Table

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**2NF Explanation**

The decided factor was determining which attribute belonged within the relationship table, **BAGEL ORDER LINE ITEM**. After some thought I chose to include **Bagel Quantity** into this table because: if it was included in the **BAGEL ORDER** table it would not have the information to describe which bagel had how much, and if it was included in the **BAGEL** table the company would not know to what order how many bagels went to. From there it was easy to determine the rest of the attributes.

The **BAGEL ORDER** table could have multiple different bagels in reference to it so it could have many **BAGEL ORDER LINE ITEM** tables. To be in 2NF a table must be in 1NF. To be in 1NF the table must be atomic. Since **BAGEL ORDER LINE ITEM** is atomic it can only refer to one Bagel Order ID at a time. Therefore, the relationship is 1:M.

The same situation occurs with **BAGEL ORDER LINE ITEM** being atomic and only being able to refer to one Bagel ID at a time. However, a bagel can appear in many different **BAGEL ORDER LINE ITEM** tables.

Table

Description automatically generated

**3NF Explanation**

I decided that moving these tables into 3NF would be best done by splitting the customer information into a new table called, **CUSTOMER ID.** In the previous 2NF tables the customer information, for example Mobile Phone, would be repeated every time an order would be placed. This would be very redundant. Also, these values would be considered transient as they did not directly depend upon the PK Bagel Order ID. The 2NF **BAGEL ORDER** dependency was structured, for example, like this: Bagel Order ID -> {First Name, Last Name} -> Mobile Phone. Now no transient dependencies exist.

I decided upon M:1 cardinality. Each bagel order can have at most one customer. Each customer can have many bagel orders.

One issue that I do have with stopping here is the fact that the flat Delivery Fee will be repeated over and over. This is unnecessary in my eyes however, the project calls for it.

Graphical user interface, application

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