STA261
MANAJEMEN DATA RELASIONAL

Model Data dan Perancangan Basis Data

DEPARTEMEN STATISTIKA
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
INSTITUT PERTANIAN BOGOR

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Pemodelan Data dengan Model ER

- Model ER (*Entity-Relationship*)
  - Model data konseptual *high-level*
- Diagram ER
  - Notasi diagram yang sesuai dengan model ER

Entity Types, Entity Sets, Attributes, and Keys

Model ER: entities, relationships, dan attributes

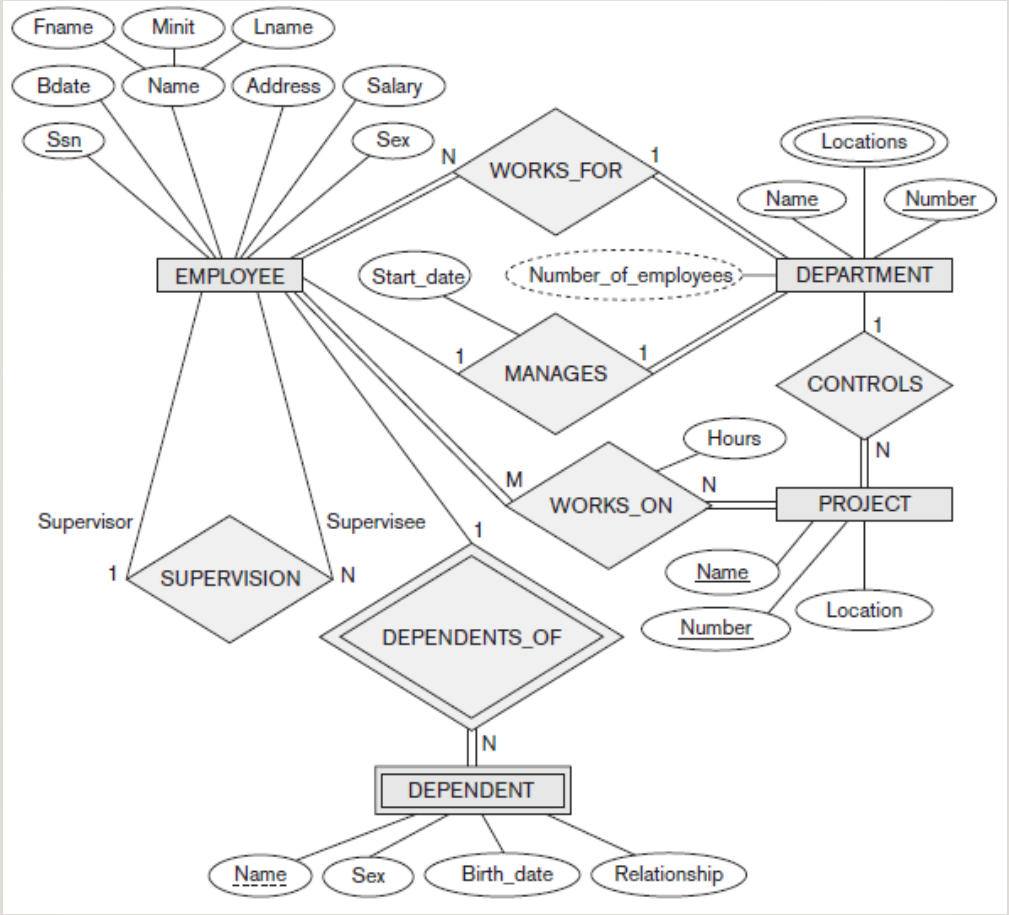


Figure 3.2 An ER schema diagram for the COMPANY database

Entity Types, Entity Sets, Attributes, and Keys

- **Entity**
  - Thing in real world with independent existence
  - Specific Object
  - Example:
    - ✓ Physical objects (person, car, house, etc)
    - ✓ Conceptual objects (organization, job, course)

Person	agent, contractor, buyer, employee, teacher, student, supplier
Location	sale location, building, room, branch office, campus
Object	book, machine, product, material, software license, software package, tool, vehicle
Event	flight, billing, order, competition, journey
Concept	account, time block, course, qualification, stock

Entity Types, Entity Sets, Attributes, and Keys

- **Attributes**
  - Particular properties that describe entity
  - An entity would have a value for each of its attributes
    Example:
    Entity employee : Name = ‘Budi’, SSN = ‘123456789’, Address = ‘Depok’,
    Gender= ‘M’, BirthDate = ’05-JAN-55’
  - Each attribute has a set of value associated with it → **data type**
    Example: integer, string, subrange, enumerated type, etc

Entity Types, Entity Sets, Attributes, and Keys

- **Attributes**
  - Types of Attributes
    - Single-valued versus multivalued attributes
      a. Single-valued attributes

         Example: Age is a single-valued attribute of a person

      b. Multivalued attributes enable attributes of the entity to have several values

         Example: the colors of a car, the academic title of an employee

    - Stored versus derived attributes
      a. Stored attributes: regular attributes
      b. Derived attributes: attributes which values are derived / calculated from stored attributes

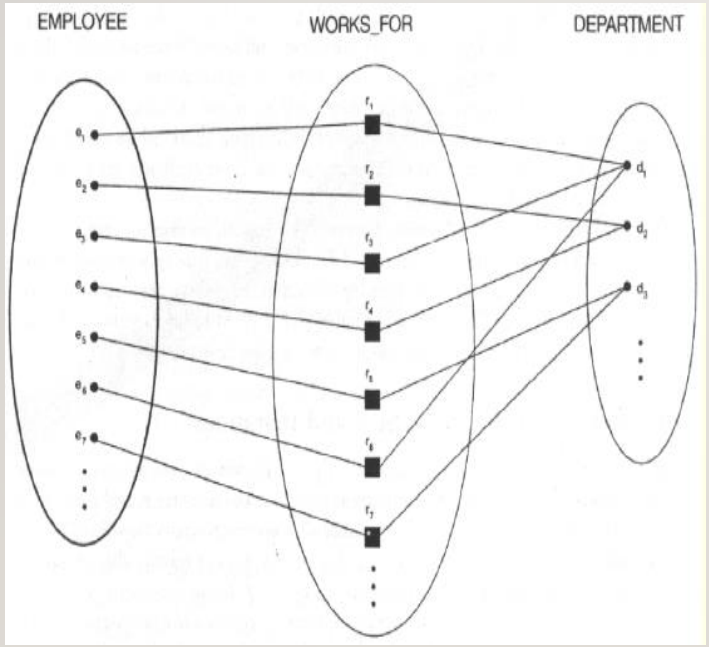
         Example: Birthdate vs Age

Entity Types, Entity Sets, Attributes, and Keys

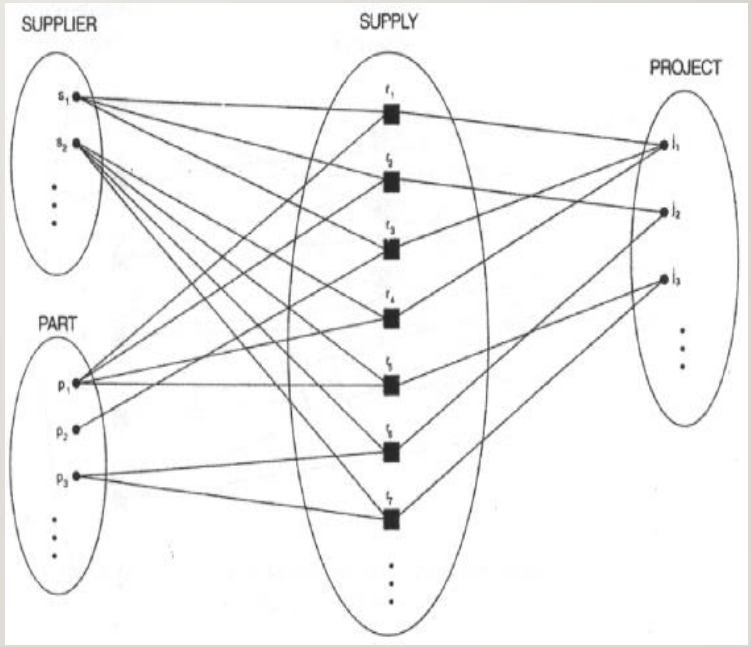
- **Relationship Degree**

  Degree of a relationship type is the number of participating entity types

  a. Binary Relationship
  b. Ternary Relationship



Binary Relationship

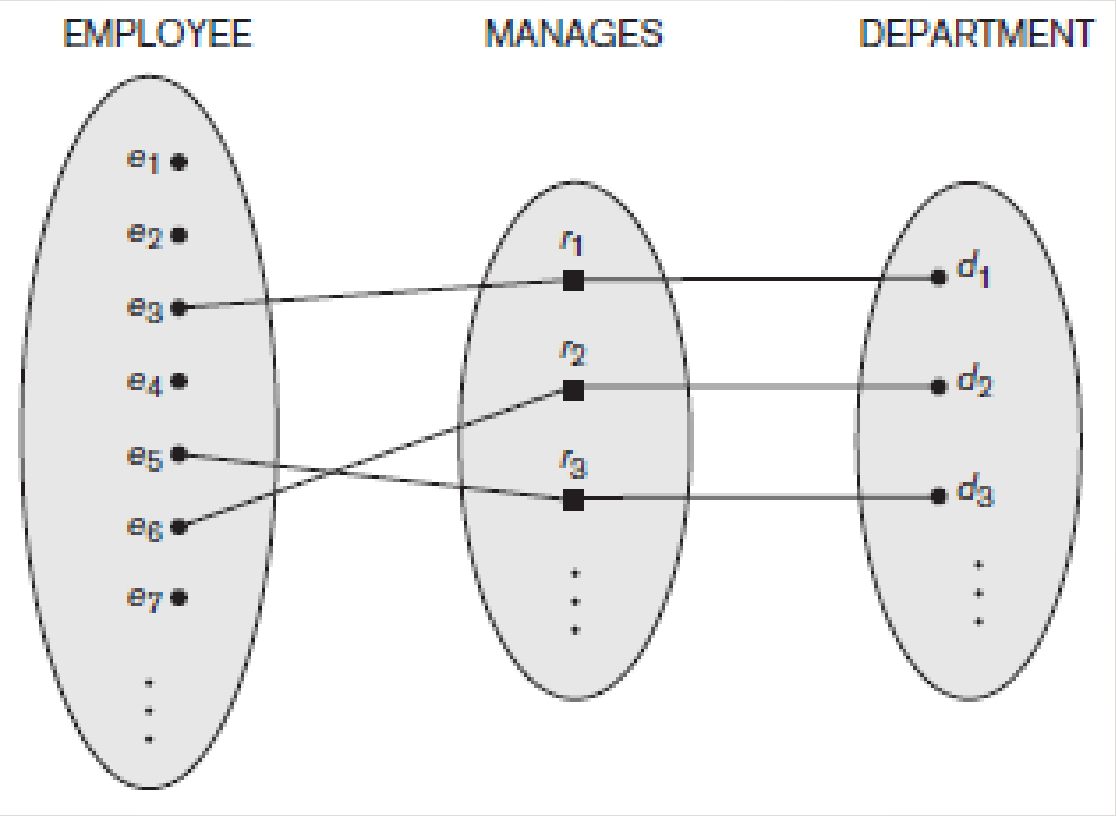


Ternary Relationship

Entity Types, Entity Sets, Attributes, and Keys

- **Attributes of Relationship Types**

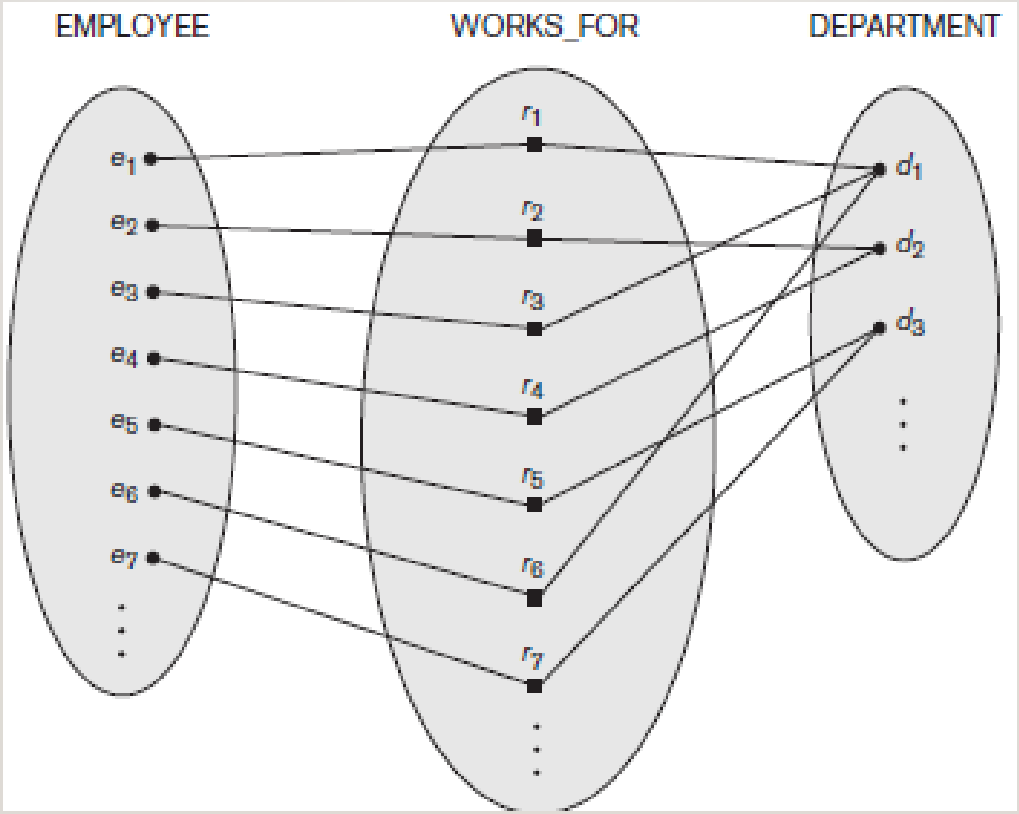
  a. **1:1** relationship types



Entity Types, Entity Sets, Attributes, and Keys

- **Attributes of Relationship Types**

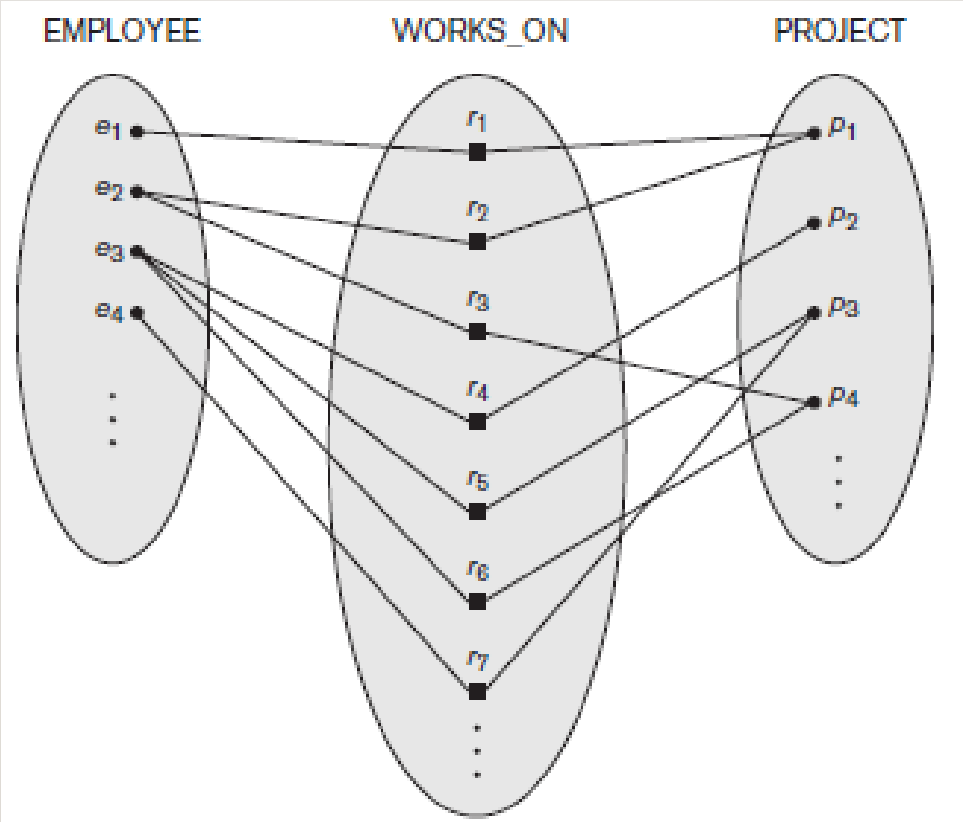
  b. **1:N** relationship types



Entity Types, Entity Sets, Attributes, and Keys

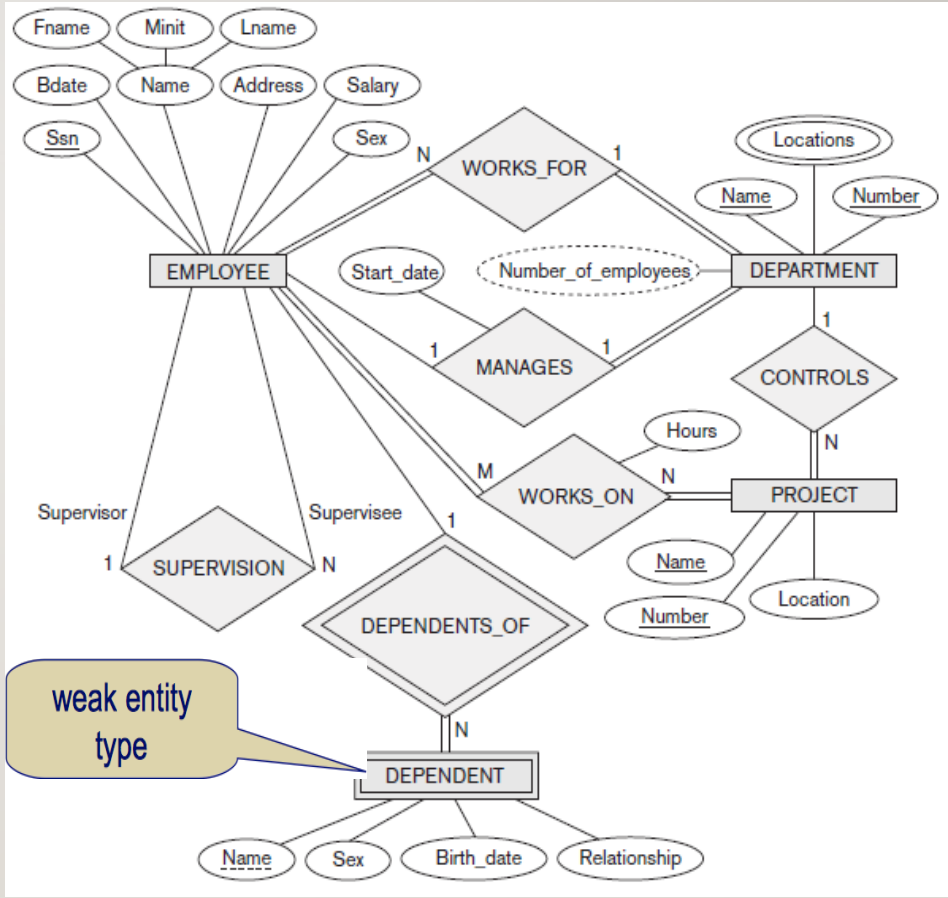
- **Attributes of Relationship Types**

  c. **M:N** relationship types

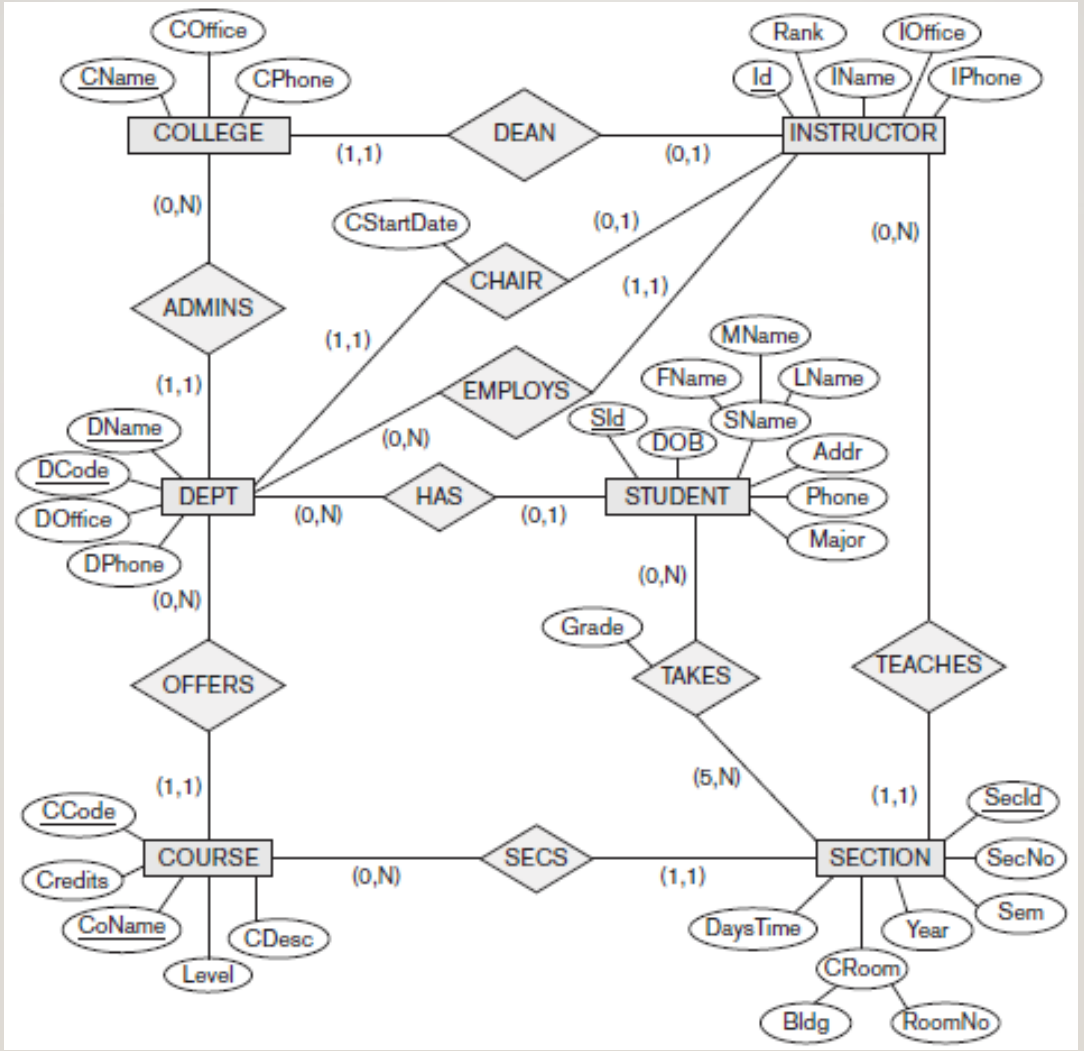


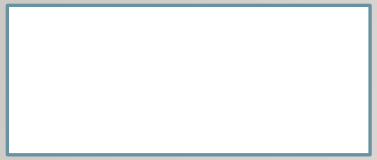
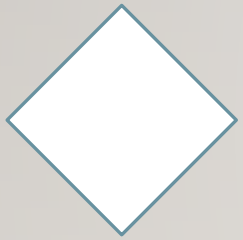
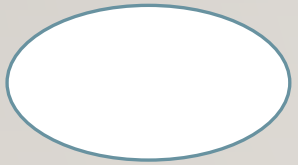
Entity Types, Entity Sets, Attributes, and Keys

- **Weak Entity Types**
  - Do not have **key attributes** of their own
    - ✓ Identified by being related to specific entities from another entity type
    - ✓ But they have partial keys (discriminator)
      - ➢ Which is the attribute that can uniquely identify **weak entities** that are related to the same owner entity.
      - ➢ Use an **underlined** with a **dashed** or dotted line.
  - **Identifying relationship**
    - ✓ Relates a weak entity type to its owner
  - Always has a total participation constraint

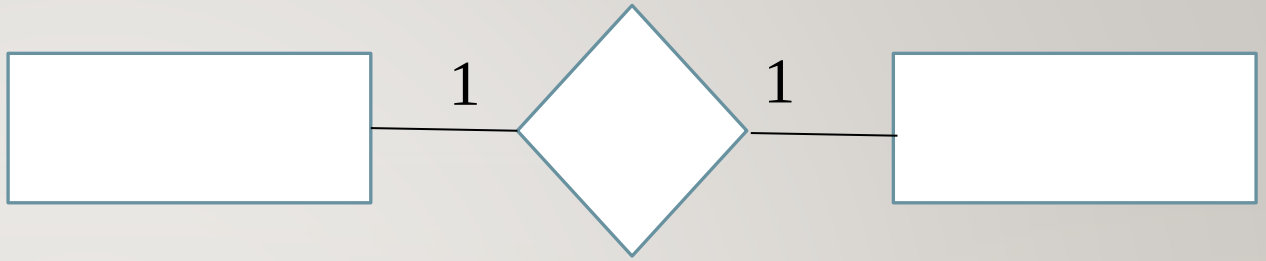


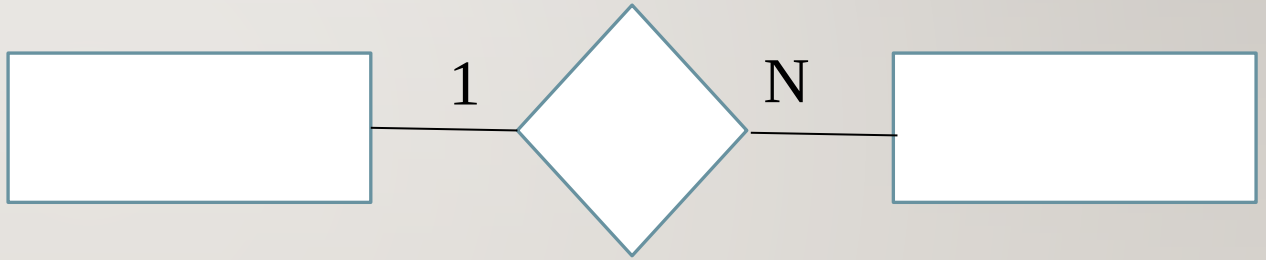
Another Example: A UNIVERSITY Database

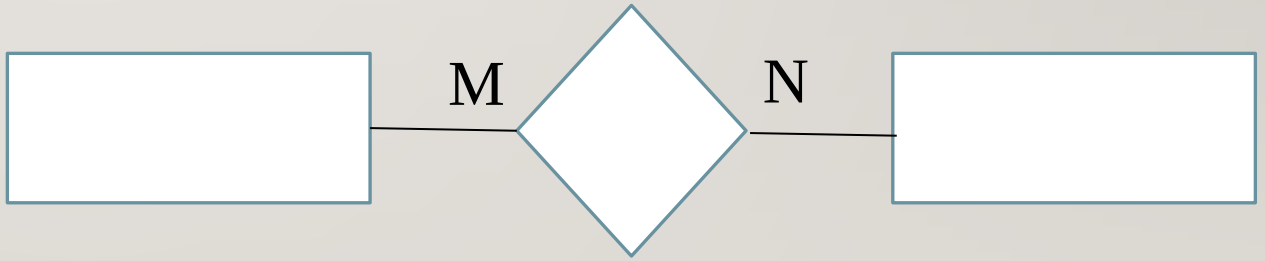


Symbol	Meaning
	Entity
	Relationship
	Attribute

Relationship Types







Latihan:

- **Mahasiswa** akan **meminjam Buku** dari perpustakaan.
- Pada saat registrasi sebagai anggota, mahasiswa diminta untuk mengisi **nama**, **nomor** identifikasi mahasiswa, dan **alamat**nya.
- Di perpustakaan terdapat banyak buku.
- Setiap buku mempunyai **nomor** identifikasi, **judul**, **penulis**, **penerbit**, dan **tahun** terbit. Suatu buku ditulis oleh lebih dari satu penulis.
- Tentukan entity-entity, atribut-atribut, dan relationship yang sesuai.

Model Data dan Perancangan Basis Data