From ER to Relational Model

Physical Data Modeling

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

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Learning Objectives

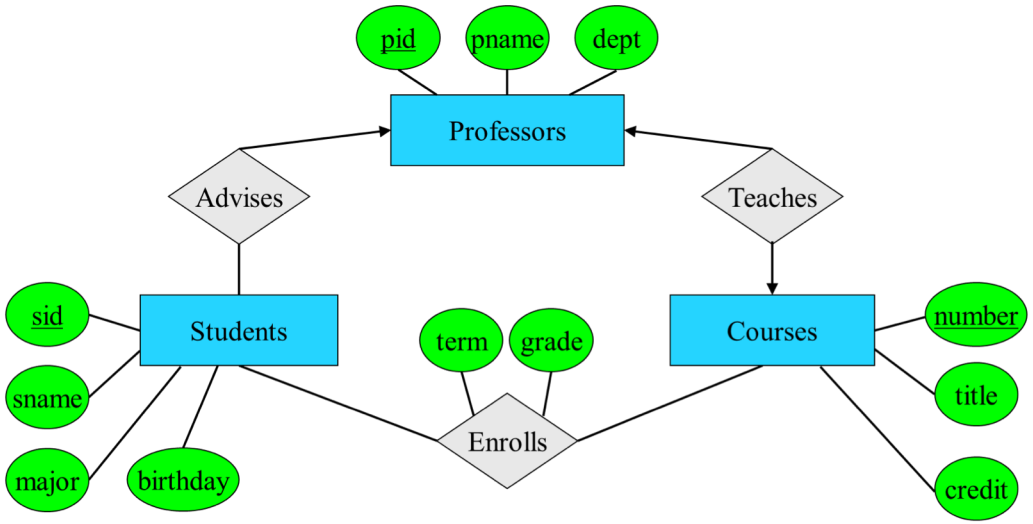
By the end of this video, you will be able to:

- Translate an ER diagram to a relational schema.
- Combine relations to simplify a schema.

Academic World

Note:

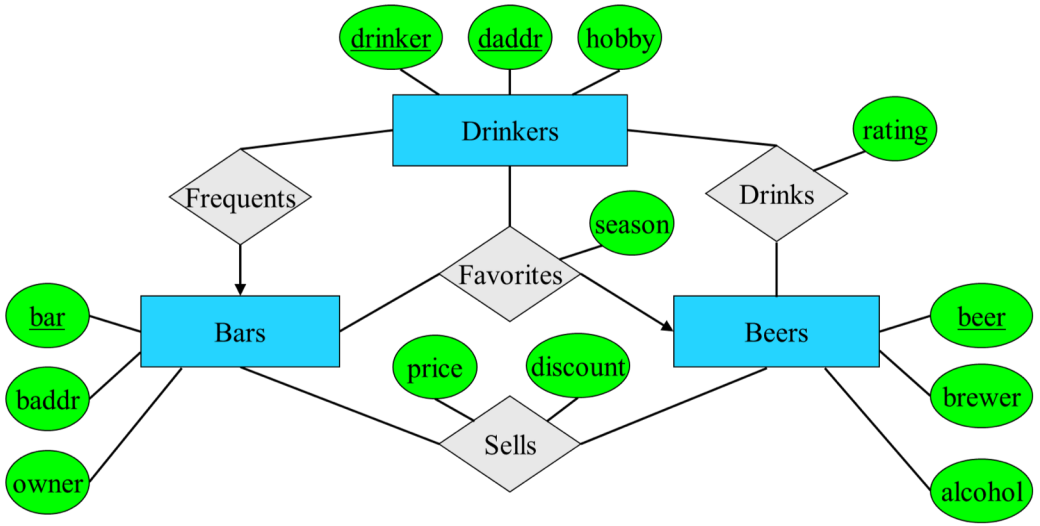
- Changed some attributes (e.g., “name” to “pname” or “sname”) on ER to avoid name clashes.
- This can also be done later when clashes happen during translation too.



Professors(<u>pid</u>, pname, dept, course)
Students(<u>sid</u>, sname, major, birthday, advisor)
Courses(<u>number</u>, title, credit)
Enrolls(<u>sid</u>, <u>number</u>, term, grade)

Translating an ER diagram to a relational schema

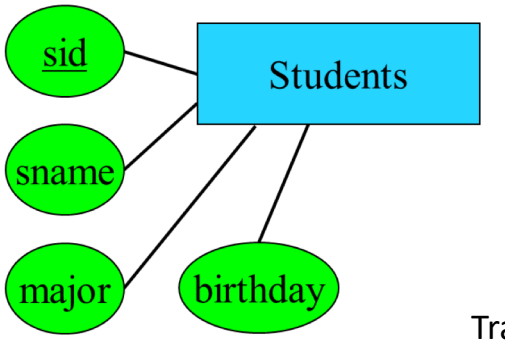
Relational Schema: Friday Night



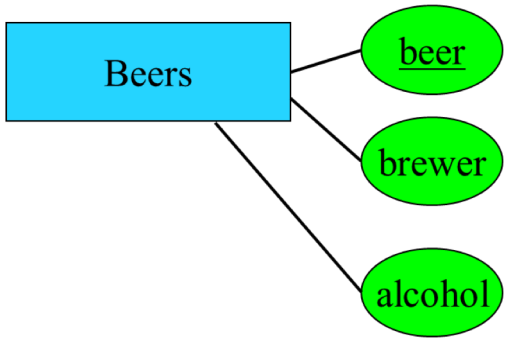
- Drinkers(drinker, daddr, hobby, bar)
- Bars(bar, baddr, owner)
- Beers(beer, brewer, alcohol)
- Sells(bar, beer, price, discount)
- Drinks(drinker, beer, rating)
- Favorites(drinker, bar, beer, season)

Translating an ER diagram to a relational schema

Rule 1: Entity Set → Relation



Translating entity set into relation



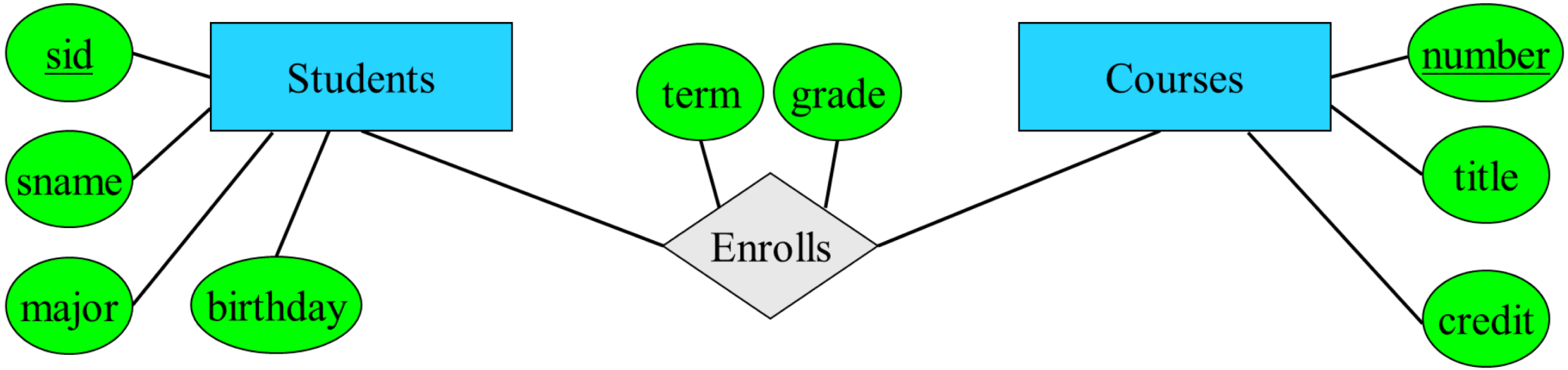
Students(<u>sid</u>, sname, major, birthday)

Beers(<u>beer</u>, brewer, alcohol)

Rule: Translating entity set E to relation R

- Attributes of R = attributes of E.
- Key of R = key of E.

Relationship → Relation: What Attributes?



Enrolls(<u>sid</u>, sname, major, birthday, <u>number</u>, title, credit, term, grade)

Enrolls(<u>sid</u>, <u>number</u>, term, grade)

Translating relationship into relation

Relationship → Relation: What Keys?

Favorites(drinker, bar, beer, season)

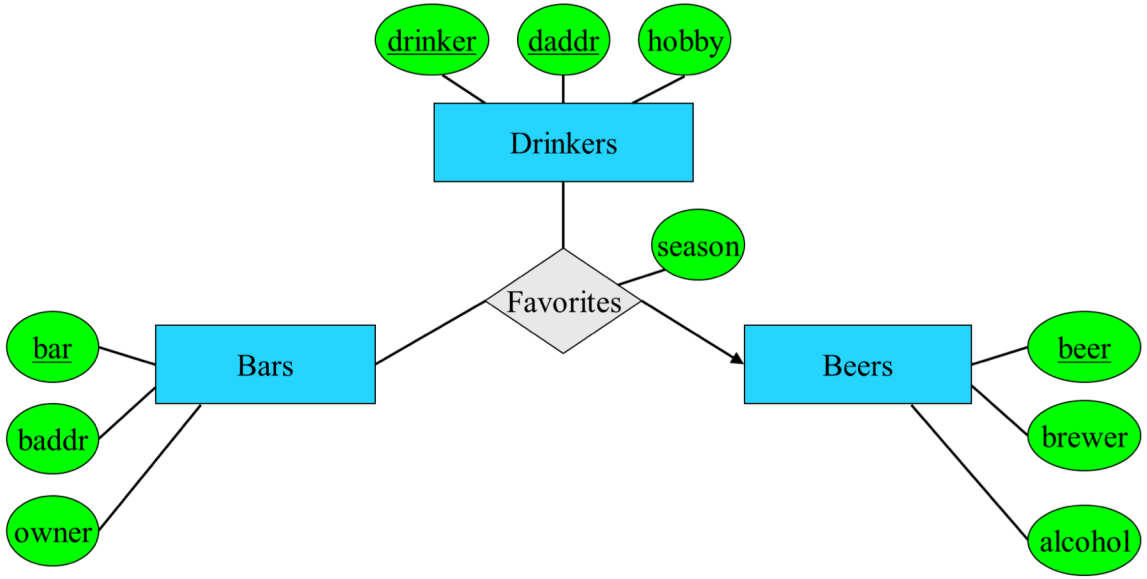
Favorites(drinker, bar, beer, season)

Translating relationship into relation

Rule 2: Relationship → Relation

Rule: Translating relationship X of $E_1 \ldots, E_n$ to relation R

- Attributes of R = key attributes of $E_1, \ldots, E_n$ plus attributes of X
- Key of R = key of $E_1, \ldots, E_n$ except those "arrowed" entities

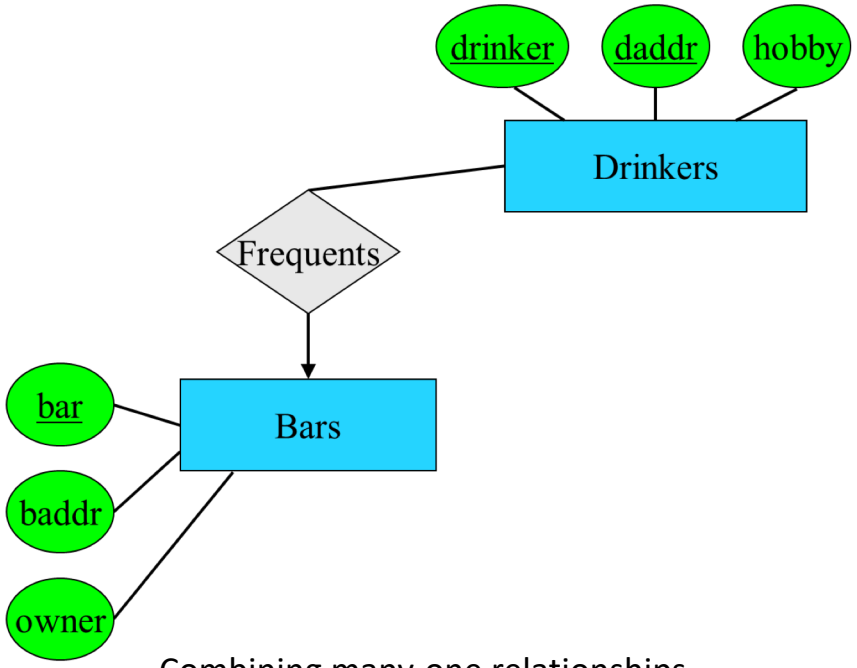


Favorites(<u>drinker</u>, <u>bar</u>, beer, season)

Translating relationship into relation

Rule 3: Combining Many-One Relationships

- Rule: Combine the relation of a many-one relationship with the relation of the “many”-side entity set.



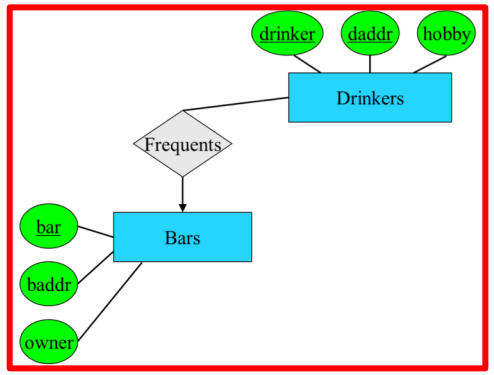
Combining many-one relationships

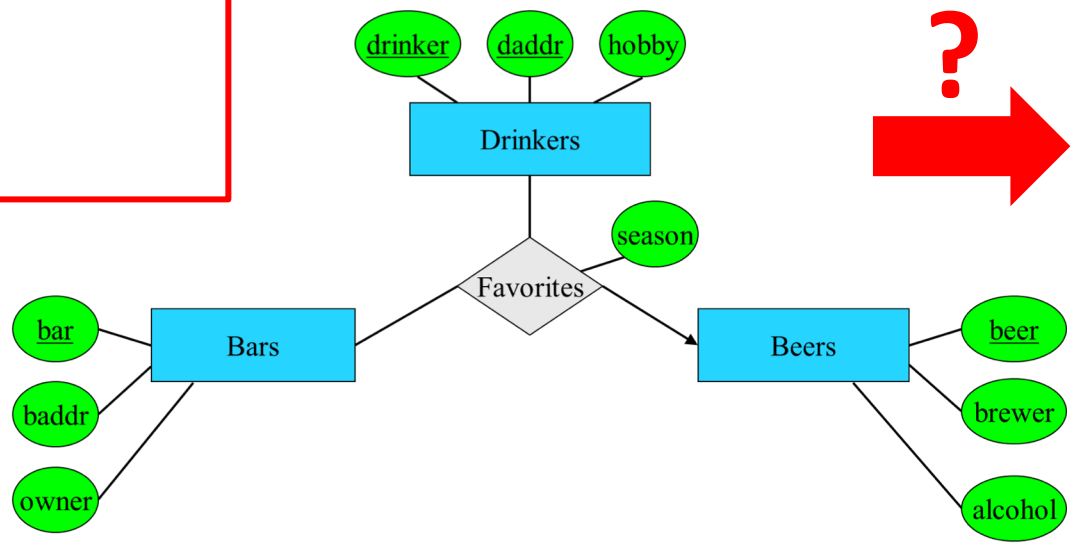
- Drinkers(drinker, daddr, hobby)
- Frequents(drinker, bar)
- Bars(bar, baddr, owner)

- Drinkers(drinker, daddr, hobby, bar)
- Bars(name, baddr, owner)

Food for Thought

We can combine a binary many-one relationship. Can we similarly combine a multiway many-many-one relationship? Say, merge Favorites to Drinkers? How about many-one-one?





?

Drinkers(drinker, daddr, hobby,

bar, beer, season)