Food Ordering System Using Mobile Phone

By

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A REPORT

SUBMITTED TO

University Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF INFORMATION SYSTEMS (HONS)

INFORMATION SYSTEMS ENGINEERING

Faculty of Information and Communication Technology

(Perak Campus)

Jan 2016

DECLARATION OF ORIGINALITY

I declare that this report entitled "**Food Ordering System using Mobile Phone**" is my own work except as cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.

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Date : __20 APRIL 2016_____ _____

ACKNOWLEDGEMENT

First of all, I would like to express a deeply thank to my supervisor, Mr. Ku Chin Soon for his demonstration of guidance, giving useful advice, conceptualize the project which enabled me to have clear understanding of my final year project. Lastly, I would like to thanks again to my final year project super visor and whoever has guided me most of the time and supported me throughout the project.

ABSTRACT

The purpose of this project is to develop a computerized and mobilized food ordering system that can be used to revolutionize the traditional ordering system that currently implemented in majority of the food and beverage industry. The traditional system that using by most of the food and beverage industry is the traditional manual ordering system which means all works and procedures is recorded through manpower manual work and it consist of a huge amount of paper work that is not effective and efficiency. This cause the business to encounter trouble which regarding human error due to the huge amount of manpower manual work that operating in each business routine. Thus, this computerized and mobilized food ordering system is designed to assist the business routine in term of having better management as well as easier to handle daily business operation.

This system is designed for small medium enterprise food and beverage industry. The chosen methodology for this project is throwaway prototyping methodology. This is because majority of the targeted user do not have the experience in using computerized system in food ordering procedure as they implement traditional ordering system previously. Therefore, this methodology enables developer to communicate with target user through using the prototyping, which can let target user to review, evaluate, visualize and learn about the system before the actual implementation of the final system.

Furthermore, the system is a cross platform system which involve desktop based and mobile phone based which is in Android operating system. It is also the highlighted feature of the system which does not limited the ordering procedures to desktop based as portable and mobility is the current trend. Besides that, with this feature it also provide a degree of level of self service for targeted users' consumers, as they can place order themselves through using the mobile application.

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CHAPTER 1 INTRODUCTION

1.1 Project Overview

This project works is aimed for developing an efficient food ordering system that can be used in the food & beverage **(F&B)** industry which can help the restaurants to quickly and easily manage daily operational task as well as improve the dining experience of customers. It is believed that still have a lot of restaurants are using the traditional method for food ordering processes. By using the traditional method, it arise a lot of human error while the restaurant's employees deal with large amount of customers, this issue will did a great impact to the restaurant in terms of profitability. Thus, this project is to propose a suitable food ordering system for F&B industry to solve the problem that mentioned above. The system will become an important tools use for restaurant to improve the management aspect by utilizing computerized system to coordinate each and every food ordering transaction instead of traditional method. In addition, it can also provide efficiency for the restaurant by reducing time consuming, minimize human errors and providing good quality customer service. In terms of the integrity and availability of the system provided, it can be concluded that this system is a suitable solution for the F&B industry.

1.2 Project Background

Nowadays, people are more and more frequent to dine-in at restaurant for their meals. Especially in Kampar, it has roughly 35 thousands to 40 thousands of citizens staying in this small town. Therefore, it will have a lot of people especially students of UTAR (University Tunku Abdul Rahman) looking for restaurant that they prefer as their meals such as breakfast, lunch and dinner. At this moment, it arise a lot of troublesome to restaurants which are still using traditional food order method as their food order process.

The traditional food order method is not efficient enough for restaurant to deals with crowded situation in their restaurant. The traditional food order methods can be classified into 2 categories which are paper based and verbal base. For paper based food order method, the waiter will record down foods that customers order and pass the food order paper to the kitchen for further process. This is the method that implement by most of the restaurants in Kampar. In addition, this method still consider efficient if restaurants are

not crowded, but however it will arise a lot of human errors while restaurants are crowded of customers such as food serve not in sequence, missing of food order paper, mistake in record down the food name and etc.

Second, verbal base food order method is even worse than paper base food order method. Because, verbal base food orders method require employees to remember all the customers' food order by relying on their memory and then employees will reach the food order message to the chef in kitchen physically. Verbal base food order method contains the weaknesses such as causing the employees unable to memorize all the food order during the restaurant is crowded of customers and the problems that mentioned above. Thus, this kind of weaknesses will did a great impact to the restaurants' profitability.

As a conclusion, this proposal is written to propose an efficient food order system to enhance and improve the existing traditional food order management system and provide convenience, availability and integrity to restaurants. At the end of the project, it will be very useful and did a huge contribution for restaurants which are located in Kampar to deals with crowded situation during operation hours.

1.3 Problem Domain
Difficulties in food order ticket tracking

For those restaurants which are using traditional method for food ordering processes, this is a problem that can't be eliminated. Because the entire manual process which involve waiters, pen and paper. Each and every food order transaction is noted down on a piece of paper and the waiters pass the food order ticket to the kitchen for further processing. While the food order tickets have passed to the kitchen, the sequence of the food order ticket might be interchanged with other ticket. Therefore, it will cause the restaurant not be able to serve their customers in sequentially according to the customer order sequence especially in peak hour, so customers would complaint to the restaurant in turn it will affect the customer relationship of the restaurant.

Potential to increase cost of operation

The cost of operation of a restaurant will be increase from days to days because of the economic inflation. When the inflation comes in, the cost for each and every fresh ingredient that used to support the restaurant daily operation will be affect too. Therefore, the restaurants have to make changes to the food price accordingly in order to maintain the profit, and then all the food menu cards have to reprint to reflect the updated price. By doing so, it will raise the cost of operation to the restaurant because we will not know how frequent the inflation occur in the economy. Next, if the physical areas of the restaurants are very large. It might need to employ extra worker in order to serve their value customer and thus it will increase the cost of operation too.

Difficulties in updating menu card information

The information that printed in the menu card is very important because it will lead consumer to made different order to the restaurant based on the information that the menu card given. If the food and beverage details changed but the employer do not update the menu card information, it may cause some possible issue such as consumer dissatisfaction to the restaurant, consumer cannot make their preferable decision and conflict during consumer make their payment.

Difficulties in providing appropriate and updated food information

The fresh ingredient that used to support the restaurant daily operation may vary depending on the market supply. Therefore, in order to provide this unexpected information during the food order process, those staff has to remember all the food availability and told the customer at the beginning of ordering process. For example, if the supplier does not supply "Salmon Fish" recently. Staff has to remember and inform consumers that all food that contains "Salmon Fish" is not available. But most of the time, the staff may forget this unexpected information due to the heavy workload. Hence, it may reduce the rate of satisfaction to the consumers after they had make decision but at the end the restaurant does not serve them accordingly.

1.4 Project Objectives

1.4.1 Provide convenience for both employees and consumers

The system will provide an experience of convenience to the restaurant employees while they are on duty as well as the consumer who dine-in at the restaurant. This system allow the staff to serve customers with the minimal delay compare to the paper based order system, because what the staff need to do is just record down the food that the customer wish to order then the staff place an order via the computer, the food order will be send to the kitchen computer simultaneously. After the order have been successfully placed one copy of the food order with it details will be printed out for customer review. It significantly shorten the time needed to take an order, assume that kitchen area is on ground floor but currently the staff is taking order at second floor. If the restaurant is using paper based system, the staff has to deliver the food order to ground floor and walk all the way back to second floor, it take a lot of time and time consuming. Therefore, by using this system it can eliminate this minor section of the order taking process. Besides, it can let consumers to enjoy their meals within a short period of time and thus it can increase the satisfaction and turnover rate of the consumers.

1.4.2 Assist restaurant to plan ahead

Whenever the staff places an order for consumers, the food order details information will be store to the database for further analyzing to perform forecasting. The employees can check previous food order details to solve any misleading and misunderstand incident while it occur. For example, staff can manage to inform the consumer estimated times that require to prepare the food during business hour especially peak hour and hence it can help reduce conflict occur. Therefore, it is very important to keep all the necessary business data for further review.

1.4.3 Prevention of food serves not in sequence

This objective will be achieved because whenever employees place an order into the system, the system will schedule the food order details in a queue then the chef will prepare the food according to the food order queue. In paper based system, the employee will deliver the food order ticket into the kitchen and the chef cook whatever foods that

are recorded on the paper, due to the order details are recorded on each and different pieces of paper it is very troublesome and possible to leads the chef to cook food without following the order sequence. Hence, when the employee serves foods to consumers without sequence it will cause consumers to be unhappy and dissatisfaction and it will affect the images and reputation of the restaurant. Therefore, the system can help prevent this kind of incident to be happening.

1.5 Project Scope

The project aimed is to developing an order system that can be used in the small medium enterprise food & beverages **(F&B)** industries which can help the restaurants to simplified their entire daily operational task as well as improve the dining experience of customers.

The system will be in 2 platforms which are mobile and computer based. For the mobile based platform will developed to let user to view the menu card information of the restaurant and able to let user place an order via the system. In computer based platform, the system will be able to let staff to update and make changes to their food and beverage menu information. Next, it also allows staffs to generate report that they wish to generate such as monthly sales report. The most important function is to allow staffs to make billing statement for consumer to make their payment after dine-in.

At the end of the project, it will improve the restaurants productivity, efficiency, effectiveness and as well as accurateness. Because of this system, it will minimize all the manual work by replacing the traditional order system into a computer system. It will eliminate the manual work such as workers physically deliver food order ticket into the kitchen, manually replace the price tag of the food and manually calculate billing price. These are some main functional module that will exist in the system.

Food & Beverage Ordering Module

This module will be developed in mobile platform that let staff pass over the mobile devices such as tablet or smart phone to the user for viewing the restaurant food menu information. User can also place an order thru the mobile devices after they make their decision and also some extra remarks that customer wish to request.

Order Queue Module

This module can help queue the food order that had been placed and display to the kitchen staff accordingly.

Reporting Module

User can view the overall performance of the restaurant in chart report. The report can generate according to the time period and the time period can customize by user.

Menu Management Module

In this module, user can update the latest and updated food menu information to the system such as name, code, price, and food availability. After the information changes, the mobile devices will retrieve the latest food menu information and display to user.

Billing Module

This module will gather the order information and print the billing statement for user to make payment and keep for their reference.

Good & Services Tax (GST) Calculation Module

This module will be able to calculate the total GST that have collected from consumer pay the amount of money to government.

1.6 Impact, Significance and Contribution

After the system was successfully developed, it will bring lots of convenience to the restaurant employees when they perform their duty within the restaurant as well as improve the consumer dining experience. It will rapidly increase the productivity of the restaurant compare to the paper based system as it shorten and simplify the entire process food order, make payment, food deliver and minimize human error.

On the other hand, the restaurant can provide better customer services to their valued customers by fully utilizing this system. With a good customer services, is a good starting point to fulfill customers' satisfaction as well as customers' wants and needs. Meanwhile, after customers experience and satisfied with the customer services that provided from the respective restaurant, they would share their experience to the popular social website nowadays. Apart from this activity, it was indirectly advertising the restaurant to the public.

1.7 Chapter Summary

This chapter will be discussing about the difficulties issues come together with the traditional approach for restaurant food ordering system. In addition, it also mentions that those people who will be facing the problem. Lastly, the project objective and project scope have been listed and discussed. The overall structure of the proposed system has been justified and project contribution is stated. Next, will be further discussing about the concept of existing restaurant management system.

CHAPTER 2 LITERATURE REVIEW

2.1 Wireless Food Ordering System

In the pass decades, the rapid growing of network and wireless technology did a great impact for how people communicate with each and other remotely. At the same time, this technology also leads different kind industries to change their entire management aspect. F&B industry is one of the industries in the market that apply these technologies into their business processes that assist them to be much more convenience and efficient.

From the message above, Wireless Food Ordering System is a system that integrated both concept of intranet and wireless technology (Khairunnisa, K. and Ayob, J., 2009). This system provide user to access the data, information and services from a remote server, which enable user to access the central databases distributed across the restaurant network. Most of the handheld devices have implemented and support wireless technology and thus mobile devices is an ideal hardware device that use to support this system in order to allow user remote access to the database for data retrieval.

The system requires the user to build an intranet network within the restaurant and there will be a central database server resides in the network and the client can perform data retrieval by using the mobile devices such as PDA (Personal Digital Assistant) connect to the wireless access point.

Wireless food ordering system is a solution that can help the restaurant to expedite their customer services as well as management aspect. After the system has been implemented in the restaurant, the flow food ordering process will be changed to computerize. Waiters have to take orders by choose the food that wish to order from the menu on the mobile devices as the input and the data will be send to the central database, after that the computer reside in kitchen will retrieve the data from the central database and display on the computer screen. After the food is being cooked, the employee in kitchen can confirm the food order and update to the database. This will signal the waiter mobile device to acknowledge the waiter the food is ready to serve the food to respective customers.
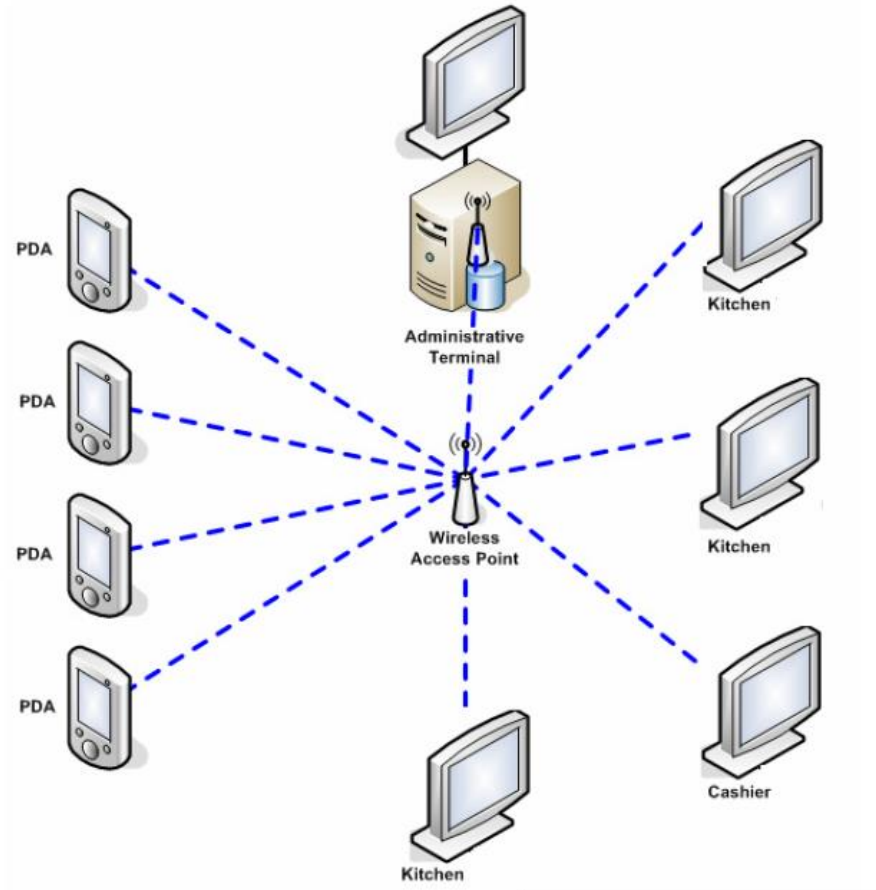
Figure 1 Logical Wireless Diagram

Strength

The system eliminates the need for a waiter to take order with pen and paper. Moreover, the waiter only needs to carry the mobile devices for the entire operational hour to perform food order process instead of using pen and paper. While using pen and paper to take order, it bring a lot of troublesome such as the waiter busying in replenish the order paper that they carrying. Other than that, this system also can help in terms of environmentally friendly by reducing the usage of paper.

Weaknesses and Limitations

The limitation would be all the client devices are connected via the wireless access point in order to let client perform data retrieval from the central database. Unfortunately, there might be a problem in wireless signal coverage is not strong enough to cover the whole restaurant area and thus cause the waiter's mobile device disconnect from the server.

2.2 Online Ordering System

In our generation era, computer has become a key component to our daily life because of the advancement technology of World Wide Web that becomes an internet that allow each and every user connected with theirs' computer for information sharing throughout the whole world. The World Wide Web did a great contribution to a lot of enterprise which use this mechanism for information sharing within the enterprise and also outside the enterprise (Kapchnaga, R, 2014).

From the benefit of World Wide Web, a lot of fast food industry applies a system known as Online Ordering System to assist their business processes. Online Ordering System is a technique that allow customer to order their favourite food online via the internet by using a web browser that installed in their respective computer or smart phone. Implementing this system can help fast food industry to solve the problem that they face while using the traditional food ordering processes.

The system greatly simplifies the food ordering process for both customer and restaurant compare to the past. The customer can place an order everywhere and anywhere whenever internet connection is available for them. Customers access to the website and choose the food that they prefer from the online menu display then customers have to choose whether the food is delivered to them or it will be packaged for pick up and the payment method will be upon delivered or pick up and lastly it will show all the order details to the customer for double checking and confirmation.

On the other hand, the system also greatly lightens the work load on the restaurant's end. Once customers have place an order via the internet, the data will send to the restaurant database and place in a queue in real-time. In addition, the data will be display on the computer screen along with the corresponding option. It allow restaurant employee easily manage the orders sequentially, produce the necessary item with a minimal delay and help reduce human error.
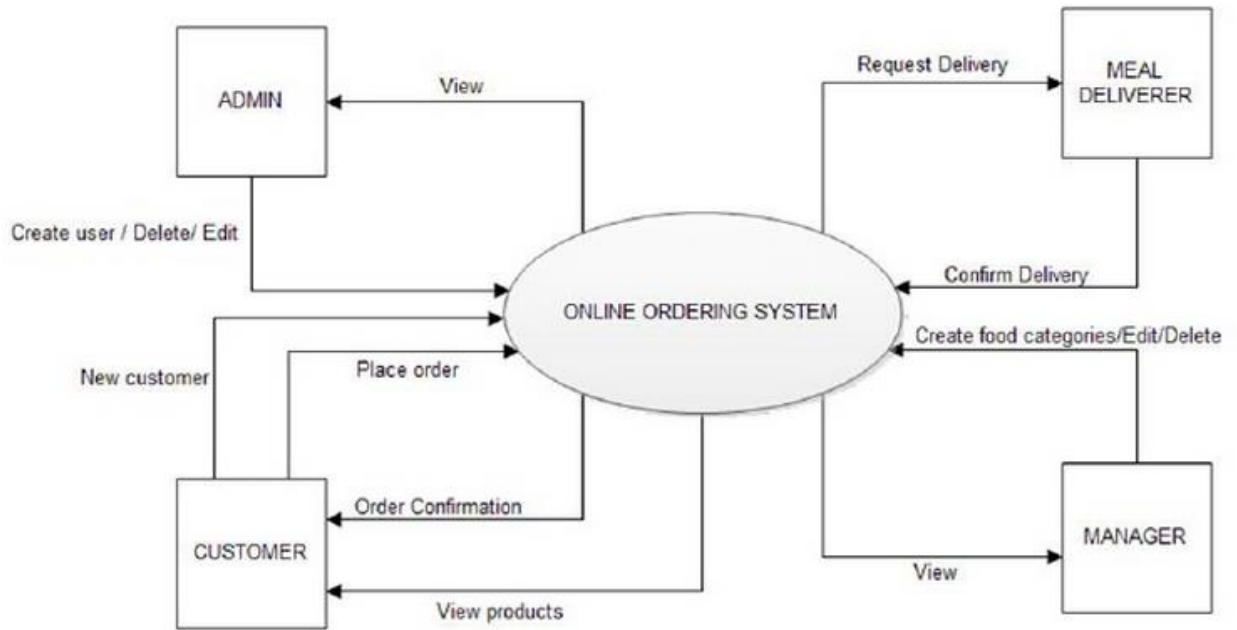
Figure 2 Context Level Data Flow Diagram of Online Order System

Strength

The system is very suitable for fast food industry due to it provides ability for customer to place order anywhere and everywhere and also minimized the time require during the order processes. Customers do not need to physically go to the restaurant for food ordering instead of just using their mobile device to place an order via the internet and when the customer reach the restaurant they can directly have their meal without waiting for the queue. Meanwhile, it help the fast food restaurant to have a better customer services because the most important factor that fast food industry concern about is quickness therefore the restaurant should serve their customer without any delay.

Weaknesses and Limitations

The main weaknesses of the system will be internet connection depended. The system will not be operating without the internet connection. Because customer have to place order via the internet as a medium and the data send to the restaurant database for further process, the customer will not be able to access the web service if no internet connection available. Furthermore, if the Internet Service Provider (ISP) is under maintenance it will did a great impact to the restaurant that relies on the online order system for their business.

Other than that, the system is not effective enough to target all the customers on the market. Because have a lot of senior citizen are without computer literate, so they do not really understand how to utilize the web service. Thus, if they want to place an order by using the system it will be a very troublesome incident for them.

2.3 Electronic Menu Card for Restaurants

This order system overcome the drawback of traditional paper based order system, it change everything from paper based into computerized. First of all, the system will be programed with the food availability from the respective restaurant and display on touchscreen devices that have been setup in each of the tables within the restaurant. In addition, the touchscreen device will have a very attractive Graphic User Interface (GUI) that displays the food menu for customer to make their choices and enable customer to place an order by touching the particular food image that display on the device screen.

Next, when the customer placed an order, the food order will be send to the kitchen and the chef can prepare for the food. This system eliminates the issue from traditional paper based system that the waiter has to manually deliver the order to kitchen. Other than that, the system provide a sub-module that enable restaurant owner to update the food details, food price and etc. It was very convenience compare to the traditional paper based system, because paper based system require the restaurant owner to dispose all old food menu cards and re-print the latest food menu card to serve their customers.

Last but not lease, the system was fully rely on the gadgets and the gadgets doesn't need leave or vacation and thus it can work efficiently 24 hours per day and 7 days per week. Therefore, it can reduce the excess manpower need in the restaurant business by reducing the number of the employee within the restaurant.
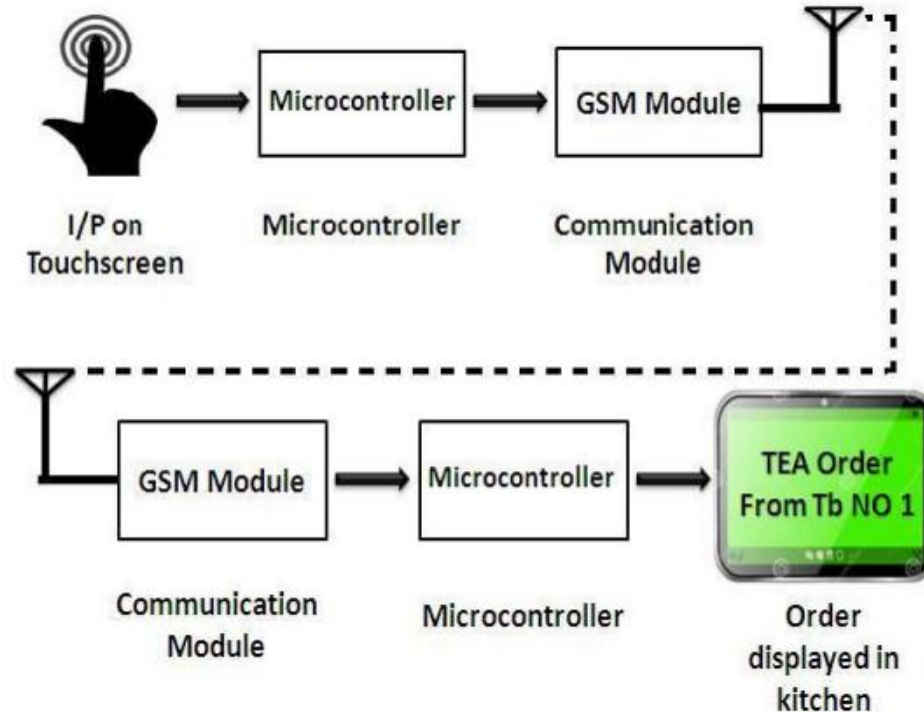
Figure 3 Entire Process Flow of Electronic Menu Card System

Strength

This system will help in reducing the number of employee that need in the restaurants hence it will directly help in considerably reducing the long-term cost of restaurant management. Second, the system also helps reducing the manual customer services activities and thus eliminating the human error and human mistakes.

Weaknesses and Limitations

Although this system provide a lot of ideal solution that can help a restaurant to solve the problem that they encountered in their working hour, but it need the restaurant owner to invest a huge amount of money in these systems. For many restaurant owners, they might not take risk to investing a huge amount of money into this system.

System / Function	Pizza POS Software	Restaurant Manager Touch Screen POS	Proposed System
Require staff to perform transaction	N/A	Yes	Yes
Fully automated	N/A	Yes	N/A
Portability	N/A	N/A	Yes
Food & Beverage Ordering	Yes	Yes	Yes
Menu management	N/A	N/A	Yes
Internet connection dependent	Yes	N/A	N/A
Online Ordering	Yes	N/A	N/A

Comparison of system functionality between 2 existing systems with the proposed system

2.4 Chapter Summary

As a conclusion, this chapter had pointed out the strength, weakness and limitation for each existing system that have been reviewed. Next, the strength of the proposed solution will be combining the strength of each reviewed existing system. Proposed solution is provided to solve the limitation and weaknesses of the existing system, thus it can be apply in small-medium restaurant enterprise.

CHAPTER 3 METHODOLOGY

3.1 Proposed Methodology

The software methodology that choosen to develop this System is Throwaway Prototyping. Throwaway Prototyping Model is especially useful when the project needs are vaguely and poorly laid out. It functions by providing proof that something can indeed be done in terms of systems and strategies. Throwaway Prototyping Model is used for certain projects and will eventually be discarded after the project has been completed. It is also known as Close-Ended Prototyping. Throwaway Prototyping Model is implemented through the creation of prototypes and thereafter gathering feedback from end users to check if they find it good or not. This is valuable to get a better understanding of the actual needs of customers before a product or service is developed and delivered. The reason to choose Throwaway Prototyping to develop this system is due to it can develop a new system in a short time compare with other software methodology. Other than that, user might not clearly understand what they really require in the system. Therefore, Throwaway Prototyping is where the objective to develop the system rapidly and to understand the user's requirements and hence develop a better requirements definition for the system. The prototype concentrates on experimenting with the user requirements that are poorly understood.
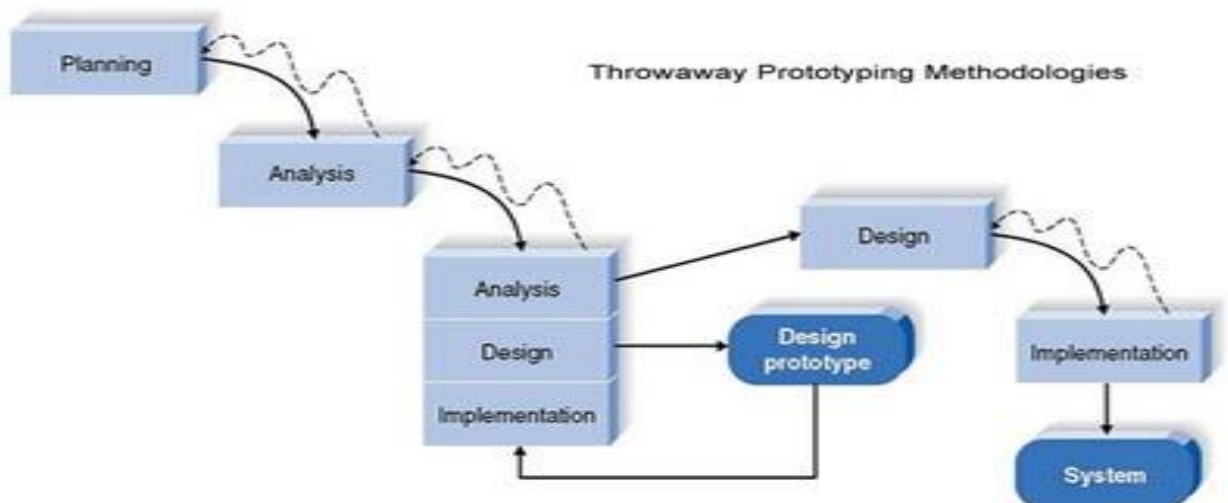

Figure 4 Diagram of Throwaway Prototyping processes

3.1.1 Planning & Analysis

First and foremost, in planning phase will conduct Joint Application Session (JAD) with users in order to gather and understand the business needs and system requirements that users are not clear. During the JAD session, will make use of CASE tools such as Microsoft Visual Studio.NET, Microsoft Visual Paradigm and so on to generate the user interface that shows users to verify the user requirements. Furthermore, the activity of observation on the users' daily work in order to understand and has clarity viewpoint of the business process that operate every day.

At the end, a work plan which includes the project's Gantt chart, Network Diagram, resource sheet, resource usage and cash flow management will be generated. Then, will follow Gantt chart and Network Diagram as a guideline to perform the tasks that scheduled to develop the system.

3.1.2 Analysis, Design & Implementation of prototype

After gather the user requirements from JAD session and observation. Will starts make analysis, design and implement each and every module base on the user requirements that gathered.

3.1.3 Design Prototype

In this phase, the work is to assemble every modules that had been implement in the previous step to complete a finalize system prototype. Prototypes will be introduced to end users who will utilize them for testing and evaluation purposes. At this time, they will be providing feedback, clarify needs and relay requirements. As per requirements of end users derived through feedback and testing, the prototypes will be continuously altered until such time it has reached near-perfection. (Repeat step 2 to step 3)

3.1.4 Design

Once everything has been set and issues have been properly addressed, the prototype will then be "thrown away" which means discard and the system will be design, taking into consideration the feedback derived during the verification process.

3.1.5 Implementation

This is the last phase, which will develop each and every finalize modules within time frame from design phases and assemble it to be a final version system and deliver to end user.

3.2 System Planning

First of all, in planning phase the system for development will be identified and selected in order to solve the problem that discuss in chapter 1. Several studies are needed to have more clearly understanding about the system requirement. In addition, the SWOT analysis techniques will be used interpret the strength, weakness, opportunities and limitations of the basic requirement for the propose solution. Next, a project timeline will be created to have a clearly understanding of what should do according to the project life cycle. The project timeline typically is a graphic design showing a long bar labelled with dates alongside itself and usually events labelled on points where they would have happened.

In this semester, the Documentation for Final Year Project will be complete in seven week. The Documentation include of the design of the system, this will serve as a reference that allow me to develop the prototype of the proposed project more efficiency. Start from week 8, the prototype of the proposed project will start develop.

After that, the full project development will start in the new coming semester and continue until the testing phase. The system will being test and the system will be debug to solve any error that found during testing. The feedback get from the system tester will collect and use as the reference in the system.
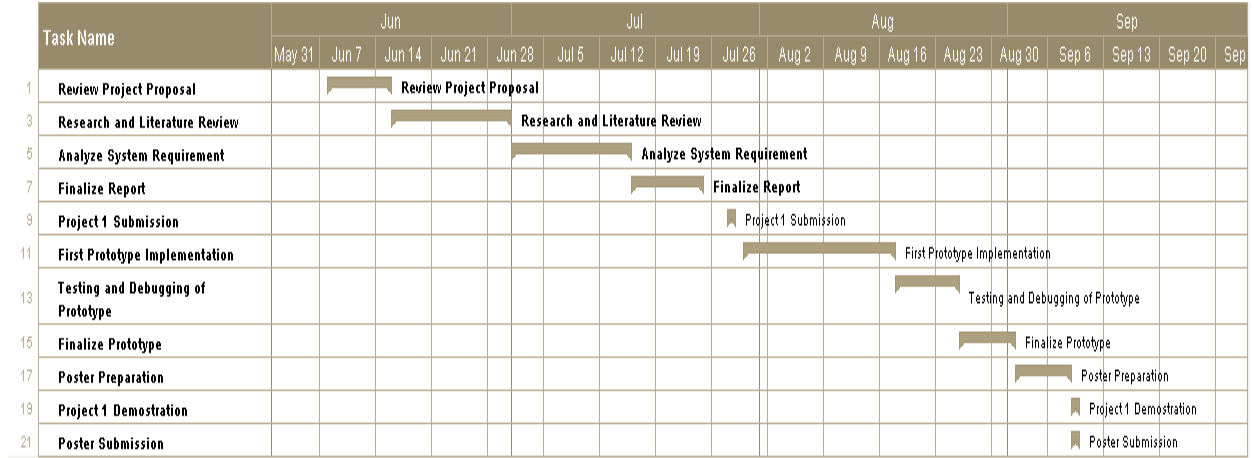
3.2.1 Project Timeline
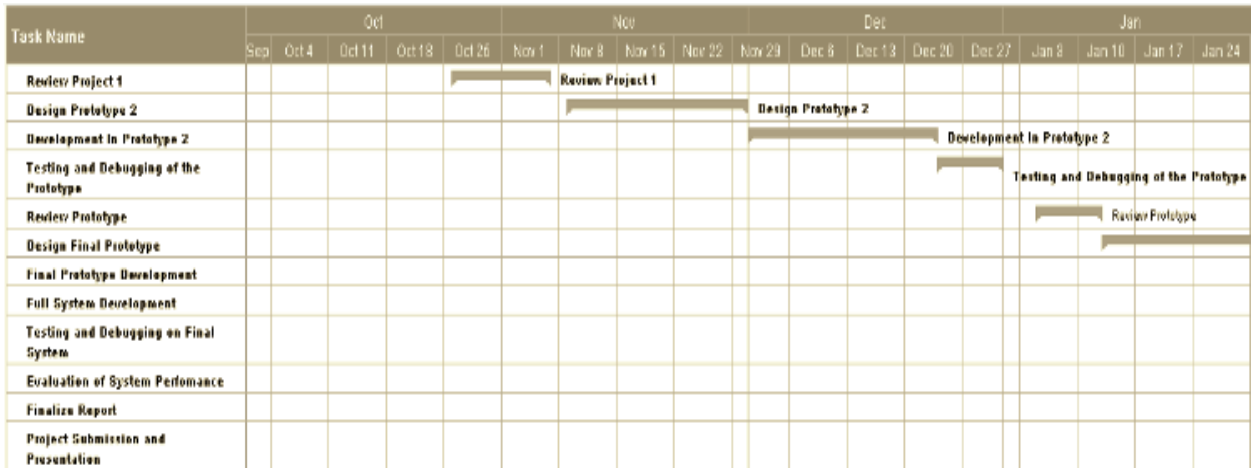

Figure 5 Timeline for Project 1

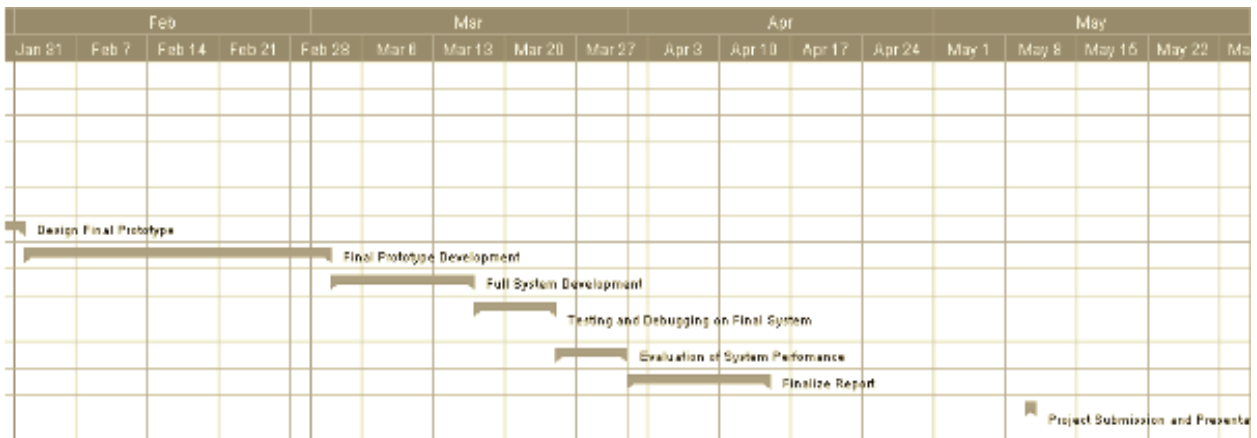**Figure 6 Timeline for Project 2**

Figure 7 Timeline for Project 2 (cont)
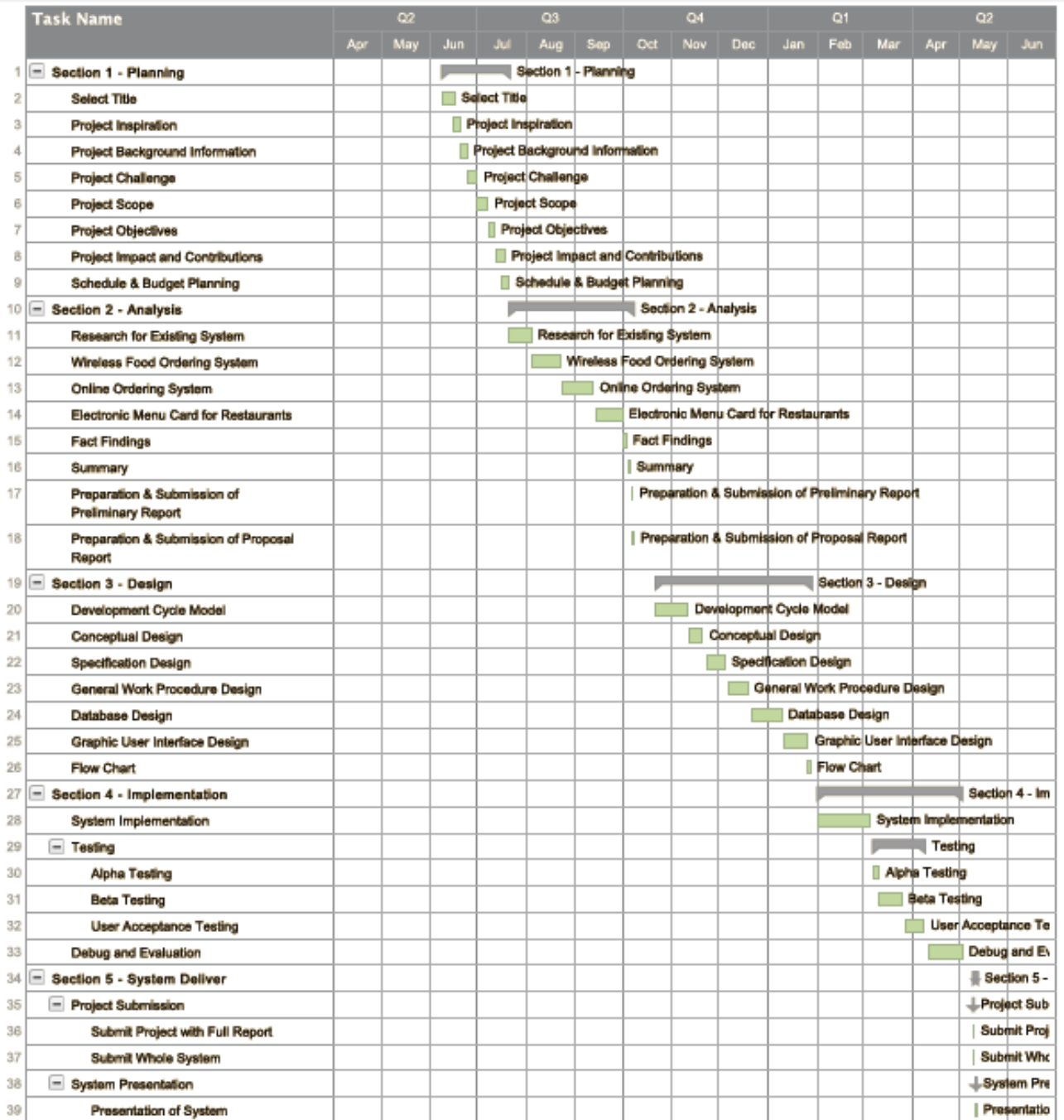
Figure 8 Project Timeline

3.3 System Analysis

In system analysis phase, interview will carry out with potential user of the propose solution to gather and collect useful information for the propose system. Next, system requirement such as user requirement, software and hardware requirement will be generated and based on the system requirement, project scope and objective is defined.

3.3.1 Functional Requirements
Order Management

- The system shall let the user to place an order for their consumers.
- The system shall prompt and ask user to verify the order that have been placed.
- The system shall allow user to add in extra remark regarding the order.
- The system shall allow user to void the order that mistakenly placed or exceptional case occur.

Reporting Management

- The system shall generate a report that based on the time period that customize by user.
- The system shall retrieve related information from the database and generate the report to user.

Menu Management

- The system shall only allow management level user to edit the menu card information by having an authorization login checking.
- The system shall allow user to update their restaurant menu card information.
- The system shall save the updated menu card information to the database.

Billing Management

- The system shall retrieve data that needed and arrange in a meaningful structure then print for user as a reference.
- The system shall let user to choose the payment channel that they wish to use.

Goods and Services Tax Management

- The system shall calculate the total amount of money that need to submit to government at the end of the month.

Order Queue Module

- The system will update the queue display whenever a new order is placed.
- The system will merge the amount identical food that needs to be prepared and display on the screen.

3.3.2 Non Functional Requirements
Operational Requirements

- The system should operate in Window platform environment.
- The system should prompt user to make a backup at the end of the operational day.

Performance Requirements

- The system should let user to place an order in a short period of time.
- The system should complete perform the billing process in a short period of time.

Security Requirements

- The system should validate the username and password in order to login and make changes to the system.
- The system should request the current password of the user in order to let them change to a new password.

Usability Requirement

- The system should have an easy understand graphic user interface that deal with the user.
- The system should let user easy to understand the functionality of each modules.

3.3.3 Hardware & Software Requirements
Hardware

    I.   Intel ® Core i3 CPU 3.0 GHz or above

    II.   8GM RAM

    III.   500GB Hard Disk Drive (HDD) + 24G Solid State Drive (SSD)

    IV.   USB port 3.0

    V.   Monitor

    VI.   Wireless Access Point

In this project, a computer with sufficient processing power is needed. The computer is require for the developer to have project development such as coding for the mobile application, database creation and modification. For the complete system to work, several hardware requirements must be met. First, it require an android based smartphone in needed to deploy the software application and this smartphone is require to connect to the wireless access point to perform request and respond processes that access to the database. Next, database is a must for the entire system to store and retrieve the necessary data. Furthermore, a laptop or desktop is required to host the database and manipulate the entire system.

Description	Minimum Requirements
Processor	1.6GHz or faster processor
RAM	512MB or more
Hard Disk	5GB of disk space available or more
Video Card	DirectX 9

Table 1 Hardware requirement for staff computer

Description	Minimum Requirements
Processor	1.1 GHz or higher
RAM	512 MB or more
Storage	2GB free or more
Wireless Connection	YES

Table 2 Hardware requirement for staff smartphone

Software

- Front End : Android Studio Development Kit

- Back End : MySQL Server, Wamp Server

- Operating System : Window XP/Window 7/Window 8 and Android 5.0 or above

- Programming Language : JAVA, SQL

Description	Minimum Requirement
Mobile Operating System	Android 5.0 or above
Windows Operating System	Windows 7 or above
Development Kit	Latest version of Java Development Kit and Android Studio Development Kit
Interface Design	Netbeans IDE 7 or higher and Android Studio Development Kit

Table 3 Software requirement for development

The software install on the operation android smartphone will be developing using Java programming language with Android Studio Development Kit installed. Next, NetBeans IDE 7 or higher will be cope with Java programming language to develop the software for the computer based side and the database configuration will be using MySQL Workbench database software.

3.3.4 Use Case Diagram
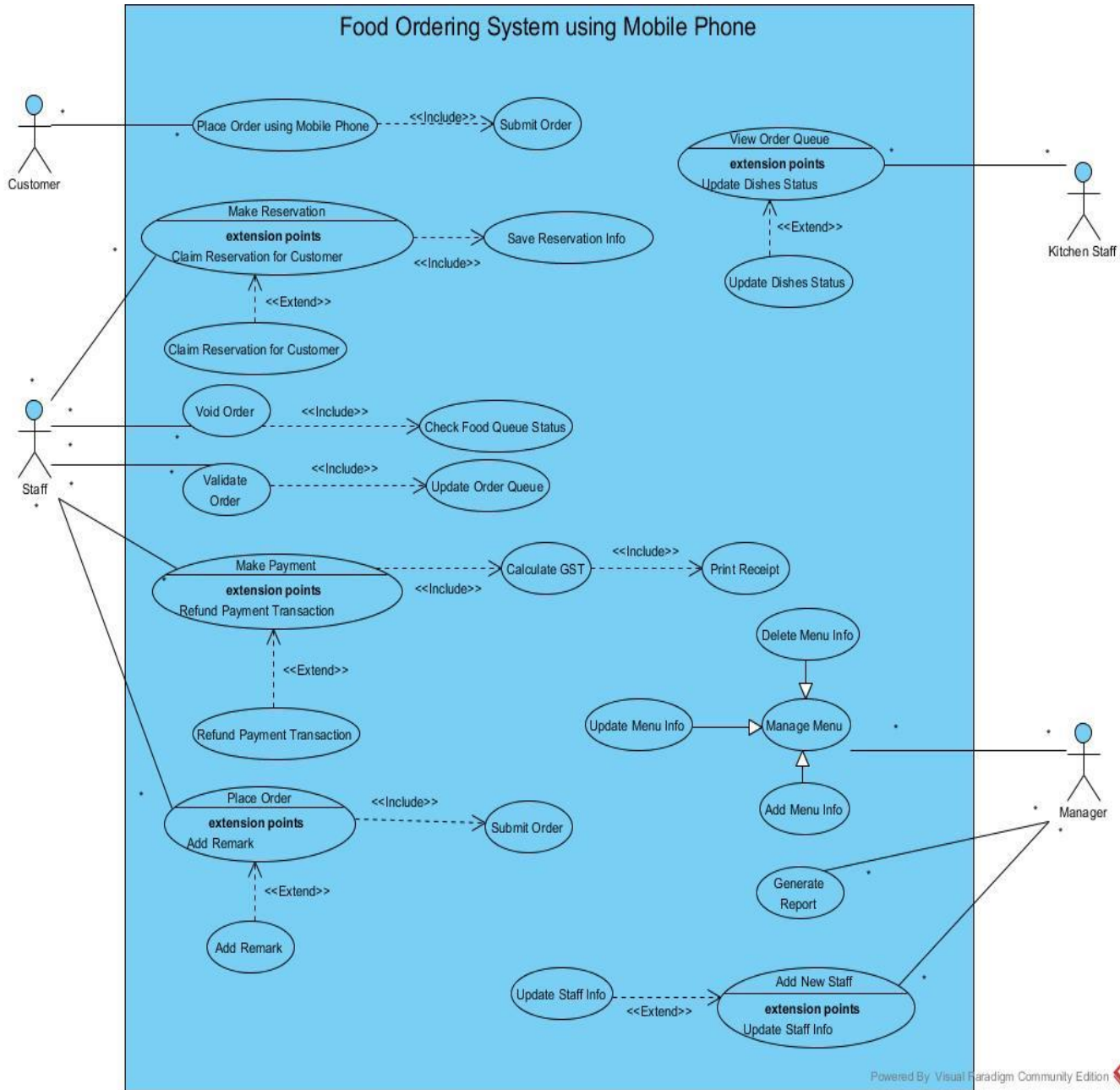
Figure 9 Use Case Diagram

3.3.5 Activity Diagram

3.3.5.1 Activity Diagram for Place Order using Mobile Phone
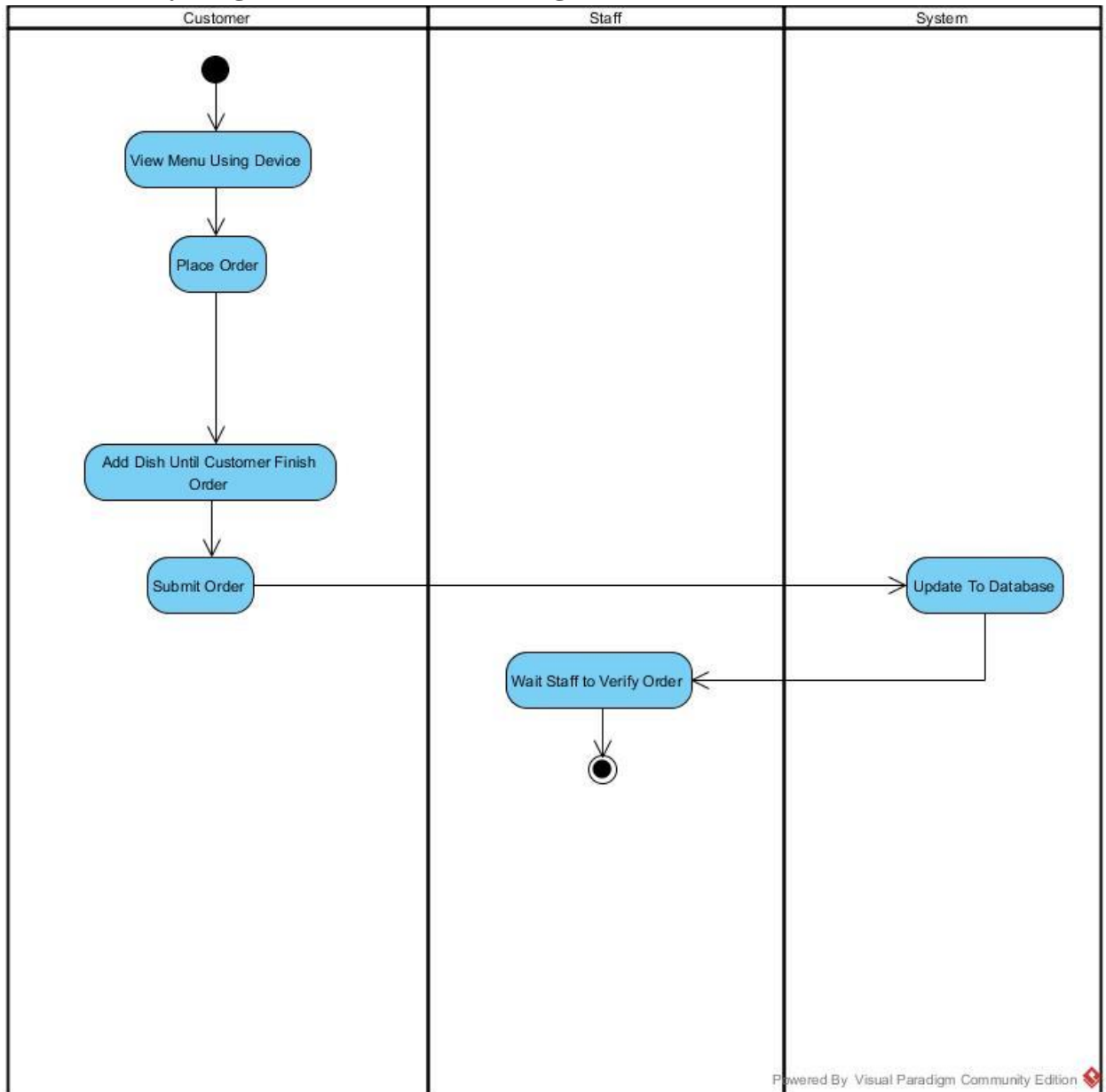
Figure 10 Activity Diagram for Place Order using Mobile Phone

3.3.5.2 Activity Diagram for Generate Report
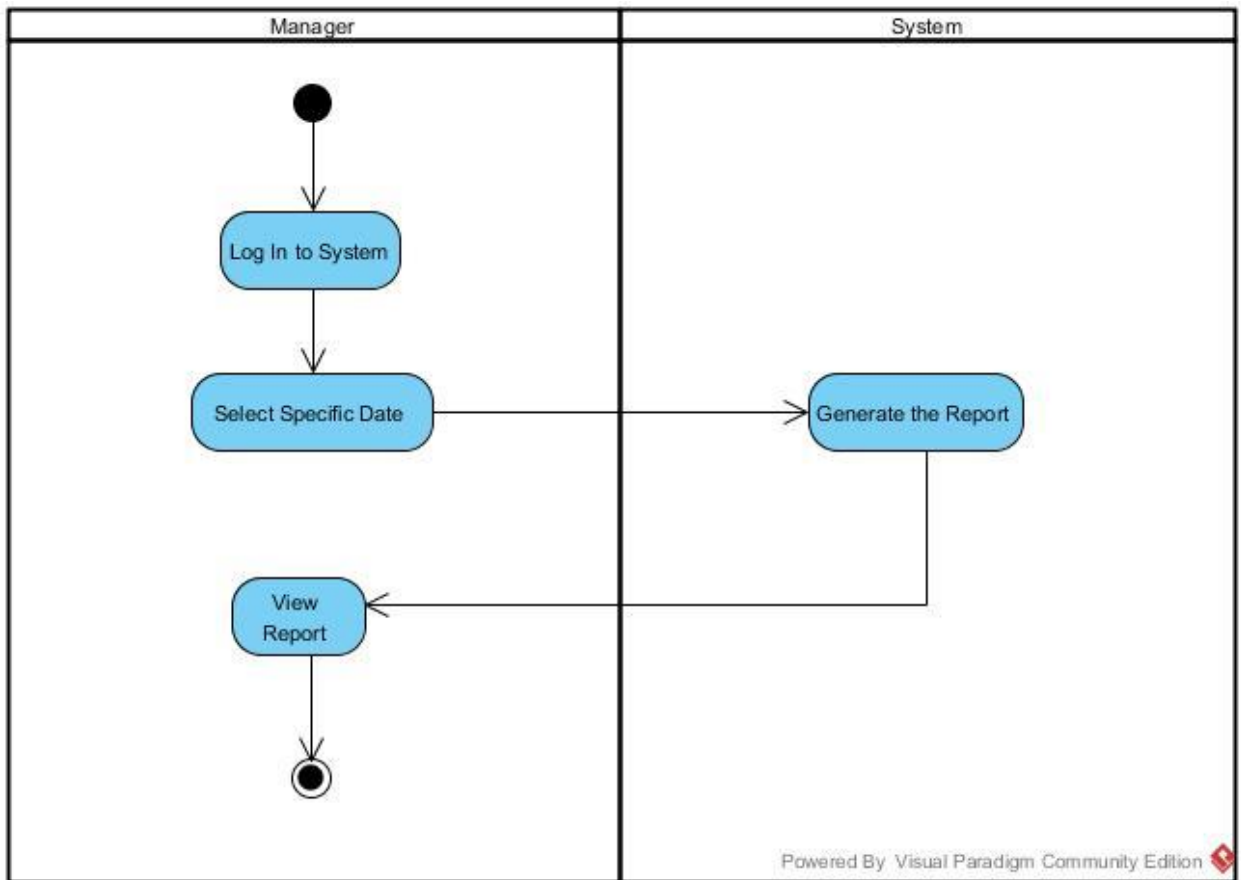
Figure 11 Activity Diagram for Generate Report

3.3.5.3 Activity Diagram for Update Menu Info
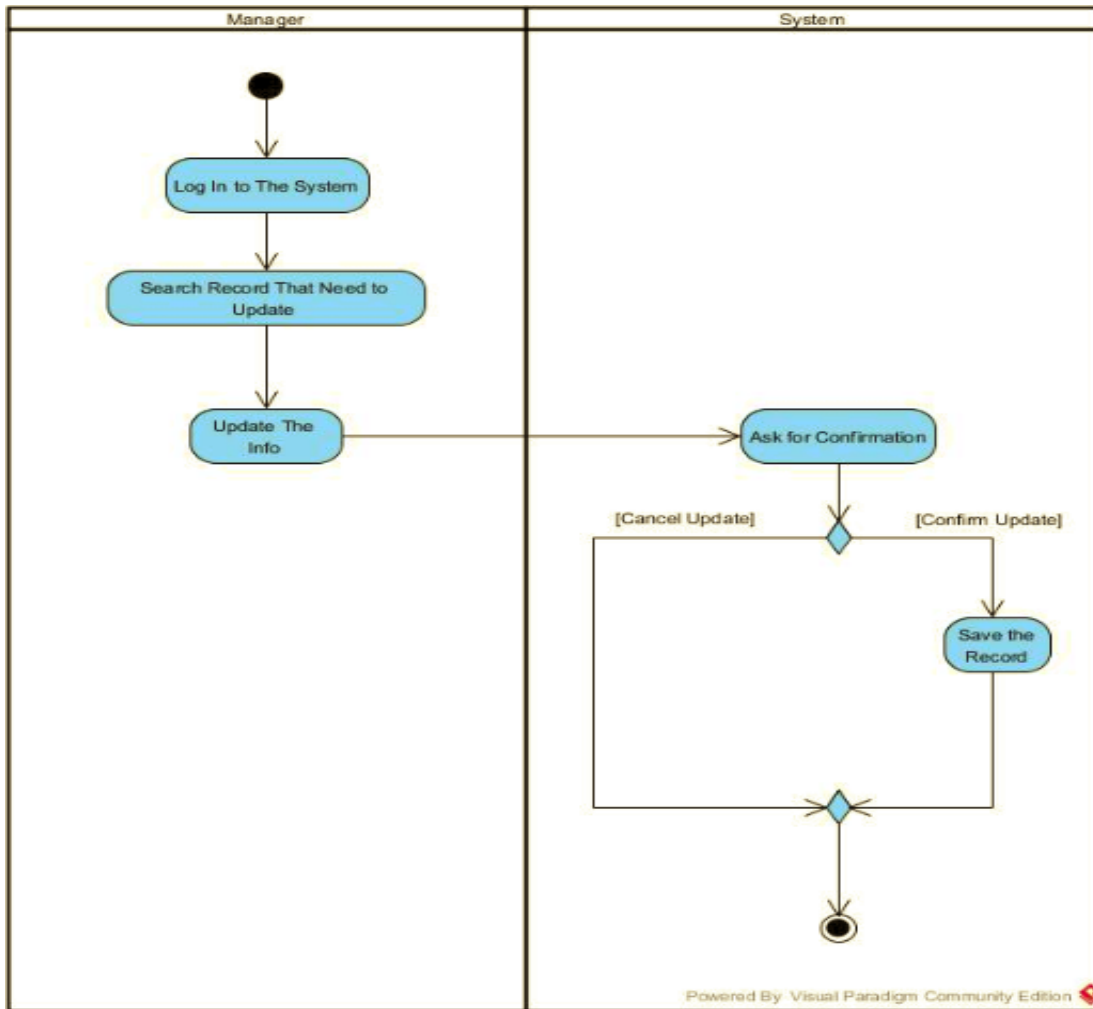
Figure 12 Activity Diagram for Update Menu Info

3.3.5.4 Activity Diagram for Validate Order
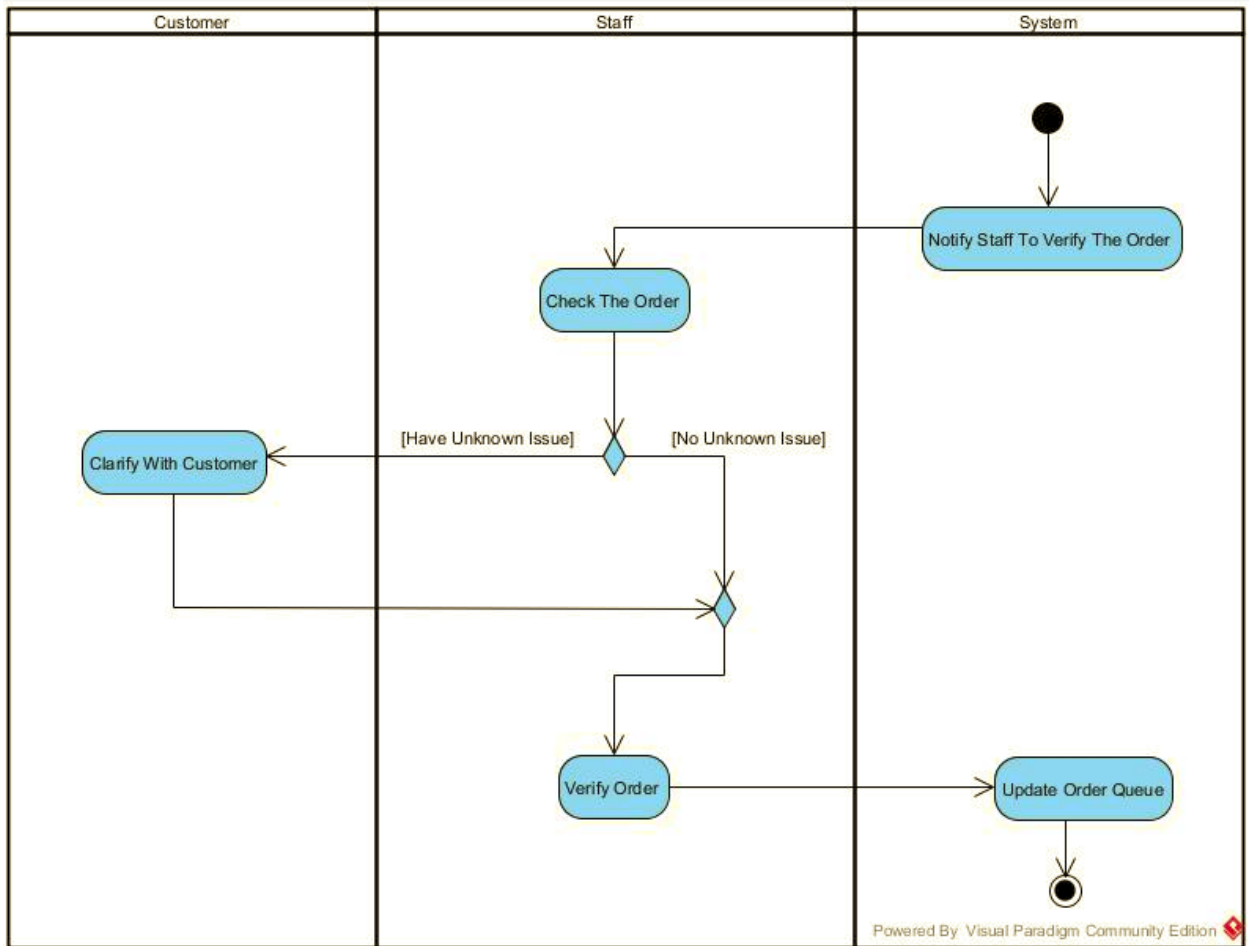
Figure 13 Activity Diagram for Validate Order

3.3.5.5 Activity Diagram for View Order Queue
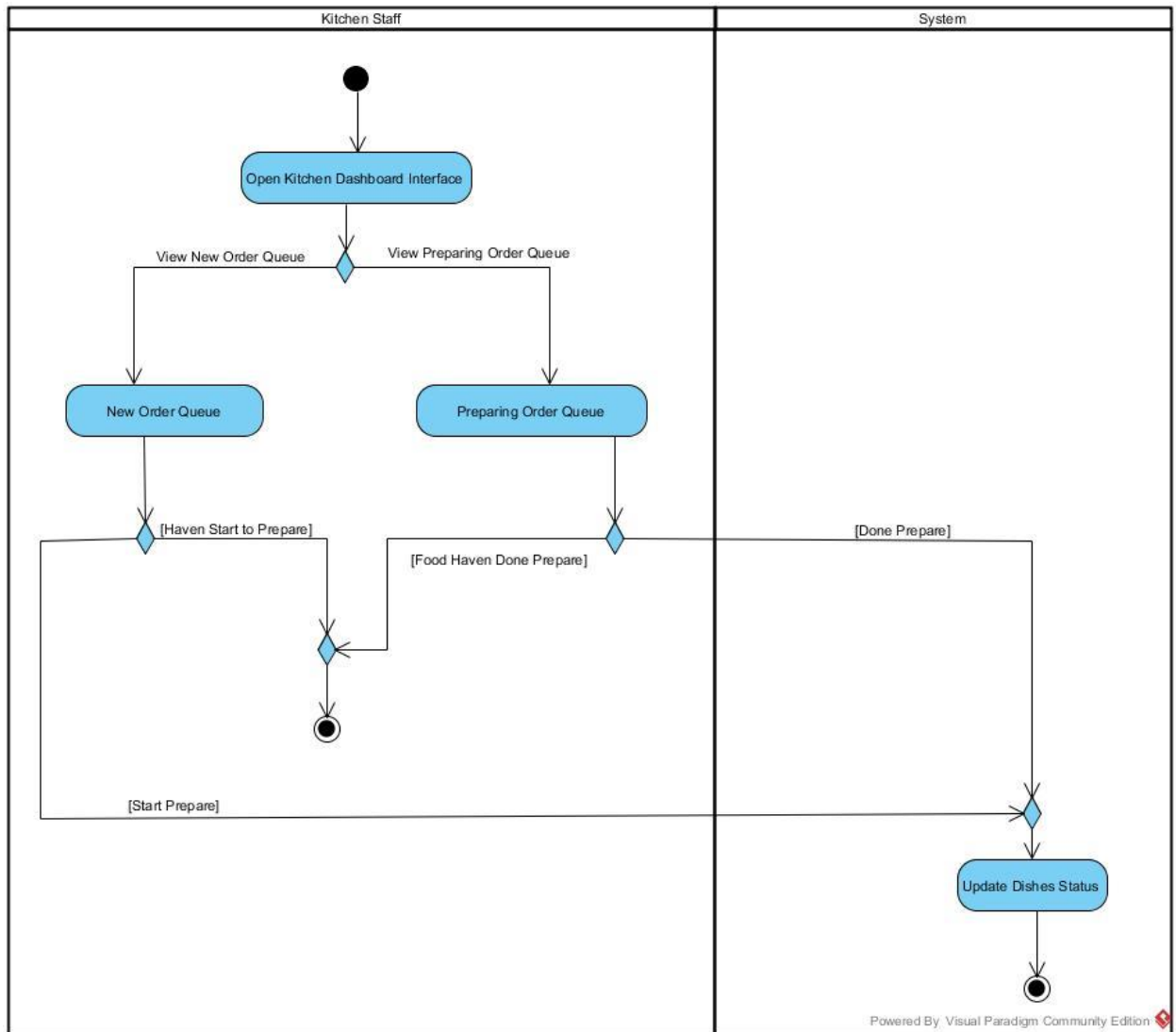
Figure 14 Activity Diagram for View Order Queue

3.3.5.6 Activity Diagram for Void Order
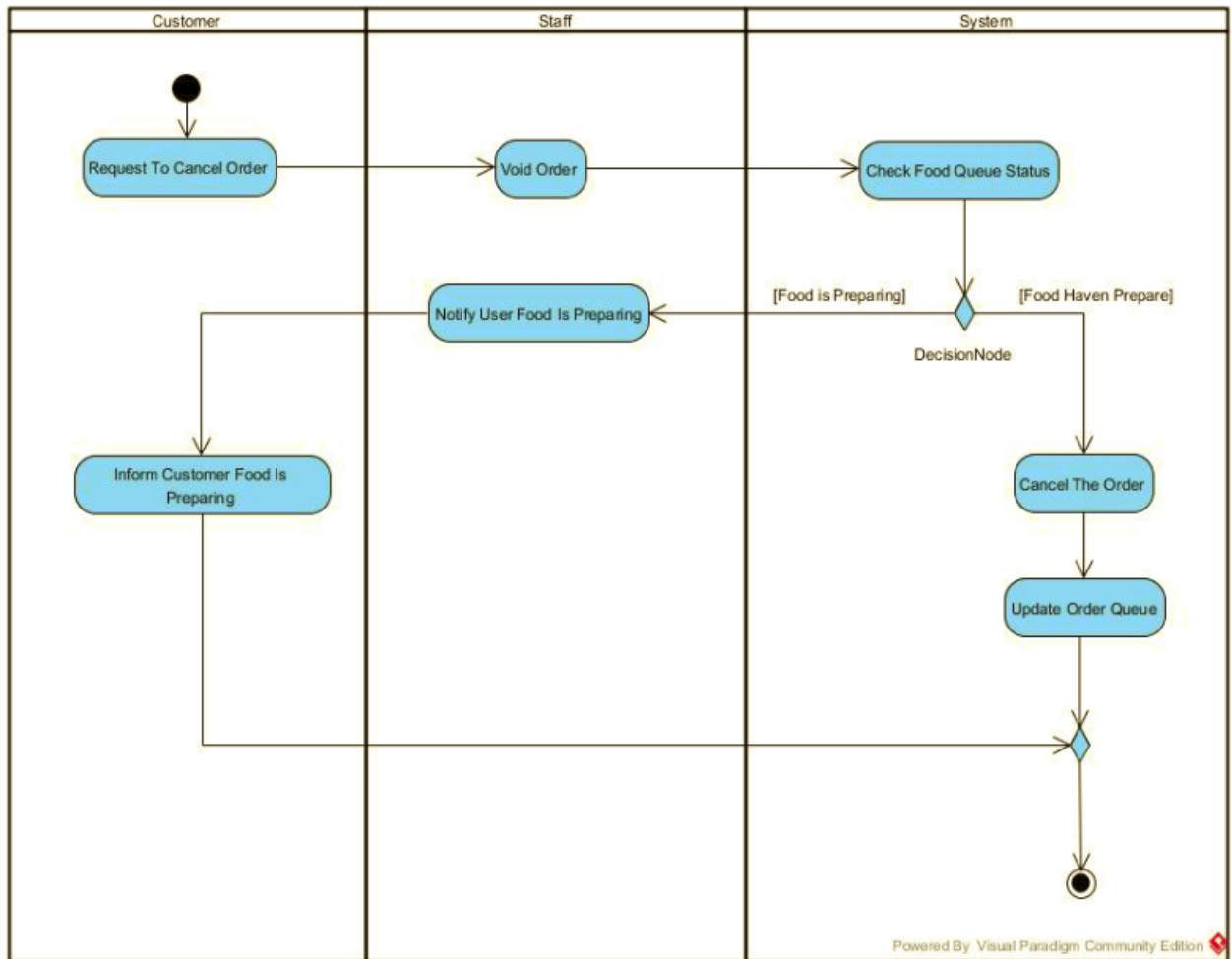
Figure 15 Activity Diagram for Void Order

3.3.5.7 Activity Diagram for Add Menu Info
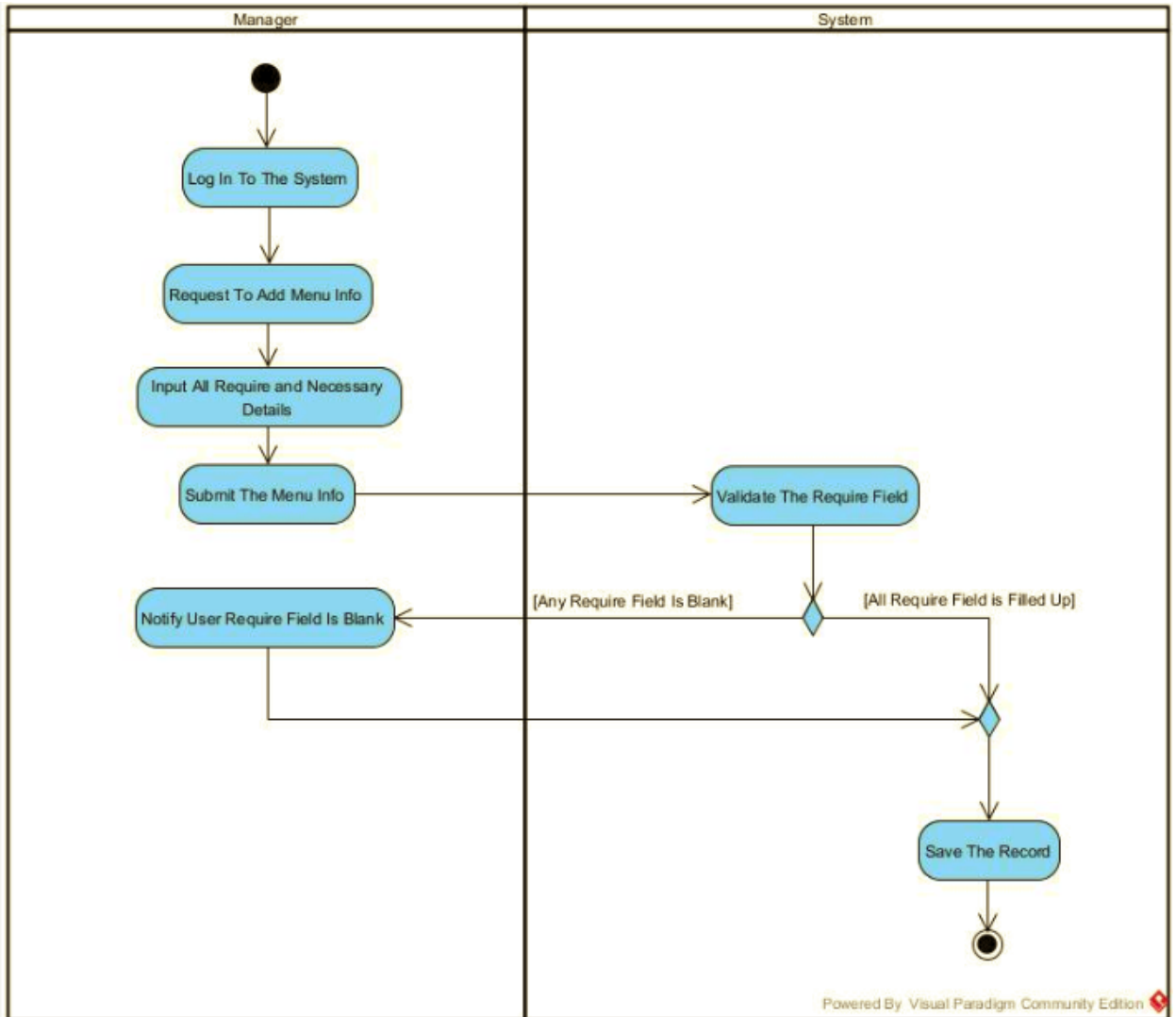
Figure 16 Activity Diagram for Add Menu Info

3.3.5.8 Activity Diagram for Delete Menu Info
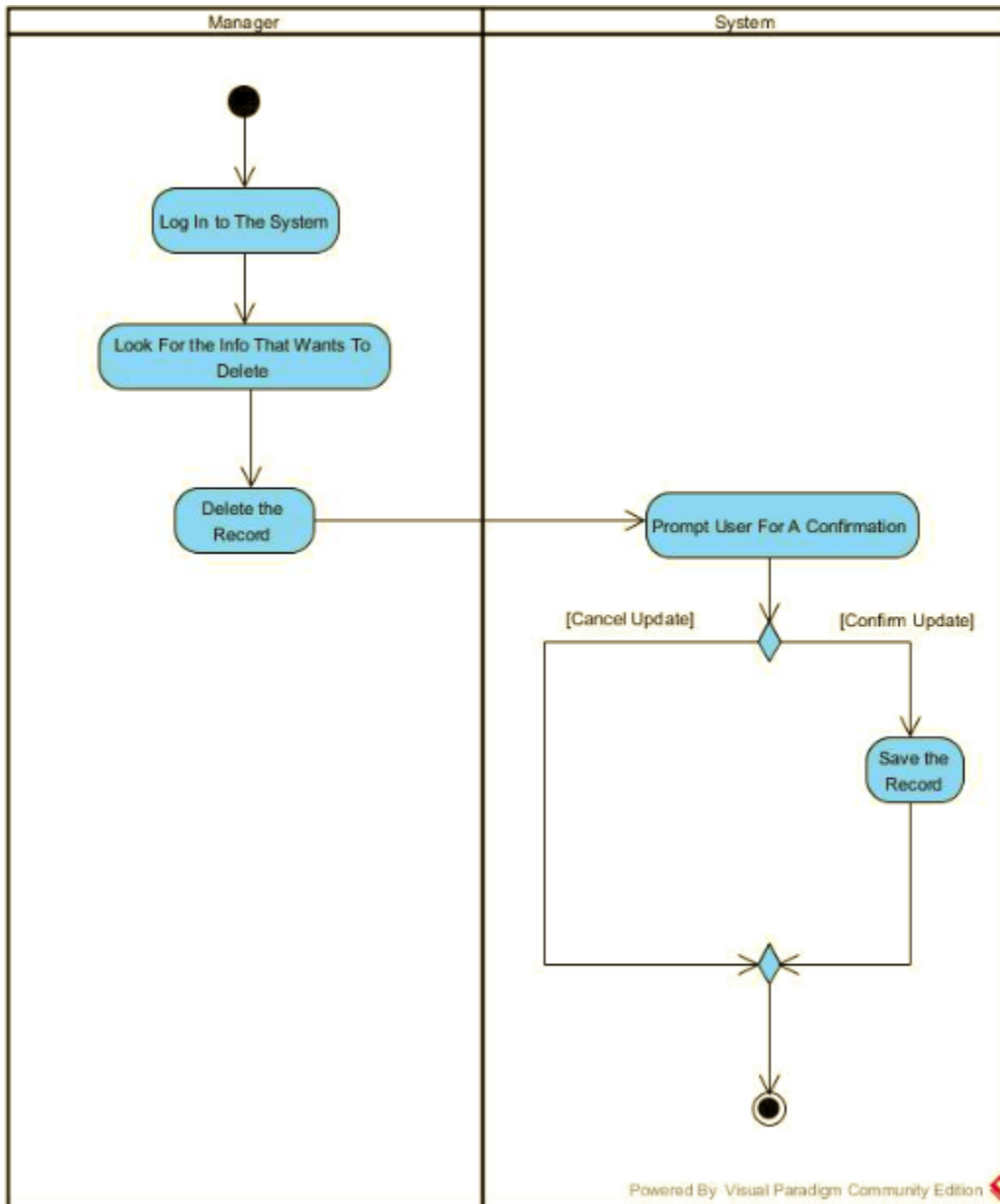
Figure 17 Activity Diagram for Delete Menu Info

3.3.5.9 Activity Diagram for Make Payment
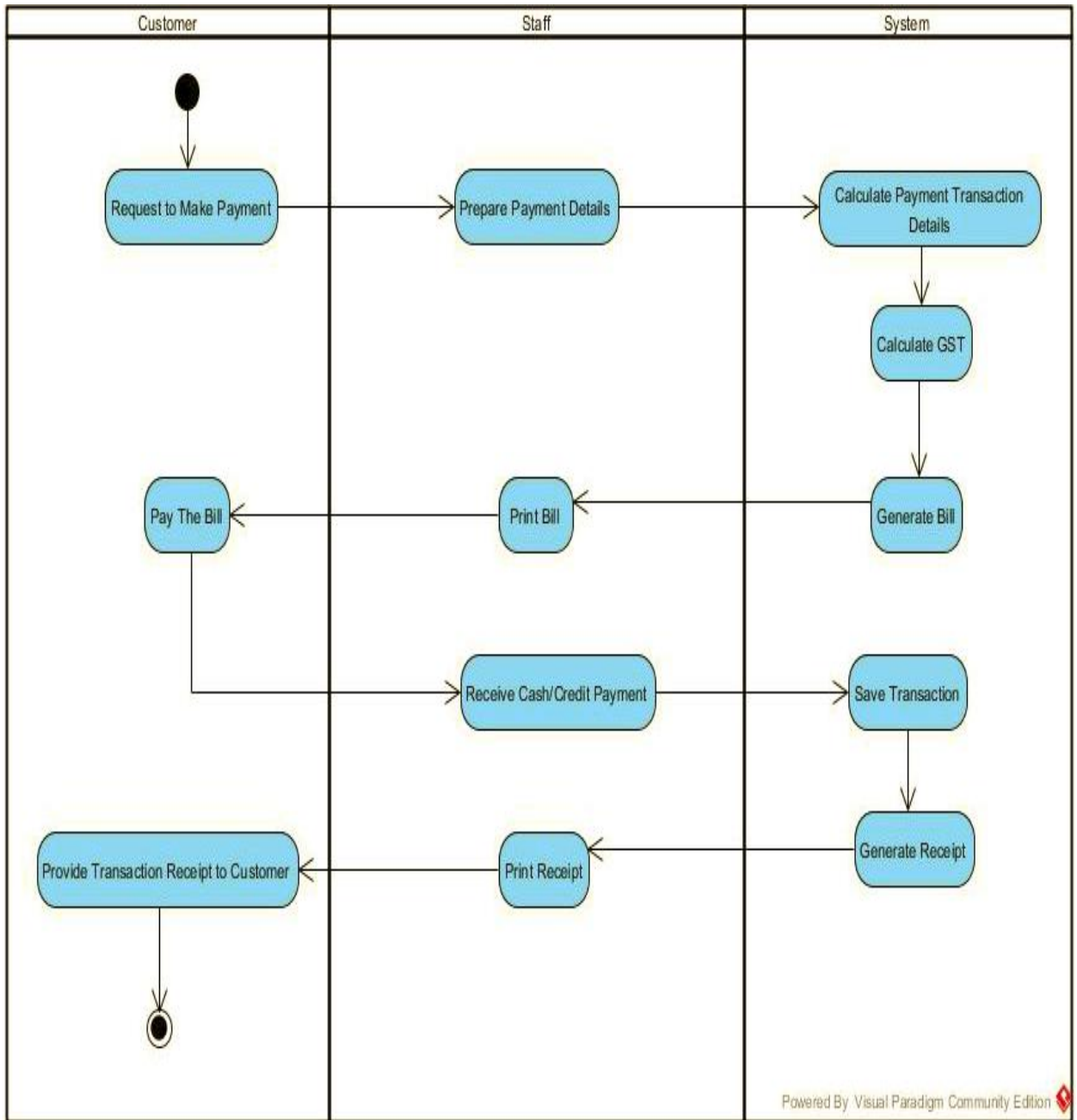
Figure 18 Activity Diagram for Make Payment

3.3.5.10 Activity Diagram for Make Reservation
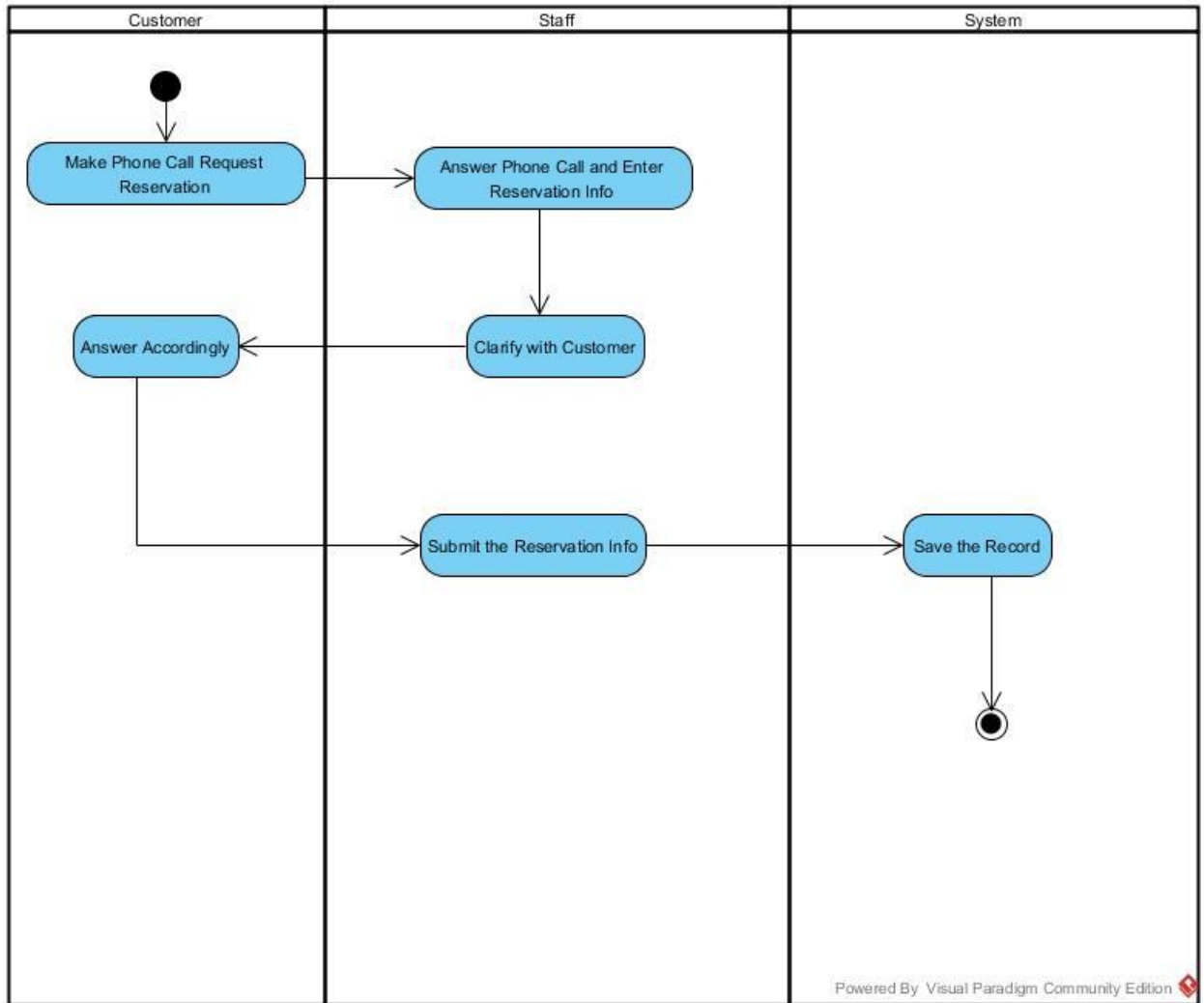
Figure 19 Activity Diagram for Make Reservation

3.3.5.11 Activity Diagram for Place Order by Staff
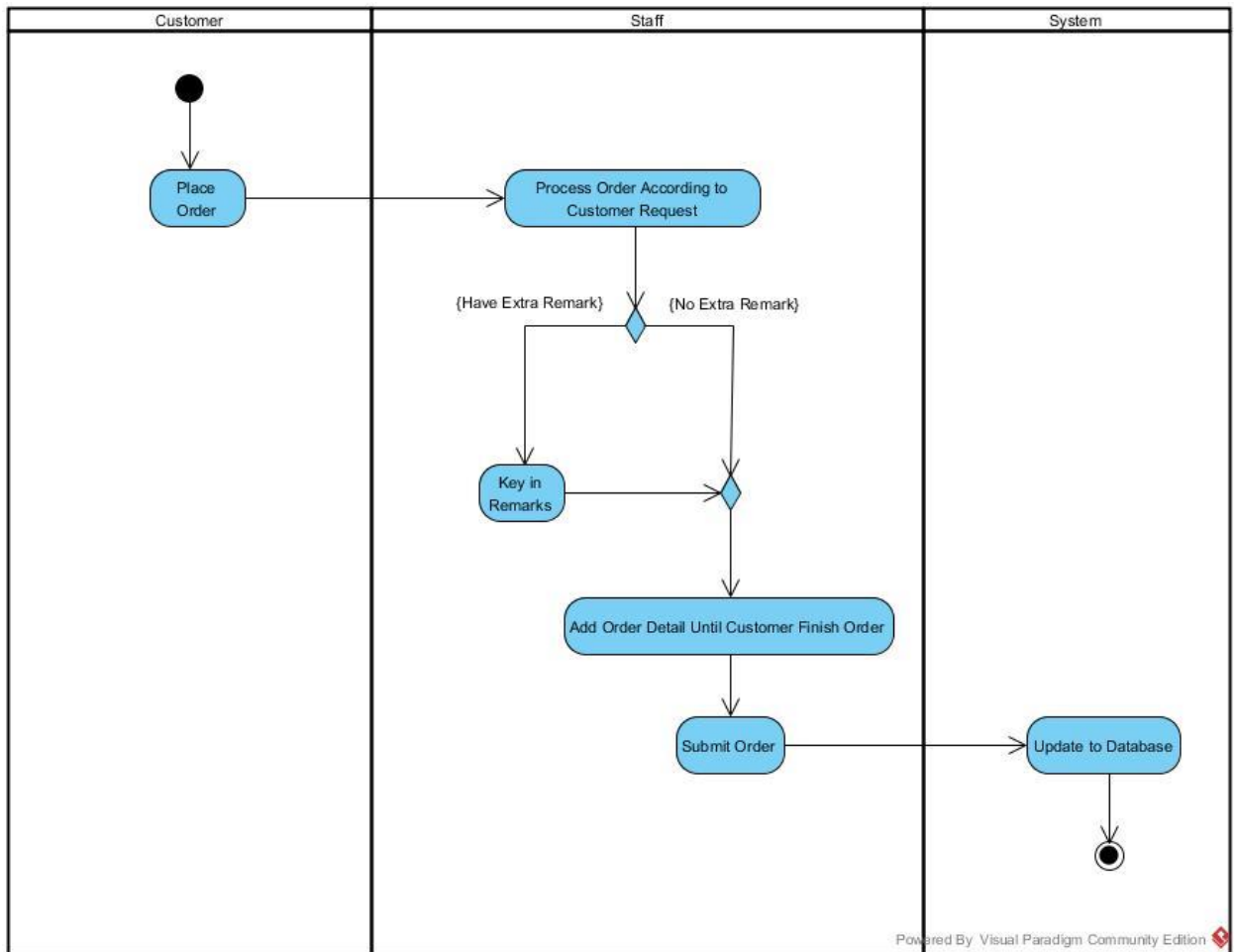
Figure 20 Activity Diagram for Place Order by Staff

3.3.5.12 Activity Diagram for Add New Staff
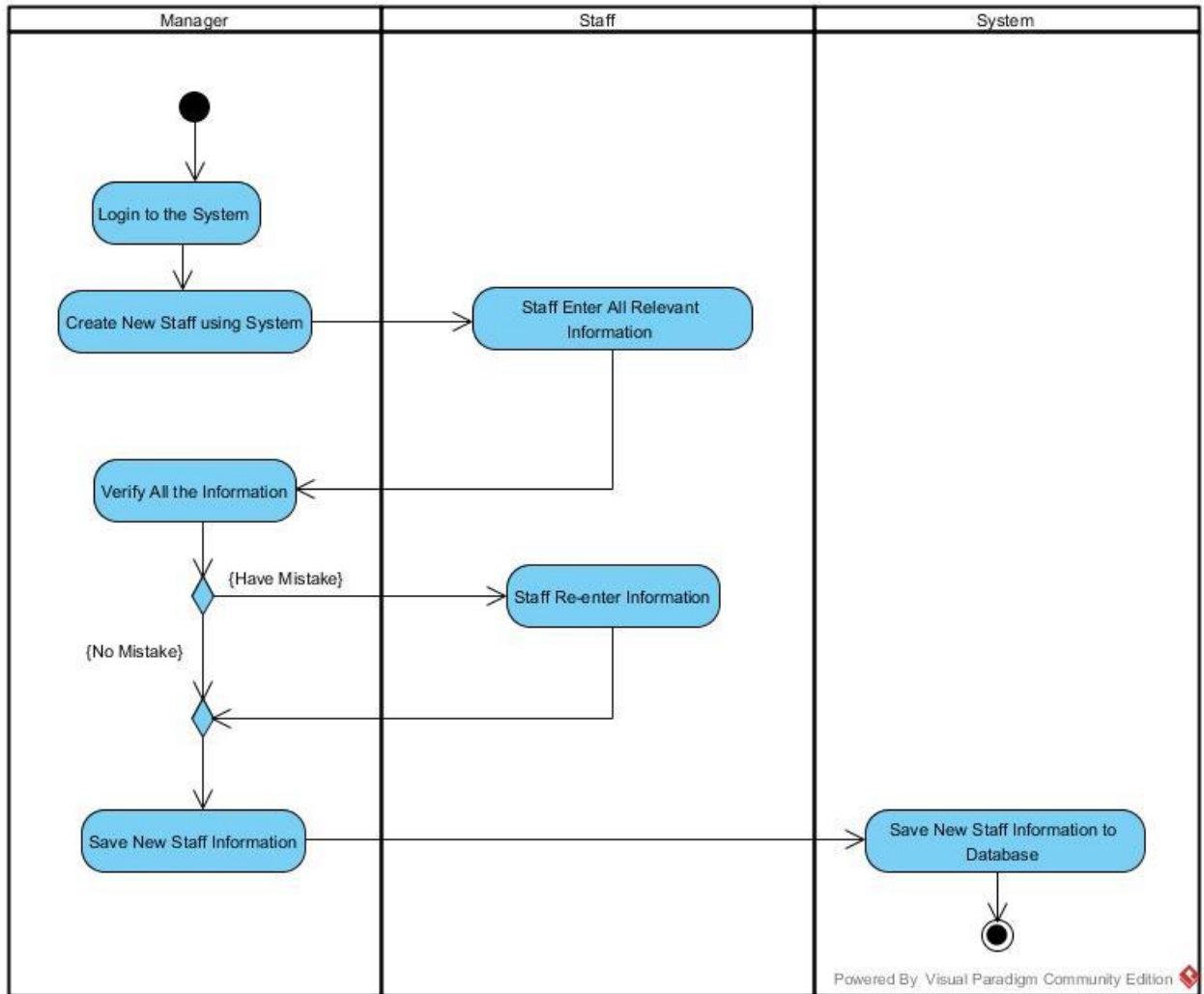
Figure 21 Activity Diagram for Add New Staff

3.3.6 Class Diagram
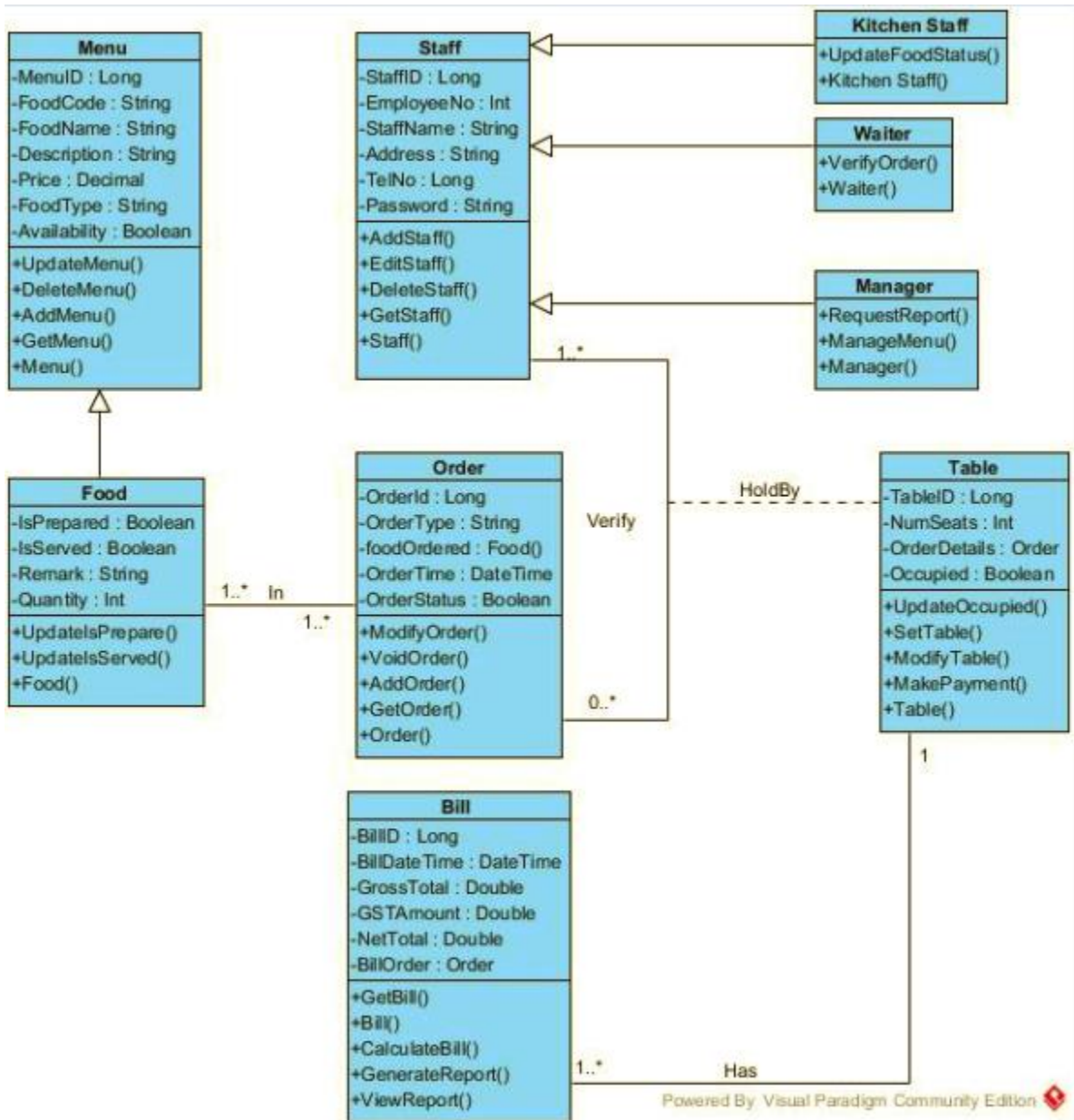
Figure 22 Class Diagram

3.3.7 Object Diagram
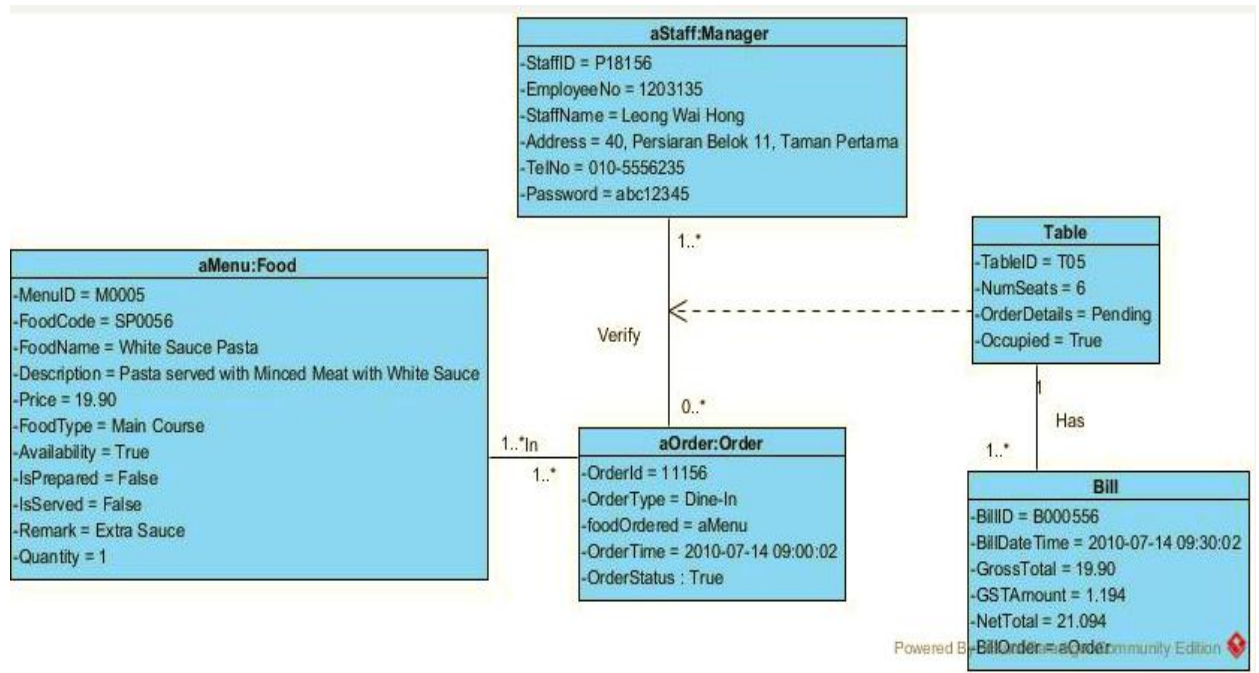
Figure 23 Object Diagram

CHAPTER 4 SYSTEM DESIGN ON FOOD ORDERING SYSTEM USING MOBILE PHONE

4.1 Project Design

At the end of the system requirements collection, several relevant diagrams have been generated in order for the preparation of system model design. The design phase activities include the design of project architecture and graphical user interfaces, develop relational databases, business logic and file specifications.

4.2 Graphic User Interface Design

4.2.1 Computer Side
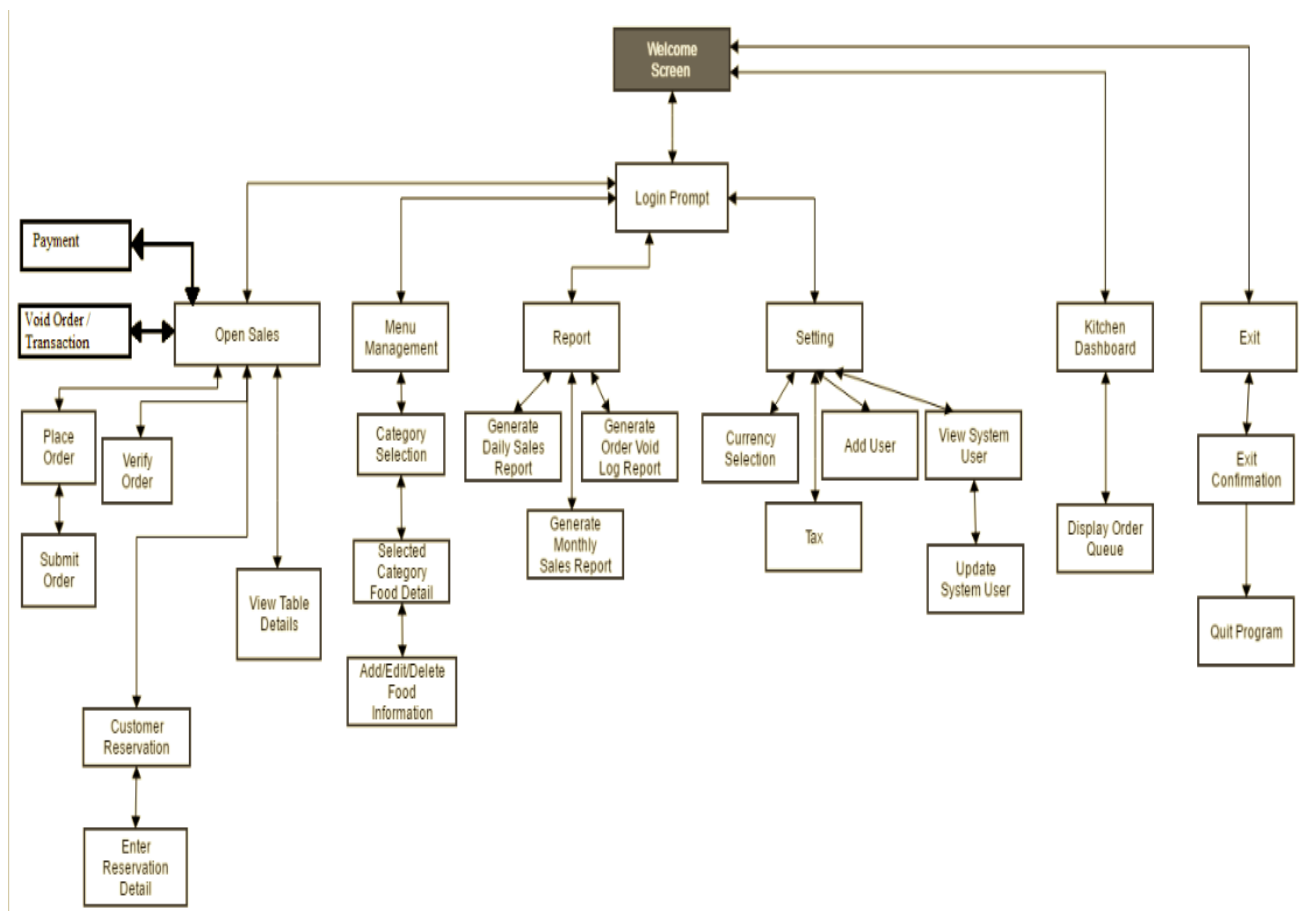
Figure 24 System Screen Flow Diagram (Computer-Side)

4.2.1.1 Welcome Screen

Figure 25 Welcome Screen

This is the first interface that will display when user run the computer side client program.

User can choose from the six buttons what he or she wants to perform.

4.2.1.2 Login Prompt

Figure 26 Login Prompt

A login prompt will pop out when user wants to perform some action which required to authorized and authenticated.

4.2.1.3 Open Sales
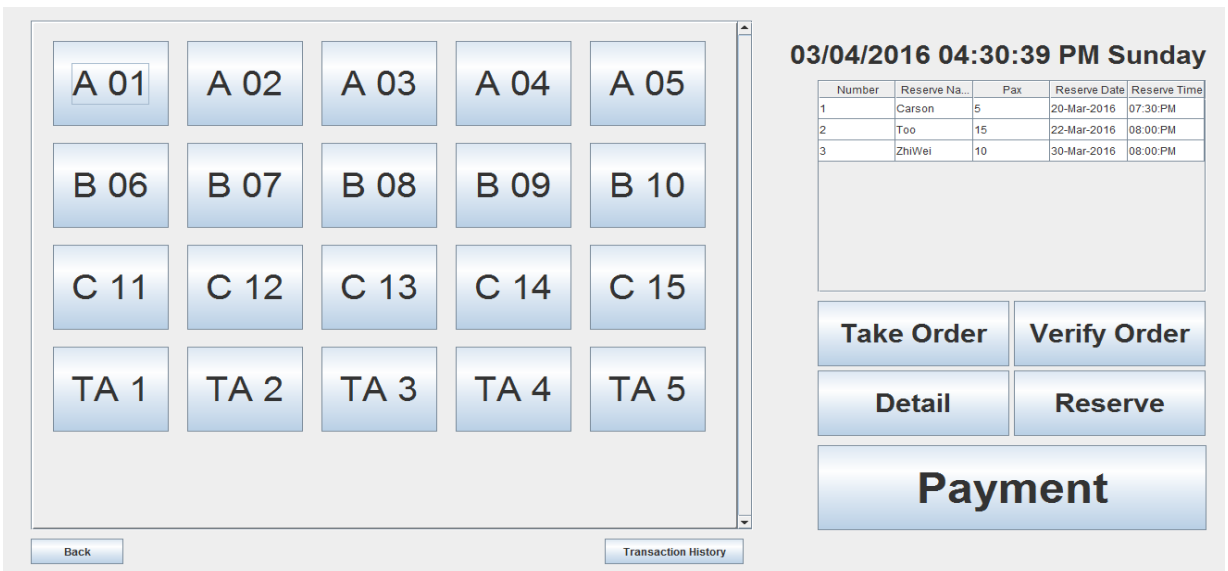
Figure 27 Open Sales

This is the open sales interface which user can place order, make and claim reservation for customer, verify order, make payment and view transaction history.

4.2.1.4 Place Order
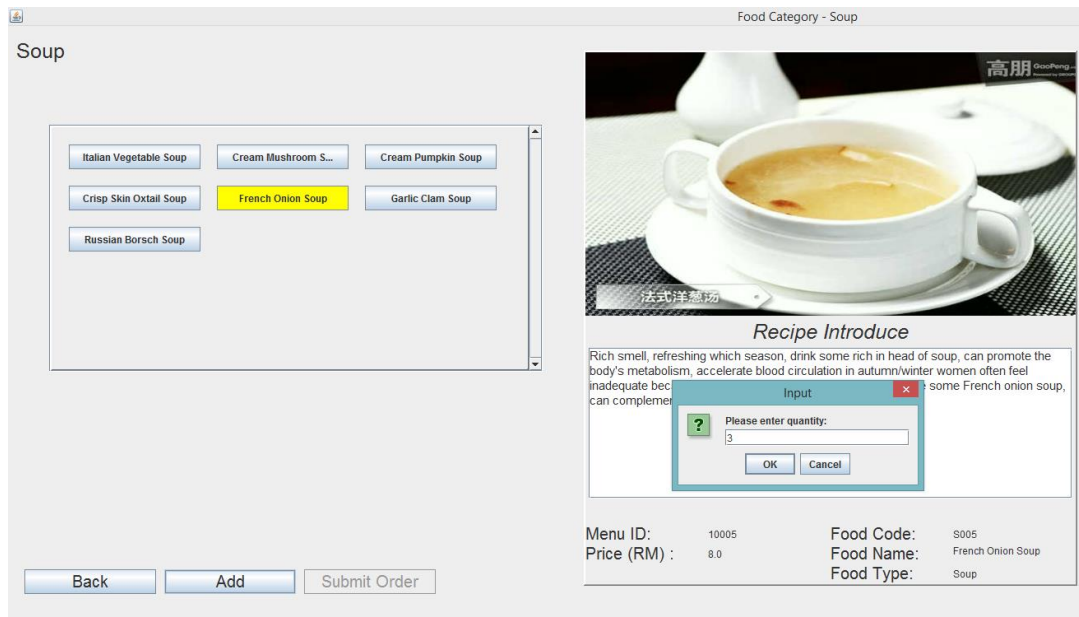
Figure 28 Place Order

This is the interface which user placing order for customer. User is required to enter order quantity and extra remark for the order.

4.2.1.5 Submit Order
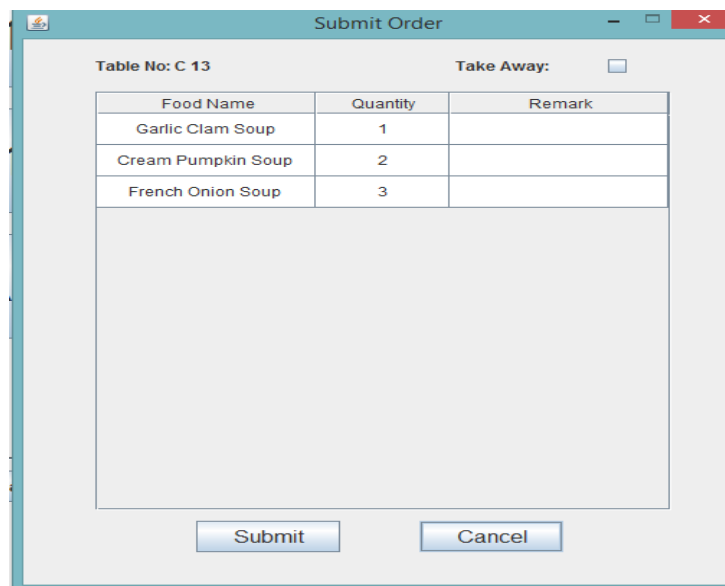
Figure 29 Submit Order

This will be the interface that displayed when user submit the order. It displays all the order information for confirmation.

4.2.1.6 Verify Order
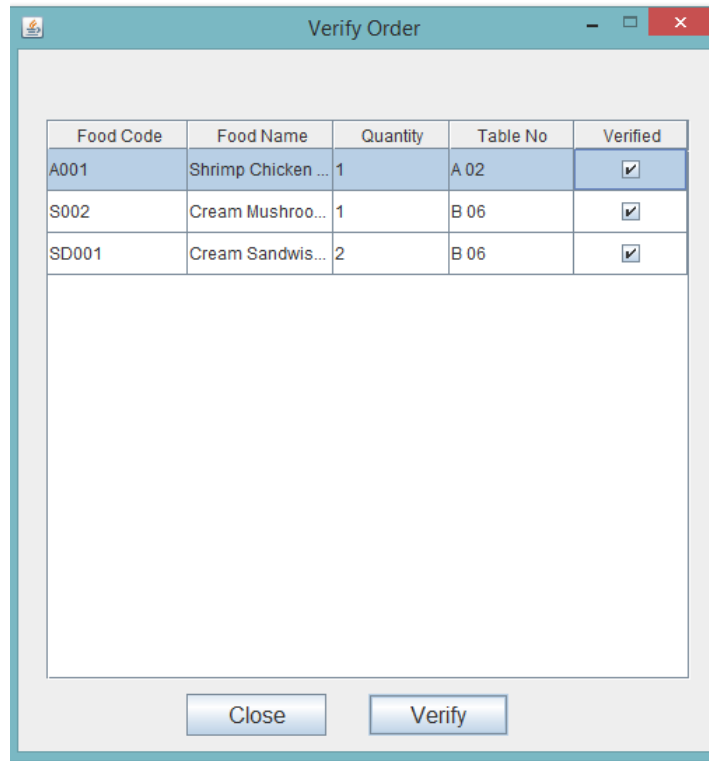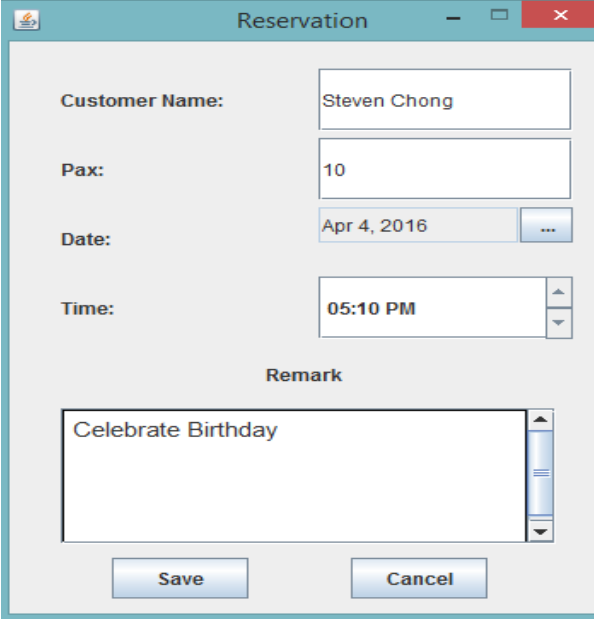
Figure 30 Verify Order

This interface will display all the order detail which the order is placed by customer through using mobile application. Staff verifies order which is without any doubt or exceptional issue, if the order has exceptional issue staff will clarify with customer.

4.2.1.7 Customer Reservation
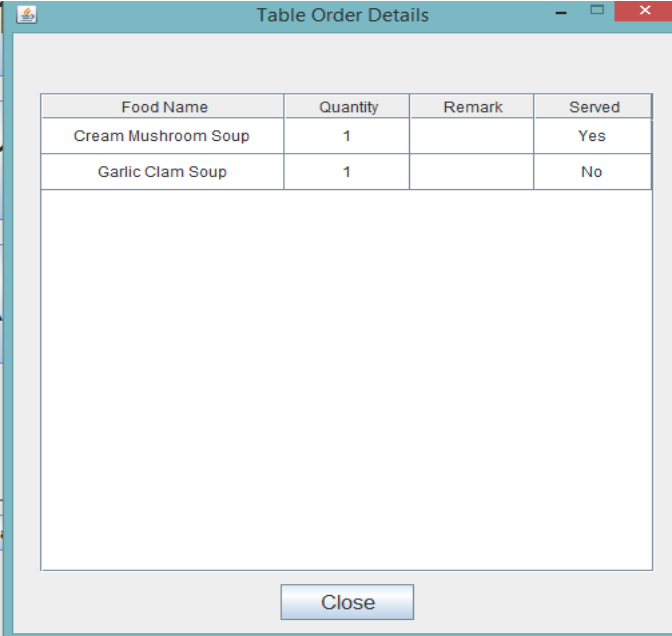
Figure 31 Customer Reservation

This interface displays the reservation information and allows staff to claim reservation for customer.

4.2.1.8 View Table Details

Figure 32 View Table Details

This interface displays all the placed order details of the particular table.

4.2.1.9 Void Order
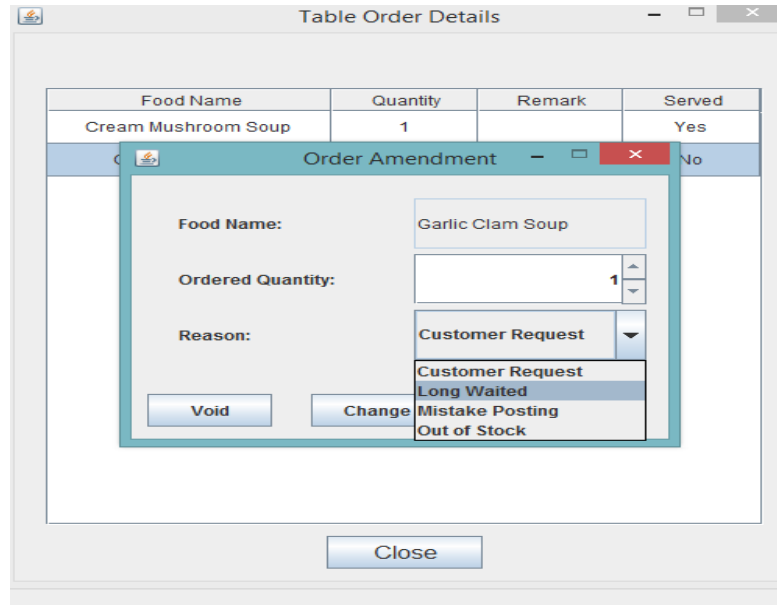
Figure 33 Void Order

This interface allows staff to void the order with a valid reason. If the "Served" status is "Yes" this interface will not pop out.

4.2.1.10 Payment
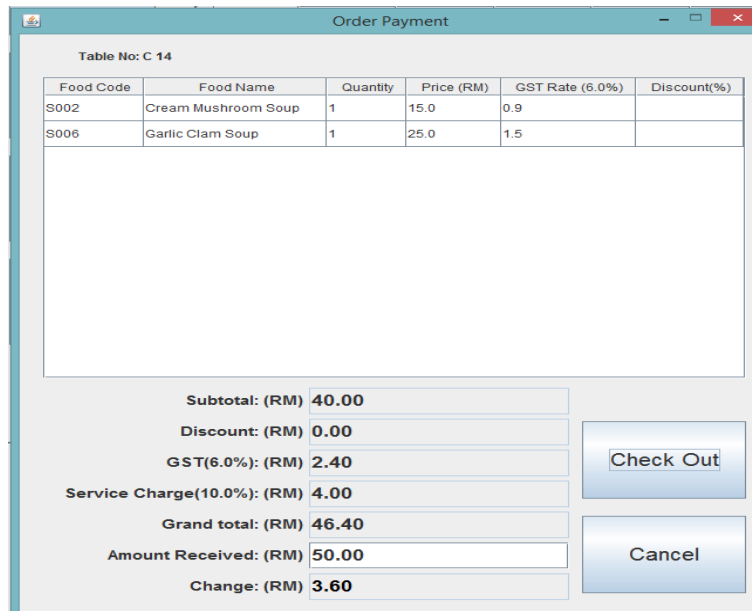
Figure 34 Payment

This is the payment interface that displays all the order details and amount details of the bill.

4.2.1.11 Void / Refund Transaction
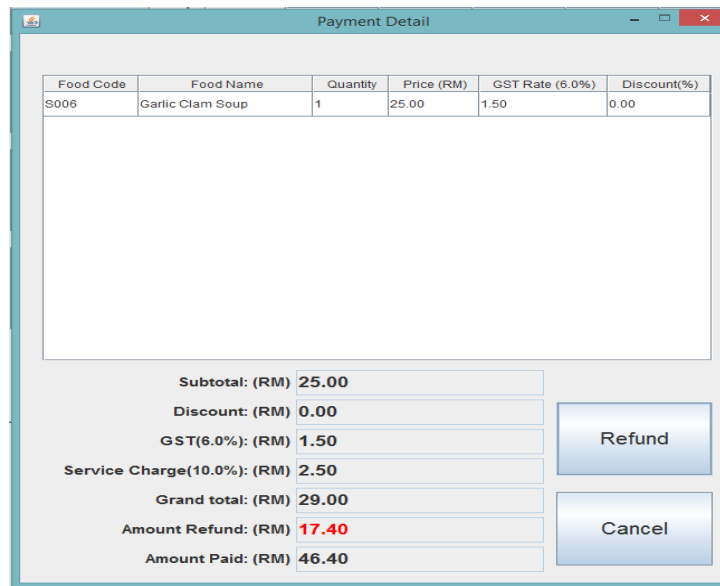
Figure 35 Void/Refund Transaction

This interface allows staff to void the transaction which is successfully done previously. It shows the total amount that need to be refund.

4.2.1.12 Menu Management – Category Selection
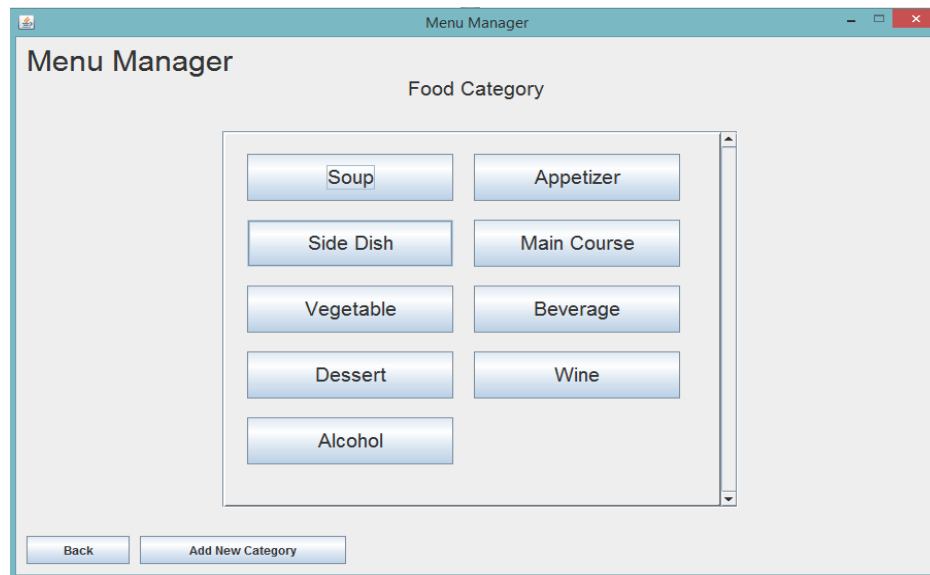
Figure 36 Menu-Management - Category Selection

This interface displays all food categories that are stored in the system.

4.2.1.13 Add New Food

Figure 37 Add New Food

This interface allows manager to add new food for the particular food category. Manager required to fill in all the relevant information.

4.2.1.14 Edit Food Information

Figure 38 Edit Food Information

This interface displays the food information that is store in the system and it allows manager to edit the food information.

4.2.1.15 Kitchen Dashboard
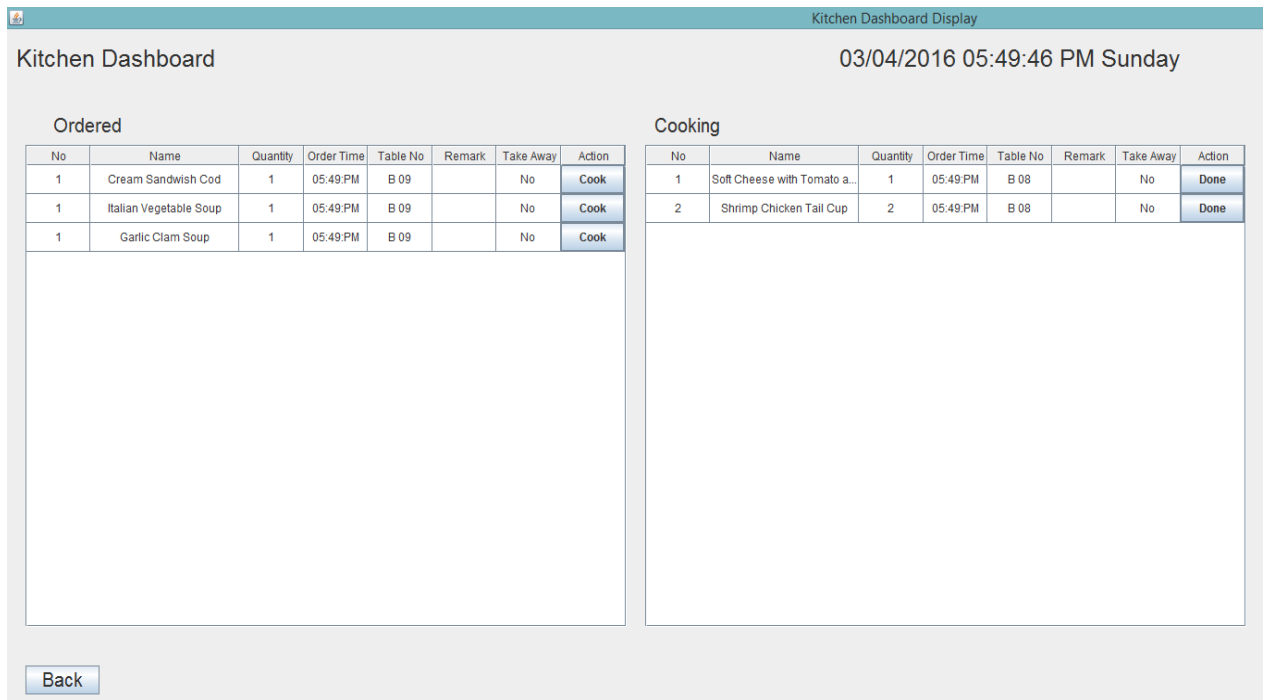
Figure 39 Kitchen Dashboard

This interface allows kitchen staff to view all the order details and update order status.

4.2.1.16 System Setting
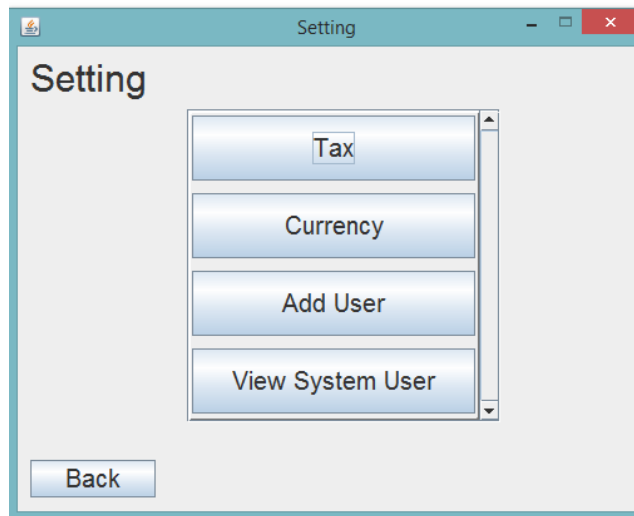
Figure 40 System Setting

This interface display choices when manager clicked "Setting" button.

4.2.1.17 System Currency Selection
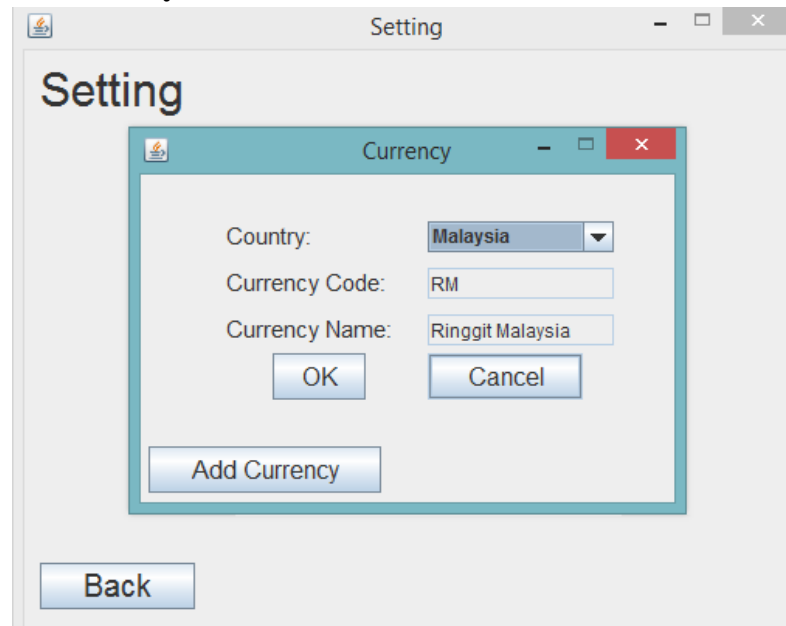
Figure 41 System Currency Selection

This interface allows manager to choose the price currency for the system.

4.2.1.18 Tax Setting
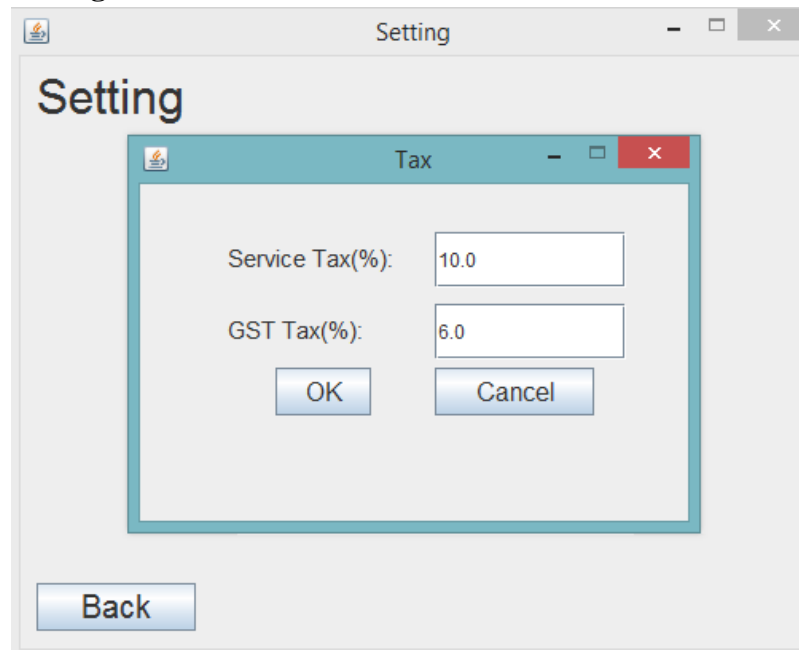
Figure 42 Tax Setting

This interface allows manager to enter the taxes percentage which will apply to all transaction into the system.

4.2.1.19 Add System User

Figure 43 Add System User

This interface enables manager to add new system which can access the system. It required to fill in all the relevant fields.

4.2.1.20 Update System User Information

Figure 44 Update System User Information

This interface display existing staff information and allow manager to update the staff information.

4.2.1.21 System Report
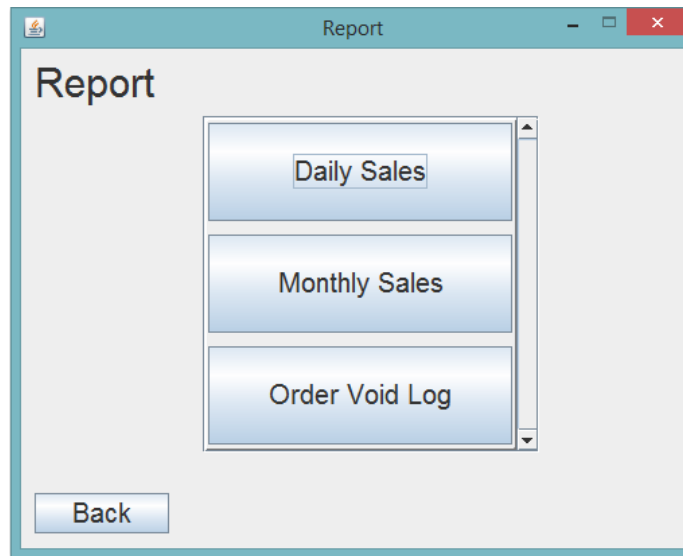
Figure 45 System Report

This interface displays the three report type can manager can choose to generate report.

4.2.1.22 Daily Sales & Order Void Log
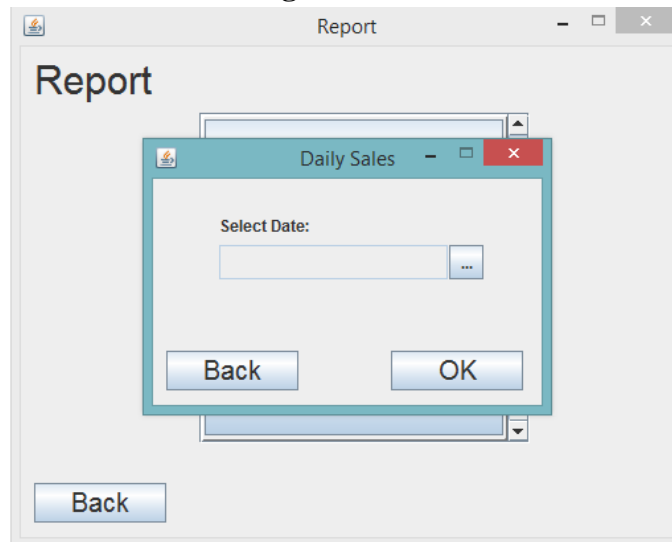
Figure 46 Daily Sales & Order Void Log

After manager choose the report type, manager need to select a date to generate the report that according to the selected date.

4.2.1.23 Monthly Sales
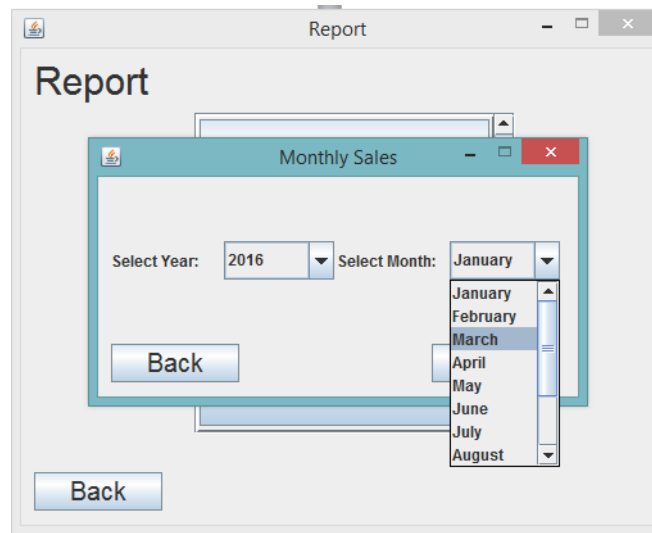
Figure 47 Monthly Sales

This interface will display, while manager choose to generate monthly sales report type.
Manager need to select a year and month.

4.2.2 Mobile Phone Side
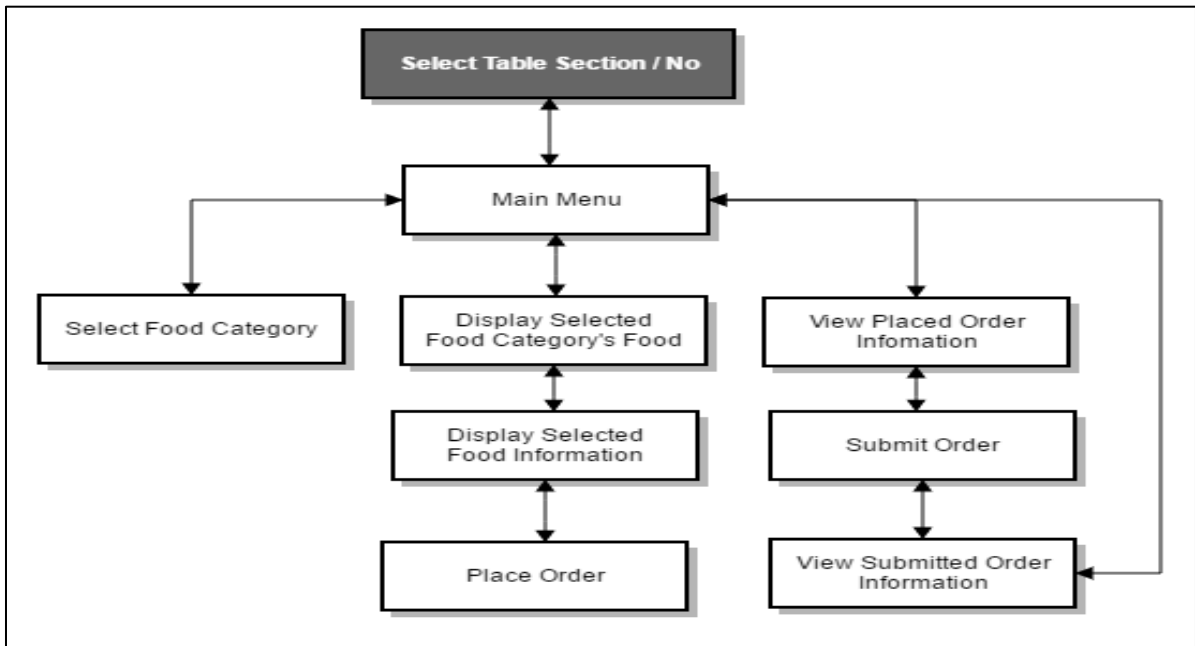
Figure 48 System Screen Flow Diagram (Mobile Phone -Side)

4.2.2.1 Select Table Section / No
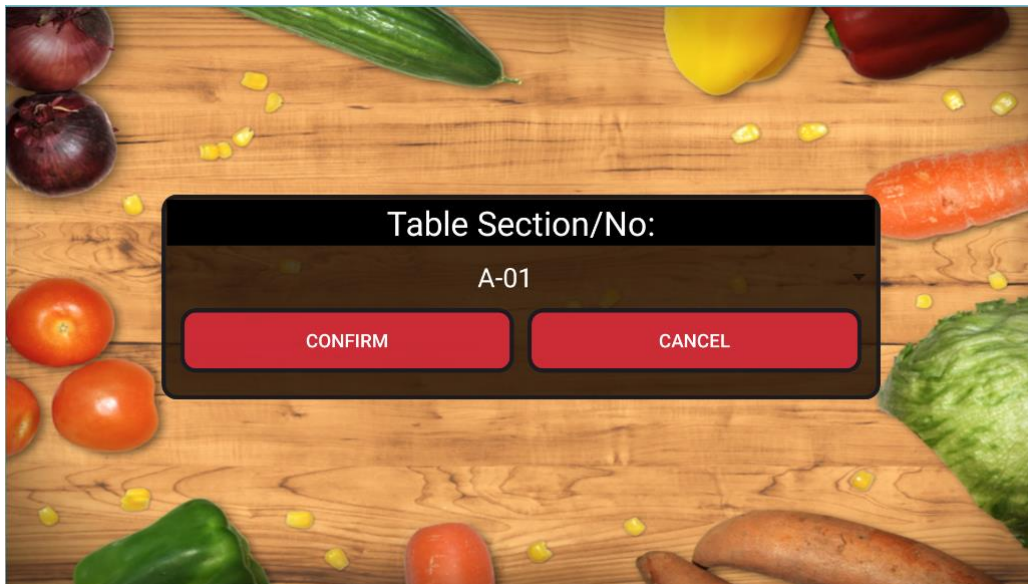
Figure 49 Select Table Section / No

This is the first interface that will display while customer runs the mobile application.

Customer can select table section and number that he or she current occupied.

4.2.2.2 Main Menu

Figure 50 Main Menu

This interface will be shows up after customer selected table section and number. It allows user to select food category and food will display according to the selected food category. Next, user can clear the order which is placed to the order list and lastly submit the order to server.

4.2.2.3 Display Selected Food Information

Figure 51 Display Selected Food Information

This interface will displays all the food information and user can enter the number of order quantity and add to the order list or back to the main menu interface.

4.2.2.4 View Submitted Order Information

Name	Quantity	Price	Total
Cream Mushroom Soup	x1	$15.0	$15.00
Crisp Skin Oxtail Soup	x1	$15.5	$15.50
Cream Sandwish Cod	x1	$20.0	$20.00

SUCCESS to submit all order.

BACK   Sub Total: $50.50

Figure 52 View Submitted Order Information

This interface displays all the order details that are submitted successfully.

4.3 Database Design/Entity Relationship Diagram (ERD)
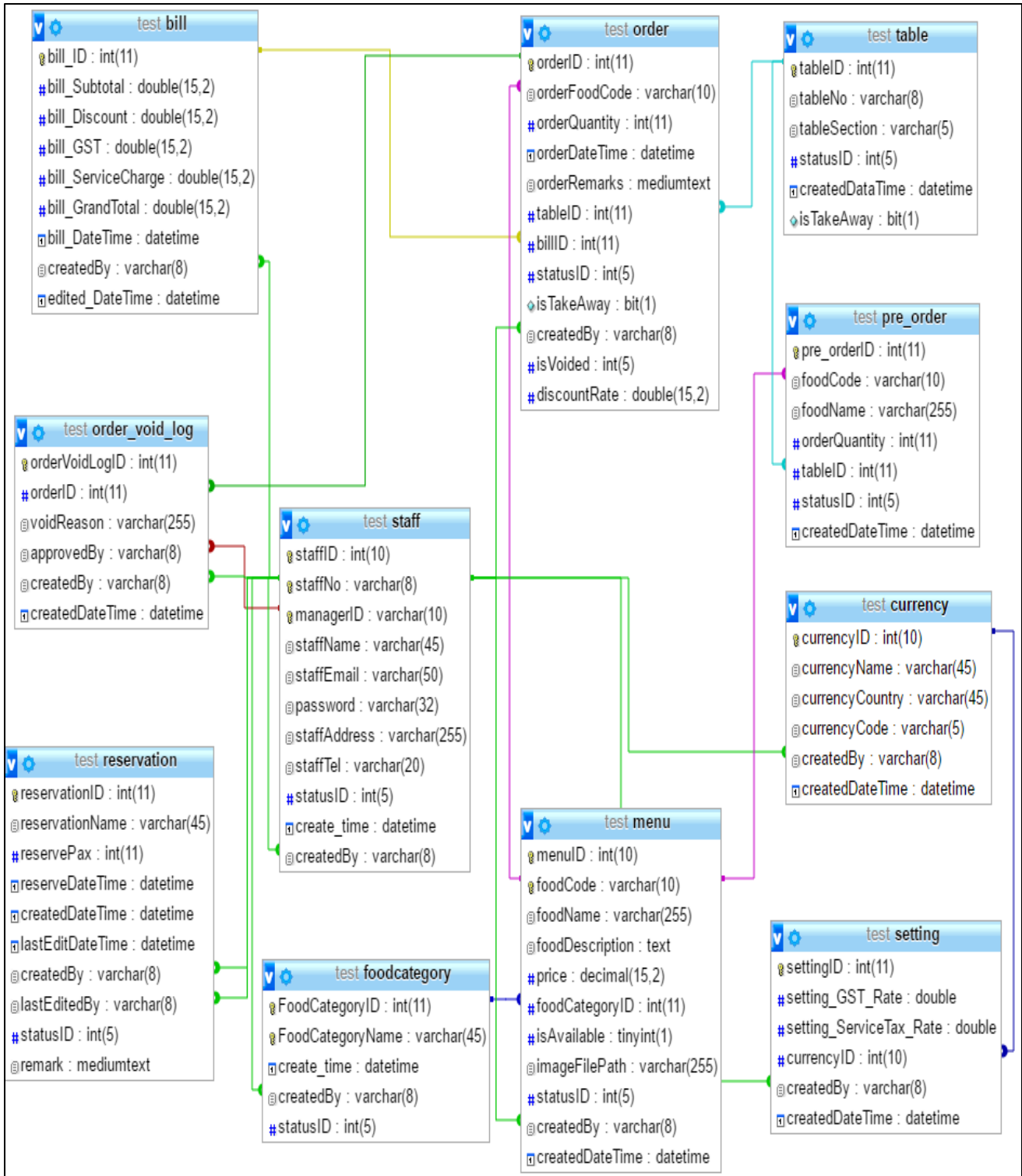
4.4 System Architecture Design

This system requires user to have a smartphone which is with android version version 5.0 or above, for example in this project the test case will be conducted using Oppo Find7A with android v5.0 Lollipop. Other than that, we are expected and assume that all users have the basic knowledge of how to operate an android phone such as connect to a wireless network using Wi-Fi. Although this application is developed under android version, but however it will not be publish to the public Google Play Store. Therefore, user are require to download it from the official restaurant website and sign up for a rules and regulations policy that to prevent misuse of the application and information. The system architecture that implemented in this project would be client-server architecture. Clients are required to connect to the server that hosting the centralized database and web services in order to request server to perform task and respond with the results.
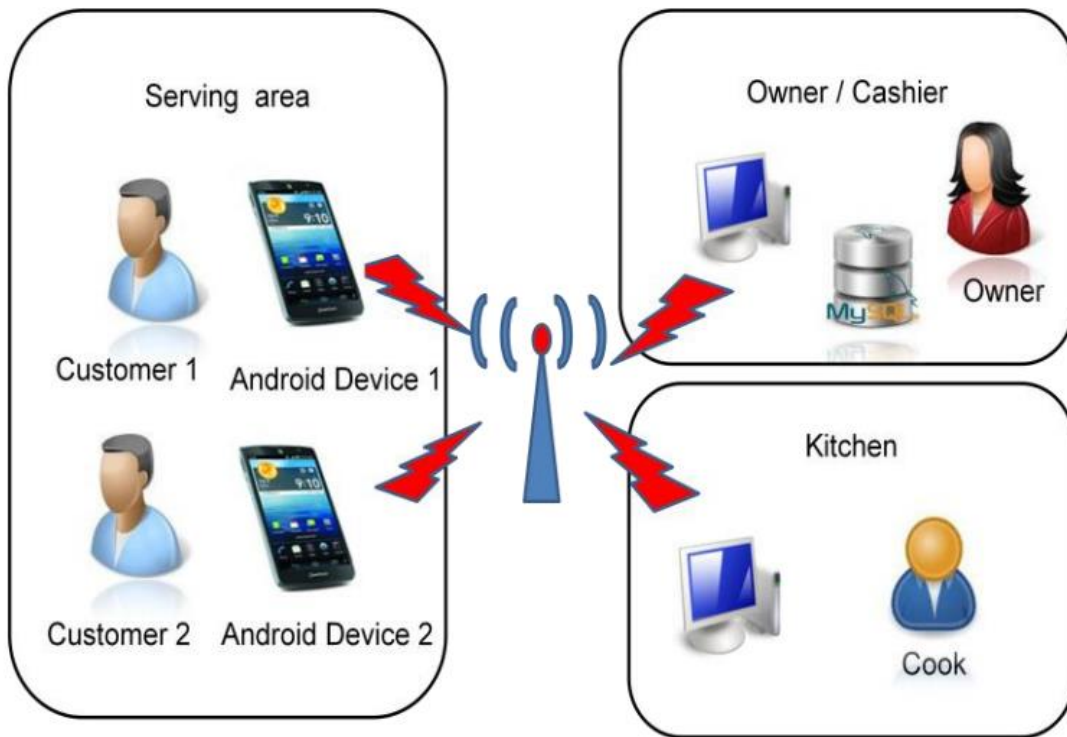
Figure 53 Diagram of System Architecture

CHAPTER 5 SYSTEM TESTING

5.1 Project Implementation & Testing

At the end of the system design, it is the beginning for the actual coding to develop the proposed system. During development phase, the table structure of the database will be first built in order to provide a suitable data types that suit the system back end development, system connection and data transfer. Next, the computer side client program will be developed and follow by will be the web services that allow mobile phone client program to communicate with the server and lastly mobile phone side client program will be developed. In testing phase, several test cases will be carry out to test the system in order to determine the system reliability and system accuracy. According to the test cases, a system testing report will be generated for further review to figure out the system weaknesses and made improvement accordingly. In the deployment phase, several training will be provided for the particular restaurant staff such as how to operate the system, the procedure of handling different event and several instruction that need to be follow when operating the system.

5.2 Implementation Issues & Challenges

During the system implementation phase, several challenges need to be confront because it involve end users to test the production system with various situation. The possible challenges may face are as following:

User without background

The users are required to have basic knowledge of how to operate a computer system and android mobile phone in order to use the system. This will be difficulty to give training to the user as the basic knowledge information can be obtained from internet easily.

The screen size of different device

This would be one of the issue that will encounter while implementing the system. Because user are able to download the mobile application from the official website and use it as a client device to place order. Therefore, if the user device screens size are too small or too big. The content and interface of the application may not consistence.

Server performance

During real time system implementation, three would be a huge number of client that access to the server at the same time. Therefore, it may slow down the connection and performances of the system and even causes the server down if the issue goes beyond the level of acceptance.

5.3 Development Tools

5.3.1 Database Environment

The proposed system will need a database system to support in order to store the huge amount of data. MySQL database system will be chosen to support the proposed system because it is well-known open source relational database management system. Other than that, MySQL database system provides software developer with a client program with easy understanding graphical user interface that can communicate to the MySQL database server named as MySQL Workbench 6.3 CE. By doing so, software developer can interact with the database system with the user friendliness client program and without using the command prompt, at the end it may speed up the development progress.

5.3.2 Web Technology

The proposed system is a cross platform system, which include Windows desktop client and Android mobile phone client. Therefore, it require to implement web services in order to support the Android mobile phone client device to fetch data from the database server and store data back to the database server. In this project, WampServer is used to support the issue that mention earlier. WampServer is a Windows web development environment that built-in comes together with the Apache, PHP and MySQL database. Furthermore, PHP will be the programming language that used to create the web services that store in the server and it is able to call by the Android mobile phone client to perform particular task.

5.3.3 System Platform

The project is a cross platform based system which includes Windows desktop client device and Android mobile phone client device in order to operate the proposed system

software. Therefore, IOS mobile phone client device will not compatible with the proposed system.

5.3.4 Project Management Tool

For the rule of thumb to develop a system, it requires to have an intact system planning which serve as a guide line during the development phases. Microsoft Project is a project management software program and it has been used in the project to design the system planning, project timeline, managing of resources, tracking development progress and etc.

5.3.5 Visual Paradigm Community Edition

In this project, Visual Paradigm software has been used to create document for several system planning diagram such as Use-Case diagram, Activity diagram, Class diagram and etc. By doing so, software developer are able to visualize the system communicate information much more concisely and clearly.

5.3.6 NetBean IDE and Android Studio IDE

Both Android Studio IDE and NetBean IDE is integrated development environment that are supported by Java programming. Furthermore, NetBean IDE is used to develop the computer client side program and Android Studio IDE is used to design and develop the mobile phone client program.

5.4 Test Plan

After the system has been developed, it will move to system testing phase. In system testing phase, the developed system is required to install on appropriate devices for testing purpose. After the system installation has been completed, the system testing task will be performed by different roles of user such as manager role and staff role. The purpose of system testing is to identify and determine the degree of system stability. At the same time, it is given an opportunity for developer to figure out error or bug that has not been raise and encounter during the system development phase. Those error or bug that has been found during the system testing activities will be solved before the system release. Each and every testing before system testing phases is actually tested by the system developer itself. Therefore, it might cause some biases toward the testing due to the system developer have knowledge about the system software logics and lead the

result to be inappropriate. There are four types of testing that will be used to test the developed system which includes unit testing, integration testing, system testing and acceptance testing.

5.4.1 Unit Testing

First of all, unit testing will be the first testing method that used to test the developed system. It consists of testing activities that test the system module by module which has not been integrated as a whole. By doing unit testing, developer are able to identify error and bug easily since it is finding the error and bug through a unit part of the system rather than finding error through the complete system. In addition, developer will test the unit part of the system with the validation and the correctness of data value. Valid and invalid input will be entering to test and ensure the system processes perform with an expected result.

Unit Testing 1: Login as system user

Testing Objective: To ensure user can login into system correctly with valid ID and password.

No	Event	Attribute and Value	Expected Result	Result
1	Verify that ID and password that enter by user and match the data in the database when user click "OK" button on the login prompt.	Login ID: validID Password: validPassword	Login successfully.	Pass
2	Verify the invalid ID and password that enter by user and match with the data that store in database when user click "OK" button on the login prompt.	Login ID: validID Password: invalidPassword OR Login ID: invalidID Password: validPassword	Login failed and prompt out the error message to user.	Pass
3	Verify the situation that user does not enter any value	Login ID: null Password: null	Login failed and prompt out the error	Pass

	into both ID and password when user click "OK" button on the login prompt.		message to user.	

Unit Testing 2: Create new system user

Testing Objective: To ensure new user can be created properly.

No	Event	Attribute and Value	Expected Result	Result
1	Create new system user.	System user information.	Prompt new user has been created successfully message.	Pass
2	Create new system user without entering any information.	All blank field.	Prompt require field error message.	Pass
3	Create new system user with duplicated staff number.	Enter duplicated staff number and click create new user.	Prompt error message indicate that particular field has duplicated.	Pass
4	Create new system user that has at least one or more field that is leave blank.	System user information with some field leave blank.	Prompt require field error message.	Pass
5	Update existing system user information.	Edit and replace the system user details. Eg: Name: Carson to Name: Carson Leong	Successfully updated system user details into system.	Pass

Unit Testing 3: Enter service tax and GST percentage to the system

Testing Objective: To ensure the taxes percentage is store properly into the system.

No	Event	Attribute and Value	Expected Result	Result
1	Manager enters numeric input for both and click "OK" button.	Service Tax(%): 10 GST Tax(%): 6	Taxes percentage is stored into the database.	Pass
2	Manager leaves taxes blank and click "OK" button.	All fields are blank.	System will detect it is null value and store	Pass

			it with default value which is 0.0 into the database.	
3	Manager enters invalid input for taxes field and click "OK" button.	Service Tax(%): 0.01.1 GST Tax(%): 6	Prompt error message indicate that invalid input has detected.	Pass

Unit Testing 4: Add new food category to the menu

Testing Objective: To ensure manager add new food category into the system properly.

No	Event	Attribute and Value	Expected Result	Result
1	Manager enters the category name and click "OK" button.	Food Category Name: Soup	The entered category name is store into the database and refreshes the food category panel with the new added category.	Pass
2	Manager leaves the category name blank and click "OK" button.	Field is blank.	System will detect it is null value and prompt error message.	Pass
3	Manager enters duplicated food category name and click "OK" button.	Food Category Name: soup Or Food Category Name: Soup	Prompt error message indicate that duplicated food category has been detected.	Pass

Unit Testing 5: Add new food to the menu

Testing Objective: To ensure manager add new food into the system properly.

No	Event	Attribute and Value	Expected Result	Result
1	Manager enters all valid food information and chooses an image that represents that food and click "Add" button.	Food Code: S002 Food Name: Mushroom Soup Price(RM):12 Food Availability: Yes	The entered food information is store into the database and refreshes the food menu panel with the new added food.	Pass
2	Manager leaves the food information blank and click "Add" button.	Field is blank.	System will detect it is null value and prompt error message.	Pass
3	Manager leaves some required field to blank and click "Add" button.	Food Code: Food Name: Mushroom Soup Price(RM): Food Availability: Yes	System will detect it is null value and prompt error message.	Pass
4	Update existing food information.	Edit and replace the current details. Eg: Food Price(RM): 25.00 to Food Price(RM): 30.00.	Successfully updated food information into system.	Pass

Unit Testing 6: Make reservation for customer

Testing Objective: To ensure user can make reservation and store into the system properly.

No	Event	Attribute and Value	Expected Result	Result
1	Staff enters all the reservation information and click "Save" button.	Customer Name: Carson Pax: 5 Date: 02 – 13 -2016	The entered reservation information is store	Pass

		Time: 8.00PM	into the database and refreshes the reservation list with the new created reservation.	
2	Manager leaves the reservation information field blank.	Field is blank.	System will detect it is null value and prompt error message.	Pass

Unit Testing 7: Payment for the ordered items

Testing Objective: To ensure payment make by customer working properly.

No	Event	Attribute and Value	Expected Result	Result
1	Verify food order record belong to which table and calculate the amount.	Food information and taxes information.	Display all food information that belong to the table and calculated correct price amount.	Pass
2	Verify the price calculation is correct.	Subtotal: RM10 Service Tax(10%): RM1 GST Tax(6%): RM0.60 Grand Total: RM11.60 Amount Receive(RM): RM15.00 Changes(RM): RM3.40	Store data into database and back to the open sales interface.	Pass
3	Verify the cash amount receive from customer must more than or equal to the grand total amount.	Subtotal: RM10 Service Tax(10%): RM1 GST Tax(6%): RM0.60 Grand Total: RM11.60 Amount Receive(RM): 10.00	Payment cannot be make if the amount receives from customer is less than the grand total amount.	Pass

		Changes(RM): -3.40		

5.4.2 Functional Testing

After conducted the unit testing, functional testing will begin to test the developed system. Functional testing is performed to verify that the system application processes that perform and functioning appropriately according to the design specifications. In functional testing, the core system application functions will be tested with several test cases in order to ensure that the entire system functioning as a whole and perform task that with the expected results.

Functional Testing 1: Login with different user role

Testing Objective: To ensure user with different role login according to restricted system features.

No	Event	Attribute and Value	Expected Result	Result
1	Login as "Staff"	Login with Normal staff information	Successfully login.	Pass
2	Login as "Manager"	Login with manager information	Successfully login.	Pass

Functional Testing 2: Place order by staff using computer and by customer using mobile phone

Testing Objective: To ensure order place by staff is stored to the system and work properly.

No	Event	Attribute and Value	Expected Result	Result
1	Place order according to what customer request	Food Quantity and extra remark for that particular food.	Order details submitted successfully and store into the database system.	Pass

2	Edit or void order detail before the order being submitted	Edited food quantity or void the ordered item.	Cancel the order process and redirect back to open sales interface.	Pass
3	Edit or void ordered item after order has been submitted.	Change order quantity with valid reason. Eg: From 2 units to 1 unit and reason is "Customer Request". Or Void the ordered item with valid reason. Eg: Cancel the entire order of the particular item and reason is "Out of Stock".	Voided order will update immediately and void log will store to the database.	Pass
4	Customer used their own device or restaurant prepared devices that installed with the mobile application to place	Selected table and selected food order quantity.	Order details submitted through mobile phone to database system successfully.	Pass

Functional Testing 3: Make reservation for customer and claim the reservation

Testing Objective: To ensure the reservation information store properly and is able to claim by customer.

No	Event	Attribute and Value	Expected Result	Result
1	Staff enters all the reservation information and click "Save" button.	Customer Name: Carson Pax: 5 Date: 02 – 13 -2016 Time: 8.00PM	The entered reservation information is store into the database and refreshes the	Pass

No	Event	Attribute and Value	Expected Result	Result
			reservation list with the new created reservation.	
2	Staff verifies the reservation information that match with the customer information and claim the reservation for customer.	Verify the reservation by customer name and it details.	The reservation claim successfully and remove from the reservation list.	Pass

Functional Testing 4: Make payment

Testing Objective: To ensure the reservation information store properly and is able to claim by customer.

No	Event	Attribute and Value	Expected Result	Result
1	Staff select the particular table that customer request to make payment.	Selected table and order details that belong to the selected table.	Each and every order details will be display, taxes amount and grand total amount will be calculated correctly.	Pass
2	Staff and customer are responsible to verify the entire order item and the price calculation is correct.	Subtotal: RM10 Service Tax(10%): RM1 GST Tax(6%): RM0.60 Grand Total: RM11.60	Store data into database for future reference.	Pass
3	Staff receive cash amount from customer and enter the amount into the amount receive field.	Subtotal: RM10 Service Tax(10%): RM1 GST Tax(6%): RM0.60 Grand Total: RM11.60 Amount Receive: RM15	Payment cannot be make if the amount receives from customer is less than the grand total amount.	Pass

		Change:RM3.40		
4	Manager is able to check transaction that has done after login.	Manager login information	Login successfully and display transaction history records.	Pass
5	Manager is able to void the transaction and refund to customer after the transaction has done.	Selected transaction and selected refund item that contain in that transaction.	Transaction will be updated with the latest grand total and amount to be refund will be calculated and display.	Pass

Functional Testing 5: Update menu information

Testing Objective: To ensure the menu information is updated and works properly.

No	Event	Attribute and Value	Expected Result	Result
1	Manager intends to update the food availability due to the fresh ingredient shortage.	Food Availability: Yes Or Food Availability: No	The particular food will disappear from the food order interface both desktop client and mobile phone client devices according to the food availability.	Pass
2	Manager intends to update the food information with the latest information.	Change the food price to the current updated pricing. Eg: Edit selected food price from RM10.00 to RM15.00.	Updated food information will store into the database and the updated information will reflect to the food order interface for both desktop client and mobile phone client devices.	Pass
3	Manager intends to add new food item that able to serve customer.	Food Code: NewFoodCode Food Name: NewFood Price(RM):12.00	New food information will store into the database and the latest food information will reflect to the food order	Pass

		Food Availability: Yes	interface.	
4	Manager intends to delete a particular food that is no longer available to sell.	Selected food information	The deleted food information will update to the database system and the deleted food will disappear from the food order interface.	Pass

Functional Testing 6: Generate report

Testing Objective: To ensure the report is generated appropriately.

No	Event	Attribute and Value	Expected Result	Result
1	Login as manager.	Manager login information.	Login successfully and display report type interface.	Pass
2	Manager generates daily sales report at the end of the day.	Select the specific date to generate the selected date daily sales report.	A PDF file daily sales report will generated according to the selected date with its records. If the selected date has no record found from the database, it will prompt a notification indicate user.	Pass
3	Manager generates daily order void report at the end of the day.	Select the specific date to generate the selected date order void report.	A PDF file daily order void report will generated according to the selected date with its records. If the selected date has no record found from the database, it will prompt a notification indicate user.	Pass
4	Manager generates monthly sales report at the end of the day.	Select the specific year and specific month to generate the monthly sales report.	A PDF file monthly sales report will generated according to the selected year and month with its records. If no record found from the database, it will prompt a notification indicate user.	Pass
5	Manager clicked	Selected date, month or	The system will not perform	Pass

	generate report without select a specific date or year for all three type of report.	year is null	any processing to generate the report.	

Functional Testing 7: Update Order through Kitchen Dashboard

Testing Objective: To ensure the order queue and order status is updated and reflects to the open sales interface.

No	Event	Attribute and Value	Expected Result	Result
1	Kitchen staff updates the order status when it is preparing to be served.	Information of the selected order.	The selected order status is updated and reflects to the open sales interface and it is no longer able to be void.	Pass
2	New order that are placed and submitted to the system.	New order information that are placed.	The order queue will automatically refresh with the new order that are placed.	Pass

5.4.3 System Testing

System testing of the software and hardware is a testing conducted on a system which is complete, integrated system that works as a whole. System testing is a critical testing procedure that must be conducted by software developer before the system released. During system testing it can evaluate the system's compliance with its specified requirements according to the system design. Furthermore, several testing activities in system testing test not only the design of the system, but also the behavior and the believed expectations result from the customer. In addition, various complex test cases that used to test the system are according to the business process requirements which are collected from the user. Meanwhile, errors or bugs that detected during the testing is required software developer look into it from the initial step of the business process to the end of the process to ensure it have expected result in order to solve the errors or bugs to determine the degree of system stability.

5.4.4 Acceptance Testing

Last but not lease, acceptance testing also known as user acceptance testing would be the final testing procedure that perform to test the developed software system. In acceptance testing, the testing activities are different compare to the testing activities that mentioned previously because the tester that tests the system will be the final user which do not have knowledge about the system logic. If the final user encountered an error while using the system, system developer are required to maintain the system as soon as possible and release a new patch for the existing system to recover the error. Meanwhile, final user will use the system that visualized as to support their real business routine operation, therefore software support team are required to stand by to provide technical support while final user need any help or support that regarding the system. If there is no errors detected by the final user while using the system for a long period, the development job of developer is consider as complete and the system will be a final system product.

CHAPTER 6 SYSTEM EVALUATE AND DISCUSSION

6.1 Proposed System Completion

The proposed system is designed and developed to solve all the problem statements which are stated in chapter one of this report. First of all, the developed system provides a feature that is able to solve the problem of difficulties in food order ticket tracking and achieve the project objective of prevention of food serves not in sequence. By using the system, it allow staff to placed order ticket through using the system and the system will automatically queue the food order information according to the first come first serve basis and kitchen staff is able to follow the food queue to serve customer accordingly. It also eliminates all the manual processes that involve in the traditional method of delivering food order ticket. In addition, the developed system allows manager to update all the food information as it is needed. This features helps restaurant to eliminate duplicated physical menu card which contain misleading information and also allow staff and customer to view the latest updated food menu information through using the system. By doing so, it helps restaurant to solve the problem which regarding difficulties in updating menu card information, difficulties in providing appropriate updated food information and the potential of increase cost of operation as the system will automatically refresh all the updated information that is edited by manager. Furthermore, the project objective which regarding provides convenience for both employees and consumers has been achieved because the system allow consumer to view all the updated information through the mobile phone client devices and it reduce the number of manual work which restaurant staff need to be performed. Last but not lease, the project objective of assisting restaurant to plan ahead has been achieved due to the system allow manager to generate several types of report in order to assist the restaurant to plan ahead. By analyzing the generated report, manager is able to carry out a planning for the next business routine of the restaurant in order to improve the restaurant operation efficiency. In a nutshell, the system has fulfilled all significant outcomes that according to all the problem statements and project objectives that are stated.

6.2 System Strength and Limitation

6.2.1 System Strength

The system provide customer with good dine in experience as it allow customer to view food information and place order through using the mobile phone device. The mobile application also provides ease of use because it has easy understandable graphic user interface and minimal instruction to follow while place order through the application. Next, it helps restaurant staff to serve their value customer in minimal delay. Furthermore, the system can be implemented with low cost and is affordable for most of the small medium enterprise restaurant, because the hardware requirements are not required to be high end powerful in order to support the system. Lastly, server and client are communicating within the restaurant which is intranet therefore it does not need to have internet access.

6.2.2 System Limitation

The system is not compatible with IOS mobile devices as the mobile application is developed in Android environment. Therefore, for IOS mobile phone user may not able to install the application in their mobile phone and experience the system. Meanwhile, the restaurant has prepared some Android mobile devices which are used to resolve the issue that mention above. Next, due to the mobile phone client devices are required to connect to the wireless intranet in order to communicate with the server. It is very important to identify a suitable location that used to install and set up the wireless access point in order to ensure the wireless signal coverage is able to reach the entire restaurant area.

6.3 Future Enhancement

The system can implement a feature which is real time notification from the mobile phone application to the service desk. This feature enable customer to request customer service through using the mobile application rather than verbally call restaurant staff to approach them. In addition, the mobile application also can implement a feature that allow customer to update the food serve status. For example, customers fine dining at the restaurant they can request the food to be serve through using the mobile application and if the customer finish the main course and feeling full, the customer may request do not serve the following food through using the mobile application. Last but not lease, the

mobile application may implement some mini game that is able to entertain customers while they are waiting for the food to be served.

CHAPTER 7 CONCLUSION

After a decade, the advancement and innovation of technology help people to manage their task easily and efficiently. In many other industry area have been used management system to assist their business grow long time ago, therefore it is also a trend that cause F&B industry to make use of a management system for their business. At the end of this project, the system can reduce and replace the human manpower task, reduce the time consume for each transaction and generate report for further management purpose by fully utilizing the system.

Obviously, the propose system can help improve the productivity of the restaurant and thus directly did an impact to the profitability of the restaurant. Furthermore, it can also help restaurant to reduce the cost of operation in term of manpower, because the system have already facilitate majority of the business process by using the system. Therefore, it is believed that the system can lead the restaurant's business grow from time to time.

On the other hand, the technology nowadays allows the portability requirement easy to achieve. Therefore, portability has become one of the factor that have to take into consideration in the system development process. Because portability bring a lot of benefit to user while they using the system such as it provide convenience, accessibility, easy to communicate and etc. Hence, portability has done an impact to the social that everybody is much more preferable to complete their task with portable device.

In order to fulfill these all requirement, our proposed method is combined the food ordering system which is in mobile platform into the restaurant management system which is in computer platform. The integration of both features which develop a system that can let user to have an experience of portability which is user can process their food ordering through using their smart phone or tablet. Besides, restaurant manage their daily operation management through using the computer platform it is because computer have some other features such as it has a wider screen, other compatible system that can help to manage the restaurant and some other driver that needed to communicate with those necessary hardware.

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APPENDIX A USE CASE DESCRIPTION

Place Order Use Case Description

Use Case Name: Place Order	ID: 1		Importance Level: High
Primary Actor: Customer		Use Case Type: Detail, Essential	
Stakeholders and Interests: Customer – wants to place an order Staff – wants to validate customer's order and save to the system			
Brief Description: This use case describes how user can place order in system			
Trigger: Customer want to order some food Type: External			
Relationships: Association: Customer, Staff Include: Submit Order Extend: Generalization:			
Normal Flow of Events: The customer view menu using the device. The customer chooses and places an order for the preferable food. The customer would continue place order until finish order. The customer submit the order when finish order. The system will update to the database and wait staff to verify the order.			
Sub Flows: 			
Alternate / Exceptional Flows: Not applicable			

Use Case Name: Make Payment	ID: 2		Importance Level: High
Primary Actor: Staff		Use Case Type: Detail, Essential	
Stakeholders and Interests: Customer – request to make payment for their order Staff – perform the billing process using the system			
Brief Description: This use case describes how user can make payment using the system			
Trigger: Customer want to make payment for their order and leave the store. Type: External			
Relationships: Association: Customer, Staff Include: Calculate GST, Print Receipt Extend: Generalization:			
Normal Flow of Events: The customer request to make payment. The staff prepares the payment details by using the system. The system calculates the payment transaction details based on the customer's order. The system calculates GST. The system generates the bill for staff. The staff click "Print" button to print the bill. The customer pay the bill according to the bill printed. The staff receives cash or credit payment from customer. The staff saves the transaction using the system. The system generates receipt for staff. The staff prints the receipt that generated. The staff provides the transaction receipt to the customer.			
Sub Flows:			
Alternate / Exceptional Flows: Not applicable			

Use Case Name: Generate Report	ID: 3		Importance Level: High
Primary Actor: Manager		Use Case Type: Detail, Essential	
Stakeholders and Interests: Manager – wants to generate report			
Brief Description: This use case describes how user can print report using the system			
Trigger: Manager click on the report button and select report type. Type: External			
Relationships: Association: Manager Include: Extend: Generalization:			
Normal Flow of Events: The manager log in to the system. The manager request to generate particular report. The system generates the report. The manager view the generated report.			
Sub Flows:			
Alternate / Exceptional Flows: Not applicable			

Use Case Name: Void Order	ID: 4		Importance Level: High
Primary Actor: Staff		Use Case Type: Detail, Essential	
Stakeholders and Interests: Customer – wants to cancel previous ordered Staff - perform void order process using the system			
Brief Description: This use case describes how the customer request to void order			
Trigger: Customer placed an order and afterwards want to cancel the order Type: External			
Relationships: Association: Customer, Staff Include: Check food queue status Extend: Generalization:			

Normal Flow of Events:
The customer request to cancel order.
The staff voids the order that the customer wish to cancel using the system.
The system checks the food queue status.
If the food status is "Preparing".
   The system will notify the staff that the food is preparing.
   The staff will inform the customer that the food is preparing. Hence cannot be void.
Else
   The system will cancel the order from the food queue.
   The system will update the order queue.			

Sub Flows:			
Alternate / Exceptional Flows: Not applicable			

Use Case Name: Validate Order	ID: 5		Importance Level: High
Primary Actor: Staff		Use Case Type: Detail, Essential	
Stakeholders and Interests: Staff – verify the order that placed by customer. Customer – clarify order details with staff.			
Brief Description: This use case describes how staff validates order using system.			
Trigger: After customer submit an order then system will notify staff to verify. Type: External			
Relationships: Association: Customer, Staff Include: Update order queue Extend: Generalization:			
Normal Flow of Events: The system notifies staff to verify the order. The staff checks the order. If the order have some exceptional issue. The staff will clarify with the customer Else The staff will click "Verify" button to verify the order. The system will update the order queue.			
Sub Flows: 			
Alternate / Exceptional Flows: Not applicable			

Use Case Name: View Order Queue	ID: 6		Importance Level: High
Primary Actor: Kitchen Staff		Use Case Type: Detail, Essential	
Stakeholders and Interests: Kitchen Staff – wants to view the food queue to prepare food accordingly.			
Brief Description: This use case describes how kitchen staff view food queue using system.			
Trigger: Kitchen staff wants to prepare food. Type: External			
Relationships: Association: Kitchen Staff Include: Extend: Update dishes status Generalization:			

Normal Flow of Events:
The kitchen staff selects view type using the system.
If selected to view "New" type.
   The kitchen staff will view on new type order.
   If the kitchen staff wants to start prepare the new order food.
      The kitchen staff will update the dishes status using the system.
      The system updates the dish status.
If selected to view "Preparing" type.
   The kitchen staff able to view on preparing type order.
   If the food on preparing food queue has completes prepare.
      The kitchen staff will update the dishes status using the system.
      The system updates the dish status.			

Sub Flows:			
Alternate / Exceptional Flows: Not applicable			

Use Case Name: Add Menu Info	ID: 7		Importance Level: High
Primary Actor: Manager		Use Case Type: Detail, Essential	
Stakeholders and Interests: Manager – wants to add new menu info to the system.			
Brief Description: This use case describe how manager can add menu info using the system			
Trigger: Manager wants to add new menu info into the system Type: External			
Relationships: Association: Manager Include: Extend: Generalization:			
Normal Flow of Events: The manager log in to the system. The manager request to add new menu info to the system. The manager key in all requires and necessary details to the system. The manager submits the menu info to the system. The system validate the require field. If any require field are blank. The system will notify the user. The system saves the record. Else The system saves the record.			
Sub Flows: 			
Alternate / Exceptional Flows: Not applicable			

Use Case Name: Delete Menu Info	ID: 8		Importance Level: High
Primary Actor: Manager		Use Case Type: Detail, Essential	
Stakeholders and Interests: Manager – wants to delete some outdated menu info from the system.			
Brief Description: This use case describes how the manager delete menu info from the system.			
Trigger: Manager wishes to delete some unnecessary menu info. Type: External			
Relationships: Association: Include: Extend: Generalization:			

Normal Flow of Events:
The manager log in to the system.
The manager looks for the unnecessary info that wants to delete.
The manager click "Delete" button to delete the unnecessary info.
The system prompt user for a confirmation.
If manager click "Cancel" button
   The info will not delete.
Else
   The system will save the record to the database.			

Sub Flows:			
Alternate / Exceptional Flows: Not applicable			

Use Case Name: Update Menu Info	ID: 9		Importance Level: High
Primary Actor: Manager		Use Case Type: Detail, Essential	
Stakeholders and Interests: Manager – wants to update particular menu info to the system.			
Brief Description: This use case describes how to manager update menu info.			
Trigger: Manager wishes to update some outdated menu info. Type: External			
Relationships: Association: Manager Include: Extend: Generalization:			
Normal Flow of Events: The manager log in to the system. The manager search info that wishes to update. The manager key in and update the require info to the system. The system asks for confirmation to save the updated info. If the manager click "Confirm" button. The system will save the updated information to the database. Else The information that edited will not save.			
Sub Flows:			
Alternate / Exceptional Flows: Not applicable			

Use Case Name: Make Reservation	ID: 10		Importance Level: High
Primary Actor: Customer		Use Case Type: Detail, Essential	
Stakeholders and Interests: Customer – wants to make a reservation for their future dine in. Staff – perform make reservation process using the system			
Brief Description: This use case describes how to staff make reservation for customer.			
Trigger: Customer request for making reservation. Type: External			
Relationships: Association: Staff, Customer Include: Save Reservation Information Extend: Claim Reservation for Customer Generalization:			
Normal Flow of Events: The customer make phone calls to request reservation for future dine in. The staff answer phone call and enter reservation information. The staff clarifies reservation information with customer to get confirmation. The staff answers accordingly. If the staff enter wrong information. The staff has to reenter correct reservation information. The staff submits the reservation information. The reservation information will save to the system. Else The staff submits the reservation information. The reservation information will save to the system.			
Sub Flows:			
Alternate / Exceptional Flows: Not applicable			

Appendix

Use Case Name: Place Order by Staff	ID: 11		Importance Level: High
Primary Actor: Customer		Use Case Type: Detail, Essential	
Stakeholders and Interests: Customer – wants to place order. Staff – perform place order process using the system			
Brief Description: This use case describes how to staff place order for customer.			
Trigger: Customer request for place order. Type: External			
Relationships: Association: Staff, Customer Include: Submit Order Extend: Add Remark Generalization:			
Normal Flow of Events: The customer request to place order. The staff place order according to the customer requested. If the customer have extra remark for the order. The staff key in remarks accordingly. The staff place order until customer finish ordering. The staff submits the order. The order details will be store to the system. Else The staff place order until customer finish ordering. The staff submits the order. The order details will be store to the system.			
Sub Flows: 			
Alternate / Exceptional Flows: Not applicable			

Use Case Name: Add New Staff	ID: 12		Importance Level: High
Primary Actor: Manager		Use Case Type: Detail, Essential	
Stakeholders and Interests: Manager – wants to add new staff that can access the system.			
Brief Description: This use case describes how manager add new staff information to the system.			
Trigger: Manager intends to add new system that able to access system. Type: External			
Relationships: Association: Manager, Staff Include: Extend: Update Staff Information Generalization:			
Normal Flow of Events: The manager login to the system. The manager navigates to create new staff interface. The staff enters all relevant information. The manager verifies all the information. If have mistaken during staff enter information. The staff re-enters information. The manager save the staff information. The staff information will save to the system. Else The manager save the staff information. The staff information will save to the system.			
Sub Flows:			
Alternate / Exceptional Flows: Not applicable			