

## Department Of Information Technology

A.Y. 2020-2021

Class: SE-ITA/B, Semester: III

Subject: **Structured Query Lab**

### **Experiment – 2: Construct and ER/EER diagram and design a relational model for the chosen system using open source tool.**

1. **Aim:** To Construct and ER/EER diagram and design a relational model for the chosen system using open source tool.
2. **Objective:** Define problem statement and Construct the conceptual model for real life application. The students should be able to clearly identify attributes, entities
  - Understand Cardinality
  - Identify and apply concepts of Generalization, Specialization and Association
3. **Outcome:** [L303.1](#): Define problem statement and Construct the conceptual model for real life application
4. **Prerequisite:** Understanding of entities, attributes and relationship.
5. **Requirements:** LibreOffice/StarUML
6. **Pre-Experiment Exercise:**

#### **Brief Theory**

Explain an Entity Relationship (ER) diagram with notations.

#### **Entities:**

An **entity** is real-world objects that are represented in database. It can be any object, place, person or class. Data are stored about such **entities**. In **dbms** we store data in the form of table containing information about **entity** type like students, teachers, employees etc

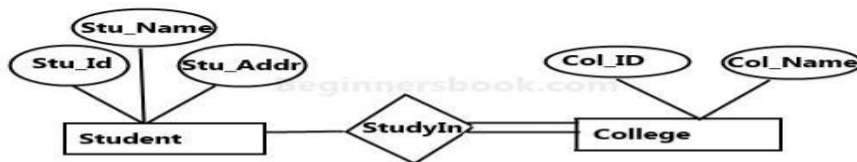
Weak Entity:

An entity that does not have a key attribute –

A weak entity must participate in an identifying relationship type with an owner or identifying entity type –

Entities are identified by the combination of: – A partial key of the weak entity type

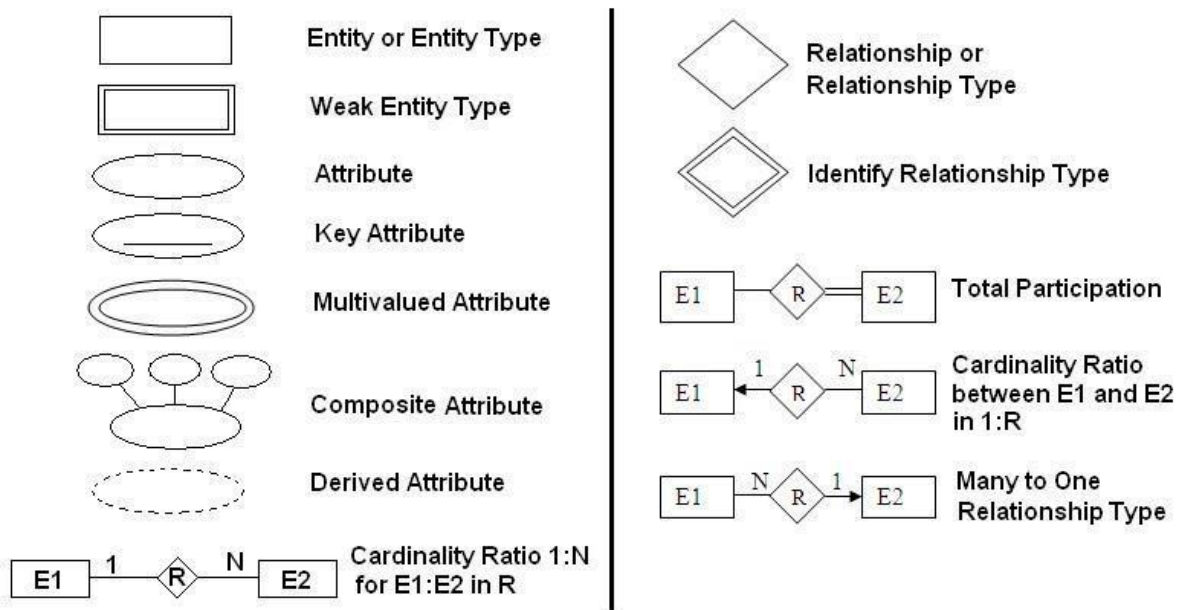
– The particular entity they are related to in the identifying entity type



**E-R Digram with total participation of College entity set in StudyIn relationship Set - This indicates that each college must have atleast one associated Student.**

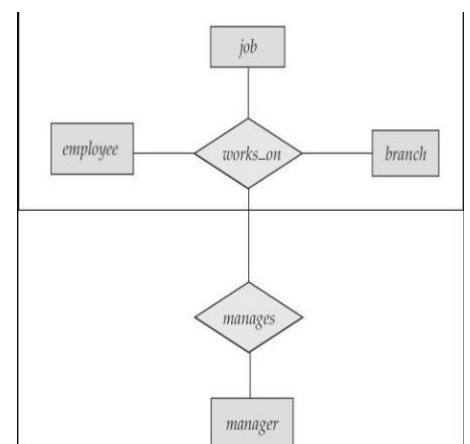
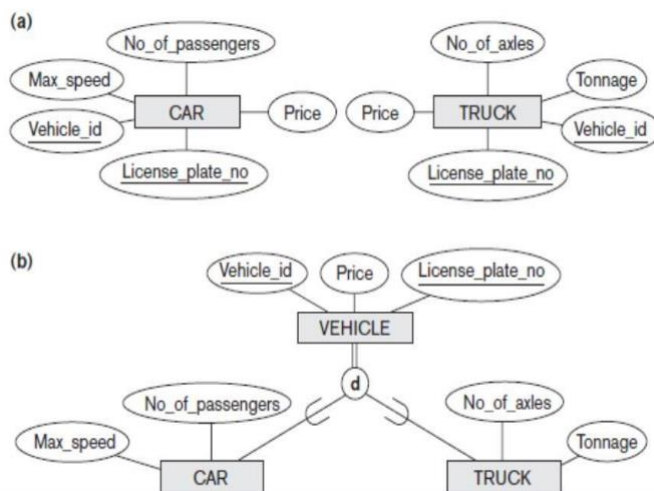
### Attributes:

Give brief description of each attribute with example



Explain basic terms used in Extended Entity Relationship (EER).

Namely Generalization, specialization and aggregation with example



**Fig:1 Example of Generalization, Specialization and Aggregation**

**Explain what a Relational Model is and how to make one.**

ER-to-Relational Mapping Algorithm

Step 1: Mapping of Regular Entity Types

Step 2: Mapping of Weak Entity Types

Step 3: Mapping of Binary 1:1 Relation Types

Step 4: Mapping of Binary 1:N Relationship Types.

Step 5: Mapping of Binary M:N Relationship Types.

Step 6: Mapping of Multivalued attributes.

Step 7: Mapping of N-ary Relationship Types.

Mapping EER Model Constructs to Relations

Step 8: Options for Mapping Specialization or Generalization.

Step 9: Mapping of Union Types (Categories).

## **7. Laboratory Exercise:**

### **A. Procedure:**

- i) Draw ER diagram for the chosen system.
- ii) Draw EER diagram for the chosen system.
- iii) Stepwise design a relational model.

### **B. Result/Observation/Program code: Attach printouts of above diagram**

[https://drive.google.com/file/d/1\\_g5lga3skkhxC-F8KlhprfwYIdCx-Vaj/view?usp=sharing](https://drive.google.com/file/d/1_g5lga3skkhxC-F8KlhprfwYIdCx-Vaj/view?usp=sharing)

<https://drive.google.com/file/d/1Rmz9E7biulSp9RJe88ekIZggHhqOn6WG/view?usp=sharing>

## **8. Post Experimental**

### **Exercise- A.**

#### **Questions:**

1. What are the limitations of ER diagram?
  - Some data may be lost or hidden in the ER diagram
  - We can't represent Specialisation, generalisation, etc
  - Different industry people may have different interpretations for symbols
  - Some schemas can't be described by an ER diagram

## 2. Compare ER and EER Diagram.

Entity Relation Diagrams(ER)	Extended Entity Relation Diagrams(EER)
1.Consist of Entity and Relations only	1.Consists of Entity, Relations, and union of different entities
2.It is the basic schema	2.It is ER diag with added concepts like Generalisation, Specialisation, superclass, subclass, etc.
3.There are no constraints for disjointness and completeness.	3.There are constraints for disjointness and completeness.
4.Inheritance of Entities is not allowed	4.Inheritance of Entities is allowed

## 3. What do you mean by Cardinality? Etc.

Cardinality is the amount of entities that are related to another set of entities. There are 3 types of cardinality:

1. 1:1(One to one):1 entity of one set can only be related to one entity of another set
2. 1:M(One to many):1 entity of one set can be related to many entities of another set
3. M:N(Many to Many):many entities of one set can be related to many entities of another set

### **B. Conclusion:**

The objective of the experiment was achieved by creating ER diagrams and using the fundamentals of inheritance, generalisation, specialisation, etc. we recreated our problem statements and ER diagrams and transformed them into EER diagrams. We looked at each entity and saw if they could be split up into more entities and checked many entities with many same attributes and made them into one.

2. Mention few applications of what was studied.

ER diagrams are used to model and design relational databases, in terms of logic and business rules (in a logical data model) and in terms of the specific technology to be implemented (in a physical data model.) In software engineering, an ER diagram is often an initial step in determining requirements for an information systems project.

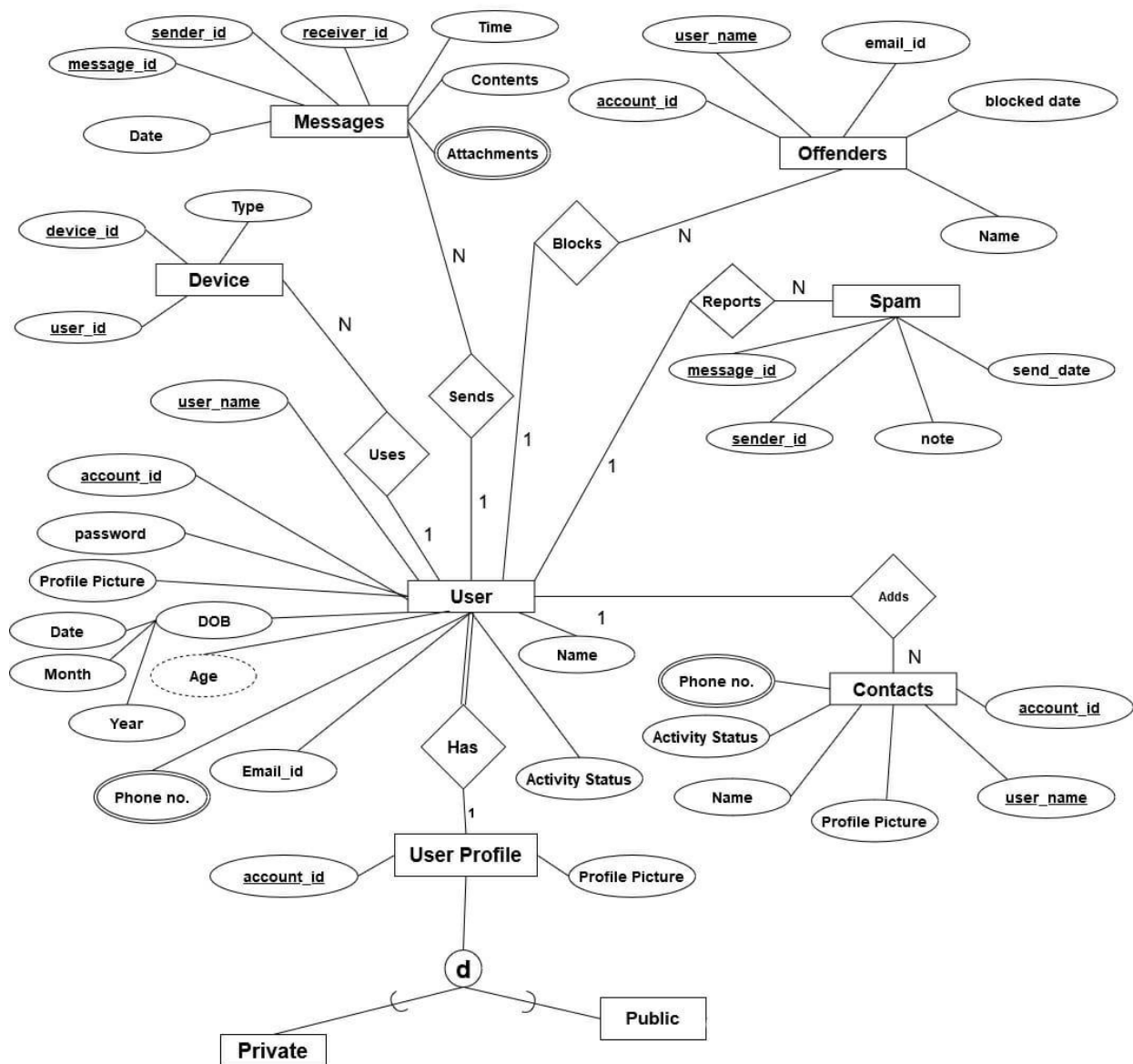
3. Write the significance of the studied topic

EER diagrams are an integral part of creating and maintaining a database. They are a guiding map for development. Without them the database structure is not efficient. It gives a visual roadmap to data storage in Databases

### **C. References:**

- [1] Elmasri and Navathe, “Fundamentals of Database Systems”, 5th Edition, PEARSON Education.
- [2] Korth, Silberchatz, Sudarshan, “Database System Concepts”, 6th Edition, McGraw – Hill

EER Model:-



Relational model:-

User

<u>user_name</u>	<u>account_id</u>	name	DOB	age	email_id	phone_no	password	activity_status
------------------	-------------------	------	-----	-----	----------	----------	----------	-----------------

