Another Notation for ER Model IE-Information Engineering (Crow Foot Notation)

ER in Chen Notation

Pros

- **Lots of information:** Most books that cover relational database design tend to use this notation.
- **Use basic figures:** You can draw an ERD with practically any program that has rectangles, diamonds, ovals, and lines (ehem … word).

Cons

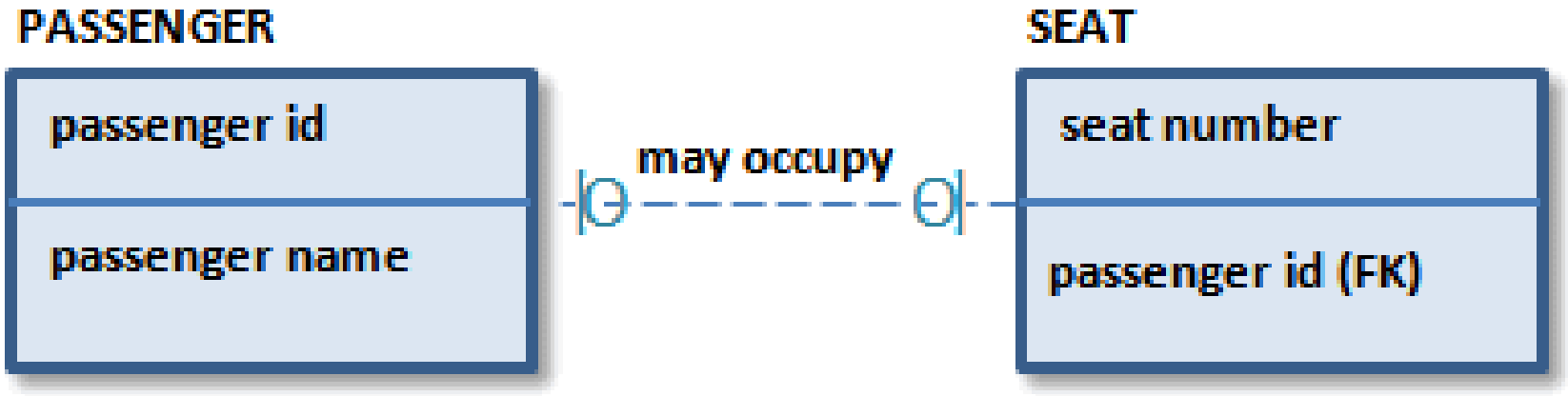
- **Notation takes up much space:** If a diagram has entities with many attributes and relationships, it becomes chaotic and difficult to read
- **No database modeler includes this notation**: so, you cannot autogenerate a logical or physical diagram and much less SQL or reverse engineering.
- **Not used in the industry:** Because of the previous points, it is not use in any company.

https://medium.com/@ericgcc/dont-get-wrong-explained-guide-to-choosing-a-database-design-notation-for-erd-in-a-while-7747925a7531

IE (Crow Foot notation)

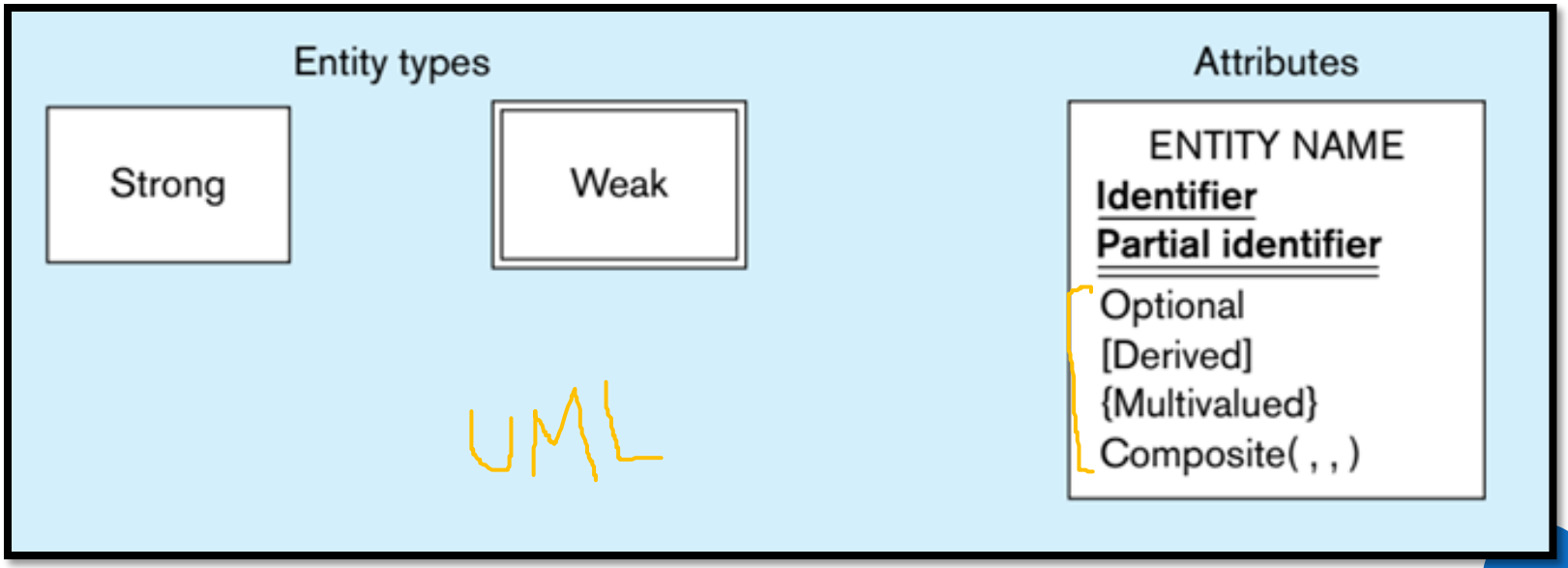
IE notation has various versions, without a single standard.

IE notation is quite popular and almost all database modeling tools include it.

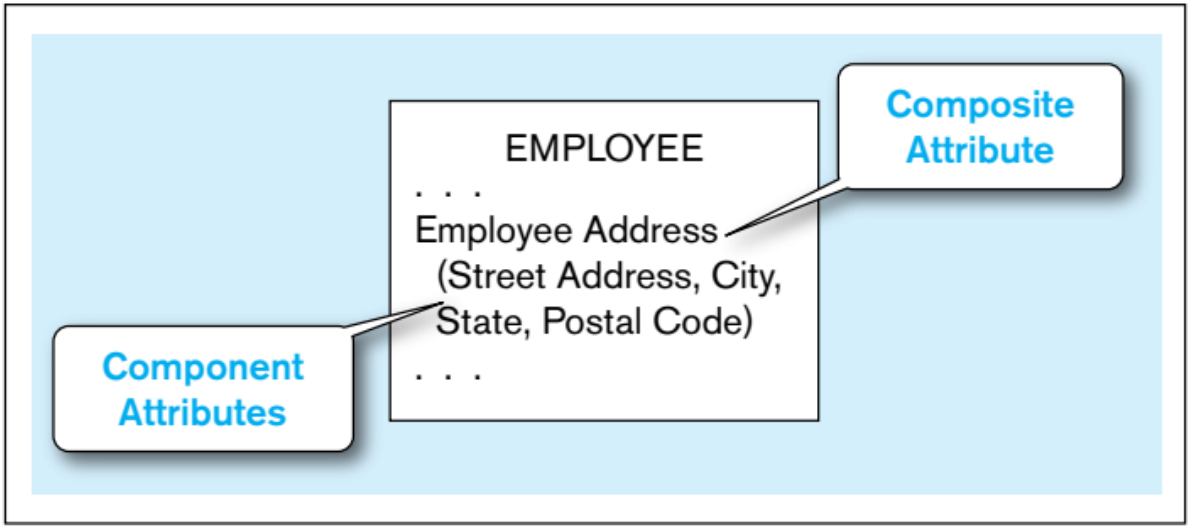


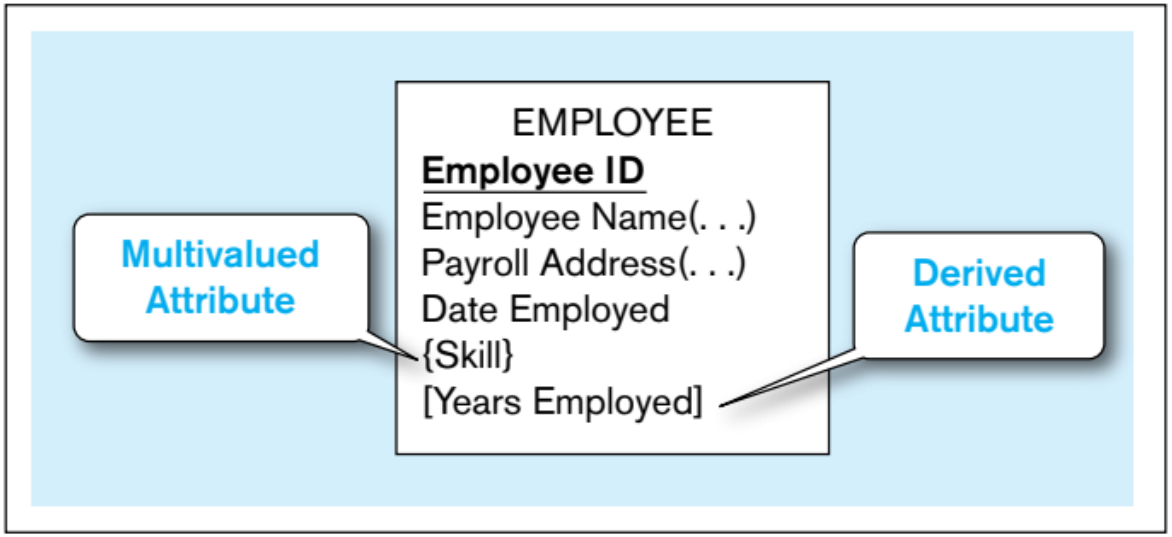
IE (Crow Foot notation)

Entities

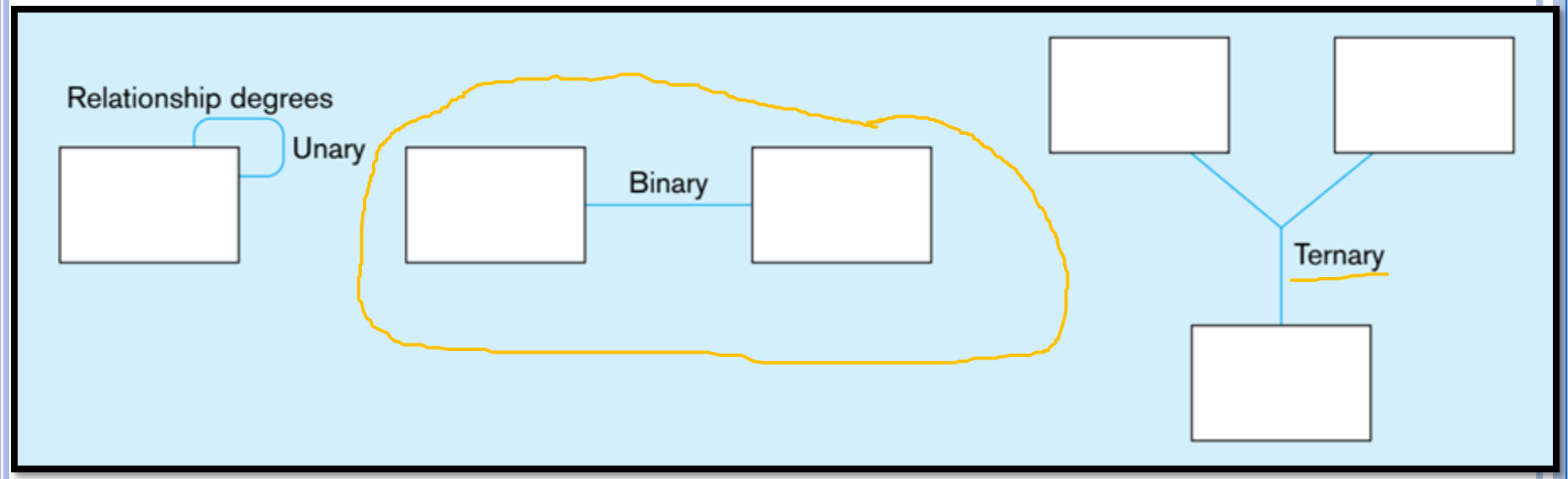


Attributes

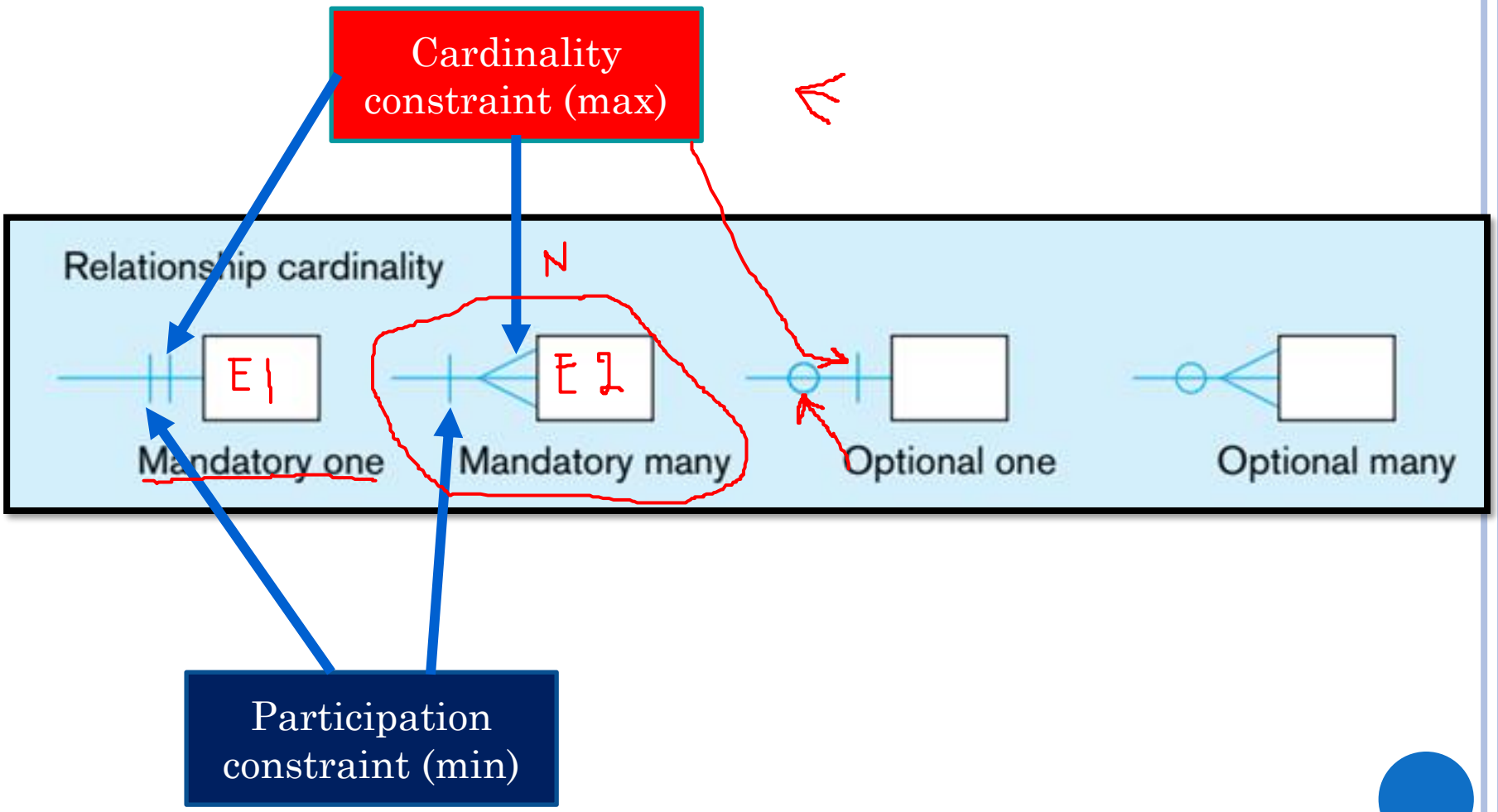

EMPLOYEE
. . .
Employee Address
(Street Address, City,
State, Postal Code)
. . .
Composite Attribute
Component Attributes


EMPLOYEE
Employee ID
Employee Name(. . .)
Payroll Address(. . .)
Date Employed
{Skill}
[Years Employed]
Multivalued Attribute
Derived Attribute

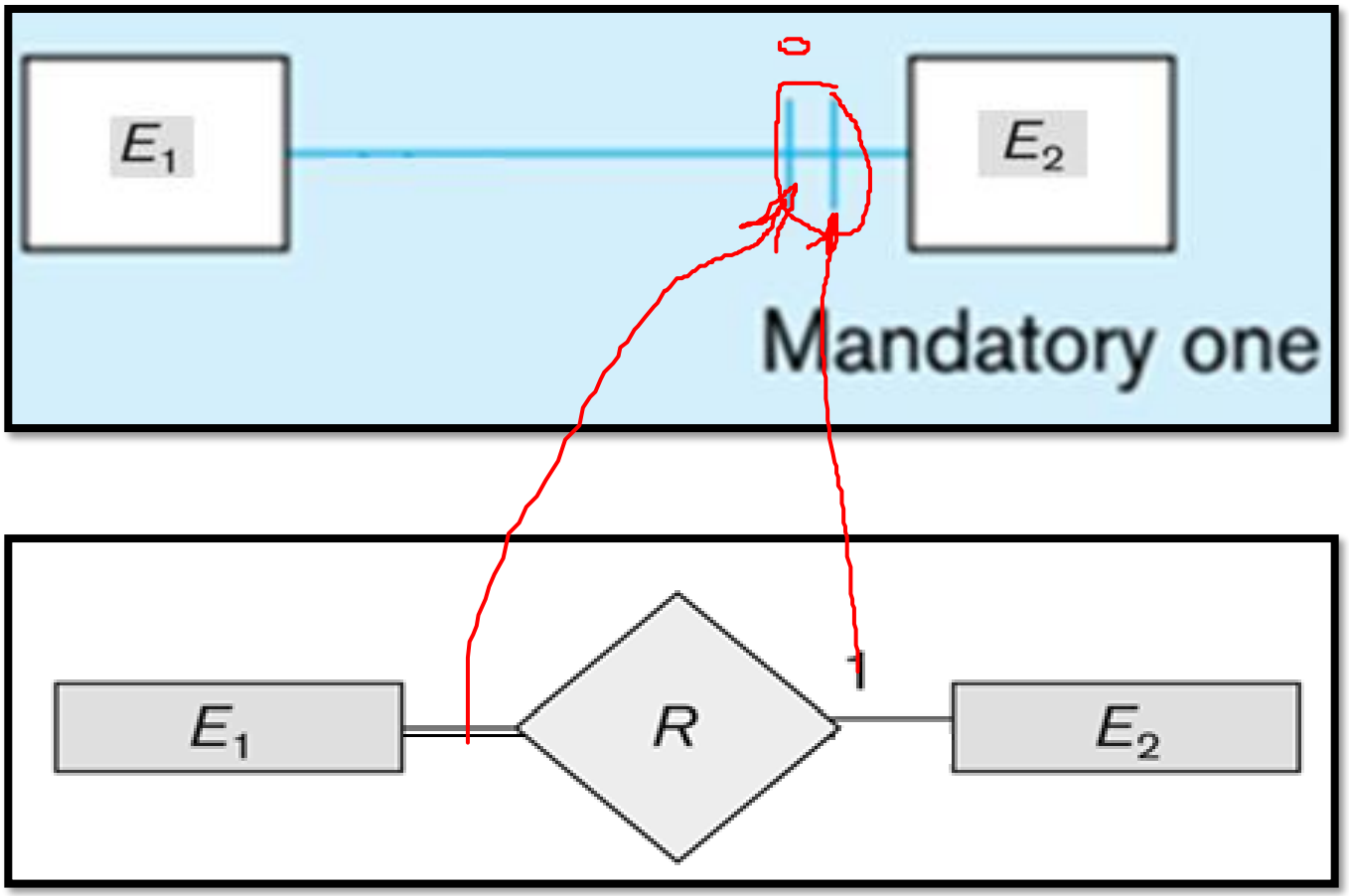
Relationships



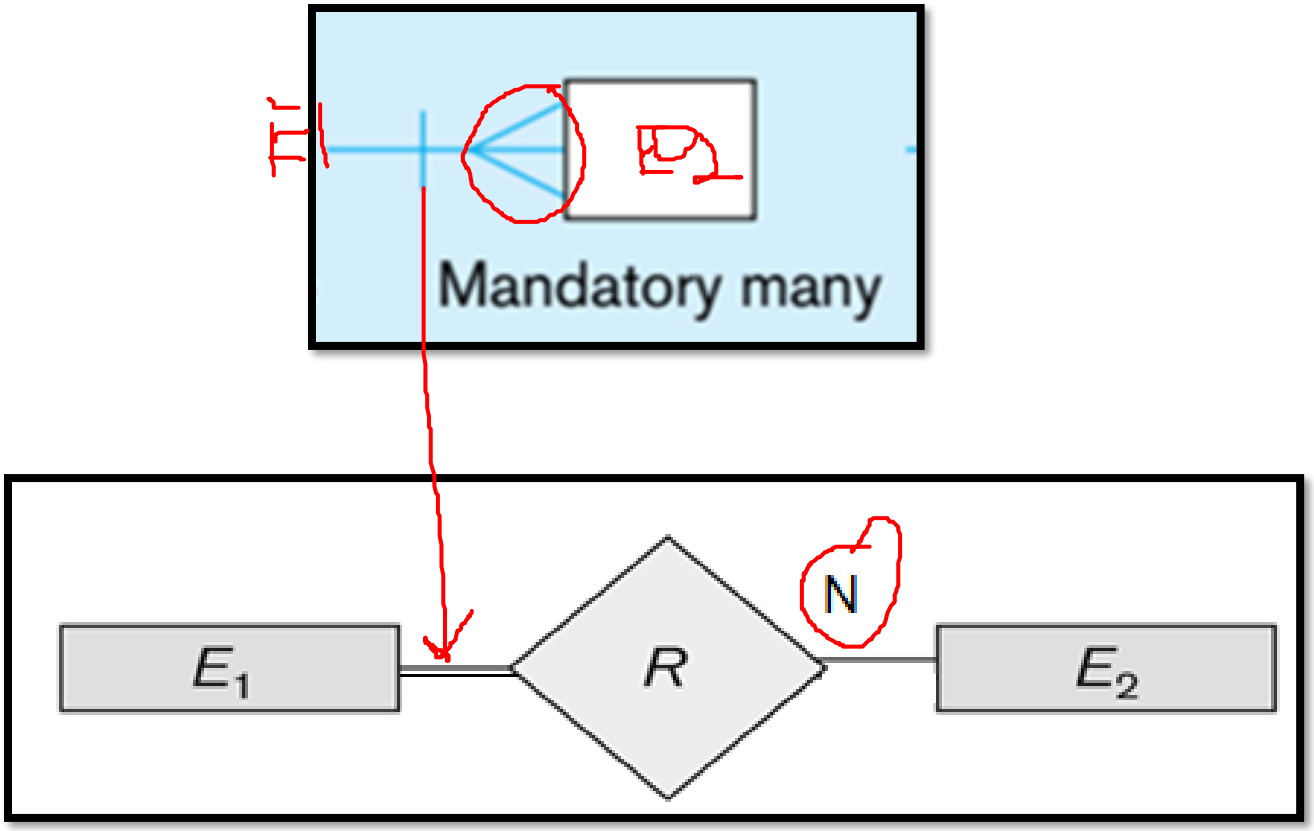
Relationship Cardinality



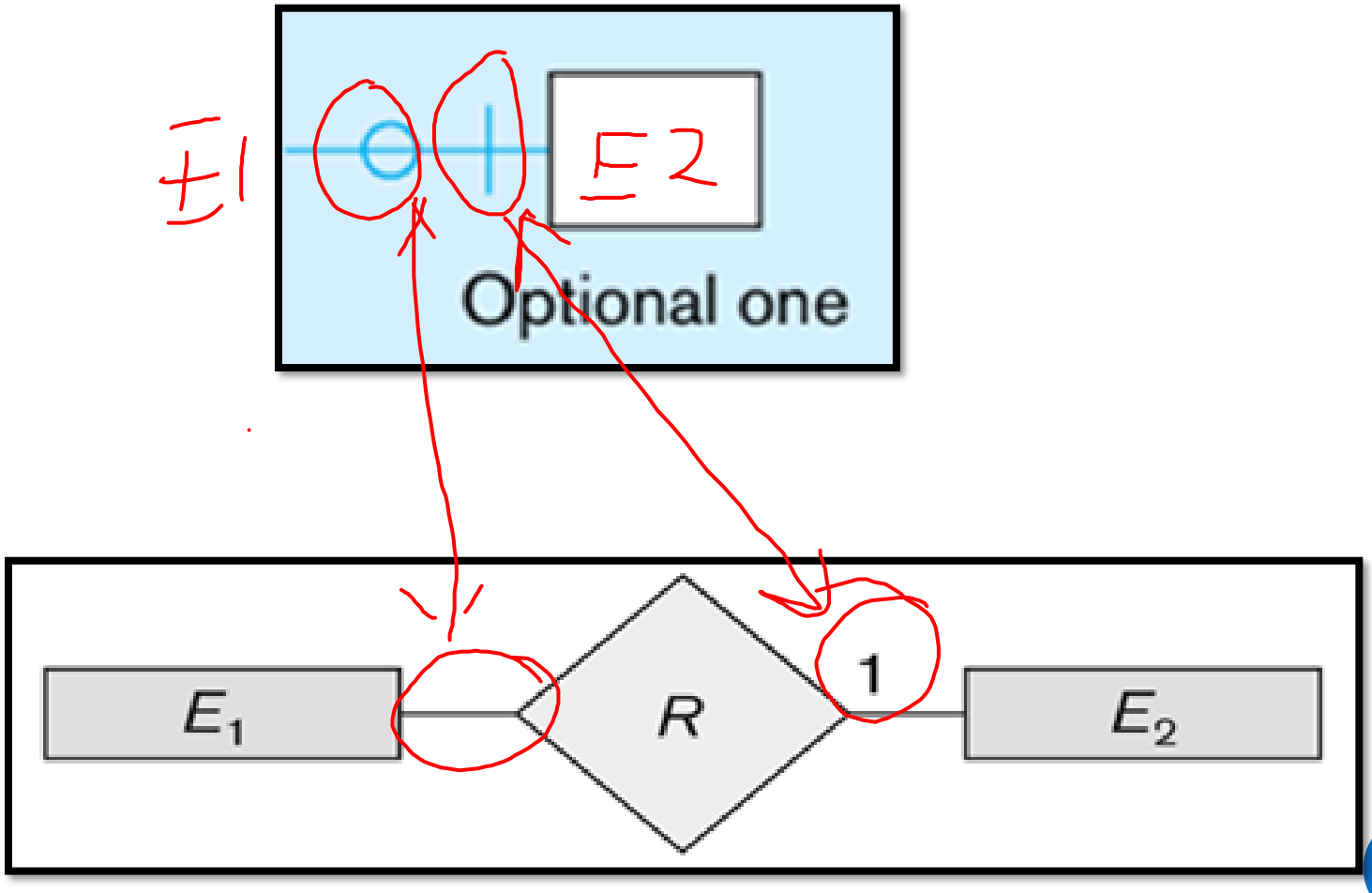
Relationship Cardinality



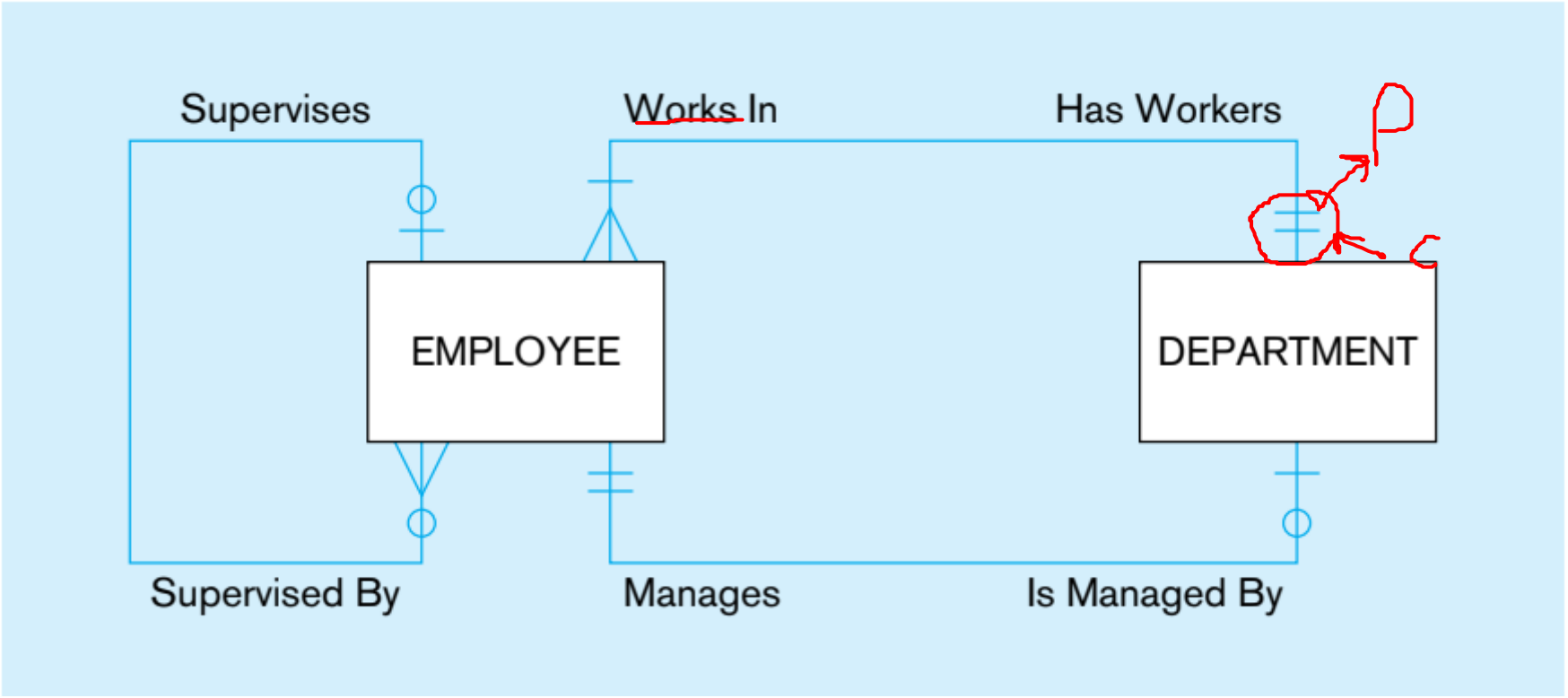
Cardinality



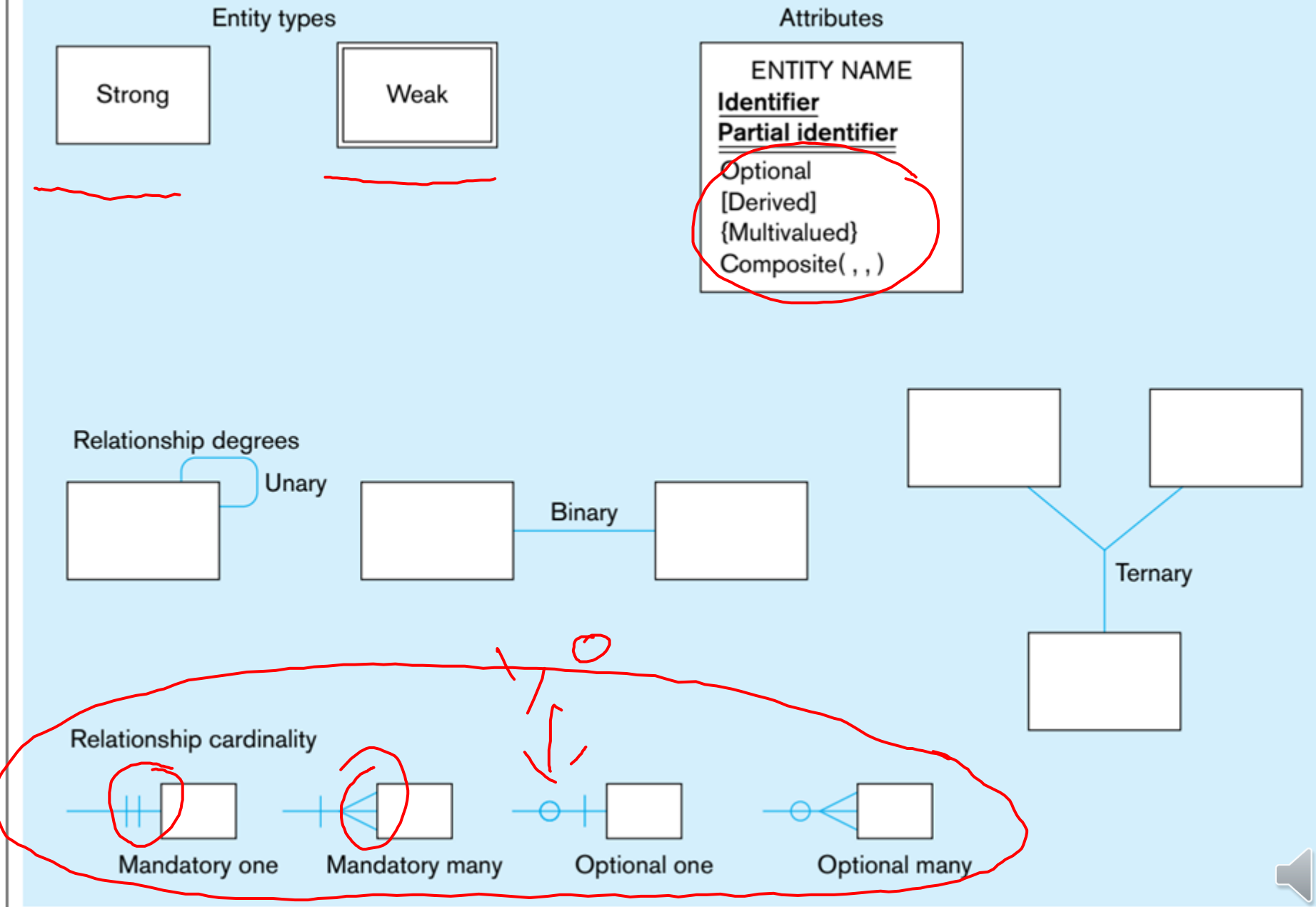
Cardinality



Example

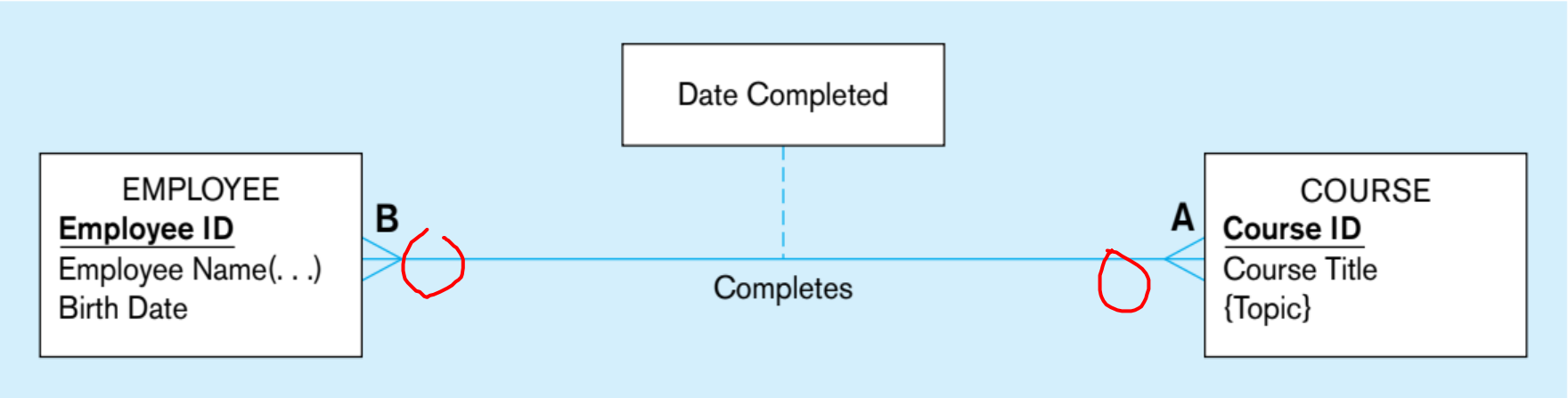

Supervises
Works In
Has Workers
EMPLOYEE
DEPARTMENT
Supervised By
Manages
Is Managed By

IE (Crow Foot notation)



Relationship Attribute

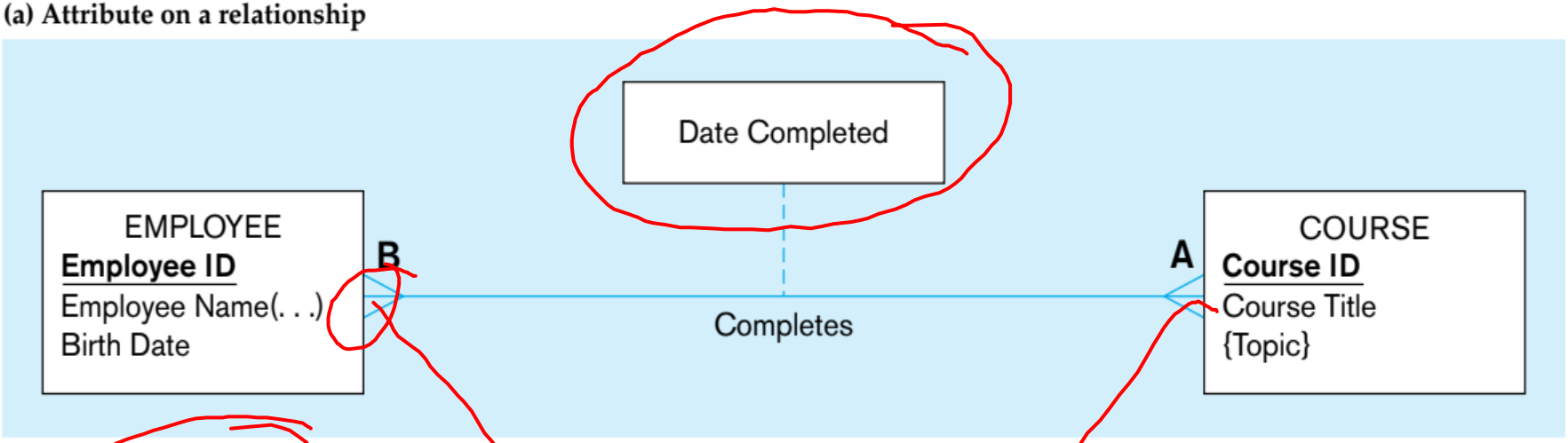
(a) Attribute on a relationship



Participation

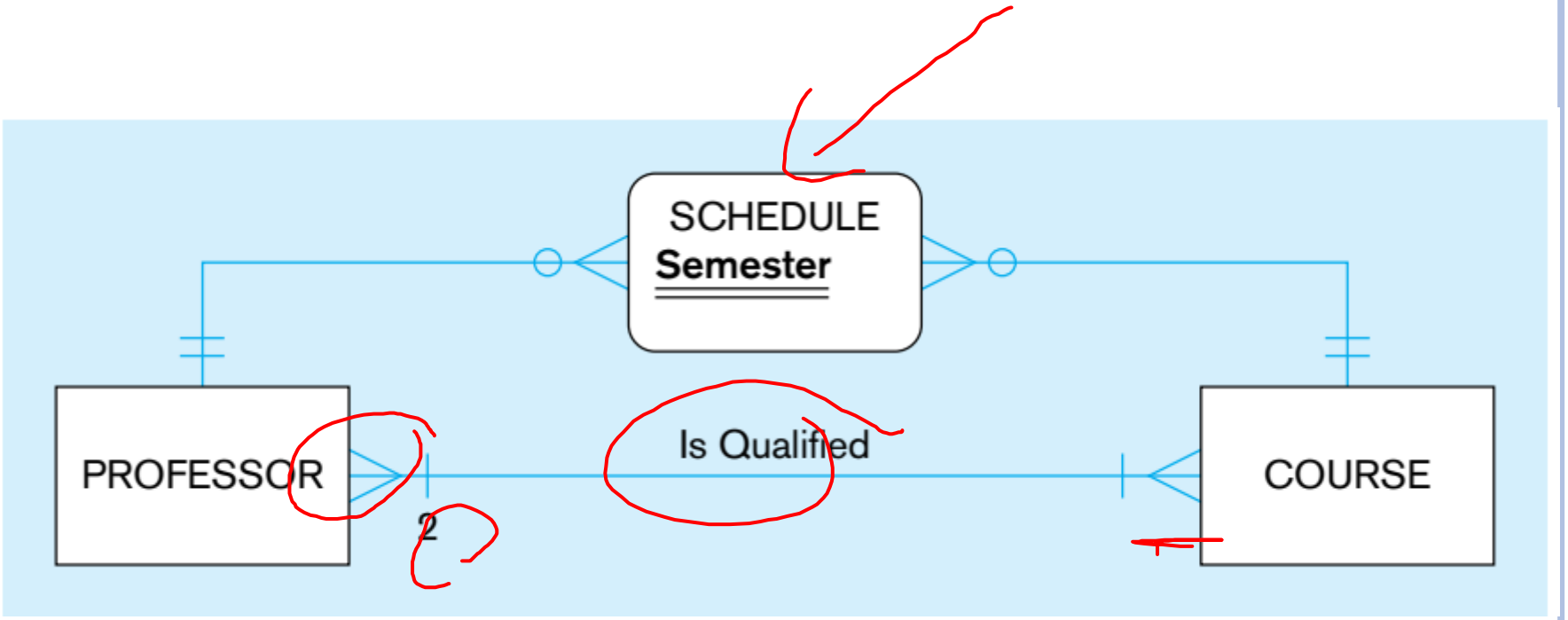
Relationship Attribute

(a) Attribute on a relationship

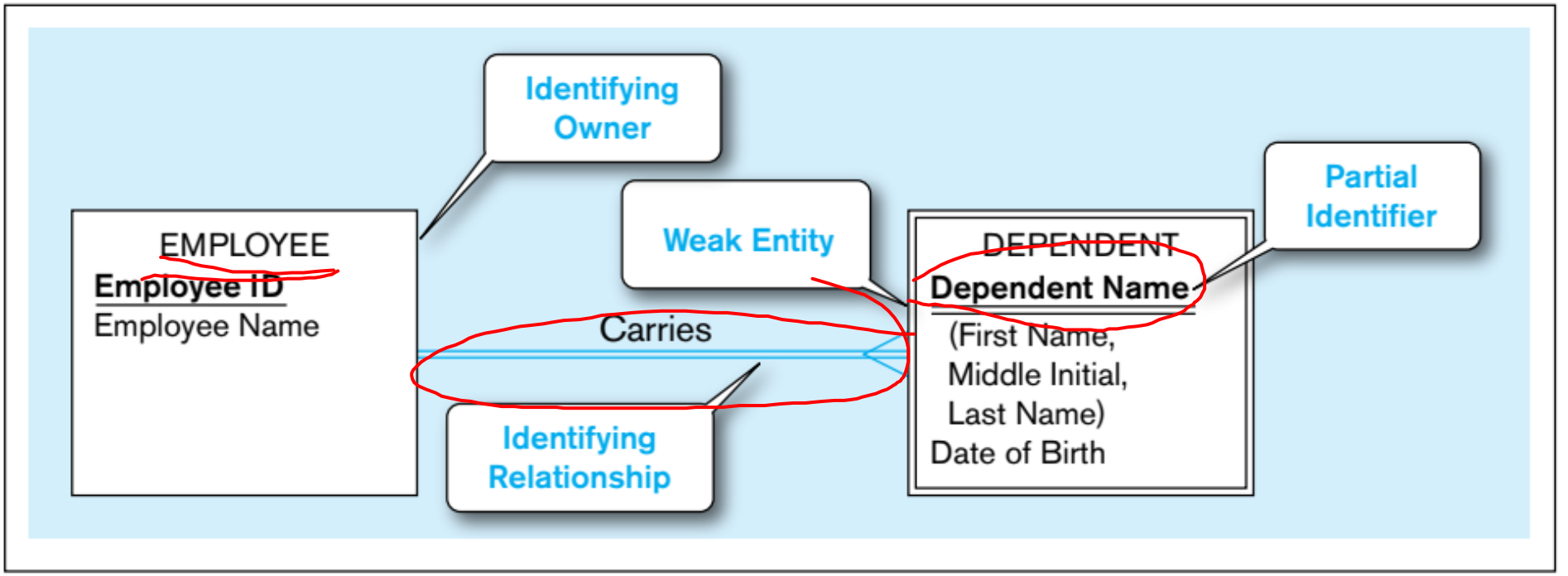


(b) An associative entity (CERTIFICATE)

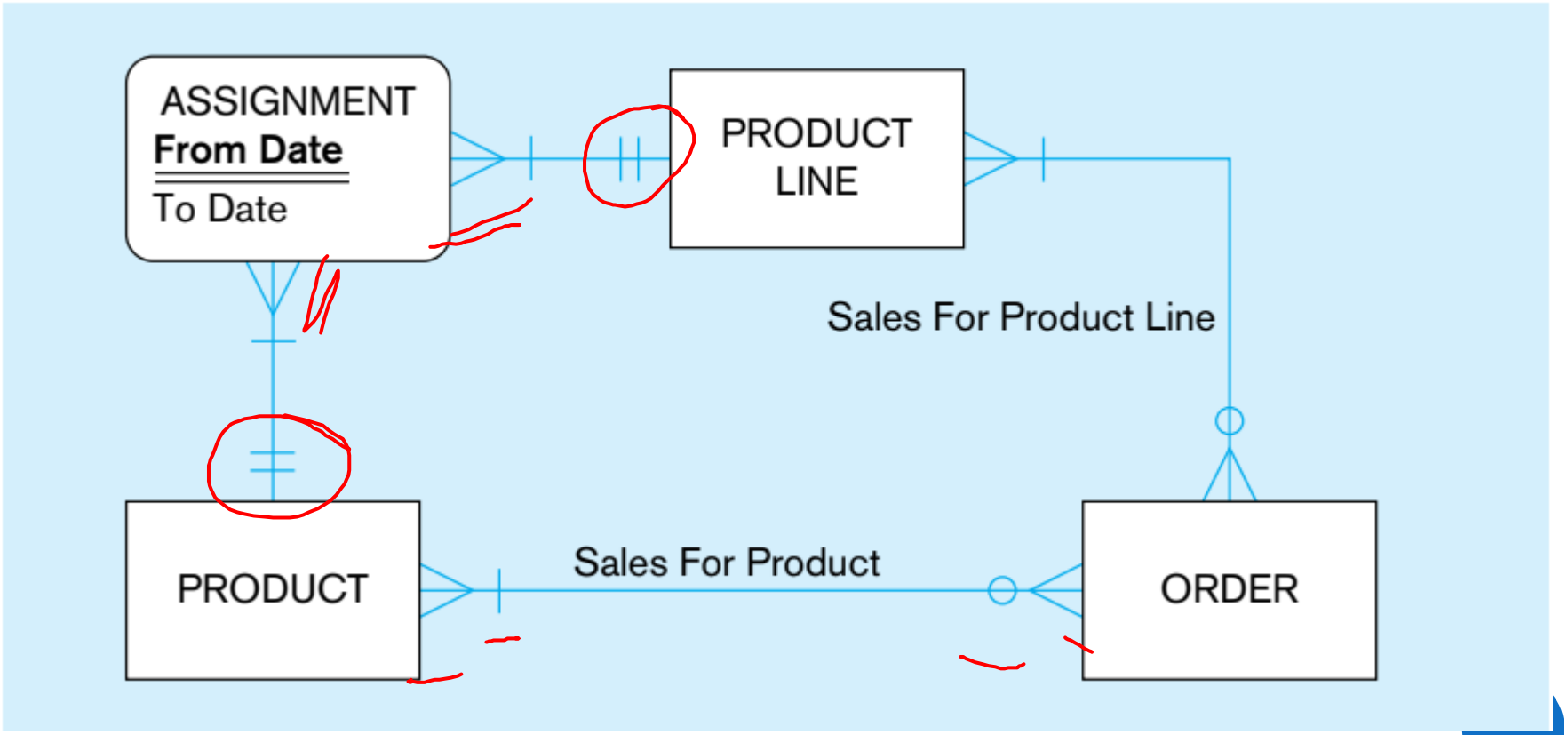
Associative entity



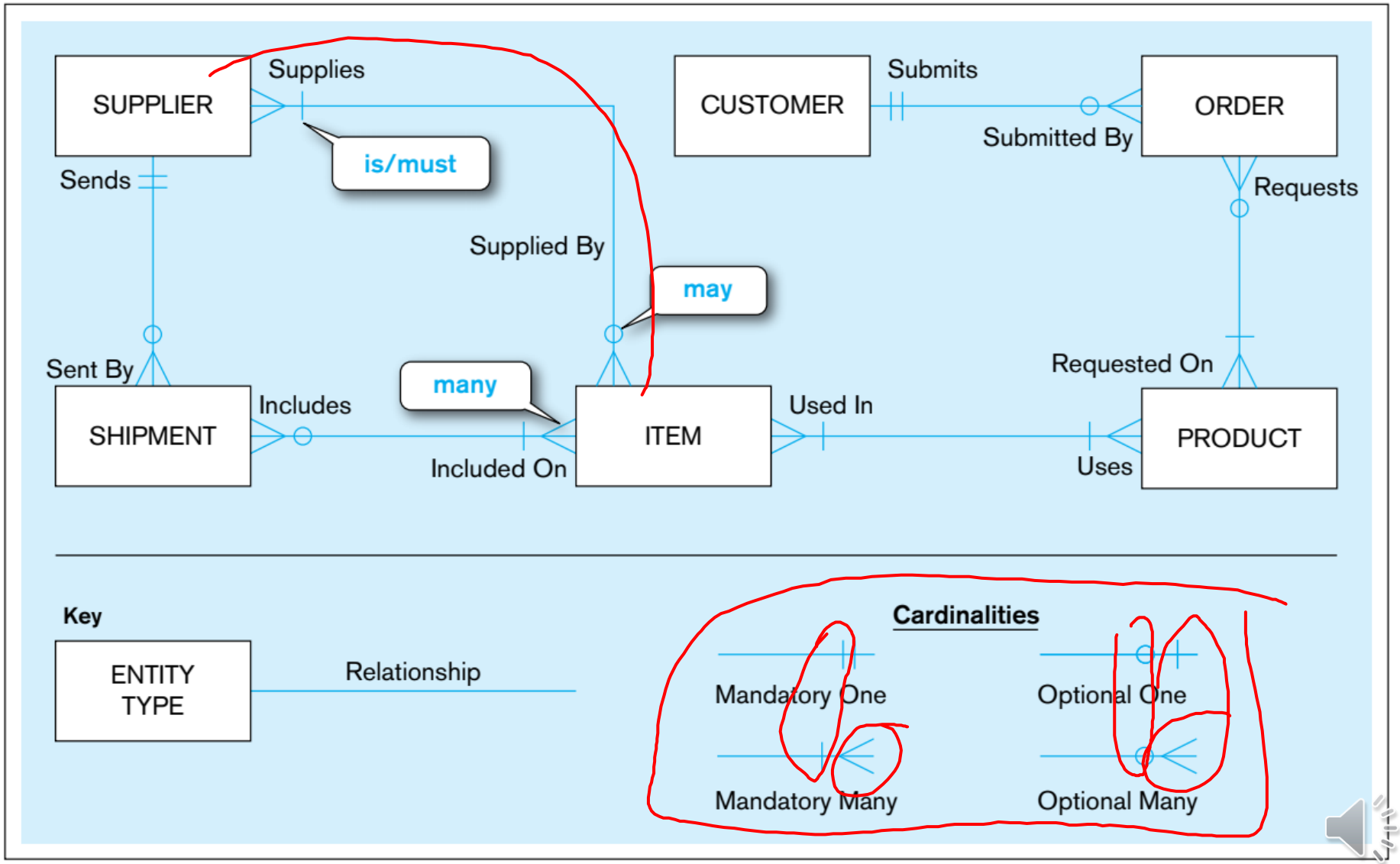
Weak Entity


Identifying Owner
Weak Entity
Partial Identifier
EMPLOYEE
Employee ID
Employee Name
Carries
DEPENDENT
Dependent Name
(First Name, Middle Initial, Last Name)
Date of Birth
Identifying Relationship

Example

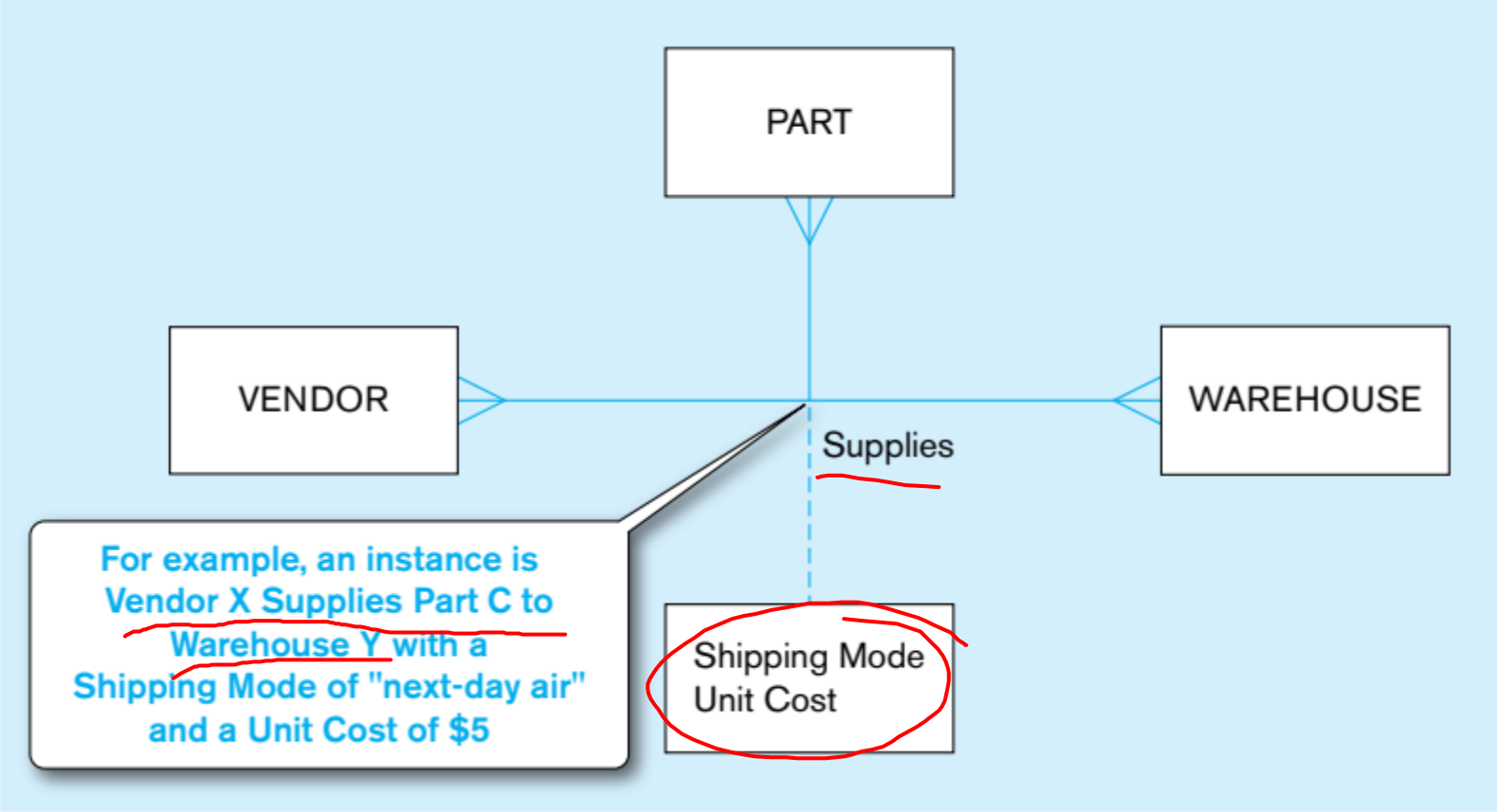

ASSIGNMENT
From Date
To Date
PRODUCT LINE
Sales For Product Line
PRODUCT
Sales For Product
ORDER

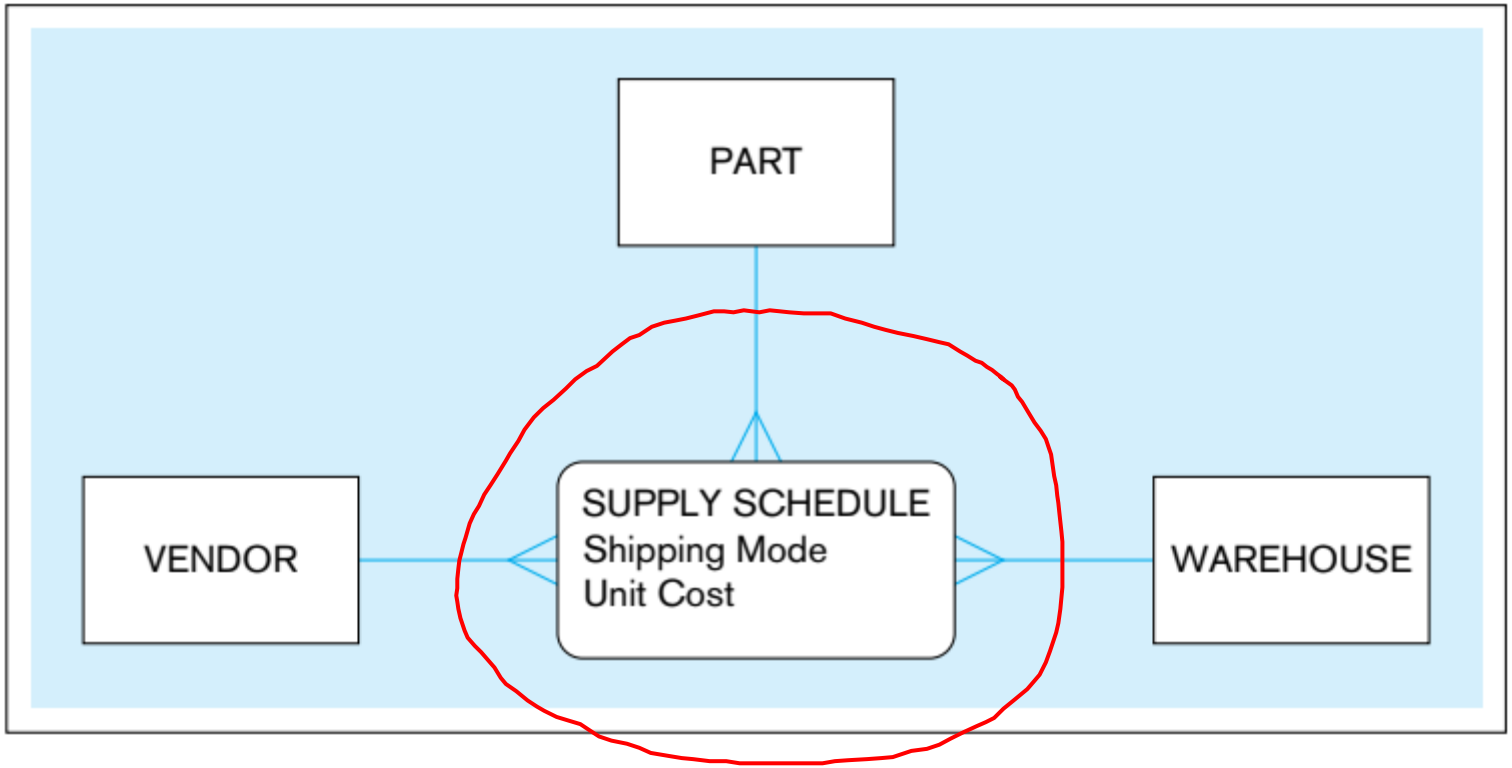
Example

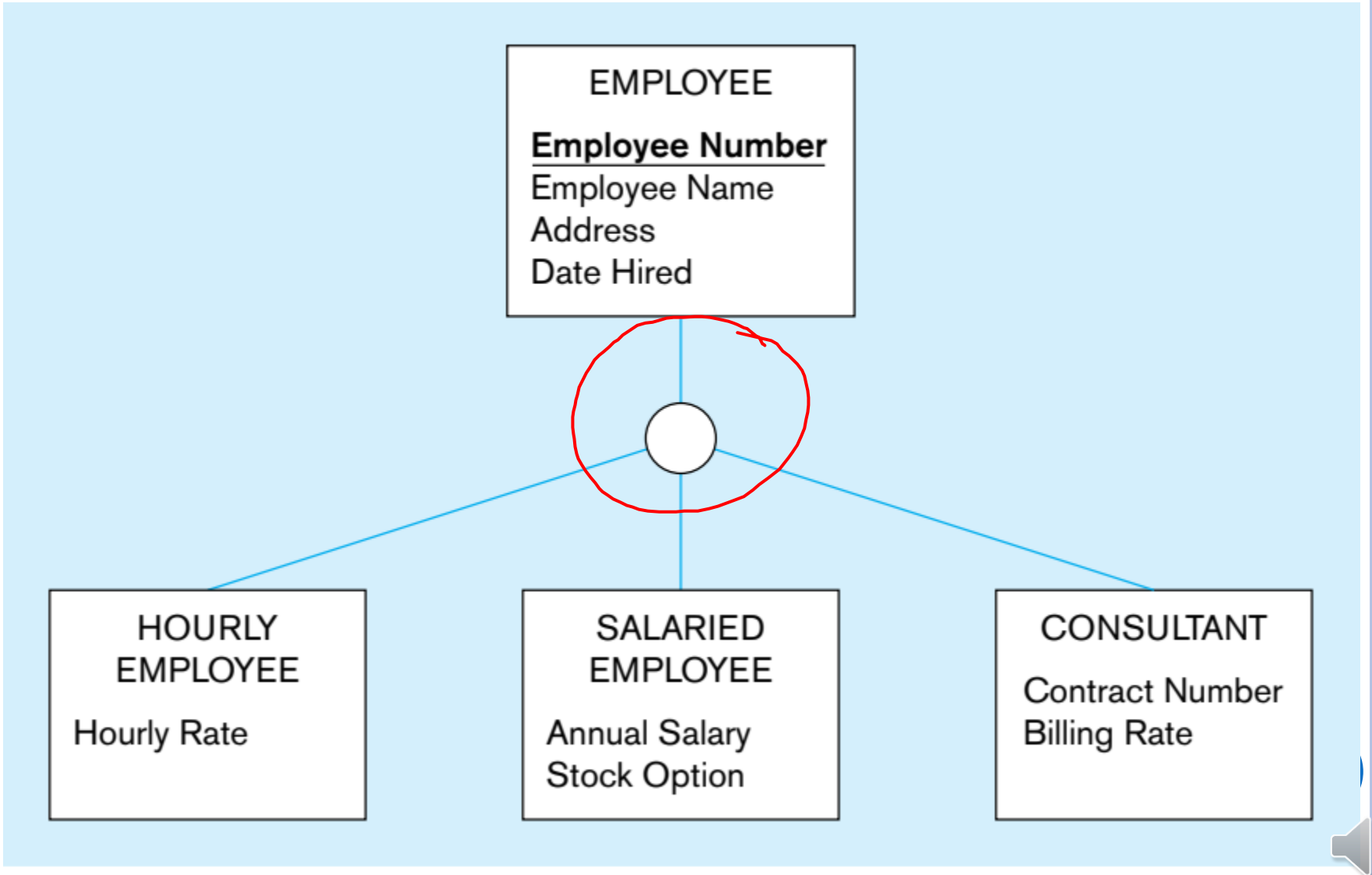

SUPPLIER
Supplies
CUSTOMER
Submits
ORDER
Submitted By
Sends
is/must
Requests
Supplied By
may
Sent By
many
Requested On
SHIPMENT
Includes
ITEM
Used In
PRODUCT
Included On
Uses
Key
ENTITY TYPE
Relationship
Cardinalities
Mandatory One
Optional One
Mandatory Many
Optional Many

Example

(c) Ternary relationship

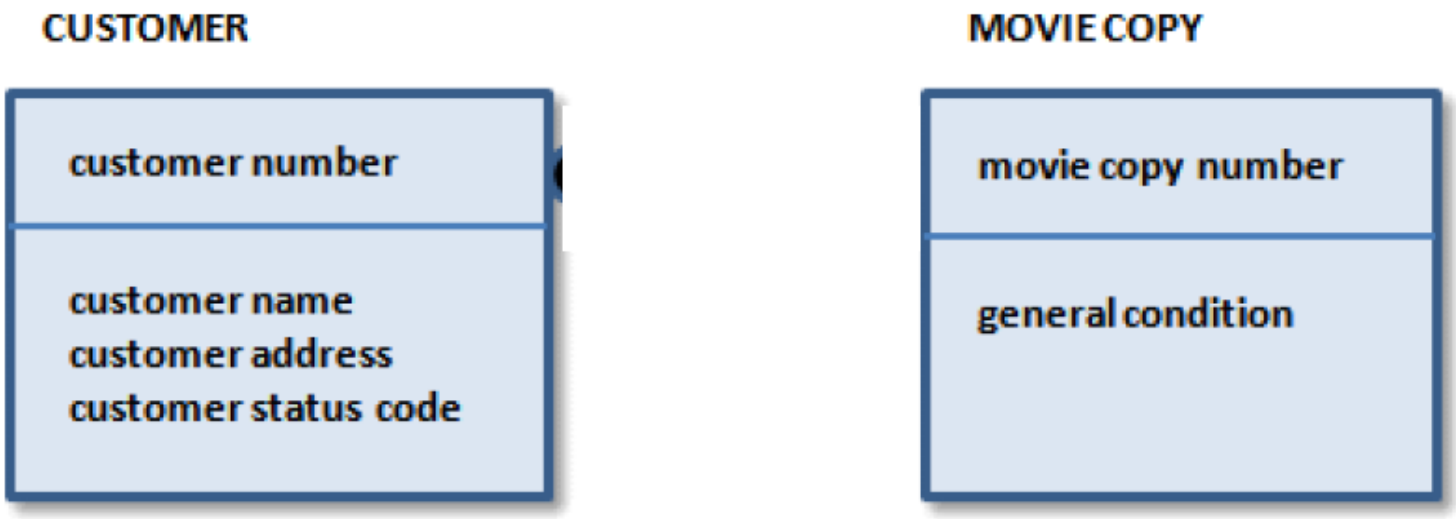



PART
VENDOR
SUPPLY SCHEDULE
Shipping Mode
Unit Cost
WAREHOUSE


EMPLOYEE
Employee Number
Employee Name
Address
Date Hired
HOURLY EMPLOYEE
Hourly Rate
SALARIED EMPLOYEE
Annual Salary
Stock Option
CONSULTANT
Contract Number
Billing Rate

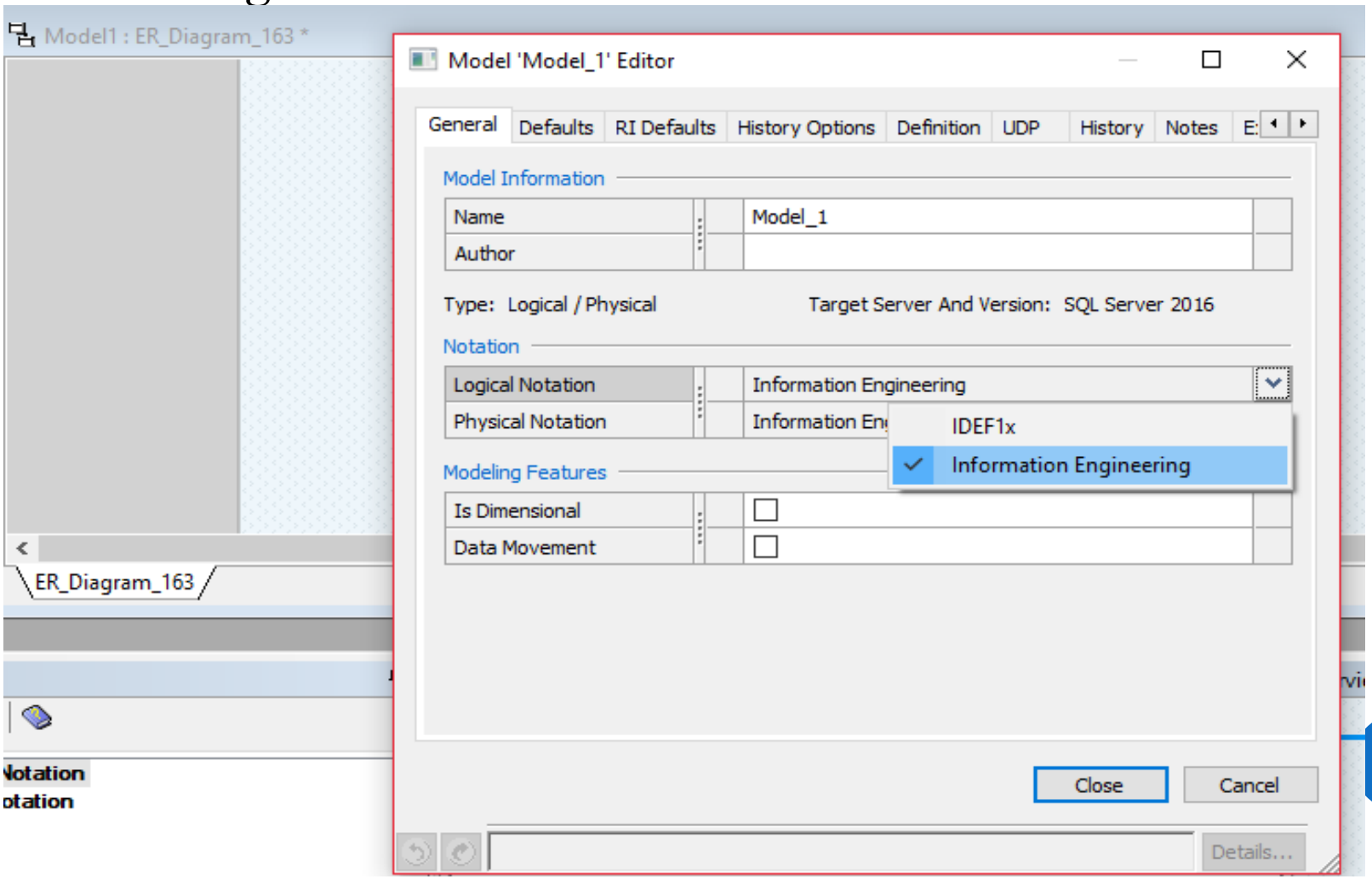
ERWIN ER MODEL

- Erwin® Data Modeler supports the IDEF1X and IE modeling standards



ERWIN ER MODEL

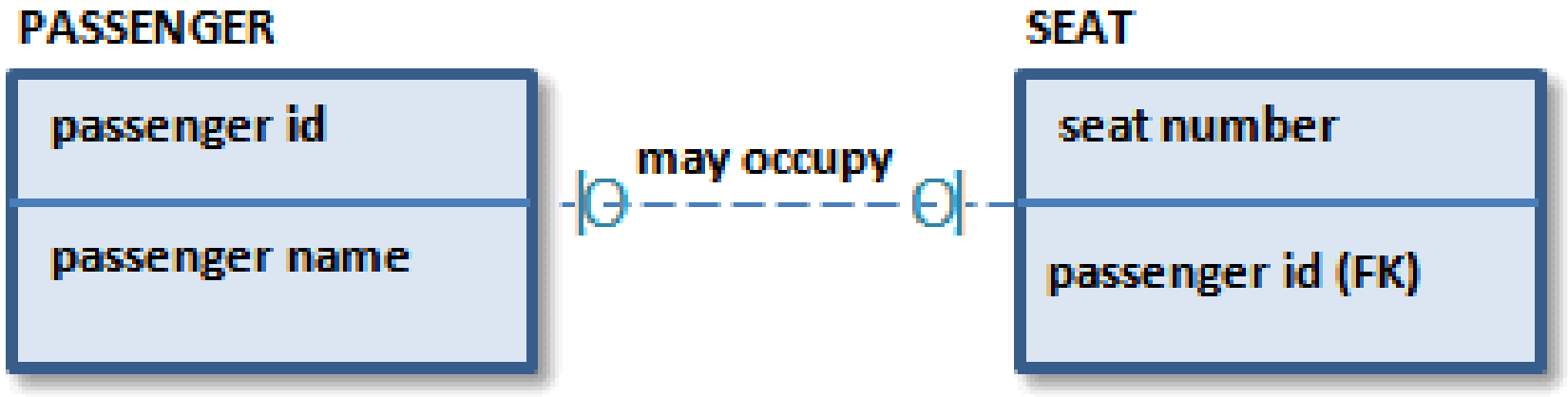
- Erwin® Data Modeler supports the IDEF1X and IE modeling standards



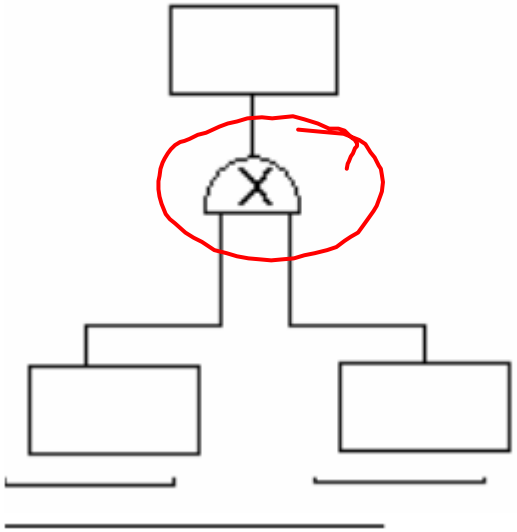
Cardinality Description	IDEF1X Notation Nonidentifying	Identifying	IE Notation Nonidentifying	Identifying
One to zero, one, or more				
One to one or more	P	P		
One to zero or one	Z	Z		
Zero or one to zero, one, or more (nonidentifying only)				
Zero or one to zero or one (nonidentifying only)	Z			

crow's foot **notation** is also known as *Information Engineering* (*IE*)

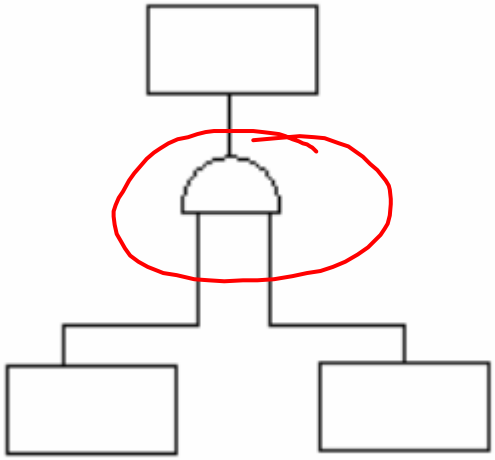
ERWIN IE (Crow Foot notation)



Exclusive Subtype



Inclusive Subtype



ER Tools

- Lucidchart
- Vertabelo
- Erwin
- Visio
- Conceptdraw
- And many more

Mapping ER-EER to Relational Model