

Online Ordering System for Wicked Cinnamon Rolls Home Bakery (e-Bakery)

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Abstract

Wicked Cinnamon Rolls are a home bakery which is located in Kota Bharu, Kelantan. This home bakery started their business in early 2021 when the COVID-19 pandemic broke out. Wicked Cinnamon Rolls Home Bakery is still using manual based system to take orders and manage their orders. This has caused them several problems which are lack of an online presence and e-commerce skills, human error and may reduce the effectiveness of the ordering process. The purpose of this project is to create an online ordering system for the home bakery in order to improve customer satisfaction, speed up the process ordering, and expand market reach. The system's design prioritizes offering a comfortable and user-friendly interface for customers to place orders and for the bakery owner to easily manage the process. The methodology used to develop this project is prototyping model. Before developing the final product, a rough version or prototype of the product is created to gather input from the user, test functionality, and refine requirements. Prototyping, assessment, and refining are iterated until the prototype achieves the required objectives and requirements. The system is a web-based system that consists of 9 modules which are register, login, profile user, menu, order, discount, invoice, sales report, and feedback. The proposed system can be used by two types of users which is administrator and customer. With this system, the process of ordering will be easy by both users. In conclusion, the system has succeeded in meeting its objectives since it was successfully designed and developed. Several enhancements to the system's performance and user experience may be implemented such as automated voucher redemption function.

1. Introduction

The COVID-19 pandemic led to a surge of entrepreneurship, with many findings innovative ways to start businesses amidst the uncertainty. One such venture is Wicked Cinnamon Rolls, a home bakery in Kota Bharu, Kelantan. Initially offering a variety of cinnamon rolls, they expanded their menu to include Thai butter cake and lemon cake as their business grew. Currently, they operate through Instagram and WhatsApp, offering only

delivery and takeaway services. However, the manual method of recording orders has led to some orders being forgotten once paid due to the lack of an automated system.

To address this, an e-Bakery system is proposed for Wicked Cinnamon Rolls. This system includes modules for login, registration, profile user, menu, order, discount, invoice, sales report and feedback. Customers can view the menu, place orders, and make online payments, which automatically confirms their order status. They also can apply the voucher code before checkout to receive the discount. On the other hand, the admin can manage the menu and order status, and use the feedback platform to improve products and services. This system aims to benefit both the owners and customers of Wicked Cinnamon Rolls Home Bakery.

Wicked Cinnamon Rolls Home Bakery, currently operating via WhatsApp and Instagram, faces challenges due to the lack of an online presence, leading to missed growth opportunities and potential customer reach. The absence of an e-Bakery system has led to human errors, such as forgotten orders, affecting customer satisfaction and profits. The proposed e-Bakery system aims to streamline order management, reduce errors, and enhance customer engagement. It will also enable effective promotion of seasonal products, improving sales opportunities. Furthermore, the system includes a feedback platform for customers, allowing the bakery to continually improve its products and services. This study aims to develop this e-Bakery system to address these issues and enhance the bakery's operations.

The project aims to develop an e-Bakery website for Wicked Cinnamon Rolls, a home bakery, to streamline the ordering and management process for both customers and administrators. The objectives include designing a web system using a structured approach, developing the e-Bakery using web-based approaches, and thoroughly testing the e-Bakery functionalities through user acceptance testing.

The scope of this web-based ordering system encompasses both administrators and customers. Administrators have the ability to customize the bakery's menu, view and modify order lists, and view sales reports. On the other hand, customers, after registering and logging into the system, can place orders, pay for delivery and takeout services, and check their order status.

Upon completion of this project, an e-Bakery will be established. Users can register, log in, and edit their profiles on this online system. They can pre-order products, add them to their cart, choose options, add notes, and modify their orders. Customers can choose delivery options, make online payments, and receive order confirmations. They can download invoices, track their order status, and leave feedback once they receive their orders. The primary user of this e-Bakery system is the admin. They can log in, manage the menu, and modify product details. The admin can view order statuses, confirm customer orders, and update order statuses to inform customers that their orders are being prepared. They can view to customer reviews in the feedback section and view sales reports in the report module.

2. Literature Review

2.1 Online Ordering System

An online ordering system is a digital platform that facilitates the purchase of goods or services over the internet. This technology streamlines the shopping process, allowing customers to browse, select products, and complete transactions without needing to be physically present [1]. These systems are prevalent in various industries, including food and beverage, retail, and services. They often feature a user-friendly website or mobile app where customers can explore available items, customize their orders, and make secure online payments. The rising importance of such digital platforms in providing smooth and user-friendly customer experiences [2]. As online ordering demand grows, it's increasingly crucial for F&B businesses to establish their own platforms.

These systems often include features like order tracking, inventory management, configurable discounts, and access to sales data. They cater to various types of orders, including dine-in, pickup, and delivery. Some systems even offer direct connectivity with delivery service providers to enhance the online purchasing experience [3]. Top online ordering systems for small restaurants in Malaysia include Eats365, GloriaFood, eRestaurant, HUBBO POS (Formerly Aliments), Oddle, dinlr Online Order, Storehub, iChef, IRS Restaurant POS System, FoodChow Online Ordering System, Xilnex LiveOrder, and Slurp! Point-of-sale [2]. In conclusion, online ordering systems improve the ordering process for both customers and businesses, making them an essential tool in today's digital world [2].

2.2 Web-Based System

Web-based systems, also known as web applications, are software that can be accessed via the HTTP protocol [4]. They can be executed through a web browser or be client-based, where a small part of the program is downloaded to a user's desktop, but processing occurs on an external server over the internet [5]. Unlike regular webpages, these systems resemble native applications in appearance and function, and are primarily designed for user interactions. They don't require specific operating systems like iOS, Android, or Windows, allowing users to access databases via a browser on any device [6]. Examples include online payment systems, content management systems, booking systems, and online retail and banking systems that work with client inputs. Web-based systems are an efficient way of interacting with users and are considered essential in today's digital era.

2.3 Comparison with the existing system

In order to develop a system with improved and essential modules to be implemented in this project, three existing system have been reviewed and studied. A comparison table has been prepared to demonstrate how the existing and proposed system uses features in terms of benefits and limitations. The system's advantages and disadvantages will be evaluated so that changes may be made, and the system can be fully applied. Table 1 compares existing systems with the proposed system.

Table 1 Comparison of the existing systems

Features/System	Sydney Cake House	Lavender Bakery	Bakesville Bakery Café Ipoh	Proposed System (e-Bakery)
Login and Registration	Optional	Yes	Optional	Yes
Delivery Service	Yes	Yes	Yes	Yes
Available item update	Yes	Yes	Yes	Yes
Points or voucher features	Yes	Yes	Yes	Yes
Tracking Order	No	Yes	No	Yes
Search product function	No	Yes	No	Yes

From the observation on the Table 1, login and registration feature for Sydney Cake House and Bakesville Bakery Café Ipoh are optional for them to submit the order while Lavender Bakery are required to do login and registration first before proceed order. For the tracking order and search product function, only Lavender Bakery have these features.

3. Methodology

This chapter discusses the use of the Prototyping Model in the development of the Online Ordering System for Wicked Cinnamon Rolls home bakery. The model stimulates a natural setting for user interaction and allows for early design revisions. It aids developers in capturing user requirements early on, providing a functional model for users to comment on and request adjustments. This participatory approach ensures the product meets user requirements and expectations. The Prototyping Model reduces the risk of developing a software product that doesn't meet end-user or stakeholder expectations, ensures user-friendliness, and has the potential to reduce development time and cost.

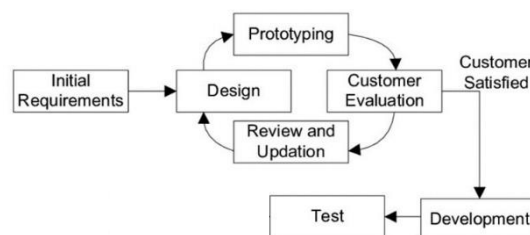


Fig. 1 Prototype Model Phase final [7]

There are total of eight phases from the prototype model. As shown in Table 2, each phase has its own assignment and output that need to produce during the entire project development. Besides that, the output had been completed within the specific days that have been given.

Table 2 *Software development task and their activities*

Phase	Task	Output
Initial Requirements	<ul style="list-style-type: none"> • Proposed the project • Determine the project schedule, activities and output 	<ul style="list-style-type: none"> • Project proposal • Develop Gantt chart
Design	<ul style="list-style-type: none"> • Create a basic design of the system based on the gathered requirements 	<ul style="list-style-type: none"> • Preliminary design document
Prototyping	<ul style="list-style-type: none"> • Develop a working model of the system based on the design 	<ul style="list-style-type: none"> • Working prototype
Customer Evaluation	<ul style="list-style-type: none"> • Present the prototype to the users for their feedback • Collect feedback from the users 	<ul style="list-style-type: none"> • User feedback
Review and Updation	<ul style="list-style-type: none"> • Analyze the feedback received from the users • Make necessary changes to the prototype based on the feedback 	<ul style="list-style-type: none"> • Refined prototype
Development	<ul style="list-style-type: none"> • Develop the final design of the system based on the refined prototype 	<ul style="list-style-type: none"> • Final design document
Testing	<ul style="list-style-type: none"> • Test the final system to ensure it meets the users' needs and expectations 	<ul style="list-style-type: none"> • Test results

Functional Requirements Analysis is a process in software development that identifies and documents the essential functions that a system or its components should perform. These requirements are the specific features that developers must implement to enable users to achieve their goals. Table 3 shows the functional requirement of the proposed system.

Table 3 *Functional Requirements Analysis*

Module	Description
Register	<ul style="list-style-type: none"> The system should allow new user to register their account before login into the system. The system should validate the information provided by user during the registration process.
Login	<ul style="list-style-type: none"> The system should allow user to login into the system using their registered email and password. The system should notify the user for any invalid input. The system should redirect user to the respective main menu upon successful login.
Profile User	<ul style="list-style-type: none"> The system should allow users to view and update their personal information after login.
Menu	<ul style="list-style-type: none"> System should allow admin to modify the product details such as add, edit, delete, or update.
Order	<ul style="list-style-type: none"> The system should allow customers to click the product details that they want, and the order will go to the order cart. The system should allow customers to edit or cancel the order as they wish. The system should allow customers to choose the date they want to order the products. The system should allow customers to choose delivery option or pickup. The system should display total costs to the customers for payment information. The system should allow customers to pay online through this system after selecting the delivery option. The system should allow the customers to keep track their order status details such as received, preparing, ready for pickup or delivery and completed. The system should allow admin to view and change the order status as the condition.
Discount	<ul style="list-style-type: none"> The system should allow customers to apply discounts to orders based on predefined rules or promotional codes. The system should allow admin to add, delete and view all voucher that available.
Invoice	<ul style="list-style-type: none"> The system should generate an invoice for each completed order. The system should allow customers to download the invoice.
Sales Report	<ul style="list-style-type: none"> The system should provide sales data in a structured format for analysis. The system should allow admin to view their monthly and annually sales report.
Feedback	<ul style="list-style-type: none"> The system should allow customers to leave the comments and reviews about product and services. The system should allow admin able to view the comments of customers.

Non-functional requirements are crucial aspects of a system that do not relate to the specific functionality, but rather to the performance and operational characteristics of the system.

Table 4 *Non-functional requirement*

No	Requirement	Description
1.	Scalability	The system should be able to handle growth in users and data over time
2.	Availability	The system should be up and running a high percentage of the time
3.	Security	User data should be protected, and transaction should be secure
4.	Performance	The system should respond quickly to user interactions and process transactions within acceptable time limits

User requirement analysis is a critical phase in the development of any system where the needs and constraints of the end-users are identified and clearly defined. Table 5 shows the user requirement of Online Ordering System for Wicked Cinnamon Rolls Home Bakery (e-Bakery).

Table 5 User requirements of e-Bakery system

No.	User Requirement
1.	All users should be able to enter the valid username and password for registration and login into the system.
2.	The admin should be able to view and modify the product details such as add, edit, delete or update.
3.	The admin should be able to view the order details.
4.	The admin should be able to change the order status.
5.	The admin should be able to view, add and delete voucher.
6.	The admin should be able to view monthly and annually sales report.
7.	The admin should be able to view to the feedback.
8.	The customer should be able to view and change their information details.
9.	The customer should be able to select the product.
10.	The customer should be able to add, edit or delete the selected product.
11.	The customer should be able to choose the date they want to order.
12.	The customer should be able to choose the delivery or takeaway option.
13.	The customer should be able to do online payment.
14.	The customer should be able to view order details.
15.	The customer should be able to apply discount voucher.
16.	The customer should be able to download the invoice order.
17.	The customer should be able to leave the comments and reviews.

3.1 Context Diagram

The context diagram in Fig. 2 shows the main process which is conducting the Online Ordering System for Wicked Cinnamon Rolls Home Bakery with two main entities in the process which are customer and administration by showing the flow data in the system. There are also several data flows that show the existence of information between the system and entities.

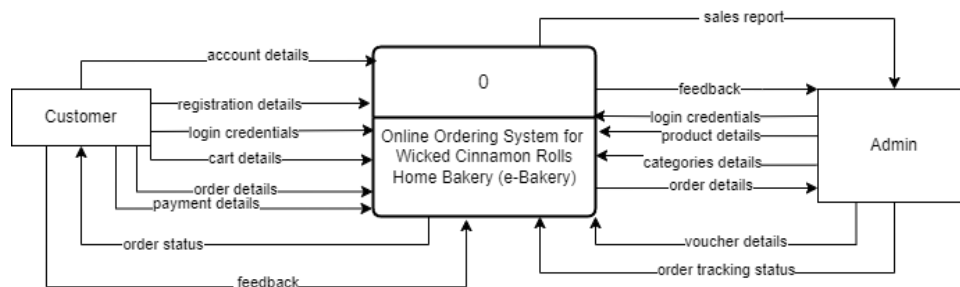


Fig. 2 Data Flow Diagram Context Diagram

3.2 Data Flow Diagram Level 0

A Data Flow Diagram (DFD) Level 0, also known as a Context Diagram, provides a high-level overview of a system, illustrating the system’s major processes, data flows, and external entities that interact with it. It shows how the system as a whole functions, highlighting the primary inputs and outputs but not detailing the internal processes or data storage. This level serves as a foundation for breaking down the system into more detailed levels in subsequent diagrams [8]. The data flow diagram level 0 of the Online Ordering System for Wicked Cinnamon Rolls Home Bakery has been divided into two which is the user and the admin. Appendix A shows the Data Flow Diagram Level 0 of Online Ordering System for Wicked Cinnamon Rolls Home Bakery for the users that involves registration, login, edit profile, manage product, manage category, add product to the cart, manage order, manage voucher, manage feedback, and generate sales report.

3.3 Database Design – Entity relationship Diagram

Entity Relationship Diagram is a type of structural diagram used in database design to visualize how different entities relate to each other within an application or a database [9]. Fig. 3 shows the entity relationship diagram (ERD) of the proposed system.

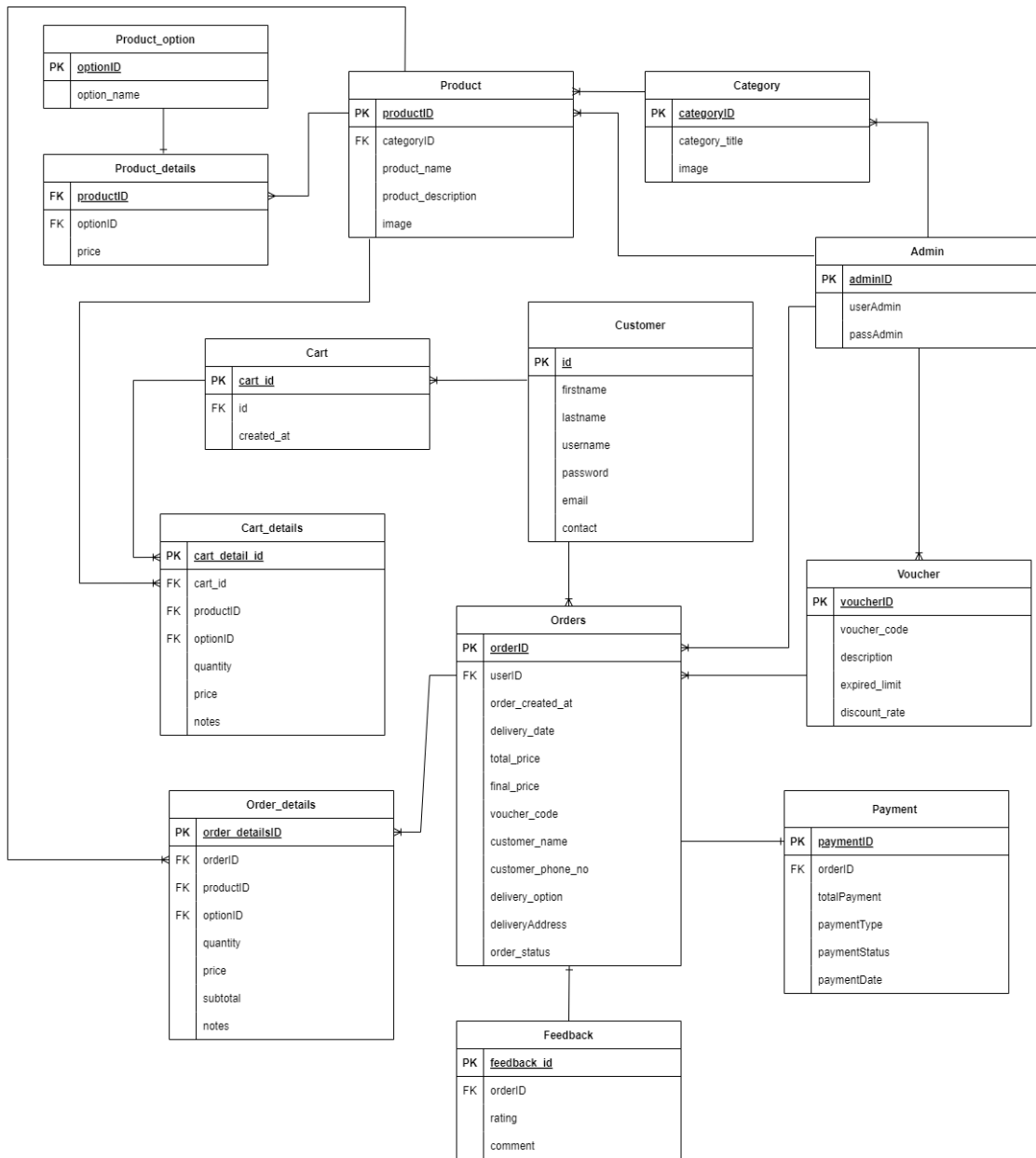


Fig. 3 Entity Relationship Diagram of Online Ordering System for Wicked Cinnamon Rolls

3.4 Interfaces Design

The following figure are the mock-up interfaces that have been designed based on each process. They are designed by using Canva.

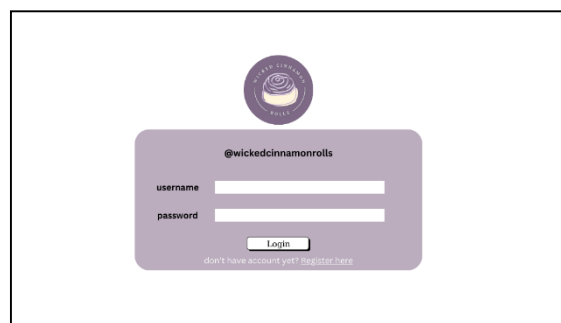


Fig. 4 Login Page Interfaces

Fig. 4 shows login page that will be displayed to customer and admin before they can access into the system. Customer and admin need to input their registered username and password. If a customer doesn't have account yet, they can click the register link which will lead them to register page.



Fig. 5 View Menu Page Interfaces

Fig. 5 shows view menu page which customers can view the menu based on selected date they chose to order. There will be many product in each category.

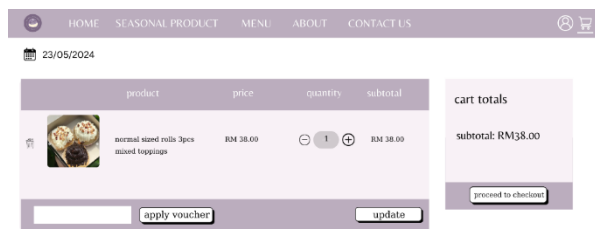


Fig. 6 Cart Page Interfaces

Fig. 6 shows cart page interface design. This cart page will be displayed based on selected product that customer choose. The order shows product name, price, quantity, and subtotal. Customer can edit and delete the product in the cart. Customer also can apply the voucher code in the voucher section.

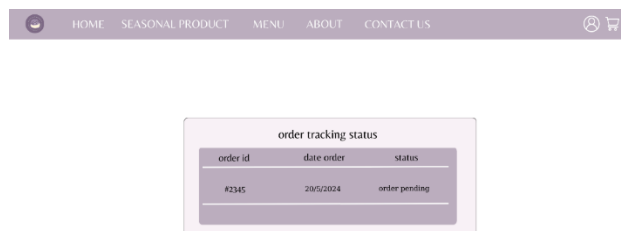


Fig. 7 Track Order Page Interfaces

Fig. 7 shows order tracking page after customer successfully made payment order. The customer can view the order tracking status to alert the order process.

Fig. 8 Manage Product Page Interfaces

Fig. 8 shows manage product page which admin can add, delete and update the product.

order id	date order	status
#2345	20/5/2024	pending

Fig. 9 Manage Order Tracking Page Interfaces

Fig. 9 shows manage order tracking page. This page will be managed by admin which admin need to update the status order and the status will alert to customer.

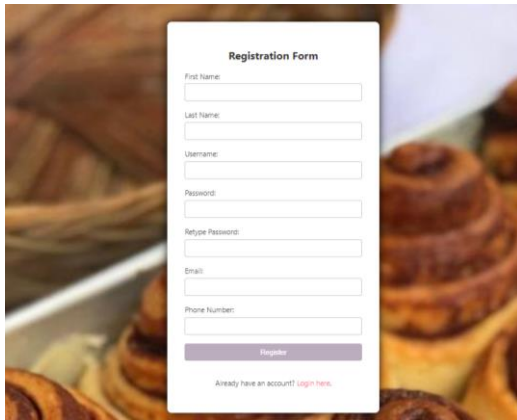
4. Result and Discussion

4.1 Implementation

Based on the analysis and design in the previous chapter, the system's plans are implemented, and the functionality is rigorously tested. The online website is created with JavaScript for interactive features, PHP for server-side functions, HTML for organizing the content, and CSS for designing the pages. MySQL acts as the database for the efficient storage and management of data. The integration of these technologies was part of the implementation process to develop a user-friendly system that works well together. Every module underwent thorough testing to verify its compliance with system requirements, confirming that all functions operate correctly as per the specifications determined in the analysis and design stages.

4.1.1 Registration Module

The registration module is for users who do not yet have an account. Users can register by filling in the required information. Once registered, their details are updated in the database, allowing them to log in. Fig. 10(a) shows the registration interface. Customers without an account must register before logging in, providing the necessary details. If the password and confirmation do not match, an error message appears. Fig. 10(b) shows the code that inserts customer information into the database when the register button is clicked. User passwords are hashed in the database for confidentiality.



(a)

```

1 <?php
2 include 'db.php';
3
4 if ($_SERVER["REQUEST_METHOD"] == "POST") {
5     $firstname = $_POST["firstname"];
6     $lastname = $_POST["lastname"];
7     $username = $_POST["username"];
8     $password = password_hash($_POST["password"], PASSWORD_DEFAULT);
9     $email = $_POST["email"];
10    $contact = $_POST["contact"];
11
12    // Insert user data into the database
13    $sql = "INSERT INTO user (firstname, lastname, username, password, email, contact)
14    VALUES ('$firstname', '$lastname', '$username', '$password', '$email', '$contact')";

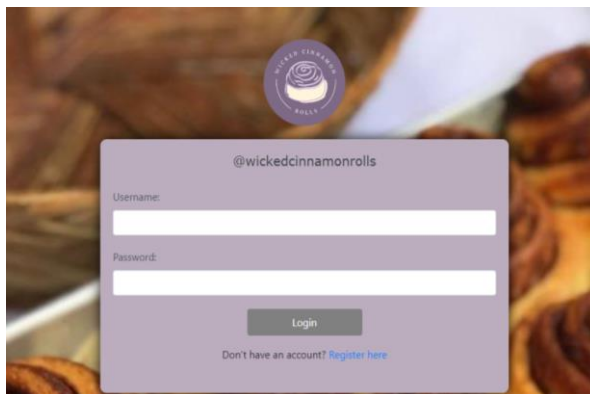
```

(b)

Fig. 10 Registration (a) Interfaces; (b) Code Segment

4.1.2 Login Module

This section discusses the login module, which includes the login functions. Users can log in using their active credentials. The system retrieves details from the database to validate the account. Fig.11(a) shows the login interface. Users must enter their registered username and password to log in. Unregistered usernames or incorrect passwords will trigger an error message. Fig. 11(b) shows how the system checks the entered username and password in the database.



(a)

```

if ($_SERVER["REQUEST_METHOD"] == "POST") {
    $username = $_POST["username"];
    $password = $_POST["password"];

    $sql = "SELECT * FROM user WHERE username = '$username'";
    $result = $conn->query($sql);

    if ($result->num_rows == 1) {
        $row = $result->fetch_assoc();
        if (password_verify($password, $row["password"])) {
            $_SESSION["id"] = $row["id"];
            $_SESSION["username"] = $row["username"];

            if ($username == 'admin' && $password == 'admin123') {
                header("Location: admindashboard.php");
                exit();
            } else {
                header("Location: homepage.php");
                exit();
            }
        } else {
            header("Location: login.php?error=1");
            exit();
        }
    } else {
        header("Location: login.php?error=1");
        exit();
    }
}

```

(b)

Fig. 11 Login (a) Interfaces; (b) Code Segment

4.1.3 Profile User Module

The profile user module enables customers to see and control their personal data in the system. This module allows users to view a specific profile page containing information like user id, username, first and last name, password, email, and contact details. Moreover, customers can also edit their profile details, guaranteeing the accuracy and currency of their information. This module offers a smooth and easy-to-use interface, enabling customers to securely and efficiently manage their personal information. Fig. 12(a) displays the interfaces of profile user page while Fig.12(b) displays the code segment of retrieving the profile user from database.



Fig. 12 Profile User (a)Interfaces; (b) Code Segment

4.1.4 Menu Module

The menu module enables the admin to effectively oversee products and categories. This module allows for products to be added, edited, or removed, ensuring the product listings stay current. Furthermore, admins have the ability to establish and manage categories for organizing the product catalog, simplifying the process for customers to browse and locate desired items. This efficient system aids in the upkeep of a well-arranged and easy-to-use online ordering platform. Fig. 13 shows the interface of manage product module. The admin can view, add, edit and delete all the products. In this page, admin can view the product name, product category, product description, and product option with their respective prices. If admin wants to add a new product, they can click the add button. If admin wants to edit or delete the products, they can click the edit button or delete button of the products.

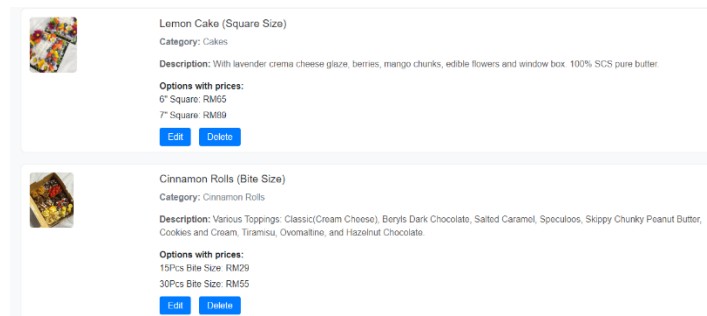


Fig. 13 Manage Product Interfaces

Fig. 14 displays the code segment of the manage product which system wants to retrieve all the product details and display it in product page. The SQL statement also needs to retrieve other data in different tables as the product is related with the others table.

```
$query = "SELECT p.productID, c.category_title, p.product_name,
p.product_details, p.image, po.option_name, pd.price
FROM product p
JOIN category c ON p.categoryID = c.categoryID
LEFT JOIN product_details pd ON p.productID = pd.productID
LEFT JOIN product_option po ON pd.optionID = po.optionID
ORDER BY p.productID, po.option_name";

$result = mysqli_query($conn, $query);
$products = [];
while ($row = mysqli_fetch_assoc($result)) {
    $productID = $row['productID'];
    if (!isset($products[$productID])) {
        $products[$productID] = [
            'productID' => $row['productID'],
            'category_title' => $row['category_title'],
            'product_name' => $row['product_name'],
            'product_details' => $row['product_details'],
            'image' => $row['image'],
            'options' => []
        ];
    }
}
```

Fig. 14 Code Segment of Manage Product

4.1.5 Order Module

The order module allows customers to add products to their order cart and provides the flexibility to edit or remove items as desired. Customers can select a delivery date, ensuring it is at least two days from the current date and within an acceptable range, with alerts for invalid selections. They can choose between delivery or pickup options and must pay online through the system. The module enables customers to track their order status, while admin can view and update order statuses to reflect current conditions, ensuring smooth and efficient order management. Fig. 15 shows the cart interfaces before checkout process.

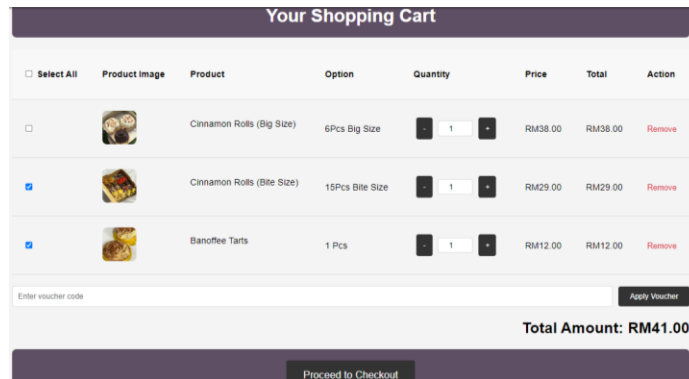


Fig. 14 Cart Interfaces

Checkout Interface in Fig. 15 shown after the “Proceed to Checkout” button is clicked. This page displays the order summary of the selected product in cart and the billing information. Customers need to choose the delivery date at least two days after the current date. The email address is retrieved from the customer’s account details. However, the customer can change the email address if they want to. Delivery options can be choose based on customer needs. The placeholder for the address will be displayed if the customer chooses the delivery option.

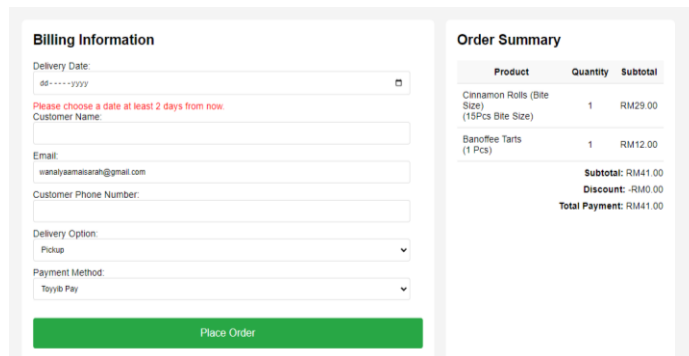


Fig. 14 Checkout Interfaces

Based on Fig. 15, the code segment shows how the checkout order is processed. The selected product from cart will be retrieved all their details and execute them to the checkout page.

```

$selectedProducts = $_POST['selected_products'] ?? [];
$productIds = implode(',', array_map('intval', $selectedProducts));

$stmt = $conn->prepare("SELECT cd.cart_detail_id, cd.productID, p.product_name, po.option_name, cd.quantity, cd.price,
(cd.quantity * cd.price) AS total_price, p.image
FROM cart_details cd
JOIN product p ON cd.productID = p.productID
LEFT JOIN product_option po ON cd.optionID = po.optionID
WHERE cd.cart_detail_id IN ($productIds)");

$stmt->execute();
$result = $stmt->get_result();
    
```

Fig. 15 Code Segment of Checkout

4.1.6 Discount Module

The manage voucher module allows administrators to add, edit, and delete voucher codes, providing flexibility in offering promotions and discounts. Customers can apply these voucher codes during cart before checkout, based on advertisements seen on the homepage, ensuring they benefit from the latest deals and offers. This module helps maintain an engaging shopping experience by easily updating promotional options. Manage voucher interfaces in Fig. 16(a) shows how admin can view, add, edit and delete the voucher. Admin also can view how many redeemed vouchers. Fig. 16(b) explains how the system gets the voucher in database and displays it in voucher page.



Fig. 16 Manage Voucher (a) Interfaces; (b) Code Segment

4.1.7 Invoice Module

Customers can access and save their order invoices using the invoice module after their order has been completed. These invoices are crucial for maintaining records, processing returns, and serving as a reference for customers to have documentation for their purchases in the future. This module improves customer ease and offers a dependable system for handling their order information. Fig. 17 displays the invoice interfaces which customers can view the invoice order when the orders are successfully delivered to them. Customers also can print the invoice order for them to keep.

Wicked Cinnamon Rolls 02 June 2024

Order Information

Order ID: #16

Customer Name: Alyaa

Order Date: 2024-06-02 18:44:28

Delivery Date: 2024-06-04

Delivery Option: Pickup

Payment Method: ToyibPay

Order Details

Product Name	Option	Quantity	Subtotal
Lemon Lushes Cake		1	RM14
Mini Bakes		2	RM14

Fig. 17 Invoice Interfaces

The code segment in Fig. 18 explains how the invoices are made. The invoice details will be retrieved from the orders and order details database.

```

11 if (isset($_GET['orderID'])) {
12     $orderID = $_GET['orderID'];
13     $orderStmt = $conn->prepare("SELECT * FROM orders WHERE orderID = ?");
14     $orderStmt->bind_param("i", $orderID);
15     $orderStmt->execute();
16     $orderResult = $orderStmt->get_result();
17
18     if ($orderResult->num_rows > 0) {
19         $order = $orderResult->fetch_assoc();
20         $orderDetailsStmt = $conn->prepare("SELECT * FROM order_details WHERE orderID = ?");
21         $orderDetailsStmt->bind_param("i", $orderID);
22         $orderDetailsStmt->execute();
23         $orderDetailsResult = $orderDetailsStmt->get_result();
24
25         $orderDetails = array();
26         while ($row = $orderDetailsResult->fetch_assoc()) {
27             $productID = $row['productID'];
28             $productNameStmt = $conn->prepare("SELECT product_name FROM product WHERE productID = ?");
29             $productNameStmt->bind_param("s", $productID);
30             $productNameStmt->execute();
31             $productNameResult = $productNameStmt->get_result();
32             $productNameRow = $productNameResult->fetch_assoc();
33             $row['product_name'] = $productNameRow['product_name'];
34
35             $orderDetails[] = $row;

```

Fig. 17 Code Segment of Invoice

4.1.8 Sales Report Module

The sales report feature allows admin to see detailed sales charts showing monthly and yearly order sales data. This visual representation assists in monitoring the sales patterns over a period, giving valuable understanding of the company's success. Using this module, admins have the capability to readily track and assess sales data, enabling them to make educated choices to enhance progress and improve efficiency. Fig. 18 shows the sales

report interfaces which are also the admin dashboard interfaces. In this page, admin can see how many total orders they have, the completed orders and the pending orders. Admin also can see the total vouchers, feedback and products that the bakery has. Other than that, the sales graph report will be displayed based on the total sales made monthly and annually.

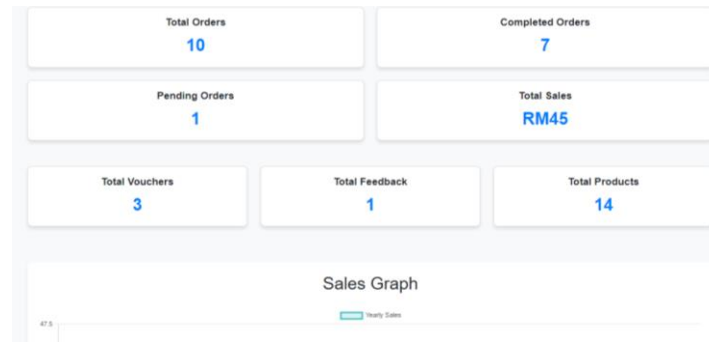


Fig. 18 Sales Report Interfaces

Fig. 19 explains how the sales graph report is made. The year and month sales will be retrieved based on the total price and date from the orders database.

```
function getSalesGraphData($conn) {
    $salesDataYearly = array();
    $salesDataMonthly = array();
    $stmt = $conn->prepare("SELECT YEAR(order_created_at) AS year, SUM(total_price) AS sales FROM orders
        WHERE order_status = 'delivered' GROUP BY year");
    $stmt->execute();
    $result = $stmt->get_result();
    while ($row = $result->fetch_assoc()) {
        $salesDataYearly[$row['year']] = $row['sales'];
    }
    $stmt = $conn->prepare("SELECT MONTH(order_created_at) AS month, SUM(total_price) AS sales FROM orders
        WHERE YEAR(order_created_at) = YEAR(CURDATE()) AND order_status = 'delivered' GROUP BY month");
    $stmt->execute();
    $result = $stmt->get_result();
}
```

Fig. 19 Code Segment of Sales Report

4.1.9 Feedback Module

The feedback management module enables customers to give feedback after receiving their order, giving valuable insights into their shopping experience. Admins have the ability to check out this feedback in order to comprehend customer satisfaction levels and pinpoint areas that need improvement. This module promotes transparent communication between clients and the company, ultimately improving the quality of service and satisfaction levels of customers. Feedback interfaces in Fig. 20 will be displayed to customers when they click the feedback button on the delivered orders. Customers can give the rating from 1 to 5 and leave a comment about the services or product received.

Fig. 20 Feedback Customer Interfaces

Feedback interfaces in Fig. 21 will be displayed to admins when they click the feedback page. Admin can view the customer feedback orders and engage with them.

Customer Feedback					
Feedback ID	Order ID	Customer Name	Customer Email	Rating	Feedback
1	#15	Wan Alyaa Maisarah Binti Wan Afindi	wanالياamaisarah@gmail.com	5	it was good
2	#15	Wan Alyaa Maisarah Binti Wan Afindi	wanالياamaisarah@gmail.com	1	Worth the price

Fig. 21 Admin Feedback Interfaces

Code segment in Fig. 22 explains how customer submit the feedback. The feedback details such as the rating and comment will be stored in the feedback database based on the order id.

```

1 <?php
2 include 'db.php';
3 $orderId = $_POST['orderId'];
4 $rating = $_POST['rating'];
5 $comment = $_POST['comment'];
6
7 $feedbackStmt = $conn->prepare("INSERT INTO feedback (orderId, rating, comment) VALUES (?,?,?)");
8 $feedbackStmt->bind_param("iis", $orderId, $rating, $comment);
9 $feedbackStmt->execute();
10 $feedbackStmt->close();
11
12 echo "Your feedback are sent, Thankyou.";
13 header("Location: users_order.php");
14 exit;
15 ?>
    
```

Fig. 22 Code Segment of Feedback Customer

Fig. 23 shows the code segment for displaying feedback from customers to admin. The system will retrieve all the feedback stores in the feedback database to the admin page.

```

5 function getAllFeedback($conn) {
6     $feedbacks = array();
7     $sql = "SELECT f.feedback_id, f.orderID, f.rating, f.comment, u.firstname, u.lastname, u.email
8           FROM feedback f
9           INNER JOIN orders o ON f.orderID = o.orderID
10          INNER JOIN user u ON o.userID = u.id";
11     $result = $conn->query($sql);
    
```

Fig. 23 Code Segment of Admin Feedback

4.2 Testing

In the development process, the testing phase is crucial as the system is subjected to different tests in order to identify and resolve any problems, errors, or defects. This phase makes sure the system meets the specified requirements and functions as anticipated. It includes various forms of testing like unit testing, integration testing, system testing, and user acceptance testing. The goal is to improve the quality of the system, test its functionality, performance, and reliability, and ensure it delivers a seamless user experience. This step is crucial prior to the system being implemented for real-world use.

4.2.1 Test Case

Each module is assigned a test case for the testing of the online ordering system. The testing includes Registration, Login, Menu, Order, Discount, Invoice, Sales Report, and Feedback modules. In the Table 6, the test cases for every module are outlined.

Table 6 Test Case of e-Bakery system

No.	Test Cases	Expected Result	Actual Output
Registration Function			
1.	Customer clicks on "Registration" tab	The system will redirect to registration page.	Success
2.	Customer does not fill in all the details field requirements.	The system will display "Please fill out this field" near the unfilled details. The customer requires to fill in all the details before click submit button.	Success
3.	The customer enters wrong value on repeat password field.	An alert message appears when the value of password and repeat password are not match.	Success
4.	The customer fills in all the field required then click on "Register" button.	The system will display message regarding successful registration then redirect customer to login page.	Success

Table 6 (cont.)

Login Function			
1.	Customer clicks on "Login" tab	The system will redirect to login page.	Success
2.	Customer does not fill in all the details requirements.	The system will display "Please fill out this field" near the unfilled details. The customer requires to fill in all the details before click submit button.	Success
3.	The customer enters wrong username or password.	An alert message appears that username or password wrong, system will redirect to login page again for customer enter back the correct username and password.	Success
4.	The customer enters correct username and password then click on "Login" button.	The system will redirect customer to login page.	Success
Menu Function			
1.	Admin clicks on "Category" tab	The system will redirect to category page.	Success
2.	Admin click the "Add Category" button	Admin able to add new category into the system.	Success
3.	Admin clicks "Edit" or "Delete" button for category.	Admin able to update new details of category or delete the existing category.	Success
4.	Admin clicks on "Product" tab	The system will redirect admin to product page.	Success
5.	Admin click the "Add Product" button	Admin able to add new product into the system.	Success
6.	Admin clicks "Edit" or "Delete" button for product.	Admin able to update new details of product or delete the existing product.	Success
Order function			
1.	Customer selects category by click the category name in menu page	System will display the product based on selected category.	Success
2.	Customer selects the product.	System will display the product details such as product image, product name, product description, product option, also product price.	Success
3.	Customer clicks the option and quantity of the product then click the "Add to Cart" button.	System will add the selected product into the cart and redirect customer to shopping cart.	Success
4.	Customer clicks the "Cart" tab	System will redirect to shopping cart page	Success
5.	Customer clicks the remove button for product in shopping cart	System will remove the selected product in the shopping cart	Success
6.	Customer does not select all the product in cart	System will only display total amount of the selected product	Success
7.	Customer selects product and click "Proceed to Checkout" button	System will redirect to the checkout page and display the billings form and order summary	Success
8.	Customer did not select any product and click the "Proceed to Checkout" button	The system will display message to select the product before proceeding the checkout	Success
9.	Customers choose the delivery date same with the current date.	System will display alert message to choose delivery date at least two days after the current date.	Success
10.	Order limits exceed on the delivery date chose by customer.	System will show message to customer to choose another date as the delivery date they choose are already exceed the limit.	Success
11.	Customer does not fill in all the required information in billing information in the checkout page.	The system will display "Please fill out this field" near the unfilled details. The customer requires to fill in all the details before click submit button.	Success

Table 6 (cont.)

12.	Customer clicks "Place order" button after filling in all the billing information to proceed the order.	System will redirect customer to payment page.	Success
13.	Customer made payment	System will redirect customer to their orders page.	Success
14.	Customer clicks the "My Orders" tab to track the order status.	System will display the past and active order for customer to track their order.	Success
15.	Admin clicks the "Order tracking" tab to see new order.	The system will show list of order in the system.	Success
16.	Admin selects the order status and update the order status based on its condition.	System will update the order status so the customer can view their latest status.	Success
Discount function			
1.	Customers enter the voucher code in the shopping cart, then click the "Proceed to Checkout" button.	System will display the total amount which already deduct the discount price based on the voucher code	Success
2.	Customers enter non-exist voucher code or expired voucher code.	System will display the total amount and discount rm0	Success
3.	Admin clicks the "Voucher" tab	System will redirect to voucher page	Success
4.	Admin click "Add Voucher" button	System displays the form and admin able to add the new voucher.	Success
5.	Admin click the "Edit" or "Delete" voucher button	Admin able to modify and delete the voucher.	Success
Invoice function			
1.	Customers click the "Print Invoice" button	System will display the invoice of order purchased by customer.	Success
2.	Customers click the "Print" button	System will print the invoice	Success
Sales Report function			
1.	Admin clicks the dashboard page	System will redirect to admin dashboard page and display the sales pages	Success
Feedback function			
1.	Customers click the "Leave Feedback" button	System will redirect customer to feedback page	Success
2.	Customers fill in form feedback and click "Submit feedback" button	System will show successful message	Success
3.	Customer does not fill in all the required information	The system will display "Please fill out this field" near the unfilled details. The customer requires to fill in all the details before click submit button.	Success
4.	Admin click the "Feedback" tab	System redirects to feedback page and display all the feedback from customers	Success

4.3 User Acceptance Testing

User Acceptance Testing (UAT) is the final stage in the testing process, where actual users, such as the owner of Wicked Cinnamon Rolls Home Bakery and its customers, evaluate the system to ensure it meets their needs and functions as intended in real-life situations [10]. During UAT, end users perform tasks to confirm the software's user-friendliness, reliability, and compliance with business requirements, identifying any issues overlooked in previous tests and building user trust. This involves a questionnaire given to ten participants, who rate their satisfaction with the system's capabilities on a scale from strongly disagree to strongly agree. The results of this testing on the online ordering system interface are displayed in the Fig. 24.

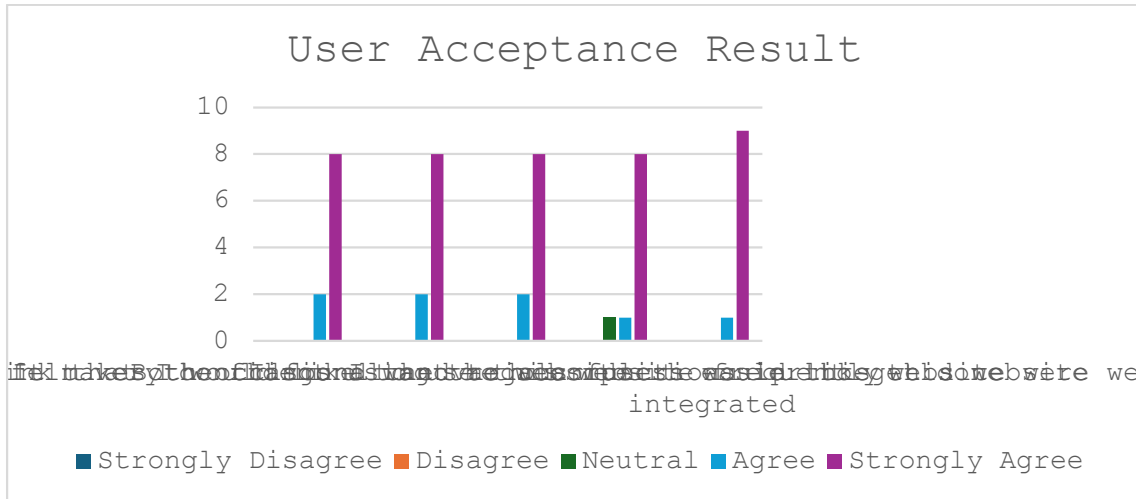


Fig. 24 User Acceptance Testing Result

5. Conclusion

In conclusion, the project successfully developed an e-bakery web-based system for Wicked Cinnamon Rolls Home Bakery, effectively addressing the owner’s needs and meeting its objectives. The key modules, including registration, login, profile user, menu management, orders, invoice, discount, sales report, and feedback have been implemented using MySQL as the database. This system enhances administrative efficiency by automating order processing, managing products, and generating sales reports, while providing customers with a convenient online ordering experience. The successful integration of these modules confirms that the system aligns with the initial goals, demonstrating efficient design and development within the set timeframe.

Despite its achievements, the system has some limitations, such as internet dependency and lack of smartphone compatibility. Recommendations for future improvements include implementing a dynamic availability calendar to help customers plan orders, simplifying voucher redemption during checkout, and creating a responsive design to ensure compatibility with smartphones and tablets. These enhancements would improve user experience and accessibility, further strengthening the e-bakery system’s effectiveness and customer satisfaction.

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Appendix A: Data Flow Diagram Level 0

