Database

Review E-R Diagram and Detail of Attributes

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Entity Relationship Model

- ER Model is best used for the conceptual design of a database
- They serve as a non-technical communication tool for technical and non-technical people
- ER Model is based on
  - Entities and their attributes.
  - Relationship among entities.

Entity

- An entity can be a real-world object, either animate or inanimate, that can be easily identifiable
- For example, in a school database, students, teachers, classes, and courses offered can be considered as entities

Student

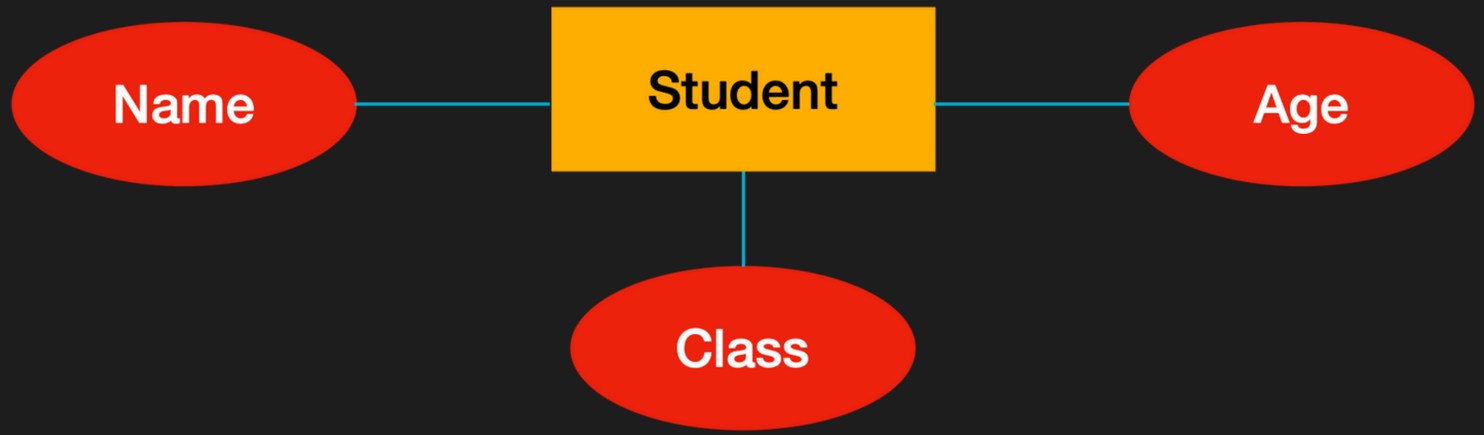
Teacher

Class

Course

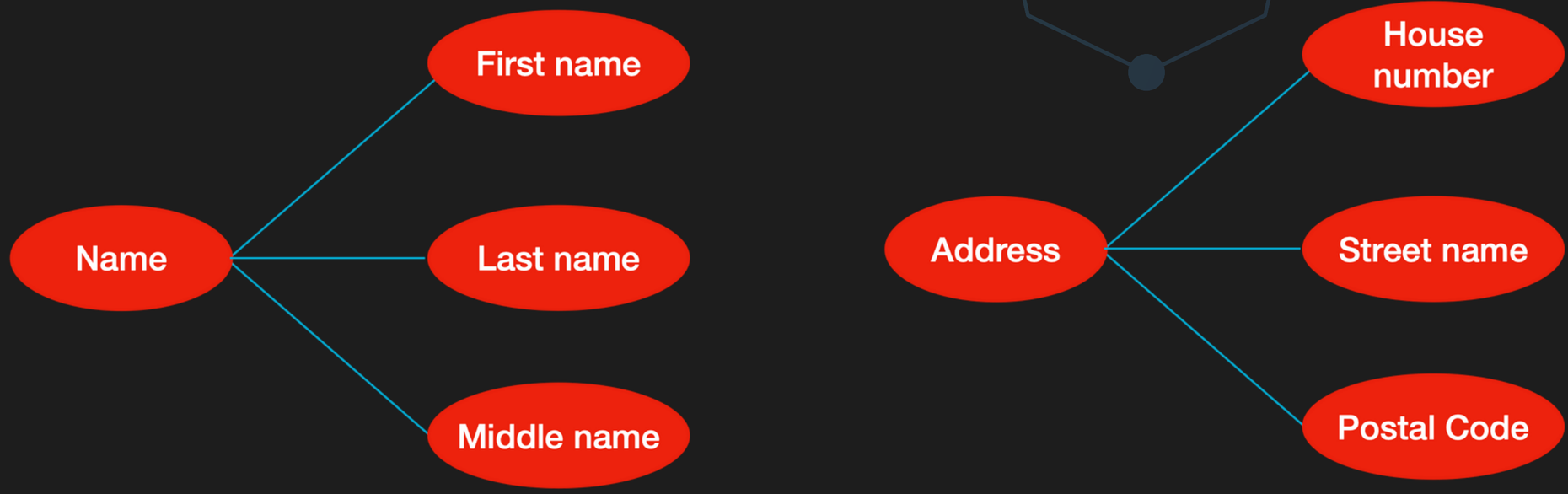
Attribute

- Entities are represented by means of their properties, called attributes. All attributes have values.
- For example, a student entity may have name, class, and age as attributes.



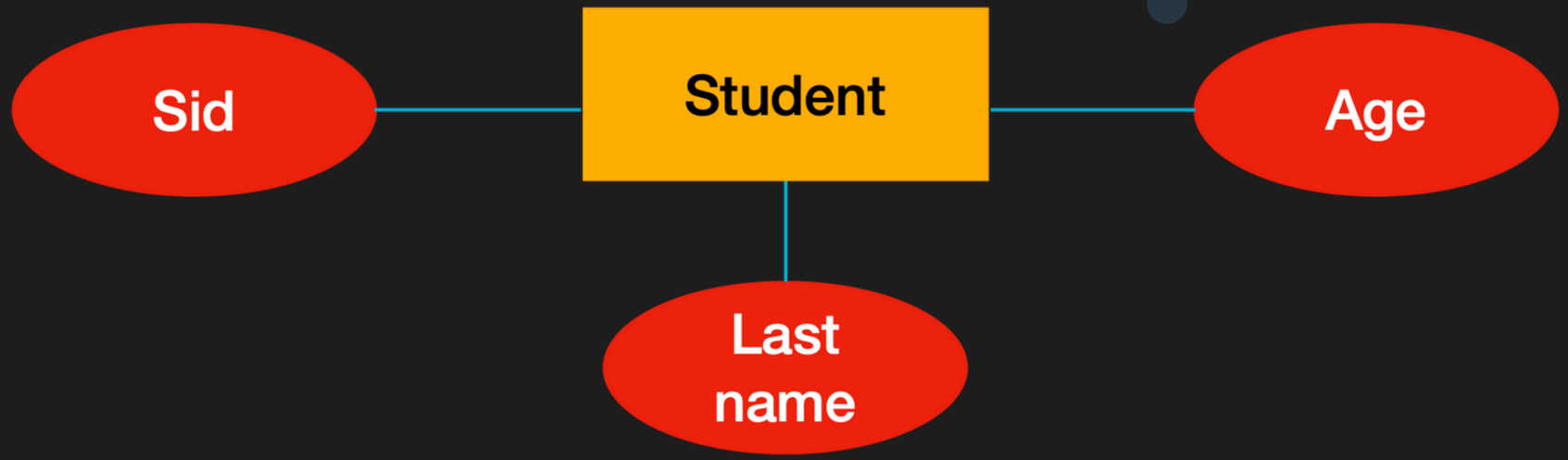
Composite Attribute

- Composite Attribute: is an attribute that can be sub divided into meaningful sub-parts.



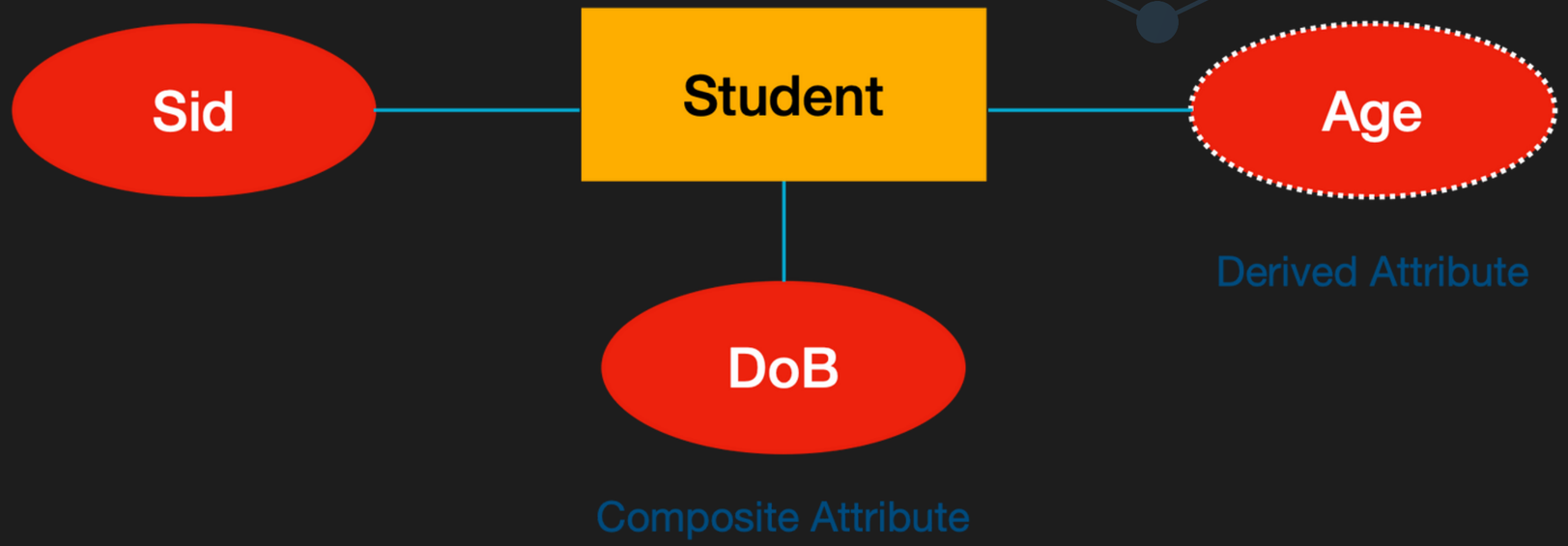
Simple Attribute

- Simple Attribute: is an attribute that cannot be sub divided into meaningful sub-parts.



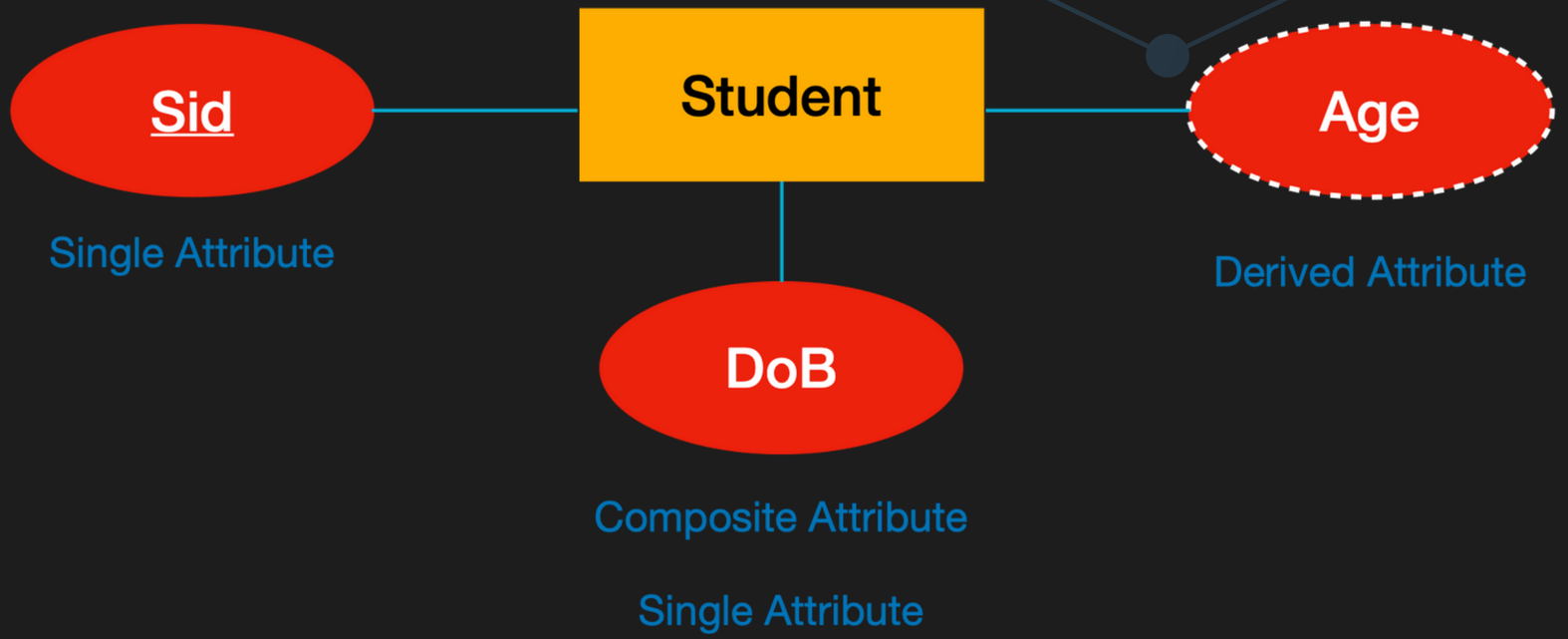
Derived Attribute:

- Derived Attribute: are the attributes that do not exist in the physical database, but their values are derived from other attributes present in the database



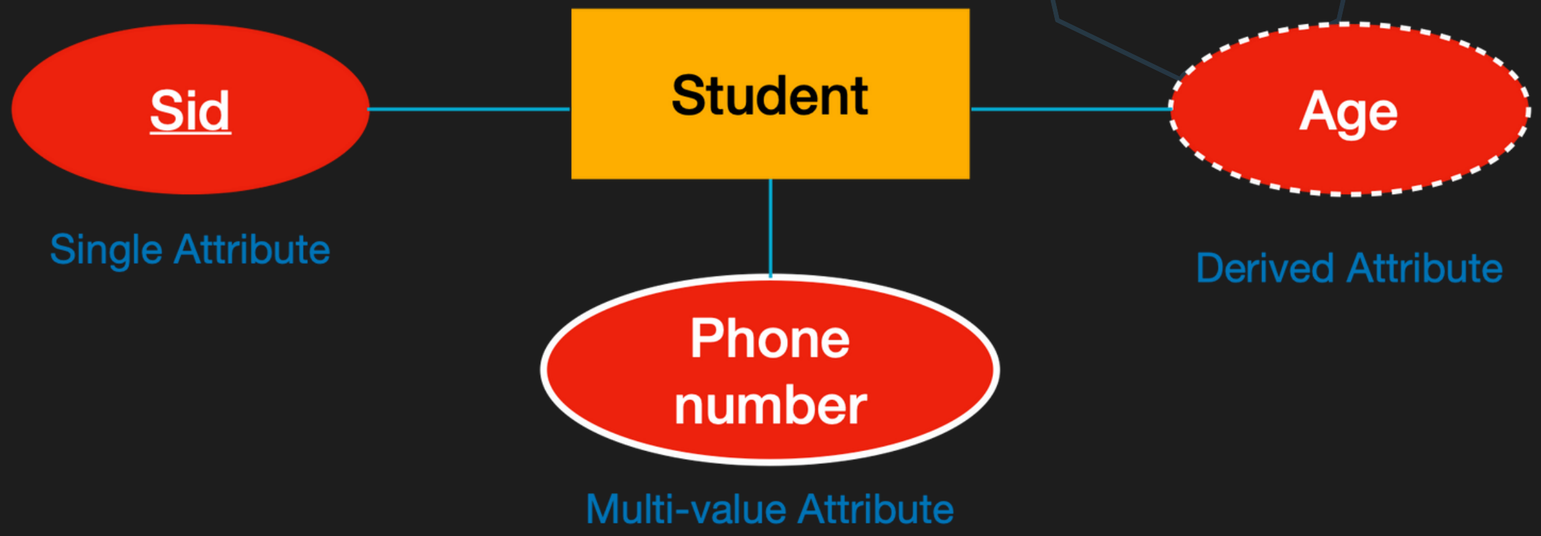
Single Attribute:

- Single Attribute: can only store one value for each entity



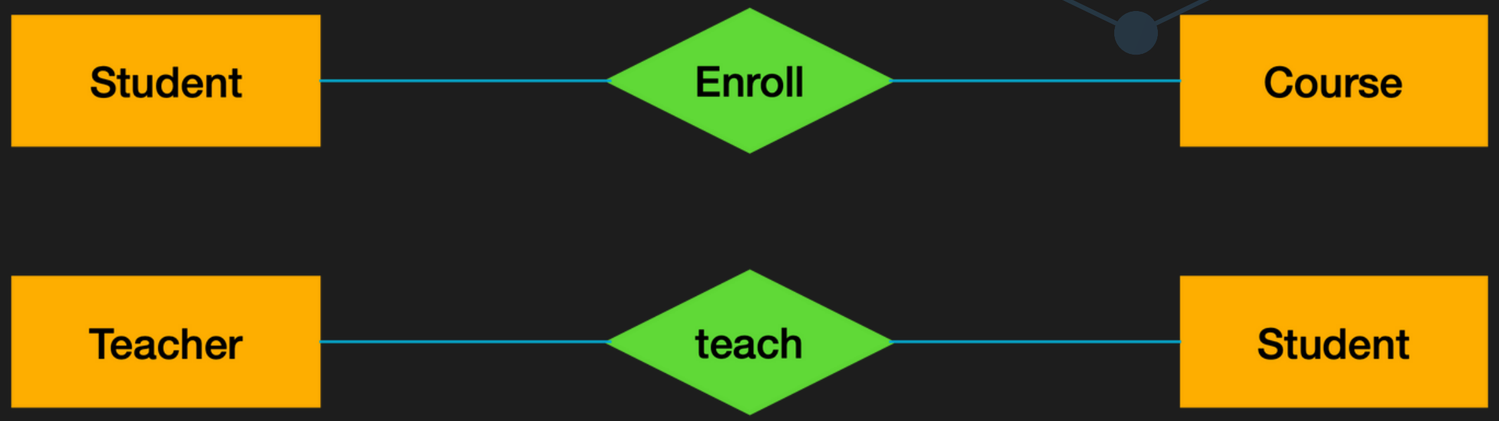
Multi-value Attribute:

- Multi-value Attribute: may contain more than one values



Relationship

- The association among entities is called a relationship



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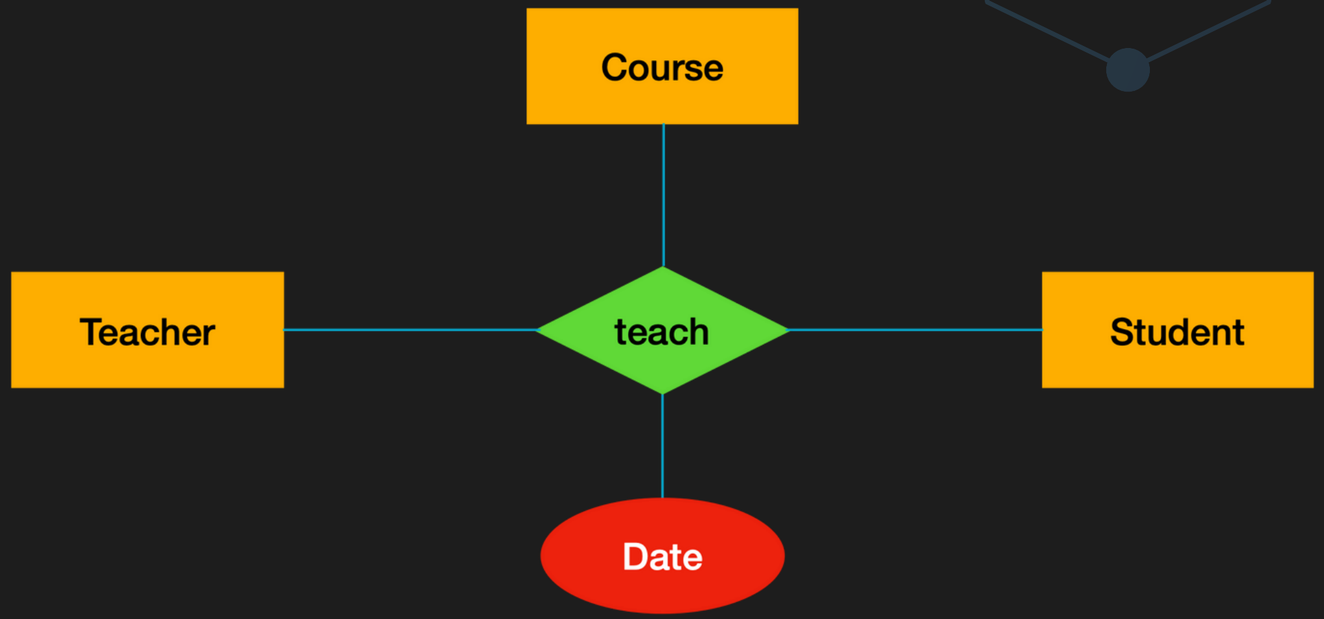

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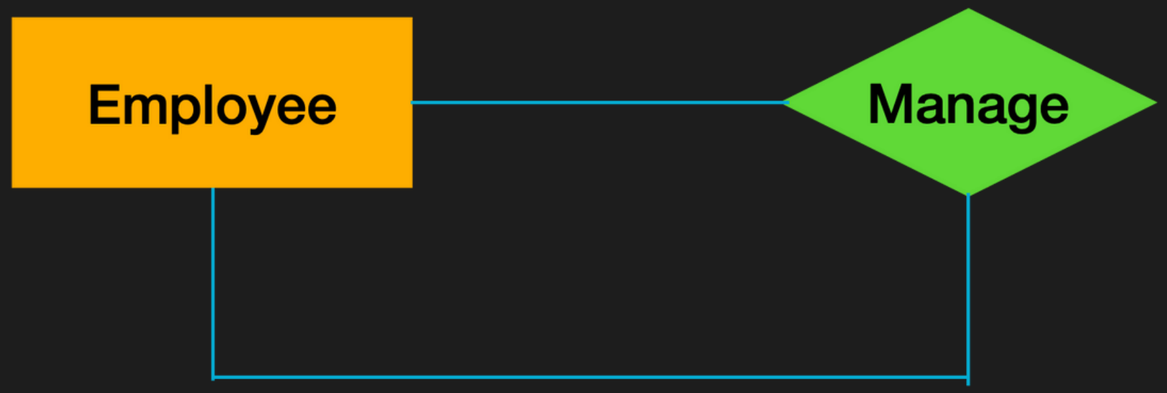

Relationship & Cardinality

- Cardinality defines the number of entities in one entity set, which can be associated with the number of entities of other set via relationship set.
  - How many students can enroll in 1 course?
  - How many courses that students can be enrolled?

Cardinality (One to One)

- One entity set can be associated with only one entity set via relationship set.
  - One people can only have 1 identity card.
  - One identity card is for one people only.

Cardinality (One to Many)

- One entity set A can be associated with many entities of set B, but one entity B can be associated with only one entity of set A via relationship
  - One people can only have many phone number.
  - One phone number is for one people only.

Cardinality (Many to Many)

- One entity set A can be associated with many entities of set B, and one entity B can be associated with many entity of set A via relationship.
  - 1 student can enroll in many courses
  - 1 course can be enrolled by many students

Practice

- Your client is an online-education company. Could you help your client record the data needed?
  - The company has more than 100 instructors, more than 400 courses, 50 online programs, and around 1 million students.
  - Instructors: instructorID, name, password, email, subject, phone, SSN, Bio, salary, rating, programID,
  - Courses: courseID, TaughtBy, language, schedule, capacity, category, credit, programName, duration, description,
  - Programs: programID, programName, ProgramInfo, duration, CourseName, Price (Free), capacity, schedule.
  - Students: programID, email, studentID, DoB, StartDate, name, progress, phone, goal, payment()

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.

Next Lesson

01 What are the relations?

02 what are keys?