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Development of Citronella Feedmill Online Store

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Abstract*:* Citronella is currently the sole animal feed and other products store in Durian Tunggal, Melaka. Citronella Feedmill Online Store is a web-based system that aims to systematically handle the ordering and purchase processes for customers as well as the recoding process for administrators. The system is built using an object-oriented approach. Functional and user acceptance testing will be used to evaluate the system. The registration module, product module, order module, payment module, order status module and report module are the system function modules. The web-based was created using a prototyping technique, in which the study was conducted using standard procedures such as initial requirements, design, prototyping, customer assessment, review and updating, and development. At the completion of the project, it is demonstrated that all functionalities are well-run, and majority of respondents are completely satisfied with the overall performance of the built system. The system might be improved in terms of data security and useful features; such as order confirmation through email for future work.

Keywords: Online Store System, JavaScript, Object-Oriented

1. Introduction

The current system used for Citronella is using Facebook to promote the products and WhatsApp to receive orders from customers. This will cause a lot of problems to the customers and the store owner. This is because the ordering procedure is done manually which can lead to human error such as the worker might read the orders wrongly [1]. If the customers want to order the products, they need to ask the worker whether the products are available or not. The customers need to wait for a reply from the worker suppliers' details on Microsoft Excel manually such as customers' addresses or contact numbers. In addition, the store owner is experiencing stock-related issues as it is difficult to keep up with the supply and demand of the products when the number of available stocks is recorded manually. which is a time-consuming operation [2]. At the same time, the worker is only available during working hours, and it will be messy with lots of customer's contact numbers since the worker is using the

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WhatsApp application for the ordering process. The worker needs to record customers' details on Microsoft Excel manually such as customers' addresses or contact numbers. In addition, the store owner is experiencing stock-related issues as it is difficult to keep up with the supply and demand of the products when the number of available stocks is recorded manually. Finally, since sales are not updated automatically, the store owner is unaware of high and low daily sales.

To overcome the problems, this project has proposed a system called Citronella Feedmill Online Store. The owner can avoid overstocking and understocking [3]. Two technologies used to build the front-end and back-end of the website so the desired website can be executed well for instance JavaScript and Bootstrap. Meanwhile, the system is a web-based system that can be access through Internet browsers such as Google Chrome, Firefox, or Microsoft Edge. The project implemented E-commerce is because it is expanding quickly and offers promising business options. It is the approach to conducting business online that is most frequently employed on the Internet. In addition, this project compared the proposed system to three already-existing ecommerce systems such as Pets Wonderland, Perromart and Pets More.

2. Related Work

2.1 E-commerce

E-commerce is growing very rapidly and provides good opportunities for business chances. It is the most widely used method of electronically accessing business over the Internet. The majority of e-commerce platform users are between the ages of 21 and 31, as they are more interested in adopting the newest technology than those between the ages of 41 and 50 [4]. In addition, online shopping allows retailers to track customer behaviour in terms of looking for products, buying, reviewing, and discarding goods and services that they believe will meet their needs [5]. E-commerce refers to a website run by an internet vendor that sells goods or services to users directly from the platform [6].

The availability of an online shopping website system can benefit both the organization and consumers. The Internet has transformed into a payment gateway for customers and new businesses locally and globally markets around the world, allowing them to buy and sell goods and services at any time and any location [7]. Customers benefit from the existence of online shopping websites because they can purchase items they want from anywhere with a single touch on any electronic device, such as a laptop or a smartphone, that is accessed through the Internet. With that kind of simple method, consumers can quickly choose the products from a wide range of sources without any physical limitations [8]. Another benefit of implementing e-commerce is that it may function 24 hours a day, allowing e-commerce customers from different time zones to access the website at their leisure. Consumers can rapidly search for and purchase the items they want because products on e-commerce are classified depending on their categorization.

Aside from that, e-commerce saves money, particularly for small or start-up businesses, because they do not have to find a strategic site to rent, resulting in lower fixed operational expenses [8]. Aside from its benefits, e-commerce contains drawbacks that do not benefit customers or corporate organizations. Firstly, the customers are likely threatened by fraud in of products [9]. It allows scammers to trap their victims by creating fake accounts that cannot be identified. Irresponsible business sellers are willing to sell counterfeit goods to make a profit. Furthermore, some vendors did not deliver the products to the customers, even though the customers had paid for goods.

2.2 JavaScript and Bootstrap

JavaScript and Bootstrap are the technologies implemented in this system. JavaScript is a dynamic programming language for computers. It is lightweight and is most widely used as an element of web pages, where its implementations allow client-side scripts to interact with the user and create dynamic sites. It is an object-oriented programming language that is interpreted [10]. Furthermore, JavaScript

programs are executed by an interpreter that is integrated into the user's web browser. It is capable of dynamically altering an HTML page, as well as reacting to and validating user input [11]. Bootstrap is applied in this system. Bootstrap is an open-source front-end framework that makes use of HTML, CSS and JavaScript in developing a website design [12]. Bootstrap is supported by multiple browsers, including Chrome and Firefox, and its design is adaptable to technologies such as desktops, tablets, and smartphones.

2.3 Comparison with the Existing Systems

When developing the proposed system, several existing systems can be compared. The chosen existing system to be compared for this project are Pets Wonderland, Perromart and Pets More. Table 1 shows the comparison between three existing systems and the proposed system.

Table 1: Systems Comparison

Features/System	Pets Wonderland	Perro mart	Pets More	Citronella Feedmill Online Store
Registration	✓	✓	✓	✓
Login	✓	✓	✓	✓
Login with Facebook	✓	✗	✓	✗
Products List	✓	✓	✓	✓
Sorted List	✓	✗	✓	✗
Add to Cart	✓	✓	✓	✓
Shopping Cart	✓	✓	✓	✓
Checkout	✓	✓	✓	✓
Payment	✓	✓	✓	✓
Delivery Address Details	✓	✓	✓	✓
Shipping Details	✓	✓	✓	✗
Return and Warranties	✓	✓	✓	✗

3. Methodology

This chapter discussed the methodology of the project which included the model that has been chosen, the phases, and the system development workflow. The model that has been chosen for this project is the prototyping model.

3.1 Prototyping Model

Because the exact technical solutions are unknown to the development team, the prototyping model was chosen as the project's methodology [13]. Using this methodology, the client and developer team can discuss and express their ideas without feeling rushed to get everything perfect right away. Furthermore, this method is best used in situations where the project's requirements are not fully understood, and the client can request the developer team to begin developing on a simple prototype with few specifications.

Once, the basic prototype is completed, the client can view and test it to determine what improvements are necessary. Figure 1 illustrates the prototyping model phases.

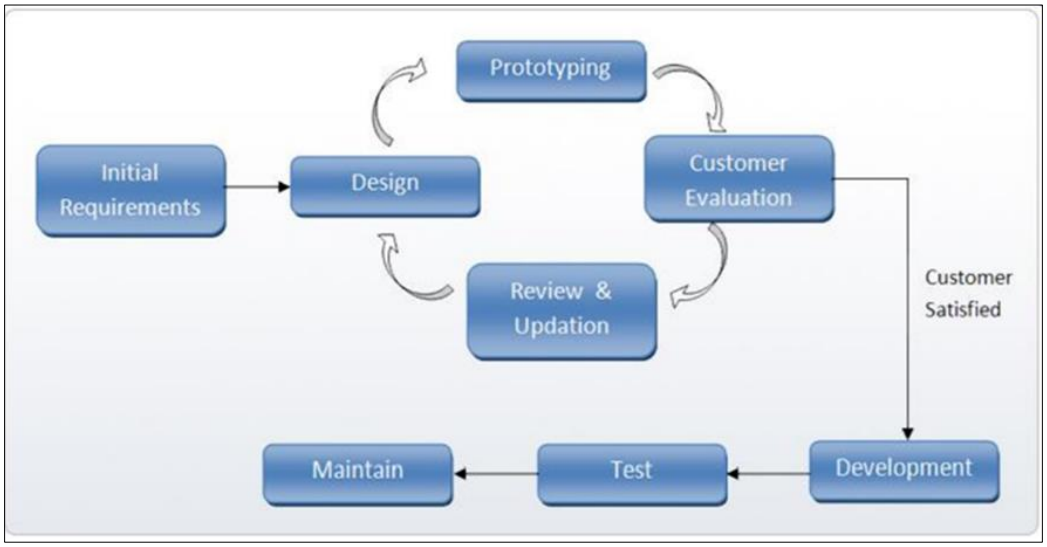


Figure 1: Prototyping Model Phases

3.2 System Development Workflow

There is a total of eight phases from the prototype model. As shown in Table 2, each phase has its 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 shows the software development activities and their task.

Table 2: Software development activities and their tasks

Phase	Task	Output
Initial Requirements	1. Create a project outline for Citronella Feedmill Online Store Module 2. Formulate financial forecasting for the project. 3. Produce project's organization. 4. Generate resource planning for the project. 5. Create a requirement elicitation and analysis for the Citronella Feedmill Online Store Module. 6. Specify the requirement involved for Citronella Feedmill Online Store Module.	A document called Software Requirement Specification (SRS) is created for Citronella Feedmill Online Store Module.
Design	1. Create a High-Level Design for Citronella Feedmill Online Store Module. 2. Create a Low-Level Design for Citronella Feedmill Online Store Module.	A Design Specification Document (DSD) is created which consists of High-Level Design and Low-Level Design

		subtask for Citronella Feedmill Online Store Module.

Table 3: Software development activities and their tasks (cont.)

Phase	Task	Output
Prototyping	Develop a real prototype of the Citronella Feedmill Online Store Module.	Prototype of Citronella Feedmill Online Store Module.
Customer Evaluation	Performing Citronella Feedmill Online Store Module prototype functional and usability testing to the client.	A detailed report on client feedback to improve the prototype.
Review and Update	Refining the prototype based on the client's suggestion and criticism.	Prototype of Citronella Feedmill Online Store Module.
Development	Develop an actual system of Citronella Feedmill Online Store.	Citronella Feedmill Online Store Module system.
Testing	1. Conduct functional testing to confirm the system meets the client's requirements. 2. Run usability testing to investigate whether another user which is customers can readily acknowledge the system.	Full documented testing report for Citronella Feedmill Online Store Module.
Maintenance	1. Rename the Citronella Feedmill Online Store Module to Citronella Feedmill Online Store. 2. Launch Citronella Feedmill Online Store software.	Full documented maintenance report for Citronella Feedmill Online Store.

	3. Routine maintenance is performed on the system to save downtime and prevent large-scale failures.

4. System Analysis and Design

The process of collecting factual data, understanding the processes involved, detecting flaws, and making practical solutions for enhancing the system's functioning is known as systems analysis.

4.1 Use Case Diagram

The fundamental form of system requirements for an undeveloped software programme is a UML Use Case Diagram. Figure 2 depicts the proposed system's Use Case Diagram.

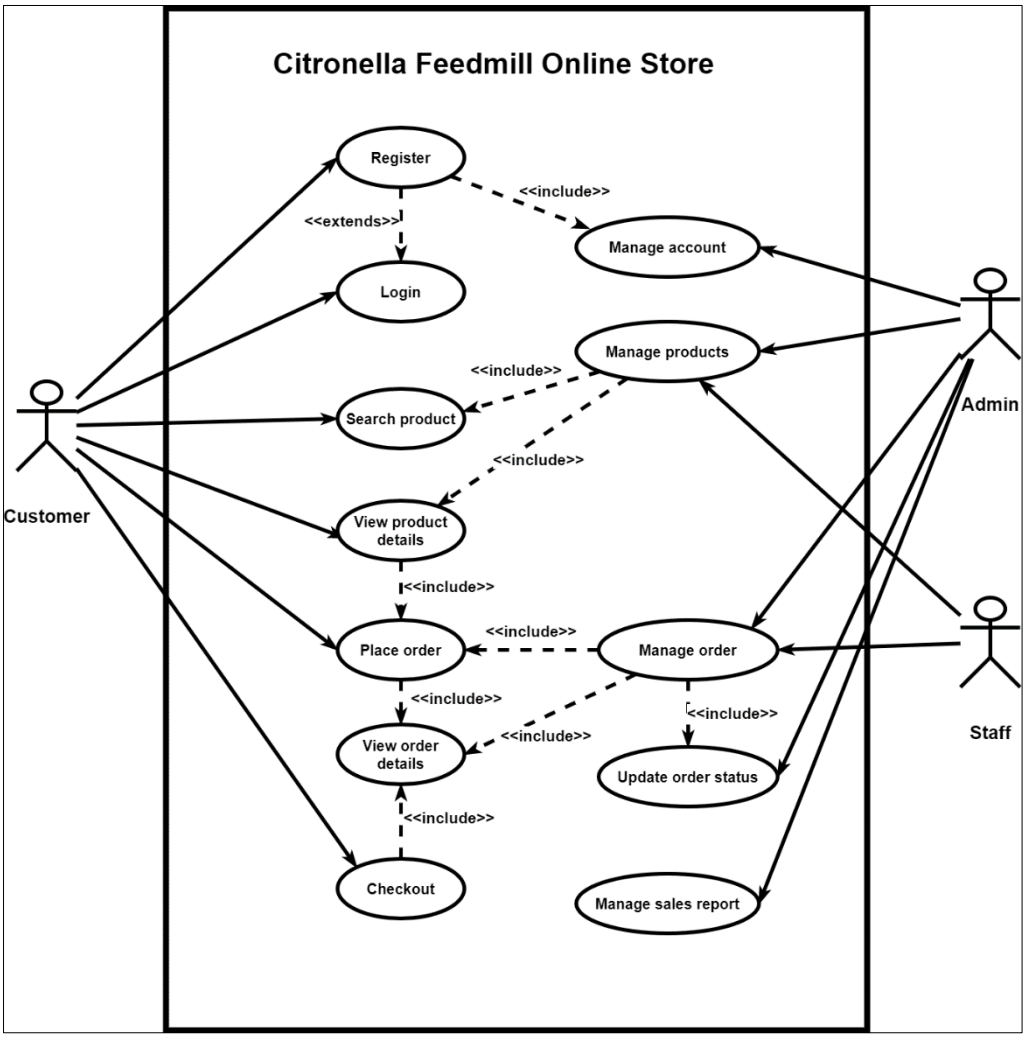


Figure 2: Use Case Diagram for the proposed system

4.2 Entity Relationship Diagram

Entity Relationship Diagram emphasize the structural elements that must be present in the system being modeled. It is frequently used to document the architecture of a software application. Figure 3 below shows the Citronella Feedmill Online Store Entity Relationship Diagram.

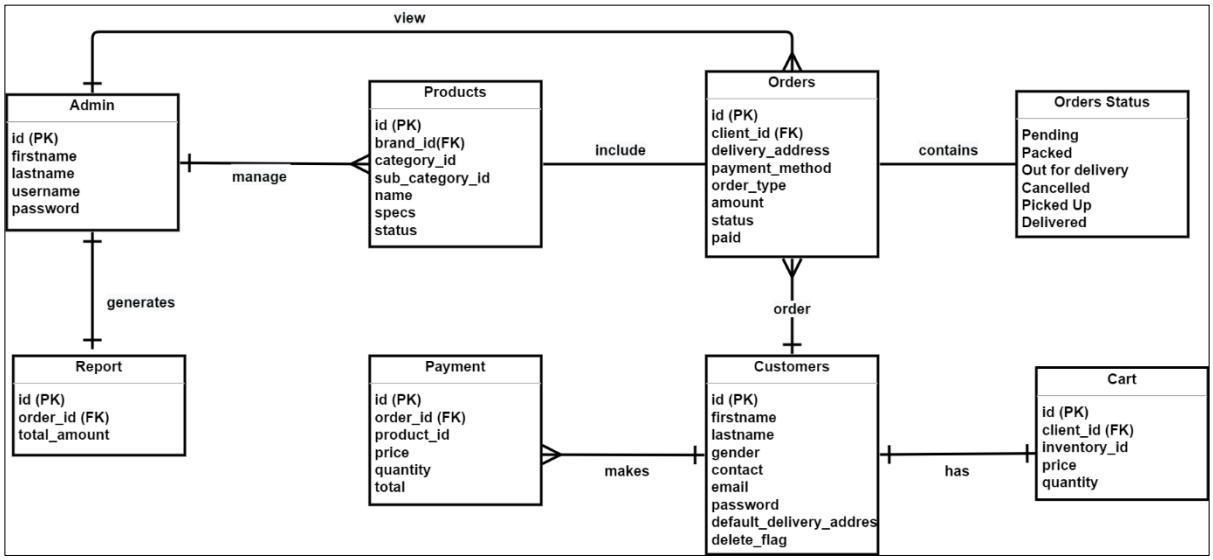


Figure 3: Entity Relationship Diagram of the proposed system

5. Implementation and Testing

Testing is done shortly after the development phase to determine the application's outcome. Testing is carried out to determine the actual and expected outcomes.

5.1 System Implementation

5.1.1 Registration Module

The customers registration module interface for new customers is shown in Figure 4, and the customers login interface is shown in Figure 5. Figures 6 and 7 illustrate the code segment for the customer registration and login process.

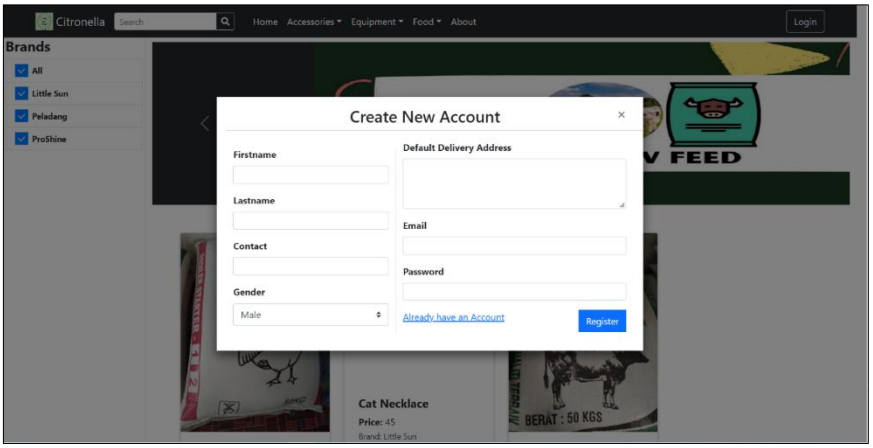


Figure 4: Customers registration interface

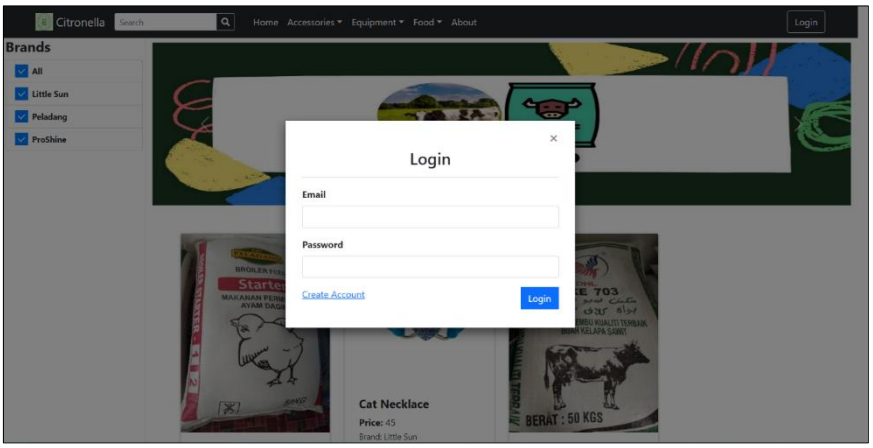


Figure 5: Customers login interface

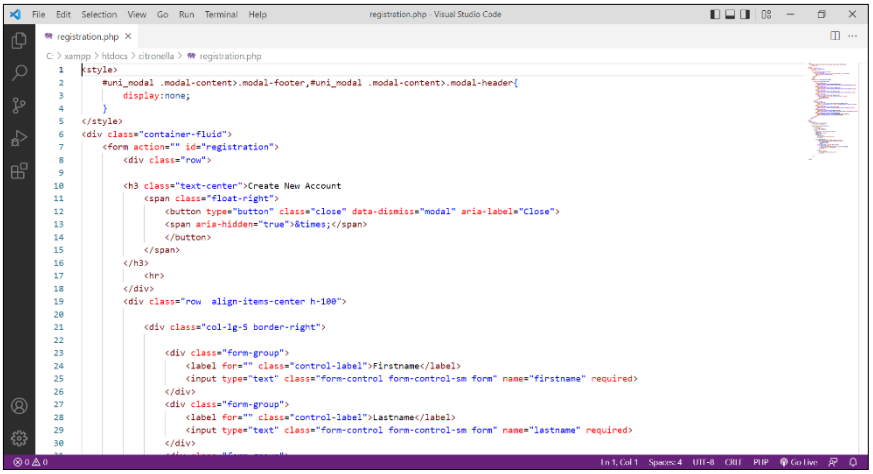


Figure 6: Customers registration code segment

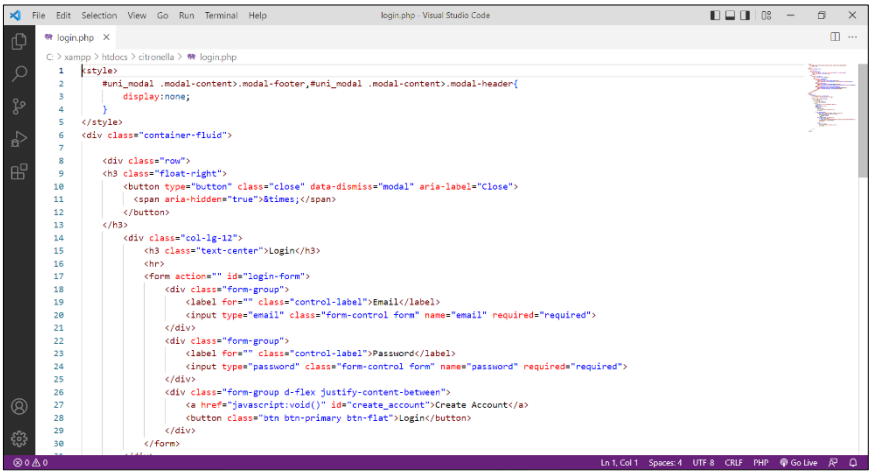


Figure 7: Customers login code segment

Figure 8 shows the admin and staff login interface. Figure 9 shows the code segment of admin and staff login.

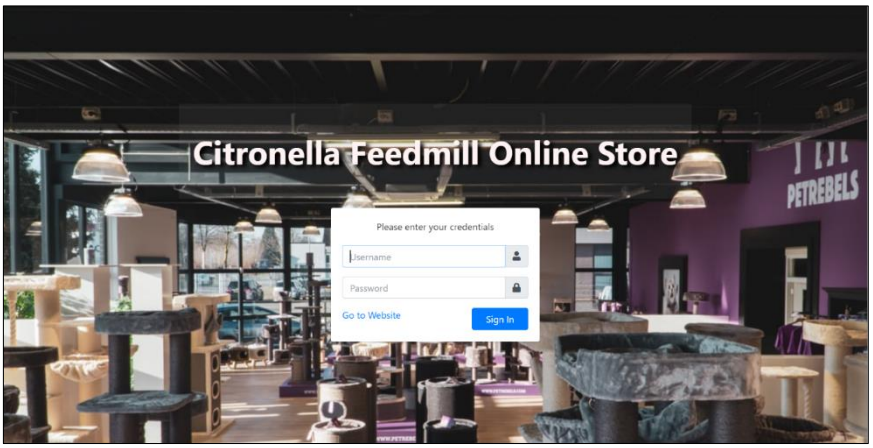


Figure 8: Admin and staff login interface

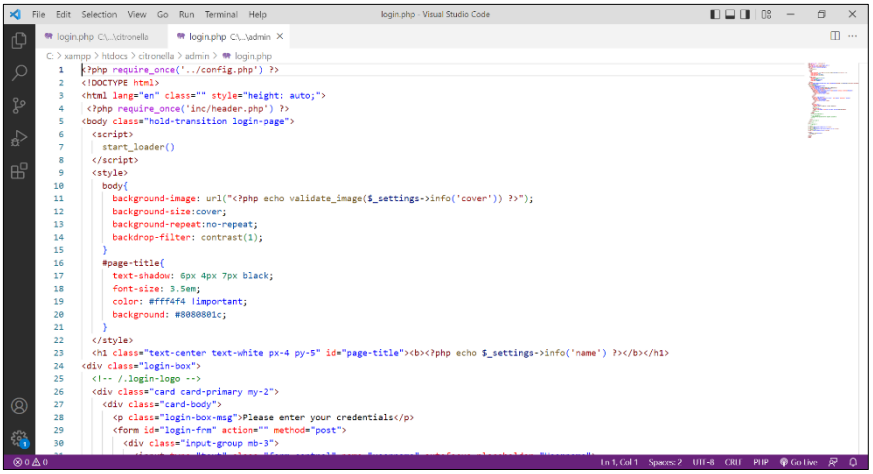


Figure 9: Admin and staff login code segment

5.1.2 Product Module

Figure 10 shows the product details and Figure 11 shows the code segment for product details.

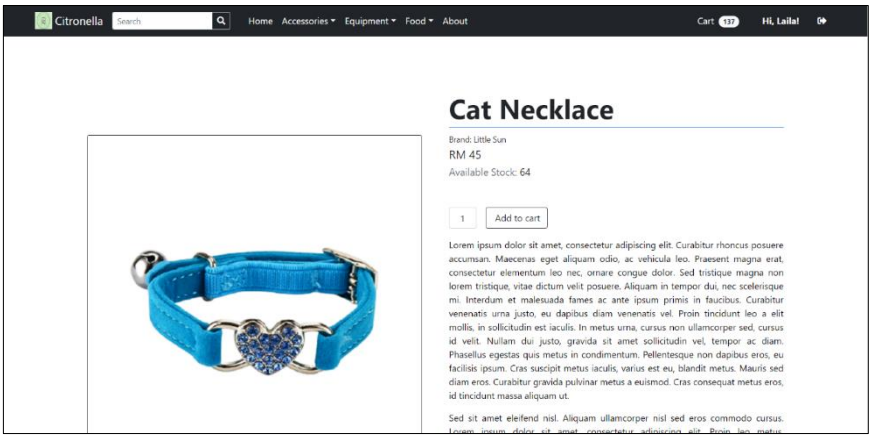


Figure 10: Product details interface

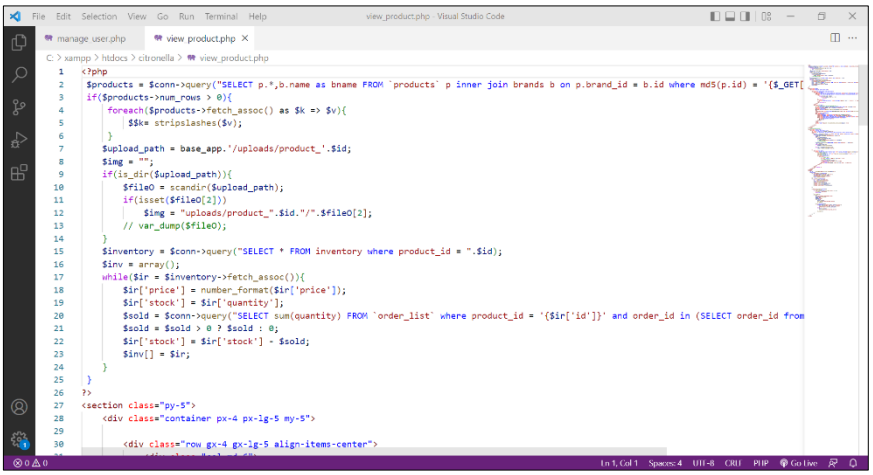


Figure 11: Product details code segment

Figure 12 shows the manage product by admin and Figure 13 shows the code segment of manage product.

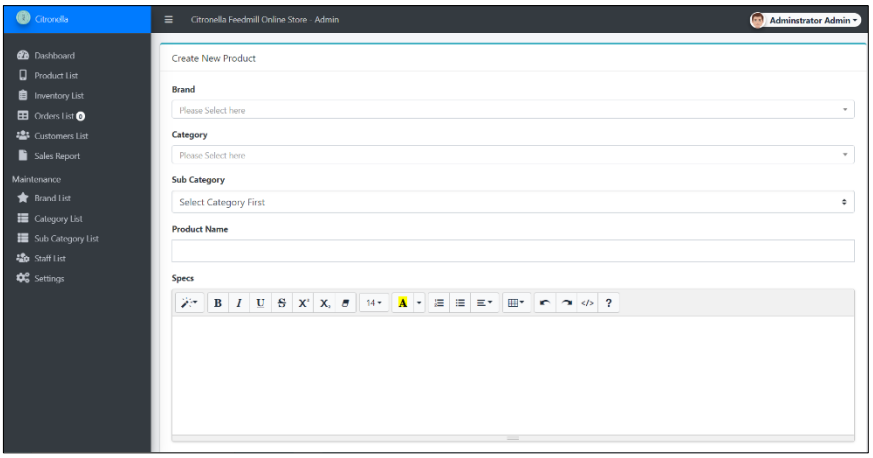


Figure 12: Admin manage product interface

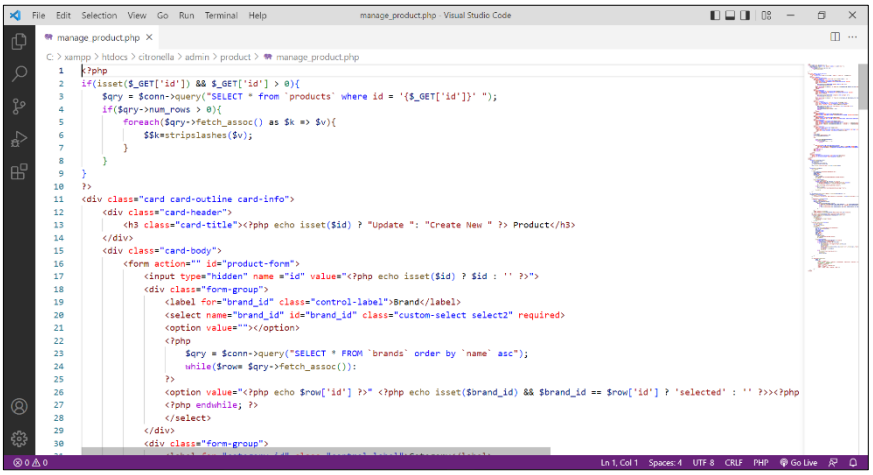


Figure 13: Manage product code segment

5.1.3 Order Module

Figure 14 shows the customers place order by adding item to cart and Figure 15 shows the code segment for cart.

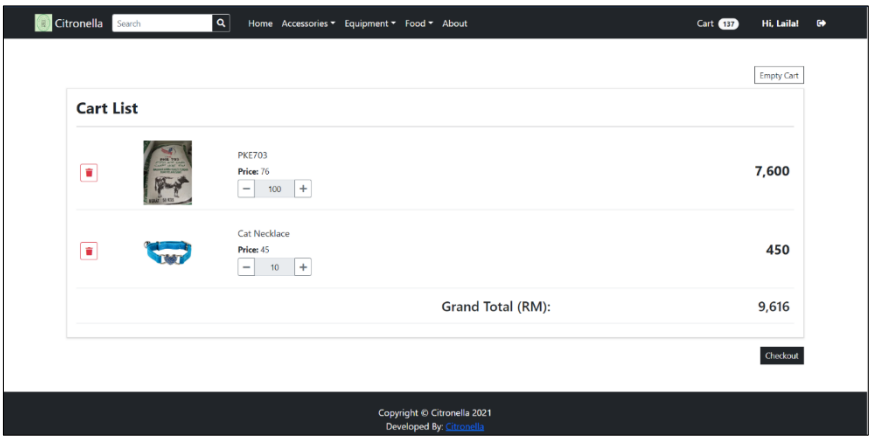


Figure 14: Cart interface

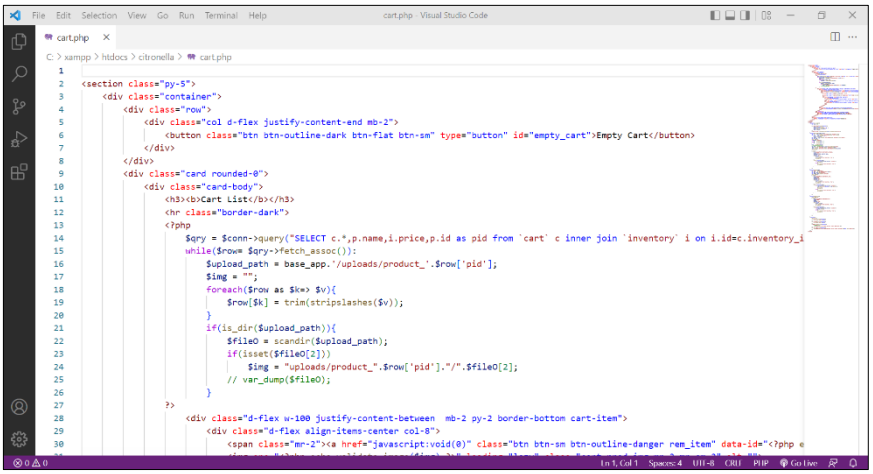


Figure 15: Cart code segment

Figure 16 below shows the manage order by admin and Figure 17 shows the code segment of manage order.

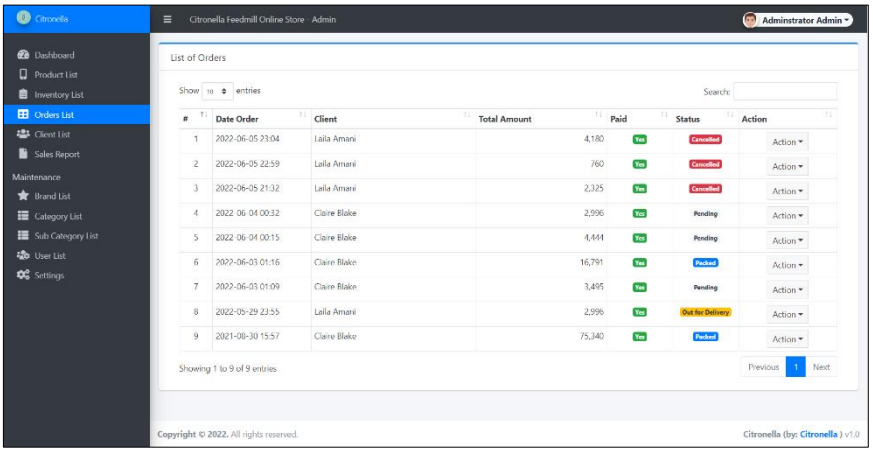
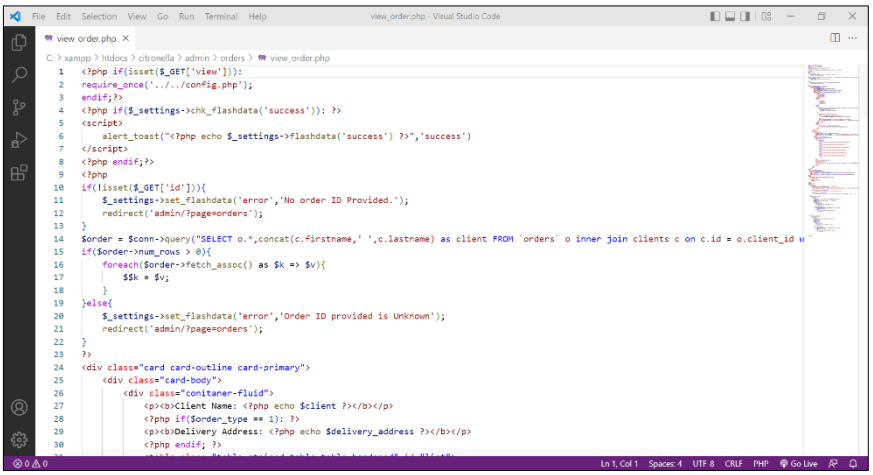


Figure 16: Manage order interface



```php
<?php if(isset($_GET['view'])):
require_once('../../config.php');
endif;?>
<?php if($_settings->chk_flashdata('success')): ?>
<script>
    alert_toast("<?php echo $_settings->flashdata('success') ?>","success')
</script>
<?php endif;?>
<?php
if(!isset($_GET['id'])){
    $_settings->set_flashdata('error','No order ID Provided.');
    redirect('admin/?page=orders');
}
$order = $conn->query("SELECT o.*,concat(c.firstname,' ',c.lastname) as client FROM `orders` o inner join clients c on c.id = o.client_id w
if($order->num_rows > 0){
    foreach($order->fetch_assoc() as $k => $v){
        $$k = $v;
    }
}else{
    $_settings->set_flashdata('error','Order ID provided is Unknown');
    redirect('admin/?page=orders');
}
?>
<div class="card card-outline card-primary">
    <div class="card-body">
        <div class="conitaner-fluid">
            <p><b>Client Name: <?php echo $client ?></b></p>
            <?php if($order_type == 1): ?>
            <p><b>Delivery Address: <?php echo $delivery_address ?></b></p>
            <?php endif; ?>
```

Figure 17: Manage order code segment

5.1.4 Payment Module

Figure 18 shows the payment process for the system and Figure 19 shows the code segment for payment process.

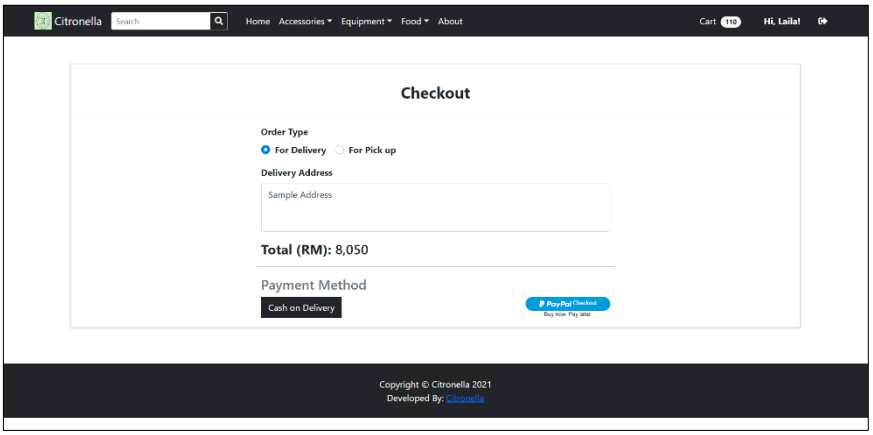
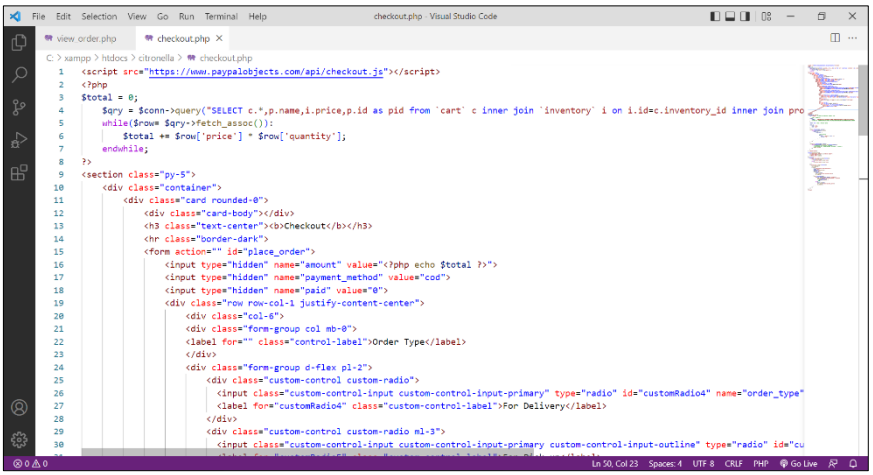


Figure 18: Checkout interface



```php
<script src="https://www.paypalobjects.com/api/checkout.js"></script>
<?php
$total = 0;
    $qry = $conn->query("SELECT c.*,p.name,i.price,p.id as pid from `cart` c inner join `inventory` i on i.id=c.inventory_id inner join pro
    while($row= $qry->fetch_assoc()):
        $total += $row['price'] * $row['quantity'];
    endwhile;
?>
<section class="py-5">
    <div class="container">
        <div class="card rounded-0">
            <div class="card-body"></div>
            <h3 class="text-center"><b>Checkout</b></h3>
            <hr class="border-dark">
            <form action="" id="place_order">
                <input type="hidden" name="amount" value="<?php echo $total ?>">
                <input type="hidden" name="payment_method" value="cod">
                <input type="hidden" name="paid" value="0">
                <div class="row row-col-1 justify-content-center">
                    <div class="col-6">
                    <div class="form-group col mb-0">
                    <label for="" class="control-label">Order Type</label>
                    </div>
                    <div class="form-group d-flex pl-2">
                        <div class="custom-control custom-radio">
                          <input class="custom-control-input custom-control-input-primary" type="radio" id="customRadio4" name="order_type"
                          <label for="customRadio4" class="custom-control-label">For Delivery</label>
                        </div>
                        <div class="custom-control custom-radio ml-3">
                          <input class="custom-control-input custom-control-input-primary custom-control-input-outline" type="radio" id="cu
```

Figure 19: Checkout code segment

5.1.5 Order Status Module

Figure 20 shows the order status of the purchased item by the customers and Figure 21 shows the manage order status by admin. Figure 22 shows the code segment of update order status.

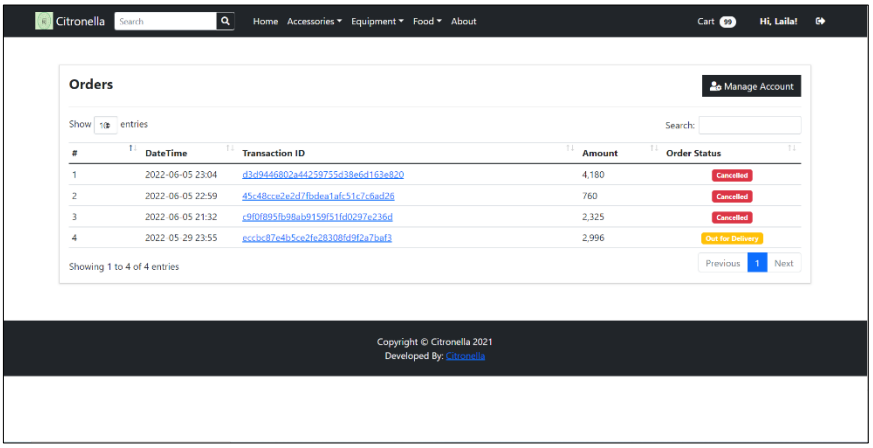


Figure 20: View order status by customers interface

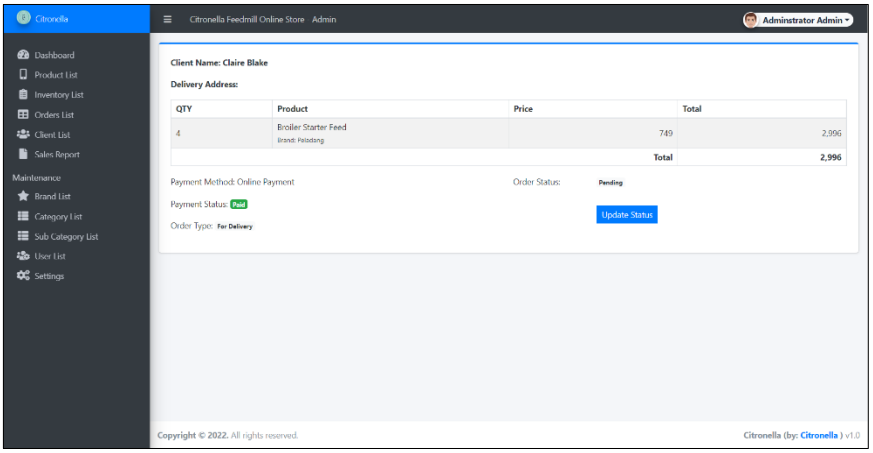


Figure 21: Admin update order status interface

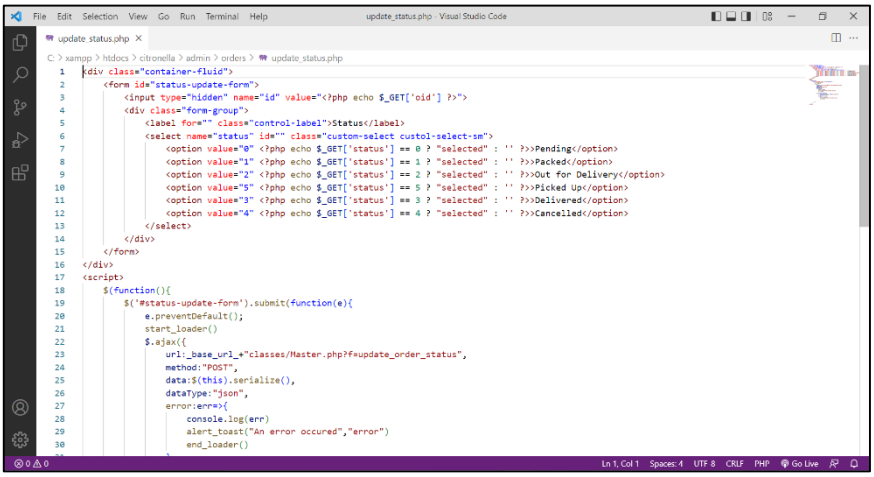


Figure 22: Update order status code segment

5.1.6 Report Module

Figure 23 shows the sales report interface for the system and figure 24 shows the code segment for the report.

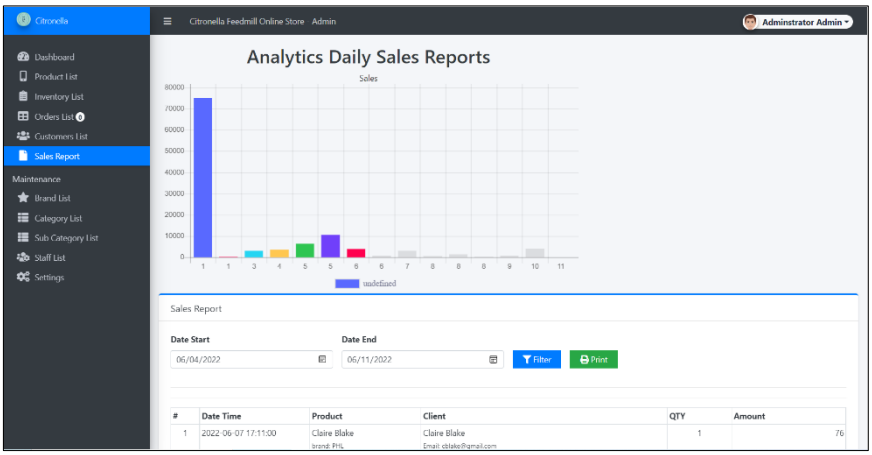


Figure 23: Sales report interface

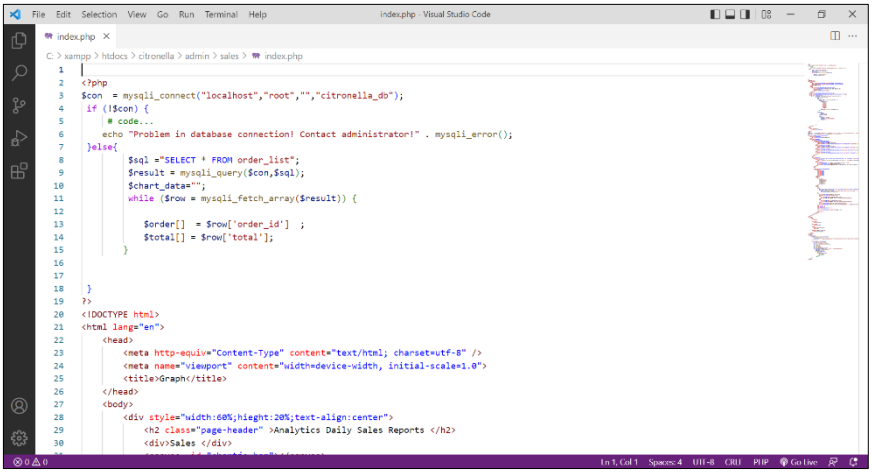


Figure 24: Sales report code segment

5.2 System Testing

Testing is done shortly after the development phase to determine the application's outcome. Testing is carried out to determine the actual and expected outcomes.

5.2.1 Functionality Testing

Table 3 presents the test cases for the customer registration and login process. The goal of this test is to see how effective users are at logging into the system, whether they are successful or not.

Table 4: Test result for customer registration and login

	Test Cases	Expected Output	Pass/Fail
T1-1	Fill in all the needed registration information.	Registration success	PASSED
T1-2	Leave certain fields blank or with no data in them.	Pop out a window with the message “Please fill out this field.”	PASSED
T1-3	Do not include the @ symbol in the email field.	Pop out a window with the message “Please include an ‘@’ in the email address.”	PASSED

Table 5: Test result for customer registration and login (cont.)

	Test Cases	Expected Output	Pass/Fail
T1-4	Enter a word in the Mobile Number field.	Pop out the window with the message "Please match the requested format"	PASSED
T1-5	Enter a number in the firstname and lastname field	Pop out the window with the message "Please match the requested format"	PASSED
T1-6	The system will display login page	Click login button to display login page	PASSED
T1-7	Enter username and password to login	Login success	PASSED
T1-8	The system will display home page after login	Display home page	PASSED

Table 4 shows the test cases for product module. The goal for this test cases is to test the effectiveness in display product details and managing new product.

Table 6: Test result for product module

	Test Cases	Expected Output	Pass/Fail
T2-1	Check the search using name or brand	Show the product based on name or brand	PASSED
T2-2	Product image, name, and price are displayed in the search results	Display the product image, price, and name	PASSED
T2-3	If customer enters an item name with typo, the system will not display any suggestion	No product is displayed	PASSED
T2-4	The system allows admin to create new product	Admin able to create new product	PASSED
T2-5	The system allows admin to edit the existing product	Admin able to edit the existing product	PASSED
T2-6	The system will give successful message if the new product is created	Show successful message	PASSED
T2-7	If the text box is left blank, the system will display an error notice.	Show error notice	PASSED

Table 5 shows the test cases for order module. The goal for this test cases is to test the effectiveness in placing an order and managing the order.

Table 7: Test result for order module

	Test Cases	Expected Output	Pass/Fail
T3-1	All items are displayed that were added in the cart	Displayed all items	PASSED
T3-2	The total price calculation is done correctly	Display the right amount of price	PASSED
T3-3	Remove item from the cart section is working	Display the latest quantity of item in the cart	PASSED
T3-4	The system allows admin to delete the order	Admin able to delete the order	PASSED
T3-5	The system allows customers to cancel their order	Customers able to cancel the order	PASSED
T3-6	The confirmation order can be viewed through email	Customers can view confirmation order through email	FAILED
T3-7	The customers can view order receipt in the system	View order receipt	PASSED

Table 6 shows the test cases for payment module. The goal for this test cases is to test the effectiveness in placing an order and managing the order.

Table 8: Test result for payment module

	Test Cases	Expected Output	Pass/Fail
T4-1	Check different payment options	Display payment options	PASSED
T4-2	Return to home page after payment is done	Display the home page after payment	PASSED
T4-3	Customers sign up to online payment account bank	Display the sign up form	PASSED
T4-4	The system allows customers to pay via online and offline	Display payment option	PASSED
T4-5	The system allows admin to view type of payment made by the customers	Display payment type	PASSED
T4-6	Admin can view whether customers have paid or not	Display YES or NO paid	PASSED
T4-6	The customers address is shown in checkout page	Display address	PASSED

Table 7 shows the test cases for order status module. The goal for this test cases is to test the effectiveness in updating the order status.

Table 9: Test result for order status module

	Test Cases	Expected Output	Pass/Fail
T5-1	Admin update the order status	Display the updated order status	PASSED
T5-2	Customers can view the updated order status in the system	Display the updated order status	PASSED
T5-3	Customers can change order status to cancel order	Display the cancel order status	PASSED

Table 8 shows the test cases for report module. The goal for this test cases is to test the effectiveness in updating the sales report.

Table 10: Test result for report module

	Test Cases	Expected Output	Pass/Fail
T6-1	Admin can print the report	Show printed page	PASSED
T6-2	The report is displayed in bar graph	Display report in bar graph	PASSED
T6-3	The report is displayed in listing order	Display report in listing order	PASSED

5.2.2 User Acceptance Testing

Figure 25 shows majority of the respondents can understand how to run the system.

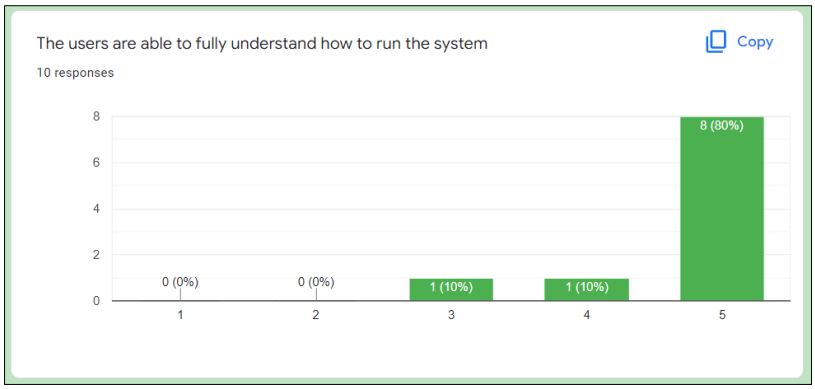


Figure 25: User Acceptance Testing

6. Conclusion

In general, the creation of this system has met the project's objectives. The system's capabilities can be expanded in the future, as it can help end-users improve the efficiency of their ordering, purchasing, and recording activities. The Citronella Feedmill Online Store web design should employ appropriate colours, fonts, images, text, and graphics to entice customers to make a purchase to attract more customers in future.

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