Database Design of a Restaurant Management System

Team 11

GitHub: https://github.com/rattball/DAMG6120_Database_Design_Team11

Team Members:

Name	NUID
Xinzhuo Liu	002197134
Yuan Huang	002117054
Licong Lou	002100980
Du Zhang	001586379
Jiao He	002192150

Database Specification:
Purpose, Business Problems Addressed and Business Rules

Database Purpose:
The purpose of the database is to maintain the data used to track and report business activities of the restaurant. The database will be used by the administration, restaurant staff, delivery, and customers.

Business Problems Addressed:

- The system engaged restaurants that can provide both dial-in and to-go meal service.
- Customers can create their personal account in the system, and save their personal information like address and telephone number into their account.
- Customers can make reservations online, restaurants will keep the seats for them.
- Customers can make online delivery orders.
- Customers can review the menu and can search for dishes.
- Customers can order by the system or in person, and the system will store the order details of all their orders.
- Restaurants can have multiple dishes.
- Restaurants can review all the orders.
- The restaurant should cooperate with at least two courier companies, one for orders deliveries and one for ingredients suppliers.
- All to-go orders should be assigned to the courier company, and the delivery company arranges for the deliveries to complete the delivery service

Business Rules:

- The restaurant has more than one seat
- The restaurant has only one menu and the menu must have at least one dishes
- Each dish could be ordered one or more times
- Each customer must register and login to their personal account before making any reservation or orders
- Each customer must enter their unique address before online order created
- Each customer must enter their unique payment method before online order created
- Each customer can have zero or more orders
- Each customer could have one or more payment information
- Each reservation must have its reservation ID
- Each order must be assigned its unique order ID
- Each order must be assigned its unique delivery man
- Each order may include one or more dishes
- Each delivery man must have its employed delivery company
- Each courier company could have one or more delivery man
- Each vendor company could have one or more ingredients
- The restaurant may have an expenditure detail everyday

Design Requirements:

- Use Crow's Foot Notation
- Specify the primary key fields in each table by specifying PK beside the fields.
- Draw a line between the fields of each table to show the relationships between each table. This line should be pointed directly to the fields in each table that are used to form the relationship.
- Specify which table is on the one side of the relationship by placing a one next to the field where the line starts.
- Specify which table is on the many sides of the relationship by placing a crow's feet symbol next to the field where the line ends.

Design Decisions:

Entity Name	Why Entity Included	How Entity is Related to Other Entities
Customer	Customers will be the ones who are using the system for making orders. They can make an order both in the restaurant or online. Customer entities will store details like orders, customer name, email, phone, address, and payment information.	Customer has a one-to-many relationship to Payment and Order Customer entity is also related to reservations entities due to a one-to-many relationship.
Customer Review	Customer Review is an entity that can be created by customers. As soon as the order has been created, customer review is also settled whether it is empty or not.	Customer Review is associated with Customer and Order.
Payment	Payment is an entity that will include the customer's financial info to process the billing, attributes are card number, name on the card, billing address, expiration year, expiration month etc.	Payment Information has an identifying relationship with CustomerId.
Address	Address is an entity that will include the customer's address info including street, city and state..	Address has an identifying relationship with CustomerId.

Order	Order has attributes like order id, dishes, order time, order type and payment method. If it is an online order, there should be attributes of delivery info and if it is a reserved order, there should be attributes of reserved info.	The order entity is directly related to customer due to one-to-one relationship, Also, it is also related to payment, dish, delivery provider and delivery entities.
Reservation	Customers can make a seat reservation before coming to the restaurant. Employees also have the right to make reservations for customers.	Reservation is directly related to the customer entity through an associative entity seat due to one-to-one relationship as well as order details.
Delivery man	When Delivery man has been arranged an order, he should send the order to the customer	Delivery is directly related to customer entity through an associated entity order due to a many-to-many relationship. Many delivery man need to deal with many orders and there may be many orders created.
Delivery service provider	When a customer makes an online order, it should be assigned their unique delivery man. Delivery man should belong to a delivery service provided, and be arranged to deliver an order.	Delivery service provider is related to Delivery Man as well as Orders.
Ingredient	When customers review the Menu, he can get all the dish information included in the Menu Entity.	Ingredients are related to the Dish entity.
Menu	The restaurant has only one menu, and customers have the right to go through the menu to get the dish information.	Menu is related to the Dish entity.
Dish	Dishes could be created and changed by employees. And each dish is also associated with its ingredients.	Dish is related to Order and Menu. Also it is related to the Ingredient entity.
Recipe	Recipe is an entity that helps to associate Dish and	Recipe is related to Dish and Ingredient.

	Ingredient Entity, with Dish ID and Ingredient Name as primary keys. Which means, each dish must have its ingredient list while created.	
Content	Content is an entity that helps to associate Order Entity and Dish Entity, with Order ID and Dish ID as primary keys. Which means, one order must have at least one dish.	Content is related to Order and Dish.
Seat	As soon as the reservation order is created, the seats should be added with it.	The seat entity is directly related to the customer entity through an associative entity reservation. It is also related to employee entity.
Vendor	The vendor can check the expenditure every day, and must be correlated with its ingredients. And he can get and change all the information on ingredients, recipes and dishes.	The vendor is related to ingredient and expenditure entities.
Employee	Employees can make reservations for customers, check and make/change orders and get customer reviews.	Employee is related to Order, Seats, Customer Review and Dish Content.
Expenditure	When running a restaurant, the owner of the restaurant needs to track the profitability of the restaurant at all times, so the daily tracking of expenditure costs is convenient for the operator to adjust the plan.	Expenditure is related to Vendor.