



Vidyavardhini's College of Engineering and Technology
Department of Artificial Intelligence & Data Science

Experiment No.1
Design an EntityRelationship (ER) / Extended Entity-Relationship (EER) Model.
Date of Performance:
Date of Submission:



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

Objective :- To identify and explore a real world problem, and to design an Entity Relationship (ER) / Extended Entity-Relationship (EER) Model.

Theory:

1. Entity:

- An entity is a real-world object or concept that exists independently and has distinguishable attributes.
- In a database context, an entity represents a table, and each row in that table represents a unique instance of that entity.
- For example, in a university database, entities could include Student, Course, Professor, Department, etc.
- Each entity has a set of attributes that describe its properties.

2. Attributes:

- Attributes are the properties or characteristics that describe an entity.
- They represent the data we want to store about each instance of an entity.
- For example, attributes of a Student entity might include StudentID, Name, Age, GPA, etc.
- Attributes can be categorized as simple (atomic) attributes, which cannot be divided further, or composite attributes, which are made up of smaller sub-parts.

3. Relationships:

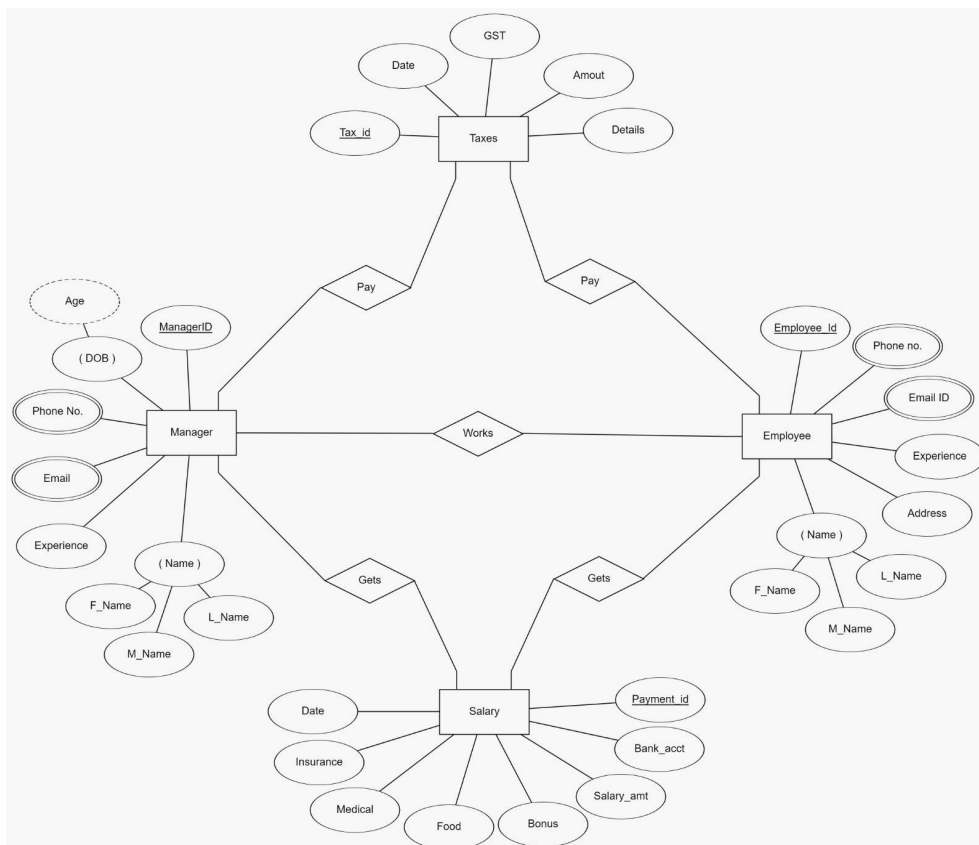
- Relationships describe how entities are related to each other or how they interact.
- They represent the associations between entities.
- Relationships are depicted as lines connecting related entities in the ER diagram.
- Each relationship has a degree, indicating the number of entities involved. It could be unary (involving one entity), binary (involving two entities), or ternary (involving three entities).
- Relationships also have cardinality, which defines the number of instances of one entity that can be associated with the number of instances of another entity through the relationship.



4. Cardinality:

- Cardinality specifies the number of instances of one entity that are related to the number of instances of another entity through a relationship.
- It defines the maximum and minimum number of occurrences of one entity that can be associated with the occurrences of another entity.
- Common cardinality constraints include:
 - I. One-to-One (1:1): Each instance of one entity is associated with exactly one instance of another entity, and vice versa.
 - II. One-to-Many (1:N): Each instance of one entity is associated with zero or more instances of another entity, but each instance of the second entity is associated with exactly one instance of the first entity.
 - III. Many-to-One (N:1): The reverse of One-to-Many; many instances of one entity are associated with one instance of another entity.
 - IV. Many-to-Many (N:N): Many instances of one entity can be associated with many instances of another entity.

Implementation:





Conclusion:

1. Define Entity, Attributes(also types) and Relationship between entities

Ans

1. Entity:

- An entity is a distinct object or concept in a domain, about which data is stored.
- It can be a person, place, thing, event, or concept that is distinguishable from other entities.
- Entities are typically nouns and serve as the basis for data modeling in databases.

2. Attributes:

- Attributes are the properties or characteristics of an entity.
- They describe the entity and provide details about it.
- Types of attributes include:
 - Simple attributes: Represent atomic values, like a person's age or a product's price.
 - Composite attributes: Composed of multiple simpler attributes, like a person's address (street, city, zip code).
 - Derived attributes: Derived from other attributes, rather than being directly stored, like a person's age calculated from their birthdate.
 - Multi-valued attributes: Can hold multiple values for a single entity, like a person's phone numbers.
 - Key attributes: Uniquely identify an entity within a set, like a person's social security number

3. Relationships:

- Relationships describe how entities interact or associate with each other.
- They represent connections between entities.
- Types of relationships include:
 - One-to-One: Each entity in one set is associated with exactly one entity in another set.
 - One-to-Many: Each entity in one set can be associated with multiple entities in another set.
 - Many-to-Many: Entities in one set can be associated with multiple entities in another set, and vice versa.
 - Recursive: An entity is related to itself.
 - Unary: An entity is related to itself in a unary relationship.
 - Binary: Two entities are involved in the relationship.
 - Ternary: Three entities are involved in the relationship.

2. Write ER/EER diagram notations

Ans

- a) Entities: Represented by rectangles, each entity denotes a distinct object, such as a person or a product.
- b) Attributes: Shown inside the entity rectangles, attributes describe properties of entities, like name or price.
- c) Relationships: Illustrated by lines connecting entities, relationships indicate connections between entities, such as a person buying a product.
- d) Cardinality: Depicted near the relationship lines, cardinality defines the number of instances of one entity that can be associated with another entity.
- e) Keys: Highlighted using underlines, keys uniquely identify instances of an entity, such as a primary key.



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