DBMS –Session 2

By- Saurabh Kumar Sharma

Course Objective

- To understand and familiarize with Entity Relationship(ER) Model.

Session Objective

- Entity Relationship Model
- Types of Entities
- Types of Attributes
- Relationships
  - Degree of Relationships
  - Cardinality of Relationships

Entity-Relationship (ER) Model

- ER model helps to capture conceptual database design
- Adopts top-down approach
- Describes the functional data requirements of a real-world problem in the form of ER diagrams
- Consists of Attributes, Entities, Relationships, Identifiers
- UML class diagrams is representative of another way of displaying ER concepts

Entity and Attribute

Entities

- Entities are specific objects or things that are represented in the database.

  Example:

  The Student , the Book

Attributes

- Attributes are properties used to describe an entity.

  Example:

  STUDENT entity may have the attributes Name, Reg. no, Address, Degree, BirthDate

- Each attribute has a value set associated with it.

  Example:

  Attribute Age associated with value ranges from 18 to 52, attribute Department should have values ‘CS’, ‘EE’,’ME’,’CV’

Types of Entities

Strong/Regular Entity

- It can exist independently of other types of entities
- It has its own unique identifier

Example:

The Student Entity can exist independent of any other entitles

Weak Entity

- It is dependent on a strong entity (identifying owner)…cannot exist on its own
- It does not have a unique identifier (only a partial identifier)

Example:

Nominee Entity cannot exist independent of Policy-Holder Entity

Types of attributes

- Simple Vs Composite
- Single valued Vs Multi-valued
- Simple attribute

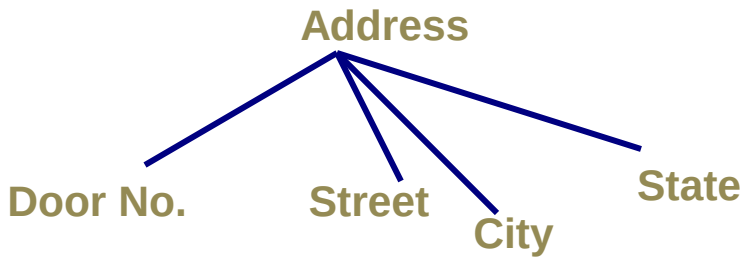
  An attribute, which cannot be sub-divided further components

  Example: Age, Sex. These attributes cannot be divided into subcomponents

- Composite attribute

  Attribute may be composed of several components

  Example: Address, Name. Address attributes can be composted of door no., street, city, state, whereas Name can compose of First Name, Last Name



Types of attributes contd…

- Single valued attribute
  An attribute, which has only single atomic values
  Example:
  Age, DOB, Sex. These attribute values are single and atomic
- Multi-valued attribute
  An Attribute may have multiple values
  Example:
  Attribute Degree can have values ‘B.Tech’ and ‘M.Tech’, attribute hobby can have values ‘playing cricket’ and ‘watching cricket’
- Key Attribute/Identifier
  An attribute of an entity type (Collection of similar entities) for which each entity must have a unique value is called a key attribute of the entity type.
  Example:
  EmployeeNo. of EMPLOYEE is key attribute

Relationships

- A relationship relates two or more distinct entities with a specific meaning

  Shyam manages the Finance Department

- Relationships of the same type are grouped or typed into a relationship type

  Example:

  the MANAGES relationship type in which EMPLOYEEs and DEPARTMENTs participate

  the WORKSON relationship type in which EMPLOYEEs and PROJECTs participate

- Relationships can have attributes, which describe features pertaining to the association between the entities in the relationship

- Identifying relationship
  - links strong entities to weak entities

Degree of Relationships

Degree of a relationship is the number of entity types that participate in it.

- Unary relationship
- Binary relationship
- Ternary relationship

Unary relationship (degree 1)

- One entity related to another of the same entity type

Example: Employee Manages other Employee

Binary relationship (degree 2)

- Entities of two different types related to each other

Example: Supplier supplies Quotations

Ternary relationship (degree 3)

- Entities of three different types related to each other

Example: Parental relationship between mother, father and child

Cardinality of Relationships

The number of entity instances that may participate in a relationship instance

One-to-one (1:1)

Each entity in the relationship will have exactly one related entity

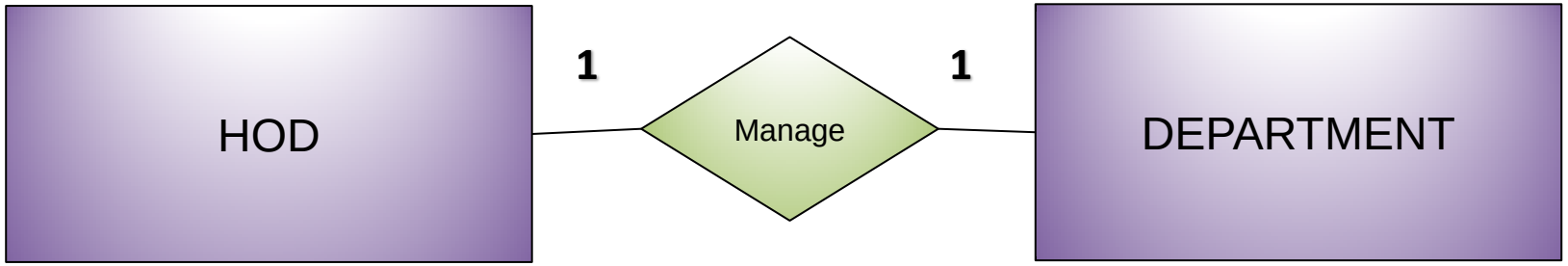
One-to-many (1:N) or Many-to-one (N:1)

An entity on one side of the relationship can have many related entities, but an entity on the other side will have a maximum of one related entity

Many-to-many (M:N)

Entities on both sides of the relationship can have many related entities on the other side

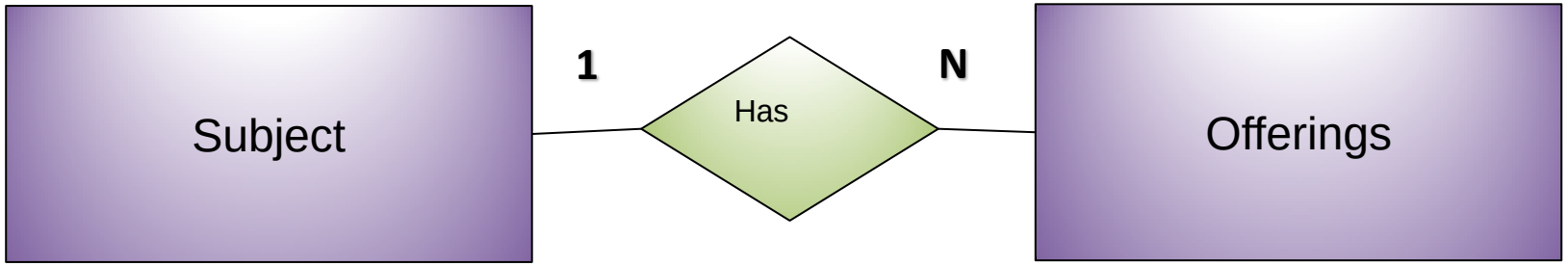
One to One



- A HOD manages one Department.
- Each Department is managed by one HOD

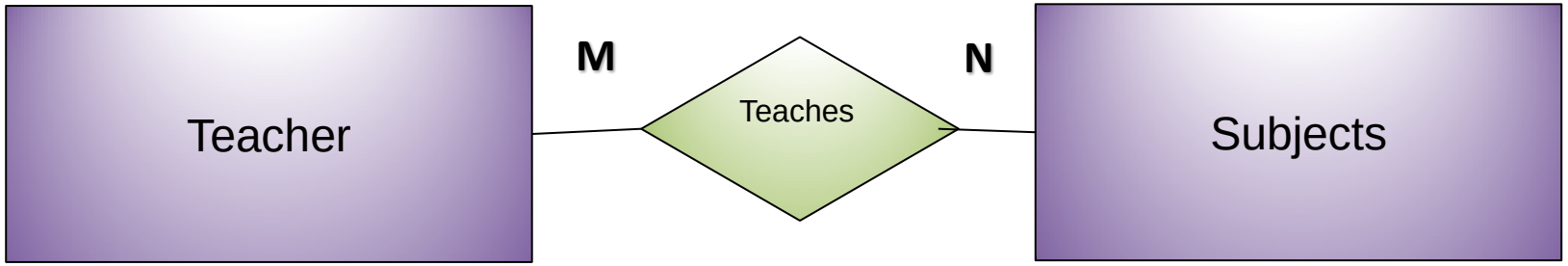
One to Many

It reflects business rule that one entity is associated with many number of same entity.



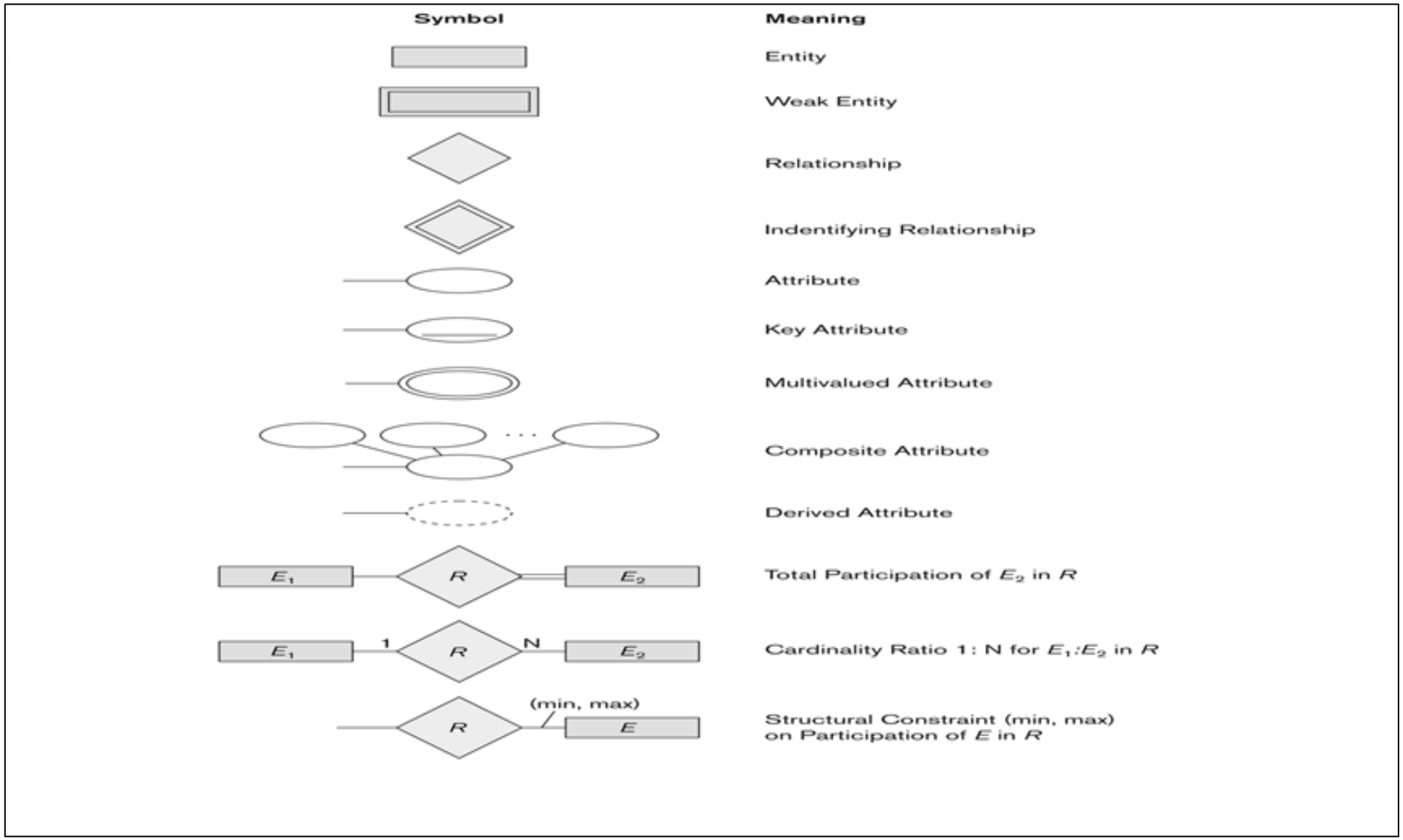
- A Subject can be offered many times
- Each Offering belongs to one Subject

Many to Many

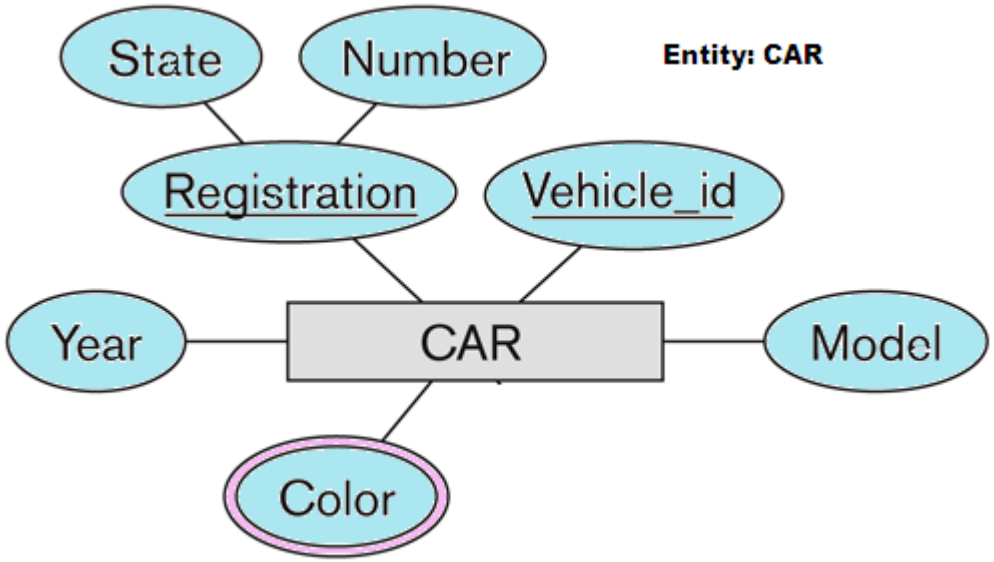


- A Teacher can teach many different Subjects
- Each Subject can be taught by many Teacher

ER Notations

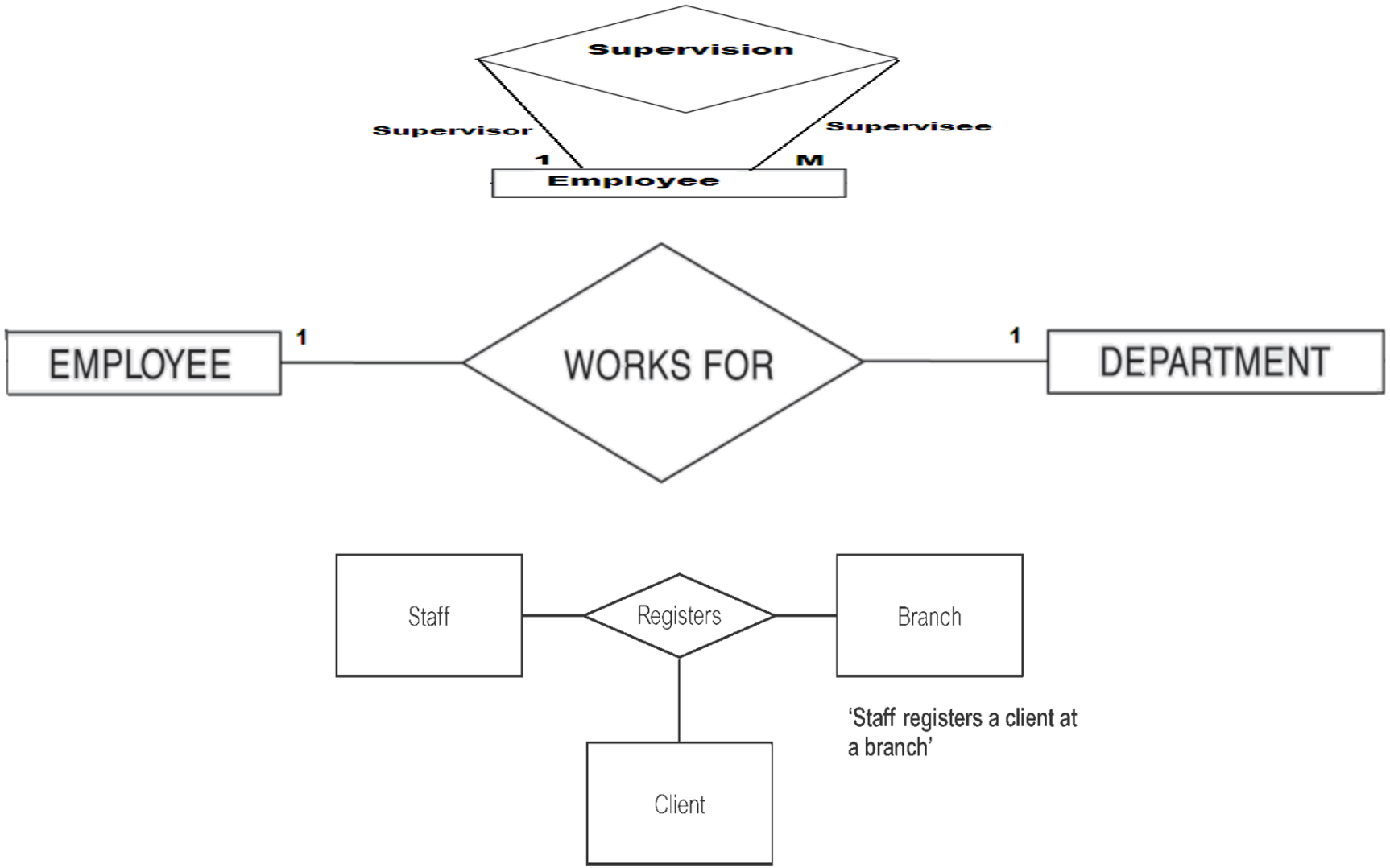


Entity and Attributes representation using ER notation



Entity is represented using Rectangle, attributes are represented with ellipse and key attributes/identifiers are underlined

Relationships representation using ER notation



Questions