Chapter 2
Entity Relationship Modeling

Department: Computer
Course: DBMS
Faculty: Sana Shaikh

Quick Recap

- Constraints on Relationship
  - Cardinality of a Relationship
  - Relationship Participation
- Attributes on Relationship
- Weak Entity
- How to Evaluate a Data Model?
- Solved examples

Topics to be covered:

- **Quick Recap**
- Extended Entity-Relationship (EER) Model:
  - Generalization
  - Specialization
  - Aggregation
- Solving Examples

Learning Outcomes:

Students should be able to:

- Define the following terms: Generalization, Specialization, Aggregation
- Understand the need of EER concepts
- Apply constraints on Generalization and Specialization, for any real world problems
- Design ER and EER diagram for real life applications

Enhanced Entity Relationship (EER) Model

- Specialization
- Generalization
- Aggregation

Super class & sub class Entity type

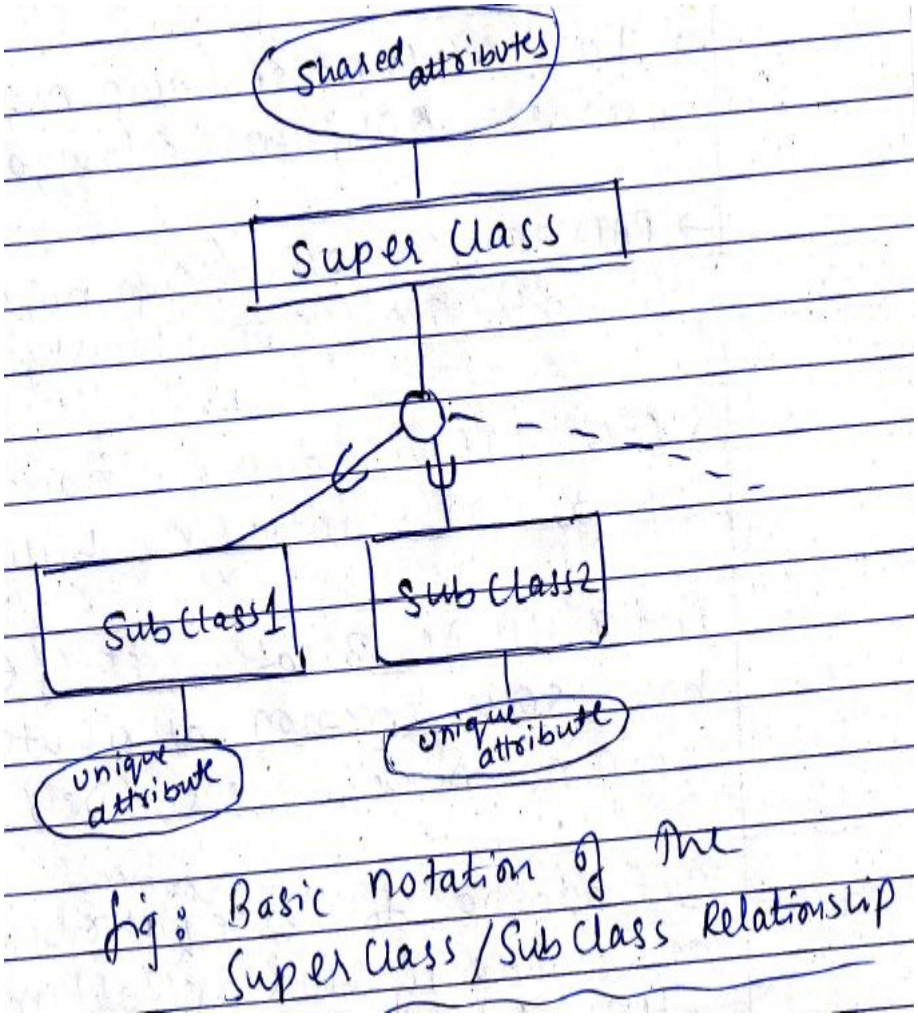
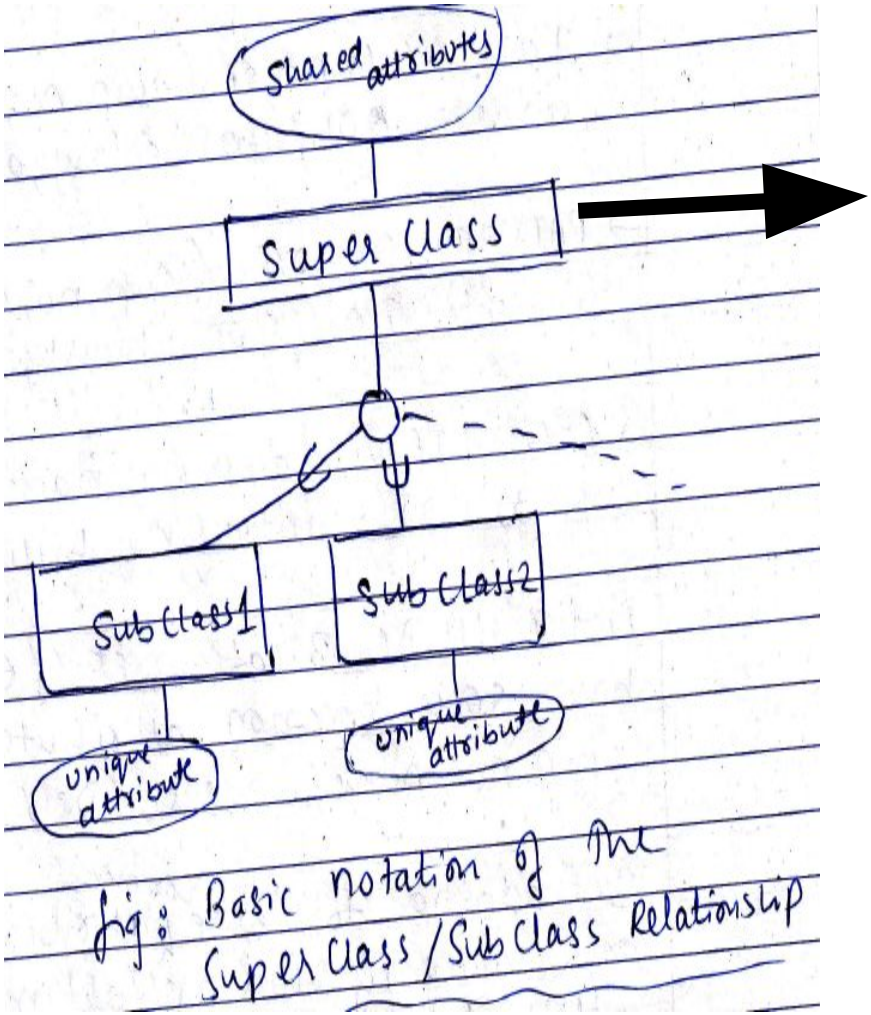


fig: Basic Notation of the Super Class / Sub Class Relationship

Super class & sub class Entity type



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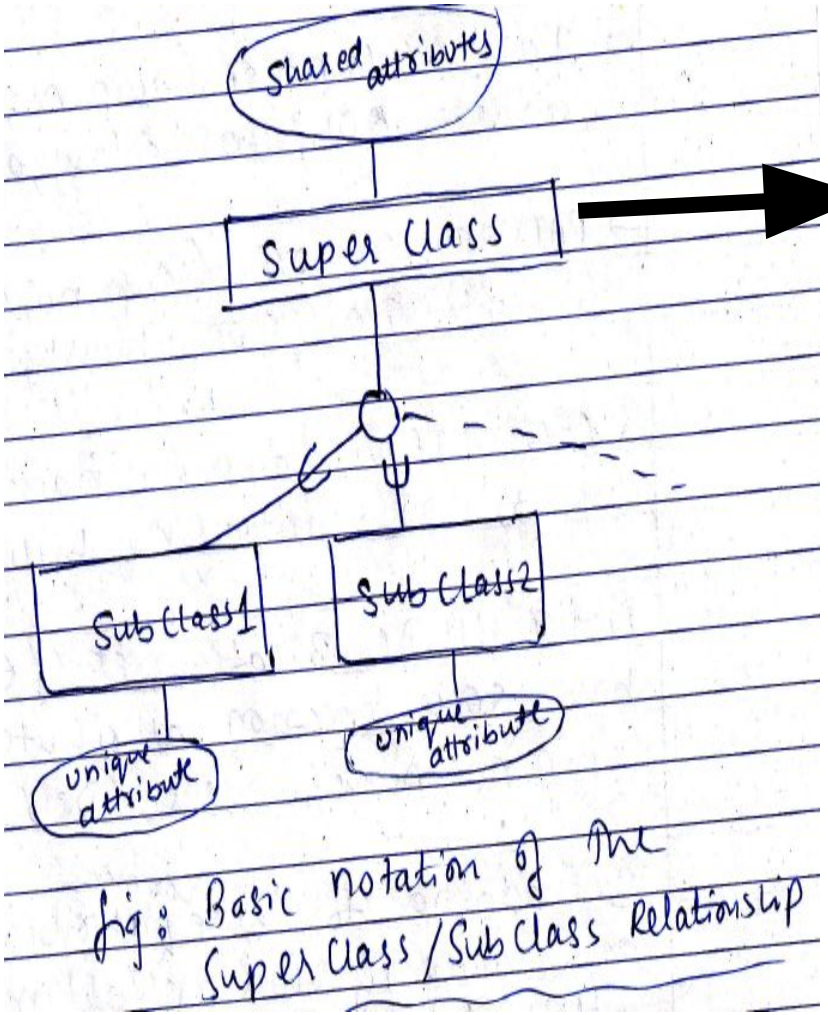

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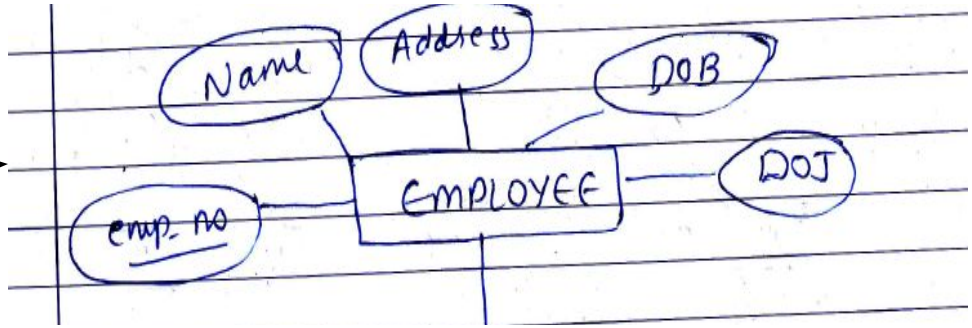

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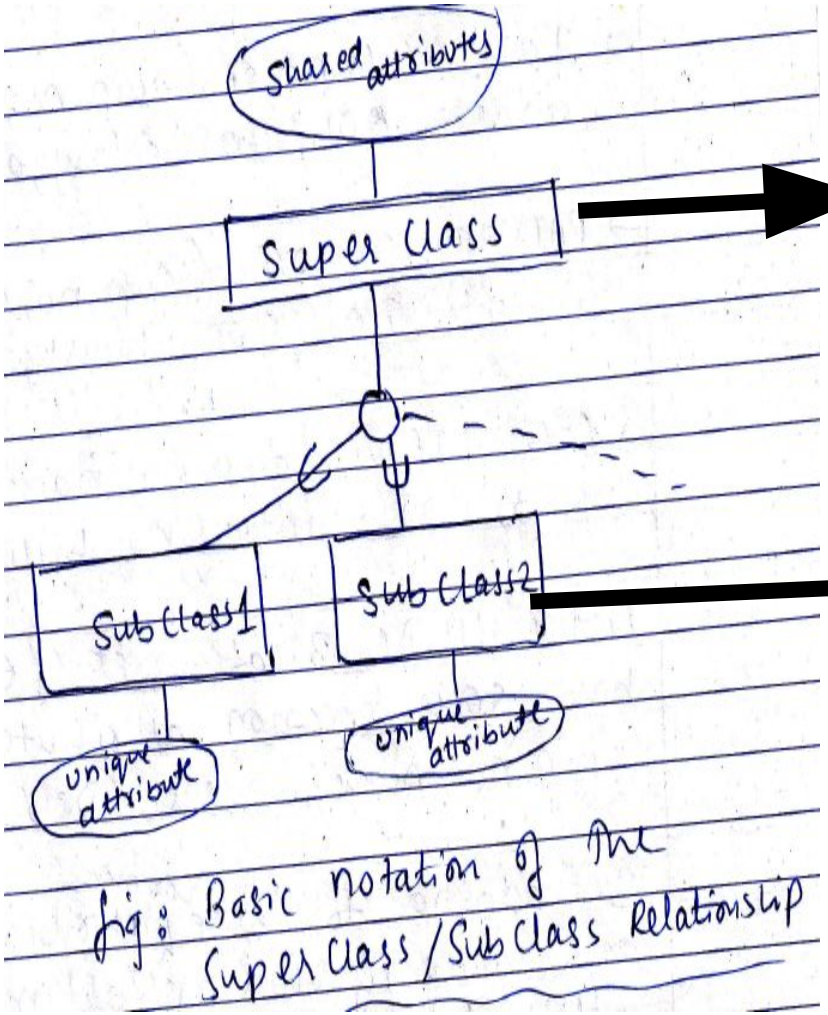

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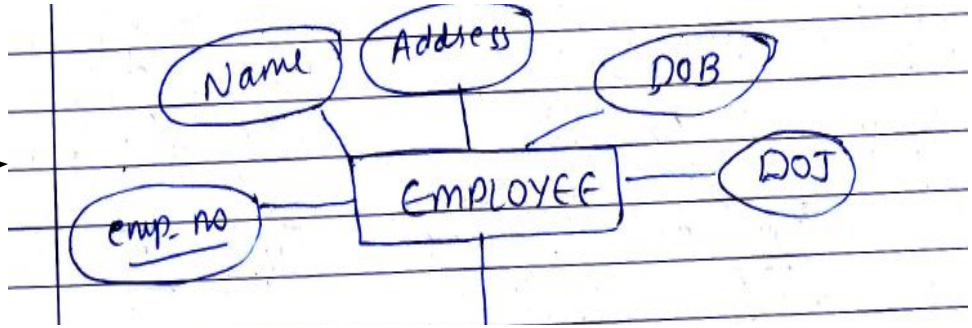

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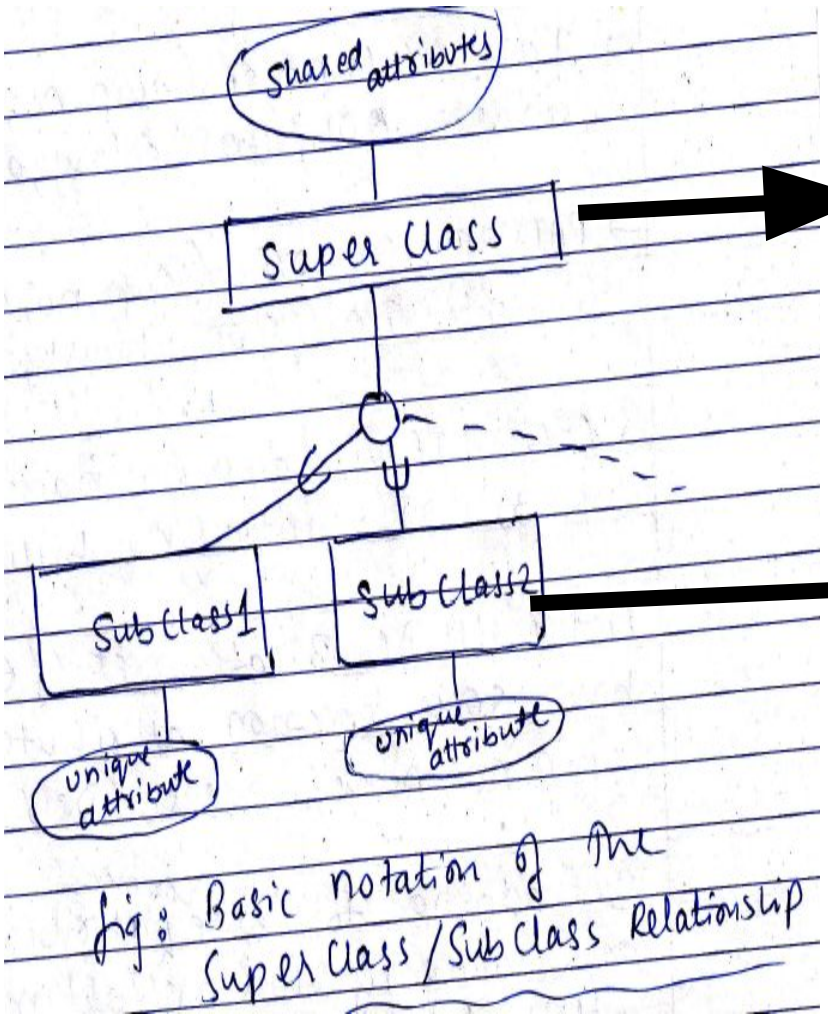

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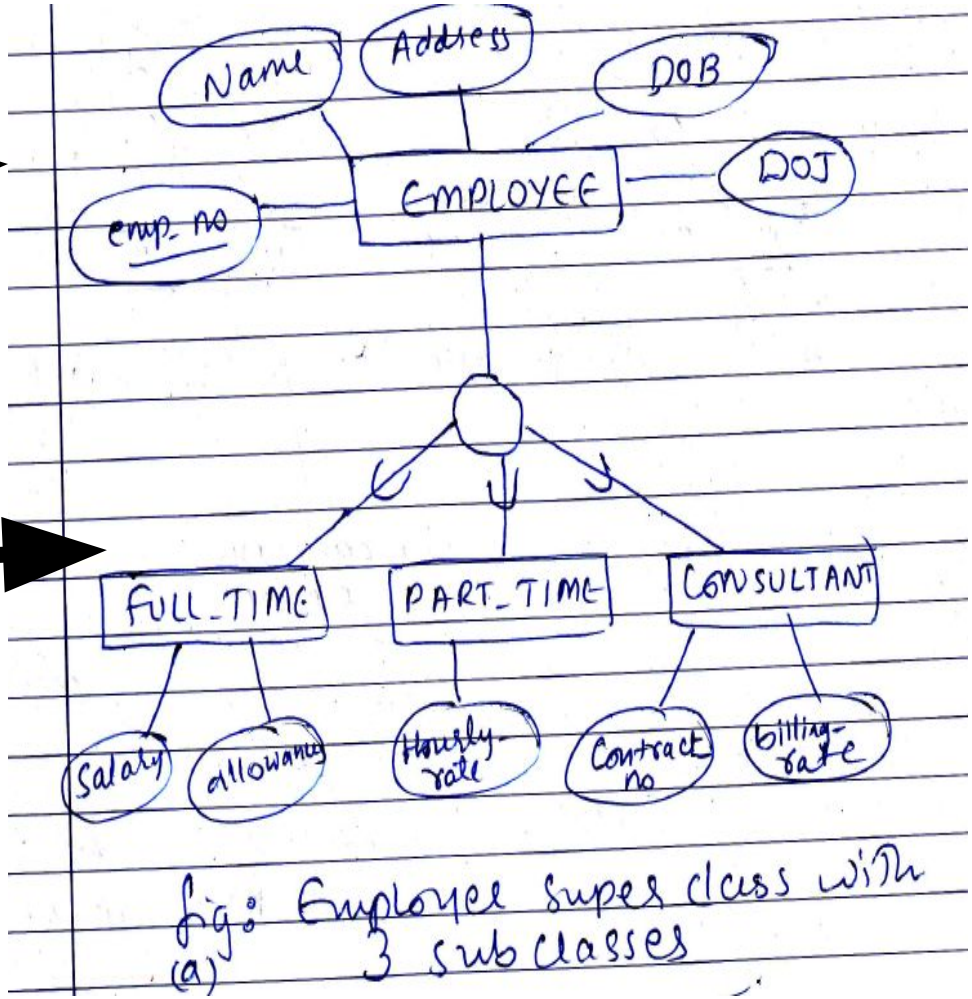

fig: Employee Super class with 3 sub classes (a)

Specialization

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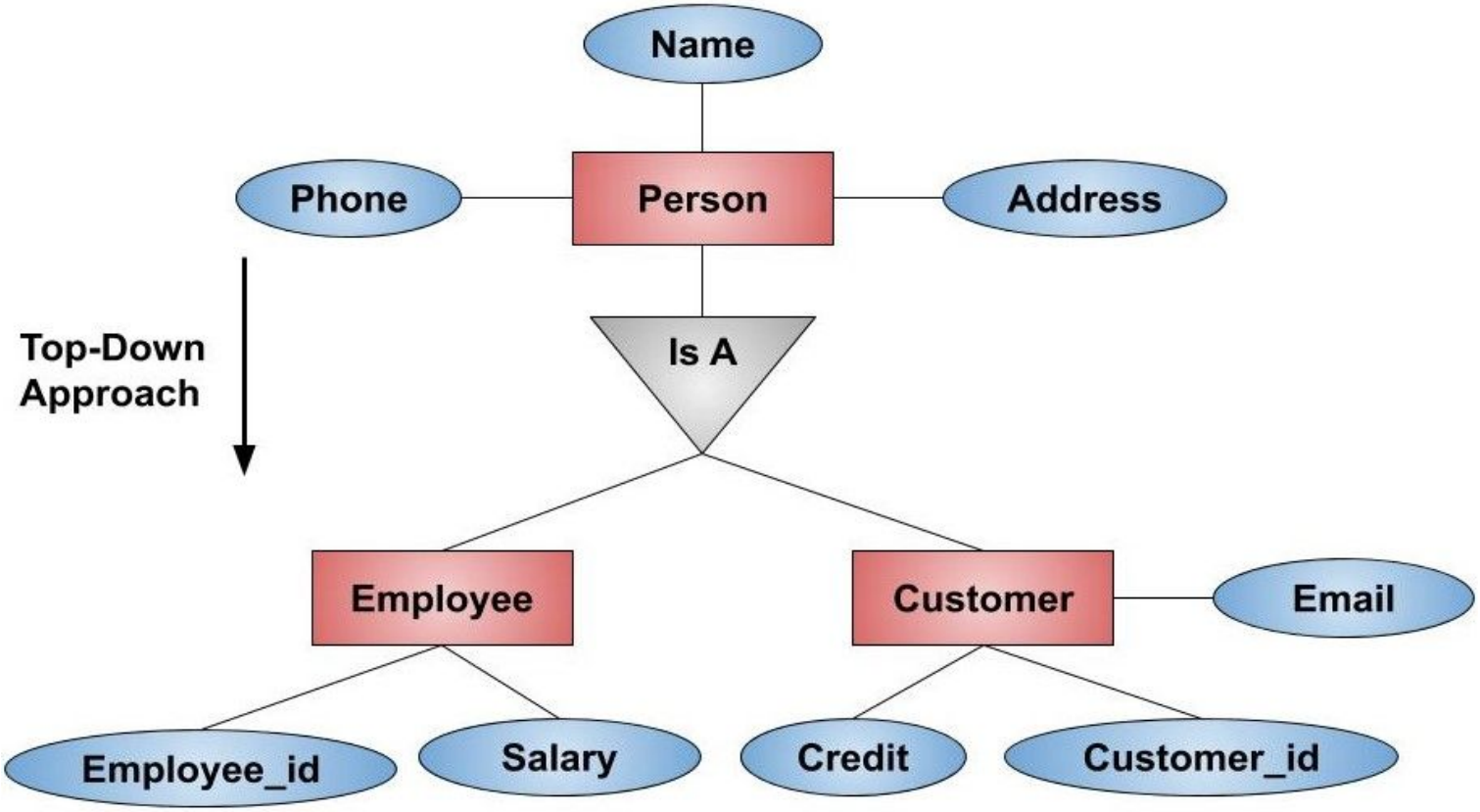
Example



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- **Reason for including Specialization in a data model**

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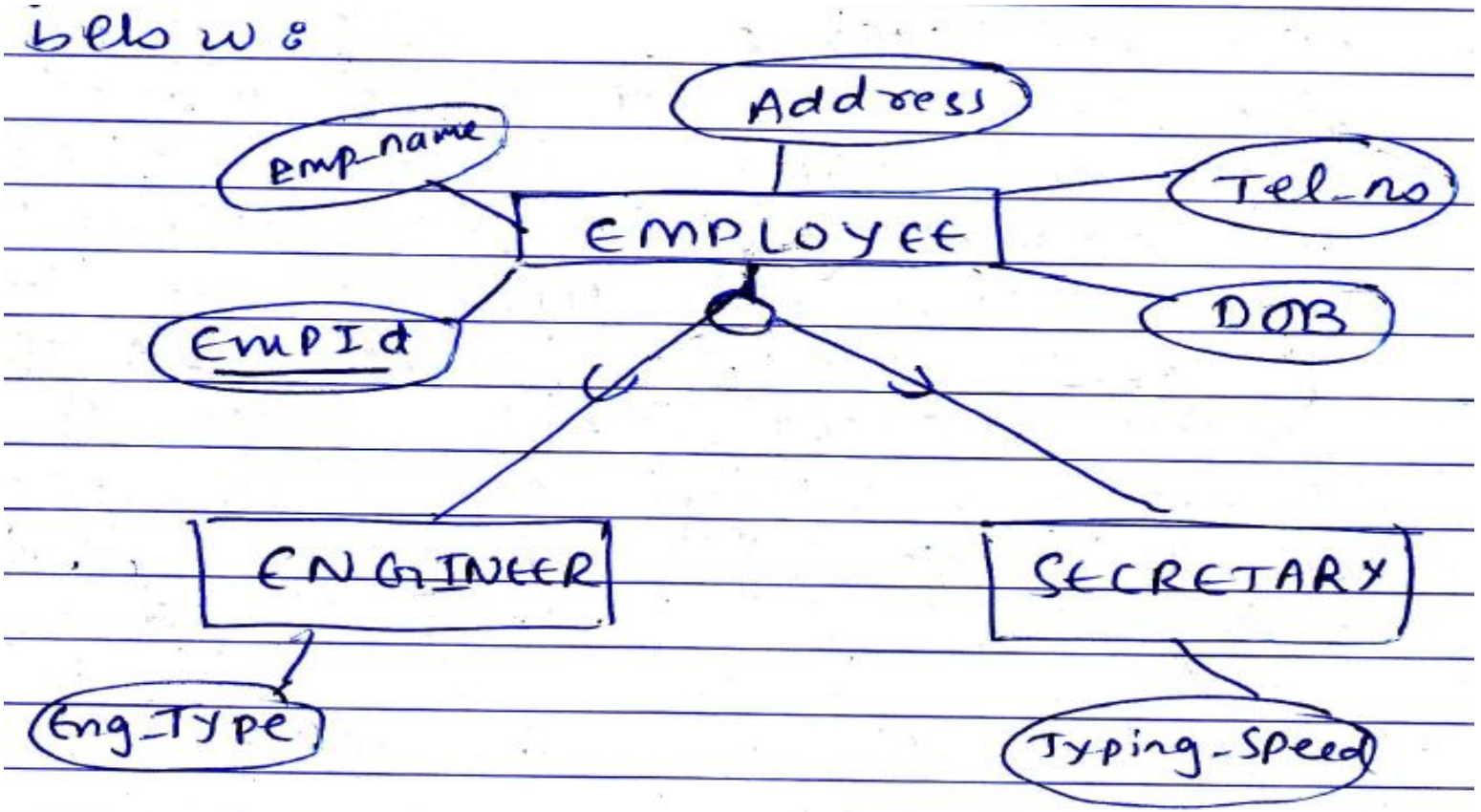

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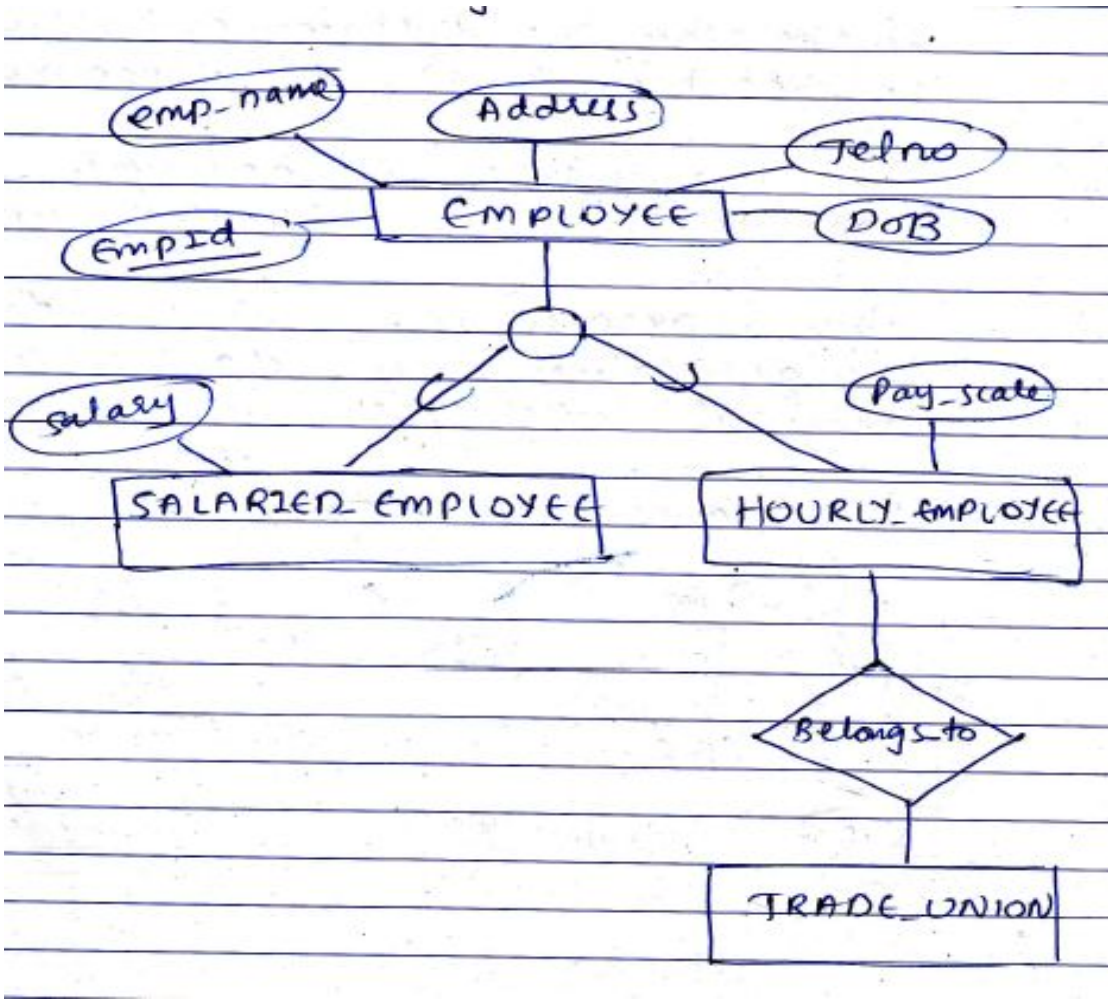

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Generalization is the process of extracting common properties from a set of entities and create a generalized entity from it.

Generalization

- **Example :** CAR & TRUCK

Generalization

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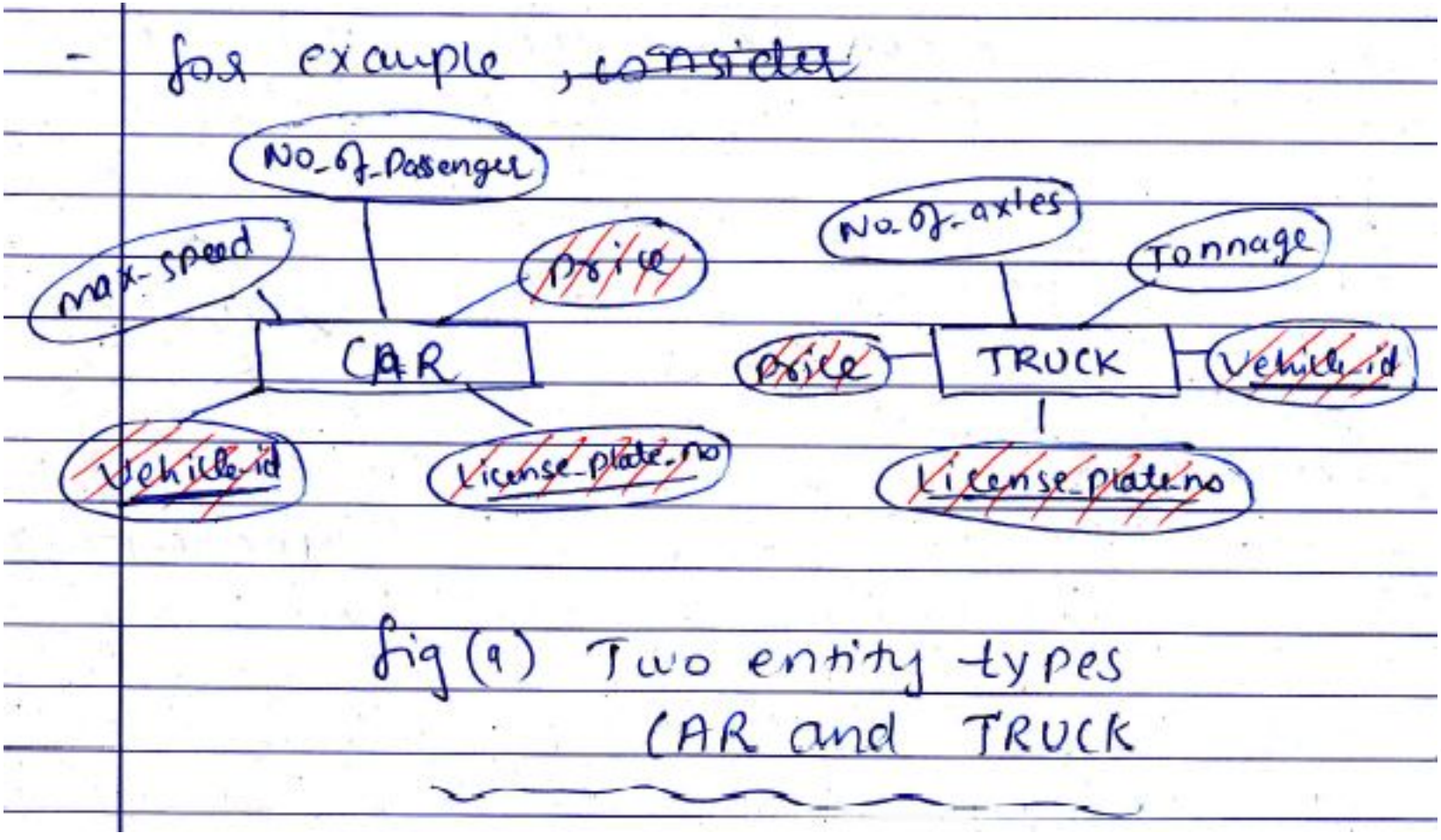

fig (a) Two entity types CAR and TRUCK

Generalization

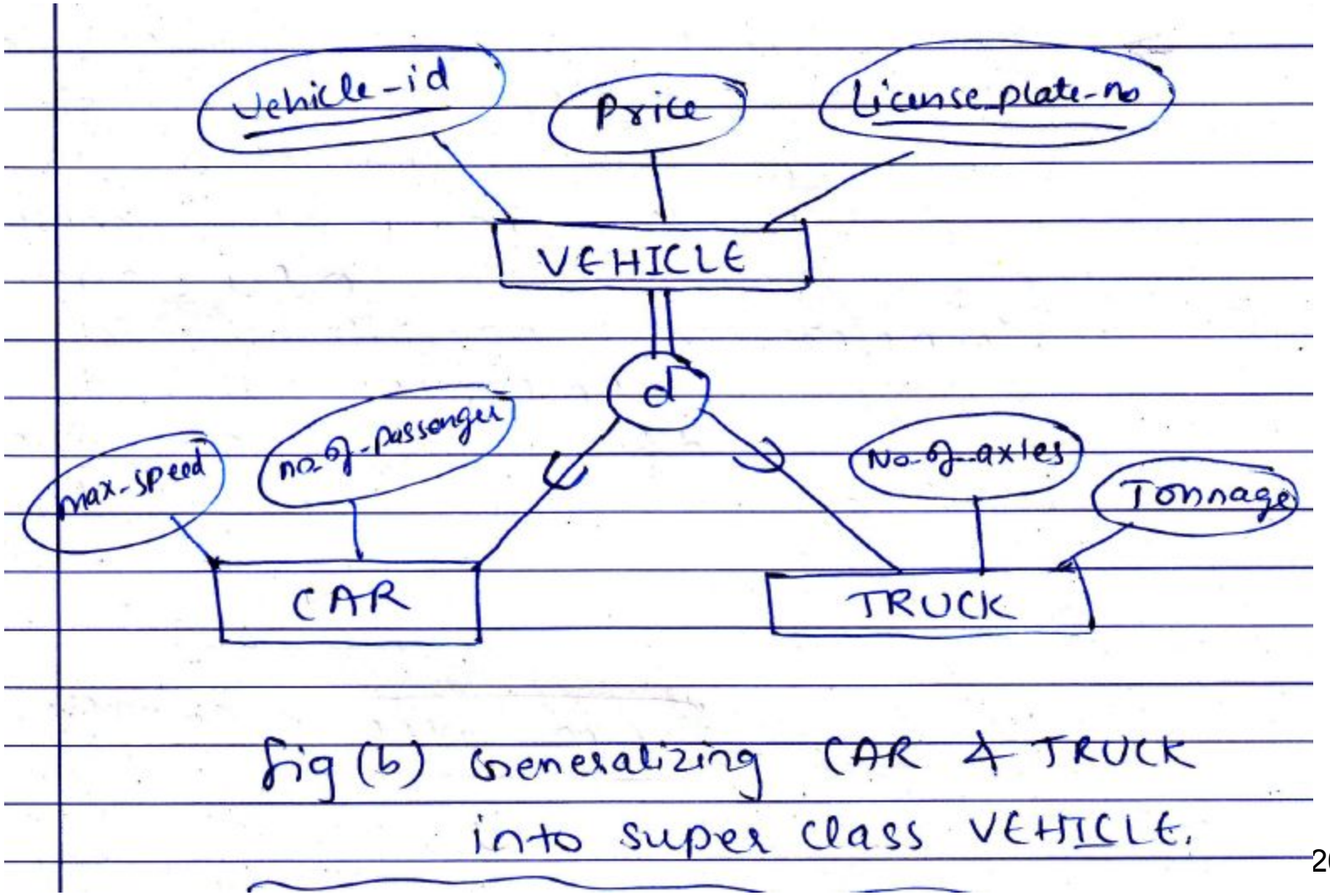

fig (b) Generalizing CAR & TRUCK into super class VEHICLE.

Constraints on Specialization & Generalization

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   - disjoint
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4 types of constraints on specialization/ generalization:

1. Disjoint, total
2. Disjoint, partial
3. Overlapping, total
4. Overlapping, partial

Constraints on Specialization & Generalization

- Dis jointness constraints

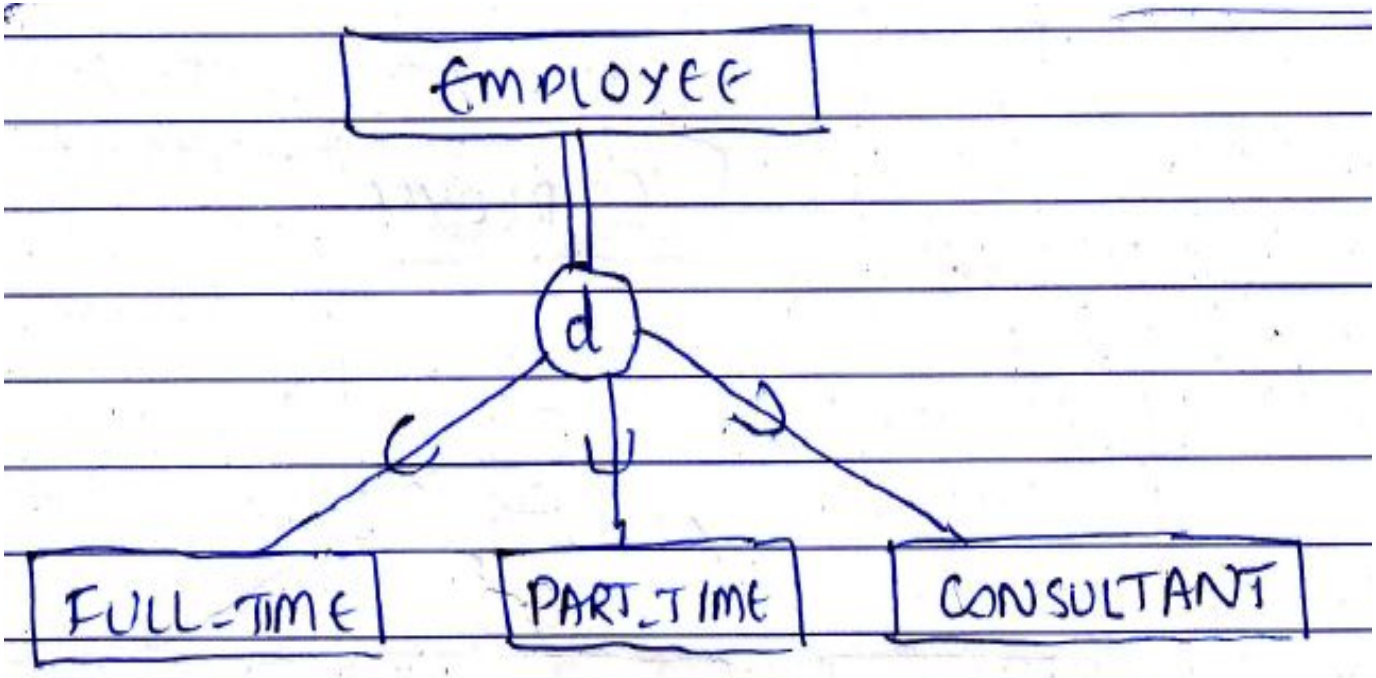

fig 3. Disjoint & Participation constraint (Disjoint, total)

Constraints on Specialization & Generalization

- Completeness constraints / Participation constraints

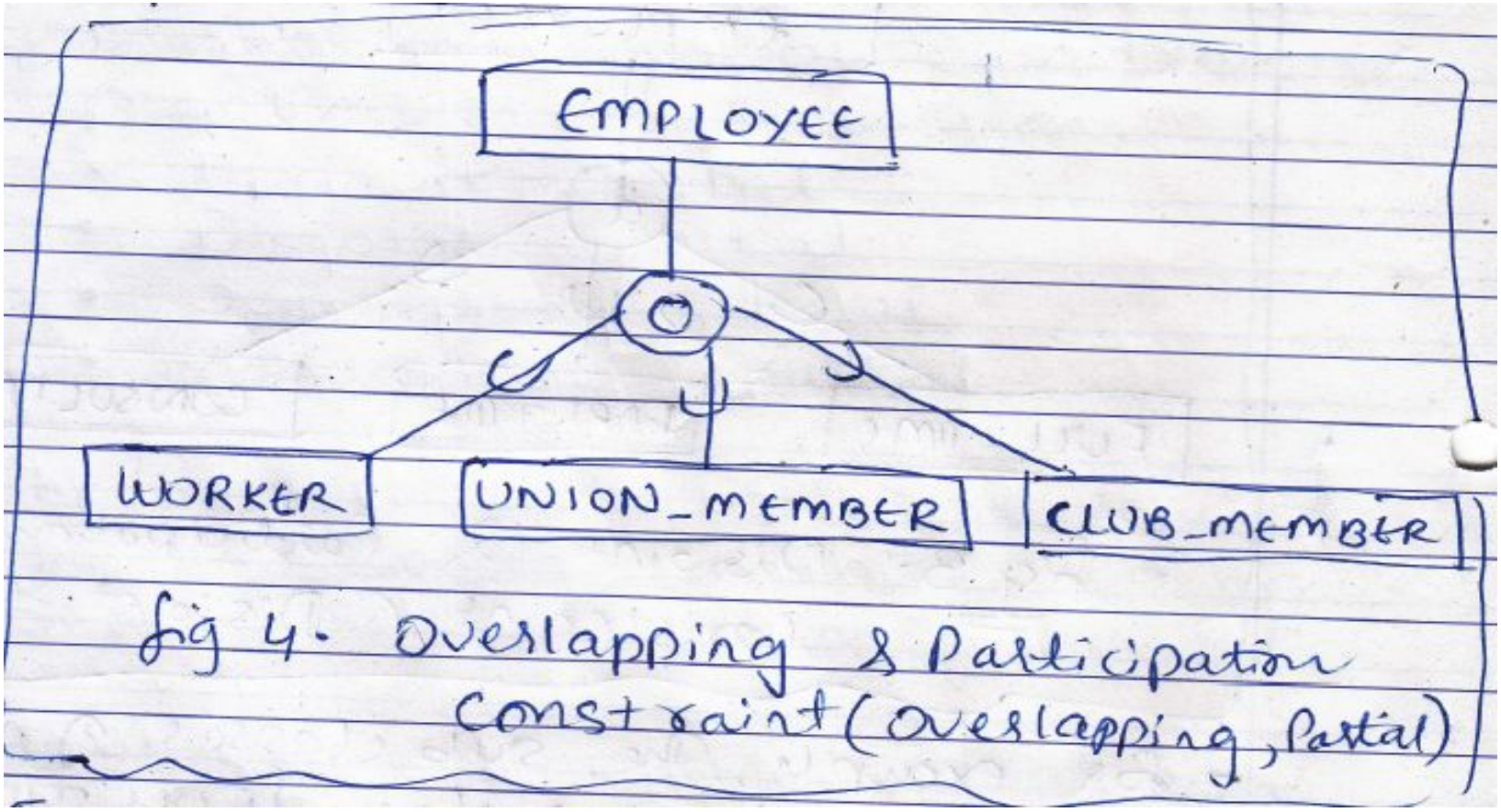

fig 4. Overlapping & Participation Constraint (Overlapping, Partial)

Parameters	Generalization in DBMS	Specialization in DBMS
Basics		
Entities		
Function		
Application		
Size		
Result		

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Size	It leads to a reduction in the size of a schema.	It leads to an increase in the size of a schema.
Result	This process leads to the formation of a single entity out of multiple entities.	This process leads to the formation of multiple entities from one single entity.

Aggregation:

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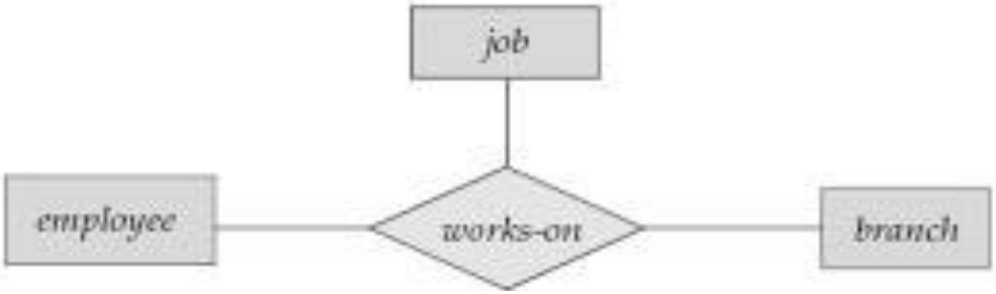

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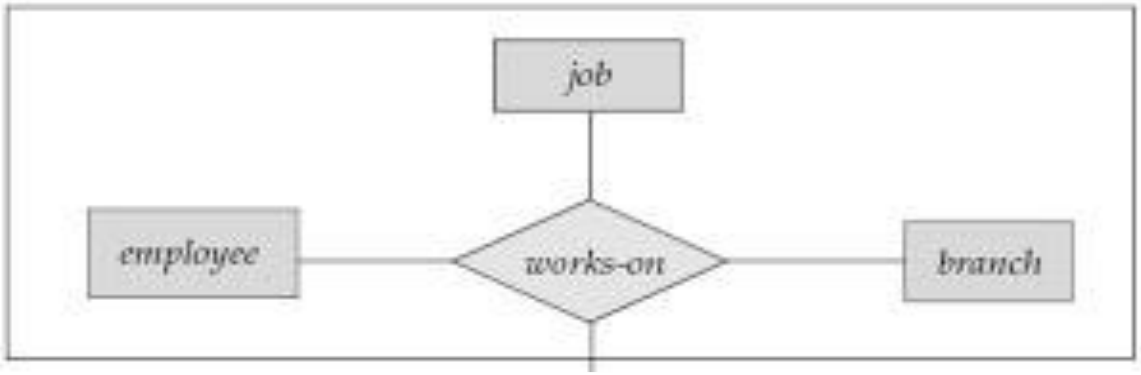

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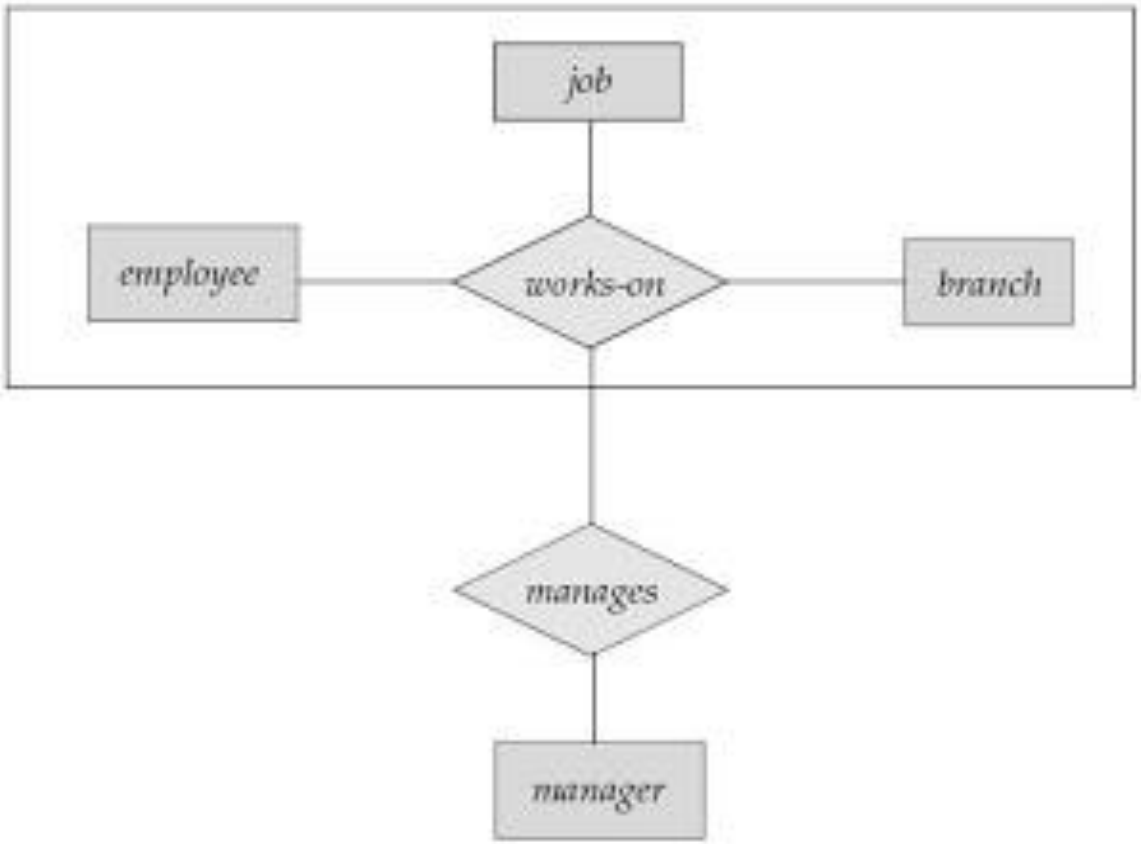
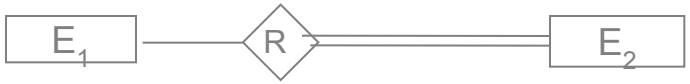


SUMMARY OF ER-DIAGRAM NOTATION FOR ER SCHEMAS

Symbol	Meaning
	ENTITY TYPE
	WEAK ENTITY TYPE
	RELATIONSHIP TYPE
	IDENTIFYING RELATIONSHIP TYPE
	ATTRIBUTE
	KEY ATTRIBUTE
	MULTIVALUED ATTRIBUTE
	COMPOSITE ATTRIBUTE
	DERIVED ATTRIBUTE
	TOTAL PARTICIPATION OF E_2 IN R
	CARDINALITY RATIO 1:N FOR E_1:E_2 IN R
	STRUCTURAL CONSTRAINT (min, max) ON PARTICIPATION OF E IN R

Solving Questions

1. Which of the following is the specialization that permits multiple sets

a) Superclass specialization
b) Disjoint specialization
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d) None of the mentioned

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3. _____ is an abstraction through which relationships are treated as higher level entities

a) Creation
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4. The completeness constraint has rules:

A. Supertype, Subtype
B. Total specialization, Partial specialization
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1. The entity set person is classified as student and employee. This process is called _____

a) Generalization

b) Specialization

c) Inheritance

d) Constraint generalization

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6.

7. Consider the employee work-team example, and assume that certain employees participate in more than one work team. A given employee may therefore appear in more than one of the team entity sets that are lower level entity sets of employee. Thus, the generalization is _____

a) Overlapping

b) Disjointness

c) Uniqueness

d) Relational

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