Data Management & SQL- BAN-453-BOS1

Database Conceptual and Logical model

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Last year I took Web Technology class which gave me room to work on my future company's website. My future company that I named as "Maksatly" will help clients find beautiful and suitable carpets, especially Turkmen Carpets, for their homes, rooms, and even offices. Turkmen Carpets are famous and observed by carpet experts as descendants of the purest and oldest carpet-weaving traditions in Central Asia. Following that, they are valued for their quality, rich colors, and good-looking geometrically and floral designs. For example, some of the carpets have traditionally been brilliant red and decorated with indigo, black and white designs. As start-up company, maintaining the data on excel sheet can work and stored data can be kept clean as they are less data about employees, carpets, stores, orders, and so on. However, when Maksatly company will increase number of carpets, expecting customer raise, and hire more employees- the maintaining data on excel sheet will be difficult and could give serious consequence such as loosing data. Accordingly, moving from excel spreadsheet to database will be effective way to prevent these consequences as it improves the data sharing and data security, increase in efficiency of data integration, and facilitates in decision making.

Mission Statement:

The purpose of the *Maksatly* database system is to keep the data that is used and generated to support the carpet retail business for our clients. Moreover, it will serve employees of the company to share information between departments and stores.

Mission Statement:

- To maintain data on departments, employees, stores, clients, carpets, orders.
- To be able to quickly look up information about selected departments, employees, departments, stores, clients, carpets, orders.
- To allow for employees at all departments and stores to access the same data at the same time.
- To have data updated in the database on daily bases
- To securely store the data and maintaining custom permission user to user bases.
- To be able to perform queries and build reports help to answer the following business questions:
    - How many carpets are sold in each store?
    - What is the monthly carpet sale average?
    - What is carpet preference of customer?

- How many carpets are put in storage per week?
- How many employees work in each department and how much they get paid?
- How much drivers get paid from commission fee?

Business Rules:

- Each individual carpet has own unique identification (two same type of carpets will have separate unique identification).
- Each individual employees, individual departments, individual stores, individual delivery orders, individual clients, and individual dependents have their own unique identification, but each individual pick-up order does not have own unique identification.
- Each employee can work one and only one department while department must have at least one employee.
- Each employee can work one and only one store while store must have at least one employee.
- Each employee can have many dependents, but each dependent must be related to at least one employee.
- Each store can sell many carpets and many carpets can be sold by only one store.
- Each store can be managed by only one department which is sales department and sales department can manage many stores.
- Each client can have many pick-up order and delivery orders while each pick-up and delivery orders must be operated by at least one client
- Each pick-up order and delivery order can include many carpets. Each carpet must relate either only one pick-up order or only one delivery order.
- Each carpet can be delivered by one employee, specifically, by one driver. However, driver can deliver many carpets.

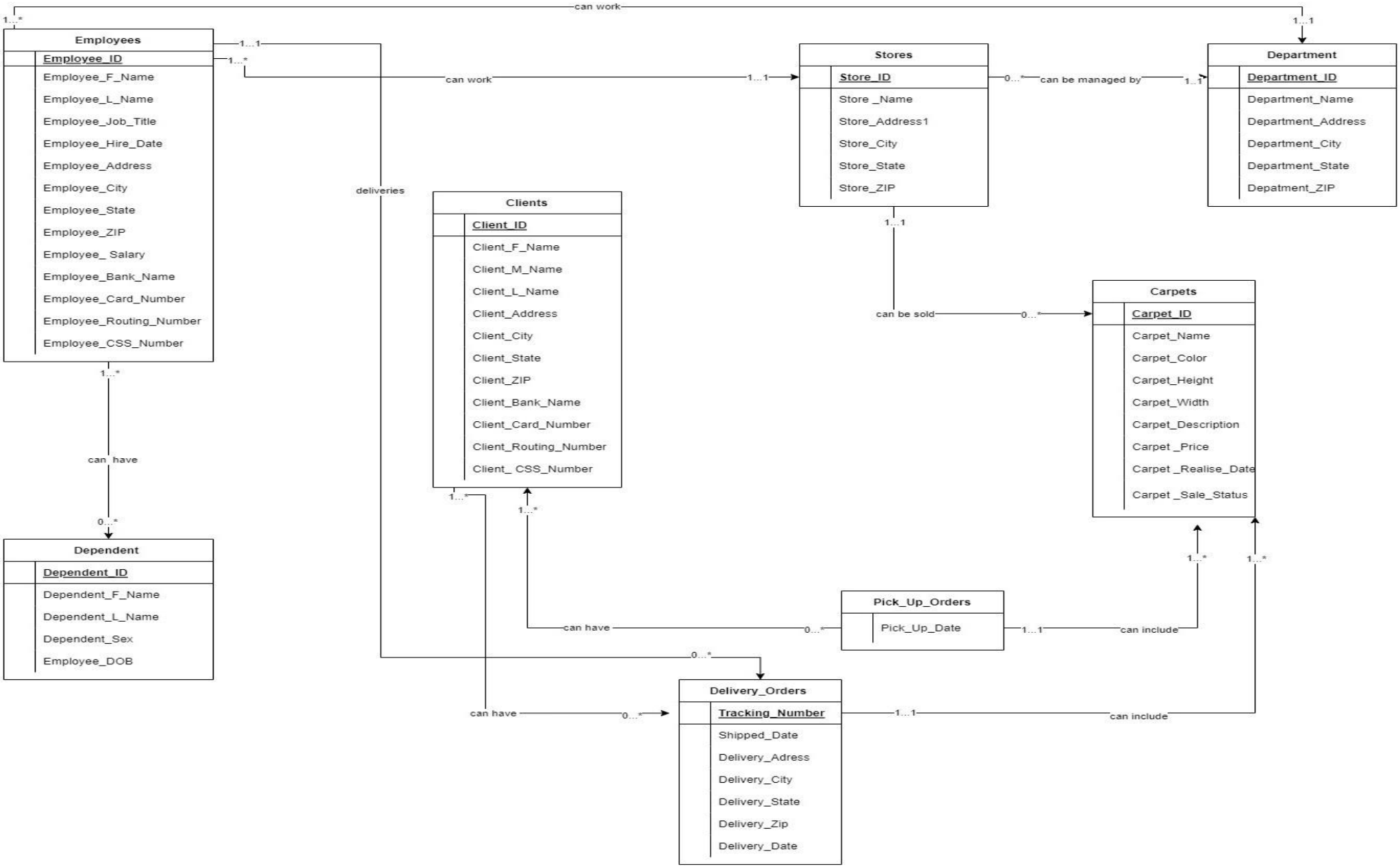
Conceptual Model And Conceptual Data Dictionary:

The initial conceptual model of Maksatly's database will have approximately 8 entities which will be made off from 1 to 14 entity occurrences. I named entity attributes based on their description except ID for each which equals to each unique identification of each entity.

1. **Employees:** Employee_ID, Employee_F_Name, Employee_L_Name, Employee_Job_Title, Employee_Hire_Date, Employee_Address, Employee_City, Employee_State, Employee_ZIP, Employee_Salary, Employee_Bank_Name, Employee_Card_Number, Employee_Routing_Number, Employee_CSS_Number.
2. **Clients:** Client_ID, Client_F_Name, Client_L_Name, Client_Address, Client_City, Client_State, Client_ZIP, Client_Bank_Name, Client_Card_Number, Client_Routing_Number, Client_CSS_Number.
3. **Dependents:** Dependent_ID, Dependent_F_Name, Dependent_L_Name, Dependent_Sex, Dependent_DOB.
4. **Stores:** Store_ID, Store_Name, Store_Address, Store_City, Store_State, Store_ZIP.
5. **Departments:** Department_ID, Department_Name, Department_Address, Department_City, Department_State, Department_ZIP.
6. **Carpets:** Carpet_ID, Carpet_Name, Carpet_Color, Carpet_Height, Carpet_Width, Carpet_Description, Carpet_Price, Carpet_Realize_Date, Carpet_Sale_Status.
7. **Pick_Up_Orders:** Pick_Up_Date
8. **Delivery_Orders:** Tracking_Number, Shipped_Date, Delivery_Address, Delivery_City, Delivery_State, Delivery_ZIP.

In the future, the number of entities and entity occurrence can be updated based on new data,

Conceptual Model Diagram:


can work
1...*
1...1
Employees
Employee_ID
Employee_F_Name
Employee_L_Name
Employee_Job_Title
Employee_Hire_Date
Employee_Address
Employee_City
Employee_State
Employee_ZIP
Employee_ Salary
Employee_Bank_Name
Employee_Card_Number
Employee_Routing_Number
Employee_CSS_Number
1...1
1...*
can work
1...1
Stores
Store_ID
Store _Name
Store_Address1
Store_City
Store_State
Store_ZIP
0...*
can be managed by
1...1
Department
Department_ID
Department_Name
Department_Address
Department_City
Department_State
Depatment_ZIP
deliveries
Clients
Client_ID
Client_F_Name
Client_M_Name
Client_L_Name
Client_Address
Client_City
Client_State
Client_ZIP
Client_Bank_Name
Client_Card_Number
Client_Routing_Number
Client_ CSS_Number
1...1
can be sold
0...*
Carpets
Carpet_ID
Carpet_Name
Carpet_Color
Carpet_Height
Carpet_Width
Carpet_Description
Carpet _Price
Carpet _Realise_Date
Carpet _Sale_Status
1...*
can have
0...*
Dependent
Dependent_ID
Dependent_F_Name
Dependent_L_Name
Dependent_Sex
Employee_DOB
1...*
1...*
1...*
1...*
Pick_Up_Orders
Pick_Up_Date
1...1
can include
0...*
Delivery_Orders
Tracking_Number
Shipped_Date
Delivery_Adress
Delivery_City
Delivery_State
Delivery_Zip
Delivery_Date
can have
0...*
1...1
can include

Logical Model:

I converted conceptual model to logical model by following the 3NFs:

1st NF- I divided the names of employees and clients by their first name and last name, and addresses by the city state, zip code to not violate the 1NF which states that each row and column intersection or cells contains one and only one values.

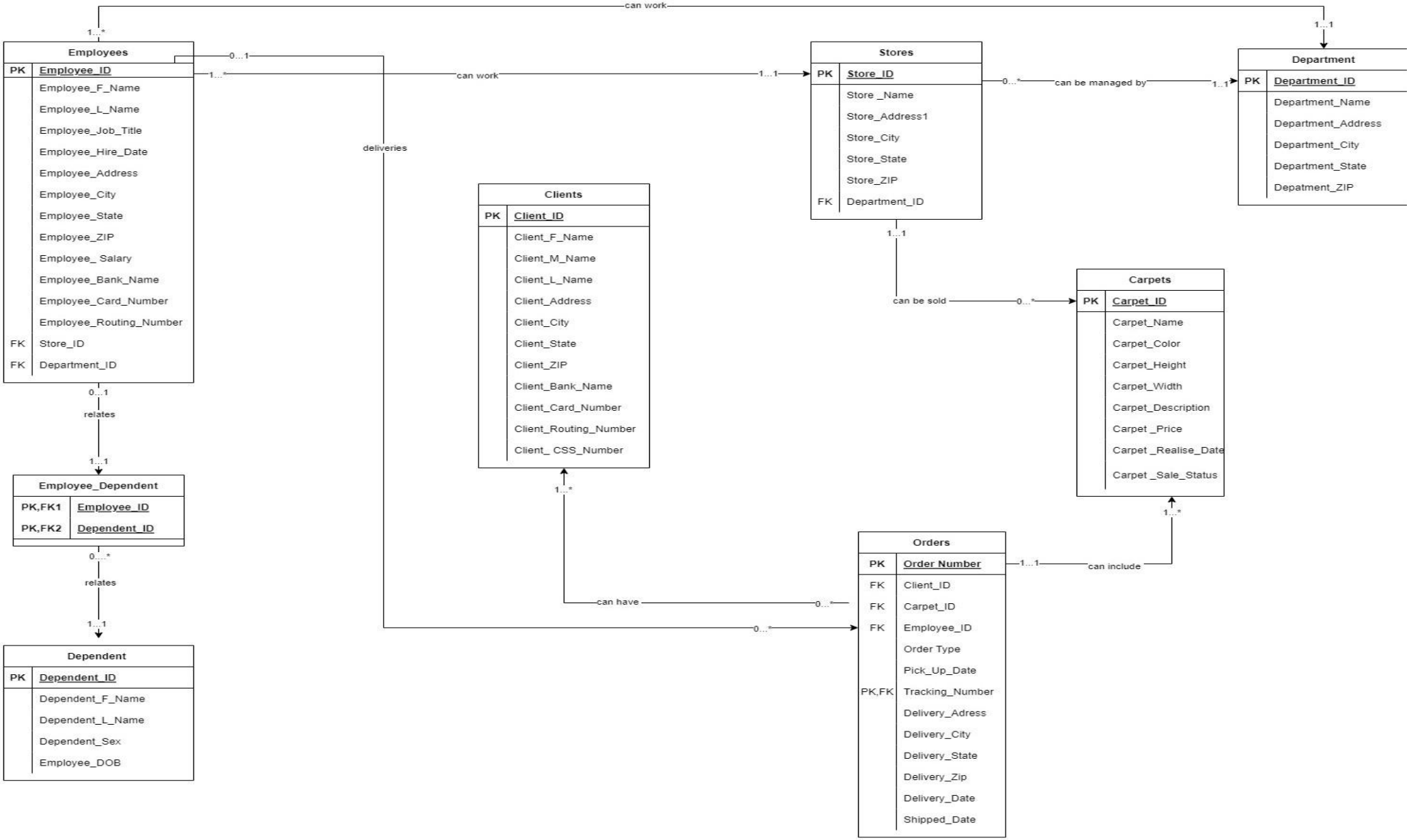
2nd NF- I assigned PK s for all entities by obeying 2NF.

3rd BF- in the future, I need to work on my logical model more as I violate the 3rd NF, specifically there is violation of 3rd NF entities: Dependents, Employees, and Orders.

Logical Data Dictionary:

Please take a look Logical Data Dictionary excel file!

Logical Model Diagram:


can work
1...*
1...1
Employees
PK Employee_ID
Employee_F_Name
Employee_L_Name
Employee_Job_Title
Employee_Hire_Date
Employee_Address
Employee_City
Employee_State
Employee_ZIP
Employee_ Salary
Employee_Bank_Name
Employee_Card_Number
Employee_Routing_Number
FK Store_ID
FK Department_ID
0...1
1...*
can work
1...1
Stores
PK Store_ID
Store _Name
Store_Address1
Store_City
Store_State
Store_ZIP
FK Department_ID
0...*
can be managed by
1...1
Department
PK Department_ID
Department_Name
Department_Address
Department_City
Department_State
Depatment_ZIP
deliveries
Clients
PK Client_ID
Client_F_Name
Client_M_Name
Client_L_Name
Client_Address
Client_City
Client_State
Client_ZIP
Client_Bank_Name
Client_Card_Number
Client_Routing_Number
Client_ CSS_Number
1...1
can be sold
0...*
Carpets
PK Carpet_ID
Carpet_Name
Carpet_Color
Carpet_Height
Carpet_Width
Carpet_Description
Carpet _Price
Carpet _Realise_Date
Carpet _Sale_Status
0...1
relates
1...1
Employee_Dependent
PK,FK1 Employee_ID
PK,FK2 Dependent_ID
0...*
relates
1...1
Dependent
PK Dependent_ID
Dependent_F_Name
Dependent_L_Name
Dependent_Sex
Employee_DOB
1...*
can have
0...*
Orders
PK Order Number
FK Client_ID
FK Carpet_ID
FK Employee_ID
Order Type
Pick_Up_Date
PK,FK Tracking_Number
Delivery_Adress
Delivery_City
Delivery_State
Delivery_Zip
Delivery_Date
Shipped_Date
1...1
can include
1...*
0...*