Reverse Engineering a Relational Model.

The idea here is that we look at the schema of a relational database and we try to infer the ER diagram from which it has been created.

Here are some examples:

1)

Person(cf, pname, paddress)
Car(cid, targa)
Insurance(iid, iname)
Has(cf, cif)
    cf FK referencing Person
    cif FK referencing Car
Has2(cf, cif, iid)
    (cf, cif) FK referencing Has
    Iid FK referencing Insurance

Person and Car and insurance have no FK (foreign key) so they can only be Entities
The key of Has consists of the attributes that are FK to other entities so it is a relationship between Person and Car. And since both FK compose the key, it is a many to many relationship

The Has2 has FK to Insurance and also to the Has so it is connecting insurance to Has. But since Has is a relationship and we cannot have a relationship to relationship, it means that the ER has an aggregation of Has, Person and Car and the Has2 is a relationship between Insurance and Has.

2)
Person(cf, pname, paddress)
Student(mat, corso)
    mat FK to Person

Person has no FK so it is for sure an entity. Student may be an entity or a relationship. We notice that the key (which is mat) is also a FK. This (meaning the key to be also FK) is happening in the case of isA relationship where the subclass has the same key as the superclass, and the key of the superclass is declared FK to the superclass to ensure it exists in the superclass. So the ER of the above relational schema has 2 entities, Person and Student with Student having an IsA relationship to Person.

3)
Person(cf, pname, paddress)
Student(mat, pers, corso)
    pers FK to Person

Person has no FK so it is for sure an entity. Student may be an entity or a relationship. We notice that it has an attribute (the pers) that is FK directly to an entity. It does not have any other FK so Student cannot be a relationship. We know that we have a FK of an attribute in a relationship when we want to model a many to one relationship. So the ER here consists of two entities, the

Person and the Student, and a relationship between them and that relationship is many to one from Student to Person.

4)
Person(<u>cf</u>, pname, paddress)
Student(<u>mat</u>, <u>pers</u>, corso)
      pers FK to Person

This is the same situation like the 3 with the only difference that the key of the student consists of both the mat and the pers. So we have a part of the key that is FK to another relation, or in other words, a key that consists of something local (the mat) and something from another relation (the pers). The situation that this is happening is the weak entity. So the ER of this situation is an entity person and another entity Sttudent, with the Student being a weak entity for Person.