DMDD Project

Organ Donation System

Business Problems Addressed:

The Organ Donation System is designed to address the following key business problems:

- Efficient Organ Matching: Ensure an efficient and accurate matching process between donors and recipients based on compatibility factors such as blood type, organ type, and medical history.
- Transparent Donor and Recipient Management: Facilitate transparent and traceable management of donors and recipients, including their registration process, medical tests, and waiting list prioritization.
- Timely Communication: Enable timely communication between hospitals, organ procurement organizations, and medical personnel involved in the organ donation process.
- Medical Record Keeping: Maintain comprehensive medical records for both donors and recipients to support medical assessments, testing, and transplantation procedures.
- Enhanced Decision-Making: Provide decision-makers with a comprehensive view of the organ donation system to make informed decisions regarding organ allocation, transplantations, and overall system management.

ENTITIES

1. **Hospital:** A strong entity where organ transplant procedures take place. It may have an Organ Collection or receive Organs for transplantation procedure from Organ Handling Entities. It is connected to Financial Entities which support Person or Hospital financially. It also maintains recipient registrations for the transplantations.

   Attributes: Hospital ID, Name, Address, Phone no.

2. **Organ (Associative Entity):** It is an associative entity between organ collection and donor. It has the business value of a successful transplantation certificate.

   Attributes: Receipt ID, Organ ID, Donor ID

3. **Person:** It is a supertype and has two subtypes, Donor who will donate organ or recipient who wishes to receive the organ. Person can be both Donor and Recipient but must be atleast one of them.

   Attributes: Person ID, Person first name, Person last name, Person date of birth, Person type, Person age, Person address, Person phone no., medical insurance, blood type

4. **Donor:** It is a subtype of person supertype, its unique attributes are donor id and organ donated. This Person donates the organ to hospital or Organ Collection

   Attributes: Donor ID, Organ donated

5. **Recipient:** It is a subtype of person supertype, its unique attribute are recipient id and organ needed. This Person wishes to receive the Organ from Hospital or Organ Handling Entity

   Attributes: Recipient ID, Recipient organ needed

6. **Doctors:** A strong entity who performs the medical procedure.

   Attributes: Doctor ID, Doctor name, Doctor email, Doctor contact, Doctor specialization

7. **Recipient Registration:** Detailed information about the recipients who wish to receive an Organ

   Attributes: Registration ID, Recipient ID, Person ID, Date of registration, organ needed, Recipient organ condition, blood type, waiting list

8. **Organ Transplantation:** Details about the organ transplantation that is being performed.

   Attributes: Transplantation ID, Organ ID, Recipient ID, Donor ID, Transplantation status Transplantation Date

9. **Financial Entity:** An organization that provides financial support that may be involved in or keeps all records of payments**.**

   Attributes: Forg ID, Insurance companies, Payment records, financial transactions

10. **Organ Handling Entity:** An organization that may store the Organ and coordinates between Hospital and the Person(supertype), Also is in relation with Financial Entities.

    Attributes: OHand ID, name, type, address, Contact number, Registration date

11. **Organ Transport:** Responsible for Organ Transportation from one hospital to another or Organ Handling Entity to the Hospital where transplantation will take place**.**

    Attributes: Vehicle ID, license plate, model, driver full name, location, contact number

12. Organ Collection: Collection pool or storage of the organs

    Attributes: Organ ID, Donor ID, Organ Type, Donor blood type, Organ life span, Organ location, Organ donation date

RELATIONSHIPS

Hospital

1. Hospital employs mandatory one or many Doctor
2. Hospital maintains optional one or many Recipient Registrations
3. Hospital has optional one or many Organ Collection
4. Hospital performs optional one or many Organ Transplantation
5. Hospital uses optional one or many Organ Transport service
6. Hospital is connected to optional one or many Financial Entity

Organ:

1. Organ is added to mandatory one Organ Collection
2. Organ is donated by mandatory one Donor

Donor:

1. Donor Donates mandatory one or many Organs
2. Donor is a person

Recipient:

1. Recipients register for mandatory one or many Recipient Registration
2. Recipient is a Person

Person:

1. Person is connected to optional one or many Financial Entities
2. Person is connected to optional one or many Organ Handling Entities
3. Person can be either a donor or a recipient or both
4. Person has to be either donor or recipient

Doctors:

1. Doctor works at mandatory in one or many Hospital

Recipient registration:

1. Recipient Registration is filled by mandatory one or many Recipients
2. Recipient Registration is handled by mandatory one or many Hospital

Organ Transplantation:

1. Organ transplantations takes place on mandatory one hospital

Financial Entity:

1. Financial Entity is connected to optional one or many Hospital
2. Financial Entity is connected to optional one or many Organ Handling Entity
3. Financial Entity is connected to optional one or many Person

Organ handling Entity:

1. Organ handling Entity uses optional one or many Organ Transport
2. Organ Handling Entity is connected to optional one or many Financial Entity

Organ Transport:

1. Organ transport takes place to optional one hospital
2. Organ transport transports mandatory one or many Organ
3. Organ Transport service is used by optional one Organ Handling Entity

Organ Collection:

1. Organ Collection is stored at mandatory one or many Hospitals
2. Organ Collection uses optional one or many Organ Transport service
3. Organ Collection contains mandatory one or many Organs

Key Design Decisions:

- Subtype Relationship for Donor and Recipient: Using a subtype relationship allows for a clear representation of shared attributes (Person) while accommodating specific attributes for donors and recipients.
- Comprehensive Medical Records: Including entities like Medical Tests and Medical Personnel enables the system to maintain detailed medical records and support medical decision-making.

- Hospital Donor Coordinators: Including a specific entity for hospital donor coordinators helps in managing and coordinating the organ donation process at the hospital level.
- Transparent Registration Process: The use of Registration entities for both donors and recipients ensures a transparent and traceable registration process.

This database design aims to provide a robust and flexible system for managing organ donation processes while addressing key business challenges and ensuring transparency, efficiency, and data integrity.

Entity Relationship Diagram