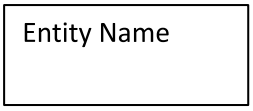
Experiment No.1
Identify the case study and detail statement of problem. Design an Entity-Relationship (ER) / Extended Entity-Relationship (EER) Model.
Date of Performance:17/01/25
Date of Submission:24/01/25

Aim: Identify the case study and detail statement of problem.
Design an Entity-Relationship (ER) / Extended Entity-Relationship (EER) Model.

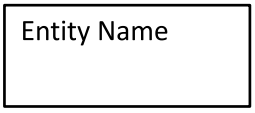
Objective: To show the relationships of entity sets attributes and relationships stored in a database

Theory: Summary of ER, EER Diagram Notation

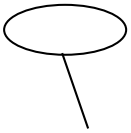
Strong Entities



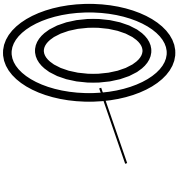
Weak Entities



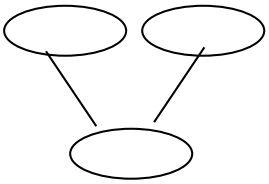
Attributes



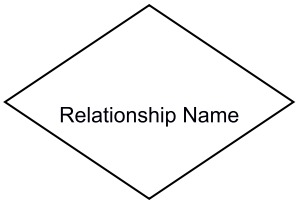
Multi Valued Attributes [Double Ellipse]



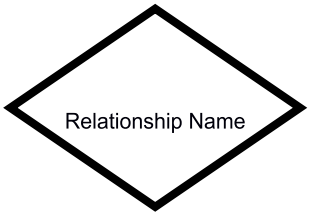
Composite Attributes



Relationships



Identifying Relationships



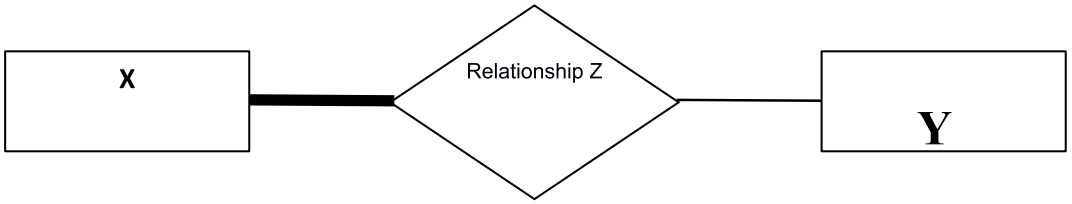
N-ary relationships

More than 2 participating entities

Constraints - Participation

. **Total Participation** - entity X has total participation in Relationship Z, meaning that every instance of X takes part in AT LEAST one relationship. (i.e. there are no members of X that do not participate in the relationship.

Example: X is Customer, Y is Product, and Z is a 'Purchases' relationship. The figure below indicates the requirement that every customer purchases a product.



. **Partial Participation** - entity Y has partial participation in Relationship Z, meaning that only some instances of Y take part in the relationship.

Example: X is Customer, Y is Product, and Z is a 'Purchases' relationship. The figure below indicates the requirement that not every product is purchases by a customer.

Cardinality:

. 1:N – One Customer buys many products, each product is purchased by only one customer.

1 N

N:1 - Each customer buys at most one product, each product can be purchased by many customers.

N 1

1:1 – Each customer purchases at most one product, each product is purchased by only one customer.

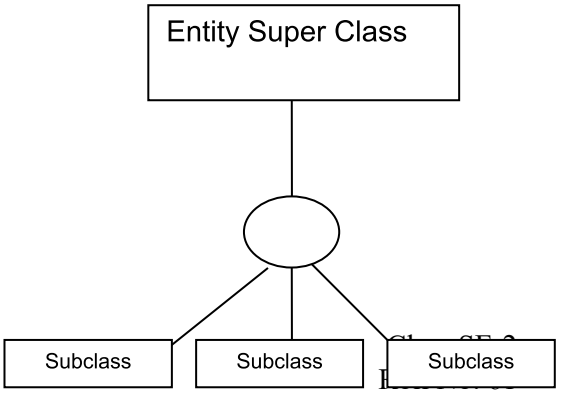
1 1

M:N – Each customer purchases many products, each product is purchased by many customers.

M N

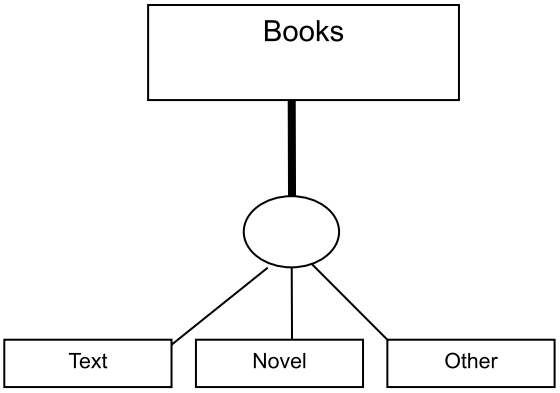
Specialization/Generalization

. Each subclass inherits all relationships and attributes from the super-class.

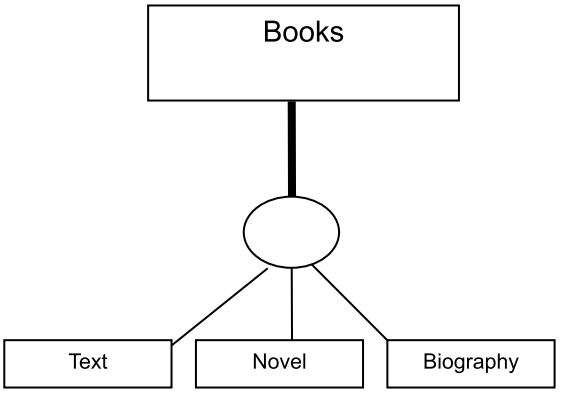


Constraints on Specialization/Generalization

Total Specialization – Every member of the super-class must belong to at least one subclass. For example, any book that is not a text book, or a novel can fit into the "Other" category.

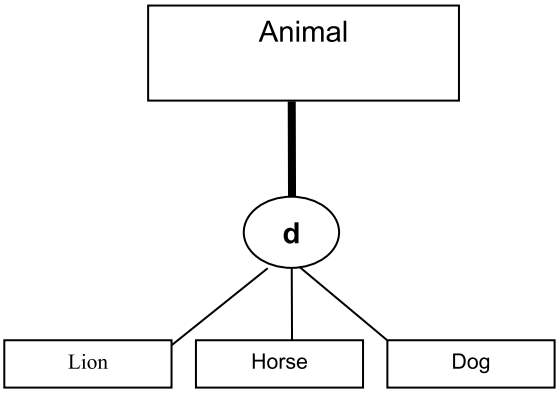


Partial Specialization – each member of the super-class may not belong to one of the subclasses. For example, a book on poetry may be neither a text book, a novel or a biography.

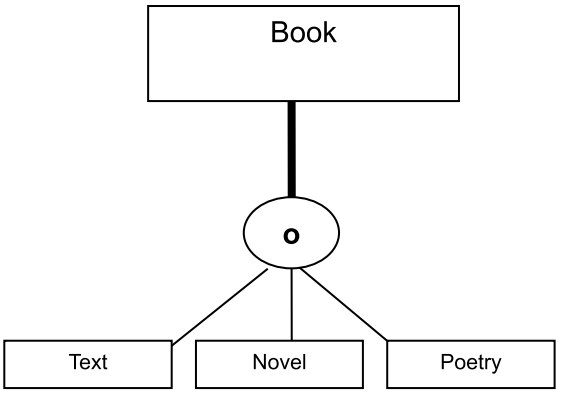


Dis-jointness Constraint

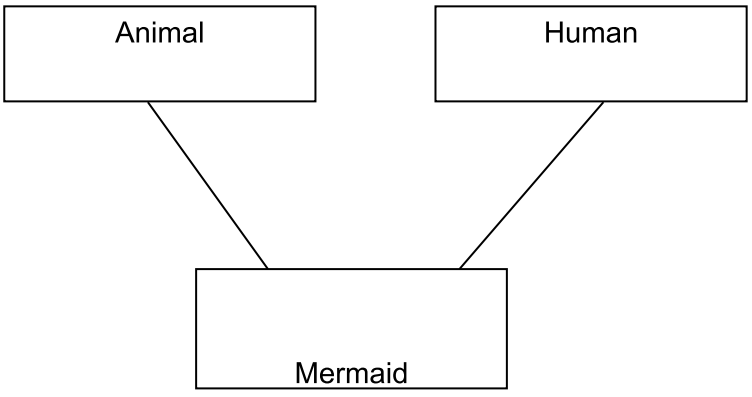
. **Disjoint** – every member of the super-class can belong to at most one of the subclasses. For example, an Animal cannot be a lion and a horse, it must be either a lion, a horse, or a dog.



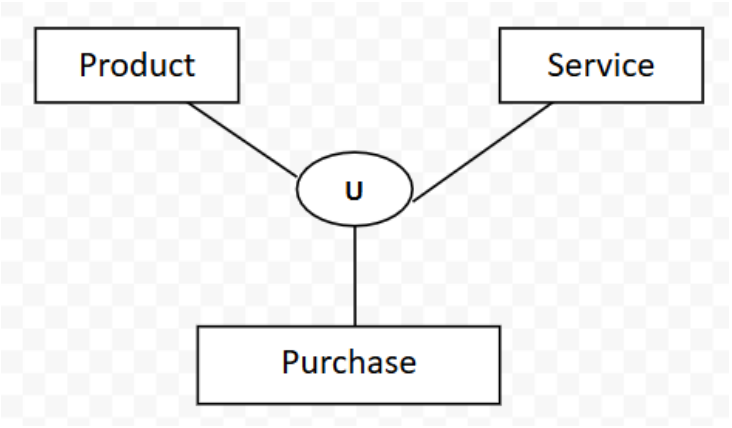
Overlapping – every member of the super-class can belong to more than one of the subclasses. For example, a book can be a text book, but also a poetry book at the same time.



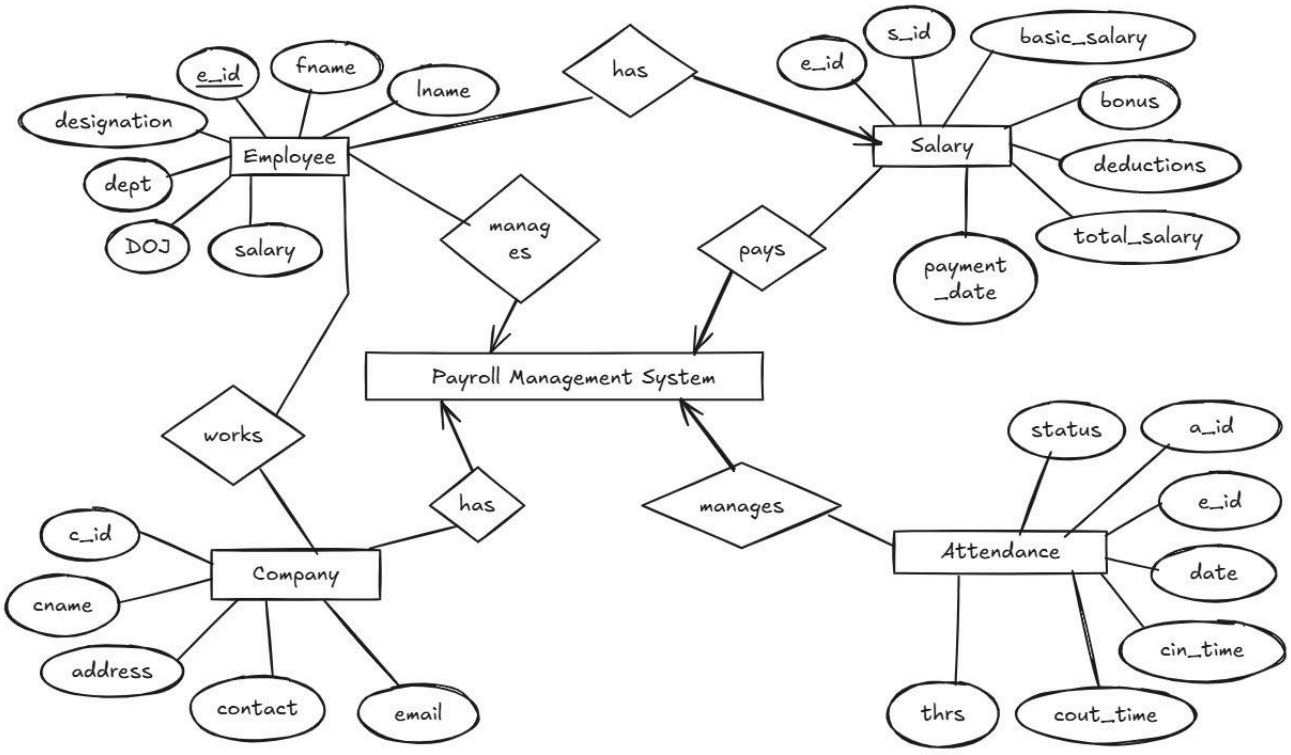
Multiple Inheritance – a subclass participates in more than one subclass/super-class relationship, and inherits attributes and relationships from more than one super-class. For example, the subclass Mermaid participates in two subclass/super-class relationships, it inherits attributes and relationships of Animals, as well as attributes and relationships of Humans.



Union – a subclass/super-class relationship can have more than one super-class, and the subclass inherits from at most one of the super-classes (i.e. the subclass purchase will inherit the relationships and attributes associated with either service or product, but not both). Each super class may have different primary keys, or the same primary key. All members of the super-classes are not members of the super-class. For example, a purchase can be a product, or a service, but not both. And all products and services are not purchase



Implementation:



Conclusion:- In this experiment, I learned to design an ER/EER model, identifying entity sets, attributes, and relationships. I understood the significance of strong and weak entities, multi-valued and composite attributes, and different types of relationships. Exploring cardinality and participation constraints helped me define real-world scenarios effectively. Specialization, generalization, and inheritance concepts provided insights into advanced database modeling.