

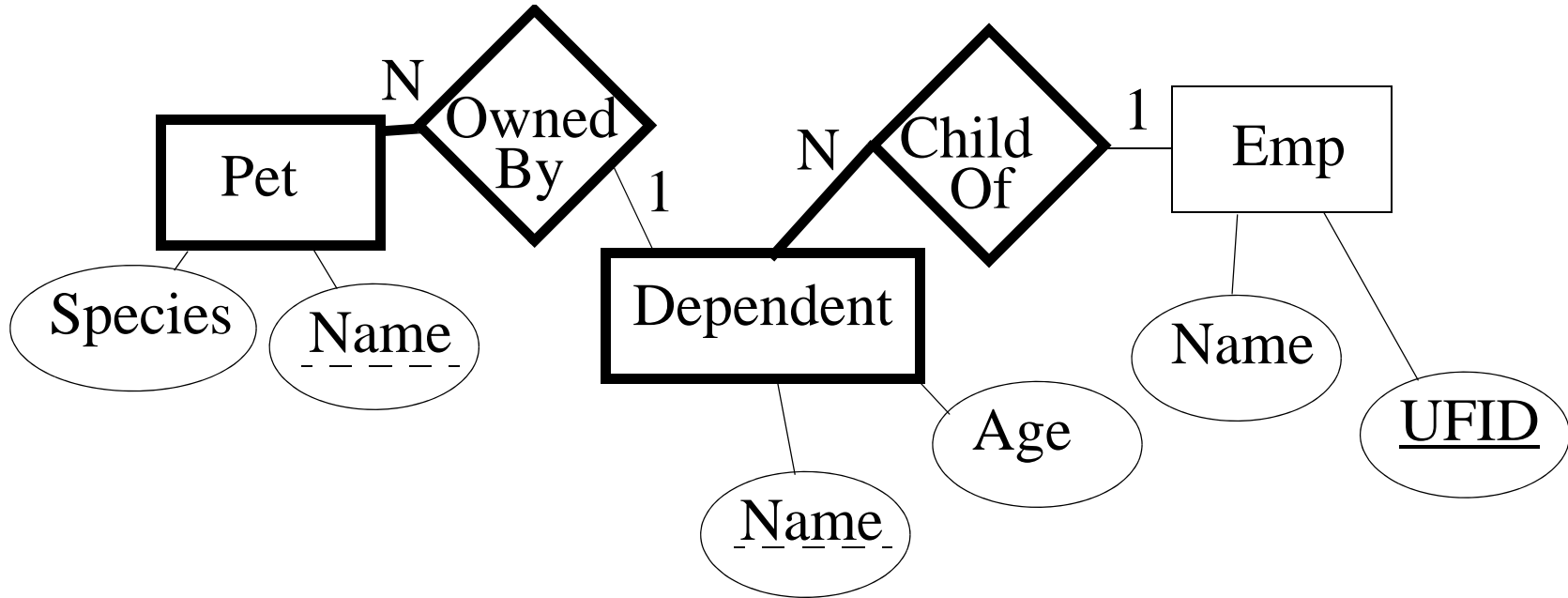
Conversion ER to Relational

- Recall: ER is a descriptive model
- Relational is a storage model
- Need to do conversion from ER to use in a DB

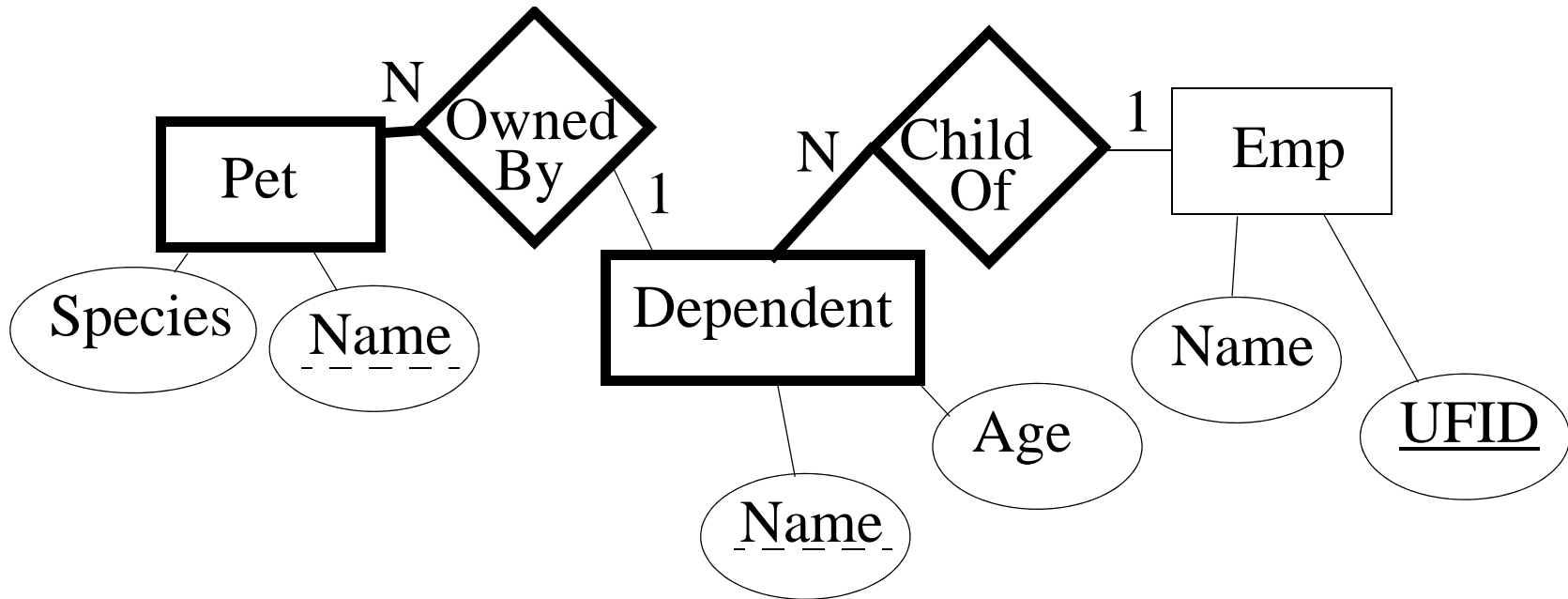
Review

- In conversion, entities become relations
- Relationships become foreign keys (if 1-1 or 1-N)
- Relationships become relations (if N-N)
- Attributes on relationships go with the corresponding fk
- Weak entities: foreign key becomes part of the key

Weak Entities: Example



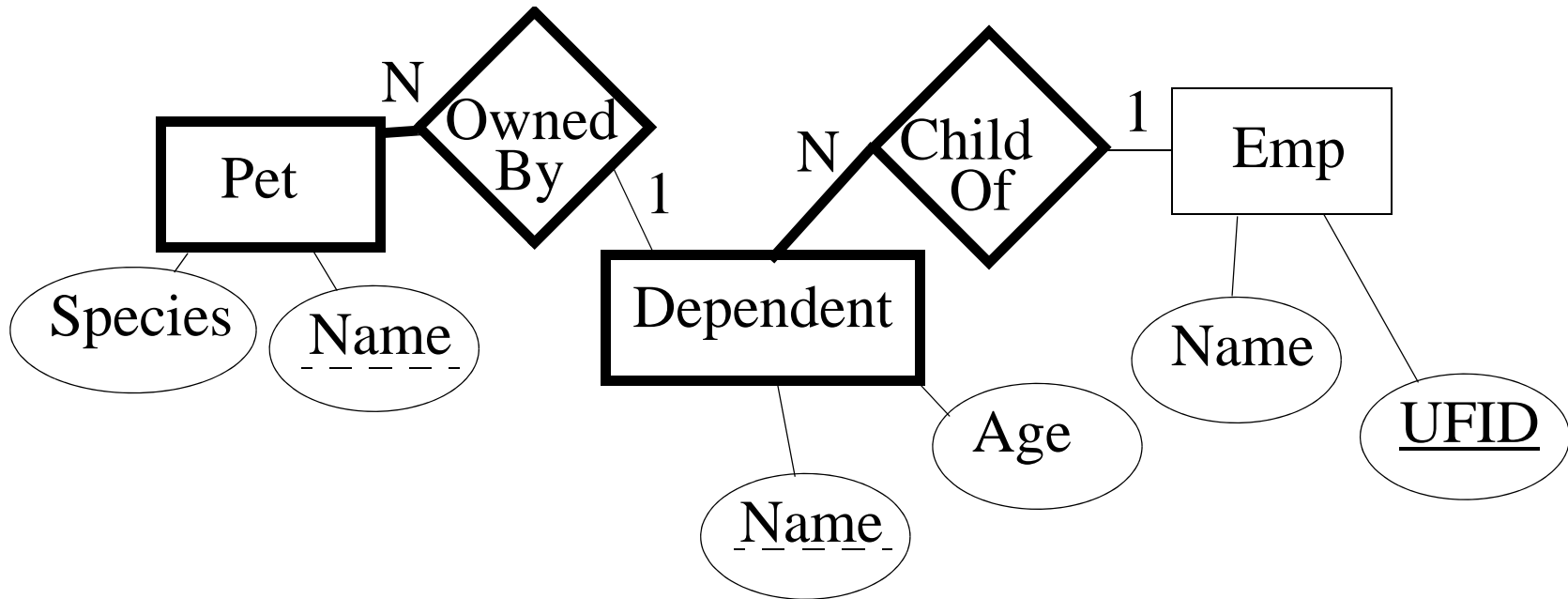
Weak Entities: Example



Emp converted as usual:

EMP (UFID , Name)

Weak Entities: Example

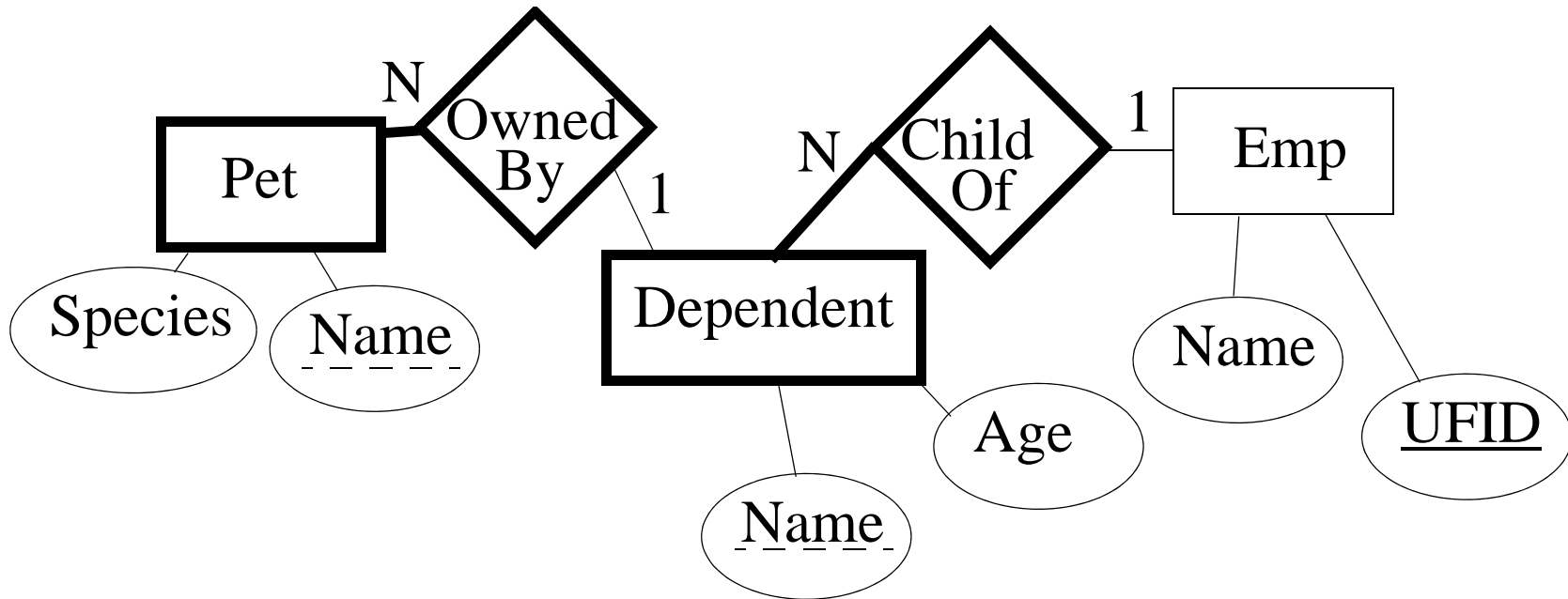


Since Dependent weak, EMP.UFID is part of key:

EMP (UFID, Name)

DEPENDENT(Name, Age, UFID; UFID → EMP.UFID)

Weak Entities: Example



Pet is also weak, borrows Dependent's key:

EMP (UFID, Name)

DEPENDENT(Name, Age, UFID; UFID → EMP.UFID)

PET(PetName, Species, DepName, UFID; DepName, UFID → DEPENDENT.Name, Dependent.UFID)

Surrogate Keys

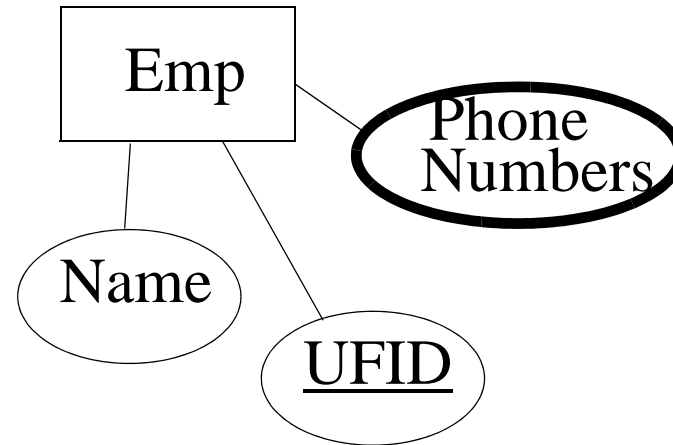
Long chains of weak entites can create big keys:

```
PET(PetName, Species, DepName, UFID; DepName, UFID → DEPENDENT.Name, Dependent.UFID)
```

- OK to define a “surrogate key” to make things easier
- Usually, this will be implemented as a DB-assigned number (like an auto-increment)

```
PET(PetID, PetName, Species, DepName, UFID; DepName, UFID → DEPENDENT.Name, Dependent.UFID)
```

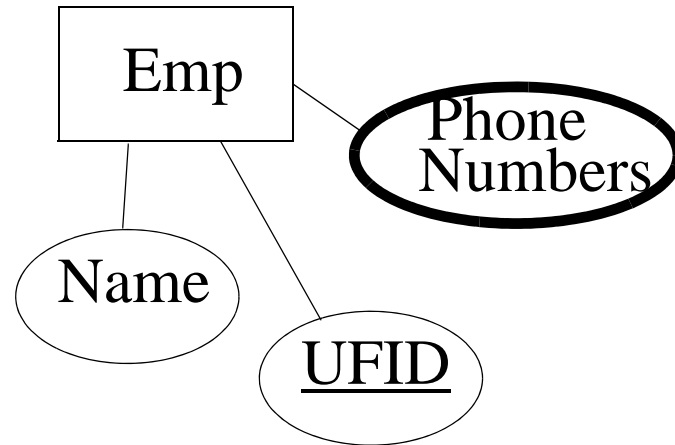
Other Parts of Conversion



How to handle multi-valued attributes?

EMP (UFID, Name)

Other Parts of Conversion



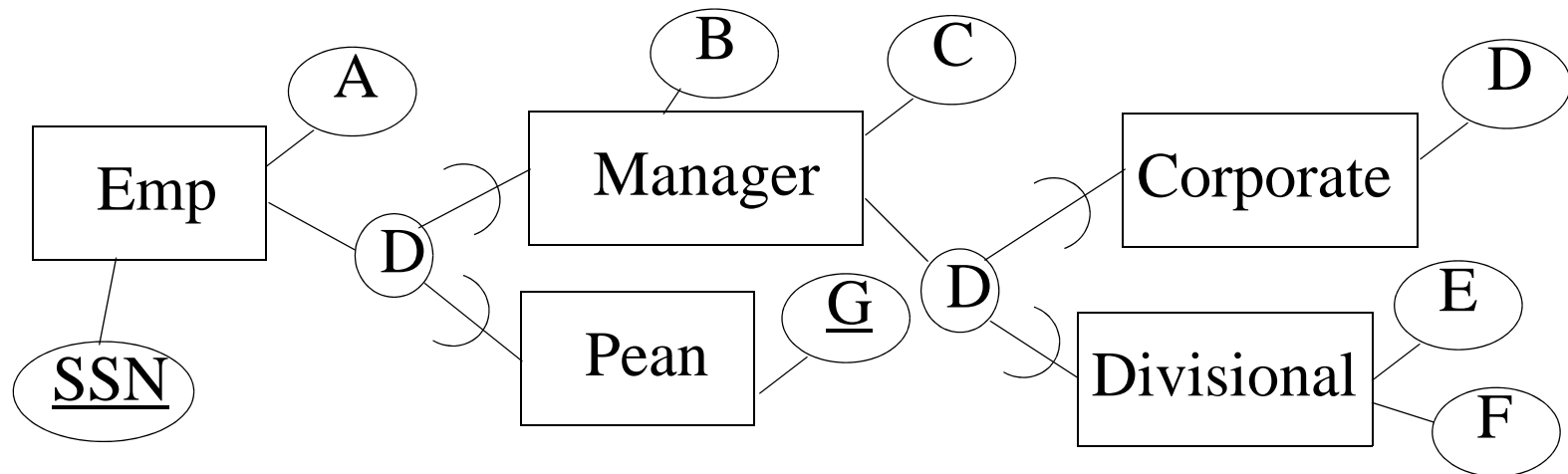
Can hold many values, so must be its own relation.

Treat like a weak entity:

```
EMP ( UFID, Name )
```

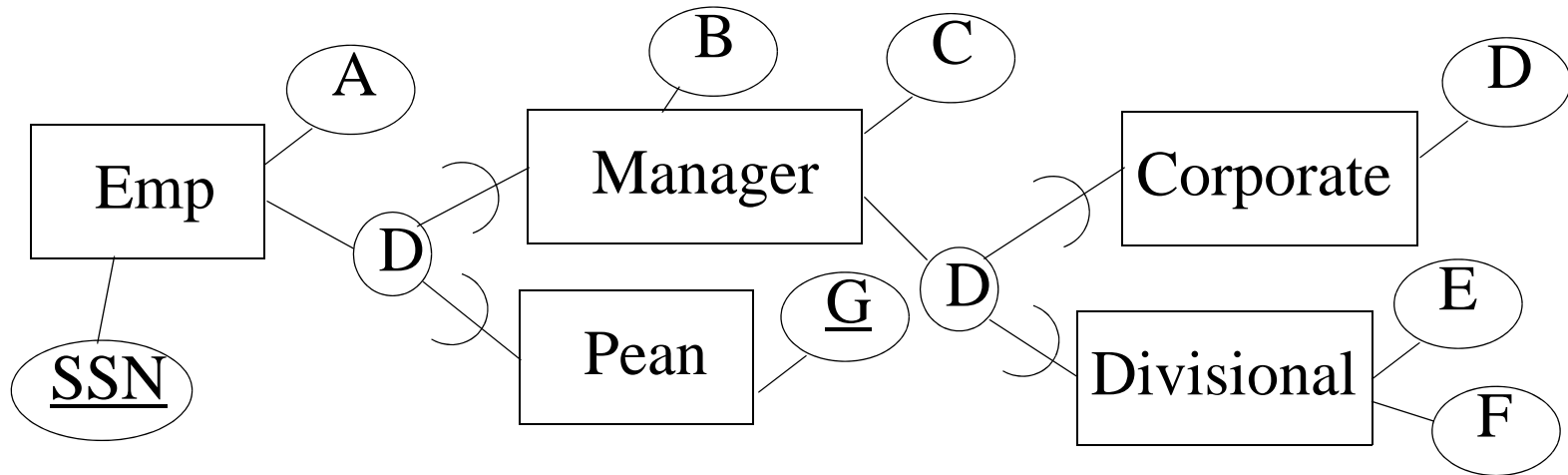
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EMP_PHONE_NUM ( NUMBER, UFID; UFID → EMP.UFID )
```

How About Inheritance?



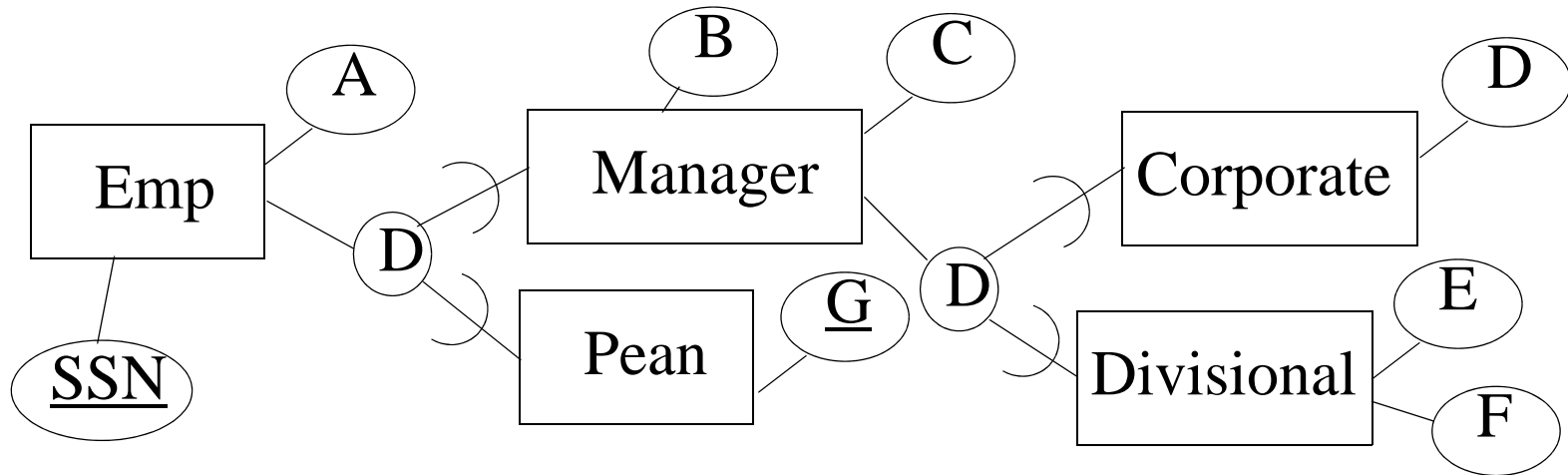
- Inheritance treated as a 1-N, parent/child relationship
- Entities in inheritance hierarchy w/o own key are treated as weak entities
- To convert: start at top and work down

How About Inheritance?



EMP (SSN, A)

How About Inheritance?



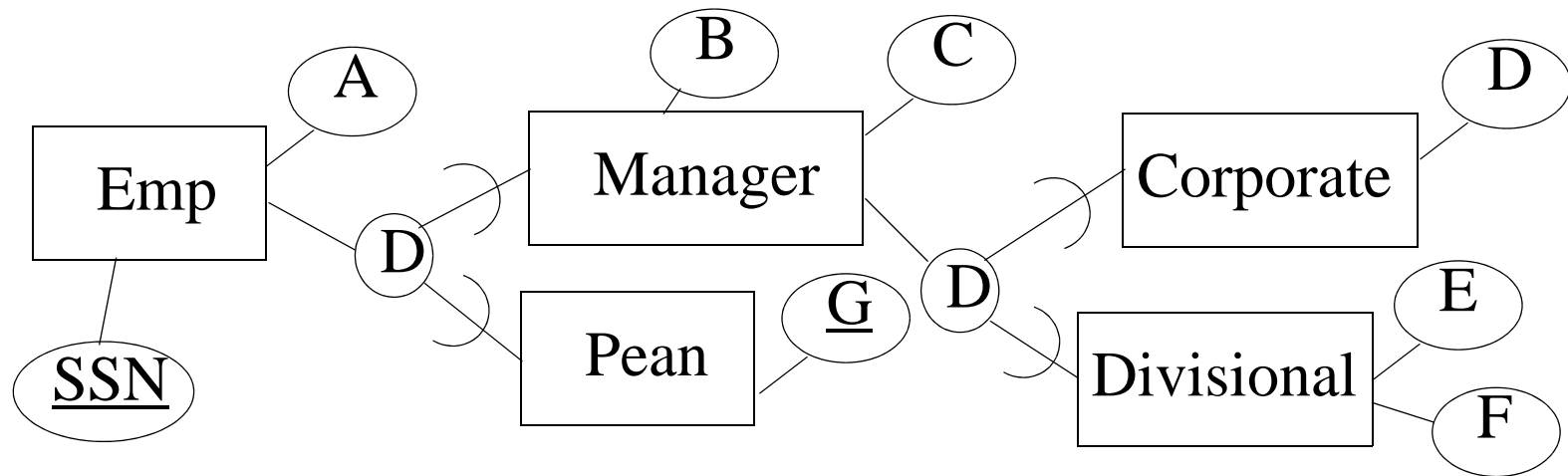
EMP (SSN, A)

Now do next level:

MANAGER (B, C, EMP_SSN; EMP_SSN → EMP.SSN)

PEAN (G, EMP_SSN; EMP_SSN → EMP.SSN)

How About Inheritance?



EMP (SSN, A)

MANAGER (B, C, EMP_SSN; EMP_SSN → EMP.SSN)

PEAN (G, EMP_SSN; EMP_SSN → EMP.SSN)

Now do last level:

CORP (D, EMP_SSN; EMP_SSN → MANAGER.EMP_SSN)

DIV (E, F, EMP_SSN; EMP_SSN → MANAGER.EMP_SSN)