# Lecture 3: Entity Relationship Model

BADM/ACCY 352

Spring 2017

Instructor: Yi Yang, PhD

# Last lecture

- Database systems
- Entity-Relationship Model

# This lecture

- Entity-Relationship Model continue

# ER Model Review

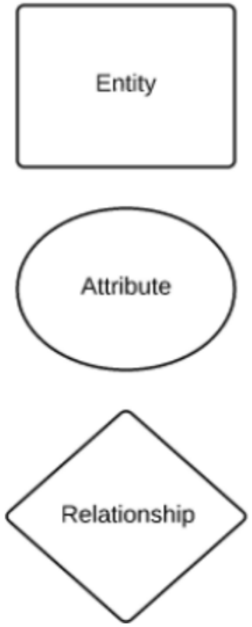
- ER Model states what data will be stored in the database, and what are the relationships of the data.
- Entity
- Attribute
- Relationship
  - 1:M
  - M:N
  - 1:1

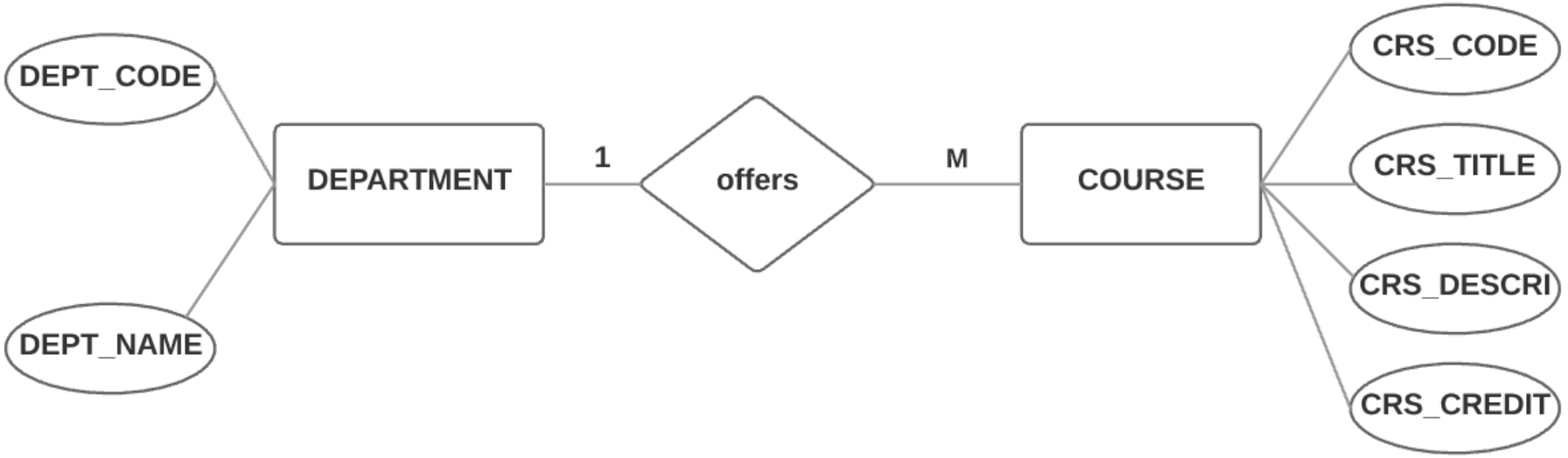
# Relationship review

- Say you are building a database for 2016 NFL season. You want to store teams, players, games, coaches.
- Entities: TEAM, PLAYER, GAME, COACH
- Can you list all relationships?

# Chen's notation

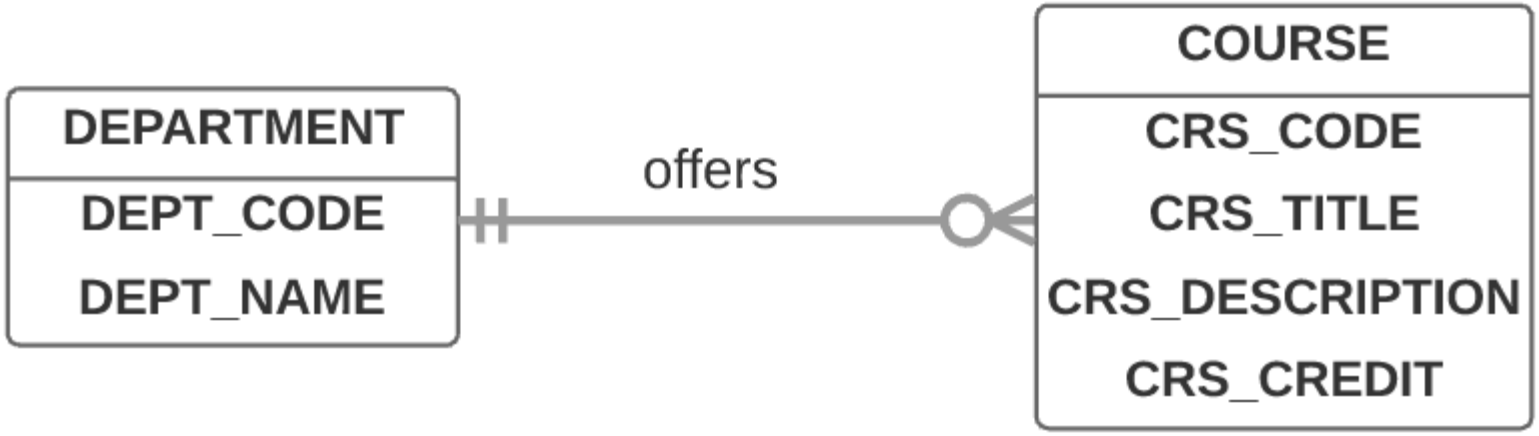
- Entity relationship modeling was developed for database design by Peter Chen in 1976.



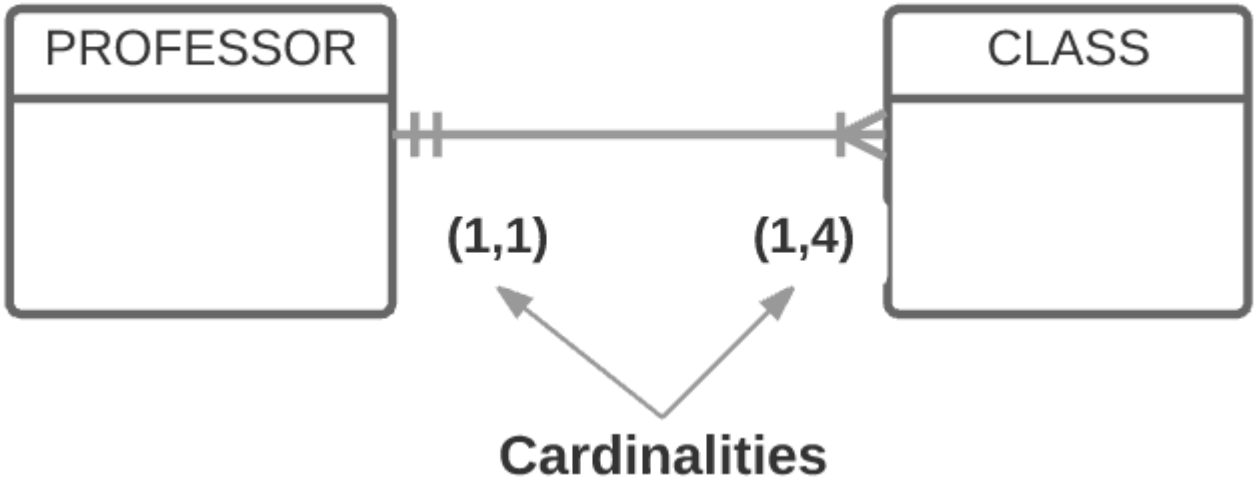
# Crow’s foot notation

- Crow's foot diagram represents entities as boxes, and relationships as lines between the boxes. Different shapes at the ends of these lines represent the relationship type.



# Relationship Cardinality

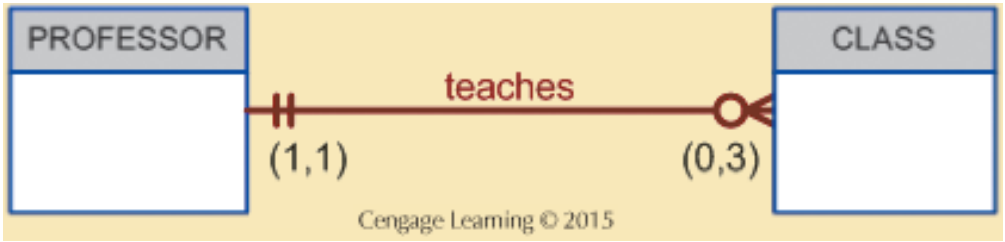
- Cardinality: the minimum and maximum number of entity occurrences associated with *one* occurrence of the *related* entity.



# Relationship Participation

- Optional or Mandatory.

| CROW's FOOT SYMBOLS | CARDINALITY | COMMENT |
|---|---|---|
|  | (0,N) | Zero or many; the "many" side is optional. |
|  | (1,N) | One or many; the "many" side is mandatory. |
|  | (1,1) | One and only one; the "1" side is mandatory. |
|  | (0,1) | Zero or one; the "1" side is optional. |



# Crow's foot notation

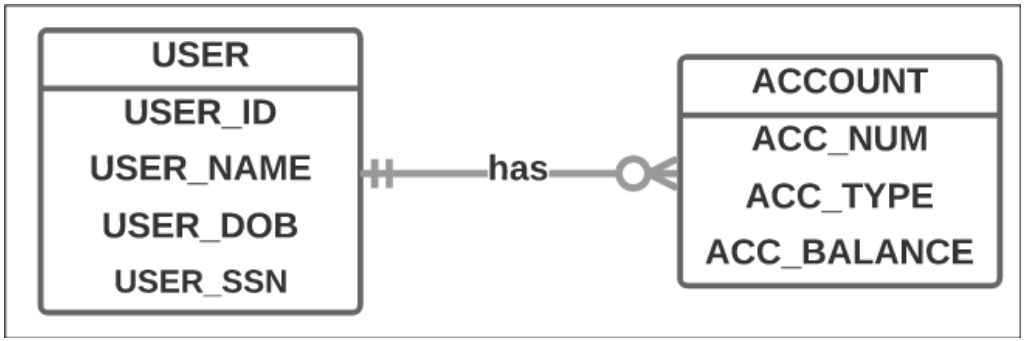
- Identify the relationship between entities.
  - 1:M
  - M:N
  - 1:1

- Identify the relationship participation for each entity.
  - optional
  - mandatory

# iclicker question

- A banking corporation. Given the following business rule, which diagram is correct.
  - A user may have many bank accounts.
  - An account can belong to multiple users (eg. A family account)

A

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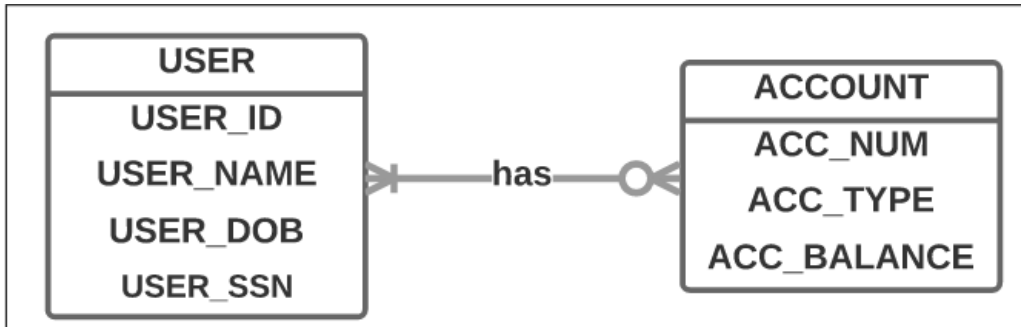
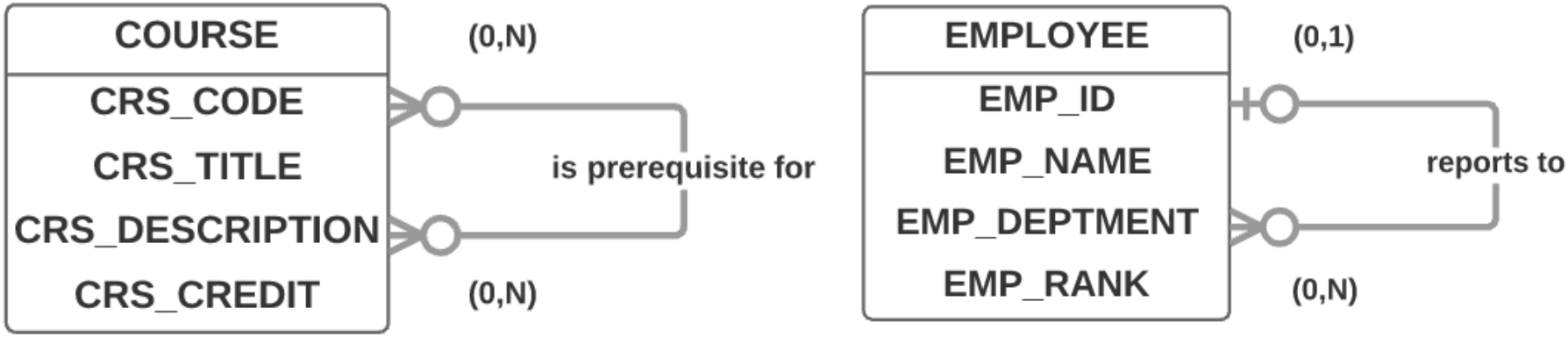


# Recursive Relationship

- A relationship exists between occurrences of the same entity.



# How to Draw an ER Diagram

- Understand the problem domain.
- According to business rules, identify entities, attributes and relationships among entities.
- ER Modeling is an iterative process, so modify the diagram as necessary.

- At the beginning, you should focus on E(ntity)R(elationship).

# ER Model Practice

- Design an ER Model for a student-enrollment management information system at Tiny College.
- The model contains data about professors, students, departments, classes, rooms, etc.

# Business rules

1. Tiny College is divided into several departments. Each department may offer several courses.
2. A course may have different class sections.
3. Each professor must employ in one department. One and only one of those professors chairs the department.
4. Each professor may teach up to four classes.
5. Each student may enroll in up to 6 classes, and each class may have up to 35 students
6. Each class is taught in a room. A building can contain many rooms, but each room is found in a single building.

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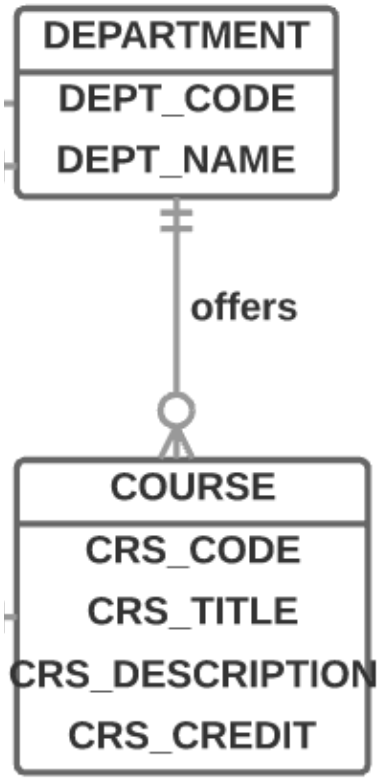
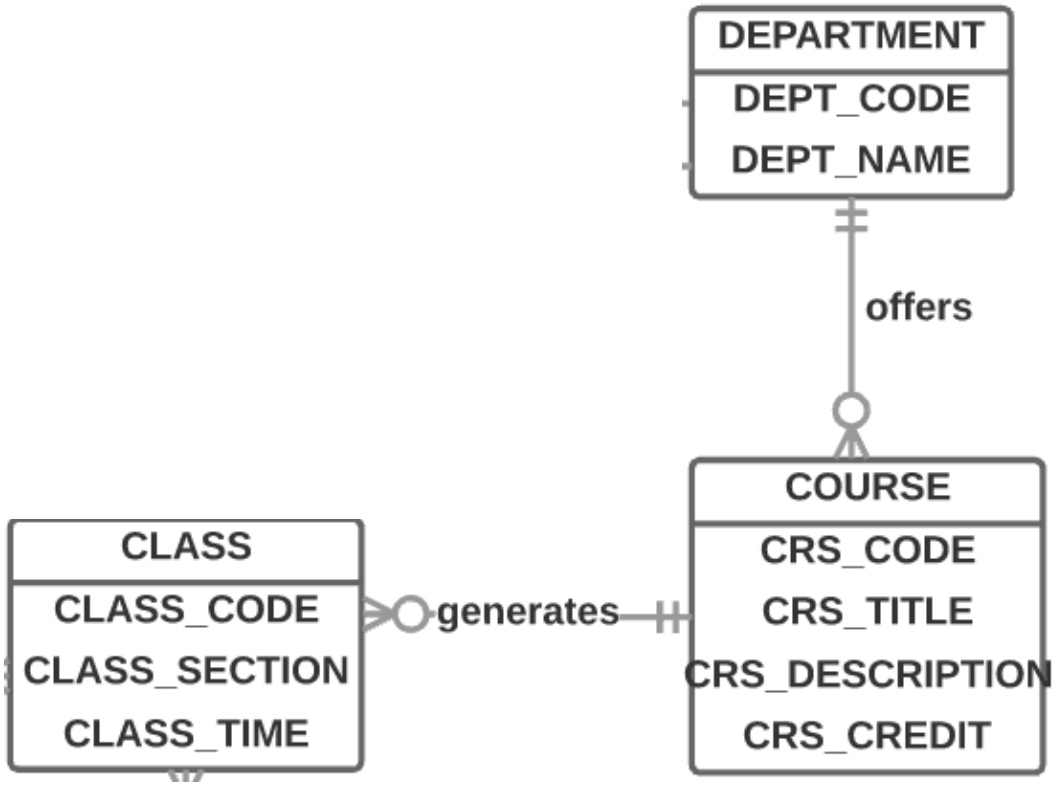


2. A course may have different class sections.



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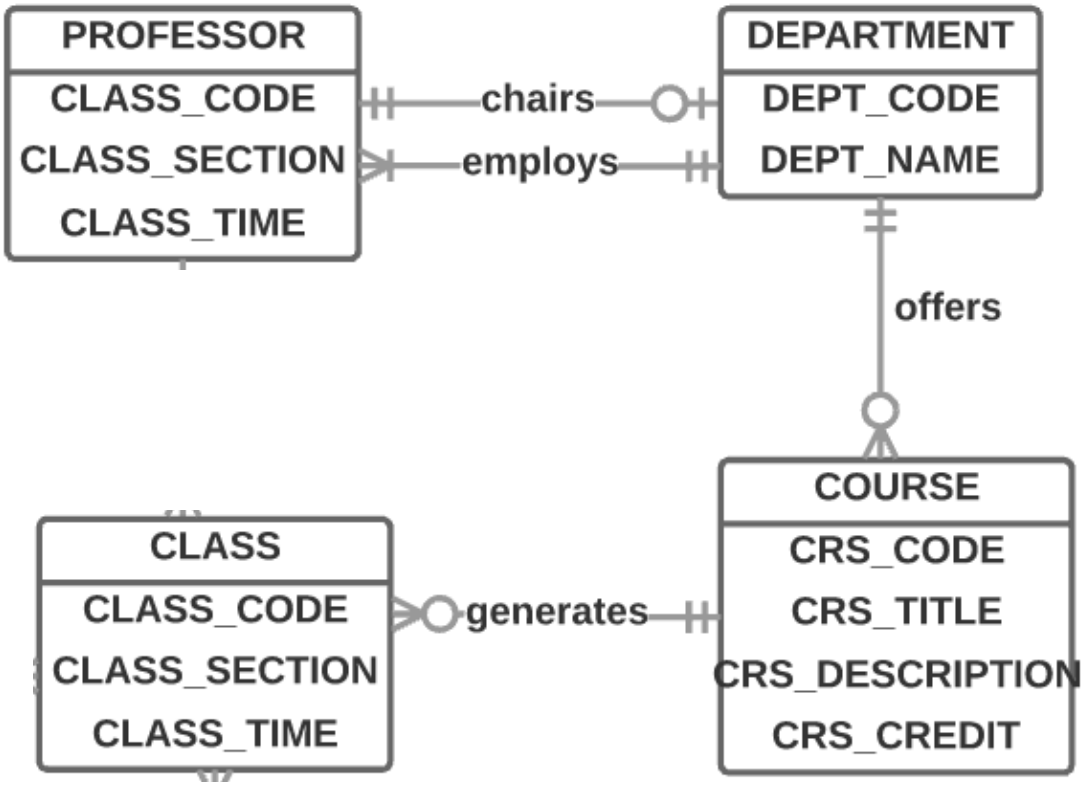
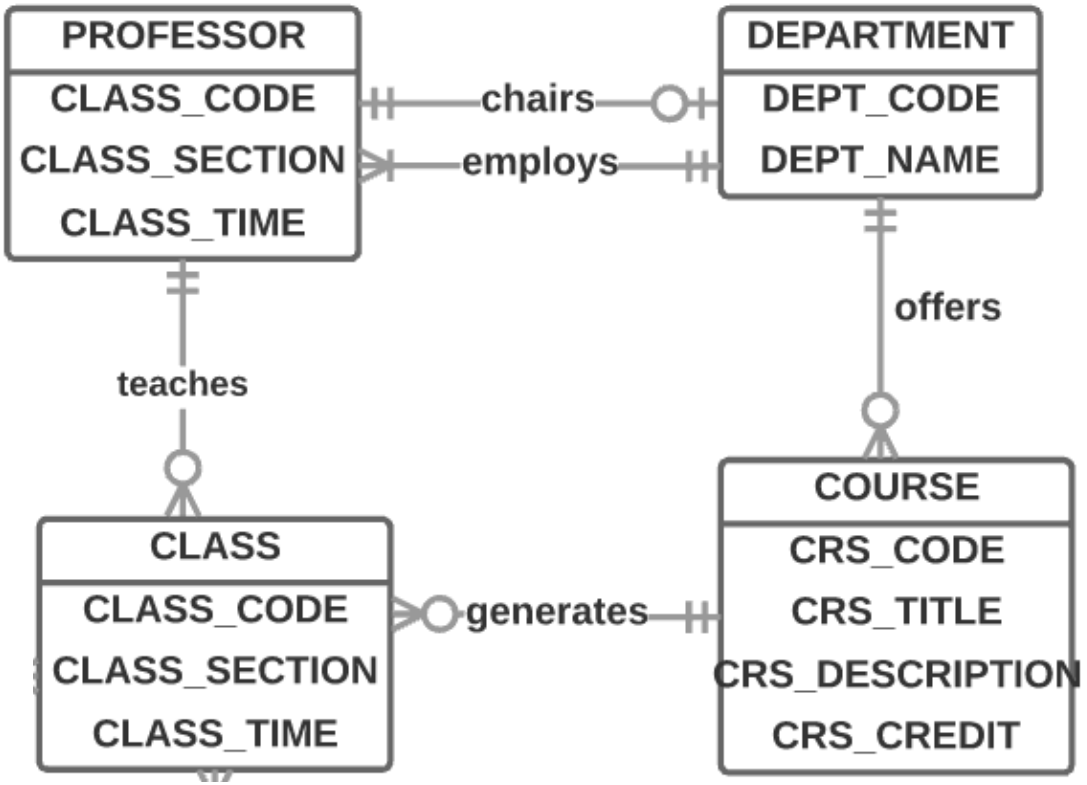
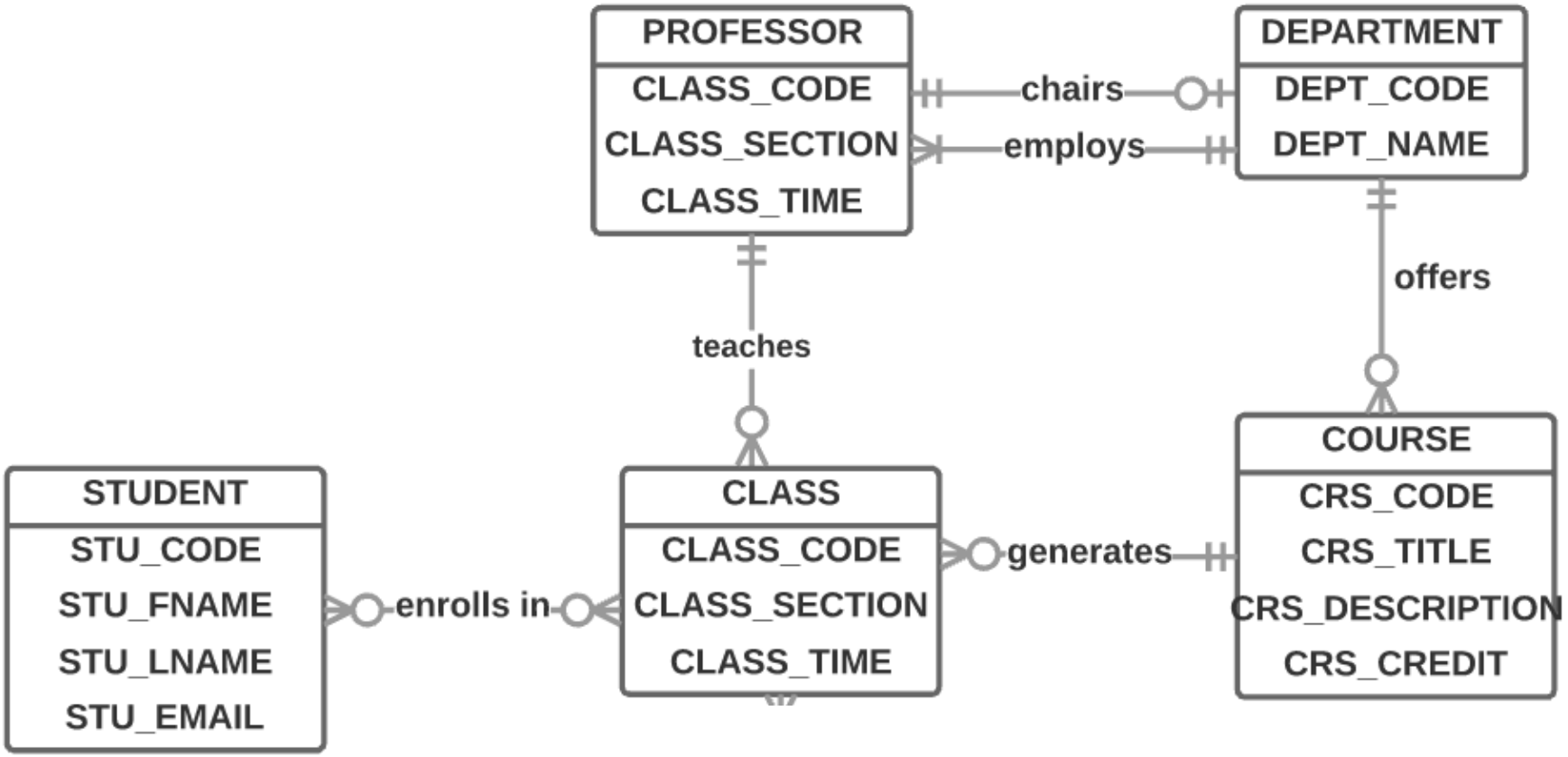


4. Each professor may teach up to four classes.



5. Each student may enroll in up to 6 classes, and each class may have up to 35 students



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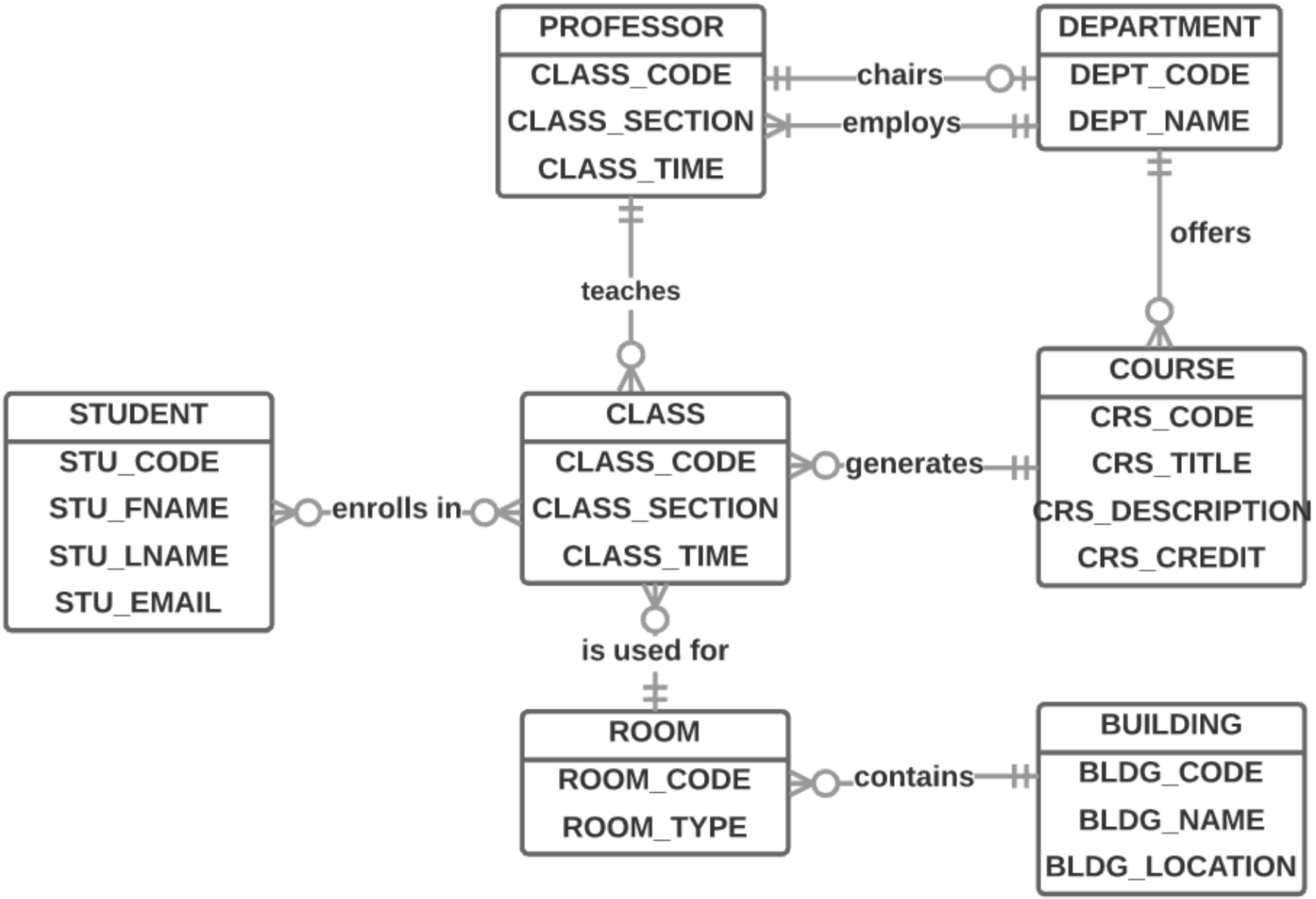

# ER Model Practice

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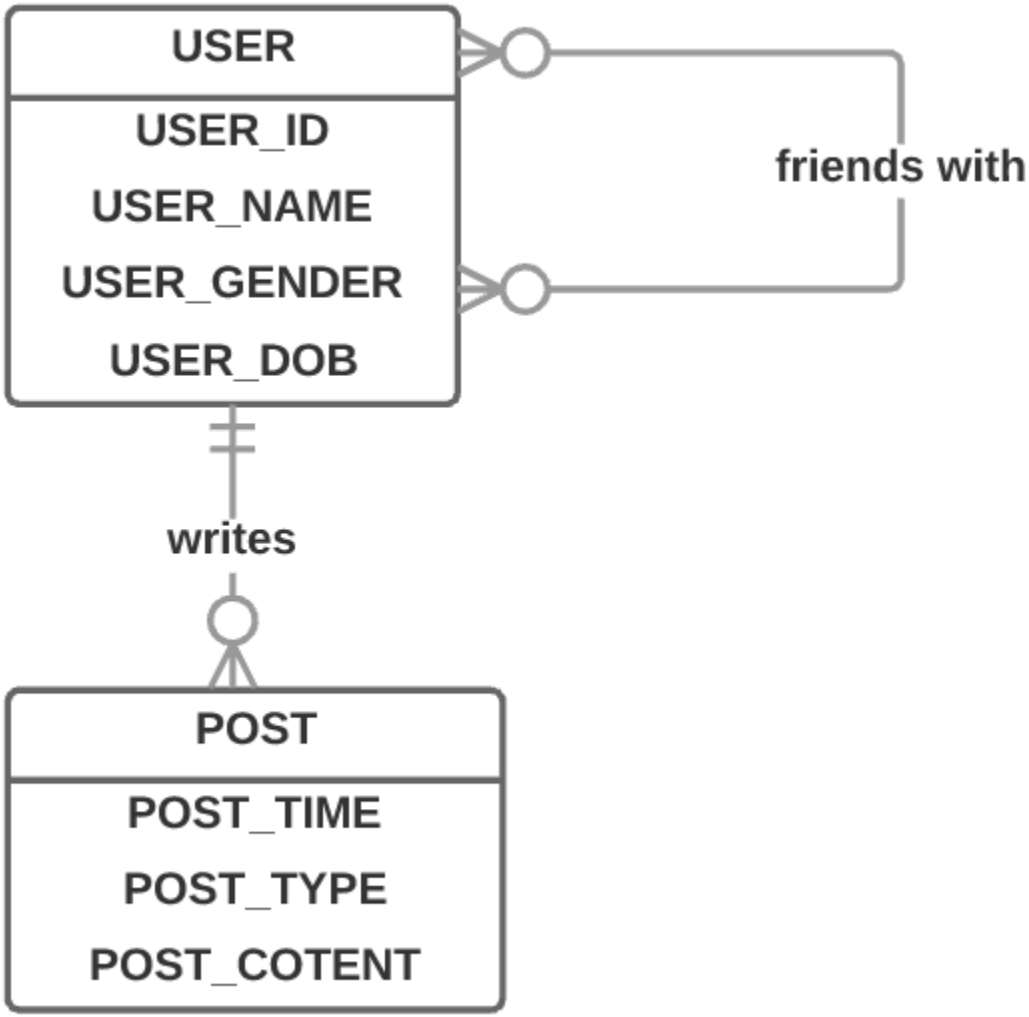

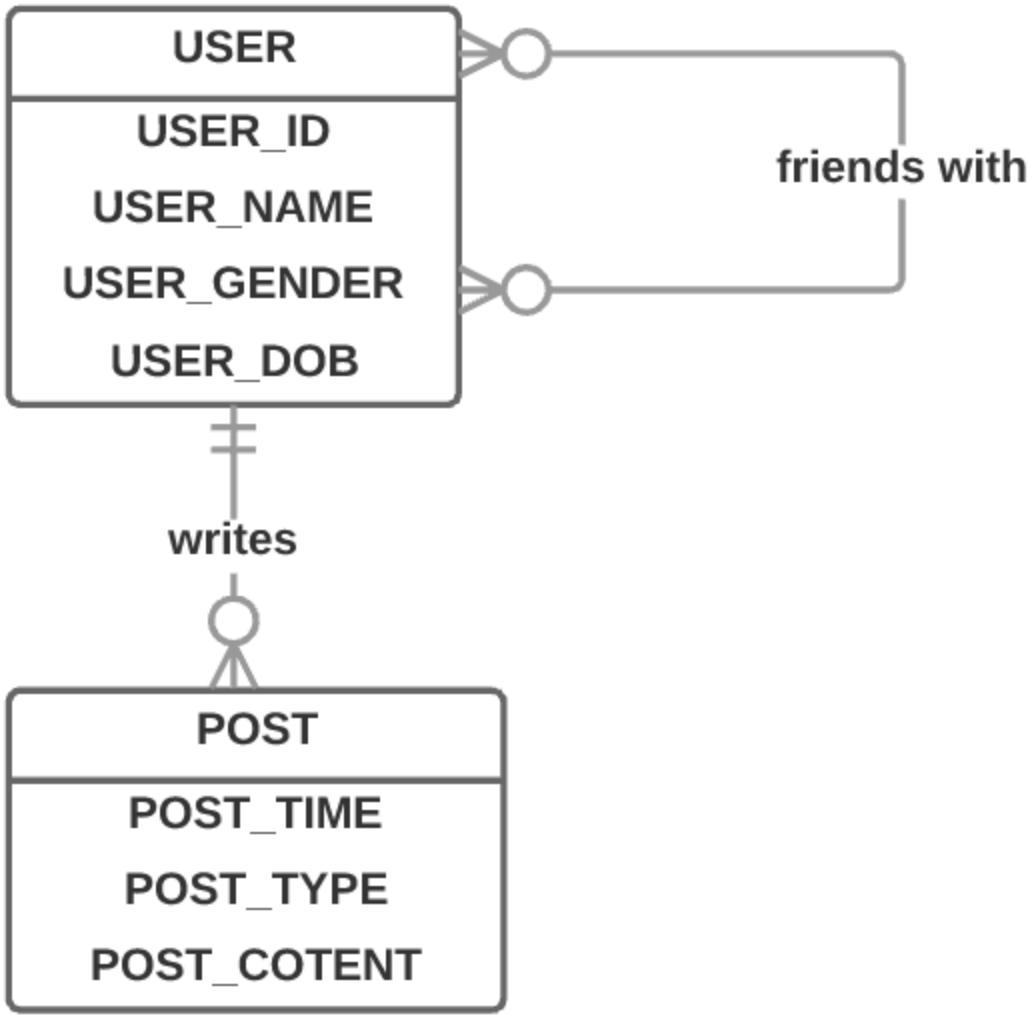


A simple version of Facebook

ER Modeling tells what, but how?

Relational Database!