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Dkicen Catering Booking and Recommendation System

Nur Aimi Mustapa[1], Nurezayana Zainal[1]*

[1] *Fakulti Sains Komputer dan Teknologi Maklumat,*
Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA

*Corresponding Author: nureazayana@uthm.edu.my
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Abstract

Dkicen Catering, based in Klang, Selangor, faces operational challenges due to reliance on manual communication channels, resulting in miscommunication and order issues. To address this, the study aims to design and implement an online ordering system. Objectives include enhancing customer satisfaction, streamlining order processing, and generating monthly reports for financial monitoring. The project involved three users which are administrator , staff and customers. The approach is object-oriented for developing the system. The development type used for the system is the Waterfall Model where is it follows a linear and sequential approach, with distint phases that must be completed before moving on the next. The expected outcome is the Dkicen Catering Booking and Recommendation System, improving efficiency, reducing errors, and benefiting both the company and customers. This project signifies a transformative step towards efficient, customer-centric order management. In conclusion, the developed system could benefit the catering company in managing orders from customers.

1. Introduction

Dkicen Catering, based in Klang, Selangor, faces challenges in managing a growing number of daily orders through manual communication methods. This study introduces the Dkicen Catering Booking and Recommendation System, aiming to streamline the reservation process and enhance customer engagement. The research questions address the efficiency of the current manual system and the potential impact of the proposed online system. The problem statement highlights issues with miscommunication and order management. The hypotheses posit that the new system will improve order processing and customer satisfaction. The aim of the system include developing an organized reservation system and menu recommendations.

The scope of the project is to design and develop an online ordering system specifically tailored for Dkicen Catering, targeting customers, administrators, and staff of the company. The system aims to improve service quality by implementing a systematic approach to order management. It encompasses several key modules, including user registration, login, menu management, booking management, cart management, payment processing, order management, and report generation. Each module is designed to enhance the user experience, streamline administrative tasks, and ensure accurate and efficient handling of catering orders.

Therefore, the primary objective of this study is to design and implement an online ordering system utilizing an object-oriented approach. By leveraging the principles of object-oriented design, the system will ensure modularity, scalability, and maintainability. Additionally, the study aims to develop the online ordering system as a web-based system, providing users with a seamless and accessible interface for placing orders. To ensure the system's robustness and user satisfaction, comprehensive testing will be conducted, including both Alpha and Beta Testing phases. These tests will evaluate the functionality, reliability, and usability of the system, identifying

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any issues and ensuring that the final product meets the highest standards of performance and user experience. Therefore , the project developed should provide efficiency , customer-centric system benefiting both Dkicen Catering and its customers in terms of improved order management and service quality.

2. Related Work

This study explores the development and implementation of an online catering booking system with a recommendation feature . In Section 2 , briefly summaries the current method used in this project.

2.1 Existing process order management of Dkicen Catering

The current business process of Dkicen Catering primarily relies on manual communication channels to manage customer orders and inquiries. Customers typically place their orders by contacting the company through messaging applications such as WhatsApp. This process involves the customer discovering Dkicen Catering through social media promotions, initiating contact via message, and discussing their event requirements with an administrator. The administrator is responsible for checking the availability of event dates, ensuring no overlap with existing orders, and confirming the number of guests (referred to as "pax") for each order.

Once the order details are confirmed, the administrator manually processes the order, which includes creating invoices and receipts. This manual data entry can lead to errors such as typos and the unintentional omission of requested menu items. The confirmed order is then communicated to the staff and kitchen helpers, who prepare the food according to the specified requirements. The logistics team is responsible for delivering the orders to the customer's location, although smaller orders can be picked up directly by customers from the catering venue.

This manual and fragmented process presents several challenges, including the risk of miscommunication, order overlaps, delayed responses to customer inquiries, and errors in order processing. These inefficiencies can lead to customer dissatisfaction and, in some cases, order cancellations. Therefore, the development of an online ordering system aims to address these issues by streamlining the order management process, reducing the potential for errors, and enhancing overall customer satisfaction.

2.2 Catering Booking System

These days the Food and Beverages (F&B) industry has seen significant advancement in technologies such as online ordering and delivery. Catering is the process or business of preparing food and providing food services for clients at remote locations. The catering sector is the companies that offer food , drinks and other services to various customers for special occasions [1]. The method used to deal with catering companies is the customers will directly dealing or discuss with the caterer about the food choices and price.

2.3 Online Booking System

An online booking system is a software solution and reservation system that makes it simple for customers to book and pay for the service. It is also a digital platform or software application that facilitates the process of scheduling and managing appointments, reservations and services. It serves as a centralized tool for businesses and customers to interact ensuring a streamlined and efficient booking process. Customers can easily access the service catalogue of the available listing of services , food and drink.

2.4 Food Recommendation System

A food recommendation system uses technology to suggest personalized food items to users based on their preferences, behavior, and relevant factors. These systems employ algorithms and user data, often incorporating external information for accurate recommendations[4]. User machine learning algorithms, part of the recommendation system, predict and understand individual preferences by analyzing historical data like past interactions and choices. This involves using machine learning techniques, such as collaborative filtering or content-based filtering, to generate personalized suggestions[7]. Overall, machine learning enhances the effectiveness of food recommendation systems, providing users with accurate and tailored suggestions based on their unique preferences and behaviors.

2.5 Web-Based Development

In our digital age, websites are essential for businesses, organizations, and individuals. Websites provide information, facilitate communication, enable online businesses, and offer various services [2]. Web applications are accessible from anywhere with an internet connection. Users can access them on various devices, including computers, tablets, and smartphones. This widespread availability ensures a broader reach. Other than that, web-

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based solutions work across different operating systems (Windows, macOS, and Linux) and browsers (Chrome, Firefox, Edge, and Safari). Developing web applications is often more cost-effective than building native applications, and they can be updated centrally on the server [3]. The users receive the latest version automatically without needing to download and update manually.

2.6 Comparison with Existing System

The analysis of the existing system was conducted by comparing to three existing system which are Big Boyz Barbeque website , FoodPanda Application and Domino's Pizza website. The Dkicen Catering Booking and Recommendation System was evaluated using three systems as a baseline to improve its quality. The comparison analysis is according to the features and modules of the systems. Table 1 shows the comparison of existing systems and proposed system.

Table 1 Comparison of existing system and proposed system.

Features/System	Big Boyz Barbeque	FoodPanda	Domino's Pizza	Dkicen Catering Booking and Recommendation System
Type of system	Web-based	Application	Web-based	Web-based
Register	Yes (Customer are able to register)	Yes (Customer are able to register)	Yes (Customer are able to register)	Yes (Customer are able to register)
Login	Yes (Customer are able to login)	Yes (Customer are able to login)	Yes (Customer are able to login)	Yes (Customer are able to login)
Manage Menu	Yes (By system)	Yes (By system)	Yes (By system)	Yes (By system)
Manage Booking	No (Do not provide)	No (Do not provide)	Yes (By system)	Yes (By system)
Manage Cart	Yes (Provide total order detail)	Yes (Provide total order detail)	Yes (Provide total order detail)	Yes (Provide total order detail)
Manage Payment	Yes (By system)	Yes (By system)	Yes (By system)	Yes (By system)
Manage Order	Yes (By system)	Yes (By system)	Yes (By system)	Yes (By system)
Generate Report	No (Do not provide)	No (Do not provide)	No (Do not provide)	Yes (Monthly report on income)

As the summary of finding, the Register, Login, Manage menu, Manage booking, Manage cart, Manage payment, Manage order, and Generate Report modules are the ones that are being compared. The login and registration modules are the same on all the systems. The Manage Booking module and Generate Report are missing from Big Boyz Barbeque and FoodPanda. Furthermore, Domino's Pizza does not have a module for generating reports. In order to improve the user experience and system functionality, Dkicen Catering Booking and Recommendation System will incorporate the features and upgrade the modules such as menu recommendation features , generating receipt for customers and report for administrator.

3. Methodology

The chosen methodology for this system is the waterfall model, a linear and sequential approach to the software development life cycle (SDLC). This model, consisting of five phases which are requirements, analysis, design, implementation, and testing[6]. This approach requires the completion of each phase before progressing to the next. Its simplicity and clear structure make it easy to understand and manage. Stakeholders benefit from the well-defined, step-by-step progression of the waterfall model, ensuring a systematic approach to project management and control.

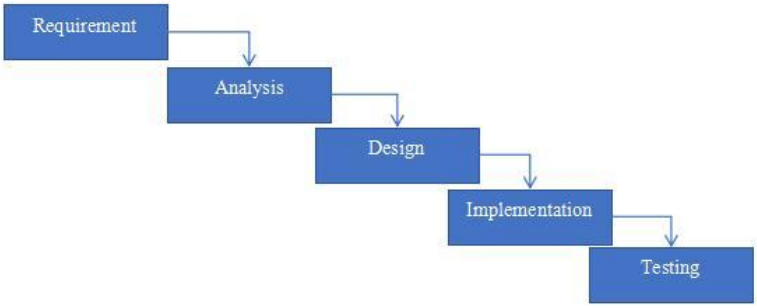

Fig. 1 Waterfall Model

3.1 Requirement Phases

Table 2 lists the tasks completed at each stage of Waterfall Model for Dkicen Catering Booking.

Table 2 Task in each phase

Phase	Function	Output
Requirement	● Determine project title ● Identify project background	● Project proposal ● Gantt Chart
Analysis	● Identify project requirement ● Generate system specification	● Hardware and Software requirement ● UML Diagrams ● Requirement Definition
Design	● Design modules interfaces ● Develop prototype	● System initial prototype
Implementation	● Develop final system ● Coding the program using PHP ● Connect to database	● Final system
Testing	● Test system ● Fixed bugs and error	● Test cases ● System's update

4. Analysis and Design

System requirement analysis is an organized procedure for specifying, documenting, and managing a system's needs.

4.1 Functional Requirements

Functional requirements are specifications that detail the features of proposed system needs to meet user needs. It define what the system should achieve and how it responds to specific inputs.Table 3 provides an overview of these functional requirements.

Table 3 Functional Requirements

Modules	Function
1. Register	System allows new customer to register account to use the system before login into the system.
2. Log in	System allows user to login using their account. The system will be redirected to homepage after login successful.
3. Manage Booking	The system should allow the administrator to view the booking details.
4. Manage Menu	System allow customer to browse menu on menu page. Each of the menu or package display with price.
5. Manage Cart	System allow customer to edit , add and delete orders before proceed to checkout.

6. Manage Payment	System allow customer to make payment of the order by using online payment.
7. Manage Order	System allow administrator to view order details and update order status in the system.
8. Generate Report	System allow administrator to view overall monthly report.

4.2 Non-Functional Requirements

Non-functional requirements specify a software system's qualities or features that are unrelated to the system functionalities. Non-functional requirements outline the system's expected level of performance, as opposed to functional requirements, which specify what the system should be able to achieve. Table 4 shows the functional requirement of Dkicen Catering Booking and Recommendation System.

Table 4 Non-Functional Requirements

Modules	Description
Usability	Usability refers to a software application or system that is user-friendly and can be easily and effectively used by its users to achieve their goals. A key component of user experience (UX) is usability, which is designing user interfaces and interactions that are simple, effective, and enjoyable.
Performance	Performance refers to how well a software application or system performs in terms of speed, responsiveness, scalability, and resource utilization.
Security	Security is one of important aspect in protecting software systems, applications, and data from unauthorized access, attacks, and other potential security threats.
Scalability	Scalability refers to the ability of a software system to handle increased workload, user traffic, or data volume while maintaining or improving its performance.

4.3 User Requirements

User requirement analysis is a crucial stage in software development, also known as user needs analysis. It involves gathering and documenting the demands, expectations, and preferences of end users who will interact with the software system. Table 5 shows User Requirements.

Table 5 User Requirements

No.	User Requirements
1	Customer shall be able to register new account.
2	Customer, Administrator and Staff shall be able to login.
3	Administrator and Staff are able to update or delete booking.
4	Administrator and Staff are able to add , edit and delete menu list.
5	Customer are able to add menu to cart and edit the selected menu.
6	Customer are able to make payment of their order.
7	Administrator are able to generate monthly report.

4.4 Use Case Diagram

The use case diagram for Dkicen Catering Booking and Recommendation System was created as the part of system analysis.

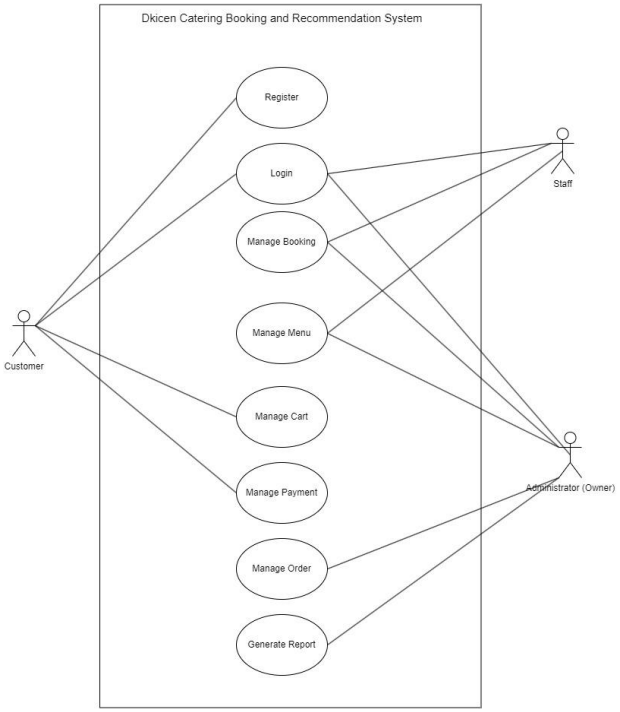

Fig. 2 Use Case

4.5 Class Diagram

Class diagrams are a fundamental component of object-oriented modeling. Through the illustration of classes, their properties, methods, and connections, they portray the static structure of a system[7]. Classes are used to represent the static structure of a system by showing their properties, methods, and connections for Dkicen Catering Booking and Recommendation System.

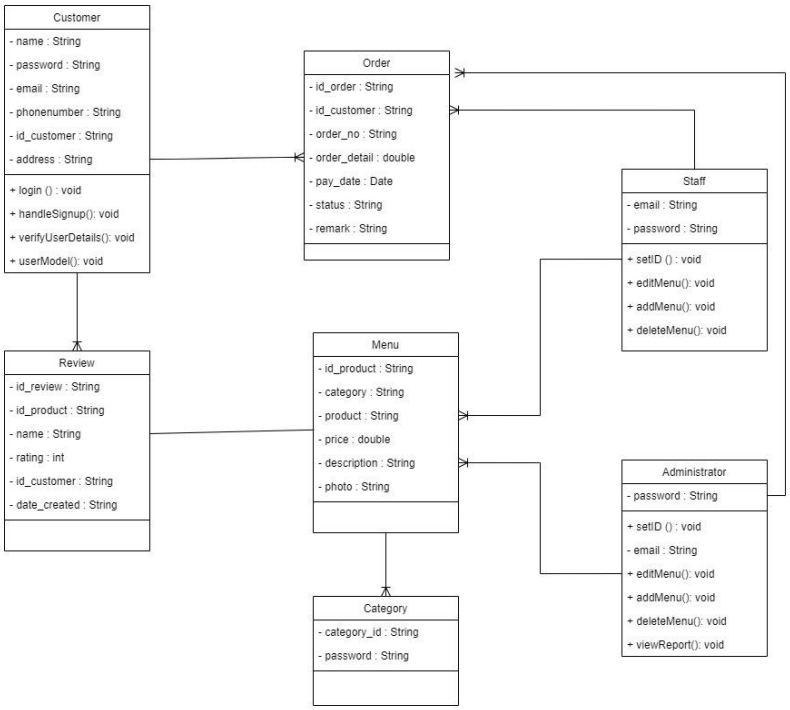

Fig. 3 Class Diagram

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4.6 Database Scheme

A database scheme would refer to the overall design or plan for organizing and structuring a database for this proposed system.

I. Customer (name , password , email , phoneNumber , id_customer , address)
II. Staff (username , password)
III. Administrator (username , password)
IV. Cateegory (category_id , category)
V. Menu (id_product ,category, product , price ,description ,photo)
VI. Order (id_product , id_customer , order_No , order_detail , pay_date , status , remark)
VII.

5. Result and Discussion

The results and discussion section presents data and analysis of the study. This section represents a collection of test cases for the system. Each test case is assigned a unique identifier (e.g., TC-01-01). This table serves as a comprehensive overview of the test scenarios, ensuring that various aspects of the application Moreover, the user acceptance testing's result will be include the scenarios, module, number of respondent, and the number of answers given for each question.

5.1 System Interface

The Dkicen Catering Booking and Recommendation System using Visual Studio Code as the platform to develop code. In this section , shows the main user interface of the system which following the module's scope. In Figure 4 shows the register page for customers meanwhile Figure 5 shows the login page for administrator and customer respectively.

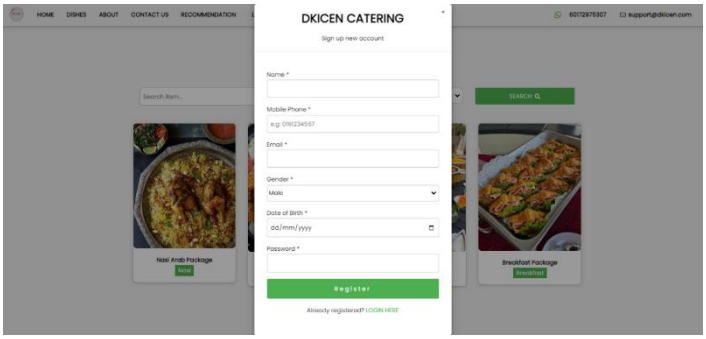
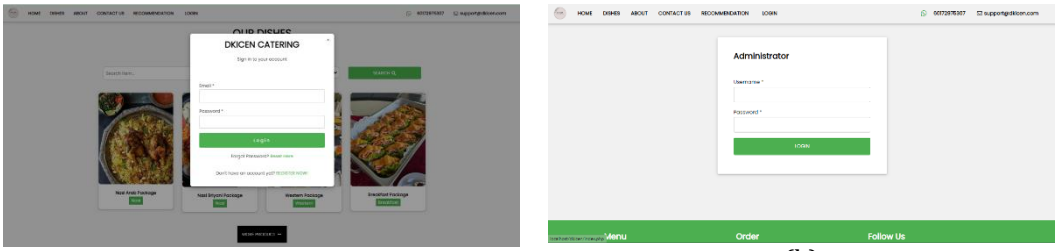


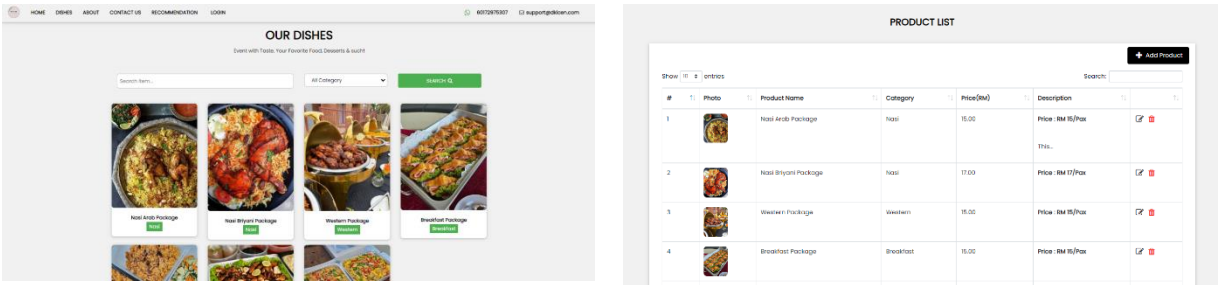
Fig 4 Register Page



(a) (b)

Fig 5 Login Page (a) Customer ; (b) Administrator/Staff

In figure 6 shows the interface of manage menu of customer and administrator respectively. This module it allows the administrator to create, modify, delete, and organize the list of items in the website . Then , the items will be display in the customer's page.



(a) (b)

Fig 6 Menu Page (a) Customer (b) Administrator

Figure 7 shows the cart page in the customer interface. It allows customer to add , selected menu in the cart and allow them to reset the cart. Moreover , the system will display the total amount and menu details before customer proceed to payment.

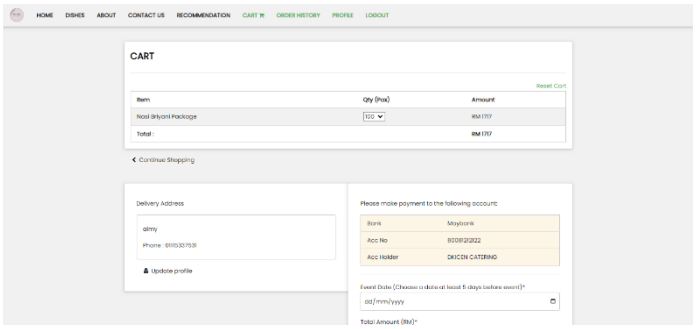


Fig 7 Cart Page

After adding menu in the cart , customer need to fill the booking details such as booking date , time and event name/type. Therefore , Figure 8 shows the booking page in the customer's page.

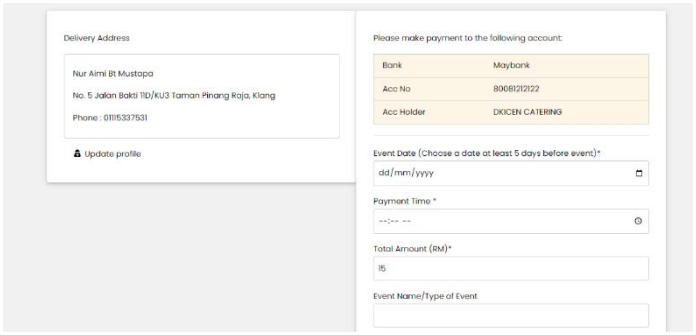


Fig 8 Booking Page

Figure 9 shows the payment page of the system. There are two payment method which are by using Paypal or Debit or Credit Card. After the payment has been made , the system will shows the purchase detail including the order ID. Then , the system will update the order list in administrator page.

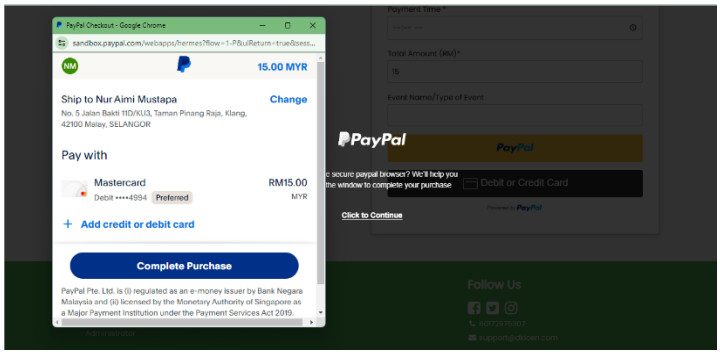


Fig 9 Payment Page

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When the payment is received ,the administrator is able to view summary of orders including update the orders status to the customer interface. This module provides detailed information about order such as order ID , customer information , menu detail and date order created. Figure 10 shows the order list in administrator page.

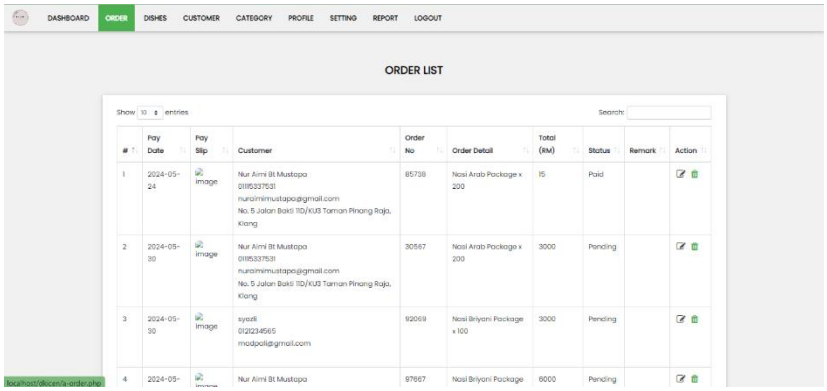

Fig 10 Order Page

Lastly , the system allow administrator to generate monthly report of sales. Other than that , the monthly report can be downloaded in PDF format. Therefore , Figure 11 shows the interface of generate report.

Fig 11 Generate Report

5.2 Test Case

Testing phase on Dkicen Catering Booking and Recommendation System is carried out for each modules. The test cases is focusing on the overall functionality of the system. Table 4 below shows the list of test cases conducted during the phase.

Table 6 List of test cases

Test case	Description	Expected Outcome	Actual Result	Status
TC-01 Register user				
TC-01-01	Customer register with valid details	Customer successfully registered. System will displayed successful message and will be redirect to login page	Customer successfully registered. System will displayed successful message and will be redirect to login page	Passed
TC-0-02	Customer register with invalid details	System will highlight an error in which information is invalid. System will prompt user to enter new details.	System will highlight an error in which information is invalid. System will prompt user to enter new details.	Passed
TC-02 Login Page				

TC-02-01	User login with valid details	User should be successfully log in and redirect to Homepage	User successfully login and redirect to homepage	Passed
TC-02-02	User login with invalid details	System should display error at which information that invalid message and prompt user to re-enter the details	System shows errors and prompt user to re-enter the details	Passed
TC-03 Manage Menu				
TC-03-01	Customer can view list of menus and able to choose menu	Customer shall be able to view and 'click' to choose the menu.	System shows menu details after 'click' on the selected menu	Passed
TC-03-02	Administrator can add new menu	Administrator should be able to add new menu and insert the menu detail	Administrator successfully add new menu into the system	Passed
TC-03-03	Administrator can edit or delete menu	Administrator should be able to edit and delete menu	System successfully display the updated list of menu	Passed
TC-03-04	Updated menu can be display in customer interface	Customer shall be able to view the updated list of menu.	Customer successfully view the updated list of menu	Passed
TC-04 Manage Cart				
TC-04-01	Customer can choose the quantity(pax)	Customer shall be able to select the number of quantity and system display the current amount	Customer can choose number of quantity available and system successfully update the current amount	Passed
TC-04-02	Customer can reset the cart	Customer should be able to click on 'Reset cart' and the cart should be clear	Customer are able to click on 'Reset cart' and the cart is reset	Passed
TC-04-03	The total amount automatically update at the payment section	The total amount should be automatically update at the payment section	The total amount is not automatically update at the payment section , and need to key in manually at the payment section	Failed
TC-05 Manage Booking				
TC-05-01	Customer can choose the event date	Customer should be able to choose the event date	Customer able to select event date	Passed
TC-05-02	Customer can enter the event name/type	Customer should be able to enter event name	Customer are able to enter event name	Passed
TC-05-03	System can receive 400 number of pax per day	System day slot should be close if the number of pax is exceed 400 pax	System did not limit the number of pax	Failed
TC-06 Manage Payment				
TC-06-01	User be able to make payment	Customer should be able to choose payment method (Paypal or Debit/Credit) and make payment	Customer are able to make payment and system shows order detail	Passed

TC-06-02	System redirect to payment gateway	System should be able to redirect users to payment gateway	System redirect user to payment gateway	Passed
TC-06-03	System can display error message if payment is interrupt	System should be able to display error message if payment is interrupt	System display "Payment Cancel"	Passed
TC-07 Manage Order				
TC-07-01	Administrator view order list	Administrator should be able to view order list	System successfully display order list and update the list if there is any new order	Passed
TC-07-02	Administrator can update order status	Administrator should be able to update order status (Pending , Paid , Unpaid , Preparing , Delivered , Cancel)	Administrator are able to update order status and successfully update on customer page	Passed
TC-07-03	Administrator can delete order	Administrator should be able delete selected order	Selected order is successfully deleted	Passed
TC-08 Generate Report				
TC-08-01	Administrator can view sales report	Administrator should be able to view monthly sales report by	System display the sales report (Graph)	Passed
TC-08-02	System can generate PDF of the report	System should be able to generate PDF of the report	System successfully generate PDF of the report	Passed

5.3 User Acceptance

User acceptance testing has been conducted to get response from the target user of the system which are customer , administrator and staff regarding the overall performance of this project. The method of this testing is via making a form that ask a few question to the users. For this project , close ended questions is distributed to the users. The total of the respondents is 7 respondents where 5 respondents are the customers and 2 respondents are staff and administrator respectively. Table 7 shows the response regarding the user interface of the system. Then , Table 8 shows the response regarding the user experience from all users of this project.

Table 7 Response regarding user interface (All users)

Scenarios	Number of respondent	Total of answers (Yes/Pass)	Total of answers (No/Fail)
The terms use in the system is easy to understand	7	7(100%)	0(0%)
The visual design of the user interface visually appealing and consistent throughout the system	7	7(100%)	0(0%)
The user interface provide clear and organized information about each product or service	7	7(100%)	0(0%)
The buttons and clickable elements in the user interface clearly visible and distinguishable	7	7(100%)	0(0%)
The icon used in the system is matchable with the action	7	6(86%)	1(14%)

Table 9 Response regarding user experience (All users)

Scenarios	Number of respondent	Total of answers (Yes/Pass)	Total of answers (No/Fail)
I find it easy to learn even without extensive documentation	7	7(100%)	0(0%)
I find that the system is user-friendly	7	7(100%)	0(0%)
I did not encounter any difficulty using this system	7	7(100%)	0(0%)
The system is lack-free and response in time	7	6(86%)	1(14%)
The error message help me to know my error while using the system	7	7(100%)	0(0%)

Table 9 shows the response regarding the functionality of the system. This question is answered by all the customers of Dkicen Catering Booking and Recommendation System.

Table 9 Response regarding functionality of the system (Customer)

Scenarios	Number of respondent	Total of answers (Yes/Pass)	Total of answers (No/Fail)
Do you successfully register a new account in the system?	5	5(100%)	0(0%)
Does the login function allow you to access your account securely?	5	5(100%)	0(0%)
Can you view the details of the menu ?	5	5(100%)	0(0%)
Are you be able to add menu to cart?	5	5(100%)	0(0%)
Are you able to make payment smoothly?	5	5(100%)	0(0%)
Can you view your order history?	5	5(100%)	0(0%)
Are you be able to make a booking ?	5	5(100%)	0(0%)
Can you update your personal information smoothly?	5	5(100%)	0(0%)
Did you find it easy to navigate through the system?	5	5(100%)	0(0%)
Were you able to access all the features you needed without the difficulty?	5	5(100%)	0(0%)

Table 10 shows the response regarding the overall functionality of the system. This user acceptance testing is answered by the administrator and staff.

Table 10 Response regarding overall functionality (Administrator and Staff)

Scenarios	Number of respondent	Total of answers (Yes/Pass)	Total of answers (No/Fail)
I able to login into the system	2	2(100%)	0(0%)
There is login page in the system	2	2(100%)	0(0%)
I able to access order features	2	2(100%)	0(0%)
I able to manage the menu in the system	2	2(100%)	0(0%)
I able to manage status of order	2	2(100%)	0(0%)
I able to receive payment	2	2(100%)	0(0%)
There is report page	2	2(100%)	0(0%)
I able to print all report	2	2(100%)	0(0%)

6. Conclusion

In conclusion, the development of the Dkicen Catering Booking and Recommendation System is a strategic step towards enhancing the efficiency and organization of the booking process. The system's core function of providing personalized recommendations simplifies the customer experience, requiring only the input of the event type to receive suitable package and food options. With features like date and time selection, menu customization based on the number of guests, and online payment capabilities, the system not only streamlines the reservation process for customers but also significantly aids administrators and staff in managing bookings. The organization of received bookings and the availability of detailed information contribute to improved operational processes. Additionally, the generation of monthly reports within the system provides valuable insights for financial monitoring. Ultimately, this system stands to elevate the overall service quality for Dkicen Catering and enhance customer satisfaction.

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