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Mobile App NGO One Heart Team

Mohammad Hafizul Zulkarnain[1], Muhaini Othman[1]*,

[1]Faculty of Computer Science and Information Technology,
Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA

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***Abstract**:*

A mobile application is software built for small devices to enhance human interaction with the software, enabling faster and more efficient usage. The main objective of this project is to develop a mobile application for an organization called One Heart Team. This organization is a non-government organization (NGO) dedicated to helping impoverished individuals, and they aim to improve the structure of their management system. They require an application that will assist them in effectively organizing the distribution of donations to impoverished individuals. The chosen methodology for development is an object-oriented approach, and the model employed will be prototyping, allowing for recycling and improvements as needed. This mobile application will facilitate the tracking of both old and new data, enabling effective organization and management of the organization.

***Keywords**: Mobile Application, Flutter, SQL, non-government organization (NGO), Object-oriented Approach*

1. Introduction

A mobile application, also known as a mobile app, is a software application designed to run on mobile devices such as smartphones or tablets. It is specifically developed to take advantage of the unique features and capabilities of these devices, including touchscreens, camera access, GPS location services, and more. Mobile applications provide users with a convenient and user-friendly interface to interact with the software, making tasks and activities easier to perform on the go. Mobile applications are running on a small hand hold mobile device which is moveable, easy to use and accessible from anywhere and any place. Mobile application is consist of software/set of programs that runs on a mobile device and perform certain task for the user. It is easy, user friendly, inexpensive, downloadable, and run able in most of the most of the mobile phone including inexpensive and entry level phone [1]. Various industries can benefit from using mobile applications for their daily tasks including non-governmental organizations (NGOs). Mobile applications can provide significant assistance to NGOs in various ways such as efficient donations management, volunteers engagement, fundraising and awareness, impact tracking and reporting, resource management, communication and engagement,

**Corresponding author: muhaini@uthm.edu.my*

information dissemination, monitoring and evaluation. **Food For All** is a mobile application developed with an objective to focus on availability of food for the NGO and to avoid the wastage of food. It's an internet-based application where food donors and volunteers from NGO communicate with each other over internet to discuss the availability of food and other details [2].

This study aims to develop a mobile application specifically for the NGO called One Heart Team. Currently, the organization manages their data using Microsoft Excel files, which are susceptible to data entry errors such as incorrect formulas, accidental deletions, or incorrect data input. These errors can lead to inaccurate results and impact decision-making processes. The data primarily includes information about the impoverished ('asnaf') individuals in Batu Pahat, Johor. Additionally, they collect data on volunteers and memberships through Google Forms. However, they face challenges in efficiently managing this data as updates and sharing are done manually.

The organization receives donations from various locations across Malaysia, and the donation records are also manually stored in individual file systems. Moreover, the 'asnaf' houses are dispersed in rural areas without precise addresses on Google Maps. This poses a challenge for volunteers who need to personally locate and deliver donations to the 'asnaf' houses.

To enhance the management of data and tasks for One Heart Team, the development of a mobile application is proposed. This mobile application will offer convenient access from anywhere and aid volunteers in locating 'asnaf' locations using GPS. Additionally, it will enable data collection in the field. The mobile application will also assist in task assignments among volunteers and facilitate the organization in monitoring donations provided to 'asnaf' individuals.

The objective for this project is to analyse and design mobile applications for One Heart Team using structured/object-oriented methodology. Next is to develop a mobile application system using android studio/flutter. Lastly, is to test the developed system by using Alpha and Beta testing.

2. Related Work

2.1 Mobile App

A software application known as a mobile application is one created exclusively for mobile devices like smartphones or tablets [3]. Due to these developments in technology, educators and researchers are now exploring how to best use these tools to improve teaching and learning. The traditional classroom setting is being revolutionized by mobile devices, which provide a revolutionary potential to develop dynamic and engaging learning environments [4]. The collection of software programs that make up mobile apps are designed to function on mobile devices, and as these programmers' capabilities develop, more people will likely utilize them in the future [5]. Users are spending more time on their phones because of the availability of mobile phone applications (apps), which are becoming commonplace on all mobile operating systems [6].

2.2 Case Study of Current Management System for One Heart Team

One Heart Team is an organization dedicated to charitable activities in various areas of the Batu Pahat district. Currently, the management of data for both 'asnaf' individuals and members relies on computer-based software programs such as Microsoft Excel and Google Forms. However, there are several drawbacks associated with these methods. The first drawback pertains to data inconsistency, as inconsistencies can arise from one cell to another within Excel. This inconsistency issue arises due to the manual handling of data. The second drawback relates to data integrity, encompassing data accuracy and reliability. Excel usage can lead to data integrity problems since humans may not always detect similar data entries manually. Furthermore, Excel imposes limitations on data records and requires substantial hard drive space for data storage. This limitation also applies when using Google Forms, where data is downloaded into an Excel spreadsheet. Additionally, member registration data needs to

be re-entered annually, even though members should only need to renew their membership by updating specific information while retaining their historical data.

2.3 MySukarela

MySukarela is a mobile application that serves as a connecting platform between volunteers and non-profit organizations (NGOs) for carrying out humanitarian tasks. This app provides a comprehensive solution for Malaysians who wish to register as volunteers, allowing them to find suitable opportunities that match their interests and skills across various NGOs, corporations, and events nationwide. The development of MySukarela was a collaborative effort involving The Malaysian Red Crescent Society Community (MRCS) and the Ministry of Youth and Sport. The app offers the convenience of not having to repeatedly input personal data for every volunteering event, as users can select from available events directly. The system implemented in MySukarela can serve as a noteworthy example for the proposed system, showcasing efficient organization and management of necessary information. Investigating the features that can be employed for the proposed system requires comparison between various systems. **Table 1** shows the comparison between the system.

Table 1: System's Comparison

Features/System	Bersamamu:Bantu Di Malaysia	MySukarela	One Hope Charity	One Heart Team Mobile App
Login and Registration	√	√	√	√
Report System	√	X	X	√
Task Handout Distribution System	X	√	X	√
Navigation System	X	X	X	√
Event System	√	√	√	√
Edit profile	√	√	√	√

3. Methodology

Prototyping is a software development approach that emphasizes the creation of functional models that are continuously refined based on user feedback. This methodology is particularly useful for systems that involve extensive user interaction and complex user interfaces. This is to ensure that any faults or missing functionality may be quickly found. Then, it can be utilised again in the future for more challenging tasks. Prototyping plays a vital role in the overall software development process as it allows for effective and cost-efficient development strategies, considering that software cannot be physically touched or experienced. The reason is that the model may be constructed without the help of specialised experts and the system specification can be derived from it as a starting point.

The prototyping model involves the production, testing, and iterative revision of prototypes until an acceptable result is achieved, forming the foundation for the entire system or product. A prototype in the creation of mobile applications is a model that simulates a mobile application and is typically created for demonstration reasons or as part of the development process. An early software version created to test and evaluate a newly suggested concept is known as a prototype. During the conceptual app design phase, a prototyping tool should be simple for designers to use. App prototyping is crucial for the quick creation of mobile apps [7]. Planning, analysis, design, prototype creation, and execution are among the steps of the prototype process, as depicted on **Table 2**.

Table 2: Phase and Task during system development

Phase	Task
Requirements Gathering Analysis	• 1. Analyse the existing system
Quick Design	• Creating a high-level design document (HLDD) for One Heart Team mobile application module. • Create a low-level design document (LLDD) for One Heart Team mobile application.
Build Prototype	• Create the One Heart Team mobile application prototype in accordance with the client's brief design and specification.
Initial User Evaluation	• Show the prototype to the user for them to do the evaluation and receive their feedback.
Refining Prototype	• Refining the prototype of the One Heart Team mobile application based on the client evaluation.
Implementing and maintaining	• Conduct system testing following the integration of the One Heart Team mobile application. • Testing the whole function to evaluate the compliance of the mobile app based on the requirement of the system. • Launch the One Heart Team mobile application.

In this section, the focus will be on examining the functional requirements of the system, along with the non-functional requirements and system design. The system design will be discussed using an object-oriented approach, incorporating flow charts, use case diagrams, and class diagrams to provide an overview of all processes. This is so that the software development process may become more modular, reusable in the future, and maintainable for longer usage. In this case, it could make future system updates and upgrades simpler. By defining the scope and context of a system, as well as eliciting and validating the functional requirements, designing with the use of flow charts, use case diagrams, and class diagrams improves in understanding.

Functional requirements entail identifying the necessary activities, tasks, or actions that the system must accomplish. They define the process of transforming input data into the desired output for the user, ensuring the system's functionality aligns with user expectations. **Table 3** shows the non-functional requirement for the proposed system.

Table 3 : Shows the functional requirement of the One Heart Team Mobile application.

Module	Function
Register Module	The One Heart Team mobile application should allow users to sign up for an account
Login Module	The One Heart Team mobile application should allow users to log in with the registered account
New 'Asnaf'Module	The One Heart Team mobile application should allow users to make a report on the new 'asnaf'
View List Module	The One Heart Team mobile application should allow the user to view the list of 'asnaf'
View detail Information Module	The One Heart Team mobile application should allow the user to click and view detail information about 'asnaf'
Navigation Module	The One Heart Team mobile application should allow the user to use the navigation function
Edit Module	The One Heart Team mobile application should allow the user to edit profile
Search Module	The One Heart Team mobile application should allow the user to search for 'asnaf'

Non-functional requirements, as opposed to specific behaviours, provide the standards that may be used to evaluate how well a system performs**. Table 4** shows the non-functional for the proposed system.

Table 4: Showed the Non-functional requirement for the One Heart Team mobile application.

Requirement	Description
Performance	The One Heart Team mobile application should be able to react within 1 second after the user interacts with the mobile application
Operational	The One Heart Team mobile application should be accessible at any time
Usability	-The One Heart Team mobile application should be designed in the English Language The button of the One Heart Team mobile application should be designed in a consistent and user familiar
Security	The One Heart Team mobile application should allow the user to view the information in the application only.

3.1 Use Case Diagram

A use case diagram is a condensed version of the system that concentrates on fulfilling particular objectives. It outlines the interactions between the system's actors and the system's overall flow. However, it doesn't go into specifics on how the system will be put into use or give implementation information [8]. **Figure 1** depicts the use case diagram for One Heart mobile application where it consist of login, membership registration, creating new 'asnaf' create donation event, assign task to members, location navigation to 'asnaf' house and uploading membership fee receipt.

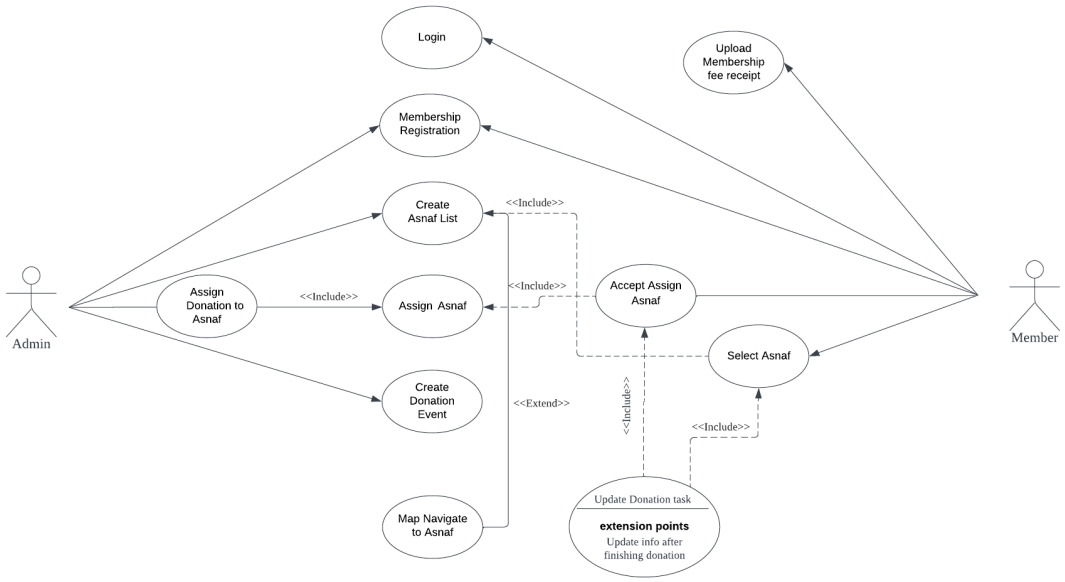

Figure 1: Use Case Diagram

3.2 Class Diagram

Creating code for the building of software applications is aided by the class diagram. The class name, characteristics, actions, and relationships between the classes are all shown in the class diagram. **Figure 2** below displays the class diagram of One Heart Team Mobile App. The consists of four classes named Admin, Asnaf, Donation, Member. The Admin class is responsible for managing members. It has the ability to oversee new member registrations and view uploaded membership payment receipts. Additionally, the Admin class can assign members to specific Asnaf groups. It also handles donation management by creating donation IDs for donation events. Moreover, the Admin class makes decisions regarding which Asnaf groups will receive donations in the organization's upcoming events based on received data.

On the other hand, the Member class allows members to select the Asnaf group they wish to donate to in future events. The Asnaf class is assigned to the MemberAsnaf group and receives donations through the DonationAsnaf class. These classes track the status of received donations, including the amount of cash received, the number of times an Asnaf group has received donations (no_recipient), and the year in which the donations were received (year_recipient). Lastly, the Donation class stores general information about donation events.

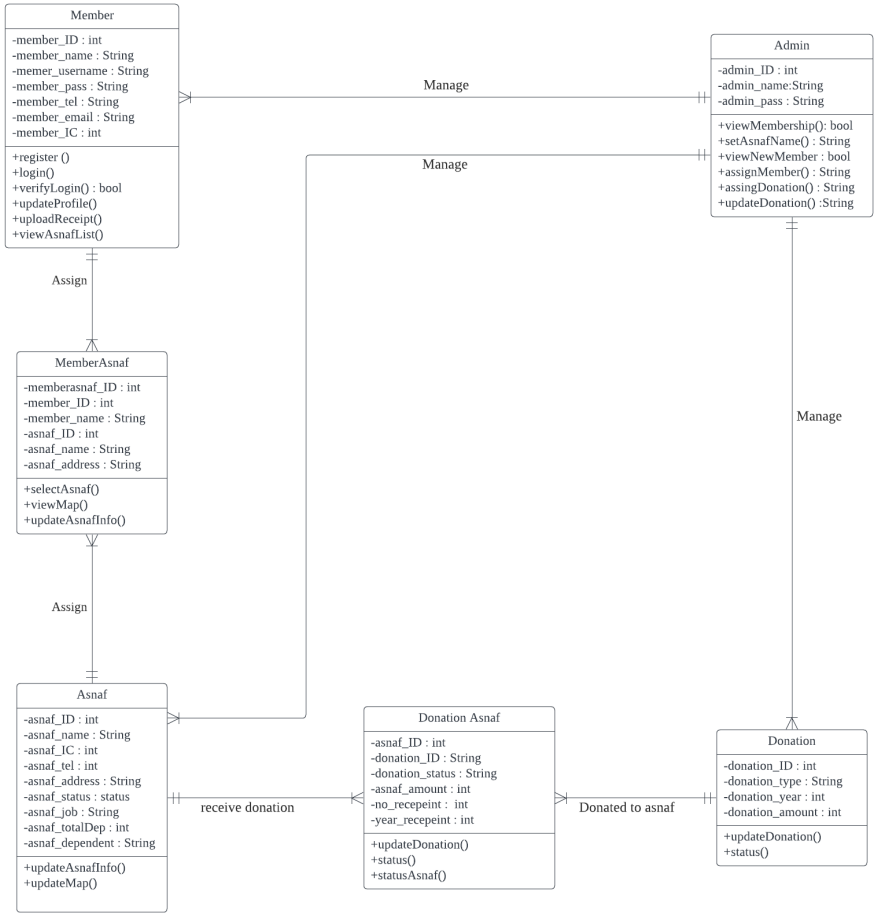

Figure 2 Class Diagram

3.3 Activity Diagram

Figure 3 shows the Registration Activity Diagram. In the initial stage, when a member has not yet signed up, they are required to complete an application form through the Sign-Up process. After submitting the form, the admin begins the registration verification process. The admin reviews the member's information and examines the payment receipt for the membership fee. Once the verification is complete, the admin sends a notification to the member informing them whether their membership status has been approved or not.

Figure 4 illustrates the activity diagram for the "Assign Asnaf" process. In the admin section, the admin creates a new donation event, which occurs whenever there is a need for a donation activity such as flooding or Ramadan box. The admin adds the donation information and assigns donations to each ‘asnaf’. This means that each ‘asnaf’ will receive a different type and amount of cash donation, as determined by the organization. Furthermore, the admin adds ‘asnaf’ in groups based on locations and assigns them to members for the donation event.

Moving to the member section, members have the option to accept the assignments made by the admin or choose their own ‘asnaf’ group or individual. If a member does not accept the assigned ‘asnaf’, they need to select an available ‘asnaf’ group or individual that has not been assigned by the admin. Additionally, if a member is unfamiliar with the location of the ‘asnaf’, they can view the ‘asnaf’ home locations on Google Maps to assist with the donation distribution process.

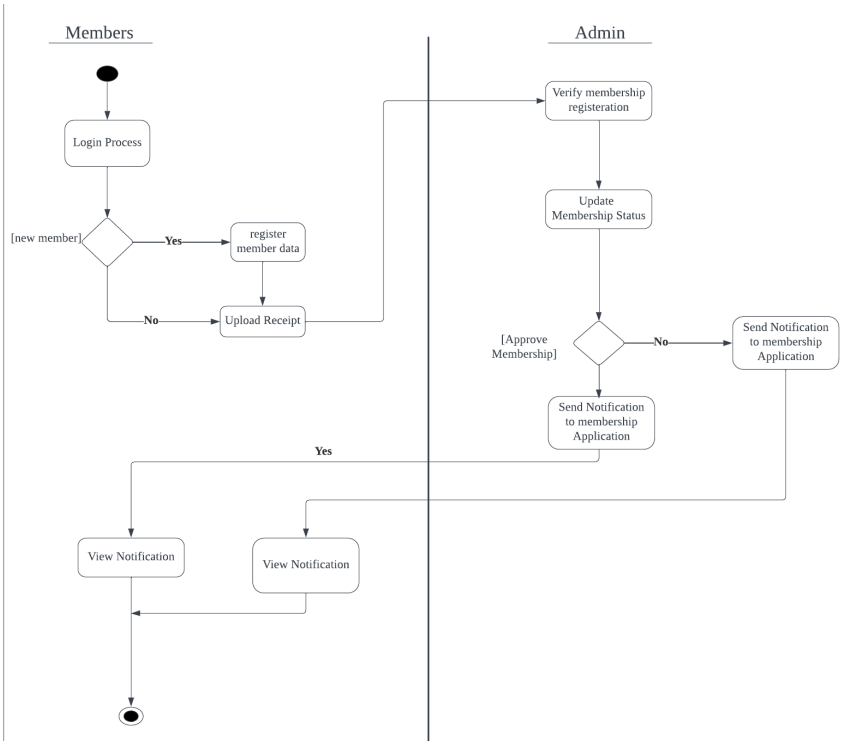

Figure 3: Activity Diagram Registration

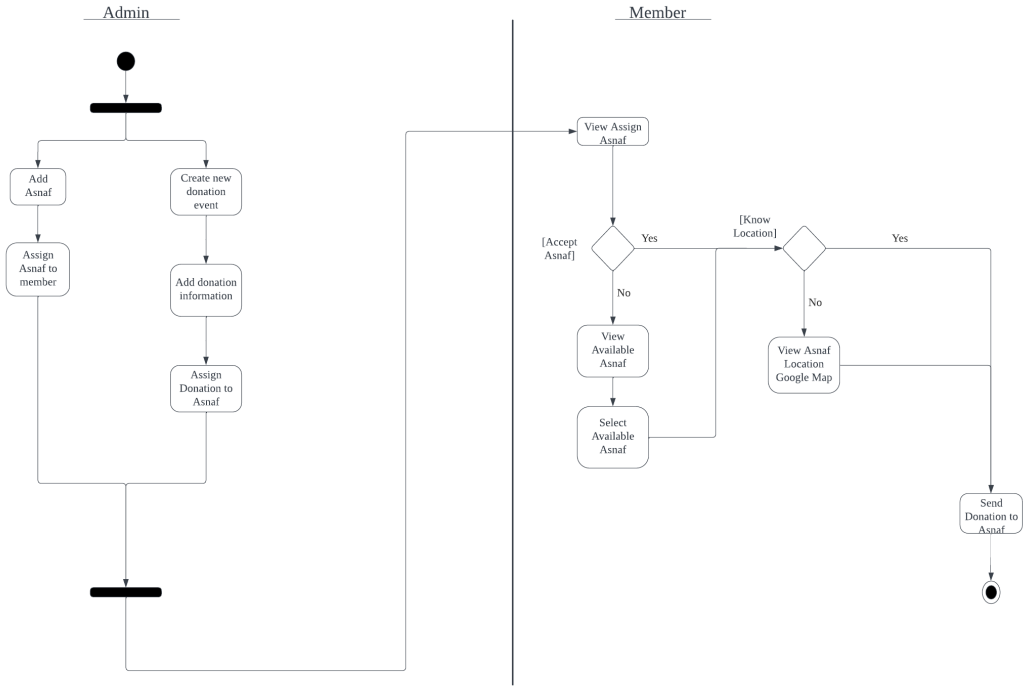

Figure 4 : Activity Diagram Assign 'Asnaf'to member

3.4 Wireframe Design

The system designer utilizes the user interface (UI) approach to construct the system interface, which acts as a bridge between individuals and computers. The user interface encompasses all technologies employed for interaction. Moreover, it assists individuals in gaining a better understanding of the proposed system's characteristics. **Figure 5 to Figure 10** show the interface of the One Heart Team Mobile Application.

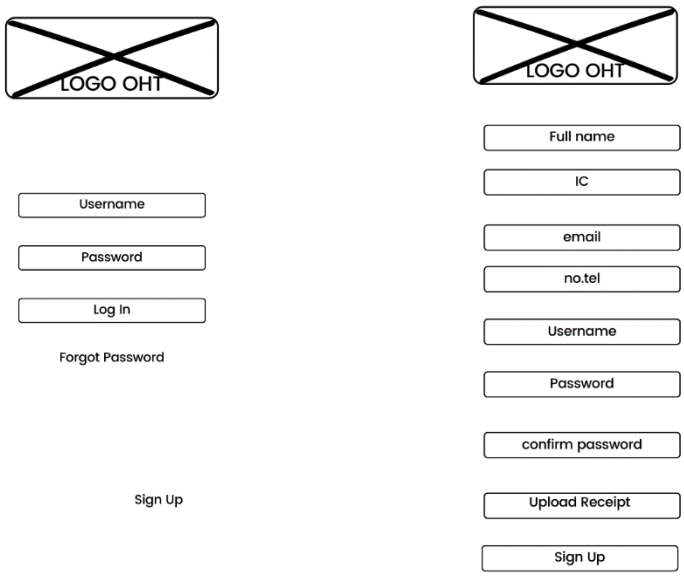

Figure 5: Login and Registration Interface of One Heart Team Mobile Application

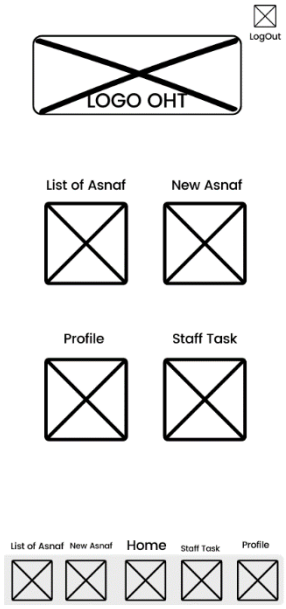

Figure 6: Main Menu Interface of One Heart Team Mobile Application

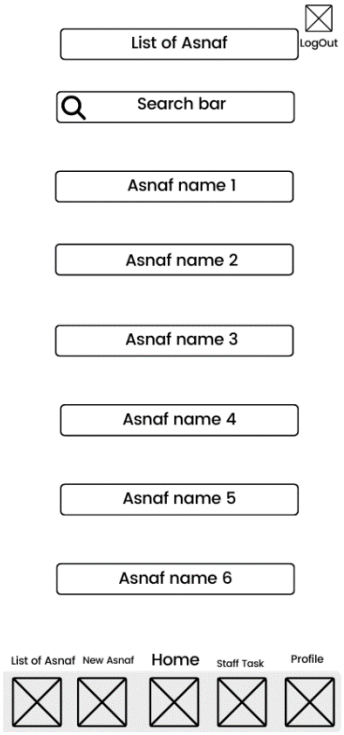

Figure 7: List of 'Asnaf' Interface of One Heart Team Mobile Application

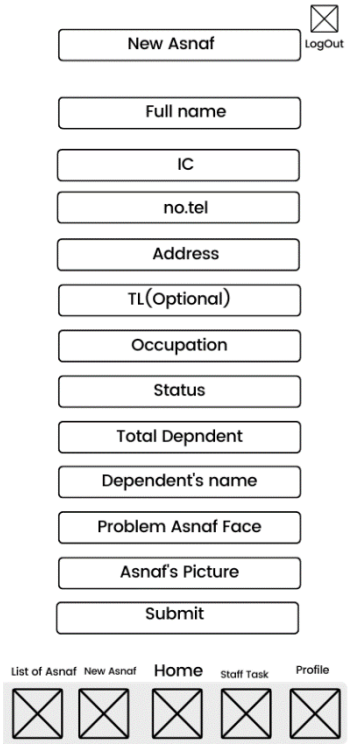

Figure 8: Report 'Asnaf' Interface of One Heart Team Mobile Application

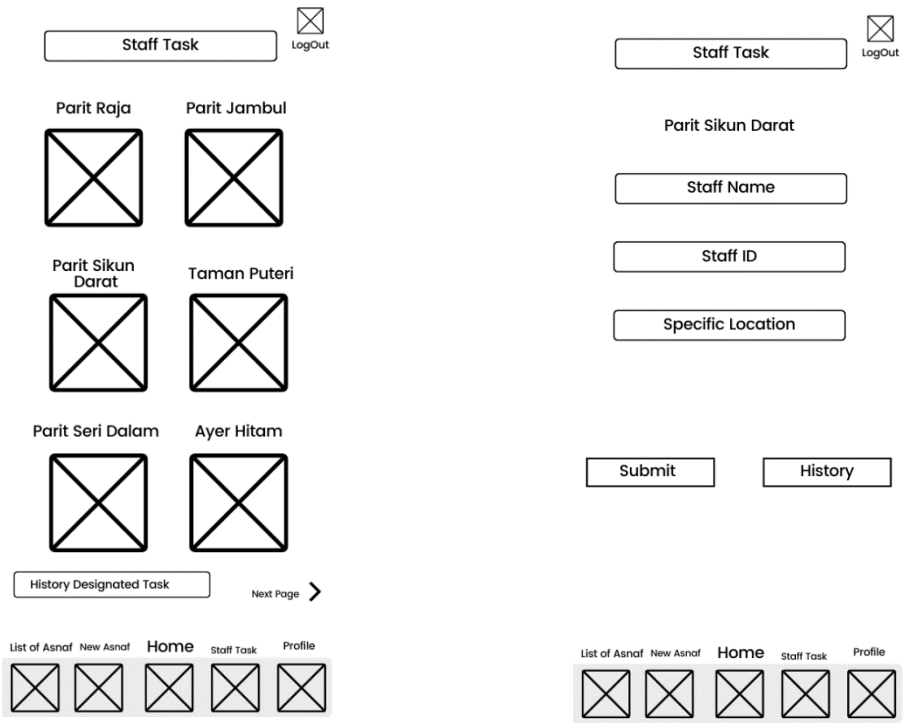

Figure 9: Designated Task Interface of One Heart Team Mobile Application

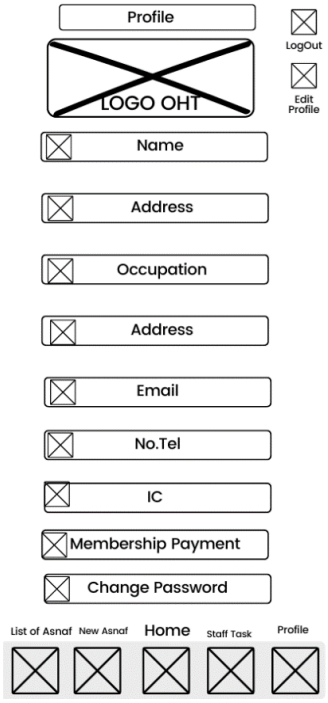

Figure 10: Profile Interface of One Heart Team Mobile Application

Figure 10: Upload Membership Fee Receipt

4. Result and Discussion

The One Heart Team Mobile Application is developed using Flutter and Dart programming languages to ensure a seamless User Experience (UX) and User Interface (UI) for all stakeholders. SQL is utilized as the database for storing data related to donation activities. The mobile application consists of eight modules, including the login module, member registration module, new 'Asnaf' module, view 'Asnaf' module, navigation module, edit module, and search module.

For administrators, there is a member registration module that allows them to oversee volunteer registrations for the One Heart Team organization. Additionally, administrators can access the receipt payment records for membership. Figure 11 illustrates the login module, where users are prompted to enter their username and password. Figure 12 displays the homepage of the mobile app, featuring a list of 'Asnaf', create 'Asnaf', Profile, and Staff Task sections, each representing a separate module.

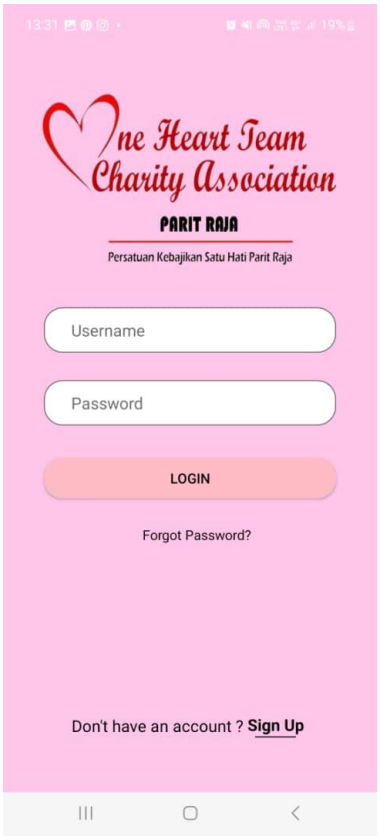

Figure 12: Login Page

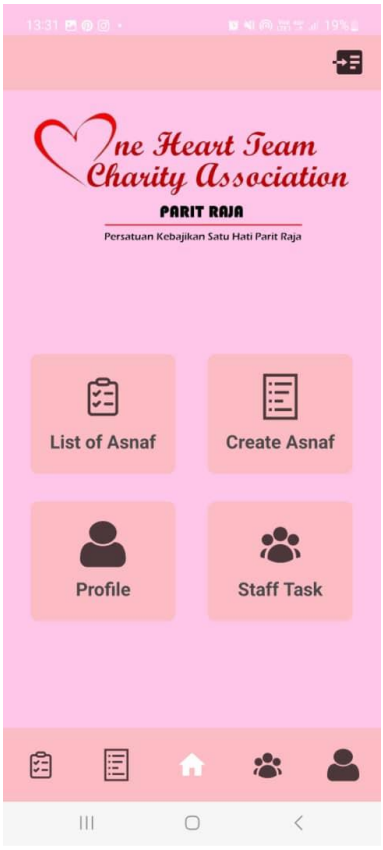

Figure 13: One Heart Team Homepage

When users encounter new 'asnaf' individuals that need to be registered, they can utilize the "Create Asnaf" form to provide the necessary information. This form includes fields for 'asnaf' details and allows users to upload a picture of the 'asnaf' individual. After submission, the administrator gains access to the latest 'Asnaf' records, which are then inserted into the "List of Asnaf". This list displays all the added 'asnaf' individuals and presents their comprehensive information when a specific 'Asnaf' is selected. **Figure 13** depicts the form for creating a new 'asnaf', while **Figure 14** showcases the display of the 'asnaf' list.

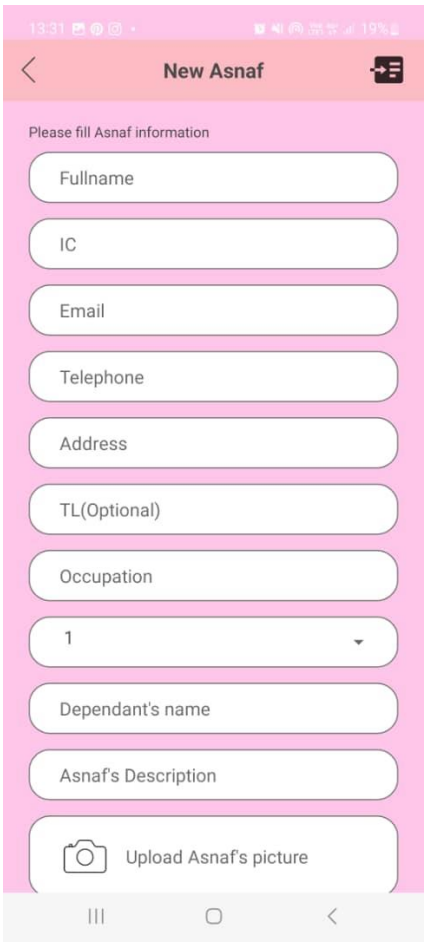

Figure 13: New 'Asnaf' page

Figure 14 : List of 'Asnaf' Page

Additionally, the results of the user acceptability test will be used to guarantee that the system functions correctly and operates without any bugs or errors. The system is tested to see if it meets the goals set out during system development. Five test cases were run to ensure that every module in this system functions as it should and produces the desired results. **Table 5** until T**able 9** shows the test case of every module in this system.

Table 5: Register Module

Module: Registration				
No	Test Case	Expected Result	Actual Result	Outcome
1	To check whether the user able to submit registration information	The user should be able to submit without and error	The user can submit the registration form.	Pass
2	To check whether the user can upload receipt membership payment	The user should be to upload the receipt membership payment	The user can upload the receipt without fail.	Pass

Table 6: New Asnaf Module

Module: New Asnaf				
No	Test Case	Expected Result	Actual Result	Pass/Fail
1	To check whether the system can enter the information on the form	The user should be entering information for ‘asnaf’	The user can enter the information of ‘asnaf’ through the form	Pass
2	To check whether the system can upload ‘asnaf’ picture	The users should be able upload ‘asnaf’ picture	The user has successfully upload picture	Pass

Table 7: List Module

Module: List				
No	Test Case	Expected Result	Actual Result	Pass/Fail
1	To check whether the list can be shown in list button	The user should be able to view ‘asnaf’ information	The user can show the information of ‘asnaf’	Pass
2	To check whether can open ‘asnaf’ info button	The user should be able to can open ‘asnaf’ info button	The user have successfully can open ‘asnaf’ info button	Pass
3	To check whether information of ‘asnaf’ is correct	The system should display information of ‘asnaf’ is correct	The system can display information of ‘asnaf’ correctly	Pass

Table 8: Search Module

Module: Search				
No	Test Case	Expected Result	Actual Result	Pass/Fail
1	To check whether it can search the name of 'asnaf' by typing their name, ID or IC	The user should be displaying search result of 'asnaf'	The system have successfully display search result of 'asnaf'	Pass

Table 9: Test Case Report Module

Module: Report				
No	Test Case	Expected Result	Actual Result	Outcome
1	To check whether the system can generate the voting report group by school, gender, and position.	The system should be able to generate the total number of voting group by school, gender, and position.	The system can generate voting report group by position.	Pass
2	To check whether the system can summarize the winner of the candidate for every position.	The system should be able to summarize the winner of the candidate for every position.	The system can summarize the winner of the candidate for every position.	Pass

4.1 User Acceptance testing

User Acceptance Testing (UAT) represents a critical phase during software development, wherein stakeholders or end users assess the product's usability, functionality, and overall user experience. It serves as the final validation step before deployment or release. UAT aims to ensure that the software adheres to its intended usage, assessing its performance under various conditions. Active involvement of end users in UAT allows them to provide feedback and approve the software for deployment. This process helps identify any issues or areas that require improvement, resulting in high-quality, user-focused software.

Table 10 presents the outcome of the user interface design. The results indicate a moderate level of success in achieving the desired user interface design. Table 11 illustrates the impact on system functionalities caused by the user interface design. The administrator's evaluation ranks the results in positions 3 and 4, indicating a generally moderate level of sophistication in the implemented system.

Table 10 : Result of User on User Interface Design

No	Feature	Rating					
		1	**2**	**3**	**4**	**5**	**Total**
1	How the overall design of the interface?	0	0	4	10	6	20
2	The layout of the user interface intuitive?	0	0	12	7	1	20
3	Easy to navigate on the system	0	0	14	4	2	20
4	Is the user interface simple to grasp and does it include useful titles that are relevant?	0	0	9	8	3	20
5	How satisfied on current interface design	0	0	10	10	0	20

Table 11 : Result of Admin on System Functionalities

No	Feature	Rating					
		1	**2**	**3**	**4**	**5**	**Total**
1	Login Function	0	0	0	2	0	2
2	Submit New Asnaf Function	0	0	1	1	0	2
3	Map Navigation Function	0	0	1	1	0	2
4	Profile Function	0	0	0	2	0	2
5	Staff Task Function	0	0	2	0	0	2
6	View List Asnaf Function	0	0	0	2	0	2
7	View Receipt Member Function	0	0	2	0	0	2

5. Conclusion

In conclusion, the implementation of this mobile application will significantly enhance the data management efficiency for One Heart Team. The app provides streamlined processes for registering new volunteers, simplifying the onboarding process. This, in turn, enables the organization to run their charity programs more efficiently. Moreover, the mobile app facilitates seamless data tracking, allowing for easy retrieval and reference to previous records. Enhancements to the mobile application can be made by incorporating an auto-generated certificate feature whenever members upload their annual membership fee. Furthermore, the system can be enhanced to ensure more systematic data insertion, thereby preventing data loss during donation events. In summary, the mobile application empowers One Heart Team to streamline their operations, enhance data organization, and improve their overall effectiveness in conducting charitable initiatives.

Acknowledgment

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