Database Management System 8

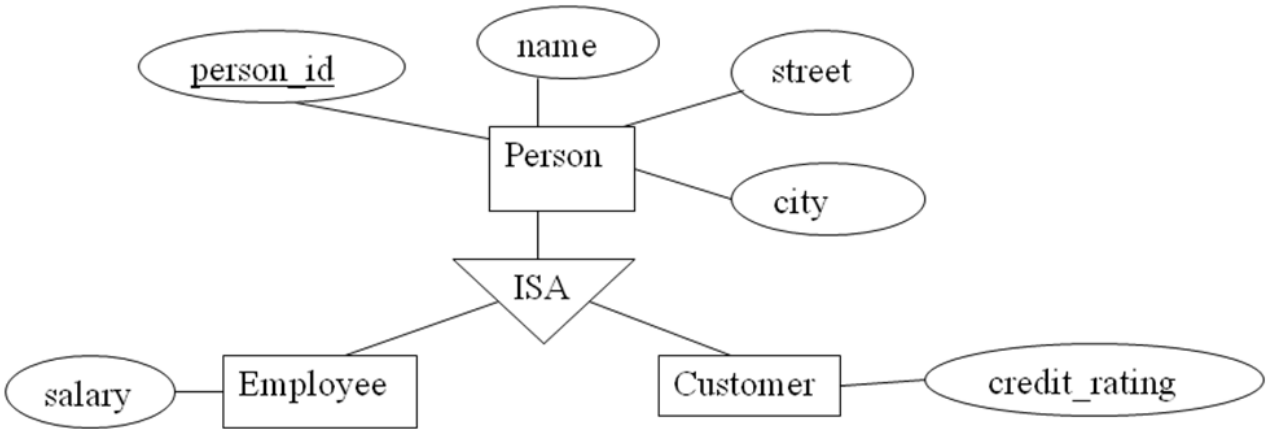
Enhanced ER-Model

Chittaranjan Pradhan
School of Computer Engineering,
KIIT University

Specialization

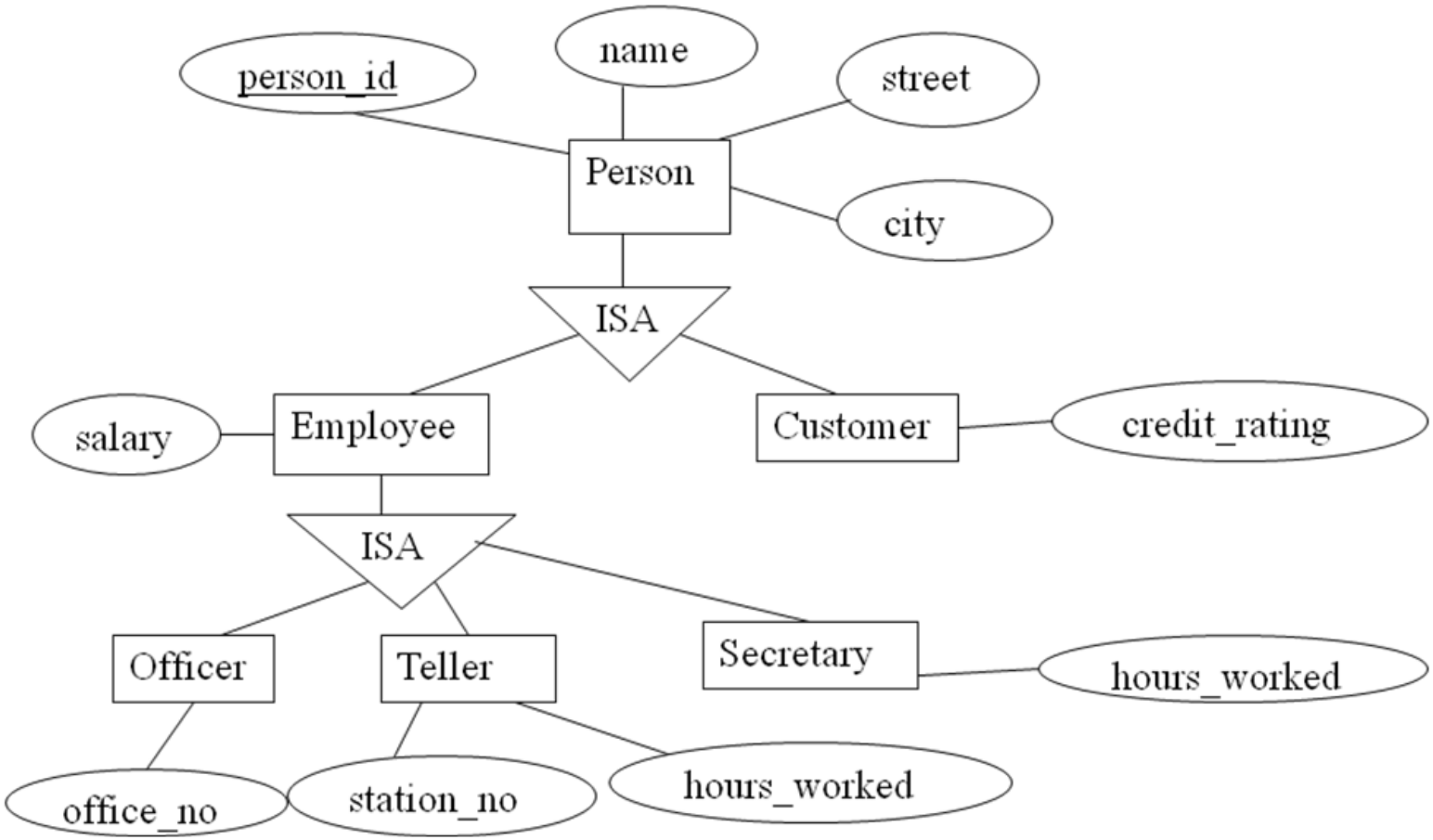
Specialization

The process of designating sub groupings within an entity set is called Specialization. An entity set may be specialized by more than one distinguishing features. ER-design, specialization is depicted by a Triangle component labeled ISA (is a)



Specialization...

We can apply specialization repeatedly to refine a design scheme



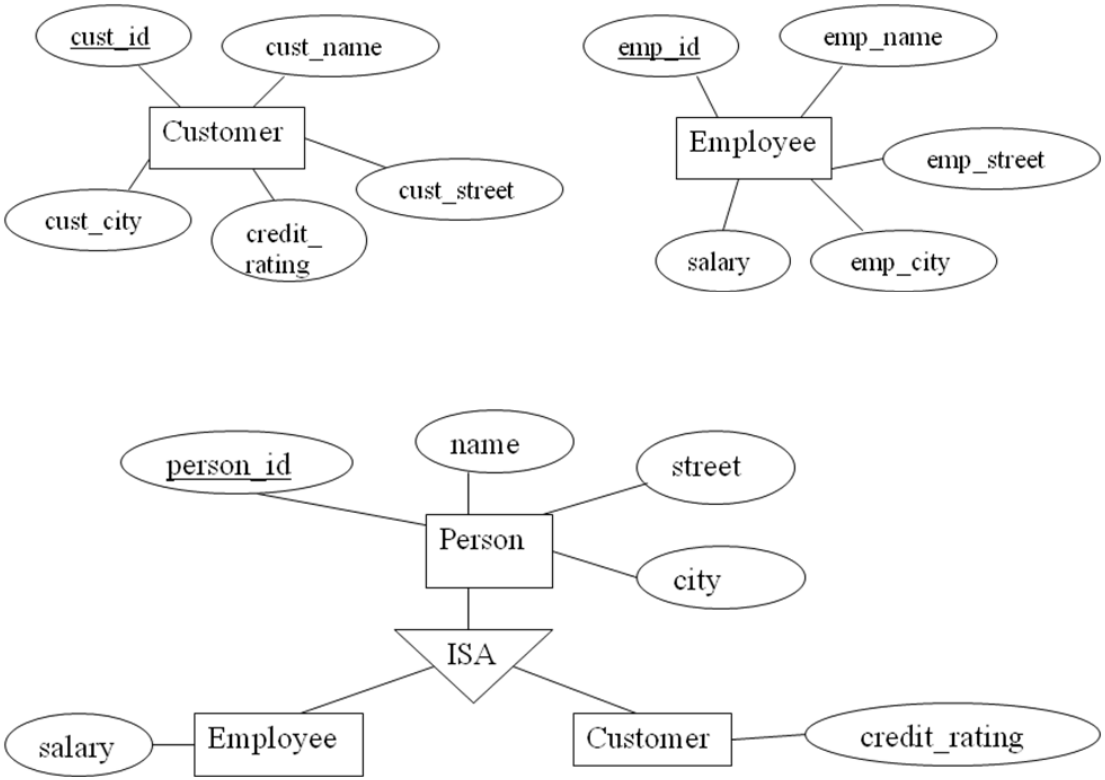
Generalization

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

- To create a generalization, the attributes must given a common name and represented with the higher-level entity
- Generalization is a simple inversion of specialization
- Specialization adopts *top-down* approach, while Generalization adopts *bottom-up* approach
- A crucial property of the higher-level and lower-level entities created by specialization and generalization is attribute inheritance
- A lower-level entity set (or subclass) also inherits participation in the relationship sets in which its higher-level entity (or superclass) participates

Generalization...



Constraints on Generalization/Specialization

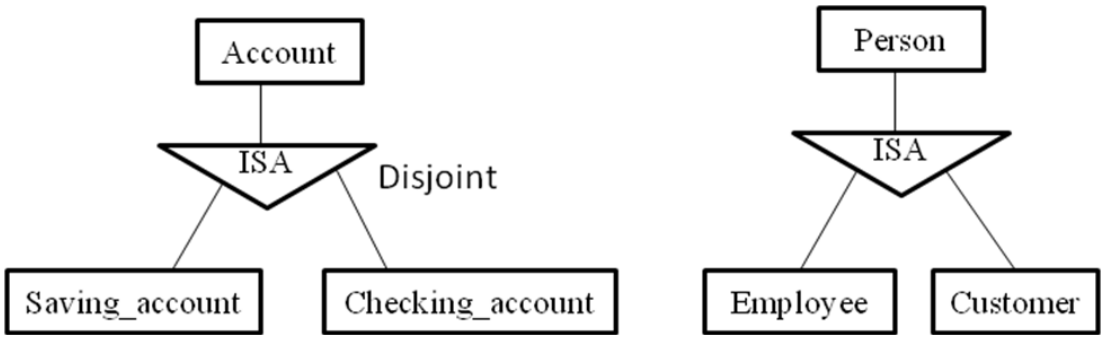
a. Condition defined or not

- **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

Constraints on Generalization/Specialization...

b. 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



Constraints on Generalization/Specialization...

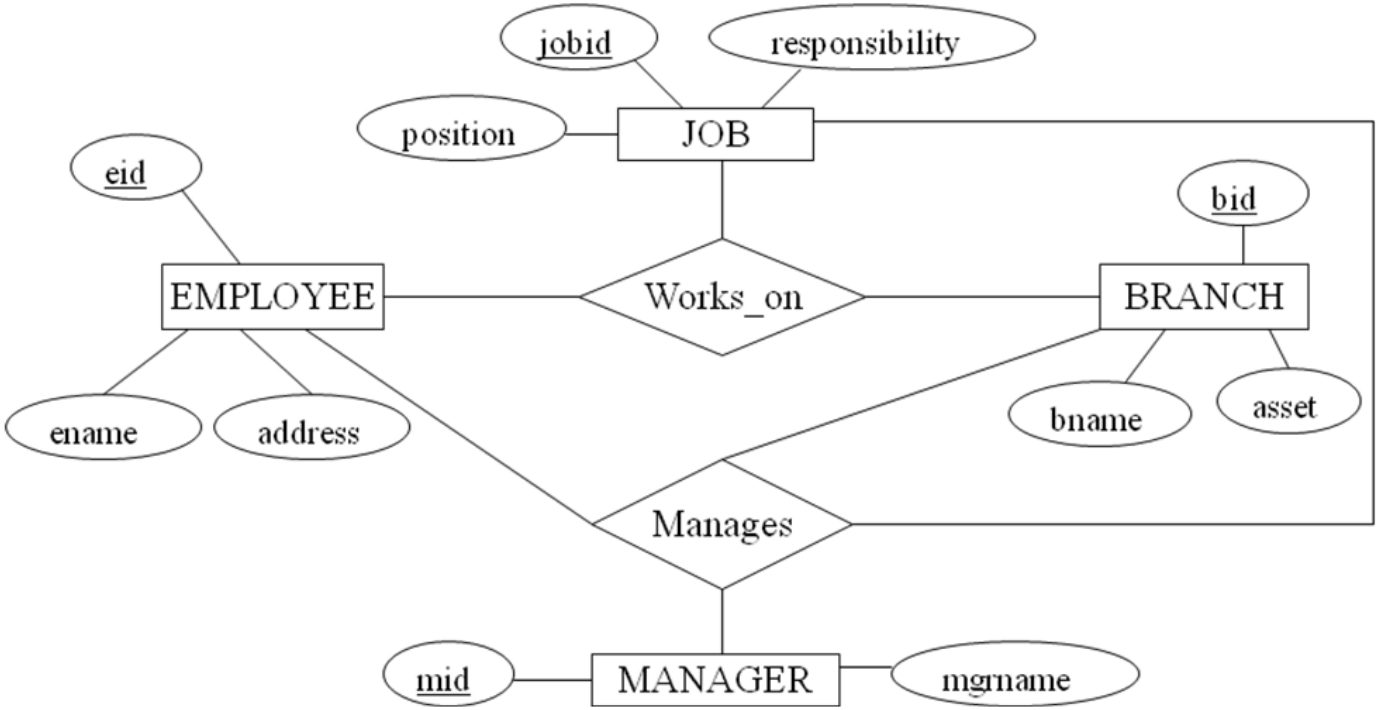
c. Completeness Constraint

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



Aggregation...

Aggregation

Aggregation *is an abstraction through which relationships are treated as higher-level entities*. Thus, aggregation allows us to treat a relationship set as an entity set for the purposes of participation in (other) relationships