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 support 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

(We removed this entity and instead added two other entities because that made more sense)

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 be one of them. 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: DPersonID (PK), Donation Date, Organ Donated

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

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

6.Doctors: A strong entity who performs the medical transplantation procedure at Hospital. Doctors are connected to Hospital 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 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

(We have removed this entity , because all this information comes under Recipient and transplantation)

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

(We have renamed this entity to transplantation)

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

(We have removed this entity, instead added another entity called Helping institutes)

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

(We have removed this entity, because we came up with the business logic that organs are stored at the hospital only)

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

(The following “Organ Transport” entity was removed since the Hospital itself will store all the organs)

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

(We removed this entity and instead added the two entities listed below)

13.Organ List : It’s a general list of all the organs that can possibly be donated. It is connected to Donated organ and Hospital enitity.

Attributes : Organ ID (PK), Organ Name

(This is a newly added entity)

14.Donated Organ : This is an associative entity , this entity is formed when a donor donates an organ at the hospital. This is responsible to hold 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
(This is a newly added entity)

15.Helping Institutes : This is a strong entity which gives financial help to person. It is connected to person through associative entity named Person_Helping_Institute
Attributes : Institute ID (PK), Institue Name , Phone number , Registration date
(This is a newly added entity)

16.Hospital_Doctor : This is an associative entity formed between Doctors and hospital. This is connected to Hospital and doctors
Attributes : Hospital ID (PK) , Doctor ID (PK) , Schedule
(This is a newly added associative entity)

17.Person_Helping_Institute : This is an associative entity formed between Person and Helping Institute. This is connected to Person and Helping Institute.
Attributes : Institute ID (PK) , Person ID (PK) , Reason
(This is a newly added associative entity)

RELATIONSHIPS

Hospital

1.Hospital employs mandatory one or many Doctors

2.Hospital has one mandatory Organ List

3.Hospital stores zero or many Donated Organs

4.Hospital performs zero or many Transplantations

(All the below relations are removed since those entities are either replaced or removed)

5.Hospital maintains optional one or many Recipient Registrations

6.Hospital has optional one or many Organ Collection

7.Hospital performs optional one or many Organ Transplantation

8.Hospital uses optional one or many Organ Transport service

9.Hospital is connected to optional one or many Financial Entity

(The Following entity “Organ” is replaced by “Organ List” entity as suggested by the professor in our discussion which happened before class)

Organ:

1.Organ is added to mandatory one Organ Collection

2.Organ is donated by mandatory one Donor

Organ List:

1.Organ List present at one or many Hospitals
2.Organ List lists one or many Donated Organs

Donor:

1.Donor donates one or many Organs

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

Recipient:

1.Recipient receives 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:

(The relationships below were removed)

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

(New Relations)

1.Person has to be 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 one or many Hospital

(removed/ replaced the entities mentioned below)

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

All the following entities were replaced by “Helping Institute” entity

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

(New entities and their relationships)

Medical Insurance:

1**.** Medical Insurance belongs to mandatory one Person

Helping Institutes:

1. Helping Institute support optional zero or many Person

Transplantation:

1.Transplantation performed on mandatory one Recipient

2.Transplantation of mandatory one Donated Organ

3.Transplantation is performed at mandatory one Hospital

Donated Organ:

1.Donated organ is donated by mandatory one Person

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