

Experiment No :- 1

Date : 12/8/2020

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Aim : To understand the concept of ER diagram and draw an ER diagram for college database

Objective :

Students will be able to :-

- Describe the concept of entity, attribute and keys
- Decide the cardinality of given ER diagram
- Draw the ER diagram for the given case

Theory :

The entity-relationship (E-R) data model was developed to facilitate database design by allowing specification of an enterprise schema that supervents the overall logical structure of a database.

The E-R model employs three basic concepts: entity sets, relationship sets and attributes.

Entity :

The basic object that the E-R model represents is an entity, which is a thing in the real world with an independent existence.

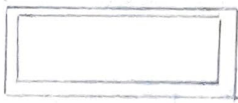
Attributes :

Each entity has attributes - The particular properties that describe it. For eg, an EMPLOYEE entity may be described by the employee's name, age, address, salary and job.

Symbols of ER diagram



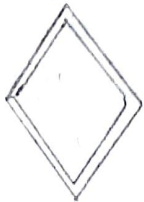
Entity



Weak Entity



Relationship



Identifying Relationship



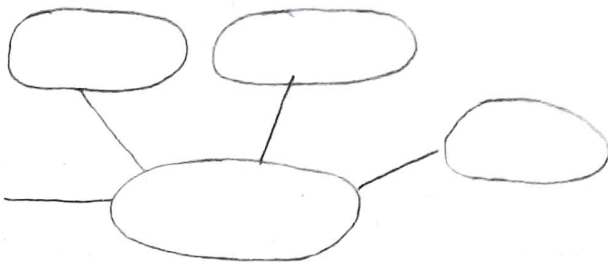
Attribute



Key attribute



Multivalued attribute



Composite attribute



Derived attribute



Total participation of E_2 in R



Cardinality Ratio 1:N
for $E_1:E_2$ in R

Types of attributes:-

- a) composite various simple
- b) single-value various multivalued attributes
- c) stored various derived attributes

Key attributes of an entity type:

An important constraint on the entities of an entity type is the key or constraints or attributes. An entity type usually has one or more attributes whose values are distinct for each individual entity in the entity set. Such an attribute is called a key attribute and its value can be used to identify each entity uniquely.

Relationship sets:

A relationship is an association among several entities. For eg, we can define a relationship advisor that associates with student

Mapping cardinalities:

Also known as cardinalities ratio, express the number of entities to which another entity can be associated via a relationship set.

→ E-R Diagram Example

A college database application: Here we are going to design an entity relationship (ER) model for a college database, we have the following statements.

1. A college contains many departments
2. Each department can offer any number of courses
3. Many instructors can work in a department
4. An instructor can work only in one department
5. For each department there is a head
6. An instructor can be head of only one department
7. Each instructor can take any number of courses
8. A course can be taken by only one instructor
9. A student can enroll for any number of courses
10. Each course can have any number of students

Step 1: Identify the entities

From the given statements, the entities are:

- department
- course
- instructor
- student

Step 2: Identify the relationships

1. One department offers many courses. But one particular course can be offered by only one department. Hence the cardinality between department and course is one to many (1:N).

2. One department has multiple instructors. But instructor belongs to only one department. Hence, cardinality is one to many (1:N)
3. One department has only one head. Hence, cardinality is one to one (1:1)
4. One course can be enrolled by many students and one student can enroll for many courses. Hence, cardinality is many to many (M:N)
5. One course is taught by only one instructor. But one instructor teaches many courses. Hence, cardinality is many to one (N:1)

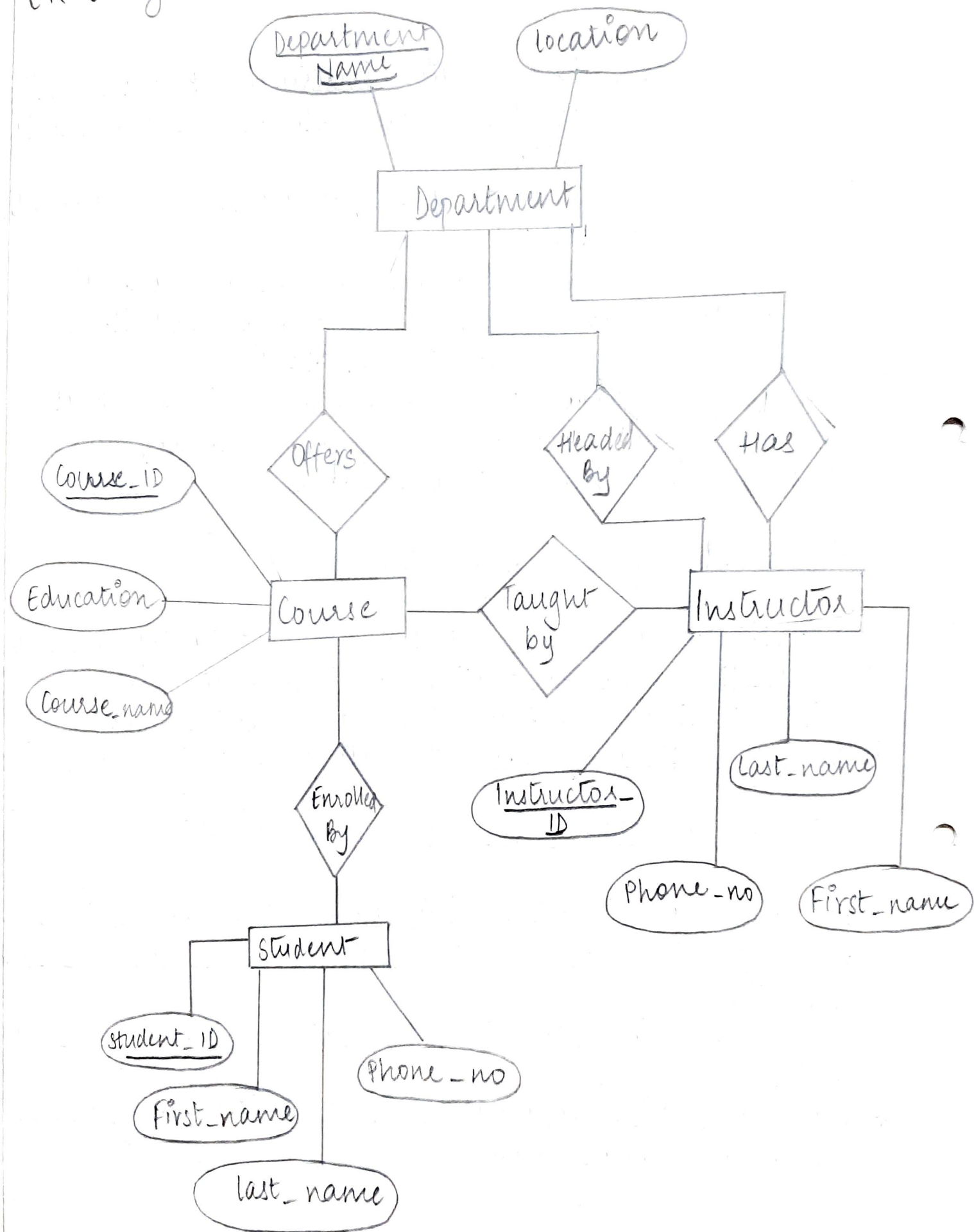
Step 3: Identify the key attributes

1. Dept_Name is the key attribute for entity department
2. Course_ID is the key attribute for entity course
3. Student_ID is the key attribute for entity student
4. Instructor_ID is the key attribute for entity instructor

Step 4: Identify other relevant attributes

1. For the department entity, other attributes are location
2. For the entity course, other attributes are course_name, duration
3. For the entity instructor, other attributes are first_name, last_name, phone_no
4. For the entity student, other attributes are f_name, l_name, phone_num.

ER diagram:



Step 5: Draw complete ER diagram

By connecting all these details, we have to draw the ER diagram.

Conclusion:

With the end of this experiment, I successfully learned how to create an ER diagram which further makes it easier