- There is a **many-to-many** relationship between the records in the doctor table and records in the patient table (Doctors have many patients, and a patient could have several doctors);
- a **one-to-many** relation between the department table and the doctor table (each doctor works for one department, but one department could have many doctors).
- **one-to-one** relationship is mostly used to split a table in two in order to optimize access or limit the visibility of some information. In the hospital example, such a relationship could be used to keep apart doctor's personal or administrative information.

Example 1 : A chemical factory producing chemical materials , each material identified by a name and a formula .

The supplier , identified by his name and his ID , purchase from the factory by an order . The order has date , amount and total.

To draw the ER model

Each supplier can have any material , and any material can go to any supplier . The relation is of type **many-to-many ,** as shown in figure 5.1.

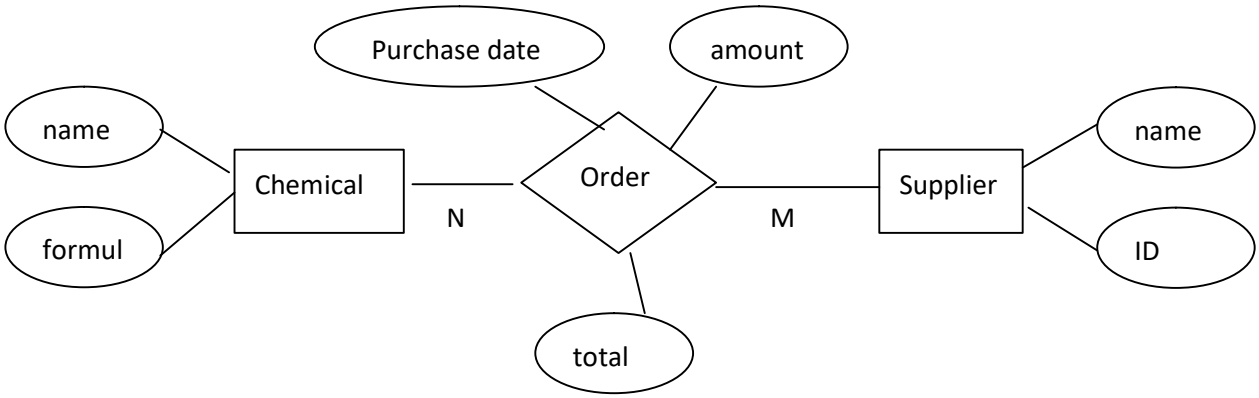
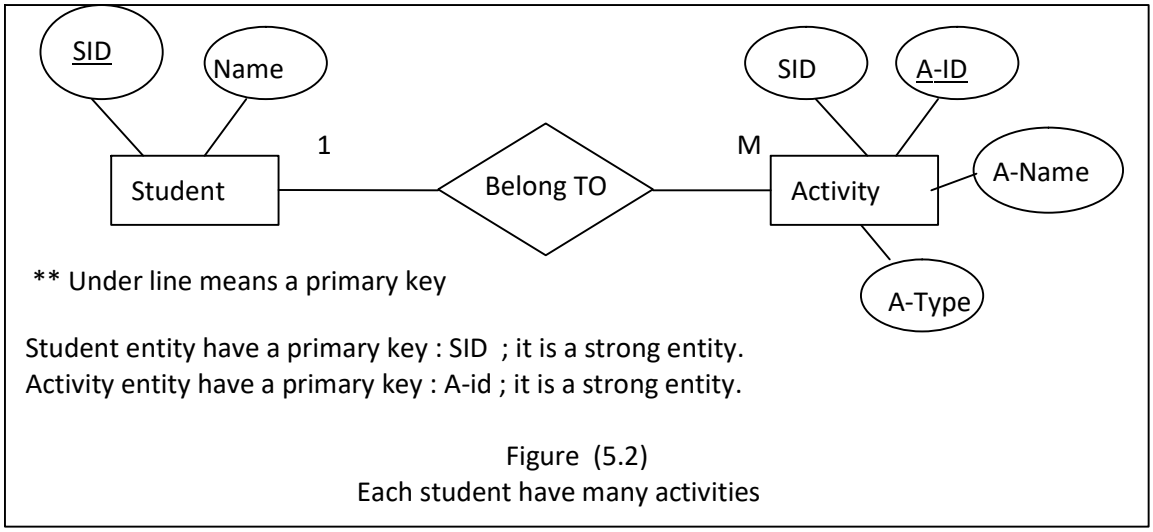


Figure 5.1 : Example 1

5.3 : Weak Entity

An entity may not have sufficient attributes to form a primary key. Such an entity is termed a ***weak entity .*** An entity that has a primary key is termed a ***strong entity.***

Consider the relationship ***Have*** which links a student with his activates as shown in figure (5.2).



** Under line means a primary key

Student entity have a primary key : SID ; it is a strong entity.
Activity entity have a primary key : A-id ; it is a strong entity.

Figure (5.2)
Each student have many activities

If more details is needed about all the activities the student have (history) , another entity will be added as shown if figure (5.3).

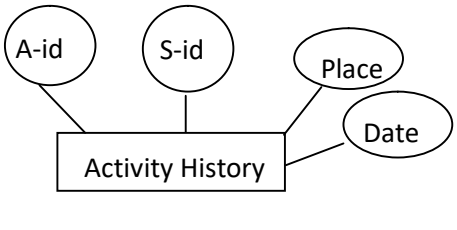


Figure (5.3)
Activity History entity

This new entity have S-ID and A-ID as a foreign keys to recognize each record belong to what student and what activity. This mean for each activity a student have , he/she can carry it many times.