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The Development of Caketisserie Bakery & Café Online Cake Ordering System

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Abstract: Caketisserie Bakery & Café is a home-based bakery that accepts the booking for cakes using the instant messaging application and manages the orders using Microsoft Excel. However, this current method is inconvenient and prone to human errors. So, it may decrease work efficiency, affect business operations and lead to dissatisfaction among customers. Therefore, this study aims to develop an online cake ordering system using a web-based approach to assist in the online cake booking process. This system is developed using a Waterfall model and object-oriented approach. Meanwhile, the development of this system is done by using MySQL database, Hypertext Preprocessor (PHP), Hyper Text Markup Language (HTML) and JavaScript programming language. Generally, this system will help to enhance the efficiency in managing the orders, improve the smoothness of business operations and bring convenience to customers for ordering cakes.

Keywords: Online ordering system, Cake ordering system, Web-based

1. Introduction

The online cake ordering system is an online booking system that provides an online service to take orders and accept payments online, then customers can look for goods or services anytime anywhere [1]. In this project, the online cake ordering system is developed for Caketisserie Bakery & Café, a home-based bakery founded by Mr. Gary Ngoe Gia Le which is located in Ulu Tiram, Johor. It allows the manager of the bakery to easily manage their orders and allows the customer to order products via the internet within seconds.

This system was developed to replace the Caketisserie Bakery & Café's existing business processes, where the bakery used Microsoft Excel to handle all orders and generate reports. The current method is inconvenient because the shop manager needs to always format the tables and enter all the data one by one. It may be prone to human error. Besides, since the catalogue and products are only updated on social media pages, it is difficult for the customer to search for a particular cake design and also difficult for the shop manager to organize the albums as he needs to regularly update the product details among the numerous products. Finally, since all the documents were only stored on the laptop, it will have catastrophic effects if the files are missing due to laptop corruption.

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To overcome these problems, the main objective of this study is to develop an online cake ordering system using a web-based approach to facilitate the business operation of the bakery and bring convenience to customers. It is specially developed for Caketisserie Bakery & Café's private cake sellers and the buyers of the cakes. Besides, the function modules that are included in this system are login, manage product, manage order, manage booking, manage delivery, make payment and manage report. All these function modules are done systematically and efficiently online. Besides, all the documents are stored in a database where all the data will be saved securely to avoid data loss.

The rest of the paper is structured as follows: Section 2 will cover the literature review of the related work and a comparison between the existing system and the proposed system. Next, the methodology used to develop the system and its workflow in this project as well as the functional requirements, non-functional requirements, use case diagram and class diagram are presented in Section 3, then followed by Section 4 which will include the implementation and testing of the system. Finally, the last section is the conclusion of the project which summarizes the works that have been done in this project.

2. Related Work

2.1 Online Ordering System (OOS)

In this fast-paced changing world, Internet has not only changed the pattern of social interaction, but also changed the pattern of business interaction and economic interaction [2]. An online ordering system, also known as OOS, is a specialized advanced organizational-technical system that facilitates the operations of creating, modifying, sending, managing access and delivery of orders [3]. It provides online services that enable customers to look for goods, place orders and buy products or services through the Internet. So, the merchants would not need to rent or own a physical location to sell their goods [4]. It is clear that this system is flexible where the customers can order the cake anytime anywhere without wasting time to go to the bakery and queue up to place their orders [5].

2.2 Comparison with the Existing Systems

In this section, three existing related systems which are DQ Cakes Reservation System [6], Eat Cake Today [7] and CAKETELLA [8] are studied and compared to the features of the proposed system, Caketisserie Bakery & Café Online Cake Ordering System. The system's comparison result can be seen in Table 1.

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

Features/System	DQ Cakes Reservation System	Eat Cake Today	CAKETELLA	Caketisserie Bakery & Café Online Cake Ordering System (Proposed System)
Login	Yes	Yes	Yes	Yes
Manage product	N/A	N/A	N/A	Yes
Manage order	Yes	Yes	Yes	Yes
Manage booking	N/A	N/A	N/A	Yes
Manage delivery	No	Yes	No	Yes
Make payment	No	Yes	Yes	Yes
Customize cake	Yes	Yes	No	Yes
Manage report	N/A	N/A	N/A	Yes

Based on Table 1, there are 8 features that act as a guide for the comparison which namely, login, manage product, manage order, manage booking, manage delivery, make payment, customize cake and manage report. “N/A” in the table indicates there is no answer or data available for that module while “No” indicates that there are no such modules in the system. So, it is clear that all the features for the admin side are unknown in all three existing systems that have been studied. However, for the customer side, Eat Cake Today includes all the features listed, DQ Cakes Reservation System contains all features except the delivery module and payment module, while CAKETELLA includes all features except the delivery module and cake customization. It is obvious that by contrast with the existing system, the proposed system provides all the features mentioned in the table. As a result, the proposed system is considered to provide a fairly complete functionality that an online cake ordering system should have.

3. Methodology/Framework

The waterfall model has been chosen to be implemented in this project. It is a sequential approach which widely used in system development [9]. As shown in Figure 1, it is flowing downward like a waterfall through several phases in the developing process which start from requirement, design, implementation, verification and maintenance. In this model, all the requirements need to be gathered before proceeding to the next phases and it can only go to the next phase if the previous one has been completed [10]. The reasons for choosing the waterfall model are that this methodology is suitable for small projects and environments where the requirements are well understood. Besides, waterfall model is a highly structured development that may prevent financial or any losses resulting from errors in earlier phases which are costly owing to the rising expenses of redevelopment [11].

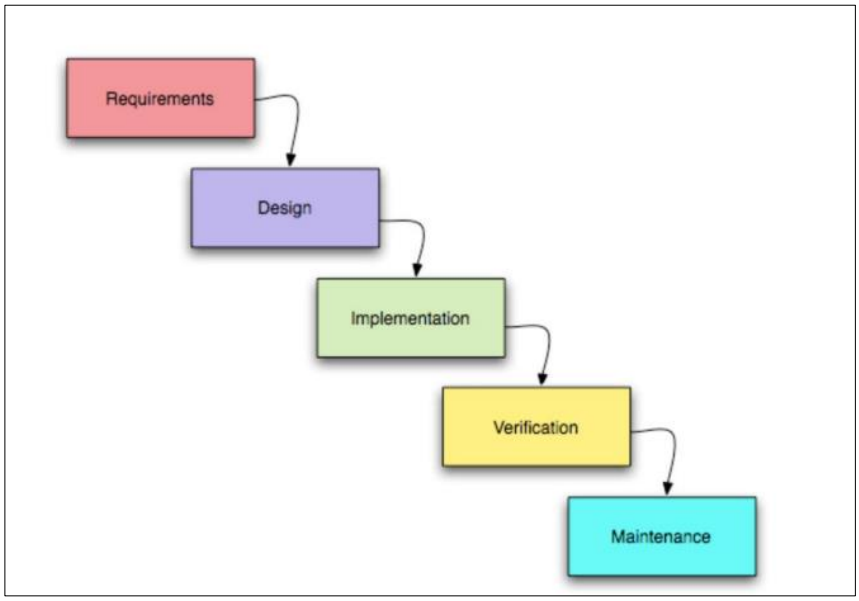

Figure 1: Waterfall Model [12]

Table 2 illustrates each phase in waterfall model which starts from requirements, design, implementation and verification. Every phase had unique tasks that resulted in various outputs during the entire project development.

Table 2: System development flow of Caketisserie Bakery & Café Online Cake Ordering System

Phase	Task	Output
Requirements	• Interview stakeholder • Collect user requirements	• Project proposal • Gantt chart

Phase	Task	Output
	• Analyse user requirements • Determine the project schedule, activities and output • Prepare project proposal	
Phase	Task	Output
	• Proposed the project	
Design	• Design function module • Design system interface • Design database	• UML diagram • System interface • Database scheme and Data dictionary
Implementation	• Develop the system by doing actual coding • Connect the system with database	• Complete executable system
Verification	• Test the developed system • Carry out user acceptance testing • Fix defects	• Test plan and test cases • Test report

Functional requirement is the list of the services that the proposed system should provide. There are seven functional requirements will be included in the proposed system. Table 3 shows the functional requirements for the proposed system.

Table 3: Functional Requirements for Caketisserie Bakery & Cafe Online Cake Ordering System

Module	Functionalities
Manage login	• The system should verify the role of the user and allow them to log in using the valid username and password. • The system should direct the user with admin role to admin view interface after successful login. • The system should direct the user without admin role to customer view interface after successful login. • The system should alert the user for invalid input.
	• The system should allow the new user to navigate to registration page. • The system should allow the user insert data to register for the new account. • The system should display error when empty field is detected. • The system should record the user's credentials into the database for login purpose. • The system should redirect the user to login page when the registration is completed.
Manage product	• The system should allow the admin to create new product to the catalogue page. • The system should allow the admin to view the selected product details. • The system should allow the admin to edit the selected product details. • The system should allow the admin to delete the selected product.
Manage order	• The system should allow the customers to browse catalogue. • The system should allow the customers to create new order by adding the product to cart from catalogue. • The system should allow the customers to customize the cake. • The system should allow the user to view the order details. • The system should allow the admin to edit the status of the specific order.
Manage booking	• The system should allow the admin to set the maximum order per day. • The system should allow the admin to select specific date to set the maximum order of that day.

Module	Functionalities
Manage delivery	• The system should allow the admin to update the selected delivery status. • The system should allow the customer to view the order's delivery status.
Make payment	• The system should allow the user to choose the payment method. • The system should allow the user to enter the payment details. • The system should allow the user to pay for the order. • The system should direct the user back to the order page if user cancel payment.
Manage report	• The system should allow the admin to select the type of report to be viewed. • The system should allow the admin to view the selected report.

Non-functional requirements are defined as the quality attributes of the system. It is a requirement that is used to specify the guidelines for evaluating the operation of a system. There are three non-functional requirements for the proposed system. Table 4 shows the non-functional requirements for the proposed system.

Table 4: Non-Functional Requirements for Caketisserie Bakery & Cafe Online Cake Ordering System

Requirements	Description
Performance	• The system should be always accessible with internet connection.
Security	• Users should only access their own account with correct username and password. • Only the admin can manage the product, booking and report.
Usability	• The system should be easy to use. • The user interface of the system should be clearly designed. • The user interface of the system should be user-friendly.

3.1 Use Case Diagram

During the design phase, the use case diagram provides a high-level perspective of how the system will be used from an outsider's view [13]. Figure 2 shows the use case diagram for Caketisserie Bakery & Café Online Cake Ordering System. In this system, there are seven modules included in the system namely login, manage product, manage order, manage booking, manage delivery, manage delivery, make payment and manage report. The actors that interact with the use cases are admin and customer.

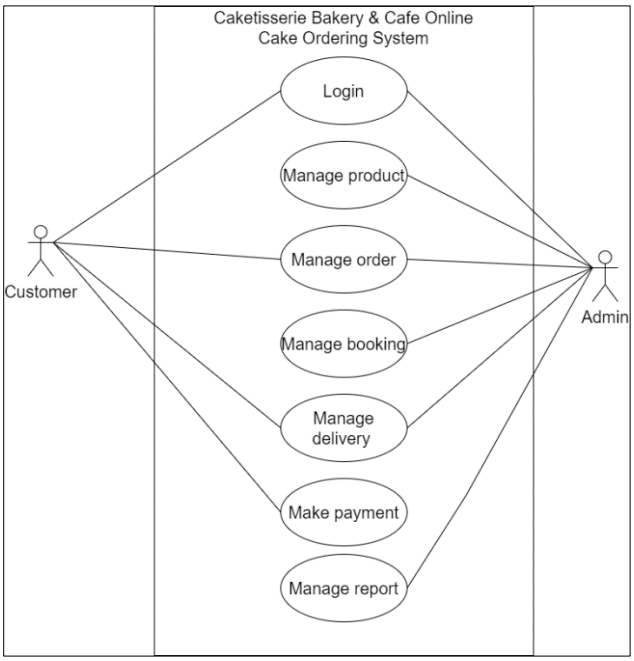

Figure 2: Use Case Diagram for Caketisserie Bakery & Café Online Cake Ordering System

3.2 Class Diagram

A class diagram is one of the unified modelling languages (UML) that depicts the classes present in a piece of software and the logical connections between them [14]. Figure 3 shows the class diagram of the system which consists of 9 classes.

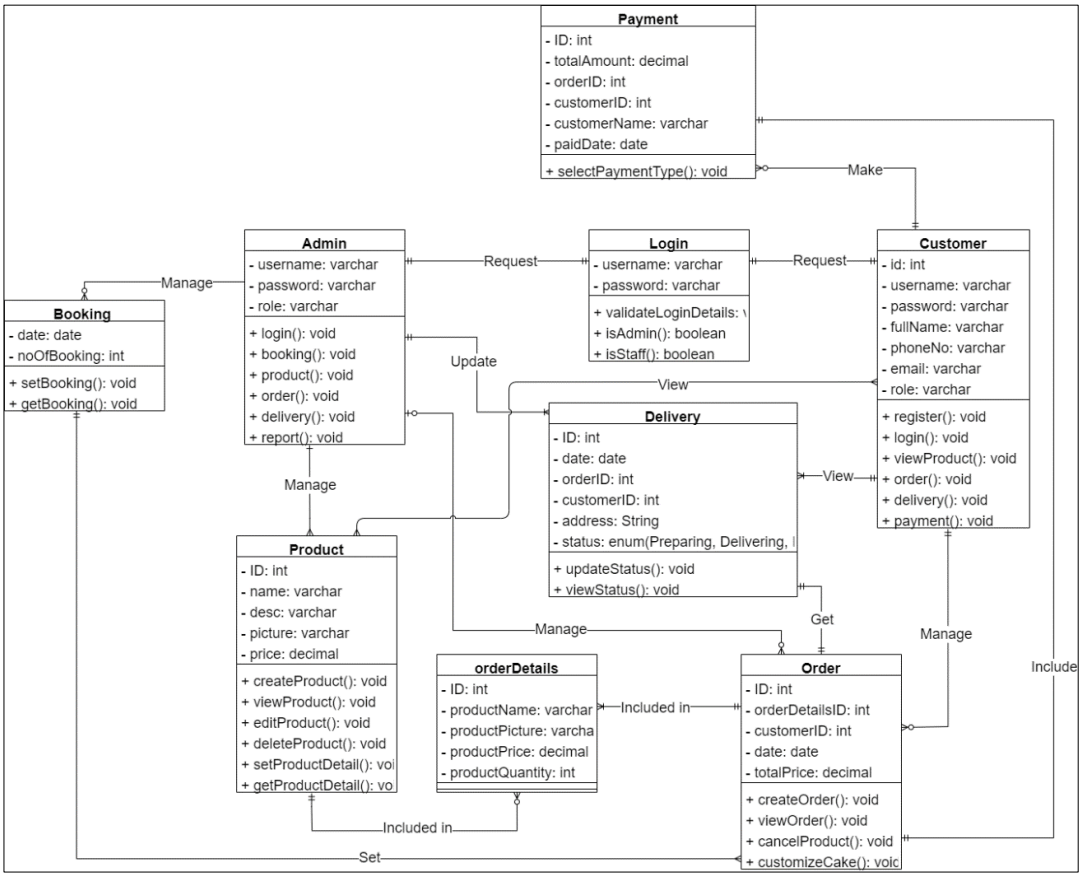

Figure 3: Class Diagram for Caketisserie Bakery & Café Online Cake Ordering System

3.3 Schema Data

In this section, the data schema to build the database is listed.

i. Admin (username, password, role)

ii. Customer (ID, username, password, fullName, phoneNo, email, role)

iii. Login (username, password)

iv. Product (ID, name, desc, picture, price)

v. orderDetails (ID, productName, productPicture, productPrice, productQuantity)

vi. Order (ID, orderDetailsID, customerID, date, totalPrice)

vii. Booking (date, noOfBooking)

viii. Delivery (ID, date, orderID, customerID, address, status)

ix. Payment (ID, totalAmount, orderID, customerID, customerName, paidDate)

4. Results and Discussion

4.1 System Implementation

Caketisserie Bakery & Café Online Cake Ordering System has been implemented according to the module listed in the previous chapter. Each of the module's development is carried out in PHP language with the use of Visual Studio Code as the code editor and MySQL Database as the database to manage the data.

4.1.1 Database Connection

MySQL is selected as the database used for this system and phpMyAdmin is used as a tool for managing the MySQL database. Figure 4 shows the code segment of the database connection for the system.

```php
<?php
$conn = mysqli_connect("localhost", "root", "", "fyp");

// Check connection
if (mysqli_connect_errno()) {
  echo "Failed to connect to MySQL: " .
  mysqli_connect_error();
}
```

Figure 4: Code segment for MySQL Database Connection

4.1.2 Login Page

In order to use the functions provided in Caketisserie Bakery & Café Online Cake Ordering System, firstly, the users need to log in to the system by providing the registered username and password. If the username or password entered is incorrect, an error message will be displayed, and the users will not be able to access the system. Figure 5 shows the login page for the system.

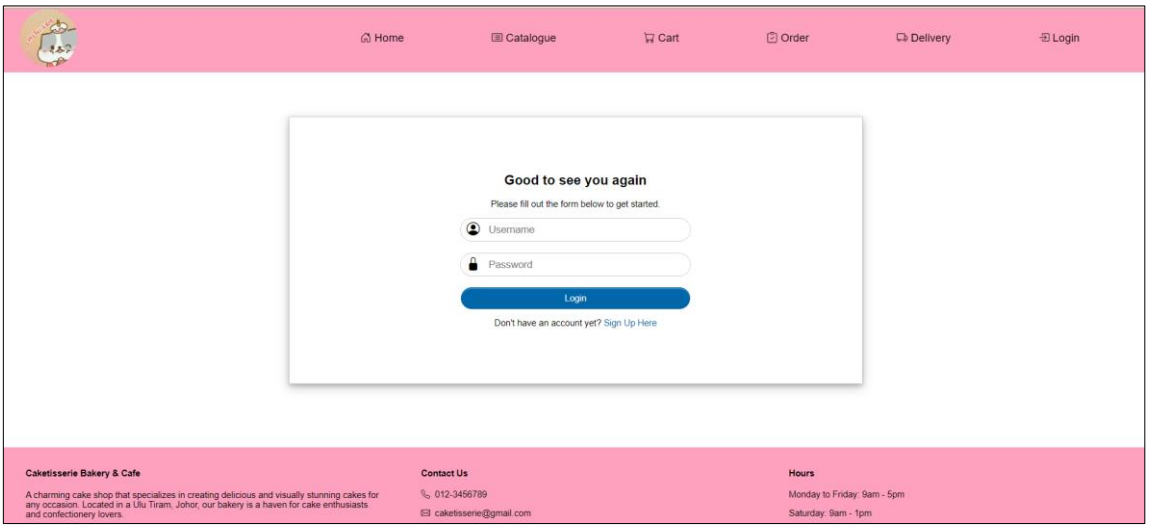

Figure 5: Login page of Caketisserie Bakery & Café Online Cake Ordering System

4.1.3 Registration Page

If the user is not registered yet, the user is required to create a new account by filling in all the information required in the registration form. An error message will be displayed if there is any empty field left upon the submission of the form. After the registration, the user would be able to log in to the system. Figure 6 shows the registration page of the system.

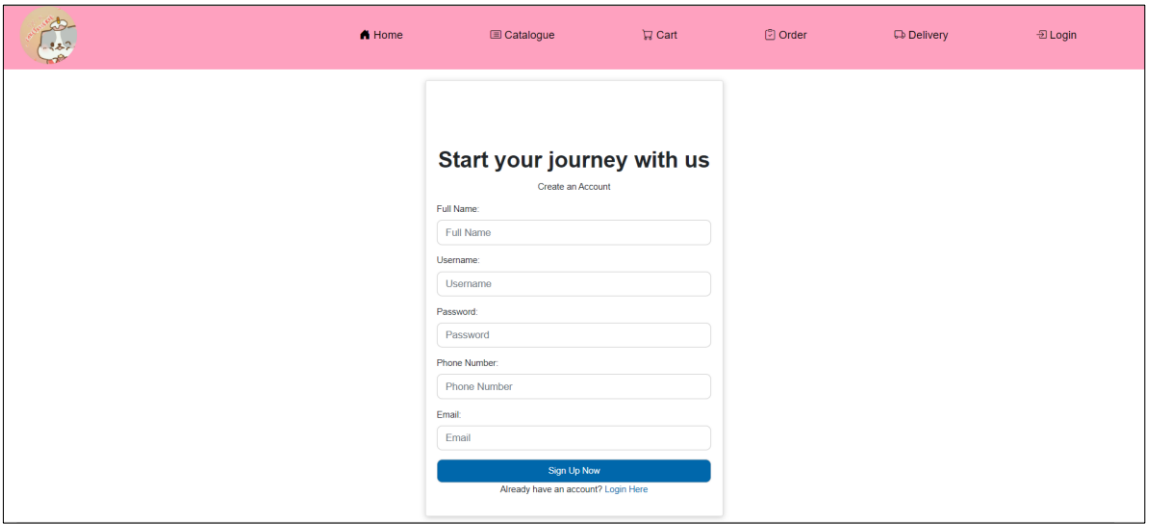

Figure 6: Registration page of Caketisserie Bakery & Café Online Cake Ordering System

4.1.4 Homepage (For Customer)

Once the users with the customer role successfully log in to the system, the homepage shown in Figure 7 will be displayed. The users can find some cakes on this page and they also can view the new arrivals and the best sellers cakes in the system.

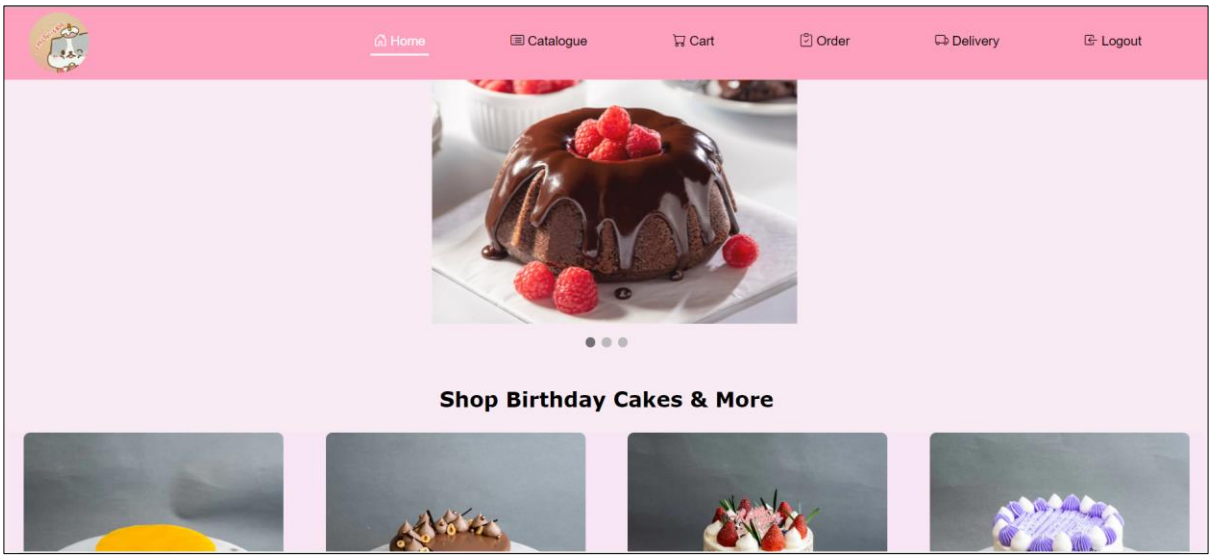

Figure 7: Homepage for customer in Caketisserie Bakery & Café Online Cake Ordering System

4.1.5 Cake catalogue (For Customer)

In this module, the users can view the list of cakes provided by the shop. By clicking the images of the specific cake, the users will be directed to the cake details page for more details about that cake. Besides, the users can click the "Add to Cart" button to add that cake to the cart. There is also a filter by category function where the user can select the specific cake category from the category list to filter the cakes to appear on this page. So, it is easier for the user to find their target. Figure 8 shows the cake catalogue page for the customer while Figure 9 shows the cake customization page for the users to customize their cakes. For the cake customization function, the users need to fill in all the required information in the form and submit the form.

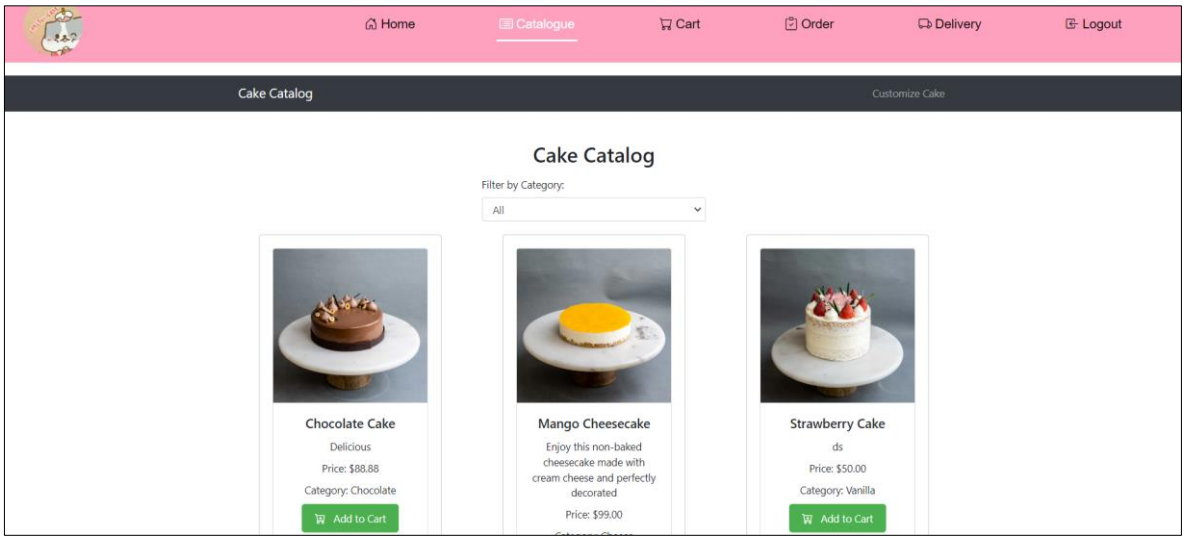

Figure 8(a): Cake catalogue page for customer

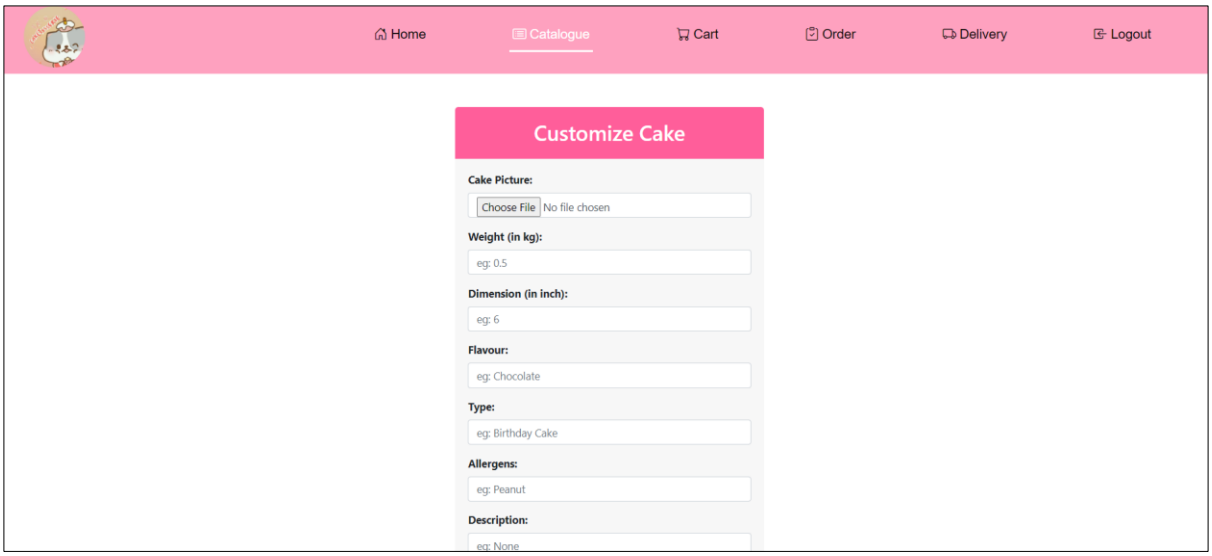

Figure 8(b): Cake customization page of Caketisserie Bakery & Café Online Cake Ordering System

4.1.6 Cart page (For Customer)

In this page as shown in Figure 10, the users can view the cakes that they added from the catalogue. They also can delete the cakes from the catalogue. By clicking the "Continue Shopping" button, the users will be redirected to catalogue page while by clicking the "Checkout" button, the user will be redirected to the checkout page for the order checked out process.

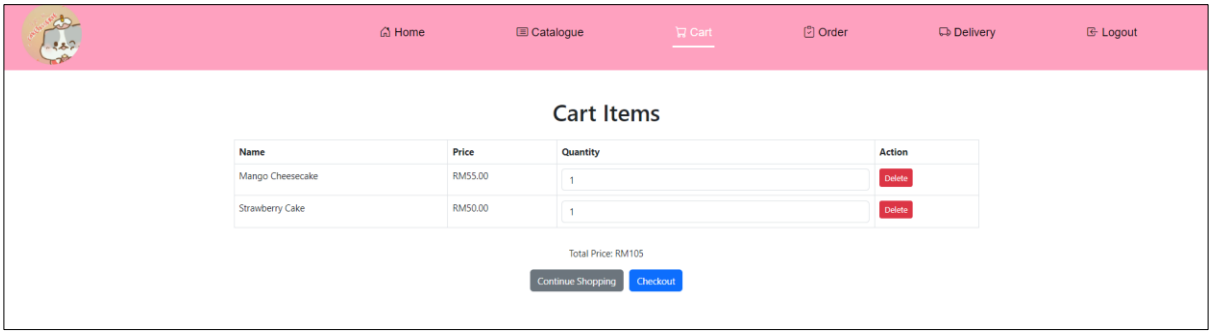

Figure 9: Cart page of Caketisserie Bakery & Café Online Cake Ordering System

4.1.7 Make Payment (For Customer)

Figure 11 shows the payment page for users which allows the users to select the payment method whether card payment or online banking. After that, the users need to fill in all the information required to pay for their order using their selected payment method.

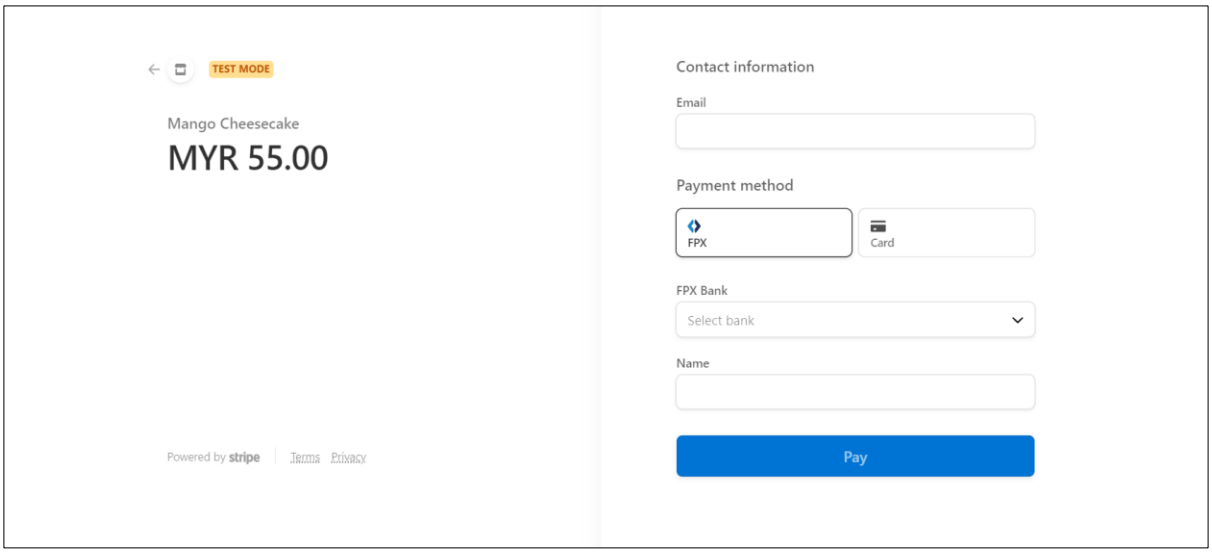

Figure 10: Payment page of Caketisserie Bakery & Café Online Cake Ordering System

4.1.8 Order Page (For Customer)

The users can view the list of orders that they have made. In the list of orders as shown in Figure 12, the order id, cake name ordered, date ordered and the order status will be shown. The color of the order status will be displayed based on the status of the order whether it is pending, accepted, rejected or completed. Besides, by clicking the "View" button, the users can view the details of the specific order.

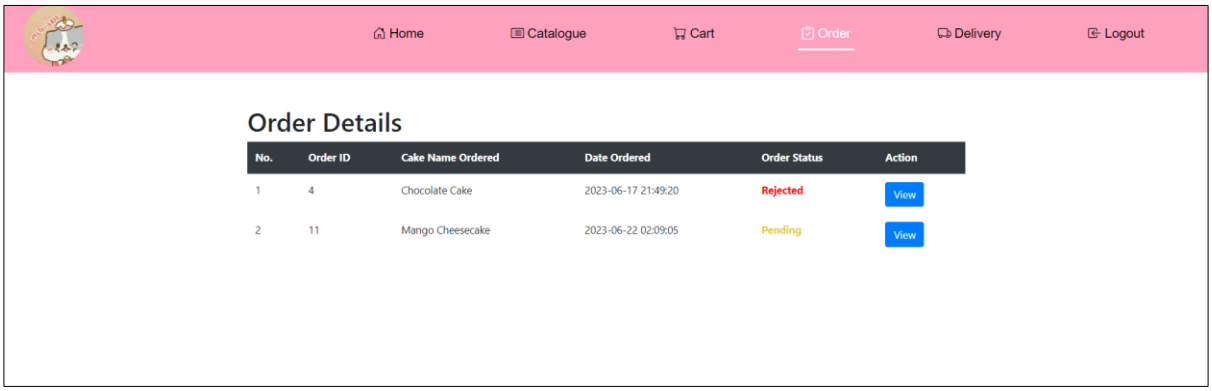

Figure 11: Order page for customer in Caketisserie Bakery & Café Online Cake Ordering System

4.1.9 Delivery Page (For Customer)

For this module, the user with the customer role can only view the delivery status of the order. The progress bar will be displayed to inform the user about the progress in a graphical way. Figure 13 shows the delivery page for users with the customer role.

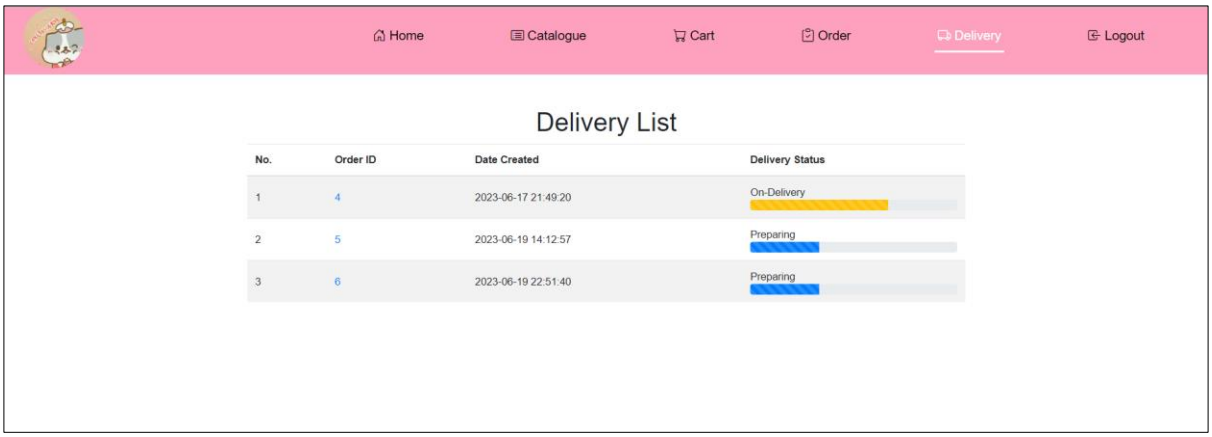

Figure 12: Delivery page for customer in Caketisserie Bakery & Café Online Cake Ordering System

4.1.10 Manage Product (For Admin)

If the users log in to the system with the admin role, the users will be redirected to the product page as shown in Figure 14. On this page, the users will be able to view the list of the cakes. They can edit the specific cake information by clicking the "Edit" button and they can delete the unwanted cakes from the list by clicking the "Delete" button. Besides, by clicking the "Add New Cakes" button, the users can add new cakes by entering the cake details into the form provided.

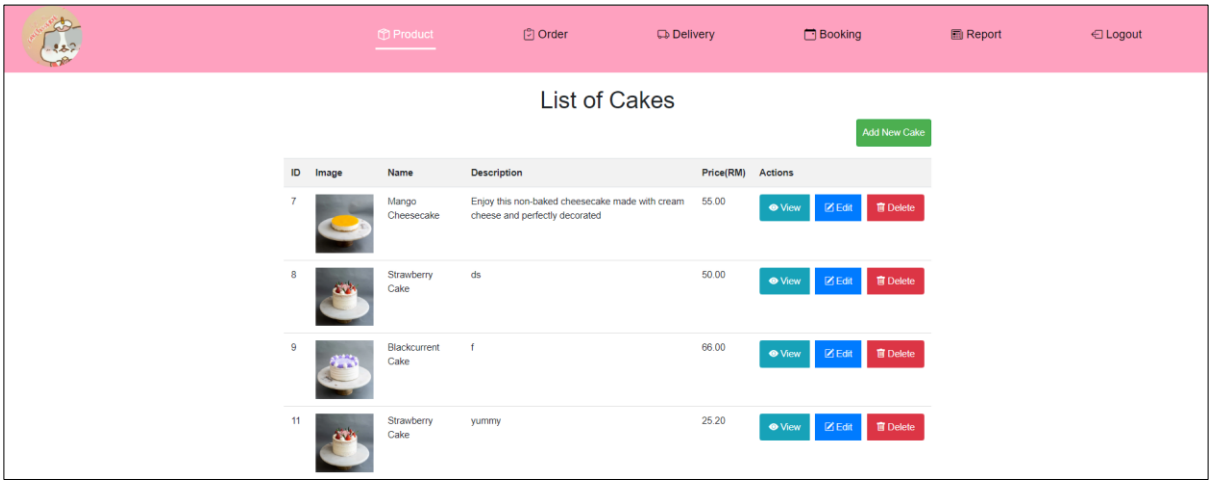

Figure 13: Product page of Caketisserie Bakery & Café Online Cake Ordering System

4.1.11 Manage Order (For Admin)

In this module, the users can view the list of orders as shown in Figure 15. The color of the order status will be changed based on the status whether it is pending, accepted, rejected or completed. Furthermore, the users can view the specific order details for the selected order by clicking "View" button and the users can edit the order status by clicking the "Edit button".

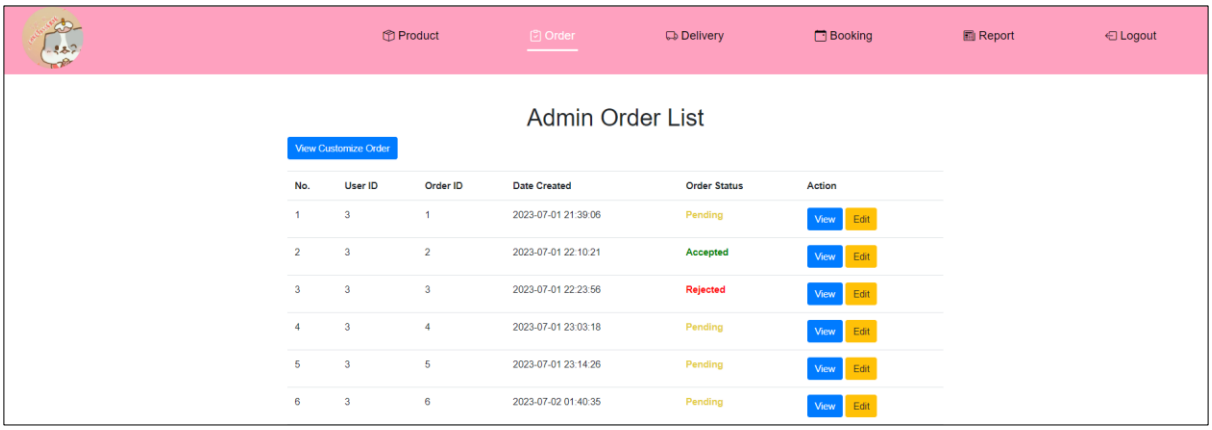

Figure 14: Order page for admin in Caketisserie Bakery & Café Online Cake Ordering System

4.1.12 Manage Delivery (For Admin)

There is a list of the delivery order displayed in the delivery page as shown in Figure 16 where the users can view the details of the specific delivery order and they can also edit the delivery status of that specific order by clicking the respective button.

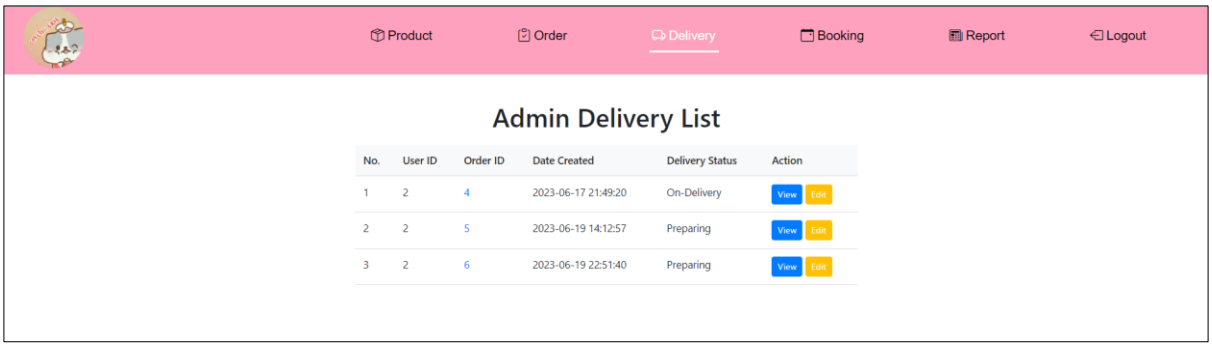

Figure 15: Delivery page for admin in Caketisserie Bakery & Café Online Cake Ordering System

4.1.13 Manage Booking (For Admin)

To manage booking in the system, the users need to select the date in the field provided, then enter the number of available slots for that date. Besides, the users can tick the checkbox provided to allocate the available slots for entire month based on the selected date. By clicking the "Save" button, the data entered will be saved into the database. Figure 17 shows the user interface for managing the booking module.

Figure 16: Booking management page of Caketisserie Bakery & Café Online Cake Ordering System

4.1.14 Manage Report (For Admin)

Last but not least, for the manage report module, the users need to choose the start date, end date and report type to be generated. Then, the details of the report will be displayed as shown in Figure 18. By clicking the "Print" button, the print view of the generated report will be shown.

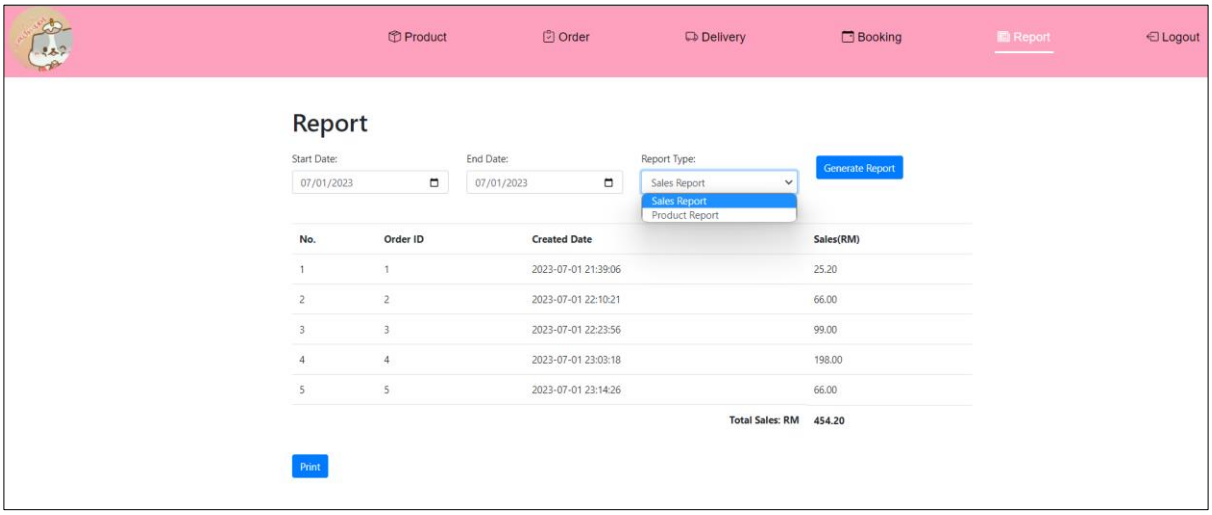

Figure 17: Sales report page of Caketisserie Bakery & Café Online Cake Ordering System

4.2 System Testing

In the testing phase, Caketisserie Bakery & Café Online Cake Ordering System is tested using alpha testing to test the functionality of the system. By executing the system testing, this system can be made sure to work as complete. Besides, it can also assist in identifying the strengths and weaknesses of the system. If some errors are occurring, the system would need to be fixed to ensure it can run smoothly. Table 5 shows the test cases and test results of each function module in the Caketisserie Bakery & Café Online Cake Ordering System.

Table 5: Test Cases for the system

Test Cases	Description	Status
TC_100	Login	
TC_100_01	The system shall allow the user to log in to the system by entering the valid username and password.	PASS
TC_100_02	The system shall prompt an error message when the user wishes to log in to the system by entering the invalid username or password.	PASS
TC_100_03	The system shall prompt the input field required if the user wishes to log in to the system with the empty input field.	PASS
TC_100_04	The system shall allow the user to register new account by entering all the information required.	PASS
TC_100_05	The system shall prompt an error message if the user wishes to register new account without entering all the information required.	PASS
TC_200	Manage Product	
TC_200_01	The system shall allow the admin to view the list of products.	PASS

Test Cases	Description	Status
TC_200_02	The system shall allow the admin to add the new product.	PASS
TC_200_03	The system shall allow the admin to view the details of the specific product.	PASS
TC_200_04	The system shall allow the admin to edit the details of the specific product.	PASS
TC_200_05	The system shall allow the admin to delete the specific product.	PASS
TC_300	Manage Order	
TC_300_01	The system shall allow the customers to browse the cake catalogue.	PASS
TC_300_02	The system shall allow the customers to view the details of the specific cake.	PASS
TC_300_03	The system shall allow the customers to add the cake to cart.	PASS
TC_300_04	The system shall allow the customers to delete the cake from cart.	PASS
TC_300_05	The system shall allow the customers to create new order by checking out the cart.	PASS
TC_300_06	The system shall allow the admin and customers to view the list of the orders.	PASS
TC_300_07	The system shall allow the admin and customers to view the details of the specific order.	PASS
TC_300_08	The system shall allow the admin to edit the status of the specific order.	PASS
TC_400	Manage Booking	
TC_400_01	The system shall allow the admin to select the date and set the numbers of booking slot that available for the selected date.	PASS
TC_400_02	The system shall allow the admin to save the details entered.	PASS
TC_500	Manage Delivery	
TC_500_01	The system shall allow the admin and customers to view the list of delivery order.	PASS
TC_500_02	The system shall allow the admin and customers to view the details of the specific delivery order.	PASS
TC_500_03	The system shall allow the admin to edit the delivery status for the specific delivery order.	PASS
TC_600	Make Payment	
TC_600_01	The system shall allow the customer to choose the payment method.	PASS
TC_600_02	The system shall allow the customer to make payment for their orders.	PASS

Test Cases	Description	Status
TC_700	Manage Report	
TC_700_01	The system shall only allow the admin to view the list of reports.	PASS
TC_700_02	The system shall only allow the admin to generate the sales report.	PASS
TC_700_03	The system shall only allow the admin to generate the product report.	PASS
TC_700_04	The system shall only allow the admin to view the details of specific report.	PASS

4.2.1 Overall Test Result of Test Cases

In overall, there are a total of 29 test cases has been carried out for the system and the summary of the test result for test cases has been tabulated into the table as shown in Table 6. All test cases have reached a 100% pass rate which means there is no fail result for the test cases and the system passes all the test cases.

Table 6: Test results for test cases

No.	Test Cases	Number of Passed Test Cases	Pass (%)
1	TC_100	5/5	100
2	TC_200	5/5	100
3	TC_300	8/8	100
4	TC_400	2/2	100
5	TC_500	3/3	100
6	TC_600	2/2	100
7	TC_700	4/4	100
	Total:	29/29	100

Figure 19 shows the pie chart that illustrates the test results of Caketisserie Bakery & Café Online Cake Ordering System. Based on the result, it is clear that all the modules are functioning well and implemented successfully.

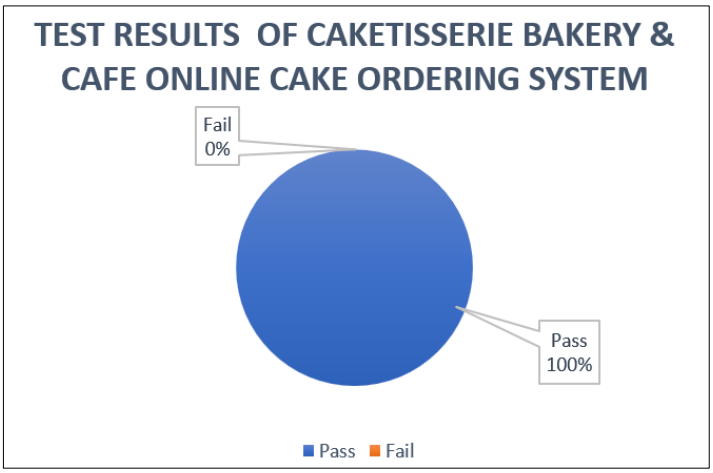

Figure 18: Pie chart for the test results of Caketisserie Bakery & Café Online Cake Ordering System

5. Conclusion

To sum up, Caketisserie Bakery & Café Online Cake Ordering System has been successfully developed and it has solved the problems faced by the bakery. This system definitely brings convenience to the shop manager and customer in managing the orders and placing the order for a cake. However, this system also has disadvantages where it does not provide the function for the admin to manage the customer information and there are no rating or feedback modules for the customers. Hence, for future work, it can be improved by adding some features such as feedback and alert functions.

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References

[1] A. A. Chia and H. Mahdin, "Design and Development of Pet Cage Ordering System on Web-Based Technology," *Applied Information Technology And Computer Science*, vol. 3, no. 2, pp. 257-275, 2022.

[2] R. Puspita and D. Rohedi, "The impact of internet use for students," *IOP Conference Series: Materials Science and Engineering*, vol. 306, no. 1, p. 012106, 2018.

[3] R. Sahu, "PROJECT MANAGEMENT FOR IMPLEMENTING AN ONLINE-ORDERING SYSTEM," *Экономика и Финансы (Украина),* no. 12, pp. 4-9, 2019.

[4] T. S. Yong and R. Ab.Aziz, "Development of My Toy House Online Ordering System for My Toy House Online Store," *Applied Information Technology And Computer Science*, vol. 2, no. 2, pp. 823-838, 2021.

[5] W. S. Jiuan, "Restaurant ordering system," 2019.

[6] "Dairy Queen," International Dairy Queen Inc., [Online]. [Accessed 2023].

[7] "Eat Cake Today - Cake Delivery from Malaysia's Best Bakers," Eat Cake Today Sdn Bhd, [Online]. [Accessed 2023].

[8] "Caketella," Cake Tella Sdn Bhd, [Online]. [Accessed 2023].

[9] T. K. Rahayu, Susanto and Suwarjono, "Application Report Process Of Islamic School Based On Pesantren Boarding Using Waterfall Model," *Journal of Physics: Conference Series*, vol. 1569, no. 2, p. 022025, 2020.

[10] G. Gurung, R. Shah and D. P. Jaiswal, "Software Development Life Cycle Models-A Comparative Study," *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, pp. 30-37, 2020.

[11] S. Herawati, Y. D. P. Negara, H. F. Febriansyah and D. A. Fatah, "Application of the Waterfall Method on a Web-Based Job Training Management Information System at Trunojoyo University Madura," *E3S Web of Conferences*, vol. 328, p. 04026, 2021.

[12] C. Fagarasan, O. Popa, A. Pisla and C. Cristea, "Agile, waterfall and iterative approach in information technology projects," *IOP Conference Series: Materials Science and Engineering*, vol. 1169, no. 1, p. 012025, 2021.

[13] R. Ganesh and G. Prabu, "Determination of internet banking usage and purpose with explanation of data flow diagram and use case diagram," *International Journal of Management and Humanities*, vol. 4, no. 7, pp. 52-58, 2020.

[14] R. Fauzan, D. Siahaan, S. Rochimah and E. Triandini, "Automated Class Diagram Assessment using Semantic and Structural Similarities," *International Journal of Intelligent Engineering and Systems*, vol. 14, no. 2, pp. 52-66, 2021.