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Data Modeling

The entity-association diagram

This is a graphical description to represent conceptual models of data in the form of a diagram. It is thanks to this diagram that you will model the data.

Data modeling helps analyze needs (in data) to produce a well-designed database. It is therefore recommended to finish the data modeling before actually implementing your database.

The entity-association diagrams help you to explain the logical structure of the databases. At first glance, an EA chart looks a lot like an organization chart. However, the EA chart includes many specialized symbols and its meaning makes this model unique.

Why use an EA chart?

- Helps to determine linked fields and associations between tables.
- Describes tables, attributes, relationships.
- Provides an overview of how tables are connected, which fields are made up of each table.
- A diagram makes it possible to build a database quickly.
- Also allows a better understanding of the information

The components of the EA diagram

An entity-association diagram contains mainly 3 components:

- The entities
- The attributes
- The associations / relationships

An entity is a 'thing' of the real world, living or non-living, which is easily recognizable and unrecognizable. That's all in the business that needs to be represented in our database. It can be a physical thing or simply a fact about the business or an event that occurs in the real world.

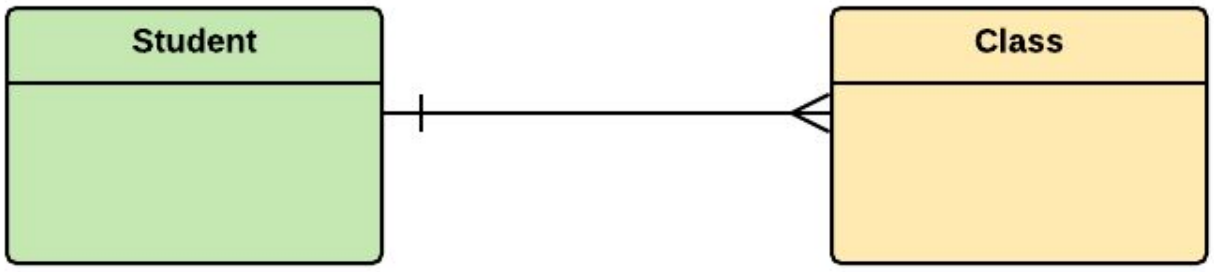
An entity can be a place, person, object, event or concept that stores data in the database. The features of the entities must have an attribute and a unique key. Each entity is composed of certain "attributes" that represent that entity.

An entity is a table.

Entities are represented by their attributes. All attributes have a distinct value. For example, a "student" entity may have a name, an age, a class, as attributes.

Entities are also represented by their relationships. For example, a "student" entity may be associated with a "course" relationship. Indeed, a student follows several courses in the year.

Here is an example diagram that represents 2 entities ('Student' and 'Class') and their relationship:



Cardinality

Defines the type of relationship between two entities or sets of entities. Indeed, there are several types of relationships.

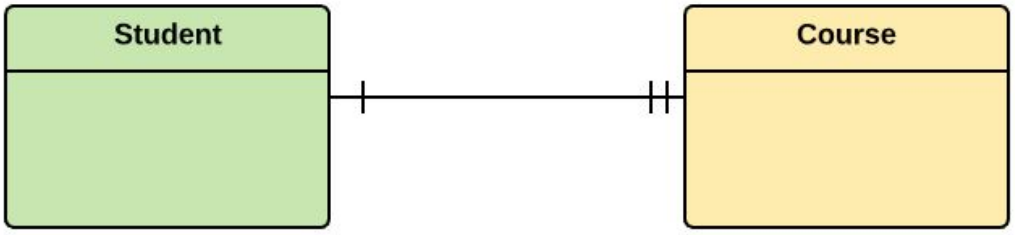
It is often possible to identify the relation with verbs or verbal sentences, for example:

- A student *participates* in a course
- A teacher is *giving* a

a) One-to-One course

An entity X can be associated with more than one entity Y and vice versa.

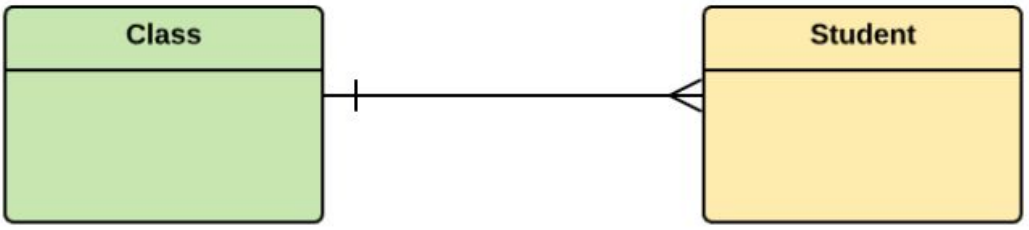
For example, a student has the choice between several courses. However, only one of these formations can be registered. It's a one-to-one relationship.



b) One-to-Many

An entity X can be associated with several entities Y, but an entity Y can be associated with only one element of Y.

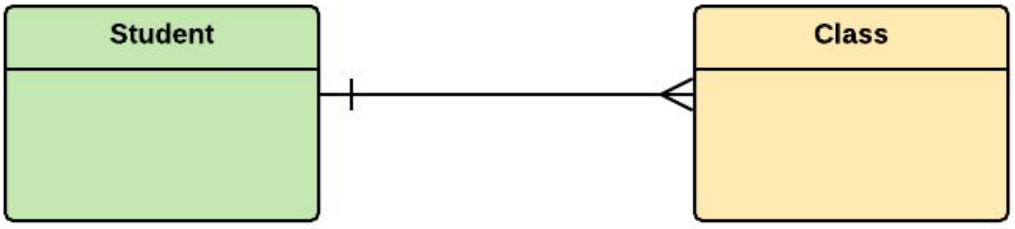
For example, a class is composed of several students.



c) Many-to-One

Several X entities can be associated with at most one entity of the Y group of entities. However, an entity of the X group of entities can be associated or not with several entities of the group of entities X.

For example several students belong to the same class.



d) Many-to-Many

Several X entities can be associated with multiple entities in the Y feature group and vice versa.

For example, a course is composed of several students and a student can be assigned to several courses.