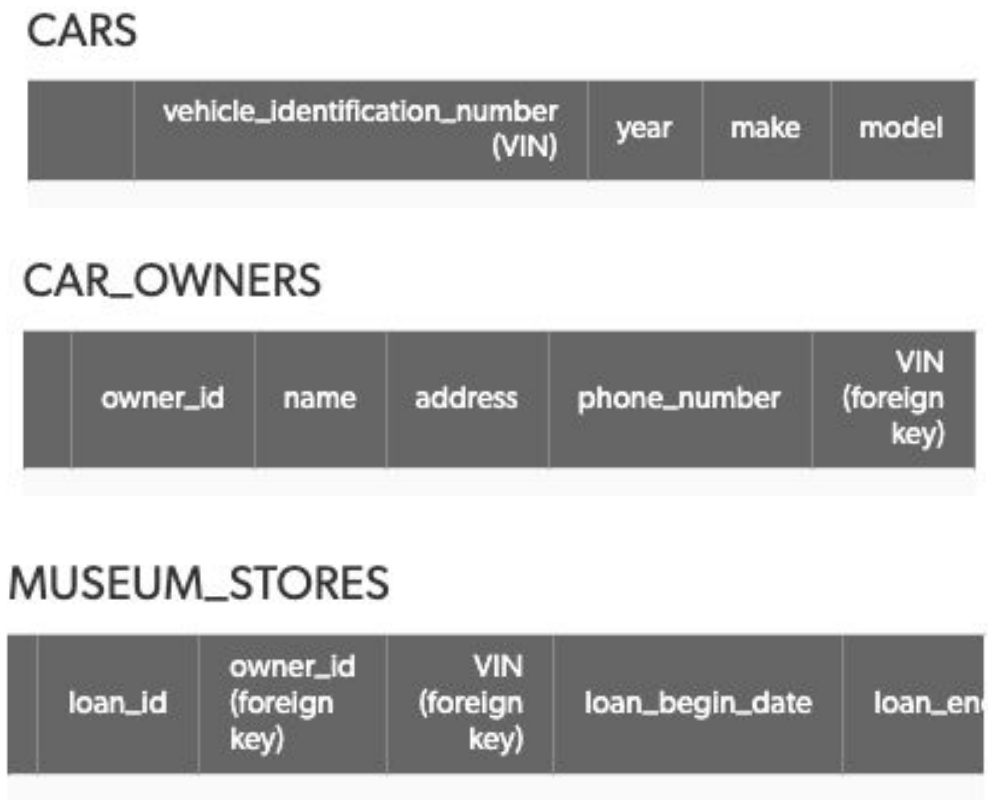
The classic car museum database system

Ben Hanson

University of Minnesota Crookston

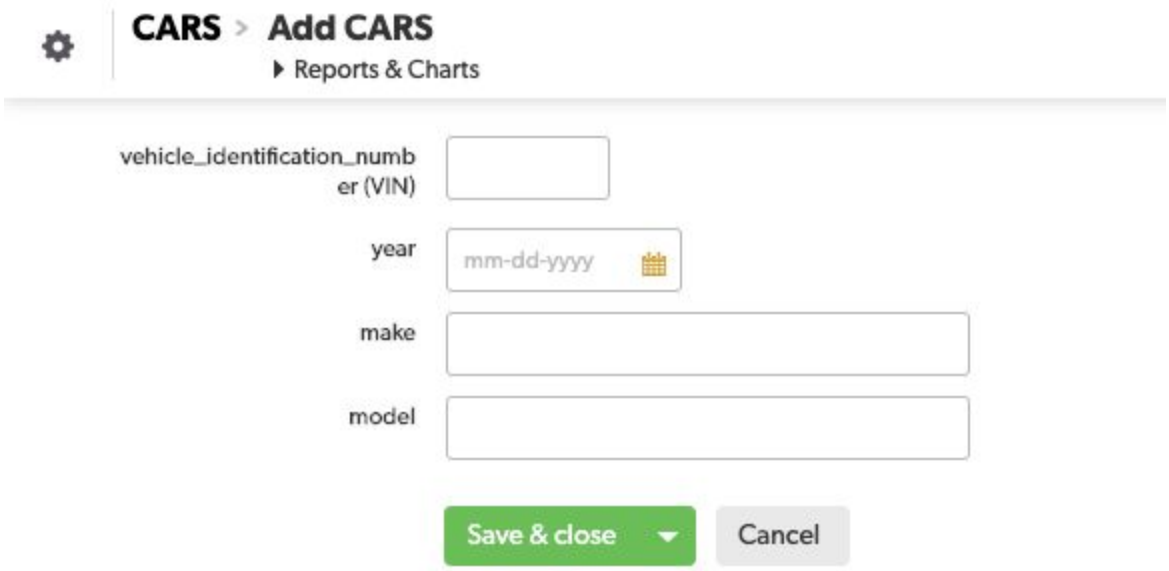
All databases consist of many entities, ranging from many different types and relationships among other entities. For every entity located inside a database, there are also many attributes, which holds a value stored inside a database. According to Silberschatz, A., Galvin, P. B., & Gagne, G., in the textbook, *Operating system concepts*, an entity is a "*thing* or *object* in the real world with an independent existence. (Silberschatz et. al, 2018). An entity may be a physical object that holds its existence, or it may be an object holding a conceptual existence. The classic car museum database system contains three entities: 'CARS', 'CAR_OWNERS', and 'MUSEUM_STORES'. Figure one below shows the three entities of the classic car museum database system.

Figure 1. Three entities of the classic car museum database system



The first entity, as shown in figure two below, is named ‘CARS’. This entity holds four simple attributes, which are ‘vehicle_identification_number (VIN)’, ‘year’, ‘make’, and ‘model’. Here is the picture of the first entity in the classic car museum database system, ‘CARS’, as well as a screenshot of what it would look like to add data to the entities attributes. This entity is important for the classic car museum database system because it allows for the addition of data regarding the cars that are inside of the museum.

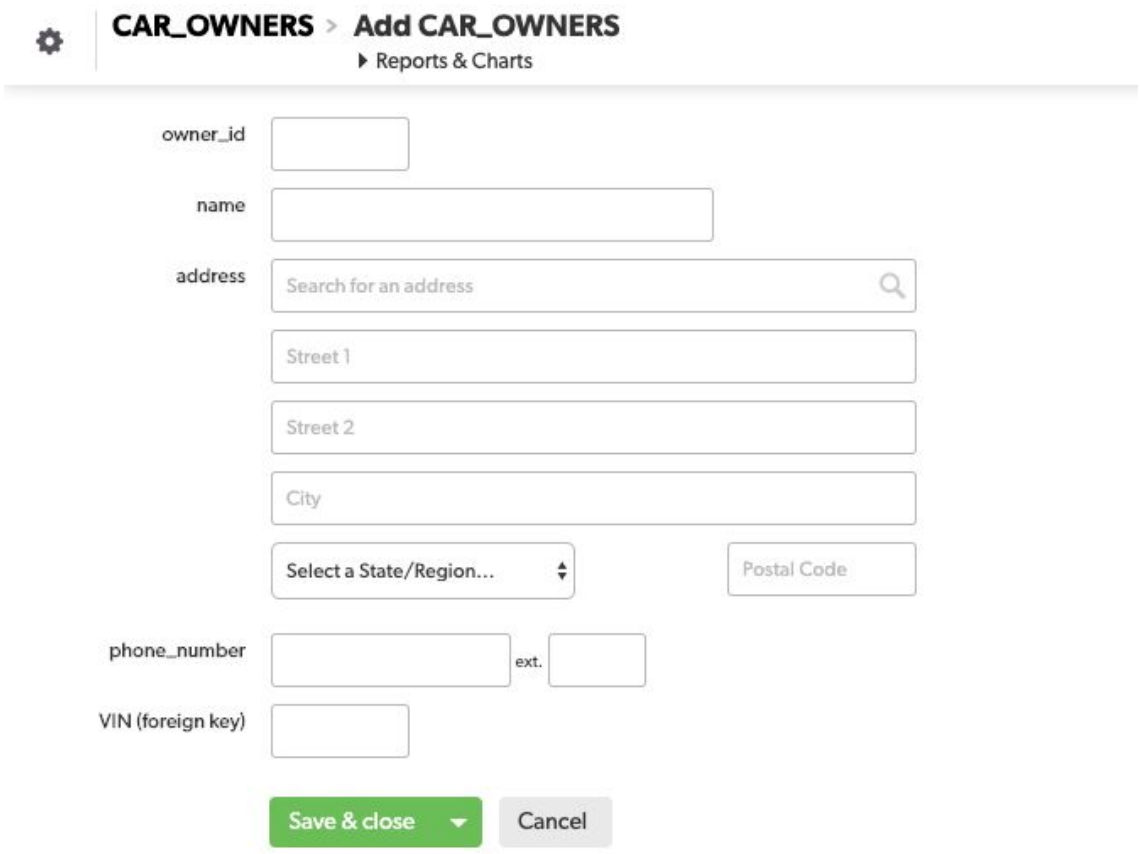
Figure 2. Entity ‘CARS’ with attributes



The second entity in the classic car museum database system is titled ‘CAR_OWNERS’. In this entity, there are five attributes, each containing meaningful data within the database system. The attributes are ‘owner_id’, ‘name’, ‘address’, ‘phone_number’, and ‘VIP (foreign key)’. All of these attributes located inside of this entity are simple attributes because as stated by Silberschatz, A., Galvin, P. B., & Gagne, G., they are “Attributes that are not divisible”. (Silberschatz et. al, 2018). Although these attributes are indeed simple attributes that can not be

divided into smaller subparts, the attribute ‘address’ could be separated into multiple subparts such as street address and zip code, making the attribute a composite attribute. This entity, along with its attributes, would be important for the classic car museum database system because it allows for the implementation regarding data relating to the owners of the cars inside the museum. In figure three, you can see the attributes of the entity ‘CAR_OWNERS’.

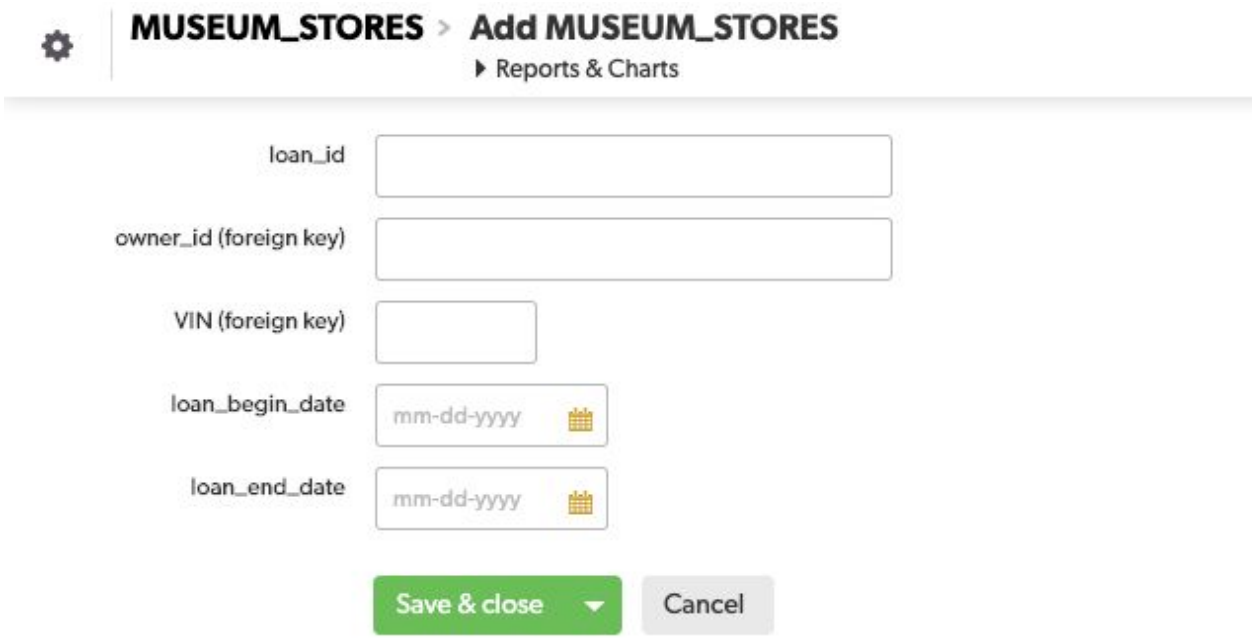
Figure 3. Entity ‘CAR_OWNERS’ with attributes



The third and final entity in the classic car museum database system, is named ‘MUSEUM_STORES’. This entity contains five important attributes inside of the classic car museum database system. This entity is very important to this database because it allows for the storage of data regarding what the museum stores when an owner loans a car to the museum.

The five attributes, as shown below in figure four, are ‘loan_id’, ‘owner_id (foreign key)’, ‘VIN (foreign key)’,’loan_begin_date’, and ‘loan_end_date’. These five attributes are also simple attributes, due to the fact that they are not separated into individual subparts.

Figure Four. Entity ‘MUSEUM_STORES’ with attributes



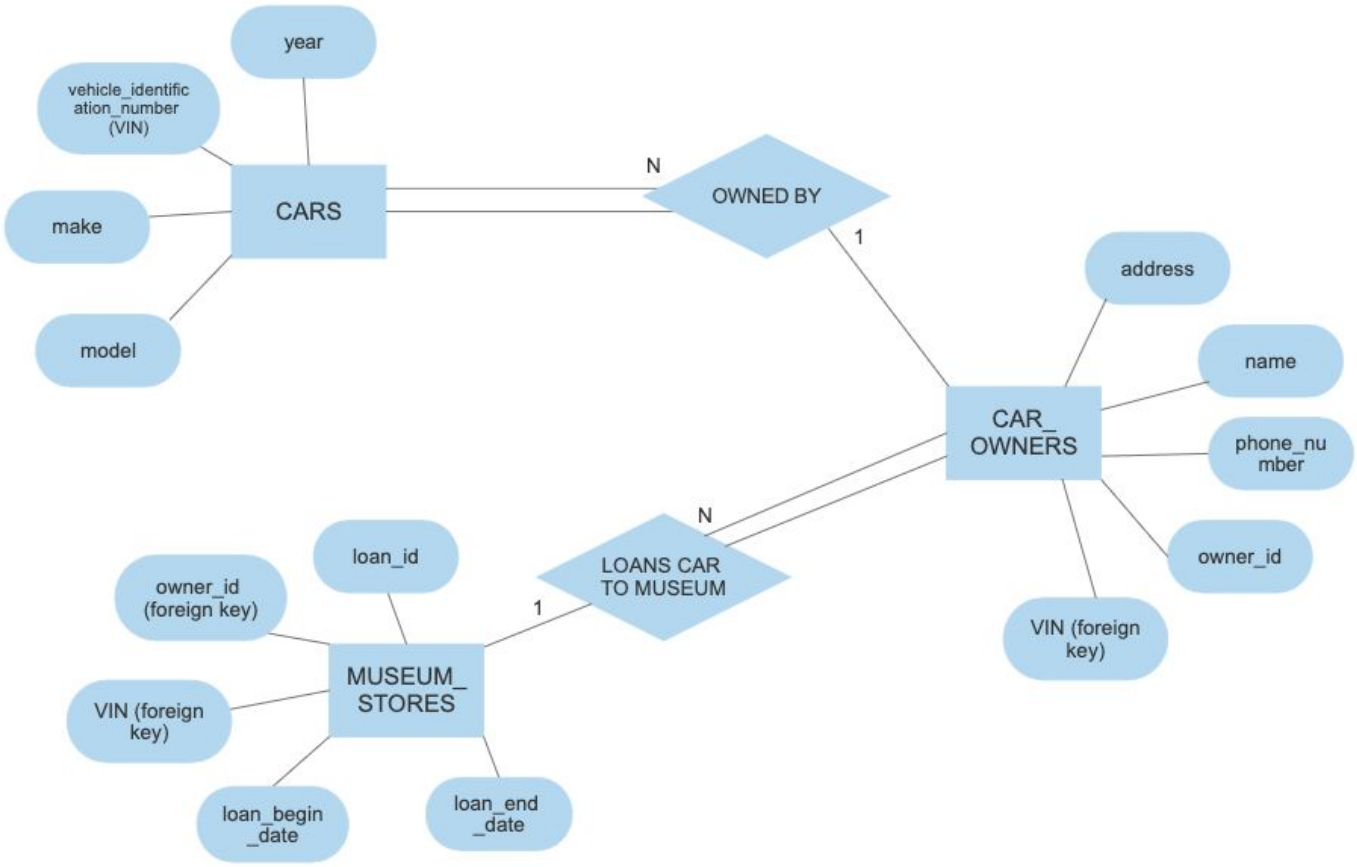
In every database, there are many relationship types, sets, and instances. According to Silberschatz, A., Galvin, P. B., & Gagne, G., “A relationship type R among N entity types E1, E2, . . ., En defines a set of associations—or a relationship set—among entities from these entity types.” (Silberschatz et. al, 2018). Every instance of a relationship within a database is an association of entities where the association includes one entity from each entity type. According to Silberschatz, A., Galvin, P. B., & Gagne, G., “Each such relationship instance *ri* represents the fact that the entities participating in *ri* are related in some way in the corresponding miniworld situation.” (Silberschatz et. al, 2018). Entity relationship diagrams, or

ER models, represent all of the entities inside a database and their relationships to each other. In the ER diagram, entity types are rectangular boxes enclosing the entity type. Attribute names, in the ER diagram, are located inside of ovals and are attached to their entity type. In the classic car museum database system, there are several relationships. In figure five below, it is shown that the relationships in the classic car museum database system exist between all three entities. One relationship in this database is located between the entities 'CAR_OWNERS' and 'MUSEUM_STORES'. The relationship between these two entities lies within the attribute 'owner_id' because both of the entities hold this attribute. The second relationship in this database exists between all three entities. As shown below, the attribute 'vehicle_identification_number', or (VIN), exists in the three attributes. Figure five shows the relationships in the classic car museum database system.

Figure Five. Relationships

The environment of the classic car museum database system is described in the ER diagram below. In this diagram, the entities are located inside the rectangular objects, and the attributes are located inside the ovals. As shown in the ER diagram, the attributes of each entity are connected to each other by a single line. The double lines in the diagram represent total participation of each entity. Single lines represent partial participation among the entities.

Figure Six. ER Diagram



References

Silberschatz, A., Galvin, P. B., & Gagne, G. (2018). Operating system concepts. Hoboken, N.J: Wiley.