

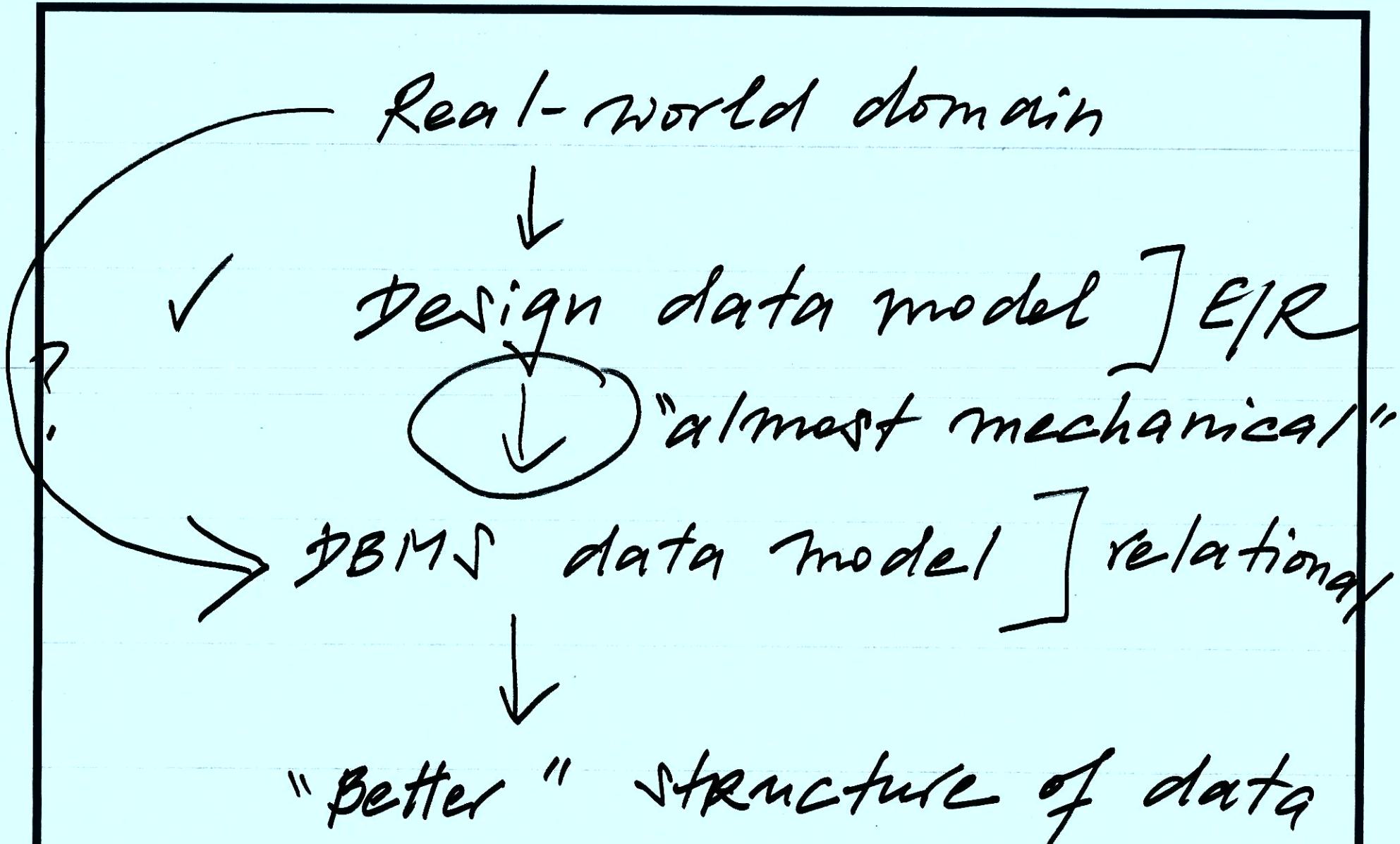
E/R diagrams

- * Specify the structure
 - rather than contents
→ of the data
- * Relational model
 - 1NF is the law
- * Each entity set should have at least one key attribute
 - except subclasses in hierarchies



- * You can represent some constraints in E/R diagrams
 - keys
 - multiplicity in relationships
(\rightarrow , $\rightarrow\!\!\!$, no arrow)
- * Special kinds of "associations" of entity sets
 - hierarchies (trees only)
 - weak entity sets and their "contexts"





• Univ (name, addr)

Dept (dname, addr, uname)

Univ: name addr

| | |
|------|------|
| 'u1' | 'a1' |
| 'u2' | 'a2' |



Dept: dname addr

| | |
|------|------|
| 'd1' | 'a3' |
| 'd2' | 'a4' |

IsIn:

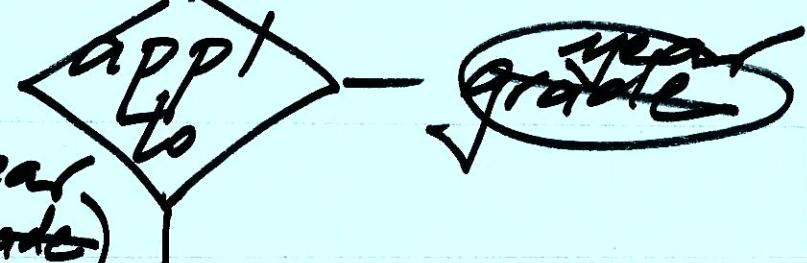
| | |
|--------------|-----------|
| <u>dname</u> | <u>un</u> |
| 'd1' | 'u2' |
| 'd2' | 'u1' |

uname

| |
|------|
| 'u2' |
| 'u1' |



[Applies To]



PS(SSN), name, year
grades)

Dept(name)

Dept: name

'd1'

'd2'

PS:name

'a'

'b'

'a'

SSN

name

year

2020

2020

2020

ApplTo: SSN, name, grade

''

''

''

'd1'

'd2'

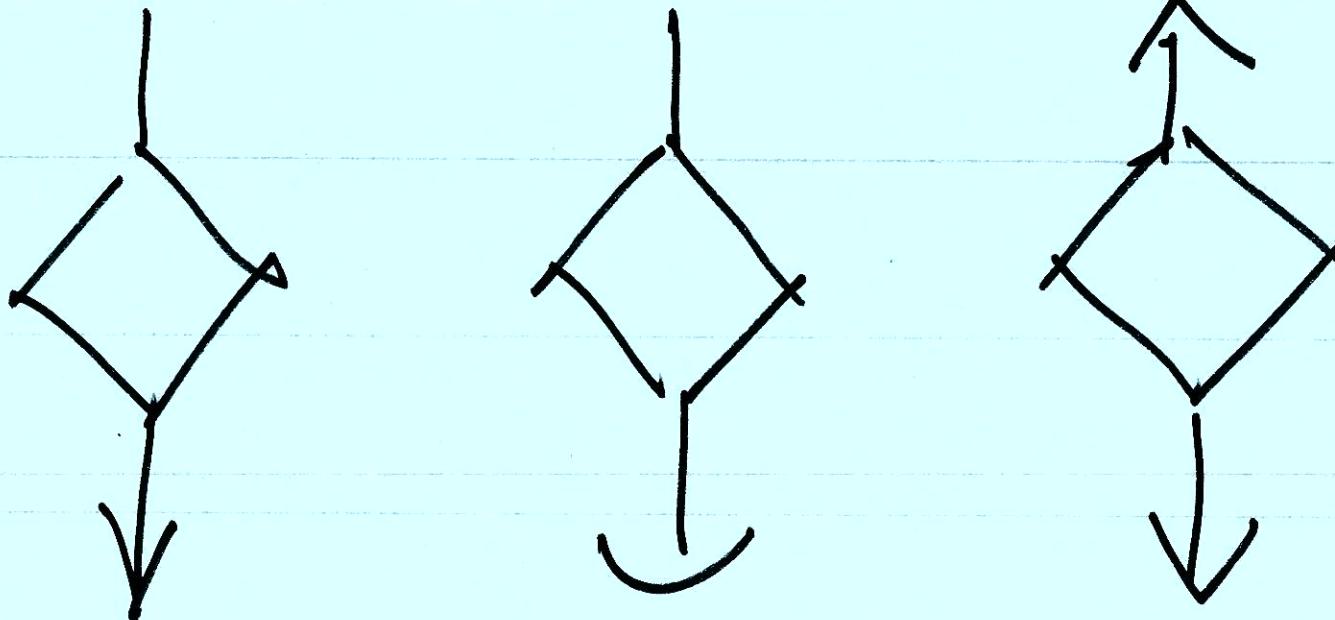
'd1'

2020

2020

2020

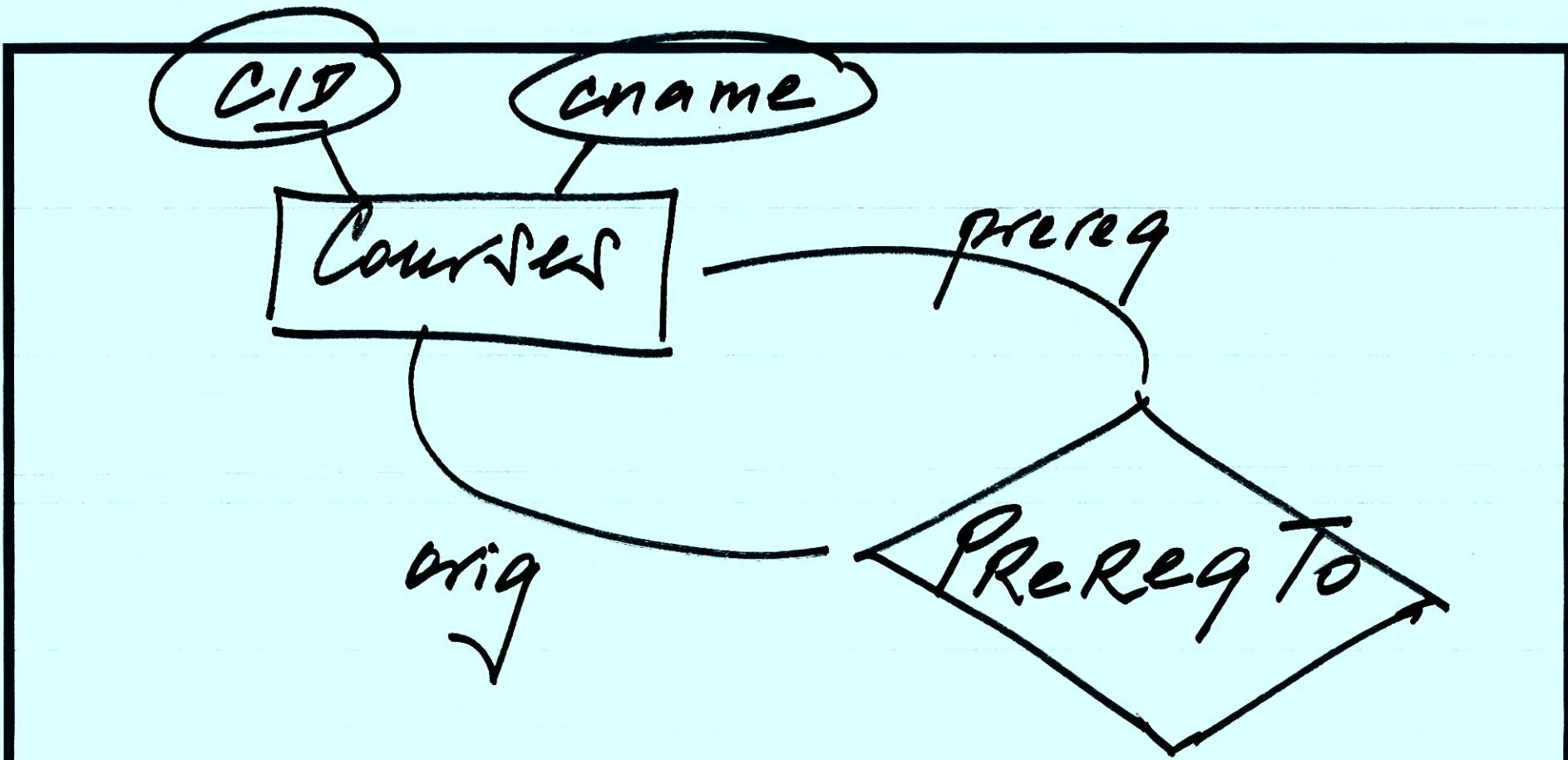




(at least one arrow
on \square)

\Rightarrow can avoid translating
the \square into its own
rel schema
— not so for





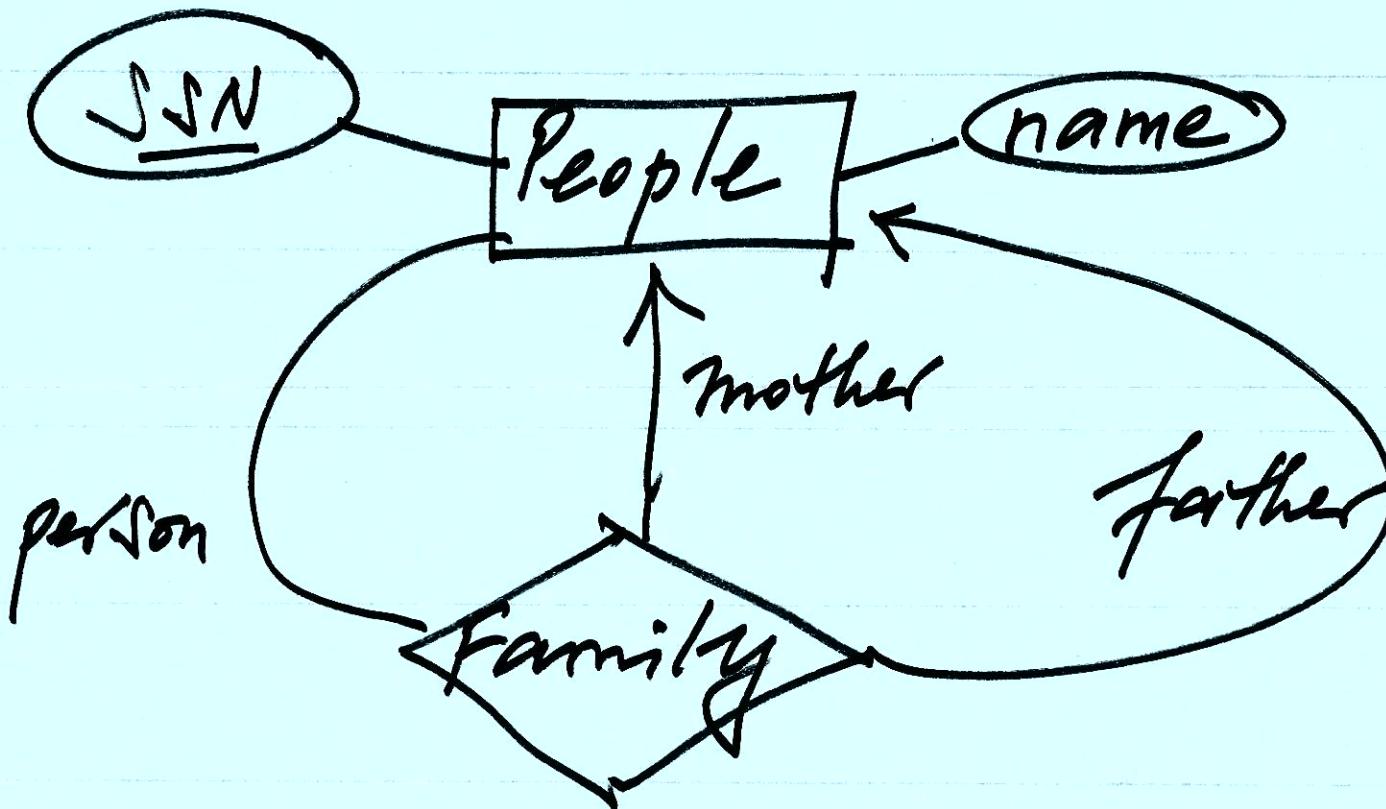
$\text{Courses}(\underline{\text{CID}}, \text{cname})$

$\text{PreReq To}(\underline{\text{OrigCourse}}, \underline{\text{Prereq}})$

'CSC 540'

'CSC 316'

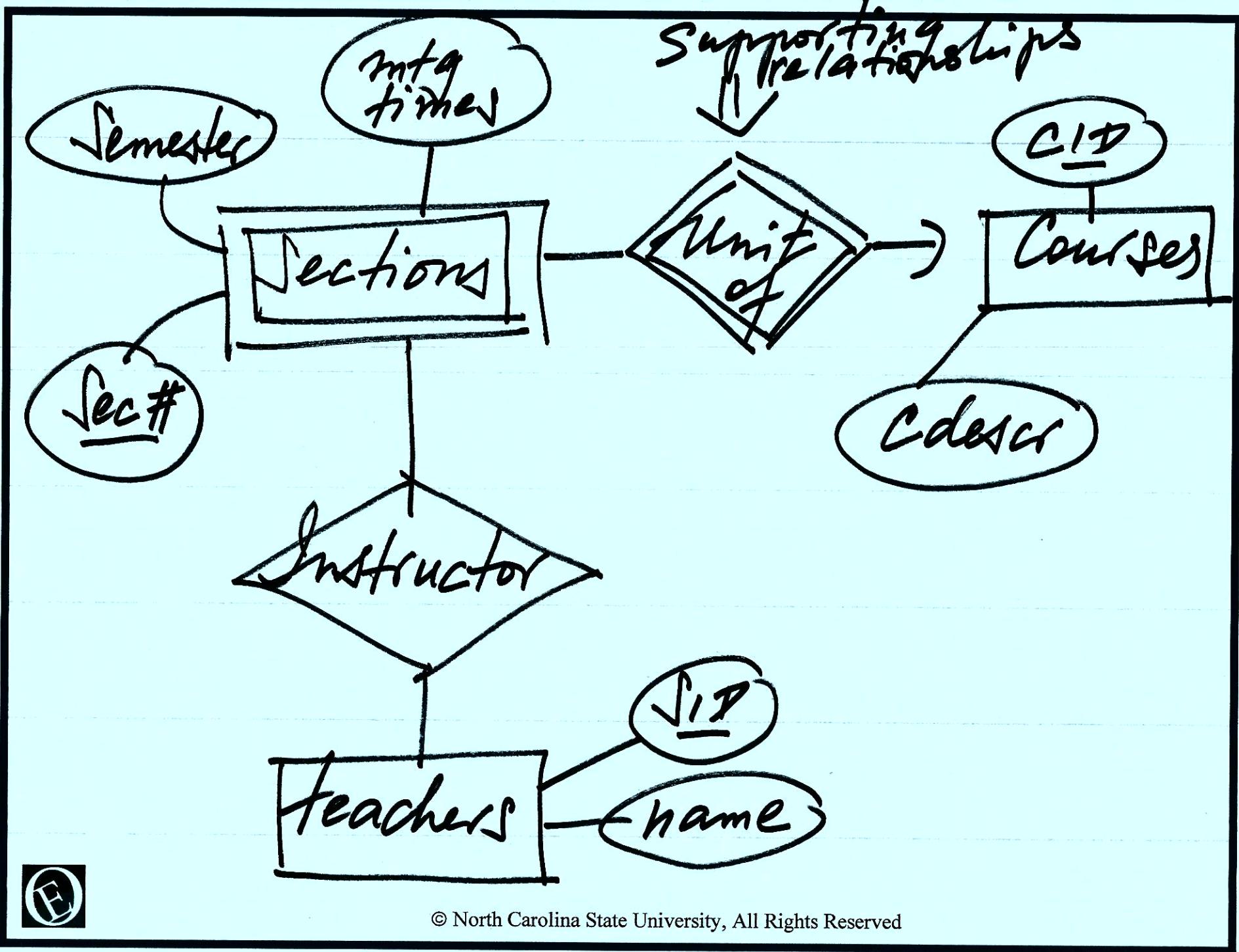




I. People(SSN, name, mvrn, fssn)

II. Family(SSNp, vrnNm, vnf)
 People(SSN, name)





Teachers (SID, name)

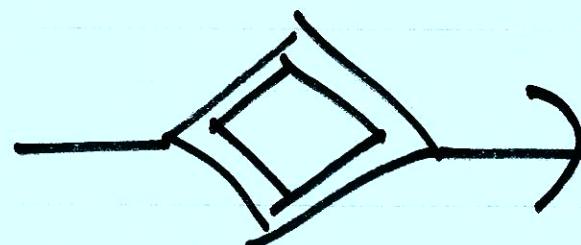
Courses (CID, codes)

Sections (sect#, semester,
mtg-times, CID)

Instructor (SID, sect#, CID)

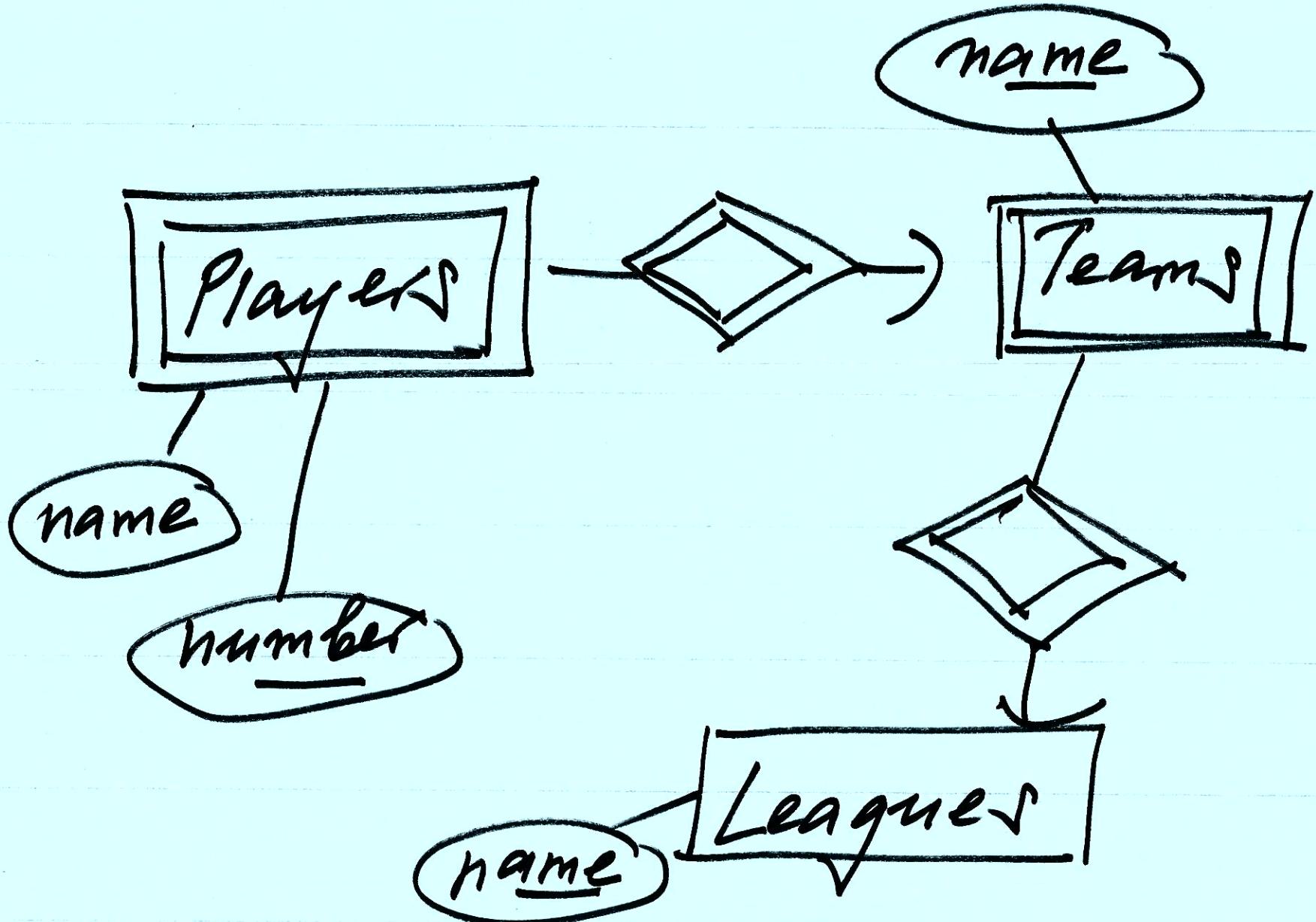
~~Unitof (sect#, CID, CID2)~~

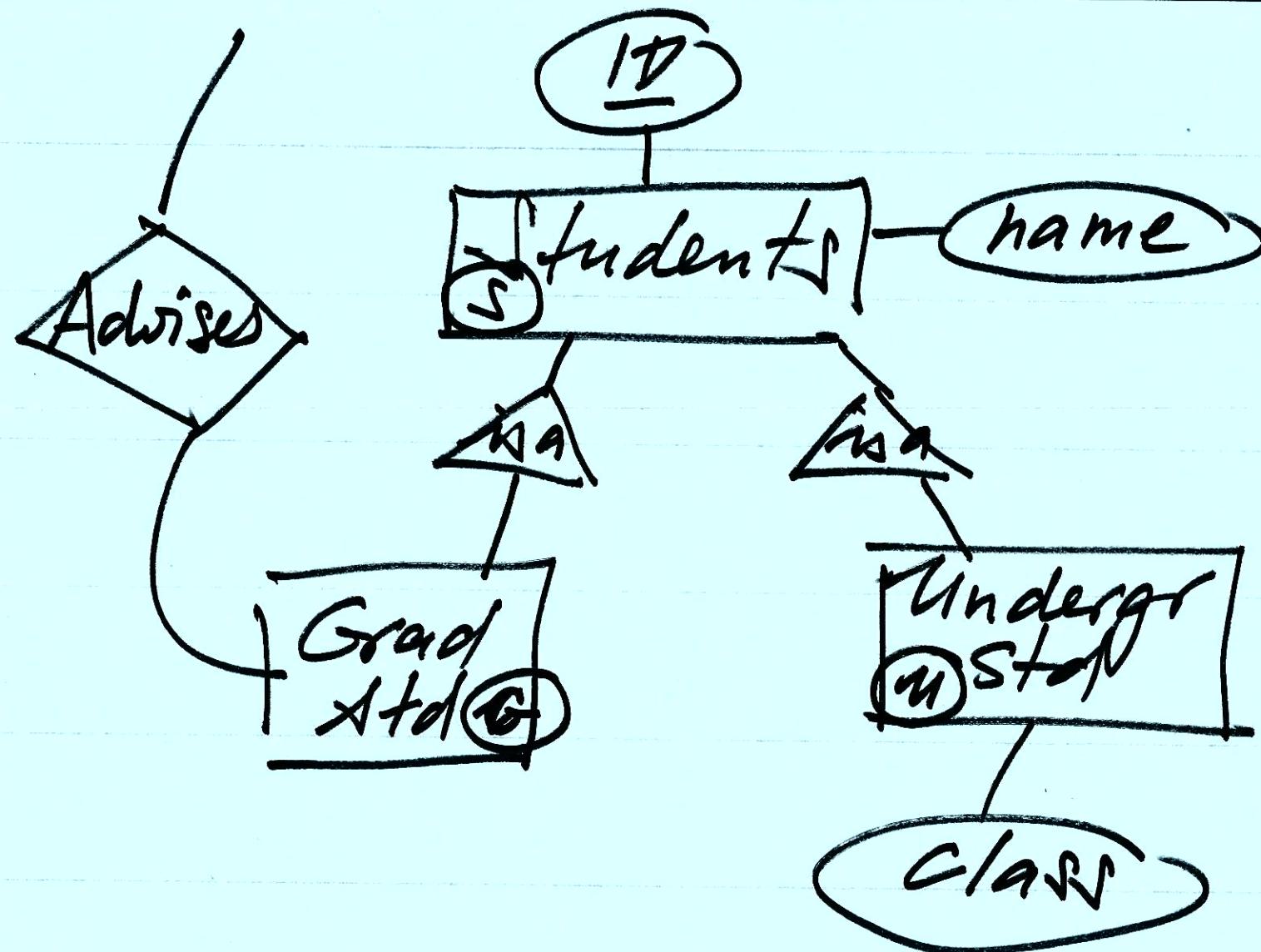
same



means
"borrows
part of key
from"







I. The "NULL" approach

Students(ID, name, class)

"NULL" value for values that

- do not exist
- are unknown
- or we are not authorized to see them



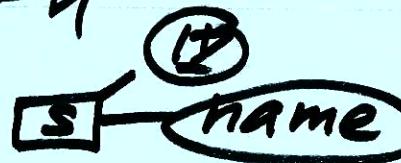
II. The E/R approach

Students(ID, name)

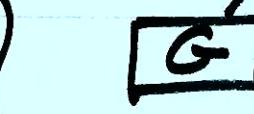
GradStd(ID)

UndergrStd(ID, class)

III. The O/O approach

(1) "S - U - G" 

(2) "SUG = U" 

(3) "SUU-G" 

(4) "SUUUG" 



- (1) $\sqrt{(\underline{ID}, \text{name})}$
- (2) $\sqrt{\text{G}(\underline{ID}, \text{name})}$
- (3) $\sqrt{\text{U}(\underline{ID}, \text{name}, \text{class})}$
- (4) $\sqrt{\text{UG}(\underline{ID}, \text{name}, \text{class})}$

