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MMCL Order Management System: An Order Manage System for Masak-Masak Cik Liza

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Abstract: These days, an increasing number of individuals, especially those with busy work schedules are choosing the convenience of ordering their meals online. Masak-Masak Cik Liza (MMCL) is a small food home-based online business that manages its operations and order data manually. This practice often results in errors and oversights in handling the business data. The main objective of this project is to develop a system that could efficiently organizes MMCL's business data and streamlines its management processes. The project utilizes the simple SDLC methodology and developed using the object-oriented approach. The computerized management system can significantly enhance MMCL business efficiency by automating key processes, ranging from order recording to order preparation and fulfillment. The system is able to assist the seller in managerial processes and the customer to browse the product and place the order. Keyword-based searches and constraint buttons are the suggested features for the system future work improvement.

Keywords: Order Management System, Web-based System, Mobile Application

1. Introduction

Masak-Masak Cik Liza (MMCL) is a small home-based food business that started operating in 2011 founded by Mrs. Noor Liza Abd Majid. The business that has been running for years is still practicing the manual method to organize the business processes. These processes include the manual method to count the stock, calculate the bills, manage the order, customer information and product information. Thus, the proposed MMCL management system is designed and developed as a solution for MMCL organization to overcome the difficulties faced along the process of recording, preparing and completing the order. Based on the manual approach of managing the business, MMCL's customer browses the business social media profile for products information and places an order through the WhatsApp

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application. Mrs. Noor Liza who is in charge of managing the product details, customer details and delivery process will be attending the customer inquiries, recording the order in Microsoft Excel, printing the order list and delivering the order. This manual approach causes delays and inefficiency in the process of recording, preparing and completing an order made by the customer. Also, due to the absence of proper database, the MMCL organization ends up with a poor record of the previous customer orders history and proper record of the product information. Therefore, the objectives of this project are:

1. To design a management system for MMCL that allows the seller to manage the business information including the product, customer and order information.
2. To build a web application and mobile application for the MMCL management system that gives the seller the flexibility to access the system from anywhere.
3. To implement user acceptance testing on the MMCL management system.

The system has several modules to ensure that it is capable of satisfying the needs of its users as shown in Table 1 below. The user of the system will involve two groups of users which is the seller and the customer. The system is designed for the customer to place an order from respective places and the seller to prepare and complete the list of orders.

Table 1: Modules of MMCL Management System

Use Case	Functional Requirement	User
Login	• This module will allow seller and customer to register and login into the system.	Seller, customer
Dashboard	• This module will allow the seller to send notifications to the customer and customer to view the notification. • This module will allow the users to edit user profile.	Seller, customer
Manage Product	• This module will allow seller to create, read, update and delete product information.	Seller
Place order	• This module will allow customer to browse the products and add the products to cart.	Customer
Manage cart	• This module will allow customer to review, update and delete the item in cart.	Customer
Checkout	• This module will allow customer to select the delivery time, review and update the recipient and delivery address.	Customer
Manage Order	• Manage order module will allow seller to update order status and view order list.	Seller
Manage Delivery	• This module will allow seller to view the list of orders ready to be delivered and update the order status.	Seller
Manage Order History	• This module will allow seller to refer back to the order history of the customer. Also, the seller will be able to view the most sold products through this module.	Seller

2. Related Work

2.1 Management System

An information system collects, saves, analyses, and disseminates data for a certain purpose [1]. Management Information Systems (MIS) are a collection of organisational, technological, software, and informational instruments integrated into a single system with the purpose of collecting, storing, processing, and disseminating management-related information [2] MIS and technology enhance the effectiveness of a company's operations and supply chain, hence contributing to its profitability. MIS structures and controls provided data to run a business's system. MIS enables quick access to necessary information, which facilitates the making of timely and adequate decisions. In addition, it is a crucial instrument for planning, organising, implementing, as well as monitoring and control [2]. With the use of information technologies (IT) in MIS, a company can enhance their performance by reducing costs and delivery time, as well as enhancing customer service and dependability [2].

2.2 Mobile Application

A mobile app is a software application designed to run on portable, wireless computing devices like smartphones and tablets, as opposed to desktop or laptop PCs. The fast adoption of smartphones and related development of mobile applications that are referred to as "app" or "apps" have altered how consumers engage with a brand. The spread of numerous sorts of mobile applications coincides with the increase in mobile technology [3].

Nowadays, restaurants have begun to examine mobile commerce (m-commerce) applications as new methods for attracting new consumers or retaining the contentment and loyalty of existing customers. This is due to the great rivalry in the sector with more than thousands of eateries for the citizens of a country and tourists to choose from [4]. In addition, the advent of interactive technologies has increased client participation in a variety of commercial activities, such as acquiring information, comparing alternatives, making purchases, and offering feedback [5].

2.3 Web Application

The Web application is composed of a client component and a server component. The client component is responsible for delivering visual data to the user's browser. The server component on the other hand in charge of data processing and storage [6]. The web application is an immensely valuable system for web development novices and small business operators because of their relative simplicity and low cost of deployment [7]. The administrative activities will become more structured. The Web-based system will also be accessible to users regardless of their proximity to the physical site of the organization.

2.4 Comparison with the Existing System

Every existing system has its own uniqueness in terms of values and features. A comprehensive study of the existing system is being done to compare and highlight each feature present in the different system. The comparison is as in Table 2 below.

Table 2: System Comparison

Features/System	Food Project Café and Bakery	KetoSis Delicacies	KFC	MMCL Management System
Type of user	Seller, customer	Seller, customer	Customer	Seller, customer

Features/System	Food Project Café and Bakery	KetoSis Delicacies	KFC	MMCL Management System
System Type	Web-based	Web-based	Mobile application	Web-based (seller), Mobile application (customer)
Login Module	Phone number or email and password	Email and password	Email and password	Username and password
Place Order Module	Available	Available	Available	Available
Cart Module	Available	Available	Available	Available
Checkout Module	Available	Available	Available	Available
Manage Order Module	Available	Available	Not Available	Available
Manage Product Module	Available	Available	Not Available	Available
Deliver Order Module	Available	Not Available	Not Available	Available
Dashboard Module	Available (seller)	Available	Available	Available
Order History Module	Available	Available	Not Available	Available

3. Methodology

In this project, the Simple SDLC model will be used to develop the MMCL Management System. The Simple SDLC is a framework for arranging software project management in its most basic form. Phases that will be included in this model are analysis, design, implementation, testing and release [8]. The graphical view of the simple SDLC model is shown in Figure 1 below.

The actions involved in the development of the system are shown in Table 3. These actions are organised in accordance with the approach that was used, which is the Simple SDLC model. The selection of this approach is essential since it enables standardisation, structuralization, and organisation of all the tasks that are involved in the system project's development. The actions that were carried out throughout each stage of the development of the system are outlined in the table.

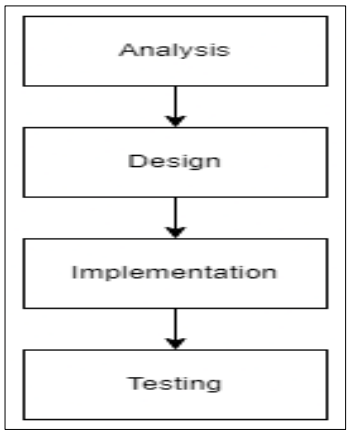


Figure 1: Simple SDLC Model [8]

Table 3 Project Workflow Of MMCL Order Management System

Phase	Task	Deliverable
Analysis	1. Proposed the project 2. Conduct session with the founder 3. Define problems, objectives and scope 4. Construct Gantt chart for workplan 5. Study similar existing system 6. Study the current MMCL Order Management System 7. Determine software and hardware requirements 8. Construct UML diagrams	1. Functional and non-functional requirements 2. Project proposal report 3. Gantt chart 4. Literature review 5. Hardware and software specifications 6. UML diagrams: Use case, class, sequence and activity diagram
Design	1. Design proposed system wireframe interfaces 2. Design database	1. Wireframe design 2. Database design
Implementation	1. Develop the system	1. System prototype
Testing	1. Execute user acceptance testing	1. Test cases

4. System Analysis and Design

This section elaborates on analysis and design phase of the MMCL Order Management System. It discussed about the overall architecture design of the system, system requirement analysis which consist of functional and non-functional requirements, the Unified Modelling Language (UML) diagrams that includes the use case diagrams, sequence diagrams and activity diagrams of the system, the requirement traceability matrix of the MMCL Order Management System and database architecture which contains a class diagram of the system. Next, design of the user interface is also discussed in this part.

4.1. General System Architecture

The system architecture of the computerised MMCL Order Management System is illustrated in Figure 2. The MMCL Order Management System is implementing the client-server architecture where the customer mobile app and the seller access the system through a web browser. The customer mobile app provides a user-friendly interface for customers to browse products, place orders, and track their order status. On the other hand, the seller accesses the system through a web application running on a browser. The web application serves as the admin panel for sellers, allowing them to manage products, view and process orders, update inventory, and perform other administrative tasks. The seller's web application

communicates with the central server via APIs to retrieve and update data related to orders, inventory, and other relevant information. This architecture ensures that both customers and sellers can conveniently access the system using their preferred devices and browsers, enabling efficient order management and seamless collaboration between customers and sellers.

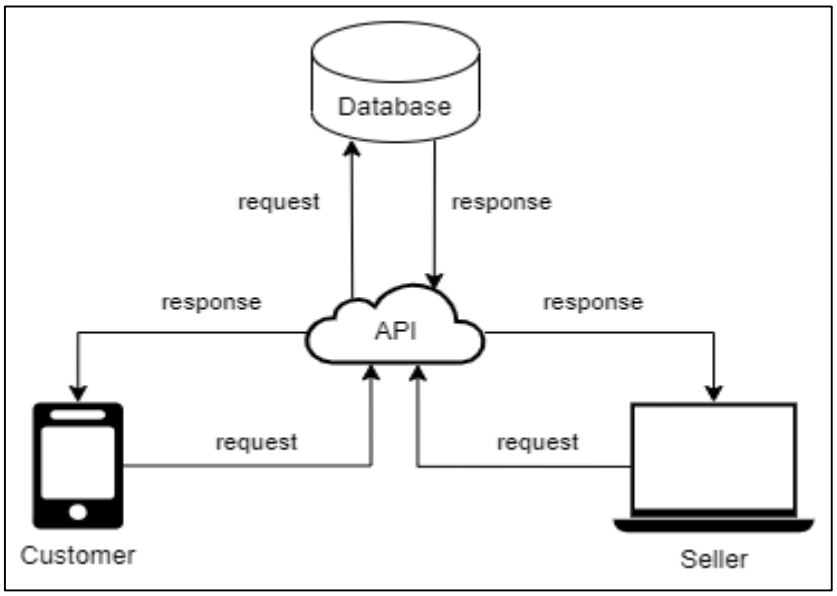


Figure 2: System Architecture Of MMCL Order Management System

4.2 Functional Requirements

Functional requirements specify what a system is capable of doing or how it should behave. The functional requirements of the MMCL Order Management System is as shown in Table 4.

Table 4: Functional Requirements Of MMCL Order Management System

Use Case	Functional Requirements
Login	• This module will allow seller and customer to register and login into the system.
Dashboard	• This module will allow the seller to send notifications to the customer and customer to view the notification. • This module will allow the users to edit user profile.
Manage Product	• This module will allow seller to create, read, update and delete product information.
Place order	• This module will allow customer to browse the products and add the products to cart.
Cart	• This module will allow customer to review, update and delete the item in cart.
Checkout	• This module will allow customer to select the delivery time, review and update the recipient and delivery address.

Use Case	Functional Requirements
Manage Order	• Manage order module will allow seller to update order status and view order list.
Manage Delivery	• This module will allow seller to view the list of orders ready to be delivered and update the order status.
Manage Order History	• This module will allow the seller to refer to the order history of the customer. Also, the seller will be able to view the most sold products through this module.

4.2 Non-Functional Requirements

Non-functional requirements play a crucial role in evaluating the overall operation of a system, focusing on its general performance rather than specific functionalities. These requirements encompass various system properties, such as operational efficiency, performance capabilities, and security measures. In the context of the MMCL Order Management System, Table 5 outlines the non-functional requirements that define its operational standards.

Table 5: Non-Functional Requirements Of MMCL Order Management System

Requirements	Descriptions
Operational	• The system should be easily understood by the users. • The system should fulfil all the users' requirements.
Performance	• The system should be robust and responsive towards the user input.
Security	• The system should authenticate the user before granting access to the system information.

4.3 Unified Modelling Language (UML) Diagram

The UML diagram is used to visually describe the proposed MMCL Order Management System by using the UML concepts where involves the use of key actors, roles, activities and classes. The visualisation of the proposed system is important in acquiring a greater understanding of the proposed system.

4.3.1 Use Case Diagram

The use case diagram is often used to present the features or the functional behaviour of a system. The way the actor or user interacts with the system will be shown through this diagram. In Figure 3, actors of the system are labelled as the seller and customer. Each of the actors is linked to the use cases to demonstrate the interaction, roles and limitation in interacting with the system according to each role.

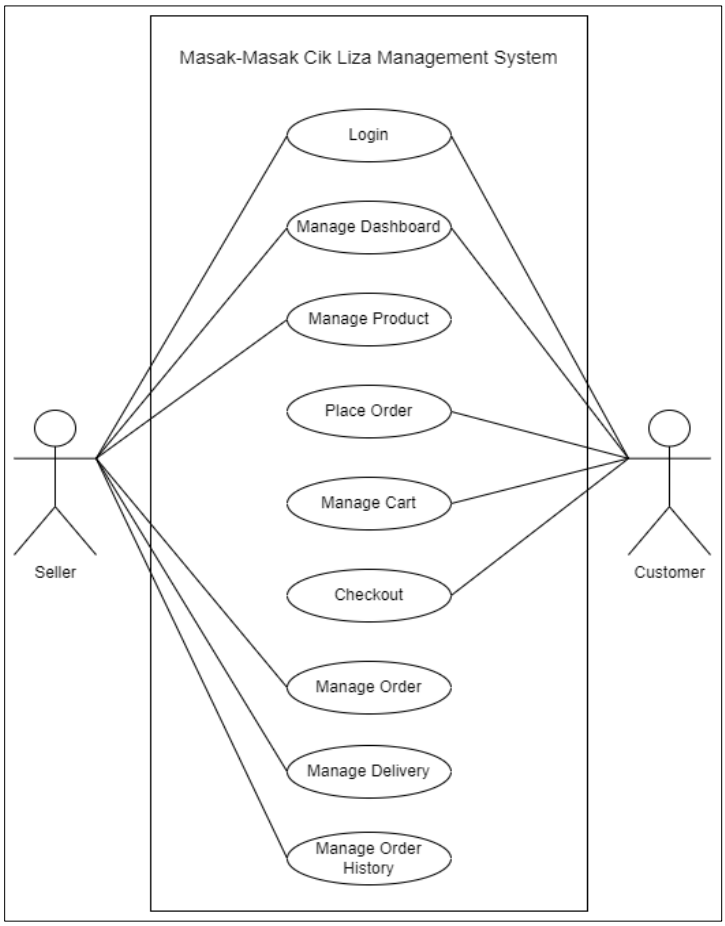


Figure 3: Use Case Diagram Of MMCL Order Management System

4.3.2 Class Diagram

Class diagram is a model that provides a static view of a system under development. It displays the classes and interactions between classes within the system that remain constant over time [9]. Figure 4 shows the class diagram of MMCL Order Management System.

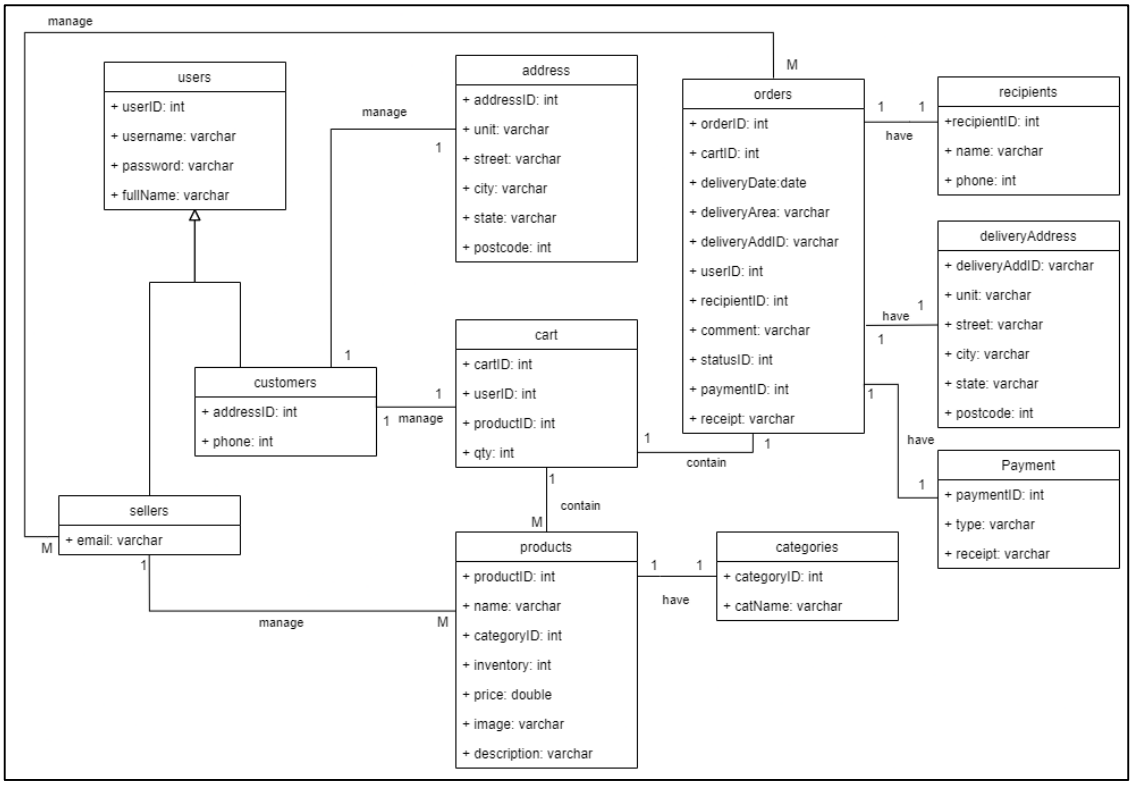


Figure 4: Class Diagram Of MMCL Order Management System

4.4 Database Schema

The database schema is a visual representation or a set of formulas that represents the logical configuration of all or part of the relationships in the database [10]. The schema for the database is listed as follows:

i. users (userID, username, password)
ii. sellers (userID, fullName, email)
iii. customers (userID, fullName, addressID, phone)
iv. address (addressID, unit, street, city, state, postcode)
v. cart (cartID, userID, productID, qty)
vi. products (productID, name, categoryID, inventory, price, image)
vii. categories (categoryID, name)
viii. order_items (orderItemsID, orderID, cartID)
ix. orders (orderID, cartID, deliveryDate, deliveryArea, deliveryAddID, userID, recipientID, comment, statusID)
x. recipients (recipientID, name, phone)
xi. deliveryAddress (deliveryAddID, unit, street, city, state, postcode)
xii. payment (paymentID, ptype, receipt)

4.5 User Interface Design

User interface is also known as *UI*. It is the medium where humans communicate and interact with a computerised system. This interaction could be an interaction between the user with a website or an application. The basic user interface of the MMCL Management System that includes the user's login and home page interfaces are shown as follows.

Figure 5 depicts the system login interface for the seller whereas figure 6 shows the login interface for the customer which consists of customer login and sign up page.

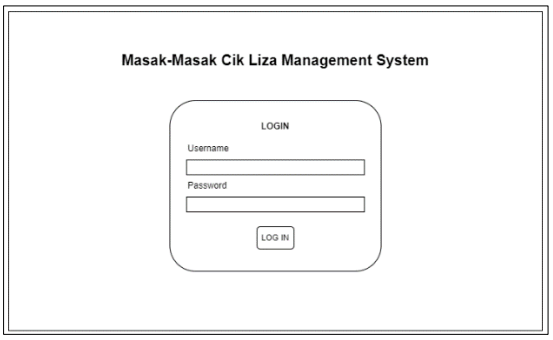


Figure 5: Seller Login

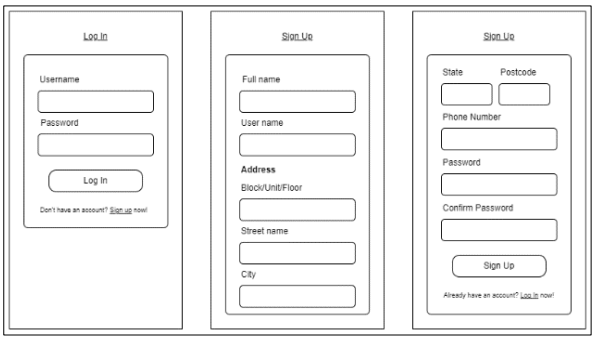


Figure 6: Customer Login

Next, Figure 7 shows the system interface for the seller dashboard page. This interface visualizes several functions available in the seller's manage dashboard module. Figure 8 shows the home page interface of the customer module. This is the interface the customer will be landing on upon successful login session.

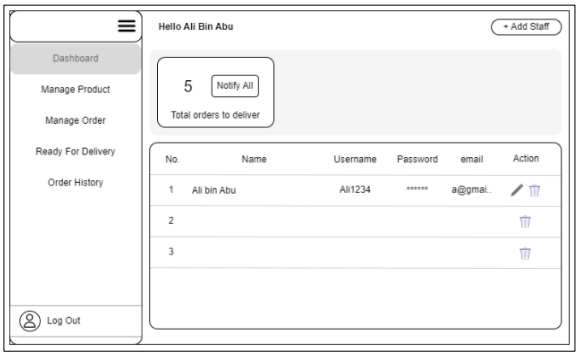


Figure 7: Seller Dashboard Page

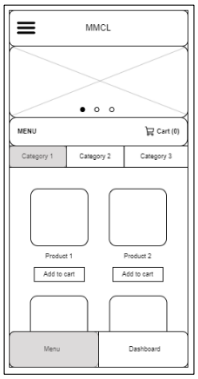


Figure 8: Customer Home Page

5. Result and Discussion

5.1 System Implementation

The MMCL Food Ordering system is implemented using Visual Studio Code and Android Studio IDE. The application is developed with the Flutter getx framework, using the Dart and PHP programming language to handle the logic and design interface and back-end of the system. For the seller's website, HTML, PHP, and JavaScript languages are used for both the front-end and back-end components. The system utilizes a MySQL database for storing data.

5.1.2 Web Based System

A web based system is implemented for the admin panel to manage the products, orders and delivery. This portion of the system is developed using the visual studio code and the system can be run in any web browser application. Figure 9 to Figure 13 shows the developed system interfaces of the admin panel of MMCL Management System.

Figure 9 shows the login module of the seller. Upon successful login attempt, the seller will be redirected to the seller dashboard module depicts in Figure 10. The seller may traverse to different interfaces using the left panel sidebar.

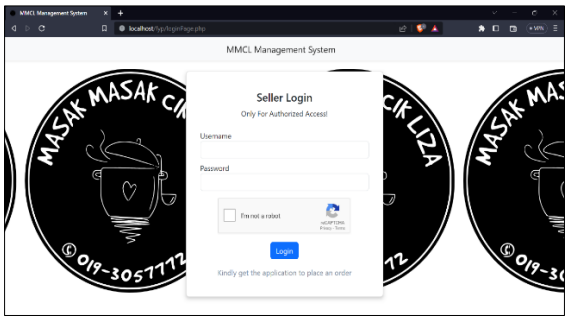


Figure 9: Seller Login Module

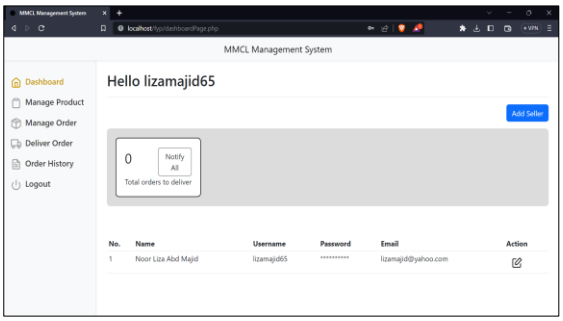


Figure 10: Seller Dashboard Module

Figure 11 shows the manage product module interface which provides several functions for the seller to manage the products and the category. Figure 12 shows the manage order module interface. This module displays the order placed by the customer in three separate views namely, the new order view, the kitchen view, and the packaging view, where it can be accessed through the respective tab. Figure 13 shows the manage delivery module interface which displays the list of orders with the "To Be Delivered" status. This module allows the seller to click on the generated customer's address link and update the order status upon the delivery completion.

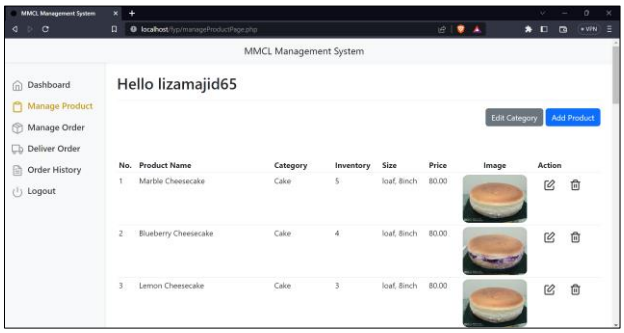


Figure 11: Manage Product Module

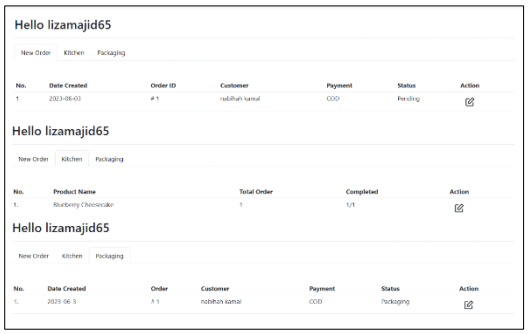


Figure 12: Manage Order Module

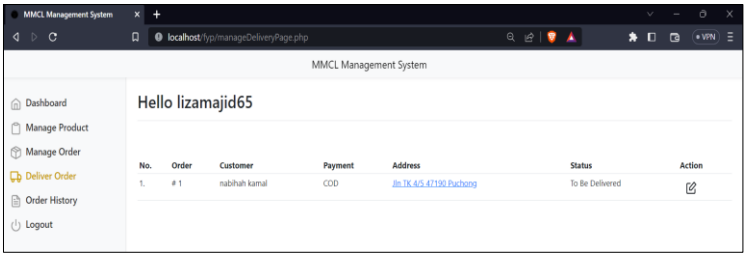


Figure 13: Manage Delivery Module

5.1.2 Mobile Application

The mobile application is developed for the customer side of the system that allows the customer to login, place orders, manage cart and checkout the order. This portion of the system is developed using android studio and can be run on both iOS and android operating systems. Figure 14 to Figure 18 shows the developed system interfaces of the customer ordering application of MMCL Management System.

Figure 14 and 15 show the system login module for the customer. Figure 14 depicts the login interface which provide the login form for customer with existing account. New customers may register for an account via the sign up page as shown in Figure 15.

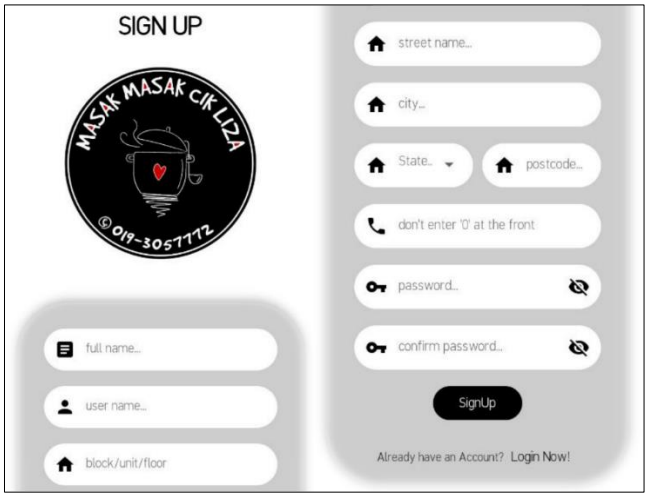
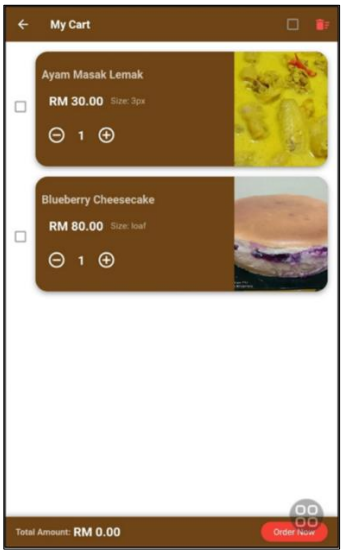


Figure 14: Customer Login Module **Figure 15: Customer Sign Up Module**

Customer with successful login attempt will then be redirected to the home page of the application which included under the place order module of the MMCL order management system as shown in Figure 16. Figure 17 shows the manage cart module of the system which includes the list of items added to the cart. The customer may select specific items for checkout and enter the next system interface which is the checkout module shown in Figure 18.



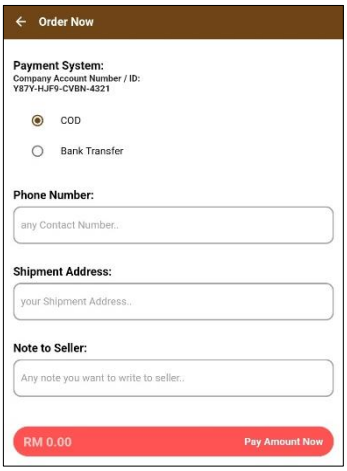


Figure 16: Place Order Module **Figure 17: Manage Cart Module** **Figure 18: Checkout Module**

5.2 System Testing

The system testing activities are executed after the system has been fully developed. This testing is designed to evaluate and validate the developed system to determine if it meets the project's objectives. Issues discovered during the testing phase are reviewed and resolved to achieve the project's objectives. User acceptance testing has been performed on the MMCL Order Management System in order to identify the strengths and weaknesses of the system that is currently being developed. The results of the testing based on the modules of the MMCL Order Management System are displayed in Table 6 as follows:

Table 6: Test Case Result Of MMCL Order Management System

Module	Test Case	Expected Result	Actual Result	Tester
Login	Users enter incorrect input	System display error message	PASS	Seller and Customer
	Users leave the text field blank and tries to login	System display error message	PASS	
Manage Dashboard	Seller send notification	Customer receive notification	FAIL	Seller and Customer
	Sellers update profile	System save the changes made	PASS	
	Customers update profile	System save the changes made	FAIL	
	Users leave empty field and submit the form	System display error message	PASS	
Manage Product	Add a new product into the system	Product is successfully added to the product list	PASS	Seller
	Update current product information	Changes are successfully saved and list is updated	FAIL	
	Add a new product category	System successfully added new product category	PASS	
	Update current product category	Changes are successfully saved and list is updated	PASS	
	Delete a product category	System successfully delete and update the list	PASS	
	Delete a product	System successfully delete and update the list	PASS	
Place Order	Browses the product list	System displays all available product in the system	PASS	Customer
	View the product by category	Product list filtered by category is displayed	FAIL	
	Add the product to cart	Product is successfully added to the customer's cart	PASS	
Manage Cart	Click cart icon	The system displays a list of items with their price and total price	PASS	Customer
	Remove an item from the cart	The item is successfully	PASS	

Module	Test Case	Expected Result	Actual Result	Tester
		removed from the customer's cart		
	Click "add more item" hyperlink	Customer is redirected to the product page for further browsing	FAIL	
	Edit the quantity of an item in the cart	The item's quantity in the cart is successfully updated	PASS	
Checkout	Add the delivery date	The delivery date is successfully added	FAIL	Customer
	Review the delivery address	The customer can view the current delivery address	FAIL	
	Edit the delivery address	The customer can successfully update the delivery address	PASS	
	Review the recipient details	The customer can view the current recipient details	FAIL	
	Edit the recipient details	The customer can successfully update the recipient details	PASS	
Manage Order	Click the manage order tab	The system displays the list of orders	PASS	Seller
	Update the order status	The order status is successfully updated	PASS	
Manage Delivery	Click on a specific order address	The system redirects to Google Maps	PASS	Seller
	Update the order status	The order status is successfully updated	PASS	
Manage Order History	Click on the order history tab	The system displays the order history	PASS	Seller
	View order history	The system displays the most purchased product for the month	PASS	
	View order history	The system displays the least purchased product for the month	FAIL	

6. Conclusion

In conclusion, the MMCL Order Management System offers several advantages in efficiently managing orders, product information, and the delivery process for sellers, while providing convenient online ordering and comprehensive product information access for customers. The system saves time for both sellers and customers by streamlining the ordering process and providing 24-hour service. However, the system has some limitations, such as the absence of category browsing and limited payment options,

which restricts customers from making online bank transfers. Additionally, certain features may not be executed perfectly due to code complexity.

To improve the system, it is recommended to enhance the browsing functionality by allowing customers to explore products by category and search for specific items using keywords. Adding a constraint button for sellers who are unable to attend to orders, especially on weekends, can enhance the system's responsiveness. Furthermore, future system design enhancements can focus on improving user-friendliness. Continuation of research in these areas can lead to an even more effective and user-friendly MMCL Order Management System.

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