AITCS

Design and Development of Web-Based Foodbank Management System by Using Waterfall Approach

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Abstract: According to the Solid Waste Management and Public Cleansing Corporation (SWCorp), Malaysians produce a large amount of food waste which can fill seven Olympic swimming pools every day. The objectives of this system are to design a food bank management system based on user requirements, develop the food bank management system which contains a module for donators, a module for food and a module for food recipients using PHP and MySQL database and test all the modules and functions of the developed food bank management system. PHP and MySQL database are used to conduct the study. Imagining and determining what the final outcomes will be is the suggestion for future work.

Keywords: Foodbank, Management, Web-based

1. Introduction

In 2019, the solid waste has increased by 15%. For 2020, the solid waste had decreased 7% due to the covid-19 which caused the absence of Ramadan bazaars. SWCorp Federal Territories estimated that urban areas contributed 41% food waste to the total weight of waste components in 2020. From that 41%, it is estimated that average of 62.44% were unavoidable food waste while 37.56% can be avoided [1]. Hence, the food bank is needed to reduce the food waste and to feed the people who are in need. The action of Malaysians reducing food waste is focused by Malaysia Foodbank Program [2]. Manual record method to manage and record the food bank is used as the idea of foodbank is a sudden inspiration.

Food bank management system is a system which is developed for Foundation Suria Johor Bahru which provide food bank service to manage the stock of food bank. The COVID-19 pandemic has caused food insecurity and demand for free food [3]. Food insecurity need to be taken as a serious public health concern [4]. Since the situation of Covid-19 in Malaysia is getting serious, some industry

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cannot operate and cause the workers do not have salary so the food bank service to help them. The diets of low-income people may become characterized if food insecurity continues [5].

The manual record method maybe difficult for others to understand and will cause them confused. Moreover, the low efficiency in manual process is the main problem. The user does not need to use the computer to keep checking the report. The system will enable the users to generate report to download or print out the report so that they can check the details offline. This function can enable the users to view the report without access to internet and can save it as back up. This food bank management system which is developed specifically for book bank will make the management of food bank become easier and make the works become more simple. The users do not need to use manual record method to record because the manual record method is more complicated and may cause a lot of mistakes by others. From the suggestion of the people, the shop can create a better food bank which can help more people.

The objectives of this system are to design a food bank management system based on user requirements, develop the food bank management system which contains a module for donators, a module for food and a module for food recipients using PHP and MySQL database and test all the modules and functions of the developed food bank management system.

The target party for this food bank management system is Yayasan Suria Johor Bahru. This system cannot be accessed by unauthorized user. This is to ensure that information and data are protected. The staff of Yayasan Suria Johor Bahru needs to log in the system to view the record or to access the information of system. The system function module will include record of stock of food, record of donator and generate record. The special feature provided is the system can generate record of the food supplied by food bank.

By using this system, users able to manage their stock of food and generate report. First, user adds the type of food provided in food bank into the system. Then, user can update the quantity of the balanced stock of each type of food. The user can also delete the type of food which is not available. Other than that, the user can add the details of suppliers into the system. By using the system, the user can know that each type of food is supplied by which suppliers.

2. Related Work

2.1 Background

Food bank is a centralized warehouse which is registered as non-profit agencies which collected, stored and distributed food to charitable agencies or directly to needy people without any charges [6]. In 1967, the first food bank was built in US and act as a response to the rediscovery of poverty and hunger of the community. In 1979, feeding America was established and the national clearing house for food banks across the country. In the early 1980s, the US food banking model of providing emergency food assistance was imported across the border into Canada.

2.2 Term

A management system is the way of an organization manages the business to achieve the objectives. These objectives can be related to many different topics such as product quality and operational efficiency. Management systems are designed to manage an organization's procedures and processes. The foodbank management system is a system which is developed to ease the works of the organization which manage food bank. The system can record the details about the foodbank and the details of donators.

2.3 Technology

PHP and MySQL will be used to develop this system. PHP is open source product. PHP is a server side scripting language which is designed for web. PHP code can be embedded in HTML page to be executed when the page is operated. PHP code is interpreted at web server and generate HTML. PHP is a programming language with syntax very close to C/C++ [7]. PHP can work on all major OS currently used.

Starting from PHP version 5, MySQLi which is a new driver connecting to databases is implemented. MySQLi is developed to support the new features in the new version of MySQL. The new features and functionalities including object-oriented interface, support for prepared statements, support for multiple statements, and support for transactions.

There are many software development process models (SDLC) which are used during development process of software. The waterfall model is the classical model of software engineering. It is referred as a linear-sequential life cycle model. In a waterfall model, each phase must be completed before the next phase can begin. The waterfall model serves as a baseline for many other lifecycle models. The waterfall model phase begins with communication, planning, modelling, construction, and finally deployment phase [8].

For the development of this food bank management system, the waterfall model will be used. It is because waterfall model is simple and easy to understand. Waterfall model can be managed easily due to the rigidity of the model. One phases can be completed at a time. It defines stages clearly and easy to arrange the tasks. The process and results for waterfall model are well documented.

2.4 Study of existing system

2.4.1 Food bank management solution by Primarius

Food bank management solution is designed specifically for food banks and the communities they serve. Primarius develops the community resource management solution which helps the organizations to achieve their mission. Food bank management solution is a web-based platform with the tools to efficiently manage the operation. Food bank management solution's capabilities giving user a flexible and integrated solution for serving the community. The system provides better management and communication with the volunteers. It interacts with the agencies through more than just online ordering. It provides the tools to assist the agencies in servicing households in need. It efficiently and accurately receives, processes and distributes inventory. By using food bank management solution which is specifically developed for food banks, the user able to streamline the food bank operations and enabling the user to focus on the community they serve [9].

Food bank management solution enable the agencies to download report, record client services and enter statistics. It will enforce stats entry by restricting online ordering until the agency fulfill the requirements. The e-signatures will enable the agency to sign electronically for the orders when pick up or delivery. It includes the client services feature which enable the agency to log the households they serve. The agency can record the pickup and view the order history. The agency can download the paperless invoices or statements.

Food bank management solution helps the user to gain better communication with the volunteers and the management of the volunteers. It can add shifts with volunteer capacity and create custom volunteer applications. It can post new opportunities and review or approve volunteer's applications. For portal features, it can apply for opportunities as an individual or a group. It can clock in or out of a shift and view the available events and shifts. It can view the volunteer history and details.

2.4.2 Automation foodbank management system by Intelicle Ltd

UK food aid is a Nottingham based charity. It provides food bank service to the local community. The management of the food bank become more difficult due to the increasing demand of

food. The system is created to manage food bank operations easily by using automation. The system simplifies the process and makes use of time of staff, volunteers and drivers [10].

This foodbank management system allows foodbank to use the latest technology and automate the day to day operation. The system makes the foodbank become paperless which means that the user can focus on helping people. The system can help to reduce human error in managing the system by reducing paperwork which is done by people. There are a lot of foodbanks which work with referrals. The referrals can be social workers or charity organizations. The referrals are emailed to the foodbank which will then be verified and catalogued.

Foodbank Management System provides portal to the referrers which enables them to input the data and submit to the food bank in real time. Next, the food bank will process and scheduling the time to send the referral to the needy people. The scheduling module shows calendar view the date and time of the needy people get their food. The distributors can view their schedule and update the delivery status so that the food bank knows who has received successfully.

Food bank management system will keep track of the inventory. Food bank management system record all the information such as age, contact number and location during the referral process. These data can be used to apply for funding by showing how many people need to be helped, the range of age of the groups and the service areas. By using the report module, user can generate the reports in seconds instead of spending time on compiling the data.

The referrals are made in real time to save time. The system is designed with the collaboration of the charities so it is easy to be used. The user can use the system to manage the food and cash donation easily. The system is secure so the charities can deal with private information as the system is emphasis on security. The system has access control. Charity organisations can take control over who can view the sensitive data. For scheduling, the user does not need to waste time on creating and managing schedule. The user can print the daily schedule with just one click.

2.4.3 Cloud based foodbank manager by Sox Box Software

Food Bank Manager is a cloud-based tracking database for food banks and pantries that is extraordinary easy-to-use. With FoodBank Manager, user can quickly cut through the paperwork and dedicate more time to provide better service. FoodBank Manager is a client-tracking tool developed by Sox Box to manage the food bank. The user can use the system to track all the numbers which are required by the partners with just simply a push of button [11].

Sox Box Software started as a family partnership in February, 2011. The main purpose of the company is to provide food pantries with exceptional and low cost software solutions to assist in feeding the large amount of people in an organized and efficient manner.

Sox Box Software took their experience by publishing many versions of software for the church for several years prior to the beginning of the company. The experience gained and the passion share to help others had led to the decision to start a company which bring to a new program for food banks which is " Food Bank Manager". FoodBank Manager was released in May 2011.

Sox Box Software ensures that the program and the company's mission fulfill the following requirements without exception. The first one is simplicity. The system needs to be user-friendly. This requirement needs to consider the experience levels of the users. Next, their goal is to provide inexpensive new program. Third one is relevant. The program must achieve the requirement of the pantry. Next will be partnership. Sox Box Software will create trust between the pantry and the Sox Box team through the unyielding support and commitment to the specific needs. The last one will be excellence. Sox Box Software will do well in what they do. They will assist to help needy people because it is their passion.

FoodBank Manager is cloud based application which allow user to work anywhere and make sure the data is safe and secure. It is perfect when working from home and home deliveries. FoodBank Manager has time tracker. It can be used to record the working time of the volunteer within the organization. FoodBank Manager provides private single databases for smaller organization and shared databases for larger organizations. FoodBank Manager provides many prebuilt reports which is designed to be used in the program. The user can create customized report based on the program. FoodBank Manager includes a full featured donation management tool which is free of charge. It can be used to record and report any donations which are received. FoodBank Manager standardizes the guest address when it is input into the program. This can prevent the creation of duplicate accounts.

2.4.4 Food pantry manager

FPM is a web based tools which are designed to help local food pantry managers and operators to manage the pantry effectively and more efficient in the daily operation of their pantry. As the hunger and homelessness become a serious reality, it has increased the need for sustainable local food pantries to help the needy people. The requirements of record keeping and coordinating volunteer and workers can be overwhelming and will often be affected from the other tasks necessary to keep an organization running. Food Pantry Manager is dedicated to create useful and affordable tools that will make the administrative aspects of any local food pantry become easier and more efficient. The system had been built with non-profit organizations which believe that the local budget limitations should not restrict an organizations ability to have access to the best tools available to help them manage their food pantry [12].

Any food pantry or food bank would take advantages by using Food Pantry Manager as part of its daily operation and management. The managers and workers of pantries can use the Food Pantry Manager to help alleviate the daily management of their food pantry. Food Pantry Manager is designed to achieve the requirement of end user to make the process of record keeping and reporting become easier and more accurate.

Food Pantry Manager have many features. The data can be accessed securely from anywhere. It is because Food Pantry Manager is an online tool. Food Pantry Manager uses the most current security standards to make sure that the data is always safe so all the users need to know is the username and the password to access the pantry data. Next, Food Pantry Manager offers paperless data management. With Food Pantry Manager, the users never have to worry about losing the documents or bringing pen and paper all day. Every documents in Food Pantry Manager is in one easy to use tool and can be accessed with the click of a button from anywhere in the world.

Food Pantry Manager offers unlimited user accounts. Users can use Food Pantry Manager to set up unique user accounts for all the volunteers with specific levels of access. Food Pantry Manager provides one click reporting. Each registered account comes with three standard reports format and the users can customize own reports so the users can always access to the data with just a click of the button. Food Pantry Manager offers secure client data storage. All the clients' data will be stored in one place and users can securely access from anywhere.

2.4.5 PantrySOFT by Cedar Mountain Software

PantrySOFT is the all-in-one management software for food banks, food pantries and food shelves. PantrySOFT helps food banks, food pantries and food shelves to manage all aspects of their operation. The client includes food pantries, food banks, meals on wheels delivery operations and universities. The app is designed with flexible settings and features to execute a wide variety of operations. Customer's feedback is a main driver for developing new feature. This means that PantrySOFT is constantly evolving to meet the changing needs of our pantry partners [13].

PantrySOFT makes the client management easier. It records the visit information of the clients including outgoing inventory, custom visit types, and custom questions pertaining to each visit. The software offers a simplified intake screen so customers can check themselves in. The software lets the users to choose from three intake modes which are a full-featured dashboard, a simplified "kiosk" interface, and an online portal where clients can check themselves through online. PantrySOFT makes it easy to consolidate the report whether it is for a manager or a potential funder. This reporting tools will help the users to see flow of the data with a simple click. Registrations are one of the important key in PantrySOFT and it allows you to record client eligibility and whole-household custom questions.

PantrySOFT offers tailored user roles for managing access to menus and restricting edit and delete permissions. It restricts certain users from editing or deleting records. It hides certain advanced menu structures from lower-level employees and volunteers. It assigns roles to certain users that will immediately direct them to specialized screens upon login. PantrySOFT settings allow the users to tailor the software to match the workflow. This can mean changing visit frequency rules, changing the labels on certain fields, or activating entire dashboard widgets. For self-service kiosk, clients can check themselves in. The Kiosk mode in PantrySOFT provides these users a simple search bar and access to a few key intake screens. The home Page is a simple search bar for finding and checking in clients. It has easy check-in with just two main screens which are registration and visit. PantrySOFT has inventory control which makes it easy for small and large teams to track food received and outgoing of the locations.

2.4.6   Comparison existing application with the proposed application

Table 1 shows the comparison of existing application.

Table 1: Comparison between existing application

System Features	Food Bank Management Solution by Primarius	Automation Foodbank Management System by Intelicle Ltd	Cloud Based Foodbank Manager by Sox Box Software	Food Pantry Manager	PantrySOFT by Cedar Mountain Software
Register and Login	✓	✓	✓	✓	✓
Store Data of Donators	✓	✓	✓	✓	✓
Update Donators' Information	✓	✓	✓	✓	✓
Data of Needy People	✗	✗	✗	✗	✗
Record Food Stock	✓	✓	✗	✓	✓
Payment	✓	✓	✓	✓	✗
Access Control	✓	✓	✓	✓	✓
Generate Report	✓	✓	✓	✓	✓
Donation	✓	✓	✗	✗	✗
System Type	Web Based	Web Based	Cloud Based	Web Based	Windows based

✓: available

✗: not available

2.4.7 Web-Based food bank management system

The web-based food bank management system will enable user to login and register. It will store the data of donators. The system will update the donator's information. It will store the data of needy people. It will record the food stock of the foodbank. It allows the donator to pay via the system. It provides access control. The system can generate report of name list and food stock. The system will have donation module which enable the donator to donate through the system. The type of the system will be web-based.

3.   Methodology/Framework

3.1   Methodology of the study

For the development of this food bank management system, the waterfall model will be used. It is because waterfall model is simple and easy to understand.

3.1.1 Requirement analysis

This is the first phase which includes the understanding the requirements to design and its function and purpose. During this phase, the detailed requirements of the proposed system are gathered from users. The specifications and requirements of the final product are studied and marked.

At this phase, a clear figure of the proposed system is produced. There are seven interview question are prepared to let the target of users answer. The interview session is recorded with the founder of Foundation Suria Johor Bahru to collect the information of the current system used. Next, the answer of the interview will be analysed. There are two problems have been defined in this phase. First problem is the foundation use manual record method to manage the in and out of the food. The manual record method maybe difficult for others to understand and will cause them confused. Moreover, the low efficiency in manual process is the main problem.

It is because the volunteers working in the foundation is not familiar with the function of computer and they cannot use the system which is complicated for them. Second problem is ability to get financial support. The foundation totally relies on the financial support from the public because it does not get help from the government.

As the problems are identified, the objectives and the scopes of the proposed system are defined. There are three objectives in this project which are to design, to develop and to test the developed system. The scope of the project will be focused on the volunteers of Foundation Suria Johor Bahru. The goal of the project is set to be achieved.

3.1.2 Design

The design phase is the consideration of the design of system which is separated to two aspects which are user interface design and implementation design. The user interface design will show how the interface would look like for the user to use. The implementation design is to help the developer to have the idea for the development of the system.

The user interface design need to be user-friendly and not complicated. It is to enable user can use the system at ease. The user interface design will plan the arrangement of the display elements in the system. The design phase also include wireframe. Wireframe is the blueprint of the interface which show briefly about the designed interface. Wireframe is efficient to develop the system by implementing the code since the developer have a clear idea of how the system will look like.

The implementation design will include all the processes which will be carried out to develop the system. It will include the structure of Unified Modelling Language (UML) Specification. It is needed to help the developer to have idea indirectly during the deployment of the system.

3.1.3 Implementation of coding

The implementation phase is the phase where the tools starts to implements all the defined requirements and the design which have been done in the previous phase. The interfaces and all the functions of the modules will be developed by using PHP programming language and the database used will be MySQL database.

3.1.4 Testing

After completing the implementation, testing needs to occur before the product is released to customers. The testing phase is important to ensure the system will function well. Three types of testing which are requirements based testing, system testing and user testing will be carried out.

Requirement Based Testing is test where the specifications used to test cases, condition and results. It includes functional testing and non-functional attributes such as performance, operational and security. Table 2 shows the functional requirement and non-functional requirement.

Table 2: Requirement

Functional Requirement	Non-functional Requirement
The system allows the volunteers to view the current stock of foodbank.	If the user wants to get access to all the functionalities of the website, he/she should log in using his username and password.
The system allows donators to donate through the system.	The website shall run on handheld devices.
The system records the donations.	The website shall be able to work on any web browser.
The system allows the volunteers to create new recipient.	

System testing is that different tests are performed to evaluate the usability and identify problems. All the functional and non-functional testing need to be studied carefully. User testing is last phase of software testing. The end user is involved in testing the system to validate whether the system meets the requirements.

3.1.5 Deployment

In this phase, the system is deployed into a live environment which is client's server to test its performance. The system will become available to end-users since the software is deployed. This phase may include training of real-time users to communicate benefits of the system.

3.1.6 Maintenance

After the deployment phase, the next phase is to provide support and maintenance for the system to make sure it can run smoothly. The developer needs to fix the system if the client and users come across errors or bugs when using it. This will be the main purpose of this phase.

3.2 Project planning

The project is planned from 5/8/2021 until 30/6/2022. The first task is to confirm the title of final year project. During this period, the title need to be discussed and approved by the supervisor. Then, the proposal is started to be prepared and submitted. After the proposal is submitted, the report can be started to prepare so that it can be submit before the deadline. Next, presentation needs to be prepared. During semester 2, system is designed and this task will spend a lot of time to develop and

test the system. After the system is developed, the completed system will be presented to the lecturer. Figure 1 shows the gantt chart.
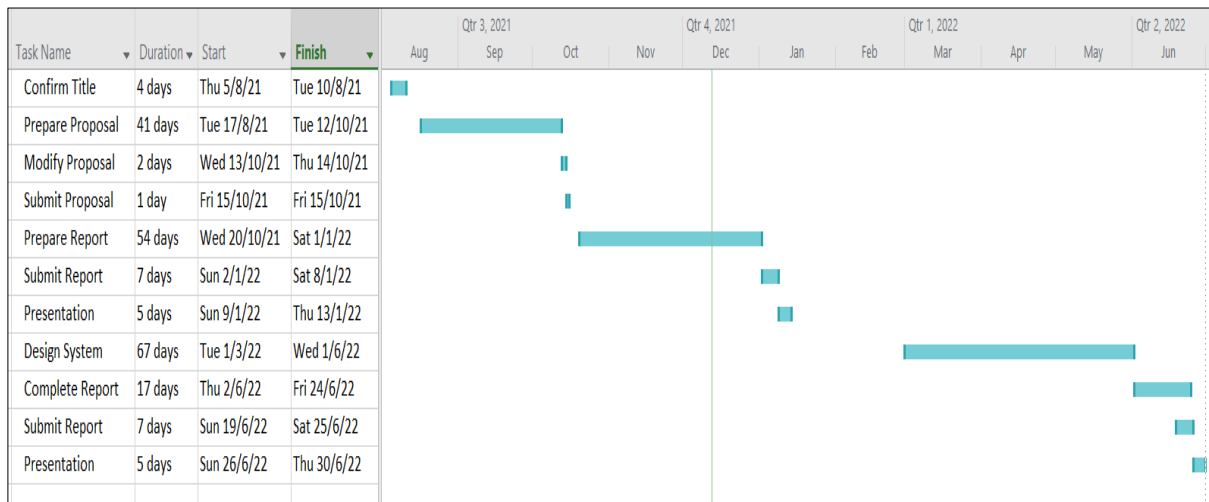
Task Name	Duration	Start	Finish
Confirm Title	4 days	Thu 5/8/21	Tue 10/8/21
Prepare Proposal	41 days	Tue 17/8/21	Tue 12/10/21
Modify Proposal	2 days	Wed 13/10/21	Thu 14/10/21
Submit Proposal	1 day	Fri 15/10/21	Fri 15/10/21
Prepare Report	54 days	Wed 20/10/21	Sat 1/1/22
Submit Report	7 days	Sun 2/1/22	Sat 8/1/22
Presentation	5 days	Sun 9/1/22	Thu 13/1/22
Design System	67 days	Tue 1/3/22	Wed 1/6/22
Complete Report	17 days	Thu 2/6/22	Fri 24/6/22
Submit Report	7 days	Sun 19/6/22	Sat 25/6/22
Presentation	5 days	Sun 26/6/22	Thu 30/6/22

Figure 1: Gantt Chart

4.   Results and Discussion

Requirements analysis which is also called requirements engineering refers to the process of determining user expectations for a new or modified system. Requirements are divided into two types which are functional and non-functional requirements. Table 3 lists the functional requirements while table 4 is updated functional requirement analysis.

Table 3: Functional requirements analysis

| Module	Functionalities
Register -donators -volunteers of the foundation	-User registers as a new user to the system -System alert for invalid input
Login -donators -volunteers of the foundation	-User inputs registered ID and password -System alert for any incorrect input.
Donation -donators	-User select the donation option. -User complete donation.
Management -volunteers of the foundation	-User manage the stock of the foodbank.

Table 4: Functional requirements analysis (Updated)

Module	Functionalities
Register -volunteers of the foundation	-User registers as a new user to the system -System alerts for invalid input
Login -volunteers of the foundation	-User inputs registered ID and password -System alerts for any incorrect input.
Donation -donators	-User inputs the donation amount. -User completes donation.
Management -volunteers of the foundation	-User manages the in-and-out of the foodbank. -User generates report -User updates profile

Non-functional requirements are quality constraints which the system must satisfy according to the project contract. Table 5 lists the functional requirements of the project.

Table 5: Non-functional requirements analysis

No.	Requirement	Description
1	Performance of the user interface and system flow	-System should be located to the correct session depend on the user authorized.
2	Operational	-System only available with internet connection.
3	Security	-User can only access the system with correct ID and password. - The password is encrypted.

Figure 2 shows context diagram of the system. It has two entities which are volunteers of the foundation and the donators. Figure 3 shows updated context diagram.
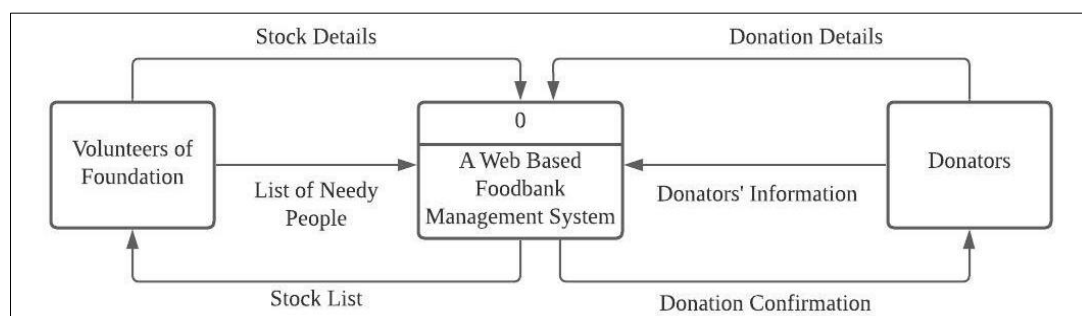
Figure 2: Context diagram
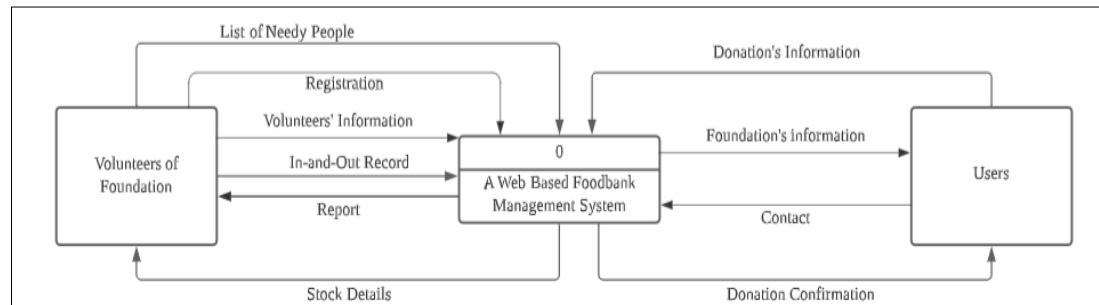
Figure 3: Context diagram (Updated)

Figure 4 shows data flow diagram level 0 of the system. This figure shows all the process in the system. The system will have three main function which are donation, foodbank management and users' information management. First process is the donation which enables the donators to donate to the foundation. Donators inputs the details and complete donation. Then, the system sends a receipt to the donators after receiving donation.

Next process is foodbank management. The foodbank management is used by the volunteers of the foundation. The volunteers input the details of food donated into the system. The system returns the stock availability. The third process is users' information management. The volunteers can input the list of needy people into the system. They can store the details of the needy people. They can update the information of needy people through the system. The system stores the details of food received by the needy people.
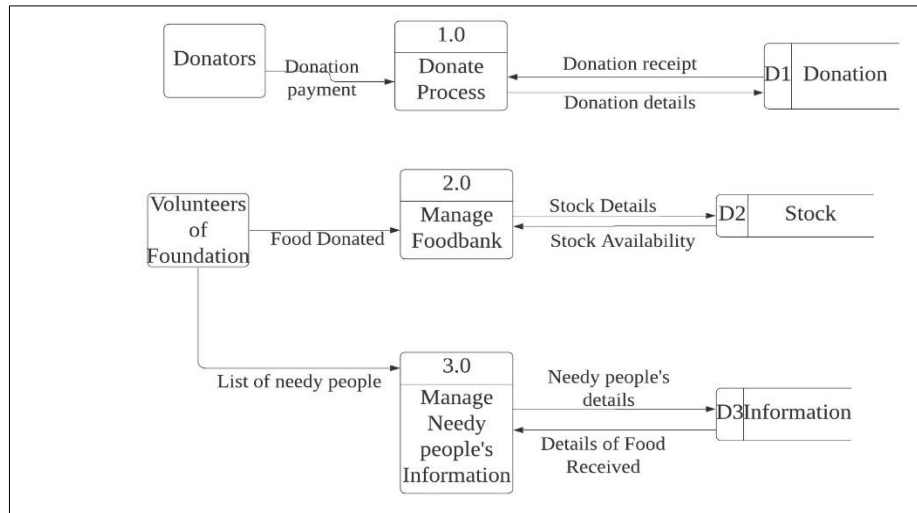
Figure 4: Data flow diagram level 0

Figure 5 shows the flow chart of the system. The system starts with the login of the users. The user needs to enter the ID and password in order to login into the system. If the user is new to the system, he needs to register first. After logging in, the user is directed to the homepage. The donator can donate through the system. The volunteers of the foundation can manage foodbank and needy people's information. Figure 6 shows updated data flow chart.
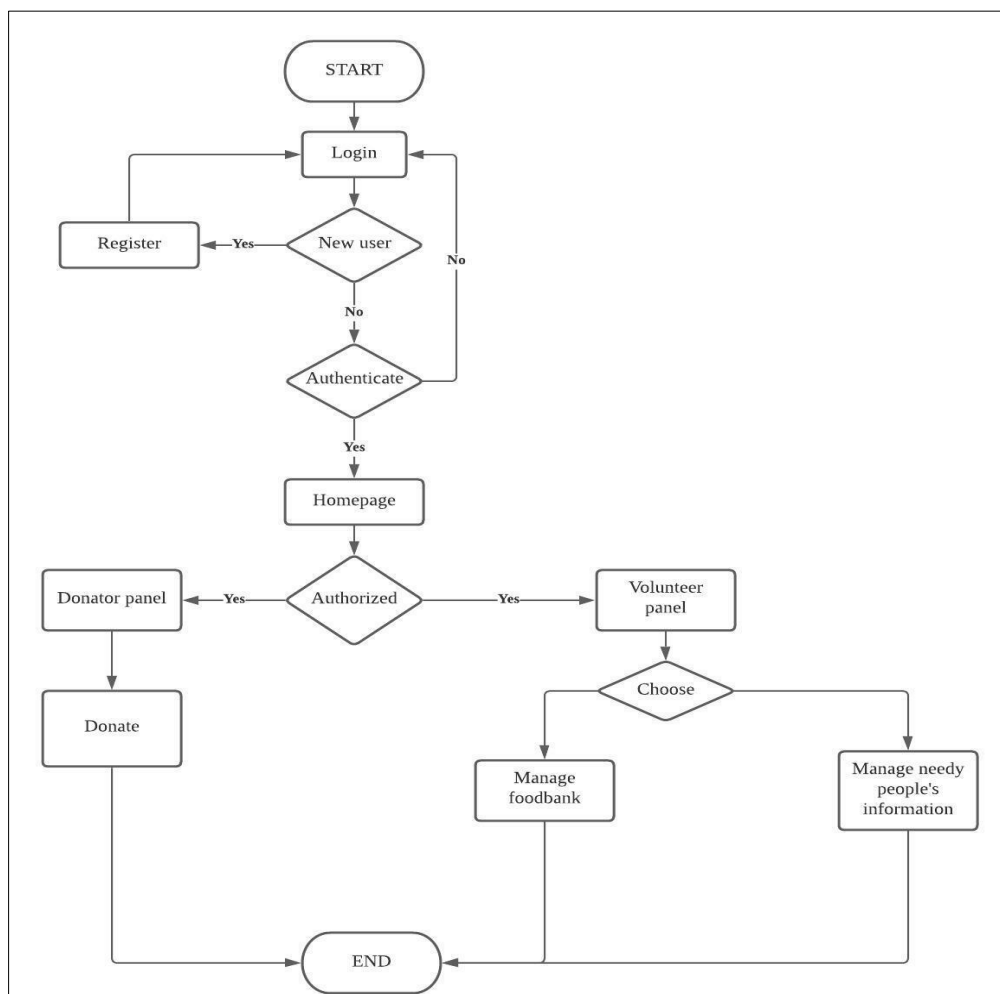

Figure 5: Flow chart
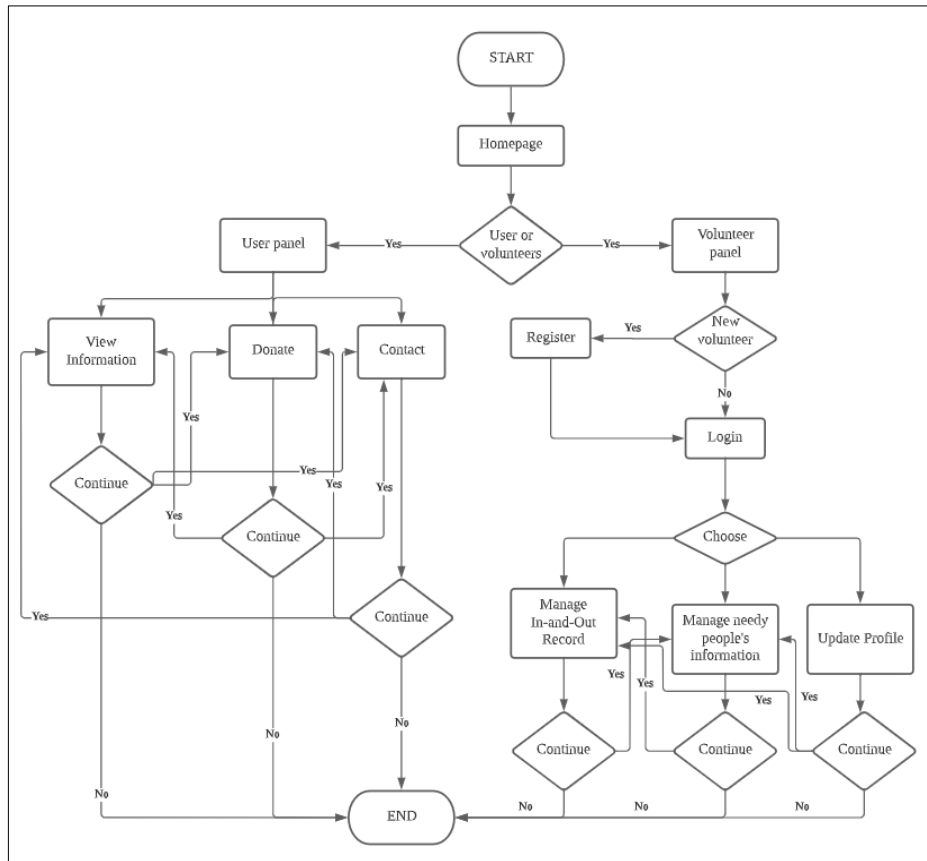
Figure 6: Flow chart (Updated)

Entity relationship diagram (ERD) is also known as an entity relationship model. It is a graphic which represents the relationships among people, objects, places, concepts or events of a system. Data modeling techniques are used in entity relationship diagram to define business processes and serve as the foundation for a relational database.

Entity relationship diagrams provide a visual starting point for database design which can be used to determine information system requirements of the system. An entity relationship diagram can act as a reference point after the relational database comes out. Figure 7 shows the entity relationship diagram of the web based foodbank management system. Figure 8 is updated entity relationship diagram.
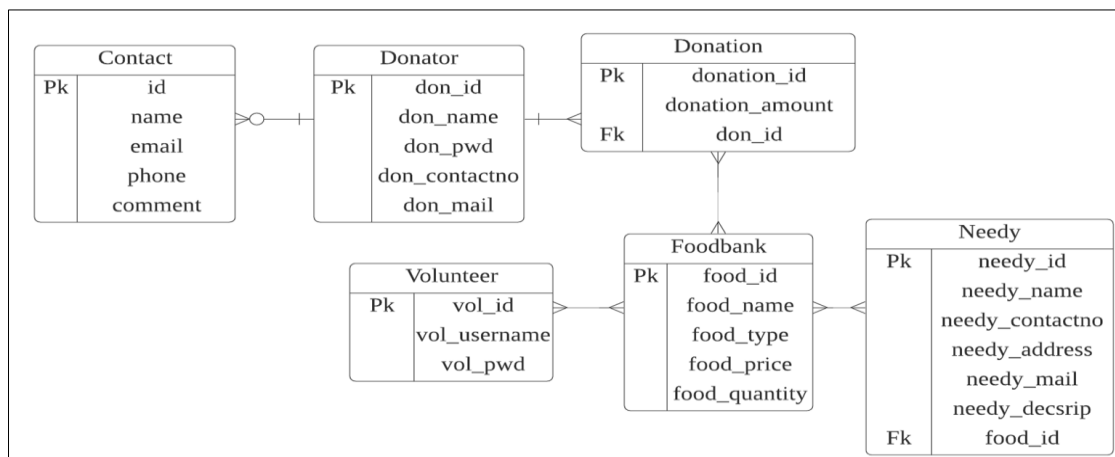
Figure 7: Entity Relationship Diagram
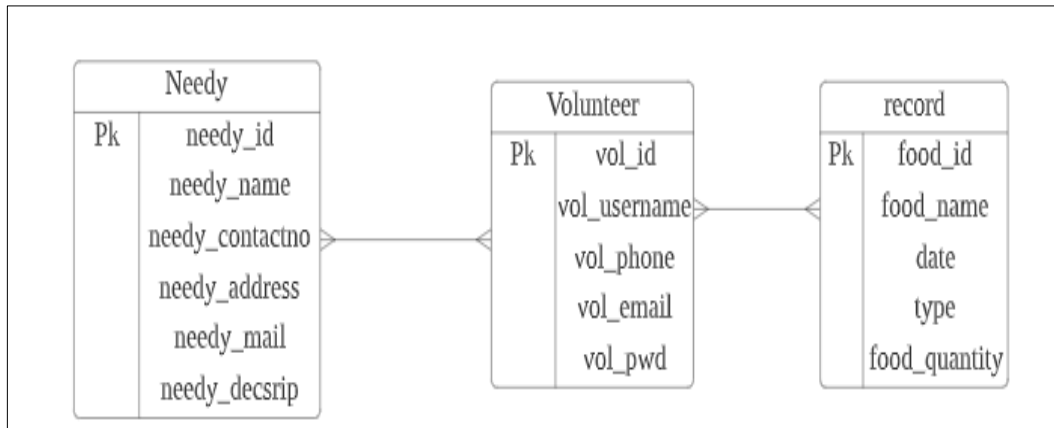
Figure 8: Entity Relationship Diagram (Updated)

Test plan is a detailed document that describes system testing areas and activities. It helps set out how the software is checked, what is needed to be tested, and who is going to perform the test. Test plans is important to list down what is new in the system and what needs to be tested. Table 6 shows the test category. Table 7 shows the test plan while Table 8 shows the security check list for the system.

Table 6: Test category

Test Category	Description
1	Test the functionality of the system will enable donators to donate.
2	Test the functionality of the system will enable users to manage stock availability of foodbank.
3	Test the functionality of the system will store and manipulate the needy people's data.

Table 7: Test plan

Test Category	Description	Expected Result	Actual Result
1	Donation: I. Click on the donation to select amount II. Online Payment	I. Option appears. II. Payment can be done.	Pass/Fail
2	Manage Stock Availability: I. View the stock list. II. Update stock details. III. Delete the selected stock.	I. Stock list is displayed. II. Stock list is updated. III. Data is deleted.	Pass/Fail
3	Manage Needy People's Data I. View the list. II. Update details. III. Delete selected data.	I. Name list is displayed. II. Details is updated. III. Data is deleted.	Pass/Fail

Table 8: Security check list

NO	Check List	Actual Result
1	Ensure the error message does not direct indicate which part of the authentication data incorrect.	Pass/Fail
2	Password is obscured in the textbox.	Pass/Fail
3	Password is encrypted.	Pass/Fail

5. System Implementation and Testing

5.1   Implementation of security module

The password is encrypted and saved into database if the password input is in the correct format and does not have error. The md5() is used to encrypt the password before saving in the database. The md5() function calculates the MD5 hash of a string. The MD5 message digest algorithm takes a message of any length as input and produces a 128-bit "fingerprint" or "message digest" of the input or 32 characters hexadecimal number as output. Another feature of MD5 is that the algorithm will always create the same fingerprint for a given string. For password security, the password must be at least 8 or more characters which contain at least one number, uppercase and lowercase letter. The pattern attribute is used with the regular expression in the password field to set the form submission constraint.

5.2   Implementation of module

5.2.1   Implementation of donation module

The donation form requires the user to input the credit or debit card number, expiry, CVV and amount of the donation. The system fetches the information input in the form and show them in the donation confirmation page. The $_POST is used to collect form data after submitting an HTML form with method="post". When the user submits the information by clicking on "Submit", the information is sent to the file specified in the action attribute of the <form> tag.

5.2.2   Implementation of login module

The volunteers need to input the username and password registered. After volunteers successfully login to the system, they will be redirected to the home page. If the user is a new volunteer, then he needs to register an account. To register an account, the user needs to insert his username, phone number, email, password and then confirm password. After he fills in all the fields and click on 'register' button, there is a pop out message that tells him that registration successfully and he need to login by using the username and password registered. If there is no error during filling of the registration form, the password is encrypted before saving in the database.

5.2.3   Implementation of in-and-out record module

The volunteers click on the 'insert new record' button, they need to fill in the form. They select the food from the drop down list, choose date, and then tick the checkbox of in or out, input quantity and then record is created. When the volunteer clicks on the 'edit' button, he will be redirected to a form which enable him to update the data. The form present the current data recorded and the volunteer can edit and update the data. After the volunteer insert the in-and-out record for every food, the system calculates and updates the stock automatically. The volunteers can search by using any keywords and the results are shown. After the volunteer clicks on the 'delete' button, a confirmation message is popped out to ask for confirmation of deleting the record. Figure 9 shows the latest stock.

Figure 9: Latest stock

5.2.4   Implementation of needy people module

The volunteer needs to input the name, address, email, phone number, and description of the needy people. When the 'update' button is clicked, the data of the needy people is presented in the form. The volunteer can edit the data and update new data. When the 'Delete' button is clicked, a confirmation message is popped out. When the volunteer confirms to delete the needy people, the needy people is deleted from the database. The volunteers can search by using any keywords and the results are shown. Figure 10 shows the insert needy people form. Figure 11 shows the needy people page.

Figure 10: Insert needy people form

No	Name	Contact Number (Self/Siblings/Friends)	Current Living Address(Line 1)	(Line 2)	Email	Description	Edit	Delete
1	satifa	197223248	2,jln kekayaan 9,tmn johor	81300 skudai jb	satifa@gmail.com	deaf	Edit	Delete
2	shaa	126452137	blk 5,taman tun aminah	81200 tampoi	m12@gmail.com	injured	Edit	Delete
3	farah	129875146	39,jln budaya8,tmn gaya	81750 permas jaya	frh@gmail.com	1-parent	Edit	Delete
4	ali	181521492	32,jln jaya 9,tmn u	81100 tebrau	-	injured	Edit	Delete
5	latiha	189752103	9,jln kebudayaan 3, tmn tebrau	81100 tmn tebrau	-	orphan	Edit	Delete
6	latofa	75212157	blk 5, tmn gaya	skudai	-	deaf	Edit	Delete

Figure 11: Needy people page

5.2.5   Implementation of report module

The volunteer selects the in-and-out report by month and needy people list by housing area from the option. After choosing the option from the drop down list, the data related to the option is

shown in the report format. Then, the volunteer can print or download the report by clicking the button upside the table. The volunteer can choose to download or print the report. When the button is clicked, the report is generated in the form of pdf file. The width of each cell is controlled by the first number. Second number represents height and followed by the text which is shown in the report. The next number represents no boarder or framed. The next number refers to the position after cell. The last character 'C' means align to center.

5.2.6 Implementation of profile module

The volunteer can update his information such as username, phone number, email address and password by editing the form and updating it. The system brings the information into the form and enable the volunteer to update his data. When volunteer clicks on the "update" button, the data in the form is saved in the database. After the volunteer edits the data and updates it, a pop up message "profile updated successfully" is shown.

5.3 Testing

5.3.1 Test plan results

Table 9 shows the test category. Table 10 shows the test plan results from three test category which is testing the functionality of enable visitors to donate, manage stock and store needy people's data. The system manages to pass all the tests. Table 11 shows the security check results of the system.

Table 9: Test category

Test Category	Description
1	Test the functionality of the system will enable donators to donate.
2	Test the functionality of the system will enable users to manage stock availability of foodbank.
3	Test the functionality of the system will store and manipulate the needy people's data.

Table 10: Test plan results

| Test Category	Description	Expected Result	Actual Result
1	Donation: I. Input card number and amount II. Online Payment	I. Data can be shown. II. Payment can be done.	Pass
2	Manage Stock Availability: I. View the in-and-out record. II. Update in-and-out record. III. Delete the selected record.	I. In-and-out record is displayed. II. Record is updated. III. Data is deleted.	Pass
3	Manage Needy People's Data I. View the list. II. Update details. III. Delete selected data.	I. Name list is displayed. II. Details is updated. III. Data is deleted.	Pass

Table 11: Security check result

| NO	Check List	Actual Result
1	Ensure the error message does not direct indicate which part of the authentication data incorrect.	Pass
2	Password is obscured in the textbox.	Pass
3	Password is encrypted.	Pass

5.3.2   User acceptance form result

Figure 12 shows 2 users satisfy with the statement "User is able to input the card information into the form." and "User is able to complete donation by using the system.". The other 8 users are strongly satisfied with both the statement. For the login module, all users are strongly satisfied to the register, login, and log out of the system.
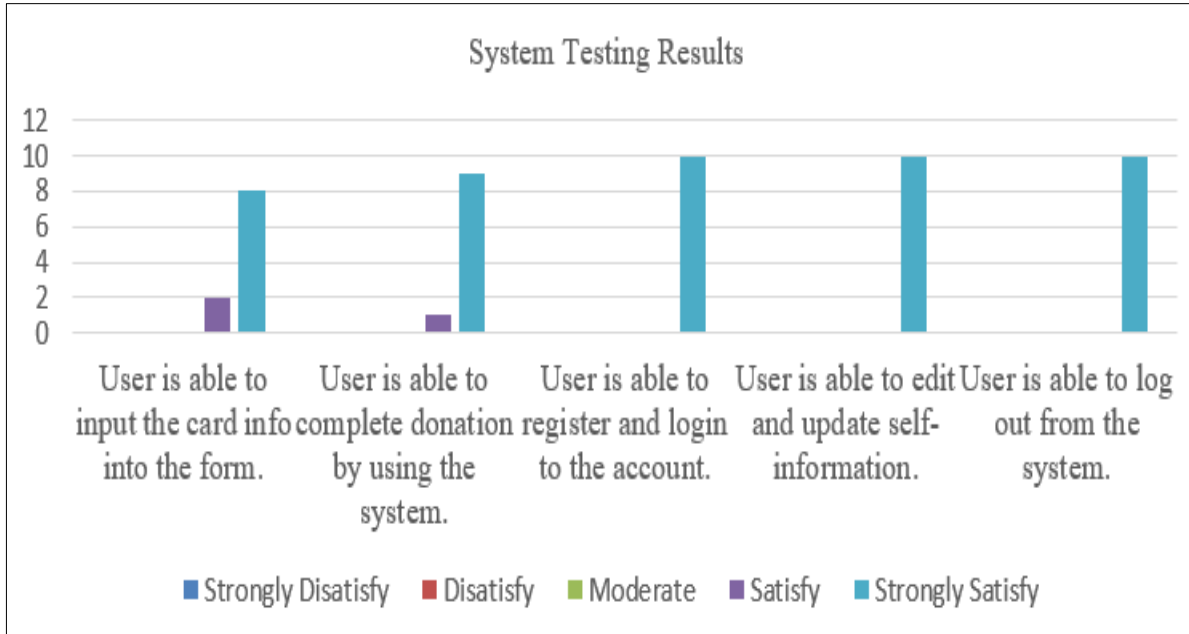
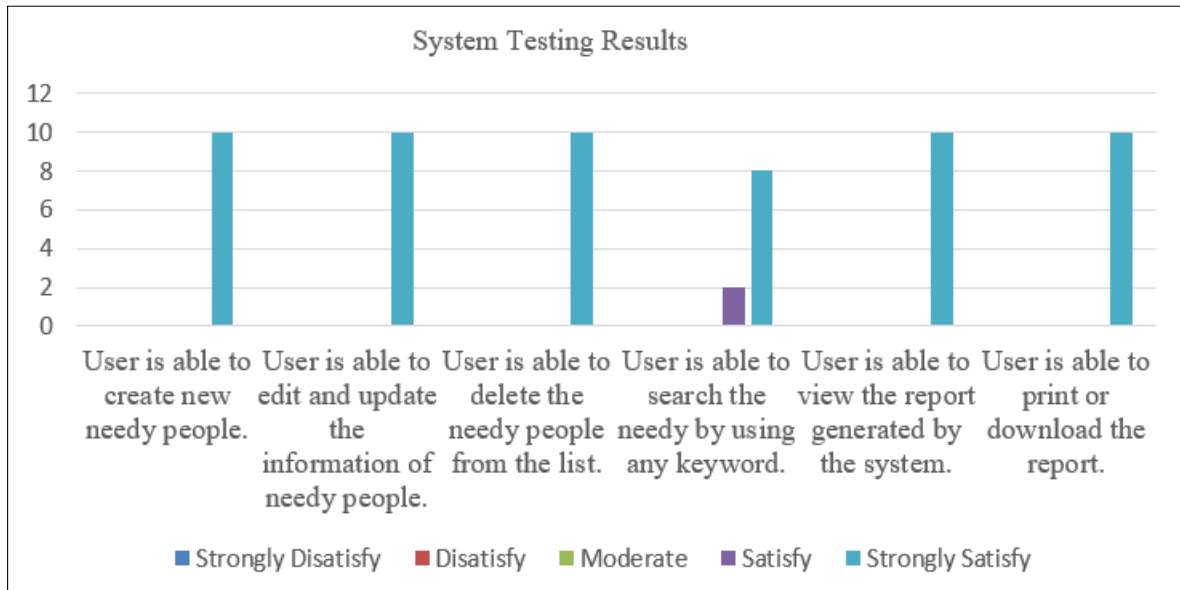**Figure 12: System testing results for donation and login module**

Figure 13 shows all the users are strongly satisfied with the create, update, and delete of the in and out module. They are also strongly satisfied with the system which shows latest stock of the foodbank. For searching record, one user is satisfied with it while the other 9 users are strongly satisfied with it.
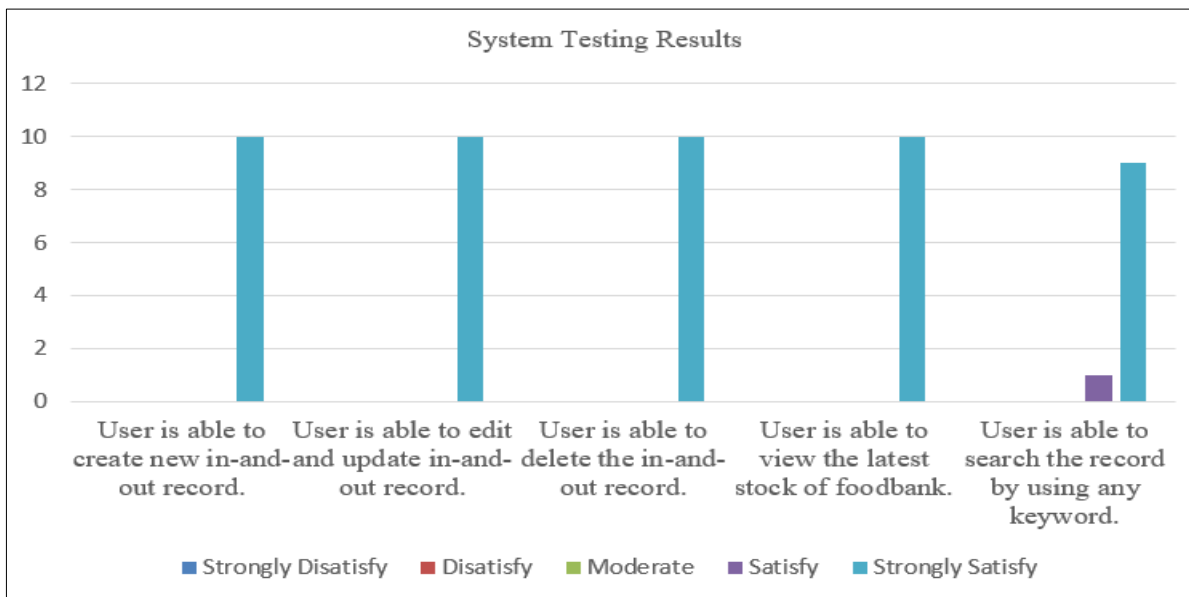
**Figure 13: System testing results for in and out module**

Figure 14 shows all users are strongly satisfied with the create, update, and delete of the needy people module. There are 2 users are satisfied with the searching needy people of the system while 8

users are strongly satisfied with it. From the figure 14, it shows that all ten users are strongly satisfied with the function which enable them to view the report generated by the system and they are able to print or download the report generated.

Figure 14: System testing results for needy people and report module

Figure 15 shows all users are strongly satisfied with the error message which does not indicate which authentication data is incorrect. All ten users are strongly satisfied with the password is obscured in the textbox.
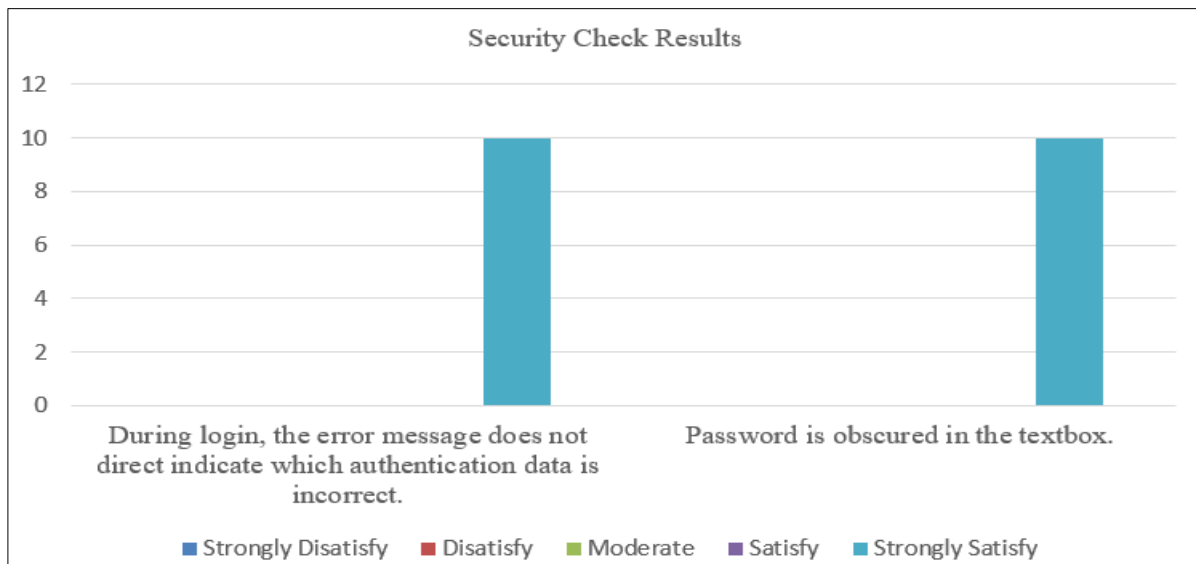
Figure 15: Security check results

6.   Conclusion

6.1   Achievements

A management system is the way of an organization manages the business to achieve the objectives. These objectives can be related to many different topics such as product quality and operational efficiency. Management systems are designed to manage an organization's procedures and processes. The foodbank management system is a system which is developed to ease the works of the

organization which manage food bank. The system can record the details about the foodbank and the details of donators.

PHP and MySQL are used to develop this system. PHP is open source product. PHP is a server-side scripting language which is designed for web. PHP code can be embedded in HTML page to be executed when the page is operated. PHP code is interpreted at web server and generate HTML. PHP is a programming language with syntax very close to C/C++. PHP can work on all major OS currently used.

For the development of this food bank management system, the waterfall model will be used. It is because waterfall model is simple and easy to understand. Waterfall model can be managed easily due to the rigidity of the model. One phases can be completed at a time. It defines stages clearly and easy to arrange the tasks. The process and results for waterfall model are well documented.

6.2   Suggested plan for project implementation/execution

Whether implementing a new marketing plan or implementing a new software platform within an organization, an implementation plan supports the strategic action plan process. In order to put the strategy into action, an implementation plan is needed. Implementation is the stage of the project where visions and plans become reality. A project's financial resources can be determined after evaluating, deciding, envisioning, planning, applying for funds, and finding the necessary resources.

Imagining and determining what the final outcomes will come out is the first step. Thinking of the answers as a springboard for the process. Implementation goals should be based on the best possible scenarios. It is a long process to integrate anything into the business strategy and it can be subject to change. Considering all possible scenarios is vital. Setting clear expected outcomes see in the project deliverables.

During the implementation project, there will be a beginning, middle, and end. In the beginning, initiate all of the actions. In the middle, execute them and track their progress, and in the end, complete all of the reviews and make the final quality checks. The scheduling decisions is made sure that it can lead to the fastest and most cost-efficient implementation without sacrificing quality. Tasks can be broken into milestone as it provides inspiration and capability to estimate progress through task achievements.

Acknowledgment

Appendix

To know about the user requirement, an interview session with the founder of Foundation Suria Johor Bahru, James Philip Ho is carried out. The link of the interview video is https://www.youtube.com/watch?v=TsPauCjJiXY. The google form is given to the volunteers of foundation to collect data of user acceptance. The link of the google form is https://forms.gle/9bDWsFZRqSj4vCA77. The URL for the system is https://fyprojectai190225.000webhostapp.com/fyproject/index.php.

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