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Gerobox Santai Online Ordering System

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Abstract: The Gerobox Santai Online Ordering System is a system that was developed to help the restaurant manage and keep track of takeaway orders. As Gerobox Santai has been established since the year 2018, Gerobox Santai is able to promote and provide their services to customers who prefer to have their meal delivered. Usually, customers are asked to order manually at the restaurant, which is time-consuming for the customer who would like to have a takeaway order. Besides, it will lead to the inefficiency of the restaurant service as the orders cannot be organised well due to the lack of a systematic and orderly system. The objective of the project is to be able to develop an online ordering system that focuses on takeout for Gerobox Santai customers. The Gerobox Santai system is built for three types of users: customers, riders, and staff, with the owner of the restaurant as the administrator. For the customers and the rider, the system will be accessible from a smartphone, while a web-based application can be accessed by the administrators. The methodology used is the waterfall model, which allows the task distribution to be divided into requirement analysis, design, implementation, and testing phases. The Android Studio Code software will be used to develop the mobile application, while the Visual Studio Code software will be used in the development of the web application. Thus, the data will be stored in the Firebase real-time database.

Keywords: Online ordering system, Gerobox Santai restaurant, restaurant, food ordering, Android Studio, takeaway, delivery.

1. Introduction

The Gerobox Santai is a restaurant that is fully managed by the restaurant's owner, Mr. Azreel Asdie bin Abd Motalib. The restaurant is located at Taman Jack, Bandar Kuantan Puteri, in Pahang. The online food delivery system is a necessity because of the recent changes in the industry and the increasing use of the internet [1]. By creating a system that allows the customer to order their food from home or elsewhere, it will allow the restaurant to grow and increase its financial stability. Thus, a computerised and mobile food ordering system is designed to assist the business routine in terms of having better management as well as making it easier to handle daily business operations [2].

One of the issues with Gerobox Santai is that the staff needs to take the order themselves. This will then lead to an increase in waiting time for each of the customers that come to order. The issue that Gerobox Santai is facing is that customers who want to order takeout must first come to the restaurant,

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or they can make an order by messaging the owner via WhatsApp. This will lead to orders that will be missed and not prepared for certain reasons, such as forgetting to insert the order as they were busy handling the customers. The system is supposed to reduce the waiting time for each customer that has placed an order through their phone, as they will get notified once their order has been prepared. This feature will help reduce the need to queue up in the restaurant, as customers can just come to take their food once they receive the notification [3].

The objectives of this system are to design the Gerobox Santai online ordering system, which is an online food ordering application that focuses on takeaway and delivery services for customers. The second objective is to develop a system that will increase the efficiency of the service by using Firebase, Visual Studio Code, and Android Studio. The third objective is to test the efficiency of the online ordering system for Gerobox Santai. The Gerobox Santai system should be able to allow the customer to select the variety of categories of food that they want to display, add the menu, and review the cart before proceeding to payment. The customer can track their order, display their order history, and view their profile. The admin can add a new menu, update the menu information, or delete it. Furthermore, the administrator and staff are able to view and alter the order's process to allow the rider to deliver the order and observe the order that remains undeliverable. The owner can manage their staff by adding or deleting them.

Subsequently, the work related to this project is discussed in Section 2 after the introduction of this project. The methodology used in this project, a waterfall model that consists of five parts: requirements analysis, system design, implementation, testing, and maintenance, is illustrated in Section 3. Section 4 covers the project results and discussion. The last section will be a summary of this report.

2. Related Work

2.1 Current system in Gerobox Santai

Gerobox Santai has been using a Point of Sale (POS) system for about 2 years of operating the restaurant, where the Gerobox Santai staff needs to key in the order that customers have made and save it to allow the order to be sent to their kitchen to be prepared. However, the POS system that Gerobox Santai has been using is limited to their staff and not for the use of their customers. So, Gerobox Santai decided to expand their sales by focusing on the customers who want to make an order online and have it delivered or pick it up themselves. The proposed system will be built for three types of users: admin, rider, and customer. The customer and rider will be present in a mobile application, while the administrator, which consists of the staff and the owner, will use a web application to observe and manage the order.

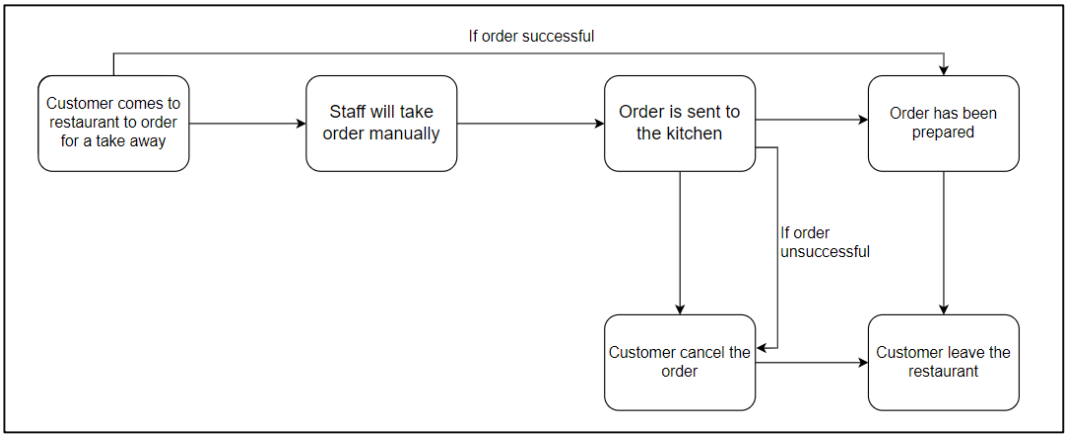


Figure 1: Process Flow of Gerobox Santai current system

2.2 Comparison of existing system

There are three existing systems that are investigated through each of their characteristics in order to support the study of the proposed system. The systems that are selected are Domino's Pizza, McDonald's, and Kentucky Fried Chicken (KFC).

i) Domino's Pizza[4]

Domino's is a food and beverage company that is dedicated to providing their clients with exceptional service, such as the ideal pizza delivery experience and the product satisfaction guarantee, which includes a 30-minute delivery guarantee and a 15-minute takeout guarantee. In the United States, Domino's is launching the "Paving for Pizza" programme with the cooperation of local governments to repair potholes in US state roadways, which the firm claims will help them deliver pizza to consumers in good shape [5].

ii) McDonald[6]

The small restaurant was designed to serve large quantities of food at low prices. Customers were served quickly since hamburgers were prepared ahead of time, wrapped, and warmed under heat lamps; this featured a self-service counter that eliminated the need for servers and waitresses. Customers can now order from McDonald's via phone or online using e-commerce software, making the company's services more efficient [7].

iii) Kentucky Fried Chicken (KFC)[8]

In 1965, an American firm, KFC, established the first global fast food outlets, soon garnering popularity throughout the United Kingdom. Quality, pricing, taste, and service are the major features that help any restaurant survive in this competitive world, and these have always been the top priorities of KFC restaurants in order to keep the world delighted in every way. Because the market is so competitive, fast-food companies like KFC must enhance their food and service quality in order to compete and thrive [9].

Table 1: Comparison between the existing systems and the proposed system

Features/System	Domino's Pizza	McDonald	KFC	Gerobox Santai Online Ordering System
Registration and Login	Yes	Yes	Yes	Yes
Authentication	Yes	Yes	No	Yes
Food Order	Yes	Yes	Yes	Yes
Order history	Yes	Yes	No	Yes
Confirmation Order	Yes	Yes	Yes	Yes
Variety of menu	Yes	Yes	Yes	Yes
Payment method	Online payment	Online payment	Online payment	Online payment and cash on delivery
Track Order	Yes	Yes	Yes	Yes
Delivery	Yes	Yes	Yes	Yes

System type	Hybrid Application	Hybrid Application	Hybrid Application	Hybrid Application

Table 1 compares existing systems, and the comparison reveals both the similarities and differences between the systems. All of the systems reviewed contain registration and login, food order, order history, confirmation order, diversity of menu, track order, delivery option, online payment as a payment mechanism, and are hybrid applications. All of the compared systems include registration and login features, which are critical for the security of the user's data. However, the Domino's Pizza, McDonald's, and proposed systems all use the authentication, which aids in whitelisting users and prevents unauthorised users from accessing the system

Beside that, the KFC system is the only one that does not have the order history features that may allow their customers to view the orders that they have made before. All of the compared system has the delivery features for the user and allow them to make online payment after they have confirm their order. Lastly, all of the systems are a hybrid application that combines the mobile application and the website application into a hybrid system.

3. Methodology

In this section, the methodology utilized to design the proposed system will be discussed. The waterfall model was used in the technique of this project. Methodology is primarily concerned with how to carry out each phase of the project in a systematic manner.

3.1 Waterfall model

The waterfall model is the model that is applied in this project because it demands the developer to undertake the phases in the sequence indicated, the waterfall technique allows the system to be completed within the time frame specified. The waterfall model is used because it is a methodology that, at the outset of the process, outlines the system's creation at a highly specific level. The waterfall method makes the procedure simple, and a computerised system can create an activity that is effective, efficient, and accurate[10].

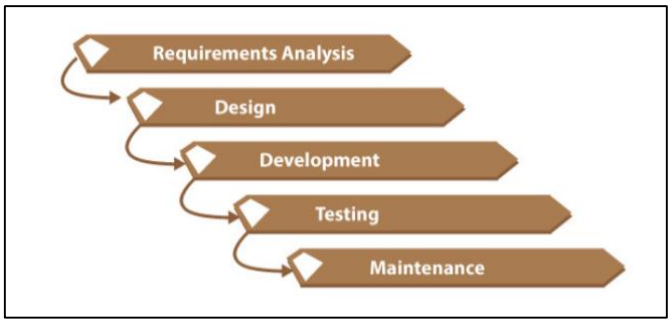


Figure 2: The waterfall process model [11]

Figure 2 depicts the waterfall model implemented in the Gerobox Santai online ordering system. The model enables for the successful development of the system, and testing will take place after the system has been fully established.

3.2 Requirement Analysis

The first phase is the requirement analysis phase, which identifies the problem, project objectives, and system scope. These data had to be studied in order to choose the best project to solve the problem and achieve the project's goal. It is also critical to research the system's main function based on the needs of the users and to meet those needs. Three systems, including McDonald's, KFC, and Domino's Pizza,

were chosen and analysed in order to identify and compare the benefits offered to users. This project's hardware and software requirements are described and documented, as is the presentation of the sequence diagram, use-case diagram, activity diagram, and class diagram.

3.3 Design Phase

The design phase is where object-oriented diagrams like the sequence diagram, class diagram, activity diagram, and use-case diagram are created based on the system requirements that were assessed during the requirement analysis phase. The wireframe for the project was produced during this phase to observe and depict the system's function and requirements. The wireframe is intended to identify the flow of the system so that people may readily use it.

3.4 Implementation

During the implementation phase, the user interface is constructed using the relevant software. Due to the fact that there are two types of interfaces: the web application for the administrator and the mobile app for the customer and rider, Android Studio and Visual Studio Code will be used. Firebase is also utilised at this point to save and retrieve data from the online application to the mobile application and vice versa.

3.5 Testing Phase

The functions and interfaces of the system are tested to ensure that the system is operational and that there are no problems with system functionality. Users are also exposed to system testing to see whether the system fits their needs and serves the intended purpose. This system requires two types of testing: unit testing and integration testing. System testing is required to ensure that the system operates properly and efficiently.

3.6 Maintenace Phase

The system will be changed during the maintenance phase to boost and improve its use. To satisfy the demands of users, the system is updated and improved during this phase in response to user feedback and testing findings. This includes making changes to improve system efficiency, eliminate faults, and strengthen security.

4. Results and Discussion

4.1 Analysis and Design

System requirements are defined to guarantee that system development proceeds smoothly. The user needs are currently being examined in order to identify the system's flaws. The system requirements are divided into two categories: functional and non-functional requirements. These requirements ensure that the proposed system's functionality can meet the project's goals. These requirements are crucial in determining how well the system meets the user's needs.

4.2 Requirement Analysis

The goal of requirement analysis is to establish the user requirements for the proposed system for administrators, staff, riders, and customers. There will be four requirements analyses because the system will be used by four different categories of users. The web application will be used by administrators and staff, while the mobile application will be used by customers and riders.

4.2.1 Admin Requirement Analysis

This section highlighted numerous admin-side features and functionalities based on the proposed system. Table 2 shows the administrative requirements of the system.

Table 2: Admin requirement for Gerobox Santai (web application)

No	Admin Requirement
1	Admin able to login into the web application.
2	Admin able to manage and view staff list.
3	Admin able to add new staff.
4	Admin able to view the sales report.
5	Admin able to manage and view menu.
6	Admin able to manage and view order.
7	Admin able to view customers detail.
8	Admin able to update and view their own profile information

4.2.2 Staff Requirement Analysis

Based on the suggested system, several features and functionalities for the staff side were identified in this section. Table 3 indicates the staff requirements for the system.

Table 3: Staff requirement for Gerobox Santai (web application)

No	Staff Requirement
1	Staff able to login into the web application.
2	Staff able to manage and view menu.
3	Staff able to manage and view order.
4	Staff able to view customers detail.
5	Staff able to update and view their own profile information

4.2.3 Customer Requirement Analysis

This section highlighted numerous customer-side features and functionalities based on the proposed system. Table 4 shows the customer requirements of the system.

Table 4: Customer requirement for Gerobox Santai (mobile application)

No	Customer Requirement
1	Customer able to register and login into mobile application
2	Customer able to view and choose the categories of menu they want
3	Customer able to add and update the item in the cart
4	Customer able to view and update profile
5	Customer able to view order history
6	Customer able to track their order
7	Customer able to make payment

4.2.4 Rider Requirement Analysis

Based on the proposed system, several features and functionalities for the rider of Gerobox Santai side were analysed and identified in this section. Table 5 indicates the rider requirements for the system.

Table 5: Rider requirement for Gerobox Santai (mobile application)

No	Rider Requirement
1	Rider able to login into mobile application
2	Rider able to view and choose the order that they want to deliver
3	Rider able to view the pending order
4	RIder able to update delivery status
5	Rider able to logout from the system

4.3 System Requirement Analysis

The proposed system has two categories of system requirements: functional requirements and non-functional needs. These specifications ensure that the proposed system's operations will meet the project's objectives.

4.3.1 Functional Requirements

There are few functional requirements for the proposed system. Table 6 shows the functional requirement analysis for the proposed system.

Table 6: Functional Requirements Analysis

No	Data	Functionality
1	Usability Requirement	The system should be in a correct session depending on the user authorization
2	Operational Requirement	The system only available when connected with the internet
3	Security Requirement	Users are only allowed to login to the system after registering and validate their email

4.3.2 Non-Functional Requirements

There are few non-functional requirement in the proposed system. Table 7 shows the functional requirement analysis for the proposed system.

Table 7: Non-Functional Requirements Analysis

No	Data	Functionality
1	Usability Requirement	The system should be in a correct session depending on the user authorization
2	Operational Requirement	The system only available when connected with the internet
3	Security Requirement	Users are only allowed to login to the system after registering and validate their email

4.4 Unified Modelling Language

The unified modelling language that is also known as UML includes the use-case diagram, sequence diagram, activity diagram, and classes diagram design. Section 4.5 shows the use-case diagram while Section 4.6 shows the sequence diagram. Section 4.7 shows the classed diagram and Section 4.8 shows the activity diagram.

4.5 Use Case Diagram

The unified modeling language that is also known as UML includes the use-case diagram, sequence diagrams, activity diagrams, and class diagrams.

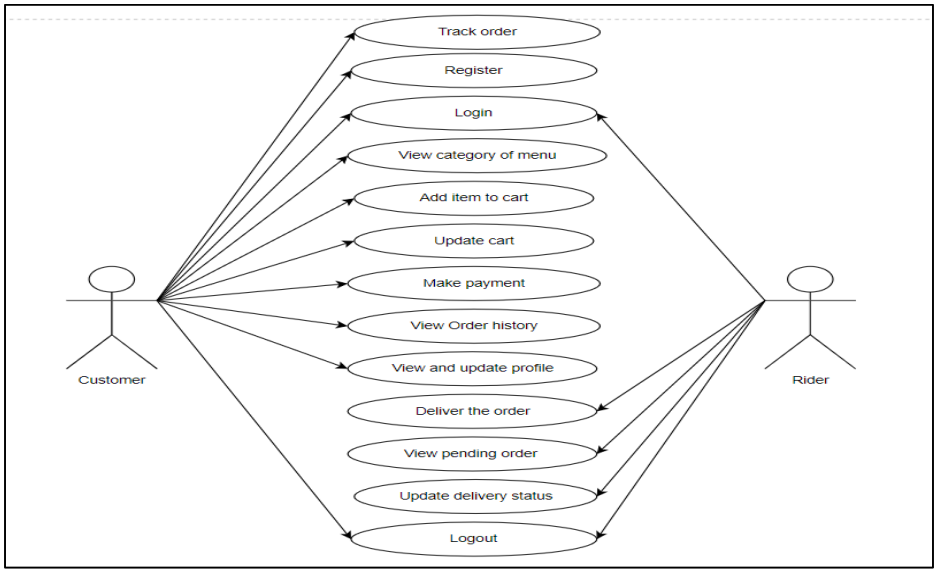


Figure 3: Use-case diagram for customer and rider (mobile application)

Figure 3 depicts the customer and rider use-case diagrams. Customers can register, login, view the menu, add an item to their cart, update their cart, make a payment, view purchase history, view and change their profile, track their order, and logout. Login, deliver order, update delivery status, view pending order, and logout are the five use cases for riders.

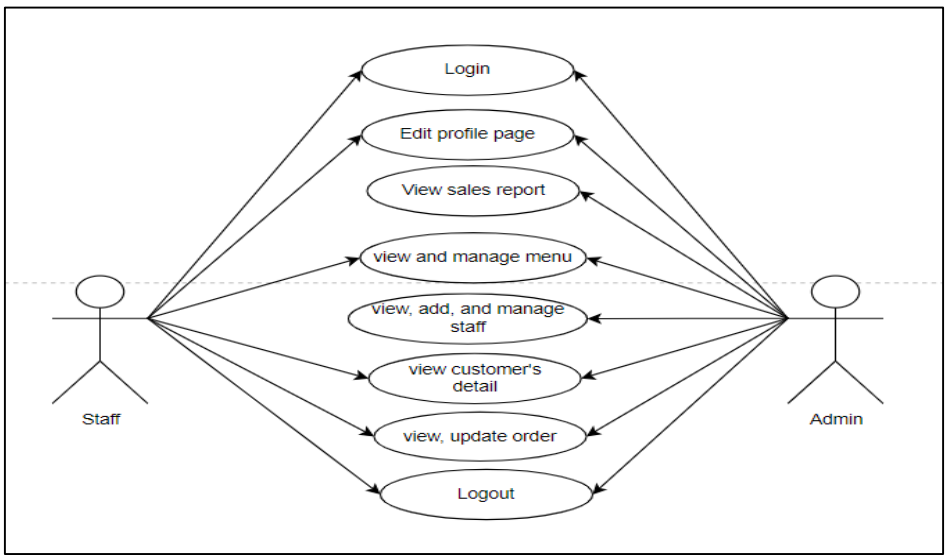


Figure 4: Use-case diagram for staff and admin (web application)

Figure 4 depicts the use-case diagram for Gerobox Santai's administration and staff members. Login, view sales report, view, add, update, and delete menu, view, add, delete staff, view and update profile, view customer's details, view and update order, and logout are the eight use cases for admin. Login, view, add, update, and delete menu; view and update profile; view customer's details; view and update order; and logout are the six use cases for staff.

4.6 Sequence Diagram

The sequence diagram is used primarily to show the interactions between objects in the sequential order that those interactions occur[12]. The sequence diagram is used in this project to show the process flow for the customer, rider, and administrator which includes the owner and staff of Gerobox Santai. Figure 5 shows the sequence diagram for admin while Figure 6 depicts the sequence diagram for staff. Figure 7 will shows the sequence diagram for customer meanwhile Figure 8 will depicts the sequenece diagram for riders.

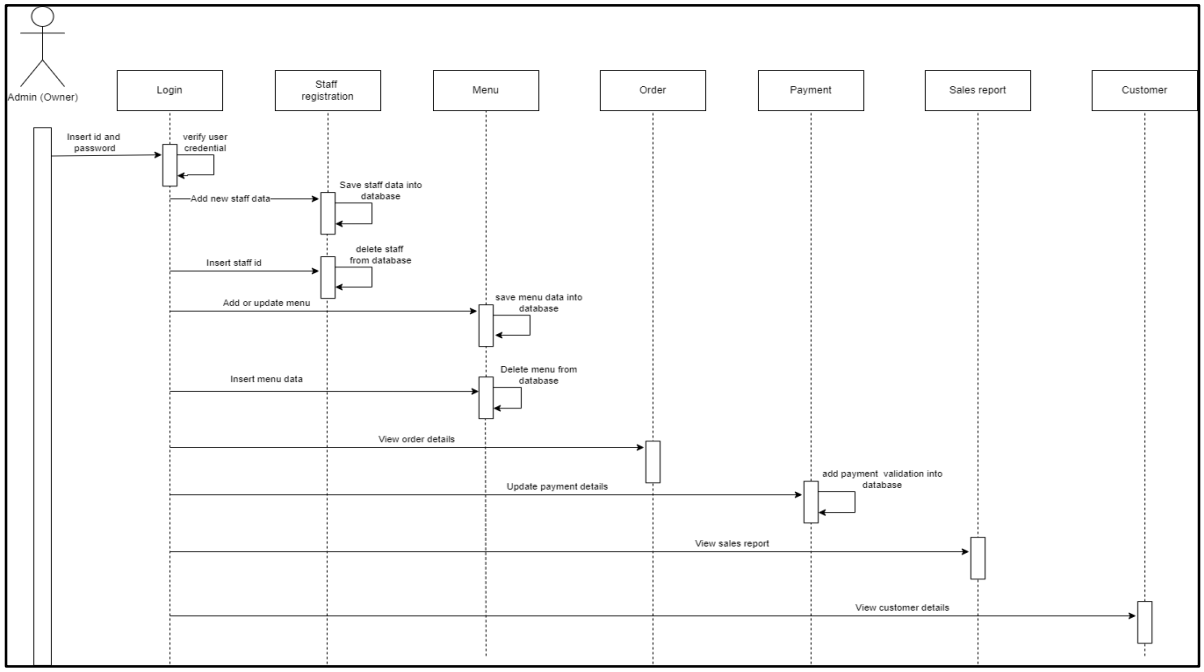


Figure 5: Sequence diagram for admin (web application)

Figure 5 depicts the sequence diagram for the administrator (owner). To access the system, the administrator must enter an id and password. To review, add, or amend the staff, menu, order, and the customer details, the administrator must enter data. An id must be provided to delete a staff member or a menu. For the owner, they have seven modules which are login, staff registration, menu, order, payment, sales report, and customer.

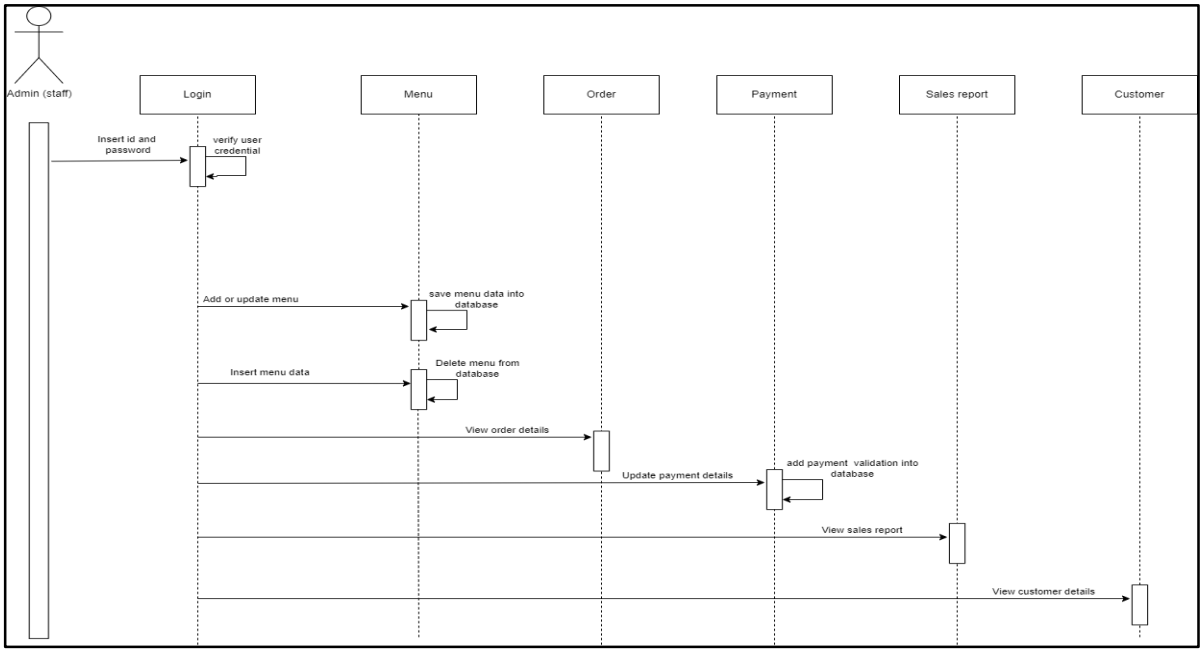


Figure 6: Sequence diagram for staff (web application)

Figure 6 depicts the staff sequence diagram. Staff must enter an id and password to access the system. To view, add, or change the menu, order status, staff must enter data. Staff can update and view their personal information at the profile page. For the staff, the module has been limited to six modules which are login, staff registration, menu, order, payment, sales report, and customer.

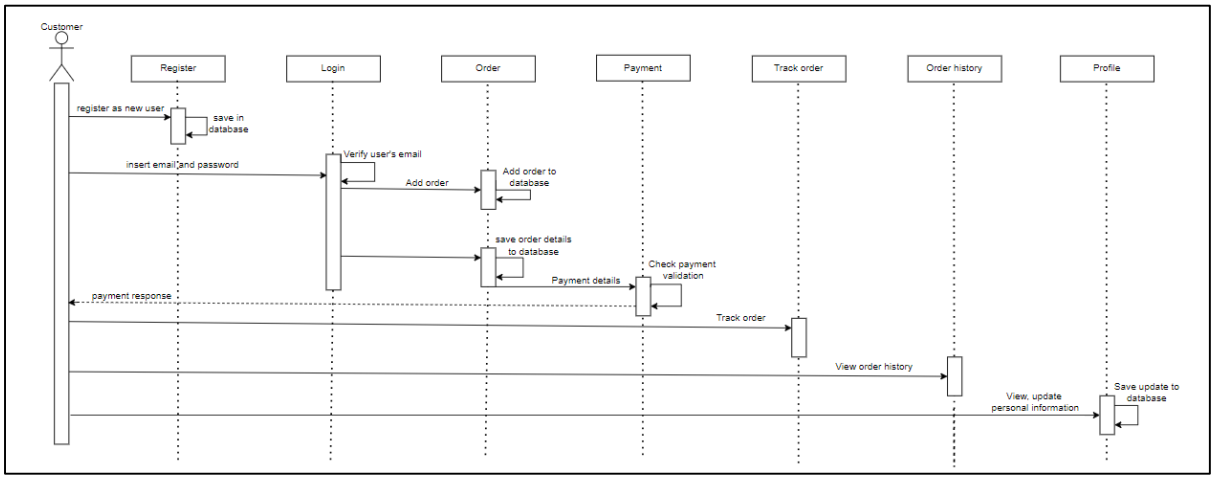


Figure 7: Sequence diagram for customer (mobile application)

Based on the Figure 7, the customer must provide their information to the system in order for the system to register new customers. The data is subsequently saved in the database. Customers must enter an email address and a password to access the system. When a user adds an order, the database creates a new order. The ordered item is saved in the database after the customer confirms their order. After the user has reviewed the order, payment can be made. After making a payment, the user can track their order nad check their order history after the order has succesfully received.

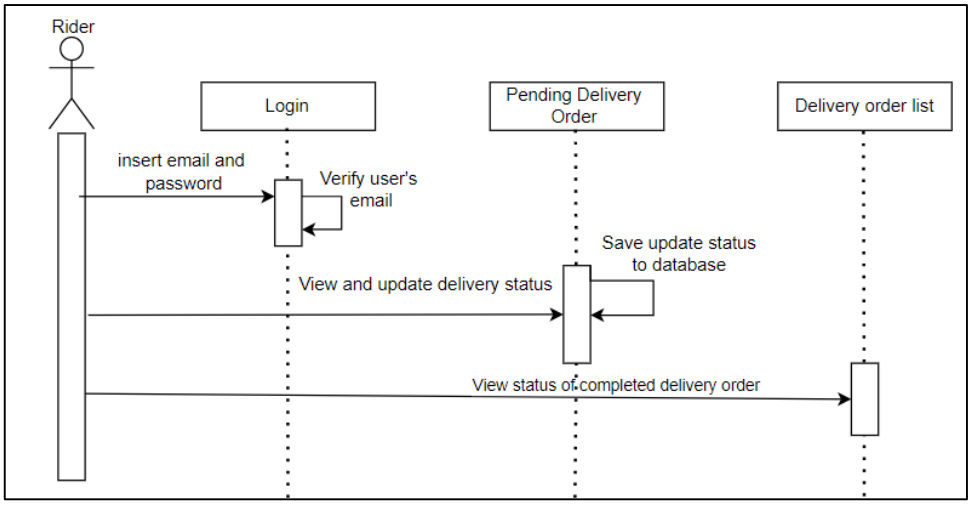


Figure 8: Sequence diagram for rider (mobile application)

According to Figure 8, the rider must login to the system in order to view the order's information. After successfully logging into the system, the rider can access two modules: the pending delivery order and the delivery order list. They can select the order to deliver and update the delivery status from the list of pending delivery orders. The order will then be listed in the delivery order list once it has been successfully delivered.

4.7 Class Design

The class diagram is a diagram that shows the relationship among all of the entities inside the proposed system.

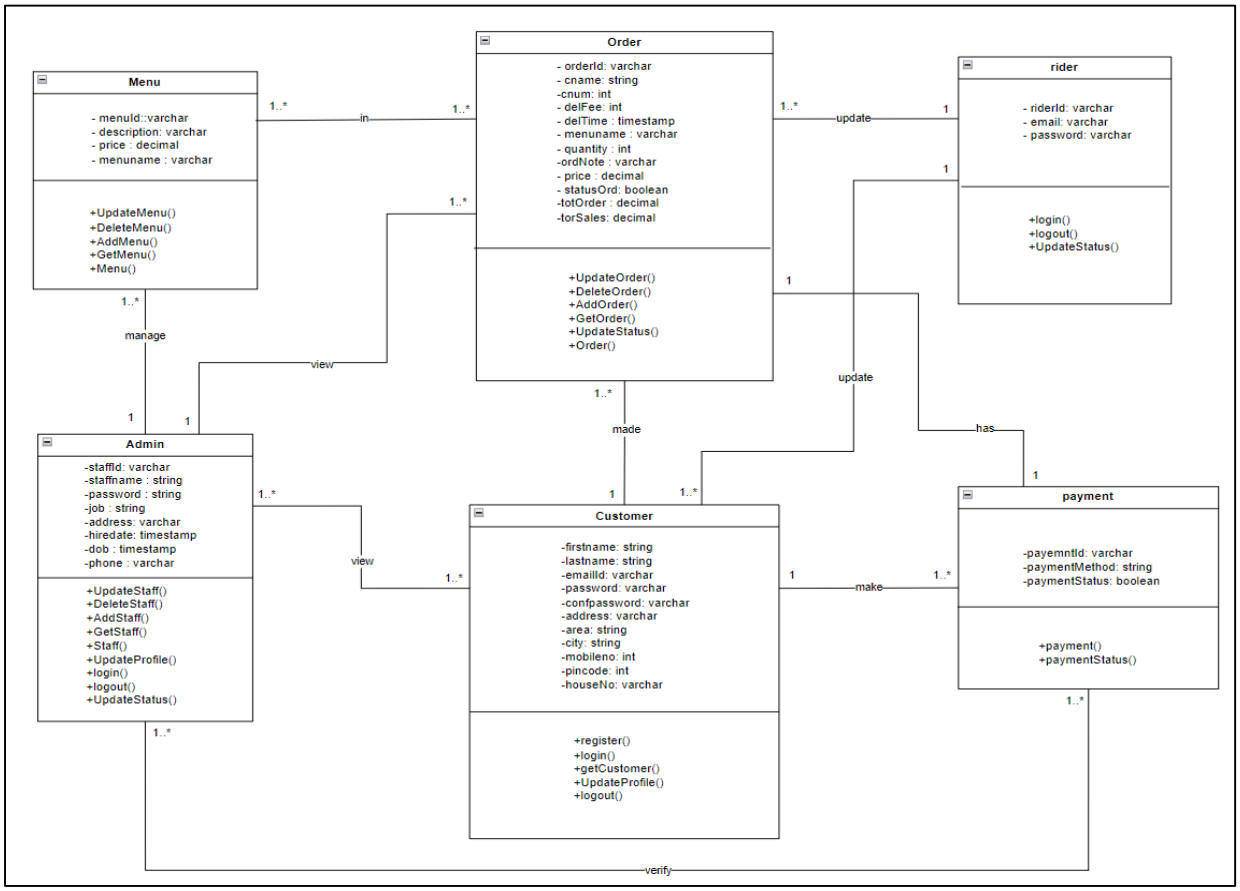


Figure 9: Class Diagram of the proposed system

Figure 9 shows the class diagram that consists of six tables which customers tables to save the data of customers, while the administrator table will save the data for admin. The menu table is to save the data of the menu that has been edited by the admin while the order table is to save the order details. The payment table is to save the data of payment that has been made by the customer and to save the total sales. The rider table is to save the rider's data and allow the rider to access the system.

4.8 Activity Diagram

Activity diagram is a diagram that represents the series of actions or flow of control in a system. The activity diagram for this proposed system is divided into three which are for customers, rider and administrator.

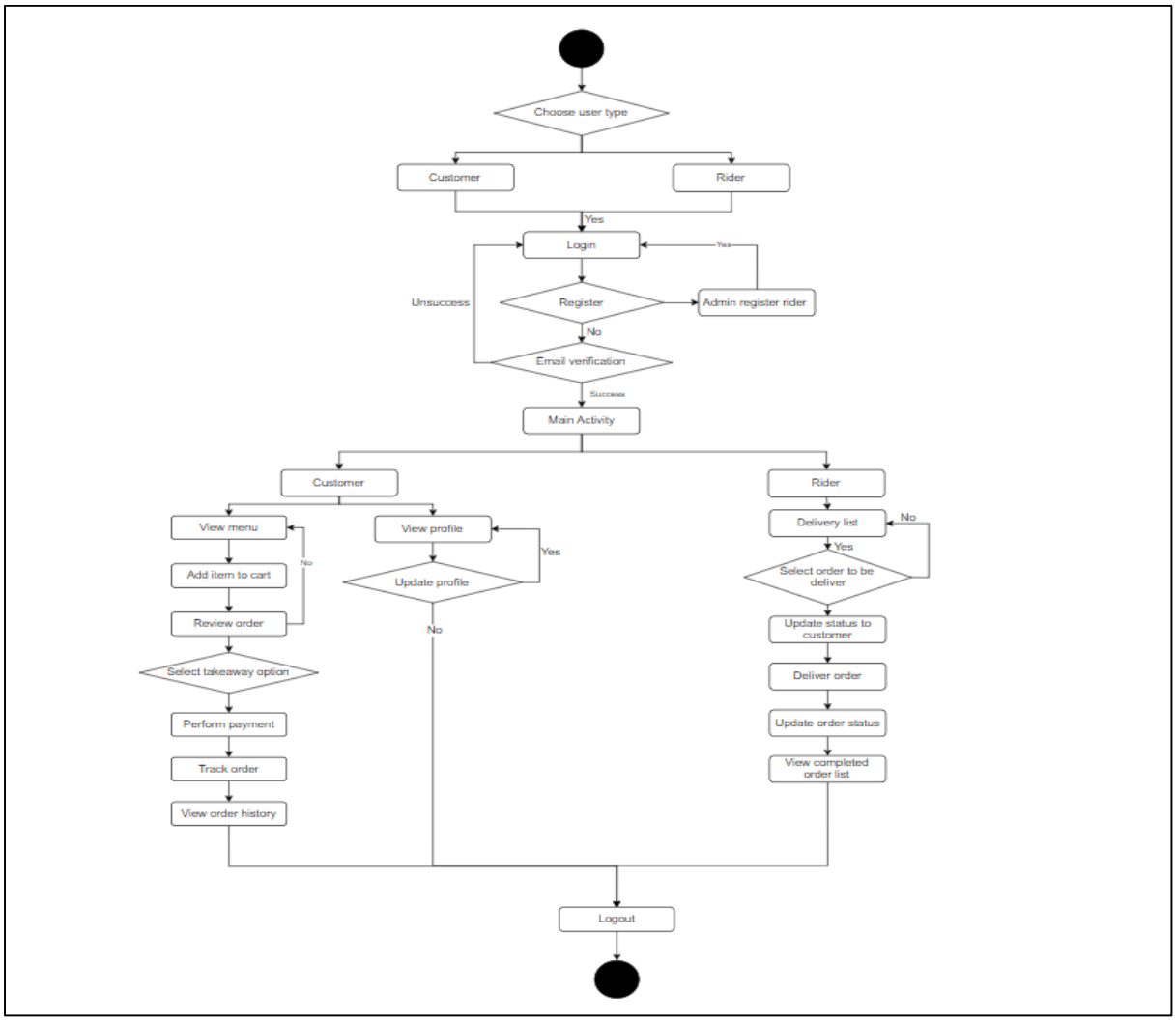


Figure 10: Activity diagram for customer

Figure 10 shows the activity diagram for customers, where it starts with registration. The customer needs to provide the information needed in the register form. After that, the customer must verify their email and then the customer can login into the system. The menu that is shown can be viewed by the customer and they can make orders by adding the items into the cart. The customer can choose their preferred takeaway option and proceed to make payment. Then they can proceed to pay the order and they can logout from the system. Customer can also view their profile page and update their information. For rider, they can login after their data has been registered by admin.

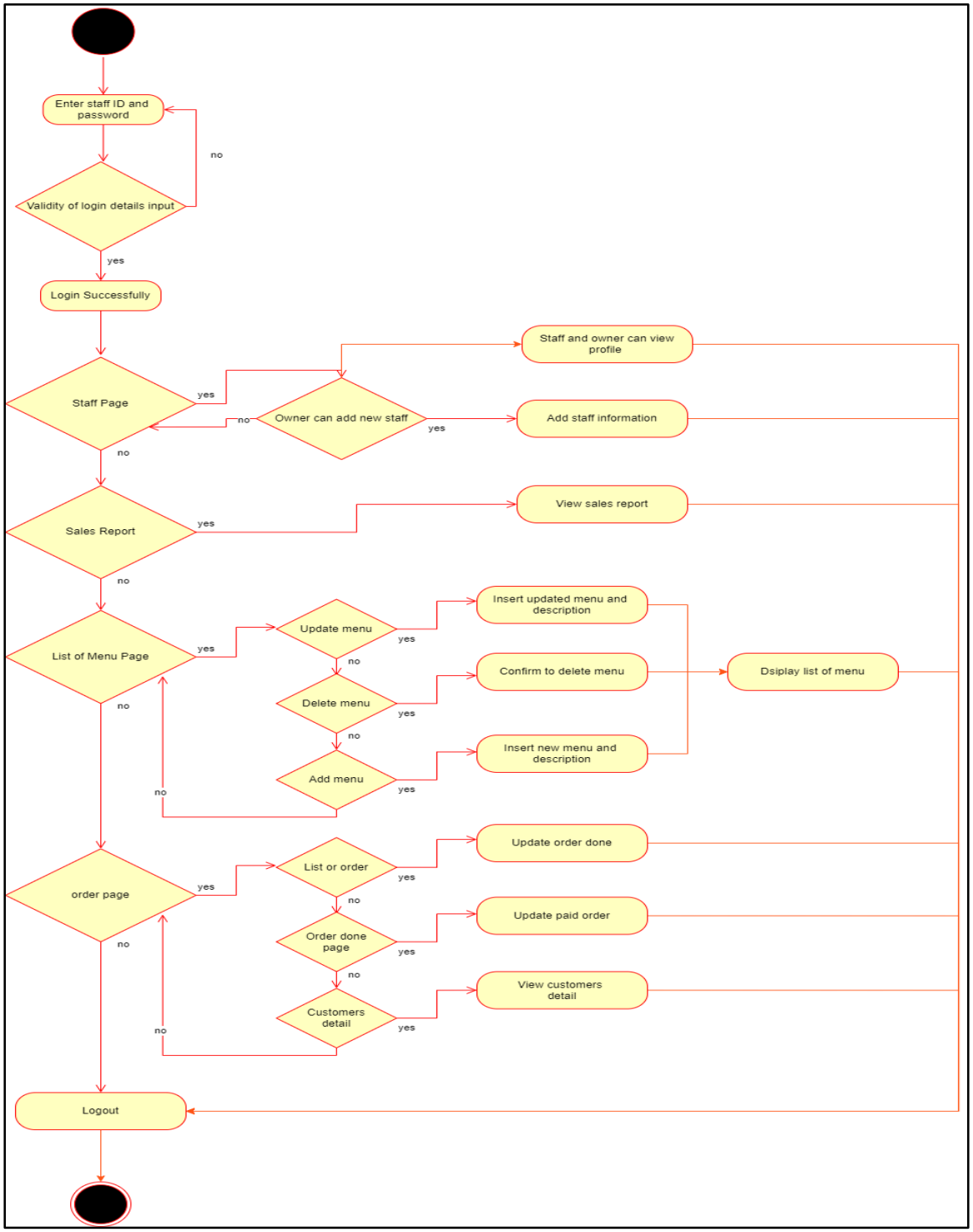


Figure 11: Activity diagram for administrator

Figure 11 shows the activity diagram for admin where it starts with login. The admin must insert their id and password to access the system. After the login is successful, admin are able to manage, view, update and delete the menu, order and order status, payment status and profile. The owner is able to add new staff into the system by adding the required information of the staff.

4.9 Application Interfaces

This section will depicts the interfaces of the Gerobox Santai online ordering system for both mobile and web application. Application interfaces will be presented in the Appendix.

4.10 Testing

During this phase, the proposed system will be tested using functional and user acceptance testing. Testing should be performed to confirm that the system is error-free and meets the project criteria. At this point, the outcomes are only partially matched to the projected results. It states that the project was a success and that it was finished in accordance with the specifications.

4.10.1 Test Plan

The test plan will be carried out after the proposed system has been fully developed. The test plan is used to determine whether the systems able to achieve the project goals and user requirment. Table 8 to Table # shows the test plan for the Gerobox Santai Online Ordering system.

Table 8: Test plan for Login

No	Test Case	Expected Result	Actual Result
1	Enter valid email and password	Once user key in valid password and password, login page will redirect to menu page	As expected
2	Enter email that is not validated	If user enter email that is not validate yet, alert message will pop up "You Have Not Verified Your Email"	As expected
3	Enter invalid email	If user enter invalid email, alert message will be display "There is no user record"	As expected

Table 8 shows the test plan for user login interface. This module can test with the customer or rider's email and password as the input.

Table 9: Test plan for Registration

No	Test Case	Expected Result	Actual Result
1	Register using valid email and password	If registration is successful, the page will redirect to verify email page	As expected
2	Enter invalid information	If user enter in valid data, the registration will be hold until user fix the error in entering data	As expected
3	Email validation sent to user's email	Email validation link will be sent to user's email	As expected

Table 9 shows the test plan for the user register interface. The user must enter the valid information according to its information required.

Table 10: Test plan for Profile

No	Test Case	Expected Result	Actual Result
1	User update personal information	User's information successfully updated and displayed in profile page,	As expected
2	Save data in Firebase	User's personal information saved and updated in Firebase	As expected
3	Logout from the system	User will be redirect to login page after click on logout button	As expected

Table 10 depicts the test plan for the profile page as in this section, the user which is customers able to view their profile page and update their personal information. The data will be saved into the Firebase.

Table 11: Test plan for Pending Order

No	Test Case	Expected Result	Actual Result
1	Rider choose order to deliver	Rider successfully view the order details and customer's address	As expected
2	Rider update delivery status	Order status saved in the Firebase	As expected

The Table 11 shows the test plan for the pending order that will be accessible for the rider. The rider will be able to update and choose the order that they want to deliver. The updated order status will be saved in the database and can be access by the admin in web application.

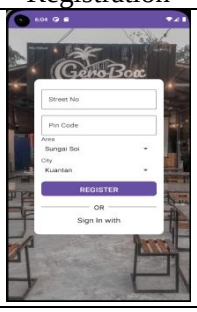
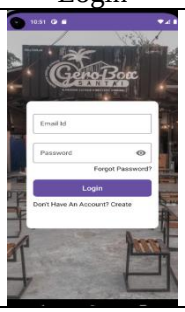
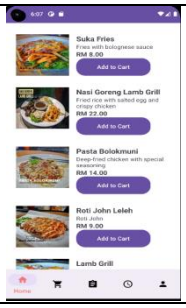
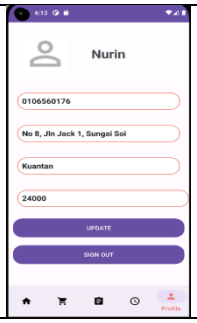
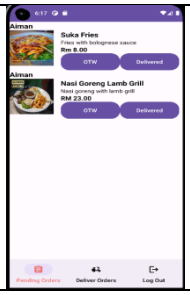
5. Conclusion

In conclusion, the proposed system is capable of meeting the project's purpose and goal, and it may be able to help Gerobox Santai improve order management performance. As the suggested approach allows customers to simply receive their orders without having to go out and dress up to buy food. The proposed method can also assist those who are uncomfortable going out and interacting with other people by allowing them to order meals and have it delivered to their home. If the customer decides to have their order ready for pick-up, they will save time because they will be contacted when their item is ready. As a result, the proposed system will enable customers to check out their order history if they want to repeat an order but forget the menu name. The suggested system should be able to allow the customer in entering updated information in their profile page to avoid the user from having to create another account whenever they want to use different address. Finally, several future upgrades are proposed, such as allowing the user to insert and save many addresses to be readily selected while ordering meals. Furthermore, the current location services that allow the consumer to simply pick their exact location can be incorporated as an enhancement. The Geolocation API can be used to implement this feature. This improvement can be made in the future because it helps the rider provide the best services to the customer while also allowing the rider to conveniently send the order to the customer's residence.

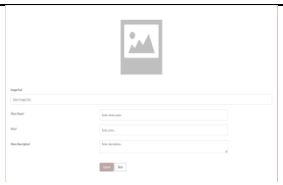
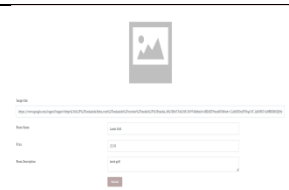
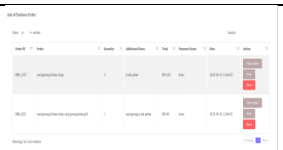
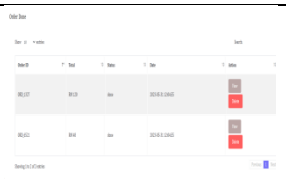
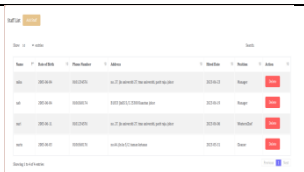
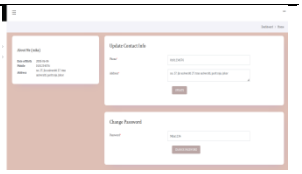
Acknowledgment

The authors would like to thank my supervisor Dr Nurul Aswa binti Omar on the unwavering support in the development of this project and to the Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia for its support.

Appendix A: Gerobox Santai Online Ordering System output interfaces (mobile application)

Interface	Rider and Customer Registration	Rider and Customer Login	Customer Menu
Output			
Interface	Customer Track Order	Customer Order History	Customer Profile Page
Output			
Interface	Customer Cart	Rider Pending Order List	Rider Completed List
Output			

Appendix B: Gerobox Santai Online Ordering System output interfaces (web application)

Interface	Login	Add Menu	Update Menu
Output			
Interface	List of Menu	List of Undone Order	Customer List
Output			
Interface	Order Done List	Staff List	Profile Page
Output			

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