|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| |  | | --- | | **Field Name** | | |  | | --- | | **Data Type** | | |  | | --- | | **Description** | | |  | | --- | | **Constraints** | |
| Donor \_id | Int | |  | | --- | | Unique identifier for each donor. |  |  | | --- | |  | | Primary key, auto increment |
| First \_name | Varchar (50) | First name of blood donor | Not null |
| Last \_name | Varchar (50) | Last name of blood donor | Not null |
| Date \_of \_ birth | date | Age of donor | Not null |
| Address | Varchar (50) | Address of donor | Null |
| Phone | Integer (10) | Phone number of donors | Null |
| Email | Varchar (100) | Email of donor | Not null |
| Donor \_status | Varchar (100) | Status of donor (e.g., Active, Inactive) | Default: active |
| Last \_donation \_date | date | Date of the last blood donation. | Null |
| Gender | Varchar (10) | Gender of donor | Not null |
| Blood \_type | Varchar (5) | Blood type of donor | Not null |

**Individual assignment**

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**Data dictionary and PDM (physical data model) of ” blood donation database”**

**Donor table:**

**Donations table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field Name** | **Data Type** | **Description** | **Constraints** |
| Donation \_ID | Int | Unique identifier for each donation | Primary key, auto increment |
| Donor \_ID | Int | Foreign key linking to Donors table (Donor \_ID). | Foreign key, not null |
| Donation \_Date | date | Donation date | Not null |
| Blood \_Type | Varchar (10) | Blood group of the donated blood (e.g., A+, O-, etc.) | Not null |
| Quantity | Integer | Quantity of blood donated | Not null |
| Donation \_Type | Varchar (10) | type of donation (e.g., Whole Blood, Plasma, Platelets) | Not null |
| Health \_Status | Varchar (100) | Health status of the donor during donation (e.g., Good, Excellent). | Null |
| Donation \_Center | Varchar (50) | The center where the donation was made | Null |

**Blood \_inventory table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field name** | **Data type** | **Description** | **Constraints** |
| Inventory \_ID | Integer | Unique identifier for each inventory entry. | Primary Key, Auto-increment |
| Blood \_Type | VARCHAR (5) | Blood group stored in inventory (e.g., A+, O-, etc.). | Not NULL |
| Quantity \_Stored | VARCHAR (20) | Total amount of blood available in inventory (in liters). | Not NULL |
| Expiry \_Date | date | Expiry date of the stored blood. | Not NULL |
| Storage \_Location | VARCHAR (10) | The location where the blood is stored. | Null |
| Donation \_Date | date | Date when the blood was donated and added to inventory. | Not NULL |

**Blood \_requests table:**

|  |  |  |  |
| --- | --- | --- | --- |
| Request \_ID | INT | Unique identifier for each blood request. | Primary Key, Auto-increment |
| Blood \_Type | VARCHAR (5) | Blood group needed for the request (e.g., A+, O-, etc.). | Not null |
| Quantity \_Required | Int | Amount of blood requested (in liters). | Not null |
| Request \_Date | Date | Date of request | Not null |
| Request \_Status | VARCHAR (50) | Status of the request (e.g., Pending, Fulfilled, Cancelled). | Default: pending |
| Hospital \_Name | Varchar (100) | The hospital making the blood request. | Not null |
| Contact \_Person | Varchar (100) | The contact person at the hospital. | null |

**Transfusions table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field name** | **database** | **Description** | **Constraint** |
| Transfusion \_ID | Int | Unique identifier of each transfusion. | Primary Key, Auto-increment |
| Donation \_ID | int | Foreign key linking to Donations table (Donation\_ID). | Foreign Key, Not NULL |
| Request \_ID | int | Foreign key linking to Blood \_Requests table (Request \_ID). | Foreign Key, Not NULL |
| Transfusion \_Date | date | Date of the blood transfusion. | Not null |
| Transfusion \_Amount | int | |  | | --- | |  |  |  | | --- | | Amount of blood transfused (in liters). | | Not null |
| Transfusion \_Status | Varchar (100) | Status of transfusion (e.g., Successful, Failed, Rejected). | Null |

**Logical data model of blood donation database**

**logical data model**: is a representation of the data requirements and structure for a system, independent of the physical implementation. It outlines the entities, their attributes, and the relationships between entities.

* Below is a logical data model for a “**Blood Donation Database**”

**Entities and Relationships**

**1. Donor**

* **Attributes**:
  + Donor \_ID (PK)
  + First \_Name
  + Last \_Name
  + Date \_of \_Birth
  + Gender
  + Blood \_Type
  + Address
  + Phone
  + Email
  + Donor \_Status
* Last \_Donation \_Date

**2. Donation**

* **Attributes**:
  + Donation \_ID (PK)
  + Donor \_ID (FK)
  + Donation \_Date
  + Blood \_Type
  + Quantity
  + Donation \_Type
  + Health \_Status
  + Donation \_Center

**3. Blood Inventory**

* **Attributes**:
  + Inventory \_ID (PK)
  + Blood \_Type
  + Quantity \_Stored
  + Expiry \_Date
  + Storage \_Location
  + Donation \_Date

**4. Blood Request**

* **Attributes**:
  + Request \_ID (PK)
  + Blood \_Type
  + Quantity \_Required
  + Request \_Date
  + Request \_Status
  + Hospital \_Name
  + Contact \_Person

**5. Transfusion**

* **Attributes**:
  + Transfusion \_ID (PK)
  + Donation \_ID (FK)
  + Request \_ID (FK)
  + Transfusion \_Date
  + Transfusion \_Amount
  + Transfusion \_Status

**Relationship**

1.Donor ↔ Donation:

* A Donor can make multiple Donations, but each Donation is made by one Donor.
* One-to-Many relationship between Donor and Donation.
* Foreign Key: Donor \_ID in Donation references Donor \_ID in Donor.

2.Donation ↔ Transfusion:

* + A Donation may be used for one or more Transfusions.
  + One-to-Many relationship between Donation and Transfusion.
  + Foreign Key: Donation \_ID in Transfusion references Donation \_ID in Donation.

3.Blood Request ↔ Transfusion:

* + A Blood Request can be fulfilled by one or more Transfusions.
  + One-to-Many relationship between Blood Request and Transfusion.
  + Foreign Key: Request \_ID in Transfusion references Request \_ID in Blood Request.

**ERD (entity relationship model)**

Blood \_ Inventory

Inventory \_ID (PK)

Blood \_Type

Quantity \_Stored

Expiry \_Date

Storage \_Location

Donation \_ Date

Donations

Donation \_ID (PK)

Donor \_ID (FK)

Donation \_Date

Blood \_Type

Quantity

Donation \_Type

Health \_Status

Donation \_Center

Donors

Donor \_ID (PK)

First \_Name

Last \_Name,

Date \_of \_Birth,

Gender,

Blood \_Type,

Address,

Phone,

Email,

Donor \_Status,

Last \_Donation \_Date

**1 to many**

<-----------🡪

M to1

Many to one 1 to many

Transfusions

Transfusion \_ID (PK)

Donation \_ID (FK)

Request \_ID (FK)

Transfusion \_Date

Transfusion \_Amount

Transfusion \_Status

Blood \_Requests

Request \_ID (PK)

Blood \_Type

Quantity \_Required

Request \_Date

Request \_Status

Hospital \_Name

Contact \_Person

1to many

Description of Blood donation system

A **Blood Donation System** is a database system that helps manage the collection, storage, tracking, and distribution of blood donations. This system facilitates the interaction between **donors**, **donations**, **blood \_request**, **blood \_inventory, transfusions** and other entities involved in the blood donation process. It aims to ensure that blood supplies are adequate, track blood types, and improve efficiency in matching donors with patients in need.

The system manages several critical aspects, including donor registration, donation scheduling, blood storage, blood requests from hospitals, blood transfusion records, and inventory management.