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Database Design

5-3

Resolving Many-to-Many Relationships

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Objectives

- This lesson covers the following objectives:
  - Identify attributes which belong to many-to-many relationships
  - Demonstrate the steps to resolve a many-to-many relationship using an intersection entity
  - Identify the UID of an intersection entity and represent it in the entity relationship diagram

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Purpose

- This lesson will help you complete your model - you may need to create new entities or new relationships based on the business needs
- It will also help you define the scope of your data model - you only model what is of importance to the business

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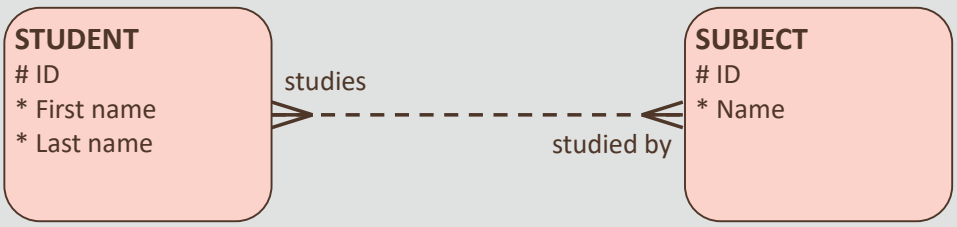
Relationship Hiding an Attribute

- In a school, a STUDENT may study one or more SUBJECTs
- Each SUBJECT may be studied by one or more STUDENTs



STUDENT and SUBJECT

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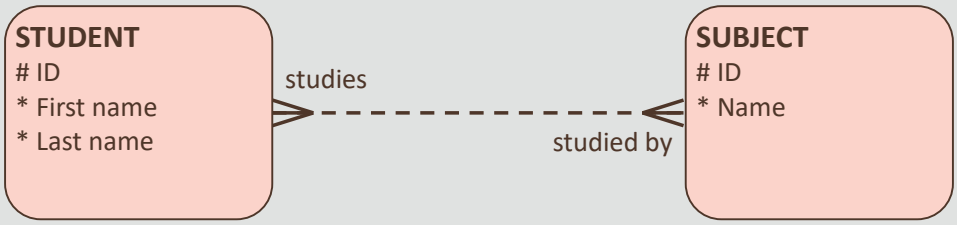
Relationship Hiding an Attribute

- When a student enrolls for a subject, we want to be able to record the grade they attain for that subject
  - Which entity would the attribute “Grade” belong to?
  - If we put “Grade” in the STUDENT entity, how would we know which SUBJECT it is for?
  - If we put “Grade” in the SUBJECT entity, how would we know which STUDENT got that grade?



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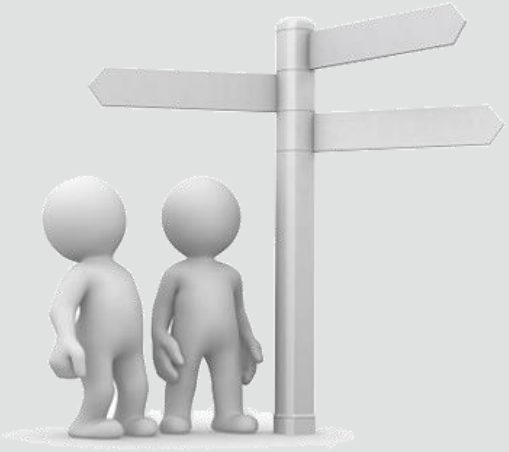
The grade is an attribute of the many-to-many relationship between STUDENT and CLASS, not of either entity alone.

Resolution of a M:M Relationship

- A third entity is needed to resolve the M:M relationship
- This is called an "intersection" entity



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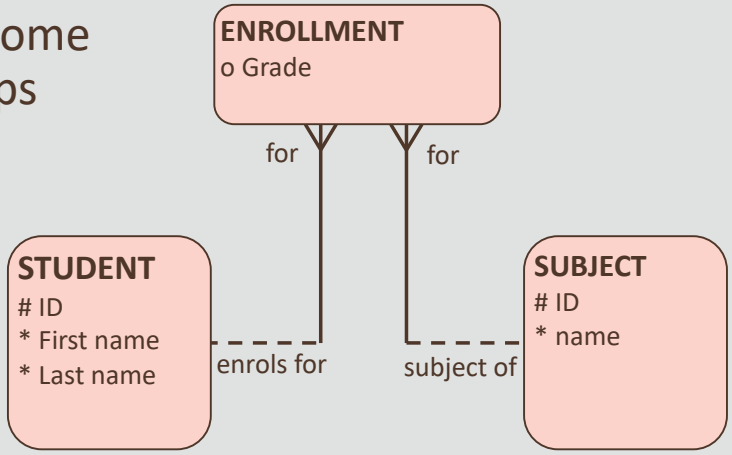
Since every attribute must belong to an entity, we need a third entity.

Intersection Entity

- An intersection entity – ENROLLMENT – has been added, including the "Grade" attribute
- The original M:M relationship has become two 1:M relationships
- What would be the UID of the intersection entity?



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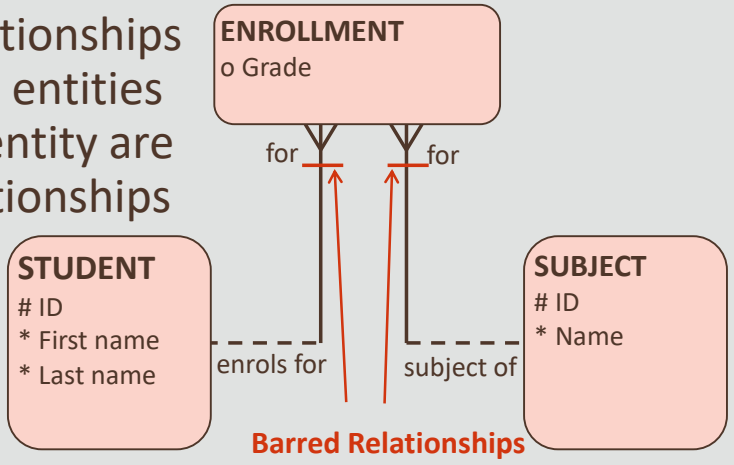
Intersection entity: The product of the resolution of a many to many relationship
Note that the relationships have become mandatory at the side of the Intersection entity, as an ENROLLMENT cannot exist without a corresponding STUDENT and SUBJECT

Barred Relationships

- The unique identifier (UID) of the intersection entity often comes from the originating relationships and is represented by the bars
- In this case, the relationships from the originating entities to the intersection entity are called "barred" relationships



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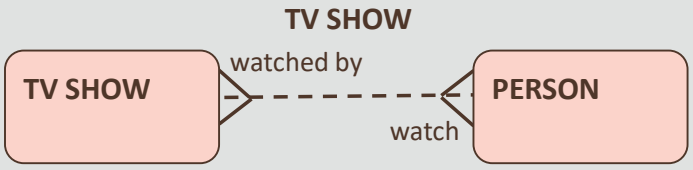
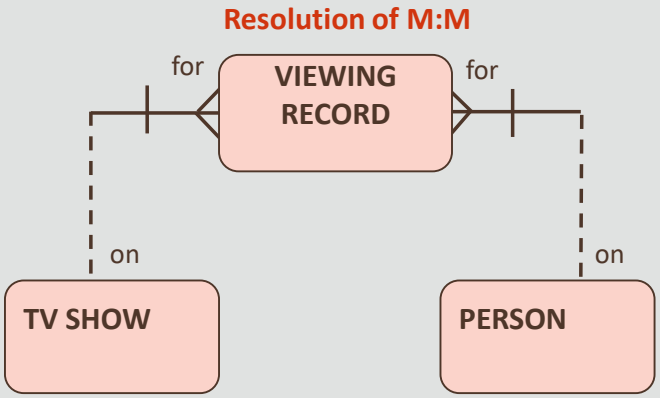
Barred relationship: A relationship that participates in an entity's unique identifier
The UID for ENROLLMENT is the combination of STUDENT id and SUBJECT id.
When you draw a barred relationship, you do not add the UID attribute names to the intersection entity, as the bars represent this.

M:M Resolution Example TV Shows

- Each TV show may be watched by one or more persons
- Each person may watch one or more TV shows





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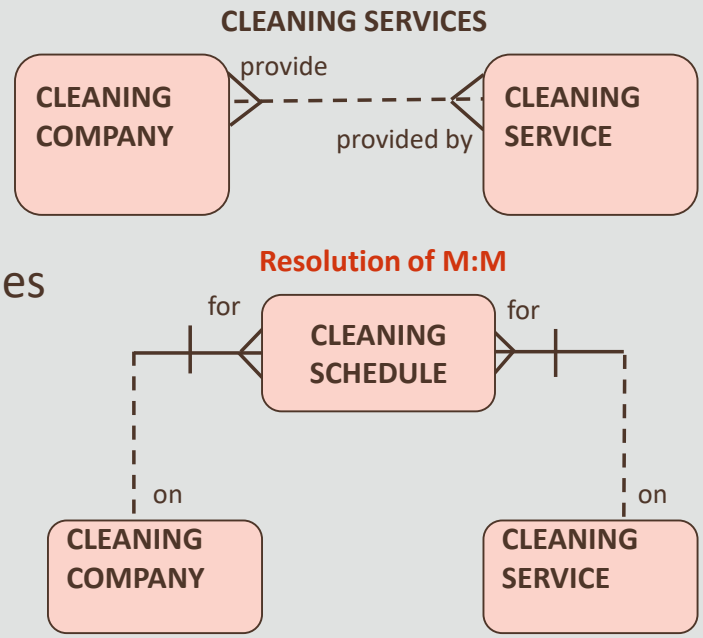
M:M Resolution Example Cleaning Services

- Each company may provide one or more cleaning services
- Each cleaning service may be provided by one or more companies



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Terminology

- Key terms used in this lesson included:
  - Barred relationship
  - Intersection entity

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Summary

- In this lesson, you should have learned how to:
  - Identify attributes which belong to many-to-many relationships
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