Assignment-1

Assignment 1: Analyze a given business scenario and create an ER diagram that includes entities, relationships, attributes, and cardinality. Ensure that the diagram reflects proper normalization up to the third normal form.

BUSINESS SCENARIO: UNIVERSITY MANAGEMENT SYSTEM

Entity: An entity is an object or component of data. An entity is represented as rectangle in an ER diagram.

Cardinality: Defines the numerical attributes of the relationship between two entities or entity sets.

Relationship: A relationship is represented by diamond shape in ER diagram, it shows the relationship among entities.

There are four types of cardinal relationships:

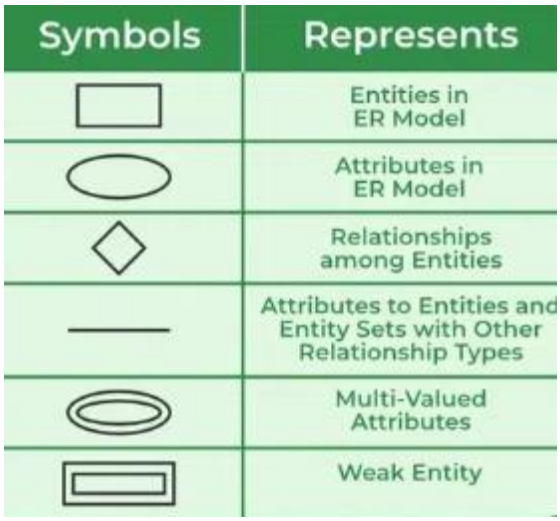
1. One to One

2. One to Many

3. Many to One

4. Many to Many

Attribute: An attribute describes the property of an entity. An attribute is represented as Oval in an ER



Entities:

1. Student
2. Course
3. Professor
4. Department
5. Enrollment

Entities with Attributes:

1. Student: Contains information about students enrolled in the university.

- Attributes: Student ID (Primary Key), Name, Email, Phone, Date of Birth, Address.

2.Course: Represents the courses offered by the university.

- Attributes: Course ID (Primary Key), Course Name, Credits, Department.

3.Professor: Contains information about professors teaching at the university.

- Attributes: Professor ID (Primary Key),
- Name,
- Email,
- Phone,
- Department.

4.Department: Represents academic departments within the university.

- Attributes: Department ID (Primary Key),
- Department Name,
- Head of Department.

5.Enrollment: Represents the enrollment of students in courses.

- Attributes: Enrollment ID (Primary Key),
- Student ID (Foreign Key),
- Course ID (Foreign Key),
- Enrollment Date.

Relationships:

Teaches: Relationship between Professor and Course entities. A professor can teach multiple courses, and a course can be taught by only one professor.

Belongs_to: Relationship between Course and Department entities. A course belongs to one department, but a department can offer multiple courses.

Enrolls_in: Relationship between Student and Enrollment entities. A student can be enrolled in multiple courses, and a course can have multiple students enrolled.

Belongs_to: Relationship between Professor and Department entities. A professor belongs to one department, but a department can have multiple professors.

Cardinalities:

1.One Professor can teach many Courses (1).

2.One Course belongs to one Department, but a Department can have many Courses (1).

3.One Student can be enrolled in many Courses, and a Course can have many Students enrolled (M).

4.One Professor belongs to one Department, but a Department can have many Professors (1).

Normalize to 3NF

• 1NF: Each table has a primary key and each column contains atomic values.

• 2NF: All non-key attributes are fully dependent on the primary key.

• 3NF: No transitive dependencies; non-key attributes depend only on the primary key

ER Diagram

Er Diagram of University Management System