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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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.

Entities and Description:

1. Doctor

- Attributes: Doctor_ID (PK), Doctor_Name, Specialization, Hospital, Contact_Info.

- Responsibilities:

    o Verifies donor eligibility

    o 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:

    o Donates blood to the Blood Bank

    o Verified by a Doctor before donation

3. Blood

- Attributes: Blood_ID (PK), Blood_Group, Donor_ID (FK), Expiry_Date, Blood_bank_ID.

- Relationships:

    o Collected from Donors

    o Stored in the Blood Bank

    o Issued to Patients

4. Blood_Bank

- Attributes: Blood_bank_ID (PK), BB_Name, BB_address.

- 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_address

Patient

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

DOCTOR

- Doctor_ID
- D_Name
- Hospital
- Specialization
- Contact_Info

examines

DONOR

- Donor_ID
- Name
- Age
- Gender
- Contact_Info
- Blood_Group
- Last_Donation_Date

donates

Blood_Bank

- Name
- Blood_bank_ID
- BB_address

Stored in

BLOOD

- Blood_ID
- Blood_Group
- Expiry_Date
- Donor_ID
- Blood_bank_ID

Blood delivery

Patient

- Request_Date
- Patient_ID
- Name
- Age
- Required_Blood_Group
- Gender
- Doctor_ID
- Contact_Info
- Blood_Group
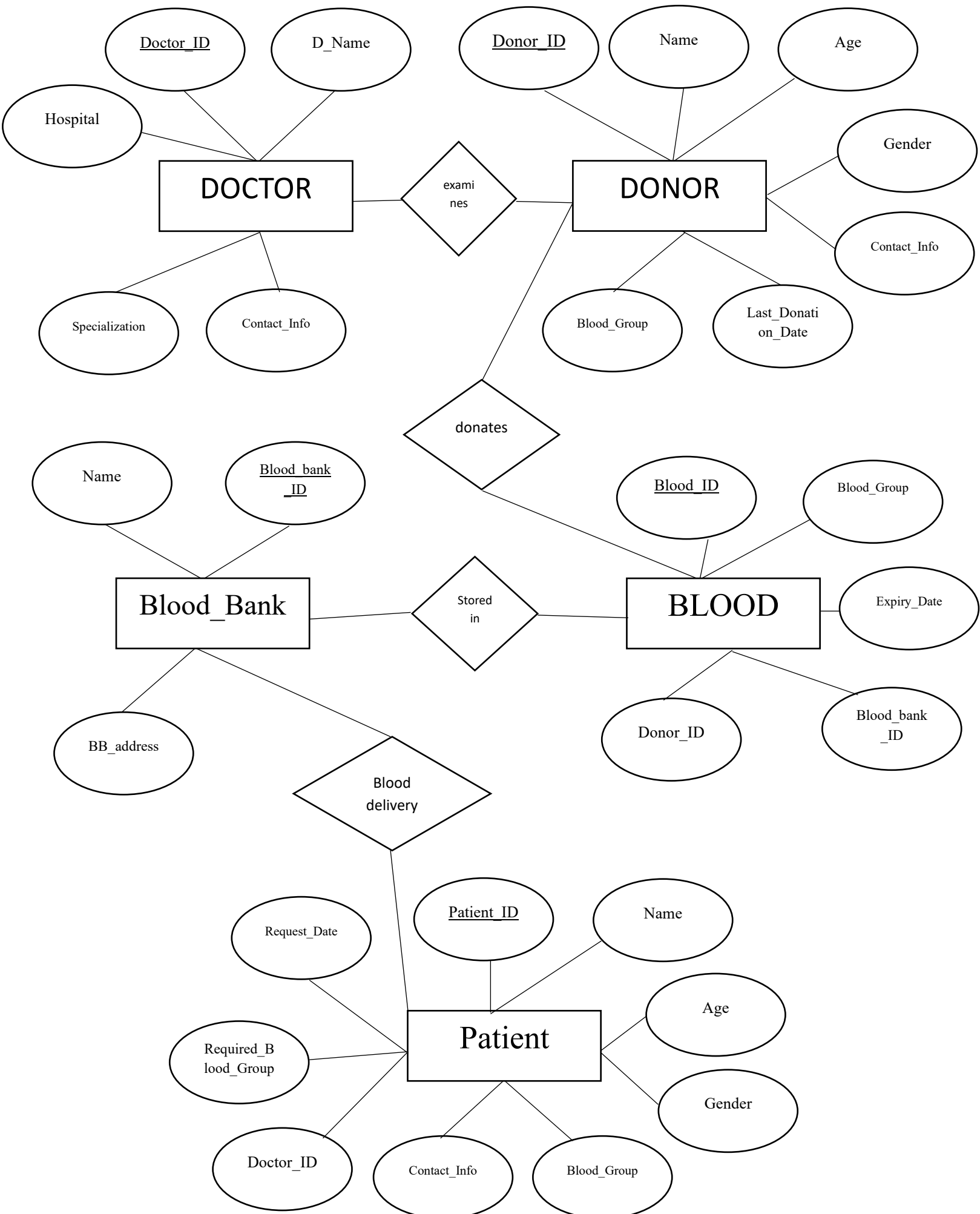
Creating tables and Inserting data:

CREATE TABLE Doctor (

    Doctor_ID INT PRIMARY KEY,

    Doctor_Name VARCHAR(100),

    Specialization VARCHAR(100),

    Hospital VARCHAR(100),

    Contact_Info VARCHAR(100)

);

INSERT INTO Doctor VALUES

(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');

CREATE TABLE Donor (

    Donor_ID INT PRIMARY KEY,

    Donor_Name VARCHAR(100),

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    Age INT,

    Gender VARCHAR(10),

    Blood_Group VARCHAR(5),

    Contact_Info VARCHAR(100),

    Last_Donation_Date DATE,

    Medical_History TEXT

);


INSERT INTO Donor VALUES

(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');


CREATE TABLE Blood_Bank (

    Blood_bank_ID INT PRIMARY KEY,

    BB_Name VARCHAR(100),

    BB_address VARCHAR(200)

);
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INSERT INTO Blood_Bank VALUES

(1, 'Rhythm Blood Centre','Elephant Road,Dhaka'),

(2, 'Red Crescent Blood Bank', 'Motijheel, Dhaka'),

(3, 'Quantum Blood Bank', 'Shantinagar, Dhaka'),

(4, 'Chattogram Blood Bank', 'Agrabad, Chattogram'),

(5, 'Sylhet Blood Bank', 'Zindabazar, Sylhet'),

(6, 'Rajshahi Blood Bank', 'Laxmipur, Rajshahi'),

(7, 'Sandhani Blood Bank', 'Dhaka Medical College, Dhaka'),

(8, 'Khulna Blood Bank', 'Sonadanga, Khulna'),

(9, 'Mymensingh Blood Bank', 'Charpara, Mymensingh'),

(10, 'Rangpur Blood Bank', 'Betpotti, Rangpur');

CREATE TABLE Blood (

   Blood_ID INT PRIMARY KEY,

   Blood_Group VARCHAR(5),

   Donor_ID INT,

   Expiry_Date DATE,

   Blood_bank_ID INT,

   FOREIGN KEY (Donor_ID) REFERENCES Donor(Donor_ID),

   FOREIGN KEY (Blood_bank_ID) REFERENCES Blood_Bank(Blood_bank_ID)

);

INSERT INTO Blood VALUES

(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);

CREATE TABLE Patient (

   Patient_ID INT PRIMARY KEY,

   Patient_Name VARCHAR(100),

   Age INT,

   Gender VARCHAR(10),

   Blood_Group VARCHAR(5),

   Contact_Info VARCHAR(100),

   Doctor_ID INT,

   Required_Blood_Group VARCHAR(5),

   Request_Date DATE,

   FOREIGN KEY (Doctor_ID) REFERENCES Doctor(Doctor_ID)

);

INSERT INTO Patient VALUES

(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');

SELECT *FROM Doctor;

SELECT *FROM Donor;

SELECT *FROM Blood_Bank;

SELECT *FROM Blood;

SELECT *FROM Patient;

SELECT BB_Name,Blood_bank_ID FROM Blood_Bank WHERE BB_Name NOT IN

(SELECT BB_Name FROM Blood_Bank WHERE Blood_Group LIKE '%O-%';

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;

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+';

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;

4. List donors who donated in the last 30 days

SELECT Donor_Name, Blood_Group, Last_Donation_Date

FROM Donor

WHERE Last_Donation_Date >= CURDATE() - INTERVAL 30 DAY;

5. 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-');

6. Count available units per blood group

SELECT Blood_Group, COUNT(*) AS Unit_Count

FROM Blood

GROUP BY Blood_Group;

7. 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;

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

SELECT Patient_Name, Required_Blood_Group

FROM Patient

WHERE Required_Blood_Group = 'AB-';

9. Update donor contact information

UPDATE Donor

SET Contact_Info = '017XXXXXXXX'

WHERE Donor_Name = 'Md. Arif Hossain';

10. Delete expired blood units

DELETE FROM Blood

WHERE Expiry_Date < CURDATE();