© Universiti Tun Hussein Onn Malaysia Publisher's Office



## AITCS

Homepage: http://publisher.uthm.edu.my/periodicals/index.php/aitcs e-ISSN :2773-5141

# **An Online Reservation and Food Ordering System for Arabian House Restaurant**

## Mazen Hamoud Mohammed AL-seaghi<sup>1</sup>, Rozaida Ghazali<sup>1\*</sup>

<sup>1</sup>Fakulti Sains Komputer dan Teknologi Maklumat, Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA

DOI: https://doi.org/10.30880/aitcs 2022.03.02.100 Received 10 August 2020; Accepted 07 November 2022; Available online 30 November 2022

**Abstract**: Online Reservation and Food Ordering System will greatly simplify the reservation and ordering process for both the customer and the restaurant. Before the adaptation of reservation systems, many people had to change their choice of restaurant or food because the restaurants were full and there was a lot of disappointment involving the management of the restaurant. The website presents an interactive and up-to-date schedule for the daily reservation and ordering with all available options in an easy-touse manner. Customers can choose the better reservation type and food to visit the restaurant which will lead to choosing the suitable day and time for him/her to make the reservation or order. This allows restaurant staff to easily manage the reservation and ordering and serve the customer efficiently and effectively with minimal time and effort consuming for both customers and staff. To achieve the objectives, the use of PHP and HTML programming and prototype models that allows repeated development processes in the analysis phase, design phase, and implementations phase was used to create a system that wanted to be developed. Test system modules will be performed after the website has been fully developed. The reliability of the system is important by the results of the tests to make changes to ensure that the system being built operates correctly and to ensure that the goals have been accomplished. The system will facilitate the customers to make a reservation and order easily by entering their information and choosing the appropriate time for visiting the restaurant. Therefore, this website also will help with the schedule to avoid crowds inside the restaurant by receiving a limited number of customers per day. In addition to that, the website will provide information and location about the restaurant for customers.

Keywords: Ordering, Reservation, Restaurant, System

## 1. Introduction

Recently, restaurants have become convenient places for certain activities and occasions such as birthday parties, graduation dinners etc. And due to the increased demand for tables which exceeds the availability of certain restaurants, reservations become necessary. This poses a great need for data

management for reservations as many restaurants still use the traditional way of food ordering and table reservation operations. The use of the traditional method in managing reservations results in a high level of human errors, especially when restaurant personnel deal with a big number of customers; this issue will have a significant influence on the restaurant's profitability [1].

Before the adaptation of reservation systems, many people had to change their choice of restaurant or food because the restaurants were full and there was a lot of disappointment involving the management of the restaurant. By adapting the reservation system, restaurants can control how many people can visit and dine at their restaurant at the same time, maintaining the restaurant's pace and avoiding customers' crowdedness, which helps improve the restaurant's image and reputation. However, it is very difficult to manage such a large amount of information or even plan for activities such as procurement operations with a traditional file approach. With a restaurant reservation system, managers can easily and quickly record information, solve problems, and handle restaurants professionally as compared to the manual way of managing a restaurant [1].

Arabian House Restaurant is one of the famous restaurants in Sana'a Yemen, which specialized in Yemeni traditional food. The restaurant currently used an old traditional method (a manual process) for a table reservation and food ordering which includes waiters, a pen, and a piece of paper. The food order ticket is passed to the kitchen for further processing by the waiters on paper. The sequence of the meal order has passed to the kitchen while the food order tickets have passed to the kitchen. One ticket may be substituted for another. As a result, the restaurant will suffer and will not be able to serve the customers efficiently and effectively. To summarize, the main problem faced by customers implementing the traditional method, the first problem the customers must wait a long time for his order to be delivered, the second problem there are just not enough staff in the restaurant, and the list problem the restaurant has no previous website, which allows users to order and reserve tables.

The rest of the paper is organized as follows: Section I describes the problem statement for this project and the main objective for this application. Section II de-scribes the related work. Section III presents the methodology on prototyping model. Finally, Section V gives the conclusion.

#### 2. Related Work

Three similar system has been studied and compared with the proposed system. The first system is Domino's Pizza. Domino's employs about 10,500 people between their 8,700 stores worldwide. Domino's Pizza Malaysia system is one of the famous online ordering websites, it provides functions ordering through the internet. it was opened in Malaysia by Tom Monaghan in September 1997. It is a great website with many advantages, it is user-friendly. for example, easy to use and the menu interface clear. other than that, customers can search for items easily and get them from the store [2].

Second system is McDonald's. McDonald's is an American fast-food company, founded in 1940 as a restaurant operated by Richard and Maurice McDonald, in San Bernardino, California, United States. McDonald's is one of the best restaurants in the world, there are many branches around 33,000 McDonald's in 119 countries. McDonald's sells chicken, fries, soft drinks, lunch items, and breakfast items, it is having an amazing menu [16]. McDonald's online ordering system is one of the best systems that provide functions ordering through the internet, this website also provides the track order status for the user to know their order [3].

The third system is NOBU Restaurant In 1997, the first Nobu opened outside of the United States, in London. By 2018, the chain has expanded to 38 restaurants and currently (November 2020) counts 47 restaurants [4]. Nobu website is one of the famous online reservations, it provides functions reservation through internet. it was opened in Malaysia at Four Seasons Place Kuala Lumpur on 15 March 2021 [4]. The customers must search for the website, and he can view the menu, contact, and hours as well as can search for information in the website and can make reservations online by inserting data, personal information, how many persons coming, and the time.

The proposed system is called Online Reservation and Food Ordering System for Arabian House Restaurant. It's replaced the manual method that used until now. Furthermore, to make a reserve or order, the customer must first register in the registration module then login to the website with a registered username and password. Moreover, the system has an Ordering module, Reservation module and menu module. The customers can reserve for table, VIP rooms or concert hall. Also, the customers can see the items with images and display the price for the customer to choose their meals. it is also allowing customers to add on food or change reservations and make changes on the chosen food in the confirmed order the customer will show the order details and the system will display the total price, besides that the payment will be cash. Furthermore, customers can use the chat module to ask for information or a location. As well as the staff allows to update the menu, create new items, display user, and display order. lastly, the manager is allowed to access all the reports in the report model, also can manage the users. Table 1 gives the summary of the comparison.

Features/System Domino's McDonald's **NOBU** Arabian Pizza Restaurant House Restaurant Login Module X X Registration module Menu  $\sqrt{}$ X  $\sqrt{}$ description X X Attractive user interface  $\sqrt{}$  $\sqrt{}$ X **Booking module** Reservation X X module

**Table 1: Comparison** 

## 3. Methodology

It is useful in making sure any attempt taken will produce something successful and coordinated while choosing the right methodology. The methodology used in the Systems development life cycle (SDLC) to use a prototype model is being used for the implementation of this system. Prototype technique is an approach that encourages system users to specifically communicate with the system as a system test ground. The principal purpose of the prototype model was selected for the purpose of developing a system so it can be repeatedly phased to satisfy users' demands over time, while continually refining the components of the project. Throughout this exact model there were four stages: the planning, analysis, design and implementation phases. The phases of this model discuss the strategies, tools, and procedures for building a system [5]. The prototype model can be referenced in Figure 1.

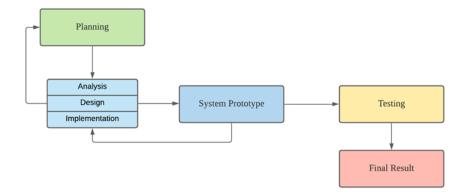


Figure 1: Prototype Methodology

Table 2 indicates the phase used as a starting point for all projects and operations to be conducted within the prototype model. The outcome of the system operation that the system creator does during the process of system creation is seen by the performance.

Table 2: Software development activities and their task

Phase	Task		Output
Planning phases		Selection and determination of project titles.	☐ The problems that Arabian House Restaurant is facing led to develop Reservation and Ordering System.
		Identifies project objectives, problem statement and project scope.	☐ Produce system objectives and system scope.
		Presents the project plan for the Coordination Panels project.	<ul> <li>Obtain authorization and approval of the requested title.</li> </ul>
		System implementation preparation and preliminary assessments to define current system problems, benefits, and weaknesses.	☐ Gantt chart generated
Analysis phases		Analysis information obtained	Gather information about the Restaurant and study the current system problems to be solved by the new system.
		Analyse Hardware and Software requirements.	<ul> <li>List the type of hardware and software used to build the system.</li> </ul>
		A literature review was undertaken in order to compare the existing system.	☐ System comparisons will be believed to improve and user-

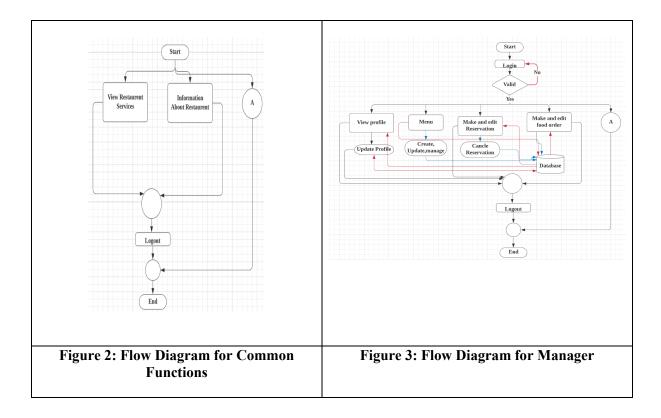
		friendly the system to be built and to set need goals.
	☐ The web-based information system programming language.	☐ Using PHP programming, SQL, and JavaScript.
	☐ Methodological selection	☐ Using prototype model methodology.
	☐ Logical structure analysis such as Unified Modelling Language (UML) and Use Case diagram.	<ul><li>□ Provide Unified Modelling Language (UML) and Use Case diagram.</li><li>□ flowchart</li></ul>
Design	☐ Creation of a web-based	□ system architecture
phase	information system, system interface design and database	□ Database design
	design.	☐ User interface design
Implemen tation phase	☐ Displays the systems and process examination.	☐ Full systems and document processing system test documentation can be produced.
		☐ Test case

## 4. System Analysis

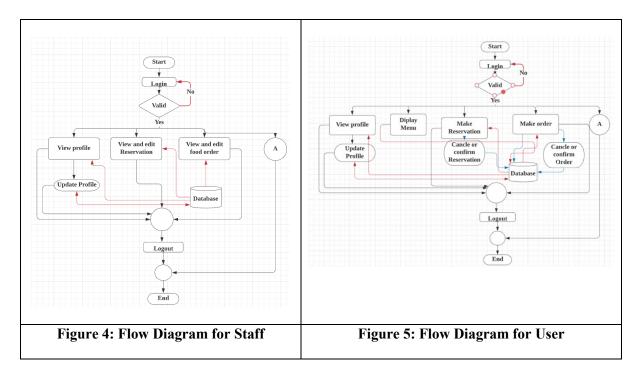
The analysis is the process of studying and researching all the data gathered by the built framework. The goal of this phase is to provide a thorough understanding of the system environment developers, to provide an alternative system to make the system more effective through using a computer system, and to define the needs of the system to be built through evaluating a system that explains the system in detail by Flow Chart, Unified Modelling Language (UML), Use Case diagram, Database design as well as user interface design are also used in the device analysis and design process.

### 4.1. Flowchart Diagram

There are three types of users in our system: customers, staff, and manager. The following sections will present process flow diagram for each user in detail. The common functions are the functions available for all users. All users can view various services available in the restaurant such as menu, reservation, and ordering. They can view and info about restaurant. The common functions are shown in Figure 2.



In Figure 3, the manager of the system needs to login to enter into this system. After logged into the admin site, he/she can view not only member information but also customers information. He/she can also view reservation and food ordering information and can replay to the customer for conformation and reply to the users for any questions or information. The manager can create staff account and add new reservation, delete, or edit reservation.



In Figure 4, the staff must log in to view his/her profile, the corresponding reservation and corresponding food ordering. After the staff views his/her profile, he/she can update his/her profile

information which need to modify. Furthermore, the staff can perform the common function's view or edit ordering and reservation.

The registered customer makes reserve and order easily to their required by login into the site with their registered name and password. They not only can make reserve and order easily but also, can either view their reservation and order or cancel reservation and order and view their profile. After they view their profile, they can edit their profile information. As show in Figure 5.

## 4.2. UML Diagram

UML Diagram in Figure 6 shows the main process which is Online Reservation and Food Ordering System for Arabian House Restaurant and the three main entities in the process which are Customer, Manager and Staff as well shows the flow of data in general on the system

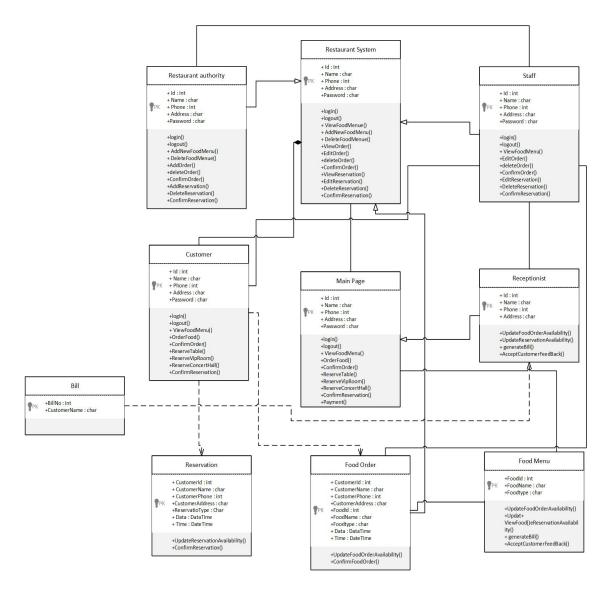


Figure 6: Class Diagram

## 4.3. Use Case Diagram

Use case model is one of the most crucial models in the design phase of the system. The use case diagrams must meet the requirements specification. Dividing the use case into small modules was desired in order to reduce the complexity of the understanding of the system function. Forth more, they illustrate how actors can communicate with the functions of the system.

Figure 7 shows the whole operation of the system that explained briefly its functions. It shows that two actors interact with the system. Normal user or as named in the figure as customer can perform several functions: starting from registration until making an order or reservation.

Arabian House food customer retrieves menu info from the server and displays it in a convenient manner for the user. Upon starting the app, the user is presented with the menu that contains list of the restaurants. Arabian House restaurant contains the available specific menu. From the customer side the system provides the customer to login to the system and provide them with some internal processes which enable customers to view category of the foods and drinks also the customer can make order and reservation by his mobile phone or laptop with knowing of the total price for the order.

The manager use case shows what they can control and the main role of the administrator over the system. The manager login to the system and manages his own account. That can manage items such as view items, delete item, edit item, add new item and change item status. Also, the manager can manage his customers like register user, add user, delete user at same times the manager can manages order like confirm or cancel it.

## Online Reservation and Food Ordering System for Arabian House Restaurant

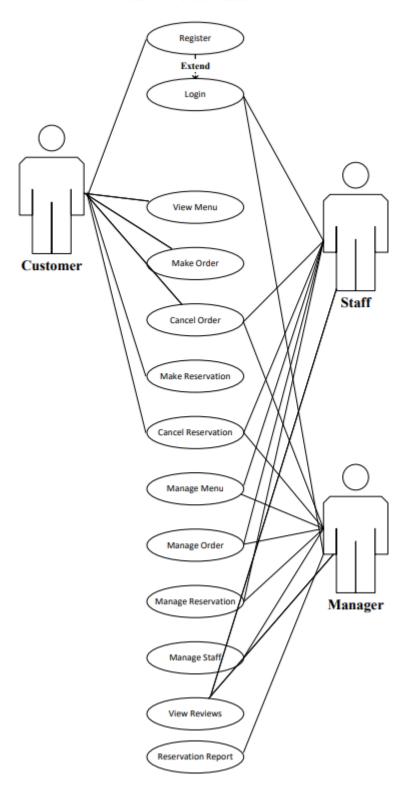


Figure 7: Use Case Diagram

## 5. Implementation And Testing

This section discusses the implementation of the system development phase according to the system specification and design that have been discussed and specified in chapter 4. While the testing phase can be divided into two, namely alpha testing by system developer and alpha testing by system users. The testing phase is an important phase to ensure system users are able to evaluate system flow and system functionality according to the system requirements set by user.

The design implementation process has been developed for Arabian House Restaurant Reservation and Food Ordering System based on the design that was identified early on this project. Software such as Bracket, XAMPP, and Google Chrome are used to display system interface. The programing language used to develop the system are PHP, CSS and HTML while MySQL is used as a database.

This module acts as the main module for this system as customers can make a reservation with the chosen types by entering the required information into the system. All reservation information and availability dates will be displayed in calendar provided in the system. Whenever a user can reserve, the information entered will be stored and recorded in the database. Figure 8 Shows the code section of Reservation module.

```
describer pure.

describer planetier many parts along anomal required that the control planetier pure makes planetier and planetier pure makes parts along anomal required that the control planetier pure makes planetier required that the control planetier pure makes required that control planetier pure makes required that control planetier pure makes required that control planetier pure plane makes required that control planetier pure plane makes required that control provider many planetier pure plane makes required that control provider many planetier pure plane makes required that control provider many planetier pure plane makes required that control provider many planetier pure planetier pure plane makes required that control provider many planetier pure planetier pure planetier date for booking required that control provider many planetier planetier pure control that control provider many planetier planetier planetier that for booking required that control provider many planetier planetier planetier pure control planetier pure pure pure that planetier pure control planetier pure control planetier pure pure makes pure to planetier pure control planetier pure pure pure that planetier pure control planetier pure control planetier chase-makes pure pure control pure pure pure control provider control page time control planetier chase-makes pure pure pure pure pure control page time control page time planetier chase-makes planetier pure control page time planetier chase-makes planetier pure control page time planetier chase-makes planetier pure control page time planetier pure planetier planetier pure planetier pure planetier pure planetier pure planetier planetier planetier planetier planetier pure planetier planetier
```

Figure 8: Partial Coding for Reservation

System testing is one of the processes that need to be done once the system development is complete. Testing of this system is intended to test the functionality and identify any errors that may occur in the system operation. There are several tests done namely module testing and system testing. Module testing refers to the process of testing that has been performed on the modules that have been developed in this system.

The function of the test is to perform the inspection of the system function. This includes tests for Customer interfaces, reservation, Login Interface, Manager Interface, staff Interfaces, menu, review, and gallery. The result is a display in the table. The table 3 shows the test result for Staff login page.

Table 1: Test Result for Staff Login Page

No	Test Case	Description	Expected Result	Result	100(%)
1.	Test_101	The staff must login before they enter to the system.	staff can explore the system and manage the reservation.	successful	100%
2.	Test_102	The system will display the login page for the staff.	The system can display staff login in this page.	successful	100%
3.	Test_103	The staff is required to enter a valid username.	The staff can enter a valid username and the login process is successful.	successful	100%
4.	Test_104	The staff is required to enter a valid password.	The staff can enter a valid password and the login process is successful.	successful	100%

Table 4 shows the tests of process for managing the system by the stuff. In this process, the stuff is able add a reservation by entering the requested information of the customer, observe the reservation, and change the descriptions.

Table 4: Test Result for Staff Interface

No	Test Case	Description	Expected Result	Result	100(%)
1.	Test_701	The staff must login before they enter to the system.	staff can explore the system and manage the System.	successful	100%
2.	Test_702	The system will display the login page for the staff.	The system can display staff login in this page.	successful	100%
3.	Test_703	The staff is able to manage menu of the restaurant.	The staff can add, menu or change menu of the restaurant.	successful	100%
4.	Test_704	The staff is able to manage gallery of the restaurant.	The staff can add, gallery or change gallery of the restaurant.	successful	100%
5.	Test_705	The staff is able to manage restaurant reservation.	The staff can create and view reservation of the restaurant.	successful	100%

This table below shows the test of user interface. In this process the user can view the system easily also can view the menu. Then they can sign in and register before order or reserve.

Table 5: Test List of the User Interface Process

No	Test Case	Description	<b>Expected Result</b>	Result	100(%)
1.	Test_101	The Customer can enter to the System easily	Customer can explore the system.	successful	100%
2.	Test_102	The Customer can view the menu.	Customer can view the menu.	successful	100%
3.	Test_103	The Customer can make reservation.	Customer can make reservation	successful	100%
4.	Test_104	The Customer can view gallery.	Customer can view restaurant.	successful	100%

This table below shows the Reservation process in the system. In this process the customer can choose the type of reservation. Then can reserve and chose available time

Table 6: Test Result for Reservation Page

No	Test Case	Description	Expected Result	Result	100(%)
1.	Test_201	The customer can	To ensure customer	successful	100%
		choose the type of	can choose the type		
		reservation.	of reservation.		
2.	Test_202	The customer can	To ensure that	successful	100%
		reserve.	customer can		
			reserve.		

This table below shows the ordering process in the system. In this process the customer can choose from the menu what they like. Then can order should be confirmed to proceed the order.

Table 7: Test list for Ordering Process

No	Test Case	Description	Expected Result	Result	100(%)
1.	Test_301	The customer can choose from the menu.	To ensure customer can choose from the menu	successful	100%
2.	Test_302	The customer can confirm the order.	To ensure that customer can confirm the order.	successful	100%

The table below shows the Manger login Interface list of tests. There are three test cases that are performed in the test process if the manger chooses the type and enter the username and password correctly to test, if the manger has selected the wrong username and password and confirm it and lastly if the user does not enter anything will not log in.

Table 8: Test List of the Manager Login Interface

No	Test Case	Description	Expected Result	Result	100(%)
1.	Test_401	The Manager must login before they enter to the system.	Manager can explore the system and manage the reservation.	successful	100%
2.	Test_402	The system will display the login page for the staff.	The system can display staff login in this page.	successful	100%
3.	Test_403	The manager is required to enter a valid username.	The manager can enter a valid username and the login process is successful.	successful	100%
4.	Test_404	The manager is required to enter a valid password.	The manager can enter a valid password and the login process is successful.	successful	100%

This table show the tests of process for managing the system by the administrator. In this process, the administrator is able to manage the staff of the restaurant, manage menu of the restaurant, manage gallery of the restaurant, manage orders of the restaurant, manage restaurant reservation, and view customers massages.

Table 9: Test List of the Manager Interface

No	Test Case	Description	Expected Result	Result	100(%)
1.	Test_501	The manager must login	manager can explore	successful	100%
		before they enter to the	the system and manage		
		system.	the System.		
2.	Test_502	The system will display	The system can display	successful	100%
		the login page for the	manager login in this		
		manager.	page.		
3	Test_503	The manager is able to	The manager can add	successful	100%
		manage the staff of the	or change the staff of		
		restaurant.	the restaurant.		
4.	Test_504	The manager is able to	The manager can add,	successful	100%
		manage menu of the	menu or change menu		
		restaurant.	of the restaurant.		
5.	Test_505	The manager is able to	The manager can add,	successful	100%
		manage gallery of the	gallery or change gallery		
		restaurant.	of the restaurant.		

6.	Test_506	The manager is able to manage stuff of the restaurant.	The manager can add, banned, or change stuff of the restaurant.	successful	100%
7.	Test_507	The manager is able to manage restaurant reservation.	The manager can create and view reservation of the restaurant.	successful	100%
8.	Test_508	The manager is able to view user massages.	The manager is able to view and reply to user massages.	successful	100%

Overall, all the modules and functions in this system succeeded as expected. Table 10 shows the overall results for all functions.

Table 10: Overall Results for all Function

No	Module Testing	Result	(%)
1.	User Interface	successful	100%
2.	Reservation Interface	successful	100%
3.	Ordering Interface	successful	100%
4.	Manager Login Interface	successful	100%
5.	Manager Interface	successful	100%
6.	Staff Login interface	successful	100%
7.	Staff Interface	successful	100%
8.	Review Module	successful	100%

## 6. Results and Discussion

In this section also discuss the user interface in proposed system. Users are allowed to explore the system, find about the restaurant, explore and view menu and can reserve, and contact with the recaption using email or WhatsApp.

## 6.1. Customer Interface

Online Reservation and Food Ordering System has developed to facilitate many things for customers. Users can enter to the website easily to see restaurant information, types of services that provided on the restaurant, reservation information which updated daily, and contact us which show the ways how user may contact restaurant reception. Figure 9 Shows the Customer interface page.



Figure 9 Customer interface page

#### 6.2. Reservation Module

This module acts as the main module for this system as customers can make an reservation with the chosen types by entering the required information into the system. All reservation information and availability dates will be displayed in calendar provided in the system. Whenever a user can reserve, the information entered will be stored and recorded in the database. Figure 10 Shows the Reservation page.

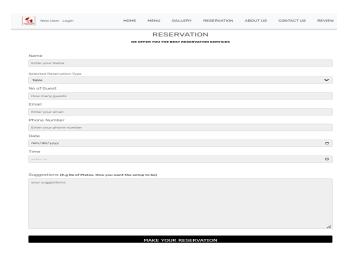


Figure 10 Reservation page.

### **6.3. Ordering Module**

This module acts as the main module for this system as customers can make orders and confirm them across this page by entering the required information into the system. All orders information and availability dates will be displayed in page provided in the system. Whenever a user can reserve, the information entered will be stored and recorded in the database. Figure 11 Shows the Ordering module.

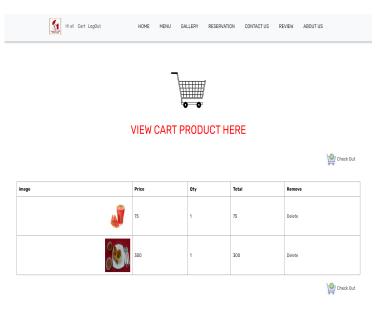


Figure 11 Ordering module.

## 6.4. Manager Interface Module

This module acts as the controller of the system. Managers are able to create, edit and delete Reservation, and view reservation sales report and add, delete and edit the menu. Figure 12 shows the Manager Interface page. The login interface image of the manager will be attached in appendix A.

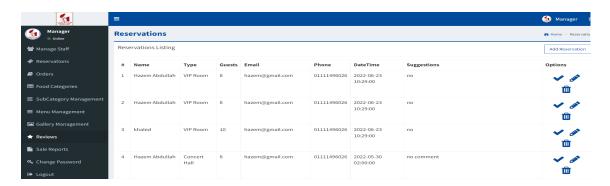


Figure 12 Manager Interface page.

### 6.5. Staff Interface Module

This module acts as the controller of the system. Managers are able to create, edit and delete Reservation, and view reservation sales report and add, delete and edit the menu. Figure 13 shows the Staff Interface page. The login interface image of the staff will be attached in appendix A.



Figure 13 Staff Interface page.

## 6.6. Review Module

This module provides a way to make communication between customer and staff of the restaurant. Customers are allowed to send a message and review to the staff and manager. Figure 14 shows the review page.

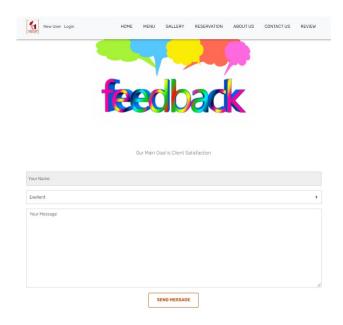


Figure 14 Review page.

## 6.7. Report Module for Reservation

In this module the manger can view and review reservation duration and the type of reservation directly throw system by selecting the days and the type also he can view all the reservation on pacific day as showing in figure 15.

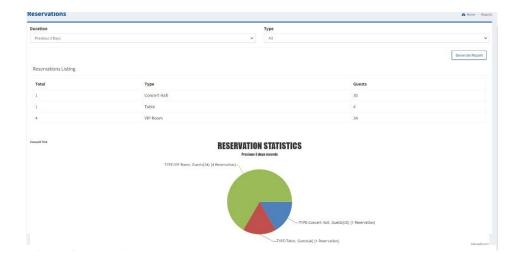


Figure 15 Reservation report page.

### 7. Conclusion

The Online Reservation and Food Ordering System is a system developed specifically for food ordering and reservation at Arabian House Restaurant. The purpose of the system was addressing the problems happening with manager and the staff of the restaurant will ordering food or reserve. The users who are allowed to use the system are customers, Staff, and Manager. As a result, system has been tested all modules and all of them worked well. This system successfully solved all the problems encountered compared to the existing manual system.

#### 8. Reference

- 1. N. Rianthong, A. Dumrongsiri and Y. Kohda, "Maximizing service value: A case study of online hotel reservation", 2014 IEEE International Conference on Industrial Engineering and Engineering Management, pp. 803-807, 2014.
- 2. Wohl, Jessica (February 20, 2018). "Domino's Unseats Pizza Hut as Biggest Pizza Chain". AdAge. (URL: https://www.dominos.com.my/)
- 3. Anon., 2017. McDonald's serves up surging sales and profits. [Online] Available at: <a href="https://www.bbc.com/news/business-41728541">https://www.bbc.com/news/business-41728541</a>
  (URL: <a href="https://www.mcdelivery.com.my/my/">https://www.mcdelivery.com.my/my/</a>)
- Matsuhisa, Nobu (November 13, 2017). "How Robert De Niro Convinced Nobu to Build a Restaurant Empire". Eater. Retrieved November 15, 2020. (URL: https://noburestaurants.com/kuala-lumpur/home/)
- 5. Peffers, K., Tuunanen, T., Rothenberger, M.A., Chatterjee, S.: A Design Science Research Methodology for Information Systems Research. J. Manag. Inf. Syst. 24, 45–77 (2007). https://doi.org/10.2753/MIS0742-1222240302.
- 6. Ashutosh, B., Niranjan, J., Apurva, J., Prachi, O. and Lahane, S. (2013). Digital Ordering System for Restaurant Using Android. [online] www.ijsrp.org. Available at: http://www.ijsrp.org/research-paper-0413/ijsrp-p1605.pdf [Accessed 16 Nov. 2014].
- 7. Khairunnisa, K., Ayob, J., Mohd. Helmy, A., Erdi Ayob, M., Izwan Ayob, M. and Afif Ayob, M. (2009). The Application of Wireless Food Ordering System. [online] Available at: http://eprints.uthm.edu.my/5726/1/Wireless Food Ordering System.PDF
- 8. Alexandrov A, Lariviere MA (2012) Are reservations recommended? Manuf Service Oper Manag 14(2):218–230
- 9. 30 10 2015]. PCMag, n.d. Encyclopedia Definition of: Web application. [Online] Available at: http://www.pcmag.com/encyclopedia/term/54272/webapplication [Accessed 30 10 2015].
- 10. PCMag, n.d. Encyclopedia Definition of desktop application. [Online] Available at: http://www.pcmag.com/encyclopedia/term/41158/desktopapplication [Accessed 30 10 2015].