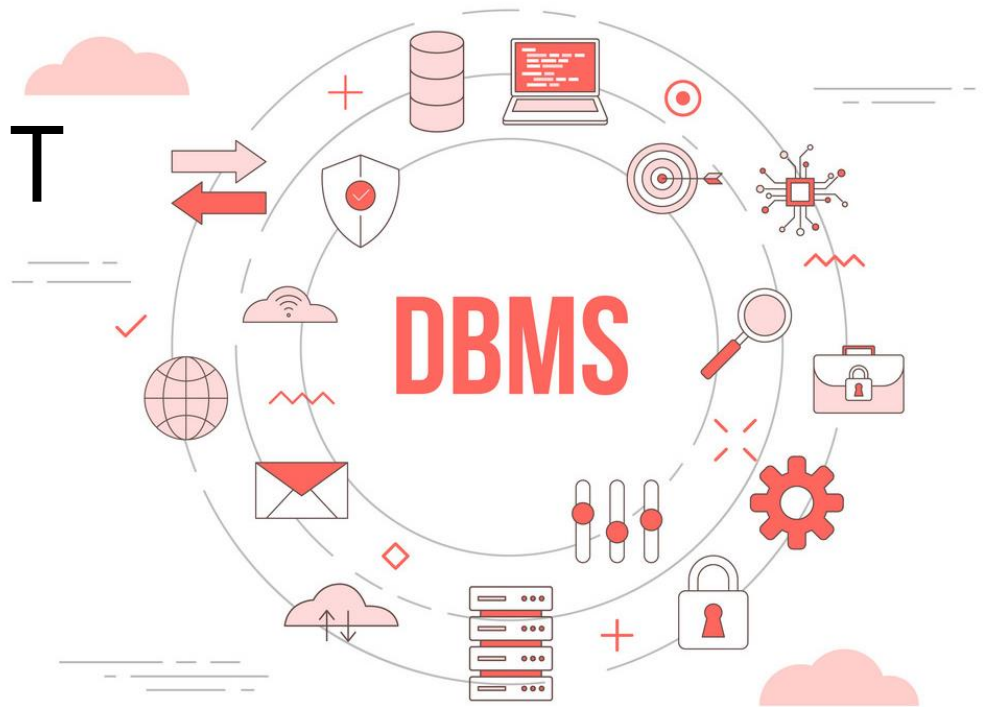


DATABASE MANAGEMENT SYSTEMS

Extended ER
Model

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Overview

Enhanced ER Model

Enhanced entity-relationship diagrams, which are sophisticated database diagrams very similar to normal ER diagrams, are used to describe the needs and complexity of intricate databases.

This diagrammatic style is used to illustrate the SubClass and SuperClass ie., Specialization and Generalization, Union or Category, Aggregation, etc.

Enhanced ER Model

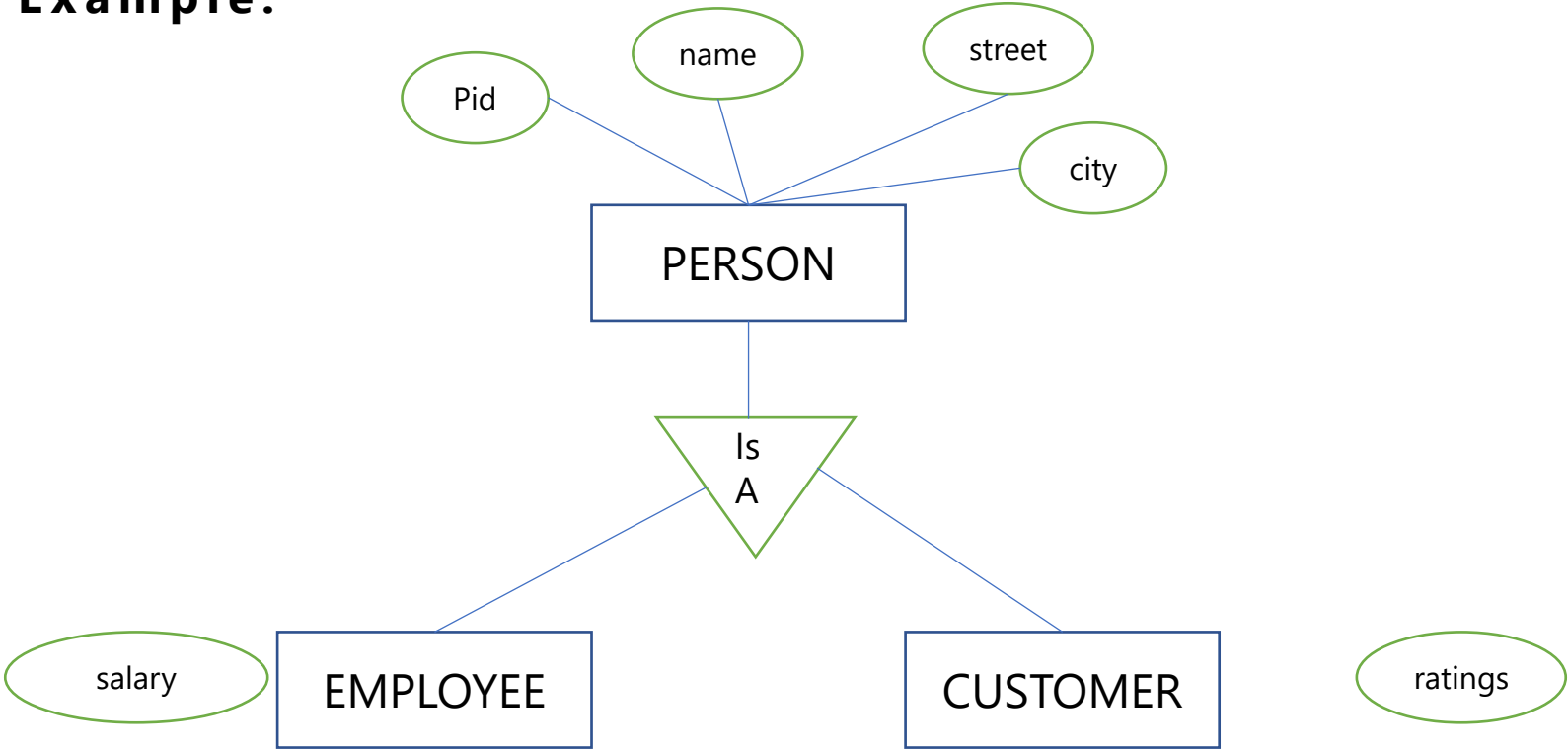
Generalization & Specialization

These two common types of relationships were included in the standard ER model to improve it. These are modelled after the object-oriented paradigm, where entities are separated into subclasses and superclasses and the code is divided into classes and objects.

Subclasses are specialised classes, whereas superclasses or base classes are generalist classes. By using "IS-A" analysis, we may understand about the idea of subclass.

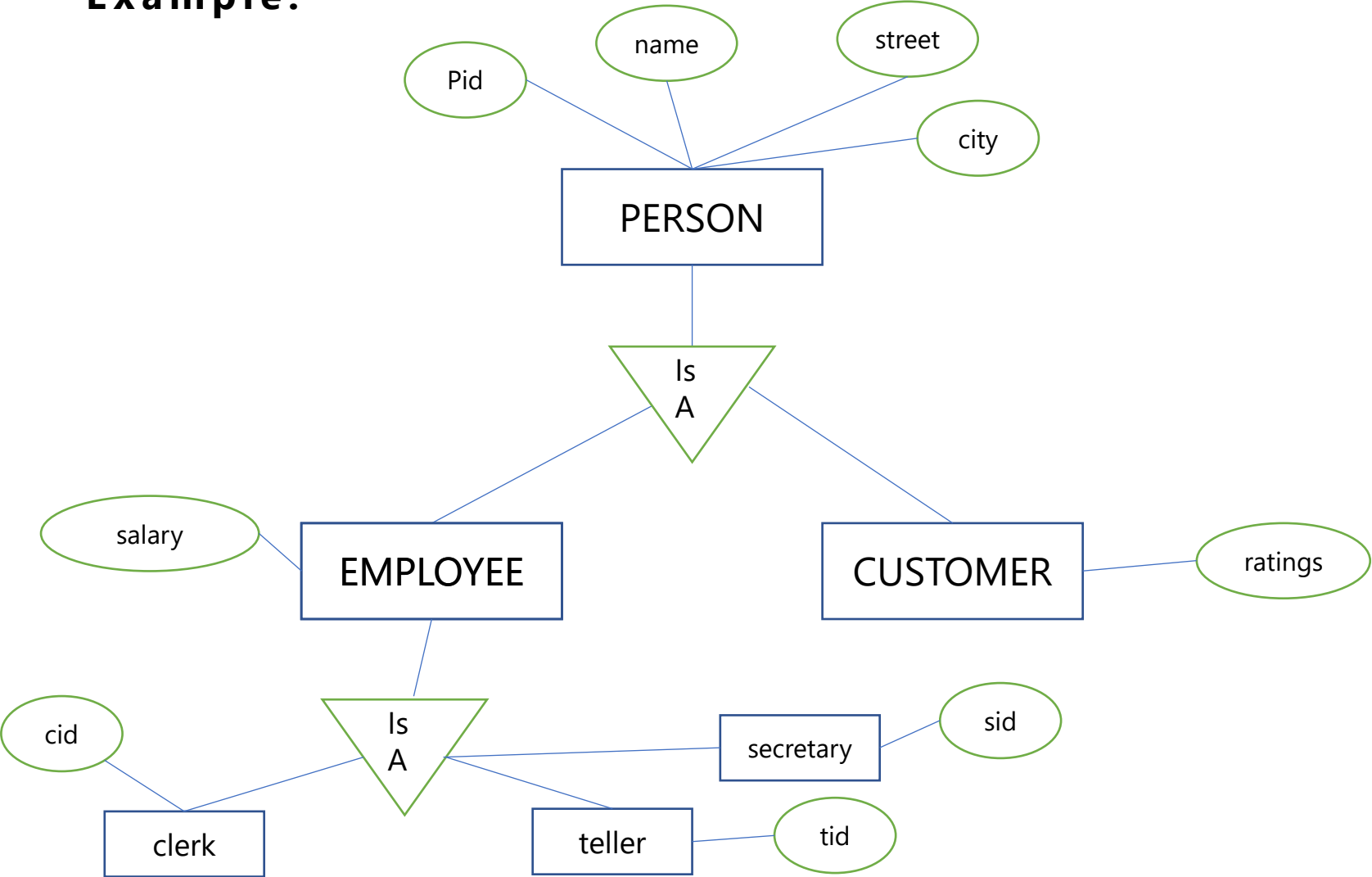
Enhanced ER Model

Example:



Enhanced ER Model

Example:

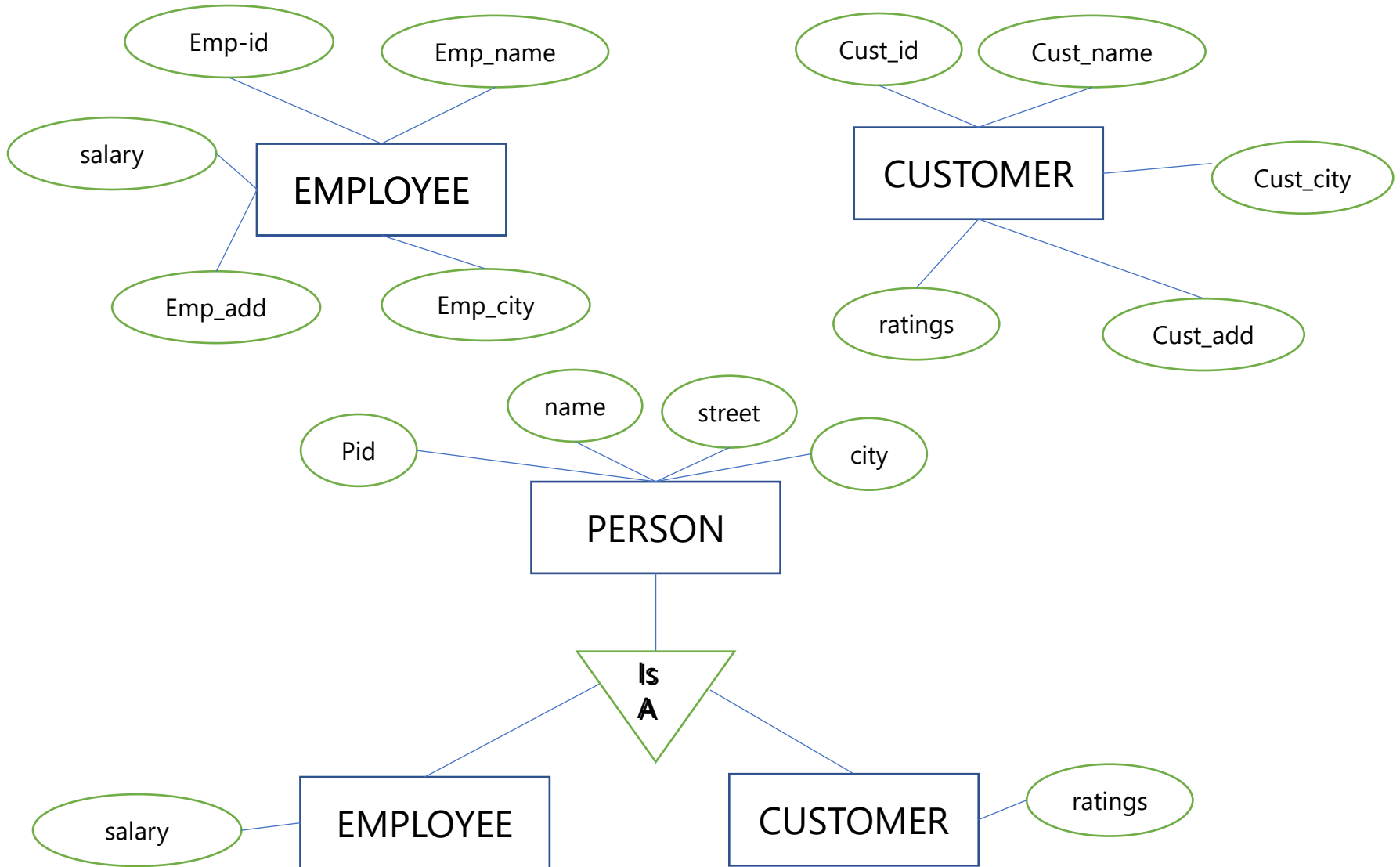


Generalization

The commonality can be expressed by Generalization, which is a containment relationship that exists between a higher-level entity set and one or more low-level entity sets

- The process of generalization involves transferring the attributes of one entity to all other generalized entities.
- In a bottom-up strategy, two lower-level entities are combined to create a higher-level entity.
- The opposite of specialization is generalization.
- From a collection of specialized entity types, it defines a generic entity type.
- By highlighting the shared characteristics, it reduces the differences between the entities.

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Constraints on Generalization/Specialization

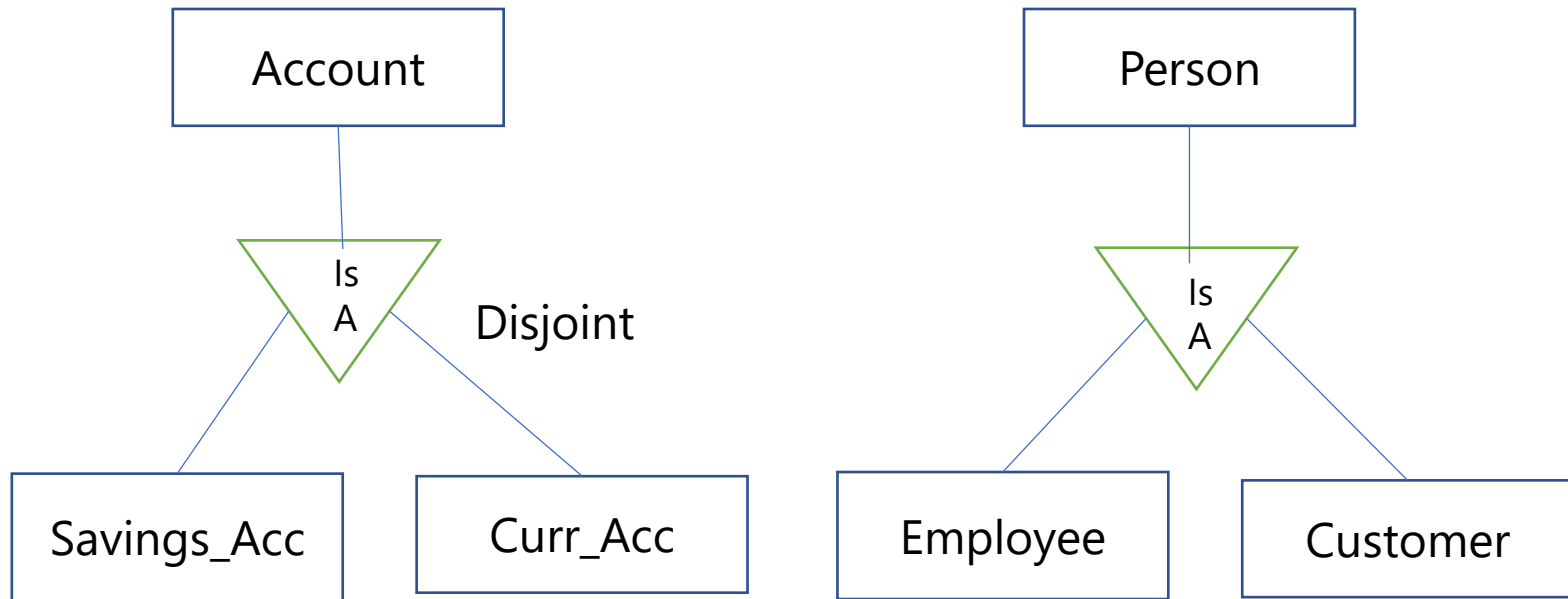
- **Condition-defined:** In condition defined lower-level entity sets, membership is evaluated on the basis of whether or not an entity satisfies an explicit condition or predicate. Since all the lower-level entities are evaluated on the basis of the same attribute, this type of generalization is also said to be attribute-defined
- **User-defined:** User-defined lower-level entity sets are not constrained by a membership condition; rather, the database user assigns entities to a given entity set

Cont...

Disjoint or Overlapping

- Disjoint: A Disjointness constraint requires that an entity belong to only one lower-level entity set
- Overlapping: In overlapping generalizations, the same entity may belong to more than one lower-level entity set within a single generalization.
- Lower-level entity overlap is the default case. A disjointness constraint must be placed explicitly on a generalization. This is done by adding the word disjoint next to the ISA symbol

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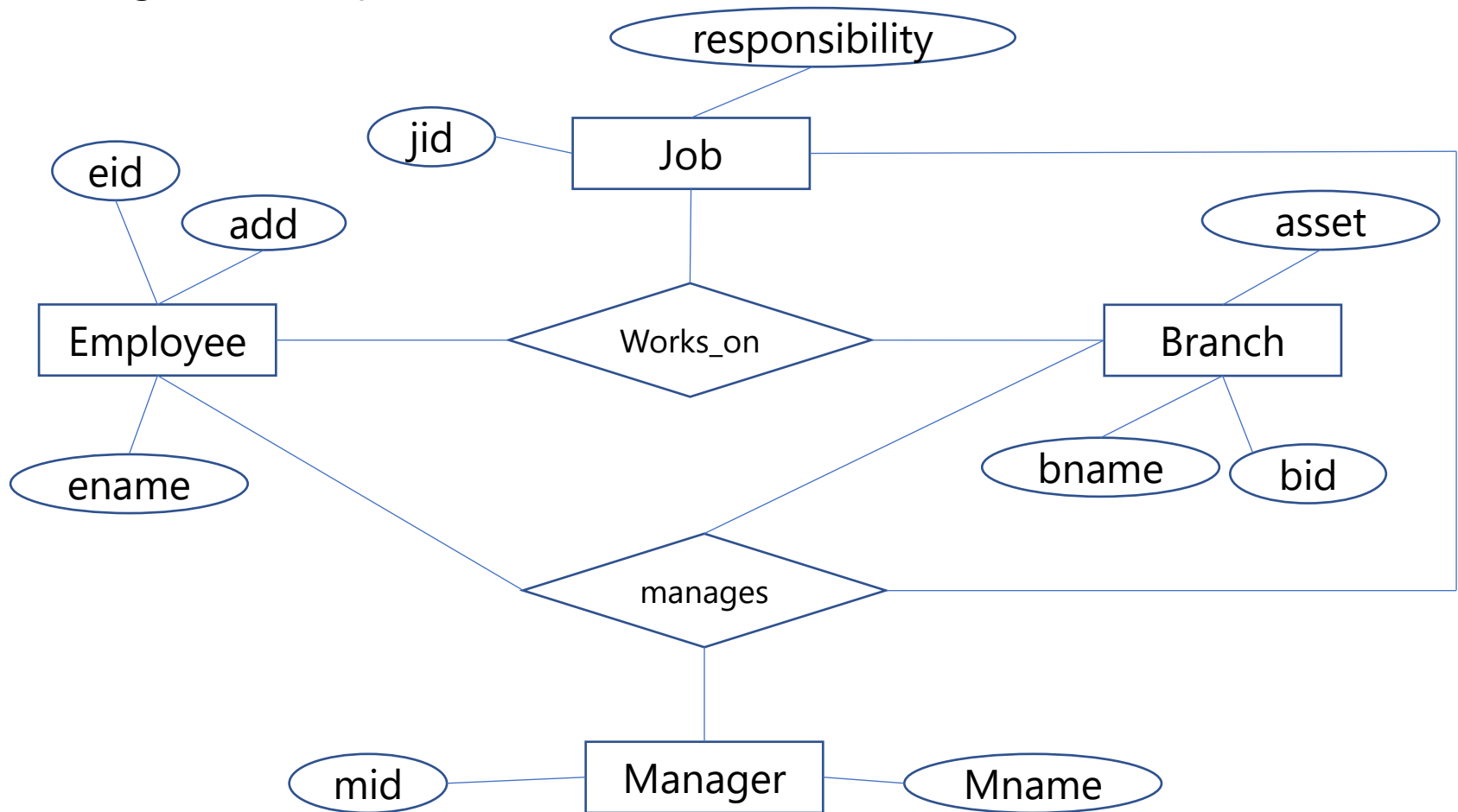
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Completeness Constraint

- Completeness constraint on a generalization/specialization specifies whether or not an entity in the higher-level entity set must belong to at least one of the lower-level entity sets within the generalization/specialization
- Total generalization/specialization: Each higher-level entity must belong to a lower-level entity set
- Partial generalization/specialization: Some higher-level entities may not belong to any lower-level entity set
- Partial generalization is the default. Total generalization in an ER diagram can be specified by using a *double line* to connect the box representing the higher-level entity set to the triangle symbols

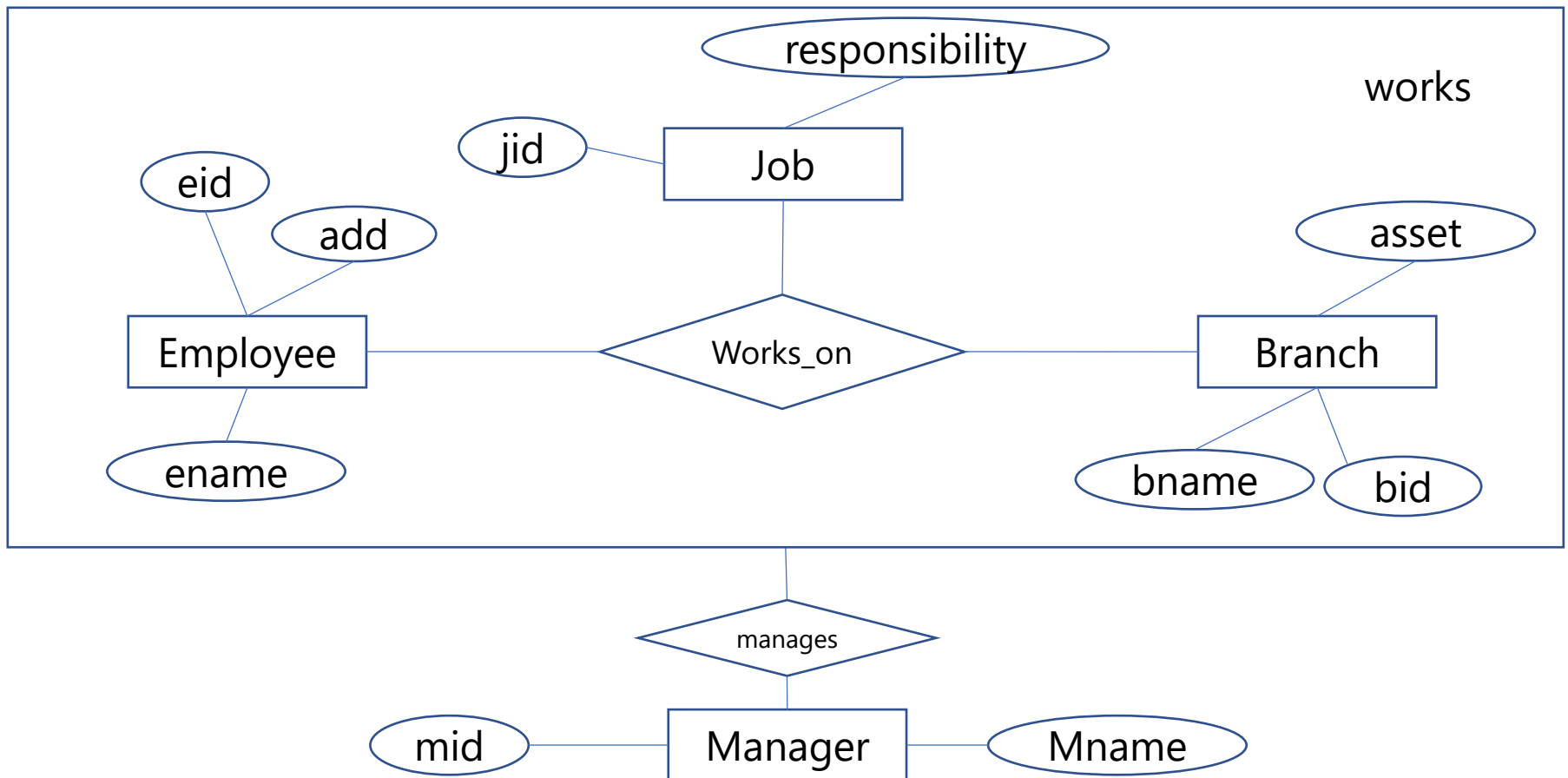
Aggregation

One limitation of the ER model is that it can not express relationship among relationships



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Relationships are handled as higher-level entities through the abstraction of aggregation. In order to participate in (other) relationships, we can treat a relationship set as an entity set by means of aggregation.



Discussions

Why and when you should use enhanced entity relationship EER model?