The Hashemite University

Prince Al-Hussein Bin Abdullah II

Faculty for Information Technology

BloodNet

Presented to the faculty of prince Al-Hussein Bin Abdullah II for Information technology, Hashemite University

In Partial Fulfillment

of the Requirements for the Degree of

Bachelor of Science in Computer Information Systems

By:

Osama Kfaween Yousef Shaban Zaid Alabed

Abdullah Abuhalimeh Asma Barakat

Supervised By:

Mohammad Kharabsheh

Zarqa, Jordan

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UNDERTAKING

This is to declare that the project entitled “Project Title” is an original work done by Osamah Kfaween, Zaid Alabed, Asma Barakat, Yousef Shaban and Abdullah Abuhalimeh, in partial fulfillment of the requirements for the degree “Bachelor in Computer Information Systems” at Computer Information Systems Department in the Prince Al-Hussein bin Abdullah II faculty for Information technology, Hashemite University.

All the analysis, design and system development have been accomplished by the previous mentioned members. Moreover, this project has not been submitted to any other college or university.

CERTIFICATE

It is hereby certified that the project titled ***BloodNet*** submitted by ***Osamah Kfaween*** (1937349), ***Yousef Shaban*** (1932107), ***Asma Barakat*** (2040495), ***Zaid Alabed*** (1932101), and ***Abdullah Abuhalimeh*** (1932342) in partial fulfillment of the award of the Degree of bachelor's in computer information systems embodies original work done by them under my supervision.

Project Supervisor : _____

Department of Computer Information Systems

ABSTRACT

Blood donation is one of the most critical issues that individuals and hospitals may face due to the lack of quantities and the large need for samples.

The role of this project is to facilitate the blood donation process, this is done by providing blood samples and ensuring that they arrive at the time of need as quickly as possible.

This research project presents the main steps that led to the creation of the system, starting from gathering data about different reporting systems that were available on the Internet and reviewing them. Then, specifying the requirements using the “Use Case” analysis method that was needed to accomplish the design and development phase of the system. The last step was implementing the system.

This Project Shall lead to the ease of blood donation via locating the nearest best possible donor, this will result in saving a lot of time in the blood donation process and help in saving human lives.

Table of Contents

CHAPTER 1: Introduction

1.1 Overview

BloodNet heavily relies on both the location of the hospital asking for blood samples and the location of the donator, as discussed in the introduction, the goal of this project is to deliver the samples as fast as possible, which means that the algorithm of this application should choose the donator who is closest to the hospital asking for samples.

1.2 Project Motivation

Our main reason for this specific sector of projects is that we want to achieve patient assistance and concern for public health. This project will save a lot of time in the blood donation process and will make it way faster than usual, which we believe will result in helping people and saving lives. BloodNet features the main idea of getting emergency blood donations by locating the nearest donor.

1.3 Problem Statement

Blood donation is found to be not guaranteed, which means it depends on whether there are available samples in other hospitals or not, for example, a hospital in Irbid declares an emergency for the need of AB blood samples for a patient's surgery, unfortunately, all the close hospitals in Irbid has the same issue of not having enough quantities of AB blood samples, which means the only available choice for the hospital is to wait for the samples to arrive from another province.

1.4 Project Aim and Objectives

With a multi-interface application (Hospital/user), BloodNet can address the problem in the problem statement. The doctor (Hospital) can request a certain kind of blood sample, and all nearby users will be alerted to the need for these samples.

1.5 Project scope

BloodNet depends on one main standard when sending the notifications, and that is the chosen hospital by the user, the hospital sends the notification based on that information, the nearest the donor could be to the hospital the more time will be saved during the process.

We have to keep in mind that there is a cooldown function for the user in case he donated to not be notified again for a period of time (112 days[1]).

1.6 Project Software and hardware Requirements

BloodNet Works on both Android (Application) and Internet Browsers (web Site),

Any Smartphone or computer can access the website, however, to install the application, an android device is needed.

1.7 Project Limitations

BloodNet locally works in Jordan only, installing the application in other countries won't come with any help at all.

1.8 Project Expected Output

The expected output of the main process of BloodNet is to make sure that the blood samples reach the hospitals in need of them.

1.9 project Schedule

When necessary, the administrator (Doctor) will access BloodNet's Hospital side program and request a certain kind of blood samples, then, the application will use its algorithm to look for the variety of best available donors, all the available donors will be notified for the need of these samples, the donors can be either regular citizens or other near hospitals, when one of the donors accepts the donation request on the user side application, the other users and the hospital will be notified that the request has been accepted by a user, the user that accepted the request should head to the hospital as fast as he possibly can to complete the donation process, finally, once the donation process is completed, the doctor shall give his feedback on the Hospital side application And the user can see the review.

1.10 Project, product, and schedule risks

There might be a problem where a user might accept a donation request and for some reason, the user wants to cancel the process, in this case, the user should cancel the process on the user side application and the application shall start looking for available donors again.

CHAPTER 2: Related Existing Systems

2.1 Introduction

The basic idea of BloodNet is not innovative, as many websites and applications are interested in blood donations, and therefore these applications helped us to be inspired by our idea and develop it to produce something new.

2.2 Existing Systems

There are a lot of systems that have similarities to this project, "Save.life[2]" is one of these similar applications, link:

2.3 Overall Problems of Existing Systems

In general, all the blood donation systems and applications are great due to the humanitarian goal they are created for, but, with all our respect to these projects, none of them can connect regular citizens with hospitals for the emergency need of blood donation, however, our project's main goal is to solve this problem.

2.4 Overall Solution Approach

Given the problems that we talked about above, our project also aims to develop the speed of the blood donation process by encouraging donors to donate by giving donors points on the

site when they donate. These points are determined based on the best donors on the site in honor of them, in addition to that, the points can be exchanged for rewards such as free meals in specific restaurants, or coupons that can be used in specific malls.

CHAPTER 3: Requirement Engineering and Analysis

3.1 Stakeholders

BloodNet will include the activity of Users (Donors), Hospitals (Doctors) directly, the outcome of this project's main goal will positively affect patients in the hospitals by providing them with the blood units they need.

3.2 Use case Diagram

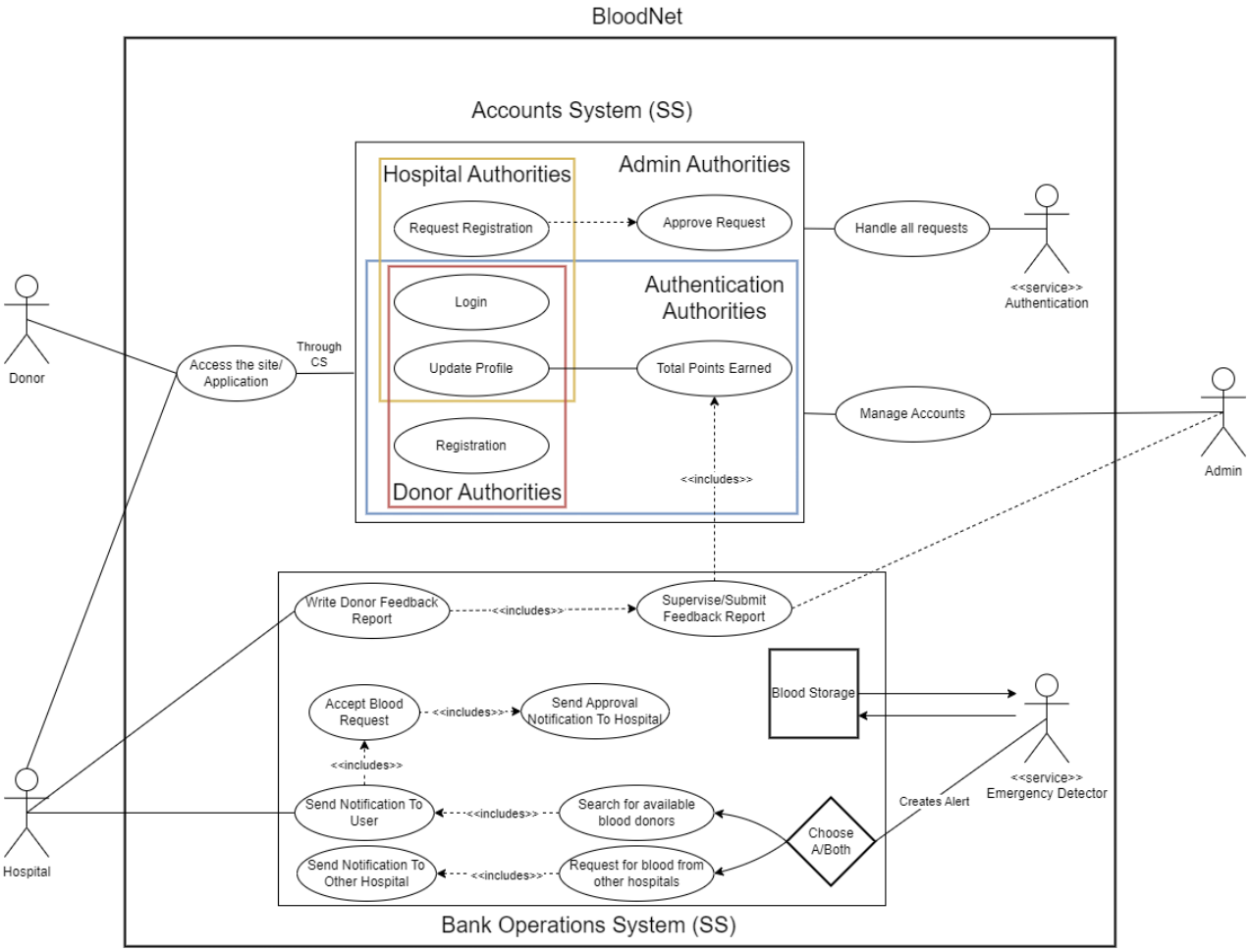


Figure 3.1 [3] [4]

This Figure shows the normal use case of BloodNet and the activities that each side (Admin/User/Hospital) can do during the use of BloodNet.

3.2.1 Use case Section

Register

Basic Flow	- The User will enter his/her Full Name - The User Enters his/her Email - The User Enters his/her phone number - The User enters his/her Username - The User enter the password and verifies it - The User enters his/her Gender - The User Enters his/her blood type - The User Enters his/her Date of Birth (Age)
Alternative Flow	- If the User enters a weak password (Similar to the Username or Full Name, doesn't include Characters or numbers or it's shorter than 8 digits length) an error message in the password section will appear - If the User enters an already existing Username, an error message will appear in the Username field telling the user what's the problem

Table 3.1

Basic flow and Alternative flow of the Registration process

Log in	
Basic Flow	- The User enters his/her Username/Email - The User enters his/her Password
Alternative Flow	- If either the Username/Email are not found or the password is not correct, an error message will appear telling the User that which field is not correct.

Table 3.2

Basic flow and Alternative flow of the Log in process

Account Management	
Basic Flow	- The User accepts a blood donation request - The User can manage his/her account like: Changing Password/Uername, Update Phone Number … Etc - The User cancels a blood donation request that he/she accepted - The User views the feedback shown on his/her account given by the hospital they donated the blood to
Alternative Flow	- If the new Password/Username doesn't meet the requirements written in the registration alternative flow, an error message will appear

Table 3.3

Basic flow and Alternative flow of the Account Management process

Admin Account Management	
Basic Flow	- The hospital views emergency requests from the hospital's blood bank asking for a specific type of blood units - The hospital requests a specific type of blood units - The hospital views the general information of the user that accepted the request - The hospital views that a user canceled an already accepted request - The hospital gives feedback on the user
Alternative Flow	- No major alternatives are normally considered during this process

3.3 Non-Functional Requirements

BloodNet is a safe, secure, and usable Website/Application, considering:

1- Will contain a server end and client end which will validate any https end requests.

2-The safety of the database system (My SQL).

3- The programming languages/frameworks for this project (Asp.Net MVC/Flutter).

4- Knowing that encapsulation approach will be used, information will private and not displayed for other users.

This project is capable of testing, the tester can check all the processes in the use case section through the multiple interfaces (hospital/user) and see if there's something wrong, although BloodNet will be operating locally in Jordan at the time of launch, the maintainability of this project is simple to handle due to how easy and straightforward the design is, it has all the qualities of extensibility and scalability for working globally in other countries.

3.3 Constraints

At debut, BloodNet will operate in Jordanian hospitals via Internet connectivity between the hospital side and the user side, this project must lead to achieving its main goal of providing blood units as quick as possible and mustn't fail in this approach.

CHAPTER 4: Architecture and design

4.1 Overview

This Chapter explains all components of our application and how they are related to each other through some of diagrams and full description of the interfaces of the website.

4.2 Software Architecture

4.2.1 Logical view

- Class diagram figure will be displayed on chapter 4.

4.2.2 Process View

- Sequence diagram figure will be displayed on chapter 4.

4.2.3 Physical View

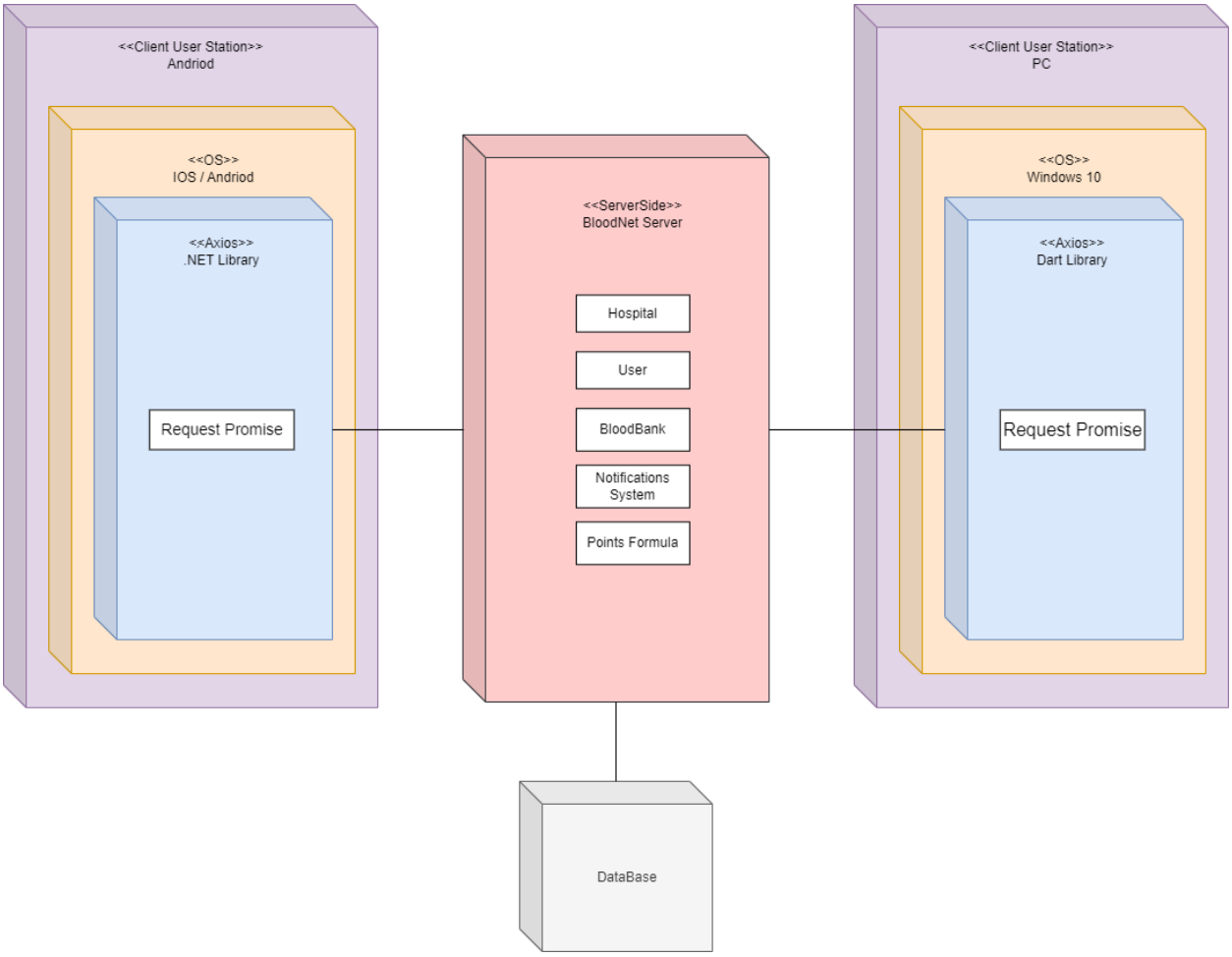


Figure 4.2.3 [3] [5]

This Deployment diagram explains the main physical components and their behavior in between.

4.3 software Design

4.3.1 UML sequence/communication diagram

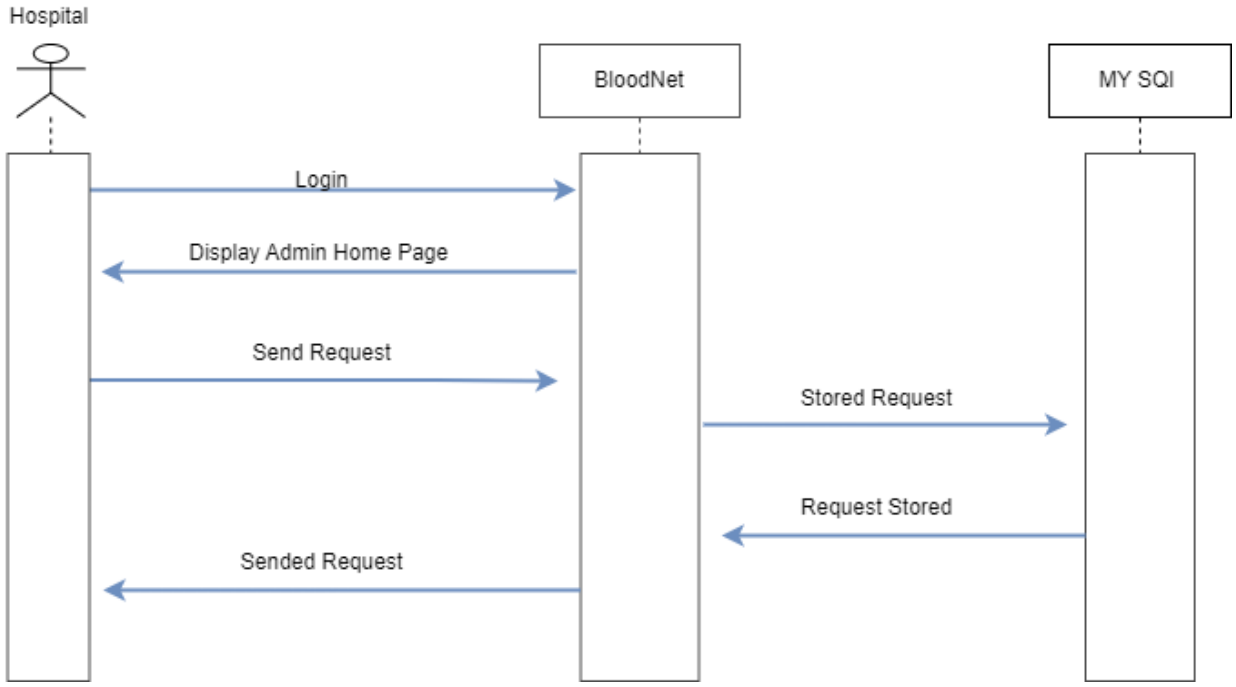


Figure 4.3.1 [3]

This Figure shows the Sequence For the hospital(doctor) on bloodnet and how it contacts with the Database and Bloodnet.

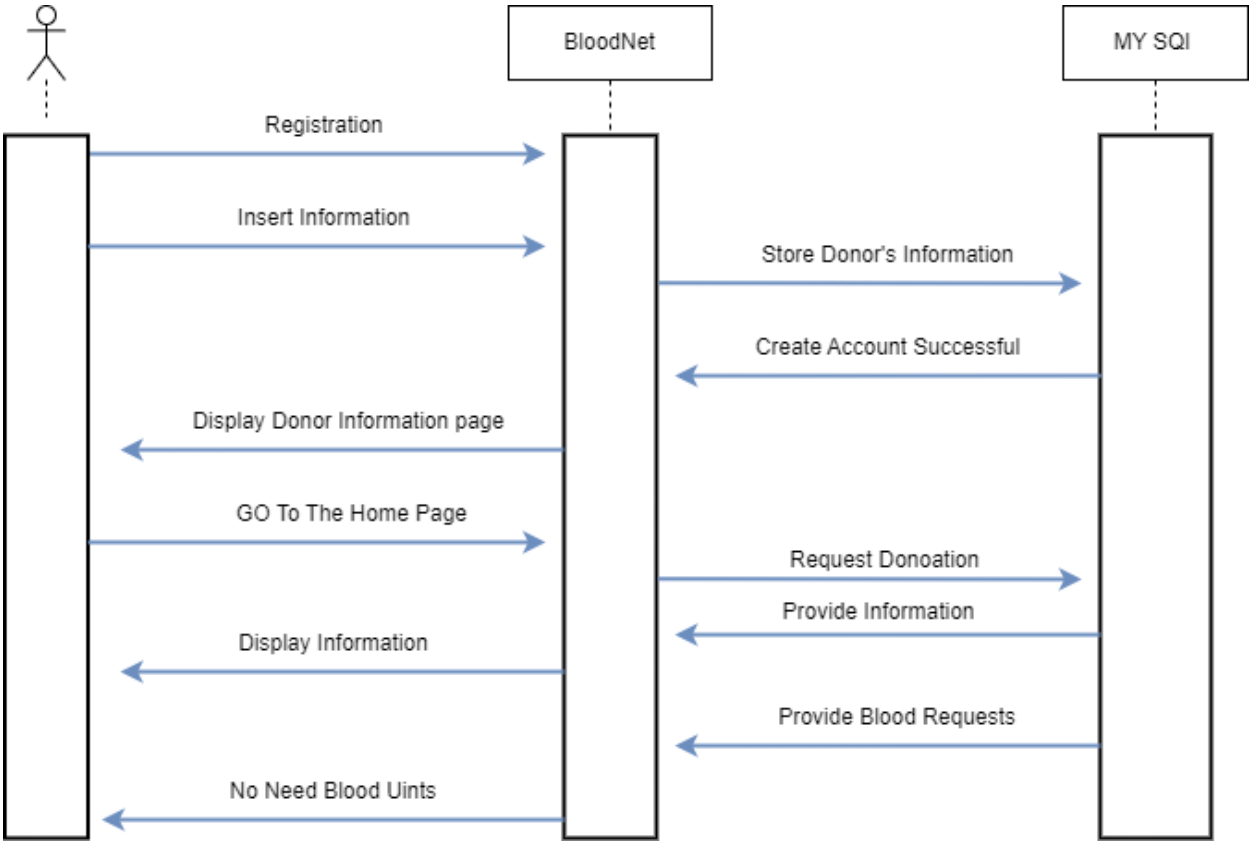


Figure 4.3.2 [3]

This Figure shows the Sequence For the user on bloodnet and how it contacts with the Database including sign up/login process.

4.3.2 Class diagram

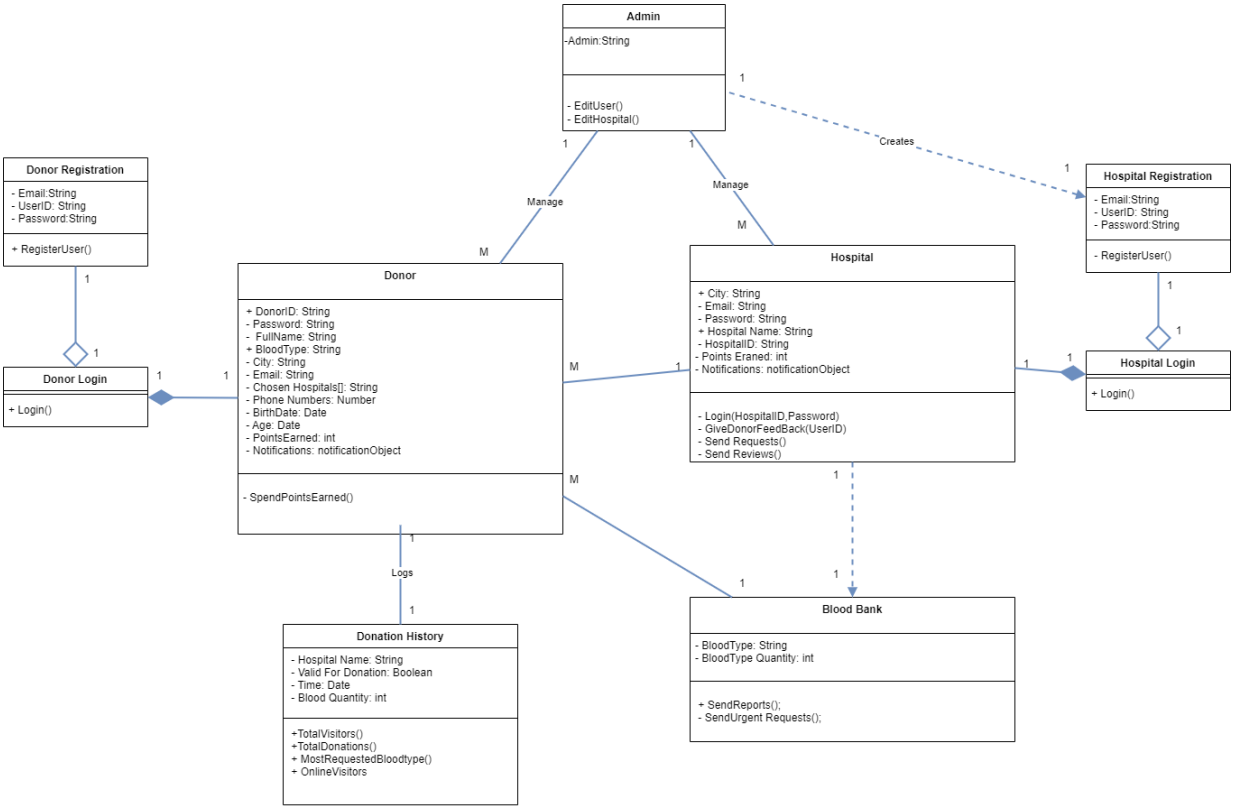


Figure 4.3.2 [3]

This Figure shows the Class diagram for BloodNet and the relationships between classes (Blood bank/Donor/Hospital) and their functions and attributes.

4.3.3 ER diagram

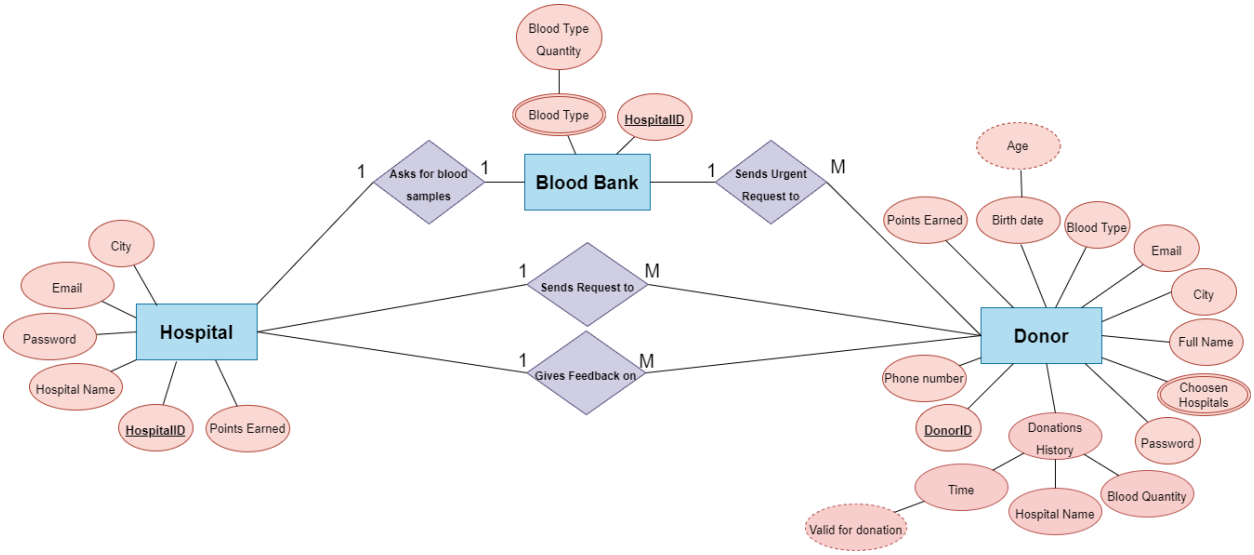


Figure 4.3.3 [3] [6]

This Figure shows the ER diagram for BloodNet and the relationships between entities (Blood bank/Donor/Hospital) and their attributes.

4.4 User interface design (Prototype)

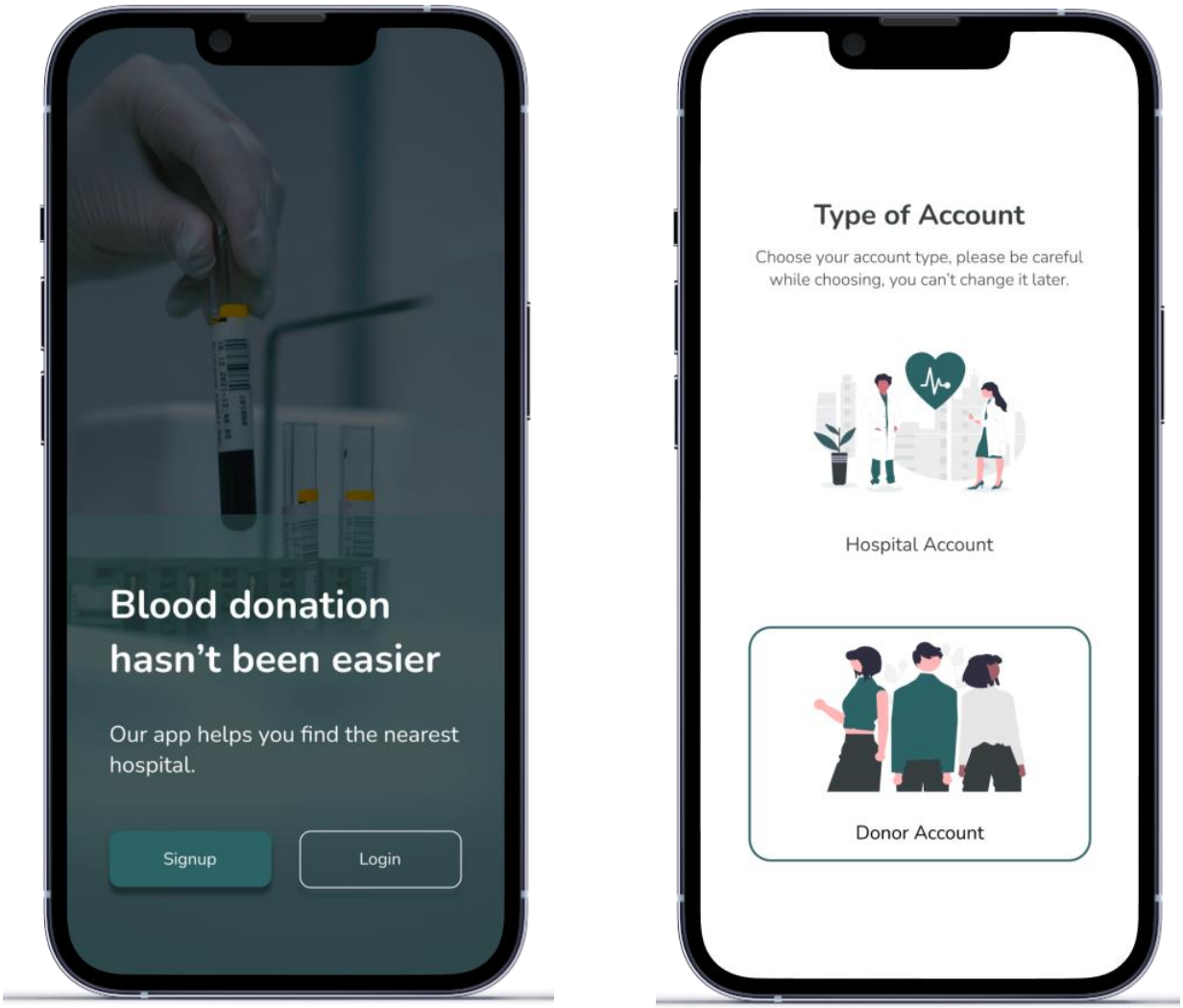


Figure 1: Registration and login process for the Hospital. [7]

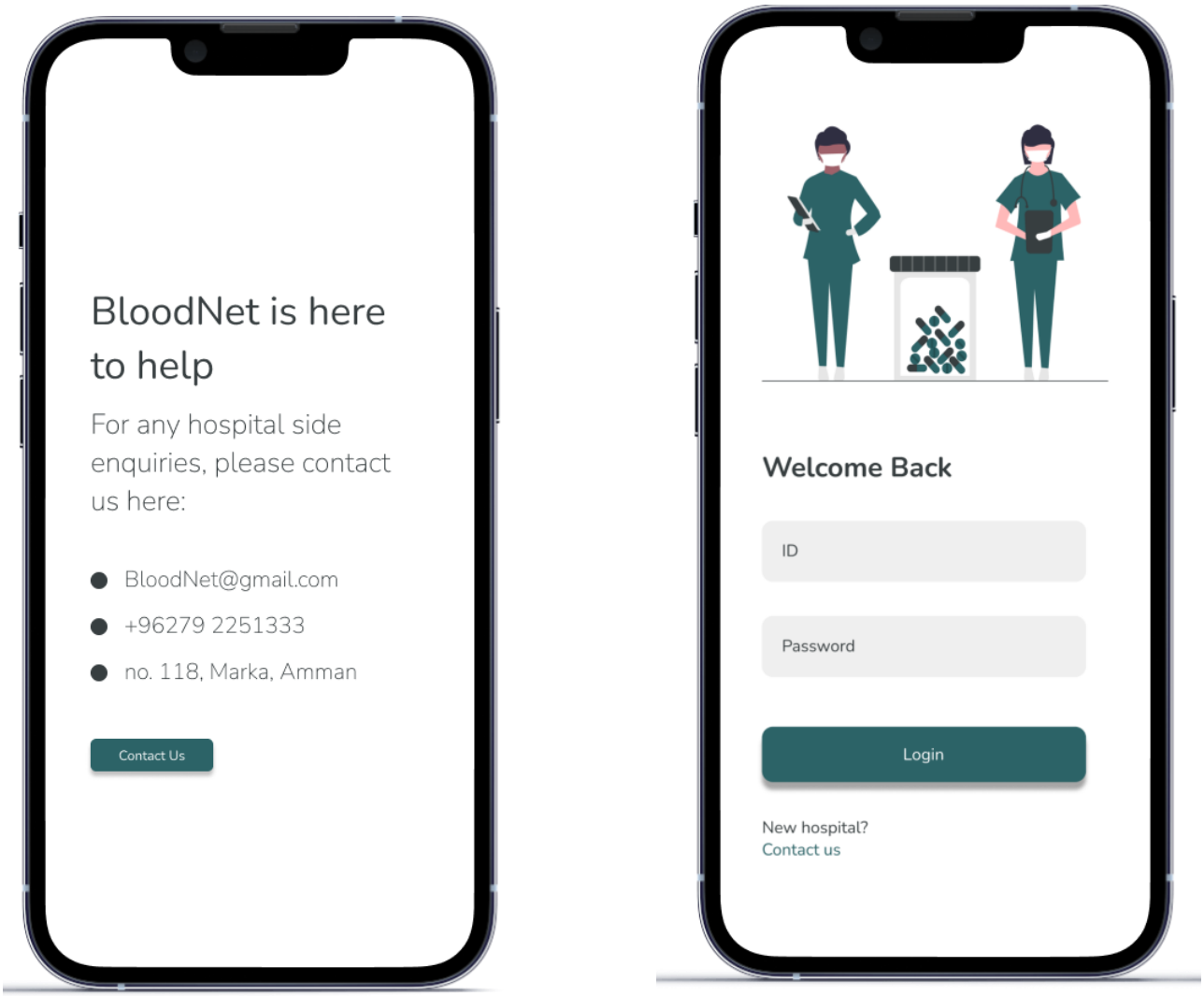
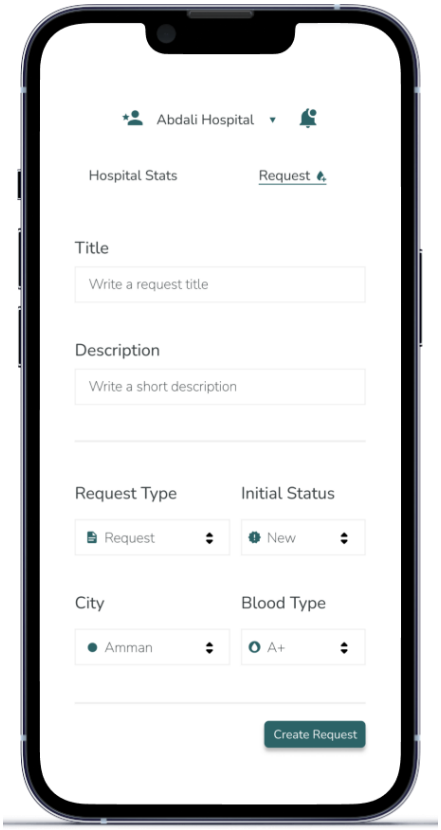


Figure 1: Registration and login process (cont…)[7]



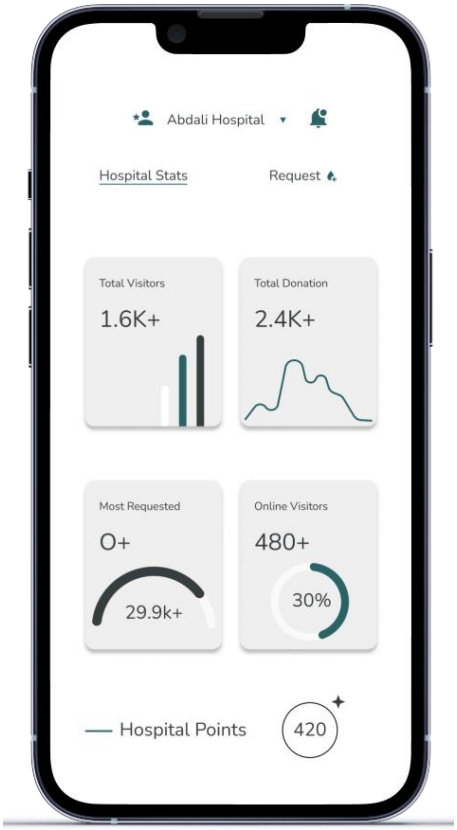
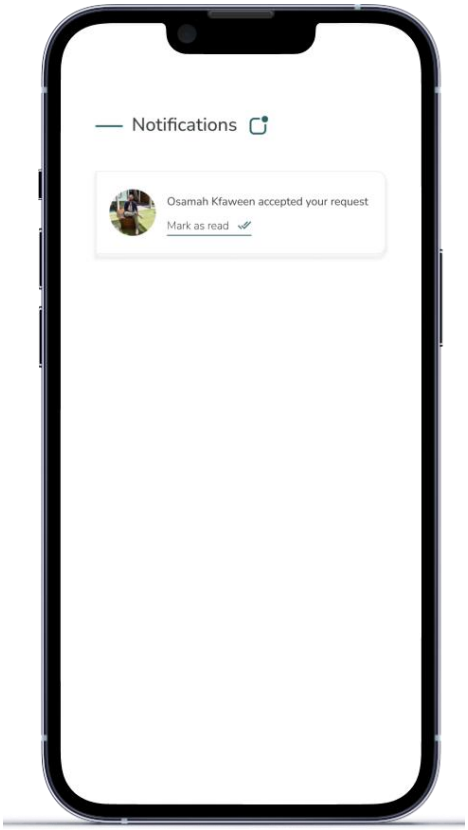


Figure 2: The main page For the Hospital Including the hospital States and the Notifications For the blood requests. [7]



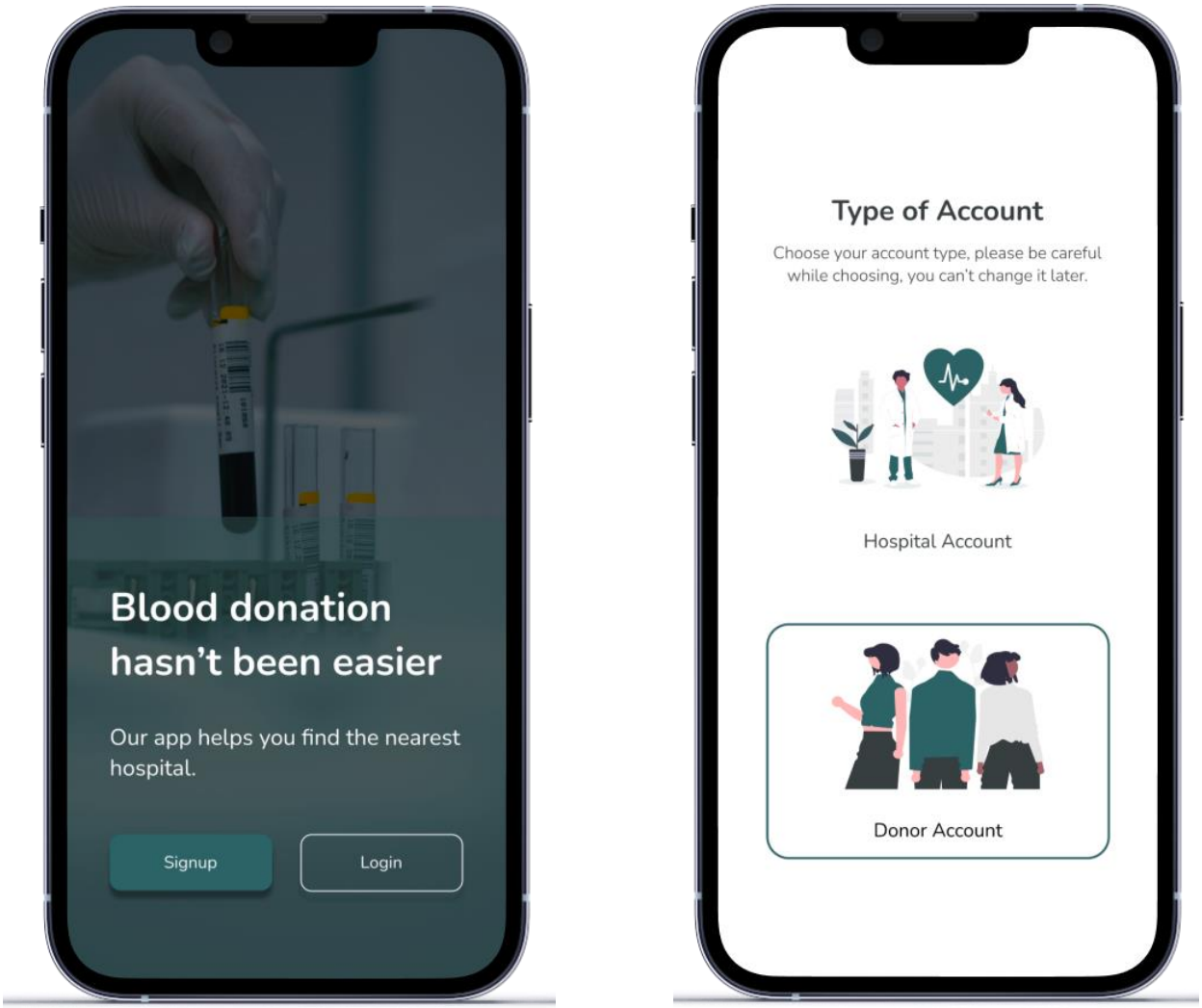
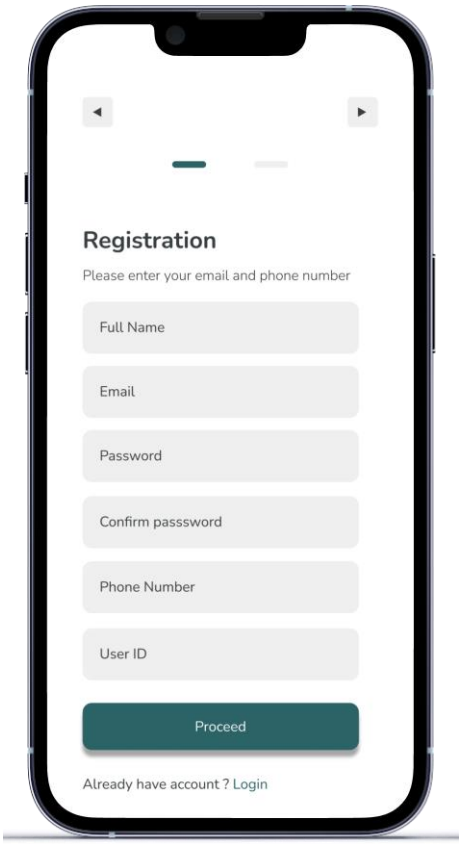
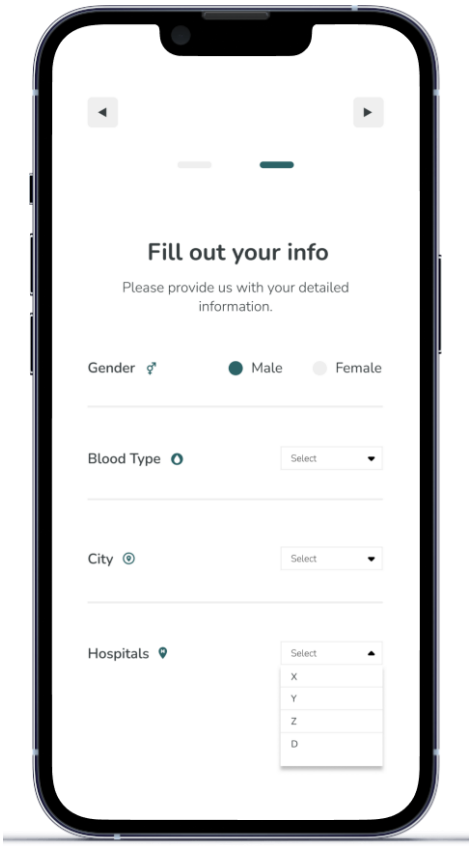


Figure 3: Registration and login process for the Donors. [7]





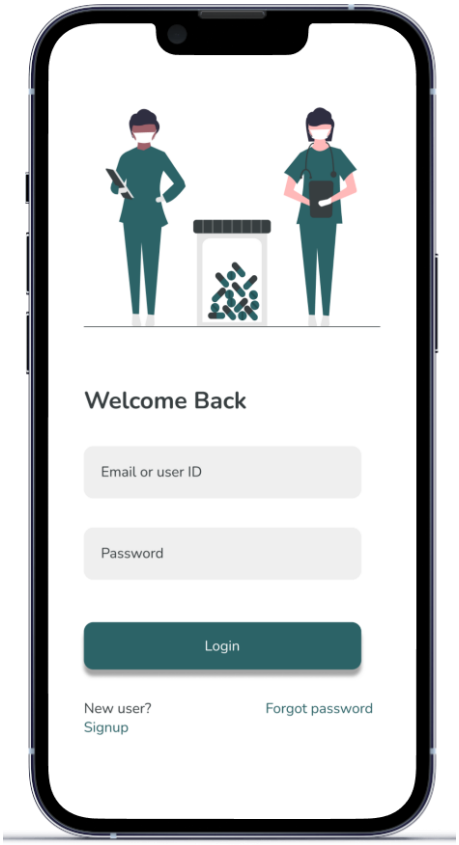


Figure 3:

Registration and login process (cont..) [7]

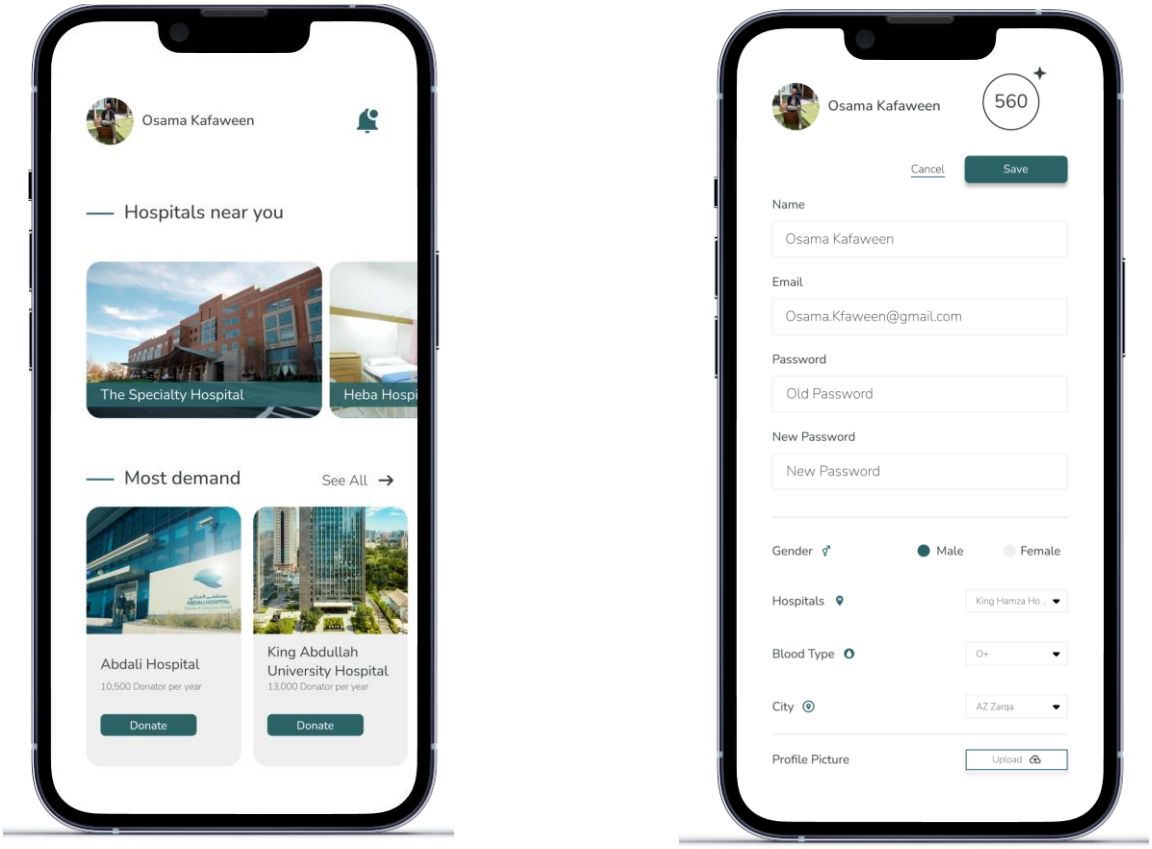


Figure 4: The main page for the donor including his profile information, Hospitals Nearby, most demand hospitals. [7]

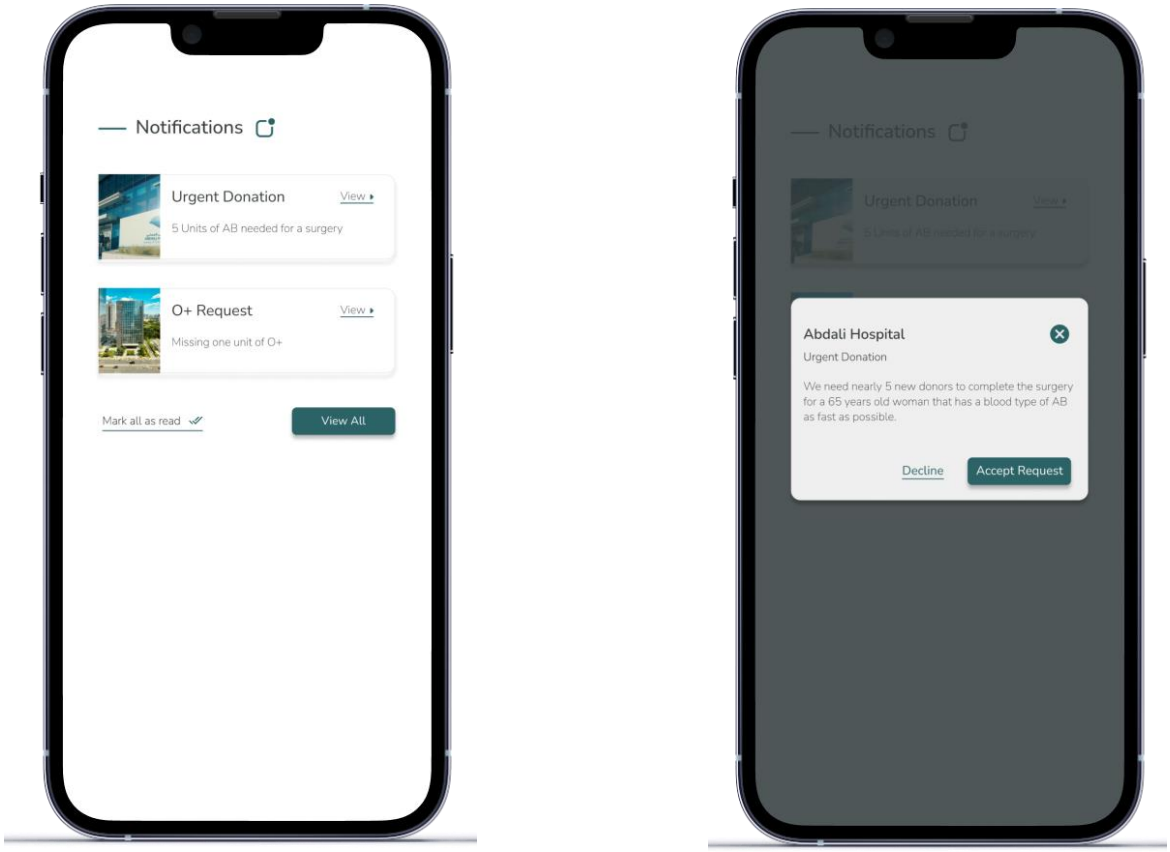


Figure 5: Hospital Notifications Accept/decline. [7]

References

[1] Memorial Sloan Kettering was founded in 1884

[2] Save.life (existing system)

[3] draw.io (chapter 3 -> all diagrams were created using draw.io)

[4] Sommerville software engineering 9th ed

[5] Modern Systems Analysis and design 7th edition

Jeffrey A. Hoffer

Joey F. George

Joseph S. Valacich

[6] Database Design Using Entity-Relationship Diagrams (Foundations of Database Design) 2nd Edition

[7] figma (all prototype designs in chapter 4 were created using figma)