

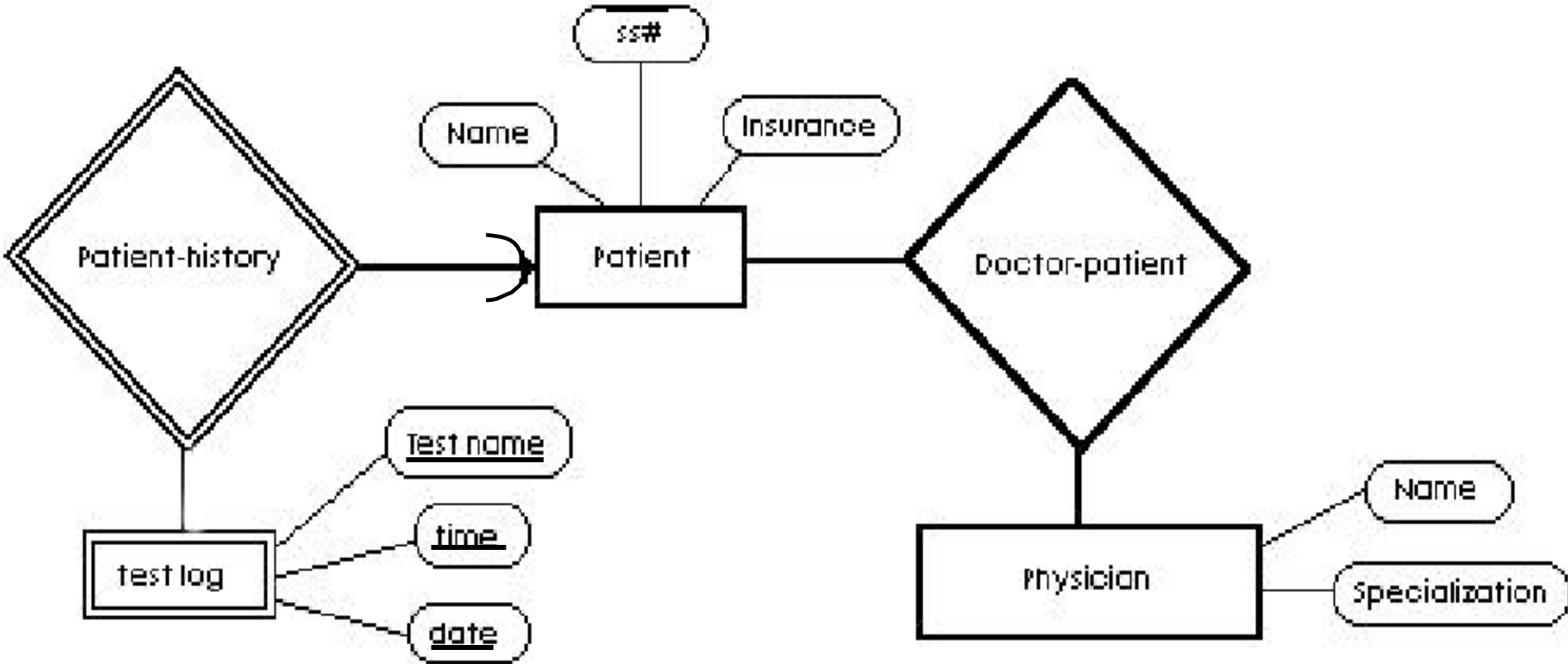


Convert E/R to Relation



Exercise # 1

- Construct an **E/R diagram** for a **hospital** with a set of patients and a set of physicians.
- Associate with each patient a log of the various tests conducted, along with the date and time of the test (assuming that test log does not have a unique ID).
- Convert the E/R diagram into **relational schemas**.



Physician(name, specialization)

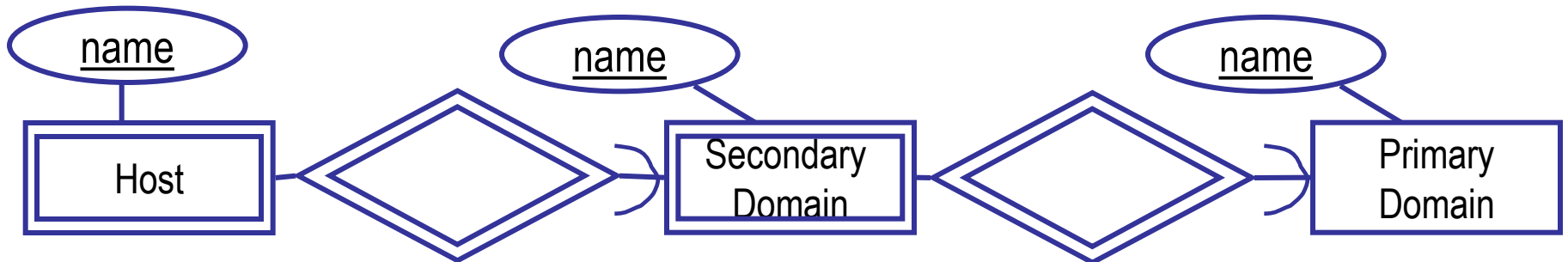
Patient(ss#, name, insurance)

DoctorPatient(name, ss#)

TestLog(ss#, testName, testTime, date)

Exercise # 2

Convert the following E/R diagram to relational schemas.



PrimaryDomain(name)

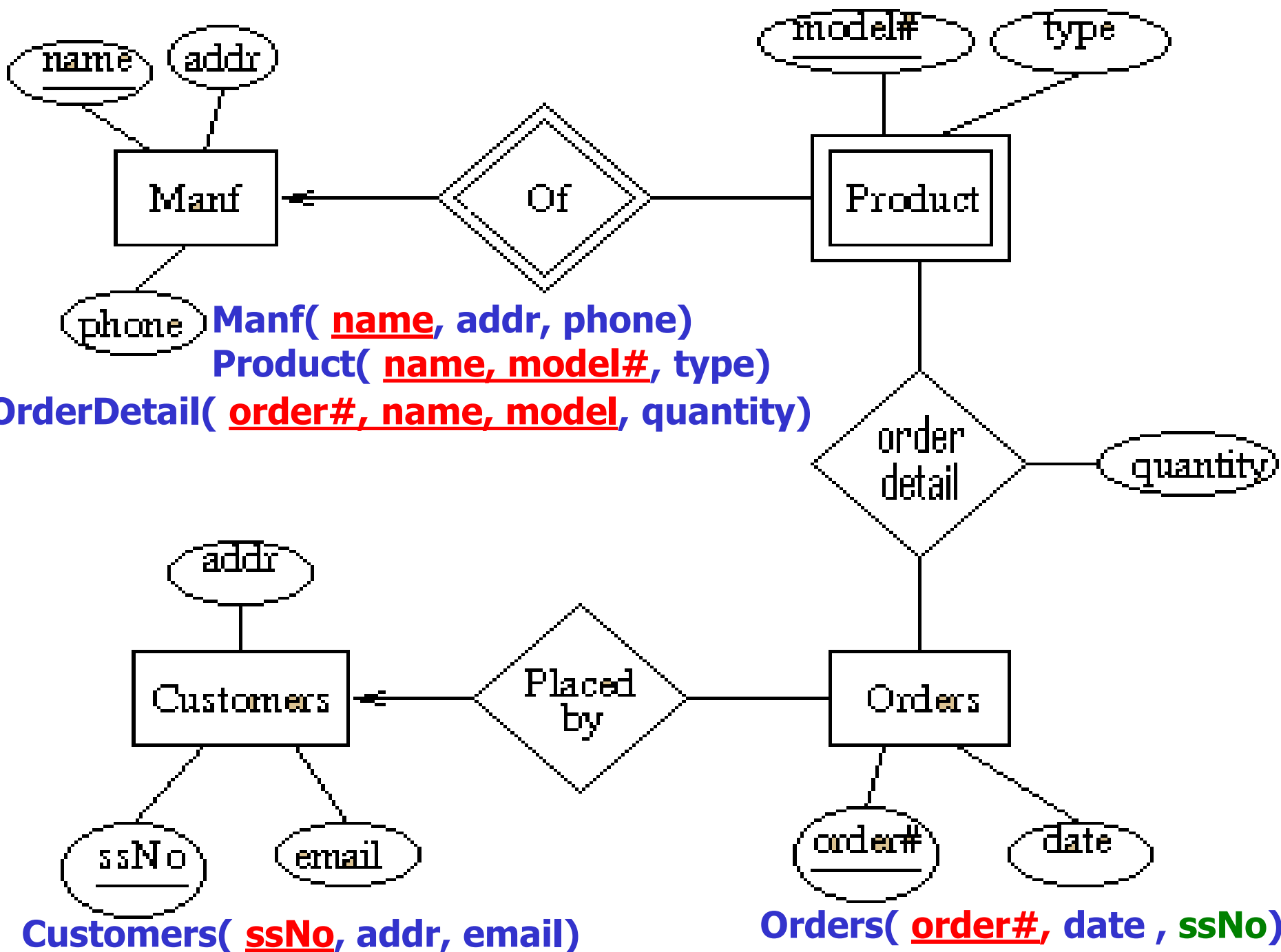
SecondaryDomain(secondaryDomainName, primaryDomainName)

Host(hostName, secondaryDomainName, primaryDomainName)



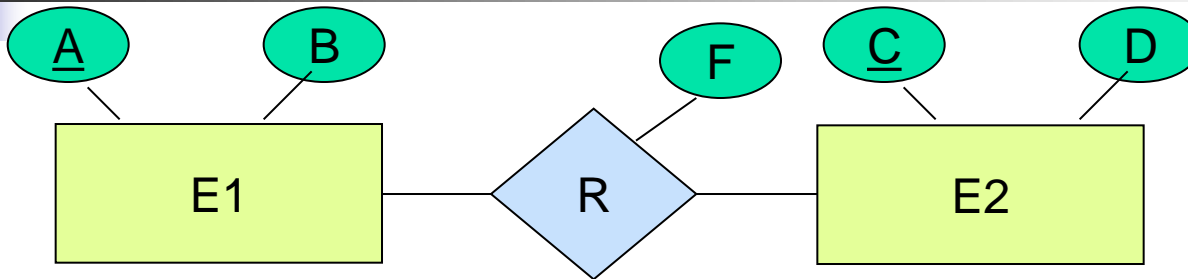
Exercise # 3

- Draw an E/R diagram for the following:
 - **Manufacturers** have an unique name, an address, and a phone.
 - **Products** have a model number and a type (e.g. "TV set"). Each product is made by one manufacture, and different manufacturers may have different products with the same model number. However, you may assume that no manufacturer would have 2 products with the same model number.
 - **Customers** are identified by their unique social security number.
 - An **order** has unique order number and a date. An order is placed by one customer. For each order, there are one or more products ordered, and there is₅ a quantity for each product on the order.

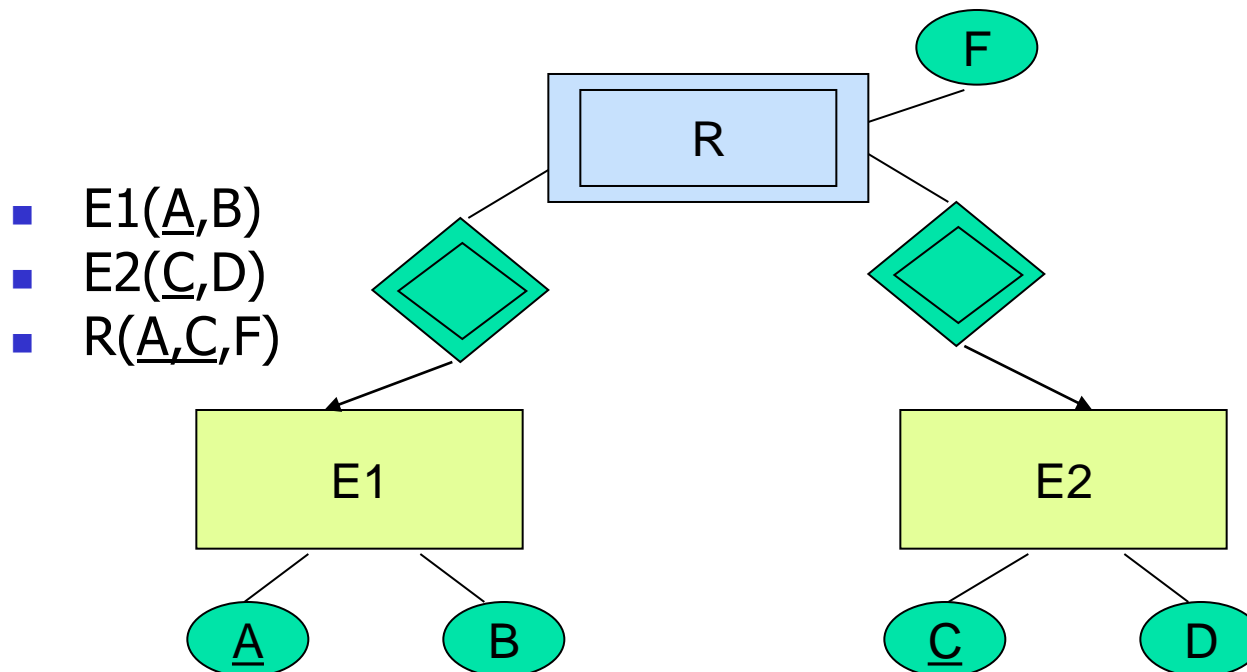


Relationship -> Weak Entity Set

Many-to-Many



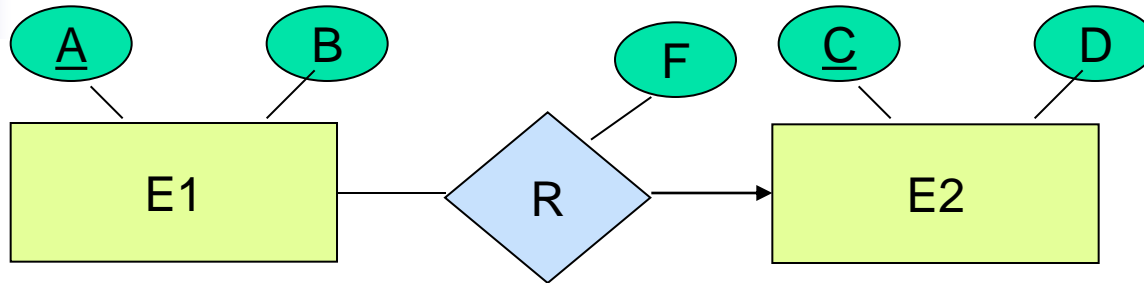
- $E1(\underline{A}, B)$
- $E2(\underline{C}, D)$
- $R(\underline{A}, \underline{C}, F)$



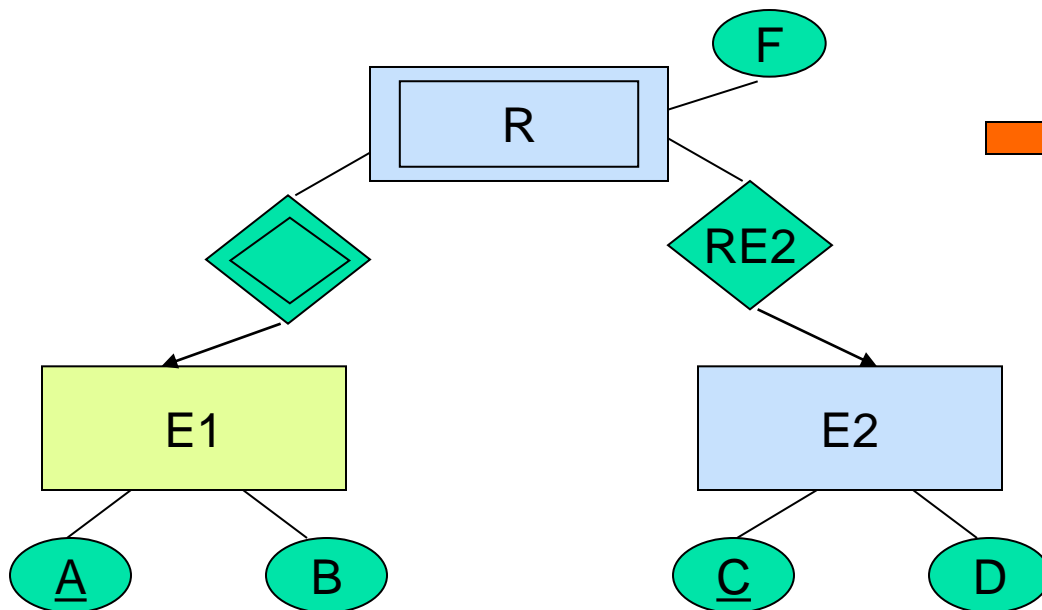
- $E1(\underline{A}, B)$
- $E2(\underline{C}, D)$
- $R(\underline{A}, \underline{C}, F)$

Relationship -> Weak Entity Set

Many-to-One



- $E1(\underline{A}, B)$
- $E2(\underline{C}, D)$
- $R(\underline{A}, C, F)$



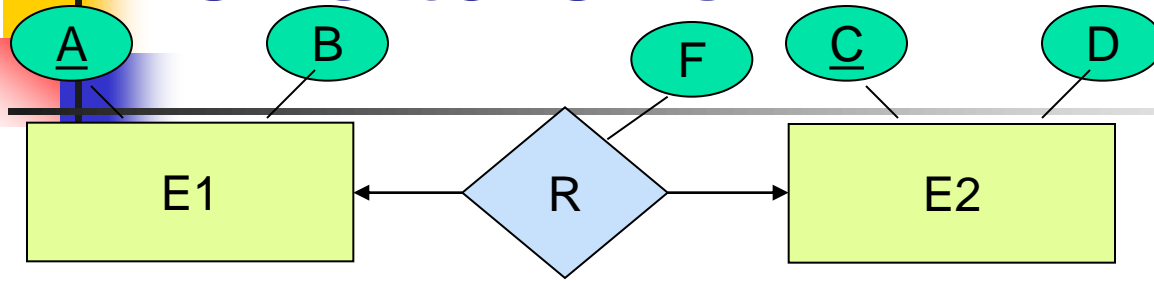
- $E1(\underline{A}, B)$
- $E2(\underline{C}, D)$
- $R(\underline{A}, F)$
- $RE2(\underline{A}, C)$

Combine
R and RE2

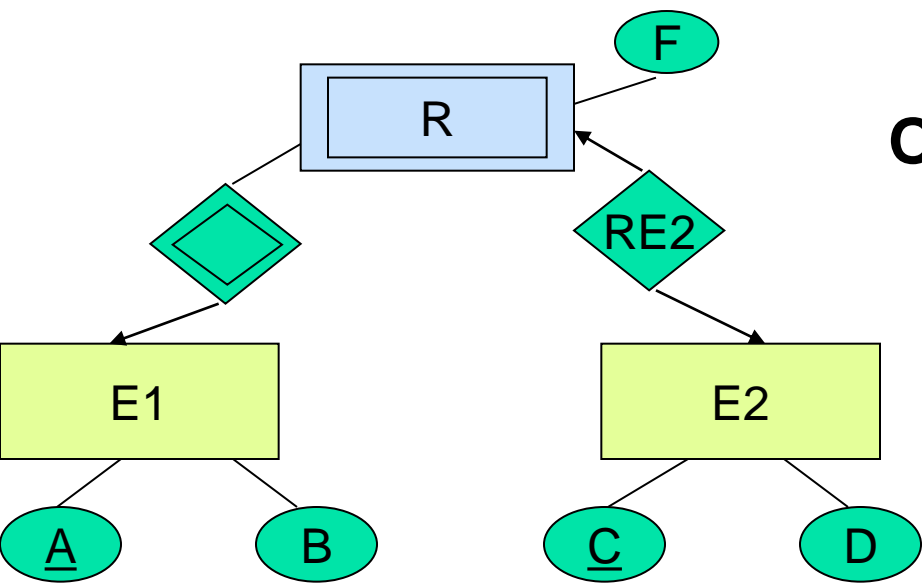
- $E1(\underline{A}, B)$
- $E2(\underline{C}, D)$
- $R(\underline{A}, C, F)$

Relationship -> Weak Entity Set

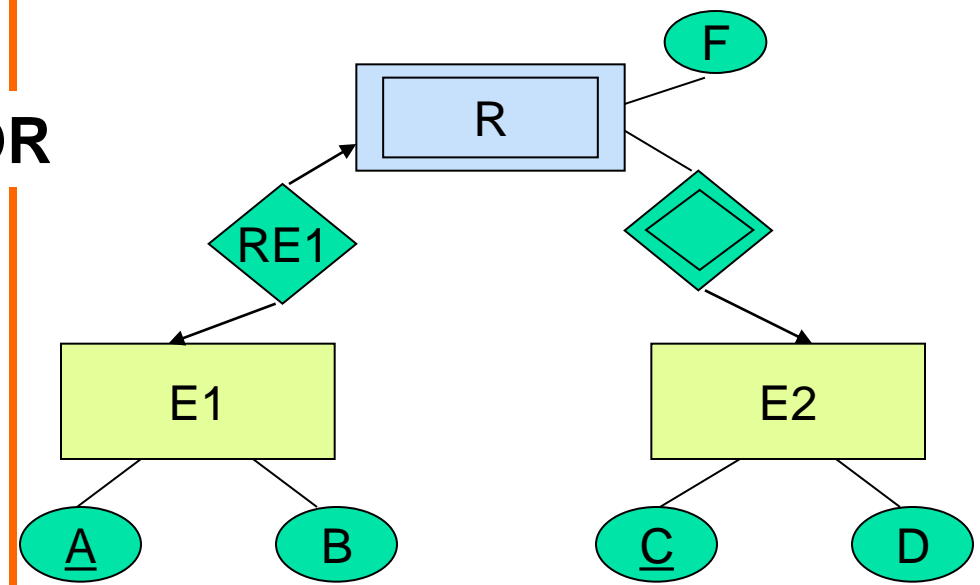
One-to-One



- E1(A,B)
- E2(C,D)
- R(A,C,F) or R(C,A,F)

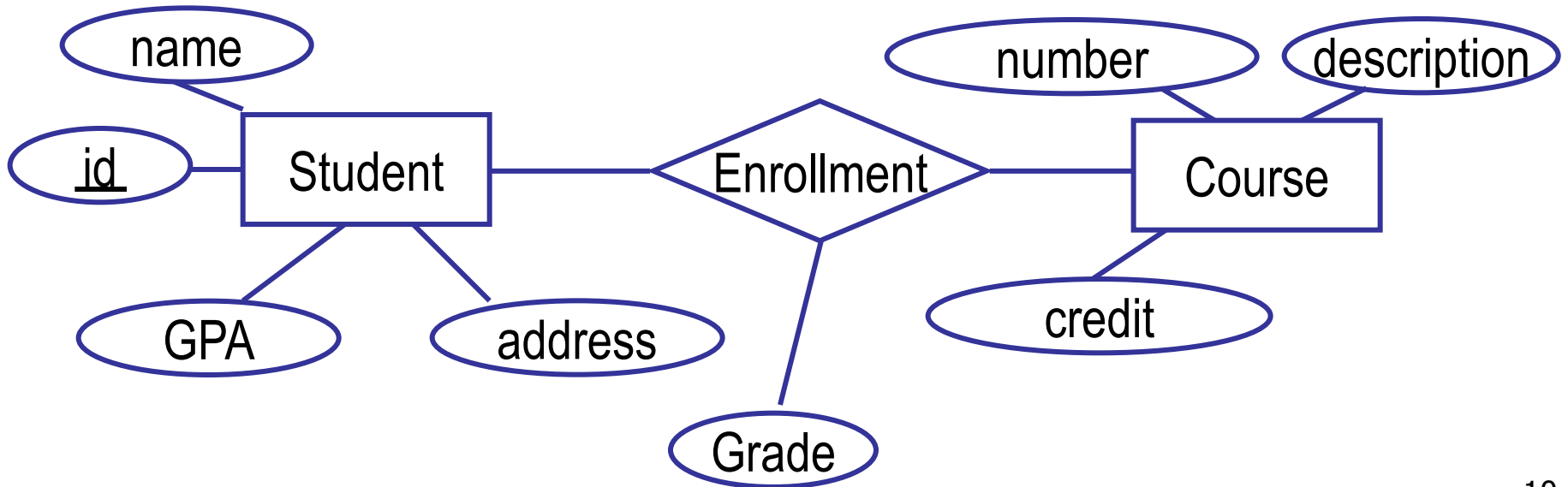


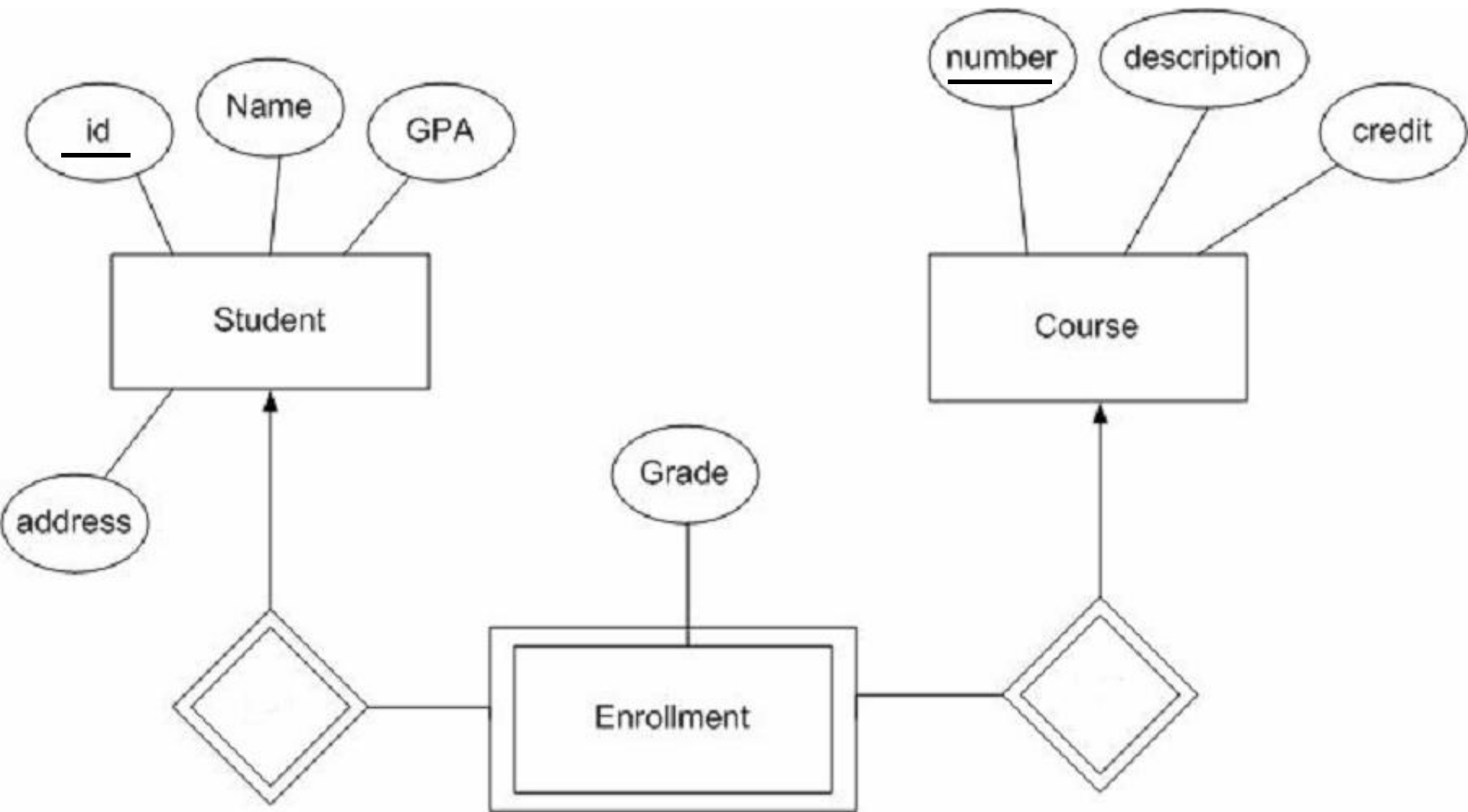
OR



Exercise

- Convert the **Enrollment** relationship in the following E/R diagram into **entity set**.
- Convert the new E/R diagram into **relational schemas**.

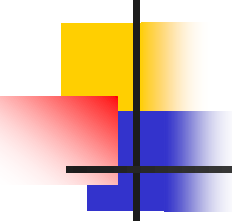




Student(id, Name, GPA, address)

Course(number, description, credit)

Enrollment(id, number, grade)



Subclass -> Relation

- ◆ **3 Approaches:**
 1. *Straight E/R method*
 2. *Object-Oriented method*
 3. *Null method*

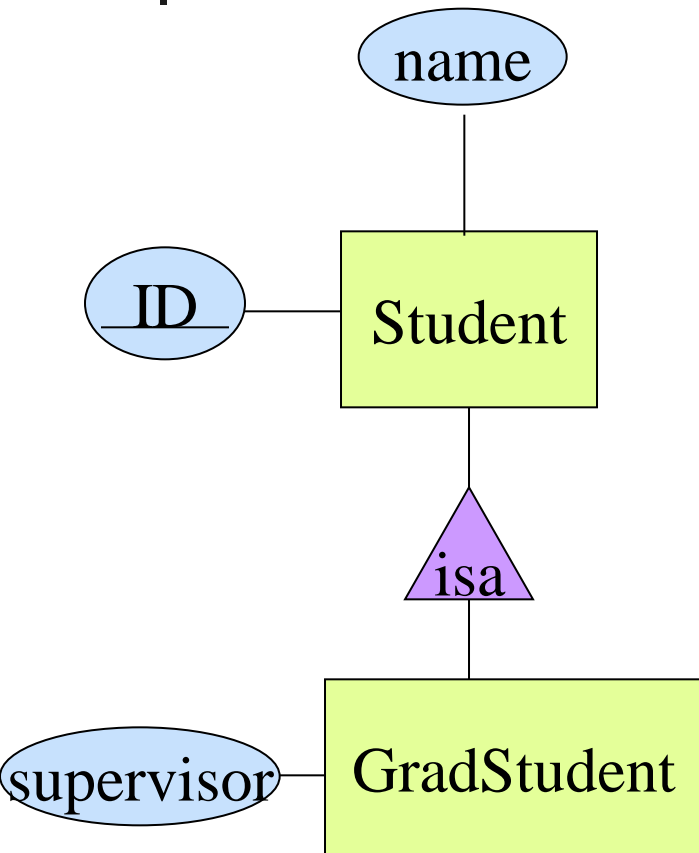


Straight E/R Method

1. *Straight E/R method*

- One relation for each subclass
- Include:
 - Key attribute(s) of parent
 - Attributes of that subclass.

Example - Straight E/R Method



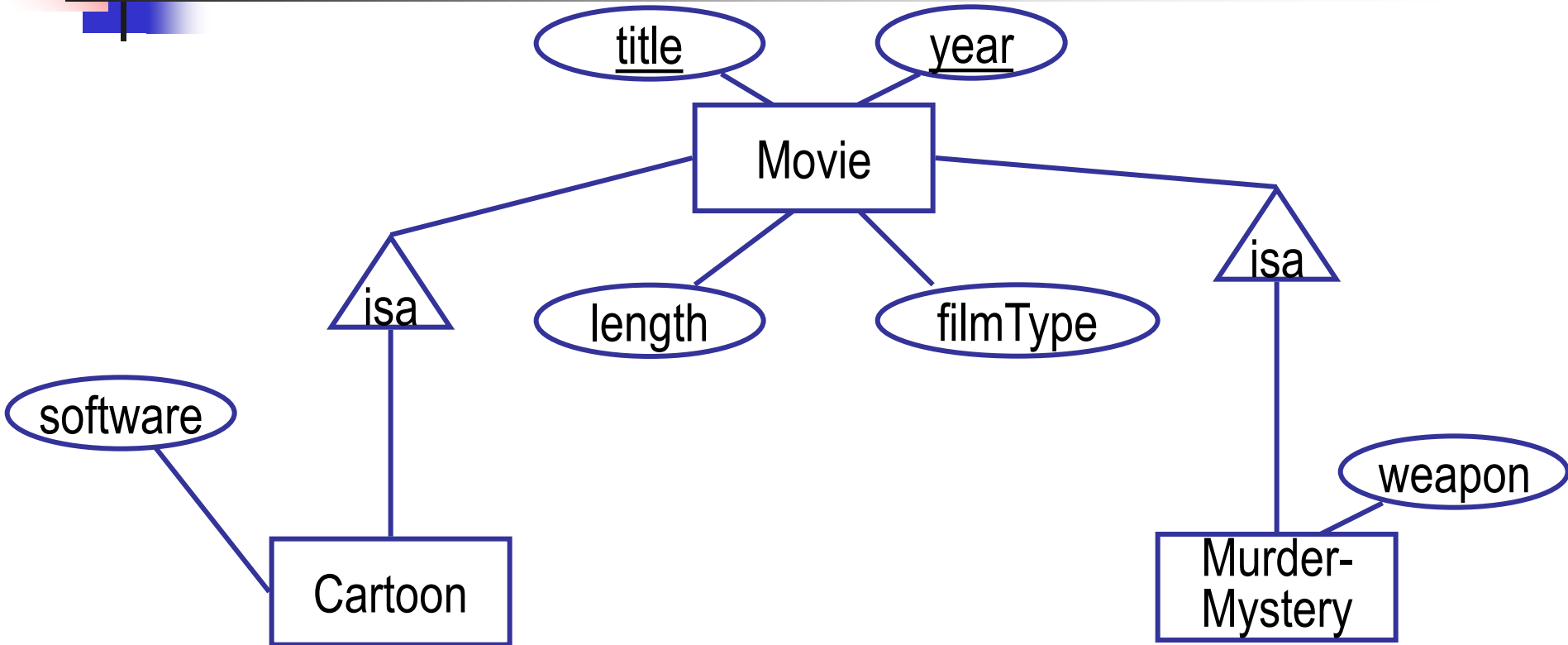
| ID | name |
|----|--------------|
| S1 | John Smith |
| S2 | Peter Taylor |

Student

| ID | supervisor |
|----|-----------------|
| S2 | Haarslev Volker |

GradStudent

Exercise #3 – Straight E/R



Movie(title, year, length, filmType)

Cartoon(title, year, software)

MurderMystery(title, year, weapon)

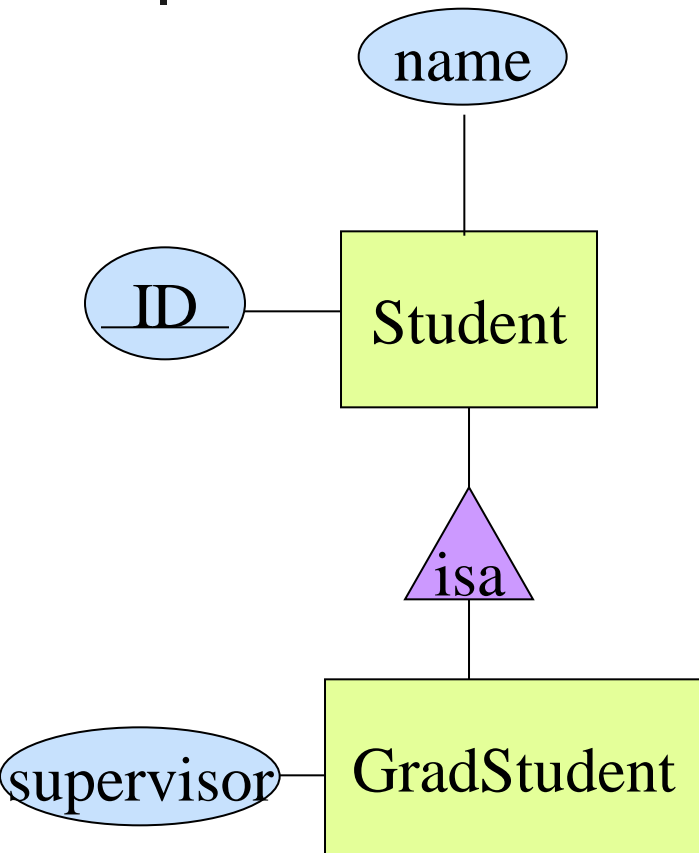


Object-Oriented Method

2. *Object-Oriented method* :

- One relation per subset of subclasses, with all relevant attributes

Example - OO Method



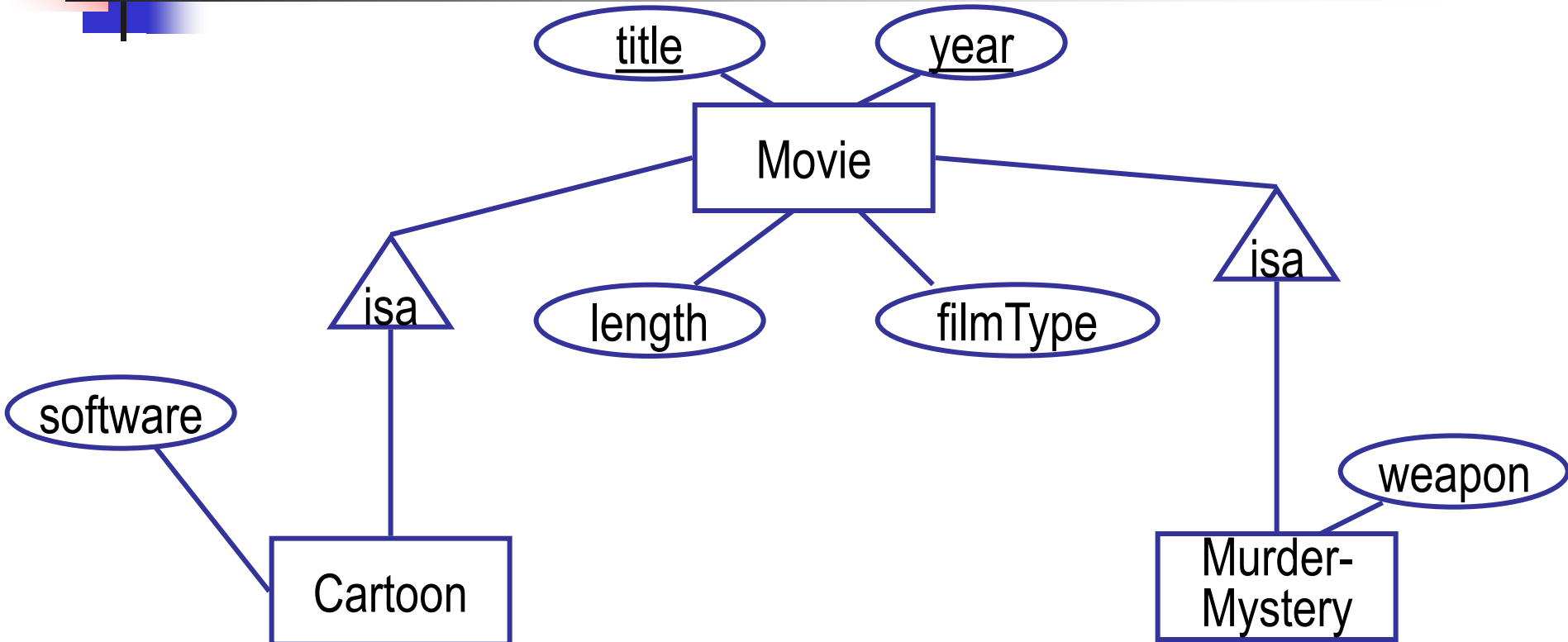
| ID | name |
|----|------------|
| S1 | John Smith |

Student

| ID | name | supervisor |
|----|--------------|-----------------|
| S2 | Peter Taylor | Haarslev Volker |

GradStudent

Exercise #4 – OO Method



`Movie(title, year, length, filmType)`

`MovieCartoon(title, year, length, filmType, software)`

`MovieMurderMystery(title, year, length, filmType, weapon)`

`MovieCartoonMurderMyst(title, year, length, filmType, software, weapon)`

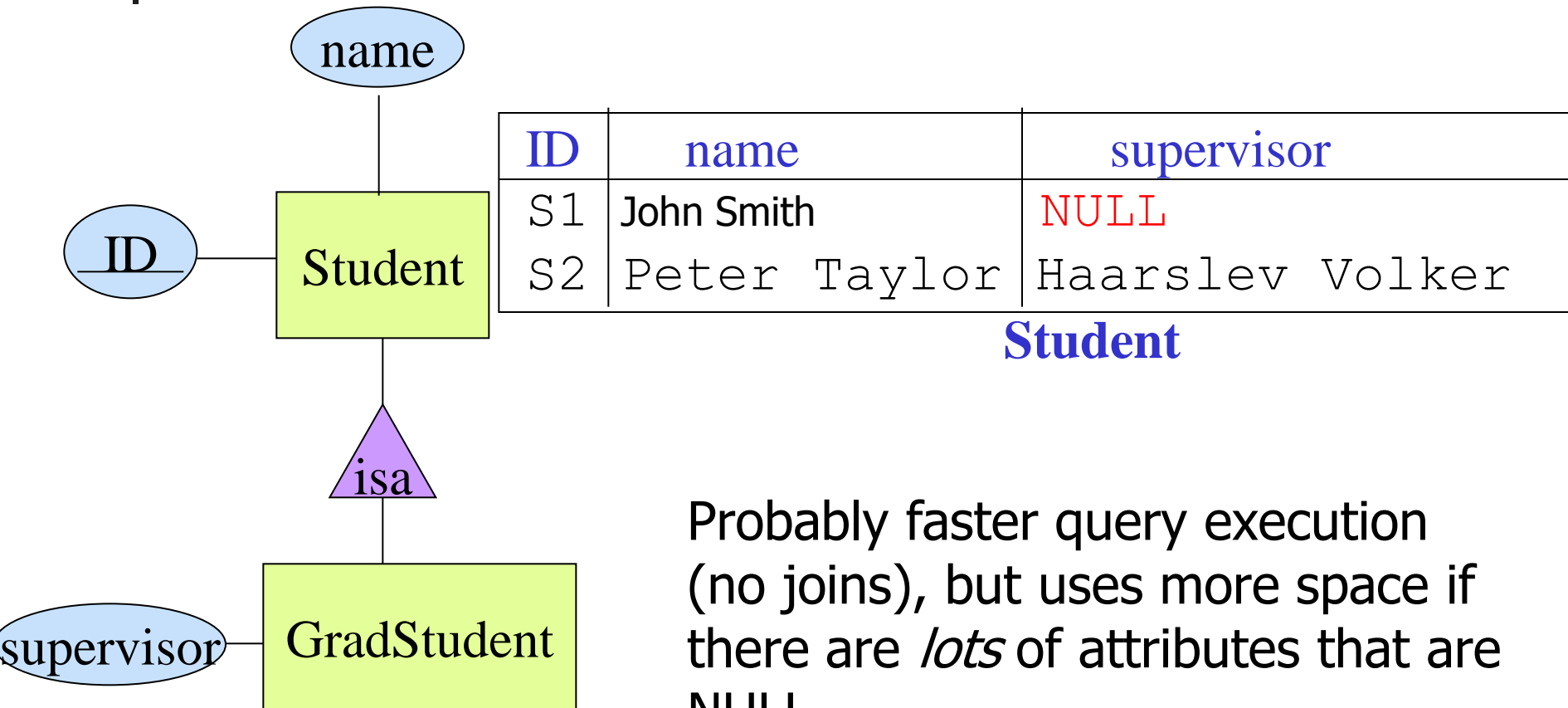


Null Method

3. *Null method* :

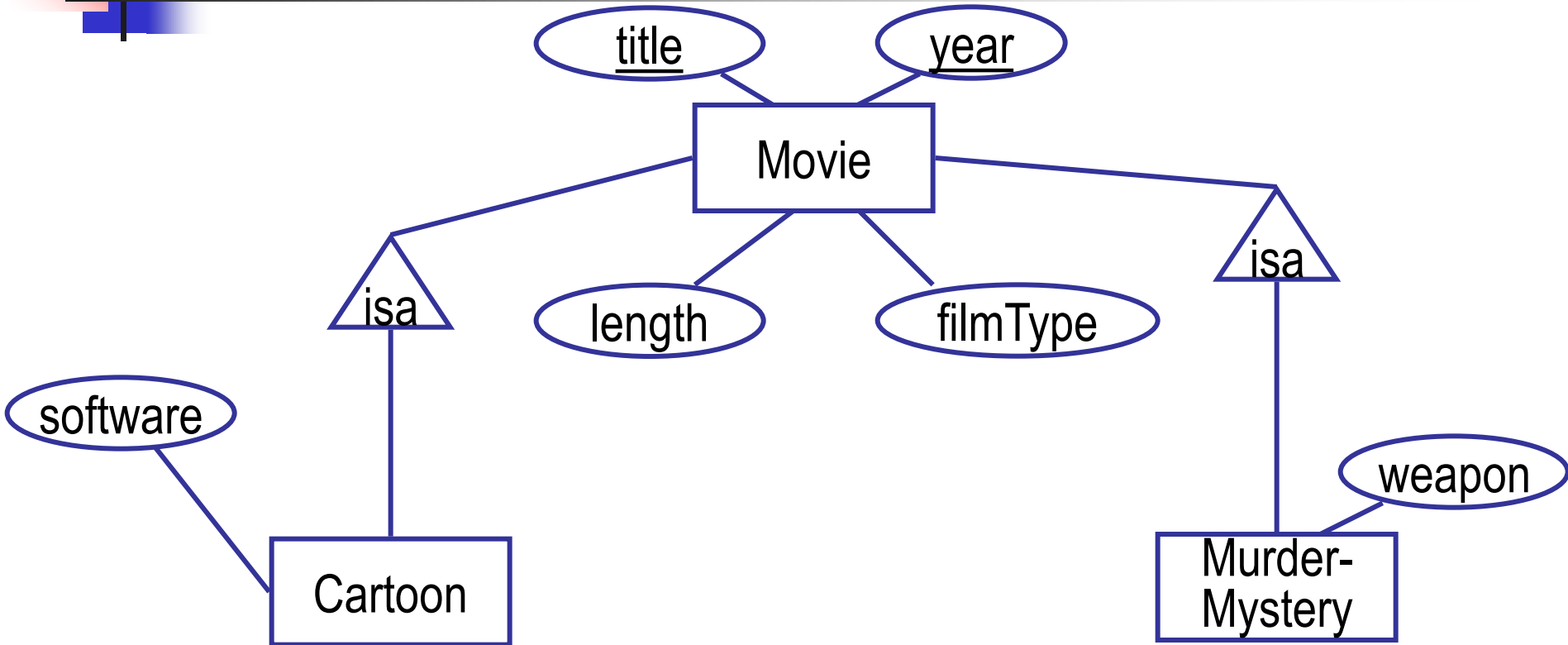
- One relation
- Entities have NULL in attributes that don't belong to them

Null Method



Probably faster query execution (no joins), but uses more space if there are *lots* of attributes that are NULL.

Exercise #5 – NULL Method



Movie(title, year, length, filmType, software, weapon)