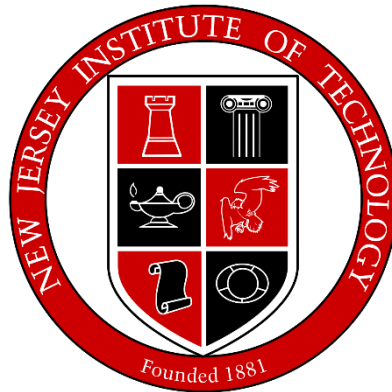# CS631 008 - Data Management Systems Design

# Woody's Automotive Online Application Project

# Final Project Phase -2

# Deliverable – 2

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# Goal of this project:

This phase's objective is to construct a logical design of the Woody's automotive database system, which outlines the requirements for database design and application development. The logical design will give a virtual representation of resulting from the mapping of an EER schema to relational schema.

# EER Diagram:
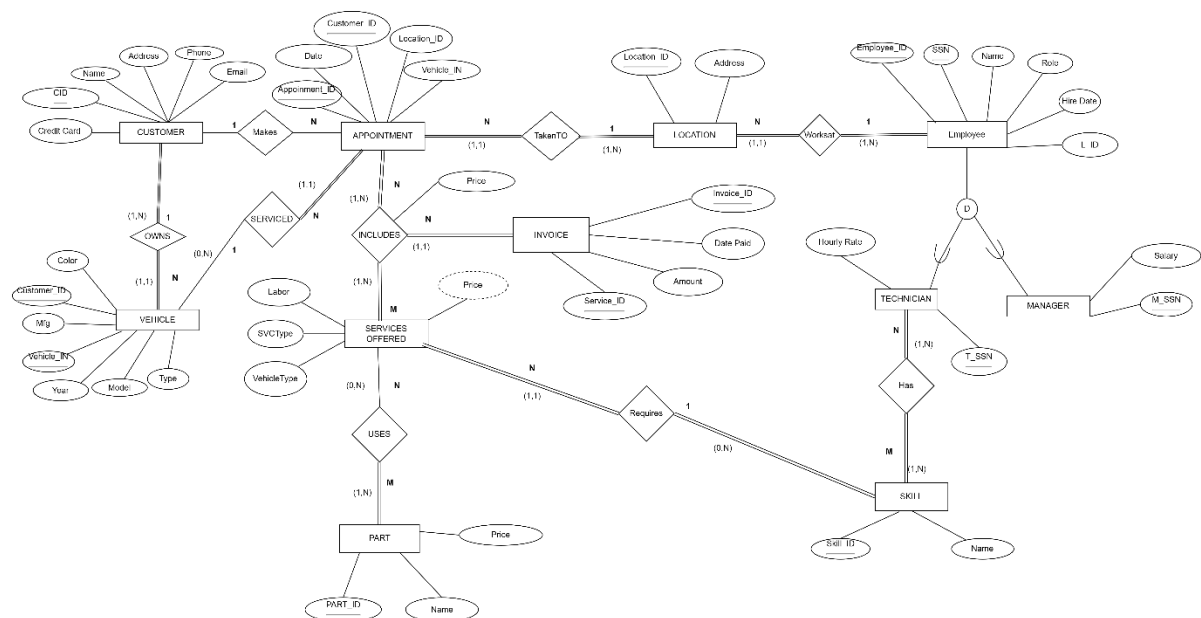


## Steps to construct from EER diagram to Relation mapping:

## Step 1 : Mapping of Strong Entity Types:

While mapping we identify the strong entity types there in our ER diagram. We used the information to create new relations, Simple attributes of the entity type along with a unique attributes that as the primary key for the relation.

The Entities are:

- Customer
- Appointment
- Location
- Employee
- Vehicle
- Services
- Invoice
- Technician
- Manager
- Part
- Skill

## Step 2 : Mapping of Weak Entity Types

Therefore, there is no weak entity relation in ER diagram.

## Step 3 : Mapping of Binary 1:1 Relation Types

We can move on to the other stages of the process because the ER diagram shows a 1:1 link.

## Step 4 : Mapping of Binary 1:N Relationship Types

In this mapping phase, we have determined which entities are a part of a 1: N relationship type. In these situations, the relation that has the N restriction on it needs to be changed.I will be adding new attribute to the N side entity. That will be the key attribute of the other side entity, which will act has a foreign key.

**Customer and Vehicle**: The relationship between Customer and Vehicle is 1: N. We changed the Vehicle relation by adding the CID from the Customer relation as a foreign key.

**Appointment and Location:** The relationship between Appointment and Location is 1:N. We changed the Appointment relation by adding Location_ID from the Appointment relation as a foreign key.

**Customer and Appointment:** The relationship between Customer and Appointment is 1: N. We changed the Appointment relation by adding the Customer_ID from the Customer relation as a foreign key.

**Location and Employee:** The relationship between Location and Employee is 1: N. We changed the Employee relation by adding the L_ID from the Customer relation as a foreign key.

**Appointment and Vehicle:** The relationship between Appointment and Vehicle is 1: N. We changed the Vehicle relation by adding the Vehicle_IN from the Vehicle relation as a foreign key.

**ServiceOffered and Skill:** The relationship between Service Offered and Skill is 1: N. We changed the Skill relation by adding the Skill_ID from the Customer relation as a foreign key.

## Step 5 : Mapping of Binary M:N Relationship Types

We have identified the entities involved in a N:M relationship type throughout this mapping phase. In these situations, a new relation must be created with the primary keys of both participating entities acting as foreign keys. The primary key for the new relation will be the result of combining these two keys. We additionally apply any straightforward N:M relationship type properties to this new relation. Here are the new relationships. We added **Uses** and **Has** as new entities by using the primary keys of the M:N participating entities.

## Step 6 : Mapping of Multivalued attributes

Therefore, there is no multivalued attribute in the ER diagram.

## Step 7: Mapping of N-ary Relationship Types

We have discovered the entities involved in a N-ary relationship type during this mapping phase. In such circumstances, a new relation must be created with the primary keys of all involved entities acting as foreign keys. The primary key for the new relationship will be the result of combining all of these keys. We added **Includes** as new entities by using the primary keys of the participating entities.

## Step 8: Mapping of Specialization or Generalization.

We have identified the entities involved in specialization during this mapping phase. The main key of the superclass must be included as a

foreign key in each of the newly generated subclasses in order to handle specialization, which necessitates the creation of a new relation for each subclass.

The following subclasses are the result of the Role property specializing the EMPLOYEE superclass.

- MANAGER
- TECHNICIAN

# Relational Schema:
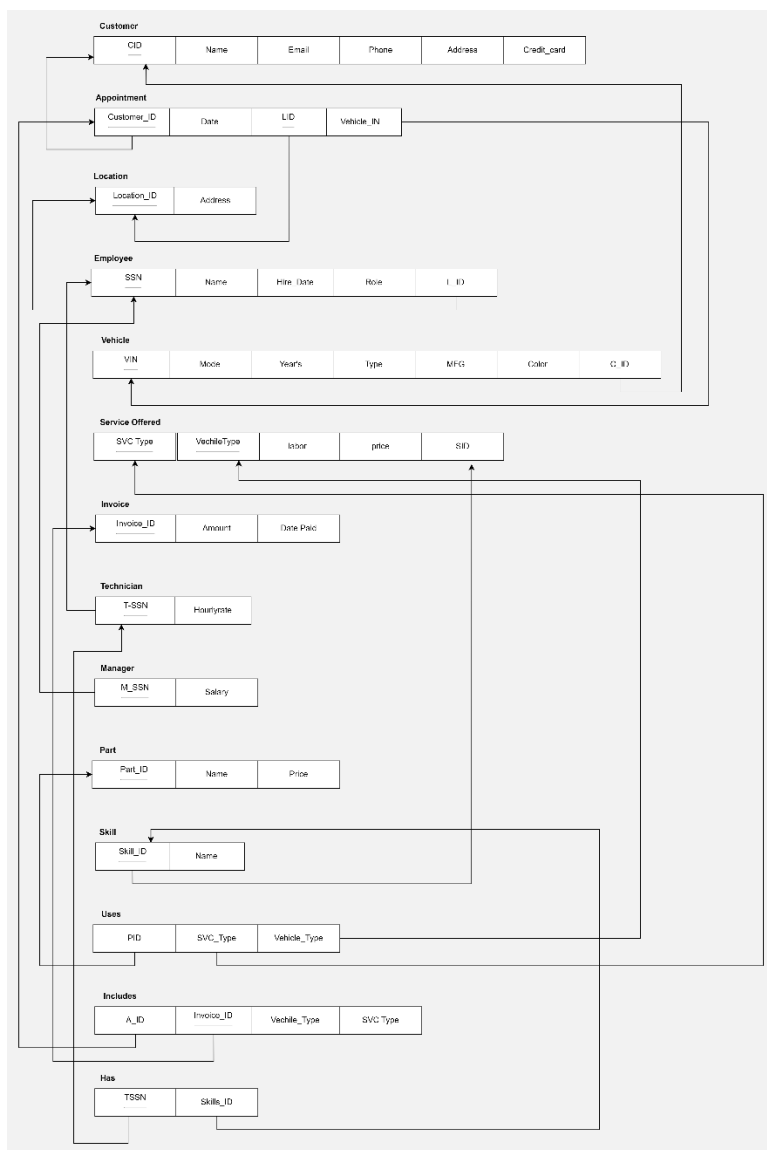
## Difficulties:

- Forming relationships for Generalized and Specialized attributes, determining the proper data elements and relations among them, ensuring data integrity, and designing the database schema in a way that optimizes performance while supporting the business requirements of Woody's Automotive application are all important tasks.
- It can also be difficult and complicated to translate complex relationships and attributes from the EER diagram to a relational schema, so this step must be done with great care.