Bilkent University

Department of Computer Engineering

Senior Design Project

HelpingHands

Project Analysis Report

Mustafa Anıl Taşdan, Metehan Gürbüz, Rola Younis, Hassam Abdullah

SUPERVISOR: Dr. İbrahim Körpeoğlu

Jury Members: Dr. Shervin Arashloo, Dr. Hamdi Dibeklioglu

Nov 15,2021

This report is submitted to the Department of Computer Engineering of Bilkent University in partial fulfillment of the requirements of the Senior Design Project course CS491/2

Table of Contents

Introduction **3**

Proposed System **4**

2.1 Overview 4

2.2 Functional Requirements 4

2.2.1 System Functionality 4

2.2.2 User Functionality 5

2.3 Non-Functional Requirements 6

2.3.1 Extensibility 6

2.3.2 Reliability 6

2.3.3 Usability 6

2.3.4 Accessibility 6

2.3.5 Portability 6

2.3.6 Efficiency 7

2.4 Pseudo Requirements 7

2.5 System Models 7

2.5.1 Scenarios 7

2.5.2 Use Case Model 14

2.5.3 Object and Class Model 15

2.5.4 Dynamic Models 16

2.5.5 User Interface Mock-ups 20

2.5.5.1 Login Page 20

2.5.5.2 Register Page 21

2.5.5.3 Home Page 22

2.5.5.4 Ask For Blood 23

2.5.5.5 Check on Map 24

2.5.5.6 My Blood Journey 26

2.5.5.7 My History 27

2.5.5.8 Show Badges 28

2.5.5.9 Teams 29

2.5.5.10 My Profile 30

2.5.5.11 My Card 31

Other Analysis Elements 32

3.1 Consideration of Various Factors in Engineering Design 32

3.1.1 Public Health 32

3.1.2 Public Safety 33

3.1.3 Privacy 33

3.1.4 Public Welfare 34

3.1.5 Economic Constraints 34

3.1.6 Social Constraints 34

3.2 Risks and Alternatives 35

3.2.1 Unexpected Costs 35

3.2.2 Losing a Team Member 35

3.2.3 Technological Change 36

3.3 Project Plan 37

3.4 Ensuring Proper Teamwork 45

3.5 Ethics and Professional Responsibilities 45

3.6 Planning for New Knowledge and Learning Strategies 46

Glossary 46

References 48

1. Introduction

As mankind progressed through the ages, the technology we possessed and our understanding of science progressed alongside us. Medicine was one of the fields that saw the most progression. Many medical conditions that may have resulted in fatalities in the past have simple solutions to them today. One big development that proved crucial to the field of medicine were blood transfusions. The first human-to-human blood transfusion was performed in 1795. [1] Since then, blood transfusions have saved countless lives, but the amount of daily blood donations is still very little. Blood transfusions are used for many medical conditions, such as anemia or cancer, but more importantly they are crucial for blood loss resulting from accidents. [2] As donated blood can only be stored for 42 days, and with only a few percent of the population donating their blood[3], a steady supply of blood donations is needed every day. This can be further proven by the fact that Bilkent University periodically sends requests for emergency blood donations. If our community consisting of 14.000 people needs to send this many requests, it is easy to grasp the grimness of the situation when we enlarge the scale to the whole population of Turkey.

This is where we, as HelpingHands, want to come in. We want to provide a mobile based solution for connecting recipients and donors. We want to provide a platform where people in need, or hospitals, can put requests for types of blood donations, and donors fitting the provided criteria can be alerted by notifications, so that they can contact the recipients easily.

2. Proposed System

2.1 Overview

HelpingHands is a mobile application that aims to provide a platform for connecting blood donors and recipients. This is a difficult task because there is not a streamlined platform for a task like this and people use all sorts of vectors, such as e-mails, social media or emergency announcements. While HelpingHands does not aim to completely replace these tools, it aims to provide a high quality platform so these tools are made redundant for this task.

The application is a mobile based application, with two parts, client and server. For the mobile client, we will use React Native, which eliminates the need for using two different native languages for Android and IOS development. For the server, we will use a Node.js framework called Express.js. We will pair it with a MongoDB No-SQL database and finally deploy it to AWS.

2.2 Functional Requirements

In this part, the functional requirements for the system and the user are discussed.

2.2.1 System Functionality

The system should:

- Ask users (clients and hospitals) to register themselves with their identification for security.
- Have a login system for users.
- Ask for/Have clients' information such as their address, phone number, blood type, and address.
- Allow donee to announce their need for blood.
- Allow users to change their profile information in case changed.
- Find blood banks near the user's location.
- Display the blood types available at the blood bank.
- Notify donors if blood is needed at a blood bank near them.
- Send an SMS to donors in case of an emergency blood needed.
- Donors can contact the recipients who posted the request via the blood bank.
- Provide a badge allocation for donors.

- Allow users to take a “selfie” during blood donation to engage more in the process and be able to post it on social media.
- Allow users to check for teams in order to either join an already existing team, or to create a new one.
- Allow users to view their blood donation card.
- Allow users to check their blood donation and reservation history in order to keep track of their blood donations periods.
- Allow users to view their blood journey from donation, to processing, to storage, and finally donating it to other people.

2.2.2 User Functionality

The user should:

- Be able to register themselves with their identification documents.
- Provide the information required to fill in during registering.
- Login to the system.
- Change profile information.
- Be able to select to access the application as a blood donor or as a recipient.
- View near blood banks near his/her area that require their blood type.
- Be able to post requests for blood donations via his/her nearby blood banks.
- Be able to contact each other via messages.
- View his/her badges to be able to know his/her rankings.
- Cancel or modify blood donation requests.
- View blood donation and reservation history.
- Be able to take a “selfie” during blood donation and post it on social media.
- View blood journey.
- Check for teams to join or create.

2.3 Non-Functional Requirements

2.3.1 Extensibility

The system should :

- Be easily maintainable
- Be available on other platforms such as a web application, if the need arises for

integration with hospitals.

2.3.2 Reliability

The system should:

● Ensure that each user’s data remains confidential and protected.

● Ensure that the location of nearby blood banks and donors are correct since any delay may be detrimental in a recipient's state.

2.3.3 Usability

The system should:

● Be user-friendly.

● Have options with themes and app layout, especially a dark theme for night-time viewing.

● Provide correct locations to users and remind users if device calibration is not correct.

2.3.4 Accessibility

The system should:

● Be downloadable from the Google Play Store.

● Be downloadable from the project's official website via the apk file provided there.

2.3.5 Portability

The system should:

● Be able to run on IOS and most Android phones.

2.3.6 Efficiency

The system should:

● Be light-weight and not consume space since it is targeted as a health critical application.

● Remain responsive and not lag even if there are multiple donors/recipients in a locale.

2.4 Pseudo Requirements

The system must:

- Run properly without major bugs.
- Not interfere with other applications/systems in the device.

- Consume minimal storage both in the device and in the cloud.
- Major development and testing must be completed before CS Fair 2022.

2.5 System Models

2.5.1 Scenarios

Scenario 1	
Use Case Name	Register
Participating Actors	Donor and Donee
Entry Conditions	• Application should be open and any user should not be logged in
Exit Conditions	• User should complete the registration by pressing the registration button or cancel the process
Main Flow Events	User: 1. Opens the app 2. Presses Registration Button 3. Fills the required fields 4. Then clicks on the Register button or cancels the registration altogether.

Scenario 2	
Use Case Name	Login

Participating Actors	Donor and Donee
Entry Conditions	● Application should be open and any user should not be logged in
Exit Conditions	● User should fill the required login fields and press the Login button
Main Flow Events	User: 1. Opens the app 2. Fills out the login fields 3. Clicks the Login button

Scenario 3	
Use Case Name	Donation Appointment
Participating Actors	Donor
Entry Conditions	● Application should be open ● Donor should be logged in ● Donee should have a request
Exit Conditions	● Completion of the scheduling process “Confirm” button or exit via the back button.
Main Flow Events	1. Press the “Schedule New Appointment” button. 2. Sets the date for the appointment 3. Sets the time for the appointment 4. Sets the location of the appointment via the map or available appointments nearby

Scenario 4	
Use Case Name	Modify Appointments
Participating Actors	Donor
Entry Conditions	● Application should be open ● Donor should be logged in ● Already scheduled an appointment
Exit Conditions	● Press the “Modify” button ● Press the back button.
Main Flow Events	1. Press the “Manage Appointments” button 2. Choose one of the existing appointments. 3. Press the appointment to modify

Scenario 5	
Use Case Name	Show Badges
Participating Actors	Donor
Entry Conditions	● Application should be open ● Donor should be logged in

Exit Conditions	● Press the back button.
Main Flow Events	1. Presses the Badges tab on the main menu

Scenario 6	
Use Case Name	Join Team
Participating Actors	Donor
Entry Conditions	● Application should be open ● Donor should be logged in
Exit Conditions	● Press the back button. ● Press the “Create” button ● Press the “Join” button
Main Flow Events	1. Press the Team tab 2. Press the “Create or Join Team” button. 2.1. Create a Team by filling up the required fields 2.2. Join an existing team by pressing on the list available

Scenario 7	
Use Case Name	Share Selfie
Participating Actors	Donor
Entry Conditions	● Application should be open ● Donor should be logged in
Exit Conditions	● Press the “Share your Selfie” button. ● Press the back button.
Main Flow Events	1. Press the “Capture the Moment” button. 2. Allow Camera permissions. 3. Take a picture 4. Select a frame 5. Add a caption and share on a social media platform.

Scenario 8	
Use Case Name	Donation History
Participating Actors	Donor
Entry Conditions	● Application should be open ● Donor should be logged in
Exit Conditions	● Press the back button.
Main Flow Events	1. Press the “Donation History” button

Scenario 9	

Use Case Name	Donor Card
Participating Actors	Donor
Entry Conditions	● Application should be open ● Donor should be logged in
Exit Conditions	● Press the back button.
Main Flow Events	1. Press the “Donor Card” button

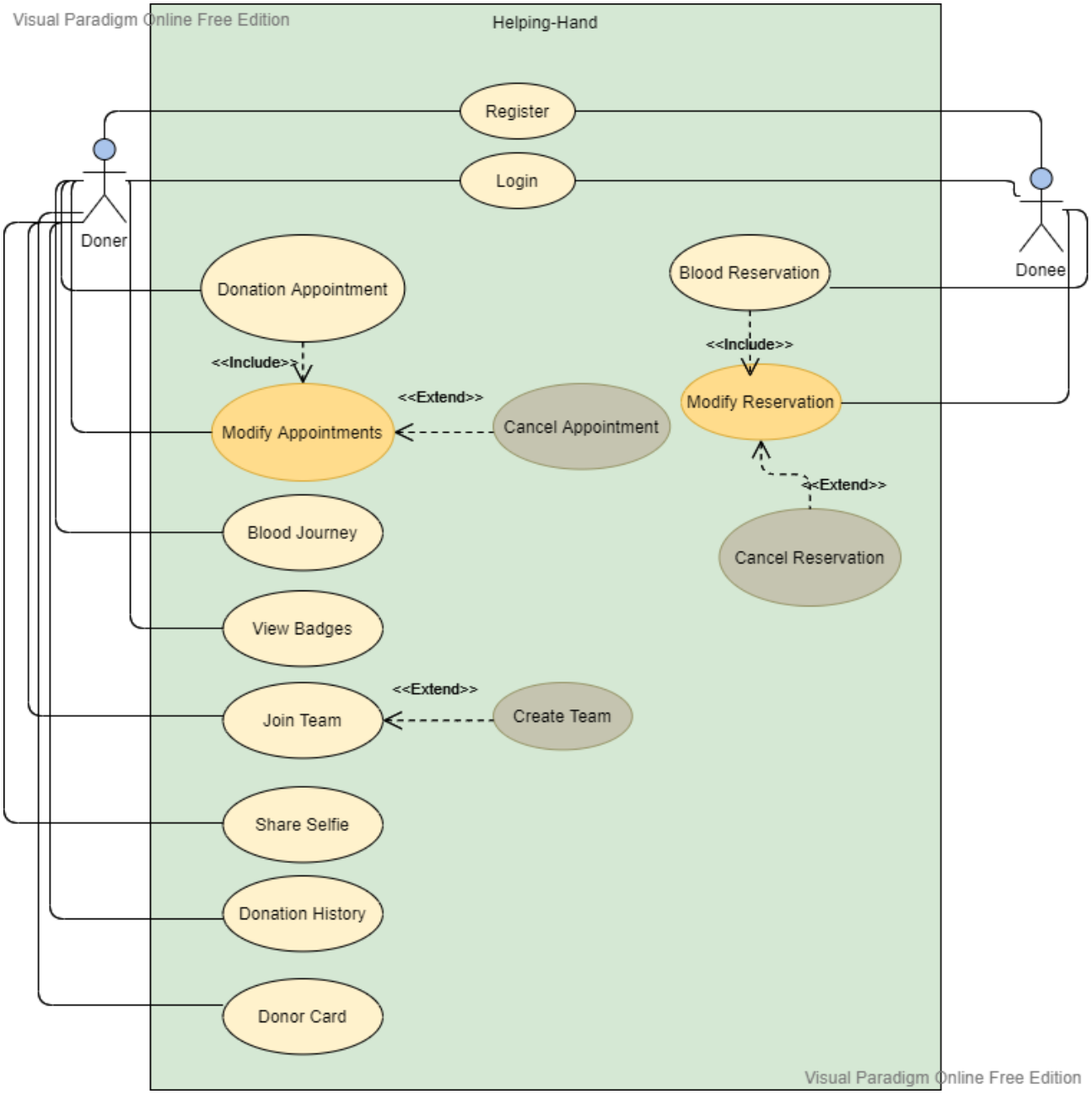
Scenario 10	
Use Case Name	Blood Journey
Participating Actors	Donor
Entry Conditions	● Application should be open ● Donor should be logged in ● Donor should have completed an appointment.
Exit Conditions	● Press the back button.
Main Flow Events	2. Press the “Blood Journey” button

Scenario 11	
Use Case Name	Blood Reservation
Participating Actors	Donee
Entry Conditions	● Application should be open ● Donee should be logged in

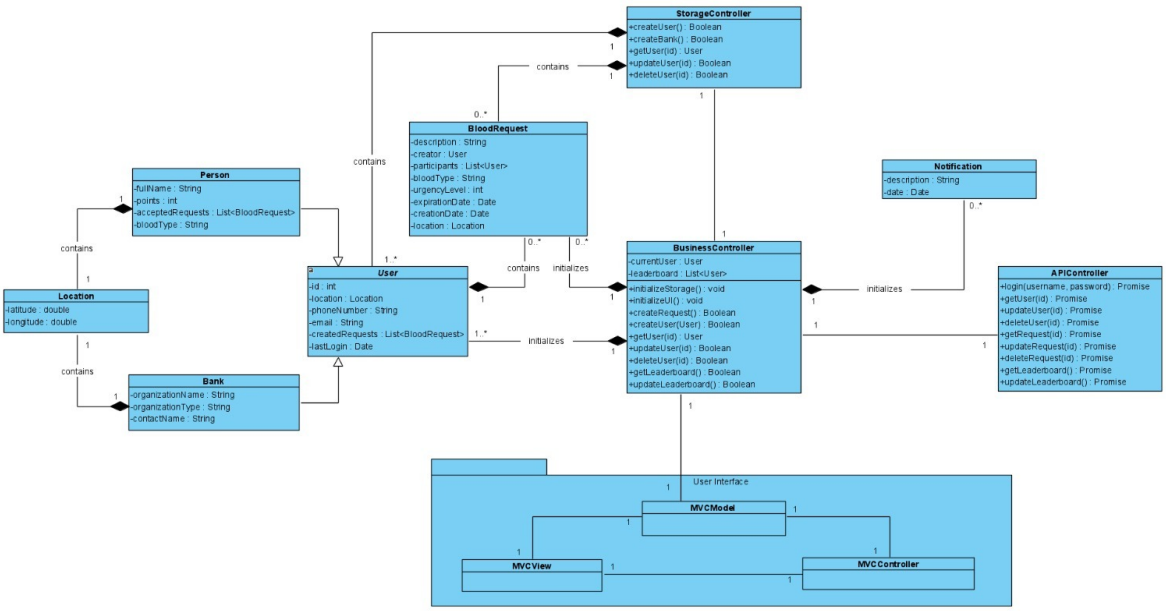
Exit Conditions	● Press the “Confirm Reservation” button. ● Press the back button.
Main Flow Events	1. Press the “Make Reservation” button. 2. Select Blood Type needed 3. Select a nearby hospital/blood bank.

Scenario 12	
Use Case Name	Modify Reservation
Participating Actors	Donee
Entry Conditions	● Application should be open ● Donee should be logged in ● Donee should already have an existing reservation
Exit Conditions	● Press the “Modify” button. ● Press the back button
Main Flow Events	1. Press the “Manage Reservations” button. 2. Find an existing reservation to change 3. Press the reservation to modify

2.5.2 Use Case Model



2.5.3 Object and Class Model



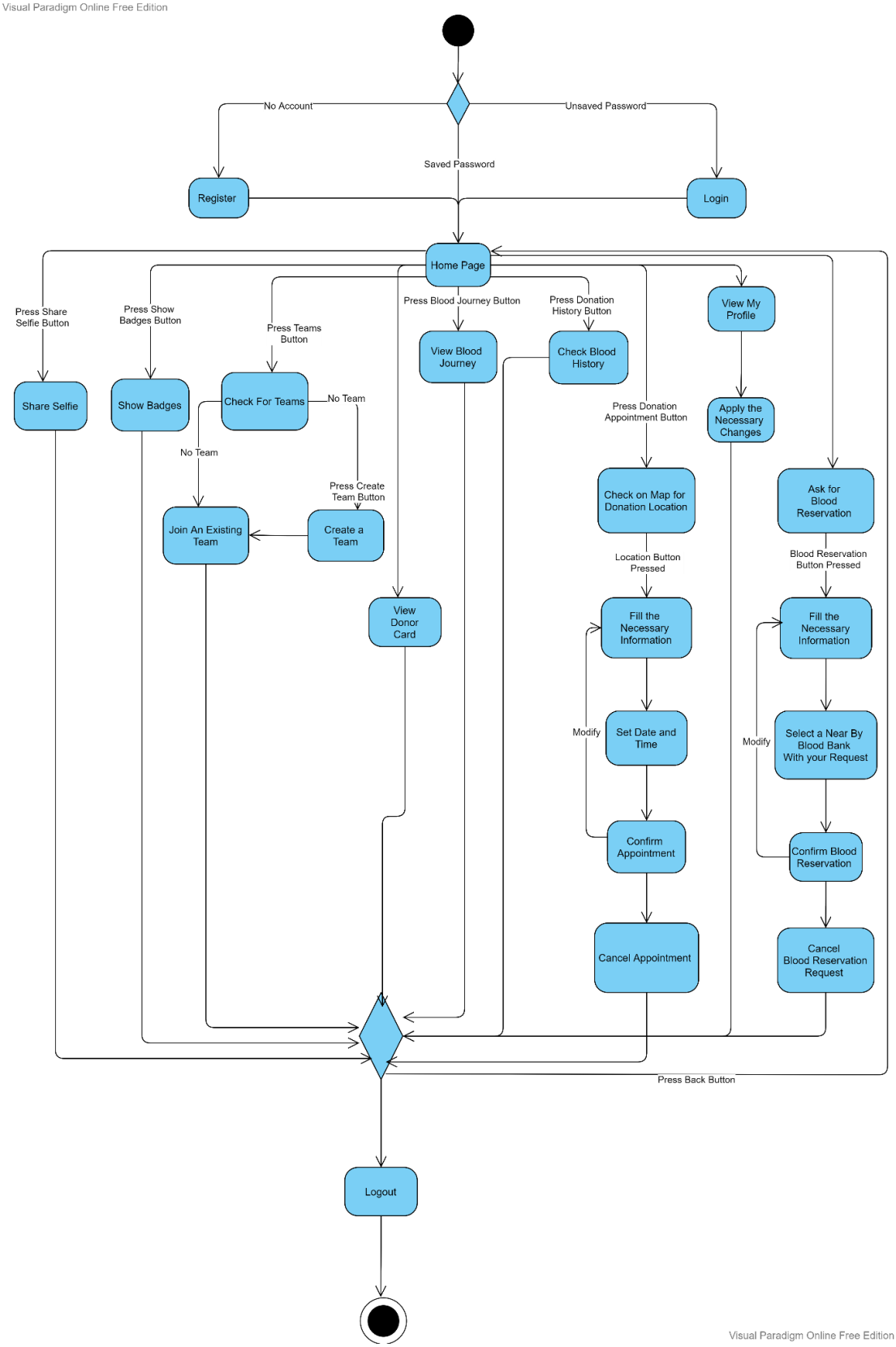
Class	**Description**
BusinessController	This class acts as an intermediary between APIController, StorageController and the UI.
APIController	Handles outgoing requests to and incoming data from the server.
User Interface ~ *Package*	Follows an MVC pattern. Since User Interface development is very fluid, implementation of the classes is not provided.
StorageController	Handles data stored on the mobile device.
BloodRequest	This class holds the necessary data for a blood request.
User ~ *Abstract*	This class is an abstract class for Person and

	Bank classes. It holds data necessary for both people and banks.
Person	This class holds data that is only necessary for people.
Bank	This class holds data that is only necessary for banks.
Location	Holds location data of people or banks.
Notification	Holds notification data when information related to the current user is received from the server.

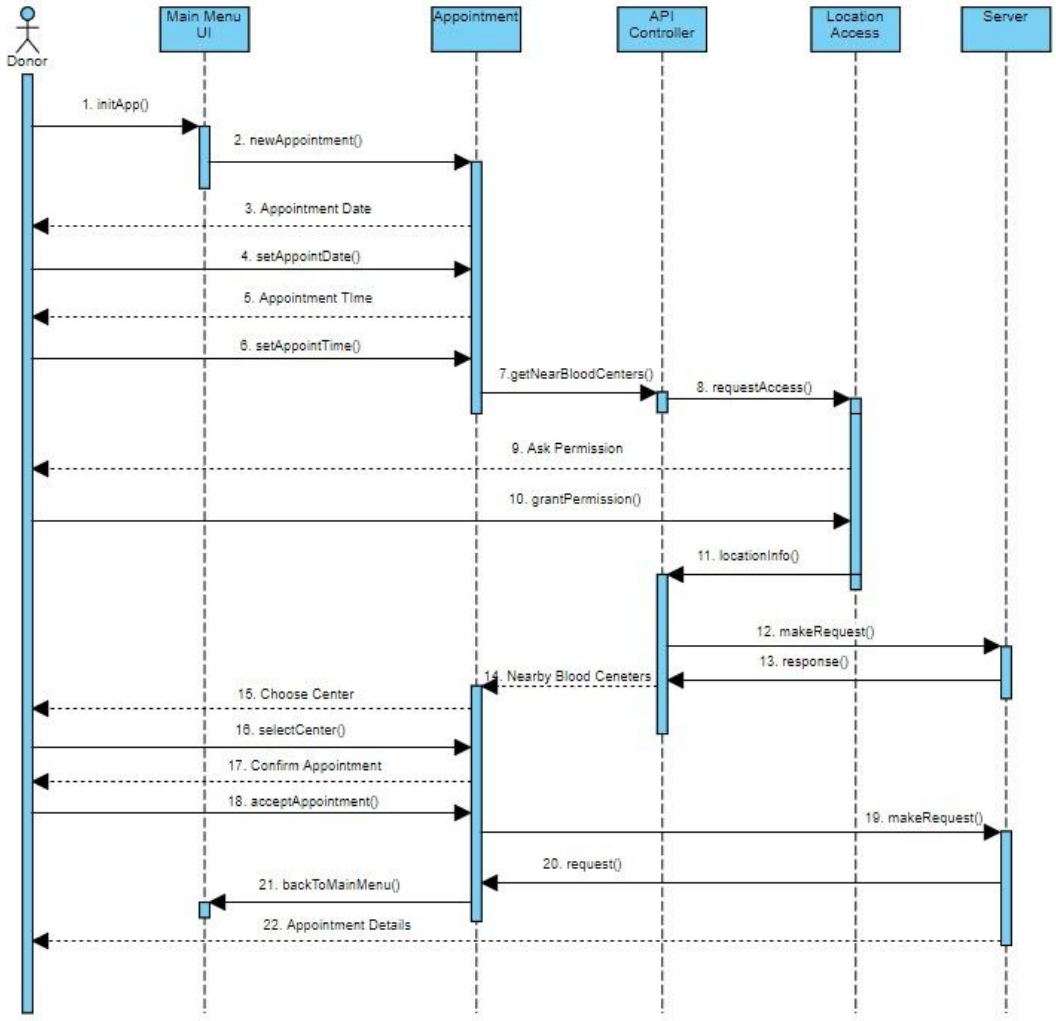
2.5.4 Dynamic Models

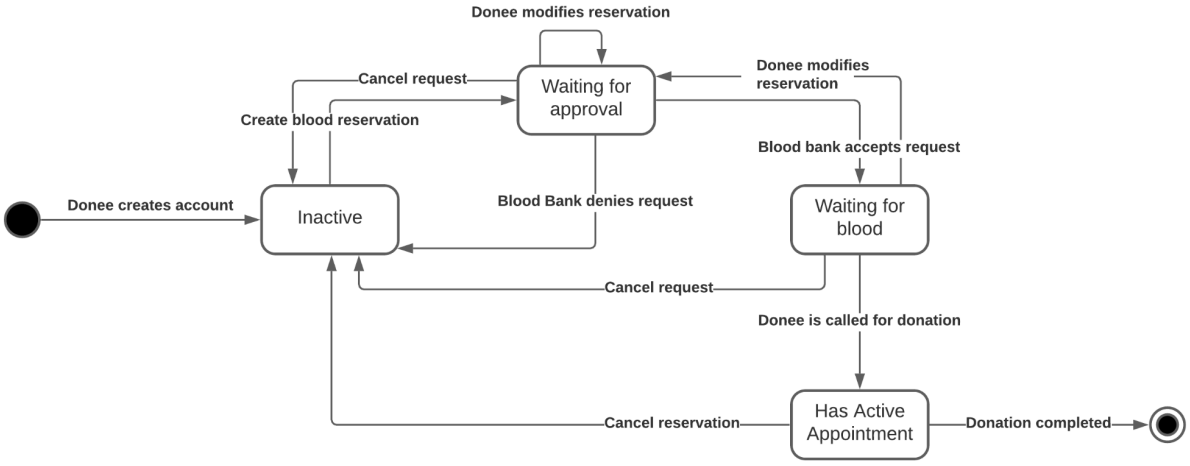
Activity Diagram

There are no two separate activity diagrams in case of regular users or hospitals and blood banks. If the users are blood banks or hospitals, they just have to request blood reservation as other users.


Visual Paradigm Online Free Edition
No Account
Unsaved Password
Saved Password
Register
Login
Home Page
Press Share Selfie Button
Press Show Badges Button
Press Teams Button
Press Blood Journey Button
Press Donation History Button
View My Profile
Share Selfie
Show Badges
Check For Teams
No Team
View Blood Journey
Check Blood History
Press Donation Appointment Button
Apply the Necessary Changes
No Team
Press Create Team Button
Check on Map for Donation Location
Ask for Blood Reservation
Join An Existing Team
Create a Team
Location Button Pressed
Blood Reservation Button Pressed
View Donor Card
Fill the Necessary Information
Fill the Necessary Information
Modify
Set Date and Time
Modify
Select a Near By Blood Bank With your Request
Confirm Appointment
Confirm Blood Reservation
Cancel Appointment
Cancel Blood Reservation Request
Press Back Button
Logout
Visual Paradigm Online Free Edition

Sequence Diagram for Donor Blood Donation

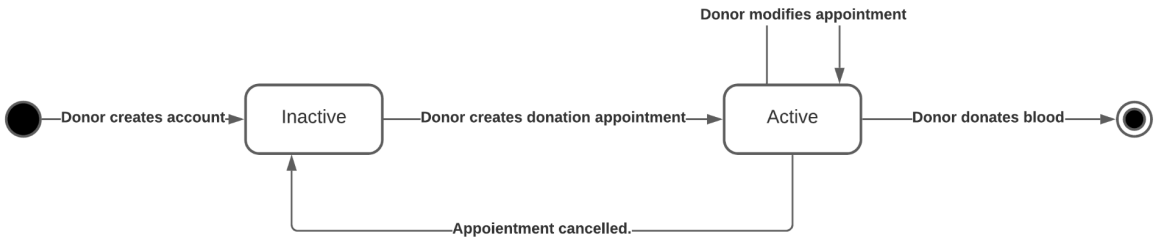




.

State Diagram for Donee:

Donee is initially in the state “inactive” and this state can only transition to the “Waiting for Approval” state. Donee has the option of cancelling their blood reservation at any state but “Inactive” state. In addition donee can modify the blood reservation while in the “Waiting for Blood” state this means the blood bank has to reapprove the new appointment therefore transition to “Waiting for Approval” state occurs. In the “Waiting for Approval” state the blood bank has the option of cancelling the appointment. The transition from “Waiting for Blood” state to “Has Active Appointment” happens when donee is called for donation. If the donation is completed successfully donee’s state goes back to “Inactive”



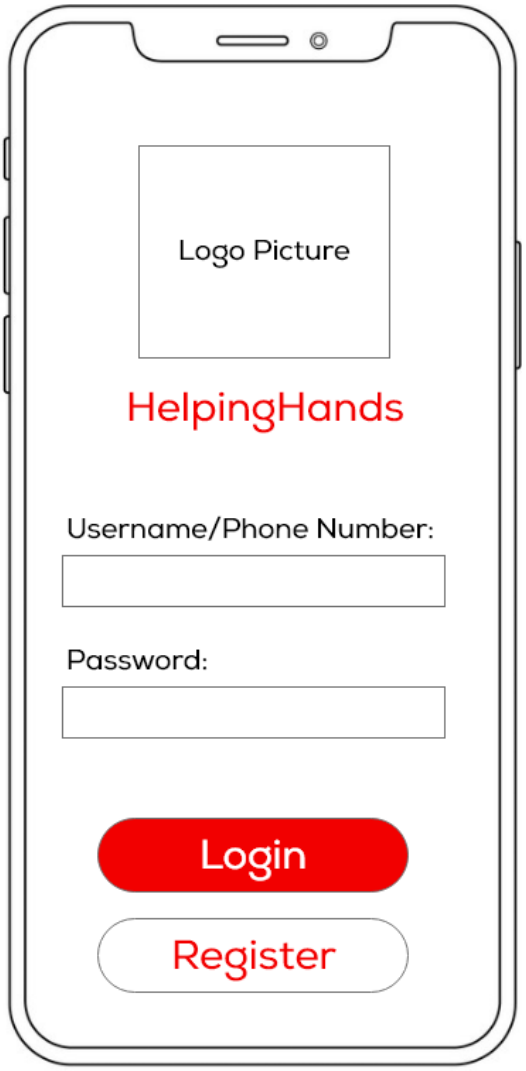
State Diagram for Donor:

The donor's state is initially "Inactive". The state of the donor transitions to Active as they create a donation appointment. They can modify their appointment in the "Active" state. They also have the option of completely cancelling the appointment which transitions the donor state to "Inactive" from "Active. When the donor donates blood the final state is reached.

2.5.5 User Interface Mock-ups

2.5.5.1 Login Page

The login page is the first page to be seen by the user when opening the application. The user has to fill two inputs in order to access his/her account with authorization. If the user doesn't have an account yet, he/she should register a new account by clicking the "Register" button.

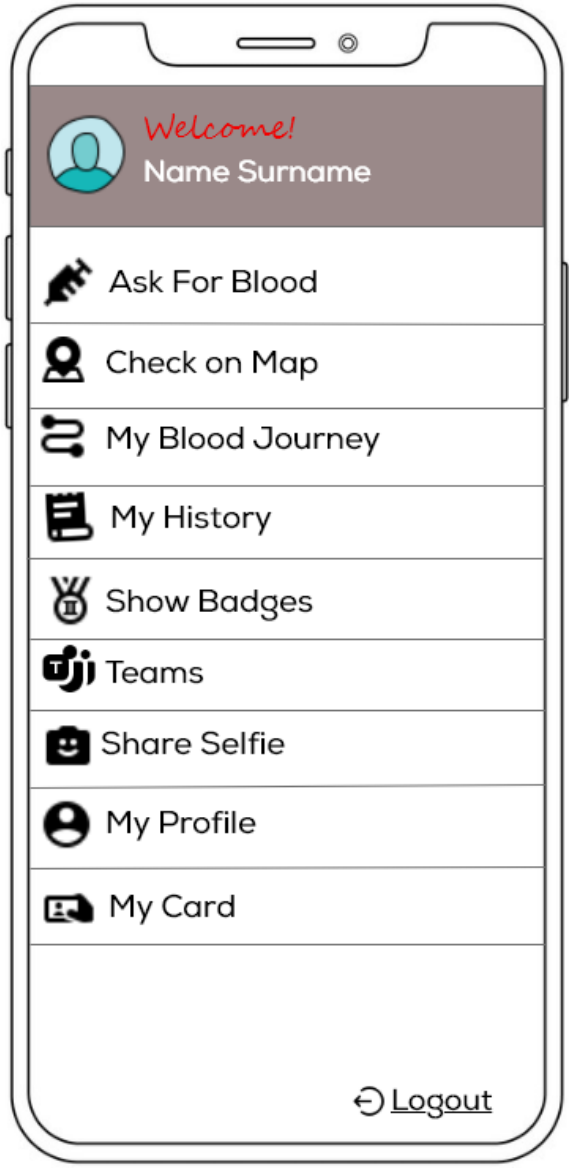


2.5.5.2 Register Page

The register page can be accessed from the login page. In case a user doesn't have a registered account yet, he/she should register a new account. The areas needed to be filled are: name, blood type, email, phone number, address, and a password. When the user completes the registration by filling all the required fields, he/she can login to their account with their username/phone number and password.

2.5.5.3 Home Page

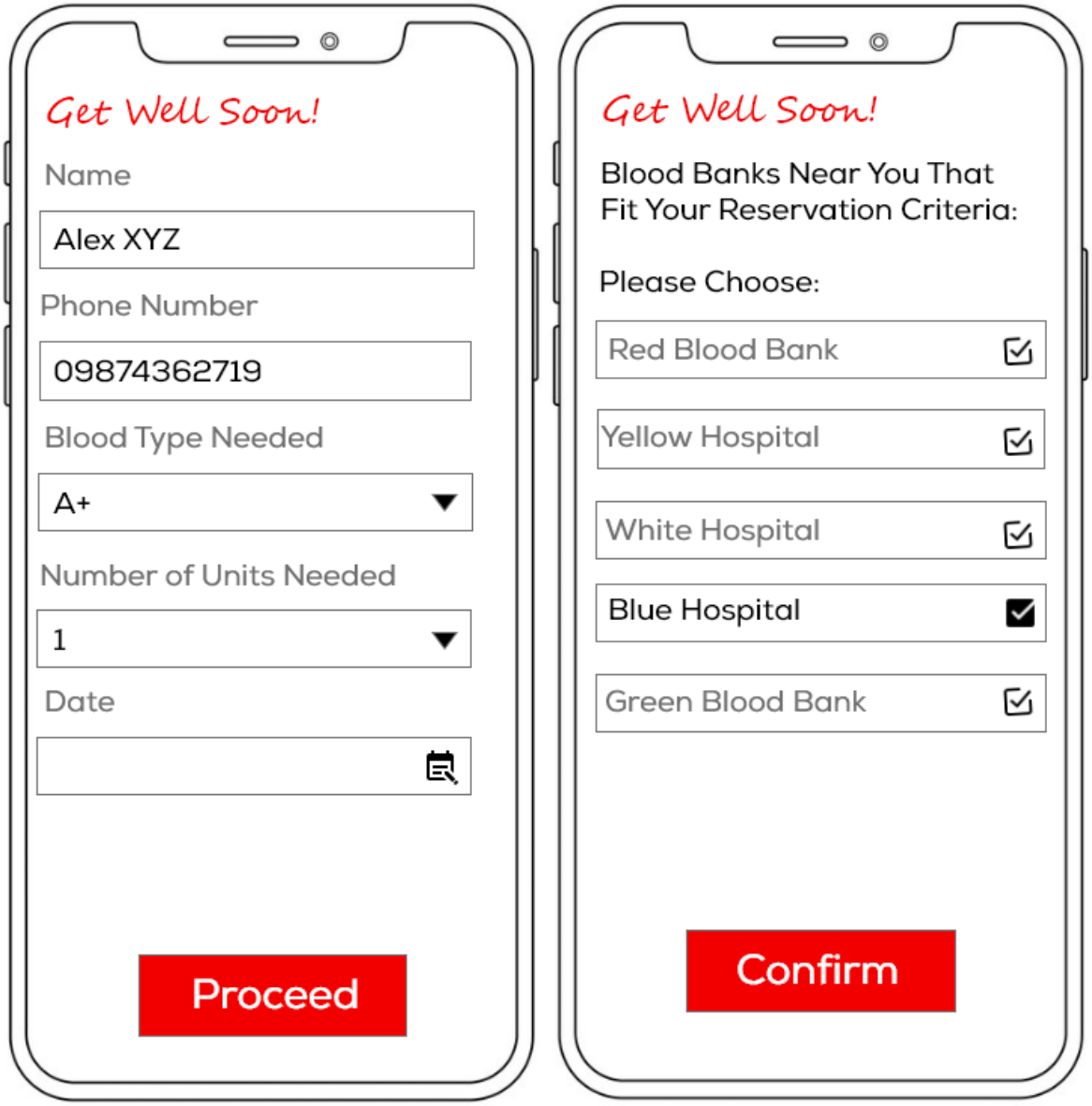
The home page is the first page to be seen by the user after logging in. at the top of the page, the application welcomes the user with his/her name and a default profile picture that can be changed. It also contains all the available specifications that the application provides which are: ask for blood, check on map, my blood journey, my history, show badges, teams, share selfie, my profile, and my card. All of these specifications are to be further explained in the next sections.



2.5.5.4 Ask For Blood

"Ask For Blood" option is for blood reservation. The page to be opened after clicking this option is displayed below. Name and phone number are to be filled but they will be already filled by the application from the user's information. However, they can also be changed in case needed. Then, the blood type needed and the number of units must be filled by the user as their needs. Finally, the date for collecting blood must be specified in order for the reservation to be completed. After finishing filling the required information, the application will direct you to another page that displays the blood banks near the user that fits their reservation criteria that the user can choose from. If the user is sure that all the information he/she entered is correct,

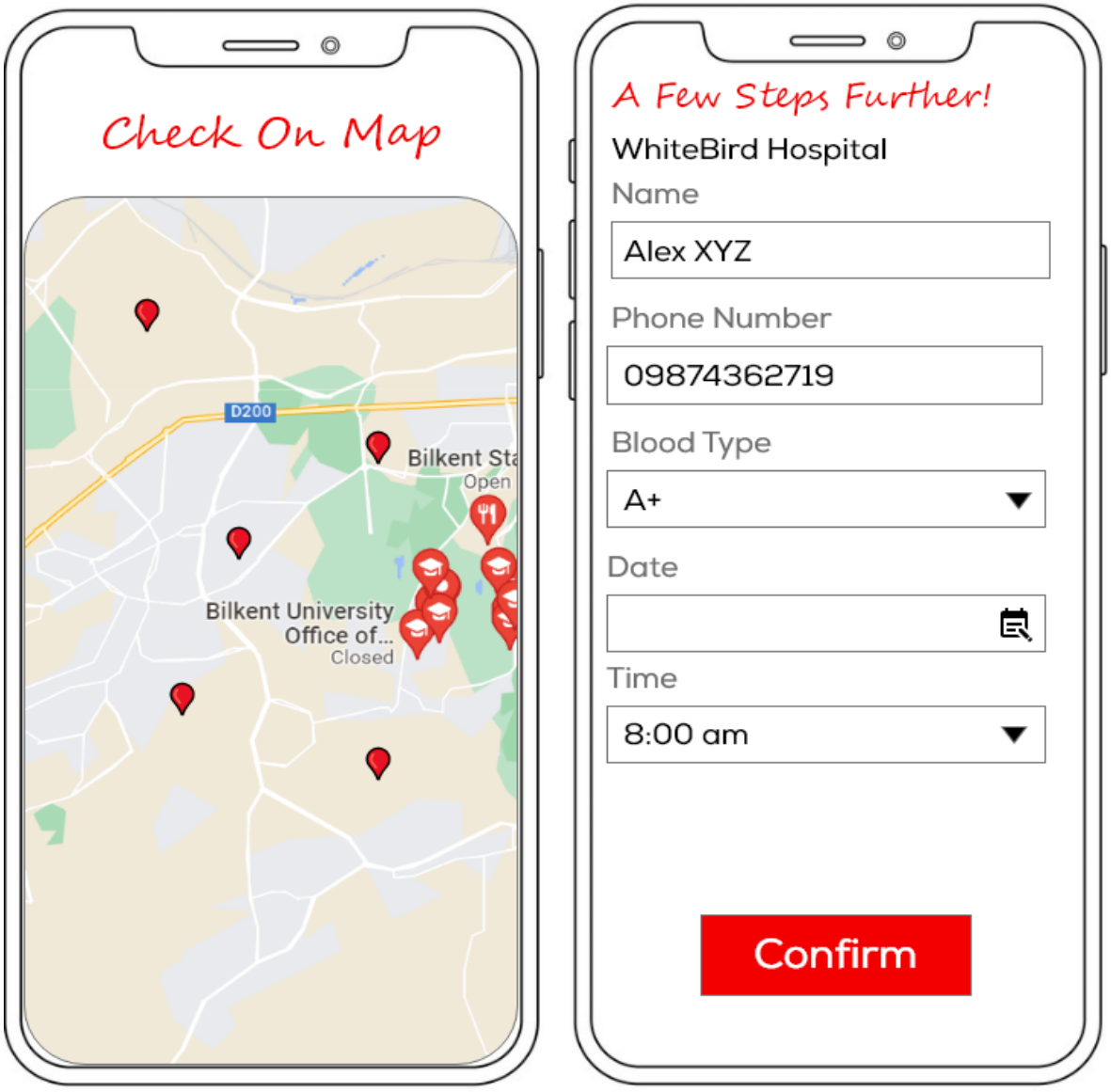
then he/she can confirm the reservation, or else, the user can modify them. Also, if the user already confirmed a reservation, they can still cancel it.



2.5.5.5 Check on Map

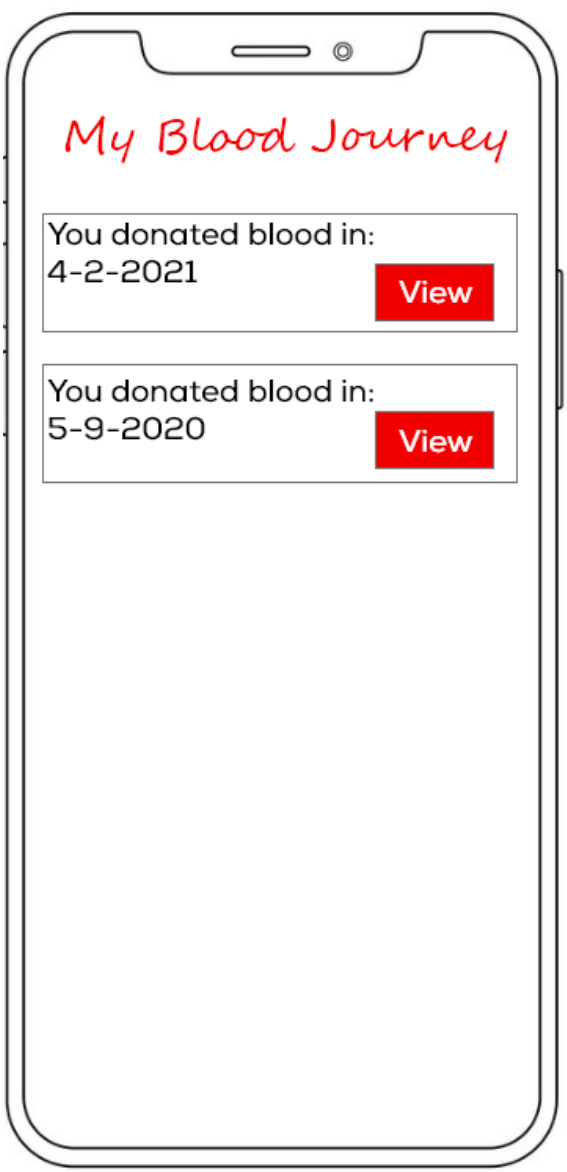
“Check On Map” option is for blood donation. When the user clicks on it the next page opened is a map with the current location of the user and all the blood banks near him/her to a specific range that the user can choose from in order to choose. The blood banks available near the user are defined by small blood dots in the map and the user can choose one of them by

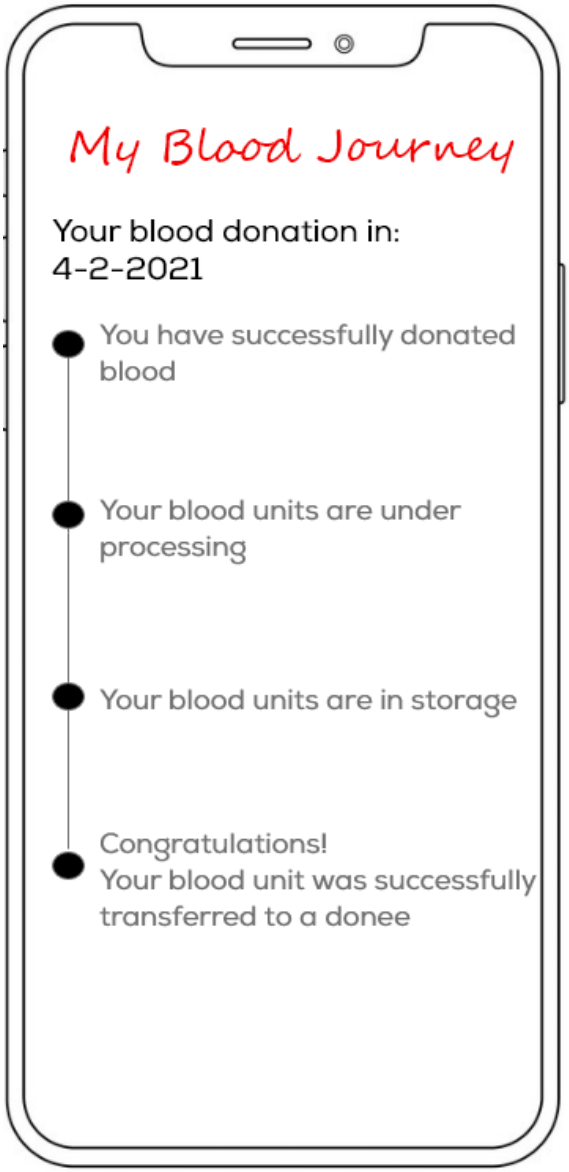
clicking on one of the dots. After that, a new page is opened with the name of the blood bank that the user has chosen and with some information below that needs to be filled. The name, phone number, and blood type are already filled by the application from the user's information. Then, the user must choose a specific date and time that fits them in order to go and do the blood donation on the specified reserved time. If the user is sure that all the information he/she entered is correct, then he/she can confirm the blood donation request, or else, the user can modify them. Also, if the user already confirmed a reservation, they can still cancel it.



2.5.5.6 My Blood Journey

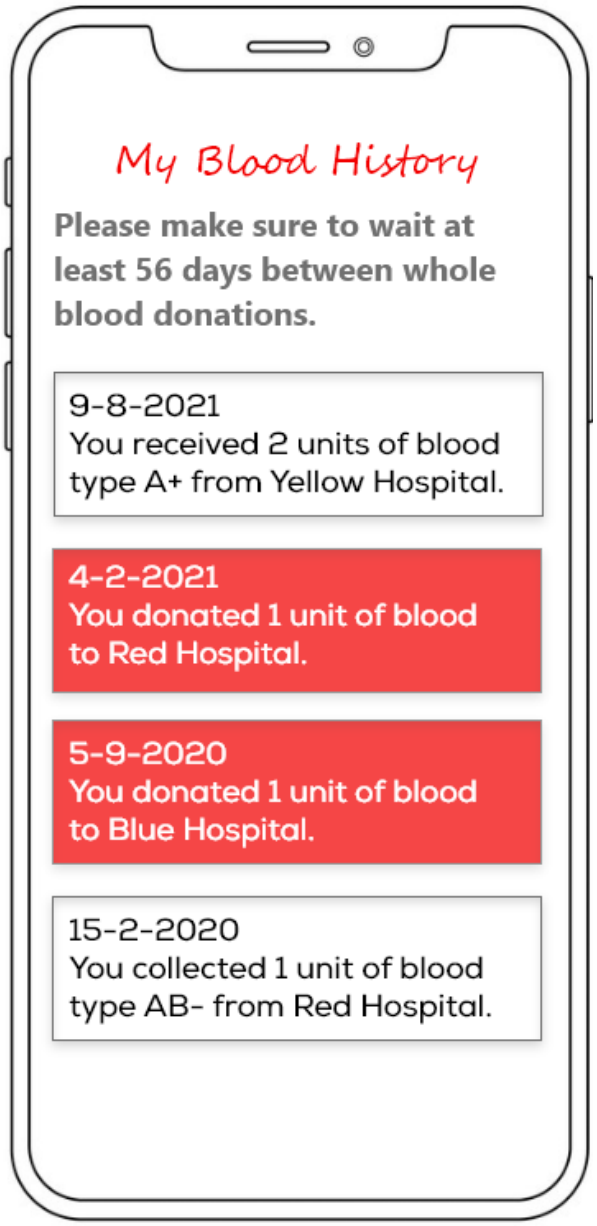
“My Blood Journey” option is added for the user who wants to check the journey of his/her blood that he/she donated. After clicking on this option it opens a history for the previous blood donations done of which the user can view the blood journey of them. When the user clicks the “view” option, it opens a new page showing the current state of his/her blood donation. It starts with successfully finishing donating the blood as a first step, followed by putting the blood units under processing, then their storage, and finally informing the user that the blood units have been transferred to a donee who is in need of the blood.





2.5.5.7 My History

“My History” option is added for the user so that he/she can keep track of their blood donations and reservations. On the top of the page, it reminds the user that they cannot donate blood if it was less than 56 days for their previous donation. And then, the page shows the dates of previous activities, from the most recent one to the oldest one with blood reservations being marked with white highlights and blood donations being marked with red highlights to easily differentiate between them.

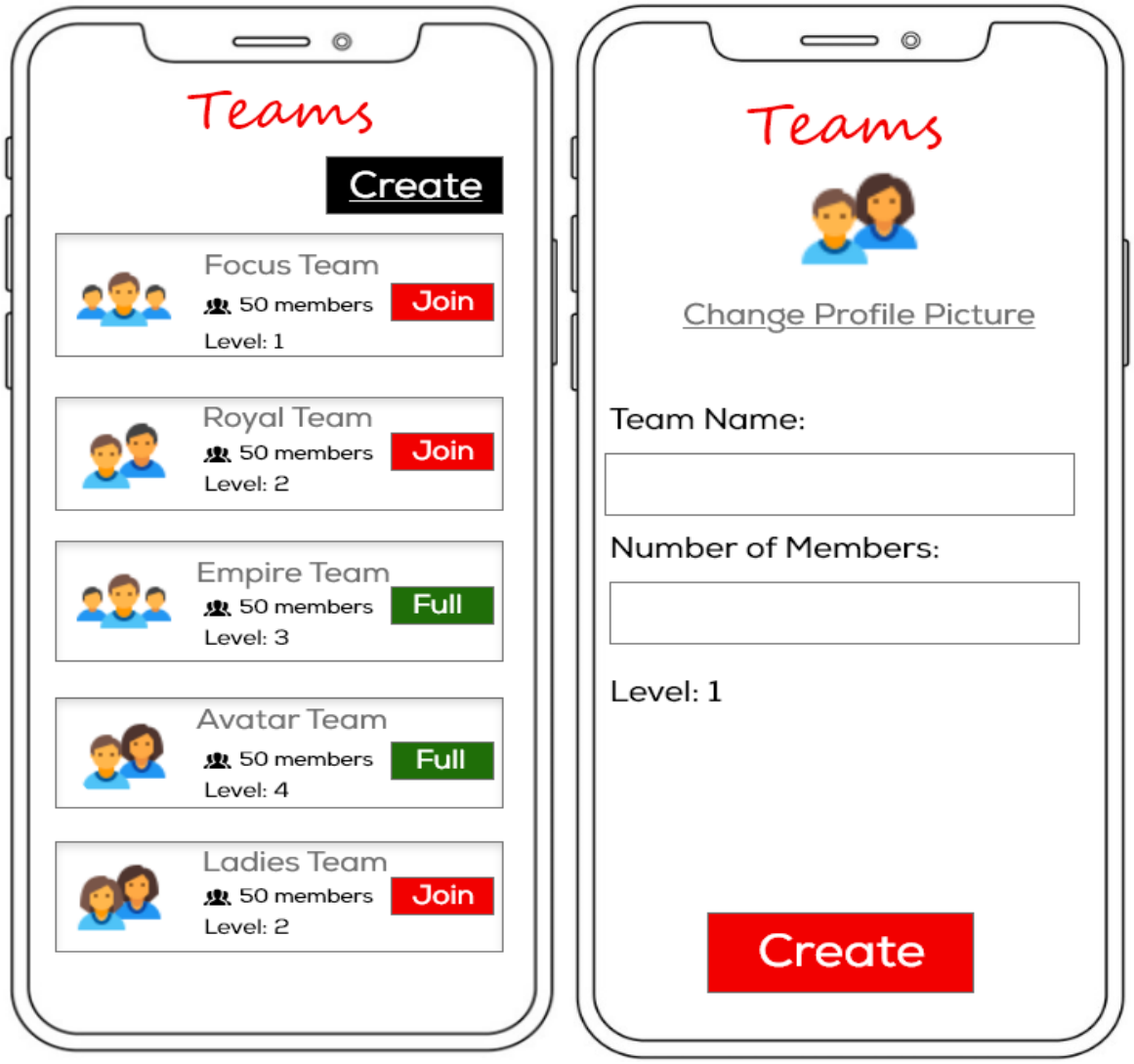


2.5.5.8 Show Badges

“Badges” option is added to encourage the user to engage more in blood donations and reserve blood for them and people in need. There are currently 4 consecutive badges: bronze, silver, gold, and platinum. Whenever the user engages more in using the application, the badge will be upgraded.

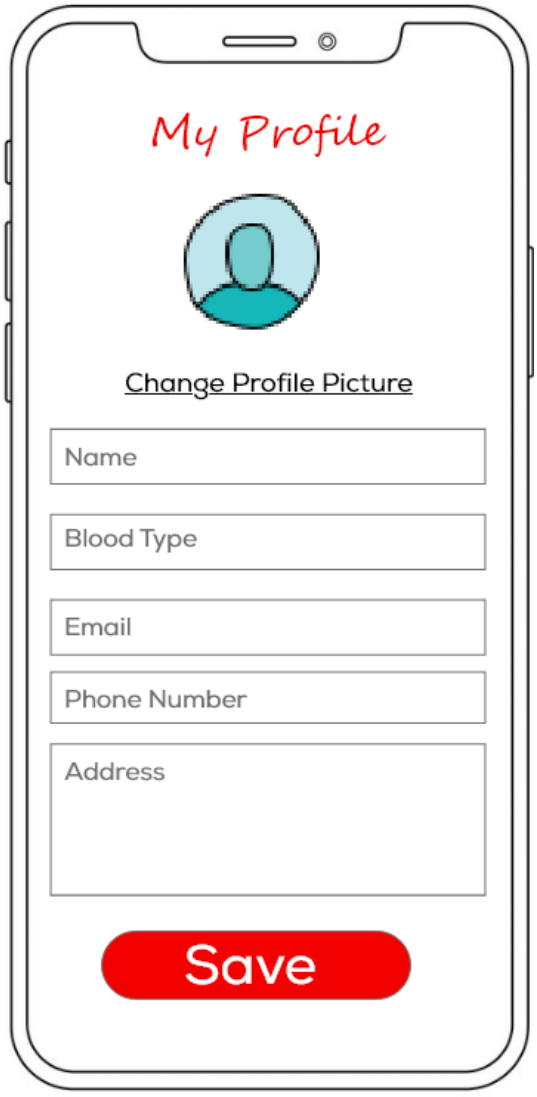
2.5.5.9 Teams

“Teams” option is added for the users to engage more in getting to know each other and therefore helping each other. When clicking on this option, a display for the available teams will be shown, if the team is still not filled, the user can then join by the “join” option, and when the team is already full, then a “full” option will be displayed next to the team name for the user which means that the user cannot join. There are certain levels that teams can go through which depends on how long the team has been created, number of users in the team, user’s kinds of badges, and how much users engage more in the application. A user can also choose to create their own team by clicking on the “create” button. If the user chose to create their own team, they can choose to have their own profile picture of the team, its name, the number of members which can be a minimum of 20 and a maximum of 50, and automatically, the team is set to be on level 1.



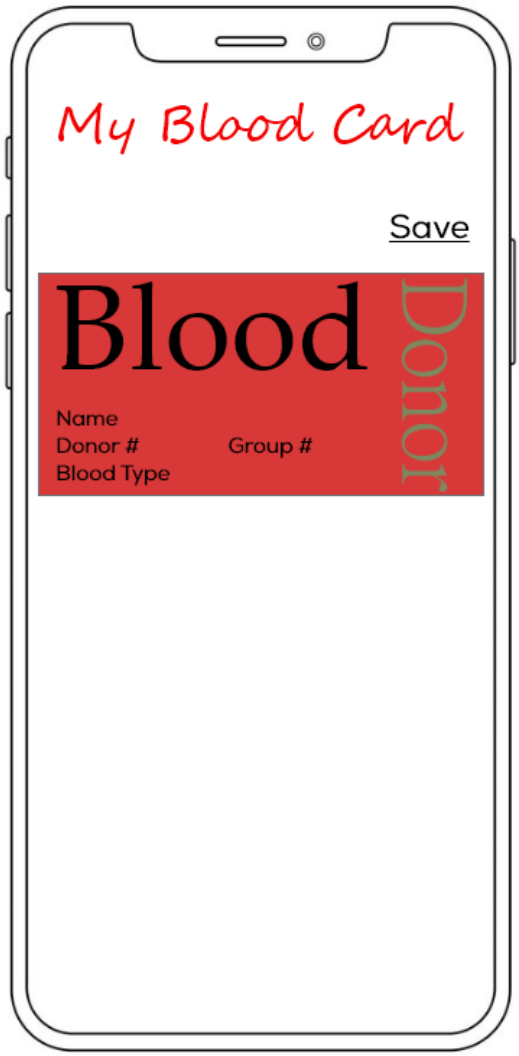
2.5.5.10 My Profile

“My Profile” option is set for the user who wants to change any of their personal details. In case of any incorrect information the user entered in the registration period, the user can still change them. Also, in case any of the information has changed in time, the user can still change them at any time. This information can be to change the profile picture, incorrect names and blood types during the registration period, also, the email, phone number, and address can be changed in case the user wants to change them.



2.5.5.11 My Card

“My Card” option is given to blood donation users like any other card that people can use for identification. The card is designed to look like any ID card that has the user’s name, a special donor number on the card for the user, a group number, and the user’s blood type. The user can also choose to save the card on their phone if they wanted.



3. Other Analysis Elements

3.1 Consideration of Various Factors in Engineering Design

3.1.1 Public Health

Perhaps the most important factor to consider, we do not think that HelpingHands will be constrained by public health. While it is true that our project aims to provide a solution to

a health problem, in all aspects it is a supplementary application. It is more of a social media app aimed to connect donors and recipients, it holds absolutely no authority in any medical domains. When a donor and recipient is connected, any medical operations deemed necessary will be performed by hospitals or blood banks, so we do not foresee any negative health effects caused by our application and we do not foresee any negative effects caused on our project by such concerns.

Level of Effect: 2/10

3.1.2 Public Safety

Public safety is an important factor for our project, as we aim to have individuals meet up in real life. Upon confirmation from the user, their name, contact information and location will be shared with a complete stranger. While we will hold the two parties' information, we cannot verify if this information is completely correct. We will try to combat these problems in two ways: First, we will share a person's desired amount of information upon their request, and we will not share live location data, as in we will only share the target hospital/blood bank's location data. After these precautions, it will mostly fall on the user to ensure their safety. Since some sort of blood donation request systems already exist (e-mails/announcements), we do not think our project will introduce any new safety concerns that do not already exist.

Level of Effect: 5/10

3.1.3 Privacy

Privacy is another extremely important factor to consider, because HelpingHands will hold vital personal information, including but not limited to: Name, Surname, Phone Number, E-Mail, Blood Type and such. While we are not set on how much will be stored on the mobile client, all information of all participants will be stored on our server. Therefore, it is important that this information is kept securely and is not shared with other people without the said individual's confirmation.

Level of Effect: 10/10

3.1.4 Public Welfare

HelpingHands will be completely free to download and use. Also, the application will not contain any paid services. All a person will need is a compatible mobile phone and an internet connection. Therefore, HelpingHands is not constrained by public welfare.

Level of Effect: 0/10

3.1.5 Economic Constraints

As the entire development team consists of CS 491 students with their own equipment, we do not foresee any costs during development. For now, we are using GitHub Pages to host our project website, which is free. To distribute our application, we can use our website, which will eliminate any distribution costs, otherwise, if we use platforms such as Google Play Store or Apple App Store, we will have some costs. Finally, we plan to host our server in a cloud service, for which we are considering Amazon Web Services. While we cannot foresee the potential costs for using the service, our Innovation Expert explained to us that it is free for some amount of usage time or storage amount. To conclude, we do not foresee any costs in the context of CS 491/492, but we may come across potential costs if we decide to continue the project after that.

Level of Effect: 0/10

3.1.6 Social Constraints

HelpingHands will not concern itself with gender, race or any other social aspects. The only consideration we will have to make is that we have to make sure that participants are over age 18, which we plan to verify during registration.

Level of Effect: 1/10

Factor	Level of Effect (out of 10)

Public Health	2
Public Safety	5
Privacy	10
Public Welfare	0
Economic Constraints	0
Social Constraints	1
Any other factors	0

3.2 Risks and Alternatives

3.2.1 Unexpected Costs

As we discussed in 3.1.5 Economic Constraints, we do not foresee any costs for our projects. Even so, we may come across potential costs, particularly considering website hosting and cloud services. As there is no company and/or sponsor behind this project, our aim is to completely avoid any costs, if possible. If we come across a potential cost, we plan to switch to another website hosting service, or another cloud service provider. We may have to entirely drop cloud hosting as well, but we do not realistically expect that to happen.

3.2.2 Losing a Team Member

As this project is our capstone project and only available once a year, we do not foresee any member of the team to voluntarily drop the project. Still, it is a two-semester long project, which is a very long time, and real life conditions may cause us to lose team members. As the team consists of four members, losing even one person will cause huge problems regarding our workflow and workload. We plan to prepare for this risk by including every

member in every part of the project as much as realistically possible, and we plan to be strict on documentation so the work of a person can be picked up more easily by another member if necessary.

3.2.3 Technological Change

As we learned during our CS 319 course, especially in the field of computer science, change can cause internal problems for an application. In our project, we plan to use different languages, frameworks and libraries, as well as external services. These tools may stop existing, stop working properly with each other or cause other problems. Even so, we do not see this happening in eight months, but it is a risk regardless. In such cases, we will have to find workarounds, if possible without major internal changes, but we may have to change large portions of our code in case of something catastrophic.

Risk	Likelihood	Effect on the Project	B Plan Summary
Unexpected Cost	Low	Low - None	Find another service or pay the cost if it is minor
Losing a Member	Very Low	High	Take precautions such as strict documentation and have everyone involved with the entire project
Technological Change	Low	Medium - High	Try to find a workaround or change used frameworks or libraries

3.3 Project Plan

WP #	Work Package Title	Leader	Members involved
WP 1	Project Specification	Anil	Hassam, Rola, Metehan
WP 2	Analysis Report	Rola	Hassam, Anil, Metehan
WP 3	High-Level Design Report	Metehan	Hassam, Rola, Anil
WP 4	Low-Level Design Report	Hassam	Anil, Rola, Metehan
WP 5	Final Report	Anil	Hassam, Rola, Metehan
WP 6	Presentation and Demonstration	Rola	Hassam, Anil, Metehan
WP 7	Client Side	Metehan	Hassam, Anil, Rola
WP 8	Server Side	Anil	Hassam, Rola, Metehan
WP 9	Database	Hassam	Anil, Rola, Metehan
WP 10	Deployment	Metehan	Hassam, Rola, Anil
WP 11	Design	Rola	Hassam, Anil, Metehan

WP 12	Project Management	Hassam	Anil, Metehan, Rola

WP 1 : Project Specification Report			
Start Date: 4 Oct 2021 **End Date:** 11 Oct 2021			
Leader:	Anil	**Members Involved:**	Hassam, Rola, Metehan
Objective: The initial requirements of the project.			
Tasks: ***Task 6.1 Report Writing***			
Deliverables: **D-6.1:** Project Specification Report			

WP 2 : Analysis Report			
Start Date: 1 Nov 2021 **End Date:** 15 Nov 2021			
Leader:	Rola	**Members Involved:**	Hassam, Anil, Metehan
Objective: The analysis report contains a detailed analysis of the problem. It should address all relevant issues			
Tasks: ***Task 6.1 Report Writing***			
Deliverables: **D-6.1:** Analysis Report			

WP 3 : High Level Design Report			
Start Date: 17 Dec 2021 **End Date:** 24 Dec 2021			
Leader:	Metehan	**Members Involved:**	Hassam, Rola, Anil
Objective: High-level or system design is the transportation of the analysis model into a system design model.			
Tasks: ***Task 6.1 Report Writing***			
Deliverables: **D-6.1:** High Level Design Report			

WP 4 : Low Level Design Report			
Start Date: Spring 2022 **End Date:** Spring 2022			
Leader:	Hassam	**Members Involved:**	Anil, Metehan, Rola
Objective: Extent and validity of the design principles that were used to carry out this phase of the project must be explained in detail. Also, creativity, that is the extent to which the team developed a novel solution to the design problem while still achieving a functional design, at the low-level design phase, must be clear			
Tasks:			

Task 6.1 Report Writing
Deliverables: **D-6.1:** Low Level Design Report

WP 5 : Final Report			
Start Date: Spring 2022 **End Date:** Spring 2022			
Leader:	Anil	**Members Involved:**	Hassam, Rola, Metehan
Objective: The final report is the culmination of the project. The final architecture and design of the system as well as the final status of the project is presented in this report.			
Tasks: ***Task 6.1 Report Writing***			
Deliverables: **D-6.1:** High Level Design Report			

WP 6 : Presentation and Demonstration			
Start Date: 5 May 2022 **End Date:** 21 May 2022			
Leader:	Rola	**Members Involved:**	Metehan, Hassam, Anil
Objective: Presentation and demo of the project			
Tasks: ***Task 6.1 Presentation*** ***Task 6.2 Demo***			
Deliverables: **D-6.1**: Presentations and Demonstrations			

WP 7 : Client Side			
Start Date: 2 December 2021		**End Date:** 1 May 2022	
Leader:	Metehan	**Members Involved:**	Rola, Hassam, Anil
Objective: A mobile app that provides functionality and accessibility to users.			
Tasks: ***Task 7.1 Storage :*** *Connection between local storage of the device and the app. Files will be encrypted while saving and will be decrypted while loading for data security.* ***Task 7.2 API Connection :*** *Connection between the app and server via REST API.* ***Task 7.3 Model*** *: Data structures for the objects received from the server.* ***Task 7.4 View*** *: User Interface part of the app.* ***Task 7.5 Controller :*** *Controller part of the app. This part is contained inside of the View part.* ***Task 7.6 Test :*** *Code coverage and testing.*			
Deliverables: **D-7.1:** HelpingHands App(Android)			

WP 8 : Server Side			
Start Date: 22 November 2021		**End Date:** 1 May 2022	
Leader:	Anil	**Members Involved:**	Metehan, Hassam, Rola
Objective: Server side of the project and provides database connection, authentication and service controls.			
Tasks:			

Task 8.1 API Connection : *Connection between the app and server via REST API.* ***Task 8.2 Database Controller:*** *Managing database queries.* ***Task 8.3 Authentication:*** *Managing user authentication.* ***Task 8.4 Test*** *: Code coverage and testing.*
Deliverables: **D-8.1:** HelpingHands Server (NodeJS)

WP 9 : Database			
Start Date: 22 November 2021		**End Date:** 1 May 2022	
Leader:	Hassam	**Members Involved:**	Anıli,Metehan, Rola
Objective: Server side of the project and provides database connection, authentication and service controls.			
Tasks: ***Task 9.1 Diagram:*** Constructing the necessary components and structures of the database.			

Task 9.2 Setup and run *: Setting up the database and testing the database. Creating scripts by using dummy data which would be benign and be reserving space for the actual data that will come in.*
Deliverables: **D-9.1:** The database **D-9.2**: Scripts used on the database

WP 10 : Deployment			
Start Date: 1 April 2022		**End Date:** 1 May 2022	
Leader:	Metehan	**Members Involved:**	Anıl, Hassam, Rola
Objectives: Deployment of services to cloud servers.			
Tasks: ***Task 10.1 Setup:*** *The initialisation of the deployment settings.* ***Task 10.2 Maintenance:*** *Maintenance.*			
Deliverables: **D-10.1:** Deployment			

WP 11 : Design			
Start Date: 1 April 2022		**End Date:** 1 May 2022	
Leader:	Rola	**Members Involved:**	Metehan, Hassam, Anil

Objective: The design of the components of the project including but not limited to the mobile application and web site of the project.
Tasks: ***Task 11.1 Decision:*** *Deciding on the color schemas and the overall design features.Logo ideas for the mobile application.* ***Task 11.2 Design Implementation:*** *Designing the logo and the design of the application, website.*
Deliverables: **D-11.1:** Logo of the application

WP 12 : Project Management			
Start Date: 22 November 2021		**End Date:** 1 May 2022	
Leader:	Hassam	**Members Involved:**	Metehan, Rola , Anil
Objective: The overall management of the entire project work environment.			
Tasks: ***Task 12.1 Project Meetings*** ***Task 12.2 Teamwork*** ***Task 12.3 Acquiring Skills for New Tasks*** ***Task 12.4 Tools***			
Deliverables: **D-11.1:** The order of the work environment.			

3.4 Ensuring Proper Teamwork

As discussed in the 3.2 Risks and Alternatives section, losing a team member would have a significant impact on the quality of our final product. Similarly, it is crucial that every member of the team does their share of the work and takes responsibility. To enforce this, we will have shared leadership during different phases of the project. To ensure every person in the team works at the necessary parts and to ensure that their products are successfully incorporated into the project, we will use the following tools/technologies:

- GitHub and Git commits will be used to track codes written by different members and to provide version/branch control. GitHub will also be used to track issues.
- Google Documents will be used to write any report/documentation, as multiple people can work on a document simultaneously.
- WhatsApp, Zoom and Discord will be used for communication, which is especially important because of possible difficulties in meeting up in today's pandemic conditions.

Expecting the exact same amount of contribution from each member of the project is unrealistic, but each member is expected to take a reasonable amount of responsibility and fulfill them consistently.

3.5 Ethics and Professional Responsibilities

Firstly, the societal implications of HelpingHands will be considered. HelpingHands will be a social-service application that will be free to download and free to use. The application is intended to be used by all class/race of people, except for possibly people, who may not fit the criteria for donating blood i.e having tattoos.

In compliance with the General Data Protection Act, Helping-Hand will not publish or sell any 3rd party information and will self-sustain costs incurred, mentioned in Section 3.1, via other means such as advertisements, if needed. The application is a health-service app and will abide by the rules of patient confidentiality.

The application is also a health-critical application and urgent blood donations will be prioritized and process delay will be minimized.

3.6 Planning for New Knowledge and Learning Strategies

Since HelpingHands is a project that will use multiple languages/frameworks, all of our members must learn the following technologies/concepts:

- JavaScript
- React Native
- NodeJS
- ExpressJS
- REST APIs
- MongoDB
- AWS

All members of the team have some knowledge about some of these technologies. To bring everyone to the same level of knowledge and proficiency, we will mainly use online learning tools such as Udemy or Coursera.

4. Glossary

UI - User Interface

UX - User Experience

JS - JavaScript

DB - Database

AWS - Amazon Web Services

REST API - Representational State Transfer API

MVC - Model View Controller

5. References

1)*What is the history of blood transfusion?* Latest Medical News, Clinical Trials, Guidelines - Today on Medscape. (2020, December 6). Retrieved October 10, 2021, from https://www.medscape.com/answers/434176-183004/what-is-the-history-of-blood-transf

usion#:~:text=The%20earliest%20known%20blood%20transfusions,Blundell%20in%20London%20in%201818.

2)U.S. Department of Health and Human Services. (n.d.). *Blood transfusion*. National Heart Lung and Blood Institute. Retrieved October 10, 2021, from https://www.nhlbi.nih.gov/health-topics/blood-transfusion.

3)*US Blood Supply Facts*. Facts About Blood Supply In The U.S. | Red Cross Blood Services. (n.d.). Retrieved October 10, 2021, from https://www.redcrossblood.org/donate-blood/how-to-donate/how-blood-donations-help/blood-needs-blood-supply.html.