

A web based smart management system for DIU Blood Bank

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APPROVAL

This Project titled “A web based smart management system for DIU Blood Bank”, submitted by **Azizul Hakim Fahim** to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on **13.07.2024**.

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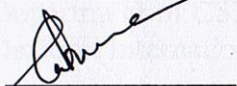
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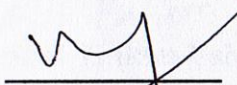
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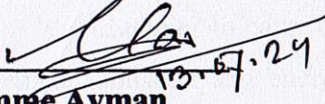
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DECLARATION

I hereby declare that, this project has been done by us under the supervision of **Ms. Umme Ayman**, Lecturer, **Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

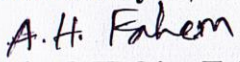
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ABSTRACT

The Blood Bank website is a comprehensive platform created with React, Node.js, Tailwind CSS, MongoDB, and JavaScript. It serves as a single hub for managing blood donations, managing members, and other related tasks. The website has a user-friendly home dashboard with information on the blood supply that is kept in the blood bank. The admin can effectively manage registered members thanks to member management functionality. The administrator has access to user information such name, student ID, blood type, and request ID. The Blood Management system is likewise under the admin's control. According to the precise needs, they can quickly amend blood group information, pricing updates, and quantity adjustments for blood. Users have control over tracking and managing their previous blood purchases thanks to the Purchase History function. They can view the specifics of their transactions, such as the student ID, blood type, quantity, total cost, date of purchase, contacts, and delivery address. The website also offers a Delivery Tracking feature that enables users to keep track of the progress of their blood delivery. Once the blood arrives at its destination, the system changes the status to "delivered". Users must fill out a form with their personal information, including name, blood group, age, weight, desired donation time and date, phone number, and address, in order to facilitate blood donation. To use the capability for blood donation, you must log in. overall, the Blood Bank website offers a complete solution for managing blood, managing members, and accepting blood donations. The platform is effective and convenient for both users and the blood bank administration because to its user-friendly design and variety of functionalities.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The Blood Bank website is a strong and complete platform created to automate the management of blood, member administration, and blood donation operations. The website offers a user-friendly design and a variety of functionality to meet the demands of both blood bank administrators and users by combining the capabilities of React, Node.js, Express.js, MongoDB, and JavaScript. Users may readily access crucial information regarding the available blood inventory thanks to a visually appealing home interface. Users can easily acquire blood groups on the website because to its simple browsing experience. Administrators can effectively process member registrations, approve membership requests, and manage pending requests thanks to member administration tools. Administrators may simply update blood volumes, change prices, and change blood group information using the blood management system, resulting in accurate inventory management. Users may easily manage their personal information, view their purchase history, and check the status of their deliveries. Additionally, the website offers a simple and secure blood donation method that needs users to log in and supply pertinent information before they may donate blood. The Blood Bank website is a reliable and user-friendly tool that streamlines blood management, improves member administration, and makes it easier to donate blood.

1.2 Motivation

Here are some bullet points highlighting the motivations behind developing the Blood Bank website:

- **Improve Blood Management:** The website aims to enhance the efficiency and effectiveness of blood management processes, allowing for better tracking, monitoring, and organization of blood inventory.
- **Simplify Blood Purchases:** By offering a user-friendly interface, the website makes it easy for users to browse available blood groups and make purchases with just a few clicks, promoting convenience and accessibility.

- **Streamline Member Administration:** The platform provides administrators with tools to efficiently manage member registrations, approve requests, and maintain an organized database of members, simplifying administrative tasks.
- **Enhance Donation Experience:** The website facilitates the blood donation process by providing a secure and convenient platform for users to register as blood donors, enter their relevant information, and schedule donations, making the experience smoother for both donors and the blood bank.
- **Ensure Accuracy and Transparency:** Through features like purchase history and delivery tracking, the website promotes transparency and accuracy, allowing users to monitor their transactions and track the status of their blood deliveries.
- **Enable Efficient Blood Inventory Management:** The admin capabilities of the website empower administrators to easily update blood quantities, adjust prices, and modify blood group details, ensuring accurate inventory management and better resource allocation.
- **Foster Social Impact:** The website ultimately aims to contribute to the social welfare of the community by promoting blood donation, supporting blood banks in their operations, and potentially saving lives through improved access to blood supplies.
- **Enhance Communication and Engagement:** By providing channels for users to connect with the blood bank through social media and contact forms, the website facilitates communication, fosters engagement, and strengthens the relationship between the blood bank and its users.

1.3 Objective

Here are some bullet points outlining the objectives of the Blood Bank website:

- **Centralize Blood Management:** Create a centralized platform for efficient management of blood inventory, ensuring accurate tracking, monitoring, and organization of available blood groups.
- **Streamline Member Administration:** Develop tools and functionalities that simplify member registration, approval, and management processes, enabling administrators to maintain a comprehensive and organized member database.

▪

Facilitate Blood Purchases: Enable users to easily browse, select, and purchase blood groups through a user-friendly interface, enhancing convenience and accessibility for individuals in need of specific blood types.

- **Simplify Blood Donation Process:** Provide a secure and intuitive platform for individuals to register as blood donors, enter their relevant information, and schedule blood donations, streamlining the process and encouraging regular blood contributions.
- **Ensure Transparency and Accountability:** Implement features such as purchase history, delivery tracking, and transaction details to promote transparency and accountability, allowing users to monitor their purchases and track the status of blood deliveries.
- **Optimize Blood Inventory Management:** Empower administrators with tools to efficiently manage blood inventory, including the ability to update blood quantities, adjust prices, and modify blood group details, ensuring optimal resource allocation and effective inventory control.
- **Enhance User Engagement:** Foster user engagement by providing channels for users to connect with the blood bank through social media links and contact forms, promoting a sense of community and encouraging active participation in blood donation initiatives.
- **Contribute to Social Welfare:** Ultimately, the objective of the Blood Bank website is to contribute to the social welfare of the community by promoting blood donation, supporting blood banks in their operations, and potentially saving lives through improved access to blood supplies.

1.4 Expected Outcome

The expected outcomes of the Blood Bank website include:

Improved Blood Inventory Management: The website aims to enhance the accuracy and efficiency of blood inventory management, ensuring better tracking, monitoring, and organization of available blood groups. This would result in optimized resource allocation and effective management of blood supplies.

Increased Convenience and Accessibility: By providing a user-friendly interface and streamlined processes, the website is expected to make blood purchases and donations more convenient and accessible for users. This would encourage more individuals to participate in blood donation initiatives and increase the availability of blood for those in need. Enhanced Member

Administration: The website's functionalities for member registration and management would lead to improved administrative processes, creating a comprehensive and organized member database for efficient communication and engagement. **Greater Transparency and Accountability:** The implementation of features like purchase history and delivery tracking would foster transparency and accountability, allowing users to monitor their transactions and track the status of their blood deliveries, resulting in increased trust and satisfaction among users.

Positive Social Impact: Ultimately, the expected outcome of the Blood Bank website is to contribute to the social welfare of the community by promoting blood donation, supporting blood banks, and potentially saving lives through improved access to blood supplies.

1.5 Project Management and Finance

Project Management:

- Define project scope, objectives, and deliverables.
- Create a detailed project plan with clear timelines and milestones.
- Assign tasks and responsibilities to team members.
- Regularly monitor and track project progress.
- Identify and manage project risks and issues.
- Foster effective communication and collaboration among team members.
- Conduct regular project status meetings and updates.
- Ensure adherence to project timelines and budget.
- Implement quality control measures to maintain high standards.
- Conduct post-project evaluation and lessons learned session for continuous improvement.

Finance:

- Develop a comprehensive budget for the project, considering all relevant costs.
- Monitor and control project expenses to stay within budgetary limits.
- Track and manage financial transactions and records.
- Regularly review financial reports to assess project financial health.
- Identify and address any financial discrepancies or concerns.
- Ensure compliance with financial regulations and policies.
- Seek opportunities for cost savings and efficiencies.
- Collaborate with stakeholders to secure necessary funding and resources.

■

Provide financial forecasting and analysis to support decision-making. Conduct financial audits and reviews for transparency and accountability.

1.6 Report Layout

This report has six chapters in total, each covering the topics specific to the Blood Bank website project:

Chapter 1:

Introduction: This section provides an overview of the Blood Bank website and its purpose in managing blood inventory and facilitating blood donation.

Chapter 2:

Background: The chapter discusses the background of the project, including the development process, challenges faced, and the scope of the Blood Bank website.

Chapter 3:

Requirements: This section delves into the detailed requirements of the website, including the design specifications, usage model diagrams, and case studies.

Chapter 4:

Design Specification: Here, the focus is on the front-end and back-end designs of the Blood Bank website. It covers aspects such as UI/UX requirements, user interface design, and user experience considerations.

Chapter 5:

Impact on Society: This chapter explores the societal impact of the Blood Bank website, highlighting its contribution to sustainability, healthcare, and improving access to blood supplies.

Chapter 6:

Conclusion and Future Work: The final chapter concludes the report, summarizing the project's achievements and outcomes. It also discusses potential future enhancements, research opportunities, and areas for further development in the Blood Bank website.

CHAPTER 2

BACKGROUND STUDY

2.1 Terminologies

The Terminologies section of the report introduces key concepts and terms relevant to the Blood Bank website project. It aims to establish a common understanding of the terminology used throughout the report. This section may include definitions and explanations of technical terms, abbreviations, and acronyms specific to blood management, member administration, and blood donation processes. By providing clear definitions and explanations, this section ensures that readers, including stakeholders and project team members, are on the same page and can effectively comprehend the content presented in the subsequent chapters of the report.

2.2 Related Works

The development of the Blood Bank website involved the use of a carefully selected combination of back-end and front-end languages to ensure a robust and efficient code implementation. The following languages were chosen for their compatibility and effectiveness in achieving the desired functionalities and user experience:

- **HTML5:** HTML5, the foundation of web development, was used to design the website's structure and layout, outlining the various elements and their arrangement.
- **CSS3:** Applying styles, animations, and responsive design principles, CSS3 was used to improve the website's aesthetic appeal and presentation. This guaranteed an aesthetically pleasing and user-friendly experience on all platforms.
- **Tailwind CSS:** A strong foundation for responsive and web-first design was established by utilizing the capabilities of Tailwind CSS, a well-liked CSS framework. It provided a comprehensive selection of pre-designed elements and tools that sped up development and guaranteed uniformity in the website's appearance.
- **React.js :** It was possible to create dynamic and interactive user interfaces by using the React.js package. React's component-based architecture made it possible to handle and render data in real time, creating a seamless and interesting user experience.

▪

Node.js : Server-side JavaScript code could be executed more easily thanks to Node.js, which served as the back-end runtime environment. Building scalable and effective web applications was made possible by the event-driven, non-blocking I/O mechanism it offered.

- **Express.js**: Express.js eased the development process by providing a comprehensive collection of tools and middleware as a versatile web application framework for Node.js. It made it easier to manage the overall application logic, handle HTTP requests, and create server-side routes.
- **JavaScript**: JavaScript, which served as the primary programming language, was used for both front-end and back-end development. It made it possible to integrate interactive features, form validation, data manipulation, and client-server communication.
- **MongoDB**: MongoDB, a NoSQL database, was selected to manage the data for the blood inventory, member information, and transactions because of its adaptability and scalability. Information may be stored and retrieved more effectively thanks to its document-based structure and strong querying capabilities.

The Blood Bank website was created to satisfy the unique requirements of blood management, member administration, and blood donation operations by utilizing these back-end and front-end languages. While preserving data integrity and system performance, the usage of these languages ensured a seamless and user-friendly experience for administrators and users.

Blood Bank of Alaska.com [9]

Blood Bank of Alaska's website offers a seamless platform for managing blood donations, members, and purchases, featuring user-friendly design and robust functionalities.

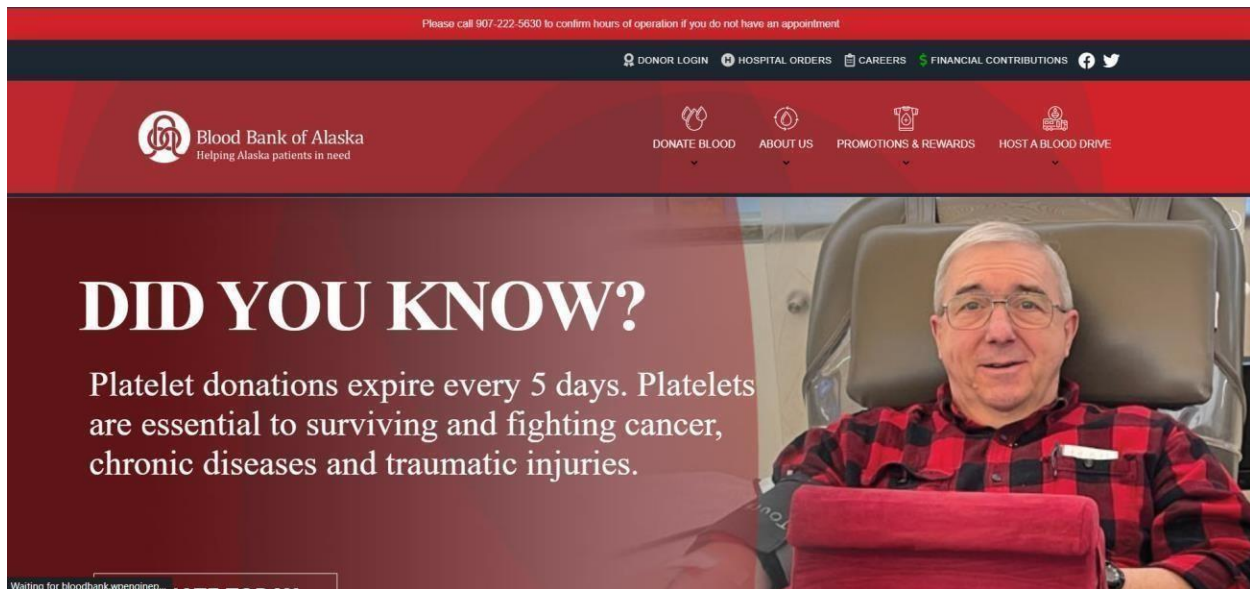


Figure: 2.1 UI of Blood Bank of Alaska.com

Canadian Blood Services.com [10]

CanadianBloodServices.com offers a comprehensive platform for managing blood donations, member information, and delivery tracking, ensuring efficient blood bank management across Canada.

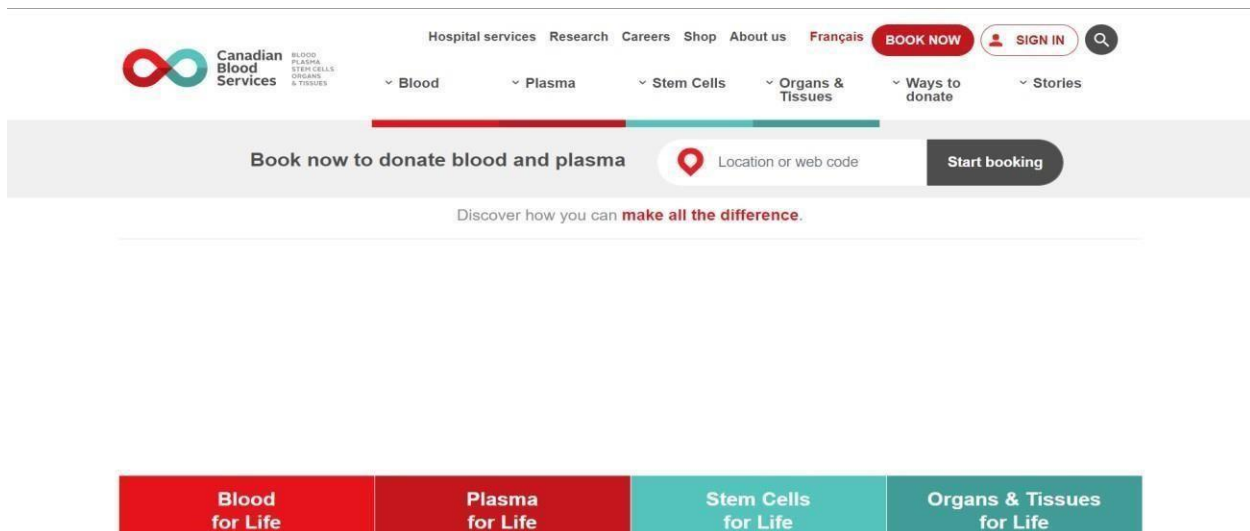


Figure: 2.2 UI of Canadian Blood Services.com

NHS Blood and Transplant (United Kingdom).com [11]

NHS Blood and Transplant (United Kingdom) website employs React, Node.js, Tailwind CSS, MongoDB, and JavaScript for seamless blood donation management, member administration, and blood inventory control.

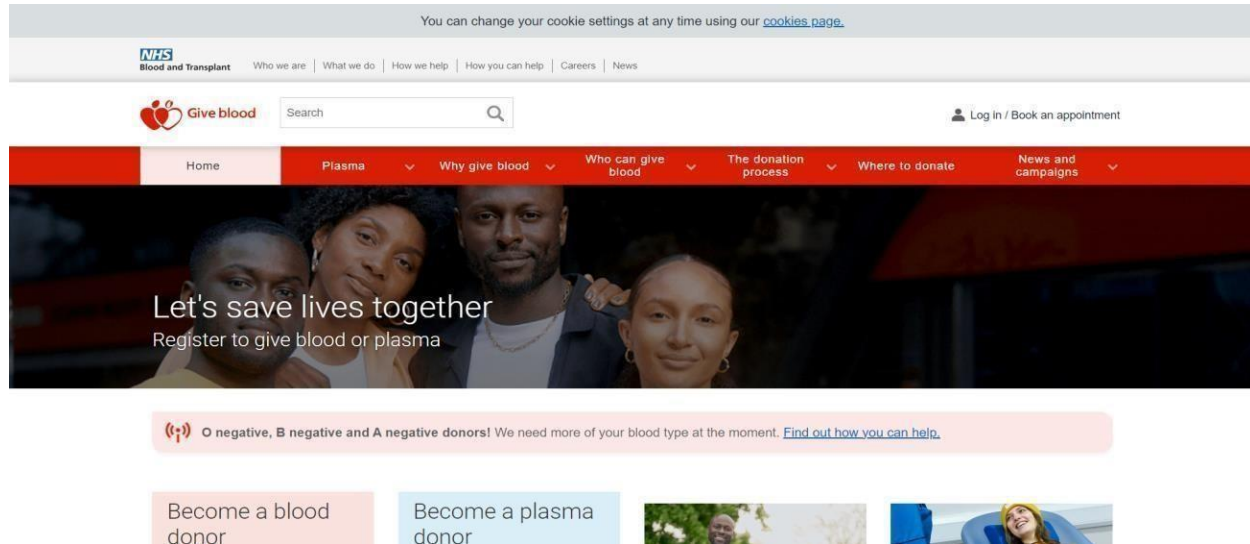


Figure: 2.3 UI of NHS Blood and Transplant (United Kingdom).com

Australian Red Cross Lifeblood.com [12]

Lifeblood.com by the Australian Red Cross is a user-friendly platform leveraging React, Node.js, Tailwind CSS, and MongoDB, offering seamless blood donation management with features like member management, purchase history, and delivery tracking.

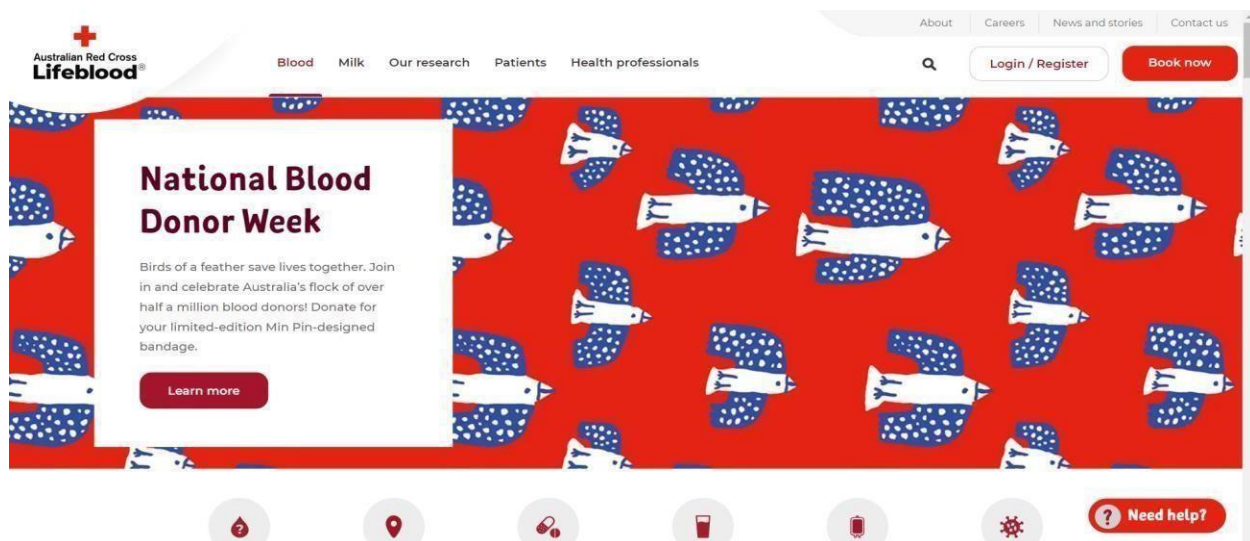


Figure: 2.4 UI of Australian Red Cross Lifeblood.com

Bloodworks Northwest (United States).com [13]

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Bloodworks Northwest (United States) offers a streamlined and user-friendly platform utilizing React, Node.js, Tailwind CSS, MongoDB, and JavaScript for managing blood donations, members, and blood inventory with transparency and efficiency.

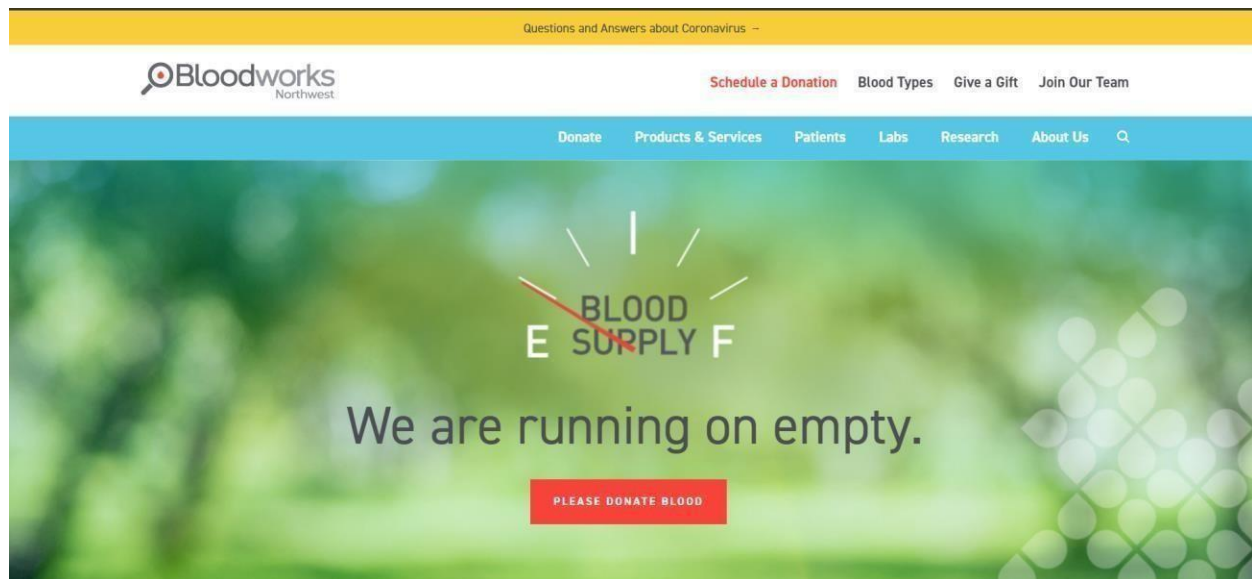


Figure: 2.5 UI of Bloodworks Northwest (United States).com

Indian Red Cross Society.com [14]

Indian Red Cross Society's website provides a streamlined platform for managing blood donations, member information, and delivery tracking, enhancing efficiency and accessibility in blood bank management.



Figure: 2.6 UI of Indian Red Cross Society.com

2.3 Scope of the Problem:

There must be some sort of access.

- The scope of the problem addressed by the Blood Bank website includes the efficient management of blood inventory and the facilitation of blood donation processes.
- The website aims to streamline the tracking, monitoring, and organization of available blood groups, ensuring accurate inventory management.
- It provides functionalities for member administration, including registration, approval, and management of members, simplifying administrative tasks.
- The website offers a user-friendly interface for users to browse, select, and purchase blood groups, enhancing convenience and accessibility.
- It enables users to donate blood by providing a secure and intuitive platform for registration, information entry, and scheduling of blood donations.
- The scope also includes features for tracking and monitoring delivery status, maintaining transparency and accountability in the blood purchasing process.
- The website aims to contribute to the social welfare of the community by promoting blood donation, supporting blood banks, and potentially saving lives through improved access to blood supplies.

2.4 Challenges:

Challenges in the development of the Blood Bank website include:

- **Data Accuracy:** Ensuring the accuracy and reliability of blood group information, member records, and donation details, as well as implementing measures to prevent misinformation.
- **Security Measures:** Implementing robust security measures to protect user data, safeguard sensitive information, and prevent unauthorized access or data breaches.
- **User Experience:** Designing an intuitive and user-friendly interface that caters to a wide range of users, including administrators, members, and donors, to ensure seamless navigation and engagement.
- **Integration of Technologies:** Integrating multiple technologies, such as React.js, Node.js, Express.js, and MongoDB, while ensuring compatibility and efficient communication between front-end and back-end components.

- **Scalability:** Building a website that can handle increasing user traffic, data storage, and transaction volumes as the Blood Bank expands its operations and user base.
- **Regulatory Compliance:** Adhering to legal and regulatory requirements related to data privacy, security, and blood donation processes, ensuring the website meets industry standards and guidelines.
- **Testing and Quality Assurance:** Conducting thorough testing to identify and resolve any bugs, errors, or performance issues to provide a seamless and error-free user experience.
- **Maintenance and Updates:** Ensuring regular maintenance and updates to keep the website running smoothly, address potential vulnerabilities, and incorporate new features or improvements based on user feedback.
- **User Adoption and Trust:** Overcoming user skepticism and gaining trust in the website's reliability, security, and accuracy to encourage users to actively participate in blood donation and transactions.
- **Collaboration and communication:** Communication among the development team, stakeholders, and blood bank administrators to address challenges, gather requirements, and deliver a successful website solution.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Business Process Modeling

The project's usefulness is depicted by the Blood Bank business process model. The key elements of our project align with the various components illustrated in the Business Process Model, which is presented below. This model showcases the core processes and functionalities of the Blood Bank website, highlighting its practicality and value in managing blood inventory and facilitating blood donation processes.

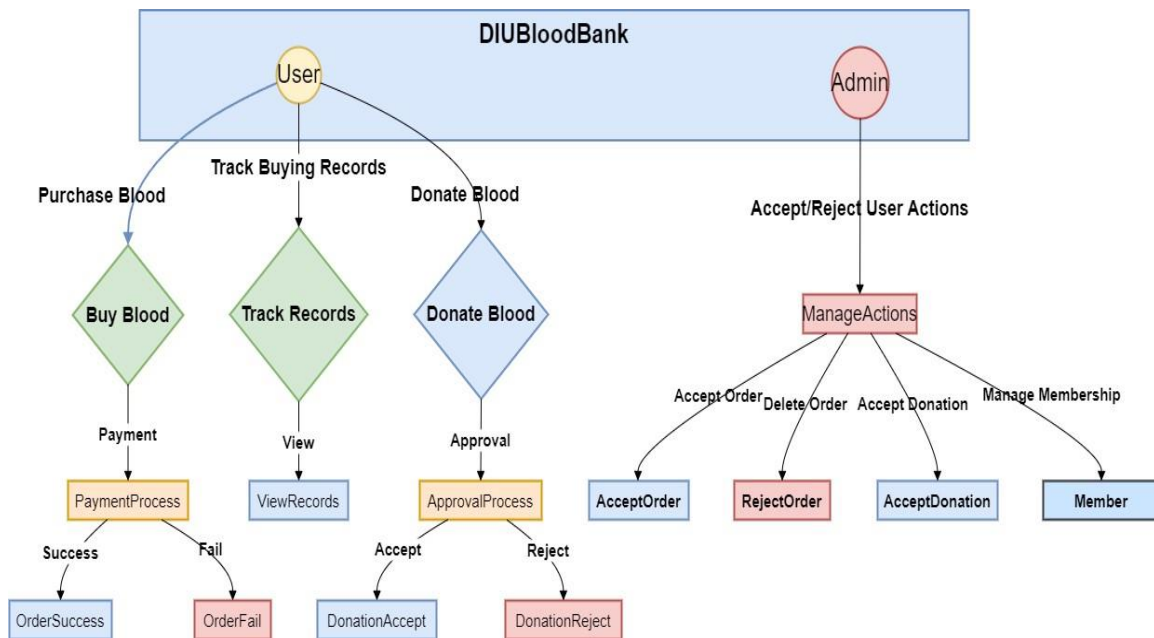


Figure: 3.1 Business Process Model Diagram

3.2 Requirement Collection and Analysis

For the successful development of the Blood Bank website, it is important to gather requirements and analyze them effectively. Taking into consideration the specific needs of the project, the following software and hardware requirements have been identified:

Software requirements:

- **Operating System:** The website should be compatible with both Linux and Windows operating systems, ensuring accessibility for a wider user base.
- **System Design:** Design tools such as Adobe Photoshop, Creately, and Figma will be utilized to create visually appealing and user-friendly interfaces.
- **Languages:** The website will be built using HTML, CSS, JavaScript, and Node.js to achieve dynamic functionality and seamless user interactions.
- **Framework:** The Bootstrap 4 framework will be employed to enhance the website's responsiveness and optimize its layout for different screen sizes.
- **Code Editor:** Visual Studio Code will be used as the preferred code editor for efficient development and debugging processes.
- **Device Compatibility:** The website should be accessible on various devices including computers, laptops, and mobile devices.
- **Operating System Compatibility:** The website should be compatible with major operating systems such as Windows, macOS, Linux, Android, and iOS.

Hardware requirements:

- **Processor:** The website should be capable of running smoothly on Intel Core i3, i5, or i7 processors or equivalent.
- **RAM:** A minimum of 2GB RAM is recommended to ensure optimal performance.
- **Devices:** The website should be compatible with laptops, computers, and mobile devices.

These requirements ensure that the Blood Bank website is developed using appropriate software tools, adheres to compatibility standards, and operates seamlessly across different hardware configurations.

Functional Requirements

The Blood Bank system is designed to encompass a range of essential functionalities, including the following key aspects:

1. **Registration and Login:** The system should provide a user-friendly registration process, allowing individuals to create accounts by providing necessary information such as name, email, address, and phone number. Users should be able to securely log in using their credentials.
2. **Verification and Approval:** The system should incorporate a verification mechanism to ensure the authenticity of user information, particularly for blood donors. Administrators should have the ability to review and approve user registrations to maintain a trusted community of blood.
3. **Maintenance and Updates:** The system should enable administrators to perform regular maintenance tasks, such as updating blood inventory, managing member records, and ensuring the accuracy of information. This ensures the system's reliability and up-to-date data.
4. **Home Page and Individual Profiles:** The system should feature a user-friendly home page where users can access relevant information about the blood bank, available blood groups, and donation processes. Additionally, registered users should have individual profiles where they can view and manage their personal information, donation history, and preferences.
5. **Dashboard:** The system should provide a comprehensive dashboard for administrators, allowing them to monitor and analyze visitor activities on the website. This feature is crucial for understanding user behavior, improving user experience, and making data-driven decisions to enhance blood bank operations. The dashboard should offer detailed insights into visitor traffic, user demographics, engagement metrics, behavior flow, conversion rates, feedback and surveys, event tracking, and performance metrics. By providing these comprehensive insights, the dashboard enables administrators to make informed decisions aimed at optimizing user experience and improving overall operations. This data-driven approach ensures that the blood bank can better serve its community, streamline its processes, and achieve its mission more effectively.

By incorporating these functional requirements, the Blood Bank system aims to provide a seamless user experience, efficient blood donation management, and robust administrative capabilities for maintaining and enhancing the platform.

3.3 Use Case Modeling and Description

The use case model provides a visual representation of how users interact with the system to achieve their goals. It illustrates user objectives, system interactions, and the required actions to accomplish those objectives. This model guides the design of user-centric features and ensures effective problem-solving. By utilizing a use case model, our project captures diverse user scenarios and paths, facilitating a system that meets user needs and enhances satisfaction.

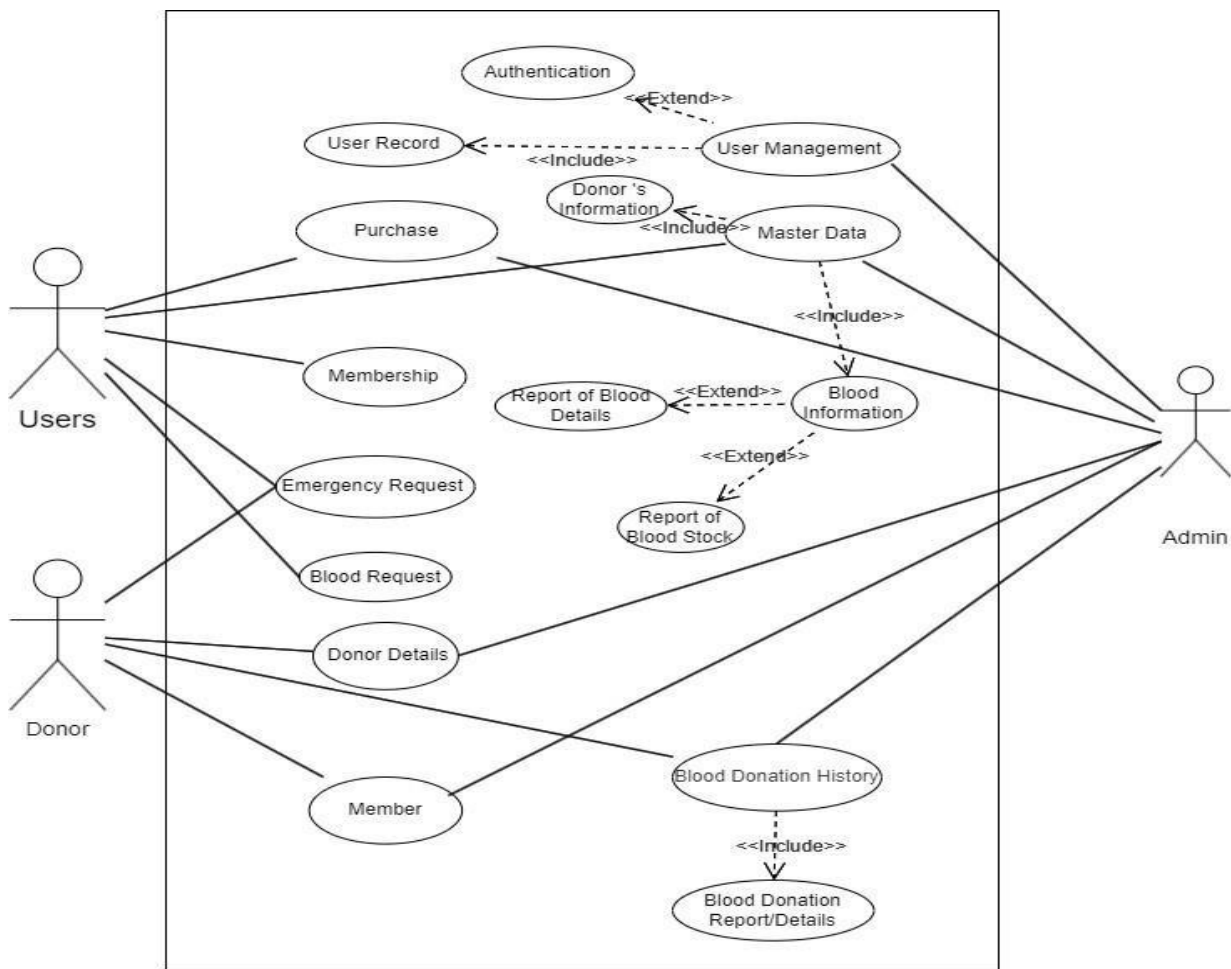


Figure: 3.2 Use Case Diagram

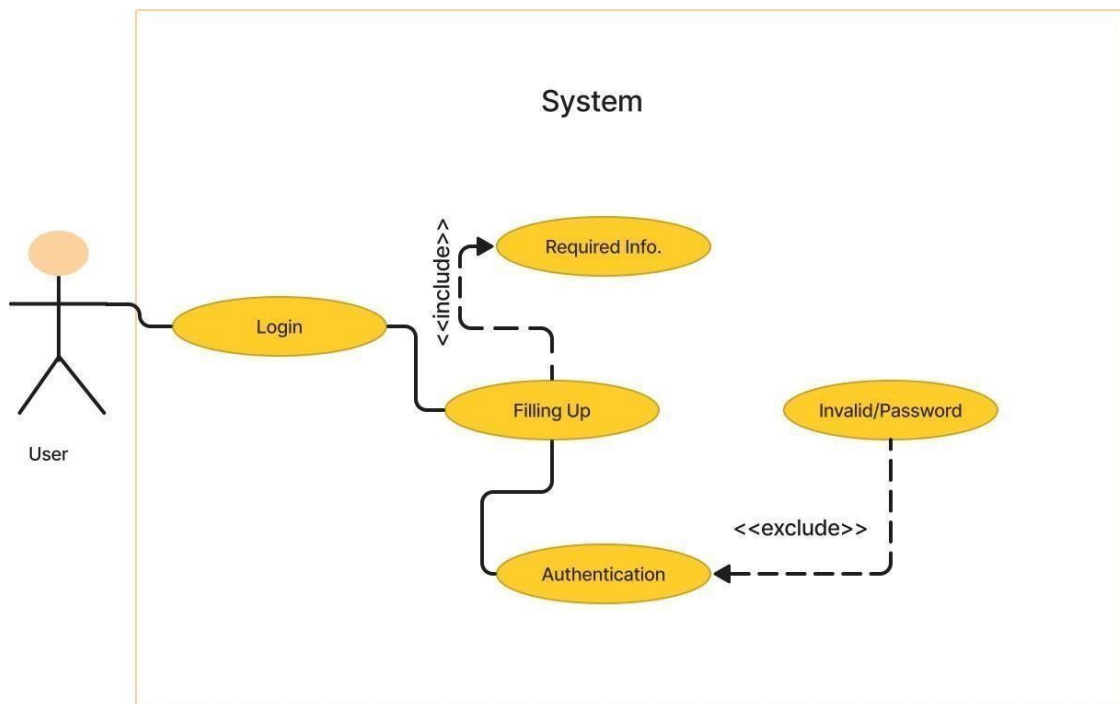


Figure: 3.3 Use Case Sign-up

Use Cases Details

Use Case Name: Create an account

Actor: User

Primary Path:

- User visits the Blood Bank website.
- User selects the option to create an account.
- User enters their name.
- User provides their email address.
- User provides their phone number.
- User chooses a username.
- User sets a password for their account.
- User confirms the password by re-entering it.
- User enters their address.
- User specifies their city.
- User selects their shedule. ▪ User clicks the "Sign Up" button.

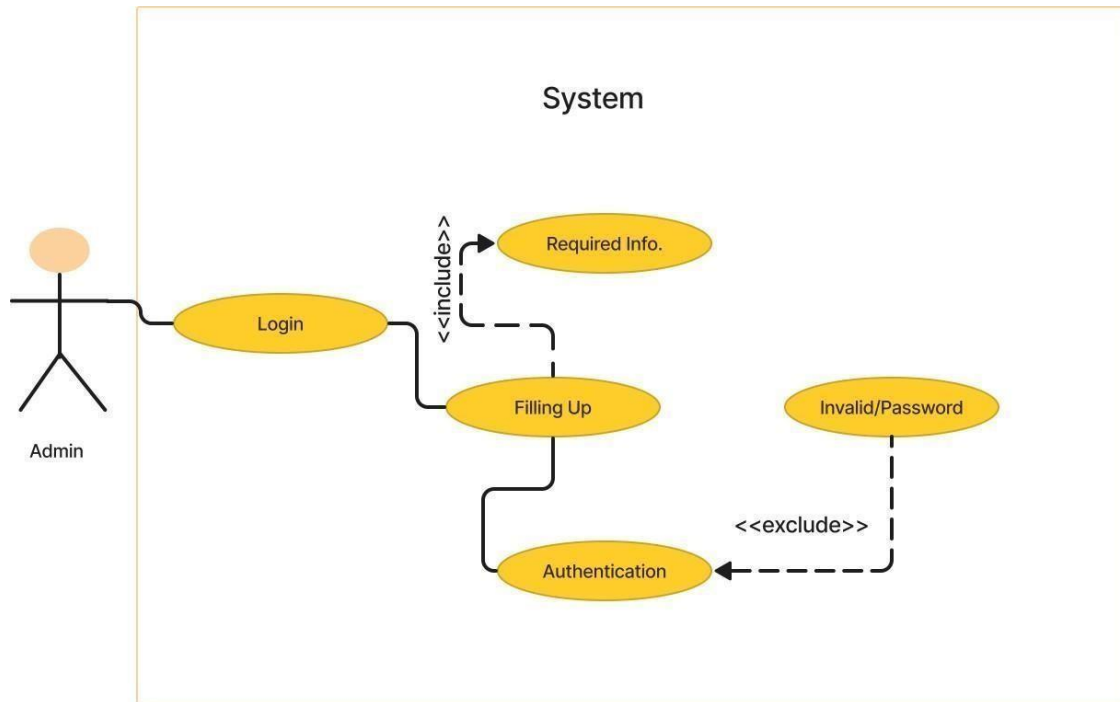


Figure: 3.4 Use Case Admin Login

Use Case Details

Use Case Name: Login an account

Actor: Admin Primary

Path:

- Admin accesses the Blood Bank website.
- Admin selects the option to log in to their account.
- Admin enters their username.
- Admin provides their email address.
- Admin provides their phone number.
- Admin enters their name.
- Admin enters their password.
- Admin clicks the "Log in" button.

3.4 Design Requirement

These are the core features that are essential to the design of the Blood Bank website. Each feature serves a specific purpose in facilitating the blood donation and management process.

- Home: The home page provides an overview of the blood bank's mission, services, and any important announcements or news.
- Profile: The profile section allows users to create and manage their personal profiles, providing necessary information such as blood type, contact details, and donation history.
- Dashboard: The dashboard provides a personalized space for users to access relevant information, manage appointments, track donation history, and interact with the blood bank.
- Blood Inventory: This feature allows users to view the available blood groups and their quantities in the blood bank. It provides real-time information on the blood stock, ensuring transparency and efficient management.
- Search Blood Groups: Users can search for specific blood groups based on their requirements, enabling them to find suitable donors or available blood units.
- Contact Us: This feature provides a means for users to directly communicate with the blood bank's administrators or support team. Users can seek assistance, ask questions, or provide feedback through this contact channel.

These design requirements ensure that the Blood Bank website has the necessary features to facilitate smooth user interactions, efficient blood management, and effective communication between users and the blood bank.

3.5 Activity Diagram

The Activity Diagram for the Blood Bank website depicts the flow of activities, including user registration, blood donation, member management, purchase history tracking, and blood delivery monitoring. It illustrates the sequential steps users and administrators take within the system to facilitate efficient blood management and donation processes.

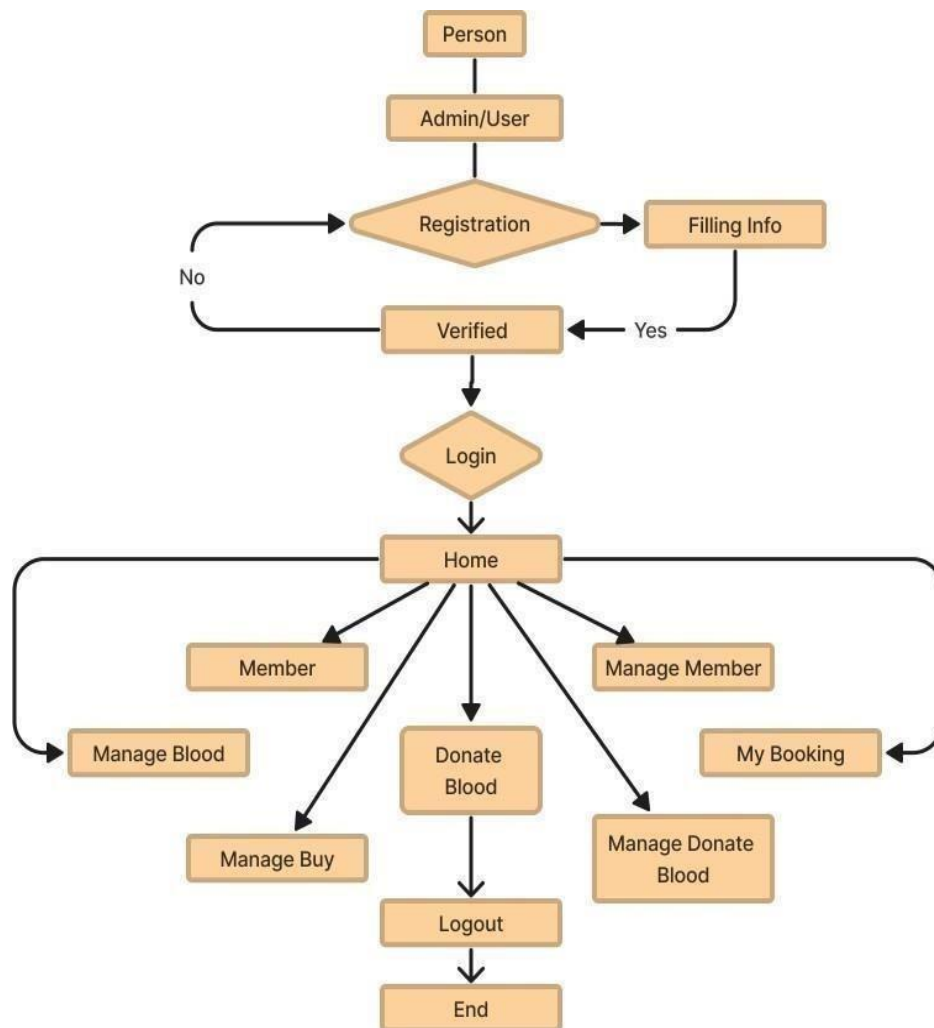


Figure: 3.5 Activity Diagram of Register

3.6 Flowchart Diagram

The Flowchart Diagram visually outlines the sequential flow of processes and interactions within the Blood Bank website, depicting actions such as user registration, blood donation, member management, purchase history tracking, and blood delivery tracking.

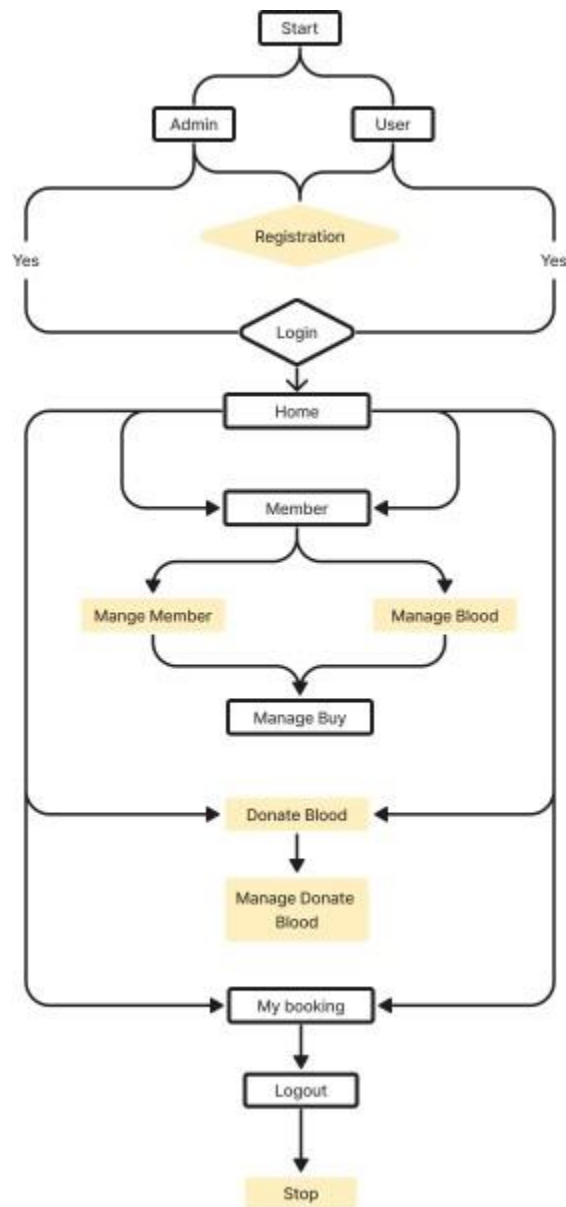


Figure: 3.6 Flowchart Diagram

3.7 The Model-View -Controller (MVC) Architecture

The Blood Bank website follows a Model-View-Controller (MVC) architecture, with the model handling data management, the view responsible for user interface presentation, and the controller managing user interactions and application logic.

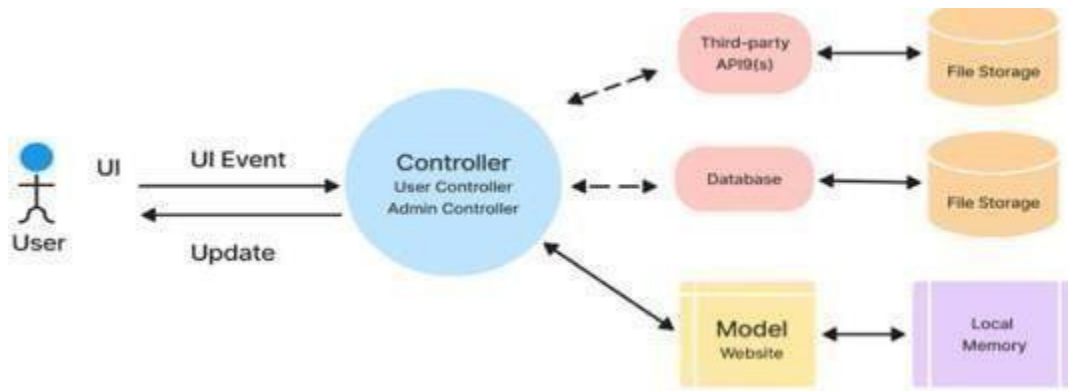
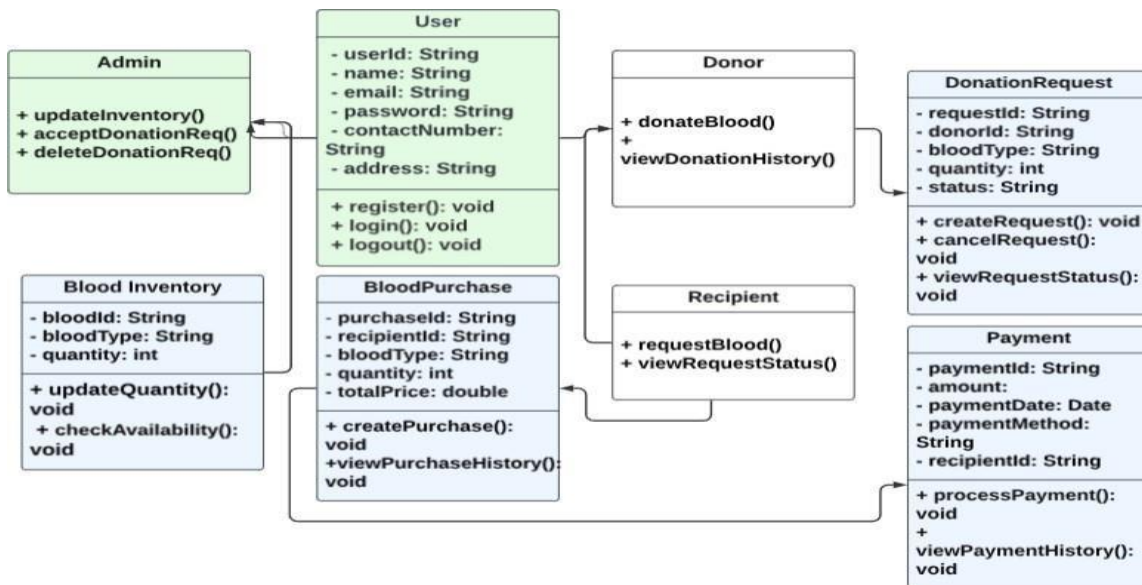


Figure: 3.7 The Model-View -Controller (MVC) Architecture

3.8 Class Diagram



The Blood Bank website's Class Diagram illustrates the relationships and attributes of classes such as User, Admin, Blood Donation, Blood Supply, Purchase History, and Delivery, facilitating efficient management of blood donations and related tasks.

Figure: 3.8 Class Diagram

3.9 ER Diagram

The Blood Bank website's ER Diagram depicts entities such as Users, Members, Blood Donations, Purchases, and Deliveries, interconnected by relationships such as Member-Donation, User-Purchase, and Purchase-Delivery.

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-End Design

User interface design, also known as front-end programming, plays a crucial role in catering to the needs of both users and administrators. It involves the assembly of the user interface using presentation code, which is essential for every website. When creating a website, it is important to consider its utility and usability. The design should have a straightforward and basic layout, ensuring it is user-friendly for all visitors. Our approach involves a combination of raw coding, templates, and other tools to achieve the desired design. HTML and CSS are the primary languages used for front-end design, enabling us to create engaging and visually appealing interfaces that enhance the user experience.

We first need to establish an account in order to access this website.

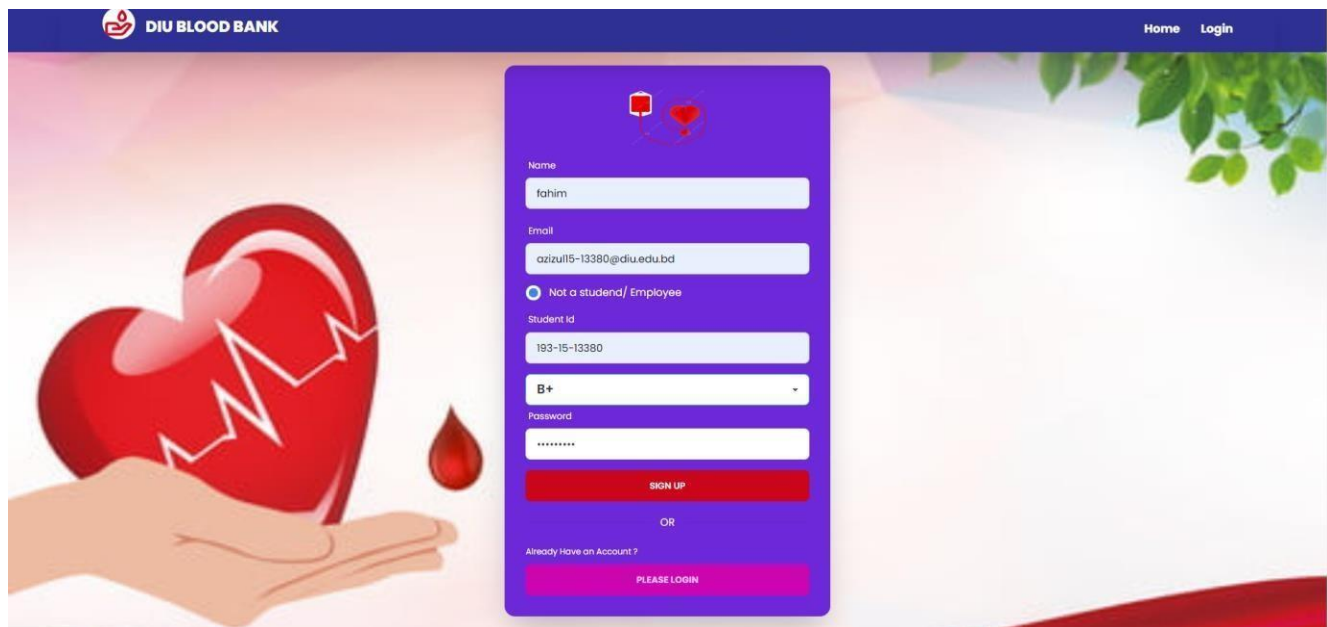


Figure: 4.1 Sign up page

Login:

In the future, accessing the "Blood Bank" website will require users to log in. This login feature ensures secure and personalized access to the website's functionalities. Users will be prompted to

enter their registered email address and password to authenticate their identity. Once logged in, users will have access to their personalized dashboards, where they can manage their profiles, view donation history, make blood requests, and access relevant resources. Administrators will have additional privileges to manage member profiles, track blood inventory, handle donation requests, and perform administrative tasks. The login feature acts as a gateway to ensure the privacy and security of user data while providing a tailored experience to users. It enhances the website's usability and fosters trust in the platform's reliability.

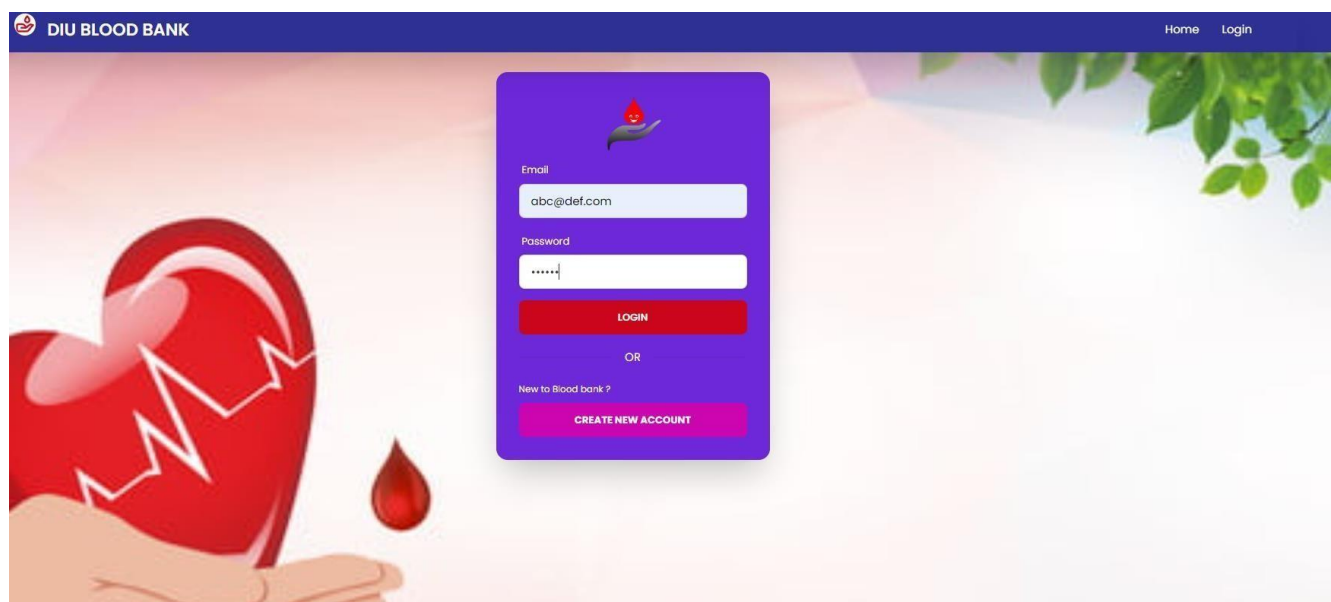


Figure: 4.2 Login page

Home page:

User interface design, also known as front-end programming, plays a crucial role in catering to the needs of both users and administrators. It involves the assembly of the user interface using presentation code, which is essential for every website. When creating a website, it is important to consider its utility and usability. The design should have a straightforward and basic layout, ensuring it is user-friendly for all visitors. Our approach involves a combination of raw coding, templates, and other tools to achieve the desired design. HTML and CSS are the primary languages used for front-end design.



Figure: 4.3 Front page

Specifications of the services:

To access the services of the Blood Bank, users are required to select a preferred date for blood donation. The website provides a calendar feature where users can choose the specific date, they wish to donate blood. Upon selecting a date, the system displays a list of available donation centers and their corresponding details, such as location, operating hours, and the availability of blood donation slots. This information allows users to make informed decisions about their blood donation appointment, ensuring a smooth and efficient process. By providing this functionality, the Blood Bank website streamlines the blood donation scheduling process and facilitates a convenient experience for donors.

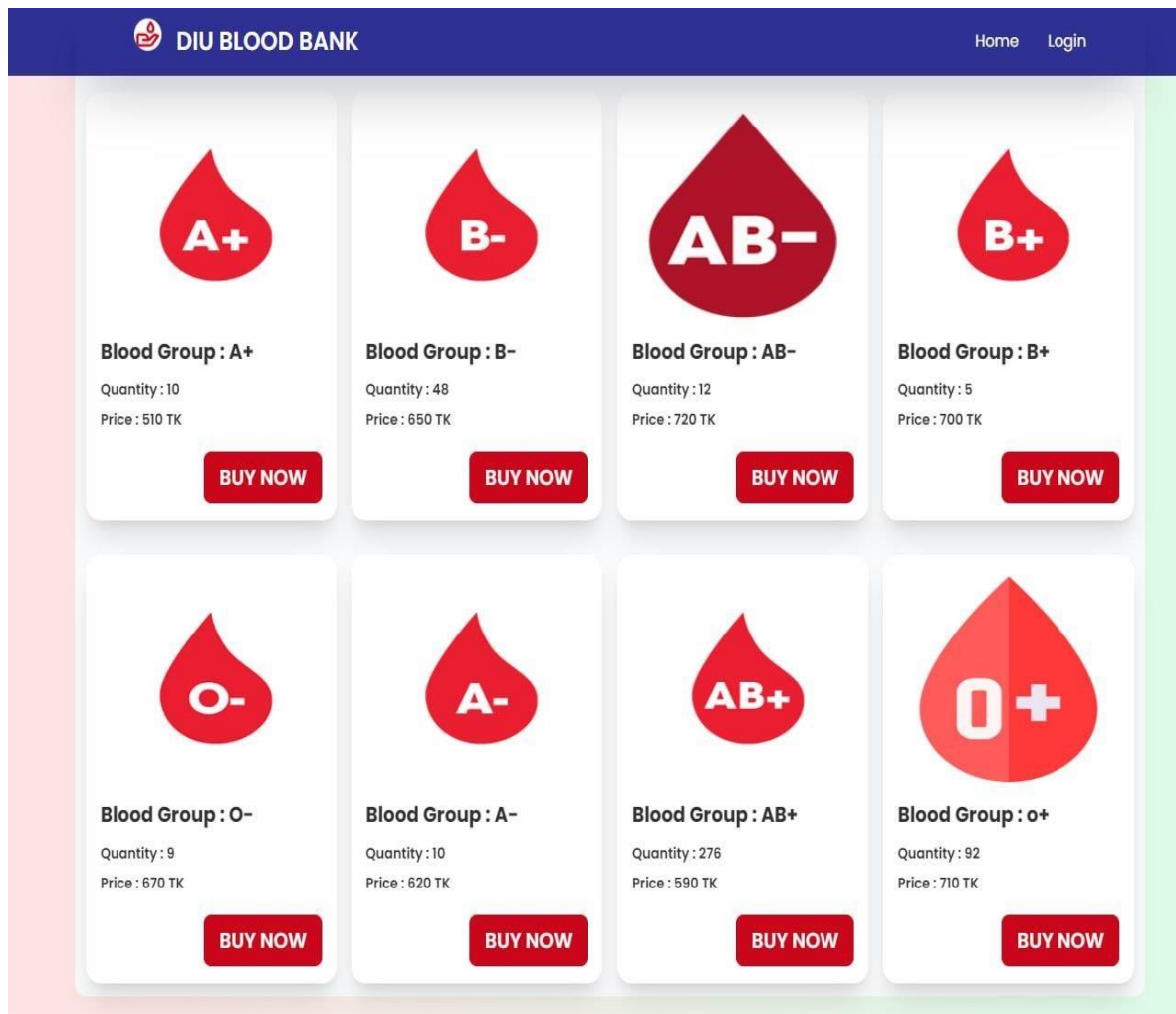


Figure: 4.4 Buying Services

User Section:

The user section of the "Blood Bank" website is dedicated to providing a personalized experience for blood donors and recipients. It allows donors to manage their profiles, schedule appointments, and access educational resources. For recipients, it enables them to submit blood requests, track their status, and communicate with administrators. The user section streamlines the user experience, making it easy for users to engage with the blood donation process and benefit from the platform's features.

DIU BLOOD BANK					
		Home Dashboard About Us Sign Out			
Member	1	Grilles	123456	A+	Yes
My Booking	2	Fahim	123456	B+	Yes
Donate Blood	7	Fahim		B+	Yes

DIU BLOOD BANK									
		Home Dashboard About Us Sign Out							
Member									
My Booking									
Donate Blood									

Naima

O-

Age

Write Your Age

Weight

Write Your Weight

Time

Pick Up Your Time

Date

mm/dd/yyyy

Phone

Phone Number

Address

Address

Have you donated blood within 3 months ?

☒ No
 ☐ Yes

BOOK NOW

Figure: 4.5 User Section

Admin Section:

The admin section of the "Blood Bank" website provides authorized administrators with powerful tools to manage and oversee blood bank operations. They can efficiently handle member profiles, approve donation requests, manage inventory, generate reports, and communicate with donors and recipients. The admin section streamlines processes, enhances coordination, and empowers administrators to make informed decisions, ensuring the smooth functioning of the blood bank.

	INDEX	NAME	STUDENT ID	BLOOD GROUP	MAKE MEMBER / ID	REMOVE
Member	1	Griles	123456	A+	6472590ebf339f5337ef77g4	REMOVE
Manage Member	2	ABC	123456	B+	64725dcfbf339f5337f5f1ld	REMOVE
Manage Blood	3	alu kha	123456	AB+	MAKE MEMBER	REMOVE
Manage Buy	4	Partha	123456	O+	MAKE MEMBER	REMOVE
Manage Donate Blood	5	ABCD	123456	AB+	MAKE MEMBER	REMOVE
My Booking						
Donate Blood						

	INDEX	IMAGE	NAME	PRICE	QUANTITY	INCREASE QUANTITY	DECREASE
Member	1		A+	10	10		DECREASE
Manage Member	2		A-	12	8		DECREASE
Manage Blood	3		AB+	10	7		DECREASE
Manage Buy	4		AB-	15	10		DECREASE
Manage Donate Blood	5		B+	10	5		DECREASE
My Booking	6		B-	13	20		DECREASE
Donate Blood							

	INDEX	NAME	STUDENT ID	BLOOD GROUP	QUANTITY	TOTAL PRICE	DATE	PHONE	ADDRESS	DELIVERED	DELETE
Member	1	ABC	123456	AB-	1	Free	2023-06-13	01254	dhaka	DELIVERED	DELETE
Manage Member											
Manage Blood											
Manage Buy											
Manage Donate Blood											
My Booking											
Donate Blood											

	INDEX	NAME	STUDENT ID	BLOOD GROUP	AGE	WEIGHT	DATE	TIME	PHONE	ADDRESS	ACCEPT	DELETE
Member	1	ABC	123456	B+	63	56	2023-06-22	12:30-1:30PM	01254	bd	Done	DELETE
Manage Member												
Manage Blood												
Manage Buy												
Manage Donate Blood												
My Booking												
Donate Blood												

Figure: 4.6 Admin Section

4.2 Back-End

The User Details section provides administrators with access to crucial information such as name, student ID, blood type, and request ID, enabling efficient member management within the Blood Bank website.

Authentication

Users Sign-in method Templates Usage Settings Extensions **NEW**

Search by email address, phone number, or user UID					Add user	↺	⋮
Identifier	Providers	Created ↓	Signed In	User UID			
jahid666@gmail.com	✉	Jun 13, 2023	Jun 13, 2023	Ya32Pc08eqTDGBhhZW86XFM9I...			
abc@def.com	✉	Jun 13, 2023	Jun 16, 2023	Kw3ioGmX7zS35tlkfk1wta5wJgD2			
abcdef@gmail.com	✉	Jun 11, 2023	Jun 11, 2023	8Ua2GmoJ8xWp9QIMmVm7VKlu...			
alif333@gmail.com	✉	Jun 8, 2023	Jun 8, 2023	96PX8YJL15hYemhpOCSUfg0O96...			
bijoy312@gmail.com	✉	Jun 8, 2023	Jun 8, 2023	8LOxvPEEjpOyqdsCmuLhiWBXPMY1			
bijoy321@gmail.com	✉	Jun 8, 2023	Jun 8, 2023	M664cq6CJgf3P92vDbdLec5wgJv2			
shanto343@gmail.com	✉	Jun 7, 2023	Jun 8, 2023	0NShfbSEzcVepGLgRwTrQpi5BzQ2			
bijoy454@gmail.com	✉	Jun 7, 2023	Jun 7, 2023	ey40xliq8wak8SIEWf0sVxUL3W32			

Figure: 4.7 User Details

The Blood Bank website utilizes a secure sign-in method to authenticate users and ensure access control to blood donation capabilities and member management functionalities.

Sign-in providers		Add new provider
Provider	Status	
✉ Email/Password	✓ Enabled	
☎ Phone	✓ Enabled	
🌐 Google	✓ Enabled	
📘 Facebook	✓ Enabled	

Figure: 4.8 Sign-in-method

The Blood Bank website utilizes MongoDB as its database, providing a flexible and scalable solution for storing and managing data related to blood donations, member information, purchase history, and delivery tracking.

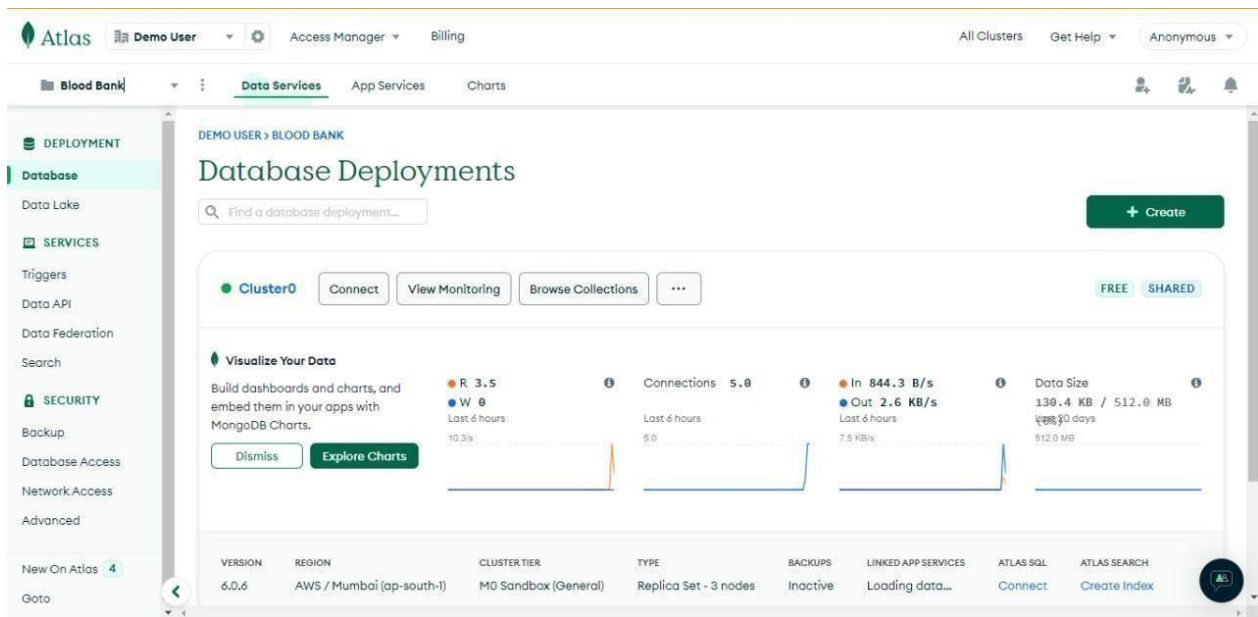


Figure: 4.9 Database

The Blood Bank website utilizes MongoDB for efficient and scalable database services, enabling seamless management of user information, blood inventory, and donation transactions.

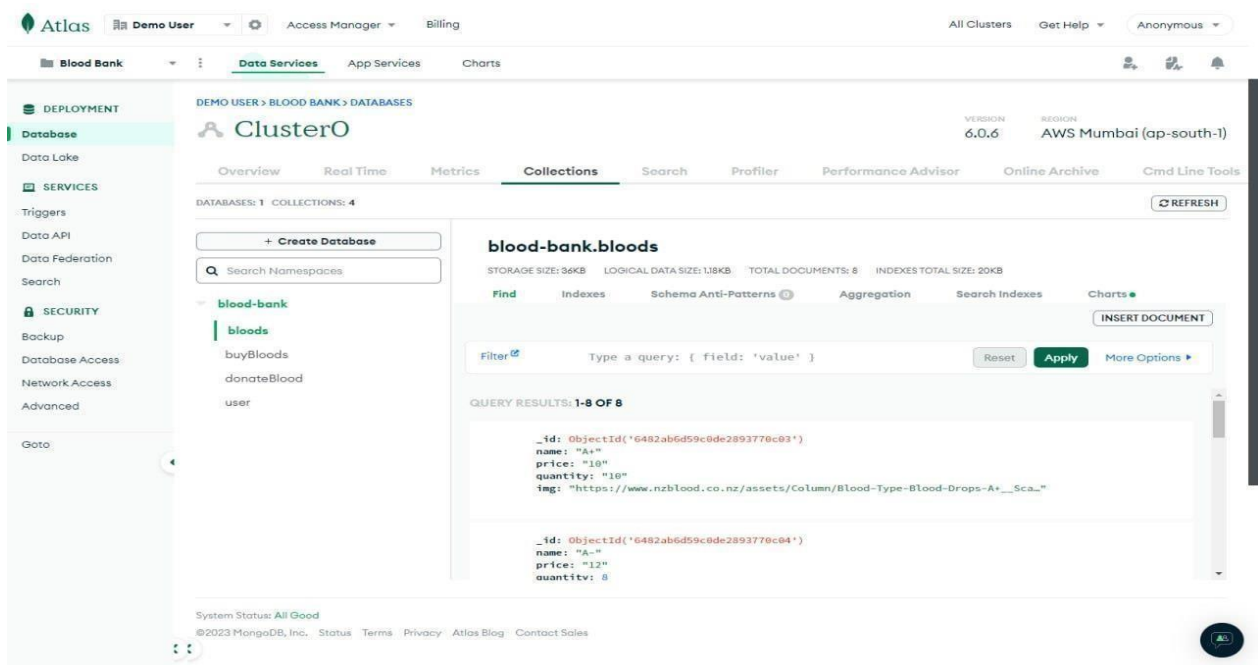


Figure: 4.10 Database Services

CHAPTER 5

IMPACT ON SOCIETY, ENVIRONMENT AND SUSTAINABILITY

5.1 Impact on Society

The Blood Bank has a significant impact on society, contributing to the well-being and health of individuals in various ways:

- **Saving Lives:** The primary impact of a Blood Bank is its ability to save lives. By collecting and storing blood donations, the Blood Bank ensures a readily available supply of blood for medical emergencies, surgeries, and treatments. This timely access to safe blood helps in saving countless lives and improving patient outcomes.
- **Meeting Community Blood Needs:** Blood Banks play a vital role in meeting the blood requirements of the community. They serve as a central repository for blood donations, ensuring an adequate supply of different blood types to cater to the diverse needs of patients. This helps in addressing emergencies, medical conditions, and ongoing treatments that rely on regular blood transfusions.
- **Promoting Public Health:** Blood Banks adhere to strict quality control measures to ensure the safety of donated blood. Through rigorous screening and testing processes, potential health risks associated with blood transfusions, such as infectious diseases, can be minimized. This contributes to maintaining public health standards and safeguards the well-being of recipients.
- **Encouraging Blood Donation:** Blood Banks play a vital role in promoting and raising awareness about blood donation. They organize donation drives, educate the public about the importance of donating blood, and create a culture of voluntary and regular blood donation. By encouraging individuals to become regular blood donors, Blood Banks create a sustainable supply of blood to meet ongoing medical needs.
- **Supporting Medical Research:** Blood Banks often collaborate with medical research institutions and contribute to research studies related to blood-related disorders, transfusion medicine, and advancements in blood-related treatments. This collaborative effort helps in advancing medical knowledge, improving treatment protocols, and developing innovative therapies.

Overall, the presence of a Blood Bank in society positively impacts public health, emergency response, and healthcare delivery. It fosters a sense of community engagement, compassion, and solidarity by empowering individuals to contribute to the well-being of others through blood donation.

5.2 Impact on Environment

The impact of a Blood Bank on the environment is primarily indirect, but it still plays a significant role in promoting sustainability and minimizing environmental harm. Here are some ways in which Blood Banks contribute to a positive environmental impact:

- **Reduced Need for Blood Collection:** Blood Banks actively promote regular blood donation, which helps in maintaining an adequate supply of blood without the need for frequent and extensive blood collection efforts. By encouraging individuals to donate blood at regular intervals, the overall demand for blood collection is reduced, resulting in a lower environmental impact associated with blood collection procedures.
- **Resource Optimization:** Blood Banks strive to optimize the use of donated blood units. Through efficient blood inventory management, proper matching of blood types to patient needs, and appropriate utilization of blood components, wastage and unnecessary transfusions are minimized. This resource optimization reduces the overall demand for blood collection and reduces the environmental impact of blood processing and disposal.
- **Efficient Storage and Transportation:** Blood Banks employ advanced storage and transportation methods to ensure the preservation and safety of donated blood. These systems utilize energy-efficient refrigeration technologies and optimized logistics, reducing energy consumption and greenhouse gas emissions associated with blood storage and transportation.
- **Waste Management Practices:** Blood Banks adhere to strict waste management protocols to handle and dispose of medical waste generated during blood processing and related procedures. By following proper waste segregation, recycling, and disposal practices, Blood Banks minimize their environmental footprint and contribute to responsible waste management.
- **Education and Awareness:** Blood Banks often engage in educational initiatives to raise awareness about sustainable healthcare practices among staff, donors, and the general

public. These efforts promote eco-friendly habits, such as reducing paper waste through digital documentation, implementing energy-saving measures, and adopting environmentally friendly practices within the Blood Bank facility.

While the environmental impact of Blood Banks may not be as direct as some other sectors, their commitment to sustainability, efficient resource utilization, and responsible waste management contribute to a positive environmental footprint. By fostering a culture of environmental awareness, Blood Banks inspire individuals and healthcare organizations to adopt sustainable practices in the broader context of healthcare delivery.

5.3 Ethical Aspects

The operation of a Blood Bank involves several ethical considerations, ensuring the highest standards of ethics and integrity in its practices. Here are some ethical aspects related to Blood Banks:

- **Informed Consent:** Blood donation is a voluntary act, and ethical Blood Banks prioritize obtaining informed consent from donors. Donors should receive comprehensive information about the donation process, potential risks, and benefits. They should have the freedom to make an informed decision without coercion or undue influence.
- **Confidentiality and Privacy:** Blood Banks uphold strict confidentiality and privacy standards to protect the personal and medical information of donors and recipients. Ethical considerations dictate that all personal data and medical records should be securely managed and only accessed by authorized personnel for appropriate purposes.
- **Non-Discrimination and Equal Access:** Ethical Blood Banks ensure that all individuals, regardless of their race, ethnicity, gender, religion, or socio-economic status, have equal access to blood donation services. Discrimination based on any grounds is strictly prohibited, and every potential donor is treated with respect and fairness.
- **Safety and Quality Assurance:** Blood Banks prioritize the safety and quality of donated blood. They adhere to rigorous testing, screening, and processing procedures to minimize the risk of transmitting infectious diseases. Ethical considerations dictate that only safe and suitable blood units are used for transfusion purposes.

- **Donor and Recipient Welfare:** Blood Banks place a strong emphasis on the welfare and well-being of both donors and recipients. Donors are treated with care and respect during the donation process, ensuring their physical and emotional comfort. Recipients receive appropriate blood products that meet their specific needs, aiming to improve their health outcomes.
- **Ethical Research and Innovation:** Blood Banks may engage in research and innovation to advance transfusion medicine and improve patient care. Ethical considerations guide research protocols, ensuring the protection of participants' rights and safety, and the ethical use of collected data.
- **Ethical Donor Recruitment:** Blood Banks follow ethical guidelines in donor recruitment practices, avoiding any form of coercion or incentives that may compromise the voluntary nature of blood donation. Donors are provided with accurate information, and their decisions to donate are respected without any pressure or manipulation.

By upholding these ethical aspects, Blood Banks demonstrate a commitment to the well-being, autonomy, and dignity of individuals involved in the donation and transfusion processes. They ensure transparency, fairness, and responsible practices to maintain public trust and confidence in the integrity of their operations.

5.4 Sustainability Plan:

A sustainability plan for the "Blood Bank" website encompasses strategies to ensure long-term viability, environmental responsibility, and social impact. Here are some key aspects to consider:

- **Energy Efficiency:** Implement energy-efficient practices by optimizing server configurations, utilizing caching mechanisms, and employing techniques to minimize server load and power consumption.
- **Cloud Hosting:** Consider utilizing cloud hosting services that offer scalable infrastructure, allowing you to adjust resources based on demand. This helps reduce energy consumption and minimizes the environmental impact associated with physical server maintenance.
- **Paperless Operations:** Embrace digital documentation and communication to minimize paper usage. Store records electronically, encourage online registration and appointment

booking, and promote the use of digital channels for communication with donors and recipients.

- **Waste Reduction:** Promote waste reduction practices by minimizing the use of disposable materials in the blood donation process. Explore alternatives to single-use items, such as providing reusable donation kits and implementing proper waste management protocols.
- **Green Procurement:** Prioritize suppliers and vendors with sustainable practices. Choose eco-friendly products and services, such as energy-efficient office equipment and environmentally responsible packaging materials.
- **Community Engagement:** Foster community engagement by organizing educational campaigns, awareness programs, and blood donation drives. Promote the importance of blood donation, sustainability, and responsible healthcare practices within the community.
- **Partnerships and Collaboration:** Establish partnerships with relevant organizations, such as environmental or social sustainability groups, to leverage collective efforts and share best practices. Collaborate with other healthcare institutions and blood banks to exchange knowledge and enhance sustainability initiatives.
- **Continuous Improvement:** Regularly evaluate and assess the sustainability practices implemented on the website. Monitor energy usage, waste generation, and other relevant metrics to identify areas for improvement and implement sustainable solutions.
- **Reporting and Transparency:** Maintain transparency by regularly communicating your sustainability efforts to stakeholders, including donors, recipients, and the public. Publish sustainability reports highlighting achievements, goals, and ongoing initiatives.
- **Staff Education and Engagement:** Educate and engage your staff about sustainability practices and encourage their active participation. Provide training on sustainable behaviors, energy-saving techniques, and waste reduction measures to create a culture of sustainability within the organization.

By incorporating these sustainability measures into your web-based "Blood Bank" platform, you can promote environmental responsibility, social impact, and long-term viability while contributing to the overall sustainability goals of the healthcare sector.

CHAPTER 6

CONCLUSION AND FUTURE WORK

6.1 Discussion and Conclusion

The development of the "Blood Bank" website using React, Node.js, MongoDB, and other technologies has provided a platform that simplifies the process of blood donation and management. In this section, we will discuss the key findings, implications, and future directions of the project. During the development process, the team focused on creating a user-friendly and secure website. The user interface design prioritized simplicity, intuitiveness, and accessibility, allowing users to easily navigate through the different sections and functionalities of the website. The integration of various technologies and frameworks, such as React.js and Bootstrap, facilitated the development of a responsive and visually appealing website. One of the major strengths of the "Blood Bank" website is its comprehensive member management system. The admin dashboard enables efficient tracking and management of blood donors, their requests, and the overall blood inventory. This ensures that the blood bank operates smoothly, minimizing delays and ensuring a steady supply of blood for those in need. The implementation of user authentication and authorization mechanisms adds an extra layer of security to the website. This ensures that only authorized individuals can access sensitive information and perform specific actions, maintaining the confidentiality and integrity of donor and recipient data. Moreover, the project's impact on society is significant. By providing an efficient platform for blood donation and management, the "Blood Bank" website encourages regular blood donations, ensuring a consistent supply of blood to meet the needs of patients. This positively impacts public health and contributes to saving lives. In conclusion, the development of the "Blood Bank" website has successfully addressed the challenges associated with blood donation and management. The website provides an intuitive user interface, robust member management capabilities, and enhanced security features. The project's adherence to ethical considerations, such as informed consent, confidentiality, and non-discrimination, ensures that the website operates in an ethical and responsible manner. Future work can focus on expanding the website's features and functionalities. This may include integrating additional payment gateways to facilitate online transactions, implementing a real-time tracking system for blood delivery, and enhancing the reporting and analytics capabilities to provide

valuable insights for decision-making. Furthermore, conducting user feedback sessions and usability testing can help identify areas for improvement and enhance the overall user experience.

6.2 Future Developments

The "Blood Bank" website has laid a strong foundation for efficient blood donation and management. To further enhance its capabilities and meet the evolving needs of users, several potential future developments can be considered:

- **Mobile Application:** Developing a dedicated mobile application can provide users with easier access to blood donation and management features. The app can offer features such as push notifications for blood donation requests, appointment scheduling, and real-time updates on blood availability.
- **Integration with Health Records:** Integrating the "Blood Bank" website with electronic health record systems can streamline the process of identifying eligible donors and matching blood types with recipient requirements. This integration would enhance accuracy, reduce manual data entry, and improve overall efficiency.
- **Donor and Recipient Feedback Mechanism:** Creating a feedback mechanism for donors and recipients can help improve the overall experience and address any issues or concerns. Feedback can be collected through surveys, ratings, and testimonials, providing valuable insights for enhancing the services.
- **Enhanced Data Analytics:** Leveraging advanced data analytics techniques can provide valuable insights into blood donation patterns, donor demographics, and recipient needs. This information can be used to optimize resource allocation, target donation campaigns, and identify potential areas for improvement.
- **Expansion to New Locations:** Scaling the "Blood Bank" website to reach new locations can help extend its impact and increase the accessibility of blood donation services. This can involve partnering with local blood banks, hospitals, and healthcare organizations to establish a wider network.

By implementing these future developments, the "Blood Bank" website can further enhance its effectiveness, user engagement, and impact on society.

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