

DATABASE ESSENTIALS

Lecture 4

E-R DIAGRAMS


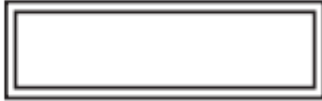

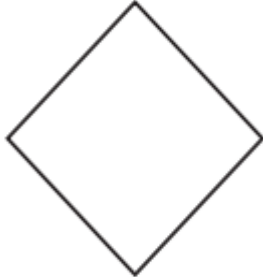
E-R diagram expresses the overall logical structure of a database graphically.

ER diagram is created based on three principal components:

- Entities
- Attributes
- Relationships





E-R DIAGRAMS

- E-R diagram basic structure consists of the following components

Name of Symbol	Symbol	Meaning
Rectangle		Entity Set (Strong)
Double Rectangle		Entity Set (Weak)
Ellipse		Attribute
Diamond		Relationship Set

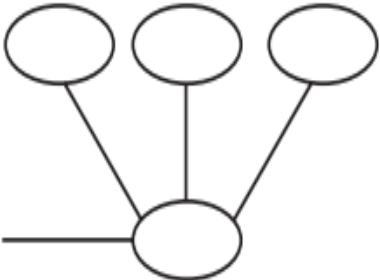
E-R DIAGRAMS

- E-R diagram basic structure consists of the following components

Name of Symbol	Symbol	Meaning
Double Diamond		Identifying Relationship set linked to weak entity
Double Ellipses		Multi-valued attributes
Dashed Ellipses		Derived attributes
Ellipse with line inside it		Key attribute

E-R DIAGRAMS

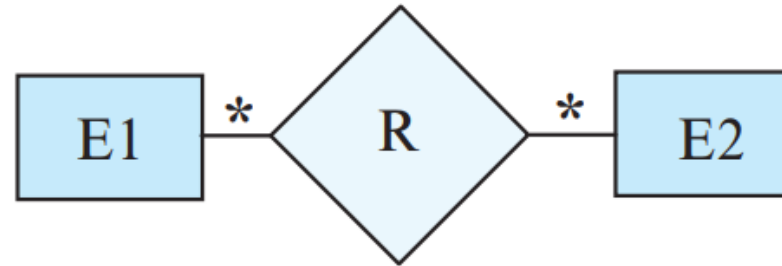
- E-R diagram basic structure consists of the following components

Name of Symbol	Symbol	Meaning
Ellipse joined with other ellipses		Composite attributes

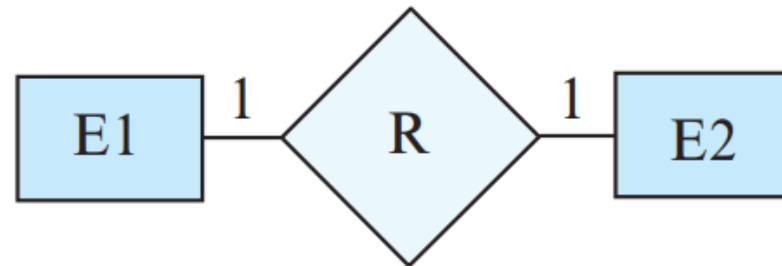
E-R DIAGRAMS

- E-R diagram basic structure consists of the following components

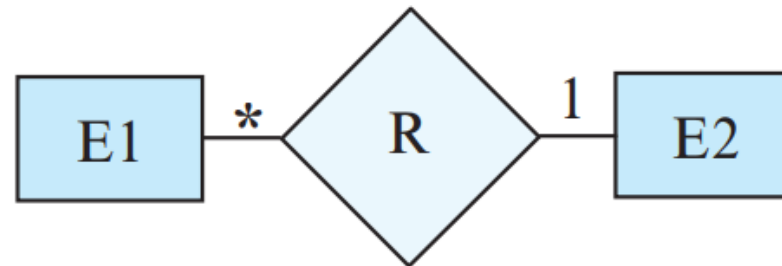
many-to-many
relationship



one-to-one
relationship



many-to-one
relationship



E-R DIAGRAMS

Steps for constructing an E-R diagram

1. Identify entities
 - ✓ List all the entities involved in the system.
2. Identify attributes
 - ✓ For each entity, identify and list its attributes.
3. Identify relationships
 - ✓ Determine the relationships between entities.
 - ✓ Identify the type of relationship (one-to-one, one-to-many, many-to-many).

E-R DIAGRAMS

Steps for constructing an E-R diagram

4. Create entity boxes

- ✓ Represent each entity as a box with its name at the top.
- ✓ List its attributes inside the box.

5. Draw relationships

- ✓ Draw lines between related entities to represent relationships.
- ✓ Label the lines with the type of relationship (1:1, 1:N, M:N).

6. Label relationships

- ✓ Add diamond shapes to the lines representing relationships.
- ✓ Label the diamonds with appropriate verbs to describe the relationship.

E-R DIAGRAMS

Steps for constructing an E-R diagram

7. Add primary keys

- ✓ Identify and designate the primary key for each entity (the unique identifier).
- ✓ The primary key is underlined in the entity box.

8. Refine the diagram

- ✓ Review the diagram for completeness and correctness.
- ✓ Ensure that all entities, attributes, relationships, and keys are accurately represented.



E-R DIAGRAMS

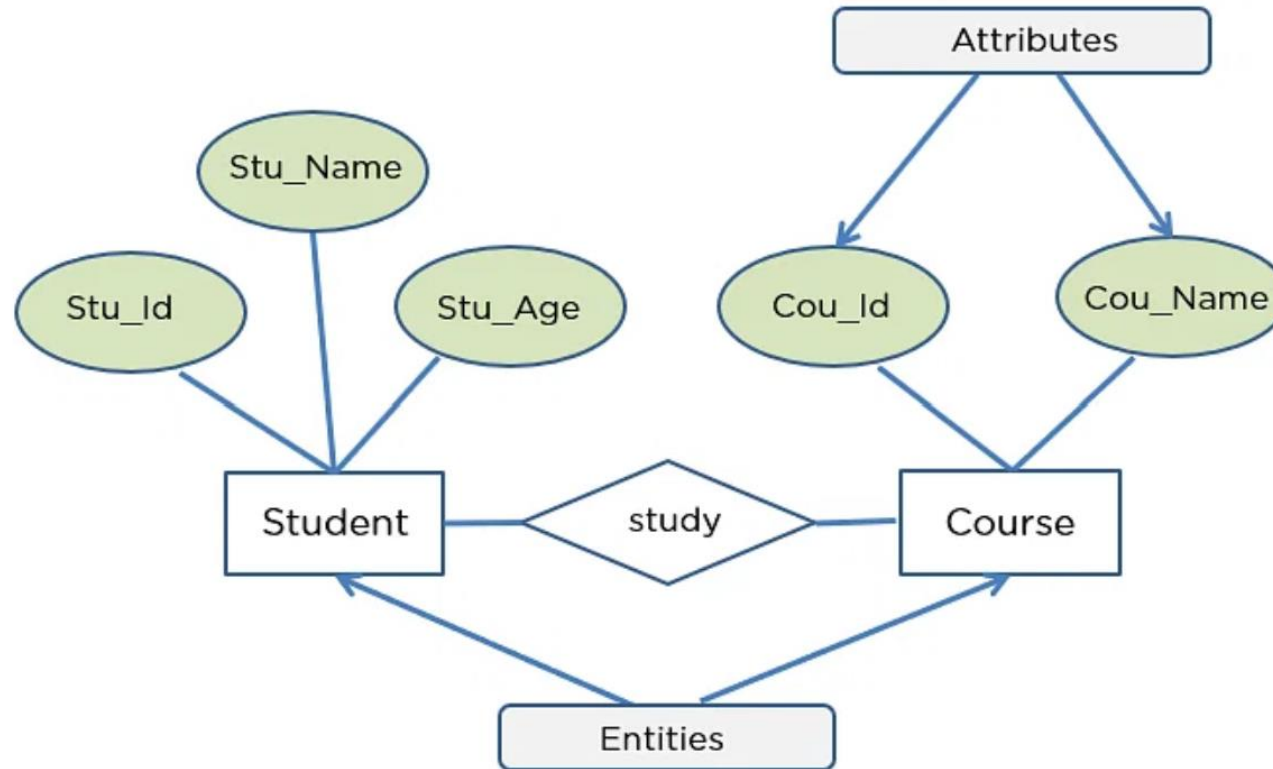
Example

Draw an E-R diagram that indicates the relationship between a student, a course and lecturer.

E-R DIAGRAMS

Example

Draw an E-R diagram that indicates the relationship between a student and a course.




E-R DIAGRAMS

Example

Construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars and has one or more premium payments associated with it. Each payment is for a particular period of time, and has an associated due date, and the date when the payment was received.

Quiz

Design an E-R diagram for keeping track of the scoring statistics of your favorite sports team. You should store the matches played, the scores in each match, the players in each match, and individual player scoring statistics for each match. Summary statistics should be modeled as derived attributes with an explanation as to how they are computed.



“There are no shortcuts to any
place worth going.”

– Beverly Sills