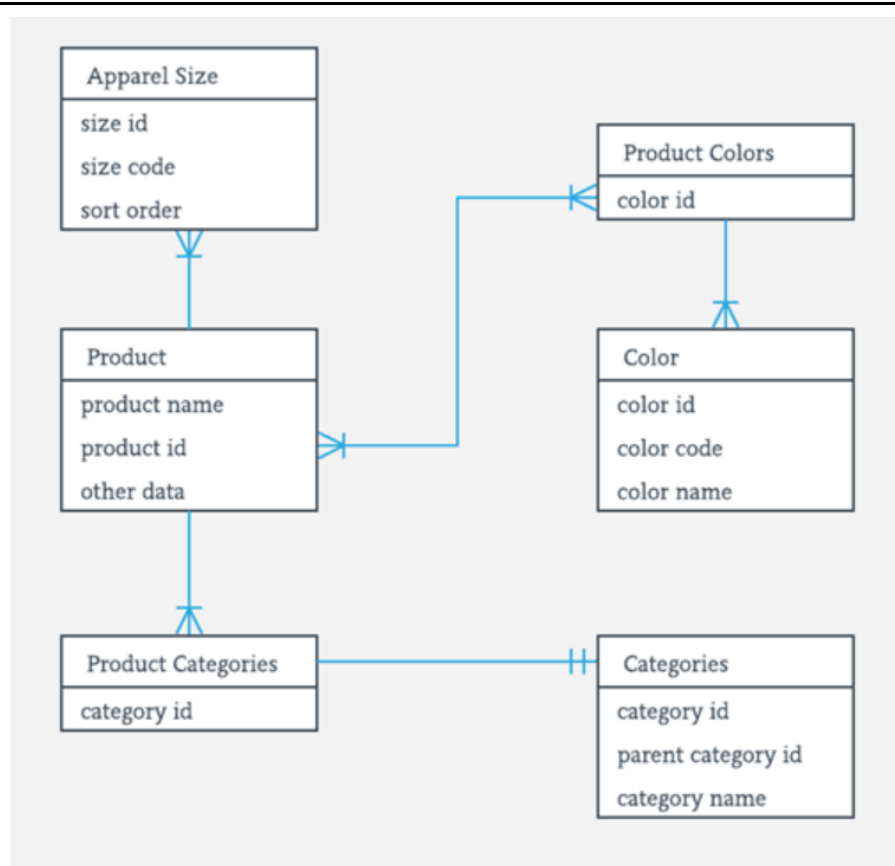| Name	Adwait S Purao
UID no.	2021300101
Experiment No.	1

AIM:	Formulate a case study and create an E-R Diagram. Mapping of E-R model to Relational model.
Program 1	
PROBLEM STATEMENT :	Create an E-R Model of a Grocery Shop
Theory :	**Entity Relationship Diagram – ER Diagram in DBMS** An Entity–relationship model (ER model) describes the structure of a database with the help of a diagram, which is known as Entity Relationship Diagram (ER Diagram). An ER model is a design or blueprint of a database that can later be implemented as a database. The main components of E-R model are: entity set and relationship set. **What is an Entity Relationship Diagram (ER Diagram)?** An ER diagram shows the relationship among entity sets. An entity set is a group of similar entities and these entities can have attributes. In terms of DBMS, an entity is a table or attribute of a table in database, so by showing relationship among tables and their attributes, ER diagram shows the complete logical structure of a database. Lets have a look at a simple ER diagram to understand this concept.

Entity Relationship Diagram Example

Here are the geometric shapes and their meaning in an E-R Diagram.
Rectangle: Represents Entity sets.
Ellipses: Attributes
Diamonds: Relationship Set
Lines: They link attributes to Entity Sets and Entity sets to Relationship Set Double
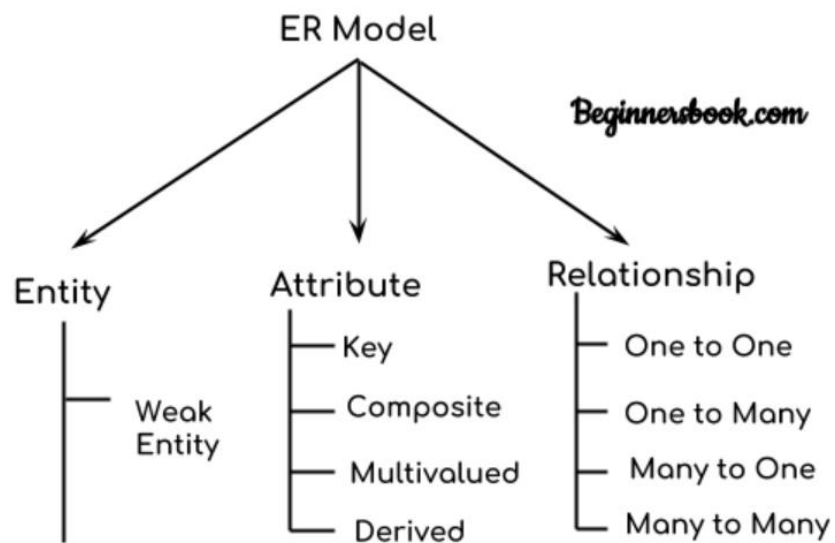**Ellipses:** Multivalued Attributes
Dashed Ellipses: Derived Attributes
Double Rectangles: Weak Entity Sets
Double Lines: Total participation of an entity in a relationship set

Components of a ER Diagram:

Components of ER Diagram

As shown in the above diagram, an ER diagram has three main
components:
1. **Entity**
2. **Attribute**
3. **Relationship**

1. Entity
An entity is an object or component of data. An entity is
represented as rectangle in an ER diagram. For example: In the
following ER diagram we have two entities Student and College
and these two entities have many to one relationship as many
students study in a single college

2.Attribute:
An attribute describes the property of an entity. An attribute is
represented as Oval in an ER diagram. There are four types of
attributes:

1. Key attribute

A key attribute can uniquely identify an entity from an entity set. It is represented with oval with underlying liens in an ER Diagram.

2. Composite attribute

An attribute that is a combination of other attributes is known as composite attribute.

Composite attributes are represented by further connected ellipse just like tree structure.

3. Multivalued attribute

An attribute that can hold multiple values is known as multivalued attribute. It is represented with double ovals in an ER Diagram.

4. Derived attribute

A derived attribute is one whose value is dynamic and derived from another attribute. It is represented by dashed oval in an ER Diagram·

Relationship:

Cardinality: Defines the numerical attributes of the relationship between two entities or entity sets. A relationship is represented by diamond shape in ER diagram, it shows the relationship among entities. There are four types of cardinal relationships:

1. One to One

When a single instance of an entity is associated with a single instance of another entity then it is called one to one relationship.

2. One to Many

When a single instance of an entity is associated with more than one instances of another entity then it is called one to many relationship.
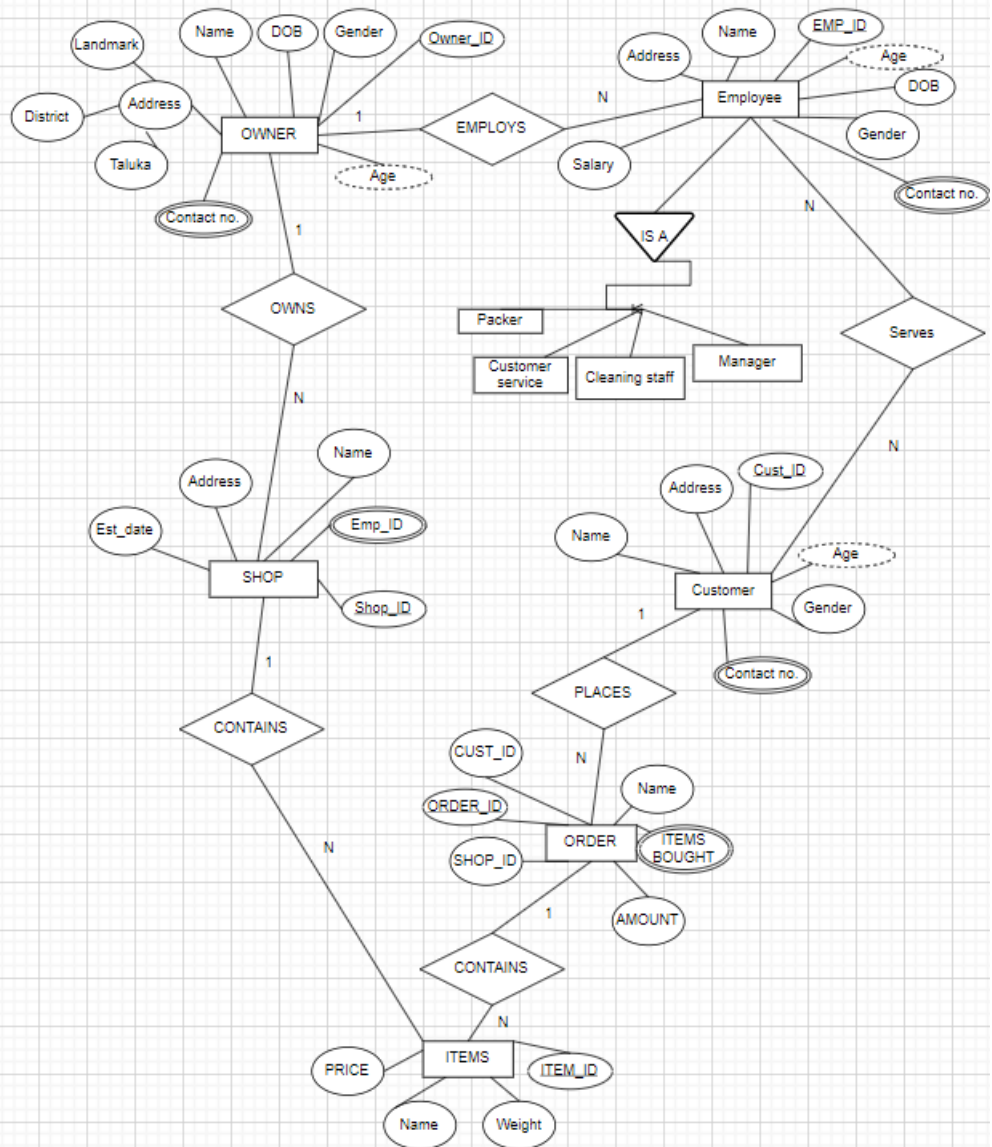
3. Many to One

When more than one instances of an entity is associated with a single instance of another entity then it is called many to one relationship

4. Many to Many

When more than one instances of an entity is associated with more than one instances of another entity then it is called many to

	many relationship. **Generalization:** Is a process in which the common attributes of more than one entities form a new entity. This newly formed entity is called generalized entity. Generalization uses bottom-up approach where two or more lower level entities combine together to form a higher level new entity. 2. The new generalized entity can further combine together with lower level entity to create a further higher level generalized entity. **Specialization:** Is a process in which an entity is divided into sub-entities. You can think of it as a reverse process of generalization, in generalization two entities combine together to form a new higher level entity. Specialization is a top-down process. The idea behind Specialization is to find the subsets of entities that have few distinguish attributes. For example – Consider an entity employee which can be further classified as sub- entities Technician, Engineer & Accountant because these sub entities have some distinguish attributes.
	E-R Model

Landmark Name DOB Gender Owner_ID   Name EMP_ID
                                        Address   Age
District Address   N   DOB
                          1   EMPLOYS   Employee
      OWNER   Gender
Taluka   Age   Salary   Contact no.
Contact no.   1   N

                                        IS A

      OWNS   Packer   Serves
                 Customer   Cleaning staff Manager
         N   service   N

                 Name   Cust_ID
   Address   Address
Est_date   Emp_ID   Name   Age
      SHOP   Customer   Gender
         Shop_ID   1
      1   Contact no.

   CONTAINS   PLACES
                 CUST_ID   N
                 ORDER_ID   Name
         N   ORDER   ITEMS
                 SHOP_ID   BOUGHT
                          1   AMOUNT
                    CONTAINS
         N   N
                    ITEMS
   PRICE   ITEM_ID
         Name   Weight

Conclusion

In this experiment we learnt about E-R Model. Our group implemented a Grocery Shop database. Through which we learnt about the various aspects of the database like Entities, Attributes and Relationships etc. This allowed us to understand the various types of Entities and Attributes like Single Valued, Multi Valued, Composite, Key, etc., followed by displaying the relations that entities have amongst themselves using Diamond Boxes. Furthermore, we have shown cardinalities That helped us understand the numerical attributes of the relationship between two entities or entity sets. Hence this experiment gave us a deeper understanding of the E-R diagram.