UML Diagram

Customers

- CustomerId
- Password
- Name
- Phone

Orders

- OrderId
- StartTime
- FinishTime
- TotalPrice

Seatings

- SeatingId
- Capacity
- Occupied

Customers ◆—— 1..1 make 0..* —— Orders

Orders 0..* occupy 1..1 ——◆ Seatings

0..*

OrderDishes

0..*

Dishes

- DishId
- DishName
- Price
- ImageUrl
- Description

Ingredients

- IngredientId
- IngredientName
- Amount

Dishes 0..* Recipies 1..* ——◆ Ingredients
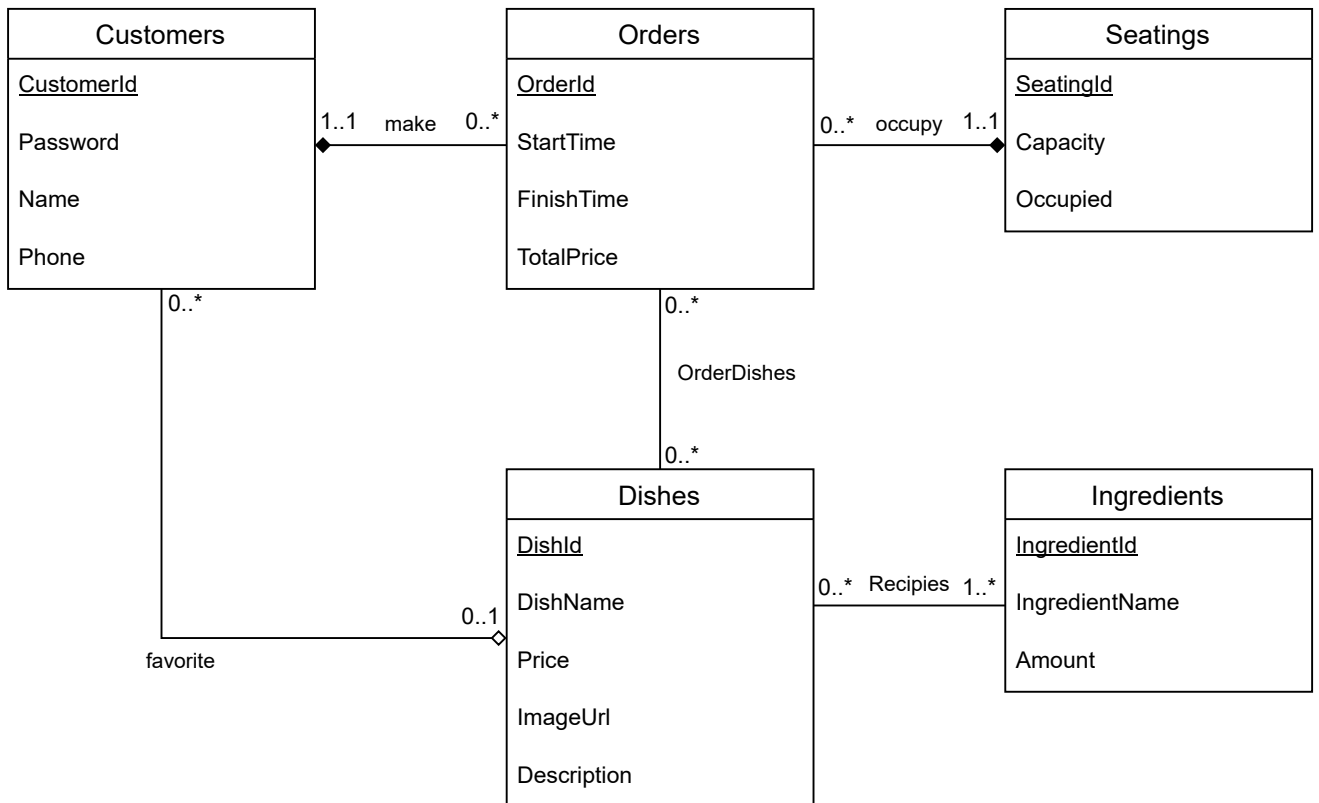
Customers 0..* ———— 0..1 ◇ Dishes

favorite

Relational Schema

Entity

Customers(CustomerId INT [PK], Password VARCHAR(32), Name VARCHAR(32), Phone VARCHAR(16), FavoriteFood INT [FK to Dishes.DishId])

Orders(OrderId INT [PK], StartTime DATETIME, FinishTime DATETIME, TotalPrice REAL, CustomerId INT [FK to Customers.CustomerId], SeatingId INT [FK to Seatings.SeatingId])

Dishes(DishId INT [PK], DishName VARCHAR(32), Price REAL, ImageUrl VARCHAR(256), Description VARCHAR(256))

Ingredients(IngredientId INT [PK], IngredientName VARCHAR(32), Amount INT)

Seatings(SeatingId INT [PK], Capacity INT, Occupied BOOLEAN)

Relationship

Dishes-Ingredients

Recipes(DishId INT [PK][FK to Dishes.DishId], IngredientId INT [PK][FK to Ingredients.IngredientId])

Orders-Dishes

OrderDishes(OrderId INT [PK][FK to Orders.OrderId], DishId INT [PK][FK to Dishes.DishId], Amount INT)

Assumption & Description

Description of Entity

1. Each customer is uniquely identified by its ID, which is the primary key of Customers. A customer logins in the system with its id and password. Customers also have names, phone numbers, and favorite food attributes. The favorite food is a foreign key referencing the dish table.
2. The primary key of dishes is dish ID. Although dish name is also unique, we still add an ID to identify it since it occupies less space in relationship table. Each dish has a price to sell and word descriptions. We store the dish images in urls to access.
3. The primary key of ingredients is ID. Ingredients have names and their current amount in the restaurant as attributes.
4. The priamry key of orders is order ID. Each order has a creation time and finish time, when a customer pays the bill and finishes the transaction. TotalPrice attributes mark the cost of the order. Customer ID serves as a foreign key referencing the customer table to link order to the customer. Seating ID also works as a foreign key referencing the seating table.
5. Seatings has the primary key as seating ID. The attributes include capacity (Maximum customers to accommadate) and occupied status to show whether it is occupied currently.

Assumption of Relationship

1. Each customer can create zero or multiple orders, but each order can only belong to exactly one customer. (Customers-Orders ⇒ "One-Many")
2. Each customer can either have no or one favorite food, and a dish can be favored by no or multiple customers. (Customers-Dishes, Foreign key) "Many to one"
3. Each dish should have at least one ingredient, each ingredient corresponds to zero or multiple dishes. (Dishes-Ingredients ⇒ "Many-Many")
4. Each order can have zero or multiple dishes and each dish can belong to zero or multiple orders. An extra attribute amount marks the number of the same dish (Orders-Dishes ⇒ "Many-Many")
5. Each order should occupy exactly one seat, each seat can be taken by zero or multiple orders. (Orders-Seatings ⇒ "Many-One"