

Blood Bank Archive System

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Introduction

The topic of blood banking revolves around the crucial processes of collecting, testing, storing, and distributing blood and its components for medical transfusions and treatments. It is an essential sector within healthcare, playing a pivotal role in saving lives during emergencies, surgeries, and treatments for various medical conditions. The group's interest in the blood banking industry stems from a collective dedication to understanding and improving healthcare systems, particularly in the context of ensuring access to safe and sufficient blood supplies. Their involvement reflects a commitment to exploring how technology and efficient management practices can enhance the reliability and availability of blood products, thereby supporting healthcare providers and benefiting patients worldwide.

Similarly, designing a database for a blood bank will include detailed and accurate records of blood inventory, encompassing donor information, blood type, quantity, and storage conditions, along with accounts of testing, processing, and distribution events. This system is vital for managing the health and safety of blood products, ensuring traceability, and supporting efficient operations within the blood bank. By developing and implementing such a system, the group will gain practical insights into the application of database systems in the healthcare sector. This experience will not only enhance their technical skills but also deepen their understanding of the critical role that organized and accessible information plays in maintaining high standards of care and patient safety. The members' keen interest in the healthcare and blood banking field will further facilitate idea generation and active participation, driving the success of this initiative.

Problem Statement

The blood banking industry requires a robust database system to ensure the accurate tracking and management of blood donations, testing, storage, and distribution, thereby guaranteeing the safety and availability of blood supplies. A comprehensive database enhances operational efficiency, supports regulatory compliance, and ensures that healthcare providers can access vital blood products promptly and reliably.

Solution

Our team will build the database by first conducting a thorough analysis of the blood banking industry's requirements, focusing on key aspects such as donor information, blood type, quantity, testing results, storage conditions, and distribution records. Utilizing industry-standard database management systems, we will design a schema that ensures data integrity, security, and accessibility. We will implement robust data validation, indexing, and backup procedures to maintain the reliability and performance of the database. Collaboration with industry experts and stakeholders will guide the iterative development process, ensuring the database meets practical needs and integrates seamlessly with existing healthcare systems.

Requirements

Data Storage:

- Donor information (name, contact details, medical history)
- Blood type and quantity
- Storage conditions (e.g., temperature, location)
- Donation dates and times
- Expiration dates of stored blood products
- Blood distribution records (e.g., recipient information, hospital/clinic details)

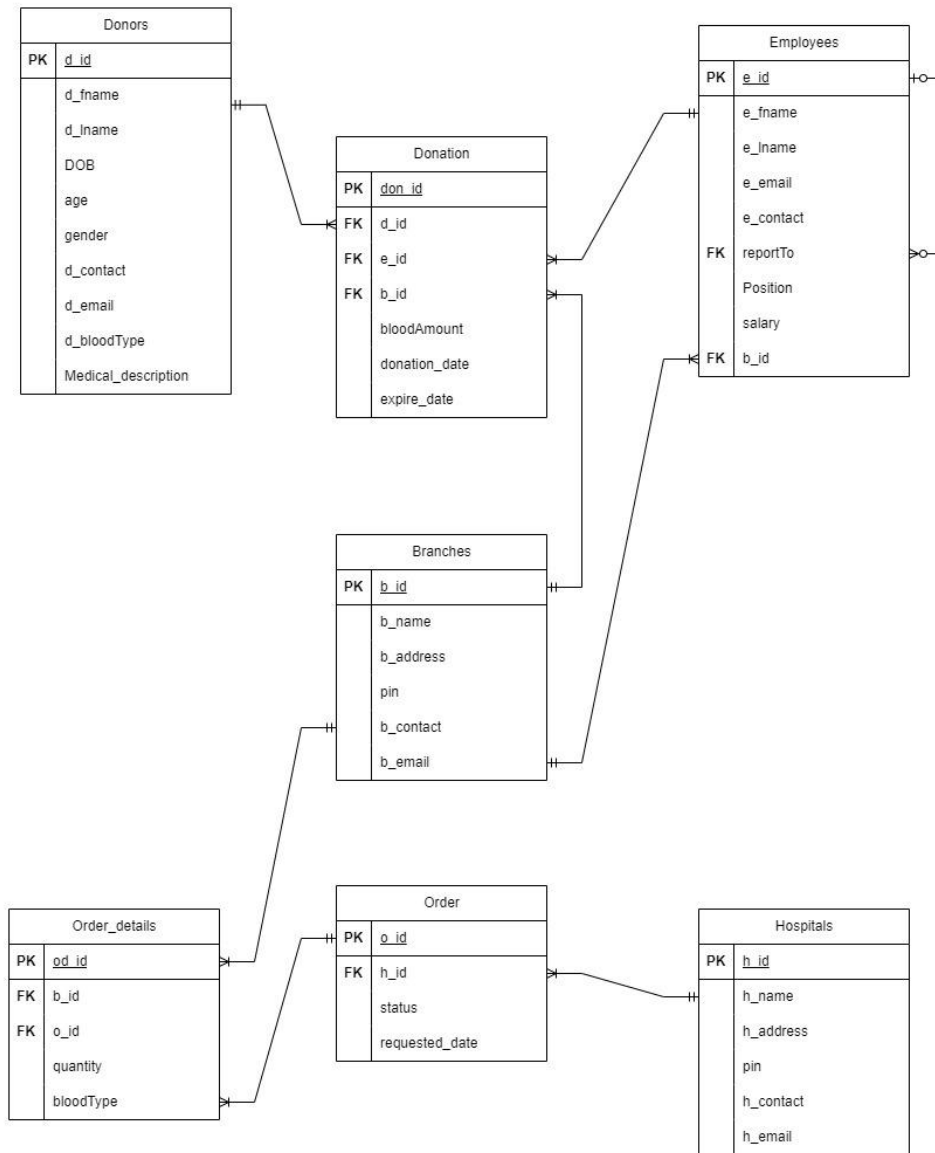
Required Reporting:

- Inventory levels (current blood stock by type and quantity)
- Expiry reports (blood products nearing expiration dates)
- Storage condition monitoring reports (e.g., instances of temperature excursions)
- Distribution efficiency (e.g., time taken to fulfill blood requests)

User Experience Features:

- Donor profile management
- Appointment scheduling for donations
- Notifications and reminders (e.g., upcoming appointments, blood product expiry)
- Search functionality (e.g., search for specific blood types, donor records)

ERD



Data Dictionary

TABLE: Donors

Column	Data Type	Size, Precision	Default	PK/FK	Required	Range	Sample Data	Notes
d_id	NUMBER	4		PK	Y	1-9999	1234	Autonumbered identity
d_fname	String	25			Y		"Bob"	
d_lname	String	25			Y		"McKenzie"	
DOB	DATE				Y		1972/05/16	Date of Birth (YYYY/MM/DD)
age	NUMBER	2			Y	10-99	36	
gender	String	15			Y		"Female"	
d_contact	NUMBER	11				2000000000-9999999999	9055551212	Assuming North American phone number
d_email	String	15			Y		"john@gmail.com"	
d_bloodtype	String	25			Y		"O+"	Blood Group of the Donor
Medical-description	String	200			Y		"Diabetic, Recent Surgery"	Pointers to assess the blood

TABLE: Branches

Column	Data Type	Size, Precision	Default	PK/FK	Required	Range	Sample Data	Notes
b_id	NUMBER	4		PK	Y	1-9999	1234	Autonumbered identity
b_name	String	100			Y		"Unity Blood Bank"	
b_address	String	100			Y		"38 Finch Ave"	
pin	NUMBER	6					123456	pin
b_contact	NUMBER	11			Y	2000000000-9999999999	9055551212	Assuming North American phone number
b_email	STRING	4			Y	0001 to 9999	0666	Current blood available in the bank

TABLE: Employees

Column	Data Type	Size, Precision	Default	PK/FK	Required	Range	Sample Data	Notes
e_id	NUMBER	4		PK	Y	1-9999	1234	Autonumbered identity
e_fname	String	25			Y		"Bob"	

e_lname	String	25			Y		"McKenzie"	
e_contact	NUMBER	11			Y	2000000000-9999999999	9055551212	Assuming North American phone number
e_email	String	50			Y		"John@gmail.com"	Electronic Mail ID to connect with the doctor
reportTo	NUMBER	4		FK		1-9999	1234	

TABLE: **Hospital**

Column	Data Type	Size, Precision	Default	PK/FK	Required	Range	Sample Data	Notes
h_id	NUMBER	4		PK	Y	1-9999	1234	Autonumbered identity
h_name	String	25			Y		"Northside General Hospital"	
h_address	String	25			Y		"18 Havoc Blvd"	
h_contact	NUMBER	11			Y	2000000000-9999999999	9055551212	Assuming North American phone number

TABLE: **Donation**

Column	Data Type	Size, Precision	Default	PK/FK	Required	Range	Sample Data	Notes
don_id	NUMBER	4		PK	Y	1-9999	1234	Autonumbered identity
d_id	NUMBER	4		FK	Y	1-9999	1234	Autonumbered identity
e_id	NUMBER	4		FK	Y	1-9999	1234	Autonumbered identity
b_id	NUMBER	4		FK	Y	1-9999	1234	Autonumbered identity
bloodAmount	NUMBER	2,2	0.00		Y	01-99	4.50	The amount of blood donated
donation_date	DATE				Y		1972/05/16	Date of donation(YYYY/MM/DD)
expire_date	DATE				Y		1972/08/16	Expiry date of the blood donated

TABLE: **Order**

Column	Data Type	Size, Precision	Default	PK/FK	Required	Range	Sample Data	Notes
o_id	NUMBER	4		PK	Y	1-9999	1234	Autonumbered identity
h_id	NUMBER	4		FK	Y	1-9999	1234	Autonumbered identity
status	String	50			Y		“Pending”	
requested_date	DATE				Y		1972/05/16	Date of request(YYYY/MM/DD)
o_id	NUMBER	4		PK	Y	1-9999	1234	Autonumbered identity
h_id	NUMBER	4		FK	Y	1-9999	1234	Autonumbered identity

TABLE: **Order_details**

Column	Data Type	Size, Precision	Default	PK/FK	Required	Range	Sample Data	Notes
od_id	NUMBER	4		PK	Y	1-9999	1234	Autonumbered identity
b_id	NUMBER	4		FK	Y	1-9999	1234	Autonumbered identity
o_id	NUMBER	4		FK	Y	1-9999	1234	Autonumbered identity
quantity	NUMBER	4			Y	0001-9999	0050	Amount of Blood requested
bloodType	String	4			Y		“O-”	Requested Blood Group
od_id	NUMBER	4		PK	Y	1-9999	1234	Autonumbered identity

Business Rules

Donors and Donations

1. Donor to Donations Relationship:

- **Rule:** A single donor can make multiple donations, but each donation is associated with only one donor.
- **Cardinality:** 1 to Many (Mandatory to Optional)

Employees and Donations

2. Employee to Donations Relationship:

- **Rule:** An employee can handle multiple donations, but each donation is managed by only one employee.
- **Cardinality:** 1 to Many (Mandatory to Optional)

Branches and Donations

3. Branch to Donations Relationship:

- **Rule:** A branch can receive multiple donations, but each donation is received by only one branch.
- **Cardinality:** 1 to Many (Mandatory to Optional)

Employees and Branches

4. Branch to Employees Relationship:

- **Rule:** A branch can employ multiple employees, but each employee is assigned to only one branch.
- **Cardinality:** 1 to Many (Mandatory to Optional)

Employees Self-Join

5. Employee to Employee Relationship:

- **Rule:** An employee can report to zero or one supervisor, and a supervisor can manage zero or many employees.
- **Cardinality:** 1 to Many (Optional to Optional)

Orders and Order Details

6. Order to Order Details Relationship:

- **Rule:** An order can include multiple order details, but each order detail is associated with only one order.
- **Cardinality:** 1 to Many (Mandatory to Mandatory)

Branches and Order Details

7. Branch to Order Details Relationship:

- **Rule:** A branch can be referenced in multiple order details, but each order detail refers to only one branch.
- **Cardinality:** 1 to Many (Mandatory to Optional)

Hospitals and Orders

8. Hospital to Orders Relationship:

- **Rule:** A hospital can place multiple orders, but each order is placed by only one hospital.
- **Cardinality:** 1 to Many (Mandatory to Optional)

ER Model

