

CUSTOMER LOYALTY REWARD APPLICATION (F&B+)

BY

NG JOOI KHUAN

A REPORT

SUBMITTED TO

Universiti 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)

JANUARY 2018

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## DECLARATION OF ORIGINALITY

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## **Abstract**

This project report summarized the development of a new customer loyalty reward application (F & B+) for restaurant. The application aims to solve a few problem that exists in traditional card based loyalty program. The loyalty program using card-based are not user friendly as the customer cannot view the information of the points accumulate so far. The card-based loyalty program also do not have system to keep track who the user is using the card. On the restaurant owner perspective, the card based system involve a huge amount of cost although it is easy to implement. Although some restaurant have implement the loyalty in application but the application do not have user friendly GUI which can navigate user to redeem the rewards. Another problem exists in existing system is the restaurant do not put their news in the application to advertise their food. Therefore, customer loyalty reward application able to provide a user friendly GUI which navigate user to redeem the rewards, news and discount page section as advertisement purpose and login page to identify each user. In addition to that, the application can simplify the redeem process which involve displaying QR code for scanning. The application will be able to download by all customer for free thus reduce the restaurant spending huge cost of creating a new card and ease the customer participate process in the loyalty program. The application will integrate with Firebase database which can produce analytical information to help admin manage the application.

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## LIST OF ABBREVIATIONS

<i>APP</i>	Application
<i>CRM</i>	Customer Relationship Management
<i>ERD</i>	Entity Relationship Diagram
<i>QR</i>	Quick Response Code
<i>RAD</i>	Rapid Application Design
<i>UI</i>	User Interface

## **Chapter 1 Introduction**

Over the past years, many businesses have started to implement customer loyalty programs in order for them to survive and gain a position in a global market. It is not easy to survive in a global market as the competitors will also try to spread their business using different strategy. The ultimate goal for a business is to gain profit through the services and customer. One of the market that looked into it is the food and beverages industry. With the increasing number of population, food industry has begun to grow widely to serve the needs of the people. In food and beverages industry includes restaurants, cafeterias, catering operations as well as others small business that include selling food and beverages (Salai, 2008). In Malaysia, the variety of local food represent each of the culture. The food and beverages industry are mostly come from restaurant, cafeterias and food vendor.

The food and beverages industry was proved to be competitive over the years as many people begin to involve into food and beverages industry. Each and every restaurant has come out with as many attractive method as possible to maintain their customer. One of the ways is through loyalty program. Generally, loyalty program aim to identify individual customers and to understand their preference. Loyalty program can be also use as a tools to show the appreciation of a businesses toward their customers. The common practices in loyalty program are such as rebate programs/cash back, discount and points program. These practices usually conducted in the form of membership card. Every food and beverage business will try to persuade their customer to the membership. This is a win-win situation where the business able to trach their customer while the customer able to gain some rewards through their spending. The membership card rewards is also known as card-based rewards.

Basically card-based rewards is a rewards card that give to their customer for free. The rewards card can be used as a punch card to gain the points each time the customer make a purchase. The similar system that describe the process is My Starbucks Rewards where it is an online platform to ties with customer purchases. This technique is remain popular until nowadays due to the implementation of the system is simple and low cost (Carter, 2014).

The card-based reward indeed is an easy implementation to gain customer loyalty but it also began to exist problem in these card-based rewards. One of the card-based rewards problem is the customer lost their card frequently. These action will lead to the business difficult to identify the customer preference. Moreover, the business need to create more card and giving it to the customer for free and will increase the cost of the businesses itself. Although, some card-based reward system required some upfront fees but when the customer loses their card, they will no longer intend to pay for the membership card again.

Since there are many problems exists in the traditional card-based system with the advance of technology here comes a digital loyalty programs to solve the problem. Many food and beverages industry have start to use digital loyalty program to substitute the card-based reward system. The reason why digital loyalty gain its popularity is due to the growing trend in mobile application.

The survey across the US which include 3162 users have shown that 59 percent of the people would be more likely to use smartphone to join the digital loyalty program (Graham, 2014). This survey reflected that the customer began to wishes the loyalty program can be done using mobile applications.

As for the business organization, digital reward system can reach their customers effectively compare to traditional card-based reward system. There are a few advantages can be gain from implementing digital loyalty program which are provide awareness, social integration, universal and avoid fraud. A digital loyalty program give a better communication with the customer. It also act as an advertisement tools to inform the loyalty rewards can be gain from customer purchase. The security features inside digital loyalty program further secure a user data which enable the organization to analyze the preference correctly.

In this project, the goals is to develop a customer loyalty reward system to replace the traditional card based system for food and beverages industry. The system aims to help the organization to keep track of their customer preferences as well as advertising the information. As for the consumer, the system will helps them to view their accumulate points and redeem the items more easily.

## 1.1 Motivation and Problem Statement

Many organizations nowadays offer membership card to their customer as their loyalty program to keep track of the loyalty. This is due to the low cost of implementation of the membership card. However, there are some weaknesses in the card-based system. Each membership card is unique to each and every individual but some of the individual will take advantages of the owner to use their membership to get the discounts. Although this may generate profit to the company but this scenario will cause the company to identify customer preference and incorrect analysis of data. Moreover, the card can be easily lose due to human carelessness. A company usually will ask for some replacement fees for a new card. This will lead the customer no longer interest to become a member and will switch to other suppliers. It is also often to hear a case where stolen membership card are used frequently by a customer. There is not security measurement to identify the ownership of the card. This happen frequently in the shopping malls where the customer take advantages of this to get a discounts or redeem a product without the notification of the owner.

On the other hands, the problem with the existing system is the information of the membership card cannot know by the owner. The curiosity of the customer about the points that accumulates so far is not easily identify. They have to go to the service counter to get the info of the points. This causes customer lost interest in to continue participate loyalty program.

Offering free membership card is only one time advertisement for a businesses. Imagine that a customer rarely use the membership card this will causes a big lost to the company. Once the customer get the membership card for free they will switch to other retailer and this behavior will continue until they get satisfied with the loyalty program in the market.

Therefore, these problem can be solve by implement a customer loyalty reward system with a mobile application. The apps will able to solve the fraud of usage of membership which can identify a customer correctly. In addition to that, it is easy to use and user friendly. A companies can use the apps as a platform to advertise their new product which helps them to reduce the cost of advertisement.

## 1.2 Project Scope

This project aims to develop an application for the SME food and beverages industry such as restaurant, café and coffee shop to conduct their customer loyalty program with a mobile version application instead of using traditional reward card system. The developed application will have the features as below:

### 1. Advertisement gallery

The application will provide a page to display the advertisement about the new foods, drinks or discount menu to inform their customer. The advertisement will be store on server as the new products or promotion launch it is easier to update their customer about the information from time to time.

### 2. Current reward and option to redeem a reward

The application will display current points gain by user. As the data is store in server, the user do not need to worry if they change their phone all accidentally uninstall the application. The points can be gain by scanning a QR code provided at the restaurant counter. User can redeem the reward from few options and display it to the counter within a specific time.

### 3. Redeem reward history

The application also display the redeem reward history to the user. User can view their redeem reward from there to decide which reward is the best for them to redeem.

### 4. Location

The application integrate with Google map API to display the location of the restaurant. User able to view and find the address of the restaurant from this features.

### 5. Feedback

The application also provided a form which can collect user feedback to improve the services or any suggestion given by the customer. This features will need user to have email services as the admin can keep in touch with them to continue to serve the customer better.



## 6. Integrated with firebase analytics

The application will integrate with firebase analytics tools to provide useful report to admin such as crashing report, most redeem reward by user and total user downloaded the application.

The final deliverables of this project will be a customer loyalty reward mobile application (F&B+) which user can download and install in on Android phone.

### **1.3 Project Objectives**

The purpose of carry out this project is to introduce digital loyalty reward program using applications instead of traditional reward program such as membership card and reward card. The purpose of carry out this project can be further divide into four objectives.

The first objective of this project aims to achieve is to develop a mobile app that serve as a digital loyalty program which ease the customer participation procedure. The mobile app is serve as a digital loyalty program to replace the traditional loyalty program. The digital loyalty programs can participate easily by the customers by downloading the app. On the other hand, there is also registration page provided which customer can create an account easily. The process of claiming loyalty points is convenience as user only need to display their unique QR code to the scanner, the points will be rewarded to the user account.

The second objective of this project aims to serve as a platform for the current restaurant to advertise their news. There will be an advertisement gallery can be view by customer which they can knows the any promotion or new menu launch by the restaurant. The application will also send notification to user whenever there is any news or upcoming event. Therefore, the apps will serve as a platform to advertise the restaurant menu and foods which save the advertisement cost and the news able to reach to more target audience.

The third objective is to provide convenience to the user to access their loyalty information anytime through their mobile devices. Customer also able to use the app to

view the information and redemption for the programs they participated anytime and anywhere. This is due to the points redeem is stored on server and the data will not easily lose.

The fourth objective of develop this project is to provide useful simple information from the application by integrate the app with Firebase analytic. Firebase analytic tools has provide some built in functionality for reporting such as how many user using the app, crash reporting, user country and event that is most selected in the app. These functionality able to provide the admin information about the application and can fix if there is any bug or crash occurs in the application. Moreover admin can view the reward claim by user in a bar chart view

In summary the fourth main objective of develop the application in this project is:

1. To develop a mobile app that serve as a digital loyalty program which ease the customer participation procedure
2. To serve as a platform for the current restaurant to advertise their news
3. To provide convenience to the user to access their loyalty information anytime through their mobile devices
4. To provide simple analytic information from the application by integrate the app with Firebase analytic

Problem	Objective
<ul style="list-style-type: none"> <li>• Easily loss of reward card</li> <li>• Fraud usage by other user of reward card</li> </ul>	To develop a mobile app that serve as a digital loyalty program which ease the customer participation procedure
<ul style="list-style-type: none"> <li>• User cannot know the current promotion offers available</li> </ul>	To serve as a platform for the current restaurant to advertise their news
<ul style="list-style-type: none"> <li>• User cannot easily know the loyalty points store inside loyalty membership card</li> <li>• User didn't bring reward card to claim loyalty points</li> </ul>	To provide convenience to the user to access their loyalty information anytime through their mobile devices
<ul style="list-style-type: none"> <li>• No valuable information provided from card-based loyalty program</li> <li>• Not able to perform analytic studies to engage customer relationship</li> </ul>	To provide useful analytic information from the application by integrate the app with Firebase analytic

#### **1.4 Impact, significance and contribution**

By having this customer loyalty reward application, it will benefit both customer as well as the owner of the shop. On the customer perspective, the applications help to store their reward points at the server. That is to say, customer do not need to worry about the reward points will be missing. Besides, customer can view their reward points and reward gift anytime by login their account on any android devices. The application itself also provide an interesting way to gain the points by scanning the QR code provided at the restaurant. All the customer need to do is open the application and press on the scan button, the QR code will be scan through the customer devices. The map function inside the application also will help user to search the location of the restaurant easier.

On restaurant owner perspective, the applications provide a convenient way to launch the loyalty program. Compare to traditional loyalty program, the application have help to save the cost of producing membership card and reward card. It is also easier to keep track of the customer through the firebase console. The application itself also serve as an advertisement platform where the restaurant owner can promote their new food and drinks. Notifications about new foods or any promotion can reach the customer easily. In order to serve the customers better, the feedback function in the application allow customer to comment on restaurant issues such as cleanliness, services and parking. This can helps to improve the services quality in the restaurant and keep their customer loyalty.

#### **1.5 Background Information**

The fast-paced growing business have drove the market become fierce with competition. In order for a business to maintain sustainability on the market, one of the way is through loyalty program. The word “Loyalty Program” is defined as a program which let customer to accumulate for free rewards when they purchasing item or goods with a company (Yuping Liu, 2007). The first loyalty programs were simply just giving a gifts from merchants such as supermarkets and gas stations to their customer so that they loyal to the business. One of the famous loyalty program in the past was S&H Green Stamps which launched in 1896. Through this program customer can claim their

reward once they have collected stamp that fulfill the condition (Schneider, n.d.). With the advance of technology nowadays, loyalty program have been evolve across the past few years. The most common form of loyalty program are using card-based loyalty card and digital loyalty card. However, in Malaysia is very rare to see small scale restaurant and caféshop implement digital loyalty program. They prefer to use traditional reward card which ask their customer to collect stamp after each purchase. This practices always end up fail due to disadvantages such as missing card, fraud use of reward card and forgotten by customer.

The reason for the company still using card-based loyalty program is due to concern of the cost, complexity and difficulties in managing the program. These uncertainty exists in the small business owner which make them do not step into digital loyalty program. However, a digital loyalty program can be inexpensive if the company planning and well integrate system with their customer (Towles, 2014). The popularity of smart phones has made loyalty programs to be created by small businesses. By developing a reward app which allow their customer to accumulate the points each time they visit and redeem the gift once they meet the condition. Through this way, problem such as missing of card and fraud use of reward card exists in card-based reward can be solved. Of course, the app have to be user friendly and attractive so that user can easily use the functionality without any problem.

Digital loyalty program will continue to grow and become more advanced in the future. Therefore each of the business not matter small or big companies will try to compete each other through implementing loyalty program to maintain their customer. The success of a loyalty program greatly lies on how it benefits the customer as well as company itself.

## **Chapter 2 Literature Review**

### **2.1 Loyalty (Marketing)**

Loyalty can be describe in many perspectives such as loyal in relationships, company, jobs and etc. In marketing, loyalty is refer to maintain trust among current customer by continuously reward them so that they will conduct the business with the company.

While another definition of loyalty in term of marketing can be also describe as an action of a customer willing to stick to the marketing organization although he or she has another option. Loyalty is created only when the customer perceive equity, fairness and transparent from the relationship with the business (Sharma, n.d.). Therefore, the organization started to build a loyalty business model to maintain their customer loyalty.

### **2.2 Loyalty Business Model**

Loyalty business model is refer as a strategic management used by an organization that focus on maintain and improving the customer loyalty. In loyalty business model the organization mainly focus on 2 factors which are service and product quality in order to achieve customer satisfaction. The services is based on the customer services. A good customer services is able to handle a customer request as fast as possible. This will leave a good impression to the customer of the services provided by the organization. On the other hand. The product quality should be reach customer expectation and performance (Thomas, 2014).

The loyalty business model should also include the strategic that can build the loyalty. The strategic are such as bait and hook where the companies will lower the price of the product to ensure that their customer stay with the business. One of the good example, will be a company sells a lower price laser printer to the customer and bait them to buy the expensive ink. Another would be offer discounts to the customer with a subscription model (Manela, n.d.).

### **2.2.1 Types of Customer Loyalty**

Customer loyalty can be defined as a deeply commitment to purchase preference product/service continuously despite the situational influences and marketing efforts that can cause customer for switching behavior (Dickinson, cited in Oliver 1999). A customer loyalty can be divided into few categories.

#### **2.2.1.1 Brand Loyalty**

Brand is refer as a sum of people's perception to an organization based on the services, reputation, advertising and logo. A brand in a company act as a recognition among all the market competitors (Deluxe, 2015). Branding is one of the strategic used by a company to maintain a brand loyalty customer.

Brand loyalty is defined as emotionally-charge decision from customer which intended to purchase a specific brand continuously. This behavior exists due to the branded product/services offer by a company meets the expectation of the consumer on a personal level (Gunelius, n.d.). Although new branding increasing over the market, a brand loyalty customer will not have the intentions to switch to other brands. Therefore, a company can use this advantages to continue to provide a good services and product based on the brand. Building brand loyalty it requires many measurement from an organization. Advertisement is part of the strategic to maintain the reputation and famous of the brand. There can be also some customer loyalty program implement by the organization to achieve the brand loyalty.

#### **2.2.1.2 Customer Loyalty Program**

A customer loyalty program is a practices or method a company offers to their customer with products, promotions, or pricing hoping them to stick with their businesses. A good customer loyalty program should not just focus on the earning the money without understanding the customer needs. A loyalty program with such ideas will mostly lead to failure (DeMatas, 2016). Many expertise have come out with their own key to success in implementing customer loyalty program.

There are 4 types of customer loyalty program which are members receive additional discount at register, receive free goods when purchase, receive rebates or points and receive targeted offers and mailings.

**Table-1: A Typology of Loyalty Program**

<b><u>Program type</u></b>	<b><u>Characteristics of program</u></b>	<b><u>Example</u></b>
<b>Type-I</b> Members receive additional discount at register	<ul style="list-style-type: none"> <li>• Membership open to all</li> <li>• Clerk will swipe</li> <li>• Each member gets same discount irrespective of purchase history</li> <li>• No information on customer name, demo or purchase history</li> <li>• No targeted communications</li> </ul>	Supermarket programs Beneficial to small firms as easy to administer and low costs
<b>Type-II</b> Members receive 1 free when they purchase n units	<ul style="list-style-type: none"> <li>• Membership open to all</li> <li>• No customer database linking purchases to specific customer</li> </ul>	Local car wash, Airport fastpark
<b>Type-III</b> Members receive rebates or points based on cumulative purchases	Seeks to get members to spend enough to receive qualifying discount program tiers; no personalized communications	Airlines
<b>Type-IV</b> Members receive targeted offers and mailings	<ul style="list-style-type: none"> <li>• Members divided into segments based on purchase history</li> <li>• Requires comprehensive database of demographics &amp; purchase history</li> </ul>	Tesco

**Figure 2.2.1.2.1 A Typology of Loyalty Program**

Source: Barry Berman, "Developing an Effective Customer Loyalty Program", California Management Review, Vol. 49, No. 1, Fall, 2006.

There are 5 keys to success in loyalty program. These factors include the company must have a dedicated team to execute the loyalty program, focus on customer experience, rewards for individuals, social media integrated and data analytics tool to analyze customer preference (Beth Negus Viveiros, 2014). On the other hand, the key success is based on research of market and investment of technology in loyalty program (Loyalty Consumer Research Study, 2014). It is important that an effective loyalty program should not minimize on the possibility of obtaining a reward to avoid consumer loss of interests towards the program.



To sum up, these success factors can be combine together in order to improve and enhance the loyalty program to hit the objective of the program. The loyalty program can further makes up the fans for the product/services.

### **2.2.1.3 Fan Loyalty**

Fan loyalty refers to the loyalty felt and expressed by a fan towards the things that his/her fanaticism in their lives (Zhang et al., 2015).

Having a fan towards a business requires learning about the customer individually and systematically turn this into a business relationships (Solomon, 2014). One of the ways to maintain fan loyalty is through immediate handling the customer request (Roth, n.d.).

A brands loyalty is associate with the fan loyalty. A financial success is come from deep understand the connection of the brand, customer and employees. When the trust is develop among the customer it will drive the company for a long run term (Jones, n.d.).

## **2.3 Customer Intimacy**

Customer intimacy is achieve when an organization able to maintain a long last relationship with the customer by satisfy their unique needs. Operational excellence works build up the customer intimacy. These two elements are used by the organization to win in a business. Customer intimacy (CI) aims to striving customer expectation while operational excellence (OE) focus on delivering service at lowest cost. OE strengthen five ways to meet the customer intimacy which are strategic message, process efficiency and effectiveness, performance management, quality mindset and organization culture. When an organization able to implement the five ways, then a customer intimacy will be build (Anderson, Healey & Locke, 2005).

Customer intimacy should be not just a marketing strategy or sales strategy. Customer intimacy is also a business model. There are steps need to be follow in order the intimacy exists among the customer. Initially a company should differentiate

business model and sales technique. It is followed by a great ideas to form the business should come by the company itself. After knowing the goals, a company should try to commercialize and dominate the market. This is a way to create a new opportunity for a business. A business that focus on customer intimacy will survive in the competitive market (Mcmann, 2011).

## **2.4 Customer Relationship Management System (CRM)**

New market today's are full with fierce competitors. Each and every second the business opportunity may come in to the market. Every company has survive themselves through implementation of new technology. Customer Relationship Management system is one of the concept that implement by most of the companies to maintain long-term relationship with the customer. CRM can be further divide to 3 types which are operational, analytical and collaborative CRM. If these CRM can be manage carefully it can deliver a great results to the organization. The fast-paced growing of technology have driven the evolution of CRM. Instead of CRM, the new eCRM can offers much convenience and analysis tools which helps a company to know the customer preferences. eCRM is not only just an electronic tools that collect and analyze the data but in also focus on customers need ensuring them to satisfied by their services or businesses. (Mishra, 2009) CRM system is where the companies able to analyze the customer data. A CRM without a proper analytical tools to work with, it is just a high cost without any profit making technology.

## **2.5 Redemption**

In conjunction with the loyalty programs, reward are usually one of the ways to show appreciation towards customers. The redemption reward in loyalty program (LP) gives a massive impact on the member behavior. The redemption can be occur during pre-purchase or post-purchase. In redemption event, even it is just a small amount of points that is given to the customer, but it will drive the redemption momentum of their customers. When the redemption momentum exists among consumer, it will encourage

them to purchase even more. Therefore, a redemption process should not be set an expiry date otherwise this will ruin the excitement of customer to redeem their rewards (Dorotic et al, 2014). There are few types of redemption such as product, discounts and free coupons commonly practices by a company.

## **2.6 Loyalty Scheme**

Loyalty schemes is an effective way to improve a company-retention level. In a competitive market, customer used to compare which loyalty scheme have reward and recognize them nicely. This is where the organization use this opportunity focus to improve their customer satisfaction. When the customer willing to purchase more and paid more, the organization will able to generate a huge profit. (Marketing Donut, n.d.)

Implementation of a loyalty scheme is not an easy task. The organization need to design the loyalty scheme with appropriate reward structure, targeting and component that can accessible across the global market. A detail research and consideration should be put in in order for the loyalty scheme to be effective. There are a few types of loyalty scheme which are point, tiered system, upfront fee and partnership (Order Dynamic, 2014).

Loyalty scheme has clearly benefits many organization. It has two major goals for an organization which are reward loyal customer and generate information. Loyalty scheme usually offers discount and product as the rewards. Due to this, some customer are motivate to the scheme and stay loyal in the business. However, a loyalty scheme can be costly requirements for doing a businesses. When this scheme was the only tools used by organization for data collection then it play a crucial role in the businesses (Malley, 1998).

## **2.7 Types of redemption**

The redemption usually comes in three form- Product, Monetary Value and Points (Discount). According to the consumer study into Australian loyalty programs, most of the consumer likes the discount redemption when they purchase a product. It makes them feel the product they purchase are at a lower prices. While product or

vouchers redemption was the second popular due to the customer able to redemption the product what they wish. It usually comes with a point system whenever the customer able to accumulate a certain amount of points, they able to exchange the points with the product.

Many organization have implement the point redemption loyalty programs as it provide more redeem option to the customer instead of fixing a products or gift. The customer also able to enjoy the purchasing processes as it is fun to accumulate points to redeem their rewards. This redemption event will leave a positive effect that lead to customer satisfaction.

## **2.8 Satisfaction**

Satisfaction is the stare or feeling of being satisfied or pleasure. Satisfaction usually use to describe the feeling of customer towards the business. In other words, the extent to which a product or services that can fulfills customer's need will form a customer satisfaction.

### **2.8.1 Customer satisfaction**

Customer satisfaction is defined as satisfaction of the customer with a product which improve the business performance to generate profit. Traditionally, a customer satisfaction is by interview and survey using questionnaires. The data collected is used to compare with the business performance to identify whether there is any increase of business profit (Suchanek & et al., n.d.).

In order for a customer to satisfied, there are a lot of measurements need to be done by the company. It can start with provide a good working condition to the employee. When the employee is satisfied it will push them to produce a good quality of product of services. This will continue to lead the customer satisfaction hence loyal to the business (Mostaghel, 2006). This can be shown as a cycle in Figure 2.8.1.1



**Figure 2.8.1.1 Circle of Satisfaction**

**Source: Rana Mostaghel, 2006**

However, a customer satisfaction is always hard to measure since it is an emotion that feel by a customer itself. The companies only can implement as much as loyalty programs and focus on deliver a good quality of services to maintain the happiness of their customers.

## **2.9 Existing System**

The implementation of reward programs in restaurant industry not work is because of the card issues. Since nowadays technology is growing fast, it is better to implement a reward program that is paperless. Duty to keep track of customer lies in the organization. This will make the customer more precious and valuable (Mankoff, 2008). There are problem exists in current system which will be improve using the new proposed customer loyalty reward application.

### 2.9.1 Ilaolao Reward Card



**Figure 2.9.1.1 Ilaolao Reward Card**

Figure 2.9.1.1 show Ilaolao Reward card. Ilaolao is a company selling frozen yogurt in many countries. Based on the picture they are using a reward card as their loyalty program. However, there is some restriction have set in order to participate this loyalty program. Firstly, user have to bring along the card in order to get the stamp. Secondly, user need to responsible for their own card. Thirdly, user cannot transfer the reward card to other user to use it. Based on the three restriction, this have bring problem to the user. In case user forget to bring the reward card during the purchase, he or she will miss the chance of getting a stamp. Besides, the reward card is easily damage as it is just a piece of paper card. If the reward card damage, a new card will be issue but user have to collect the stamp all over again. The reward card also cannot authenticate who is the user, making fraud use of reward card.

## 2.9.2 Sweet Hug Reward Card



**Figure 2.9.2.1 Sweet Hug Restaurant Reward Card**

Figure 2.9.2.1 show Sweet Hug restaurant reward card. Sweet Hug restaurant is located at 2236, Jalan Batu Sinar Taman Bandar Baru, 31900 Kampar, Perak. As shown in figure the reward card is the loyalty program done by them. The reward card contain the telephone number of the owner and address of the restaurant. It also notify the user that they have a Facebook page from the reward card. However, there are a few drawbacks from this loyalty reward card. The loyalty card is easy to damage and loss due to human mistakes. The user may need to start all over again to collect the stamp. Although the information are clearly provided, but user cannot directly access to the Facebook page. The user might encounter same name of restaurant at the Facebook page. Besides, the loyalty program cannot keep track of the progress of the user in the program. It does not provide any analytic detail to the company.

### 2.9.3 Each A Cup Reward Flyer

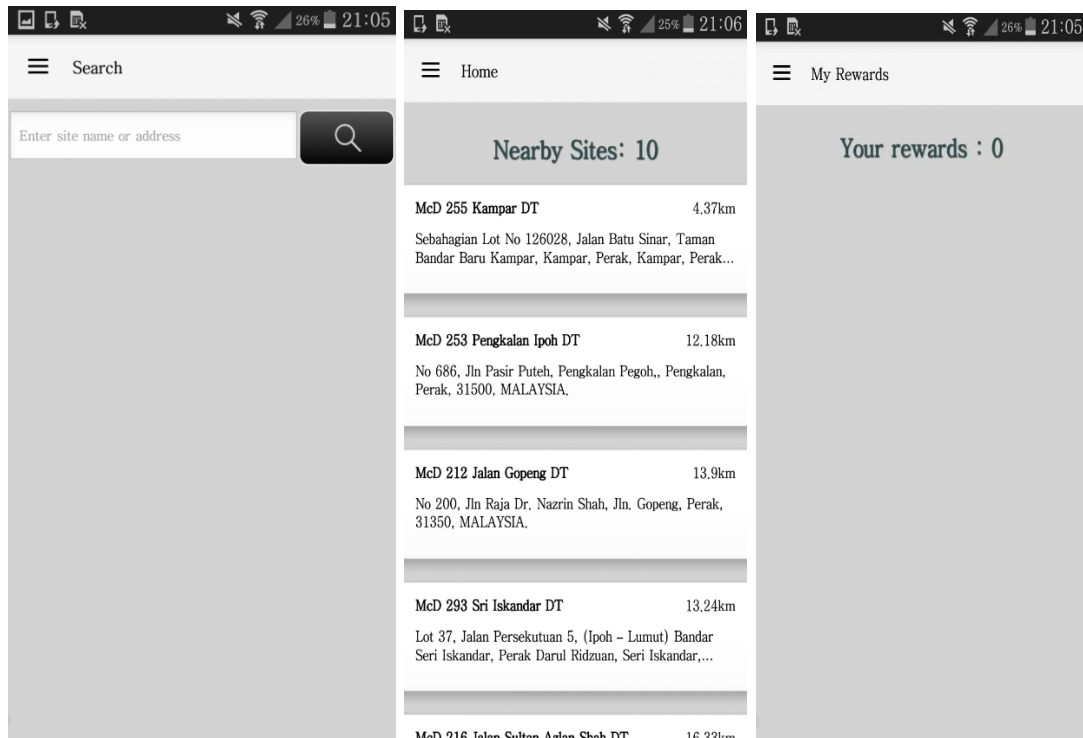


**Figure 2.9.3.1 Each a Cup restaurant loyalty flyers**

Figure 2.9.3.1 show loyalty program for one of the franchisee of Each a Cup which located at No 2369, Ground Floor, Jalan Hala Timah 3, Taman Bandar Baru, 31900 Kampar, Ipoh Perak. The reward card is actually gives as a flyer where user need to collect specific stamp in order to get rewarded. The flyer contain the information such as reward, how many stamp needed, locations to redeem. There is some drawbacks on implementing such loyalty programs using flyers. The flyer is distribute all the way in Bandar Baru area. This is not an efficient way to notify user as it involve a lot of cost and resources to the company. Since the manpower are limited, therefore the message only can be convey to the Bandar Baru area. Besides, the redeem process is difficult to manage. Once the users collected enough stamp, the cashier will tear out the collected stamp and exchange a free drinks to the users. The collected stamp might easily damage and lost due to human mistakes. The company also difficult to keep track of how many user have participate in this loyalty program.



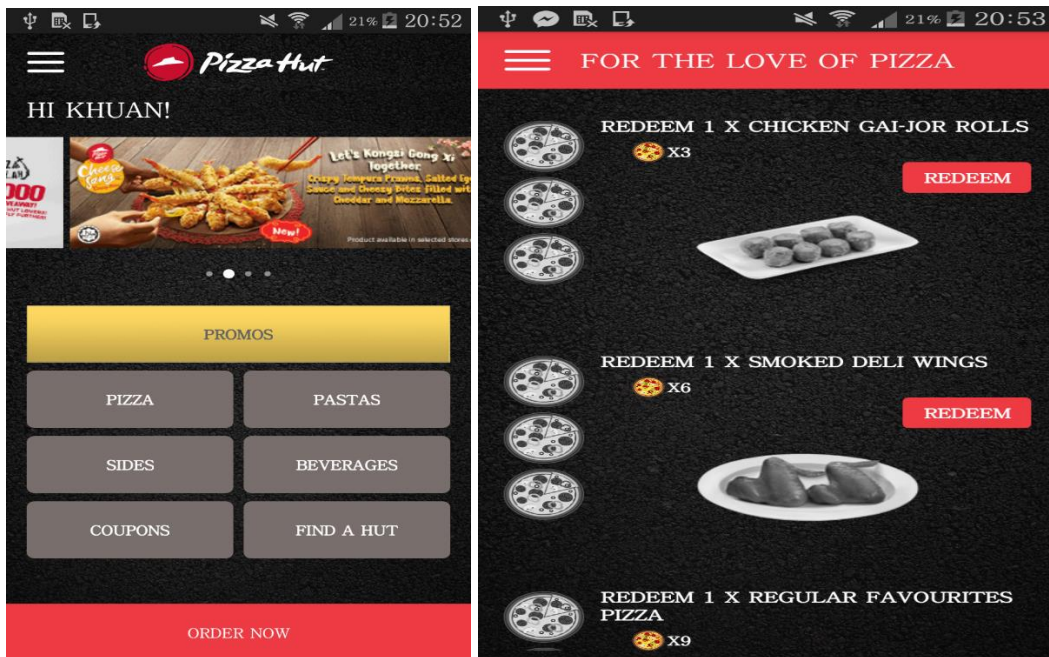
### 2.9.4 McDonald's Feedback App



**Figure 2.9.4.1 McDonald's Feedback App User Interface**

Figure 2.9.4.1 show McDonald's Feedback application user interface. The purpose of launching this application is to collect feedback from the customer. Based on the diagram the application have function such as find nearby restaurant, view rewards points and claim the reward. However, the user interface design is bad due to the font, color of text and background. It gives the user a perception that the application is launch without putting much effort.

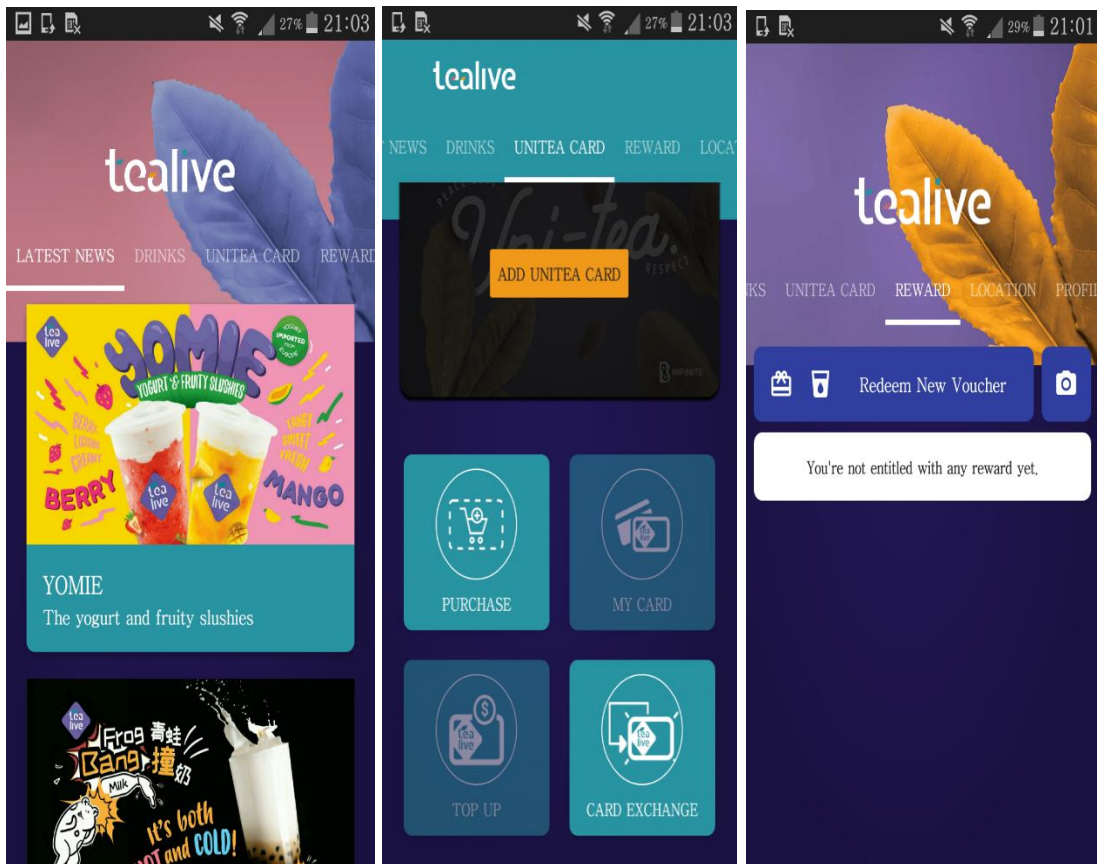
## 2.9.5 Pizza Hut Malaysia



**Figure 2.9.5.1 Pizza Hut Malaysia App User Interface**

Figure 2.9.5.1 show Pizza Hut Malaysia application user interface. This application consists of many function which is very useful to the user. Based on the diagram this application have a great design in user interface. The color and text used is attractive and clear to view. The option menu able to link user to view food menu, reward and location of the restaurant. Besides, the additional great things about this application is it provide ordering function enable user to purchase the pizza online. However, the claiming user points required a coupons in order to proceed thus make the customer inconvenience. The application also do not provide any feedback function to the user. This made user unable to report for issues if got bugs or they wish to complain.

## 2.9.6 Tealive App



**Figure 2.9.6.1 Tealive App User Interface**

Figure 2.9.6.1 show Tealive application user interface. Based on the diagram the application have provided function such as view latest news, drinks menu, order online and top up the credit. The application have a good user interface where every font and color used is attractive and suite the theme of the beverages. The application also include some of the animation when pressing a button. However, in order to redeem reward the application required the customer to key in the voucher information manually. Besides, customer have to purchase a membership card in order to purchase or get the reward. This waste company resources and cost as this function can be implement into the application.

### 2.9.7 Existing System Comparison

Criteria	Ilao Reward Card	Ilao Card	Sweet Reward Card	Hug Card	Each A Loyalty Flyers	Cup	Expected System(F& B+)
Food Advertisement	None		None		Yes		Yes
Cost of Implementation	Low		Low		Low		Moderate
Able to provide analytic information	No		No		No		Yes
Convenience	Yes		Yes		Yes		Yes
Provide feedback	No		No		No		Yes
Able to view for points	Yes		Yes		Yes		Yes
Able to identify User	No		No		No		Yes

**Table 2.9.7.1 Comparison of Developed System with Traditional Loyalty Reward Program**

Table show the comparison of existing system based on different criteria. Ilao Ilao, Sweet Hug and Each A Cup reward card mostly share the same criteria. Since three of them are card-based loyalty program therefore they do not able to advertise their food or drinks while the expected system will have a function which provide the new offers and promotion of the restaurant. Besides, expected system able to identify users and allow them to view the loyalty points easily. However, the card-based loyalty program have advantages in term of cost implementation and convenience for use. The expected system will involve a certain cost to maintain the user data and providing the services. On the other hand, the expected system have provide email function for user to give their feedback on the services as well as collecting useful data from customer to perform analysis in order to know customer preferences and serve them better in the future.

Criteria	McDonald's Feedback App	Pizza Hut App	Tealive App	Expected System(F&B+)
Food Advertisement	No	Yes	Yes	Yes
UI Design	Bad	Good	Excellent	Moderate
Able to provide analytic information	No	No	No	Yes
Convenience	Yes	No	No	Yes
Provide feedback	Yes	No	No	Yes
Able to view for points	Yes	Yes	Yes	Yes
Able to identify User	Yes	Yes	Yes	Yes

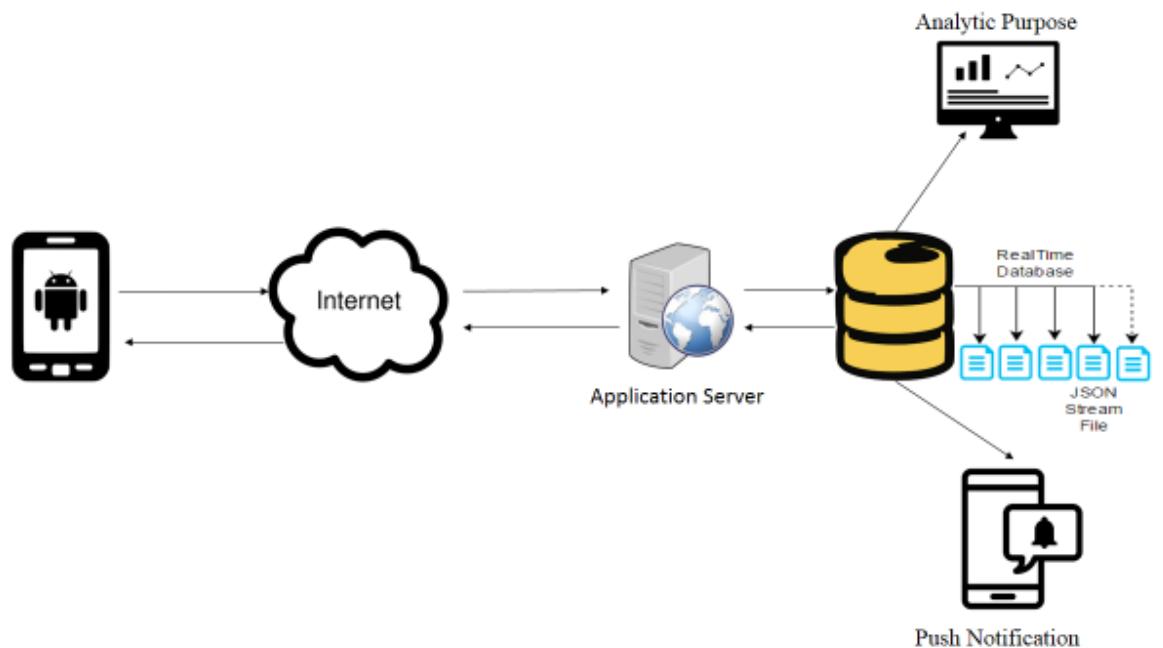
**Table 2.9.7.2 Comparison of Developed System with Existing App in Malaysia**

Table 2.9.7.2 show comparison of developed system with existing app in Malaysia. Basically all the application able to provide the main function such as enable user to view user points, claim reward and location. Pizza Hut application have the most excellent UI design compare to all other application. However, Pizza Hut application do not provide feedback section for the user. The developed system able to fix this weaknesses by providing a section for the user to give their feedback through form or Google email. Pizza Hut and Tealive indeed have a great design in UI but the loyalty program design by then company required user to have a membership card in order to participate. On the other hand, F&B+ application able to give convenience to the user by allowing them to access their info anytime by using an android phone. User only need to display the QR code generated by F&B+ application to claim the reward points.

## Chapter 3 Proposed Method/Approach

### 3.1 Design Specification

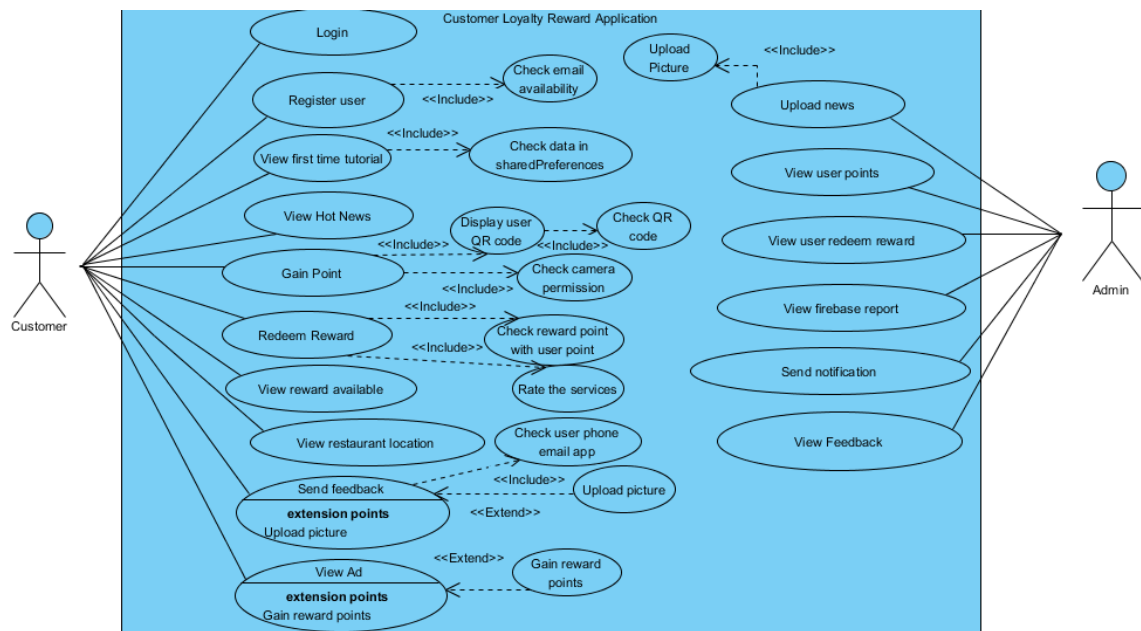
#### 3.1.1 Architecture Design



**Figure 3.1.1.1 Architecture design for Customer Loyalty Reward Application**

Figure 3.1.1.1 show the architecture design for Customer Loyalty Reward application. The architecture use in this project is client server architecture. The user use their mobile phone to access the internet in order to use the application. If there any changes made for example user have gain the reward point, the data will be sent to application server to process and further store into firebase in the form of JSON stream file. Firebase have provided a console which enable admin to carry out simple analytic such as displaying total user using the app. Moreover, push notification can be done easily using firebase to notify user for any update or news.

### 3.1.2 Use Case Diagram



**Figure 3.1.2.1 Use Case diagram for Customer Loyalty Reward Application**

Figure 3.1.2.1 show Use Case diagram for customer loyalty reward application. Based on the diagram there are two important actor in this system.

A customer will able to:

Login - login to the application using email and password

Register- register a new account to use the application. The email has to be unique

View first time tutorial – Once a user open an application for the first time there will be some intro slide to emphasize on what the app can provide

View hot news: User able to view the latest as well as old news

Gain point: User display the use QR code to the scanner, the server will check whether it is a valid QR code and return point to the user

Redeem reward: User able to use the accumulated points to redeem their reward

View reward: User able to view back the redeemed reward and available reward

View location: User able to view the location of the restaurant branch

Send feedback: User able to provide their suggestion by using their email account to contact the restaurant owner

View ad: User able to gain extra reward points by viewing video ad provided in AdMob

The admin will be able to use this system to:

Upload news: Admin can upload picture of poster to the hot news gallery

View user points: Admin can view all the user points from firebase

View user redeem reward: Admin can trace the reward redeemed by the user

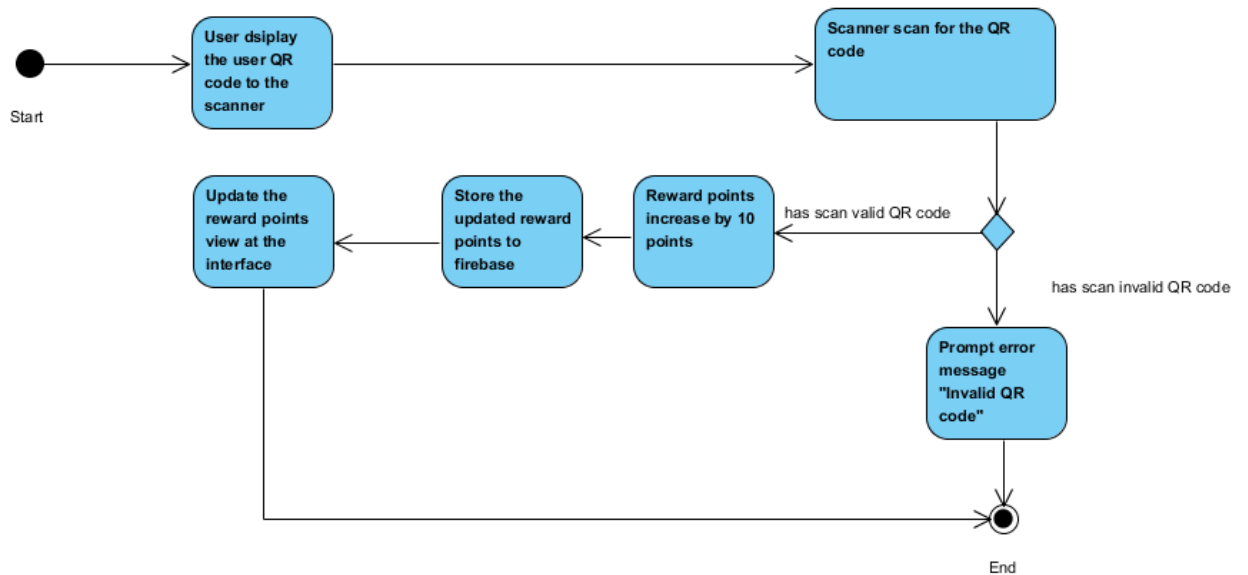
View feedback: Admin able to view the feedback given by the customer

View firebase report: Admin can go to firebase console to view reporting services about the app

Send notification: Admin can send notification using firebase to notify user any update or news on the app

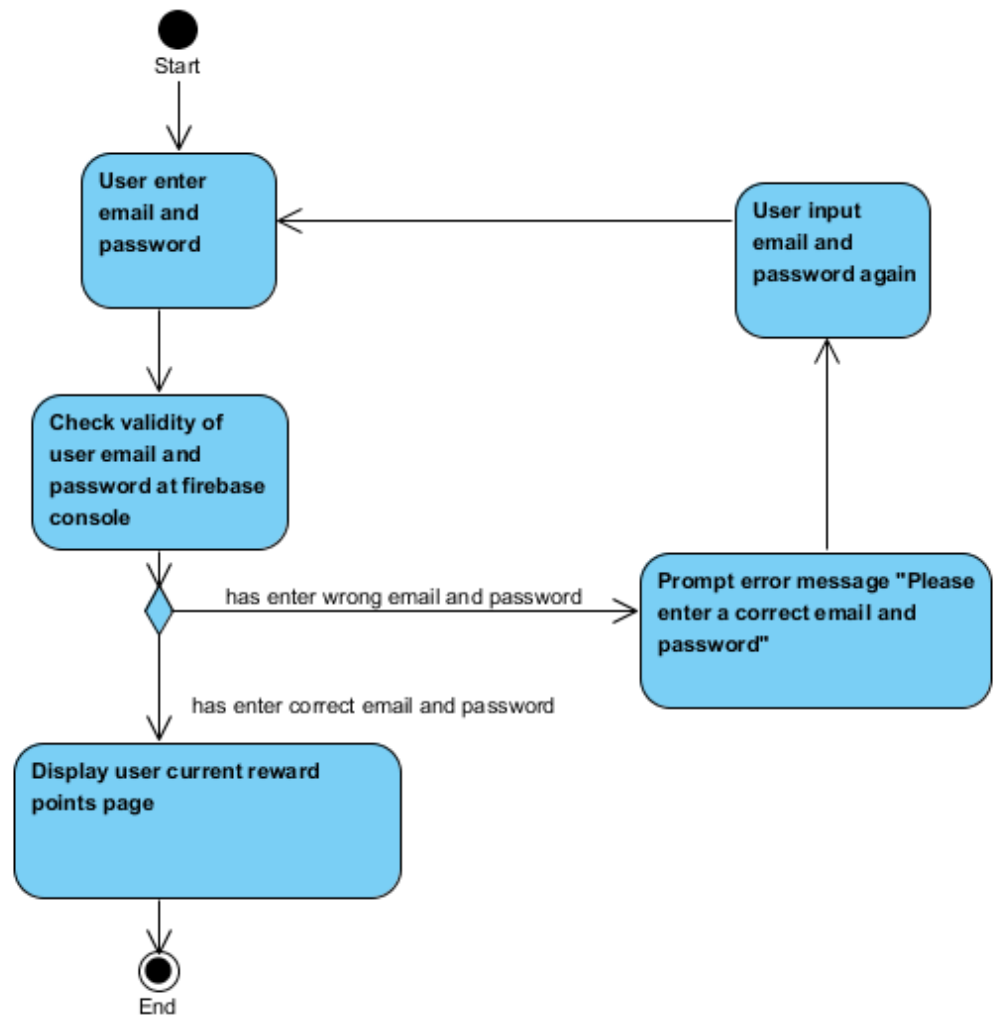


### 3.1.3 Activity Diagram



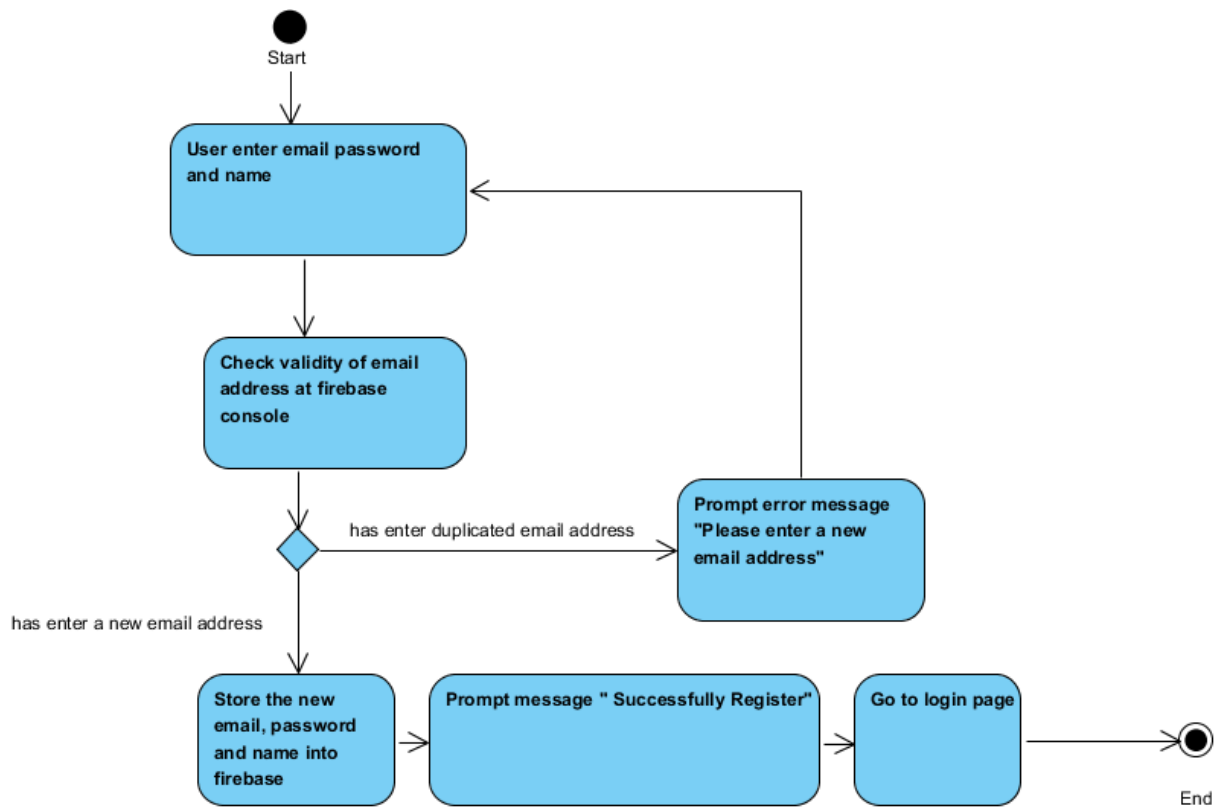
**Figure 3.1.3.1 Activity diagram for Gain Point function**

Figure 3.1.3.1 show activity diagram for gain point function. Initially, user have to login to their account in order to view their account QR code. The user then can display the QR to the scanner interface. The scanner function will scan the result and check whether the QR code is valid. If the QR code is invalid, an error message will be prompt out else points will be rewarded to the user account and display on user application.



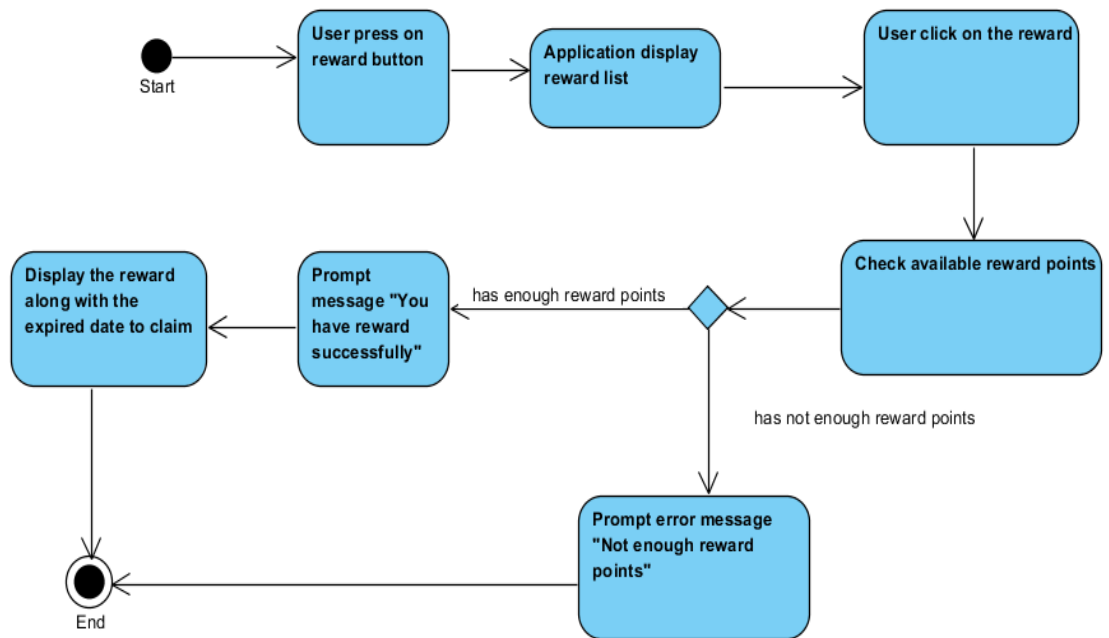
**Figure 3.1.3.2 Activity diagram for login function**

Figure 3.1.3.2 show activity diagram for login function. Initially user need to enter users email and password. Then the system will check the entered user email and password whether it match the firebase record. If there the user email or password is incorrect, an error message will be prompt out else the system will bring user to the main page of the application.



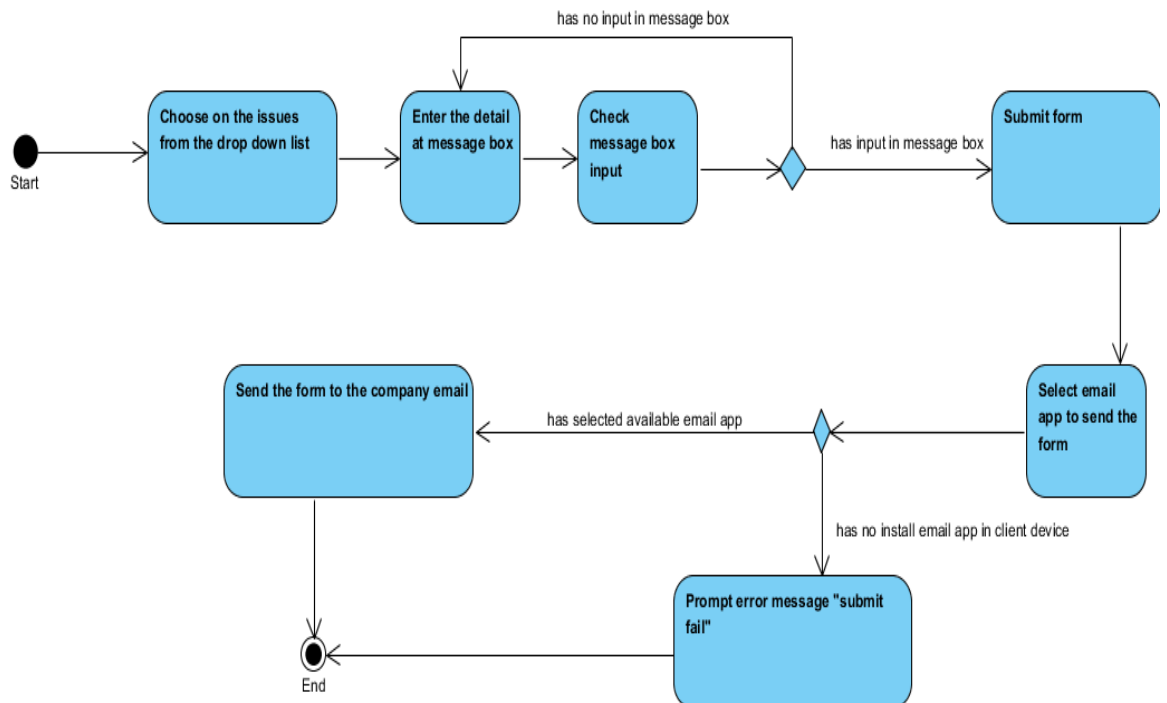
**Figure 3.1.3.3 Activity diagram for Register function**

Figure 3.1.3.3 show activity diagram for register function. Initially, user need to enter email, password and name. After user press the register button, the firebase will check the entered email whether is there any duplication email in the firebase. If the email already been used an error message will be prompt out else the firebase will store the new email, password and name and will redirect user to the login page.



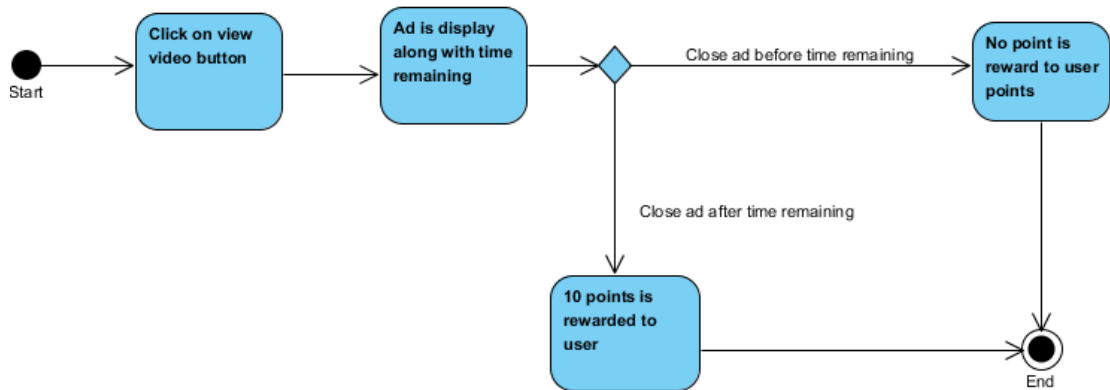
**Figure 3.1.3.4 Activity diagram for redeem reward function**

Figure 3.1.3.4 show activity diagram for redeem reward function. Initially, user press on the reward button a reward list will be prompt out. User can click on the reward. Then the system will check the available user reward points if there is not enough reward points error message will prompt out else a successful message will prompt and display a reward page along with the expired date to claim.



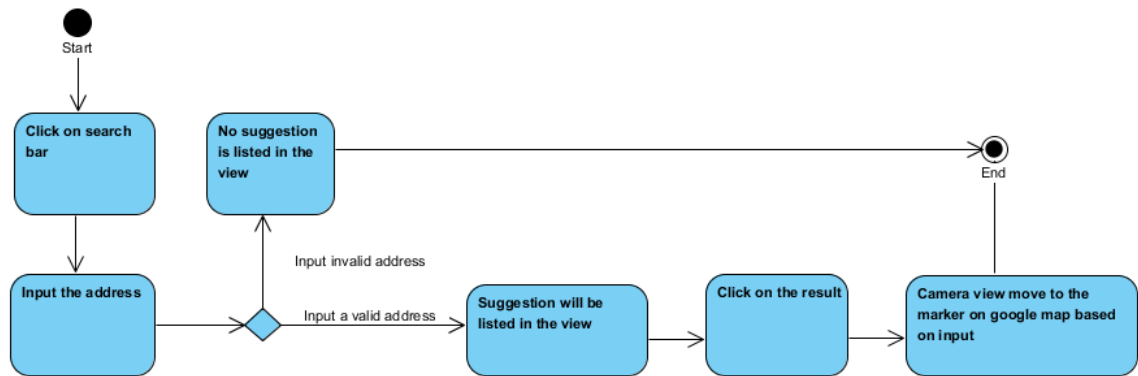
**Figure 3.1.3.5 Activity diagram for Feedback function**

Figure 3.1.3.5 show activity diagram for feedback function. Initially, user need to choose the issues from the dropdown list. Then user need to input message into message box if no message is inserted an error message will be prompt out and request user to input again. When submit the form, the user need to ensure he/she have install an email app in the client device, if there is no email app in client device error message will prompt out else the email will be submit to the company.



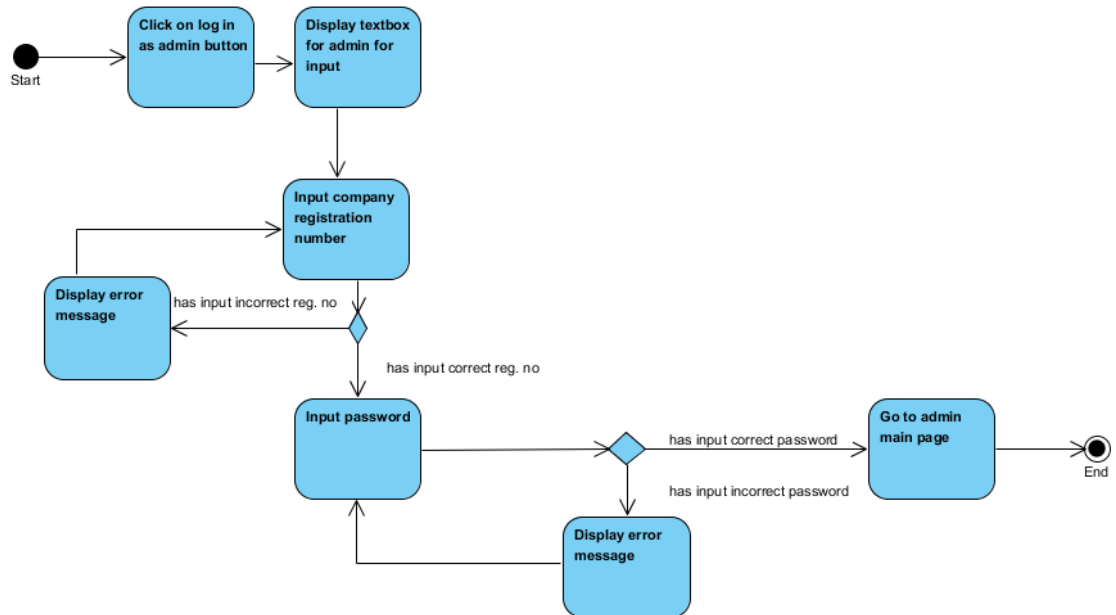
**Figure 3.1.3.6 Activity diagram for Watch Ad function**

Figure 3.1.3.6 show activity diagram for watch ad function. Once the user go into watch ad function there will be an animated gif instructing user to click on the view video button. When user click on view button the ad will display along with time remaining. If user close the ad before the remaining time no points will be rewarded to user else 10 points is given to user.



**Figure 3.1.3.7 Activity diagram for Location function**

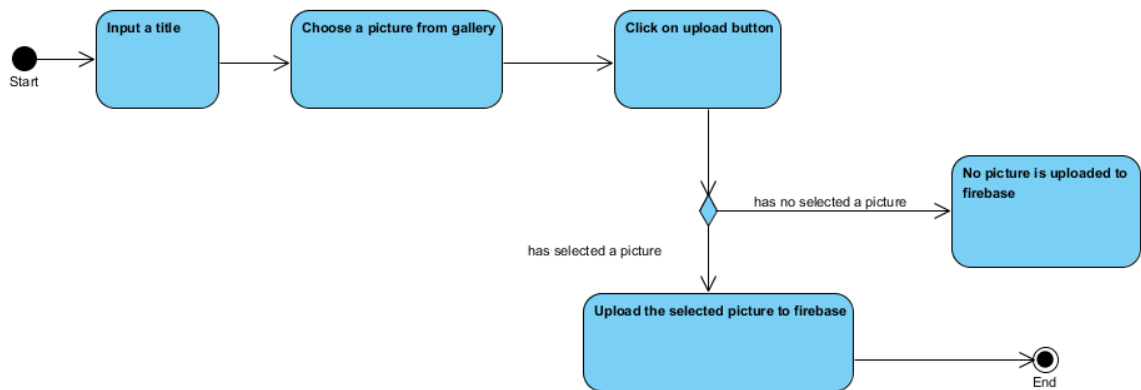
Figure 3.1.3.7 show activity diagram for location function. Initially, user need to click on the search bar. User can type the location they wish to search and the bar will list out all the suggestion address. If user input an invalid address then user will not able to find the restaurant location else the camera will move to marker on Google map based on the input.



**Figure 3.1.3.8 Activity diagram for Admin Login function**

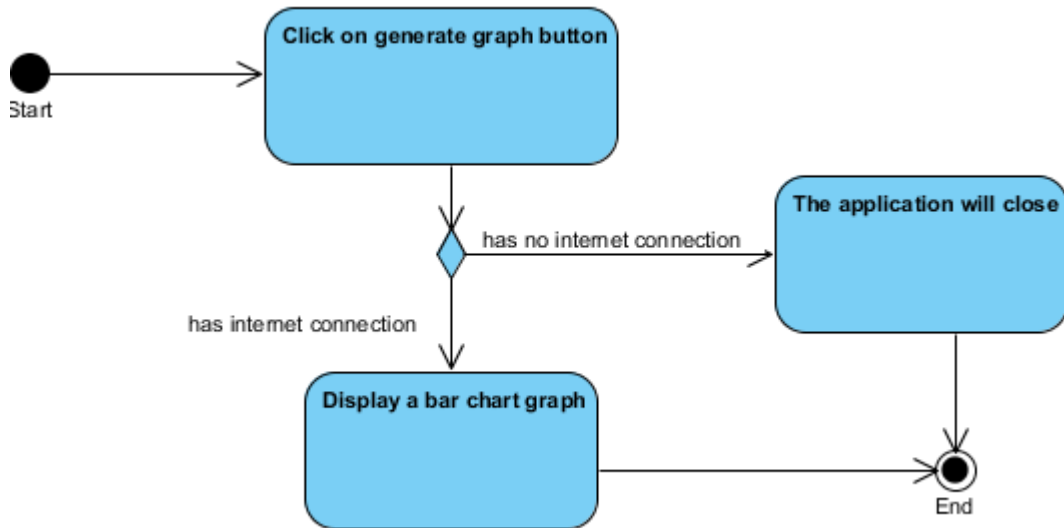
Figure 3.1.3.8 show activity diagram for admin login function. Initially, admin need to click on the log in as admin button in order to display a textbox for input. If admin able to input a correct company registration number and password the app will bring admin go to admin page else error message will be pop up required admin to input the detail again.





**Figure 3.1.3.9 Activity diagram for Admin Upload function**

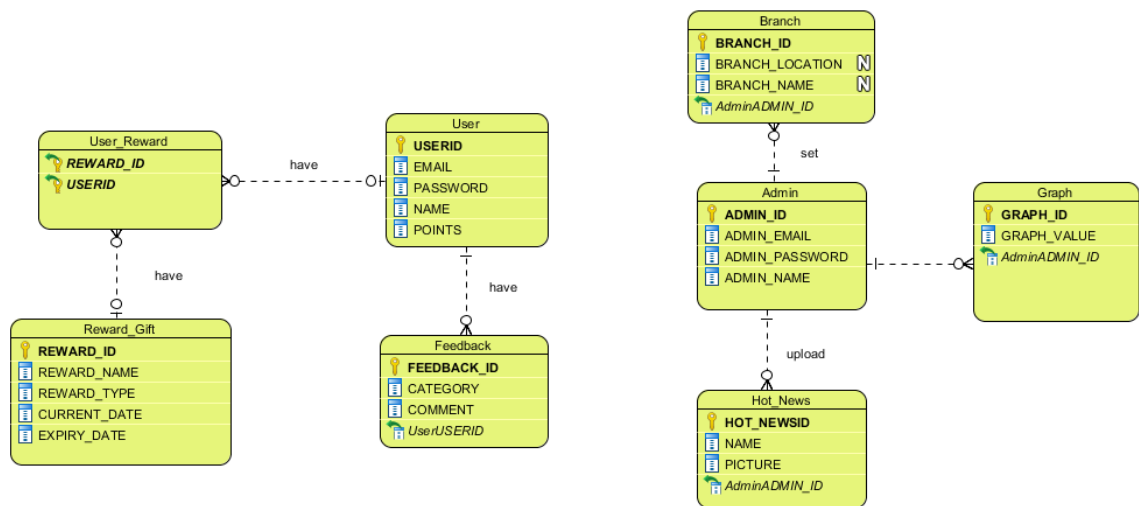
Figure 3.1.3.9 show activity diagram for admin upload function. Firstly, admin need to input a title for the picture to be uploaded. Secondly, admin choose a picture from gallery then click on upload button. If there is a picture selected the app will upload the selected picture to firebase else no picture will be uploaded.



**Figure 3.1.3.10 Activity diagram for Admin Analytic function**

Figure 3.1.3.10 show activity diagram for admin analytic function. Admin click on the generate graph button and a bar chart will be displayed given that the app has internet connection else the app will close.

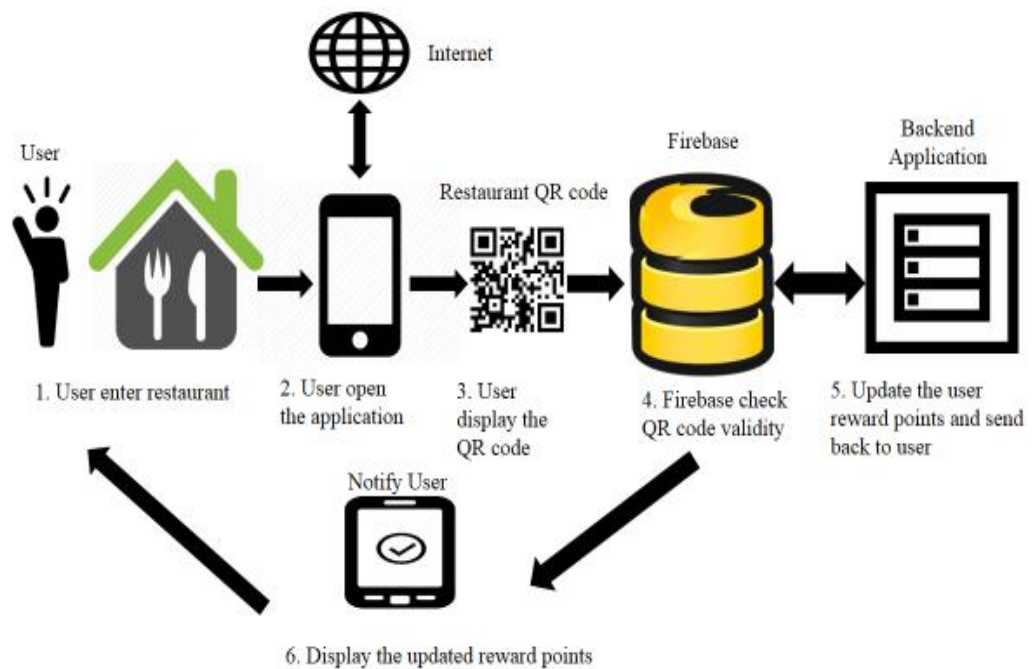
### 3.1.4 ERD Diagram



**Figure 3.1.4.1 ERD Diagram for Customer Loyalty Application**

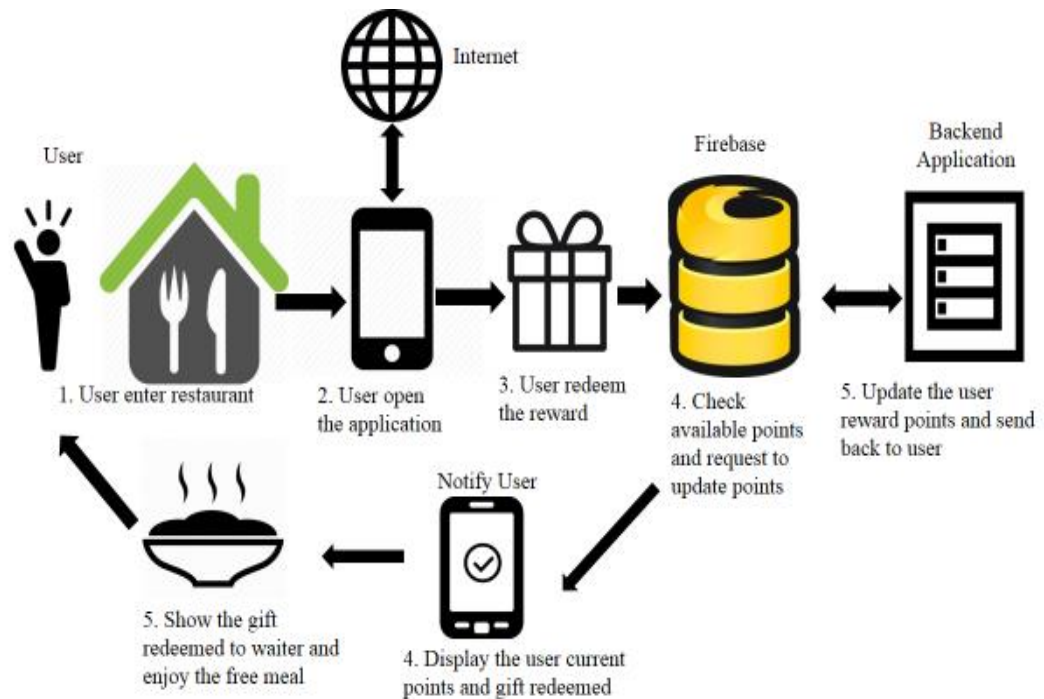
Figure 3.1.4.1 show ERD diagram for customer loyalty application. There are total 8 table which exist in the system to store the data. User table is storing information of user such as user id, email, password, name and points. The user can have zero to many feedback as well as reward gift. Reward gift table are defined to store information of reward such as reward name, type, current date and expiry date. On the other hand, admin table are storing detail like email, password and name. Admin can set the branch location name and upload news picture with name to the database. Last but not least, admin can generate graph and the graph will able to display reward count for each category.

### 3.1.5 Business Process



**Figure 3.1.5.1 Business Process of Gain Point**

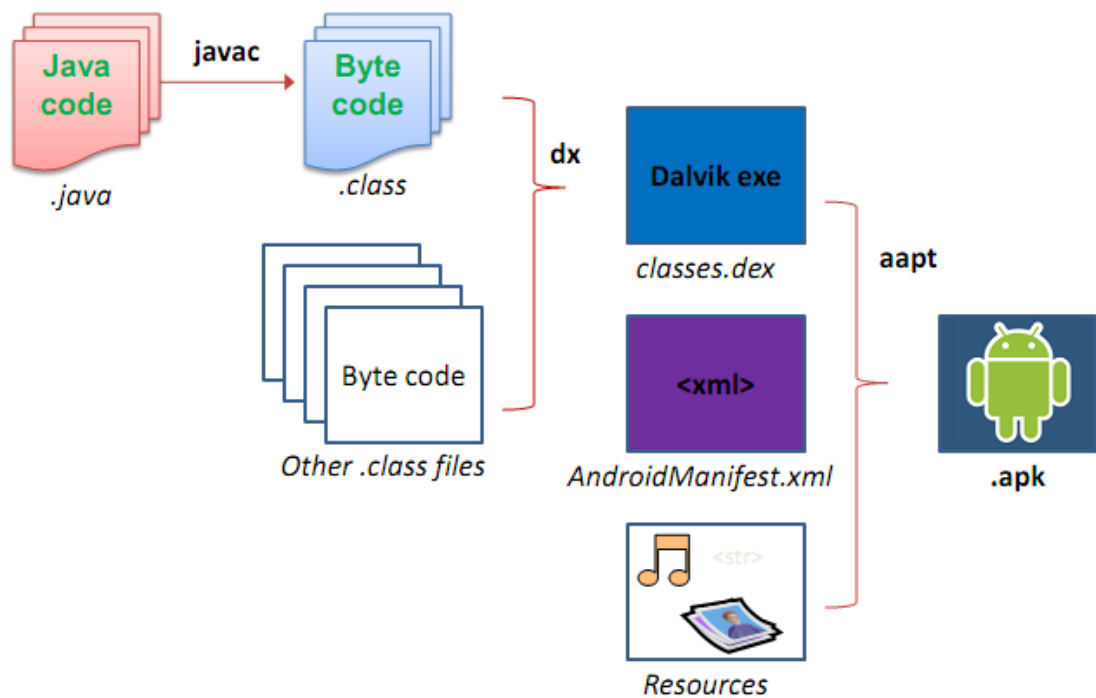
Figure 3.1.5.1 show business process of user gaining points by using the application. Firstly, user enter the restaurant to order some food. During the payment process, user can open the application with access to internet to gain reward points. Cashier will log in to admin version of the application to use the scanner function to get user QR code. After scanning user QR code, if the user QR code is valid the database will update the value. The result is then display on the user screen.



**Figure 3.1.5.2 Business Process of Redeem Reward**

Figure 3.1.5.2 show business process of redeem reward using the application. Firstly, user go to the restaurant and open the application. From the app, user able to view a list of reward to redeem. Then user can select the reward they wish to redeem given the condition that they have access to internet and have enough points. The app will check the request in the firebase and return a result if the claim is successful. Finally, the reward will be display on the user history reward. User can now show the reward to the waiter and get the reward.

### 3.1.6 APK Compilation Process

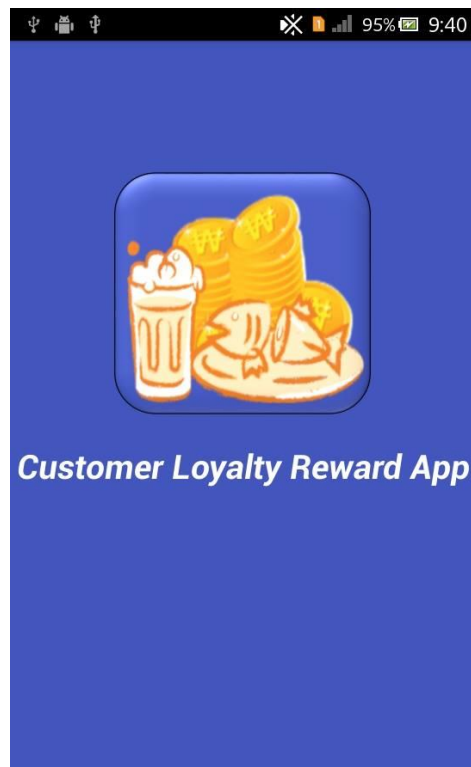


**Figure 3.1.6.1** APK Compilation Process

Source: Chandrayan, 2017

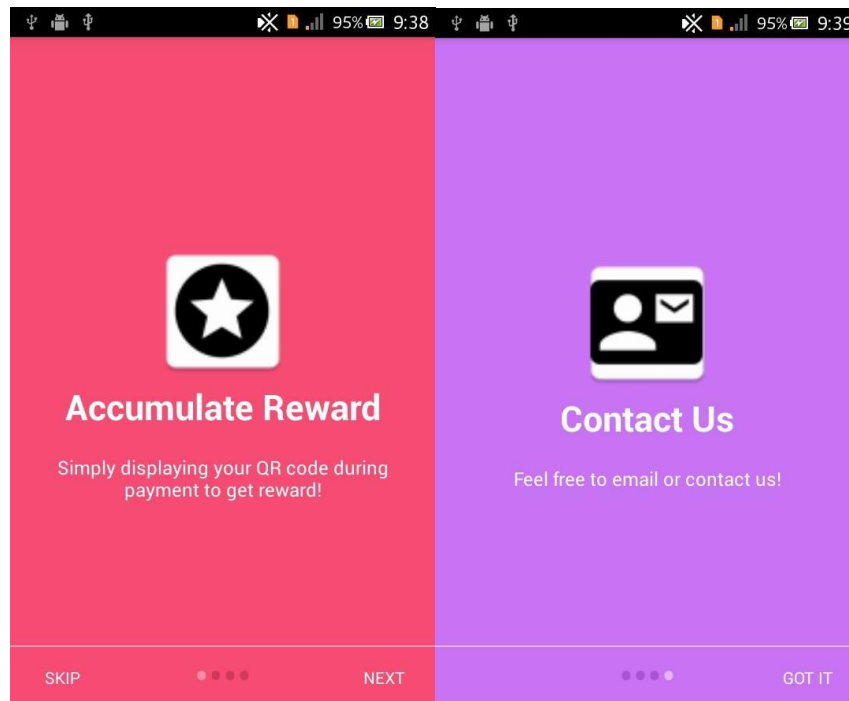
Figure 3.1.6.1 show the APK compilation process in android studio. After the java code have been done, programmer will click on the build button to build the APK. Initially, java code will be converted into byte code. Java code together will other class files which is also in byte code will be converted to dalvik byte code. This process is to ensure android operating system can understand the class files. Finally, packaging process is done by using android apk tool (APPT). APPT will generate an .apk files by combining Dalvik executable files, non-Java libraries and resources used.

### 3.1.7 Customer User interface design



**Figure 3.1.7.1** Splash Screen layout

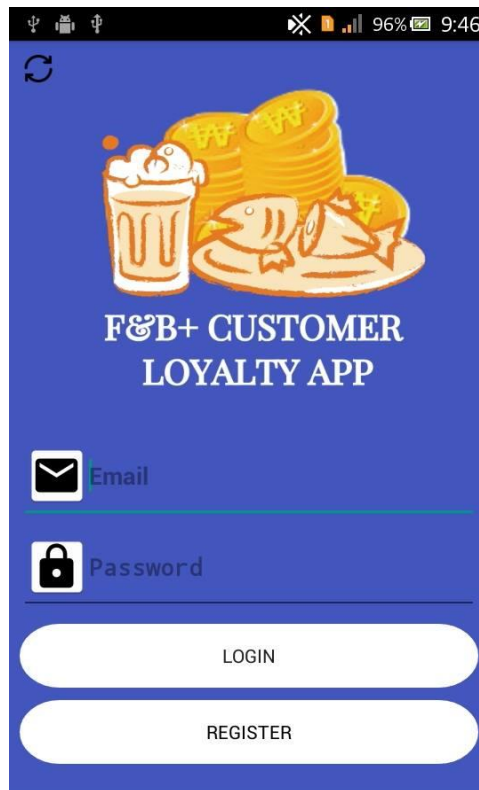
Figure 3.1.7.1 show splash screen layout of the application. The layout will appear each time user open the application. This layout aim to stress on the importance of the app and create a pleasant view for the user.



**Figure 3.1.7.2 Welcome layout**

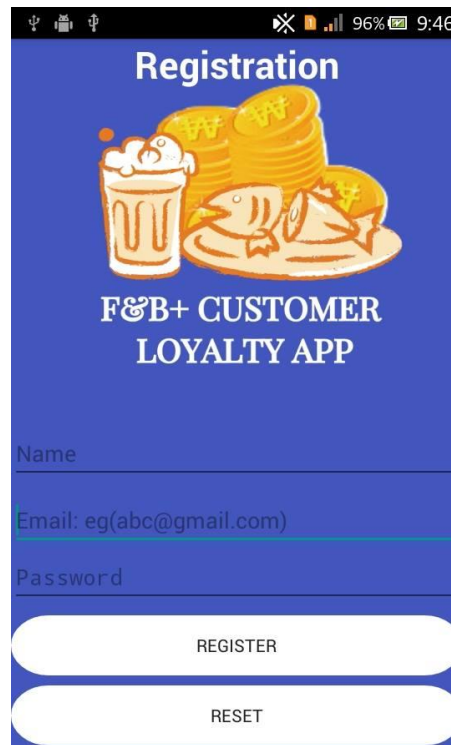
Figure 3.1.7.2 show welcome layout of the application. When user first time open the application the user able to view the welcome activity. The layout intend to promote the function available in the application.





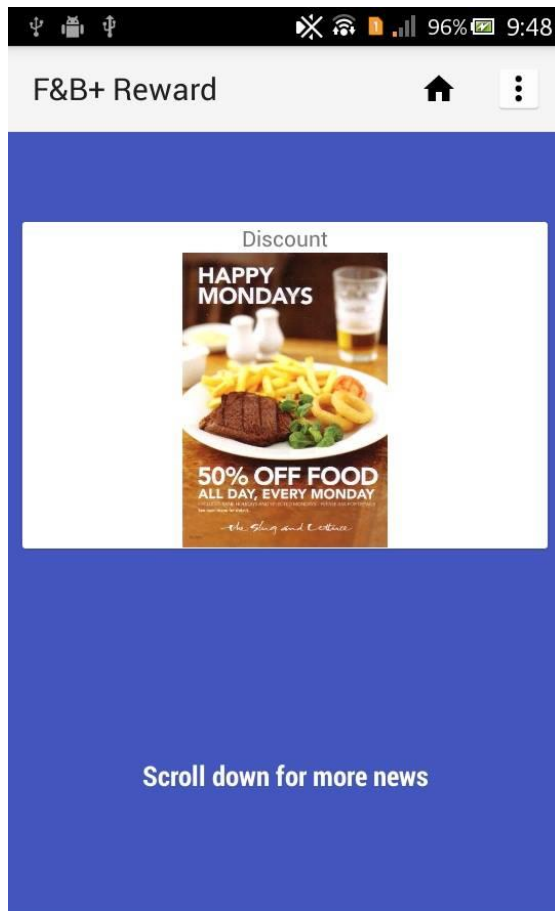
**Figure 3.1.7.3 Login function layout**

Figure 3.1.7.3 show login function layout of the application. Based on the diagram, there are two input which require user to enter in order to login to their account. The two input have to enter and the application will check the input with the firebase to determine the account availability.



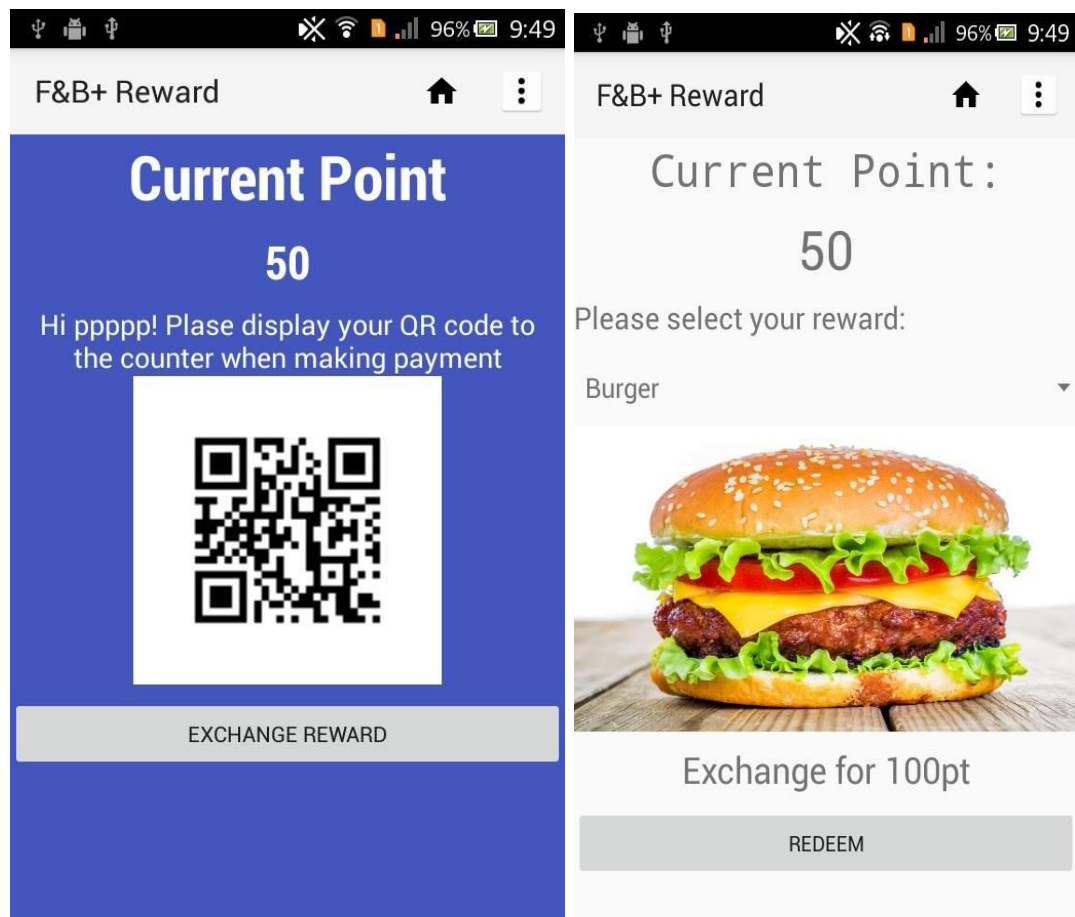
**Figure 3.1.7.4 Registration layout**

Figure 3.1.7.4 show registration layout for the application. Based on the diagram there are three input which require user to fill in. The name textbox is for user to enter their name. The input can be anything and can also pair with a spacing. The email textbox is required user to input an email address while password required user to input password without a spacing which is used later as the input for login. Once user click on register button, the firebase will check whether the input email is unique, if the email address is unique then success registration message will be prompt out else the error message will prompt out and user need to input a new email address.



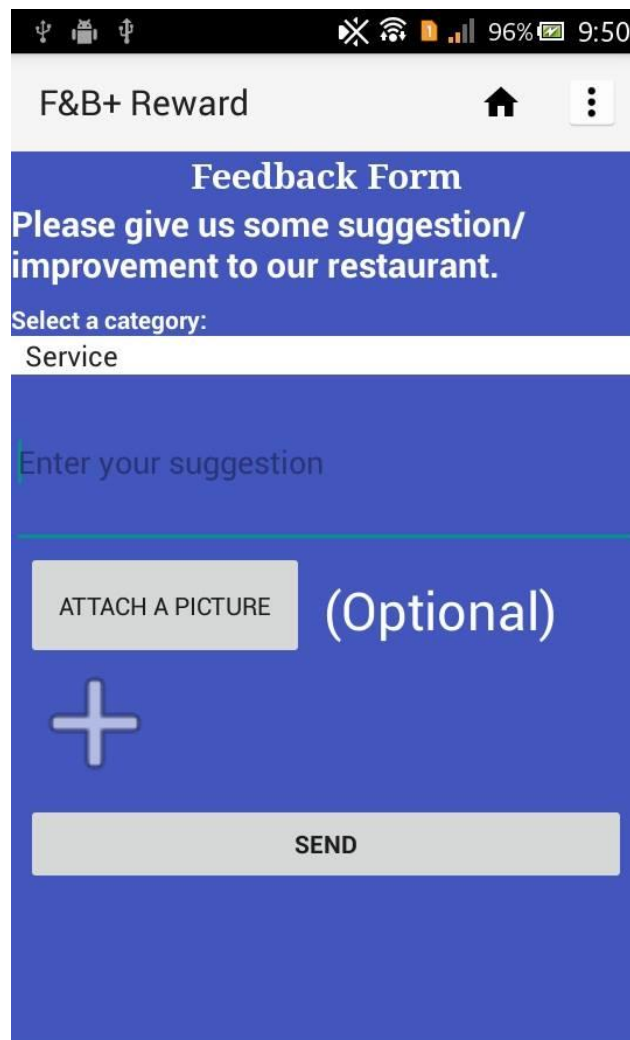
**Figure 3.1.7.5 User Hot News layout**

Figure 3.1.7.5 show Hot News layout for the application. Based on the diagram, the user able to view the news and promotion which is available currently and previous offer.



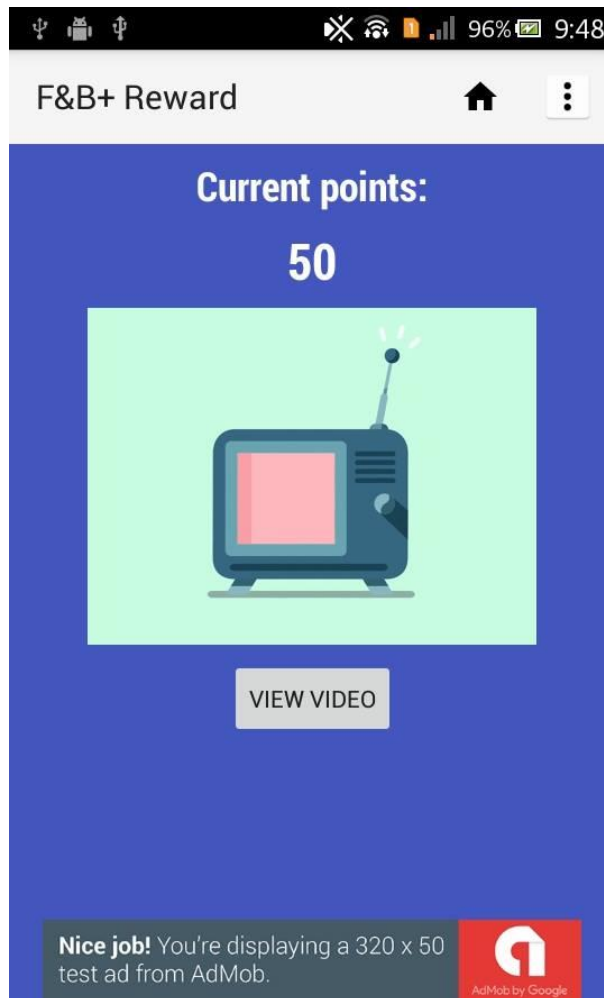
**Figure 3.1.7.6 User Reward point layout**

Figure 3.1.7.6 show user reward point layout for application. Based on the figure, the user able to view their current point available. User account QR code is generate automatically based on the unique ID during user registration. The QR code will be used for scanner to scan in order to gain reward points. The exchange button will bring user to claim the reward. User able to view the reward available and claim at anytime.



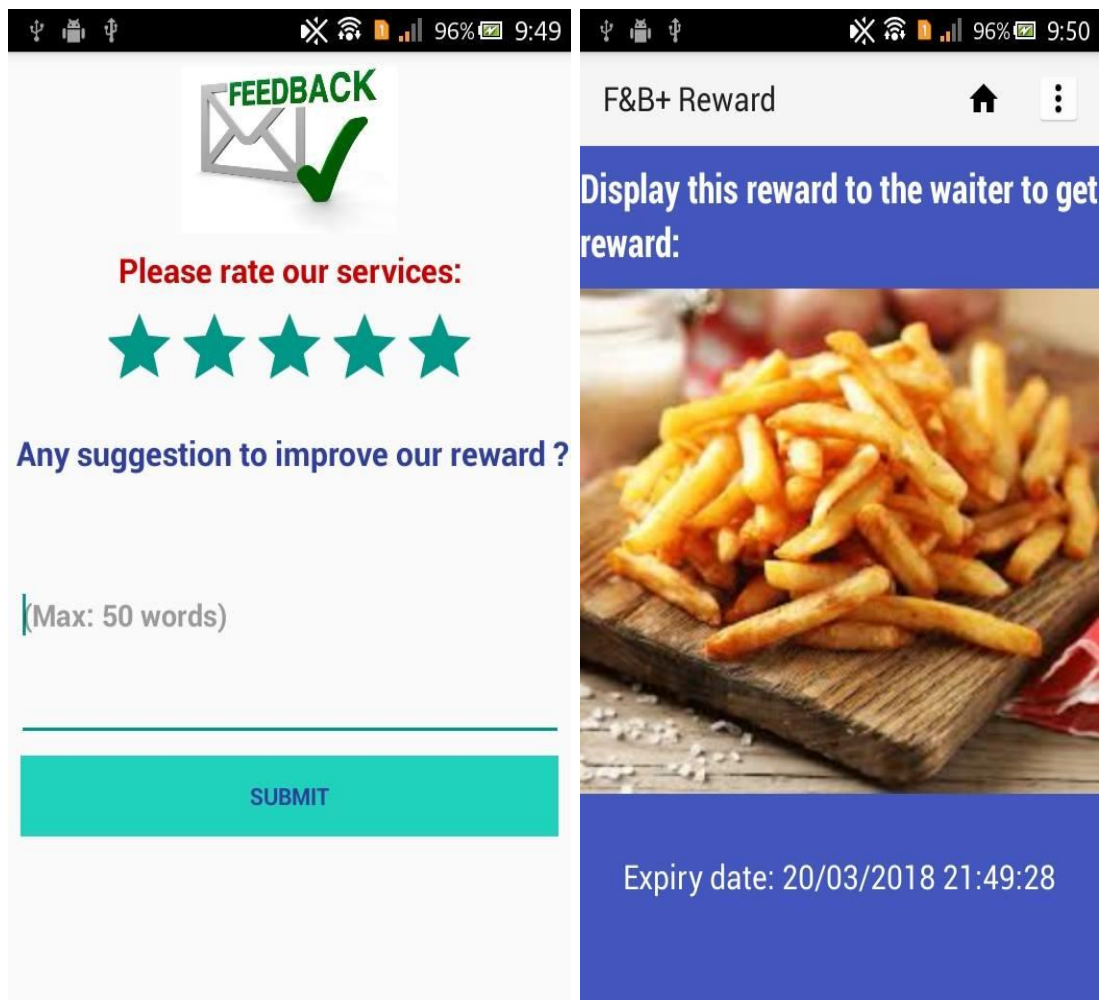
**Figure 3.1.7.7 Feedback layout**

Figure 3.1.7.7 show feedback layout for the application. User able to enter some message to give feedback or comment on the restaurant services. The message must have some input in order for user to send the message. Once the send button is press, the application will request email app from user phone. The message will bind with user email in order to send out the message. The restaurant owner will able to communicate and collect feedback from their customer through email.



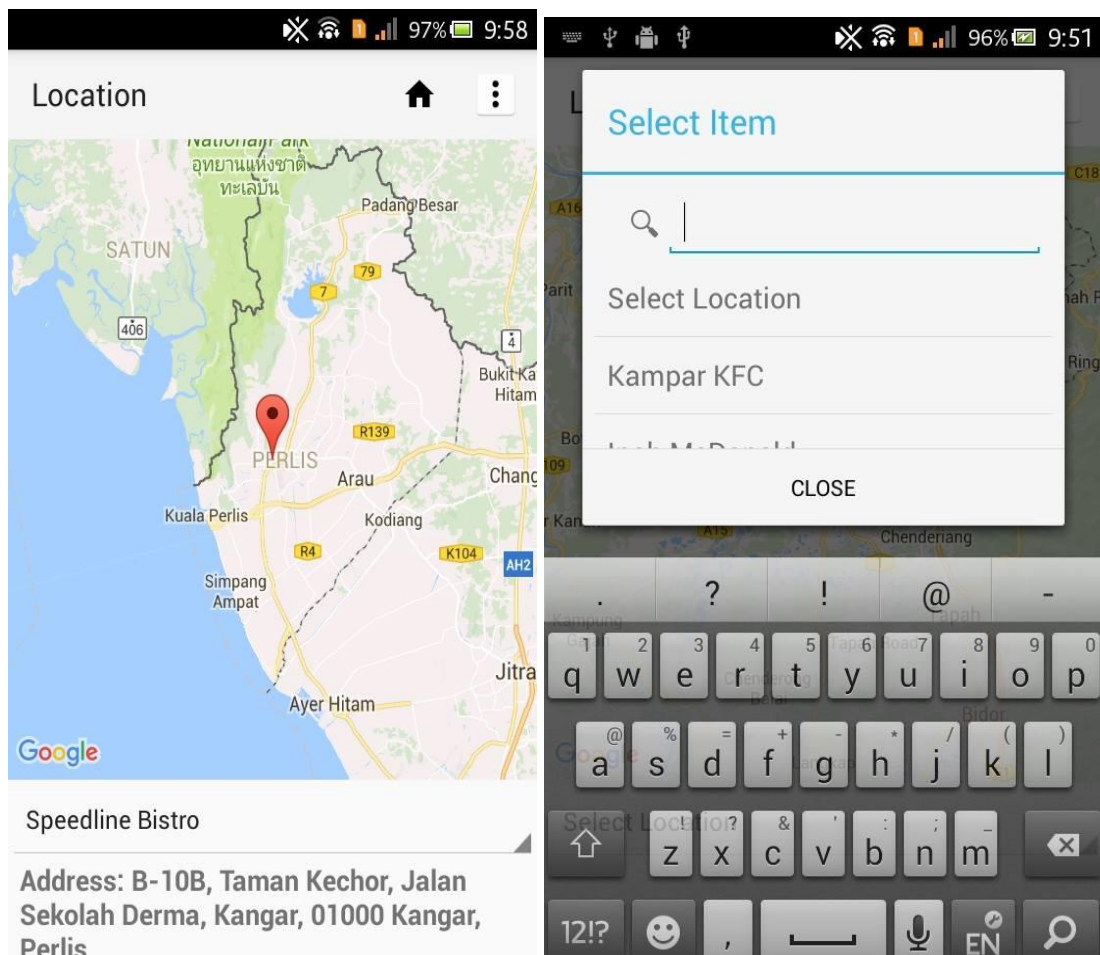
**Figure 3.1.7.8 Watch Ad layout**

Figure 3.1.7.8 show watch ad layout for the application. User able to claim points by viewing a video ad given the condition that user watch the ad until finish. 10 points will be rewarded once user finish watching an ad video.



**Figure 3.1.7.9 Reward History layout**

Figure 3.1.7.9 show reward history layout for the application. Once user exchange their reward the application will pop up a simple feedback form for user to fill in. After that user able to see the expiry date for the reward to be claimed. User can show the page to the waiter or cashier to claim the reward.

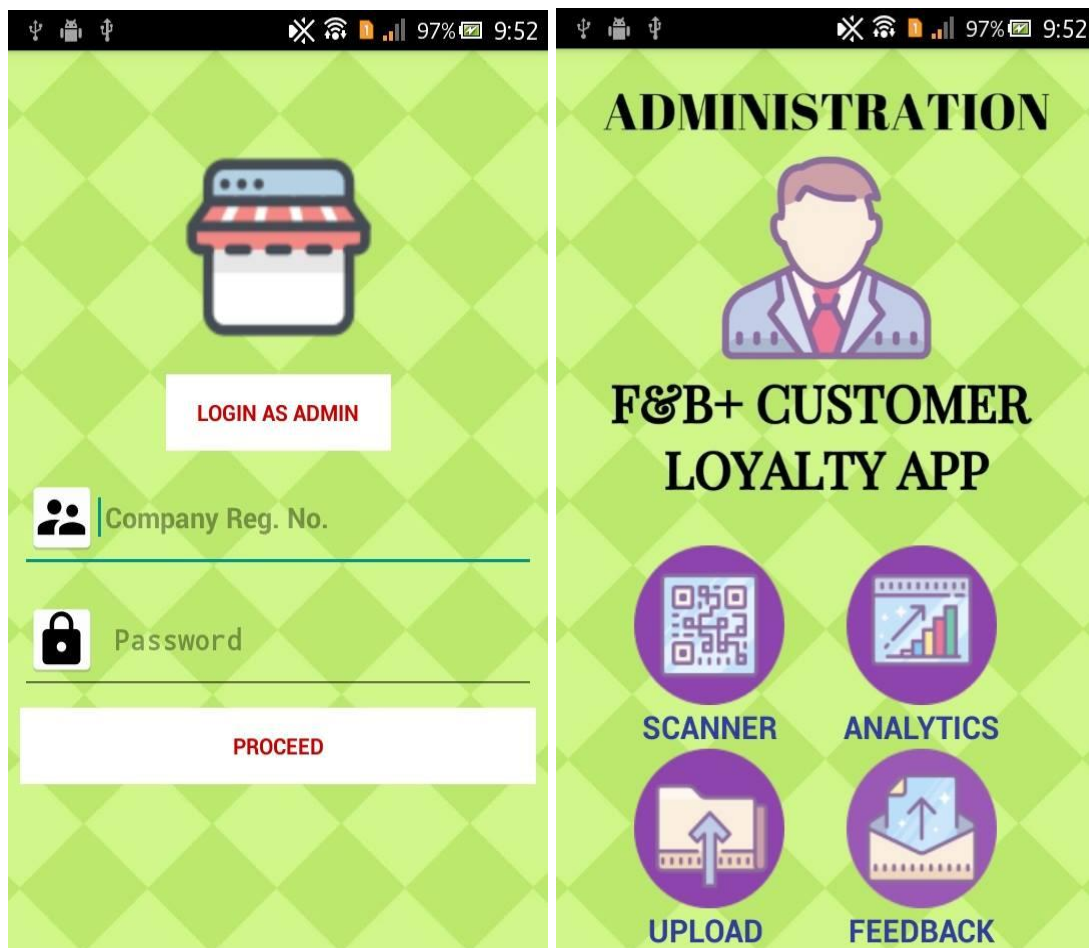


**Figure 3.1.7.10 Location Layout**

Figure 3.1.7.10 show location layout for the application. User able to view the available location for restaurant branch through this function. User can key in a restaurant name and the suggestion will be in the drop down list if the name exist, then the camera will move to the selected restaurant location.

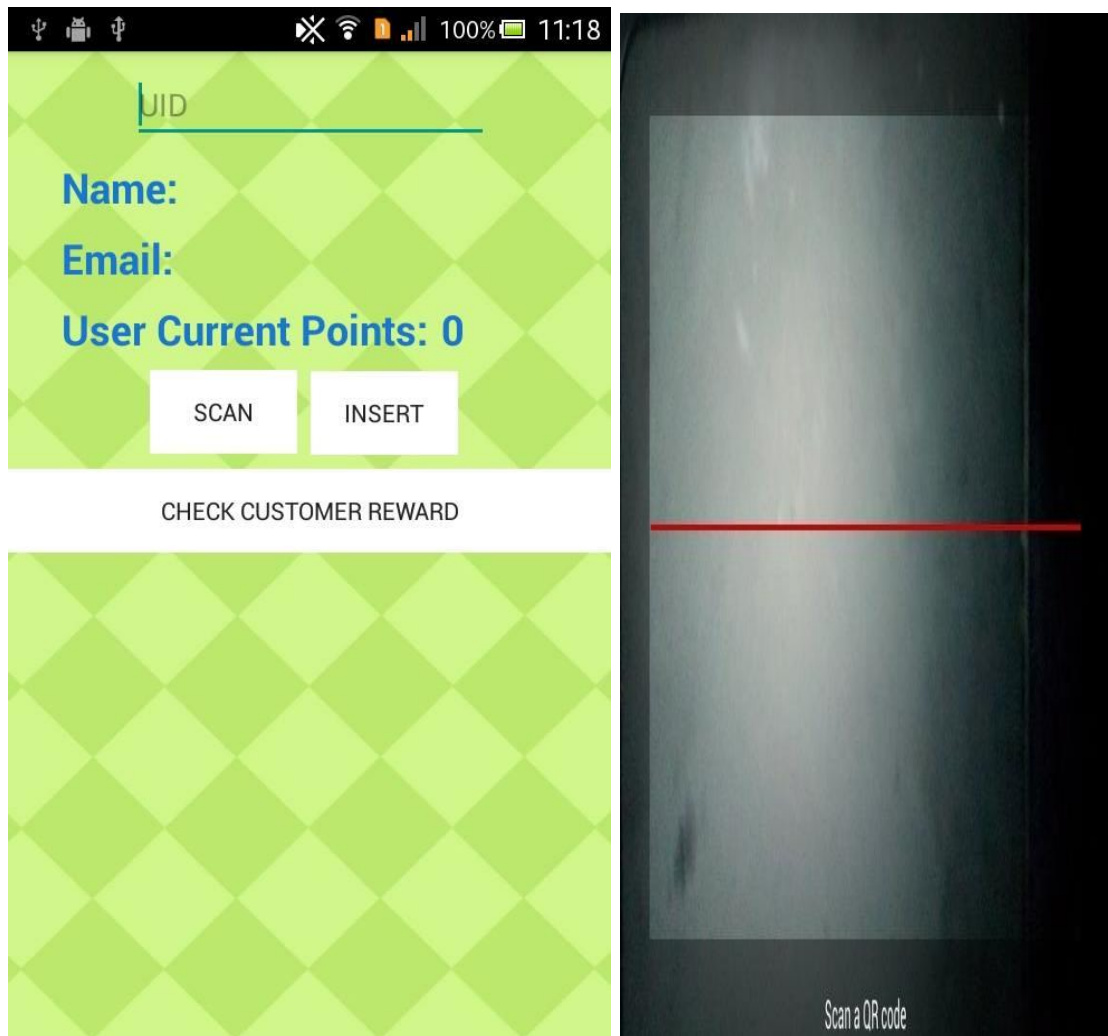


### 3.1.8 Admin Page User interface design



**Figure 3.1.8.1 Admin Login Layout**

Figure 3.1.8.1 show admin login layout for the application. Admin can login to the app by input a correct company registration number and password. Once admin successful login admin main menu page will be display. The function which admin able to access include scanner, upload picture, view reward claim and customer feedback.



**Figure 3.1.8.2 Admin Scanner Layout**

Figure 3.1.8.2 show admin scanner layout for the application. Admin able to use the scanner which is using camera view in phone to scan the user QR code in order to reward them points. If user have display a valid QR code the scanner will reward user 10 points and update the data in firebase.



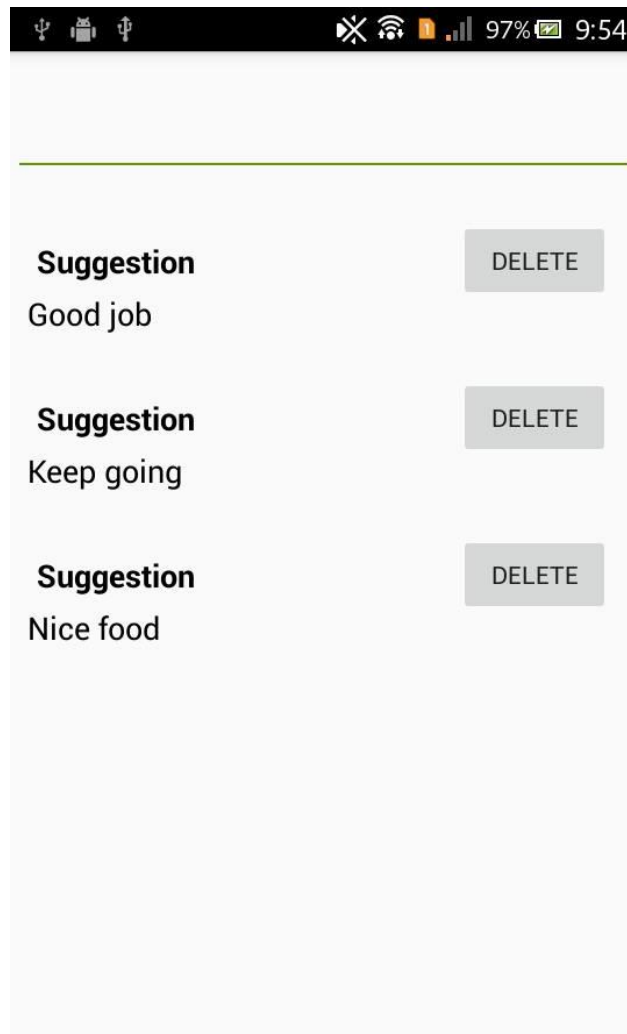
**Figure 3.1.8.3 Admin View Claim Reward Layout**

Figure 3.1.8.3 show admin view claim reward layout for the application. Each time a user claim a reward the data will be store in the firebase. Admin able to view how many times user have claim the reward for each category. Moreover, admin can view the data in bar chart view.



**Figure 3.1.8.4 Admin Upload Picture Layout**

Figure 3.1.8.4 show admin upload picture layout for the application. Admin can upload a picture by giving it a name in this function. User will able to see the uploaded picture in user hot news function.



**Figure 3.1.8.5 Admin View Feedback Layout**

Figure 3.1.8.5 show admin view feedback layout for the application. Each time user claim a reward, user are prompt to submit their rating and feedback for the services or reward. The suggestion will be display in this layout and admin can know customer feedback in order to improve the services or upgrading the reward.



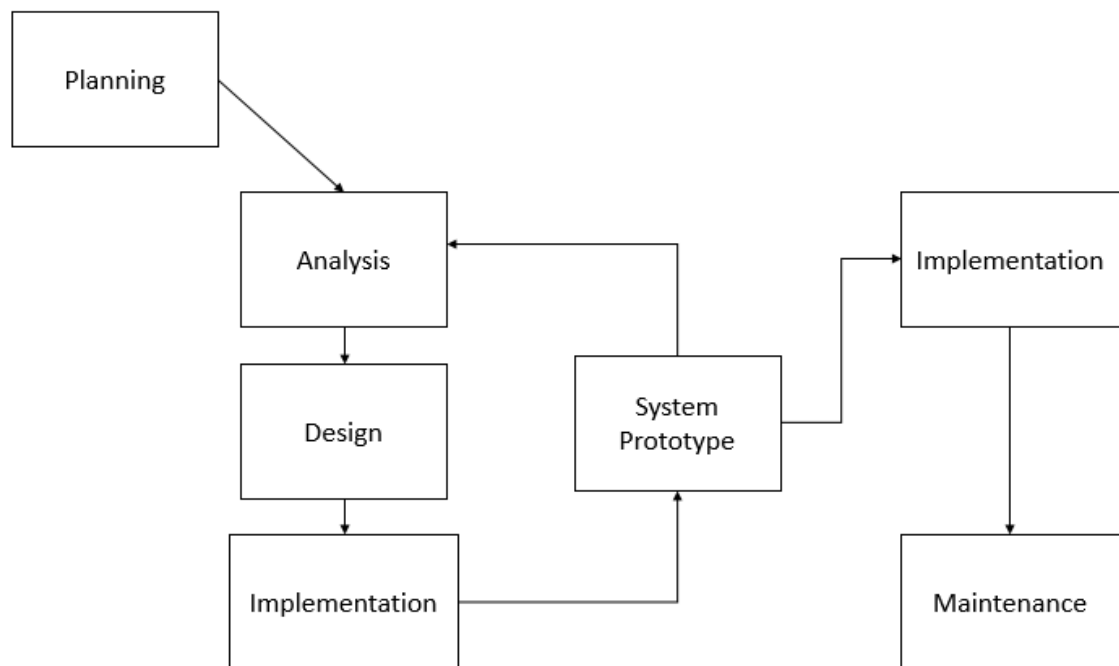
**Figure 3.1.8.6 Admin View Claim History Layout**

Figure 3.1.8.6 show admin view claim history layout for the application. In this function, the layout able to display the reward claim by the customer. When customer approach to claim the reward they just need to state their email along with their history page then the cashier will check the whether the reward is available in the database. Once the reward is given to customer the record will be deleted.

## Chapter 4 System Implementation

### 4.1 Methodologies and General Work Procedures

The development method used to develop customer loyalty reward application is rapid application development. In rapid application development there can be further breakdown into throwaway prototyping and prototyping. Prototyping is suitable since the system is developed with a prototype which can be test by the user. Prototyping approach is faster and focus on the prototype. If the user wishes to add the requirements to the system, prototyping approach able to go back to further enhance the system. Since many testing will be done to the system and user test, system will become more user acceptance. The development time will be reduced since the prototype is enhance throughout the development phase.



**Figure 4.1.1 RAD Phase**

In planning phase, aims and objective of the system is identify. A project management plan which consists of problem statement, objectives and scope is documented in order to identify task need to carry out for developing the system.

During analysis phase, the requirements gather from the customer about their opinion of digital loyalty program. The requirements also come from the restaurant owner to decide what information should be included in the system. The requirements are analyze and implement in the customer loyalty rewards system. The features and functionality is design based on the user requirements in design phase.

Then a system prototype is build and give user to test on the system. The prototype continue to enhance until user are satisfy with the system. Then the app will publish online and let the customer to download and use. Any bugs or missing features will be improved in the maintenance stage.



## 4.2 Tools, connectivity, hardware and software

### Firestore console

- Firestore console provide a user interface to manage the user account, data, reporting services and sending notification to all user. The data in firestore are store in JSON file format. Firestore also synchronize the data across all devices which means if data is updated for that account, all the devices will able to see the same output.

### UML diagram

- A tools which use to create different types of diagram such as Use Case, activity, data flow, sequence, state diagram and etc. The diagram will able to describe how the system works and serve as a guideline for developer to develop the function.

### Android studio

- Android studio is a development tools used to develop android application. With the new version of android studio, it help the developer to design user interface easier and no need to worry about different screen solution. This development tools also allow developers to write the code in Java which presented in more organize and allow them easily to manage. Moreover, Android help to import the API easily which can speed up the development process

### 4.3 Installation Guide

The installation process required user to scan a restaurant QR code in order to download the application. The following section will explain the installation process in detail.

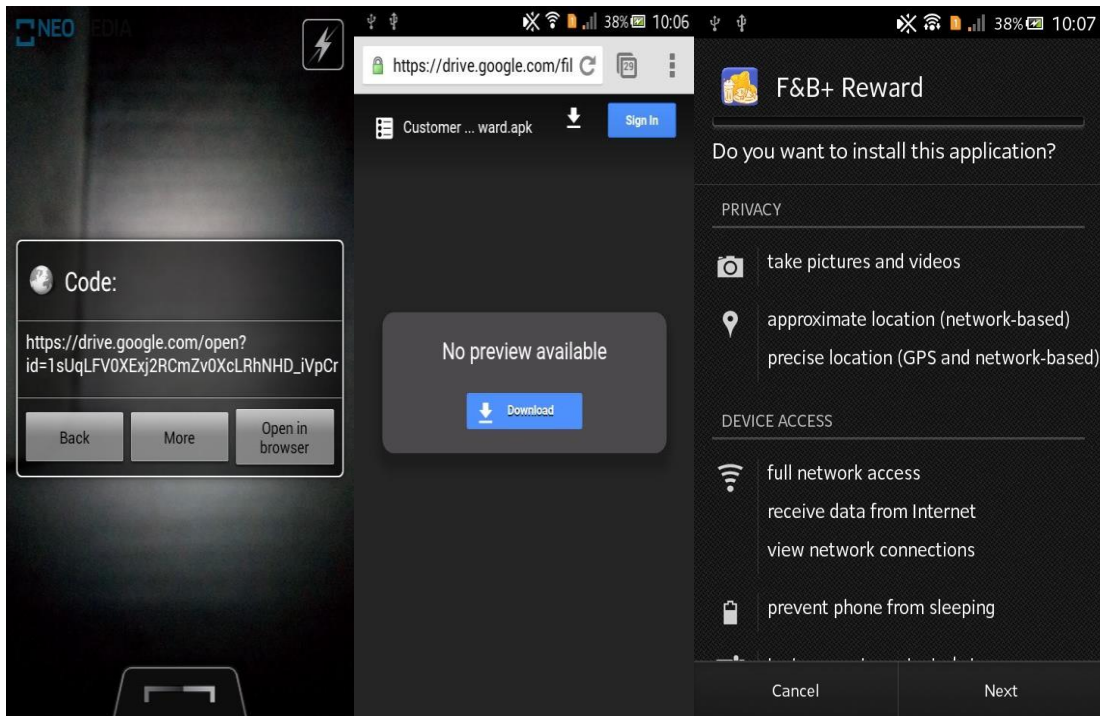
#### 4.3.1 QR Code Design



**Figure 4.3.1.1 Restaurant QR Code Design**

Figure 4.3.1.1 show the restaurant QR code design. The diagram above will be place in the restaurant in order for the user to download the application. User can scan the QR code image in order to get a downloadable link.

### 4.3.2 Application Setup



**Figure 4.3.2.1 Customer Loyalty Reward App Setup Process**

Figure 4.3.2.1 show customer loyalty reward app setup process. After user scan the restaurant QR code, he or she will able to see a Google drive link. Next, the user need to download the APK file and install it according to the diagram. Once the app is install successfully user can now start to use the application.

### 4.4 Project Timeline

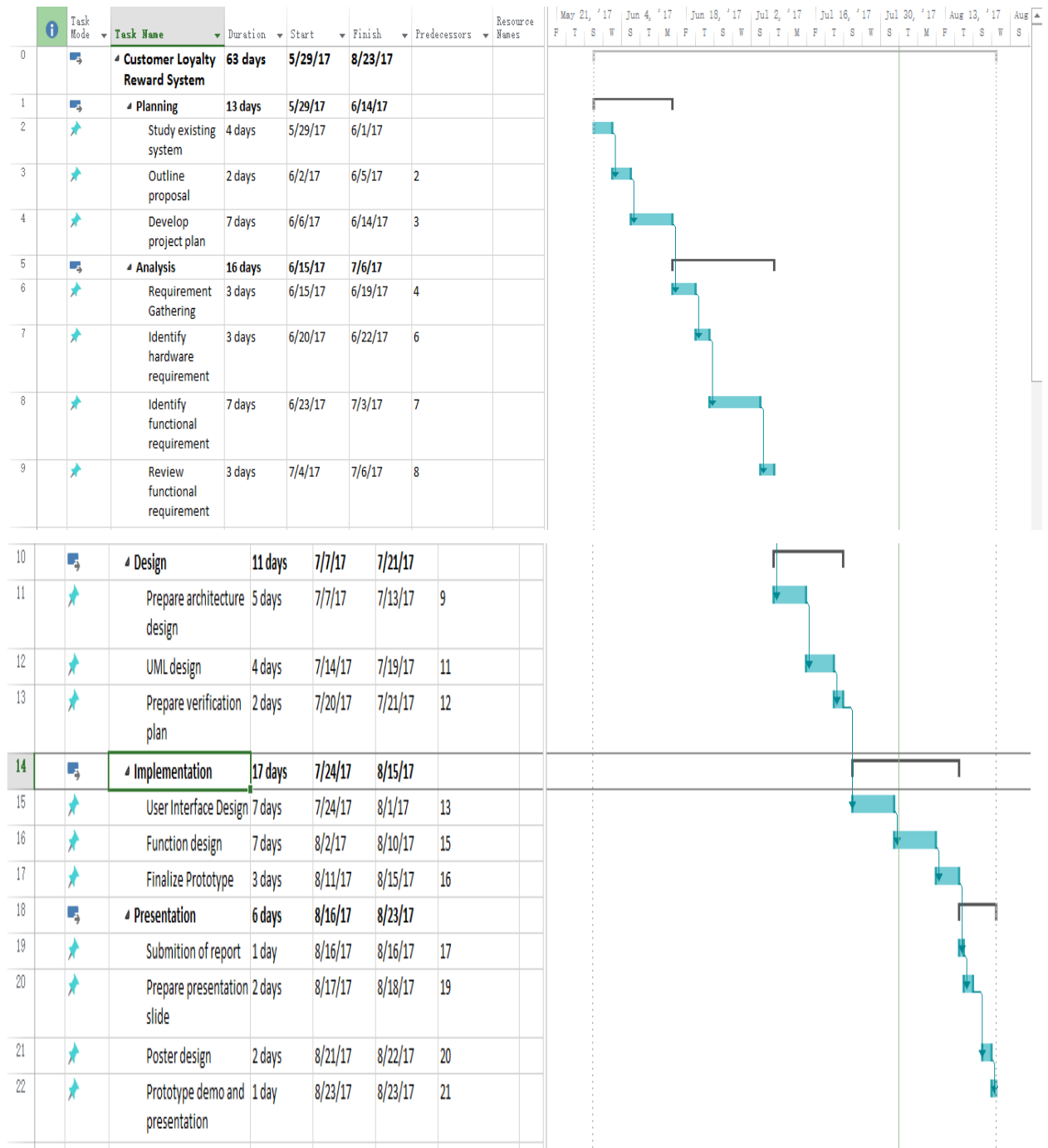


Figure 4.4.1 Gantt Chart for project timeline

Figure 4.4.1 show Gantt chart for project timeline in this semester. The development phase start with planning where strength and weaknesses of existing system is study and review again to identify any potential new features can be implement in our system. Next, outline the requirement need in proposal and develop a project plan for the development of app. In analysis phase, requirement are gather from user in order to identify what are the critical function are needed in the application. Hardware and functional requirement are study and design the app based on the requirement. The development phase continue with design phase where architecture, UML diagram and verification plan are design and prepare. During the implementation phase, user interface (UI) of the app is take place which involve the arrangement of layout, design of button, design of navigation and choosing a background color. The process is follow by implementing the function according to the user requirement. The prototype is tested and finalize before given for evaluation. Lastly, the presentation of prototype is carried out through demo of application to the client.

### **4.5 Implementation issues and Challenges**

Some implementation issues have to be concern while developing this application. The application itself is integrate with firebase therefore there are some limited function which some function cannot be developed. For example, loading the image from firebase to the devices requires to specify an URL. The process of gaining points through scanning the QR code might requires user to have a nice camera view. Besides, user interface in mobile application is an important key to determine whether people will use the application. However, user interface design always cannot make all user to satisfy the design in term of color, navigation and display.

As for user, they need to have an android phone in order to download the application. The application only support for Android platform. This will causes iOS platform user unable to download the application. As challenges for admin, he or she have to familiar with firebase console to view the detail of their customer. Functionality in firebase have to explore by the admin himself in order to integrate firebase function with the application well.

## Chapter 5 System Testing

In this chapter, the application testing is done in order to detect if there is any bug in the application. Black box testing is done here so that tester can compare the expected output with the actual output based on user input. Any bug detected will be fix and test again.

### 5.1 Verification Plan (User Function)

Input	Expected output	Actual output
User enter an email in the email bar but with a wrong password	Display a login fail message	Login fail message was displayed
User didn't enter any value in email bar and password bar	Display an error message notify user to fill in the detail	Display an error message notify user to fill in the detail

**Table 5.1.1 Verification plan for user login**

Input	Expected output	Actual output
User didn't enter name but fill in correct user name and email address and submit the request	Prompt error message to ask user key in a name	Error message was displayed to ask user key in a name
User spacing when enter password and press register button	Prompt error message which notify user that password cannot have spacing	Error message displayed to prevent user register with word spacing

User insert a wrong format of email	Display error message asking user to retype a correct format of email	Error message was displayed to notify user enter correct email format
User register with same email	Display error message notify the email have been exist	Error message was displayed the database will not register the email

**Table 5.1.2 Verification plan for user registration**

Input	Expected output	Actual output
User display an invalid account QR code to the scanner	No data is stored and return an error message	Error message insert fail will be display
User sign in successfully and go into reward page	An image of QR code is auto generated based on UID of user	Image of QR was generated and displayed middle of the UI

**Table 5.1.3 Verification plan for Reward Activity**

Input	Expected output	Actual output
User didn't enter comment and submit the email	Prompt error message asking user to fill in the detail	Error message was displayed required user to fill in detail
User press the choose picture button	System bring user to photo gallery and let user to choose which picture to upload	Android system will prompt user to select picture from picture gallery

**Table 5.1.4 Verification plan for Contact Us function**

Input	Expected output	Actual output
User click to view hot news without internet connection	No image is loaded for the user	Nothing was displayed in the UI

**Table 5.1.5 Verification plan for User Hot News function**

Input	Expected output	Actual output
User view the ad until finish	Points is added to user reward points	10 points was added to user reward points

**Table 5.1.6 Verification plan for Watch Ad function**



Input	Expected output	Actual output
User click on exchange reward button	Display list of reward that can be claim	A list of reward was displayed along with user reward points
User claim reward that exceed user reward points	Display error message notify user do not have enough points	Error message was displayed notify user do not have enough points

**Table 5.1.7 Verification plan for Claim reward function**

**5.2 Verification Plan (Admin Function)**

Input	Expected output	Actual output
Admin login with an invalid company registration number	Display error message notify user that registration number is invalid	Error message was displayed and prevent admin from logging it
Admin press login without giving any input	Display error message asking admin to input registration number and password	Error message was displayed and prevent admin log in

**Table 5.2.1 Verification plan for Admin Login function**

Input	Expected output	Actual output
Admin press upload without providing a picture	Display error message notify user to select a picture	No picture is uploaded to firebase
Admin press upload providing a picture and enter a name	The picture is upload to the firebase and prompt upload success message	Picture was uploaded and displayed in user hot news

**Table 5.2.2 Verification plan for Admin Upload function**

Input	Expected output	Actual output
Admin scan a customer QR code	Display user current points and email in the screen	User points was displayed along with email
Admin insert points to an invalid customer QR code	Display an error message stating insert has fail	Error message was displayed and no data will be save to database

**Table 5.2.3 Verification plan for Admin Scanner function**

Input	Expected output	Actual output
Admin generated graph without internet access	Display a blank graph with no data	The application will shut down

**Table 5.2.4 Verification plan for Admin Analytic function**

Input	Expected output	Actual output
Admin access to feedback function with internet connection	Display list of user feedback	List of user feedback is displayed and allow admin to delete it

**Table 5.2.5 Verification plan for Admin Feedback function**

## **Chapter 6 Project Review and Discussion**

### **6.1 Discussion**

Customer loyalty reward application was developed to ease the participation of the loyalty program. The developed application had many strength compare to traditional loyalty program. It has solved problem such as unable to view the points anytime user wants, unable to identify user and prevent the loss of accumulated reward. On the other hand, the developed application has its own unique features of which is using QR code to claim the points and reward. The whole business process become simple and efficient as user just need an android phone to display the QR code. The application do not need any extra membership card in order to redeem or gain any reward if compare to existing app.

### **6.2 Project Achievement**

The developed application has played two main roles in providing function. The application can be used by user as well as admin or cashier. The function for user included view hot news, view user points, watch ad, redeem reward, give feedback and view restaurant location. As for admin, he or she can upload picture, view reward claimed by customer, view feedback and scan user QR code to reward them points.

The application has achieved the objectives to ease the customer participation in loyalty program by using QR code. Secondly, it also had able to identify the user by providing them a platform to store their username and password along with their reward points. Thirdly, the app able to advertise the restaurant by providing a hot news function. User can view the hot news to find out what is the current offer and new dishes available in the restaurant. Lastly, the app has provided simple analytic function for the admin. Admin can view the reward claim by the customer in bar chart view. Moreover, the user feedback is directly link with the admin account. Through this function admin able to improve the restaurant services, reward as well as food quality.

### **6.3 Future Improvements**

Customer loyalty reward application indeed is a trend in the future. User can simple use the application anytime they want as long as there is an android phone in their hand. The application can be improved in term of providing a diverse platform. The current application only focus on android phone. The app should be developed also in iOS platform in order to widen the target audience. Besides, the layout can be more attractive and pleasant to look and use by using Adobe product to design the layout. The additional function such as able to insert the points based on user email will be an extra advantages. Lastly, the analytic function can be strengthen to view in various form such as pie chart, and line graph. There should be a filter section where admin can check the reward claimed the most in daily, weekly and monthly.

## **Chapter 7 Conclusion**

Digital loyalty program is expected to be famous as the technology growing. It is correct to say that the digital loyalty program are began to substitute the traditional card-based loyalty program. This application developed in this project able to help a restaurant to optimize their loyalty program more efficient and effective to use it. The problem in traditional loyalty program such as unable to view the points, easily loss of reward card, fraud usage of reward card, keep tracks of customer in business are solve by implementing customer loyalty reward application.

An application that have wide range of user acceptance must fulfill a few criteria such as attractive UI, easy navigation, precise on functionality and putting a suite background color. In this project, the application is develop based on the criteria in order for user to use the application without any difficulty. The function which have provided in this application are view hot news, food menu, reward point, redeem gift, feedback and view location.

The customer loyalty reward application also bring a huge advantages to the business itself. The admin or the owner can view their customer detail and perform analytic to serve them better in future using firebase. Through this process, owner able to know the business situation and continue improving their loyalty program to attract more customer.

In conclusion, a success business involve many aspects that need to be maintain and take care by the owner itself. By choosing a right technology to suite one's business will bring a huge success as well as profit to the company.

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## Appendix

### Poster

**UTAR** UNIVERSITI TEKNOLOGI ABDUL RAZWAN **CUSTOMER LOYALTY REWARD APP** 

**INTRODUCTION:**  
The system aims to help the organization to keep track of their customer preferences as well as advertising the information. As for the consumer, the system will help them to engage in loyalty program more easily.

**OBJECTIVE:**

1. To develop a mobile app that serve as a digital loyalty program which ease the customer participation procedure
2. To serve as a platform for the current restaurant to advertise their news
3. To provide convenience to the user to access their loyalty information anytime through their mobile devices
4. To provide simple analytic information from the application by integrate the app with Firebase analytic

**APPLICATION FUNCTION:**

<b>User functionality:</b>	<b>Admin functionality:</b>
1. Gain Points	1. Reward User Points
2. Redeem Reward	2. View Feedback
3. Feedback	3. Upload Advertisement
4. Search Location	4. Analytic
5. View Hot News	

**PROJECT DEVELOPER:**  
**NG JOOI KHUAN**

**PROJECT SUPERVISOR:**  
**Mr. Soong Hoong Cheng**

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### Chapter 1 Introduction

Over the past years, many businesses have started to implement customer loyalty programs in order for them to survive and gain a position in a global market. It is not easy to survive in a global market as the competitors will also try to spread their business using different strategy. The ultimate goal for a business is to gain profit through the services and customer. One of the market that looked into it is the food and beverages industry. With the increasing number of population, food industry has begun to grow widely to serve the needs of the people. In food and beverages industry includes restaurants, cafeterias, catering operations as well as others small business that include selling food and beverages (Salai, 2008). In Malaysia, the variety of local food represent each of the culture. The food and beverages industry are mostly come from restaurant, cafeterias and food vendor.

The food and beverages industry was proved to be competitive over the years as many people begin to involve into food and beverages industry. Each and every restaurant has come out with as many attractive method as possible to maintain their customer. One of the ways is through loyalty program. Generally, loyalty program aim to identify individual customers and to understand their preference. Loyalty program can be also use as a tools to show the appreciation of a businesses toward their customers. The common

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