NIIT UNIVERSITY, NEEMRANA

Car Dealership Database

**Group Members-**

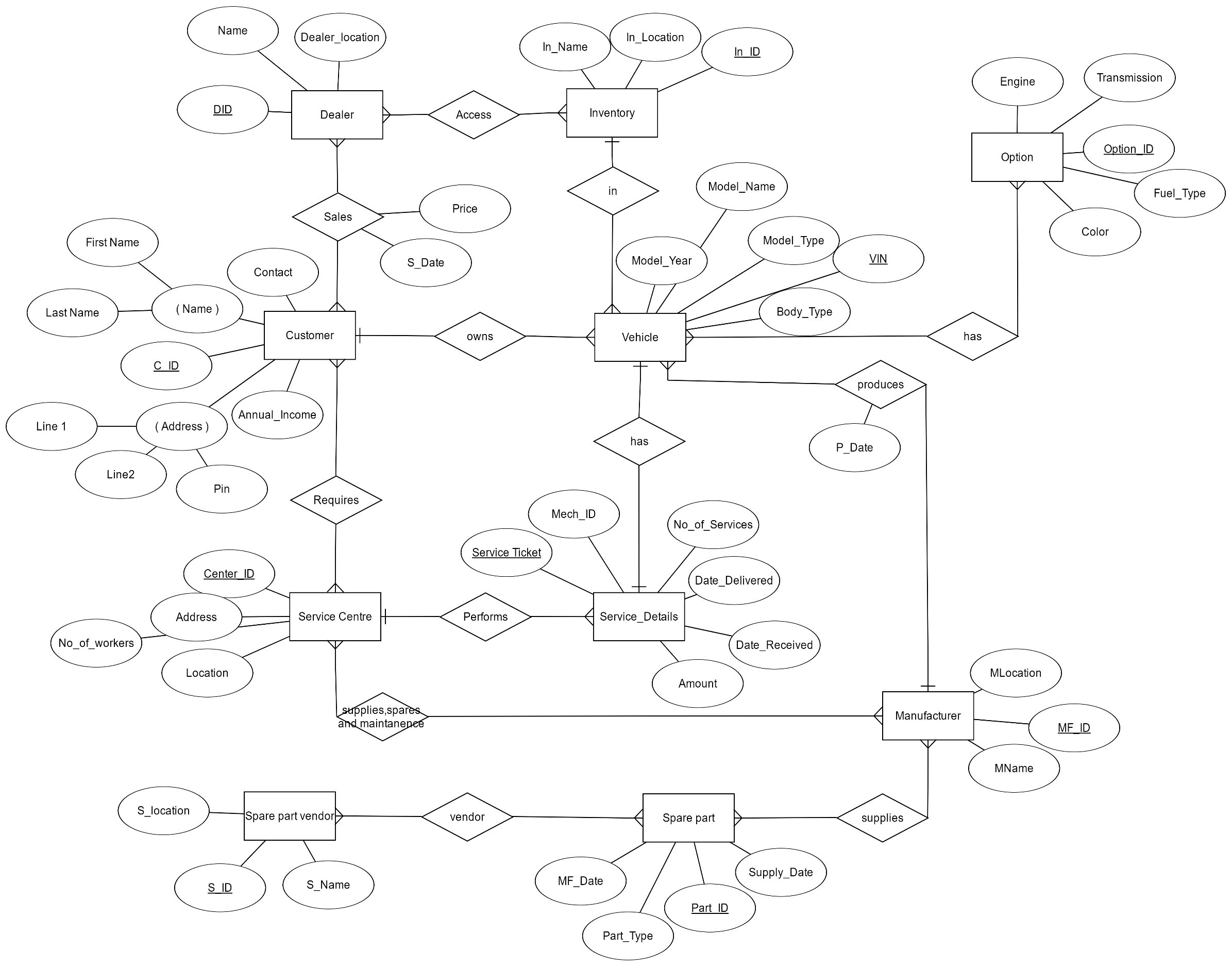
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The project is about a car dealership database of a firm which manufactures car. Overview of database is getting spares from vendor to assembling and then selling it to customer through dealer. The company also have a service center for the maintenance of cars. It contains all the information about the car’s make and model, Customer’s basic info, the allotted service Centre (we assume that the customer goes to the same allotted service center). Also it contains the information about the spare part used and the details about the vendor who sold the part and the information about manufacturer of the spare part.

It has 10 entities which further have various attributes that are briefly explained below:

* **Customers**: this entity contains all the information about the customers, i.e. name, address, contact, etc.
* **Dealer**: this entity contains the information about the location and name of the dealer.
* **Inventory**: this entity contains the information about name and location of the warehouses where the cars are stored.
* **Manufacturer**: this entity contains the information about the name and location of the manufacturer.
* **Service Centre**: this entity contains the information of the service ticket, receiving and delivery date, mechanics’ ID who serviced the vehicle and the payment.
* **Car Model**: this entity contains the year in which the model was released, body type and the model name of the car.
* **Spare part**: this entity contains the information about date of supply, the date of manufacture, and the part type or description.
* **Spare part Vendor**: It contains the information about the name and location of the spare part vendor.
* **Vehicle**: It contains the information of the vehicle for example the VIN or Vehicle Identification Number ,model name of the vehicle , color, transmission, fuel type and engine.
* **Service Details** – Is contains the information of the service details of the vehicles a particular service center has performed , it has details like , mech\_id , service\_center ID, date received , date delivered and amount.

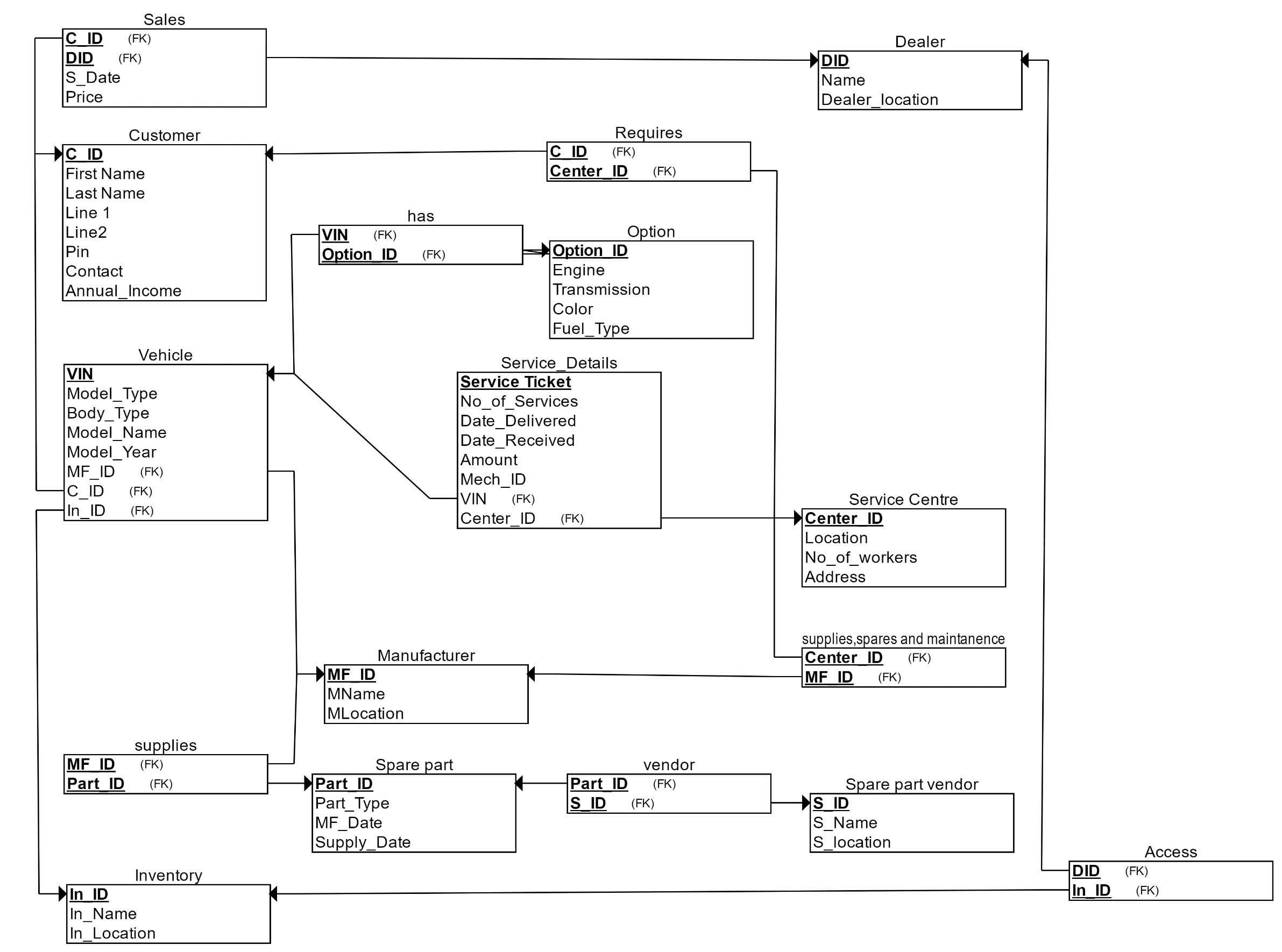
**ER DIAGRAM**



|  |  |
| --- | --- |
| *Entity* | *Attributes* |
| Customer | FirstName, LastName, C\_ID, Contact, Line1, Line2, Pin, Annual\_Income |
| Dealer | Dealer\_location, Name, DId |
| Service Centre | Centre\_ID, Address, No.\_of\_workers,Location |
| Manufacturer | MLocation, MName,MF\_ID |
| Spare Parts | Supply\_Date, Part\_ID, Part\_Type, MF\_Date |
| Spare parts Vendor | S\_Name, S\_location, S\_ID |
| Vehicle | Model\_Year, Model\_Type, VIN, Model\_Name, Body\_Type |
| Service Details | Service\_Ticket, Mech\_ID, Amount, Date\_Received,Date\_Delivered,No\_of\_Services |
| Inventory | In\_Name, In\_Location, In\_ID |
| Option | Engine, Transmission, Option\_ID, Color, Fuel\_Type |

**Table 1. Attributes of Entities/Tables**

**Relational Schema**

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Functional Dependencies of Relation:

|  |  |  |
| --- | --- | --- |
| *Relation* | Description | SQL |
| Customer | A separate table for the given entity “Cutsomer” with entity's attributes becoming columns of the table. And we declare C\_ID as the primary key. | CREATE TABLE Customer  (  C\_ID VARCHAR(10) NOT NULL,  First\_Name VARCHAR(20) NOT NULL,  Last\_Name VARCHAR(10) NOT NULL,  Line\_1 VARCHAR(50) NOT NULL,  Line2 VARCHAR(40) NOT NULL,  Pin INT NOT NULL,  Contact VARCHAR(10) NOT NULL,  Annual\_Income VARCHAR(20) NOT NULL,  PRIMARY KEY (C\_ID)  ); |
| Dealer | A separate table for the given entity “Dealer” with entity's attributes becoming columns of the table. And we declare DID as the primary key. | CREATE TABLE Dealer  (  DID VARCHAR(10) NOT NULL,  Name VARCHAR(20) NOT NULL,  Dealer\_location VARCHAR(30) NOT NULL,  PRIMARY KEY (DID)  ); |
| Inventory | A separate table for the given entity “Inventory” with entity's attributes becoming columns of the table. And we declare In\_ID as the primary key. | *CREATE TABLE Inventory*  *(*  *In\_Name VARCHAR(20) NOT NULL,*  *In\_Location VARCHAR(20) NOT NULL,*  *In\_ID VARCHAR(20) NOT NULL,*  *PRIMARY KEY (In\_ID)*  *);* |
| Service\_Center | A separate table for the given entity “Service\_Center” with entity's attributes becoming columns of the table. And we declare Center\_ID as the primary key. | *CREATE TABLE Service\_Centre*  *(*  *Location VARCHAR(20) NOT NULL,*  *No\_of\_workers INT NOT NULL,*  *Center\_ID VARCHAR(20) NOT NULL,*  *Address VARCHAR(50) NOT NULL,*  *PRIMARY KEY (Center\_ID)*  *);* |
| Spare\_part\_vendor | A separate table for the given entity “Spare\_part\_vendor” with entity's attributes becoming columns of the table. And we declare S\_ID as the primary key. | *CREATE TABLE Spare\_part\_vendor*  *(*  *S\_Name VARCHAR(20) NOT NULL,*  *S\_location VARCHAR(30) NOT NULL,*  *S\_ID VARCHAR(10) NOT NULL,*  *PRIMARY KEY (S\_ID)*  *);* |
| Opt | A separate table for the given entity “Opt” with entity's attributes becoming columns of the table. And we declare Option\_ID as the primary key. | CREATE TABLE Opt  (  Option\_ID VARCHAR(10) NOT NULL,  Engine VARCHAR(20) NOT NULL,  Transmission VARCHAR(20) NOT NULL,  Color CHAR(1) NOT NULL,  Fuel\_Type CHAR(1) NOT NULL,  PRIMARY KEY (Option\_ID)  ); |
| Manufacturer | A separate table for the given entity “Manufacturer” with entity's attributes becoming columns of the table. And we declare MF\_ID as the primary key. | *CREATE TABLE Manufacturer*  *(*  *MName VARCHAR(20) NOT NULL,*  *MLocation VARCHAR(20) NOT NULL,*  *MF\_ID VARCHAR(10) NOT NULL,*  *PRIMARY KEY (MF\_ID)*  *);* |
| Spare\_part | A separate table for the given entity “Spare\_part” with entity's attributes becoming columns of the table. And we declare Part\_ID as the primary key. | CREATE TABLE Spare\_part  (  Part\_ID VARCHAR(10) NOT NULL,  Part\_Type VARCHAR(10) NOT NULL,  MF\_Date DATE NOT NULL,  Supply\_Date DATE NOT NULL,  PRIMARY KEY (Part\_ID)  ); |
| Sales | A separate table for the given entity “Sales” with entity's attributes becoming columns of the table. And we declare (C\_ID,DID) as the primary key and C\_ID,DID as the Foreign key (Due to Total Participation). | CREATE TABLE Sales  (  S\_Date DATE NOT NULL,  Price INT NOT NULL,  C\_ID VARCHAR(10) NOT NULL,  DID VARCHAR(10) NOT NULL,  PRIMARY KEY (C\_ID, DID),  FOREIGN KEY (C\_ID) REFERENCES Customer(C\_ID),  FOREIGN KEY (DID) REFERENCES Dealer(DID)  ); |
| Access | A separate table for the given entity “Access” with entity's attributes becoming columns of the table. And we declare (DID,In\_ID) as the primary key and DID,In\_ID as the Foreign key (Due to Total Participation). | CREATE TABLE Access  (  DID VARCHAR(10) NOT NULL,  In\_ID VARCHAR(20) NOT NULL,  PRIMARY KEY (DID, In\_ID),  FOREIGN KEY (DID) REFERENCES Dealer(DID),  FOREIGN KEY (In\_ID) REFERENCES Inventory(In\_ID)  ); |
| Requires | A separate table for the given entity “Requires” with entity's attributes becoming columns of the table. And we declare (C\_ID,Center\_ID) as the primary key and C\_ID,Center\_ID as the Foreign key (Due to Total Participation). | CREATE TABLE Requires  (  C\_ID VARCHAR(10) NOT NULL,  Center\_ID VARCHAR(20) NOT NULL,  PRIMARY KEY (C\_ID, Center\_ID),  FOREIGN KEY (C\_ID) REFERENCES Customer(C\_ID),  FOREIGN KEY (Center\_ID) REFERENCES Service\_Centre(Center\_ID)  ); |
| vendor | A separate table for the given entity “vendor” with entity's attributes becoming columns of the table. And we declare (Part\_ID,S\_ID) as the primary key and Part\_ID,S\_ID as the Foreign key (Due to Total Participation). | *CREATE TABLE vendor*  *(*  *Part\_ID VARCHAR(10) NOT NULL,*  *S\_ID VARCHAR(10) NOT NULL,*  *PRIMARY KEY (Part\_ID, S\_ID),*  *FOREIGN KEY (Part\_ID) REFERENCES Spare\_part(Part\_ID),*  *FOREIGN KEY (S\_ID) REFERENCES Spare\_part\_vendor(S\_ID)*  *);* |
| supplies | A separate table for the given entity “supplies” with entity's attributes becoming columns of the table. And we declare (MF\_ID,Part\_ID) as the primary key and MF\_ID,Part\_ID as the Foreign key (Due to Total Participation). | *CREATE TABLE supplies*  *(*  *MF\_ID VARCHAR(10) NOT NULL,*  *Part\_ID VARCHAR(10) NOT NULL,*  *PRIMARY KEY (MF\_ID, Part\_ID),*  *FOREIGN KEY (MF\_ID) REFERENCES Manufacturer(MF\_ID),*  *FOREIGN KEY (Part\_ID) REFERENCES Spare\_part(Part\_ID)*  *);* |
| Supplies\_spares\_and\_maintanence | A separate table for the given entity “supplies\_spares maintainance” with entity's attributes becoming columns of the table. And we declare (Center\_ID, MF\_ID) as the primary key and Center\_ID, MF\_ID as the Foreign key (Due to Total Participation). | *CREATE TABLE supplies\_spares\_and\_maintanence*  *(*  *Center\_ID VARCHAR(20) NOT NULL,*  *MF\_ID VARCHAR(10) NOT NULL,*  *PRIMARY KEY (Center\_ID, MF\_ID),*  *FOREIGN KEY (Center\_ID) REFERENCES Service\_Centre(Center\_ID),*  *FOREIGN KEY (MF\_ID) REFERENCES Manufacturer(MF\_ID)*  *);* |
| Vehicle | A separate table for the given entity “Vehicle” with entity's attributes becoming columns of the table. And we declare VIN as the primary key and MF\_ID,C\_ID,In\_ID as the Foreign key (Due to Total Participation). | *CREATE TABLE Vehicle*  *(*  *VIN INT NOT NULL,*  *Model\_Type VARCHAR(10) NOT NULL,*  *Body\_Type VARCHAR(20) NOT NULL,*  *Model\_Name VARCHAR(20) NOT NULL,*  *Model\_Year INT NOT NULL,*  *MF\_ID VARCHAR(10) NOT NULL,*  *C\_ID VARCHAR(10) NOT NULL,*  *In\_ID VARCHAR(20) NOT NULL,*  *PRIMARY KEY (VIN),*  *FOREIGN KEY (MF\_ID) REFERENCES Manufacturer(MF\_ID),*  *FOREIGN KEY (C\_ID) REFERENCES Customer(C\_ID),*  *FOREIGN KEY (In\_ID) REFERENCES Inventory(In\_ID)*  *);* |
| Service\_Details | A separate table for the given entity “Service\_Details” with entity's attributes becoming columns of the table. And we declare Service\_Ticket as the primary key and Center\_ID,VIN as the Foreign key (Due to Total Participation). | *CREATE TABLE Service\_Details*  *(*  *Service\_Number INT NOT NULL,*  *Date\_Delivered DATE NOT NULL,*  *Date\_Received DATE NOT NULL,*  *Bill INT NOT NULL,*  *Mech\_ID VARCHAR(20) NOT NULL,*  *Service\_Ticket VARCHAR(20) NOT NULL,*  *Center\_ID VARCHAR(10) NOT NULL,*  *VIN VARCHAR(20) NOT NULL,*  *PRIMARY KEY (Service\_Ticket),*  *FOREIGN KEY (Center\_ID) REFERENCES Service\_Centre(Center\_ID),*  *FOREIGN KEY (VIN) REFERENCES Vehicle(VIN)*  *);* |
| has | A separate table for the given entity “has” with entity's attributes becoming columns of the table. And we declare (VIN,Option\_ID) as the primary key and VIN, Option\_ID. as the Foreign key (Due to Total Participation). | *CREATE TABLE has*  *(*  *VIN INT NOT NULL,*  *Option\_ID VARCHAR(10) NOT NULL,*  *PRIMARY KEY (VIN, Option\_ID),*  *FOREIGN KEY (VIN) REFERENCES Vehicle(VIN),*  *FOREIGN KEY (Option\_ID) REFERENCES Opt(Option\_ID)*  *);* |

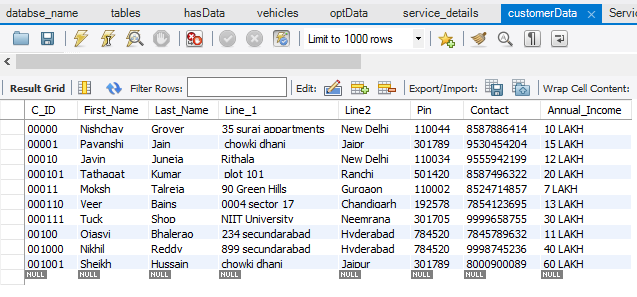
**Table 2. Table Schema**

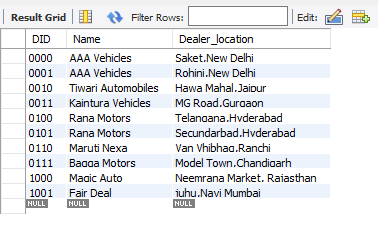
|  |  |
| --- | --- |
| *Relation* | *Functional Dependencies* |
| Customer | {C\_ID} -> {Name}  {C\_ID} -> {Address}  {C\_ID} -> {Contact}  {C\_ID} -> {Annual Income}  {Name,Address} -> {C\_ID}  {Name,Address} -> {Annual Income}  {Name,Address} -> {Contact}  {Address,Contact} -> {Name}  {Address,Contact} -> {C\_ID}  {Address,Contact} -> {Annual Income}  {Contact} -> {C\_ID}  {Contact} -> {Name}  {Contact} -> {Address}  {Contact} -> {Annual Income}  {Name,Contact} -> {C\_ID}  {Name,Contact} -> {Annual Income}  {Name,Contact} -> {Address}  {Contact,Gender} -> {C\_ID}  {Contact,Gender} -> {Name}  {Contact,Gender} -> {Address}  {Contact,Gender} -> {Annual Income}  {Contact,Annual Income} -> {CID}  {Contact,Annual Income} -> {Name}  {Contact,Annual Income} -> {Address}  {Name,Address,Contact} -> {C\_ID}  {Name,Address,Contact} -> {Annual Income}  {Address,Contact,Annual Income} -> {C\_ID}  {Address,Contact,Annual Income} -> {Name}  {Contact,Annual Income,Name} -> {C\_ID}  {Contact,Annual Income,Name} -> {Address}  {Name,Address,Contact,Annual Income} -> {C\_ID} |
| Manufacture | {MF\_ID} -> {MLocation}  {MF\_ID} -> {M\_Name}  {M\_Name,MLocation} -> {MF\_ID} |
| Inventory | {IN\_ID} -> {IN\_Name}  {IN\_ID} -> {IN\_Location}  {IN\_Location,IN\_Name} -> {IN\_ID} |
| Spare Parts | {Part\_ID} -> {Supply\_Date}  {Part\_ID} -> {Type}  {Part\_ID} -> {MF\_Date} |
| Spare Part Vendors | {S\_ID} -> {S\_location}  {S\_ID} -> {S\_Name}  {S\_Name,S\_location} -> {S\_ID} |
| Option | {Option\_ID} -> {Engine}  {Option\_ID} -> {Transmission}  {Option\_ID} -> {Fuel\_Type}  {Option\_ID} -> {Color} |
| Dealer | {DID} -> {Name}  {DID} -> {Dealer\_Location}  {Name,Dealer\_Location} -> {DID} |
| Service Center | {Center\_ID} -> {Location}  {Center\_ID} -> {No\_of\_workers}  {Center\_ID} -> {Address}  {Address} -> {Center\_ID}  {Address} -> {No\_of\_workers}  {Address} -> {Location} |
| Service Details | {Service\_Ticket} -> {No\_of\_Services}  {Service\_Ticket} -> {Mech\_ID}  {Service\_Ticket} -> {Date\_Recieved}  {Service\_Ticket} -> {Date\_Delivered}  {Service\_Ticket} -> {Center\_ID}  {Service\_Ticket} -> {VIN}  {Service\_Ticket} -> {Amount}  {Service\_Ticket,VIN} -> {No\_of\_Services}  {Service\_Ticket,VIN} -> {Mech\_ID}  {Service\_Ticket,VIN} -> {Date\_Recieved}  {Service\_Ticket,VIN} -> {Date\_Delivered}  {Service\_Ticket,VIN} -> {Center\_ID}  {Service\_Ticket,VIN} -> {Amount}  {Service\_Ticket,Center\_ID} -> {No\_of\_Services}  {Service\_Ticket,Center\_ID} -> {Mech\_ID}  {Service\_Ticket,Center\_ID} -> {Date\_Recieved}  {Service\_Ticket,Center\_ID} -> {Date\_Delivered}  {Service\_Ticket,Center\_ID} -> {Amount} |
| Vehicle | {VIN} -> {Model\_Type}  {VIN} -> {Body\_Type}  {VIN} -> {Model\_Name}  {VIN} -> {Model\_Year}  {VIN} -> {MF\_ID}  {VIN} -> {C\_ID}  {VIN} -> {IN\_ID}  {VIN,MF\_ID} -> {Model\_Type}  {VIN,MF\_ID} -> {Body\_Type}  {VIN,MF\_ID} -> {Model\_Name}  {VIN,MF\_ID} -> {Model\_Year}  {VIN,MF\_ID} -> {C\_ID}  {VIN,MF\_ID} -> {IN\_ID}  {VIN,C\_ID} -> {Model\_Type}  {VIN,C\_ID} -> {Body\_Type}  {VIN,C\_ID} -> {Model\_Name}  {VIN,C\_ID} -> {Model\_Year}  {VIN,C\_ID} -> {MF\_ID}  {VIN,C\_ID} -> {IN\_ID}  {VIN,IN\_ID} -> {Model\_Type}  {VIN,IN\_ID} -> {Body\_Type}  {VIN,IN\_ID} -> {Model\_Name}  {VIN,IN\_ID} -> {Model\_Year}  {VIN,IN\_ID} -> {MF\_ID}  {VIN,IN\_ID} -> {C\_ID} |

**Table 3. Functional Dependencies of Relation**

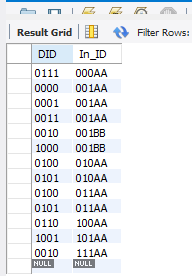
|  |  |
| --- | --- |
| *Relation* | *Normalization* |
| Customer | {C\_ID} -> {Name}  {C\_ID} -> {Address}  {C\_ID} -> {Contact}  {C\_ID} -> {Annual Income} |
| Manufacture | {MF\_ID} -> {MLocation}  {MF\_ID} -> {M\_Name} |
| Inventory | {IN\_ID} -> {IN\_Name}  {IN\_ID} -> {IN\_Location} |
| Spare Parts | {Part\_ID} -> {Supply\_Date}  {Part\_ID} -> {Type}  {Part\_ID} -> {MF\_Date} |
| Spare Part Vendors | {S\_ID} -> {S\_location}  {S\_ID} -> {S\_Name} |
| Option | {Option\_ID} -> {Engine}  {Option\_ID} -> {Transmission}  {Option\_ID} -> {Fuel\_Type}  {Option\_ID} -> {Color} |
| Dealer | {DID} -> {Name}  {DID} -> {Dealer\_Location} |
| Service Center | {Center\_ID} -> {Location}  {Center\_ID} -> {No\_of\_workers}  {Center\_ID} -> {Address} |
| Service Details | {Service\_Ticket} -> {No\_of\_Services}  {Service\_Ticket} -> {Mech\_ID}  {Service\_Ticket} -> {Date\_Recieved}  {Service\_Ticket} -> {Date\_Delivered}  {Service\_Ticket} -> {Center\_ID}  {Service\_Ticket} -> {VIN}  {Service\_Ticket} -> {Amount}  {Service\_Ticket,VIN} -> {No\_of\_Services}  {Service\_Ticket,VIN} -> {Mech\_ID}  {Service\_Ticket,VIN} -> {Date\_Recieved}  {Service\_Ticket,VIN} -> {Date\_Delivered}  {Service\_Ticket,VIN} -> {Center\_ID}  {Service\_Ticket,VIN} -> {Amount}  {Service\_Ticket,Center\_ID} -> {No\_of\_Services}  {Service\_Ticket,Center\_ID} -> {Mech\_ID}  {Service\_Ticket,Center\_ID} -> {Date\_Recieved}  {Service\_Ticket,Center\_ID} -> {Date\_Delivered}  {Service\_Ticket,Center\_ID} -> {Amount} |
| Vehicle | {VIN} -> {Model\_Type}  {VIN} -> {Body\_Type}  {VIN} -> {Model\_Name}  {VIN} -> {Model\_Year}  {VIN} -> {MF\_ID}  {VIN} -> {C\_ID}  {VIN} -> {IN\_ID}  {VIN,MF\_ID} -> {Model\_Type}  {VIN,MF\_ID} -> {Body\_Type}  {VIN,MF\_ID} -> {Model\_Name}  {VIN,MF\_ID} -> {Model\_Year}  {VIN,MF\_ID} -> {C\_ID}  {VIN,MF\_ID} -> {IN\_ID}  {VIN,C\_ID} -> {Model\_Type}  {VIN,C\_ID} -> {Body\_Type}  {VIN,C\_ID} -> {Model\_Name}  {VIN,C\_ID} -> {Model\_Year}  {VIN,C\_ID} -> {MF\_ID}  {VIN,C\_ID} -> {IN\_ID}  {VIN,IN\_ID} -> {Model\_Type}  {VIN,IN\_ID} -> {Body\_Type}  {VIN,IN\_ID} -> {Model\_Name}  {VIN,IN\_ID} -> {Model\_Year}  {VIN,IN\_ID} -> {MF\_ID}  {VIN,IN\_ID} -> {C\_ID} |

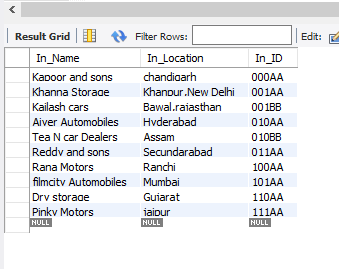
**Table 4. Normalized table**

**Customer **

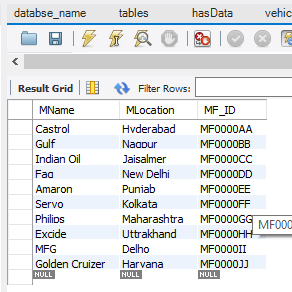
**Dealer**

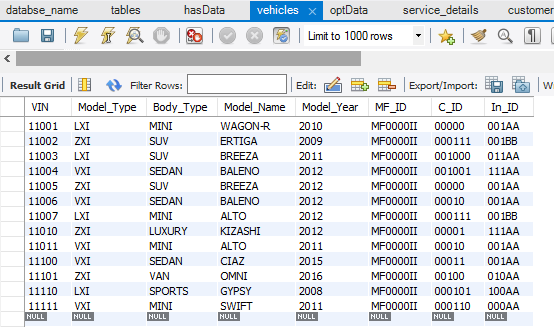
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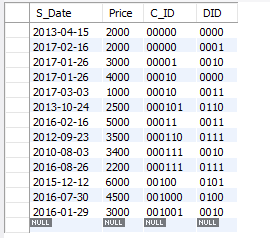


**Inventory**

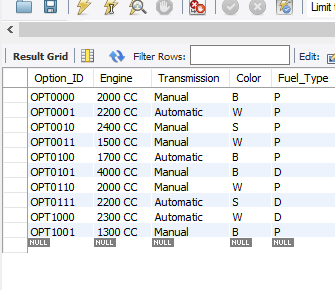
**Manufacturer**

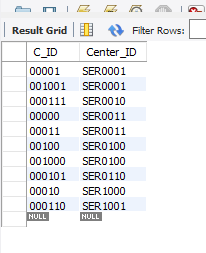


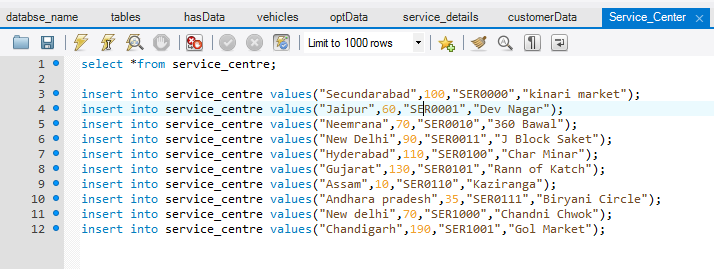
**Vehicle**

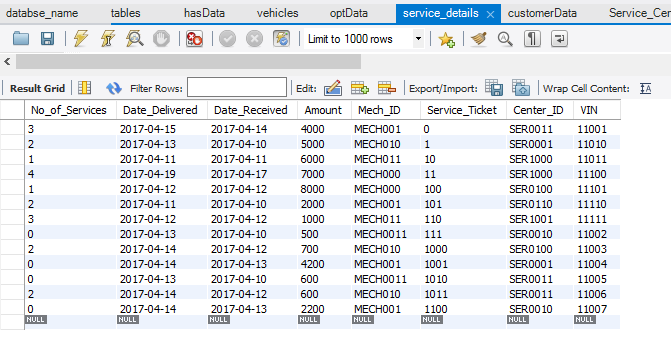
**Sales**

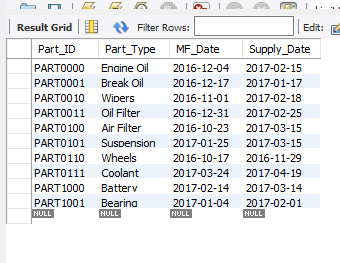
**OPT**

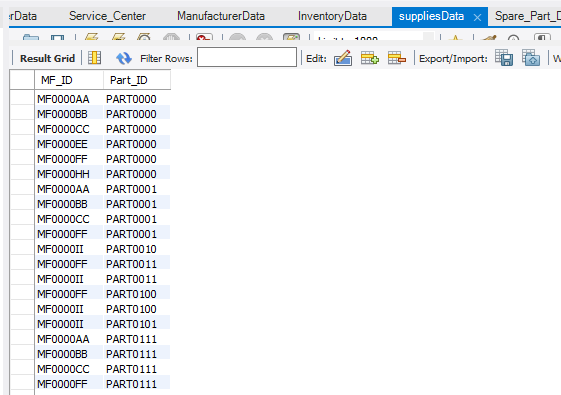


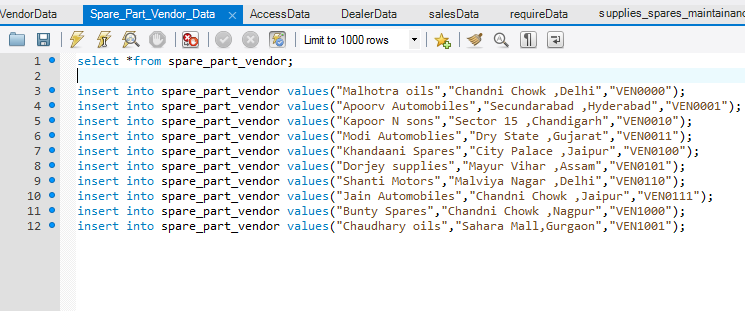
**Require**

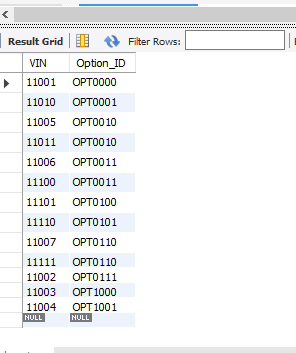
**Service Center**

**Service Details**

**Spare Part**

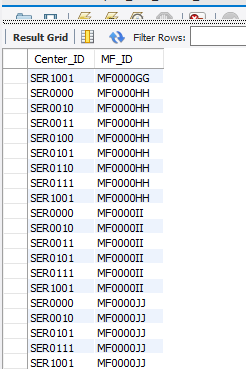
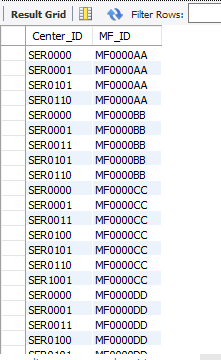
**Supplies**

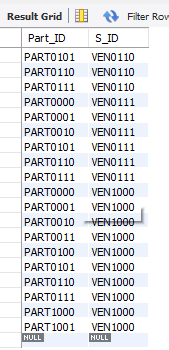
**Spare Part Vendor**

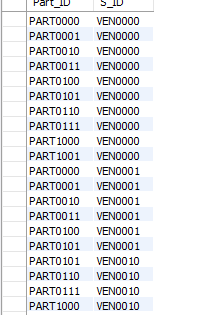
**Has**

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**Supplies Spares**

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**Vendor**

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