

# Database Laboratory

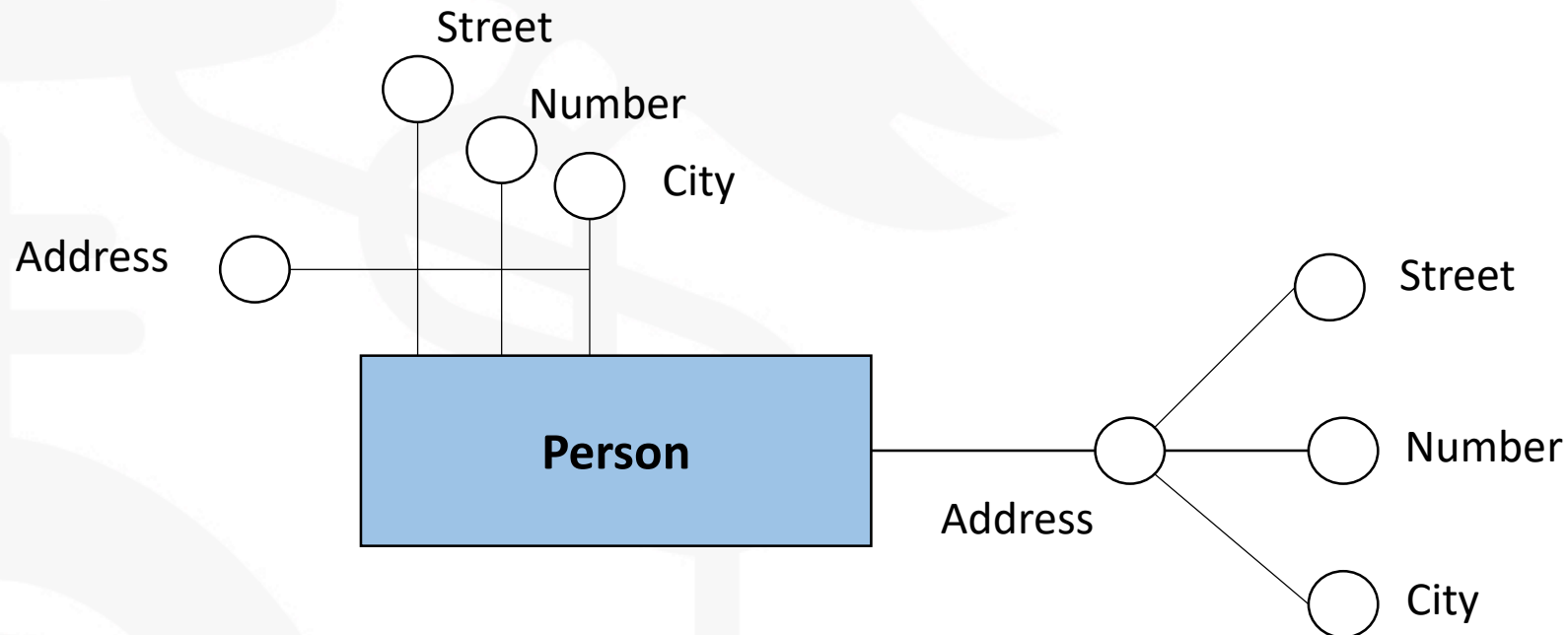
## Lesson 3

Extended E/R Model

# Attributes

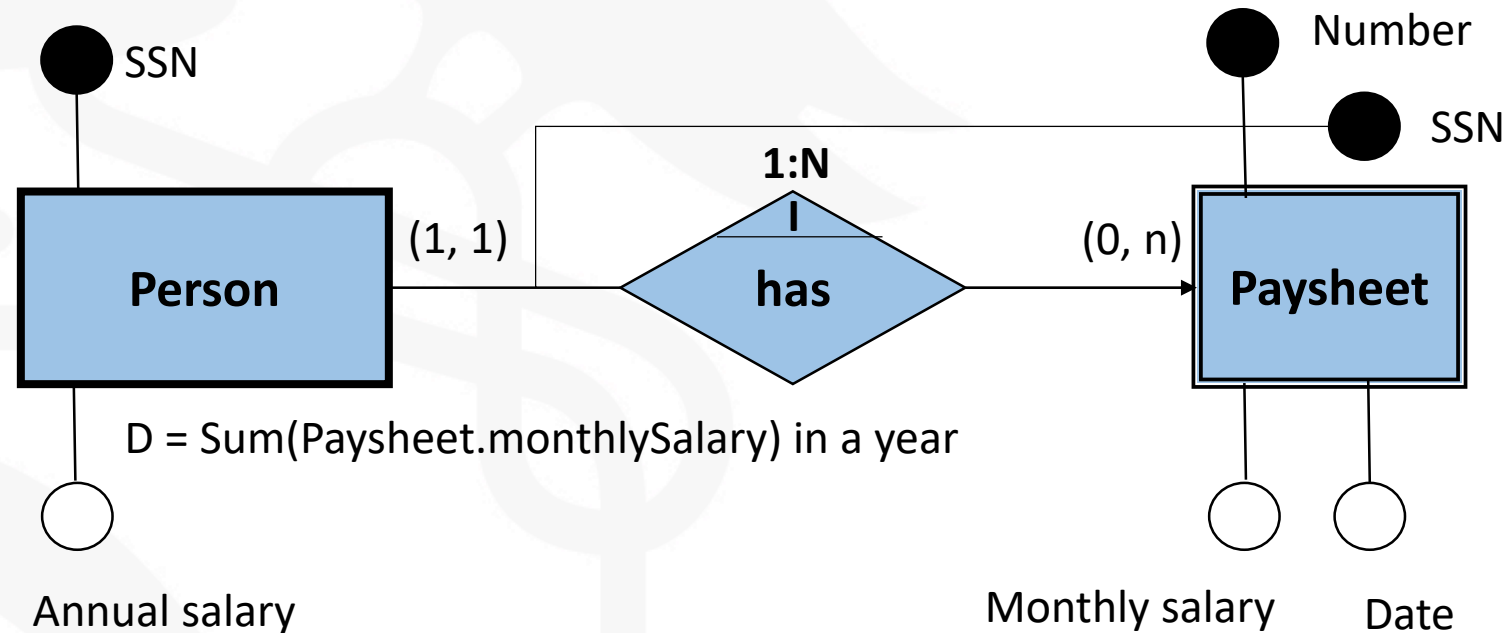
# Composite attributes

- Group of related attributes
- They allow to make clearer designs



# Derived attributes

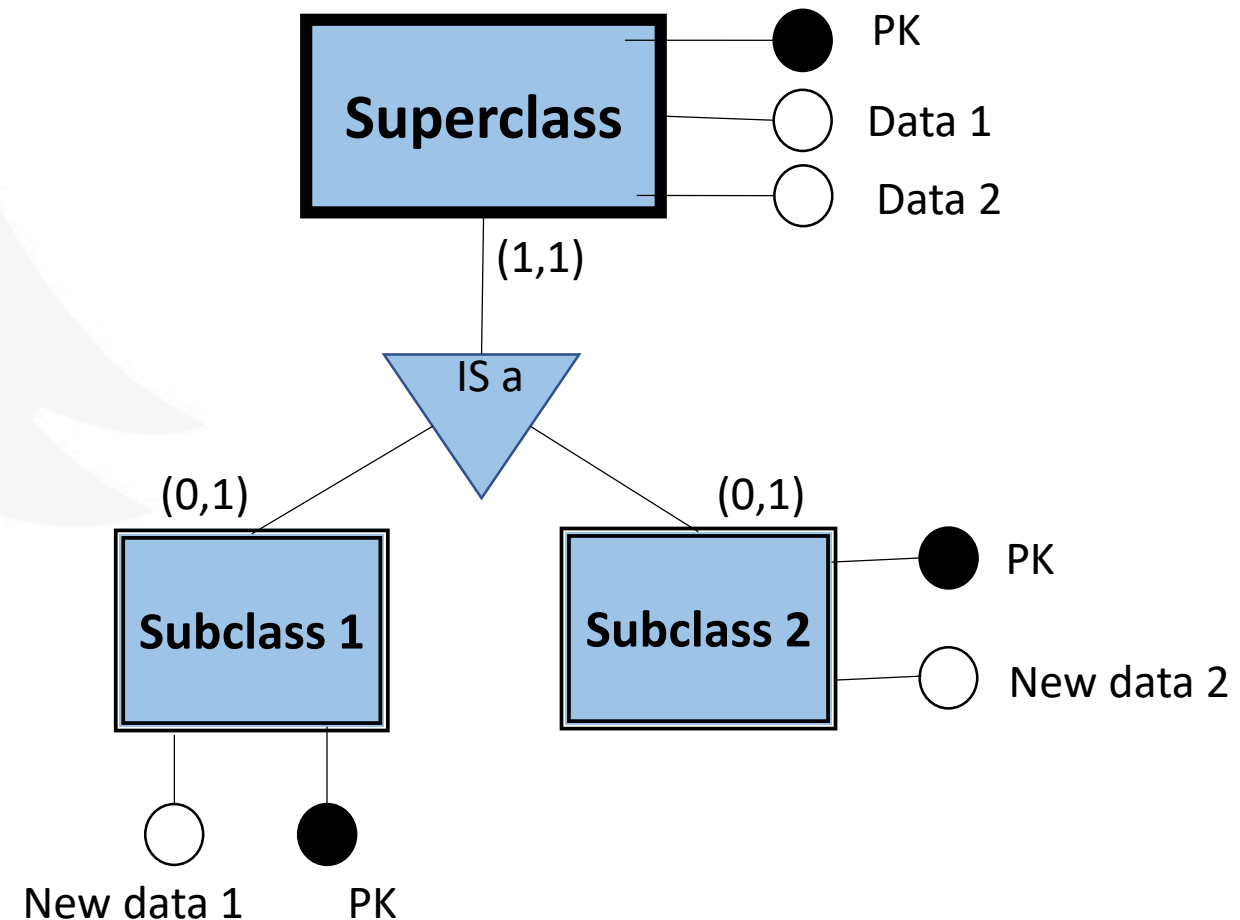
- Their value can be obtained using the value of other attributes
  - They are only calculated when necessary
- They are not stored in the database



# Relationships

# Hierarchy

- Specialization: Top-down design process
- Generalization: Bottom-up design process
- An inheritance relationship is established between the entities
  - The lower-level entities inherit attributes
  - And participate in relationships of the superclass



# Design Constraints

- Constraint on whether or not entities may belong to more than one lower-level entity set.
  - **Disjoint**
    - an entity can belong to **only one** lower-level entity set (a person is a man or a woman)
  - **Overlapping**
    - an entity can belong to **more than one** lower-level entity set (a student can be a football player and a baseball player)

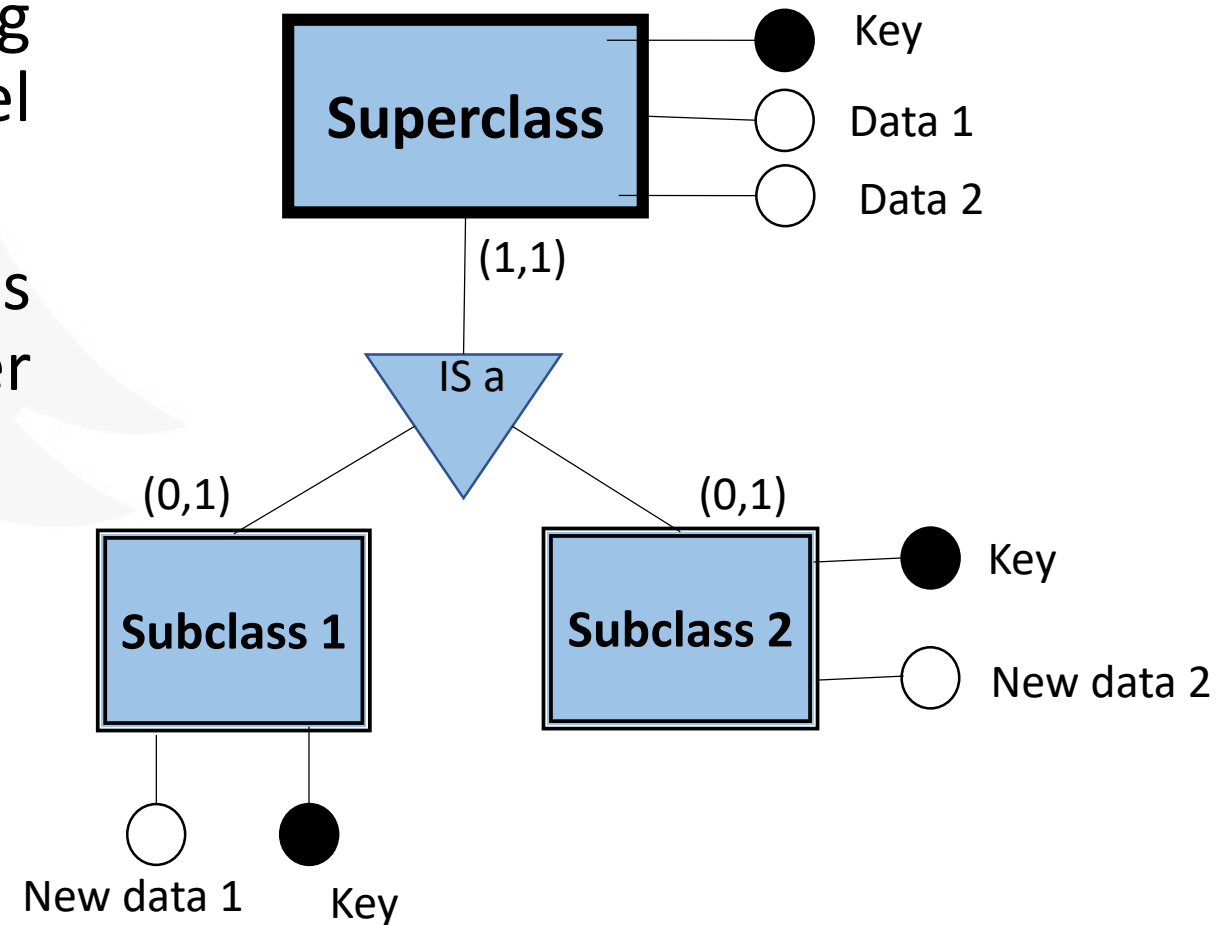
# Design Constraints

- Constraint on whether or not an entity in the higher-level entity set must belong to at least one of the lower-level entity sets.
  - **total**: an entity **must belong to one** of the lower-level entity sets (every person is a man or a woman)
  - **partial**: an entity **need not belong to one** of the lower-level entity sets (a student is a football player or a baseball player. Not all students play sports)



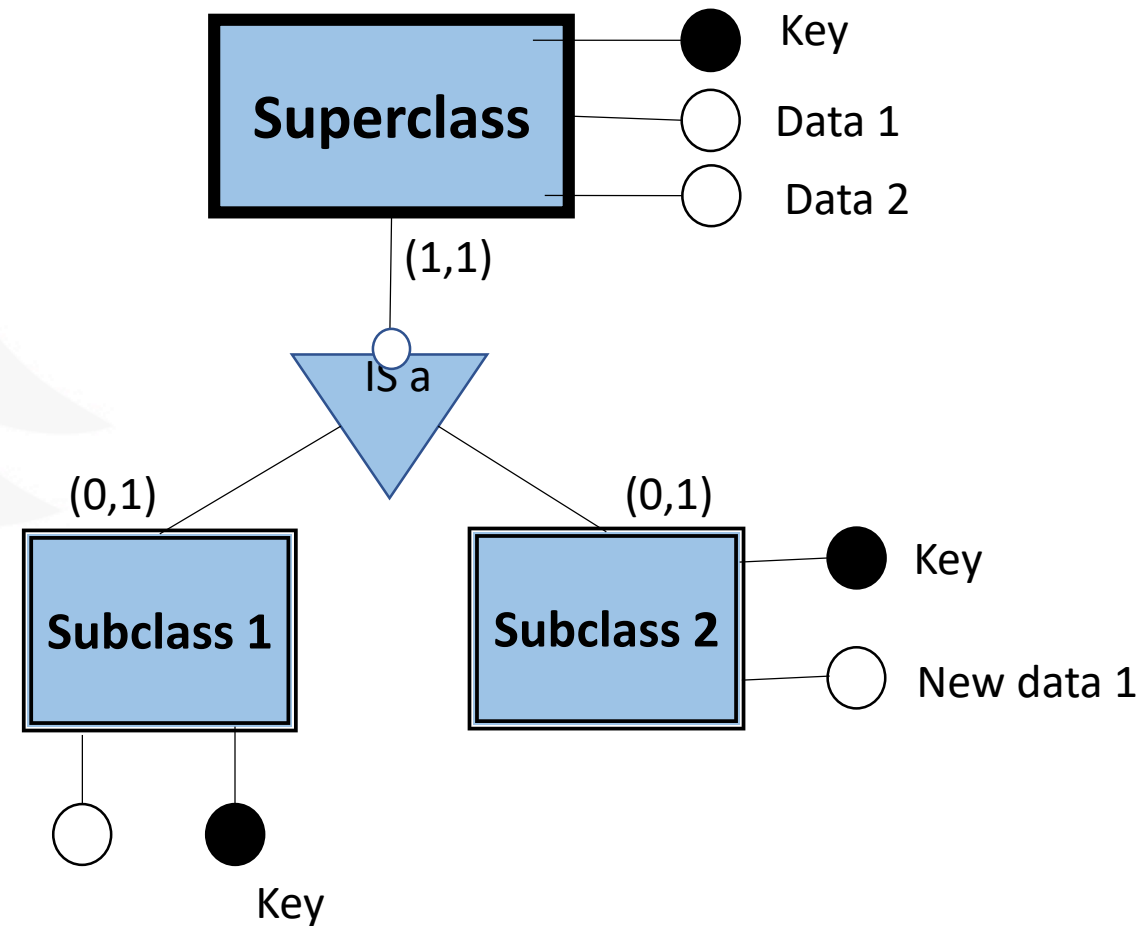
# Hierarchy. Overlapping and partial

- Overlapping: An entity can belong to more than one set of lower level entities.
- Partial: some higher level entities may not belong to any set of lower level entities.



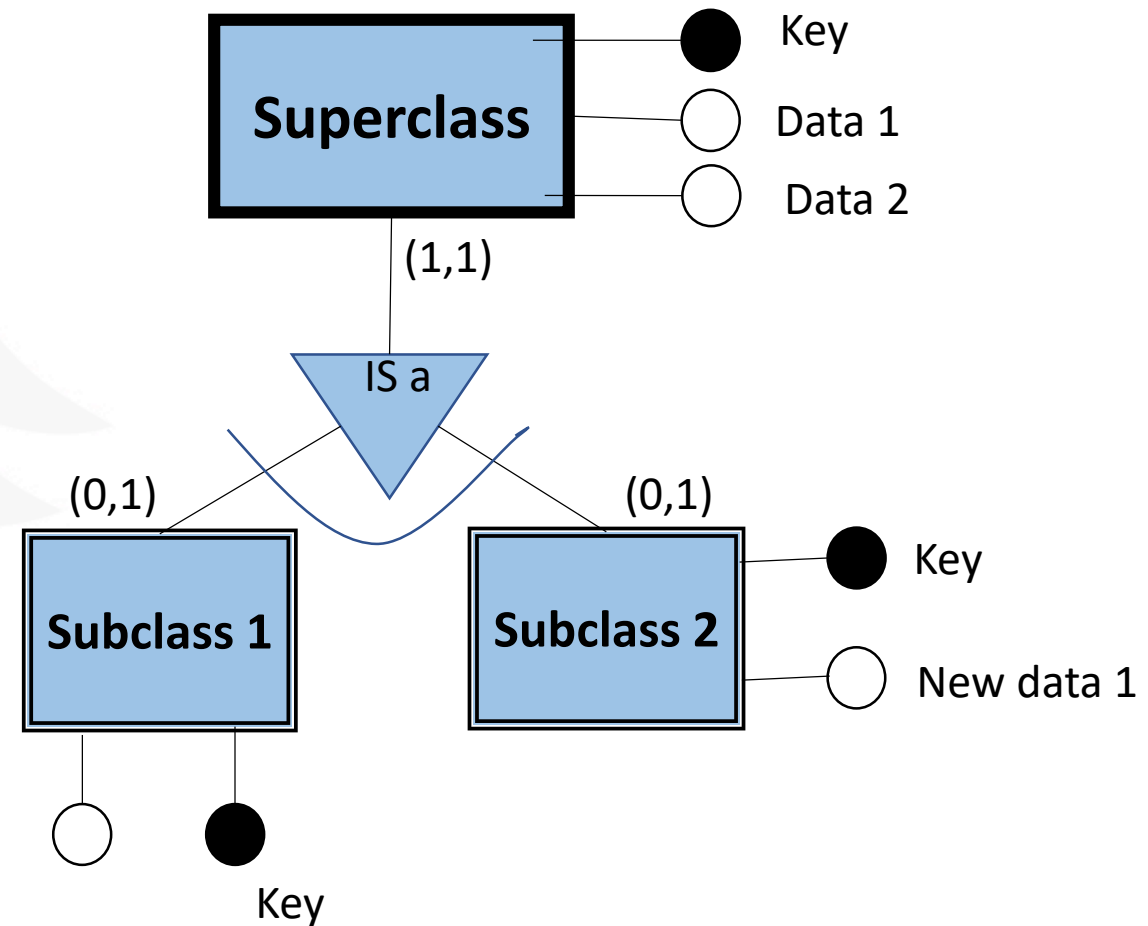
# Hierarchy. Overlapping and total

- Overlapping: An entity can belong to more than one set of lower level entities.
- Total: all higher level entities must belong to a set of lower level entities.



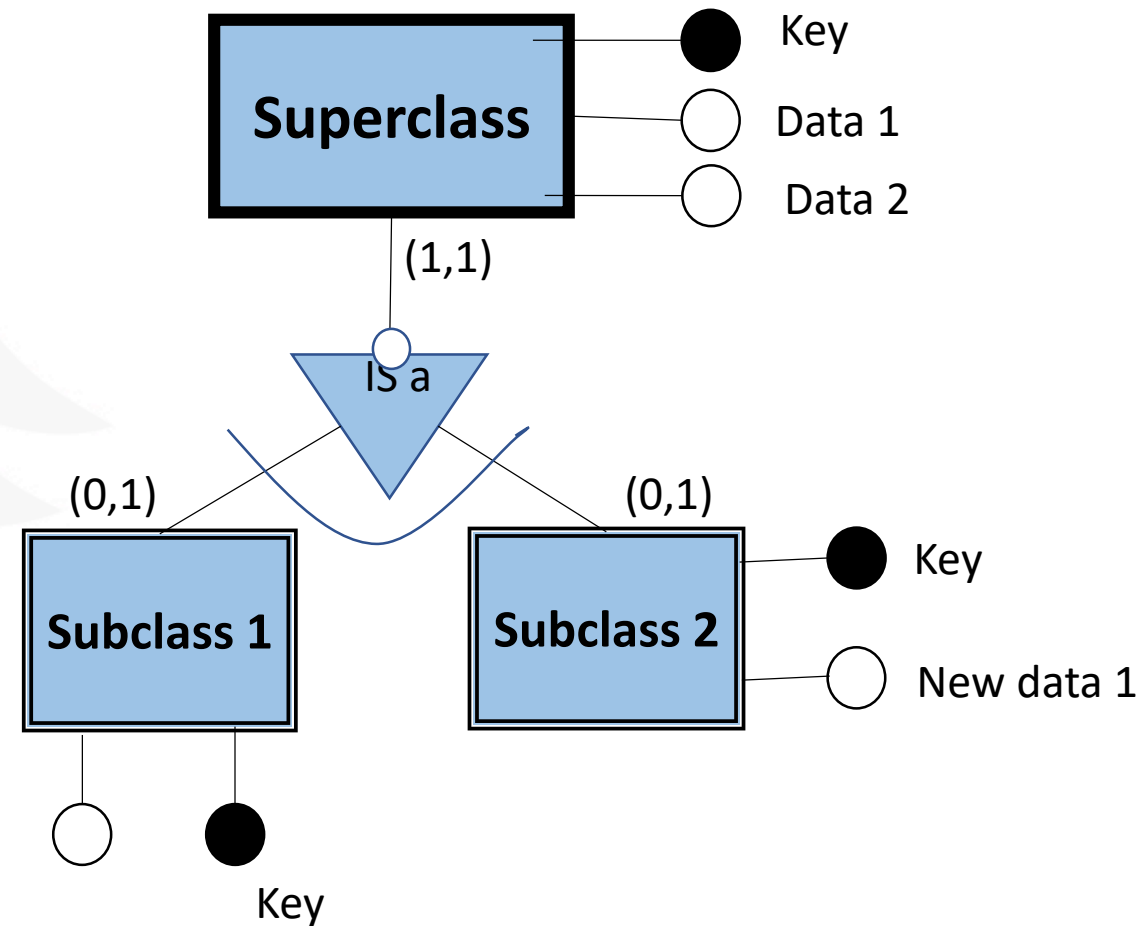
# Hierarchy. Disjoint and partial

- Disjoint: An entity cannot belong to more than one set of lower level entities.
- Partial: some higher level entities may not belong to any set of lower level entities.



# Hierarchy. Disjoint and total

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- Total: all higher level entities must belong to a set of lower level entities.



# Aggregation

# Aggregation

- The ER model limits us, since we cannot express relationships among relationships
- A new entity is built as a composition of other elements (entities and relationships)
- It provides a higher level of abstraction

# Aggregation - Example

- A company interviews a candidate because it has a vacant to cover.



- Some interviews result in a job offer while other do not. How can we model this?

# Aggregation - Example

