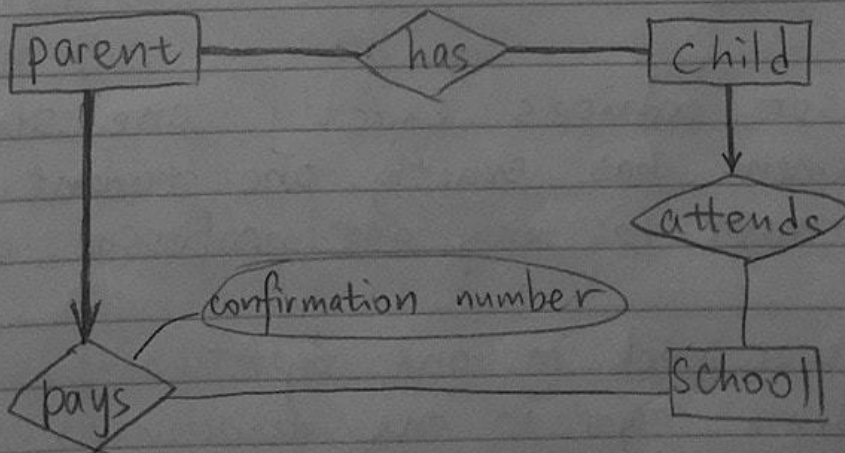


one to many  
Total participation

Each parent has to get  
announcement from school.



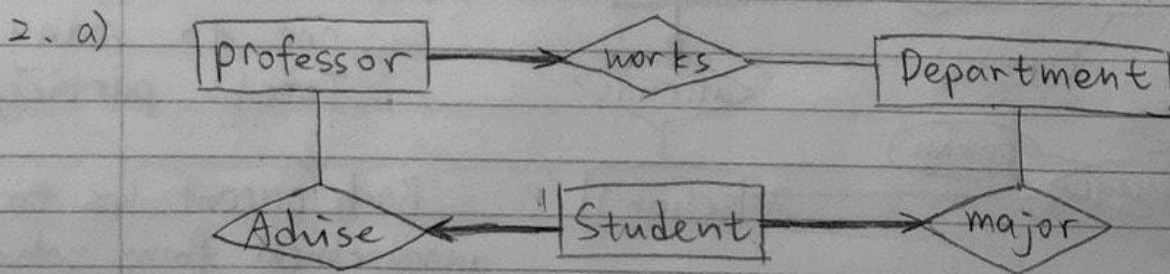
many to one  
total participation

Each parent has to pay for that school.

d) Dependent loops occur when the attribute of a relationship can be found in attribute of the entity. For instance, the email of a parent is already in one of the attributes of parent. The relationship of announcement is not necessary.

- Independent loops occur when there is no redundancy, all attributes in each entity and relationship don't appear twice.

e)



b) Each professor advises exactly one student.  
Each department has exactly one student.  
Each department has only one professor works in.

c) Multiple professor work in one department.  
Multiple students major in one department.

d) No.

a) Same

e.g. INSERT

VALUES (53688, 'Smith', 'smith@ee', 18, 3.2)

Relation won't change as tuples are inserted in different orders.

b) same

e.g. DELETE

FROM Student S

where S.name = 'smith'

c) Not the same

e.g. INSERT ('Smith')

DELETE S.name = 'smith'

> No Smith

< DELETE S.name = 'smith'

INSERT ('Smith')

> one smith

d) Not the same

Insert something that's tried to update may cause deadlocks.

e) Not the same

The conditions of update operations will change because of the change of order.



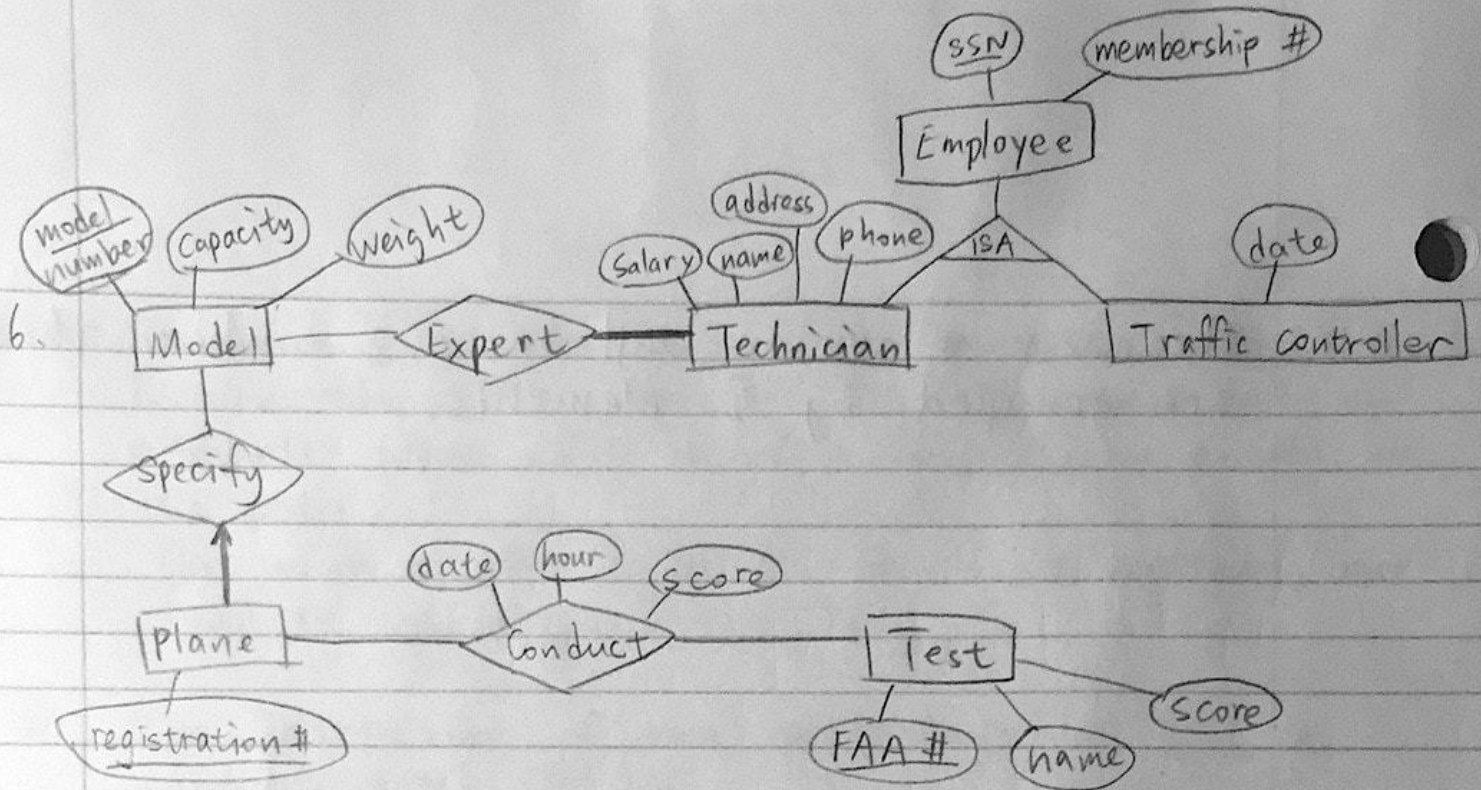
4. a) The union of two candidate keys is NOT a candidate key. Because the union may not be a minimal set of attributes whose value uniquely identify an entity in the set.

The union of two candidate keys is a superkey, but could be not a candidate key.

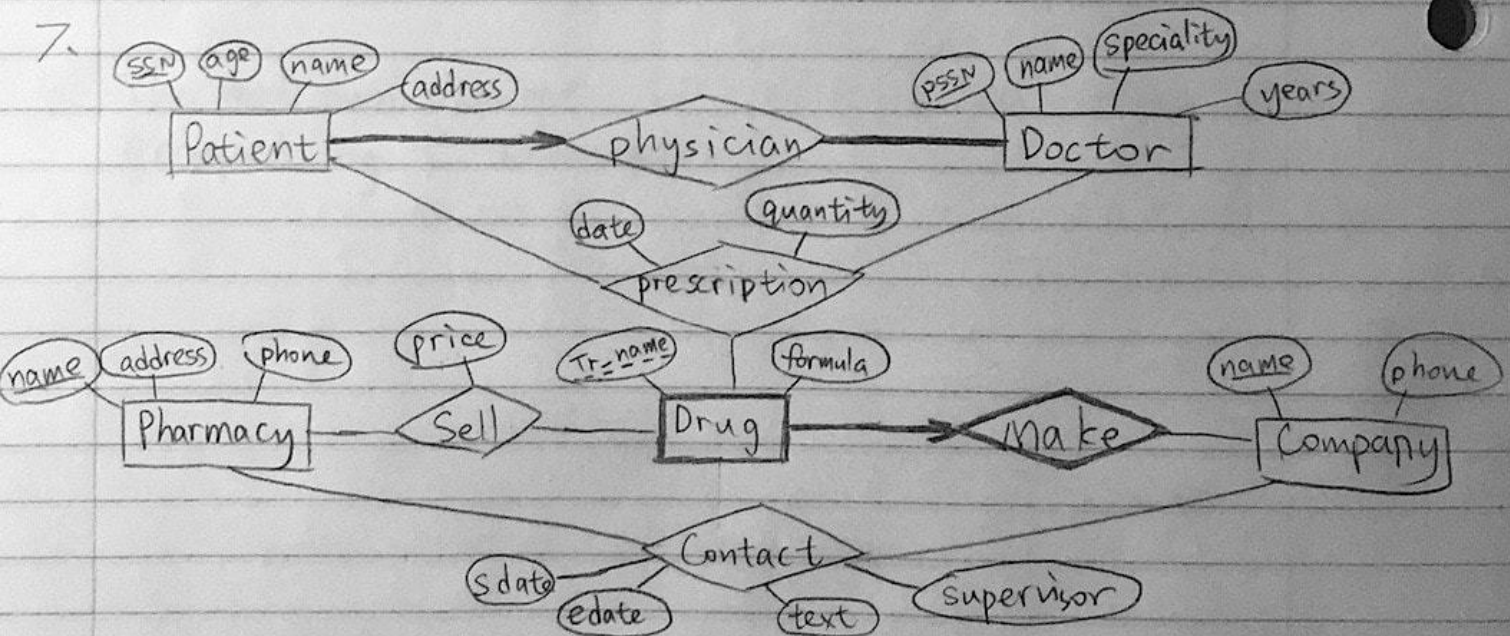
b) The intersection of two super keys is NOT a candidate key.

For instance, Students (sid, name, address, phone). Both (sid, name) and (address, phone, name) are superkeys. But their intersection (name) is not a candidate key.

5. The maximum number is  $nC_{\frac{n}{2}}$  when they are grouped by  $\frac{n}{2}$  elements.



Cannot. It requires a notation for equivalence, but there isn't one.



2) Add the price to Drug, delete the price from Sell.

3) Add a new entity Pres. date because we can't have date as an attribute of Prescription.