

CAFETERIA FOOD PAYMENT USING QR CODE

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CAFETERIA FOOD PAYMENT USING QR CODE

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Thesis submitted in fulfillment of the requirements
for the award of the degree of
Bachelor of Computer Science (Computer Systems & Networking) With Honors

Faculty of Electrical & Electronics Engineering

UNIVERSITI MALAYSIA PAHANG

JANUARY 2018

ACKNOWLEDGEMENTS

I would like to thanks to Allah s.w.t for his blessed during the completed this project final year. Without his blessed, I will not be able to finish this project on time and successfully

I would wish to show my gratitude towards my supervisor, Madam Zalili Binti Musa for guidance, encourage, idea and give the moral support to me along way to finish this project. She always helps me a lot in suggestion the solution to the problem that have been encountered within this period for a year. She also sacrificed the free time in order to make sure this project will be run smoothly.

Special thanks to my beloved family, and all my friends for their support, helps and motivation throughout as complete the project. Thanks to all lectures who give idea and insights about the project being implemented. To all my fellow friends in University Malaysia Pahang students and for those who help me during this project resolved. I really appreciate their services in encouraging me and never give up on stimulating words in order to foster this project.

ABSTRAK

Pengurusan kewangan merupakan salah satu perkara yang penting bagi setiap orang terutama sekali dikalangan pihak remaja. Kebanyakan remaja mempunyai masalah dalam pengurusan wang pembelajaran mereka, lebih-lebih lagi apabila mereka di alam pelajaran ke peringkat yang lebih tinggi. Pihak remaja menghadapi masalah kekurangan wang pembelanjaan adalah disebabkan mereka tidak mahir dalam pengurusan wang pembelanjaan mereka dengan betul, wang simpanan tidak mencukupi, ataupun pembelian barangan keperluan serta pembelajaran yang melebihi dari anggaran pembelian mereka. Maka pembayaran dengan menggunakan QR codes sistem telah di kemukakan bagi membantu pihak remaja dalam pengurusan wang pembelanjaan mereka dengan lebih baik yang dipanggil Cafeteria Food Payment System atau singkatannya CFPayment sistem. Sistem ini berfungsi untuk membantu pihak remaja dalam pengurusan wang pembelanjaan mereka secara alam maya agar mereka mempunyai wang simpanan untuk pembelanjaan terlebih dahulu sebelum mereka menghadapi masalah wang tidak mencukupi untuk pembelanjaan. Selain itu, sistem ini juga turut membantu pihak remaja dalam pengasingan wang mereka dari segi pembelian dan juga pembelanjaan. Objektif sistem tersebut adalah untuk membantu pihak remaja bagi pengurusan wang dengan lebih teratur, mengelakkan mereka menghadapi masalah wang tidak mencukupi untuk pembelanjaan dan wang mereka tertinggal atau terlupa untuk dikeluarkan daripada mesin atm. Maka demi menyelesaikan masalah tersebut, sistem ini telah dikemukakan untuk dibangunkan bagi memenuhi cadangan yang telah dikemukakan untuk membantu pihak remaja dalam pengurusan wang pembelanjaan mereka dengan lebih teratur dan sistematik. Hasil yang diharapkan daripada sistem ini adalah agar pihak remaja dapat menguruskan wang pembelanjaan mereka dengan lebih baik agar dapat mengelakkan masalah wang pembelanjaan mereka yang dihadapi sepanjang mereka di alam pelajaran peringkat yang lebih tinggi.

ABSTRACT

Financial management is one of the important things for everyone, especially among students. Most teens have problems managing their money, especially when they are in higher education. Adolescents are faced with a shortage of spending money because they are not skilled in managing their money properly, insufficient savings, or purchase of essentials and learning materials that exceed their estimated purchases. Payment by using the system QR codes has been raised to help the adolescents in managing their spending money better called the Cafeteria Food Payment System or the CFPayment system. This system works to help the adolescents in managing their spending money virtually so that they have saved on their spending before they face inadequate money for spending. In addition, the system also helps students in exile in terms of purchasing and spending. The objective of the system is to help adolescents manage money more efficiently, preventing them from having enough money for their expenses and their money left behind or forgetting to be removed from ATM machines. So to solve this problem, it has been proposed to be developed to meet the recommendations put forward to assist the youth in the management of their spending money more regularly and systematically. The expected result of this system is that the teens can manage their spending money better in order to avoid spending money problems they faced during their lessons in nature at a higher level.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In the ever-increasing technology era, various technologies have been built to meet the needs, wants and satisfaction of all, especially among teens. This technology can be said almost everyone has a smartphone regardless of age and it becomes a necessity nowadays. Their phones are only used for long distance communications, but in the near future, the smartphones have been equipped with a variety of systems, facilities and applications to meet their needs.

Smartphones can be categorized between one of the key requirements to teens, as well as easy to carry anywhere, regardless of the time, place or where they are, it is also a versatile tool for communication, data storage, information search and more can help students.

However, if viewed from a different angle, there are few distinct advantages that can be seen, for example buying a trade. Smartphones are definitely the system's wisdom used to provide facilities including online purchases, but facilities still cannot help this problem especially for students in spending such as food or beverages.

Thus, the Cafeteria Food Payment Using QR Codes system or better known as CFPayment has been proposed to help students in managing money wisely for their spending in universities. The main aim of the proposed system is to replace the cash needed to be brought to the market with cash in the virtual world. The system is also suggested as it is installed on smartphones like other applications and added with QR Codes scan application to signal and get a response. Thus, smartphones have been used by various ages and races, incorporating this unique CFPayment system which is suitable for use by various levels of society.

In order to function and get better performance, this proposed device will make it ideal for teens to help with better and safe money handling. QR Codes is a specially

designed application for students as current smart cards can be easily broken. The QR Codes system also has a variety of types and types that are suitable for use as SQRC systems that are able to store information in secret as well as in management in the case. It also avoids if teens are left out or lose their money and with the system, they can be brought anywhere as they bring their own smartphones. In fact, teens are extremely active in the use of smartphones regardless of where they are. That is one of the major reasons CFPayment has been proposed to facilitate their use for easier purchase of smart card usage. Students only need to register their account number upon registration of the system according to the type of bank they want to register, as each of their purchases will be deducted from their account to facilitate and save time for them to manage the transaction.

1.2 Problem Statement

Generally, students will use cash as an asset for a purchase, but some issues will make them complacent and their money shortage in something. Most of the teens will feel tired and forget about their spending money and just buy something without first knowing whether it needs or will and regardless of the price of the item and their budget at any one time.

The main problem that often occurs among students is they often have a shortage of cash for their food expenses, as students do not practice savings and often use their money to buy something according to their wants and satisfaction regardless of the budget and price of the item. Then this will cause students not to spend as usual for basic expenses like food and drink.

In addition, time constraints are also a major problem for students because if students do not have enough cash to buy food, they need to spend some time finding an ATM machine to take about spending their money. This can be considered a problem because there are a small number of teens who have little time to relax and buy food, but not enough time for them to withdraw their money at ATM machines and chances are they cannot buy food and rest even if only briefly.

Time wastage can also be an issue for students as teens do not have small money while spending, while at the counter payment side also do not have enough money left, it will take a bit of time for teens even though salesperson to make a cash advance before the sale can continue as usual.

The last problem that is often heard is the problem of losing money unknowingly. Students who are being careless and lackadaisical in the storage of their money, would cause them to forget where they put their money or they do not realize that the money they have fallen or dropped in a place before they realized the events that had happened to them.

Therefore CFPayment system has been proposed to solve the problems faced by students. These issues are often heard at any university area, so the system aims to facilitate teens who often hold and use their smartphones regardless of time, place and time as an app for them to spend without them worrying about losing money, not It has enough time to withdraw money from an ATM machine or less money due to bad money management. At the same time, they can learn a bit about money management for their basic needs as students.

1.3 Objective

The objective of this project are:-

- To study on how system CFPayment used for students in the process of purchases.
- To design and develop the CFPayment system for student to pay food.
- To test usability functions of CFPayment system using QR Codes for student.

1.4 Scope

The main scopes of the project are:-

- To design and develop the android application and web base.
- The target area for this research is for students to make food payers in the cafeteria.
- For campus community UMP.

1.5 Summary

Chapter 1 will discuss about introduction of the Cafeteria Payment Food using QR Code. This chapter will explain the problem with the current application QR Code using smart phone. The research objectives set the goal of the system that need to be achieved. The scope of the proposed system is the High School Education.

Chapter 2 will discuss the existing system that is related to Cafeteria Payment Food using QR Code. This chapter will justify the need of the proposed system from the comparison of existing system. Also, this chapter will describe about of the smart phone using application QR Code.

Chapter 3 will discuss about the methodology used in the design of the system. This chapter will discuss about hardware and software that will be used in the design of the system. The Gantt chart will describe the time line of the project.

Chapter 4 will discuss about the implementation process of the application QR Codes, the testing of the project also the result discussion about the proposed system.

Chapter 5 discuss about the conclusion of the research where constraint of the project and the project and the future work will be discussed there.

CHAPTER 2

LITERATURE REVIEW

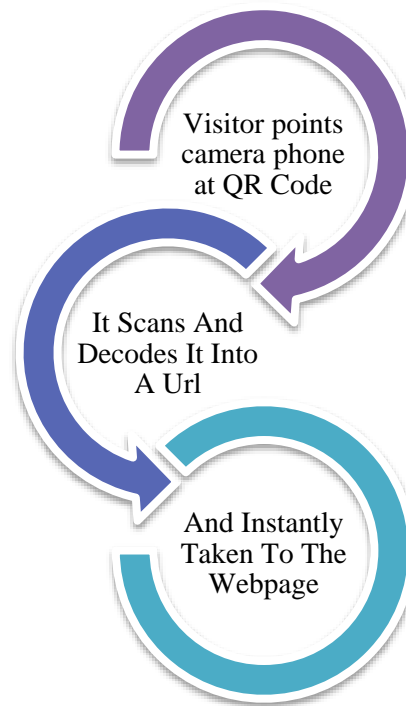
2.1 Introduction

The literature review will focus on the existing systems. In addition, this chapter also compares hardware, technology or tools that are more appropriate for the project. The first thing to focus on is the overview of the QR Code which includes a brief description of QR Code, QR Code history and QR Code application. Next, will define QR Code components and QR Code operations summary. Additionally, compare the three existing merit systems to prove that QR Code technology is more appropriate in this project. Finally, it will explain the comparison between QR Code and other technologies.

2.2 Overview of QR Code

QR code is remains for “Quick Responses Code” as the maker planned the code to permit its substance to be decoded at high speed. It also a matrix code created and discharged basically to be an image that is effectively translated by scanner gear. It contains data in both vertical and even headings, though and stablished barcode has just a single bearing of information which is usually the vertical one. Contrasted with a ID barcode, and can hold an extensively more noteworthy volume of data.

Besides that, QR Codes are helpful innovation in our life and it can utilized on everything and turned out to be more prevalent. QR Codes also can numerous item and can get the information of the products even in store, ad, magazines and some more. QR Code is a simple as long as have the codes scanner software and a camera.



Steps to scan a QR Codes:

- i. Open QR Codes application and point the camera at the QR Codes that you want.
- ii. The application will interpret the QR Code.
- iii. The application is loading the information.
- iv. A few seconds, the information will shows on the screen.

2.3 Existing System

In this topic, we will discuss the differences between developed systems and systems that have been developed based on databases that almost have links to each other such as storing information in databases, link connection between devices, data updates and so on. Therefore, this topic has been chosen and will explain about the three systems that have been selected to help and see the comparison of the system to be developed.

2.3.1 Positive Patient Identification Using RFID and Wireless Network

Identification is a common way of knowing the patient's details and history hospital. The patient will enter the hospital with the first step made for registration get information on patients entering hospital and wards. But there is some of the problems faced by many hospitals. This is a misidentification of the patient.

If hospital make mistakes with patient information, it will be the biggest problems and it can also be a dangerous situation. The introduction of patients is the most important thing for a hospital needs to be considered. Because details about the patient will be easier for the staff to check the information without finding the file.

Hospitals are complex institutions, with human interactions between medical staff and patients becoming an important element in timely delivery of care to patients. Nurses and doctors will always interact with thousands of patients to cure them each year, giving those services. Therefore, doctors and nurses need to know identify the right client. In addition, the problem of unidentified patient's face from the hospital needs to be seen even further before something bad will happen. Technical solutions using RFID technology will provide a way to enforce the identity of the manufacturer of the patient and reduce the risk of misidentification.

2.3.1.1 Using RFID Technology

Interface for detecting the information will develop use the mobile application to read the patients details while scan the wristband. In Figure 2.1 the positive identification on patients was performed using the software and selecting RFID interface (*Aguilar et al., 2006*). To get the patients information about the medical stuff and retrieve the details. To use it is, the In Figure 2.2 staffs needs to press the scan button to start 8 the scanning for patient's wristband (*Aguilar et al., 2006*). After the scanning, it will appear the patient's id. This will reduce patient's misidentification errors by these safety producers. Besides that, it will make a medical staff work wisely and quickly because the way to know about the patient's is faster and accurate. The nurses also do not have to search the file through the pages of information to find out about the information patients.



Figure 2.1 Detect the RFID



Figure 2.2 Display patient's information

2.3.2 Meal Card System

An automated money installment framework is utilized for all students in the cafeteria. This eating framework takes into account fast food lines and does not require money consistently in light of the fact that nourishment can be paid ahead of time.

Every property contains the purchaser prepaid (full and decreased costs) and those qualified for nothing or low-valued dinners will get a bar-coded feast card. Each card is the same. Just PCs, perusing standardized tags, can separate the contrast between paid understudies, diminished understudy rates or free understudies. Autonomous or lessened

understudy status is required by law to be kept in full certainty and just container chiefs and collaborator administrators know this status.

Meal Plan Card System



Figure 2.3 Meal plan card system

2.3.3 Seamless Elderly Healthcare System

This system provides parents with a chronic or high risk factors. Parents now need to go to the hospital to make checks and needs work out for their health. The main recommendation of this system is for the community Wuhan city. Patients often queue for a long time to get treatment. It will be so it is difficult for the elderly to wait a long time to treat their illness. This is why parents care for their poor health because they have no right treatment.

The Perfect Citizen Care System is for a quick parent efficiency treatment. Which hospital emergency cases will be available it is difficult to see their history for the fastest treatment. It can also be threatening life and health for the elderly and for more efficient treatment. This system uses RFID technology. It uses a data collection layer to organize antennas, readers, read and write RFID mobile devices. In layer will identify and read all types of data in smart RFID tags bracelet for use for parents. For the data transport layer, it focuses on the data being transmitted via network. It is as a bridge from the data collection layer to data applications layer. It is a bridge from the data collection layer to data applications. Figure 2.4, data application layer means planning to use RFID tag data, PDAs controlled by medical bases and real-time APS location servers and tracking systems in community databases and hospital information systems (Mu, 2014).

This system will provide for parents who usually suffer from serious illness. To monitor old physiological status when they are at home. The Electronic labels keep important personal information such as health records especially for those who have health history, such as drug allergies and medicines information. Readers will cover all hospitals. RFID reader automatically identify the smart bracelet and monitor the information inside it to monitor the terminal knowing the current situation and location also reach real-time position. Smart the bracelet also has a self-alarm button set in RFID. When the patient has emergency happens, the smart bracelet will send alarm information to monitor the terminal for quick assistance in critical situations.

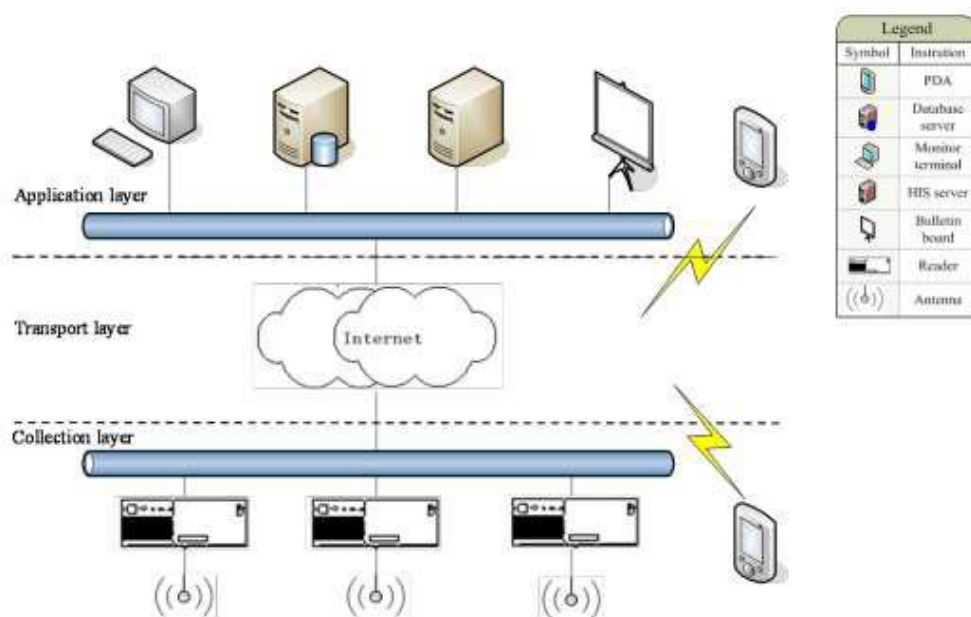


Figure 2.4 The layer for system concept

2.4 Summary Comparison of the Existing Systems

Table 2.1 show the summaries of the existing systems and the proposed system. The comparison against the proposed project can help us to know a deficiency of the existing system so that we can avoid it and become more competitive. This comparison also help to improve productivity and quality of the CFPayment..

Table 2.1 Comparison of three existing system with CFPayment

System/Features	Positive Patient Identification using RFID and Wireless Network	Meal Card System	Seamless Elderly Healthcare System	CFPayment
Application for	Patients	Student	Older Adults	Student
Product Functionality	Help staff to recognize the patient and get some information about patient history.	Giving the truth and easy way for students to make food expenses by just scanning barcodes.	Detects health level to consumers.	Allowing students to buy food by simply using their smart phone through a QR Code scan.
Connection type	Wristband connection with RFID for identification.	Bar-Coded Meal Card.	Bracelet that allocate wrist.	QR Codes with smart phone.
Advantages	<ul style="list-style-type: none"> ➤ Staff of hospital will easy to recognize the patients. ➤ Easier for doctors and nurses to know what the history 	<ul style="list-style-type: none"> ➤ Can give and distinguish capable students and students who cannot afford to buy food. ➤ Students only need to carry cards to get the 	<ul style="list-style-type: none"> ➤ Improving the elderly life. ➤ Lowering the threshold to access everyday technologies. 	<ul style="list-style-type: none"> ➤ Easy for use. ➤ Make a fast payment. ➤ Reduce the rate of loss the money.

	sickness of patients.	food they have prepared quickly and save time.		
Disadvantage	<ul style="list-style-type: none"> ➤ Faulty or deficient detection of tags. ➤ High cost usage. 	<ul style="list-style-type: none"> ➤ There is a change of student card to get free food. ➤ The card will be damaged or the barcode system is hard to read. 	<ul style="list-style-type: none"> ➤ Is only given priority to elderly citizens. ➤ Need to make daily access to their level of health. 	<ul style="list-style-type: none"> ➤ -
User friendly interface	Yes	No	Yes	Yes

Based on table 2.1, here we can see some comparisons that have been done such as applying for, product functionality, connection type, advantages and disadvantages, and user friendly interface. The comparison between the three systems with the development system can see the difference as a whole and in terms of the advantages and disadvantages of the system. In addition, it can also show for who was developed and how the system works.

The difference in application form can see that the system has been developed for patients, adolescents and senior citizens. If seen in the eye view, the system can be applied to all parties regardless of age. While the product functionality section can see the

difference, according to the situation that is appropriate with the development system. Such as a 'Positive Patient Identification using RFID and Wireless Network' system is used in hospitals to identify patients and to know the patient's background. The 'Seamless Elderly Healthcare System' system has little difference in which it works to detect the patient's heart rate. The system 'Meal Card System' and 'CFPayment' have similarities that are developed for teens to make food purchases without using money but using scanning methods.

The connection type used to launch the system is different, even though the system is almost identical to the scan. Like the use of wristbands on the 'Positive Patient Identification' and 'Seamless Elderly Healthcare System' systems. 'CFPayment' uses a scan method of the QR code for smart phones which is a system upgrade and some modifications of the 'Meal Card System' that use the Bar-coded scan method on the card.

The comparison between advantage and disadvantage of the system can be seen how a system works for the user. The beginning of the 'Positive Patient Identification' system has the advantage that it helps to identify and know the background of a person, but the lack of it, is that the system will have some problems such as errors in reading or not being displayed, and having high costs.

The second comparison is the 'Seamless Elderly Healthcare System' which has the advantage of maintaining daily health status. But the shortage is that it needs access daily and is only given priority to senior citizens. With this, it will speed up the user rate of the system.

The latter is the 'Meal Card System' which is located on the card for students to make a scan for the purchase of food and to distinguish students who are able to buy or not and at the same time can make their time. It makes it easier for students not to spend or spend money. Just as the system will be developed, namely 'CFPayment' which only needs to scan on smartphones to process food purchases. The shortage is clearly seen as being given priority to students and they can get food for free if they terminate forcibly on students who have the card to be scanned and students cannot buy food if the card or bar code on the card has been damaged.

As a result of the difference, the 'CFPayment' system can be developed by looking at how the system works and how to interact with the user. And the shortage can still be overcome by upgrading the system to the next level to meet the shortcomings in the system.

CHAPTER 3

METHODOLOGY

3.1 Introduction

Methodology is part of the development process. Methodology is the framework that is used to structure, plan and control the process of developing and information system. Besides that, the important part in software development since it controls the flow of the project and can be done based on the timeline of Gantt chart given the project (refer to Appendix 1). Each method is best suited for specific kind of project and development.

This chapter will discuss the approach and the framework of the research:

i. **Methodology**

This topic will explain the method used while developing the proposed design application that connect with the QR Code system and reader to make a payment.

ii. **Hardware and Software**

This topic will explain about hardware and software that will be used in this project and this is important this to choose the right hardware and software for the development project to avoid the failure.

iii. **Gantt Chart**

This topic will show the timeline of this project from the beginning of the development until the end.

3.2 Methodology

The methodology that will be implemented is Waterfall methodology because this is simple and easy to understand and use. In Waterfall methodology, each phase has its own relationship and the new phase can be developed when the previous phase is completed. This is because of the nature of the phase, then every phase of the Waterfall methodology model is quite precisely defined:

- ❖ Planning phase
- ❖ Requirement analysis phase
- ❖ Design phase
- ❖ Implementation phase
- ❖ Testing phase

Waterfall methodology has six phases that must be followed step by step to ensure that the project will be developed more systematic and achieve a highest quality of product. Waterfall methodology is chosen to develop this project because this type of methodology allows to conduct one phase at one time, so that it is easy to maintain. Apart from that, the entry and exit criteria in Waterfall methodology are well defined, so it is easy and systematic to proceed with quality. Figure 3.1 shows the diagram of the Waterfall methodology phases that will be followed and implemented.

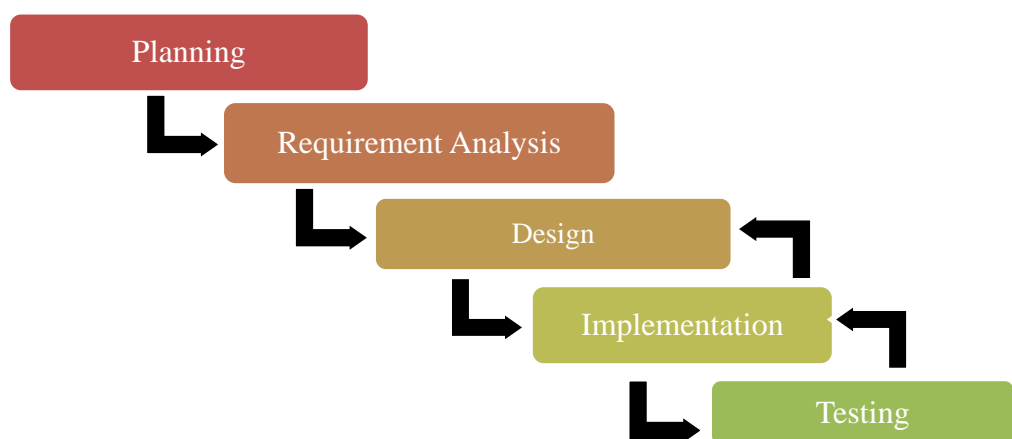


Figure 3.1 Waterfall Methodology

3.3 Planning

For this project, the first planning activity that has been done is by identifying the projects requirement and needs. First of all, we identify the problems that may existed and find the solutions for the problems. Then, we determine the project objectives and scopes. With the objectives and scopes, we may know the motives for developing this project.

After that, the name for the project is created where the name of CFPayment system is selected. The name is designed as CFPayment because it is the short from full name Cafeteria Food Payment Using QR Codes.

3.3.1 Gantt chart

The Gantt chart aims to provide a description of the project schedule and tasks that need to be done on timely basis. The Gantt chart also shows the task from the beginning to the final stage of the project development process. CFPayment development starts from planning, analysis, design, implementation and testing.

(Refer Appendix A)

3.4 Requirement Analysis phase

In necessity investigation stage, we choose what we need to do and the issue we are endeavouring to comprehend. The issue of utilizing the manual strategy to taking a request in the eatery are distinguish and propose the Cafeteria Food Payment System (CFPayment) that can take care of the issue. At that point, characterizing the destinations and extent of CFPayment. In addition, setting up the Gantt graph to calendar and plan every one of the exercises that required amid the task advancement together with the term of every action. At that point, the CFPayment is characterized in detail. In this stage, we direct conceptualizing to social occasion all utilitarian necessity that can be incorporated into CFPayment to guarantee that this framework can give the convenient route to the client to influence a request in the eatery and staff to can without much of a stretch oversee it. What's more, acquiring the data and particular information identified with the current framework. Other than that, do the examination on the capacity and capacity gave by the current nourishment requesting framework to take care of the issue of utilizing manual method. This can help us to know the shortcoming and quality of the current

framework with the goal that we can make a superior framework. In this stage, the SRS (Software Requirement Specification) record will be readied which comprises of all the item necessities to be composed and created amid the task life cycle.

3.5 Design phase

The outline stage centres around the framework configuration on related information investigation alongside data which has been gathered amid the necessity examination arrange. Plan general architecture of CFPayment in view of the prerequisite particular to guarantee that we can see the review of framework in detail. In this stage, the outline capacities and tasks are depicted in detail, including screen formats, process graphs and other documentation. Next, indicating equipment and programming use being developed process. In this stage, recognize the quality of each capacity in CFPayment, input that client need to enter, yield that client will get, portray stream of each procedure and information word reference of the database. Software design document (SDD) is readied which comprise the plan portrayal of CFPayment and it write so as to give the advancement group general direction to the architecture of CFPayment.

3.5.1 Context Diagram

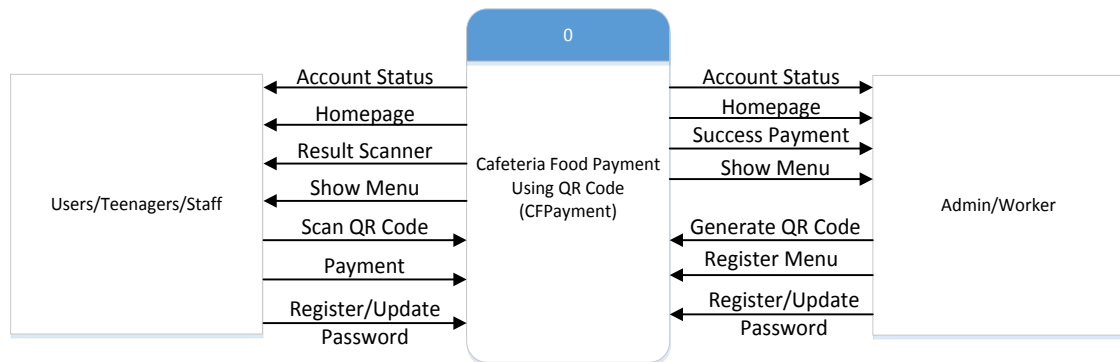


Figure 3.2 Context Diagram of CFPayment

Figure 3.2 shows the context diagram describing the inputs and outputs between users and trades where using the application CFPayment system to intermediate between

the situations. It shows the general view of the function can be used to interact with the system together with input and output that can fill that users will get.

3.5.2 Use Case Diagram

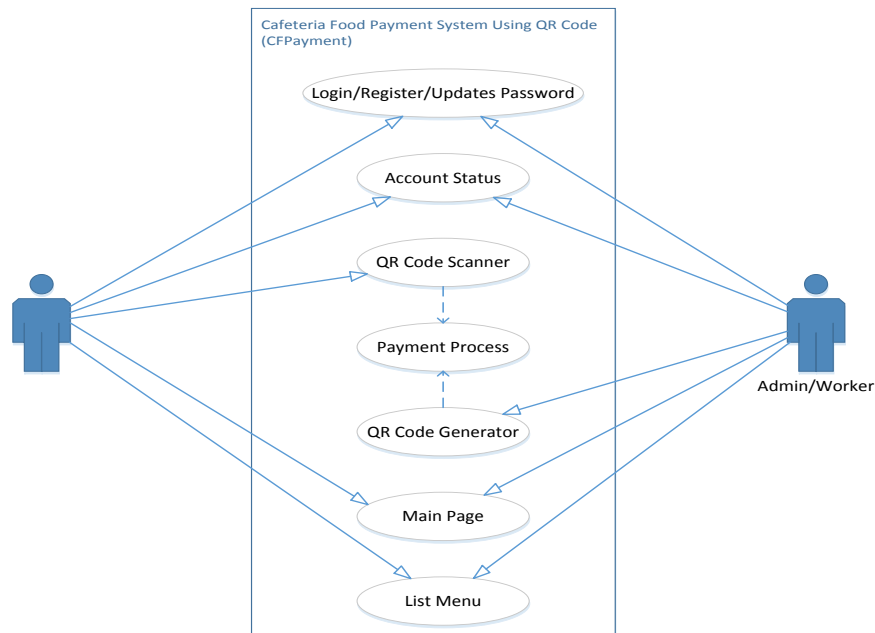


Figure 3.3 Use Case Diagram of CFPayment System

Figure 3.3 shows the user and employee interaction in CFPayment system users. Users can pre-select their preferred meal at the time before the QR Code scanning is performed from the system. This can give some time to the user to choose what menu they are on and save time so there is no need to cancel scanning in the system. Once they have decided on their choice of choice, the user should simply go to the counter to inform the food workers of their choice. Next, the employee will enter the food that the user has chosen on the system and at the same time, the display on the screen will display to give satisfaction and certainty to both parties to view the list of the food. After completing the selection of food in the system, the QR Code will be displayed separately on the cafeteria counter screen. At the same time, users will open the system through their smartphones and scanners the QR Code to make payments. Once payment by QR Code has been successfully executed, the user's smartphone screen will display a notification to inform the user that the payment has been successfully made and the balance in their remaining account.

3.5.3 Module of System



Figure 3.4 User Registration Module

The student or worker need to do registration to CFPayment before they can access and use this application. CFPayment will prompt user to enter full name, username, email, and password but at worker must enter cafeteria name, full name, email and password for creating a new account.



Figure 3.5 Login Module

Student or worker can enter login information which are email and password before access the CFPayment Application system.

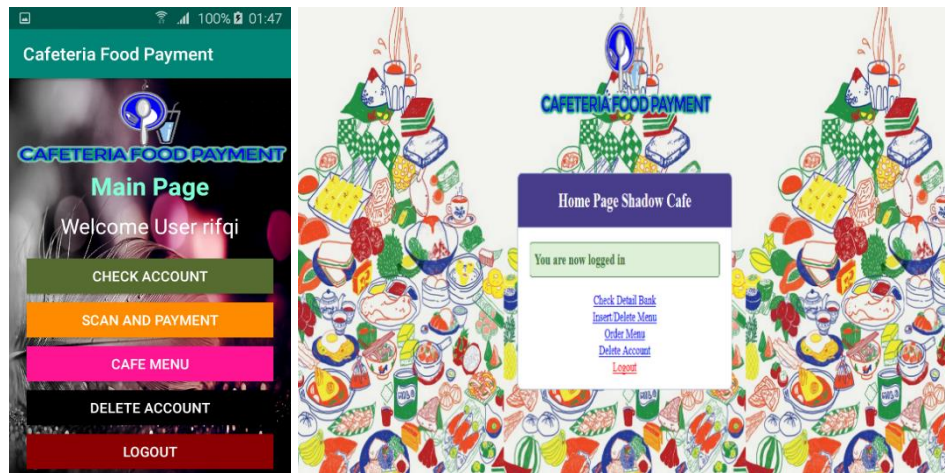


Figure 3.6 Main Page Module

Will be show the name of the user who is using the CFPayment system. The display will also show a variety of functional buttons to facilitate system users.



Figure 3.7 Check Detail module

Users need to enter CVC number and a bank password to get information about the remaining money in their account. While the worker only needs to press the button detail check only to find out their cafeteria account information at bank.



Figure 3.8 Insert/Delete Menu Module

Cafeteria can include menus and prices at their cafeteria or they can remove the menu from their cafeteria database.

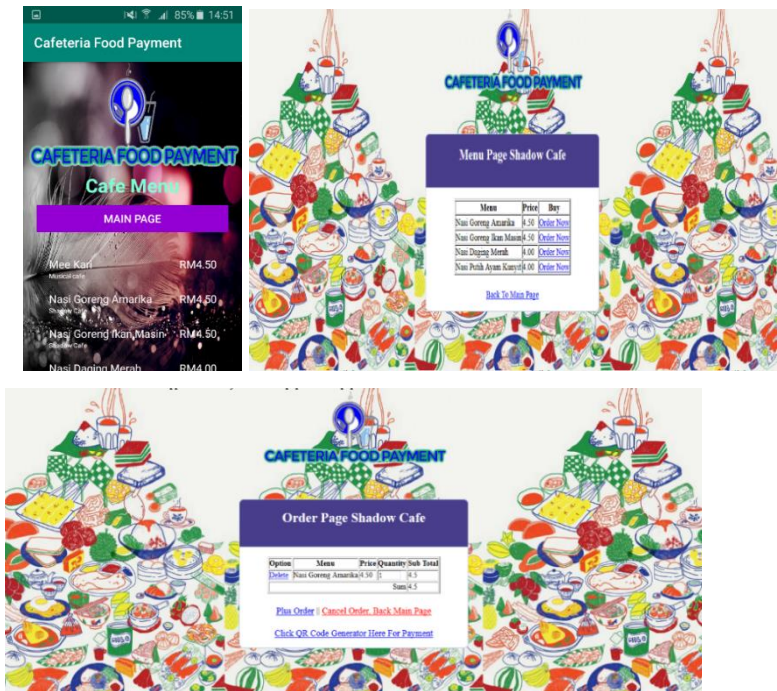


Figure 3.9 Menu List Order Module

Users can first see what menu in the cafeteria and cafeteria will do the order and show the optional menu according to customer's wish.



Figure 3.10 QR Code module

After completing the order, the cafeteria will generate the QR Code according to how much the amount is to be paid and the next step the user should only scan against the QR Code.

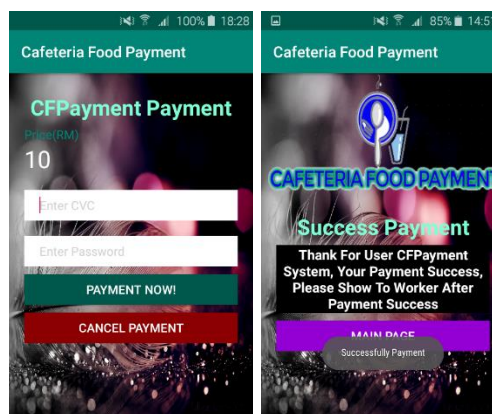


Figure 3.11 Payment Module

After the scan, a price display will be displayed and the user will need to enter the CVC number and the bank's password to make the payment. Once the payment is completed, the user will need to show the completed view to the cafeteria worker to notify the payment has been successful.

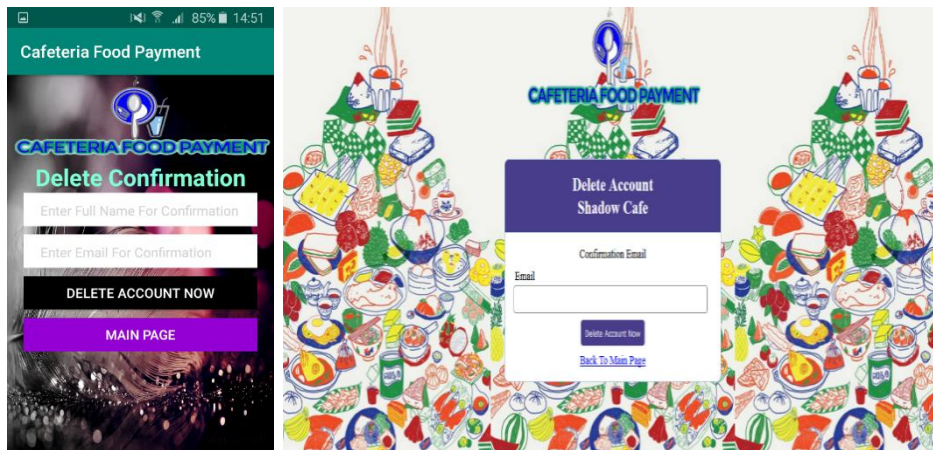


Figure 3.12 Delete Module

System users can remove their own account that they have registered as an existing application.



Figure 3.13 Reset Password Module

If the user forgets the password used for the application, the user can reset and enter a new password.

3.5.4 Flowchart

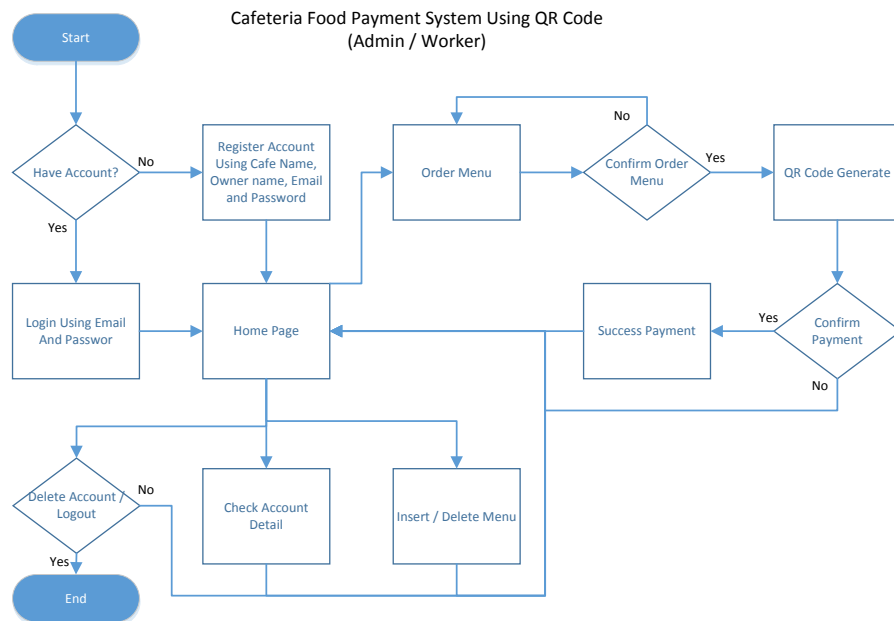


Figure 3.14 Flowchart of CFPayment For Admin/Worker

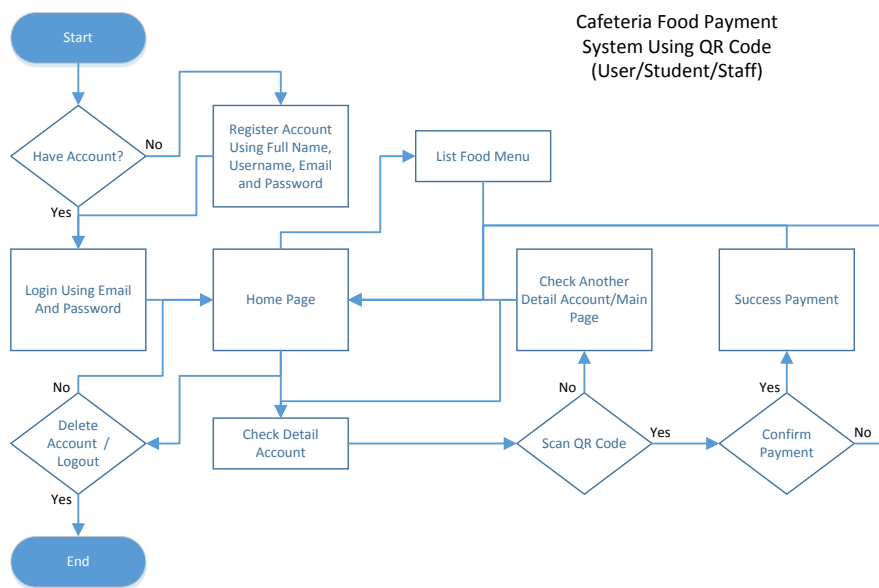


Figure 3.15 Flowchart of CFPayment For User/Student/Staff

Figure 3.14 and figure 3.15 shows the user flow chart for the CFPayment system. First, the system is required to connect the database. After the connection is established, the user is logged into the system by using the email and password. However, if the user does not have that data, users need to register into the system first before using the system

completely. After login has been made, the main view will be displayed whether the user is a student or an employee. Users can view the account first before moving next steps or can continue without seeing the account. If teens can choose food first and if employees, every menu should be included in the database first with the food price. After teens make choices, teens need to go to the counter to tell about their food choices to employees and workers will press into the system according to the desired food choices. Then the food that has been selected will create a QR code on the display and the reminder should only issue their smartphones for scanning and payment. Finally, after a payment is made, a popup says that payments have been made for adolescents and employees.

3.5.5 Dialog Diagram

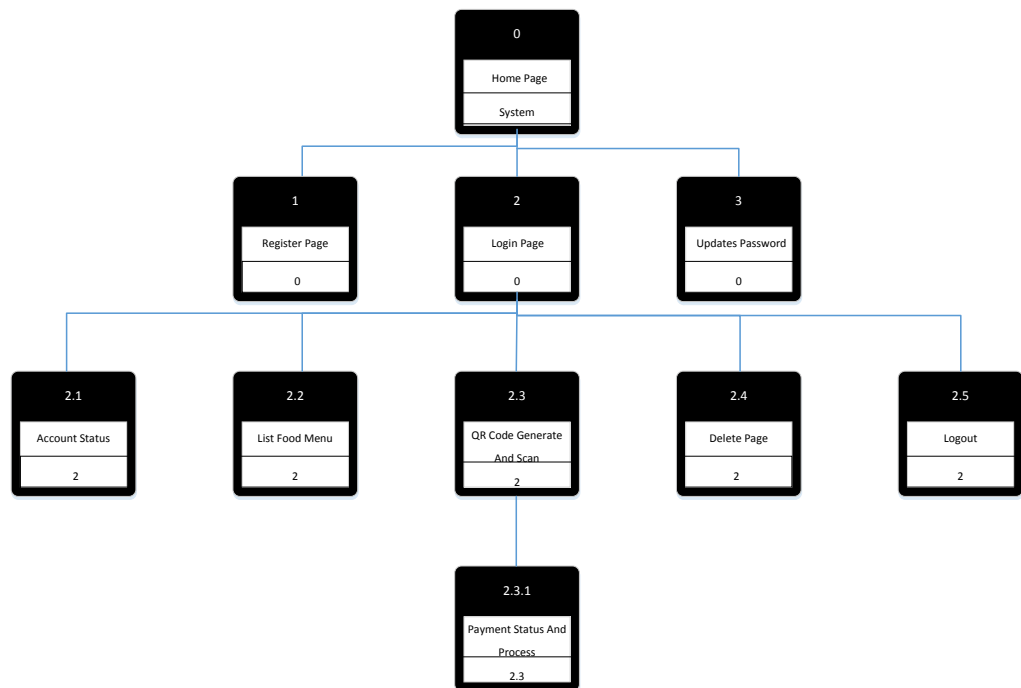


Figure 3.16 Dialogue Diagram of CFPayment Web Application

Figure 3.16 shows details and overview of CFPayment systems based on system implementation. Employees must sign up as a CFPayment user to run the system and to be able to register the food they choose to create a QR Code as a scanned detail. Additionally, employees should also include some details on their cafeteria information so that every successful business money can be entered into their cafeteria account. Users

must also register before they can use the system. During registration, users must enter some personal information that has been specified and must add value in their registration account to execute the sale and purchase transaction. Once registered, users will be able to look back at their personal details to see if they fill them correctly or vice versa. This CFPayment system will be developed in a concise and user-friendly way to facilitate and provide clear understanding to employees and users of the system. However, workers or users can cancel their registration at any time if they want to process a food-buying process without using the system or if they do not want to do business anymore.

3.5.6 Entity Relational Diagram (ERD)

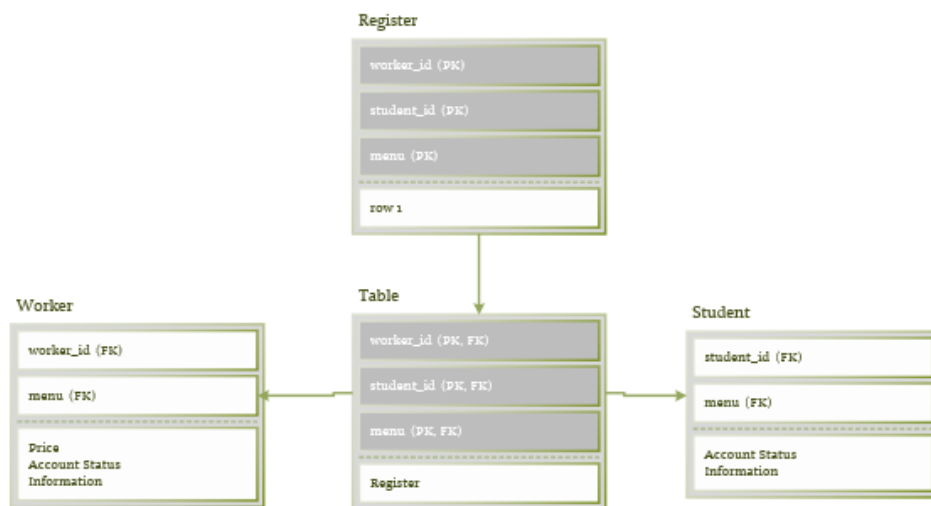


Figure 3.17 ERD of CFPayment Databases

Figure 3.17 shows the databases used in the CFPayment system where their databases often relate to one another to carry out the prescribed processes for the system to work comprehensively and may perform a payment process.

3.6 Implementation phase

Project implementation begins with gathering information and requirements regarding the system. This search is also done by looking up information about existing systems or systems that are almost similar to the ones to be developed and comparable to analysing the advantages and disadvantages of this system. Using this information

collected, we can develop the perfect system and improve its function in order to compete with existing systems.

Waterfall methodology is used as a guide for the implementation of this project. The Waterfall methodology needs to be followed and implemented step by step until completion to ensure that implementation activities are easier to manage and do. Project implementation starts with providing necessary documents such as software requirements and specifications and software design documents. This document is used to determine all the features required in the system CFPayment including the technical requirements and interface requirements. Additionally, Diagrams such as Used Case Diagrams, Context Diagrams and Dialog Diagrams are created to show system overview. From this, we can better understand the interaction of functions in CFPayment.

Prior to implementation, all hardware and software required to develop CFPayment should be provided. For example, the hardware used to develop FRA is the Fujitsu Lifebook Series LH532 laptop and the Samsung Galaxy J5 (2016) smartphone. Both devices are used to build and test all functions within CFPayment. Software used like Adobe Dreamweaver and Google Chrome to develop a CFPayment web app that forces users to have the web open through laptops and smartphones. Next, Xampp is used as a web server for the database to store XAMPP data.

CFPayment contains two available sections in the version of the web app used by the workers in the cafeteria and the mobile app version used by teens. Implementation of CFPayment begins with the planning of the website application interface used by CFPayment. At the same time, every website application interface will be included once the CFPayment function and method will be implemented. The functionality that must be provided in the CFPayment web application such as an example login and register an account. Then, databases are created to store CFPayment data. When each CFPayment function is completed, the test process is performed by implementing it in the browser to ensure CFPayment can run without any problems.

3.7 Testing phase

The test is done to evaluate the function of the system CFPayment developed. This test is very important to check whether the developed system meets the needs of the users or not and to ensure that the system performs perfectly without any errors. In this project, there are two types of tests used to test this system namely black box and white box testing. This thesis of two testing techniques is to evaluate the achievement, safety and system integration.

In the black box test is to view the system functions tested without looking inside the internal code structure, the execution details and the software's internal routing knowledge. This test activity is performed by focusing on the input and output of the software system without disturbing the internal knowledge of the software program. In this project, CFPayment is tested by inputting the input into the application and waiting for output from it. It is a test to ensure that the system output meets the done by teens and workers in cafeteria.

While the white box test is to see the test against the internal structure, the design and execution of the encoding. White box tests are done by developers who have good skills and strong knowledge in programming and system implementation. This test includes unit tests by testing the inputs and outputs together functions of each module. Each small unit within CFPayment will be tested to ensure that all unit structure in CFPayment are implemented according to the requirements and are free of errors. Next, evaluate the integration of modules that connect together as a whole system. The spying test is to ensure that all modules in CFPayment can interact together without failure or mistake during students or workers using the system.

CHAPTER 4

IMPLEMENTATION AND TESTING

4.1 Introduction

This chapter should discuss about implementation of hardware, testing plan and result discussion of the system. Interfaces design of the system is the appearance part and the functions is more important for every system. The function of system can be using the source code to develop it. Besides that, source code can develop various function of the system and enable system became a robust system. In the Section 4.2, it show the source code how to implement on Cafeteria Food Payment System by using web based and android studio. Moreover, testing plan is test about the function of reading of QR Code data, extract the data and save into the database.

4.2 Implementation Requirements

The source codes of android studio and PHP are applied in this project to develop a system. Moreover, the source codes of MySQL (XAMPP) for insert, update, select and delete syntax also be implemented in this system. In addition, the database system will also be linked to the system for recording and storing information. On the other hand, a camera on a tablet or smartphone will be used to scan the QR Code while the web base is used to generate QR Codes.

4.2.1 Hardware Implementation

Hardware needed for this system is a smartphone and computer. The first step to implementing hardware is that the smartphone should be in the android version and have a camera to scan the QR Code. While the computer is used to generate the QR Code to scan. As in Figure 4.1 and Figure 4.2, note that the camera on the smartphone must properly to scan the QR code of the price from the web base displayed on the computer.



Figure 4.1 Phone camera are used to scan QR Codes.

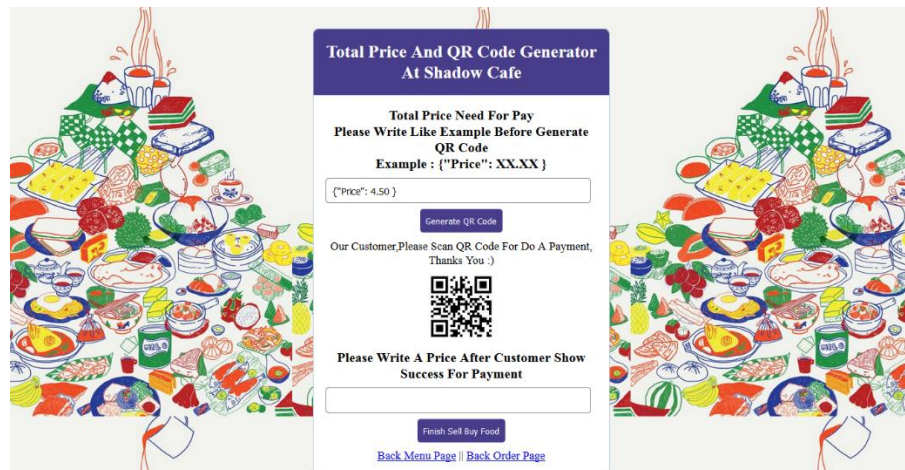


Figure 4.2 The web base on the computer will generate QR Codes and be displayed for scanners.

4.2.2 Software Implementation

The next phase is the implementation of the software. The CFPayment system is based on the use of the web and androids systems. Users need to register first to gain access to the system. Cafeteria workers who use the web base can not only produce QR Codes, but can also view their cafeteria bank account details and can add or delete the menus that have been incorpotared into the system. Also, android users also see their bank account details and view the menu provided at each registerd cafeteria and using the CFPayment system. Web based and android-based systems have been developed

using Notepad++. The interface is developed using Android Studio, Php,CSS,Adobe Dreamweaver and MySQL languages for databases. The following figure is the interface and code to develop a simple web-based QR Code system.

4.2.2.1 Main Page

Figure 4.3 and Figure 4.5 show the main page for the CFPayment system that has been implemented. Web base is used for employees while the android version is used for the user.

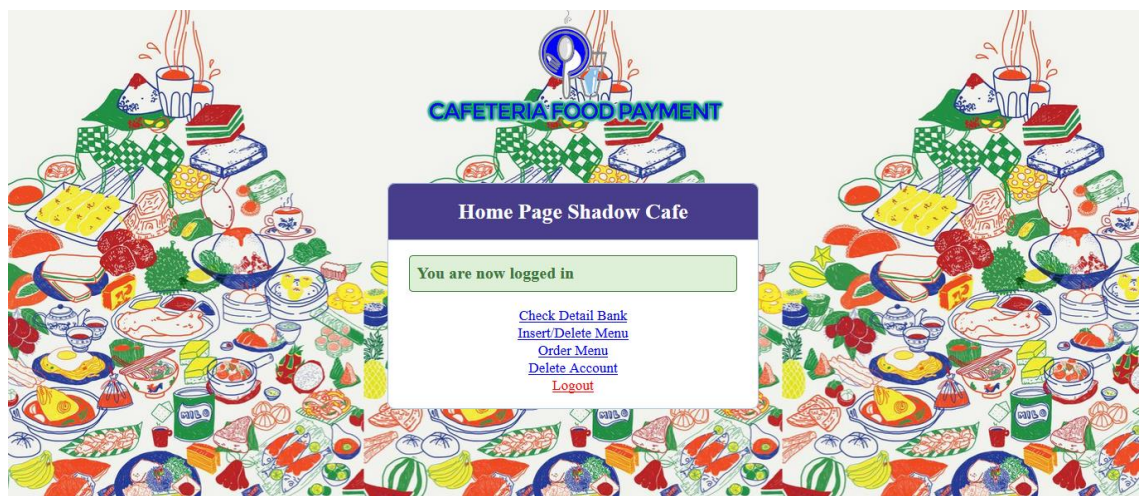


Figure 4.3 Main page of the system (Web)

```

<?php
    session_start();

    if (!isset($_SESSION['cafename'])) {
        $_SESSION['msg'] = "You must log in first";
        header('location: login.php');
    }

    if (isset($_GET['logout'])) {
        session_destroy();
        unset($_SESSION['cafename']);
        header("location: login.php");
    }

?>
<!DOCTYPE html>
<html>
<head>
    <title>Cafeteria Food Payment System</title>
    <link rel="stylesheet" type="text/css" href="style.css">
</head>
<body>
<center><a href=""></a></center><br>
    <div class="header">
        <?php if (isset($_SESSION['cafename'])) : ?>
            <center><h2>Home Page <?php echo $_SESSION['cafename']; ?></h2></center>
        <?php endif ?>
    </div>
    <div class="content">
        <!-- notification message -->
        <?php if (isset($_SESSION['success'])) : ?>
            <div class="error success">
                <h3>
                    <?php
                        echo $_SESSION['success'];
                        unset($_SESSION['success']);
                    ?>
                </h3>
            </div>
        <?php endif ?>

        <!-- logged in user information -->
        <center>
            <p> <a href="detail.php">Check Detail Bank</a></p>
            <p> <a href="menu.php">Insert/Delete Menu</a></p>
            <p> <a href="listmenu.php">Order Menu</a></p>
            <p> <a href="delete.php">Delete Account</a></p>
            <p> <a href="index.php?logout='1'" style="color: red;">Logout</a> </p>
        </center>
    </div>
</body>
</html>

```

Figure 4.4 Source code for main page (Web)

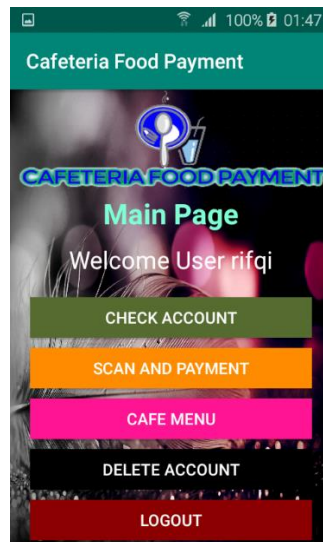


Figure 4.5 Main page of the system (Android)

```
package com.example.rifqirafever.cafe;

import ...

public class UserProfile extends AppCompatActivity implements View.OnClickListener{

    Button logout, detail, ScanPay, CafeMenu, Delete;
    TextView tvname;
    IntentIntegrator intentIntegrator;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_user_profile);
        tvname=findViewById(R.id.welcomeUser);
        logout=findViewById(R.id.btnLogout);
        logout.setOnClickListener(this);
        detail=findViewById(R.id.btnDetail);
        detail.setOnClickListener(this);
        ScanPay=findViewById(R.id.btnPayment);
        ScanPay.setOnClickListener(this);
        CafeMenu=findViewById(R.id.btnMenuCafe);
        CafeMenu.setOnClickListener(this);
        Delete=findViewById(R.id.btnDelete);
        Delete.setOnClickListener(this);

        Intent intent=getIntent();
        tvname.setText("Welcome User "+intent.getStringExtra( name: "name"));
    }

    @Override
    protected void onActivityResult(int requestCode, int resultCode, Intent data) {
        IntentResult result = IntentIntegrator.parseActivityResult(requestCode, resultCode, data);
        if (result != null){
            if (result.getContents() == null){
                Toast.makeText( context: this, text: "QR Code Not Found", Toast.LENGTH_SHORT).show();
            }
        }
    }
}
```



```

    }else{
        try{
            JSONObject object = new JSONObject(result.getContents());
            String price = object.getString( "name: \"Price\"");
            Intent intent = new Intent( packageContext: UserProfile.this, Payment.class);
            intent.putExtra( "name: \"Price\",price);
            startActivity(intent);

        }catch (JSONException e){
            e.printStackTrace();
            Toast.makeText( context: this, result.getContents(), Toast.LENGTH_SHORT).show();
        }
    }
}

@Override
public void onClick(View v) {
    if(v.getId()==R.id.btnLogout)
    {
        Intent intent=new Intent( packageContext: UserProfile.this, Login.class);
        startActivity(intent);
    }
    else if(v.getId()==R.id.btnDetail)
    {
        Intent intent=new Intent( packageContext: UserProfile.this, DetailAccount.class);
        startActivity(intent);
    }
    else if(v.getId()==R.id.btnPayment)
    {
        intentIntegrator = new IntentIntegrator( activity: this);
        intentIntegrator.initiateScan();
    }
}

else if(v.getId()==R.id.btnMenuCafe)
{
    Intent intent = new Intent( packageContext: UserProfile.this, ListMenu.class);
    startActivity(intent);
}
else if(v.getId()==R.id.btnDelete)
{
    Intent intent = new Intent( packageContext: UserProfile.this, Delete.class);
    startActivity(intent);
}
}
}

```

Figure 4.6 Source code main page process (Android)

4.2.2.2 Login Page

Figure 4.7 and Figure 4.9 indicate the entry page for the CFPayment system that has been implemented. System users need to enter their email and password before they can access the system as a whole.

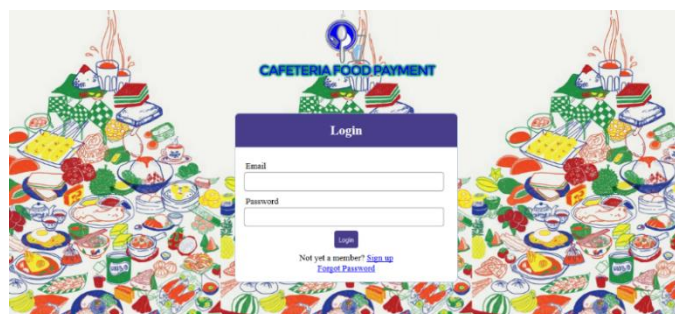


Figure 4.7 Login Page (Web)

```
// LOGIN USER
if (isset($_POST['login_user'])) {
    $email = mysqli_real_escape_string($db, $_POST['email']);
    $password = mysqli_real_escape_string($db, $_POST['password']);

    if (empty($email)) {
        array_push($errors, "Email is required");
    }
    if (empty($password)) {
        array_push($errors, "Password is required");
    }

    if (count($errors) == 0) {
        $query = "SELECT * FROM cafeteria WHERE email='$email' AND password='$password'";
        $results = mysqli_query($db, $query);

        if (mysqli_num_rows($results) == 1) {
            while($row = mysqli_fetch_assoc($results))
            {
                $cafename = $row['cafename'];
                session_start();
                $_SESSION['cafename'] = $cafename;
                $_SESSION['success'] = "You are now logged in";
                header('location: index.php');
            }
        } else {
            array_push($errors, "Wrong email/password combination");
        }
    }
}
}
```

Figure 4.8 Source code login process (Web)

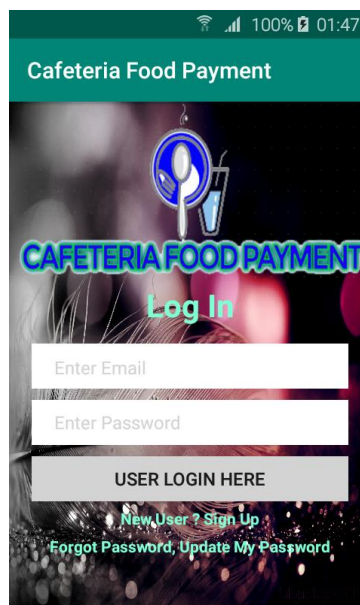


Figure 4.9 Login Page (Android)

```

<?php
$con=mysqli_connect("127.0.0.1","root","","shadowcafe");
$email=$_POST['email'];
$password=$_POST['password'];
$sql=mysqli_prepare($con," select * from user_detail where email=? and password=? ");
mysqli_stmt_bind_param($sql,"ss",$email, $password);
mysqli_stmt_execute($sql);
mysqli_stmt_store_result($sql);
mysqli_stmt_bind_result($sql, $FullName, $name, $email, $password);

$response=array();
$response["success"]=false;
while(mysqli_stmt_fetch($sql))
{
    $response["success"]=true;
    $response["name"]=$name;
}
echo json_encode($response);
?>

```

Figure 4.10 Source code login process (Android)

4.2.2.3 Detail Page

Figure 4.11 and Figure 4.13 show for details of bank accounts. Android users need to enter the CVC number and password, but the web base will display according to the registered cafeteria.

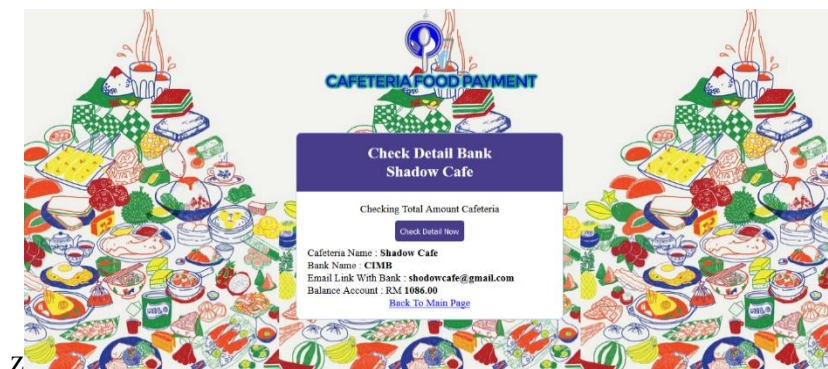


Figure 4.11 Check Detail (Web)

```

//Detail Bank User
if (isset($_POST['detail_user'])) {
    $cafename = mysqli_real_escape_string($db, $_SESSION['cafename']);

    if (count($errors) == 0) {
        $query = "SELECT * FROM bank WHERE name_cafe='$cafename'";
        $results = mysqli_query($db, $query);

        if (mysqli_num_rows($results) == 1) {
            while($row = mysqli_fetch_assoc($results)) {
                $name_cafe = $row['name_cafe'];
                $name_bank = $row['name_bank'];
                $no_account = $row['no_account'];
                $email = $row['email'];
                $balance = $row['balance'];
                session_start();
                $_SESSION['name_cafe'] = $name_cafe;
                $_SESSION['name_bank'] = $name_bank;
                $_SESSION['no_account'] = $no_account;
                $_SESSION['email'] = $email;
                $_SESSION['balance'] = $balance;
            }
            header('location: detail.php');
        } else {
            array_push($errors, "Sorry, Your Caffe Not Register Any Bank Yet, Please Register Your Caffe At Any Bank You Like, Thanks You");
        }
    }
}
}

```

Figure 4.12 Source Code Check Detail Process (Web)

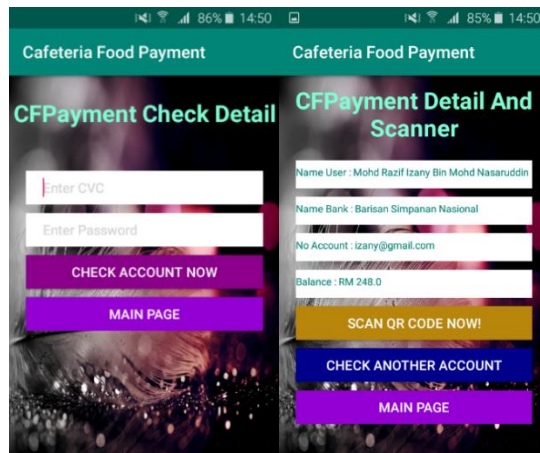


Figure 4.13 Check Detail (Android)

```

<?php
$con=mysqli_connect("127.0.0.1","root","","smpn12345");
$cvv=$_POST['cvv'];
$password=$_POST['password'];
$sql=mysqli_prepare($con," select * from bank where cvv=? and password=? ");
mysqli_stmt_bind_param($sql,"ss",$cvv, $password);
mysqli_stmt_execute($sql);
mysqli_stmt_store_result($sql);
mysqli_stmt_bind_result($sql, $name, $name_bank, $cvv, $no_account, $email, $password, $balance);

$response=array();
$response["success"]=false;
while(mysqli_stmt_fetch($sql))
{
    $response["success"]=true;
    $response["name"]=$name;
    $response["name_bank"]=$name_bank;
    $response["no_account"]=$no_account;
    $response["email"]=$email;
    $response["cvv"]=$cvv;
    $response["password"]=$password;
    $response["balance"]=$balance;
}

echo json_encode($response);
?>

```

Figure 4.14 Source code check detail process (Android)

4.2.2.4 QR Code Generate Page

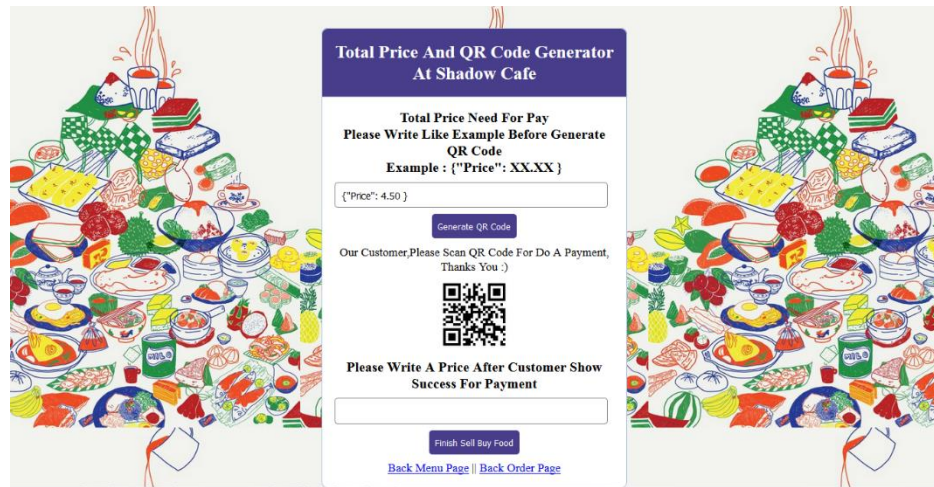


Figure 4.15 QR Code Generate (Web)

```
<form method="post" action="totalsum.php">

    <?php include('errors.php'); ?>
    <center><h3>Total Price Need For Pay</h3></center>
    <center><h3>Please Write Like Example Before Generate QR Code</h3></center>
    <center><h3>Example : { "Price": XX.XX }</h3></center>

    <div class="input-group">
        <input type="text" name="total">
    </div>
    <div class="input-group">
        <center><button type="submit" class="btn" name="generator">Generate QR Code</button></center>
    </div>

    <center><label>Our Customer,Please Scan QR Code For Do A Payment, Thanks You :)</label></center>
    <?php
        $s = $_POST['total'];
    ?>
    <center><img src='qr_img.php?d=<?php echo $s ; ?>'></center>

    <center><h3>Please Write A Price After Customer Show Success For Payment</h3></center>
    <div class="input-group">
        <input type="text" name="totalsum">
    </div>
    <div class="input-group">
        <center><button type="submit" class="btn" name="btn_pay" style="color: white;">Finish Sell Buy Food</button></center>
    </div>
    <center><a href="listmone.php">Back Menu Page</a> || <a href="listmene2.php">Back Order Page</a></center>
</p>
</form>
```

Figure 4.16 Source Code QR Code Generate (Web)

Figure 4.15 shows the production of QR Code by entering the price that the customer needs to pay.

4.2.2.5 QR Scanner Page



Figure 4.17 QR Code Scanner (Android)

```
@Override
protected void onActivityResult(int requestCode, int resultCode, Intent data) {
    IntentResult result = IntentIntegrator.parseActivityResult(requestCode, resultCode, data);
    if (result != null) {
        if (result.getContents() == null) {
            Toast.makeText( context: this, text: "QR Code Not Found", Toast.LENGTH_SHORT).show();
        } else {
            try {
                JSONObject object = new JSONObject(result.getContents());
                String price = object.getString( name: "Price");
                Intent intent = new Intent( packageContext: Scanner.this, Payment.class);
                intent.putExtra( name: "Price", price);
                startActivity(intent);
            } catch (JSONException e) {
                e.printStackTrace();
                Toast.makeText( context: this, result.getContents(), Toast.LENGTH_SHORT).show();
            }
        }
    } else {
        super.onActivityResult(requestCode, resultCode, data);
    }
}
```

Figure 4.18 Source Code QR Code Scanner (Android)

Figure 4.17 shows the QR Code scan process using the application to make payments. After scan, users need to enter the cvc number and password to make sure which account is used to make the payment.

4.3 Testing and Result

The next phase is testing the system. This phase is important to ensure that the system works well or not without any mistake and achieves the stated project goals. Additionally, the database will be tested to ensure the data passes correctly between the interfaces. Besides that, acceptance tests need to be made available to users to test individually from login, check details, QR Code scans and payments. The user acceptance test will determine whether the event works well or not and the system should run as described in the expected result. This system test was conducted by providing demo and survey questions to students and staff with the experience of being the user of the system. As well as this system was also asked and shown to cafeteria staff about the web base to be used.

As a result, consumers and cafeteria employees give positive words and provide some suggestions for additions in the system. And as a whole, the users of the system really love the system that has been built for them. There are 14 questions during the survey and the results are very satisfactory and users have suggested that they be fully utilized at universities. Table 4.1 and figure 4.19 is the entire pie chart of questions and quotes given to the user.

Table 4.1 User Acceptance Test of CFPayment system.

Bil	Question/Acceptance Test	Yes	No	Comment
Admin / Worker				
1	Is the admin / employee system working properly?			
2	Is the display for the admin / employee system remove the correct display?			
3	Is the information entered equal to the information displayed?			
4	Viewable. Readable and understandable?			
5	Does each display have the title correctly?			
User's				
6	Is the user's system working properly?			

7	Is the display for the user system remove the correct display?			
8	Is the information entered equal to the information displayed?			
9	Viewable, readable and understandable?			
10	Does each display have the title correctly?			
Overall System				
11	Is this system user-friendly?			
12	Is the system easy to understand?			
13	Will the system be of interest to users using the system?			
14	Is the system suitable for campus communities?			

How would you rate your overall satisfaction with this system? Comment and Suggestion

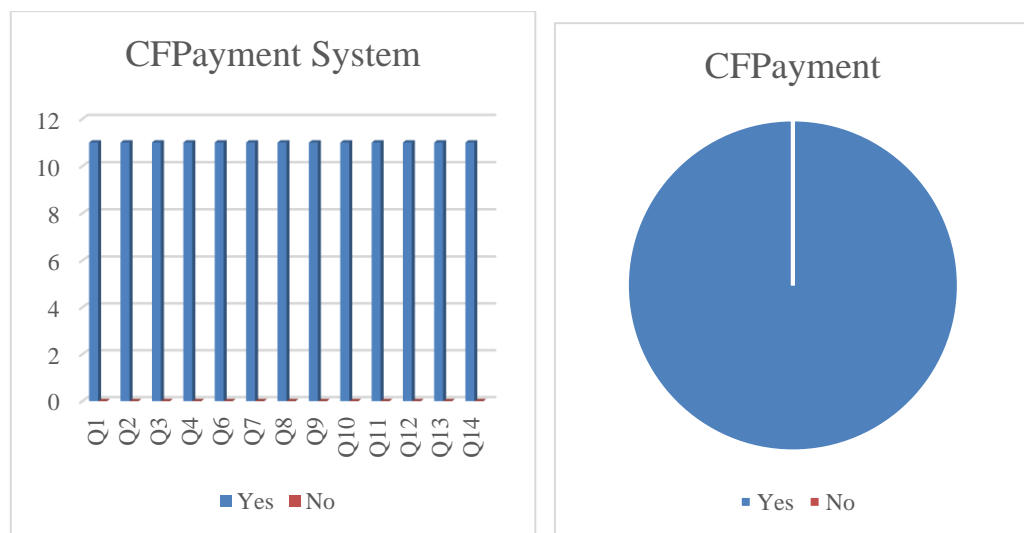


Figure 4.19 Column Diagram and Pie Chart Diagram

(Refer Appendix B)

CHAPTER 5

CONCLUSION

5.1 Conclusion

In conclusion this CFPayment system has been designed and develop to help consumers in their spending processes in the cafeteria. Through this system, it can be said to force the user as it is the main focus that will be used in the user's smartphone. Because almost every user has their own smartphones and is often used regardless of time, place and time. Thus the CFPayment system will be together in the user's life to carry out the spending process. Consumers also do not have to worry about lack of money in the cafeteria, lose money or do not have time to spend money on ATM machines. In addition, users need not worry about insufficient spending money because they use methods such as spending money in their accounts. In addition, it also helps users in managing money more efficiently and in order to save time users during the use of this system.

5.2 Research Constraints

This system limitation is a system that can only be controlled of there is an internet connection otherwise the system cannot be used by users even though the cafeteria staff. Second is the system is not used if the user of cafeteria does not have an account in the bank. There may be abuse of power among cafeteria to set prices in producing QR codes. Users should also be wary when entering CVC number and password current bank details and make payment.

5.3 Future Work

Although objectives have been achieved, this upgrade is still needed. Future systems need to include the following criteria:

1. The CFPayment system can remotely order food from the cafeteria.
2. Upgrade more on safety part as maybe a lot of personal detail are exposed to public.
3. Upgrade drive-thru protocol and delivery service

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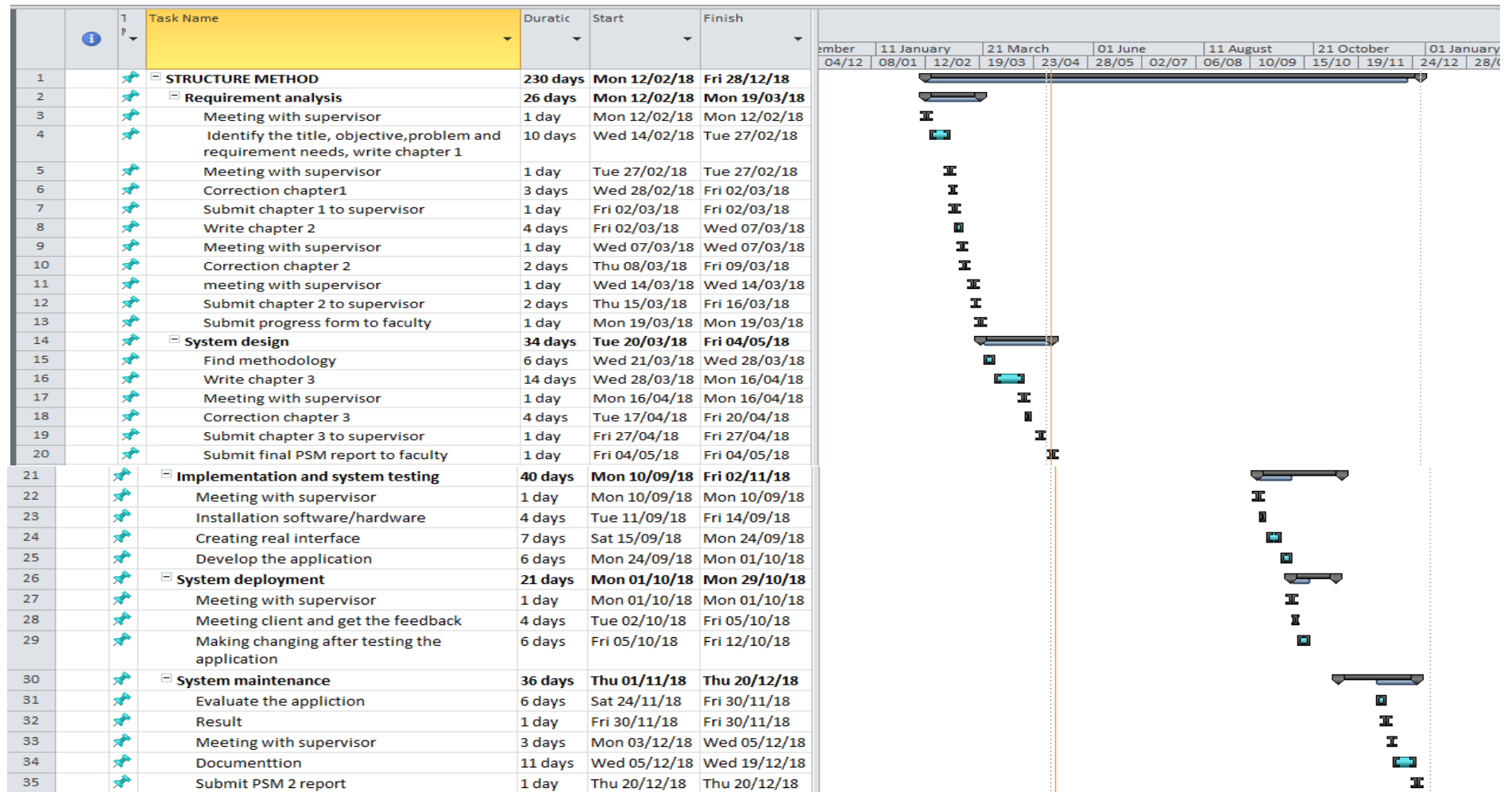
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APPENDIX A (GANTT CHART)



APPENDIX B
(USER ACCEPTANCE TEST OF CFPAYMENT SYSTEM)