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INTERNATIONAL UNIVERSITY



WEB APPLICATION DEVELOPMENT PROJECT

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I. INTRODUCTION

1. ABOUT US

In this section, we introduce the nature of our project software development team, the "car selling project". We delve into the foundational aspects of our endeavor – a car selling website project – and highlight the challenges encountered throughout the project's development journey. We joined hands to realize a platform project for trading cars. Our collaboration harnesses our shared skills and vision, creating a user-centric digital space for buying and selling cars.

2. THE PRODUCT'S INFORMATION

In today's increasingly modern era, cars are everywhere, but the variety of showrooms available for sale often leaves users overwhelmed and consumers have to carefully consider price and reputation to avoid being scammed. The challenge lies in finding a balance between price and user-friendly features that easily cater to a diverse audience around the world. The solution we propose is a car exchange website called "car selling", designed with meticulous attention to address these challenges. By providing a streamlined and intuitive user experience combined with powerful functionality, "car selling" aims to foster a favorable environment between sellers and buyers. This initiative is driven by our commitment to making it easier to choose the "companion" for every family's purpose and to establish a global community where people can easily get the exact look they want with the type of vehicle they want.

3. DEVELOPMENT ENVIRONMENT

- + Front End: Using Nodejs: [ReactJS](#), Embedded JavaScript
- + Back End: Implementing Servlets to handle server-side logic
- + Database: Employing MySQL for data storage and management
- + Architecture: Following the Model-View-Controller (MVC) for structuring code.
- + Version Control: Managing code with GitHub to track changes and collaborate. Link github: <https://github.com/ITITIU21171/WebPrj.git>

- + Communication: Using Discord for team meetings and discussions.
- + Task management: Keeping track of work with Google sheet
- + Documentation: Using JSON to store raw data

II. REQUIREMENT ANALYSIS AND DESIGN

This section presents a customized requirements analysis and design framework for the development of the trading platform. It acts as a blueprint for the project implementation, specifying each feature along with the defined conditions, as well as the functional and non-functional requirements outlined by the client. During the development process, we will continuously update and improve future iterations, ensuring an accurate and comprehensive record of the project's progress.

1. REQUIREMENT ANALYSIS

A. FUNCTIONAL REQUIREMENTS

Use case 1: Log in

+ Product scope: Allows users to log into the system to perform their functions.

+ Main action:

Actor: User	System
1. Select the login function	1.1 Display login screen
2. Enter username and password	2.1 Fail -> move to sub-action 2.2 Successful -> display screen
3. End of use case	

+ Sub action

Actor: User	System
1. Password checking	1.1 Noticed that there is wrong username or password 1.2 Re-display login screen 1.3 Return to step 2 in main action
2. Change password 2.1 Click “change password” in login screen 2.2 Enter old password and enter new password, re-enter new password 2.3 Enter new password	2.1 Display screen to change password 2.2.1 Check old password 2.2.2 Check if the new password and re-entered new password are the same 2.3 Display successful notification screen

- + Precondition: User must have an account on the system
- + Post-condition: User successfully logged in

Use case 2: Manage accounts

- + Product scope: Allows admin to manage customer accounts
- + Main action:

User: Admin	System
1. Click “manage account” to request	1.1 Show form “manage account”
2. Action (more details, lock, open account)	2.1 Return the corresponding operation result

- + Precondition: Already have an admin account
- + Post-condition: Manage all accounts

Use case 3: Manage cars

- + Product scope: Allows admin to manage cars in website
- + Main action:

User: Admin	System
1.1 Send a car management request 1.2 Choose “add product” 1.3 Add information of car 1.4 Save new car	1.1 Show manage form 1.2 Show add product form 1.3 Send information of car and check information 1.4 Send notice back
2.1 Send a car management request 2.2 Choose “Update product” 2.3 Change information of car 2.4 Update information of car	2.1 Show manage form 2.2 Show update product form 2.3 Send information of car and check information 2.4 Send notice back
3.1 Send a car management request 3.2 Choose “delete car” 3.3 Update “manage car”	3.1 Show manage form 3.2 Confirm delete and check validity 3.3 Send notice and result back

- + Precondition: Already have an admin account
- + Post-condition: Manage all cars

Use case 4: Manage type of cars

+ Product scope: Allows admin to manage types of all cars

+ Main action:

User: Admin	System
1.1 Send a type of car management request 1.2 Choose “add type of product” 1.3 Add information of type 1.4 Save new type	1.1 Show manage form 1.2 Show add type of product form 1.3 Send information of type and check information 1.4 Send notice back
2.1 Send a type of car management request 2.2 Choose “Update type of product” 2.3 Change information of type 2.4 Update information of type of car	2.1 Show manage form 2.2 Show update type of product form 2.3 Send information of type and check information 2.4 Send notice back
3.1 Send a type of car management request 3.2 Choose “delete type of product” 3.3 Update “manage type of car”	3.1 Show manage form 3.2 Confirm delete and check validity 3.3 Send notice and result back

+ Precondition: Already have an admin account

+ Post-condition: Manage all types of car

Use case 5: Manage origin of products

+ Product scope: Allows admin to manage origin of cars.

+ Main action:

User: Admin	System
1.1 Send a origin management request 1.2 Choose “add origin” 1.3 Add information of origin 1.4 Save new type	1.1 Show origin form 1.2 Show add origin form 1.3 Send information of origin and check validity 1.4 Send notice back
2.1 Send a origin management request 2.2 Choose “Update origin”	2.1 Show manage form 2.2 Show update origin form

2.3 Change information of origin	2.3 Send information of origin and check information
2.4 Update information of origin	2.4 Send notice back
3.1 Send a origin management request	3.1 Show manage form
3.2 Choose “delete origin”	3.2 Confirm delete and check validity
3.3 Update “manage origin”	3.3 Send notice and result back

+ Precondition: Already have an admin account

+ Post-condition: Manage origin of cars

Use case 6: Manage bills

+ Product scope: Allows admin to manage bills

+ Main action:

User: Admin	System
1.1 Send manage bill request	1.1 Show bill form
1.2 Choose see more details	1.2.1 Check id of bill 1.2.2 Send back result 1.2.3 Send back notice
1.3 Choose back	1.3 Return to home page
2.1 Send manage bill request	2.1 Show bill form
2.2 Click received	2.2 Update the bill
3.1 Send manage bill request	3.1 Show bill form
3.2 Click cancelled	3.2 Update the bill

+ Precondition: Already have an admin account

+ Post-condition: Manage all bills

Use case 7: Revenue statistics

+ Product scope: Allows admin to compile revenue statistics

+ Main action:

User: Admin	System
1.1. Send a request for statistical management	1.1 display statistics form
1.2 Statistics of received orders	1.2 request time information
1.3 Choose time	1.3.1 Check information 1.3.2 Send back result

2.1. Send a request for statistical management 2.2 Statistics of cancelled orders 2.3 Choose time	2.1 display statistics form 2.2 request time information 2.3.1 Check information 2.3.2 Send back result
3.1. Send a request for statistical management 3.2 Statistics of best selling orders 3.3 Choose time	3.1 display statistics form 3.2 request time information 3.3.1 Check information 3.3.2 Send back result

+ Precondition: Already have an admin account

+ Post-condition: Revenue Analysis

B. NON-FUNCTIONAL REQUIREMENTS

1. Usability requirements:

- + It is crucial to guarantee that all software components operate accurately and efficiently.
- + The hosting environment must hold an active license to manage incoming requests effectively.
- + A designated administrator should oversee regular software updates and actively monitor for system errors.

2. Usability Requirements:

- + Structured and straightforward to understand.
- + Clear and informative.
- + User-friendly, enabling seamless learning and navigation.
- + Allows users to accomplish tasks effortlessly and error-free.

3. Humanity Requirements:

- + Detailed documentation is provided to ensure users can fully comprehend the system through thorough reading.

- + The graphical user interface (GUI) is designed intuitively to facilitate easy learning and quick user adaptation.

- + Responsive interfaces are a critical aspect, enhancing the overall user experience.

4. Maintainability Requirements:

- + The system is built to support regular updates and modifications. Since users may have limited understanding of its internal processes, the development team must ensure the platform is user-friendly and straightforward for both users and maintenance staff.

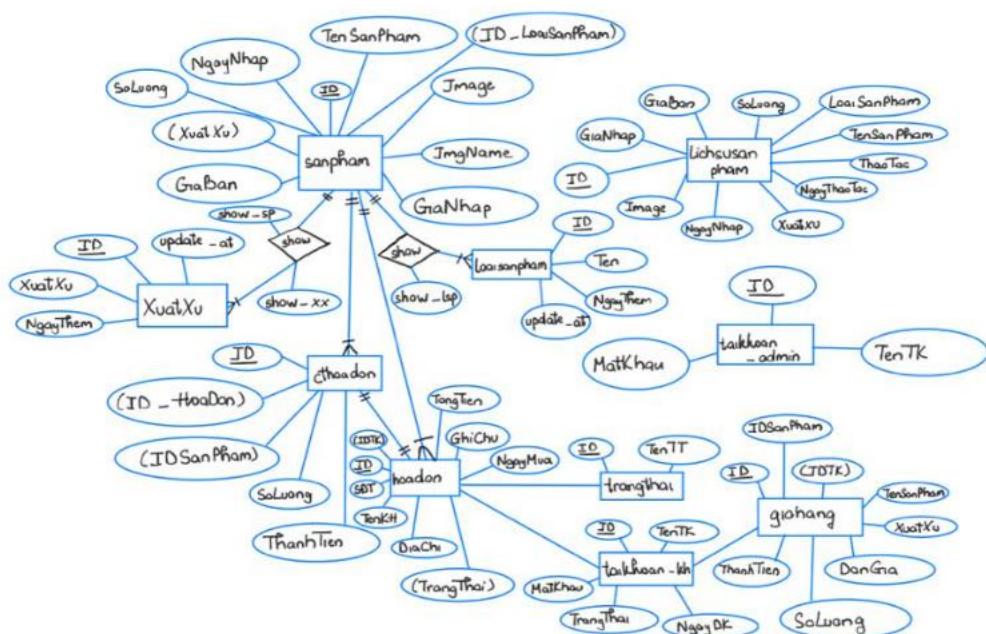
- + The platform should offer intuitive features enabling users to easily update and manage information related to videos, channels, and viewer interactions.

- + The source code should be cleanly organized and thoroughly documented to improve readability and simplify future updates or debugging.

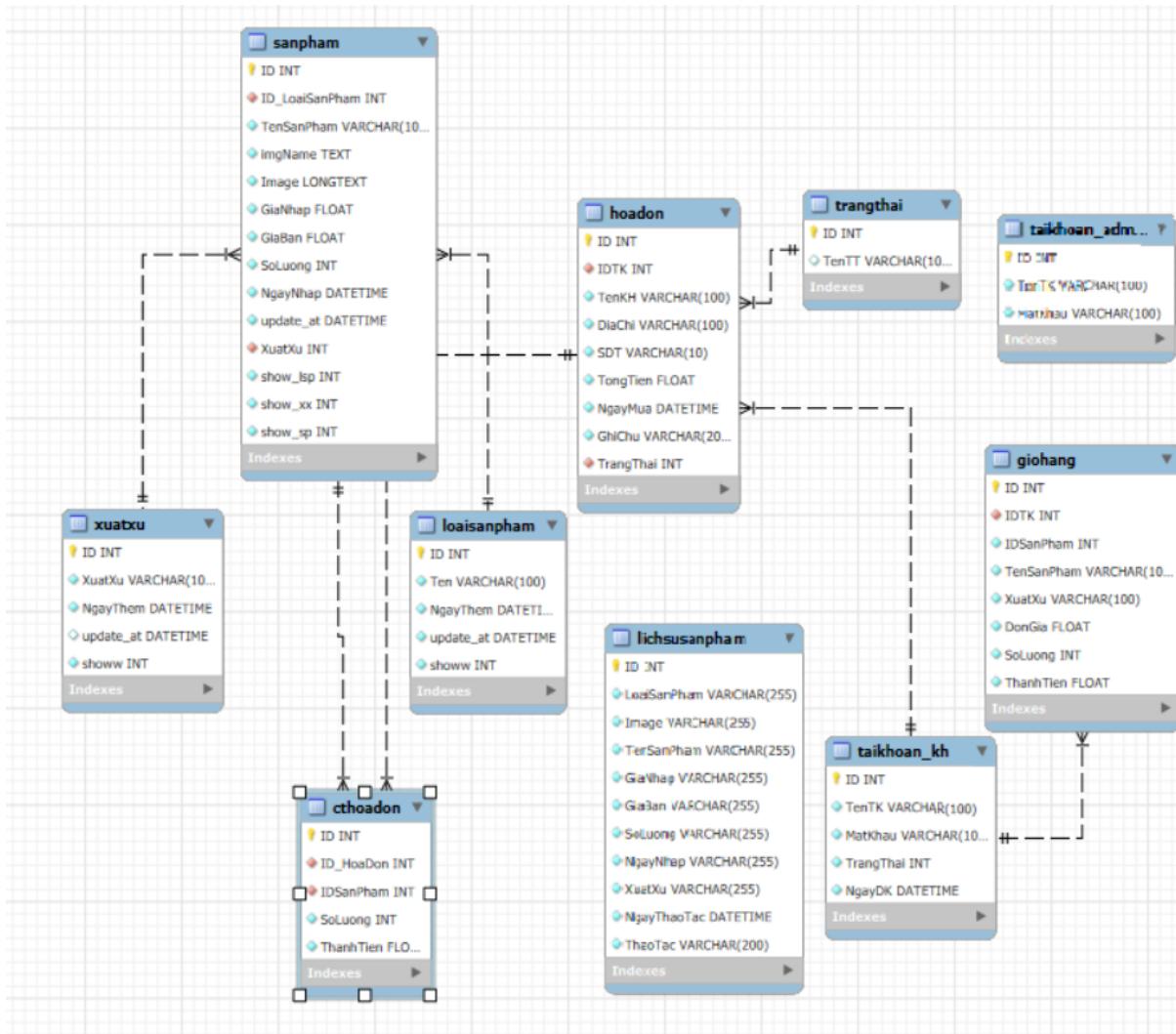
- + A well-defined and stable database architecture is essential to ensure a reliable foundation for maintenance and scalability.

2. DESIGN

A. ERD DIAGRAM

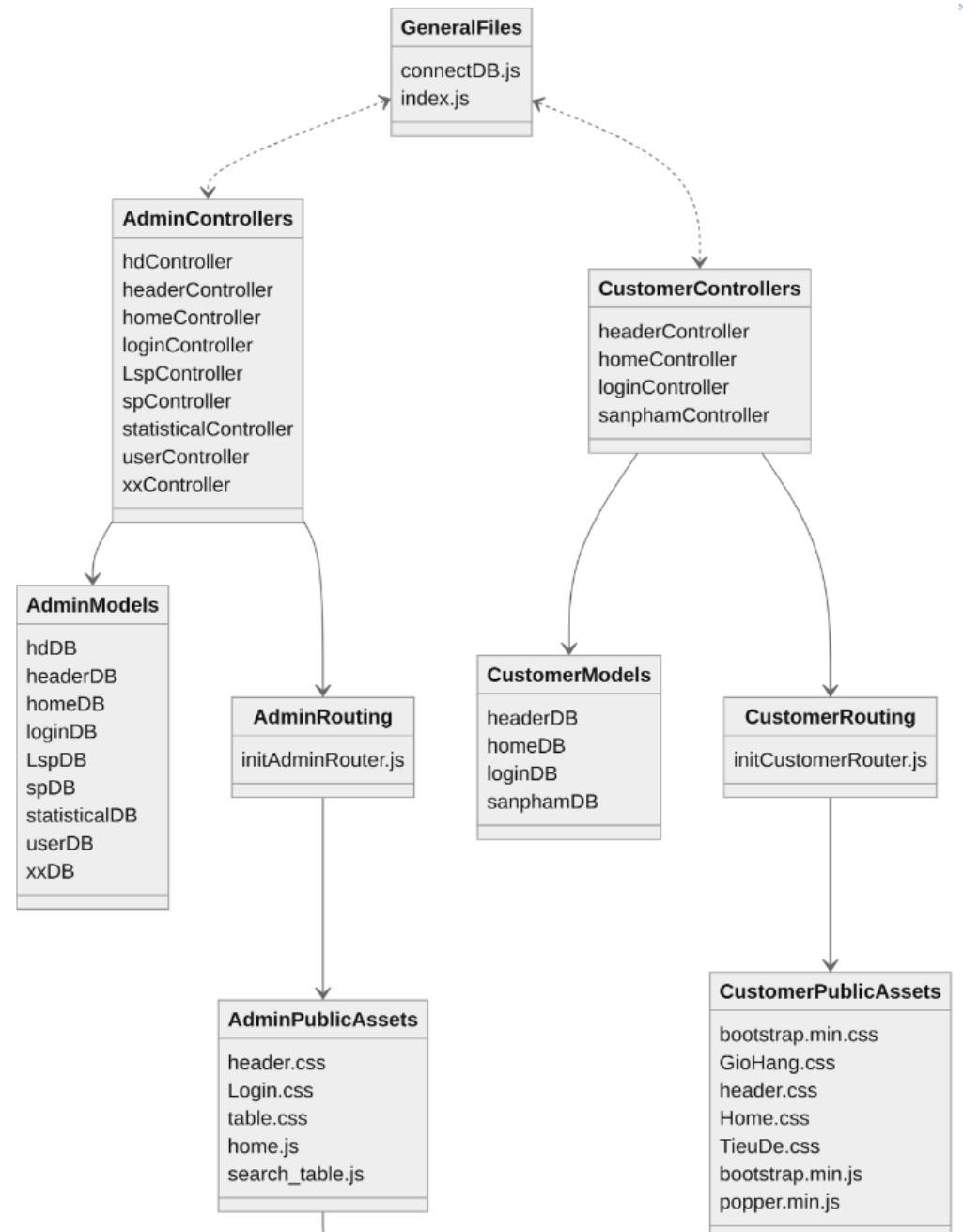


B. RELATIONAL SCHEMA DIAGRAM

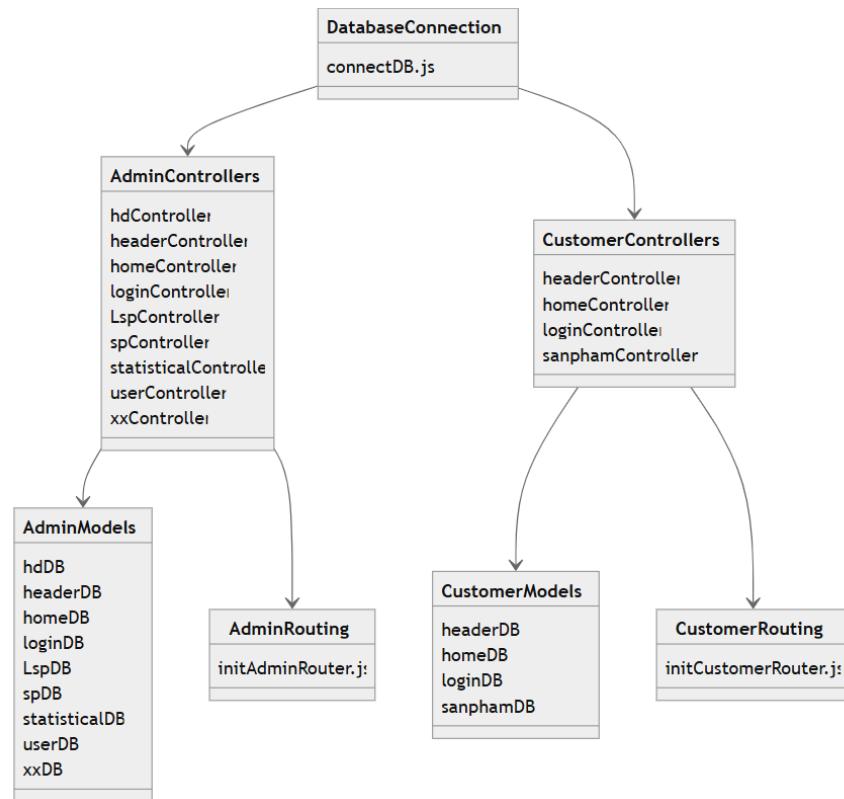


C. CLASS-DIAGRAM

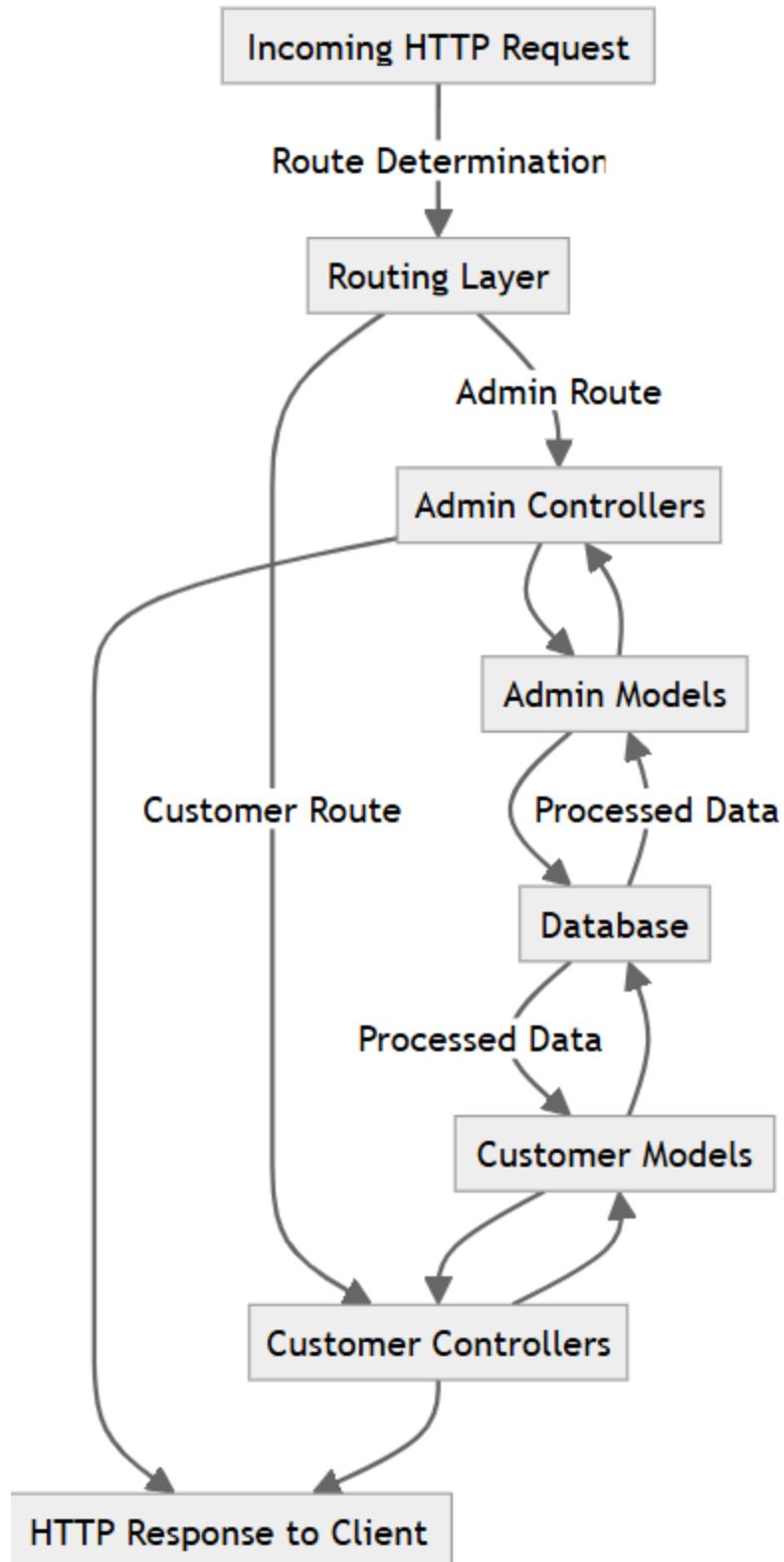
a) FRONT-END



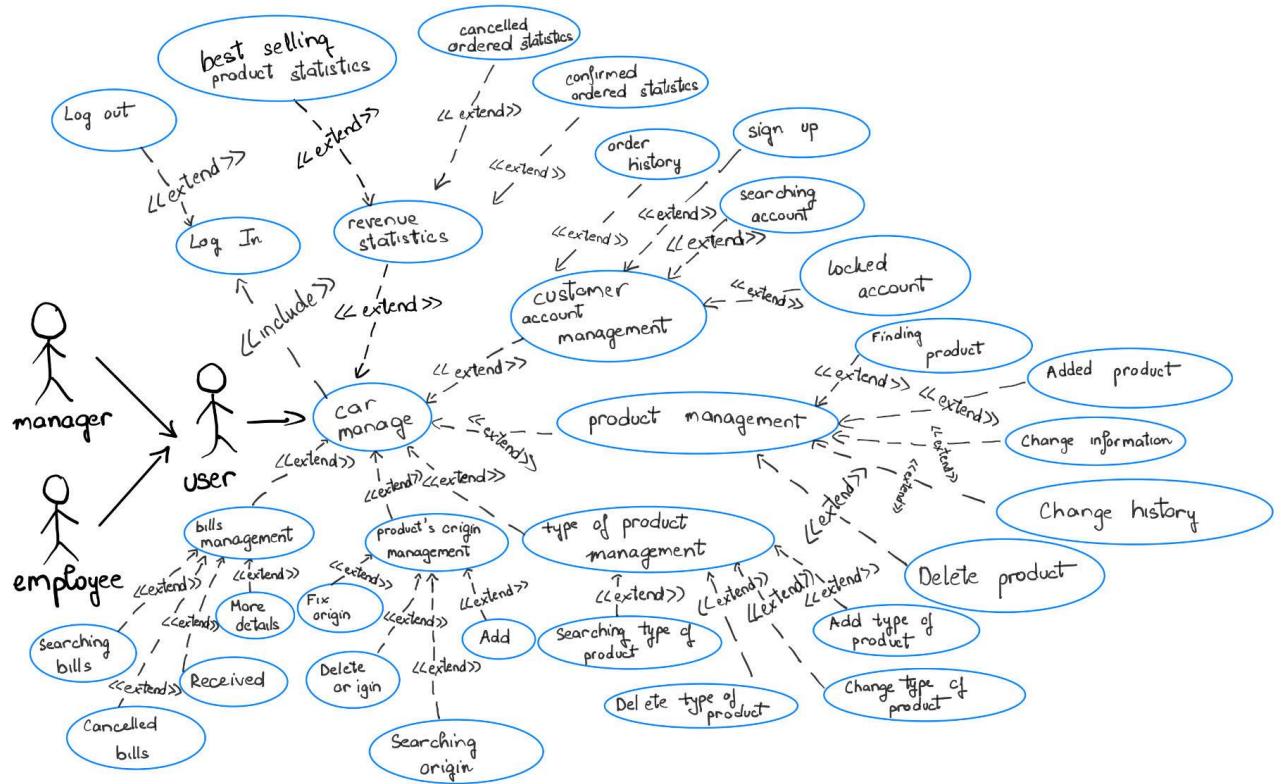
b) BACK-END



c) LOGIC FLOW OF BACKEND API



D. USER CASE DIAGRAM



E. API

a) FRONT-END:

- `/login`: Page for users to log in.
- `/home`: Homepage displaying main content for users.
- `/header`: Header section displayed on customer pages.
- `/sanpham`: Page displaying products for customers.
- `/admin`: Admin login page for administrative access.

b) BACK-END:

- `/api/admin/hd`: Endpoint to manage admin header content.
- `/api/admin/home`: Endpoint to manage admin home data.
- `/api/admin/login`: Endpoint for admin login authentication.
- `/api/admin/statistical`: Endpoint for retrieving statistical data.
- `/api/admin/user`: Endpoint to manage user accounts.
- `/api/admin/sp`: Endpoint for managing products.
- `/api/customer/header`: Endpoint for retrieving customer page headers.
- `/api/customer/home`: Endpoint for fetching customer home data.
- `/api/customer/login`: Endpoint for customer login authentication.
- `/api/customer/sanpham`: Endpoint for managing customer products.

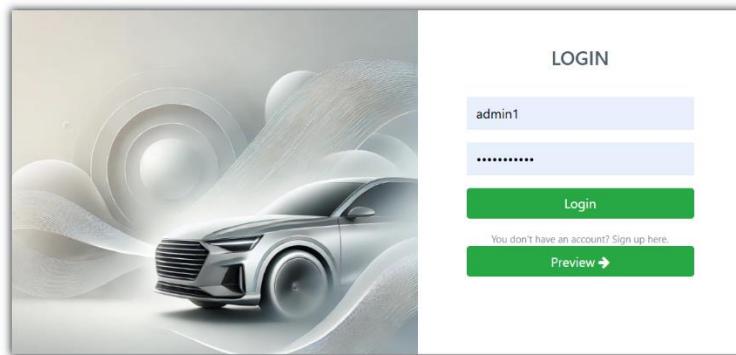
III. IMPLEMENTATION

1. Users' account

1.1 Account Management

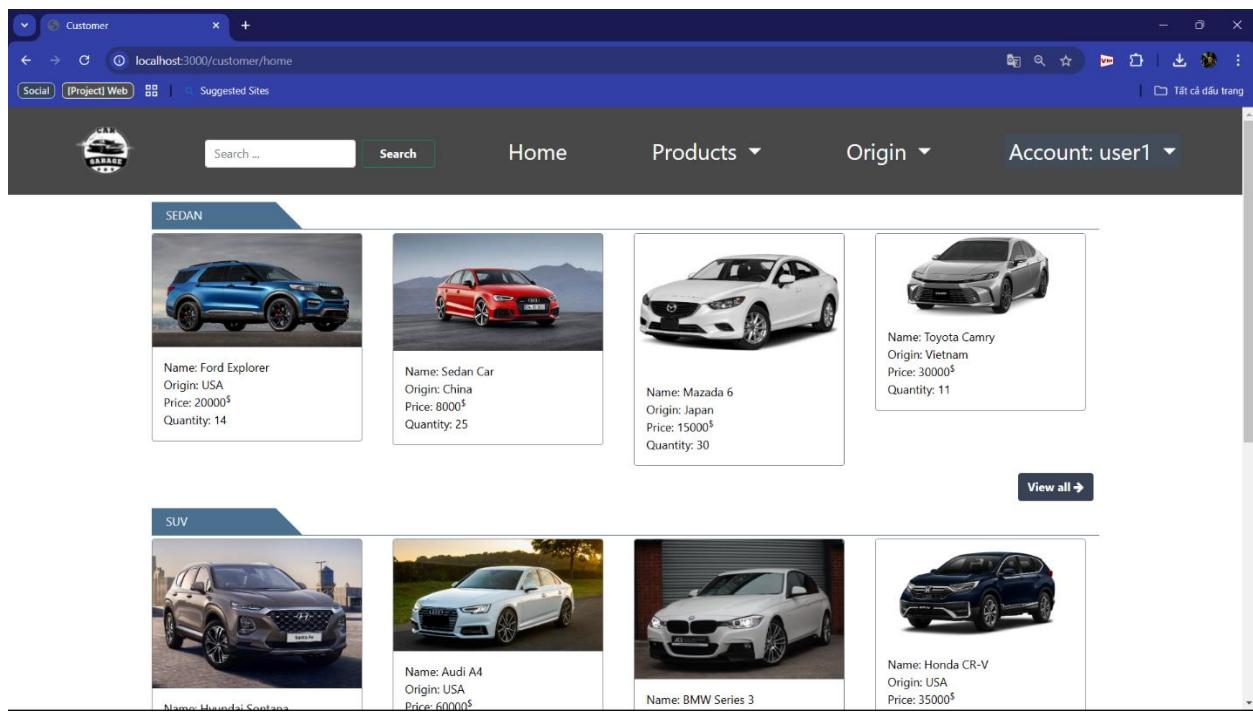
1.1.1 Login to application

Step 1: Click Account icon

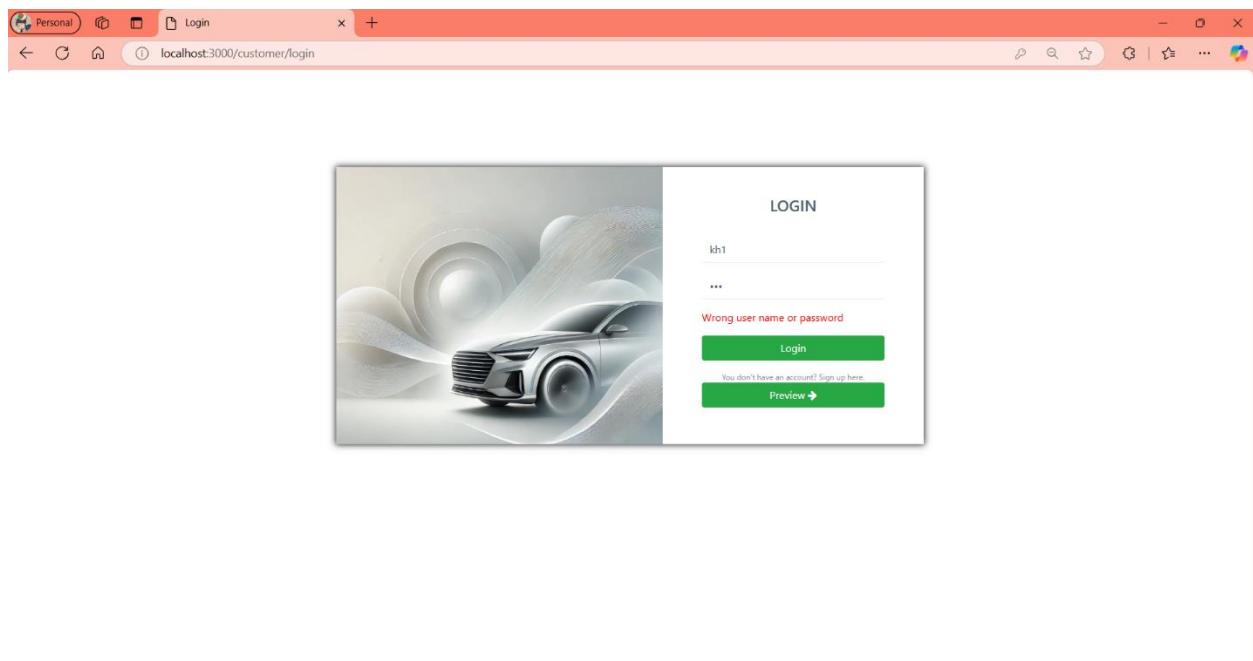


Step 2: Enter the user and password of your account. Then click “Login”, then the system will check if username and password is true it redirects to Home page. Otherwise, it will return the error message

+ True username and password:

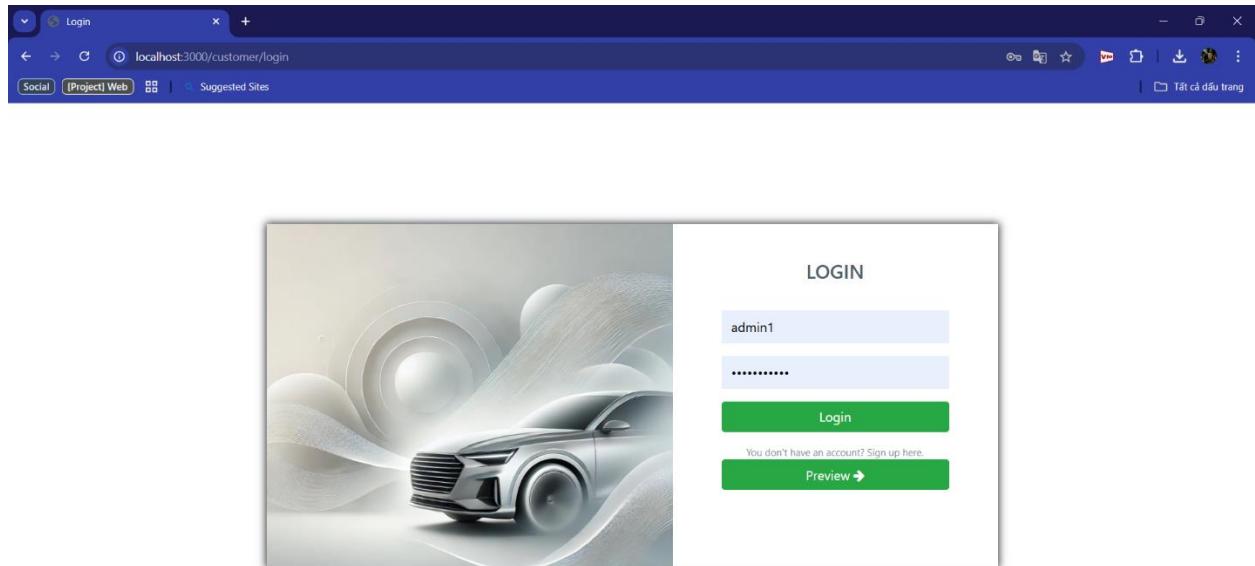


+ Wrong password or username:

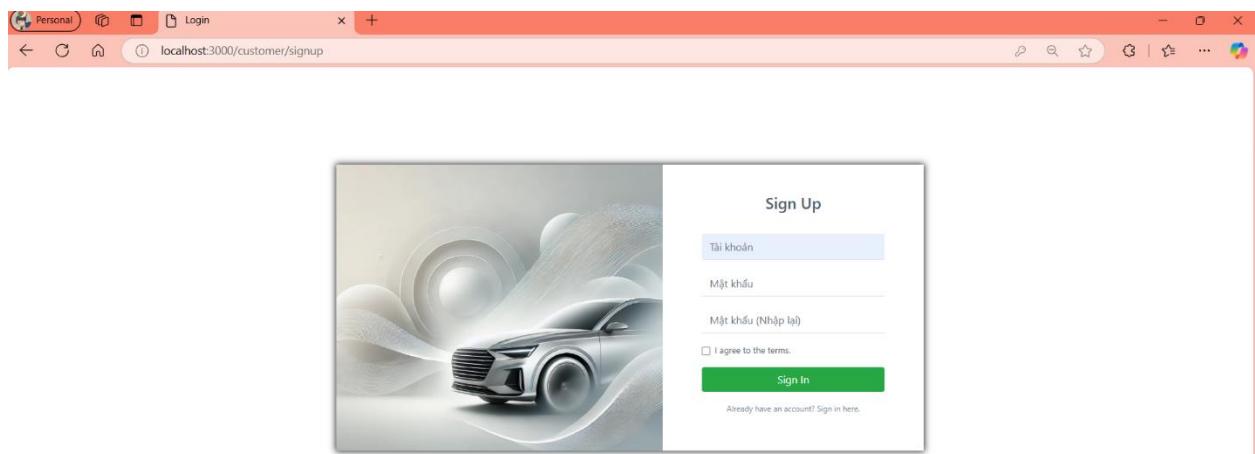


1.1.2 Register

Step 1: Click “Preview”

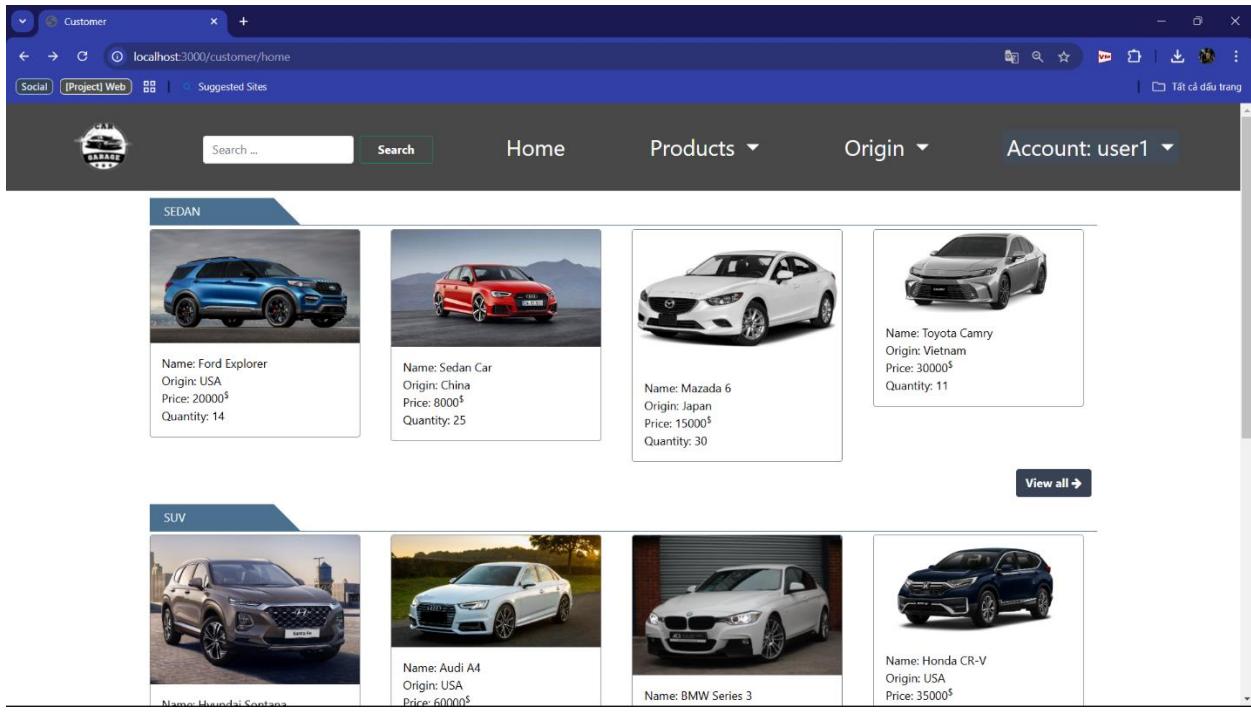


+ Step 2: Input username, password and re-password



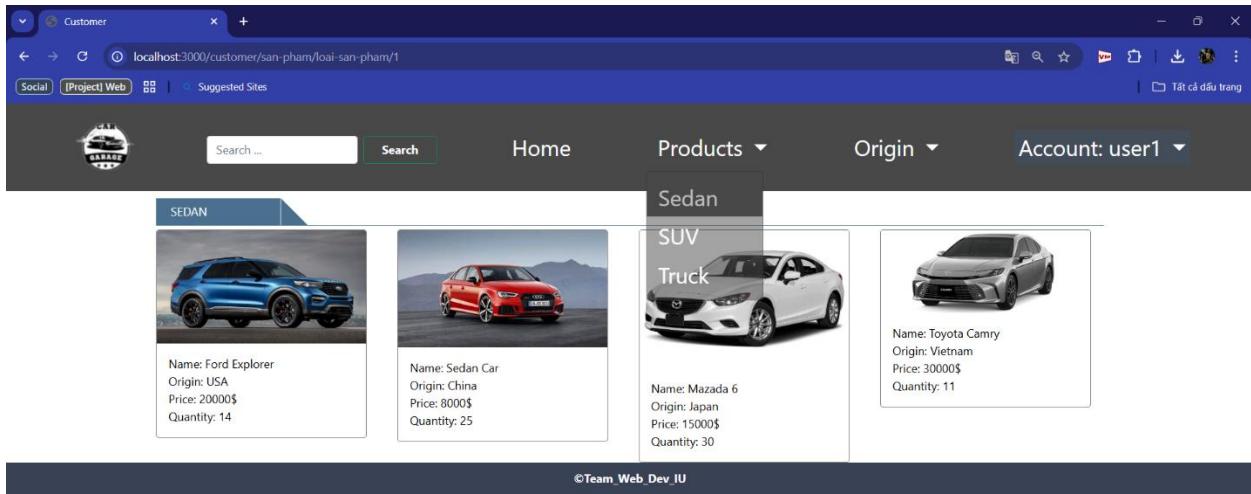
1.2. Home

1.2.1 Products



+ When you click “Products”, web will show all types of products, you click on the type you want and the web will show the one you choose.

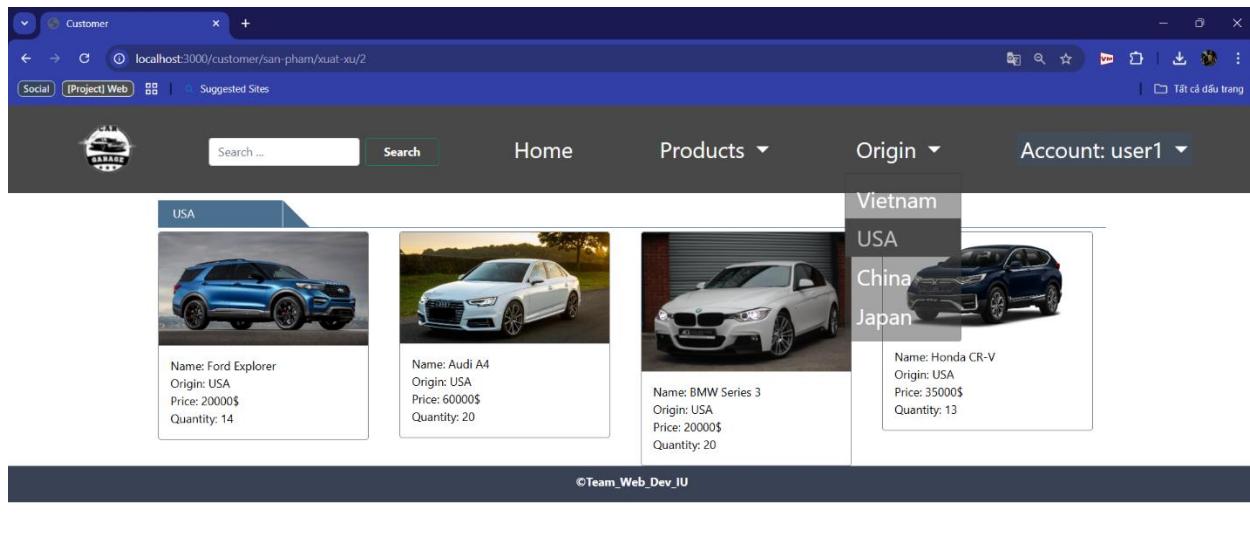
Example: you choose “Sedan”



1.2.2 Origin

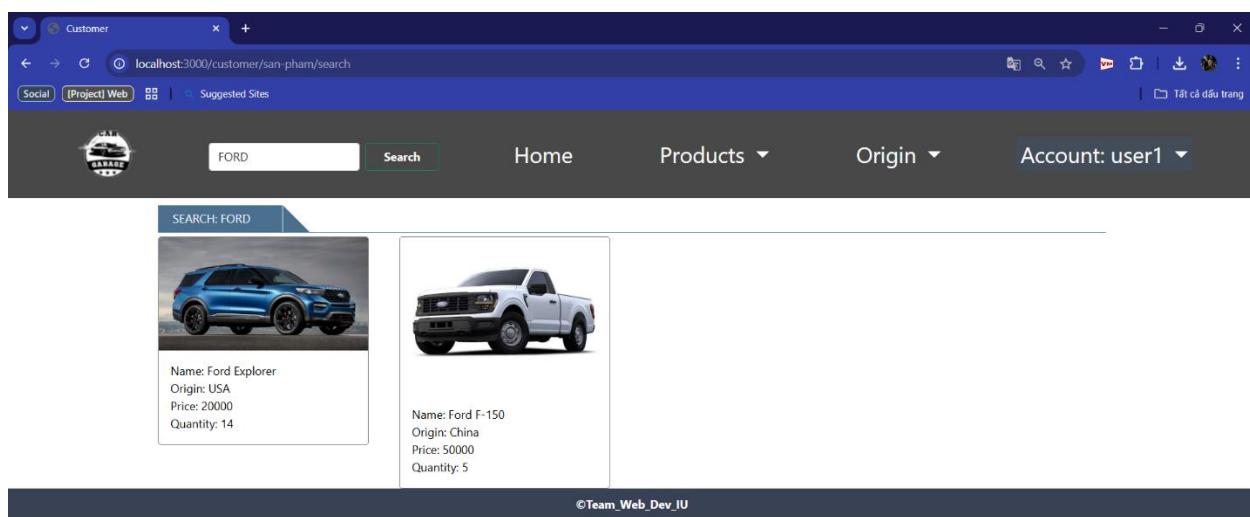
+ When you click “Origin”, web will show all origins of cars, you click on the type you want and the web will show the one you choose.

Example: you choose “USA”

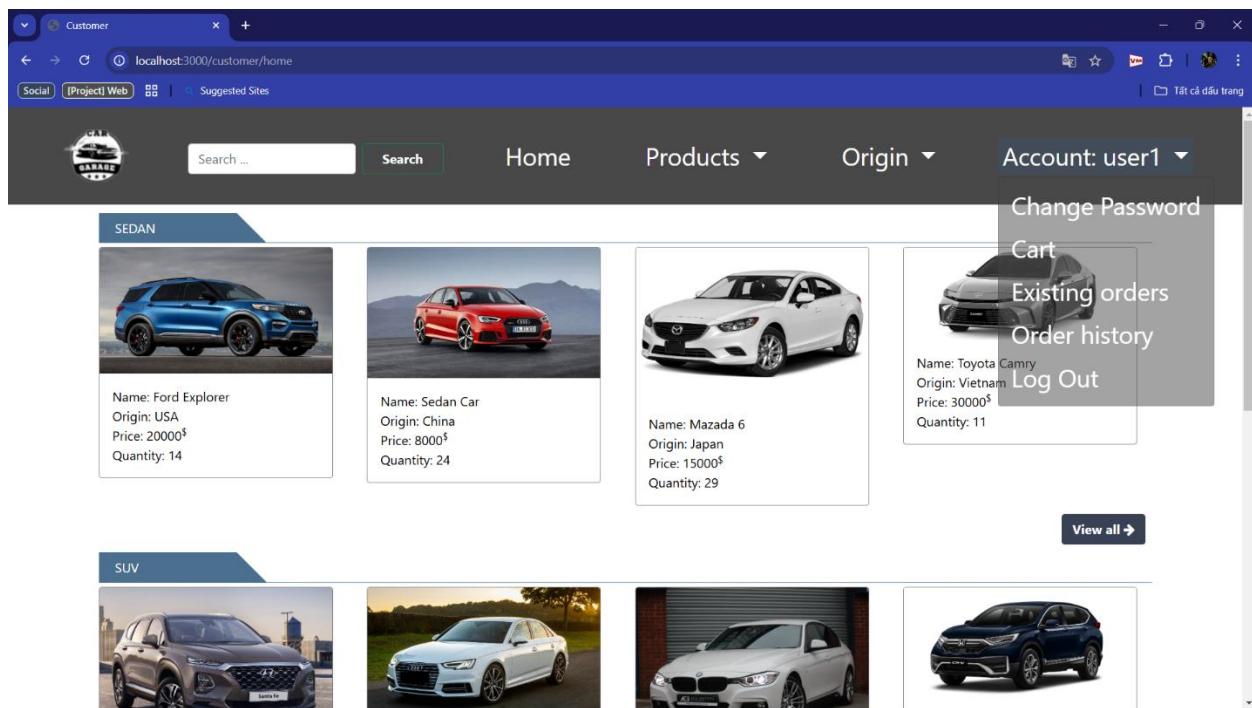


1.2.3 “Search” engine

+ You can search the car you want by type in “search” box

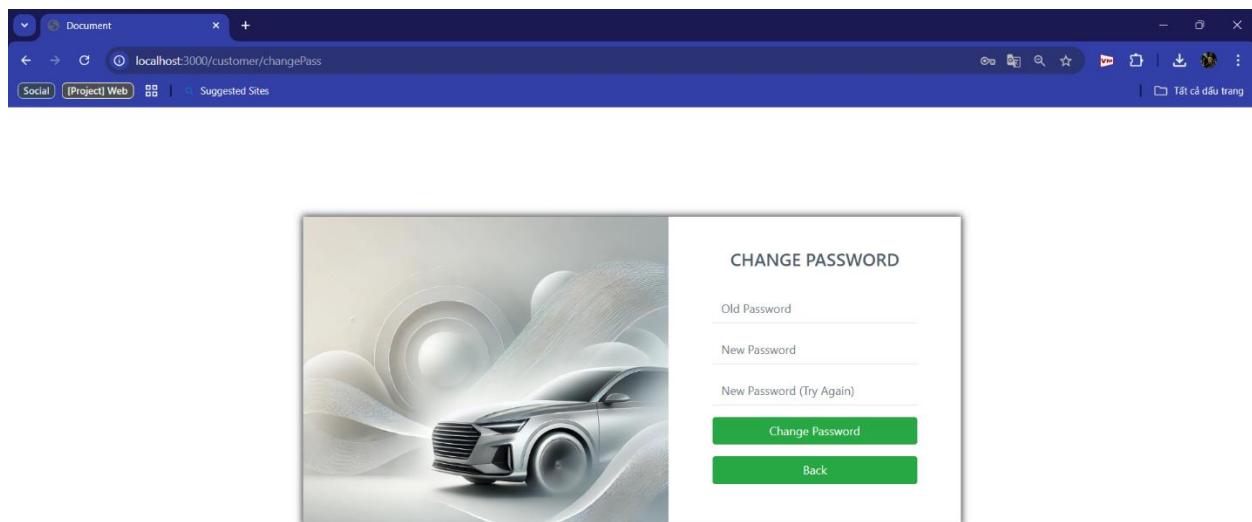


1.2.4 Account



1.2.4.a Change password

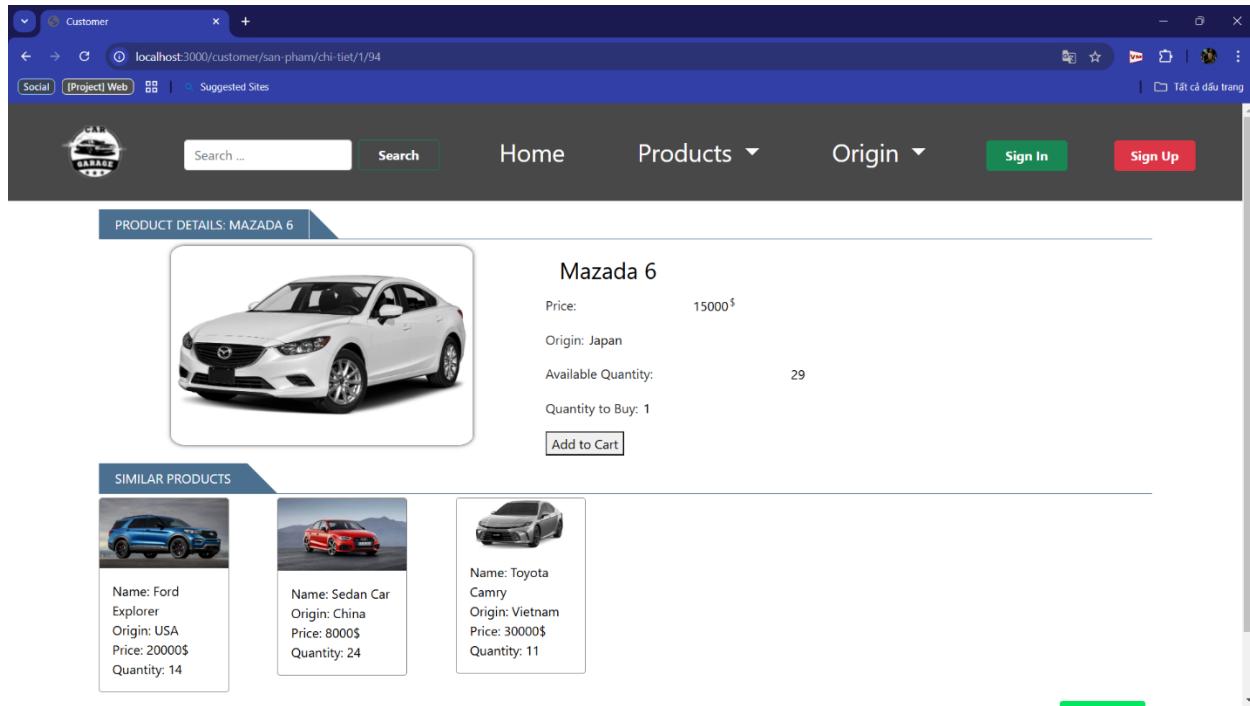
Step 1: You click “Change password”



Step 2: Input old password, new password and re-new pasword. After that, click “Change password”. If you don’t want to change your password, click “Back”

1.2.4.b Cart

+ Step 1: Click to a car, you choose “Quantity to Buy” and click “Add to Cart”



PRODUCT DETAILS: MAZADA 6

Mazada 6

Price: 15000\$

Origin: Japan

Available Quantity: 29

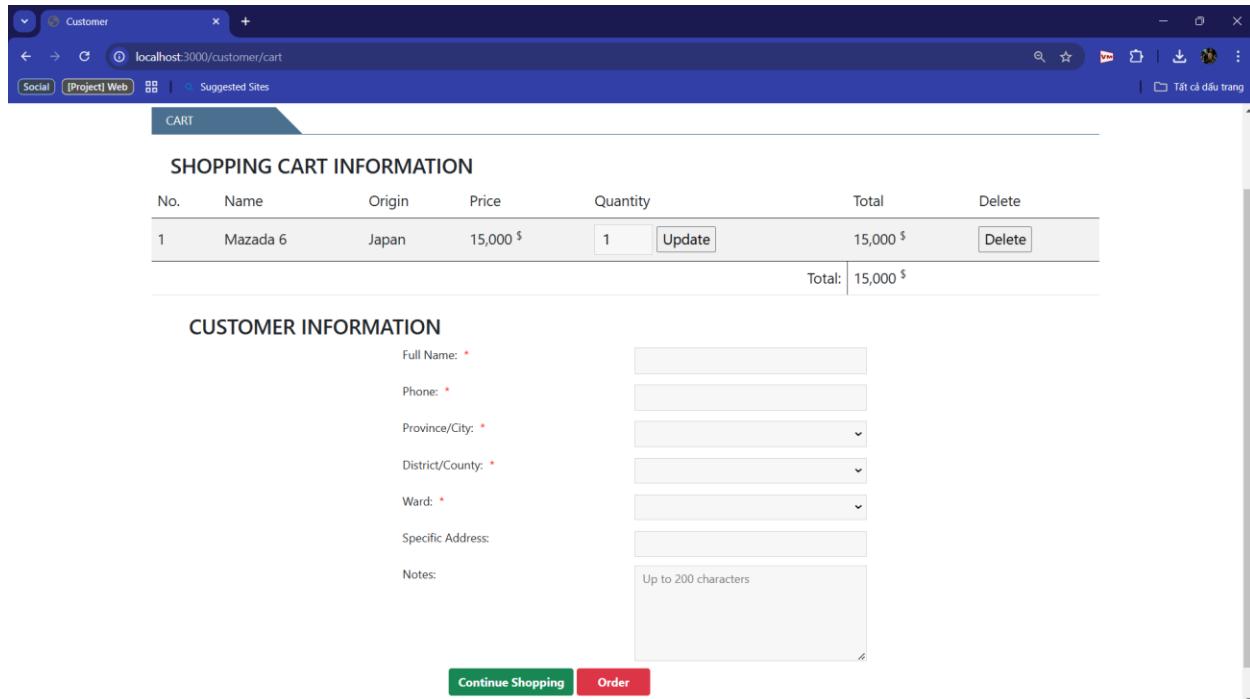
Quantity to Buy: 1

Add to Cart

SIMILAR PRODUCTS

Name	Origin	Price	Quantity
Ford Explorer	USA	20000\$	14
Sedan Car	China	8000\$	24
Toyota Camry	Vietnam	30000\$	11

+ Step 2: Change to Cart Form



CART

SHOPPING CART INFORMATION

No.	Name	Origin	Price	Quantity	Total	Delete
1	Mazada 6	Japan	15,000 \$	1	15,000 \$	Delete

TOTAL: 15,000 \$

CUSTOMER INFORMATION

Full Name: *

Phone: *

Province/City: *

District/County: *

Ward: *

Specific Address:

Notes: Up to 200 characters

Continue Shopping Order

+ You can update the quantity of car or add more cars

SHOPPING CART INFORMATION

No.	Name	Origin	Price	Quantity	Total	Delete
1	Mazada 6	Japan	15,000 \$	2	30,000 \$	<button>Update</button> <button>Delete</button>
2	Audi A4	USA	60,000 \$	3	180,000 \$	<button>Update</button> <button>Delete</button>
3	BMW Series 3	USA	20,000 \$	1	20,000 \$	<button>Update</button> <button>Delete</button>
4	Toyota Tacoma	Japan	25,000 \$	2	50,000 \$	<button>Update</button> <button>Delete</button>
Total: 280,000 \$						

CUSTOMER INFORMATION

Full Name: *

Phone: *

Province/City: *

District/County: *

+ You can delete cars in cart, too

SHOPPING CART INFORMATION

No.	Name	Origin	Price	Quantity	Total	Delete
1	BMW Series 3	USA	20,000 \$	1	20,000 \$	<button>Update</button> <button>Delete</button>
2	Toyota Tacoma	Japan	25,000 \$	2	50,000 \$	<button>Update</button> <button>Delete</button>
Total: 70,000 \$						

CUSTOMER INFORMATION

Full Name: *

Phone: *

Province/City: *

District/County: *

Ward: *

Specific Address:

+ If you don't fill information at "customer information", the notice will show to remind you fill information

Cài đặt - Địa chỉ và các lựa chọn

localhost:3000/customer/cart

No.	Name	Origin	Price	Quantity	Total	Delete
1	BMW Series 3	USA	20,000 \$	1	20,000 \$	<button>Delete</button>
2	Toyota Tacoma	Japan	25,000 \$	2	50,000 \$	<button>Delete</button>
						Total: 70,000 \$

CUSTOMER INFORMATION

Full Name: *

Phone: *

Province/City: *

District/County: *

Ward: *

Specific Address:

Notes:

Vui lòng điền vào trường này.

Up to 200 characters

Continue Shopping Order

©Team_Web_Dev_IU

+ You can choose address

SHOPPING CART INFORMATION

No.	Name	Origin	Price	Quantity
1	Mazda 6	Japan	15,000 \$	1

CUSTOMER INFORMATION

Full Name: *

Phone: *

Province/City: *

District/County: *

Ward: *

Specific Address:

Notes:

Tỉnh Lâm Đồng
Tỉnh Bình Phước
Tỉnh Tây Ninh
Tỉnh Bình Dương
Tỉnh Đồng Nai
Tỉnh Bà Rịa - Vũng Tàu
Thành phố Hồ Chí Minh
Tỉnh Long An
Tỉnh Tiền Giang
Tỉnh Bến Tre
Tỉnh Trà Vinh
Tỉnh Vĩnh Long
Tỉnh Đồng Tháp
Tỉnh An Giang
Tỉnh Kiên Giang
Thành phố Cần Thơ
Tỉnh Hậu Giang
Tỉnh Cà Mau
Thành phố Hồ Chí Minh
Quận Thủ Đức
Phường Linh Trung
Thủ Đức
Hihi

Continue Shopping Order

©Team_Web_Dev_IU

The screenshot shows a web browser window with a shopping cart interface. At the top, there's a header bar with a logo, a search bar, and some navigation links. Below the header, the main content area has two sections: "SHOPPING CART INFORMATION" and "CUSTOMER INFORMATION".

SHOPPING CART INFORMATION:

No.	Name	Origin	Price	Quant
1	Mazada 6	Japan	15,000 \$	1

CUSTOMER INFORMATION:

Form fields include:

- Full Name: *
- Phone: *
- Province/City: *
- District/County: *
- Ward: *
- Specific Address:
- Notes:

A dropdown menu is open over the "District/County" field, listing various districts and counties in HCMC. The option "Quận Thủ Đức" is currently selected.

At the bottom of the page are two buttons: "Continue Shopping" and "Order".

+ After that, you click “Order”

The screenshot shows a web browser window with a dark-themed header bar. The header includes a logo, a search bar, and user account information ("Account: user1"). Below the header, the main content area has a section titled "CURRENT ORDERS".

ORDER INFORMATION:

No.	Recipient Name	Address	Phone	Total Amount	Purchase Date	Notes	Status	Actions
1	Nguyễn Sỹ Thúy	Thủ Đức - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	15000 \$	2024/12/15 21:48:08	Hihi	Pending	Details Cancel Order

At the bottom of the page is a footer bar with the text "©Team_Web_Dev_IU".

+ When you click “Cancel Order”, the Order will disappear. When you click “Details”

ORDER

No.	Recipient Name	Address	Phone Number	Total Amount	Purchase Date	Notes	Status
1	Nguyễn Sỹ Thúy	Thủ Đức - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	15,000 \$	2024/12/15 21:48:08	Hihi	Pending

ORDER DETAILS

No.	Product Name	Origin	Price	Quantity	Total
1	Mazada 6	Japan	15,000 \$	1	15,000 \$

DETAILS

No.	Product Name	Origin	Price	Quantity	Total
1	Mazada 6	Japan	15,000 \$	1	15,000 \$

1.2.4.c Existing orders

+ When you click “existing orders”, the web will show your all waiting order

CURRENT ORDERS

ORDER INFORMATION

No.	Recipient Name	Address	Phone	Total Amount	Purchase Date	Notes	Status	Actions	
1	Nguyễn Văn Nam	Bình Dương - Xã Ngọc Hội - Huyện Chiêm Hóa - Tỉnh Tuyên Quang	0962843303	11000 \$	2024/12/15 22:26:04	Pending	Details	Cancel Order	
2	Nguyễn Sỹ Thúy	Thủ Đức - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	8000 \$	2024/12/15 21:52:30	Pending	Details	Cancel Order	
3	Nguyễn Quốc Đạt	Bình Thạnh - Phường Tam Bình - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	60000 \$	2024/12/15 21:50:49	Hehe	Pending	Details	Cancel Order

1.2.4.d Order history

+ When you click “order history”, the web will show all your cancelled/completed order

Customer

localhost:3000/customer/don-hang/lich-su

Social | [Project] Web | Suggested Sites

Home Products Origin Account: user1

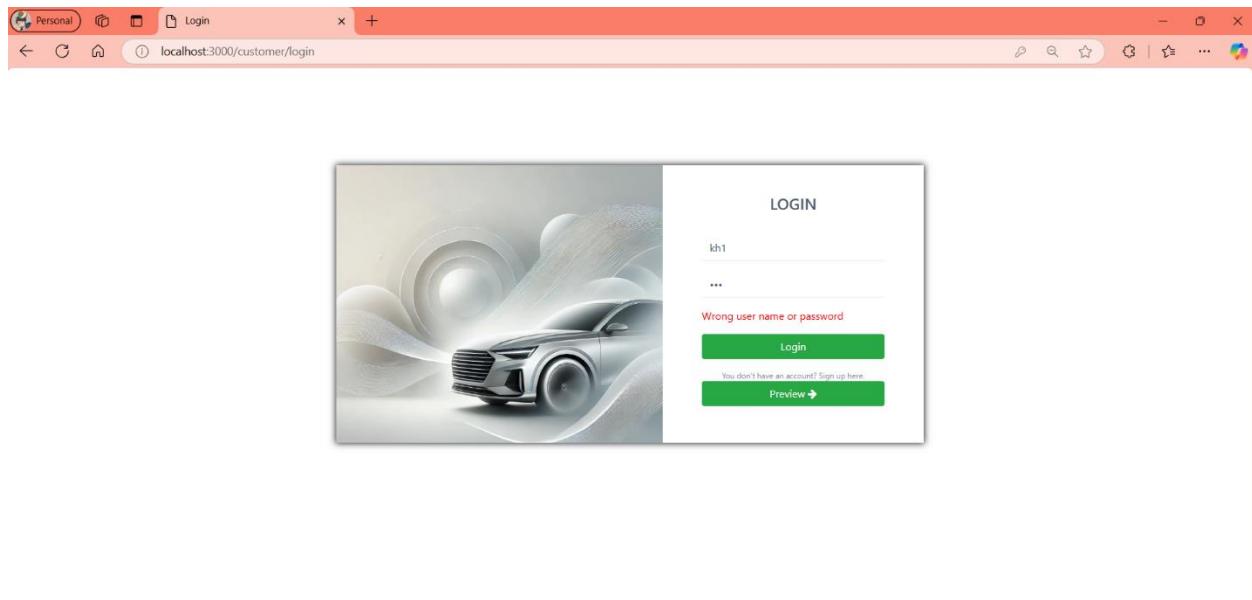
ORDER HISTORY

ORDER HISTORY

#	Recipient's Name	Address	Phone Number	Total Amount	Purchase Date	Notes	Status	
1	Nguyễn Sỹ Thúy	Thủ Đức - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	15000 \$	2024/12/15 21:48:08	Hihi	Cancelled	Details
2	Nguyễn Sỹ Thúy	338/41 Trường Chinh - Trà Bá - Pleiku - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	70000 \$	2024/12/15 21:46:25		Cancelled	Details
3	Nguyễn Sỹ Thúy	338/41 Trường Chinh - Trà Bá - Pleiku - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	20000 \$	2024/12/15 21:01:19	Mua mua mua	Cancelled	Details
4	Nguyễn Quốc Đạt	Ho Chi Minh city, Viet Nam - Xã Bình Phước - Huyện Mang Thít - Tỉnh Vĩnh Long	0353226016	70000 \$	2024/12/15 16:34:01	cvxvxc	Completed	Details
5	John Doe	123 Main St	1234567890	30000 \$	2024/12/11 14:50:51	First car purchase	Completed	Details

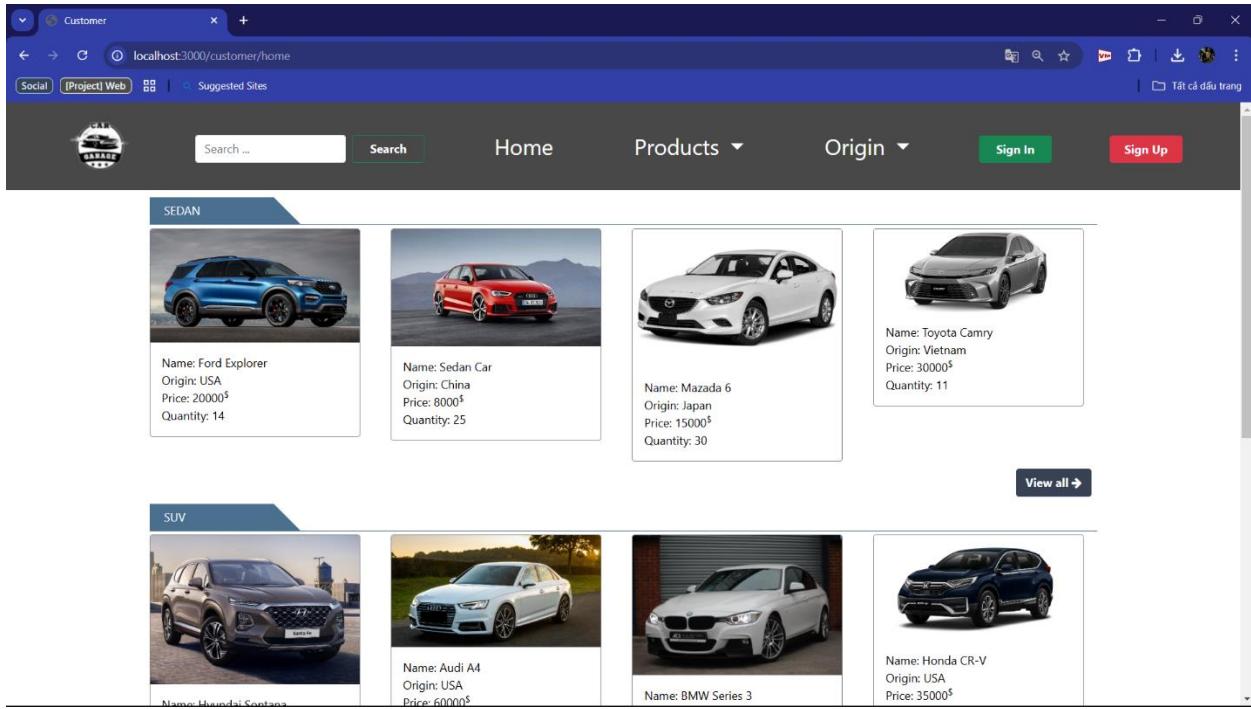
1.2.4.e Log out

+ When you “log out”, come back the log in screen

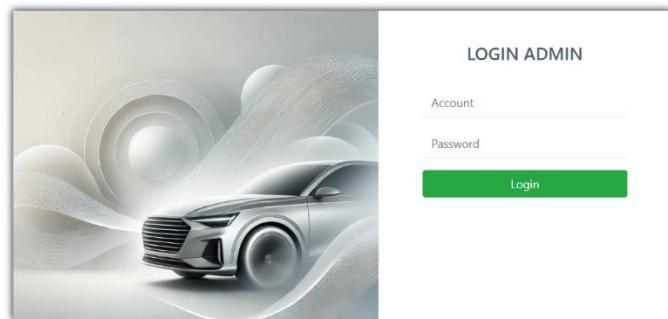


2. Admins' Account

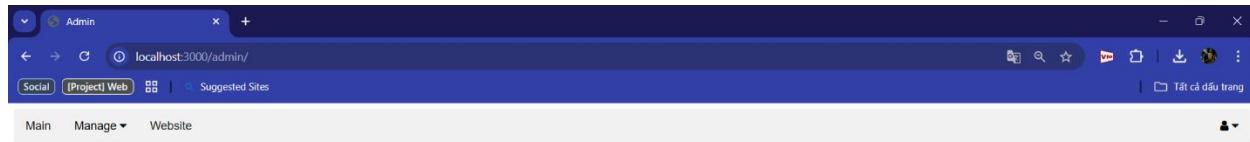
2.1 Login



+ Step 1: If you click to the icon in the left corner of page, the login page will shown



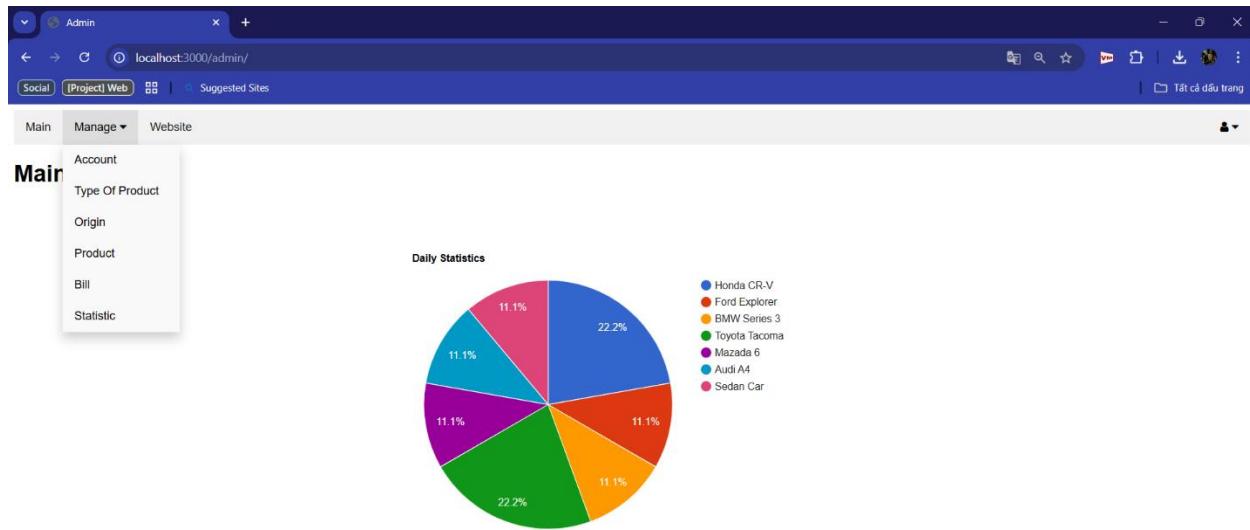
+ Step 2: When you fill username, and password, the web will show the login screen



Main

+ Login screen will show daily statistics

2.2 Admins' manage



2.2.1 Account

+ When you click “Account”, the web show all account your web has

ID	Account Name	Status	Sign up Date	Bills	Actions
1	user1	1	2024/12/11 14:50:51	View	Lock Account
2	user2	1	2024/12/11 14:50:51	View	Lock Account
3	user3	1	2024/12/11 14:50:51	View	Lock Account

+ You can find Account by search

ID	Account Name	Status	Sign up Date	Bills	Actions
2	user2	1	2024/12/11 14:50:51	View	Lock Account

+ When you click “Views”, it will show all details as pending/ cancelled/ completed order

Main Manage Website

ID	Account	Status	Sign up Date
1	user1	1	2024/12/11 14:50:51

ID	Name	Address	Phone Number	Total	Purchased Date	Note	Status	More details
54	Nguyễn Sỹ Thùy	Thủ Đức - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	8000	2024/12/15 21:52:30		Pending	View
53	Nguyễn Quốc Đạt	Bình Thạnh - Phường Tam Bình - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	60000	2024/12/15 21:50:49	Hehe	Pending	View
52	Nguyễn Sỹ Thùy	Thủ Đức - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	15000	2024/12/15 21:48:08	Hihi	Pending	View
51	Nguyễn Sỹ Thùy	338/41 Trường Chinh - Trà Bá - Pleiku - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	70000	2024/12/15 21:46:25		Cancelled	View
50	Nguyễn Sỹ Thùy	338/41 Trường Chinh - Trà Bá - Pleiku - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	20000	2024/12/15 21:01:19	Mua mua mua	Cancelled	View
49	Nguyễn Quốc Đạt	Ho Chi Minh city, Viet Nam - Xã Bình Phước - Huyện Mang Thít - Tỉnh Vĩnh Long	0353226016	70000	2024/12/15 16:34:01	cvvxvc	Completed	View
1	John Doe	123 Main St	1234567890	30000	2024/12/11 14:50:51	First car purchase	Completed	View

[Back](#)

+ Click “view” to View more details in that bill

Main Manage Website

ID	Account	Password	Status	Sign Up Date
1	user1	pass1	1	2024/12/11 14:50:51

Bill's ID	Customer's Name	Address	Phone Number	Total	Purchased Date	Note	Status
54	Nguyễn Sỹ Thùy	Thủ Đức - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	8000\$	2024/12/15 21:52:30		Pending

No.	Product's ID	Product	Origin	Cost	Quantity	Total
1	97	Sedan Car	China	8000\$	1	8000\$

[Back](#)

+ You can open or lock account

ID	Account Name	Status	Sign up Date	Bills	Actions
1	user1	0	2024/12/11 14:50:51	View	Open Account
2	user2	1	2024/12/11 14:50:51	View	Lock Account
3	user3	1	2024/12/11 14:50:51	View	Lock Account

2.2.2 Manage type of products

+ When you click “Type of product”, it will show all types you have

No.	ID	Type of Product	Added Date	Updated Date	Available	Actions
1	1	Sedan	2024/12/11 14:50:51	2024/12/11 14:50:51	YES	Change Hide
2	2	SUV	2024/12/11 14:50:51	2024/12/11 14:50:51	YES	Change Hide
3	3	Truck	2024/12/11 14:50:51	2024/12/11 14:50:51	YES	Change Hide

+ You can change the name of type of products when click “Change”

Social [Project] Web Suggested Sites

Main Manage Website

Manage type of product

Search for names... Add Product

No.	ID	Type of Product	Added Date	Updated Date	Available	⋮
1	1	Sande	2024/12/11 14:50:51	2024/12/15 22:29:39	YES	<button>Change</button> <button>Hide</button>
2	2	SUV	2024/12/11 14:50:51	2024/12/11 14:50:51	YES	<button>Change</button> <button>Hide</button>
3	3	Truck	2024/12/11 14:50:51	2024/12/11 14:50:51	YES	<button>Change</button> <button>Hide</button>

Then the name of products will be change in the customer's web

Admin Customer

localhost:3000/customer/home

Search ... Search Home Products Origin Account: user1

SANDE

- Name: Ford Explorer
Origin: USA
Price: 20000\$
Quantity: 14
- Name: Sedan Car
Origin: China
Price: 8000\$
Quantity: 24
- Name: Mazda 6
Origin: Japan
Price: 15000\$
Quantity: 29
- Name: Toyota Camry
Origin: Vietnam
Price: 30000\$
Quantity: 11

SUV

- Name: Hyundai Santa Fe
- Name: Audi A4
Origin: USA
Price: 60000\$
- Name: BMW Series 3
- Name: Honda CR-V
Origin: USA
Price: 35000\$

View all ➔

+ Hide/Show the type of products

No.	ID	Type of Product	Added Date	Updated Date	Available	
1	1	Sedan	2024/12/11 14:50:51	2024/12/15 22:30:27	YES	<input type="button" value="Change"/> <input type="button" value="Hide"/>
2	2	SUV	2024/12/11 14:50:51	2024/12/11 14:50:51	YES	<input type="button" value="Change"/> <input type="button" value="Hide"/>
3	3	Truck	2024/12/11 14:50:51	2024/12/11 14:50:51	NO	<input type="button" value="Change"/> <input type="button" value="Show"/>

=> Then this type of product will be unavailable

Name: Ford Explorer Origin: USA Price: 20000\$ Quantity: 14	Name: Sedan Car Origin: China Price: 8000\$ Quantity: 24	Name: Mazda 6 Origin: Japan Price: 15000\$ Quantity: 29	Name: Toyota Camry Origin: Vietnam Price: 30000\$ Quantity: 11
View all →		View all →	
Name: Hyundai Sontana Origin: Japan Price: 11000\$ Quantity: 19	Name: Audi A4 Origin: USA Price: 60000\$ Quantity: 19	Name: BMW Series 3 Origin: USA Price: 20000\$ Quantity: 19	Name: Honda CR-V Origin: USA Price: 35000\$ Quantity: 13
View all →		View all →	

2.2.3 Manage origin of products

Manage origin of product

STT	ID	Origin	Added Date	Updated Date	Available	
1	1	Vietnam	2024/12/11 14:50:51	2024/12/11 14:56:05	Yes	<button>Change</button> <button>Hide</button>
2	2	USA	2024/12/11 14:50:51	2024/12/11 14:56:05	Yes	<button>Change</button> <button>Hide</button>
3	3	China	2024/12/11 14:50:51	2024/12/11 14:56:05	Yes	<button>Change</button> <button>Hide</button>
4	4	Japan	2024/12/11 14:50:51	2024/12/11 14:56:05	Yes	<button>Change</button> <button>Hide</button>

Manage products

Manage Product

No.	ID	Type Of Product	Image	Product	Import Price	Price	Quantity	Added Date	Updated Date	Origin	Available	
1	1	Sedan		Toyota Camry	25000\$	30000\$	11	2024/12/11 14:50:51	2024/12/14 23:23:04	Vietnam	YES	<button>Change</button> <button>Hide</button>
2	94	Sedan		Mazada 6	12000\$	15000\$	29	2024/12/15 12:46:57	2024/12/15 12:46:57	Japan	YES	<button>Change</button> <button>Hide</button>
3	97	Sedan		Sedan Car	4000\$	8000\$	24	2024/12/15 12:50:17	2024/12/15 12:50:17	China	YES	<button>Change</button> <button>Hide</button>
4	98	Sedan		Ford Explorer	18000\$	20000\$	14	2024/12/15 12:51:21	2024/12/15 12:51:21	USA	YES	<button>Change</button> <button>Hide</button>
5	2	SUV		Honda CR-V	28000\$	35000\$	13	2024/12/11 14:50:51	2024/12/14 23:22:45	USA	YES	<button>Change</button> <button>Hide</button>
6	92	SUV		BMW Series 3	15000\$	20000\$	19	2024/12/15 12:44:07	2024/12/15 12:44:07	USA	YES	<button>Change</button> <button>Hide</button>
7	93	SUV		Audi A4	50000\$	60000\$	19	2024/12/15 12:46:23	2024/12/15 12:46:23	USA	YES	<button>Change</button> <button>Hide</button>
8	96	SUV		Hyundai Sontana	10000\$	11000\$	19	2024/12/15 12:49:37	2024/12/15 12:49:37	Japan	YES	<button>Change</button> <button>Hide</button>
9	3	Truck		Ford F-150	40000\$	50000\$	5	2024/12/11 14:50:51	2024/12/14 23:23:12	China	YES	<button>Change</button> <button>Hide</button>

Add products

Add Product

Type of Product:
-Choose type of product-

Image:
 Không có file nào được chọn

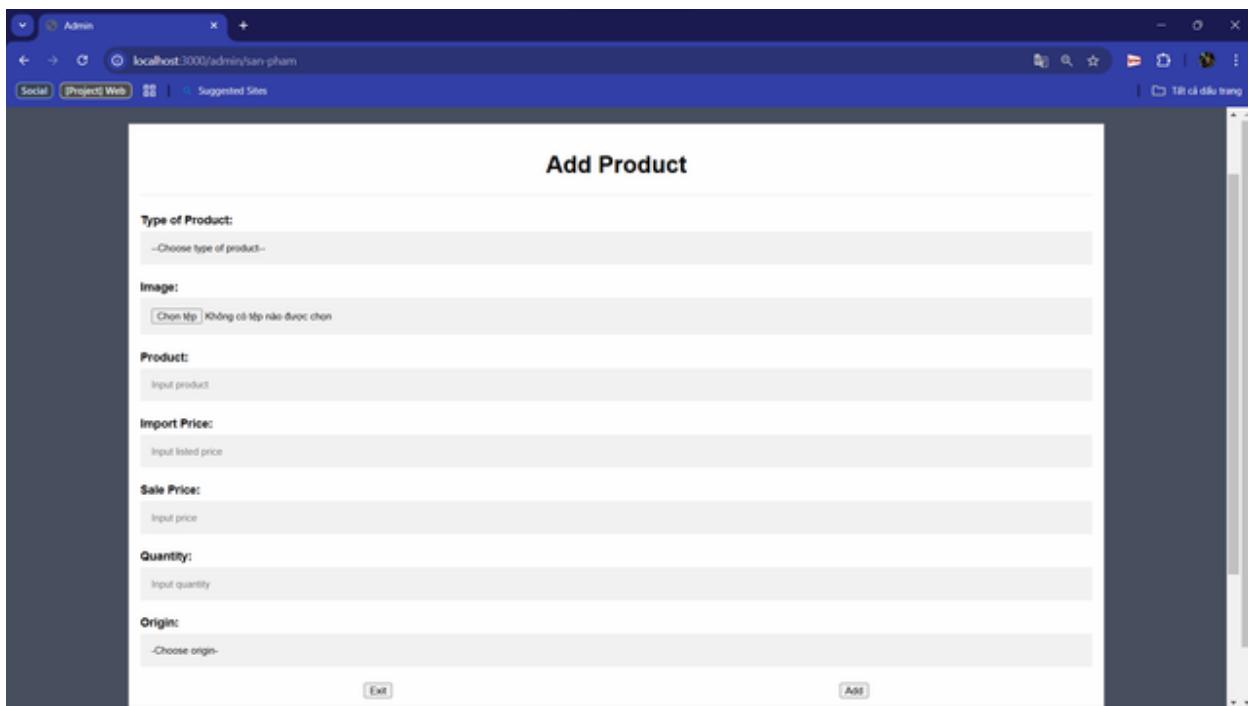
Product:

Import Price:

Sale Price:

Quantity:

Origin:
-Choose origin-



Change products

Change Product

Type of Product:
Sedan

Image 
 Không có file nào được chọn

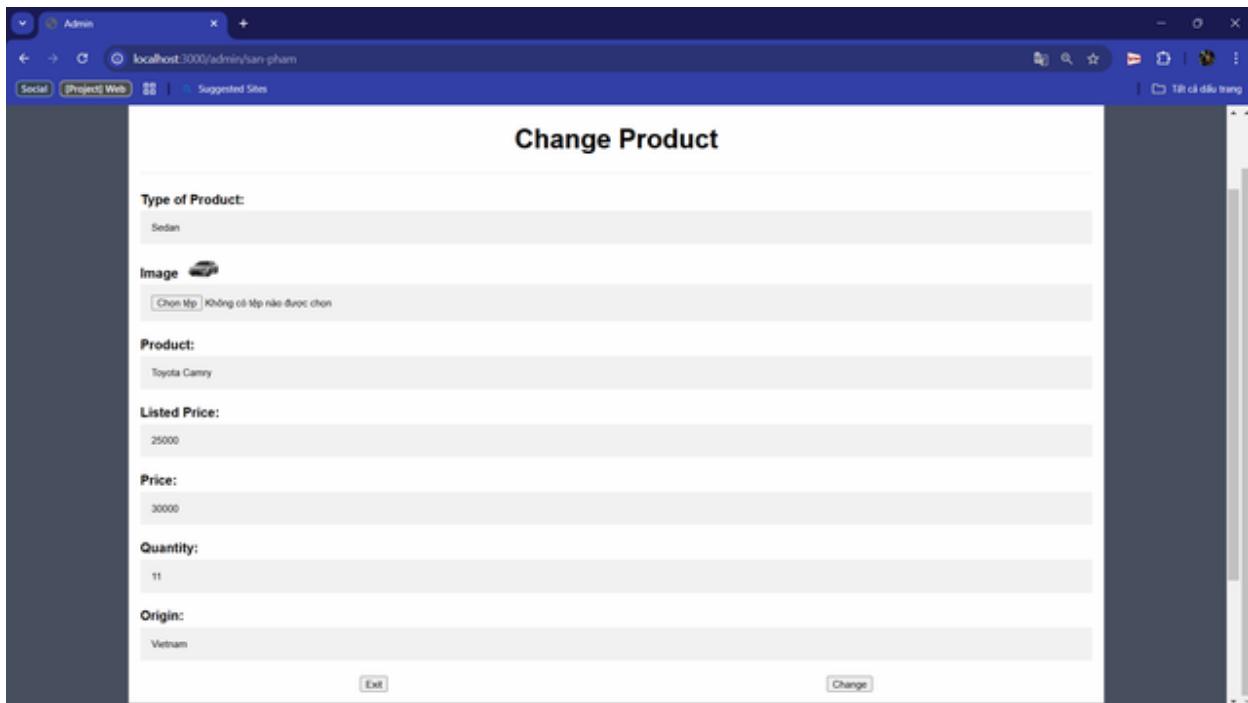
Product:
Toyota Camry

Listed Price:
25000

Price:
30000

Quantity:
11

Origin:
Vietnam



Bill management

Screenshot of a web browser showing the 'Bill Management' page. The URL is 'localhost:3000/admin/hoa-don'. The page displays a table of bills with columns: No., Account ID, Name, Address, Phone Number, Total, Purchased Date, Note, Status, and Done.

No.	Account ID	Name	Address	Phone Number	Total	Purchased Date	Note	Status	Done
1	1	John Doe	123 Main St	1234567890	30000\$	2024/12/11 14:50:51	First car purchase	Completed	<button>More Information</button>
2	2	Jane Smith	456 Elm St	0987654321	70000\$	2024/12/11 14:50:51	SUV for family	Completed	<button>More Information</button>
3	1	Nguyễn Quốc Đạt	Ho Chi Minh city, Việt Nam - Xã Bình Phước - Huyện Mê Linh - Tỉnh Vĩnh Long	0353226016	70000\$	2024/12/15 16:34:01	cxxxx	Completed	<button>More Information</button>
4	1	Nguyễn Thị Thúy	338/41 Trường Chinh - Trà Bá - Pleiku - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	20000\$	2024/12/15 21:01:19	Mua mua mua	Cancelled	<button>More Information</button>
5	1	Nguyễn Thị Thúy	338/41 Trường Chinh - Trà Bá - Pleiku - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	70000\$	2024/12/15 21:46:25		Cancelled	<button>More Information</button>
6	1	Nguyễn Thị Thúy	Thủ Đức - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	15000\$	2024/12/15 21:48:08	Hihi	Pending	<button>More Information</button> <button>Received</button> <button>Cancelled</button>
7	1	Nguyễn Quốc Đạt	Bình Thành - Phường Tam Bình - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	60000\$	2024/12/15 21:50:49	Hehe	Pending	<button>More Information</button> <button>Received</button> <button>Cancelled</button>
8	1	Nguyễn Thị Thúy	Thủ Đức - Phường Linh Trung - Quận Thủ Đức - Thành phố Hồ Chí Minh	0962843303	8000\$	2024/12/15 21:52:30		Pending	<button>More Information</button> <button>Received</button> <button>Cancelled</button>
9	1	Nguyễn Văn A	Bình Dương - Xã Ngọc Hồi - Huyện Chiêm Hóa - Tỉnh Lào Cai	0962843303	11000\$	2024/12/15 22:55:04		Pending	<button>More Information</button> <button>Received</button> <button>Cancelled</button>

More Information in Bill

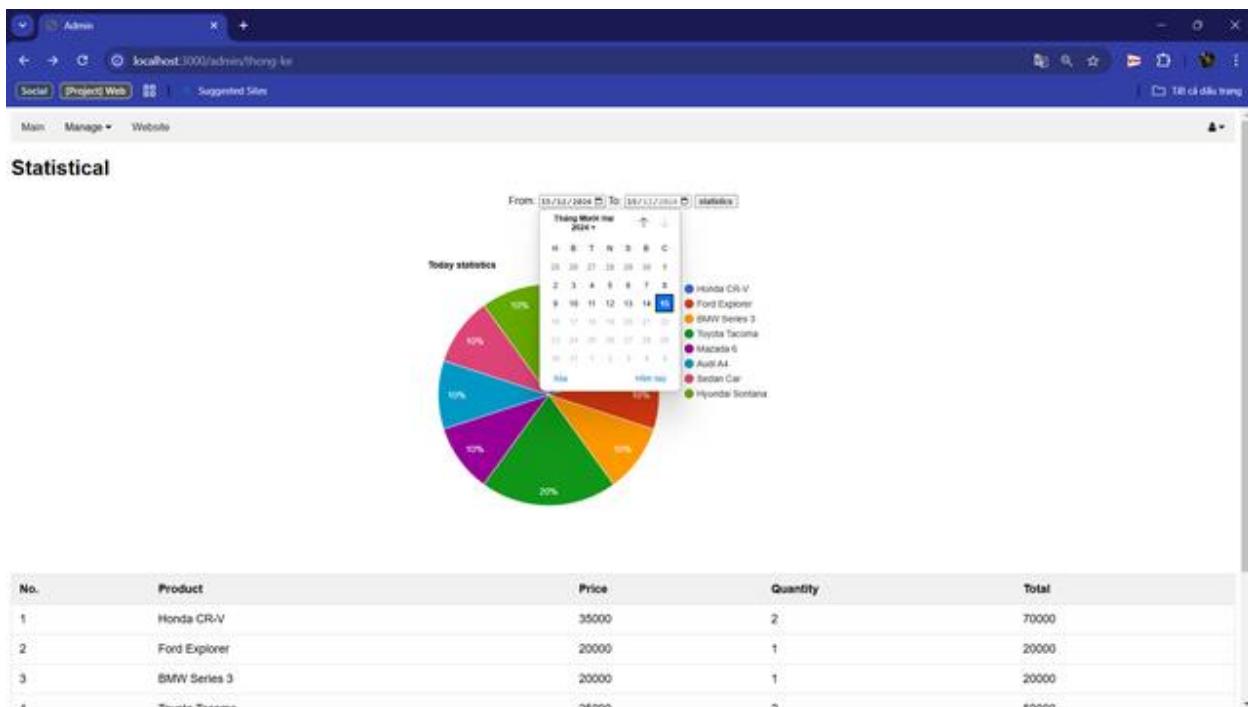
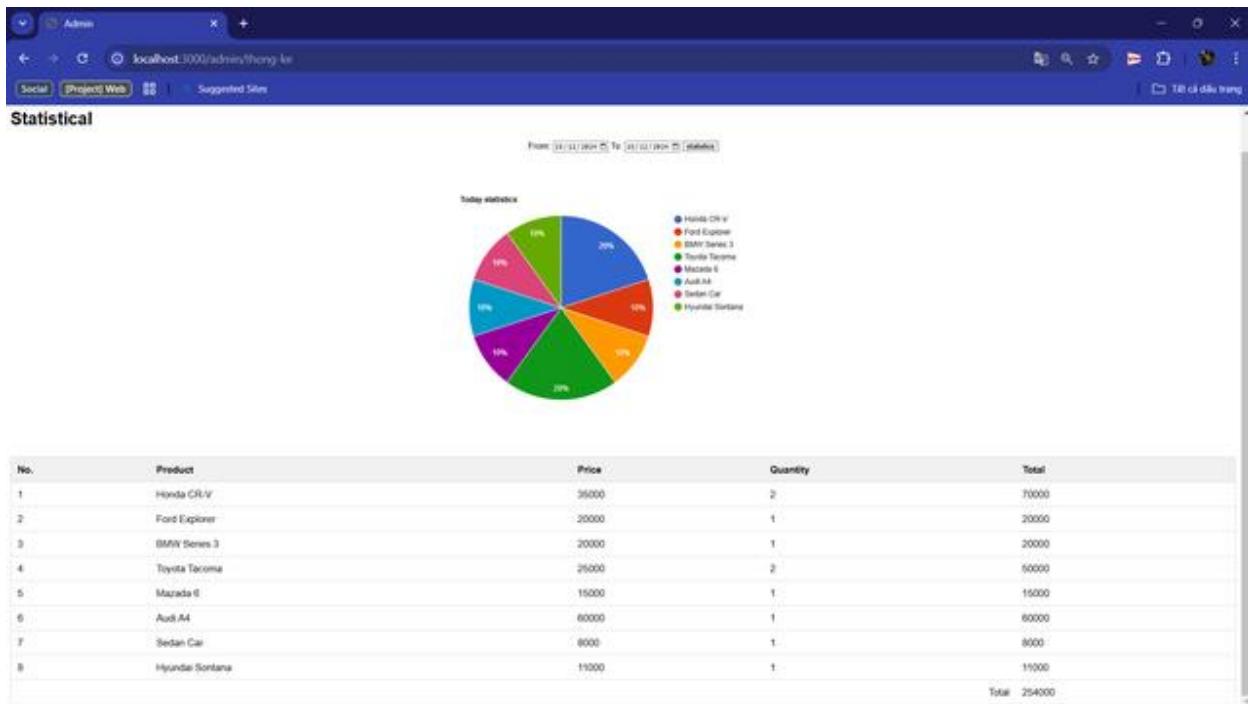
Screenshot of a modal window titled 'Bill' showing detailed information for bill number 3. The modal includes a table for the bill details and another table for 'More Information'.

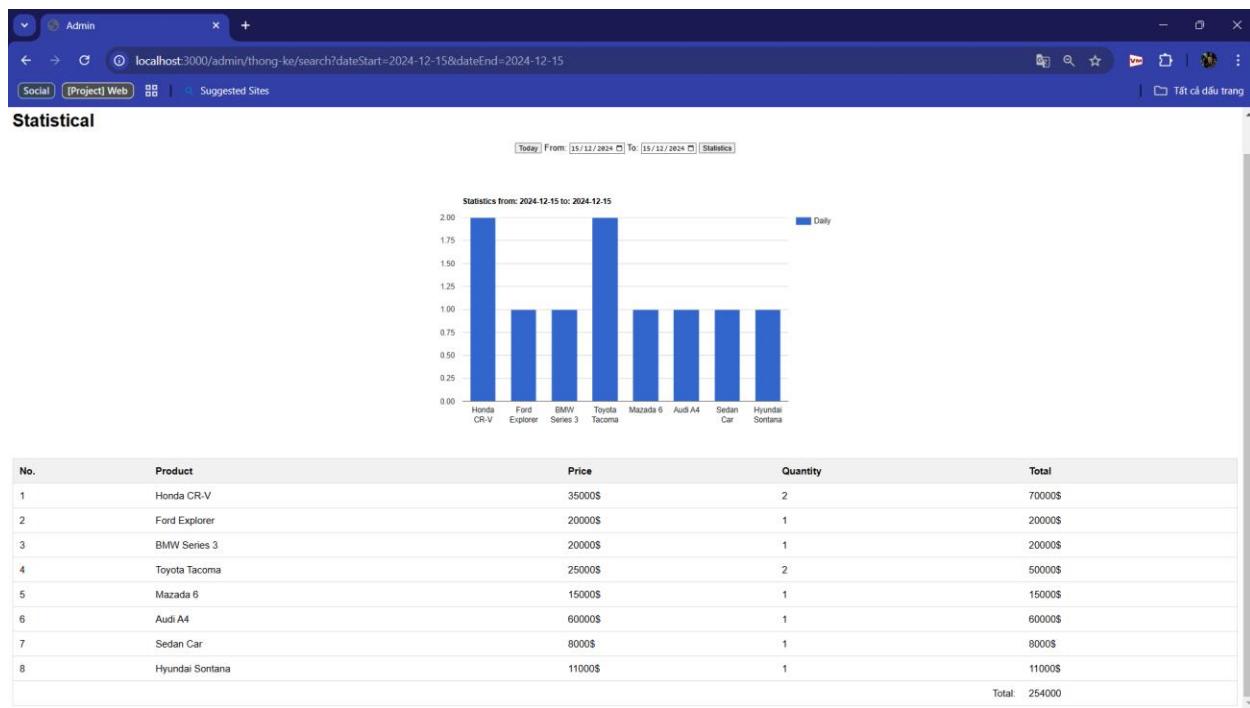
No.	Account ID	Name	Address	Phone Number	Total	Purchased Date	Note	Status
3	1	Nguyễn Quốc Đạt	Ho Chi Minh city, Việt Nam - Xã Bình Phước - Huyện Mê Linh - Tỉnh Vĩnh Long	0353226016	70000\$	2024/12/15 16:34:01	cxxxx	Completed

More Information

No.	Product ID	Product	Image	Origin	Cost	Quantity	Total
1	2	Honda CR-V		USA	35000	2	70000\$

Statistical





IV. DISCUSSION AND CONCLUSION

Developing a web application for car sales presented significant challenges, particularly in managing a comprehensive inventory system and implementing a seamless vehicle comparison feature. One of the primary difficulties was efficiently storing and retrieving detailed vehicle data, including images, specifications, and pricing information. Node.js and the Ant Design (antd) library provided an excellent foundation for the frontend, enabling a modern, responsive, and user-friendly interface. On the backend, built with Servlets, meticulous optimization was necessary to handle complex queries for filtering and sorting vehicle data. This included configuring Docker containers for improved scalability and leveraging AWS services for secure image storage and fast retrieval. Implementing the vehicle comparison feature added another layer of complexity, requiring precise synchronization between the frontend and backend to ensure accurate and real-time updates to the comparison list, enhancing the overall user experience.

This project was a comprehensive learning experience that helped us gain a better understanding of comprehensive web development and modern deployment techniques. We gained practical knowledge in managing video data, optimizing server performance, and ensuring seamless user interaction. Using the tools to complete the project not only improved our deployment skills but also taught us how to leverage cloud services for scalable applications. Overall, this project strengthened our technical skills and prepared us for future challenges in web development and cloud computing.

V. REFERENCES

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