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, matching score.
- Transparent Donor and Recipient Management: Facilitate transparent and traceable management of donors and recipients, including their waiting list prioritisation.
- Timely Communication: Enable timely communication between hospitals, donors, recipients and helping institutes involved in the organ transplantation process.
- Medical Record Keeping: Maintain comprehensive medical records for organ transplantation and donation.
- 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/donation procedure takes place. It is connected to the doctors, organ list and person through donated organ or transplantation which supports the Person.

Attributes: Hospital ID(PK), Organ ID, Street, State, Zip code, Hospital Phone number, Hospital Name

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, the Donor who will donate the organ or the recipient who wishes to receive the organ. A person can be both a Donor and a Recipient but must be at least one of them. A person is connected to Helping Institutes and Medical insurance.

Attributes: Person ID (PK), Person first name, Person last name, Person address(Street, State, Zip Code), Person Contact number, blood type, Person date of birth, Person type

4. **Donor:** It is a subtype of person supertype, its unique attributes are organ donated and donation date. This Person donates the organ to the hospital.

Attributes: Donor_ID (PK), Donation Date, Organ Donated

5. **Recipient:** It is a subtype of person supertype, its unique attributes are Required organ, Date Registered and Waitlist no. This Person wishes to receive the Organ from the Hospital

Attributes: Recipient_ID (PK), Required Organ, Date Registered, Wait List No

6. **Doctors:** A strong entity who performs the medical transplantation procedure at the Hospital. Doctors are connected to Hospitals and Schedule is the unique attribute of this relationship. Hence another associative entity Hospital_Doctor is formed.

Attributes: Doctor ID (PK), Doctor name, Doctor email, Doctor contact, Doctor specialisation

7. **Organ List:** It's a general list of all the organs that can possibly be donated. It is connected to Donated organs and Hospital entities.

Attributes: Organ ID (PK), Organ Name

8. **Donated Organ:** This is an associative entity, this entity is formed when a donor donates an organ at the hospital. This is responsible for holding the information about the Donated organ. It is connected to transplantation, Organ List, Hospital and Donor.

Attributes: Donated Organ ID (PK), Person ID, Hospital ID, Organ ID, Matching score, Organ Lifespan

9. **Helping Institutes:** This is a strong entity which gives financial help to a person. It is connected to a person through an associative entity named Person_Helping_Instittute.

Attributes: Institute ID (PK), Institute Name, Phone number, Registration date

10. **Hospital_Doctor:** This is an associative entity formed between Doctors and hospitals. This is connected to Hospitals and doctors

Attributes: Hospital ID (PK), Doctor ID (PK), Schedule

11. **Person_Helping_Institute:** This is an associative entity between Person and Helping Institute. This is connected to Person and Helping Institute.

Attributes: Institute ID (PK), Person ID (PK), Reason

12. **Medical_insuarance:** This is an entity which stores the Medical Insurance company names

Attributes, Insurance_ID, Person_ID, Insurance Company, Insurance Amount

RELATIONSHIPS

Hospital

1. Hospital employs mandatory one or many Doctors
2. Hospital stores zero or many Donated Organs
3. Hospital performs zero or many Transplantations

Organ List:

1. Organ List lists mandatory one or many Donated Organs

Donor:

1. Donor donates mandatory one or many Donated Organs

2. Donor is a sub-type of “Person” Supertype with special attributes like “Donation Date” and “Organ Donated”

Recipient:

1. Recipient receives mandatory one or many Transplantations
2. Recipient is a sub-type of “Person” Supertype with special attributes like “Required Organ”, “Date Registered” and “Waitlist No”

Person:

1. Person has to be mandatorily one of either donor or recipient or could be both.
2. Person approaches zero or many Helping Institutes.
3. Person has zero or many Medical Insurance

Doctors:

1. Doctor works at mandatorily one or many

Medical Insurance:

1. Medical Insurance belongs to zero or one Person

Helping Institutes:

1. Helping Institute supports optional zero or many Person

Transplantation:

1. Transplantation is performed on mandatory one Recipient
2. Transplantation is performed by mandatory one Doctor
3. Transplantation is performed at mandatory one Hospital
4. Transplantation involves at mandatory one Donated Organ

Donated Organ:

1. Donated organ is donated by mandatory one Person(Donor)
2. Donated Organ may or may not be involved in Transplantation
3. Donated Organ is listed in mandatory one Organ List
4. Donated Organ is stored at mandatory one Hospital..

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