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The Development of Online Food Reservation for Restaurant Kahfi using Structured Approach

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Abstract: Nowadays, information technology plays a big role, where it is used to store, manipulate, distribute or create information. This is no exception in the field of food and beverage, which uses information technology optimally to promote and manage food sales services. In conjunction with that, an Online Food Reservation for Restaurant Kahfi is developed. It is a web-based system where customers are able to view and order various courses available in the restaurant online. Each customer will get a reservation code whenever an order is placed. By this means, it will lessen the waiting time as the chef knows in advance and early preparation can be made according to the order list Hence, to achieve these goals, the proposed web-based system applies an information system method which is categorized under web-technologies for delivering information and services to users. Waterfall model is chosen as a methodology to develop this system, which is easy to understand and less complicated. Meanwhile, Xampp and PhpMyAdmin are used to develop the system. As the output of this project. Hopefully, this system will help in terms of waiting time for the customers to get their orders and for the management of the restaurant to increase their efficiency of working in order to get the maximum profit for their business.

Keywords: Food Reservation, Food and Beverages, Information Technology, Web-Based System, Waterfall Model.

1. Introduction

Ordering food online is something really important nowadays not only to ease the management of the restaurant but also this system will give a huge benefit to the customer. A survey of the top 26 U.S restaurant chains in all categories finds the industry gradually adopting electronic ordering, in the form

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of online, mobile and text order [1]. A normal process of taking orders is where a waiter will be holding a piece of paper going around from table to table to take orders from customers. From this process, there are a few problems that occur, for example the customer needs to wait for a quite long time before the meal can be served because they need to come to the restaurant first because the workers take their order. Other than that, the main problem is the restaurant still didn't have the official platform to take orders from online. This will give a slight disadvantage to management to compete with other restaurants that have a more efficient way in terms of taking orders.

Hence, the objective for this project is to design an Online Food Reservation using structured approach, to develop an Online Food Reservation system for Restaurant Kahfi and to test the developed system. There will be 2 types of users which are customer and management. Customers can view and order food from that restaurant and they also can generate reports to give suggestions or comment about the restaurant services. The management can view the menu, edit the menu and reply to the report that is submitted by the customers.

This report contains four main sections. Part 1 describes the introduction of the project, while Part 2 provides the results of the literature review. Part 3 shows the research methodology, Part 4 explains the findings from the analysis and design of the system. Last part gives the conclusion.

2. Related Work

2.1 Study on Food Ordering Process

Right now, a system of ordering food is something common especially for famous restaurants, fast food restaurants and also for family restaurants. This system will not only give benefits to customers where they can order from online at any time. It is also beneficial to the management of the restaurant where they can track their food order, give latest information about their food menu promotion, new menu and more.

Using paper for the food ordering system is something that is commonly used especially for small restaurants because they want to cut their budget. The main disadvantages using this old method is where paper can get easily lost or damaged. This will cause more waste of money and more paper will be destroyed after this. Hence, to provide a better way of taking orders, an Online Food Reservation is proposed to overcome the problems from the manual process. Having the system not only will increase the performance of taking orders, but also it can consume a lot of energy especially for the workers to take orders.

2.2 Information System

This system will use a web-based food ordering system where it includes a customer computer system in communication with a server. The server is where it hosts a restaurant related web site that will give web pages of this restaurant data for the users either customer or management computer systems.

Information systems have their own features where some of them are collections of input data, storage, processing and producing the output information. From that feature, it is really suitable to use an information system to build this system where it will collect the data from the customer and store it inside the database for the workers to know their order [2]. Therefore, the advantages of the information system method will be used in developing the proposed system with a combination of internet technology. This allows the developed system to operate fully online. Thus, the process of managing the system can be done centrally and users can reach the system from a wider geographical area.

2.3 System Comparison

Table 1 shows the comparison between 3 established systems and the proposed system. The 3 systems are similar which are all about the food ordering but some of the features that are not available in the 3 system are available in the proposed system. The 3 established systems are Oda Makan, Delivery Eat and Dah Makan. The aspect of differentiation is only made by focusing on the function and module of the proposed system.

Table 1: Comparison Between Existing Systems and Proposed System

Aspect / System	Oda Makan	Delivery Eat	Dah Makan	Online Food Reservation
Login	Id, Password	Facebook/Google Account	Id, Password	Id, Password
System Type	Web-based, android application	Web-based, android application	Web-based, android application	Web-based
Food Customize	Not available	Not available	Not available	Available
Report Module	Available	Not available	Available	Available
Edit Customer Profile	Not available	Not available	Not available	Available

3. Methodology

System Development Methodology is important where it can reduce the risk and improve the probability of project success, an organization can use a structured development approach for such a project, beginning with the selection stage and culminating in the operation stage [3]. Hence, to meet the requirement for developing this system, it will use Waterfall Model Development as the methodologies. This method is more structured and focuses on one task per time. Every phase needs to be done in a perfect way to give the best output for the customer to use and that leads to advantages to the developers to finish the task before the due date. The Waterfall Model is divided into several phases which are requirement, design, implementation, testing, deployment and maintenance. Table 2 shows the system development task and deliverables for the proposed system. The Gantt Chart for this project is attached in Figure 4 at Appendix A.

Table 2: System Development Task and Deliverables

Phase	Activity	Deliverable
Requirement	Determine the scope of the project based on user requirement. Identify the problems that occur.	● Proposal ● Gantt Chart ● Functional and Non-functional requirement ● CD/DFD ● ERD
Design	Generate flowchart for users. Discuss the function for the system. Design the user interface.	● Flowchart ● Database schema and data dictionary

Phase	Activity	Deliverable
		● User interface
Implementation	Implement all the function and features by develop the system	● Program code
Testing	Perform all the function of the system to make sure it is error free and based on the user requirement	● Test case
Maintenance	Asking real users after 4-5 days of launching about the system	● Improve the system

3.1 Analysis and Design

Design Analysis is the systematic process of developing a design including all the information discovery, planning and communication. This can be applied to any type of design including the design of physical things such as building or structure or intangible things such as software or process [4]. Software or system designer uses the system's specification as a starting point to determine how the system should achieve its requirement. Using the requirement, they will expand and modify to clarify what must still be defined in order to be able to achieve the requirement.

3.2 System Requirement Analysis

For this subtopic, there are 2 types of functional which are functional and nonfunctional requirement analysis. Table 3(a), 3(b) and Table 4 show the functional and non-functional requirement for this proposed system.

Table 3(a): Functional Requirement for customers.

No.	Modules	Functionalities
1.	Registration	● The system should allow a new user to register before login to the menu.
2.	Login	● The system should allow the user to login into the system using an id and password registered. ● The system should warn the user for any wrong id and password. ● The system will show the user the homepage once successful login.
3.	Food menu selection	● The system should allow the customer to view all the menus ● The system should allow the customer to view the ordered menu.
4.	Food ordering	● The system should allow customers to order food and beverages from the system. ● The system should allow the customer if they want to cancel the orders.
5.	Report	● The system should be able to create a report to give suggestions to the management of the restaurant.

Table 3(b): Functional Requirement for administrator.

No.	Modules	Functionalities
1.	Registration	● The system should allow a new administrator to register before login to the menu.
2.	Login	● The system should allow the administrator to login into the system using an id and password registered. ● The system should warn the admin for any wrong id and password. ● The system will show the administrator the homepage once successful login.
3.	Manage food order	● The system should allow the administrator to view all the orders from the customers. ● The system should allow the administrator to view all the cancel orders from the customers.
4.	Manage food menu	● The system should allow the administrator to add the new menu in the system. ● The system should allow the administrator to delete the menu
5.	Manage report	● The system should allow the administrator to view all the reports that had been submitted by the customers. ● The system should allow the administrator to edit the status of the report if the administrator has taken action on the report/suggestion.

Table 4: Non-Functional Requirement for users.

No.	Requirements	Descriptions
1.	Performance	● The system should pop-up less than 10seconds the main page after the login section is successful. ● The system should be able to be used anytime and anywhere. ● The system should be able to work even at its highest workload.
2.	Operational	● The system should be easy to use. ● The system should be able to browse in any browser.
3.	Security	● Users can only access with their own id and password for this system. ● All the details about the customers will be located somewhere in the database.

3.3 System Analysis

Figure 1 is all about the context diagram for the proposed system where there will be two users, customer and administrator. Each user will get through several modules for example register, login, view menu and report

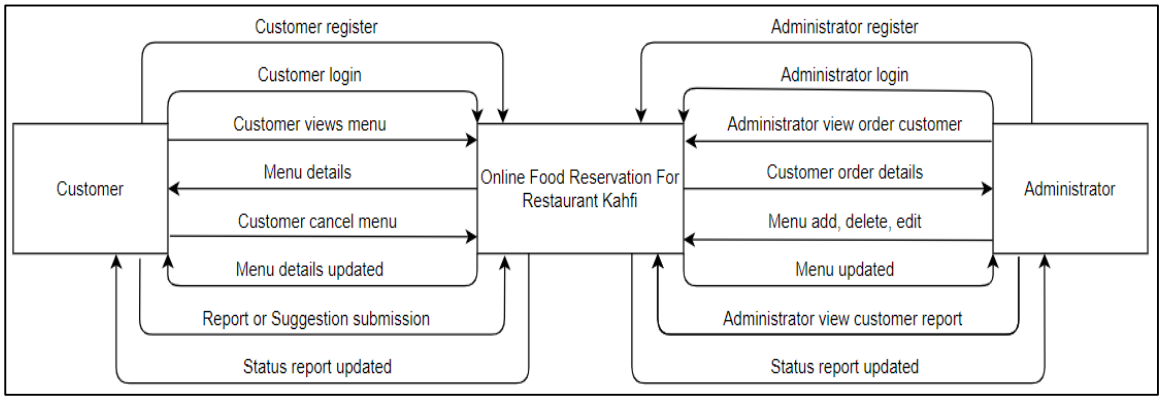

Figure 1: Context Diagram for proposed system

Figure 2 is Data Flow Diagram (DFD) where there are 5 processes and 5 datastore. Each process will get information from the users and it will store in the specific database based on the data given by the users.

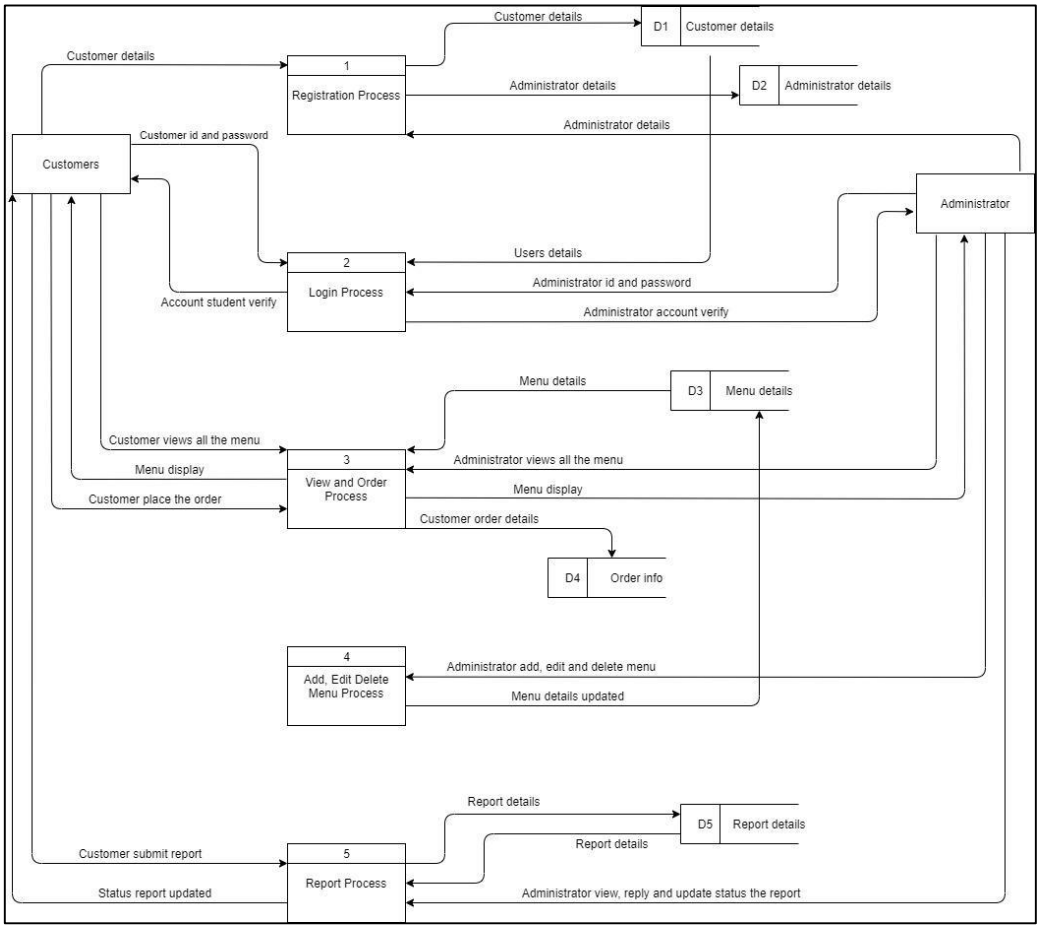

Figure 2: Data Flow Diagram for proposed system

Figure 3 is Entity Relationship Diagram, from 5 datastore at DFD, it creates 5 entities for ERD. All entities have their own attributes, primary key and foreign key.

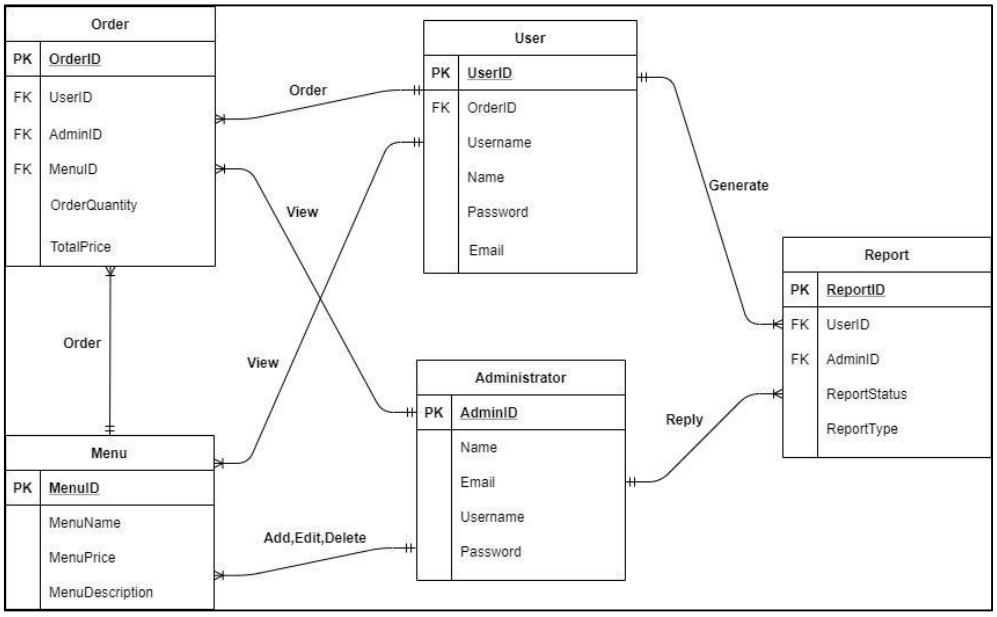

Figure 3: Entity Relationship Diagram for proposed system

3.4 System Design

For this proposed system, there will be two flowcharts which are user flowchart and administrator flowcharts. The figure of both flow charts is in Figure 4 and Figure 5.

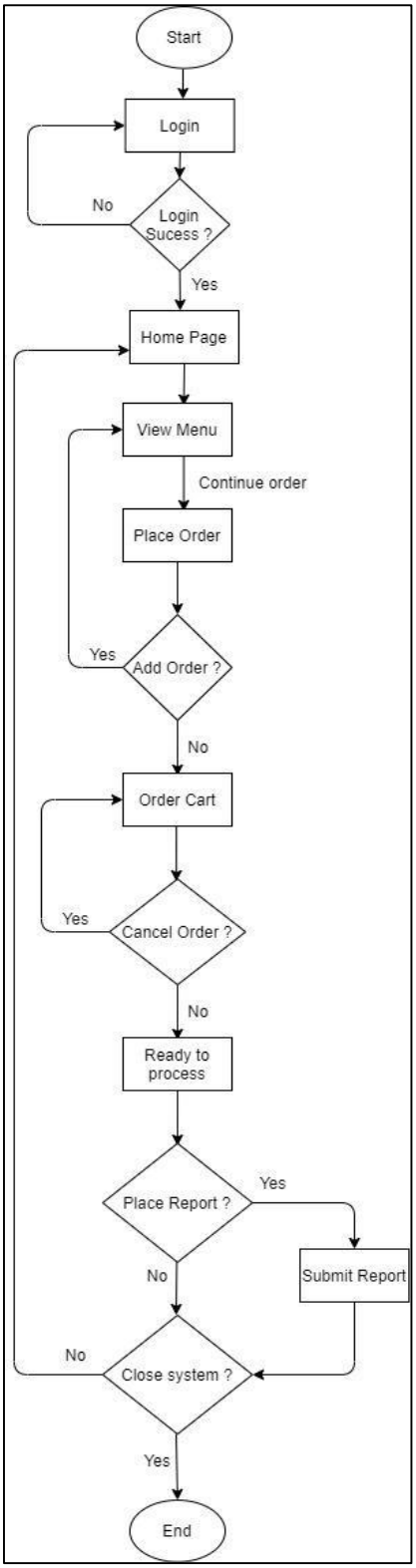

Figure 4: User flowchart for proposed system

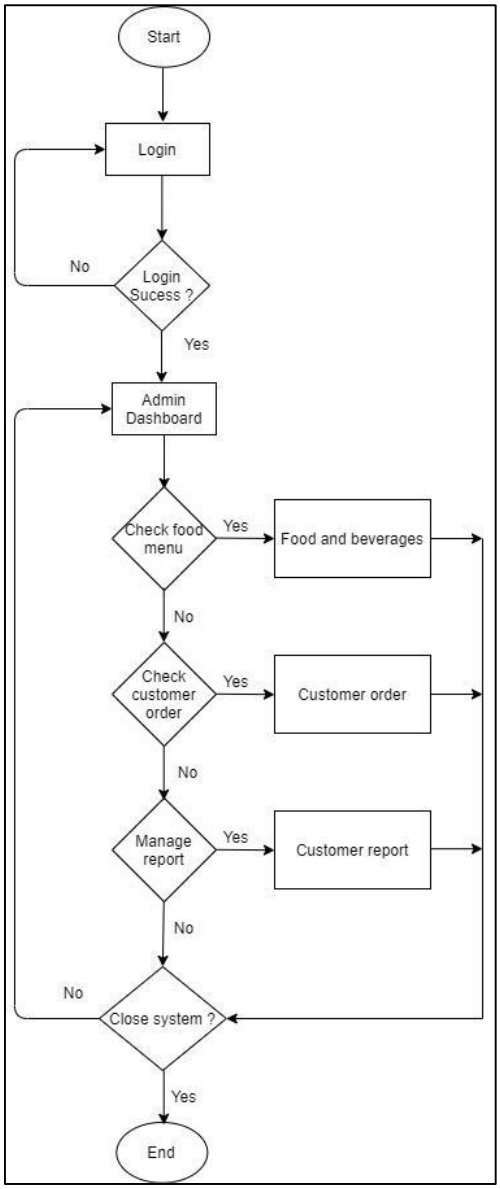

Figure 5: Administrator flowchart for proposed system

3.5 User Interface Design

Sridevi (2014) mentioned that user interface is very important element for a computer-based system where if the interface of a system is poor, the user's ability to tap the computational power of an application may be severely hindered. For this proposed system, the user interface will be simple and easy for the customer to use. These are some of the examples of the user interface design.

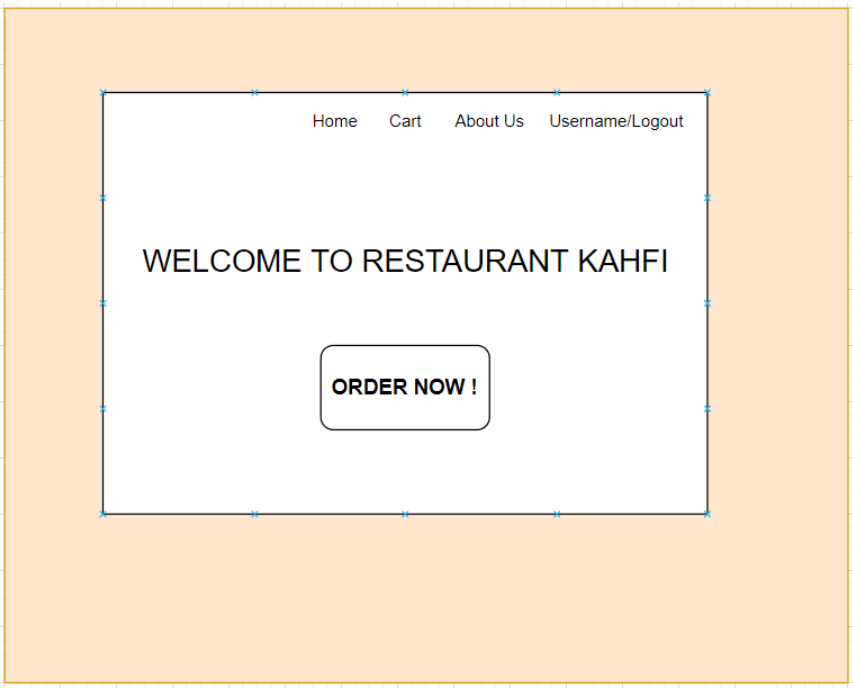

Figure 6: Home Page

This is the home page after they successfully insert their email and password. If they want to order, just click Order Now or if they want other option for example view cart, about us and they also can straight away logout by clicking Logout on top of the page

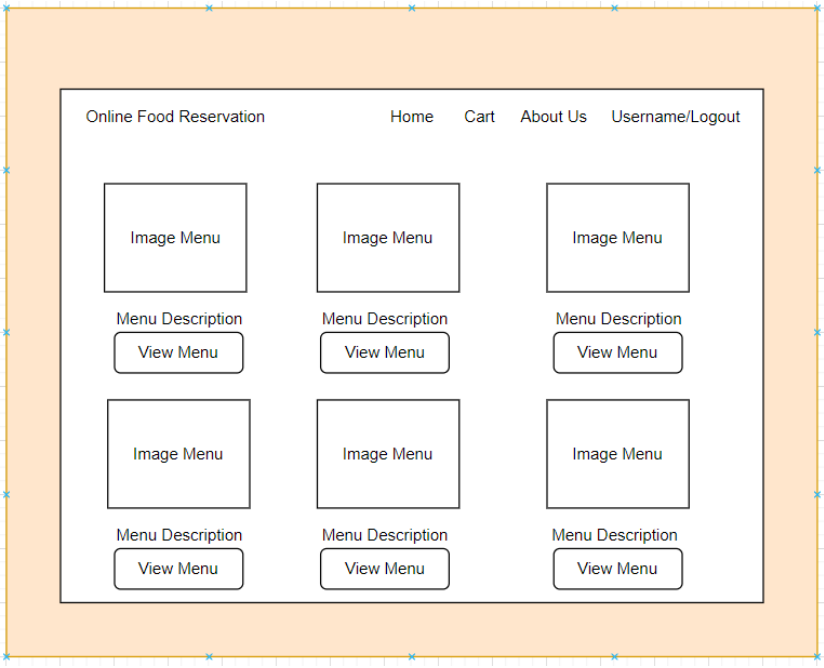

Figure 7: View Menu Page

This page will appear once a customer clicks Order Now, and it will give a menu image and menu description. Menu description is where the administrator will give details about the menu or the ingredients of the foods.

3.6 Implementation and Testing

In this chapter, the implementation and testing phase are discussed. The implementation phase represents the work that has been done by the team developer to meet the requirement of the scope of work and fulfill the charter. Meanwhile, for the testing phase, the purpose of having this phase is to determine whether the system or application software or IT solution developed or acquired and preliminary tested during the development phase is ready for implementation [5]. Testing plan consists of a test case, expected output and actual output will be carried out for the functional testing. User acceptance tests are also discussed in this chapter to know the user's opinion and get more information in order to make enhancements for the system from time to time.

3.7 Implementation

The modules that will be discussed in this chapter is registration, login, food menu selection and food ordering for customers. Meanwhile for administration, the modules will be registration, login, manage order menu and manage food menu. Partial code of the program for each module will be explained in the different sections respectively.

3.7.1 Registration – Customer and Administrator

Registration process requires the customer and administrator to enter their information for example first name, email, contact number, address and password. This system will crosscheck the information that has been stored inside the database or the email that has been registered already exists inside the system to avoid any redundancy data. Figure 8 indicates the interface of the registration function while Figure 9 shows the partial code for registration function.

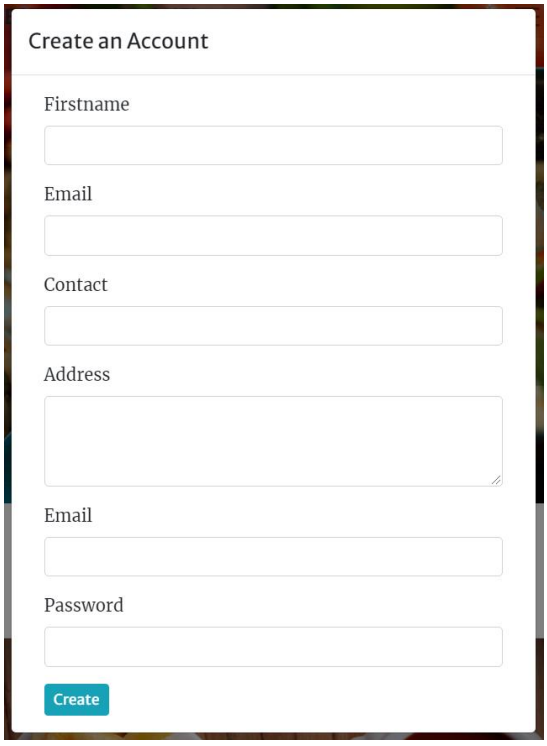

Figure 8: The interface of the registration function

```
<div class="form-group">
  <label for="" class="control-label">Firstname</label>
  <input type="text" name="first_name" required="" class="form-control">
</div>
<div class="form-group">
  <label for="" class="control-label">Email</label>
  <input type="text" name="last_name" required="" class="form-control">
</div>
<div class="form-group">
  <label for="" class="control-label">Contact</label>
  <input type="text" name="mobile" required="" class="form-control">
</div>
<div class="form-group">
  <label for="" class="control-label">Address</label>
  <textarea cols="30" rows="3" name="address" required="" class="form-control"></textarea>
</div>
```

Figure 9: Partial code for registration function

3.7.2 Login – Customer and Administrator

The login process is where customers need to enter their email and password, meanwhile for administrators they need to enter their username and password. Figure 10 and 11 shows the interface of the login function for customer and administrator. Figure 12 and 13 shows the partial code of the login function for customer and administrator.

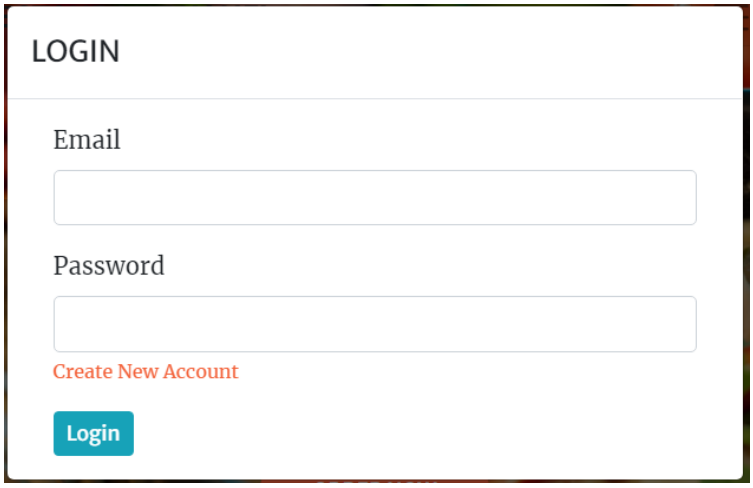

Figure 10: Login interface for customer

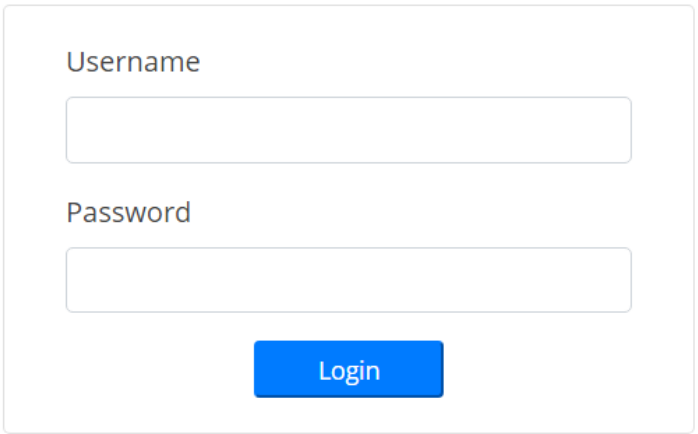

Figure 11: Login interface for administrator

```
<div class="form-group">
  <label for="" class="control-label">Email</label>
  <input type="email" name="email" required="" class="form-control">
</div>
<div class="form-group">
  <label for="" class="control-label">Password</label>
  <input type="password" name="password" required="" class="form-control">
```

Figure 12: Partial code of login function for customer

```
<div id="login-right">
  <div class="card col-md-8">
    <div class="card-body">
      <form id="login-form" >
        <div class="form-group">
          <label for="username" class="control-label">Username</label>
          <input type="text" id="username" name="username" class="form-control">
        </div>
        <div class="form-group">
          <label for="password" class="control-label">Password</label>
          <input type="password" id="password" name="password" class="form-control">
        </div>
        <center><button class="btn-sm btn-block btn-wave col-md-4 btn-primary">Login</button></center>
      </form>
```

Figure 13: Partial code of login function for administrator

3.7.3 Food Menu Selection – Customer

Customers are able to view all the food and beverages from the system. The view also includes the image of every portion, name of the menu, menu description and add to cart to proceed the order. Figure 14 indicates the interface of the food menu selection module for the customer while Figure 15 is the partial code for this module.

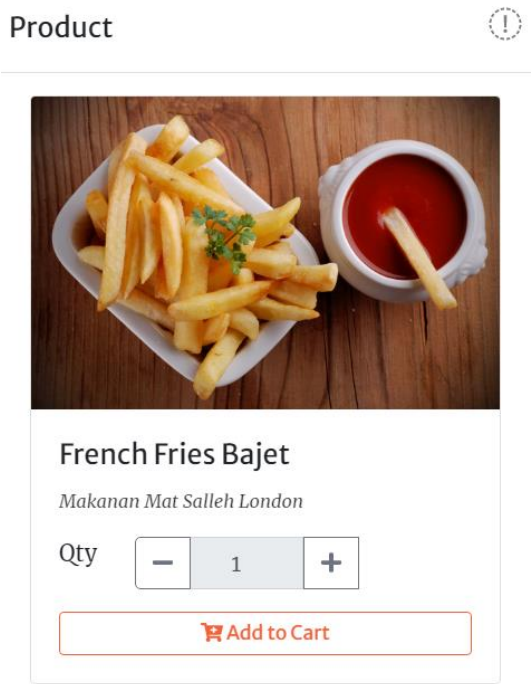

Figure 14: The interface for food menu selection

```
    <div class="row">
      <div class="col-md-2"><label class="control-label">Qty</label></div>
      <div class="input-group col-md-7 mb-3">
  <div class="input-group-prepend">
    <button class="btn btn-outline-secondary" type="button" id="qty-minus"><span class="fa fa-minus"></button>
  </div>
  <input type="number" readonly value="1" min = 1 class="form-control text-center" name="qty" >
  <div class="input-group-prepend">
    <button class="btn btn-outline-secondary" type="button" id="qty-plus"><span class="fa fa-plus"></span></button>
  </div>
</div>
    </div>
    <div class="text-center">
      <button class="btn btn-outline-primary btn-sm btn-block" id="add_to_cart_modal"><i class="fa fa-cart-plus"></i> Add to Cart</button>
    </div>
```

Figure 15: Partial code of food menu selection for customer

3.7.4 Food Ordering – Customer

Customers can order any food or beverages from the system. Figure 16 shows the interface of the food ordering process for customers after they view the menu while Figure 17 indicates the partial code for the food ordering function.

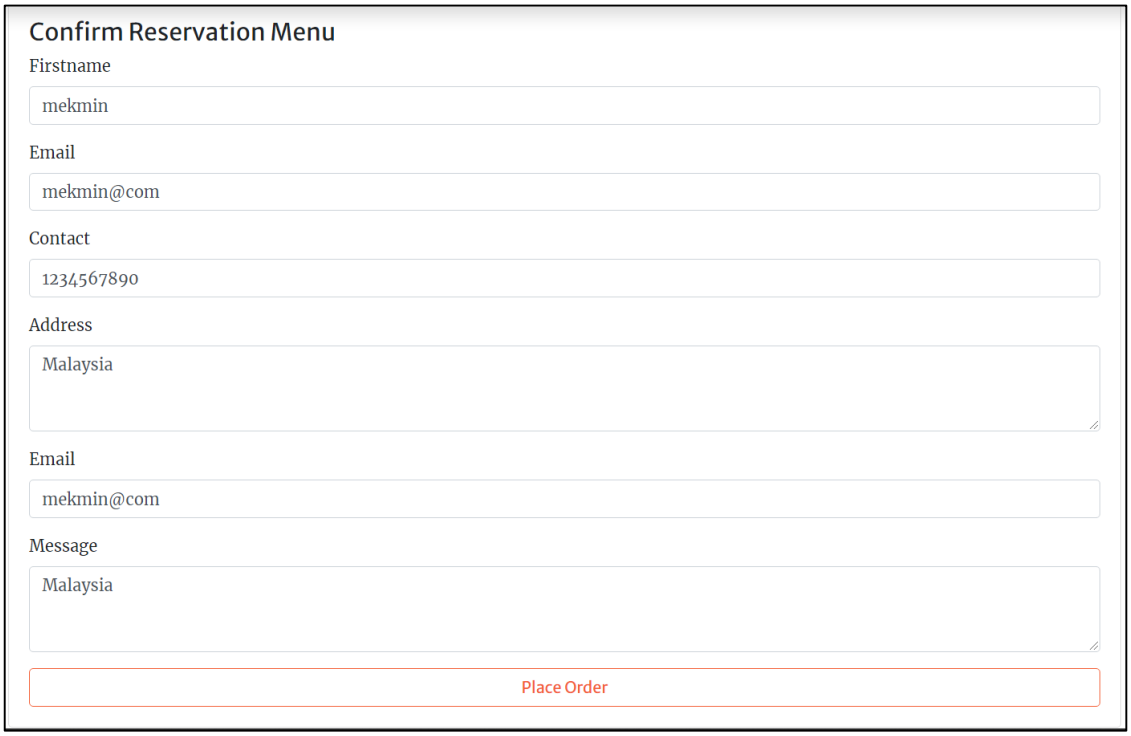

Figure 16: The interface for food ordering process

```
<h4>Confirm Reservation Menu</h4>
<div class="form-group">
    <label for="" class="control-label">Firstname</label>
    <input type="text" name="first_name" required="" class="form-control" value="<?php echo $_SESSION['login_first_name'] ?>">
</div>
<div class="form-group">
    <label for="" class="control-label">Email</label>
    <input type="text" name="last_name" required="" class="form-control" value="<?php echo $_SESSION['login_last_name'] ?>">
</div>
<div class="form-group">
    <label for="" class="control-label">Contact</label>
    <input type="text" name="mobile" required="" class="form-control" value="<?php echo $_SESSION['login_mobile'] ?>">
</div>
<div class="form-group">
    <label for="" class="control-label">Address</label>
    <textarea cols="30" rows="3" name="address" required="" class="form-control"><?php echo $_SESSION['login_address'] ?></textarea>
</div>
<div class="form-group">
    <label for="" class="control-label">Email</label>
    <input type="email" name="email" required="" class="form-control" value="<?php echo $_SESSION['login_email'] ?>">
</div>
<div class="form-group">
    <label for="" class="control-label">Message</label>
    <textarea cols="30" rows="3" name="" required="" class="form-control"><?php echo $_SESSION['login_address'] ?></textarea>
</div>

<div class="text-center">
    <button class="btn btn-block btn-outline-primary">Place Order</button>
</div>
```

Figure 17: Partial code of food ordering function for customer

3.7.5 Manage Order Menu – Administrator

This module is where administrators can view all the orders from the customer after they have proceeded to place an order. Figure 18 shows the interface for the administrator to see the menu ordered by the customer and Figure 19 indicates the partial code for this module.

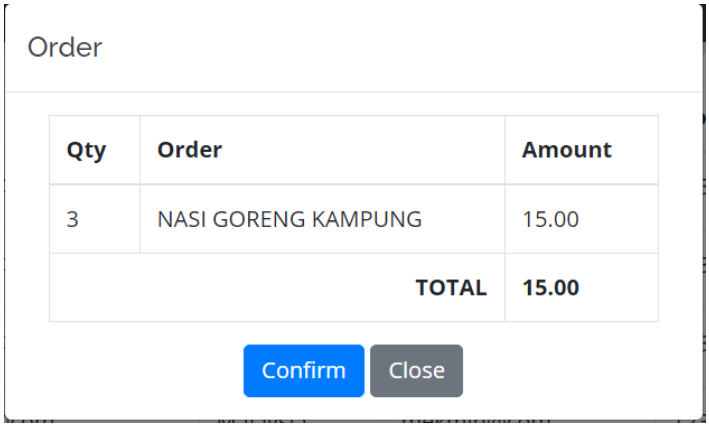

Figure 18: The interface of manage order menu for administrator

```
    <tr>
      <th colspan="2" class="text-right">TOTAL</th>
      <th ><?php echo number_format($total,2) ?></th>
    </tr>

  </tfoot>
</table>
<div class="text-center">
  <button class="btn btn-primary" id="confirm" type="button" onclick="confirm_order()">Confirm</button>
      <button type="button" class="btn btn-secondary" data-dismiss="modal">Close</button>
```

Figure 19: Partial code of manage order menu for administrator

3.7.6 Manage Food Menu – Administrator

The administrators are able to edit any food and beverages inside the system using the administrator account. The interface of the managed food menu for administrators is depicted in Figure 20 while partial code for this function is shown in Figure 21.

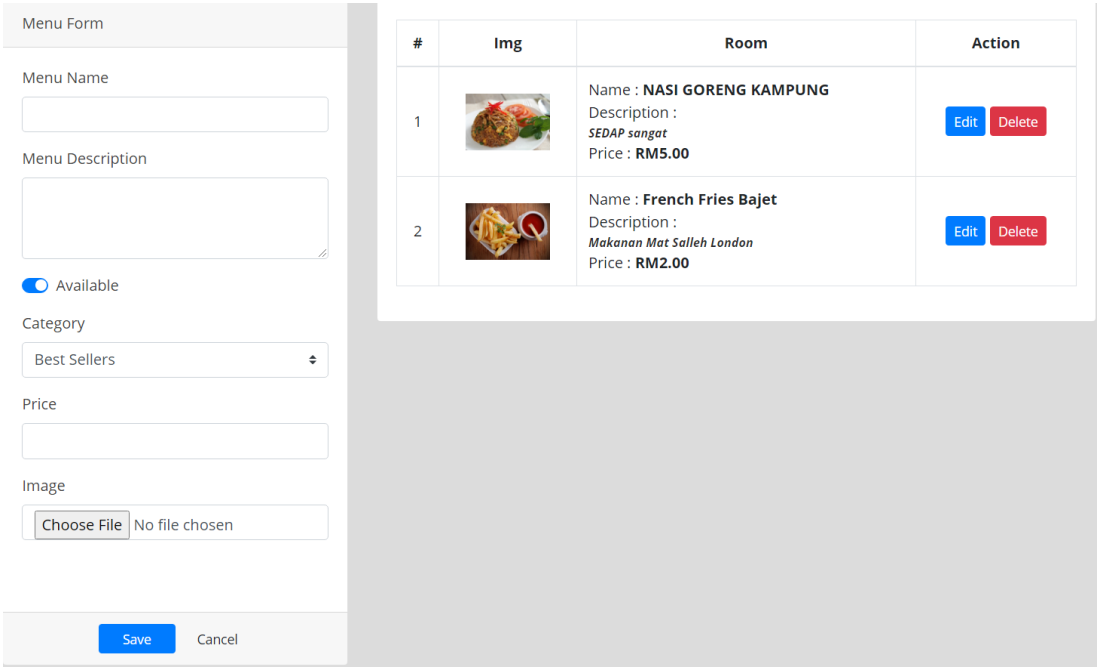

Figure 20: The interface of manage food menu for administrates

```
<div class="card-body">
    <input type="hidden" name="id">
    <div class="form-group">
      <label class="control-label">Menu Name</label>
      <input type="text" class="form-control" name="name">
    </div>
    <div class="form-group">
      <label class="control-label">Menu Description</label>
      <textarea cols="30" rows="3" class="form-control" name="description"></textarea>
    </div>
```

Figure 21: Partial code for manage food menu

3.8 Testing

According to Noel Ransom, during the testing phase, the developer will try to find out whether their code and programming work according to customer requirements. It is not possible to solve all the errors that they might find during the testing phase and it is possible to use the result from this phase to reduce the error within the software. Test plan is vital to ensure the system produces the expected outcome. It consists of a test case, expected outcome and actual output. User acceptance test also included to check the user's satisfaction on the system.

3.8.1 Test Plan for Registration Function

Table 5 shows the test plan for the registration function. The purpose of this test plan is to test the new administrator and customer's capabilities to insert email, name, phone number, address and password to complete the registration process.

Table 5: Test Plan for Registration Function.

No.	Test Case	Expected Outcome	Actual Output
1.	Fill in the valid details in the registration form.	Users need to enter some information: name, email, password, address. Successfully registered and redirected the users to the login page.	Same as expected outcome.
2.	Fill in the invalid details in the registration form.	If users put wrong information, for example the same email, it will show an error message and require users to input the details again.	Same as expected outcome.

3.8.2 Test Plan for Login Function

Table 6 shows the test plan for login function. The purpose of this test plan is to test the customer and administrator login function based on their inputs during the registration process.

Table 6: Test Plan for Login Function

No.	Test Case	Expected Outcome	Actual Output
1.	Fill in valid email and password for customer, username and password for administrator.	Once a user inserts their email and password, they will redirect to the home page and redirect administrator to administrator page.	Same as expected outcome.
2.	Fill in invalid email, username and password.	If users insert the wrong email and password, it will show an error message and require the user to login again.	Same as expected outcome.

3.8.3 Test Plan for Food Menu Selection for Customer

Table 7 shows the test plan for food menu selection for customers. The purpose of this test plan is to check whether customers are able to view all the menu from the system.

Table 7: Test Plan for Food Menu Selection for Customer

No.	Test Case	Expected Output	Actual Outcomes
1.	Customers click on the view button to get extra details on the menu.	Users are able to view all the menu to get more details about price, description of the menu before proceeding to checkout.	Same as expected output.

3.8.4 Test Plan for Food Ordering for Customer

Table 8 shows the test plan for the food ordering process for customers. The purpose of this test is to make sure customers can order all the menu from the system and cancel before placing the order.

Table 8: Test Plan for Food Ordering for Customer

No.	Test Case	Expected Output	Actual Outcomes
1.	Customers are able to place orders for all types of food and beverages on the system.	Once a user click add to cart to order on a menu, it will show the cart list on the customer cart list and they can recheck the menus before placing the orders.	Same as expected output.

3.8.5 Test Plan for Manage Order Menu for Administrator

Table 9 shows the test plan for managing the order menu for the administrator. The purpose of this test is to make sure that the administrator gets updated if any new order comes in once the customer places the order inside the system.

Table 9: Test Plan for Manage Order Menu for Administrator

No.	Test Plan	Expected Output	Actual Outcomes
1.	The system should allow the administrator to view all the menu that order by the customer	Once the customer placed the order, it will update automatically inside the administrator order list and it will show name, address, contact number, order list and order status.	Same as expected output.

3.8.6 Test Plan for Manage Food Menu for Administrator

Table 10 shows the test plan for managing the food menu for administrators. The purpose of this test is to make sure that the administrators are able to add new menus, edit menu details and delete old menus.

Table 10: Test Plan for Manage Food Menu for Administrator

No.	Test Plan	Expected Output	Actual Outcomes
1.	The system should allow the administrator to add, edit and delete menu from the system	Administrator able to add, edit, delete the food menu inside the system. From that, it will automatically update on the system and the customer will view the update menu on the system as soon as possible.	Same as expected output.

4. Result and Discussion

This section 4 will discuss about the user acceptance test where the respondents are 10 respondents. 8 of them are users from customers and 2 of them are users from managements.

4.1 User Acceptance Test

User acceptance test is the evaluation that is obtained from the users which are the administrators and customers which are a total of 10 users. This test is important to ensure that the user requirements are achieved and the output fulfills the user's expectation. The test is conducted in two sections which are the application design and function section. Figure 22 shows the result of the user acceptance test for graphical user interface design.

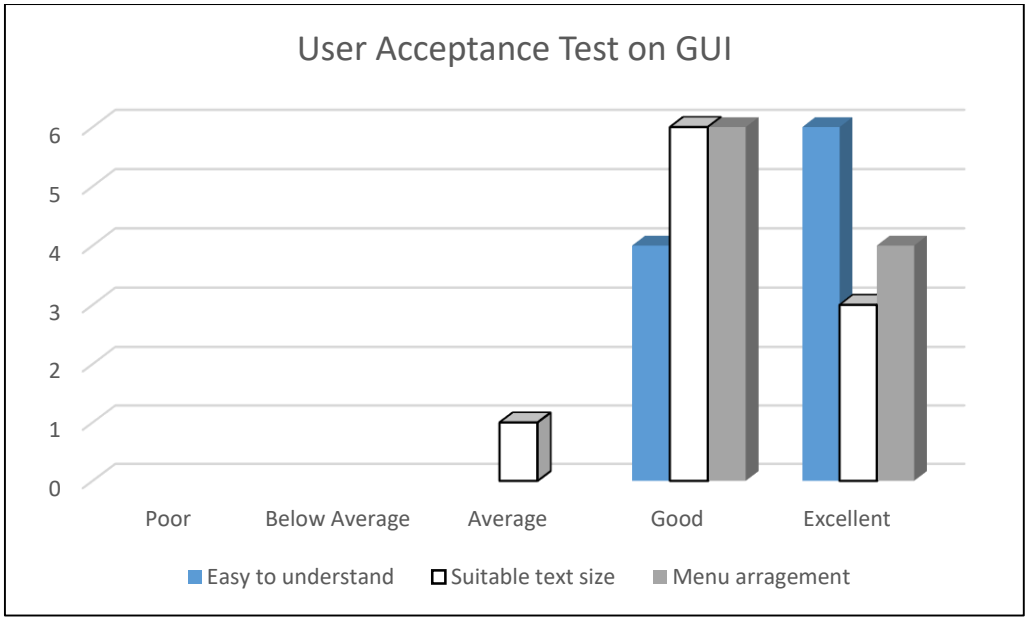

Figure 22: User Acceptance Test on Graphical User Interface

Figure 23 shows the result of the system functionalities test of the user. The login and register reached the most excellent level which obtained 8 respondents out of 10.

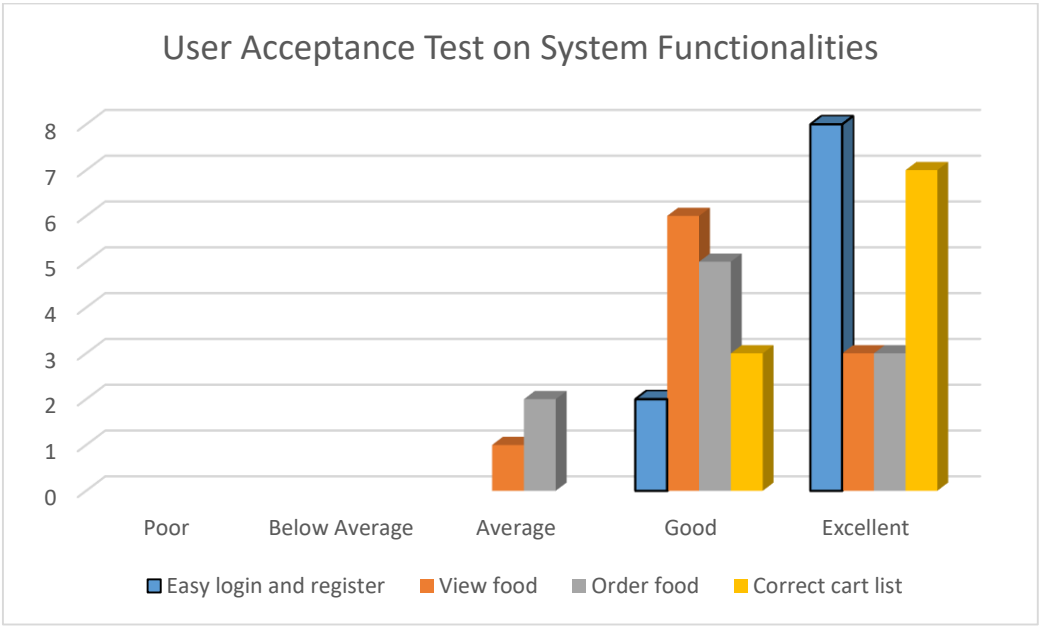

Figure 23: User Acceptance Test on System Functionalities

5. Conclusion

The result obtained from the testing allows the developers to discuss and conclude the achievement and further enhancements of the developed system. There are some advantages from this system where it allows for the customer to view and order food from this restaurant using the best method. This system also able to use from anywhere using the correct link and browser which are Chrome, Firefox etc. For management aspect, it gives huge advantages where this system will increase the efficiency of working and gaining maximum profit using minimum cost to run this restaurant. Beside advantages, it also has disadvantages where this system does not provide the function for the customer to view all the history orders before. For administrator function, it does not provide the function of managing customer information. Somehow, this function is quite important for safety because the administrator needs to

know either the person is legit or has some kind of other agenda toward the system. Lastly, there are 2 recommendations that need to enhance in the future for this system where first is to display the menu based on category. For example, promotion at top view while meals, snacks, drinks at below of the pages. Second recommendation is this system need to have the real-time notification function for the users to know the latest menu of food and beverages or promotion launched.

Acknowledgement

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Appendix A

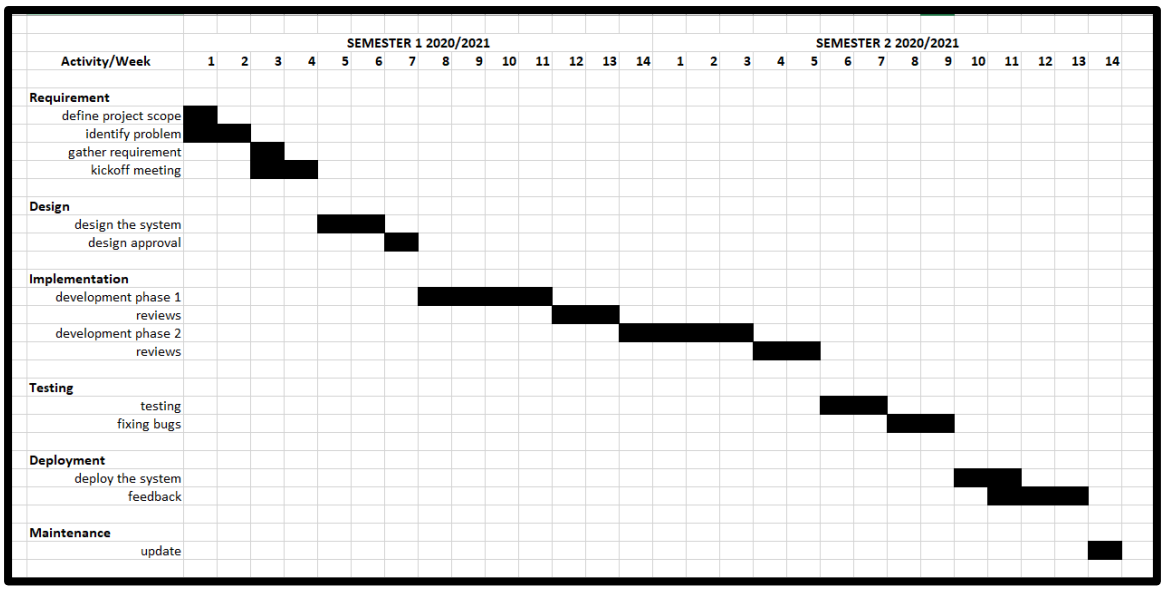

Figure 24: Gantt Chart for proposed system.

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