Database Management System (DBMS)

Lecture-11

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Specialization

The process of designating subgroupings within an entity set is called specialization.
be further classified as one of the following:

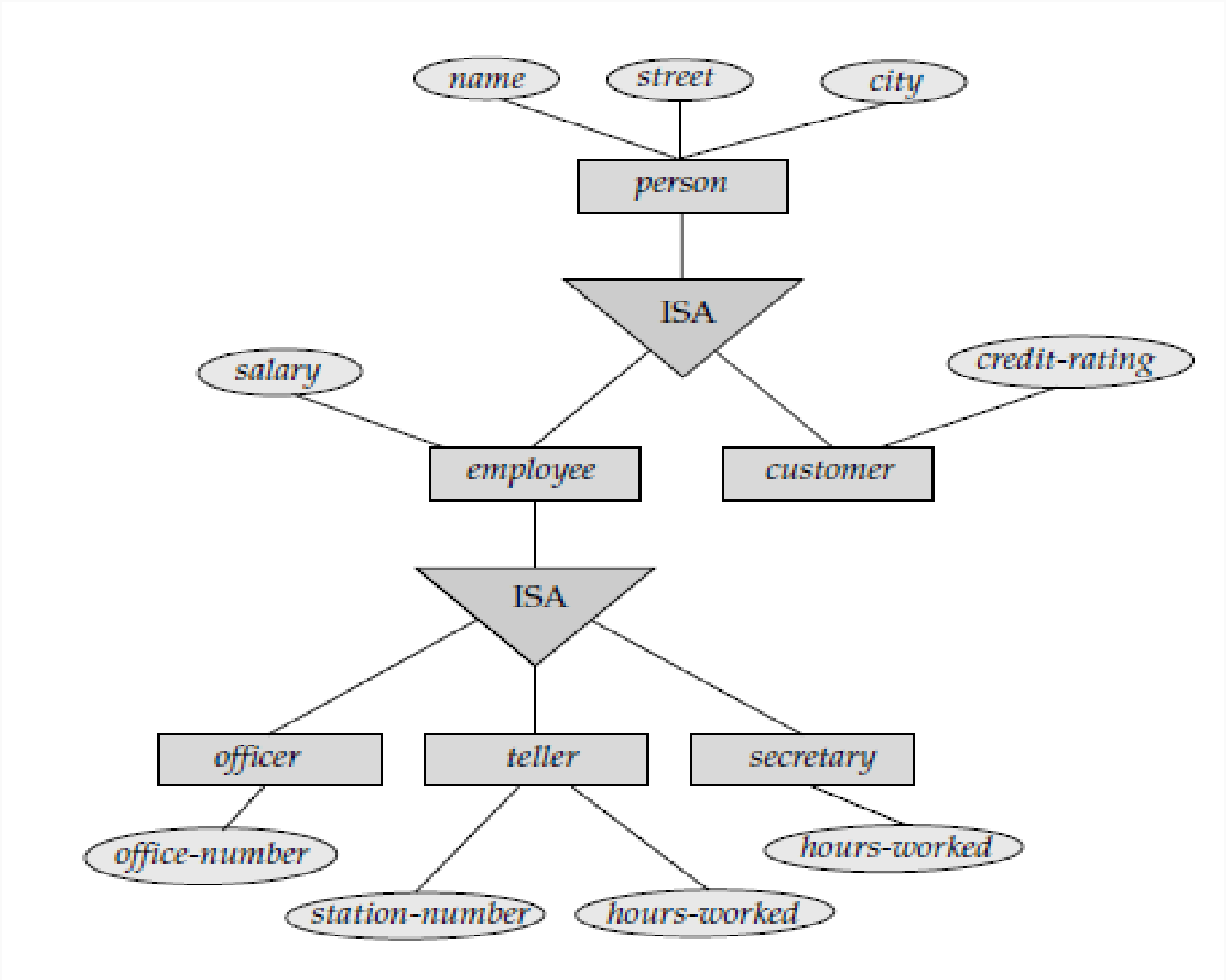
- customer
- employee

Each of these person types is described by a set of attributes that includes all the attributes of entity set person plus possibly additional attributes. For example, customer entities may be described further by the attribute customer-id, whereas employee entities may be described further by the attributes employee-id and salary.

Extended E-R Features

In terms of an E-R diagram, specialization is depicted by a triangle component labeled ISA, as shown in the following figure. The label ISA stands for "is a". The ISA relationship may also be referred to as a superclass-subclass relationship. Higher- and lower-level entity sets are depicted as regular entity sets that is, as rectangles containing the name of the entity set.

Extended E-R Features



Generalization

- Generalization is a containment relationship that exists between a higher-level entity set and one or more lower-level entity sets.
- Generalization is a bottom-up design process that combines the number of entity sets that share the same features into higher level entity sets.
- Generalization and specialization are simple inversions of each other. They are represented in an E-R diagram in the same way.
- In E-R diagram, generalization is also represented by triangle symbol "ISA" just like specialization.
- Same E-R diagram is used to represent specialization and generalization.

Extended E-R Features

Example: In generalization process, database designer may have first identified a customer entity set with the attributes name, street, city, and customer-id, and an employee entity set with the attributes name, street, city, employee-id, and salary.

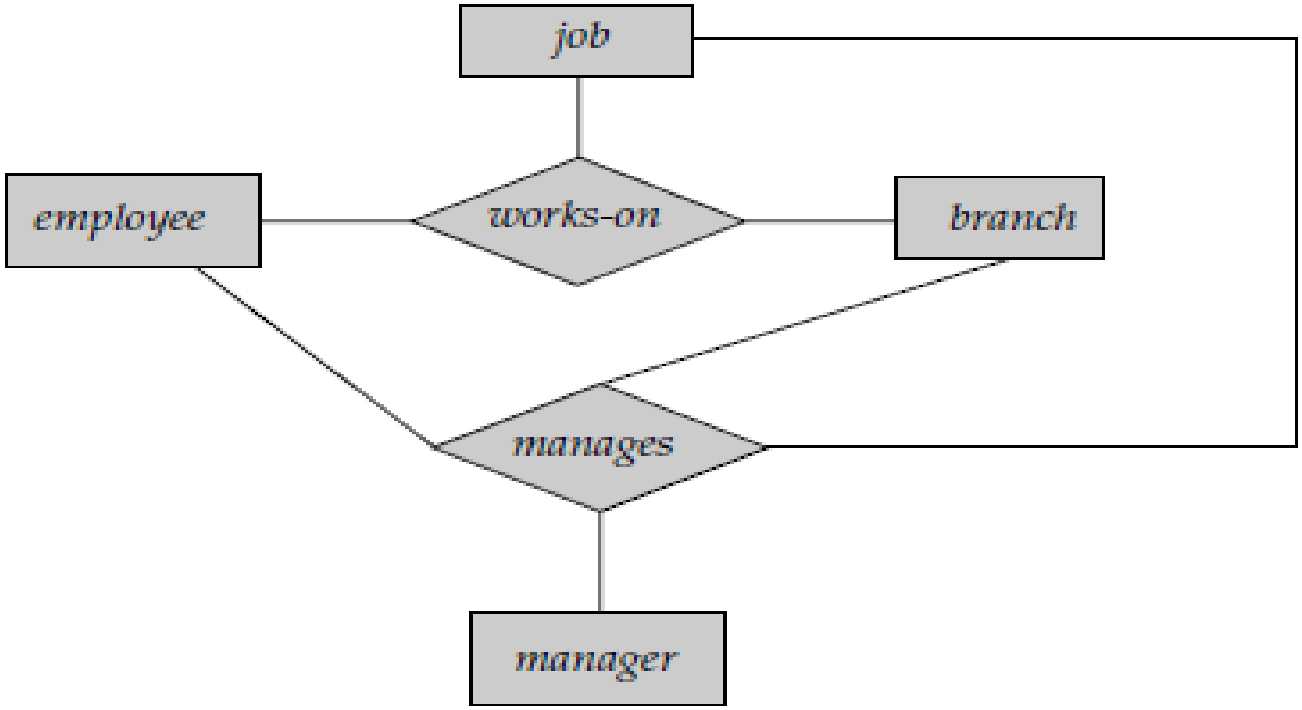
There are similarities between the customer entity set and the employee entity set in the sense that they have several attributes in common. This commonality can be expressed by generalization.

Aggregation

- Aggregation is an abstraction through which relationships are treated as a higher level entity sets and can participate in relationships.
- Aggregation allows us to indicate that a relationship set participates in another relationship sets.

Extended E-R Features

Example: Consider the following E-R diagram:-



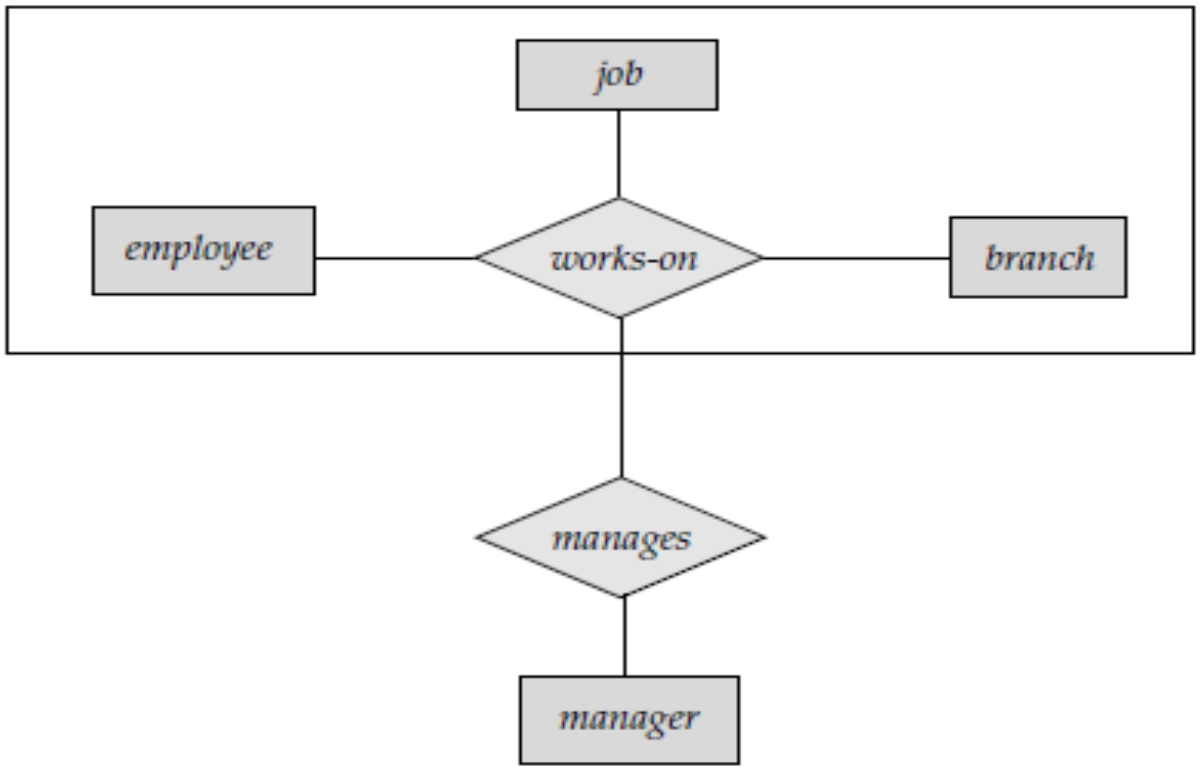
E-R diagram with redundant relationships

Extended E-R Features

There is redundant information in the above figure, however, since every employee, branch, job combination in manages is also in works-on. If the manager were a value rather than an manager entity,we could instead make manager a multi-valued attribute of the relationship works-on.

Using aggregation, the relationship set works-on (relating the entity sets employee, branch, and job) is treated as a higher-level entity set called works-on. Such an entity set is treated in the same manner as is any other entity set. We can then create a binary relationship manages between works-on and manager to represent who manages what tasks. It is shown in the following figure:-

Extended E-R Features



E-R diagram with aggregation

Example:

Draw the E-R model or diagram for banking enterprise.

Solution: To design E-R model corresponding to any enterprise, we follow the following steps:-

- **Data requirements**
- **Entity Sets Designation**
- **Relationship Sets Designation**
- **Identify attributes**
- **Identify mapping cardinality of each relationship**

Extended E-R Features

E-R diagram for banking enterprise is the following:-