MIS 301 RELATIONAL DATABASE MANAGEMENT SYSTEM

DATABASE MANAGEMENT SYSTEM

Database Design: ER modeling [Entity-Relationship Diagrams (ERD)

Lecture 19 & 20

ENTITY-RELATIONSHIP(E-R) DIAGRAM

- The Entity-Relation model represents real-world entities and the relationship between them.
- ER diagram is a visual tool which is helpful to represent the ER model.
- It is a GUI representation of the logical structure of a Database
- It helps you to identify the entities which exist in a system and the relationships between those entities.
- E-R diagrams provide a preview of how all tables should connect, what fields are going to be there in each table
- It helps to describe entities, attributes, relationships
- ER diagrams are translatable into relational tables which allow one to build databases quickly

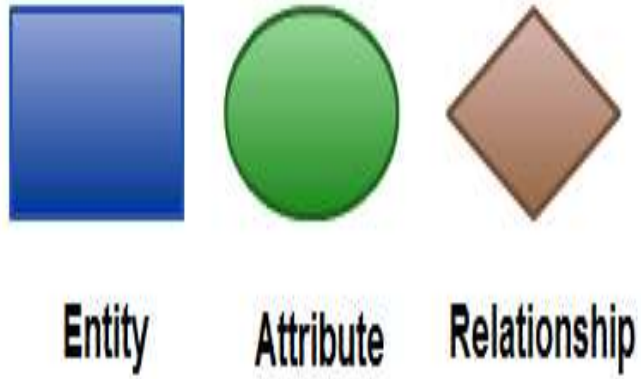
ENTITY-RELATIONSHIP(E-R) DIAGRAM

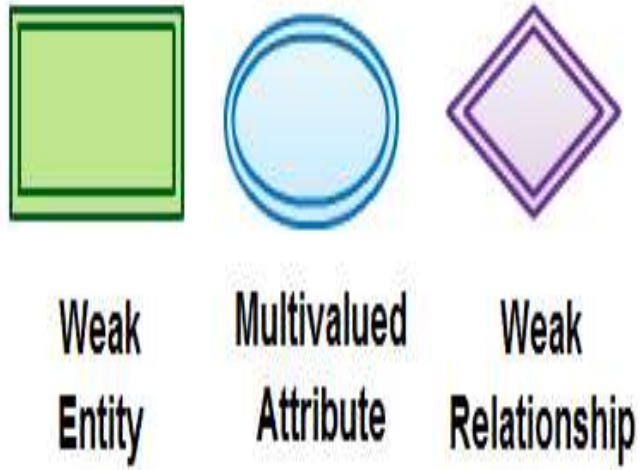
❖Components of the ER Diagram

- Entity-is anything in the enterprise that is to be represented in our database.
- Attributes-Entities are represented by their properties, which are also called attributes.
- Relationships-an association among two or more entities.

❖An entity set is a group of similar kind of entities.

❖A weak entity is a type of entity which doesn't have its key attribute. It can be identified uniquely by considering the primary key of another entity.

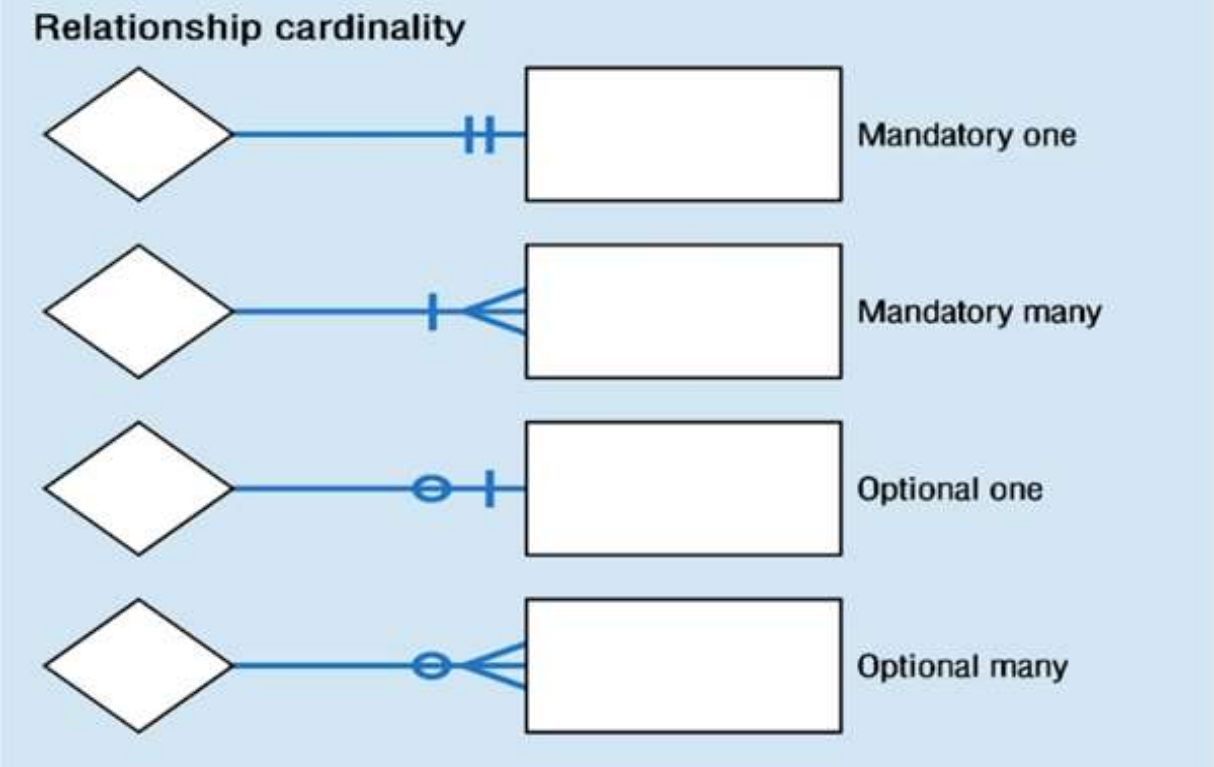




Relationship Types

- One-to-One Relationships
- One-to-Many Relationships
- Many-to-Many Relationships

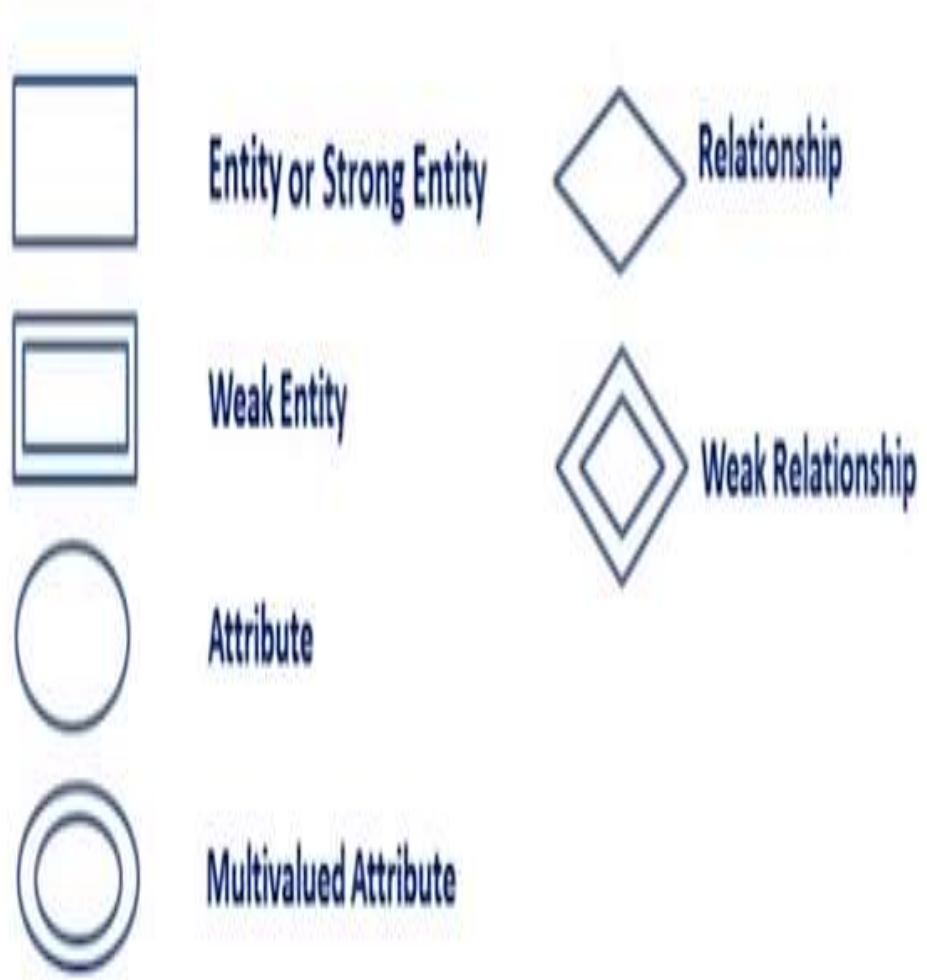
Cardinality Defines the numerical attributes of the relationship between two entities or entity sets.



ER- DIAGRAM NOTATIONS

ER- Diagram is a visual representation of data that describes how data is related to each other.

- **Rectangles:** This symbol represents entity types
- **Ellipses :** Symbol represent attributes
- **Diamonds:** This symbol represents relationship types
- **Lines:** It links attributes to entity types and entity types with other relationship types
- **Primary key:** attributes are underlined
- **Double Ellipses:** Represent multi-valued attributes



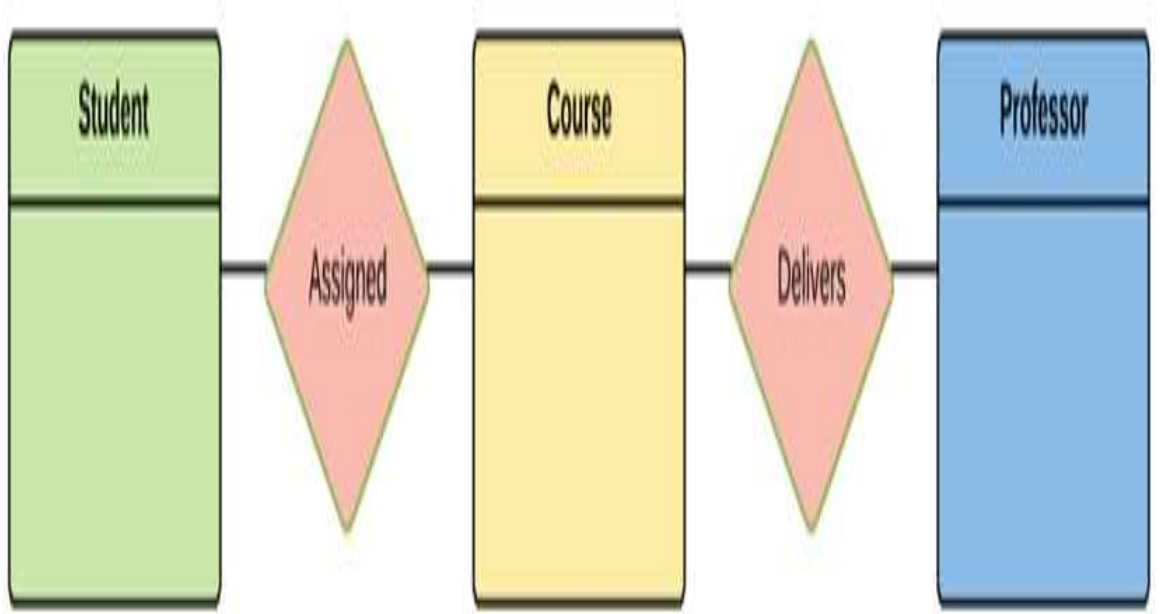
CREATING ERD

Step 1) Entity Identification

- Student
- Course
- Professor

Step 2) Relationship Identification

- The student is **assigned** a course
- Professor **delivers** a course



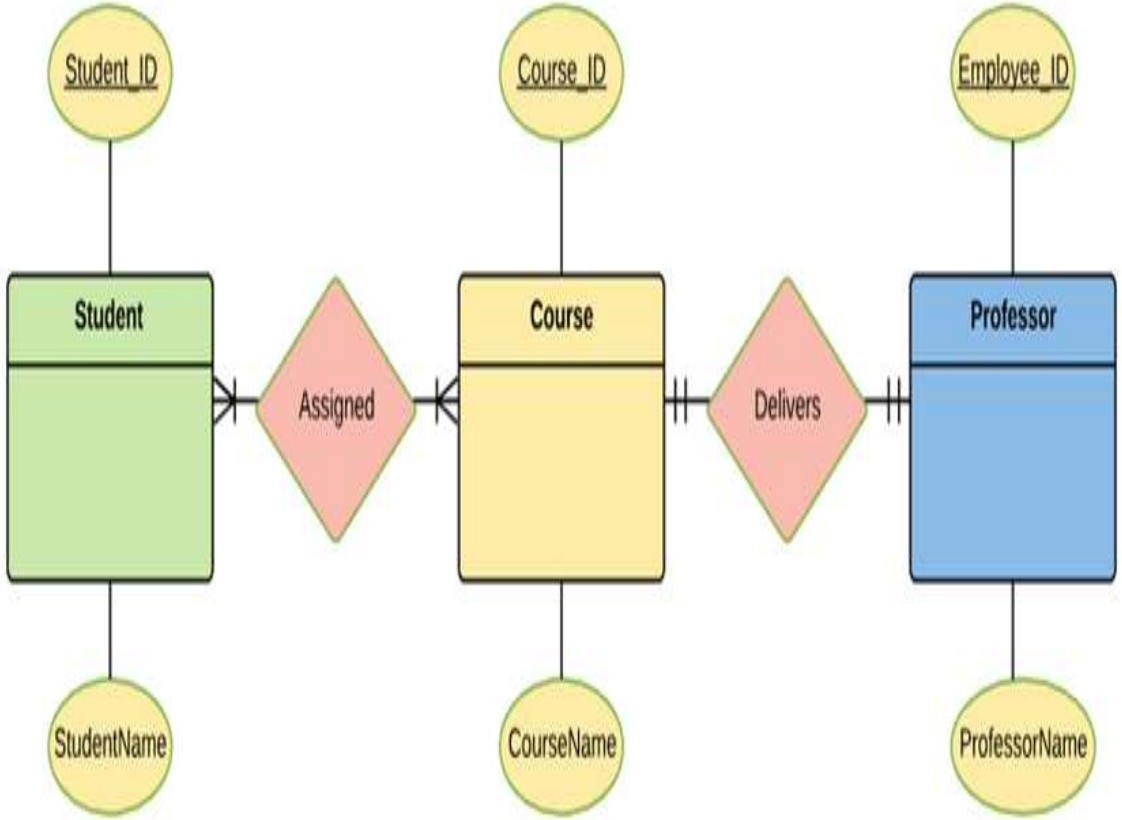
CREATING ERD

Step 3) Cardinality Identification

- A student can be assigned **multiple** courses
- A Professor can deliver only **one** course

Step 4) Identify Attributes

Entity	Primary Key	Attribute
Student	Student_ID	StudentName
Professor	Employee_ID	ProfessorName
Course	Course_ID	CourseName



CREATING ERD

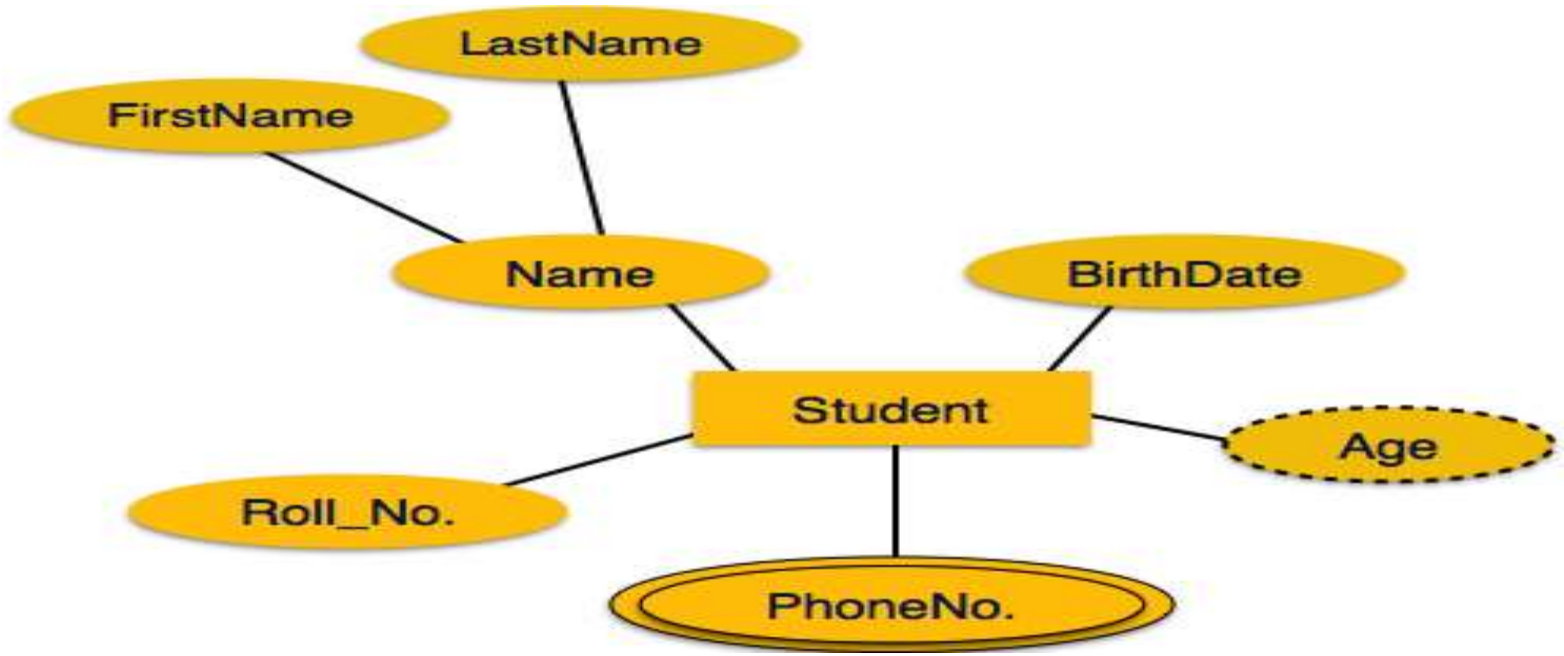
Step 5) Create the ERD

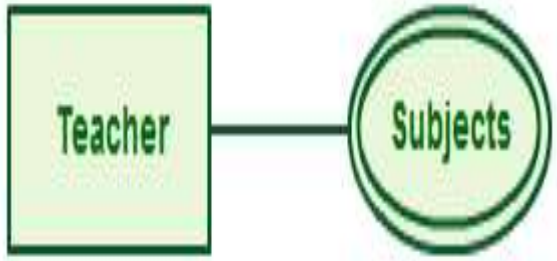
ENTITY-RELATIONSHIP(E-R) DIAGRAM

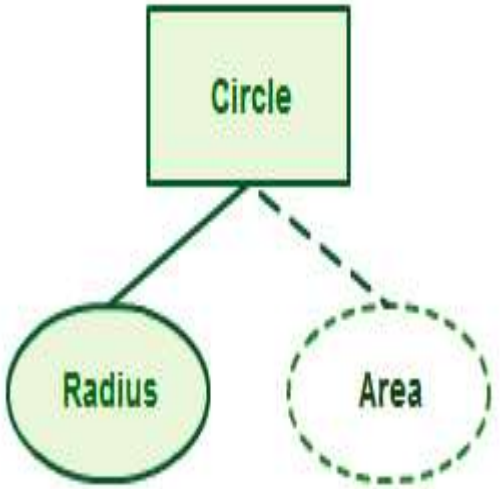
Participation Constraints

- **Total Participation** − Each entity is involved in the relationship. Total participation is represented by double lines.
- **Partial participation** − Not all entities are involved in the relationship. Partial participation is represented by single lines.

MULTIVALUED ATTRIBUTE & DERIVED ATTRIBUTE

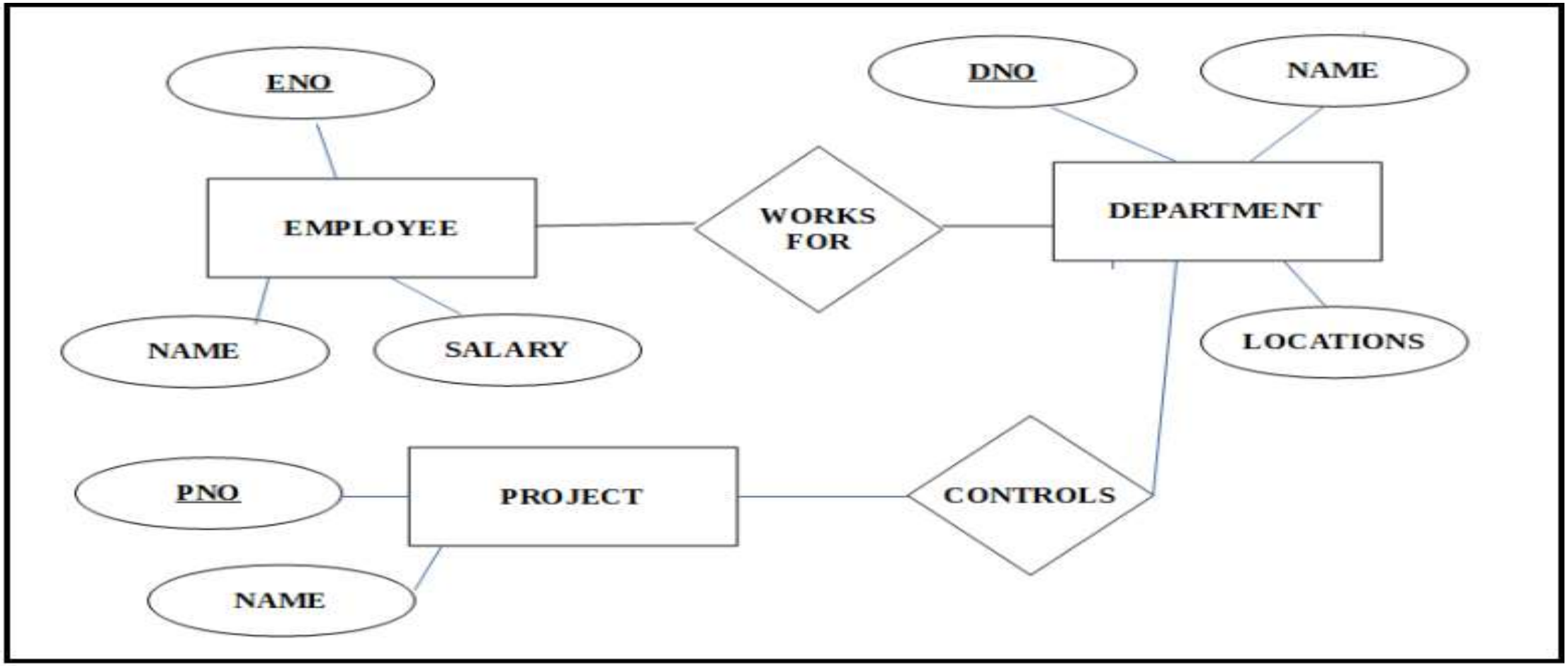






Age, Area-derived attribute **PhoneNo, Subjects**-multivalued attribute

EXAMPLE OF AN E-R DIAGRAM



CONVERTING E-R MODEL INTO RELATIONAL MODEL

- Entity type is converted to a Relation or table.
- 1:1 relationship forms a single table
- 1: N relationship type is converted to two tables with primary key of first being the foreign key of the second.
- M: N relationship type is converted to at least three tables, two with primary keys that become two foreign keys in the third.
- Simple attribute is converted to an attribute.
- Value set is converted to a domain.
- Key attribute is converted to a primary key.

- TILL WE MEET AGAIN IN THE NEXT CLASS.....