IS 441 Group Project

Natalie Windisch

Fall 2019

12 03, 2018

HONDA

Introduction:

- Founded in 1948 in Hamamatsu, Japan.
- Honda opened its first U.S. store in Los Angeles, CA, in 1959.
- Supplies products of the highest quality, at a reasonable price for worldwide customer satisfaction.
- “The Power of Dreams” is Honda’s belief to create intelligent products that enhance mobility and increase the joy in people’s lives.

Introduction Continued…

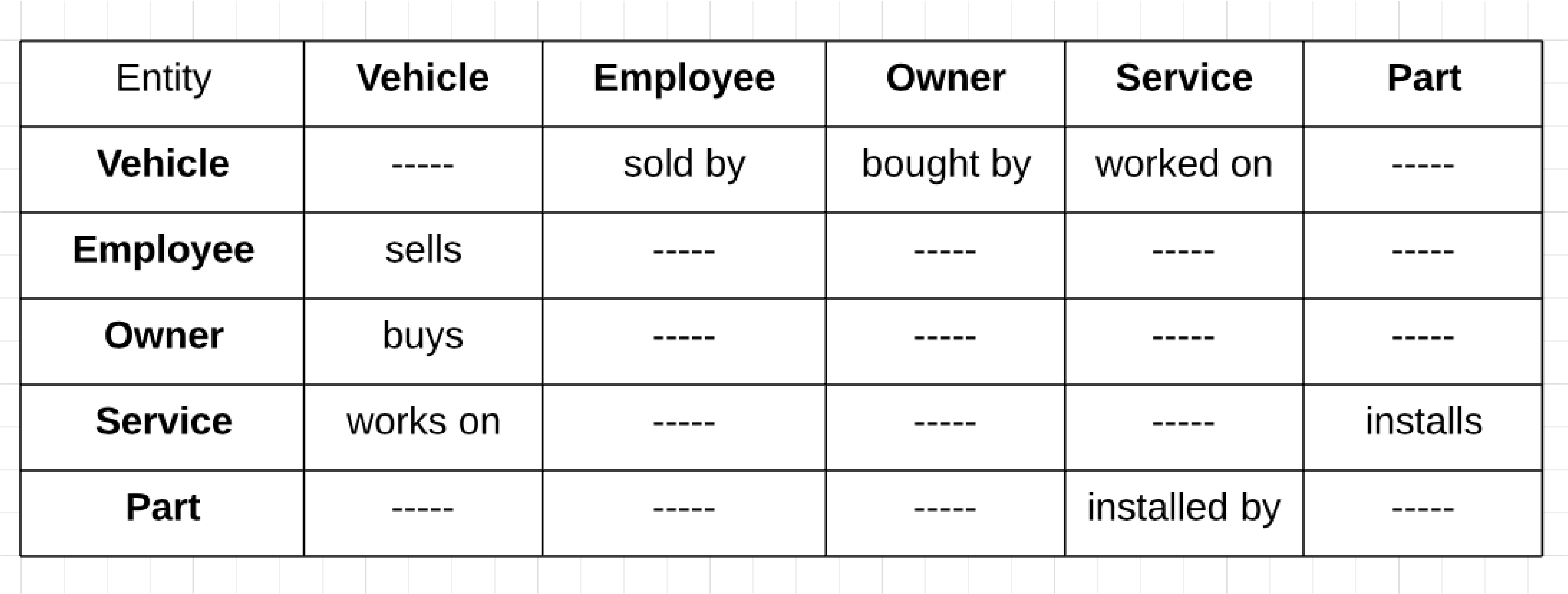
- Conceptual logical design focuses on one dealership located on 7514 Reseda Blvd, Reseda, CA 91335.
- Honda’s Problem: File processing method has multiple data redundancies causing many maintenance headaches and risk of compromising data integrity.

- IS 441 Group Purpose:

Create an ERD which improves Honda’s data redundancies, eliminates the maintenance headaches and risk of compromising data integrity.

Business Rules and ERD

Entity Relationship Matrix:



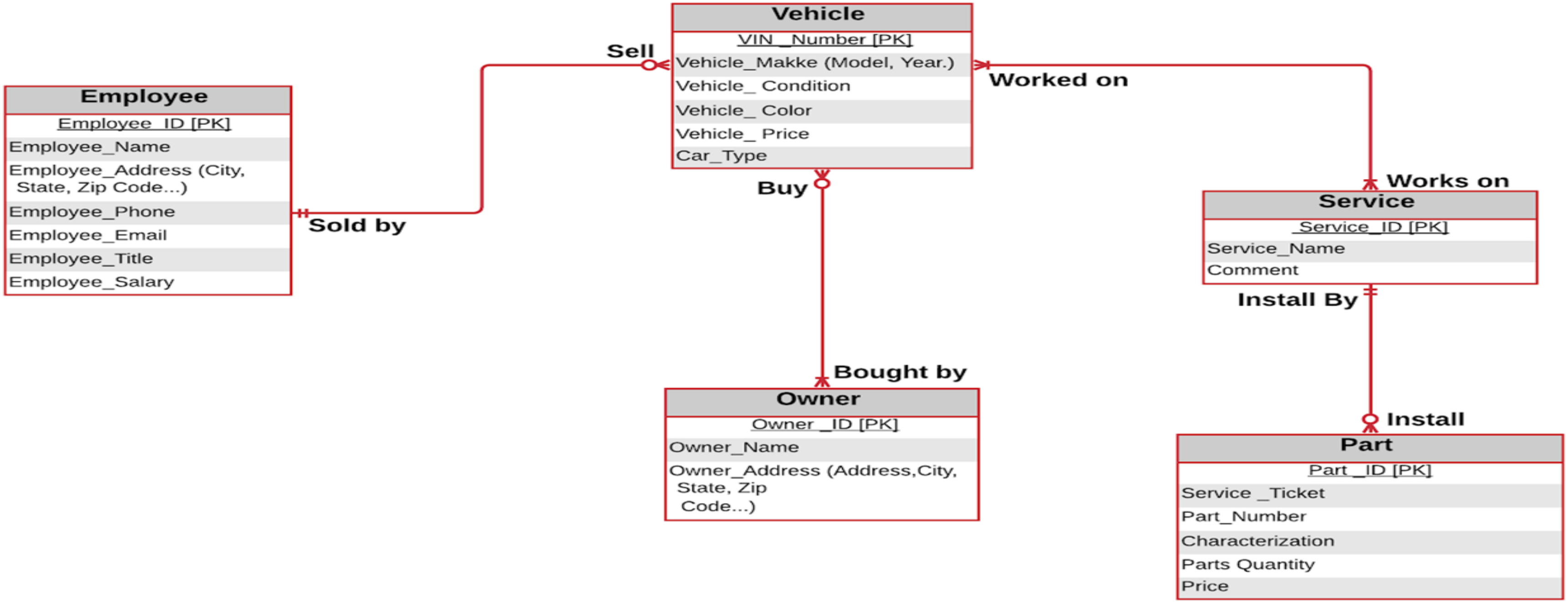
Entity	**Vehicle**	**Employee**	**Owner**	**Service**	**Part**
Vehicle	-----	sold by	bought by	worked on	-----
Employee	sells	-----	-----	-----	-----
Owner	buys	-----	-----	-----	-----
Service	works on	-----	-----	-----	installs
Part	-----	-----	-----	installed by	-----

Business Rules:

- Each employee can sell many vehicles; Each vehicle must be sold by one and only one employee.
- Each vehicle is worked on by at least one service; Each service works on at least one vehicle.
- Each service can install many parts; Each part must be installed by one and only one service.
- Each vehicle can be bought by one or more owners; Each owner can buy many vehicles.

Entity Relationship Diagram Example (UML Notation)

| December 3, 2019



Vehicle

VIN _Number [PK]
Vehicle_Makke (Model, Year.)
Vehicle_ Condition
Vehicle_ Color
Vehicle_ Price
Car_Type

Employee

Employee_ID [PK]
Employee_Name
Employee_Address (City, State, Zip Code...)
Employee_Phone
Employee_Email
Employee_Title
Employee_Salary

Service

Service_ID [PK]
Service_Name
Comment

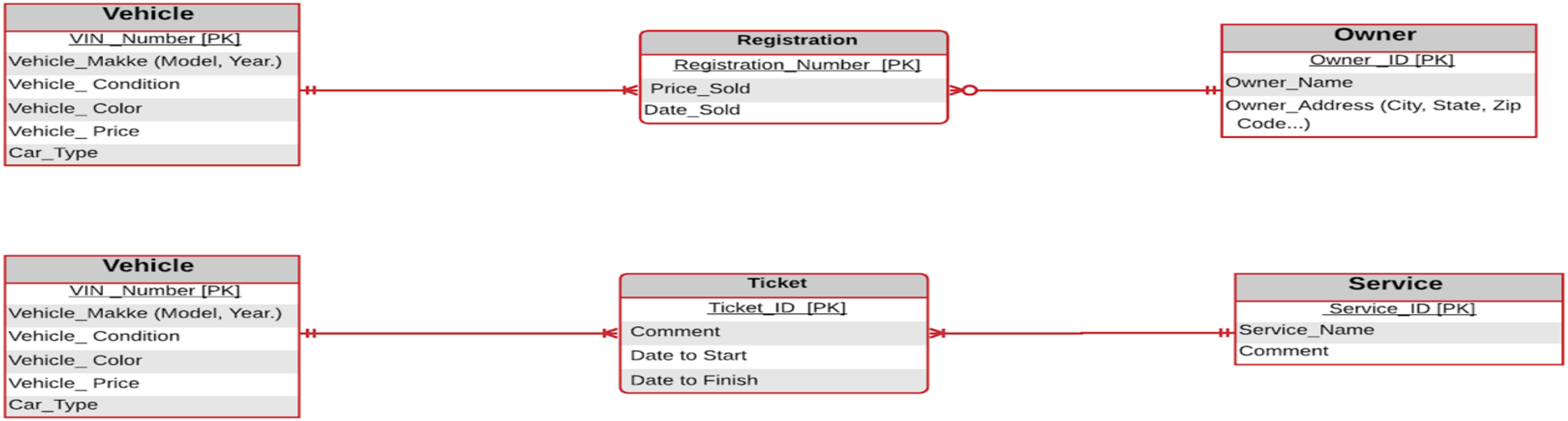
Owner

Owner _ID [PK]
Owner_Name
Owner_Address (Address,City, State, Zip Code...)

Part

Part _ID [PK]
Service _Ticket
Part_Number
Characterization
Parts Quantity
Price

Optimized (Using Associated Entity):



Vehicle

VIN _Number [PK]
Vehicle_Makke (Model, Year.)
Vehicle_ Condition
Vehicle_ Color
Vehicle_ Price
Car_Type

Registration

Registration_Number [PK]
Price_Sold
Date_Sold

Owner

Owner _ID [PK]
Owner_Name
Owner_Address (City, State, Zip Code...)

Vehicle

VIN _Number [PK]
Vehicle_Makke (Model, Year.)
Vehicle_ Condition
Vehicle_ Color
Vehicle_ Price
Car_Type

Ticket

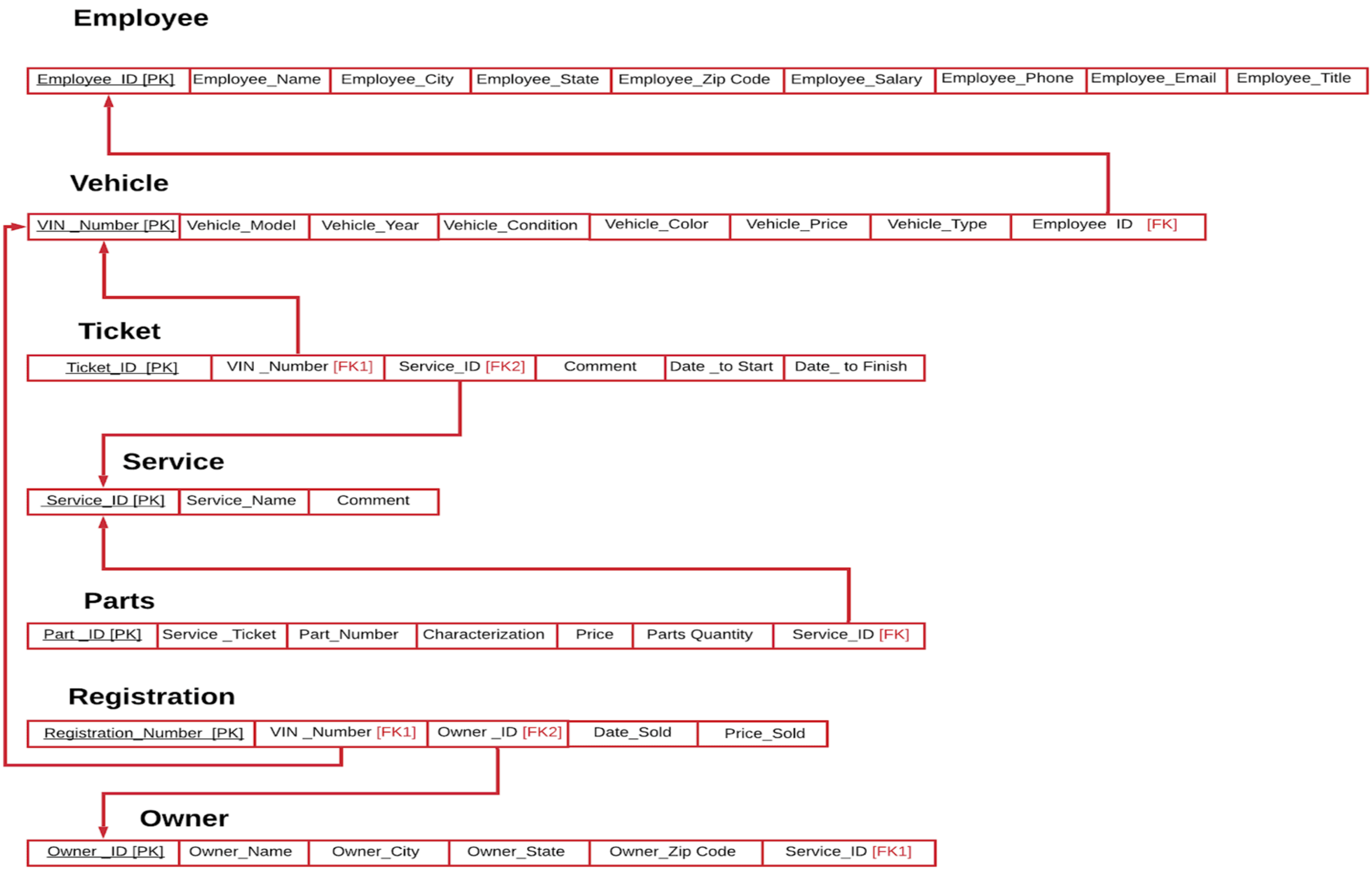
Ticket_ID [PK]
Comment
Date to Start
Date to Finish

Service

Service_ID [PK]
Service_Name
Comment

Relational Data Model

Relational Data Model



Employee

Employee_ID [PK]	Employee_Name	Employee_City	Employee_State	Employee_Zip Code	Employee_Salary	Employee_Phone	Employee_Email	Employee_Title

Vehicle

VIN _Number [PK]	Vehicle_Model	Vehicle_Year	Vehicle_Condition	Vehicle_Color	Vehicle_Price	Vehicle_Type	Employee ID [FK]

Ticket

Ticket_ID [PK]	VIN _Number [FK1]	Service_ID [FK2]	Comment	Date _to Start	Date_ to Finish

Service

Service_ID [PK]	Service_Name	Comment

Parts

Part _ID [PK]	Service _Ticket	Part_Number	Characterization	Price	Parts Quantity	Service_ID [FK]

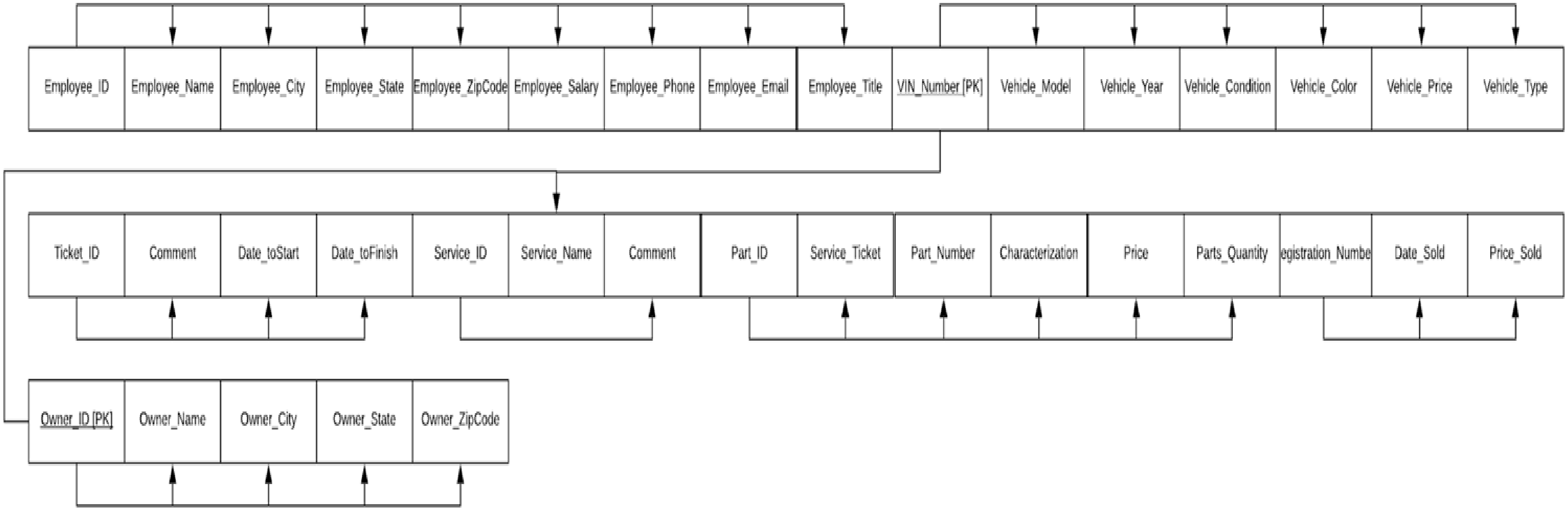
Registration

Registration_Number [PK]	VIN _Number [FK1]	Owner _ID [FK2]	Date_Sold	Price_Sold

Owner

Owner _ID [PK]	Owner_Name	Owner_City	Owner_State	Owner_Zip Code	Service_ID [FK1]

Functional Dependency Diagram:



Employee_ID	Employee_Name	Employee_City	Employee_State	Employee_ZipCode	Employee_Salary	Employee_Phone	Employee_Email	Employee_Title	VIN_Number [PK]	Vehicle_Model	Vehicle_Year	Vehicle_Condition	Vehicle_Color	Vehicle_Price	Vehicle_Type

Ticket_ID	Comment	Date_toStart	Date_toFinish	Service_ID	Service_Name	Comment	Part_ID	Service_Ticket	Part_Number	Characterization	Price	Parts_Quantity	egistration_Numbe	Date_Sold	Price_Sold

Owner_ID [PK]	Owner_Name	Owner_City	Owner_State	Owner_ZipCode

Full Dep: (Owner_ID, VIN_Number) -> Service_Name

Transitive Dep: Emlpoyee_ID -> Elpoyee_Name, Employee_City, Employee_State, Empoyee_ZipCode, Employee_Salary, Employee_Phone, Empoyee_Email, Employe_Title

Partial Dep: VIN_Number -> Vehicle_make, Vehical_Model, Vehicle_Year, Vehicle_new, Vehicle_Used, Vehicle_Coupe, Vehicle_Hybrid, Vehicle_Sedan

Transitive Dep: Ticket_ID -> Comment, Date_toStart, Date_toFinish

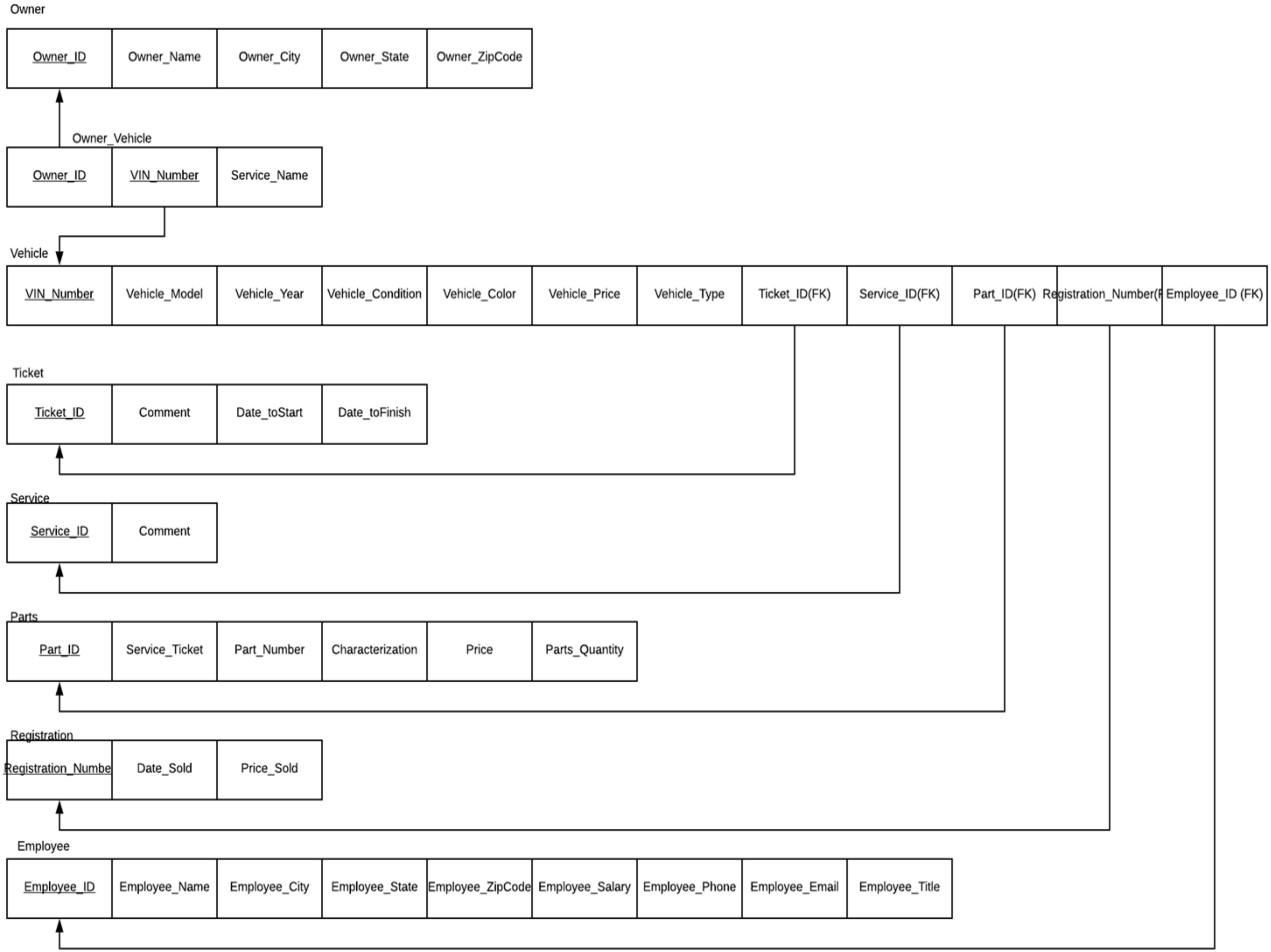
Transitive Dep: Service_ID -> Comment

Transitive Dep: Part_ID -> Service_Ticket, Part_Number, Characterization, Price, Parts_Quantity

Transitive Dep: Registration_Number -> Date_Sold, Price_Sold,

Partial Dep: Owner_ID -> Owner_Name, Owner_City, Owner_State, Owner_ZipCode,

Normalization to the 3rd Normal Form



Owner

Owner_ID	Owner_Name	Owner_City	Owner_State	Owner_ZipCode

Owner_Vehicle

Owner_ID	VIN_Number	Service_Name

Vehicle

VIN_Number	Vehicle_Model	Vehicle_Year	Vehicle_Condition	Vehicle_Color	Vehicle_Price	Vehicle_Type	Ticket_ID(FK)	Service_ID(FK)	Part_ID(FK)	Registration_Number(F	Employee_ID (FK)

Ticket

Ticket_ID	Comment	Date_toStart	Date_toFinish

Service

Service_ID	Comment

Parts

Part_ID	Service_Ticket	Part_Number	Characterization	Price	Parts_Quantity

Registration

Registration_Numbe	Date_Sold	Price_Sold

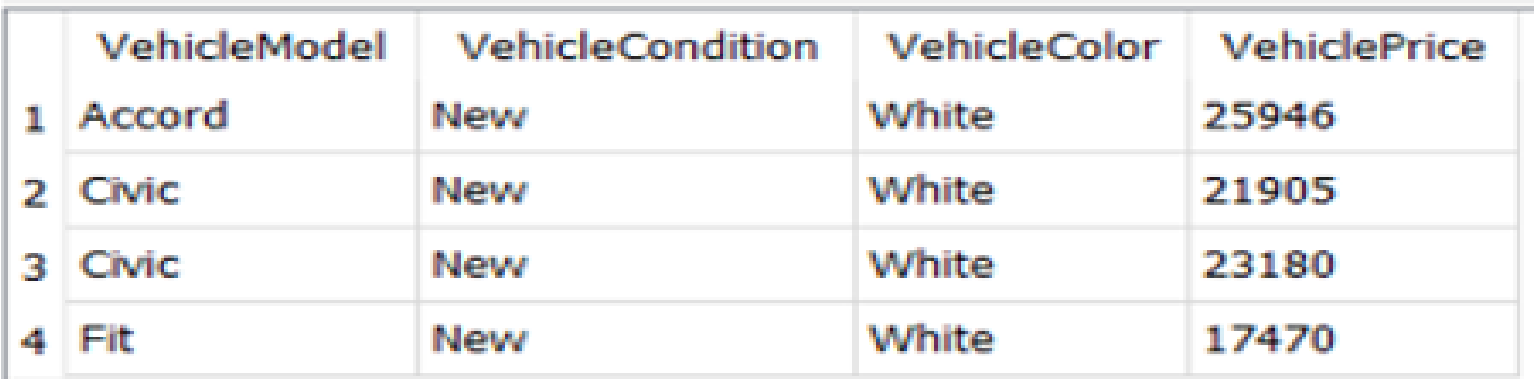
Employee

Employee_ID	Employee_Name	Employee_City	Employee_State	Employee_ZipCode	Employee_Salary	Employee_Phone	Employee_Email	Employee_Title

10 Query Questions:

1. **Display the vehicle models for every new vehicle condition and white color, whose price is less than $30,000.**

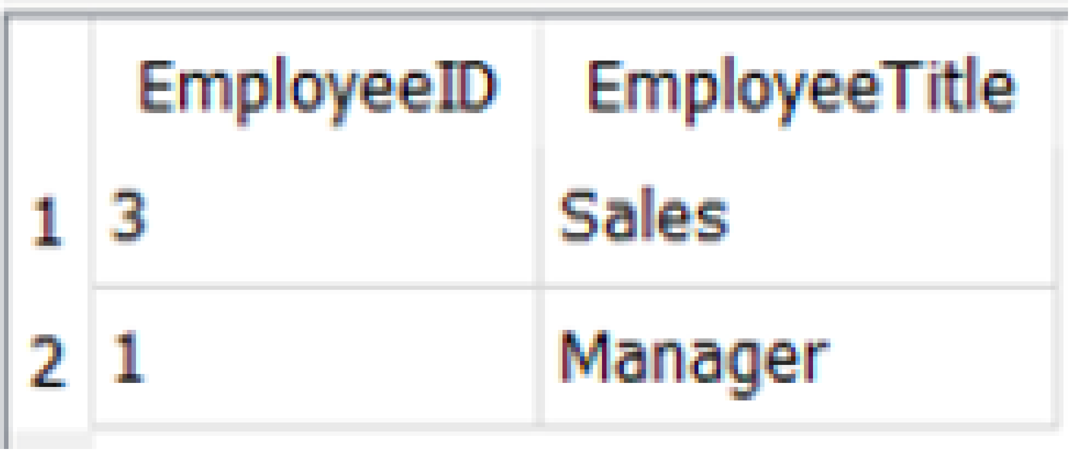
```
SELECT VehicleModel, VehicleConidition, VehicleColor, VehiclePrice
FROM Vehicle_T
WHERE VehicleConiditon NOT IN (‘Pre-Owned’)
AND Vehiclecolor=(‘White’)
AND VehiclePrice<30000;
```



	VehicleModel	VehicleCondition	VehicleColor	VehiclePrice
1	Accord	New	White	25946
2	Civic	New	White	21905
3	Civic	New	White	23180
4	Fit	New	White	17470

2. List the employee’s ID and titles who live in the city of Northridge that sold a car.

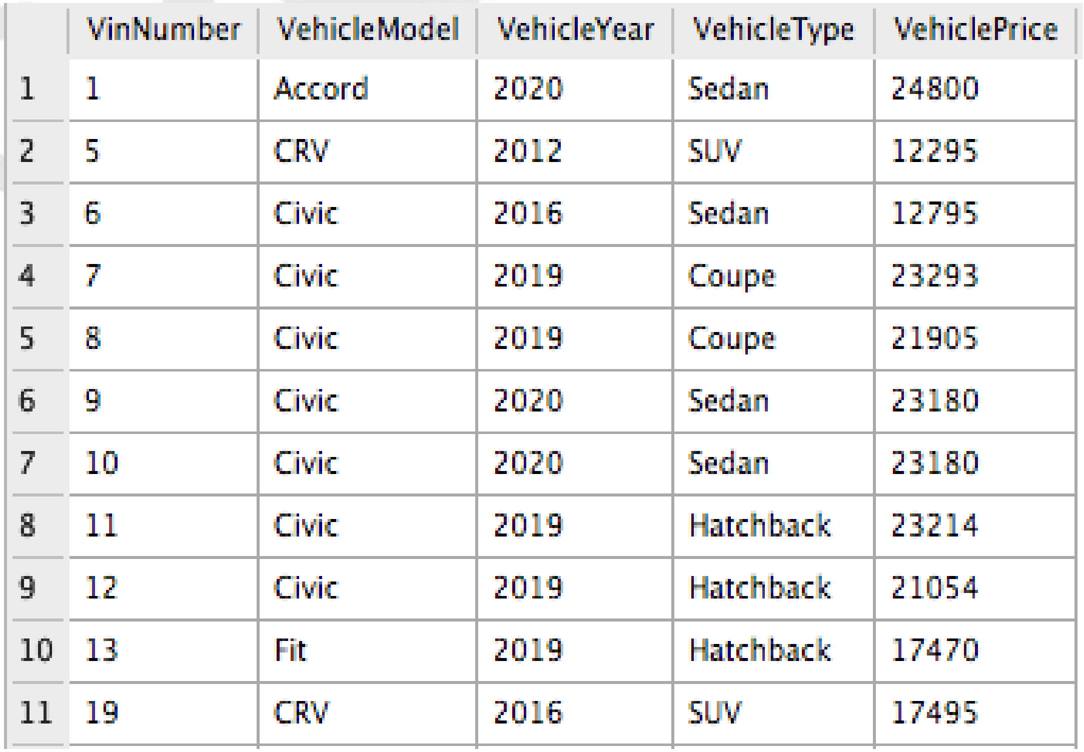
```
SELECT DISTINCT Employee_T.EmployeeID, EmployeeTitle
FROM Employee_T INNER JOIN Vehicle_T
ON Employee_T.EmployeeID=Vehicle_T.EmployeeID
AND EmployeeCity IN (‘Northridge’);
```



	EmployeeID	EmployeeTitle
1	3	Sales
2	1	Manager

3. List Vin number, VehicleModel, VehicleYear, VehicleType, and Vehicle Price with less than Average Vehicle Price of all Vehicles.

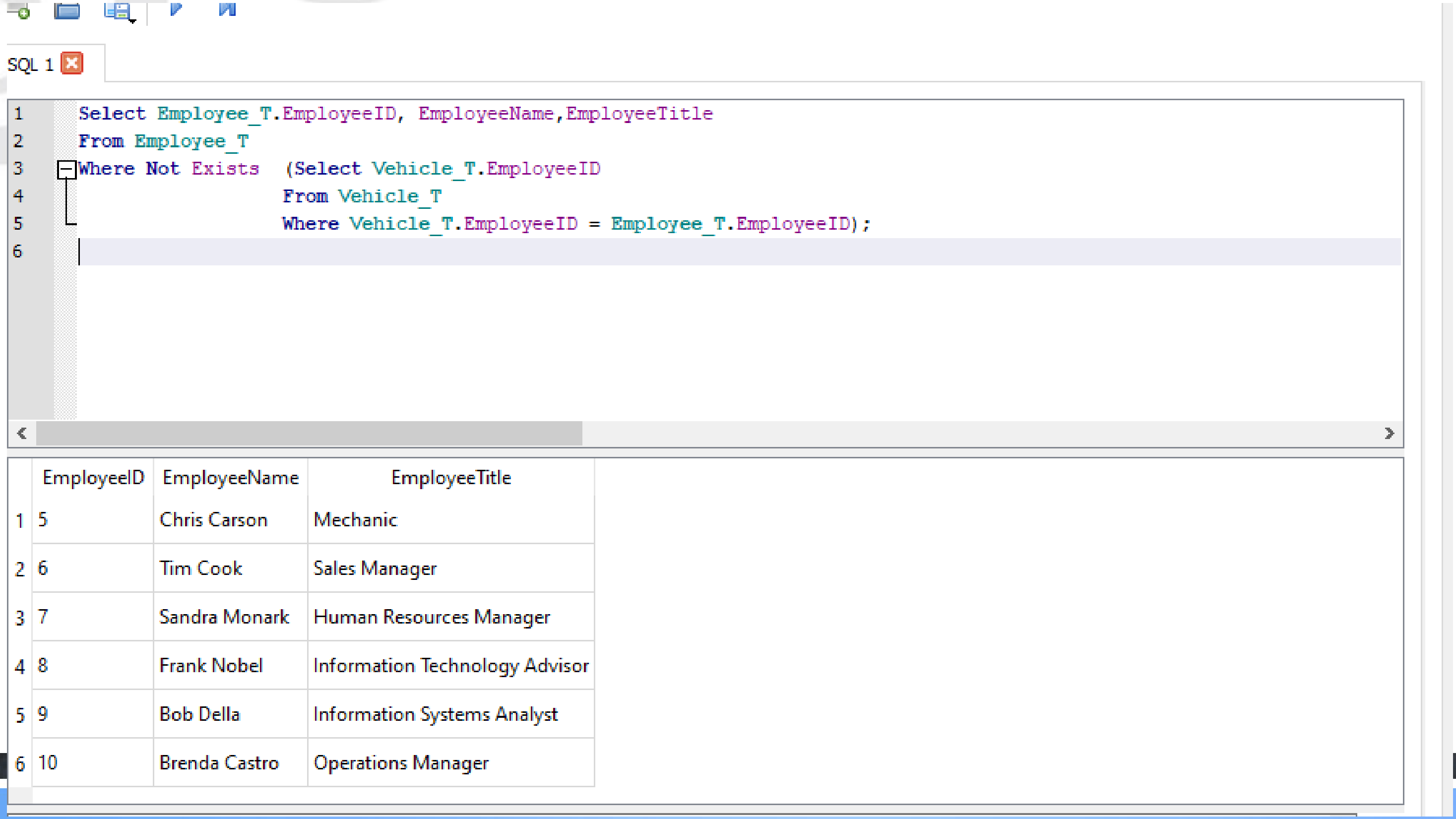
```
Select Vehicle_T.VinNumber, VehicleModel, VehicleYear, VehicleType, VehiclePrice
From Vehicle_T
Where VehiclePrice <(Select Avg(VehiclePrice)
                  From Vehicle_T);
```



	VinNumber	VehicleModel	VehicleYear	VehicleType	VehiclePrice
1	1	Accord	2020	Sedan	24800
2	5	CRV	2012	SUV	12295
3	6	Civic	2016	Sedan	12795
4	7	Civic	2019	Coupe	23293
5	8	Civic	2019	Coupe	21905
6	9	Civic	2020	Sedan	23180
7	10	Civic	2020	Sedan	23180
8	11	Civic	2019	Hatchback	23214
9	12	Civic	2019	Hatchback	21054
10	13	Fit	2019	Hatchback	17470
11	19	CRV	2016	SUV	17495

4. List EmployeeID, names of the employees and their Job titles that did not sell a car.

```
Select Employee_T.EmployeeID, EmployeeName,EmployeeTitle
From Employee_T
Where Not Exists  (Select Vehicle_T.EmployeeID
                From Vehicle_T
                Where Vehicle_T.EmployeeID = Employee_T.EmployeeID);
```



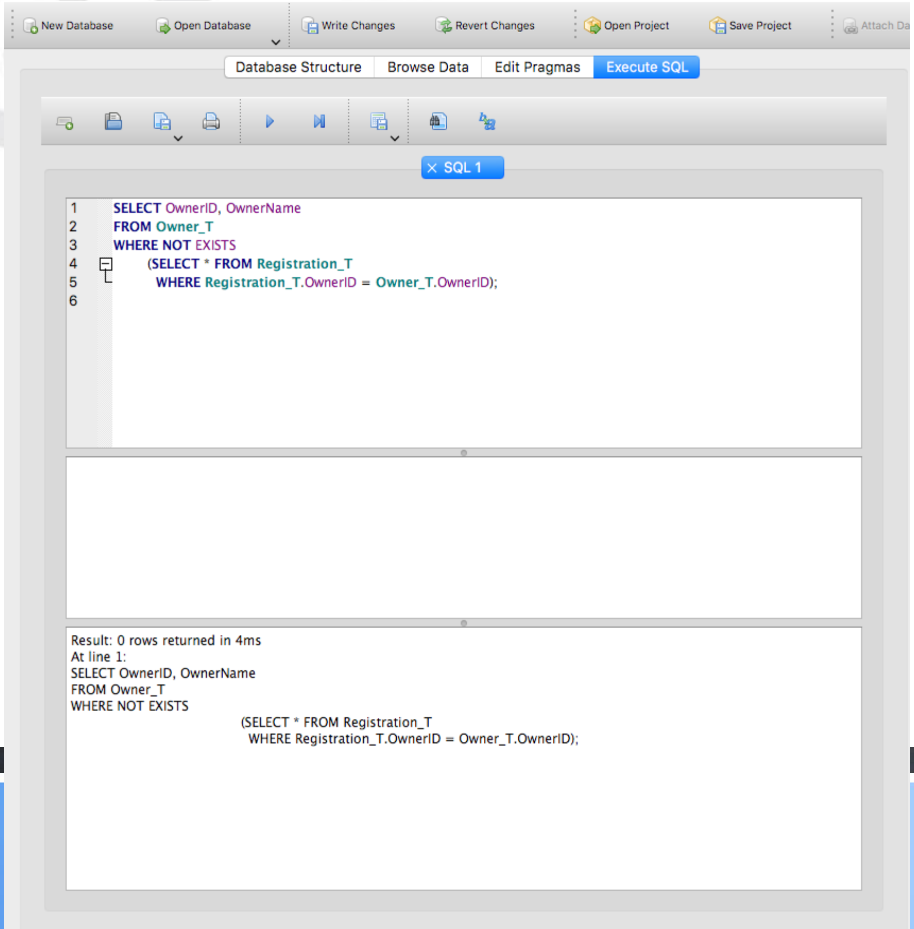
SQL 1

```
Select Employee_T.EmployeeID, EmployeeName,EmployeeTitle
From Employee_T
Where Not Exists  (Select Vehicle_T.EmployeeID
                   From Vehicle_T
                   Where Vehicle_T.EmployeeID = Employee_T.EmployeeID);
```

	EmployeeID	EmployeeName	EmployeeTitle
1	5	Chris Carson	Mechanic
2	6	Tim Cook	Sales Manager
3	7	Sandra Monark	Human Resources Manager
4	8	Frank Nobel	Information Technology Advisor
5	9	Bob Della	Information Systems Analyst
6	10	Brenda Castro	Operations Manager

5. List Owner ID and Owner Names for Owner that did not place any Registration.

```
SELECT OwnerID, OwnerName
FROM Owner_T
WHERE NOT EXISTS
              (SELECT * FROM Registration_T
                WHERE Registration_T.OwnerID = Owner_T.OwnerID);
```

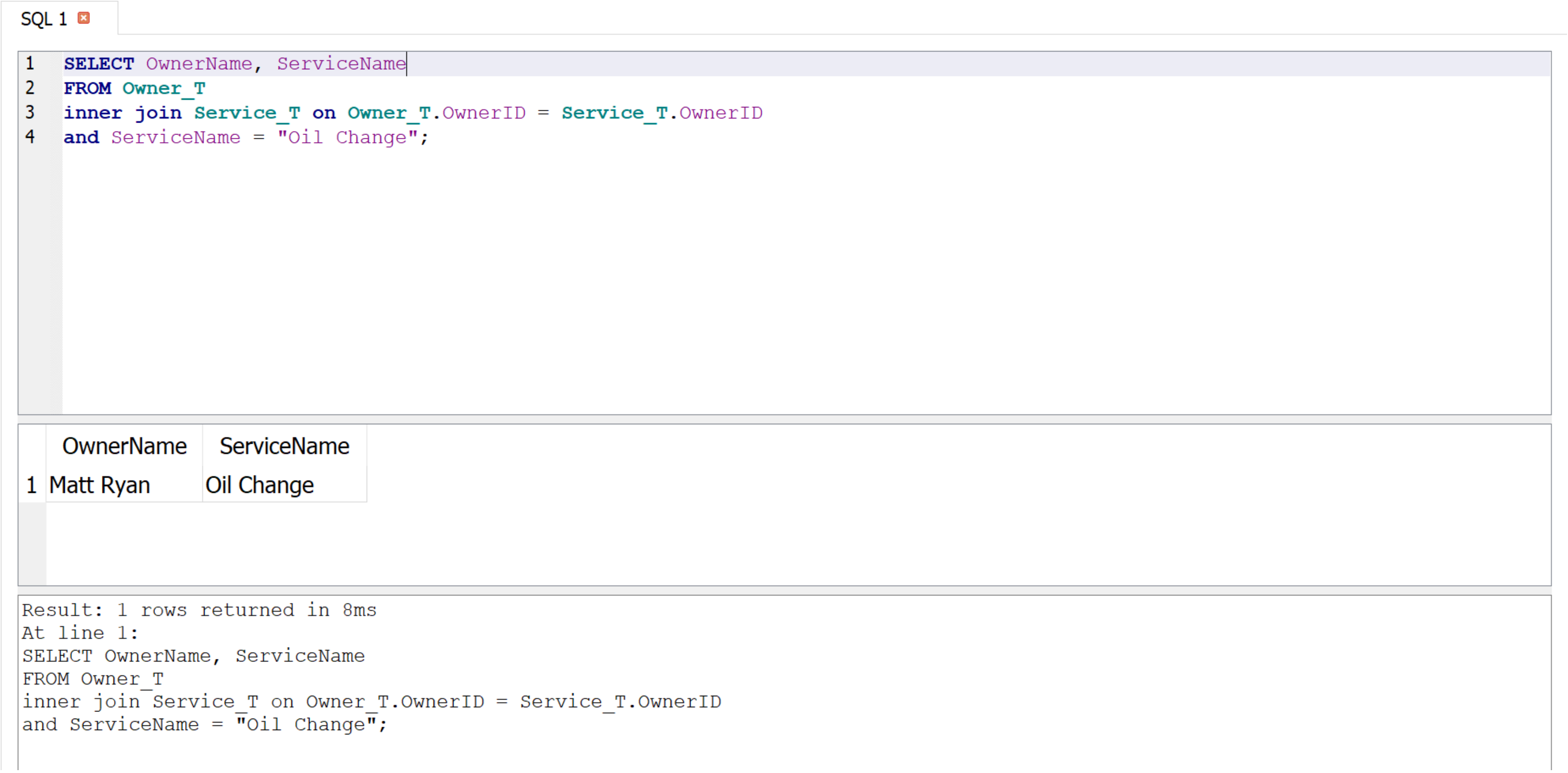


```
SELECT OwnerID, OwnerName
FROM Owner_T
WHERE NOT EXISTS
     (SELECT * FROM Registration_T
      WHERE Registration_T.OwnerID = Owner_T.OwnerID);
```

```
Result: 0 rows returned in 4ms
At line 1:
SELECT OwnerID, OwnerName
FROM Owner_T
WHERE NOT EXISTS
                              (SELECT * FROM Registration_T
                                WHERE Registration_T.OwnerID = Owner_T.OwnerID);
```

6. List all owner names that had an oil change.

SELECT OwnerName, ServiceName
FROM Owner_T
INNER JOIN Service_T ON Owner_T.OwnerID = Service_T.OwnerID
AND ServiceName = “Oil Change”;



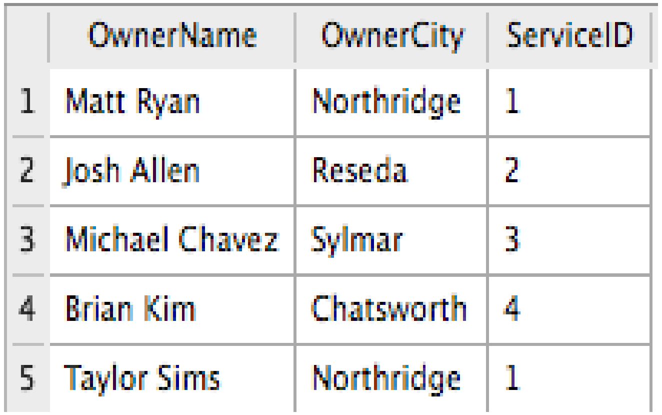
```
SELECT OwnerName, ServiceName
FROM Owner_T
inner join Service_T on Owner_T.OwnerID = Service_T.OwnerID
and ServiceName = "Oil Change";
```

	OwnerName	ServiceName
1	Matt Ryan	Oil Change

```
Result: 1 rows returned in 8ms
At line 1:
SELECT OwnerName, ServiceName
FROM Owner_T
inner join Service_T on Owner_T.OwnerID = Service_T.OwnerID
and ServiceName = "Oil Change";
```

7. List all owner names and their city that had any service done.

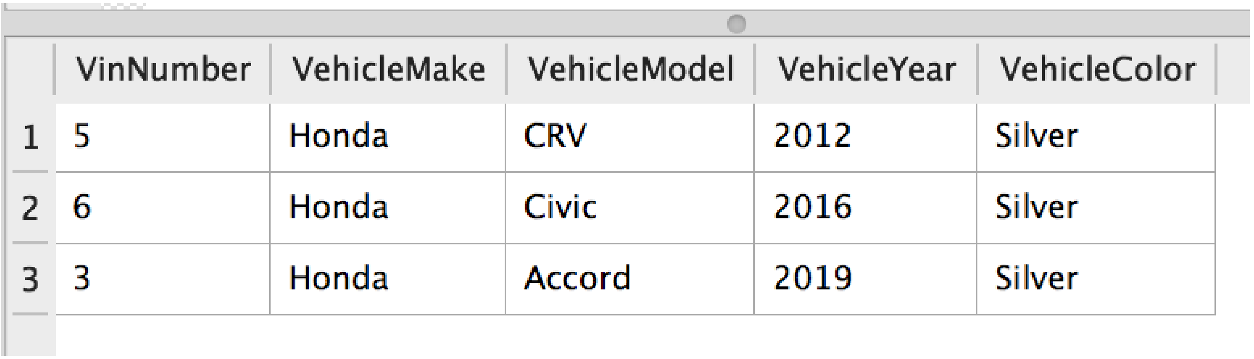
```
SELECT OwnerName, OwnerCity, ServiceID
FROM Owner_T
WHERE ServiceID IN (SELECT ServiceID FROM Service_T);
```



	OwnerName	OwnerCity	ServiceID
1	Matt Ryan	Northridge	1
2	Josh Allen	Reseda	2
3	Michael Chavez	Sylmar	3
4	Brian Kim	Chatsworth	4
5	Taylor Sims	Northridge	1

8. List VinNumber, VehicleMake, VehicleModel, VehicleYear, and VehicleColor of vehicles that had any service done and if the vehicle was silver. Order by the year of the vehicle.

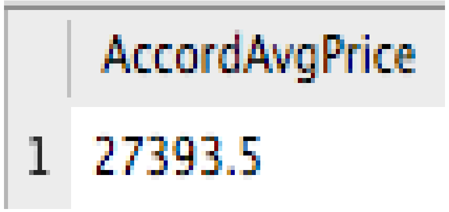
```
   SELECT Vehicle_T.VinNumber, VehicleMake, VehicleModel, VehicleYear, VehicleColor
FROM Vehicle_T, Ticket_T
WHERE Vehicle_T.VinNumber = Ticket_T.VinNumber
AND VehicleColor = 'Silver'
ORDER BY VehicleYear;
```



	VinNumber	VehicleMake	VehicleModel	VehicleYear	VehicleColor
1	5	Honda	CRV	2012	Silver
2	6	Honda	Civic	2016	Silver
3	3	Honda	Accord	2019	Silver

9. List the average price of all Accords.

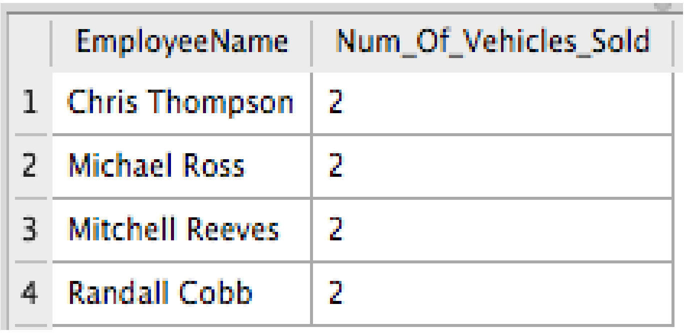
```
   SELECT AVG(VehiclePrice) AS AccordAvgPrice
FROM Vehicle_T
WHERE VehicleModel = 'Accord’;
```



```
   AccordAvgPrice
1  27393.5
```

10. For each employee with greater than or equal to 1 vehicle, display their names and number of times each employee sold a vehicle. Label number of times as Num_of_Vehicles_Sold.

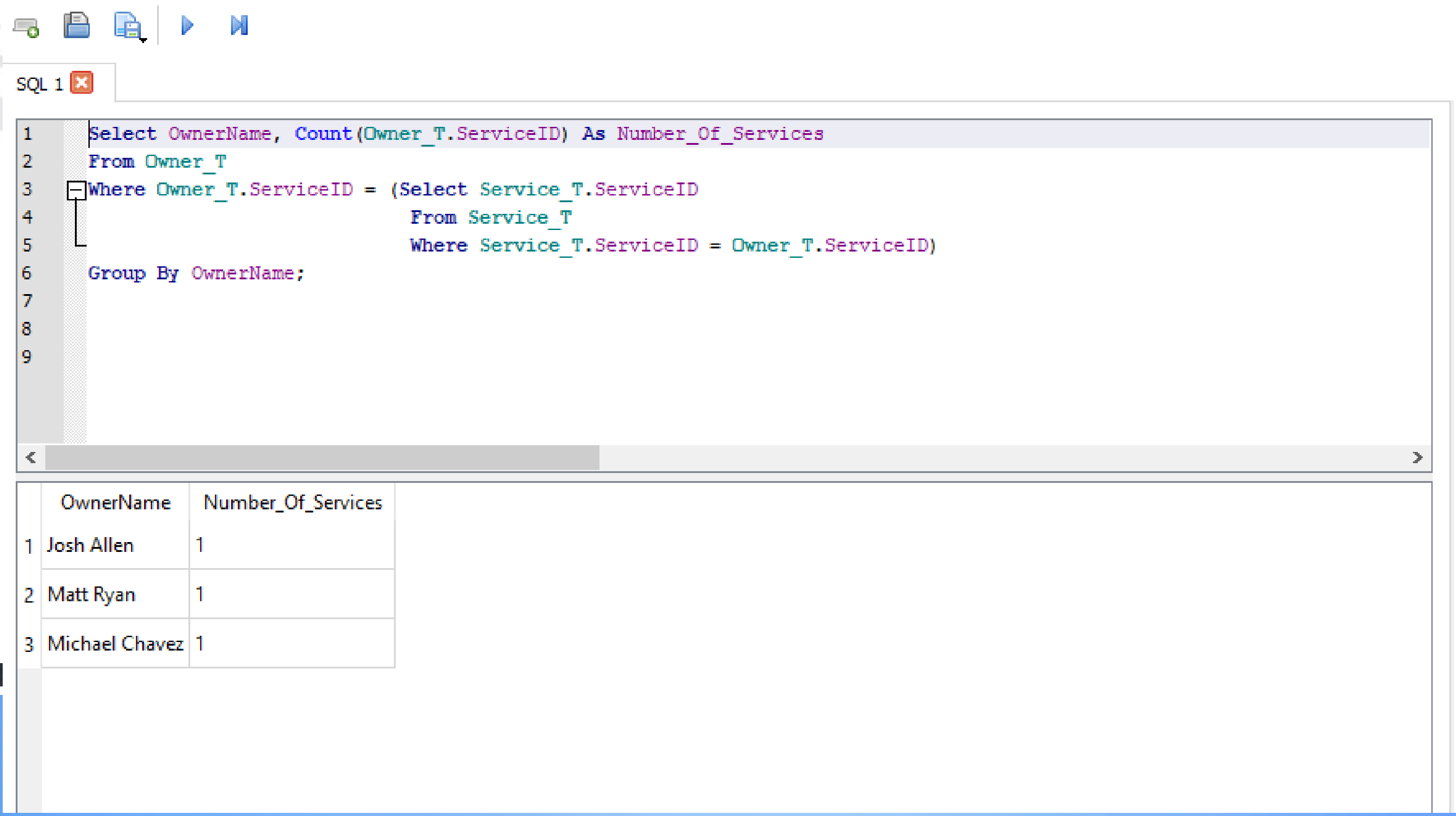
```
Select EmployeeName, Count(Vehicle_T.EmployeeID) As Num_Of_Vehicles_Sold
From Employee_T Left Outer Join Vehicle_T
On Employee_T.EmployeeID = Vehicle_T.EmployeeID
Group By EmployeeName
Having Count (Vehicle_T.EmployeeID) >= 1;
```



	EmployeeName	Num_Of_Vehicles_Sold
1	Chris Thompson	2
2	Michael Ross	2
3	Mitchell Reeves	2
4	Randall Cobb	2

11. How many services did each owner have? Display the owner names.

```
Select OwnerName, Count(Owner_T.ServiceID) As Number_Of_Services
From Owner_T
Where Owner_T.ServiceID = (Select Service_T.ServiceID
              From Service_T
              Where Service_T.ServiceID = Owner_T.ServiceID)
Group By OwnerName;
```



```
Select OwnerName, Count(Owner_T.ServiceID) As Number_Of_Services
From Owner_T
Where Owner_T.ServiceID = (Select Service_T.ServiceID
                            From Service_T
                            Where Service_T.ServiceID = Owner_T.ServiceID)
Group By OwnerName;
```

	OwnerName	Number_Of_Services
1	Josh Allen	1
2	Matt Ryan	1
3	Michael Chavez	1

Questions