

# **Delivery Restaurant Management System and Database**

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# I. Requirement Analysis

## Introduction

### Purpose

Our application will allow restaurant owners to efficiently manage workforce resources and fulfill customer requests. This will allow owners to maximize margin by reducing instances of overstaffing by properly assigning staff to fulfill orders. The application will also allow the structured assignment of staff for delivery to categorized area codes. Therefore, the efficient management of restaurant resources and proper categorization of delivery requests inspire the design of the application.

### Data and functional requirements

The database will have *general staff* (call-order takers, internet-order takers, cooks, managers, cleaners, etc.) and *delivery personnel*. Both are part of the *staff*. *Delivery personnel* are specifically assigned to deliver *orders*. *Customers* order from the restaurant *menu* of *food* and *beverages* by phone or by internet, and delivery personnel are assigned to fulfill these orders based on the customers' *area code*.

## Database description

### Entities and Their Attributes

- **Menu:** Menu presents food and beverages items offered at the restaurant. Menu consists of name, price, and picture. Each item has an ID number (mid).
  - **Beverage:** Beverage is a subcategory of the menu entity set. It inherits all attributes of menu and will consist of a list of categories such as wine, beer, soft drinks, etc.
  - **Food:** Food is also a subcategory of the menu entity. It will also inherit all attributes of menu and it will have list of categories such as starters, soup & salads, entrees, small plates, accompaniments, desserts, etc.
- **Staff:** Staff entity set includes all the employees (call-takers, cooks, delivery personnel, etc.) working in the restaurant. Staff entity set consists of their salary, name, phone number, and staff ID (sid).
  - **General Staff:** General staff is a subcategory of the staff entity set. General staff includes the employees that work inside the restaurant (e.g. call-order takers, internet-order takers, cooks, managers, cleaners, and other personnel). In addition to the inherited attributes of staff, general staff entity set will also consist of position.
  - **Delivery Staff:** Delivery staff is also a subcategory of the staff entity set. Delivery staff will only be responsible for delivery jobs. This entity set will inherit all attributes of staff. In addition to the inherited attributes of staff, the delivery staff entity set will also have an area code.
- **Area:** Area is a division of delivery area and is associated with area code and the actual address of the area.
- **Order:** Order entity set will handle incoming delivery orders either by phone or online. Order entity will have a method (phone or online) attribute and an order ID (oid).
- **Customer:** The database will keep a list of customers who order from the restaurant. Each customer entry will have a name, phone number, address, area code, and customer ID (cid).

## Relations

- **Assigned to:** A *delivery staff* is assigned to an *area code*. This is a one-to-one relationship. One *delivery staff* can only be assigned to one *area code* and one *area code* can only be assigned by one *delivery staff*. *Delivery staff* will only be responsible for delivery orders for his/her area.
- **Delivers to:** A *delivery staff* delivers order to *customers*. This is a one-to-many relationship. One *delivery staff* can deliver to many *customers* with the same area code; however, each *customer* will have their orders delivered by one *delivery staff*.
- **Done by:** An *order* is done by a *customer*. This is a one-to-many relationship. One *customer* can make many *orders*, but each *orders* can be only made by one *customer*.
- **Used to:** A *menu* is used to make an *order*. This is a one-to-many relationship. One *menu* is used to make many *orders*; however, but each *order* is made using one *menu*.

## Application description

### Overview

The delivery restaurant management systems is designed to efficiently manage restaurant personnel during the course of the restaurant's daily operations as well as display the most popular food and beverage items by customer. Managers will have an overview of available personnel, and map orders to addresses and delivery personnel. Managers will also have an overview of popular food items, which will allow the restaurant to assess inventory requirements. Thus, the application will ensure both the effective utilization of staff and the proper balance of restaurant inventory.

### Preliminary calculations

The algorithm queries order information for an overview of the restaurant's daily deliveries and menu items ordered by customers. Algorithm **1**) counts the row entries in the *Order* table and returns the value. This data is then used by **2**) to assess the required number of active delivery personnel any given day. Algorithm **3**) collects all entries from the *Order* table and inspects the corresponding *Menu* items (*Food* and *Beverage*). These items are then returned and ranked according to the number of order instances.

### Functions

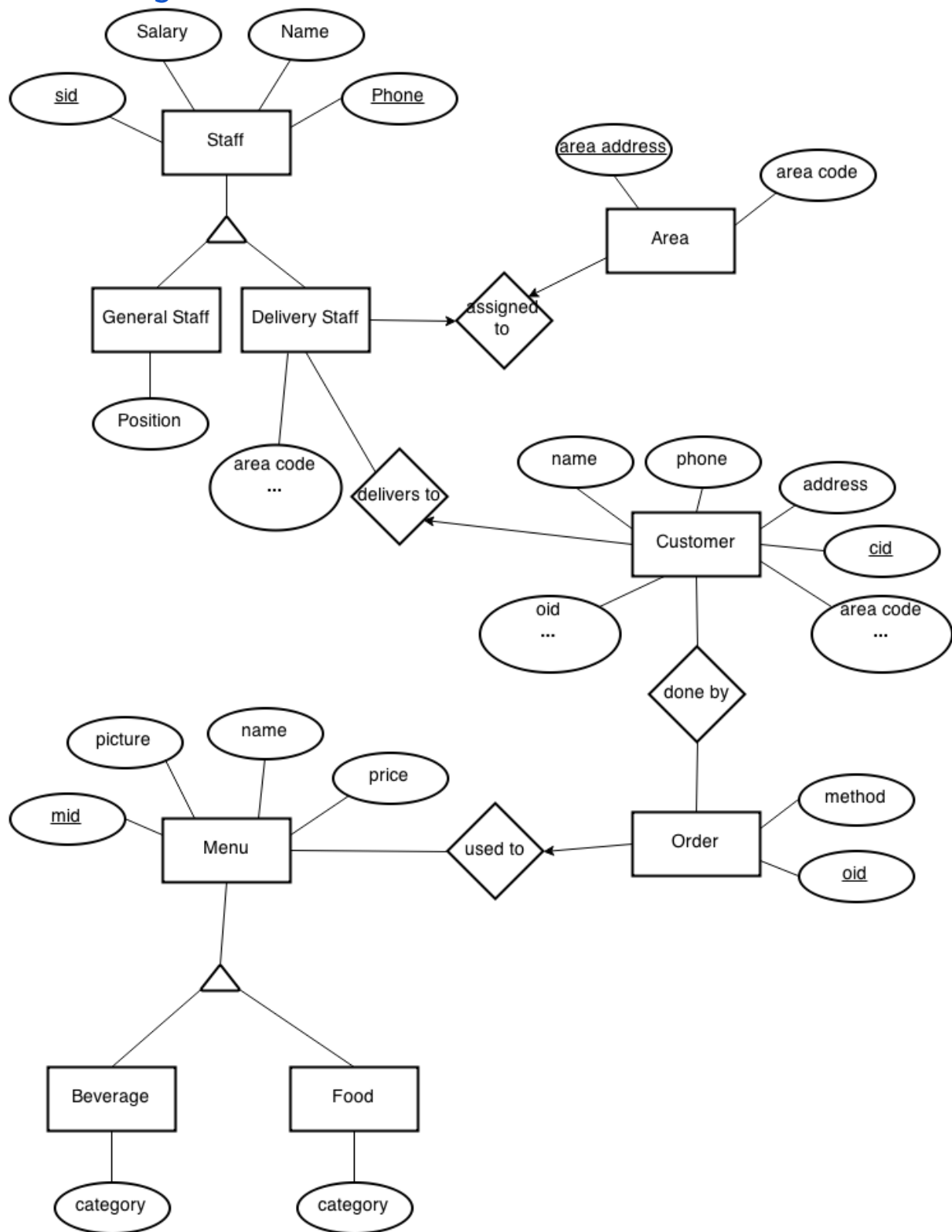
- 1) **totalOrders(order)**: returns the total number of orders made in a day
- 2) **expectedDeliveryStaff(total orders)**: returns the estimated number of delivery staff needed based on the number of daily deliveries
- 3) **orderItem(order)**: returns distinct menu items from all orders

### Algorithm description

The algorithm depends on a few variables in order to estimate the number of delivery personnel required for the following day.

- **Total orders**: Returned by totalOrders(order).
- **Orders per area**: Total number of orders by area code
- **Area code**: Area code designating a group of addresses where orders originate from

## II. E/R Diagram



### III. Relations

#### Entities

- Staff ( sid, phone, salary, name )
- General Staff ( sid, phone )
- Delivery Staff ( sid, phone, aid )
- Area ( area address, area code )
- Customer ( cid, name, phone, address, area code, oid )
- Order ( oid, method )
- Menu ( mid, picture, name, price )
- Beverage ( mid, category )
- Food ( mid, category )

#### Relationships

- assigned\_to ( sid, area code )
- delivers\_to ( sid, cid )
- done\_by ( oid, cid )
- used\_to ( oid, mid )