Jadyn Falls
Hayley Owen
Jace Peloquin
Jacob Stein
Jacob Von Tress

Team Data-J's Man-H-ment Systems
Assignment #2 - Relational Model Mapping - Write-Up
6 January 2023

a) Transport Ships

Step 1 - Mapping of Regular entities: SHIP, SHIP_TYPE, STATE/COUNTRY, SEA/OCEAN/LAKE.

- Regular entity SHIP is mapped as SHIP relation. Includes all simple attributes. Attribute "Sname" chosen as primary key.
- Regular entity SHIP_TYPE is mapped as SHIP_TYPE relation. Includes all simple attributes. Attribute "Type" is chosen as the primary key.
- Regular entity STATE/COUNTRY is mapped as STATE/COUNTRYrelation. Includes all simple attributes. Attribute "SCname" chosen as primary key.
- Regular entity SEA/OCEAN/LAKE is mapped as SEA/OCEAN/LAKE relation. Includes all simple attributes. Attribute "SOLname" chosen as primary key.

Step 2 - Mapping of Weak Entity Types: SHIP_MOVEMENT, PORT, PORT_VISIT

- Weak entity SHIP_MOVEMENT mapped as SHIP_MOVEMENT relation. Includes all simple attributes, as well as the "Sname" attribute from the SHIP relation as a foreign key. The attribute "Time_stamp" is broken down into the partial key attributes "Date" and "Time". The attributes "Sname", "Date", and "Time" are chosen as the primary key attributes.
- Weak entity PORT mapped as PORT relation. Includes all simple attributes. Includes the foreign key "SCname" from the STATE/COUNTRY relation. The partial key attribute "Pname", as well as "SCname" are the primary key attributes.
- Weak entity PORT_VISIT mapped as PORT_VISIT relation. Includes all simple attributes. Includes the foreign key "Sname" from the SHIP relation and "Pname" from the PORT relation. The partial key attribute "Sname", as well as "Pname", and "Start_date" are the primary key attributes.

Step 3 - Mapping of Binary 1:1 Relationships: (NOT NEEDED)
Step 4 - Mapping of Binary 1:N Relationships: TYPE, ON, HOME_PORT

- 1:N relationship TYPE is mapped as a foreign key "Stype" in the SHIP relation from the SHIP_TYPE relation primary key "Type".
- 1:N relationship ON is mapped as a foreign key "SOLname" in the PORT relation from the SEA/OCEAN/LAKE relation primary key "Name".
- 1:N relationship HOME_PORT is mapped as a foreign key "Pname" in the SHIP relation from the PORT relation primary key "Pname".

Step 5 - Mapping of Binary M:N Relationships: (NOT NEEDED)
Step 6 - Mapping of Multivalued Attributes: (NOT NEEDED)
Step 7 - Mapping of N-ary Relationships: SHIP_AT_PORT (NOT NEEDED)
- While SHIP_AT_PORT is a N-ary relationship, the weak entity participants of the relation (PORT and PORT_VISIT) were already mapped over. Thus a new relation is not needed as the relationships were already accounted for.

Step 8 - Mapping of Specializations and Generalizations: (NOT NEEDED)
Step 9 - Mapping of Union Types (Categories): (NOT NEEDED)

b) Car Dealer

Step 1 - Mapping of Regular entities: VEHICLE, SALESPERSON, CUSTOMER.
- Regular entity type CAR is mapped as a CAR relation. All simple attributes of the CAR entity type are included as well as the simple attributes of the VEHICLE entity type. Attribute "Vin" is chosen as a primary key from the superclass VEHICLE.
- Regular entity type TRUCK is mapped as a TRUCK relation. All simple attributes of the TRUCK entity type are included as well as the simple attributes of the VEHICLE entity type. Attribute "Vin" is chosen as a primary key from the superclass VEHICLE.
- Regular entity type SUV is mapped as a SUV relation. All simple attributes of the SUV entity type are included as well as the simple attributes of the VEHICLE entity type. Attribute "Vin" is chosen as a primary key from the superclass VEHICLE.
- Regular entity type SALESPERSON is mapped as a SALESPERSON relation. All simple attributes are included, and the attribute "Sid" is chosen as a primary key.
- Regular entity type CUSTOMER is mapped as a CUSTOMER relation. All simple attributes are included, and the attribute "Ssn" is chosen as a primary key.

Step 2 - Mapping of Weak Entity Types: (NOT NEEDED)
Step 3 - Mapping of Binary 1:1 Relationships: (NOT NEEDED)
Step 4 - Mapping of Binary 1:N Relationships: (NOT NEEDED)
Step 5 - Mapping of Binary M:N Relationships: (NOT NEEDED)
Step 6 - Mapping of Multivalued Attributes: (NOT NEEDED)
Step 7 - Mapping of N-ary Relationships: SALE
- N-ary relationship SALE is mapped as a SALE relation. It includes the primary keys of all of the entities present in the relationship (CAR, TRUCK, SUV, SALESPERSON, and CUSTOMER) as foreign keys. The combination of these foreign keys are the primary key of the SALE relation. It also includes all simple attributes of the relationship.

Step 8 - Mapping of Specializations and Generalizations:
- We selected 8B for the VEHICLE to CAR/TRUCK/SUV specialization because it is a total and disjoint specialization. Each CAR, TRUCK, or SUV is a VEHICLE; therefore, they must all have the attributes of a VEHICLE, so 8B was the best choice because it requires the attributes of VEHICLE to be included in each subclass. As such, a relation

was made for CAR, TRUCK, and SUV, with each having the primary key "Vin" and the simple attributes from the VEHICLE superclass.

Step 9 - Mapping of Union Types (Categories): *(NOT NEEDED)*