Assignment 3: Online Food Ordering Database – Task 3

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CPT 310 Database Systems & Management

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November 16, 2020

The process of organizing data in a database efficiently is called normalization (Chapple, 2019). Normalization reduces redundancy of data and compartmentalize it in smaller chunks. For this assignment, we are going to normalize to the first, second, and third forms (1NF, 2NF, & 3NF).

# Database Before Normalization

Before the normalization process, we have a database with all of the data contained in a single table called tbl\_employee.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **employee\_id** | **employee\_gender** | **employee\_address** | **employee\_phone** | **employee\_salary** | **employee\_annual\_salary** | **department\_name** | **department\_location** | **department head** |
| **1** | **Male** | **123 Main St** | **817-555-4521** | **$1,000** | **$52,000** | **Management,**  **Kitchen,**  **Customer Service** | **Store Office,**  **Kitchen,**  **Counter** | **Store Manager** |
| **2** | **Female** | **365 First St** | **817-555-9632** | **$500** | **$26,000** | **Customer Service** | **Store Counter** | **Lead CSR** |
| **3** | **Male** | **7845 3rd Ave** | **817-555-8564** | **$600** | **$31,200** | **Kitchen** | **Store Kitchen** | **Lead Cook** |
| **4** | **Female** | **7489 5th Ave** | **817-555-6541** | **$1,500** | **$78,000** | **Management,**  **Kitchen,**  **Customer Service** | **Store Office,**  **Kitchen,**  **Counter** | **Store Manager** |
| **5** | **Female** | **268 Main St** | **817-555-7439** | **$750** | **$39,000** | **Delivery Drivers,**  **Customer Service** | **Delivery Station,**  **Store Counter** | **Store Manager** |

**Table 1: tbl\_employee before normalization.**

# Database After Normalization

Next, we will begin the process of normalizing the database. For the first normalization form (1NF), according to Coronel and Morris, the database needs to be in table form, all of the key attributes are defined, each field contains only one entity (no repeating groups), and all of the attributes are dependent on the primary key (2019). For the above table, we have a primary key named employee\_id. All of the other fields are dependent, if only partially, upon the primary key. Because there are repeating groups in table 1, we first have to put each group into separate entries to put the table into 1NF form.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **employee\_id** | **employee\_gender** | **employee\_address** | **employee\_phone** | **employee\_salary** | **employee\_annual\_salary** | **department\_name** | **department\_location** | **department head** |
| **1** | **Male** | **123 Main St** | **817-555-4521** | **$1,000** | **$52,000** | **Management** | **Store Office** | **Store Manager** |
| **1** | **Male** | **123 Main St** | **817-555-4521** | **$1,000** | **$52,000** | **Kitchen** | **Kitchen** | **Store Manager** |
| **1** | **Male** | **123 Main St** | **817-555-4521** | **$1,000** | **$52,000** | **Customer Service** | **Counter** | **Store Manager** |
| **2** | **Female** | **365 First St** | **817-555-9632** | **$500** | **$26,000** | **Customer Service** | **Store Counter** | **Lead CSR** |
| **3** | **Male** | **7845 3rd Ave** | **817-555-8564** | **$600** | **$31,200** | **Kitchen** | **Store Kitchen** | **Lead Cook** |
| **4** | **Female** | **7489 5th Ave** | **817-555-6541** | **$1,500** | **$78,000** | **Management** | **Store Office** | **Store Manager** |
| **4** | **Female** | **7489 5th Ave** | **817-555-6541** | **$1,500** | **$78,000** | **Kitchen** | **Kitchen** | **Store Manager** |
| **4** | **Female** | **7489 5th Ave** | **817-555-6541** | **$1,500** | **$78,000** | **Customer Service** | **Counter** | **Store Manager** |
| **5** | **Female** | **268 Main St** | **817-555-7439** | **$750** | **$39,000** | **Delivery Drivers** | **Delivery Station** | **Store Manager** |
| **5** | **Female** | **268 Main St** | **817-555-7439** | **$750** | **$39,000** | **Customer Service** | **Store Counter** | **Store Manager** |

**Table 2: tbl\_employee in 1NF.**

Now that the database is in 1NF form, the second normal form (2NF) is obtained by separating out partial dependencies. We create a new table pulling out the department information.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **employee\_id** | **employee\_gender** | **employee\_address** | **employee\_phone** | **employee\_salary** | **employee\_annual\_salary** |
| **1** | **Male** | **123 Main St** | **817-555-4521** | **$1,000** | **$52,000** |
| **2** | **Female** | **365 First St** | **817-555-9632** | **$500** | **$26,000** |
| **3** | **Male** | **7845 3rd Ave** | **817-555-8564** | **$600** | **$31,200** |
| **4** | **Female** | **7489 5th Ave** | **817-555-6541** | **$1,500** | **$78,000** |
| **5** | **Female** | **268 Main St** | **817-555-7439** | **$750** | **$39,000** |

**Table 3: tbl\_employee in 2NF.**

|  |  |  |  |
| --- | --- | --- | --- |
| **department\_id** | **department\_name** | **department\_location** | **department head** |
| **1** | **Management** | **Store Office** | **Store Manager** |
| **2** | **Customer Service** | **Store Counter** | **Lead CSR** |
| **3** | **Kitchen** | **Store Kitchen** | **Lead Cook** |
| **4** | **Delivery Drivers** | **Delivery Station** | **Store Manager** |

**Table 4: tbl\_department in 2NF.**

To normalize a database to the third form (3NF), it must already be normalized from 1NF to 2NF. We get the 3NF form by taking the 2NF form and removing any transitive dependencies. In the above tables, while I could be mistaken, there are no transitive dependencies, so this database is already normalized to the third form (3NF).

**References**

Coronel, C., & Morris, S. (2019). *Database systems: Design, implementation, and management* (13th   ed.). Retrieved from <https://www.vitalsource.com>

Chapple, M. (2019) *Database Normalization Basics*. Retrieved from https://www.lifewire.com/database-normalization-basics-1019735