ER to Relational Model
Mapping Rules

Step 1 : Entity

- From entity to relation/table
- Create a new relation that includes all the attributes
- Leave out multi-valued attributes (if any)
- Pick up appropriate PK

instructor
ID
name
first_name
middle_initial
last_name
address
street
street_number
street_name
apt_number
city
state
zip
{ phone_number }
date_of_birth
age ( )

2

Instructor DDL

CREATE TABLE Instructor

      (I_ID CHAR(20)

      name CHAR(20),

      dept_name CHAR(10),

      salary (INTEGER)

PRIMARY KEY (I_ID))

Step 2 : Weak Entity

- Create a new relation
- Include all attributes
- Include FK pointing towards owner relation
- Example: adding 'C_ID' to the 'section' relation
- PK is the combination of the FK and the partial key
- **Section**(*C_ID, Sec_ID, semester, year,* **building, room_number**)

course
course_id
title
credits

sec_course

| section |
| --- |
| *sec_id* |
| *semester* |
| *year* |

4
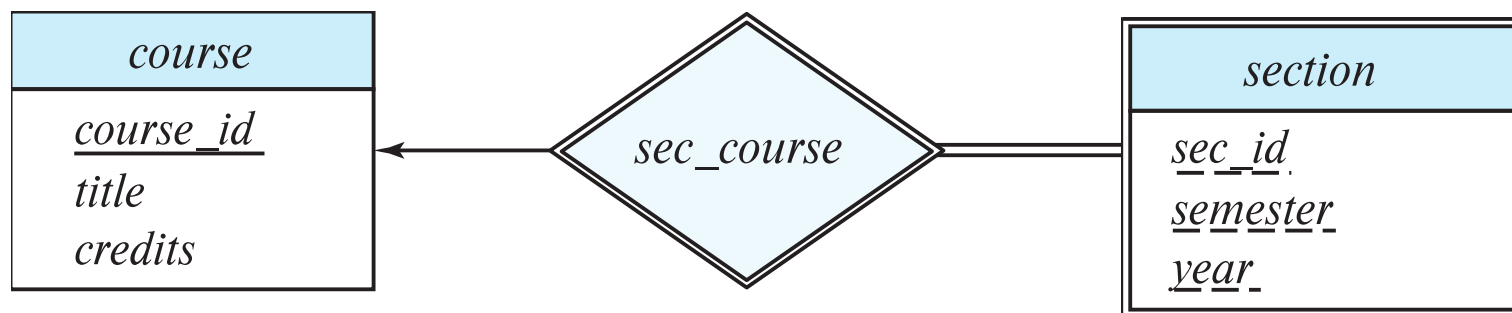
Weak Entity sets

- Weak entity set (section) and identifying relationship set (course) are translated into a single table Section_sec_course
- When the owner entity is deleted, all owned weak entities must also be deleted.

CREATE TABLE Section_Sec_course (
 Sec_ID CHAR(20),
Semester CHAR (20),
Year CHAR (20),
Building CHAR(20),
Room number INTEGER,
C_ID INTERGER NOT NULL,
  PRIMARY KEY (sec_ID, semester, year, C_ID),
  FOREIGN KEY (C_ID) REFERENCES Course,
   ON DELETE CASCADE)

Step 3 : 1:1 Relationship

- Add to one of the participating relation a FK to other relation
- It is better to add to the relation that has a total participation in the relationship
- Include any relationship attributes
- Example: consider **instructor-advisor-student**
- Every student has at most one advisor and an instructor advises at most one student

- **Stu_advisor (_s_ID_**, *s_name, dept_name, tot_credit, I_ID, since)*
- Foreign Key *I_ID* references to **Instructor**
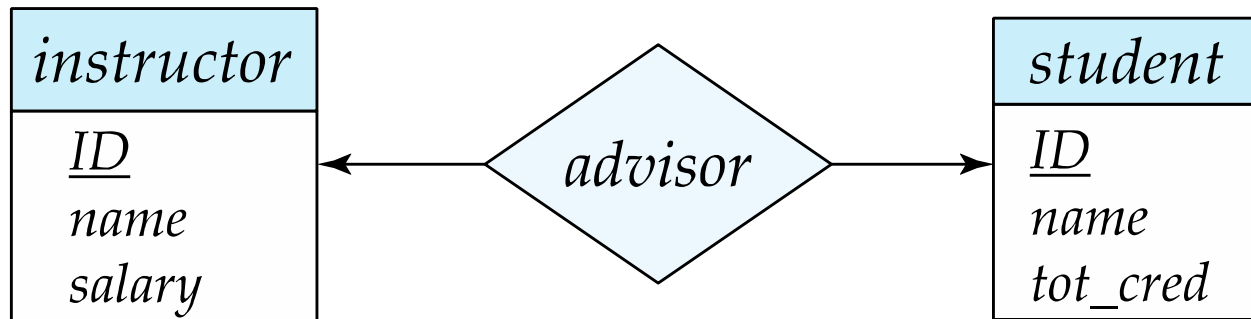
Every student must have an advisor

Step 4 : 1:N Relationship

- Add to the relation a FK from the other side
- Include any relationship attributes
- Example: instructor-advisor-student
- 1:N
- Add to student relation I_ID
- Add attribute since
- Student (**S_ID**, S_name, dept_name, total_cred, I_ID, since)
  FK (I_ID) references Instructor

8
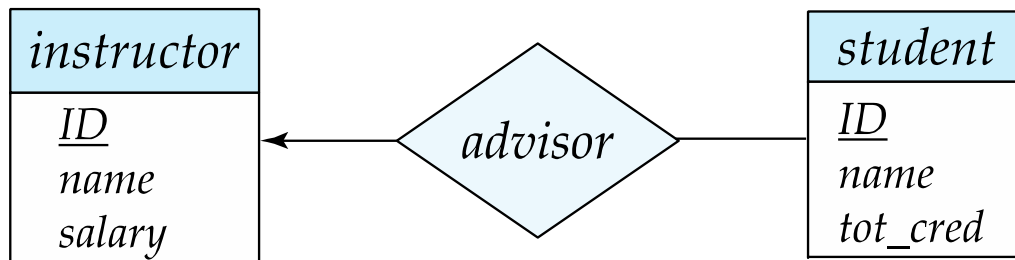
Step 5 : M:N Relationship

- Create a new relation containing FKs to both the participating relations

- Add relationship attributes (since)

- PK is the combination of both the FKs

- Instructor-advisor-student

- student can have many advisors and instructor can advise many students

- **Advisor**(*I_ID, S_ID*, *since)*
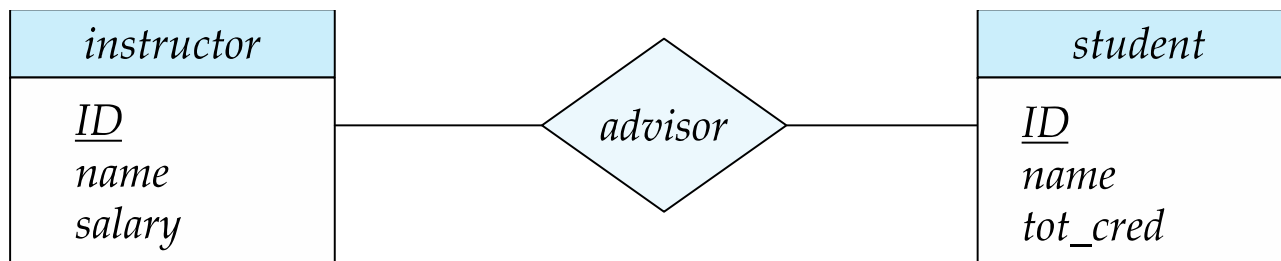
Step 6 : Multivalued Attributes

- Create a new relation
  - containing FK to the entity containing it
  - Attribute or attributes
- PK is FK plus the attributes

- Instructor (**_I_ID,_** *Name, Dept_name, salary, {phone_no})*

- *Inst_ph (* **_I_ID, ph_no_**)

- It is all key relation
- FK (I_ID) references Instructor)

Step 7 : Ternary Relationship

- New relation containing a foreign key referencing each of the 3 entities
- Include relationship/descriptive attributes (if any)

Proj_guide (instructor, project, student)

- Proj_guide has descriptive attribute (since)
- **Proj_guide (I_ID, P_ID, S_ID, since)**