

## **Organ Donation for Top Glove and Global Doctor (TGGD) Medical Centre**

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**Abstract:** Waiting for a long time to get a suitable organ donor specifically liver and kidney is really stressful. Especially during this Movement Control Order (MCO) period. To solve this issue, Organ Donation Application was developed for Top Glove and Global Doctor (TGGD) Medical Centre. The operation unit is still using manual method which means all the documents and reports of the donors are kept in file and organized by the unit staff. Implementation of this traditional method had brought up a lot of problems to the operation unit as well as to the donors and recipients. Some of the major problems are loss of data such as donors medical report and details, absent of organ donation application can make difficulty for searching a suitable donor and final problem is failed to generate statistical report for audit purpose. Next for the objective this project holds three objectives. The first objective is to design an android application for the organ donor to donate organs. The second is to develop a mobile application that can provide platform that can save time to reach desired organ donor. The final is to evaluate an effective method to create awareness towards organ donation. The development of this project will instantly solve the problem faced by TGGD Medical Centre. For the physical design of this application is being constructed using a mobile-based technology, which are phpmyadmin, MySQL and JavaScript and PHP language. The methodology used in developing this application system is Object-Oriented System Development (OOSD) which involves four phases which are Object-Oriented Requirement Analysis, Object-Oriented Design, Object Oriented Implementation and Object-Oriented Testing. To conclude, this application will increase the awareness among others to become a donor and can find a suitable organ donor in a short period.

**Keywords:** Mobile Application, Organ Donation Application, Email

### **1. Introduction**

Top Glove Corp Bhd launches its Top Glove Global Doctors Medical Centre (TGGD) 29 August 2017. It is a move for the world's biggest glove manufacturer to make an attack into the medical care business through a joint progress (JV) with Global Doctors which is a center chain. The aim is to serve

the neighboring society especially in on preventive medical care, TGGD is a one-stop mobile consideration place offering a total scope of clinical administrations enveloping analysis, perception, conference, therapy, mediation, restoration and full-layered dental offices on an outpatient premise. TGGD also received license from the Ministry of Health as an ambulatory care centre. The objective of TGGD is to provide a high-quality medical care, specialist and dental services to the society in and around this area (Setia Alam).

Since operation unit is still using manual appointment method and because of that they are facing with some problems. The first problem is loss of data such as donor and patient report regularly missing because there is no database to store them. The second problem is there is lack online organ donation application to allow donor to donate their organ which is kidney and lungs. Because of that, patient who have failure in their organ need to search a suitable donor means take a long time. So, this will lead to delay of process in the hospital operation. The final problem is statistical review cannot be generated in the manual method for the number of donors who donated. So, hospital administrators facing difficulties to create report for future use such as audit purpose. So, this mobile application aims TGGD Medical centre that connecting the coordination and communication gap between patients and donors, we know that lot of patients die without access to a proper donor. This organ application help TGGD Medical Centre to get a suitable donor in immediate time that maintains and secure the information of donors who are going to register. According to a thesis studied, several interventions involving education and outreach have helped candidates successfully identify live donors [1]. Examples include house calls, champions, the Talking about Live Kidney and Lungs Donation social worker intervention and Explore Transplant training seminars. These interventions are time and resource intensive, and they all involve directly asking people to donate. Directly asking people about live donation remains difficult, even with adequate education and support. Problem statement of this application is the manual process of TGGD Medical Centre took a lot of time and energy.

According to a past study it stated that, the existing manual process takes a lot of time and man power [2]. So, the user needs to connect to the Internet to collect the donor's information. There are so many people out there who are willing to donate their organs but they need a platform to inform their possibilities to donate their organs but the donors are afraid that others would misuse their personal information. So that, as the admins, we will secure the donors' information. The objective of this application are to design an android application for the organ donor to donate organs, to develop a mobile application that can provide platform that can save time to reach desired organ donor, to evaluate an effective method to create awareness towards organ donation. The project scope of this application is additional features like implementing a machine learning model which will automatically suggests for the compatible source of organs and donors thereby eliminating the risk of tissue rejection in organ transplantation [3]. Currently, this system use within the patients who came to the medical centre only and will be expanded to other states once it is stable. Moreover, this application mainly for those your need of organs and who are willing to volunteer for giving their organs.

## **2. Literature Review**

In developing the organ donation application, literature survey has been done in order to ensure that the system developed reflects both the advantage and disadvantage. The creation of android software is the process where new apps for devices available for Android are developed. Google developed the Android Operating System [4]. It is driven by customer experience of the Linux kernel. The working framework is outlined for smartphones and tablet computers and permits clients to lock in with it through a touchscreen interface. The work on other existing applications that are as of now created is briefly clarified. Investigate and investigation on existing frameworks accessible in Google Play Store

are valuable as a reference to urge more data and information in detail some time recently creating this application. The three applications are Mohan Foundation (MF) Giver Card Application, Give Life Application and Derma Organ Framework. In addition, it provides a comparative analysis of all three applications and the application for organ donation. Identifying the positives and negatives of the application is the aim of carrying out evaluations and comparisons with existing applications.

## 2.1 Background of Women Safety and Mobile Application

Healthy organs can help people live longer. They also make your life much better and healthy. Organ donation allows for the replacement of organs when they are requested, such as a kidney and liver in the case of organ failure. Organ donation is becoming the most prevalent and effective method of treating people who require organ transplants. An organ donation application is a technique for a patient to get the organ they want in a reasonable time. Before operation, the doctor must examine the patient's data and medical history to find a match with an organ donor. The Top Glove Global Doctors Medical Centre (TGGD) is a combined venture between Top Glove and Global Doctors. Both organizations have constantly strive to deliver the highest-performing facilities to all of their users. The TGGD Medical Centre is a multidisciplinary, multi-specialty Ambulatory Care Center that provides Family and Specialist Practice, Diagnostics such as ultrasound, X-ray, stress and testing, and is a multidisciplinary, multi-specialty Ambulatory Care Center. TGGD Medical Centre includes an organ donation center in conjunction to Top Glove and Global Doctor. They conduct this unit in the traditional way, with all documentation, such as patient medical reports, referral letters, and a few others, being kept on paper and filed in a file. The first step is to sign up to be an organ donor. This may be conducted by visiting to the medical centre. The administrator at the organ donation facility will ask you to fill out a form with questions on the donor's health. The donor will then be required to undergo a medical examination by a doctor at the medical centre. The application form will start after the result is achieved and the donor is found to be suitable to donate due to the lack of any health problems. The administrator will complete the registration form with all of the donor's relevant information, including name, address, and phone number, as well as the donor's medical results. The report will be taken to any available medical officer for evaluation and verification. Finally, the submitted form will be stored in a file and organized.

## 2.2 Technology Approach

### 2.2.1 PHP Programming Languages

PHP is a web programming language used to write out the foundation of a web application. It is open source and free to use. In this project, the system code had built using PHP from scratch. PHP from scratch able to make developer more understand on how their coding works.

### 2.2.2 MySQL Database

MySQL is one the most popular and most used databases because of several characteristics that allows it to stand out among others. MySQL has a wide inventory of servers and provides master-slave replication configurations that allows gives the server its high accessibility at all times.

## 2.3 Study of Existing Related Systems

The work on other current apps that have previously been built is briefly detailed in this section. Research and analysis of current systems in the Google Play Store may be used as a starting point for providing material information and knowledge before developing this app. The three applications are Mohan Foundation (MF) Donor Card Application, Donate Life Application and Derma Organ System. In addition, it provides a comparative analysis of all three applications and the application for organ

donation. Identifying the positives and negatives of the application is the aim of carrying out evaluations and comparisons with existing applications. It can also be used as a reference for the development of a better application.

**Table 1: Comparison table of Organ Donation Application with three existing system**

| <b>Application/<br/>Features</b>                  | <b>MF Donor<br/>Card</b>  | <b>Donate Life</b>  | <b>Derma Organ</b>                         | <b>Organ Donation<br/>Application</b>  |
|---|---|---|--|--|
| <b>User</b>                                       | Individual  | Individual,<br>Admin  | Individual,<br>Admin                       | Individual, Admin  |
| <b>Language</b>                                   | English   | English   | Malay, English                             | English  |
| <b>User Interface</b>                             | The information is organized in a structured and adaptable manner | Graphics components are used less frequently, and the user interface is basic | Colorful and well-organized user interface | With a colorful outlook, everything is arranged in a highly methodical and well-organized manner |
| <b>Login and Register</b>                         | Yes   | Yes   | Yes  | Yes  |
| <b>Database</b>                                   | Yes   | Yes   | Yes  | Yes  |
| <b>Statistics</b>                                 | No  | No  | Yes  | Yes  |
| <b>User Support System (Administrator)</b>        | Yes   | Yes   | Yes  | Yes  |
| <b>Messaging platform Using TAC/ Notification</b> | Yes   | Yes   | Yes  | Yes  |

### 3. Methodology

Project methodology examines the strategy utilized to create the organ gift application for TGGD therapeutic centre. Software improvement lifecycle (SDLC) utilized as a direct to decide the computer program handles show that will be utilized within prepare to create the framework in this project. There are several types of software process models that can be used in developing a system including Waterfall Model, V-Shaped Model, Evolutionary Prototyping Model, Spiral Model and Agile Development. To develop the organ donation application for TGGD medical centre, object-oriented structured design (OOSD) has been selected as a methodology to describe the processes that take place in each phase of system development.

### 3.1 System Development Workflow

There are 7 main phases that need to carry in the process of development of this system. Table 2 detail out the task and output for each phase. Topic will clarify more clearly on the concept, roles and benefits of the technology and approach. The timeline based on prototyping process has built.

**Table 2: Task and output for each phase**

| Phases                       | Activities   | Results   |
|------------------------------|--|---|
| Planning                     | <ol style="list-style-type: none"> <li>1. Determine and propose the project's title.</li> <li>2. Define the context, problem description, objectives, and scope of the project.</li> <li>3. Identify the methodology that was employed.</li> <li>4. Provides task and timeframe timetables.</li> <li>5. Prepare a proposal for a project.</li> </ol> | <ol style="list-style-type: none"> <li>1. It has been determined what the background, problem description, objectives, and scope are.</li> <li>2. A structured object-oriented design technique was used.</li> <li>3. Gantt Chart is produced.</li> <li>4. Documentation for a project proposal.</li> </ol>   |
| Analysis                     | <ol style="list-style-type: none"> <li>1. Gather data and draw comparisons to similar apps.</li> <li>2. Examine the criteria of the application.</li> <li>3. Examine the necessary hardware and software requirements.</li> <li>4. Choose the programming language that will be used.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Write a report on a similar application study.</li> <li>2. Document describing the application's requirements.</li> </ol>   |
| Design                       | <ol style="list-style-type: none"> <li>1. Contextual diagrams, sequence diagrams, and class diagrams should all be designed.</li> <li>2. Making a convenient diagram of the Organ Donation Application as a prototype.</li> </ol>  | <ol style="list-style-type: none"> <li>1. A context diagram, a sequence diagram, a class diagram, and a use case diagram are all examples of diagrams.</li> <li>2. Connect the database to the donor information. Then install phpmyadmin as an operating system for writing programming languages, such as java, to establish coding for all of the project's hardware.</li> </ol> |
| Implementation (Prototype)   | <ul style="list-style-type: none"> <li>• Develop 3 prototypes</li> <li>• Coding the program using PHP</li> <li>• Connect MySQL to the system</li> </ul>  | <ul style="list-style-type: none"> <li>• Prototype 1</li> <li>• Prototype 2</li> <li>• Prototype 3</li> </ul>   |
| Prototype                    | <ul style="list-style-type: none"> <li>• Develop Prototype 1 of Iteration 1</li> <li>• Develop Prototype 2 of Iteration 2</li> <li>• Develop Prototype 3 of Iteration 3</li> </ul>   | <ul style="list-style-type: none"> <li>• Prototype 1 (interfaces of all use cases)</li> <li>• Prototype 2 (a database connection between interfaces and database)</li> <li>• Prototype 3 (navigation between interfaces)</li> </ul>   |
| Implementation (Application) | <ul style="list-style-type: none"> <li>• Develop an application</li> <li>• Create the test case list</li> <li>• Testing the system function</li> <li>• Fixed bug and error</li> </ul>  | <ul style="list-style-type: none"> <li>• Application</li> <li>• Test cases</li> </ul>   |

#### 4. Analysis and Design

Analysis and design phase are carried out to enable the development process for a system to run according to the specifications. This part explains about the analysis and design of this application system. These components are closely linked to each other to ensure that the system developed meets the needs and requirements of the user. In fact, to ensure that the system works properly according to the specifications set.

##### 4.1 System Requirement Analysis

Requirement analysis consist of two category which are functional requirement and non-functional requirement. Functional requirements refer to the task or function that needs to be performed and also the task that is prohibited for the system. As for the non-functional requirement, it refers to the systems operation’s capabilities and the constraints that will increase the systems performance [5].

##### 4.1.1 Functional Requirement Analysis

Functional requirements describe on what the system should operate, consist and function. The functional requirements for each use cases presented in the following:

**Table 3: Functional Requirement**

| No | Use cases                            | Functional Requirement   |
|----|--------------------------------------|--|
| 1. | Register                             | <ul style="list-style-type: none"> <li>The application should allow the staff to register in doctor page.</li> <li>The system should allow the doctor to edit and makes changes on the current data of staff.</li> </ul>                     |
| 2. | Log in                               | <ul style="list-style-type: none"> <li>The system should allow the doctor, staff log in into the system by inserting correct username and password</li> <li>The system should detect if user enter the wrong password or username</li> </ul> |
| 3. | Assign suitable donor and recipient. | <ul style="list-style-type: none"> <li>The system should allow the doctor to assign suitable donor and recipient according to their blood group and organs.</li> </ul>   |
| 4. | Create new donor and recipient       | <ul style="list-style-type: none"> <li>The system should allow the staff to register donor and staff.</li> <li>The system should allow the doctor to view the donor and recipient details.</li> </ul>  |
| 5. | Donor and staff details              | <ul style="list-style-type: none"> <li>The system should allow the staff to insert, edit and delete the donor and staff detail</li> <li>The system should allow the doctor to view the details.</li> </ul>                                   |
| 6. | Email verification                   | <ul style="list-style-type: none"> <li>The system should allow the staff to send email verification to check whether it is a valid email.</li> </ul>   |
| 7. | Statistics                           | <ul style="list-style-type: none"> <li>The system should allow the doctor to generate a statistics that shows the number of person donate and receive their organs.</li> </ul>   |
| 8. | QR Code                              | <ul style="list-style-type: none"> <li>The system should allow the donor and recipient to answer the questionnaire by generate the QR code.</li> </ul>   |

#### 4.1.2 Non-Functional Requirement Analysis

Non-functional requirement is a specification that explain the ability of the system operation and constraints. The non-functional requirement shown in the following:

**Table 4: Non-Functional Requirement**

| <b>Data</b>  | <b>Description</b>  |
|--------------|---|
| Reliability  | Application should be usable for visually impaired people                         |
| Availability | Application should be available in English languages.                             |
| Scalability  | Application should follow Responsive Web Design rules                             |
| Operational  | The system required less time to update and the system required to updated easily |

#### 4.2 Use case diagram

Use case is one of the most import tool under the category of UML to represent or show the operation involved in a system. Use case diagram consist of actor which is the user in the real world interacting with entities or object to give a clear picture of the process in the system. For organ donation application, there are three actors in the use case diagrams that are doctor, staff and donor/recipient. There are eleven use cases of consisting which are login, register donor and recipient, view donor and recipient details, assignation of donor and recipient details, update profile, send mail to donor and recipient, show questionnaire QR code, verify, send data and get data. Figure 1 shows the use case diagram of the organ donor application. Figure 2 (Appendix A) shows the use case diagram of proposed system.

#### 4.3 Sequence diagram

Sequence diagrams are used to view the relationships involved in this application in detail. This ensures that the diagrams give a clear view of the actor's sequence of events as well as the proper order for the outcome of each event. It also explains how entities associate each other. Figure 3, Figure 4, Figure 5, Figure 6, Figure 7, Figure 8 (Appendix B) shows the sequence diagram of proposed system.

#### 4.4 Class diagram

A static model representing classes and their interaction with the proposed system is the class diagram. Each class has its own internal frameworks in the class diagrams and its relationships with other classes. Class diagrams are used during the design phase to show the general roles and responsibilities of the individuals that provide the activity of the system. Figure 9 (Appendix C) shows the class diagram of proposed system.

#### 4.5 Activity diagram

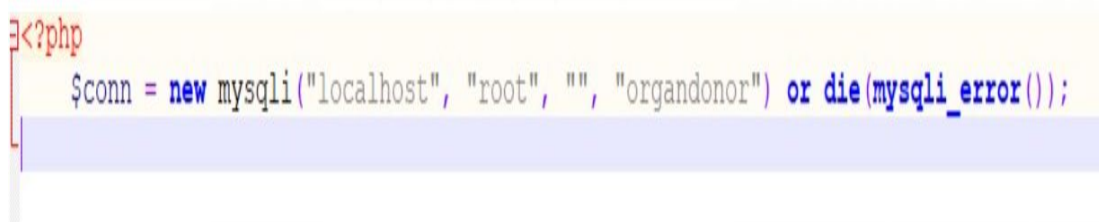
The activity diagram is also a graphical presentation composed of workflow behaviors and attitudes that aid stepwise selection, iteration and control of competitiveness. One of the UML requirements is the activity diagram. The task diagram shows the flow of activities based on the use case or detailed methods of design. There are several symbols used in flow maps in the activity diagram, which are the input, output, processes and data flow. Figure 10, Figure 11, Figure 12, Figure 13 (Appendix D) shows the activity diagram of proposed system.

## 5. Implementation and Testing

System testing is carried out to check that the produced system's functioning is entirely consistent with the designed requirement specification. Several test records were created at this stage to ensure that the system functions as planned. Before beginning the system installation procedure, any issues discovered during the testing phase will be corrected.

### 5.1 Database Connection

The phpmyadmin database has been selected as the data storage location for Organ donation application for Top Glove and Global Doctors (TGGD) Medical Centre. Figure 1 shows the program code for the connection of database to Organ donation application for Top Glove and Global Doctors (TGGD) Medical Centre.



```
<?php
$conn = new mysqli("localhost", "root", "", "organdonor") or die(mysqli_error());
```

**Figure 1: Source code for phpmyadmin database connection**

### 5.2 Application Interfaces

This section will show the interfaces of the application system.

#### 5.2.1 Login Interface

Figure 14 (Appendix E) shows the login interface of the proposed application. In order to utilize this programme, doctors and staff must first log in. To return to the home page, both must enter their username and password.

#### 5.2.2 Main (home) page for doctor Interface

Figure 15 (Appendix E) shows the main (home) page for doctor interface of the proposed application. By clicking the more info button, the doctor can see donor and recipient's information.

#### 5.2.3 Create, edit and delete doctor account Interface

Figure 16 (Appendix E) shows create, edit and delete doctor account interface of the proposed application. This website enables doctors to set up an administrator account. They can also modify or remove their account.

#### 5.2.4 Create, edit and delete staff account Interface

Figure 17 (Appendix E) shows create, edit and delete staff interface of the proposed application. This page allow staff to create their account in admin page. They also can edit and delete their account.

#### 5.2.5 View donor details Interface

Figure 18 (Appendix E) shows the view donor details interface of the proposed application. This interface enables the doctor can access this page to learn more about the donor. The donor's id, name, address, blood group, and organ are all listed on this page.



#### 5.2.6 View recipient details Interface

Figure 19 (Appendix E) shows view recipient details interface of the proposed application. This page contains the doctor can access this website to see the recipient's information. The recipient's ID, name, address, blood group, and organ are all listed on this page.

#### 5.2.7 Create new donor Interface

Figure 20 (Appendix E) shows create new donor interface of the proposed application. This page contains the donor must register on this website, which will be monitored by the staff. The form must be filled out completely and accurately by the donor.

#### 5.2.8 Create new recipient Interface

Figure 21 (Appendix E) shows create new recipient interface of the proposed application. This page contains the donor must register on this website under the supervision of the staff. The recipient must complete the form with accurate information.

#### 5.2.9 Update and delete donor details Interface

Figure 22 (Appendix F) shows the update and delete donor details interface of the proposed application. This interface contains the donor's information can be seen on this page. Donors can modify their information as well as delete their account from this page.

#### 5.2.10 Update and delete recipient details Interface

Figure 23 (Appendix F) shows the update and delete recipient details interface of the proposed application. The donor's information can be seen on this page. The recipient can modify their details as well as delete their account from this page.

#### 5.2.11 Email verification Interface

Figure 24 (Appendix F) shows the email verification interface of the proposed application. This page displays an email verification send button. As a result, staff can check to see if the donor and recipient are sending genuine email addresses.

#### 5.2.12 Scan QR code page Interface

Figure 25 (Appendix F) shows the scan QR code page interface of the proposed application. After the user has enabled the camera setting permission, this page displays the phone's back camera functions. This scan code page allows employees to scan the QR code.

#### 5.2.13 Generate statistics Interface

Figure 26 (Appendix F) shows the generate statistics interface of the proposed application. This page keeps a record of organ donors and recipients. The data appears to make the doctor's job easier.

#### 5.2.14 Assign method Interface

Figure 27 (Appendix F) shows the assign method interface of the proposed application. This page keeps allow doctor to assign suitable donor and recipient with same blood group and organ.

### 5.3 Testing

Functional system testing is used to test and document the organ donation application during the testing phase. Testing is necessary to determine whether the application contains any errors and to guarantee that the application meets the project's requirements.

#### 5.3.1 Functional Testing

The purpose of functional testing is to ensure that all of the application's components and features work properly. This is to guarantee that the system works and operates as it should. Testing elements are incorporated into test plans based on various test cases for each module. The test reports for functional testing for each module in this system will be presented in the subsections below.

#### 5.3.2 Test Plan

Following the implementation of the suggested application, the test plan is carried out. It can be used to determine whether the application meets the project's criteria. Tables 1 to 15 illustrate the test plan for all of the functions in the organ donation application (Appendix G).

Table 5 shows the test plan for user login page. This module is able to test with input of user's username and password. Table 6 shows the test plan for staff registration page. In this page staff register them. Table 7 shows the test plan for assign suitable donor and recipient. In this activity, doctor assign suitable donor and recipient with same blood group and organ. Table 8 shows the test plan for register donor and recipient details. In this page, staff register donor and recipient. Table 9 shows the test plan for update donor and recipient details. In this activity, staff can update donor's or recipient's details. Table 10 shows the test plan for delete donor and recipient details. In this page staff can delete donors and recipient information. Table 11 shows the test plan for scan QR code. In this activity user can scan QR code to answer the questions. Table 12 shows test plan for generate QR code. In this page, staff can view how many person did answer the questions. Table 13 shows the test plan for generate email verification. In this page, staff send verification message to check whether it is valid or invalid email address. Table 14 shows the test plan for view statistics. In this page, doctor can view the statistics of how many people donate and receive their organ. Table 15 shows the test plan for assign donor and recipient. In this page, doctor enter blood group and organ, it arranged according to it.

## 6. Conclusion

Organ Donation Application for TGGD Medical Centre will be developed in order to connect the donors and the receivers. Overall, all phases of the application development process has been carried out to meet the target of achieving satisfactorily. This application plays a significant role in finding a suitable donor and receiver on time. In addition, this application is also expected to be enhanced by improving its quality in the near future. The improvement can be done by optimizing performance and usability of the application.

### 6.1 Limitations

Although the project's objectives have been met, this part will highlight the barriers of the proposed application. The following are the limitations:

1. Donors and staff must have access to the internet during registration.
2. Only the statistics of the donor and recipient are displayed in the application.
3. The app is only available for Android users; it is not available for iOS users.
4. Authentication and security elements are lacking from the application.

## 6.2 Future Work

This section will cover potential work enhancements. These are a few suggestions on how to improve this application.

1. To prevent forgery, the application's security should be improved.
2. The application's user interface should be improved so that it can be used by both Android and iOS users.
3. More functions should be added to the application in order to make it more user-friendly.

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## Appendix A

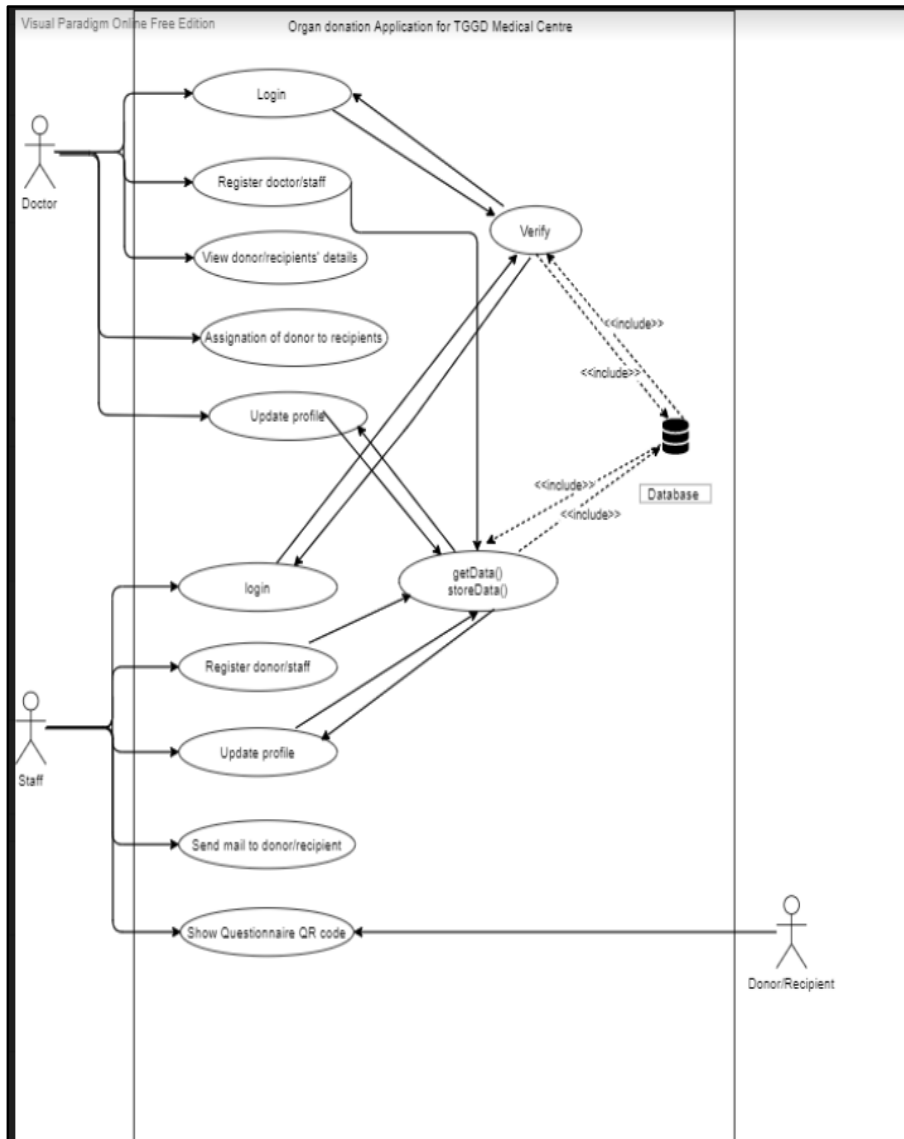


Figure 2: Use Case Diagram

## Appendix B

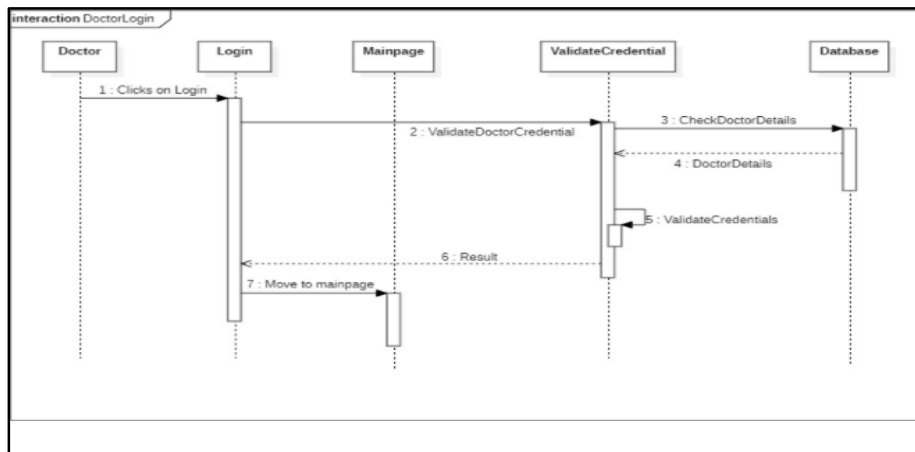


Figure 3: Sequence Diagram for Doctor Login

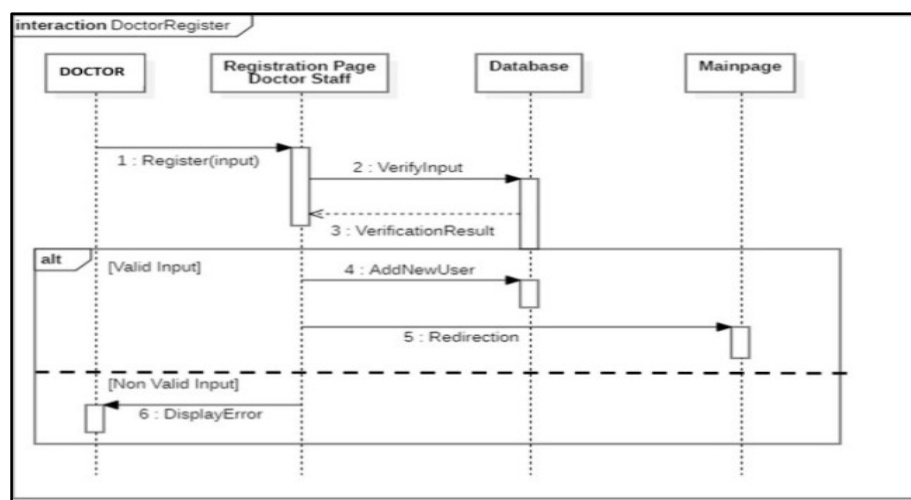
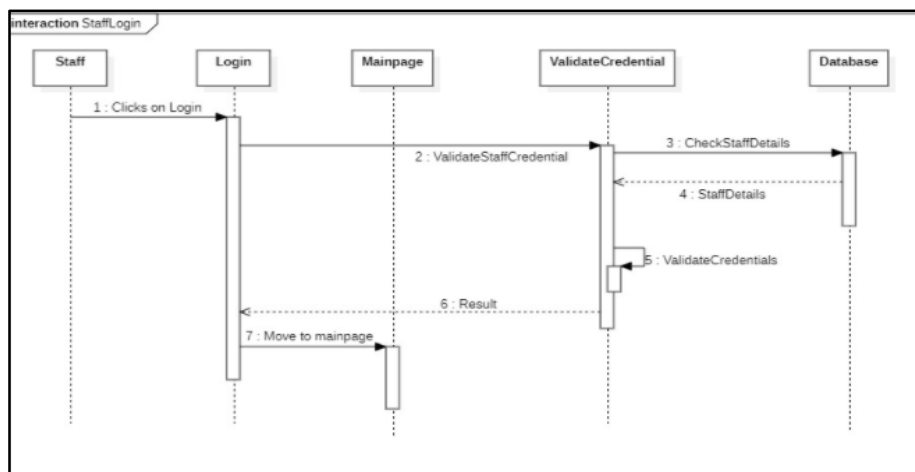


Figure 5: Sequence Diagram for Register Doctor

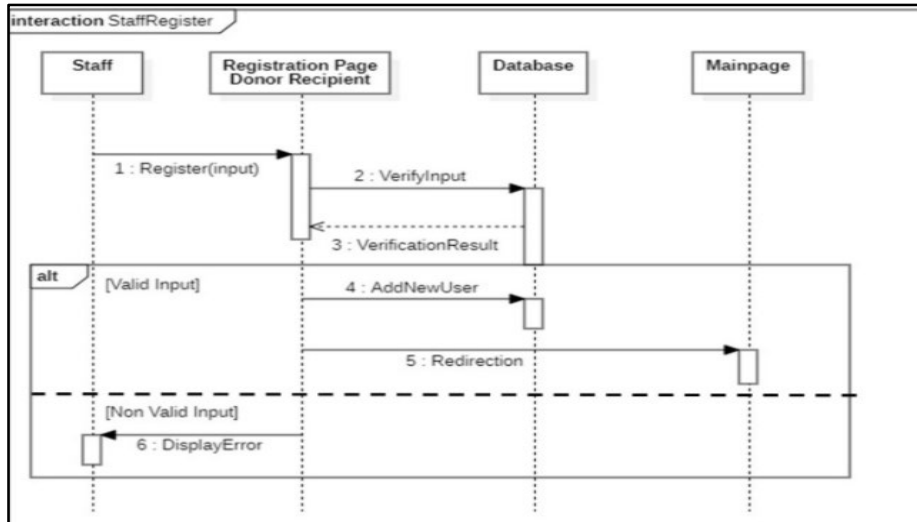


Figure 6: Sequence Diagram for Staff Register

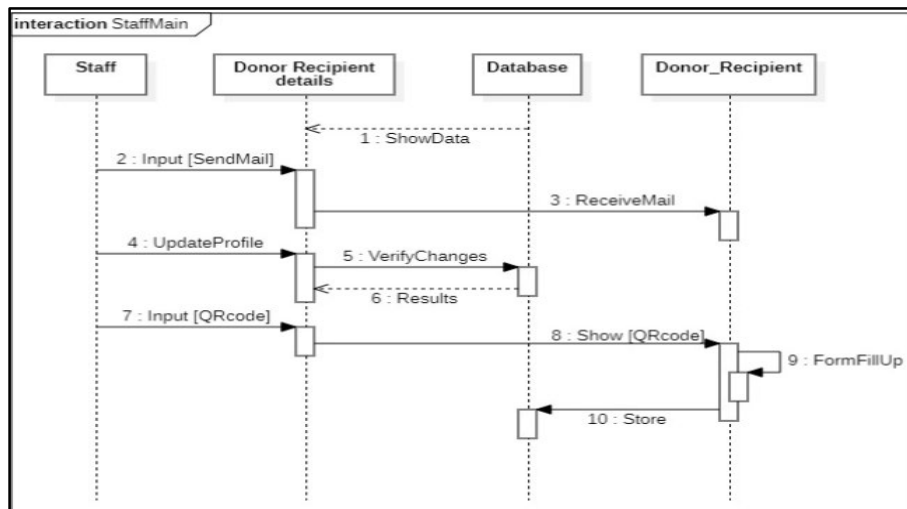


Figure 7: Sequence Diagram for Staff Main Page

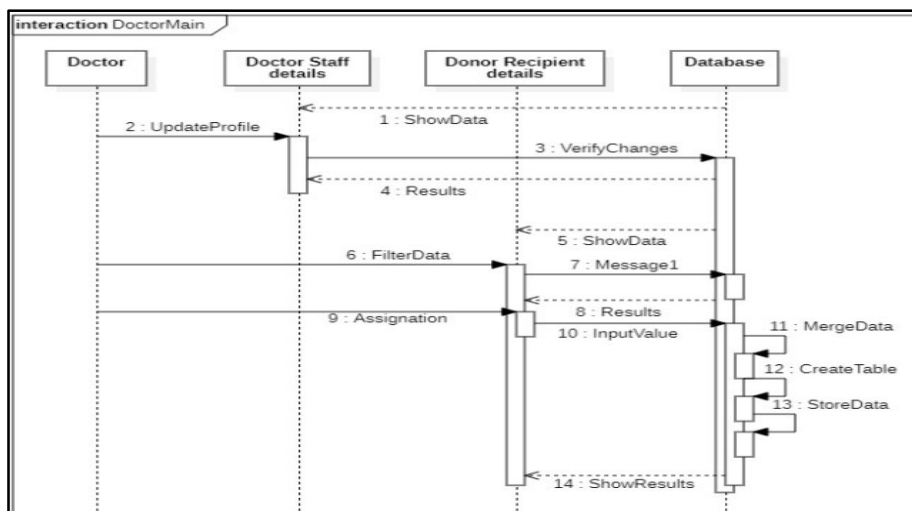


Figure 8: Sequence Diagram for Doctor Main Page

## Appendix C

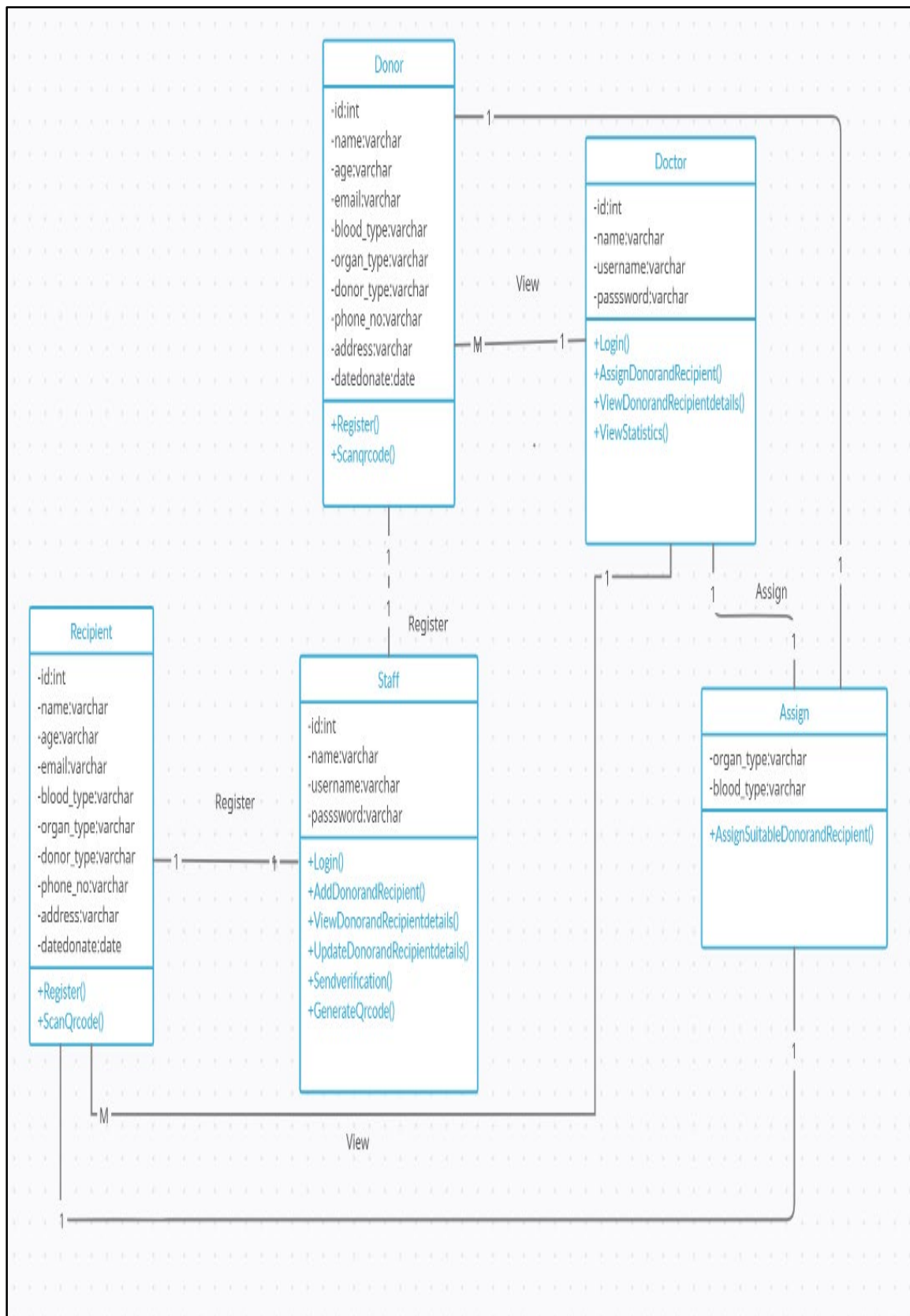


Figure 9: Class Diagram

Appendix D

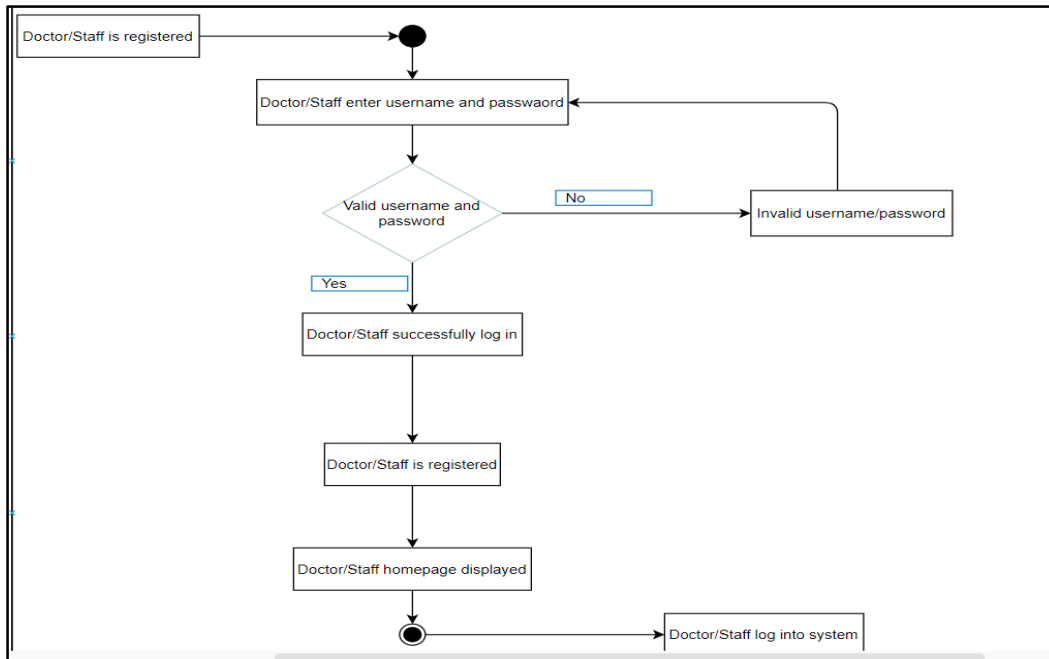


Figure 10: Activity Diagram for Doctor and Staff Login

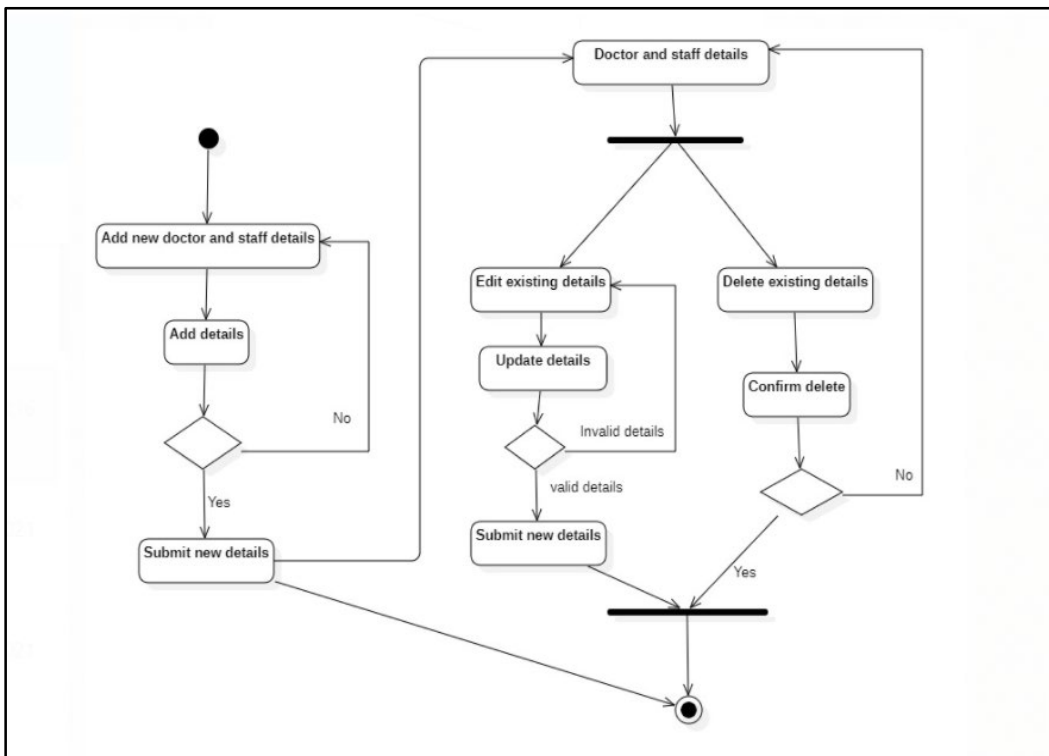


Figure 11: Activity Diagram for Doctor Main Page



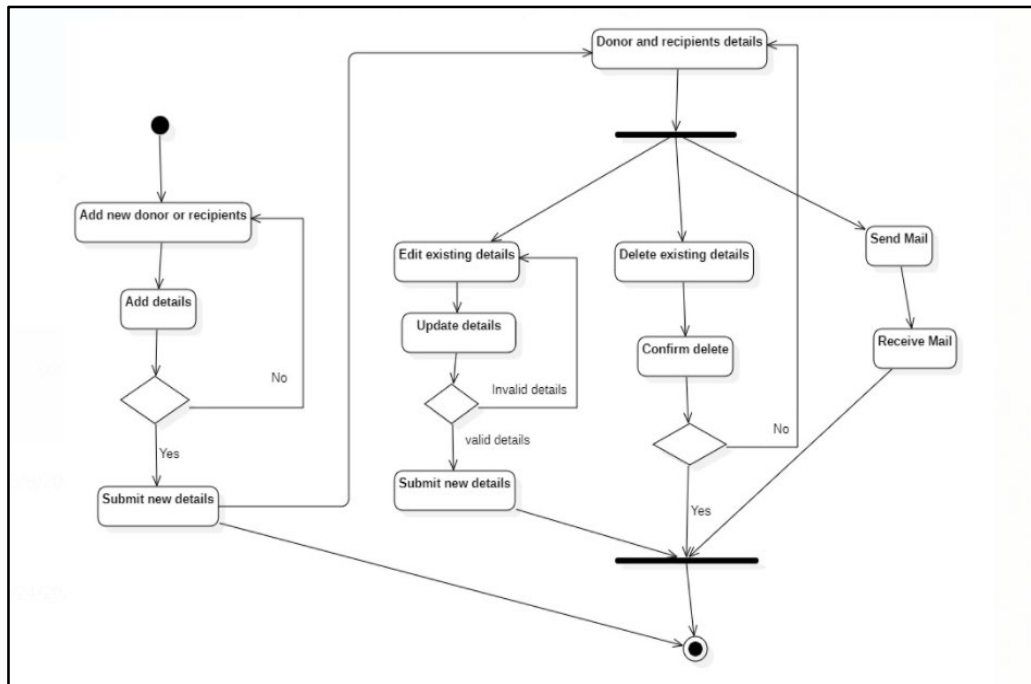


Figure 12: Activity Diagram for Staff Main Page

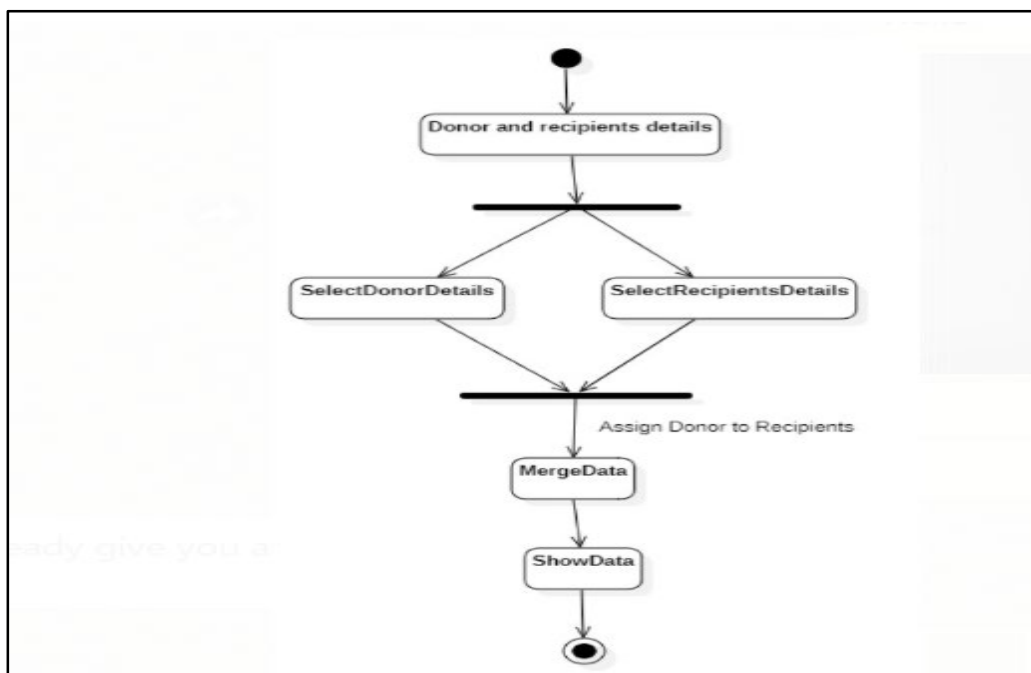


Figure 13: Activity Diagram for Assign Donor and Recipient

## Appendix E



Figure 14: Login Interface

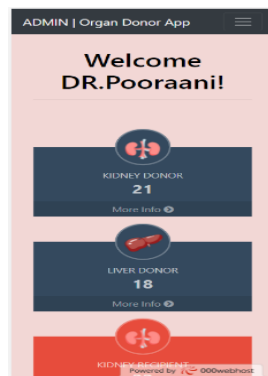


Figure 15: Main (home) Page for Doctor Interface

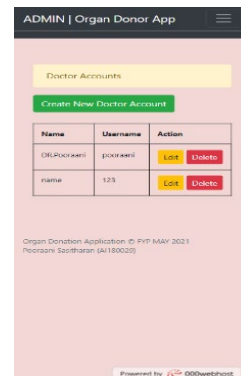


Figure 16: Create, Edit and Delete Doctor Account



Figure 17: Create, Edit and Delete Staff Account

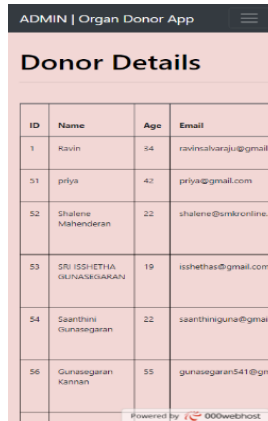


Figure 18: View Donor Details



Figure 19: View Recipient Details Interface

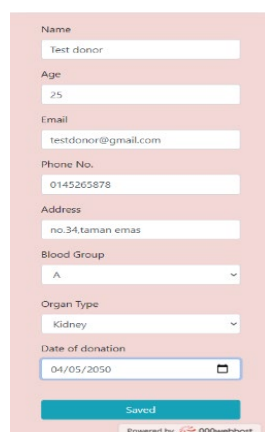


Figure 20: Create New Donor

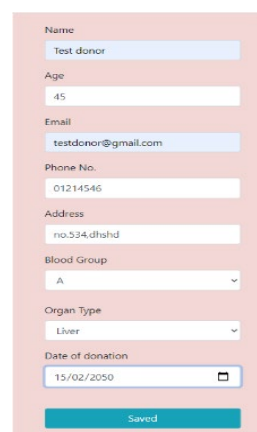


Figure 21: Create New Recipient Interface

## Appendix F

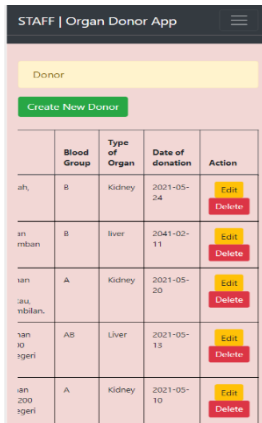


Figure 22: Edit and Delete Donor Details Interface

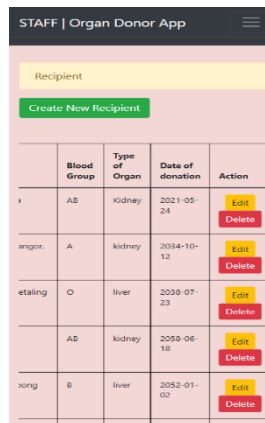


Figure 23: Edit and Delete Recipient Details Interface

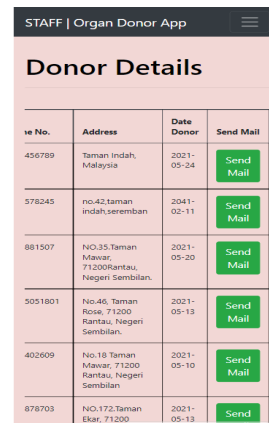


Figure 24: Email Verification

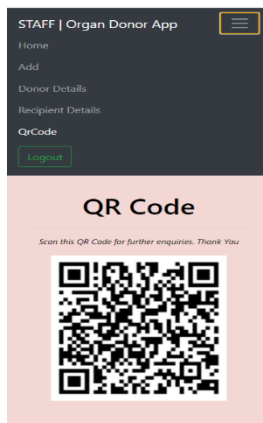


Figure 25: Scan QR Code

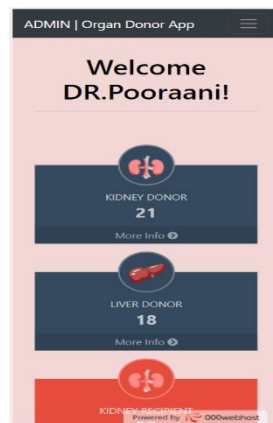


Figure 26: Generate Statistics Interface

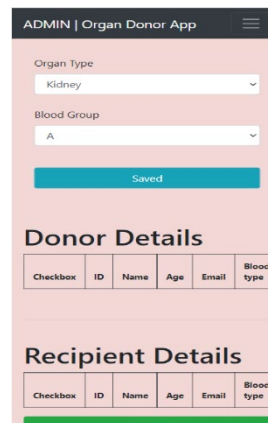


Figure 27: Assign Method Interface

## Appendix G

**Table 5: Test Plan for Login**

| No | Test Cases                                     | Expected Output  | Actual Output |
|----|--|--|---------------|
| 1. | Enter valid email address and password         | Login is successful and a message box with the message "Login Successful" will be displayed.         | As expected   |
| 2. | Enter invalid email address and valid password | If login is unsuccessful, a message box with the message "Invalid username or password" will appear. | As expected   |
| 3. | Enter valid email address and invalid password | If login is unsuccessful, a message box with the message "Invalid username or password" will appear. | As expected   |
| 4. | Enter invalid email address and password       | If login is unsuccessful, a message box with the message "Invalid username or password" will appear. | As expected   |

**Table 6: Test Plan for Staff Registration**

| No. | Test Cases                                   | Expected Output   | Actual Output |
|-----|--|---|---------------|
| 1.  | Register using correct username and password | Registration successful and display in create new staff account page. | As expected   |
| 2.  | Click delete button                          | Warning message is displayed to confirm the deletion.                 | As expected   |
| 3.  | Click edit button                            | Changes will occur after change password or username.                 | As expected   |

**Table 7: Test plan for assign suitable donor and recipient**

| No. | Test Cases                           | Expected Output  | Actual Output |
|-----|--------------------------------------|--|---------------|
| 1.  | Click a type of organ and blood type | List out all the donor and recipient details according to the specific organ and blood group | As expected   |
| 2.  | Click assign button                  | Assign a donor to a suitable recipient.  | As expected   |

**Table 8: Test Plan for Register Donor and Recipient Details**

| No. | Test Cases   | Expected Output  | Actual Output |
|-----|--|--|---------------|
| 1.  | Insert valid details about the donor and recipient | Details of donor and recipient successfully appear in the table. | As expected   |
| 2.  | Leaves empty fields without filling up             | Failure message is shown and prompt users to fill in the blank   | As expected   |
| 3.  | Internet Problems/ No connection                   | Failure message is shown and add event action is rejected        | As expected   |

**Table 9: Test Plan for Update Donor and Recipient Details**

| No. | Test Cases                      | Expected Output   | Actual Output |
|-----|---------------------------------|---|---------------|
| 1.  | Click edit button               | An update information successfully appear in the table. | As expected   |
| 2.  | No connection/Internet problems | Failure is shown.                                       | As expected   |

**Table 10: Test Plan for Delete Donor and Recipient Details**

| No. | Test Cases                      | Expected Output  | Actual Output |
|-----|---------------------------------|--|---------------|
| 1.  | Click delete button             | The deleted person details will not appear in the table.     | As expected   |
| 2.  | Internet problems/No connection | Failure message is shown and delete event action is rejected | As expected   |

**Table 11: Test Plan for Scan QR code**

| No. | Test Cases                                  | Expected Output  | Actual Output |
|-----|---|--|---------------|
| 1.  | Allow permission on phone camera setting    | The scan QR code page able to access phone camera and scan QR code     | As expected   |
| 2.  | Disallow permission on phone camera setting | The scan QR code page not able to access phone camera and scan QR code | As expected   |
| 3.  | Scan QR code                                | The questionnaire appears  | As expected   |
| 4.  | Scan invalid QR code                        | No data recorded message appears                                       | As expected   |

**Table 12: Test Plan for Generate QR Code**

| No. | Test Cases                   | Expected Output                                       | Actual Output |
|-----|------------------------------|---|---------------|
| 1.  | Complete the questionnaire   | The QR code generated and stored in user history page | As expected   |
| 2.  | Incomplete the questionnaire | No QR code generated                                  | As expected   |

**Table 13: Test Plan for Generate Email Verification**

| No. | Test Cases                  | Expected Output                            | Actual Output |
|-----|-----------------------------|--|---------------|
| 1.  | Enter valid email address   | A verify message send to the email address | As expected   |
| 2.  | Enter invalid email address | No message will be sent                    | As expected   |

**Table 14: Test Plan for View Statistics**

| <b>No.</b> | <b>Test Cases</b>           | <b>Expected Output</b>                     | <b>Actual Output</b> |
|------------|-----------------------------|--|----------------------|
| 1.         | Enter valid email address   | A verify message send to the email address | As expected          |
| 2.         | Enter invalid email address | No message will be sent                    | As expected          |

**Table 15: Test Plan for Assign Donor and Recipient**

| <b>No.</b> | <b>Test Cases</b>           | <b>Expected Output</b>  | <b>Actual Output</b> |
|------------|-----------------------------|---|----------------------|
| 1.         | Enter blood group and organ | The name of donor and recipient arranged based on the blood group and organ | As expected          |
| 2.         | Enter submit button         | Redirect to assign details page   | As expected          |