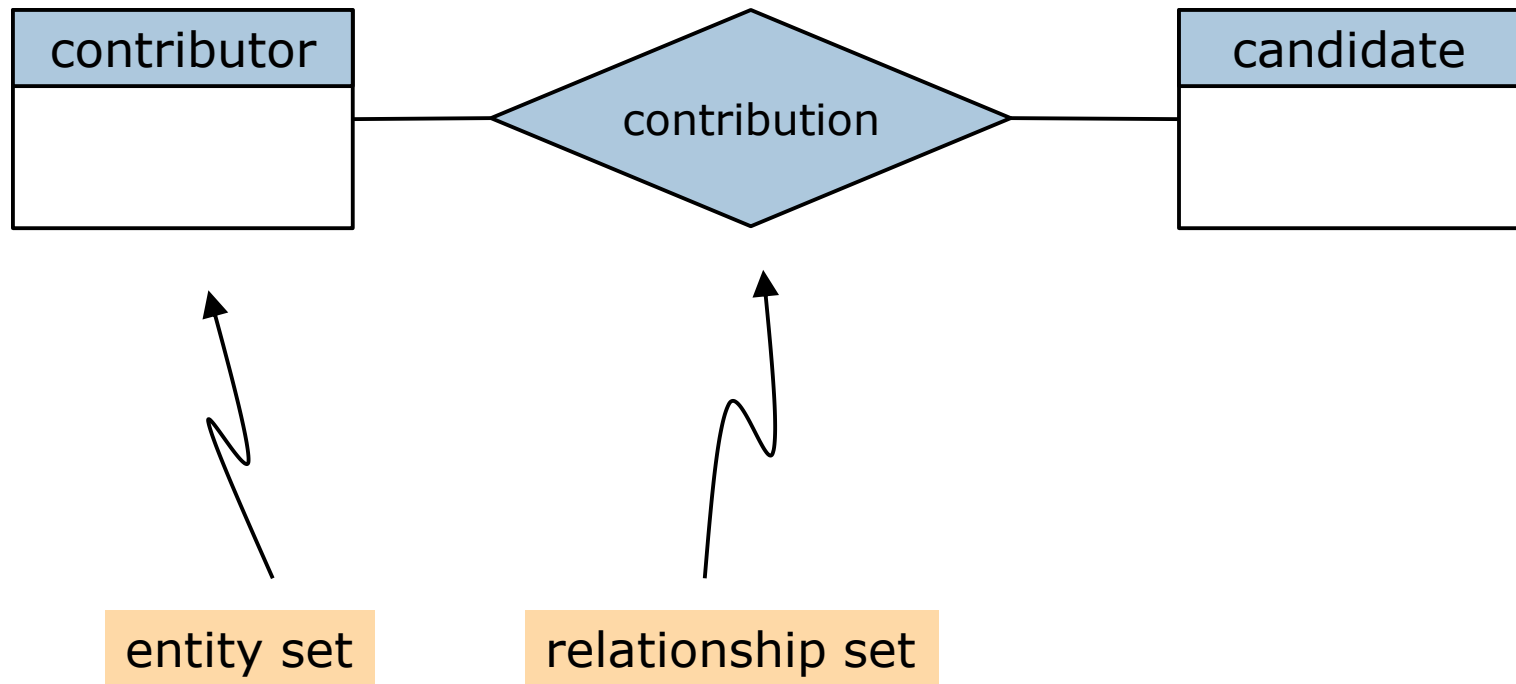


ER Diagrams

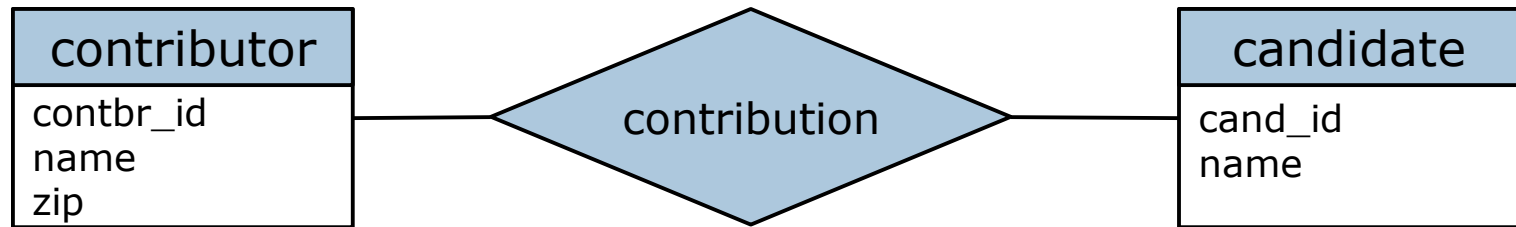
Motivation

- ❑ We want to share the conceptual design with a wide range of stakeholders
- ❑ Most stakeholders won't know about database schemas or conceptual modeling
- ❑ How to share a conceptual model?

ER diagram basics

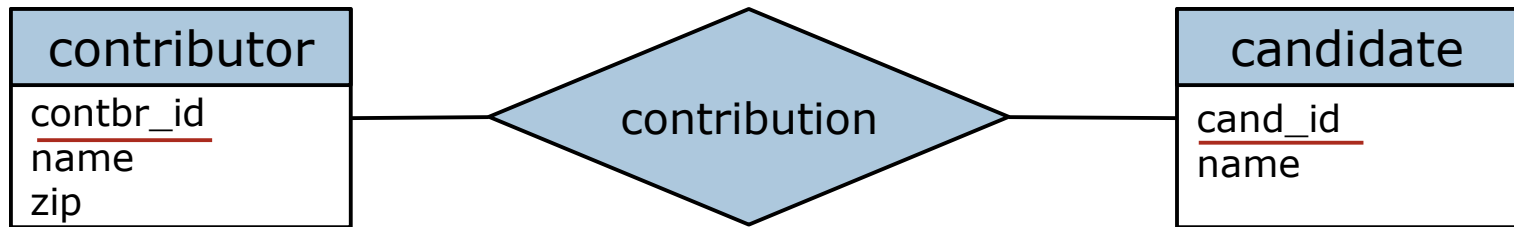


Attributes of entity sets



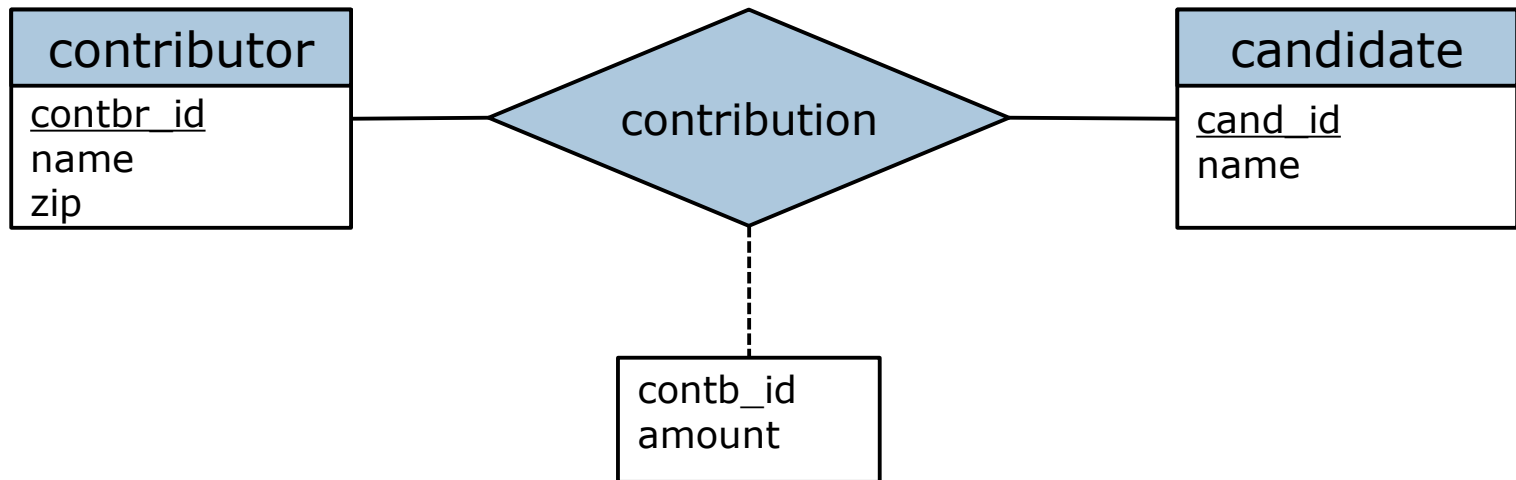
Where shall we put attributes of entity sets?

Primary keys of entity sets



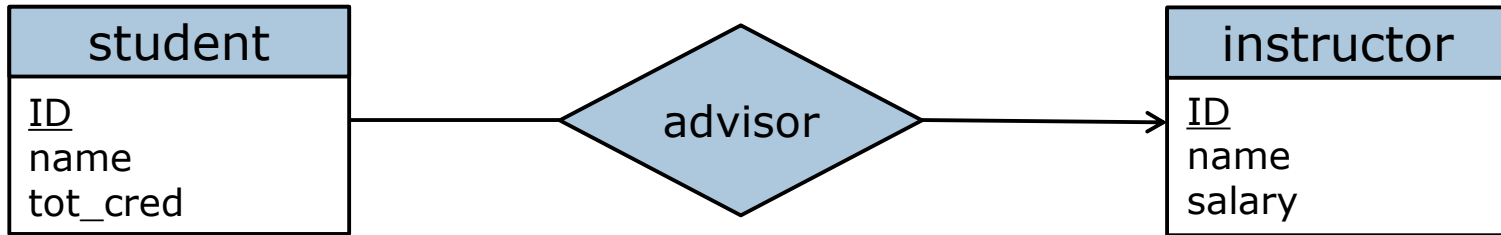
How can we indicate the attributes that form the primary key of an entity set?

Attributes of relationship sets



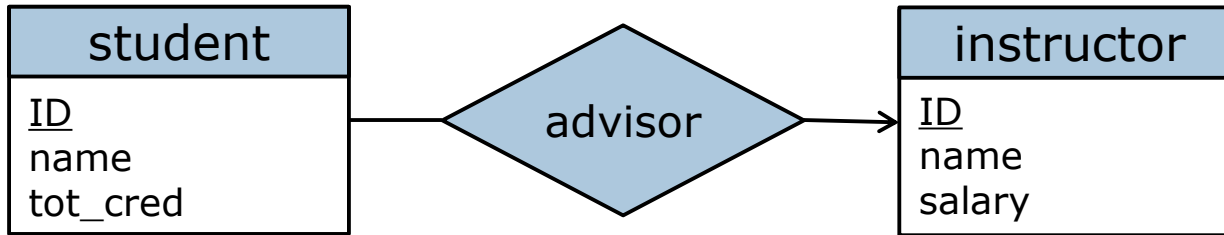
Where shall we put attributes of relationship sets?

Mapping cardinalities

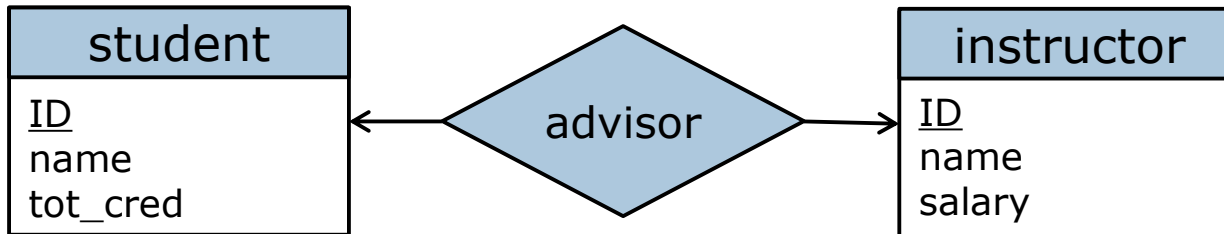


How to show that each a student can have at most one advisor?

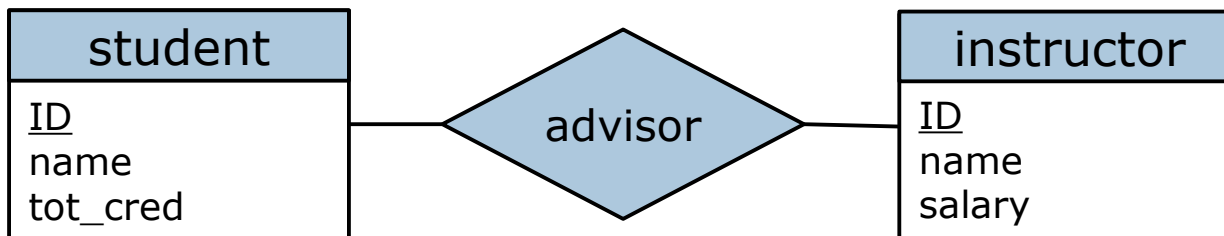
All kinds of mapping cardinalities



a student has at most one advisor

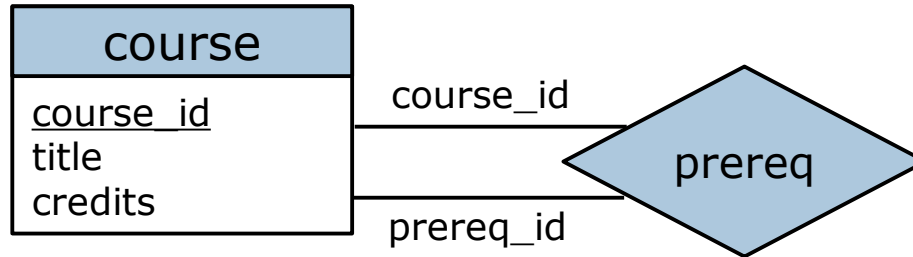


What does this say?



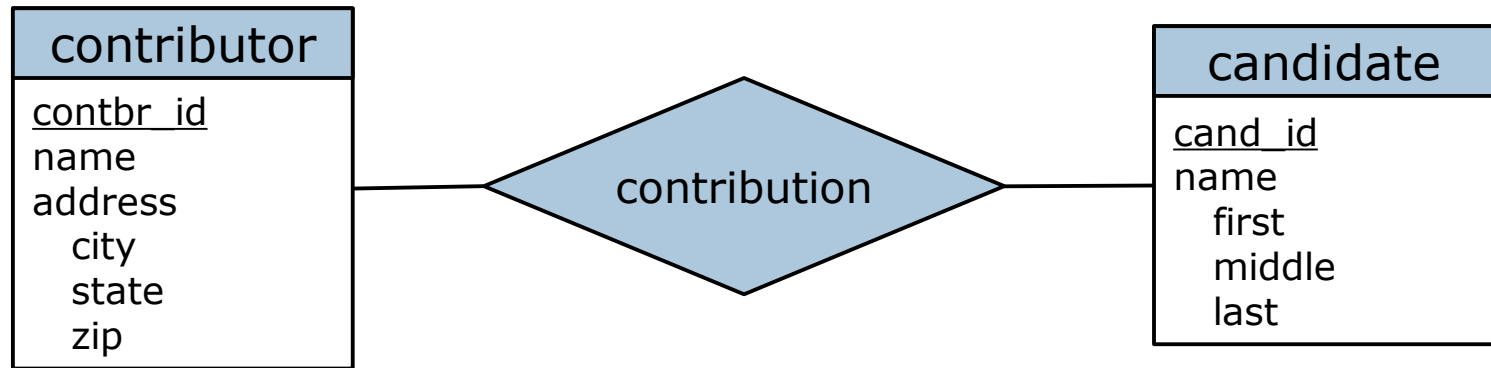
What does this say?

Roles



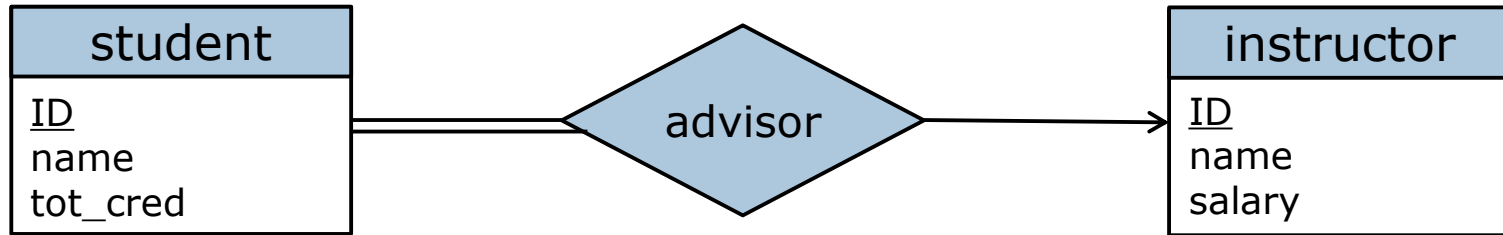
How to show the role that an entity set has in a relationship set?

Composite attributes



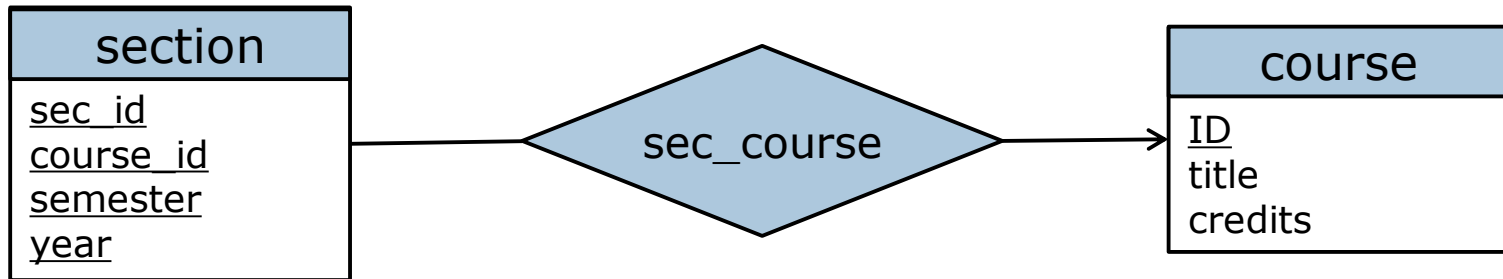
How to display composite attributes?

Participation cardinalities



How to show that every student will have exactly advisor?

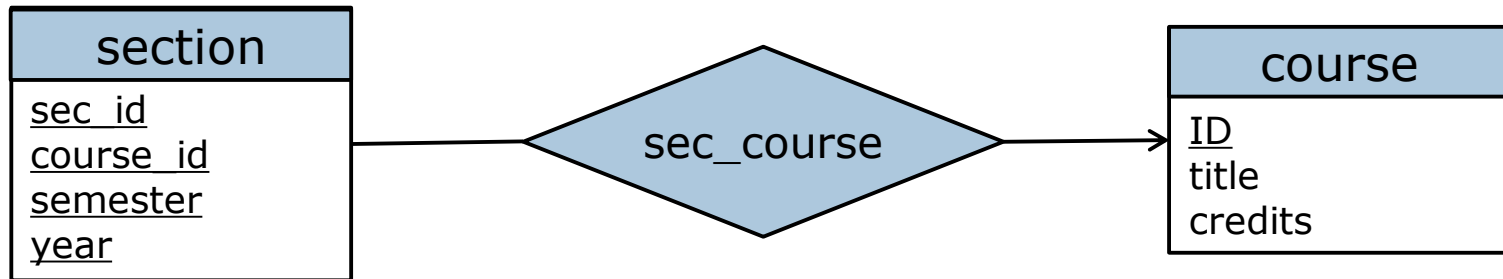
Complication: weak entity sets



We define the section and course entity sets,
then add the sec_course relationship set.

What goes wrong?

Solving the problem



Problem: course_id is now redundant with relationship

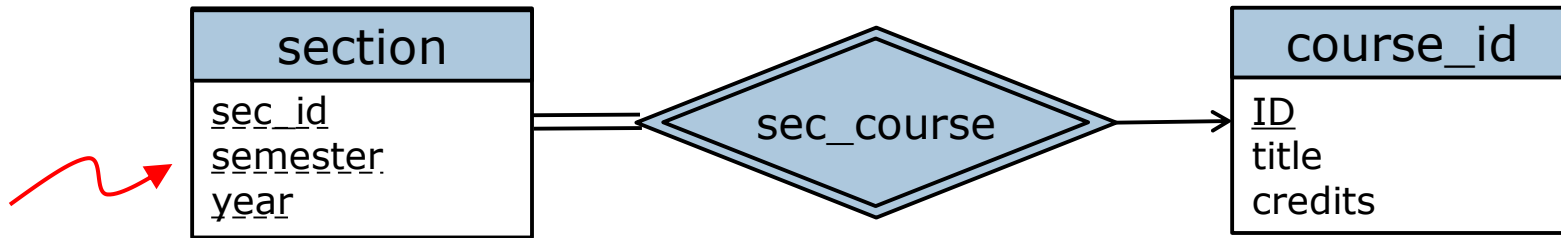
Idea 1: remove the course_id attribute of 'section'

- but then 'section' has no key

Idea 2: remove the sec_course relationship set.

- but then diagram does not show relationship

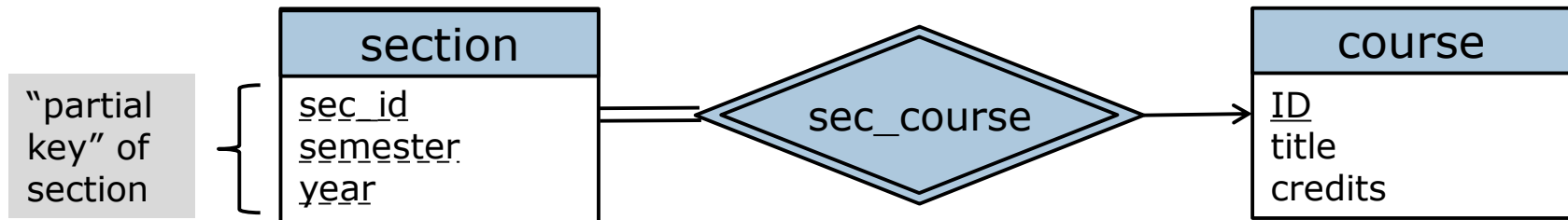
Weak entity set



Solution: allow section to have no key; treat relationship with course_id as an “identifying” one

- section is a “weak entity set” (has no primary key)
- a weak entity set must be tied to an “owner” entity set
- the relationship is called an “identifying relationship”
- relationship is many-to-one
- participation of weak entity set in relationship is total (note double line)

Weak entity sets have “partial keys”



section attributes do not form a key, but:

- attributes sec_id, semester, year are enough to discriminate between any two sections tied to the same identifying entity set

primary key of a weak entity set =
 partial key of the weak entity set
 + primary key of identifying entity set

ER diagram for a university

