# Database

Section 3,4

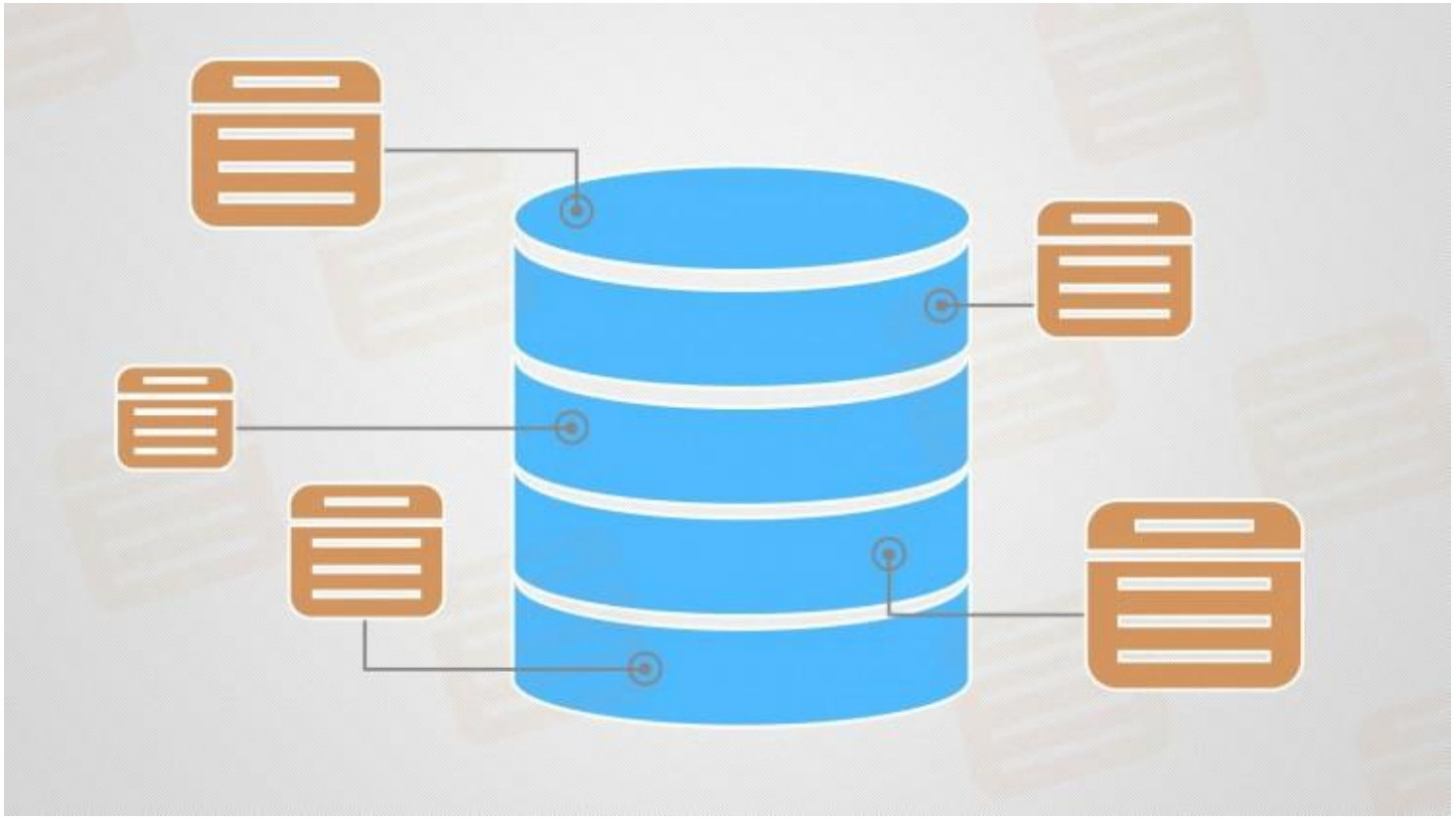
By/ Abanop Gerges

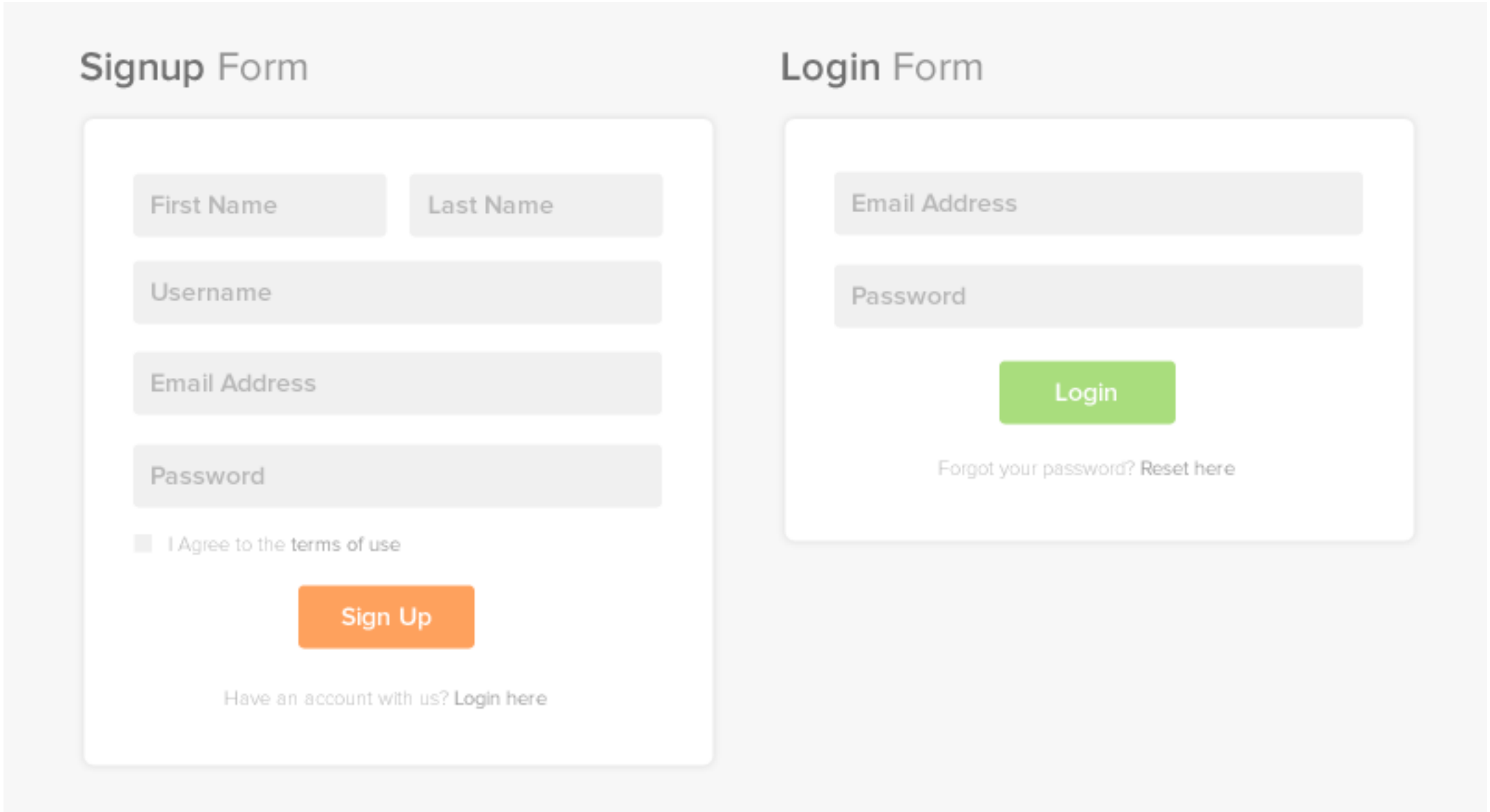
# Database

A database is an organized collection of structured information, or data, organized to provide efficient storage efficient retrieval and manipulation.

# Database

- **Databases are the backbone of software applications.**




Signup Form
First Name
Last Name
Username
Email Address
Password
I Agree to the terms of use
Sign Up
Have an account with us? Login here
Login Form
Email Address
Password
Login
Forgot your password? Reset here

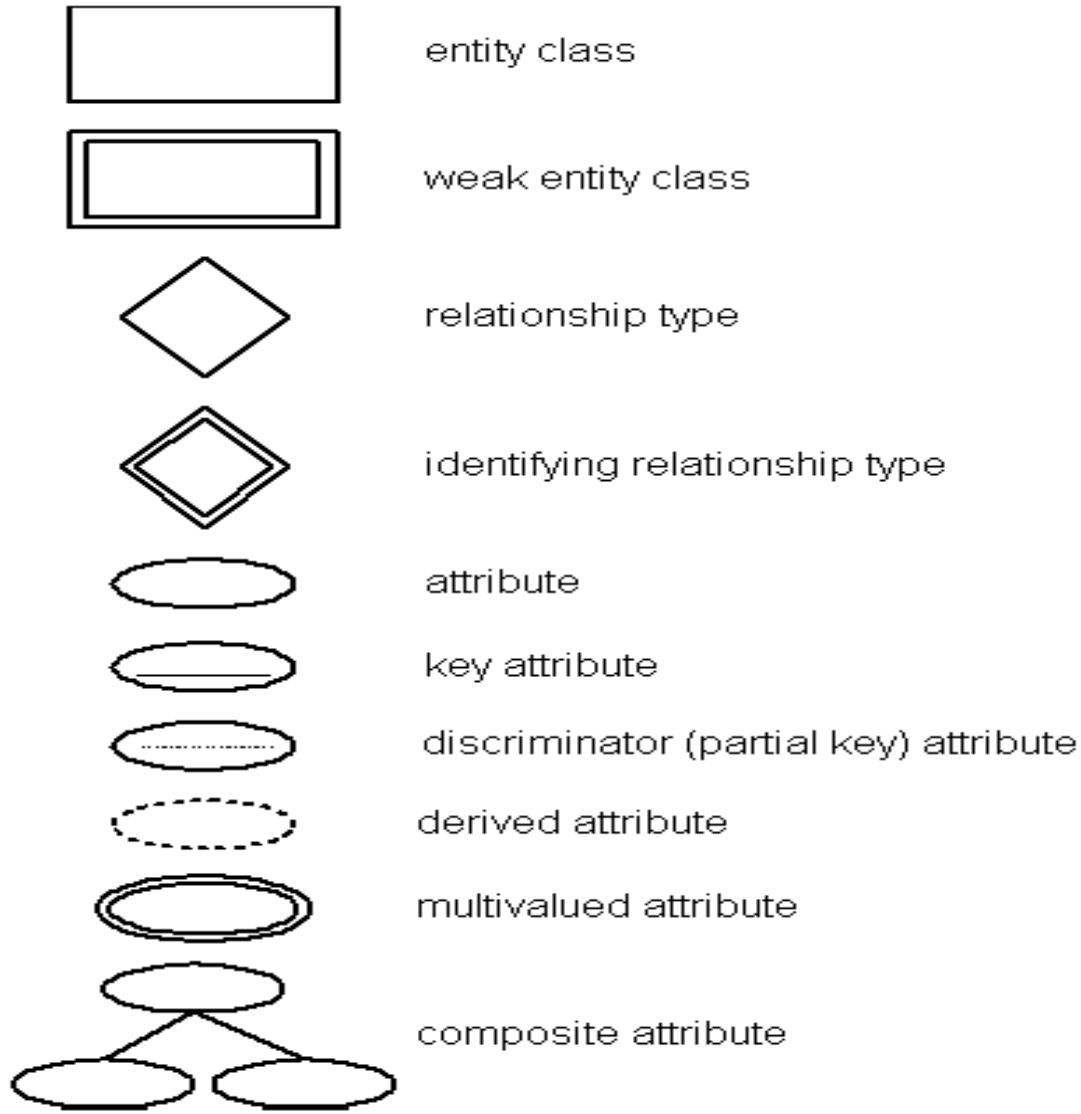
# Important terms

- DBMS
- RDBMS
- Relation = Table
- Relation vs Relationship
- Entity → what we store about
- Attribute → the data we store
- Rows
- Columns
- Key attribute

# ERD

- Entity Relationship Diagram
  - Entities ex: employee, office, course, job
  - Attributes ex: name, age
  - Relationships

# ERD Symbols

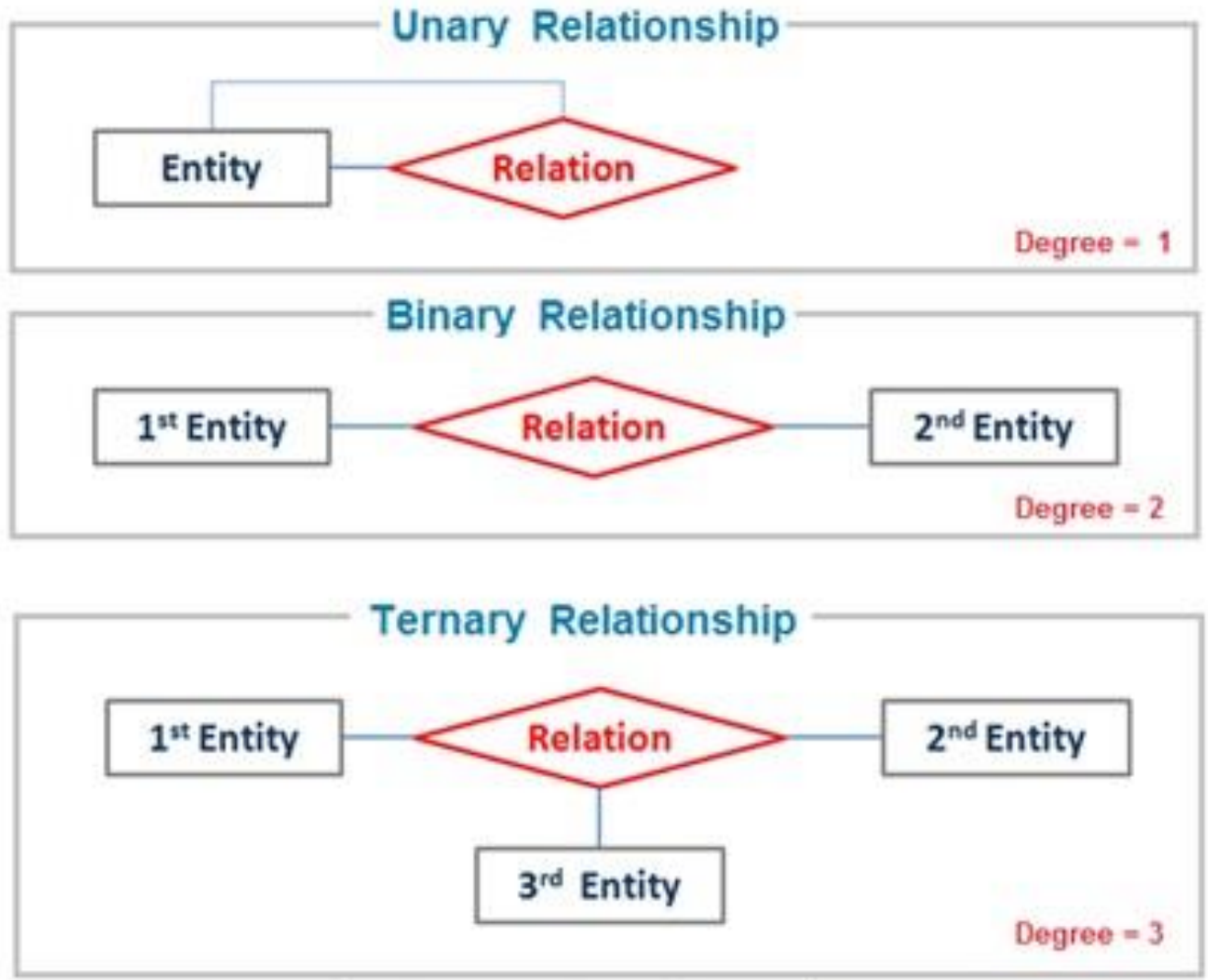

entity class
weak entity class
relationship type
identifying relationship type
attribute
key attribute
discriminator (partial key) attribute
derived attribute
multivalued attribute
composite attribute

# Attributes

- **Simple**
  - ex: gender, ssn
- **Composite** (devide)
  - ex: name – (Fname,Lname)
- **Single-valued**
  - ex: gender, age
- **Multivalued**
  - ex: college degree
- **Derived**
  - ex: age
- **Stored**
  - ex: date of birth

# Relationships

- **Degree**
  - Binary
  - Recursive
  - Ternary



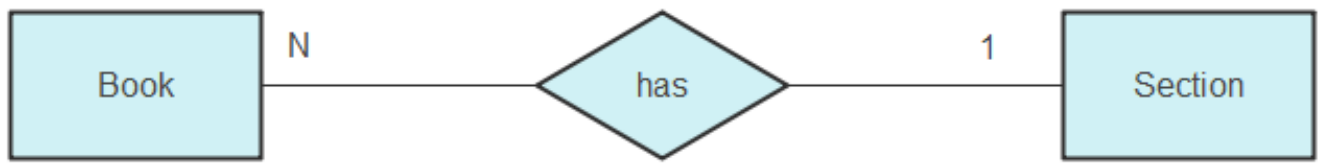
# Relationships

- **Cardinality**
  - One to one
  - One to many
  - Many to many

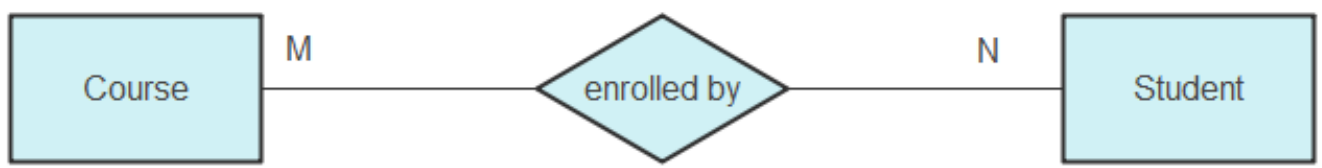
**one-to-one (1:1)**


**one-to-many (1:N)**


**many-to-one (N:1)**

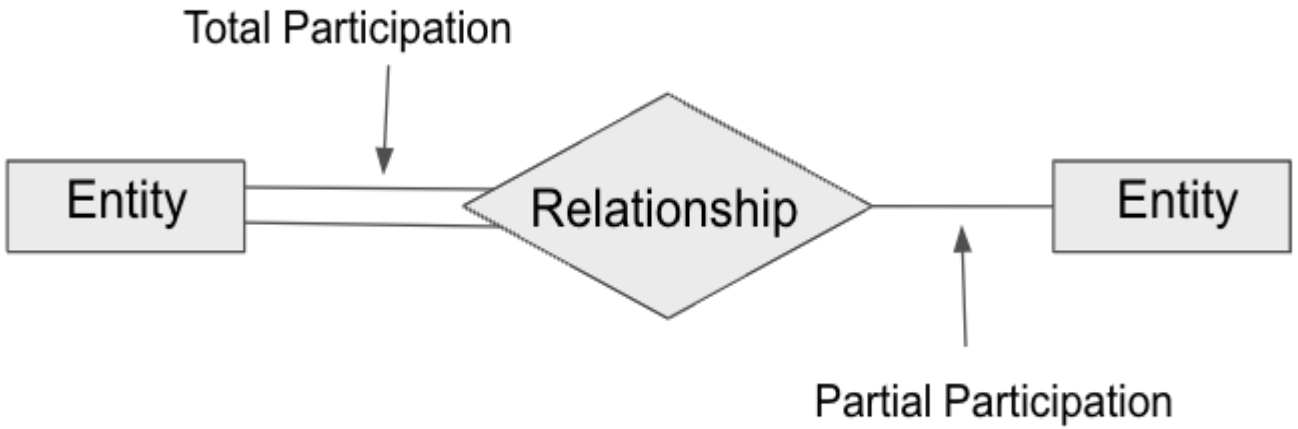


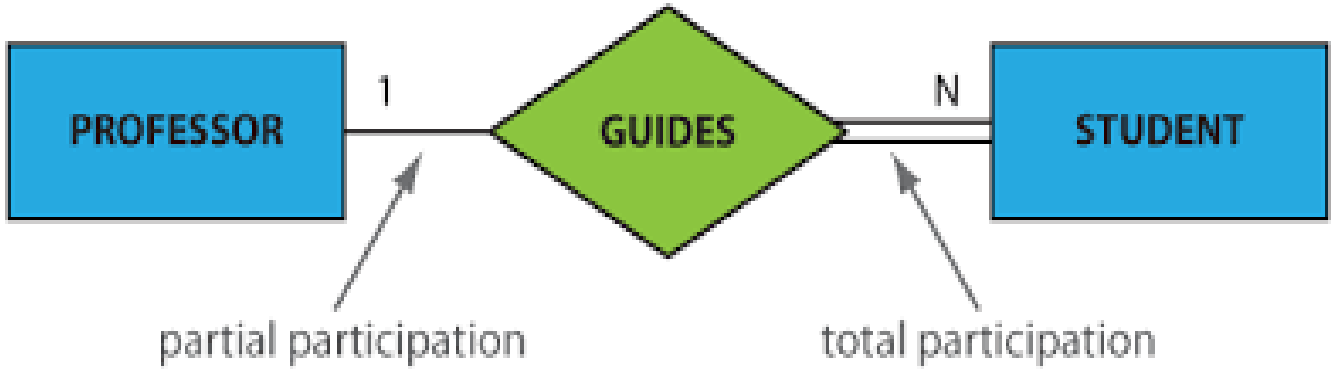

**many-to-many (M:N)**



# Relationships

- **Participation**
  - Partial
  - total


Total Participation
Entity
Relationship
Entity
Partial Participation


PROFESSOR
1
GUIDES
N
STUDENT
partial participation
total participation

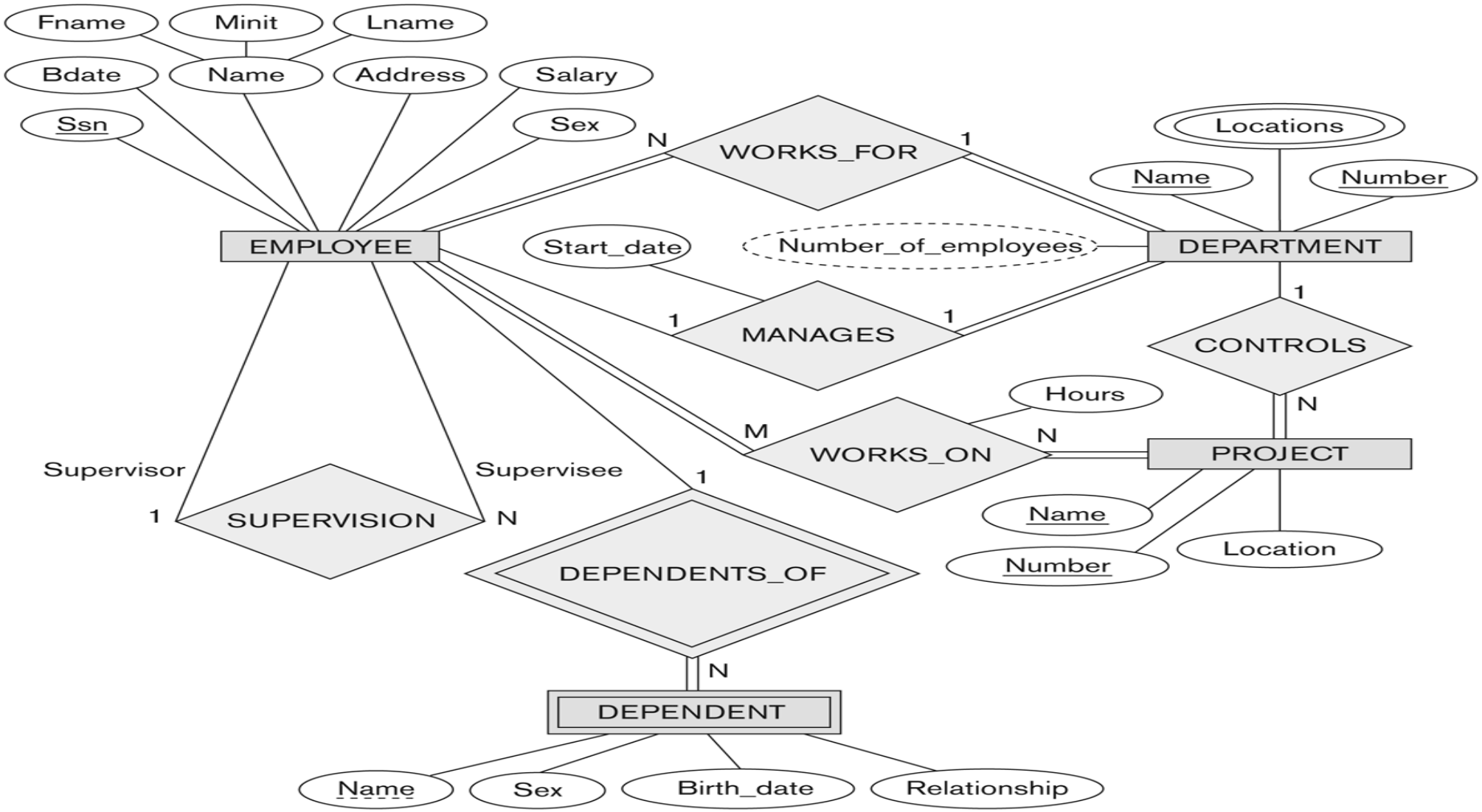
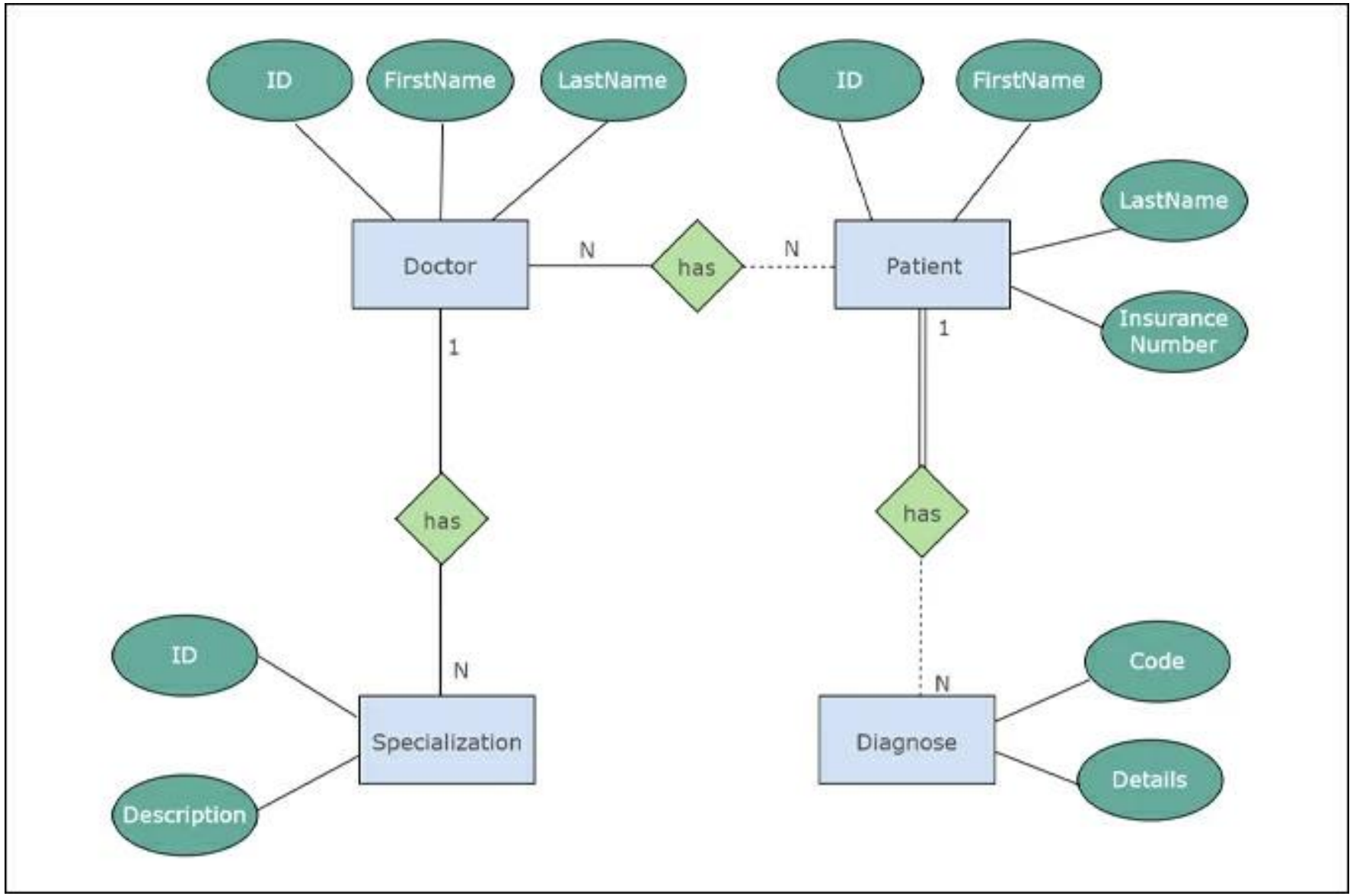



**Figure 3.2**
An ER schema diagram for the COMPANY database. The diagrammatic notation is introduced gradually throughout this chapter.


ID
FirstName
LastName
Doctor
N
has
N
ID
FirstName
Patient
LastName
Insurance Number
1
1
has
has
ID
Specialization
N
Description
N
Code
Diagnose
Details