Project Phase 1 **CS 166 Database Management Systems**

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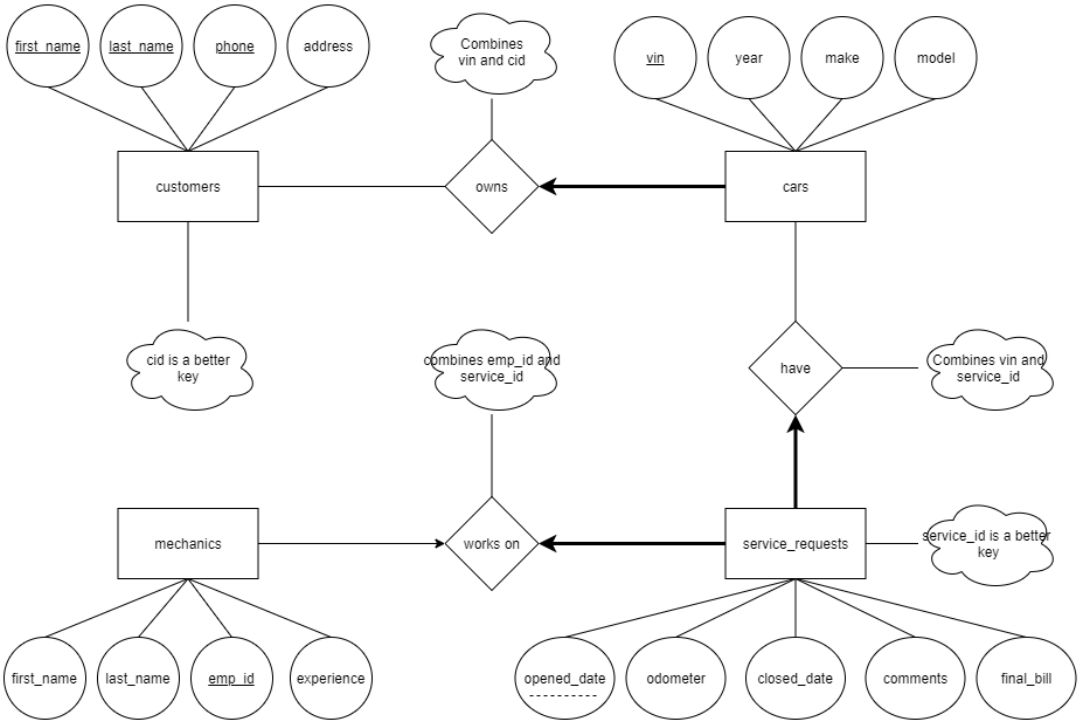
Iteration 1:

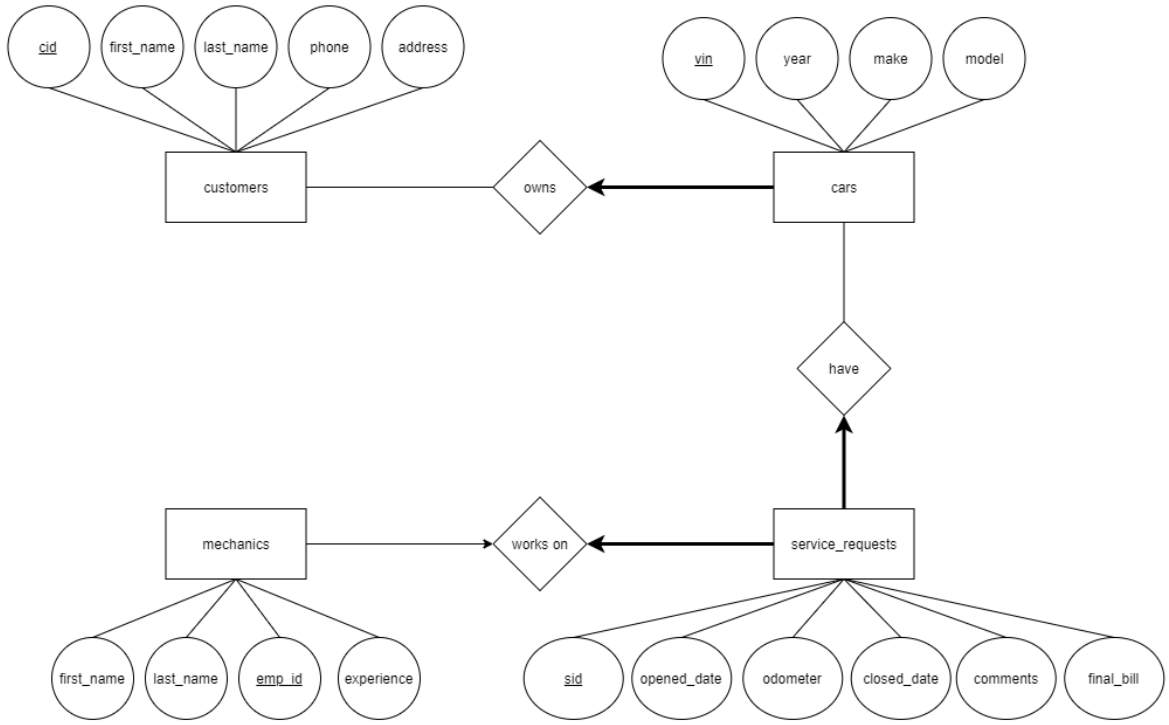


The above ER diagram is constructed just with the information obtained from the requirement analysis. The clouds are not part of the ER diagram and are just to represent additional/better information. This will be implemented in the further iterations. I am not including the foreign keys into ER-diagram because they can be interpreted from the relationships.

Things I find interesting:

- The base skeleton of the requirement makes the ER-diagram more informative yet seeming simple. For example, after the merging of relationships with entity sets, we will have customer information in cars, and car, mechanic information in service requests.
- We can introduce unique-valued attributes into customers and service_requests which will act as the new primary keys.
- With above, the before weak entity set service_requests **(vin, emp_id, opened_date)** will become a strong entity set with new unique valued attribute service_id as the primary key.

Iteration 2:



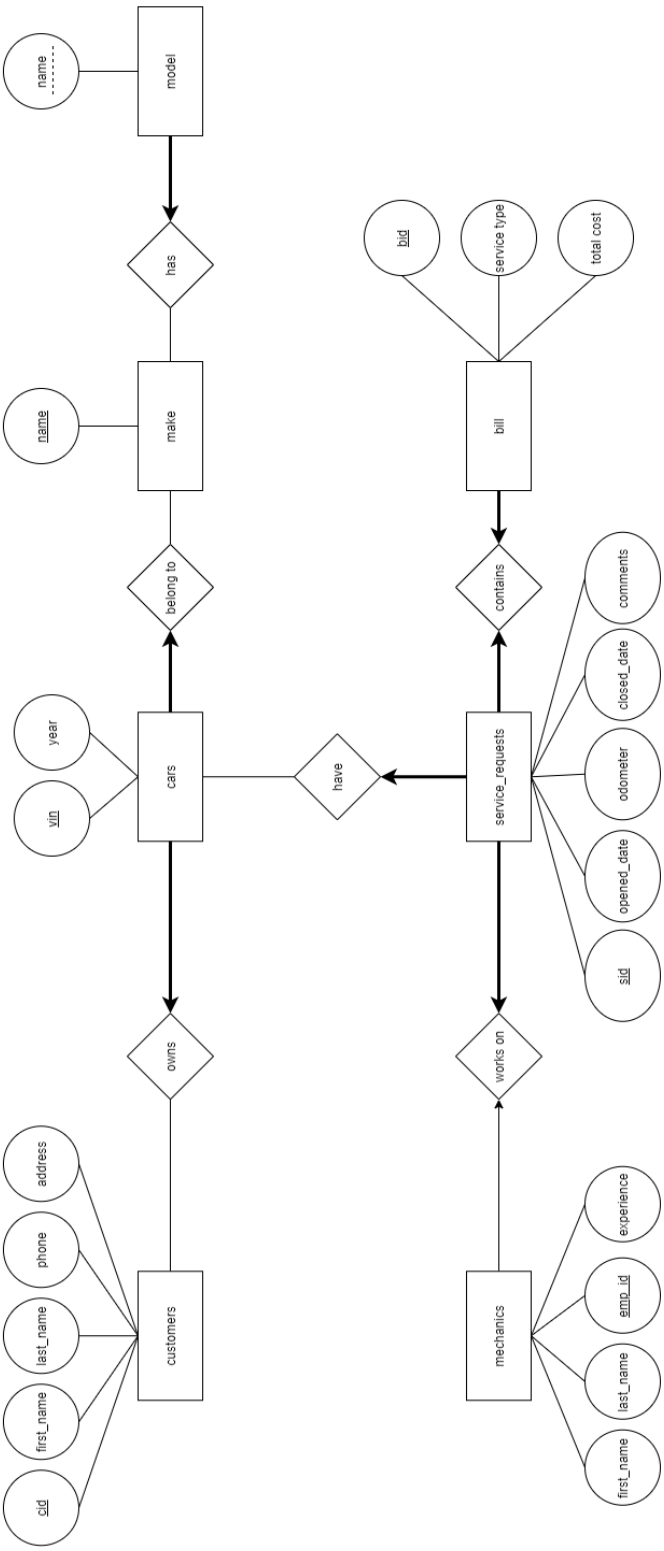
The above ER diagram includes the additional attributes which make the relationships less complicated. We can even expand the entity set to make it more meaningful and address various scenarios. However, this is the base of the project, and the relationships can be explained as follows,

- Every car must be linked to a single customer. (Ownership)
- Every service request must be created and linked to a single car. (Real-World)
- Every service request must be created a single mechanic. (Requirement)
- Every mechanic may work on almost one service request at a time. (Requirement)

Now all these assumptions and requirements are addressed in the above diagram.

Iteration 3:

The below ER diagram is an expansion of some of the trivial entity set. These expansions makes the relationships more simple. This also reduces the total entries of the databases because we are avoiding redudant instances information in the table. For example, in the cars table before even though a car is redudant with the make and model we again enter the information in the table. But in the new senario, we can reduce the entries and just refer the make and model. Additionaly the bill expansion is just for an exploration of new options that can be given to the user. It does not improve the performance but increases the utilities and functions. This is not the limit, some attributes such as phone, address, can have their own entity set. But for this project, they don't offer much improvement.



References: I referred the lecture and laboratory notes for the construction of ER diagrams listed above.