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by

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Titled

Conception and realization of a blood donation platform

In front of the jury composed of:

Mr. Barkat Abdelbasset	Université de M'sila	President
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Mr. Tahri Zohir	Université de M'sila	Examine

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خلاصة

يلعب **التبرع بالدم** دورًا مهمًا في تلبية الطلب على عمليات نقل الدم ، وهو أمر ضروري للإجراءات الطبية المختلفة. يركز هذا المشروع على تصميم وتنفيذ **منصة رقمية** تهدف إلى الإدارة الفعالة للتبرعات بالدم. تهدف المنصة إلى تبسيط إدارة المتبرعين وبنوك الدم ، وتوفير وصول سريع وسهل للمعلومات والبيانات. الهدف الأساسي للمشروع هو تعزيز **إدارة المعلومات المتعلقة بالمتبرعين** ومجموعة متنوعة من أنواع الدم المتاحة. من خلال الاستفادة من التكنولوجيا الرقمية ، نهدف إلى المساهمة في رقمنة قطاع الرعاية الصحية في الجزائر وتسهيل الوصول الفعال إلى المعلومات المتعلقة بالتبرع بالدم.

الكلمات المفتاحية: التبرع بالدم ، المنصة الرقمية ، إدارة التبرع بالدم ، إدارة المتبرع

Abstract

Blood donation plays a crucial role in meeting the demand for blood transfusions, which is essential for various medical procedures. This project focuses on the design and implementation of a **digital platform aimed** at effectively managing blood donations. The platform aims to streamline the management of donors and blood banks, providing quick and easy access to information and data. The project's primary objective is to enhance **the management of donor-related** information and the diverse range of blood types available. By leveraging digital technology, we aim to contribute to the digitization of the healthcare sector in Algeria and facilitate efficient access to information regarding blood donations.

Keywords: Blood donation, digital platform, management of blood donation, donor management

Abstrait

Le don de sang joue un rôle crucial pour répondre à la demande de transfusions sanguines, essentielle pour diverses procédures médicales. Ce projet porte sur la conception et la mise en place d'une **plateforme numérique** visant à gérer efficacement les dons de sang. La plateforme vise à rationaliser la gestion des donneurs et des banques de sang, en offrant un accès rapide et facile aux informations et aux données. L'objectif principal du projet est d'améliorer **la gestion des informations relatives aux donneurs** et la diversité des groupes sanguins disponibles. En tirant parti de la technologie numérique, nous visons à contribuer à la numérisation du secteur de la santé en Algérie et à faciliter un accès efficace aux informations concernant les dons de sang.

Mots-clés : Don du sang, plateforme numérique, gestion du don de sang, gestion des donneurs

Dedication

We dedicate this letter to our beloved parents, our mother and our father, for their unwavering patience, unconditional love, constant support, and endless encouragement throughout our academic journey.

We also offer our dedication to our brothers, friends, and comrades who have been pillars of strength and provided invaluable companionship during this endeavour. Furthermore, we would like to express our gratitude to our extended family for their continued love and support.

We express our sincere appreciation to all of our teachers, from the early stages of my education to higher education, who imparted knowledge, guidance and inspiration, shaped our intellectual growth and nurtured our passion for learning.

Finally, we express our sincere thanks to all of our dear ones, including everyone who has played a role in our personal and academic development. Your presence, encouragement and belief in us has been a key factor in our achievements.

Thank you all from the bottom of our hearts.

Thanks:

First of all, we thank Allah for granting us success in completing this study journey;
Thank you to the director professor who addressed this interesting subject, and for the information and guidance he provided us;

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Chapter1

General Framework for Research

1.1 Introduction

The act of donating blood is crucial for the healthcare sector worldwide, particularly in relation to blood transfusions. This life-sustaining procedure is considered a form of therapeutic phlebotomy and is a primary medical intervention.

It is estimated that more than one hundred million units of blood are donated annually across the globe. However, there has been a recent decline in blood donation rates, leading to a shortage of blood supply for patients, particularly those who require regular transfusions such as cancer patients, pregnant women, and individuals with renal failure.

As someone with a strong humanitarian spirit, this issue deeply concerns me and my colleagues. This inspired us to develop a graduation project, an application that streamlines the process of donating blood by making it more accessible and convenient for donors and hospitals alike.

1.2 Significance of the study

The goal is to ensure that patients receive the necessary blood supply in the shortest time possible. The application will also store important donor and patient data and educate the community about the importance of donating blood. When a potential donor goes to the hospital, they will provide their personal identification number, which will enable the medical staff to determine their eligibility to donate and proceed with the donation process accordingly. Additionally, the application will keep track of the number of donors to ensure a steady supply of blood for patients in need.

1.3 Obstacles we encountered

Encountering challenges in reaching out to relevant authorities is a common issue, and even when we manage to communicate with them, they often provide no answer, citing the term "forbidden". Additionally, there are no clear guidelines in the law regarding the eligibility criteria for blood donors, as the requirements vary among institutions depending on their resources and capabilities.

1.4 Research challenge

Through the information we collected from our field trip to the hospital, we discovered that there are the equivalent of 400 diseases for which the patient cannot donate, we were not able to put all the cases, but rather we limited ourselves to the most common cases we have, and this is what we consider a problem that we seek to solve it.

Our thesis is structured into three chapters:
The first chapter provides an overview of blood donation, while the second chapter focuses on the design of our information system, which we will model using UML.

The third chapter will cover the implementation of our application in detail, including the database and various other components. Finally, we will conclude our document with a comprehensive summary.

1.5 Definition of blood

Blood is a complex and essential bodily fluid that helps maintain homeostasis and keep the body functioning properly. It consists of different types of cells, proteins, and other substances that work together to carry out important functions, such as transporting oxygen and nutrients to tissues, and fighting infections and diseases. The normal amount of blood in the human body is about 5 liters or 5.3 liters[1].

1.6 Blood components

Blood is composed of different elements, including:

1.6.1. Plasma

This is a transparent, yellowish liquid that makes up around 54% of the blood volume. It contains water, which helps to transport nutrients, hormones, vitamins, oxygen, and other essential substances throughout the body[6].

1.6.2. Red blood cells

Also known as erythrocytes, these are disc-shaped cells that contain hemoglobin, a protein that carries oxygen. Women typically have around 4 million red blood cells per microliter of blood, while men have slightly more. Red blood cells are important for delivering oxygen to the body's tissues and removing carbon dioxide[14].

1.6.3. Platelets

These are small, irregularly shaped cells that help with blood clotting. Normal platelet counts range from 150,000 to 450,000 per microliter of blood. Platelets are crucial for preventing excessive bleeding in response to injuries or other damage to blood vessels[15].

1.7 Functions of Blood

Blood performs a variety of important functions in the human body, including:

1.7.1. Regulating body temperature

Blood helps to regulate the body temperature by transporting heat away from the internal organs towards the skin, where it can be dissipated through sweat or other cooling mechanisms. Additionally, blood can also generate heat by burning sugar in the body to produce energy[26].

1.7.2. Clotting

When a blood vessel is injured, platelets in the blood form a clot to stop the bleeding. This process is essential in preventing excessive blood loss and allowing the wound to heal[26].

1.7.3. Transporting nutrients

Blood delivers essential nutrients such as oxygen, fluids, hormones, and vitamins to all parts of the body, and then returns with waste products like carbon dioxide to be eliminated from the body[26].

1.8 How can blood type be determined?

The type of blood group an individual has is determined by the presence or absence of certain antigens on the surface of red blood cells and corresponding antibodies in their plasma. Blood type A has antigen A on the surface of red blood cells and antibodies to antigen B in the plasma, while blood type B has antigen B on the surface of red blood cells and antibodies to antigen A in the plasma. Blood type AB has both antigen A and B on the surface of red blood cells and no corresponding antibodies in the plasma, while blood type O has neither antigen A nor B on the surface of red blood cells but has both antibodies in the plasma.

Additionally, the presence or absence of another antigen, RhD factor, can determine whether an individual's blood type is Rh-positive or Rh-negative. If red blood cells have RhD antigen, the blood type is Rh-positive, while its absence makes the blood type Rh-negative. It's estimated that around 85% of people in the world have the RhD

antigen[16].

Based on the above, it can be said that the factions are eight types as follows:

- (A +) / (A-)
- (B +) / (B-)
- (O +) / (O-)
- (AB +) / (AB)

1.9 Blood Types

Blood types are determined by the presence or absence of certain proteins, called antigens, on the surface of red blood cells. There are two main classification systems for blood types:

1.9.1. ABO

The ABO blood group system includes four blood types: A, B, AB, and O, which are determined by the presence or absence of two different antigens, A and B, on the surface of red blood cells.

1.9.2. Rh

The Rh blood group system is based on the presence or absence of another antigen, called the Rh factor. Individuals who have the Rh factor are considered Rh-positive, while those who do not are Rh-negative.

The type of blood that can be received by an individual is determined by their blood type and the Rh factor. For individuals with Rh-positive blood type, they can receive blood from both Rh-positive and Rh-negative donors, as long as their ABO blood type is compatible. On the other hand, individuals with Rh-negative blood type can only receive blood from Rh-negative donors, again, as long as their ABO blood type is compatible[27].

- Blood type A can receive blood from donors with blood type A or O, depending on their Rh factor.
- Blood type B can receive blood from donors with blood type B or O, depending on their Rh factor.
- Blood type AB can receive blood from all blood types, taking into account the Rh factor.
- Blood type O can only receive blood from donors with blood type O, taking into account the Rh factor.
- Rh- type O blood can be used for all blood types.
- - Rh+ type O blood can only be given to individuals with Rh+ blood types.

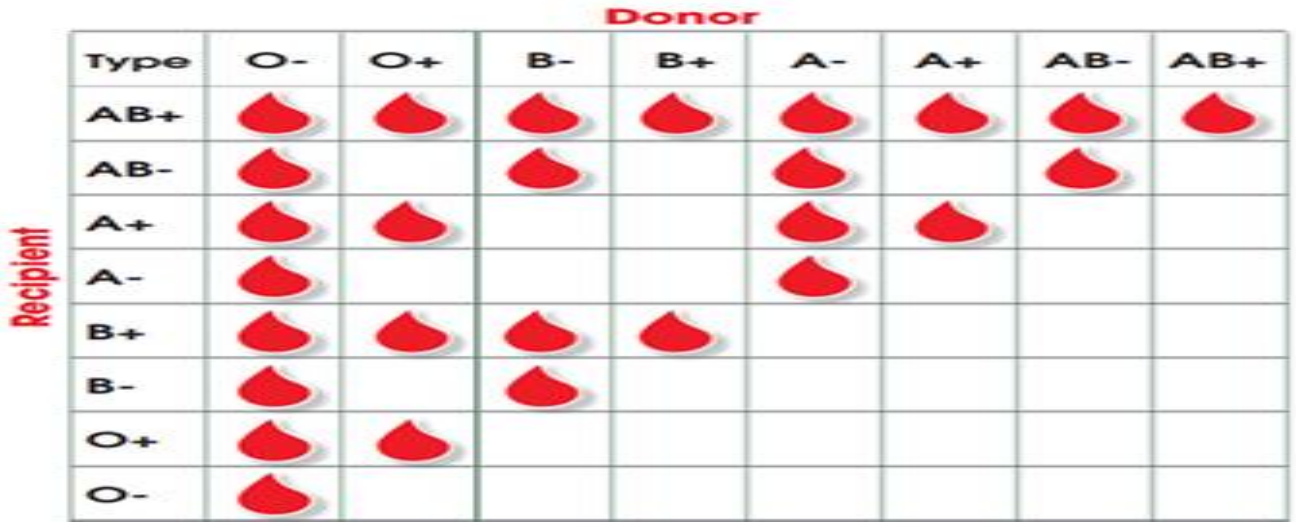

Figure1. 1:The law of the donor and the recipient[3]

1.10 What is a blood donation process?

Blood transfusion is a vital medical procedure that involves the transfer of blood or its components from a healthy donor to a patient in need. It is a voluntary procedure that is crucial in saving millions of lives each year, especially during emergencies such as accidents, surgeries, and various diseases that require blood transfusion. The process involves careful screening and testing of both the donor and the recipient to ensure compatibility and safety. Blood transfusion is a life-saving procedure that has significantly improved the health and well-being of many patients worldwide[7].

1.11 What are the benefits of donating blood?

Donating blood is an honest and noble act that has a great impact on the lives of others. Blood transfusion is vital in treating patients with serious medical conditions, and the need for blood never stops. Donating whole blood, which includes platelets, plasma, and red blood cells, is a simple and safe process that can save many lives. Each blood donation has the potential to save up to three lives, making it an excellent way for individuals to give back to their communities and make a difference in the world. It is important to note that donating blood not only benefits the recipients, but also provides health benefits to the donors, such as reducing the risk of many diseases, including heart and cancer[17].

In addition to the benefits of donating blood to the needy person, there are many health, physical, and psychological benefits for the donor, some of them are shown in the following:

- Reducing stress and improving emotionalhealth.
- Get rid of negativefeelings.
- Reducing the risk of heartdisease.
- Reducing the risk of some types ofcancer.
- Detecting some health problems, due to some blood tests being done before the donation is made. Detecting the integrity of blood pressure, pulse strength, body temperature, and hemoglobinlevel.
- Burn somecalories.

1.12 Risks of donating blood

While blood donation is generally considered safe, there are some potential risks that donors should be aware of. The most common risks associated with blood donation include mild symptoms such as nausea, dizziness, and lightheadedness. These symptoms usually disappear within a few hours and are not considered serious. However, in rare cases, donors may experience more severe side effects such as fainting, allergic reactions, or infections. To minimize the risk of complications, blood donation centers follow strict safety protocols, including using sterile needles for each donation and screening donors for potential health issues. Donors are also required to meet certain eligibility criteria to ensure the safety of both the donor and the recipient. While the risks associated with blood donation are relatively low, it is important for donors to be aware of the potential complications and to report any symptoms or concerns to the blood donation center staff immediately[18].

1.13 Reasons for donating blood

Blood donation is crucial for saving lives, and it is necessary that donated blood is free from any diseases that can be transmitted through it. Continuous blood donation is essential to maintain an adequate supply of different blood types in blood banks, ensuring that they are available when needed. Blood transfusions are required in many cases, including severe injuries resulting from accidents or other traumas, complex medical procedures, surgeries, cancer treatments, severe anemia, especially childhood anemia caused by malaria or malnutrition, and anemia such as thalassemia or sickle cell anemia[19].

1.14 Steps for blood donation

To donate blood, the donor must meet certain requirements such as good health, suitable age, and appropriate weight. It is also important to prepare for the donation by getting enough sleep, eating a healthy meal, and drinking plenty of fluids. Before drawing the blood, the donor will undergo some medical tests to ensure that they are eligible to donate. The blood is then collected by inserting a special needle into a vein in the arm, and the necessary amount of blood is drawn. The process usually takes around 10-15 minutes, and the donor is then provided with snacks and fluids to help them recover. The donated blood is then carefully screened and processed before being

used for transfusions. By following these procedures, blood donation can be a safe and straightforward process for those who wish to contribute to saving lives[20].

1.15 Advantages of giving blood

The benefits of donating blood extend beyond just saving someone's life. Donating blood can also have some positive effects on the donor, such as reducing the amount of iron in the body, which can lead to a healthier liver and heart function. Additionally, the physical examination and blood tests required before donating blood can help detect any underlying health problems. Donors may also experience a boost in self-confidence and satisfaction from knowing that they are helping others. Moreover, donating blood can also aid in burning calories, with approximately 650 calories burned during each donation[21].

1.16 Necessary conditions for blood donation

The conditions for donating blood are the basic requirements that must be met in order to perform the blood donation process. These conditions include:

1.16.1. Age: The person donating blood should be at least 18 years old, and there is an upper age limit of 65 years, provided that the donation does not affect the person's activities and life.

1.16.2. Weight: The weight of the blood donor must be at least 50 kilograms because the volume of blood drawn is proportional to body weight.

1.16.3. Good Health: The donor must be in good health and not have certain symptoms related to infection, such as fever or cough accompanying sputum. People with chronic diseases may be able to donate depending on their condition, and blood pressure and blood sugar levels must be controlled[20].

1.16.4. Not having a recent medical procedure or tattoo: Those who have recently undergone a medical procedure or gotten a tattoo or piercing should wait a certain period of time before donating blood to reduce the risk of infection[24].

It is important to meet these conditions to ensure the safety and well-being of both the donor and the recipient of the blood.

1.17 Factors that make blood donation unsafe

There are certain cases in which a person cannot donate blood. These include:

1. Having a recent history of infectious diseases or symptoms of an infection, such as fever, cough, or flu-like symptoms[25].

2. Having certain medical conditions, such as a history of heart disease, stroke, cancer, or hepatitis[25].

3. Using certain medications, such as antibiotics or blood thinners, which may make it unsafe to donate blood[25].

4. Having a history of drug use or engaging in high-risk behaviors, such as unprotected sex, which may increase the risk of transmitting infections[25].

5. Being pregnant or having given birth within the past 6 months[25].

6. Having received a blood transfusion within the past 12 months[25].

7. Having certain medical procedures, such as getting a tattoo or piercing, within the past 6 months[25].

It is important to be honest about your health history and eligibility to donate blood to ensure the safety and well-being of both the donor and the recipient.

1.18 Side effects of donating blood

1.18.1. Headache and Nausea:

Donors may experience feelings of dizziness or nausea after donating blood, so it is recommended to keep them under observation for at least 15 minutes after the procedure. They should also be provided with snacks and fluids to help alleviate these symptoms[22].

1.18.2. Physical Weakness:

Donors may feel physically weak, particularly in the arm where the needle was inserted. It is recommended that they avoid carrying heavy objects with that arm in order to prevent discomfort and reduce the risk of injury[23].

1.18.3. Pain:

It is common to experience some level of pain or discomfort during the blood donation process, as a needle is inserted into the arm to draw blood. However, this should only be temporary and mild. Donors should notify the healthcare provider if they experience any severe or prolonged pain[23].

1.18.4. Bruising:

After donating blood, it is possible to experience bruising at the site where the needle was inserted. This is due to the compression bandage that is placed on the arm to help fill the blood veins. If a bruise does appear, it is recommended to apply cold compresses to the area to help reduce any discomfort[23].

1.18.5. Continuing Bleeding:

It is important to keep the dressing on the arm for several hours after the donation process is complete. This will ensure that any bleeding has stopped and prevent further bleeding. Typically, it is advised to keep the dressing on for 4 to 5 hours after the needle has been removed[23].

1.19 Conclusion

In this chapter, we have provided a comprehensive overview of blood and the donation process, highlighting crucial information and emphasizing the potential risks that arise when proper attention is not given to the matter.

Chapter 2
ANALYSIS AND MODELISATION

2.1 Introduction

All the published documentation is provided in this chapter as it describes what has been achieved within the project framework after the Unification Process (UP). This document presents the goals, participants, and necessary requirements to proceed to the implementation phase of a web application. These requirements are primarily used to ensure a successful execution of the project.

2.1 Use case diagram

2.1.1 Definition

A case diagram, also known as a use case diagram, is a type of behavioral diagram in the Unified Modeling Language (UML) that depicts the interactions between actors (users or external systems) and a system or application. The main purpose of a case diagram is to provide a high-level view of the system's functionality from the user's perspective, by showing the different use cases and actors involved in the system..

2.1.2 Relationship between use cases:

In a use case diagram, the relationships between use cases can be represented using three types of relationships: include, extend, and generalization.

1. Include Relationship: An include relationship indicates that a use case includes another use case as a part of its functionality. The included use case is not a standalone use case and can only be executed in conjunction with the including use case. The included use case provides some additional functionality to the including use case.

2. Extend Relationship: An extend relationship indicates that a use case can be extended by another use case. The extending use case adds some optional functionality to the base use case. The extending use case is not always executed and may be conditional on certain conditions or triggers.

3. Generalization Relationship: A generalization relationship indicates that a child use case inherits behavior from a parent use case. The child use case is a more specialized version of the parent use case and may include additional functionality or behaviors specific to the child use case.

These relationships can be used to describe how different use cases are related to each other and how they interact with each other in a system.

2.1.3 Identification of use cases:

The identification of use cases involves identifying the actors who will interact with the system, defining their goals or objectives, and identifying the different use cases that the system will need to support. Once the use cases have been identified, they should be documented in detail and validated with stakeholders to ensure that they accurately reflect the requirements and goals of the system. The use cases provide a high-level view of the system's functionality from the user's perspective and are an important tool in requirements gathering and analysis for software systems.

2.2 General use case diagram

The following figure represents the general use case diagram for our site:

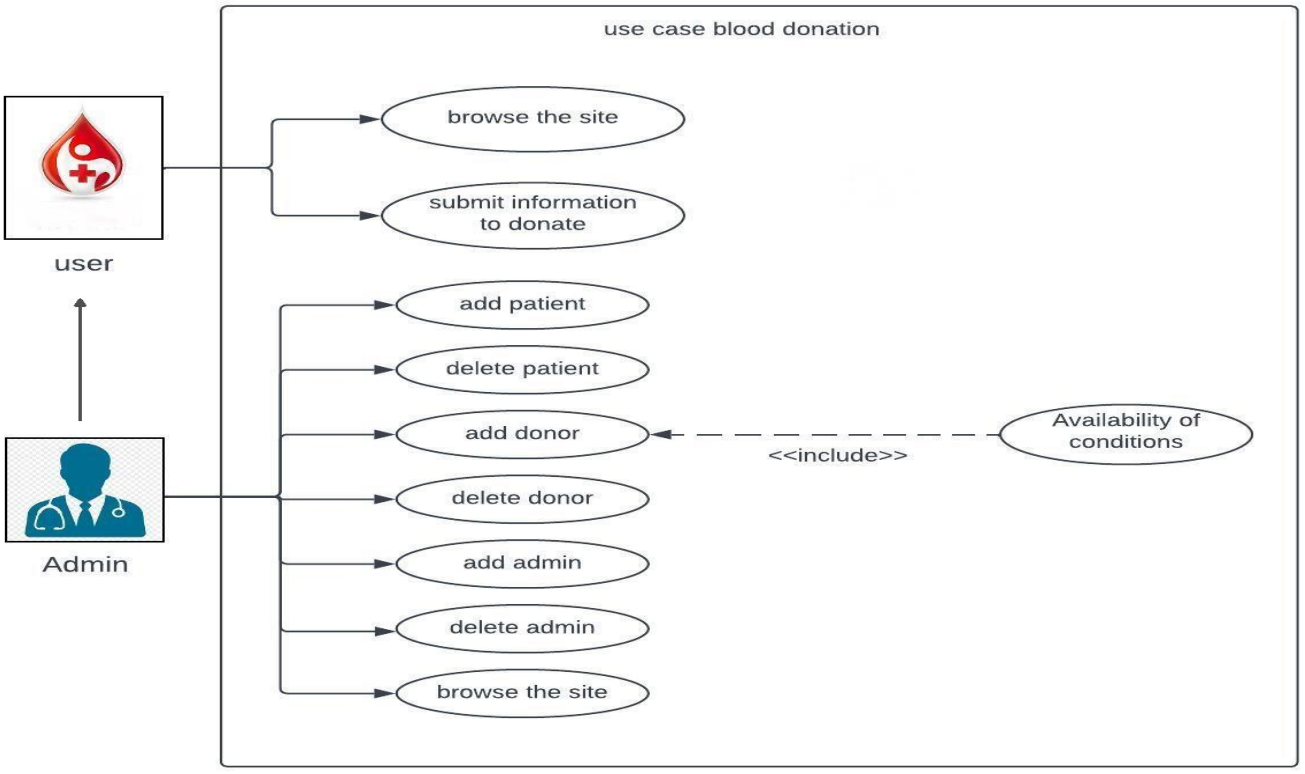

Figure2.1: use case Diagram N°1 "blood donation''

2.3 Sequence diagram

2.3.1 Definition

A sequence diagram is a type of interaction diagram that shows the interactions between objects or components in a system over time. It is commonly used in software engineering to describe the behavior of a system, particularly in the context of object-oriented programming[8].

A sequence diagram consists of a set of lifelines, which represent the objects or components involved in the interactions, and a set of messages, which represent the interactions themselves. The lifelines are arranged vertically, with time flowing from top to bottom, and the messages are represented by arrows between the lifelines, indicating the direction of the communication.

Sequence diagrams are useful for visualizing complex interactions between components, particularly when those interactions involve multiple objects or components. They can also be used to identify potential problems or bottlenecks in a system's design, by highlighting areas where there may be excessive or inefficient communication between components.

2.4 Our Sequence diagrams

The following figures represent general sequence diagrams for our site

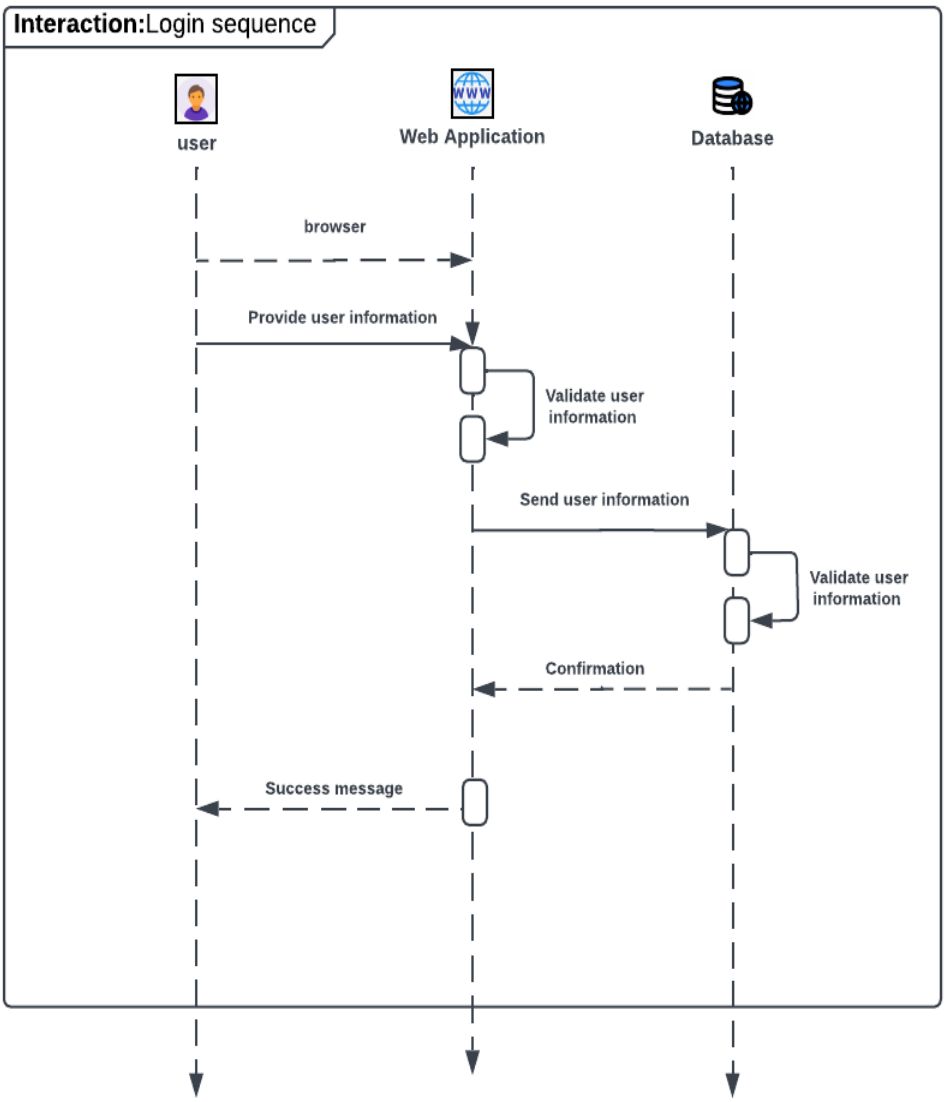

Figure2.2: Sequence diagram ‘’user Login sequence‘’

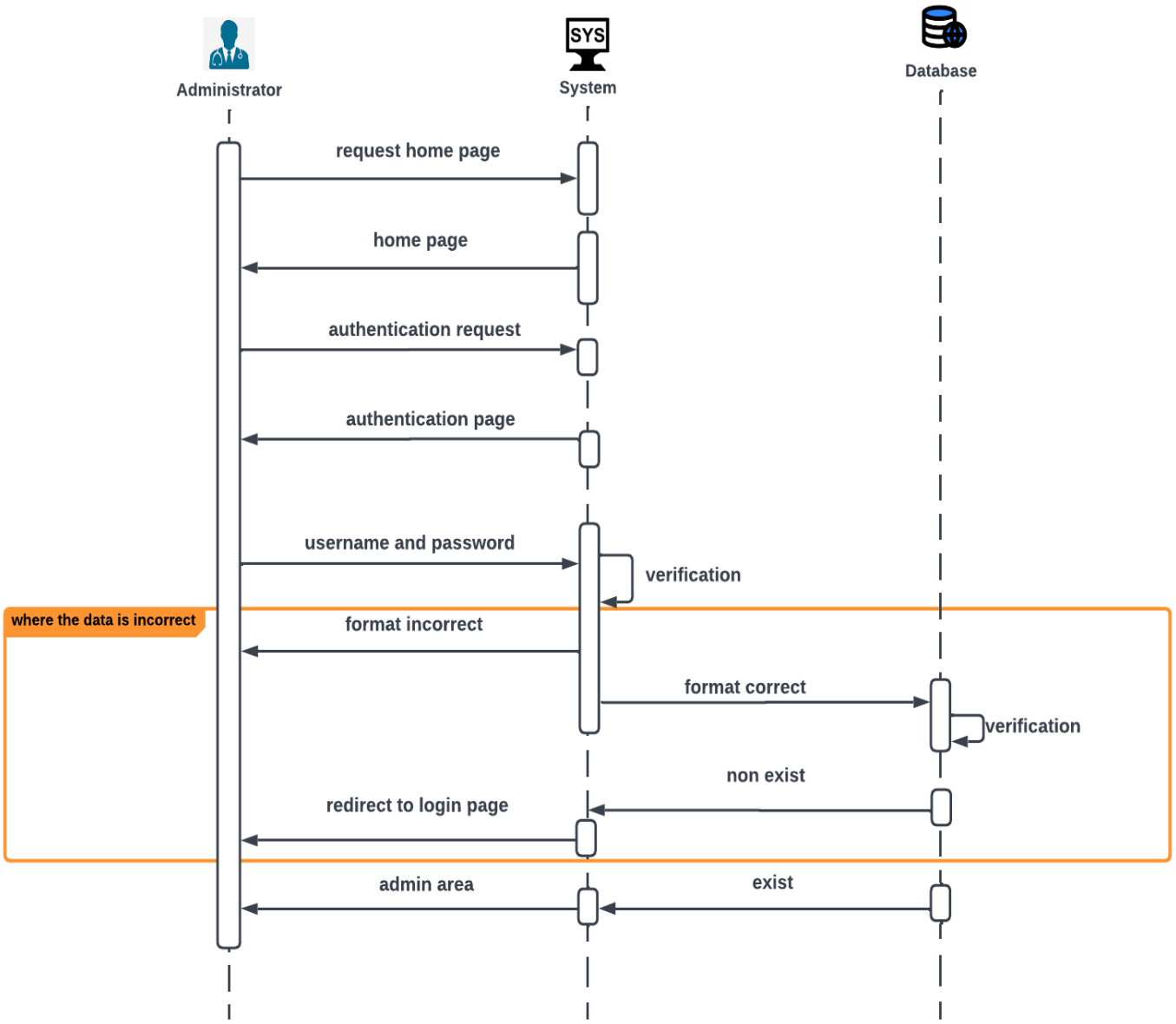

Figure2.3: Sequence diagram ‘’admin Login sequence‘’

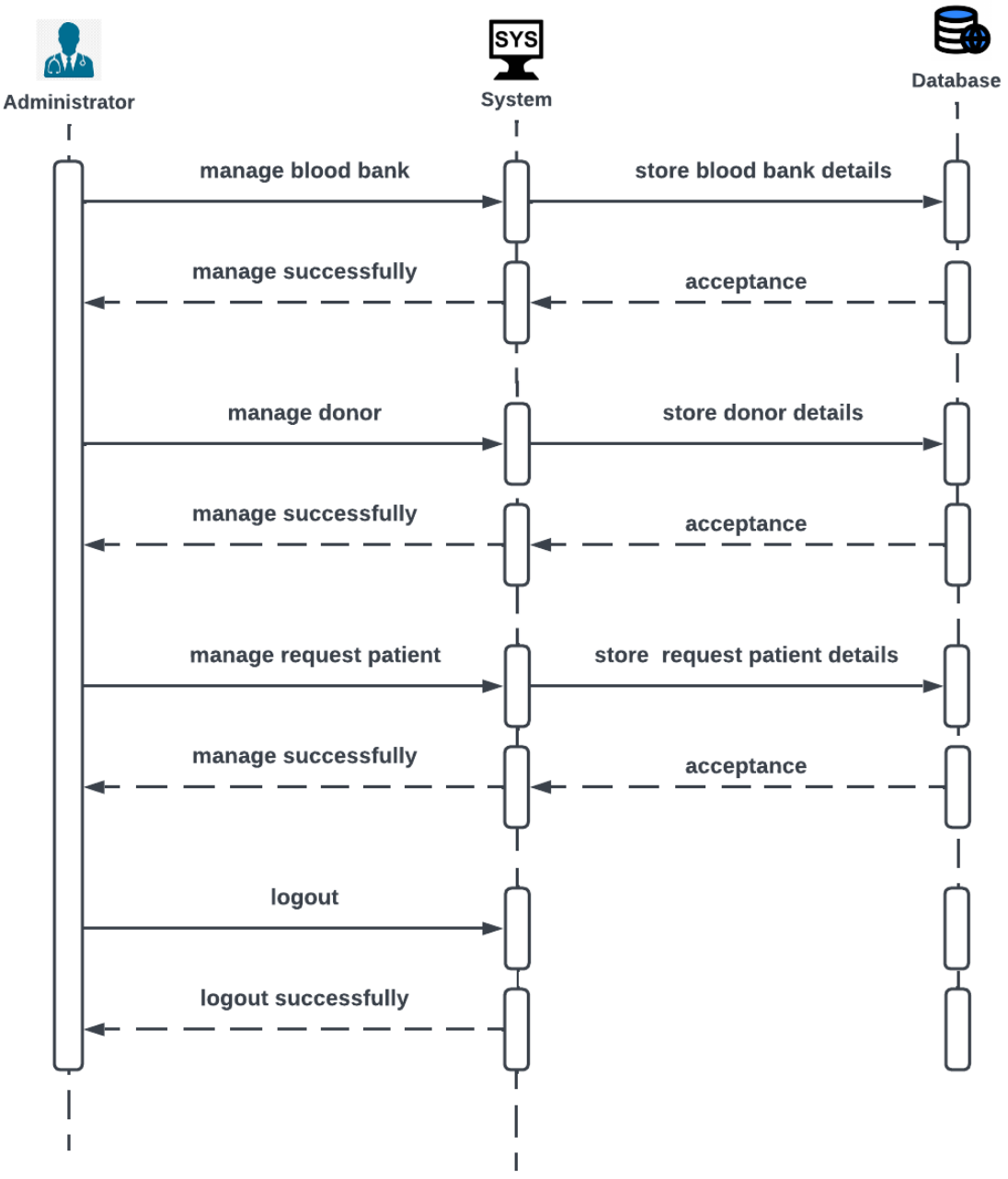

Figure2.4: Sequence diagram ‘management sequence‘’

2.5 class diagram

Definition

A class diagram is a visual representation of the structure and relationships among classes in an object-oriented system. It is typically used to model the static aspects of a software system, showing the classes, their attributes, methods, and associations[8].

In a class diagram, classes are represented as rectangles with three sections: the top section contains the class name, the middle section lists the attributes or data members, and the bottom section lists the methods or operations. Arrows between classes indicate associations, dependencies, or inheritance relationships.

The class diagram provides a high-level view of the system's structure, helping to understand how classes are related and how they interact. It is a valuable tool for software design, documentation, and communication among stakeholders.

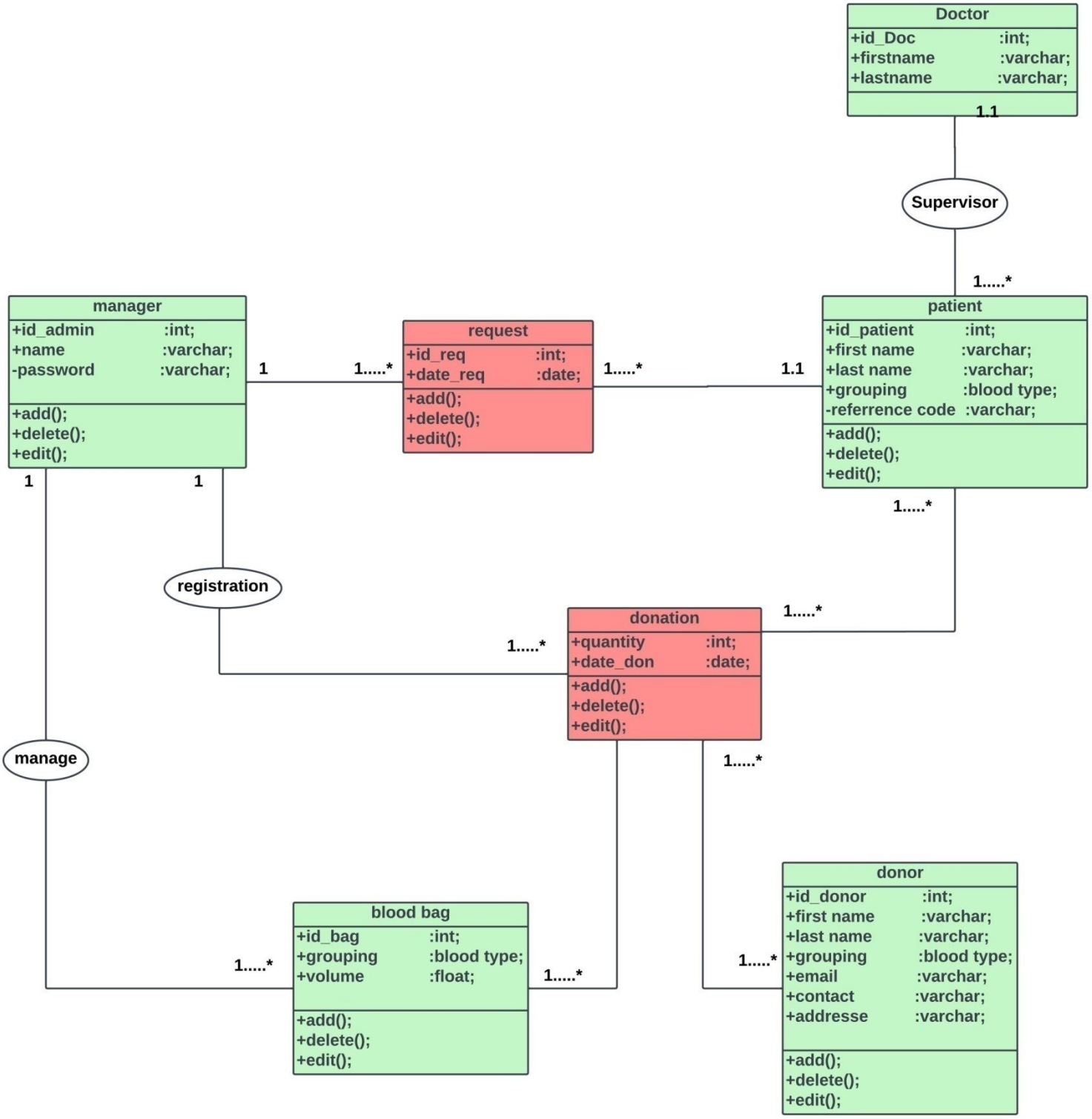

Figure2.5: Class diagram

2.6 Relational Blood Model

By applying the transformation rules from a class diagram , we ended up with the relational diagram following :

manager (id_admin , name , passe word)
patient (id_patient ,first name,last name , grouping , referrence code,id_doc*)
donor (id_donor ,first name,last name, grouping , email , contact , addresse)
Donation (id_donneur*, id_patient* , id_bag*, date_don ,quantity)
request (id_req , date_req , id_patient*)
blood bag (id_bag, grouping,volume)
doctor (id_doc , first name,last name)

2.7 Conclusion

In this chapter, we initiated by conducting a needs analysis. Subsequently, we presented the use cases, corresponding sequence diagrams, and the class diagram. Lastly, we concluded with the modeling of relational data, enabling us to obtain the database schema for the application. Moving on to the next chapter, we will showcase the implementation of our application along with the utilized tools and environments. Additionally, screenshots have been included to demonstrate the functionality of our app.

Chapter 3
IMPLEMENTATION

3.1 Introduction

In this chapter, we will focus on the implementation phase, our goal is to provide an overview of the development environments used to build the application, and describe the interface navigation scheme. In addition, we will discuss the different hardware and software environments used during the development of our system.

3.1 Machine environment

Dell Desktop-9JIOMT5

Processor: Intel(R) Core(TM) i5-6200U CPU @ 2.30GHz 2.40 GHz

Installed memory (RAM): 8.00 GB.

System Type Operating System: 64-bit, x64 processor.

Windows: Windows 10 Professional.

3.2 Software environment

To ensure the success of a high-quality IT project, it is crucial to carefully select the appropriate software tools. While it is not accurate to claim that one programming language is inherently superior to another, certain languages may be better suited for specific tasks. For our web application, we have utilized the following software environment:

Front-end:

- HTML
- CSS
- JavaScript

Backend:

- PHP

By leveraging these technologies, we have developed and implemented our web application to deliver the desired functionality and user experience.

3.2.1 HTML

HTML is a standard language used for coding web pages. It provides the structure and semantic markup for website interfaces, as well as the inclusion of multimedia resources such as images and videos[4].

Figure3.1: HTML Logo

HTML allows the creation of documents that are interoperable with various devices and conform to web accessibility requirements. It is often used in conjunction with other languages to enhance the functionality and interactivity of web applications.

3.2.2 CSS

CSS stands for Cascading Style Sheets. It is a style sheet language used to describe the presentation and visual appearance of a document written in HTML or XML. CSS is responsible for controlling the layout, colors, fonts, and other visual aspects of a web page.

Figure3.2: CSS Logo

It allows web developers to separate the structure and content of a webpage from its design, making it easier to maintain and update the website's appearance. CSS uses a set of rules and selectors to define how different elements should be displayed on the screen or printed[9].

3.2.3 MYSQL

https://www.mysql.com/downloads/

MySQL is an open-source relational database management system (RDBMS) that is widely used for storing and managing structured data. It is a popular choice for web applications and is often used in conjunction with PHP to create dynamic and interactive websites[12].

MySQL provides a robust and scalable database solution that allows users to create, modify, and query databases using a SQL (Structured Query Language) interface. It supports various features such as data integrity, transactional processing, and security mechanisms.

Figure3.3: MySQL Logo

MySQL is known for its speed and performance, making it suitable for handling large volumes of data and high-traffic websites. It is compatible with different operating systems and can be easily integrated with other programming languages and frameworks.

Overall, MySQL is a reliable and versatile database system that is widely adopted by developers and organizations for building and managing data-driven applications.

3.2.4 Javascript

JavaScript is a high-level programming language primarily used for creating interactive and dynamic content on websites. It is often referred to as the language of the web because it runs directly in a web browser and allows developers to add functionality to web pages.

JavaScript can be used for a wide range of tasks, including validating user input, manipulating and updating webpage content, handling events, making asynchronous requests to servers (AJAX), creating animations, and much more. It is a versatile language that can be used both on the client-side (in the browser) and on the server-side (with the help of frameworks like Node.js)[10].

Figure3.4: Javascript Logo

JavaScript is based on ECMAScript specifications and has evolved over time to include new features and improvements. It has a simple and flexible syntax, making it relatively easy to learn and use. JavaScript code is typically embedded directly into HTML documents or included as external script files.

With JavaScript, developers can enhance the user experience, create interactive web applications, and add interactivity to websites. It has a large and active community, with many libraries and frameworks available to simplify and speed up development tasks[10].

3.2.5 Jquery

jQuery is a popular JavaScript library that simplifies web development by providing a concise and efficient way to interact with HTML documents, handle events, create animations, and manipulate the content on web pages.

Figure3.5: Jquery Logo

It offers a wide range of built-in functions and methods that make it easier to write JavaScript code and perform common tasks such as selecting and manipulating HTML elements, making AJAX requests, and handling browser events. jQuery has been widely adopted and used by developers to enhance the functionality and user experience of websites[11].

3.2.6 PHP

https://www.php.net/downloads.php

PHP (Hypertext Preprocessor) is a server-side scripting language primarily used for web development. It is embedded within HTML code and executed on the server, generating dynamic web pages. PHP is known for its flexibility and ease of use, making it one of the most popular languages for building dynamic websites and web applications.

Figure3.6: PHP Logo

PHP can interact with databases, handle form data, perform file operations, create sessions, and handle cookies, among other tasks. It offers a wide range of built-in functions and features that simplify common web development tasks, such as handling user authentication, managing sessions, and generating dynamic content[13].

PHP is an open-source language, meaning its source code is freely available and can be modified and extended by the developer community. It has a vast ecosystem of frameworks, libraries, and resources that make it easier to build complex web applications efficiently.

Our application comprises a homepage accessible to all visitors, along with a dedicated page for donors to submit their information. Once the donor's information is sent to the official, it will be assessed for acceptance or rejection. Once approved, donors can proceed with their blood donation.

The administrator holds the authority to oversee various functionalities, including monitoring the blood stock, registering patients, approving or rejecting blood requests, and accessing comprehensive updates. Additionally, the administrator can manage customer records, including addition, modification, or deletion of entries.

The administrator possesses full control and authorization over these operations.

3.3 User page

3.3.1 Home

Figure3.7: home user page

3.3.2 To donate

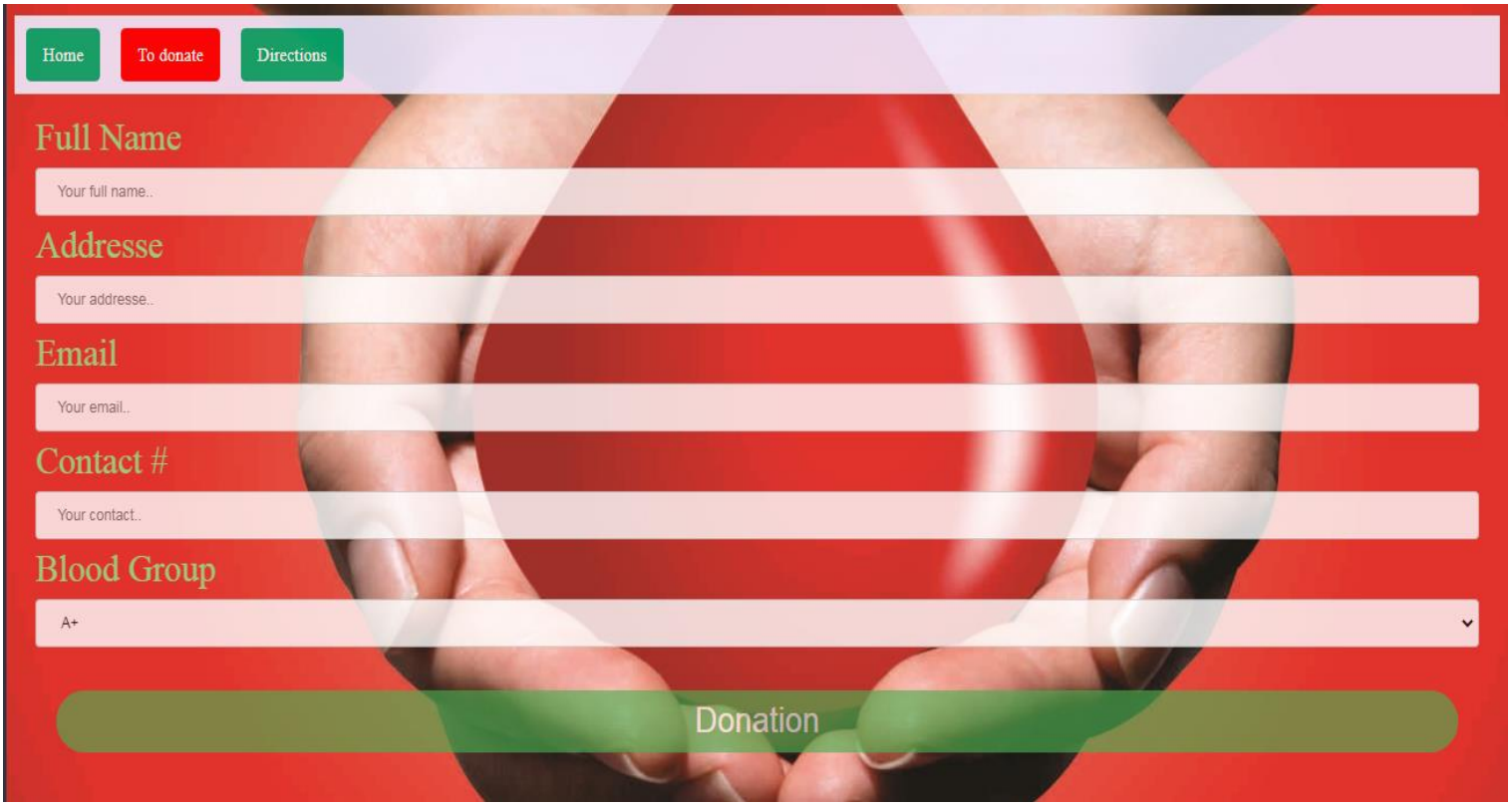

Figure3.8: to donate page

This is the designated area where blood donors can provide their essential information, including:

1. Full name
2. Address
3. E-mail
4. Phone number or any other preferred method of contact for the administrator to reach out
5. Blood type

In this section, users who wish to donate blood can conveniently submit these details for further communication and coordination with the administrator.

3.3.3 directions

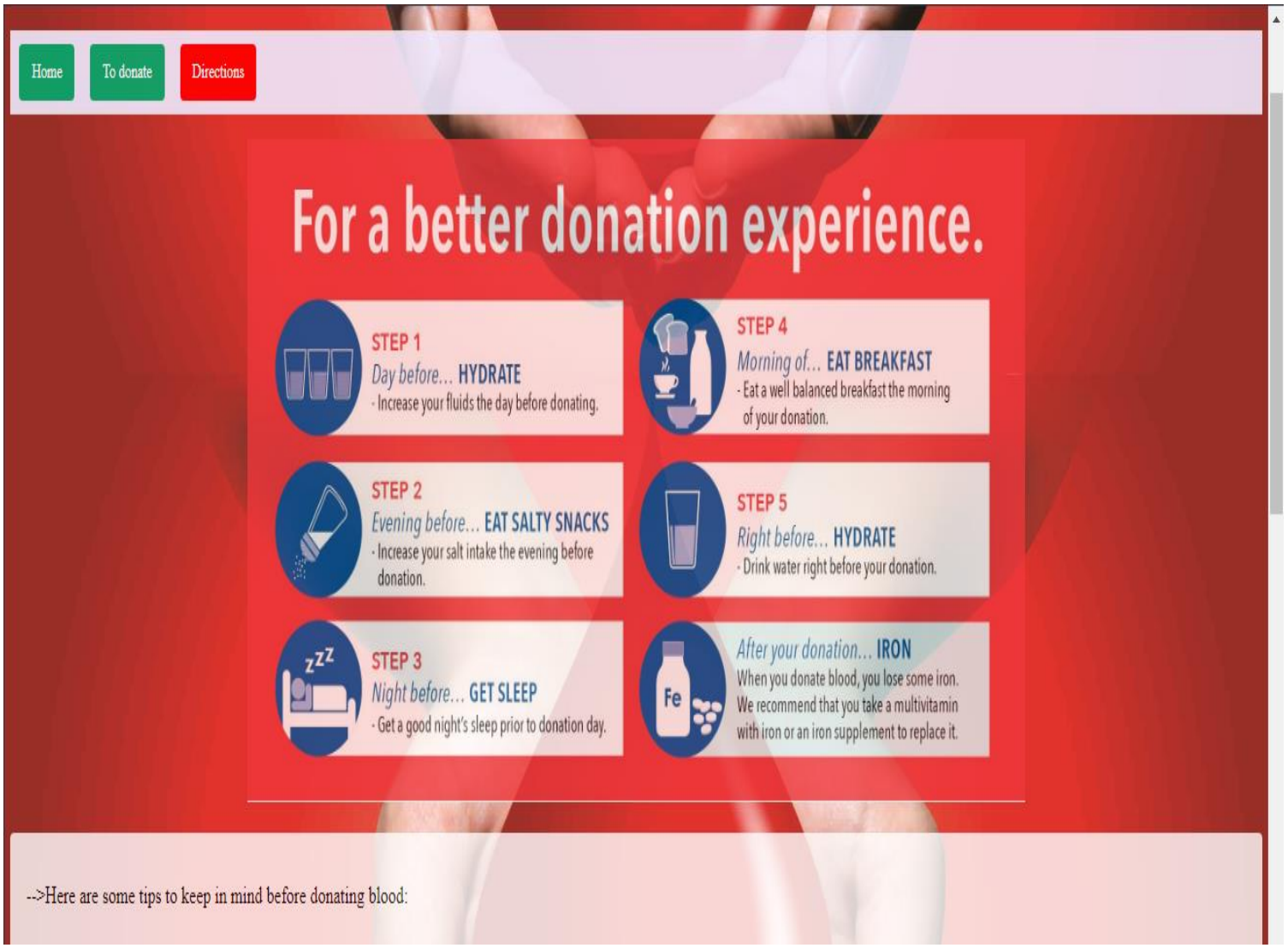

Figure3.9: directions user page

This section provides users with important guidelines and instructions to be aware of prior to donating blood. It aims to ensure a smooth and informed donation process.

3.4. Admin page

3.4.1 Login page

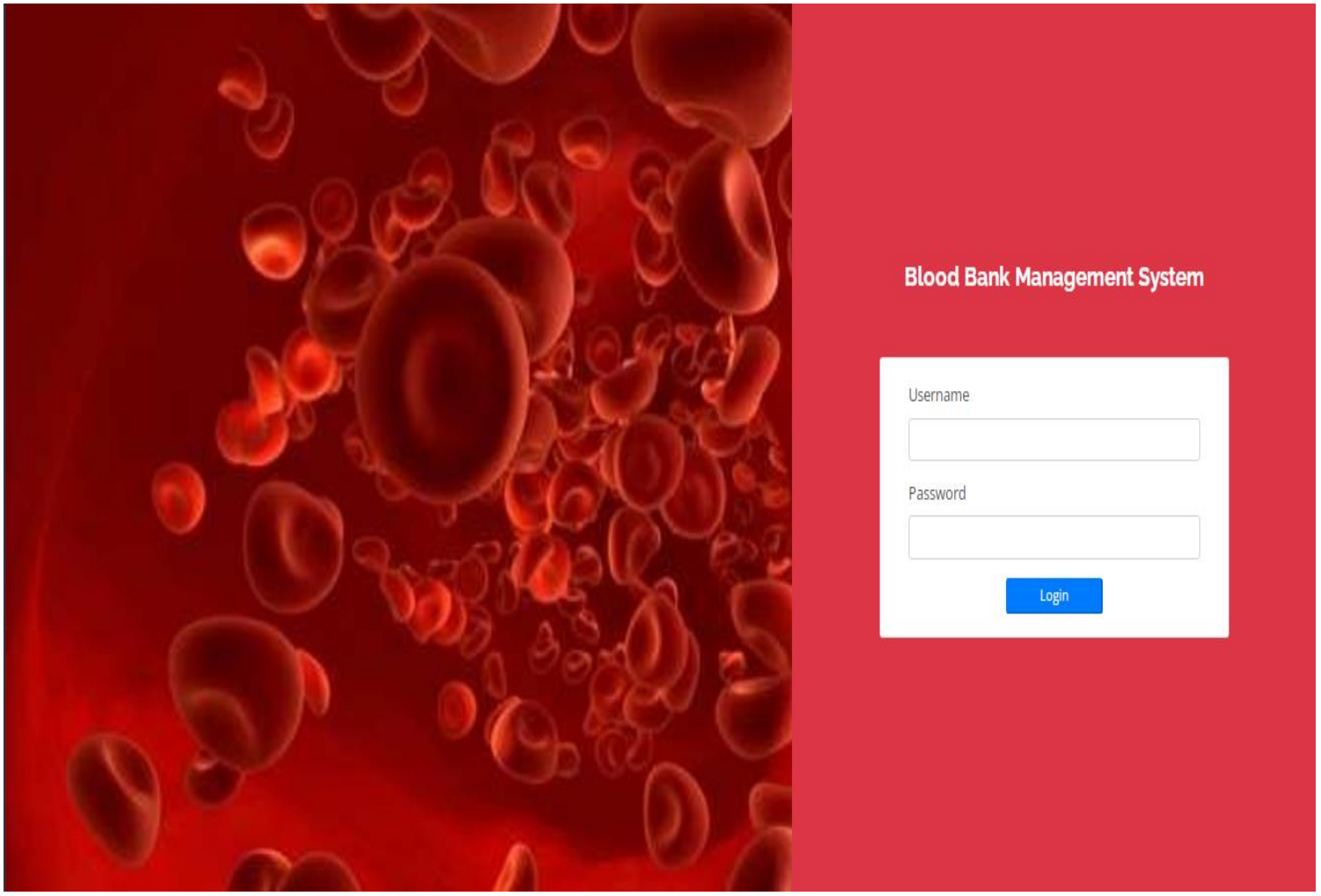

Figure3.10: login admin page

This is the dedicated login area for administrators to access the administrator page.

3.4.2 Home

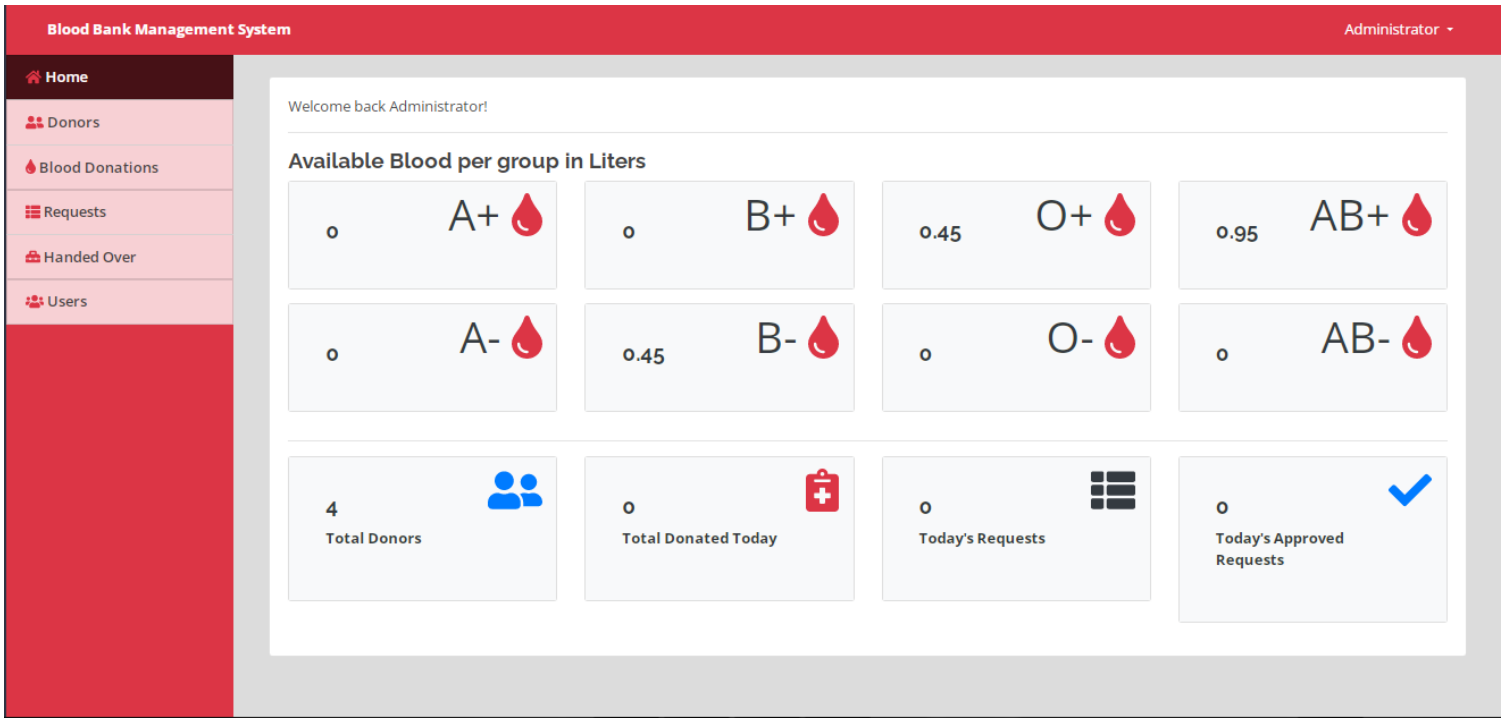

Figure3.11: home admine page

On this page, the administrator has the ability to view the blood stock for each blood group individually. Additionally, they can access the following information:

- Total donors: The overall count of registered blood donors.
- Total donations today: The number of blood donations received on the current day.
- Requests today: The total count of blood requests received on the current day.
- Requests approved today: The number of blood requests that have been approved on the current day.

The administrator can easily monitor and keep track of these key metrics to ensure efficient management of the blood supply and demand.

3.4.3 donors

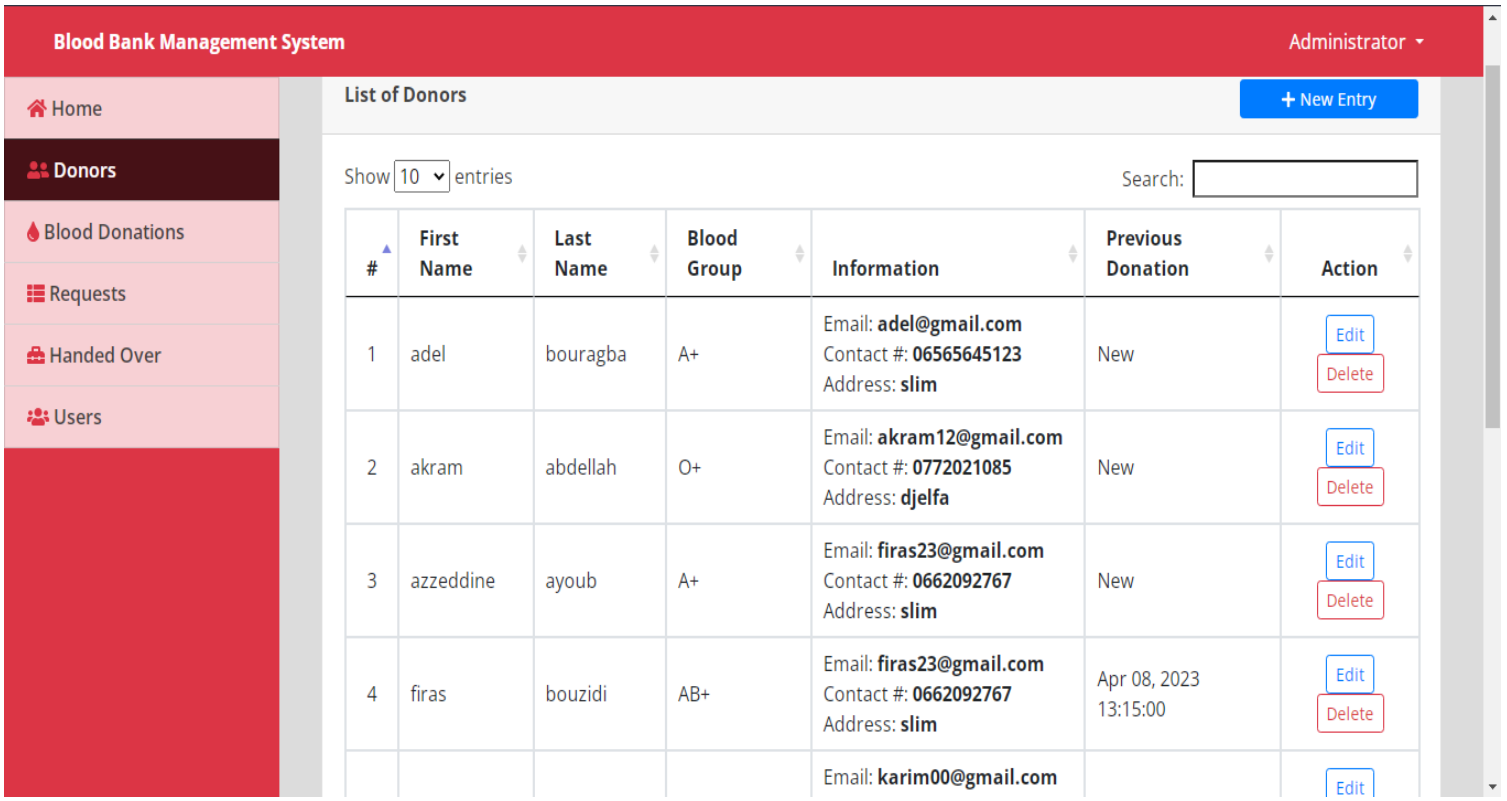

Figure3.12: donors page

On this page, users can access a comprehensive list of individuals who are interested in donating blood. The administrator holds the authority to perform various actions on these user profiles, including:

1. Accept: The administrator can approve the donor's information, indicating their eligibility to donate blood.
2. Delete: In case of any discrepancies or if the user's information becomes invalid or outdated, the administrator can remove the donor's profile from the list.
3. Amend: If there are any necessary updates or corrections required in the donor's information, the administrator can make appropriate changes to ensure accuracy.

Additionally, the administrator has the capability to add new donors to the system, allowing for the expansion and maintenance of the donor database effectively.

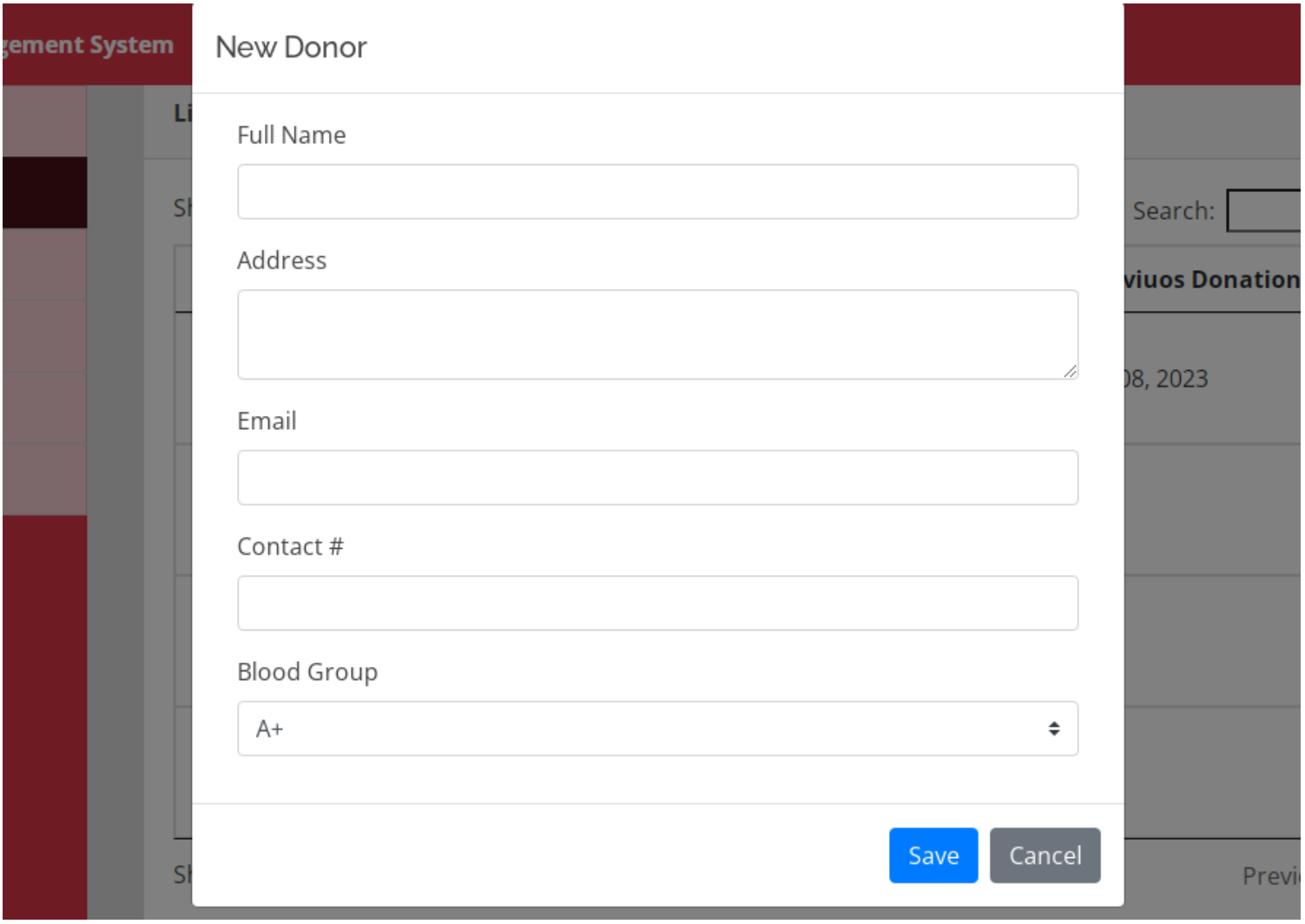

Figure3.13:add new donors by admin

It is worth noting that the information provided by the user is essentially the same information that can be added by the administrator. This allows for consistency and accuracy in the donor database.

3.4.4 blood donations

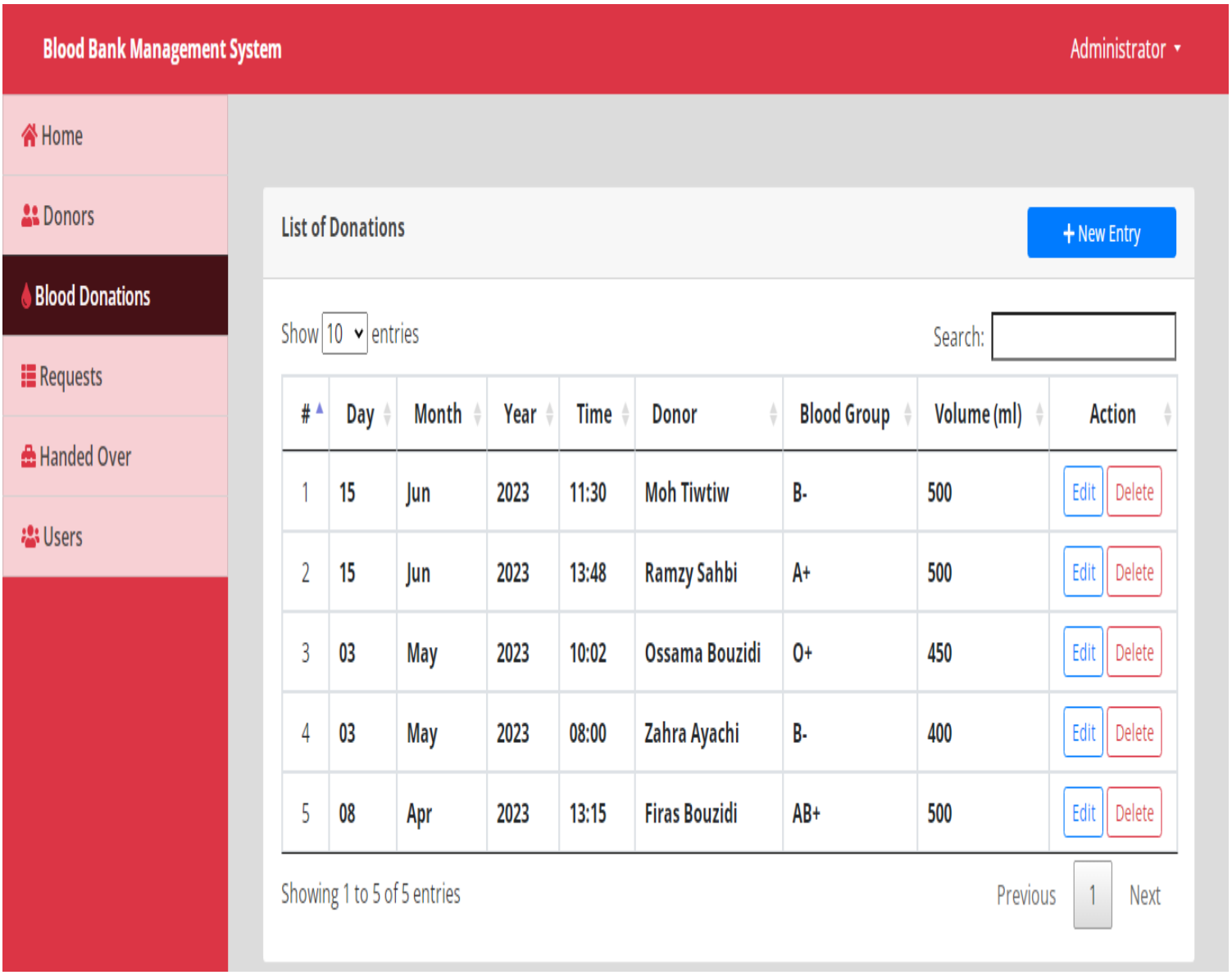

Figure3.14:blood donations page

This is the designated area where the official can document the blood donation process and update the blood stock accordingly. This task is performed on a specific date set by the administrator. It involves recording the details of each blood donation received and ensuring its inclusion in the current stock inventory.

A new donation can be added by registered donors only

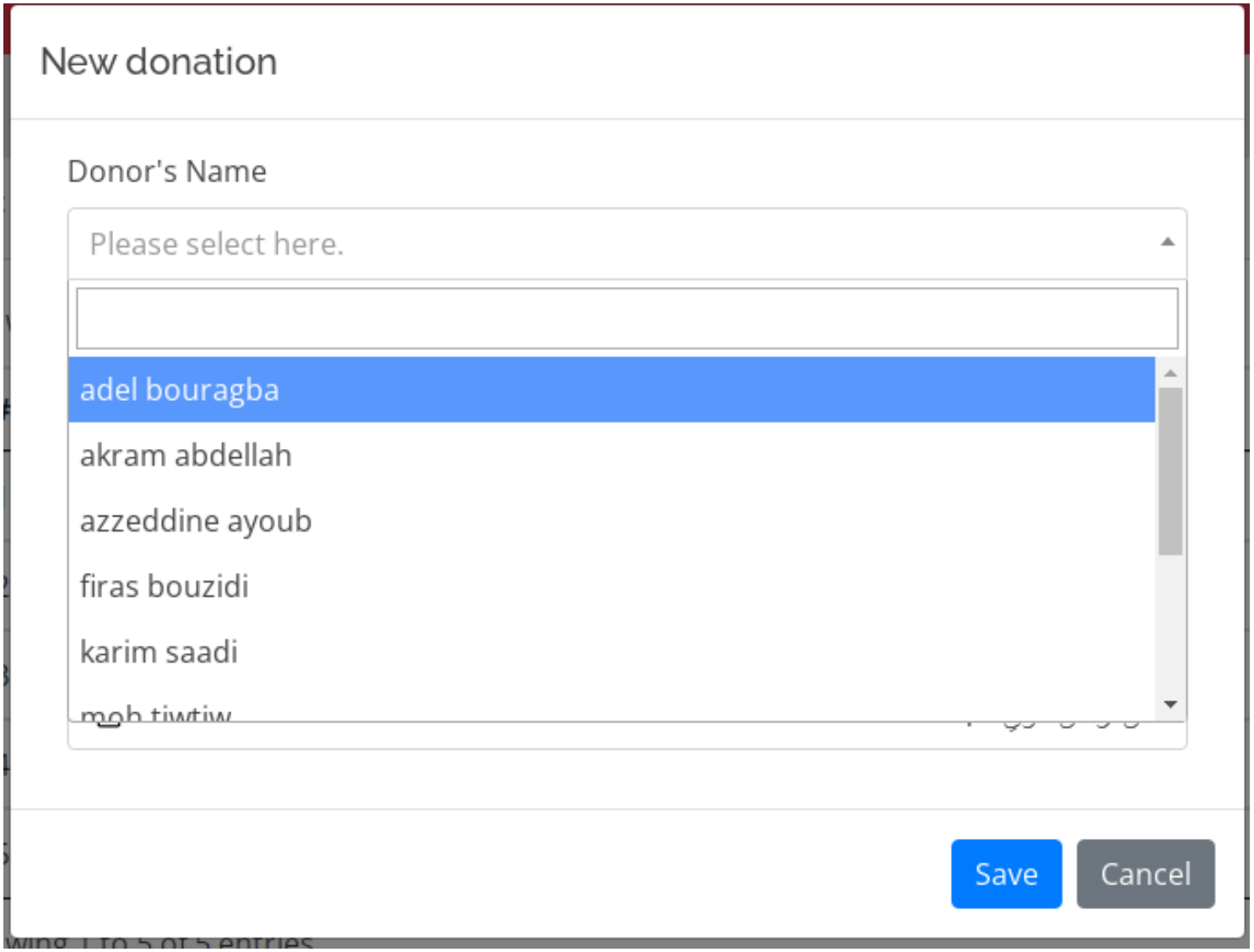

Figure3.15:Add new donation

This systematic approach enables effective management and tracking of the blood supply.

3.4.5 Requests

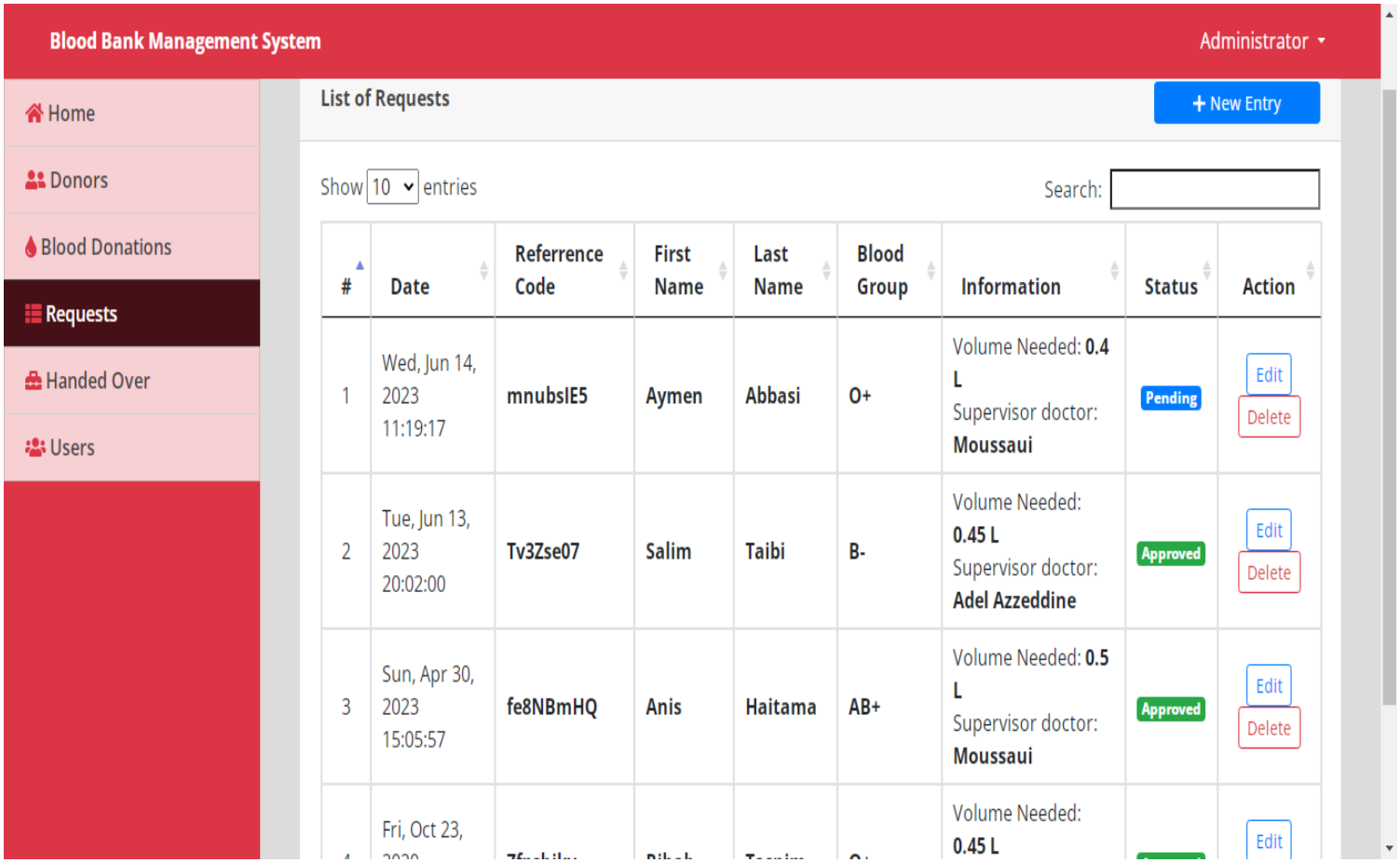

Figure3.16:requests page

This section is dedicated to the recording of blood requests by the administrator. It encompasses the following essential information:

1. Reference code: A unique identifier assigned to each blood request for easy reference and tracking.
2. Patient name: The name of the individual in need of blood.
3. Blood type: The specific blood type required by the patient.
4. Amount of blood needed: The quantity of blood units needed by the patient.
5. Doctor in charge: The name of the doctor responsible for the patient's care.

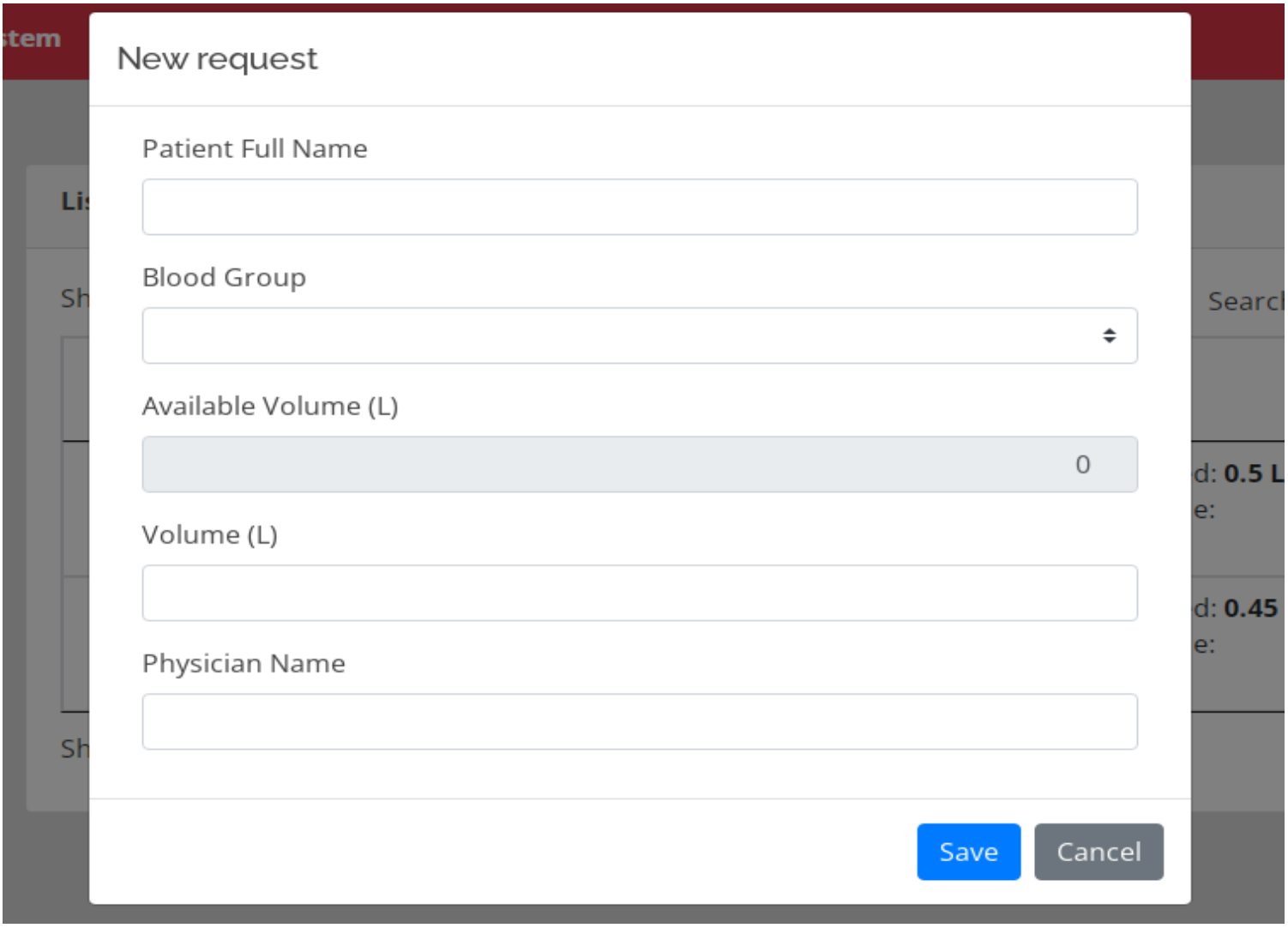

Figure3.17:Add new request

The administrator possesses the authority to perform various actions on these requests, including:

- Approval: The administrator can approve the blood request, indicating that it meets the criteria and can be processed for potential donation.
- On-hold: In certain cases, the administrator may choose to put a request on hold, usually to gather more information or assess the situation further.
- Deletion: If a request becomes obsolete or is deemed unnecessary, the administrator has the ability to completely delete it from the system.

These options empower the administrator to manage and prioritize the blood requests effectively.

3.4.6 Handed over

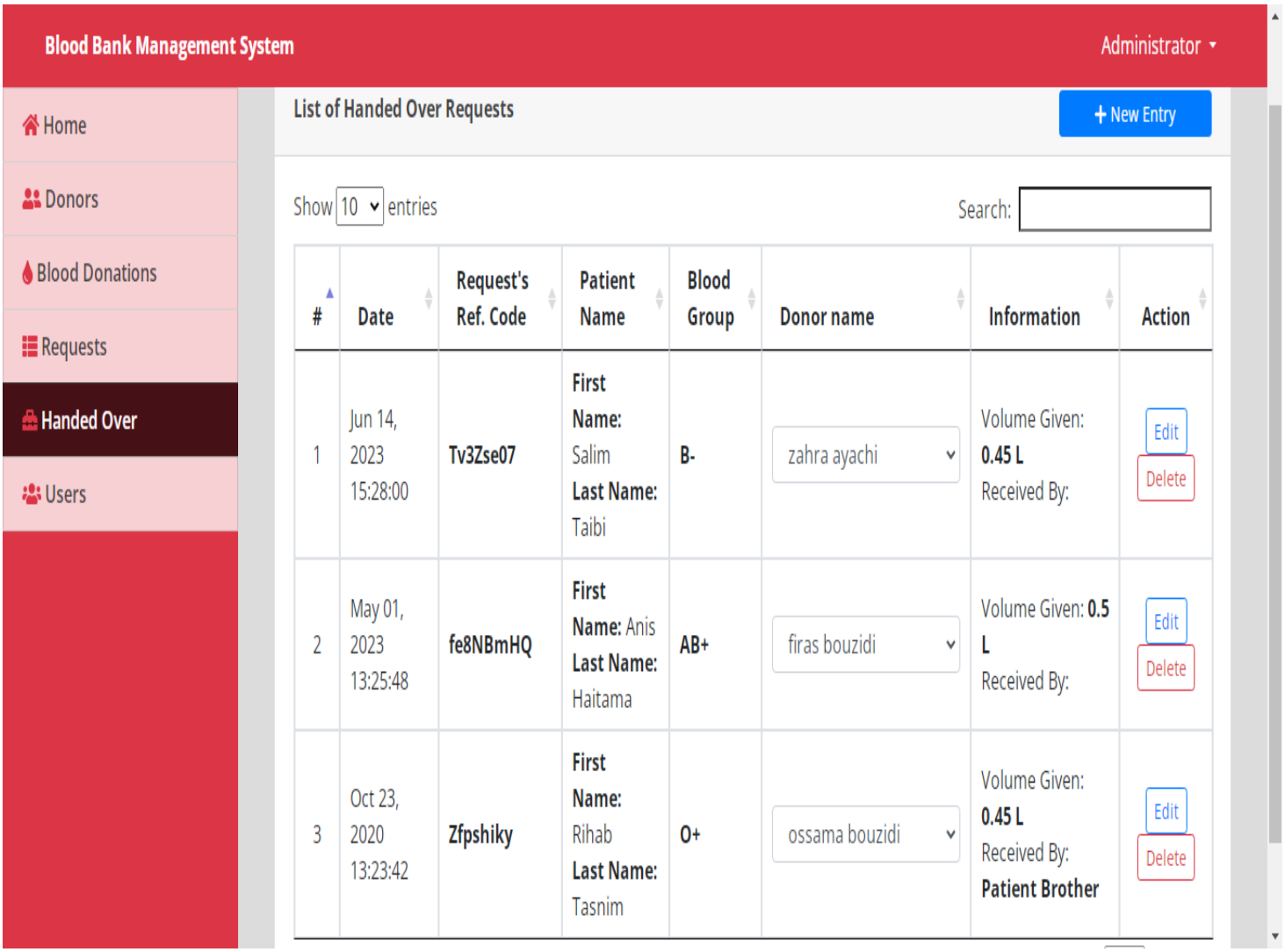

Figure3.18: handed over page

This section serves as a record for the volume of blood delivered to patients who are registered in the order list. It allows for accurate tracking and documentation of the amount of blood provided to each patient.

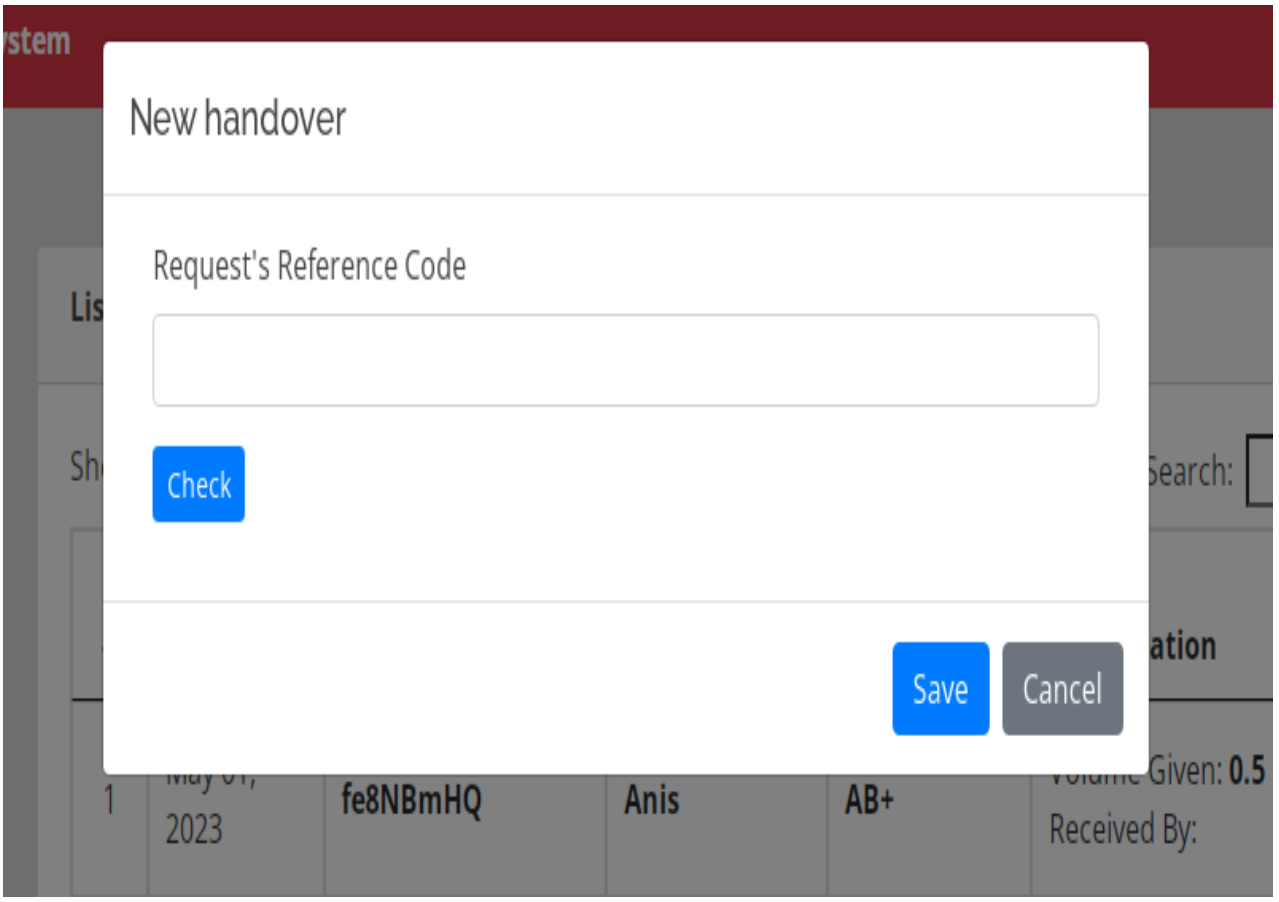

Figure3.19:Add new handover

The blood delivery process is recorded and associated with the respective reference code. By linking the delivery information to the reference code, transparency is ensured, and effective management of the blood supply becomes possible to meet the requirements of registered patients. This systematic approach allows for accurate tracking, monitoring, and coordination of blood delivery, ultimately ensuring that patients receive the necessary blood units in a timely manner.

3.4.7 users

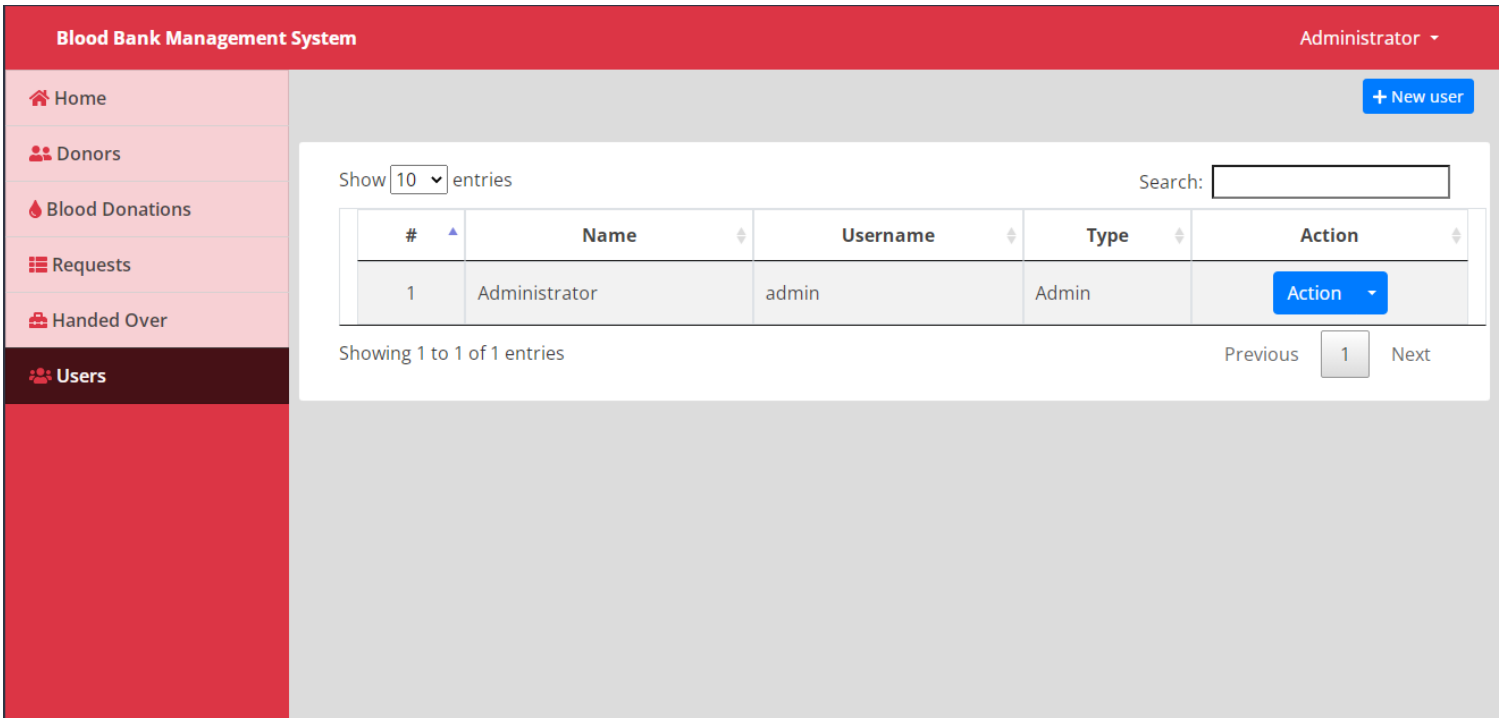

Figure3.20: users page

This section is exclusively designed for primary administrators to manage officials within the system. Primary administrators have the privilege to perform the following actions:

1. Add new officials: Primary administrators can add new officials to the system, granting them access and necessary privileges.
2. Update official data: Primary administrators can modify the data of existing officials, such as changing passwords or updating other relevant information.

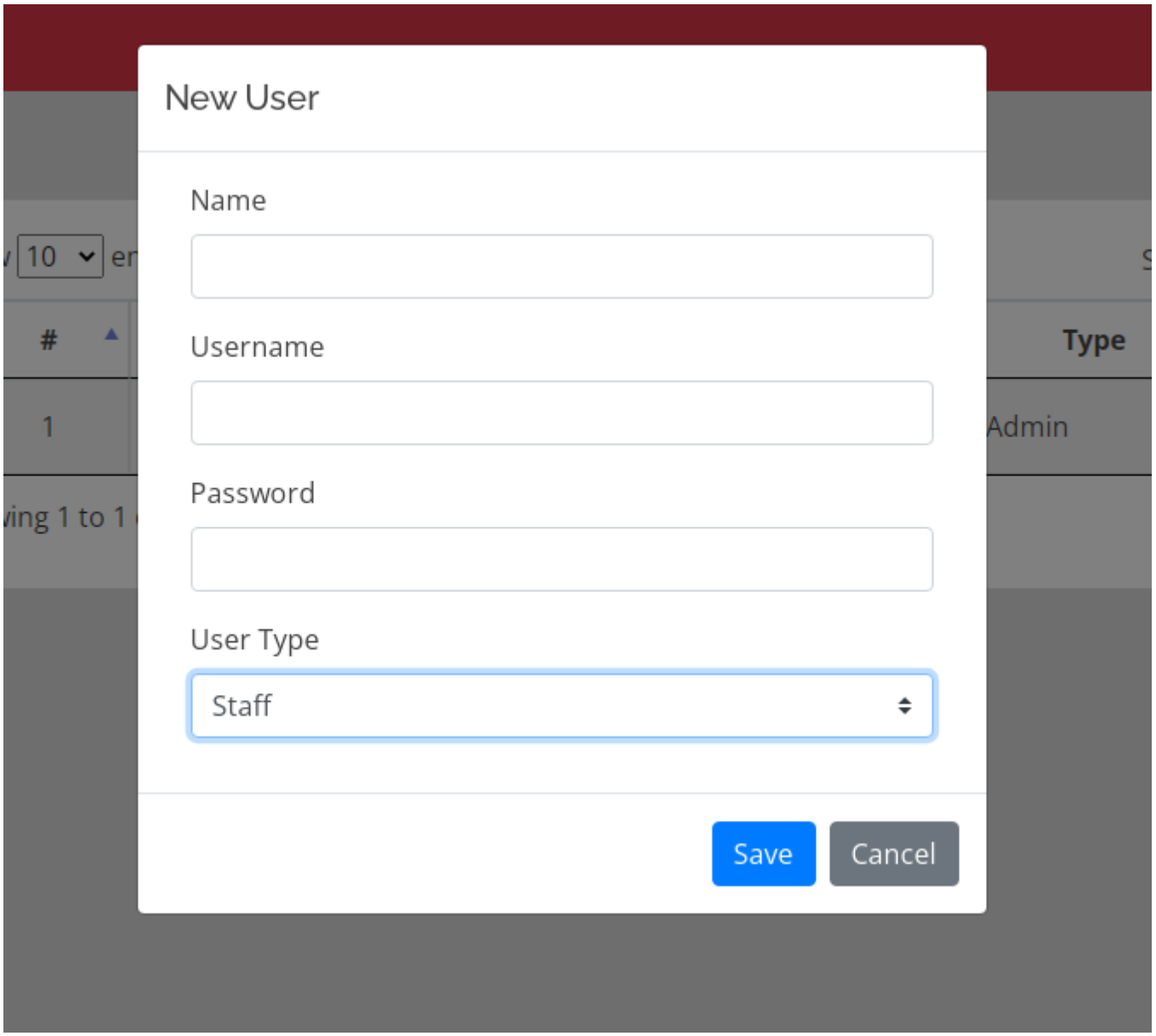

Figure3.21:Add new users

It is important to note that this feature is exclusive to primary administrators and is not available to staff. By providing primary administrators with the ability to manage administrators, the system ensures proper control and supervision of administrative access and maintains the integrity of user accounts. and maintains the integrity of user accounts.

3.5 Conclusion

In this chapter, we showcased our application and its inclusive features designed to streamline the blood donation process and efficiently manage inventory.

General Conclusion

This web application aims to enhance communication between individuals in need of blood and those who are willing to donate blood with just a few clicks. By utilizing this blood donation app, the barriers between blood donors and individuals desperately in need of blood will be significantly reduced. Donors can easily provide assistance to anyone requiring blood, while recipients can conveniently find the help they seek.

In conclusion, this project serves as a crucial solution to address the urgent shortage of blood and meet future demands. By leveraging technology in the healthcare sector in Algeria, the Blood Donor application aims to improve the efficiency and accessibility of blood donation processes.

The expanded proposal provides a comprehensive overview of the project, including the introduction, background of the study, problem statements, and objectives. The methodology chosen ensures the successful completion of the project, and the system functions as planned, successfully achieving its objectives.

The user-friendly blood donation process offered by the application attracts donors and encourages frequent donations. The convenient storage of donor information simplifies record-keeping. Donors also experience a sense of fulfillment due to the streamlined donation process.

Furthermore, this project provided valuable opportunities to design, code, test, and implement an application. It allowed for the practical application of software engineering principles and database management concepts, ensuring data integrity and consistency. The project facilitated learning about various technologies such as CSS, JavaScript, HTML, MySQL, and Personal Web Server, enabling a deeper understanding of

web development and the research process.

Overall, this project not only addresses the pressing need for blood supply but also enhances technological advancements in the healthcare sector in Algeria, while providing valuable learning experiences for the project team.

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