SCHOOL OF COMPUTER SCIENCES

ACADEMIC SESSION: 2021/2022

CSE241/CMM341 FOUNDATIONS OF SOFTWARE ENGINEERING

Software Engineering Project - Report II

Team name: Ketchup cannot catchup

SDG 1: No Poverty

Project title: Food Bank Application – Meal For All

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1.0 PROJECT BACKGROUND

1.1 System overview

1.1.1 System objectives

- To provide a proper platform for the organization to manage the whole process of handling food and essential items donation.
- To open up a spot-on channel for the people who wants to donate in any form of donation through the system.
- To provide a reachable platform for people those who need basic necessities or food by signing up on the system
- To provide a platform to those who are interested in volunteering in the volunteer activities or programs by signing up on the system to become a part of the workforce
- To extend the opportunities of reaching organization in charge easily through the system

1.1.2 Use case diagram

Figure 1 Use case diagram

1.1.3 Features to be tested

Use Case ID	Use Case Name	Description
UC-01	Create new user account	Create new user account either food applicant, food donor or volunteer enters new personal information, and the system provides unique code number for later verification purpose.
UC-02	Search for item	Food applicant can browse for the application for their needed items or food available at the moment.
UC-03	View detailed description	Food applicant can select the item and view the detailed description of the item
UC-04	View comments and ratings	Food applicant can also comment and give rating to the items they are familiar with so it can help other food applicant.
UC-05	Search nearby food banks	After food applicant, donor or volunteer click the "Locate Me" button, the system will display the nearby food banks. The users also can enter their address manually if the system can't locate the accurate current location.
UC-06	Add item to shopping cart	Let the food applicant select the items they want and add them to the cart.
UC-07	Modify item from shopping cart	Let the food applicant remove any unwanted or unavailable items from the cart
UC-08	Check out active cart	Food applicant can directly show/give their cart list to the volunteer in charge to receive them.
UC-09	Donate food and essential items	Donors clicks on the "donate" button, the system will ask user to enter personal details and the donated items.
UC-10	Donate money through online banking	Donor enters the amount of money donated, and the system will link to external online banking application for transaction purpose.
UC-11	Join volunteering activities	Volunteer enters preferrable time and location, the system will display the recent available timeslot and nearby food banks that are going to have volunteering activities.
UC-12	Make complaint	Either food applicant, donor, or volunteer can click the questions and feedback button, then the system will display a descriptive box for users to make his feedback.

UC-13	View/Approve food applicant request	Admin access food applicant information, the system will display the recent application. An email will be sent to them after verification success
UC-14	View/Approve donor request	Admin access donor information, the system will display the recent application. An email will be sent to donor after verification success
UC-15	View/Approve volunteer request	Admin access volunteer information, the system will display the recent application. An email will be sent to volunteer after verification success.
UC-16	View user feedback	Admin can examine and review all the users' feedback from the application's users.
UC-17	Generate overall report	The application is able to generate the summary monthly report for the admin.
UC-18	View the overall report	Admin can view the generated summary monthly report in the application

Table 1.1 Features to be tested

2.0 TEST CASE DESIGN

Test Case ID	TC-UC-01
Use Case ID	UC-01
Use Case name	Create new user account
Use Case Description	Food applicant enters the personal information including the user's type, first name, last name, date of birth, NRIC number, email, password, address, and phone number.

Test input	Expected result	Pass criteria	Fail criteria
Type of user: Food applicant First name: Angelina Last name: Chong Date of Birth (dd/mm/yy): 17/3/1992 NRIC number: 920317-10-8902 Email: chongangelina@gmail.com Password: Angel12345 Address: 4, Jalan Keladi 32, Kampung Paya, Perak Phone number: 0118902343	Registration success. Information saves to database. System sends verification code to user via email or SMS.	Complete record attributes are displayed. User receives verification code.	Failed to save the record. Some record attributes are missing. Field validation Age must be more than 0. Identity card number must be 12 digits not including hyphen. All attributes are mandatory fields. User does not receive verification code.

Table 2.1 Create new user account

Test Case ID	TC-UC-02
Use Case ID	UC-02
Use Case Name	Search for items
Use Case Description	Food applicant enters the name of the food required in the search engine.

Test input	Expected result	Pass criteria	Fail criteria
Search: "Water bottle"	Page shows research results on water bottle items and availability.	The page displays correct attributes of items such as name, brand and availability.	Display "internal error occurred". Display incorrect information of items such as item name and availability.

Table 2.2 Search for items

Test Case ID	TC-UC-03
Use Case ID	UC-03
Use Case Name	View detailed description
Use Case Description	Food applicant selects an available item in the food bank.

Test input	Expected result	Pass criteria	Fail criteria
User selects item "Water bottle".	Detailed description of "Water bottle" is displayed.	A list of available water bottles, the brands, sizes, quantity available is displayed.	Missing description of "Water bottle". Empty page display.

Table 2.3 View detailed description

Test Case ID	TC-UC-04
Use Case ID	UC-04
Use Case Name	View comments and ratings
Use Case Description	Food applicant leaves a comment and rating after receiving the food.

Test input	Expected result	Pass criteria	Fail criteria
Comment: This item is of very great quality and packed with sufficient nutritional values. I am happy and grateful. Rating: 5/5	User's comments and ratings are successfully posted at item page. Comment and rating from the user are saved in the database. Correct comment and rating from the user are displayed. Comments and ratings from the users are updated in the database.	Display list of updated comments and ratings of the item.	System displays incorrect comments and rating from user. Does not display any comments and ratings. User's comment and ratings are not saved.

Table 2.4 View comments and ratings

Test Case ID	TC-UC-05
Use Case ID	UC-05
Use Case Name	Search nearby food banks
Use Case Description	Food applicant clicks the "Locate Me" button and enter the address of the location manually.

Test input	Expected result	Pass criteria	Fail criteria
User clicks "Locate Me" button. Street address: Jalan Pelangi Postcode: 41300 City: Klang State: Selangor	Display accurate location of user on map. List of nearby food banks are displayed based on the address input.	System displays the correct map and the accurate location of user. Display a list of nearby food banks.	System displays the wrong map and the wrong location of user. System shows the wrong nearby food banks.

Table 2.5 Search nearby food banks

Test Case ID	TC-UC-06		
Use Case ID	UC-06		
Use Case Name	Add item to shopping cart		
Use Case Description	Food applicant adds a desired item from a menu into the shopping chart and enter the desired quantity of item needed.		
Test input	Expected result	Pass criteria	Fail criteria
User adds "Water Bottle" to cart. Enter quantity: 2	New record of shopping chart is created in the database. The item and its quantity are added successfully to the shopping chart. Information of the shopping chart is saved to the database.	Correct item is successfully added to the shopping chart. Display the complete updated list of items and their quantity in the shopping cart of the food applicant.	Unsuccessful adding of item to the shopping cart. Shopping cart is not updated, and it shows the same list as before. Field validation Quantity added must not be more than the available amount in the food bank. Quantity must not be <= 0.

Table 2.6 Add item to shopping cart

Test Case ID	TC-UC-07		
Use Case ID	UC-07		
Use Case Name	Modify item from shopping cart		
Use Case Description	Food applicant attempts to remove an item from the shopping chart.		
Test input	Expected result	Pass criteria	Fail criteria
Click on "Shopping Cart" button. Remove 1 "Water bottle" item from cart.	The item is removed successfully from the shopping chart. Information of the shopping chart is updated in the database.	Correct item is successfully removed from the shopping chart. Display the complete updated list of items and their quantity in the shopping cart of the food applicant.	No effect on modification of items in the shopping cart. Shopping cart is not updated, and it shows the same list as before. Field validation The quantity of item that will be removed should not be more than the amount added in the shopping chart.

Table 2.7 Modify item from shopping cart

Test Case ID	TC-UC-08
Use Case ID	UC-08
Use Case Name	Check out active cart
Use Case Description	Food applicant attempts to check out the shopping chart.

Test input	Expected result	Pass criteria	Fail criteria
Click on "Shopping cart" button.	Information of the shopping cart is saved in database. Updated items in the shopping cart are displayed successfully.	Display the item's name, brand, and quantity. Display a successfully check-out message.	No display of shopping chart. Missing of items in the shopping cart. Incorrect display of items and quantity than what was entered.

Table 2.8 Check out active cart

Test Case ID	TC-UC-09
Use Case ID	UC-09
Use Case Name	Donate food and essential items
Use Case Description	Donor clicks on the "donate" button, the system will ask user to enter personal details and the donated items. Then, the system will display the available and nearby food banks.

Test input	Expected result	Pass criteria	Fail criteria
Click on "Donate" button. Full name: Nur Amira Phone number: 0192459965 Donation type: Food Donation items: 3 water bottles	Personal details of donor saved in database. Donated items information saved in database. Send a thank you message through SMS to the donor.	Correct and complete details of donor and items are saved. Display the complete details of the items donated. Display a successfully donated message.	Information of donation not saved in database. Personal details incorrect or missing. Donation item description incorrect or missing.

Table 2.9 Donate food and essential items

Test case ID	TC-UC-10
Use case ID	UC-10
Use case name	Donate money through online banking
Use case description	Donor enters the amount of money donated, and the system will link to external online banking application for transaction purpose.

Test input	Expected result	Pass criteria	Fail criteria
Click "Donate" button. Click "Money" button. First name: Sarah Last name: Nair Debit card number: 4632 9075 8974 0923 Amount (RM): 200 Click "Pay" button.	Personal details of the donor saved to database. Debit card details of the donor is saved to database. Redirect page to external online banking gateway. Amount of donation successfully added in fund and saved in database.	Correct and complete personal details of donor are saved. Correct debit card details are saved. Amount of donation is correct. Successful page redirect to external banking system. Display a successfully donated message.	Missing or incomplete personal details of donor saved to database. Missing or incomplete debit card details saved. Missing or incorrect amount of donation. No page redirect to external banking system. Field validation Amount of donation must be more than 0. Debit card number must have 16 numerical characters.

Table 2.10 Donate money through online banking

Test Case ID	TC-UC-11
Use Case ID	UC-11
Use Case Name	Join volunteering activities
Use Case Description	Volunteer enters preferable time and location, the system will display the recent available timeslot and nearby food banks that are going to have volunteering activities.

Test input	Expected result	Pass criteria	Fail criteria
Click "Volunteer" button. Full name: Amelia Ramona Phone number: 0178906543 Time slot: 3 PM Location: Taman Melawati, Kuala Lumpur Activity: Distribute food Click "Join" button.	Personal details of volunteer saved to database. Time slot availability of volunteer saved to database. Nearby and available food banks are displayed successfully based on the volunteer's location.	Complete and correct personal details of volunteer. Correct time slot chosen by volunteer. Food banks shown on display are nearby and available.	Missing or incomplete personal details of volunteer. Field validation Time slot cannot be 0 value.

Table 2.11 Join volunteering activities

Test Case ID	TC-UC-12
Use Case ID	UC-12
Use Case Name	Make complaint
Use Case Description	Either food applicant, donor, or volunteer can click the questions and feedback button, then the system will display a descriptive box for users to make his feedback.

Test input	Expected result	Pass criteria	Fail criteria
Click "Feedback" button. Name: Soraya Ahmad Description: This is an excellent application that allows the people to help each other in need. I recommend others to use this platform! Click "Finish" button.	Feedback comment saved into database for review. Display "Thank you" message after clicking the "Finish" button.	Correct name, date of comment and text of comment is saved to the database.	Missing or incorrect information and feedback from the user. No feedback added to database.

Table 2.12 Make complaint

Test case ID	TC-UC-13
Use case ID	UC-13
Use case name	View/Approve food applicant request
Use case description	Admin access food application information, the system will display the recent application. An email will be sent to them after verification success.

Test input	Expected result	Pass criteria	Fail criteria
Click on "Verify users" button. Click "Approve" button.	Page direct to list of users' pending requests. Successful display of user's personal details. Approval is successful. Email of notification is sent to user. User is added in database.	Page displays correctly list of pending requests from users. Displays user's full name, date of birth, IC number, address, and employment status correctly and completely. System successfully sent verification email to user.	Error in displaying list of user requests. Missing or incomplete personal information of user. Approval not updated in database.

Table 2.13 View/Approve food applicant request

Test case ID	TC-UC-14
Use case ID	UC-14
Use case name	View/Approve donor request
Use case description	Admin access donor information, the system will display the recent application. An email will be sent to donor after verification success

Test input	Expected result	Pass criteria	Fail criteria
Click on "Verify donors" button. Click "Approve" button.	Page direct to list of donors' pending requests successful. Successful display of donor's personal details. Approval is successful. Email of notification is sent to donor. Donor is added in database.	Page displays correctly list of pending requests from donor. Displays donor's full name, date of birth, IC number, address and employment status correctly and completely. System successfully sent verification email to donor.	Error in displaying list of donor requests. Missing or incomplete personal information of donor. Approval of donor not updated in database.

Table 2.14 View/Approve donor request

Test case ID	TC-UC-15
Use case ID	UC-15
Use case name	View/Approve volunteer request
Use case description	Admin access volunteer information, the system will display the recent application. An email will be sent to volunteer after verification success.

Test input	Expected result	Pass criteria	Fail criteria
Click on "Verify volunteers" button. Click "Approve" button.	Page direct to list of volunteers' pending requests successful. Successful display of volunteer's personal details. Approval is successful. Email of notification is sent to volunteer. Volunteer's details are added in database.	Page displays correctly list of pending requests from volunteers. Displays volunteer's full name, phone number, time slot availability, type of activity and location correctly and completely. System successfully sent verification email to volunteer.	Error in displaying list of volunteer requests. Missing or incomplete personal information of volunteer. Approval of volunteer not updated in database.

Table 2.15 View/Approve volunteer request

Test Case ID	TC-UC-16		
Use Case ID	UC-16		
Use Case Name	View user feedback		
Use Case Description	The admin examines and views the feedback from the application's users.		
Test input	Expected result	Pass criteria	Fail criteria
Click "View Feedbacks" button	Display a list of feedback details.	A list of feedbacks including the user's name or anonymous user, comments and rating is displayed.	No or wrong feedbacks is displayed.

Table 2.16 View user feedback

Test Case ID	TC-UC-17
Use Case ID	UC-17
Use Case Name	Generate overall report
Use Case Description	The application can generate the summary monthly report for the admin.

Test input	Expected result	Pass criteria	Fail criteria
Report Type: Total Donation (RM) Monthly Report Month: January Year: 2022	Report is generated successfully. Total donation (RM) is displayed in the report based on the month and year input.	Complete report details are displayed.	Report details are not displayed based on month and year input. Some report details are missing. Field validation Advance month and year cannot be selected. All attributes are mandatory fields.

Table 2.17 Generate overall report

Test Case ID	TC-UC-18
Use Case ID	UC-18
Use Case Name	View the overall report
Use Case Description	Admin can view the generated summary monthly report in the application

Test input	Expected result	Pass criteria	Fail criteria
Click "View Report"	Display a list of report details.	A list of report's name, month and year is displayed.	No report is displayed. Wrong report's name, month and year is displayed.

Table 2.18 View the overall report

3.0 PROJECT MANAGEMENT AND PLANNING

3.1 Project objectives and constraints

Project objectives

- To reduce and eliminate all kinds of hunger and poverty in Malaysia.
- To raise the community's awareness on food waste.
- To collect foods that are still edible through the collection of donors and contributors.
- To help food insecure families to get access to the food supplies in order to alleviate their cost of living.
- To collaborate with non-government organizations to create and enhance surplus food management system.

Project constraints

- The project should be completed in 20 weeks.
- The codes in the project should be written in Java or C++.
- The project is dependent on volunteers and donations; hence the budget is limited. If the inventory storage is out of stock, the food bank must temporarily close the doors.
- If there is a risk of losing an important team member, handover documents of the activities done in the project by that team member are prepared.
- The use of draw.io for UML diagrams and Adobe XD for UI design are required in the project.
- The scope of the project is to collect food from the donors, distribute food to the poor families and gather volunteers.

3.2 Project risk and feasibility

PROJECT RISKS	
Risk type	**Possible Risk**
Organizational risk	1. The organization is restructured so that different management are responsible for the project. 2. Unsustainable debt levels cause financial problem while implementing the project.
External risk	1. The organization is fear of not receiving any food or beverages from the donors. 2. The nutritional profile of the foods donated may not meet the nutritional needs of the applicants. 3. The organization fear of not enough inventory storage to store the food and beverages donated. 4. The organization cannot guarantee that the food or beverages are stored in a safe condition during the collection process.
Technological risk	1. The privacy of the applicants may be leaked. 2. The database in the system cannot process many transactions at the same time as expected. 3. The system may fail to back up the data to the database. 4. The hardware or software used by the organization is too old or inconsistent. 5. The technical support of the system may be weak.
Resource risk	1. A critical team member may be sick or called away unexpectedly. 2. The team member involved in the system is not skilled enough. 3. The cost of the system may overrun. 4. The productivity of the team members will be decreased due to improper allocation and causes the project to delay.
Schedule risk	1. End users may find the system to be unsatisfactory and requires the organization to redesign and rework the project. 2. The size of the project is larger than estimated. 3. Development of wrong software functionalities are required to redesign. 4. Strict and precise requirements in the system requires more testing and design than expected. 5. The project which is required to operate on different operating systems takes longer to design than expected.

Table 3.1 Project Risks

RISK ANALYSIS		
Possible Risk	**Probability**	**Effect**
The organization is restructured so that different management are responsible for the project.	Medium	High
Unsustainable debt levels cause financial problem while implementing the project.	Medium	High
The organization is fear of not receiving any food or beverages from the donors.	Medium	High
The nutritional profile of the foods donated may not meet the nutritional needs of the applicants.	Low	Low
The organization fear of not enough inventory storage to store the food and beverages donated.	Medium	High
The organization cannot guarantee that the food or beverages are stored in a good condition during the collection process.	Medium	Medium
The privacy of the applicants may be leaked.	Low	High
The database in the system cannot process many transactions at the same time as expected.	Medium	High
The system may fail to back up the data to the database.	Low	High
The hardware or software used by the organization is too old or inconsistent.	Low	Medium
The technical support of the system may be weak.	Medium	Medium
A critical team member may be sick or called away unexpectedly.	Low	High
The team member involved in the system is not skilled enough.	Medium	Medium
The cost of the system may overrun.	Medium	High
The productivity of the team members will be decreased due to improper allocation and causes the project to delay.	Low	High
End users may find the system to be unsatisfactory and requires the organization to redesign and rework the project.	Medium	High
The size of the project is larger than estimated.	Medium	High
Development of wrong software functionalities are required to redesign.	Medium	High
Strict and precise requirements in the system requires more testing and design than expected.	Medium	High
The project which is required to operate on different operating systems takes longer to design than expected.	Medium	Medium

Table 3.2 Project Risks

PROJECT FEASIBILITY			
Possible Risk	**Probability**	**Control**	**Feasibility**
The organization is restructured so that different management are responsible for the project.	Medium	Prepare a briefing document for senior management demonstrating how the project is making a very important contribution to the goals of the business.	Techinically feasible but need more time to tackle
Unsustainable debt levels cause financial problem while implementing the project.	Medium	Prepare a briefing document for the senior management to show the causes of unsustainable debt levels to the project.	Low cost of implementation
The organization is fear of not receiving any food or beverages from the donors.	Medium	Partnership with big companies to ensure that there are donors that are always available.	Technically feasible
The nutritional profile of the foods donated may not meet the nutritional needs of the applicants.	Low	Set rules regarding what food the organization will and will not accept.	Technically feasible and it can be carry out easily
The organization fear of not enough inventory storage to store the food and beverages donated.	Medium	Check the expiry date and divide the food and beverages into categories so it is easier to organize and keep track of which category of food or bevarages are needed the most.	Low cost of implementation and it can be carry out easily
The organization cannot guarantee that the food or beverages are stored in a good condition during the collection process.	Medium	Package and label the foods correctly and refrigerate more hazardous perishable foods.	Technically feasible but possible high-cost solution since the staff have to repack and label the food
The privacy of the applicants may be leaked.	Low	Encrypte the user data.	Technically feasible
The database in the system cannot process many	Medium	Buy a higher performance database.	Technically feasible but

transactions at the same time as expected.			possible high-cost solution
The system may fail to back up the data to the database.	Low	Regularly carry out back-up procedures so backup files can be used to restore back the database in such cases.	Technically feasible
The hardware or software used by the organization is too old or inconsistent.	Low	Consult with a professional about the regulatory standards of the hardware or the software.	Technically feasible
The technical support of the system may be weak.	Medium	Provide quality training to the team members.	Technically feasible
A critical team member may be sick or called away unexpectedly.	Low	Make sure the team members always prepare a proposal to clarify about their duties, work progress and the best method to contact them.	Simple and transparent so the other team members can easily take over their work
The team member involved in the system is not skilled enough.	Medium	Provide training related to the skills needed in the project.	Technically feasible
The cost of the system may overrun.	Medium	Make a detail planning before executing the project by considering all the possible scenerios such as interviews and experience and always keep to the planned scope to prevent scope creep.	Simple and transparent to the team
The productivity of the team members will be decreased due to improper allocation and causes the project to delay.	Low	Make sure the jobs assigned to the team members depend on their skills and personalities.	Simple and easy to be implemented
End users may find the system to be unsatisfactory and requires the organization to redesign and rework the project.	Medium	Make sure the system meets the user requirements listed in the requirement document.	Technically feasible

The size of the project is larger than estimated.	Medium	Make sure the project is stick with the planned scope and prevent scope creep.	Technically feasible
Development of wrong software functionalities are required to redesign.	Medium	Pay attention to detail when the system requirements are derived and make sure the system at least meets its functional requirements and non-functional requirements.	Technically feasible
Strict and precise requirements in the system requires more testing and design than expected.	Medium	Complete the system earlier so there will be more time for testing.	Technically feasible
The project which is required to operate on different operating systems takes longer to design than expected.	Medium	Plan the types of operating systems that will be operated by the project before working on the project.	Technically feasible

Table 3.3 Project Feasibility

3.3 Project iteration schedule

Project Iteration Schedule for the Food Bank Application – Meal for All		
Iteration	**Time estimate**	**Use cases assigned to iteration**
1	4 weeks	1. Sign up as new user. 2. Search for item. 3. View detailed descriptions. 4. View comments and ratings. 5. Search nearby food banks.
2	5 weeks	6. Add item to shopping cart. 7. Modify item from shopping cart. 8. Check out active cart. 9. Donate food. 10. Donate money through online banking.
3	4 weeks	11. Join volunteering activity 12. Make a complaint. 13. View/Approve user request 14. View/Approve donor request 15. View/Approve volunteer request
4	4 weeks	16. View user feedback 17. Generate overall report 18. View overall report
5	3 weeks	19. Clean up, final test, harden site, tune database, etc.
Total	**20 weeks**	

Table 3.4 Project iteration schedule for the Food Bank Application – Meal for All

3.4 Work breakdown structure (WBS) for all iterations

Subsystem 1 – Users Module

Activity	Date	Duration (Days)
1. Project planning		
a. Develop WBS and build schedule and then plan the work.	3/1/2022	1
2. Analysis task		
b. Gather and analyze detailed information from resources.	4/1/2022	1
c. Review and analyze existing system.	5/1/2022	1
d. Define and prioritize requirements.	6/1/2022	1
e. Analyze and model new system using UML diagrams.	7/1/2022	1
3. Design task		
f. Design database scheme.	10/1/2022	1
g. Design screen layouts and cross links for mobile application.	11/1/2022 – 12/1/2022	2
h. Design screen layouts and cross links for web-browser.	13/1/2022 – 14/1/2022	2
i. Identify program classes and methods.	15/1/2022	1
4. Build task		
j. Build required databases.	17/1/2022	1
k. Write program code GUI for mobile application.	18/1/2022 – 20/1/2022	3
l. Write program code GUI for web-browser.	21/1/2022 – 22/1/2022	2
m. Build test data.	23/1/2022	1
n. Perform unit test.	24/1/2022	1
o. Perform integration test.	25/1/2022	1
p. Perform system and acceptance test.	26/1/2022	1

Note: This subsystem will be led by Jazreel Ooi Sue Ching.
 	
Note: The five use cases that will be developed during this iteration are:
  1. Sign up as new user.
  2. Search for item.
  3. View detailed descriptions.
  4. View comments and ratings.
  5. Make a complaint.		

Table 3.5 Subsystem 1 – Users Module

Gantt Chart Iteration 1

Project Start: 3/1/2022
Display Month: January

Task	Start Date	End Date	Duration Work (Days)	First Week (Date)							Second Week (Date)							Third Week (Date)							Forth Week (Date)						
				M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
Project Planning																															
a. Develop WBS and build schedule and then plan the work.	3/1/2022	3/1/2022	1	█																												
Analysis Task																															
a. Gather and analyze detailed information from resources.	4/1/2022	4/1/2022	1		█																											
b. Review and analyze existing system.	5/1/2022	5/1/2022	1			█																										
c. Define and prioritize requirements.	6/1/2022	6/1/2022	1				█																									
d. Analyze and model new system using UML diagrams.	7/1/2022	7/1/2022	1					█																								
Design Task																															
a. Design database scheme.	10/1/2022	10/1/2022	1								█																					
b. Design screen layouts and cross links for mobile application.	11/1/2022	12/1/2022	2									█	█																			
c. Design screen layouts and cross links for web-browser.	13/1/2022	14/1/2022	2											█	█																	
d. Identify program classes and methods.	15/1/2022	15/1/2022	1													█																
Build Task																															
a. Build required databases.	17/1/2022	17/1/2022	1															█														
b. Write program code GUI for mobile application.	18/1/2022	20/1/2022	3																█	█	█											
c. Write program code GUI for web-browser.	21/1/2022	22/1/2022	2																			█	█									
d. Build test data.	23/1/2022	23/1/2022	1																					█								
e. Perform unit test.	24/1/2022	24/1/2022	1																						█							
f. Perform integration test.	25/1/2022	25/1/2022	1																							█						
g. Perform system and acceptance test.	26/1/2022	26/1/2022	1																								█					

Figure 2 Gantt Chart Iteration 1

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Subsystem 2 – Donors Module

Activity	Date	Duration (Days)
1. Project planning		
a. Develop WBS and build schedule and then plan the work.	3/2/2022	1
2. Analysis task		
b. Gather and analyze detailed information from resources.	4/2/2022	1
c. Review and analyze existing system.	5/2/2022	1
d. Define and prioritize requirements.	6/2/2022	1
e. Analyze and model new system using UML diagrams.	7/2/2022	1
3. Design task		
f. Design database scheme.	10/2/2022	1
g. Design screen layouts and cross links for mobile application.	11/2/2022 – 12/2/2022	2
h. Design screen layouts and cross links for web-browser.	13/2/2022 – 14/2/2022	2
i. Identify program classes and methods.	15/2/2022	1
4. Build task		
j. Build required databases.	17/2/2022	1
k. Write program code GUI for mobile application.	18/2/2022 – 20/2/2022	3
l. Write program code GUI for web-browser.	21/2/2022 – 22/2/2022	2
m. Build test data.	23/2/2022	1
n. Perform unit test.	24/2/2022	1
o. Perform integration test.	25/2/2022	1
p. Perform system and acceptance test.	26/2/2022	1
Note: This subsystem will be led by Chong Qin Hui. Note: The five use cases that will be developed during this iteration are: 1. Donate food. 2. Donate money through online banking. 3. Add item to shopping cart. 4. Modify item from shopping cart. 5. Check out active cart.		

Table 3.6 Subsystem 2 – Donors Module

Gantt Chart Iteration 2

Project Start: 3/1/2022
Display Month: February

Task	Start Date	End Date	Duration Work (Days)	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
Project Planning																															
a. Develop WBS and build schedule and then plan the work.	3/2/2022	3/2/2022	1				█																									
Analysis Task																															
a. Gather and analyze detailed information from resources.	4/2/2022	4/2/2022	1					█																									
b. Review and analyze existing system.	5/2/2022	5/2/2022	1						█																								
c. Define and prioritize requirements.	6/2/2022	6/2/2022	1							█																							
d. Analyze and model new system using UML diagrams.	7/2/2022	7/2/2022	1								█																						
Design Task																															
a. Design database scheme.	10/2/2022	10/2/2022	1											█																			
b. Design screen layouts and cross links for mobile application.	11/2/2022	12/2/2022	2												█	█																	
c. Design screen layouts and cross links for web-browser.	13/2/2022	14/2/2022	2														█	█															
d. Identify program classes and methods.	15/2/2022	15/2/2022	1																█														
Build Task																															
a. Build required databases.	17/2/2022	17/2/2022	1																		█												
b. Write program code GUI for mobile application.	18/2/2022	20/2/2022	3																			█	█	█									
c. Write program code GUI for web-browser.	21/2/2022	22/2/2022	2																						█	█							
d. Build test data.	23/2/2022	23/2/2022	1																								█						
e. Perform unit test.	24/2/2022	24/2/2022	1																									█					
f. Perform integration test.	25/2/2022	25/2/2022	1																										█				
g. Perform system and acceptance test.	26/2/2022	26/2/2022	1																											█			

Figure 3 Gantt Chart Iteration 2

Subsystem 3 – Volunteer Module

Activity	Date	Duration (Days)
1. Project planning		
a. Develop WBS and build schedule and then plan the work.	3/3/2022	1
2. Analysis task		
b. Gather and analyze detailed information from resources.	4/3/2022	1
c. Review and analyze existing system.	5/3/2022	1
d. Define and prioritize requirements.	6/3/2022	1
e. Analyze and model new system using UML diagrams.	7/3/2022	1
3. Design task		
f. Design database scheme.	10/3/2022	1
g. Design screen layouts and cross links for mobile application.	11/3/2022 – 12/3/2022	2
h. Design screen layouts and cross links for web-browser.	13/3/2022 – 14/3/2022	2
i. Identify program classes and methods.	15/3/2022	1
4. Build task		
j. Build required databases.	17/3/2022	1
k. Write program code GUI for mobile application.	18/3/2022 – 20/3/2022	3
l. Write program code GUI for web-browser.	21/3/2022 – 22/3/2022	2
m. Build test data.	23/3/2022	1
n. Perform unit test.	24/3/2022	1
o. Perform integration test.	25/3/2022	1
p. Perform system and acceptance test.	26/3/2022	1
Note: This subsystem will be led by Nur Afina Binti Mohammad Nadzri. Note: The four use cases that will be developed during this iteration are: 1. Sign up as new user. 2. Join volunteering activity. 3. Make a complaint. 4. Search nearby food banks.		

Table 3.7 Subsystem 3 – Volunteer Module

Gantt Chart Iteration 3

Project Start: 3/1/2022
Display Month: March

Task	Start Date	End Date	Duration Work (Days)	First Week (Date)							Second Week (Date)							Third Week (Date)							Forth Week (Date)						
				M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
Project Planning																															
a. Develop WBS and build schedule and then plan the work.	3/3/2022	3/3/2022	1				█																									
Analysis Task																															
a. Gather and analyze detailed information from resources.	4/3/2022	4/3/2022	1					█																								
b. Review and analyze existing system.	5/3/2022	5/3/2022	1						█																							
c. Define and prioritize requirements.	6/3/2022	6/3/2022	1							█																						
d. Analyze and model new system using UML diagrams.	7/3/2022	7/3/2022	1								█																					
Design Task																															
a. Design database scheme.	10/3/2022	10/3/2022	1											█																		
b. Design screen layouts and cross links for mobile application.	11/3/2022	12/3/2022	2												█	█																
c. Design screen layouts and cross links for web-browser.	13/3/2022	14/3/2022	2														█	█														
d. Identify program classes and methods.	15/3/2022	15/3/2022	1																█													
Build Task																															
a. Build required databases.	17/3/2022	17/3/2022	1																		█											
b. Write program code GUI for mobile application.	18/3/2022	20/3/2022	3																			█	█	█								
c. Write program code GUI for web-browser.	21/3/2022	22/3/2022	2																						█	█						
d. Build test data.	23/3/2022	23/3/2022	1																								█					
e. Perform unit test.	24/3/2022	24/3/2022	1																									█				
f. Perform integration test.	25/3/2022	25/3/2022	1																										█			
g. Perform system and acceptance test.	26/3/2022	26/3/2022	1																											█		

Figure 4 Gantt Chart Iteration 3

Subsystem 4 – Location and Feedback Module

Activity	Date	Duration (Days)
1. Project planning		
a. Develop WBS and build schedule and then plan the work.	4/4/2022	1
2. Analysis task		
b. Gather and analyze detailed information from resources.	5/4/2022	1
c. Review and analyze existing system.	6/4/2022	1
d. Define and prioritize requirements.	7/4/2022	1
e. Analyze and model new system using UML diagrams.	8/4/2022	1
3. Design task		
f. Design database scheme.	11/4/2022	1
g. Design screen layouts and cross links for mobile application.	12/4/2022 – 13/4/2022	2
h. Design screen layouts and cross links for web-browser.	14/4/2022 – 15/4/2022	2
i. Identify program classes and methods.	16/4/2022	1
4. Build task		
j. Build required databases.	18/4/2022	1
k. Write program code GUI for mobile application.	19/4/2022 – 21/4/2022	3
l. Write program code GUI for web-browser.	22/4/2022 – 23/4/2022	2
m. Build test data.	24/4/2022	1
n. Perform unit test.	25/4/2022	1
o. Perform integration test.	26/4/2022	1
p. Perform system and acceptance test.	27/4/2022	1
Note: This subsystem will be led by Mohammed Hammad. Note: The four use cases that will be developed during this iteration are: 1. Search for item. 2. Search nearby food banks. 3. View comments and ratings. 4. View user feedback.		

Table 3.8 Subsystem 4 – Location and Feedback Module

Gantt Chart Iteration 4

Task	Start Date	End Date	Duration Work (Days)	First Week (Date)							Second Week (Date)							Third Week (Date)							Forth Week (Date)						
				M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
Project Planning																															
a. Develop WBS and build schedule and then plan the work.	4/4/2022	4/4/2022	1	█																												
Analysis Task																															
a. Gather and analyze detailed information from resources.	5/4/2022	5/4/2022	1		█																											
b. Review and analyze existing system.	6/4/2022	6/4/2022	1			█																										
c. Define and prioritize requirements.	7/4/2022	7/4/2022	1				█																									
d. Analyze and model new system using UML diagrams.	8/4/2022	8/4/2022	1					█																								
Design Task																															
a. Design database scheme.	11/4/2022	11/4/2022	1								█																					
b. Design screen layouts and cross links for mobile application.	12/4/2022	13/4/2022	2									█	█																			
c. Design screen layouts and cross links for web-browser.	14/4/2022	15/4/2022	2											█	█																	
d. Identify program classes and methods.	16/4/2022	16/4/2022	1													█																
Build Task																															
a. Build required databases.	18/4/2022	18/4/2022	1															█														
b. Write program code GUI for mobile application.	19/4/2022	21/4/2022	3																█	█	█											
c. Write program code GUI for web-browser.	22/4/2022	23/4/2022	2																			█	█									
d. Build test data.	24/4/2022	24/4/2022	1																					█								
e. Perform unit test.	25/4/2022	25/4/2022	1																						█							
f. Perform integration test.	26/4/2022	26/4/2022	1																							█						
g. Perform system and acceptance test.	27/4/2022	27/4/2022	1																								█					

Figure 5 Gantt Chart Iteration 4

Subsystem 5 – Administrative Module

Activity	Date	Duration (Days)
1. Project planning		
a. Develop WBS and build schedule and then plan the work.	3/5/2022	1
2. Analysis task		
b. Gather and analyze detailed information from resources.	4/5/2022	1
c. Review and analyze existing system.	5/5/2022	1
d. Define and prioritize requirements.	6/5/2022	1
e. Analyze and model new system using UML diagrams.	7/5/2022	1
3. Design task		
f. Design database scheme.	10/5/2022	1
g. Design screen layouts and cross links for mobile application.	11/5/2022 – 12/5/2022	2
h. Design screen layouts and cross links for web-browser.	13/5/2022 – 14/5/2022	2
i. Identify program classes and methods.	15/5/2022	1
4. Build task		
j. Build required databases.	17/5/2022	1
k. Write program code GUI for mobile application.	18/5/2022 – 20/5/2022	3
l. Write program code GUI for web-browser.	21/5/2022 – 22/5/2022	2
m. Build test data.	23/5/2022	1
n. Perform unit test.	24/5/2022	1
o. Perform integration test.	25/5/2022	1
p. Perform system and acceptance test.	26/5/2022	1
Note: This subsystem will be led by Nur Syamim Binti Ahmad Zamri. Note: The six use cases that will be developed during this iteration are: 1. View/Approve user request 2. View/Approve donor request 3. View/Approve volunteer request 4. View user feedback 5. Generate overall report 6. View overall report		

Table 3.9 Subsystem 5 – Administrative Module

Gantt Chart Iteration 5

Task	Start Date	End Date	Work (Days)	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
				\<- First Week (Date) ->							\<- Second Week (Date) ->							\<- Third Week (Date) ->							\<- Forth Week (Date) ->						
Project Planning																															
a. Develop WBS and build schedule and then plan the work.	3/5/2022	3/5/2022	1		█																												
Analysis Task																															
a. Gather and analyze detailed information from resources.	4/5/2022	4/5/2022	1			█																											
b. Review and analyze existing system.	5/5/2022	5/5/2022	1				█																										
c. Define and prioritize requirements.	6/5/2022	6/5/2022	1					█																									
d. Analyze and model new system using UML diagrams.	7/5/2022	7/5/2022	1						█																								
Design Task																															
a. Design database scheme.	10/5/2022	10/5/2022	1									█																					
b. Design screen layouts and cross links for mobile application.	11/5/2022	12/5/2022	2										█	█																			
c. Design screen layouts and cross links for web-browser.	13/5/2022	14/5/2022	2												█	█																	
d. Identify program classes and methods.	15/5/2022	15/5/2022	1														█																
Build Task																															
a. Build required databases.	17/5/2022	17/5/2022	1																█														
b. Write program code GUI for mobile application.	18/5/2022	20/5/2022	3																	█	█	█											
c. Write program code GUI for web-browser.	21/5/2022	22/5/2022	2																				█	█									
d. Build test data.	23/5/2022	23/5/2022	1																						█								
e. Perform unit test.	24/5/2022	24/5/2022	1																							█							
f. Perform integration test.	25/5/2022	25/5/2022	1																								█						
g. Perform system and acceptance test.	26/5/2022	26/5/2022	1																									█					

Figure 6 Gantt Chart Iteration 5

**Gantt Chart Excel Link: Gantt Chart.xlsx

4.0 PROTOTYPE

4.1 Prototype tool

- Adobe XD was used to design and implement the prototype.
- It is a feature rich application which allows you to prototype and design efficiently.

4.2 User & system interface screen designs

Desktop Interface:

Main Page
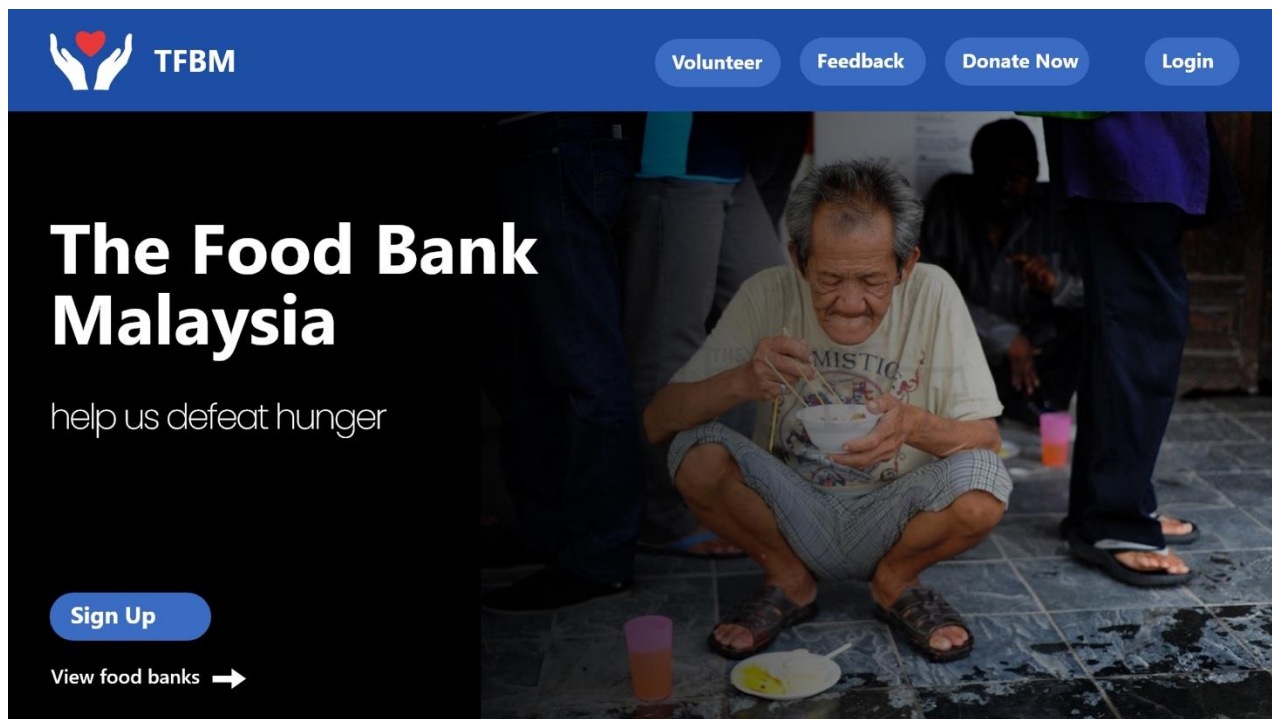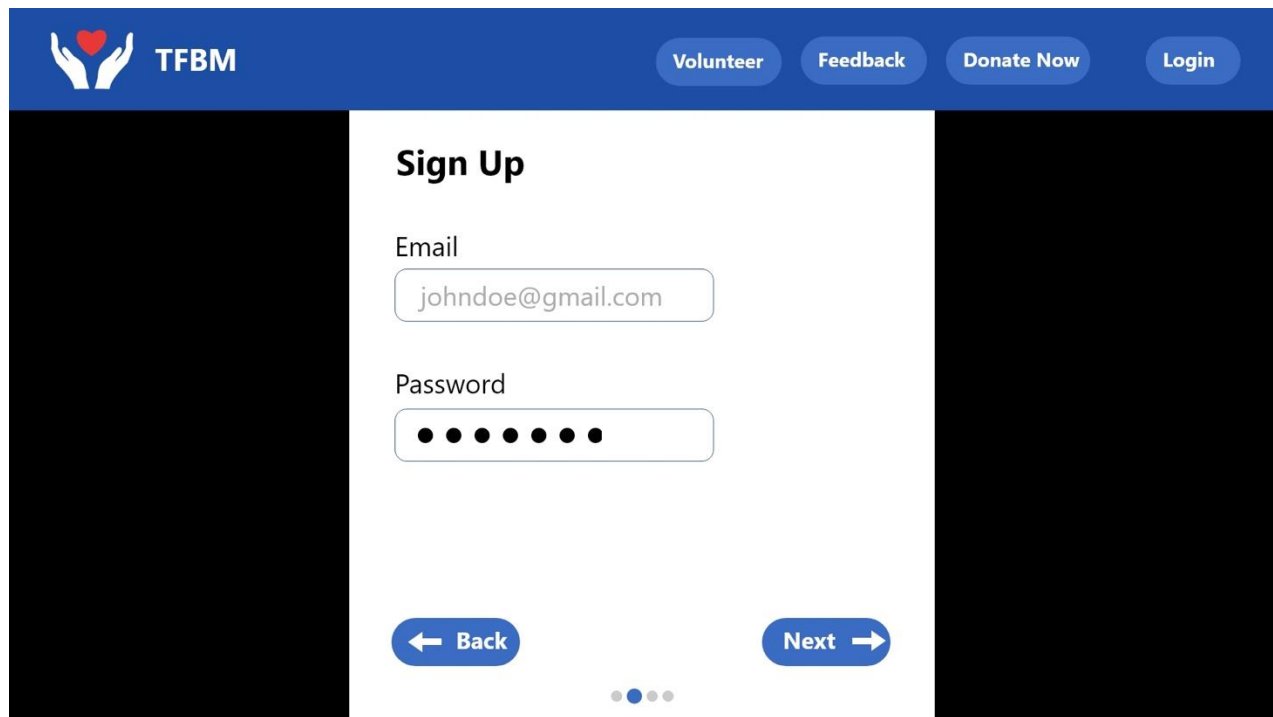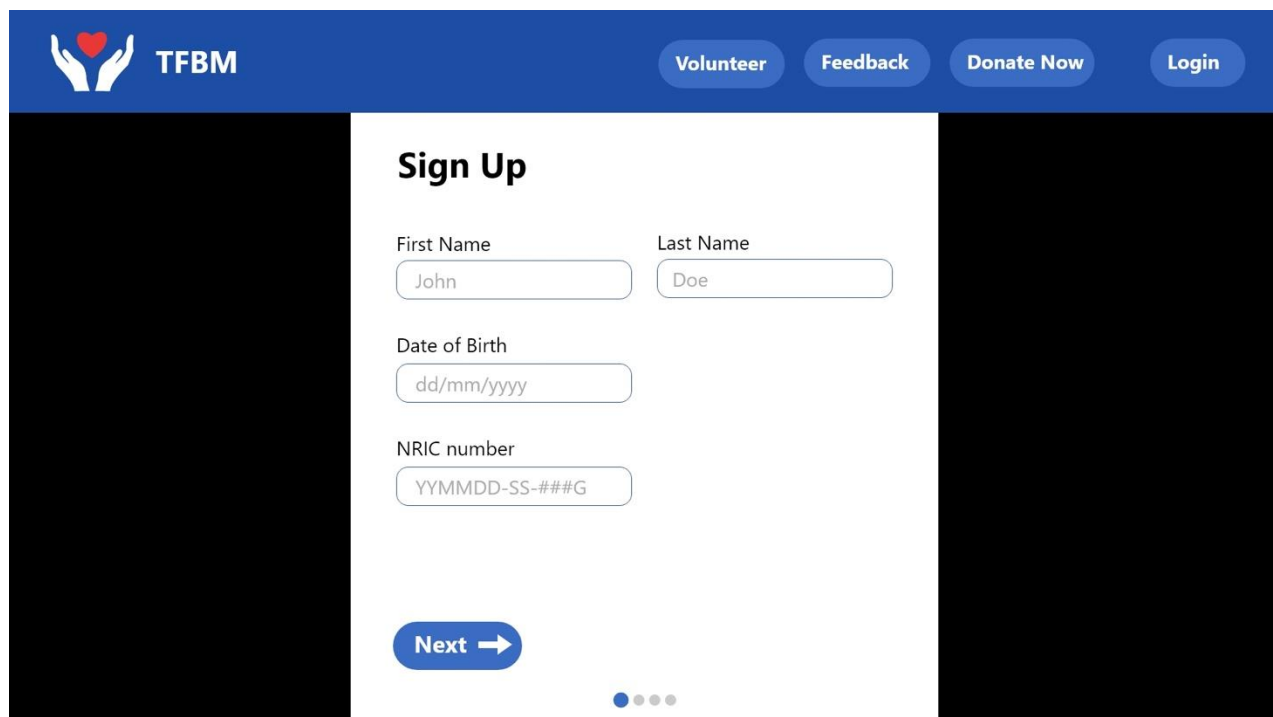
Figure 7 Main Page

<u>Sign Up Page</u>
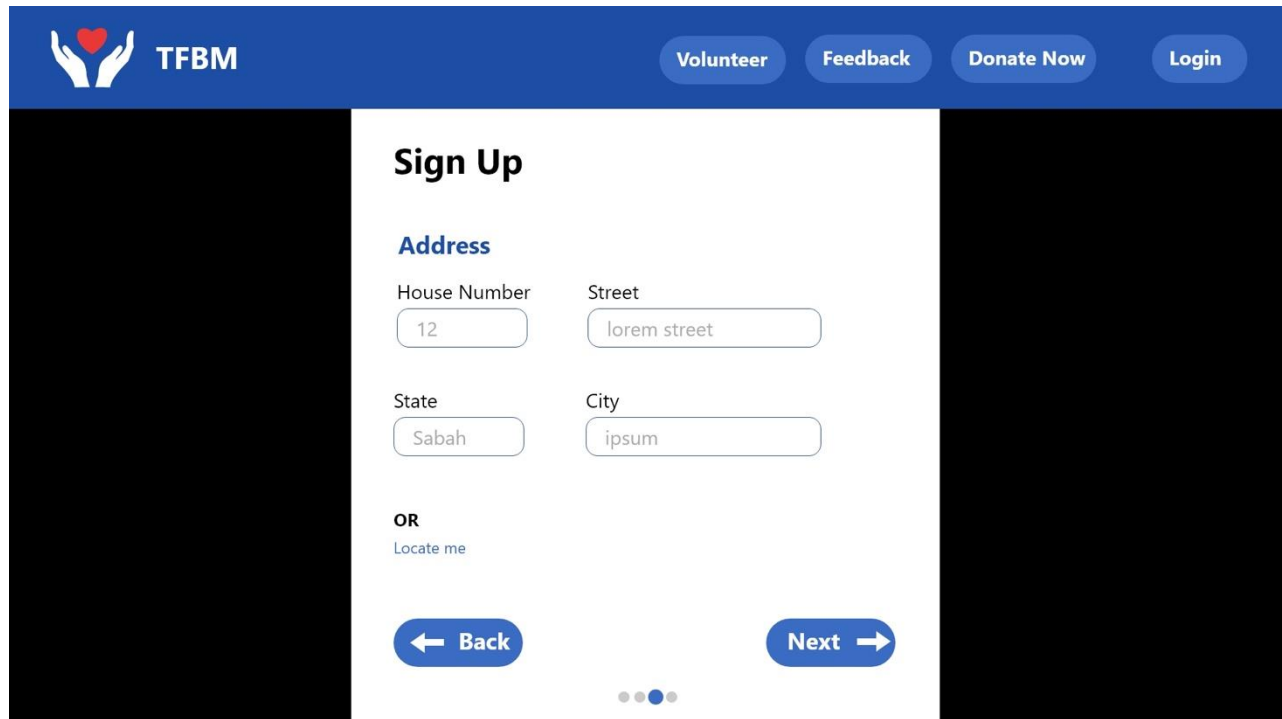
Figure 8 Enter email and password
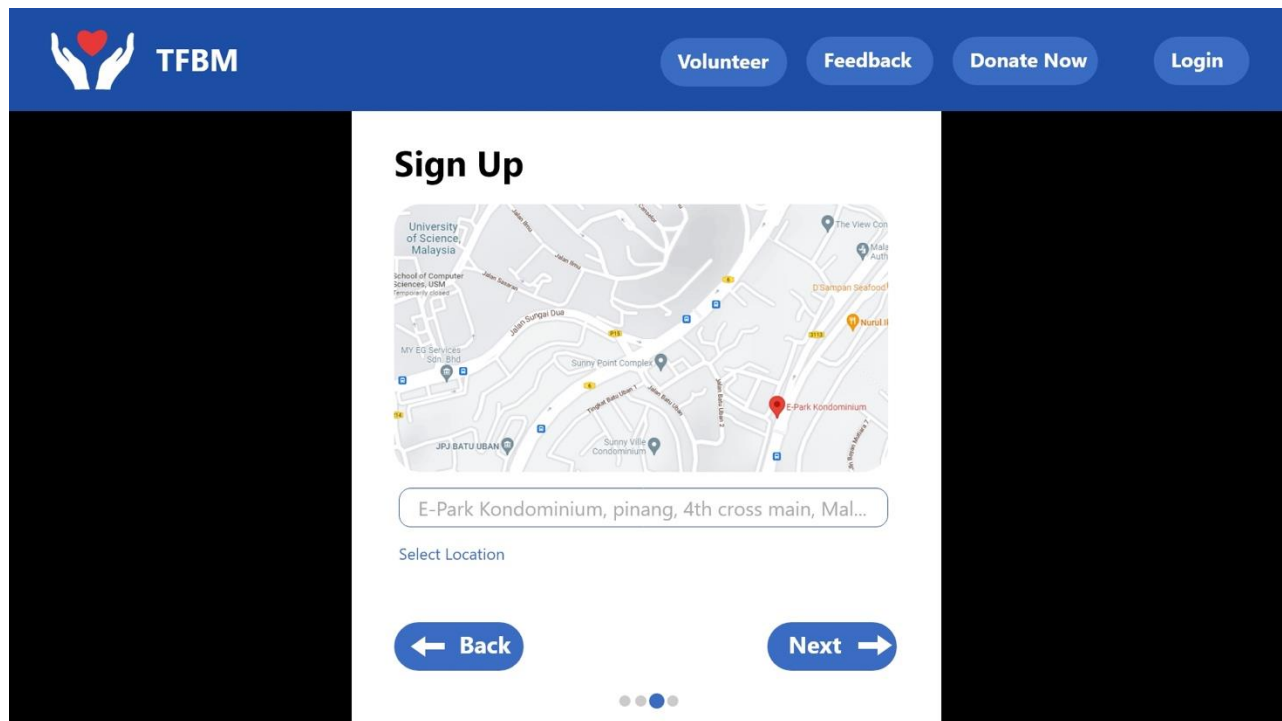
Figure 9 Enter personal details

Figure 10 Enter address details

Figure 11 Click "Locate Me" button and it will automatically locate the user's location

Figure 12 Enter the OTP received to verify the account

Login Page

Figure 13 Enter email and password to login

Volunteer Page

Figure 14 Sign up as a volunteer

Donate Page
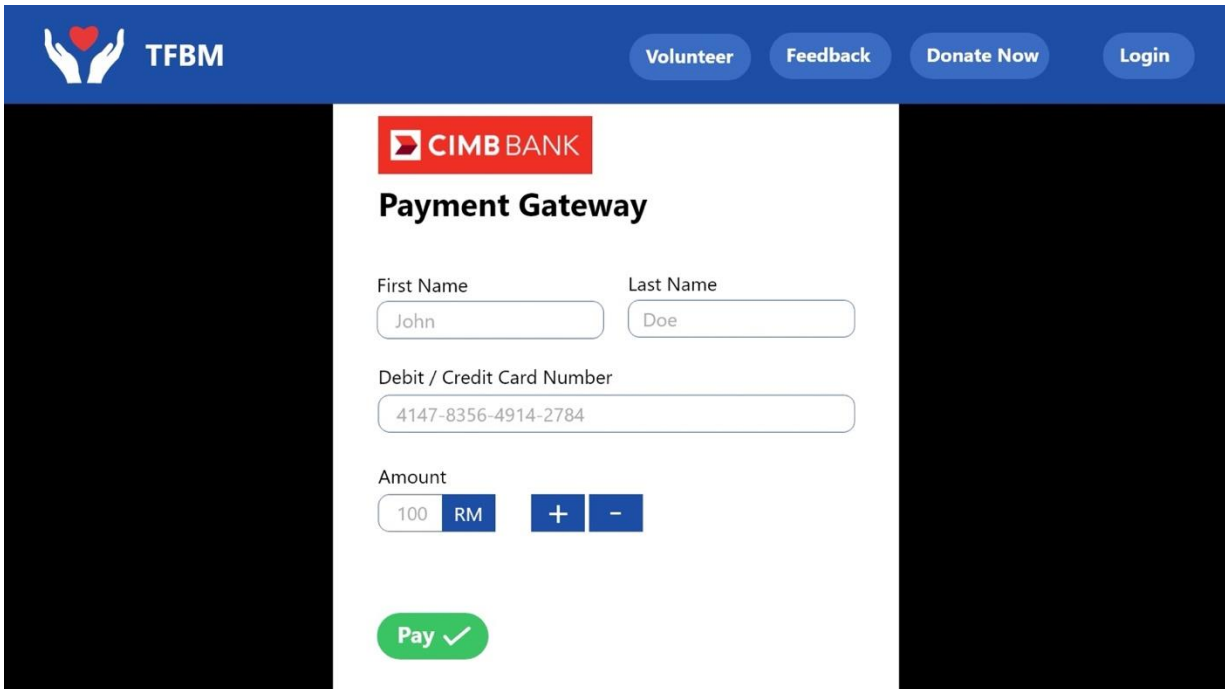
Figure 15 Select the type of donation
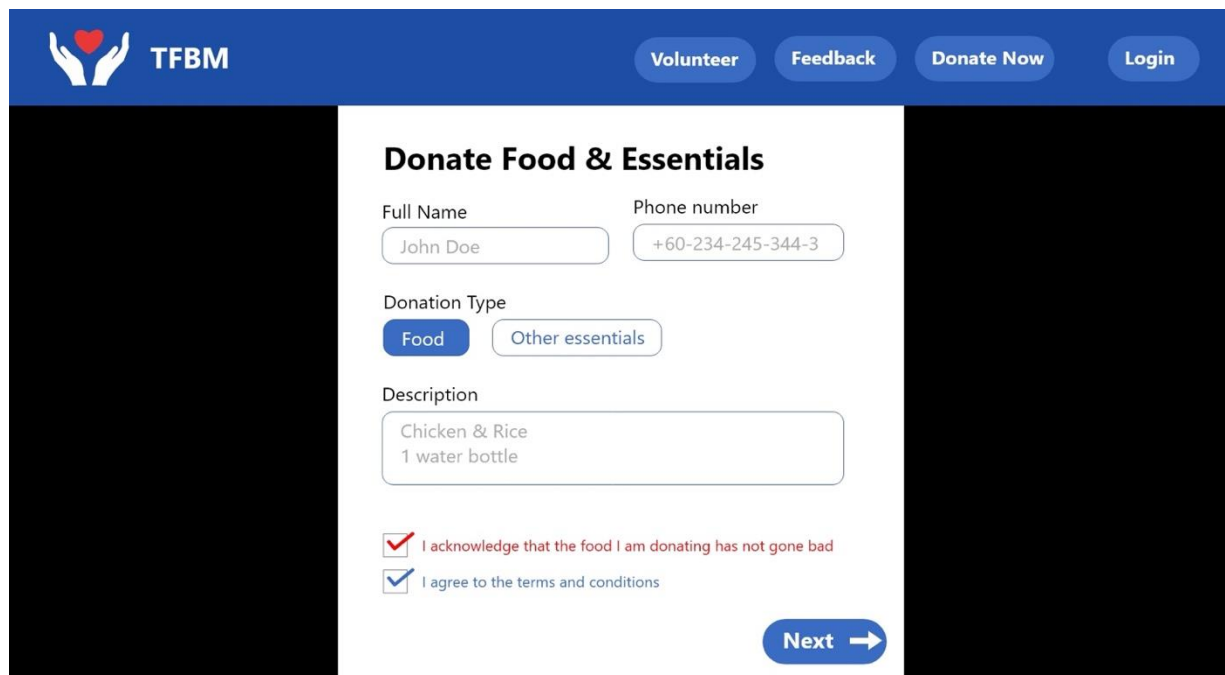
Donate Money

Figure 16 Enter personal details, card details and total amount of money for donation

Donate Food and Essential Item

Figure 17 Enter personal details and food details

<u>Select Food Page</u>
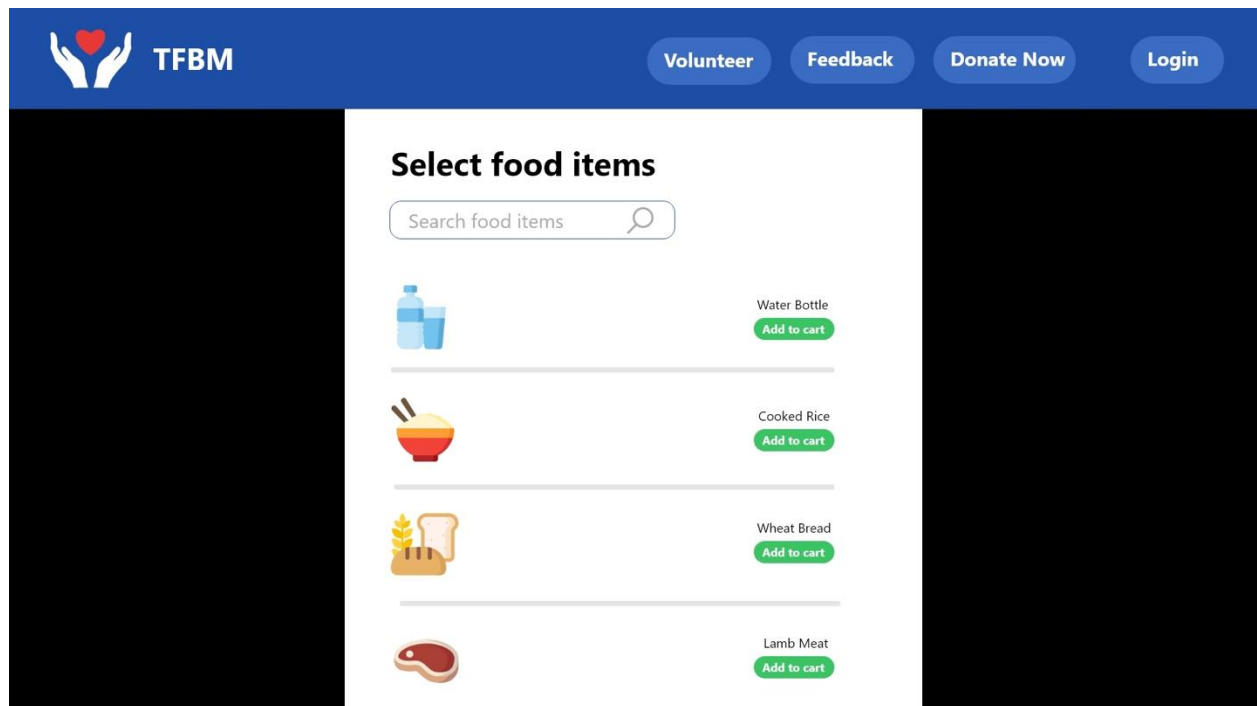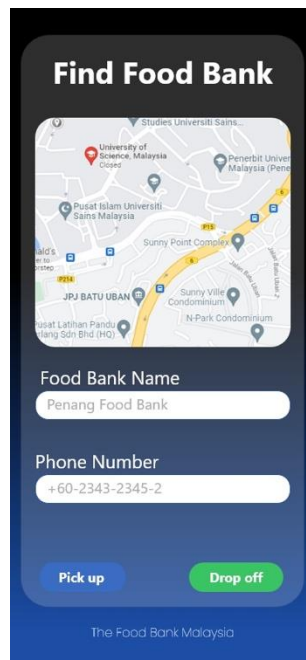

Figure 18 Select the food items into the shopping chart
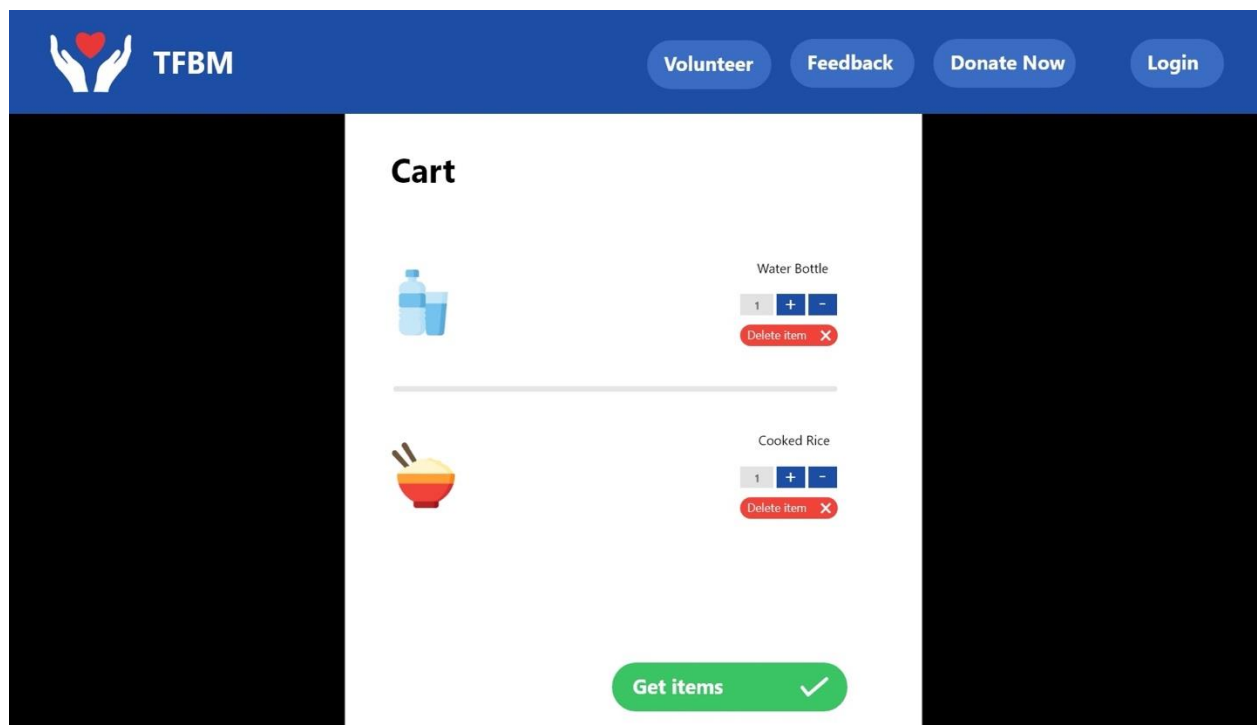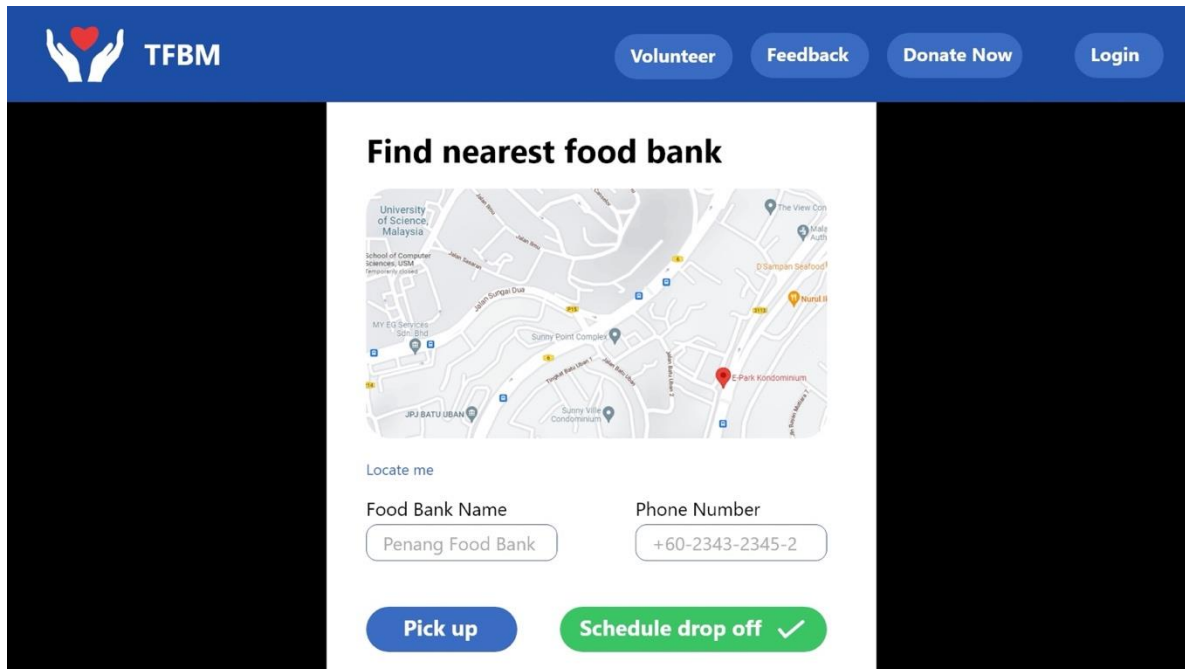
Figure 19 View of personal shopping chart

Search The Nearest Food Bank Page
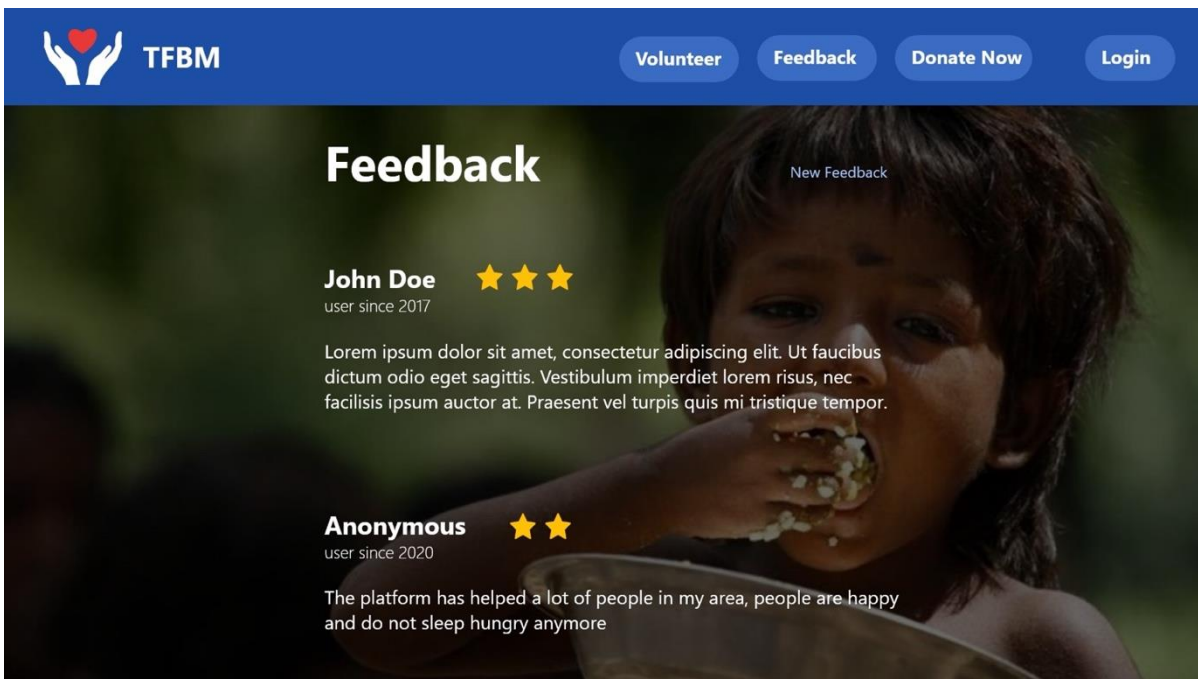
Figure 20 Search food banks near the user's location

Feedback Page

Figure 21 View other user's feedback

Figure 22 Write feedback

Admin Portal Page

Figure 23 View or approve user's request

Figure 24 View or approve donor's request

Figure 25 View or approve volunteer's request
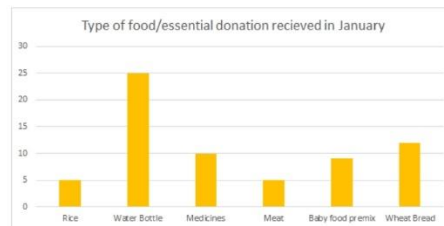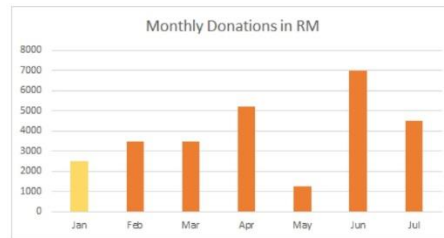
Figure 26 Summary of Monthly Report

Mobile interface

Sign Up Page

Figure 27 Sign up by entering personal and address details
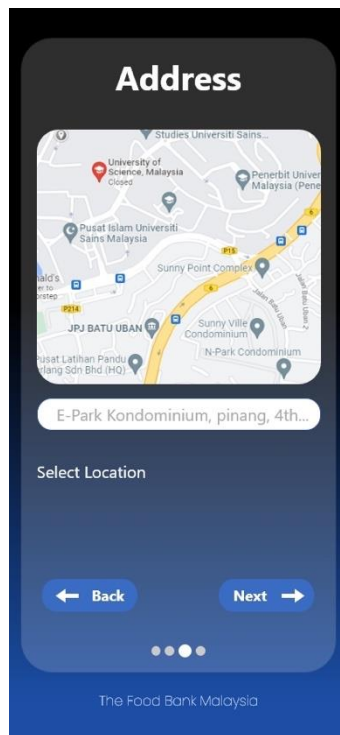
Figure 28 Click "Locate Me" button and it will automatically locate the user's location
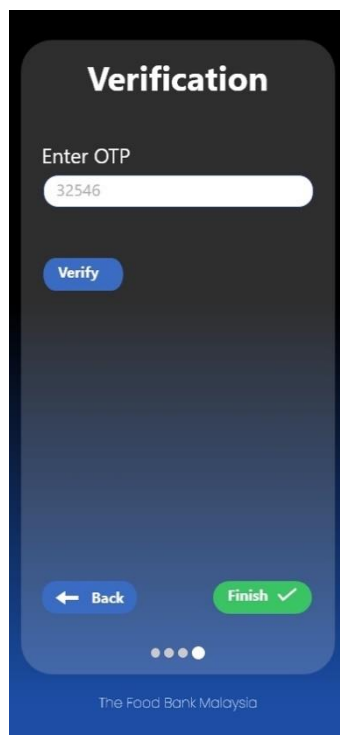
Figure 29 Enter the OTP received to verify the account

Login Page
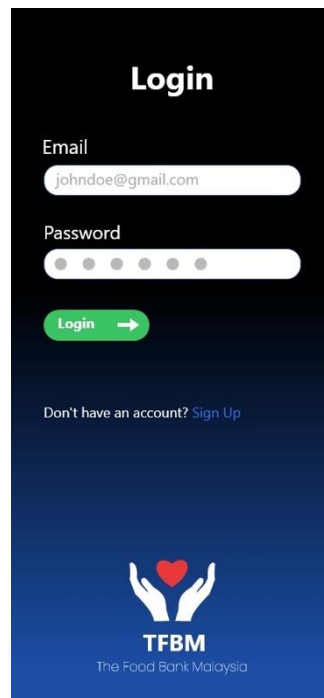
Figure 30 Enter email and password to login

Donate Page
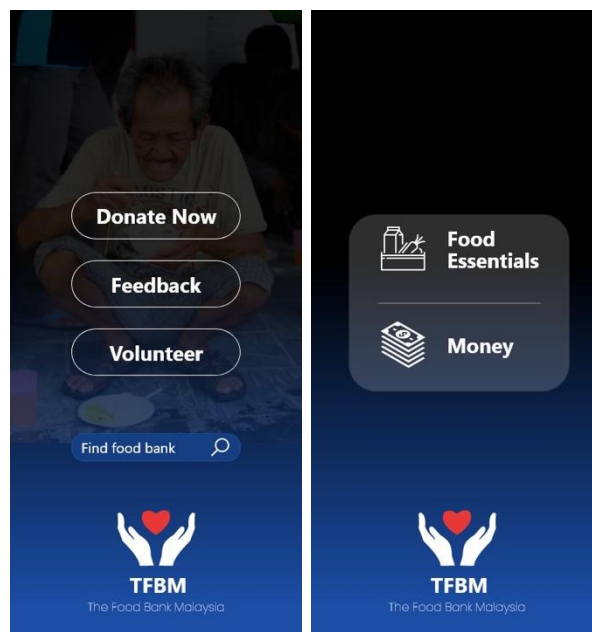
Figure 31 Select the type of donation

Donate Money

Figure 32 Enter personal details, card details and total amount of money for donation

Donate Food

Figure 33 Enter personal details and food details

<u>Select Food Page</u>
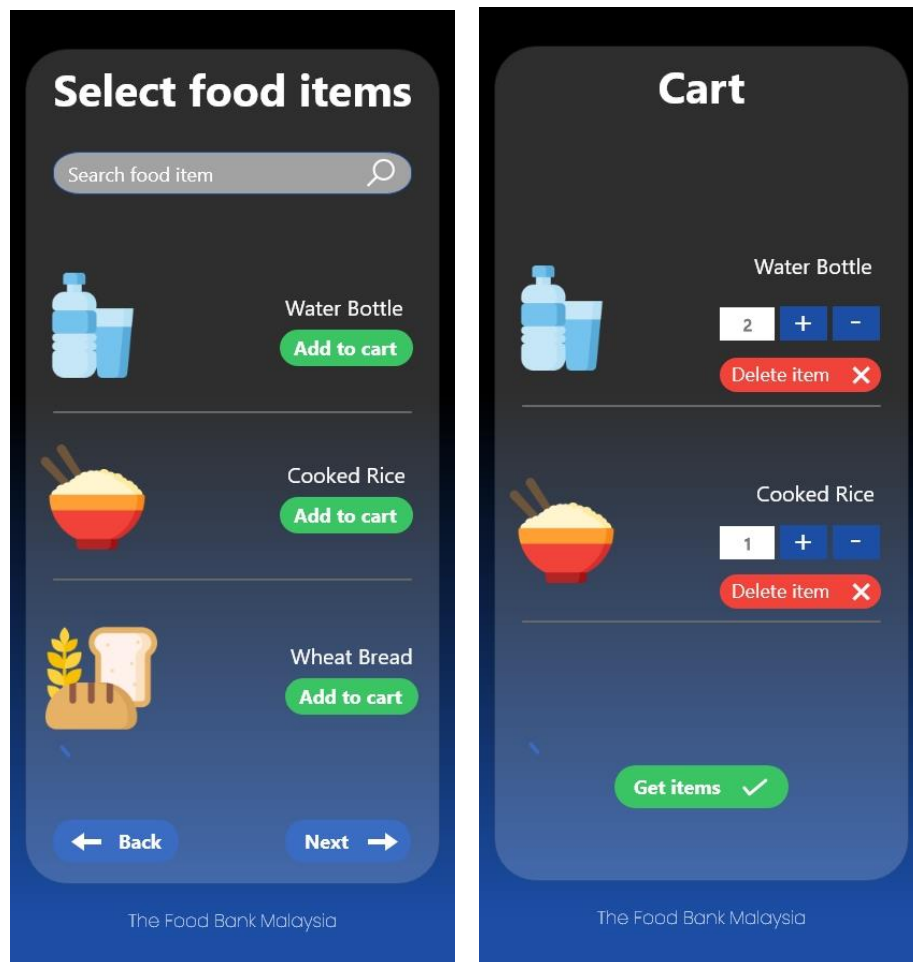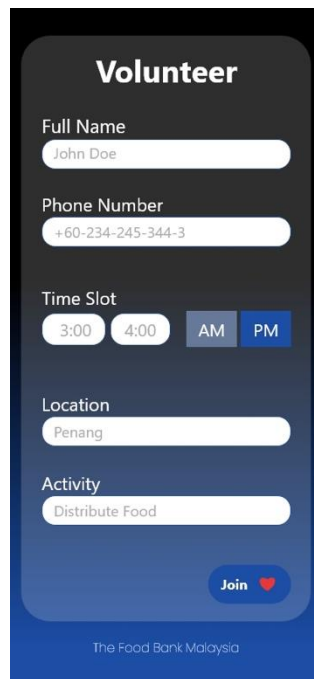
Figure 34 Select and the food items in the shopping chart

Volunteer Page

Figure 35 Enter personal details to sign up as a volunteer

Search The Nearby Food Bank Page

Figure 36 Search for food banks near the user's location

<u>Feedback Page</u>

Figure 37 View and write feedback

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