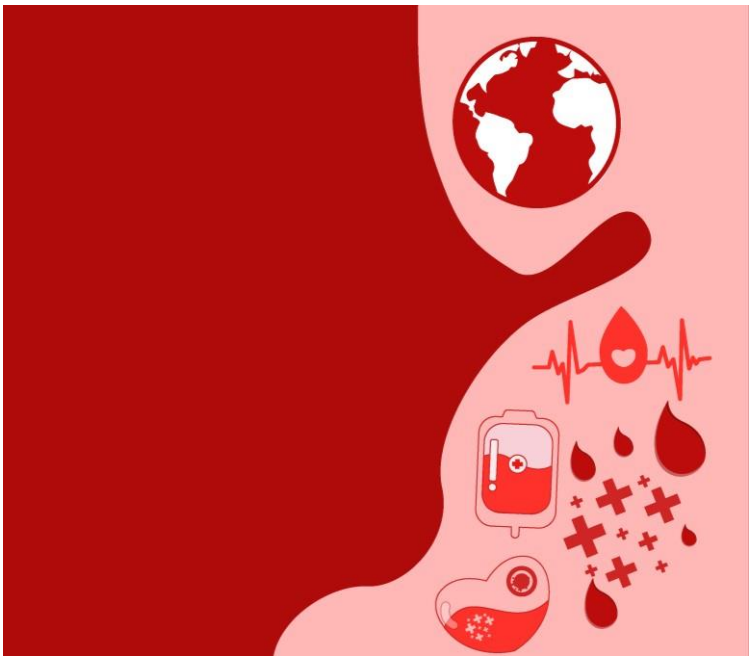

BLOOD DONOR MANAGEMENT SYSTEM

ABSTRACT

The Blood Donor Management System is a database-driven application that connects donors, doctors, patients, and blood banks to ensure efficient and safe blood donation and transfusion. It manages donor registrations, tracks blood inventory, matches patient needs with available blood, and streamlines approvals by doctors.

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ID: 0432410005101142 (C2)

Project Title: Blood Donor Management System.

Objective: To design a centralized database system for managing blood donation, storage, and distribution that efficiently connects donors, patients, doctors, and blood banks to facilitate timely and safe blood transfusions.

Introduction: The Blood Donor Database Management System (DBMS) is designed to simplify the process of managing blood donor and recipient information. With the growing need for timely blood donations, traditional record-keeping methods are often slow and inefficient. This project aims to create a centralized digital system to store donor details, track blood availability, and match donors with recipients quickly.

Experimental Setup: The experimental setup for the Blood Donor Management System was developed using open-source tools and online platforms to design, test, and implement a database system for managing blood donation records. The setup details are given below:

Database System: MySQL

Server Environment: XAMPP (Apache + MySQL)

Online SQL Editor: OneCompiler (MySQL mode)

Language: SQL

Operating System: Windows (via XAMPP control panel)

Entities and Description:

1. Doctor

- Attributes: Doctor_ID (PK), Doctor_Name, Specialization, Hospital, Contact_Info.
- Responsibilities:
    - Verifies donor eligibility
    - Approves blood transfusions for patients

2. Donor

- Attributes: Donor_ID (PK), Donor_Name, Age, Gender, Blood_Group, Contact_Info, Last_Donation_Date, Medical_History
- Relationships:
    - Donates blood to the Blood Bank
    - Verified by a Doctor before donation

3. Blood

- Attributes: Blood_ID (PK), Blood_Group, Donor_ID (FK), Expiry_Date, Blood_bank_ID.
- Relationships:
    - Collected from Donors
    - Stored in the Blood Bank
    - Issued to Patients

4. Blood_Bank

- Attributes: Blood_bank_ID (PK), BB_Name, BB_address, BB_Contact_Info.
- Responsibilities:
    - Stores and manages blood inventory
    - Links with Hospitals, Donors, and Patients

5. Patient

- Attributes: Patient_ID (PK), P_Name, Age, Gender, Blood_Group, Contact_Info, Doctor_ID (FK), Required_Blood_Group, Request_Date.
- Relationships:

- Requests blood via Doctor
- Receives blood from Blood Bank

View Schema:

Doctor

Doctor_Name	Doctor_ID	Specialization	Hospital	Contact_Info

Donor

Donor_ID	Donor_Name	Age	Gender
Blood_Group	Contact_Info	Last_Donation_Date	Medical_History

Blood

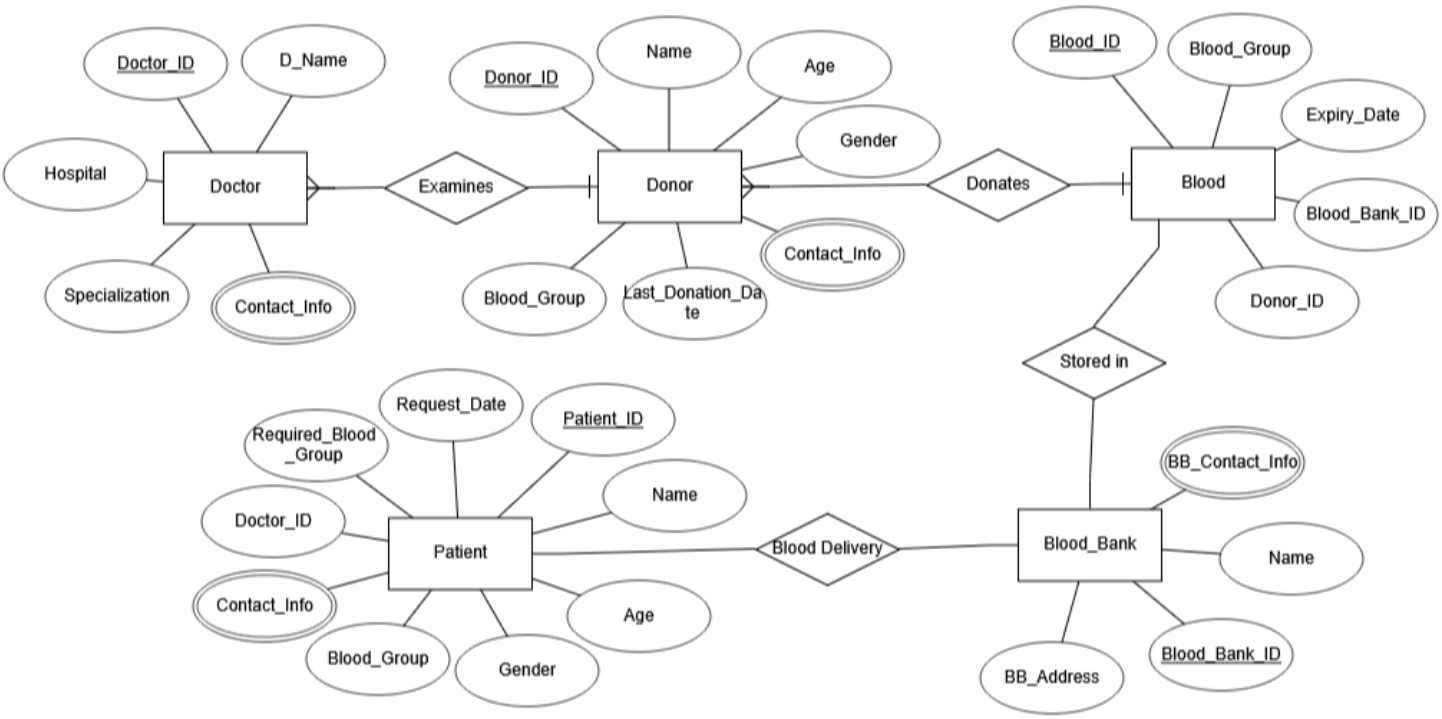
Blood_ID	Blood_Group	Donor_ID (FK)	Expiry_Date	Blood_bank_ID

Blood Bank

Blood_bank_ID	BB_Name	BB_Contact_Info	BB_address

Patient

Patient_ID	Patient_Name	Age	Gender	Blood_Group
Contact_Info	Doctor_ID (FK)	Required_Blood_Group	Request_Date	



Creating tables and Inserting data:

SELECT *FROM Doctor;

SELECT *FROM Donor;

Doctor_ID	Doctor_Name	Specialization	Hospital	Contact_Info
1	Dr. Mizanur Rahman	Cardiology	Dhaka Medical College	mizanur@dmch.gov.bd
2	Dr. Nusrat Jahan	Hematology	Chittagong Medical College	nusrat@cmch.gov.bd
3	Dr. Sayeed Hasan	Orthopedics	Rajshahi Medical College	sayeed@rmch.gov.bd
4	Dr. Rubina Akter	Pediatrics	Sylhet MAG Osmani Hospital	rubina@osmani.gov.bd
5	Dr. Jahangir Alam	General Surgery	IBN Sina Hospital	jahangir@ishospital.bd
6	Dr. Farhana Hossain	Dermatology	Square Hospital	farhana@squarehospital.com
7	Dr. Tanvir Kabir	Neurology	United Hospital	tanvir@unitedhospital.com
8	Dr. Laila Khatun	ENT	Popular Diagnostic Center	laila@popularbd.com
9	Dr. Mahmudul Haque	Oncology	National Institute of Cancer Research	mahmudul@nicr.gov.bd
10	Dr. Shakil Ahmed	Urology	Evercare Hospital Dhaka	shakil@evercarebd.com

Donor_ID	Donor_Name	Age	Gender	Blood_Group	Contact_Info	Last_Donation_Date	Medical_History
1	Md. Jahed Hossain	24	Male	B+	01710000001	2025-04-01	None
2	Sharmin Akter	26	Female	A+	01710000002	2025-03-20	None
3	Jamal Uddin	35	Male	O+	01710000003	2025-03-15	High blood pressure
4	Salma Begum	30	Female	AB+	01710000004	2025-02-28	None
5	Sabbir Rahman	40	Male	A-	01710000005	2025-01-15	Diabetes
6	Nusrat Chowdhury	23	Female	B-	01710000006	2025-02-20	None
7	Rasel Miah	31	Male	O-	01710000007	2025-03-05	Asthma
8	Farzana Yasmin	29	Female	A+	01710000008	2025-04-10	None
9	Rakibul Islam	38	Male	AB-	01710000009	2025-03-01	None
10	Tahmina Sultana	33	Female	B+	01710000010	2025-02-25	None

SELECT *FROM Patient;

Patient_ID	Patient_Name	Age	Gender	Blood_Group	Contact_Info	Doctor_ID	Required_Blood_Group	Request_Date
1	Habibur Rahman	50	Male	A+	01810000001	2	A+	2025-05-01
2	Nasima Khatun	34	Female	B+	01810000002	1	B+	2025-04-28
3	Rafiq Ullah	29	Male	O+	01810000003	3	O+	2025-05-02
4	Jannatul Ferdous	42	Female	AB+	01810000004	4	AB+	2025-05-03
5	Mahbub Alam	55	Male	A-	01810000005	5	A-	2025-04-25
6	Rumana Ahmed	30	Female	B-	01810000006	6	B-	2025-04-20
7	Tariqul Islam	38	Male	O-	01810000007	7	O-	2025-04-22
8	Nilufa Yasmin	27	Female	A+	01810000008	8	A+	2025-05-04
9	Fahim Chowdhury	45	Male	AB-	01810000009	9	AB-	2025-05-05
10	Meherun Nesa	32	Female	B+	01810000010	10	B+	2025-05-06
11	Jakiya Sulatana	26	Female	O+	01810000011	6	O+	2025-05-07
12	Nusrat Faria	36	Female	A+	01810000012	3	A+	2025-05-09
13	Jabeda Sulatana	12	Female	B-	01810000013	6	B-	2025-05-17

SELECT *FROM Blood_Bank;

SELECT *FROM Blood;

Blood_bank_ID	BB_Name	BB_address	BB_Contact_Info
1	Rhythm Blood Centre	Elephant Road,Dhaka	01910000001
2	Red Crescent Blood Bank	Motijheel, Dhaka	01910000002
3	Quantum Blood Bank	Shantinagar, Dhaka	01910000003
4	Chattogram Blood Bank	Agrabad, Chattogram	01910000004
5	Sylhet Blood Bank	Zindabazar, Sylhet	01910000005
6	Rajshahi Blood Bank	Laxmipur, Rajshahi	01910000006
7	Sandhani Blood Bank	Dhaka Medical College, Dhaka	01910000007
8	Khulna Blood Bank	Sonadanga, Khulna	01910000008
9	Mymensingh Blood Bank	Charpara, Mymensingh	01910000009
10	Rangpur Blood Bank	Betpotti, Rangpur	01910000010

Blood_ID	Blood_Group	Donor_ID	Expiry_Date	Blood_bank_ID
1	A+	2	2025-07-01	1
2	B+	1	2025-07-10	2
3	O+	3	2025-06-30	3
4	AB+	4	2025-07-15	4
5	A-	5	2025-06-20	5
6	B-	6	2025-07-01	6
7	O-	7	2025-07-05	7
8	A+	8	2025-06-25	8
9	AB-	9	2025-07-08	9
10	B+	10	2025-07-02	10

Some essential SQL queries for blood bank management project:

1) List all available blood units with expiry dates

SELECT Blood_ID, Blood_Group, Expiry_Date, Blood_bank_ID

FROM Blood

ORDER BY Expiry_Date ASC;

Blood_ID	Blood_Group	Expiry_Date	Blood_bank_ID
5	A-	2025-06-20	5
8	A+	2025-06-25	8
3	O+	2025-06-30	3
1	A+	2025-07-01	1
6	B-	2025-07-01	6
10	B+	2025-07-02	10
7	O-	2025-07-05	7
9	AB-	2025-07-08	9
2	B+	2025-07-10	2
4	AB+	2025-07-15	4

2) Find all blood banks that have a specific blood group (e.g., 'A+')

SELECT DISTINCT bb.BB_Name, bb.Blood_bank_ID

FROM Blood_Bank bb JOIN Blood b ON bb.Blood_bank_ID = b.Blood_bank_ID WHERE b.Blood_Group = 'A+';

BB_Name	Blood_bank_ID
Rhythm Blood Centre	1
Khulna Blood Bank	8

3) Show patient details along with their assigned doctor

```
SELECT p.Patient_Name, p.Blood_Group, d.Doctor_Name, d.Specialization
FROM Patient p
JOIN Doctor d ON p.Doctor_ID = d.Doctor_ID;
```

Patient_Name	Blood_Group	Doctor_Name	Specialization
Nasima Khatun	B+	Dr. Mizanur Rahman	Cardiology
Habibur Rahman	A+	Dr. Nusrat Jahan	Hematology
Rafiq Ullah	O+	Dr. Sayeed Hasan	Orthopedics
Nusrat Faria	A+	Dr. Sayeed Hasan	Orthopedics
Jannatul Ferdous	AB+	Dr. Rubina Akter	Pediatrics
Mahbub Alam	A-	Dr. Jahangir Alam	General Surgery
Rumana Ahmed	B-	Dr. Farhana Hossain	Dermatology
Jakiya Sulatana	O+	Dr. Farhana Hossain	Dermatology
Jabeda Sulatana	B-	Dr. Farhana Hossain	Dermatology
Tariqul Islam	O-	Dr. Tanvir Kabir	Neurology
Nilufa Yasmin	A+	Dr. Laila Khatun	ENT
Fahim Chowdhury	AB-	Dr. Mahmudul Haque	Oncology
Meherun Nesa	B+	Dr. Shakil Ahmed	Urology

4) List donors who donated in the last 90 days

```
SELECT Donor_Name, Blood_Group, Last_Donation_Date
FROM Donor
WHERE Last_Donation_Date >= CURDATE() - INTERVAL 90 DAY;
```

Donor_Name	Blood_Group	Last_Donation_Date
Md. Jahed Hossain	B+	2025-04-01
Sharmin Akter	A+	2025-03-20
Jamal Uddin	O+	2025-03-15
Salma Begum	AB+	2025-02-28
Nusrat Chowdhury	B-	2025-02-20
Rasel Miah	O-	2025-03-05
Farzana Yasmin	A+	2025-04-10
Rakibul Islam	AB-	2025-03-01
Tahmina Sultana	B+	2025-02-25

5) Find donors eligible to donate again (last donation was over 3 months ago)

```
SELECT Donor_Name, Blood_Group, Last_Donation_Date
FROM Donor
WHERE Last_Donation_Date <= DATE_SUB(CURDATE(), INTERVAL 90 DAY);
```

Donor_Name	Blood_Group	Last_Donation_Date
Sabbir Rahman	A-	2025-01-15
Nusrat Chowdhury	B-	2025-02-20

6) Check which blood banks don't have a certain blood group ('O-')

```
SELECT BB_Name, Blood_bank_ID
FROM Blood_Bank
WHERE Blood_bank_ID NOT IN (
 SELECT Blood_bank_ID FROM Blood WHERE Blood_Group = 'O-' );
```

BB_Name	Blood_bank_ID
Rhythm Blood Centre	1
Red Crescent Blood Bank	2
Quantum Blood Bank	3
Chattogram Blood Bank	4
Sylhet Blood Bank	5
Rajshahi Blood Bank	6
Khulna Blood Bank	8
Mymensingh Blood Bank	9
Rangpur Blood Bank	10

7) Count available units per blood group

```
SELECT Blood_Group, COUNT(*) AS Unit_Count
FROM Blood
GROUP BY Blood_Group;
```

Blood_Group	Unit_Count
A+	2
B+	2
O+	1
AB+	1
A-	1
B-	1
O-	1
AB-	1

8) List doctors who are treating more than 1 patient

```
SELECT d.Doctor_Name, COUNT(p.Patient_ID) AS Patient_Count
FROM Doctor d
JOIN Patient p ON d.Doctor_ID = p.Doctor_ID
GROUP BY d.Doctor_Name HAVING COUNT(p.Patient_ID) > 1;
```

Doctor_Name	Patient_Count
Dr. Sayeed Hasan	2
Dr. Farhana Hossain	3

9) Get patients who require a rare blood group (e.g., AB-)

```
SELECT Patient_Name, Required_Blood_Group
FROM Patient
WHERE Required_Blood_Group = 'AB-';
```

Patient_Name	Required_Blood_Group
Fahim Chowdhury	AB-

10) Update donor contact information

```
UPDATE Donor SET Contact_Info = ' 01710000015'
WHERE Donor_Name = 'Nusrat Chowdhury';
SELECT Donor_Name,Contact_Info from Donor;
```

Donor_Name	Contact_Info
Md. Jahed Hossain	01710000001
Sharmin Akter	01710000002
Jamal Uddin	01710000003
Salma Begum	01710000004
Sabbir Rahman	01710000005
Nusrat Chowdhury	01710000015
Rasel Miah	01710000007
Farzana Yasmin	01710000008
Rakibul Islam	01710000009
Tahmina Sultana	01710000010

11) Delete expired blood units

```
DELETE FROM Blood

WHERE Expiry_Date < CURDATE();
```

Output: Program did not output anything! Because all bloods are up to date according to the table.

12) Count of donors by gender and blood group

```
SELECT Gender, Blood_Group, COUNT(*) AS Total_Donors

FROM Donor

GROUP BY Gender, Blood_Group

ORDER BY Gender, Blood_Group;
```

Gender	Blood_Group	Total_Donors
Female	A+	2
Female	AB+	1
Female	B-	1
Female	B+	1
Male	A-	1
Male	AB-	1
Male	B+	1
Male	O-	1
Male	O+	1

Discussion:

In this project, the Blood Donor Management System was developed to organize and manage blood donation-related information efficiently. Using MySQL through XAMPP and OneCompiler, the system was built and tested with realistic data, representing donors, patients, doctors, blood banks, and blood supplies. The database structure was designed to keep the data accurate and consistent by linking related tables through keys. This helped ensure that information about donors, blood availability, and patient requests was stored properly without duplication. By writing and running various SQL queries, we were able to retrieve important information such as which donors are eligible, which blood groups are available, and which blood units are close to expiry. This made it easier to match patients with the blood they need.

One challenge was that advanced features like stored procedures couldn't be used on the online platforms, but the essential operations could still be performed using standard SQL commands. This project helped in understanding how databases support healthcare applications by improving data management and making the donation process more efficient.

Overall, the system shows how technology can help save time and improve service in blood donation management, which is very important for patient care.

Conclusion:

This Blood Donor Management System effectively manages donor and blood data, making it easier to match patients with the right blood type. Using MySQL and simple queries, the system improves the blood donation process and supports faster, accurate decision-making in healthcare.