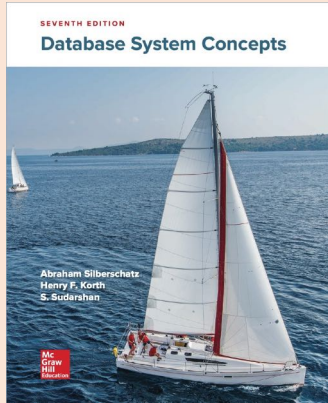
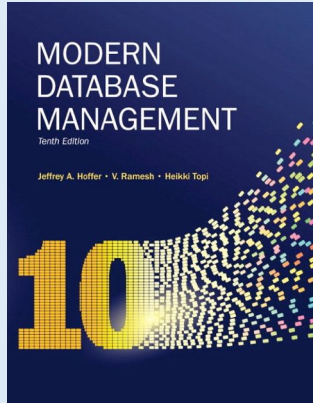


Different sources, different notations

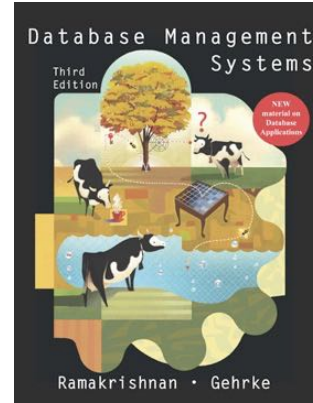
11/16/2022



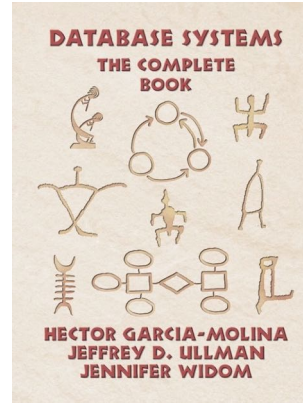
[Silberschatz+'20]
SDK arrows



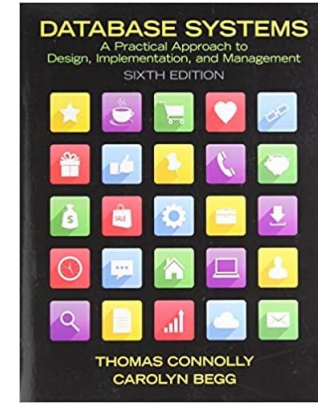
[Hoffer+'10]
Crow's foot



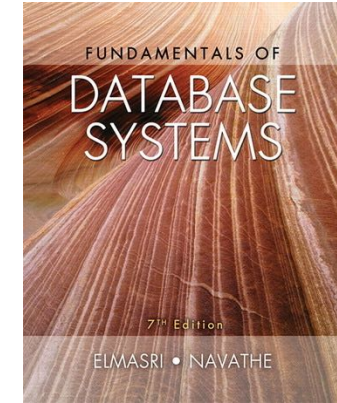
[Cow book'03]



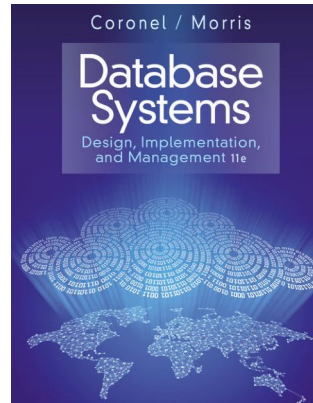
[Stanford book'08]



[Connolly+'15]



[Elmasri+'15]



[Coronel+'15]

"SDK" [Silberschatz+'20]: Silberschatz, Korth, Sudarshan. Database system concepts, 7th ed, 2020. <https://www.db-book.com/db7>

[Hoffer+'10]: Hoffer, Ramesh, Topi. Modern Database Management, 10th ed, 2010.
<https://www.pearson.com/us/higher-education/product/Hoffer-Modern-Database-Management-10th-Edition/9780136088394.html>

[Cow book'03]: Ramakrishnan, Gehrke, Database Management Systems, 3rd ed, 2003. <http://pages.cs.wisc.edu/~dbbook/>

[Stanford book'08]: Garcia-Molina, Ullman, Widom. Database Systems: The Complete Book, 2nd ed, 2008. <http://infolab.stanford.edu/~ullman/dscb.html>

[Connolly+'15]: Connolly, Begg. Database systems: A practical approach to design, implementation, and management, 6th ed, 2015.
<https://www.pearson.com/us/higher-education/program/Connolly-Database-Systems-A-Practical-Approach-to-Design-Implementation-and-Management-6th-Edition/PGM116956.html>

[Elmasri+'15]: Elmasri, Navathe. Fundamentals of Database Systems, 7th ed, 2015.
<https://www.pearson.com/us/higher-education/program/Elmasri-Fundamentals-of-Database-Systems-7th-Edition/PGM189052.html>

[Coronel+'15]: Coronel, Morris. Database systems: design, implementation, and management, 11th ed, 2015.
<https://www.cengage.com/c/database-systems-11e-coronel-morris/9781285196145>

Wolfgang Gatterbauer. Database design: <https://northeastern-datalab.github.io/cs3200/>

Notations for binary one-to-many relationships

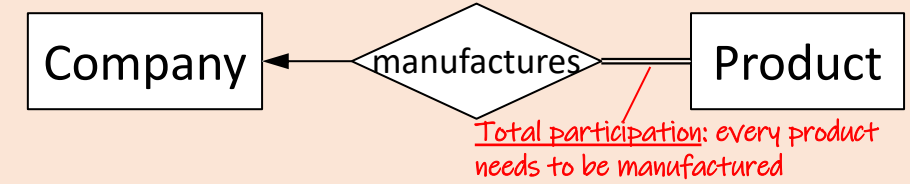
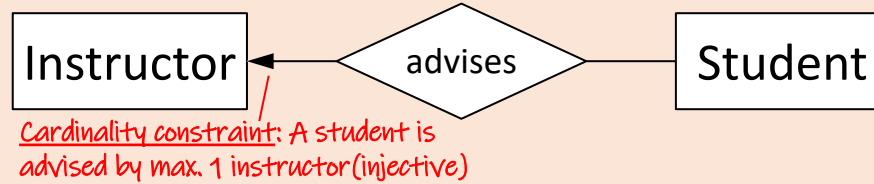
10/24/2022

if you are overwhelmed by the different notations, just use the one from our textbook

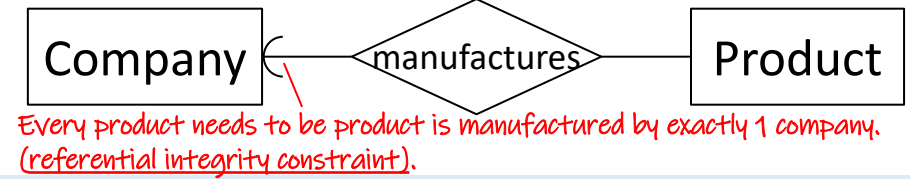
Every student is advised by maximum 1 instructor.
An instructor may advise 0, 1 or more students.

Every product is manufactured by exactly 1 company.
A company may manufacture 0, 1 or more products.

SDK [Silberschatz+'20]

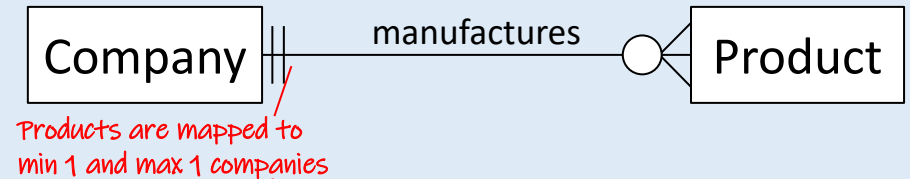
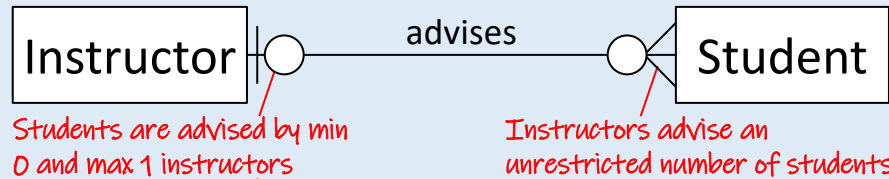


[Stanford book'03]
also used by Gradiance

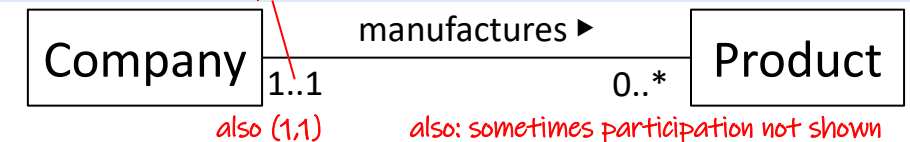
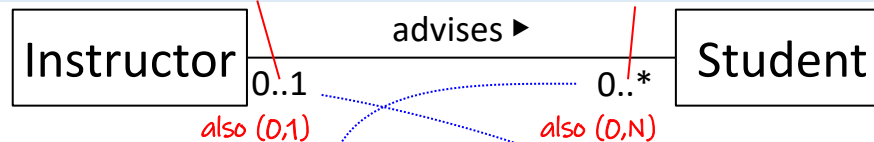


Crow's foot
[Hoffer+'10]

Most often used in practice
look across notation

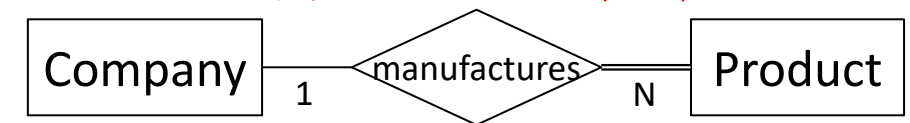


UML
[Connolly+'15]



[Elmasri+'15]

look across for cardinality, same-side for participation

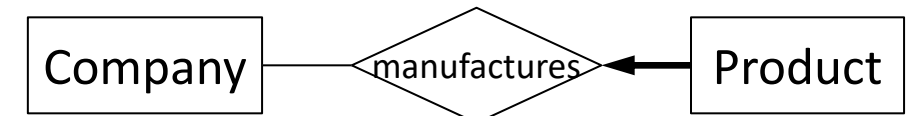
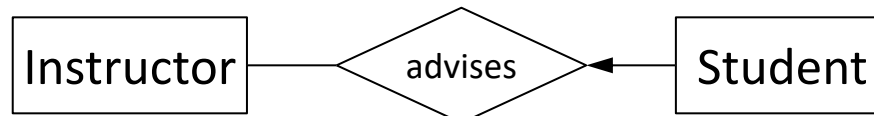


Avoid (min-max) !!!
(min-max)
[Elmasri+'15]

same-side notation



[Cow book'03]



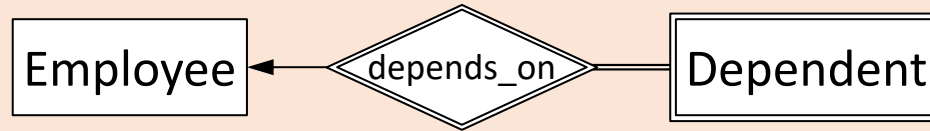
Notations for weak entities

10/24/2022

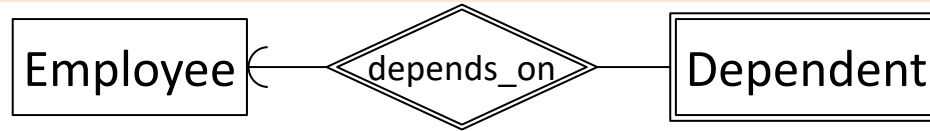
if you are overwhelmed by the different notations, just use the one from our textbook

A course may have 0, 1 or more sections

[Silberschatz+'20]

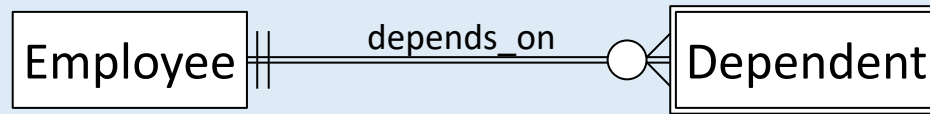


[Stanford book'03]
also by Gradiance

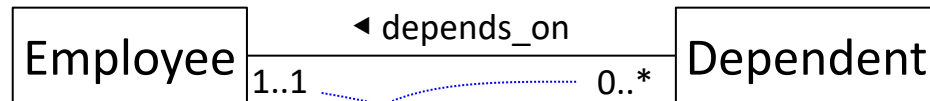


Crow's foot
[Hoffer+'10]

Most often
used in practice
look across
notation

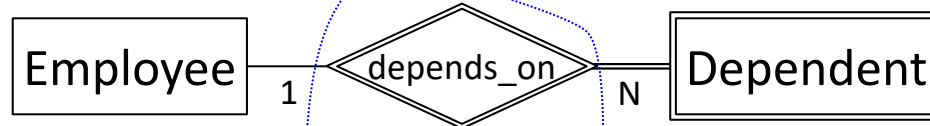


UML
[Connolly+'15]



[Elmasri+'15]

look across for
cardinality,
same-side for
participation



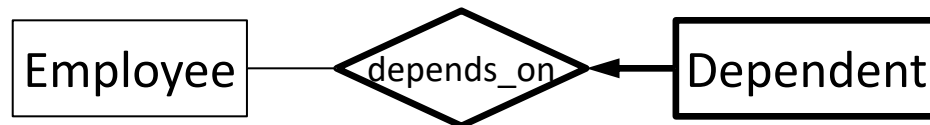
Avoid (min-max) !!!
(min-max)
[Elmasri+'15]

same-side
notation



strongly discouraged since it is the exact opposite of the more commonly used crow's foot look across notation

[Cow book'03]



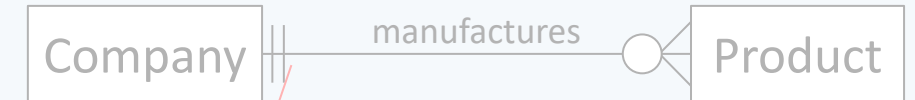
Every product is manufactured by exactly 1 company.
A company may manufacture 0, 1 or more products.



Total participation: every product
needs to be manufactured (surjective)



Every product needs to be product is manufactured by exactly 1 company.
(referential integrity constraint).



Products are mapped to
min 1 and max 1 companies



also (1,1)

also: sometimes participation not shown



Chen "bubble" variants

"Boxed" variants

[Silberschatz+'20]

[Stanford book'03]
also used by Gradiance

[Hoffer+'10]

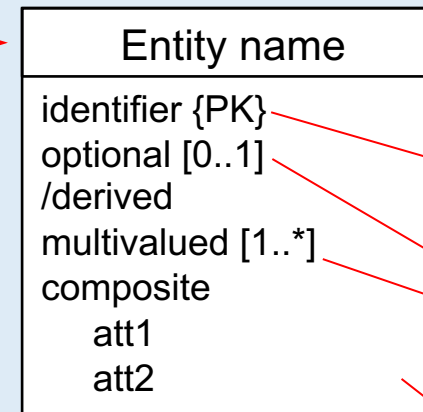
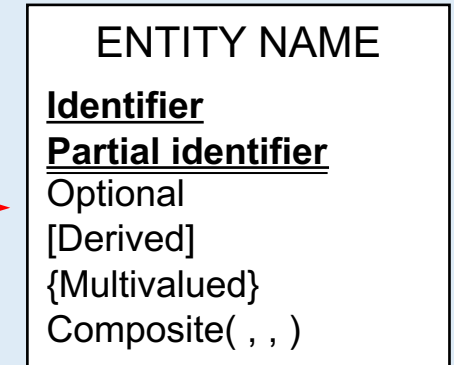
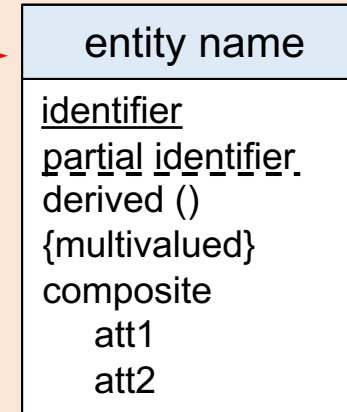
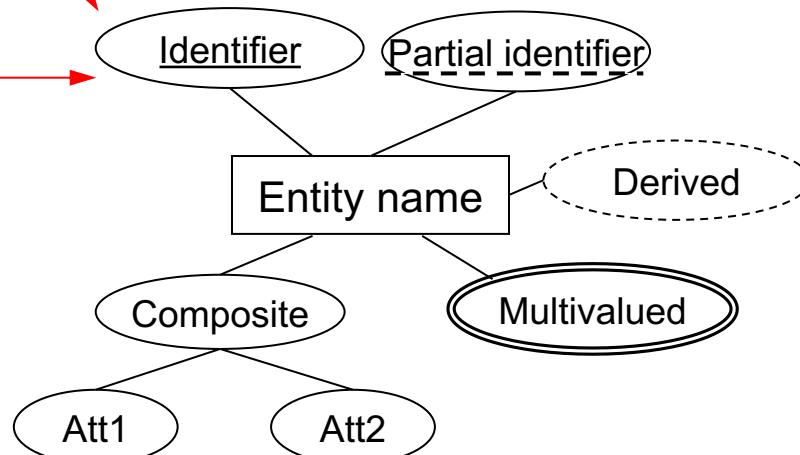
UML
[Connolly+'15]

[Elmasri+'15]

[Cow book'03]

if you are overwhelmed by the different notations, just use the one from our textbook

no visual notation for optional attributes (vs. mandatory, which will later become "NOT NULL" in the relational schema)



In practice you will likely see some variant of all these three variants

sometimes {id}

unified concept for mandatory, optional, multivalued

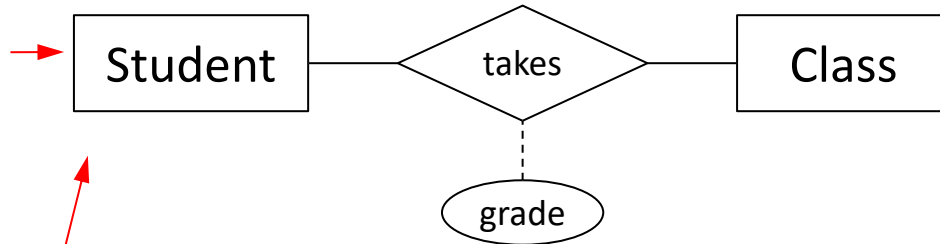
no notion of weak or strong entity in UML notation

"Bubble variants"

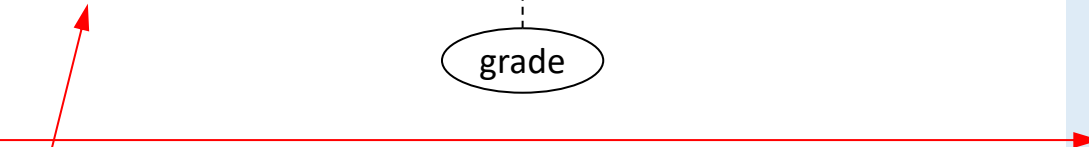
[Silberschatz+'20]



[Stanford book'03]
also used by Gradiance



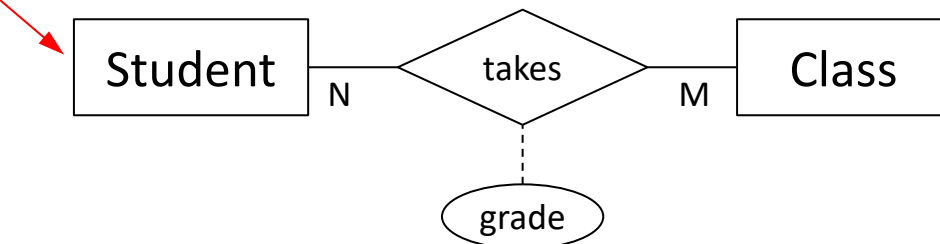
Crow's foot
[Hoffer+'10]



UML
[Connolly+'15]

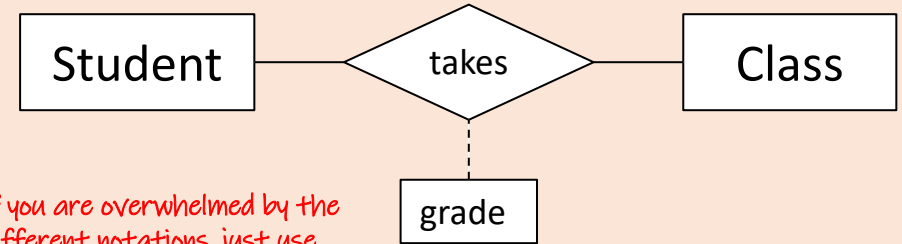


[Elmasri+'15]

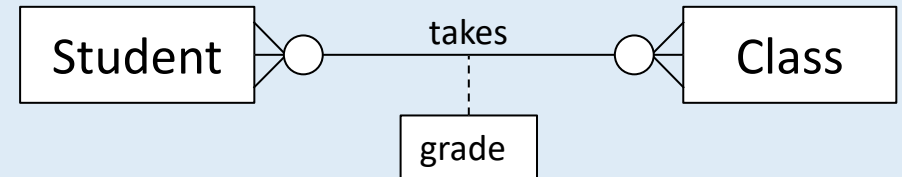


[Cow book'03]

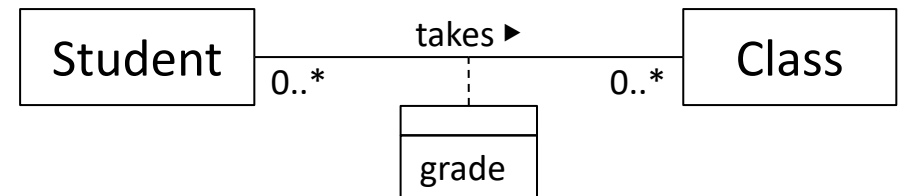
"Box variants"



if you are overwhelmed by the different notations, just use the one from our textbook



In practice you will likely see some variant of all these three variants



Notations for specialization ("ISA relationship")

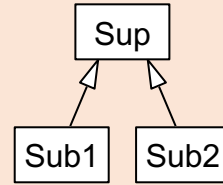
11/16/2022

Participation (or covering) constraint
(optional=partial | mandatory=total)

[Silberschatz+'20]

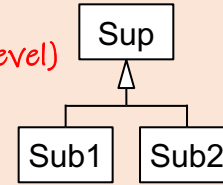
Please use the notation from our textbook even though I will use slides with various notation

Partial-overlapping

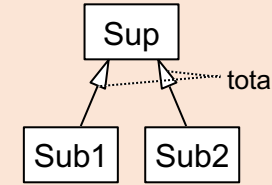


Super entity (more generalized, higher-level)
Sub entity (more specialized, lower-level)

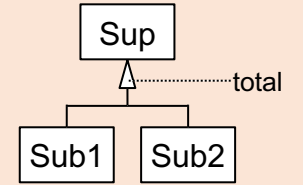
Partial-disjoint



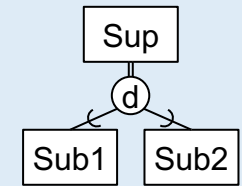
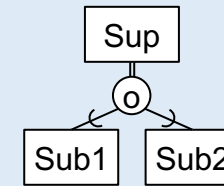
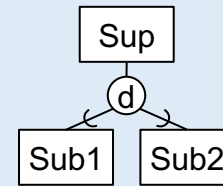
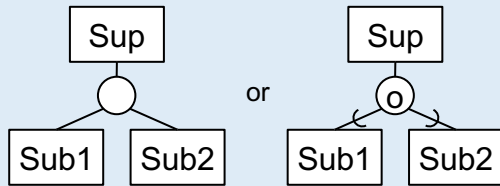
Total-overlapping



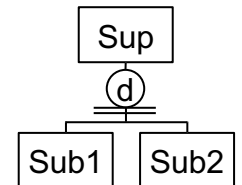
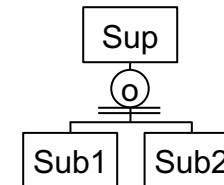
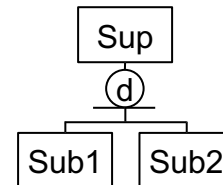
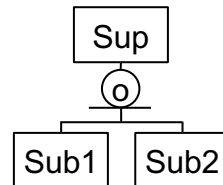
Total-disjoint



[Elmasri+'15],
[Hoffer+'10]

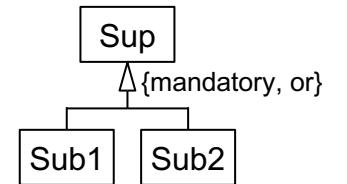
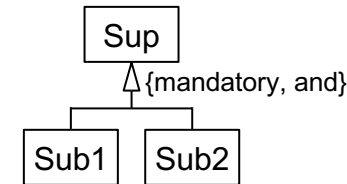
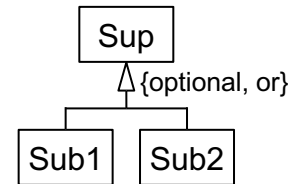
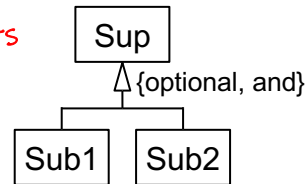


[Coronel+'15]



UML
[Connolly+'15]

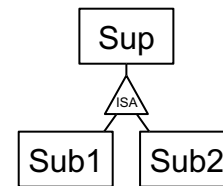
Overlap (or disjoint) constraints
(or=disjoint | and=overlapping)



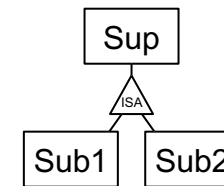
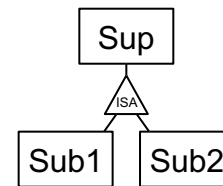
[Stanford book'03]

also by Gradiance

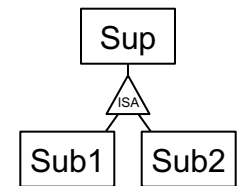
[Cow book'03]



Sub1 overlaps Sub2



Sub1 overlaps Sub2
Sub1 and Sub2 cover Sup



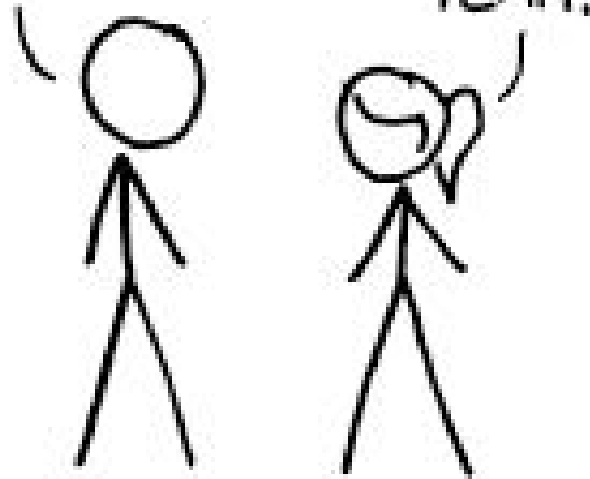
Sub1 and Sub2 cover Sup

HOW STANDARDS PROLIFERATE:

(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC) *also ERD conventions!*

SITUATION:
THERE ARE
14 COMPETING
STANDARDS.

14?! RIDICULOUS!
WE NEED TO DEVELOP
ONE UNIVERSAL STANDARD
THAT COVERS EVERYONE'S
USE CASES.



SOON:

SITUATION:
THERE ARE
15 COMPETING
STANDARDS.