Week03 Entity Relationship Modelling

Relational Model and SQL

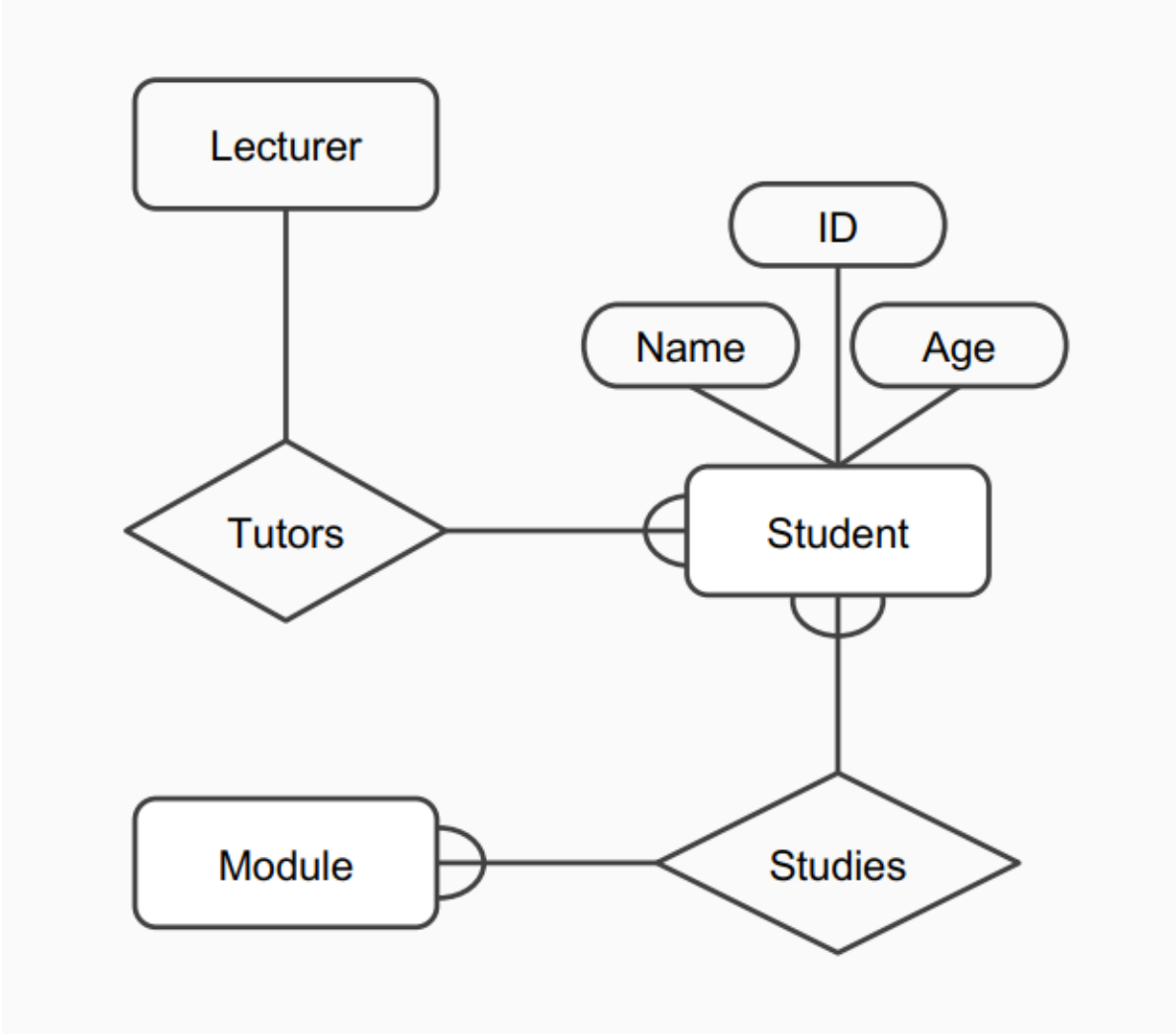
SQL is Based on the relational model
Tables, queries implements relational model and algebra

Database Design

Conceptual Design

- Build a model independent of the choice of DBMS

Entity/Relationship Model



Entities

Entities represent objects or things of interest

In E/R Diagrams, we will represent Entities as boxes with rounded corners

Attributes

Attributes are facts, aspects, properties, or details about an entity

In an E/R Diagram attributes are drawn as ovals

Each attribute is linked to its entity by a line

Relationships

Relationships are an association between two or more entities

Degree of Relationship: the number of entities that participate

Relationship type : an association between two or more entity types

Relationship instance : a uniquely identifiable association that includes one instance from each participating entity type

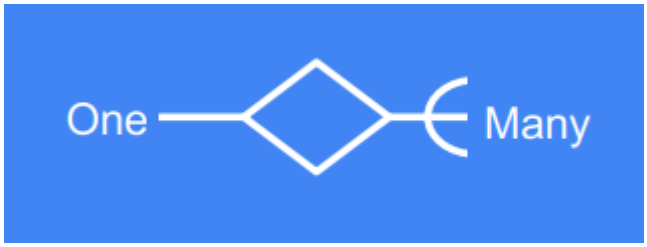
Cardinality Ratios

Each entity in a relationship can participate in zero, one, or more than one instances of that relationship

One to one (1:1)

One to many (1:M)

Many to many (M:M)



E/R Model vs Relational Model

Relational Model	E/R Model
Relation	Entity Type
Tuple	Entity Instance
Attribute	Attribute
Primary Key	Attribute
Foreign Key	1:M relationship

How to draw E/R diagram

Example

> *A department offers several courses. A number of modules make up each course. Students enrol in a particular course and take modules towards the completion of that course. Each module is taught by a lecturer from the appropriate department (several lecturers work in the same department), and each lecturer tutors a group of students. A lecturer can teach more than one module but can work only in one department.*

find Entities

department

course

modules

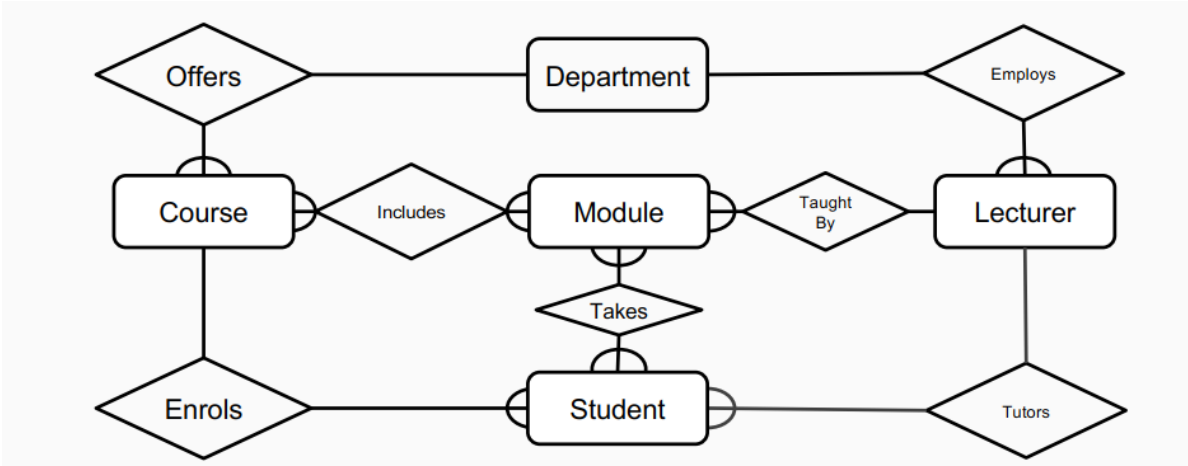
student

lecturer

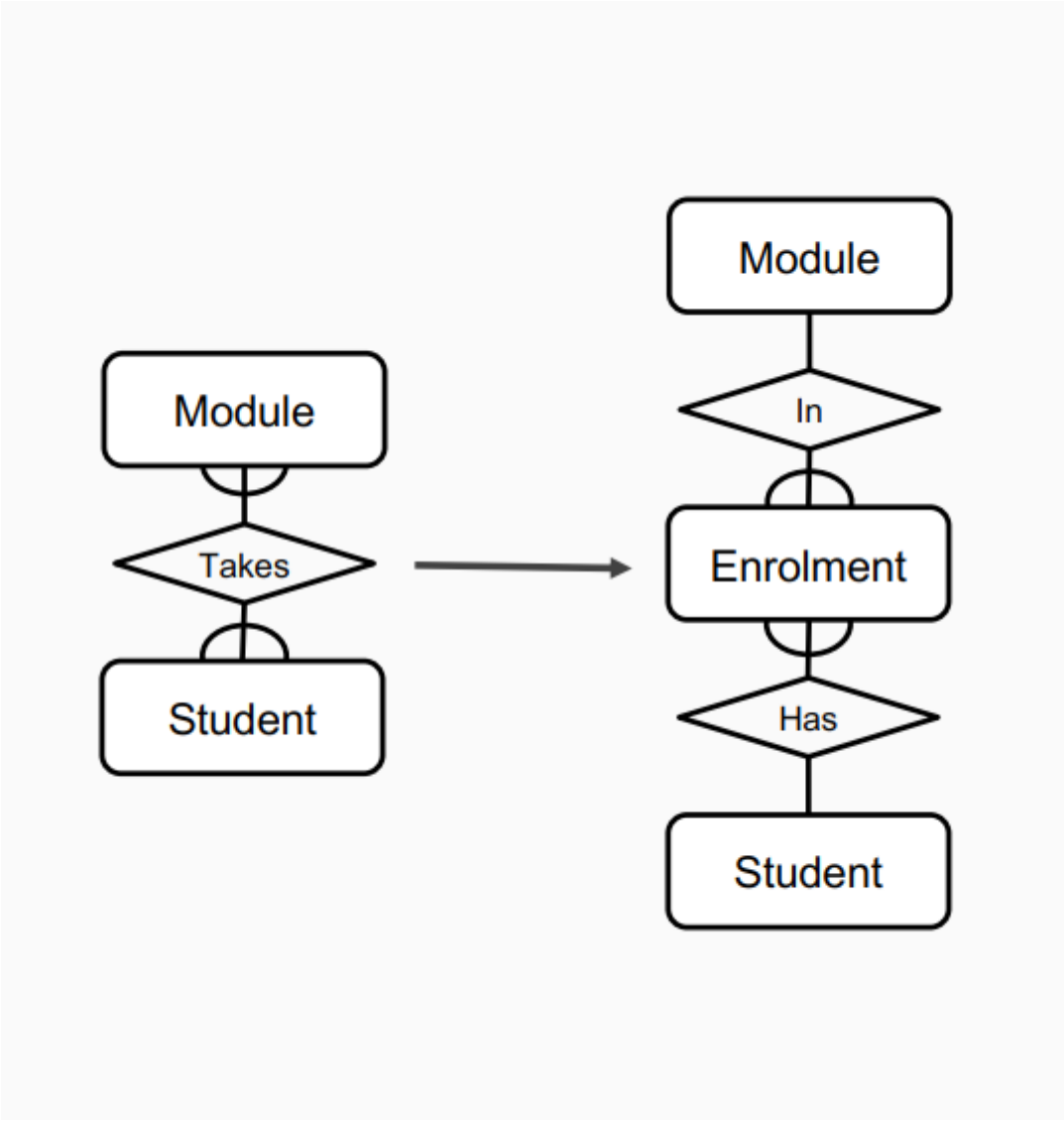
find Relationships

- A department offers several courses.
- A number of modules make up each course.
- Students enroll in a particular course.
- Students take several modules.
- Each module is taught by a lecturer.
- Each department employs a number of lecturers.
- Each lecturer tutors a group of students.

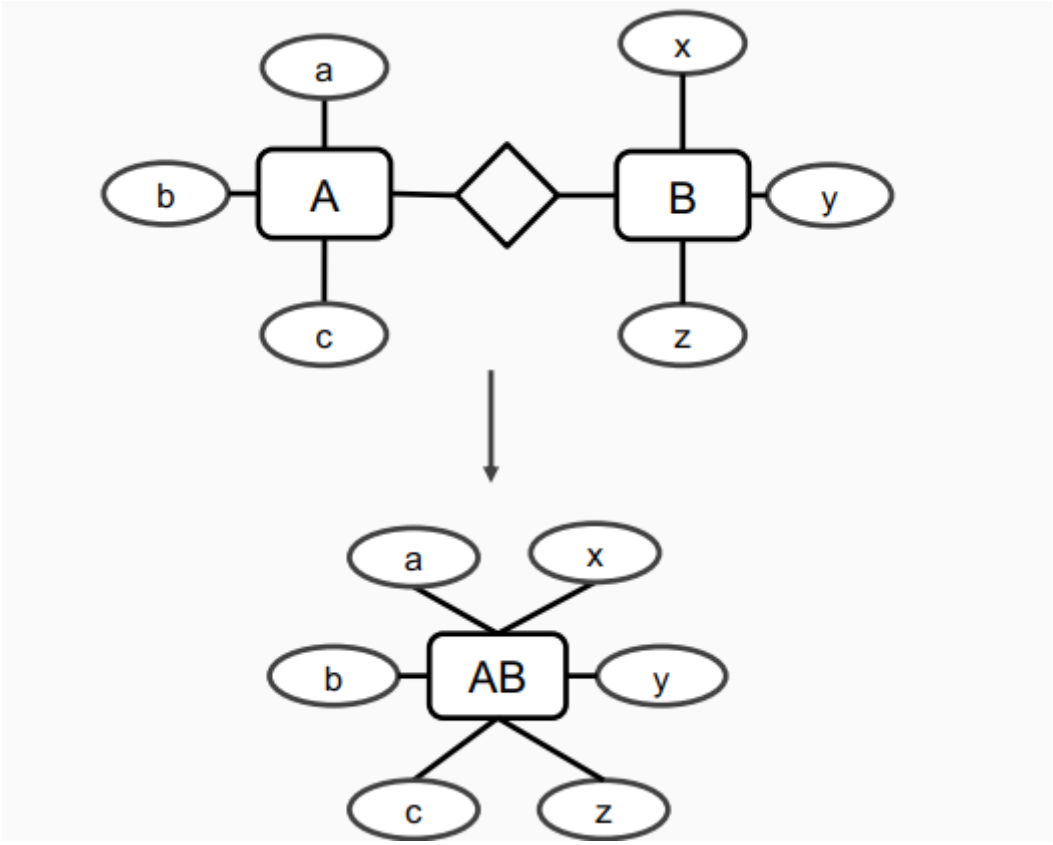
draw graph



Removing M:M to 1:M



Removing 1:1 to attributes



primary key

draw an underline under the attribute to identify the primary key

Entities and Attributes

- Entities can have attributes but attributes have no smaller parts
- Entities can have relationships between them, but an attribute belongs to a single entity