

**Government College of Engineering, Jalgaon**  
**(An Autonomous Institute of Government of Maharashtra)**

<b>Name :</b>	<b>Semester : V</b>	<b>PRN :</b>
<b>Class : T. Y. B.Tech Computer</b>	<b>Academic Year : 2024-25</b>	<b>Subject : DBMSL</b>
<b>Course Teacher : Mr. Vinit Kakde</b>		
<b>Date of Performance :</b>	<b>Date of Completion :</b>	

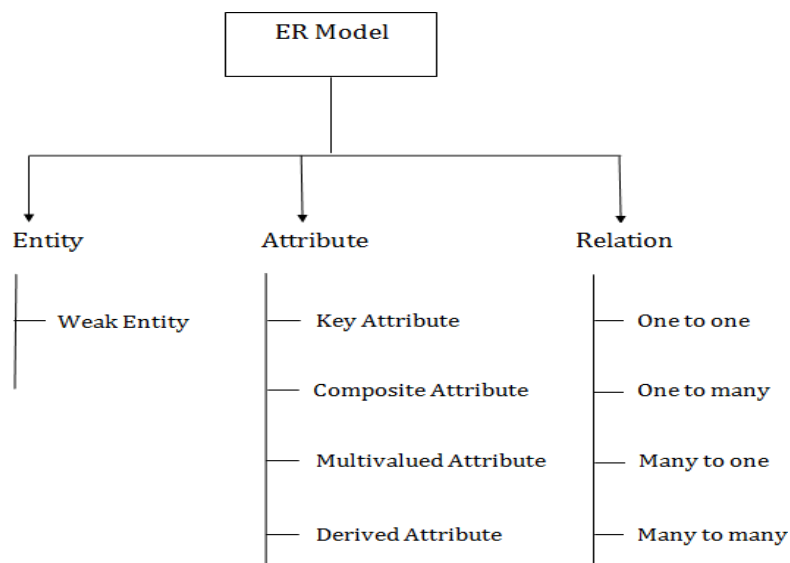
**Practical no. 1**

**Aim** : Map the ER/EER diagrams to a relational schema. Be sure to underline all primary keys, include all necessary foreign keys and indicate referential integrity constraints. Create a database of the same schema using Data Definition Language (DDL). Use all DDL statements (Create, Alter, Drop) with all possible options and constraints (Primary key, Foreign Key, unique, Not Null, Default, Check etc. ).

**ER model**

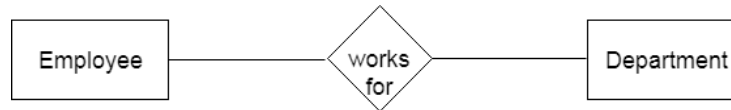
- ER model stands for an Entity-Relationship model. It is a high-level data model. This model is used to define the data elements and relationship for a specified system.
- It develops a conceptual design for the database. It also develops a very simple and easy to design view of data.
- In ER modeling, the database structure is portrayed as a diagram called an entity-relationship diagram.

**Component of ER Diagram**



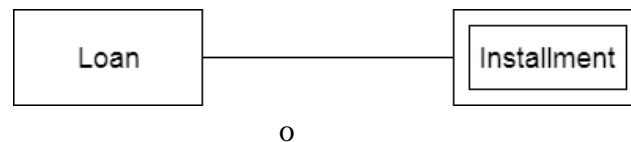
## 1. Entity:

- An entity may be any object, class, person or place. In the ER diagram, an entity can be represented as rectangles.
- Consider an organization as an example- manager, product, employee, department etc. can be taken as an entity.



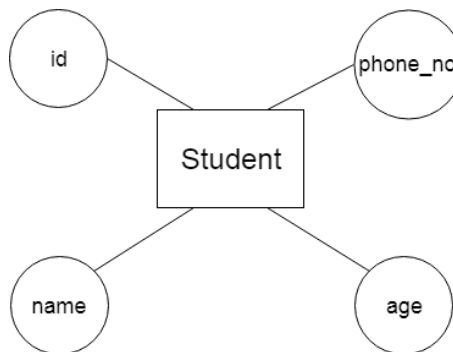
### **a. Weak Entity**

- An entity that depends on another entity called a weak entity. The weak entity doesn't contain any key attribute of its own. The weak entity is represented by a double rectangle.



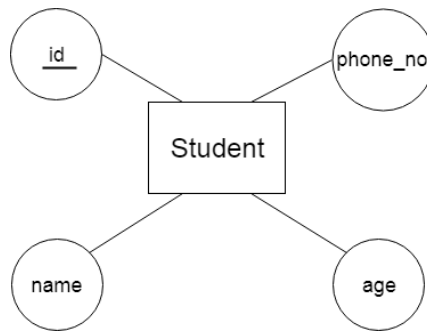
## 2. Attribute

- The attribute is used to describe the property of an entity. Eclipse is used to represent an attribute.
- **For example**, id, age, contact number, name, etc. can be attributes of a student.



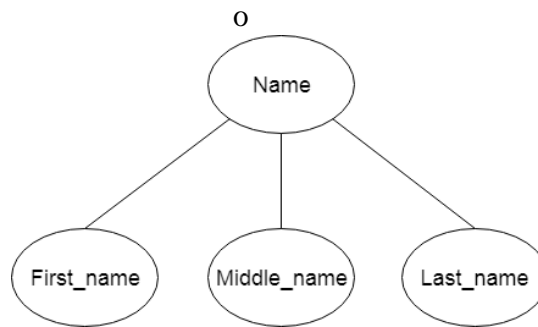
### **a. Key Attribute**

- The key attribute is used to represent the main characteristics of an entity. It represents a primary key. The key attribute is represented by an ellipse with the text underlined.



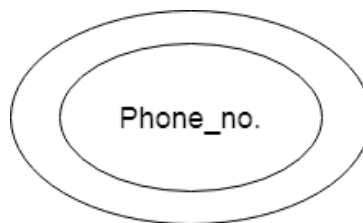
### b. Composite Attribute

- An attribute that composed of many other attributes is known as a composite attribute. The composite attribute is represented by an ellipse, and those ellipses are connected with an ellipse.



### c. Multivalued Attribute

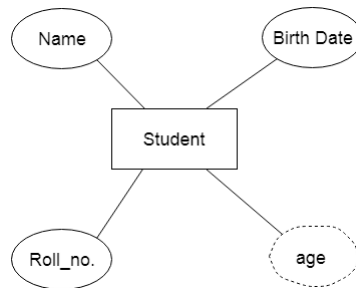
- An attribute can have more than one value. These attributes are known as a multivalued attribute. The double oval is used to represent multivalued attribute.
- **For example**, a student can have more than one phone number.



### d. Derived Attribute

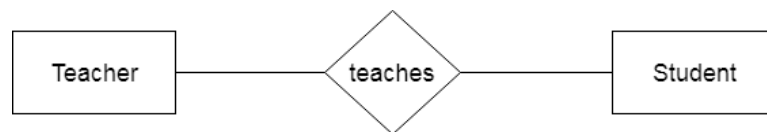
- An attribute that can be derived from other attribute is known as a derived attribute. It can be represented by a dashed ellipse.

- **For example,** A person's age changes over time and can be derived from another attribute like Date of birth.



### 3. Relationship

- A relationship is used to describe the relation between entities. Diamond or rhombus is used to represent the relationship.



Types of relationship are as follows:

#### **a. One-to-One Relationship**

- When only one instance of an entity is associated with the relationship, then it is known as one-to-one relationship.
- **For example,** A female can marry to one male, and a male can marry to one female.



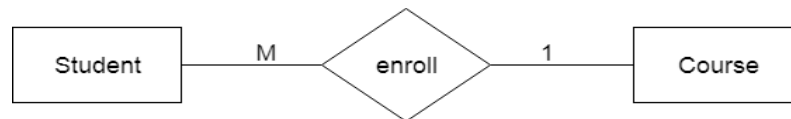
#### **b. One-to-many relationship**

- When only one instance of the entity on the left, and more than one instance of an entity on the right associates with the relationship then this is known as a one-to-many relationship.
- **For example,** Scientist can invent many inventions, but the invention is done by the only specific scientist.



### c. Many-to-one relationship

- When more than one instance of the entity on the left, and only one instance of an entity on the right associates with the relationship then it is known as a many-to-one relationship.
- **For example**, Student enrolls for only one course, but a course can have many students.






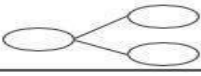






### d. Many-to-many relationship

- When more than one instance of the entity on the left, and more than one instance of an entity on the right associates with the relationship then it is known as a many-to-many relationship.
- **For example**, Employee can assign by many projects and project can have many employees.



### Symbols used in ER diagram :

Entity Set 	Strong Entity Set	
	Weak Entity Set	
Attributes 	Simple Attribute	
	Composite Attribute	
	Single-valued Attribute	
	Multivalued Attribute	
	Derived Attribute	
	Null Attribute	
Relationship	Strong Relationship	
	Weak Relationship	

### Schemas :

#### 1. College Database :

Student ( PRN, Name, Address, Phone, Gender)  
Semester ( SSID, Semester, Section)  
Class ( PRN, SSID)  
Subject ( SubjectCode, Title, Semester, Credits)  
MARKS ( PRN, SubjectCode, Test1, Test2, Final)

#### 2. COMPANY DATABASE:

EMPLOYEE (SSN, Name, Address, Sex, Salary, SuperSSN, DNo)  
DEPARTMENT (DNo, DName, MgrSSN, MgrStartDate)  
DLOCATION (DNo, DLoc)  
PROJECT (PNo, PName, PLocation, DNo)  
WORKS\_ON (SSN, PNo, Hours)

#### 3. Bank Database:

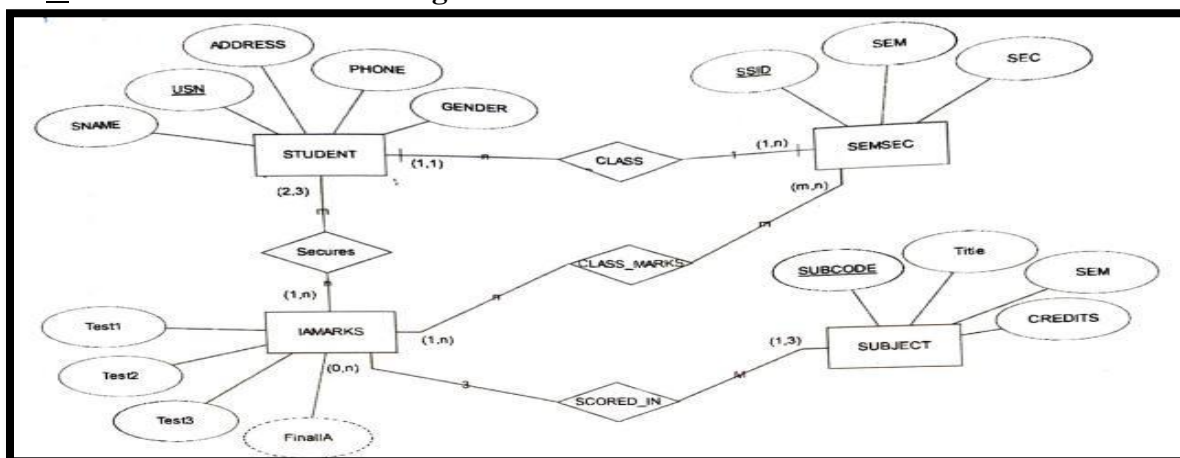
Bank ( IFSC code, Name, telephone , Address)  
Staff ( ID, Name, Address, Phone, Salary, Age)  
User ( Account number, Name, Address, Phone, Balance, DOB, aadhar number, Account type, Opening date)

#### 4. College Database:

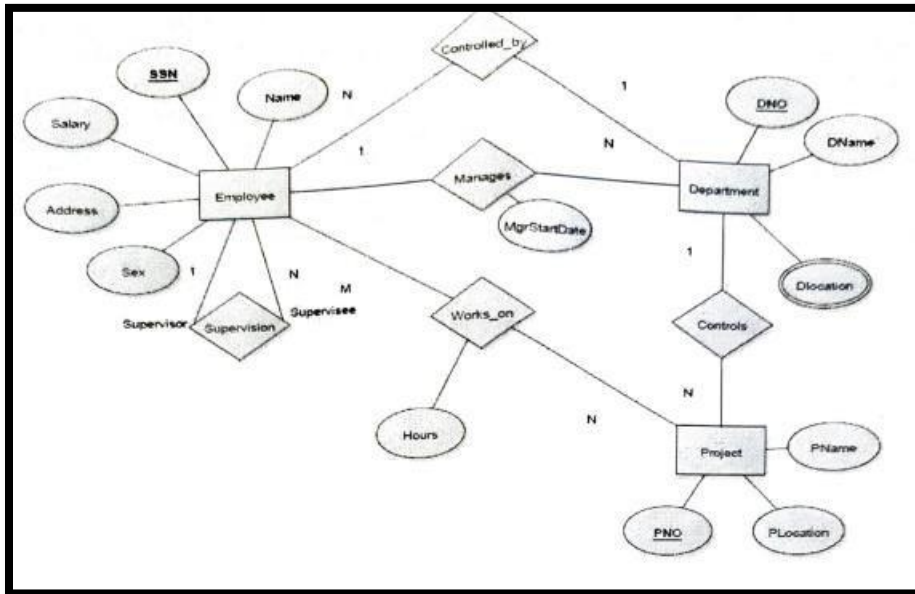
College ( RegNo, Address, Name)  
Office\_Staff ( ID, Name, Gender, Address)  
Teaching\_staff ( ID, Name, Gender, Address)  
Student ( PRN, Name, Age, Address, Gender)  
Books ( BookID, Name, Author)  
Course (Year, Subjects)  
Marks ( PRN, Test1, Test2, Final)

### ER-Diagram:

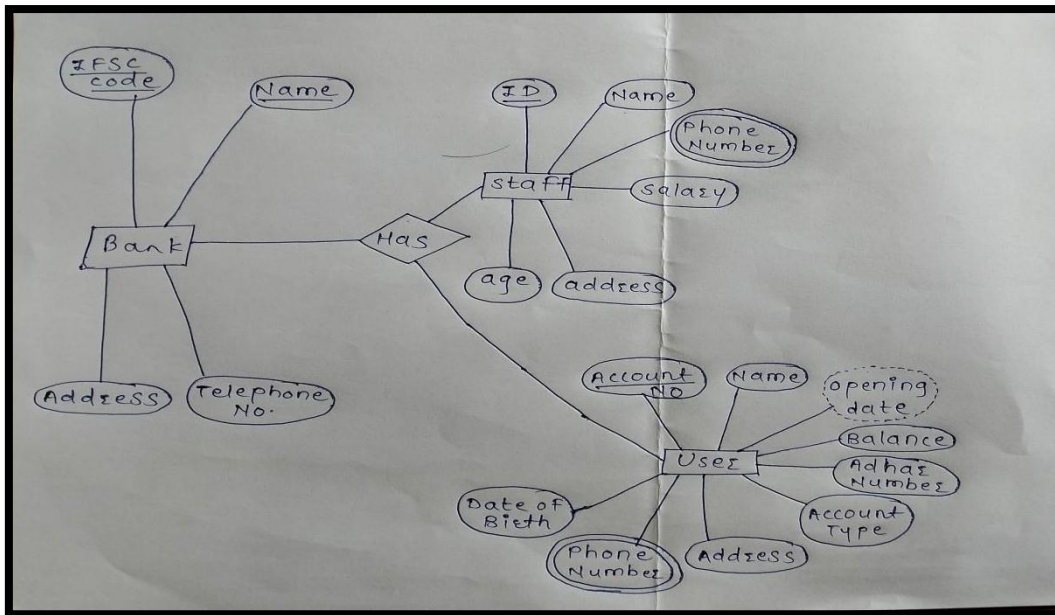
#### 1. Student database ER diagram



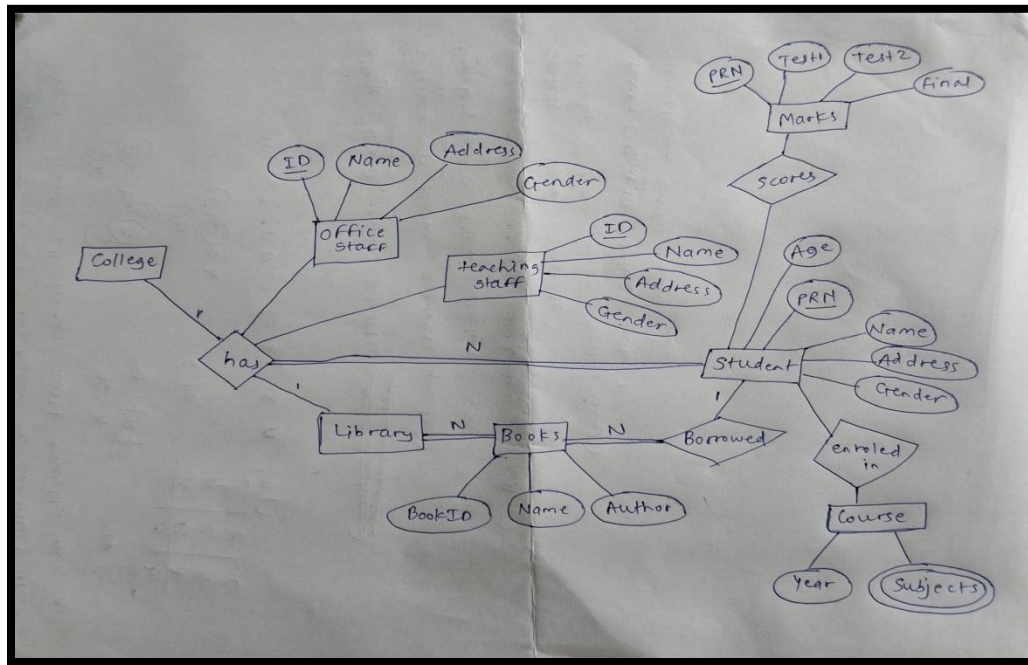
## 2. Company Database ER diagram



## 3. Bank Database:



#### 4. College Database:



#### Conclusion:

In this practical we learned about various attributes and the components of ER diagram. We drew ER diagrams for college, student, company and bank.

#### Questions:

1. What is an ER Diagram?

***An ER diagram is a graphical representation of an entity relationship model. It is used to represent the relationships between entities in a database.***

2. Can you explain the different symbols used in an ER diagram?

***The three most common symbols used in an ER diagram are rectangles, diamonds, and ovals. Rectangles are used to represent entities, while diamonds represent relationships between those entities. Ovals are used to represent attributes.***



3. Why are composite keys important when modeling databases with entity-relationship diagrams?

*Composite keys are important when modeling databases with entity-relationship diagrams because they can help to uniquely identify each row in a table. This is especially important when modeling databases that will be used for transactional purposes, such as online stores. By using a composite key, you can ensure that each row in the database is uniquely identified, which can help to prevent errors during transactions.*

4. How can cardinality be applied to relationships in ER diagrams?

**Cardinality is a way of representing the minimum and maximum number of occurrences of an entity in a relationship. For example, if you have a relationship between two entities, A and B, and you want to indicate that A can be related to B multiple times, you would use a cardinality of 1:N.**

5. What is normalization?

**Normalization is the process of organizing data in a database so that it meets certain requirements, in order to reduce data redundancy and improve data integrity.**

**Name & Sign of Course  
Teacher**

Mr. Vinit Kakde