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NILL Concept Store Online System

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Abstract

NILL Concept Store Online System addresses the limitations of face-to-face traditional clothing sales by launching a comprehensive e-commerce platform. Developed to overcome seasonal dependence and expand market reach, the system enhances customer experience and streamlines administration. Key features include user registration and login, product management, shopping cart, sales tracking, delivery monitoring, reporting, and color suggestion tools. Built with standard web technologies (VS Code, PhpMyAdmin) and tested on Chrome and Edge, it meets performance, security, and compatibility requirements. The platform significantly improves product accessibility, automates orders and payments, and provides real-time inventory updates. Sales reporting enables effective trend analysis. This robust solution offers NILL a seamless, efficient online sales channel. Future enhancements could focus on advanced personalization and marketing integration to further boost engagement and performance.

1. Introduction

The traditional clothing industry in Malaysia, especially Baju Melayu and sampin, is dependent on seasonal in-store sales. NILL Concept Store has such a focus but without an online platform. Most of the time, there is a significant increase in sales during big events, for example, Raya Aidilfitri and Raya Aidiladha. The founder, Mr. Luqman, manages the business, sourcing materials, coordinating with sewing shops, and customizing Baju Melayu buttons. The company hires temporary staff to help with inventory, displays, and sales for events such as Starvendors in Kuala Lumpur to meet seasonal demand.

NILL is currently executing only manual and direct marketing. The highest sales happen a month before Raya Aidiladha, and two months before Raya Aidilfitri also fall in the middle of Ramadan. This confines the visibility and growth of the company solely to these local events. Online customers are underserved, with problems such as inefficiencies and mistakes from manual sales and inventory tracking [1] [2]. Without an e-commerce platform, the company finds it hard to give accurate size recommendations, particularly for customers used to varying sizing standards like slim fit or regular fit.

The NILL Concept Store online system will be an e-commerce platform for easy browsing and purchases. It will offer personalized size recommendations and automated color matching suggestions based on skin tones. For administrators, the system will make operations easier by maintaining product lists, tracking inventories, processing sales, handling customer inquiries, and generating sales reports. The online platform, with a centralized database, will improve operational efficiency, decrease manual errors, and provide an efficient shopping experience [3].

The NILL Concept Store online system is bound to enable the business to reach more customers, maximize sales beyond seasonal events, and update its operations. Customers enjoy a convenient shopping cart, delivery tracking, and the ability to save favorites or make a review about the product. Administrators can manage

products, handle customer issues, and optimize inventory. This project will improve the customers' shopping experience and the competitiveness of the company in the traditional clothes market [4] [5] [6].

2. Literature Review

NILL is the first e-commerce platform featuring traditional Malay clothing such as Baju Melayu and sampin. This website aims to solve all the operational problems related to this seasonal event, like Hari Raya Aidilfitri and Aidiladha, where presently the management of sales by employees becomes manual during hectic moments. This traditional approach restricts the company's reach and makes it hard to effectively carry out sales and inventory tracking.

Establish an e-commerce system in a digital storefront that will enable browsing of products and making purchases over the internet. E-commerce websites successfully allow companies to overcome geographical barriers besides offering online payment, inventory, and order tracking in real-time. These systems make shopping easy and enhance operations, thus helping businesses to reach a wider audience throughout the year. By adopting e-commerce, NILL can save on efficiency and ensure year-round sales, not just during peak seasons. The NILL platform will utilize the Laravel framework for its elegant syntax, security features, and strong set of tools that make development seamless and improve performance [7].

Three e-commerce systems are analyzed for a competitive platform: Khatam, Jakel Online, and Omar Ali. Khatam provides an intuitive interface for product browsing and customer engagement. Jakel Online comes with online payment and delivery services. All features that make it the perfect fit for traditional cloth retailers. Omar Ali is all about the luxurious experience, with advanced order tracking. NILL's design, informed by insights from these platforms, includes a report module and personalized product suggestions based on skin tones. These features enhance the shopping experience and efficiency, thus placing NILL at the forefront in the traditional clothing industry. The comparison between similar systems and the proposed system will be shown in **Table 1.**

Table 1 *System Comparison*

System / Features	Khatam	Jakel	Omar Ali	NILL Concept Store
User Register and Login	X	X	X	√
Product management	√	√	√	√
Shopping cart	√	√	√	√
Track order	√	√	√	√
Report	X	X	X	√
Suggestion	X	√	X	√

3. Methodology

The appropriate methodology must be selected carefully to ensure the successful development of a system. For the NILL Concept Store online system, the Agile Model was chosen due to its flexibility, iterative progress, and focus on continuous collaboration with stakeholders [8]. This methodology is particularly effective in addressing evolving requirements, ensuring that the system aligns with user feedback and project objectives [9]. Agile's phased approach, which is meet, plan, design, develop, test, and evaluate. As shown in **Figure 1** and **Table 2,** It ensures each stage produces specific outputs contributing to the system's overall success. For instance, the Meet phase gathers business requirements through stakeholder interviews, while the Plan phase outlines the project structure using tools like Gantt charts, DFDs, and ERDs. In the Design phase, requirements are transformed into user-friendly features such as a responsive interface and personalized product recommendations. The Develop phase implements these designs into a functional e-commerce system, followed by the Test phase to identify and resolve issues, ensuring reliability. Finally, the Evaluate phase deploys the system and incorporates feedback for continuous improvement. This iterative approach allows NILL to develop a high-quality e-commerce platform to enhance customer experience and streamline operations.

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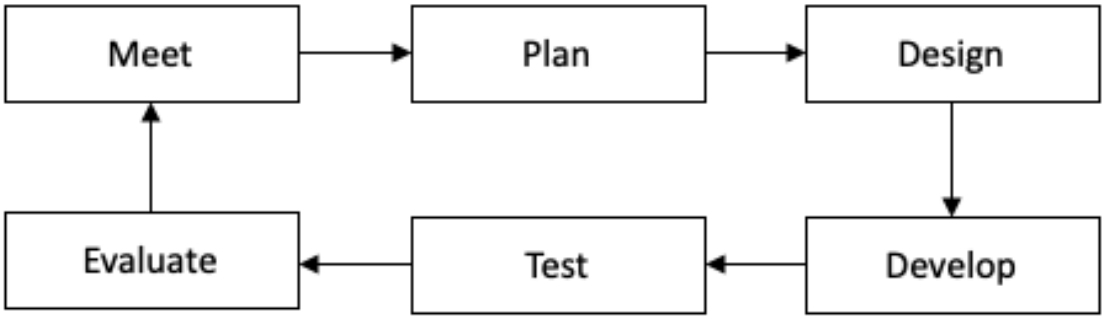

Fig. 1 *Agile Methodology*

Table 2 *Software development activities*

Phase	Task	Output
Meet	Gather information, conduct interviews	Requirement document
Plan	Develop project schedule, create system design	Proposal, Gantt chart, DFD, ERD
Design	Create database schema and interface designs	Wireframes, UI Mockups, data dictionary
Develop	Implement front-end and back-end functionality	Functional system with e-commerce features
Test	Conduct testing and debug issues	Verified and optimized system
Evaluate	Collect feedback, finalize deployment	Improved system, deployed platform

4. Analysis and Design

This section shows the analysis and design of the proposed system. It starts with the requirements analysis in which both functional and non-functional requirements are included to describe how the system operates. To develop the system, context diagram, data flow diagram and entity relationship diagram which are building diagrams are created. In the case of the database design, the entity relationship diagram is adopted to illustrate how the tables are related and connected. Lastly, the user interfaces are developed to provide an overview of the system's appearance.

4.1 Functional and Non-Functional Requirements

Collectively, these aspects ensure that the system indeed functions properly and efficiently and meets user expectations and organizational goals. Both functional and non-functional requirements are paramount in enabling the realization of goals by the NILL Concept Store online system and ensuring a seamless experience for users. The details of the system's functional and non-functional requirements are encapsulated in Table 3 and Table 4.

Table 3 *Functional Requirements*

No	Modules	Functionalities
1	Registration and Login	System should allow customers and admin to log in using unique credentials for each user type.
		System should ensure proper access control to functionalities based on the user roles.
2	Manage Product	System should allow admin to create, update, and delete products.
		System should allow customers to view products, review about products.
		System should allow admin to resolve customer feedback and manage product stock statuses.
3	Shopping Cart	System should allow customers to add products to a shopping cart and integrate with the payment gateway.
		System should enable customers to view order history.
		System should allow admin to manage payment details.
4	Report	System able to generate sales reports and identify products for admin.
5	Tracking	System enables customers to track orders by using tracking number and allow admin to update delivery statuses.
6	Suggestion	System should allow to provide customers with suitable color suggestions for their Baju Melayu.

Table 4 *Non-Functional Requirements*

No	Requirements	Description
1	Performance	The system should always be fast, accessible, responsive for users and handle task efficiently.
2	Operational	The website's loading time should not exceed 1 minute for any page or feature.
3	Security	The system must protect customer data against unauthorized access and offer secure payment processing.
4	Cultural and Political	The system should ensure compliance with cultural norms, local regulations, relevant legal standards to work smoothly on all web browsers and across devices.

4.2 System Analysis

Context diagrams give an overall representation of the interaction taking place between the system and its user. Context diagrams also show the input and output being passed between the user and the system. Figure 2 represents the context diagram of the system that has been designed. Data Flow Diagram DFD A Data Flow Diagram is the graphical representation of how input provided by an entity undergoes a process, which in turn outputs either to another entity or it is stored in data storage. It clearly defines each input and output of all the entities and processes involved. Following is the Level 0 Data Flow Diagram for the system designed. Figure 3 which is Level 0 DFD.

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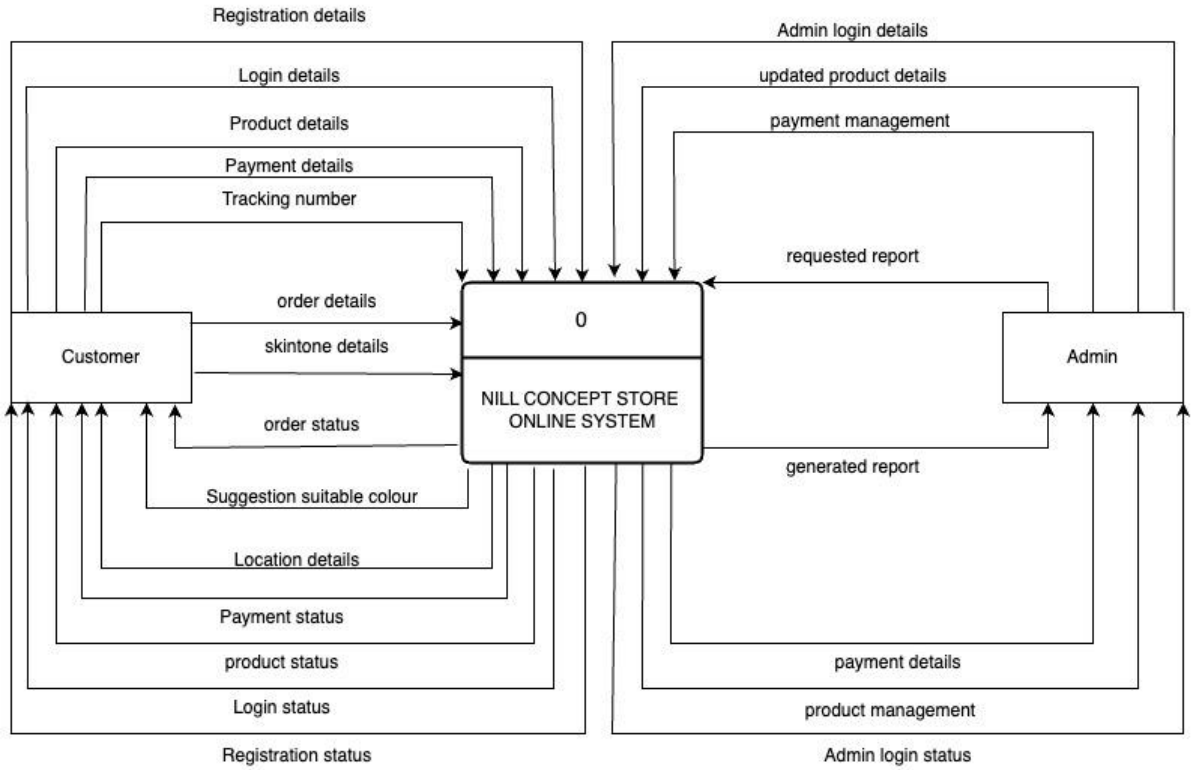

Fig. 2 *Context Diagram*

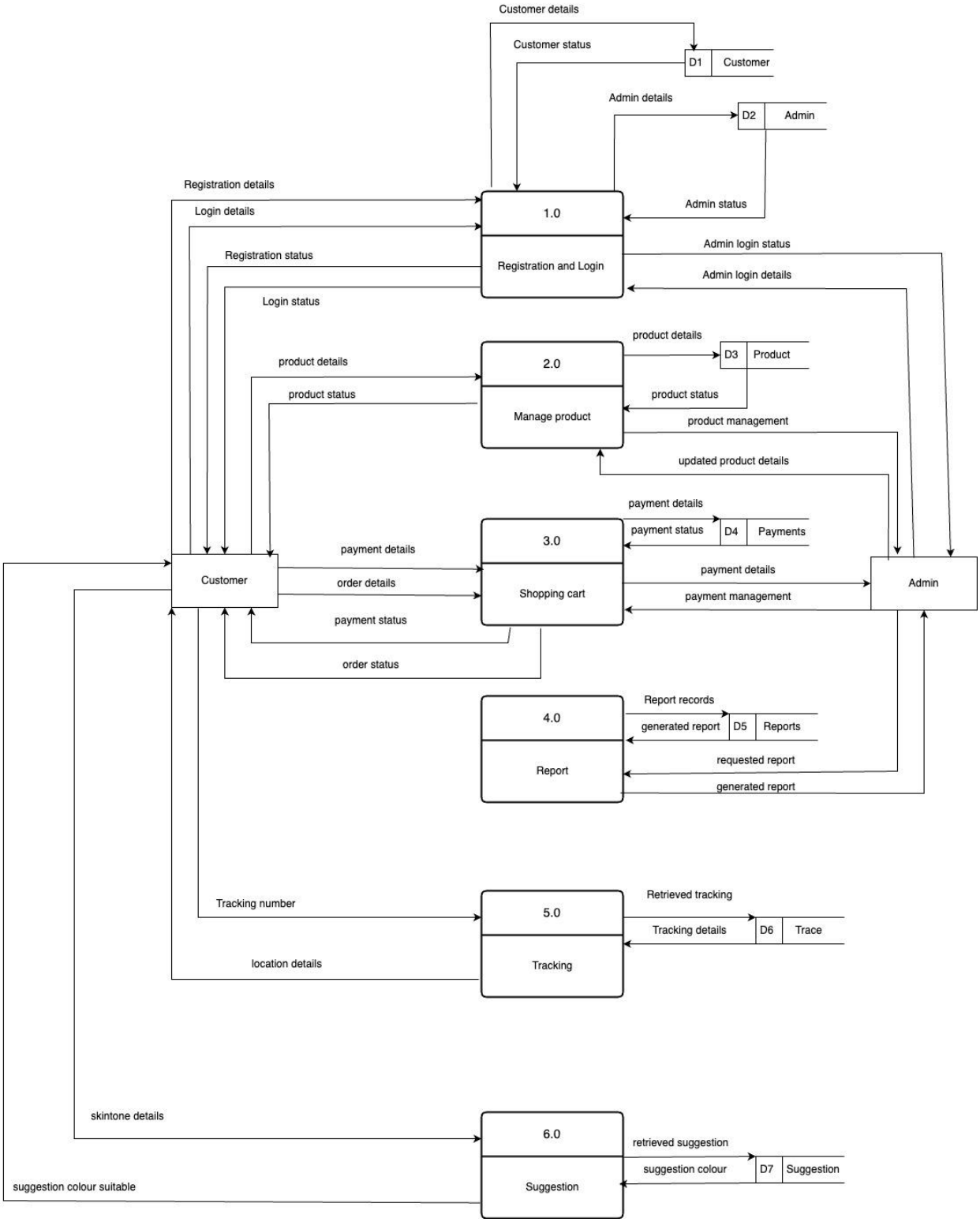

Fig. 3 *Data Flow Diagram level 0*

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An Entity Relationship Diagram is a pictorial representation, shown in the NILL Concept Store system, where different entities are related. The creation of a structured database allows proper administration over the data. ER diagrams are used in database designs for defining relationships and assuring data integrity. These tables identified are User, Product, Order, Cart, Payment, Tracking, Skintone Record, and Product Color. These tables represent important functionalities in user account management, product inventory, placing an order, cart operations, payment processing, order tracking, and personalized tone and color recommendations. Figure 4 shows the ERD for this system, showing the relationships and dependencies between the entities for seamless operation.

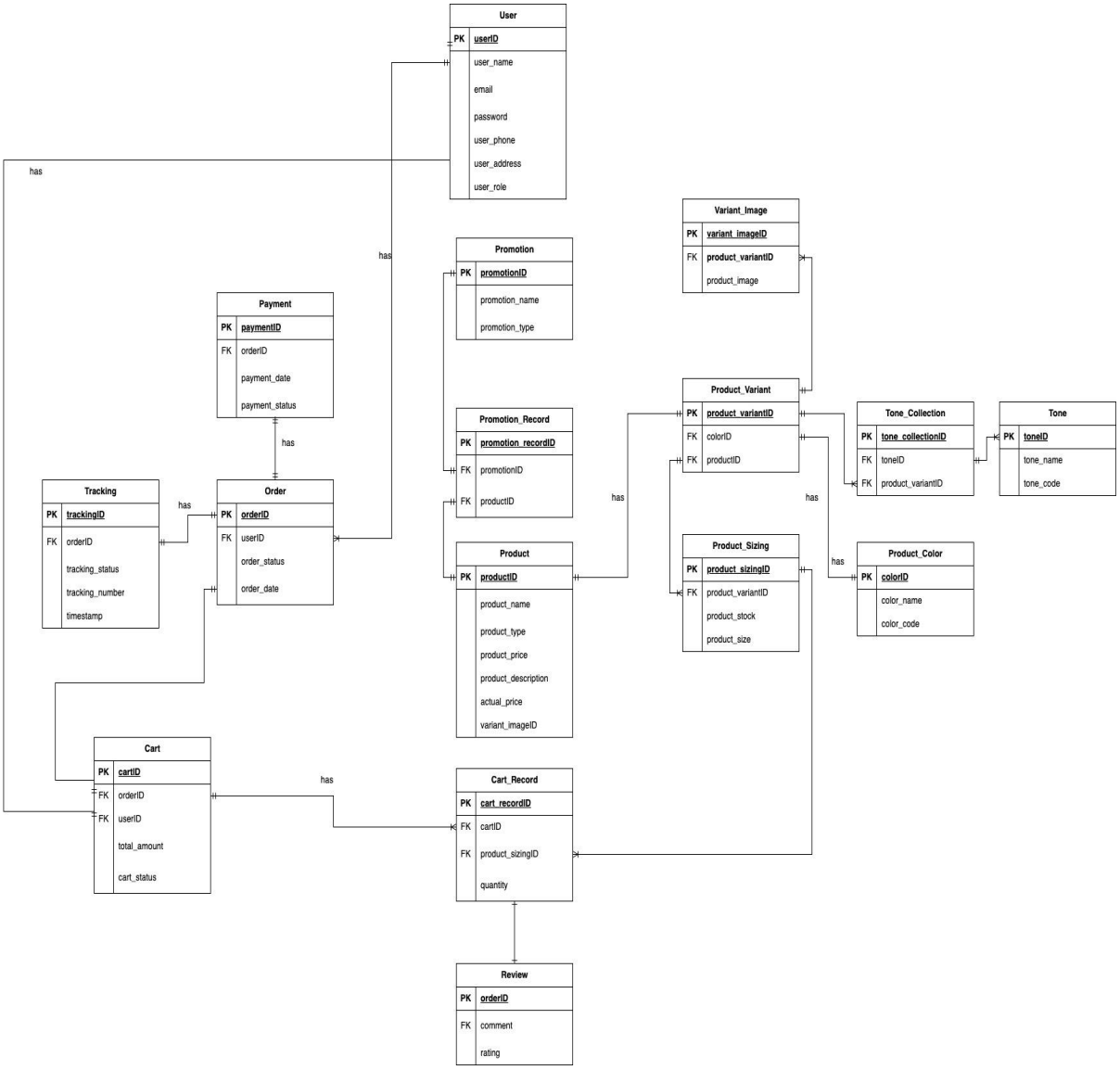

Fig. 4 *Entity Relationship*

A flowchart is a diagram representing the steps in a process. It's mainly used in the visualization, analysis, and communication of processes. Every stage of the process is represented by a certain symbol, together with the explanation of that stage. Figure 5 shows the flowchart of the developed system. The figure presents the flowchart of: (a) Customer, and (b) Admin.

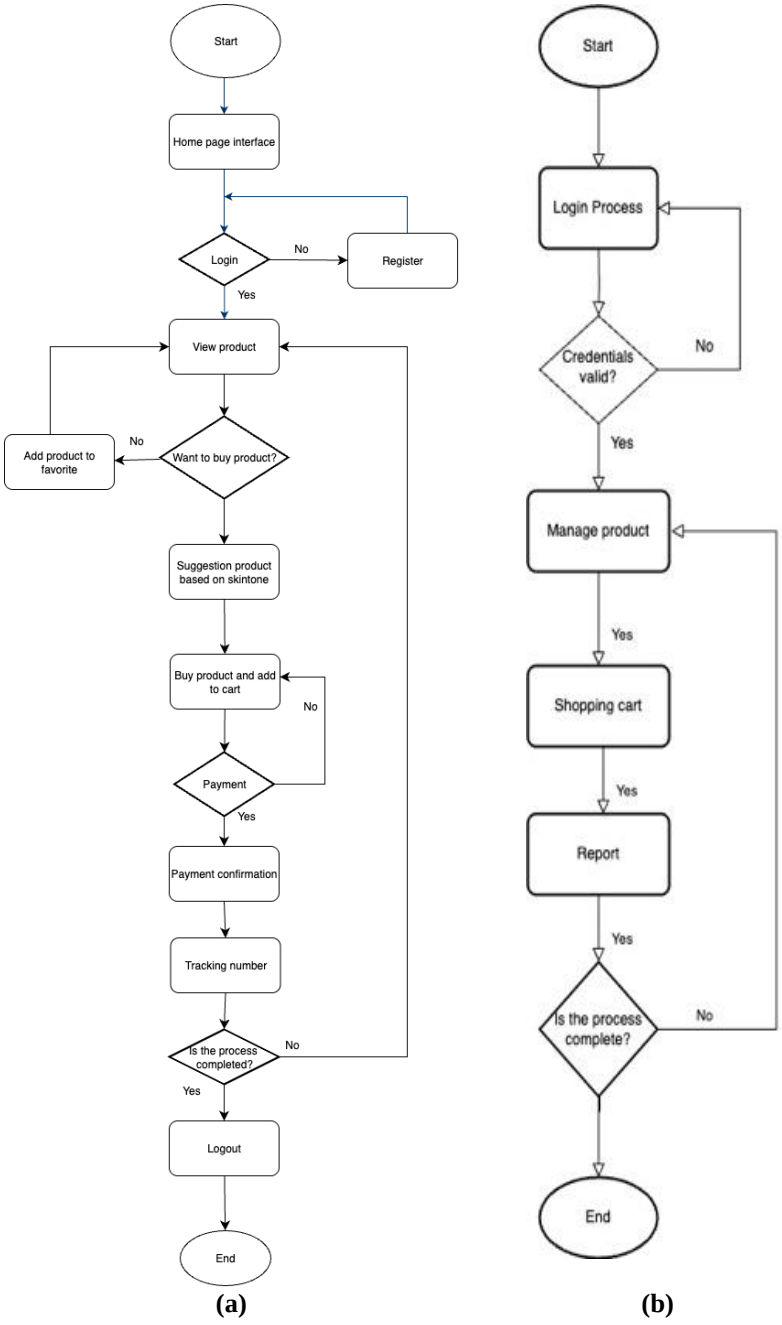

Fig. 5 *Flowchart (a) Customer; (b) Admin*

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4.3 System Design

After analyzing all the users' requirements successfully, the project will continue at the design phase. During this phase, both interface and database had been designed to help visualize the system before proceeding with the coding of the system. System Architecture refers to a conceptual model of the system which explains the structure, behaviors, and the view of the system. System architectures for web-based systems refers to the structure, behaviors and the view of the system that defines the components, their interactions, and the organization within a system. **Figure 6** shows the system architecture comprising of two users which customers and admin interacting with user interface. Customers and Administrators interact with the User Interface. Their actions Collect Data and send it to the backend System. The System processes the request and sends results back to the UI to Display Data to the user. The specific features listed (Login, Cart, Manage Product, Reports, etc.) are the functionalities this system provides through this interaction model.

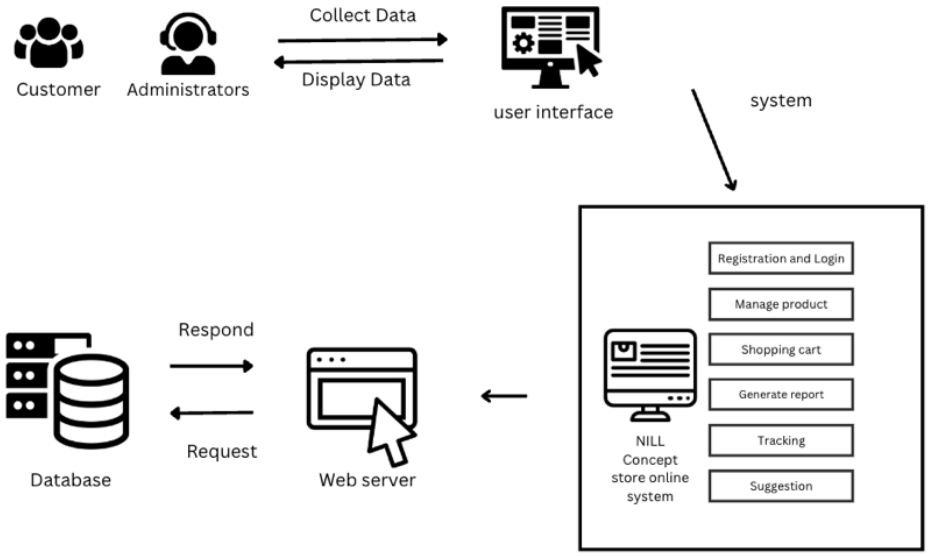


Fig. 6 *System Architecture*

5. Results and Discussion

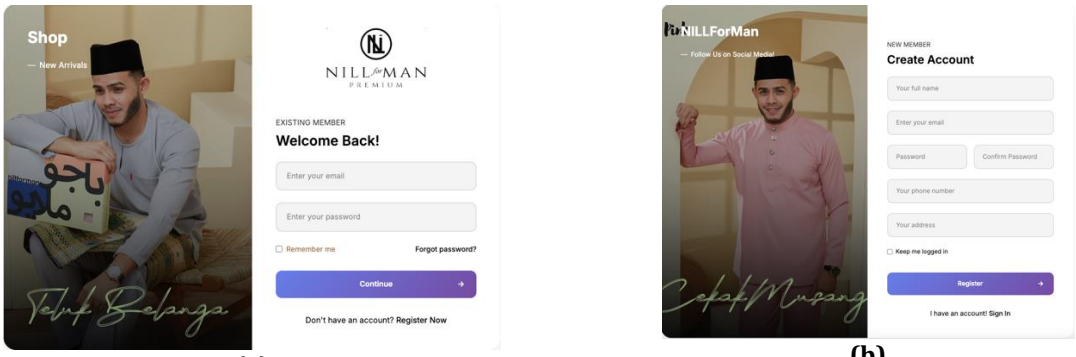
Implementation means creating the system in different formats using HTML, JavaScript, PHP, CSS, and Bootstrap to ensure that the system will work and meet quality levels. This chapter will explain that once the developers ensure that the system meets the user requirements and follows the development plan and system testing is conducted to verify each of the functions works as planned, and errors are rectified. This section of the report will elaborate on two types of testing which consists of functional testing is specified, and user acceptance testing, is also specified.

5.1 System Implementation

The system implementation for the NILL Concept Store Online System is the coding, designing, and carrying out of the project. This section is going to look at all the planning, analysis, and design phase that came before it and that all culminated in designing the website to be a fully functioning website that performs as it should and adheres to user and business requirements.

5.1.1 Login and Registration Interface

Figures 7(a) and Figure 7(b) show the Login and Registration Interfaces, and it is required for the user to register before allowing access to the system.

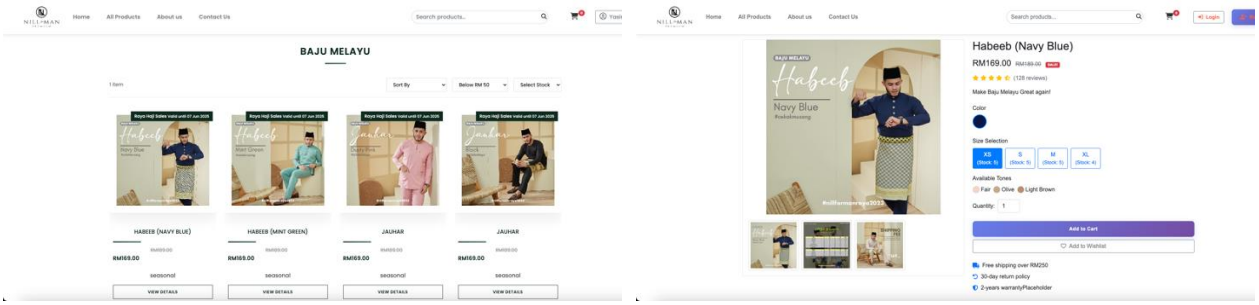


(a) **(b)**

Fig. 7 *Interface (a) Login; (b) Register*

5.1.2 Product and Product Display Interface

Figure 8(a) shows the Product Interface where users may view a catalog of all products available. Figure 8(b) shows the Product Display Interface, requiring users to login first to add items to the cart and proceed with payment. Th skin tone color suggestion is also provided to help users choose suitable product colors.



(a) **(b)**

Fig. 8 *Interface (a) Product; (b) Product Display*

5.1.3 Product Admin Interface

Figure 9(a) displays the Product Admin Interface, which allows the admin to manage products by creating, editing, and deleting items to be displayed to users through the system.

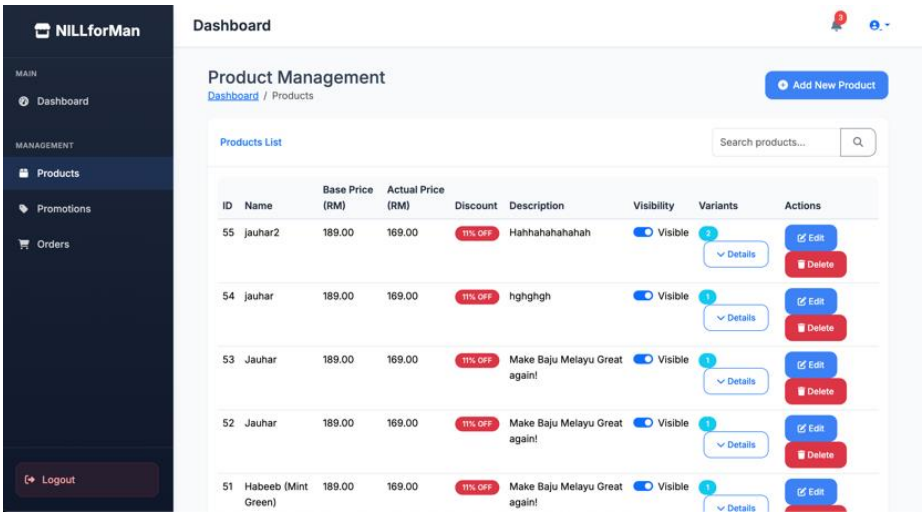
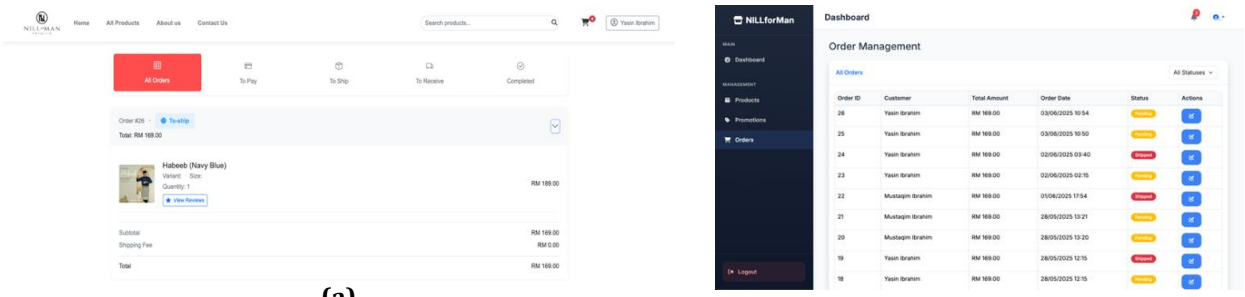


Fig. 9 *Product Admin's Interface*

5.1.4 Order Interface

Figure 10(a) shows the Order Interface for Users where they can view past orders, track orders from tracking numbers, and write reviews for products they have purchased. Figure 10(b) shows the Order Interface for Admin, where admins can see the order status or pending or shipped. Admins may ship products by assigning tracking numbers which allows the system to auto change the shipping status for customers.



(a) **(b)**

Fig. 10 *Interface (a) Order for User; (b) Order for Admin*

5.1.5 Payment Interface

Figure 11(a) shows the Shopping Cart Interface which is displayed when customers add products to their shopping cart. Customers can change item quantities, remove items, continue shopping, or checkout.

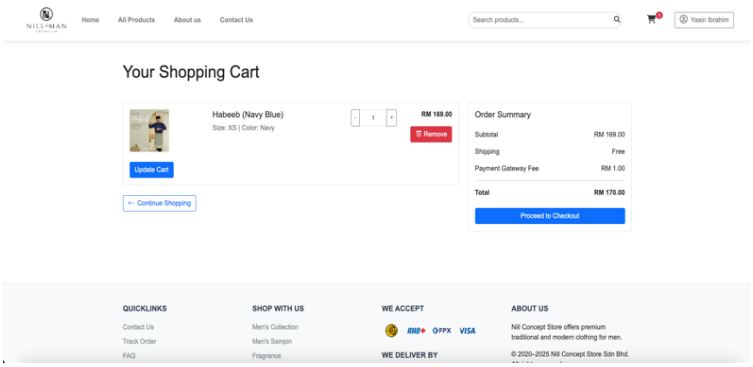
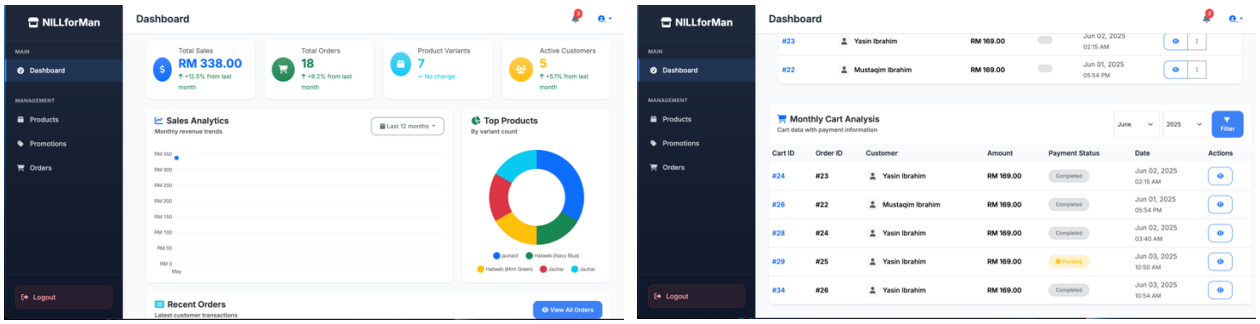


Fig. 11 *Interface of Payment and Code for Payment*

5.1.6 Admin Dashboard Interface

Figures 12(a) and Figure 12(b) show the Admin Dashboard Interfaces. Figure 12(a) displays product and sales data with visual charts, such as top products and sales analytics plot. It also shows the total sales, total orders, product variants, and active customers. Figure 12(b) isolates the dashboard section for monthly sales tracking where the admin can filter data by a particular month and years.



(a) **(b)**

Fig. 12 *Interface (a) Admin Dashboard for Charts Analytics (b) Admin Dashboard for List Analytics*

5.2 System Testing

System testing is the phase where the complete and integrated NILL Concept Store Online System is evaluated. This phase includes functional testing and user acceptance testing to ensure the system meets user requirements and performs as expected. The purpose is to identify any errors or bugs and confirm that all features function correctly according to the specified needs. Table 5 presents the functionality testing conducted for the NILL Concept Store Online System.

5.2.1 Functional Testing

Table 5 *Functional Testing*

No	Module	Test Cases	Description	Expected Output	Actual Output
1	Registration and Login	M1-1	System should allow customers and admin to log in using unique credentials for each user type.	Customers and Admin login to the system with different credentials.	SUCCESS
.		M1-2	System should ensure proper access control to functionalities based on the user roles.	Customer and Admin access different system interfaces.	SUCCESS
2.	Manage Product	M2-1	System should allow admin to create, update, and delete products.	Admin can create, update and delete products easily.	SUCCESS
		M2-2	System should allow customers to view products, review about products.	Customer can view and review about the products.	SUCCESS
		M2-3	System should allow admin to resolve customer feedback and manage product stock statuses.	Admin can solve customer feedback and manage product statuses successfully.	SUCCESS
3.	Shopping Cart	M3-1	System should allow customers to add products to a shopping cart and integrate with the payment gateway.	Customers can add products to shopping cart and make payments using online banking.	SUCCESS
		M3-2	System should enable customers to view order history.	Customers can view their order history.	SUCCESS
		M3-3	System should allow admin to manage payment details.	Admin can view manage payment details for user.	SUCCESS
	Report	M4-1	System able to generate sales reports and identify products for admin.	Admin can generate the sales by month and identify total products most sold.	SUCCESS
	Tracking	M5-1	System enables customers to track orders by using tracking number and allow admin to update delivery statuses.	Customers can track orders by using tracking number that admin has set.	SUCCESS
	Suggestion	M6-1	System should allow to provide customers with suitable color suggestions for their Baju Melayu.	Customers can view the suitable color suggestion for Baju Melayu through the list of color skin tone that suits the best.	SUCCESS

5.2.2 User Accepting Testing

User Acceptance Testing (UAT) is the last step of the system testing for the NILL Concept Store Online System. The UAT was conducted using a Google Form sent to selected target participants, Customers and staff who will have existing roles in the system. A total of 8 participants took part in this testing, 5 customers and 3 administrators. This session was intended to get feedback on key components of the system for usability, functionality, and user satisfaction. Participants would have to engage with the system and complete a corresponding set of questions based on their experiences.

The data collected was analyzed and then presented visually. Some of the questions used a 1-5 Likert Scale where a 5 is the top level of agreement or satisfaction. The data is shown in Appendix D for the Admin Section and Appendix E for the Customer Section. Most of the users rated their experience as a 4 or 5. Based on these findings, the NILL Concept Store Online System meets user requirements and is ready for implementation.

6. Conclusion

In conclusion, the NILL Concept Store system being proposed changes the retail operation from a manual, hands on system, to a centralized online system. The system also addresses major issues such as slow and inefficient order processing, management difficulties keeping track of payments, and no capability to suggest products based on individual consumers. Ultimately, the NILL Concept Store system solves these issues by providing positive flow in the current operations, improves the overall customer experience and operations, provides a faster and more accurate service. The NILL Concept Store system was designed to assist with the flow of information to make decisions and grow the business. The operation will have no problem addressing the operational challenges outlined currently with the NILL Concept Store system. The NILL Concept Store will provide an enhanced experience for all customers and NILL staff members to buy and sell, look for new and exciting adventures, and ultimately makes the experience more pleasurable and satisfying.

While the NILL Concept Store system has met its main objectives, there are several limitations that can be improved for the future. First, the interface design and layout are not standardized across the pages of the customer and administrator views. There are variations of how some pages are displayed across different screen sizes, which impacts user experience on tablets or phone and any other devices. There are certain product details and user preferences not stored in a personalized way that further limits the feasibility of tracking customers behavior or making better recommendations. Finally, the system is currently embedded with a payment gateway named ToyyibPay that only allows for payments for personal banking, limiting customers with alternate payment preferences. Future upgrades could involve improving the responsive design and providing expanded payment options, thereby improving overall flexibility of the system and user satisfaction.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of the paper.

Author Contribution

The authors confirm sole responsibilities for the following: ***study conception and design:*** *Yasin Ibrahim, Rozlini Mohamed;* ***data collection:*** *Yasin Ibrahim, Rozlini Mohamed;* ***analysis and interpretation of results:*** *Yasin Ibrahim, Rozlini Mohamed;* ***draft manuscript preparation:*** *Yasin Ibrahim, Rozlini Mohamed. All authors reviewed the results and approved the final version of the manuscript.*

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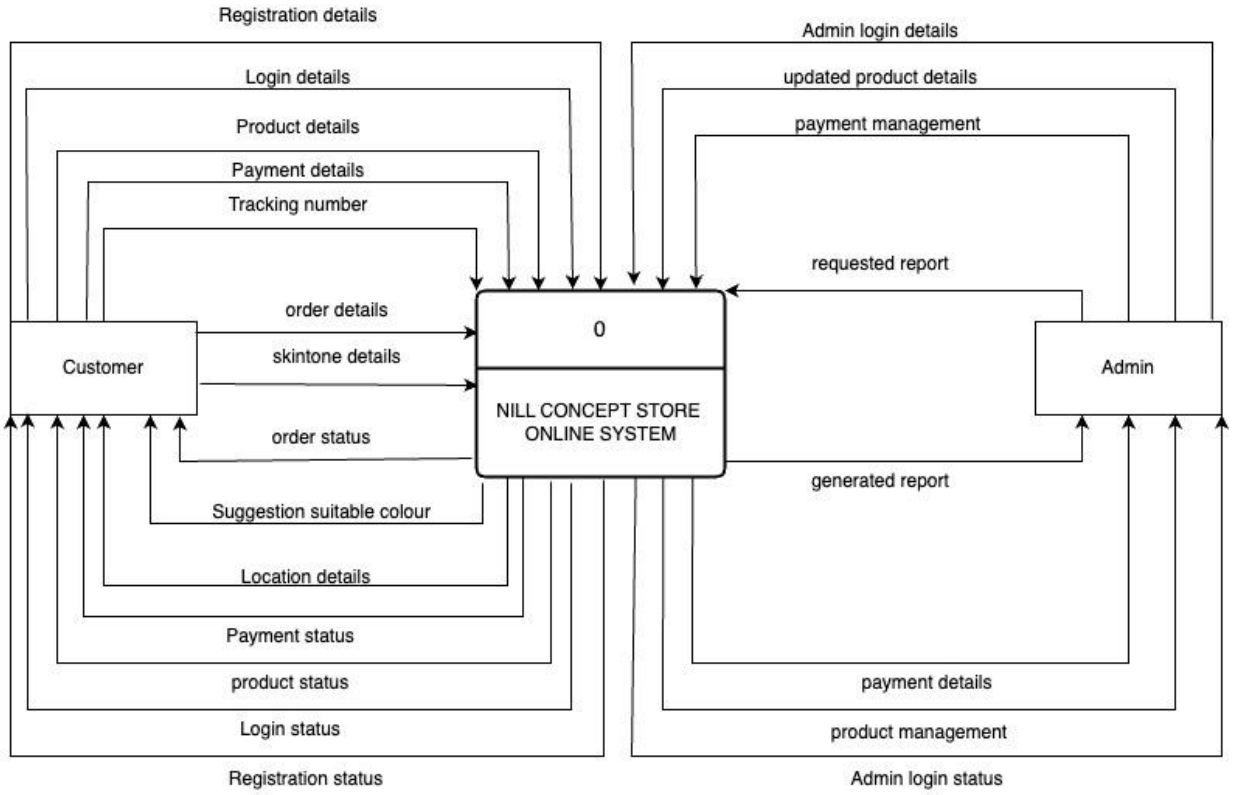
Appendix A: Context Diagram



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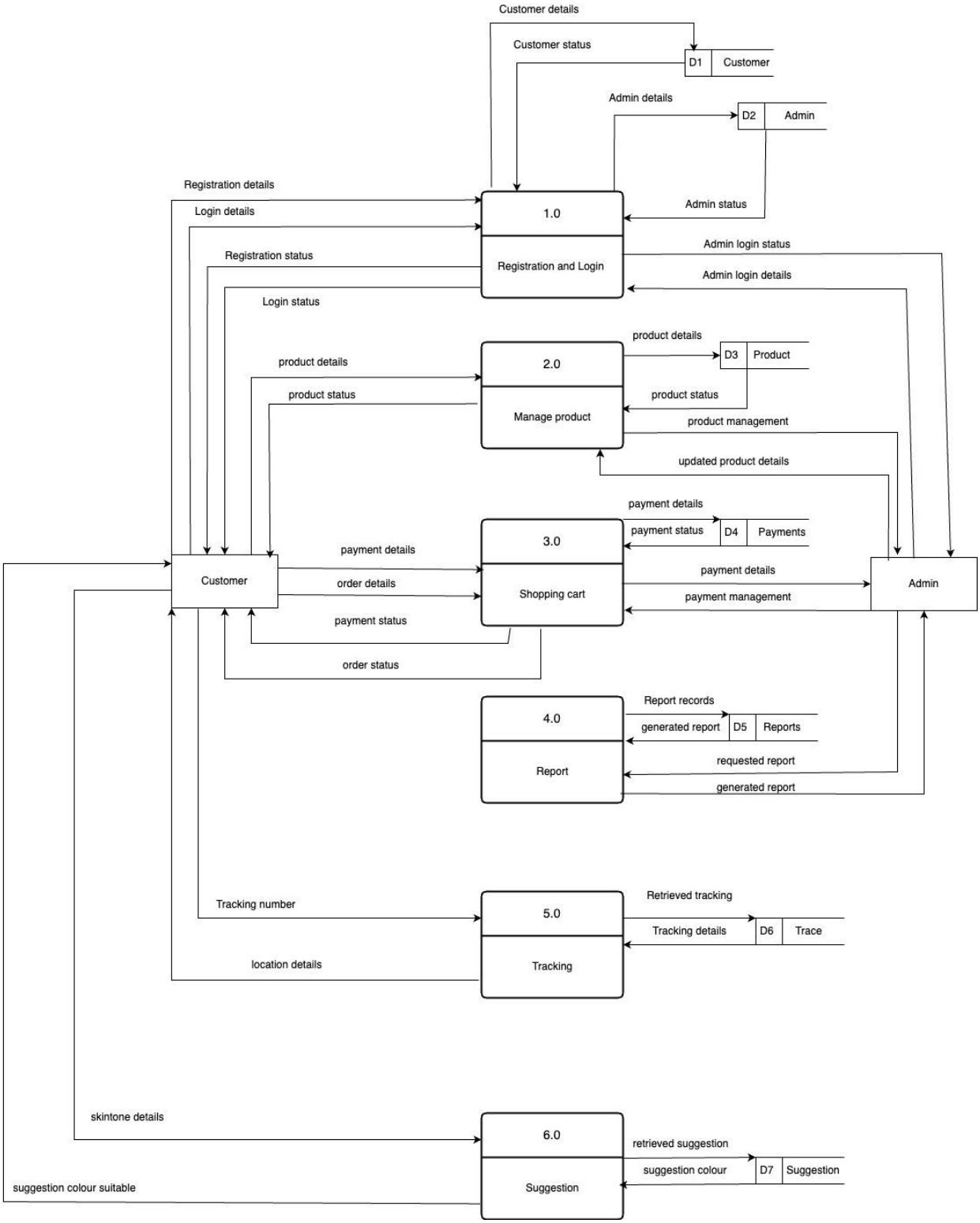
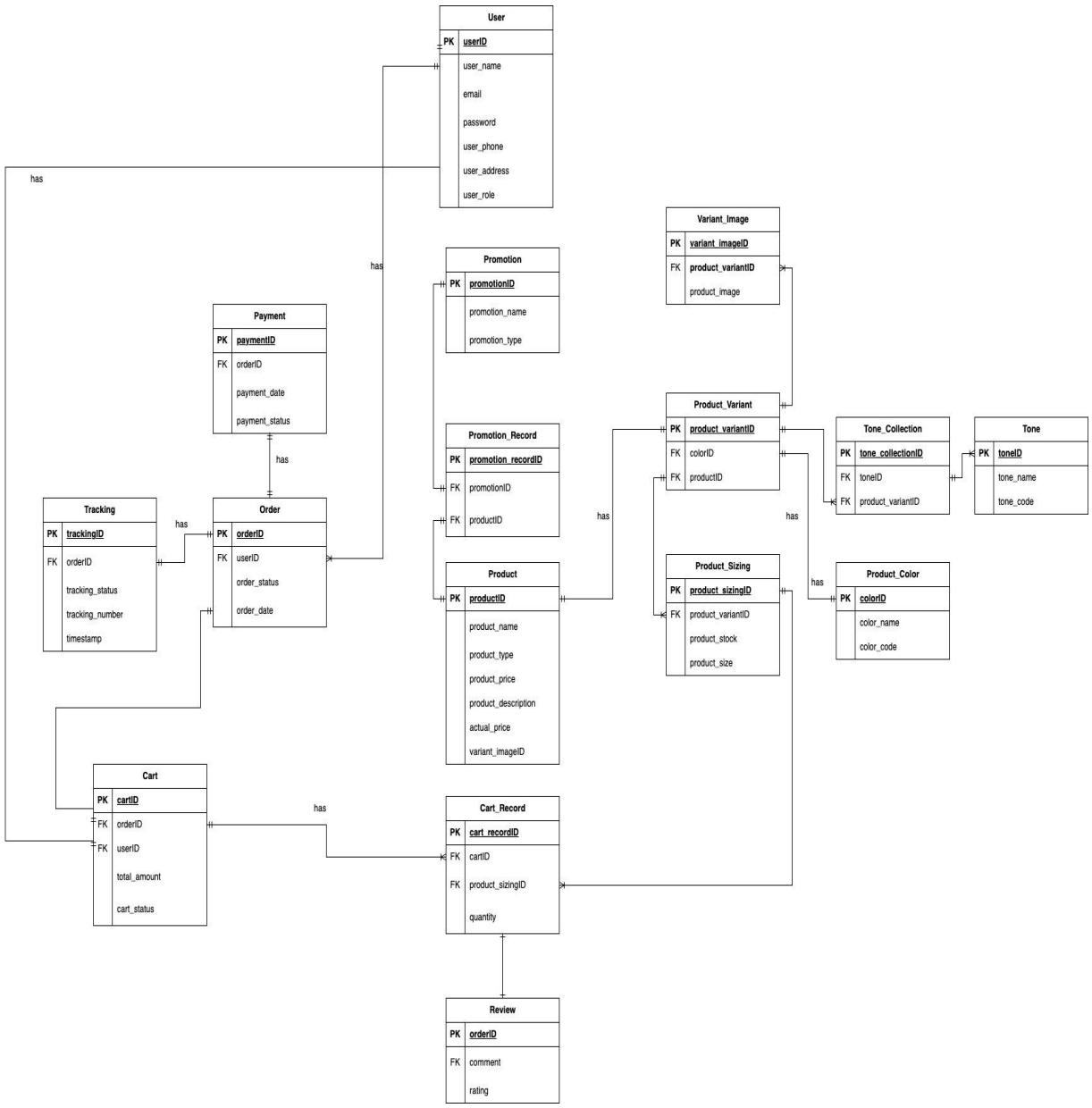
Appendix B: Data Flow Diagram Level 0



Appendix C: Entity Relationship



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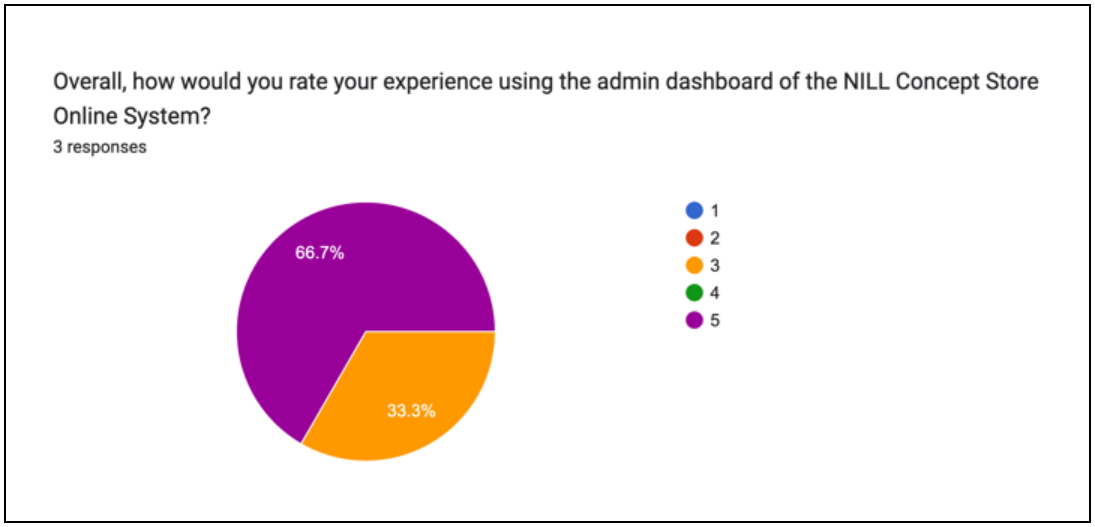
Appendix D: Admin User Acceptance Testing



Appendix E: Customer User Acceptance Testing