

# A Tailored E-Commerce System for Small Automotive Retail Business: The Case of YH Speed

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## Abstract

E-commerce refers to the buying and selling of goods or services over the Internet, covering various online transactions including retail, digital services, and online marketplaces. Pusat Tayar & Bateri YH Speed is a small automotive shop in Jitra, Kedah. Currently, it faces issues with manual order handling and outdated tracking of product availability, which often leads to overselling and delays. Its reliance on social media for promotions also limits reach and requires frequent manual updates. To address these issues, an e-commerce system is designed using the Waterfall development model, ensuring a structured approach from requirements gathering to design, implementation, and testing. The system will be developed using PHP for the backend, MySQL for the database, and HTML, CSS, and JavaScript for the frontend. The system is designed to streamline operations, improve customer experience, and increase visibility, helping the business scale and compete effectively. The platform will automate tasks like updating product availability, tracking order status, boosting sales and efficiency while expanding the business's reach for long-term success.

## 1. Introduction

E-commerce, short for electronic commerce, is purchasing and selling goods or services online [1]. Pusat Tayar & Bateri YH Speed is an automotive shop in Jitra, Kedah. The business primarily serves local clients seeking high-quality car parts and services. The company, known for its diverse range of products, has established a reputation as a dependable provider of essential car components in the surrounding area.

Currently, Pusat Tayar & Bateri YH Speed relies on manual processes for handling sales, where customers place orders via WhatsApp and marketing is done through Facebook. This approach limits efficiency, causes delays, and often leads to mistakes such as outdated product information and overselling. Customers cannot easily browse available products or get real-time updates, making the buying process inconvenient and less engaging. To overcome these challenges, this project proposes an e-commerce system featuring an online catalogue that allows customers to browse products, place orders, and upload payment receipts. The system will provide real-time product availability, streamline order processing, and reduce manual errors. By automating key sales functions and improving online visibility, the platform will enhance customer experience and support the business's growth.

This project aims to design an e-commerce system for Pusat Tayar & Bateri YH Speed using a structured approach, develop it with XAMPP and Visual Studio Code, and test its functionality while collecting user acceptance feedback. The project focuses on a local shop in Jitra, Kedah, targeting both customers and the shop owner (admin). Customer modules include: user account, products, learning guide, shopping cart & checkout,

order management, FAQ, and a vehicle customization preview feature that shows rims or tires on selected car models. Admin modules include: user management, product management, content management, order management, and report generation.

## 2. Related Work

This part discusses the related work about e-commerce system, web-based system and comparison between existing system and proposed system.

### 2.1 E-Commerce System

E-commerce refers to a wide variety of online business transactions that take place electronically rather than in person [2]. It involves purchasing and selling goods and services through online platforms, and it grew rapidly between 2020 and 2024 as a result of shifting consumer habits and technology advancements, particularly during the COVID-19 pandemic [3]. Mobile commerce has grown significantly, with many purchases now conducted using mobile devices [4]. Convenience, 24/7 access, and worldwide reach without the need for physical locations are among the key benefits, which are backed by digital marketing and social media [5]. Personalized recommendations are provided by technologies such as artificial intelligence [6], and augmented reality enables customers to evaluate products in real-world settings before to purchase [7].

### 2.2 Web Based System

A web-based system is software that can be accessed via a browser over the internet or intranet and provides flexibility, real-time updates, and centralized data administration without the need for individual device installation [8]. These systems provide increased security through centralized controls like encryption and secure access, are affordable, and can be scaled for expanding enterprises [9]. As technology advances, web-based systems will continue to play an important role in providing efficient and accessible digital solutions.

### 2.3 Comparison between Existing System and Proposed System

Three existing systems will be discussed and investigated through each characteristic of the system, including advantages, disadvantages, and features, to compare with the proposed system. The three existing systems are Apollo Tyres, Mytayar, and Mytyres.

The comparison table below compares the features of the three existing systems MyTayar, MyTyres, Apollo Tyres, and the proposed system for Pusat Tayar & Bateri YH Speed.

**Table 1** Comparison between three existing systems and proposed system

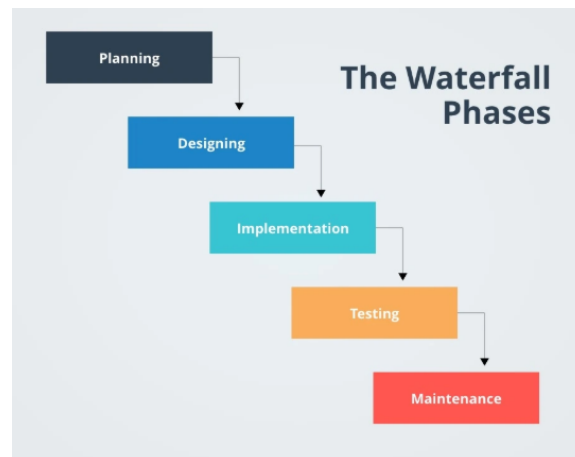
Application Features	Apollo Tyres	Mytayar	Mytyres	Pusat Tayar & Bateri YH Speed (Proposed System)
Registration and Login	√	√	√	√
Search Function	√	√	√	√
Learning Guide	√	√	√	√
Customization Preview	×	×	×	√
Shopping Cart	√	√	√	√
Order Summary	√	√	√	√
Delivery Options	×	×	√	√
FAQ	×	√	√	√
Order Tracking	√	√	√	√
Review/Feedback	×	√	√	√
Refund and Cancellation Process	√	√	√	√

The comparison in table above shows that all systems—MyTayar, MyTyres, Apollo Tyres, and Pusat Tayar & Bateri YH Speed—provide key functions such as registration, login, search, and a learning guide. But what makes Pusat Tayar & Bateri YH Speed unique is its customizable preview option, which lets customers see items like rims or tires before they buy. Like MyTyres, it also has a shopping cart, order summary, and shipping choices.

Unlike Apollo Tyres, the other three platforms, which include Pusat Tayar and Bateri YH Speed, provide a useful FAQ section. All things considered, Pusat Tayar & Bateri YH Speed provides the most complete and customized experience.

### 3. Methodology

Figure 1 shows waterfall model which is used in this project with clearly define and document the requirements for the e-commerce system. The development process will proceed in an ordered way, with deliverables from one phase acting as the input for the next one [10]. These phases are requirement analysis, system design, implementation, testing, and maintenance. This model reduces risk by ensuring that the system is completely defined and documented before development begins, resulting in a predictable path to project completion.



**Fig. 1** Waterfall model for each phase

Table 2 outlines the activities and deliverables for each project phase. This process consists of five phases: requirement and analysis, design, implementation, testing, and maintenance — each with its own duration contributing to the overall project timeline.

**Table 2** Specification of activities to be carried out in each phase

Phases	Task/Activities	Deliverables
Requirement & Analysis	- Identity system scope and requirements - Analyse requirements: <ul style="list-style-type: none"> <li>• Data collection – interview client to identify system requirements</li> <li>• Project timeline – Gantt Chart</li> </ul>	i. Proposal ii. Gantt Chart
Design	- Design the flowchart of the proposed system - Design user interface as per requirement - Design database as per requirement - Design Data Flow Diagram (DFD) and Entity Relationship Diagram (ERD)	i. Flowchart ii. Context Diagram (CD) iii. Data Flow Diagram (DFD) iii. Entity Relationship Diagram (ERD) iv. Data Dictionary v. Interfaces
Implementation	The designated design will be converted to actual code.	To execute system
Testing	Alpha & beta testing	Test the functionalities and acceptance test
Maintenance	Involve routine monitoring, error correction, and upgrades.	Make sure the system is ready to use by the stakeholder and ensures the quality of use which provides effectiveness, efficiency, satisfaction, reliable and secure

## 4. Analysis And Design

Based on user requirements, defining the proposed system involves designing the system architecture, flowchart, context diagram, data flow diagram (DFD), and entity-relationship diagram (ERD) to ensure a thorough understanding and effective planning. These designs must meet the requirements and be usable.

### 4.1 System Requirement Analysis

Requirement analysis is a phase in which information is collected and gathered to produce a complete and successful system by collecting characteristics and features of the system. There are two types of requirement analysis which are functional requirement analysis and non-functional requirement analysis. Table 3, 4, and 5 below show the functional requirement analysis and non-functional requirement analysis respectively.

**Table 3** *Functional Requirements of the Proposed System (Customer)*

Modules	Functionalities
Customer Account	<ul style="list-style-type: none"> <li>- The system should allow users to register an account with their details.</li> <li>- The system should enable to send a verification email to new registered users to - activate their account.</li> <li>- The system should enable users to log in and log out securely.</li> <li>- The system should allow users to manage and update their profile information.</li> <li>- The system should allow users to reset their password by sending a reset link to their registered email.</li> </ul>
Products	<ul style="list-style-type: none"> <li>- The system should display car accessories categorized by type for browsing.</li> <li>- The system should provide a search functionality for users to find products by name.</li> <li>- The system should display detailed product information, including specifications and images.</li> <li>- The system should offer a vehicle customization preview to display accessories on selected car models.</li> <li>- The system should allow users to submit ratings and reviews for purchased products.</li> </ul>
Learning Guide	<ul style="list-style-type: none"> <li>- The system should provide guides, tutorials, and installation instructions for the products.</li> </ul>
Shopping Cart & Checkout	<ul style="list-style-type: none"> <li>- The system should allow users to add items to their shopping cart.</li> <li>- The system should enable users to view and edit items in their shopping cart.</li> <li>- The system should calculate and display shipping costs based on the weight of items in the cart.</li> <li>- The system should calculate and display shipping costs based on the user's location and items in the cart.</li> <li>- The system should present an order summary for user review before proceeding to checkout.</li> <li>- The system should allow users to proceed to checkout and confirm shipping and contact information.</li> <li>- The system should allow users to upload payment receipt as proof of manual payment before or after placing the order.</li> </ul>
Order Management	<ul style="list-style-type: none"> <li>- The system should allow users to track the status of their orders in real-time.</li> <li>- The system should display users' order history, including details of past orders.</li> <li>- The system should provide users the ability to cancel orders that have not yet been shipped.</li> <li>- The system should allow users to request return for purchased items within 7 days after the order has been delivered.</li> <li>- The system should allow users to provide reason when submitting a return or cancellation request.</li> <li>- The system should allow users to check the status of their return or cancellation requests.</li> <li>- The system should allow users to view refund status once a return or cancellation has been approved.</li> </ul>

**Table 4** Functional Requirements of the Proposed System (Administrator)

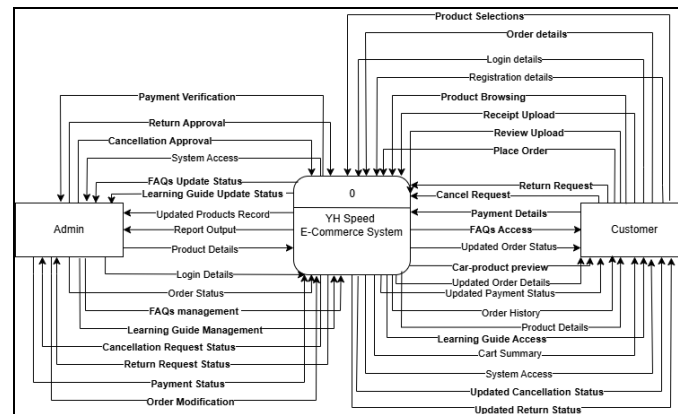
Modules	Functionalities
User Management	<ul style="list-style-type: none"> <li>- The system should allow the owner to add new user accounts.</li> <li>- The system should allow the owner to edit user account details.</li> <li>- The system should allow the owner to delete user accounts.</li> <li>- The system should allow the owner to view and manage all user accounts.</li> </ul>
Product Management	<ul style="list-style-type: none"> <li>- The system should allow the owner to add new products to the catalogue.</li> <li>- The system should allow the owner to edit existing product details.</li> <li>- The system should allow the owner to remove products from the catalogue.</li> <li>- The system should allow admin to manage vehicle models and product compatibility.</li> <li>- The system should allow the admin to manage the vehicle preview images.</li> <li>- The system should allow the owner to track and update stock levels of products.</li> </ul>
Order Management	<ul style="list-style-type: none"> <li>- The system should allow the owner to view a list of all orders placed by customers.</li> <li>- The system should allow the owner to update the status of orders.</li> <li>- The system should allow the owner view submitted cancellation or return requests along with reasons and approve or reject them.</li> <li>- The system should allow owner to update the refund status after a return or cancellation request has been approved.</li> </ul>
Content Management	<ul style="list-style-type: none"> <li>- The system should allow the admin to manage learning materials, including creating, editing, categorizing, and deleting guides, tutorials, and detailed instructions for using or installing products in the Learning Guide section.</li> <li>- The system should also allow the admin to manage FAQs to provide answers to frequently asked questions.</li> </ul>
Reports	<ul style="list-style-type: none"> <li>- The system should allow the owner to view real-time sales reports.</li> <li>- The system should provide the owner with insights into product performance.</li> <li>- The system should allow owner to print out the reports.</li> </ul>

**Table 5** Non-Functional Requirements of the Proposed System

No	Requirements	Descriptions
1.	Operational	<ul style="list-style-type: none"> <li>- The interaction between the user and the system should not be more than 10 minutes.</li> <li>- The system should be able for use anytime.</li> </ul>
2.	Performance	<ul style="list-style-type: none"> <li>- The system should be user-friendly.</li> <li>- The system should be easily maintained and updated.</li> <li>- The system should be able to work on any web browser.</li> </ul>
3.	Security	<ul style="list-style-type: none"> <li>- Only administrator can access the report.</li> <li>- Users(customers) can only access their own account with their username and password.</li> </ul>

## 4.2 Context Diagram

Figure 2 below shows the context diagram that shows the overall workflow of the YH Speed E-Commerce System by showing how data flows between the system and its two primary external entities: the Customer and the Administrator.



**Fig. 2** Context Diagram for YH Speed E-Commerce System System

### 4.3 Flowchart Diagram

The system flowchart is a visual guide that explains every step of actions within the YH Speed E-Commerce System before the real development phase begins. The flowchart breaks down the workflow of the system into various stages, each of which is represented by a different shape. These shapes are connected by directional lines, indicating the logical flow of information and actions. A detailed flowchart, which covers both the admin and customer points of view will be showed in Appendix A.

### 4.4 Data Flow Diagram (DFD)

In a graphical representation, the Data Flow Diagram (DFD) shows how information flows through the system. It is often used as the first stage in providing an overview of the system's processes. A DFD illustrates key connections while displaying the data flow into and out of the system. The registration and login function represented by Process 1.0 of the YH Speed E-Commerce System, while Product Management is handled by Process 2.0, Cart Management by Process 3.0, Order Management by Process 4.0, Content Management by Process 5.0, Refund and cancellation Management by Process 6.0, Customer Reviews by Process 7.0, and Reports by Process 8.0. The system's complete DFD will be attached in Appendix B.

### 4.5 Entity Relationship Diagram (ERD)

Entity relationship diagram is a structural diagram that is used to illustrate the database design. There are thirteen database tables in the system. The ERD will be attached in Appendix C.

## 5. Implementation and Testing

Implementation and Testing are critical phases in development into real-world environments. During implementation, the system is configured and integrated with modules requirements and followed by testing phases to identify and resolve any issues to ensure system's reliability and performance.

### 5.1 Implementation

This section shows the output of the project by displaying the interface of the web system for each module in detail. The modules in this system are user account module, products module, shopping cart and checkout module, order management module, content module, and report module.

#### 5.1.1 User Account Module

The system features a complete user management system, an admin dashboard for managing users, a secure login interface with role-based access control, and an easy-to-use registration mechanism. The login system manages authentication and session management, while the admin interface allows adding and editing users with validation. The registration procedure validates password strength and requires email verification, ensuring that user accounts are created securely.

The Admin Management interface is divided into two main sections. The top section, titled 'Add New Admin', contains a form with three input fields: 'Username', 'Email', and 'Password'. Below these fields is a blue 'Add Admin' button. The bottom section, titled 'Admins List', features a search bar with the placeholder 'Search by username or email' and a 'Search' button. Below the search bar is a table with the following data:

ID	Username	Email	Actions				
41	Hyu	hyu@gmail.com	<input type="text" value="Hyu"/>	<input type="text" value="hyu@gmail.com"/>	<input type="text" value="New Password"/>	<input type="button" value="Update"/>	<input type="button" value="Delete"/>
9	Xru	Xru@gmail.com	<input type="text" value="Xru"/>	<input type="text" value="Xru@gmail.com"/>	<input type="text" value="New Password"/>	<input type="button" value="Update"/>	<input type="button" value="Delete"/>

At the bottom of the table, it says 'Showing 1 to 2 of 2 records'.

(a)

The Customer Registration form is centered on the page. It has the following fields and elements:

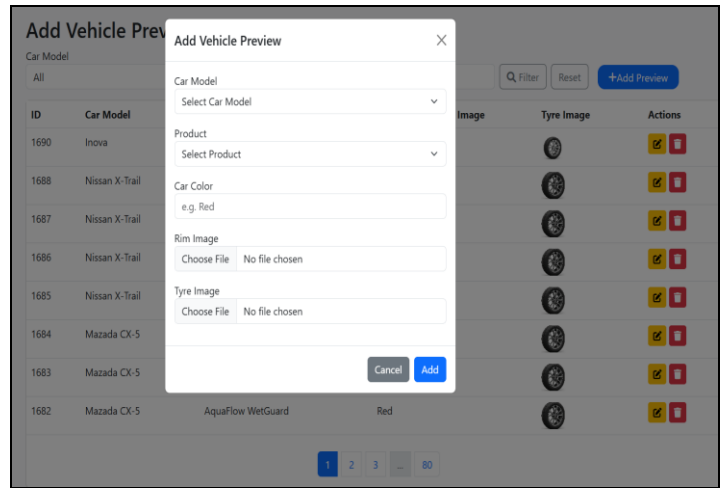
- Username:**
- Email:**
- Password:** 
  - At least 8 characters
  - At least one uppercase letter
  - At least one lowercase letter
  - At least one number
  - At least one special character
- Confirm Password:**
- Register:** A large purple button.
- Already have an account? [Login here](#)**

(b)

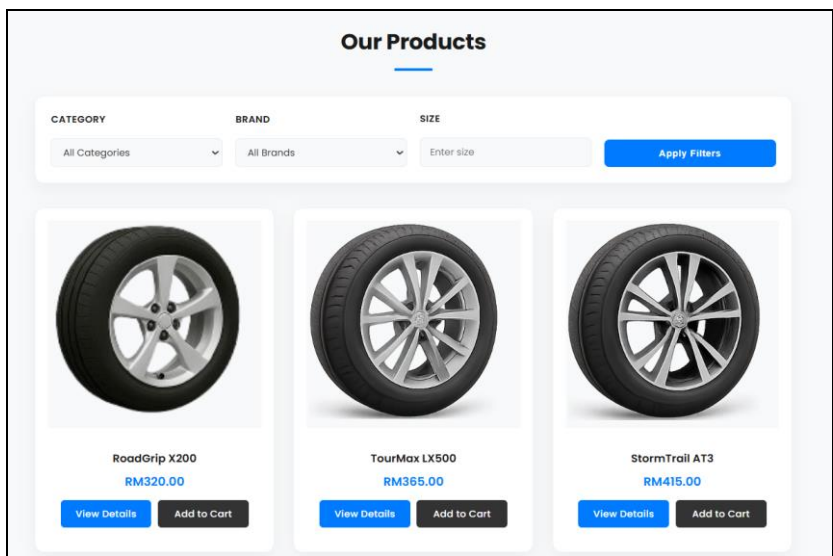
Fig. 3 (a) Admin User Management Interface; (b) Registration Page

### 5.1.2 Products Module

The system includes a full product management solution, including an admin interface for adding products (tires/rims) with detailed specifications, a user-friendly product listing page with filtering options, and a secure cart system that handles both guest and logged-in users, as well as stock validation and quantity management.



(a)



(b)

**Fig. 4** (a) Product Form in Product Main Page; (b) Product Listings in Products Page

The system includes a responsive cart page that displays product descriptions, quantities, and subtotals, a secure checkout procedure that calculates shipping costs based on product weight, and real-time cart management, which includes item modifications and removals. The checkout page includes an order summary, shipping calculations, and payment processing, as well as validation of stock levels and user information.



(a)

**Checkout**

**Contact Information**

Username  
Ooi Xin Ru

Email  
oxr3827@gmail.com

Phone Number  
0113456782

**Shipping Address**

Use My Default Address  
8Y, Jalan Cahaya, Taman Bahagia, 23090, Alor Setar, Kedah

Use Different Address For This Order Only

**Payment Method**

Cash on Delivery (COD)  Bank Transfer

**Order Summary**

ForgedFlight 19  
Quantity: 1  
Weight: 11.30 kg  
Shipping: RM25.00  
RM575.00

StormTrail AT3  
Quantity: 1  
Weight: 12.10 kg  
Shipping: RM25.00  
RM415.00

Order All Subtotal  
RM990.00

Total Weight  
23.40 kg

Total Shipping Cost  
RM50.00

Total  
RM1,040.00

**Place Order**

(b)

Fig. 5 (a) Shopping Cart Page; (b) Checkout Page

The system provides a complete order management solution, including an admin dashboard for tracking and updating order statuses, a user-friendly "My Orders" page for customers to view their order history, secure status transition handling with stock management, and detailed order displays for both administrators and customers that show product information, shipping costs, and order timelines.

**Order Management**

Search: Search orders... Status: All Status Payment: All Payment Date From: mm/dd/yyyy Date To: mm/dd/yyyy Filter Reset

Order ID	Customer Email	Product (Name x Qty)	Order Date	Total Price	Payment Info	Status	Action
#155	oxr3827@gmail.com	TourMax LX500 x 1	2025-05-30 01:42	RM385.00	COD	Pending	Show Timeline EDIT DELETE
#154	oxr3827@gmail.com	RallySport RS-15 x 1 TitanSteel Heavy 20 x 1	2025-05-30 00:57	RM939.00	COD	Cancelled	Show Timeline EDIT DELETE
#153	oxr3827@gmail.com	ForgedFlight 19 x 1 TourMax LX500 x 1	2025-05-24 15:02	RM985.00	Bank Transfer No Receipt	Pending	Show Timeline EDIT DELETE
#152	oxr3827@gmail.com	TourMax LX500 x 1	2025-05-24 14:51	RM385.00	Bank Transfer No Receipt	Pending	Show Timeline EDIT DELETE

(a)

**Order #156**  
May 31, 2025, 7:49 pm Pending

ForgedFlight 19  
Quantity: 1 Price: RM575.00

StormTrail AT3  
Quantity: 1 Price: RM415.00

Haven't uploaded payment proof yet? [Upload Receipt](#)

[View Details >](#)

**Order #155**  
May 30, 2025, 1:42 am Delivered

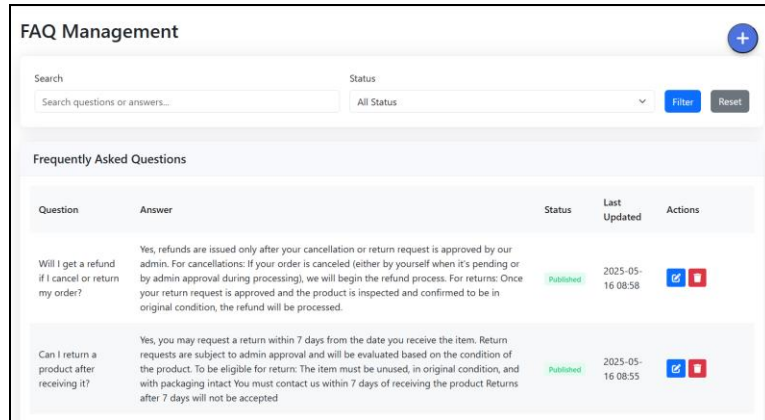
TourMax LX500  
Quantity: 1 Price: RM385.00

[View Details >](#)

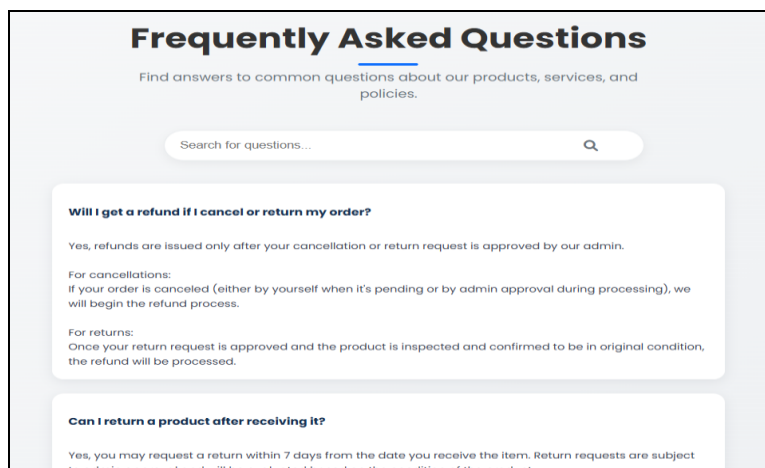
(b)

Fig. 6 (a) Order Management in Admin\_Orders Page; (b) My Order Page

The system features a complete FAQ management solution with an admin interface for adding and managing frequently asked questions, a user-friendly FAQ page for customers to browse questions and answers, and a smart search functionality that highlights relevant text when users search for specific topics.



(a)

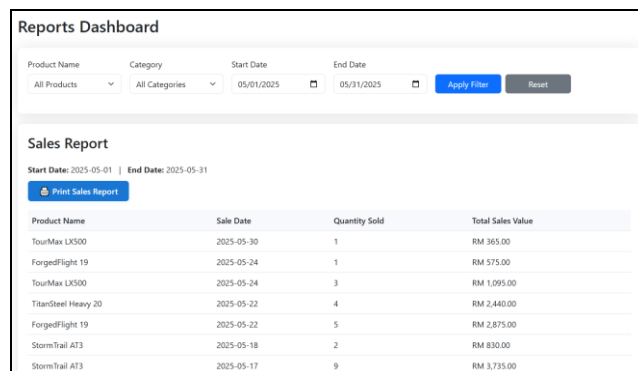


(b)

Fig. 7 (a) FAQ Management in Admin\_FAQ Page; (b) FAQ Page

### 5.1.3 Report Module

The Report Dashboard provides sales and product performance analytics with filtering options by date, product, and category.



(a)

Fig. 8 (a) Report Dashboard in Admin\_Report Page

### 5.2 System Testing

The testing phase is critical in the development process since it exposes the system to various tests in order to find and address any problems, faults, or defects. This step ensures that the system fulfills the required specifications and performs as expected. This step is critical before the system is ready for real-world use.

### 5.2.1 System Functionality Testing

System functionality testing is a crucial phase in the development and acceptance of a system, ensuring it meets all requirements and design specifications. Independent testers evaluate the system's overall functionality, including interfaces between modules. Test cases are created to verify the features of the YH Speed E-Commerce System.

**Table 6** Test Plan for All Modules

<b>User Account Module (TEST_100)</b>			
<b>Test Case</b>	<b>Description</b>	<b>Expected Outcome</b>	<b>Actual Result</b>
TEST_101	Test account registration with valid details.	User is registered and receives a verification email.	Pass
TEST_102	Test registration with invalid or missing details.	Error messages are displayed for missing or invalid input.	Pass
TEST_103	Test login with valid credentials.	The user is successfully logged in.	Pass
TEST_104	Test login with invalid credentials.	An error message is displayed.	Pass
TEST_105	Test updating user profile.	User profile updates are saved successfully.	Pass
TEST_106	Test logout functionality.	The user is successfully logged out.	Pass
TEST_107	Test manage a new user account.	The user account can be deleted, edited and added successfully.	Pass
<b>Products Module (TEST_200)</b>			
<b>Test Case</b>	<b>Description</b>	<b>Expected Outcome</b>	<b>Actual Result</b>
TEST_201	Test browsing products by category.	Products are displayed according to the selected category.	Pass
TEST_202	Test searching by product name.	Matching products are displayed based on the search query.	Pass
TEST_203	Test viewing product details.	The product detail page displays all relevant information.	Pass
TEST_204	Test the vehicle customization preview.	Accessories can be added and are correctly displayed on the selected car model.	Pass
TEST_205	Test rating and reviewing purchased products.	Ratings and reviews are submitted and displayed successfully.	Pass
TEST_206	Test editing product details.	Product details are updated successfully.	Pass
TEST_207	Test to update stock levels for a product.	Stock levels are updated correctly based on orders.	Pass
<b>Content Management Module (TEST_300)</b>			
<b>Test Case</b>	<b>Description</b>	<b>Expected Outcome</b>	<b>Actual Result</b>
TEST_301	Test accessing product guides, tutorials and faq.	Guides, tutorials, instructions and faq are displayed correctly.	Pass
TEST_302	Test managing guide or faq.	The content of guide or faq is added, edited and deleted successfully.	Pass

Table 6 (cont)

<b>Shopping Cart and Checkout Module (TEST_400)</b>			
<b>Test Case</b>	<b>Description</b>	<b>Expected Outcome</b>	<b>Actual Result</b>
TEST_401	Test adding products to the cart.	Selected items are added to the cart.	Pass
TEST_402	Test editing items in the cart.	Updates to the cart are saved successfully.	Pass
TEST_403	Test viewing shipping costs.	Shipping costs are calculated and displayed based on the product's weight.	Pass
TEST_404	Test reviewing the order summary.	The summary displays all selected products, shipping costs, and total price.	Pass
TEST_405	Test to upload payment receipt.	Receipt is uploaded and attached to order.	Pass
<b>Order Management Module (TEST_500)</b>			
<b>Test Case</b>	<b>Description</b>	<b>Expected Outcome</b>	<b>Actual Result</b>
TEST_501	Verify order status updates in real-time.	Order status shows current stage: Pending / Processing / Shipped / Delivered.	Pass
TEST_502	View full order history.	Displays order number, items, price, date, payment method, and status.	Pass
TEST_503	Cancel order before it is shipped.	Order status changes to Cancelled, and cancelled_at is saved.	Pass
TEST_504	Restrict order cancellation after shipped.	"Cancel Order" button is not visible.	Pass
TEST_505	Request return within 7 days of delivery.	The return request is submitted successfully.	Pass
TEST_506	Block return after 7 days of delivery.	"Request Return" button is not visible.	Pass
TEST_507	Submit reason for return or cancellation.	Reason is stored and visible to admin for review.	Pass
TEST_508	Track return/cancellation request status.	Status shows: Pending / Approved / Rejected.	Pass
TEST_509	View refund status after request is approve.	Refund status shows Pending / Completed and refund date is visible if applicable.	Pass
TEST_5010	Test viewing all orders.	A list of all orders is displayed with relevant details.	Pass
TEST_5011	Test updating the status of an order.	The order status is updated successfully.	Pass
TEST_5012	Test viewing submitted cancellation requests.	A list of all requests with reasons and status is displayed.	Pass
TEST_5013	Approve or reject cancellation requests.	Request is updated with new status.	Pass
TEST_5014	Test viewing submitted return requests.	A list of all requests with reasons and status is displayed.	Pass

**Table 6 (cont)**

TEST_5015	Approve or reject return requests.	Request is updated with new status.	Pass
TEST_5016	Update refund status after approval.	Refund status is updated successfully.	Pass
<b>Report Module (TEST_600)</b>			
<b>Test Case</b>	<b>Description</b>	<b>Expected Outcome</b>	<b>Actual Result</b>
TEST_601	Test accessing sales reports.	Sales data is displayed correctly with accurate calculations.	Pass
TEST_602	Test evaluating product performance reports.	Product performance metrics are displayed correctly.	Pass
TEST_603	Test to print report.	Report is downloaded or sent to printer.	Pass

### 5.2.2 User Acceptance Testing

The user acceptance testing is carried out to make sure the developed system fulfills the client needs and requirements. YH Speed E-Commerce System was tested through UAT which allows users to interact with the system before it is formally established. The system was tested by 10 users using a 5-point scale. Overall feedback was very positive. Most users rated the interface as clear and user-friendly. Core features like registration, login, shopping cart, and order placement worked smoothly. Other features such as payment receipt upload and order history were also well received. Users found the system responsive and easy to navigate. Overall satisfaction was high, indicating the system meets user needs effectively. The figure that shows the acceptance testing's results based on respond from each of the ten respondents will be displayed in Appendix D.

**Table 7 User Acceptance Testing Evaluation**

No	Statement	Scale					Total
		1	2	3	4	5	
1.	Interface is clear, visually appealing, and user-friendly.	0	0	0	2	8	10
2.	Registration, login, and logout work without issues.	0	0	0	4	6	10
3	Shopping cart and order list functions are intuitive.	0	0	0	0	10	10
4.	Payment receipt upload and status management work smoothly.	0	0	0	3	7	10
5.	Vehicle customization preview is accurate and easy to use.	0	0	0	1	9	10
6.	Order history and return/cancellation features are straightforward.	0	0	0	3	7	10
7.	Learning guides and FAQs provide relevant help.	0	0	0	2	8	10
8.	Shopping cart and order list functions are intuitive.	0	0	0	3	7	10
9.	System responds quickly and navigates smoothly.	0	0	0	0	10	10
10.	Overall satisfaction with system functionalities and performance.	0	0	0	2	8	10

## 6. Conclusion

The E-Commerce System for Pusat Tayar & Bateri YH Speed enhances business operations by replacing manual processes with a more efficient digital platform. It includes secure customer account management, product browsing with a vehicle customization preview, and interactive learning guides. Customers can use features such as a shopping cart, manual payment upload, and real-time order tracking with support for cancellations, returns and refunds. The admin dashboard enables the shop owner to manage users, products, vehicle models, content, and view sales reports. This system improves time efficiency, reduces manual work, and enhances the overall shopping experience. With ongoing updates, it has the potential to scale alongside business growth and adapt to evolving customer and operational needs.

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## Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

## Author Contribution

This journal requires that all authors take public responsibility for the content of the work submitted for review. The contributions of all authors must be described in the following manner:

*The authors confirm contribution to the paper as follows: **study conception and design:** Ooi Xin Ru, Nurul Aswa binti Omar; **data collection:** Ooi Xin Ru, Nurul Aswa binti Omar; **analysis and interpretation of results:** Ooi Xin Ru, Nurul Aswa binti Omar; **draft manuscript preparation:** Ooi Xin Ru, Nurul Aswa binti Omar. All authors reviewed the results and approved the final version of the manuscript.*

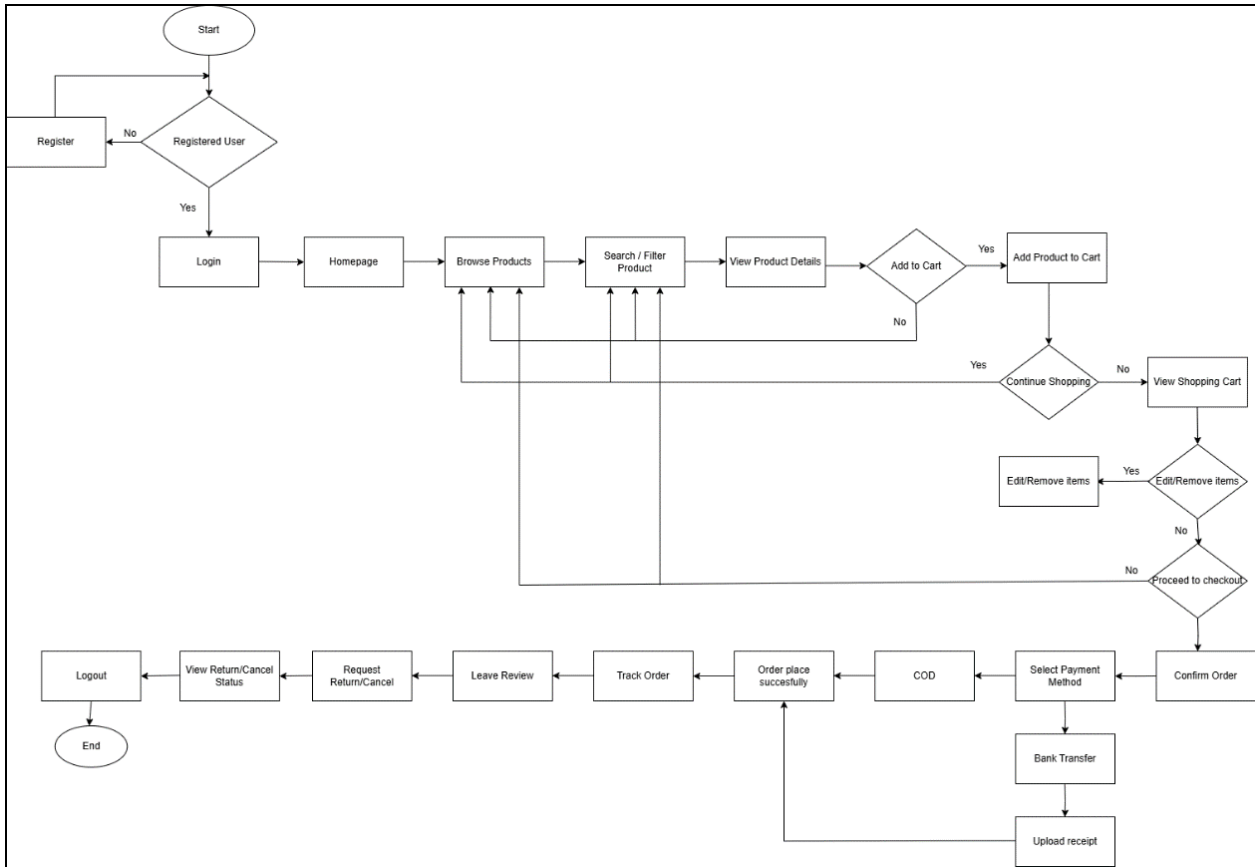
An author name can appear multiple times, and each author name must appear at least once. For single authors, use the following wording:

*The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.*

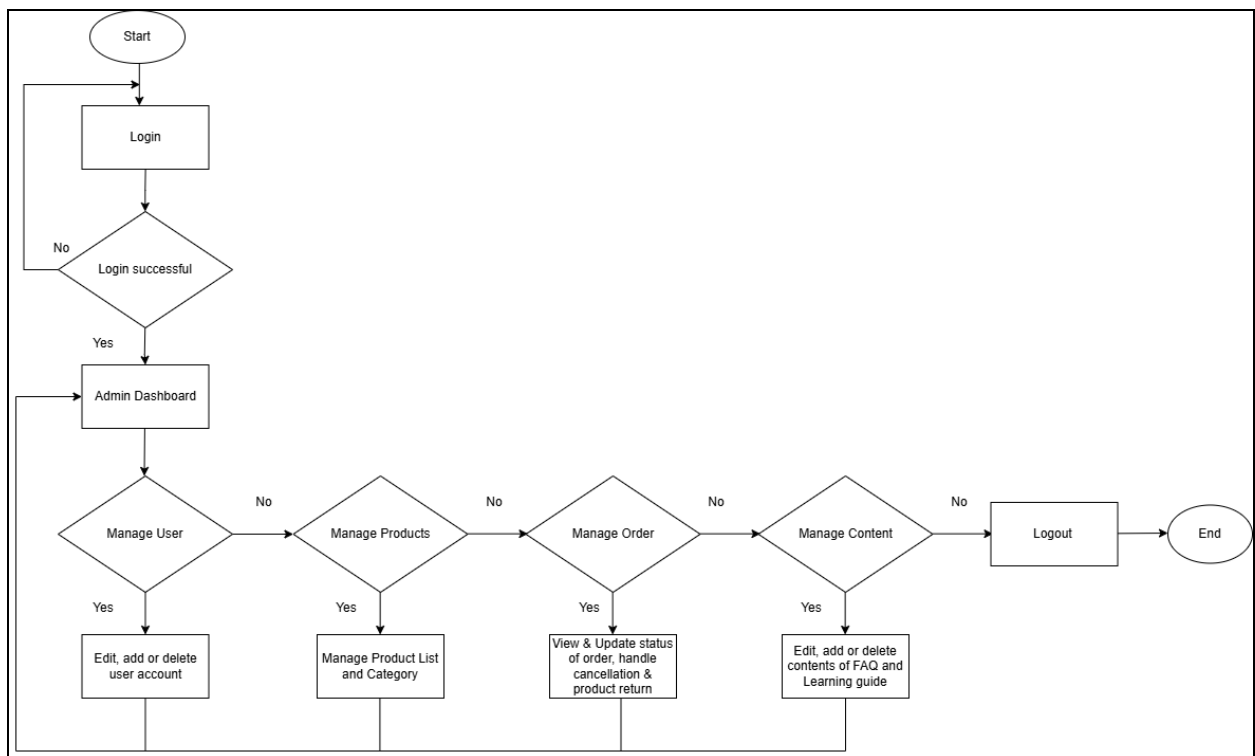
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### Appendix A: Flowchart Diagram for Customer and Administrator Side

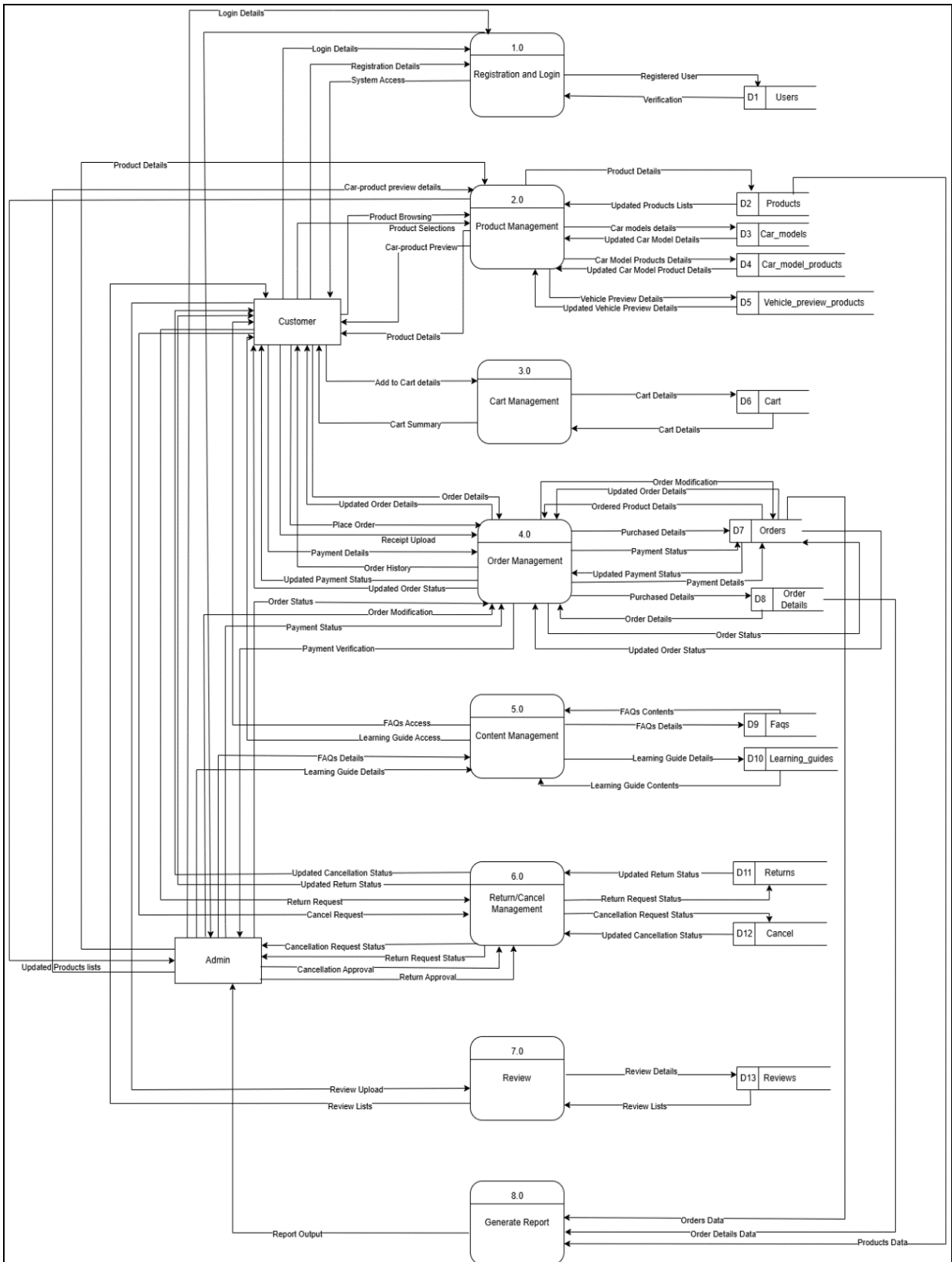


Flowchart of Customer Side

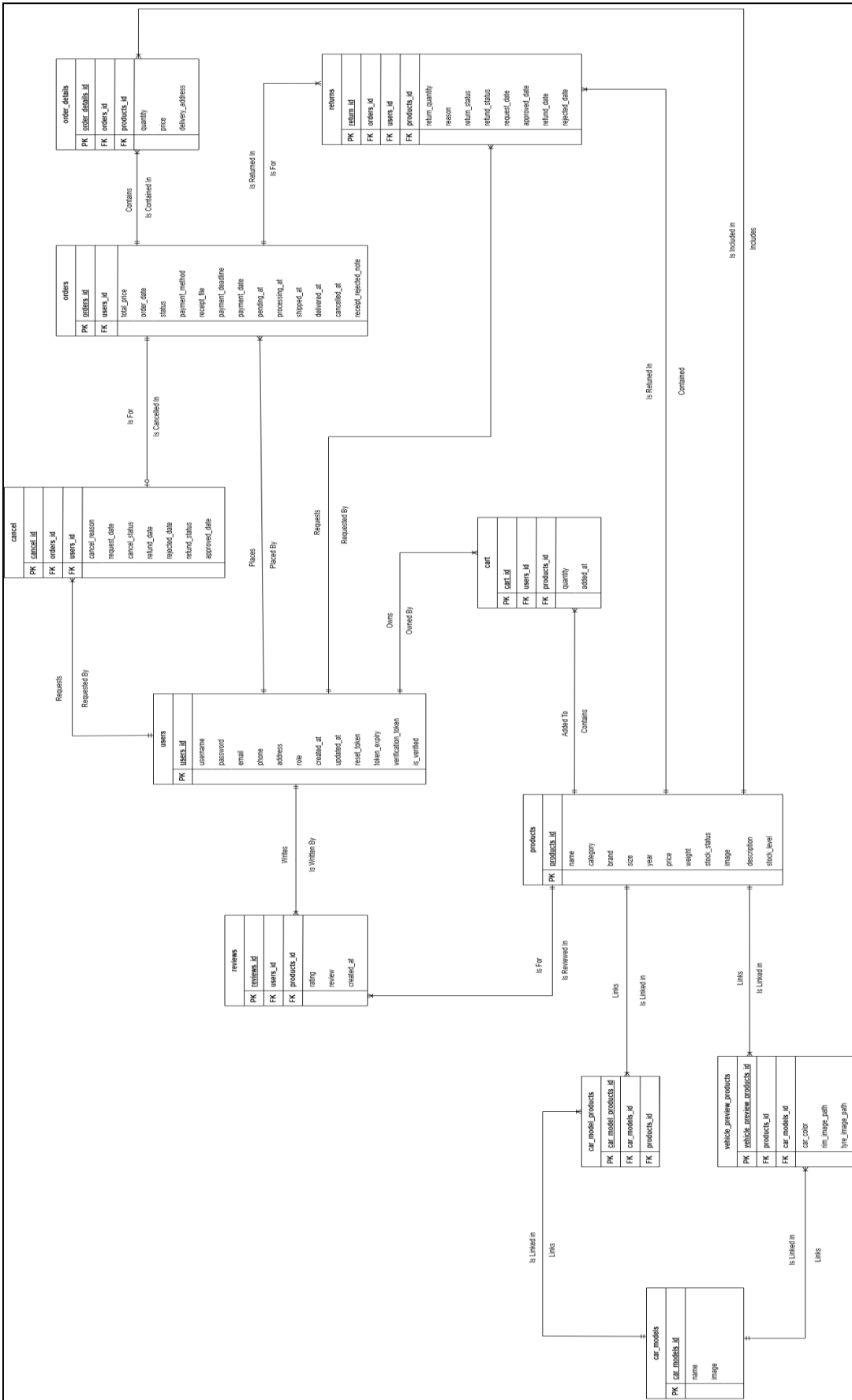


Flowchart of Administrator Side

### Appendix B: Data Flow Diagram (DFD)



### Appendix C: Entity Relationship Diagram



### Appendix D: User Acceptance Results

