BLOOD BANK MANAGEMENT SYSTEM

A MINI-PROJECT REPORT

Submitted by

BAVESHKARTHIK .K 220701039

in partial fulfilment of the award of the degree

of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING

RAJALAKSHMI
ENGINEERING COLLEGE
An AUTONOMOUS Institution
Affiliated to ANNA UNIVERSITY, Chennai

RAJALAKSHMI ENGINEERING COLLEGE

AUTONOMOUS, CHENNAI

NOV/DEC, 2024

BONAFIDE CERTIFICATE

Certified that this mini project **"BLOOD BANK MANAGEMENT SYSTEM** " is the bonafide work of "**BAVESHKARTHIK K (2116220701039)"** who carried out the project work under my supervision.

SIGNATURE

DR. N DURAIMURUGAN ,

Associate Professor,

Computer Science & Engineering

Rajalakshmi Engineering College

Thandalam, Chennai -602105.

Submitted for the End semester practical examination to be held on

INTERNAL EXAMINER **EXTERNAL EXAMINER**

ACKNOWLEDGEMENT

I express my sincere thanks to my beloved and honorable chairman **MR.S.MEGANATHAN** and the chairperson **DR.M.THANGAM MEGANATHAN** for their timely support and encouragement.

I am greatly indebted to my respected and honorable principal **Dr. S.N.MURUGESAN** for his able support and guidance.

No words of gratitude will suffice for the unquestioning support extended to us by my head of the department **Dr. P. KUMAR,** and my Academic Head **Dr.R.SABITHA,** for being ever supporting force during my project work.

I also extend my sincere and hearty thanks to my internal guide **Dr.N.DURAIMURUGAN** for her valuable guidance and motivation during the completion of this project.

My sincere thanks to my family members, friends and other staff members of Computer Science and Engineering.

BAVESHKARTHIK K

(2116220701039)

ABSTRACT

The **Blood Bank Management System (BBMS)** is designed to streamline the process of managing blood donations, storage, and distribution within hospitals or blood banks. It aims to provide a centralized system for handling various operations such as donor registration, blood inventory management, blood requests, and patient transfusions. The system ensures efficient tracking of blood stocks, enhances the safety and reliability of blood distribution, and helps meet the urgent needs of patients in a timely manner.

Key features of the system include the registration of donor details, the ability to track blood types and quantities, management of blood requests by hospitals, and automated matching of blood groups between donors and recipients. Additionally, the system generates reports for administrative and operational purposes, ensuring proper documentation and transparency.

The system also ensures compliance with health and safety standards by maintaining records of blood donations, donor eligibility, and screening for infectious diseases. Through an intuitive user interface, blood bank staff can easily update blood stock, process donor contributions, and fulfill blood requests from hospitals or clinics.

Overall, the Blood Bank Management System provides an efficient and user-friendly platform that reduces administrative overhead, improves blood availability, and ensures safe transfusions for patients in need.

TABLE OF CONTENTS

CHAPTER 1

1.1 INTRODUCTION

The Blood Bank Management System (BBMS) is designed to streamline the collection, storage, and distribution of blood in a hospital or blood bank setting. The primary goal of this system is to ensure a seamless flow of blood and blood products to patients in need. This system helps in managing donor details, recipient details, blood inventory, and ensures safe and efficient blood distribution. It also ensures the maintenance of blood donation records, and can generate reports on donor history, inventory status, and blood usage.

1.2 SCOPE OF THE WORK

The Blood Bank Management System has the following key functionalities:

1. **Donor Management**: The system allows donors to register their details (name, blood group, contact details, etc.) and track their donation history. Donors can donate blood at regular intervals, and their eligibility for donation is automatically checked.
2. **Blood Stock Management**: The system tracks the inventory of different blood groups (A+, B+, AB-, O+, etc.). It provides information on the available quantity of each blood type, and flags when blood levels are running low.
3. **Blood Request Management**: The system allows hospitals or clinics to request blood, and tracks the fulfillment of these requests. It provides the necessary details for the hospital staff, such as the blood type, quantity needed, and urgency.
4. **Recipient Management**: The system tracks the recipient's details such as name, contact information, the blood group required, and the purpose of transfusion. It helps ensure that blood is correctly matched to the recipient’s blood type.
5. **Reporting**: The system can generate detailed reports on various aspects of blood bank operations such as:

- Blood donation records.
- Blood inventory status.
- Requests and fulfillment.
- Donor eligibility and donation history.

6. **Compliance and Safety**: The system ensures compliance with medical regulations, by maintaining safety standards for blood storage and ensuring all blood is screened for disease

1.3 PROBLEM STATEMENT

The **Blood Bank Management System (BBMS)** is designed to streamline the process of managing blood donations, storage, and distribution within hospitals or blood banks. It aims to provide a centralized system for handling various operations such as donor registration, blood inventory management, blood requests, and patient transfusions. The system ensures efficient tracking of blood stocks, enhances the safety and reliability of blood distribution, and helps meet the urgent needs of patients in a timely manner.

Key features of the system include the registration of donor details, the ability to track blood types and quantities, management of blood requests by hospitals, and automated matching of blood groups between donors and recipients. Additionally, the system generates reports for administrative and operational purposes, ensuring proper documentation and transparency.

The system also ensures compliance with health and safety standards by maintaining records of blood donations, donor eligibility, and screening for infectious diseases. Through an intuitive user interface, blood bank staff can easily update blood stock, process donor contributions, and fulfill blood requests from hospitals or clinics.

1.4 AIM AND OBJECTIVES OF THE PROJECT

The aim of the **Blood Bank Management System (BBMS)** is to design and implement a comprehensive software solution that automates the processes of blood donation, storage, management, and distribution. The system will improve the overall efficiency and accuracy of blood bank operations, ensure real-time tracking of blood inventory, and facilitate better matching of blood donors with recipients. Ultimately, the BBMS will enhance the safety and reliability of blood transfusions, leading to better patient care in healthcare facilities.

1. **To Develop a Centralized System for Blood Bank Management:**
    - Create an automated platform that centralizes all data related to donors, blood types, inventory, and recipient requests.
    - Provide an easy-to-use interface for blood bank administrators and hospital staff.
2. **To Track Donor Information and Blood Donations:**
    - Implement functionality to register donor details, track their blood donation history, and monitor donor eligibility for future donations.
    - Maintain a record of blood donation types, quantities, and dates to ensure efficient blood bank operations.
3. **To Manage Blood Inventory Effectively:**
    - Automate the management of blood stocks across different blood groups (A+, O-, B+, AB-, etc.), tracking quantities in real-time.
    - Provide alerts for low blood stock levels to ensure timely replenishment of blood supplies.
4. **To Enable Blood Request and Distribution:**
    - Allow hospitals and healthcare facilities to place blood requests based on blood group and urgency.

- Facilitate matching of blood requests with available inventory and ensure timely distribution of blood.

5. **To Provide Real-Time Reporting and Analytics:**
   - Generate reports for tracking blood donations, blood stock levels, and fulfillment of blood requests.
   - Provide insights into donation patterns, blood usage, and overall operational efficiency.
6. **To Ensure Compliance with Safety and Health Regulations:**
   - Integrate features to ensure that all blood donations are screened for potential diseases, and adhere to safety standards for blood storage and handling.
   - Ensure that all data related to donors and recipients is securely stored and complies with privacy regulations.
7. **To Improve Efficiency and Accuracy in Blood Matching:**
   - Implement an automated matching system to ensure that the right blood type is provided to the right recipient, reducing the risk of transfusion-related errors.
8. **To Reduce Manual Work and Improve Record Keeping:**
   - Replace paper-based or manual tracking of blood donations with an automated system that logs all data in a secure digital format, making it easier to retrieve and manage records.
9. **To Facilitate User-Friendly Interface for All Users:**
   - Ensure that the system is intuitive and accessible for all users, including blood donors, blood bank administrators, and hospital staff, by providing a simple and effective user interface.
10. **To Provide Emergency Blood Availability:**

- Ensure that the system supports emergency blood requests and helps prioritize

The **automation of blood request matching** is also a crucial objective. Hospitals and medical facilities require blood of specific types and quantities for their patients. The system will automate the process of matching blood requests with the available inventory, prioritizing urgent or emergency requests. By doing so, the BBMS aims to eliminate delays, reduce the chances of blood mismatches, and streamline the distribution process. This will improve response times and ensure that hospitals receive the appropriate blood type in a timely manner, ultimately enhancing patient care.

Finally, the **BBMS aims to enhance reporting, monitoring, and analysis**. Through its robust reporting and analytics features, the system will provide blood banks with actionable insights into donation trends, inventory levels, and operational performance. The system will generate reports on blood donations, request fulfillment rates, and donor participation to aid decision-making and optimize future blood drives. Additionally, by analyzing historical data, the BBMS can forecast blood demand and supply patterns, enabling blood banks to plan for shortages or surpluses more effectively. This data-driven approach is expected to drive continuous improvement in blood bank operations and ensure the availability of safe blood for patients in need.

CHAPTER 2

SYSTEM SPECIFICATIONS

2.1 HARDWARE SPECIFICATIONS

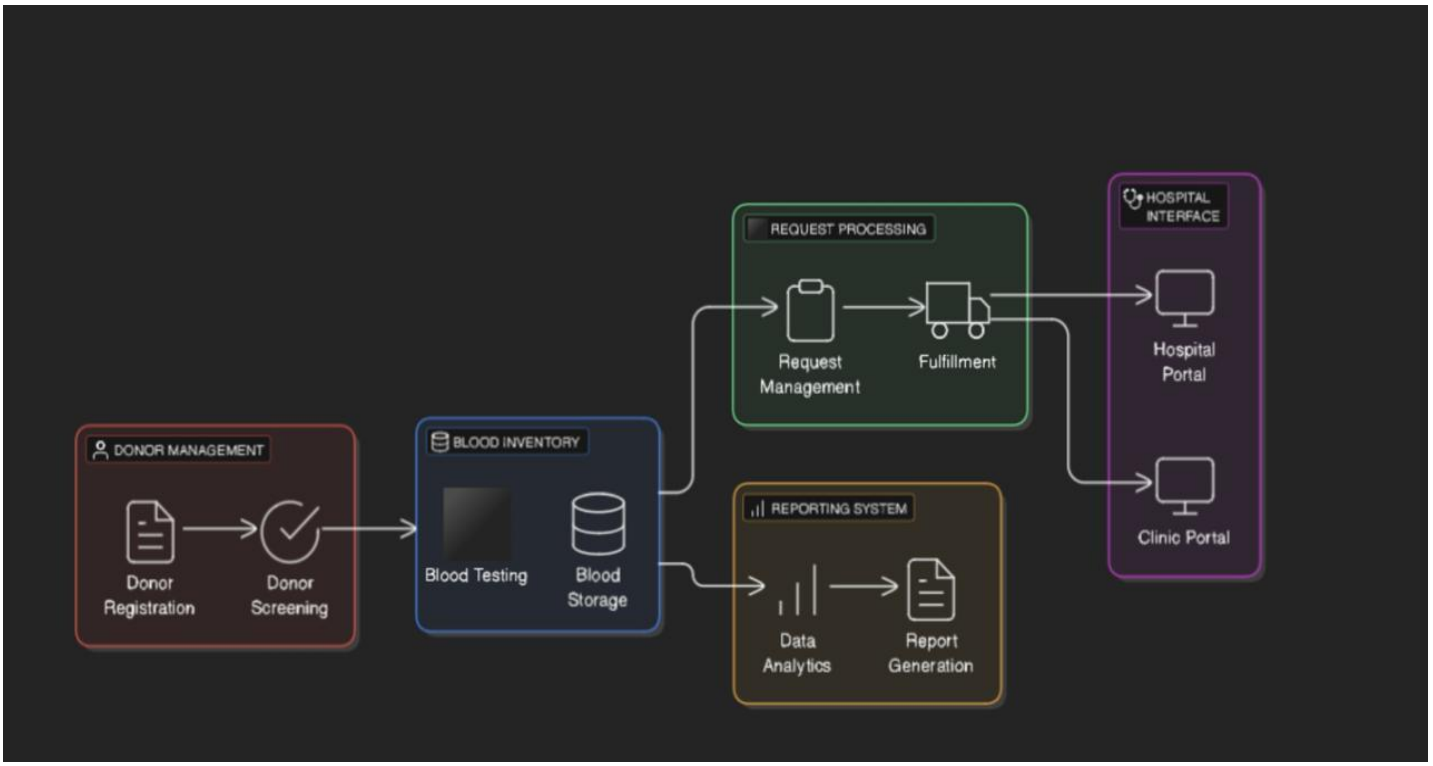
Processor	:	Pentium IV Or Higher
Memory Size	:	128 GB (Minimum)
HDD	:	40 GB (Minimum)

2.2 SOFTWARE SPECIFICATIONS

Operating System	:	WINDOWS 7 AND PLUS
Front – End	:	HTML, CSS, JAVASCRIPT
Back – End	:	PHP, MYSQL

CHAPTER 3

ARCHITECTURE DIAGRAM



CHAPTER 4

MODULE DESCRIPTION

The Blood Bank Management System (BBMS) is composed of several key modules, each responsible for different aspects of managing blood donations, storage, and distribution. These modules ensure the system's efficiency, ease of use, and accuracy in tracking and managing blood-related data. Below is a description of each module involved in the BBMS: User Registration and Login Module:

1. Donor Management Module

Purpose: This module allows the blood bank to register and manage donor details, track their blood donation history, and maintain eligibility criteria for future donations.

Key Features:

- **Donor Registration:** Capture basic information such as name, age, gender, contact details, blood type, and medical history.
- **Donation History:** Keep track of blood donations made by each donor, including the date, blood type donated, and donation frequency.
- **Eligibility Check:** Automatically check whether the donor is eligible for future donations based on medical guidelines (e.g., minimum waiting period between donations).
- **Donor Updates:** Enable the blood bank staff to update donor information in case of any changes (e.g., change in contact details, medical conditions).

2. Blood Inventory Management Module

Purpose: This module tracks the available blood stocks in the blood bank, including the quantities of different blood types and their expiration dates.

Key Features:

- **Blood Stock Tracking:** Track the quantity of each blood type (e.g., O+, A-, B+, AB-) available in the inventory.
- **Expiry Management:** Monitor the expiration dates of stored blood and send alerts when blood is nearing expiry.
- **Stock Replenishment:** Enable notifications when blood stock levels fall below a certain threshold, prompting the need for additional donations or requests from hospitals.
- **Blood Type Management:** Manage blood types and categories, including rare blood types, for efficient allocation.

3. Blood Request and Distribution Module

Purpose: This module manages blood requests from hospitals or healthcare facilities and matches them with the available blood supply based on type, quantity, and urgency.

Key Features:

- **Request Creation:** Hospitals or medical facilities can create blood requests based on the required blood group and quantity.
- **Request Validation:** Verify that the request is valid (e.g., requested blood type and quantity are available).
- **Priority and Urgency:** Support emergency blood requests by prioritizing them based on urgency (e.g., critical surgery, accident cases).
- **Matching and Distribution:** Automatically match blood requests to available inventory and schedule distribution of blood to the requesting hospitals.
- **Request Tracking:** Monitor the status of each request from initiation to fulfillment.

4. Blood Screening and Testing Module

Purpose: This module ensures that the blood collected from donors is screened for potential infectious diseases and is safe for transfusion.

Key Features:

- **Blood Testing:** Include automatic flags to record and track test results for HIV, Hepatitis, Malaria, and other transfusion-transmitted diseases.
- **Test Results:** Store and manage test results to ensure compliance with health and safety regulations.
- **Safe Blood Donation Confirmation:** Confirm whether the blood donation is safe for storage or if it needs to be discarded due to positive test results.

5. Reporting and Analytics Module

Purpose: This module provides administrative and operational reports, helping blood bank managers and staff analyze donation patterns, blood usage, and inventory management.

Key Features:

- **Donation Reports:** Generate reports on the number of donations by blood type, donor frequency, and overall blood stock levels.
- **Inventory Reports:** Track blood stock levels, expiration dates, and distribution details.
- **Request Fulfillment Reports:** Monitor the status and fulfillment of blood requests, including pending, completed, and emergency requests.
- **Performance Analytics:** Analyze trends in blood donations, demand spikes, and donor participation to optimize operations and improve donor retention strategies.

6. User Authentication and Role Management Module

Purpose: This module ensures that only authorized users can access the system and performs different functions based on user roles (e.g., admin, staff, donor).

Key Features:

- **User Registration and Login:** Allow users to register and log into the system using secure authentication methods.

- **Role-based Access:** Assign roles to users (admin, donor, blood bank staff, hospital representative) and restrict access to specific features based on their roles.
- **Admin Controls:** Enable the admin to manage user roles, permissions, and system settings.

7. Notification and Alert System Module

Purpose: This module ensures that all relevant stakeholders are notified about important events such as low blood stock levels, donor eligibility, blood expiration, and pending requests.

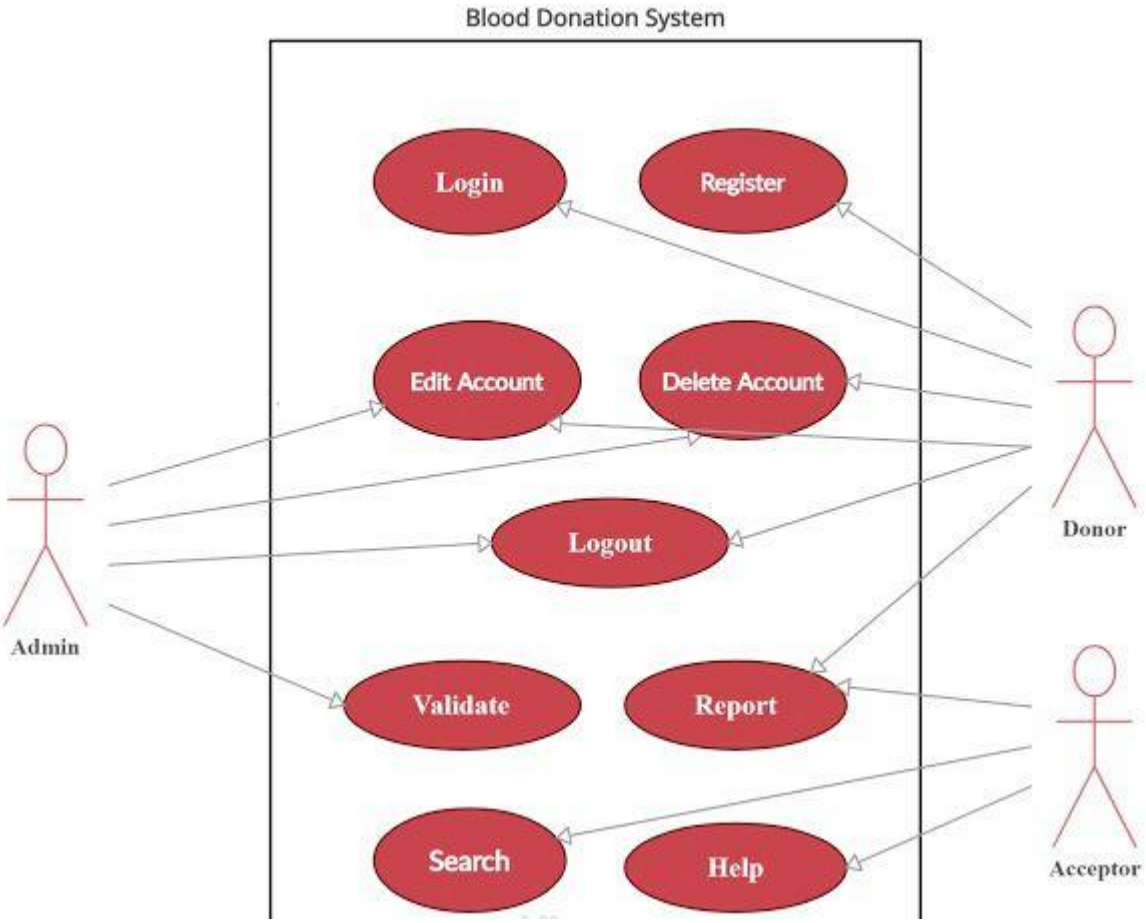
Key Features:

- **Email Notifications:** Send automated emails to donors about eligibility, upcoming donation drives, and thank-you messages.
- **Alert for Expired Blood:** Notify staff when blood donations are approaching their expiration dates or have expired.
- **Request Updates:** Send notifications to hospitals or requesters about the status of their blood requests (e.g., approved, fulfilled, pending).
- **System Alerts:** Alert administrators about system issues or critical changes in the system (e.g., low stock levels, pending donation requests).

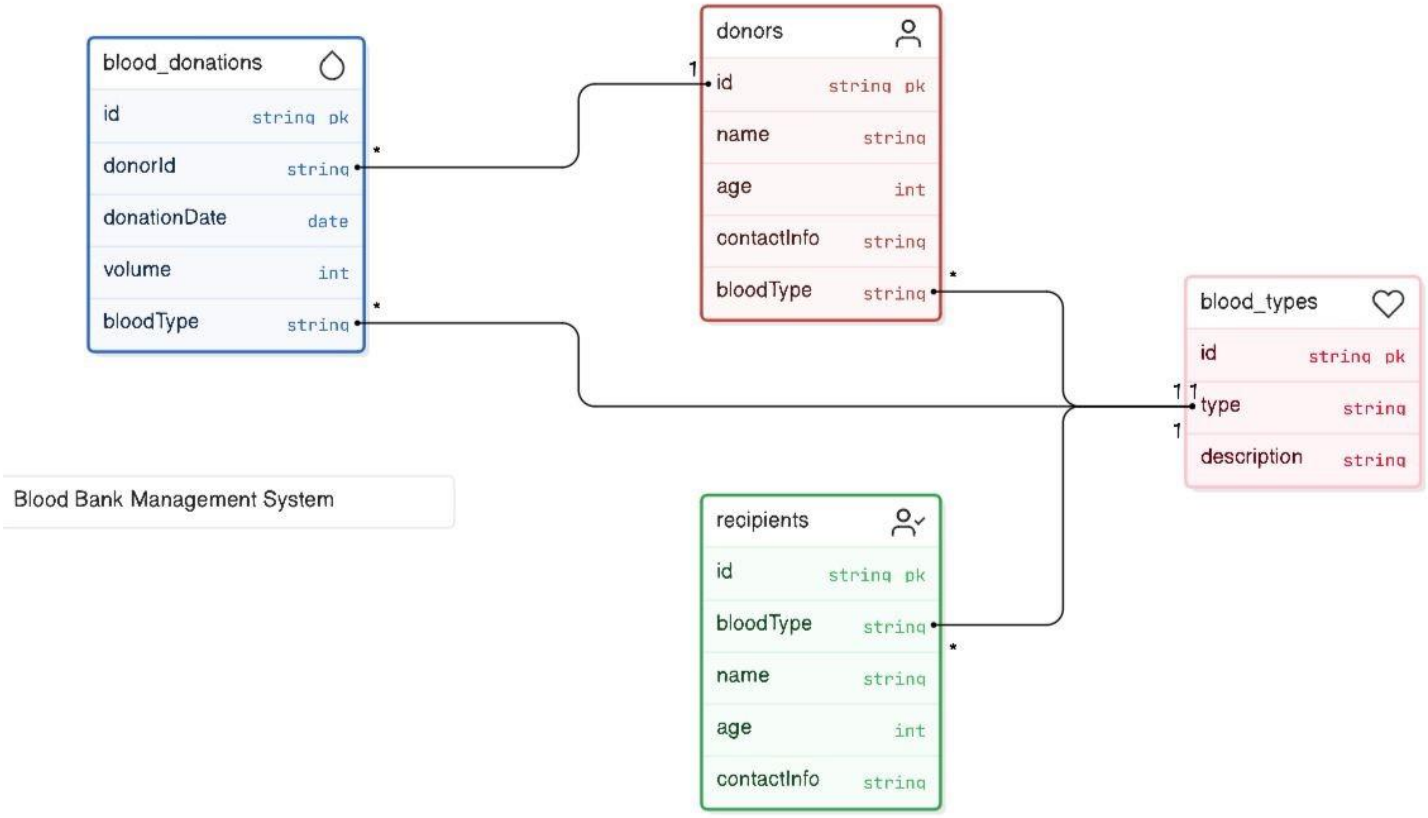
CHAPTER 5

SYSTEM DESIGN

5.1 USE CASE DIAGRAM

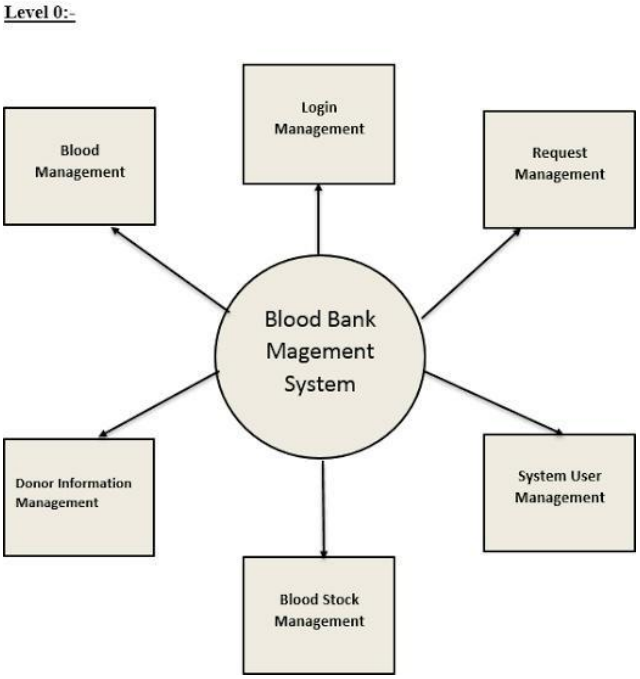


5.2 ER DIAGRAM



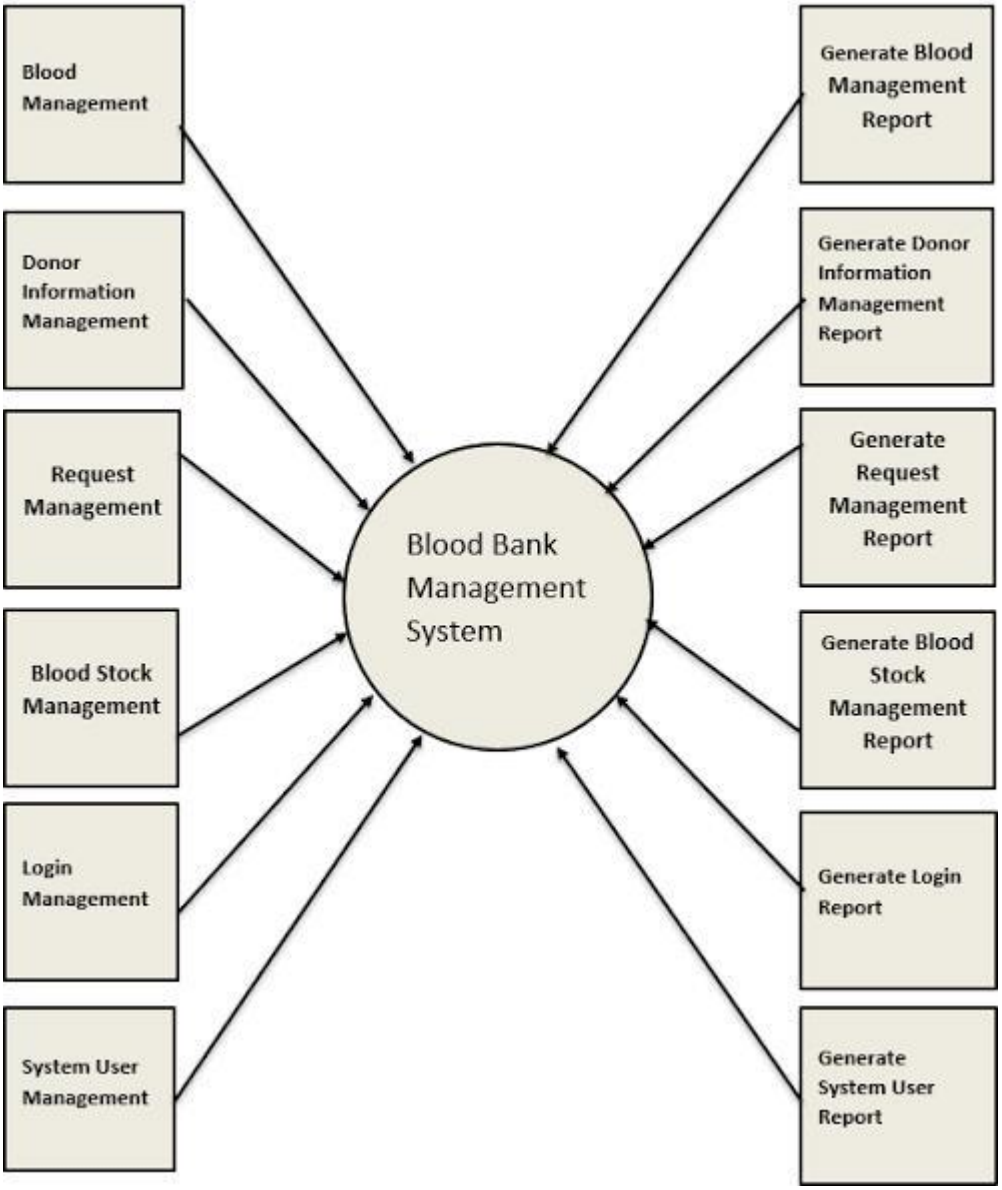
5.3 DFD DIAGRAM

DFD level-0 diagram

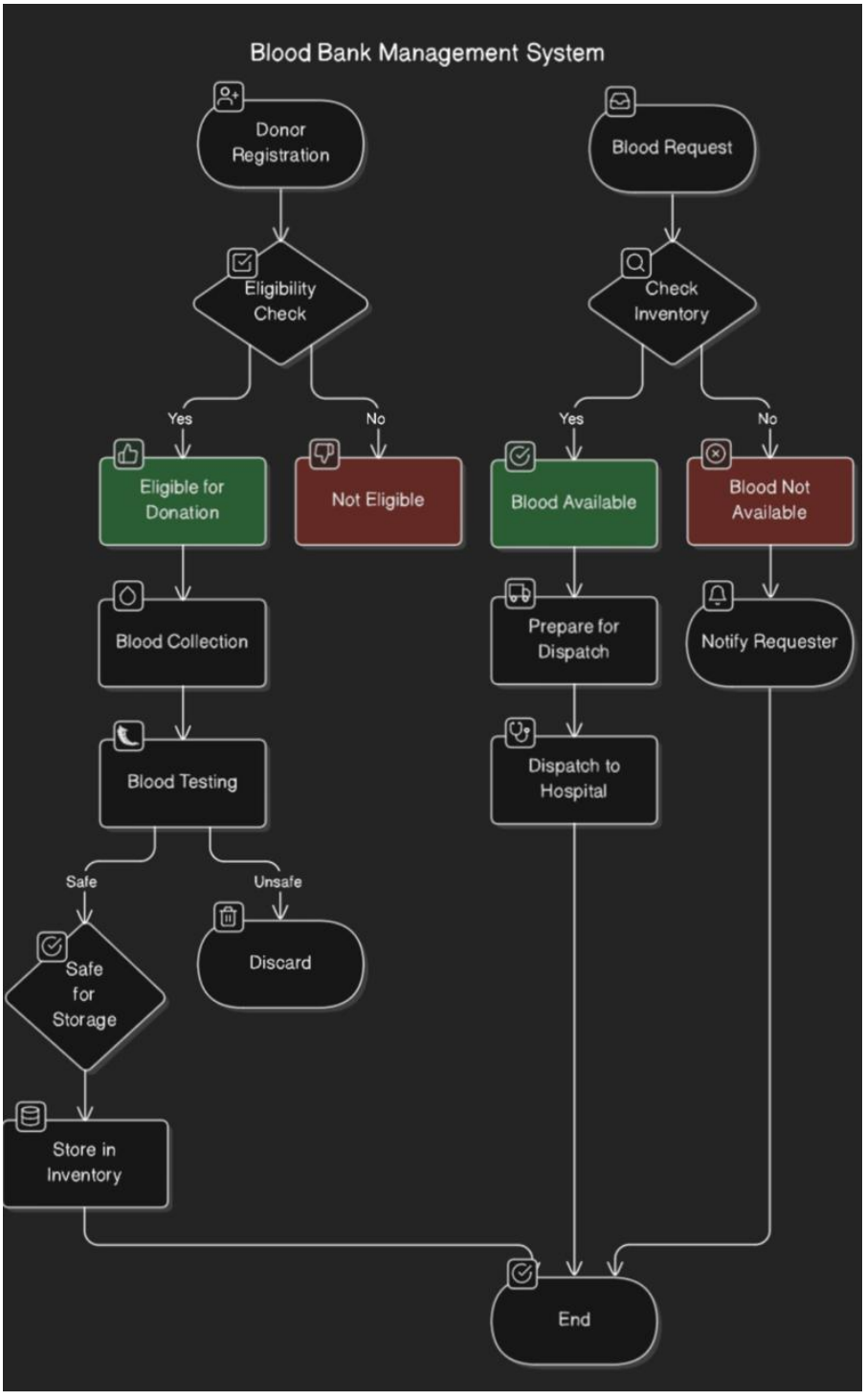


DFD Level-1 Diagram

Level 1:-


Blood Management
Donor Information Management
Request Management
Blood Stock Management
Login Management
System User Management
Blood Bank Management System
Generate Blood Management Report
Generate Donor Information Management Report
Generate Request Management Report
Generate Blood Stock Management Report
Generate Login Report
Generate System User Report

5.4 ACTIVITY DIAGRAM



CHAPTER 6

SAMPLE CODING

Index.php

```
<!DOCTYPE html>
<html lang="en">
<?php
session_start();
include('./db_connect.php');
ob_start();
if(!isset($_SESSION['system'])){
    $system = $conn->query("SELECT * FROM system_settings limit 1")->fetch_array();
    foreach($system as $k => $v){
        $_SESSION['system'][$k] = $v;
    }
}
ob_end_flush();
?>
<head>
  <meta charset="utf-8">
  <meta content="width=device-width, initial-scale=1.0" name="viewport">

  <title><?php echo $_SESSION['system']['name'] ?></title>
```

```
<?php include('./header.php'); ?>
<?php
if(isset($_SESSION['login_id']))
header("location:index.php?page=home");

?>

</head>
<style>
	body{
		width: 100%;
	    height: calc(100%);
	    /background: #007bff;/
	}
	main#main{
		width:100%;
		height: calc(100%);
		background:white;
	}
	#login-right{
		position: absolute;
		right:0;
		width:40%;
```

```
        height: calc(100%);
        background:white;
        display: flex;
        align-items: center;
    }
    #login-left{
        position: absolute;
        left:0;
        width:60%;
        height: calc(100%);
        background:#59b6ec61;
        display: flex;
        align-items: center;
        background: url(assets/uploads/blood-cells.jpg);
      background-repeat: no-repeat;
      background-size: cover;
    }
    #login-right .card{
        margin: auto;
        z-index: 1
    }
    .logo {
margin: auto;
font-size: 8rem;
background: white;
```

```
    padding: .5em 0.7em;
    border-radius: 50% 50%;
    color: #000000b3;
    z-index: 10;
}
div#login-right::before {
    content: "";
    position: absolute;
    top: 0;
    left: 0;
    width: calc(100%);
    height: calc(100%);
    /background: #000000e0;/
}

</style>

<body>


  <main id="main" class=" bg-danger">
                <div id="login-left">
                </div>

                <div id="login-right" class="bg-danger">
```

```
                    <div class="w-100">
                    <h4 class="text-white text-center"><b><?php echo $_SESSION['system']['name'] ?></b></h4>
                    <br>
                    <br>
                    <div class="card col-md-8">
                        <div class="card-body">
                            <form id="login-form" >
                                <div class="form-group">
                                    <label for="username" class="control-label">Username</label>

                                    <input type="text" id="username" name="username" class="form-control">
                                </div>
                                <div class="form-group">
                                    <label for="password" class="control-label">Password</label>
                                    <input type="password" id="password" name="password" class="form-control">
                                </div>
                                <center><button class="btn-sm btn-block btn-wave col-md-4 btn-primary">Login</button></center>
                            </form>
                        </div>
                    </div>
```

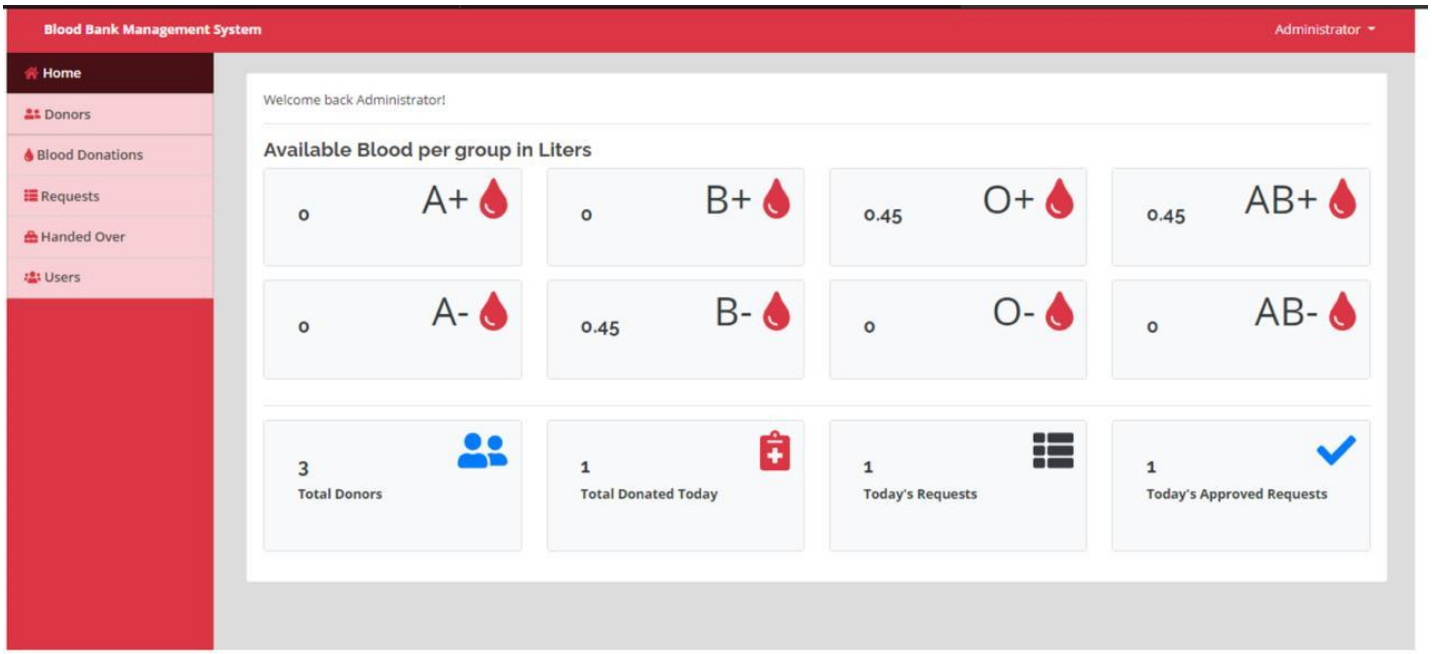
```
                </div>
            </div>


  </main>

  <a href="#" class="back-to-top"><i class="icofont-simple-up"></i></a>



</body>
<script>
    $('#login-form').submit(function(e){
        e.preventDefault()
        $('#login-form button[type="button"]').attr('disabled',true).html('Logging in...');
        if($(this).find('.alert-danger').length > 0 )
            $(this).find('.alert-danger').remove();
        $.ajax({
            url:'ajax.php?action=login',
            method:'POST',
            data:$(this).serialize(),
            error:err=>{
                console.log(err)
        $('#login-form button[type="button"]').removeAttr('disabled').html('Login');
```

```
                },
                success:function(resp){
                        if(resp == 1){
                                location.href ='index.php?page=home';
                        }else{
                                $('#login-form').prepend('<div class="alert alert-danger">Username or password is incorrect.</div>')
                                $('#login-form button[type="button"]').removeAttr('disabled').html('Login');
                        }
                }
            })
    })
</script>
</html>
```

CHAPTER 7

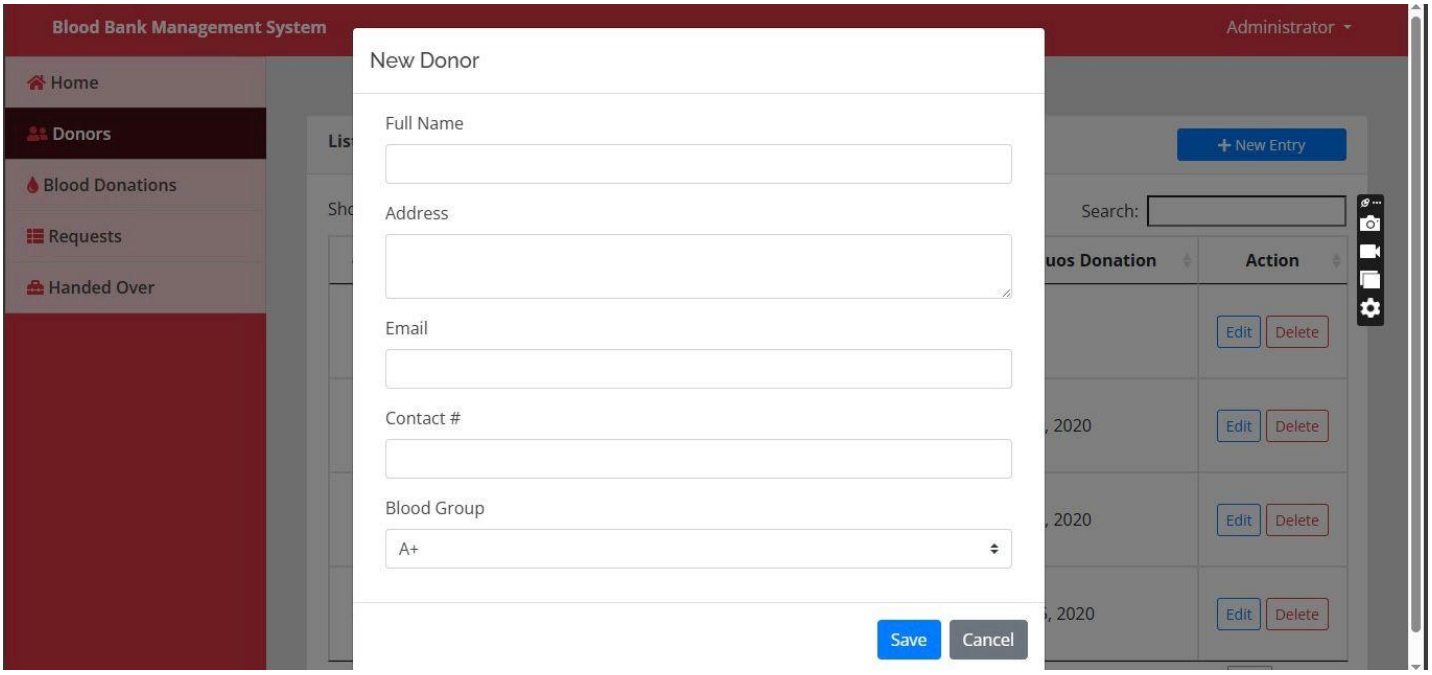
SCREEN SHOTS

Fig. 7.1. Home Page



From this above figure this is the home page where the Donors and users can login.

Fig. 7.2. Login page Section



From this above figure user can login the page by using their credentials.

Fig. 7.3. Donor Page

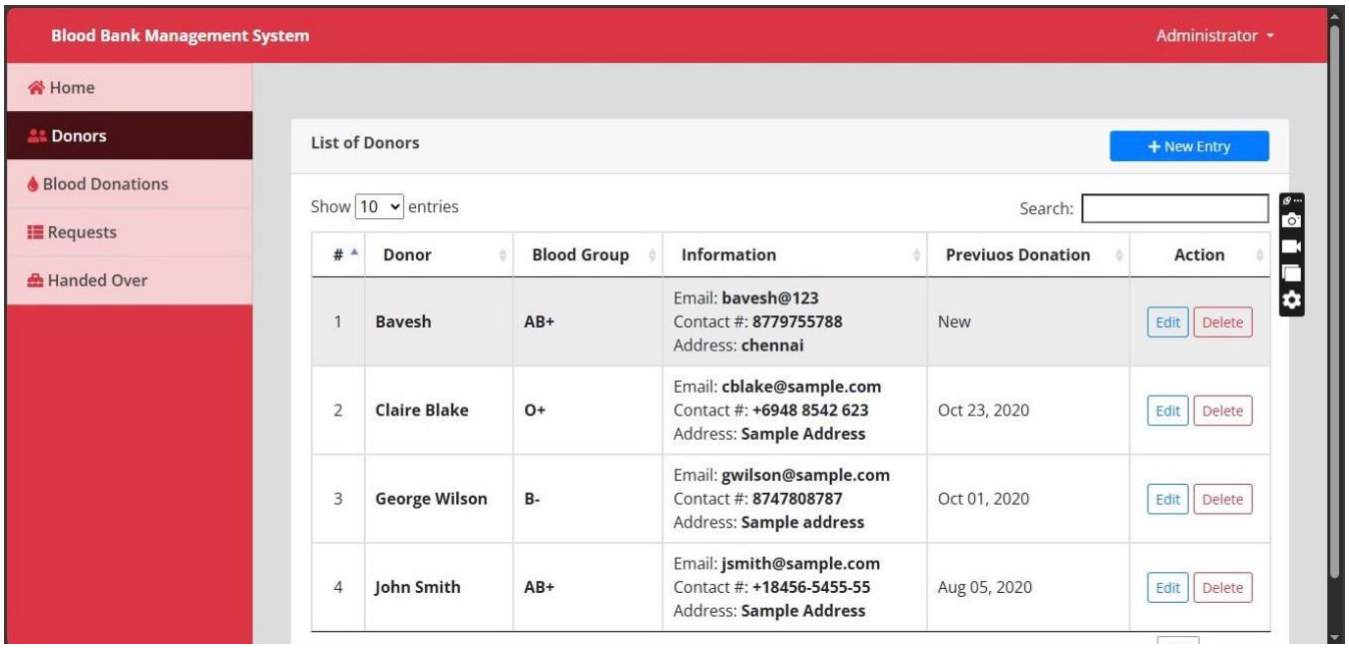
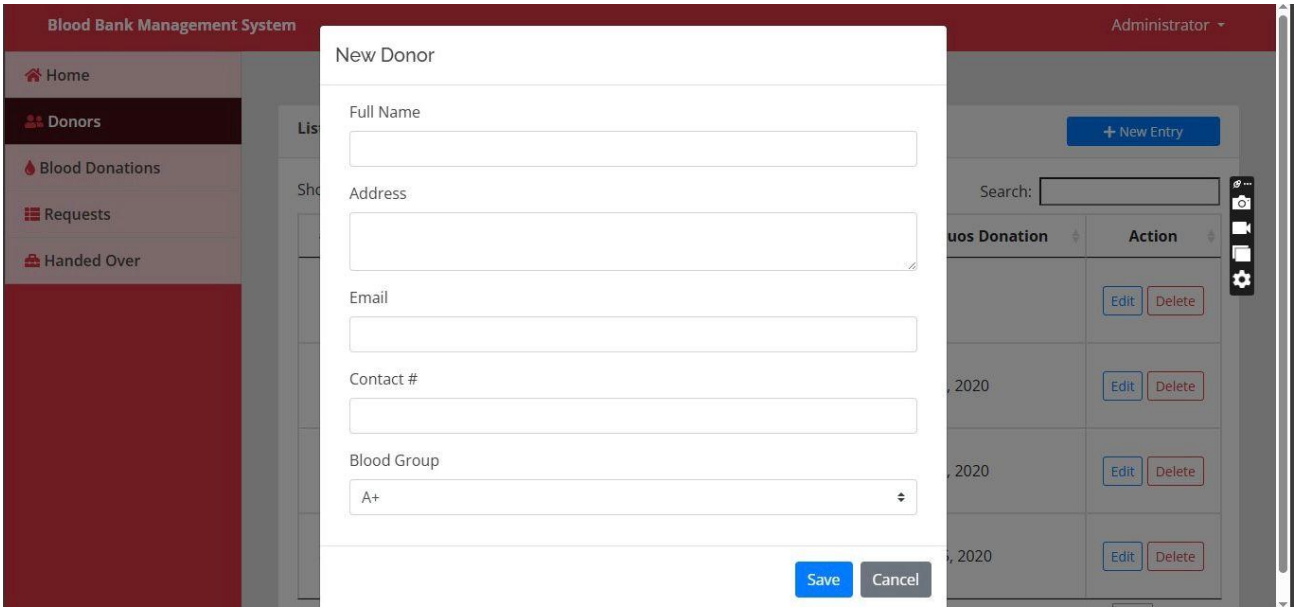
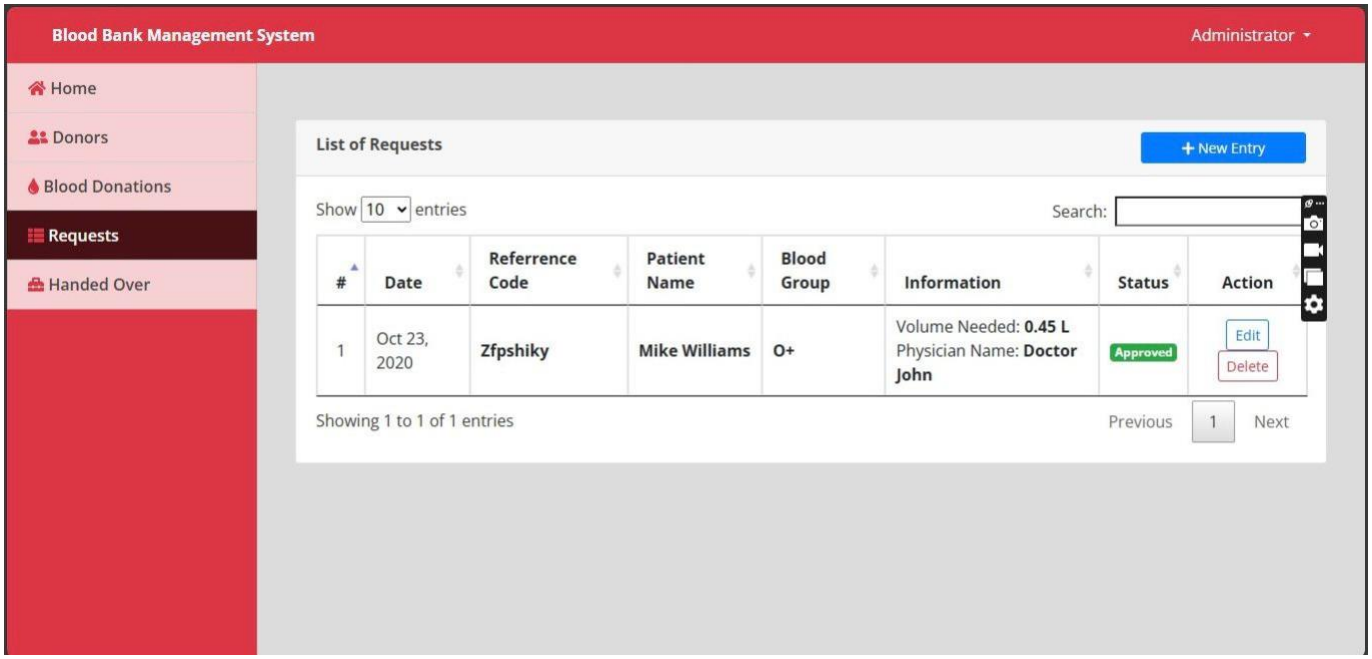


Fig. 7.4 Donor registration page



From this above figure donors can see the detailed information about the registration desk.

Fig. 7.5. Blood Request page



From this above figure Admin can see the detailed information about the Admin profile.

CHAPTER 8

CONCLUSION

The **Blood Bank Management System** (BBMS) is a comprehensive and automated solution designed to streamline the management of blood donations, inventory, and distribution. By digitizing and automating key processes, the system improves operational efficiency, reduces human errors, and ensures that blood banks can maintain accurate, real-time records of blood stocks, donor information, and medical histories. With the ability to track blood types, quantities, and expiration dates, the system significantly reduces the chances of running out of critical blood supplies or administering expired blood to patients.

Additionally, the BBMS facilitates the automated matching of blood requests with available inventory, ensuring that hospitals and healthcare facilities receive the correct blood type and quantity when needed. This feature is especially critical in emergency situations, where timely access to the **right blood can save lives**. The system also allows for better donor management, tracking donation histories, eligibility, and providing timely notifications to encourage repeat donations. By maintaining up-to-date records, the system helps ensure that donor information is accurate and compliant with health regulations, improving both safety and transparency.

In conclusion, the Blood Bank Management System enhances the overall efficiency of blood bank operations and improves the safety of blood transfusions. It provides valuable insights into blood donation trends, request fulfillment, and inventory management through its reporting and analytics module. By automating many of the manual processes, the BBMS not only **increases operational efficiency** but also ensures that blood is available when and where it is needed, ultimately contributing to better patient care and saving lives. The system represents a crucial advancement in blood bank management and a step toward more reliable, efficient healthcare.

REFERENCES

HTML , CSS , JS – www.w3schools.com

PHP, MYSQL – www.youtube.com

Product Details– www.amazon.in

Carousel Slider – www.glidejs.com

Font Awesome Icons – www.fontawesome.com

PHP Mailer - https://github.com/PHPMailer/PHPMailer

SweetAlert2 - https://sweetalert2.github.io/v10.html