AY: 2024-25

Class:	SE	Semester:	IV
Course Code:	CSL402	Course Name:	DBMS Lab

Name of Student:	Shravani Sandeep Raut
Roll No. :	48
Experiment No.:	1
Title of the Experiment:	Design an Entity Relationship (ER) / Extended Entity-Relationship (EER) Model.
Date of Performance:	22/01/2025
Date of Submission:	29/01/2025

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Performance	5	
Understanding	5	
Journal work and timely submission	10	
Total	20	

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Performance	4-5	2-3	1
Understanding	4-5	2-3	1
Journal work and timely submission	8-10	5-8	1-4

Checked by

Name of Faculty : Ms. Neha Raut

Signature :

Date:

CSL402 : Database Management System Lab

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
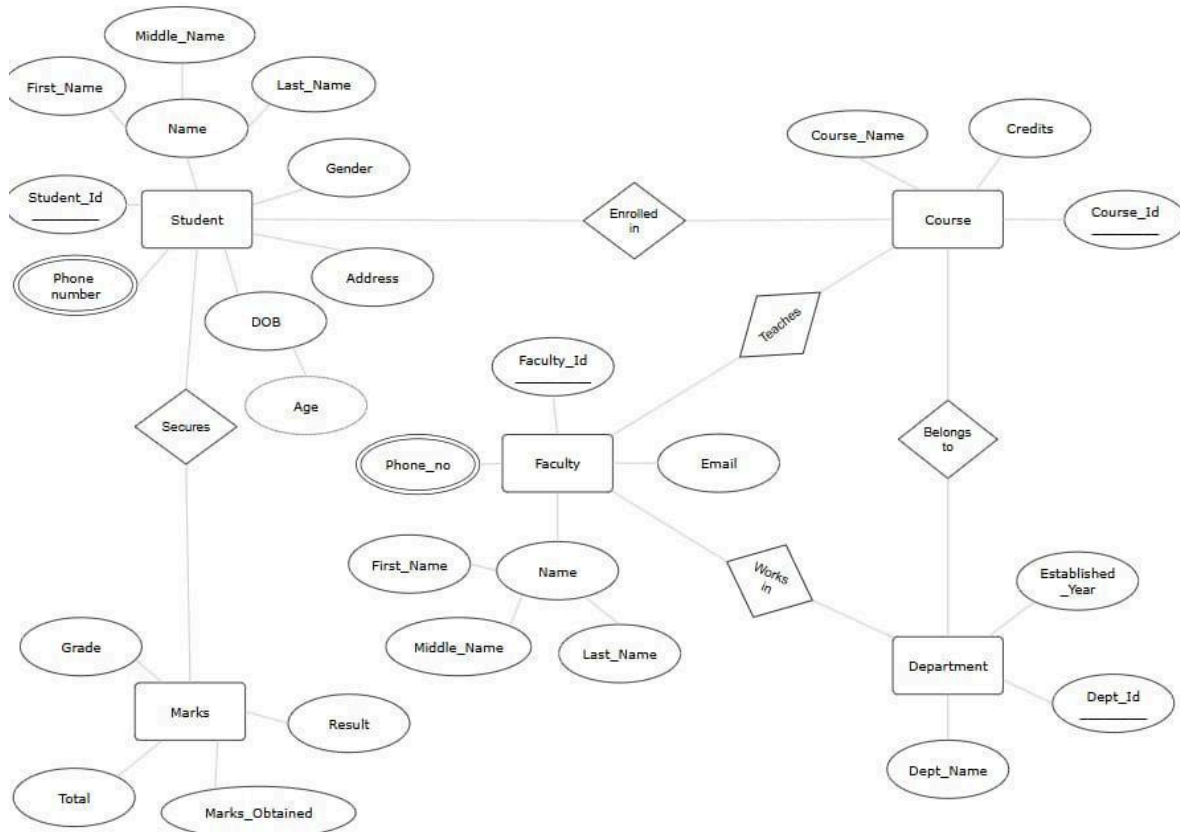
Conclusion

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

   Entity: a "thing" or "object" in the enterprise that is distinguishable from other objects
   Described by a set of attributes
   Example: specific person, company, event, plant

   Relationship: an association among several entities
   Types of Relationships:

- **One-to-One (1:1)**: One instance of an entity is associated with exactly one instance of another entity.

- **One-to-Many (1:M)**: One instance of an entity is associated with multiple instances of another entity.

- **Many-to-Many (M:N)**: Multiple instances of an entity are associated with multiple instances of another entity.

Attributes are the properties or characteristics that describe an entity.

Types of attributes

    Single valued Attributes - Cannot be divided into smaller components.

    For example, "First Name"

    Multi valued Attributes - Can have multiple values for a single entity.

    For example, phone numbers.

    Compound Attribute/Composite Attribute - Can be broken down into smaller components.

    For example, "Full Address"

    Derived Attribute - Its value can be derived from other attributes.

    For example, "Age"

    Complex Attributes

    Key Attribute - An attribute that uniquely identifies an entity.

    For example, "Employee ID"

2. **Write ER/EER diagram notations**

    1. Entity Notation (Rectangle)

    An **Entity** is represented by a **rectangle**.

    2. **Attribute Notation**

- **Simple Attribute**: Represented by a simple ellipse.

- **Composite Attribute**: Represented by an ellipse, which is further divided into smaller components.

- **Derived Attribute**: Represented by a dashed ellipse

- **Multi-valued Attribute**: Represented by a double ellipse.

- **Key Attribute**: Represented by an ellipse with a key symbol i.e underline inside.

3. Relationship Notation (Diamond)

A **Relationship** between two or more entities is represented by a **diamond shape**.

4. Weak Entity Notation

A **Weak Entity** depends on a **Strong Entity** for its identification. Weak entities are represented with a **double rectangle**, and their relationships with strong entities are represented by a **double diamond**.