ER Model: Constraints

Conceptual Data Modeling

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Learning Objectives

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

- Define constraints used in the ER model.
- Identify different types of constraints.

Constraints

- An **assertion** about the database that must be true at all times.
- Part of the data modeling (and database “schema”).
- Important in database design.

Various Types of Constraints

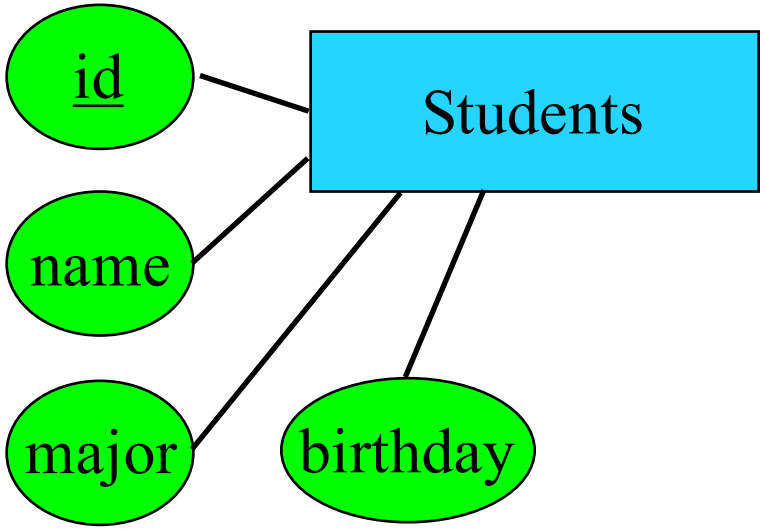
- Keys: Unique identifier
  - The “netid” at UIUC uniquely identifies a member of it.
- Referential integrity: A referenced entity must exist
  - If a drinker frequents a bar, the bar must exist.

- Many other constraints
  - Domain constraints: Grade $\in$ {A, B, C, D}. Price $\in$ [0, 100].
  - General constraints: BirthDate < EmploymentDate.

Why Constraints Are Important?

- Give more semantics to the data.
- So we can check correctness (consistency) of data.
- So we can enable efficient storage, data lookup, etc.

Keys

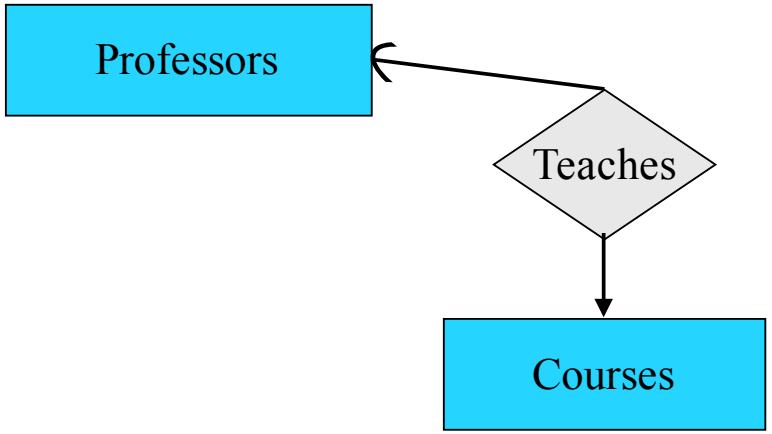


Labeling a key in an entity set

- A key can consist of one or more attributes.
  - {id} identifies a student.
  - {name, major} identifies a student.
- Every entity set must have a key.
  - At least the entire set of attributes would form a key.
  - We must capture sufficient attributes to distinguish entities.
- There can be more than one key.
  - We designate one key as the **primary key**, by underlining its attributes.
  - No formal way to specify multiple keys other than the primary.

Referential Integrity Constraint

- In a relationship, expressed by a round arrow:
  - A “referencing” entity must reference exactly-one “referenced” entity.
  - A referenced entity must exist.
- I.e., no “dangling pointer” (segmentation fault in programming).



Referential integrity constraint

Food for Thought

ER Model does not allow us to specify all kinds of constraints– but you can specify more than keys and referential integrity.

What other constructs we have learned also represent constraints?