



CAR SERVICE CENTER

DATABASE SYSTEM

Car Service Center System

This document is detailed document from A-Z for our “CSE 346:Advanced Database Systems” semester project which we chose to be implementing a Database System for a Car Service Center.

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Introduction

This database is mainly directed towards car service centers. Car service centers are complex systems consisting of multiple perspectives to look at from customers to mechanics to maintenance employees. Each of these actors affect the system differently but surely effectively. The goal is to separate the information between the actors in their description and the components with their information.

A car service center is by default divided into a number of departments. All customers should be directed to a specific department according to the kind of problem their car has. Each department contains a number of specialized Engineers.

All actors need different attributes which will be discussed in details in the next subject but all of them either an employee or customer must have a different ID to try and separate them so that there are no complications. Also, the component parts are going to have serial numbers for the ease of finding.

One of the most important principles in a car service center is customers/employees privacy. Different actors can access the system but must have a limited view of which data they can access. Customers can access only their car repair history report and see what services are available in the center. Engineers can access all customers' cars information to check up with them. Administrators can access some personal information of mechanics and customers to reach them when needed.

Entities

Attributes with 2 words are separated by ' _ ' but it may not appear normally if it is underlined.

Person: SSN, FirstName, Middle_Name, Last_Name, Birthdate, Email, Phone_NO

Customer: City, District, Street_NO, Building_NO

Supplier: Website

Employee: Role, Salary

Engineer: Specialization

Sales Man: Sales_Made

Service Center: Center_ID, No_of_Employees, City, District, Street_NO, Building_NO

Maintenance Task: Task_ID, Task_Date, Price

Car: Plate_NO

Model: Model_Name, Model_Year, Brand

Component: Component_Model, Price

Body: Chassis_Type

Battery: Expiry_Date

Transmission: Type

Engine: Lubricant_Type, Horse_Power

Order: Order_ID, Date, Status, Payment_Method, Total_Cost

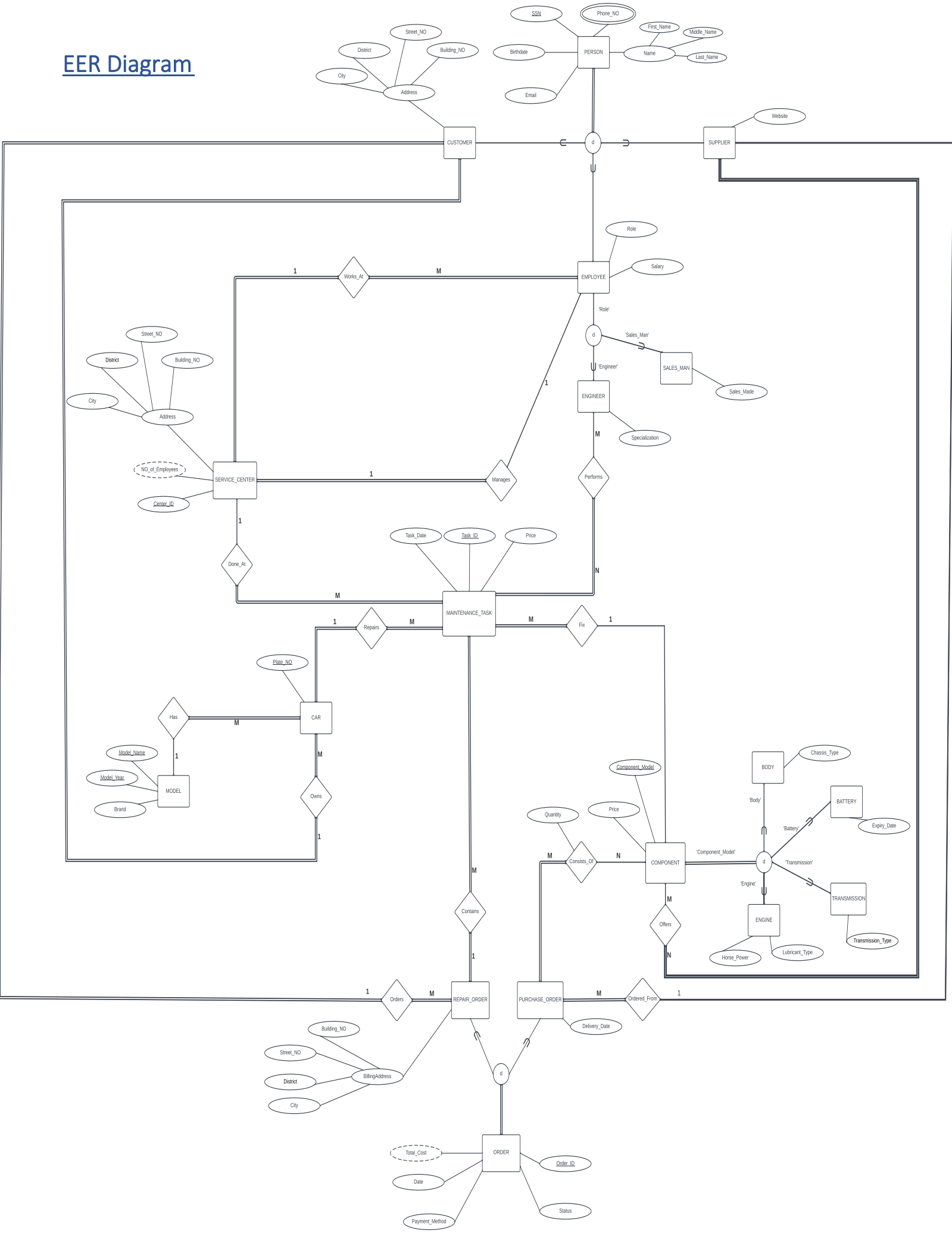
Repair Order: City, District, Street_NO, Building_NO

Purchase Order: Delivery_Date

Assumptions

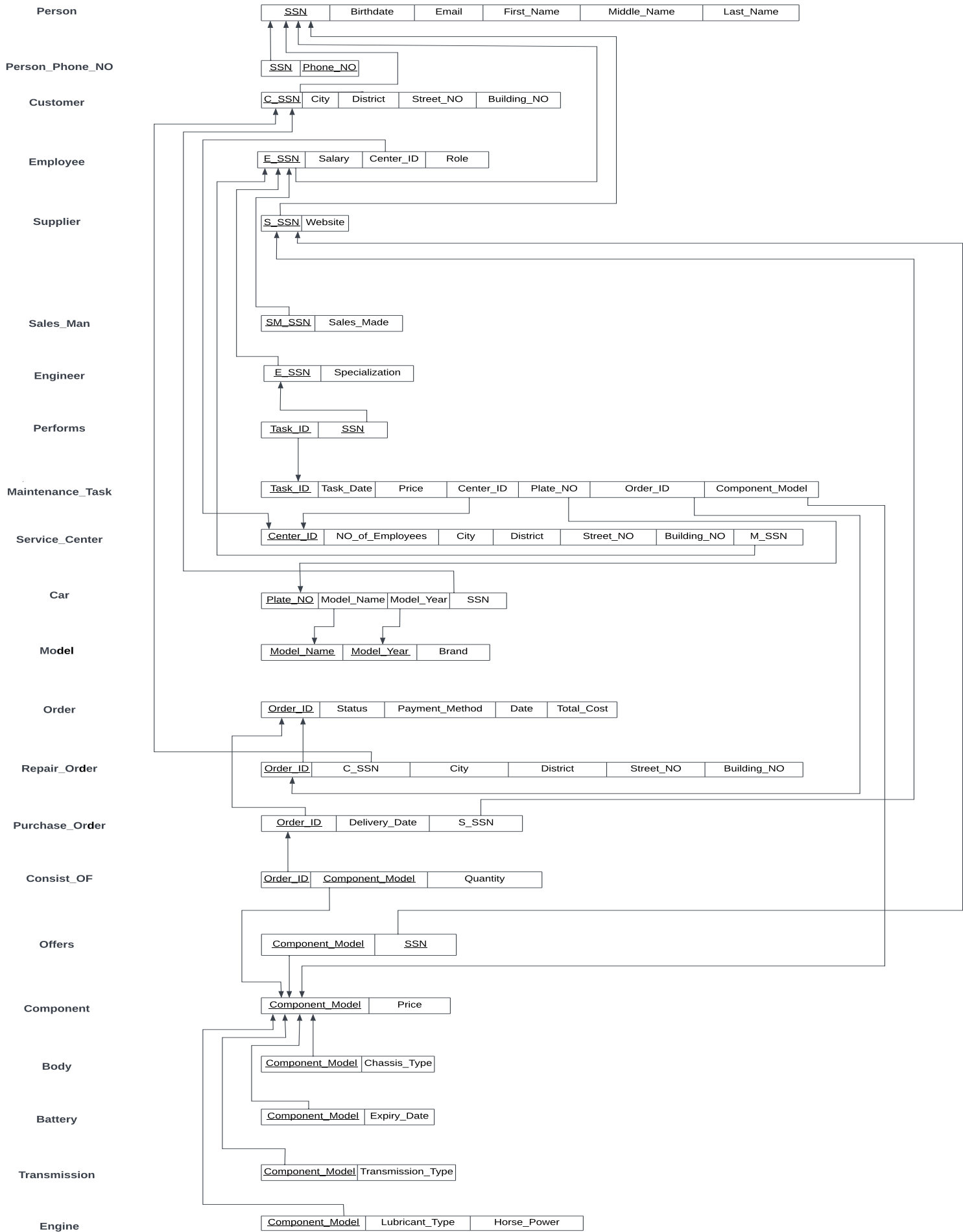
1. *A person may either be a customer, supplier, or an employee.*
2. *A component may either be a battery, body, transmission, or engine.*
3. *An order is either a repair order or purchase order.*
4. *An employee is either a sales employee, engineer, or another type of employee.*
5. *A customer must own at least 1 car, A car is owned by 1 customer.*
6. *A customer must order at least 1 repair order, A repair order is ordered by 1 customer.*
7. *A car has 1 model, A model may be a model of many cars.*
8. *A car must be repaired by at least 1 maintenance task, A maintenance task repairs 1 car.*
9. *A maintenance task is contained in 1 repair order, A repair order contains at least 1 maintenance task.*
10. *A maintenance task fixes 1 component, A component may be fixed in many maintenance tasks.*
11. *A maintenance task is worked on by at least 1 engineer, an engineer may work on many maintenance tasks.*
12. *A maintenance task is done at a service center, A service center may have many maintenance tasks done at it.*
13. *A component may be purchased in many purchase orders, A purchase order consists of at least 1 component.*
14. *A component may be offered by many suppliers, A supplier must offer at least 1 component.*
15. *A purchase order is ordered from 1 supplier, A supplier may sell us many purchase orders.*
16. *A service center is managed by 1 employee, an employee may manage 1 service center.*
17. *A service center must have at least 1 employee working at it, and an employee must work at 1 service center.*
18. *The model of Body component starts with 'A', Battery starts with 'B', Transmission starts with 'C' and Engine starts with 'D'.*

EER Diagram



Database Schema

Attributes with 2 words are separated by '_' but it may not appear normally if it is underlined.



Research Paper Topic

Our Team's research paper topic will be Vectorized Database and its Applications in Artificial Intelligence.

Research Paper links

- <https://arxiv.org/pdf/2402.01763.pdf>
- <https://arxiv.org/pdf/2401.08281.pdf>
- <https://www.sciencedirect.com/science/article/pii/S1389041724000093>
- <https://arxiv.org/pdf/2310.11703.pdf>
- <https://arxiv.org/pdf/2206.13843.pdf>