



Faculty of Computer Science and Information Technology

QR-POWERED ONLINE FOOD ORDERING PLATFORM

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PLATFORM PESANAN MAKANAN DALAM TALIAN BERASASKAN QR

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Projek ini merupakan salah satu keperluan untuk Ijazah Sarjana Muda Kejuruteraan Perisian
dengan Kepujian
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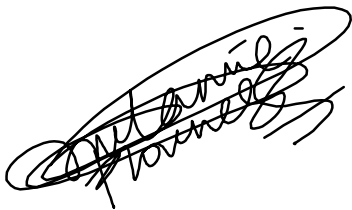
Fakulti Sains Komputer dan Teknologi Maklumat

UNIVERSITI MALAYSIA SARAWAK

2024

DECLARATION

I hereby declare that the work presented in this Final Year Project (FYP) is entirely my own effort. All contributions from external sources have been duly acknowledged and appropriately cited within the project. This project has not been submitted elsewhere for any other degree or qualification.



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ABSTRACT

The suggested system is a QR-based online food ordering solution aimed at improving the dining experience for both customers and staffs. It allows customers to access the menu, place orders, and reserve tables effortlessly through a QR code scan, thereby removing the necessity for physical menus and minimizing wait times. The system includes features like adding items to a cart, checking order history, and requesting decorations for events. Staff can easily manage orders, confirm reservations, and update the menu via a unified dashboard. The goal of the system is to boost operational efficiency, enhance customer satisfaction, and lessen the manual workload. By leveraging modern technologies, the proposed solution delivers a smooth and tailored dining experience, tackling prevalent issues encountered by restaurants.

ABSTRAK

Sistem yang dicadangkan adalah sistem pemesanan makanan berkuasakan QR yang direka untuk memperkemas pengalaman makan bagi pelanggan dan kakitangan. Ia membolehkan pelanggan melihat menu, membuat pesanan, dan menempah meja dengan mudah melalui imbasan kod QR, menghapuskan keperluan menu tradisional dan mengurangkan masa menunggu. Sistem ini menyokong ciri-ciri seperti menambah item ke dalam troli, melihat sejarah pesanan, dan membuat permintaan dekorasi acara untuk majlis istimewa. Kakitangan boleh menguruskan pesanan, mengesahkan tempahan, dan mengemas kini menu dengan cekap melalui papan pemuka yang bersepadu. Sistem ini bertujuan untuk meningkatkan kecekapan operasi, kepuasan pelanggan, dan mengurangkan beban kerja manual. Dengan menggabungkan teknologi moden, sistem yang dicadangkan memastikan pengalaman makan yang lancar dan diperibadikan, sekali gus menangani cabaran biasa yang dihadapi oleh restoran.

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Chapter 1: Introduction

1.0 Introduction

Till today, most restaurant industry still manage their services manually, for example taking orders table to another table by manually writing down orders, relaying to others or by keying in orders in the restaurant ordering system at the counter. By taking orders manually and relaying to others, this method may lead to delays and order error due to mistakes in orders particularly during peak hours and group events. Furthermore, these methods may also result in food waste and revenue loss considering staff need to remake or refund the order if customer is not satisfied with their order. Moreover, due to recent global events have transformed customer expectations around safety and convenience, causes to an increasing demand for contactless ordering and self-service options in restaurant industry. Hence, a digital solution is needed to solve those problems.

This project, the QR-Powered Online Food Ordering Platform, aims to counter these operational issues by developing a digital solution that can convenience both customer and staff in ordering and booking processes. By creating a responsive web application that enables customer to scan QR code at their table using their mobile phone, they can view the menu, and place orders directly through their device. This system will minimise waiting time and effort for both customer and staff, leading to more efficient and pleasant dining experience. This website also highlights some unique features such as for logged-in customer, they can make table reservations, customise service requests and make group ordering based on link they shared to others. This digital solution is being developed to cater both customer and staff requirements, ultimately improving customer user experience and operation efficiencies.

1.1 Problem Statement

A restaurant management system indeed continues to rely on manual operations operated by staff and is not being automated yet (Singh et al., 2022). According to the case study of Paul et al., (2020), digital ordering is introduced due to few limitations including being late entertained by staff, reducing manual orders errors and enabling customer to make self-order. They may face operational efficiencies such as staff taking orders manually, orders error due to miscommunication, staff came late to table to take orders and customer need to book table

through direct message or call the restaurant manager. This will lead to delays in service, incorrect orders and the absence of personalization, which all contribute to customer dissatisfaction and creating an intense work environment for staff as well. As for the lack of personalization, customer needs to manually book table by messaging or contact the manager, which can be inconvenient for them. This process will lead to miscommunication, such as wrong time or wrong request. While the problem more focused to enhance customer user experience, at the same time it will also increase staff user experience. Moreover, manual order taking will lead to time wastage. This is because when staff taking orders at the table, they need to wait for customer's decisions on deciding which food and drinks they are going to order which will take longer time during group orders. Therefore, a digital solution that offers online personal ordering, booking table under any event and able to request staff's service on decorating the table or chair might optimizes the overall experience needed to enhance customer satisfaction and operational efficiency.

1.2 Objectives

The main objective of this QR-Powered Online Food Ordering Platform is to develop a responsive web-based platform that can enhance both customer and staff restaurant experience. The objectives are as follows;

- To design a responsive web-based online food ordering system that simplifies the food ordering and table booking processes.
- To develop a responsive web-based online food ordering system that enables customers to conveniently browse menus, place orders, book tables and request custom decorations through a message feature.
- To evaluate the usability of this system by conducting usability survey and report the findings.

1.3- Methodology

Waterfall methodology is one of the traditional methods that includes linear and a sequential approach to project a software development, where each phase must be completed before moving to the next phase. This methodology is recommended for its highly organized and

well documented, making it ideal for QR-Powered Online Food Ordering Platform project with clear objectives and requirements.

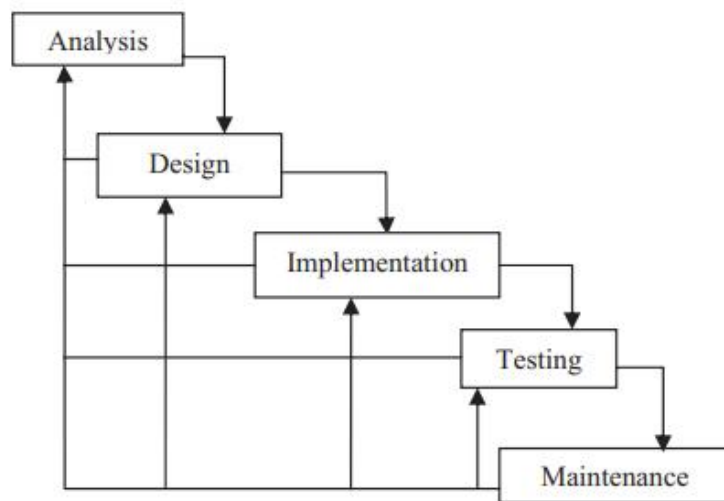


Figure 1. 1: Waterfall Methodology (Trivedi & Sharma, 2013)

1.3.1 Requirement Analysis

In this phase, begin project by defining the essential requirements, understanding and documenting the functional requirements. Literature reviews based on 4 other similar system are used in this phase to gather insights and support usability analysis. All systems are reviewed to make deductions about their features, performance, and device compatibility.

1.3.2 System Design

Once requirements are well defined, the design phase commences. A Class Diagram will be implemented to view the relationship of the whole system. Followed by Activity Diagram and sequence Diagram to show how the data flows in this system. Next, Unified Modelling Language (UML) diagram will be designed to show all the connections of attributes, entities and relationships. For user interface, prototypes will be designed using Figma to display the webpage designs.

1.3.3 Implementation

The implementation phase includes transcribing the design phase into a functional restaurant management system. This QR-Based Online Food Ordering Platform will be implemented using HTML and CSS for frontend purpose, PHP for backend, and MySQL for databases to store orders, menu, reservations, and users. The development part will be using VS Code editor while for database management will be implemented using XAMPP.

1.3.4 Testing

In this phase, after implementation is completed, manuals will be prepared for potential users on how to use the system. User testing will be conducted within small scale, with few real users such as friends and family members to test and observe on how they use the system. From user testing, feedback from users will be collected regarding usability and functionality. Test cases will be executed too to achieve its original objectives. With a thoroughly tested system, deployment involves making the system accessible to users by doing web hosting. Website such as Hostinger will be used to implement the web hosting.

1.3.5 Maintenance

After executing web hosting, which is the deployment part, amendments of system will be done based on the testing. This includes checking for slow load times, errors in scanning QR code or any error concern that is related to the system.

1.4 Scope

The QR-Powered Online Food Ordering Platform seeks to serve a small-scale restaurant that will be deployed as a responsive web application. For small restaurant, this system will serve in providing simple ordering system, simple reservation system that allow customer to book their table with customization for smaller event. This system can handle table-service type restaurant that incorporate with digital solution. Table-service restaurant describes a dining where customer is seated at tables, place orders via system which staff will view and receive service from staff (Pendrell, n.d.). Moreover, this system does have its own boundaries as well. For user accounts will only stick to 2 users, which are staff and customer. Next, for menu management, only basic menu will be updates without any seasonal menus added. Table booking can only be made 1 month prior to event date within open hours only, starting from 10am till 10pm.

This system primary purpose are as follows:

- A secure customer registration and login system.
- A user-friendly and responsive web application where website can be view on mobile phone and computer.
- A functional management system where restaurant can easily update and manage the menus.

- A workable ordering management system where customer able to place order and order is based on table number.
- Table reservation system that can accommodate both staff and customer in terms of dates, time and confirmation booking.
- Special request for event decorations and customization in message box under table booking feature.
- Quality assurance testing to ensure functionality, performance, and security.

1.5 Significant of Project

This project possesses a significant potential to transform traditional restaurant into a digital solution where it serves as a platform by tackling key challenges in order taking, reservation management, and customer service. QR-Powered Online Food Ordering Platform is anticipated to lessen the reliance on manual order taking, enabling restaurant staff to focus more on their value-added task rather than repetitive workload.

Meanwhile for customers part, it enhances customer's user experience by providing self-service options that in line with customer's preferences for personalization, speed and convenience to use. Furthermore, by adding a special feature where customer can book table and request for staff's service, it may enhance the normal restaurant management system functionality beyond mere ordering food.

Thus, the capacity of this system to simplify the operations, reduce errors and enhance customer satisfaction enable a restaurant business to be more influence in terms profitability and customer loyalty.

1.6 Project Schedule

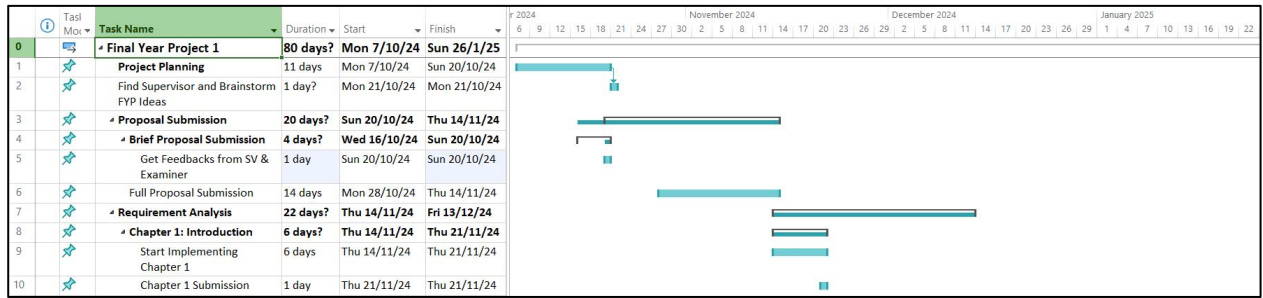


Figure 1. 2: Project Schedule for FYP1



Figure 1. 3: Project Schedule for FYP1

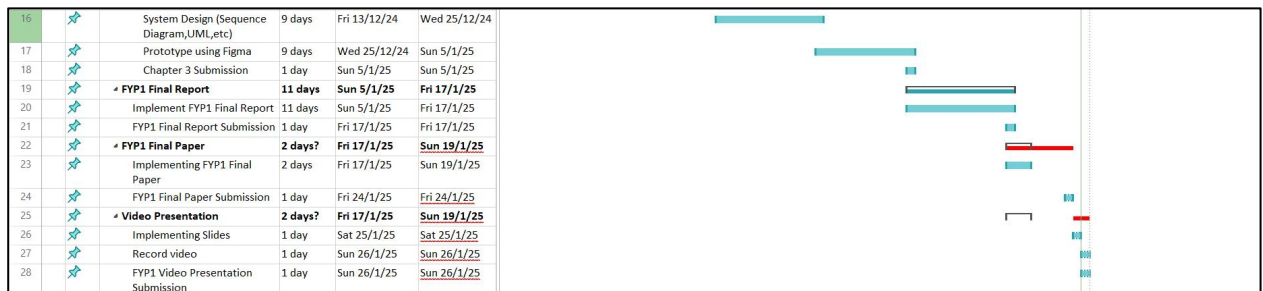


Figure 1. 4: Project Schedule for FYP1

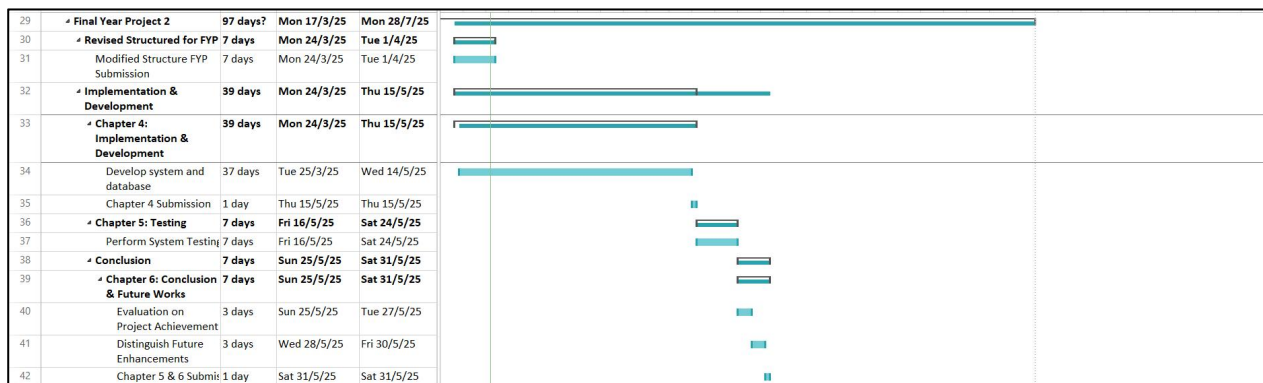


Figure 1. 5: Project Schedule for FYP2

1.8.2 Chapter 2: Literature Review

Chapter 2 discusses the comparisons with another three similar existing system regarding their features and functionality. All those existing systems will be reviewed to make deductions over their features and performance.

1.8.3 Chapter 3: Requirements Analysis and Design

Chapter 3 describes the methodology used in developing the system. In this chapter, an online survey will be conducted, and data will be collected for system's feedback. Next, system design such as ERD will be used to view the relationship of the whole system. Moreover, UML Diagram will be included to show all the connections of attributes, entities and relationships. As for user interface, prototypes design using Figma is being utilized to display the webpage designs.

1.8.4 Chapter 4: Implementation and Development

Chapter 4 describes the implementation of the system using proposed tools and the process behind the implementation. Web hosting will be utilized and QR will be generate too during deployment.

1.8.5 Chapter 5: Testing

As for testing phase, user testing and test cases will be caried out to demonstrate this chapter. Web hosting will be utilized too during deployment.

1.8.6 Chapter 6: Conclusion and Future Works

This chapter will depict briefly on the summary of this project. Project's achievements and contributions and future enhancement will be portrayed to highlight on how it improves the user experience.

Chapter 2: Literature Review

2.1 Introduction

Chapter 2 describes detailed literature reviews on similar existing food ordering systems. Based on the related existing system, the features, technologies, and functionalities will be analysed to help the development of the proposed QR-Powered Online Food Ordering Platform. The review also includes evaluating the strengths and weaknesses of the related system to highlight best practices and areas for improvement. All of the analysis collected from the reviews will provide insights regarding the features, designs and technologies used for the proposed system.

Nowadays, restaurant in Malaysia has been utilizing online ordering system to ease the ordering process. QR code usually is pasted on the table for customers to scan, enabling them to perform online orders. Similar existing restaurant management system such as McDonald application, Singapore Chicken Rice (SCR) web ordering, Secret Recipe web ordering and The Chicken Rice Shop website.

2.2 Reviews on the Features for Online Food Ordering System

Due to the widespread usage of digital technology, many have embraced digital revolution by utilizing mobile applications and websites for entertainment and everyday task purposes. The digital era has become the new normal in the field of communication and commerce, offering innovative solutions that could cater to nowadays community who are less inclined towards traditional methods of shopping and interaction (Sonwane et al., 2023). In this case, the digital revolution can meet the requirements of communities in terms of convenience and efficiency in this modern world.

Online food ordering systems are one example of the digital revolution, a dynamic system encompasses interactive features, Point-of-Sale (POS) system, restaurant service integration, and an additional group order feature. The sections below discuss the details and comparisons of the related systems.

2.2.1 Existing Food Ordering System

The selected existing food ordering includes McDonald's application, The Chicken Rice Shop (TCRS) website, Singapore Chicken Rice (SCR) table ordering system and Secret Recipe application. The sections below will depict a short introduction on each selected system.

2.2.1.1 McDonald Application

According to Figure 2.1 below, McDonald's app main dashboard displays five (5) pages consists of Home, Rewards, Order, McDelivery and More page. It is an online ordering mobile application that can be installed into customer's mobile devices. Customer need to pick the nearest McDonald branch to them before proceed ordering. It provides various types of ordering options including pick-up; where customer are given the option to dine-in, drive thru or takeaway and delivery to their address. Next, the application serves customer not only in ordering food, but also to show the current promotions and customer's rewards after reaching certain points. The application includes some interesting features such as *Parties @ McD*, and *Job Vacancies*. *Parties @ McD* is a feature where customer can book party under any events and able request for venue decorations from staff while *Job Vacancies* features is a job application specifically for job seekers. Moreover, McDonald also prepares self-ordering kiosk for customer to order, instead of the traditional way, ordering at the counter through a staff.

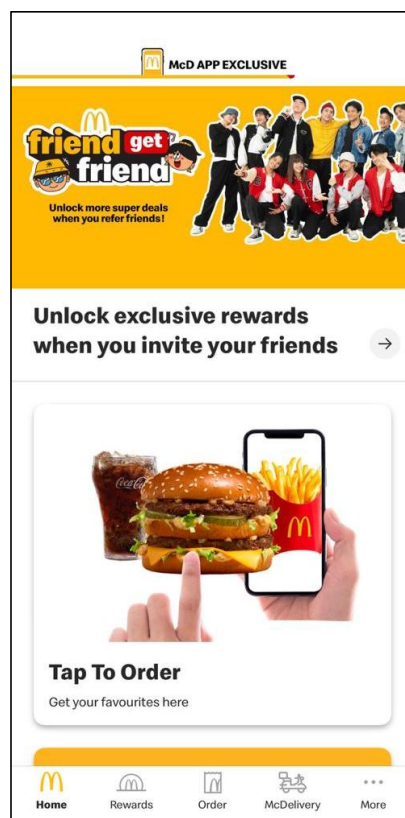


Figure 2. 1: McDonald's App Main Interface

2.2.1.2 Singapore Chicken Rice Web Ordering

Figure 2.2 shows the main dashboard for SCR's system where it straight away display the online ordering types which consists of takeaway and dine-in. This web ordering system specifically works for table fourteen (14) as depicts in the figure above, as it handles order only for that table itself. In this case, customer scans QR from the table, orders food from system then submit it to the system for staff to start preparing their food. It is a simple system where customer order through system, submit order then make payment at the counter.



Figure 2. 2: Singapore Chicken Rice's Main Interface

2.2.1.3 The Chicken Rice Shop Website

Figure 2.3 illustrates the main interface of TCRS that contain navigation of pages from Promotions, Menu, Find Us to Order Now pages. Customer must navigate to order now page to search for menu and proceed with ordering process. This website provides two (2) types of online ordering types which are delivery and self-pickup. It does deliver few interesting features such as group order and track order for customer.



Figure 2. 3: The Chicken Rice Shop Main Interface

2.2.1.4 Secret Recipe Web Ordering (SR Go)

Based on Figure 2.4, this web ordering system, SR Go, only offers self-pickup for customers. SR Go is a simple system where customers can order through their website, submit the order, pick up the order, and make payment at the counter. Customer can add instructions such as “no dairy” in the remark feature to notify staff not to add onion in their dish.

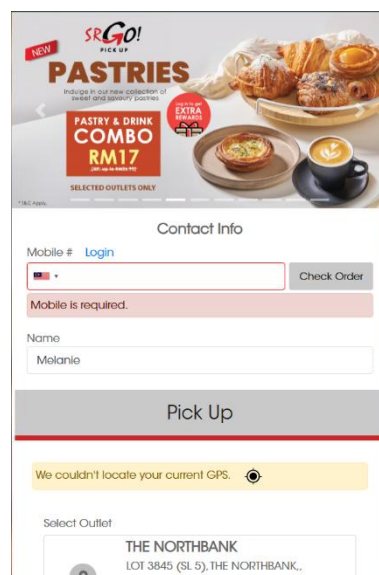


Figure 2. 4: SR Go Main Interface

2.2.2 Basic Feature

The menu feature is one of the most important part in a food ordering system as it serves as the primary point of interaction for customer. Customer that uses the system will navigate to the menu section first to select food and beverage either to dine in or takeaway. According to Easyeat (2024), an intuitive and customizable menu interface not only streamlines navigation for customers selecting food and beverages but also streamlines operations, minimize errors and improve overall customer satisfaction. Hence, menu feature plays a vital role in attracting customer to choose the selected restaurant.

All selected system can display menu without prompting user to register before navigating to menu. McDonald and The Chicken Rice Shop displays visually appealing dashboard and complete details that can attract customer but at the same time it could be overwhelming for users preferring simplicity as shown in figure 2.5 and figure 2.6. The ease of access of a menu and simplicity are the vital things that should be integrate in a ordering food system in a restaurant (Liyanage, et al., 2018).

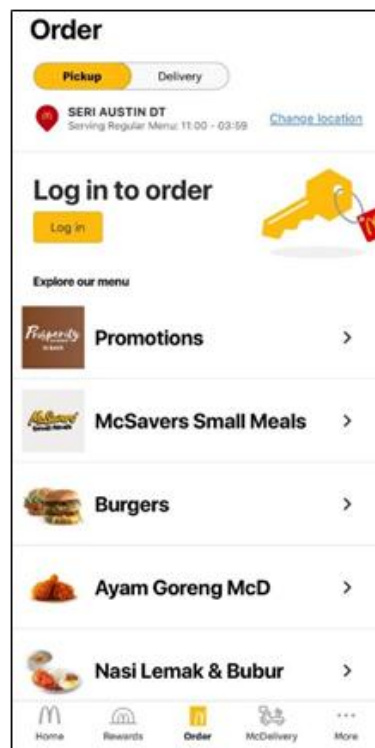


Figure 2. 5: McDonald's Menu Interface



Figure 2. 6: The Chicken Rice Shop Menu Interface

On the other hand, Singapore Chicken Rice and Secret Recipe Go system utilize a minimalist system where there are not very much visual, but it is filled with necessary details such as dish name, image and price as depicts in figure 2.7 and figure 2.8. Moreover, all systems display the availability of the dish. For example, the system displays ‘Sold Out’ or ‘Out of Order’ to symbolize that the dish has been sold out, hence order will not be taken for that dish.

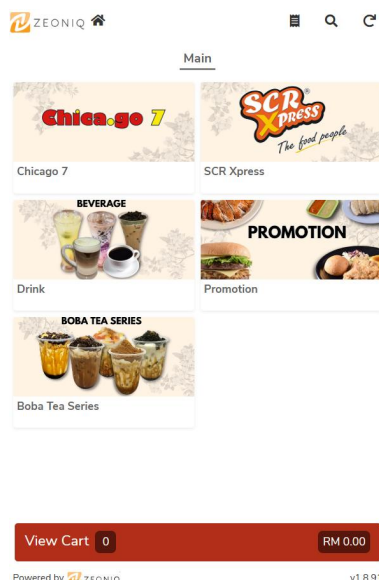


Figure 2. 7: Singapore Chicken Rice Menu Interface

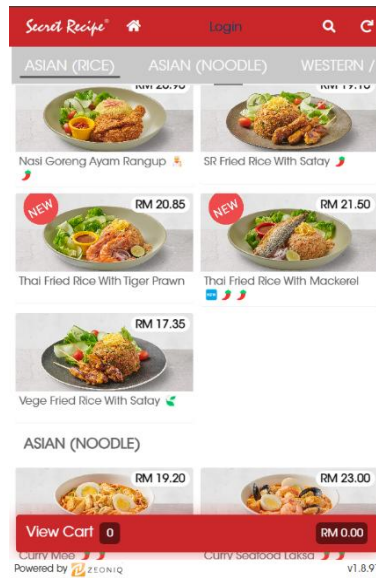


Figure 2. 8: Secret Recipe Go Menu Interface

Next, add-to-cart feature also plays a significant role in all existing online food ordering system. Without an add-to-cart option, placing orders individually leads to multiple charges when paying online and at the same time higher budget needed to pay and time wastage (Strikingly, 2022). Placing order for every item one by one could lead to multiple charges to the debit or credit card, causing difficulty in tracking order. Paying items separately also could exceed budget, for example, customer must pay service tax for 5 dishes separately, which is causing customers to lose money.

Add-to-cart feature also integrates with place order feature. Place order feature includes the process placing orders from cart and submit it to the system where staff can view their orders. According to figure 2.9, McDonald's allows for real-time customization of items before confirming order, while the other 3 systems allow editing items such as delete items or add items before submitting order as shown in figure 2.10 for TCRS website, figure 2.11 for SCR system and figure 2.12 for SR Go system.

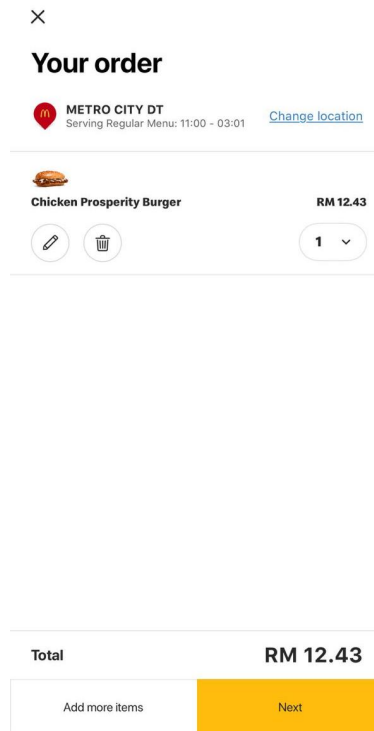


Figure 2. 9: McDonald's Customization Options

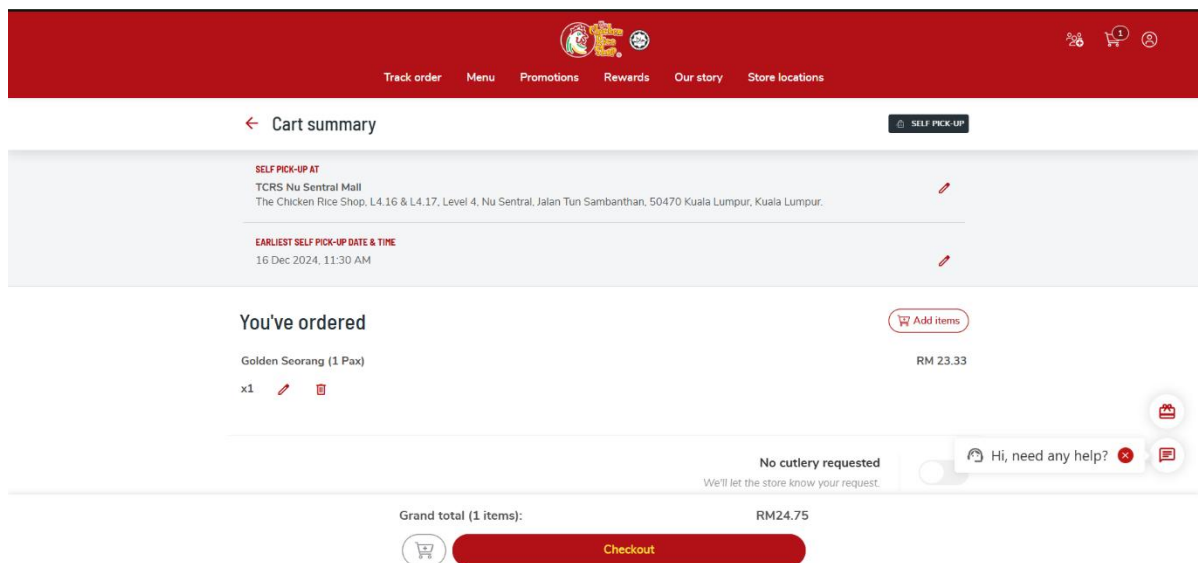


Figure 2. 10: The Chicken Rice Shop

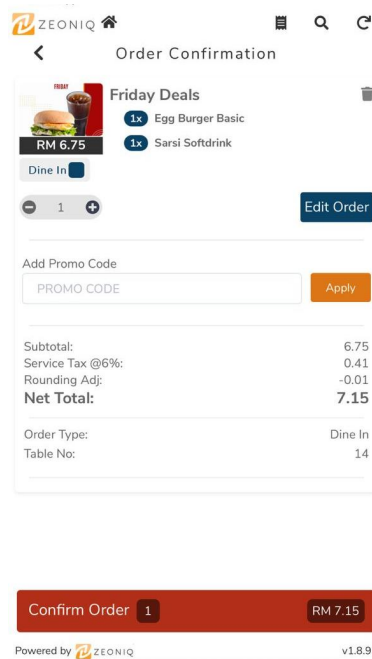


Figure 2. 11: Singapore Chicken Rice

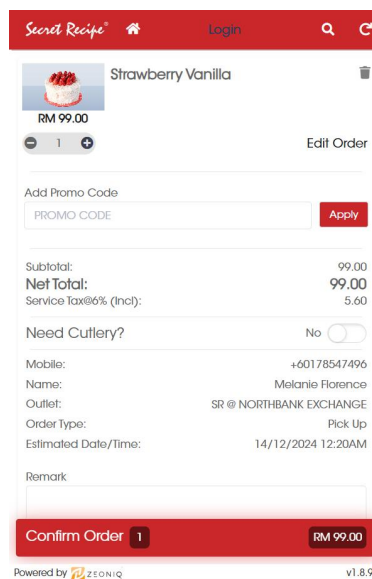


Figure 2. 12: Secret Recipe Go

2.2.3 Online Ordering Types

RMS ordering types typically either has dine in and takeaway option or self-pickup and delivery option depending on the restaurant's operational needs. Dine-in and takeaway feature focuses on table management, allowing customer either eat in the premises or

takeaway and eat the food somewhere else, but the customer must order food in the restaurant. For example, customers scan QR codes at the table, and then select whether to dine in or take away for the food that they will order. On the other hand, the self-pickup and delivery feature focuses on off-site services, where customer orders food from the application and choose either to pick up the food or food delivered to their address with extra charges. For instance, customers who order food from TCRS website have to select either to self-pickup or have the delivery service to deliver the food before proceeding with online payment.

According to the McDonald's order page in Figure 2.13, after clicking the dine-in option, it will navigate to self-pickup and table service options as shown in Figure 2.14. It allows customers to pick food from the counter or let staff serve food to the table. Assuming that customer selects the table service feature, they have to input their table number to let the staff know of their table placement and ensure correct delivery. Overall, these features enhance convenience and minimize queuing especially for busy customers. However, while these features offer flexibility in restaurant service, challenges may include heavy reliance on the system to perform essential operations such as order processing. During system downtime, all operations can be delayed or cannot be utilized at all until bugs are fixed causing dissatisfaction among customers. Not only that, but potential service delays also could happen during high demand. This is because restaurants often struggle to balance incoming orders with the size of their kitchen, staff, and delivery infrastructure (Cloud Kitchen, 2024).

Select

Confirm & Pay

Collect

<



SERI AUSTIN DT
Serving Regular Menu: 11:00 - 03:59

[Change location](#)

How would you like to collect your meal?



Takeaway
Open: 04:00 - 03:59



Drive Thru
Open: 04:00 - 03:46



Dine-In
Open: 04:00 - 03:59

Add to order

Figure 2. 13: McDonald's Order Page

<

Table service

Enter table number

Please find an available table and enter the table number.

Table number

Confirm

1

4

7

2
ABC

5
JKL

8
TUV

3
DEF

6
MNO

9
WXYZ

0

<

✕

Figure 2. 14: McDonald's Table Service Page

Compared to other systems, SCR's system only offers table management which are dine-in and takeaway, hence it is a straightforward system that offers the bare minimum as shown in Figure 2.15.

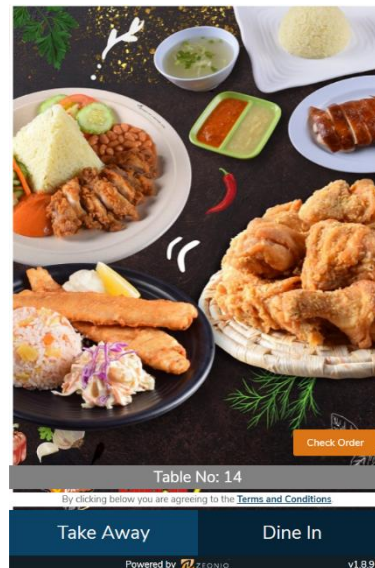


Figure 2. 15: Singapore Chicken Rice Ordering Options

As for the TCRS website, it offers off-site services where it only includes delivery and self-pickup options as depicted in Figure 2.16. Thus, if customers want to dine in the restaurant, they would have to order using the traditional method, ordering food through the staff.

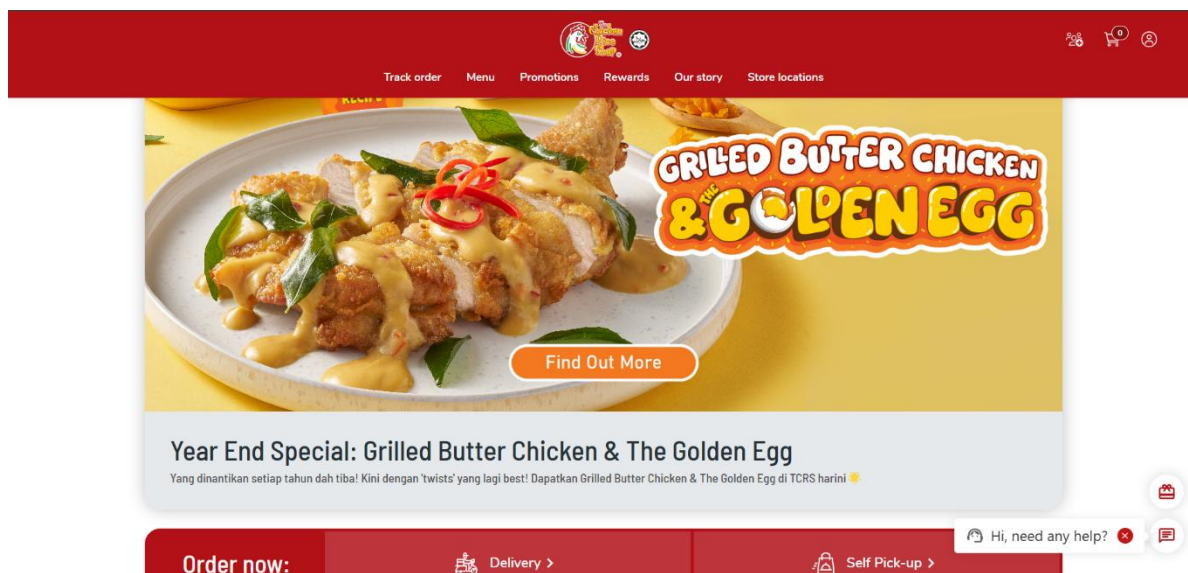


Figure 2. 16: The Chicken Rice Shop Ordering Option

Meanwhile for SR Go system in Figure 2.17 only offers a self-pickup option for customers to order food through their system.

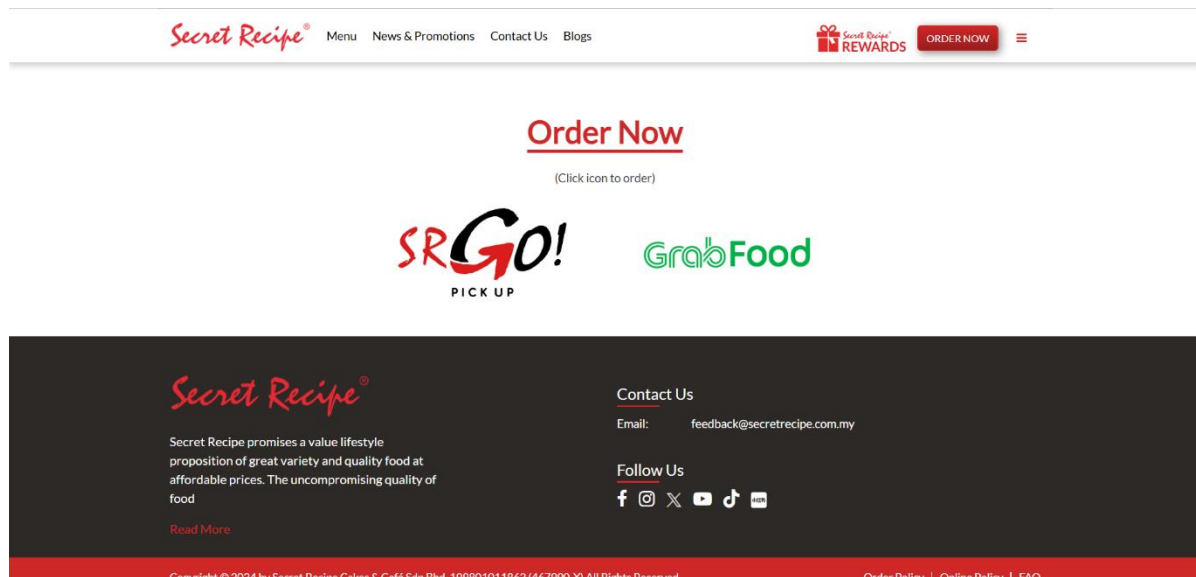


Figure 2. 17: Secret Recipe Go Ordering Option

Overall, McDonald's application does offer a vast option of online ordering types compared to the other three (3) systems. While TCRS system and SCR system consecutively enable two (2) types of options either self-pickup and delivery options or dine-in and takeaway options, SR Go offers the least option for customers who only provide self-pickup option.

2.2.4 Group Order Feature

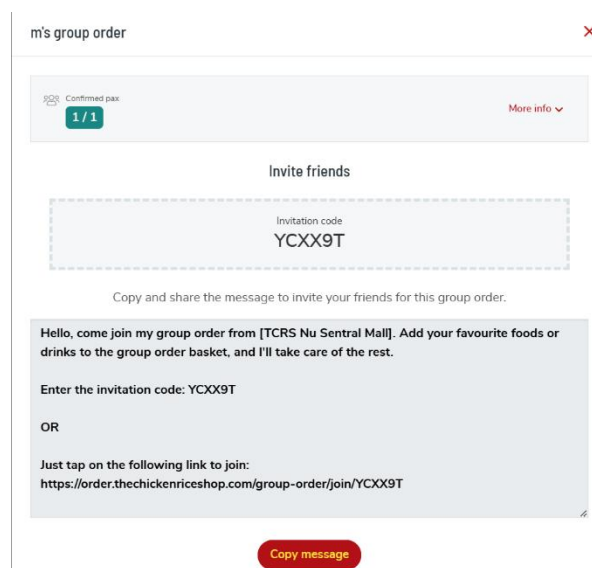


Figure 2. 18: The Chicken Rice Shop Group Order Feature

Among the selected existing systems, The Chicken Rice Shop does include a group order feature, enabling customers to perform group orders by sharing links with others within the group of customers. In this case, the system builds this feature where a representative creates a group order, then the system will generate an invitation code and he or she needs to send a link or code to the group of friends to perform group order. According to Foodstorm (2023), clients have received group orders up to 230% larger than average orders. This is because a customer may order more than 1 dish or order a large portion instead of incorporating a large number in a group, causing total payment to shoot up. Nevertheless, large orders may confuse staff due to different customization for each customer. This could increase the chances of errors in preparing food such as missed orders or wrong customization requests by customers as orders become more complex.

2.3 Reviews on Current Technologies Used for Online Ordering

2.3.1 Quick Response Code (Web-based)

Towards today revolution, QR codes can be seen often pasted on the table for food ordering process and for menu viewing (Wong, et al., 2023). Customer scan QR code on the table and proceed with ordering process, submit orders and payment process. Quick response (QR) is one of the technologies that is being utilised among all the system. QR codes function to transmit URLs to smart devices that have camera functions, hence QR utilizations good in conveying unique information, making it a trend due to growing number of mobile devices usage nowadays (Wong, et al., 2023).

2.3.1.1 Static QR Code

According to Vall (2024), static QR code is a fixed destination because the data is permanently encoded into its pattern, thus, once the pattern is created the contains cannot be altered. Figure 2.19 shows the SCR table static QR where the restaurant usually placed it on the table to convenience customer to scan and order. Every table has its own QR code to order. The advantages of static QR improves efficiency and fasten the ordering process because QR is fixed unnecessarily to keep printing a new QR (StoreHub, 2024). At the same time, it could save costs in printing papers. However, the QR codes are always available as it is permanent causing ghost orders or prank orders by certain societies (StoreHub, 2024). This could lead the restaurant to face a slump in finances in the future.



Figure 2. 19: Singapore Chicken Rice (SCR) Static QR Code

2.3.1.2 Dynamic QR Code

As explained by StoreHub (2024), dynamic QR codes will keep on generating unique patterns through the Point-of-Sale (POS) system, it may include expiration times for the QR to be available to improve security and operational efficiency. Through Figure 2.20, the QR will be generated for each table, but once other customers are seated at that table, the QR code will change. Dynamic QR code benefits the restaurant in terms of flexibility, they can update the contents on it adjusting to their operational ideas (StoreHub, 2024). Despite that, to set up a dynamic QR code, restaurants may need to subscribe to any available QR code service (Sinclair, 2024). Usually, a subscription plan needs to be paid monthly, every six (6) months or annually, hence it does need an additional cost to create a dynamic QR.



Figure 2. 20: QR Generation Through POS System (StockHub, 2024)

Overall, the main advantage of integrating QR is it is fast and convenient to use as customers do not need to queue at the counter to order or staff need to take orders manually. This fastens the ordering process and saves time for both customers and staff. While it is convenient, the customers that less inclined towards technology would find it very difficult to order through a mobile device. Staff may still need to assist them in ordering the food that they favour.

2.3.2 Mobile Application

Online food ordering system includes utilizing mobile application as a medium for customers to perform online orders. Customers need to install the application on mobile devices before using the system. Based on Manzoor and Hasan (2021), these applications are being downloaded on tablets by restaurants or diners can download them on smartphones to order food. Restaurant that prepare tablet on the table has already prepared a readily installed ordering application that enables customers to browse menu and proceed to order food, while there are customers that order food from their mobile phones directly even before entering the premises.

The strength of using a mobile application platform in food ordering system is customers are able to perform online ordering seamlessly without encountering issues or interruptions compared to a web-based application. However, customers are not keen on installing applications on their smartphones due to big storage space especially if the application needs

to keep on updating. Moreover, customer also do not feel the need to download it in their smartphone if they only visit the restaurant occasionally.

2.4 Reviews on the Usability of the Related Systems

The usability guidelines are based on the International Standard (ISO) 9241-11. Usability is defined as how effectively, efficiently, and satisfactorily a product enables specified users to accomplish defined objectives within a particular context of use (Abbasi, et. al., 2023). The framework emphasizes the three (3) elements; effectiveness, ensuring customers can achieve goals and perform tasks successfully; efficiency, reducing the effort and time required to achieve the customer's goals in using the system; and satisfaction, giving customers a good experience while using the system.

2.4.1 Ease of Use

A system is said to be 'easy to use' when users can quickly understand and navigate the system. All selected existing system excels with intuitive interface and visual design. It provides clear instructions on what to do next, making it easy for users to use. For instance, McDonald's system does provide clear instructions, hence users can easily navigate features from the menu feature to the place order feature. Despite that, both Secret Recipe and SCR's system does provide a simple but functional system, but a lack of a visual interface may seem unattractive to users, particularly those unfamiliar with the digital ordering system.

2.4.2 User Satisfaction

User experience (UX) is important to increase user satisfaction. According to Alisya et. al., (2023), UX refers to the interaction and overall experience of a user when using the system. Its main goals are to increase system functionality, ensure user satisfaction and it focus on user's needs and preferences.

Mobile application such as McDonald's provides better personalization in food ordering, such as customers can customize the ice level in ice drinks from none to level three (3), which probably enhances user satisfaction. Meanwhile, other existing systems may not offer the same level of customization as McDonald's, which may impact user experience, especially for those who want a variety option of customization. However, because of their simple and minimalist interface designs, make the system more appealing to a broader audience since it is easy to learn and understand.

2.4.3 Efficiency

A system that efficiently functions can ensure customers to accomplish tasks in minimal time and effort. An efficient system with clear workflows enables the customer to navigate from one interface to another interface to achieve their goals without confusion or delays. Customer prefers workflows such as logical, straightforward, and easy to follow in a system. For example, when a customer utilizes SCR's table ordering system, he can navigate the system from selecting the menu to placing orders due to straightforward interfaces within just a few minutes.

While there exists a system that frustrates customers in terms of slow loading time, requires more waiting time for customers to proceed with the payment feature. For example, The Chicken Rice Shop's system provides interactive designs but slow loading time causing the customer to give up in the middle way rather than wait. Based on Shubham (2022), large media files can affect loading time, at the same time causing the website's code to bloat leading to slower speeds. Hence, too much media in a system can cause it to load slower creating more waiting time for customers.

Table 2. 1: Comparison of Similar Existing Systems

2.5 Comparison between Similar Existing System

Feature/Aspect	McDonald's Apps	Singapore Chicken Rice system	Secret Recipe Go System	The Chicken Rice Shop Website	Proposed System
Basic features	Yes	Yes	Yes	Yes	Yes
Online Ordering Types	Dine-in Takeaway Delivery Drive-Thru	Dine-in Takeaway	Self-pickup	Delivery Self-pickup	Dine-In Pickup
Group Order	No	No	No	Yes	No
Technology used	Mobile application	QR (Web-based)	Website	Website	QR (Web-based)
Loading time	Fast	Fast	Fast	Slow	Fast

Ease of Use	Yes	Yes	Yes	Yes	Yes
User Satisfaction	Yes	Yes	No	No	Yes
Efficiency	Yes	Yes	Yes	No	Yes
Table Booking	No	No	No	No	Yes

Table 2.1 shows the comparison of features and aspects between the 4 existing system, which are McDonald's Mobile Application, the Singapore Chicken Rice Table Ordering System, the Secret Recipe System and The Chicken Rice Shop Website. They are being compared in terms of having basic features, restaurant service options, group order, technology used and rate of loading time.

Explanation:

Loading time for TCRS's system is measured based on comparison with the three (3) other systems. McDonalds app, SCR system and SRGo system load the page much faster compared to TCRS system, within 2 seconds, all 3 systems able to load page while TCRS takes longer than 2 seconds to load the main page. TCRS system takes longer time to load due to larger images size that displayed in the system. This unexpectedly increases data transfer time which is the cause of slow loading time.

Moreover, the TCRS system may not qualify the user satisfaction due to the slow loading time. As for SRGo system, the reasons for the lack user satisfaction in this system is due to lack of features offer in the system compared to other systems. SRGo only offers self-pickup options for customer compared to other similar systems, either can pick-up or dine-in. This leads to lower user satisfaction and convenience.

As for the proposed system, compared to other similar systems, the proposed system includes features such as table booking and request service for event. This is one of the uniqueness of the system where customers able to book table earlier and request staff service to decorate the table. Furthermore, the proposed system also integrates dine-in and pick-up options to enhance user satisfaction and convenience. This proposed system focusses on both in-restaurant dining and order collection through the scanning the static QR code on the table. Where users can directly place orders directly through mobile phone at the same time reduces

order taking time. User also able to utilize the table booking feature and request decoration service from staff.

2.6 Summary

Overall, this chapter evaluates and analysis of 4 existing systems, focusing on their features, functionality, strength and limitations. This chapter includes examining the system approaches to food ordering, restaurant service options, efficiency, user satisfaction, and ease of use. The reviews emphasize the increasing reliance on technology in the restaurant industry, such as integrated POS system, online ordering system and restaurant service options. This comparative analysis serves as a foundation for the proposed system, QR-Powered Restaurant Management System, which aims to address these limitations by adding features such as table booking and request service for event. Therefore, Chapter 2 able to outlines the distinctive value proposition of the existing system and proposed system in addressing current challenges and improving operational efficiency.

Chapter 3: Analysis Requirements & Design

3.1 Introduction

Chapter three (3) outlines the detailed process of analyzing requirements and designing the proposed QR-Powered Online Food Ordering Platform. The chapter begins by identifying and analysing the functional and non-functional requirements that guide the system's development. The system design section elaborates on the module designs, database schema, system architecture, and user interface prototypes. This chapter aims to build a strong foundation for implementation and ensure the system is aligned with its initial goals.

3.2 Requirement Analysis

Requirement analysis is a critical phase that clearly explains the system's objectives, constraints, and outcomes. This ensures that the proposed solution aligns with user needs and operational requirements, as the literature reviews in Chapter 2 indicate. This section explains both functional and non-functional requirements. The goal is to identify all necessary features and ensure the system's usability and performance.

3.2.1 Functional Requirement Analysis

This section will focus on functional requirements of this proposed system needs based on the findings from the literature review in Chapter 2. There are two (2) actors that will be using the system, which are customer and staff. The functional requirements for the proposed system are as below:

a) Customer (Logged In & Not Logged In)

i. User Registration and Login

Customers can create accounts, log in to access order history, and book tables.

ii. Menu Browsing and Ordering

Customer can view menu items, add items to cart and place order.

iii. Table Booking

Customer can book table before coming to the restaurant.

iv. Event Decoration Requests

Customer may request staff's service on table decorations based on any events.

- v. Order History Access
Only logged-in users can view order history.

b) Staff/Admin

- i. Login
Staff require to login to edit the system contains.
- ii. Menu Management
Staff can add, update and delete menu items.
- iii. Reservation Management
Staff can confirm the table booking and decorations request.
- iv. Food Order Management
Staff can confirm customer's orders.

3.2.2 Non-Functional Requirement Analysis

The Non-Functional requirement (NFRs) analysis specify how a software product will perform its functions and it determine the system quality and serve as limitations on the services that the system will offer (Aljallabi & Mansour, 2015). NFR analysis defines the performance and operational aspects of a software system, specifying how the system's usability and functionality under various conditions. Hence, this analysis plays a critical role in shaping user experience and maintaining the system integrity.

- a) User-friendly interface and simple navigation within the web-based system.
- b) Real-time updates for orders and bookings status for admin.
- c) Functional QR code so that can be utilized by customers.

3.2.3 Use Case Diagram

This diagram clearly visualizes all possible interactions within the system, enabling clear understanding of both customer and admin functionalities as shown in Figure 3.1. The use cases in this proposed system are as below:

1. Registration
2. Login
3. Select Order Types
4. View Menu
5. Add-to-cart
6. Place Order
7. Enter Table Number
8. Book Table
9. Event Decoration Request
10. Order History
11. Add Item
12. Update Item
13. Delete Item
14. Confirm Order
15. Confirm Table Booking

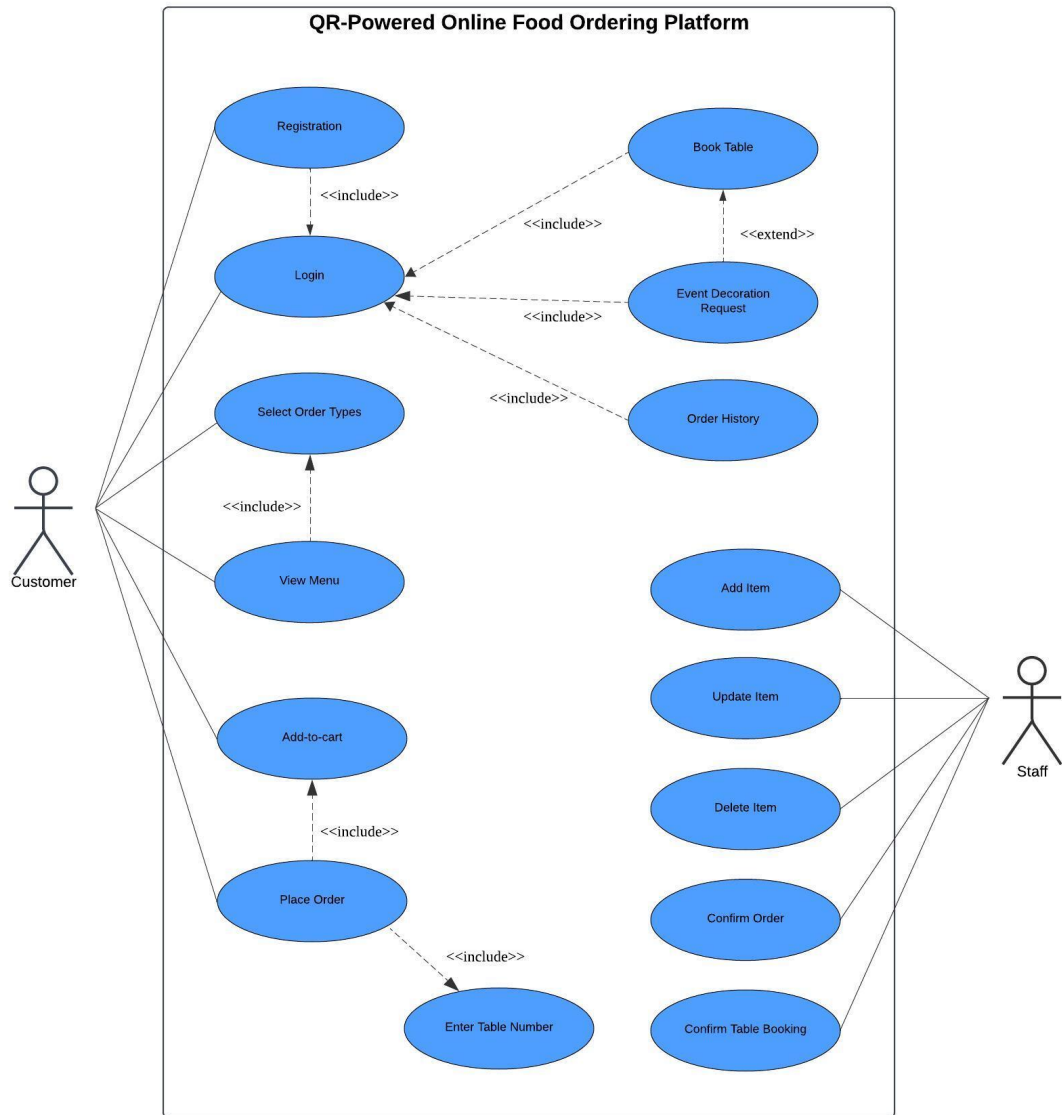


Figure 3. 1: Use Case Diagram for QR-Powered Online Food Ordering Platform

There two (2) actors that interacts within the system, including customer and staff. The use case description is shown in Table 3.1 until Table 3.16.

Table 3. 1: Use Case Description for Registration

Use Case ID	UC-1.0
Use Case Name	Registration
Description	Customer register account to access order history and table booking
Actor	Customer
Trigger	When customer wants to create new account

Dependency	UC-2.0 Login
Pre-Condition	The system is connected to strong internet connection
Basic Flow	1. System displays sign up page. 2. User inputs name, email address, phone number and password. 3. User selects “Sign Up” button. 4. System verifies and save the information. [AF-1.1]
Alternative Flow	[AF-1.1] 1. System prompt user to login after registration.
Exception Flow	1. System returns error message to show that name, email or telephone number is empty. 2. System prompt user to inputs credentials again.
Post-Condition	User complete registration.

Table 3. 2: Use Case Description for Login

Use Case ID	UC-2.0
Use Case Name	Login
Description	Customer logs in system using own account
Actor	Customer
Trigger	Users log into the system
Dependency	UC-1.0
Pre-Condition	User is already registered
Basic Flow	1. System display login page. 2. User inputs correct credentials such as email and password. 3. User selects “Login” button. 4. User logged into account. [AF-2.1] [AF-2.2] 5. System display homepage.
Alternative Flow	[AF-2.1] 1. System returns error message to notify email is invalid. 2. The system prompts user to reinput email address. [AF-2.2] 1. System returns error message to notify password is invalid.

	2. System prompts user to reinput password.
Exception Flow	None
Post-Condition	User successfully logged into system.

Table 3. 3: Use Case Description for Select Order Types

Use Case ID	UC-3.0
Use Case Name	Select Order Types
Description	Customers choose either to dine-in or takeaway the food
Actor	Customer
Trigger	Users selects order types.
Dependency	UC-4.0 View Menu
Pre-Condition	Customer scan QR and enter system
Basic Flow	1. System displays order types page. 2. User selects either “Dine-In” or “Takeaway”. 3. System display Homepage.
Alternative Flow	None
Exception Flow	None
Post-Condition	User able to view menu page.

Table 3. 4: Use Case Description for View Menu

Use Case ID	UC-4.0
Use Case Name	View Menu
Description	Customers view items in menu.
Actor	Customer
Trigger	When customer visit menu page
Dependency	UC-3.0 Select Order Types
Pre-Condition	User must select an order type.
Basic Flow	1. System displays menu page. [AF-4.1] 2. User access menus.
Alternative Flow	[AF-4.1: Item unavailable] 1. System displays “Unavailable” message near items’ image. 2. User can view other menu as usual.

Exception Flow	None
Post-Condition	User able to view menu page

Table 3. 5: Use Case Description for Add-to-Cart

Use Case ID	UC-5.0
Use Case Name	Add-to-cart
Description	Customers add selected items to cart
Actor	Customer
Trigger	When customer add items from menu to cart
Dependency	UC-4.0
Pre-Condition	User has to add items from menu
Basic Flow	1. User adds items from menu to cart. 2. User selects “Add to Cart” button to view items that they have inserted. [AF-5.1] 3. User can view total price.
Alternative Flow	[AF-5.1: Removes item from cart] 1. User removes item from cart. 2. System refreshes the items’ total price.
Exception Flow	None
Post-Condition	Items are saved in cart for place order action.

Table 3. 6: Use Case Description for Place Order

Use Case ID	UC-6.0
Use Case Name	Place Order
Description	Customers submit order after confirming items in cart.
Actor	Customer
Trigger	When user selects “Place Order” button
Dependency	UC-5.0 Add-to-Cart
Pre-Condition	User must have items in their cart
Basic Flow	1. User reviews and confirms items in cart. 2. User selects “Place Order” button. [EF-7.1] 3. System processes the order.

Alternative Flow	None.
Exception Flow	[EF-7.1: User cancels order] 1. User cancels order after selecting “Place Order” button. 2. User may need to ask staff for manual cancellation.
Post-Condition	Order is successfully placed and sent for processing.

Table 3. 7: Use Case Description for Enter Table Number

Use Case ID	UC-7.0
Use Case Name	Enter Table Number
Description	Dine-In
Actor	Customer
Trigger	When user selects Dine-In order type.
Dependency	UC-3.0 Select Order Types
Pre-Condition	User must select “Dine-In” in order types.
Basic Flow	1. User inputs table number after selecting Dine-In option. [AF-7.1] 2. System validates table number. 3. System displays homepage for user to proceed with other actions.
Alternative Flow	[AF-7.1: Table number invalid] 1. System displays error message with invalid table number. 2. User re-enters table number until success. 3. System display homepage.
Exception Flow	None
Post-Condition	User successfully input table number and may proceed with homepage.

Table 3. 8: Use Case Description for Book Table

Use Case ID	UC-8.0
Use Case Name	Book Table
Description	Customer wants to reserve table for Dine-In.
Actor	Customer

Trigger	When user selects “Book Table” button
Dependency	UC-2.0 Login
Pre-Condition	User must log into system to book table.
Basic Flow	1. User accesses the table booking feature. 2. User chooses date and time for event. [AF-8.1] 3. System saves booking details
Alternative Flow	[AF8.1: Booking cancelled by user] 1. User accesses booking details and select cancel option to cancel table booking. 2. System updates booking details.
Exception Flow	None
Post-Condition	User successfully booked table for dining.

Table 3. 9: Use Case Description for Event Decoration Request

Use Case ID	UC-9.0
Use Case Name	Event Decoration Request
Description	Customer wants to request staff’ service for event decoration
Actor	Customer
Trigger	When customer wants to request for event decoration.
Dependency	UC-8.0 Book Table
Pre-Condition	User must book table before request for event decoration.
Basic Flow	1. In ‘book table’ feature, user selects event decoration option. 2. User writes their request to staff through message box in the system. [AF-9.1] 3. System saves the table booking & decoration request.
Alternative Flow	[AF-9.1: Request cancelled by user] 1. User accesses booking details and select event decoration option then cancel option to cancel table booking. 2. System updates booking details.
Exception Flow	None
Post-Condition	User successfully request for event decoration.

Table 3. 10: Use Case Description for Order History

Use Case ID	UC-10.0
Use Case Name	Order History
Description	Customer wants to view their past orders.
Actor	Customer
Trigger	When customer selects ‘order history’ option
Dependency	UC-2.0 Login
Pre-Condition	User must complete login.
Basic Flow	1. User accesses order history in Homepage. 2. System displays customer’s order history. [EF-10.1]
Alternative Flow	None
Exception Flow	[EF-10.1: Order history unavailable] 1. System returns error message that will notifies user that no order has been made before.
Post-Condition	User successfully view order history.

Table 3. 11: Use Case Description for Add Item

Use Case ID	UC-11.0
Use Case Name	Add Item
Description	Staff wants to add item in menu
Actor	Staff
Trigger	When staff selects ‘add item’ option.
Dependency	None
Pre-Condition	Staff must login using StaffID.
Basic Flow	1. User selects ‘add item’ at Homepage. 2. User adds items such as new menu or new details to system. 3. User saves the newly added item. 4. System saves and database records the newly added items.
Alternative Flow	None
Exception Flow	None
Post-Condition	Staff able to add new items in system.

Table 3. 12: Use Case Description for Update Item

Use Case ID	UC-12.0
Use Case Name	Update Item
Description	Staff wants to update items in menu part.
Actor	Staff
Trigger	When staff selects ‘update item’ option.
Dependency	None
Pre-Condition	Staff must login using StaffID.
Basic Flow	1. User selects ‘edit item’ at Homepage. 2. User edits the items’ details. 3. User saves the items’ details. [EF-12.1] 4. System saves the edited details.
Alternative Flow	None
Exception Flow	None
Post-Condition	Staff able to update items details in system.

Table 3. 13: Use Case Description for Delete Item

Use Case ID	UC-13.0
Use Case Name	Delete Item
Description	Staff wants to delete items from menu
Actor	Staff
Trigger	When staff selects ‘delete item’ option
Dependency	None
Pre-Condition	Staff must login using StaffID.
Basic Flow	1. User selects item to delete. 2. System verifies and deletes the item.
Alternative Flow	None
Exception Flow	None
Post-Condition	Staff able to delete items in system.

Table 3. 14: Use Case Description for Confirm Order

Use Case ID	UC-14.0
Use Case Name	Confirm Order
Description	Staff confirm customers' order
Actor	Staff
Trigger	When staff selects 'confirm order' option
Dependency	UC-6.0 Place Order
Pre-Condition	Staff must login using StaffID.
Basic Flow	1. User reviews order details. 2. Staff accept customers' orders. 3. System records order.
Alternative Flow	None
Exception Flow	None
Post-Condition	Staff able to confirm customers' order

Table 3. 15: Use Case Description for Confirm Table Booking

Use Case ID	UC-15.0
Use Case Name	Confirm Table Booking
Description	Staff will confirm customers' table booking details
Actor	Staff
Trigger	When staff selects 'confirm table booking' option
Dependency	UC-8.0 Book Table
Pre-Condition	Staff must login using StaffID.
Basic Flow	1. Staff reviews booking details. 2. Staff confirms the table booking order. 3. System records booking details.
Alternative Flow	None
Exception Flow	None
Post-Condition	Staff able to confirm table booking by customer.

3.3 System Design

The system architecture includes several elements that collaborate to provide the intended functionality. Every element is crafted to guarantee scalability, security, and ease of use,

establishing a solid basis for the system's execution. This part highlights the importance of modularity to make certain that the system remains straightforward to maintain and enhance.

3.3.1 Module Design

The design of the module outlines the system's architecture by employing well-structured modules that manage specific functions. Important modules consist of user administration, menu administration, order handling, reservation management, payment handling, and QR code management. These modules work together smoothly to create an effective and unified system. This modular strategy improves maintainability and supports the addition of new features.

3.3.1.1 UML Class Diagram

The UML class diagram defines the system's structure with the following classes as shown in Figure 3.2. There are 6 classes in this class diagram, including customer, staff, add-to-cart, menu, order and booking class.

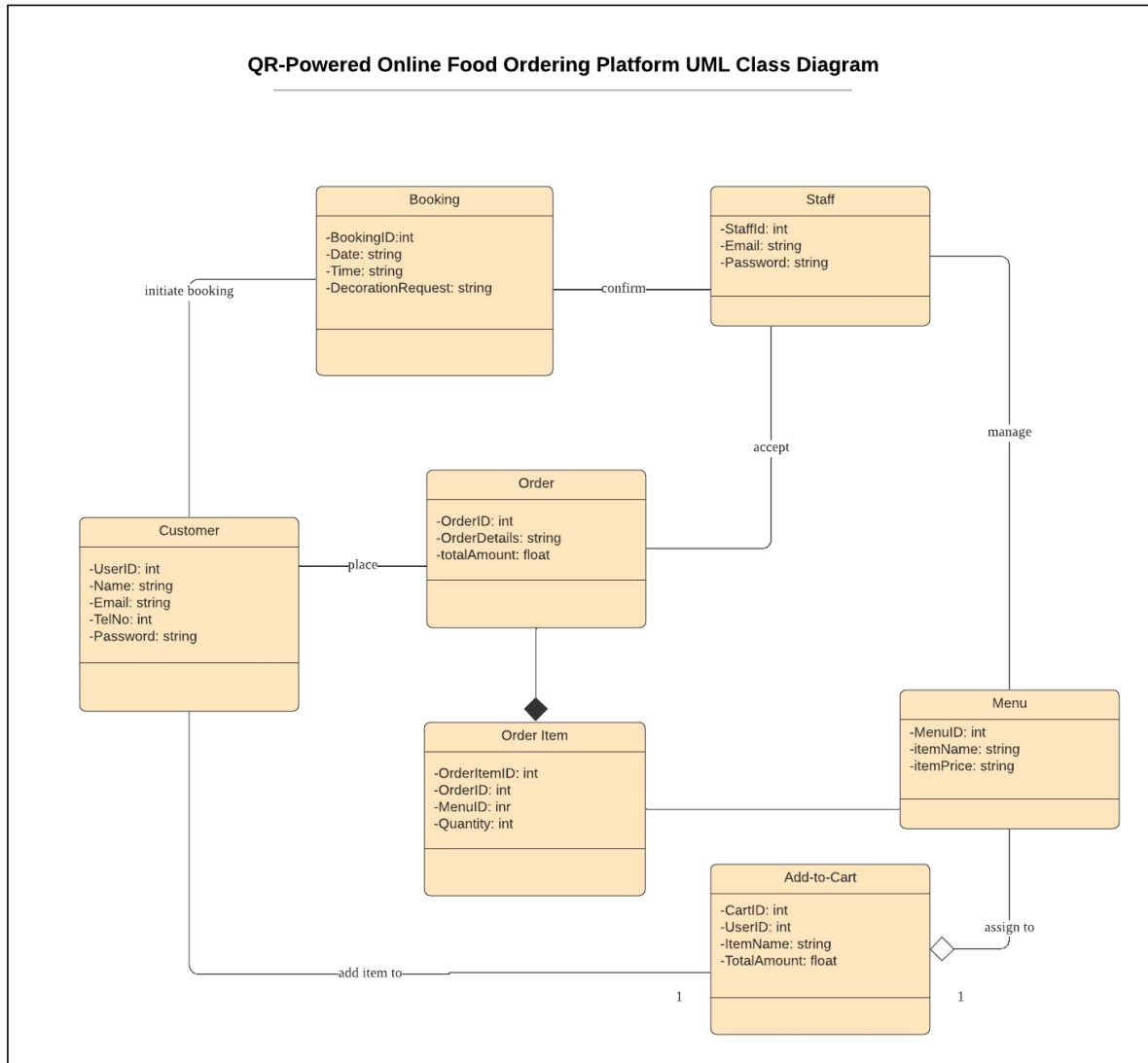


Figure 3. 2: UML Class Diagram for QR-Powered Restaurant Management System

3.3.1.2 Sequence Diagram

The sequence diagram shows how the objects work together in a system. For this proposed system, the diagrams are as shown from Figure 3.3 to Figure 3.14.

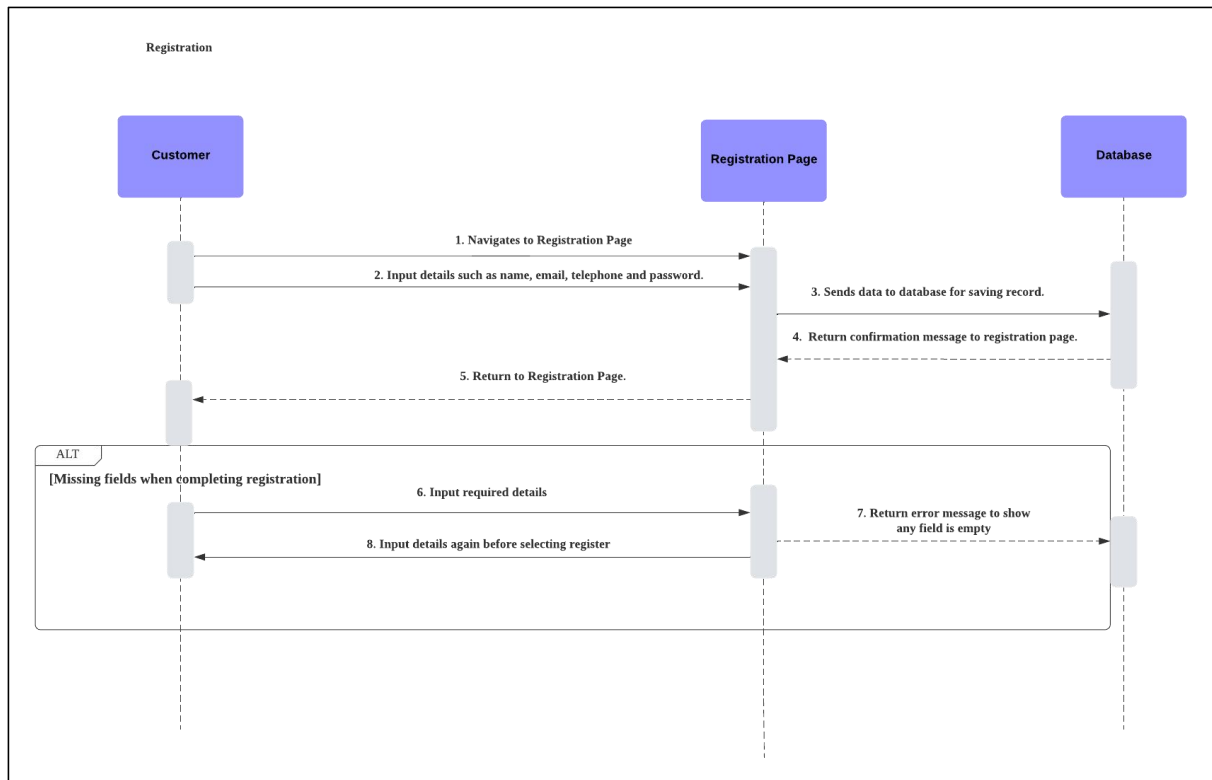


Figure 3. 3: Sequence Diagram for Registration

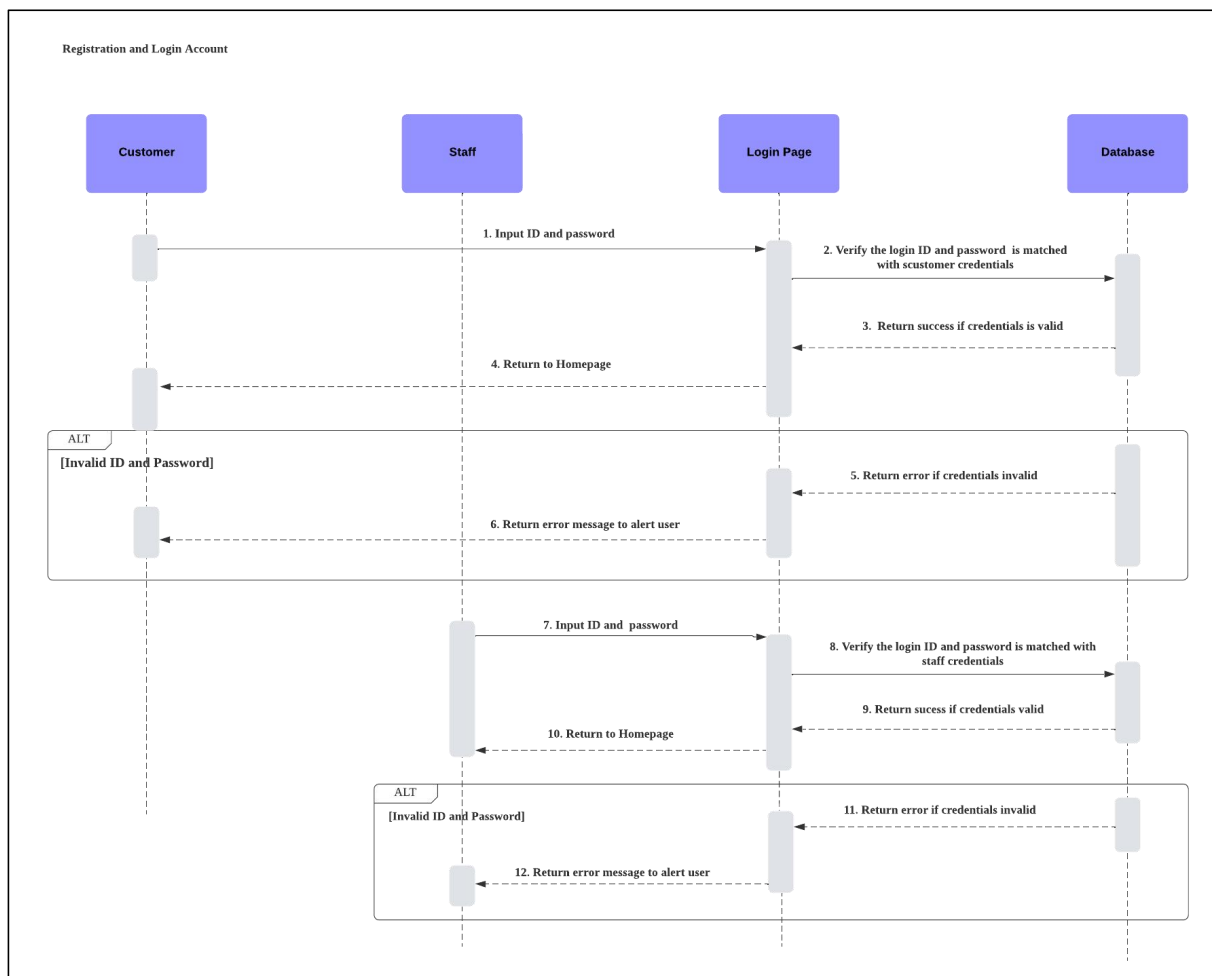


Figure 3. 4: Sequence Diagram for Login Account

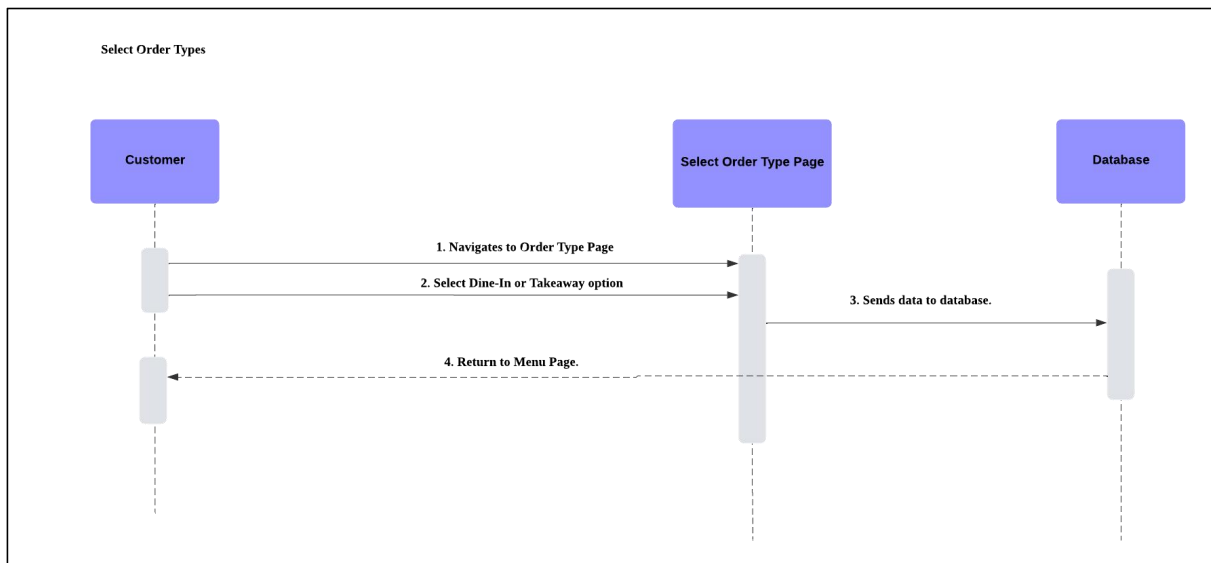


Figure 3. 5: Sequence Diagram for Select Order Types Page

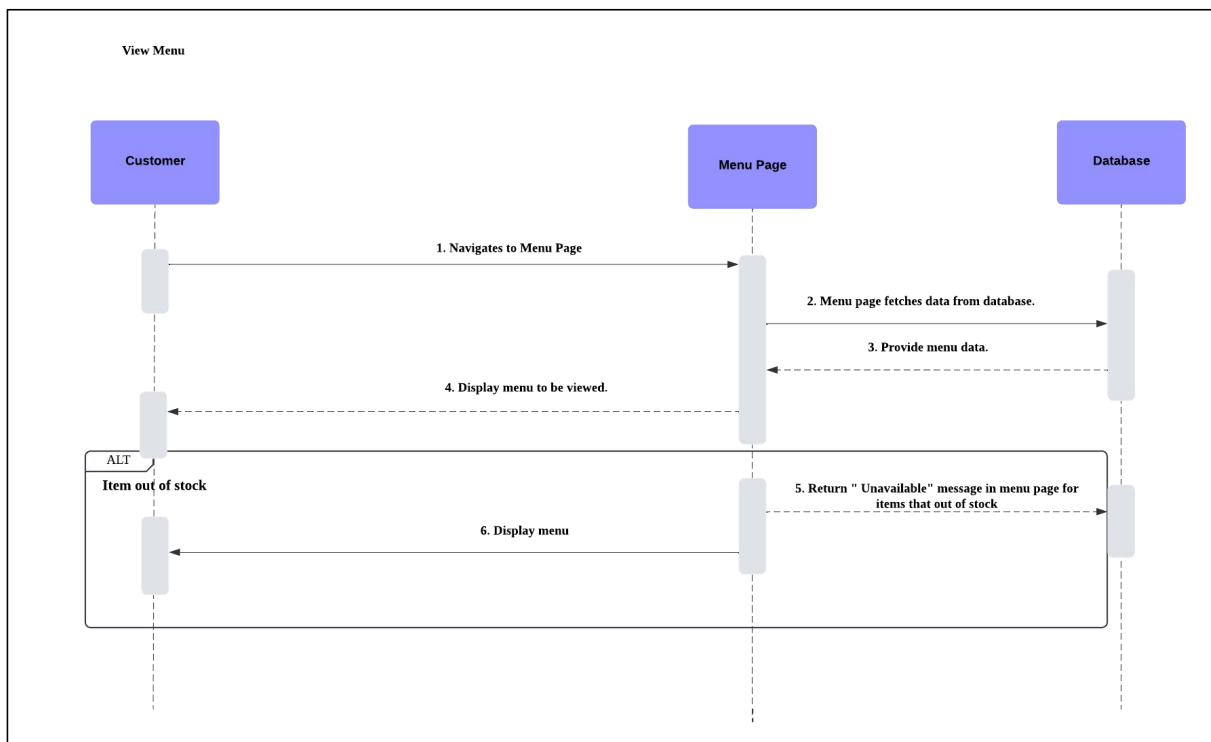


Figure 3. 6: Sequence Diagram for View Menu

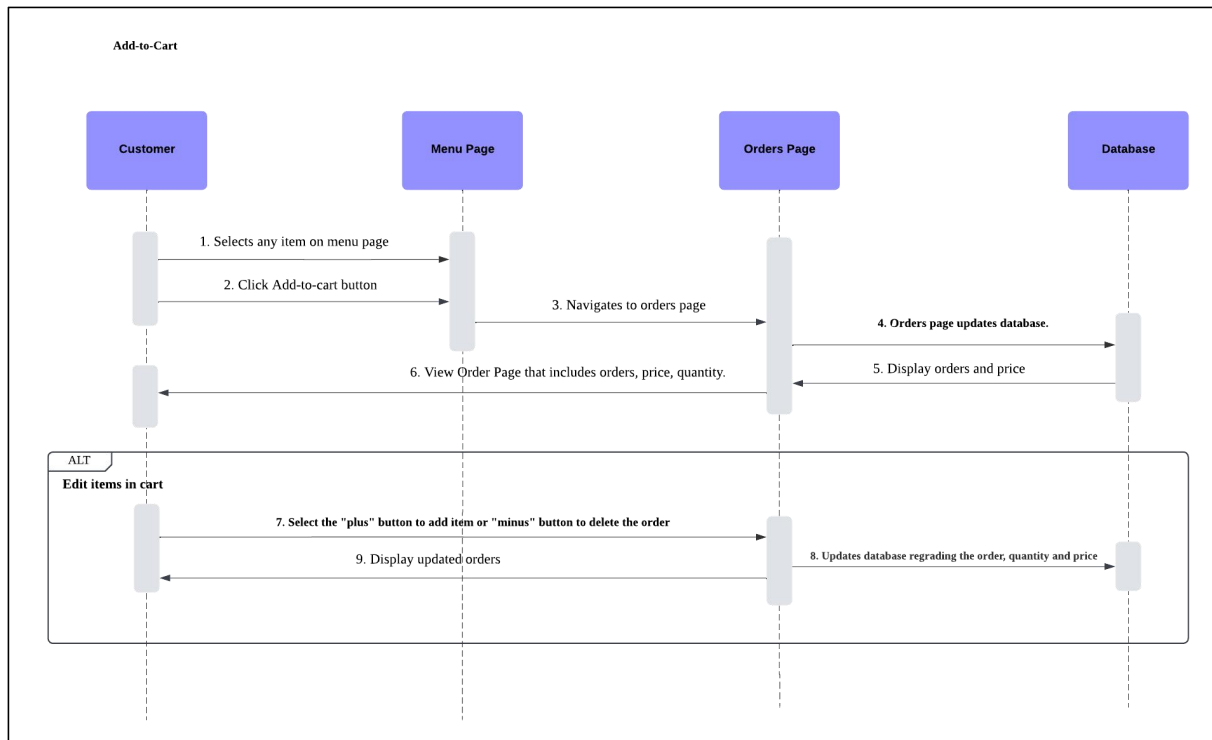


Figure 3. 7: Sequence Diagram for Add-to-Cart

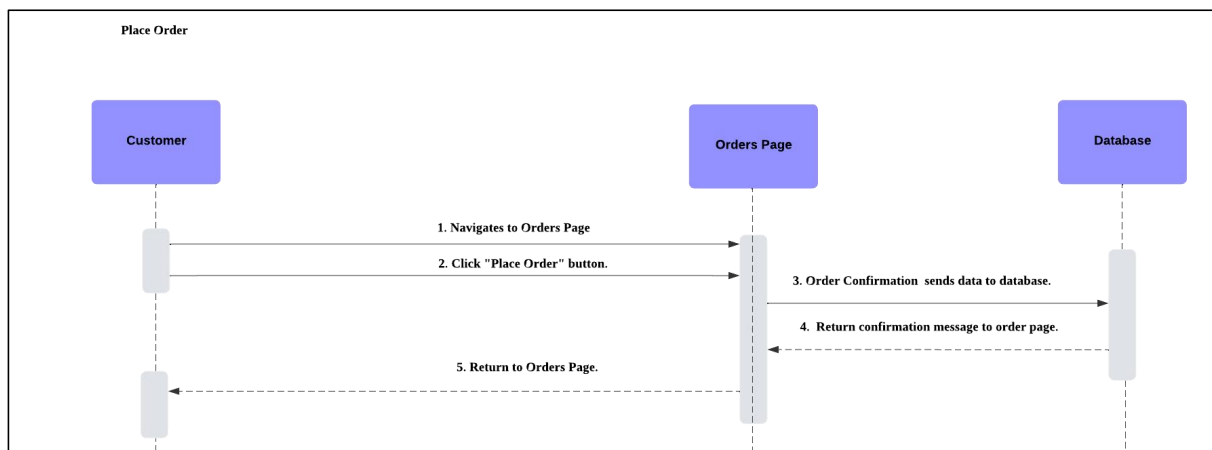


Figure 3. 8: Sequence Diagram for Place Order

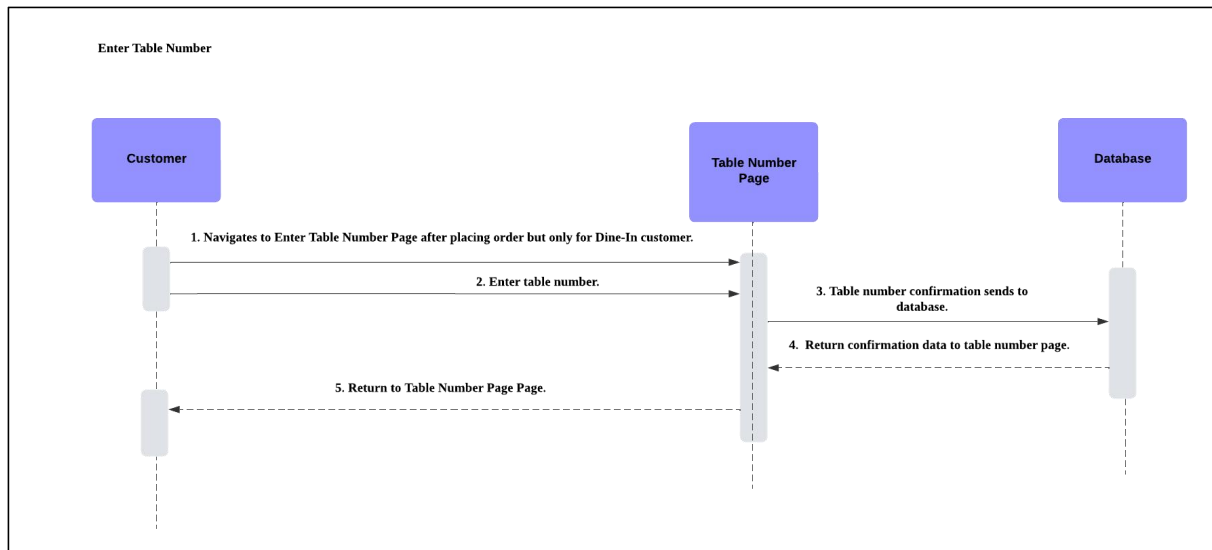


Figure 3. 9: Sequence Diagram for Enter Table Number

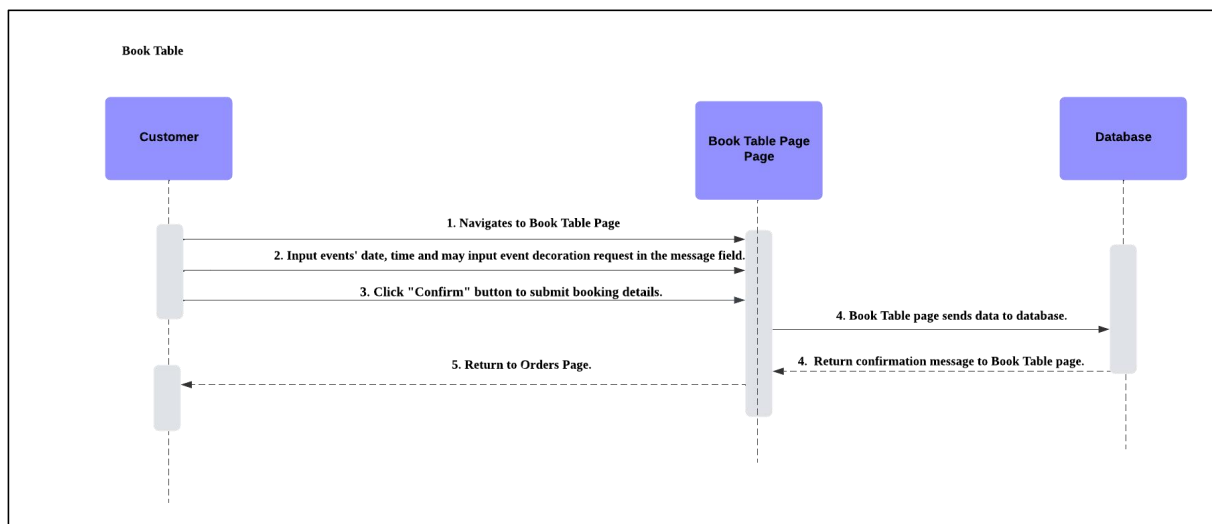


Figure 3. 10: Sequence Diagram for Book Table & Event Decoration Request

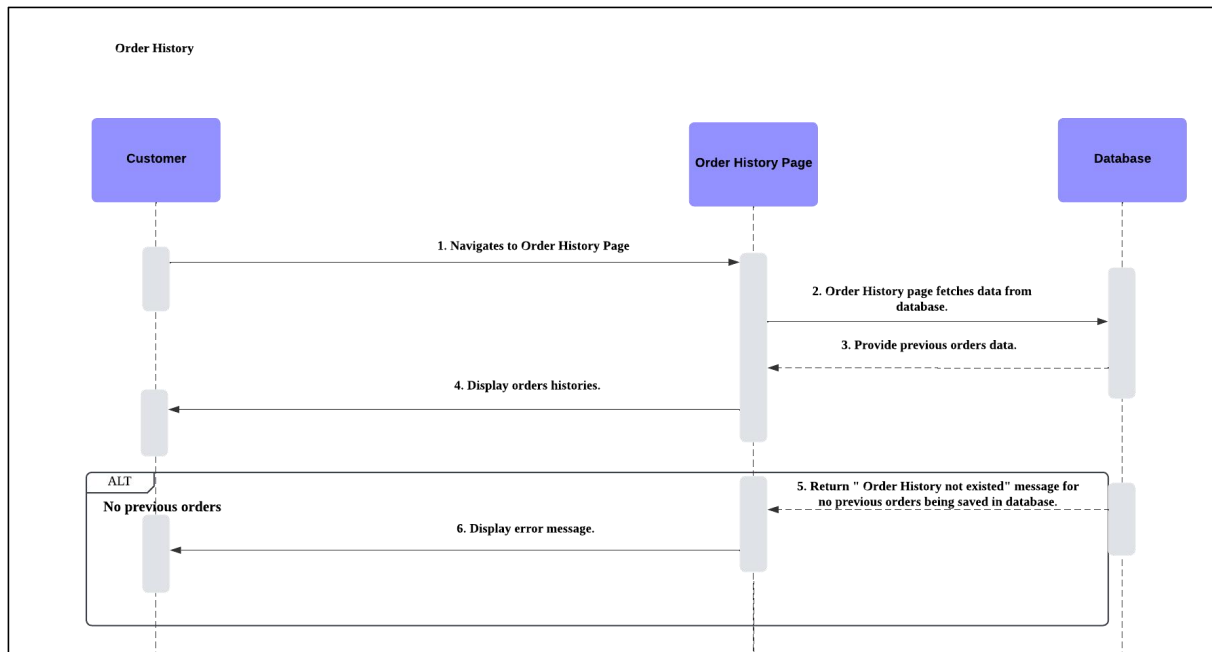


Figure 3. 11: Sequence Diagram for Order History

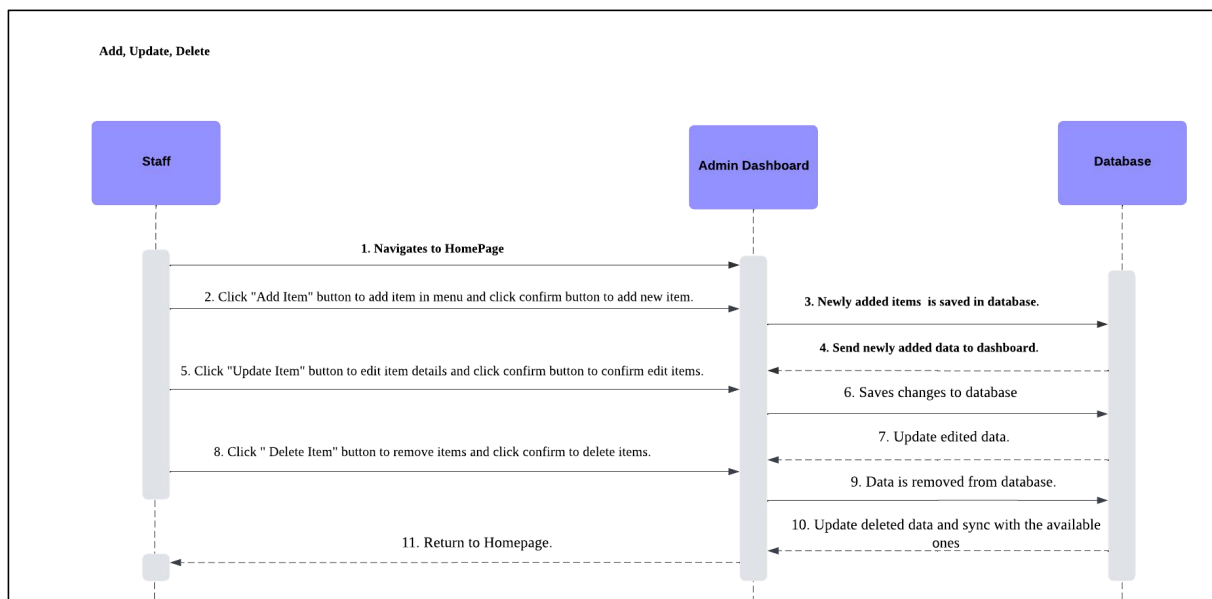


Figure 3. 12: Sequence Diagram for Add, Update & Delete Item

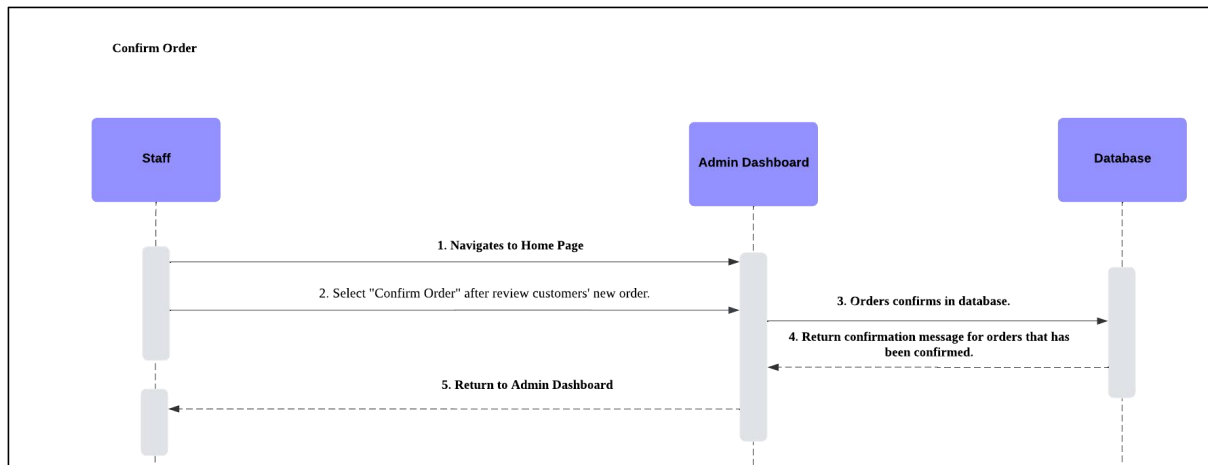


Figure 3. 13: Sequence Diagram for Confirm Order

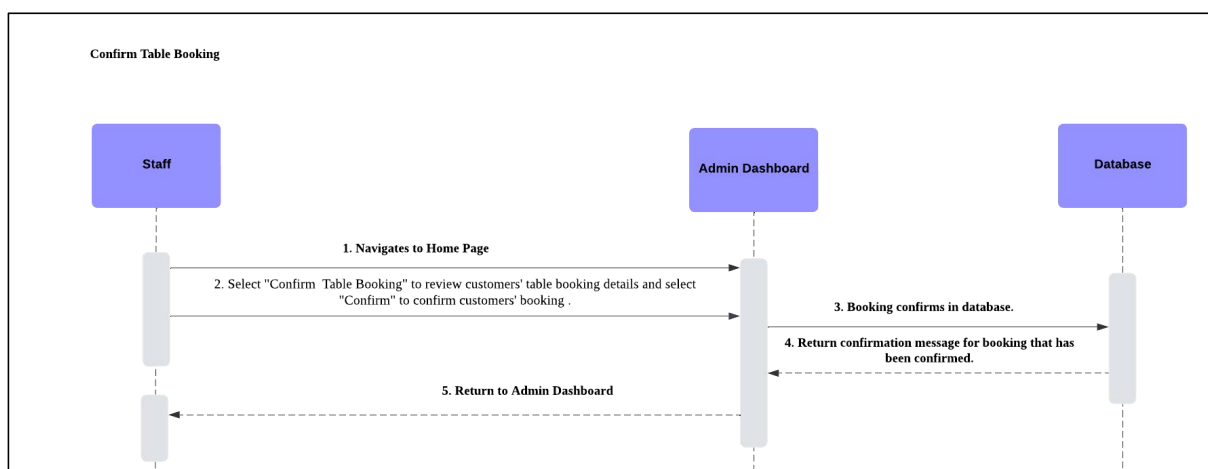


Figure 3. 14: Sequence Diagram for Confirm Table Booking

3.3.1.3 Activity Diagram

The activity diagram is a visual diagram that shows the process of one activity to another in a system. For this proposed system, the diagrams are as shown from Figure 3.15 to Figure 3.25.

Figure 3.15 depicts the process where a customer first registers for an account by providing their details (name, email, phone number, and password). Upon successful registration, the system prompts the user to log in. During login, the system validates the user's credentials, allowing access to the system upon success. If the credentials are invalid, the user is prompted to re-enter their information.

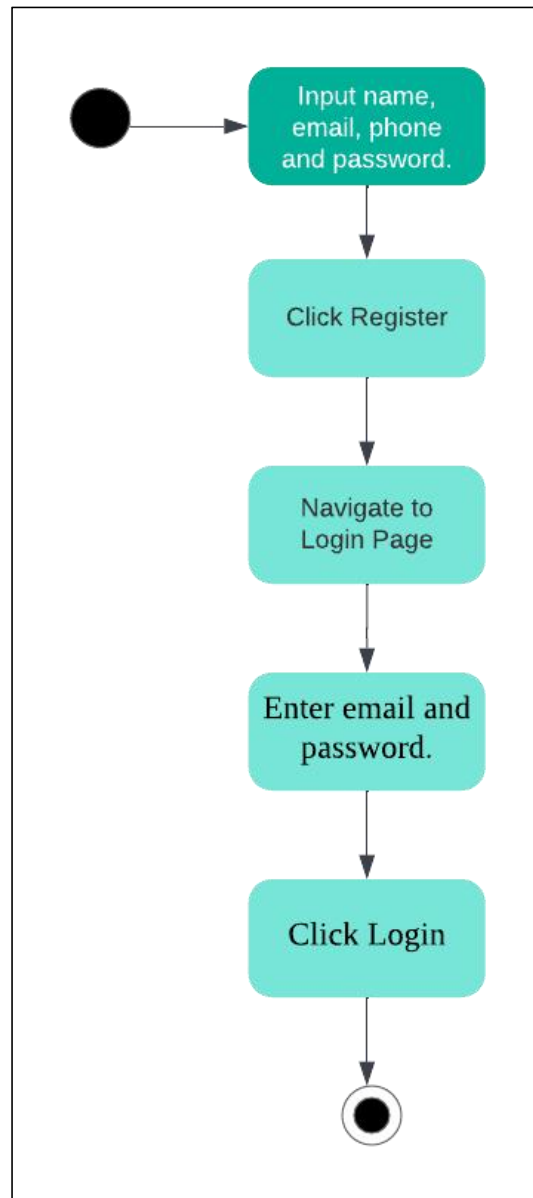


Figure 3. 15: Activity diagram for Registration & Login

Figure 3.16 begins with customer scanning a QR code and accessing the system. The system prompts the customer to select the order type (Dine-In or Takeaway). Upon selection, the system displays the menu items. If menu items are unavailable, a message indicating "Unavailable" is shown, allowing the customer to view other options.

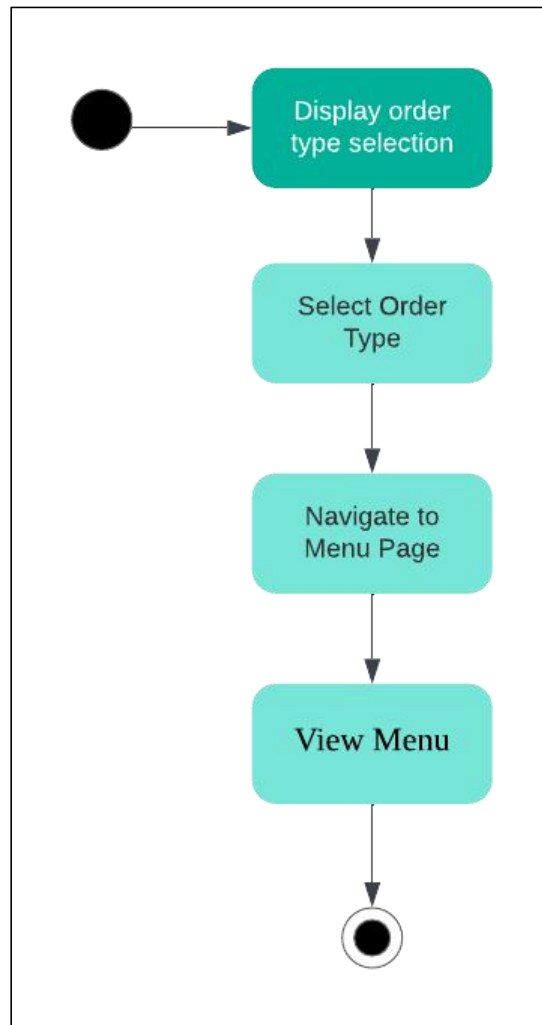


Figure 3. 16: Activity Diagram for Select Order Types and View Menu

Figure 3.17 illustrates the process where a customer adds items to the cart after viewing the menu. The system calculates the total price and updates the cart. Customers review their cart and proceed to place the order. If the customer cancels after initiating the order, the process halts, and they may need to start again.

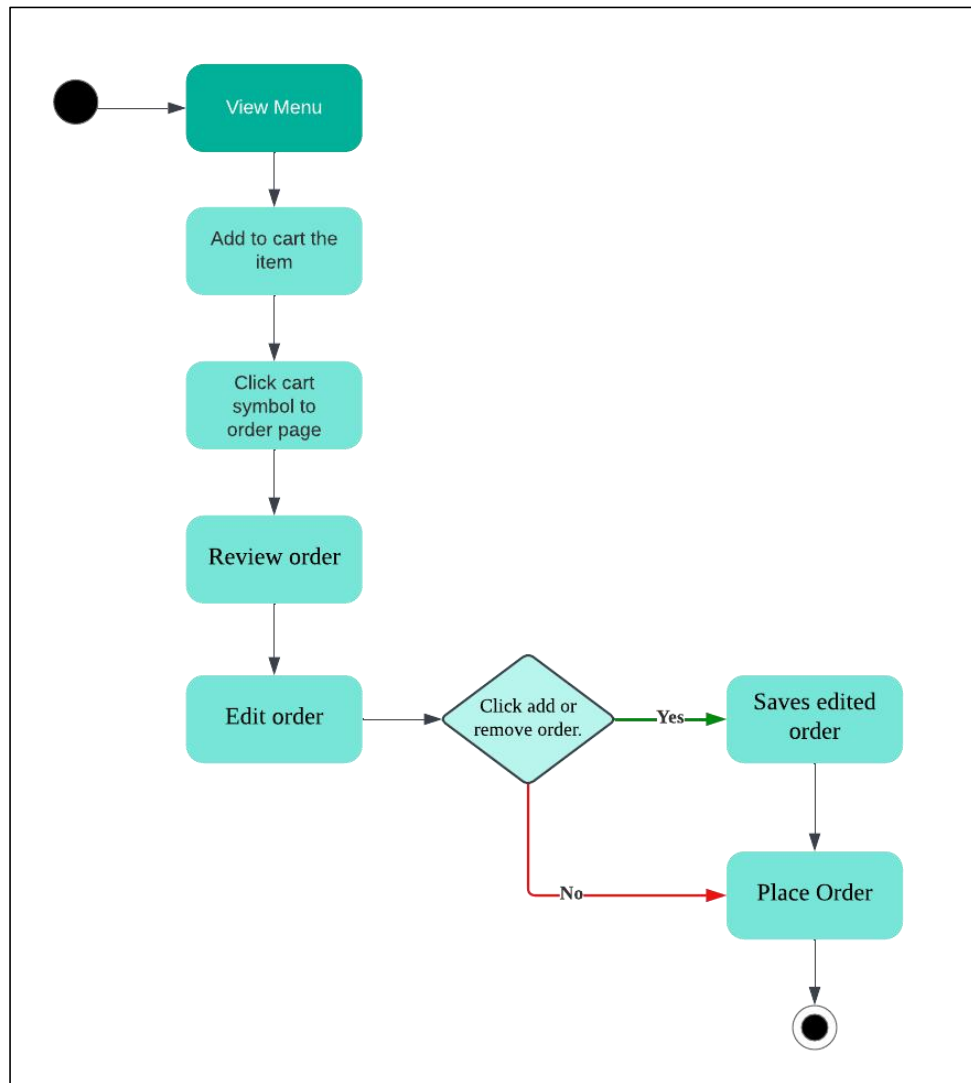


Figure 3. 17: Activity Diagram for Add-to-Cart & Place Order

This activity is triggered when a customer selects the "Dine-In" option. The system prompts the customer to enter a table number. Upon validation, the system associates the table number with the order. If the table number is invalid, an error message is displayed, and the customer is prompted to re-enter the number.

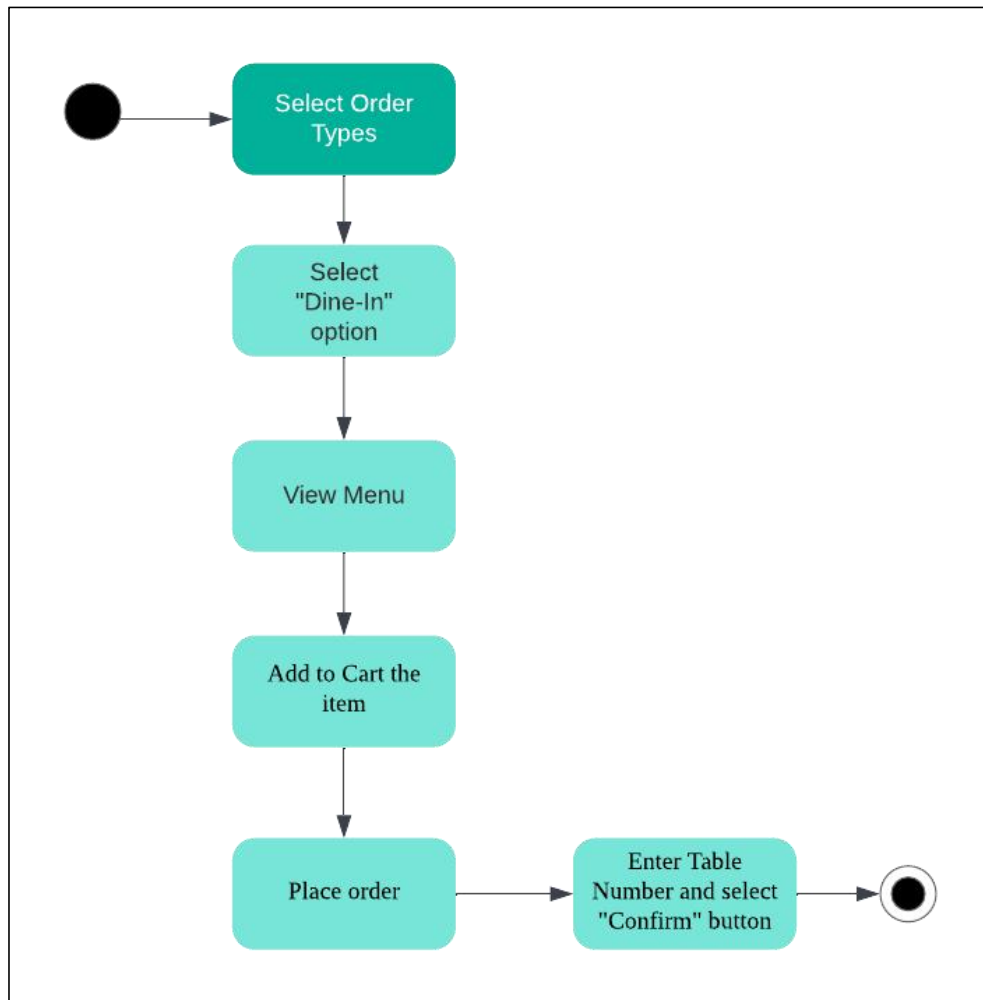


Figure 3. 18: Activity Diagram for Enter Table Number

Figure 3.19 details the customer booking a table for a specific date and time. Customers can request event decoration by adding specific requirements via a message box. If the customer cancels the booking or request, the system updates the records to reflect the cancellation.

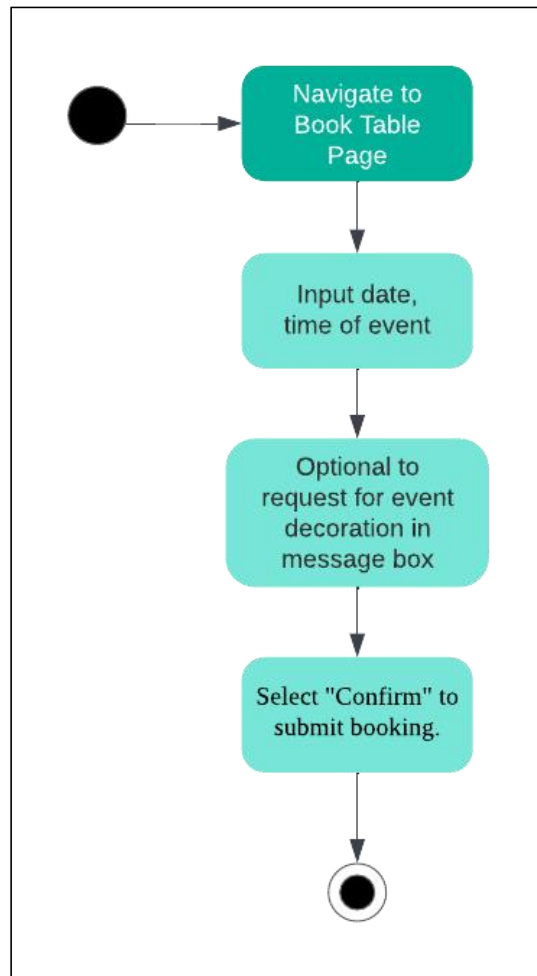


Figure 3. 19: Activity Diagram for Book Table & Event Decoration Request

The activity begins when a logged-in customer selects the "Order History" feature as shown in Figure 3.20. The system retrieves and displays the customer's previous orders. If no history is available, the system displays a "No Orders Found" message.

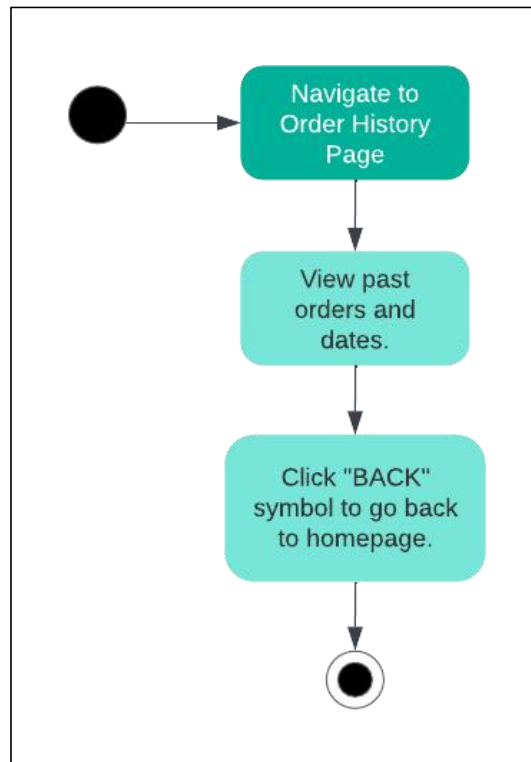


Figure 3. 20: Activity Diagram for Order History

This diagram demonstrates how staff members add new menu items as shown in Figure 3.21. Staff access the system, input item details (name, price, description), and save the item. The system validates the input and updates the menu. If the input is invalid, the system prompts the staff to correct it.

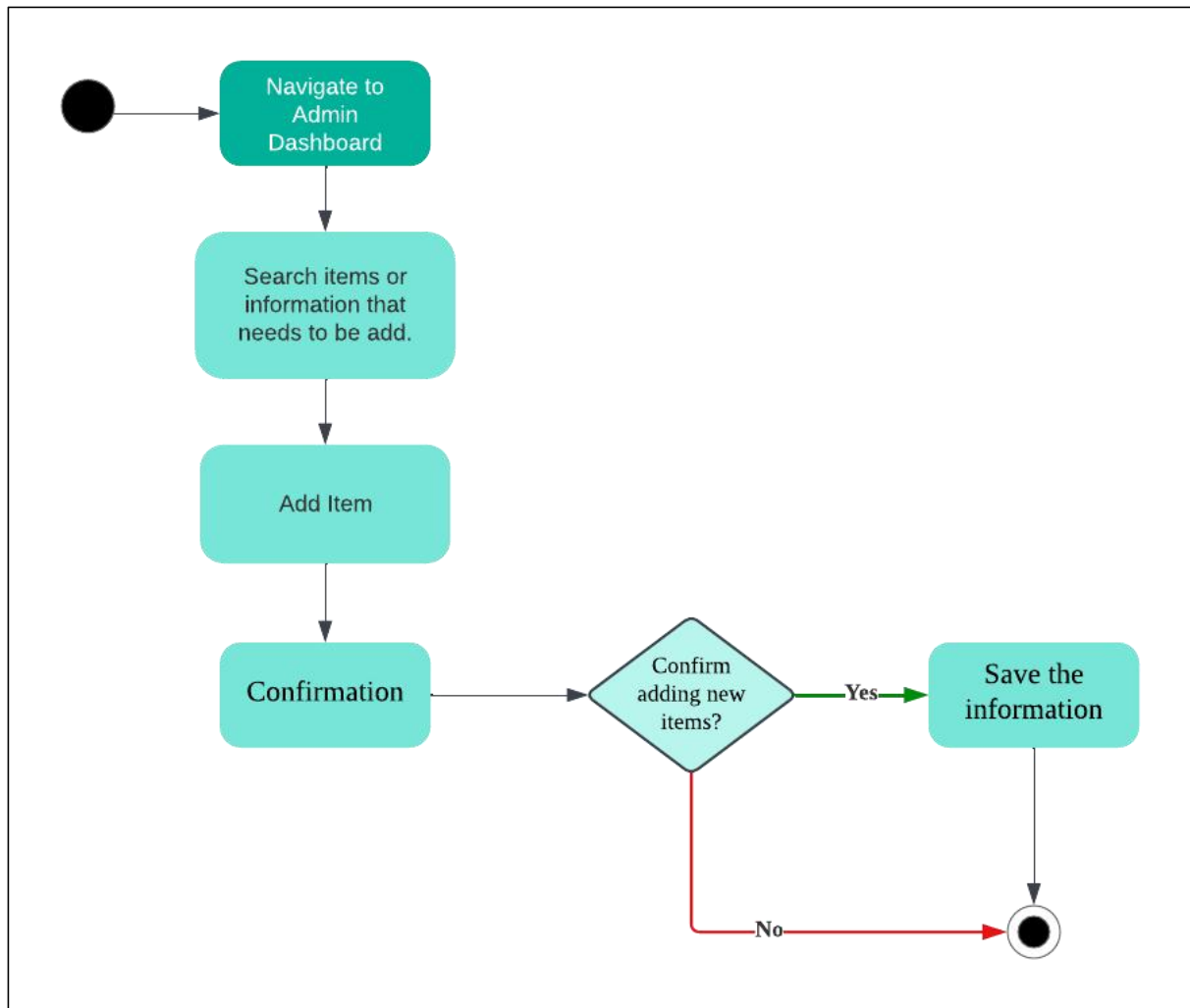


Figure 3. 21: Activity Diagram for Add Item

Figure 3.22 shows the staff members access the menu management system, select an item to update, and modify its details. Upon saving, the system validates and updates the menu. If any issues arise (e.g., invalid data), the system notifies the staff and halts the update process.

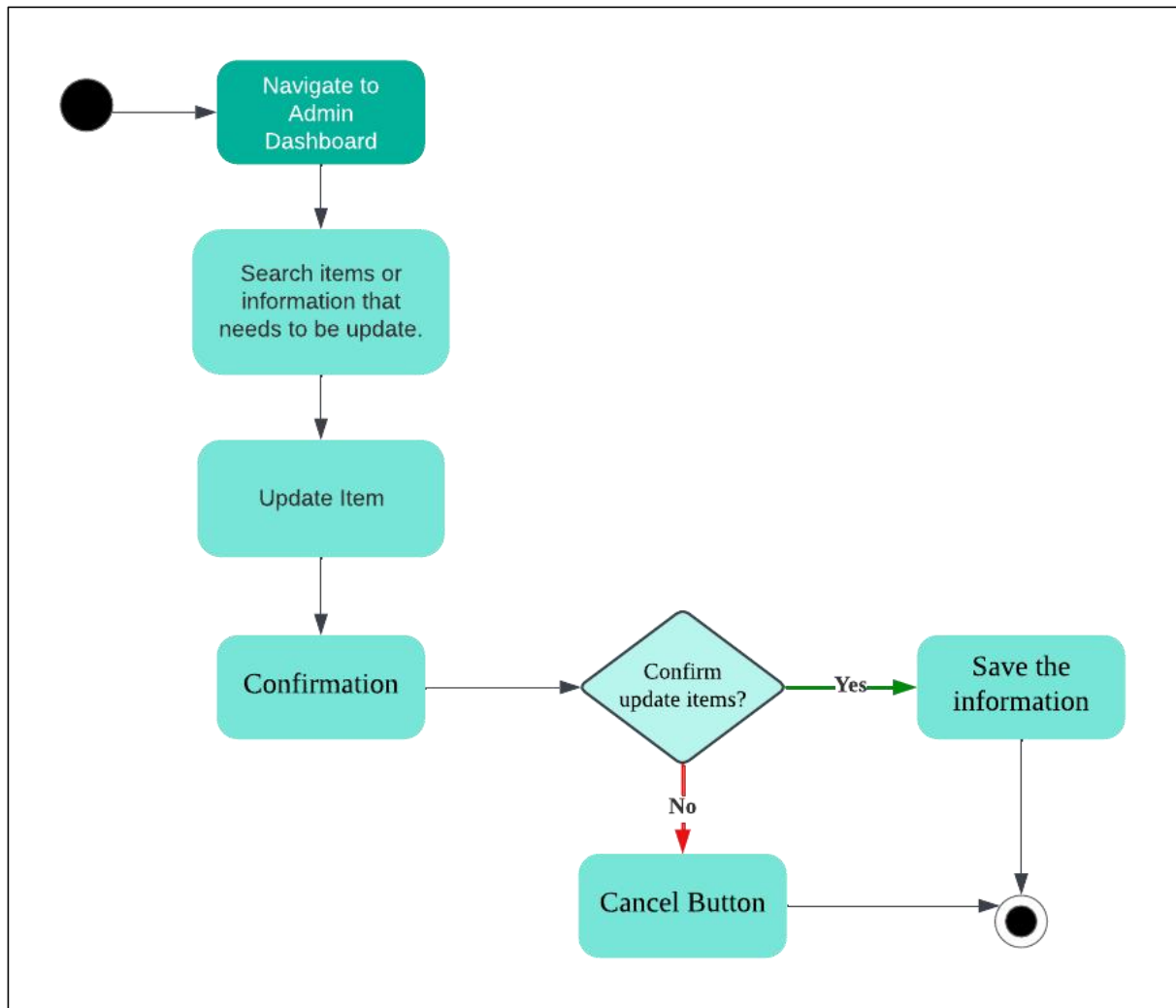


Figure 3. 22: Activity Diagram for Update Item

The process starts with staff selecting an item to delete as shown in Figure 3.23. After confirming the action, the system removes the item from the menu.

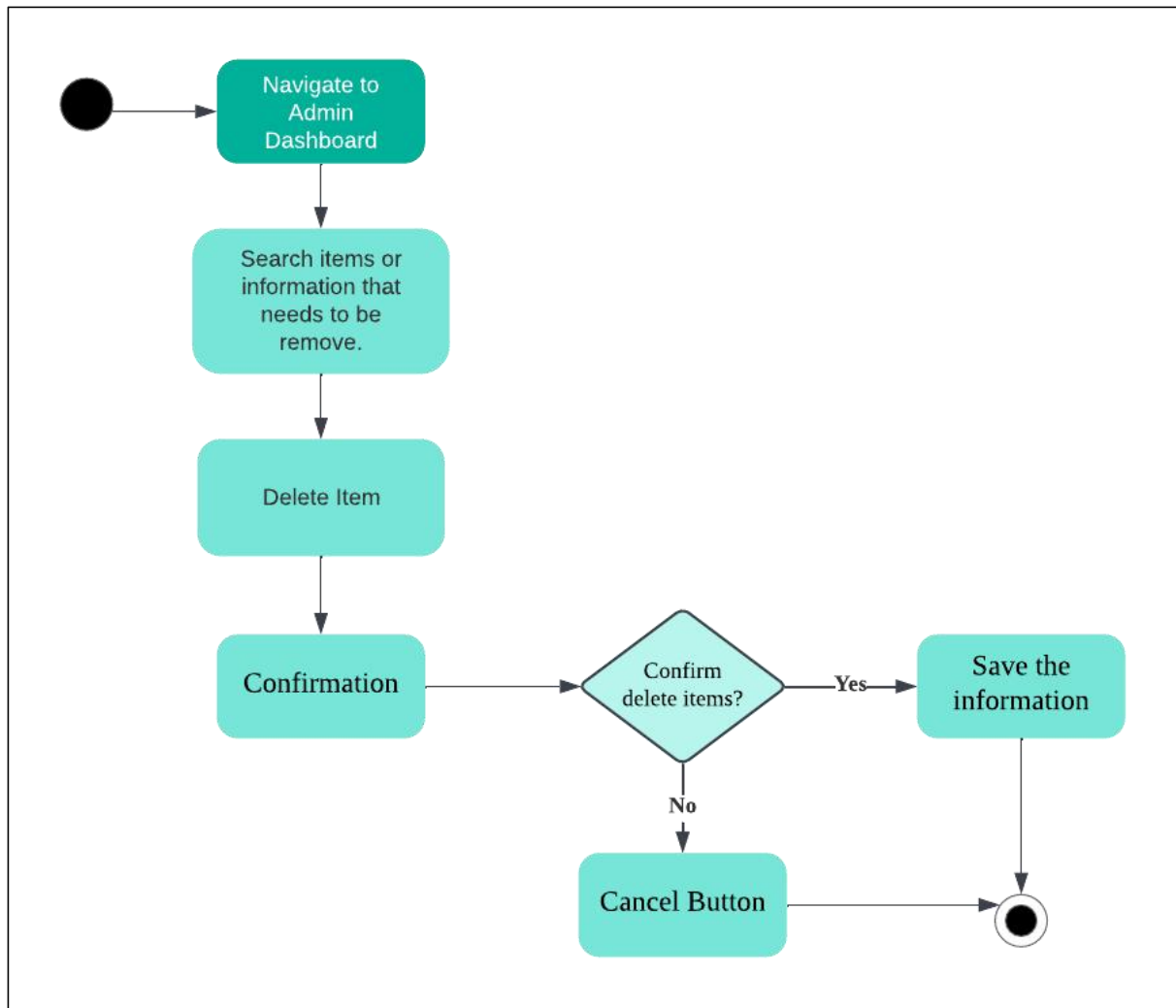


Figure 3. 23: Activity Diagram for Delete Item

The diagram begins with staff accessing the pending orders list as shown in Figure 3.24. They review the order details and confirm it. Upon confirmation, the system updates the order status to "Confirmed" and notifies the customer. If there are discrepancies, staff may reject or adjust the order.

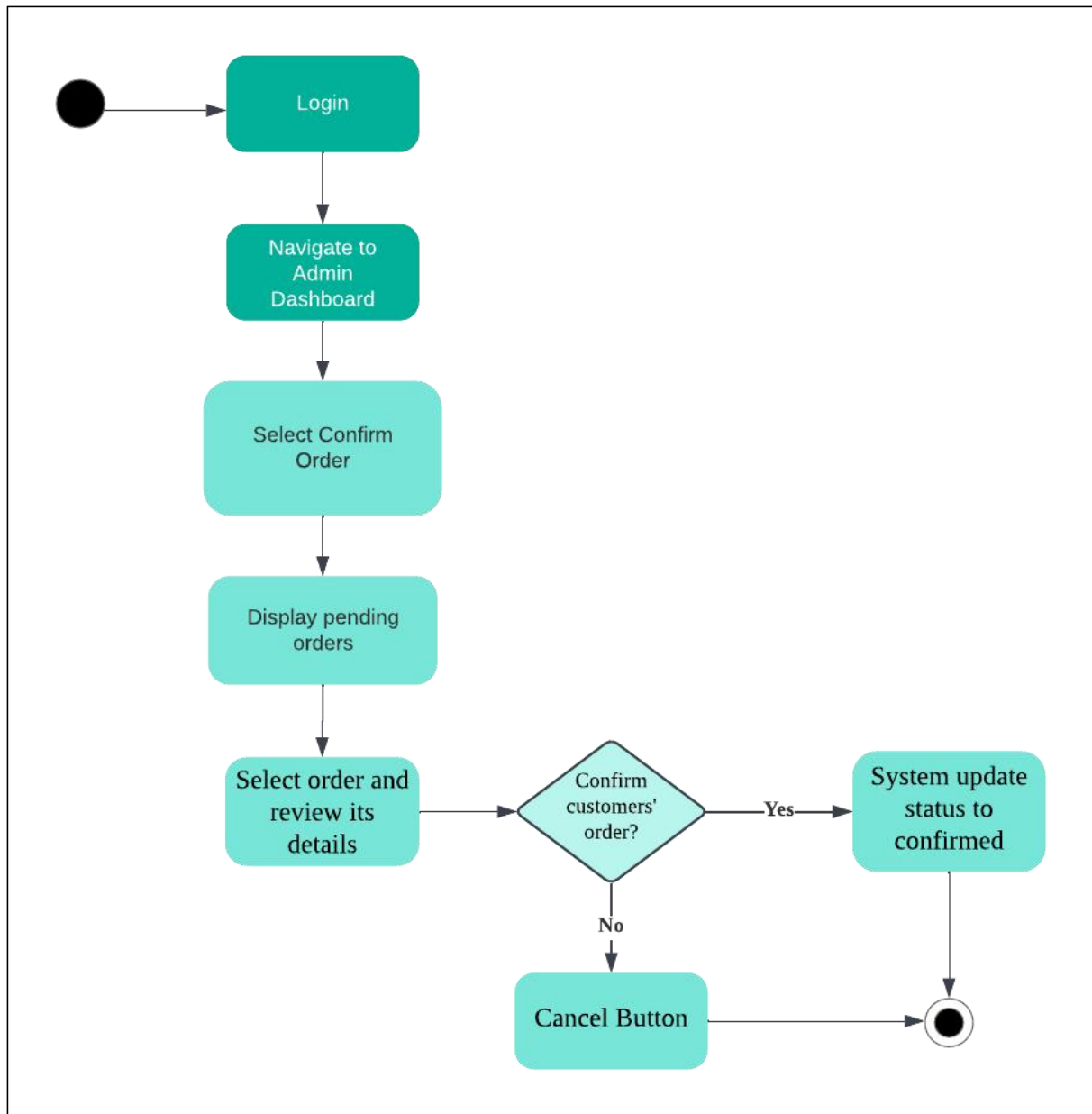


Figure 3. 24: Activity Diagram for Confirm Order

Figure 3.25 depicts the process of staff confirming table booking. This process involves staff reviewing customer table booking requests. They validate the booking details and confirm the reservation. If the details are incorrect or the time slot is unavailable, the system prompts staff to reject or modify the booking.

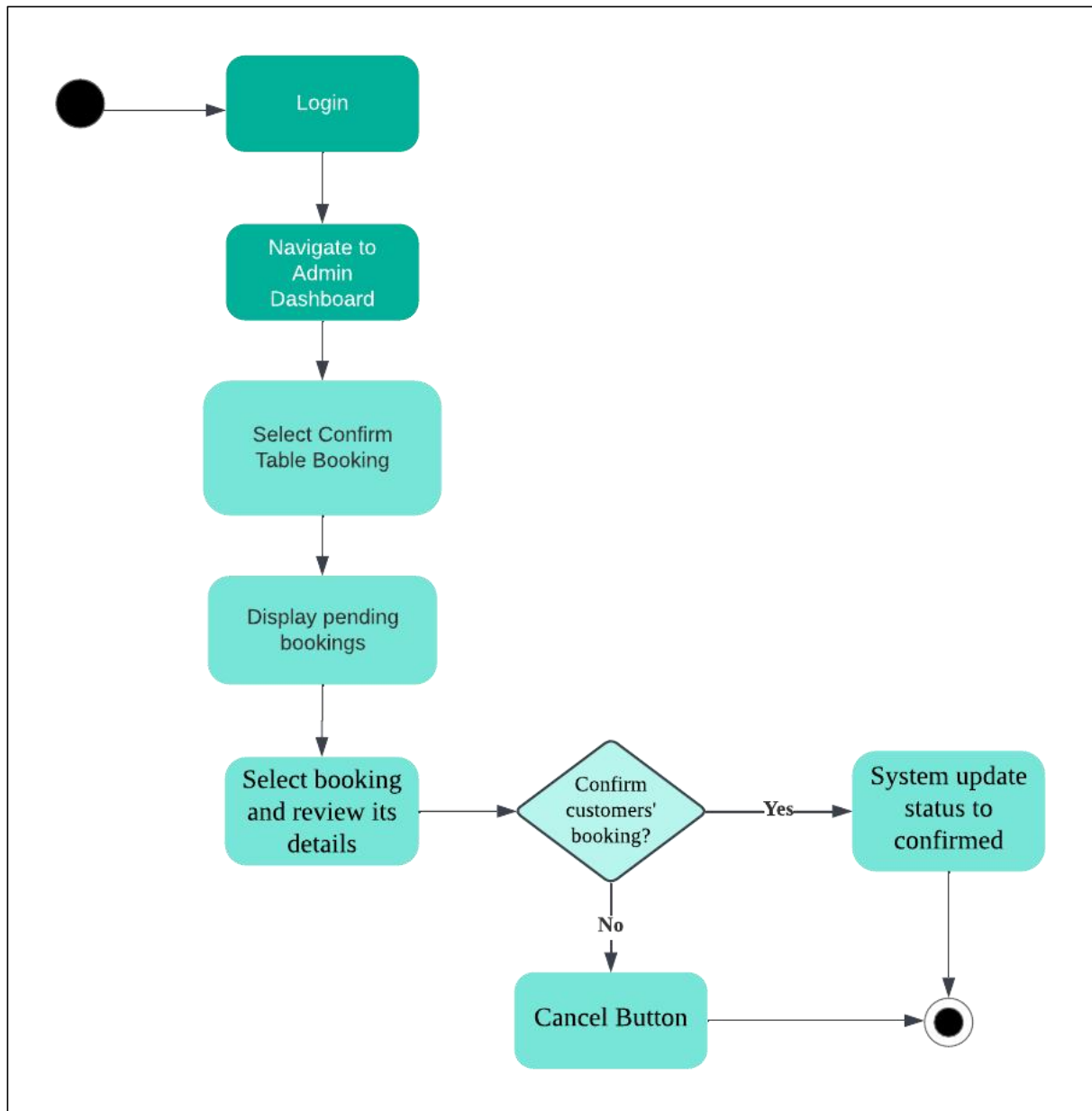


Figure 3. 25: Activity Diagram for Confirm Table Booking

3.3.2 Database Design

The class diagram's database design is organized to show the entities and relationships needed by the system. Important entities are implemented as database tables with attributes corresponding to their roles, including Customer, Staff, Menu, AddToCart, Order, Booking, and OrderItem. The class diagram is shown in Figure 3.26.

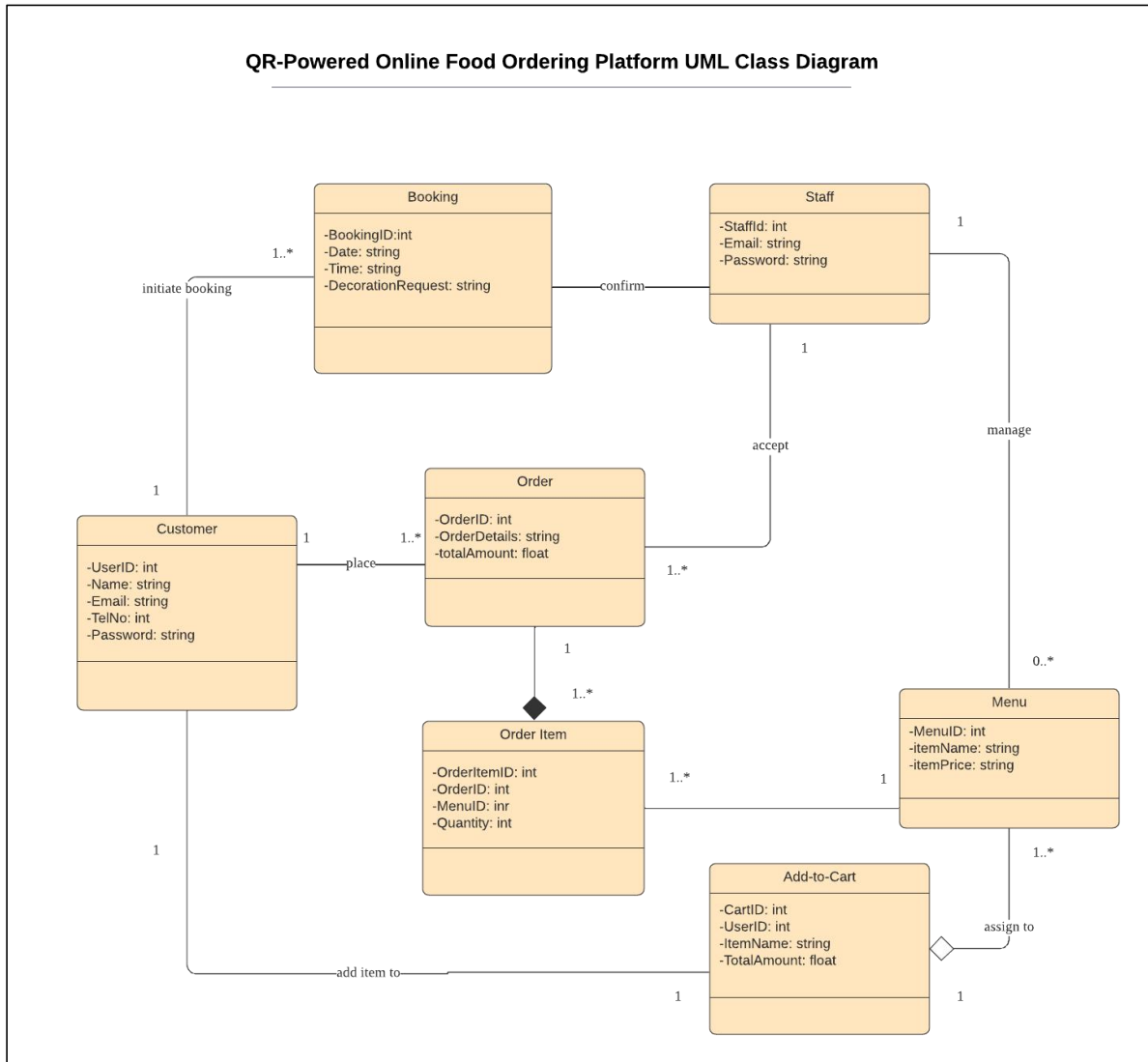


Figure 3. 26: Database Design for QR-Powered Online Food Ordering System

One way to describe a data dictionary in a database management system (DBMS) is that it functions to keep track of the names, descriptions, and characteristics of data components that were utilized in the database. Metadata, or information about the database, is kept in the Data Dictionary (Singh, 2022). The data dictionary is shown in Table 3.16, where there are few fields being described including Customer, Staff, Order, Order Item, Booking, AddToCart and Menu.

Table 3. 16: Data Dictionary

Data ID	Data Name	Data Description	Data elements				
			Name	Description	Element Length	Type of data	Example Format
D-1	Customer	Store customer account information, including personal details and login credentials	CustomerID	ID for customer	10	Integer	1
			Name	Customers' name	100	String	Melanie
			Email	Customers' email address	50	String	melanie@gmail.com
			TelNo	Customers' phone number	12	Integer	0123456789
			Password	Password for account	12	String	1q2e4r4r
D-2	Staff	Stores staff account details, including their roles and credentials	StaffID	ID for staff	10	Integer	11
			Name	Staff's name	100	String	John
			Email	Staff's email address	50	String	John@restaurant.com
			Password	Password for account	12	String	Restaurant13
D-3	Menu	Stores menu items with details like name, price, and availability.	MenuID	ID for menu	10	Integer	12
			ItemName	Items' name	100	String	Chicken
			ItemDescription	Items' details	100	String	Grilled Chicken
			ItemPrice	Items' price	4	Float	12.50
			IsAvailable	Status of availability for item	1	Boolean	True
D-4	AddToCart	Stores temporary cart data for customers,	CartID	ID for cart	10	Integer	15

		including selected items and total price					
D-5	Order	Stores information about customer orders, including details	OrderID	ID for order	10	Integer	8
			OrderDetails	Order details	100	String	Quantity:2
			TableNo	Table number	10	Integer	01
			TotalAmount	Total price for order	4	Float	52.70
D-6	Booking	Stores table booking details, including time, date, and decoration requests	BookingID	ID for customer booking	10	Integer	60
			Date	Booking date	128	Date	13-01-2025
			Time	Booking time	128	Time	15:30:00
			DecorationRequest	Descriptions of decoration request	100	String	Balloon setup in blue colour
D-7	Order Item	Stores item within an order for detailed tracking	OrderItemID	ID for order item	10	Integer	125
			Quantity	Items' quantity	8	Integer	2

3.3.3 Architecture Design

The architectural design of the QR-Powered Online Food Ordering Platform facilitates effective communication between users and the various components of the system as shown in Figure 3.27. Customers engage with the Web Ordering System via their devices, which allows them to explore menus, submit orders, and reserve tables. The Database functions as the central element, housing user information, menu items, orders, and reservations. Orders are accessed and processed, enabling staff to view real-time order details through an Order Management System. Moreover, staff members can handle menus and make necessary updates, ensuring that front-end and back-end operations remain in sync. This design

prioritizes smooth integration and functionality to improve the experiences of both customers and staff.

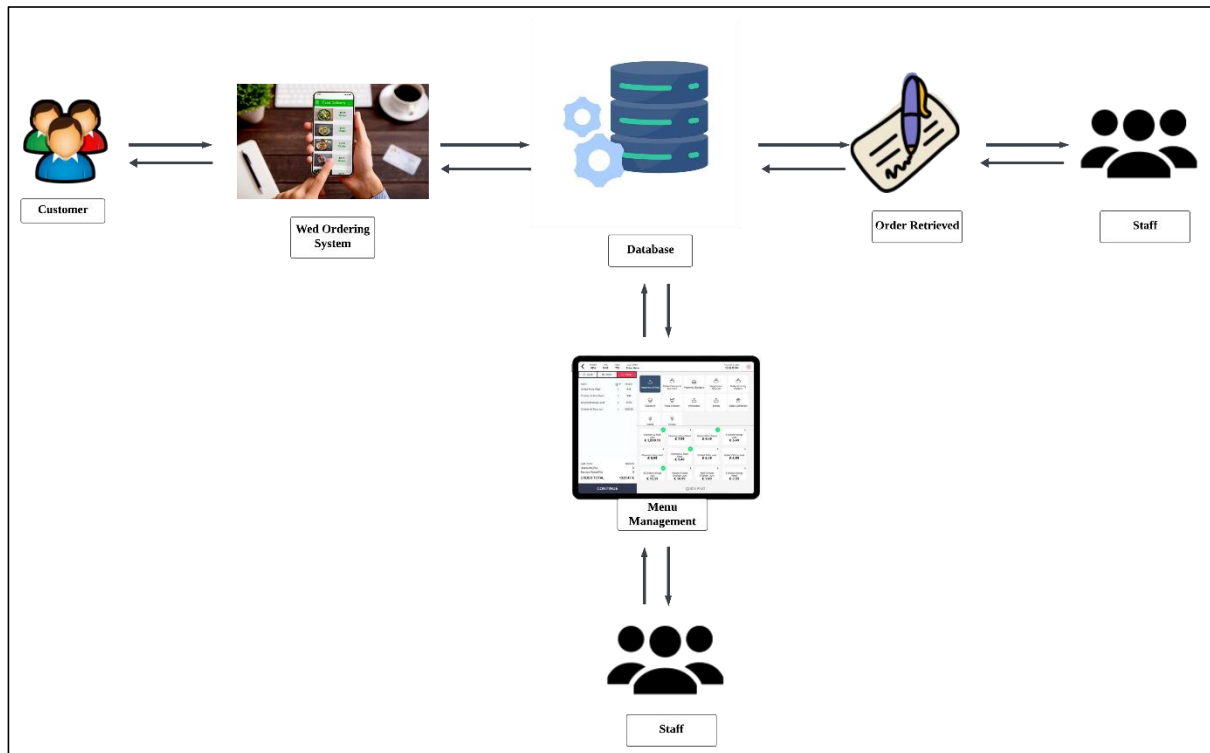
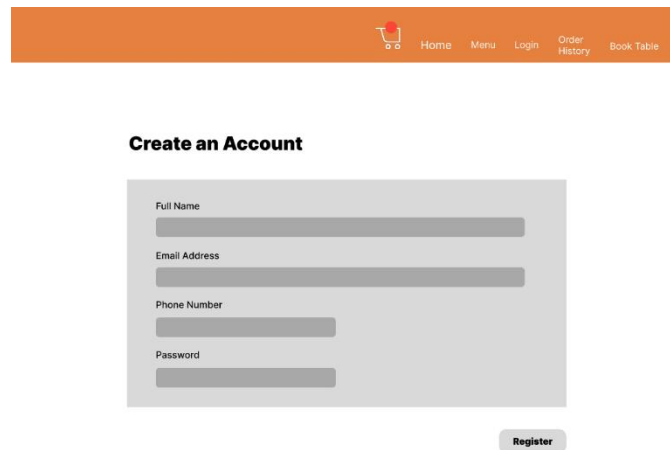


Figure 3. 27: Architecture Design of QR-Powered Online Food Ordering Platform (Riddy et. al., 2022)

3.3.4 User Interface Design (Prototype)

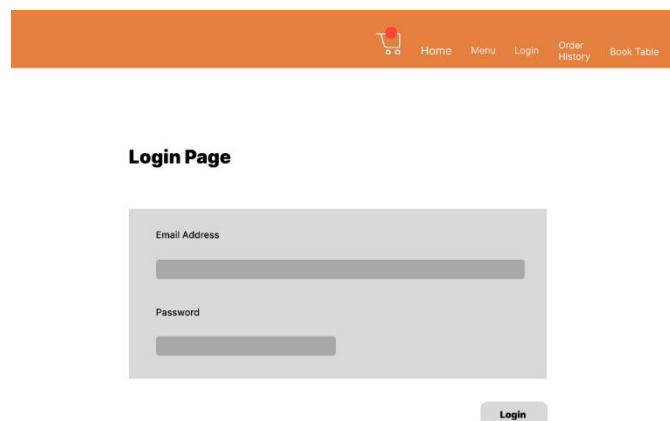
Customer can create account as shown in Figure 3.28 to register if want to proceed with book table and order history feature. As for direct order, without logging in also can place order, but order will not be recorded.



The screenshot shows the 'Create an Account' register page. At the top is an orange navigation bar with a shopping cart icon and links for Home, Menu, Login, Order History, and Book Table. Below the navigation bar, the title 'Create an Account' is centered. The main content area is a light gray box containing four input fields: 'Full Name', 'Email Address', 'Phone Number', and 'Password'. Each field has a corresponding label above it. A 'Register' button is located at the bottom right of the form area.

Figure 3. 28: Register Page

Figure 3.29 shows the login page for this propose system. It only prompts customer to input email address and password.



The screenshot shows the 'Login Page'. It features the same orange navigation bar as the register page. Below the navigation bar, the title 'Login Page' is centered. The main content area is a light gray box containing two input fields: 'Email Address' and 'Password'. Each field has a corresponding label above it. A 'Login' button is located at the bottom right of the form area.

Figure 3. 29: Login Page

Customer needs to choose either to dine-in or takeaway as in Figure 3.30. For dine-in customer, they will need to input their table number to ease the staff for sending their food.

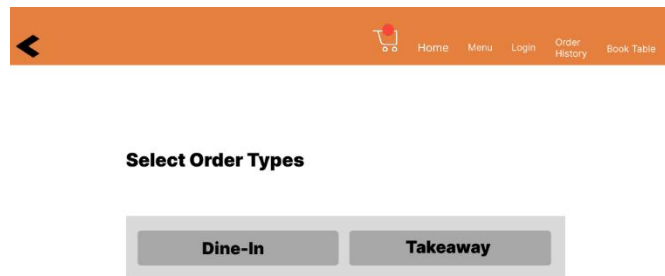


Figure 3. 30: Select Order Types Page

Figure 3.31 shows the menu page for this proposed system. Customer may view the food's image, name, description and price. They can select the add to cart button to checkout the food.

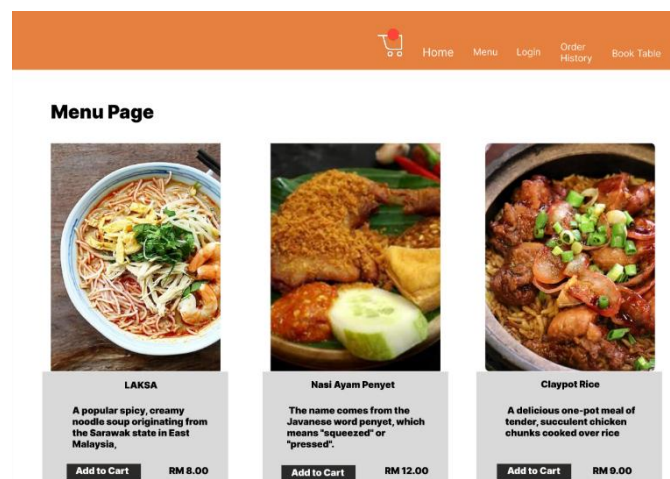


Figure 3. 31: Menu Page

Figure 3.32 shows the Place Order page. Through this page, customer may double check their orders whether they want to maintain, add, delete the food selection that they have add to cart in Menu page earlier.

Orders Page

Item Name	Quantity	Price
Laksa	1	RM 8.00
Nasi Ayam Penyet	1	RM 12.00
Claypot Rice	1	RM 9.00
Total Amount		RM 29.00

Place Order

Figure 3. 32: Place Order Page

For Dine-In customer, they need to input table number as shown in Figure 3.33. This is to let the staff knows the customers' table number to ease them to send the food.

Enter Table Number

Table No.

Confirm **Back**

Figure 3. 33: Enter Table Number Page

Figure 3.34 shows the table booking page. Customer that needs to sign up before proceeding to this feature. Customer needs to input date and time of their event. As for the event decorations request, customers are encouraged to input their request for the event that going to be held in the message field.

Figure 3. 34: Book Table Page

Figure 3.35 shows the order history of this proposed system. Customer may view their order history from previous orders that includes food that they had ordered, quantities, price and the date they ordered the food.

Date : 20/12/2025		
Item Name	Quantity	Price
Laksa	1	RM 9.00
Nasi Ayam Penyet	1	RM 12.00
Claypot Rice	1	RM 9.00
Total Amount		RM 29.00

Figure 3. 35: Order History Page

Admin page which also same as staff Homepage as shown in Figure 3.36. This page can be only accessed by the staff. They can add, update, delete item, confirm order and confirm table booking.

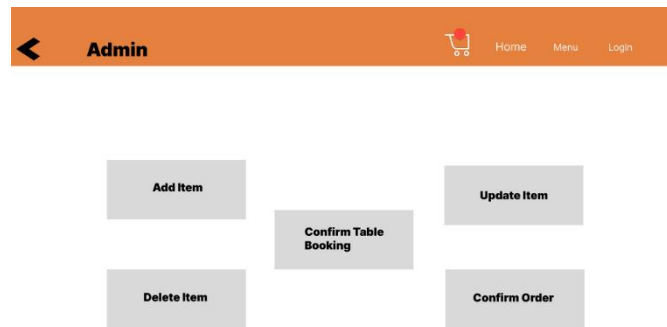


Figure 3. 36: Admin HomePage

CHAPTER 4: IMPLEMENTATION

4.1 Introduction

Chapter 4 will discuss the implementation phase of the proposed QR-Powered Online Food Ordering Platform, converting design ideas into a workable system. It describes the technical configuration, system environment and the development procedure needed to realize the platform. This chapter will discuss the setup of the development tools, database configuration and the implementation of the platform. The implementation activities recorded here illustrate how the proposed solution was developed to fulfil the needs both customer and admin and to satisfy the project's functional and non-functional requirements.

4.2 Development Tools Setup

4.2.1 Visual Studio Code

This section will present the essential development tools needed for the proposed system. The development tools include using Visual Studio Code as shown in Figure 4.1, the main source code editor that accommodates HTML, PHP, CSS and JavaScripts that are utilized in this proposed project.

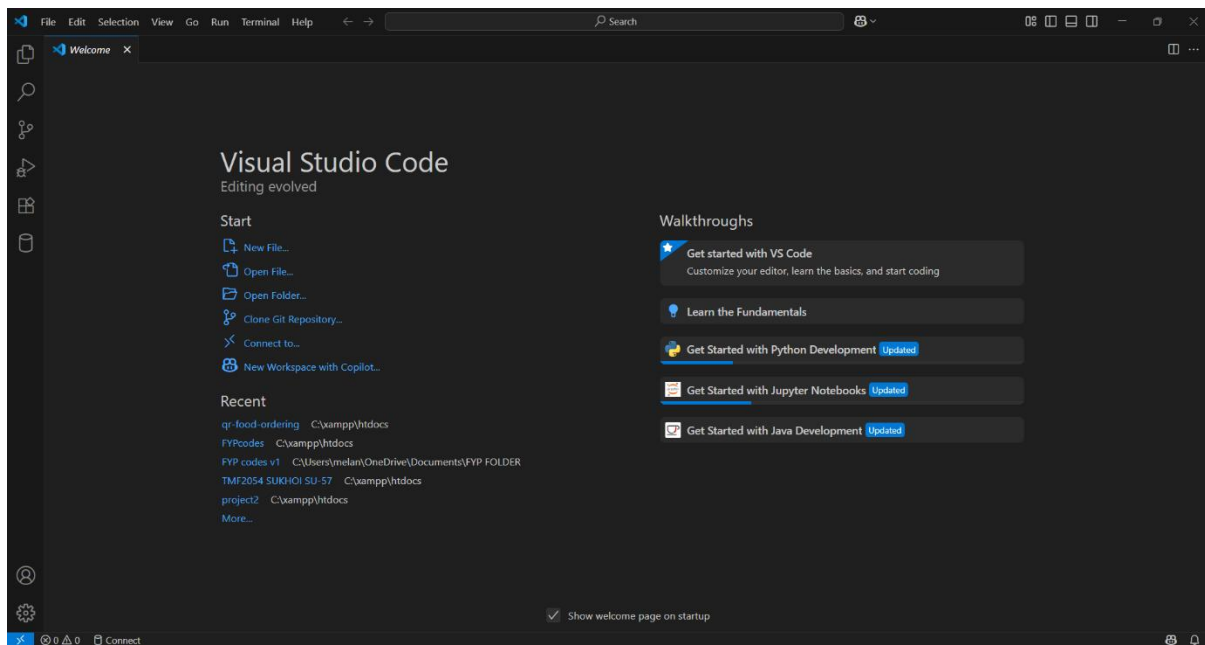


Figure 4. 1: Visual Studio Code Application

4.2.2 XAMPP Application

Figure 4.2 shows XAMPP application that combines Apache and MySQL, offering a local server along with a database management tool via phpMyAdmin interface. In this proposed project, XAMPP is used to create and test websites through localhost on computer before hosting it to the server officially.

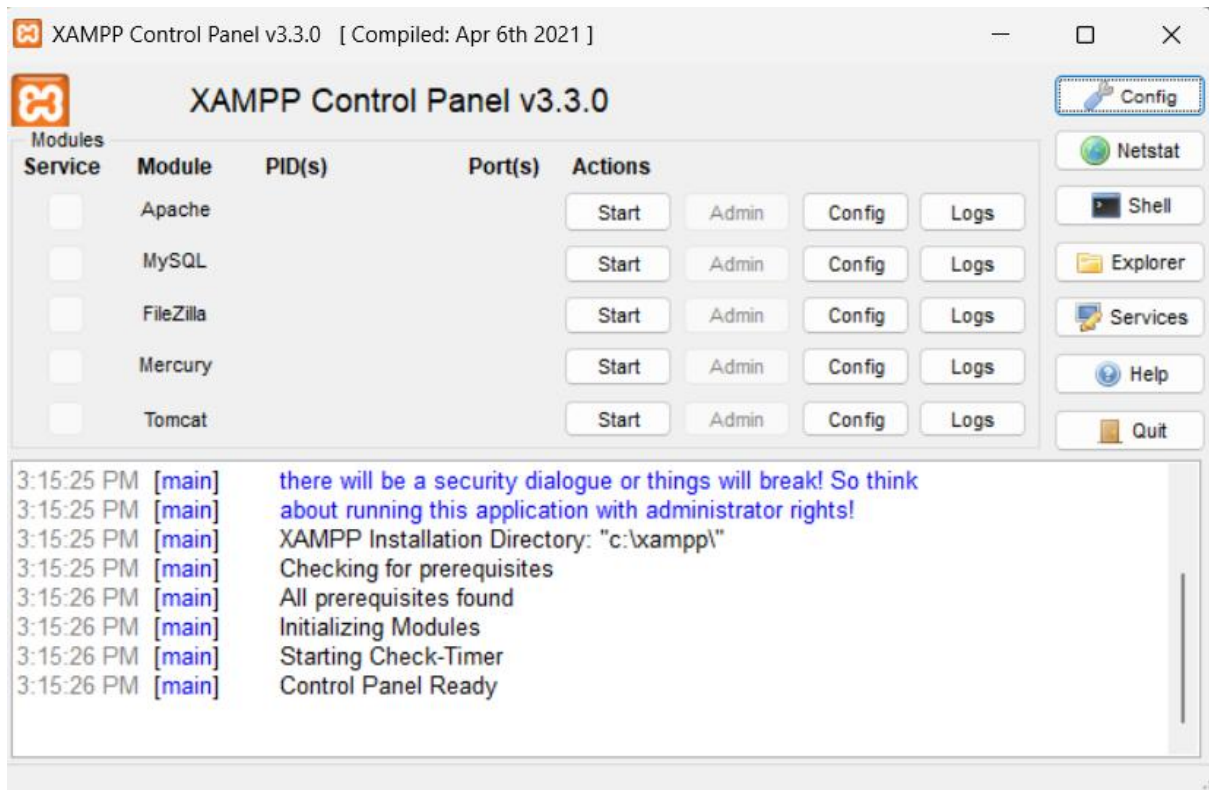


Figure 4. 2: XAMPP Application in laptop

4.2.3 MySQL Database

As depicted in Figure 4.3, MySQL database functions to store all the project's critical data such as menu items, customer's orders, table bookings details and so on. This relational database management system (RDBMS) organizes and manipulate data using Structured Query Language (SQL) to create dynamic websites and apps when it is connected to programming language such as PHP, Java and Python (GeeksforGeeks, 2025).

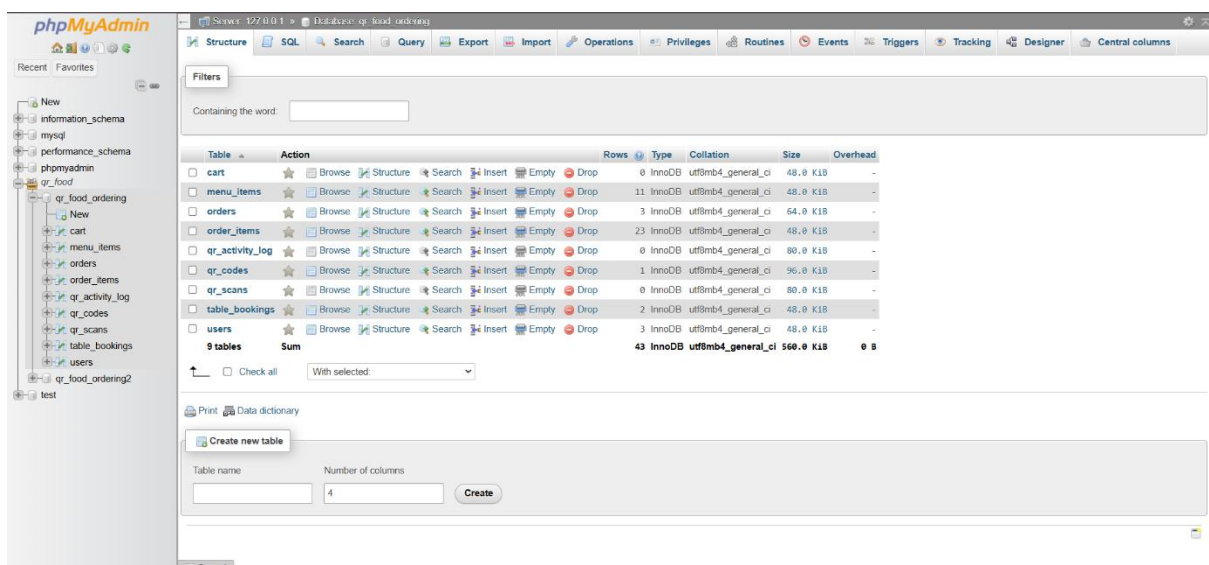


Figure 4. 3: Database for QR-Powered Online Ordering Platform

4.3 Implementation of QR-Powered Online Ordering Platform

This section will explore on the QR-Powered Online Ordering Platform's interface design and system behaviour. The development of this web-based application focusses on creating an intuitive and user-friendly interface that seamlessly bridges the gap between traditional dining and modern digital. Moreover, this platform is carefully designed to guarantee all users from all technical backgrounds can easily navigate through the website.

The system was designed to accommodate three distinct customers; non logged in customer, logged in customer and staff. Non logged in customer can place order as usual without logging in, but they cannot access table booking and event decoration request feature and unable to view order history too. As for logged in customers, they can access all the features. Additionally, staff side would only able to access the admin dashboard for restaurant management purposes.

4.3.1 Technology

i. QR Code

After the website has been developed, web hosting was set up so that the platform can be accessed online. Figure 4.4 illustrates the QR code that has been generated from the web application's URL. Customer can simply scan the QR code using their mobile phone through camera or a code scanner application without downloading apps or manually key-in website address in browser. By scanning the QR code, customers can place order at their own pace and waited for the order to be served to them.

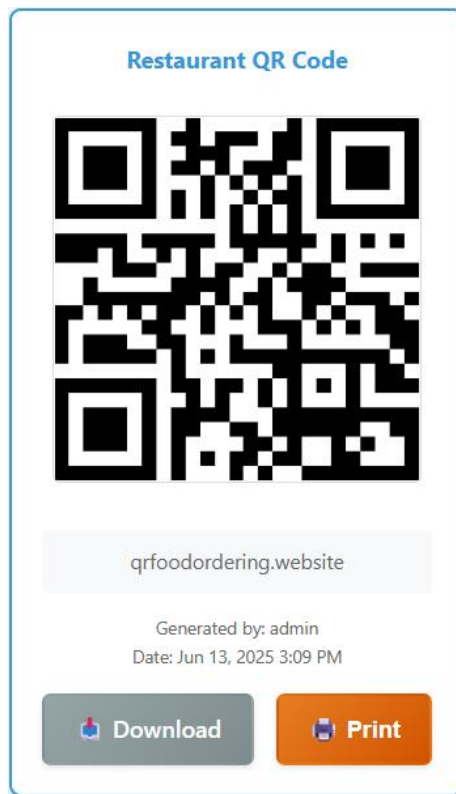


Figure 4. 4: QR code for QR-Powered Online Ordering Platform

4.3.2 Customer

4.3.2.1 Non-Logged In Customer

The system was designed to accommodate two distinct users, customer (logged in and non logged in) and staff, each with tailored interfaces and specialized functions to meet the operational needs. For physical customer that visit the restaurant without logging in will have no access to few features such as view order history, do table booking and request for event decorations. Meanwhile the customer that opt to log in may have access to all features.

i. Homepage

Figure 4.5 depicts the homepage after scanning the QR code. For customer that did not opted to register and log in, they can directly select ‘Order Now’ to continue view menus and make order. The homepage also shows the way of how the website works to ease customer navigation through the web app.

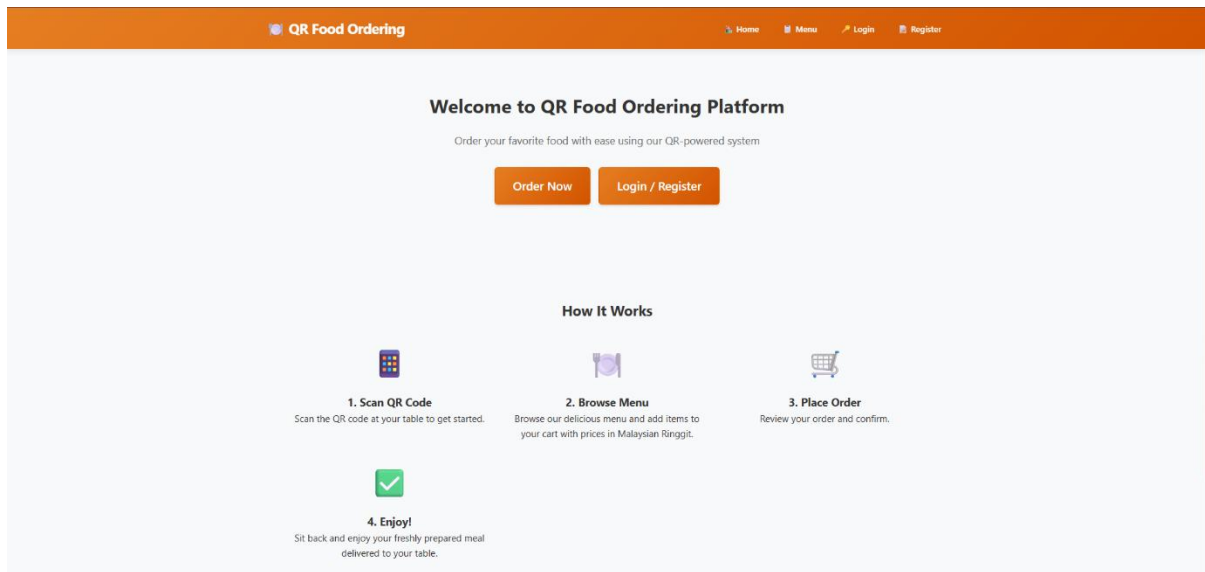


Figure 4. 5: Screenshot of Homepage

ii. Food Ordering Module

When customer select 'Order Now' button, it redirect them order type page as in Figure 4.6. Customer that came to the restaurant physically may choose to either dine-in or takeaway the food that they will order.

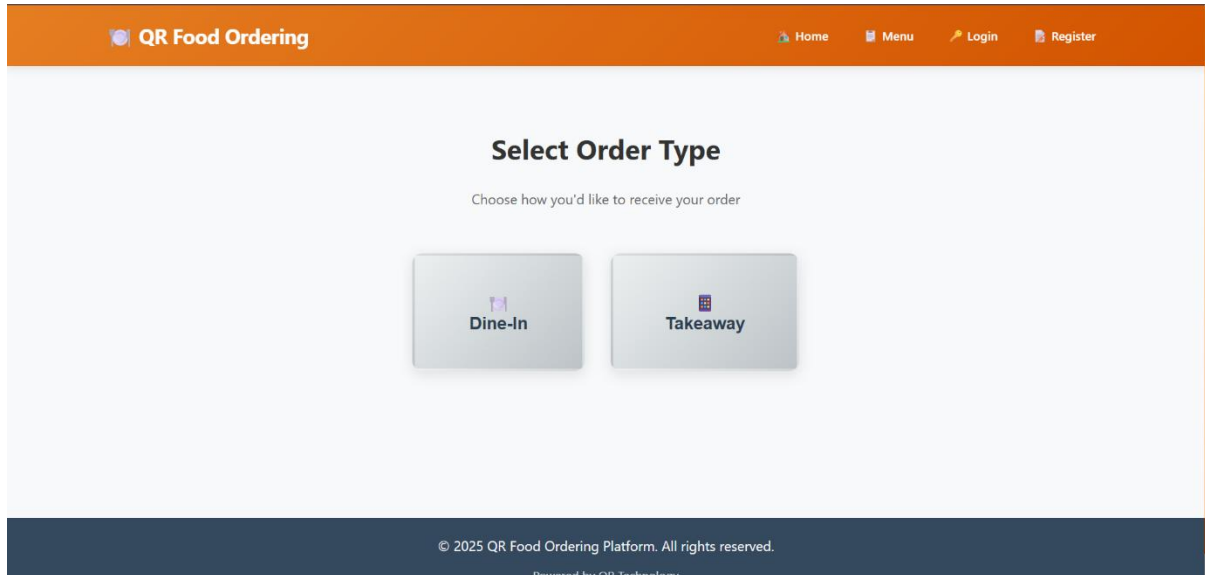


Figure 4. 6: Screenshot of Order Type page

For customer that opted to dine-in at the restaurant, they may enter their table number where they are seated at as shown in Figure 4.7. System will prompt dine-in customer to input their table number. As for customer that opted to have takeaway, this landing page will not show in their screen. Instead, they will directly land at the menu page.

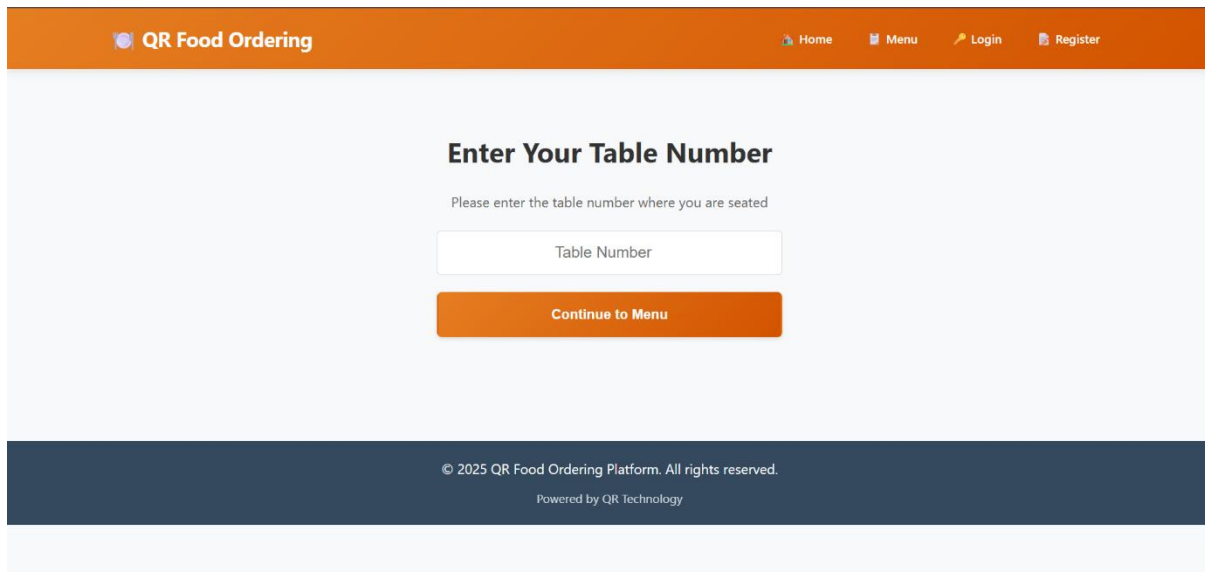


Figure 4. 7: Screenshot of Table Number page

iii. Menu Page

Figure 4.8 illustrates the menu page of this web application. This page shows all the menus available in the restaurant. Customer may add the food to cart simply by clicking ‘add to cart’ button in the menu picture. Moreover, customer also can update the quantity of food if they wish to add more than 1 quantity of food to the cart by clicking the up or down button as shown in Asam Pedas menu container. Up button is to increase the quantity while down button is to decrease the quantity if the quantity is exceeded.

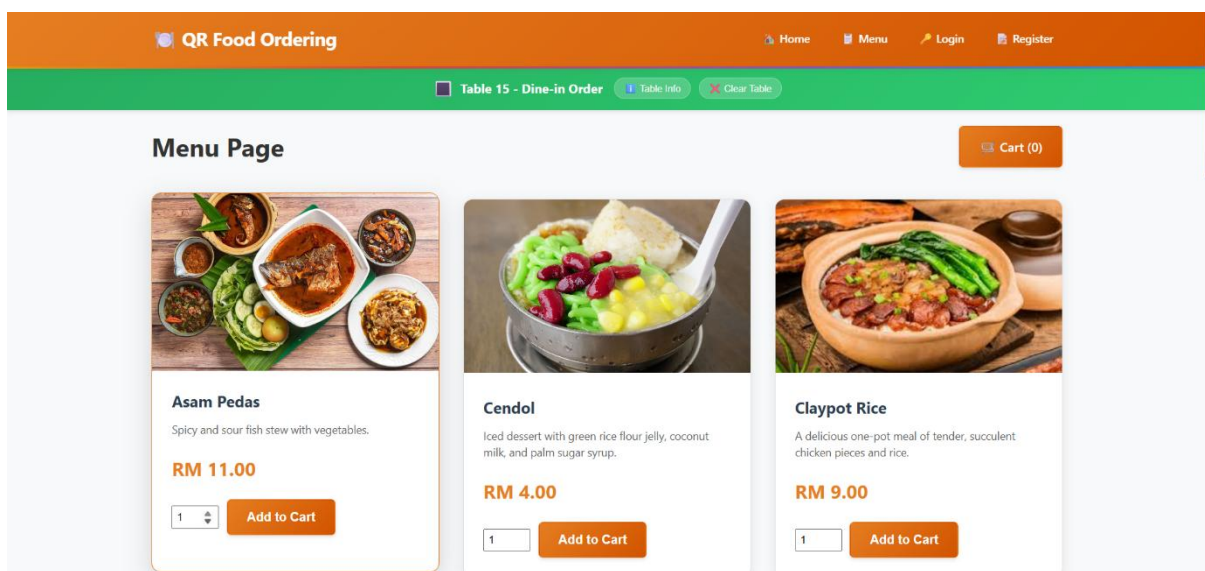


Figure 4. 8: Screenshot of Menu page

After selected menus are added to cart, there will be pop up notice that shows the menu has been added to cart to notify the customer that the menu has been successfully added into the cart as depicted in Figure 4.9. At the same time, the cart button on top right will automatically detect how many menus have been added to the cart.

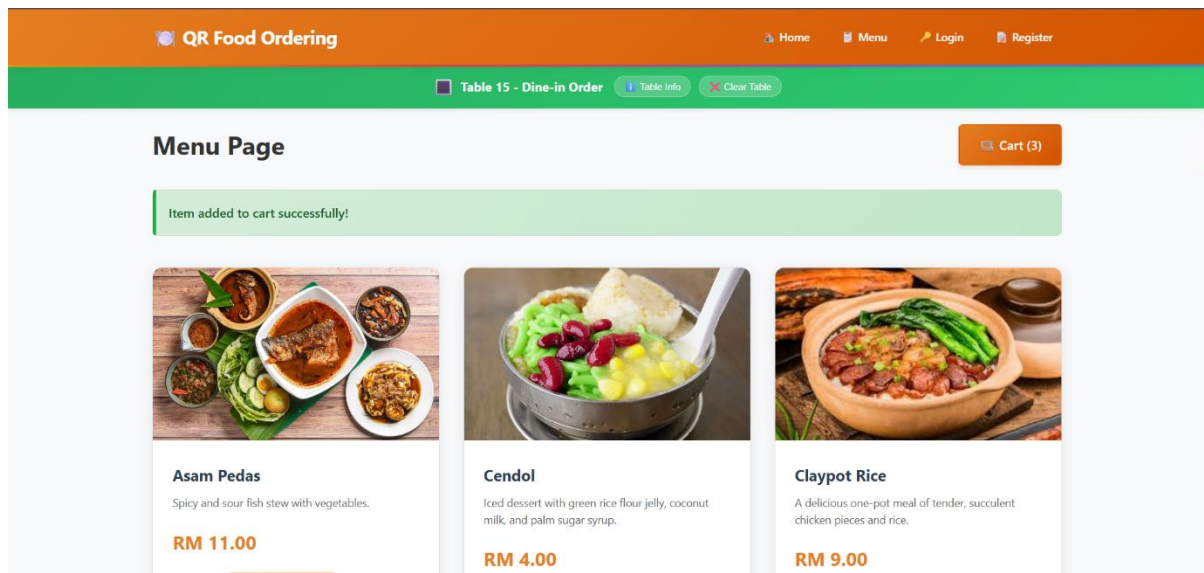


Figure 4. 9: Screenshot of menu added to cart

Figure 4.10 shows the cart page of this proposed project. Customer may update if they want to increase or decrease the quantity of menu by clicking the 'update' button. Meanwhile, they can just click the red 'x' button if they wish to remove the menu from the cart. At the same time, customer may browse for more options of menu simply by selecting the 'continue shopping' button. The total price of all menus can be view from this cart page. After confirming their order, customer must select 'proceed to checkout' button in order to check out the menus before placing order.

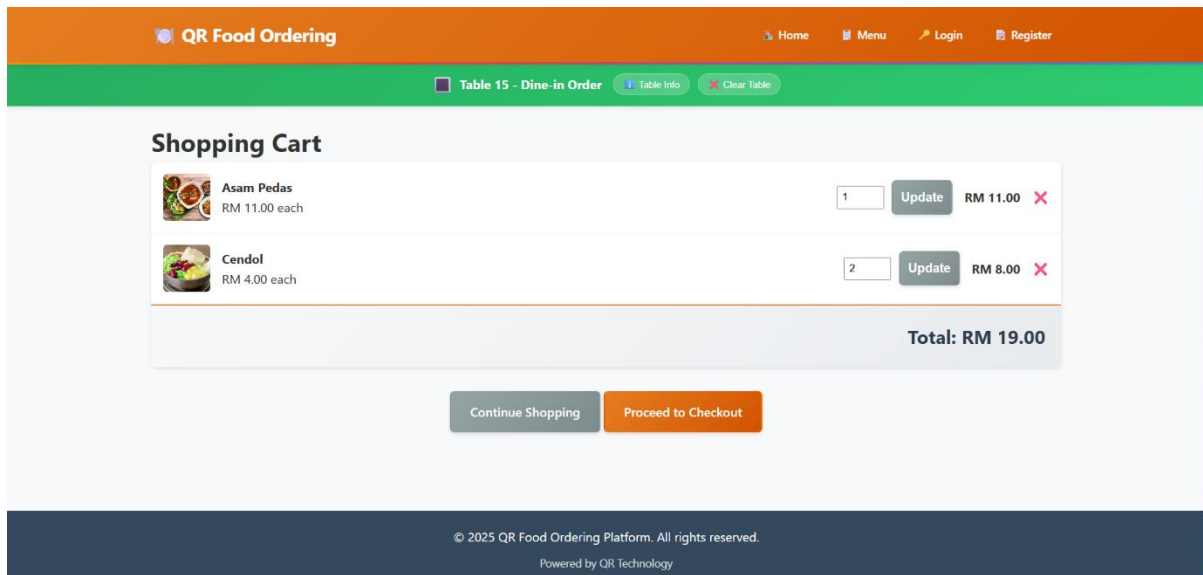


Figure 4. 10: Screenshot of Cart page

iv. Place Order

After all menus are proceed to checkout, it will redirect customer to this checkout menus page as illustrated in Figure 4.11. For customers that did not opt to log in, they need to fill in their customer details such as name and phone number for restaurant's record. Subsequently, customer may place order after double checking all the information on menus, price and personal details are correct.

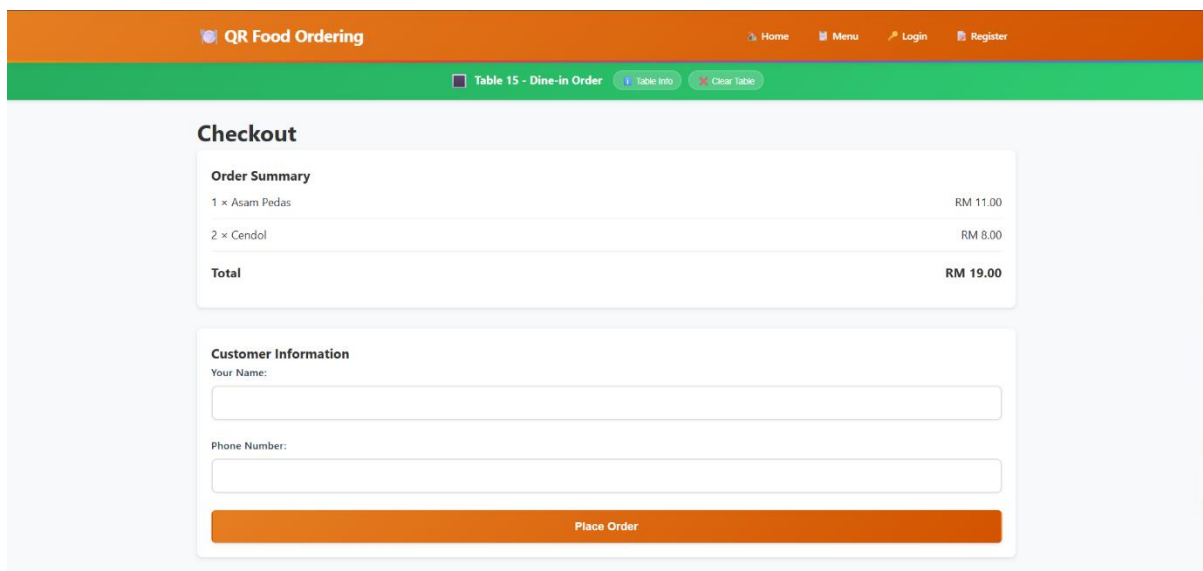


Figure 4. 11: Screenshot of Place Order page

v. Order Receipt

Figure 4.12 showcases the order receipt page after customer proceed from placing order their items. There will be a pop out message in the page if the order has been successfully placed

to notify the customer. Next, they may print receipt or screenshot the receipt page for payment purposes at the counter. This order receipt has an order id that connects customer's digital order with the restaurant's internal processing system, making it easy for staff to match the payments with correct orders. Customers can simply show this receipt or order number to cashier staff at the counter to proceed with payment of the food after dining. Additionally, the receipt also serves as an importance record for both customer and staff. For instance, if a customer's have received all the meals but have not received that one particular meal, then they may call out to the staff nearby. Both staff and customer may refer back to the receipt and verify what was originally ordered to solve the issues.

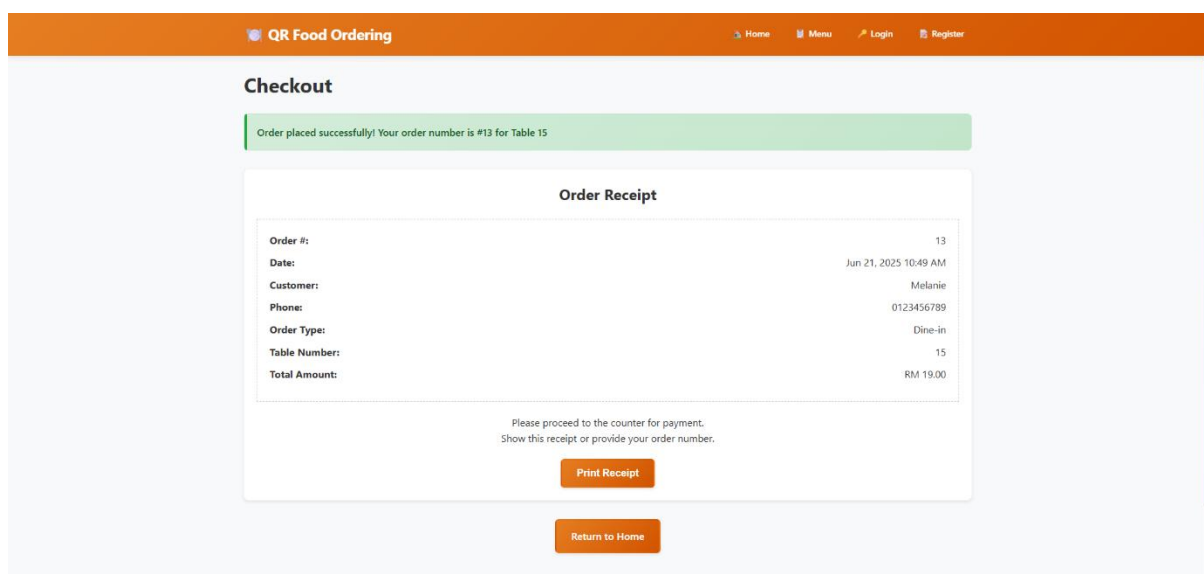


Figure 4. 12: Screenshot of Place Order page

4.3.2.2 Logged In Customer

i. Register

This section provides new customer with an optional sign-up process to create their personal accounts on the platform as described in Figure 4.13. New customers have the option to fill in their personal details such as username, email and password. The registration form is designed with user-friendly input fields and clear validation messages that may assist customers throughout the process, making sure all necessary information is properly entered before account is successfully created. After account registration, system also sends a confirmation message to verify the registration is successful to notify customers.

The screenshot shows the 'Register' page of the 'QR Food Ordering' system. The page has an orange header with the logo and navigation links: Home, Menu, Login, and Register. The main content area is light gray. In the center, there is a white card with the title 'Register'. Inside the card, there are four input fields labeled 'Username:', 'Email:', 'Password:', and 'Confirm Password:'. Below these fields is an orange 'Register' button. At the bottom of the card, there is a link that says 'Already have an account? [Login here](#)'.

Figure 4. 13: Screenshot of Register page

ii. Log In

Figure 4.14 illustrates the login page where it offers customers with their registered accounts to login using their username and password. At the same time, staff that manage the system also log in here using their username and password. User role authentication ensures that staff and customer will not access each dashboard. While guest customer can browse menu and place orders without creating account, but logged in customers may enjoy additional benefits such as making advance table booking and request for event decorations and viewing order history if they place orders while logging in.

The screenshot shows the 'Login' page of the 'QR Food Ordering' system. The page has an orange header with the logo and navigation links: Home, Menu, Login, and Register. The main content area is light gray. In the center, there is a white card with the title 'Login'. Inside the card, there are two input fields labeled 'Username or Email:' and 'Password:'. Below these fields is an orange 'Login' button. At the bottom of the card, there is a link that says 'Don't have an account? [Register here](#)'. At the very bottom of the page, there is a dark gray footer with the text '© 2025 QR Food Ordering Platform. All rights reserved.' and 'Powered by QR Technology'.

Figure 4. 14: Screenshot of Log In page

iii. Logged In Customer's Dashboard

Figure 4.15 below shows the dashboard that welcomes logged in customers to their account area. The dashboard below displays a simple navigation option that allow customer to view their order history, make table booking and request event decorations and at the same time view the status of the table booking whether it is being confirmed or rejected.

This system does not integrate payment gateway, hence customer need to pay for their meal at the counter by cash or using debit card.

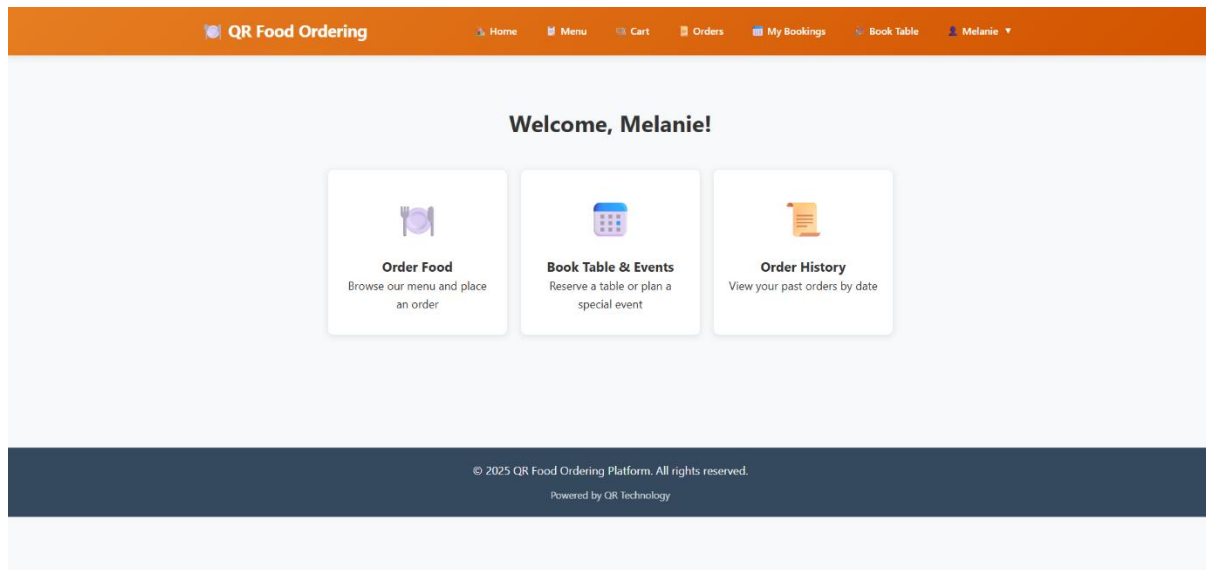


Figure 4. 15: Screenshot of Logged-In Customer's Dashboard

iv. Food Ordering Module

For logged in customer, they have the same access to food ordering as non-logged in customer. The specialty for them is that they can access table booking and request event decorations including viewing order history.

v. Book Table and Request Event Decoration

Figure 4.16 presents the available packages for the event decorations. Package B is slightly expensive than package A because it could accommodate with higher than 10 customers at a time. Hence, the system will detect automatically which package to pick based on number of guests that customer had keyed in.

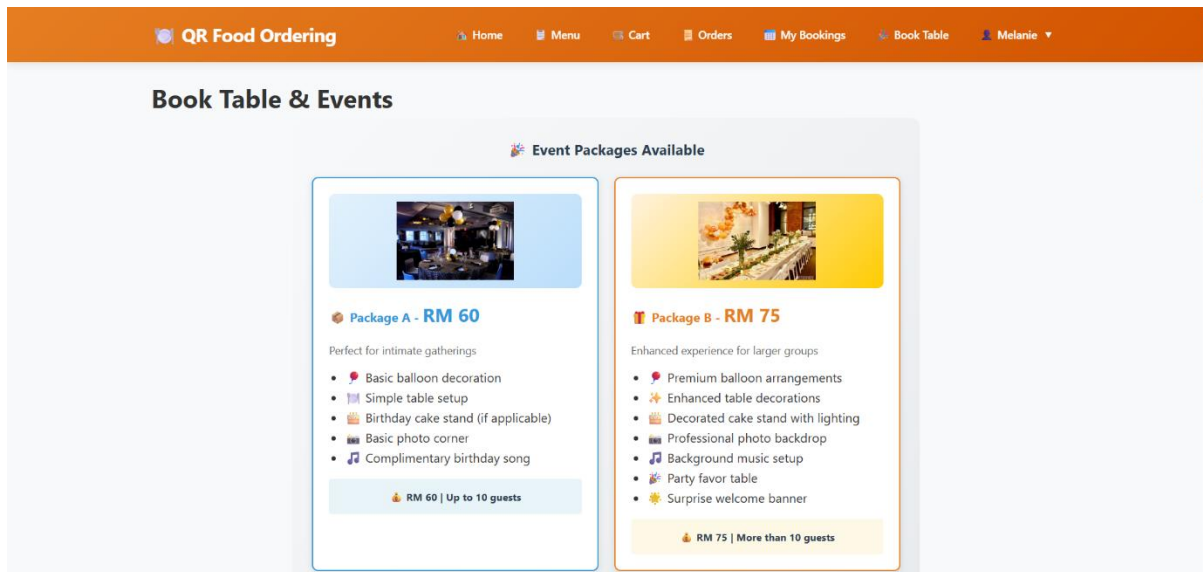


Figure 4. 16: Screenshot of Logged-In Customer's Book Table & Event Decoration Request

Figure 4.17 below depicts the continuation of the Figure 4.16 above. The table booking form below enable customers to book table for both regular dining and event decoration request. Hence, when customer select regular dining, event packages will not be displayed and will not be charged.

Figure 4. 17: Screenshot of Logged-In Customer's Book Table & Event Decoration Request

Figure 4.18 showcases the event type available in the restaurant, where customers can choose from various celebrations such as birthdays, anniversaries, corporate events or casual gatherings. If customers have other celebrations planning in mind, they could choose 'Other Special Occasion' in event type and write any messages in the 'Special Requests' box messages. Moreover, customer may select the time which available starting from lunch time

11:00am until dinner time 09:00pm. The time given for each reservation dining is limited to 2 hours only.

The screenshot displays the 'Reservation Details' form in the QR Food Ordering app. The form has a white background with orange borders. At the top, there's a navigation bar with the app name and various icons. The form fields are as follows:

- Preferred Table Number:** A dropdown menu showing 'Table 6 (8 seats)'.
- Number of Guests:** A dropdown menu showing '8 Guests'.
- Date:** A date picker showing '23/06/2025'.
- Time:** A time picker showing '11:00'.
- Event Type (Optional):** A dropdown menu with a list of event types: Farewell Party, Regular Dining (No Special Event), Birthday Celebration, Anniversary, Graduation Party, Business Meeting, Marriage Proposal, Baby Shower, and Other Special Occasion. The 'Farewell Party' option is currently selected.
- Special Requests (Optional):** A text area with the text 'Please prepare a blue theme includes balloon.'

Figure 4. 18: Screenshot of Logged-In Customer's Book Table & Event Decoration Request – Event Type

Type of packages will be automatically detected when customers input the number of guests as displayed in Figure 4.19. This 'Select Event Type' will not be displayed if customers opted for regular dining in the first place. For example, if a customer wanted to book table for a private birthday dinner without requesting for decorations, they can book under regular dining. Therefore, event package will only charge to customers who wants to request decorations for their event.

This screenshot shows the 'Reservation Details' form with additional fields compared to Figure 4.18. The fields are:

- Preferred Table Number:** 'Table 6 (8 seats)'.
- Number of Guests:** '8 Guests'.
- Date:** '23/06/2025'.
- Time:** '11:00'.
- Event Type (Optional):** 'Farewell Party'.
- Select Event Package:** A dropdown menu showing 'Package A (RM 60) - Basic Decoration - Up to 10 guests'.
- Package Price:** 'RM 60'.
- Special Requests (Optional):** A text area with the text 'Please prepare a blue theme includes balloon.'

Figure 4. 19: Screenshot of Logged-In Customer's Book Table & Event Decoration Request – Event Package

Figure 4.20 showcases the confirmation message that appears after customers successfully submit their booking request. This immediate message reassures customers that their request has been received and is being processed by the restaurant staff. The booking request confirmation includes important details such as the booking reference number and booking details.

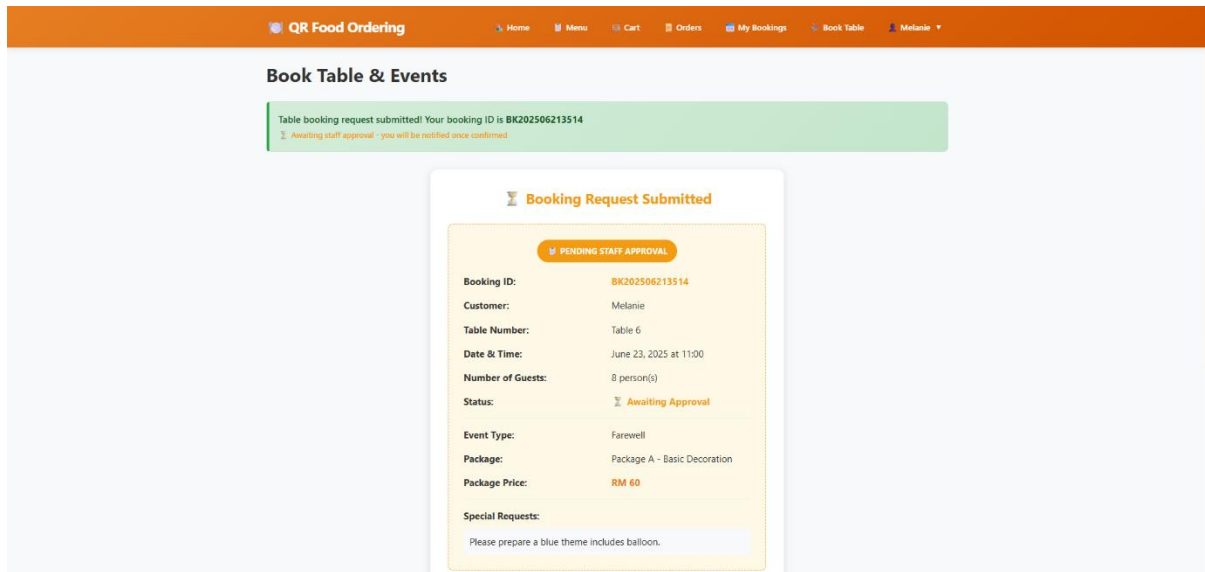


Figure 4. 20: Screenshot of Booking Request Submitted

Figure 4.21 below shows the continuation of the booking confirmation screen, providing additional action buttons about booking details. Customer may want to print or save booking request details in their phone as booking proof in case of any inconvenience.

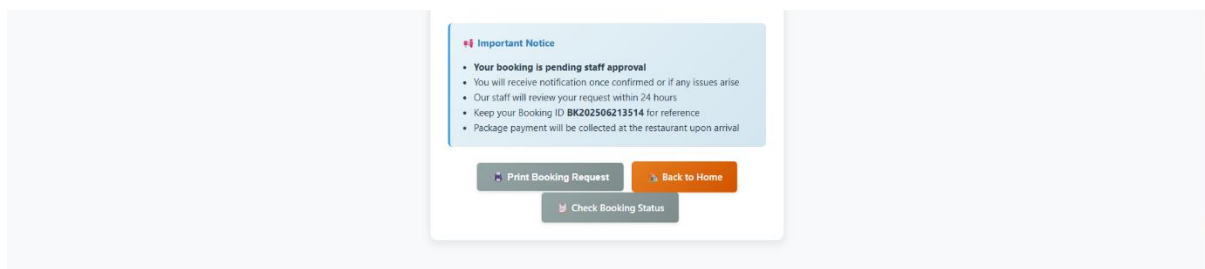


Figure 4. 21: Screenshot of Booking Request Submitted - Continuation

Figure 4.22 illustrates the booking request receipt including its reservation details. This receipt is optional to print as it serves as a digital record that customer can save in the phone's storage for easy reference.

Book Table & Events

📄 Booking Request Submitted

📅 PENDING STAFF APPROVAL

Booking ID:	BK202506213514
Customer:	Melanie
Table Number:	Table 6
Date & Time:	June 23, 2025 at 11:00
Number of Guests:	8 person(s)
Status:	⏸ Awaiting Approval
Event Type:	Farewell
Package:	Package A - Basic Decoration
Package Price:	RM 60

Special Requests:
Please prepare a blue theme includes balloon.

📢 Important Notice

- Your booking is pending staff approval
- You will receive notification once confirmed or if any issues arise
- Our staff will review your request within 24 hours
- Keep your Booking ID **BK202506213514** for reference
- Package payment will be collected at the restaurant upon arrival

Figure 4. 22: Screenshot of Booking Request Receipt

Figure 4.23 presents the booking status checking interface, where customers can monitor the progress of their reservation requests. The pending label shows that the reservation has not been confirmed by staff member. Status label will change once staff member do actions either confirm or reject the reservation. Rejected reservation messages will be displayed in the interface for customer's view.

QR Food Ordering

[Home](#)
[Menu](#)
[Cart](#)
[Orders](#)
[My Bookings](#)
[Book Table](#)
[Melanie](#)

My Table Bookings

1
Total Bookings

1
Pending Approval

0
Confirmed

0
Rejected

0
Upcoming

Make New Booking

Refresh Status

Booking #BK202506213514

Date: June 23, 2025

Time: 11:00:00

Table: Table 6

Guests: 8 person(s)

Booked: Jun 22, 2025 2:58 AM

Event Details
PENDING

Event Type: Farewell

Package: Package A - Basic Decoration

Package Price: **RM 60.00**

Special Requests:
"Please prepare a blue theme includes balloon."

⏸ Awaiting Staff Approval
Your booking is being reviewed by our staff. You will be notified once confirmed or if any issues arise. Expected response within 24 hours.

⌚ Waiting for approval...

Back to Home

Make New Booking

Figure 4. 23: Screenshot of Booking Request Checking Status

Figure 4.24 below showcases the order history page, which provides logged-in customers with a comprehensive record of all their previous orders. This feature enable customer to

track back their order history date by date. The order history displays key information such as order dates, total amounts, and order amount in that date.

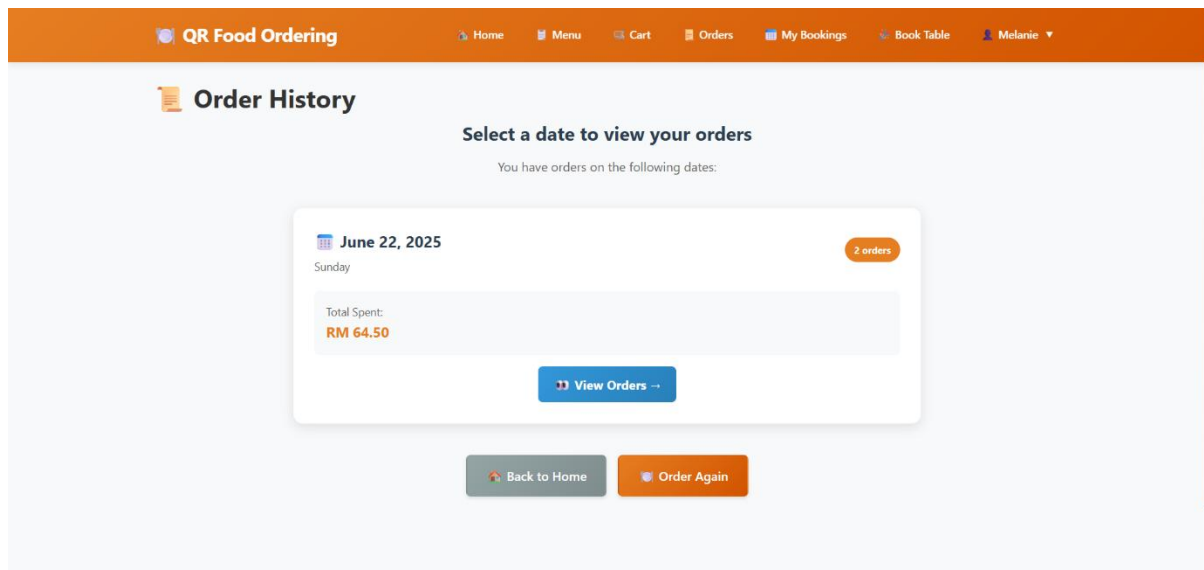


Figure 4. 24: Screenshot of Order History

By clicking the chosen date of order history, customers can view the in-detailed order history such as in Figure 4.25. This interface shows the complete breakdown of foods ordered, quantities, prices, order type (takeaway or dine-in) and even table number.

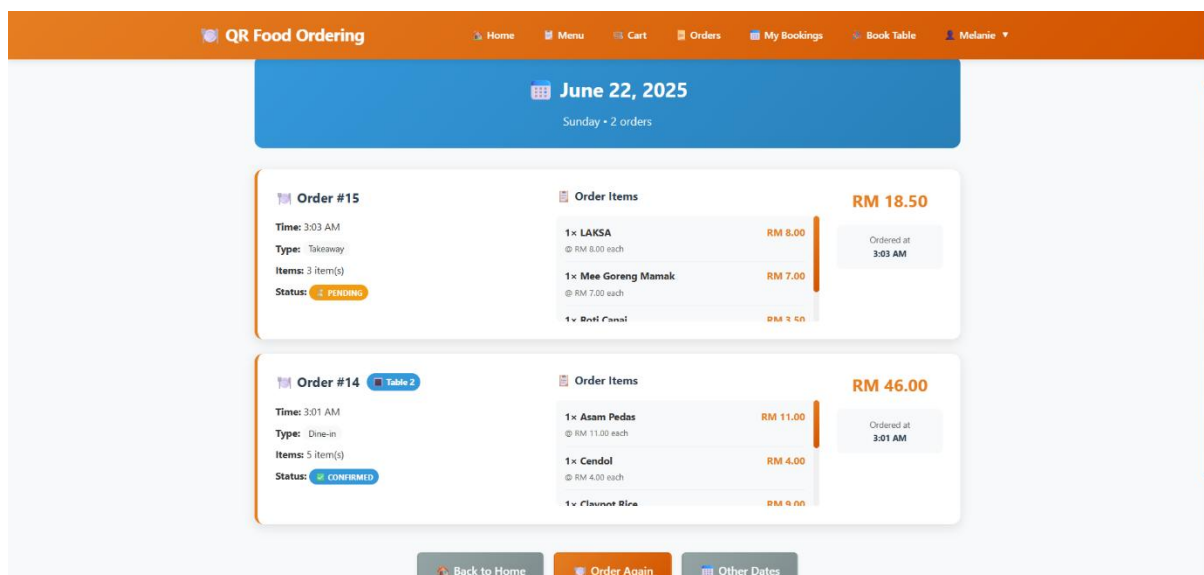


Figure 4. 25: Screenshot of Order History Details

4.3.3 Staff

i. Staff Dashboard

Figure 4.26 below displays the staff dashboard, which serves as the command centre for restaurant personnel to manage the whole aspects of the QR food ordering system. The dashboard design prioritizes functionality and efficiency, presenting critical information in an organized format that allows staff to quickly assess restaurant operations and respond to customer needs. It allows staff to manage menu items, food orders and table reservation.

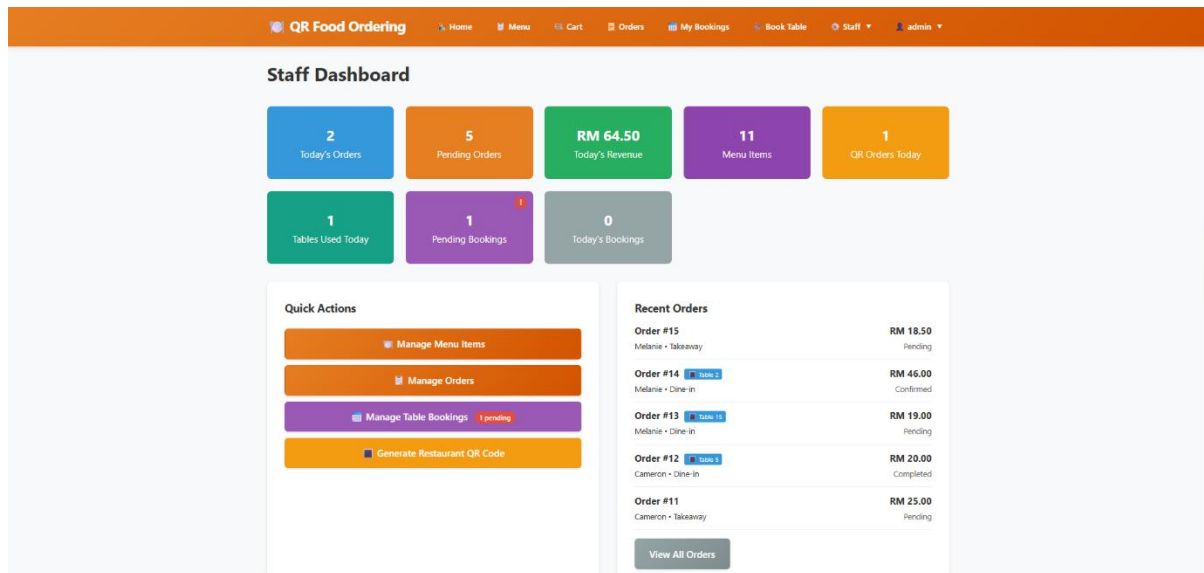


Figure 4. 26: Screenshot of Staff's Dashboard

Figure 4.27 illustrates the continuation of the staff dashboard, revealing customer's table booking details and pending actions that needed to be done. Staff may oversee the status in the figure below whether there are pending actions just by clicking the 'review pending' button. There are 3 types of status; confirmed, rejected and pending.

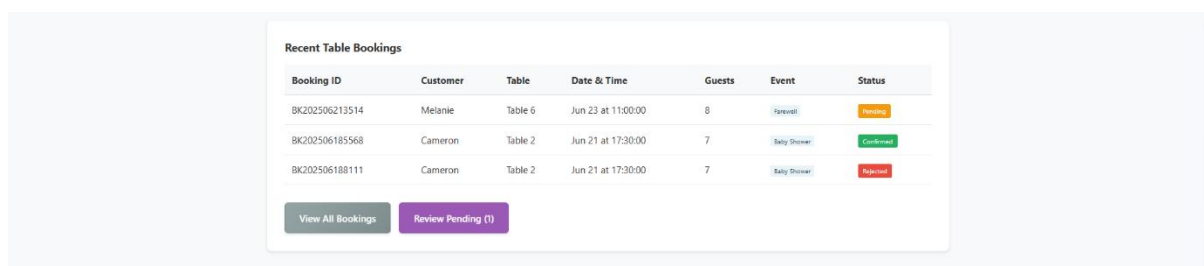


Figure 4. 27: Screenshot of Staff's Dashboard - Continuation

ii. Menu Management

Figure 4.28 below depicts the menu management interface, where staff can oversee and maintain the restaurant's digital menu offerings. This function is responsible for adding new items, editing items, deleting items and the visibility of items in customer's menu page.

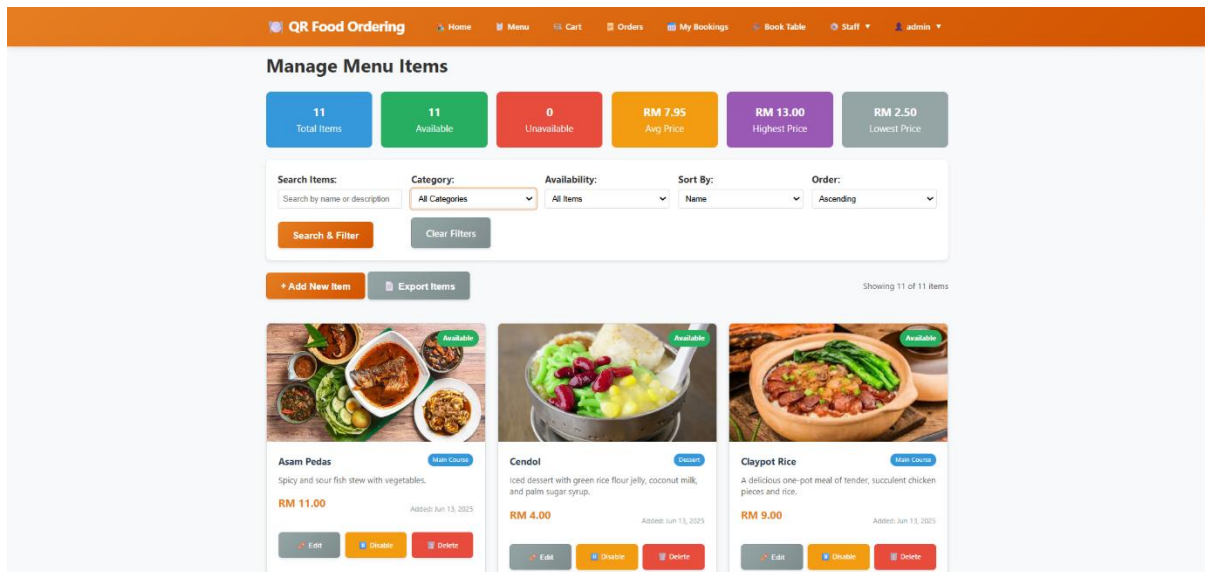


Figure 4. 28: Screenshot of Staff's Menu Management

Figure 4.29 demonstrates the menu item disabling feature, which allows staff to temporarily remove items from customer view without permanently deleting them from the system. This feature is especially useful when certain dish runs out of ingredients hence cannot be served to customers. Thus, the disabled button may provide a quick and reversible way to manage menu availability, helping restaurants avoid disappointing customers with unavailable items while maintaining the flexibility to reactivate dishes when they become available again.

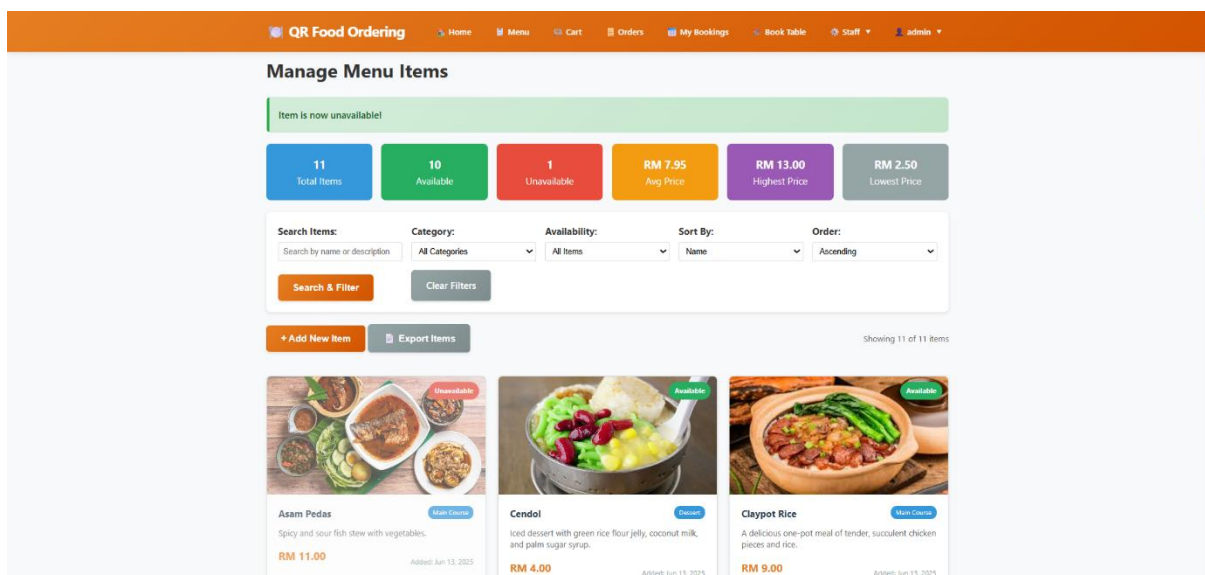


Figure 4. 29: Screenshot of Disable Menu

Figure 4.30 below showcases the menu editing display, where staff can modify existing items details such as descriptions, prices, images, and ingredient information. It enables staff to

quickly implement changes without needing technical skills, allowing restaurant personnel to efficiently manage menu information during regular operations.

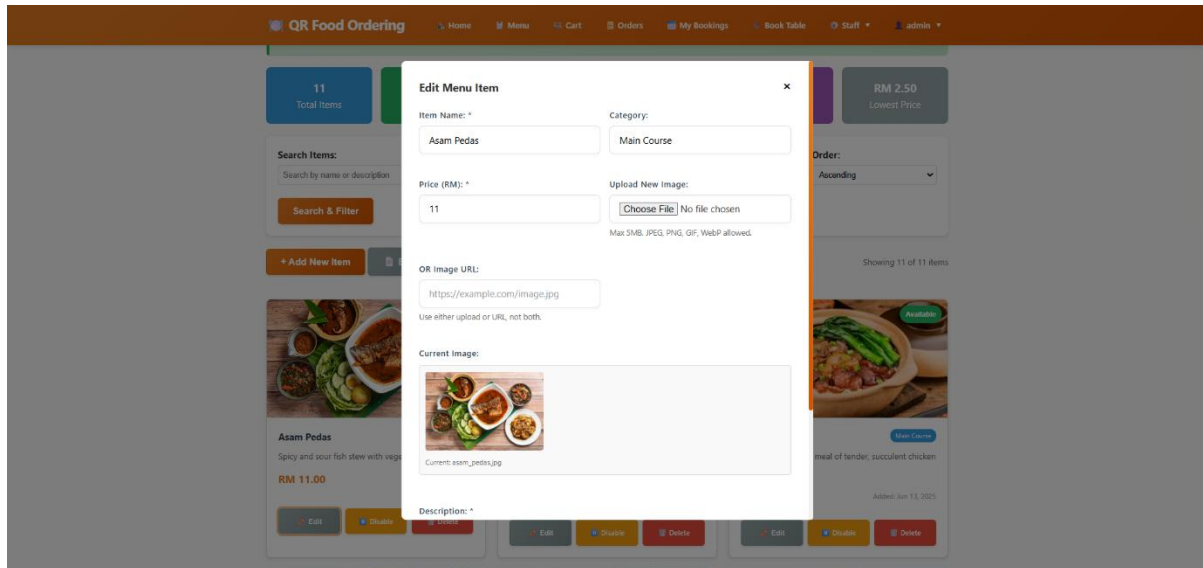


Figure 4. 30: Screenshot of Edit Menu

Figure 4.31 below presents the menu deletion confirmation message, opting staff to either confirm or cancel menu deletion. This verification step requires staff to consciously affirm their choice to permanently delete items from the menu system.

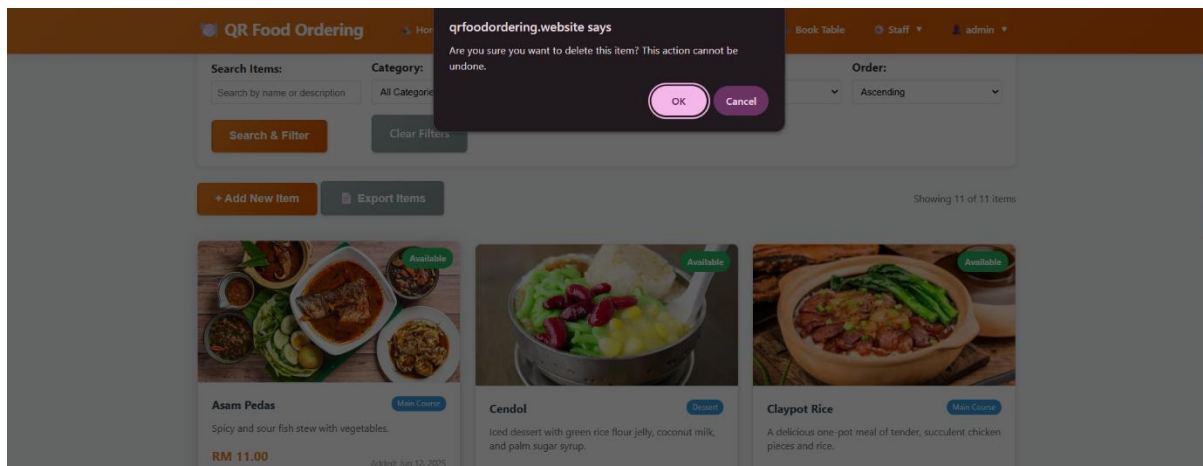


Figure 4. 31: Screenshot of Delete Menu

iii. Order Management

The order management as illustrated in Figure 4.32 below offers staff a detailed overview of all incoming and completed food orders. This feature enables restaurant staff to oversee order status, track preparation advancement, and guarantee food to be served to customer on time.

At first, staff will view a pending order, then they need to confirm or reject the order. Since this system only offers takeaway and dine-in service, hence customer will be in the restaurant physically to receive their food. In the case of order rejection, staff will need to delete order in the system and approach the customer directly to explain the reasons behind it.

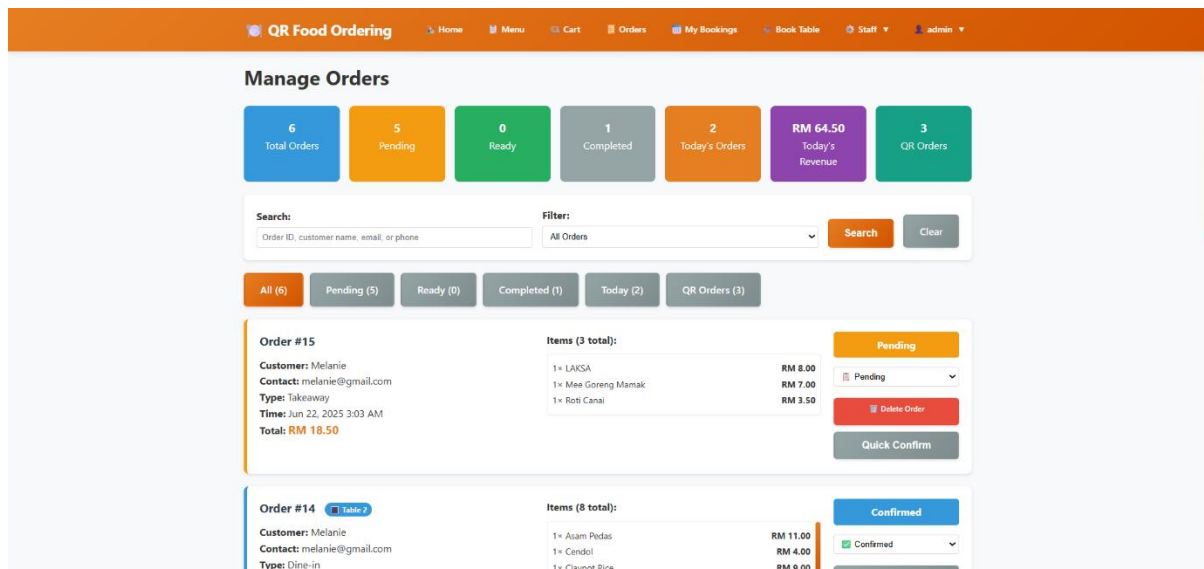


Figure 4. 32: Screenshot of Order Management

iv. Table Booking and Event Decoration Request Management

Figure 4.33 below showcases the table booking and event decoration management interface, where staff can approve or reject reservation. This booking management provides restaurant staff with all the necessary information to make informed decisions about booking approvals, customer details, event requirements, requested dates and times, and special accommodation needs. Simultaneously, staff may view upcoming reservation that is near to the date to reserve the table and prepare event decorations if required by customer.

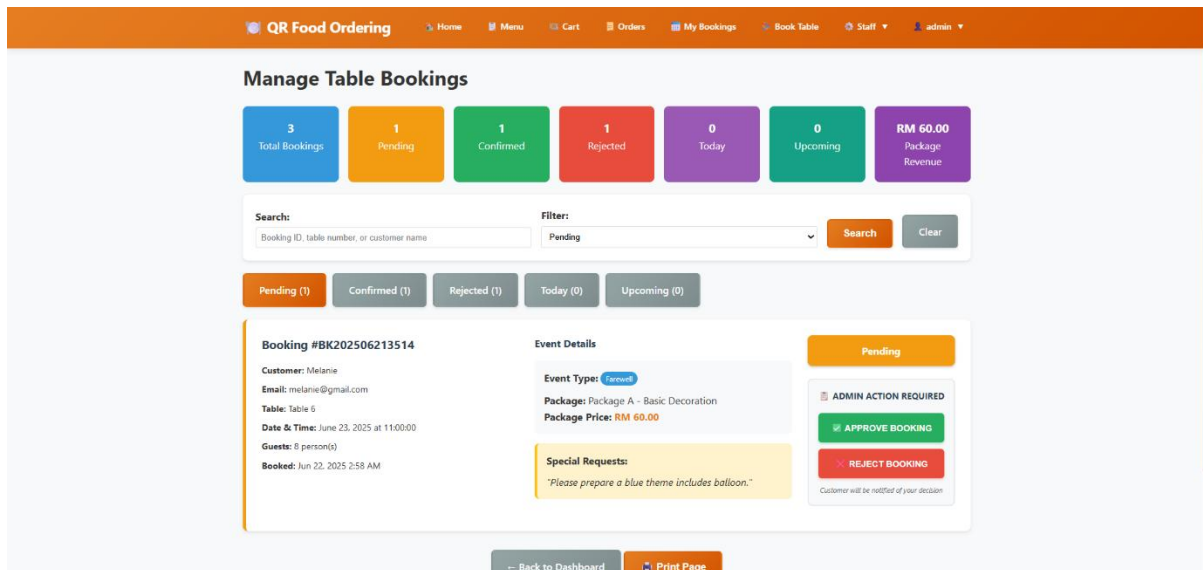


Figure 4. 33: Screenshot of Table Booking and Event Decoration Request Management

Figure 4.34 demonstrates the booking rejection process, showing how staff can decline reservation requests when necessary due to capacity constraints, scheduling conflicts, or other operational considerations. The rejection interface includes options for staff to provide explanatory messages to customers, helping maintain positive relationships even when requests cannot be fulfilled. This method of professional communication aids customers in grasping the reasons for rejection and might prompt them to look at different dates or options.

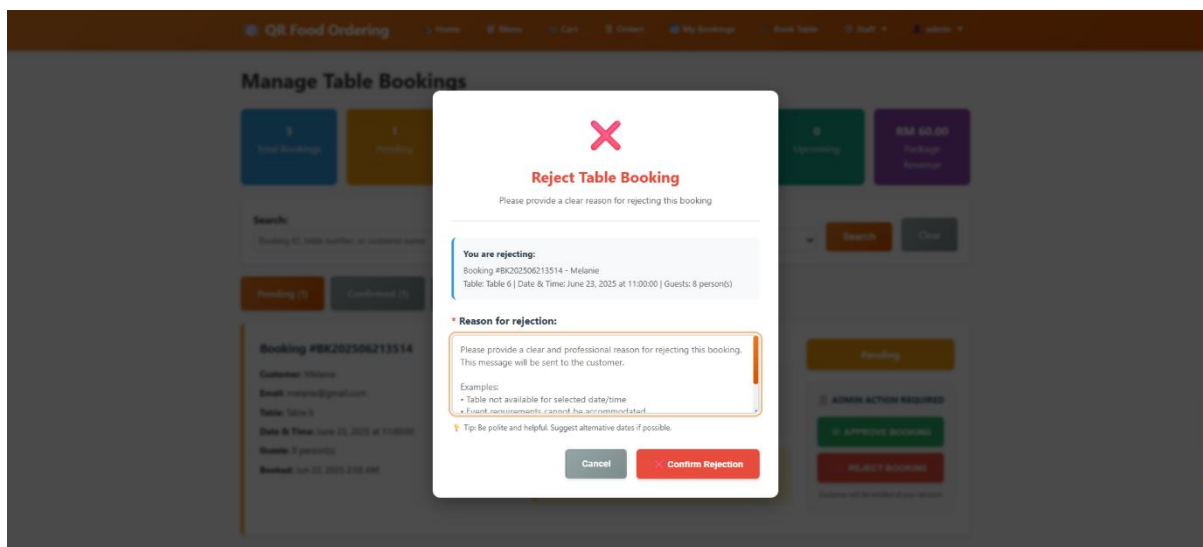


Figure 4. 34: Screenshot of Rejecting Table Booking

Figure 4.35 below showcases the booking approval process, where staff can confirm and finalize customer reservation requests. The approval function allows staff to review all booking details and make any necessary modifications if it clashes with other reservations. This systematic approval process ensures that all accepted bookings are properly recorded in

the restaurant's scheduling system and that customers receive clear confirmation of their reservation details. Here, the 'pending' label will integrate to 'confirmed' label in customer's check booking status landing page.

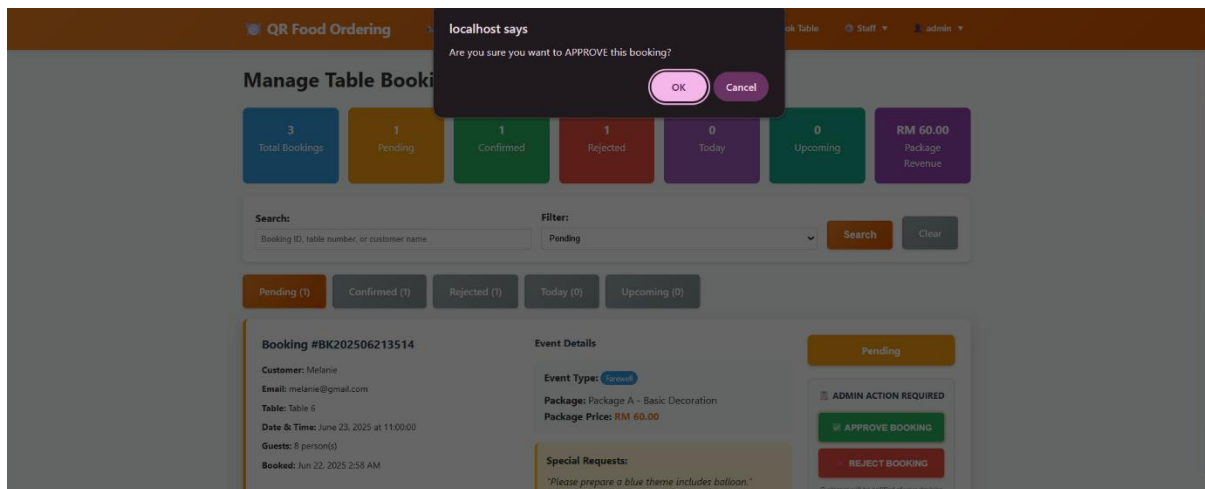


Figure 4. 35: Screenshot of Approving Table Booking

4.4 Summary

Overall, chapter 4 reflects a careful strategy to provide customized experiences for both customers and staff. The dual-interface system effectively addresses the requirements of each user group while maintaining consistent design principles and clear navigation throughout the application. The customer interface focuses on ease of use and visual appeal, while the staff interface emphasizes the functionality and operational efficiency, creating a balanced system that improves the overall dining experience for both users.

CHAPTER 5: TESTING

5.1 Introduction

This chapter 5 presents the comprehensive testing conducted on the QR-Powered Online Food Ordering Platform to ensure all system components operate correctly according to the specified requirements. Both functional testing and usability testing will be conducted to enhance user interface, system functionalities, and workflows for both customer and staff users.

5.2 Testing Environment Setup

The testing environment specifications include:

- **Operating System:** Windows 11, Android, iOS
- **Web Browsers:** Chrome, Firefox, Safari, Edge
- **Mobile Devices:** Android smartphones, iPhones
- **Testing Tools:** Manual testing with browser developer tools

5.3 Functionality Testing

5.3.1 QR Code Functionality Testing

Table 5. 1: Test case for QR Code Functionality module

Module		QR Code Functionality Module				
Test Case Description		This test will validate the QR code generation, scanning functionality, and cross-device compatibility.				
Test Objective		To verify that customers can successfully scan QR codes and access the ordering platform across different devices.				
Trigger		Customer scans the QR code using mobile device camera or QR scanner application.				
Precondition		QR code has been generated from the web application URL and is displayed for customers.				
Postcondition		Customer successfully accesses the homepage of the ordering platform.				
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail
TC5.1	Verify QR code generation and display	1.Generate QR code from application URL. 2.Display QR code for customer access	Application URL: https://qrfoodordering.website/ QR: 	QR code is generated successfully and displays correctly	QR code generated and displayed properly	Pass
TC5.2	Test QR code scanning with Android device	1.Open camera app on Android device 2.Point camera at QR	Android device with camera	QR code is scanned successfully and redirects to	QR code scanned successfully, homepage loaded	Pass

		code 3.Tap on QR code detection		homepage		
TC5.3	Test QR code scanning with iOS device	1.Open camera app on iOS device 2.Point camera at QR code 3.Tap on QR code notification	iOS device with camera	QR code is scanned successfully and redirects to homepage	QR code scanned successfully, homepage loaded	Pass
TC5.4	Test QR code scanning with third-party scanner app	1.Open QR scanner application 2.Scan the QR code 3.Verify redirection	Third-party QR scanner app	QR code is recognized and opens the application URL	QR code recognized correctly, application opened	Pass

5.3.2 Customer Registration and Login Testing

Table 5. 2: Test case for Customer Registration module

Module	Customer Registration Module
Test Case Description	This test will validate the customer registration process with both valid and invalid inputs.
Test Objective	To verify that new customers can successfully register accounts with proper validation.
Trigger	New customer accesses the registration page and attempts to create an account.

Precondition		Customer has accessed the registration page from the homepage.				
Postcondition		Customer account is created successfully, or appropriate error messages are displayed.				
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail
TC5.5	Verify registration page display	1.Navigate to registration page 2.Check form fields visibility	-	Registration form with username, email, password fields is displayed	Registration form displayed correctly with all required fields	Pass
TC5.6	Test registration with valid inputs	1.Enter valid username 2.Enter valid email 3.Enter valid password 4.Confirm password 5.Click Register button	Username: Melanie Email: <u>melanie@gmail.com</u> Password: 123456 Confirm Password: 123456	Registration successful message displayed and account created	Success message "Registration successful" displayed, account created	Pass
TC5.7	Test registration with invalid email	1.Enter username	Username: Melanie Email:Melanie.com	Error message "Please enter valid email address"	Error message displayed correctly, registration	Pass

	format	2.Enter invalid email 3.Enter password 4.Confirm password 5.Click Register button	Password: 123456 Confirm Password: 123456	displayed	prevented	
TC5.8	Test registration with mismatched passwords	1.Enter username 2.Enter email 3.Enter password 4.Enter different confirm password 5.Click Register button	Username: Hazim Email: <u>Hazim@yahoo.com</u> Password: Pass123! Confirm Password: Pass456!	Error message "Passwords do not match" displayed	Error message displayed correctly, registration prevented	Pass
TC5.9	Test registration with duplicate username	1.Enter existing username 2.Enter email	Username: Melanie Password: 123456 Confirm Password:	Registration form with username, email, password fields is	Success message "Registration successful" displayed, account created	Pass

		3.Enter password 4.Confirm password 5.Click Register button	123456	displayed		
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Table 5. 3: Test case for Customer Login module

Module		Customer Login Module				
Test Case Description		This test will validate the customer login process with valid and invalid credentials.				
Test Objective		To verify that registered customers can login successfully and unauthorized access is prevented.				
Trigger		Customer accesses the login page and enters credentials.				
Precondition		Customer has a registered account in the system.				
Postcondition		Customer is logged in and redirected to dashboard or appropriate error message is shown.				
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail
TC5.10	Test login with valid credentials	1. Enter valid username 2.Enter correct password 3.Click Login	Username: Melanie Password: 123456	Login successful, redirect to customer dashboard	Successfully logged in and redirected to dashboard	Pass

		button				
TC5.11	Test login with invalid username	1. Enter non-existent username 2.Enter password 3.Click Login button	Username: Florence Password: 123456	Error message "Invalid username or password" displayed	Error message displayed correctly, login prevented	Pass
TC5.12	Test login with incorrect password	1.Enter valid username 2.Enter wrong password. 3.Click Login button	Username: Melanie Password: WrongPass!	Error message "Invalid username or password" displayed	Error message displayed correctly, login prevented	Pass
TC5.13	Test login with empty fields	1.Leave username empty 2.Leave password empty 3.Click Login button	Username: (empty) Password: (empty)	Error messages "Username is required" and "Password is required" displayed	Validation messages displayed correctly, login prevented	Pass

5.3.3 Order Management Testing

Table 5. 4: Test case for Order Type Selection module

Module		Order Type Selection Module				
Test Case Description		This test will validate the order type selection functionality for dine-in and takeaway options.				
Test Objective		To verify that customers can select appropriate order types and are redirected correctly.				
Trigger		Customer clicks "Order Now" button from homepage.				
Precondition		Customer has accessed the homepage via QR code or direct URL.				
Postcondition		Customer selects order type and proceeds to appropriate next step.				
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail
TC5.14	Verify order type page display	1.Click "Order Now" from homepage 2.Check page elements	-	Order type page with Dine-in and Takeaway options displayed	Order type page displayed correctly with both options	Pass
TC5.15	Test dine-in option selection	1.Select "Dine-in" option 2.Click continue	Order Type: Dine-in	Redirect to table number input page	Successfully redirected to table number page	Pass
TC5.16	Test takeaway option selection	1.Select "Takeaway" option 2.Click continue	Order Type: Takeaway	Redirect directly to menu page	Successfully redirected to menu page	Pass

Table 5. 5: Test case for Table Number Input module

Module		Table Number Input Module					
Test Case Description		This test will validate the table number input functionality for dine-in customers.					
Test Objective		To verify that customers can input valid table numbers and invalid inputs are handled properly.					
Trigger		Customer selects dine-in option and proceeds to table number input.					
Precondition		Customer has selected dine-in order type.					
Postcondition		Valid table number is accepted and customer proceeds to menu page.					
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail	
TC5.17	Test valid table number input	1.Enter valid table number 2.Click continue	Table Number: 5	Table number accepted, redirect to menu page	Table number accepted successfully, redirected to menu	Pass	
TC5.18	Test invalid table number input (letters)	1.Enter letters instead of numbers 2.Click continue	Table Number: ABC	Error message "Please enter valid table number" displayed	Error message displayed correctly, input rejected	Pass	
TC5.19	Test empty table number input	1.Leave table number field empty 2.Click continue	Table Number: (empty)	Error message "Table number is required" displayed	Error message displayed correctly, prevented from continuing	Pass	

TC5.20	Test invalid table number (zero)	1.Enter zero as table number 2.Click continue	Table Number: 0	Error message "Please enter valid table number" displayed	Error message displayed correctly, input rejected	Pass
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Table 5. 6: Test case for Menu Display and Cart Management module

Module		Menu Display and Cart Management Module				
Test Case Description		This test will validate the menu display, item selection, and cart management functionality.				
Test Objective		To verify that customers can view menu items, add items to cart, and manage cart contents effectively.				
Trigger		Customer accesses the menu page after selecting order type and table number (if applicable).				
Precondition		Customer has completed order type selection and table number input (for dine-in).				
Postcondition		Customer can successfully add items to cart and manage cart contents.				
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail
TC5.21	Verify menu page display	1.Navigate to menu page 2.Check menu items visibility 3.Verify images and prices	-	All menu items displayed with images, names, and prices	Menu items displayed correctly with all details	Pass
TC5.22	Test add single item	1.Click "Add to	Menu Item: Nasi	Item added to cart, cart	Item added successfully,	Pass

	to cart	Cart" on menu item 2. Verify cart counter update	Lemak - RM8.50	counter shows 1, success message displayed	cart counter updated, success message shown	
TC5.23	Test quantity increases before adding to cart	1.Click quantity increase button 2.Click "Add to Cart" 3.Verify cart contents	Menu Item: Asam Pedas Quantity: 2	2 items added to cart, cart counter shows correct count	Quantity updated correctly, 2 items added to cart	Pass
TC5.24	Test cart page functionality	1.Navigate to cart page 2.Verify items display 3.Test quantity update 4.Test item removal	Cart Items: Nasi Lemak (1), Asam Pedas (2)	Cart displays all items with correct quantities and total price	Cart displayed correctly with accurate information	Pass
TC5.25	Test cart quantity update	1. In cart page, change quantity 2.Click "Update"	Original: Nasi Lemak (1) Updated: Nasi	Quantity updated, total price recalculated correctly	Quantity and total price updated successfully	Pass

		button 3.Verify total price update	Lemak (3)			
TC5.26	Test item removal from cart	1.Click "X" button on cart item 2.Verify item removal 3.Check total price update	Remove: Asam Pedas (2 items)	Item removed from cart, total price updated, cart counter decreased	Item removed successfully, price and counter updated	Pass

5.3.4 Order Checkout and Receipt Testing

Table 5. 7: Test case for Order Checkout module

Module		Order Checkout Module				
Test Case Description		This test will validate the order checkout process for both guest and registered customers.				
Test Objective		To verify that customers can successfully complete the checkout process with proper validation.				
Trigger		Customer clicks "Proceed to Checkout" from cart page.				
Precondition		Customer has items in cart and proceeds to checkout.				
Postcondition		Order is successfully placed and receipt is generated.				
Test	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail

Case ID						
TC5.27	Test checkout for guest customer	1.Proceed to checkout 2.Fill customer details 3.Click "Place Order"	Name: Annice Phone: 012-8527379 Order Type: Dine-in Table: 5	Order placed successfully, order confirmation displayed	Order placed successfully with confirmation message	Pass
TC5.28	Test checkout with empty customer details	1.Proceed to checkout 2.Leave name field empty 3.Click "Place Order"	Name: (empty) Phone: 012-8527379	Error message "Name is required" displayed	Error message displayed correctly, order prevented	Pass
TC5.29	Test checkout with invalid phone number	1.Proceed to checkout 2.Enter invalid phone format 3.Click "Place Order"	Name: Annice Phone: 012-8527379	Error message "Please enter valid phone number" displayed	Error message displayed correctly, order prevented	Pass
TC5.30	Test checkout for	1.Login as	Logged-in	Order placed with customer	Order placed successfully,	Pass

	logged-in customer	registered customer 2.Add items to cart 3.Proceed to checkout 4.Place order	User: Annice Items: Nasi Lemak (2)	details auto-filled, order history updated	details auto-filled, history updated	
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Table 5. 8: Test case for Order Receipt Generation module

Module	Order Receipt Generation Module					
Test Case Description	This test will validate the order receipt generation and display functionality.					
Test Objective	To verify that order receipts are generated correctly with all order details and unique order ID.					
Trigger	Customer successfully places an order.					
Precondition	Order has been successfully processed and confirmed.					
Postcondition	Order receipt is displayed with accurate information and unique order ID.					
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail

TC5.31	Verify receipt generation after order placement	1.Complete order placement 2.Check receipt display 3.Verify order details	Order: Nasi Lemak (2) - RM17.00 Customer: Melanie Table: 5	Receipt displayed with order ID, items, quantities, prices, and customer details	Receipt generated correctly with all details and unique order ID	Pass
TC5.32	Test receipt print functionality	1.Access order receipt 2.Click print button 3.Verify print dialog	Order Receipt displayed	Print dialog opens, receipt formatted for printing	Print functionality works correctly	Pass
TC5.33	Verify order ID uniqueness	1.Place multiple orders 2.Compare order IDs 3.Verify uniqueness	Order 1: #15 Order 2: #12	Each order has unique ID, no duplicates	Each order assigned unique ID successfully	Pass

5.3.5 Customer Dashboard and Advanced Features Testing

Table 5. 9: Test case for Customer Dashboard module

Module		Customer Dashboard Module				
Test Case Description		This test will validate the customer dashboard functionality and navigation for logged-in customers.				
Test Objective		To verify that logged-in customers can access dashboard features and navigate effectively.				
Trigger		Customer successfully logs in to their account.				
Precondition		Customer has registered account and is successfully logged in.				
Postcondition		Customer can access all dashboard features and navigate between sections.				
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail
TC5.34	Verify dashboard display after login	1.Login with valid credentials 2.Check dashboard layout 3.Verify navigation options	Username: Melanie Password: 123456	Dashboard displayed with welcome message and navigation menu	Dashboard displayed correctly with all navigation options	Pass
TC5.35	Test order history navigation	1.From dashboard, click "Order History" 2.Verify page navigation	Logged-in user with previous orders	Redirect to order history page with previous orders displayed	Successfully navigated to order history with orders listed	Pass
TC5.36	Test table booking	1.From dashboard, click "Book Table"	Logged-in user	Redirect to table booking page with booking form	Successfully navigated to booking page with form	Pass

	navigation	2.Verify page navigation			displayed	
TC5.37	Test booking status navigation	1.From dashboard, click "Check Booking Status" 2.Verify page navigation	Logged-in user with booking requests	Redirect to booking status page with current bookings	Successfully navigated to booking status with current bookings	Pass

Table 5. 10: Test case for Table Booking and Event Decoration module

Module		Table Booking and Event Decoration Module				
Test Case Description		This test will validate the table booking functionality including event decoration requests.				
Test Objective		To verify that customers can book tables for regular dining and special events with proper validation.				
Trigger		Logged-in customer accesses table booking page.				
Precondition		Customer is logged in and has accessed the booking page.				
Postcondition		Booking request is submitted successfully or appropriate error messages are displayed.				
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail
TC5.38	Test regular table booking	1.Select "Regular Dining"	Booking Type: Regular Dining	Booking submitted successfully, confirmation	Booking submitted successfully with	Pass

		2.Choose date and time 3.Enter guest count 4.Fill details 5.Submit booking	Date: 2025-07-01 Time: 19:00 Guests: 4 Name: John	message displayed	confirmation	
TC5.39	Test event booking with decoration Package A	1.Select "Event with Decoration" 2.Choose date and time 3.Enter guest count (≤ 10) 4 Select event type 5.Submit booking	Date:2025-07-15 Time: 18:00 Guests: 8 Event: Birthday Celebration Package: A (Auto-selected)	Package A selected automatically, booking submitted with decoration charges	Package A auto-selected, booking submitted with correct charges	Pass
TC5.40	Test event booking with decoration Package B	1.Select "Event with Decoration" 2.Choose date and time	Date: 2025-07-20 Time: 19:30 Guests: 15	Package B selected automatically, booking submitted with higher decoration charges	Package B auto-selected, booking submitted with correct charges	Pass

		3.Enter guest count (>10) 4.Select event type 5.Submit booking	Event: Anniversary Package: B (Auto-selected)			
TC5.41	Test booking with past date	1.Select booking type 2.Choose past date 3.Attempt to submit	Date: 2025-06-20 (past date) Current date: 2025-06-23	Error message "Cannot book for past dates" displayed	Error message displayed correctly, booking prevented	Pass
TC5.42	Test booking status checking	1.Navigate to booking status page 2.View submitted booking 3.Check status display	Previous booking submitted	Booking displayed with "Pending" status and booking details	Booking status displayed correctly with all details	Pass

Table 5. 11: Test case for Order History module

Module		Order History Module				
Test Case Description		This test will validate the order history functionality for logged-in customers.				
Test Objective		To verify that customers can view their previous orders with detailed information.				
Trigger		Logged-in customer accesses order history page.				
Precondition		Customer is logged in and has placed previous orders while logged in.				
Postcondition		Order history is displayed with accurate order information.				
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail
TC5.43	Verify order history display	1.Navigate to order history 2.Check order list display 3.Verify order information	Customer with 3 previous orders	Order history displays all orders with dates, amounts, and order types	Order history displayed correctly with all order details	Pass
TC5.44	Test order details view	1.Click on specific order date 2.View detailed order information 3.Verify completeness	Order Date: 2025-06-20 Order ID: #10	Detailed view shows items ordered, quantities, prices, table number, order type	Detailed view displayed correctly with complete information	Pass

TC5.45	Test order history with no orders	1.Login with new account 2.Navigate to order history 3.Check display	New customer account with no orders	Message "No order history found" displayed	Appropriate message displayed for empty order history	Pass
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5.3.6 Staff Interface Testing

Table 5. 12: Test case for Staff Login and Dashboard module

Module		Staff Login and Dashboard Module				
Test Case Description		This test will validate the staff login functionality and dashboard access.				
Test Objective		To verify that staff members can login with proper role-based access and view administrative dashboard.				
Trigger		Staff member accesses login page and enters credentials.				
Precondition		Staff account exists in the system with appropriate permissions.				
Postcondition		Staff member is logged in and can access administrative functions.				
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail
TC5.46	Test staff login with valid credentials	1.Enter staff username 2.Enter staff password	Username: <u>admin@restaurant.com</u> Password: Password	Login successful, redirect to staff dashboard	Successfully logged in and redirected to staff dashboard	Pass

		3.Click Login button				
TC5.47	Test role-based access control	1.Login as staff 2.Verify staff dashboard access 3.Attempt to access customer features	Staff credentials	Staff can access admin functions but not customer-specific features	Role-based access working correctly, appropriate restrictions in place	Pass
TC5.48	Verify staff dashboard display	1.Access staff dashboard 2.Check navigation menu 3.Verify admin functions	Staff logged in	Dashboard displays menu management, order management, and booking management options	Staff dashboard displayed correctly with all administrative options	Pass

Table 5. 13: Test case for Menu Management module

Module	Menu Management Module
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Test Case Description		This test will validate the menu management functionality for staff members.				
Test Objective		To verify that staff can add, edit, disable, and delete menu items effectively.				
Trigger		Staff member accesses menu management section from dashboard.				
Precondition		Staff member is logged in with administrative privileges.				
Postcondition		Menu items are managed successfully with changes reflected in customer menu.				
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail
TC5.49	Test add new menu item	1. Navigate to menu management 2. Click "Add New Item" 3. Fill item details 4. Upload image 5. Save item	Name: Rendang Daging Price: RM12.00 Description: Creamy and delicious traditional beef curry Category: Main Course	New menu item added successfully and appears in customer menu	Menu item added successfully and visible to customers	Pass
TC5.50	Test edit existing menu item	1. Select existing menu item 2. Click "Edit" 3. Modify details 4. Save changes	Original: Nasi Lemak RM8.50 Updated: Nasi Lemak RM9.00	Menu item updated successfully, changes reflected in customer menu	Menu item updated successfully with new price	Pass

TC5.51	Test disable menu item	1.Select menu item 2.Click "Disable" button 3.Confirm action	Menu Item: Asam Pedas	Item disabled, no longer visible to customers but retained in system	Item disabled successfully, removed from customer view	Pass
TC5.52	Test enable disabled menu item	1.Select disabled item 2.Click "Enable" button 3.Verify visibility	Previously disabled: Asam Pedas	Item enabled and visible to customers again	Item enabled successfully and visible to customers	Pass
TC5.53	Test delete menu item	1.Select menu item 2.Click "Delete" button 3.Confirm deletion	Menu Item: Test Item	Confirmation dialog displayed, item deleted after confirmation	Confirmation dialog shown, item deleted successfully	Pass

Table 5. 14: Test case for Order Management module

Module	Order Management Module
Test Case Description	This test will validate the order management functionality for staff members.

Test Objective		To verify that staff can view, confirm, and manage customer orders effectively.				
Trigger		Customer places order and staff accesses order management section.				
Precondition		Staff member is logged in and customer orders exist in the system.				
Postcondition		Orders are managed successfully with appropriate status updates.				
Test Case ID	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail
TC5.54	Verify order display in management panel	1.Navigate to order management 2.Check pending orders display 3.Verify order details	Customer Order: Nasi Lemak (2) Table: 5 Status: Pending	Pending orders displayed with customer details, items, and table information	Orders displayed correctly with all relevant information	Pass
TC5.55	Test order confirmation	1. Select pending order 2. Click "Confirm Order" 3. Verify status update	Order ID: #20 Items: Rendang Daging (1)	Order status updated to "Confirmed", order moves to confirmed section	Order confirmed successfully, status updated	Pass
TC5.56	Test order rejection	1.Select pending order	Order ID: #20 Items:	Order status updated to "Rejected", order removed	Order rejected successfully, removed	Pass

		2.Click "Reject Order" 3.Confirm rejection	Unavailable item	from pending	from pending list	
TC5.57	Test order completion	1.Select confirmed order 2.Click "Mark as Completed" 3.Verify completion	Order ID: #20 Status: Confirmed	Order marked as completed, moves to completed orders section	Order completed successfully, status updated	Pass

Table 5. 15: Test case for Booking Management module

Module		Booking Management Module				
Test Case Description		This test will validate the booking management functionality for staff members.				
Test Objective		To verify that staff can review, approve, and reject customer booking requests.				
Trigger		Customer submits booking request and staff accesses booking management.				
Precondition		Staff member is logged in and customer booking requests exist.				
Postcondition		Booking requests are processed with appropriate status updates to customers.				
Test	Test Scenario	Test Steps	Test Data	Expected Result	Actual Result	Pass/Fail

Case ID						
TC5.58	Verify booking request display	1.Navigate to booking management 2.Check pending bookings 3.Verify booking details	Customer: Annice Date: 01/07/2025 Guests: 4 Event Type: Regular Dining	Pending bookings displayed with customer details, date, time, and special requests	Booking requests displayed correctly with complete information	Pass
TC5.59	Test booking approval	1.Select pending booking 2.Review booking details 3.Click "Approve Booking	Customer: Annice Date: 01/07/2025 Guests: 4 Event Type: Regular Dining Action: Approve Booking	Confirmed bookings displayed with customer details, date, time, and special requests	Booking requests displayed correctly with complete information	Pass

5.4 Usability Testing

Usability testing assesses how simple and effectively actual users can engage with the QR-Powered Online Food Ordering Platform to achieve their desired tasks. This testing approach concentrates on watching real customers and restaurant staff as they interact with the system, pinpointing any misunderstandings, challenges, or obstacles that could hinder them from effectively placing orders or using the platform. To facilitate this testing phase, the web application was temporarily hosted at <https://qrfoodordering.website/> allowing customer to have access on the website.

There are 30 respondents that have participated in this survey. Responses were gathered via an online survey designed using Google Forms, which was segmented into multiple sections addressing customer experience, assessment of staff interaction, and overall usability of the system. The survey inquiries focused on essential factors like navigation simplicity, instruction clarity, mobile adaptability, and contentment with the ordering procedure. Respondents in this survey were tasked with exploring and testing the main features available to both guest customers and logged-in users, while a separate group of participants evaluated the staff management interface including menu management, order processing, and booking administration features.

5.4.1 Section 1: Participant Information

Figure 5.1 presents a list of participants' full names who contributed to the usability testing. It serves to document the diversity and involvement of the test group in the evaluation phase.

Section 1: Participant Information

1. Full Name

30 responses

Nana Mysara

Peggy Suenie anak Achog

Elvina

Nathaniel Anak Thompson

Emily

Tensu Achin

Fennyllia Gerasi

Jessica James Anak Johnny

Alex Achong

Figure 5. 1: Participants Name Submission

Figure 5.2 shows the breakdown of participants' ages who took part in the usability testing. It highlights whether the system is being tested by a varied demographic, especially those in the most likely customer range (18–35 years old). Majority's age is 18 – 25 years old at (53.3%) while the minority age range that filled up this survey are group age below 18 and 35 – 45 years with (6.7%).

2. Age

30 responses

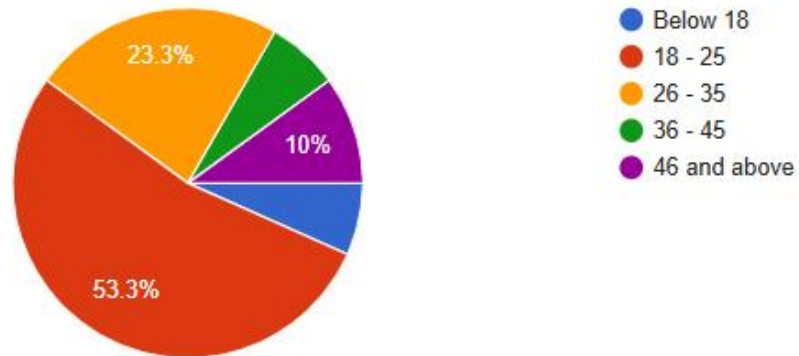


Figure 5. 2: Distribution of Participants by Age

This chart illustrates the gender composition of respondents, ensuring that the survey includes diverse perspectives when evaluating usability. 70% respondents are females while others are males.

3. Gender

30 responses

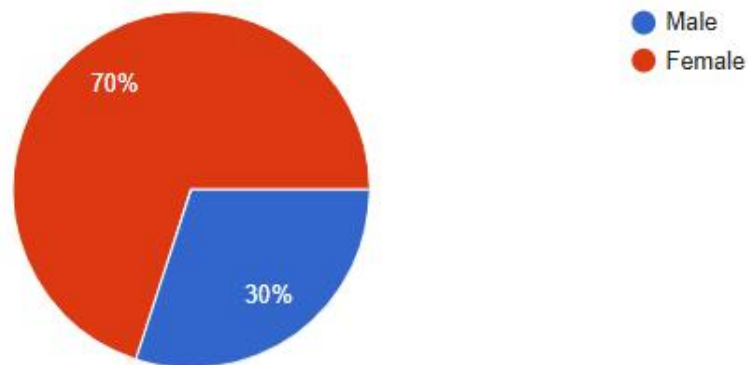


Figure 5. 3: Gender Breakdown of Participants

Figure 5.4 illustrates the educational or professional background of our participants, showing the variety of perspectives brought to the testing process. Mostly students (53.3%) and public (43.3%), where both serves as same role in testing this system which is possible customer that

uses system to order. While the restaurant staff also is to test the customer page, they could give insights on the quality of system in their perspective. Having users from different educational levels helps ensure our platform is accessible and intuitive for people with varying levels of technical experience and digital literacy.

4. Role

30 responses

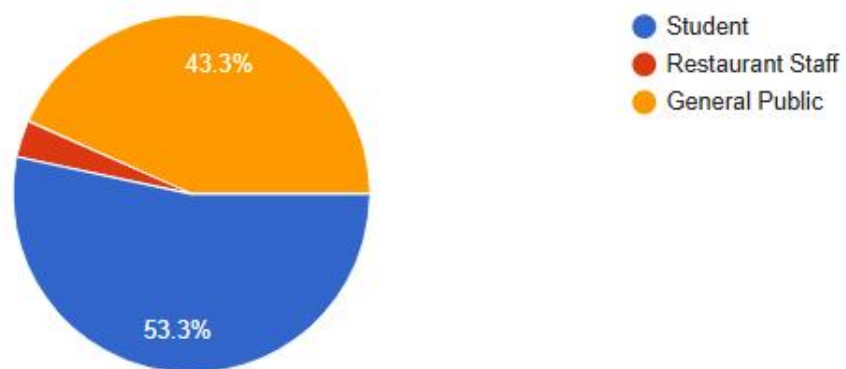


Figure 5. 4: Role Distribution

Figure 5.5 reveals how comfortable participants are with technology or how frequently they use similar platforms through a detailed pie chart breakdown. Since 80% respondents are familiar with the QR ordering platform before, understanding users' tech-savviness helps to interpret their feedback more accurately and identify whether difficulties stem from the platform design itself or from unfamiliarity with digital tools.

Have you used QR-based ordering platforms before?

30 responses

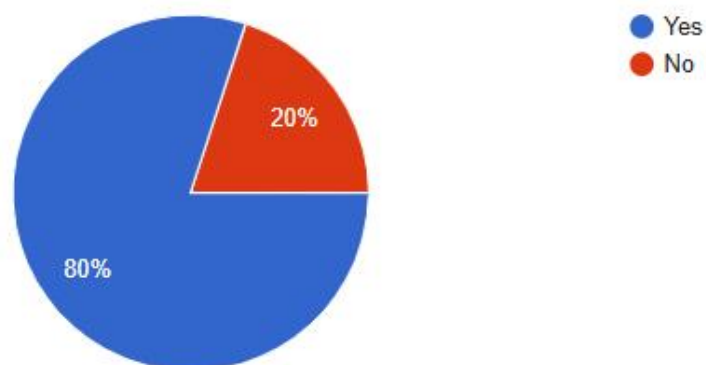


Figure 5. 5: Technology Familiarity

5.4.2 Section 2: System Testing

Figure 5.6 demonstrates participants should test the system first before proceeding to section 3 which will covers all about the system. They may either scan QR code or click URL link to access the QR Food Ordering Platform.

Section 2: System Testing

Before answering the survey, please follow these steps:

1. Scan the QR code below OR click the link to access the system:

(Or <https://qrfoodordering.website/>)

2. Try the following actions:

• Place an order **without logging in**

• Register and log in as a customer

• Place another order **as a logged-in user**

• Try **booking a table with event decoration**

• View your **order history and booking status**

Then proceed to answer the survey below.

QR for QR Food Ordering Platform



Figure 5. 6: System Testing

5.4.3 Section 3: Guest Customer Experience

Figure 5.7 presents a comprehensive chart showing how easily guests could navigate through the ordering platform without creating an account. The feedback captured here is crucial since

135

many customers prefer to order quickly without the commitment of registration, making the guest experience a key factor in user satisfaction and conversion rates.

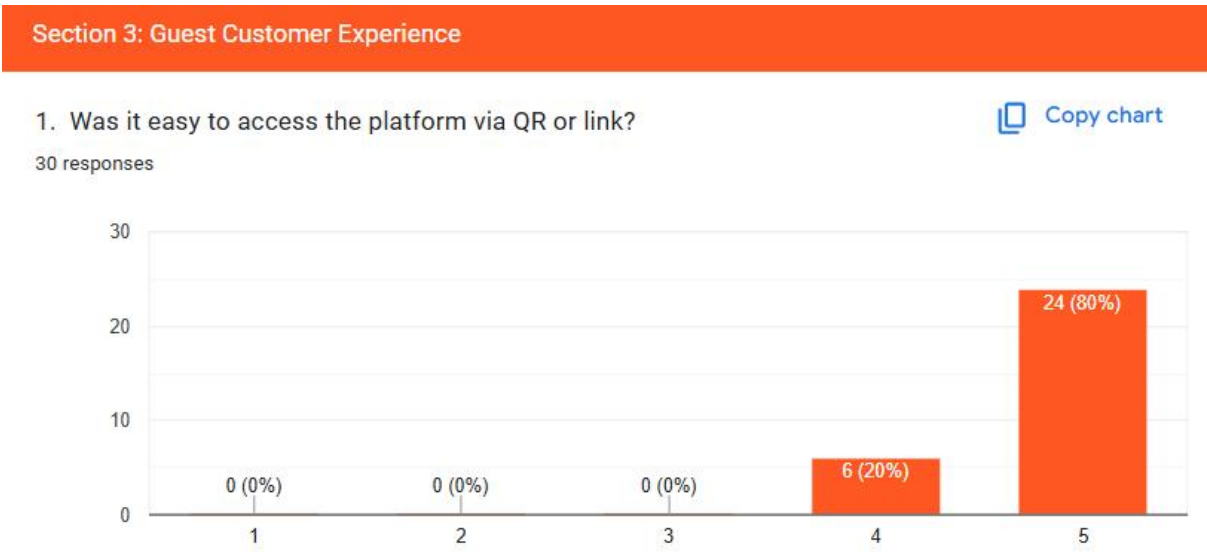


Figure 5. 7: Guest Navigation Ease

Figure 5.8 displays the results revealing how intuitive participants found the menu browsing process during their guest user sessions. Since browsing the menu is one of the most fundamental actions users perform and often determines whether they complete their order, positive feedback in this area indicates that the system’s categorization, search functionality, and visual presentation are working effectively. The bar chart format shows the distribution of user satisfaction levels and identify specific areas where the menu interface might need improvement.

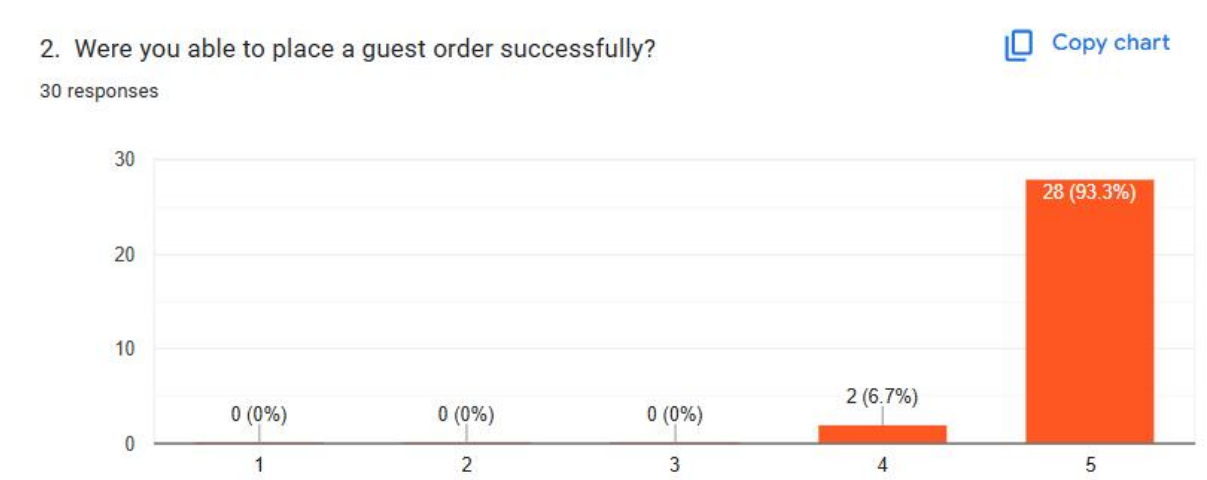


Figure 5. 8: Menu Browsing Experience

Figure 5.9 illustrates participant responses regarding the actual order placement as guest users, indicating satisfaction levels across various elements of the ordering process. The information indicates if users perceived it easy to add products to their cart, change amounts, utilize any existing promotions, and finalize their purchases without facing perplexing steps or technical obstacles. This feedback is especially important since the order placement process directly affects overall success of this system.

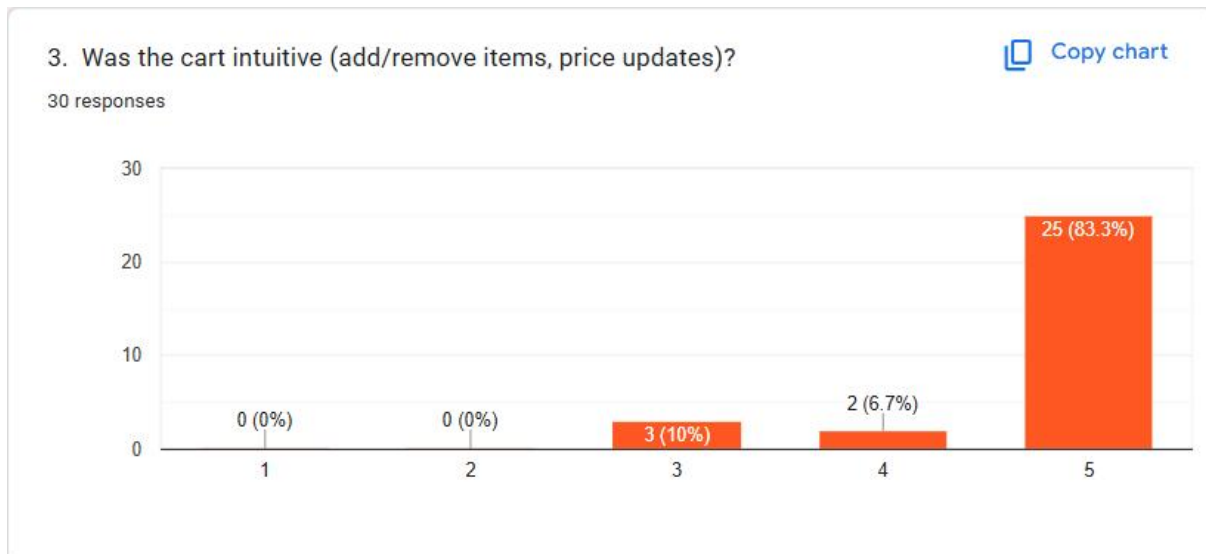


Figure 5. 9: Order Placement Process

Figure 5.10 focuses on the order confirmation and the printed receipt after order has been placed. The result shows that most respondents have good experience in viewing the clear order confirmation.

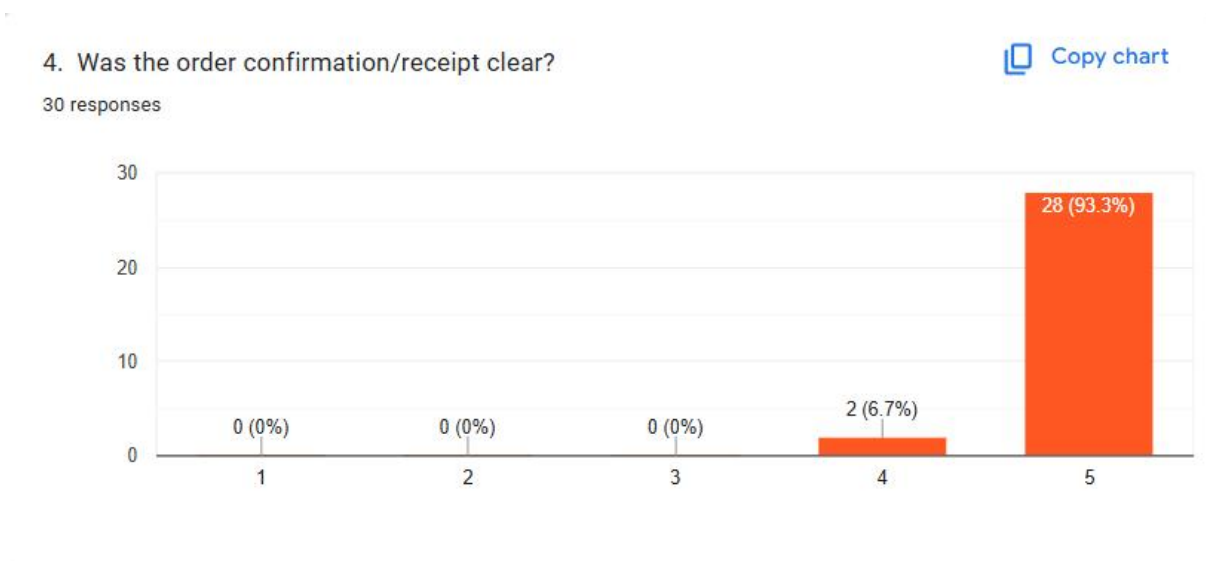


Figure 5. 10: Order Confirmation / Receipt Satisfaction

Figure 5.11 evaluates how clear and understandable participants found the interface when using the platform as guests, with results displayed in an easy-to-interpret format. All respondents did not address any problem encounter while ordering food as guest customer.



Figure 5. 11: Guest User Interface Clarity

Figure 5.12 provides a summary chart showing participants' overall satisfaction with the guest user experience, offering a holistic view of the platform's performance for non-logged in customers. One of the suggestions given was “Add show password option”, clearly refer to as logged in user that uses the system. Indeed, the system did not show password when user type in their password.



Figure 5. 12: Overall Guest Experience

5.4.4 Section 4: Feature Usage Confirmation

Figure 5.13 shows comprehensive data on which features participants actually used during their testing session and which functionalities they discovered, utilized, or overlooked entirely. Understanding feature adoption patterns helps to identify which functionalities are intuitive and immediately valuable to users. The chart provides crucial insights into user behaviour patterns and helps prioritize future development efforts by highlighting both successful features and those requiring improvement.

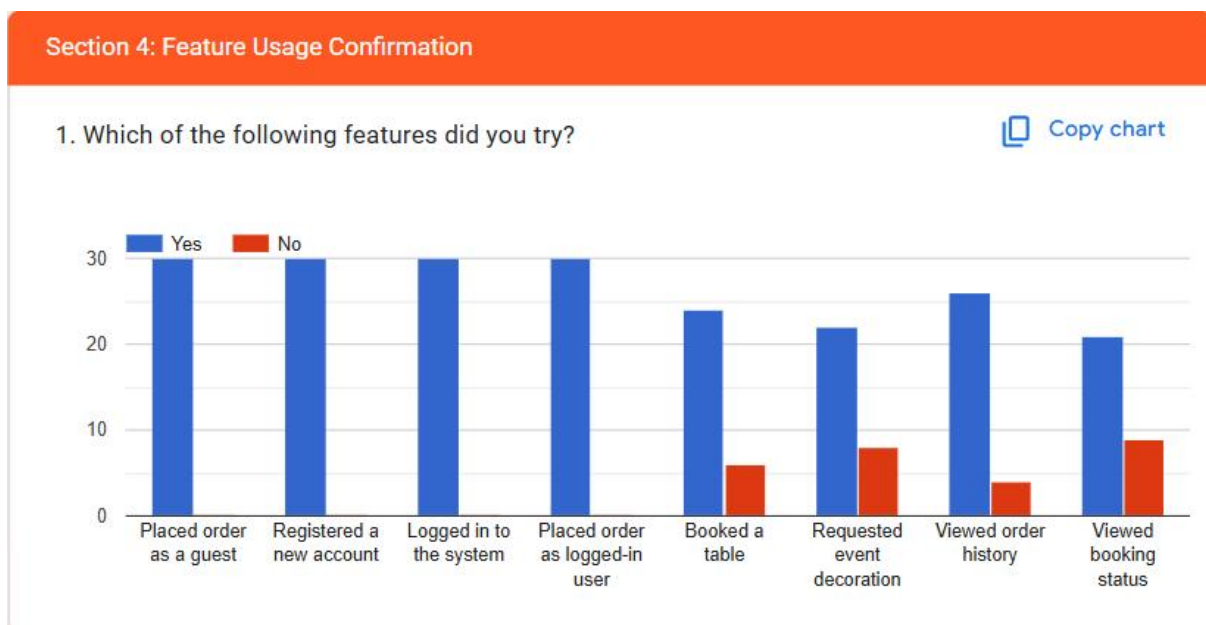


Figure 5. 13: Feature Utilization Tracking

5.4.5 Section 5: Logged-In User Experience

Figure 5.14 captures detailed feedback on how smooth and straightforward participants found the account creation process, displaying user satisfaction levels across different registration steps. 23 respondents have good experience during registration and login process.

Section 5: Logged-In User Experience

1. Was the registration and login process smooth?

 Copy chart

30 responses

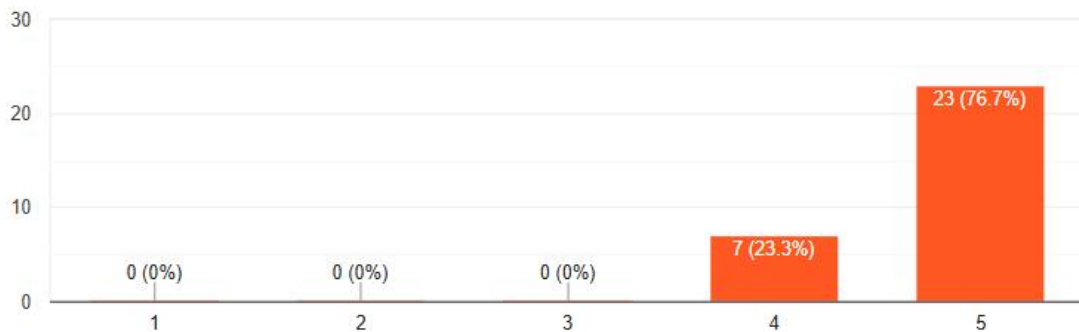


Figure 5. 14: Account Registration Process

Figure 5.15 presents results showing how easily returning users can place order while logging in. All respondents were able to place order while they are logging in helps to identify that the process to place order as logged in customer is easy to use.

2. Were you able to place an order while logged in?

 Copy chart

30 responses

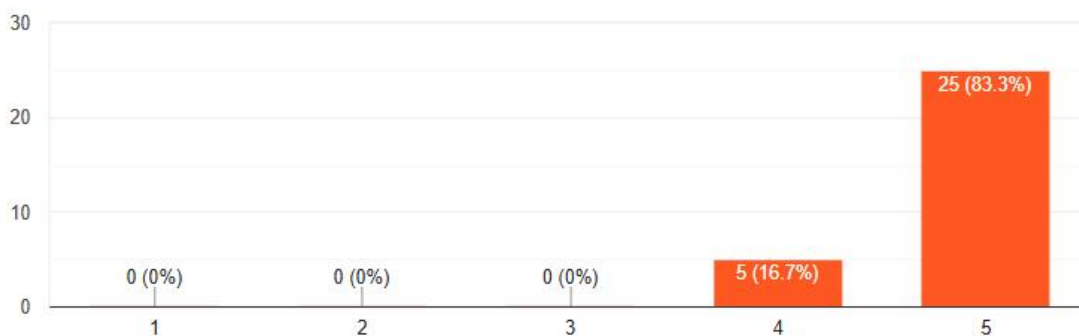


Figure 5. 15: Login Experience Satisfaction

Figure 5.16 captures the intuitiveness of ordering process while logging in for participants. Mostly were able to just follow the navigation when ordering food, meaning that the user interface and flow is easy to understand and use.

3. Ordering as a logged-in user was intuitive.

 Copy chart

30 responses

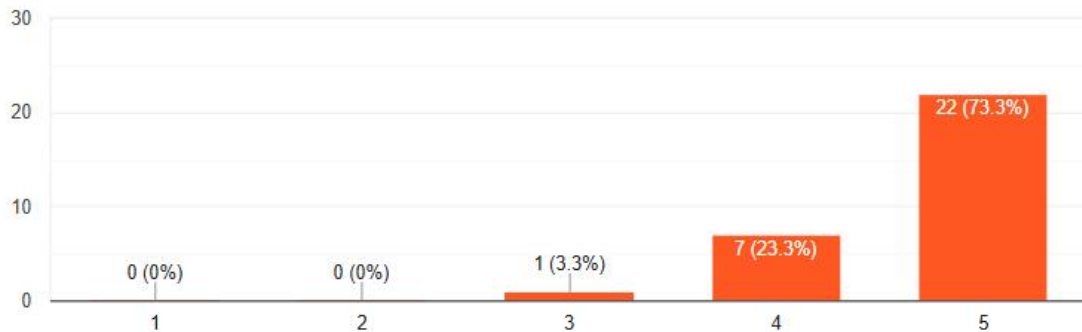


Figure 5. 16: Logged In User Experience Satisfaction While Ordering Food

Figure 5.17 displays a pie chart that sum up 23 respondents tried the table booking feature and have good satisfaction towards it while 10% of the respondents stated that the feature was a little confusing. This might because they confuse of the layout of interface, or the event decoration request packages or even workflows may seems confusing to them.

4. Did you try the table booking feature?

 Copy chart

30 responses

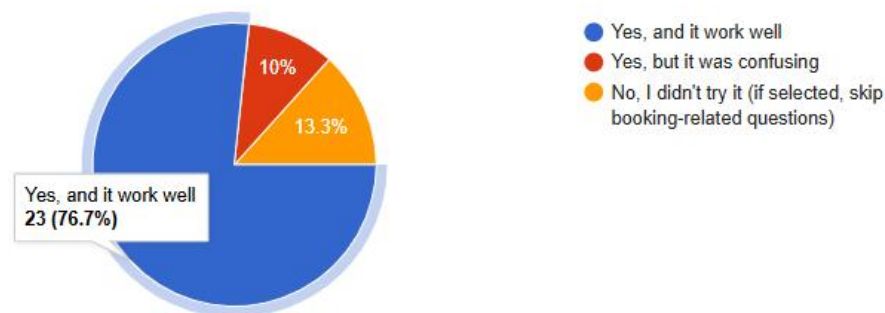


Figure 5. 17: Table Booking Feature Satisfactory

Figure 5.18 captures user feedback on how easy and straightforward participants found the table booking functionality within the platform. This feature allows customers to reserve tables at restaurants while placing their food orders, creating a seamless dining experience that combines both ordering and reservation systems. The data helps to identify whether the table booking interface is intuitive enough for users to navigate without confusion or not.

5. The table booking feature was easy to use.

 Copy chart

27 responses

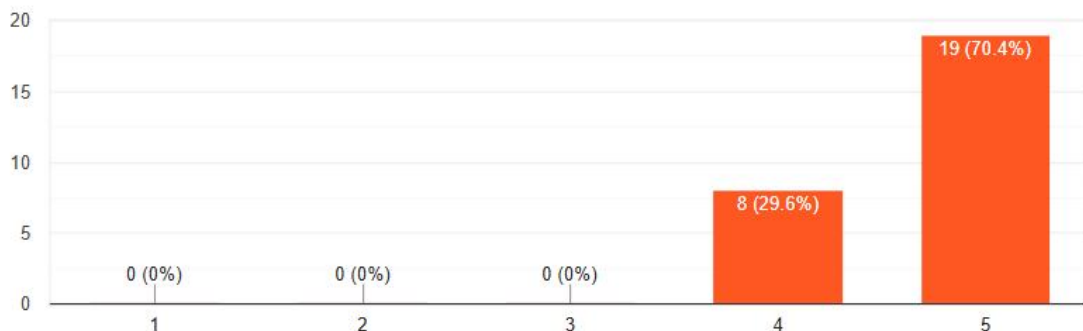


Figure 5. 18: Table Booking Ease of Use

Figure 5.19 shows result on how satisfied users were with the overall table booking process, including the event decorations options. 2 packages were introduced in this system, which each has its own speciality. The feedback helps to evaluate whether the table booking process including the event decorations options is clear enough to understand.

6. Event decoration options were clear and helpful.

 Copy chart

28 responses

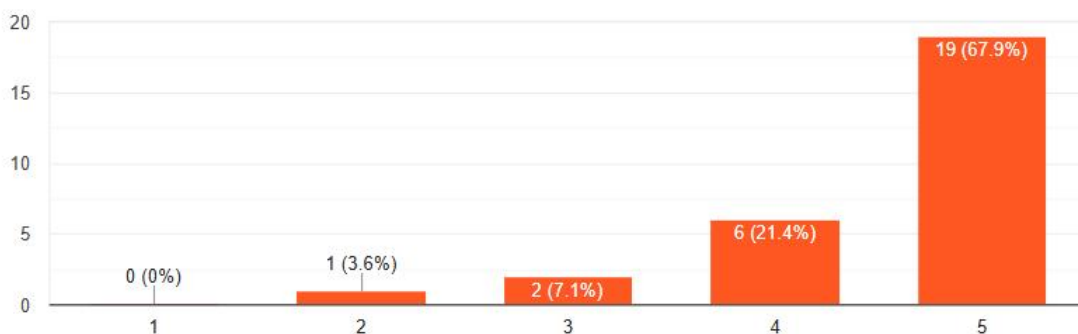


Figure 5. 19: Table Booking Process Satisfaction

Figure 5.20 displays feedback on how well users could navigate and view booking and order history. Successful booking and order lead to another navigation where customer can track their booking and order history. It is crucial for user confidence, as customers need to feel secure that their reservations are properly recorded and can be easily accessed or modified if needed.

7. I could easily view my booking and order history.

 Copy chart

28 responses

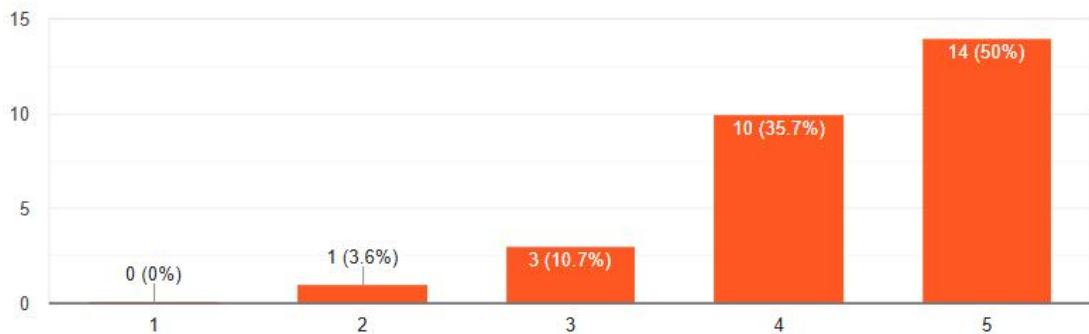


Figure 5. 20: *Booking Confirmation and Order History Satisfactory*

Figure 5.21 presents a comprehensive chart summarizing the overall experience of users who created accounts and used the platform's full range of personalized features as logged-in customers. There are several suggestions such as;

“Let restaurant member to assign customer table”

“Decorations are not that clear”

“Put notifications if items is added to cart at least to let user know”

“Should put more details of decorations for all packages”

3 suggestions were clearly related to table booking process feature including requesting event decorations. This suggestion provides better insights that this feature need more improvement.

8. Any suggestions for improving the logged-in user experience?

9 responses

No
Let restaurant member to assign customer table
Superb
Decorations are not that clear
.
Put notifications if items is added to cart at least to let user know
Should put more details of decorations for all packages

Figure 5. 21: Overall Logged-In Customer User Experience

5.4.6 Section 6: Overall Design and Usability

Figure 5.22 addresses the aesthetic aspects of the platform, including color scheme, typography, and overall visual hierarchy, showing user satisfaction levels across different design elements. All participants put high scale for this survey. This means that functionality is crucial for any ordering platform, attractive design also plays a significant role in user trust, and overall enjoyment of the ordering experience.

Section 6: Overall Design and Usability

1. The overall system design is visually appealing.

 Copy chart

30 responses

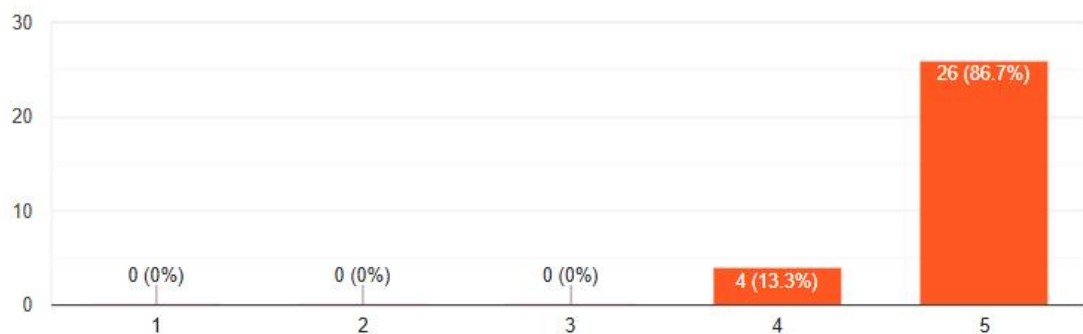


Figure 5. 22: Visual Design Appeal

Figure 5.23 presents results that are particularly important since most food ordering happens on mobile devices since user need mobile phone in their daily life. The chart shows the platform able adapt to different screen sizes and responsive across various mobile devices and operating systems. Positive feedback is crucial for enhance user overall satisfaction.

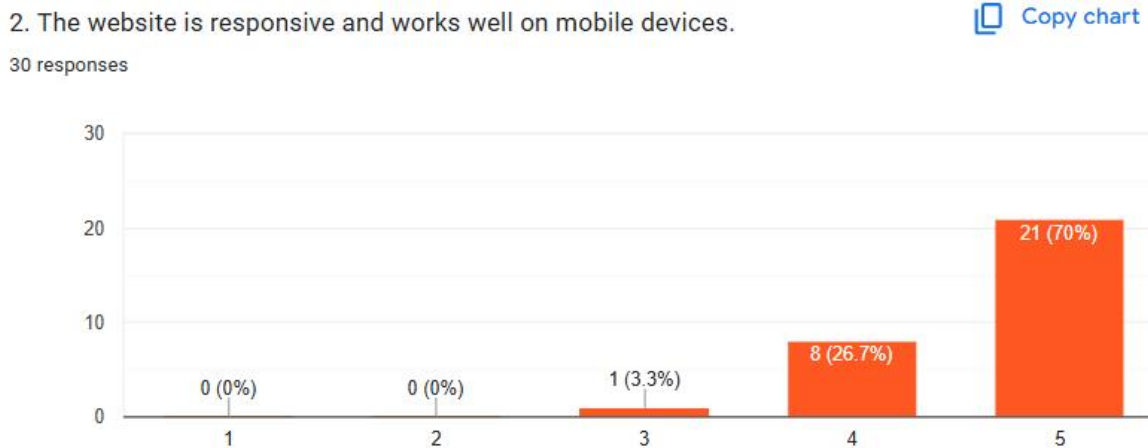


Figure 5. 23: Mobile Responsiveness

Figure 5.24 below captures the UI/UX satisfactory. Most participants are satisfied with the overall system text type, button and layout.

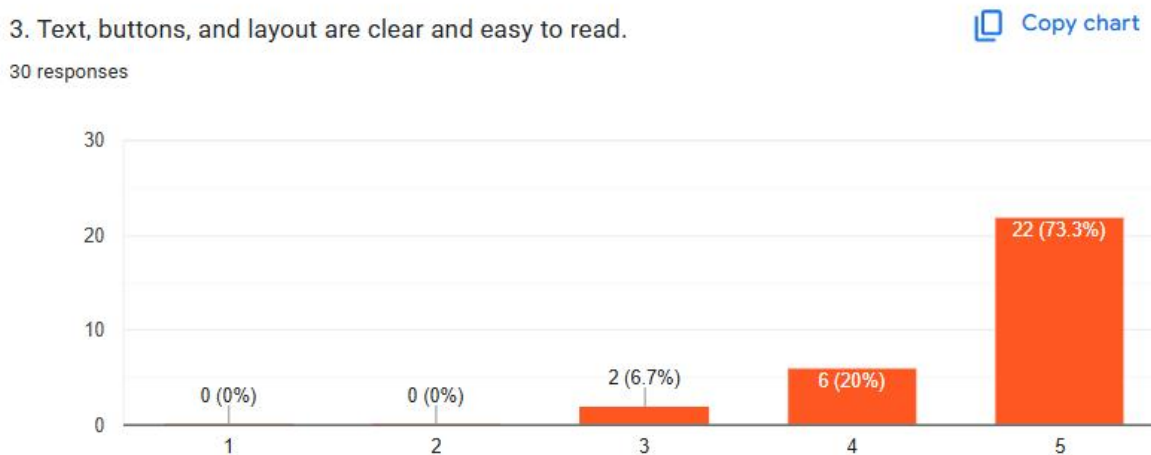


Figure 5. 24: Text, Button and Layout Satisfactory

Figure 5.25 captures user perception of the platform's performance speed across different sections and functionalities, showing satisfaction levels with page load times and system

responsiveness. Through this survey, seems all participants are satisfied with the loading time. In food ordering, where customers are often hungry and impatient, fast loading times can significantly impact user satisfaction.

4. System performance was fast and smooth.

 Copy chart

30 responses

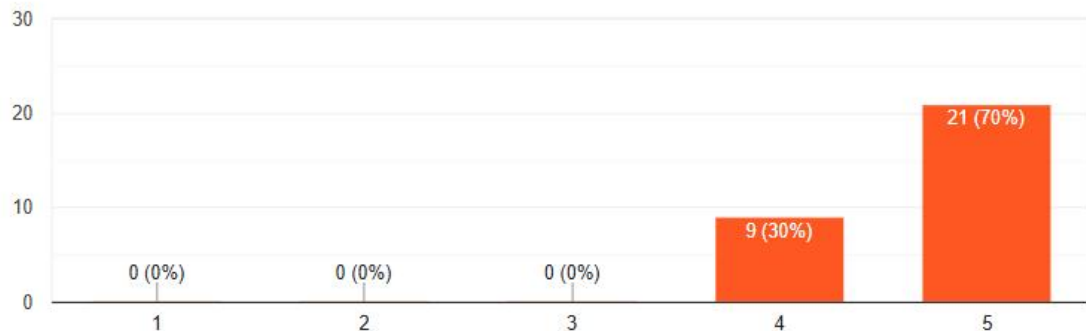


Figure 5. 25: Loading Speed Satisfaction

Figure 5.26 shows 25 respondents would recommend while others are not sure. High recommendation scores indicate that the platform not only meets functional requirements but also provides a positive experience that users want to share with friends and family.

5. I would recommend this system to others.

 Copy chart

30 responses

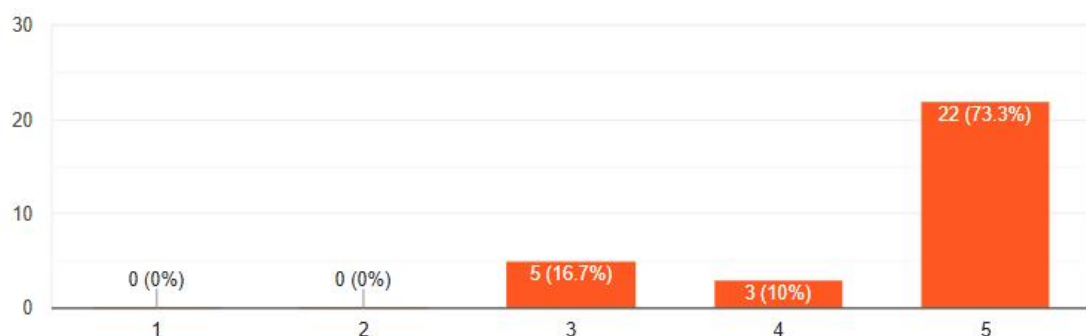


Figure 5. 26: Recommendation to Others

Figure 5.27 displays the open-ended feedback from participants who provided additional comments or suggestions for improving the QR-powered food ordering platform, with 6 responses collected. The responses include valuable suggestions such as adding a feature to

update profile pictures and implementing additional payment options like cash or card payments, while other responses like "Okay," "Good," and "No" indicate general satisfaction with the current platform features.

6. Any additional comments or suggestions?

6 responses

Add the feature to update profile picture
Okay
.
Good
Add payment option - cash or card
No

Figure 5. 27: Overall Platform Comments and Suggestions

5.5 Summary

Chapter 5 presents a comprehensive evaluation of the QR-Powered Online Food Ordering Platform through two critical testing methodologies: functional testing and usability testing. The functional testing phase systematically validated all core features and functionalities to ensure they operate according to specifications while the usability testing involve an online survey that were tested by 30 willing participants. The combination of successful functional validation and positive usability feedback demonstrates that the platform is technically robust, easy to use, and prepared for effective deployment.

Chapter 6: Conclusion and Future Works

6.1 Introduction

This chapter wraps up the creation of the QR-Powered Online Food Ordering Platform. It emphasizes the main accomplishments in achieving the project's goals, addresses the system's existing shortcomings, and proposes avenues for future enhancements. The QR-based system seeks to offer a simplified ordering and booking experience for customers and restaurant personnel. Although the created system shows the practicality and benefits of a web-based ordering solution, there are still aspects that could be improved to enhance its usability, scalability, and range of features.

6.2 Project Achievement

The project had met its expectations as outlined in objectives in Chapter 1. Table 6.1 outlines how the objectives were achieved throughout the whole project process:

Table 6. 1: Project Achievement

No.	Objective	Achievement
1	To design a responsive web-based online food ordering system that simplifies the food ordering and table booking processes.	Developed a web-based system using HTML, CSS, PHP, JavaScript and MySQL to create a responsive interface. Customers can scan QR code to view menus, place orders, and input their table number, do table booking and request for event decorations, view booking and order history.
2	To develop a system that enables customers to conveniently browse menus, place orders, book tables, and request custom decorations.	Implemented features such as viewing menus, adding items to cart, confirming orders, booking tables, and submitting event decoration requests. Staff can manage menus, confirm orders, and reservations.
3	To evaluate the usability of the system by conducting a usability survey and report the findings.	Usability testing was conducted with users from various backgrounds. Feedback confirmed the system's ease

		of use, functionality, and convenience, especially for dine-in scenarios and small events.
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6.3 Project Limitations

QR-Powered Online Food Ordering Platform seems to have successfully meets all its objectives, but there are several limitations that were identified and observed during the implementation and testing phases. These limitations ideas were introduced to highlight where the proposed system seems to be lack of, that could enhance a better usability, scalability and overall user satisfaction.

i. No Payment Gateway

At present, the system lacks online payment capabilities. Customers are required to pay in person at the restaurant counter after ordering online. This dependence on manual payments diminishes the ease of a completely digital solution, particularly in the current cashless society where consumers anticipate using e-wallets, credit/debit cards, or online banking for transactions. Moreover, this could result in extended wait times during peak hours and a higher likelihood of payment errors.

ii. Limited Admin Role (Only 1 staff account)

The system limits access to one admin (staff) account with complete system control. This approach isn't feasible for actual restaurant operations, especially in larger venues where tasks must be shared among various personnel (e.g., chefs, cashiers, floor managers). In the absence of role-based access control, ensuring accountability, security, and effective task assignment among employees becomes challenging

iii. Usage of Static QR Codes

This system utilizes static QR codes that fixed to all tables. Even though this way is simpler and more cost-effective, it does come with few actual risks.

- Anyone with the QR link can place an order at any time, even if they are not present at the restaurant.

- It is vulnerable to abuse such as prank or ghost orders, which can disrupt operations and lead to revenue loss.
- Static codes cannot be updated dynamically to reflect changes such as menu updates or session-specific access control.

iv. **Lack of Customer Review and Rating Feedback**

Users now lack a method to evaluate their dining experience or offer opinions on menu items. This restricts the restaurant's capability to collect insights from customer experiences, pinpoint areas for enhancement, or establish trust with potential customers. A review and rating system enhances user involvement and openness, essential for digital platforms within the food service industry.

v. **Not Included Profile Picture Functionality**

The current system does not provide customer or staff to upload profile picture as part of account information. Although it may appear as a trivial aspect, profile images are crucial for enhancing personalization and the user experience in contemporary web applications. For users, possessing a profile image can enhance the interface's appeal and familiarity, particularly for returning customers. For employees, profile pictures can aid in internal recognition if additional users are included in upcoming updates.

6.4 Future Work

Here are a few recommendations to enhance the user's experience and ensure that all the objectives are met in future projects. The following recommendations have been made:

- ***Integration of Online Payment System:*** Implement secure payment gateways (e.g., FPX, Touch 'n Go eWallet) to allow seamless transactions during the ordering process.
- ***Multi-admin Support with Role-based Access:*** Enable multiple admin accounts with different access levels (e.g., cashier, manager) to enhance system scalability and management.
- ***Real-time Notification System:*** Integrate a real-time alert system using WebSockets or Firebase to inform staff instantly of new orders or booking requests.

- ***Dynamic QR Code Implementation:*** Utilize dynamic QR codes to enhance order validation, session expiry, and prevent prank orders.
- ***Customer Rating and Feedback Feature:*** Add a feature for users to rate dishes and leave comments, improving transparency and service quality.
- ***Analytics Dashboard:*** Develop a dashboard for admins to view sales trends, popular items, and customer behavior to make data-driven decisions.

6.5 Summary

In summary, the QR-Powered Online Food Ordering Platform effectively resolves significant challenges in conventional restaurant ordering and reservation methods. It improves operational efficiency, customer convenience, and user satisfaction via its digital-first strategy. Although the existing version meets the original goals, adding future improvements like payment integration, dynamic QR codes, and support for multiple languages will greatly enhance its capabilities and attractiveness. By consistently adapting the system according to user input and market trends, it can function as a strong and scalable digital solution for today's dining experience.

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APPENDICES

Appendix A: Online Survey for Usability Testing

Usability Testing Survey – QR-Powered Online Ordering Platform

Hello! I am Melanie Florence Anak Cameron Gerald, a final-year student at Universiti Malaysia Sarawak (UNIMAS), pursuing a Bachelor of Computer Science with Honours in Software Engineering.

This survey is part of my Final Year Project (FYP) titled **"QR-Powered Online Ordering Platform"**, which aims to improve restaurant service efficiency by allowing customers to scan a QR code, view the digital menu, place orders, and make table bookings seamlessly using a web-based system.

Participants may explore the system by placing a food order either as a guest (without logging in) or by registering and logging in. You are encouraged to try both methods to evaluate the full user experience.

- ♦ *Guest users can place orders without registration.*
- ♦ *Only logged-in users can access table booking, event decoration requests, and view order history.*

Your responses will help evaluate the usability of the platform and guide future improvements. All answers are confidential and used only for academic purposes. This survey should take **5–10 minutes**.

Thank you in advance for your time and valuable feedback – your input is greatly appreciated and will help improve the quality and usability of this system.

If you have any questions or concerns, do not hesitate to contact me via email (80020@siswa.unimas.my).

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Section 1: Participant Information

1. Full Name *

Your answer:

2. Age *

- ☐ Below 18
- ☐ 18 - 25
- ☐ 26 - 35
- ☐ 36 - 45
- ☐ 46 and above

3. Gender *

- ☐ Male
- ☐ Female

4. Role *

- ☐ Student
- ☐ Restaurant Staff
- ☐ General Public

Have you used QR-based ordering platforms before? *

- ☐ Yes
- ☐ No

Section 2: System Testing

Before answering the survey, please follow these steps:

1. Scan the QR code below OR click the link to access the system:

(Or <https://qrfoodordering.website/>)

2. Try the following actions:

- Place an order **without logging in**
- Register and log in as a customer
- Place another order **as a logged-in user**
- Try **booking a table with event decoration**
- View your **order history and booking status**

Then proceed to answer the survey below.

QR for QR Food Ordering Platform



Section 3: Guest Customer Experience

Answer these based on your experience **without logging in**.

Linear Scale (1–5), where:

- 1 = Strongly Disagree / Very Difficult / Very Poor
- 5 = Strongly Agree / Very Easy / Excellent

1. Was it easy to access the platform via QR or link? *

1	2	3	4	5
☐	☐	☐	☐	☐

2. Were you able to place a guest order successfully? *

1	2	3	4	5
☐	☐	☐	☐	☐

3. Was the cart intuitive (add/remove items, price updates)? *

1	2	3	4	5
☐	☐	☐	☐	☐

4. Was the order confirmation/receipt clear?

1	2	3	4	5
☐	☐	☐	☐	☐

5. Did you encounter any issues as a guest? *

Your answer

6. Suggestions to improve guest experience?

Your answer

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Section 4: Feature Usage Confirmation

1. Which of the following features did you try? *

	Yes	No
Placed order as a guest	☐	☐
Registered a new account	☐	☐
Logged in to the system	☐	☐
Placed order as logged-in user	☐	☐
Booked a table	☐	☐
Requested event decoration	☐	☐
Viewed order history	☐	☐
Viewed booking status	☐	☐

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Section 5: Logged-In User Experience

Answer these after logging in and exploring user-only features.

Linear Scale (1–5), where:

- **1 = Strongly Disagree / Very Difficult / Very Poor**
- **5 = Strongly Agree / Very Easy / Excellent**

1. Was the registration and login process smooth? *

1	2	3	4	5
☐	☐	☐	☐	☐

2. Were you able to place an order while logged in? *

1	2	3	4	5
☐	☐	☐	☐	☐

3. Ordering as a logged-in user was intuitive. *

1	2	3	4	5
☐	☐	☐	☐	☐

4. Did you try the table booking feature? *

- ☐ Yes, and it work well
- ☐ Yes, but it was confusing
- ☐ No, I didn't try it (if selected, skip booking-related questions)

5. The table booking feature was easy to use.

1	2	3	4	5
☐	☐	☐	☐	☐

6. Event decoration options were clear and helpful.

1	2	3	4	5
☐	☐	☐	☐	☐

7. I could easily view my booking and order history.

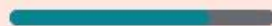
1	2	3	4	5
☐	☐	☐	☐	☐

8. Any suggestions for improving the logged-in user experience?

Your answer

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Section 6: Overall Design and Usability

Linear Scale (1–5), where:

- 1 = Strongly Disagree / Very Difficult / Very Poor
- 5 = Strongly Agree / Very Easy / Excellent

1. The overall system design is visually appealing. *

1	2	3	4	5
☐	☐	☐	☐	☐

2. The website is responsive and works well on mobile devices. *

1	2	3	4	5
☐	☐	☐	☐	☐

3. Text, buttons, and layout are clear and easy to read. *

1	2	3	4	5
☐	☐	☐	☐	☐

4. System performance was fast and smooth. *

1	2	3	4	5
☐	☐	☐	☐	☐

5. I would recommend this system to others. *

1	2	3	4	5
☐	☐	☐	☐	☐

6. Any additional comments or suggestions?

Your answer

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 **Thank you for your time and valuable feedback!**

Your valuable feedback will help us improve the system's functionality, user experience, and overall design before its final release.

We sincerely appreciate your time, effort, and contribution to this project.

🌟 *Your input truly makes a difference.*

— Melanie Florence (80020)

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