Database

Entities and Relationship Diagram and Notations

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Contents

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Objective

- Draw Entity-Relationship Diagram based on
  - Chen Notation
  - Crew's foot notation

Entity Relationship Model

- We represent Entity Relationship Models using ERD (Entity Relationship Diagram)
  - Represent Entities (Attributes/ Identifiers)
  - Represent Relationships (Cardinality/ Participation)
  - Provide a high level picture of what the database is organized

Notations for ERD

- There are several notations used for ERD:
  - UML (Unified Modeling Language)
  - Chen
  - Crow's Foot
- We are going to use Chen and Crow's Foot for this course
- We are going to use lucid.app to draw ERDs. You can create a free account or log in with your google account.

ERD with Chen

- Entity

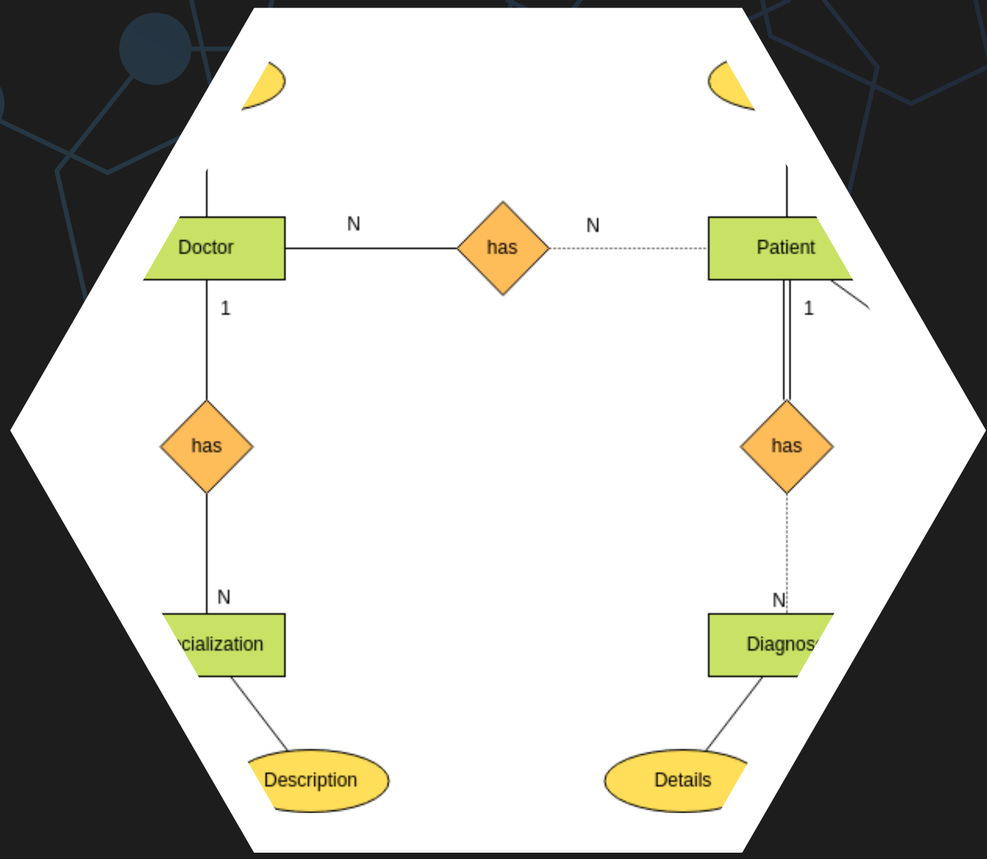
Entity

- Attribute

Attribute

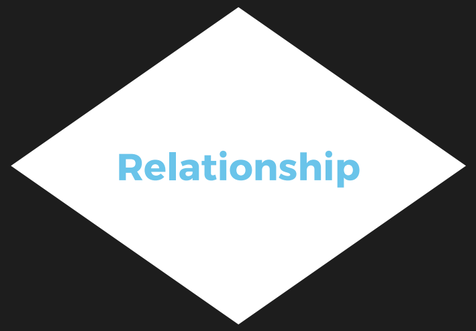
- Attribute (identifier)

Attribute



ERD with Chen

- Relationship
  - Name
  - Cardinality (One, Many)
  - Participation (Mandatory, Optional)

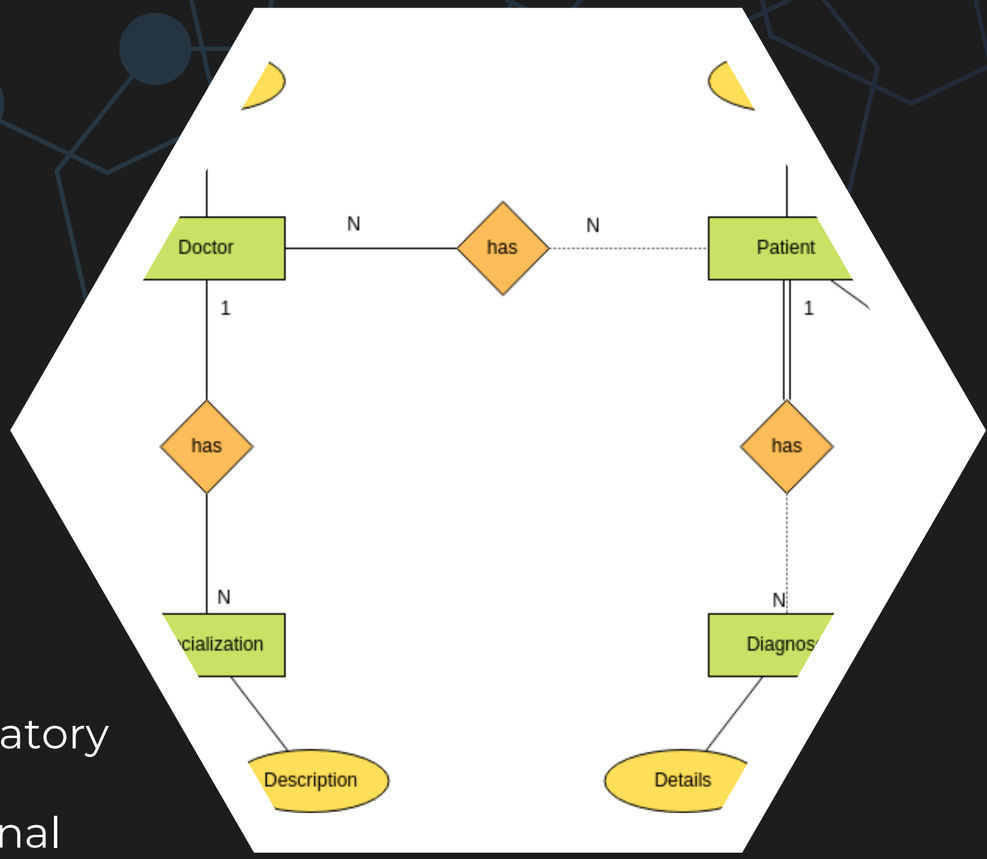


1 Cardinality: One

N Cardinality: Many

Participation: Mandatory

Participation: Optional



Example

- One Mandatory (1 and only 1) to One Optional (0 or 1)

  1-1 0-1

- One Mandatory (1 and 1) to many Mandatory (1 or N)

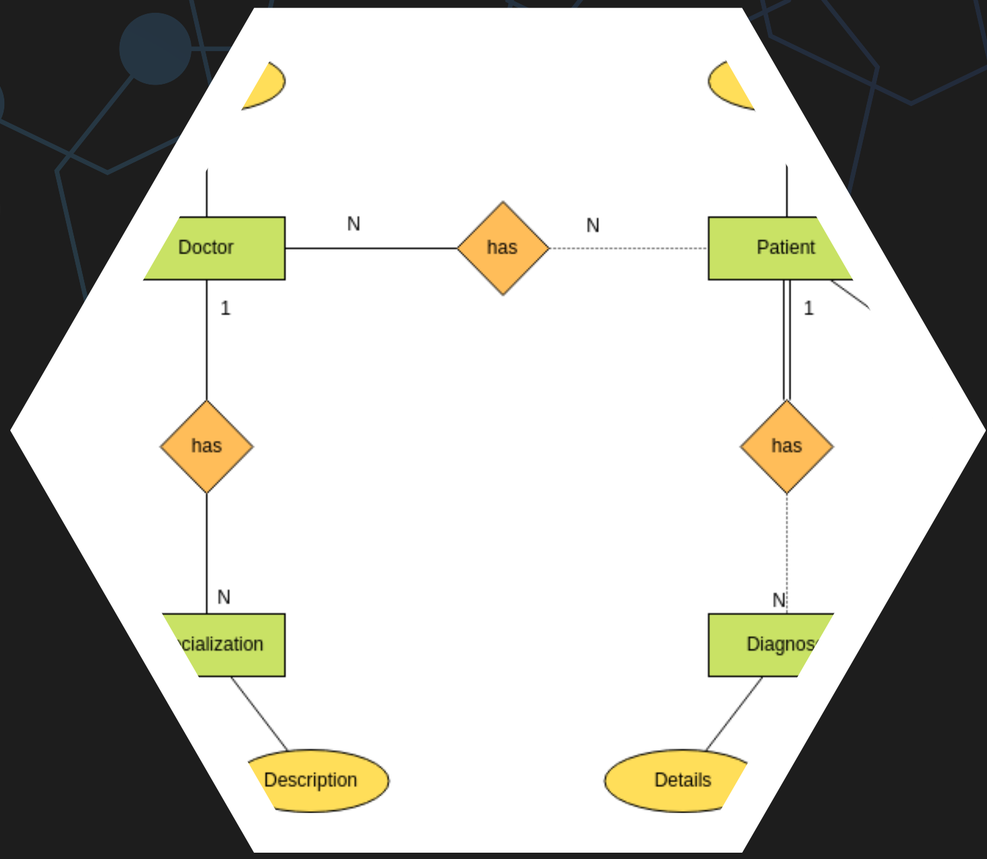
  1-1 0-1

- Many Optional (0 or N) to One Optional (0-1)

  N-0 0-1

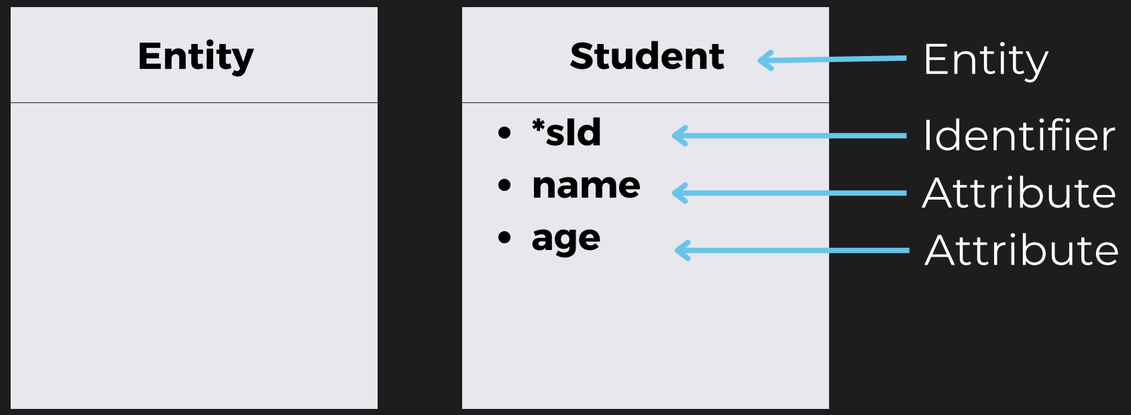
- Many Optional (0 or N) to Many Mandatory (1 or N)

  N-0 1-N



ERD with Crow's Foot

- Entity



ERD with Crow's Foot

- Relationship
  - Name
  - Cardinality (One, Many)
  - Participation (Mandatory, Optional)

Cardinality: One

Cardinality: Many

Participation: Mandatory

Participation: Optional

Example

- One Mandatory (1 and only 1) to One Optional (0 or 1)
- One Mandatory (1 and 1) to many Mandatory (1 or N)
- Many Optional (0 or N) to One Optional (0-1)
- Many Optional (0 or N) to Many Mandatory (1 or N)

Practice

- You should first find Entities; what are they?
  - Instructors, Courses, Programs, Students.
- Then, what are the attributes of these entities?
  - Instructors have info: Name, *EmpID, SSN, DoB, Email, Salary.
  - Courses have info: Title, *Course#, Time, Location, Description.
  - Programs have info: *title, Chair, Office#, Contact, Description.
  - Students have info: Name, *StuID, DoB, Email.

Practice

- Last, what are the relationships among these Entities?
  - An instructor may teach multiple courses, and multiple instructors might teach a course.
  - Each course must belong to only one online program, and each program must have one or more courses.
  - A student may take multiple courses, and a course must have one or more students.
  - A student must belong to exactly one program, and a program may have one or more students.
  - A student may be a friend of other students

Next Lesson

01 What are the relations?

02 what are keys?