



## Project

**Project Name:** RedConnect – Blood Management System

**Course Title:** Web Technology

**Course Code:** CSE 434

## Prepared By

DIBA DEV **CSE 029 07763**

Department of Computer Science and Engineering

**Port City International University**

Chittagong, Bangladesh

# RED CONNECT

A Full-Stack Web Solution for Automated Blood Management.

## Abstract

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Timely availability of blood is a crucial requirement in healthcare, yet traditional blood management systems often rely on manual processes that cause delays and inefficiencies. **RedConnect** is a web-based automated blood management system developed to simplify blood searching, donation tracking, and request handling through a centralized platform.

The system allows users to search for blood by group and location, submit blood requests, and register as donors. An administrator module is included to manage blood stock, monitor requests, and oversee donor activity. Automated notifications inform users about request approvals and important updates, improving communication and response time.

RedConnect is implemented using **Flask (Python)** for backend development, **SQLite** for database management, and **HTML, CSS, and JavaScript** for the user interface. The system follows proper database normalization and role-based access control to ensure data consistency and security. This project demonstrates how web technologies can be used to improve efficiency and accessibility in blood management systems.

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## 1 Introduction

### 1.1 Overview

Blood management is a critical part of healthcare services, especially in emergency and surgical cases. However, many blood banks and hospitals still rely on manual or poorly organized systems, which often cause delays and miscommunication. With the advancement of web technologies, automated systems can significantly improve the efficiency and reliability of blood management.

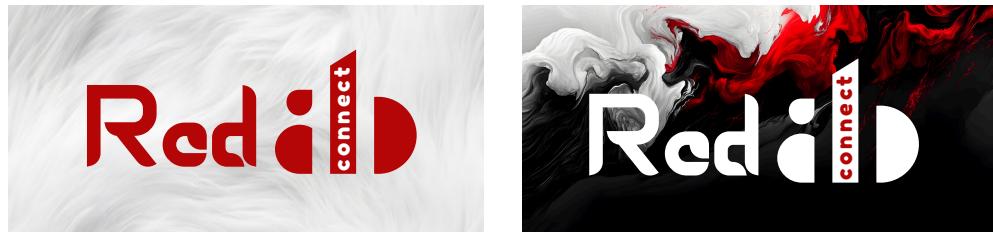


Figure : RedConnect Logo

### 1.2 Problem Statement

Finding the required blood group at the right time remains a major challenge. Existing systems lack real-time data, centralized access, and proper request tracking. These limitations can lead to delayed treatment and inefficient use of available blood resources.

### 1.3 Objectives

The main objective of RedConnect is to develop a web-based automated blood management system. The system aims to:

- Provide real-time blood search by location and group
- Enable users to request and donate blood
- Allow administrators to manage stock and user requests efficiently

## 1.4 Scope

RedConnect supports both users and administrators through a centralized platform. Users can search blood, submit requests, and manage profiles, while administrators handle approvals, stock updates, and user management. The system is designed for small to medium-scale use and can be expanded in the future.

# 2 System Analysis and Requirements

## 2.1 Problem Analysis

Traditional blood management systems often rely on manual processes or outdated software. These systems fail to provide real-time information about blood availability, donor status, and request tracking. As a result, patients may experience delays during emergencies, and administrators face difficulties managing blood stock efficiently.

## 2.2 Objectives of the System

- To provide real-time blood availability information
- To allow users to search blood by group and location
- To enable users to submit blood requests online
- To provide administrators with full control over stock, users, and requests
- To ensure secure access using role-based authentication



"While every two seconds someone needs blood, 61% of countries worldwide still face a chronic shortage. This deficit translates to over 100 million missing units every year, leaving tens of thousands of mothers and trauma victims to die simply because they could not get life-saving blood on time."

- *The Lancet Global Health (via National Institutes of Health)*

- *World Health Organization (WHO) Blood Safety Fact Sheet (Updated May 2025)*

Figure 1: The Global Blood Deficit

## **2.3 Functional Requirements**

- Allow users to register, log in, and manage their profiles
- Enable users to search for available blood units
- Allow users to request blood and track request status
- Allow administrators to manage blood stock
- Allow administrators to approve or reject blood requests
- Display dashboards with live system data

## **2.4 Non-Functional Requirements**

- Be easy to use and user-friendly
- Ensure data security and role-based access control
- Provide fast response time for searches and requests
- Be scalable for future feature expansion
- Maintain data consistency using a relational database

## **2.5 User Roles**

- **Normal User:** Can search blood, submit requests, and view personal information
- **Administrator:** Can manage users, blood stock, requests, and system data

## 3 System Design and Methodology

### 3.1 System Architecture

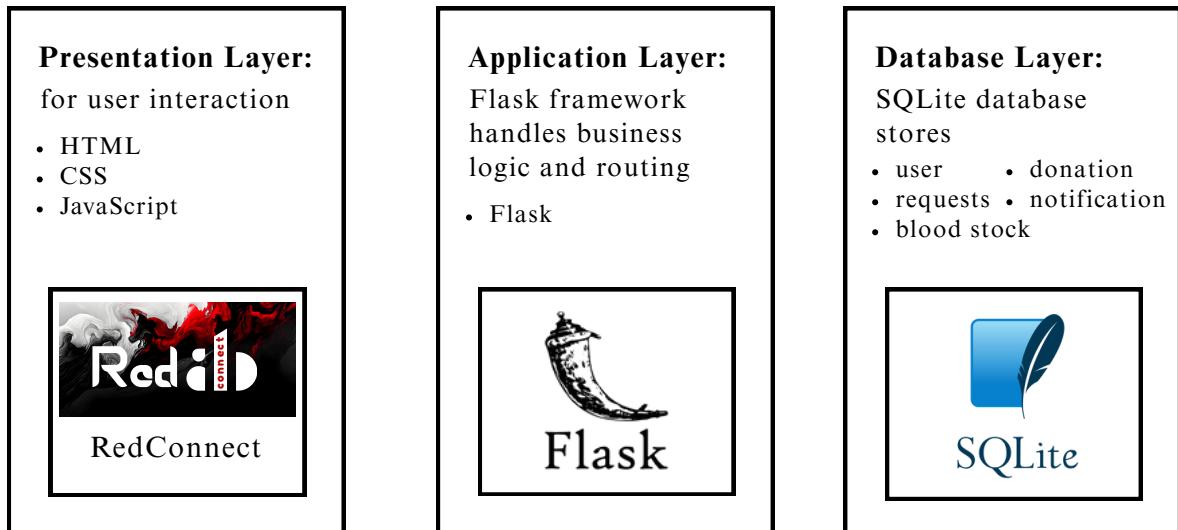


Figure 2: System Architecture

### 3.2 Database Design

The database is designed using a relational model to maintain data integrity and reduce redundancy.

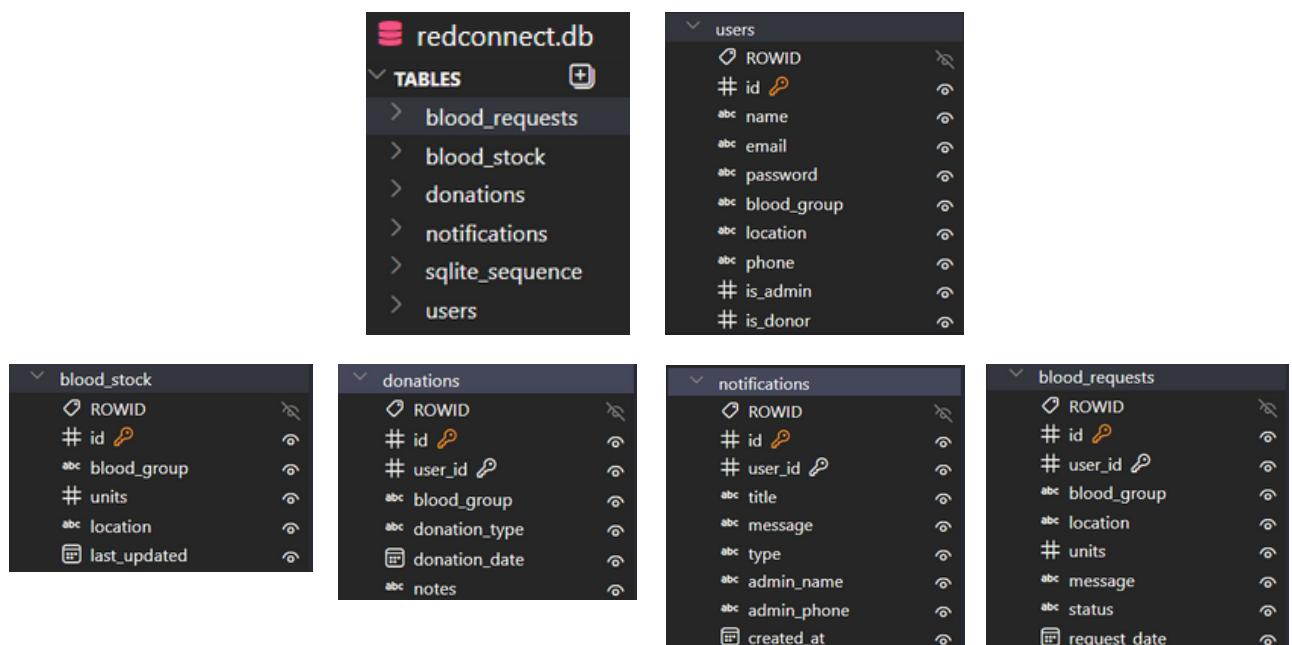


Figure 3: SQLite Database

### 3.3 Entity Relationship (ER) Diagram

The ER diagram represents the relationship between different entities in the system:

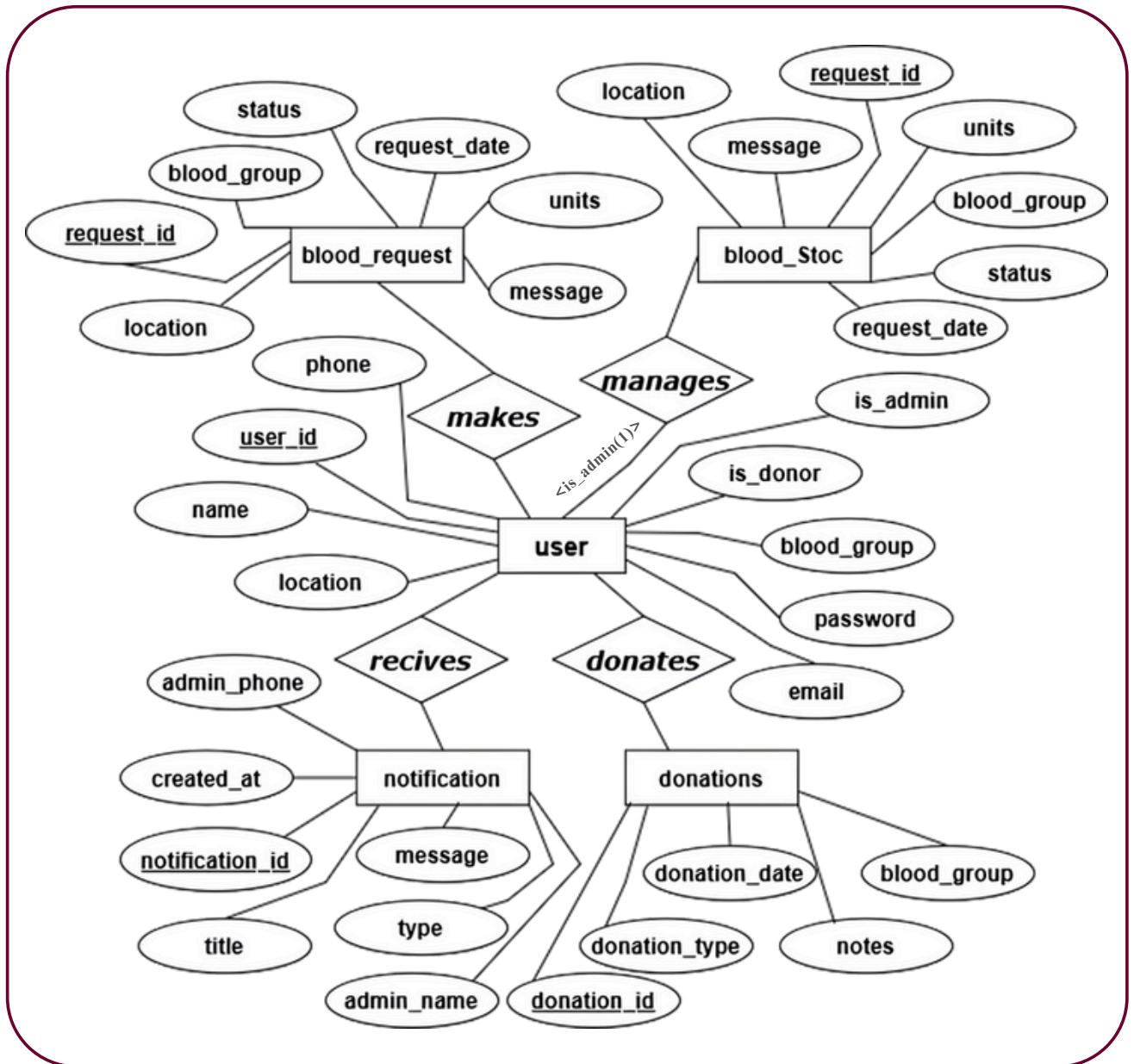


Figure 4: ER Diagram RedConnect

### 3.4 Flow Diagram

The flow diagram shows how users interact with the system:

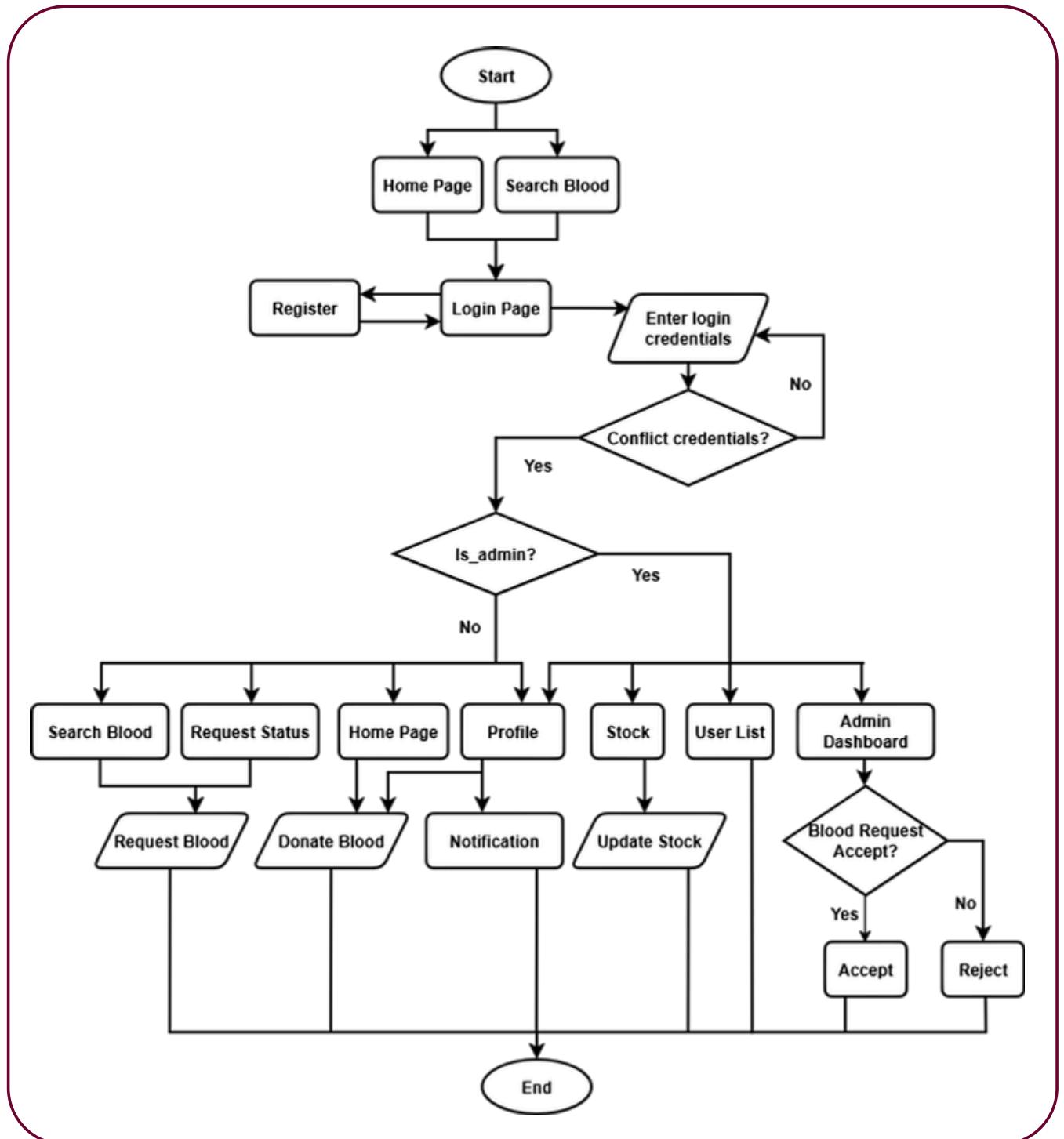


Figure 5: Flow Diagram RedConnect

## 3.5 Technology Stack

The RedConnect system is developed using modern web technologies to ensure reliability, scalability, and ease of use. The selected technology stack supports efficient data management, secure user authentication, and smooth interaction between system components.

### Frontend Technologies



HTML5 – Used to structure web pages and present content.



CSS3 – Applied for styling, layout design, and responsive user interface.



JavaScript – Used to enhance interactivity and client-side validation.

### Backend Technologies



Python – Used as the primary server-side programming language.



Flask Framework – A lightweight web framework responsible for routing, request handling, session management, and application logic.



Jinja2 Template Engine – Used with Flask to dynamically render HTML pages by embedding Python data into templates.

### Database Technology



SQLite – A relational database management system used to store user data, blood stock, requests, donations, and notifications efficiently.

### Development Tools



Visual Studio Code – Used as the primary code editor.

### Deployment Environment



localhost Development Server – Used during development and testing.



Flask Built-in Server – Used to run the application during development.

## 4 System Implementation

### 4.1 Home Page Interface

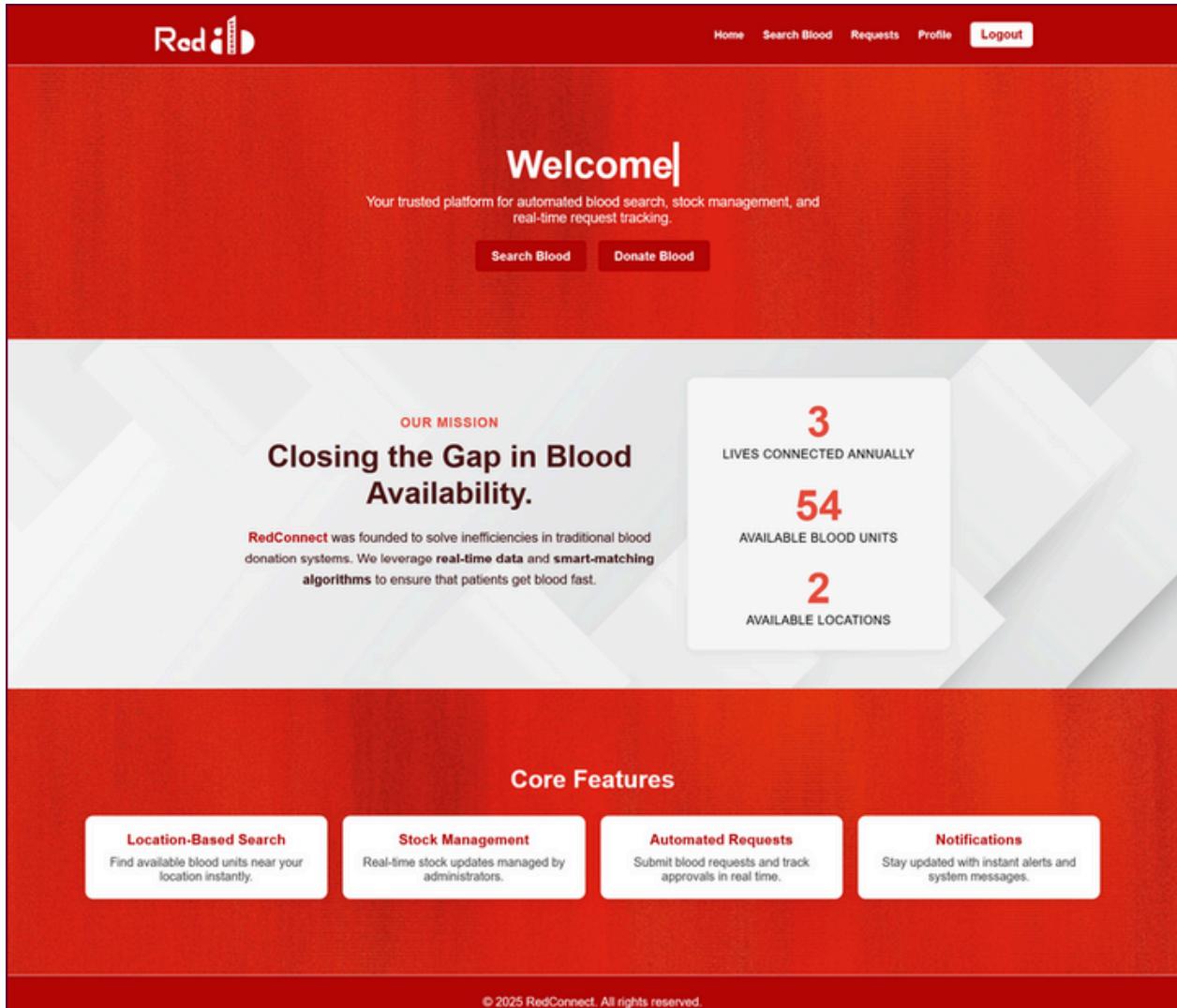


Figure 6: Shows the home page of the RedConnect system, providing an overview of the platform along with real-time statistics such as total users, available blood units, and supported locations.

## 4.2 Blood Search Interface

The screenshot shows the RedConnect blood search interface. At the top, there is a navigation bar with links for Home, Search Blood, Requests, Profile, and Logout. Below the navigation bar is a search form titled "Search Blood Centers". The search form includes a dropdown for "Blood Group" (set to "A+"), a text input for "Location (optional)" with placeholder "Enter city or hospital", and a red "Search" button.

Below the search form, there are four search results, each enclosed in a box:

- Blood Group: A+**  
Available Units: 29  
Location: Dhaka  
Center: Dhaka  
**Request Now**
- Blood Group: A+**  
Available Units: 21  
Location: Chittagong  
Center: Chittagong  
**Request Now**
- Blood Group: A+**  
Available Units: 3  
Location: Khulna  
Center: Khulna  
**Request Now**
- Blood Group: A+**  
Available Units: 5  
Location: Khagrachari  
Center: Khagrachari  
**Request Now**

At the bottom of the page, a red footer bar contains the text "© 2025 RedConnect. All rights reserved."

Two side-by-side screenshots of the RedConnect blood search interface. Both screenshots show the same search form and results for blood group A+.

**Left Screenshot:**

**Search Blood Centers**

Blood Group: A+  
Location (optional): Enter city or hospital  
Search

**Blood Group: A+**  
Available Units: 29  
Location: Dhaka  
Center: Dhaka  
**Request Now**

**Right Screenshot:**

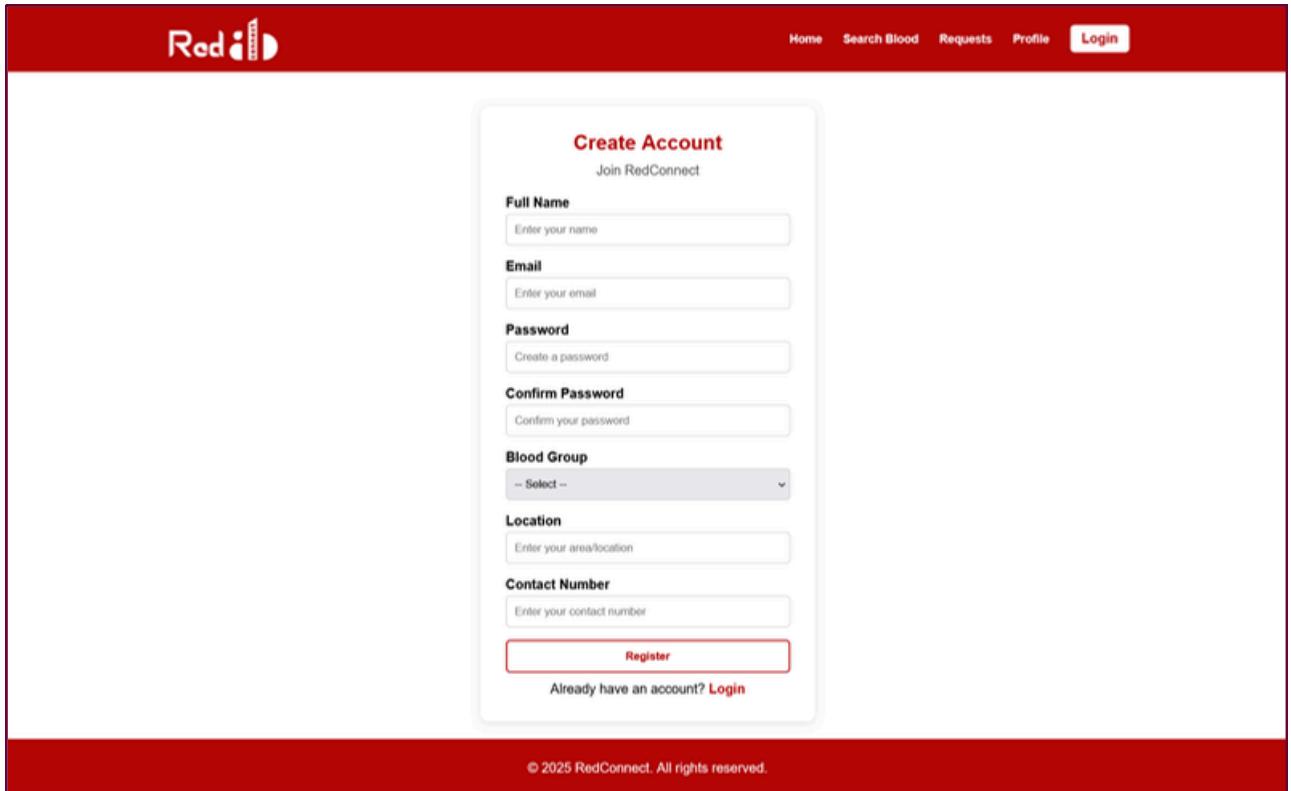
**Search Blood Centers**

Blood Group: A+  
Location (optional): Khulna  
Search

**Blood Group: A+**  
Available Units: 3  
Location: Khulna  
Center: Khulna  
**Request Now**

Figure 7: Presents the blood search module, allowing users to search available blood stock based on blood group and location.

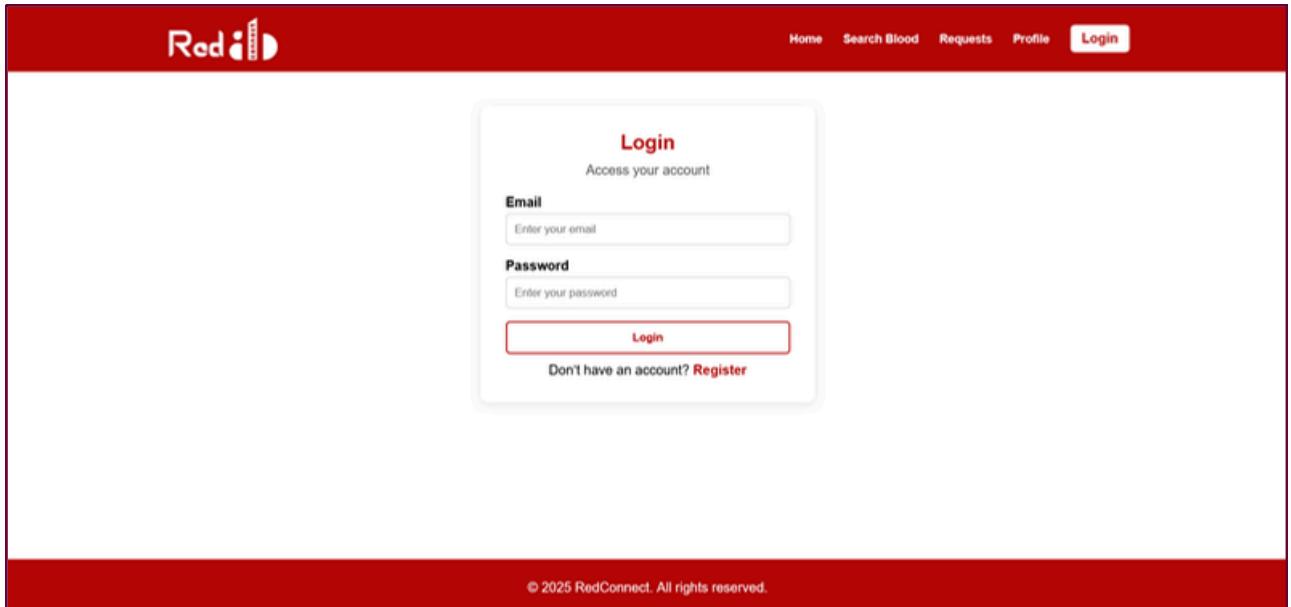
## 4.3 User Registration Page



The screenshot shows the user registration page for RedConnect. At the top, there is a red header bar with the RedConnect logo on the left and navigation links for Home, Search Blood, Requests, Profile, and Login on the right. Below the header is a white form titled "Create Account" with the sub-instruction "Join RedConnect". The form contains fields for Full Name (with placeholder "Enter your name"), Email (placeholder "Enter your email"), Password (placeholder "Create a password"), Confirm Password (placeholder "Confirm your password"), Blood Group (a dropdown menu with the option "- Select -"), Location (placeholder "Enter your area/location"), and Contact Number (placeholder "Enter your contact number"). A red "Register" button is at the bottom of the form, and a link "Already have an account? [Login](#)" is located just below it. The footer of the page includes a copyright notice "© 2025 RedConnect. All rights reserved.".

Figure 8: illustrates the user registration interface, where new users can create an account by providing basic personal and blood-related information.

## 4.4 User Login Page



The screenshot shows the user login page for RedConnect. It features a red header bar with the RedConnect logo and navigation links for Home, Search Blood, Requests, Profile, and Login. The main content area has a white background with a central login form titled "Login" and the sub-instruction "Access your account". The form includes fields for Email (placeholder "Enter your email") and Password (placeholder "Enter your password"). A red "Login" button is positioned at the bottom of the form, and a link "Don't have an account? [Register](#)" is located just below it. The footer of the page includes a copyright notice "© 2025 RedConnect. All rights reserved.".

Figure 9: displays the login interface that authenticates registered users and grants access to personalized system features.

## 4.5 Blood Request Submission Page

The screenshot shows the 'Submit New Blood Request' form. At the top, there's a red header bar with the RedConnect logo and a navigation menu with links for Home, Search Blood, Requests, Profile, Admin, Users, Stock, and Logout. Below the header is a white form area with a title 'Submit New Blood Request' and a sub-instruction 'Fill out the details below'. The form fields include: 'Blood Group' (a dropdown menu with 'Select' placeholder), 'Location' (an input field with 'Enter hospital or area' placeholder), 'Number of Units' (an input field with 'Enter required units' placeholder), and 'Message' (a text area with 'Optional message' placeholder). A red 'Submit Request' button is at the bottom of the form. At the very bottom of the page is a red footer bar with the copyright notice '© 2025 RedConnect. All rights reserved.'

Figure 10: shows the blood request form, enabling authenticated users to submit requests by specifying blood group, required units, and location.

## 4.6 Blood Donation Page

The screenshot shows the 'Donate Blood' form. It has a red header bar with the RedConnect logo and a navigation menu. The main form area has a title 'Donate Blood' and a sub-instruction 'Fill up the form below to register your blood donation.' The fields are: 'Date of Donation' (a date input field with a calendar icon), 'Blood Group' (a dropdown menu with 'Select Blood Group' placeholder), 'Donation Type' (a dropdown menu with 'Whole Blood' placeholder), and 'Additional Notes' (a text area with 'Optional notes' placeholder). A red 'Submit Donation' button is at the bottom. The page ends with a red footer bar containing the copyright notice '© 2025 RedConnect. All rights reserved.'

Figure 11: shows the donation form where user can apply for blood donation, which is later collected by any admin and then added to the stock by admin.

## 4.7 User Profile Page

The screenshot shows the RedConnect User Profile page. At the top, there is a red header bar with the RedConnect logo on the left and navigation links for Home, Search Blood, Requests, Profile, and Logout on the right. The main content area has a light gray background with a white header titled "User Profile" and a subtitle "Manage and update your personal information".

**Become a Donor:** A section with a toggle switch that is currently turned on. Below it is a button labeled "+ Donate Blood".

**Personal Information:** A box containing the user's details: Name (Saima Ajim), Email (saimaaajim@gmail.com), Phone (01234567890), Blood Group (A+), and District (Chittagong). There is also a "Edit Information" button.

**Edit Information:** A modal window allowing users to edit their personal information. It includes fields for Name (Saima Ajim), Email (saimaaajim@gmail.com), Phone (01234567890), Blood Group (A+), and District (Chittagong). A "Save Changes" button is at the bottom.

**Your Donations:** A box showing a single donation record: Blood Group (B-), Type (Whole Blood), Date (2025-12-19), and Notes (Interested).

**Latest Notifications:** A section displaying two notifications under the heading "Blood Request Approved". Both notifications state: "Your request for 2 unit(s) of A+ blood has been approved." The first notification is from Admin Contact Diba (Admin | 01234567890) on 2025-12-17. The second notification is from Admin Contact Admin (Admin | 01234567890) on 2025-12-17.

At the bottom of the page, a red footer bar contains the copyright notice "© 2025 RedConnect. All rights reserved."

Figure 12: illustrates the user profile page, where users can view and update personal information, donation history, and system notifications.

## 4.8 Admin Dashboard

The screenshot shows the RedConnect Admin Dashboard. At the top, there's a red header bar with the RedConnect logo on the left and navigation links for Home, Search Blood, Requests, Profile, Admin, Users, Stock, and Logout on the right. Below the header is a section titled "Admin Dashboard" with a subtitle "Monitor stock, requests, and system activity". This section contains two buttons: "Manage Stock" (Update and maintain blood availability) and "User Directory" (Search User by location or group). Below these buttons is a "System Overview" section with two boxes: one showing "Total Requests: 10" (Pending: 5) and another showing "Total Donors: 3" (Active Today: 2). The main content area is titled "Manage Blood Requests" and includes a subtitle "Approve or reject incoming blood requests". It features a table with columns: User Name, Blood Group, Location, Date, Contact, Status, and Action. The table lists ten entries, each with a green "Approved" button and a red "Reject" button. At the bottom of the dashboard is a red footer bar with the text "© 2025 RedConnect. All rights reserved."

User Name	Blood Group	Location	Date	Contact	Status	Action
Salima Ajim	A+	Dhaka	2025-12-17 19:11:43	01234567890	<span>Approved</span>	<span>Reject</span>
Saima Ajim	A+	Dhaka	2025-12-17 19:09:13	01234567890	<span>Approved</span>	<span>Reject</span>
Admin	A+	fds	2025-12-17 08:57:04	3333333333	<span>Rejected</span>	<span>Approve</span>
Admin User	A-	sdf	2025-12-16 20:07:43	36420129783	<span>Approved</span>	<span>Reject</span>
Admin User	B+	dsf	2025-12-16 20:01:15	36420129783	<span>Approved</span>	<span>Reject</span>
Admin User	A+	asdf	2025-12-16 19:59:26	36420129783	<span>Approved</span>	<span>Reject</span>
Admin User	A+	sdff	2025-12-16 19:58:23	36420129783	<span>Rejected</span>	<span>Approve</span>
Admin User	A+	sdf	2025-12-16 19:56:34	36420129783	<span>Approved</span>	<span>Reject</span>
Admin User	A+	sdf	2025-12-16 19:53:00	36420129783	<span>Approved</span>	<span>Reject</span>
Admin User	A+	sdf	2025-12-16 19:52:26	36420129783	<span>Approved</span>	<span>Reject</span>

Figure 13: shows the administrator dashboard, providing a centralized view of blood requests, donor activity, and overall system statistics.

## 4.9 Blood Stock Management Page

Current Blood Stock				
Blood Group	Units Available	Last Updated	Location	Action
A+	29	2025-12-17	Dhaka	<input type="button" value="29"/> <input type="button" value="Update"/>
A+	21	2025-12-17	Chittagong	<input type="button" value="21"/> <input type="button" value="Update"/>
A+	3	2025-12-17	Khulna	<input type="button" value="3"/> <input type="button" value="Update"/>
A+	5	2025-12-17	Khagrachari	<input type="button" value="5"/> <input type="button" value="Update"/>

Figure 14: illustrates the blood stock management module, where administrators can add, update, and monitor available blood units.

## 4.10 Admin User Management Page

The screenshot shows the 'User Directory' section of the RedConnect Admin interface. At the top, there are filters for 'Blood Group' (set to 'All') and 'Location' (input field 'Enter location'). Below the filters is a table listing three users:

User Name	Contact	Blood Group	Donor Status	Last Donation	Donation Eligibility	Location	Actions
Saima Ajim	01234567890	A+	ON	2025-12-19	Next donation in 91 days	Chittagong	You
Admin	333333333	O-	ON	2025-12-18	Next donation in 90 days	Dhaka	<button>Remove Admin</button> <button>Delete</button>
Admin User	36420129783	O+	ON	Never	Available	None	<button>Remove Admin</button> <button>Delete</button>

At the bottom of the page, a red footer bar contains the text '© 2025 RedConnect. All rights reserved.'

Figure 15: displays the user management interface, enabling administrators to view user details, assign administrative roles, and manage system users.

## 4.11 View Request Status

The screenshot shows the 'Your Requests' section of the RedConnect user interface. It features a heading 'Your Recent Requests' and two request cards:

- Blood Group:** A+  
**Location:** Dhaka  
**Date:** 2025-12-17 19:11:43  
**Status:** Approved
- Blood Group:** A+  
**Location:** Dhaka  
**Date:** 2025-12-17 19:09:13  
**Status:** Approved

At the bottom of the page, a red footer bar contains the text '© 2025 RedConnect. All rights reserved.'

Figure 16: displays the user blood request, here user can see the update of his own blood request.

## **5 Results and Discussion**

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### **5.1 Results**

The RedConnect system was successfully implemented and tested. All core features, including user registration, login, blood search, request submission, donation tracking, and admin management, worked as intended. Role-based access control correctly restricted admin functions to authorized users only. Blood stock updates and request status changes were reflected in real time, ensuring data accuracy and system reliability.

### **5.2 Discussion**

The system effectively improves blood availability management by automating search, requests, and notifications. Using Flask, Jinja2, and SQLite provided a lightweight yet efficient solution. While the system meets its primary objectives, future improvements such as SMS/email notifications and automated stock updates can further enhance usability and scalability.



# Thank You

## RED CONNECT

A Full-Stack Web Solution for Automated Blood Management.