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INTERNATIONAL UNIVERSITY  
SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT**



**WEB APPLICATION DEVELOPMENT PROJECT SHOPPING ONLINE  
STORE**

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## I.INTRODUCTION 1. Overview

In today's fast-paced technological landscape, online shopping has become an unavoidable trend. The purpose of the online shopping project is to establish a userfriendly and convenient platform for online shopping. This report will outline the various stages of the project, including requirement analysis, system design, implementation, testing, and result evaluation.

### 2. Product information

Today, Adidas clothing is highly popular and valued in Vietnam due to its stylish appearance and quality. More and more families and individuals desire Adidas apparel to enhance their wardrobe and daily comfort.

Our online store system offers a seamless shopping experience for customers seeking Adidas clothing. Built using HTML, CSS, React.js, and MongoDB, our platform provides a user-friendly interface that simplifies the process of ordering and purchasing products.

This system allows customers to effortlessly browse, select, and buy Adidas apparel from the comfort of their homes using either a computer or mobile device. Our web page introduces several new features, such as allowing customers to leave reviews and comments directly on product pages and check product availability in real-time.

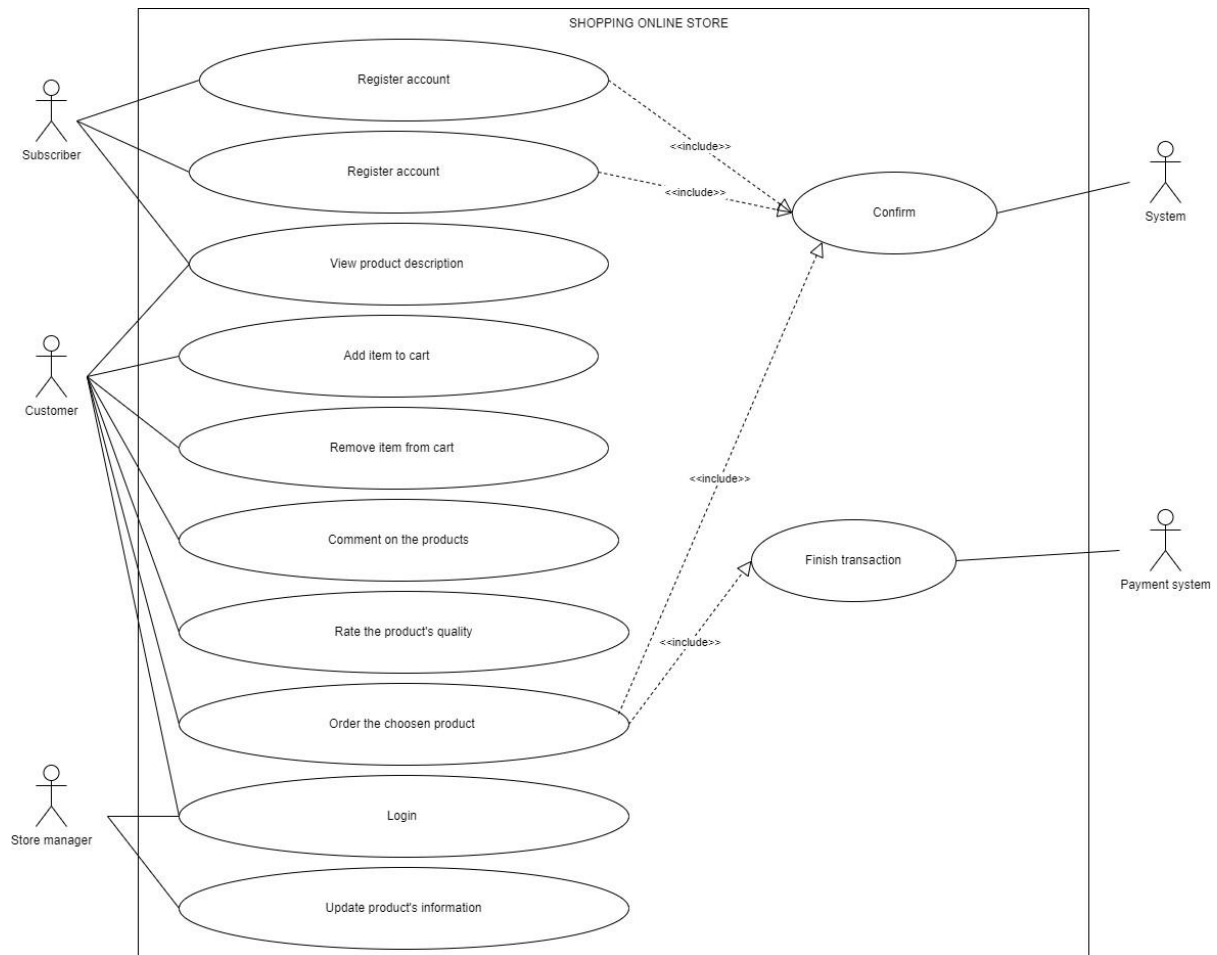
With our solution, shopping for Adidas clothing becomes easier, faster, and more convenient, meeting the growing demand for an efficient online shopping experience.

## II. Requirement Analysis and Design

This section provides a brief introduction to the requirement analysis and design process. Its purpose is to pave the way for the future implementation of the project. According to this requirements specification, we will implement each function, taking into consideration all conditions as well as the functional and non-functional requirements supplied by the customers. Throughout our implementation, we will continuously revise and update the newer version to keep track of the project's progress.

## 1. Requirement Analysis

### USE CASE DIAGRAM



#### Use Case 1:

**Name:** Log in the store system

**Identifier :** UC1 **Inputs:**

1. User name

2. Password **Outputs:**

1. The home page with user's authorization [If success]

2. The login page [If fail] **Basic Course:**

Actor: User (Customer/Store Manager)	System
1. Open the login page	1.1. Display the login page

2. Enter user name and password	
3. Submit	3.1. Check the user's info. 3.2. If success, return the home page 3.3. Else return the login page

### Precondition

1. User has an registered account of online store that is created earlier (ID and password)

### Post condition

1. None

**User story:** As an online shop visitor, I want to log in the shop system so that I can use functions of the shop like buy products, gain the promotion, discuss about the products ...

### Use Case 2:

**Name:** Rate/Vote the quality of products

**Identifier:** UC2 **Input:**

1. Vote value from 1 (worst) to 5 (best) stars by clicking the vote section
- Outputs:**
1. New voting value of product in database
  2. Product page with updated voting value
- Basic Course:**

Actor: User (Customer/Store Manager)	System
1. Open that product detail page	1.1. Display the page with details of product
2. Vote the product by choosing the number of stars from 1 (worst) to 5 (best)	2.1. Display user's selection
3. Submit	3.1. Update the voting value in database. 3.2. Reload the page to show the updated voting value from user

### Preconditions

1. User must log in the store system earlier
2. User opens the product page with the details of a certain product

### Post condition

1. None

**User Story:**

As a shop customer, I want to vote or rate the product to recommend other customers to buy that  
Products

### Use Case 3:

**Name: Register a new account of online store**

**Identifier: UC3 Input:**

1. Personal information from user
2. The home page [If success]
3. The register page If fail]

**Outputs:**

### Basic Course

Actor: User (Customer/Store Manager)	System
1. Access a page of online shop	1.1. Display the page
2. Click on the “register” button	2.1. Display the register page
3. Input the personal information (ID, password, Full name, DOB, email...)	
4. Submit	4.1. Check the validity of account information 4.2. If success, display the page that remind user check the mailbox 4.3. If fail, return back to the register page

### Preconditions

1. None

### Post condition

1. None User

### story:

As a visitor, I want to have a shop account so that I can take advantage of the offered function from the online shop

### Use Case 4:

**Name: Add/Remove desired products to/from wish list and shopping cart**

**Identifier: UC4 Input:**

1. None **Output:**
2. Display message that user has successfully added items to shopping cart or wish list

### Basic Course

Actor: member	System
1. Click the “Add to Cart” button	1.1. If logged in, add items to member’s shopping cart 1.2. Else display “Must log in” message
2. Click the “Add to Wish List” button	2.1. If logged in, add items to member’s wish list 2.2. Else display “Must log in” message
3. Click the “My Shopping Cart” image	3.1. Open the “Your Shopping Cart” page 3.2. If logged in, display all the products added 3.3. Else display “Must log in” message
4. Click “Remove from Cart” of item	4.1. Remove item from Shopping Cart
5. Input new quantity for the selected item	5.1. Update the quantity for the selected the item in shopping cart
6. Click the “My Wish List” image	6.1. Open the “Your Wish List” page 6.2. If logged in, display all the products added 6.3. Else display “Must log in” message
7. Click “Remove item” in wish list	7.1. Remove item from Wish List
8. Click the “Add to Cart” button in wish list	8.1. Add items to member’s shopping cart

### Preconditions

1. User has logged in
2. User is currently in the product viewing or product description page

### Post conditions

3. Items added to or removed from the shopping cart or wish list
4. Database updated

**Here are your user stories rewritten with improved clarity and corrected errors:**

### User Story 1:



As a user, I want to be able to add selected items to my cart so that I can purchase them later, specifying the quantity I desire.

**User Story 2:**

As a user, I want to remove items from my shopping cart in order to choose alternatives that better suit my needs.

**User Story 3:**

As a user, I want to be able to adjust the quantity of items in my shopping cart so that I can buy just the right amount that I need.

**User Story 4:**

As a user, I want to add items to my wish list so that I can save them for future reference.

**User Story 5:**

As a user, I want to be able to remove items from my wish list so that I can either purchase them or add new items that I find more appealing.

**User Story 6:**

As a user, I want to move items from my wish list to my shopping cart so that I can proceed to purchase the items I need.

**Use Case 5:**

**Name:** Perform buying transaction and checkout

**Identifier:** UC5

**Input:** None

**Output:** Display message that user has successfully purchased products

**Basic Course:**

Actor: member	System
1. Click Checkout button	1.1 Ask user to log in 1.2. Navigate to Checkout page 1.3. Create a session 1.4. Display the user's shopping cart
2. Click Next	2.1. Display the form for user to input their information, type of payment for the current transaction

3. Fill out the form and click Submit	3.1. Display message about successful transaction. 3.2. Update the database 3.3. Destroy the current session 3.4. Navigate back to homepage
4. Click Update shopping cart	4.1. Destroy the current session 4.2. Navigate to Shopping cart page

### **Preconditions**

1. Shopping cart is not empty
2. User has register an account

### **Post conditions**

1. Mail confirmation is successfully sent
2. Database updated

### **User story 1:**

Navigate to the shopping cart page. As a user, I want to review the products in my shopping cart so that I can make an online purchase and have them shipped to my location.

### **User story 2:**

As a user, I want to update my shopping cart to add or remove items as needed.

### **Use Case 6:**

**Name: Update the product information and clearance sale-off**

**Identifier: UC6 Inputs:**

1. Product's Updated Information
2. Sale-off event's Description (option)

### **Output:**

1. Display result on the store's page

### **Basic Course:**

<b>Actor: Store Manager</b>	<b>System</b>
1. Login as store manager	1.1 System will resolve this step base on UC1

2. Request for store's database	2.1 System will display the store's database to the user on screen
3. Update the product's information	3.1 If nothing wrong occurs, update the information. 3.2 Else, notify the user of the error.
4. Create an sale events by picking out the items and update the new price for those particular items	4.1 If nothing wrong occurs, update the price for the item. 4.2 Else, notify the user of the error.
5. Input for sale's event description	5.1 Display form for the user to input description text. 5.2 Will show the event on the store's homepage.
6. Submit the form	6.1 Update the database with input information

### Precondition

1. The user has logged in as store manager

### Post condition

1. Display all information of the user

**User Stories:** "The store manager needs to update the quantity of certain items because the store has just received supplies from the suppliers. Additionally, the manager wants to create a sale event for specific items, which will involve reducing the current price of those items. The manager also needs to create a description for the sale event."

### Use Case 7:

**Name:** View the product's information on the web page

**Identifier:** UC7 **Input:**

1. Click on the product after searching **Outputs:**

1. Display a more detailed version of the product, including the description, in-stock or out-of-stock status, etc.
2. Provide photos of the products taken from different perspectives.
3. Show rates and comments from different users.

### Basic course

Actor: Visitor	System
1. Click on the searched product	1.1 Display the product description in more details
2. View the comments in more details	2.1 Expand the comments' pages and lists

**Pre-condition:** Visitors searched the product and got the desire result.

**Post-condition:** None

**User Stories:** "Visitors should be able to view the product in detail, including comments and ratings, in order to assess its quality, authenticity, brand reputation, and any production-related issues."

## A. FUNCTIONAL REQUIREMENTS

### *Use Case 1: Log in the store system*

#### **1.The Scope of the Work**

- This occurs in the sprint 5 in the process
- 4 tasks needed for this function
- 20 hours of effort is needed for this function

#### **2. The Scope of the Product:** This is the main part of user's login functionality **3. Functional and Data Requirements**

##### a. Functional Requirement

- Shall display the log in so that user can input the information of account
- Shall achieve the information of the account that is matched with the ID that user logs in from the database
- Shall decrypt password of user account from the database
- Shall check the validity of user login account

##### b. Data Requirement: The log in information (ID and password) must be valid

### *Use Case 2: Create a new store account*

#### **1. The Scope of the Work**

- This occurs in the sprint 6 in the process
- 5 tasks needed for this function
- 20 hours of effort is needed for this function

#### **2. The Scope of the Product:** This is the a part of user's login functionality **3. Functional and Data Requirements**

##### a. Functional Requirement

- Shall display the page to require account information from the user
- Shall check the validity of account ID
- Shall insert a new account of user into database
- Shall link information to mailing system
- Shall display the announcing page the success of registration process.

##### b.Data Requirement

- Valid account information (ID is not used, email is valid)

### *Use Case 3: Rate/Vote the quality of products*

#### **1. The Scope of the Work**

- This occurs in the sprint ... in the process
- 5 tasks needed for this function
- 20 hours of effort is needed for this function

#### **2. The Scope of the Product**

This is a part that offers function that is Voting/Rating on the product **3.**

#### **Functional and Data Requirements**

##### a. Functional Requirement

- Shall retrieve and Display current voting value from the database

- Shall check the authorization of the user
- Shall check the voting ability of user
- Shall display the voting section for user
- Shall update/Insert the voting value of product inside database

**b. Data Requirement**

- Each user has only one chance to vote the product

***Use Case 4: Add/ Remove desired products to/from wish list and shopping cart***

**1. The Scope of the Work**

This occurs in the sprint 6 in the process

4 tasks needed for this function

20 hours of effort is needed for this function

**2. The Scope of the Product:** This is a part in the last piece of the product **3.**

**Functional and Data Requirements**

**a.Functional Requirements:**

- Shall add item to cart
- Shall add item to wish list
- Shall remove item from cart
- Shall remove item from wishlist
- Shall update the wishlist table in the database

**b.Data Requirements:**

- The total value of the purchase = quantity \* price per item

***Use Case 5: Perform buying transaction and checkout***

**1. The Scope of the Work**

- This occurs in the sprint 6 in the process
- 5 tasks needed for this function
- 30 hours of effort is needed for this function

**2. The Scope of the Product:** This is a part in the last piece of the product **3.**

**Functional and Data Requirements**

**a.Functional Requirements:**

- Shall destroy a session
- Shall view/update shopping cart
- Shall display input form to ask for user's information
- Shall the user's information
- Shall update the orders table in the database
- Shall update the point in the member table in the database

**b.Data Requirements:** none

***Use Case 6: Check availability of merchandise, Update the product information and clearance sale-off***

**1. Scope of the work**

- This occurs in the sprint 5 in the process
- 3 tasks needed for this function
- 30 hours of effort is needed for this function

**2. Scope of the Product part of the Store Manager Management use cases 3. Functional and Data requirements**

**a. Functional Requirements:**

- Shall update the product information

Shall insert into the database the clearance price sale-off

**b. Data Requirements:**

- The data in the product table exists before query

***Use Case 7: View the product's information on the web page (for visitor)***

**1. Scope of the work**

- This occurs in the sprint 4 in the process
- 4 tasks needed for this function
- 10 hours of effort is needed for this function

**2. Scope of the Product**

- This is the part of 85 % GUI of the product (how the product might display) and 15% of database retrieval (stock left, numbers of rates, comments,...) 3.

**Functional and Data Requirements**

**a. Functional Requirements:**

- Shall show images gallery slideshow of the product. (include zoom in, zoom out, forward and backward buttons)
- Shall rating: Scale from Poor to Excellent (red to green), along with the diagram and favorites.
- Shall show comment section: Hide and show comments with button, the content should be retrieved from the stored database.

**b. Data requirement:**

- Sample images □ Description, stock availability, discount, number of rates, comments' contents: Taken from the database

**B. NON-FUNCTIONAL REQUIREMENTS**

**1. Operational requirements:**

- Must make sure all of the components of the software operate in good manner
- Must keep the host running licensed so that it can handle all of the requests properly

- Must keep an administrator to frequently update the software as well as checking for the system's errors

## **2. Legal requirements:**

- Must cite all the components integrated into the system to avoid copyright violation
- Must keep the own-written source code confidential to avoid unauthorized use

## **3. Usability requirements:**

- Usability is the ease with which a user can learn to operate, prepare inputs for, and interpret outputs of system or component
- Well-structured user manuals
- Informative error messages – Error messages must state clear and might include hint to retrieve the solutions.
- Help facilities.
- Well-formed graphical user interfaces – easy to learn and navigate.
- Efficiency of use: goals are easy to accomplish and with few or no user error.

## **4. Humanity Requirements:**

- The user who works on the system usually has none or little computer background.
- Development team must create detail documentation so that the user can easily understand the system just by reading that documentation. The graphical user interfaces of the system must also be well designed so that it is easy to learn and easy to use. User should not be required a lot of time to learn how to get used to the system
- interfaces. Also the attractiveness and responsiveness also part of the interface □ requirement to help increase user experience.

## **5. Performance Requirements:**

This is the concern on speed of the system in operating

### **a. Response Requirements** (how quickly the system response to the user's request)

- I. Login response time for both customer and manager must be fast.
- II. Time for the system to update on Database modifications must be small. System must be able to change the multiple database tables' attributes seamlessly.
- III. Time to process certain services that are offered by the system must be achieved quickly and no delay. Our system must be able to process 10 different transactions simultaneously.
- IV. Website loading time must be fast and all the items must be generated correctly.

For this particular requirement, our system can able to achieve of loading more than 50 products per page in the minimal time.

### **b. Throughput Requirements** (how much can system achieved in a specific amount of

- I. System must be able to handle significant large amount of requests from many customers at one time without being delay. Our system must be able to handle more than 1000 visitors simultaneously who are simply browsing our products on the store page.
  - II. System must be able to handle multiple database modifications quickly.
- c. Availability Requirements** (is the system available when is requested by the user)
- I. System should have good memory management – Programming Language garbage collection must be utilized.

### **Description:**

This is an e-commerce store which might have more than thousands of visitors each day. This will be an extreme heavy workload for the server if all the requests have not been handled thoroughly. The shopping-cart system must be able to process orders simultaneously as many as possible without getting delay or overload. The website can handle many different requests from many customers on different operating system without being postponed.

### **6. Maintainability Requirements:**

Online Store system is a system that needs to update or change continuously. The user of the system has a very little background about inside aspects of the system. Therefore the developer team has to implement the system in the way that the user and further maintenance team can easily manipulate the current system.

- Offer the functions that help user to update/manage the information of products and customers .
- Write well-defined and clean source code with necessary comment lines to enhance the comprehension.
- Design the clear and stable database that is convenient for the further maintenance work .

### **7. Support Requirements**

System users (especially, Store manager) are the people who do not have much background on technology maintenance. therefore, beside developing the system, the developer team should have a better way so that the user can receive the support from the developer team as soon as possible

- Provide the hotline to receive the feedback from store manager if there is a problem
- Provide a remote maintenance tool (like TeamViewer, Computer Remote control ... ) to support the store manager directly



- Check frequently and maintain the stability of the system (monthly or each 2/3 months)

## **8. Security requirements:**

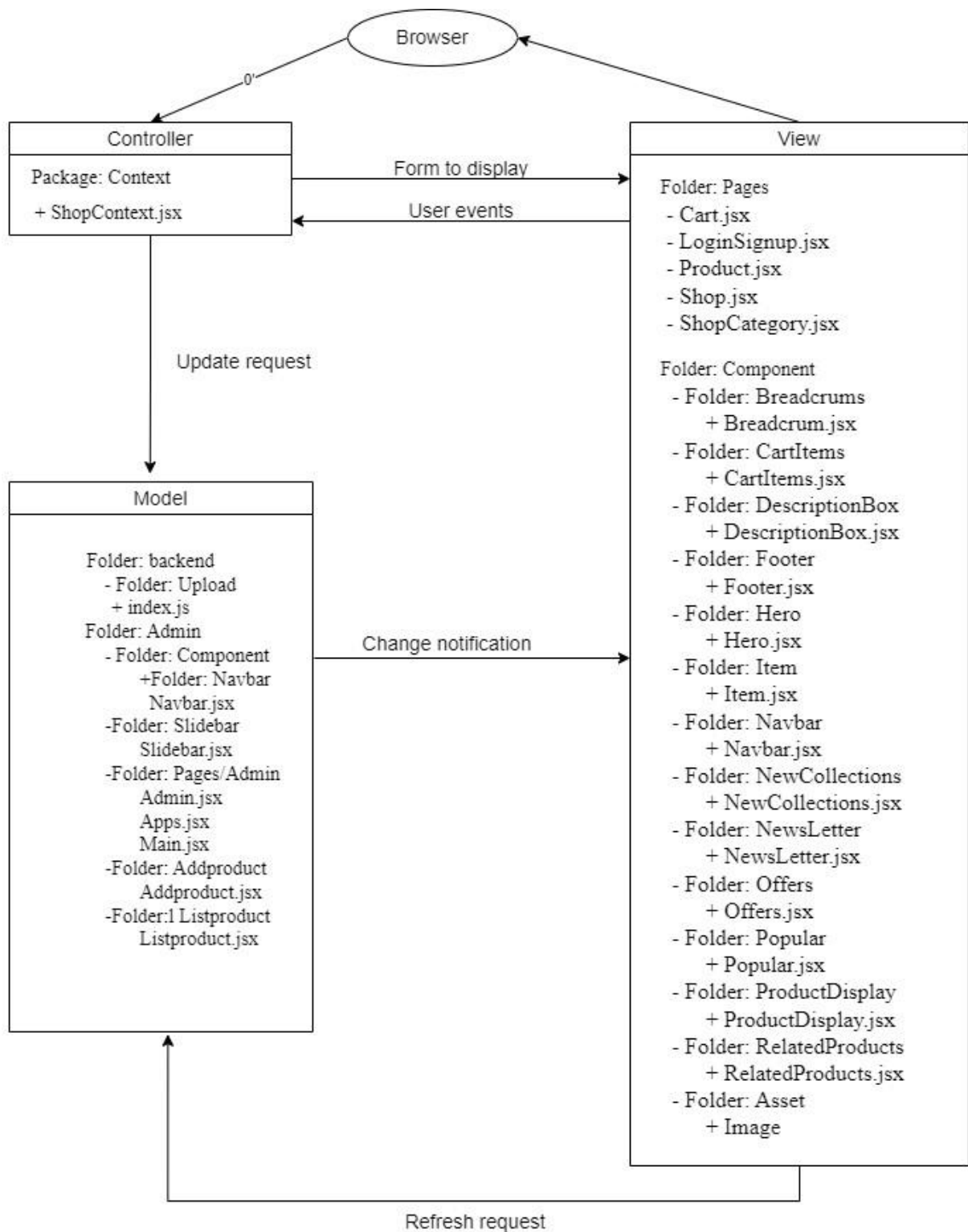
- This web operating system shall ensure that data is protected from unauthorized access.
- Ensure the integrity of the system from accidental or malicious damage.
- Restrict log-in attempts: Failure to log in the website (five times or more) should lead to a ban from access the website within 24 hours.
- The access permissions for system data changes might only be done by the administrator. <
- All modification events shall be logged. The event log shall contain "date, "time, "user, "action, "object", "prior" , " value", "new value" ,...
- All communications between the system's data server and clients must be encrypted (SSL, SSH protocol for HTTP, etc.)
- When customer logins, a session and timeout should be set.
- Information of the customers must be encrypted before adding to the database.
- All system data, including the information of products, customers (cookies, sessions), etc. must be backed up every 24 hours and there should be one copies stored in a secure location different from where the system is placed.
- Policy of privacy should be given out to restrict the third retrieval of many of customers' information.

## **9. Interface requirements:**

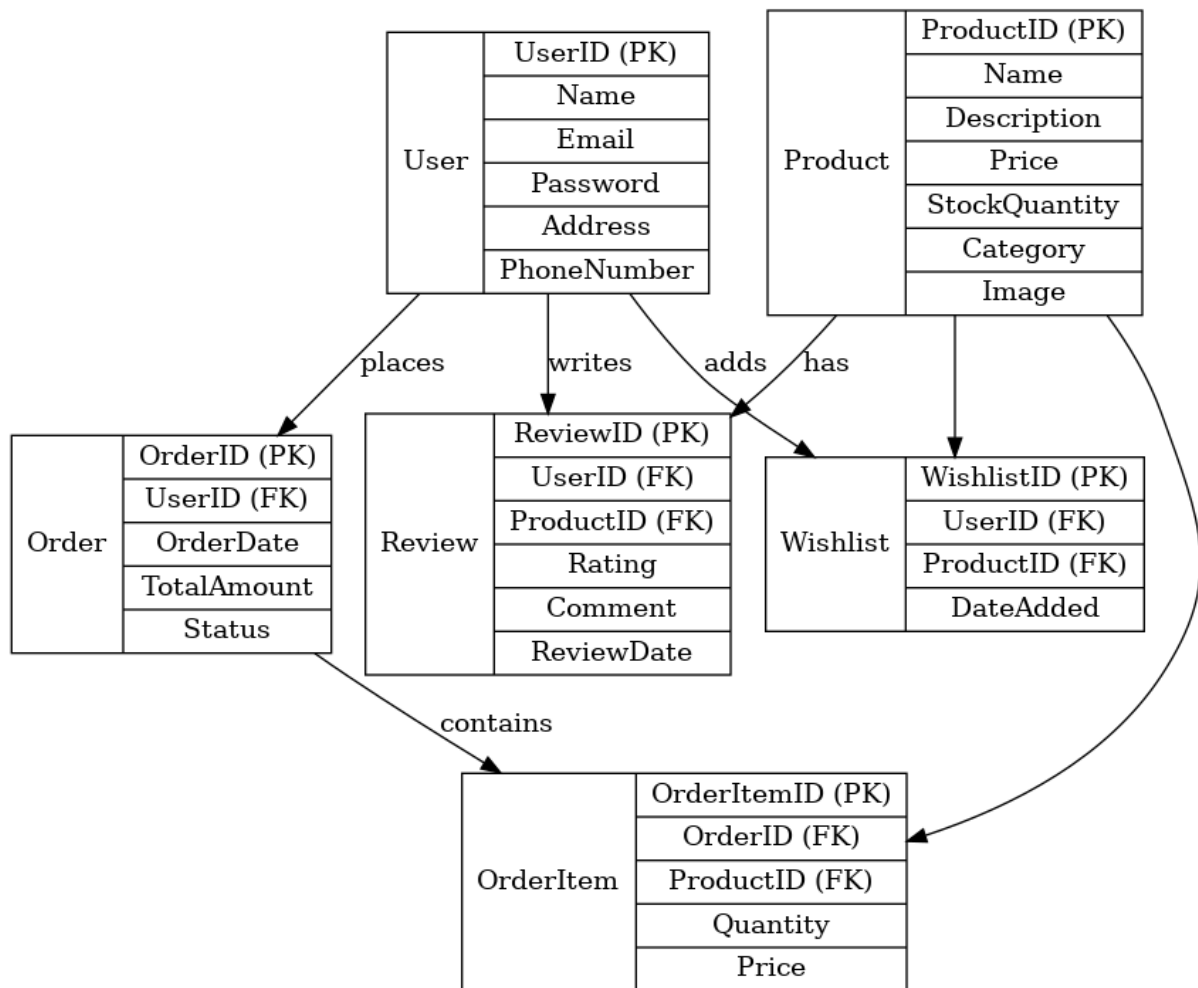
- Describe all of the technical requirements that affect interfaces such as protocol management, scheduling, directory services, broadcasts, message types, error and buffer management, security, etc. Assign a unique ID number to each requirement.
- Some non-functional requirements of interface:
  - +Buttons should include feature symbols equivalent to their functionalities .
  - + Sales report included in every successful transaction.
  - + Java might support different libraries of Look and Feel to decorate the website.
  - + Include language options for native and foreign visitors/customers

## **2.Design**

### **System Architecture Model**

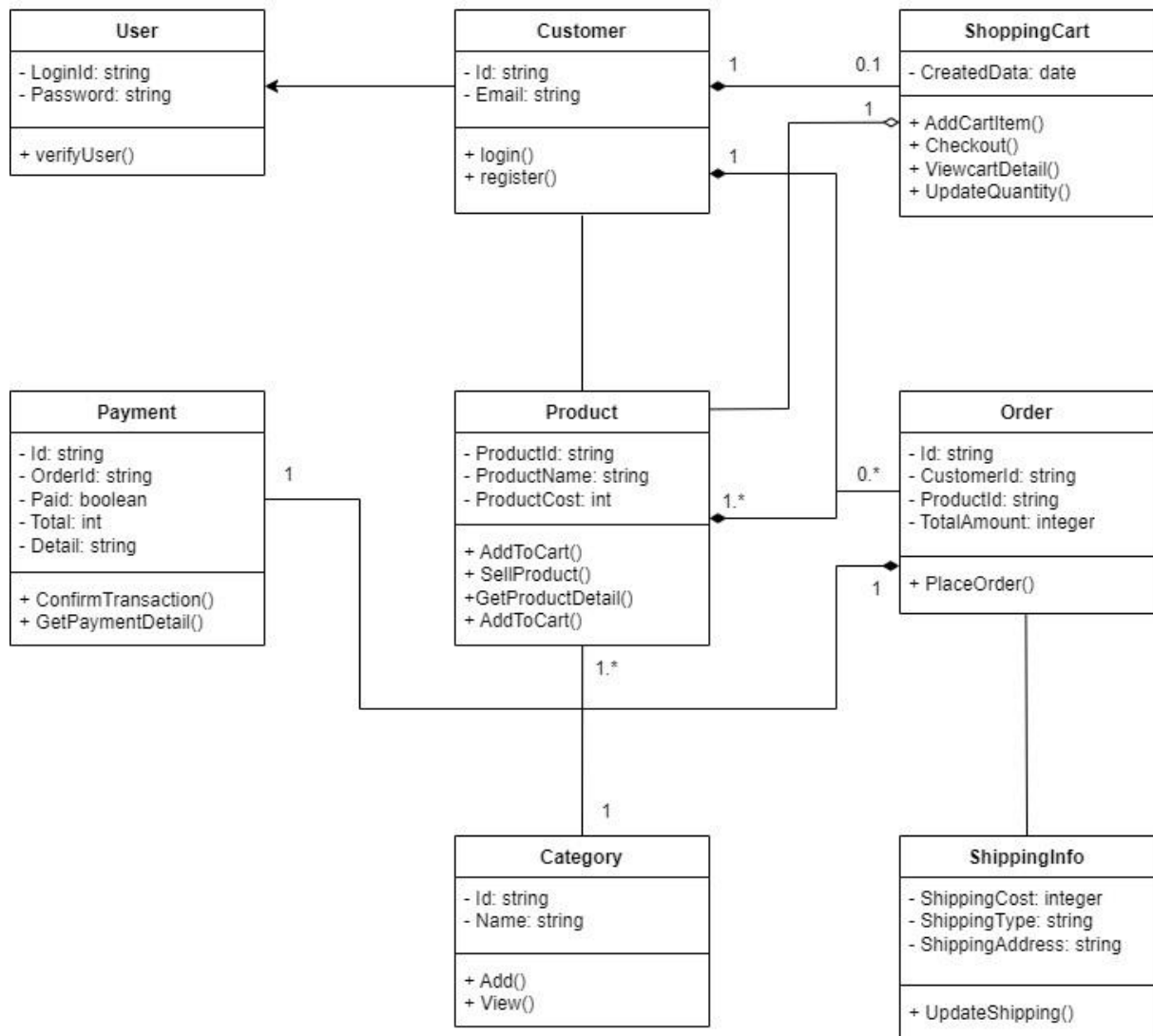


## Entity-Relationship Diagram(ERD)

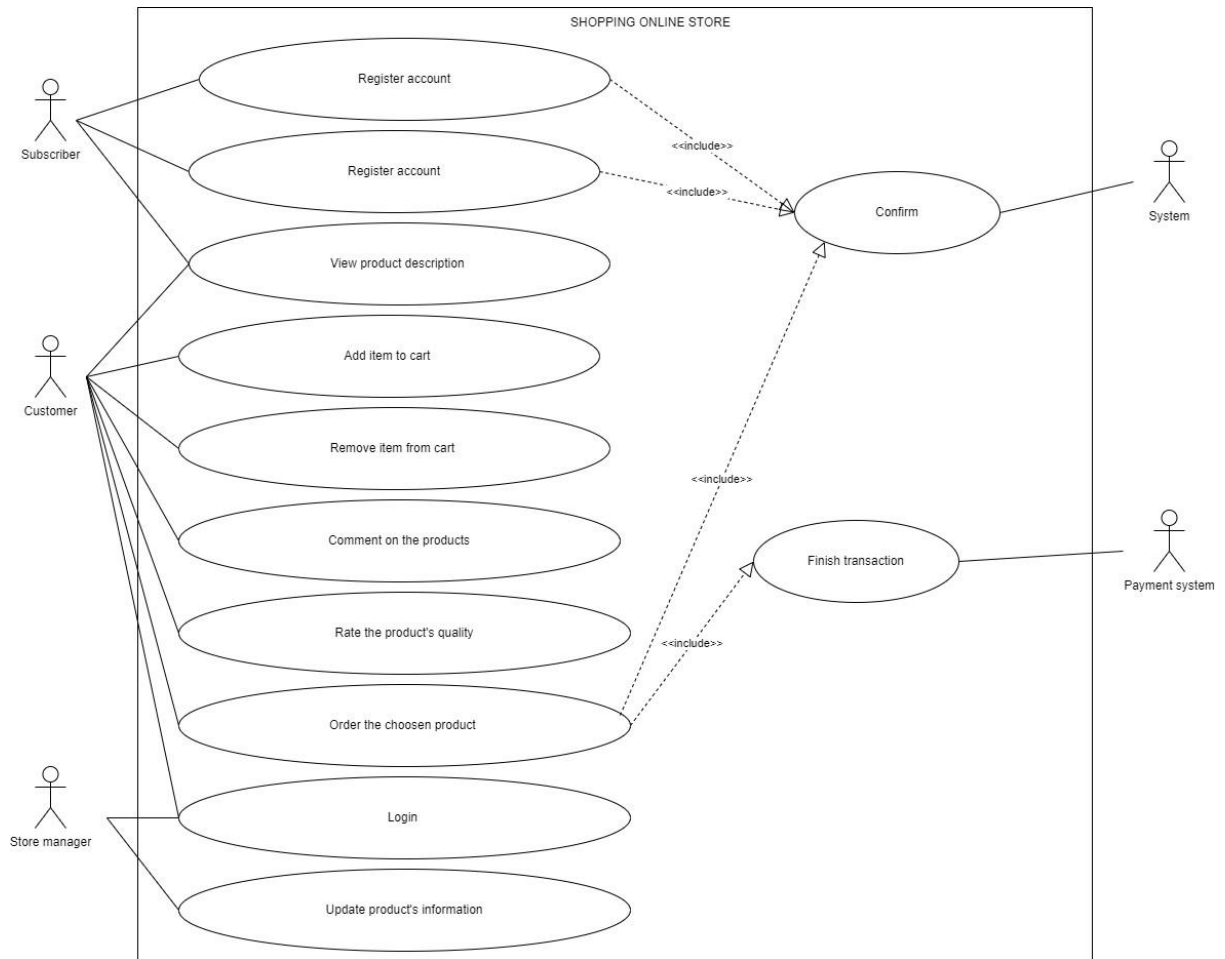


## Class Diagram

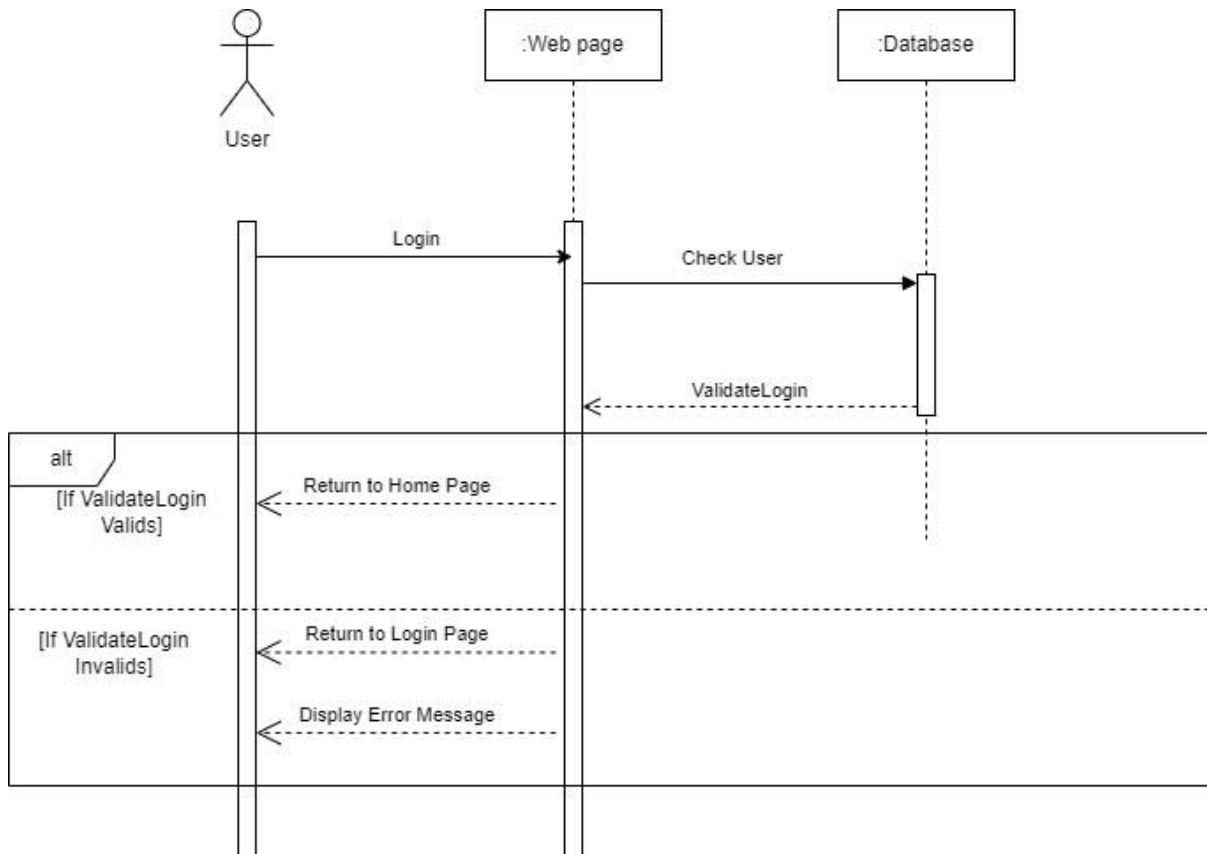
# Class Diagram



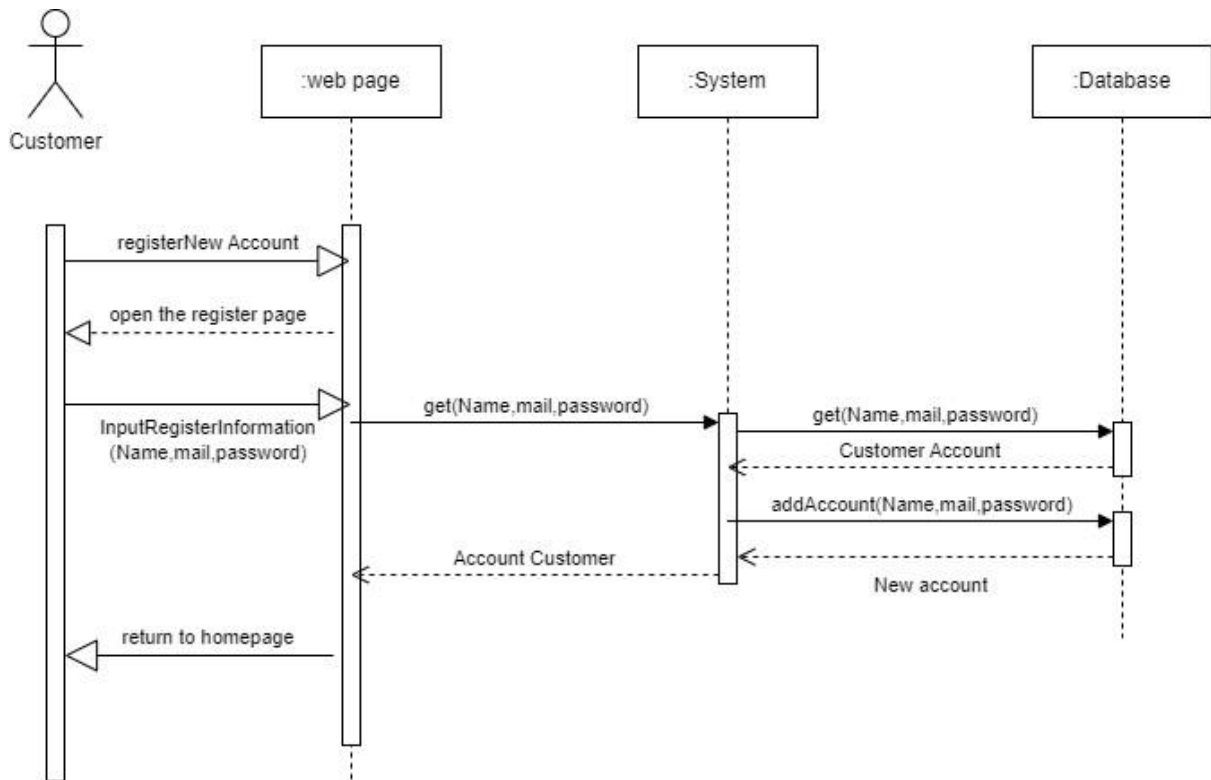
## Use case Diagram



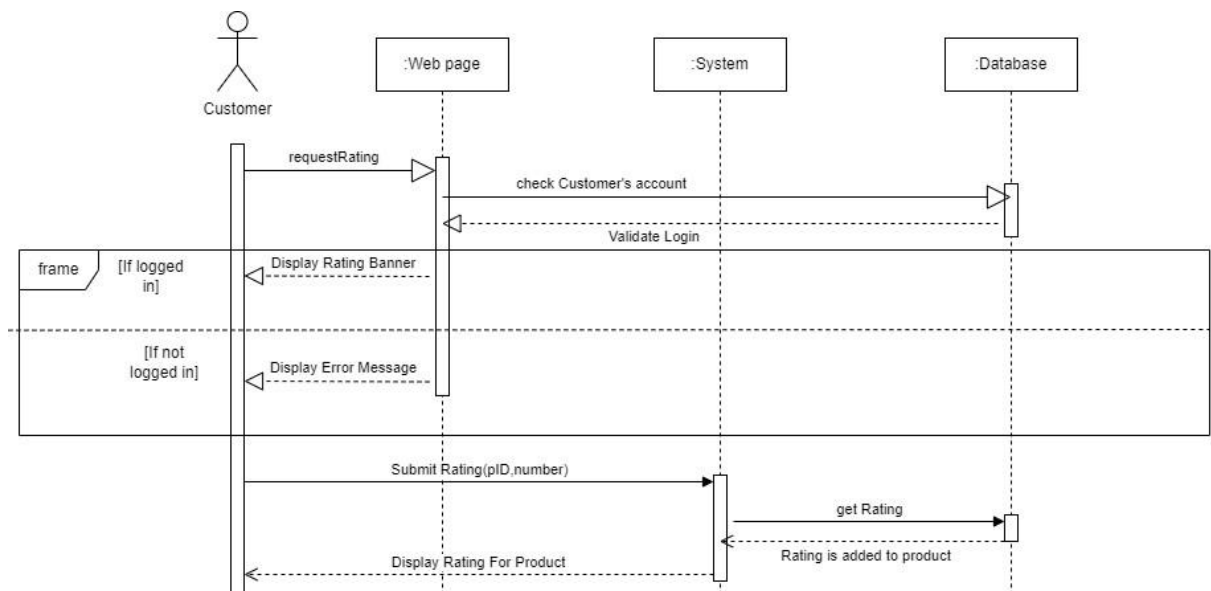
### Use case 1: Log in the store system



### Use case 2: Creat a new account

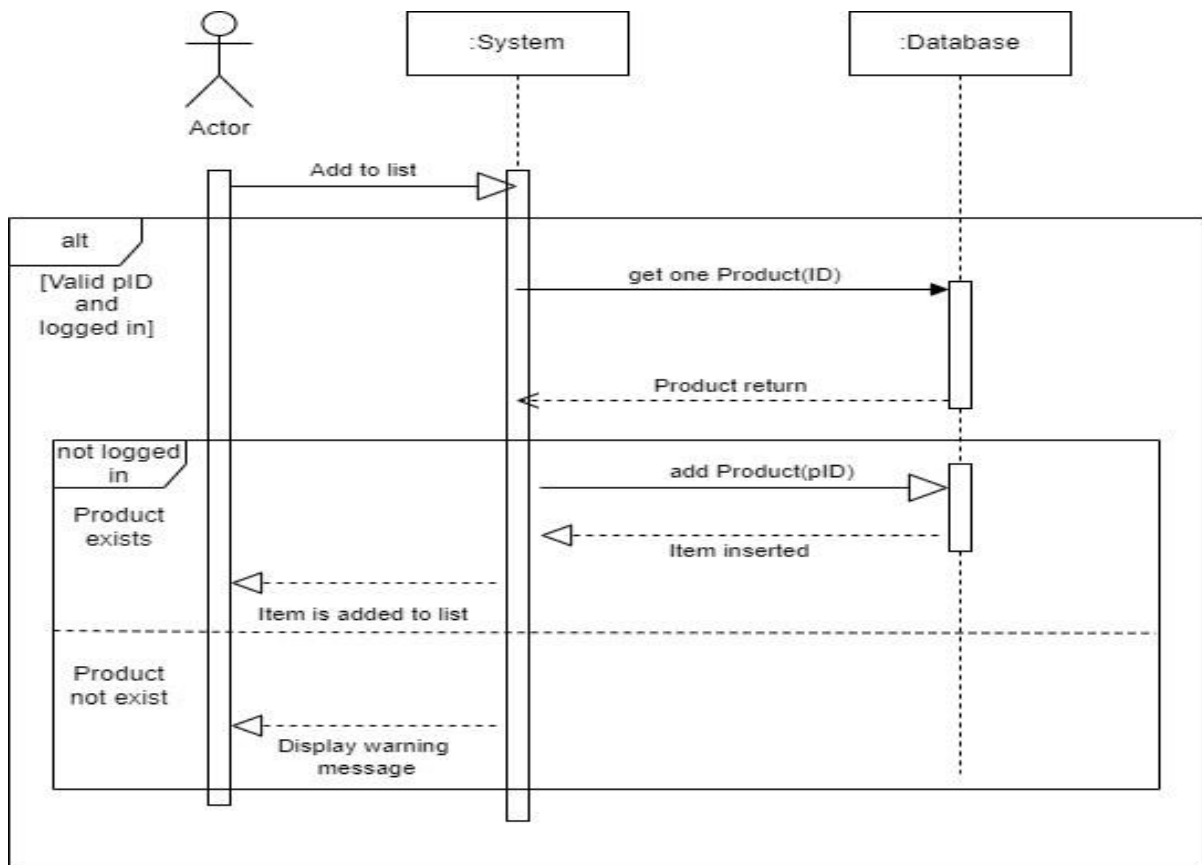


### Use Case 3: Rate/Vote the quality of products



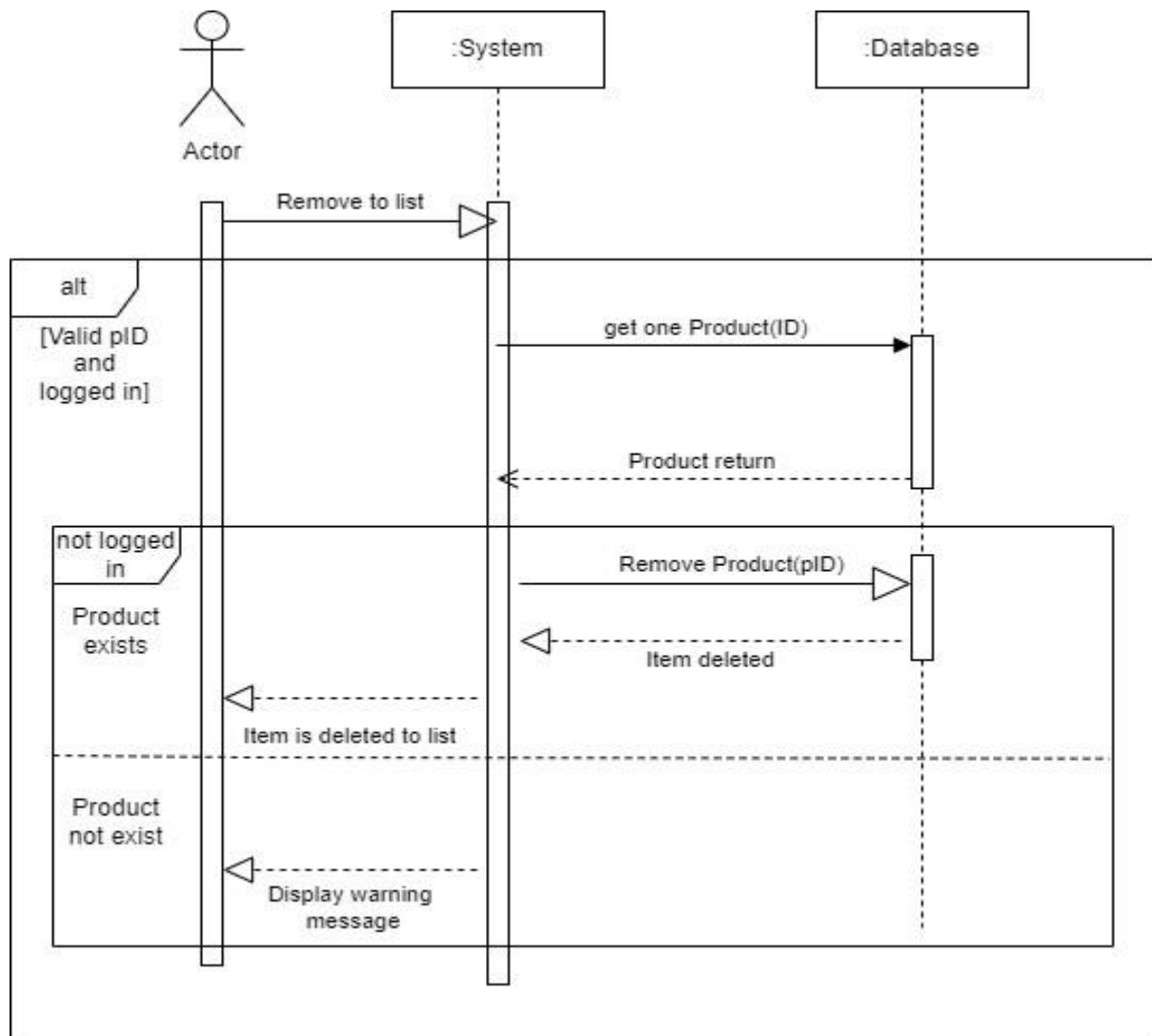
### Use Case 4: Add/ Remove desired products to/from wish list and shopping cart

#### Use Case 4.1: Add to wish list

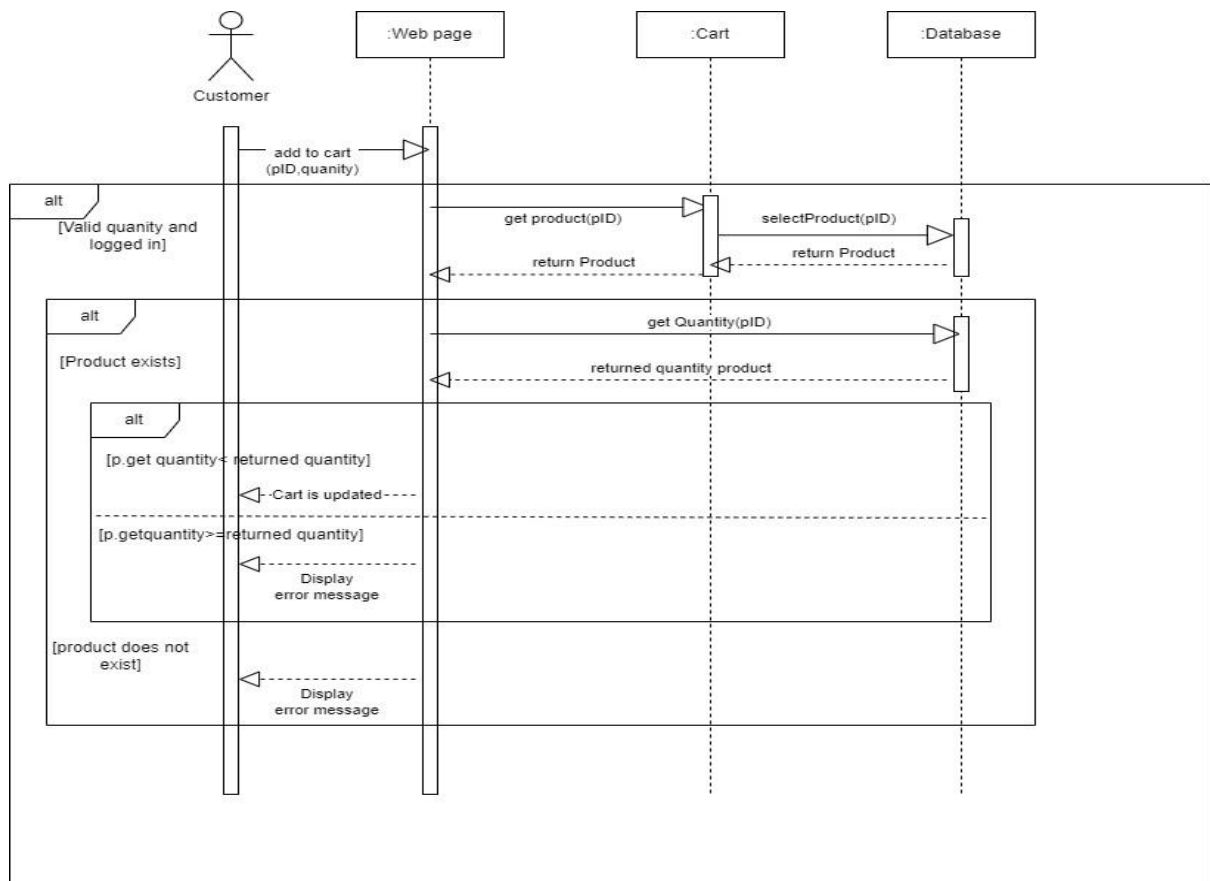


## Use Case 4.2: Remove from wish list

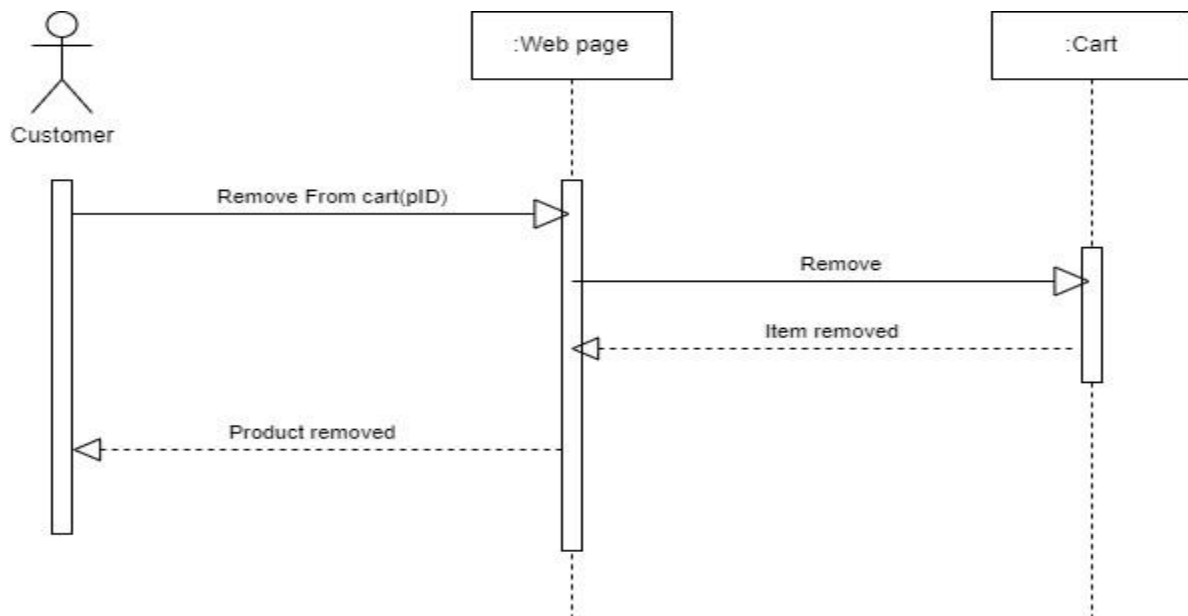




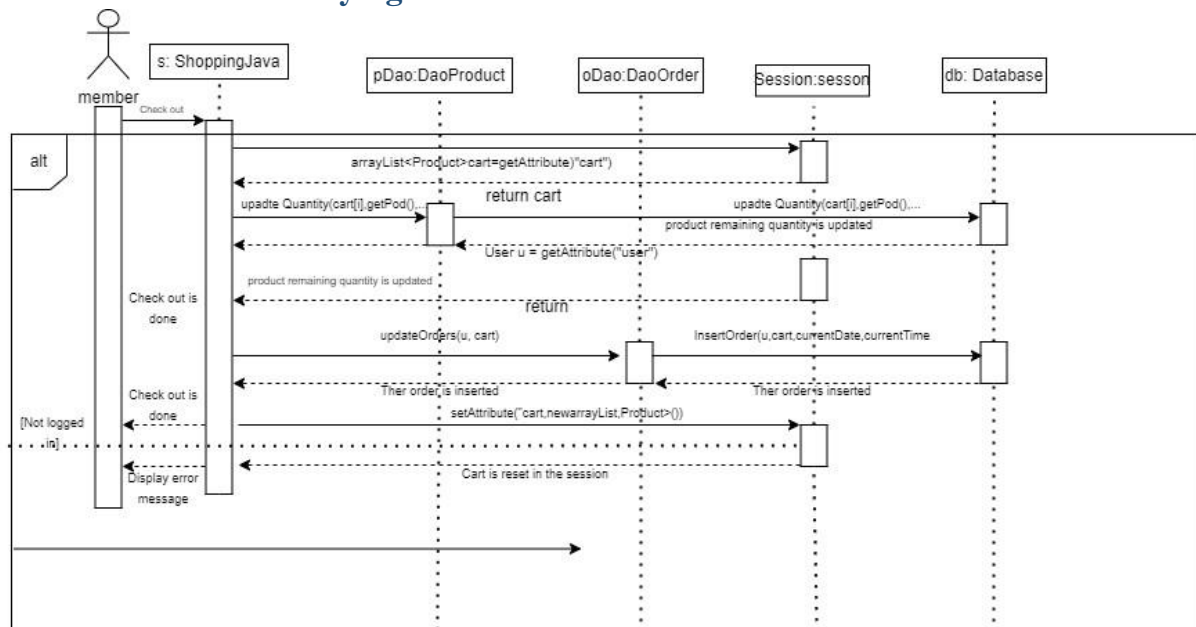
### Use Case 4.3: Add from cart



### Use Case 4.4: Remove from cart



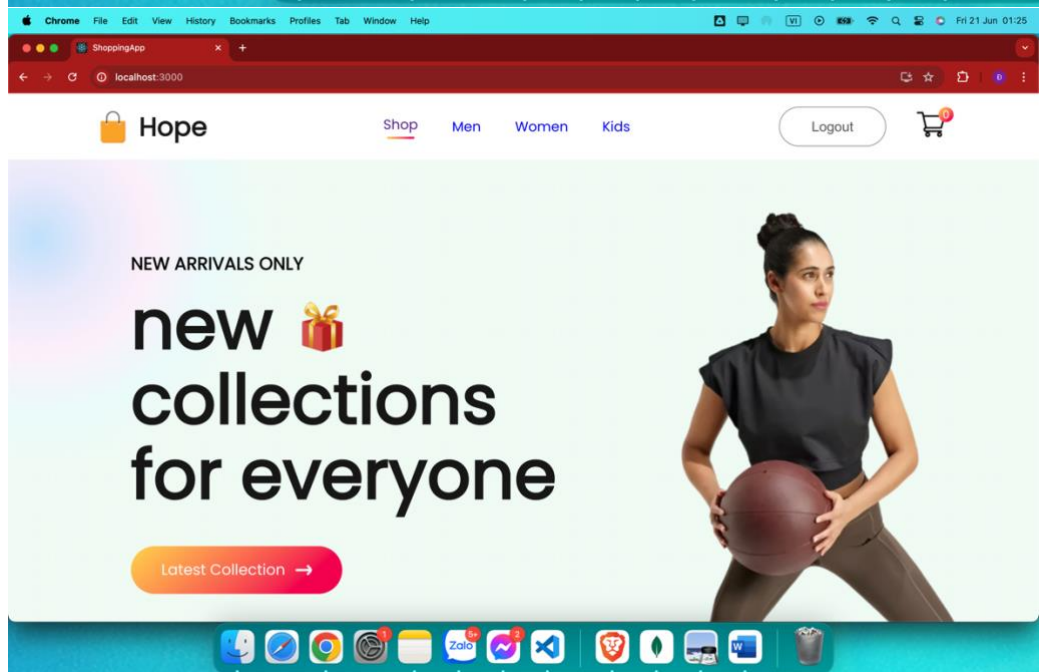
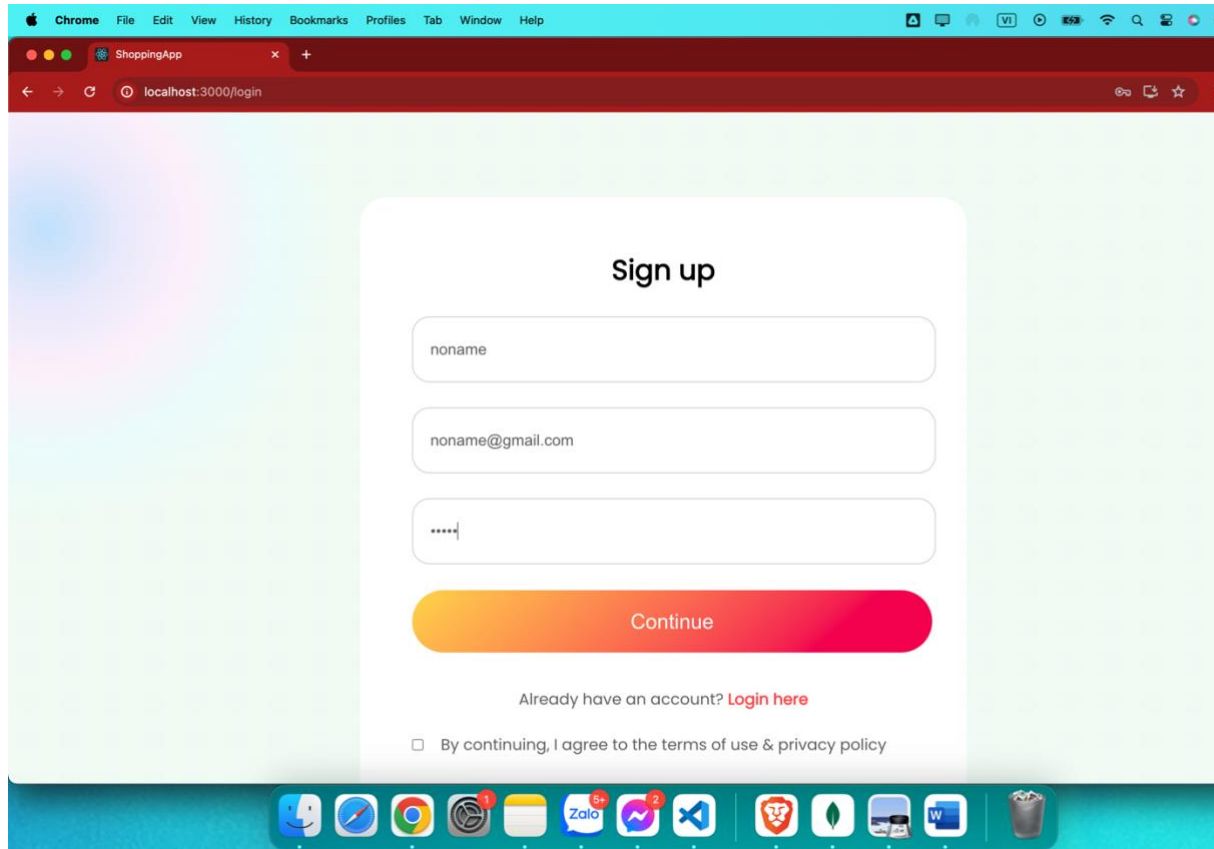
### Use Case 5: Perform buying transaction and checkout

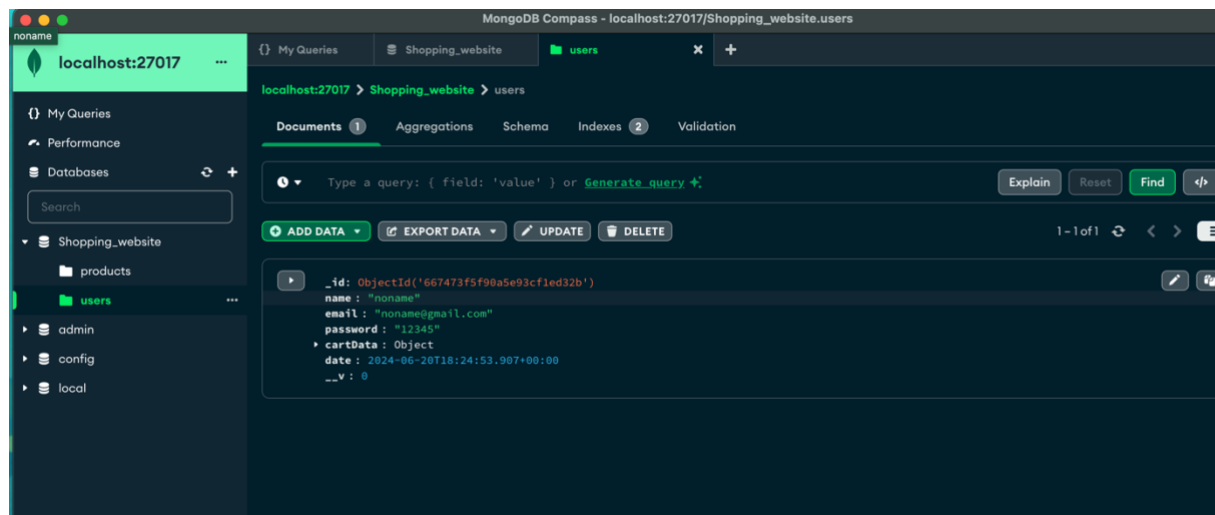


## III. IMPLEMENTATION

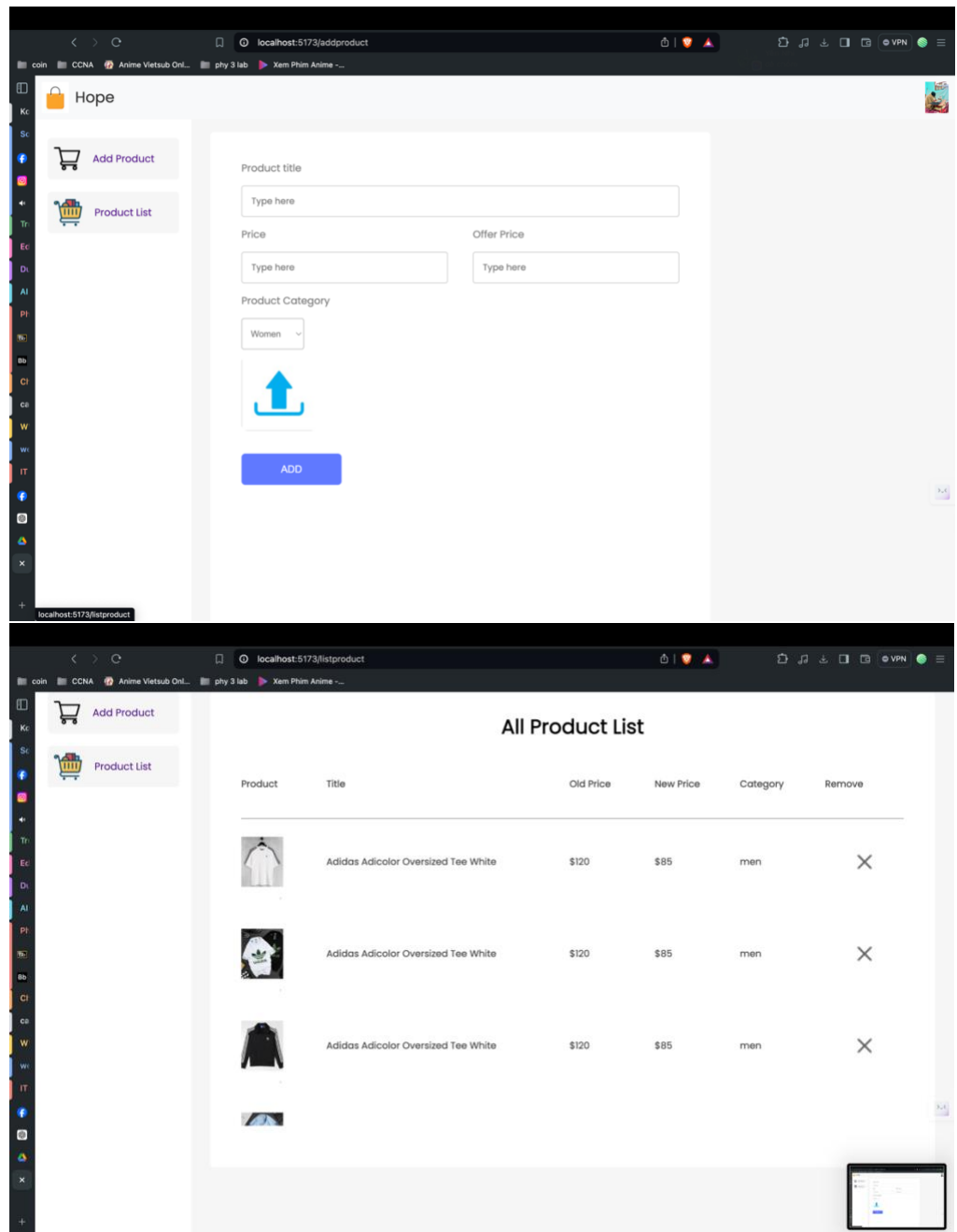
### 1 USER'S ACCOUNT MANAGEMENT FUNCTIONS

#### 1. Register account in the store



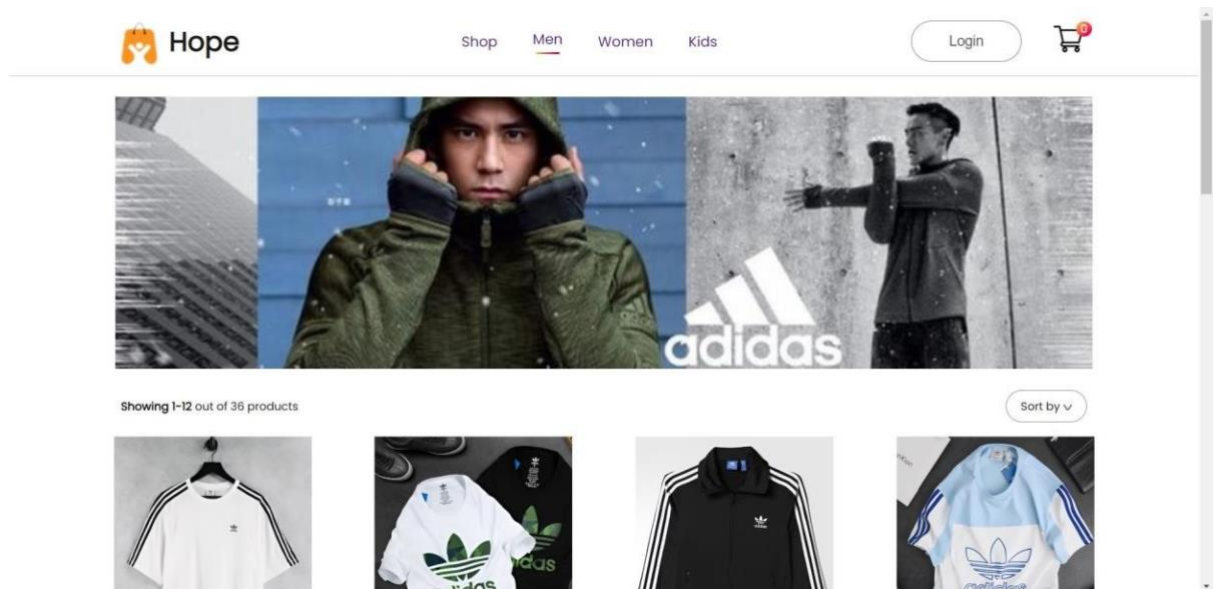


## 1.1 Admin



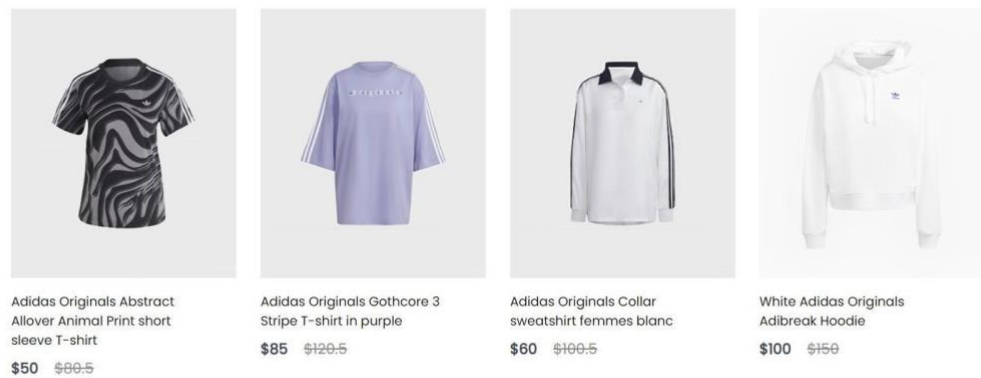
## 2 PRODUCT VIEWING FUNCTIONS

### 2.1. View a category of products



2.2. View a specified product

## POPULAR IN WOMEN



2.3. Comment on a product



## Adidas Adicolor Oversized Tee White

★★★★★ (122)

~~\$120.5~~ **\$85**

A lightweight, usually knitted, pullover shirt, close-fitting and with a round neckline and short sleeves, worn as an undershirt or outer garment.

Select Size

    **ADD TO CART**



2.4. Rate/Vote a product

# Adidas Adicolor Oversized Tee White

★★★★★ (122)

### 3 TRANSACTION FUNCTIONS 3.1 Add product to shopping cart

[Shop](#) [Men](#) [Women](#) [Kids](#)[Login](#)

Products	Title	Price	Quantity	Total	Remove
	Adidas Originals Premium Essentials	\$85	<input type="text" value="1"/>	\$85	×
	SweatShirt Adidas Trefoil Hoody	\$85	<input type="text" value="1"/>	\$85	×

#### Cart Totals

Subtotal	\$170
Shipping Fee	Free
<b>Total</b>	<b>\$170</b>

If you have a promo code, Enter it here

**Submit**

### 3.2 Remove product from shopping cart



Remove



### 3.3 Checkout your orders from the shop

## Cart Totals

Subtotal	\$170
Shipping Fee	Free
<b>Total</b>	<b>\$170</b>

PROCEED TO CHECKOUT

## 4 TRANSACTION FUNCTIONS

### 4.1. View Product List



Hope



Login



Shop

Men

Women

Kids

### **III. DISCUSSION AND CONCLUSION**

The project of the Adidas Online Clothing Store has provided us with a comprehensive understanding of the Web Application Development Process. As the current project has concluded, there are several extensions we can implement to further enhance and develop in the future.

Firstly, the system could become more attractive and effective in e-commerce by incorporating a product recommendation feature. This feature would suggest products related to the items purchased by customers, thereby making it easier for customers to buy additional products and periodically increasing the efficiency and sales of the clothing store.

Secondly, the current system is a demo running on a computer's local host, meaning it can only handle one user session at a time. To expand and implement this system in a real-world scenario, it is crucial to address the task of serving multiple users simultaneously.

Lastly, to achieve a fully functional e-commerce system, integrating banking systems into our Adidas store is essential. This will provide both customers and store managers with more tools to conduct transactions seamlessly through the system.

Another significant aspect of this project is the wealth of knowledge gained from both current and previous work. Firstly, our coding skills and ability to organize source code within a project have improved considerably. This improvement is crucial for maintaining and developing the system over a long period, even into the future. Additionally, the project has enhanced our ability to analyze and translate system requirements into an initial implementation sketch before writing the first line of code.

Furthermore, working on a large system like this has greatly improved our communication and teamwork skills among team members. This improvement facilitates easy interaction and idea exchange among us.

In summary, the Adidas Online Clothing Store Web Application Development Project has been an invaluable opportunity to apply what we learned in our course. Moreover, it has provided us with valuable experience and skills that will be beneficial in future endeavors.

### **IV. REFERENCES**

#### **SCRUM**

<https://www.scrum.org/>

## **Agile**

<http://agilemethodology.org/>

**HTML, CSS, JavaScript techniques** [www.w3schools.com](http://www.w3schools.com)

## **DATA**

<https://www.mongodb.com/>

**Text data and image data**

<https://www.adidas.com.vn/vi>

## **Framework**

<https://react.dev/>