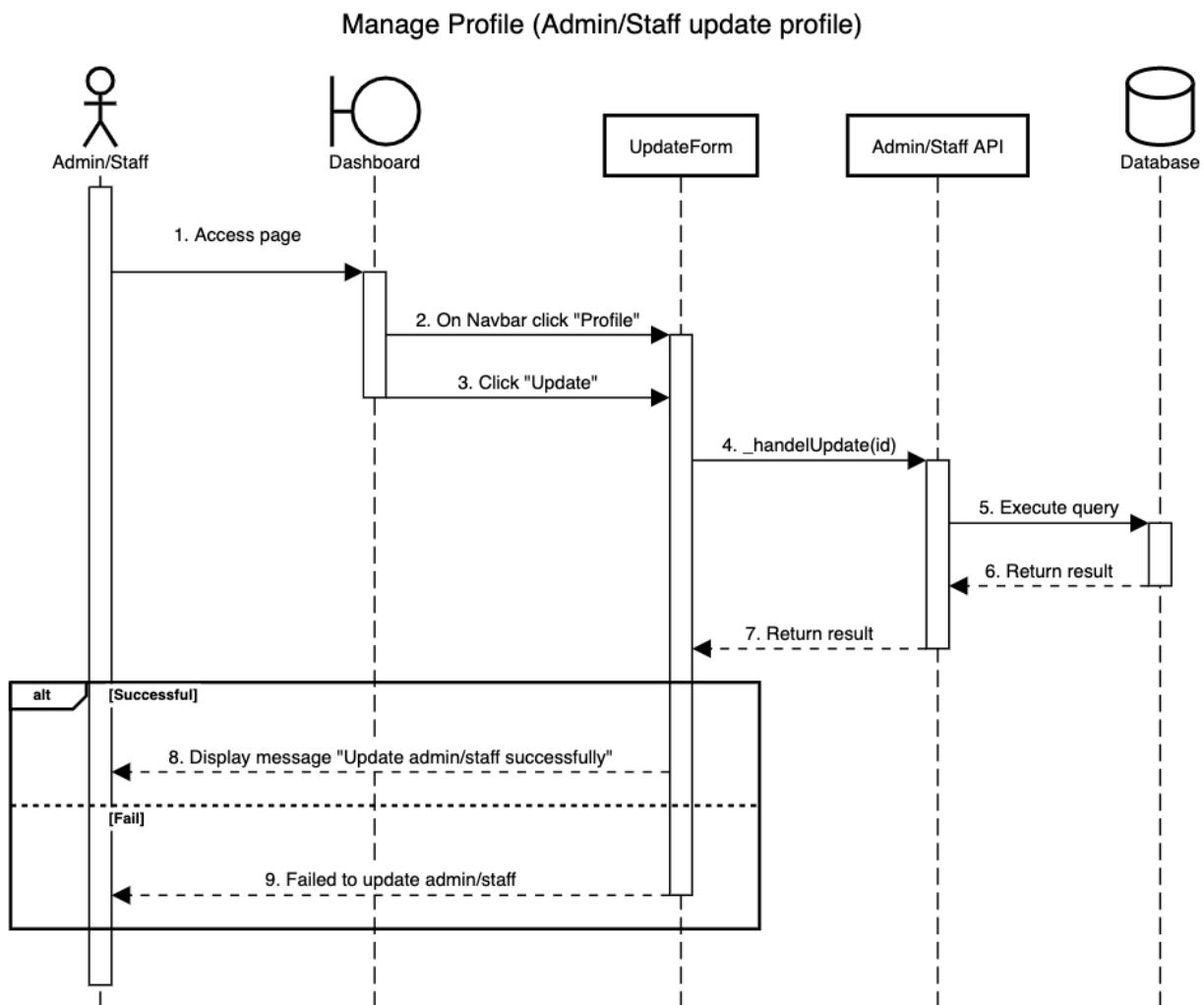


Figure 42 - Sequence Diagram Manage Profile (Admin/Staff update profile)

3.16 Manage Blogs

3.16.1 Class Diagram

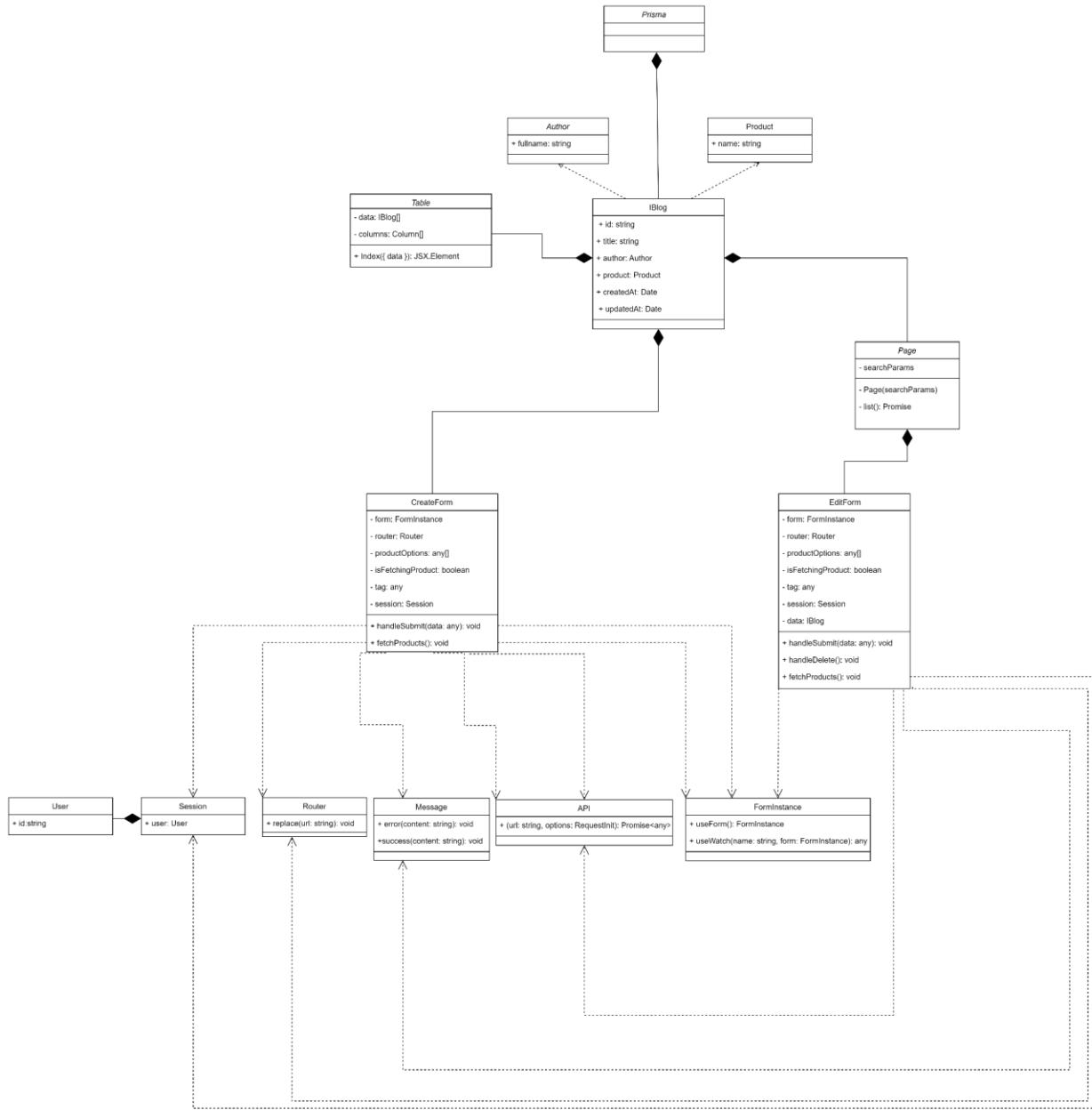


Figure 43 - Class Diagram - Manage Blogs

3.16.2 Sequence Diagram Manage Blogs(View)

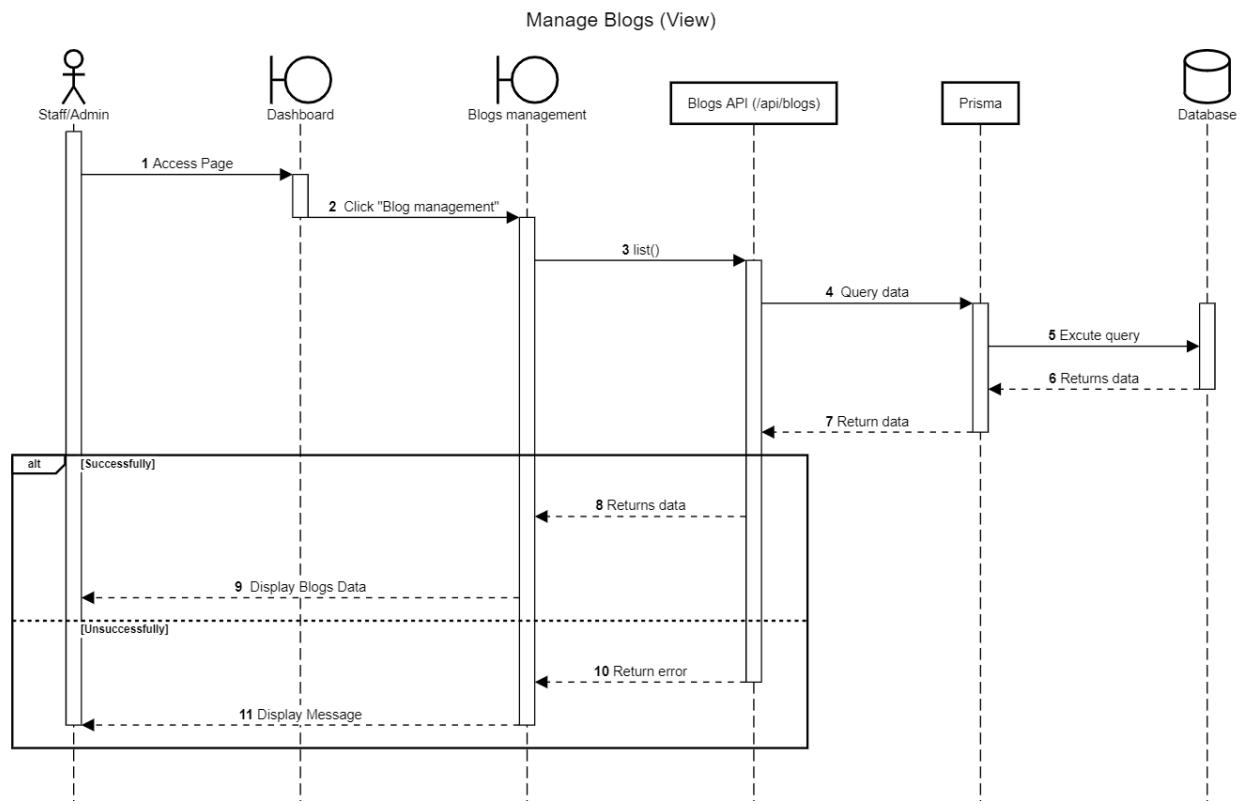


Figure 44 - Sequence Diagram Manage Blogs(View)

3.16.3 Sequence Diagram Manage Blogs(Create)

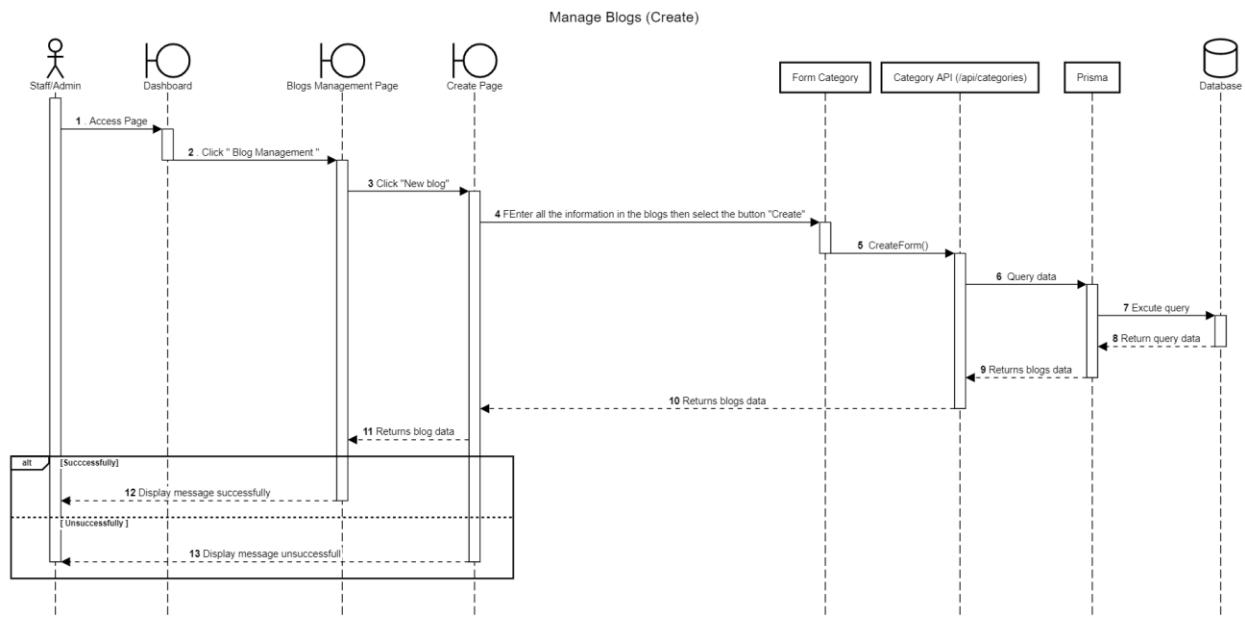


Figure 45 - Sequence Diagram Manage Blogs(Create)

3.16.4 Sequence Diagram Manage Blogs(Update)

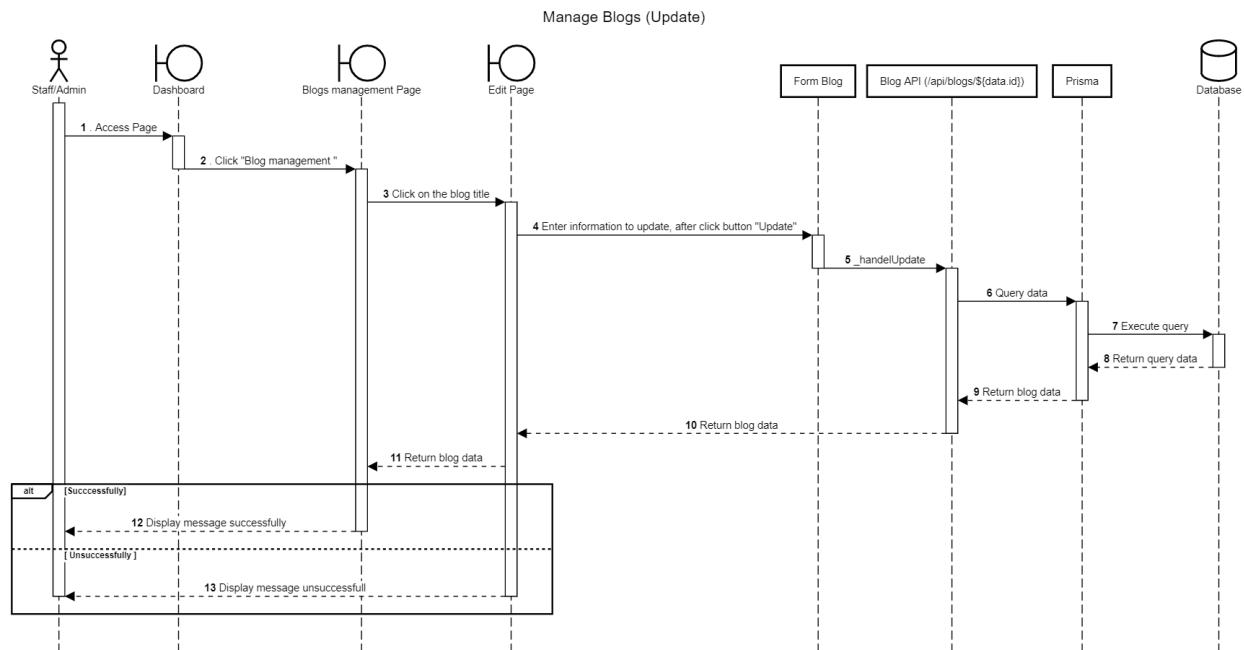


Figure 46 - Sequence Diagram Manage Blogs(Update)

3.16.5 Sequence Diagram Manage Blogs(Delete)

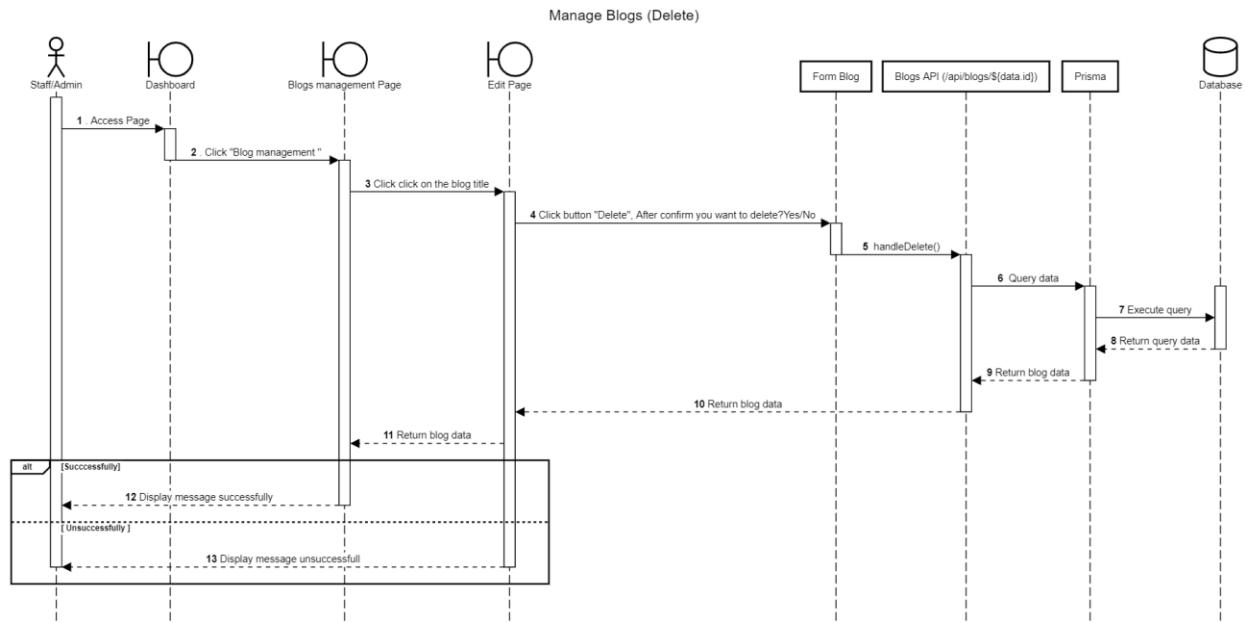


Figure 47 - Sequence Diagram Manage Blogs(Delete)

3.17 Manage Order

3.17.1 Class Diagram

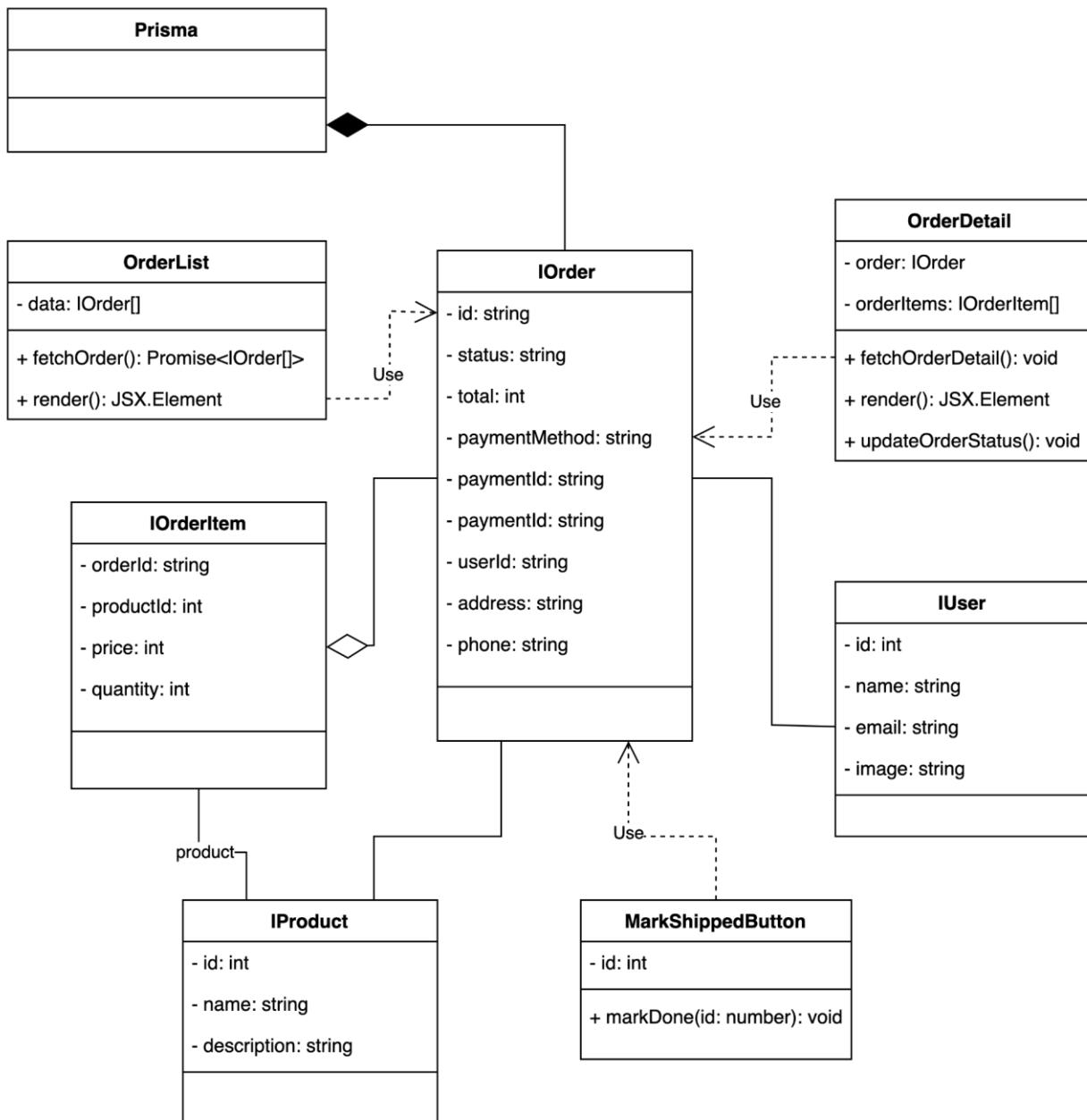


Figure 48 - Class Diagram - Manage Order

3.17.2 Sequence Diagram Manage Order (View order list)

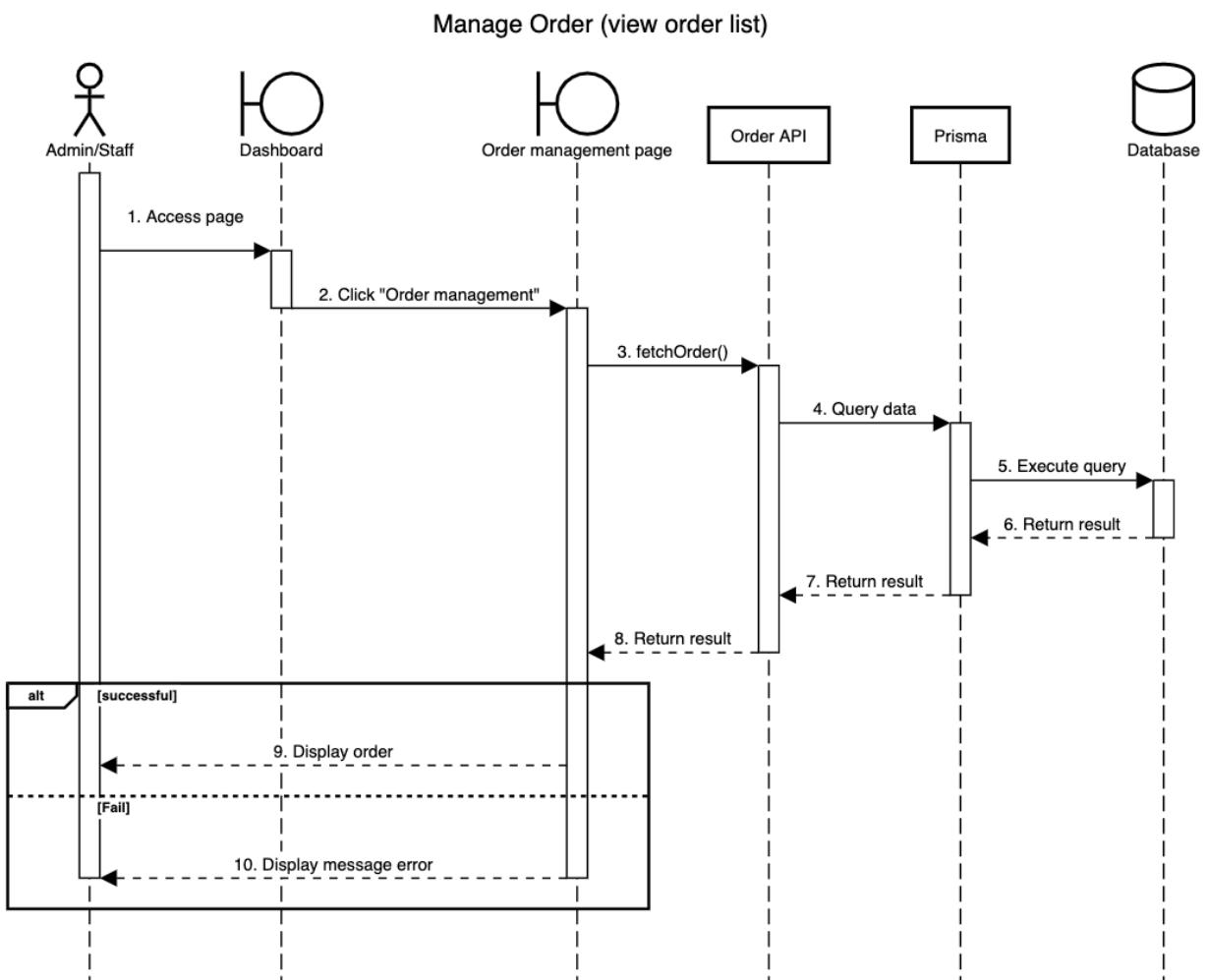


Figure 49 - Sequence Diagram Manage Order (View order list)

3.17.3 Sequence Diagram Manage Order (View order details)

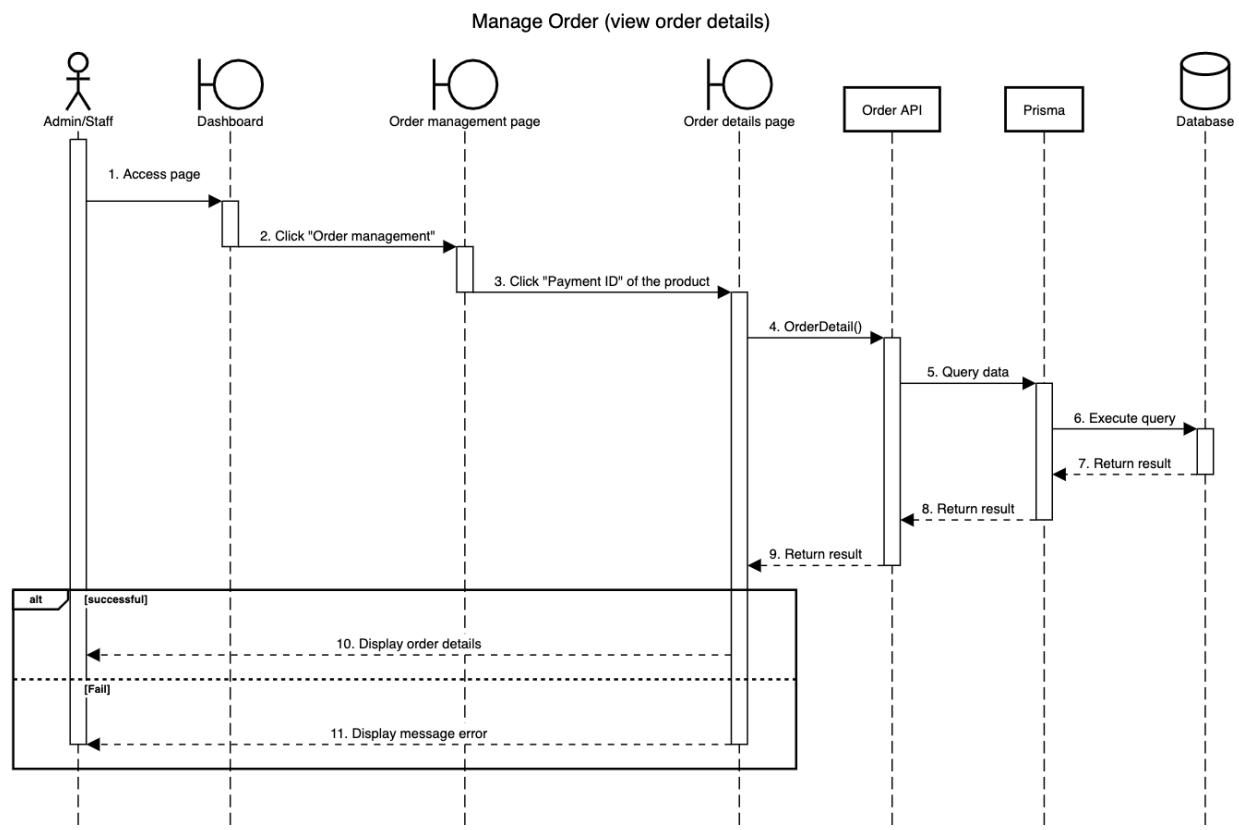


Figure 50 - Sequence Diagram Manage Order (View order details)

3.17.4 Sequence Diagram Manage Order (Update order status)

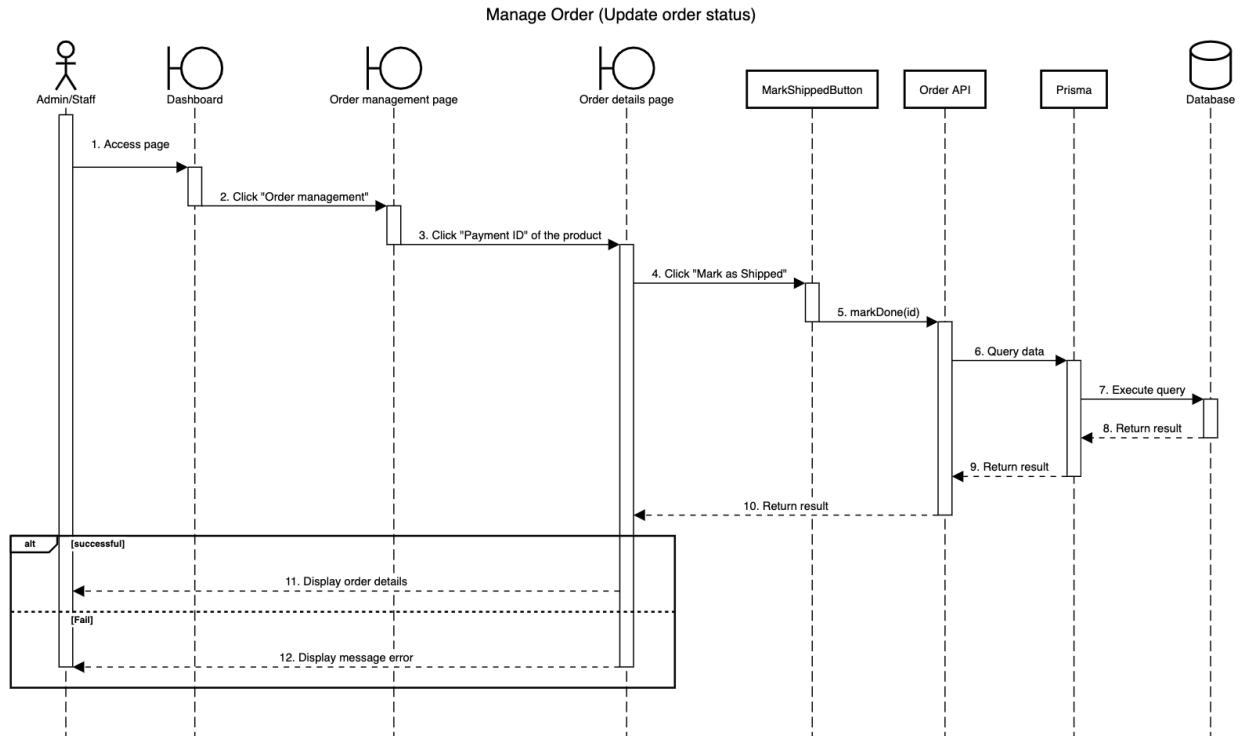


Figure 51 - Sequence Diagram Manage Order (Update order status)

3.18 Manage Product

3.18.1 Class Diagram

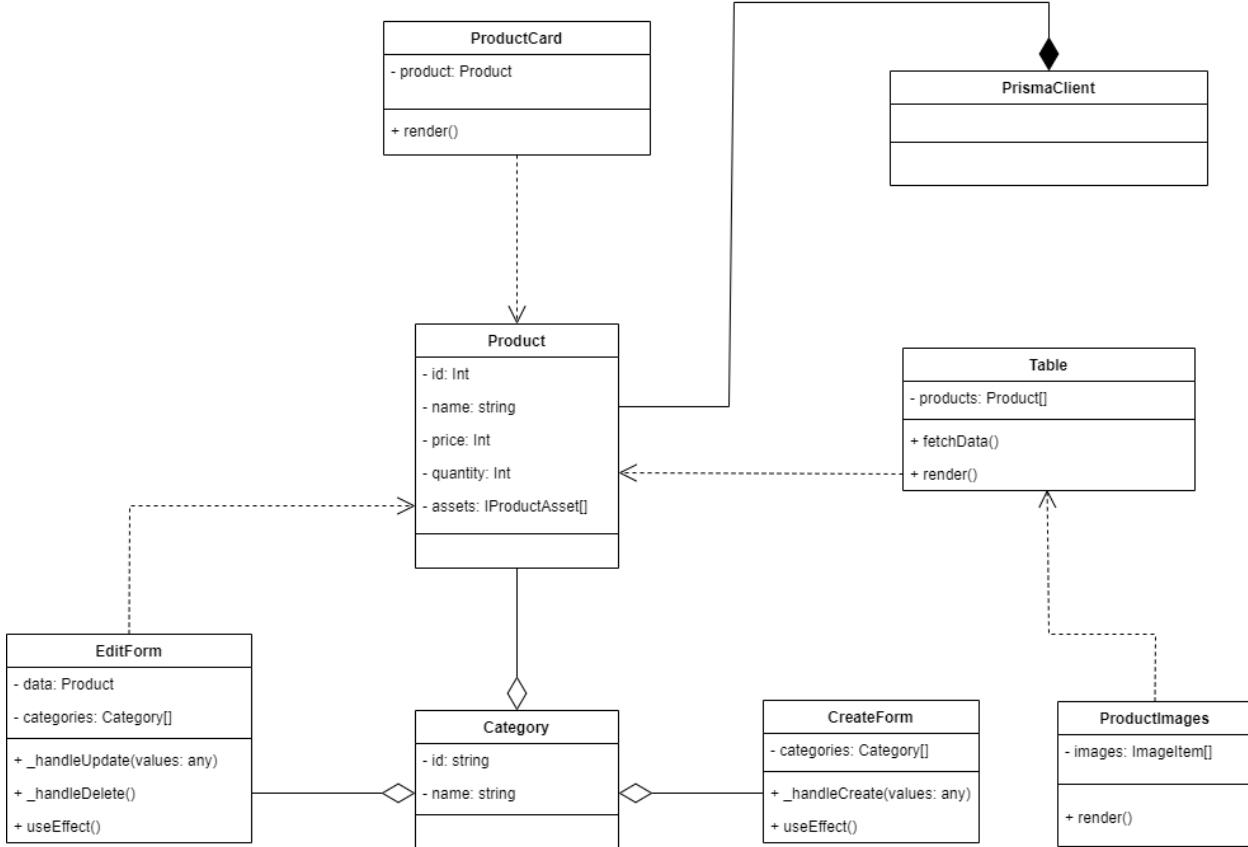


Figure 52 - Class Diagram - Manage Product

3.18.2 Sequence Diagram Manage Product (View)

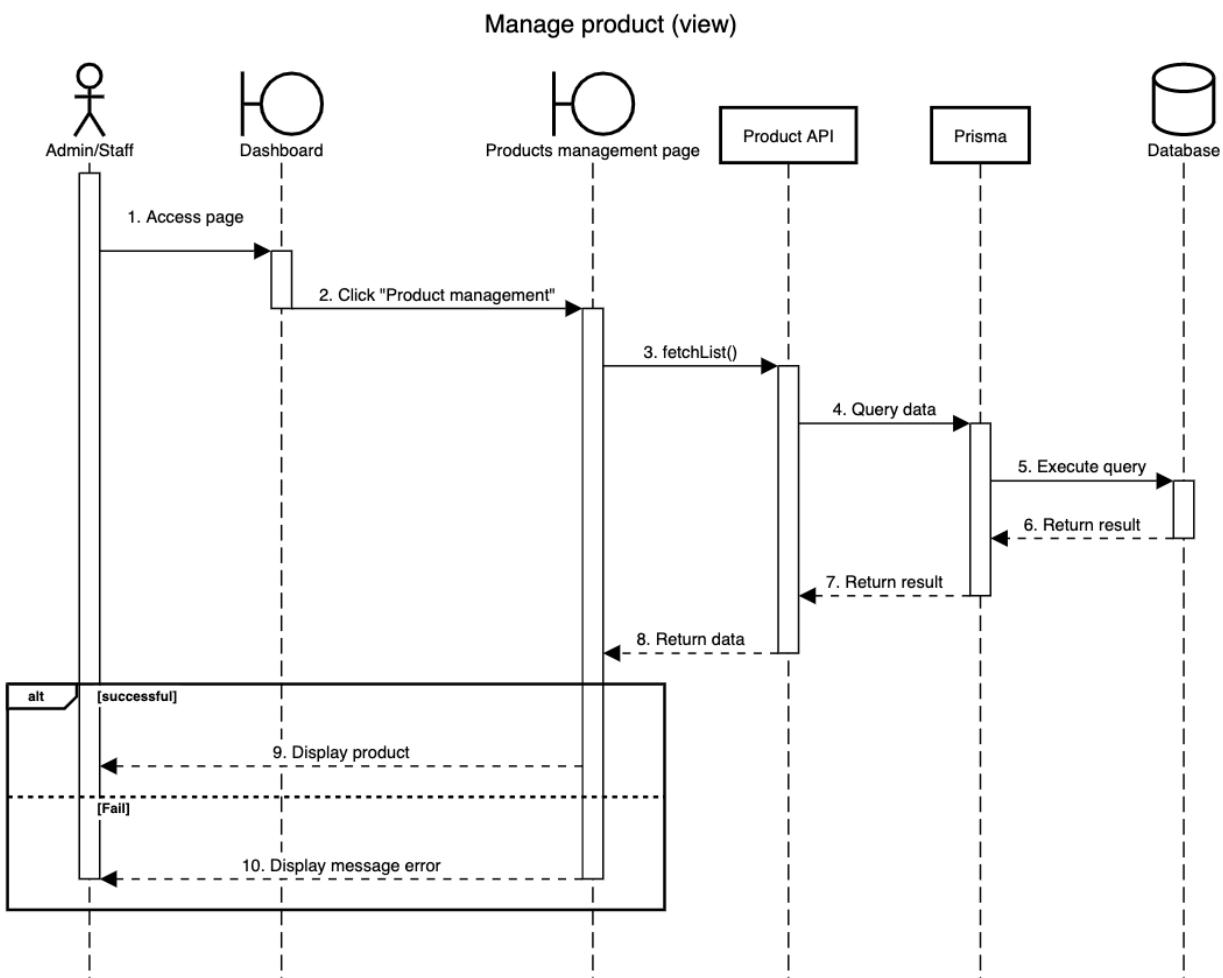


Figure 53 - Sequence Diagram Manage Product (View)

3.18.3 Sequence Diagram Manage Product (Update)

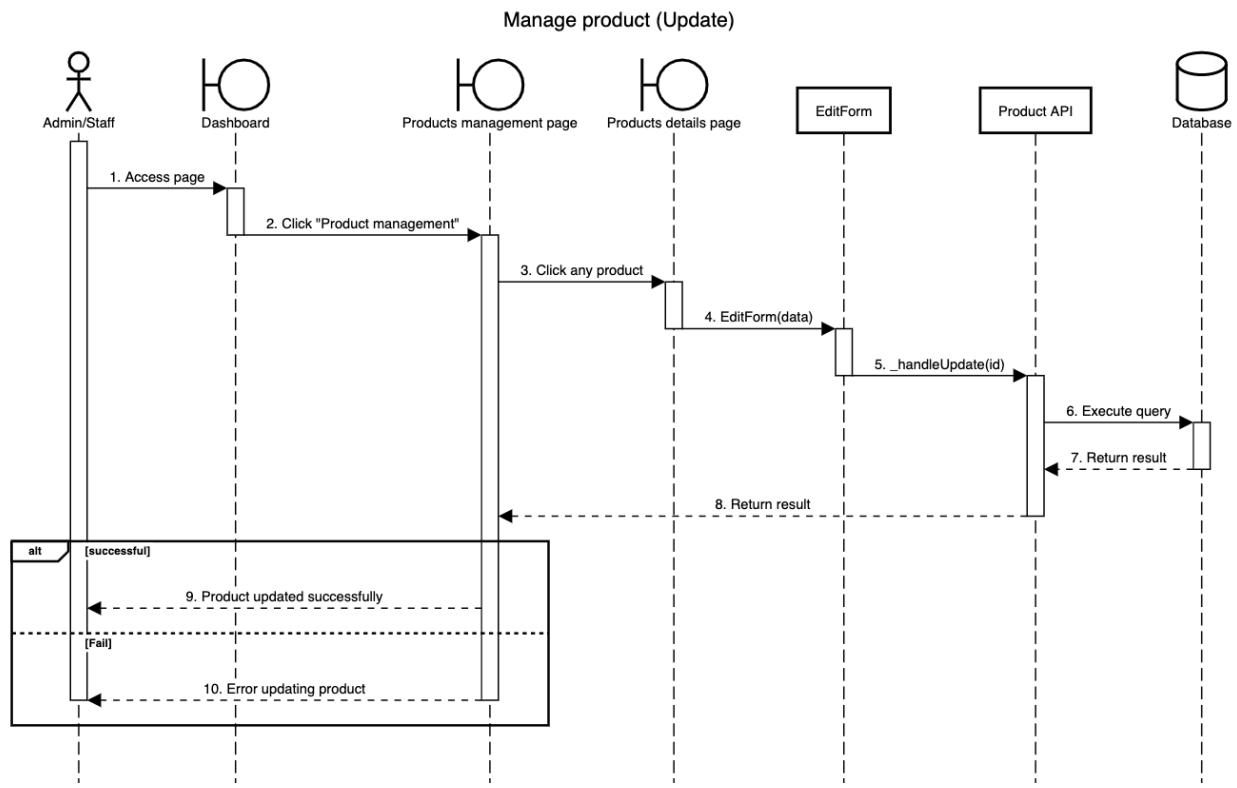


Figure 54 - Sequence Diagram Manage Product (Update)

3.18.4 Sequence Diagram Manage Product (Delete)

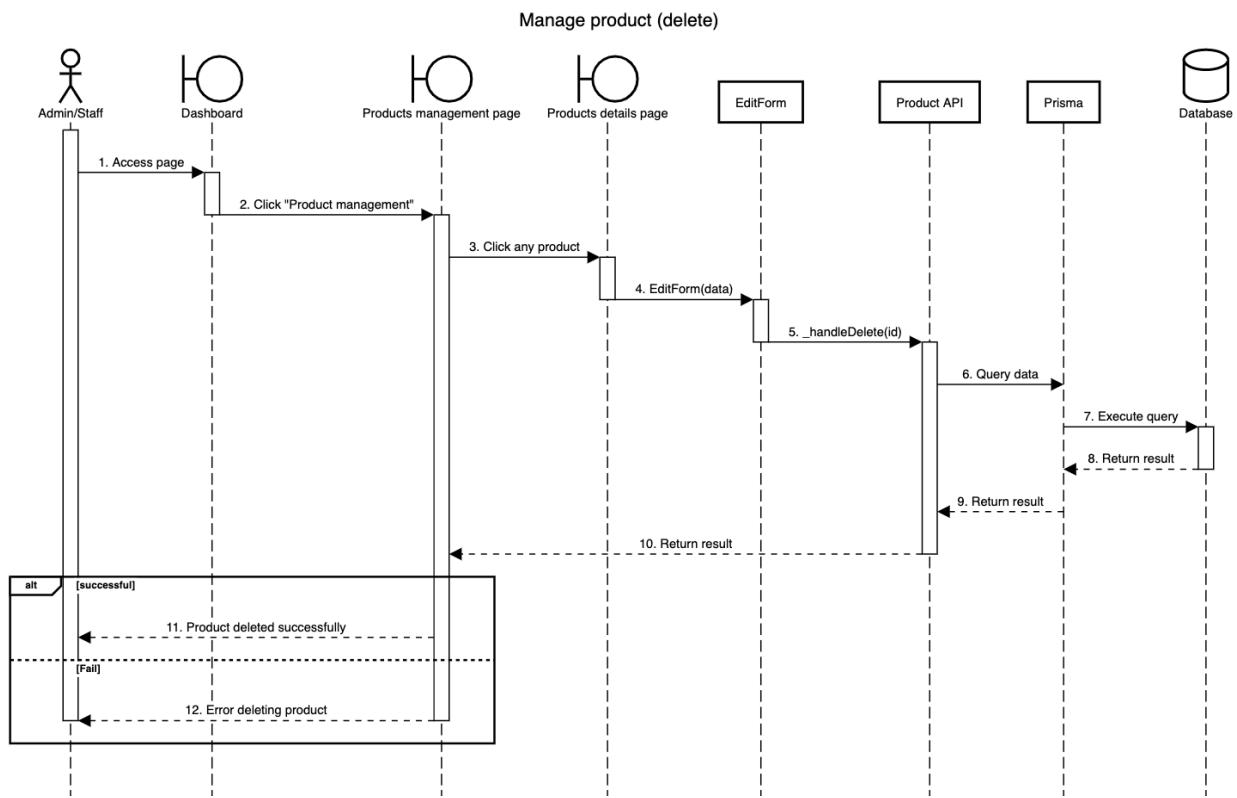


Figure 55 - Sequence Diagram Manage Product (Delete)

3.18.5 Sequence Diagram Manage Product (Add new product)

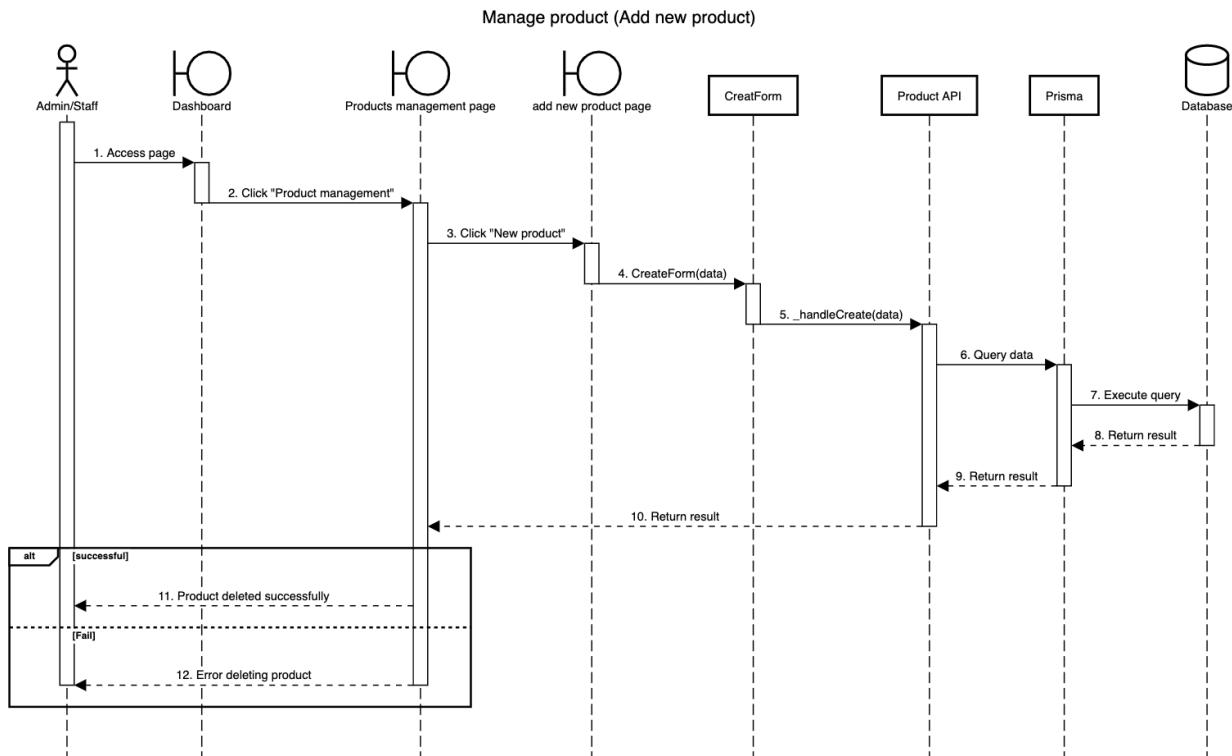


Figure 56 - Sequence Diagram Manage Product (Add new product)

3.19 Manage Staff

3.19.1 Class Diagram

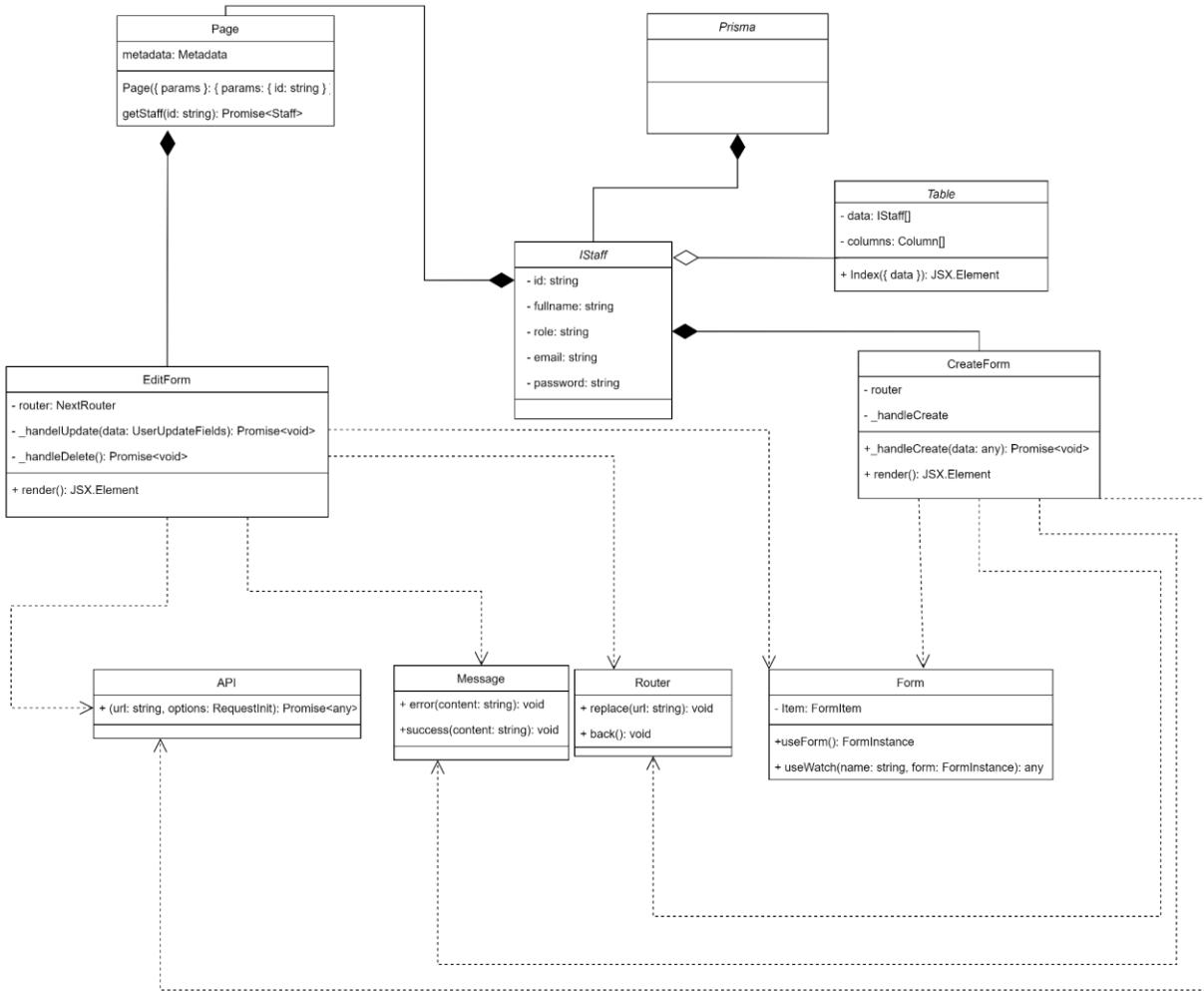


Figure 57 - Class Diagram - Manage Staff

3.19.2 Sequence Diagram Manage Staff (View)

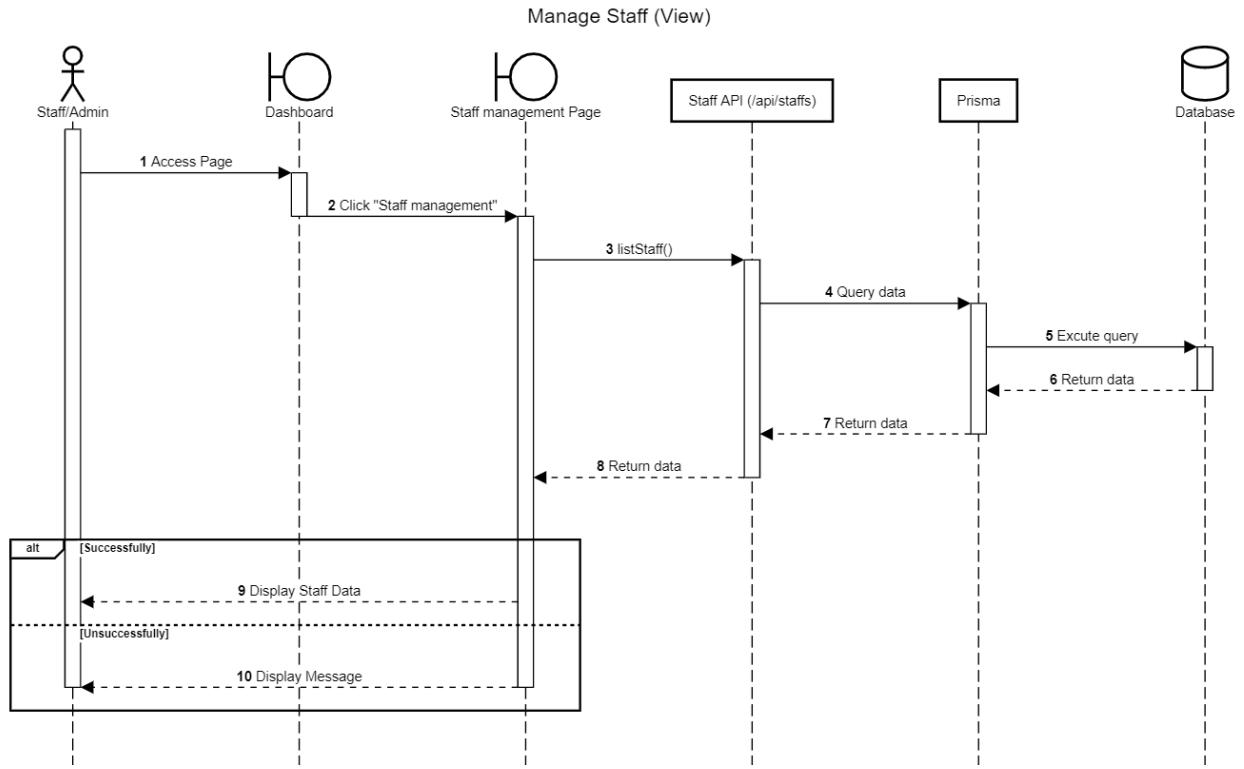


Figure 58 - Sequence Diagram Manage Staff (View)

3.19.3 Sequence Diagram Manage Staff (Create)

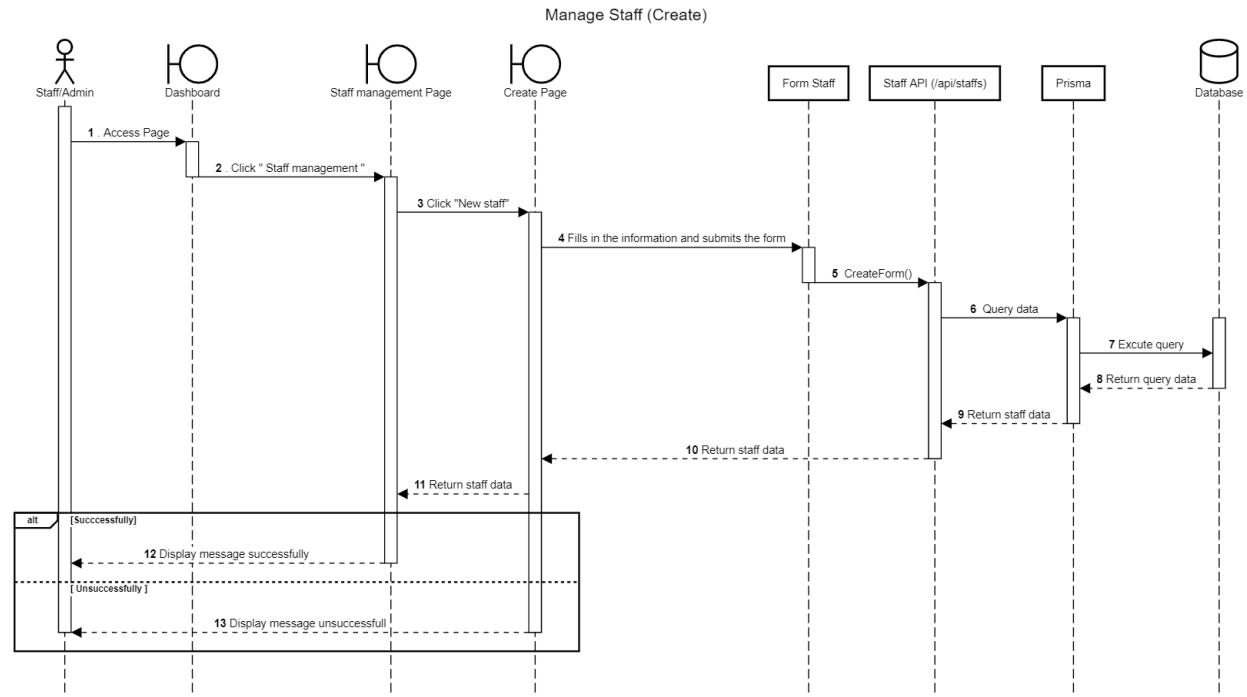


Figure 59 - Sequence Diagram Manage Staff (Create)

3.19.4 Sequence Diagram Manage Staff (Update)

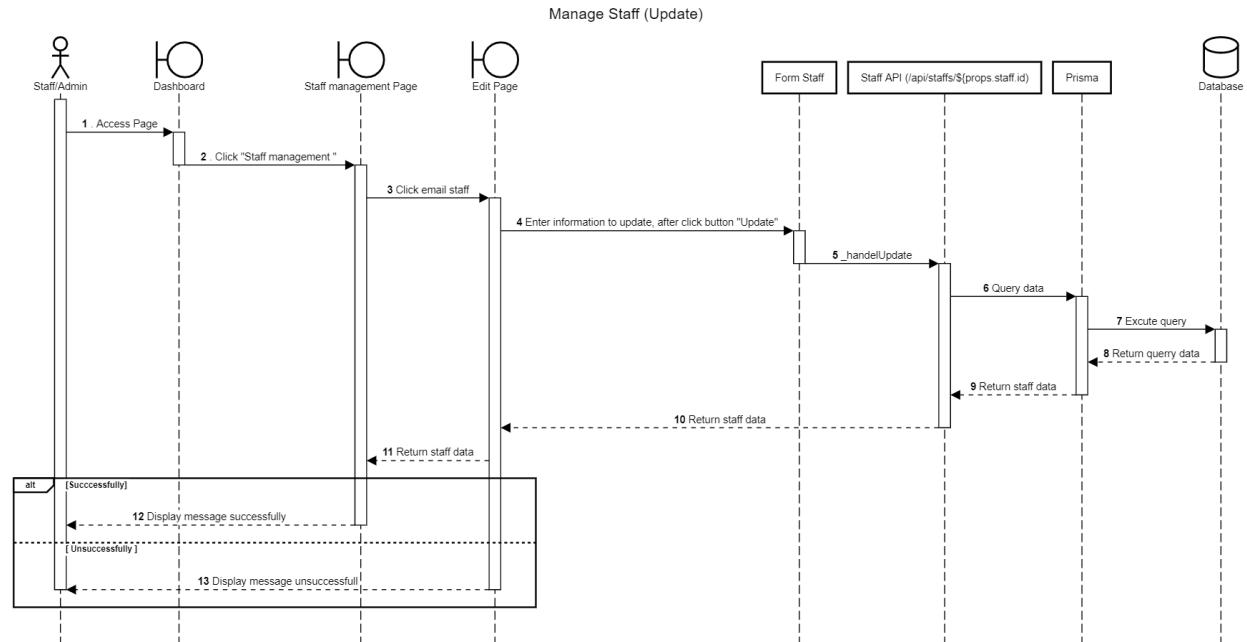


Figure 60 - Sequence Diagram Manage Staff (Update)

3.19.5 Sequence Diagram Manage Staff (Delete)

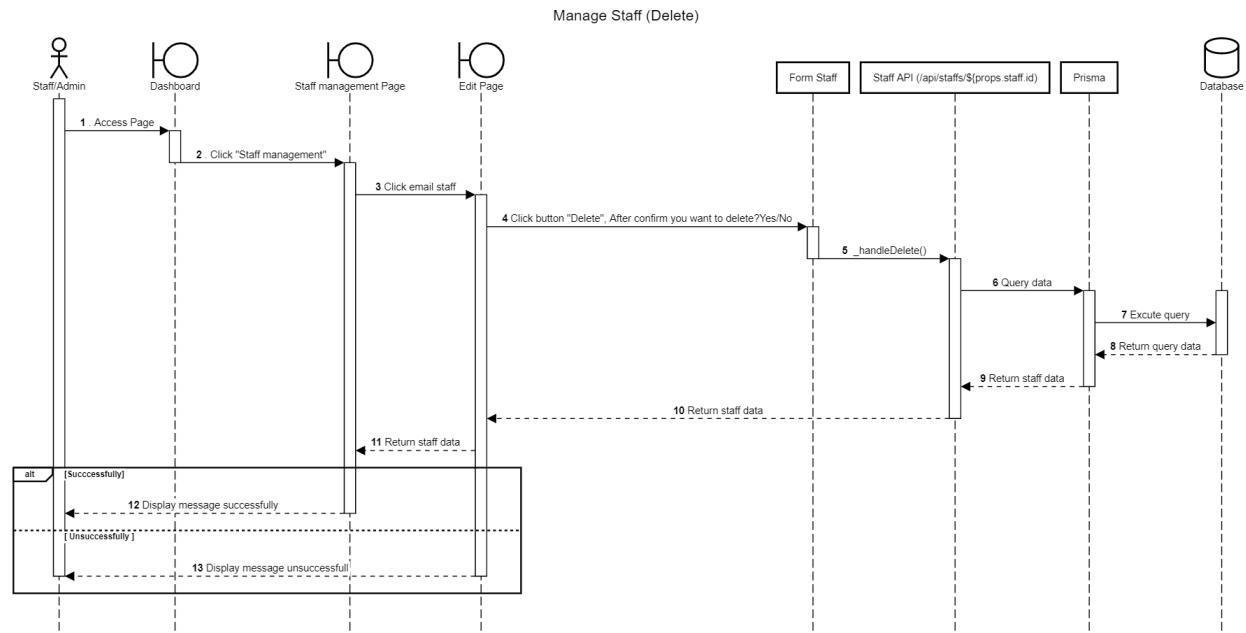


Figure 61 - Sequence Diagram Manage Staff (Delete)

3.20 Manage Customer

3.20.1 Class Diagram

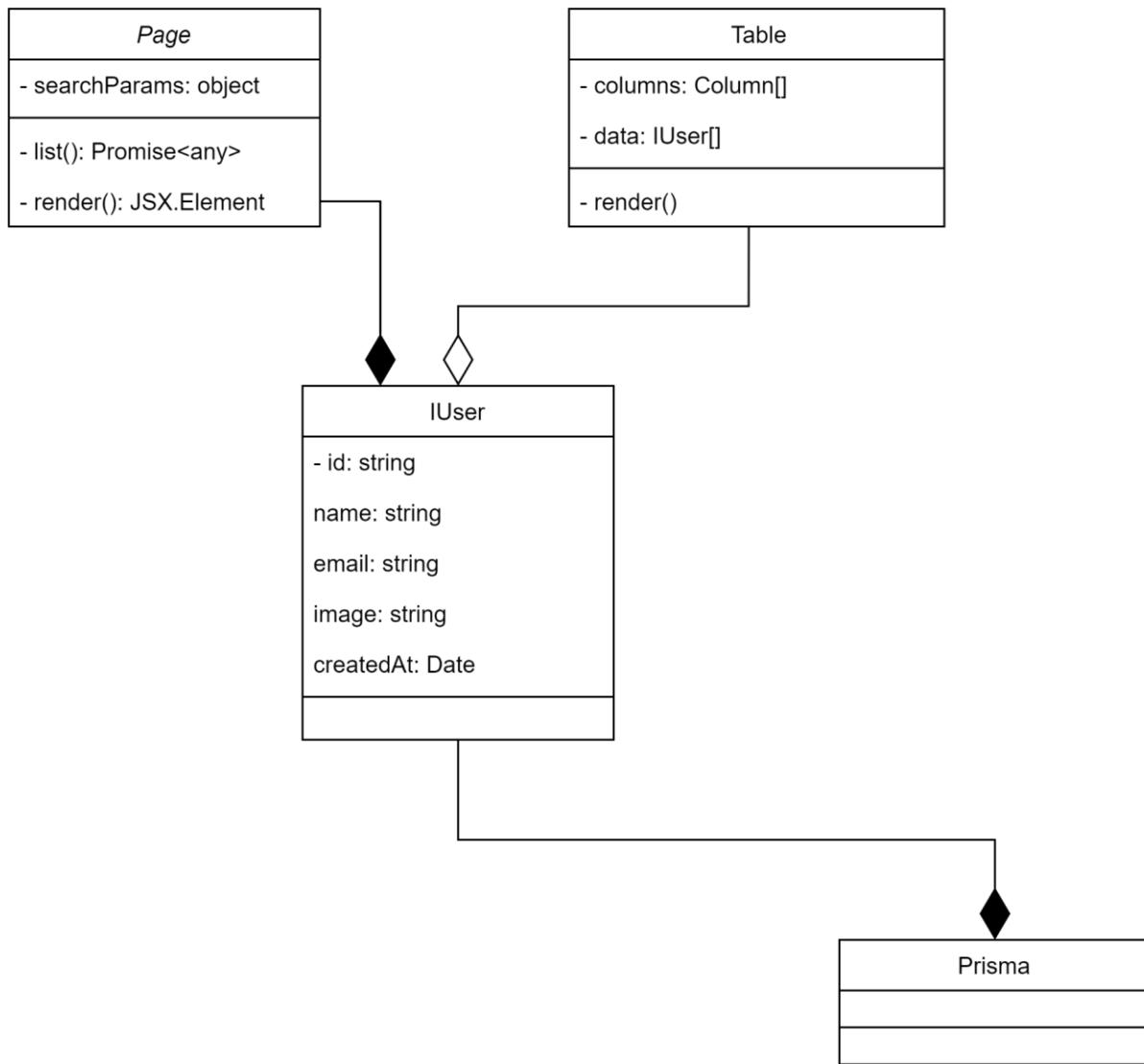


Figure 62 - Class Diagram - Manage Customer

3.20.2 Sequence Diagram Manage Customer (View)

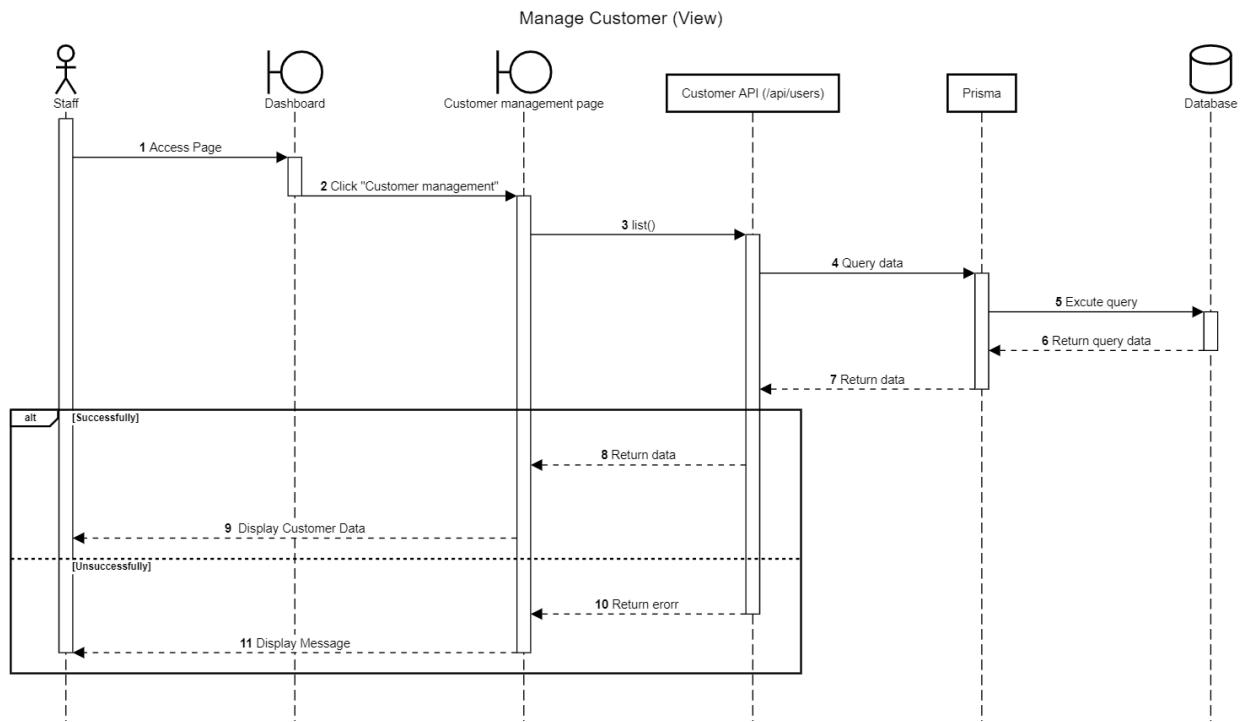


Figure 63 - Sequence Diagram Manage Customer (View)

3.21 Dashboard Statistics

3.21.1 Class Diagram

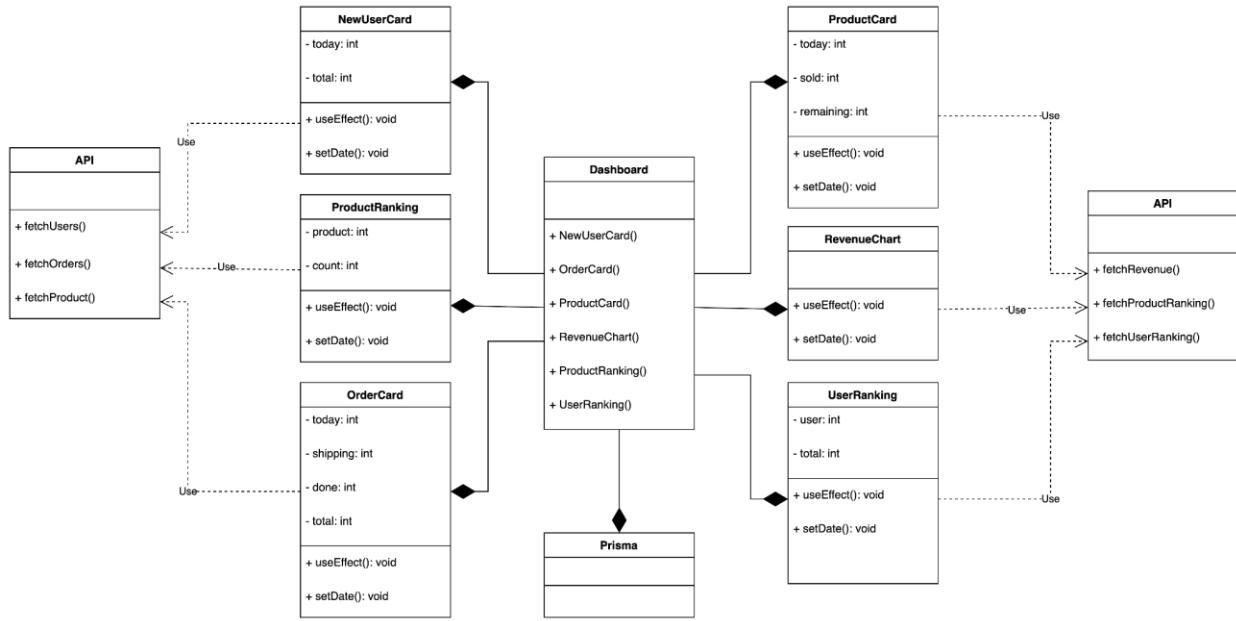


Figure 64 - Class Diagram - Dashboard Statistics

3.21.2 Sequence Diagram Dashboard Statistics

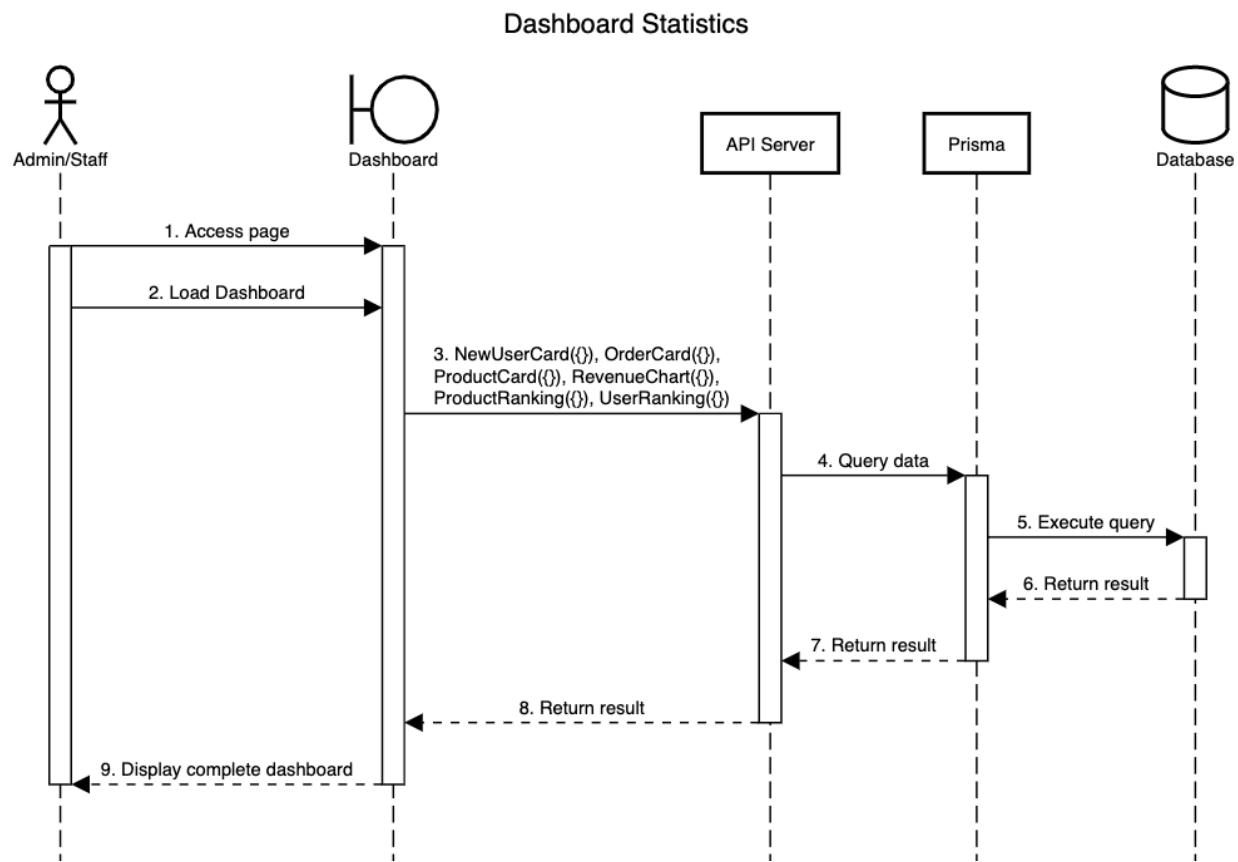


Figure 65 - Sequence Diagram Dashboard Statistics

3.22 Export File

3.22.1 Class Diagram

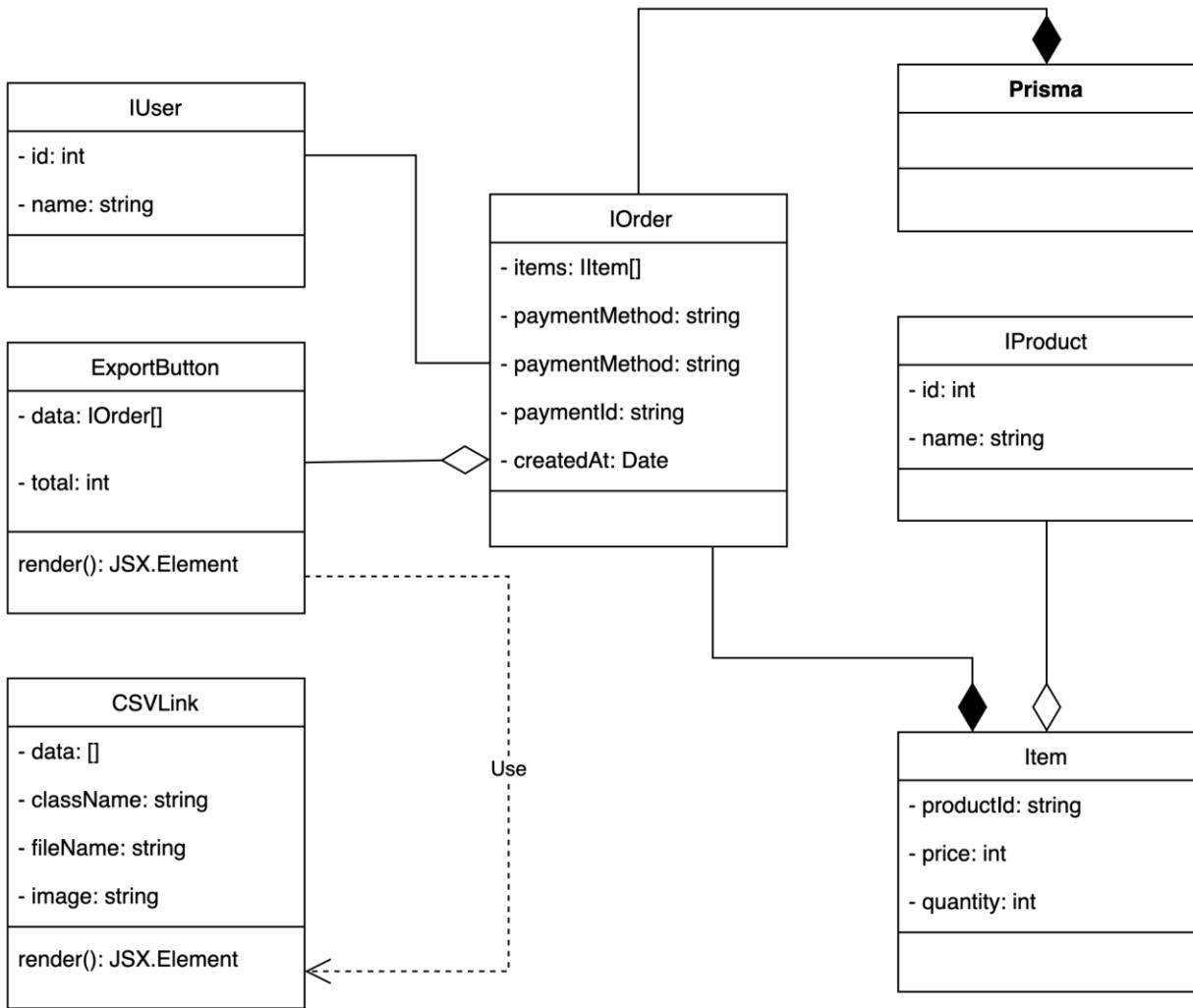


Figure 66 - Class Diagram - Export File

3.22.2 Sequence Diagram Export File

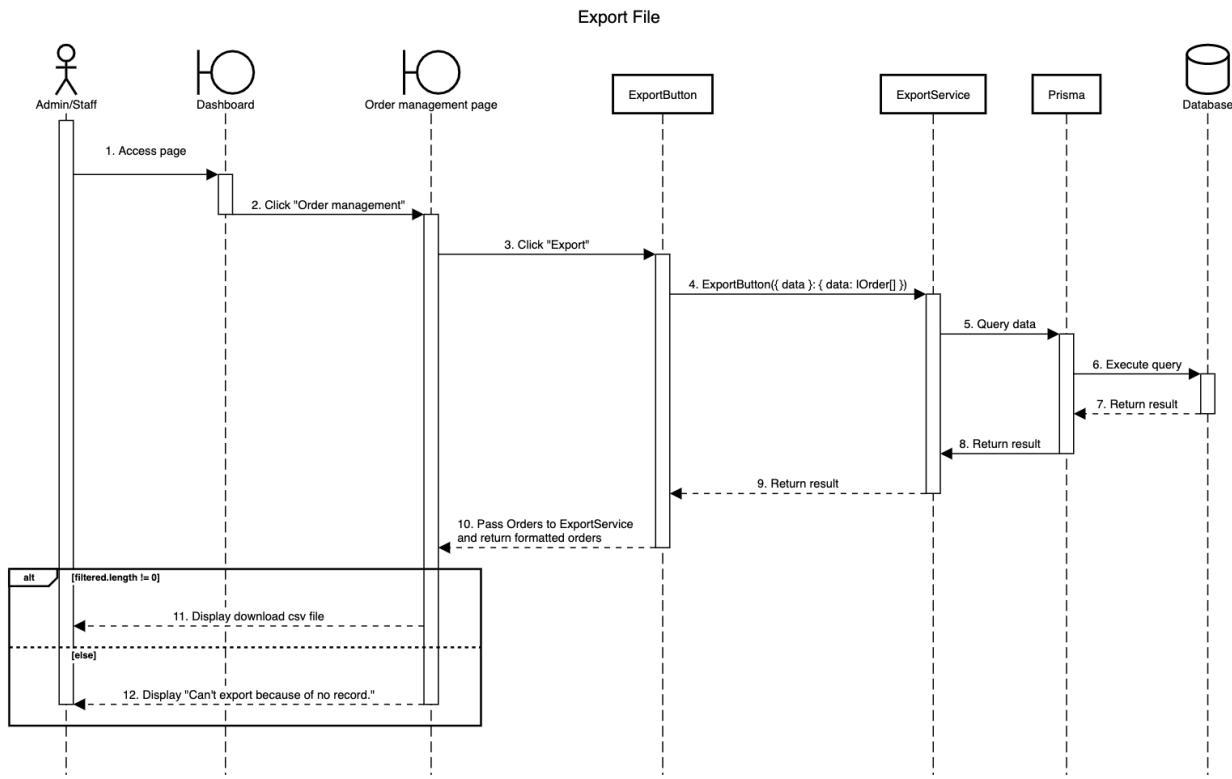


Figure 67 - Sequence Diagram Export File

3.23 Manage Category

3.23.1 Class Diagram

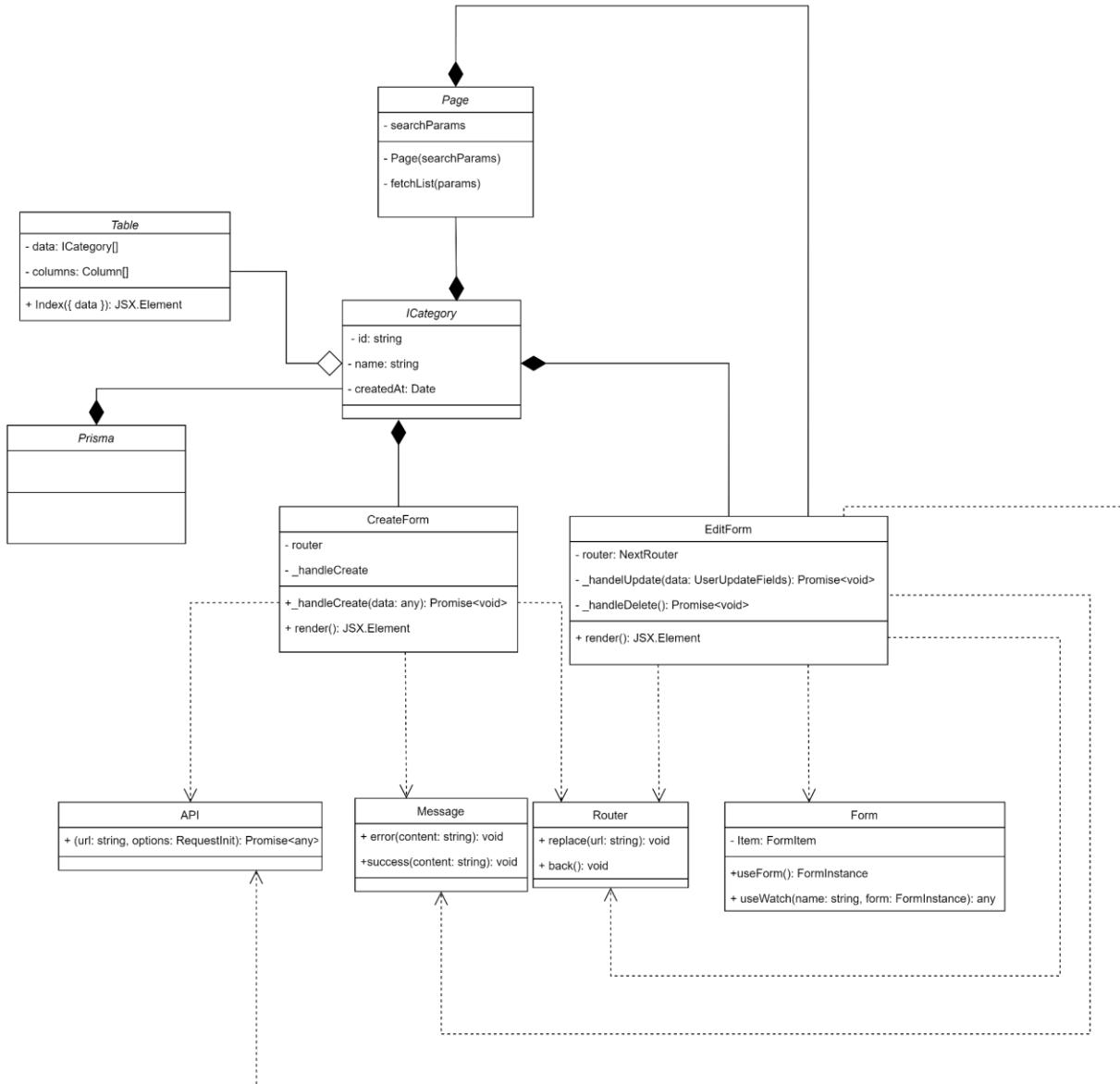


Figure 68 - Class Diagram - Manage Category

3.23.2 Sequence Diagram Manage Category (View)

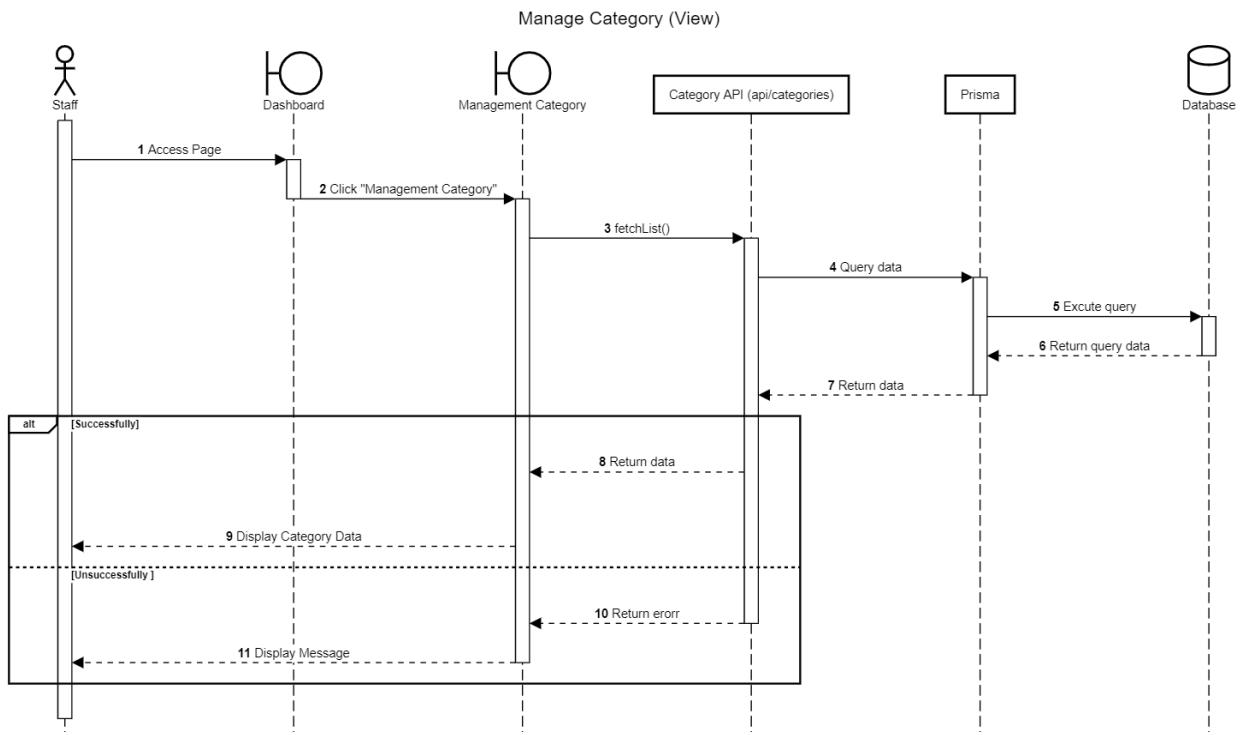


Figure 69 - Sequence Diagram Manage Category (View)

3.23.3 Sequence Diagram Manage Category (Create)

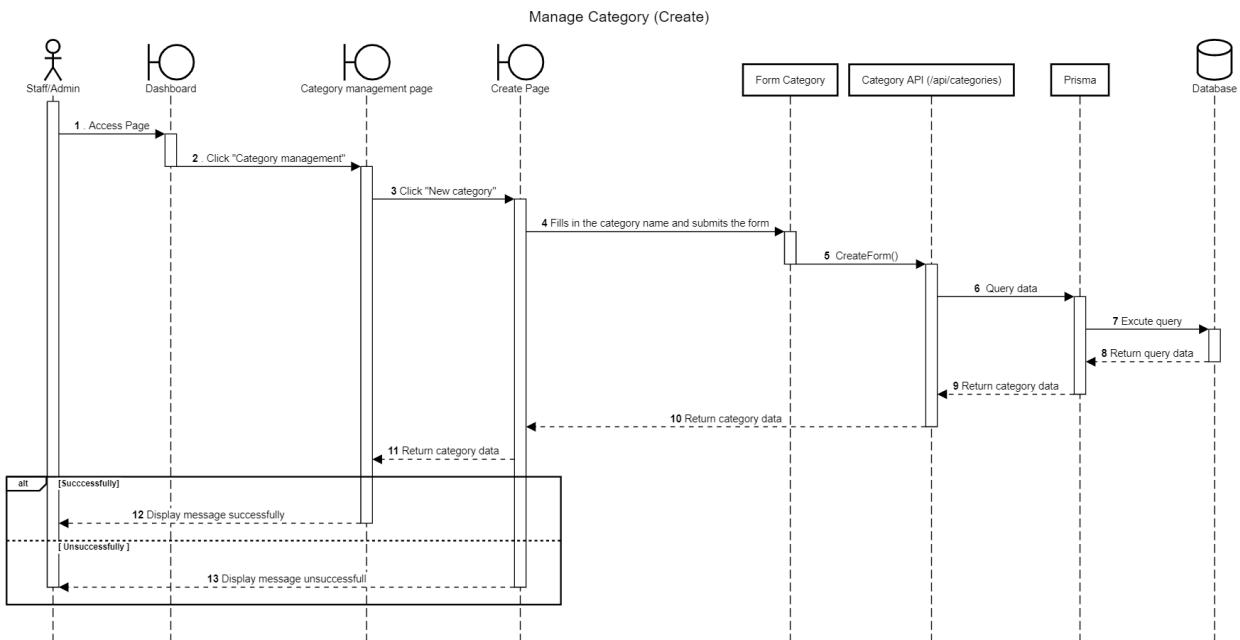


Figure 70 - Sequence Diagram Manage Category (Create)

3.23.4.Sequence Diagram Manage Category (Update)

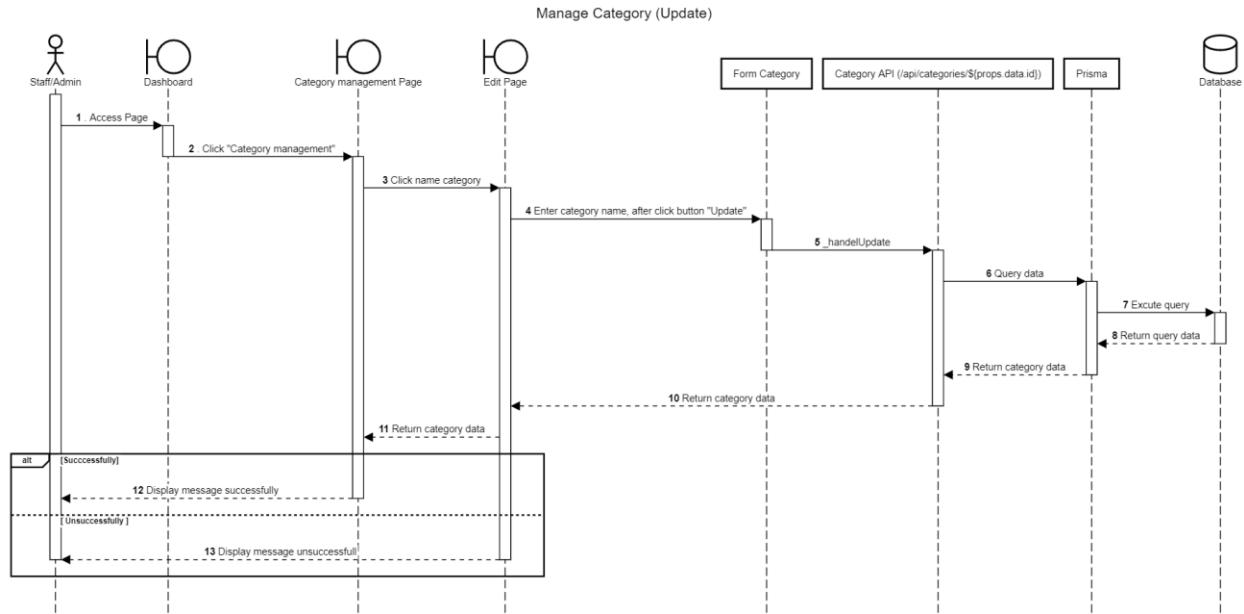


Figure 71 - Sequence Diagram Manage Category (Update)

3.20.5.Sequence Diagram Manage Category (Delete)

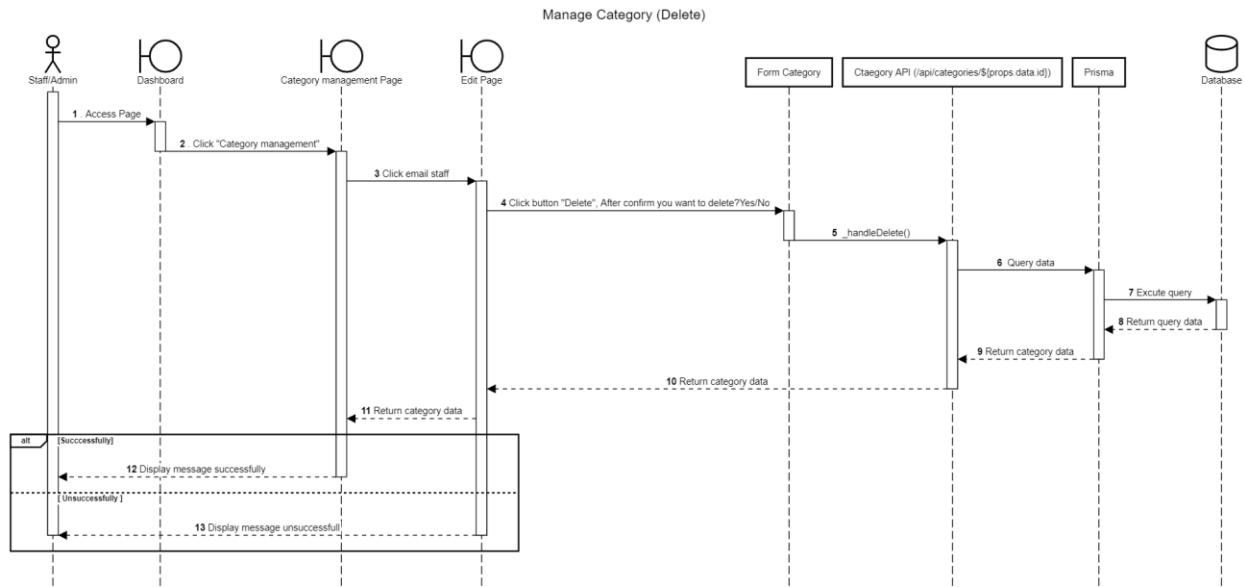


Figure 72 - Sequence Diagram Manage Category (Delete)

3.24 View blog detail

3.24.1 Class Diagram

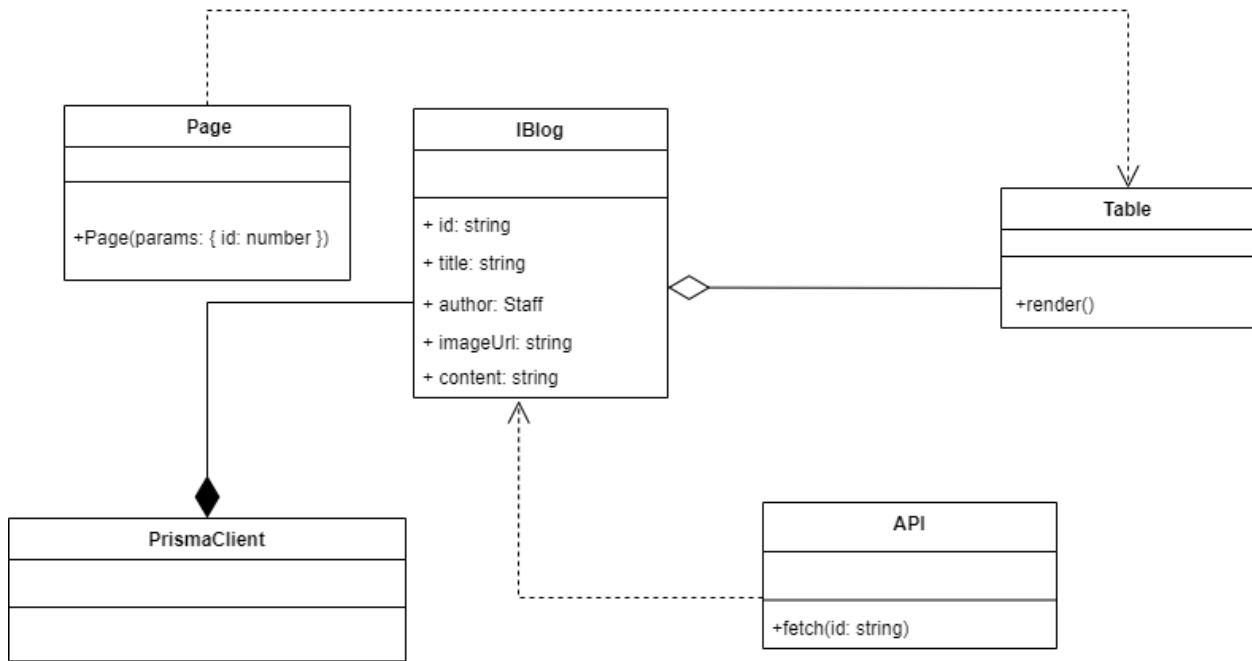


Figure 73 - Class Diagram - View blog detail

3.24.2 Sequence Diagram View blog detail

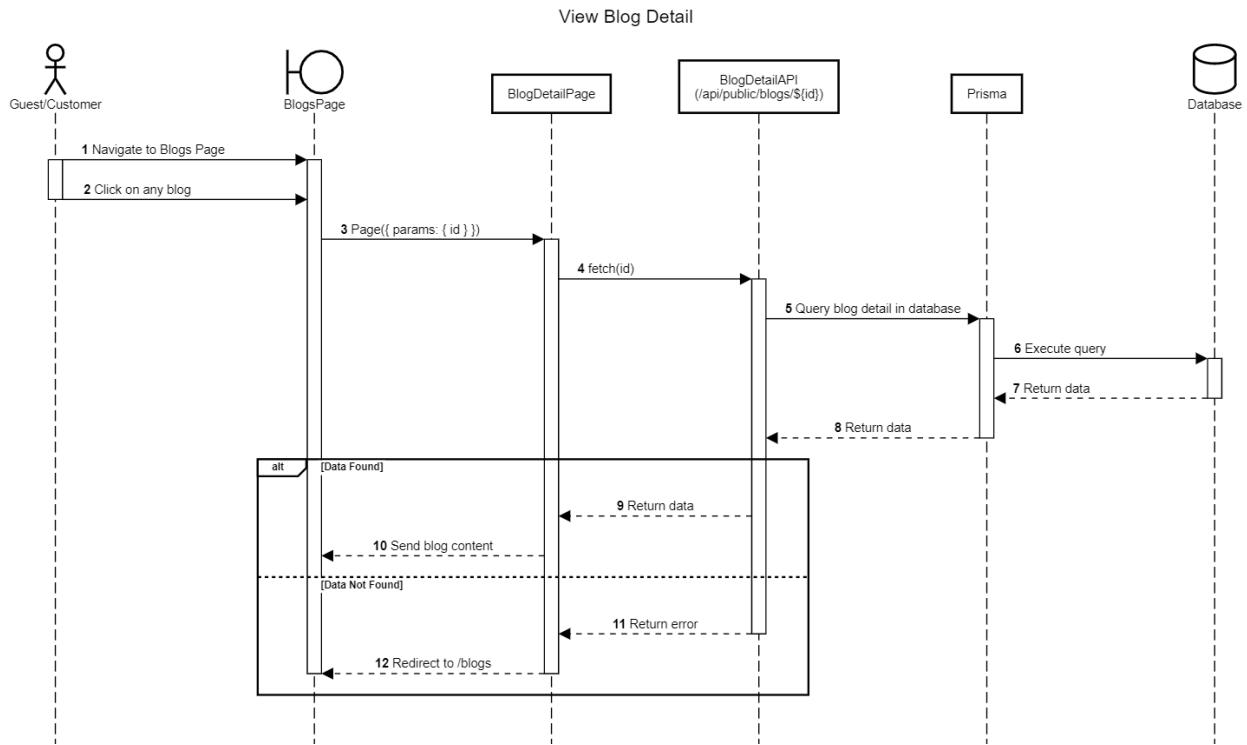


Figure 74 - Sequence Diagram View blog detail