

FOOD BANK
MOBILE APPLICATION
(SHARE PANTRY)

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Bachelor of Computer Science
(Graphics & Multimedia Technology)
With Honors

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MOBILE APPLICATION
(SHARE PANTRY)

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Thesis submitted in fulfillment of the requirements
for the award of the degree of
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ABSTRAK

Pada masa kini, penggunaan teknologi mudah alih telah menjadi trend dalam bidang yang besar seperti pendidikan, hiburan, perniagaan dalam talian, dan lain-lain bidang yang memberikan faedah. Terdapat pelbagai aplikasi yang boleh memberi manfaat kepada masyarakat. Aplikasi mudah alih membolehkan cara baru bekerja dalam dunia yang semakin terhubung dan mudah alih. Perusahaan menyedari kelebihanannya dan bersedia untuk maju. Dengan peningkatan bilangan aplikasi mudah alih yang digunakan, adalah penting bagi organisasi untuk membuat pelaburan yang paling cekap untuk keperluan mobiliti perusahaan mereka. Platform pembangunan mudah alih dengan keupayaan penggunaan berbilang saluran, keselamatan, pengurusan, dan keupayaan integrasi belakang membuat banyak akal. Selain itu, aplikasi mudah alih membolehkan pengurusan data yang cepat dan berkesan melalui kemudahan internet. Aplikasi mudah alih bank makanan dibangunkan untuk orang yang memerlukan bantuan daripada bank makanan, orang yang ingin membuat sumbangan, orang yang ingin menjadi sukarelawan untuk membantu mengedarkan bank makanan, dan untuk NGO itu sendiri. Mereka boleh membuat sumbangan atau membuat permintaan untuk bank makanan jauh dari lokasi yang berbeza. Pengguna ini akan membantu menyebarkan maklumat bank makanan melalui peranti mudah alih. Dalam pada itu, beberapa NGO masih menggunakan cara lama dalam mengambil data penderma, orang yang diperlukan dan sukarelawan. Seseengah situasi hanya diketahui oleh NGO dan bukan kepada masyarakat. Oleh itu, matlamat projek ini adalah untuk menyediakan perkhidmatan bank makanan kepada pengguna dan menyediakan lokasi bank makanan berdekatan di seluruh Malaysia menggunakan antara muka pengguna grafik GPS dan Google Map. Akibatnya, pengguna boleh mengenal pasti bank makanan yang ada dan berdekatan dengan mudah dan membuat sumbangan atau permintaan. Aplikasi ini jauh lebih pantas dan boleh digunakan pada bila-bila masa dan di mana sahaja selagi terdapat sambungan internet.

ABSTRACT

Nowadays, the usage of mobile technology has become a trend in a huge area such as education, entertainment, online business, and other kinds of areas that gives benefits. There are various applications that can benefit the community. Mobile applications enable new ways of working in an increasingly connected and mobile world. Enterprises realize the advantages and are gearing up to get ahead. With the increasing numbers of mobile applications being deployed, it is important for organizations to make the most efficient investments for their enterprise mobility needs. Mobile development platforms with multi-channel deployment capabilities, security, management, and back-end integration capabilities make a whole lot of sense. Besides, mobile applications allow fast and effective data management through internet network facilities. The mobile application for food bank is developed for people who need help from food bank, people who want to make donation, people who want to be volunteer to help distribute the food bank, and for NGO itself. They can make donations or make requests for food banks remotely from different locations. These users will help to spread the food bank information via mobile devices. In the meantime, some NGOs are still using old-fashioned ways in taking data of donors, needed people and volunteers. Some situations are only known by NGO and not to the community. So, the aim of this project is to provide food bank services to users and provide locations of nearby food bank in entire Malaysia using GPS and Google Map graphical user interface. As a result, users can easily identify available and nearby food banks and make donations or requests. This application is much faster and can be used in anytime and anywhere as long as there is an internet connection.

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LIST OF ABBREVIATIONS

NGO	Non-Governmental Organization
SDG	Sustainable Development Goals
KPDNHEP	Domestic Trade and Consumer Affairs Ministry
UI	User Interface
UI	User Experience

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Food banks are charitable organization and an incentive program which provides food assistance to families in situations of food insecurity who having financial difficulty. Today, thousands of food banks are located around the world. In Malaysia, there are lot of Non-Governmental Organization (NGO) involve in distributing the food bank to people. However, food banks are still to a large extent unheard of, with the exception of a handful of organizations (Isa et al., 2021). Therefore, this proposed project is making improvement on how charitable organizations can set up food banks with effective management of its daily operations using mobile application. Food banks give food assistance to many people through government, community, and welfare programmes. It demonstrates a unique collaboration of three major public sector representatives: the public sector (government at all levels), the business sector (traders, including the food industry and the media), and the volunteer sector (NGO community) in addressing hunger issues (Syah, 2019). The outcome of this proposed project is a food banking management system in mobile application that performs improvement from existing management system where the output is measured against the requirements. A good system is essential to managing food banks, as they face both supply and demand uncertainties. With this improvement, charitable organizations will be able to demonstrate accountability to their donors and show the positive impact they have on the community, hence inviting more donors to contribute to the food bank (Beatty & Foden, 2015).

According to SolidWaste Corporation (SWCorp) Malaysia, numerous studies show that a total of 33,000 tonnes from daily food waste disposal and the amount is equal to the amount needed to feed 10 million people. Food waste is a sign of not simply pollution or famine, but also a variety of economic issues (Md et al., n.d.). Food waste is regarded as a major problem all throughout the world, with a particularly terrible

condition in wealthy countries. It is a global issue that affects every country on the planet. It may appear to be insignificant cases for people to be concerned about, but when it comes to poverty and hunger among those who want food, it is a major issue that must be addressed (Masrom et al., 2018). Food Bank Malaysia Programme has been launched in Penang on 22 December 2018 which targeting households from the B40 group including students and public universities. This initiative aimed to offer zero hunger and reduce wastage by gathering excess food from hypermarkets and distribute these to the needed people. It saved 1055 tonnes of excess food and more. Reducing food wastage will help to achieve SDG Goal 12.3: “halve per capita global food waste at the retail and consumer level and reduce food losses along production and supply chains by 2030” (Sustainable Development Goal 12: Responsible Consumption and Production, 2020). The Domestic Trade and Consumer Affairs Ministry (KPDNHEP) are responsible to connect the food industry such as hypermarkets, hotels, restaurants, and manufacturers with NGO to help in collecting and distributing food bank to the target groups.

So rather than waste food, it can be used to give it to a variety of organizations. The product is a mobile application that basically aims to improve food bank distribution in systematic way. Many of needy people seek for food bank help and wish to ask various food daily required by them such as rice, flour, cooking oil, etc. Many people or institutes also wish to donate to needy organizations (Talati et al., 2017). The issue is there are only less source available through which they can satisfy their requirements. Thereby, responding to that problem, a food bank mobile application named Share Pantry app has been developed.

1.2 PROBLEM STATEMENTS

The purpose of this project is to improve the food bank management from existing system. In Malaysia, there are more than 100 food banks from all over the states. Currently, food bank organization are only using their website or social media like Facebook or Instagram to spread more information to people and to manage their food bank organization. However, most of NGO are not active in such platforms and they still collecting the data manually such as food industry data, needy people’s data, and volunteers’ data. Based on my research, food bank is only active in all states during

pandemic started and during flood happened so when the needy people need such help, some of them seems unavailable. The current issue is the lack of communication and management between the needy, food donators and food suppliers. This is important to get the user's feedback to decrease the number of poverty and food waste (United Nations Environment Programme, 2021). Besides that, food prices are predicted to rise in the future as the world's population grows and agricultural input costs rise. Food insecurity will arise because of poverty, as the two are inextricably linked. As a result, this circumstance demonstrates that individuals are still exposed to a lack of food security since they are unable to feed themselves and their family (Syah, 2019).

The next problem is some of NGO are having problem to sort out the volunteers to the specific location from time to time. Some of organization just collect the volunteer's list through google form and it takes time to sort them to their location. Some of NGO have good system but they only have limited functionalities. In addition, it takes times for them to notify the volunteer needed through email. It is much easier if the system can be upgrade by trigger the message or notification in their mobile phone because people use mobile phone often rather than checking email notifications. This can make users more alert and more interesting in experiencing the mobile application.

Other than that, some of people does not know about the existence of food bank at their area. It is because the organization does not take serious responsibility on this initiative and there are too many of platforms does not give further details about it. So, by developing Share Pantry app, it will help to gather all users which are NGO, the donators, and the needy in one application and share latest updates about food bank in discover feeds.

1.3 OBJECTIVE

The objectives of the project are:

- i. To design and develop food bank management system application in Malaysia.
- ii. To apply mobile and database for distributing food bank in systematic way to help NGO's and needy people.
- iii. To test and evaluate user requirement of the developed food bank application.

1.4 SCOPE

The scope of the project is:

- User Scope:
 - i. Non-Governmental Organization (NGO) Agent
 - ii. Needed people
 - iii. Donor
- System Scope:
 - i. Available in Android platform.
 - ii. Discover the latest updates about food bank information.
 - iii. Build for NGO agent, needed people and donor.
 - iv. Trigger push notification.
 - v. Focused in Malaysia area.

- Development Scope:
 - i. Using Android Studio, Adobe XD, and Adobe Photoshop software for design, function, and database development.
 - ii. Contains user interface (UI) and user experience (UX) elements.

1.5 SIGNIFICANCE OF PROJECT

The significance of this project gives people a sense of consciousness with food safety among the poor or needy people in Malaysia. This project will help them to find the food that they needed in that area. Other than that, it gives people awareness with food waste in Malaysia. All of them can help to reduce food waste percentage in our country in the lowest percentage. Moreover, food bank initiative will get more well known among Malaysian people through this project. Not just that, this project will benefit most of organization to save all the information in one place and it will enhance the performance of the food bank management.

1.6 REPORT ORGANIZATION

This report contains of five chapters. Chapter 1 explain about the overview of the project including the Introduction, Problem Statements, Objective of the project, Scope, and Report Organization.

Chapter 2 briefly explain about the literature review of three existing system food bank mobile application with descriptions and comparison of its features and functionalities regarding the management system.

Chapter 3 focuses on the methodology that will be used in developing the project. Based on research and review, RAD model is chosen and will be implement in this project. Any tasks that will be done in each of the phases in the model is explained. The stages that involved in this project are requirements planning, user design, construction, and cutover.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Before developing this project, a little research regarding the existing systems, and tools or method to develop this project is needed so that the improvement can be made and how it can be done. The reasons for the comparison of the existing systems are to identify the flaw or weaknesses of the systems so that the improvement can be done. Then, the comparison of the tools is needed to choose what the best tools to be used and why the selected tools are being chosen. After the comparison have been made, it will give a clear view to identify and understand on what application that should be build and how it can be create.

2.2 REVIEW ON EXISTING SYSTEM

In this section, three existing of food bank management system will be reviewed. The existing system developed by other researchers is based on different approaches. This existing system will be analysed in different criteria such as functions, features, and technologies used. These three applications are Gerobok Dapur, Food for You (F4U), and Food Charity Management System.

2.2.1 Kita Jaga

Kita Jaga was launched on 5th July 2021 as a platform to highlight the White Flag during pandemic. At first, this application only available on website platform and currently it available in mobile devices as well which are Android and iOS. The movement started with a social media initiative urging people in need to display a white

flag outside their homes so they can receive assistance (Perimbanayagam, 2021). This application was founded by Reza Razali and built by a team of local developers at Terato Tech. This app got high support from the public and got over RM100,00 in two weeks. This app also covers the food bank for entire Malaysia.

There are two categories for user to use this application. This app allows users to search for help and search for food banks. It also allows users to give help to the needy people. All the information is provided, and the needy people are required to fill in their details to ease other people to help them. It contains phone number, address, and the food that they needed. Other than that, users can search or mark the locations of food banks. They may also use Kita Jaga Malaysia to open the location on Google Maps or use the share button to share the listing with their social media and other connections. Figure 2.1 is the interface of Kita Jaga app.

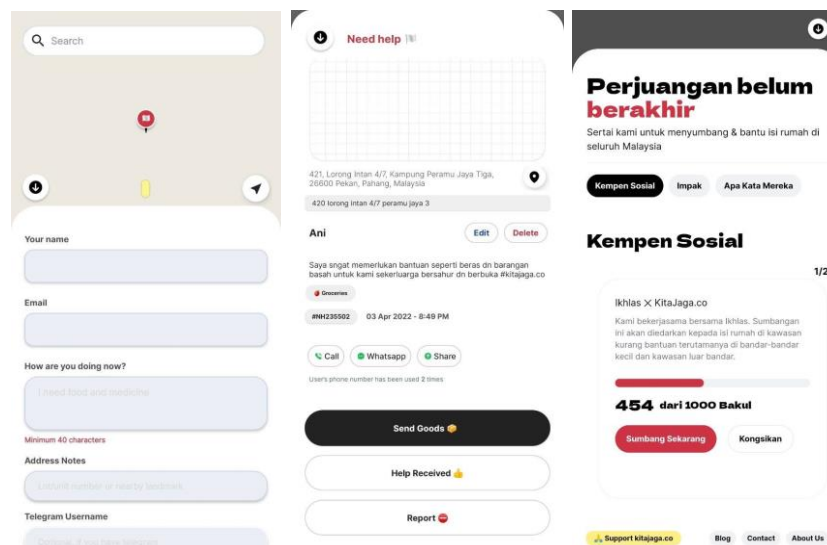
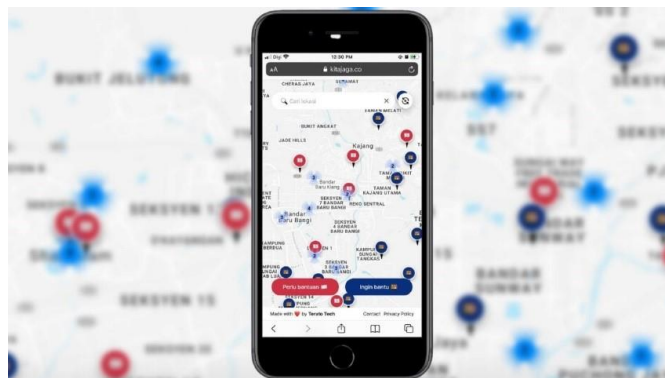


Figure 2.1 Kita Jaga Interface

2.2.2 Gerobok Dapur

Gerobok Dapur is a mobile application that focusing on the food bank. Same as other application, this app is available for all user but its mainly focused on the needy people and the donator. This app is a proposed application, and it is not available in Play Store. This app has lot of functions. Users who want to donate can simply choose by the category like bread, fruits, poultry, food cooked, groceries and beverages. They will choose and set the delivery time for donation. They also can view the donation list that they can donate to. In addition, there is a news and community section to know latest updates about food bank or any information. Message section also available to interact with other peoples. The Gerobok function which is needy people section. They can choose and request the food from the listing of available food. Figure 2.2 shows the high-fidelity prototype of Gerobok Dapur app.

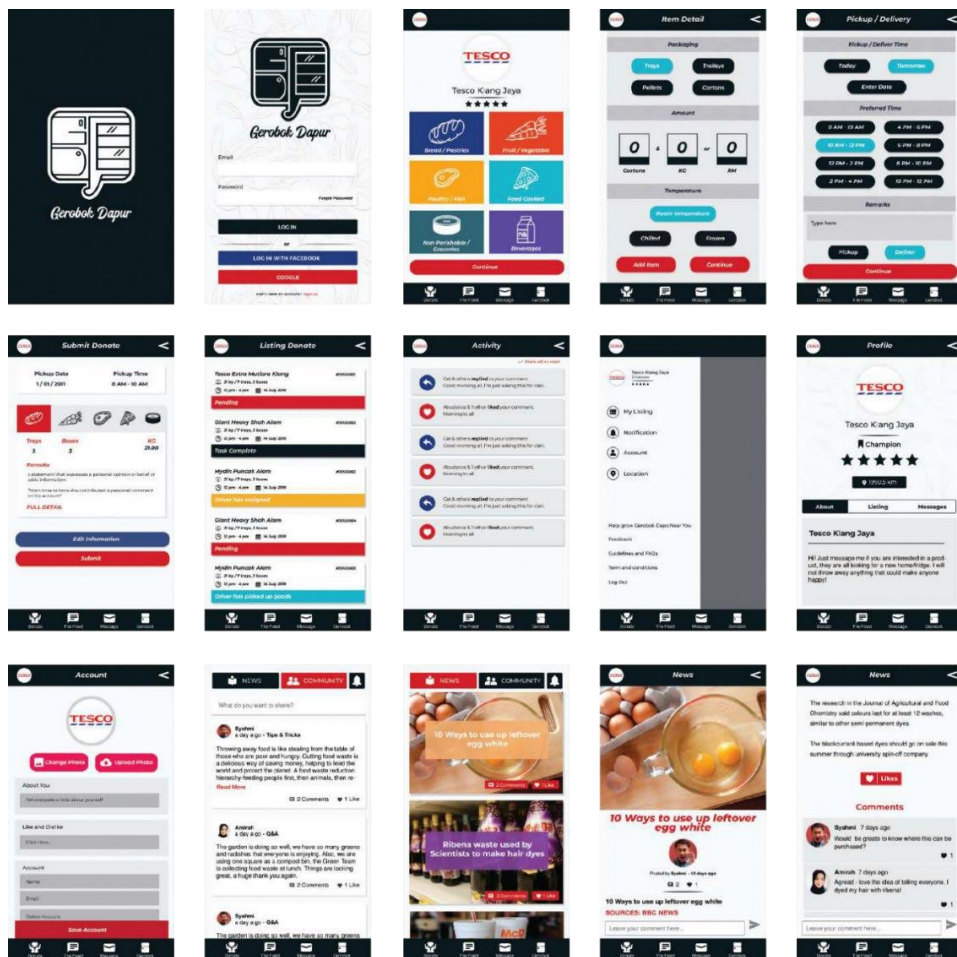


Figure 2.2 Gerobok Dapur Prototype Interface

2.2.3 MyBendera

MyBendera, a BeanCow Corporate Social Responsibility (CSR) programme, is a platform that connects people who are in need with others who are eager to help. Similar like other app, MyBendera app also locate and find nearby food bank and this app covers the food bank for entire Malaysia. Users can request on fundamental needs such as food and clothes from community. For the beginner users that might have problem on experiencing this app whether want to ask or contribute the essential needs, this app help with users. In addition, users can discover with the latest update according to the user' place. This app triggers some notification for the user. Once users raise Bendera Putih, the notification will pop up in their phone. Besides that, there are history records features which will record the user's hospitality as people will know their kindness. This would make this app become popular because of the user's feedback. Figure 2.3 is the interface of MyBendera app.

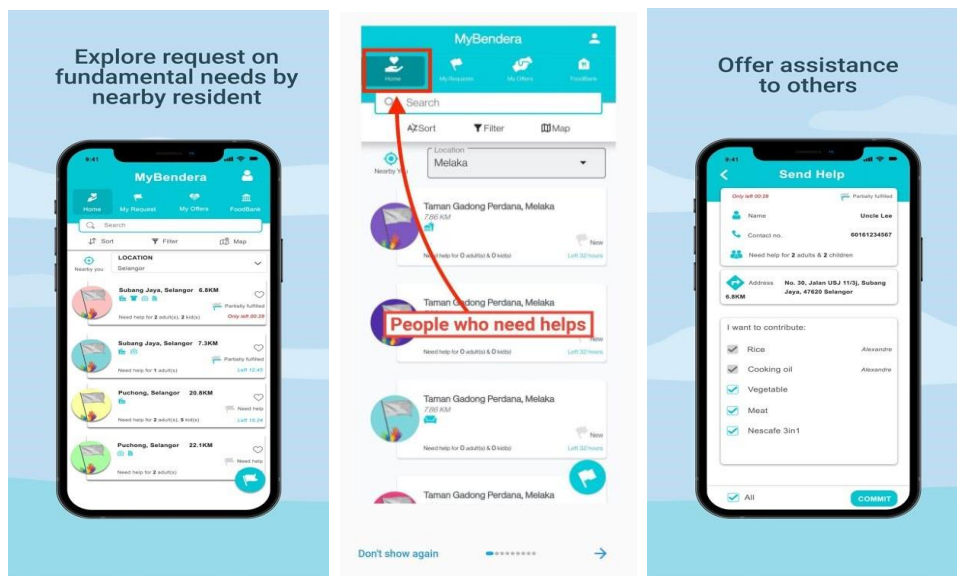


Figure 2.3 MyBendera Interface

2.3 COMPARISON ON THREE EXISTING SYSTEM

Table 2.1 Comparison between KitaJaga, Gerobok Dapur, and MyBendera application

Features	KitaJaga	Gerobok Dapur	MyBendera	Proposed application (Share Pantry)
Interoperability	Web application	Mobile application	Mobile application	Mobile application
Operating System (OS)	Android 5.0 or above, iOS 12.0 or above	Android	Android, iOS	Android
Area Cover	Entire Malaysia	Entire Malaysia	Entire Malaysia	Entire Malaysia
Language	English, Malay	English	English, Malay, Chinese	Malay
Size of Application	12MB	Not released in Play Store	33MB	N/A
Graphical User Interface (GUI)	<ul style="list-style-type: none"> • Usability – Easy to use with effective interaction and achieve maximal performance for navigation. • Familiarity – Provide familiar icon interactions. 	<ul style="list-style-type: none"> • Usability – Easy to use with effective interaction and achieve maximal performance for navigation. • Familiarity – Provide less of icon. 	<ul style="list-style-type: none"> • Usability – Easy to use with effective interaction and achieve maximal performance for navigation. • Familiarity – Provide familiar icon interactions. 	<ul style="list-style-type: none"> • Usability – Easy to use with effective interaction and achieve maximal performance for navigation. • Familiarity – Provide familiar icon interactions.

	<ul style="list-style-type: none"> • Consistency – Use consistent of colours, font and elements 	<ul style="list-style-type: none"> • Consistency – Too much use of colours 	<ul style="list-style-type: none"> • Consistency – Use consistent of colours, font and elements 	<ul style="list-style-type: none"> • Consistency – Use consistent of colours, font and elements
Features	<ul style="list-style-type: none"> • Pin flag without search in map. • Locate the place that user want to help as job vacancy section. • User can share the help information to social medias or other contacts. • Feed section about on-going social campaigns. • User can save the flag pin. 	<ul style="list-style-type: none"> • Chat section to connect with other users. • Feed section to get daily news and announcement. • Gerobok section to manage food stock. • Profile section to manage account setting. 	<ul style="list-style-type: none"> • Locate and pin nearby food bank. • Record history of location searched. • Offer assistant to the user. • Offers fundamental needs such as food and clothes from community. • Explore request on fundamental needs by local resident. 	<ul style="list-style-type: none"> • Locate nearby food bank in Malaysia. • Feed section about food bank and available leftover food. • Profile section to manage account setting. • User can request for food bank. • User can give a donation. • User can be NGO agent to deliver the food bank. • Record donation history. • Trigger notification.

Advantages	<ul style="list-style-type: none"> • User-friendly. • The interface is attractive and well-designed. • Place to search for jobs. • The details for the needy people or job vacancy are provided completely. • Filter on search engine. • Report features for user to report suspicious activities. 	<ul style="list-style-type: none"> • The food stock is well organized with different category. • Trigger notification about user's activity. • User can know real-time progress for their donation. 	<ul style="list-style-type: none"> • Report section if having problem to reach the food bank. • Easy to get access the surrounding food banks according to user's location. • Filter on search engine. 	<ul style="list-style-type: none"> • Easy to get access the surrounding food banks according to user's location. • Real-time map tracker during food bank delivery. • Trigger notification about donation reminder, food bank schedule and volunteer registration.
Disadvantages	<ul style="list-style-type: none"> • The map locator does not show in the mobile phone's screen. 	<ul style="list-style-type: none"> • There is no button to locate the location of the food bank directly. • Does not provide the contact number of the food supplier. 	<ul style="list-style-type: none"> • User cannot contact the food bank directly with the app. 	<ul style="list-style-type: none"> • User cannot pin food bank location in the map.

2.4 SUMMARY

Based on comparison and analysis of three existing systems, it can be concluded that each system offers special features that could attract the users. According to the analysis above, there are several aspects that may be employed and adopted in the proposed system. These existing systems will serve as the basis for the designs and references of the proposed system.

In the suggested application, for example, a user-friendly interface should be used. Some of current systems has a user-friendly interface, the suggested application would have a simple and minimalist user interface that will be easy to use and comprehend by users. The existing systems' user interfaces and the way users search for destinations are straightforward and essentially the same. The user familiarity concept was used in this case. As a result, the proposed application would have a comparable interface and functionality to the existing system so that users are comfortable with it.

Other than that, the proposed system would have feed section about food bank information. The implementation of feed section from existing system will be accepted and implemented since this feature will assist users to get more information about food bank latest updates. All the users can view and share their thoughts, knowledge, or available leftover food in the section. As a result, this functionality should be included in the proposed system.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

A good application development methodology is needed to ensure that the application can be created and developed successfully within a time limit. The purpose of methodology is to discuss the overall approach and framework for the Share Pantry food bank mobile application. Besides that, the requirements of the system and how it was used on the development of this system are being discussed.

3.2 PROJECT MANAGEMENT FRAMEWORK

3.2.1 Chosen Methodology

Rapid Application Development (RAD) methodology are being selected to be implemented on this project. In general, RAD methodology put less emphasis on planning and more emphasis on an adaptive process (Dhanotia & Goyal, 2012). Unlike traditional System Development Life Cycle (SDLC) which require a lot of planning and analysis, RAD focuses on collecting customer requirements, early testing of the prototypes by the customer using iterative concept, reuse of the existing prototypes (components), continuous integration and rapid delivery (Airbrake, 2016). RAD methodology is more suitable to be use for mobile application development where the time constraints exists as it helps to reduce design and implementation time. This methodology suite best for the time constraints because the application produce is flexible and adaptable to changes. Besides, RAD also including customers feedback which are important during the development of Share Pantry food bank mobile application. The suggestion from the customers will result a constant improvement for the application

from time to time. Due to prototyping and continuous testing, the possibility of defects can be reduced. During this process, the project is continuously modified and altered to solve the problems occurred during the user design and construction phases. As a result, the product produced has better quality and has fewer defects.

3.2.2 Methodology Phases

In the RAD model, there are 4 phases involved where the first phase is requirements planning, second is user design, third is construction, and the last phase is cutover as shown in Figure 3.1.

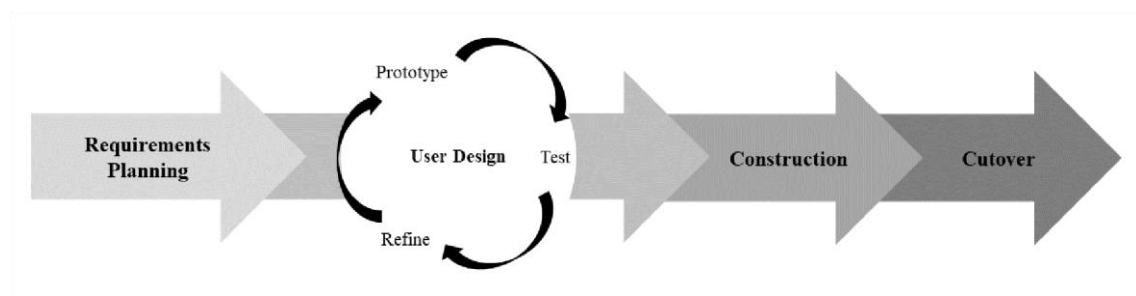


Figure 3.1 RAD Model

The first phase of this project is Requirements Planning where the process of identifying project tasks takes place. During this phase, project title, problem statement, scope, method and tools that will be used are being discussed and analysed in order to develop this project. Furthermore, a few researches related to the methodology and existing system to be improved have been conducted to give an overview on what to do and how this project can give benefits to users.

Second phase is user design where the project begins to be designed according to the requirements and methodology from phase 1. In this phase, diagrams such as context diagrams, use case diagrams are being created to show the flow of the designated system. The requirements listed and the prototype of the application will be developed as well. The prototype takes place in this phase as a way of enhancing the system by doing re-evaluation. Besides, the user interfaces are also being proposed.

Third phase is construction phase. The system design from second phase is being implemented and developed. The tasks that take place during this phase are programming and application development, coding, and system testing. The application will also undergo various testing methods to ensure it fulfils the requirements listed. Functional testing will be carried out to ensure all the functional requirements are fulfilled and working as intended. In acceptance testing, it is important that users can achieve the intended purpose of the mobile application. The output of the system may be different from what have been planning and it still can be modified to give the best output. This shows that the RAD methodology is flexible in terms of implementation.

Last phase is cutover. The final tasks including data conversion, testing, changeover to the new system, and user training are taking place during this phase. Compared with traditional methods, the entire process is compressed. As a result, the new system is built, delivered, and placed in operation much sooner. In conclusion, the methodology used to develop this Share Pantry is RAD because it gives more benefits compare with other methodology especially in terms of time constraints.

By using the RAD model, a fully functional complete application can be achieved in a shorter period due to the repeated iterations and feedback provided that allows the application to be easily refined and enhanced flexibly. Testing is carried out at every iteration, thus, minimizing errors and the time taken to fix them. The RAD model is suitable for this project as it provides flexibility and efficiency in developing the project.

3.2.3 Requirements Planning

During this stage, all the user requirement needed will be collected by survey. The developer will be investigating on what the respondent give respond to implement the good thing into the mobile app. To get the responding from survey, the survey was spread to the NGO that involve in distributing food bank. Lastly, secondary data via internet is also used to collect the requirement analysis. The advantages of this method can get the information quickly and have lower costs.

3.2.3.1 User Requirement

i. Questionnaire Analysis

To do analysis of user requirement, I used questionnaire analysis to get information and produce the overall idea of the project. There are seven questions have been provided in the questionnaire. I spread the questionnaire to the few NGOs in Malaysia as the respondent for this questionnaire. I got the feedback of the questionnaire from 5 people from different NGO. The result of the questionnaire is shown below.

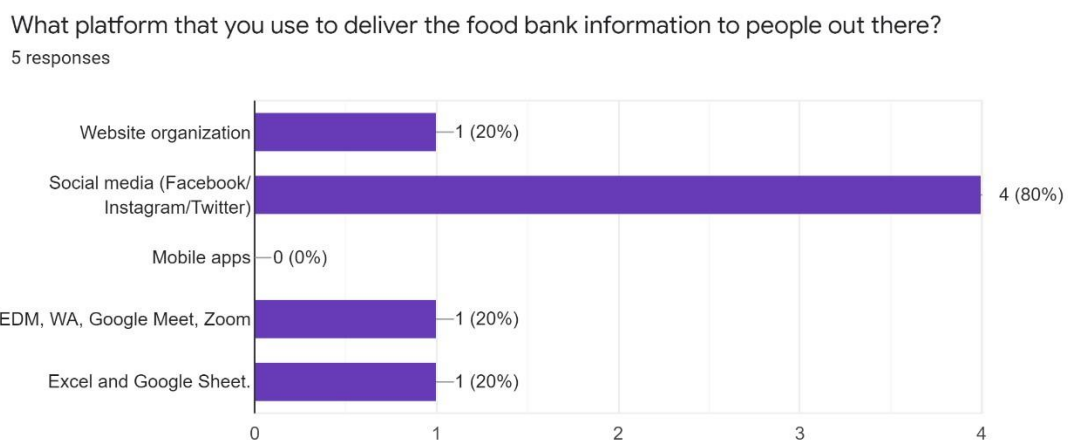


Figure 3.2 The percentage of platform used by NGO

Figure 3.2 shows 80% of respondent are using social media such as Facebook, Instagram, or Twitter to distribute the food bank information to people out there. 20% of respondent are using their official website, Google Meet or Zoom, and Excel or Google Sheet. This result shows that most of them more likely to use social media as the main platform as well as managing the food bank contribution. It is because some of NGO feels like it is not necessary to have official website because it is easier to create an account for the NGO's social media. In addition, most people nowadays are using these social media because they can know all information or current issue and it is easy for people to reach them. This would be one of the problems for the NGO because they did not use the same platform. People must search or browse deeply to contact them.

Did you face any problems during the management of food bank using your website/mobile apps?
 (If you does not use both of them, did you face any problems during distribution of the food?)
 5 responses

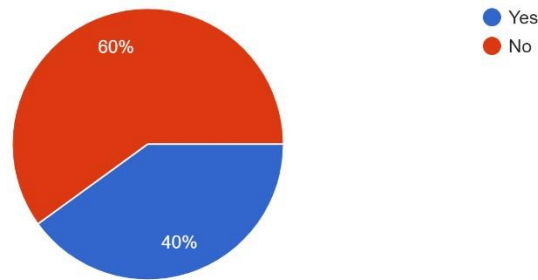


Figure 3.3 The percentage of NGO that having problem during managing the food bank

Figure 3.3 shows that most NGO are having problem to manage the food bank using their website or social medias. However, 40% of respondent do not have any problem during distribute the food bank. The respondent that answering ‘yes’ showing NGO who are using their website and social media of their organization. The problems were asked in the next question as shown in Figure 3.4.

What are the problems that you faced during the management of the food bank using the website?

5 responses

Basically, we had a form on our social media where people can fill out their detail and we would then take those datas, compile it and send over the food according to their location. The whole data collection process thats way too much time and it was also difficult to manage volunteers as we would need them to drive and deliver.

N/A - we only use social media and it works fine.

our organisation never use website

limited access and functionalities

No problem.

Figure 3.4 The problem faced by NGO to manage the food bank

Figure 3.4 shows an NGO that having problem to manage the volunteers to deliver the food bank. They say the process of collecting data took too much time and that would waste their time to handle that. This problem shows that their system in managing this process is not systematic. From this situation, I would implement a systematic and simple registration for volunteers in my mobile application. Other than that, other NGO saying that they had limited access and functionalities in their system. They might have limited features to sort out the food bank list, volunteers list, and needy people list. They also have limited access to reach any information about current data. Besides that, the other NGO saying that they do not have any problem on their social media or their management on food bank. However, still an NGO never use website because they might feel it is costly to build a website.

Do you agree if there are platforms such as apps on smartphones available for Food Bank in Malaysia?
5 responses

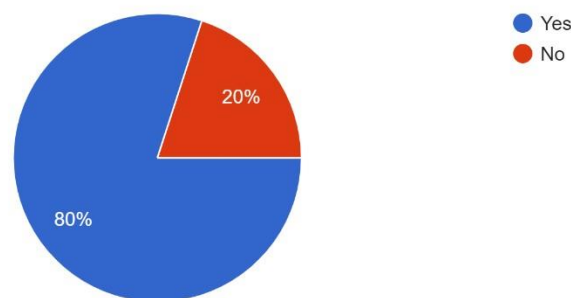
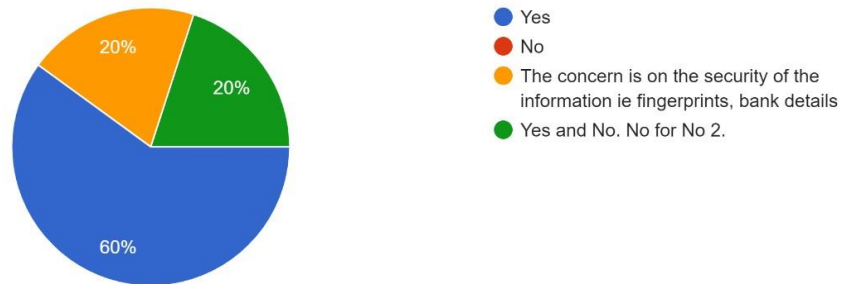


Figure 3.5 The percentage of respondent that agree with the existence of food bank mobile application

Figure 3.5 shows that most of respondent are agree if there are mobile application for food bank in Malaysia while 20% of respondent do not agree with that question. It would be good idea to build a mobile application for the food bank because most people nowadays are using mobile phone all the time. People get and reach all the information by just using mobile phone.

If the mobile app for food bank will be develop, do you agree with the features provided below to improve and give benefits to any food bank organization in Malaysia?

5 responses



Potential features available in Food Bank apps:

1. Locate nearby food bank at your home area.
2. Make donation to the needed people by using online transfer banking directly.
3. Discover the latest updates about food bank in just one app (User can make any post related to food bank information).
4. Register as a volunteer for food bank.
5. Shows the availability of leftover food
 - Example: Leftover food from restaurant/hotel
 - Needed people can get the food for free and pick up the food at the restaurant by their own
 - Post the photo & name of the food, as well as the location (when user click, it will direct to google maps)
6. Get notification
 - According to the schedule (Receive notification to take the food on available date and time at nearby food bank)
 - Reminder to give donations
 - Notification about latest food bank programs
 - Notification on available leftover food on that day
7. NGOs can
 - View volunteer list
 - View total donation (per month/year)

Figure 3.6 The percentage of NGO that agree with the suggestion's features provided for the food bank mobile application

Figure 3.6 shows that 60% of the respondent are agree with the potential features for this propose mobile application. 20% of respondent does not agree with the online transfer banking features because of the security concerns. From this result, I would be implementing security during the banking transaction.

Would you like to suggest any other features to improve the food bank app?

5 responses

- No
- The features above are fine except need refinement on the data security measures.
- give more people information about the app
- apps can also extend to beneficiaries access to see what are the donated food available for pick up
- None.

Figure 3.7 The suggestion from certain NGO about the features for the food bank application

Figure 3.7 are asking the suggestion from the respondent about features to improve in the food bank app. A respondent suggest to provide a section to give more people information about the app or about the food bank. Thus, I will provide feed section for people to post anything related to food bank. Other respondents suggest displaying the donated food available for pick up. I would implement the list of food available for needy people and the list of urgent food that needed for them so that both user will get the benefits.

Can I know which state that your organization handle to offer the food bank to needed people?

5 responses

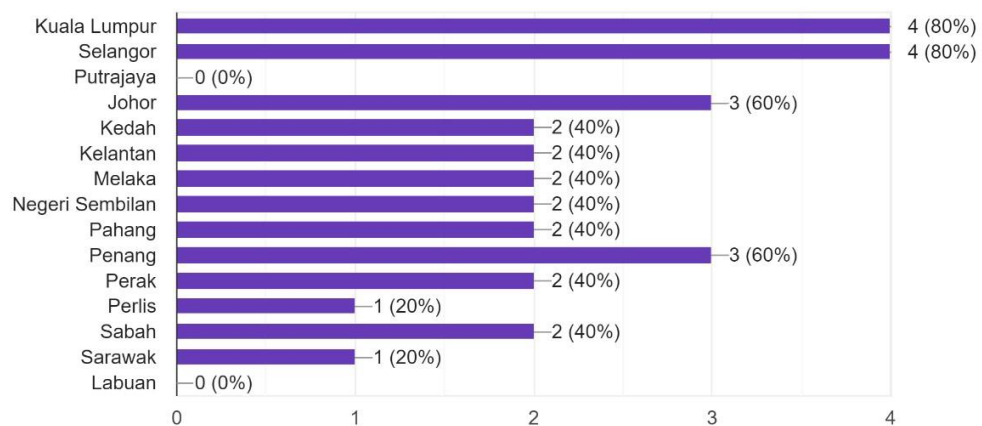


Figure 3.8 The percentage of NGO that handle in certain state

Figure 3.8 shows that most of respondents are distributing the food bank in Kuala Lumpur and Selangor. 60% of respondents cover in Johor and Penang. The remaining are covered in Kedah, Kelantan, Melaka, Negeri Sembilan, Pahang, Perak, Perlis, Sabah, and Sarawak. However, this application allow user from entire Malaysia to use the features to help the community. Thus, users who live in Malaysia will be involved for the testing application.

ii. Internet Analysis

Second method to do user requirement is internet analysis. This method basically is existing information that have been collected for another purpose. This project used internet sources to obtain information of the organization or the existing system.

3.3 PROJECT MANAGEMENT FRAMEWORK

3.3.1 Functional Requirement

- i. The system shall allow the user to locate the nearby food bank at their area.
- ii. The system shall require the user to create an account and provide username and password for security purpose.
- iii. The system shall allow the user to make donation by using online transfer banking.
- iv. The system shall allow the user to post and explore the latest updates about food bank information in the feed section.
- v. The system shall allow the user to register as NGO agent to help deliver the food bank.
- vi. The system shall allow the user to register as needy people to ask for food bank help by providing required details such as name, address, phone number and food needed.

- vii. The system shall allow the user to post available leftover food by posting the photo of the food and the address as the location of the place for food needy people.
- viii. The system shall allow the user to request location permission to use location API.
- ix. The system shall allow the user to receive notification about the latest updates on food bank, available leftover on that day, and reminder to give donations.
- x. The system shall allow the needy people to receive notification for the schedule to take the food bank on available date and time.
- xi. The system shall allow the NGO agent to view the donor and needy people list to manage the food bank request.

3.3.2 Non-functional Requirement

- i. Any interaction between user and the functions should not exceed 1 second.
- ii. The system will run on Android mobile devices.
- iii. All the user data and information will have a record and backup.
- iv. All the user data and information must keep with good security.
- v. The system should be available 24 hours per day for user to use.

3.3.3 Constraints and Limitations

The constraints of this project are during spreading the survey to NGOs. The survey has sent to more than 10 of organizations through their official email but only the total of five responses for the requirement process. Furthermore, the other constraints are during designing the prototype. There are some difficulties to arrange and connecting each page in my application prototype, but the constraints are managed to be solved by watching tutorial from YouTube and other platforms like Google. However, there are

some limitations in the project. There is no function for generating the report for admin. They can only manage the food bank list through the application. Other than that, this application only available in English language. Users cannot choose other common language like Malay language since it takes long process to translate each page in the application. Besides that, this application is only available in Android platform so iOS users cannot use this application.

3.3.4 Hardware and Software Requirement

Table 3.1 Hardware Requirement

Hardware	Purpose
Mobile Devices	Mobile device is used to run the Share Pantry food bank mobile application.
Laptop	Laptop is used for the development of the system by using Android Studio

Table 3.2 Software Requirement

Software	Purpose
Android Studio	Tool to develop mobile application
Firebase Database	Platform for database services
Adobe XD	Tool for designing the prototype of mobile application
Adobe Photoshop	Tool for designing the interface of mobile application
Microsoft Office Word	Tool for documentation purpose
Gantt Pro	Tool for creating Gantt chart of the project

3.3.5 Context Diagram

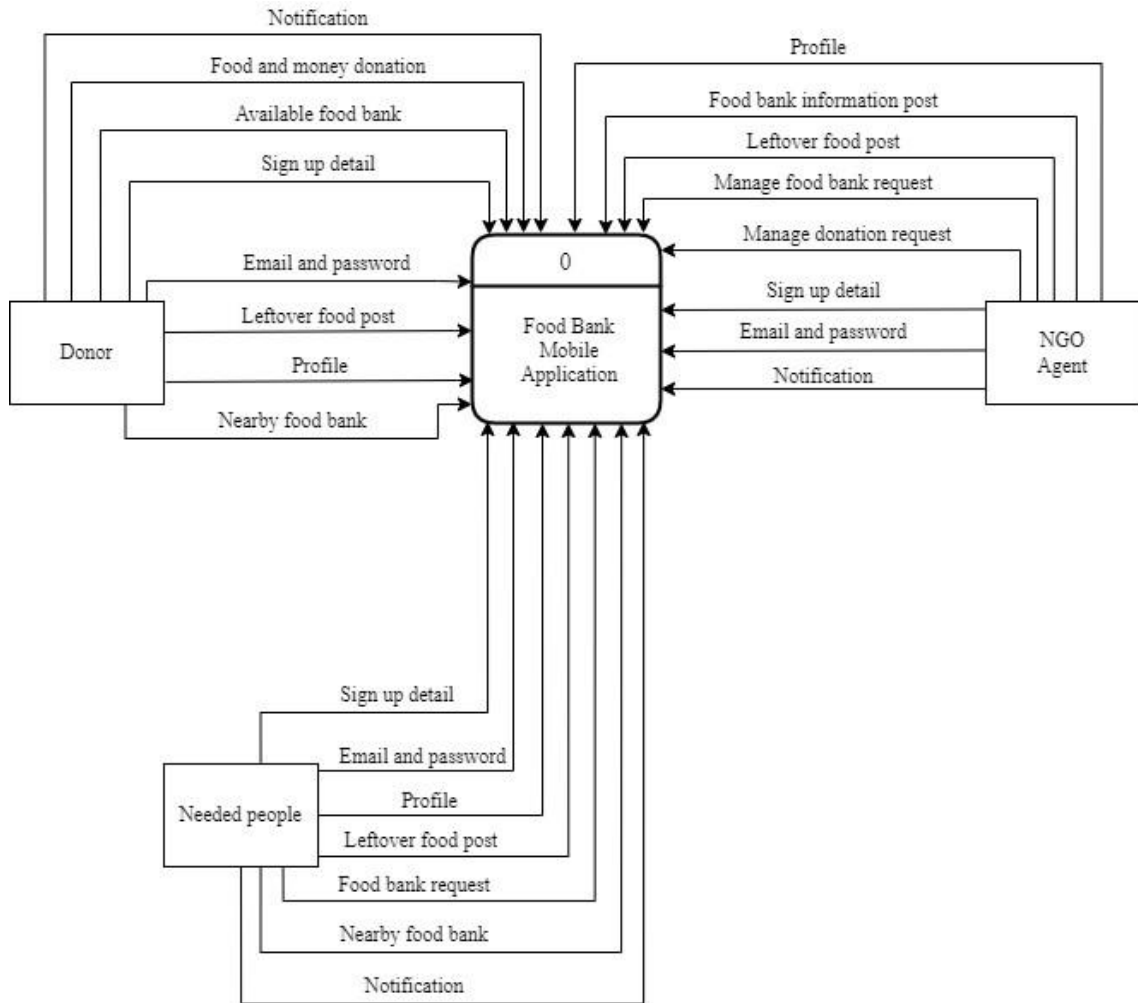


Figure 3.9 Context Diagram of Share Pantry app

Figure 3.9 shows the context diagram with external entities that outlines the interaction with internal system. This diagram shows that the system has three entities involved with different activities of interaction which are donors, needed people, and NGO agent. The donor is the user that will donate the food or money to the food bank. Within the system, the donor can view nearby food banks to give food or money donations. Donors will receive the notification once the food has been delivered by an NGO agent. Donors also can view and post in the feed section. Furthermore, the needed people are the users that want to request food bank. They can view a nearby food bank and request it. Once the NGO agent starts the delivery, they will receive notification.

Needed people can view the food bank information and the leftover food available on that day. The other entities are NGO agents which will help to distribute the food to the food bank and the needed people. Like other entities, NGO agents can view and post about the food bank information and the leftover food available on that day. NGO agents need to manage the food bank and donation requests.

3.3.6 Use Case Diagram

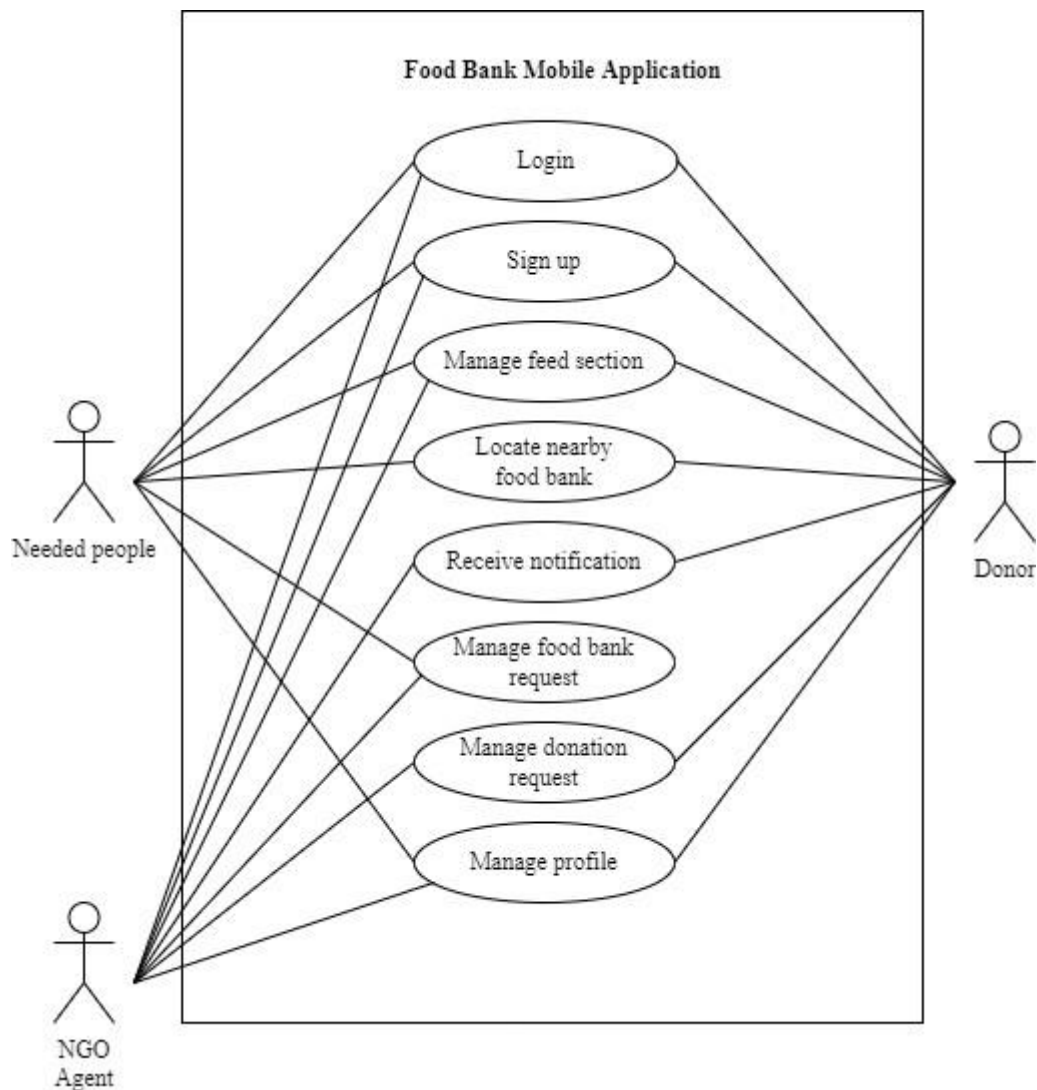


Figure 3.10 Use case diagram of Share Pantry app

Figure 3.10 shows the use case diagram which involve needed people, donor, and NGO agent with its actions in the system. Use case diagram illustrates the action done by the external entity with the system. Each sequence represents an interaction of actors and its behaviours in the system. Based on the diagram, all users required to login before access the system. All users need to choose their role before entering the main page.

3.3.6.1 Use Case Description

Table 3.3 Use case description for login

Use case name	Login
Brief Description	This use case is for user to login into the application
Actor	NGO agent, needed people, donor
Pre-Condition	User must already register in the database
Basic Flow	<ol style="list-style-type: none"> 1. The use case starts when system display the login page. 2. The user can: <ol style="list-style-type: none"> a. Enter email address and password [A1: Enter Credentials] b. Request help of forgot the password [A2: Forgot Password] 3. User click <<LOGIN>> button. 4. System redirects the user to the main page. 5. The use case ends.
Alternative Flow	<p>A1: Enter Credentials</p> <ol style="list-style-type: none"> 1. User enter email address and password. 2. If the email address or the password is wrong, the system will display an error message [E1: Invalid Email Address or Password]. 3. The use case continues to step number 2 in basic flow. <p>A2: Forgot Password</p> <ol style="list-style-type: none"> 1. User click <<FORGOT PASSWORD>> button. 2. User enter the email address.

	<ol style="list-style-type: none"> 3. System will send an email to reset the password. 4. The use case continues to step number 2 in basic flow.
Exception Flow	<p>E1: Invalid Email Address or Password</p> <ol style="list-style-type: none"> 1. User enter correct email. 2. The use case continues to step 1 in alternative flow A1.
Post Condition	The login is success
Constraints	<p>C1: Length of password</p> <p>The password must be at least 6 characters and numbers.</p>

Table 3.4 Use case description for sign up

Use case name	Sign up
Brief Description	This use case is for user to sign up into the application
Actor	NGO agent, needed people, donor
Pre-Condition	User not registered in the database
Basic Flow	<ol style="list-style-type: none"> 1. The use case starts when user go to sign up page. 2. The user can: <ol style="list-style-type: none"> a. Enter full name, email address, phone number, and password [A1: Enter User Details] 3. User click <<DONE>> button. 4. System redirects the user to the login page. 5. The use case ends.
Alternative Flow	<p>A1: Enter User Details</p> <ol style="list-style-type: none"> 1. User enter full name, email address, phone number, and password. 2. If the password did not have combination of number or did not have combination of character, the system will display an error message [E1: Invalid Password]. 3. The use case continues to step number 2 in basic flow.
Exception Flow	<p>E1: Invalid password</p> <ol style="list-style-type: none"> 1. User enter correct password. 2. The use case continues to step 1 in alternative flow A1
Post Condition	The sign up is success
Constraints	C1: Length of password

	The password must be at least 6 characters and numbers.
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Table 3.5 Use case description for manage feed section

Use case name	Manage feed section
Brief Description	This use case is to manage the feed section.
Actor	NGO agent, needed people, donor
Pre-Condition	User does not publish any post.
Basic Flow	<ol style="list-style-type: none"> 1. The use case starts when user go to feed page. 2. User click “+” button. 3. The user is able to: <ol style="list-style-type: none"> a. Add new post in the feed section [A1: Add New Post]. b. Delete post in the feed section [A2 : Delete Post]. 6. User click <<POST>> button. 7. System redirects the user to the feed page and display latest post. 8. The use case ends.
Alternative Flow	<p>A1: Add New Post</p> <ol style="list-style-type: none"> 1. User enter caption, uploading photo, or put location. 2. User click <<POST>> button. 3. The use case continues to step number 2 in basic flow. <p>A2: Delete Post</p> <ol style="list-style-type: none"> 1. User enter caption, uploading photo, or put location. 2. User click <<DELETE>> button. 3. The use case continues to step number 2 in basic flow.
Post Condition	Manage feed is success

Table 3.6 Use case description for locate nearby food bank

Use case name	Locate nearby food bank
Brief Description	This use case is for user to locate nearby food bank in Malaysia.
Actor	Needed people, donor

Pre-Condition	User find for nearby food bank.
Basic Flow	<ol style="list-style-type: none"> 1. The use case starts when user go food bank page. 2. User click <<FOOD BANK NEAR ME>> button on the map in the food bank page. 3. The user is able to: <ol style="list-style-type: none"> a. View food bank details [A1: View Food Bank]. 4. User click on the food bank. 5. System redirects to food bank details page. 6. The use case ends.
Alternative Flow	A1: View Food Bank <ol style="list-style-type: none"> 1. User view available food bank near them on the map. 2. The use case continues to step number 1 in basic flow.
Post Condition	Locate nearby food bank is success

Table 3.7 Use case description for receive notification

Use case name	Receive notification
Brief Description	This use case is to receive notification
Actor	Needed people, donor
Pre-Condition	User must have internet connection
Basic Flow	<ol style="list-style-type: none"> 1. The use case starts when user go notification page. 2. The user can: <ol style="list-style-type: none"> a. View notification. 3. User click on the notification. 4. System redirects to chosen notification page. 5. The use case ends.
Post Condition	Receive notification is success

Table 3.8 Use case description for manage food bank

Use case name	Manage food bank
Brief Description	This use case is to manage food bank
Actor	NGO agent, needed people
Pre-Condition	User must login to the application.

Basic Flow	<ol style="list-style-type: none"> 1. The use case starts when user go food bank page. 2. Needed people can: <ol style="list-style-type: none"> a. View and choose available food bank. [A1: View Food Bank] b. Click “→” button on the food bank to see the food bank details. c. Request for food bank. [A2: Request Food Bank] 3. The NGO can: <ol style="list-style-type: none"> a. View food bank request [A3: View Food Bank Request]. b. Notify needed people. 4. The use case ends.
Alternative Flow	<p>A1: View Food Bank</p> <ol style="list-style-type: none"> 1. User view available food bank near them in the food bank page. 2. The use case continues to step number 2 in basic flow. <p>A2: Request Food Bank</p> <ol style="list-style-type: none"> 1. User view and choose available food bank. 2. User click <<REQUEST FOOD BANK>> button. 3. User enter personal details. 4. User click <<REQUEST>> 5. The use case continues to step number 2 in basic flow. <p>A3: View Food Bank Request</p> <ol style="list-style-type: none"> 1. User view food bank request list. 2. User click <<ACCEPT >> button to notify needed people. 3. User click <<CONFIRM DELIVERY>> after completing the delivery. 4. The use case continues to step number 3 in basic flow.
Post Condition	Manage food bank is success

Table 3.9 Use case description for manage donation

Use case name	Manage donation
Brief Description	This use case is for user to manage donation.
Actor	NGO agent, donor
Pre-Condition	User must login to the application.
Basic Flow	<ol style="list-style-type: none"> 1. The use case starts when user go to food bank page. 2. Donor can: <ol style="list-style-type: none"> a. View and choose available food bank. [A1: View Food Bank] b. Click “→” button on the food bank to see the food bank details. c. Donate to the food bank [A2: Donate Food Bank] 3. The NGO can: <ol style="list-style-type: none"> a. View donation request [A3: View Donation Request]. b. Notify donor. 4. The use case ends.
Alternative Flow	<p>A1: View Food Bank</p> <ol style="list-style-type: none"> 1. User view available food bank near them in the food bank page. 2. The use case continues to step number 1 in basic flow. <p>A2: Donate food bank</p> <ol style="list-style-type: none"> 1. User view available food bank. 2. User click <<DONATE >> button. 3. User enter the donation details. 4. User click <<DONATE>> to complete the donation. 5. The use case continues to step number 2 in basic flow. <p>A3: View Donation Request</p> <ol style="list-style-type: none"> 1. User view donation request list. 2. User click <<ACCEPT >> button to notify donor.

	<ol style="list-style-type: none"> 3. User click <<CONFIRM DELIVERY>> after completing the delivery. 4. The use case continues to step number 3 in basic flow.
Post Condition	Manage donation is success

Table 3.10 Use case description for manage profile

Use case name	Manage profile
Brief Description	This use case is for user to manage profile details.
Actor	NGO agent, donor, needed people
Pre-Condition	User already login to the system.
Basic Flow	<ol style="list-style-type: none"> 1. The use case starts when user go to profile page. 2. User click <<MY PROFILE>> button to view profile details. 3. User can: <ol style="list-style-type: none"> a. Update profile details [A1: Update profile] b. Delete profile [A2: Delete profile] 4. The use case ends.
Alternative Flow	<p>A1: Update Profile</p> <ol style="list-style-type: none"> 1. User enter the updated details in profile details. 2. User click <<UPDATE >> button to update the profile. 3. The use case continues to step number 2 in basic flow. <p>A2: Delete profile</p> <ol style="list-style-type: none"> 1. User click <<DELETE >> button to delete the profile. 2. The use case continues to step number 2 in basic flow.
Post Condition	Manage profile is success

3.3.7 Activity Diagram

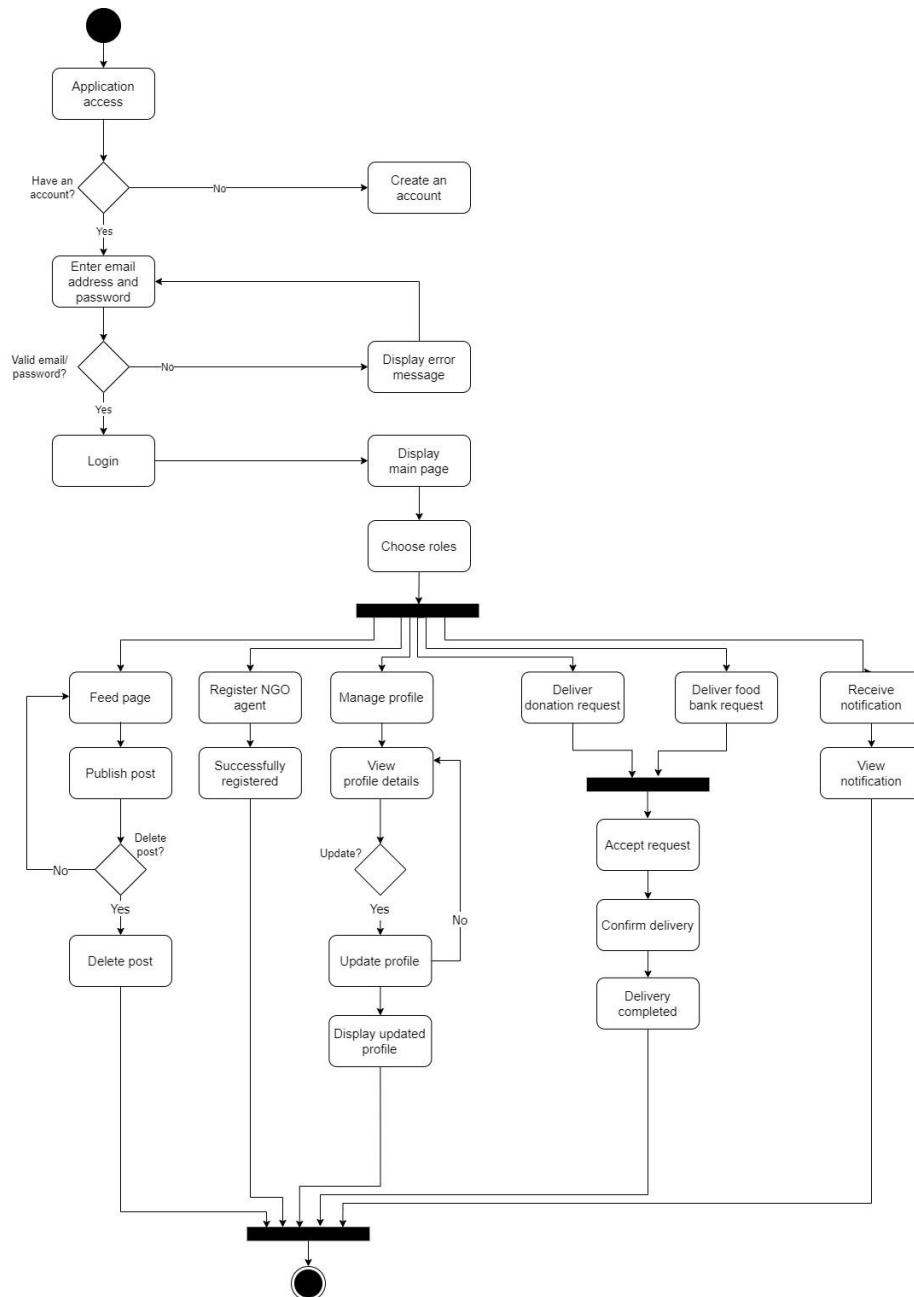


Figure 3.11 Activity Diagram for NGO agent in Share Pantry app

Figure 3.11 shows the activity diagram of Share Pantry flow which focus on NGO agent activity. This diagram function is to represent a set of activities or system flow in visual representation.

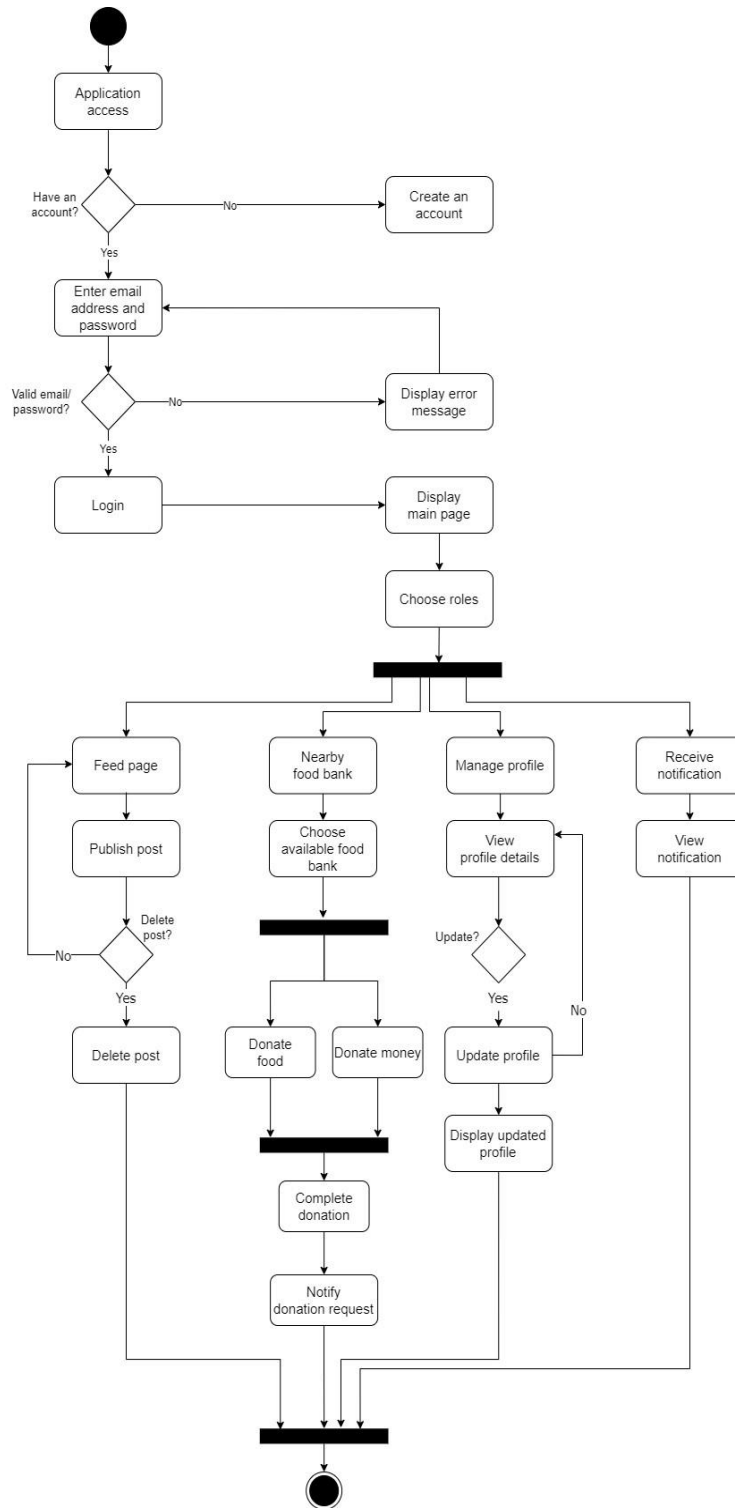


Figure 3.12 Activity diagram for donor in Share Pantry app

Figure 3.12 shows the activity diagram of Share Pantry flow which focus on donor activity. This diagram function is to represent a set of activities or system flow in visual representation.

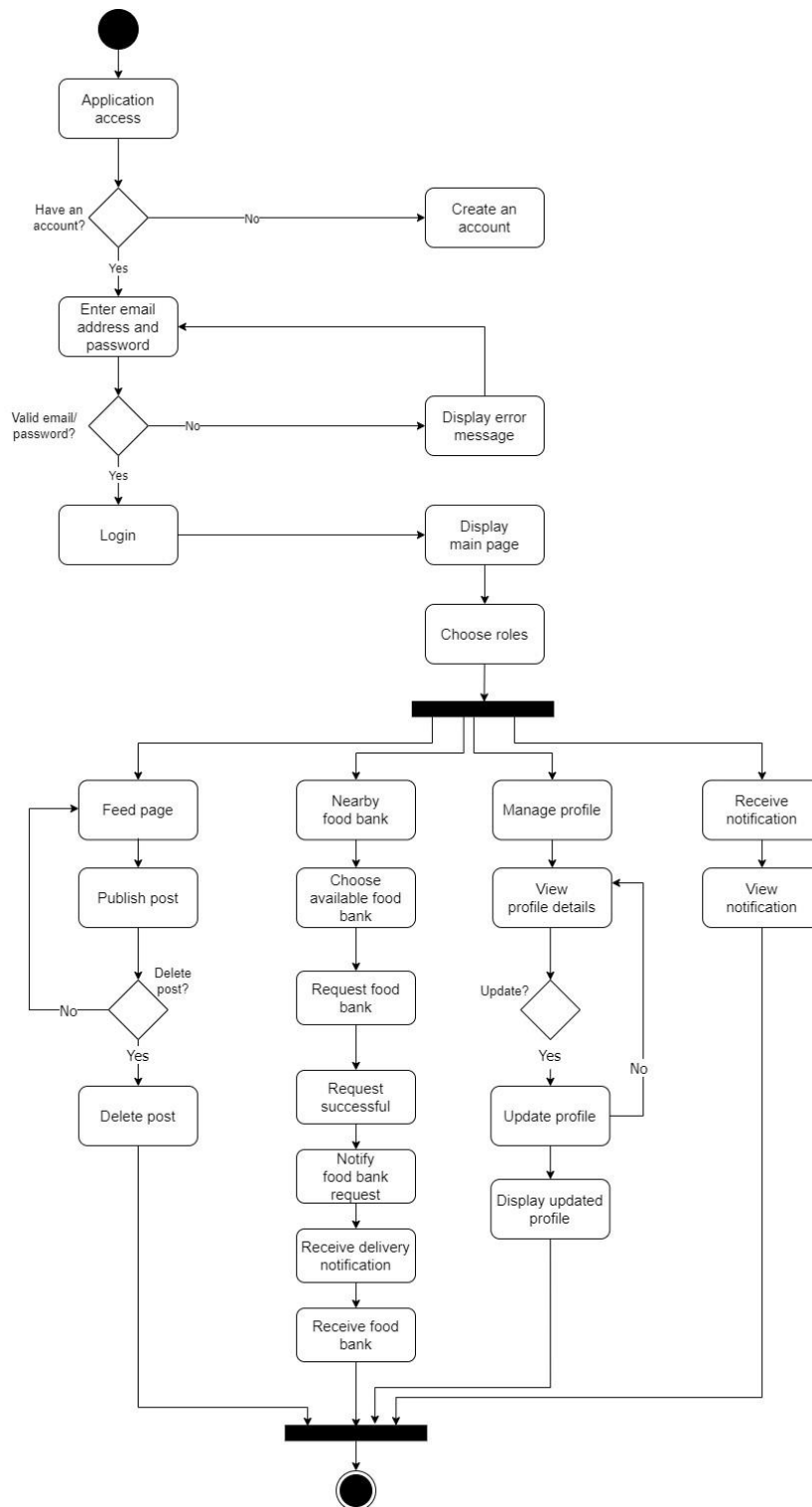


Figure 3.13 Activity diagram for needed people in Share Pantry app

Figure 3.13 shows the activity diagram of Share Pantry flow which focus on need people activity. This diagram function is to represent a set of activities or system flow in visual representation.

3.4 DATA DESIGN

3.4.1 ERD

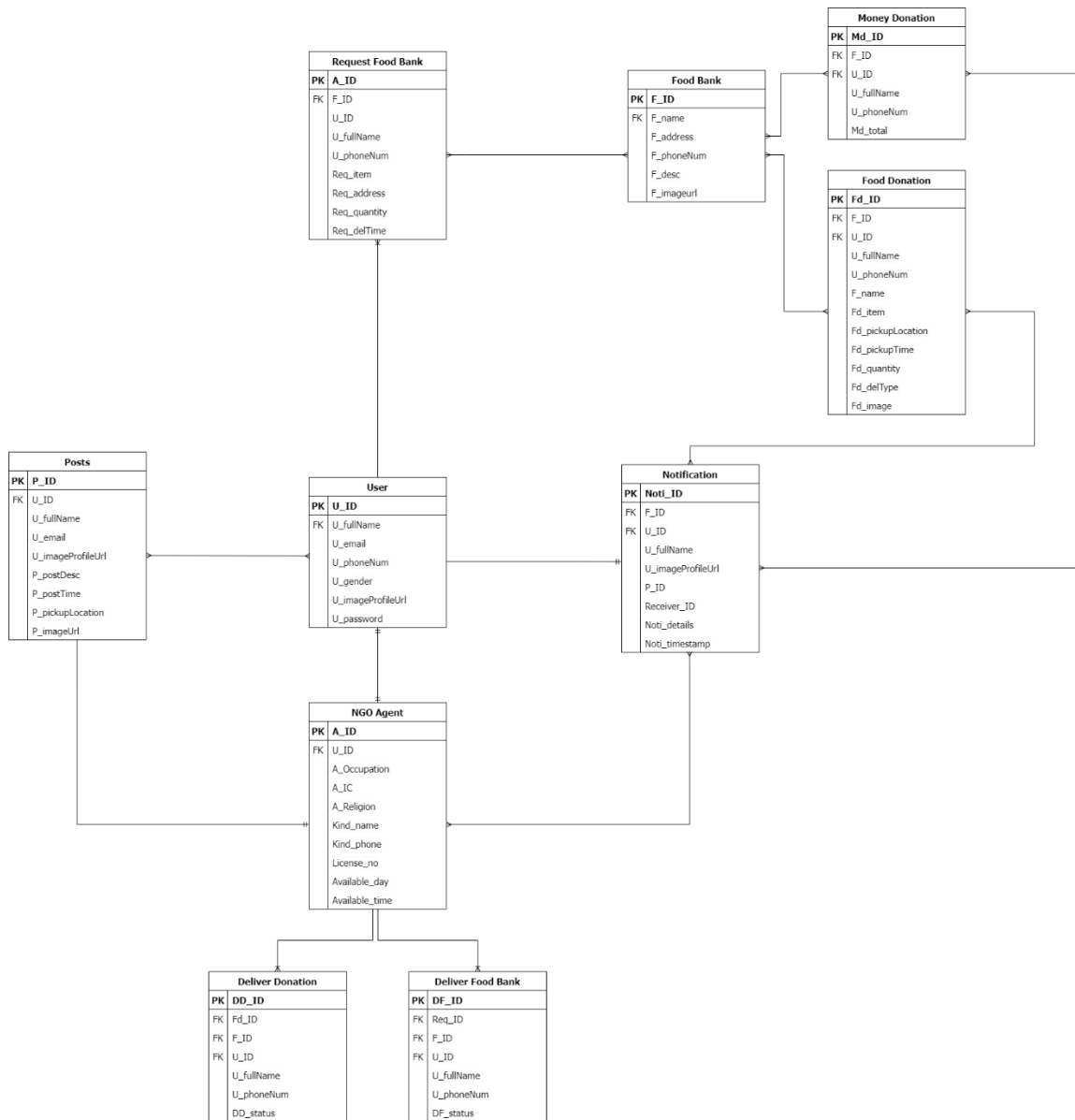


Figure 3.14 ERD of Share Pantry app

Figure 3.14 shows the ERD of the Share Pantry system. Each entities have their relation in the database. Each of attribute will have to store data in the database.

3.4.2 Data Dictionary

Table 3.11 Data dictionary of User

Field Name	Description	Data Type	Constraint
U_ID	User ID	STRING	PK, NOT NULL
U_fullName	User full name	VARCHAR (50)	FK
U_email	User email	VARCHAR (50)	
U_phoneNum	User phone number	INT	
U_gender	User gender	VARCHAR (50)	
U_imageProfileUrl	User profile image	STRING	
U_password	User password	VARCHAR (50)	

Table 3.12 Data dictionary of Posts

Field Name	Description	Data Type	Constraint
P_ID	Post ID	STRING	PK, NOT NULL
U_ID	User ID	STRING	FK
U_fullName	User full name	VARCHAR (50)	
U_email	User email	VARCHAR (50)	
U_imageProfileUrl	User profile image	STRING	
P_postDesc	Post description	VARCHAR (300)	
P_postTime	Post time	STRING	
P_pickupLocation	Pick-up address	VARCHAR (50)	
P_imageUrl	Image path	STRING	

Table 3.13 Data dictionary of Food Bank

Field Name	Description	Data Type	Constraint
F_ID	Food bank ID	STRING	PK, NOT NULL
F_name	Food bank name	VARCHAR (50)	FK
F_address	Food bank address	VARCHAR (50)	
F_phoneNum	Food bank phone number	INT	
F_desc	Food bank description	VARCHAR (300)	
F_imageUrl	Food banj image	STRING	

Table 3.14 Data dictionary of Food Donation

Field Name	Description	Data Type	Constraint
Fd_ID	Food donation ID	STRING	PK, NOT NULL
U_ID	User ID	STRING	FK
F_ID	Food bank ID	STRING	FK
F_name	Food bank name	VARCHAR (50)	
U_fullName	User full name	VARCHAR (50)	
U_phoneNum	User phone number	VARCHAR (50)	
Fd_item	Food item	VARCHAR (50)	
Fd_pickupLocation	Pick-up address	VARCHAR (50)	
Fd_quantity	Quantity of food	INT	
Fd_pickupTime	Pickup time	STRING	
Fd_delType	Delivery type	VARCHAR (50)	
Fd_image	Food image	STRING	

Table 3.15 Data dictionary of Money Donation

Field Name	Description	Data Type	Constraint
Md_ID	Money donation ID	STRING	PK, NOT NULL
F_ID	Food bank ID	STRING	FK
U_ID	User ID	STRING	FK
F_name	Food bank name	VARCHAR (50)	
U_fullName	User full name	VARCHAR (50)	
U_phoneNum	User phone number	VARCHAR (50)	
Md_total	Donation amount	FLOAT	

Table 3.16 Data dictionary of Notification

Field Name	Description	Data Type	Constraint
Noti_ID	Notification ID	STRING	PK, NOT NULL
Sender_ID (U_ID)	Sender ID (User ID)	STRING	FK
P_ID	Post ID	STRING	
Receiver_ID	Receiver ID	STRING	
U_fullName	User full name	VARCHAR (50)	
U_imageProfileUrl	User profile image	STRING	
Noti_details	Notification details	VARCHAR (50)	
Noti_timestamp	Notification timestamp	STRING	

Table 3.17 Data dictionary of NGO Agent

Field Name	Description	Data Type	Constraint
A_ID	NGO Agent ID	STRING	PK, NOT NULL
U_ID	User ID	STRING	FK
A_fullName	NGO Agent full name	VARCHAR (50)	
A_email	NGO Agent email	VARCHAR (50)	

A_phoneNum	NGO Agent phone number	VARCHAR (50)	
A_occupation	NGO Agent Occupation	VARCHAR (50)	
A_icNo	NGO Agent IC No	VARCHAR (50)	
A_address	NGO Agent address	VARCHAR (50)	
hasLicense	Licence availability	BOOLEAN	
Available_day	Available day	VARCHAR (50)	
Available_time	Available time	VARCHAR (50)	

Table 3.18 Data dictionary of Request Food Bank

Field Name	Description	Data Type	Constraint
Req_ID	Request food bank ID	STRING	PK, NOT NULL
F_ID	Food bank ID	STRING	FK
U_ID	User ID	STRING	
U_fullName	User full name	VARCHAR (50)	
U_phoneNum	User phone number	VARCHAR (50)	
Req_item	Food item	VARCHAR (50)	
Req_address	Needed people address	VARCHAR (50)	
Req_quantity	Quantity of food	INT	
Req_delTime	Delivery time	STRING	

Table 3.19 Data dictionary of Deliver Donation

Field Name	Description	Data Type	Constraint
DD_ID	Deliver donation ID	STRING	PK, NOT NULL
Fd_ID	Food donation ID	STRING	FK
F_ID	Food bank ID	STRING	FK
U_ID	User ID	STRING	FK

U_fullName	User full name	VARCHAR (50)	
U_phoneNum	User phone number	VARCHAR (50)	
DD_status	Delivery status	VARCHAR (50)	

Table 3.20 Data dictionary of Deliver Food Bank

Field Name	Description	Data Type	Constraint
DF_ID	Deliver food bank ID	STRING	PK, NOT NULL
Req_ID	Request food bank ID	STRING	FK
F_ID	Food bank ID	STRING	FK
U_ID	User ID	STRING	FK
U_fullName	User full name	VARCHAR (50)	
U_phoneNum	User phone number	VARCHAR (50)	
DF_status	Delivery status	VARCHAR (50)	

3.5 PROOF OF INITIAL CONCEPT

Prototype design is one of the important things before we develop the fully system. It is because prototype can be early testing for the user to test the system before proceeding to the development. In addition, prototype helps to improve the system in term of its design, usability, consistency, and the feedback from user.

3.5.1 Interface Design Elements

i. Logo

As the main concept, the logo idea is from the food inside the paper bag, also combining it with the heart symbol. The food in the paper bag represents the food bank received to the needed people and each donation is the act of the heart symbol. Figure 3.15 shows the logo of Share Pantry.



Figure 3.15 Logo of Share Pantry

ii. Colour Palette

The colour combination for this application is chosen from the light colour which represents the happiness colour.



#9968ac



#ffce82



#ffffff

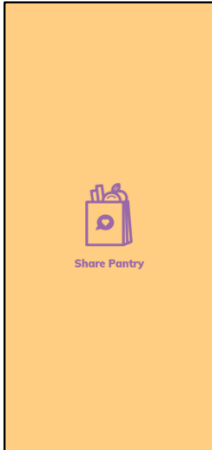
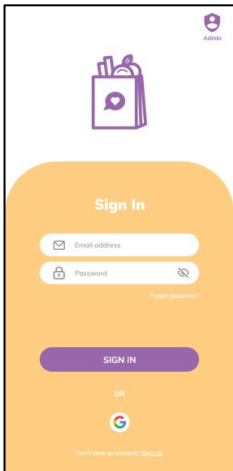
iii. Fonts

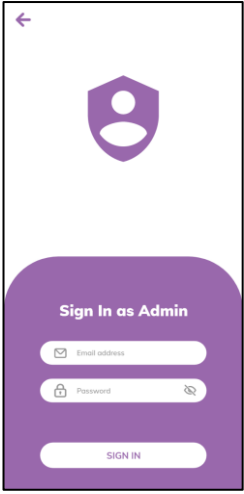
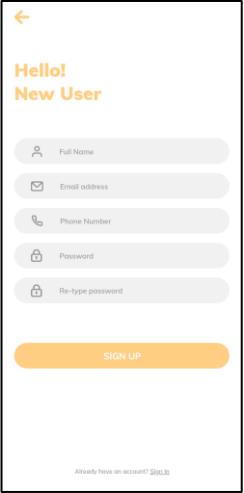
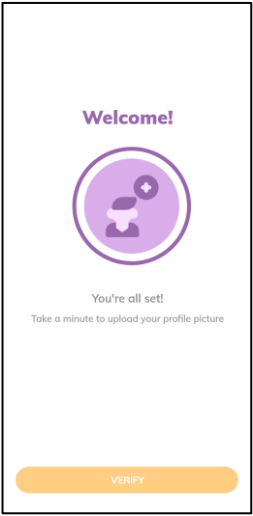
The fonts that would use in this application is a Mulish font which is a standard font that were used by most of existing mobile applications. This font would be applied for all interfaces in this application.

3.5.2 Prototype Design

Prototype link: <https://shorturl.at/blAQS>

Table 3.21 Prototype design of Share Pantry

No	Prototype	Description
1.	 The image shows a vertical rectangular splash screen with a solid orange background. In the center, there is a purple icon of a shopping bag with a white outline. Below the icon, the text "Share Pantry" is written in a small, purple, sans-serif font.	This is the splash screen which pop up for 2 seconds with Share Pantry logo when user open the application.
2.	 The image shows a mobile application login page with a white background. At the top, there is a purple shopping bag icon and a small "Admin" button with a shield icon. Below this is a large orange rounded rectangle containing the "Sign In" section. It features two input fields: "Email address" with an envelope icon and "Password" with a lock icon and a "Show/Hide" toggle. Below the fields is a purple "SIGN IN" button. At the bottom, there is a "OR" separator and a Google logo for social login. A "Don't have an account? Sign Up" link is at the very bottom.	This is the login page when user already sign up to the application. User required to enter email address and password to login. User also can login with Google or Facebook account. If user forgot the password, users can get help by clicking "Forgot password" button. The system will send an email to reset the password. If user do not have any account yet, user must click "Sign Up" button and system will display the sign-up page. If the user want to login as admin, the user must click on "Admin" button.

3.	<p>Admin Login Page</p> 	<p>This is the login page for admin. Admin required to enter email address and password to login.</p>
4.	<p>Sign Up Page</p> 	<p>For the first time user, user is required to fill in full name, email address, phone number, and password. Email address and password will be used to login activity. The password must contain at least 8 characters with combination of numbers. After user finish fill in the details, user must click “DONE” button and user will redirect to login page.</p>
5.	<p>Set Profile Picture Page</p> 	<p>After user complete sign-up process, they have to upload their profile picture. User can either capture live picture with their camera or using existing picture in their gallery. After that, user must click “DONE” and user will redirect to the main page.</p>


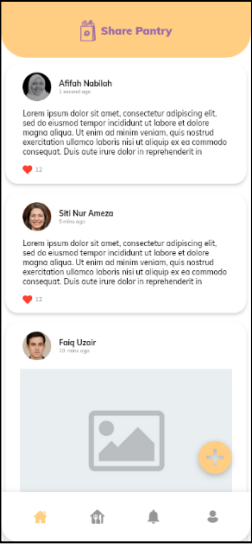
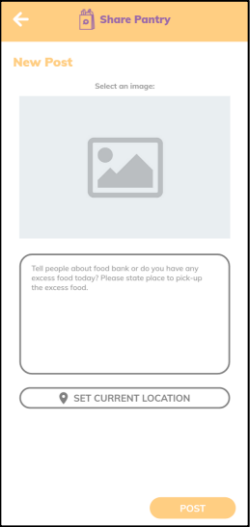
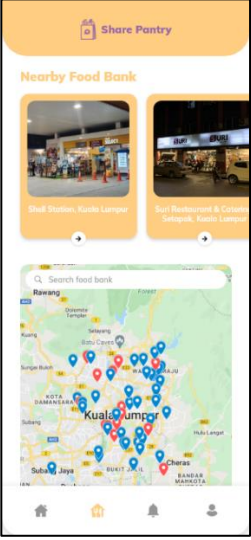
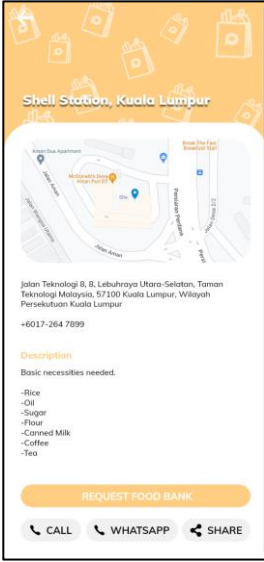
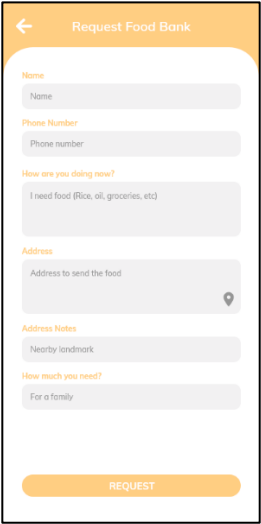
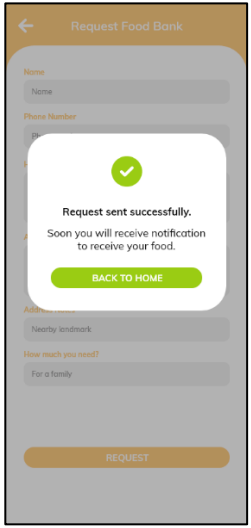

6.	<p>Main Page</p> 	<p>After login, user will be redirect to main page.</p> <p>User can choose any of the role before proceeding to the next page. Each role shows different function.</p>
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Table 3.22 Prototype design of needed people

No	Prototype	Description
1.		<p>As the user click “Request Food Bank” on the previous page, user will see feed page which display latest post about food bank information and available leftover food. User can publish post by clicking “+” icon button and write any post about food bank or available leftover food. User can also hit a like button on any post.</p>
2.		<p>If user want to publish new post, they must click “+” button in the previous page. User can write any post related to excess food or food bank. User also can upload picture of the excess food from the gallery or camera. If user want to drop current address, they can click on “Set Current Location” button. Once user complete, user must click “Post” button and it will appear in the feed page.</p>
3.	<p>Food Bank Page</p>	<p>When user click on “FOOD BANK” icon button on the navigation bar, it will display food bank page. In the food bank page, system will display nearby food bank in their area. There is also a map for user to locate nearby food bank in the map. Users need to click on “→” button to view the food bank details.</p>

		
4.	<p>Food Bank Details Page</p> 	<p>This is the food bank details page that will display a map to show the location of the food bank. User will redirect to Google Map application if they click on the map to get the direction. User can also view the phone number of the food bank and the food needed at the food bank. However, the available food bank shows that they are available to give food to any user. If user want to request the food bank, user must click “Request Food Bank” button and it will show the next page. User can also click the back button to go to the previous page. If user want to communicate with the food bank, user can easily call or message them through WhatsApp. In addition, user can share the food bank to their friend to any social media.</p>
5.	<p>Request Food Bank Page</p>	<p>This is the page for user to enter the request food bank details. User are required to fill all the details. Once user has complete fill the details, user must click “Request” button. It will show the popup page. User can also click the back button to cancel the request and go to the previous page.</p>

		
6.	<p>Popup message</p> 	<p>This popup message show that the food bank request has been successfully sent to the NGO agent. NGO agent will deliver the food bank as soon as possible. User will receive a notification when NGO agent accept the request. Then, user must click “Back To Home” to go back to the home page.</p>
7.	<p>Profile Page</p> 	<p>This is the profile page for user to view the profile details and update it. If they want to update the details, they just enter the new details and click “Save” button. The system will store the latest details in database. User can also click the back button to cancel the activity and go to the previous page. This page is also available in donor and NGO agent page.</p>
8.	<p>Notification Page</p>	<p>This is the notification page that will display all the notification that user received.</p>

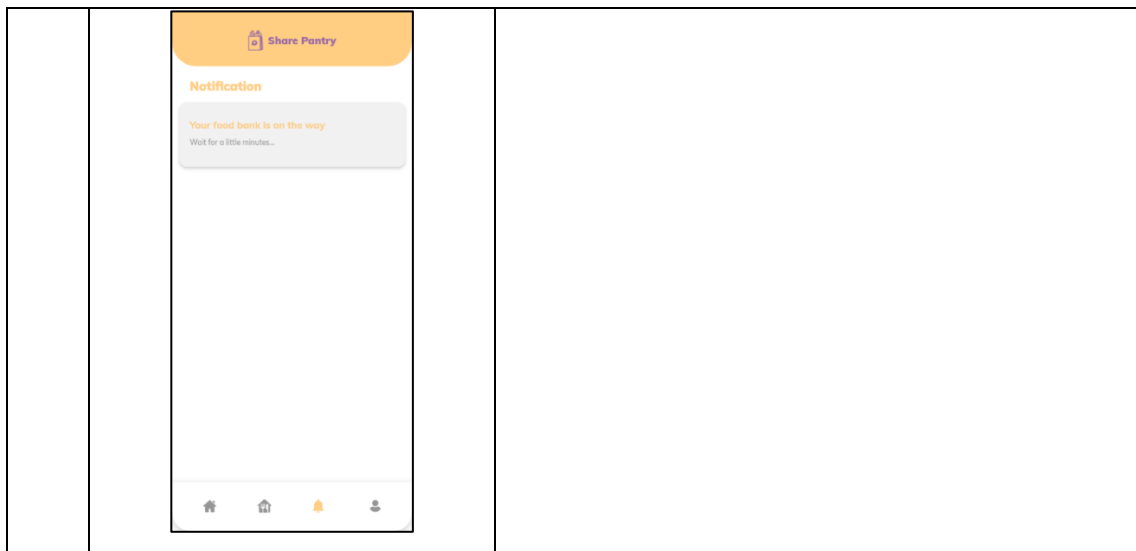
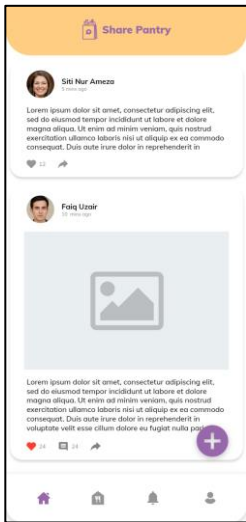
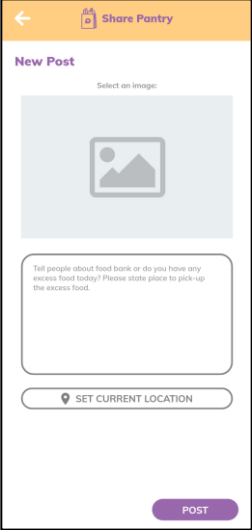
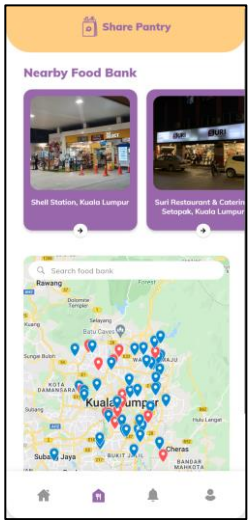
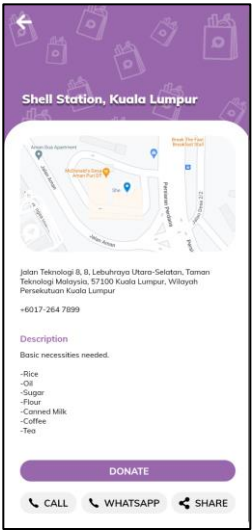
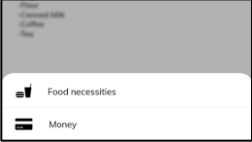
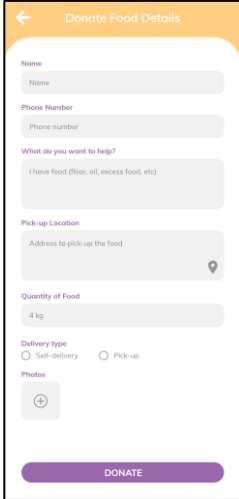
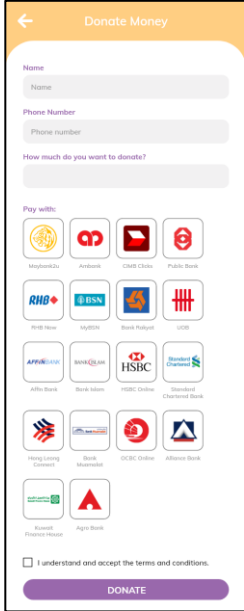


Table 3.23 Prototype design of donor

No	Prototype	Description
1.		<p>As the user click “Request Food Bank” on the previous page, donor will see feed page which display latest post about food bank information and available leftover food. Donor can publish post by clicking “+” icon button and write any post about food bank or available leftover food. Donor can also hit a like button on any post.</p>
2.	<p>New Post Page</p>	<p>If donor want to publish new post, they must click “+” button in the previous page. User can write any post related to excess food or food bank. User also can upload picture of the excess food from the gallery or camera. If user want to drop current address, they can click on “Set Current Location” button. Once donor</p>

		<p>complete, donor must click “Post” button and it will appear in the feed page.</p>
<p>3.</p>	<p>Food Bank Page</p> 	<p>When donor click on “FOOD BANK” icon button on the navigation bar, it will display food bank page. In the food bank page, system will display nearby food bank in their area. There is also a map for user to locate nearby food bank in the map. Users need to click on “→” button to view the food bank details.</p>
<p>4.</p>	<p>Food Bank Details Page</p> 	<p>This is the food bank details page that will display a map to show the location of the food bank. Donor will redirect to Google Map application if they click on the map to get the direction. Donor can also view the phone number of the food bank and the food needed at the food bank. However, the available food bank shows that they are available to give food to any user. If donor want to donate the food bank, user must click “Donate” button donor must choose either want to donate food or money. Donor can also click the back button to go to the previous</p>

		<p>page. If donor want to communicate with the food bank, donor can easily call or message them through WhatsApp. In addition, donor can share the food bank to their friend to any social media.</p>
5.	<p>Food Donation Page</p> 	<p>This is the page for donor to enter the food donation details. Donor is required to fill all the details. Once donor has complete fill the details, donor must click “Donate” button. It will show the popup message. Donor can also click the back button to go to the previous page.</p>
6.	<p>Money Donation Page</p> 	<p>This is the page for donor to enter the money donation details. Donor is required to put the amount of the donation and select the online banking that they use to donate the money. Once donor has complete fill the details, donor must click “Donate” button. It will show the popup message. Donor can also click the back button to go to the previous page.</p>
7.	<p>Popup message</p>	<p>This popup message show that the food or money donation has been successfully sent to the admin or NGO agent respectively. NGO agent will deliver the food donation as soon as possible. Donor will receive a notification when</p>

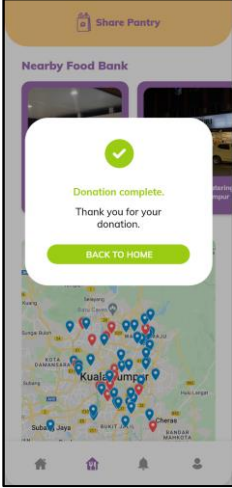
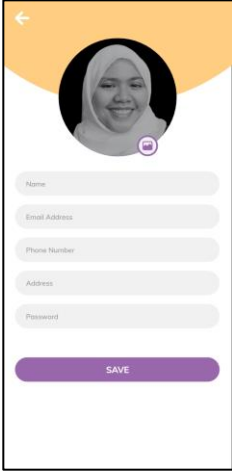

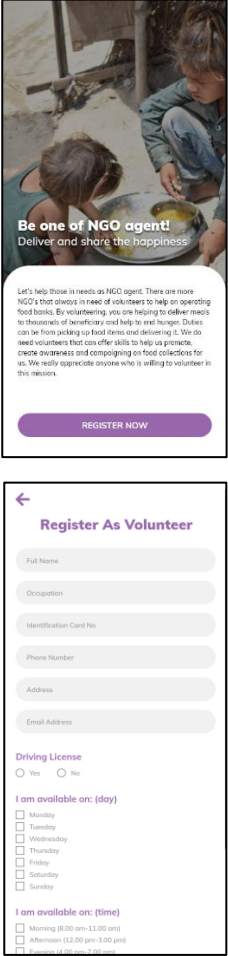
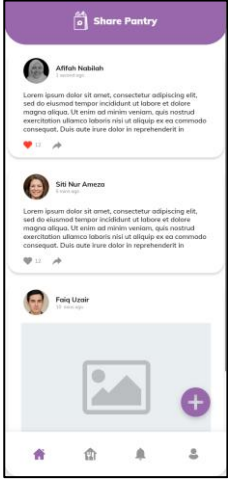
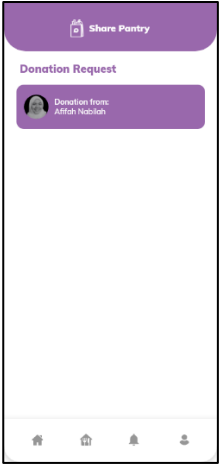
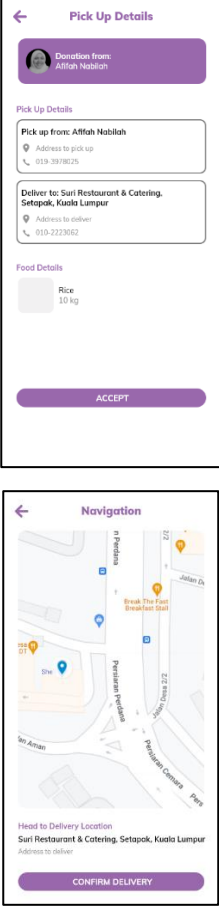
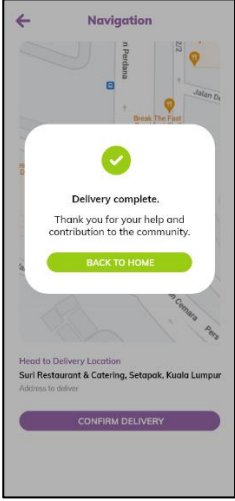
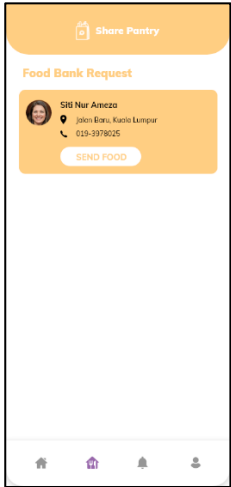
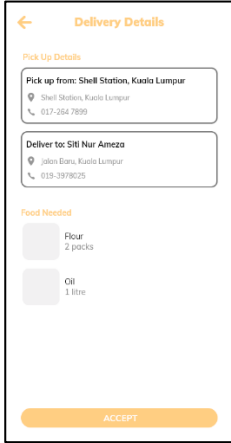
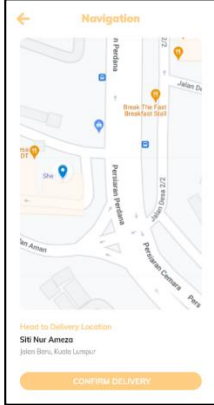
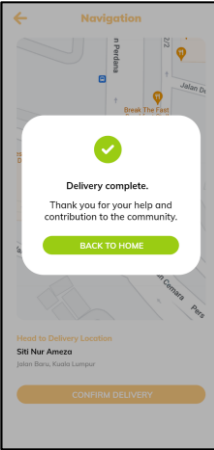
		<p>NGO agent accept the request. Then, donor must click “Back To Home” to go back to the home page.</p>
<p>8.</p>	<p>Profile Page</p> 	<p>This is the profile page for donor to view the profile details and update it. If they want to update the details, they just enter the new details and click “Save” button. The system will store the latest details in database. Donor can also click the back button to cancel the activity and go to the previous page.</p>
<p>9.</p>	<p>Notification Page</p> 	<p>This is the notification page that will display all the notification that donor received.</p>

Table 3.24 Prototype design of NGO agent

No	Prototype	Description
1.	 <p>The prototype for the Main Page of the NGO Agent is divided into two sections. The top section features a photograph of children eating, with the text "Be one of NGO agent! Deliver and share the happiness." Below this is a paragraph of text explaining the need for volunteers and a purple "REGISTER NOW" button. The bottom section is a "Register As Volunteer" form with fields for Full Name, Occupation, Identification Card No, Phone Number, Address, and Email Address. It also includes radio buttons for "Driving License" (Yes/No), checkboxes for "I am available on: (day)" (Monday through Sunday), and checkboxes for "I am available on: (time)" (Morning 08.00 am - 11.00 am, Afternoon 12.00 pm - 3.00 pm, Evening 4.00 pm - 7.00 pm).</p>	<p>This is the first page when user choose to enter the NGO agent page. This page shows that user must register first to be an NGO agent. It will display a short information about it. If user want to join, user must click “Register Now” button. It will redirect the user to the registration page.</p>
2.	 <p>The prototype for the Feed Page is titled "Share Pantry". It displays a list of three posts. Each post includes a user profile picture and name (Afiqah Nabillah, Siti Nur Ameza, and Fatiq Uszir), a placeholder for an image, and a paragraph of placeholder text. Below each post are icons for likes and comments. At the bottom of the feed is a large image placeholder with a purple "+" icon to the right. A navigation bar at the very bottom contains icons for home, search, notifications, and profile.</p>	<p>Same as needed people and donor, NGO agent also have feed page for them to view the display latest post about food bank information and available leftover food. User can publish post by clicking “+” icon button and write any post about food bank or available leftover food. User can also hit a like button on any post.</p>

3.	<p>Donation Request Page</p> 	<p>This is the donation request page that shows the list of donation request that have not been delivered yet. User must click on the donor's name to view the delivery details.</p>
4.	<p>Donation Request Pick Up Page</p> 	<p>In this page, user can view the address to pick up the food donation and the address to deliver to. User can also view the item that the donor want to donate. Once user confirm about it, user will click “Accept” button to notify the donor that it will be pick up soon. Then, when NGO agent already delivered the item, he must click “Confirm Delivery” to notify the donor that the donation has successfully contributed.</p>
5.	<p>Popup Message</p>	<p>This popup message show that the donation has been successfully deliver to the chosen food bank. Then, user must click “Back To Home” to go back to the home page.</p>

		
6.	<p>Food Bank Request Page</p> 	<p>This is the food bank request page that shows the list of food bank request that have not been delivered yet. User must click “Send Food” to view the delivery details.</p>
7.	<p>Food Bank Request Delivery Page</p> 	<p>In this page, user can view the address to pick up the food bank and deliver it to the needed people. User can also view the item that have been requested by needed people. Once user confirm about it, user will click “Accept” button to notify the donor that it will be pick up soon. Then, when NGO agent already delivered the item, he must click “Confirm Delivery” to notify the donor that the donation has successfully contributed.</p>

		
8.	<p>Popup message</p> 	<p>This popup message show that the delivery has been successfully deliver to the needed people. Then, user must click “Back to Home” to go back to the home page.</p>

3.6 TESTING PLAN

After the development of the project have been completed, the testing plan of the deployment is required to assess the functionality of the application to make sure that the application work successfully and meet the requirements.

3.6.1 Testing Approach

Jacob Nielsen's heuristic design principles were used to describe usability problems for this application. It is evaluated based on qualitative criteria established like these heuristics which are derived from the principles of ease of use. Heuristic assessment saves time by testing usability, as usability can be achieved with few resources in a short period of time. This evaluation was used to measure how well a system operates as opposed to a set of clearly defined parameters and this is a good technique to identify the problem of ease of use in the design of the UI for this application. The results are obtained in the next chapter.

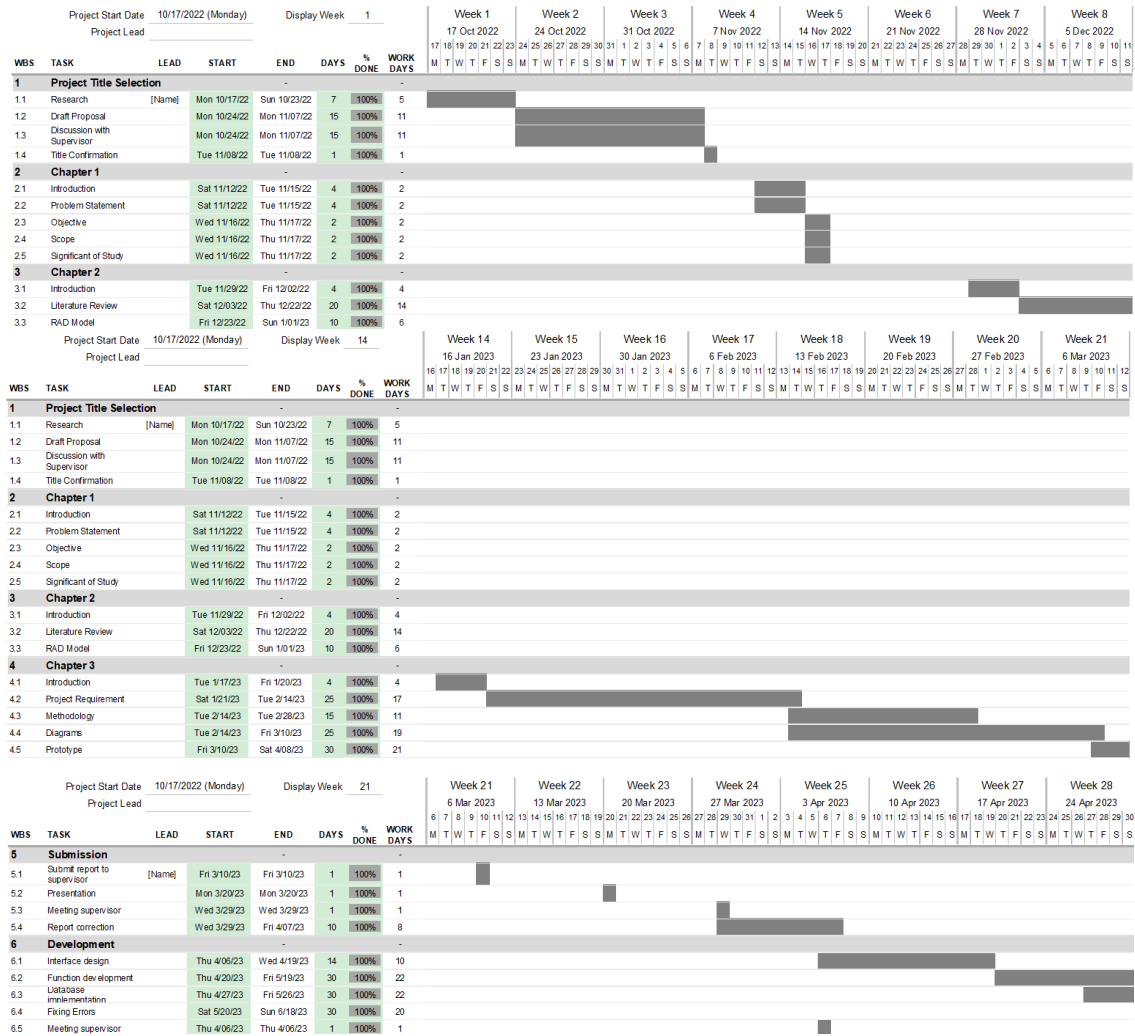
Besides that, testing in term of usability and functionality were used to ensure this application is fulfilled the requirements. Alpha Testing is performed by the employees of the organization but for this case, the developer will perform the Alpha testing. An internal test is performed using black and white box techniques. During the test, the developer will identify the errors and start fixing the bugs once the errors have been identified. In addition, only functionality and usability are tested during this testing. As the result, all the errors and bugs are fixed and resolved.

After completing the alpha testing, Beta testing is performed by the real users such as NGO and normal users which can be as donor, needed people, or NGO agent. Unlike Alpha testing, an external test is performed to carry out in the user's environment. Users are required to give some feedbacks from the error that they found. It will be implemented in the future vision of this application as it is performed after alpha testing, and it is final test before releasing the application in the marketplace. In this testing, users will test the usability, functionality, reliability, and security of the application.

3.6.2 Testing Strategies

There are some strategies and techniques used to test this application. Emulators in Android Studio have been used to test this application and it is widely used for mobile testing and it available with any version of Android. Due to limited emulator coverage, real-world devices were also used to obtain accurate results and increase test coverage. There is multiple hardware from real devices can be tested such as GPS, camera, and others. Apart from this, instead of just using the device to test the application, the tests were also done by different testers from different locations. This strategy helps because it will test in various types of devices.

3.7 GANTT CHART



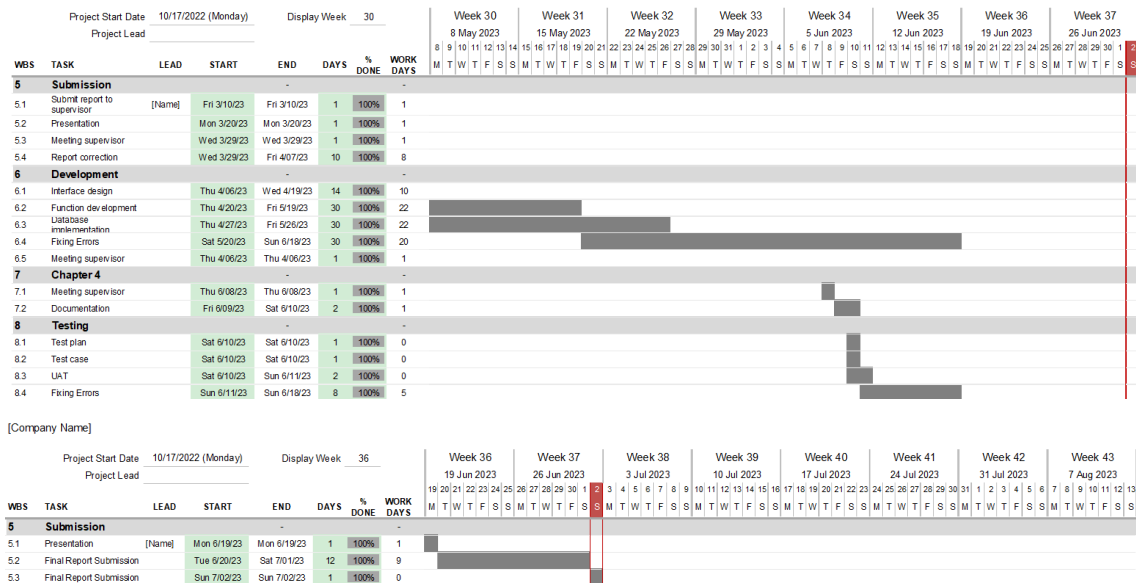


Figure 3.16 Gantt Chart

3.8 POTENTIAL USE OF PROPOSED SOLUTION

This project will be improving by some years and give benefits to NGO to contribute the food bank all over the state in Malaysia. This application is gathering all users which is NGO agent, donor, and needed people in one application. This application is aimed to be deployed to the public. This makes easier for people to use one application with many features. Hope this application can give more information to the user in Malaysia.

CHAPTER 4

IMPLEMENTATION, RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter will discuss about the result that have been collected from the project and the discussion. Section 4.2 shows the implementation steps for the application project. In section 4.3, the section will have discussed about the testing process of the mobile application to the user. The user will test the mobile application and comment from the user will be recorded in Table 4.1 and 4.2. Next, section 4.4 gives a brief description about the result that are obtained from the application. It included the design and layout of the application that's being used by the user. While the advantages and disadvantages of the mobile application are stated in section 4.5. Lastly, section 4.6 will conclude all the content in the chapter.

4.2 IMPLEMENTATION PROCESS

This section explained about the steps in developing and implementing various features of the application. Each process involved is describe briefly in this section. In general, the firebase database was used to store the database and the application is built using Android Studio software.

4.2.1 Create a Project in Android Studio

Firstly, after user open an Android Studio software, user must choose an empty activity to create new activity layout. The user will then be presented with interface which shows the directory, coding workspace, and layout of the design. Figure 4.1 shows the

application configuration to create new project in Android Studio. The user also will be provided with emulator to preview the application instead of running the application in device using USB debugging as shown in Figure 4.2.

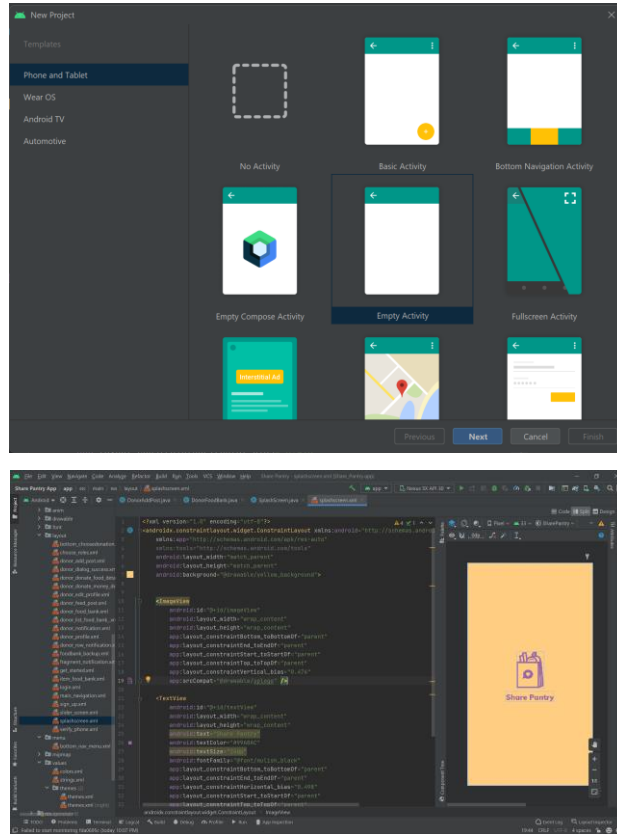


Figure 4.1 Create a new project in Android Studio

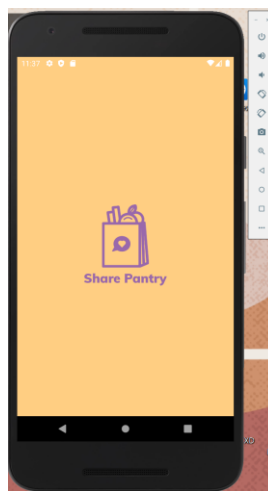


Figure 4.2 Android Emulator

4.2.2 Configure Firebase Authentication API

Firebase Authentication provides backend services, easy-to-use SDKs, and ready-made UI libraries to authenticate users to the project application. The application of the project used authentication using the email and password to authenticate the user's email and password. This application also used authentication using existing Google account. This is essential to prevent the user from registering with an unverified account. Figure 4.3 shows the dependencies needed to connect to Firebase, and Figure 4.4 and Figure 4.5 show the scripts to start a connection with Firebase and to use Firebase Authentication.

```
dependencies {  
  
    //implementation 'androidx.appcompat:appcompat:1.6.1'  
    implementation 'com.google.android.material:material:1.6.0'  
    implementation 'androidx.constraintlayout:constraintlayout:2.1.4'  
    implementation 'androidx.appcompat:appcompat:1.6.1'  
    implementation 'androidx.legacy:legacy-support-v4:1.0.0'  
    implementation 'com.google.firebase:firebase-auth:20.0.4'  
    implementation 'com.google.firebase:firebase-database:19.2.1'  
    implementation 'com.google.firebase:firebase-auth-ktx:21.2.0'  
    implementation 'com.google.firebase:firebase-database-ktx:20.1.0'  
    implementation 'com.google.firebase:firebase-storage:20.1.0'  
}
```

Figure 4.3 Firebase Connection Dependencies

```
mAuth.createUserWithEmailAndPassword(email, pass).addOnCompleteListener(new OnCompleteListener<AuthResult>() {  
    @Override  
    public void onComplete(@NonNull Task<AuthResult> task) {  
  
        if (task.isSuccessful()) {  
            mRef.child("users").child(mAuth.getUid()).child("fullName").setValue(fullName);  
            mRef.child("users").child(mAuth.getUid()).child("email").setValue(email);  
            mRef.child("users").child(mAuth.getUid()).child("phoneNumber").setValue(phone);  
            mRef.child("users").child(mAuth.getUid()).child("password").setValue(pass);  
  
            Toast.makeText(context, SignUp.this, "Registration Successful", Toast.LENGTH_SHORT).show();  
            mLoadingBar.dismiss();  
            Intent i = new Intent(context, Signup.this, Login.class);  
            i.setFlags(Intent.FLAG_ACTIVITY_CLEAR_TASK | Intent.FLAG_ACTIVITY_NEW_TASK);  
            startActivity(i);  
            finish();  
        }  
        else {  
            Toast.makeText(context, SignUp.this, task.getException().toString(), Toast.LENGTH_SHORT).show();  
        }  
    }  
});
```

Figure 4.4 Firebase Email and Password Authentication

```
private void firebaseAuthWithGoogle(GoogleSignInAccount acct) {  
    AuthCredential credential = GoogleAuthProvider.getCredential(acct.getIdToken(), null);  
    mAuth.signInWithCredential(credential)  
        .addOnCompleteListener(this, new OnCompleteListener<AuthResult>() {  
        @Override  
        public void onComplete(@NonNull Task<AuthResult> task) {  
            if (task.isSuccessful()) {  
                FirebaseUser user = mAuth.getCurrentUser();  
                Toast.makeText(context, Login.this, user.getEmail(), Toast.LENGTH_SHORT).show();  
                updateUser();  
            }  
            else {  
                Toast.makeText(context, Login.this, task.getException().toString(), Toast.LENGTH_SHORT).show();  
                updateUser(null);  
            }  
        }  
    });  
}
```

Figure 4.5 Firebase Google Authentication

4.2.3 Configure Google Map using JavaScript API

Google Map JavaScript API allows the application to visualize maps and accessing rich mapping features like the Marker for view location of the nearby food bank. Figure 4.6 and Figure 4.7 shows the scripts of Google Map API key and Google Map JavaScript API interface.

```
<meta-data
    android:name="com.google.android.geo.API_KEY"
    android:value="AIzaSyCQWWHs8k2UMNr5fuBKJURKRFQHV26Y5yA" />
```

Figure 4.6 Google Map JavaScript API

```
// Check Google play services
if (checkGooglePlayServices()) {
    SupportMapFragment supportMapFragment = SupportMapFragment.newInstance();
    getSupportFragmentManager().beginTransaction().add(R.id.container, supportMapFragment).commit();
    supportMapFragment.getMapAsync(this);
    if (isPermissionGranted) {
        checkGps();
    }
} else {
    Toast.makeText(this, "Google Play Services not available", Toast.LENGTH_SHORT).show();
}

//SEARCH BUTTON
searchBtn.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view) {
        String location = inputLocation.getText().toString();
        if (location == null) {
            Toast.makeText(this, "Type any location", Toast.LENGTH_SHORT).show();
        } else {
            Geocoder geocoder = new Geocoder(this, Locale.getDefault());
            try {
                List<Address> listAddress = geocoder.getFromLocationName(location, 1);
                if (listAddress.size() > 0) {
                    LatLng latLng = new LatLng(listAddress.get(0).getLatitude(), listAddress.get(0).getLongitude());
                    MarkerOptions markerOptions = new MarkerOptions();
                    markerOptions.title("Search position");
                    markerOptions.position(latLng);
                    googleMap.addMarker(markerOptions);
                    CameraUpdate cameraUpdate = CameraUpdateFactory.newLatLngZoom(latLng, 10);
                    googleMap.animateCamera(cameraUpdate);
                }
            } catch (IOException e) {
                e.printStackTrace();
            }
        }
    }
});

public void onMapReady(@NonNull GoogleMap googleMap) {
    this.googleMap = googleMap;
    LatLng latLng = new LatLng(3.137132, longitude 101.703123);
    MarkerOptions markerOptions = new MarkerOptions();
    markerOptions.title("My Position");
    markerOptions.position(latLng);
    googleMap.addMarker(markerOptions);
    CameraUpdate cameraUpdate = CameraUpdateFactory.newLatLngZoom(latLng, 10);
    googleMap.animateCamera(cameraUpdate);
    googleMap.getUiSettings().setZoomControlsEnabled(true);
    googleMap.getUiSettings().setCompassEnabled(true);
    googleMap.getUiSettings().setZoomGesturesEnabled(true);
    googleMap.getUiSettings().setScrollGesturesEnabled(true);
    googleMap.getUiSettings().setRotateGesturesEnabled(true);
    googleMap.getUiSettings().setMyLocationButtonEnabled(true);
    if (ActivityCompat.checkSelfPermission(this, Manifest.permission.ACCESS_FINE_LOCATION)
        != PackageManager.PERMISSION_GRANTED
        && ActivityCompat.checkSelfPermission(this, Manifest.permission.ACCESS_COARSE_LOCATION)
        != PackageManager.PERMISSION_GRANTED) {
        return;
    }
    googleMap.setMyLocationEnabled(true);
}
```

Figure 4.7 Google Map JavaScript API Interface

4.2.4 Configure Firebase Realtime Database

Firebase Realtime Database is a cloud-hosted NoSQL database provided by Google as part of the Firebase platform. It is designed to store and sync data in real-time across multiple clients, such as web and mobile applications. The Realtime Database uses a JSON data model to store and sync data between clients, allowing developers to build real-time applications without the need for writing complex server-side logic or managing

infrastructure. One of the key features of the Realtime Database is its ability to sync data in real-time. This means that any changes made to the data on one client are automatically synchronized to all other clients in real-time, without the need for developers to write any additional code. Figure 4.8 and Figure 4.9 shows the project in firebase real-time database which store all the data of the application.

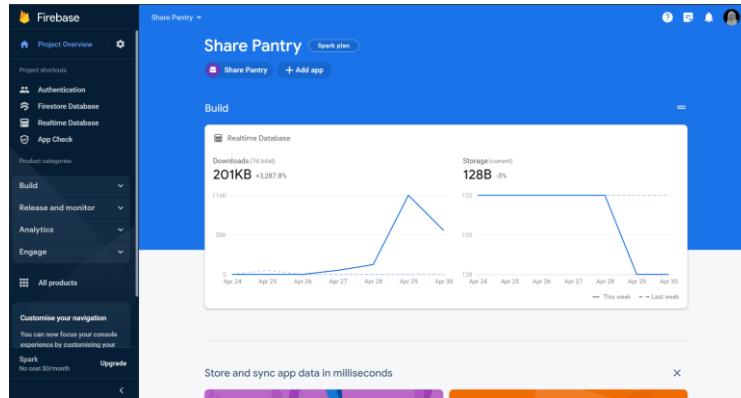


Figure 4.8 Main Page of Firebase Realtime Database

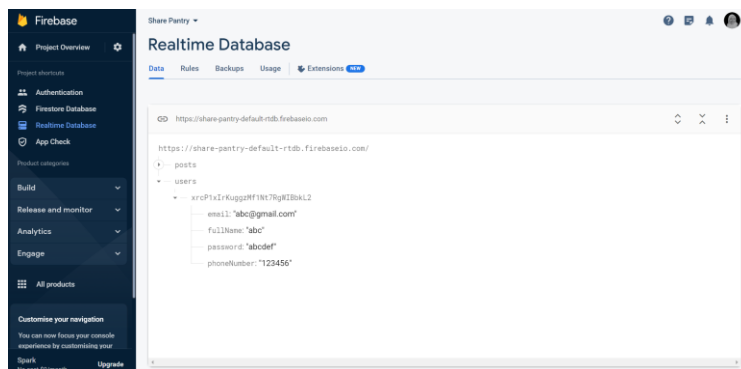


Figure 4.9 Realtime Database Interface

4.2.5 Export Component of Design from Adobe XD

The application for this project is using Adobe XD to create the design and prototype before implementing Java code on it. All the components from each page have been exported to put in Android Studio project as drawable file. Figure 4.10 shows the configuration of exporting the components inside drawable file from Adobe XD to Android Studio folder.

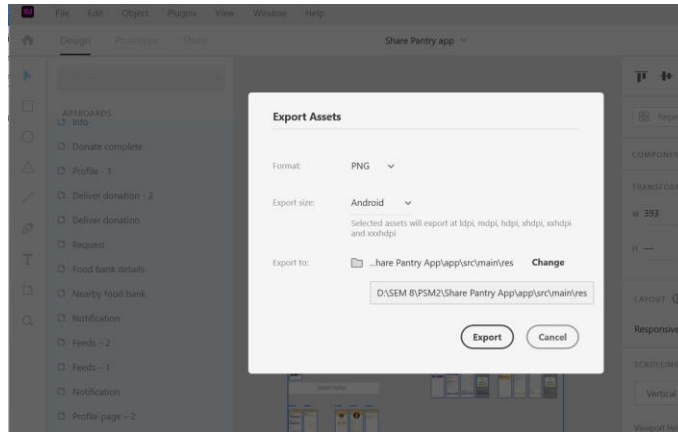


Figure 4.10 Export the Components of Design from Adobe XD

4.3 INTERFACE AND CODING OF THE SYSTEM

Interface and coding are one of the important things in developing the system. Coding is useful to make sure the system can run successfully. All the function and coding can be accepted and having no errors during the testing. Interface is to make easier for user to interact with this system and create a user-friendly environment. This system has three kind of interface that is for needy people, donor, and NGO agent. Both interface in Share Pantry application for admin (non-governmental organization) and users are mobile application interface.

4.3.1 Splash Screen

Share Pantry application launched with splash screen which will display for 3 seconds before displaying the main activity. The splash screen can enhance the user experience by providing visual feedback that the application is loading and by displaying branding or a logo that helps to reinforce the identity of the application. Figure 4.11 shows the interface and coding of the splash screen.

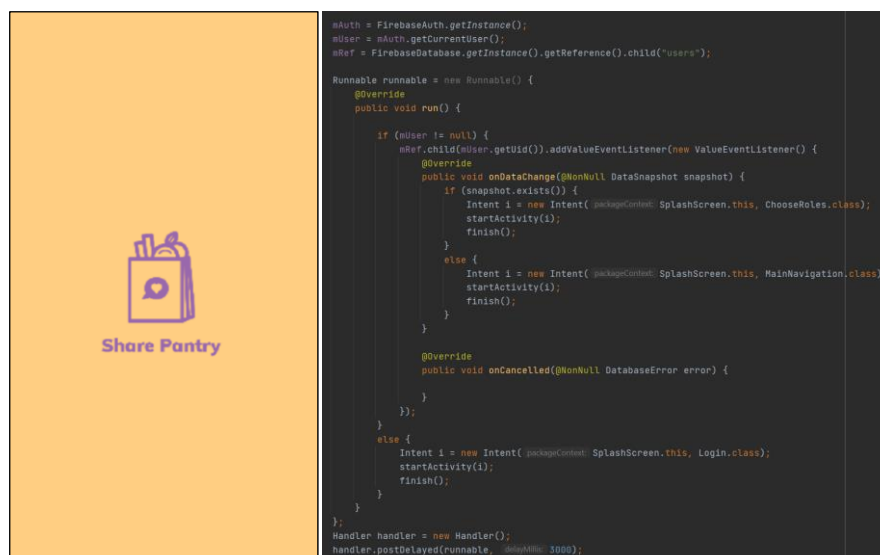


Figure 4.11 Interface and Coding for Splash Screen

4.3.2 Onboard Screen

An onboarding screen are used as welcome screen for Share Pantry application user. It is a screen that are displayed to users when they first open an application. The purpose of an onboarding screen is to introduce the application's features and functionality to the user. This implementation can also help to set user expectations and increase user engagement by demonstrating the value of the application. Figure 4.12 shows the interface and Figure 4.13 shows the coding for onboarding screen.

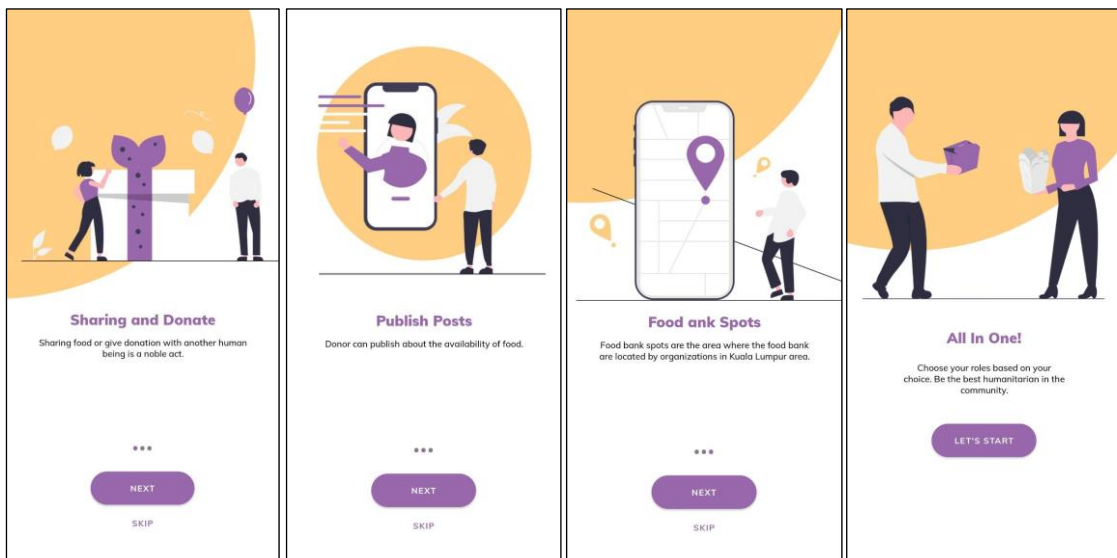


Figure 4.12 Interface of Onboarding Screen

```
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);

    setContentView(R.layout.main_navigation);

    nextButton = findViewById(R.id.nextButton);
    skipButton = findViewById(R.id.skipButton);

    nextButton.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            if (getCurrent() < 2)
                slideViewPager.setCurrentItem(getCurrent() + 1, true);
            else {
                Intent i = new Intent(getApplicationContext(), MainActivity.class);
                startActivity(i);
                finish();
            }
        }
    });

    skipButton.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            Intent i = new Intent(getApplicationContext(), LoginActivity.class);
            startActivity(i);
            finish();
        }
    });

    slideViewPager = (ViewPager) findViewById(R.id.slideViewPager);
    dotIndicator = (LinearLayout) findViewById(R.id.dotIndicator);
    viewPagerAdapter = new ViewPagerAdapter(this);
    slideViewPager.setAdapter(viewPagerAdapter);
    setDotIndicator(0);
    slideViewPager.addOnPageChangeListener(viewPagerListener);
}
```

Figure 4.13 Coding of Onboarding Screen

4.3.3 Sign Up and Login Module

For the first time user, they must register their personal information such as name, email, phone number, and password. All the information will be stored in the database. Figure 4.14 shows the login interface of Share Pantry.

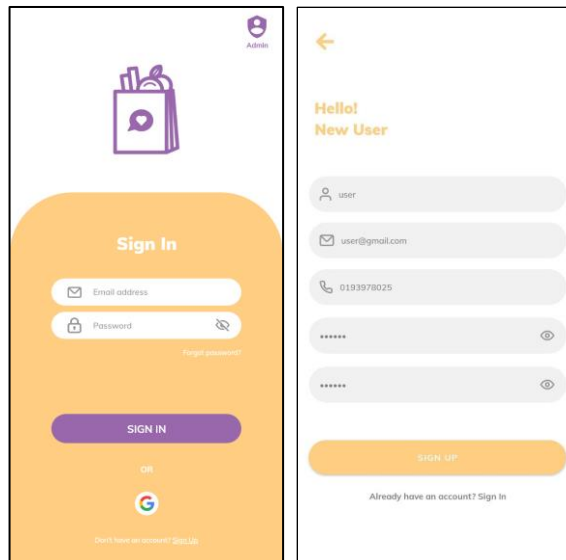


Figure 4.14 Interface of Sign Up and Login Page

Figure 4.15 and Figure 4.16 shows the coding to connect the database. It is connected to database to read the personal information from the table user. If the email and password is correct, it will direct to successful pages. Figure 4.17 shows the table of user in firebase.

```
private void checkCredentials() {
    String email = editTextEmail.getText().toString();
    String pass = editTextPassword.getText().toString();

    if (email.isEmpty() || !email.contains("@")) {
        showError(editTextEmail, "Email is not valid");
    } else if (pass.isEmpty() || pass.length() < 6) {
        showError(editTextPassword, "Password must have at least 6 characters");
    } else {
        loadingBar.setTitle("Login");
        loadingBar.setMessage("Please wait while check your credentials");
        loadingBar.setCanceledOnTouchOutside(false);
        loadingBar.show();

        FirebaseAuth.getInstance().signInWithEmailAndPassword(email, pass).addOnCompleteListener(new OnCompleteListener<SignInResult>() {
            @Override
            public void onComplete(@NonNull Task<SignInResult> task) {
                if (task.isSuccessful()) {
                    Toast.makeText(Login.this, "Login Successful", Toast.LENGTH_SHORT).show();
                    loadingBar.dismiss();
                    Intent i = new Intent(MainActivity.this, HomeScreen.class);
                    i.putExtra("email", email);
                    i.putExtra("password", pass);
                    startActivity(i);
                    finish();
                } else {
                    Toast.makeText(Login.this, "Login Failed", Toast.LENGTH_SHORT).show();
                    loadingBar.dismiss();
                    Intent i = new Intent(MainActivity.this, Login.class);
                    i.putExtra("email", email);
                    i.putExtra("password", pass);
                    startActivity(i);
                    finish();
                }
            }
        });
    }
}
```

Figure 4.15 Database Login Coding

```

mhf.child("users").addListenerForSingleValueEvent(new ValueEventListener() {
    @Override
    public void onDataChange(@NonNull DataSnapshot snapshot) {
        if (snapshot.exists()) {
            Toast.makeText(this, "Your account has already registered", Toast.LENGTH_SHORT).show();
        } else {
            mAuth.createUserWithEmailAndPassword(email, pass).addOnCompleteListener(new OnCompleteListener<AuthResult>) {
                @Override
                public void onComplete(@NonNull Task<AuthResult> task) {
                    if (task.isSuccessful()) {
                        mhf.child("users").child(mhf.getId()).child("fullName").setValue(fullName);
                        mhf.child("users").child(mhf.getId()).child("email").setValue(email);
                        mhf.child("users").child(mhf.getId()).child("password").setValue(password);
                        mhf.child("users").child(mhf.getId()).child("password").setValue(pass);

                        Toast.makeText(this, "Registration Successful", Toast.LENGTH_SHORT).show();
                        progressBar.dismiss();
                        Intent i = new Intent(this, Login.class);
                        startActivity(i);
                        finish();
                    } else {
                        Toast.makeText(this, task.getException().toString(), Toast.LENGTH_SHORT).show();
                    }
                }
            };
        }
    }

    @Override
    public void onCancelled(@NonNull DatabaseError error) {
    }
}
}

```

Figure 4.16 Database Sign Up Coding

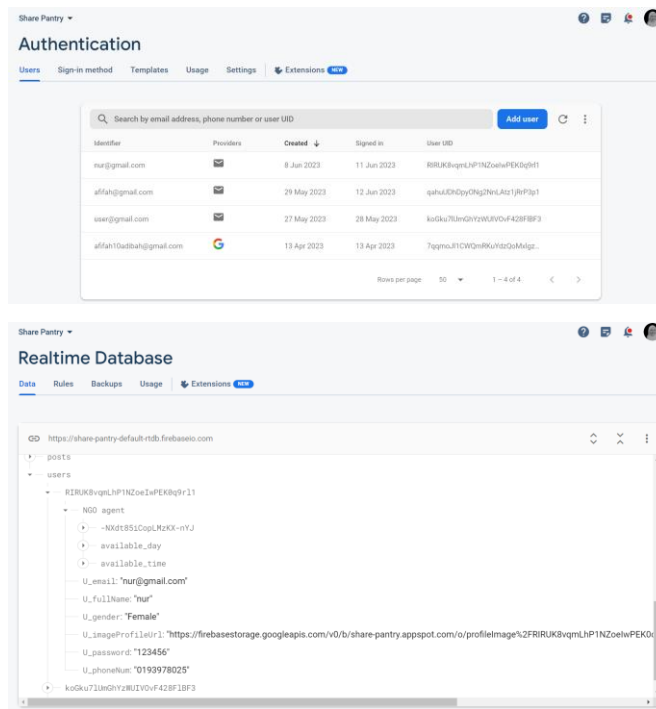


Figure 4.17 Table User in Database

4.3.4 Select Roles Module

After user has successfully login, they must select the role of user. Users are allowed to select any kind of role depending on their desire as shown in Figure 4.18.



Figure 4.18 Select Role Interface

4.3.5 Feed Module

All users can publish posts in each role of interface, but the purpose of this page is to give available leftover food and announce it in feed page. User must click on “+” button in feed main page then user will directly go to add post interface. User can upload an image from gallery or camera regarding leftover food. After the food have finished, the owner that post the leftover food must delete the post to tell other users that the leftover food has been finished or other users can interact with the donor through comment section. User required to fill in the post description and put the current location by clicking the location button as shown in Figure 4.19. This module is available for all users. Figure 4.20 shows the coding and database for the related information.

4.3.6 Food Bank Module

The other feature in this application is displaying available food bank in Malaysia and displaying nearby food bank. Admin will add new food bank as shown in Figure 4.22 and it will be display in the map view as well as the available food bank in donor and needed people page. User can search for food bank place in the search engine, but the easier way is user can simply click the current location button and they can see nearby food bank (Figure 4.23). Donor and needed people can view it in the food bank page. Figure 4.24 shows the coding for this module.

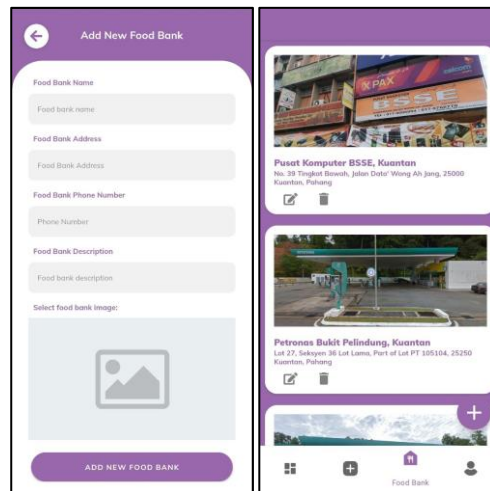


Figure 4.22 Admin Add New Food Bank

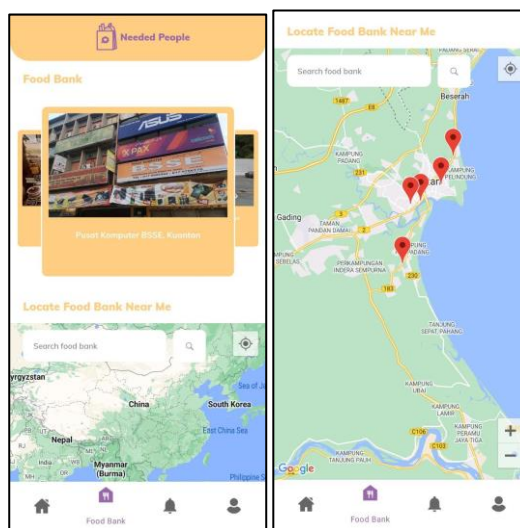


Figure 4.23 Food Bank Interface in Needed People Page

```

//check google play services
private boolean checkGooglePlayServices() {
    GoogleApiAvailability googleApiAvailability = GoogleApiAvailability.getInstance();
    int result = googleApiAvailability.isGooglePlayServicesAvailable(this);
    if (result == ConnectionResult.SUCCESS) {
        return true;
    } else if (googleApiAvailability.isUserResolvableError(result)) {
        Dialog dialog = googleApiAvailability.getErrorDialog(this, result, 201, new DialogInterface.OnClickListener() {
            @Override
            public void onCancel(DialogInterface dialogInterface) {
                Toast.makeText(NeededFoodBank.this, "User Cancelled Dialog", Toast.LENGTH_SHORT).show();
            }
        });
        dialog.show();
    }
    return false;
}

@Override
public void onMapReady(GoogleMap googleMap) {
    this.googleMap = googleMap;
    LatLng latlng = new LatLng(5.177132, 103.793223);
    CameraUpdate cameraUpdate = CameraUpdateFactory.newLatLngZoom(latlng, 10);
    googleMap.animateCamera(cameraUpdate);

    googleMap.getUiSettings().setZoomControlsEnabled(true);
    googleMap.getUiSettings().setCompassEnabled(true);
    googleMap.getUiSettings().setZoomGesturesEnabled(true);
    googleMap.getUiSettings().setScrollGesturesEnabled(true);
    googleMap.getUiSettings().setRotateGesturesEnabled(true);

    googleMap.getUiSettings().setMyLocationButtonEnabled(true);

    if (ActivityCompat.checkSelfPermission(this, android.Manifest.permission.ACCESS_FINE_LOCATION)
        != PackageManager.PERMISSION_GRANTED ||
        ActivityCompat.checkSelfPermission(this, android.Manifest.permission.ACCESS_COARSE_LOCATION)
        != PackageManager.PERMISSION_GRANTED) {
        return;
    }
    googleMap.setMyLocationEnabled(true);

    LatLng address = null;
    for (int i = 0; i < foodBankModelList.size(); i++) {
        try {
            address = getLatLngFromAddress(this, foodBankModelList.get(i).getF_address());
            googleMap.addMarker(new MarkerOptions().position(address).title(foodBankModelList.get(i).getF_address()));
            googleMap.moveCamera(CameraUpdateFactory.newLatLng(address));
        } catch (Exception e) {}
    }
}

LatLng getLatLngFromAddress(NeededFoodBank context, String add) {
    Geocoder geocoder = new Geocoder(context);
    List<Address> address;
    LatLng latlng = null;

    try {
        address = geocoder.getFromLocationName(add, maxResults: 2);

        if (address == null) {
            return null;
        }

        Address location = address.get(0);
        latlng = new LatLng(location.getLatitude(), location.getLongitude());
    } catch (Exception e) {}

    return latlng;
}

```

Figure 4.24 Coding of Food Bank Interface

```

food bank
├── -NXgPGzn5zjJ78_7uc7D
│   ├── F_address: "No. 39 Tingkat Bawah, Jalan Dato' Wong Ah Jang, 25000 Kuantan, Pahang"
│   ├── F_desc: "Bantuan makanan asas"
│   ├── F_imageUrl: "https://firebasestorage.googleapis.com/v0/b/share-pantry.appspot.com/o/f"
│   ├── F_name: "Pusat Komputer BSSE, Kuantan"
│   └── F_phoneNum: "0179006994"

```

Figure 4.25 Database for Food Bank

Both donor and needed people can click on the food bank list that have been displayed in food bank page. Donor can make donation for needed people. Then the donor can see the necessities or food needed by available food bank to deliver to needed people. Donor can click on “Donate” button to choose type of donation, either food necessities donation or money donation. Then, they will redirect to next page as shown in Figure 4.28 and Figure 4.28.

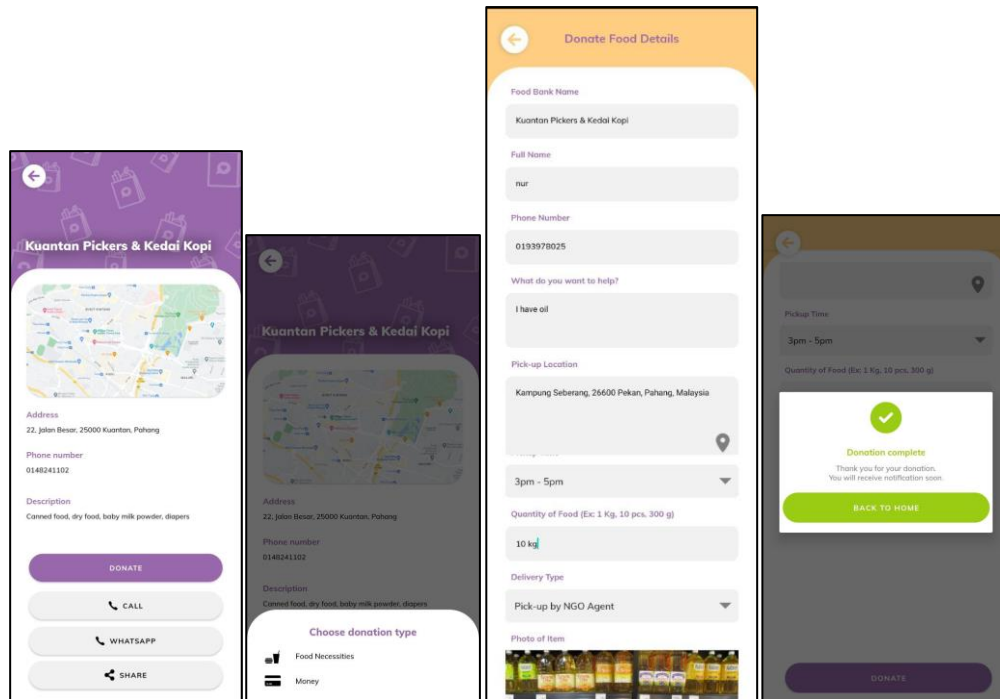


Figure 4.26 Food Donation (Donor)

```
private void addData(String name, String userPhone, String item, String address, String quantity, String deliye, Str
    isLoading.setMessage("Food Donation...");
    isLoading.show();

    Date date = new Date();
    SimpleDateFormat formatter = new SimpleDateFormat("dd/MM/yyyy hh:mm:ss");
    String strDate = formatter.format(date);

    //for post image name, id, publish time
    String filePathAndName = "food_donation/" + "food_donation_" + strDate;

    StorageReference ref = FirebaseStorage.getInstance().getReference().child(filePathAndName);
    ref.putFile(Uri.parse(uri), addOnSuccessListener(new @SuccessListener.UploadTask.TaskSnapshot() {
        @Override
        public void onSuccess(UploadTask.TaskSnapshot taskSnapshot) {
            //image upload in firebase
            Task<URI> task = taskSnapshot.getStorage().getDownloadUrl();
            URI uri = (task.isSuccessful());

            String downloadUrl = task.getResult().toString();
            //to received upload food donation to firebase
            Map<String, Object> hashMap = new HashMap<>();
            hashMap.put("id", "FD-" + uri);
            hashMap.put("full_name", name);
            hashMap.put("user_phone", userPhone);
            hashMap.put("fd_item", item);
            hashMap.put("fd_pickup_location", address);
            hashMap.put("fd_quantity", quantity);
            hashMap.put("fd_delivery_type", deliye);
            hashMap.put("fd_pickup_time", pickupTime);
            hashMap.put("fd_image", downloadUrl);

            //path to store food bank data
            ref = FirebaseDatabase.getInstance().getReference().child("food bank");
            Log.d("tag", "foodbankPost: " + uri);
        }
    }));
}
```

Figure 4.27 Coding for New Food Donation (Donor)

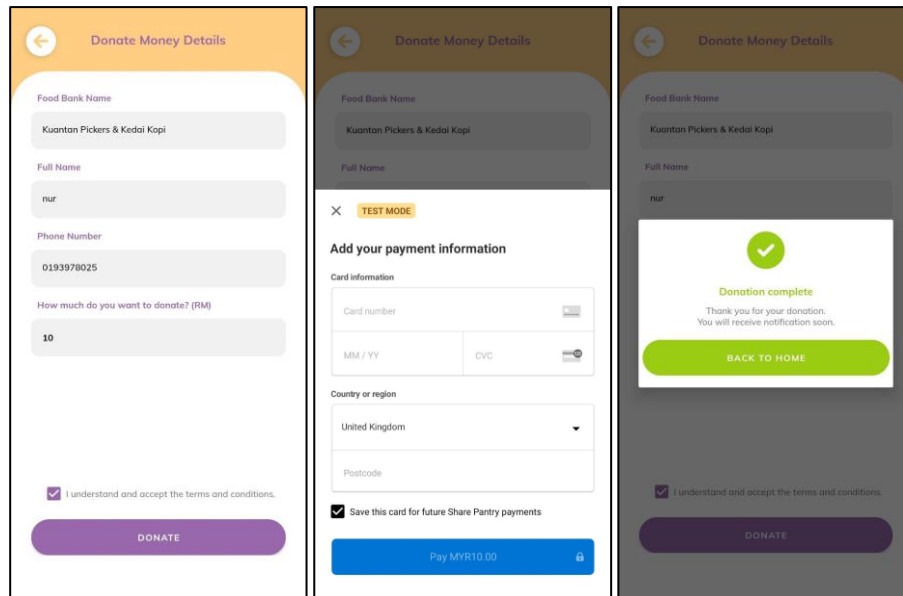


Figure 4.28 Money Donation (Donor)

Besides that, needed people can request for food bank after they click on the food bank. Figure 4.29 shows that needed people must fill all the details needed, then user must click “Request Food Bank” and NGO agent will help to deliver the food bank to them. After submitting the details, a successful dialog will appear, and user will go back to the main page.

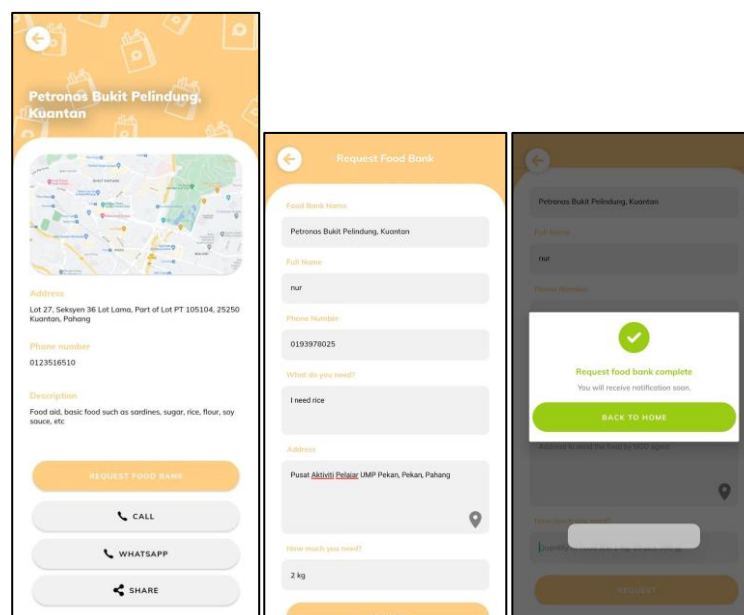


Figure 4.29 Request Food Bank (Needed People)

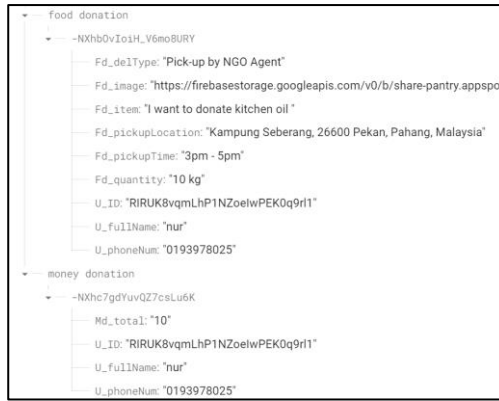


Figure 4.30 Database for Food Donation and Money Donation



Figure 4.31 Database for Request Food Bank

4.3.7 Profile Module

Once user have been registered earlier, the information of user's profile will be retrieved from firebase, and it will display the information in profile details page as shown in Figure 4.33. All users are allowed to view and update their profile and they have same interface.

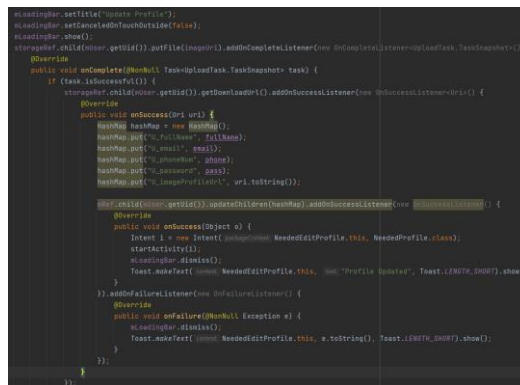


Figure 4.32 Coding for Update Profile

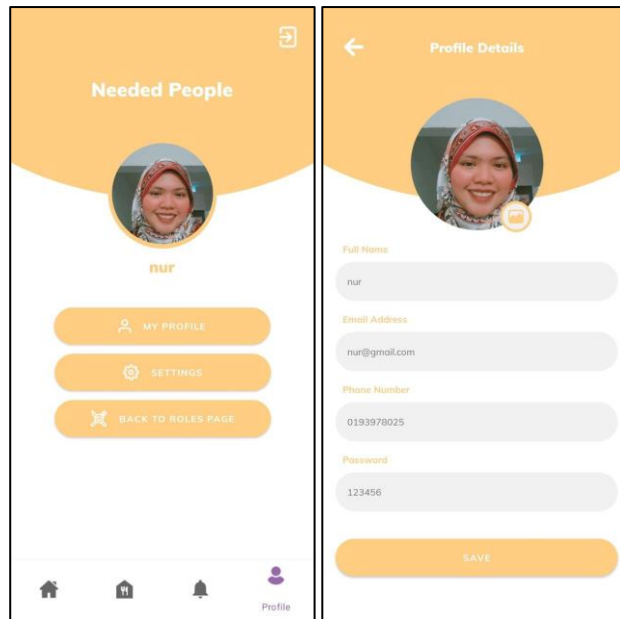


Figure 4.33 Profile Module Interface (Needed People)

4.3.8 Notification Module

After user complete the donation or request activities, they will get notification regarding the activities. For food donation, donor will receive notification from the NGO agent to deliver the food bank. NGO agent will accept the request and once it is completed, the user will get another notification. Same to food bank request, both needed people and NGO agent will get notification. In addition, all users also will get notification from the application if there are new announcement made by admin. Figure 4.34 shows the notification page for all users.

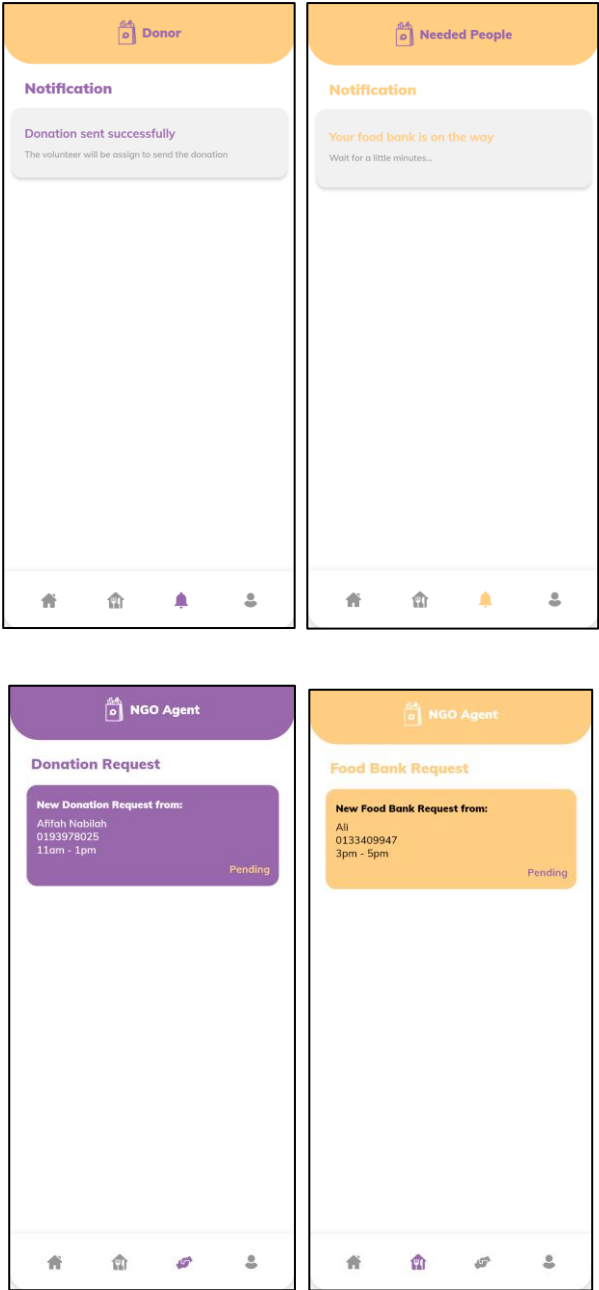


Figure 4.34 Notification Module Interface

4.4 TESTING

4.4.1 Alpha Testing

Alpha Testing is performed by the employees of the organization but for this case, the developer will perform the Alpha testing. An internal test is performed using black and white box techniques. During the test, the developer will identify the errors and start fixing the bugs once the errors have been identified. In addition, only functionality and usability are tested during this testing. All modules for each role of user have been tested. As the result, all the errors and bugs are fixed and resolved. Table 4.1, Table 4.2, and Table 4.3 shows the functionality testing for each module.

Table 4.1 Testing for Needed People Page

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
M01 - Login	Registration	User insert their details such as full name, email, phone number and password	Successfully registered	Same as expected result	Pass	
	Authenticate Google account	User insert the existing Google email	Successfully authenticated Google account	Same as expected result	Pass	
	Login with correct email and password	User insert their email and password created	Successfully login	Same as expected result	Pass	
	Login with incorrect email and password	User insert wrong email and password created	Login failed	Same as expected result	Pass	
	Upload picture	User upload picture from gallery or camera as their profile picture	Successfully upload picture	Same as expected result	Pass	
	Forgot password	User insert their email address	Successfully send password via phone number	Same as expected result	Pass	

M02 - Select Roles	Select roles	User choose type of user in roles page	Successfully navigate to selection user	Same as expected result	Pass	
M03 – Manage Post	View feed page	User navigate with home button	Successfully view the feed page	Same as expected result	Pass	
	Add new post with image	User insert image, post description, and pick-up location	Successfully add new post with image	Same as expected result	Pass	
	Add new post without image	User post description and pick-up location	Successfully add new post without image	Same as expected result	Pass	
	Add comment to existing post	User insert new comment	Successfully add new comment	Same as expected result	Pass	
	Likes to existing post	User click like button on the existing post	Successfully add new likes	Same as expected result	Pass	
	Gallery storage permission	User allow to give permission to access image from gallery	Successfully allow the permission	Same as expected result	Pass	
	Camera permission	User allow to give permission to access taking picture with camera	Successfully allow the permission	Same as expected result	Pass	

	Location permission	User allow to give permission to access the device's location	Successfully allow the permission	Same as expected result	Pass	
M04 – Food Bank	View food bank page	User navigate with food bank button	Successfully view the food bank page	Same as expected result	Pass	
	View food bank list	User scroll the list of available food bank	Successfully view the food bank list	Same as expected result	Pass	
	View nearby food bank	User view the marker on the Google map	Successfully view the marker	Same as expected result	Fail	
	Search food bank	User search food bank in the search input	Successfully search food bank	Same as expected result	Pass	
	View searched food bank	User view the marker on the searched food bank on the Google map	Successfully view searched food bank	Same as expected result	Pass	
	Locate current location	User click locate current location	Successfully locate current location	Same as expected result	Pass	
M05 – Food Bank Details	View food bank details	User clicks on each of food bank list	Successfully view the food bank details	Same as expected result	Pass	
	Launch WhatsApp application	User clicks on WhatsApp button and redirect to	Successfully launch WhatsApp application	Same as expected result	Pass	

		WhatsApp application and message the food bank number				
	Share food bank on other application	User share the food bank details on other application	Successfully share the food bank details	Same as expected result	Pass	
	Call food bank directly	User click on “Call” button and directly go to dial pad	Successfully launch the dial pad	Same as expected result	Pass	
M06 – Request Food Bank	Request food bank	User inserts details such as food needed, address, and the quantity of the food needed	Successfully request the food bank	Same as expected result	Pass	
	Success dialog message	User clicks on “Request” button to confirm the request	Successfully request food bank	Same as expected result	Pass	
	View successful dialog	User clicks on “Request” button to confirm the request and click “Back to Home” to return to home page.	Successfully view the successful dialog	Same as expected result	Pass	
M07 - Notification	View notification page	User navigate with notification button	Successfully view notification page	Same as expected result	Fail	

	View notification details	User clicks on notification	Successfully view notification details	Same as expected result	Fail	
M08 – Manage Profile	View profile page	User navigate with profile button	Successfully view profile page	Same as expected result	Pass	
	View profile details	User clicks on “My Profile” button	Successfully view profile details	Same as expected result	Pass	
	Update profile image	User click on profile image button	Successfully update the profile image	Same as expected result	Pass	
	Update profile details	User update full name, email address, phone number, and password then click on “Save” button	Successfully update the profile details	Same as expected result	Pass	
M09 – Profile Page	View profile page	User click on “My Profile” button	Successfully view profile page	Same as expected result	Pass	
	View setting page	User click on “Settings” button	Successfully view setting page	Same as expected result	Pass	
	View roles page	User click on “Back to Roles Page” button	Successfully view roles page	Same as expected result	Pass	
M10 - Logout	Logout	User clicks on logout button in profile page	Successfully logout the application	Same as expected result	Pass	

Table 4.2 Testing for Donor Page

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
M01 - Login	Registration	User insert their details such as full name, email, phone number and password	Successfully registered	Same as expected result	Pass	
	Authenticate Google account	User insert the existing Google email	Successfully authenticated Google account	Same as expected result	Pass	
	Login with correct email and password	User insert their email and password created	Successfully login	Same as expected result	Pass	
	Login with incorrect email and password	User insert wrong email and password created	Login failed	Same as expected result	Pass	
	Upload picture	User upload picture from gallery or camera as their profile picture	Successfully upload picture	Same as expected result	Pass	
	Forgot password	User insert their email address	Successfully send password via phone number	Same as expected result	Pass	

M02 - Select Roles	Select roles	User choose type of user in roles page	Successfully navigate to selection user	Same as expected result	Pass	
M03 – Manage Post	View feed page	User navigate with home button	Successfully view the feed page	Same as expected result	Pass	
	Add new post with image	User insert image, post description, and pick-up location	Successfully add new post with image	Same as expected result	Pass	
	Add new post without image	User post description and pick-up location	Successfully add new post without image	Same as expected result	Pass	
	Add comment to existing post	User insert new comment	Successfully add new comment	Same as expected result	Pass	
	Likes to existing post	User click like button on the existing post	Successfully add new likes	Same as expected result	Pass	
	Gallery storage permission	User allow to give permission to access image from gallery	Successfully allow the permission	Same as expected result	Pass	
	Camera permission	User allow to give permission to access taking picture with camera	Successfully allow the permission	Same as expected result	Pass	

	Location permission	User allow to give permission to access the device's location	Successfully allow the permission	Same as expected result	Pass	
M04 – Food Bank	View food bank page	User navigate with food bank button	Successfully view the food bank page	Same as expected result	Pass	
	View food bank list	User scroll the list of available food bank	Successfully view the food bank list	Same as expected result	Pass	
	View nearby food bank	User view the marker on the Google map	Successfully view the marker	Same as expected result	Fail	
	Search food bank	User search food bank in the search input	Successfully search food bank	Same as expected result	Pass	
	View searched food bank	User view the marker on the searched food bank on the Google map	Successfully view searched food bank	Same as expected result	Pass	
	Locate current location	User click locate current location	Successfully locate current location	Same as expected result	Pass	
M05 – Food Bank Details	View food bank details	User clicks on each of food bank list	Successfully view the food bank details	Same as expected result	Pass	
	Launch WhatsApp application	User clicks on WhatsApp button and redirect to	Successfully launch WhatsApp application	Same as expected result	Pass	

		WhatsApp application and message the food bank number				
	Share food bank on other application	User share the food bank details on other application	Successfully share the food bank details	Same as expected result	Pass	
	Call food bank directly	User click on “Call” button and directly go to dial pad	Successfully launch the dial pad	Same as expected result	Pass	
M06 – Donate Food Bank	Donate food necessities	User insert details such as food details, pick-up location, pick-up time, quantity of food, delivery type and images of the food	Successfully donate food necessities	Same as expected result	Pass	
	Donate money	User insert amount of donation and bank details	Successfully donate money	Same as expected result	Pass	
	Confirm donation	User clicks on “Donate” button to confirm the donation	Successfully making donation	Same as expected result	Pass	
	View successful dialog	User clicks on “Donate” button to confirm the donation	Successfully view the successful dialog	Same as expected result	Pass	

M07 – Notification	View notification page	User navigate with notification button	Successfully view notification page	Same as expected result	Fail	
	View notification details	User clicks on notification	Successfully view notification details	Same as expected result	Fail	
M08 – Manage Profile	View profile page	User navigate with profile button	Successfully view profile page	Same as expected result	Pass	
	View profile details	User clicks on “My Profile” button	Successfully view profile details	Same as expected result	Pass	
	Update profile image	User click on profile image button	Successfully update the profile image	Same as expected result	Pass	
	Update profile details	User update full name, email address, phone number, and password then click on “Save” button	Successfully update the profile details	Same as expected result	Pass	
M09 – Profile Page	View profile page	User click on “My Profile” button	Successfully view profile page	Same as expected result	Pass	
	View setting page	User click on “Settings” button	Successfully view setting page	Same as expected result	Pass	
	View roles page	User click on “Back to Roles Page” button	Successfully view roles page	Same as expected result	Pass	

M10 – Logout	Logout	User clicks on logout button in profile page	Successfully logout the application	Same as expected result	Pass	
--------------	--------	--	-------------------------------------	-------------------------	------	--

Table 4.3 Testing for NGO Agent Page

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
M01 - Login	Registration	User insert their details such as full name, email, phone number and password	Successfully registered	Same as expected result	Pass	
	Authenticate Google account	User insert the existing Google email	Successfully authenticated Google account	Same as expected result	Pass	
	Login with correct email and password	User insert their email and password created	Successfully login	Same as expected result	Pass	
	Login with incorrect email and password	User insert wrong email and password created	Login failed	Same as expected result	Pass	

	Forgot password	User insert their email address	Successfully send password via phone number	Same as expected result	Pass	
M02 - Select Roles	Select roles	User choose type of user in roles page	Successfully navigate to selection user	Same as expected result	Pass	
M03 – Manage Post	View feed page	User navigate with home button	Successfully view the feed page	Same as expected result	Pass	
	Add new post with image	User insert image, post description, and pick-up location	Successfully add new post with image	Same as expected result	Pass	
	Add new post without image	User post description and pick-up location	Successfully add new post without image	Same as expected result	Pass	
	Add comment to existing post	User insert new comment	Successfully add new comment	Same as expected result	Pass	
	Likes to existing post	User click like button on the existing post	Successfully add new likes	Same as expected result	Pass	
	Gallery storage permission	User allow to give permission to access image from gallery	Successfully allow the permission	Same as expected result	Pass	

	Camera permission	User allow to give permission to access taking picture with camera	Successfully allow the permission	Same as expected result	Pass	
	Location permission	User allow to give permission to access the device's location	Successfully allow the permission	Same as expected result	Pass	
M04 – NGO Agent Registration	NGO Agent Registration	User insert their details such as full name, occupation, IC No., email, phone number, address, available day and time	Successfully registered	Same as expected result	Pass	
M05 – Deliver Food Bank Request	View food bank request	User click on each food bank request to view the details	Successfully view food bank request details	Same as expected result	Pass	
	Accept food bank request	User click on “Accept” button and confirm the delivery	Successfully accept the food bank request	Same as expected result	Pass	
	Confirm Delivery	User click on “Complete Delivery” after complete	Successfully deliver the food bank request	Same as expected result	Pass	

		delivering the food bank request				
M06 – Deliver Donation Request	View donation request	User click on each donation request to view the details	Successfully view donation request details	Same as expected result	Pass	
	Accept donation request	User click on “Accept” button and confirm the delivery	Successfully accept the donation request	Same as expected result	Pass	
	Confirm Delivery	User click on “Complete Delivery” after complete delivering the donation to the food bank	Successfully deliver the donation request	Same as expected result	Pass	
M07 – Notification	View notification page	User navigate with notification button	Successfully view notification page	Same as expected result	Fail	
	View notification details	User clicks on notification	Successfully view notification details	Same as expected result	Fail	
M08 – Manage Profile	View profile page	User navigate with profile button	Successfully view profile page	Same as expected result	Pass	
	View profile details	User clicks on “My Profile” button	Successfully view profile details	Same as expected result	Pass	

	Update profile image	User click on profile image button	Successfully update the profile image	Same as expected result	Pass	
	Update profile details	User update full name, email address, phone number, and password then click on “Save” button	Successfully update the profile details	Same as expected result	Pass	
M09 – Profile Page	View profile page	User click on “My Profile” button	Successfully view profile page	Same as expected result	Pass	
	View setting page	User click on “Settings” button	Successfully view setting page	Same as expected result	Pass	
	View roles page	User click on “Back to Roles Page” button	Successfully view roles page	Same as expected result	Pass	
M10 – Logout	Logout	User clicks on logout button in profile page	Successfully logout the application	Same as expected result	Pass	

4.4.2 User Acceptance Testing (UAT)

User Acceptance Testing (UAT) is the last phase of this application testing process. During UAT, actual application users test the application to make sure it can handle the required tasks in real environment, according to specifications. UAT is one of the final and critical application project procedures that must occur before the application can be used commercially. In general, UAT is the usage of the software by people from the intended audience and recording and correcting of any defects which are discovered. It gives users the chance to interact with the software and find out if everything works as it should if features have been overlooked, miscommunicated, not communicated, and so on.

The purpose of this section is to outline the User Acceptance Testing (UAT) process for the system. Approval of this testing implies that reviewers are confident that following the execution of the test plan, the resulting system will be considered fully tested and eligible for implementation. Any error or problem found by the user must be noted on the form. In this case, the user, that tested this system are user that living in Malaysia. The user acceptance test from some of users who lived in Malaysia are shown in **Appendix A**. After user complete fill in the user acceptance form, they must give evaluation through the Google Form that have been created to improve the application. The Google Form is shown in **Appendix B**.

4.4.3 User Acceptance Testing (UAT) Analysis

Following the testing procedure, I was able to gather 3 of UAT forms. The testing was done face-to-face to ensure efficient communication and interaction between the testers and the application itself. This method made it possible to receive input right away and made it easier to assess the system's functionality in detail. The testing phase took place around two days, which allowed us to run the desired amount of tests.

Unfortunately, the testing findings showed that the Share Pantry was still under development. During the testing procedure, the notification components were having some errors. Positively, the application's remaining modules all operated well and showed the intended capability. These modules were successfully created and put into

use, living up to the standards and expectations that were set for them. The complete list of volunteers that took part in the testing process is shown in Table 4.4.

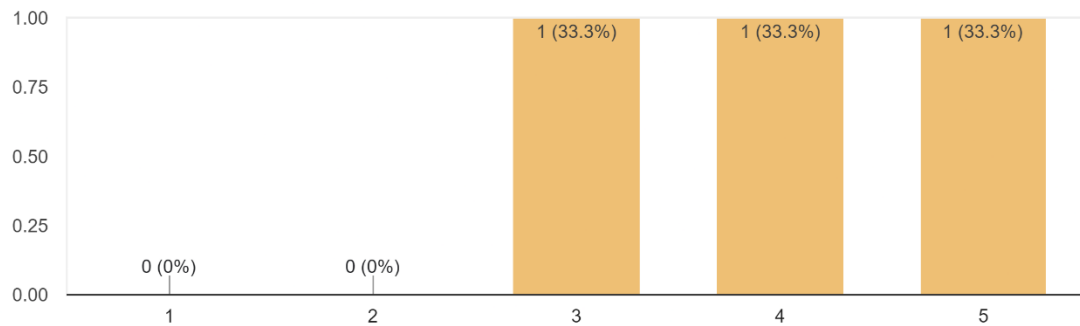
Table 4.4 UAT Analysis Tester's List Name

No.	Tester's Name	Testing Date
1.	Aliah Maisarah Binti Mohamadiah	10 June 2023
2.	Siti Aishah Binti Johan Iskandar	11 June 2023
3.	Adibah Kamilah Binti Mohd Suhaimi	11 June 2023

After the tester completes the UAT form, they must fill in the evaluation form in the Google Form. The result of the analysis of evaluation form is shown below.

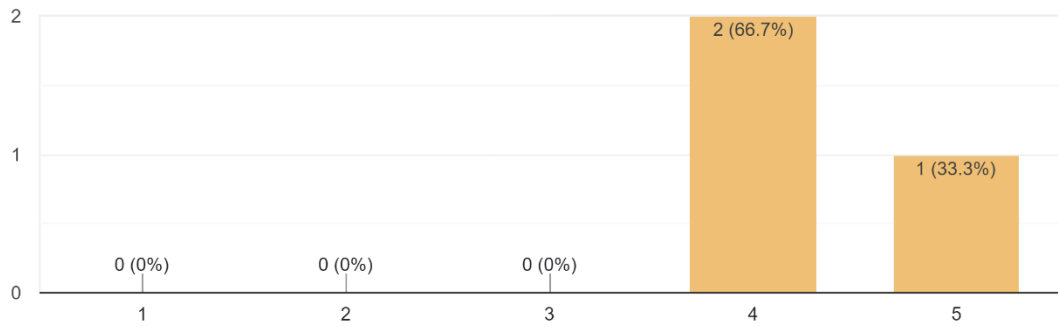
1. This application is user-friendly.

3 responses



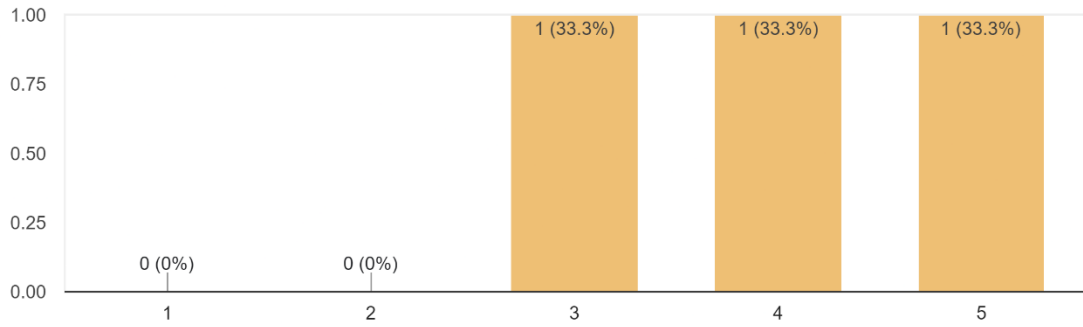
2. I am able to register and login to Share Pantry app.

3 responses



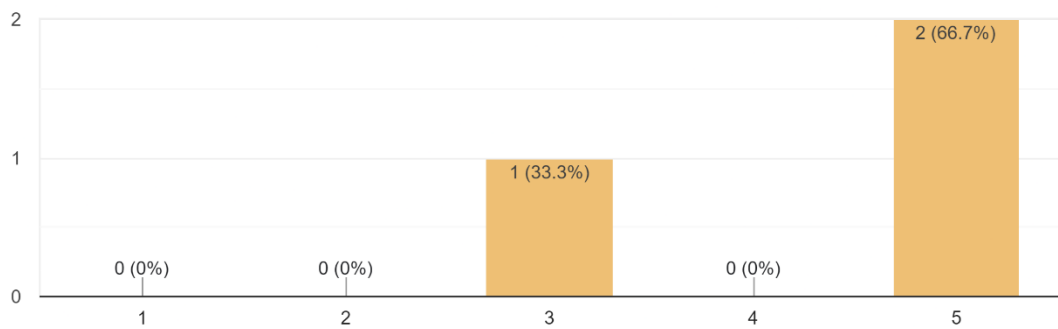
3. I am able to create new post and view the post in the feed page.

3 responses



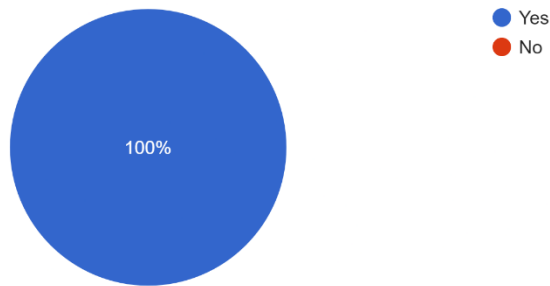
4. I am able to navigate to other pages easily.

3 responses



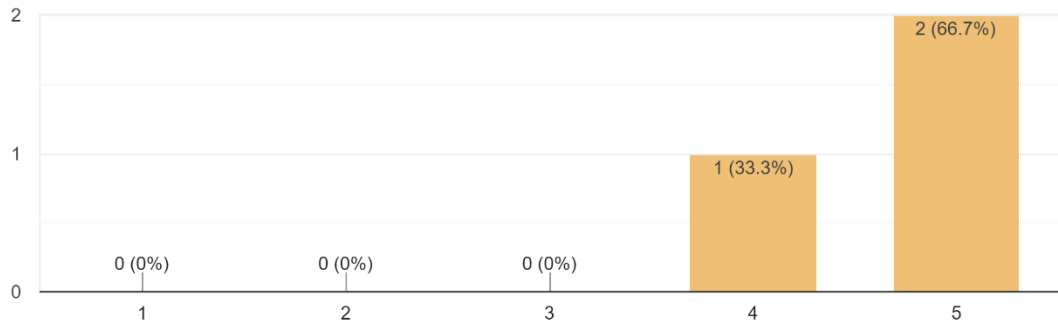
5. Did you found any nearby food bank around your place in the map?

3 responses



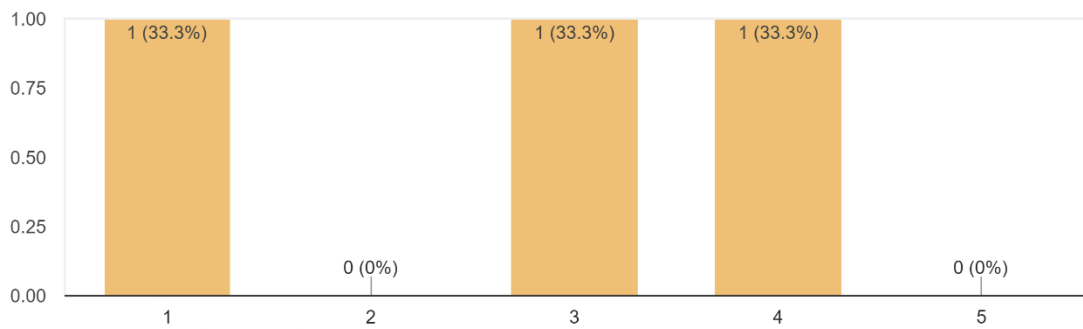
6. This application prompt a message or a dialog after completing activities. Did u find it is easy to understand?

3 responses



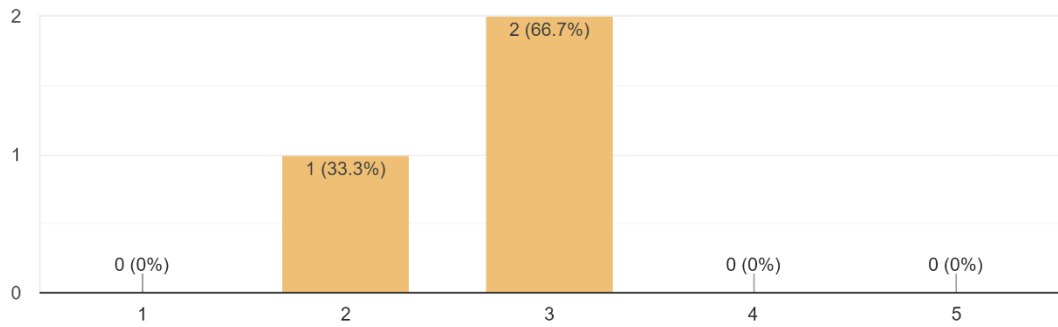
7. How satisfied are u with the stability of the app?

3 responses



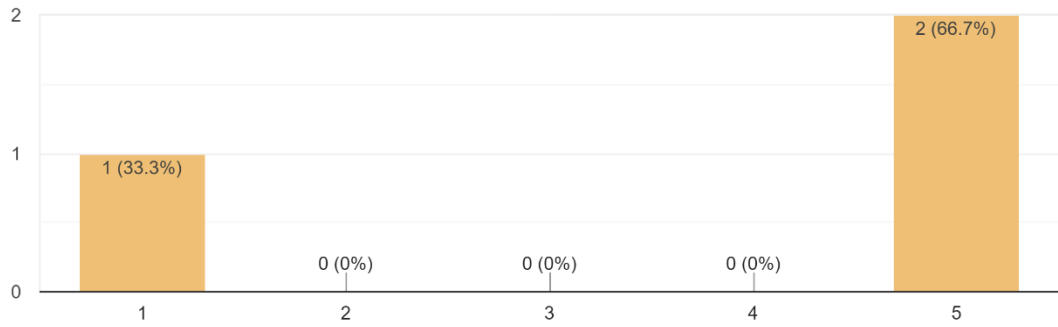
8. How satisfied are u with the security of the app?

3 responses



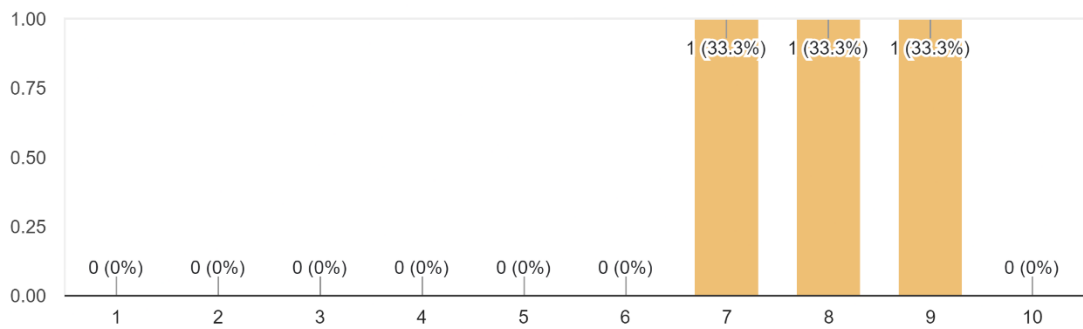
9. As a user, I feel this application is helpful for the community nowadays.

3 responses



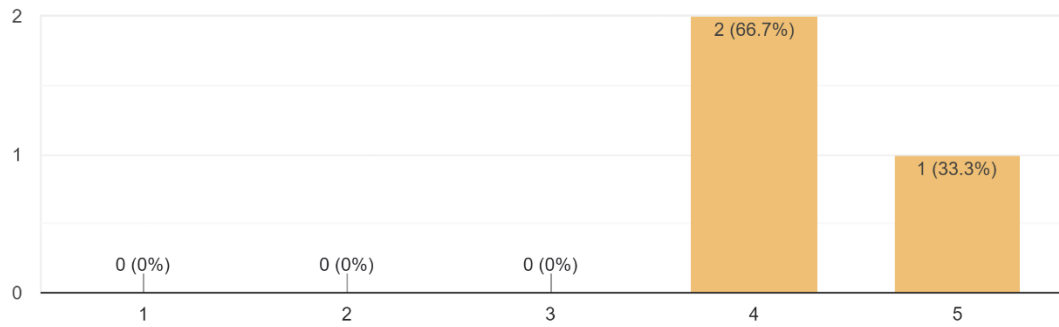
10. Overall, how would you rate this app?

3 responses



11. How likely are u to recommend this application to your friend, family, or colleague?

3 responses



12. Give any suggestions or comments about this application.

0 responses

No responses yet for this question.

CHAPTER 5

CONCLUSION

5.1 INTRODUCTION

This chapter gives a general conclusion about the proposed project in the thesis. In section 5.2, the section discusses about the constraints faces throughout developing the mobile application. Finally, section 5.3 gives a brief description of the future work that will be done in improving the security, efficiency, and effectiveness of the application.

5.2 RESEARCH CONSTRAINT

5.2.1 Application Constraint

There are some constraints of Share Pantry application because of several factors such as lack of knowledge, time, budget, resources, and others. The constraints of the project are:

- i. The application can be use by Android user only.
- ii. The user must have an Internet connection ether by using Wi-Fi or mobile data.
- iii. The application took few seconds to load the page.
- iv. The control and touch gestures on Google Map in food bank page is difficult to handle.
- v. This application only available in English language.

5.2.2 Project Constraint

There are some constraints during the completion of this project This includes development constraint and software constraint.

- i. Error problems – Errors in the coding are difficult to determine and it took long time to figure out the solution.
- ii. Limited time - There are some of function and bugs that need to fix during the usability of the application.
- iii. Compatibility challenges – Ensuring compatibility across different devices proved to be a significant constraint.
- iv. Technical limitations – There are various technical challenges and limitations were faced during the application development.
- v. Resource limitations - Some of resources is not helping to figure out the solution of some errors in the application.

5.3 FUTURE WORK

The aspect that can be improved from the application is in term of security. Currently, the application is implementing payment gateway which user required to insert their bank card details to complete the money donation. So, improvement for this vulnerability can give a good credit to the application. Furthermore, the notification is having function error and need to be fix for few times. Due to limitation of time, the improvement for the notification will be add as future work. Next, the application can be enhanced by adding an email trigger function so every new update regarding food bank can be post through email. Other than that, the application can be improved by integrating the same features for iOS platform since most people are using both iOS and Android as their platforms.

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APPENDIX A
SAMPLE APPENDIX 1

USER ACCEPTANCE TEST
Share Pantry Mobile Application

Name of Tester: Aliah Maisarah Binti Mohamadiah

Date of Tester: 10/6/2023

No.	Acceptance Requirement	Test Result (/)		Comment
		YES	NO	
	Login			
1.	Sign Up	/		
2.	Upload Picture	/		
3.	Forgot Password	/		
4.	Logout	/		
	Select Roles			
1.	Select roles	/		
	Feed Page			
1.	View feed page	/		
2.	Add new post with image	/		
3.	Add new post without image	/		
4.	Add new comment	/		
5.	Like existing post	/		
6.	Unlike existing post	/		
7.	Delete post	/		
	Food Bank Page			
1.	View food bank	/		
2.	View food bank details	/		
3.	View nearby food bank	/		
4.	Search food bank	/		
5.	View searched food bank	/		
6.	Locate current location	/		
	Food Bank Details			
1.	Launch WhatsApp application	/		
2.	Share food bank	/		
3.	Call food bank	/		
4.	Launch Google Map application	/		
	Request Food Bank			
1.	Request food bank	/		

2.	Add new request	/		
3.	View successful dialog	/		
Food Donation				
1.	Add new food donation	/		
2.	View successful dialog	/		
Money Donation				
1.	Add new money donation	/		
2.	View successful dialog	/		
Notification				
1.	View notification details		/	Error
Profile				
1.	View profile details	/		
2.	Update profile details	/		
3.	Update profile images	/		
NGO Agent Registration				
1.	Registration	/		
Deliver Food Bank Request				
1.	View food bank request	/		
2.	Accept food bank request	/		
3.	Confirm delivery	/		
Deliver Donation Request				
1.	View donation request	/		
2.	Accept donation request	/		
3.	Confirm delivery	/		

Comment for improvement:

Touch gesture from google map should be fix



Name: Aliah Maisarah Binti Mohamadiah

Kindly evaluate the app in this form: <https://forms.gle/C1cXNnTWCN6Z2Jxg7>

USER ACCEPTANCE TEST

Share Pantry Mobile Application

Name of Tester: Siti Aishah Binti Johan Iskandar

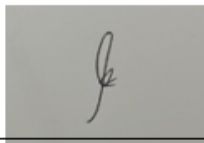
Date of Tester: 11/6/2023

No.	Acceptance Requirement	Test Result (/)		Comment
		YES	NO	
	Login			
5.	Sign Up	/		
6.	Upload Picture	/		
7.	Forgot Password	/		
8.	Logout	/		
	Select Roles			
2.	Select roles	/		
	Feed Page			
8.	View feed page	/		
9.	Add new post with image	/		
10.	Add new post without image	/		
11.	Add new comment	/		
12.	Like existing post	/		
13.	Unlike existing post	/		
14.	Delete post	/		
	Food Bank Page			
7.	View food bank	/		
8.	View food bank details	/		
9.	View nearby food bank	/		
10.	Search food bank	/		
11.	View searched food bank	/		
12.	Locate current location	/		
	Food Bank Details			
5.	Launch WhatsApp application	/		
6.	Share food bank	/		
7.	Call food bank	/		
8.	Launch Google Map application	/		
	Request Food Bank			
4.	Request food bank	/		

5.	Add new request	/		
6.	View successful dialog	/		
Food Donation				
3.	Add new food donation	/		
4.	View successful dialog	/		
Money Donation				
3.	Add new money donation	/		
4.	View successful dialog	/		
Notification				
2.	View notification details		/	Error
Profile				
4.	View profile details	/		
5.	Update profile details	/		
6.	Update profile images	/		
NGO Agent Registration				
2.	Registration	/		
Deliver Food Bank Request				
4.	View food bank request	/		
5.	Accept food bank request	/		
6.	Confirm delivery	/		
Deliver Donation Request				
4.	View donation request	/		
5.	Accept donation request	/		
6.	Confirm delivery	/		

Comment for improvement:

Interface is good but should concern more about the security especially on payment
--



Name: Siti Aishah Binti Johan Iskandar

Kindly evaluate the app in this form: <https://forms.gle/C1cXNnTWCN6Z2Jxg7>

USER ACCEPTANCE TEST
Share Pantry Mobile Application

Name of Tester: Adibah Kamilah Binti Mohd Suhaimi

Date of Tester: 11/6/2023

No.	Acceptance Requirement	Test Result (/)		Comment
		YES	NO	
	Login			
9.	Sign Up	/		
10.	Upload Picture	/		
11.	Forgot Password	/		
12.	Logout	/		
	Select Roles			
3.	Select roles	/		
	Feed Page			
15.	View feed page	/		
16.	Add new post with image	/		
17.	Add new post without image	/		
18.	Add new comment	/		
19.	Like existing post	/		
20.	Unlike existing post	/		
21.	Delete post	/		
	Food Bank Page			
13.	View food bank	/		
14.	View food bank details	/		
15.	View nearby food bank	/		
16.	Search food bank	/		
17.	View searched food bank	/		
18.	Locate current location	/		
	Food Bank Details			
9.	Launch WhatsApp application	/		
10.	Share food bank	/		
11.	Call food bank	/		
12.	Launch Google Map application	/		
	Request Food Bank			
7.	Request food bank	/		

8.	Add new request	/		
9.	View successful dialog	/		
	Food Donation			
5.	Add new food donation	/		
6.	View successful dialog	/		
	Money Donation			
5.	Add new money donation	/		
6.	View successful dialog	/		
	Notification			
3.	View notification details		/	Error
	Profile			
7.	View profile details	/		
8.	Update profile details	/		
9.	Update profile images	/		
	NGO Agent Registration			
3.	Registration	/		
	Deliver Food Bank Request			
7.	View food bank request	/		
8.	Accept food bank request	/		
9.	Confirm delivery	/		
	Deliver Donation Request			
7.	View donation request	/		
8.	Accept donation request	/		
9.	Confirm delivery	/		

Comment for improvement:

Interface looks nice but the app is not too stable. The location sometimes working, sometimes not working.

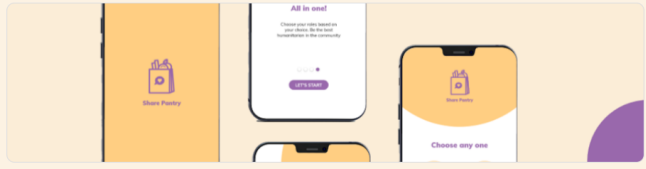


Name: Adibah Kamilah Binti Mohd Suhaimi

Kindly evaluate the app in this form: <https://forms.gle/C1cXNnTWCN6Z2Jxg7>

APPENDIX B

SAMPLE APPENDIX 2



Share Pantry Evaluation Form


Assalamualaikum and good day!
I am Afifah Nabilah Binti Mohd Suhaimi, an undergraduate student from Faculty of Computing at Universiti Malaysia Pahang. Currently I am working on a food bank mobile application called Share Pantry. This application is focusing more for those who want to request food bank or those who want to give some donation to the food bank. I would greatly appreciate your feedback on this application, as it will assist in this development and improvement. Your kind and sincere cooperation to answer this survey are really needed and very much appreciated. Thank you and have a nice day!

Before you begin the evaluation, you have to install this application in your mobile phone.
Share Pantry Mobile App: [Share Pantry.apk](#)

afffah10adibah@gmail.com [Switch accounts](#)

Not shared

[Next](#) [Clear form](#)



Share Pantry Evaluation Form

afffah10adibah@gmail.com [Switch accounts](#)

Not shared

* Indicates required question

Section 2

1. This application is user-friendly. *

1 2 3 4 5

Strongly disagree Strongly agree

2. I am able to register and login to Share Pantry app. *

1 2 3 4 5

Strongly disagree Strongly agree

3. I am able to create new post and view the post in the feed page. *

1 2 3 4 5

Strongly disagree Strongly agree

4. I am able to navigate to other pages easily. *

1 2 3 4 5
Strongly disagree Strongly agree

5. Did you found any nearby food bank around your place in the map? *

Yes
 No

6. This application prompt a message or a dialog after completing activities. Did u find it is easy to understand? *

1 2 3 4 5
Strongly disagree Strongly agree

7. How satisfied are u with the stability of the app? *

1 2 3 4 5
Extremely satisfied Not satisfied at all

8. How satisfied are u with the security of the app? *

1 2 3 4 5
Extremely satisfied Not satisfied at all

9. As a user, I feel this application is helpful for the community nowadays. *

1 2 3 4 5
Strongly disagree Strongly agree

10. Overall, how would you rate this app? *

1 2 3 4 5 6 7 8 9 10

11. How likely are u to recommend this application to your friend, family, or colleague? *

1 2 3 4 5
Not likely Very likely

12. Give any suggestions or comments about this application.

Your answer

Back

Submit

Clear form