

**VIETNAM NATIONAL UNIVERSITY – HOCHIMINH CITY
INTERNATIONAL UNIVERSITY**

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING



**WEB APPLICATION DEVELOPMENT
IT093IU**

FINAL REPORT

Topic: EGAY AUCTION SITE

(Project Github: [Link](#))

By Group: 99% gambler – Members List

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I. INTRODUCTION

This section presents background information about the software development team - Gambler 99. It also introduces the core concept and basic details of the “Egay Auction Site” project. In addition, the main constraints encountered during the development process are outlined.

1. ABOUT US

99% Gambler is a team of four members formed as part of the Web Application Development course project. The primary objective is to design and implement a functional web application that demonstrates the practical application of web development concepts. This project also serves as valuable preparation for upcoming internships, allowing team members to gain hands-on experience with real-world tools, workflows, and problem-solving strategies. Throughout the development process, knowledge gained from lectures, textbooks, and online resources has been applied to build a platform that incorporates essential features of a modern website. The application supports dynamic user interaction, simulating the kind of technical and collaborative challenges commonly faced in professional software development environments.

Here is the information of team members and the tasks distribution:

Name	Task	Contribution
Đàm Nguyễn Trọng Lẽ	Full - Stack	25%
Nguyễn Quốc Trung	Front-end	25%
Lê Hưng	Back-end	25%
Lê Nhật Anh	Back-end	25%

Table 1. Task Distribution

2. THE PRODUCT'S INFORMATION

Inspired by the success and influence of eBay - a pioneer in online auctions and consumer-to-consumer (C2C) sales—we chose to build a web like it to gain a deeper understanding of the unique architecture and functionality behind real-time bidding systems. The auction feature, which sets eBay apart from traditional e-commerce platforms, introduces dynamic pricing, time-sensitive competition, and live user interaction making it both technically challenging and intellectually engaging to implement. Through this project, we are able to explore essential concepts such as real-time auction mechanics, bid synchronization, user authentication, product management, and secure transactions.

3. WORK BREAKDOWN STRUCTURE

The structure of this project can be expressed in the figure 1:

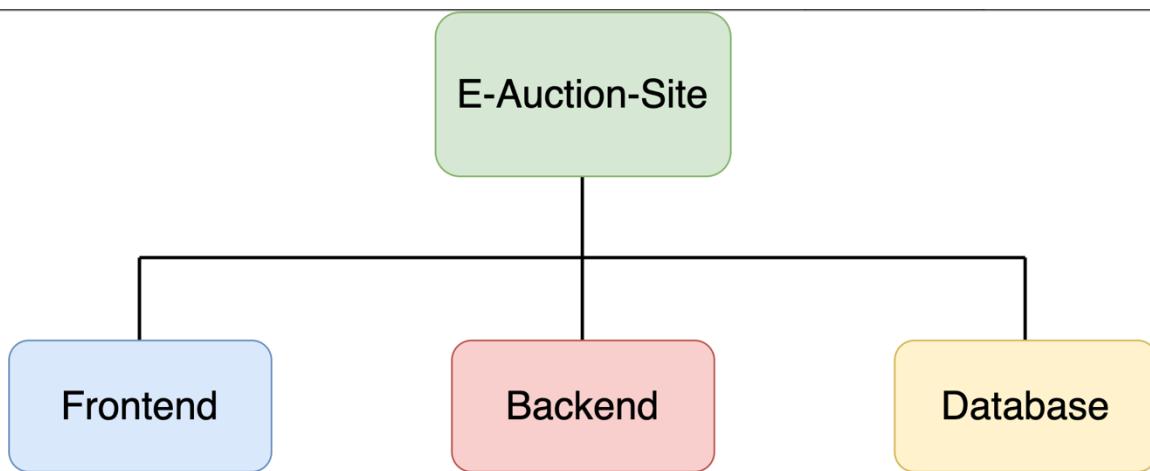


Figure 1. General structure of the project

This project contains three primary components: the Frontend, the Backend, and the Database. Each of these components is further organized into distinct substructures which describe the tasks needed to be accomplished of each teammembers. These diagrams below illustrate about the overview of the works of building database, backend and frontend. Each process of building them contains specification (identify all of things need to be constructed), implementation (implement, code base on the specification) and testing (check out the result of implementation whether meets the specification)

The Task for the Database Design can be expressed the the figure 2:

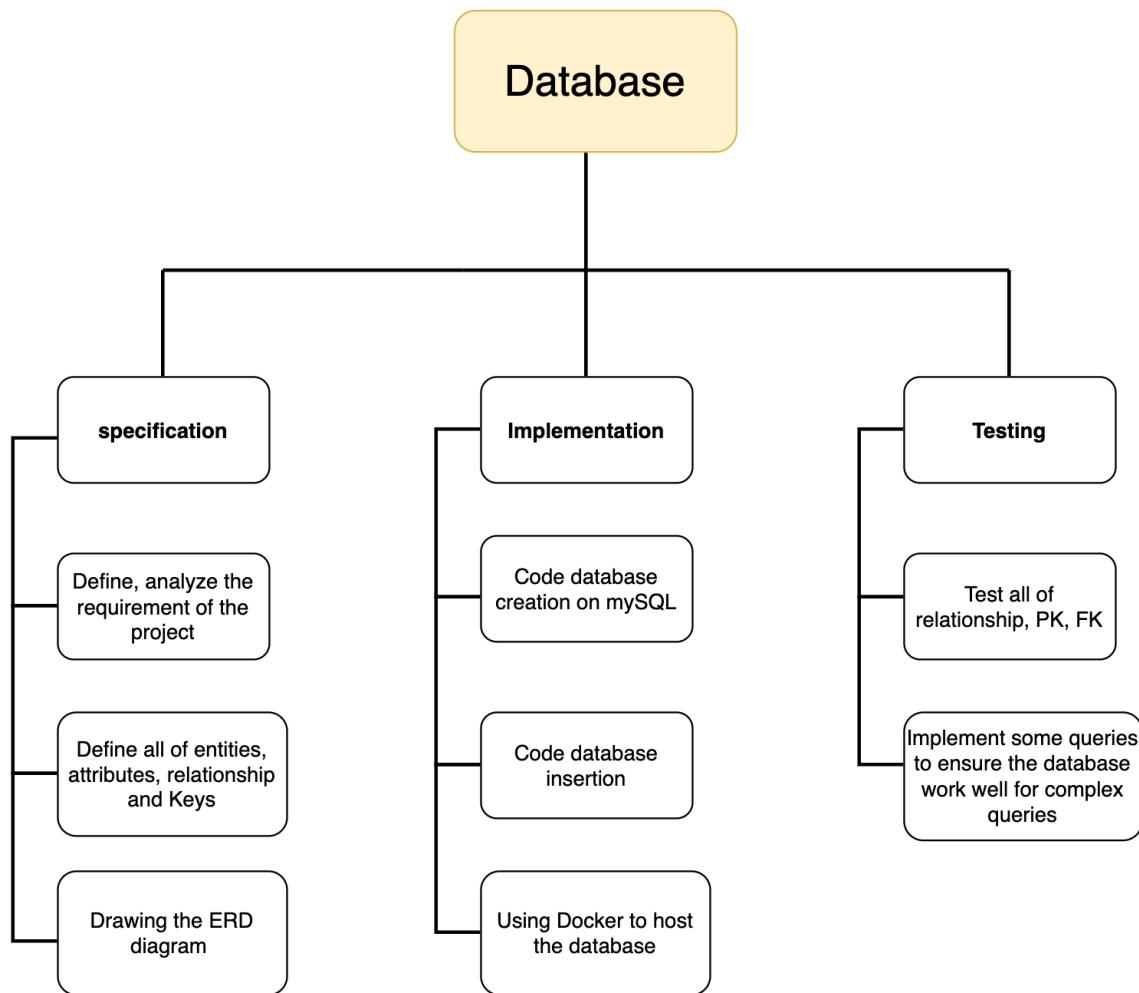


Figure 2. Database overview

- The tasks of the backend can be expressed in the figure 3:

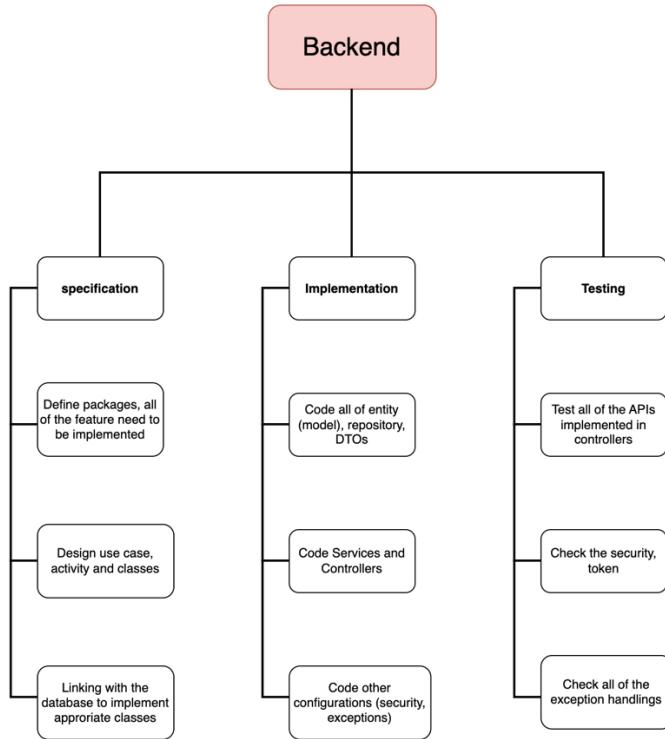


Figure 3. Backend overview.

- The tasks of the Frontend can be expressed in the figure 4:

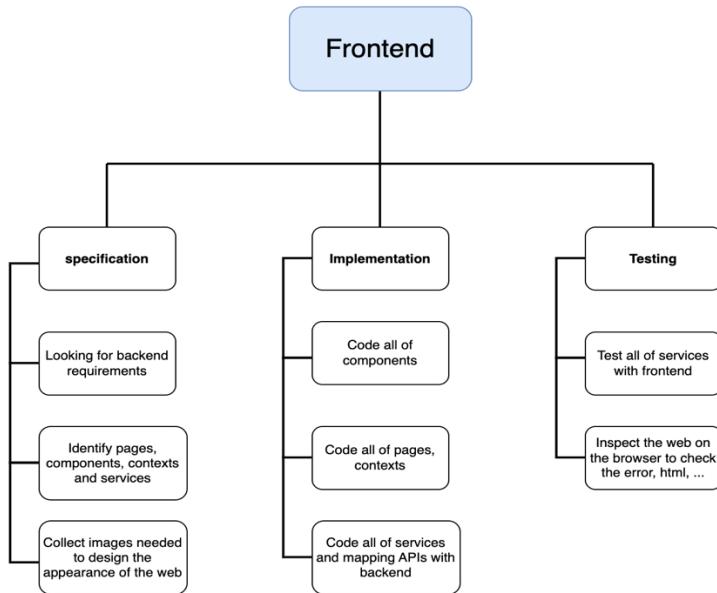


Figure 4. Frontend overview.

4. DEVELOPMENT PROCESS:

This project is built step by step from the basic feature to the more complex. Each feature was designed base on the “Software Development Life Circle” rule: planning, Define requirement, coding, testing. In the testing step, if is there any bugs, the process will go back to the coding. This approach provide a alige model for building the project, which employs incremental and iterative development that are also called sprints. The figure 5 below will visulize the Alige Model:

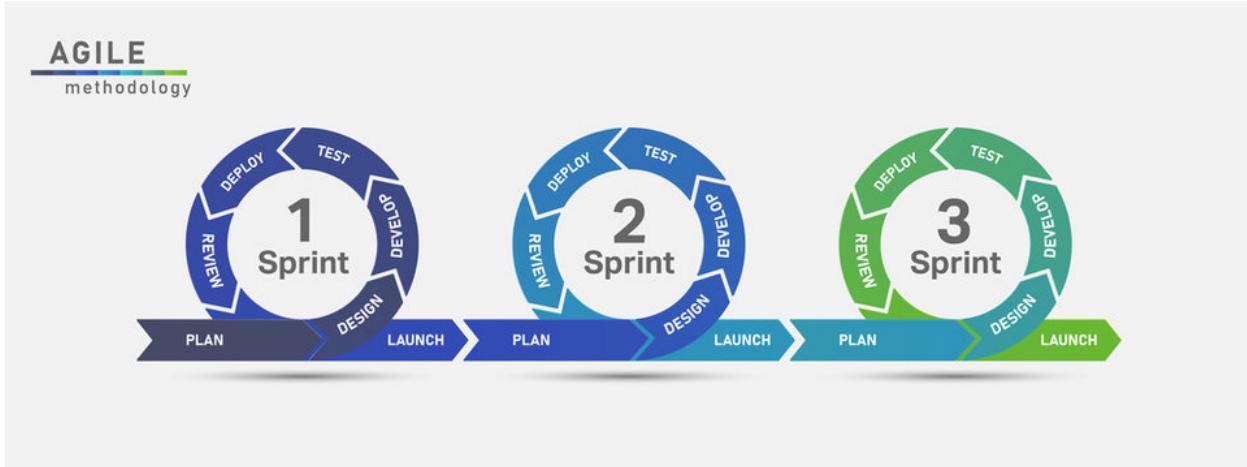


Figure 5. Alige Model.

5. DEVELOPMENT ENVIRONMENT:

The project is an e-commerce platform, which requires a user-friendly, responsive, and secure implementation to meet modern web standards and user expectations. To achieve this, appropriate technologies were carefully selected to support both functionality and maintainability.

Programming Languages:

- Java was chosen for backend development due to its robustness, strong community support, and seamless integration with enterprise-level frameworks.
- JavaScript was used for frontend development, enabling dynamic user interfaces and smooth interaction with backend services.
- MySQL: A relational database management system used to store and manage structured data. It supports SQL for querying data and integrates smoothly with Java through Spring Data JPA, allowing efficient database access and manipulation.

Frameworks:

- Spring Boot was used to develop the backend, following the MVC architecture. It simplifies the creation of RESTful APIs and integrates well with:
 - Spring Security for handling authentication and authorization using JWT (JSON Web Tokens).
 - Spring Data JPA for database interaction and ORM mapping.
 - Uses application.properties for centralized, flexible configuration.
- ReactJS Framework was used for building the frontend, providing a component-based architecture and efficient rendering. React allows for a responsive user experience and facilitates seamless integration with REST APIs.

Tools:

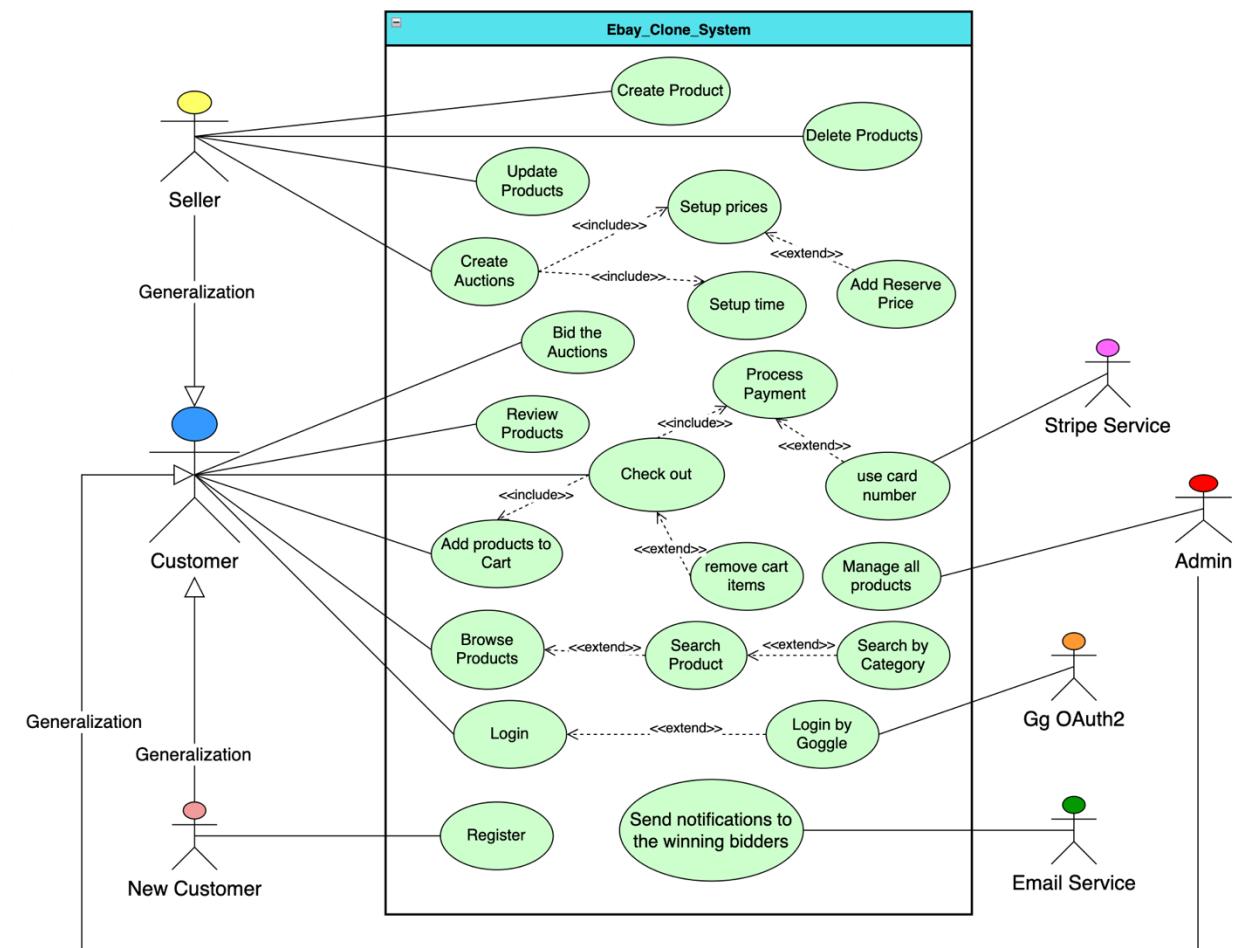
- Docker was used for hosting mySQL server: By using configure docker-compose file, and initialized SQL queries, it can easily install and running the database server, especially using docker to make the configuration setting (connection name, password, port) is consistent within each team members machine. Furthremore, mySQL workbench is also selected as a IDE tool for seeing and editing database.
- IntelliJi and Vscode are two main IDEs for coding frontend and backend because they provide friendly UI and useful extensions, plugins for Java and Javascript (NodeJS).
- Postman was used to test all of the API services throughout the development process. It allowed the team to send HTTP requests (GET, POST, PUT, DELETE) to the backend, verify responses, debug issues, and ensure that each endpoint behaved as expected before connecting the frontend.

II. REQUIREMENT ANALYSIS AND DESIGN

Requirement Analysis and Design is a critical phase in the software development lifecycle that focuses on understanding what the system should do and how it should be structured to meet those needs. During requirement analysis, stakeholders' needs are gathered, clarified, and documented to define functional and non-functional requirements. This ensures that the system will align with user expectations and business goals. Following this, the design phase translates these requirements into a blueprint for implementation, including system architecture, data models, interface designs, and component interactions. Together, these phases lay the foundation for building reliable, scalable, and user-centric software systems.

1. REQUIREMENT ANALYSIS

Use Case Diagram:



A. FUNCTIONAL REQUIREMENTS:

Use case 1: Registration into the system.

Inputs:

1. Username
2. Email
3. Password
4. Address

Outputs: navigate to login page to login the account just created

Basic Course

Actor: New Customer	System
1. Click register button	1.1 display the Sign-up Page.
2. Enter username, email, address and password.	
3. Click Sign Up button.	3.1 validate input form and send to backend. 3.2 if success, return to the Login page. 3.3 if fail, display fail message.

Precondition: none.

Postcondition: database update new account.

User Story:

As a new visitor to the e-commerce website, I want to register a new user account with my personal information, so that I can log in, browse products, make purchases, and manage my orders.

Use case 2: Login into the system

Input:

1. username
2. password

outputs:

1. Home page with user's authorization [if success]
2. Login page [if fail]

Basic Course

Actor: Customer	System
1. Click sign in button	1.1 display the Sign-in Page.
2. Enter username and password.	
3. Click Sign In button.	3.1 validate input form and send to backend. 3.2 if success, return to the home page. 3.3 if fail, display fail message.

Precondition: The customer must have an existing account.

Postcondition: The customer gains access to the website's features.

User story: As a registered customer, I want to log in using my username and password, so that I can securely access my personal account, view orders, and make purchases.

Use case 3: Login by google account

Input:

1. Gmail address
2. Password of the Gmail

outputs:

1. Home page with user's authorization [if success]
2. Error Page [if fail]

Basic Course

Actor: Customer	System	Actor: Google Oauth2
1. Click sign in with google button	1.1 Direct to the google login page	
2. Enter Gmail address and password.		2.1 authenticate the Google account
3. Click accept to access to the web	3.1 validate the google account input and redirect to home page	

Precondition:

1. Customer already have a google account.

Postcondition:

1. The customer gains access to the website's features.

User story: I want to quickly register and log in using my Google account, so that I can access the web without manually entering my information or remembering another password.

Use case 4: Browse product**Input:** None**Output:** See all active products**Basic Course**

Actor: Customer	System
Click products button	display the product page.

Precondition: none**Postcondition:** none**User story:** as a customer, I want to see all of the products to buy.**Use case 5:** Search product by name, category**Input:**

1. Searching keywords
2. Select category (optional)

Output:

1. Display all of products that have names match with the searching keywords and category.

Basic Course

Actor: Customer	System
1. Input keywords	
2. Select the category.	2.1 display category dropdown
3. Click search button	3.1 Display products for the given condition.

Precondition: none**Postcondition:** none**User story:** as a customer, I want to search products that I needed so that I can reduce my time for finding the appropriate products.

Use case 6: add product to cart

Input:

1. Select product to add
2. Choose the quantity to add

Output:

1. The selected products will be in the cart.

Basic Course

Actor: Customer	System
1. Choose a product to add	1.1 Display product details page
2. Select quantity	
3. Click add to cart button	3.1 Add the chosen product and quantity to customer's cart

Precondition:

1. The product must be active

Postcondition:

1. Display success message that product was added to cart

User Story: As a customer, I want to see the details information of a specific product. If I like it, I can choose the quantity and add it into my cart.

Use case 7: Remove product from cart

Input:

1. Select product want to remove.
2. Input quantity to remove.
3. Customer can choose clear cart to remove all of items. (optional)

Output:

1. The product is deleted from cart or decrease the amount of quantity.

Basic Course

Actor: Customer	System
1. Click cart button	1.1 Display cart page
2. Select quantity of a specific product to remove.	2.1 remove the cart item and update cart

Precondition:

1. cart is not empty

Postcondition:

1. the cart item is deleted.

User story: as a customer, I want to remove products from my shopping cart or decrease the quantity of a product, so that I can update my order to only include items I intend to purchase.

Use case 8: review a product

Input:

1. Write the review for a product.
2. Choose the rating.

Output:

1. Display success message
2. Display comment and rating in the product detail page.

Basic Course

Actor: Customer	System
1. Access to a product	1.1 Display product details page
2. Input review	
3. Choose the rating (from 1 to 5)	3.1 Add the chosen product and quantity to customer's cart
4. Submit review	4.1 Validate review and update

Precondition: none

Postcondition:

1. The review is added

User story: As a customer, I want to see the reviews of a product and also give my review for a product.

Use case 9: make purchase (payment)

Input:

1. Complete check cart and proceed to payment.
2. Input card number [if use Stripe method]

Output:

1. Update order and payment.
2. Display transaction details
3. Display fails message [if process payment fails]

Basic Course

Actor: Customer	System
1. Access to cart page	1.1 Display product cart page
2. Click checkout button	2.1 display payment methods
3. Choose a payment method to purchase	
4. Submit payment information	4.1 Process payment 4.2 Display transaction information
5. Confirm and view order	5.1 Display order details

Precondition:

1. The cart is not empty
2. Customer would have a valid card number [if using Stripe payment]

Postcondition:

1. The order is created from cart.
2. The payment succeeds and update for order and payment.

User story:

1. As a customer, I want to make purchase directly on the website using my card number.
2. As a customer, I want to pay by cash when the products are delivered.

Use case 10: Bid an auction

Input:

1. Bidders submit the amount of money that they want to buy a product on auction.

Output:

1. The new bid is accepted and display immediately on the auction page.
2. Display fails if the auction is due, or the amount of bid is not larger than the current price.

Basic Course

Actor: Bidder	System
1. Access to auction page	1.1 Display product auction page
2. Select an active auction to bid	2.1 Display the auction detail page
3. Place an amount of money to bid	3.1. Update the current price 3.2. Display the new bid

Precondition:

1. The auction must be active.
2. The amount of bid must be larger than the newest bid.
3. The bidder is not owner of this product.

Postcondition:

1. Update current price for the auction.
2. Display the newest bid in real time.

User story: As a customer, I want to place bids on a unique product that is listed for auction, so that I have a chance to win and purchase the product if I offer the highest bid before the auction ends.

Use case 11: Update profile

Input:

1. Enter the feature that users want to change

Output:

1. The account information is update

Basic Course

Actor: User	System
1. Access to edit account page	1.1 Display account information
2. Change some information	
3. Place an amount of money to bid	3.1 Display update success

Precondition:

1. User login into the web

Postcondition:

1. The account information is update

User story: As a customer, I want to update my personal information such as address and email, So that my shipping and delivery details are always accurate.

Use case 12: Reset password.

Input:

1. Users enter the username

Output:

1. The password is reset to “123456” (user can change it later)

Basic Course

Actor: User	System
1. Click forgot password	1.1 Display the reset password

Precondition:

1. User input correct username

Postcondition:

1. A new password is released

User story: As a customer, I want to reset and change my password when I forget it, So that I can regain access to my account securely.

Use case 13: Create product

Input:

1. Seller fill all of information of a product

Output:

1. A new product is created for that seller

Basic Course

Actor: Seller	System
1. Access to seller page	1.1 Display seller page
2. Click create new product	
3. Fill all information of new product	3.1 The new product is created

Precondition:

1. User must be a seller

Postcondition: none

User Story: As a customer, I also want to sell my own products on this website.

Use case 14: Delete product

Input:

1. The Seller selects a product to delete

Output:

1. The product is deleted

Basic Course

Actor: Seller	System
1. Access to seller page	1.1 Display seller page
2. Click delete product	2.1 the product is deleted

Precondition:

1. User must be a seller
2. The seller already has at least one product.

Postcondition:

1. Buyer cannot see that product because it is deleted

User Story: As a seller, there are some products that I cannot supply more, so I need to delete them on the web to avoid some customers buy them, but I cannot offer.

Use case 15: Update product

Input:

1. the sellers submit the updating information of a product

Output:

1. The product information is updated

Basic Course

Actor: Seller	System
1. Access to seller page	1.1 Display seller page
2. Select a product and click update	
3. Submit updating information	3.1 The product is updated

Precondition:

1. User must be a seller.
2. Seller has at least one product.

Postcondition:

1. The product is updated

User Story: As a seller, I want to update my product information (such as name, description, price, and stock), so that customers see the most accurate and up-to-date details when browsing or purchasing.

Use case 16: Create auction

Input:

1. Seller selects an inactive product to create auction.
2. Seller input start and end time, starting price and reserve price if needed.

Output:

1. An auction is created for the selected product.

Basic Course

Actor: Seller	System
1. Access to seller page	1.1 Display seller page
2. Select a product and click auction	2.1 Display add auction page
3. Submit auction setup	3.1 The auction is created for that product

Precondition:

1. The user must be a seller.
2. The seller has at least one product.
3. The product selected is not an active product.

Postcondition:

1. Seller who owns the product in this auction cannot place any bid.

User story: As a seller, I want to create auctions for my unique products, so that I can sell my products with the prices as high as possible.

Use case 17: Place bid for an auction

Input:

1. Customers select an auction and submit bid amount.

Output:

1. The system displays the newest bid.

Basic Course

Actor: Customer	System
1. Access to auction page	1.1 Display auction page
2. Select an auction to place a bid	2.1 Display auction details page
3. Submit bid	3.1 Display the newest bid.

Precondition:

1. The bidder does not own the product in the selected auction.
2. The auction must be active.

Postcondition:

1. The current price of the auction is update to the amount of newest bid.

User story: As a customer, I want to buy unique products through an auction feature, so that I can place bids and potentially win items at competitive prices.

Use case 18: win the auction

Input: none

Output:

1. Customer will have an order with the product in the auction they won.
2. Customer will receive email notification about winning an auction.

Basic Course

Actor: Customer	System
1. Placed the highest bids	1.1 Check the winners and create orders for them 1.2 Send email notification

Precondition:

1. The customer's bid must be the highest in the auction.
2. The auction is ended.

Postcondition:

1. An order for product in the winning auction is created.
2. Other bidders cannot place any bid on the ended auction.

User Story: I want the system automatically to create an order and send email if I win an auction.

B. NON – FUNCTIONAL REQUIREMENTS:

1. Performance Requirements:

- Response Time: The system should respond to user actions (e.g., bidding, page loading) within 2 seconds under normal load.
- Concurrent Users: The system should support at least 10,000 concurrent users during peak bidding hours.
- Real-Time Updates: Bid updates on auction items should reflect on all active user sessions within at least 1 second.

2. Availability & Reliability

- Uptime: The system should have an availability of 99.9% uptime over a 12-month period.
- Backup and Recovery: Daily automated backups must be performed, with the ability to recover data within 30 minutes after a failure.

3. Scalability

- The system should be able to scale horizontally to handle increased traffic during promotional or festive periods without performance degradation.

4. Security

- Authentication: Secure user login with OAuth 2.0 support (e.g., Google login).
- Authorization: Different roles (customer, seller, admin) must have proper access control.
- Data Protection: All sensitive user data must be encrypted in transit (HTTPS) and at rest.
- Audit Logs: All bidding and transaction activities should be logged for dispute resolution and monitoring.
- Allow some pages (list of products, auctions, ...) can be accessed without login.

5. Usability

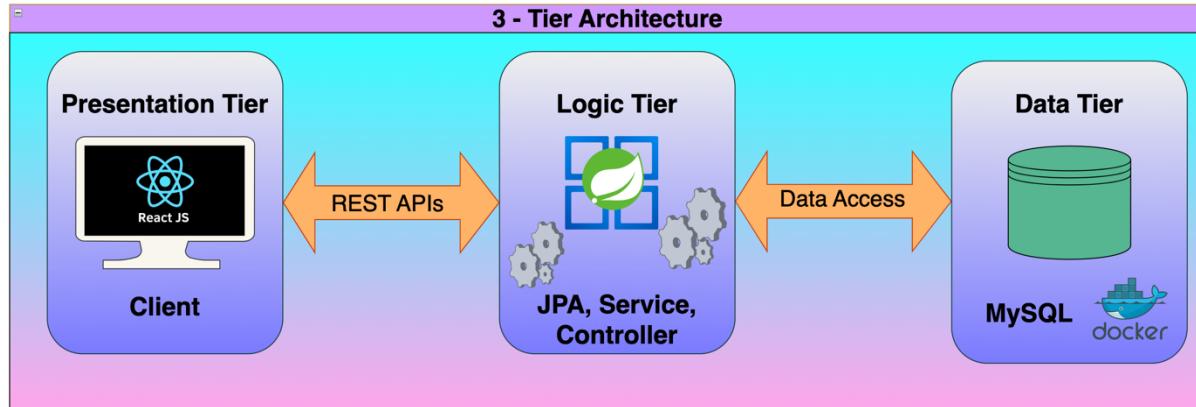
- The user interface should be intuitive and responsive, working seamlessly across desktop, tablet, and mobile devices.
- The learning curve for a new user should not exceed 5 minutes.

6. Maintainability

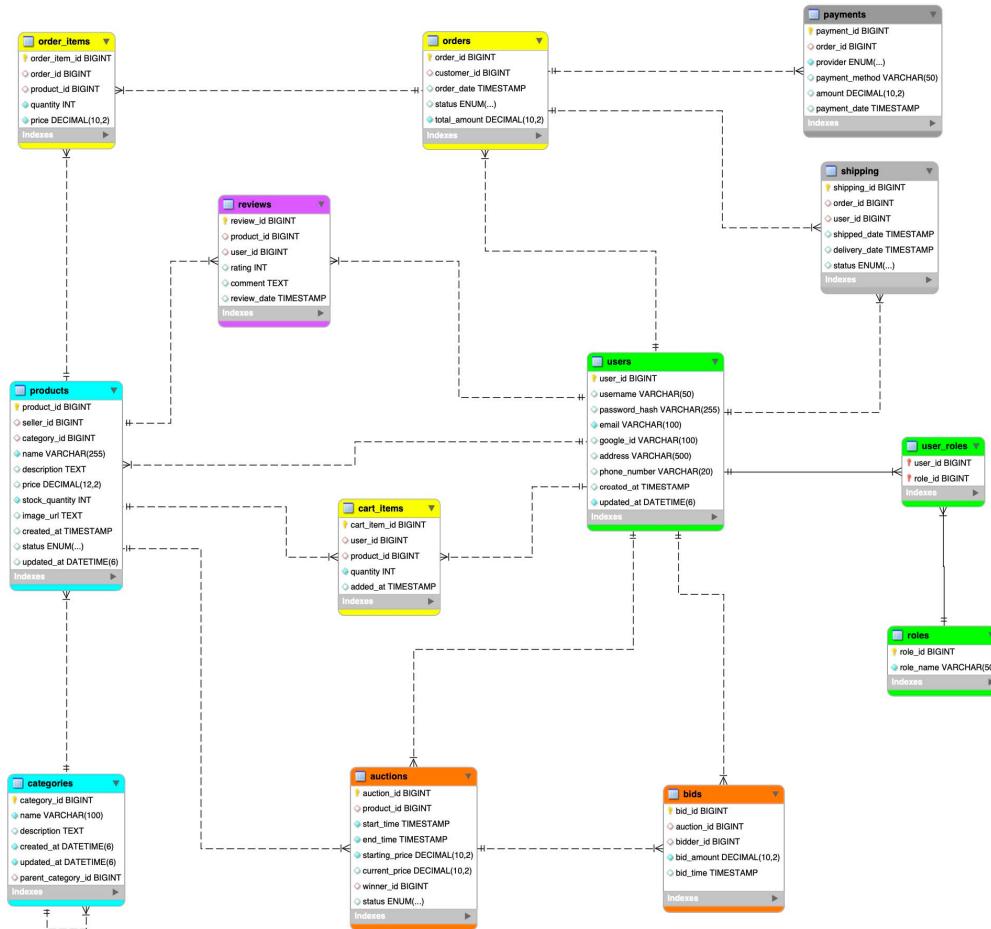
- The codebase should follow modular architecture (e.g., microservices or layered architecture) to allow easier updates and debugging.
- New features should be able to be integrated with minimal downtime.

2. DESIGN

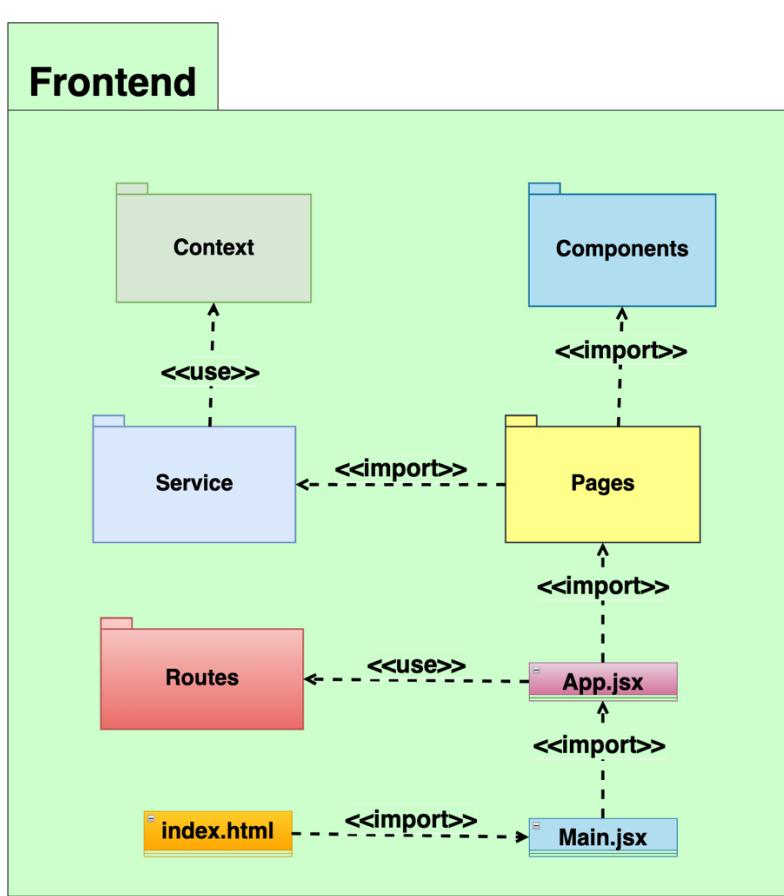
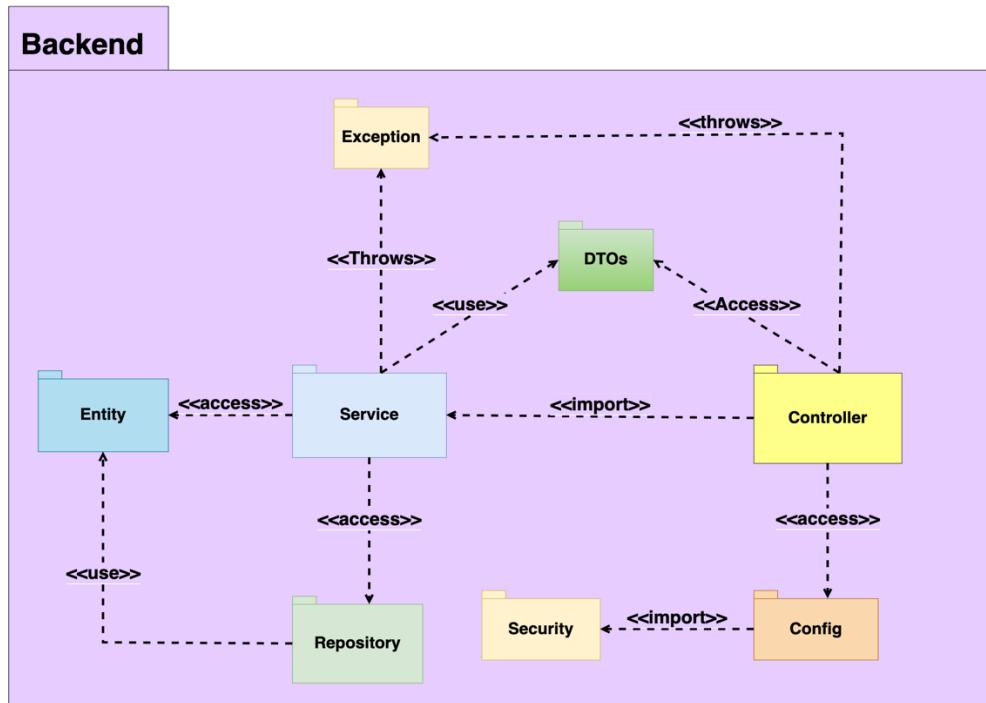
System Architecture Model



Schema Diagram

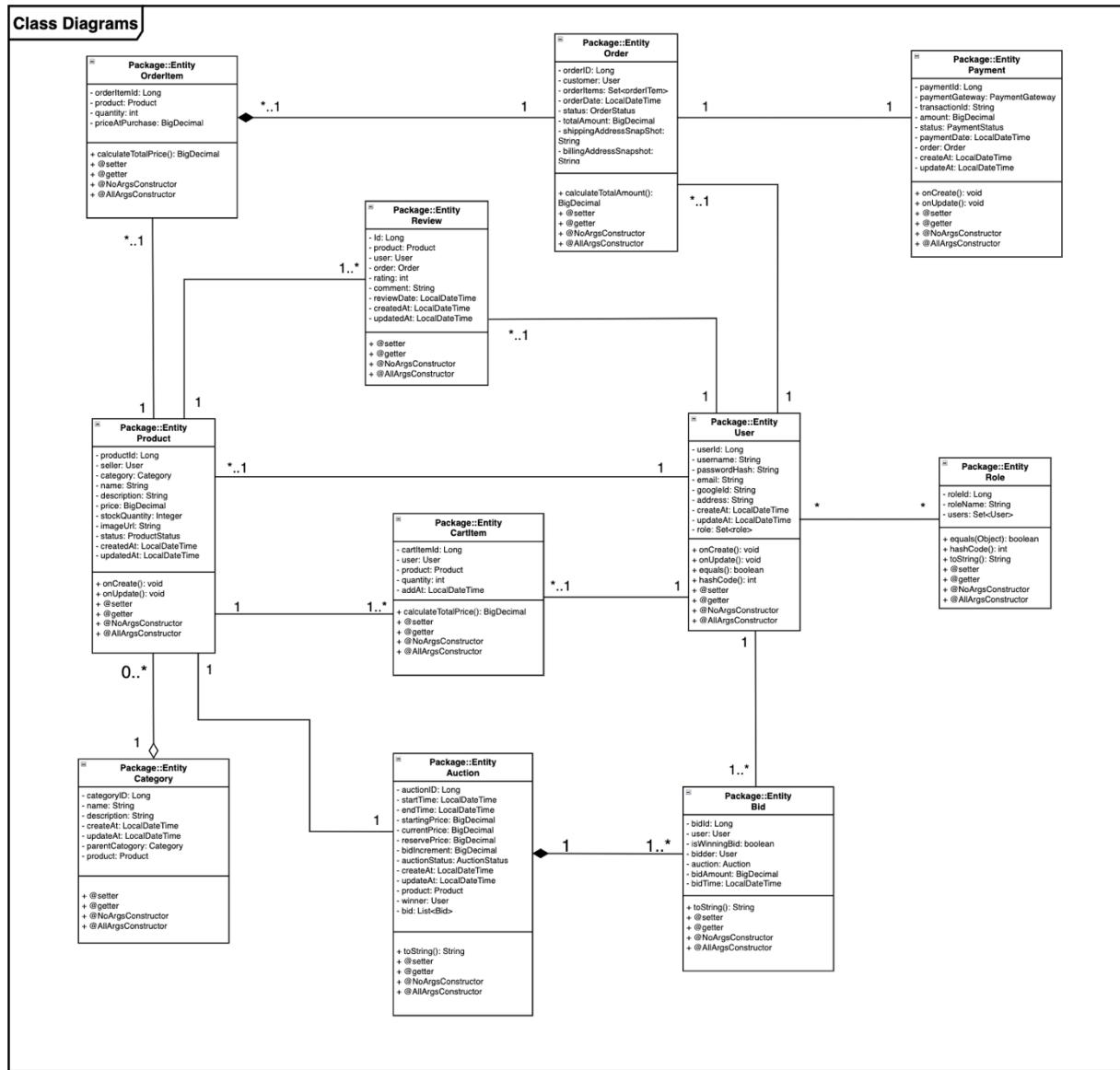


Package Diagram

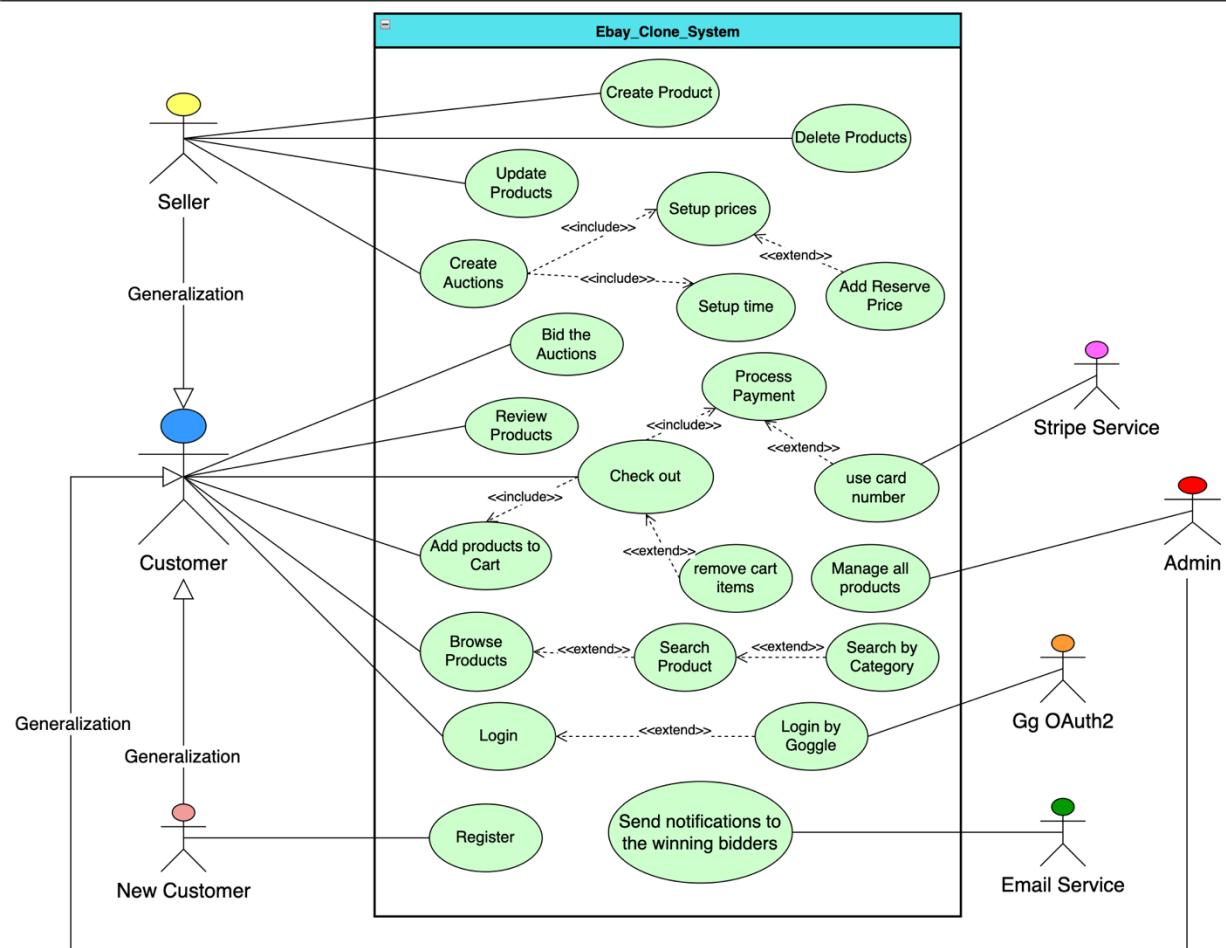


Class Diagram

(Since this project has more than 100 classes, so here is just class diagram for package Entity)

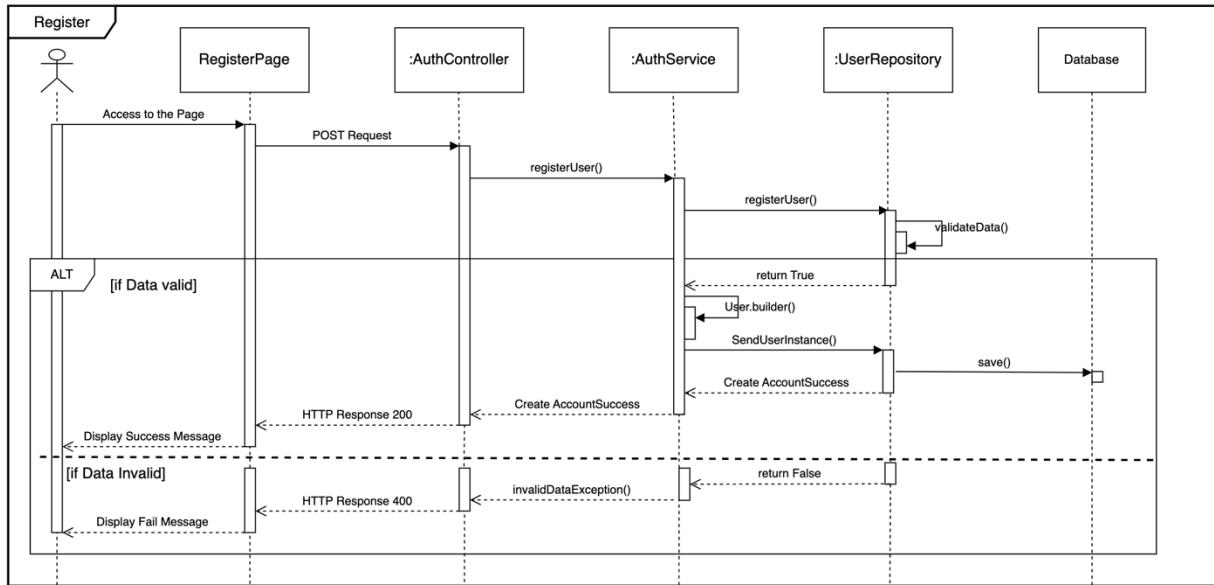


Use Case Diagram

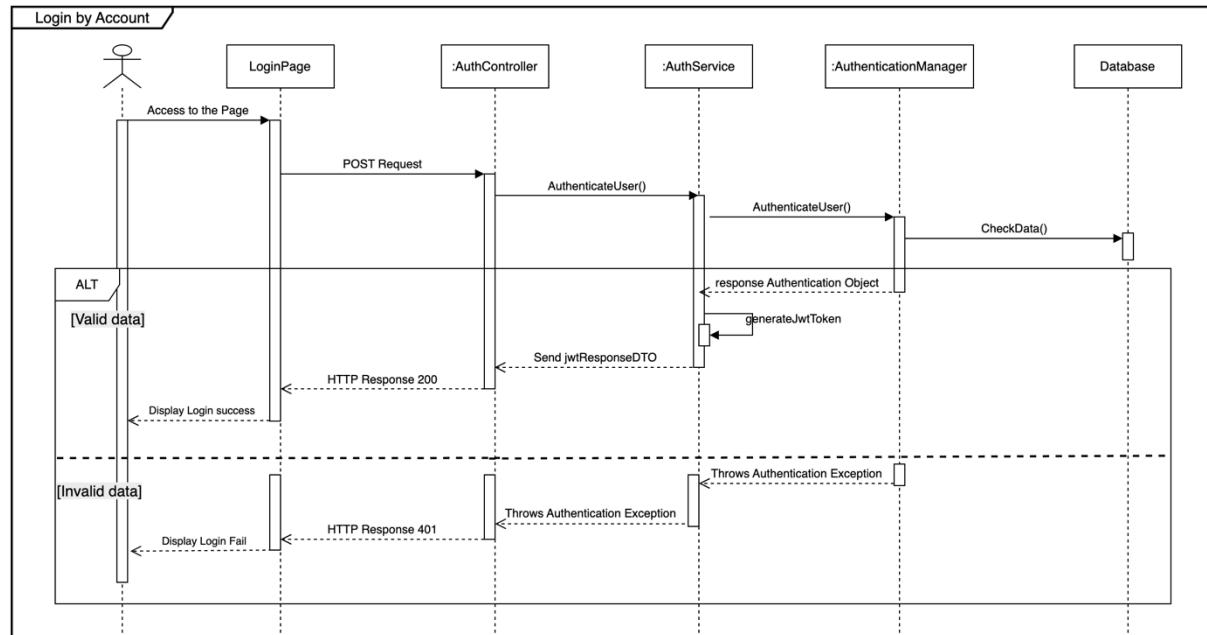


Sequence Diagram

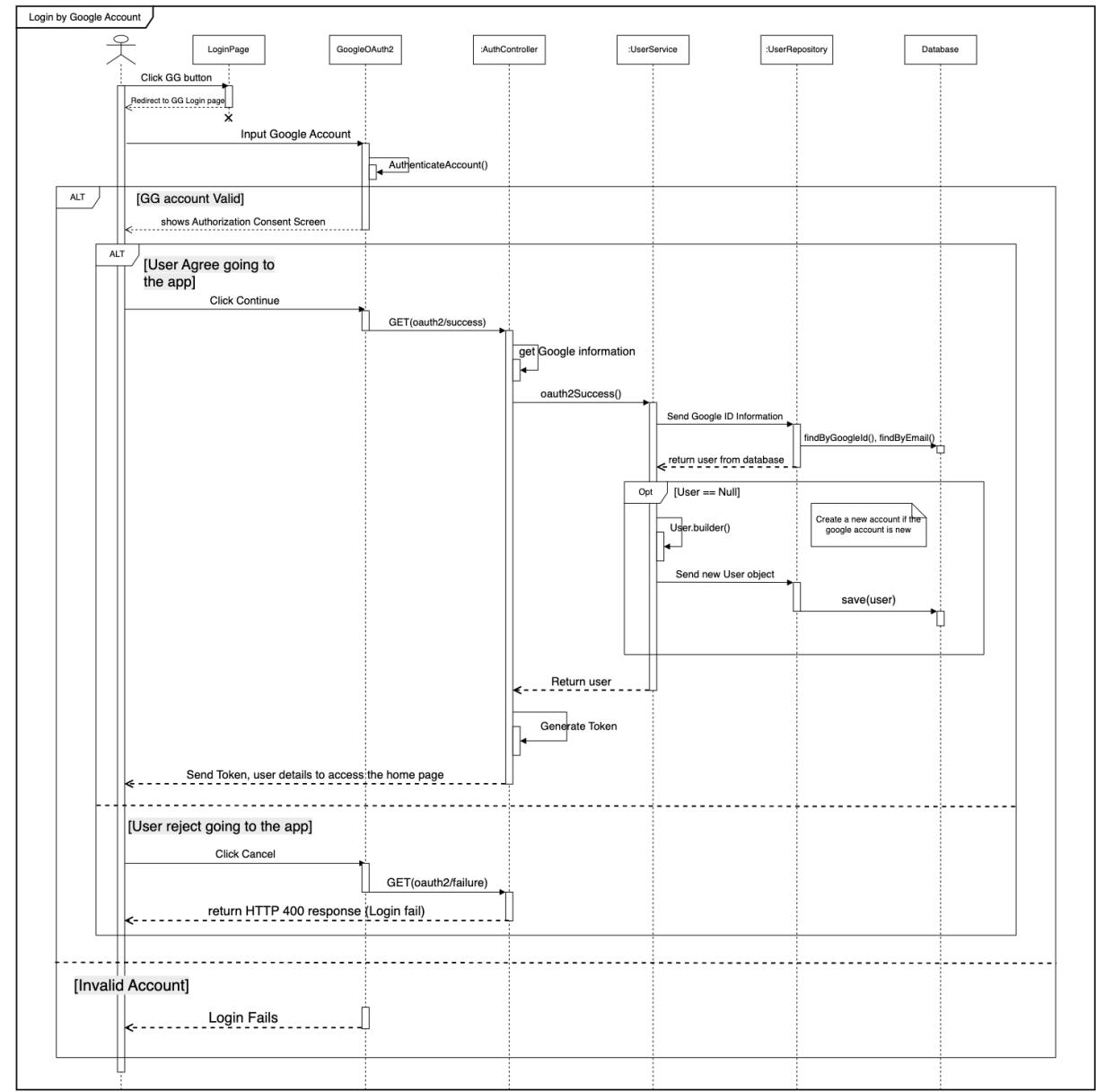
Use case 1: Register a new account.



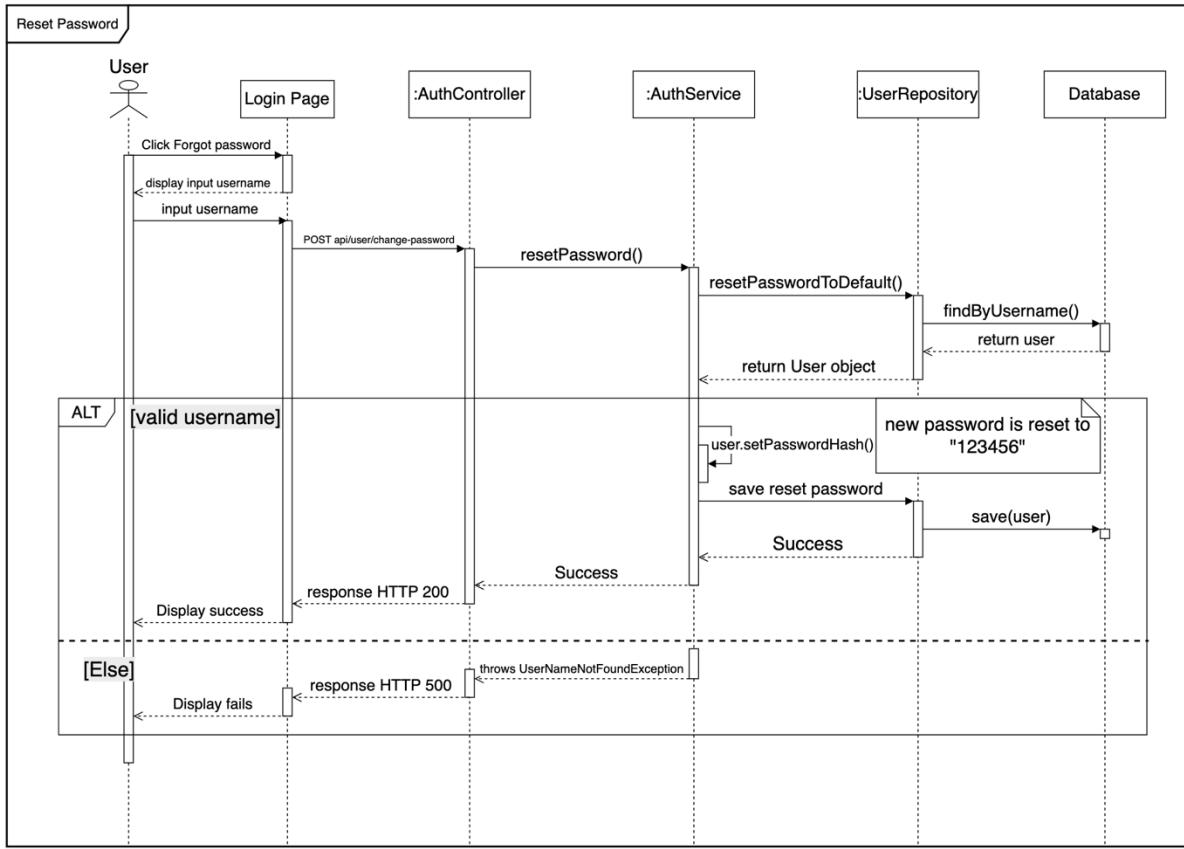
Use case 2: Login into the system.



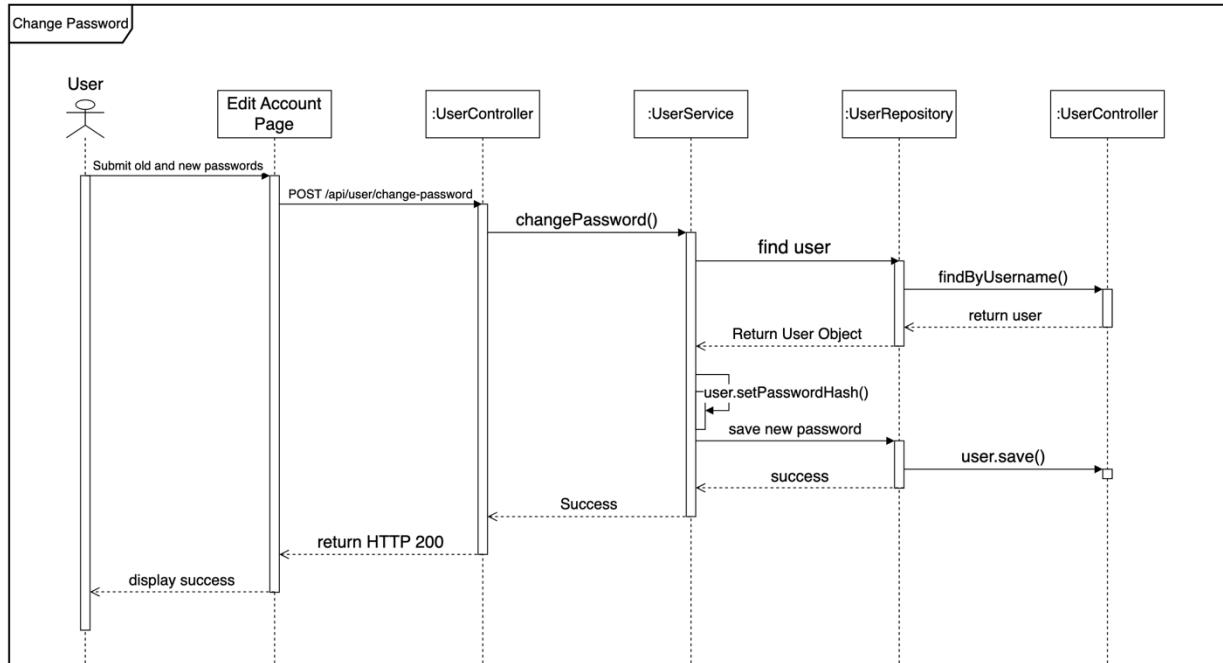
Use case 3: Login by Google account.



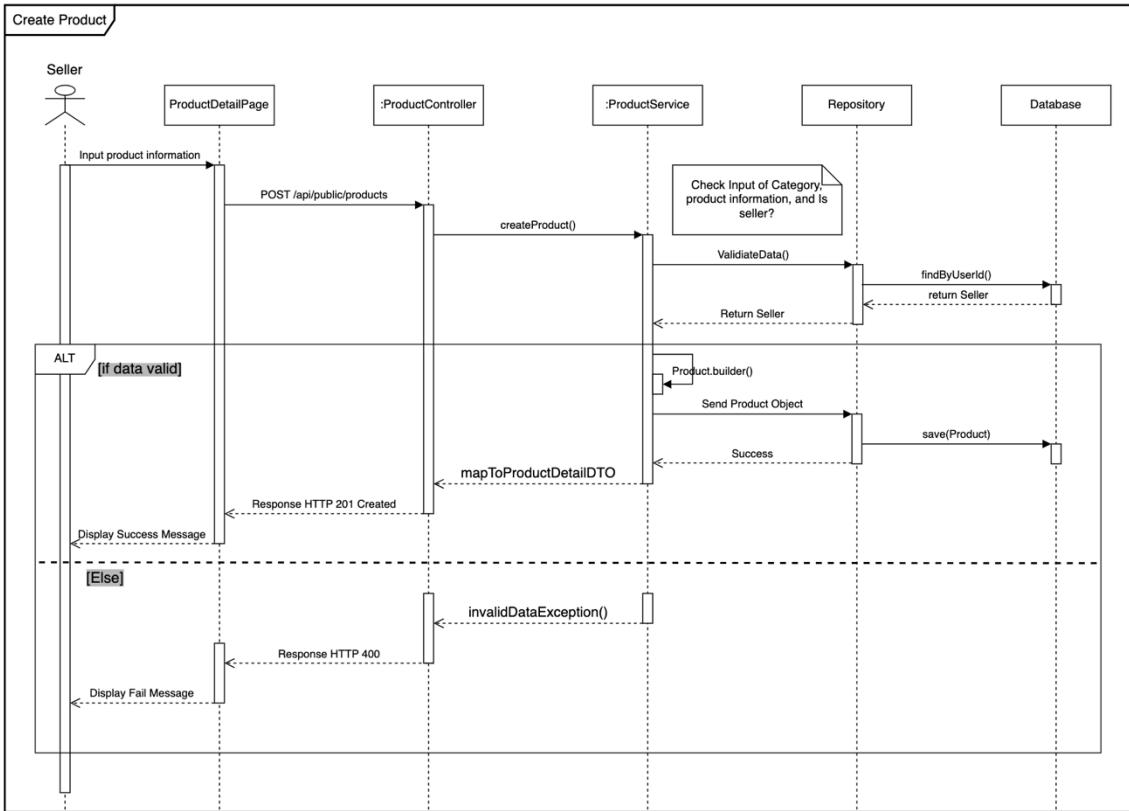
Use case 4: Reset password.



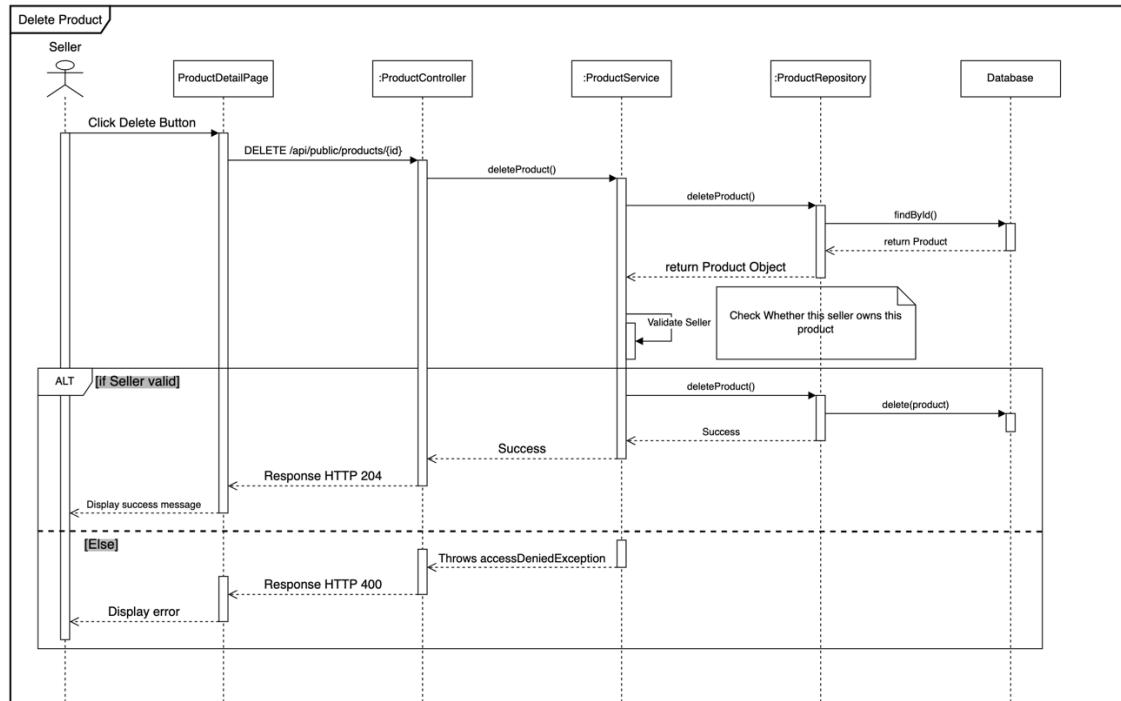
Use case 5: Change password.



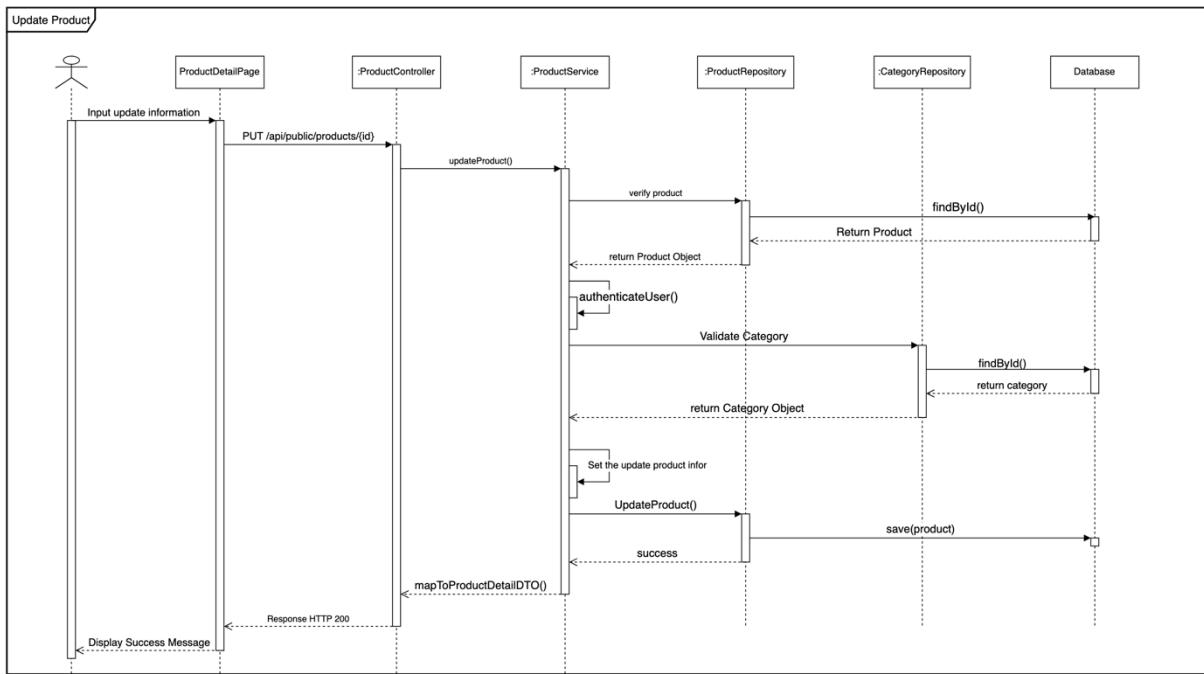
Use case 6: Create product.



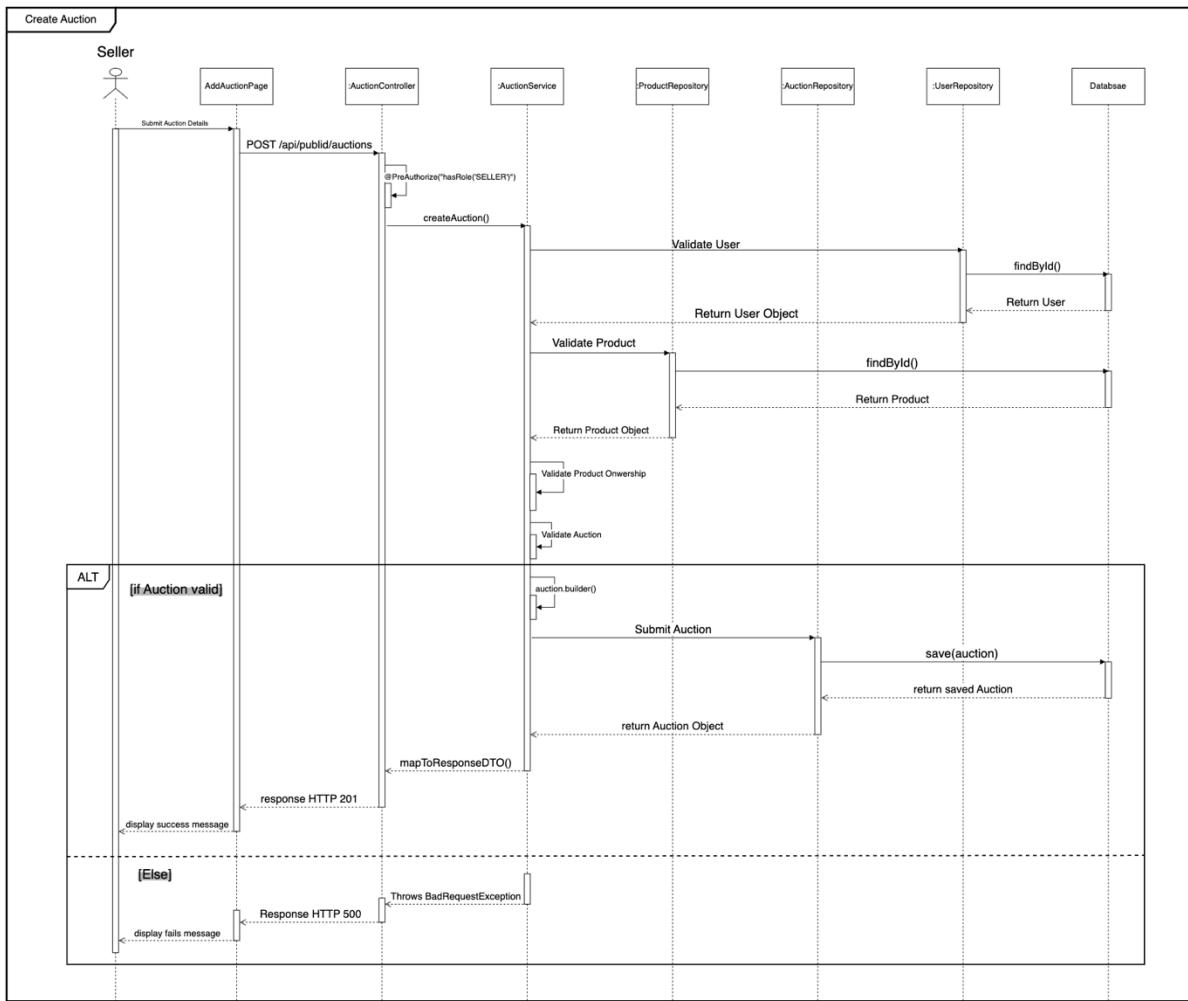
Use case 7: Delete product.



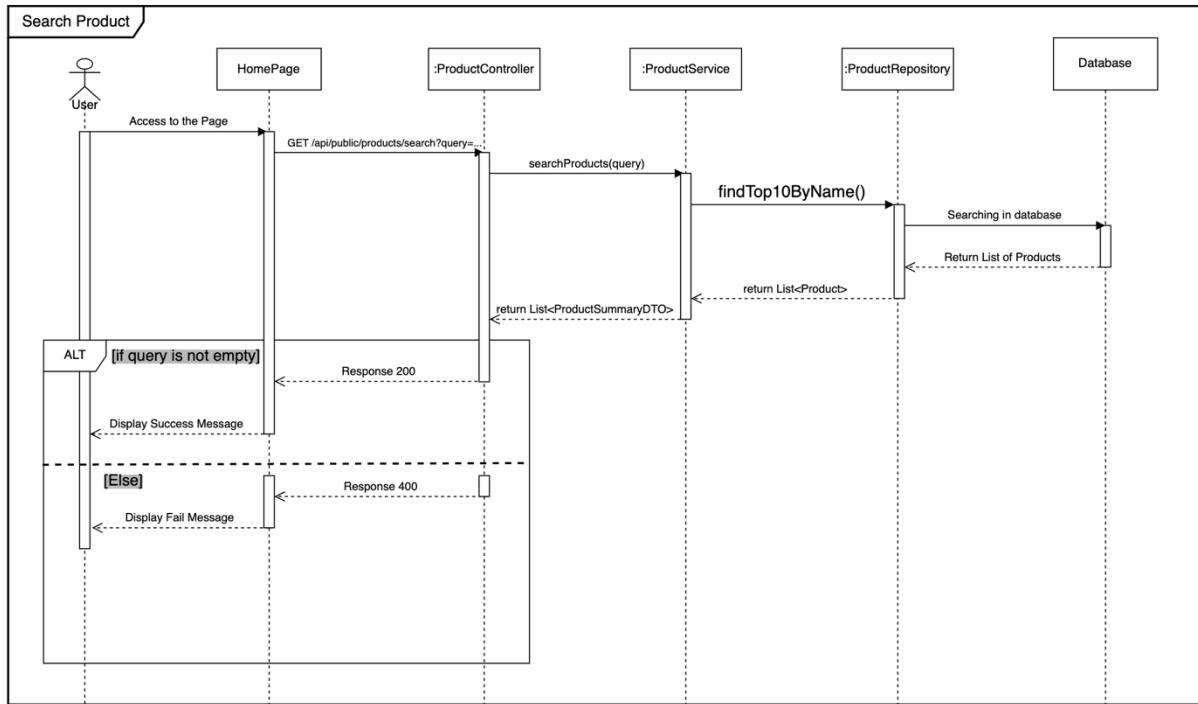
Use case 8: Update product.



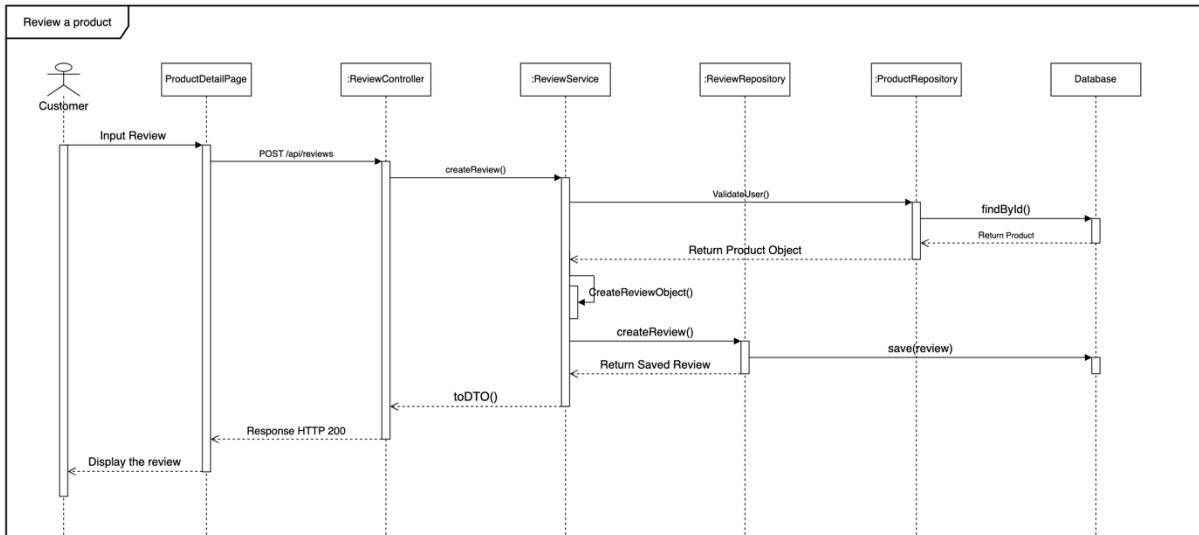
Use case 9: Create Auction.



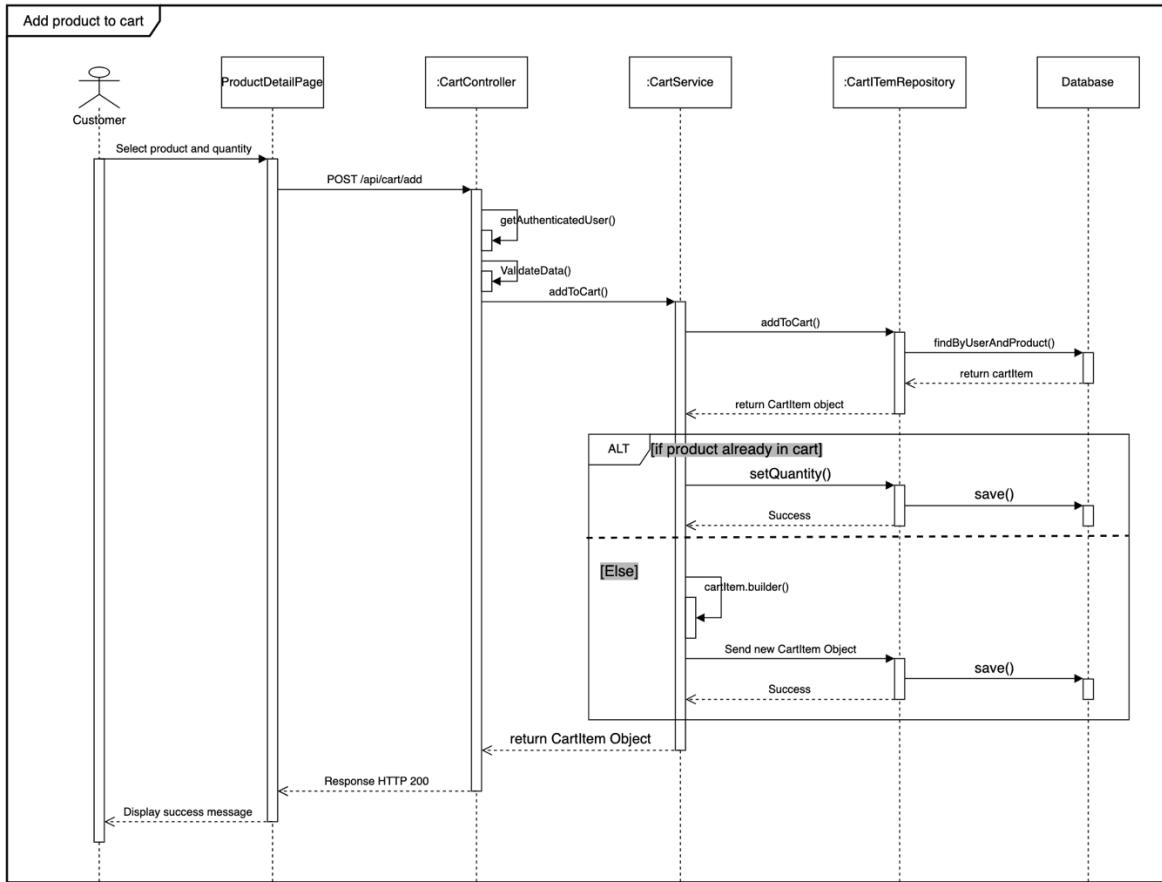
Use case 10: Search product.



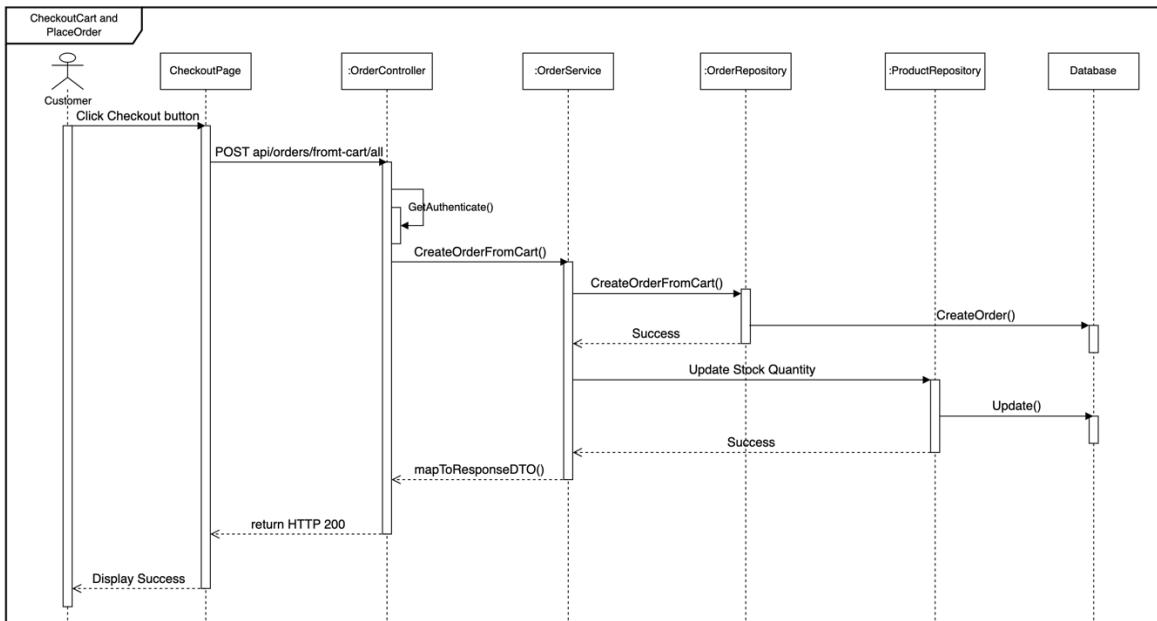
Use case 11: Review product.



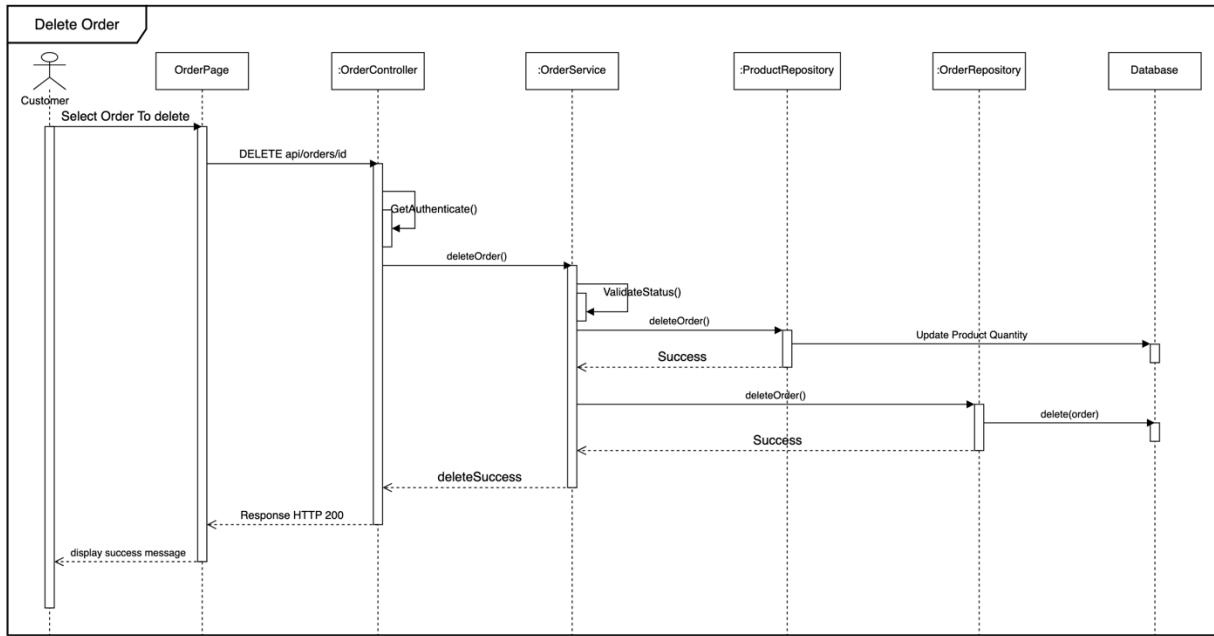
Use case 12: Add product to cart.



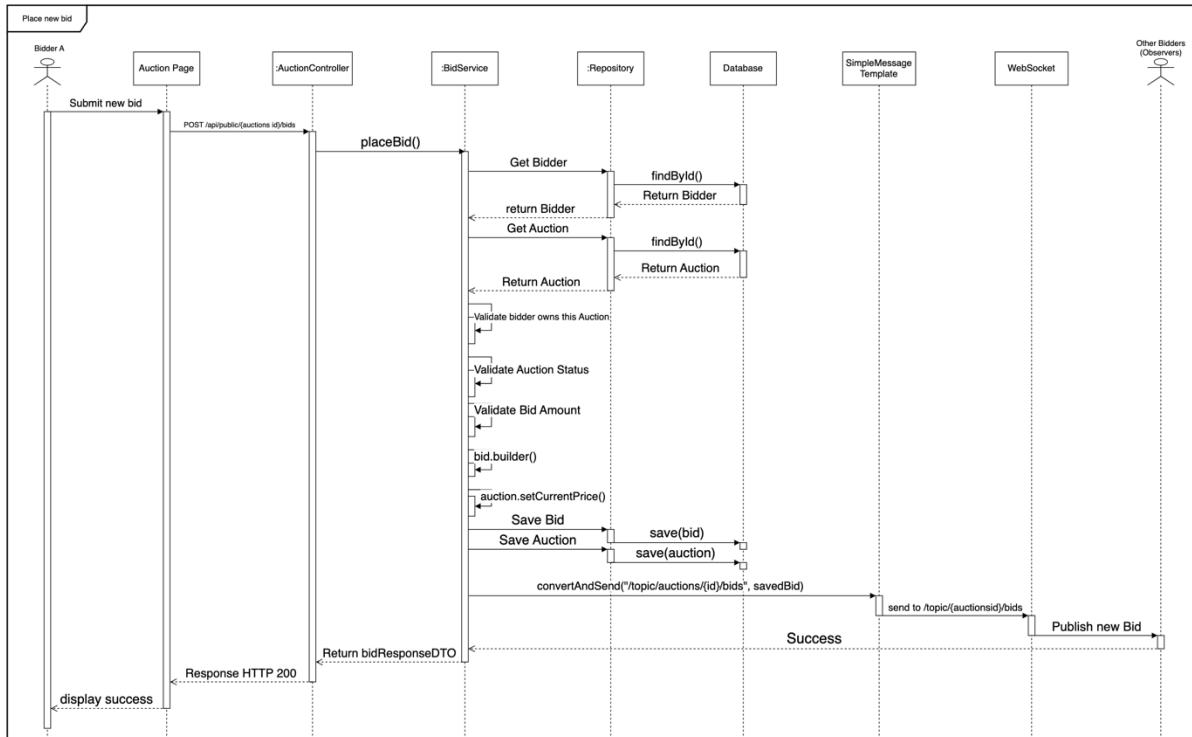
Use case 13: Checkout cart and place order.



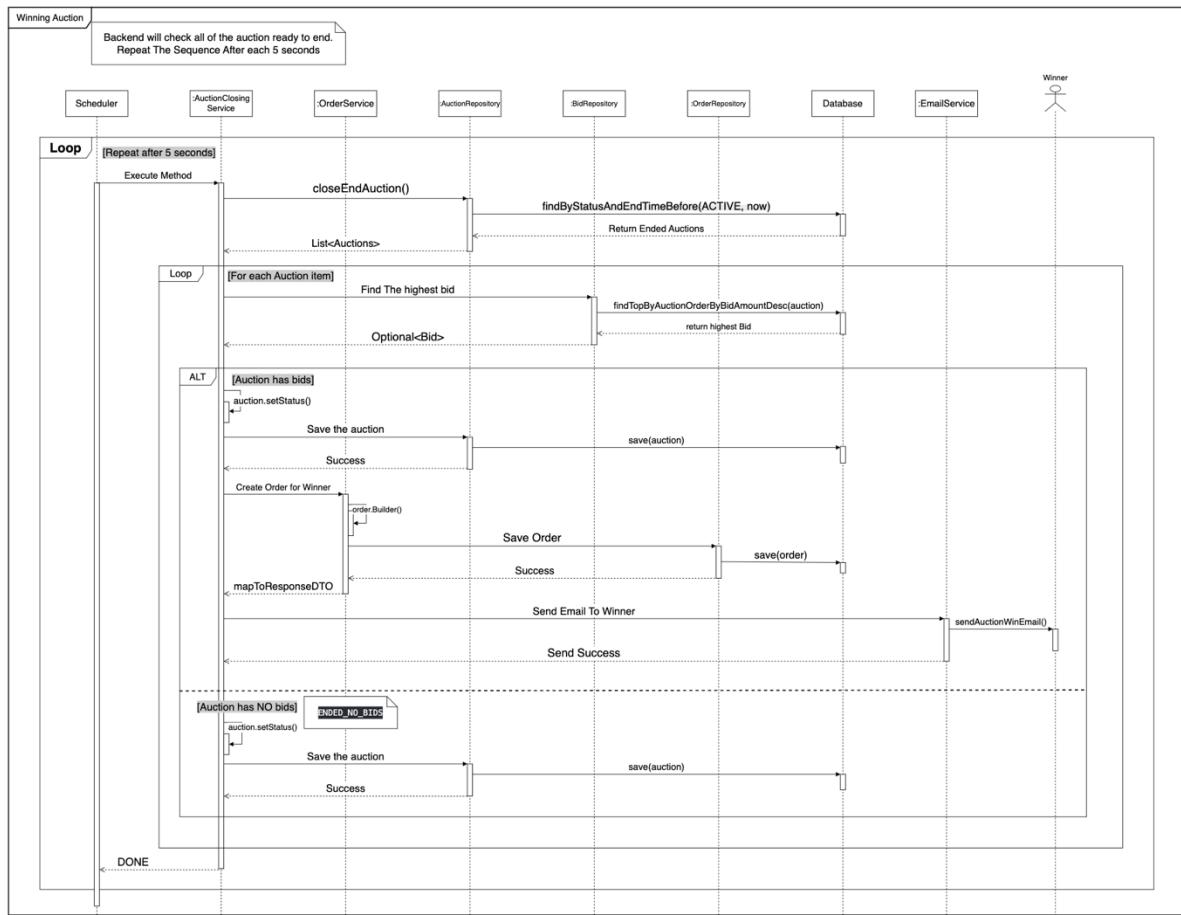
Use case 14: Delete order.



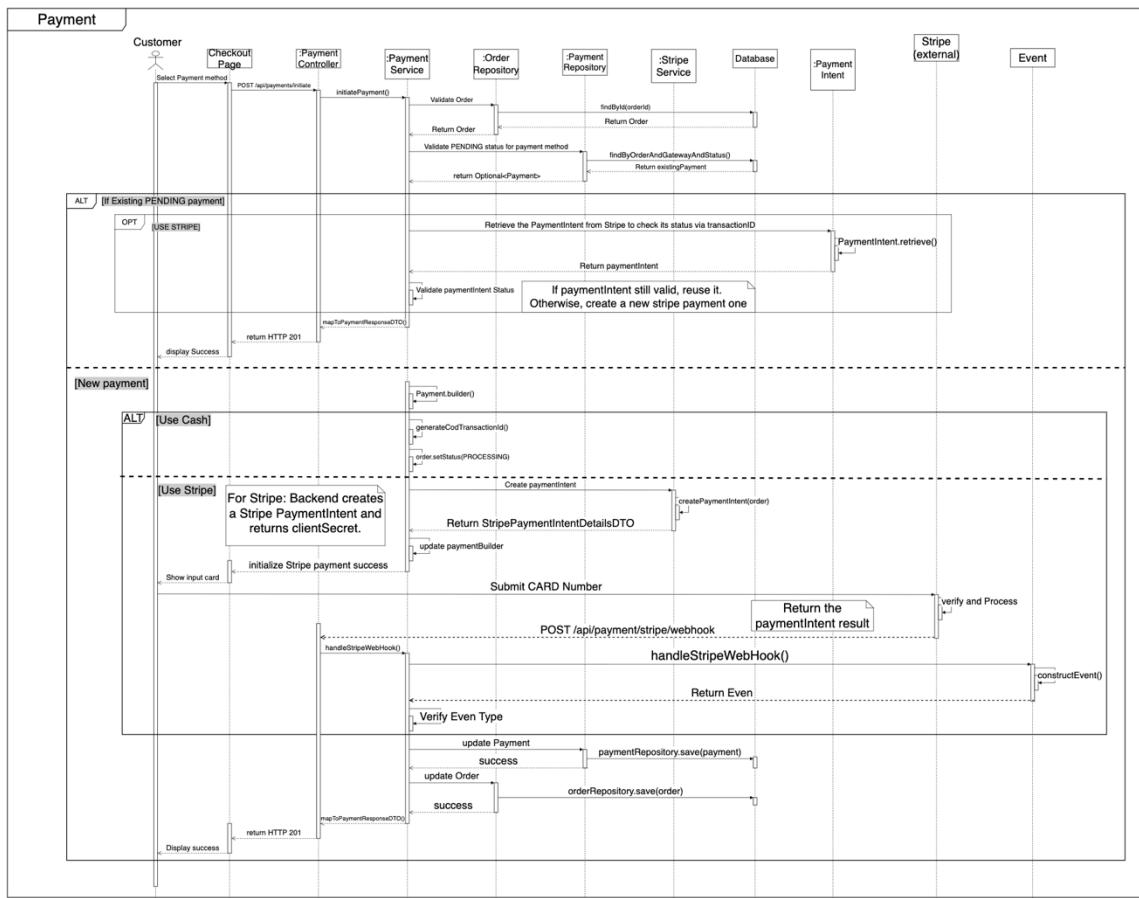
Use case 15: Place new bid.



Use case 16: Winning auction.



Use case 17: Make Payment.

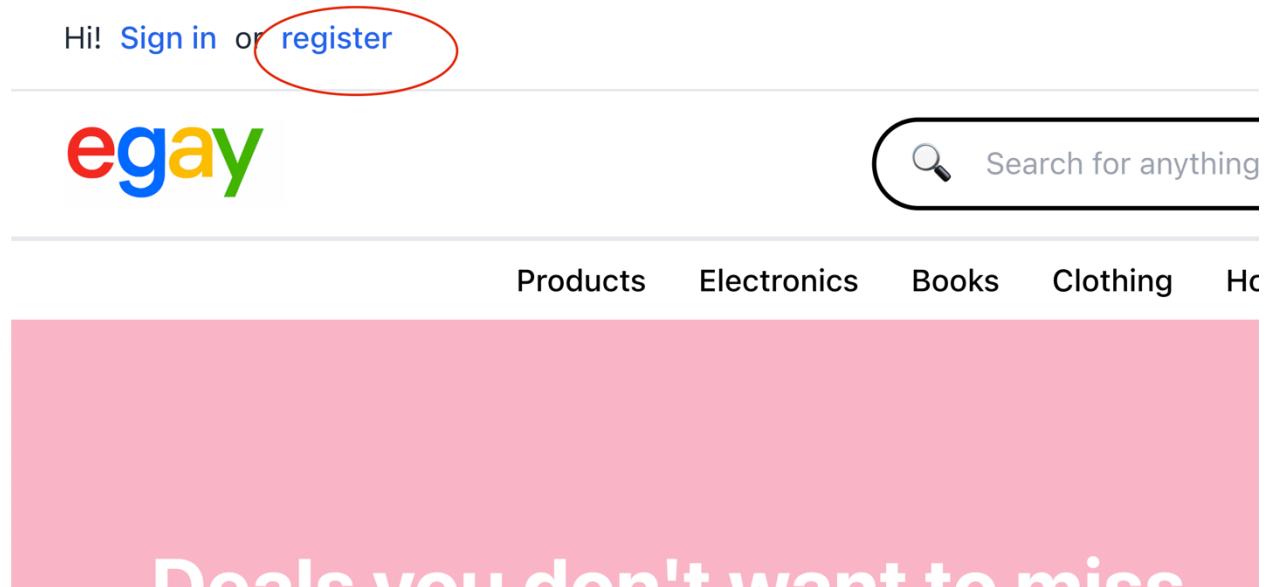


III. IMPLEMENTATION

1. AUTHENTICATION FUNCTIONS

1.1 Register new account:

Step 1: Click “register” button:



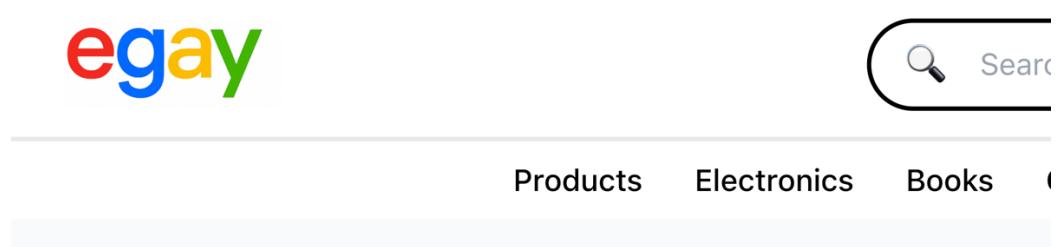
Step 2: Fill all of information to the register form:

A screenshot of the "Create your account" form. At the top, it says "Create your account" and "Already have an account? Sign in". The form consists of several input fields: "Username" (HCMIU), "Email" (hcmiu@student.hcmiu.edu.vn), "Address" (District 10), "Password" (a series of dots), and "Confirm Password" (whatThe33@). A blue "Sign Up" button is at the bottom.

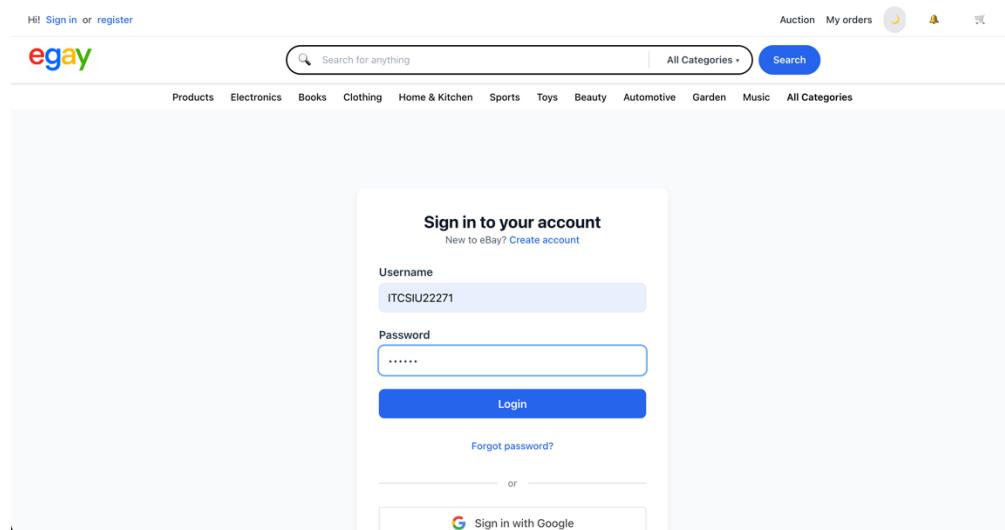
1.2 Login

Step 1: Click “Sign in” button.

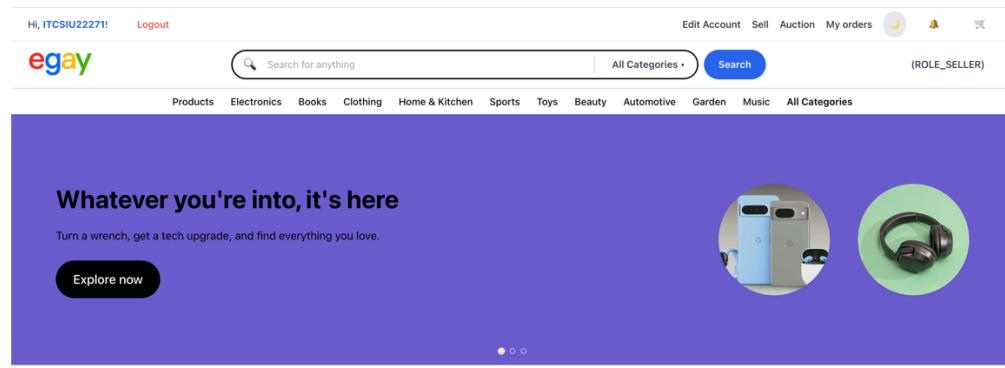
Hi! [Sign in](#) or [register](#)



Step 2: Input username and password.

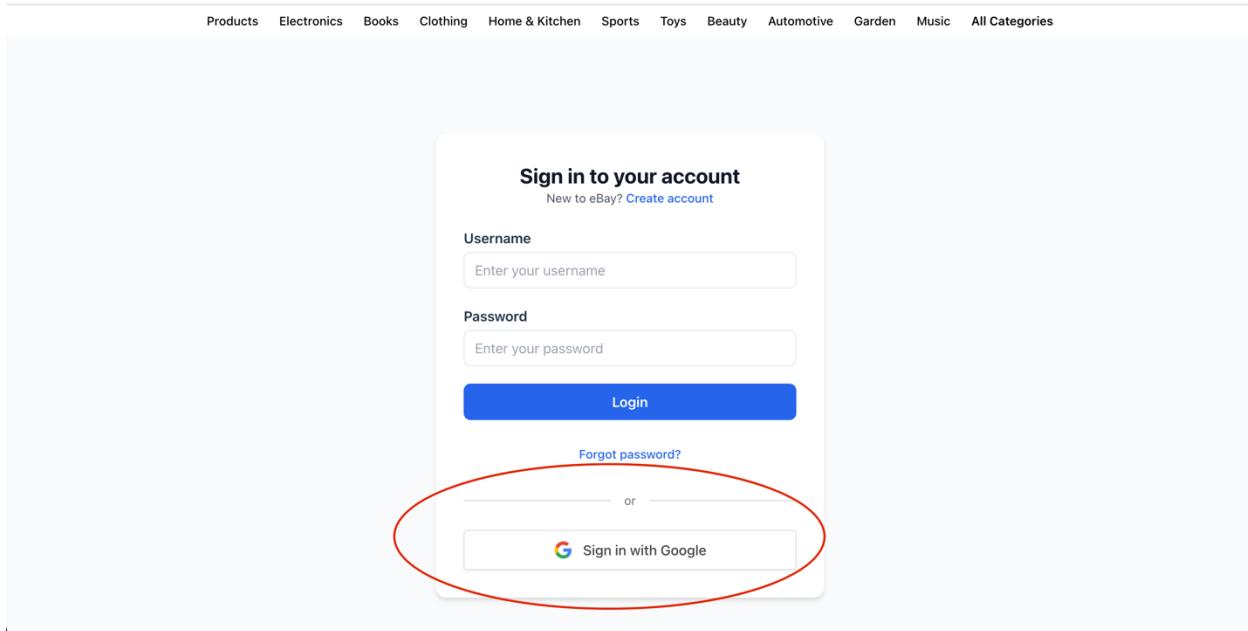


Step 3: System Redirect to homepage if login success.

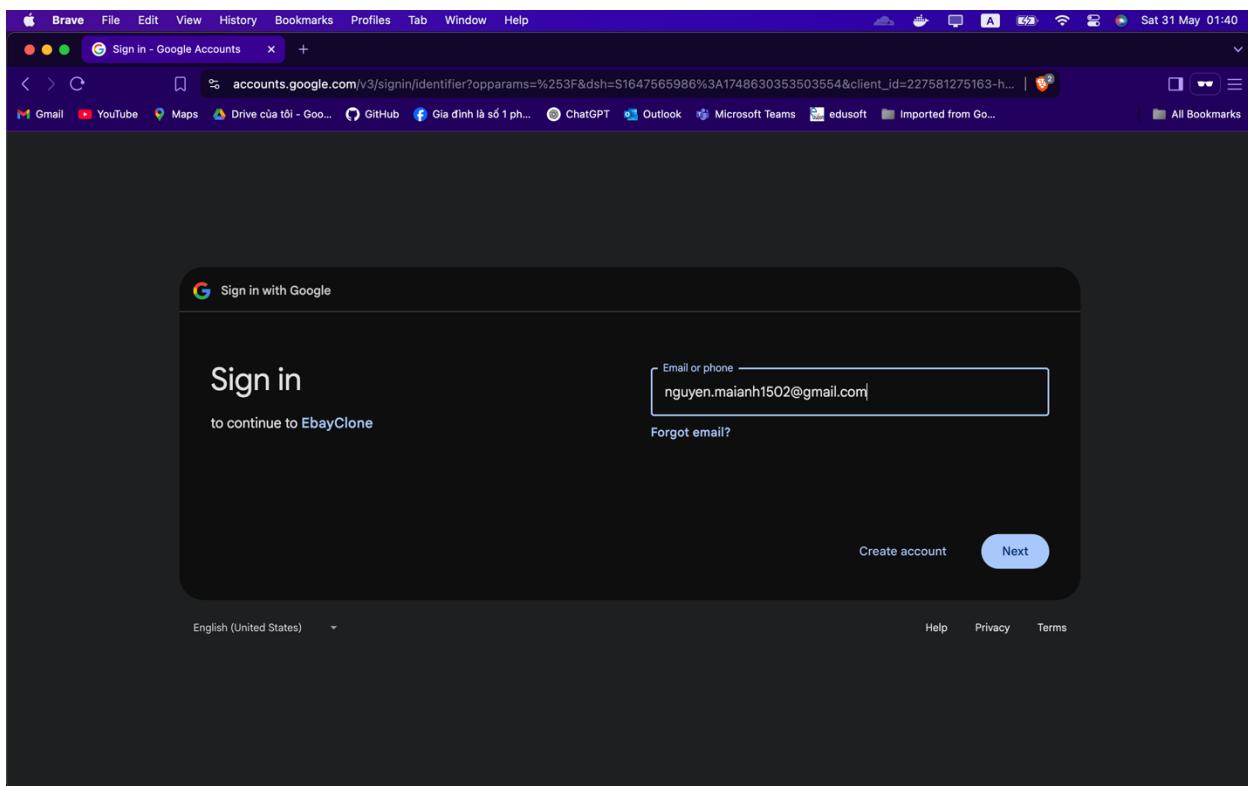


1.3 Login by Google Account:

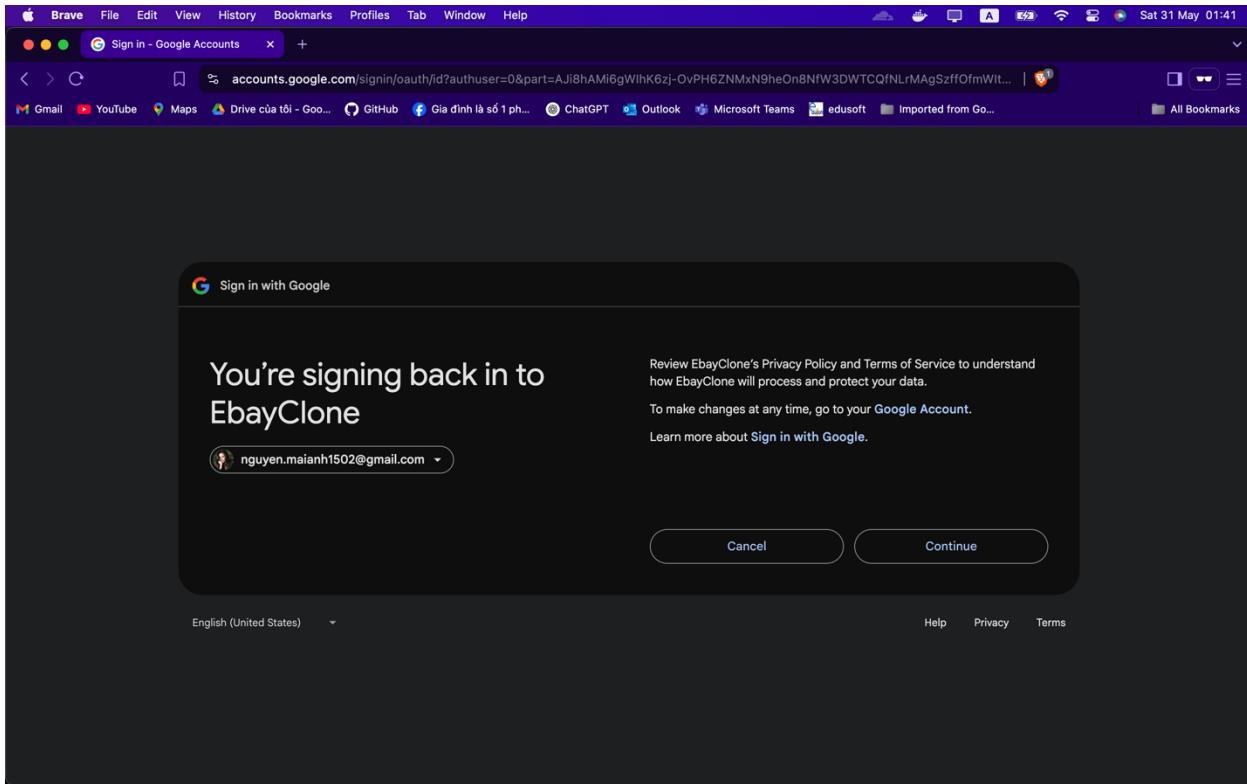
Step 1: click google button in the login page.



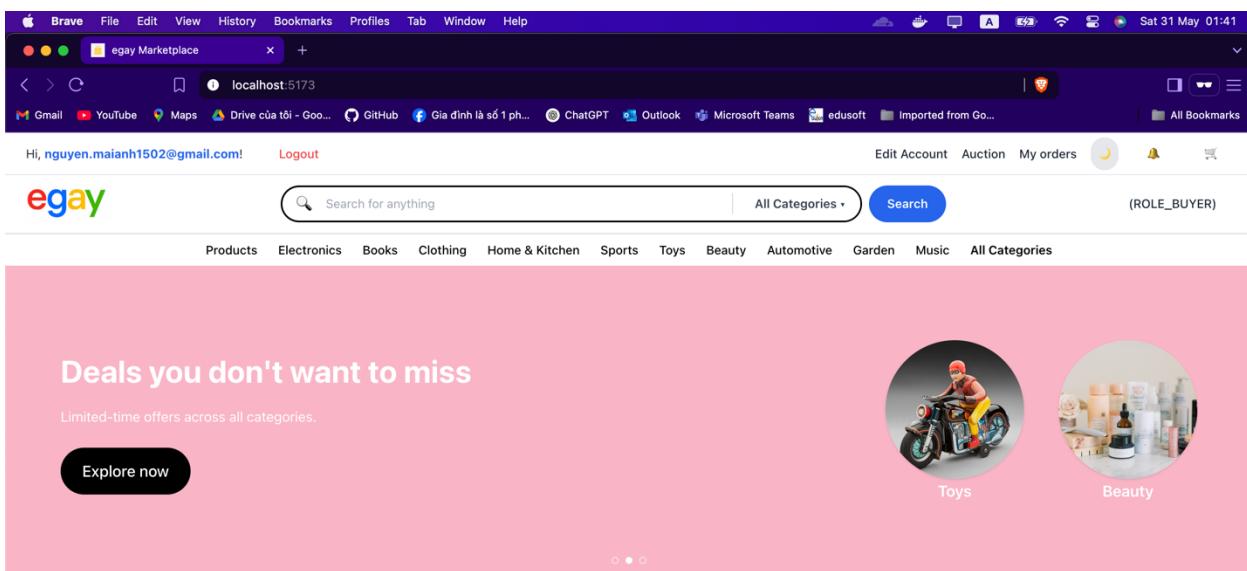
Step 2: input google account.



Step 3: if google account is valid and the password is entered correctly, the gg Oauth2 will show the google consent screen → click continue.

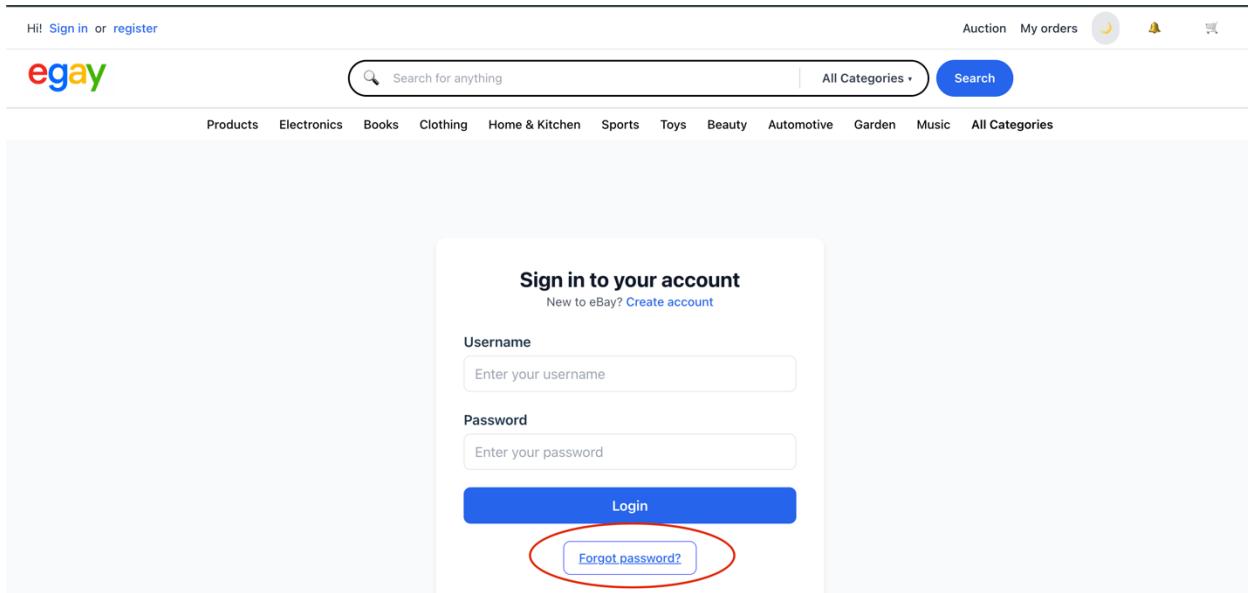


Step 5: After click continue, the customer will go back to homepage.

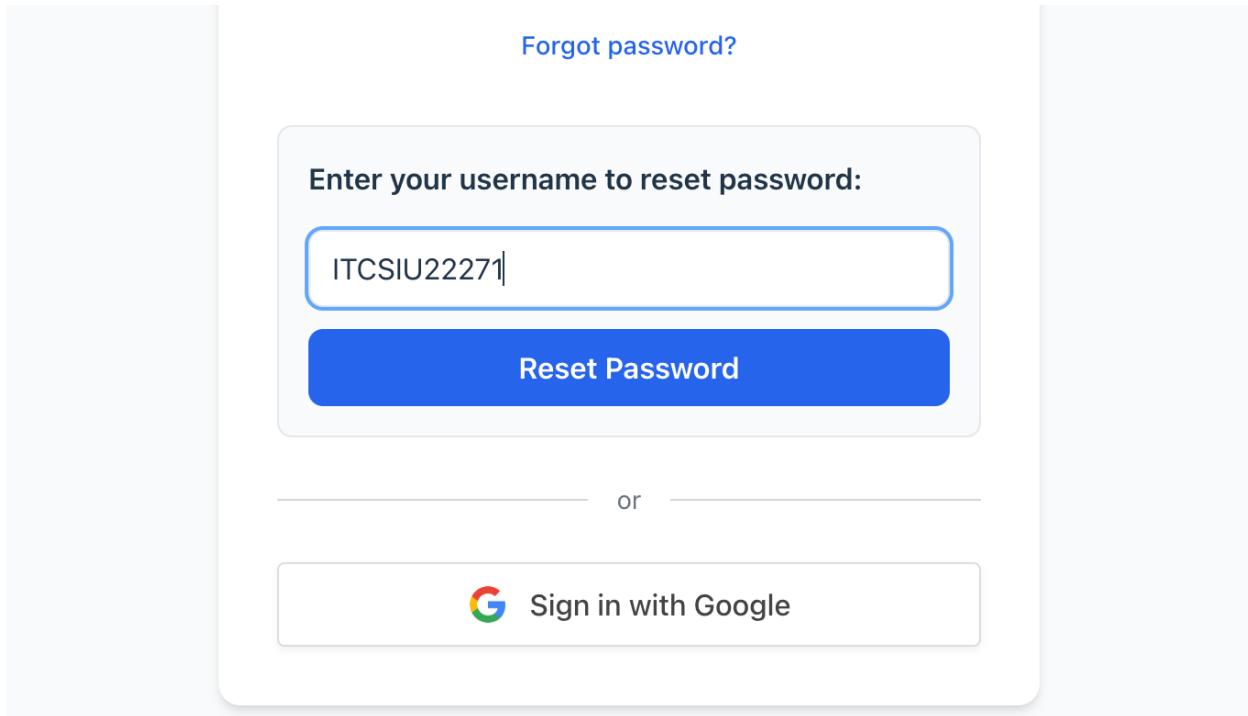


1.4 Forgot password when login.

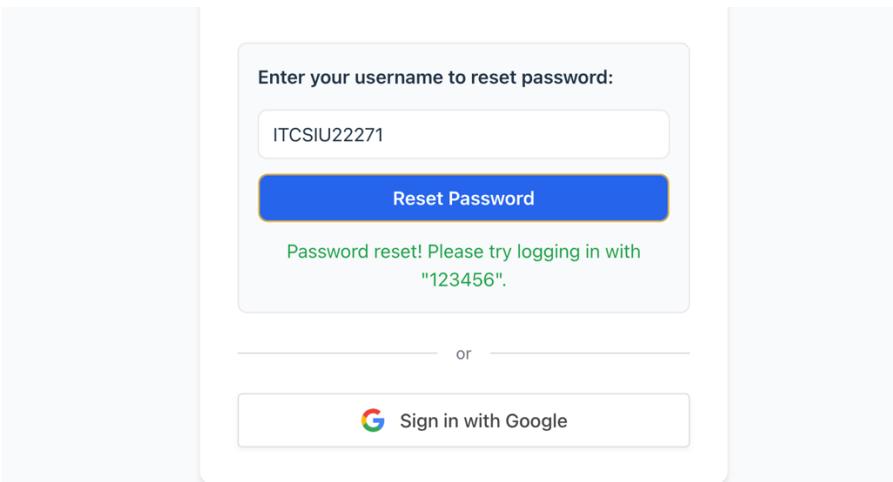
Step 1: click “forgot password?” button in the login page



Step 2: input username to reset password



Step 3: after click reset password, the password will be “123456”



1.5 Edit account information

Enter to the edit account page and change any information you want (include change password).

The screenshot shows the eBay 'Edit Account' page. At the top, there is a navigation bar with links for "Edit Account", "Sell", "Auction", "My orders", and user icons. Below the navigation is the eBay logo and a search bar with the placeholder "Search for anything...". The main content area is titled "Edit Account". It contains several form fields: "Username" (ITCSIU22271), "Email" (itcsiu22271@student.hcmiu.edu.vn), "Address" (Thu Duc City), and "Phone Number" (0333333332). Below these fields is a blue "Save Changes" button. Further down, there is a "Change Password" section with "Old Password" and "New Password" fields, and a blue "Change Password" button.

2. CUSTOMER USE CASE

2.1 search product

Step 1: Use the Search Bar

At the top of the page, locate the search bar, type in a keyword related to the product you're looking for. The system will return a list of products that match the search keyword.

The screenshot shows the eBay clone's search results for "watch". At the top, there's a navigation bar with links for Sell, Auction, My orders, and user icons. Below it is the eBay logo and a search bar containing the query "watch". A dropdown menu for "All Categories" is open. The main content area displays a single search result for the "Smartwatch Pro X", showing its image, name, price (\$199.00), and category (Electronics). Other categories like Products, Electronics, Books, Clothing, etc., are listed below the search bar.

Step 2: View Product Details

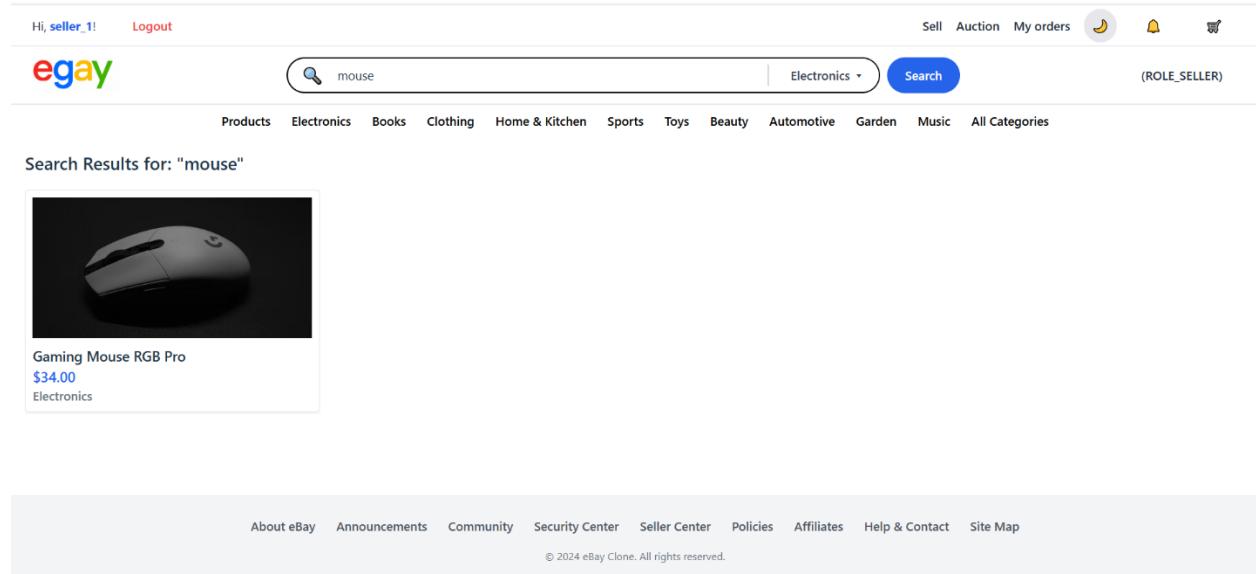
Click on any product from the search result list to view its full details. Admin or sellers may also see buttons like Delete, Update, or Create Auction depending on their role.

[← Back](#)

The screenshot shows the detailed product page for the "Smartwatch Pro X". On the left is a large image of the watch. To the right, the product name "Smartwatch Pro X" is displayed in bold, followed by the price "\$199". Below the price is the stock information "Stock: 30". There's a "Quantity" selector set to "1" with "Add to Cart" and "Buy Now" buttons. Three expandable sections are shown: "Product Info", "Shipping Times & Costs", and "Returns Policy". At the bottom are three buttons: "Delete" (red), "Update" (yellow), and "Create Auction" (blue).

Filter by Specific Category

Customer can narrow the search results further by selecting a specific category from the dropdown. For example, typing mouse and choosing Electronics will return only products related to mice within that category.

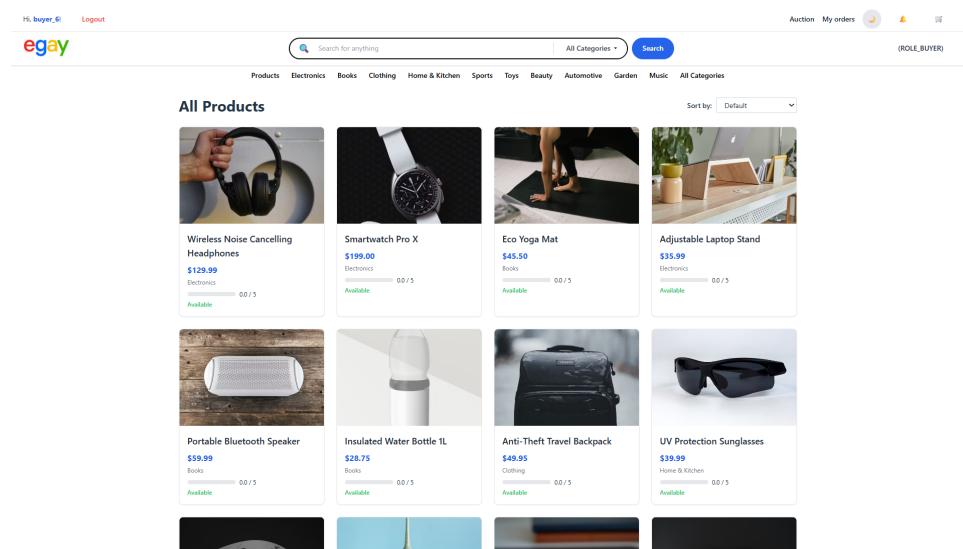


The screenshot shows the egay search results for "mouse". At the top, there's a navigation bar with links for "Sell", "Auction", "My orders", and icons for notifications and a shopping cart. Below the navigation is a search bar with the word "mouse" and a dropdown menu set to "Electronics". To the right of the search bar is a blue "Search" button. Underneath the search bar is a horizontal menu with categories: Products, Electronics, Books, Clothing, Home & Kitchen, Sports, Toys, Beauty, Automotive, Garden, Music, and All Categories. The main content area displays a product listing for a "Gaming Mouse RGB Pro" which costs \$34.00 and is categorized under Electronics. The product has a small thumbnail image and a brief description. At the bottom of the page, there's a footer with links to About eBay, Announcements, Community, Security Center, Seller Center, Policies, Affiliates, Help & Contact, and Site Map. A copyright notice at the very bottom reads "© 2024 eBay Clone. All rights reserved."

2.2 Add a product to cart.

Step 1: Login or register to the system (follow step in 1.1)

Step 2: From product page , choose which product that you want to add it into your cart and click it.



The screenshot shows the egay product listing page titled "All Products". The page features a grid of product cards. Each card includes a thumbnail image, the product name, price, category, availability status, and a "View Details" button. The products listed are: Wireless Noise Cancelling Headphones (\$129.99, Electronics, Available), Smartwatch Pro X (\$199.00, Electronics, Available), Eco Yoga Mat (\$45.50, Books, Available), Adjustable Laptop Stand (\$35.99, Electronics, Available), Portable Bluetooth Speaker (\$59.99, Books, Available), Insulated Water Bottle 1L (\$28.75, Books, Available), Anti-Theft Travel Backpack (\$49.95, Clothing, Available), and UV Protection Sunglasses (\$39.99, Home & Kitchen, Available). The page also includes a "Sort by:" dropdown menu and a vertical scroll bar on the right side.

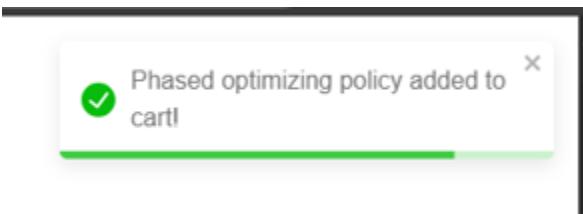
Step 3 : After enter the detail page of the product that customer want to add. Additionally, customer can increase or decrease the quantity that they want to add into your page.

The screenshot shows a product detail page on the eGAY platform. At the top, there is a navigation bar with links for 'Auction', 'My orders', and a user profile icon. Below the navigation is a search bar and a category dropdown. The main content area features a large image of a person holding a pair of black headphones. To the right of the image, the product title 'Wireless Noise Cancelling Headphones' is displayed in bold, followed by the price '\$129.99'. Below the price, it says 'Stock: 45'. There is a 'Quantity' selector set to '4'. Two buttons are visible: 'Add to Cart' and 'Buy Now'. Below these buttons are three expandable sections: 'Product Info', 'Shipping Times & Costs', and 'Returns Policy', each with a '+' sign to its right. At the bottom of the main content area, there is a section titled 'You May Also Like' featuring five recommended products with their images and names: 'Adjustable Laptop Stand', 'Fitness Smart Ring', 'Portable SSD 1TB', 'External SSD 2TB', and 'Air Fryer XL'.

Step 4: After customer choose your quantity that you want to add into your cart, click “add to cart” button.

This screenshot shows the same product detail page as the previous one, but with a key difference: the quantity selector has been changed from '4' to '5'. All other elements on the page remain identical to the first screenshot, including the product image, title, price, stock level, and the 'You May Also Like' section at the bottom.

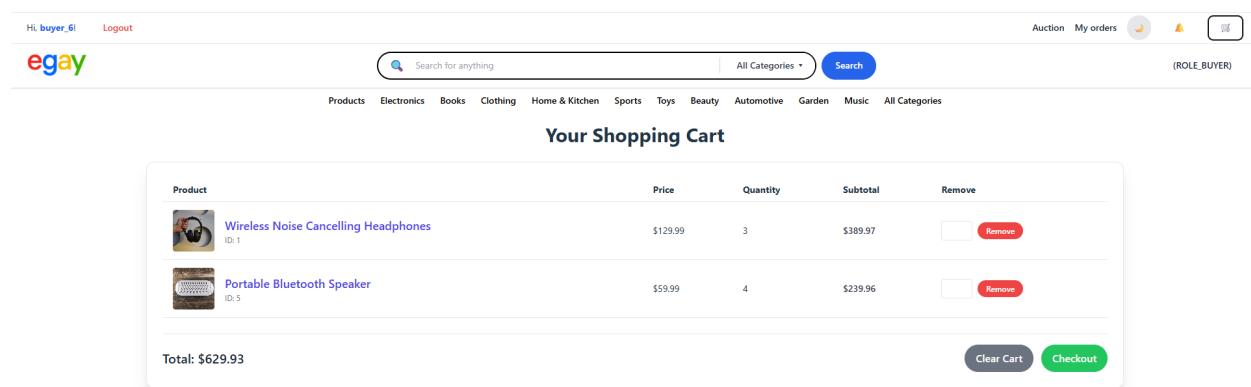
After click that button, a pop-up show confirmation will apper on top of product detail page.



If customers want to see what they have add into your cart , follow the incoming step:

Step 5 : Click this icon  on top right of page to see their cart.

In here, they can see all products that they have added to their cart:



The screenshot shows a shopping cart interface on a website. At the top, there's a navigation bar with links like 'Products', 'Electronics', 'Books', etc., and a search bar. Below the navigation is a header with the text 'Your Shopping Cart'. A table lists the items in the cart:

Product	Price	Quantity	Subtotal	Remove
Wireless Noise Cancelling Headphones ID: 1	\$129.99	3	\$389.97	<button>Remove</button>
Portable Bluetooth Speaker ID: 5	\$59.99	4	\$239.96	<button>Remove</button>

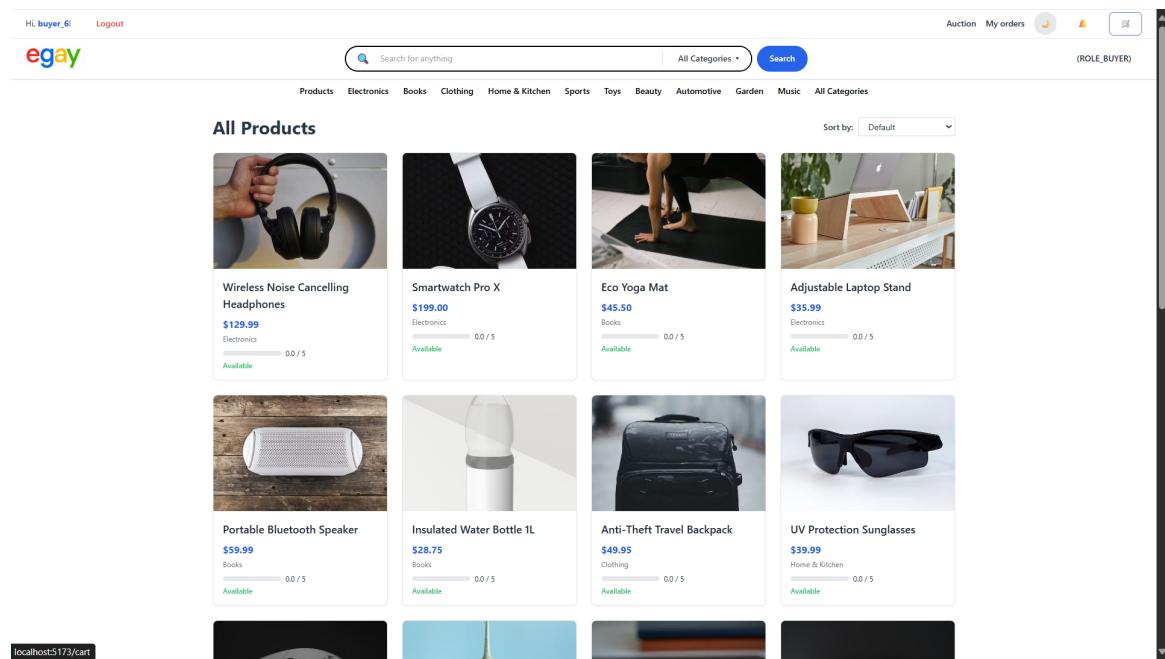
Total: \$629.93

At the bottom of the cart area are two buttons: 'Clear Cart' and 'Checkout'.

2.3 Remove item from cart

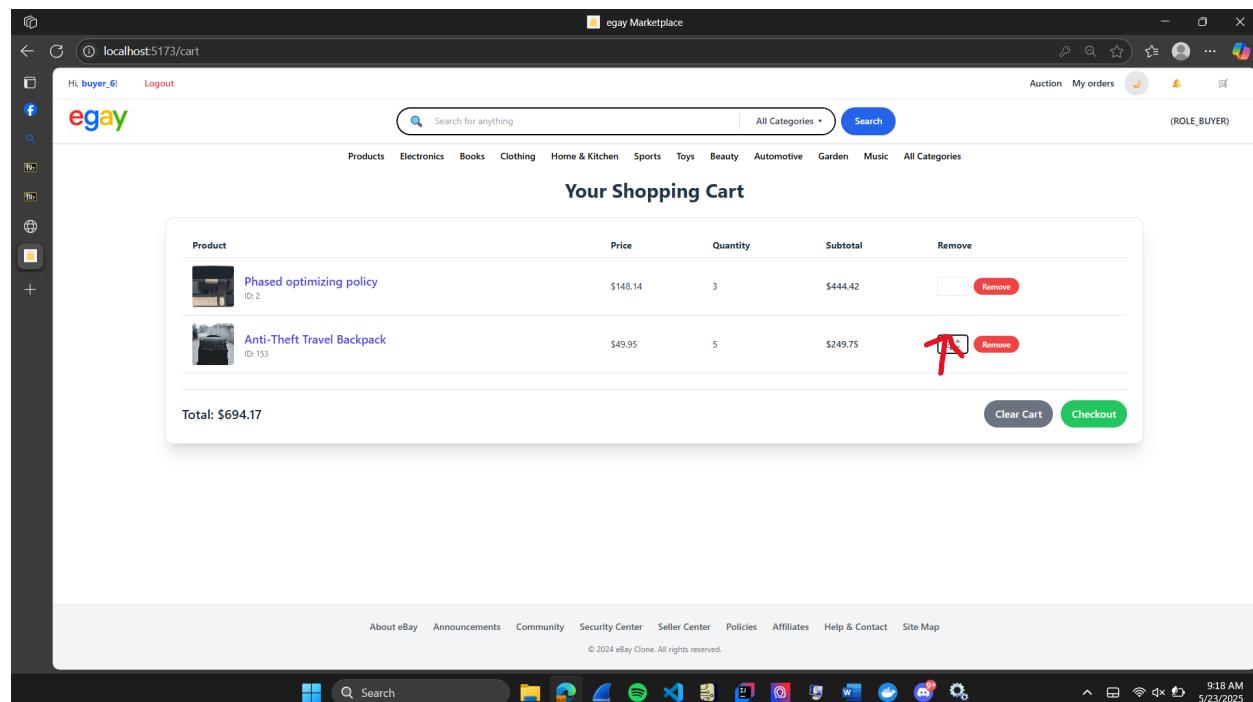
Step 1: Login or resister to the system (follow step in 1.1)

Step 2 :From the home page , Click on “cart” icon to go into cart page



The screenshot shows the homepage of an eBay clone named "egay". At the top, there's a navigation bar with links for "Products", "Electronics", "Books", "Clothing", "Home & Kitchen", "Sports", "Toys", "Beauty", "Automotive", "Garden", "Music", and "All Categories". A search bar is centered above a grid of product cards. The grid displays various items: Wireless Noise Cancelling Headphones (\$129.99), Smartwatch Pro X (\$199.00), Eco Yoga Mat (\$45.50), Adjustable Laptop Stand (\$35.99), Portable Bluetooth Speaker (\$59.99), Insulated Water Bottle 1L (\$28.75), Anti-Theft Travel Backpack (\$49.95), and UV Protection Sunglasses (\$39.99). Each card includes a small image, the product name, price, category, and availability status (e.g., "Available"). A "Sort by:" dropdown menu is visible at the top right of the grid.

Step 3 : After the customer access into your “cart” page, choose the quantity of products that theywant to remove in “remove” section.



The screenshot shows the "Your Shopping Cart" page. It lists two items: "Phased optimizing policy" (Quantity: 3, Subtotal: \$444.42) and "Anti-Theft Travel Backpack" (Quantity: 5, Subtotal: \$249.75). Below the table, it says "Total: \$694.17". At the bottom right of the table area, there are "Clear Cart" and "Checkout" buttons. A red arrow points to the "Remove" button next to the "Anti-Theft Travel Backpack" row. The page also includes a footer with links to "About eBay", "Announcements", "Community", "Security Center", "Seller Center", "Policies", "Affiliates", "Help & Contact", and "Site Map". The bottom of the screen shows a Windows taskbar with various icons.

Step 4 : After choose the quantity that theywant to remove, click “Remove” button

The screenshot shows a shopping cart page from the egay Marketplace. The cart contains two items:

Product	Price	Quantity	Subtotal	Remove
Phased optimizing policy ID: 2	\$148.14	3	\$444.42	<input type="button" value="Remove"/>
Anti-Theft Travel Backpack ID: 153	\$49.95	3	\$149.85	<input type="button" value="Remove"/>

Total: \$594.27

Buttons: Clear Cart, Checkout

Page footer: About eBay, Announcements, Community, Security Center, Seller Center, Policies, Affiliates, Help & Contact, Site Map. © 2024 eBay Clone. All rights reserved.

Bonus: if the customer choose quantity that you want to remove equal to quantity you have in product

The screenshot shows the same shopping cart page. The 'Phased optimizing policy' item has its quantity set to 3. Red arrows point to both the quantity input field and the 'Remove' button.

it will delete that product out of their cart.

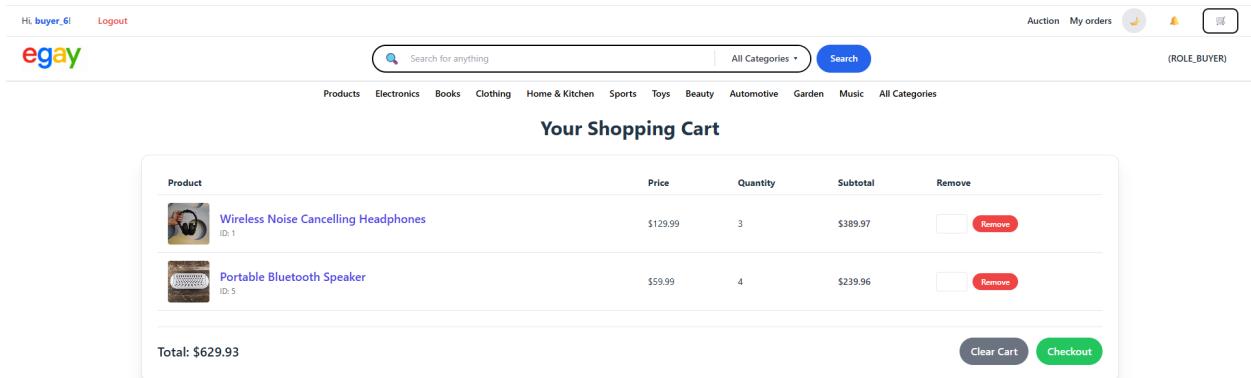
The screenshot shows the shopping cart after the 'Phased optimizing policy' item was removed. Only the 'Anti-Theft Travel Backpack' item remains in the cart.

2.4 Clear cart

Step 1: Login or register to the system (follow step in 1.1)

Step 2: From the home page , click to “cart” icon to go to cart page.

Step 3 : click “clear cart” button



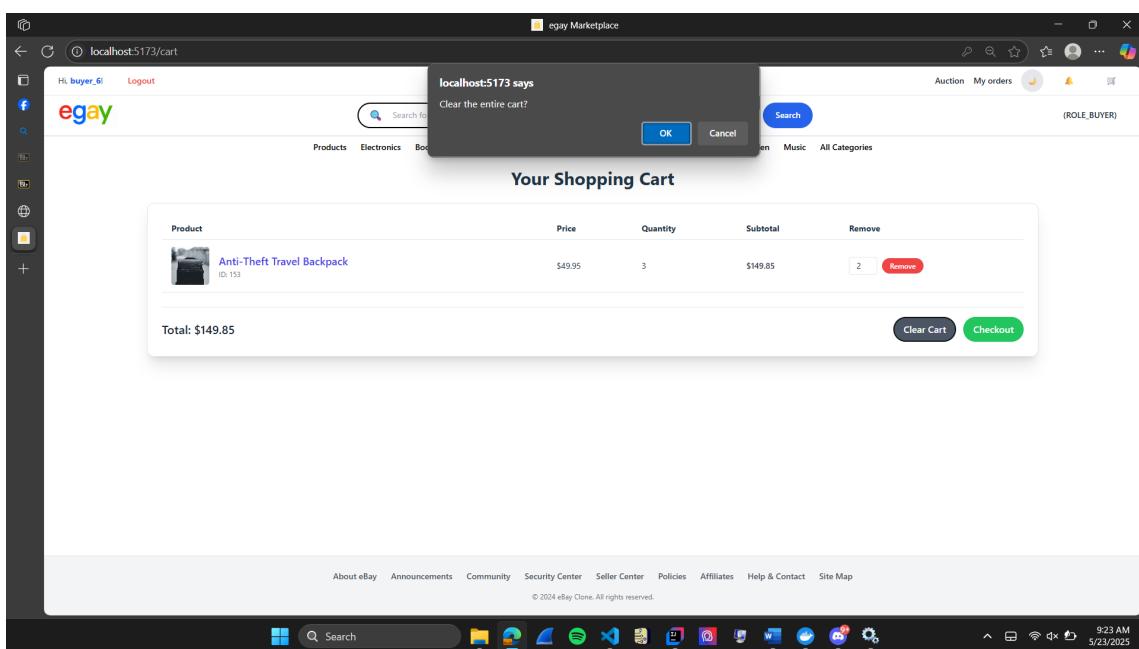
The screenshot shows the egay marketplace website. At the top, there is a navigation bar with links for Auction, My orders, notifications, and user role (ROLE_BUYER). Below the navigation is a search bar with placeholder text "Search for anything" and a "Search" button. A dropdown menu labeled "All Categories" is visible. The main content area is titled "Your Shopping Cart". It displays a table with two items:

Product	Price	Quantity	Subtotal	Remove
Wireless Noise Cancelling Headphones ID: 1	\$129.99	3	\$389.97	<input type="button" value="Remove"/>
Portable Bluetooth Speaker ID: 5	\$59.99	4	\$239.96	<input type="button" value="Remove"/>

Total: \$629.93

At the bottom right of the cart table are two buttons: "Clear Cart" and "Checkout".

Step 4: After click “clear cart”button , a pop-up warning will appear , Click “ok” button on pop-up

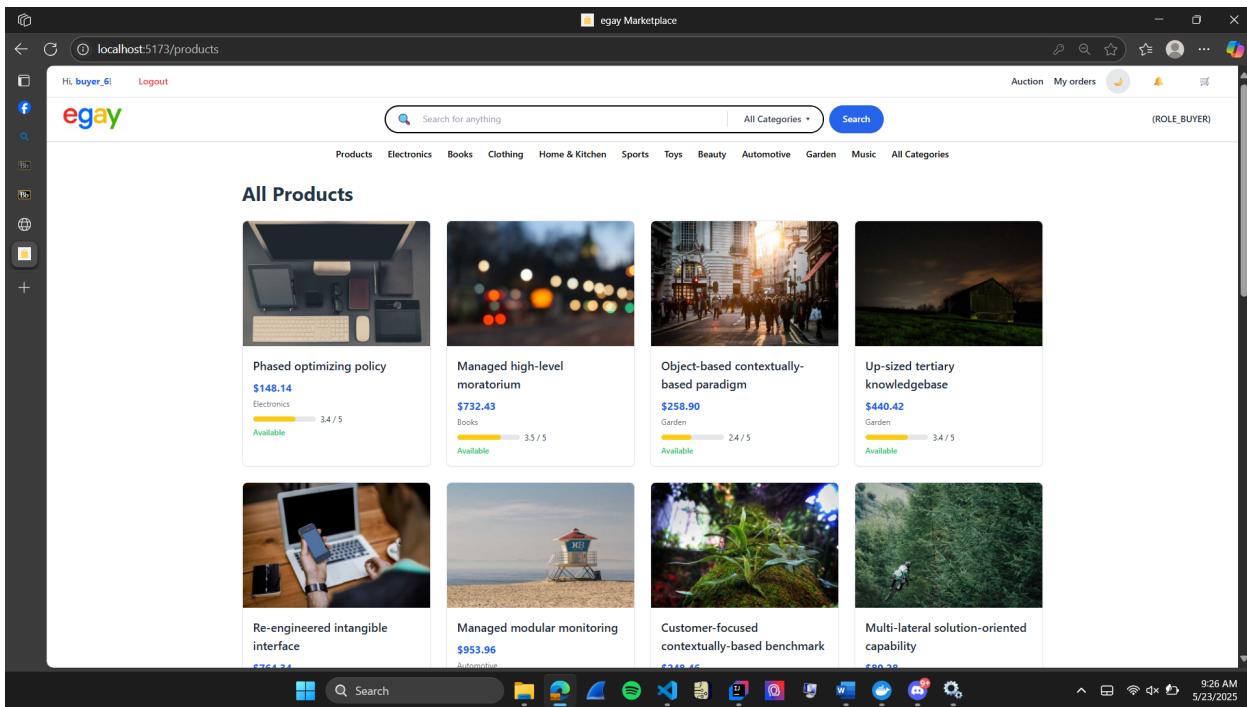


The screenshot shows the egay marketplace website with a confirmation dialog box overlaid. The dialog box has a dark background and contains the text "localhost:5173 says" followed by "Clear the entire cart?". It features two buttons: "OK" and "Cancel". The rest of the page is visible in the background, showing the shopping cart interface with one item: Anti-Theft Travel Backpack (ID: 153) priced at \$49.95 for 3 units, totaling \$149.85. The "Clear Cart" button is visible at the bottom of the cart table.

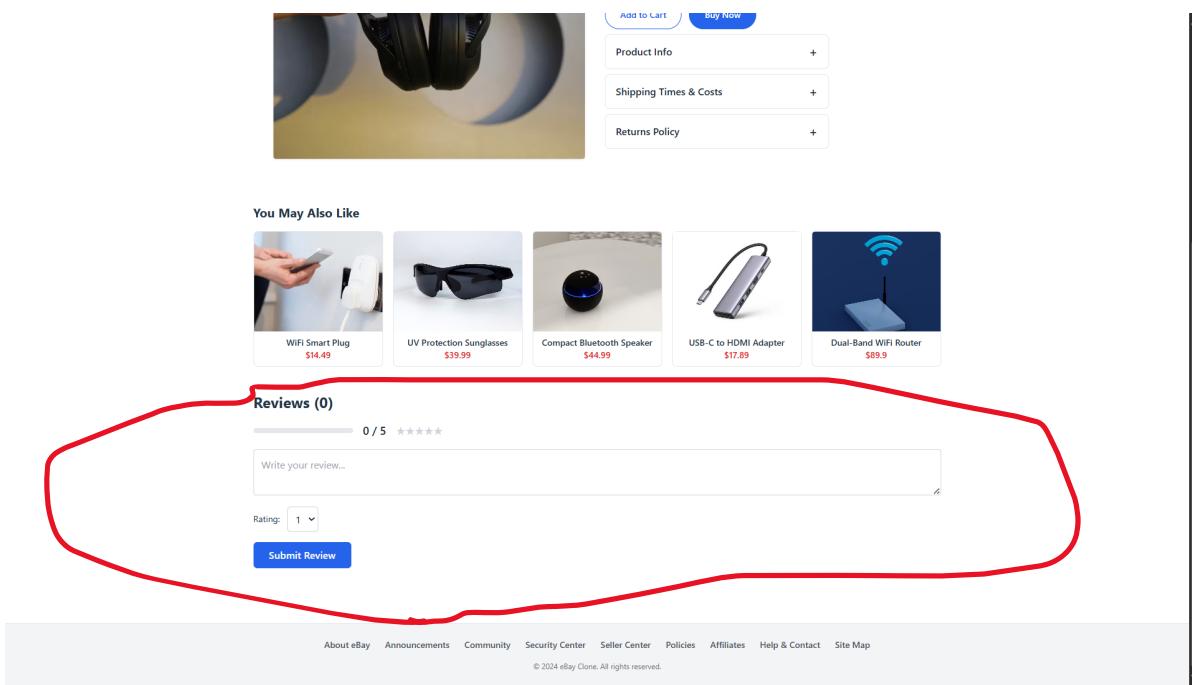
2.5 Add comment and rating

Step 1: Login or register to the system (follow step in 1.1)

Step 2: From product page, you can view and click on the product that you want to leave your comment.



Step3: From “product detail” page, scroll down until you see comment and rating section.



Step 4: Customer can leave your comments in “comment” text box and choose the rating in “rating” drop down

Reviews (74)

3.4 / 5 ★★★★☆

Write your review...

Rating: 1 ▾

Submit Review

After leave the review and rating, click “submit review” button:

Reviews (74)

3.4 / 5 ★★★★☆

test review

Rating: 2 ▾

Submit Review

Step 5: After, you click submit review, a pop up will show up that show “you have leave review success”

The screenshot shows a product page for a pair of headphones. At the top right, there's a 'Review submitted!' message with a green checkmark and a red arrow pointing to it from the left. Below the message, there are buttons for 'Add to Cart' and 'Buy Now'. To the left of the message, there's a sidebar with links for 'Product Info', 'Shipping Times & Costs', and 'Returns Policy'. The main content area features a 'You May Also Like' section with five items: WiFi Smart Plug (\$14.49), UV Protection Sunglasses (\$39.99), Compact Bluetooth Speaker (\$44.99), USB-C to HDMI Adapter (\$17.89), and Dual-Band WiFi Router (\$89.9). Below that is a 'Reviews (1)' section with a 3/5 rating. A user review by 'buyer_6' is shown, reading 'anh ne béo'. The bottom of the page includes a URL bar with 'localhost:5173/products/27'.

2.6 place a bid on auction

Step 1: go to Auction page:

The screenshot shows a local development environment for the egay Marketplace. The browser's address bar displays "localhost:5173/auctions". The page title is "Active Auctions". A featured auction for "Upgradable stable task-force" is shown, currently active with a bid of \$464.89. The auction ends at 3:02 AM on May 31, 2025. A "Bid Now" button is visible.

Step 2: choose the auction you want to bid (with the tag active)

Step 3: go to the detail auction item page

The screenshot shows the detailed view of the auction item. It includes a product image of coffee beans, a summary box with current price (\$465.10), starting price (\$464.89), total bids (3), start time (May 31, 2025 - 2:59 AM), and end time (May 31, 2025 - 3:02 AM). Below this is a "Place Your Bid" form with a bid amount of \$465.12 and a "Place Bid" button. At the bottom is a "Bid History" table showing three bids:

RANK	BIDDER	AMOUNT	TIME
1	ITCSIU22271	\$465.10	May 31, 2025 - 3:01:20 AM
2	LeHung1213	\$465.02	May 31, 2025 - 3:01:00 AM
3	ITCSIU22271	\$464.98	May 31, 2025 - 3:00:24 AM

Step 4: place a legitimate price for the product and the bid is updated on the bid history card immediately.

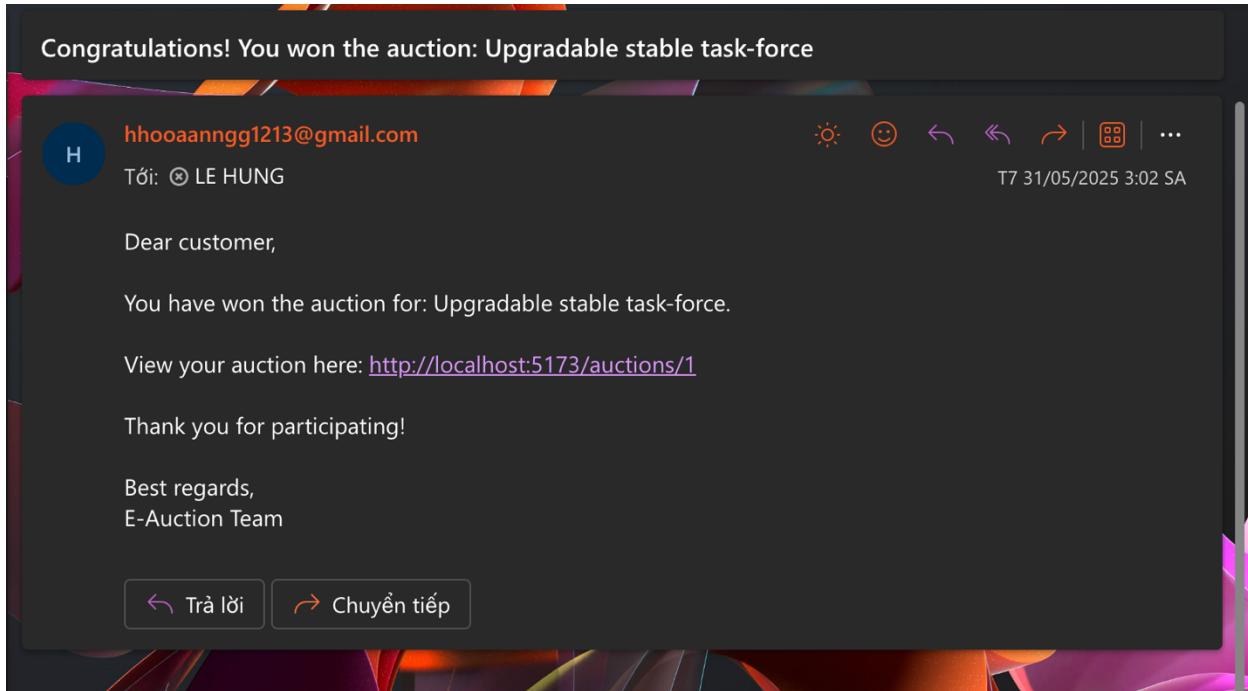
The screenshot shows a web browser window with the URL localhost:5173/auctions/1. The page displays an auction for coffee beans. The current price is \$465.16. The bid history table shows two entries:

RANK	BIDDER	AMOUNT	TIME
1	ITCSIU22271	\$465.16	May 31, 2025 - 3:01:35 AM
2	ITCSIU22271	\$465.12	May 31, 2025 - 3:01:29 AM

If the auction ended and bidder win, their name will be display on the auction detail page:

The screenshot shows the egay Marketplace auction detail page for the coffee beans. The auction has ended, and the winning bidder is listed as ITCSIU22271. The winning bid amount is \$465.26.

Concurrently, the bidder will receive an email sent to announce and confirm the winning of the auction:



2.7 Checkout and make purchase.

Step 1: go to cart page and check (add more or delete product from cart before checkout). Then click button checkout

Hi, LeHung1213! Logout

Edit Account Sell Auction My orders

egay

Search for anything All Categories Search (ROLE_SELLER)

Products Electronics Books Clothing Home & Kitchen Sports Toys Beauty Automotive Garden Music All Categories

Your Shopping Cart

Product	Price	Quantity	Subtotal	Remove
Up-sized tertiary knowledgebase ID: 24	\$440.42	1	\$440.42	<input type="button" value="Remove"/>
Customer-focused contextually-based benchmark ID: 29	\$248.46	1	\$248.46	<input type="button" value="Remove"/>

Total: \$688.88

Clear Cart Checkout

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Step 2: Review the new order:

The screenshot shows the eBay clone's checkout process. At the top, there is a navigation bar with links for 'Edit Account', 'Sell', 'Auction', 'My orders', a user icon, a bell icon, and a shopping cart icon. Below the navigation is the eBay logo and a search bar with the placeholder 'Search for anything'. To the right of the search bar are 'All Categories' and a blue 'Search' button. A sub-navigation bar below the main one includes links for 'Products', 'Electronics', 'Books', 'Clothing', 'Home & Kitchen', 'Sports', 'Toys', 'Beauty', 'Automotive', 'Garden', 'Music', and 'All Categories'. The main content area is titled 'Checkout' and contains a section titled 'Review Your Order'. It displays 'Items in cart: 2' and 'Total Amount: \$688.88'. A large green button at the bottom of this section says 'Place Order & Proceed to Payment'. At the very bottom of the page, there is a footer with links for 'About eBay', 'Announcements', 'Community', 'Security Center', 'Seller Center', 'Policies', 'Affiliates', 'Help & Contact', and 'Site Map', followed by a copyright notice: '© 2024 eBay Clone. All rights reserved.'

Step 3: choose one payment method

This screenshot continues the checkout process. The top navigation bar and sub-navigation bar are identical to the previous screen. The main content area now displays a message 'Order Placed (ID: 63)' and 'Status: PENDING_PAYMENT'. It also shows the total amount 'Total Due: \$688.88'. Below this, there is a section titled 'Select Payment Method' with two options: a blue button labeled 'Pay with Card (Stripe)' and a dark grey button labeled 'Cash On Delivery'. At the bottom of the page, the footer links and copyright notice are present.

Step 4: Confirm transaction and order:

The screenshot shows the eBay checkout process. At the top, there's a navigation bar with 'Hi, LeHung1213!', 'Logout', 'Edit Account', 'Sell', 'Auction', 'My orders', and user icons. Below the navigation is the eBay logo and a search bar with 'Search for anything'. A dropdown menu for 'All Categories' is open. On the right, it says '(ROLE_SELLER)'. The main content area has a title 'Checkout'. A box titled 'Cash On Delivery Confirmed' contains the following information:
Your order (ID: 63) has been placed successfully.
Payment Method: Cash On Delivery
Amount Due: **\$688.88**
Transaction ID: COD_63_1748637248786
Order Status: PENDING_PAYMENT
Please keep the exact amount of **\$688.88** ready for payment upon delivery. Our team will contact you shortly to confirm delivery details.
A green button at the bottom of this box says 'Track Your Order / View Order Details'.

Step 5: Thank you message:

This screenshot continues the eBay checkout process. The top navigation bar and search bar are identical to the previous screenshot. The main content area has a title 'Checkout'. A blue banner at the top says 'Cash On Delivery order confirmed!'. Below it is a large green checkmark icon. A box contains the following message:
Thank You! Your Order is Confirmed!
Order ID: 63
Your order for Cash On Delivery has been confirmed. We will contact you for delivery.
A blue button at the bottom of this box says 'View My Orders'.

Step 6: view order details:

Products Electronics Books Clothing Home & Kitchen Sports Toys Beauty Automotive Garden Music All Categories

Order Details

Order ID: 63
Customer: LeHung123

[← Back to My Orders](#)

Order Information

Date: 5/31/2025
Status: PROCESSING
Total Amount: \$688.88

Shipping Address

Di An City, Dorm A

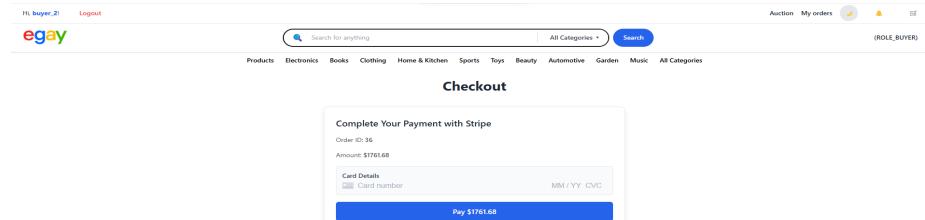
Billing Address

Di An City, Dorm A

Items in this Order

	Up-sized tertiary knowledgebase Product ID: 24 Quantity: 1 Price per item: \$440.42	Subtotal: \$440.42
	Customer-focused contextually-based benchmark Product ID: 29 Quantity: 1 Price per item: \$248.46	Subtotal: \$248.46

[if customer pay by card number – using stripe service], after choosing Pay with Stripe, the form for filling card number is displayed:



The screenshot shows the eBay checkout process. At the top, there's a navigation bar with links for 'Hi, buyer_21' and 'Logout'. The main header says 'Checkout'. Below it, a box titled 'Complete Your Payment with Stripe' displays the order ID (16) and amount (\$1763.68). It has fields for 'Card Details' (including 'Card number' and 'MM / YY CVC') and a large blue button labeled 'Pay \$1763.68'.

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Enter card number:

Card Details

4242 4242 4242 4242 12 / 25 123 111

Confirm success:

Hi buyer_2! [Logout](#)

Search for anything [All Categories](#) [Search](#)

(ROLE_BUYER)

Products Electronics Books Clothing Home & Kitchen Sports Toys Beauty Automotive Garden Music All Categories

Checkout

Stripe payment successful! Transaction ID: pi_3RT8jZHM7UpjLoh1kDLive. Finalizing order...

Thank You! Your Order is Confirmed!

Order ID: 36
Your payment was successful. We've received your order and will process it shortly.

[View My Orders](#)

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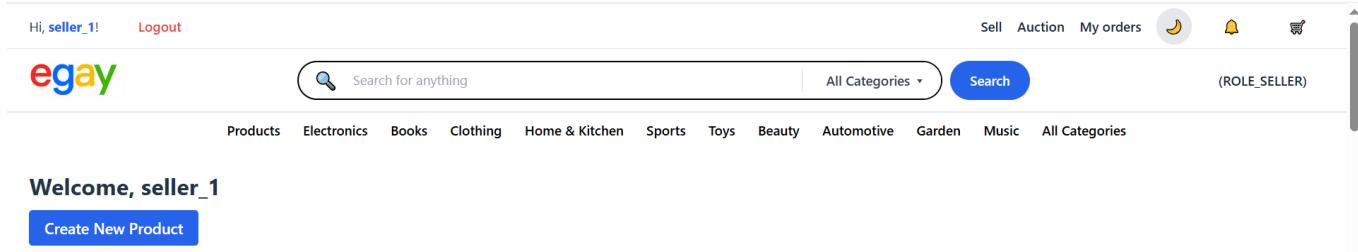
3. SELLER USE CASE

3.1 create product.

Step 1: Access to seller page

From the homepage, log in with your seller account and navigate to the seller dashboard.

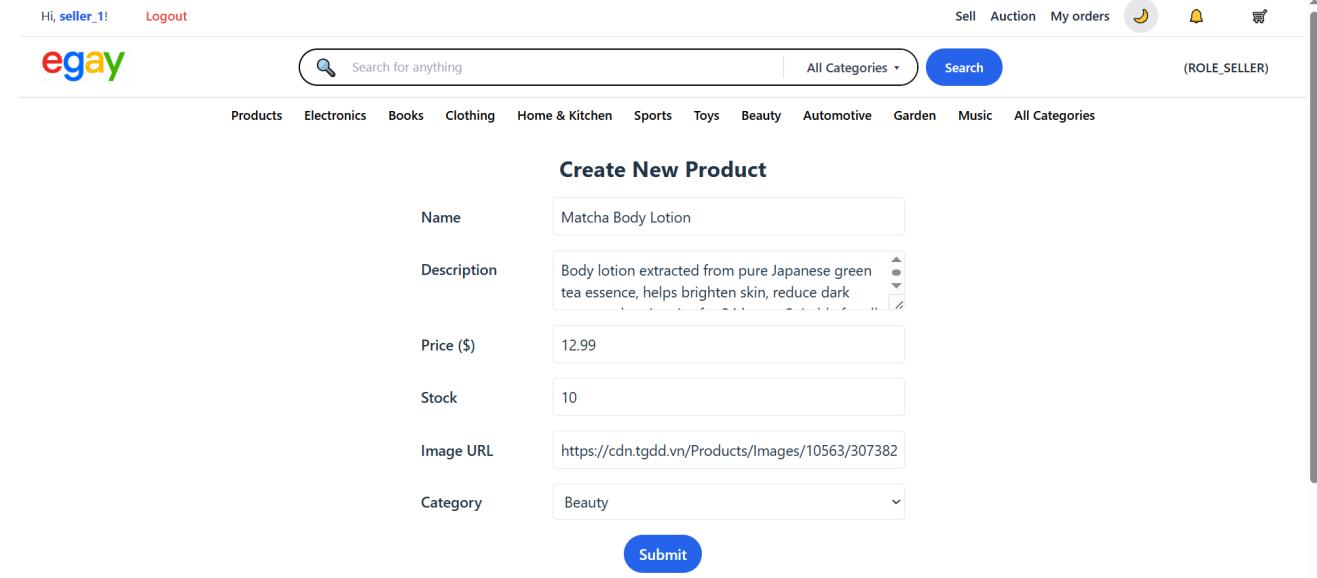
Click on the "Create New Product" button to begin adding a new item to your store.



The screenshot shows the eGay seller dashboard homepage. At the top, there are links for 'Hi, seller_1!', 'Logout', 'Sell', 'Auction', 'My orders', a notification bell icon, and a shopping cart icon. Below the header is the eGay logo and a search bar with the placeholder 'Search for anything'. A 'Search' button is next to the search bar. To the right of the search bar is a dropdown menu labeled '(ROLE_SELLER)'. Below the search area is a navigation bar with categories: Products, Electronics, Books, Clothing, Home & Kitchen, Sports, Toys, Beauty, Automotive, Garden, Music, and All Categories. A welcome message 'Welcome, seller_1' is displayed, followed by a blue 'Create New Product' button.

Step 2: Fill Out the Product Creation Form

After clicking the button, a form titled "Create New Product" will appear. Fill in the required fields.



The screenshot shows the 'Create New Product' form. The form has the following fields:

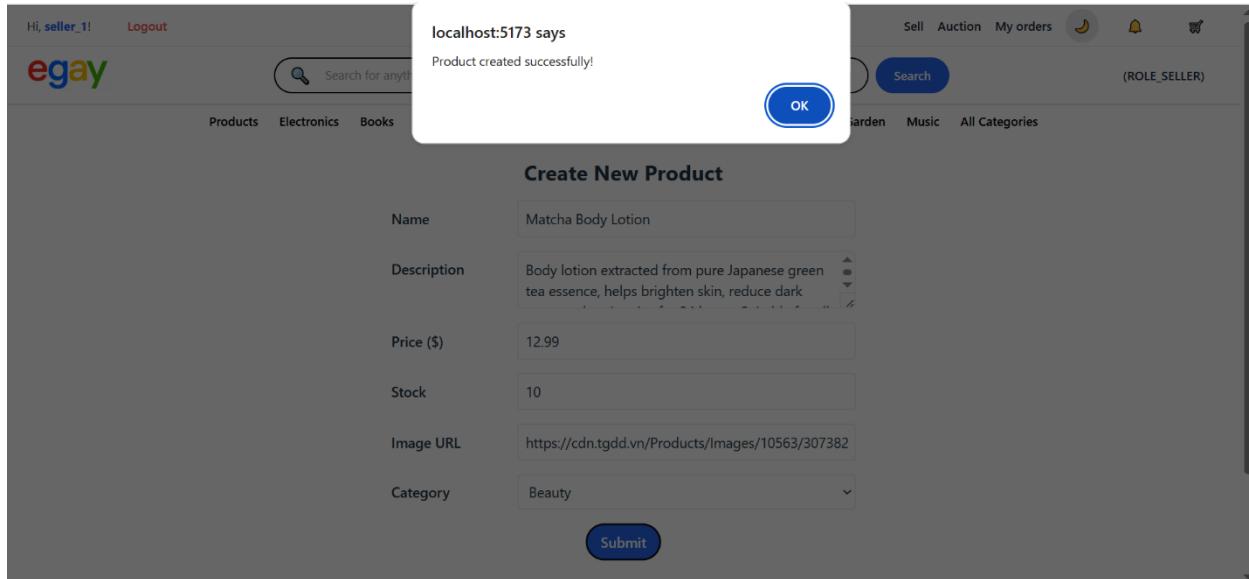
Create New Product	
Name	Matcha Body Lotion
Description	Body lotion extracted from pure Japanese green tea essence, helps brighten skin, reduce dark
Price (\$)	12.99
Stock	10
Image URL	https://cdn.tgdd.vn/Products/Images/10563/307382
Category	Beauty

At the bottom of the form is a blue 'Submit' button.

Step 3: Submit the form

After completing all required fields in the product creation form, click the Submit button at the bottom of the form.

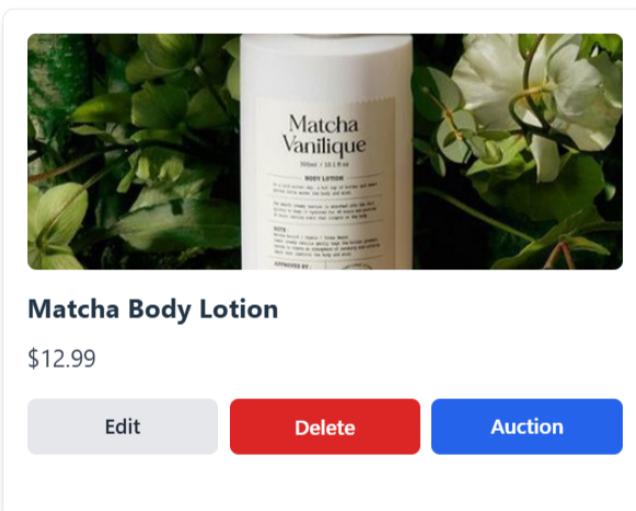
A confirmation popup will appear (e.g., “Product created successfully”).



Step 4: View the Newly Created Product

Once the product is created, the system automatically redirects the user back to the Seller Page.

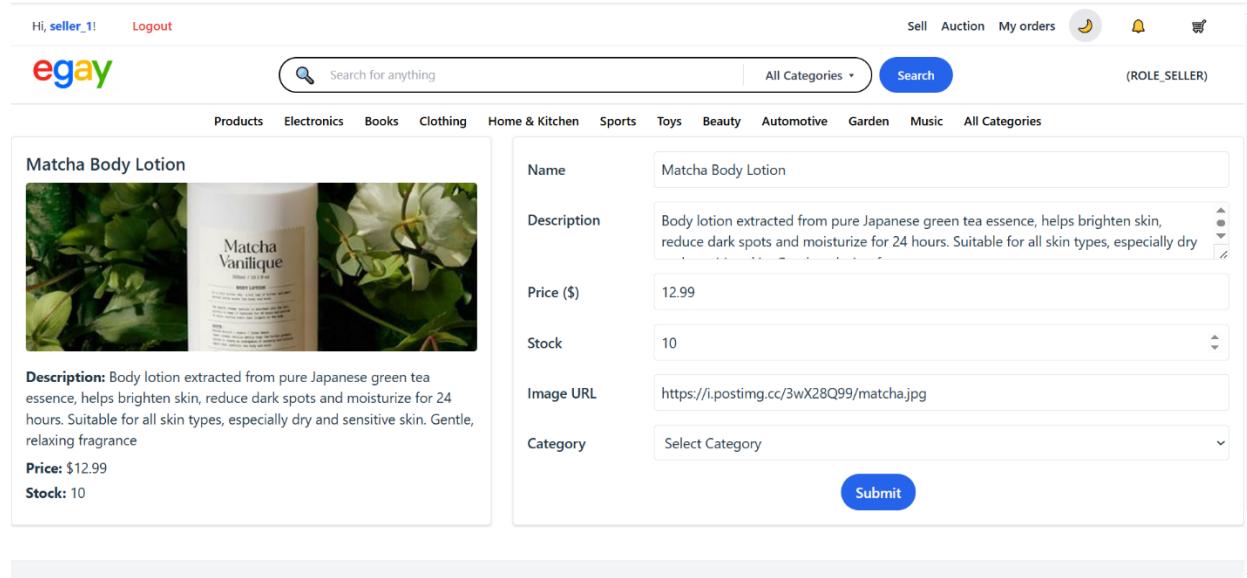
The newly created product is now displayed in the seller's product list.



3.2 update an existing product

On the seller dashboard, locate the product you want to update.

Click the Edit button underneath the product card.

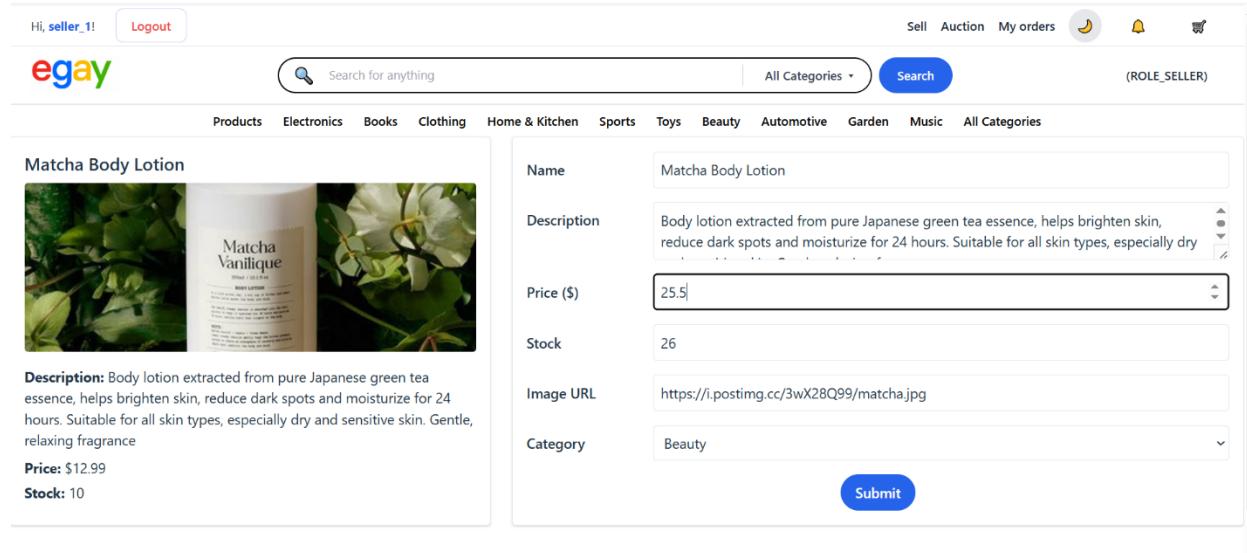


The screenshot shows the egay seller dashboard. At the top, there are links for 'Hi, seller_1!', 'Logout', 'Sell', 'Auction', 'My orders', and notifications. The search bar contains 'Search for anything' and 'All Categories'. A blue 'Search' button is next to it. On the right, it says '(ROLE_SELLER)'. Below the header, there's a navigation menu with categories: Products, Electronics, Books, Clothing, Home & Kitchen, Sports, Toys, Beauty, Automotive, Garden, Music, and All Categories. A product card for 'Matcha Body Lotion' is displayed. The card includes a thumbnail image of the lotion bottle, its name, a brief description, price (\$12.99), stock (10), and a link to its image URL. To the right of the card is a detailed edit form. The form fields are: Name (Matcha Body Lotion), Description (Body lotion extracted from pure Japanese green tea essence, helps brighten skin, reduce dark spots and moisturize for 24 hours. Suitable for all skin types, especially dry), Price (\$) (12.99), Stock (10), Image URL (https://i.postimg.cc/3wX28Q99/matcha.jpg), and Category (Select Category). A blue 'Submit' button is at the bottom right of the form.

Step 2: Modify the Product Details

In the product form, update the information as needed. You can change the price, stock quantity, or even update the description or image URL.

For example, the price was updated from \$12.99 to \$25.5, and the stock from 10 to 26.



This screenshot shows the same egay seller dashboard and product card for 'Matcha Body Lotion' as the previous one. The product card remains the same. To the right is the updated edit form. The changes made are: Price (\$) is now 25.5, and Stock is now 26. All other fields (Name, Description, Image URL, Category) remain the same as in the first screenshot. The 'Submit' button is visible at the bottom right of the form.

Step 3: Submit the Changes

After making the desired updates, click the Submit button.

A confirmation popup will appear — e.g., “*Product updated successfully*”.

The screenshot shows a web-based application for managing products. On the left, there's a preview of a product card for "Matcha Body Lotion". The main area contains a form with the following fields:

Name	Matcha Body Lotion
Description	Body lotion extracted from pure Japanese green tea essence, helps brighten skin, reduce dark spots and moisturize for 24 hours. Suitable for all skin types, especially dry and sensitive skin. Gentle, relaxing fragrance.
Price (\$)	25.5
Stock	26
Image URL	https://i.postimg.cc/3wX28Q99/matcha.jpg
Category	Beauty

A blue "Submit" button is at the bottom right of the form. A modal window is overlaid on the page, displaying the message "localhost:5173 says Product updated successfully!" with an "OK" button.

Step 4: View the Updated Product

After successful update, the system redirects to the seller page.

You will now see the product card reflecting the latest changes:

The screenshot shows the "Matcha Body Lotion" product card on the seller's page. It includes the following details:

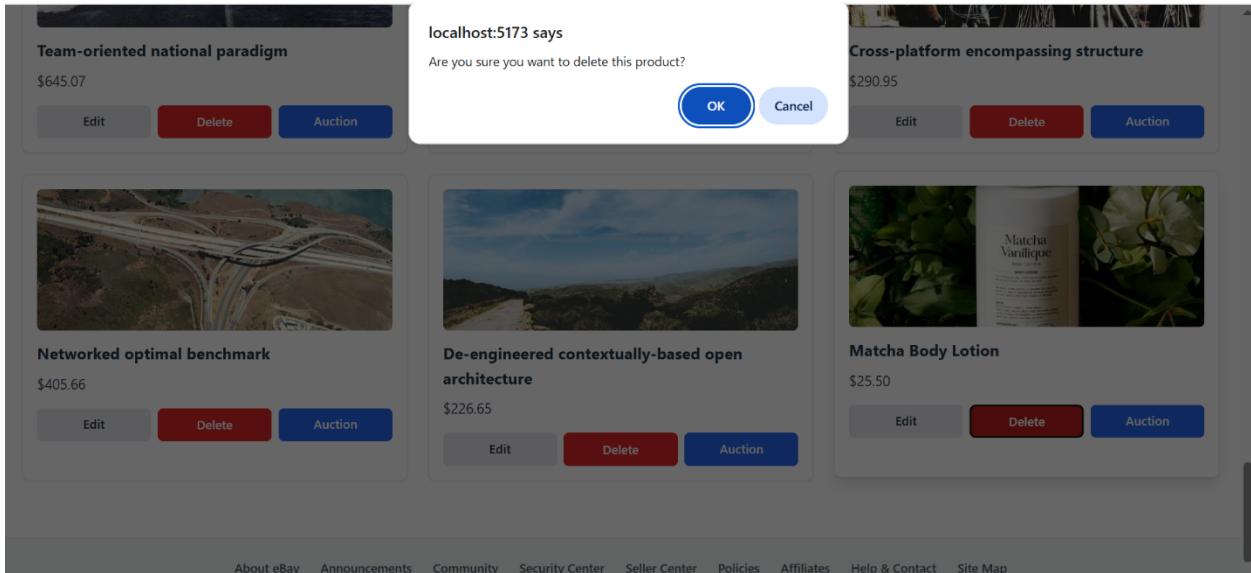
- Image:** A large image of the product bottle surrounded by green leaves.
- Title:** Matcha Body Lotion
- Price:** \$25.50
- Actions:** Buttons for "Edit", "Delete", and "Auction".

3.3 Delete product

Step 1: Click the Delete Button

Click the Delete button below the product card.

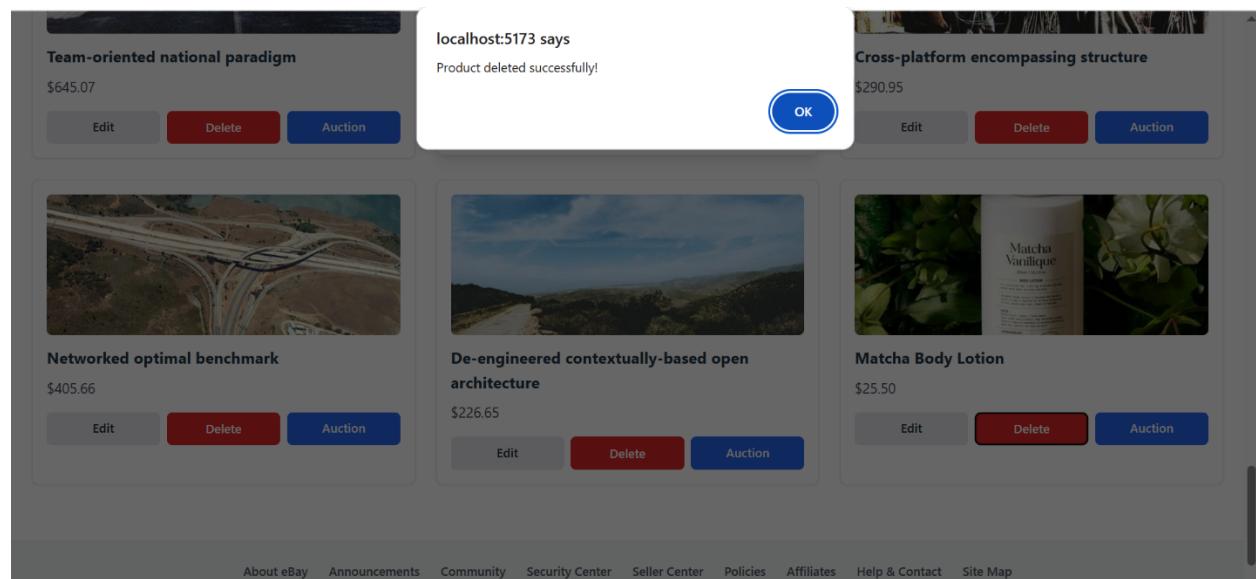
A confirmation dialog will appear asking:
“Are you sure you want to delete this product?”



Step 2: Confirm Successful Deletion

After clicking OK, the system processes the deletion.

A popup message appears: “Product deleted successfully.”



Step 3: View the Updated Product List

Once deletion is successful, the product card will no longer appear in the seller's product list.

The screenshot shows a product listing page with five items:

- Team-oriented national paradigm** (\$645.07): This item is missing from the list.
- Robust client-server help-desk** (\$198.18): This item is present with its original title and price.
- Cross-platform encompassing structure** (\$290.95): This item is present with its original title and price.
- Networked optimal benchmark** (\$405.66): This item is missing from the list.
- De-engineered contextually-based open architecture** (\$226.65): This item is present with a modified title.

Each item card includes "Edit", "Delete", and "Auction" buttons.

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IV. DISSCUSSION AND CONCLUSION

The development of the Egay Website provided a comprehensive understanding of the web application development lifecycle, encompassing system analysis, design, and implementation. Although the current version functions as a proof of concept, multiple areas have been identified for further enhancement to improve functionality and performance. Introducing a product recommendation engine based on user behavior and purchase history would offer a more personalized shopping experience and could significantly increase user engagement and sales. Additionally, migrating the application from a local development environment to a production server is crucial to ensure scalability and support for concurrent user sessions in a real-world setting. The integration of secure payment gateways such as Stripe or PayPal is also essential to enable reliable and secure financial transactions, thereby fostering user trust and platform credibility.

From a developmental perspective, the project contributed substantially to the application of modern web development methodologies and tools. It reinforced proficiency in utilizing contemporary frameworks, managing version control through Git/Github, and adhering to clean coding practices. The ability to accurately interpret and translate system requirements into implementable components was also notably strengthened. Furthermore, exposure to complex problem-solving scenarios, including architectural design decisions and debugging, highlighted the importance of systematic planning, the use of design patterns, and rigorous testing protocols in building dependable web applications.

Overall, the Egay Website project served as a meaningful case study for applying theoretical concepts in a practical development environment. It illustrated the importance of both technical competency and project coordination in the successful delivery of a web-based e-commerce platform. The experience facilitated the cultivation of essential skills in software design, system integration, and collaborative development practices. These outcomes collectively contribute to a stronger foundation for engaging in future professional or academic endeavors within the domain of software engineering and information systems development.

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