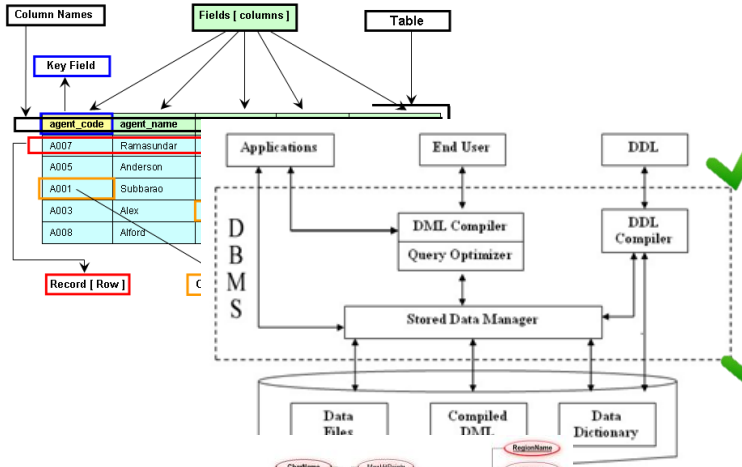
RELATIONAL DATABASE SCHEMA

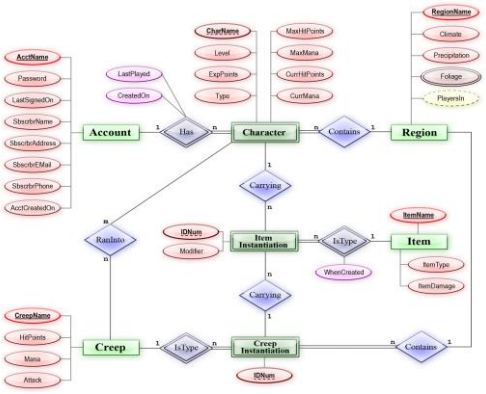
Instructor:

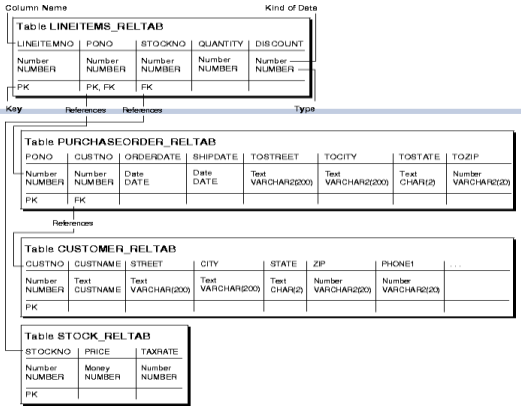
Learning Goals

By the end of this lecture students should be able to:

- Understand an overview of the basic RDBMS Concepts
- Understand an insight into the architecture and components of a Database System.
- Describe how entities, attributes and relationships are used to model data;
- Converting ER Model to relational schema







Section 1

RELATIONAL DATABASE SCHEMA

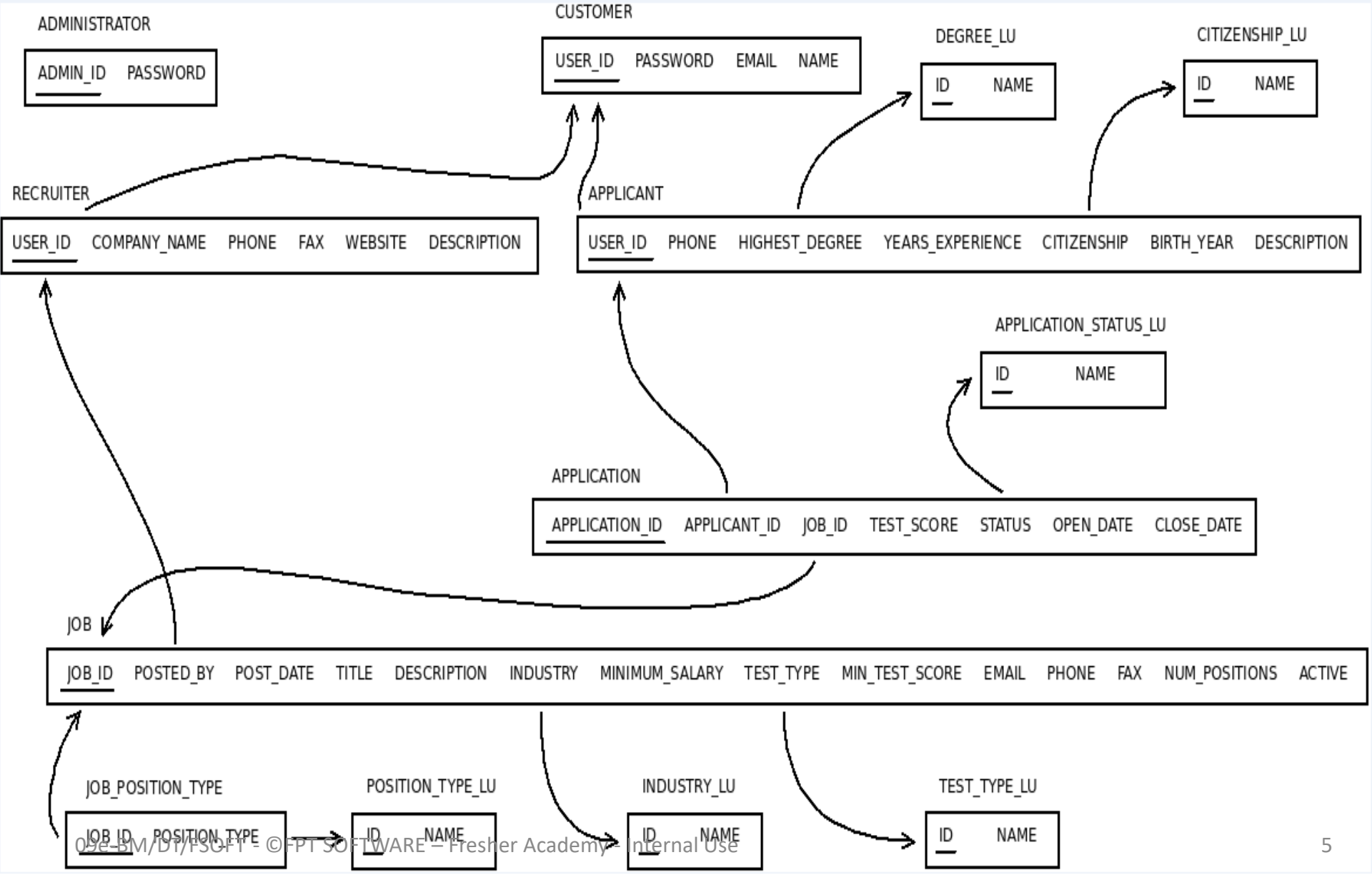
Schema (1/2)

- The name of a relation and the set of attributes for a relation is called a **schema**.
  - ✓ Example: the schema for previous slide is

Supplier (SCode, SName, Quantity, City)

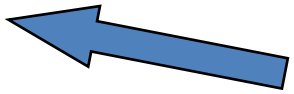
- **Relation schema** = name(attributes) + other structure info., e.g., keys, other constraints.
- Order of attributes is arbitrary, but in practice we need to assume the (*standard*) order given in the relation schema.
- **Relational database schema** = collection of relation schemas.

Schema (2/2)


ADMINISTRATOR
ADMIN_ID PASSWORD
CUSTOMER
USER_ID PASSWORD EMAIL NAME
DEGREE_LU
ID NAME
CITIZENSHIP_LU
ID NAME
RECRUITER
USER_ID COMPANY_NAME PHONE FAX WEBSITE DESCRIPTION
APPLICANT
USER_ID PHONE HIGHEST_DEGREE YEARS_EXPERIENCE CITIZENSHIP BIRTH_YEAR DESCRIPTION
APPLICATION_STATUS_LU
ID NAME
APPLICATION
APPLICATION_ID APPLICANT_ID JOB_ID TEST_SCORE STATUS OPEN_DATE CLOSE_DATE
JOB
JOB_ID POSTED_BY POST_DATE TITLE DESCRIPTION INDUSTRY MINIMUM_SALARY TEST_TYPE MIN_TEST_SCORE EMAIL PHONE FAX NUM_POSITIONS ACTIVE
JOB_POSITION_TYPE
JOB_ID POSITION_TYPE
POSITION_TYPE_LU
ID NAME
INDUSTRY_LU
ID NAME
TEST_TYPE_LU
ID NAME

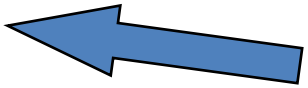
Schema versus Instance

Student(studno,name,address)
Course(courseno,lecturer)



Schema

Student(123,Bloggs,Woolton)
(321,Jones,Owens)



Instance

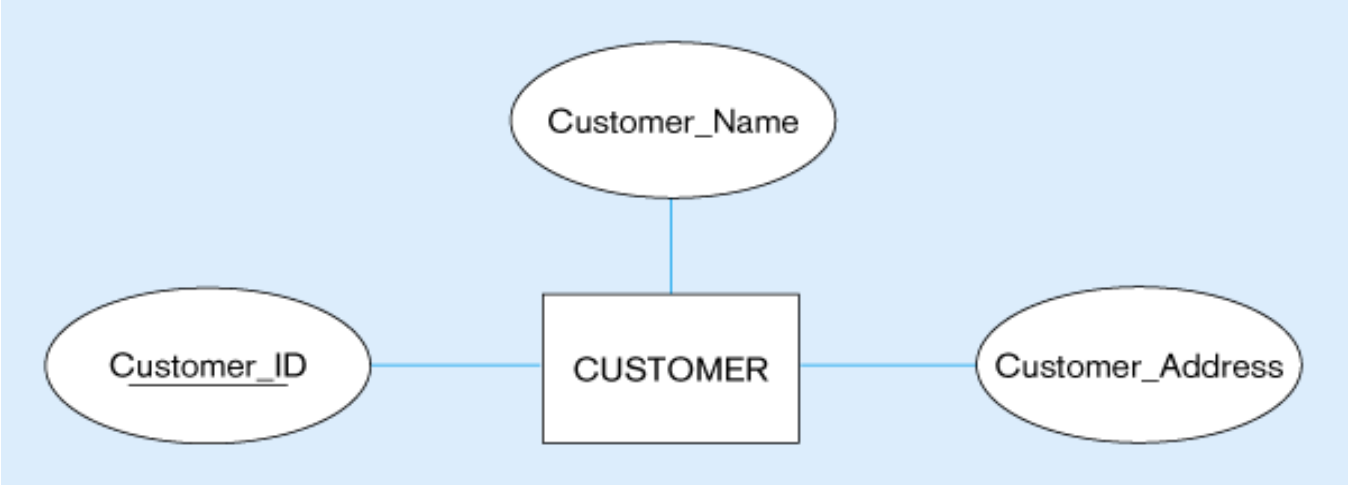
sid	Name	Login	age	GPA
53666	Jones	Jones@ca	18	3.4
53444	smith	Smith@ecs	18	3.2
53777	Blake	Blake@aa	19	3.8

➔ Cardinality = 3, arity = 5 , all rows distinct

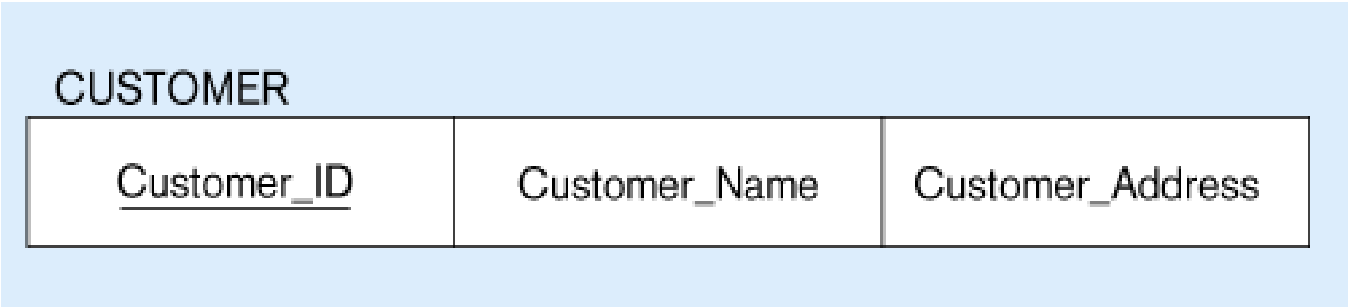
➔ Do all values in each column of a relation instance have to be distinct?

Converting ER Model to relational schema

Rule 1 - Convert entity type with simple attributes



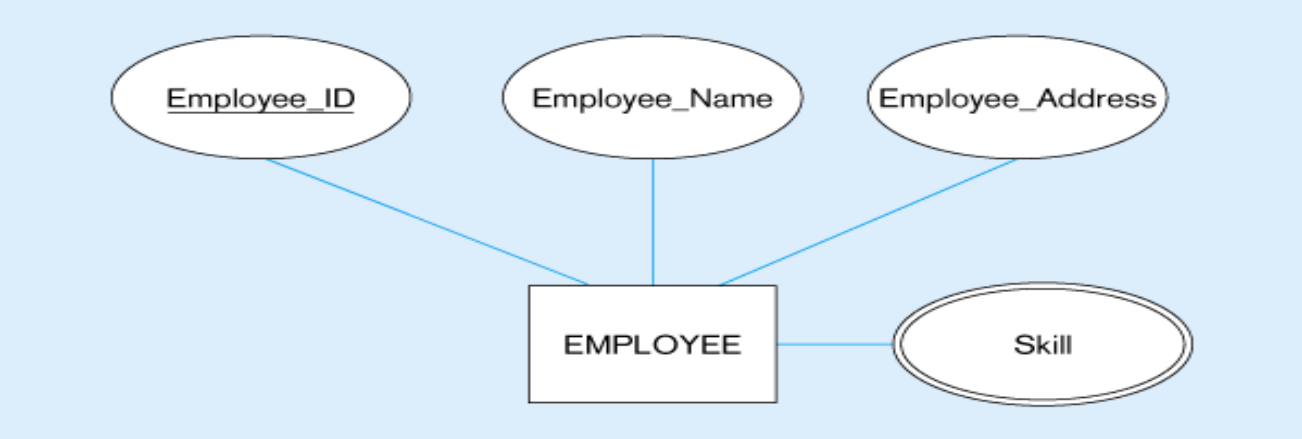
CUSTOMER entity type with simple attributes



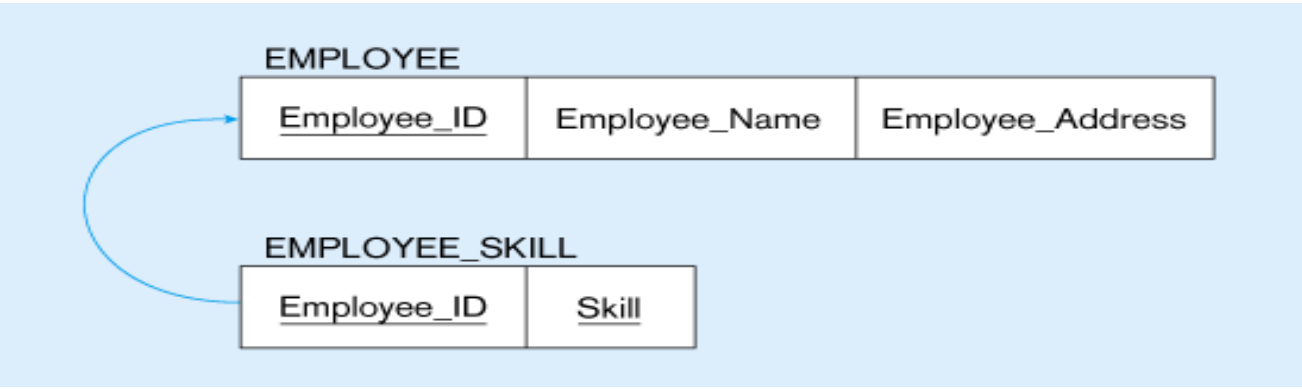
CUSTOMER relation

Converting ER Model to relational schema

Rule 2 - Convert Multivalue attribute



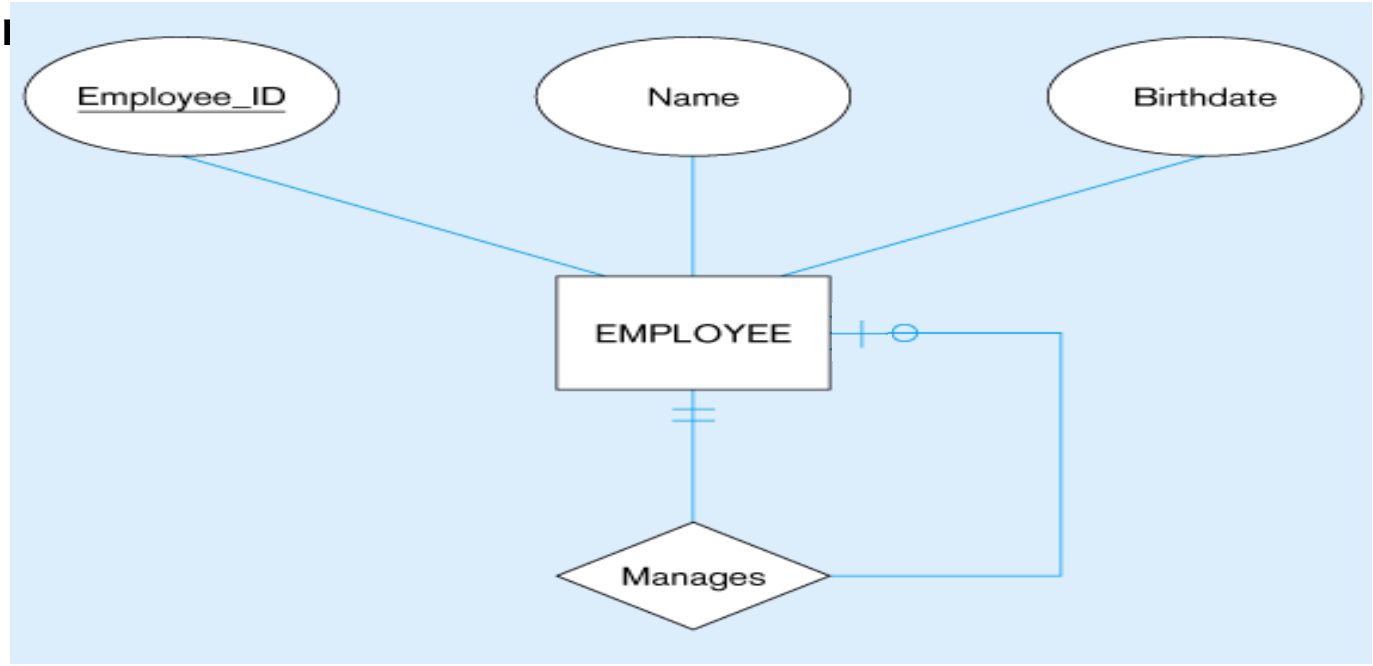
Multivalued attribute becomes a separate relation with foreign key



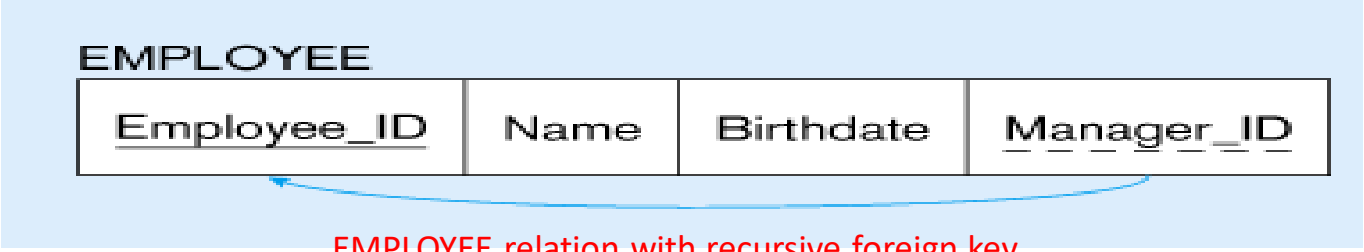
1–to–many relationship between original entity and new relation

Converting ER Model to relational schema

Rule 3 - Co



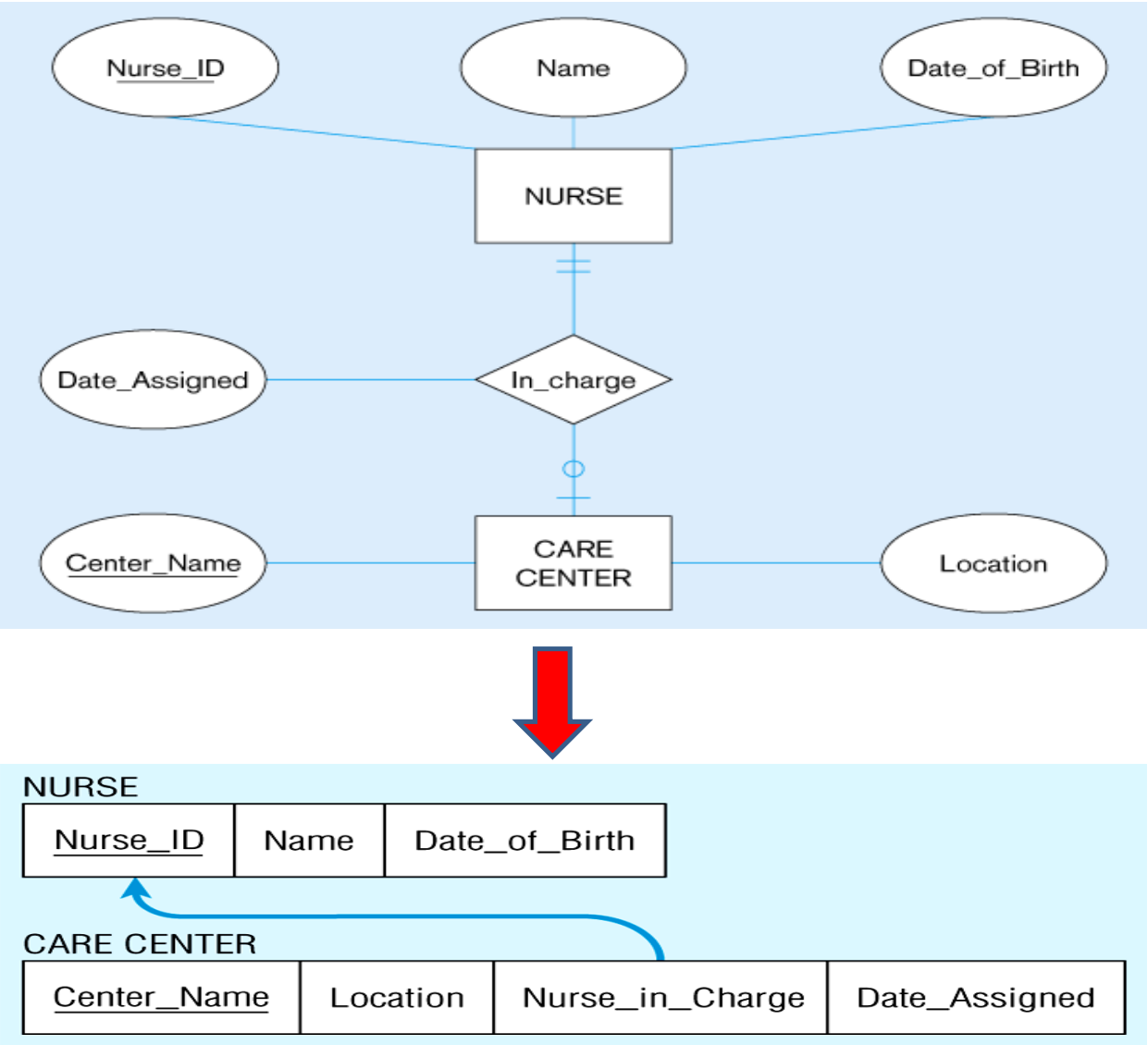
EMPLOYEE entity with Manages relationship



EMPLOYEE relation with recursive foreign key

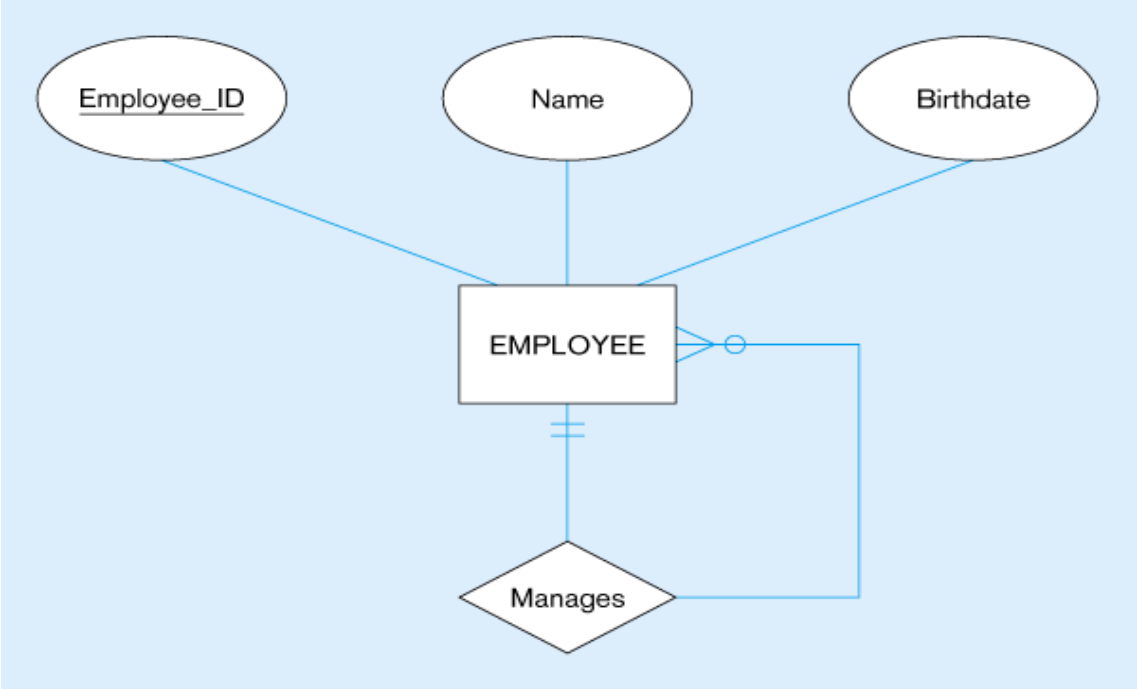
Converting ER Model to relational schema

Rule 4 – Convert binary relationship one to one

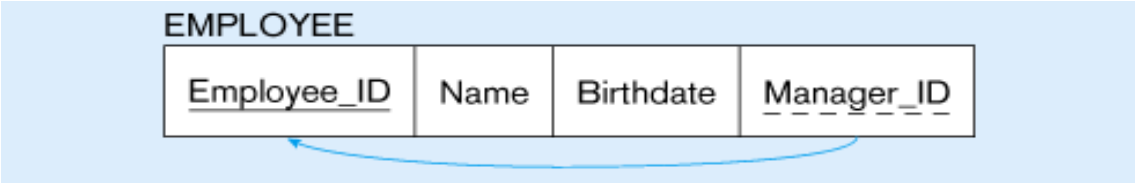


Converting ER Model to relational schema

Rule 5 – Convert Unary relationship one to many



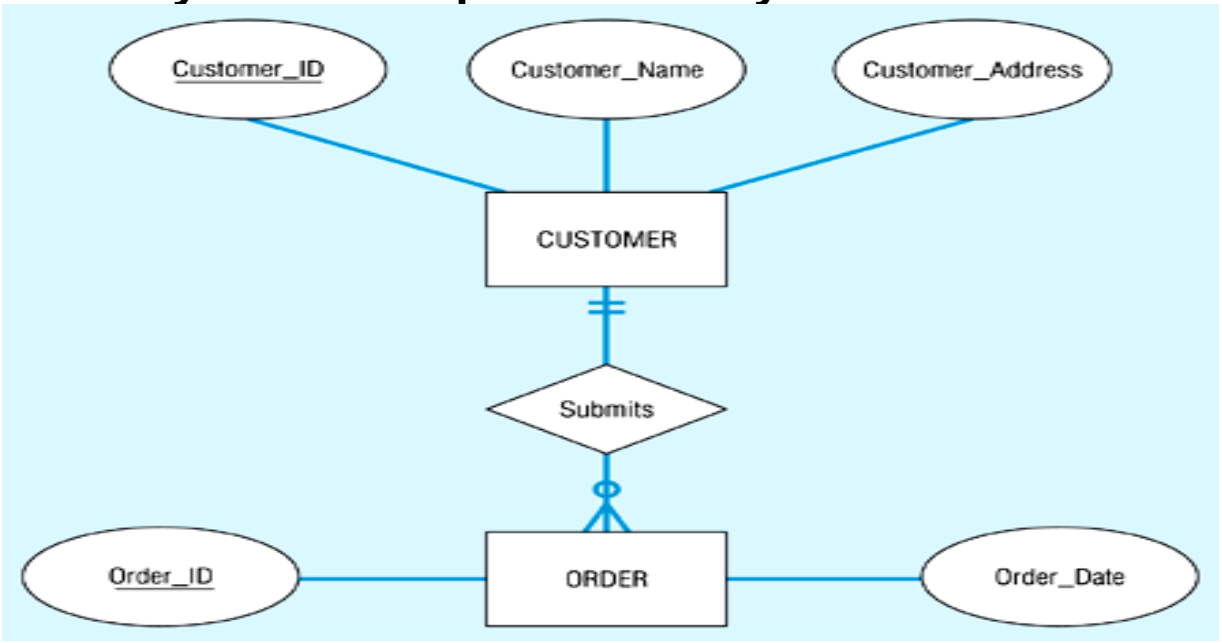
EMPLOYEE entity with Manages relationship



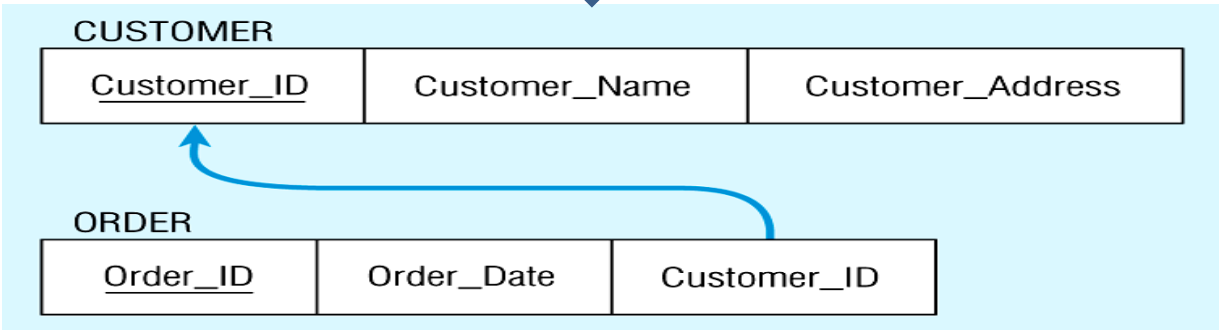
EMPLOYEE relation with recursive foreign key

Converting ER Model to relational schema

Rule 6 – Convert Binary relationship one to many



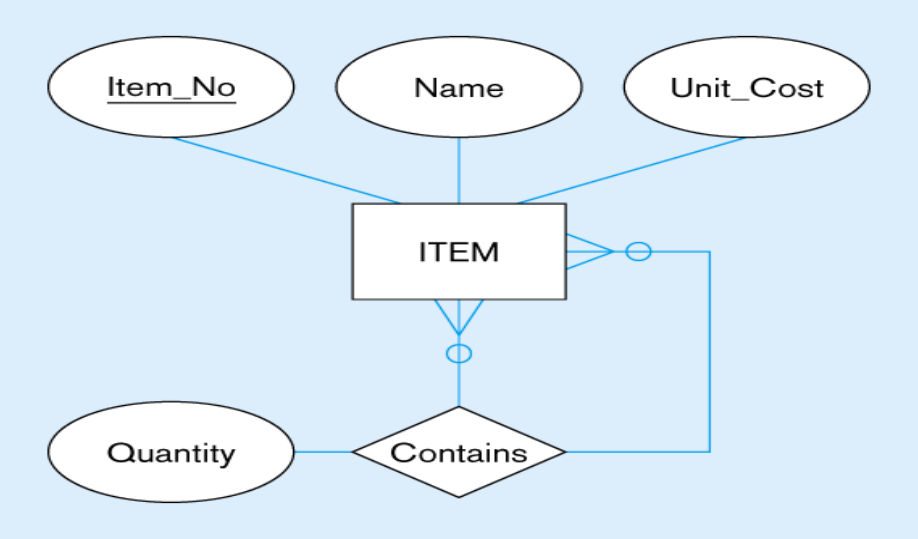
Note the mandatory one



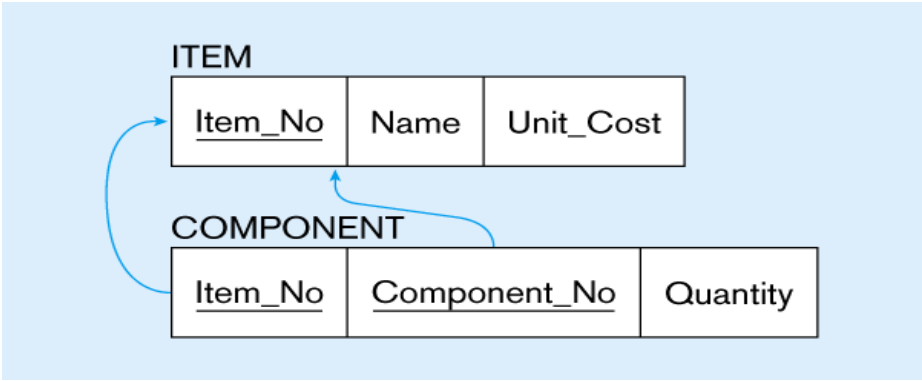
Again, no null value in the foreign key…this is because of the mandatory minimum cardinality

Converting ER Model to relational schema

Rule 7 – Convert Unary relationship many to many



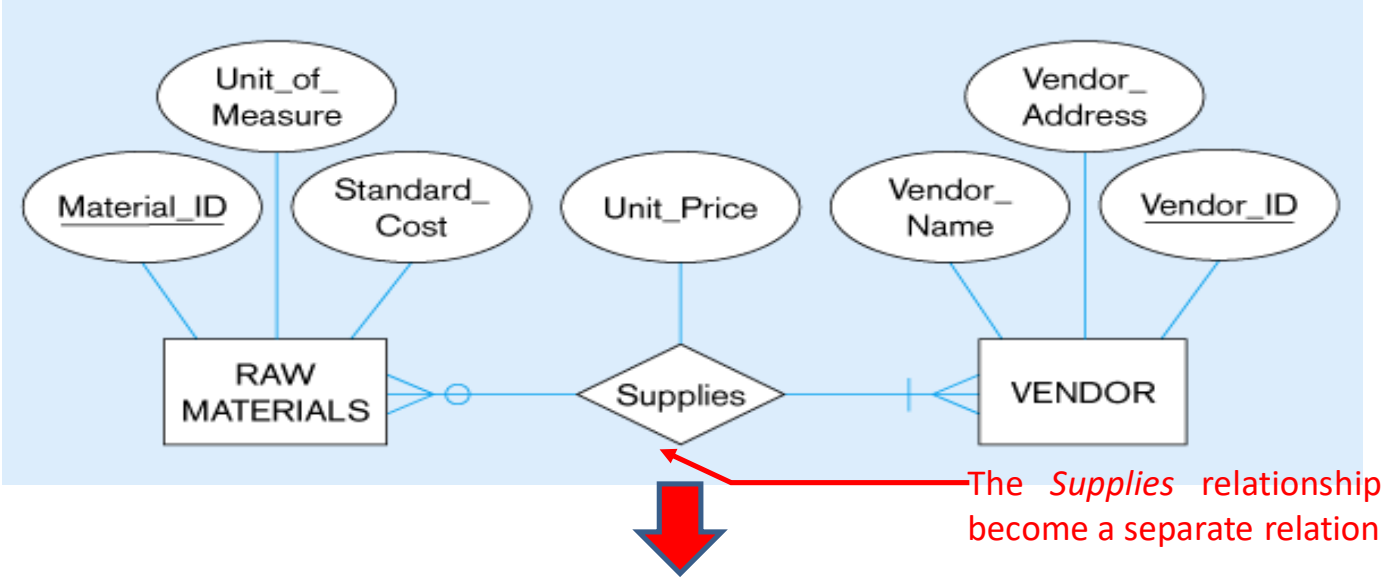
Bill-of-materials relationships (M:N)

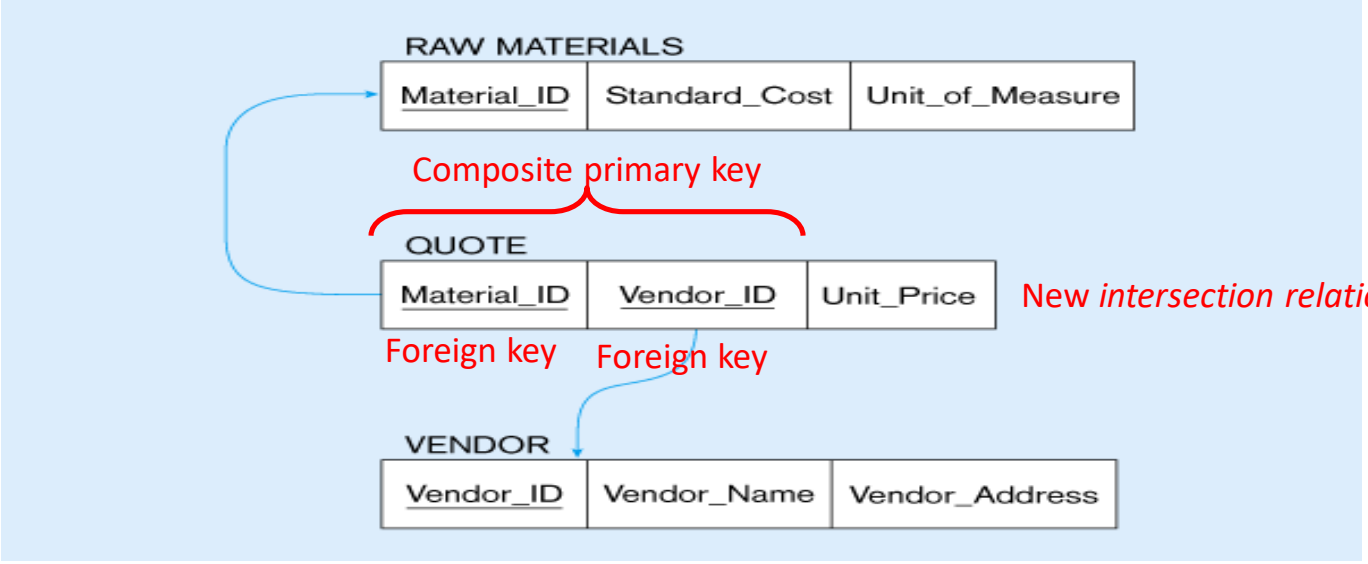


ITEM and COMPONENT relations

Converting ER Model to relational schema

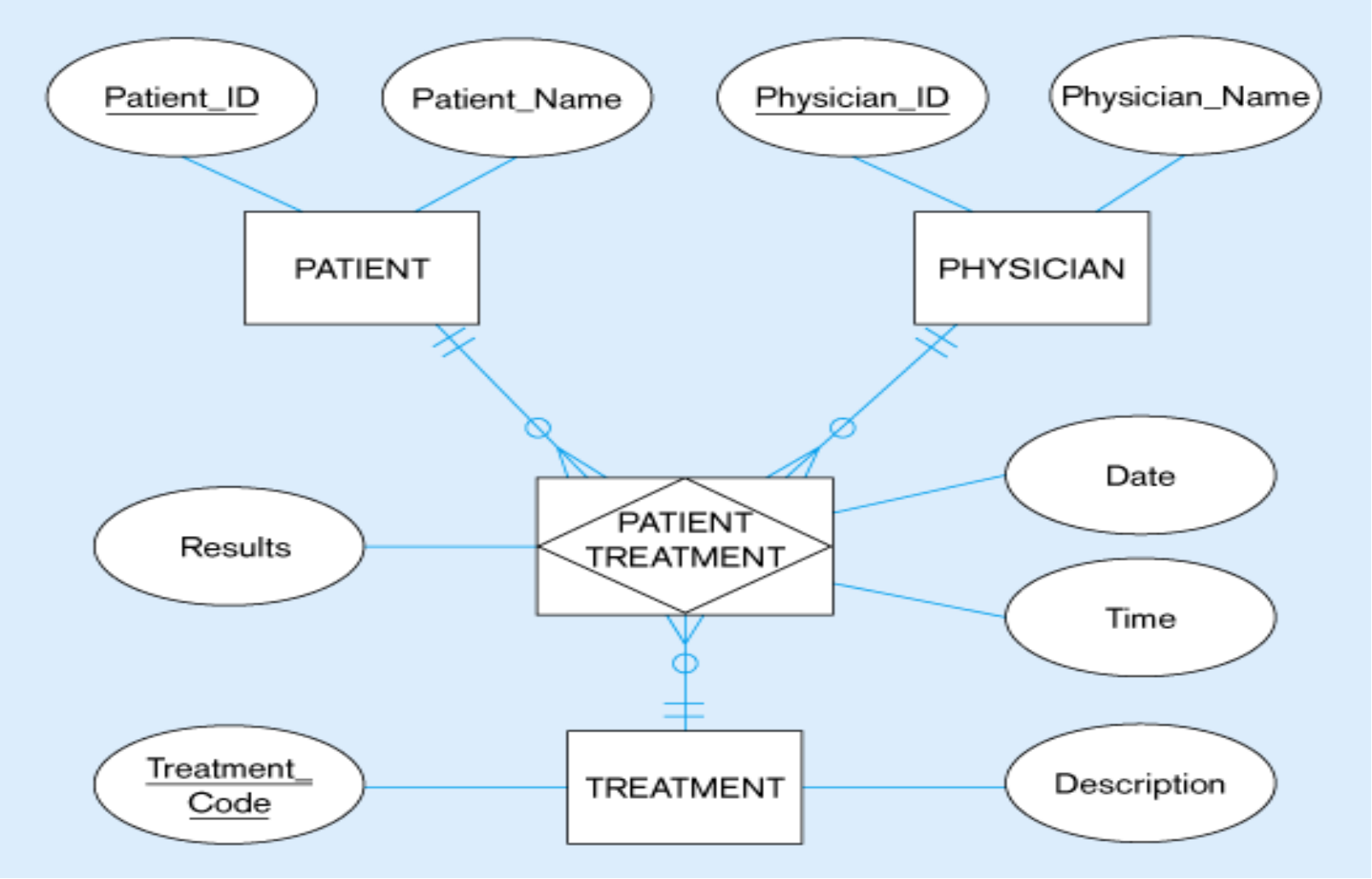
Rule 8 – Convert Binary relationship many to many





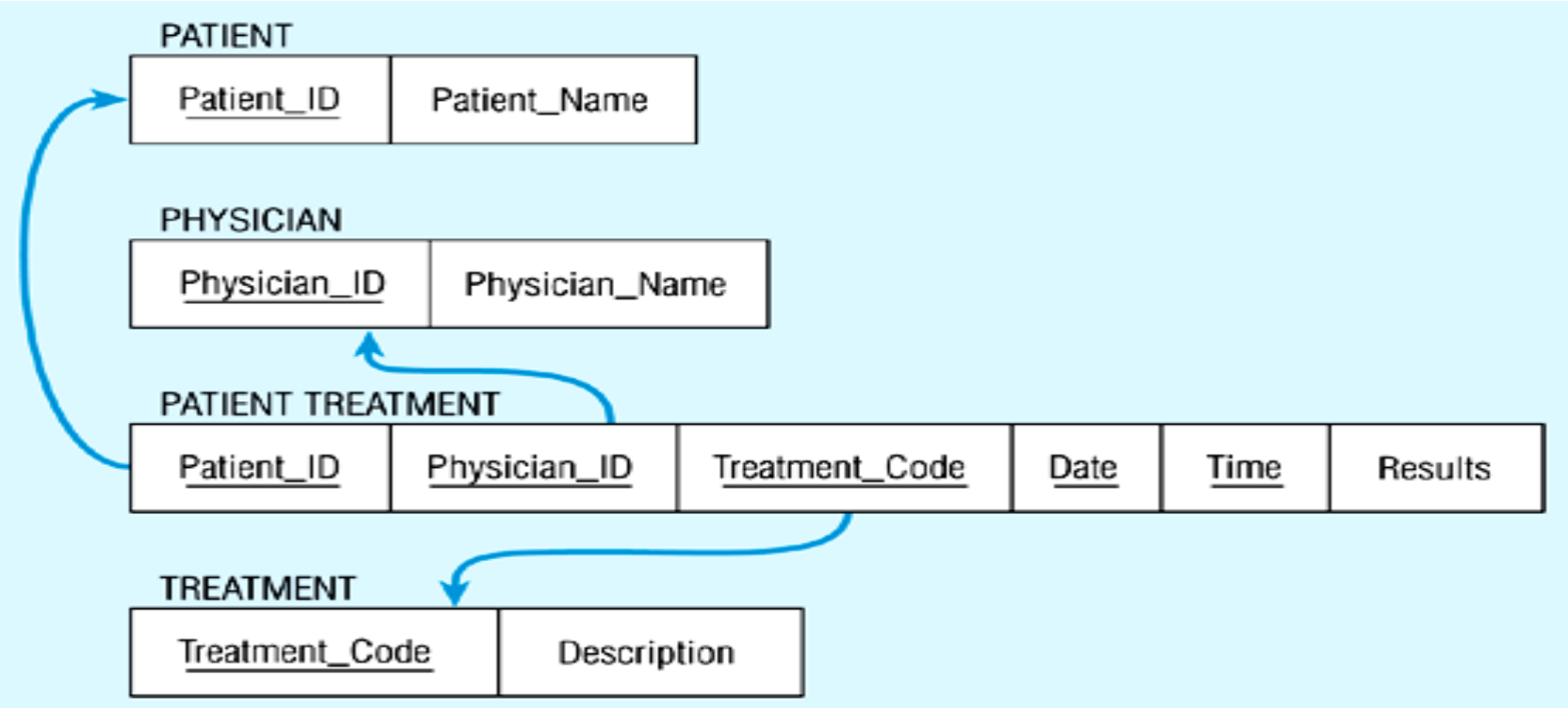
Converting ER Model to relational schema

Another - Convert Ternary relationship



Converting ER Model to relational schema

Another- Convert Ternary relationship (2)



Thank you