Relational Model

We used the Relational Model into our project because one of our project objectives, is to store many entities into our database, for that the Relational Model is an appropriate model for our project.

Some entities depend on other entities attributes to exist, that is why the primary key and the foreign system that the Relational Model uses is crucial to our project.

Entity's Relationship

A relationship is a logical connection between different tables, established based on interaction among these tables. To build a program able make operations without losing the information about the rows who are about to be operated by the program, the foreign keys from the Relation Model are needed. For this database, we decided to use the crown's feet model:

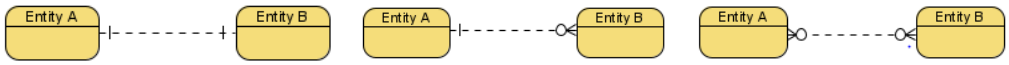

Figure 1 One-to-One relationship / One-to-Many relationship / Many-to-Many relationship

Primary Keys

Every entity in a Relational Model must have a primary key. The primary key is an attribute or more attributes that helps the database to distinguish the rows. The primary key value is unique which means there cannot be rows with the same value on the primary key. In our project, we need the entities connected to each other by a relationship.

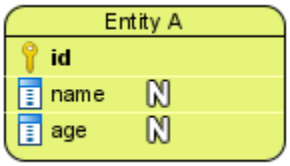

Figure 2 Primary key example

In this example, the id attribute cannot be null and it needs to be a unique value.

Foreign Keys

The foreign key is a set of attributes in a table that refers to the primary key of the table, which has a relationship with. The foreign key links both tables. The table that contains the foreign key is called the child table, and the table, which has the candidate key, is called the parent table, the purpose of the foreign key is to identify a particular row when that relationship of tables is being used for an operation.

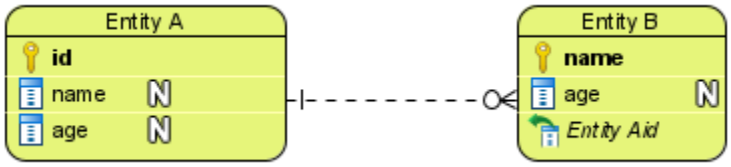

Figure 3 Foreign key example

Advantages and Disadvantages

- Advantages:
  - It is a fast database model because of its simplicity and the various optimizations that it offers;
  - Accessibility, a relational model does not require a path for accessing the data, modifying the data of a specific column is easy in this model;
  - This model avoids any duplicate data thanks to the primary keys and the foreign keys.

- Disadvantages:
  - The performance of the relational database depends on the number of tables, the more the number of tables the slower the performance;
  - This model requires a lot of physical storage.

Conclusion

As explained before, the Relational Model is the most appropriated model for our project. The database must always have the information status of the containers, for that we will have to distinguish not only the containers themselves but the ships or the truck which the containers are being transported, what coordinates are positioned, which country are at that moment. Other entities and relationships are going to be required to have a well-functioning database.

Bibliography:

- https://www.hitechwhizz.com/2021/04/6-advantages-and-disadvantages-limitations-benefits-of-relational-database.html
- https://en.wikipedia.org/wiki/Foreign_key
- https://en.wikipedia.org/wiki/Relational_database