

P3: Logical ERD

Modification Done:-

Entities added :

- 1. Membership:** Added a new entity "Membership" to establish the relation between "Customer" and "Payment" to distinguish the type of membership a customer purchased and its related details and benefits.
Customer to Membership: A Customer can buy only one Membership, only one Membership can be bought by a Customer.
Payment to Membership: A payment can have only one Membership, to buy a membership only one payment is needed.
- 2. Order :** Added a new associative entity "Order" to in a ternary relation between "Customer", "Payment" and subtype "Product".
Customer to Order : A customer can place many orders for the product.
Order to Payment : A payment can be associated with one or more order
Orders to product : An order can include multiple products.
- 3. fitness_routine :** Fitness_Routines as an associative entity is added since "Exercise" and "Exercise Program" in conceptual was coming under many to many relationships.
Fitness_Routines to Exercise: A exercise can have many different Fitness_Routines
Fitness_Routines to Exercise Program: A Exercise Program can have many multiple Fitness_Routines.

Entities removed :

- 1. Member:** We decided to remove the "Member" entity because it served the same purpose as the "Customer" entity. Both were essentially performing the same functions, such as tracking personal details, membership information, and payment records. By merging the two entities into one, we simplify the system design, reduce redundancy, and avoid unnecessary complexity in the database structure.

Generalization:-

Item

The Item entity acts as a Supertype having all the common attributes of the subtypes (Product and Equipment). The Product and Equipment entity is a speacilaised entities having unique attributes.

Item has general attributes that apply to anyone(e.g. Name, Price, Type)

Product and **Equipment** add additional type-specific attributes:

- **Product** has Manufactured By..
- **Equipment** has Service dates.

Person

The person entity represents a different role in the system such as the Customer and the Trainer, which is in the form of generalization. Person entity has the attributes that are common to the Customer and Trainer. PersonType is the discriminator that distinguishes the role between the entities. The Customer and Trainer is a specialized entity with a specific role.

Person has general attributes that apply to anyone (e.g., name, contact details).

Customer and **Trainer** add additional, role-specific attributes:

- **Customer** has membership information.
- **Trainer** has a trainer type.

Logical ERD Model

