

**HO CHI MINH CITY UNIVERSITY TECHNOLOGY AND EDUCATION**



**HCMUTE**

**INSTRUCTOR:**

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# **PROJECT ON SOFTWARE ENGINEERING**

## **BUILDING A HI-TECH ONLINE STORE**

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**SEMESTER: 1 – YEAR: 2020-2021**

## EVALUATION AND SCORE

EVALUATION:

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SCORE:

WORD	NUMBER

## **PREFACE**

Our group are sincerely thankful to Mr. Nguyen Thien Bao – Lecturer of Faculty of Information Technology of Ho Chi Minh City University of Education and Technology. We often have some problems during implementation and testing. Thank to Mr. Bao, we could come over it and complete our project. We are grateful to him.

Thank you,

Mr.Bao

Nguyen Thien Bao

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## I. Purpose:

During COVID-19 pandemic, many people do not go to store many more but buying stuff online on the internet, so the need of an website of online store is becoming more popular in these day

For that, we implement a website that selling hi-tech/electronics using MERN stack for satisfying people's shopping need

## II. Functionals Analysis:

### 1. Functional Business

Number	Function	Description
1	Storage	Web's database stores information about:  Order's information: total price, product list, payment method, tax price, shipping price, ...  User's information: email, name, order history  Product's information: name, description, price, quantity in stock, review, ...
2	Searching	Search for the product's information: name, description, price, quantity in stock, review, ...
3	Authentication	System shall authenticate user and distinguish user role is an admin or not
4	Calculating	Total price of an order Shipping, tax fee User's order history
5	Printing out	List of available products List of user's orders, all orders List of active users List of active products

## 2. Functional System Requirements

Number	Function	Description
1	User Accounts	<p>The customer enters the system as a user or guest. Check for available products, product's information such as price,...</p> <p>For customer who want to purchase product, they must login/register new account</p> <p>Customer can edit his/her profile anytime</p>
2	Registration of user profile	<p>The system shall require a user to register, through 2 method, input information for register or register through social network through google or facebook, to carry out any transactions with it except for checking the list of products and its information. It will ask the user for the following information at the least – email, password</p>
3	Checking product detail and availability	<p>After logging in a user (either a registered user or a guest), the system shall show all information about the product user want to check – name, price, description, is out of stock or not, ...</p>
4	Making purchase	<p>If user want to buy the product and not log on yet, he/she should login into system</p> <p>In case the user wants to purchase, the system charges the price of the ticket to user's credit card or e-wallet such as paypal. After payment, the system will mark the order payment successful status/fail, and admin will mark order delivered status is delivered or not if product is delivered</p>

5	Checking order history	The system will list all of orders and its detail of user for user who want to checking order information
6	View order status	The system shall allow a user to view all information about his orders. After logging on, user can view order detail on purchase history. It retrieves the details of the order and presents them to the user in a convenient format, including any last minute changes, such as delivering and payment status

### 3. Non-functional system requirement

Number	Function	Description
1	Performance	Response time of the software should be less than 2 second most of the time. Response time refers to the waiting time while the software accesses, queries and retrieves the information from the databases
2	Reliability	System shall be available 24 hours a day, 7 days a week System shall always provide real time information about order information.  System shall validate input and authenticate user if is valid or not
3	Integrity	Users need to be authenticated before having access to any personal data  System shall authenticate if user is admin or not to provide access to designated features
4	Usability	System shall provide a easy-to-use graphical interface similar to other existing ecommerce system so that the users do not have difficulty learning using it  Any notification or error messages generated by system shall be clear, polite



### III. Database system

#### 1. Database description

- Users

Name	Type	Value	Notes
id	string	Primary Key	Automated created by DB System
name	string		Required
isAdmin	boolean		Default value: false
email	string		Required
password	string		Required
createdAt	date		Automated created by DB System
updatedAt	date		Automated created by DB System

- Orders

Name	Type	Value	Notes
id	string	Primary Key	Automated created by DB System
userId	string	Foreign Key	
taxPrice	number		
totalPrice	number		

shippingPrice	number		
isPaid	boolean		Default value: false
isDelivered	boolean		Default value: false
orderItems	Products[]		
shippingAddress	string{}		
paymentMethod	string		
paymentResult	string{}		
deliveredAt	date		
createdAt	date		Automated created by DB System
updatedAt	date		Automated created by DB System

- **Products**

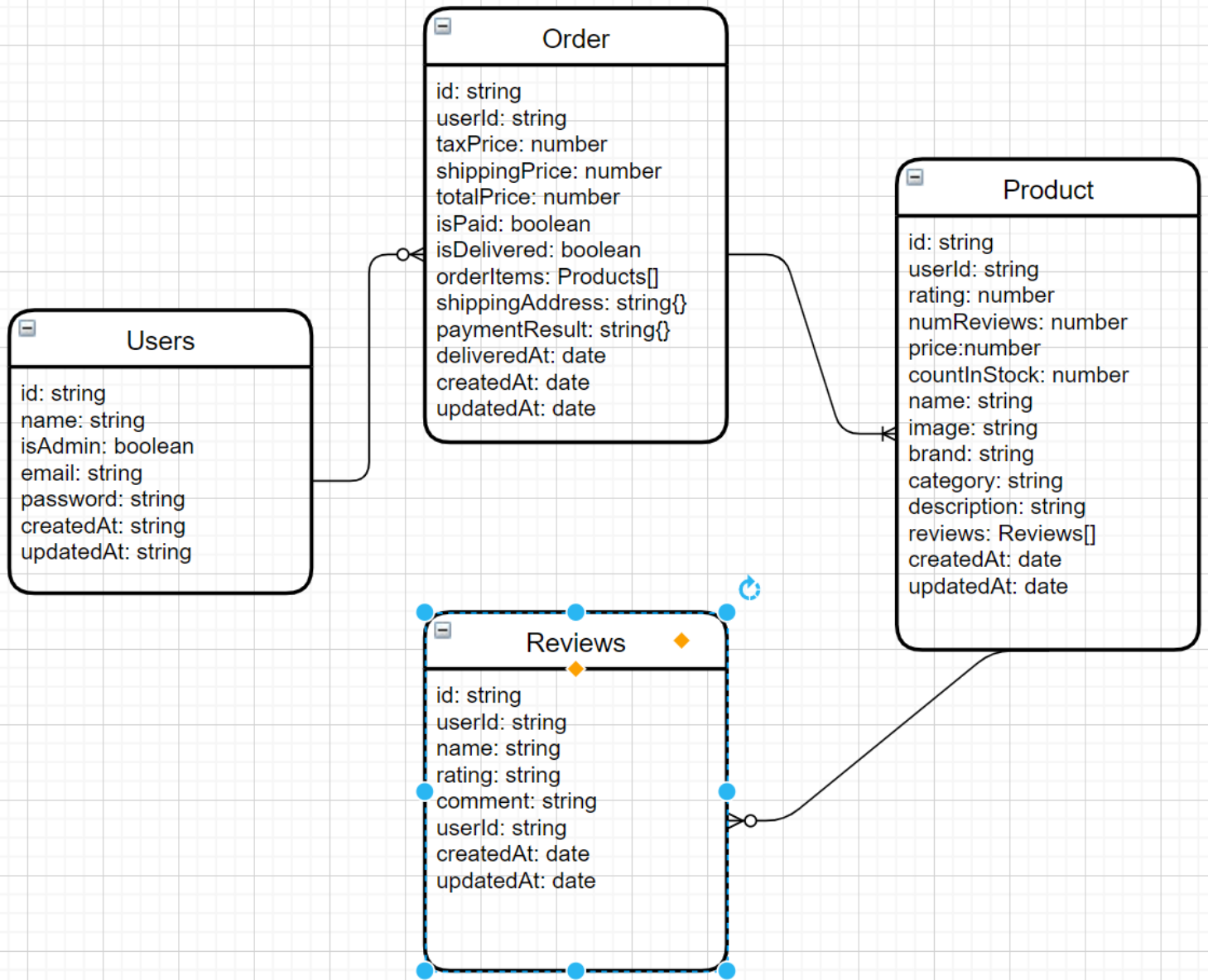
Name	Type	Value	Notes
id	string	Primary Key	Automated created by DB System
userId	string	Foreign Key	
rating	number		Default value: 0
numReviews	number		Default value: 0
price	number		

countInStock	number		
name	string		
image	string		
brand	string		
category	string		
description	string		
reviews	Reviews[]		
createdAt	date		Automated created by DB System
updatedAt	date		Automated created by DB System

- **Reviews**

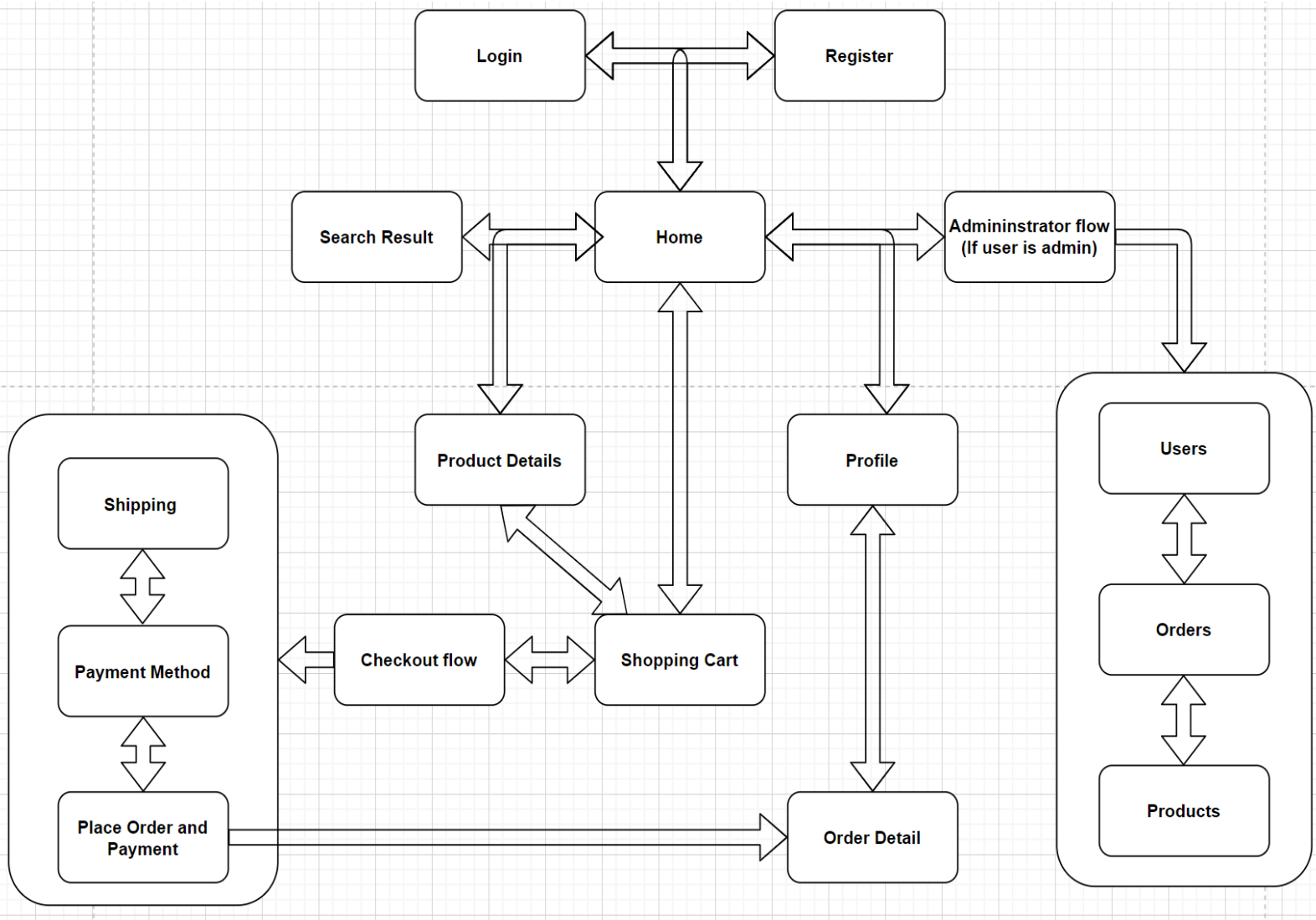
Name	Type	Value	Notes
id	string	Primary Key	Automated created by DB System
name	string		
rating	string		
comment	string		
userId	string	Foreign Key	
createdAt	date		Automated created by DB System
updatedAt	date		Automated created by DB System

## 2. Database relationship

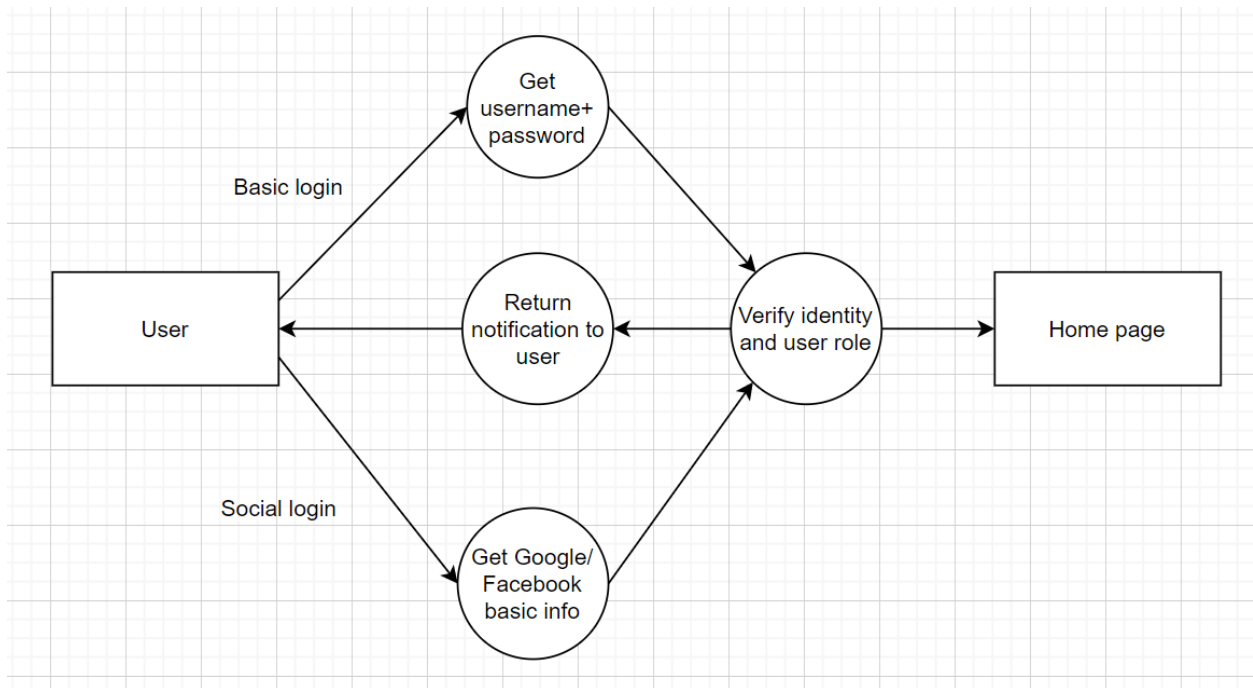


## IV. UI Design Of Hi-Tech Online Store

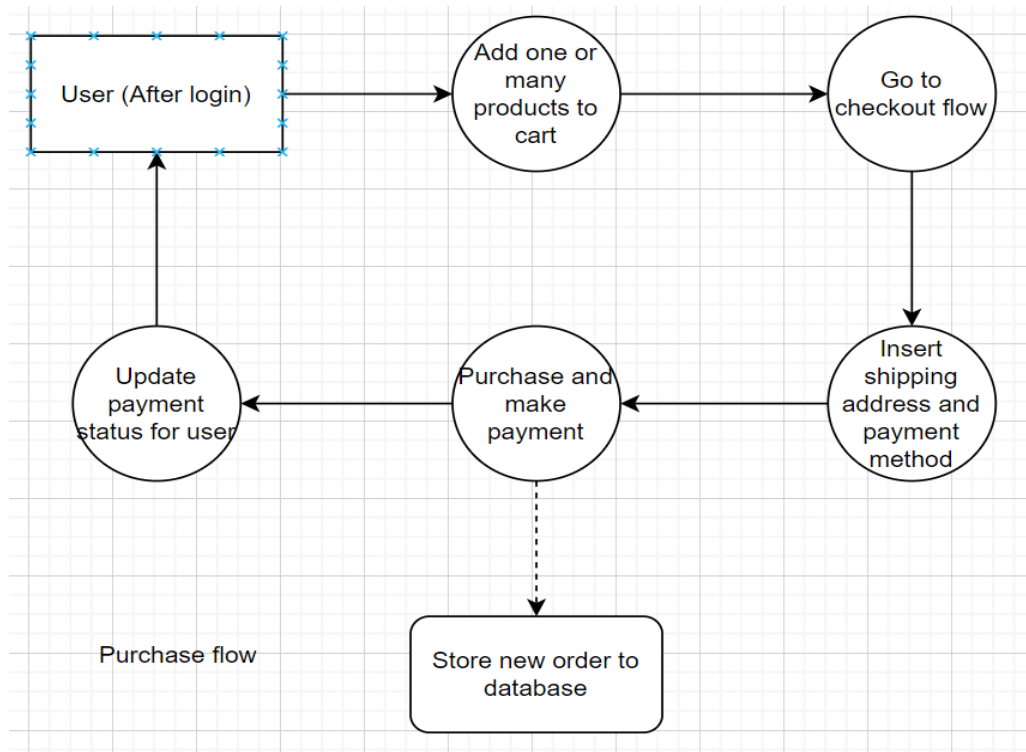
### 1. GUI Flow



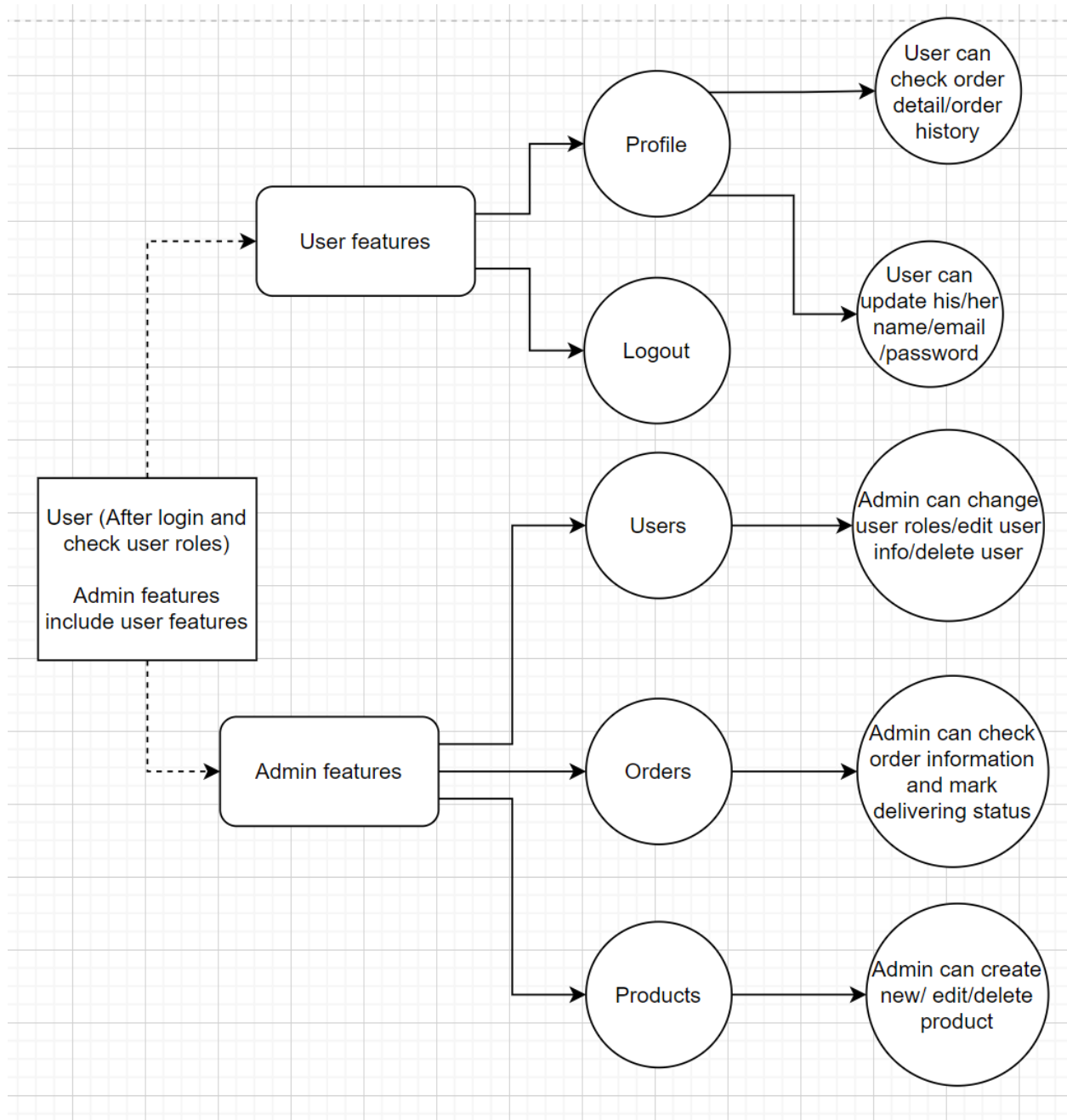
## 2. Login Flow:



## 3. Purchase Flow:



#### 4. User privileges flow:



## 5. Screen design

- **Login screen:** In this screen user input username and password to login, another way to login is through social network (google, facebook)

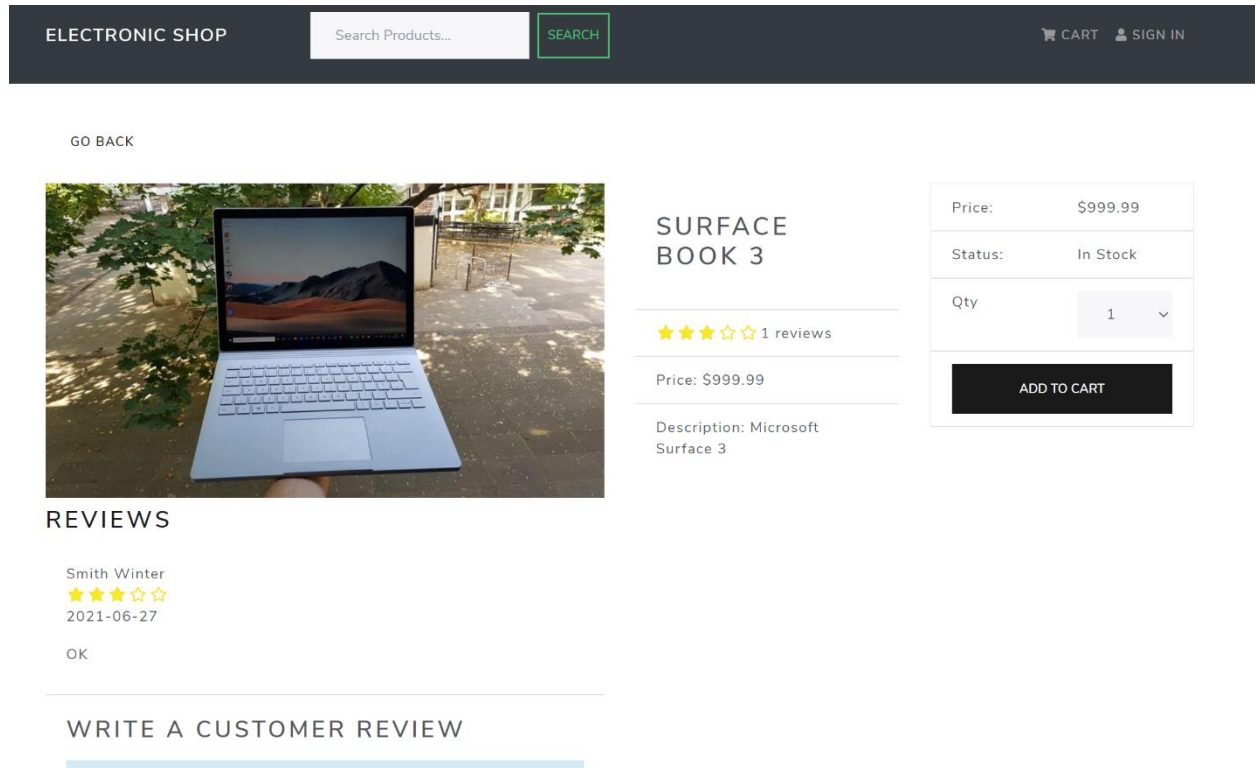
The screenshot shows the top navigation bar of an 'ELECTRONIC SHOP' with a search bar and 'CART' and 'SIGN IN' links. The main content area is titled 'SIGN IN' and contains two input fields: 'Email Address' with a placeholder 'Enter email' and 'Password' with a placeholder 'Enter password'. Below these fields are three buttons: 'LOGIN', 'GOOGLE' (with a Google logo), and 'FACEBOOK' (with a Facebook logo). At the bottom, there is a link that says 'New Customer? Register'.

- **Register screen:** In this screen user input username and password to register

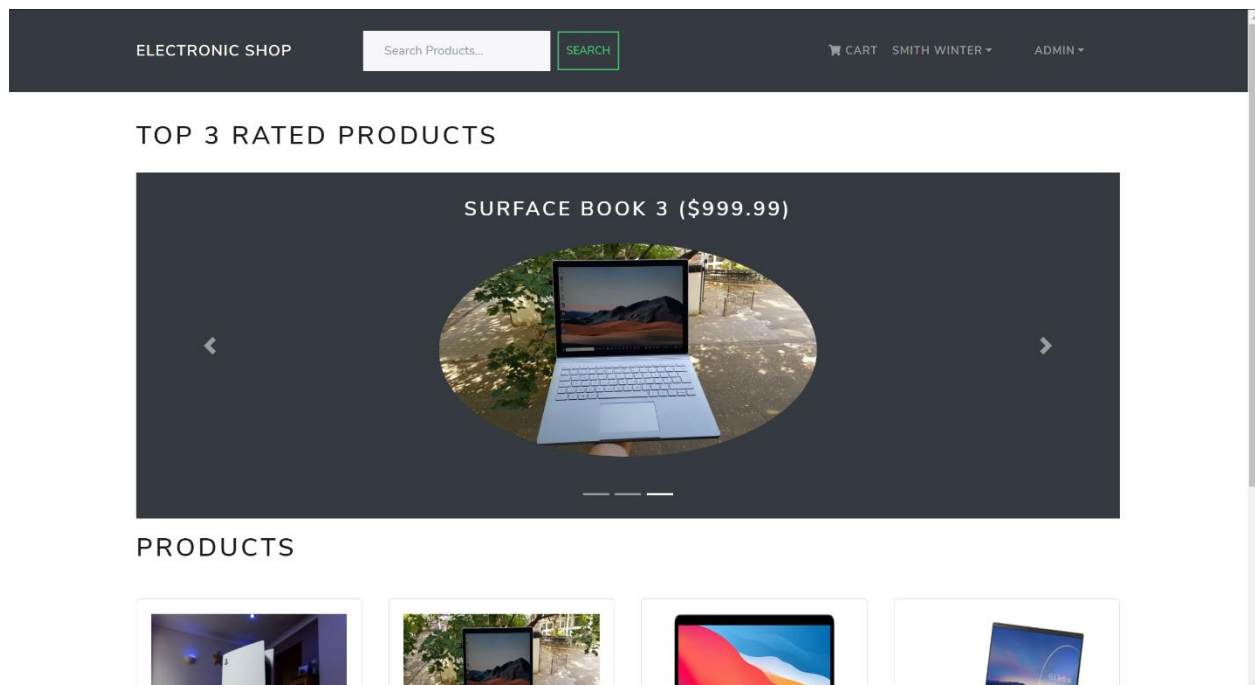
The screenshot shows the top navigation bar of an 'ELECTRONIC SHOP' with a search bar and 'CART' and 'SIGN IN' links. The main content area is titled 'SIGN UP' and contains four input fields: 'Name' with a placeholder 'Enter name', 'Email Address' with a placeholder 'Enter email', 'Password' with a placeholder 'Enter password', and 'Confirm Password' with a placeholder 'Confirm password'. Below these fields is a 'REGISTER' button. At the bottom, there is a link that says 'Have an Account? Login'.



- **Homepage:** In this screen, there are carousel display top rated products and products list



- **Product detail screen:** In this screen display product information and user review



- **Shipping address screen:** In this screen, user fills information to proceed to payment method screen

ELECTRONIC SHOP

SEARCH

CART SMITH WINTER ADMIN

Sign In

Shipping

Payment

Place Order

SHIPPING

Address

Some Address 123

City

Ho Chi Minh

Postal Code

70000

Country

United States

CONTINUE

- **Payment method screen:** In this screen, user select payment method

ELECTRONIC SHOP

SEARCH

CART SMITH WINTER ADMIN

Sign In

Shipping

Payment

Place Order

PAYMENT METHOD

Select Method

☒ PayPal or Credit Card

CONTINUE

- **Place order screen:** In this screen, user check information of an order then place order

ELECTRONIC SHOP

Search Products...

SEARCH

CART SMITH WINTER ADMIN

Sign InShippingPaymentPlace Order


SHIPPING

Address:Some Address 123, Ho Chi Minh 70000, United States

PAYMENT METHOD

Method: PayPal

ORDER ITEMS

 Surface Book 3

1 x \$999.99 = \$999.99

ORDER SUMMARY

Items	\$999.99
Shipping	\$50.00
Tax	\$150.00
Total	\$1199.99

PLACE ORDER

- **Order detail screen:** This screen display information of an order

ELECTRONIC SHOP

Search Products...

SEARCH

CART SMITH WINTER ADMIN

ORDER 60E5926369B94E3AE074C77A

SHIPPING

Name: Smith Winter

Email: hovuminhduc@gmail.com

Address:Some Address 123, Ho Chi Minh 70000, United States


Not Delivered

PAYMENT METHOD

Method: PayPal

Not Paid

ORDER ITEMS

 Surface Book 3

1 x \$999.99 = \$999.99

ORDER SUMMARY

Items	\$999.99
Shipping	\$50
Tax	\$150
Total	\$1199.99

PayPal

Debit or Credit Card

Powered by PayPal

- **User profile screen:** In this screen, user can edit information and view order history

ELECTRONIC SHOP


CART
SMITH WINTER
ADMIN

### USER PROFILE

Name

Smith Winter

Email Address

hovuminhduc@gmail.com

Password

Enter password

Confirm Password

Confirm password

### MY ORDERS

ID	DATE	TOTAL	PAID	DELIVERED	
60e5926369b94e3ae074c77a	07/07/2021 18:39	1199.99	✗	✗	<input type="button" value="DETAILS"/>
60e580c9315a433d9482594e	07/07/2021 17:24	1199.99	✗	✗	<input type="button" value="DETAILS"/>
60e03c0cb85e9f2f5849ea59	03/07/2021 17:29	1149.99	03/07/2021 17:30	03/07/2021 17:30	<input type="button" value="DETAILS"/>
60dfcbf306a25724fc686159	03/07/2021 09:31	5749.94	03/07/2021 09:31	03/07/2021 09:32	<input type="button" value="DETAILS"/>
60d858cf068f3c1afc393416	27/06/2021 17:54	576.14	27/06/2021 17:56	27/06/2021 17:56	<input type="button" value="DETAILS"/>

- **User list screen:** In this screen, admin can view/edit user's information or delete user

ELECTRONIC SHOP


CART
SMITH WINTER
ADMIN

### USERS

ID	NAME	EMAIL	ADMIN	
5fea1c2a55bea759157f75ca	Admin User	admin@example.com	✓	<input type="button" value="edit"/> <input type="button" value="delete"/>
5fea1c2a55bea759157f75cc	Jane Doe	jane@example.com	✓	<input type="button" value="edit"/> <input type="button" value="delete"/>
5fea847c161b98091517caa0	qwerty	qwerty@example.com	✗	<input type="button" value="edit"/> <input type="button" value="delete"/>
5ff2bc208849e3bc5e16489b	Smith Winter	hovuminhduc@gmail.com	✓	<input type="button" value="edit"/> <input type="button" value="delete"/>
60dd8848a2fb4d1a0cd55f21	The Calvary	thecalvary2806@gmail.com	✗	<input type="button" value="edit"/> <input type="button" value="delete"/>

- **Product list screen:** In this screen, admin can view/edit product's information or delete product









ELECTRONIC SHOP

Search Products... SEARCH

CART SMITH WINTER ADMIN

PRODUCTS

+ CREATE PRODUCT

ID	NAME	PRICE	CATEGORY	BRAND	
5ff2bdda4f3b99bcbcf390a	Playstation 5	\$999.99	Electronics	Sony	 
60d8277f068f3c1afc39326e	Surface Book 3	\$1199.99	Electronics	Microsoft	 
60dd978e376a803100499a44	Macbook Air M1	\$999.99	Laptop	Apple	 
60e0487d484f3c0870bbac29	ASUS Zenbook	\$1299.99	Laptop	Asus	 

- **Order list screen:** In this screen, admin can view all order

ELECTRONIC SHOP

Search Products... SEARCH

CART SMITH WINTER ADMIN

ORDERS

ID	USER	DATE	TOTAL	PAID	DELIVERED	
60e5926369b94e3ae074c77a	Smith Winter	07/07/2021 18:39	\$1199.99	✗	✗	DETAILS
60e580c9315a433d9482594e	Smith Winter	07/07/2021 17:24	\$1199.99	✗	✗	DETAILS
60e041cefa17df2808cc6439	The Calvary	03/07/2021 17:54	\$1199.99	03/07/2021 17:54	✗	DETAILS
60e03c0cb85e9f2f5849ea59	Smith Winter	03/07/2021 17:29	\$1149.99	03/07/2021 17:30	03/07/2021 17:30	DETAILS
60dfcbf306a25724fc686159	Smith Winter	03/07/2021 09:31	\$5749.94	03/07/2021 09:31	03/07/2021 09:32	DETAILS
60d858cf068f3c1afc393416	Smith Winter	27/06/2021 17:54	\$576.14	27/06/2021 17:56	27/06/2021 17:56	DETAILS

## V. Software design

### 1. Identify actors and functions for use case diagrams

Actors	Functions
Admin	<ul style="list-style-type: none"><li>- Login</li><li>- Product management</li><li>- User management</li><li>- Order management</li><li>- Statistics</li></ul>
Customer	<ul style="list-style-type: none"><li>- Login</li><li>- Profile management</li><li>- Search product</li><li>- View product information</li><li>- Review product</li><li>- Make an order</li><li>- Make a payment for an order</li><li>- Statistics</li></ul>

### 2. Description of actors and functions

#### 2.1. Actors and its roles

Actors	Roles
Admin	<ul style="list-style-type: none"><li>- Login system</li><li>- Add new product</li><li>- Edit product</li><li>- Delete product</li><li>- Change user information</li><li>- Delete users</li><li>- View product list</li><li>- View order list</li><li>- View user list</li><li>- Change delivering status of an order</li></ul>

Customer	<ul style="list-style-type: none"> <li>- Login system</li> <li>- Search product</li> <li>- View product information</li> <li>- Make an order and purchase</li> <li>- View order history</li> <li>- Change user information</li> <li>- Review product</li> </ul>
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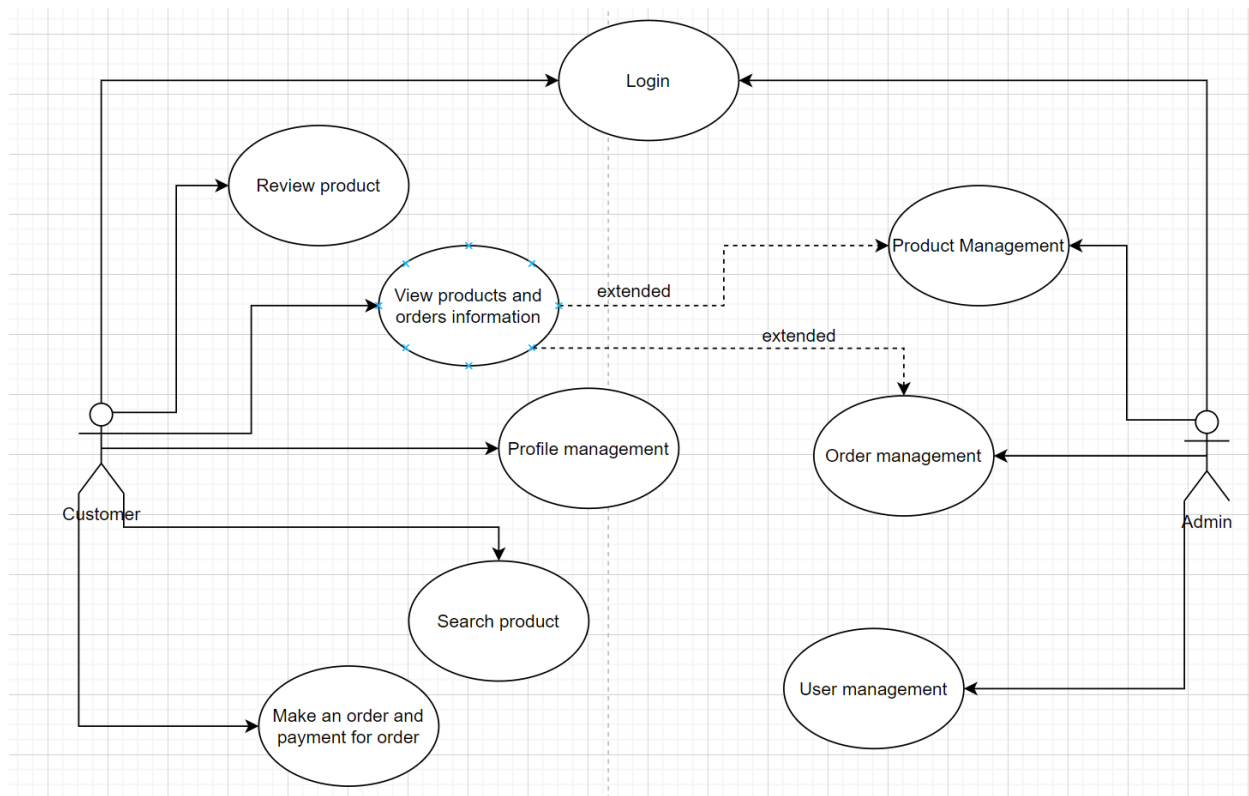
## 2.2. Functions and its roles

ID	Functions	Roles
1	Login system	Authenticate user or admin login to system
2	Add new product	Admin input new product information to the system, such as name, description, price, image, ... in admin panel
3	Edit product	Admin update product information to the system, such as name, description, price, image, ... in admin panel
4	Delete product	Admin deactivate the product from the system in admin panel
5	Change user information	<p>Customer can change information such as name, email, password on his own account</p> <p>Admin can change information such as name, email password excludes user roles on his own</p> <p>Admin can change information such as name, email password, roles on other account</p>
6	Delete users	Admin can deactivate another account (not include his own account) in admin panel in case of special case such as agreement violation
7	View product list	Admin can view all products in admin panel

8	View order list	Admin can view all orders in admin panel
9	View user list	Admin can view all users in admin panel
10	Change delivering status of an order	Admin can go to order detail and change delivering status of an order from not delivered to delivered
11	Search product	User can search product available in system, after searching, display list of product and its detail found base on keyword
12	View product information	User can check product information such as checking if the product is out of stock or not
13	Make an order and purchase	After making an order, user can make payment by using Paypal payment gate
14	View order history	User can view list of order history and its detail
15	Review product	User can review a product and provide feedback to it



### 3. System use case diagrams



#### 3.1. Use case descriptions

Use Case - Login	
<b>Description</b>	Allow admin and customer login to the system
<b>Actors</b>	Customer, admin
<b>Pre-conditions</b>	Customer and admin both know email, password (optional) for login through form or through social network
<b>Steps</b>	<ol style="list-style-type: none"> <li>(1) Admin/Customer go to website</li> <li>(2) Input email and password</li> <li>(3) Press “Login” Button and enter / Press “Google” or “Facebook” to login</li> <li>(4) If login success and user account is not deactivated, direct the user to home page, if not, return notifications to user</li> </ol>

Use Case – Add new product	
<b>Description</b>	Allow admin creates new product in system
<b>Actors</b>	Admin
<b>Pre-conditions</b>	Admin must be logged in to use this function
<b>Steps</b>	<ol style="list-style-type: none"> <li>(1) Admin go to website and go to admin's product management page</li> <li>(2) Input information to form, such as name, description, price, ...</li> <li>(3) After input, press "Add" button</li> <li>(4) If product create successful, new product will be updated to database and display new product in list, otherwise, return error and input again</li> </ol>

Use Case – Edit product	
<b>Description</b>	Allow admin edit selected product in system
<b>Actors</b>	Admin
<b>Pre-conditions</b>	Admin must be logged in to use this function
<b>Steps</b>	<ol style="list-style-type: none"> <li>(1) Admin go to website and go to admin's product management page, press edit button to edit selected product</li> <li>(2) Input information to form, such as name, description, price, ...</li> <li>(3) After input, press "Update" button</li> <li>(4) If product edit successful, selected product will be updated to database and display notification, otherwise, return error and input again</li> </ol>

Use Case – Delete product	
<b>Description</b>	Allow admin delete selected product in system
<b>Actors</b>	Admin
<b>Pre-conditions</b>	Admin must be logged in to use this function
<b>Steps</b>	<ol style="list-style-type: none"> <li>(1) Admin go to website and go to product management page, press delete button to delete selected product</li> <li>(2) Press “Yes” to confirmation box</li> <li>(3) Product has been deleted and system return notification to user</li> </ol>

Use Case – Change user information	
<b>Description</b>	Allow admin and customer edit account information
<b>Actors</b>	Admin, Customer
<b>Pre-conditions</b>	Admin/Customer must be logged in to use this function
<b>Steps</b>	<ul style="list-style-type: none"> <li>• <b>For customer</b> <ol style="list-style-type: none"> <li>(1) Customer go to profile page</li> <li>(2) Customer change information such as name, email, password</li> <li>(3) Customer press “update” button to update the user’s info to database</li> <li>(4) Database will save edit info and return notifications to user</li> </ol> </li> <li>• <b>For admin</b> <ol style="list-style-type: none"> <li>(1) Admin go to user management page</li> <li>(2) Admin change information such as name, email on all accounts but cannot change his own roles</li> <li>(3) Admin press “update” button to update the user’s info to database</li> </ol> </li> </ul>

	(4) Database will save edit info and return notifications to user
--	---

Use Case – Delete user	
<b>Description</b>	Allow admin delete user account (exclude his own)
<b>Actors</b>	Admin
<b>Pre-conditions</b>	Admin must be logged in to use this function
<b>Steps</b>	(1) Admin go to user management page (2) Admin press “Delete” button to selected account (3) Press “Yes” to confirmation box (4) System return user delete successful

Use Case – Change delivering status of an order	
<b>Description</b>	Allow admin change delivering status of an order in the system
<b>Actors</b>	Admin
<b>Pre-conditions</b>	Admin must be logged in to use this function
<b>Steps</b>	(1) Admin go to order management page (2) Press “Detail” to navigate to selected order detail (3) Admin press “Mark as delivered” button to change order’s delivering status

Use Case – Make an order and purchase	
<b>Description</b>	Allow customer to make an order and make payment for it
<b>Actors</b>	Customer
<b>Pre-conditions</b>	Customer must be logged in to use this function Shopping carts must not be empty
<b>Steps</b>	<ol style="list-style-type: none"> <li>(1) Customer fill shipping address form, such as name, address, zip code</li> <li>(2) Customer select payment method</li> <li>(3) Customer check order information for confirmation and make an order</li> <li>(4) Customer make payment for order by using Paypal payment gate</li> </ol>

Use Case – Search product	
<b>Description</b>	Allow customer or guest search a product
<b>Actors</b>	Guest, Admin, Customer
<b>Pre-conditions</b>	None
<b>Steps</b>	<ol style="list-style-type: none"> <li>(1) Admin/Guest/Customer input keyword to search box</li> <li>(2) Press “Search” button to search</li> <li>(3) System will display products that relevant to keyword</li> </ol>

Use Case – View order history	
<b>Description</b>	Allow customer view his order history
<b>Actors</b>	Customer
<b>Pre-conditions</b>	Customer must be logged in to use this function
<b>Steps</b>	<ol style="list-style-type: none"> <li>(1) Customer go to profile page</li> <li>(2) Customer view order history list and press “Details” button to view selected order detail</li> </ol>

Use Case – Review order	
<b>Description</b>	Allow customer review an order
<b>Actors</b>	Customer
<b>Pre-conditions</b>	Customer must be logged in to use this function
<b>Steps</b>	<ol style="list-style-type: none"> <li>(1) User select a product to navigate to product detail</li> <li>(2) User select number of stars and input comment</li> <li>(3) User press “Review” button to upload new review or overwrite previous review of a product to database</li> </ol>

## **VI. Conclusions**

### **1. About knowledge and skill**

Through the time we design and implement hi-tech online store, we have learned many things about teamwork, researching, documentation

- Learn about ReactJS, frontend framework and its library such as React Bootstrap
- Learn about MongoDB database and how to implement back-end with database by using NodeJS with ExpressJS as framework
- Learn about Redux for implementing frontend state management

### **2. About topics**

We build the online store have basic functions of an ecommerce store

- With guest: Guest can visit the store without login
- With customer: Customer can make an order, payment for order, review product and manage profile
- With admin: Admin can manage orders, products and users

However, we have some limitations due to the time limit, such as searching functions for admin and user auto logout after edit profile

### **3. Developing**

This is first time we implement the whole app, including frontend and backend, so we have some mistake due to lack of experience. If we have more time, we will improve UI/UX of the store, implement some functions such as calculate revenue in weekly, monthly, yearly, export receipt to user, backup database schedule, ...

## VII. Resources and References

- ReactJS: [React – A JavaScript library for building user interfaces \(reactjs.org\)](https://reactjs.org/)
- React Bootstrap: [React-Bootstrap · React-Bootstrap Documentation](https://react-bootstrap.github.io/)
- Redux: [Redux - A predictable state container for JavaScript apps. | Redux](https://redux.js.org/)
- NodeJS: [Node.js \(nodejs.org\)](https://nodejs.org/)
- ExpressJS: [Express - Node.js web application framework \(expressjs.com\)](https://expressjs.com/)
- MongoDB: [The most popular database for modern apps | MongoDB](https://www.mongodb.com/)
- Paypal Developer Docs: [PayPal Developer](https://developer.paypal.com/)
- **Source code:** [SmithWinter/TLCN: ElectronicShop \(github.com\)](https://github.com/SmithWinter/TLCN-ElectronicShop)



## VIII. Work distribution table

Member name	Task Assignment	Report Assignment
Ho Vu Minh Duc	<ol style="list-style-type: none"> <li>1. Create MongoDB database instances on its online service</li> <li>2. Implement database model code</li> <li>3. Implement backend middleware and API routes with functions</li> <li>4. Implement Paypal payment gate</li> </ol>	Demo and explain the program
Nguyen Quang Minh	<ol style="list-style-type: none"> <li>1. Implement screens of the website</li> <li>2. Design GUI and UI of the website</li> <li>3. Implement state management code using Redux</li> </ol>	Write the report
Phan Hoang Long	<ol style="list-style-type: none"> <li>1. Design GUI and UI of the website</li> <li>2. Implement state management code using Redux</li> <li>3. Implement screens of the website</li> </ol>	Write the report
All member	<ol style="list-style-type: none"> <li>1. Research ReactJS, Redux, MongoDB, React Bootstrap, NodeJS and ExpressJS</li> <li>2. Testing through the website</li> <li>3. Integrate backend to frontend</li> </ol>	