NYU, Tandon School of Engineering

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CS-GY 6083

Principles of Database Systems

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Project #1

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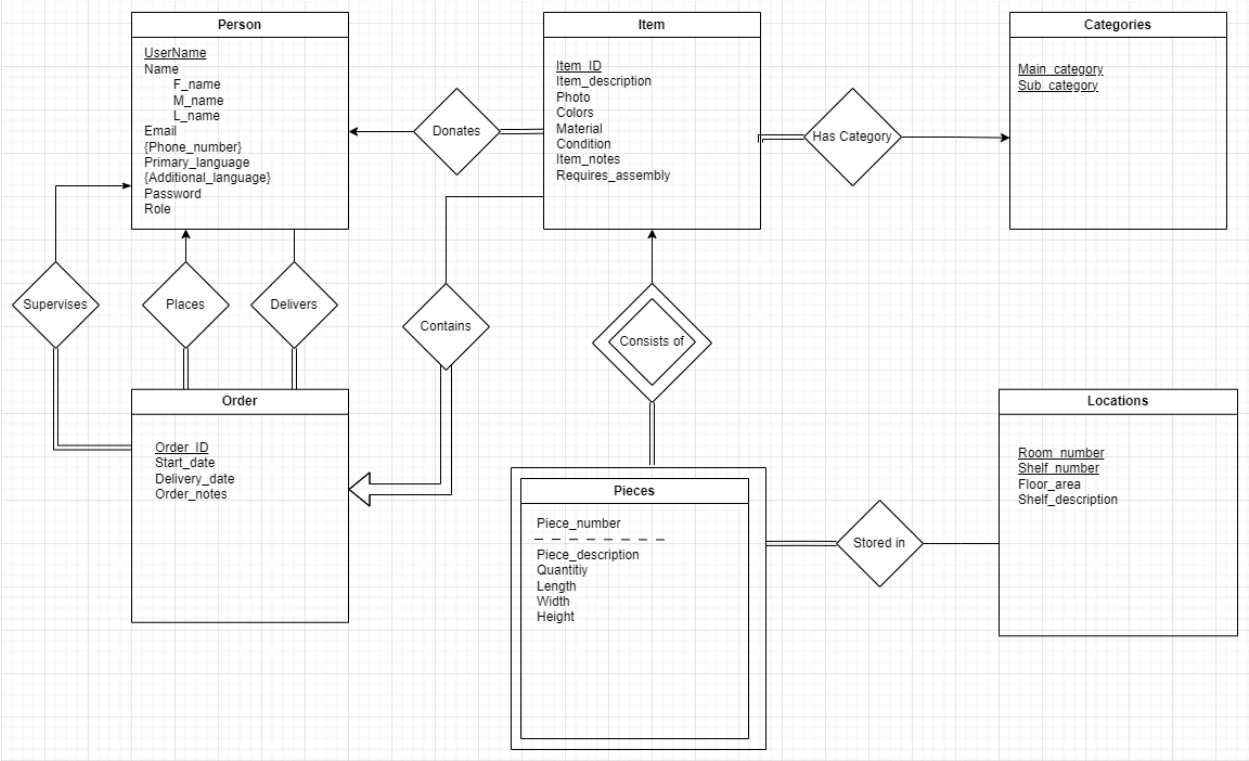
ER Diagram:


Person
UserName
Name
F_name
M_name
L_name
Email
{Phone_number}
Primary_language
{Additional_language}
Password
Role
Item
Item_ID
Item_description
Photo
Colors
Material
Condition
Item_notes
Requires_assembly
Categories
Main_category
Sub_category
Donates
Has Category
Supervises
Places
Delivers
Contains
Consists of
Order
Order_ID
Start_date
Delivery_date
Order_notes
Pieces
Piece_number
Piece_description
Quantitiy
Length
Width
Height
Stored in
Locations
Room_number
Shelf_number
Floor_area
Shelf_description

Assumptions

- Each item can be donated by exactly one person
- Each item can have exactly one category
- Since there are multiple pieces stored in numerous locations, each piece will be stored in atleast one location, however there might be locations in which nothing is stored.
- Condition attribute indicated whether an item is new or used
- Each order is supervised by exactly one person
- Each order is placed by exactly one client
- Each order maybe delivered by multiple people collectively since its mentioned volunteer(s) or staff as in plural.
- A person can have multiple roles (staff, volunteer, clients, donor) which are stored in the role attribute
- Pieces is a weak entity set dependent upon the items entity set since each piece is unique for its item but different items can have the piece identified using the same PieceNum.

Entity Sets:

Person (Strong Entity):

- This entity represents different types of people such as staff, volunteers, clients, and donors. Each person has a unique username and can be associated with different roles. Additional details like their full name, email, password, and phone numbers are stored. People may also speak multiple languages. The `role` attribute helps distinguish between the various roles that people play within the system.

Item (Strong Entity):

- Represents donated or purchased items that are part of the system's inventory. Each item has a unique ID and includes details such as a description, material, color, whether it's new or used, and whether it needs assembly. Items are categorized and subcategorized to make them easier to organize.

Category (Strong Entity):

- Represents categories that classify the items in the inventory. Each item belongs to a specific category and subcategory, which helps organize and filter the items more effectively (e.g., category: furniture, subcategory: chair).

Piece (Weak Entity):

- Some items consist of multiple parts or pieces. The `Piece` entity tracks these components, each identified by a unique number within its item. Since a piece can't exist without the item it belongs to, it is considered a weak entity. Each piece may also have its own dimensions and quantity.

Location (Strong Entity):

- Represents specific storage places within a warehouse where items or pieces are stored. Locations are identified by a combination of room and shelf numbers, allowing for precise tracking. A description of the shelf can also be included if needed.

Order (Strong Entity):

- Tracks orders placed by clients. Each order has a unique ID and contains details such as the start date, expected delivery date, and any additional notes. An order can contain one or more items that need to be delivered.

Relationship Sets

Donates :

- Entities: Person and Item
- Relationship type: One to Many (Person to Item)
- Participation Constraints: Person (Partial Participation), Item (Full Participation)
- Description: This relationship tracks which Person (role as a donor) donated which Items. A Person can donate multiple Items, and each Item is donated by one Person.

Has Category :

- Entities: Item and Category
- Relationship type: Many to One (Item to Category)
- Participation Constraints: Item (Total), Category (Partial)
- Description: This relationship associates Items with their Categories. An Item can belong to exactly one category, and each Category can contain multiple Items.

Consists of:

- Entities: Item and Piece
- Relationship type: One to Many (Item to Piece)
- Participation Constraints: Item (Partial), Piece (Total)
- Description: This relationship connects an Item to its constituent Pieces. It allows for tracking multiple pieces of a single item, such as a dining set consisting of a table and chairs. Each Piece belongs to only one Item, but an Item can have multiple Pieces.

Stored In:

- Entities: Piece and Location
- Relationship type: Many to Many
- Participation Constraints: Piece (Total), Location (Partial)
- Description: This relationship tracks where each Piece is stored within the warehouse. A Piece can be stored in multiple Locations (e.g., if it's large and spans multiple shelves), and each Location can store multiple Pieces.

Contains:

- Entities: Order and Item
- Relationship type: One to Many (Order to Item)
- Participation Constraints: Order (Total), Item (Partial)
- Description: This relationship associates Orders with the Items they include. Each Order can contain multiple Items, but each Item can be in at most one Order at a time. Also, all order will contain at least one item.

Places:

- Entities: Person and Order
- Relationship type: One to Many (Person to Order)
- Participation Constraints: Person (Partial), Order (Total)
- Description: This relationship represents a Person (role as a client) placing an Order. A Person can place multiple Orders, but each Order is placed by only one Person.

Delivers:

- Entities: Person and Order
- Relationship type: Many to Many
- Participation Constraints: Person (Partial), Order (Total)
- Description: This relationship tracks which Persons (role as volunteers or staff) deliver which orders. Multiple Persons can be involved in delivering a single order (like a huge item say a Sofa), and each Person can deliver multiple Orders. Also, all orders are delivered.

Supervises:

- Entities: Person and Order
- Relationship type: One to Many (Person to Order)
- Participation Constraints: Person (Partial), Order (Total)
- Description: This relationship represents a Person (role as staff) supervising an Order. Each Order is supervised by one Person & all orders are supervised, but a Person can supervise multiple Orders.