Lecture 6

The Enhanced Entity Relationship Data Model

Week 3

Overview

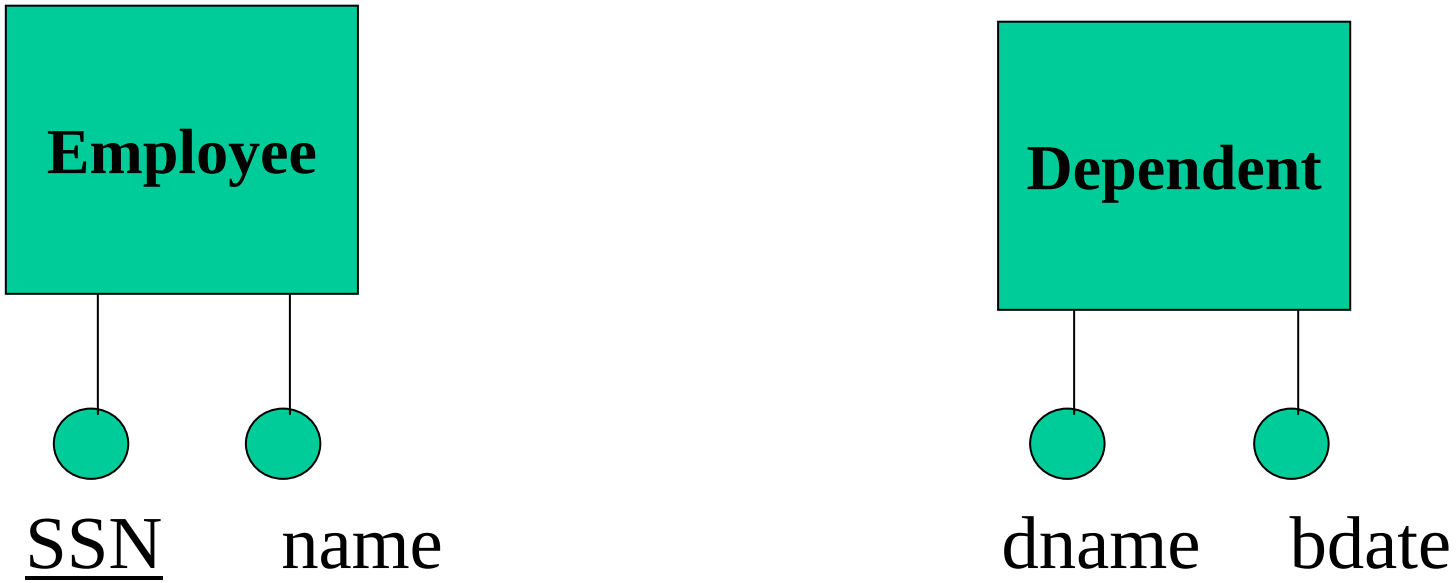
- Semantic integrity constraints
- Weak Entity types,
  - weak entity
  - identifying entity
  - identifying relationship type
- Generalisation and specialisation
- Alternatives to higher order relationships

Semantic integrity constraints

- In addition to participation and integrity constraints, as well as attribute domain constraints there may be many propositions that must hold true of any database instance
- Since the variety of such constraints is endless, we use textual or First Order Logic (FOL) representations of additional constraints, *written on the schema*

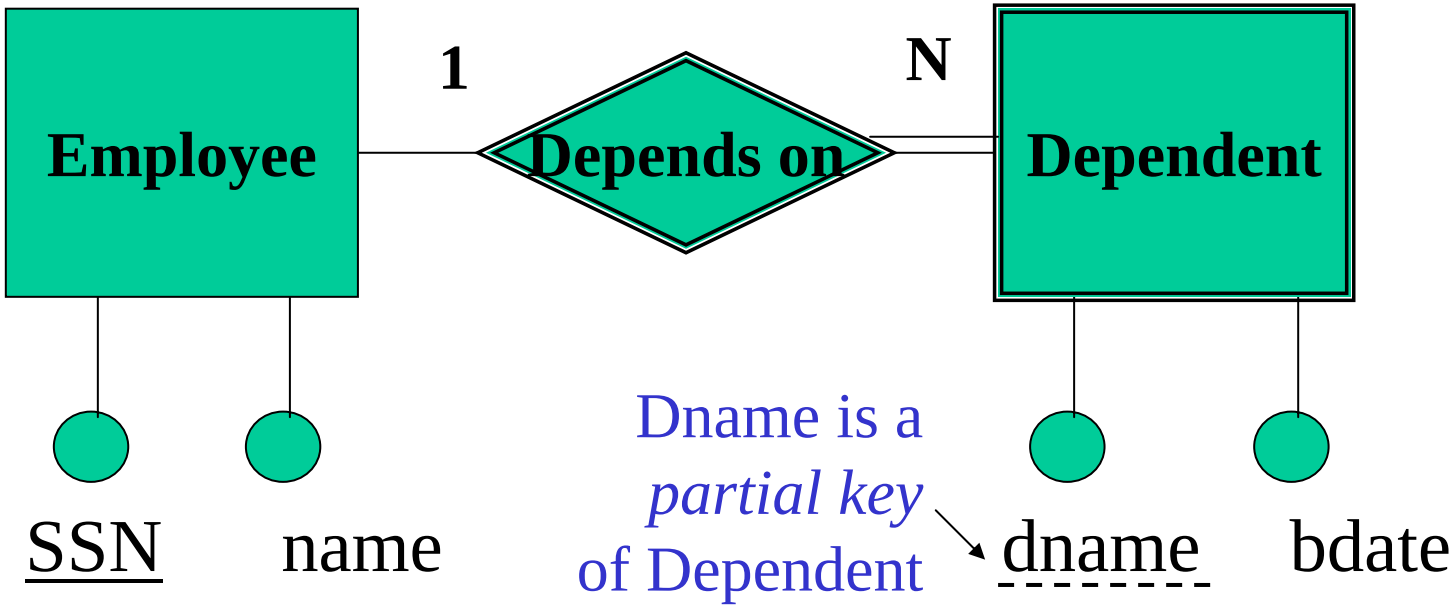
Weak entity types

- Weak entity types are entity types which have no key attributes of their own



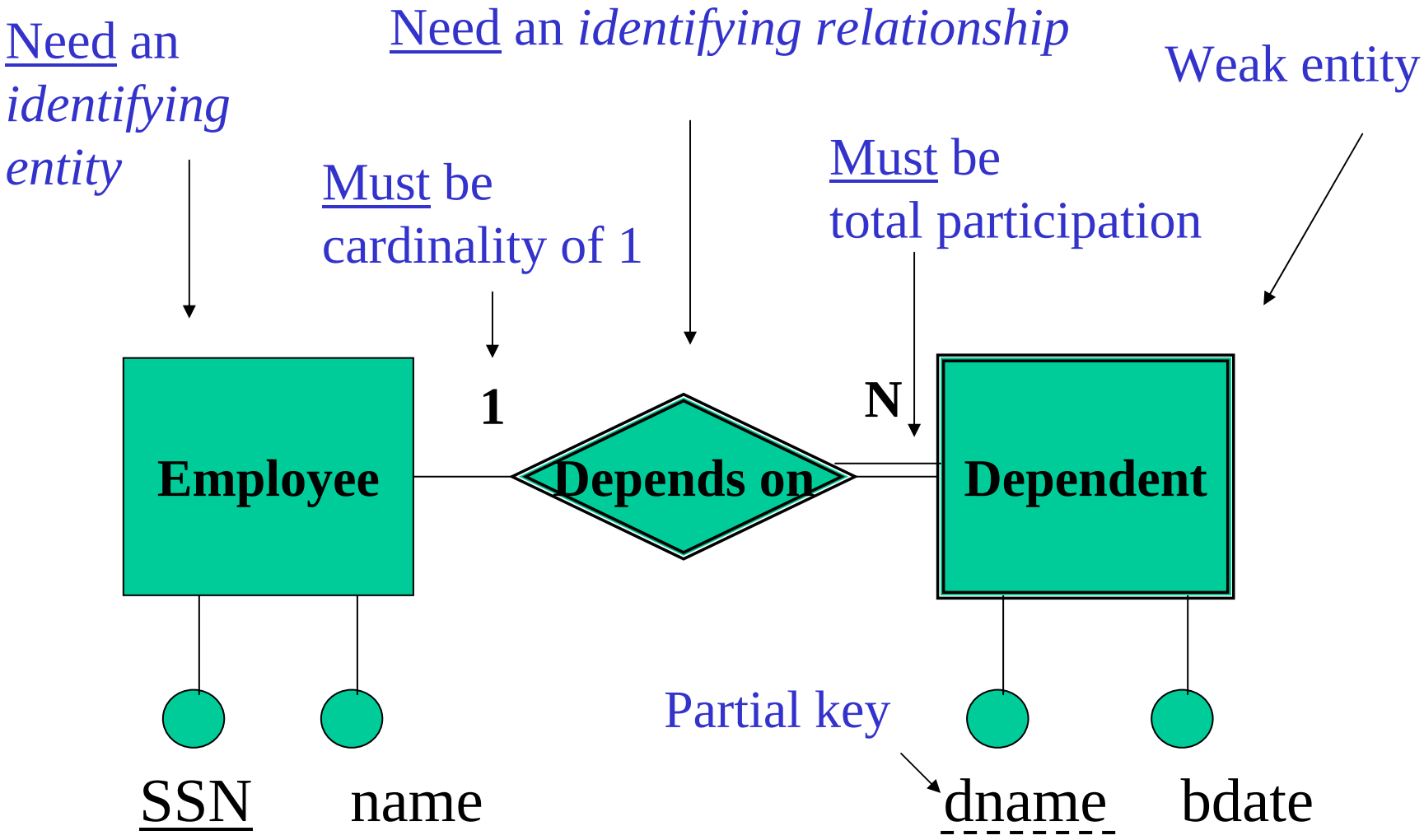
Weak entity types

- Weak entity types are entity types which have no key attributes of their own



The primary key of a weak entity type consists of its partial key *plus* the key of its identifying entity

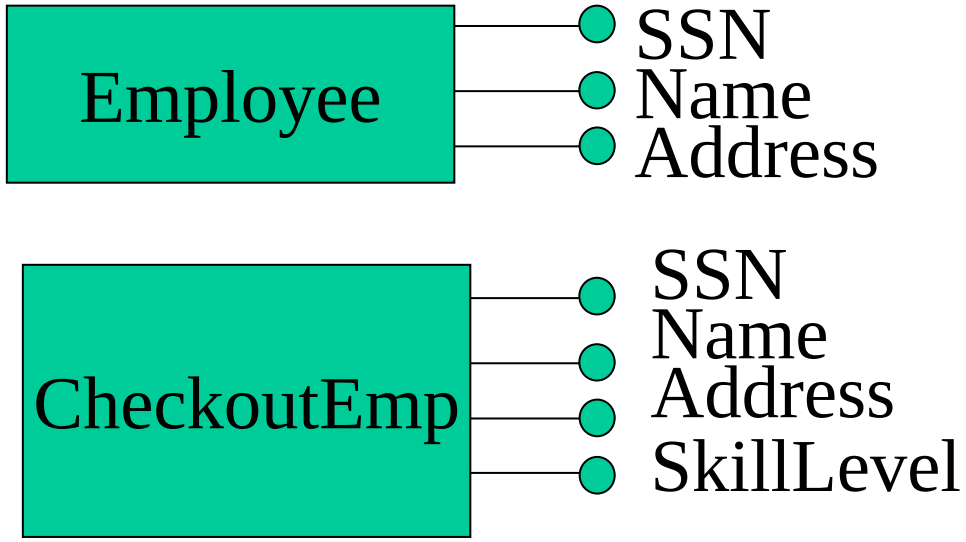
E.g., the primary key of Dependent is {SSN, dname}



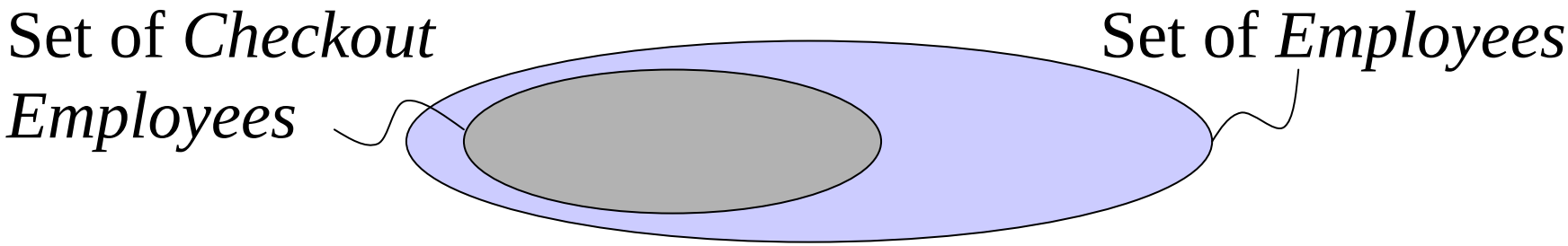
Generalisation and specialisation

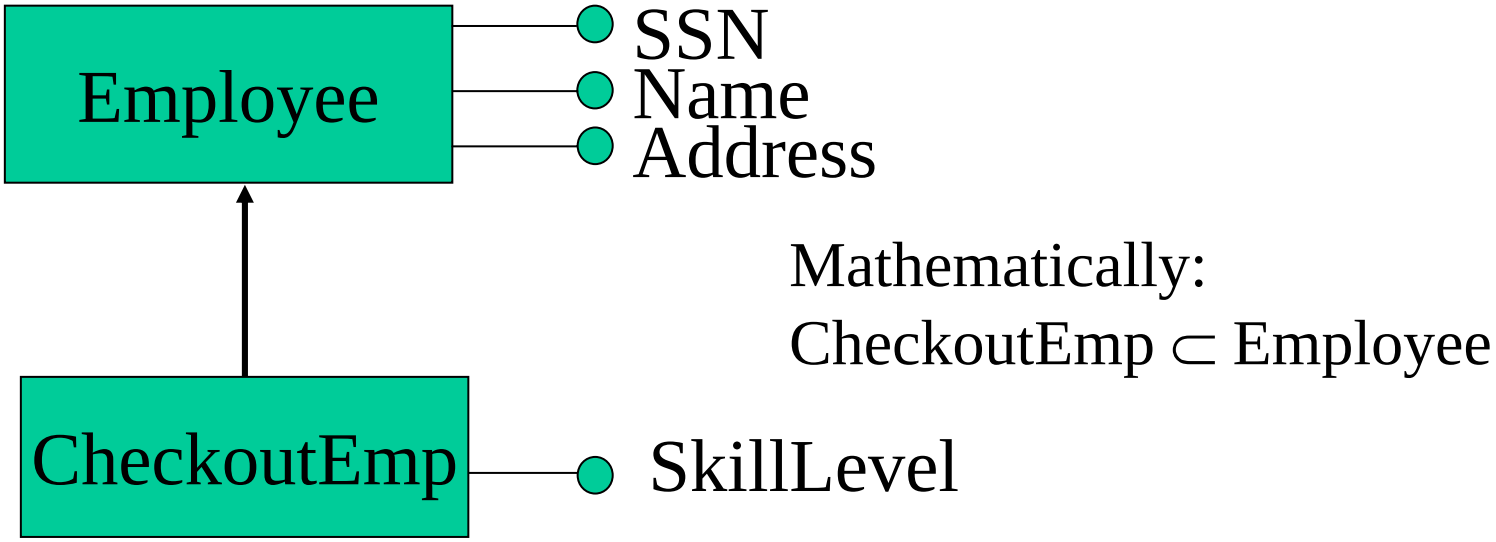
- Often entity types in a universe of discourse display some resemblance

Employee	(SSN, Name, Address)
CheckoutEmployee	(SSN, Name, Address, Skill Level)



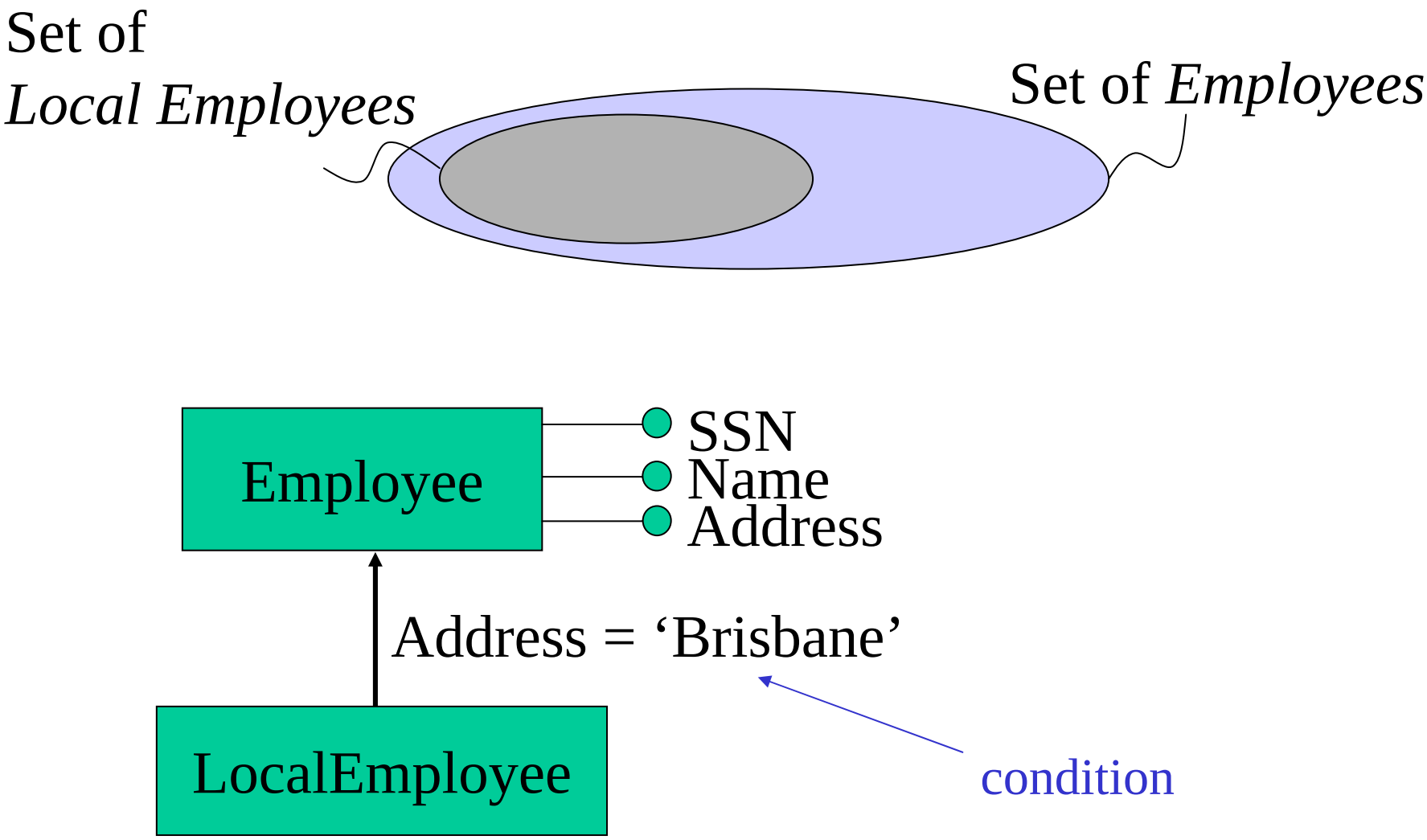
Generalisation and specialisation



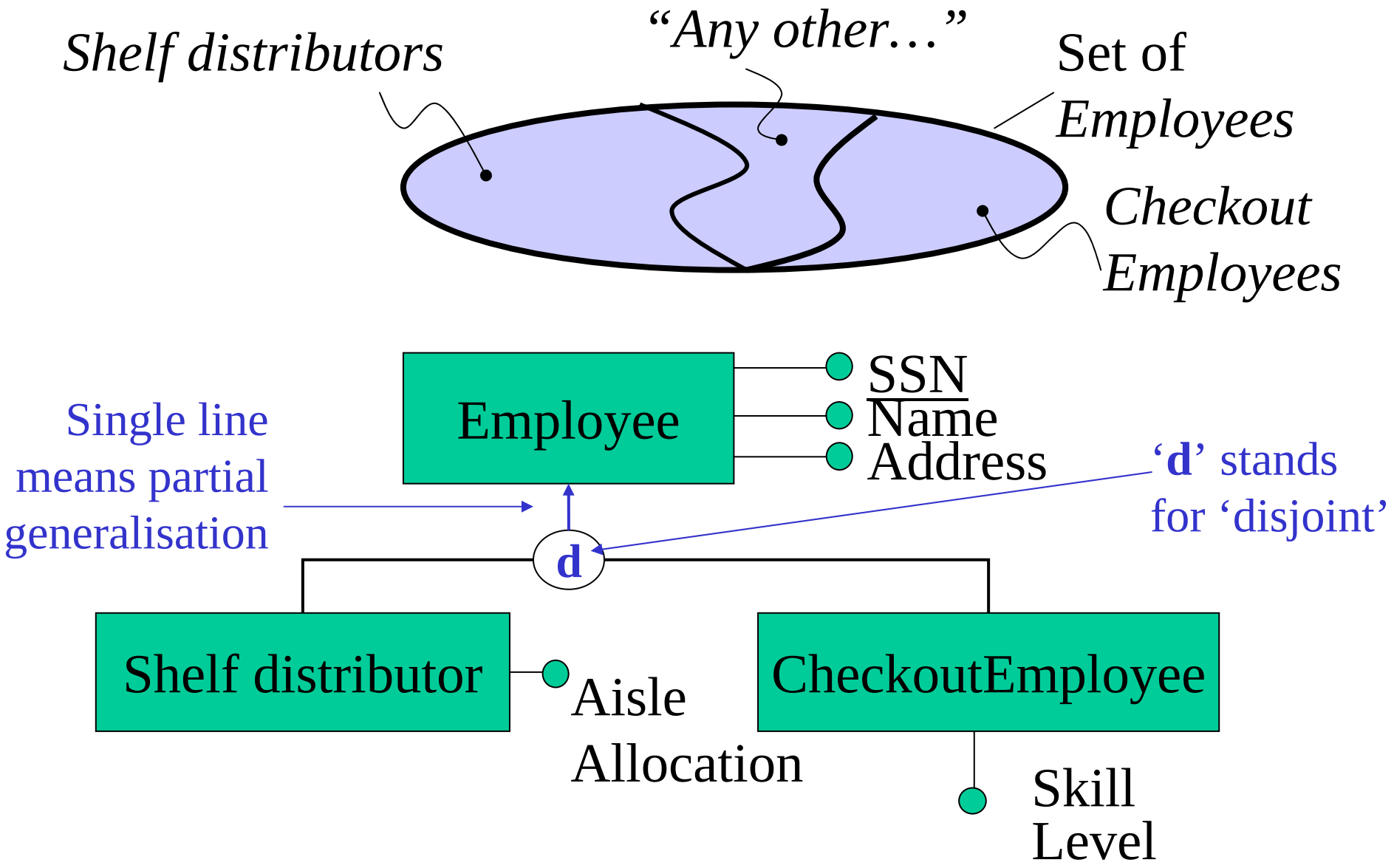


Note: attributes ‘SSN’, ‘Name’, ‘Address’ are inherited from Employee

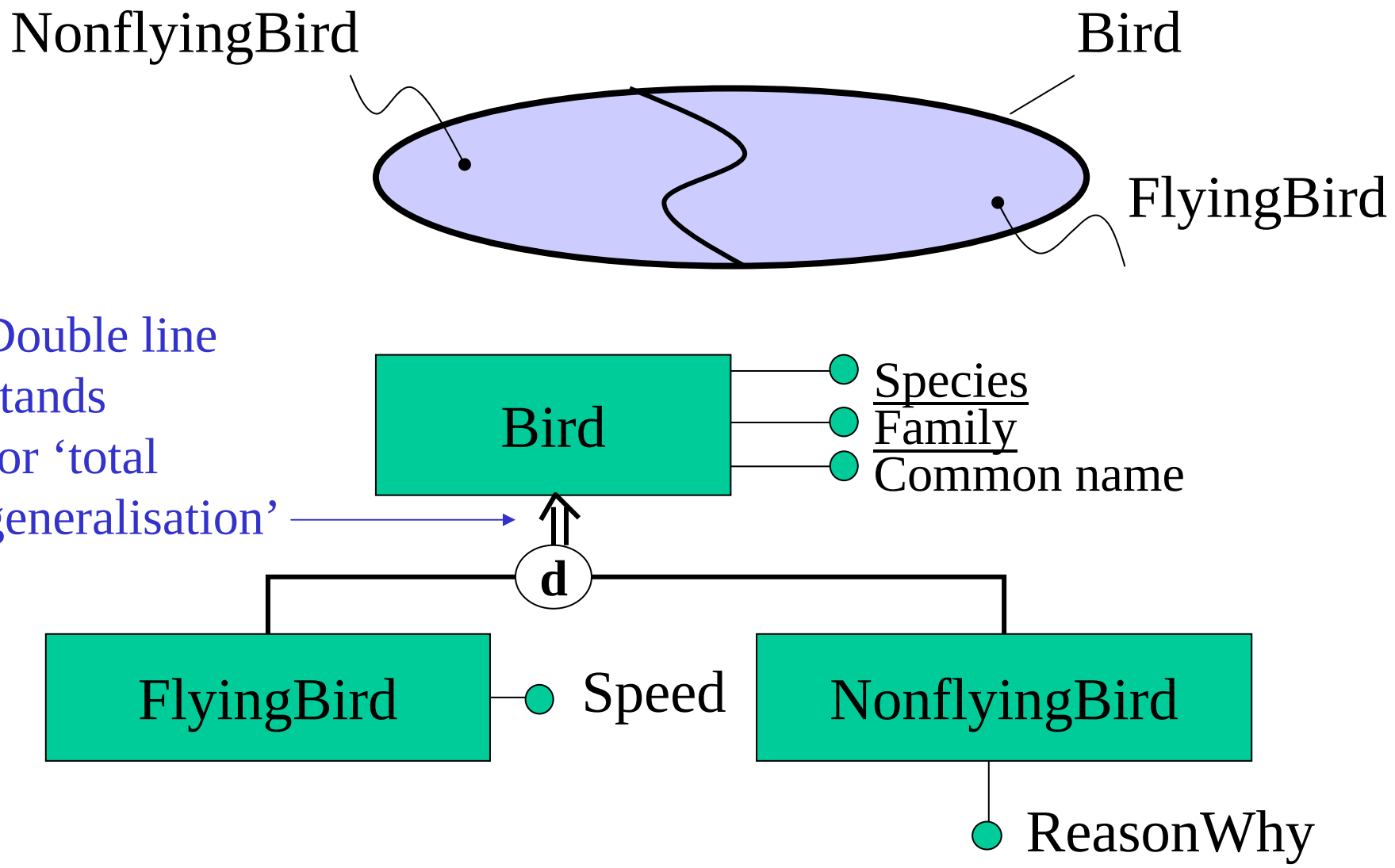
Derived subtype



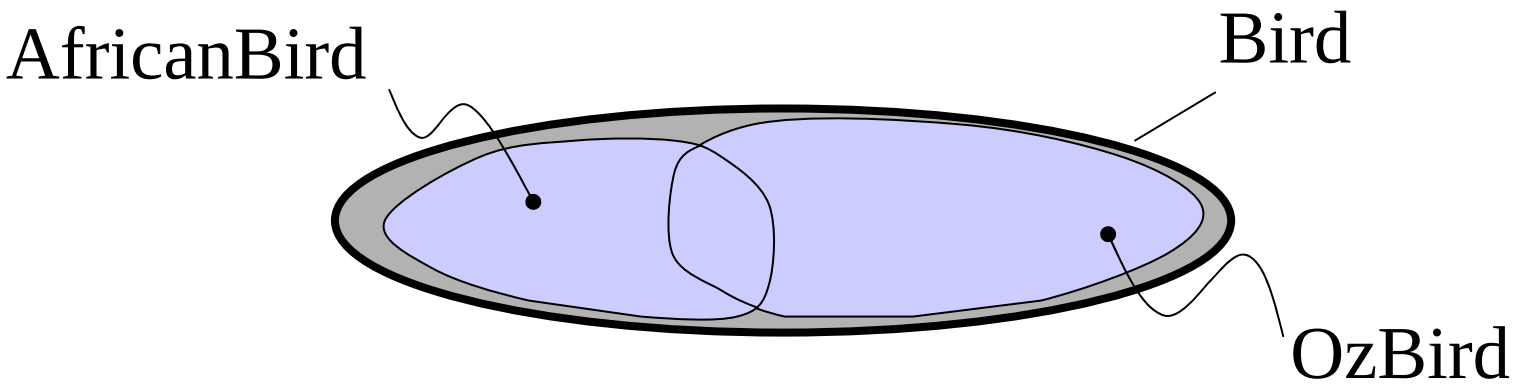
Partial generalisation / specialisation



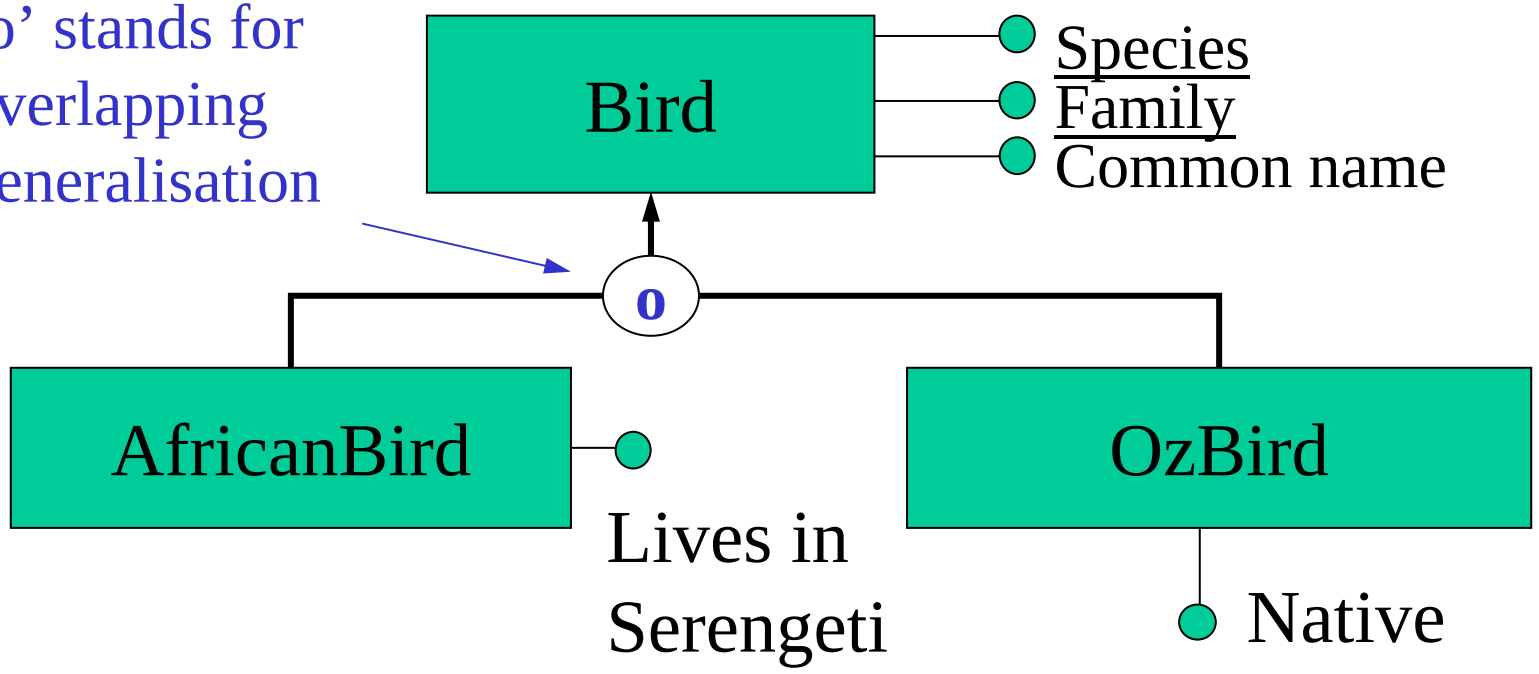
Total generalisation / specialisation



Overlapping generalisation / specialisation

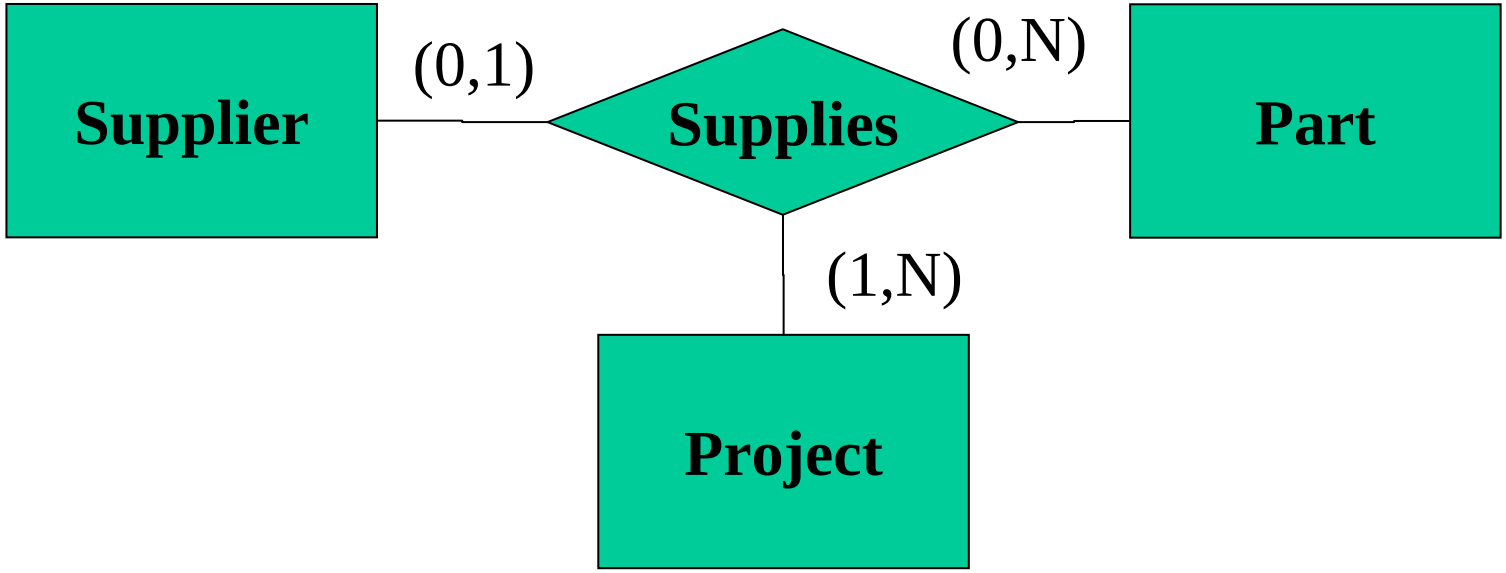


‘o’ stands for overlapping generalisation

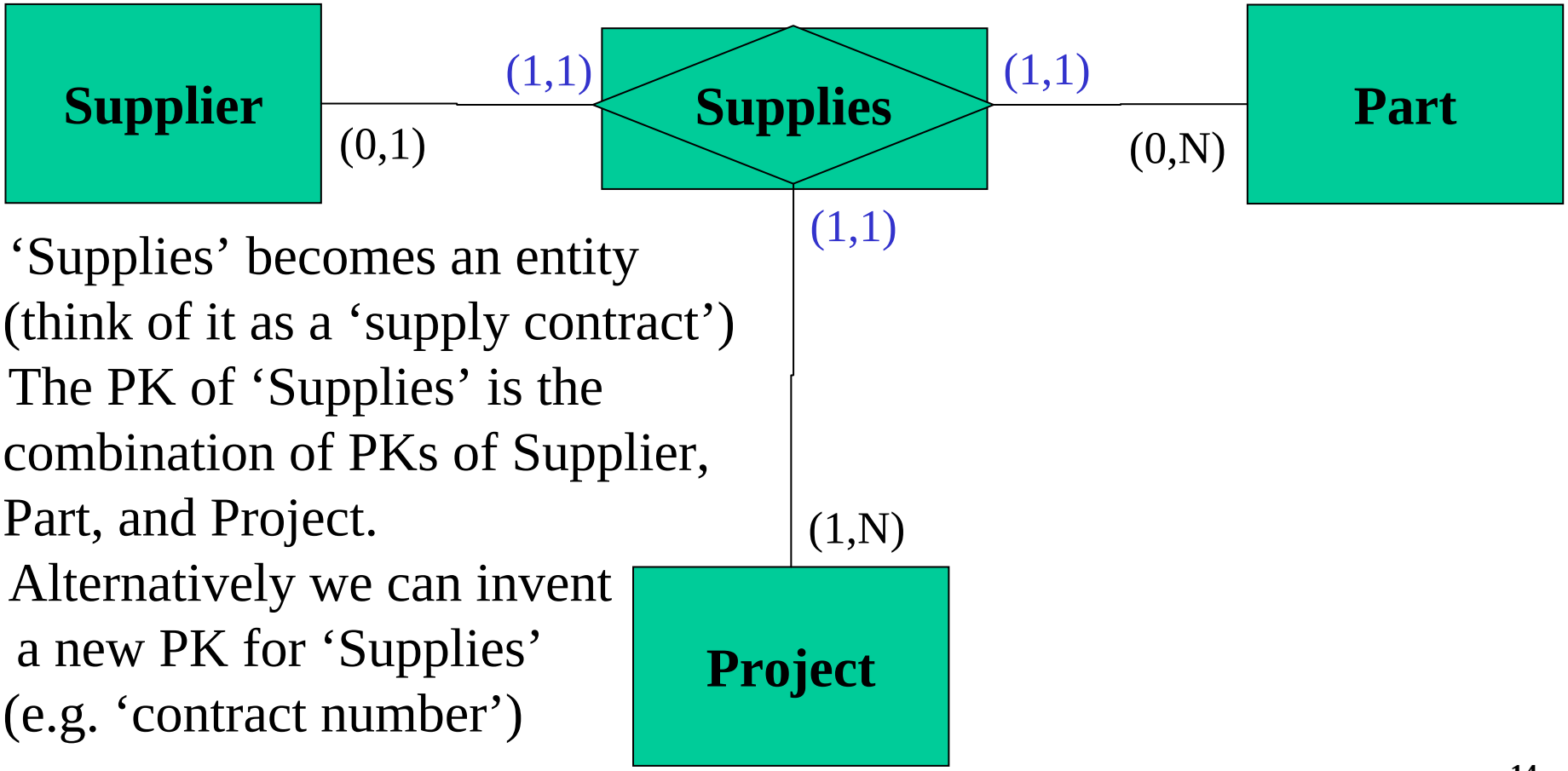


Alternative Representation for Higher Order Relationship Types

What if we can represent binary relationship types only?
(e.g. a CASE tool often places this restriction)

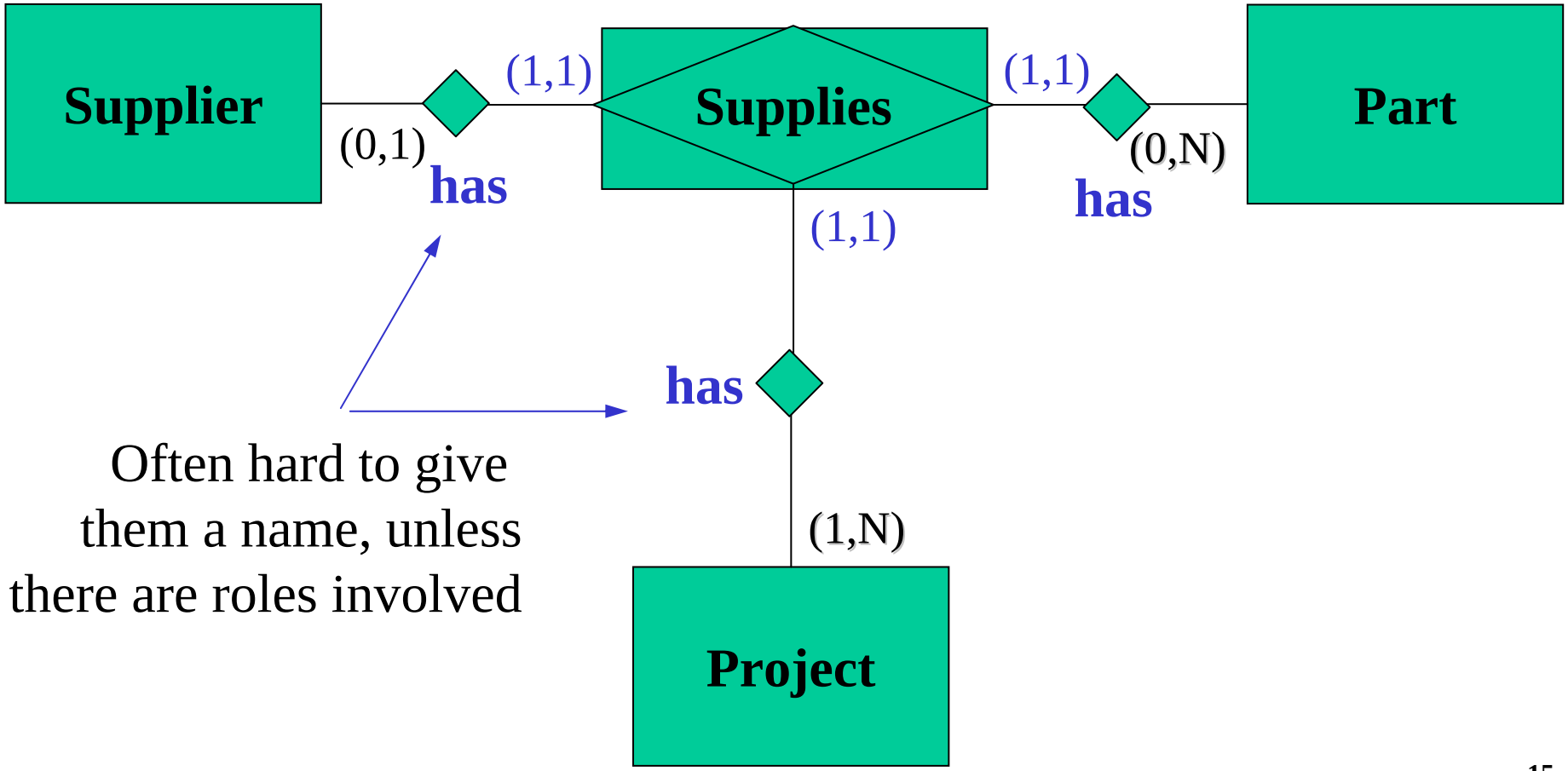


Solution: ‘objectify’ the ‘Supplies’ relation



- ‘Supplies’ becomes an entity (think of it as a ‘supply contract’)
- The PK of ‘Supplies’ is the combination of PKs of Supplier, Part, and Project.
- Alternatively we can invent a new PK for ‘Supplies’ (e.g. ‘contract number’)

The connecting lines represent binary relations between ‘Supplies’ and the entities involved

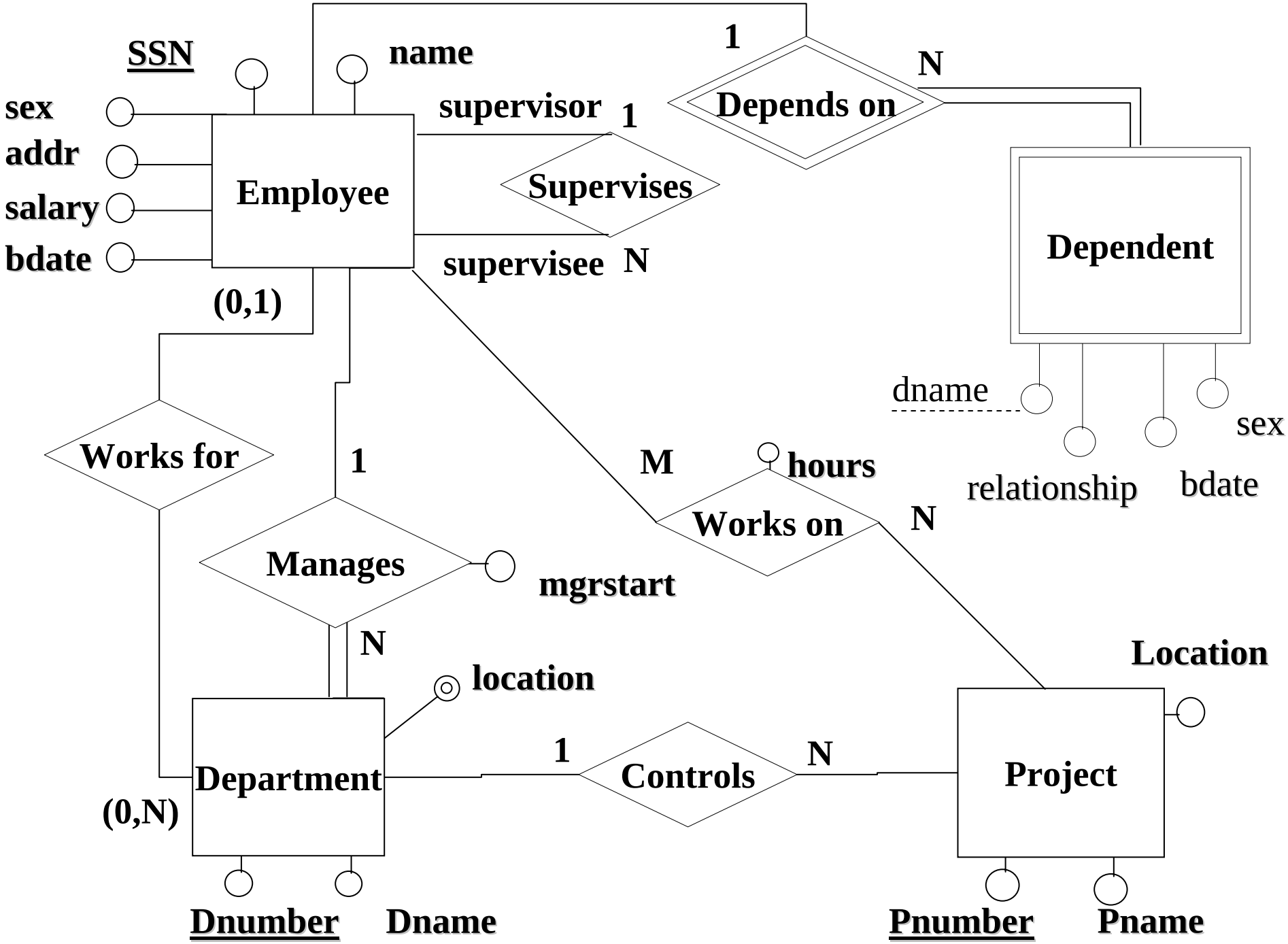


Example ER schema: the Company schema

You must be able to read an English description of a universe of discourse and transcribe its contents into an ER schema.

Your must be able to read an ER schema and transcribe it to *precise* English text.

You must be able to read an English description of a Universe of Discourse and an ER schema (representation) of it, and identify any mistakes and/or ambiguities in the ER schema.


SSN
name
sex
addr
salary
bdate
Employee
supervisor
1
Supervises
supervisee
N
1
Depends on
N
Dependent
dname
sex
relationship
bdate
(0,1)
Works for
1
Manages
mgrstart
N
M
hours
Works on
N
Location
location
Department
(0,N)
1
Controls
N
Project
Dnumber
Dname
Pnumber
Pname

Summary

This lecture has covered the extensions to the ER data model, thus called EER (Enhanced / Extended ER) including:

- Semantic integrity constraints
- Weak Entity types,
- Generalisation and specialisation hierarchies
- Alternatives to higher order relationships

The end