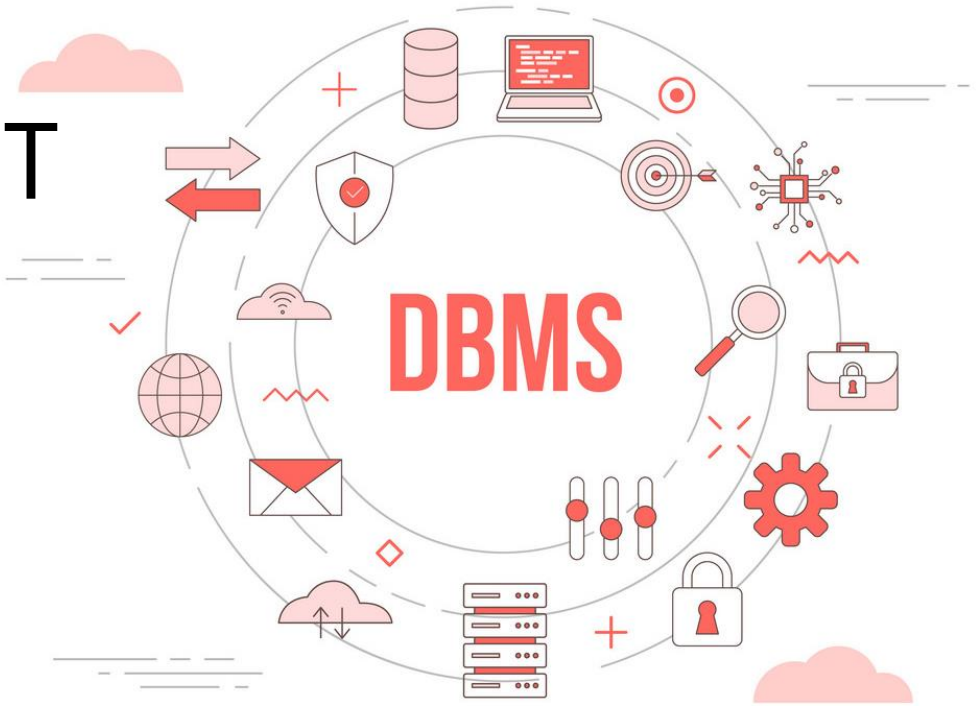
DATABASE MANAGEMENT SYSTEMS

ER Design Issues



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KIIT Deemed to be University

Overview

ER Design Issues.

In the previous section we understood:
- How to design a ER diagram?
- Different ways of identifying entity sets and their relationships.
- Various representations of entity sets, attributes and relationships.

However, users often mislead the concept of the elements and the design process of the ER diagram. Thus, it leads to a complex structure of the ER diagram and certain issues that does not meet the characteristics of the real-world enterprise model.

ER Design Issues

In this section we discuss the basic design issues while designing ER model.

1. Entity vs Attribute
2. Entity vs Relationships
3. Binary vs Ternary Relationships
4. Placement of Relationship Attributes

Entity vs Attributes

1 Entity vs Attributes

When to represent a value as an attribute?
When to represent a value as a separate entity-set?

The structure of the real-world enterprise being simulated and the semantics attached to its properties determine how an entity set or attribute should be used. When a user uses the main key of one entity set as an attribute of another, it results in an error. Instead, he ought to make use of the connection to do so. Additionally, although we identify it in the relationship sets, the main key characteristics are implicit in the relationship set.

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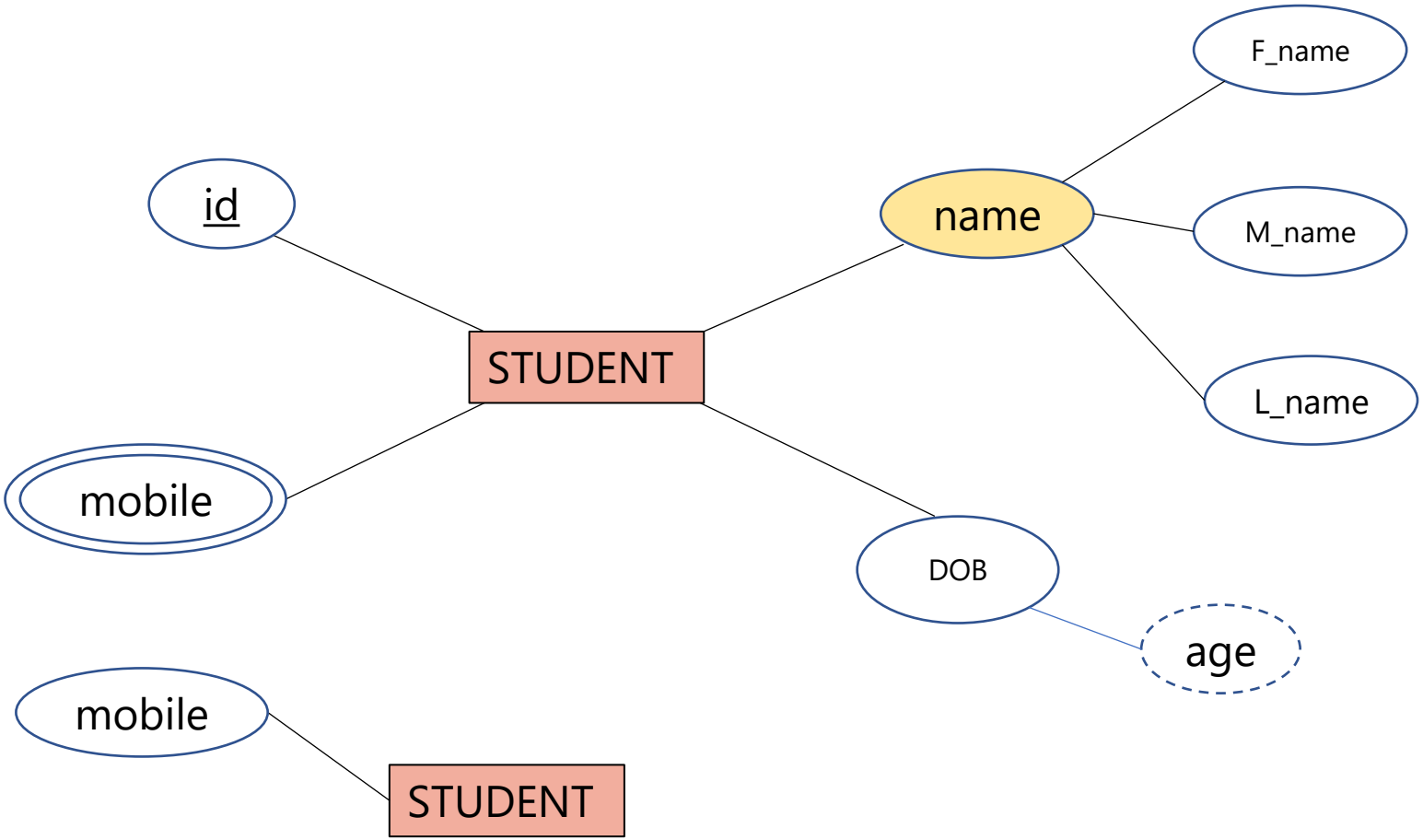
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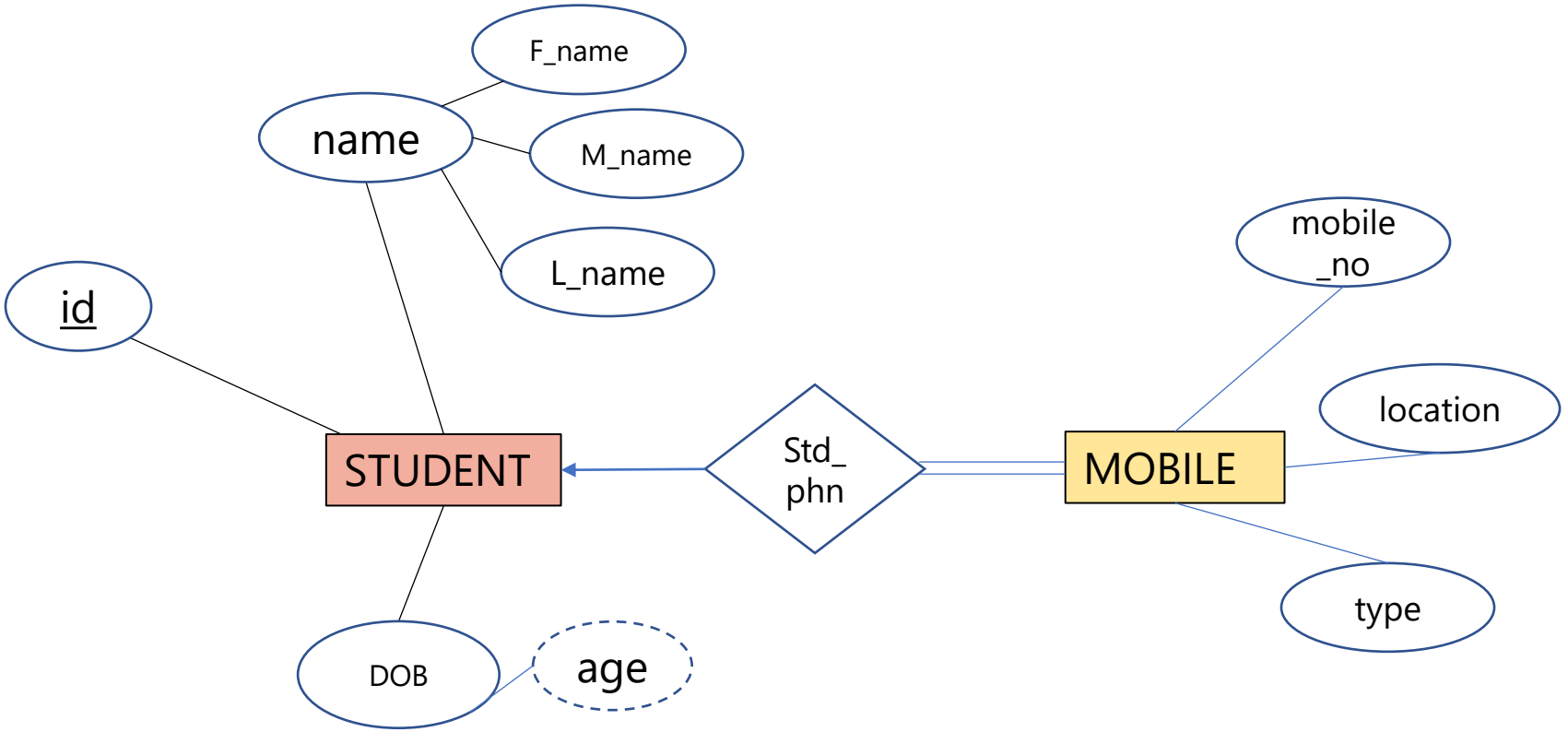
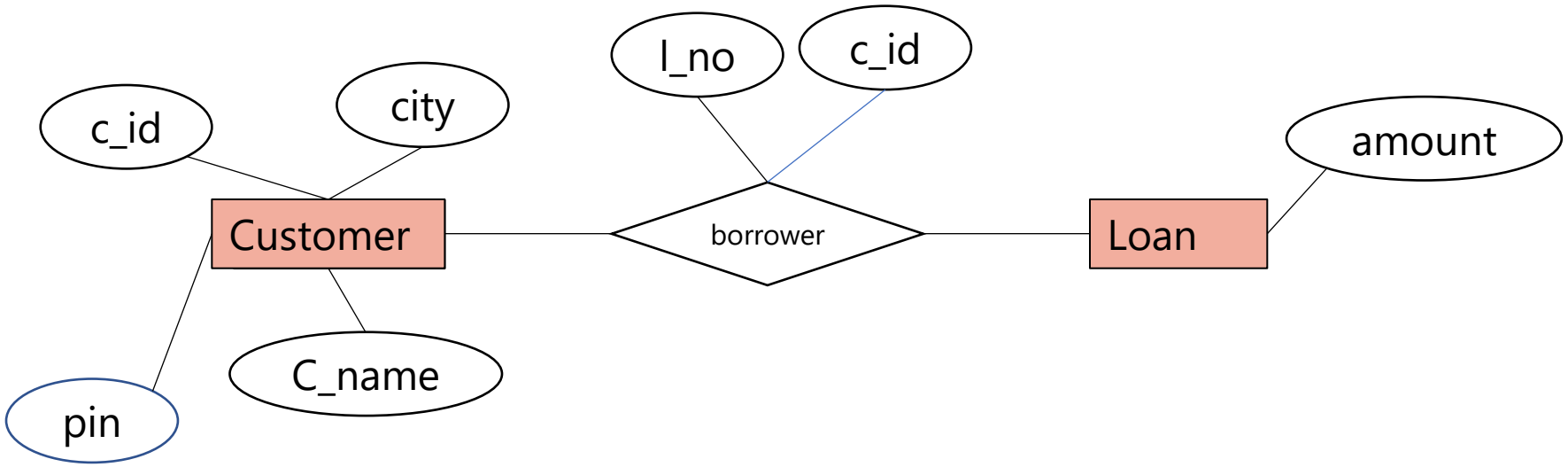


Note: Representing as a separate entity-set allows details to be added later.

Common Attribute Mistakes

Don't include primary key attributes as descriptive attributes on relationship-set.

Example: customer and loan relations again – IDs used as descriptive attributes on borrower.



Association is contained by the relationship, so specifying foreign key attributes is redundant.

Entity vs Relationship

2 Entity vs Relationship

It might be challenging to determine whether an entity set or relationship set can best explain a given item. One must choose a relationship set for expressing an activity that takes place between the entities in order to comprehend and decide on the appropriate usage. It is best to keep the entity set separate from the object if portraying it as a relationship set is necessary.

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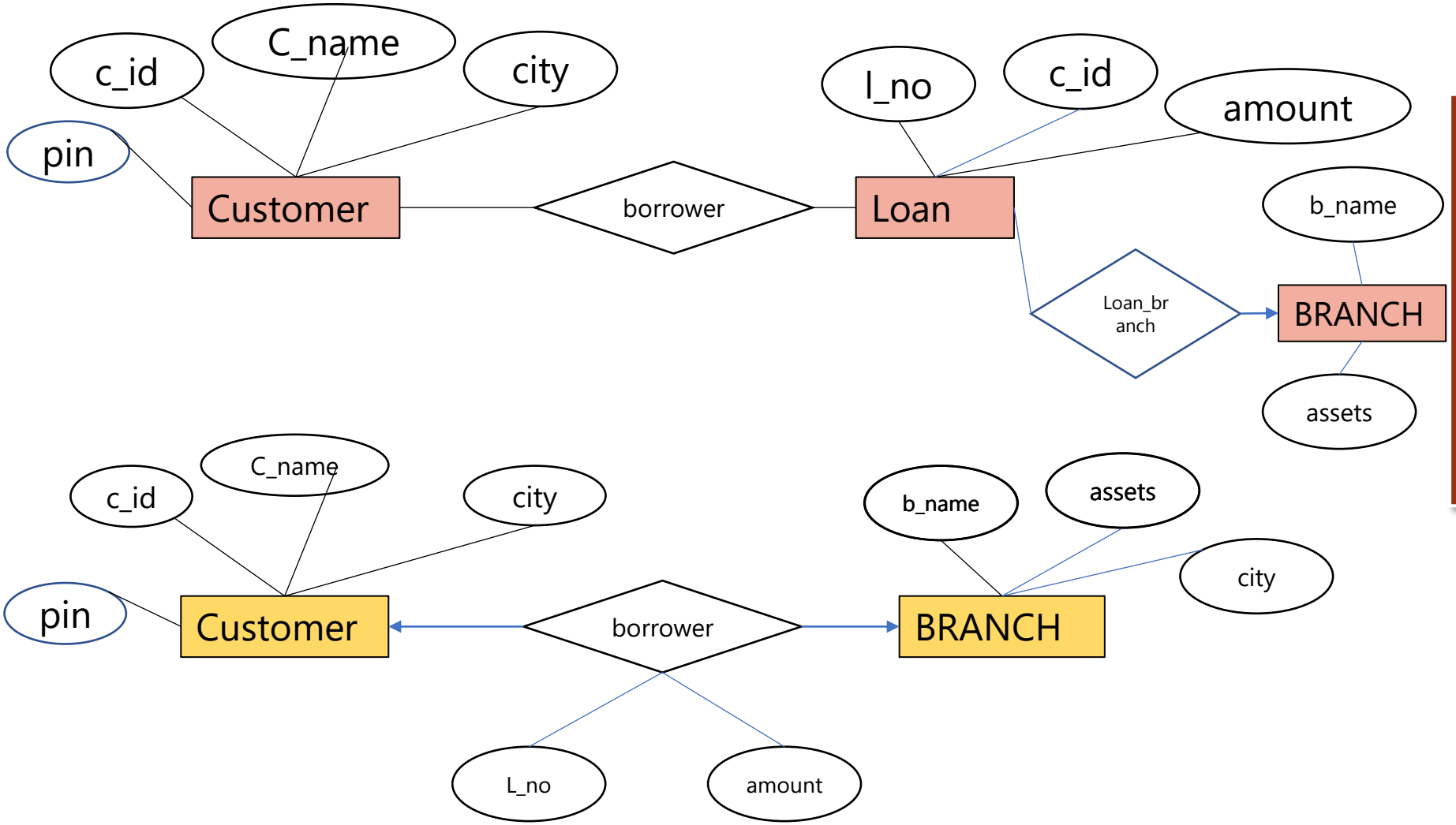
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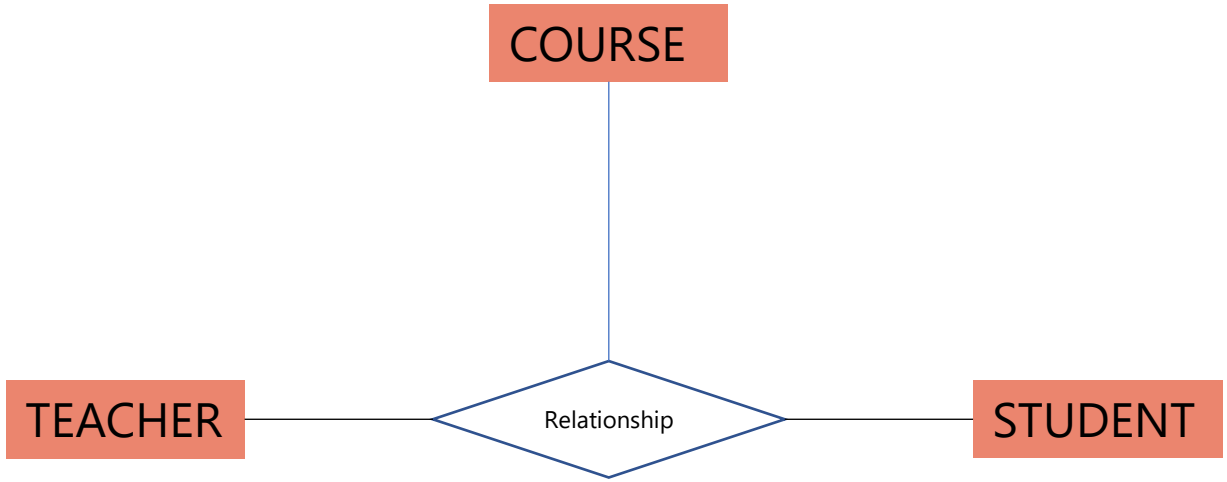
Binary vs. n-ary relationship set

3 Binary vs. n-ary relationship set

ER design can be complicated because to the n-ary relationships, however we can transform and describe every n-ary relationship using multiple binary relationships.



Cont...


TEACHER
Relationship
STUDENT


TEACHER
Relationship
COURSE


STUDENT
Relationship
COURSE

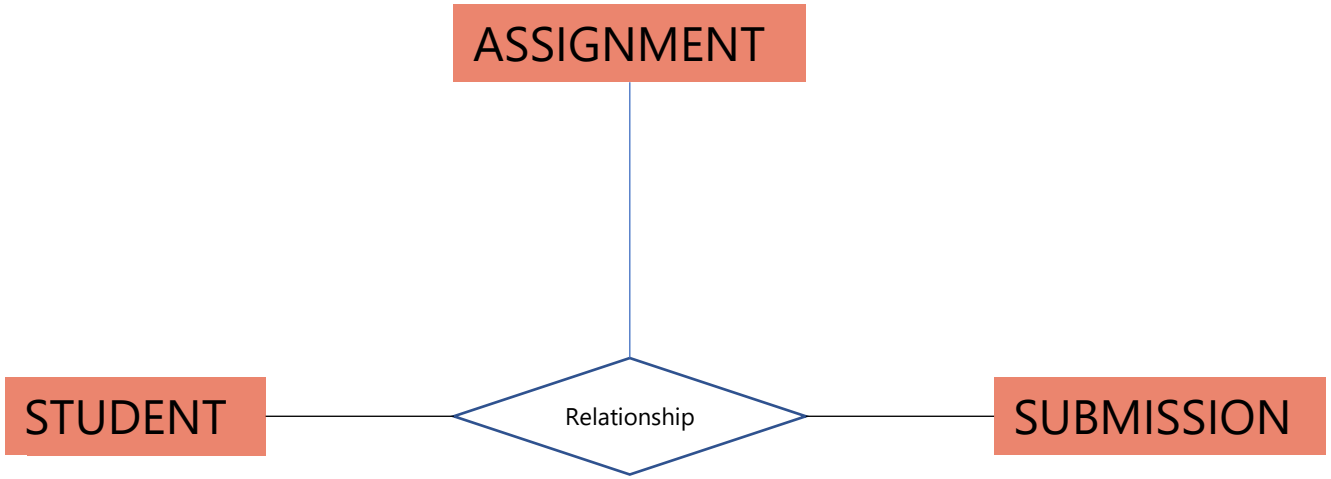

TEACHER
teaches
COURSE
enroll
STUDENT

Cont…

Common Attribute Mistakes

Ternary relationship between student, assignment, and submission.

Need to allow multiple submissions for a particular assignment, from a particular student.



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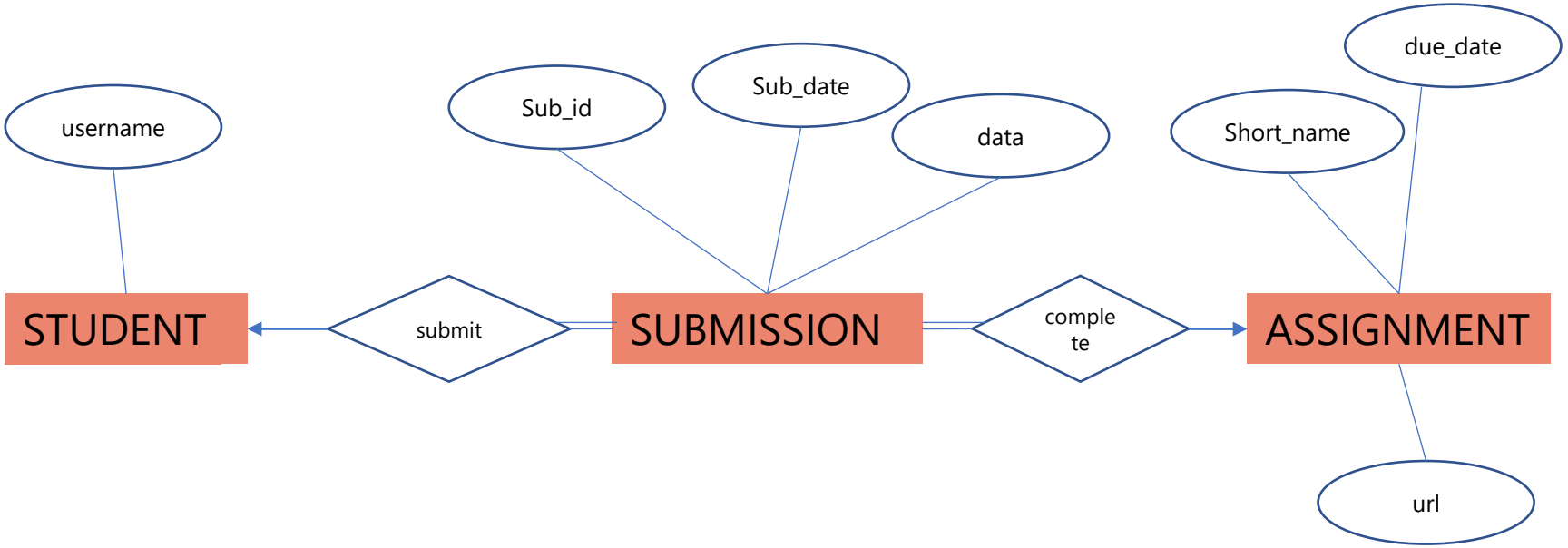
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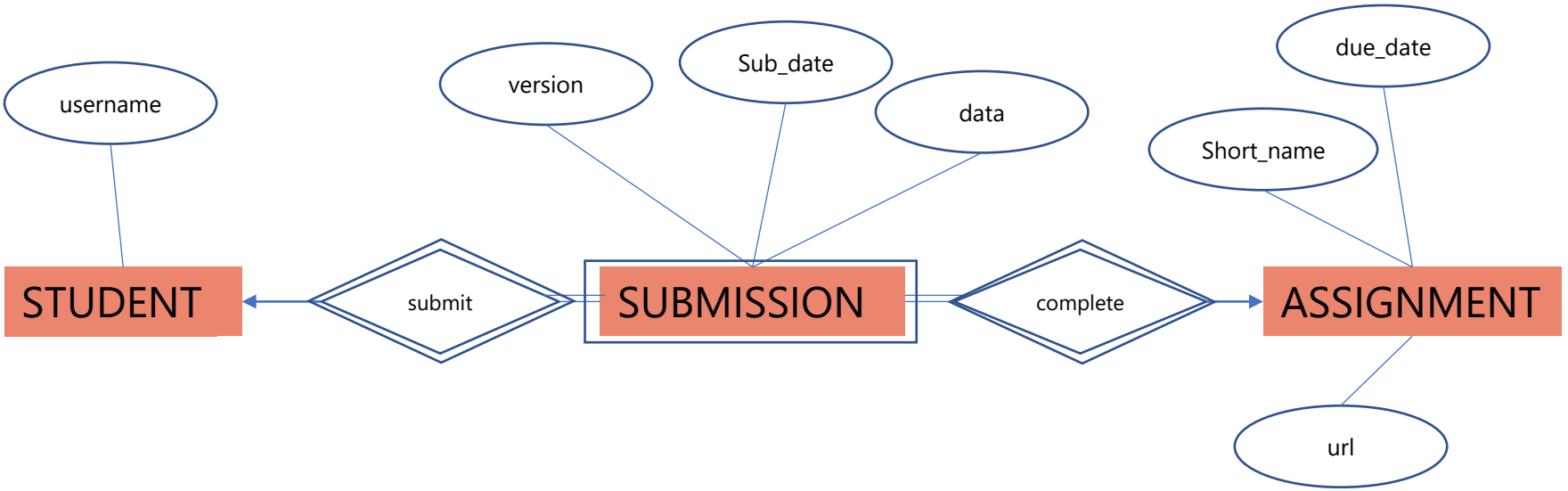

Can also make submission a weak entity-set – Both student and assignment are identifying entities.

Discriminator for submission is version number.

Placement of Relationship Attributes

3 Placement of Relationship Attributes

The cardinality ratio of a relationship can affect the placement of relationship attributes:
- One-to-Many: Attributes of 1:M relationship set can be repositioned to only the entity set on the many side of the Relationship.

- One-to-One: The relationship attribute can be associated with either one of the participating entities

- Many-to-Many: Here, the relationship attributes can not be represented to the entity sets; rather they will be represented by the entity set to be created for the relationship set

Design Methodologies

The guidelines that should be followed while designing an ER diagram are discussed below

1. Recognize entity sets.
2. Recognize relationship sets and participating entity sets.
3. Recognize attributes of entity sets and attributes of relationship sets.
4. Define binary relationship types and existence dependencies.
5. Define general cardinality, constraints, keys, and discriminators.

Design diagram.