Lesson1

Friday, July 31, 2020   10:37 AM

☐ SQL only for relational-database
☐ Aims for designing a database

Good data storage allows:

Easy retrieval

Easy updating

Accessibility for multiple people
    at the same time

Data consistency

Space efficiency

Speed

Security

- ☐ Relational database follows the set theory
- ☐ Requirements of a well-established database

Tables = smallest logical subsets of data

Each column represents a unique category of information

Each row must be unique

Order of columns or rows doesn't matter

Lesson2

ER diagram (entity-relational diagram)

- Box in ER diagram called entities

Entities:
Categories of similar, but unique
measurements

STUDENT   COLLEGE

- Ovals called attributes (according to the set theory, it should be unique, means you could not have two same attributes)

StudentID   StudentName   CollegeName

STUDENT   COLLEGE

CollegeStartDate   CollegeLocation

Attributes:
unique measurements
within a category

- Unique attributes (unique among entities) also called unique keys or unique identifiers, Every entity must have at least one unique key.
- Use diamond and lines to represent and describe relationships between entities.
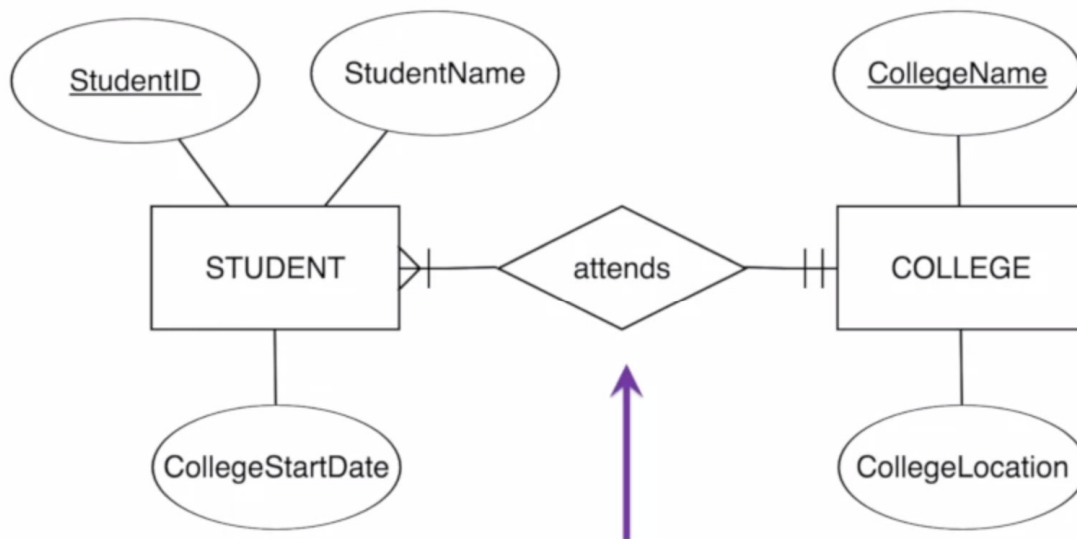
A relationship

- Cardinality constraints represent the mapping relationships between different entities (one to many, one to one, many to many)
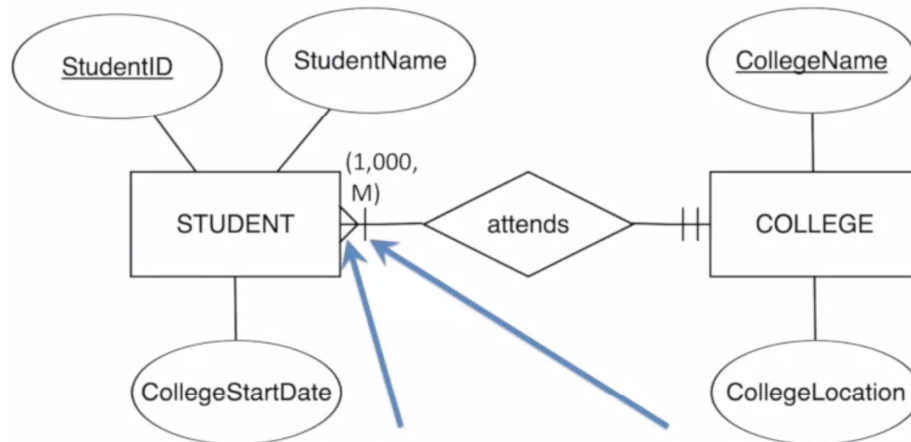
Cardinality Symbols

| One

< Many

M Infinite

O Optional

Specific Cardinality Constraint Notation

- Numbers take precedence over symbols
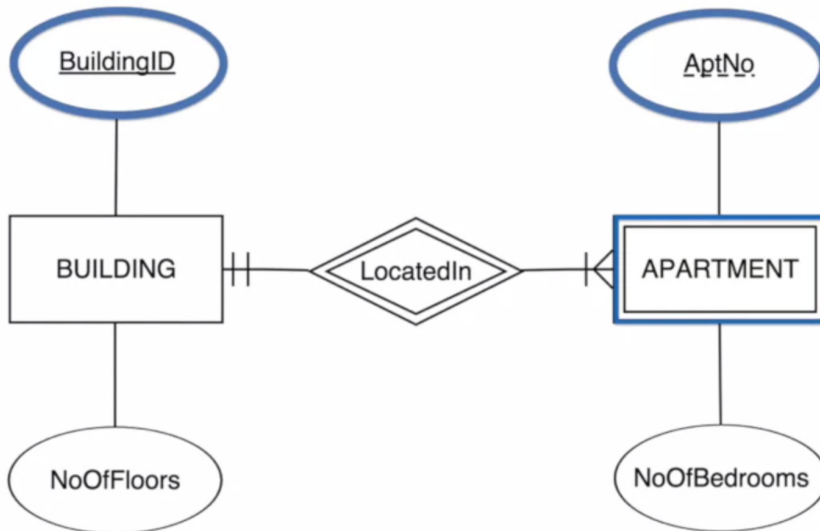
- Numbers are always written from left to right

- Attributes in a parentheses means it is a composite attribute
- Double rectangle called weak entity, it has a weak unique key, which means you cannot identify only according to the weak key, but could be used when associated with the unique key of the entity which connected with the double diamond (called partial key)
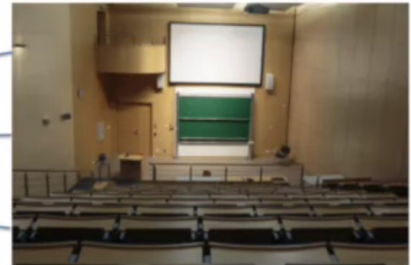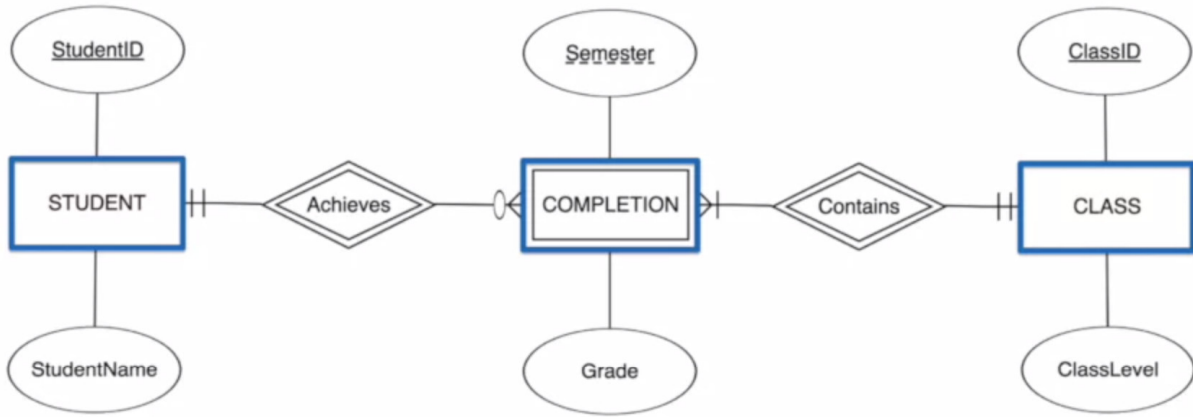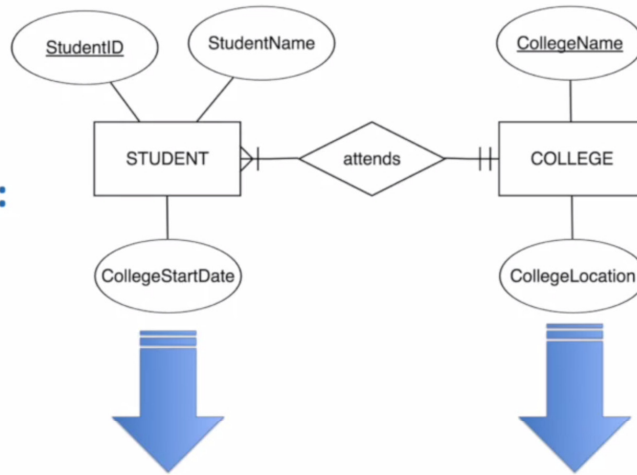
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Relational schemas (basically it is a blueprint map of database talking about relation, not just table)

Critical Components of a Relational Schema

- Tables
- Primary keys
- Foreign keys

- The underline key is the primary key just like the ER diagram. Only 1 column per table could be a primary key.
- The foreign key refers to the primary key of another table, which are used to connect two tables.

ER Diagram:

Relational Schema:

STUDENT
| StudentID |
| StudentName |
| CollegeStartDate |
| CollegeName (FK) |

COLLEGE
| CollegeName |
| CollegeLocation |

Table (technical term: relation)

Column, Field (technical term: attribute)

Row (technical term: Tuple)
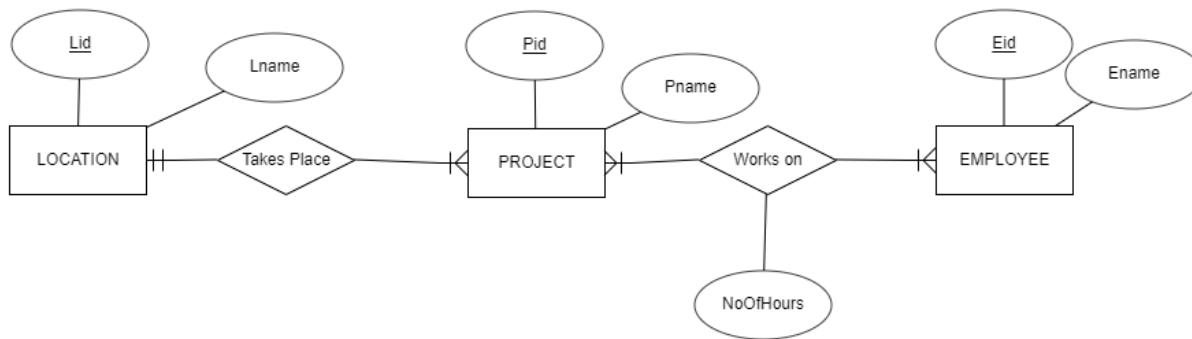
Theory: no order
Practice: no order

Theory: tuples can't be duplicated
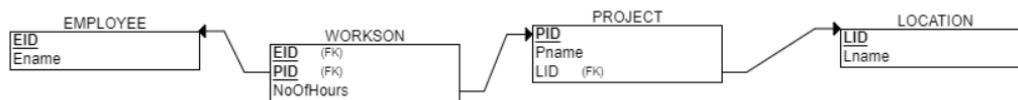**Practice:** rows can be duplicated

Lesson3

Use [ERDPlus](https://erdplus.com/) to draw a ER diagram

It could also be used to draw relational schema (for 'many to many' relationship, we should establish another table to save this relationship)

Arrow from 'many' to 'one' or 'one' to 'one'