B. maheshswar Reddy,
VTU 28585

DATABASE MANAGEMENT SYSTEMS

(10211DS207)

TASK : 12

TEAM DETAILS :

Team Leader : P koteswara Rao (VTU28129)

Reg No : (24UEDC0053)

Team members :

Names :	**VTU :**	**Registrationno:**
M. karthik reddy	(VTU28133)	(24UEDC0039)
G. Adithya reddy	(VTU28321)	(24UEDC0026)
N.Mohan sai	(VTU28583)	(24UEDC0046)
B. Maheshswar reddy	(VTU28585)	(24UEDC0007)

AIM :

To develop a microproject on Online Grocery System.

1. ER Diagram

The ER Diagram for an **Online Grocery System** represents how different components like customers, products, orders, carts, payments, and deliveries interact with each other. This model helps in designing a database that efficiently handles online ordering, payment, inventory, and delivery of grocery items.

Entities

1. Customer

- **Attributes**:
  `Customer_ID (PK), Name, Email, Phone, Address, Password`

2. Product

- **Attributes**:
  `Product_ID (PK), Name, Category_ID (FK), Price, Description, Stock_Quantity`

3. Category

- **Attributes**:
  `Category_ID (PK), Name, Description`

4. Order

- **Attributes**:
  `Order_ID (PK), Customer_ID (FK), Order_Date, Total_Amount, Status`

5. Order_Item

- **Attributes**:
  `OrderItem_ID (PK), Order_ID (FK), Product_ID (FK), Quantity, Subtotal`

6. Cart

- **Attributes**:
  `Cart_ID (PK), Customer_ID (FK), Created_Date`

7. Cart_Item

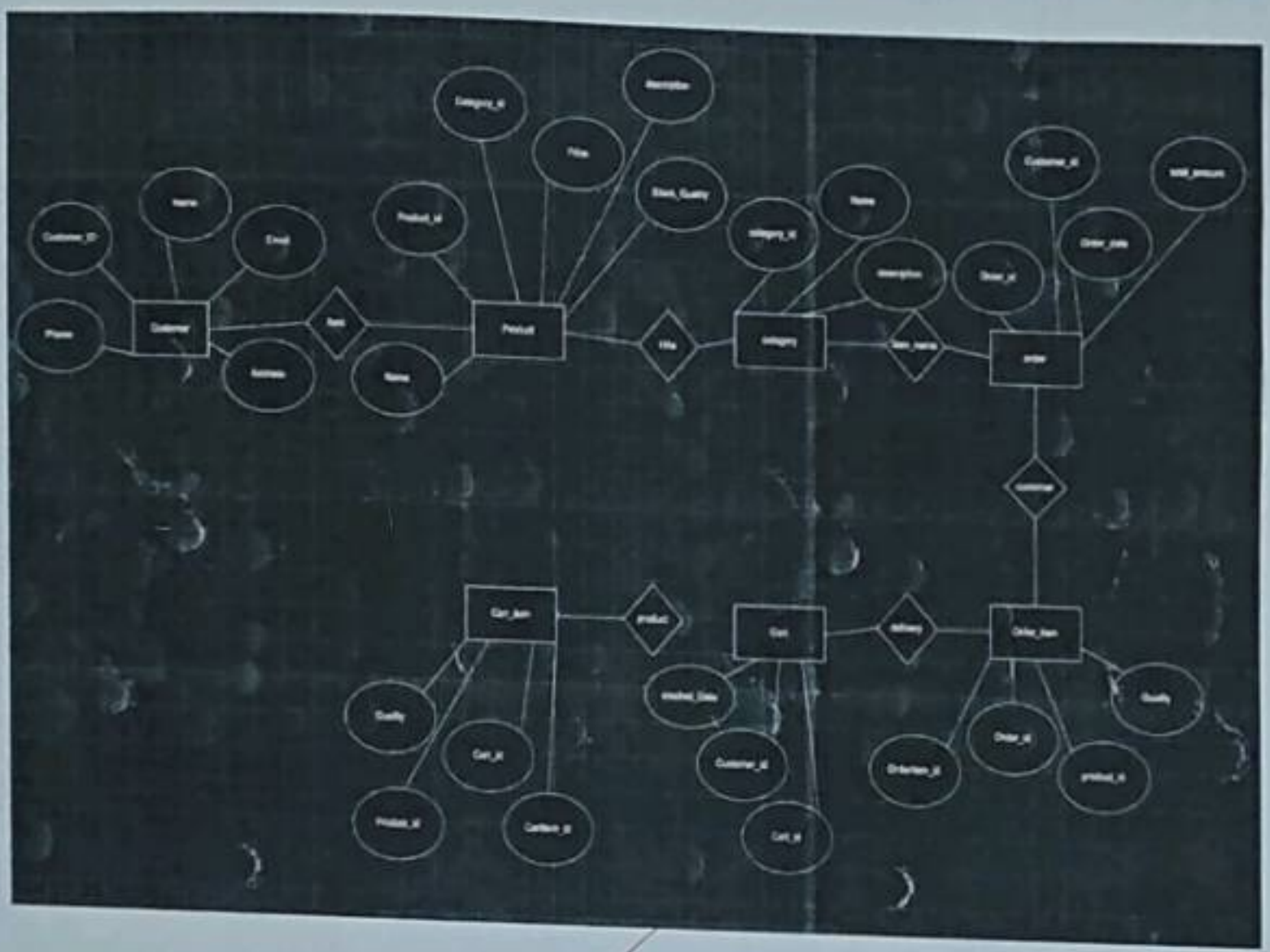
- **Attributes**:
  `CartItem_ID (PK), Cart_ID (FK), Product_ID (FK), Quantity`

Relationships

Relationship	Description	Type
Customer —> Order	One customer can place many orders	1-to-N
Order —> Order_Item	One order can contain multiple products	1-to-N
Product —> Order_Item	One product can be in many order items	1-to-N
Customer —> Cart	One customer has one cart	1-to-1
Cart —> Cart_Item	One cart contains multiple items	1-to-N
Product —> Cart_Item	One product can be added to many carts	1-to-N
Product —> Category	One category has many products	1-to-N

- Each box represents an entity with its attributes inside.
- PK stands for Primary Key,which uniquely identifies each record in the table.
- FK stands for Foreign Key,which establishes a relationship between tables.
- The line connecting the entities represent the relationships between them.
- The notation "1" and "N" indicates the cardinality of the relationships.

ER DIAGRAM :



2.SQL Queries & Relational operations :

1. Select operation :

```
SELECT *
FROM Product
WHERE Price > 100;
```

Output

```
+----+------------------------+--------+-------------+
| id | name                   | price  | category    |
+----+------------------------+--------+-------------+
| 1  | Wireless Headphones    | 150.00 | Electronics |
| 3  | Office Chair           | 120.00 | Furniture   |
| 5  | Smartwatch             | 199.99 | Electronics |
| 7  | Blender                | 110.00 | Kitchen     |
```

2. Project operation :

```
SELECT Name, Price
FROM Product;
```

Output :

```
+------------------------+--------+
| name                   | price  |
+------------------------+--------+
| Wireless Headphones    | 150.00 |
| Laptop Stand           |  45.99 |
| Office Chair           | 120.00 |
| USB-C Hub              |  35.00 |
| Smartwatch             | 199.99 |
| Desk Lamp              |  29.50 |
| Blender                | 110.00 |
```

3. Union :

```
SELECT Product_ID FROM Cart_Item
UNION
SELECT Product_ID FROM Order_Item;
```

Output :

```
+------------+
| product_id |
+------------+
|          1 |
|          3 |
|          5 |
|          5 |
|          7 |
+------------+
```

4. Union all :

```
SELECT Product_ID FROM Cart_Item
UNION ALL
SELECT Product_ID FROM Order_Item;
```

Ouput :

```
+------------+
| product_id |
+------------+
|          1 |
|          3 |
|          5 |
|          5 |
|          7 |
|          3 |
|          4 |
+------------+
```

5. intersect :

```
SELECT Customer_ID FROM Orders
INTERSECT
SELECT Customer_ID FROM Cart;
```

Output :

```
+-------------+
| customer_id |
+-------------+
| 101         |
| 203         |
| 315         |
```

6. Sum :

```
SELECT SUM(Quantity) AS Total_Products_Sold
FROM Order_Item;
```

Output :

```
+----------------------+
| total_products_sold  |
+----------------------+
| 342                  |
```

7. Count :

```
SELECT COUNT(*) AS Total_Customers
FROM Customer;
```

Output :

```
+-------------------+
| Total_Customers   |
+-------------------+
| 259               |
+-------------------+
```

8. AVG :

```
SELECT AVG(Price) AS Average_Product_Price
FROM Product;
```

Output :

```
+-------------------------+
| Average_Product_Price |
+-------------------------+
| 85.42                   |
```

9. Minimum :

```
SELECT MIN(Price) AS Lowest_Product_Price
FROM Product;
```

Output :

```
+-------------------------+
| Lowest_Product_Price |
+-------------------------+
| 12.99                   |
```

10. Maximum :

```
SELECT MAX(Price) AS Highest_Product_Price
FROM Product;
```

Output :

```
+-------------------------+
| highest_product_price |
+-------------------------+
| 499.99                  |
+-------------------------+
```

11.Nested Querires :

Find products priced above the average price

```
SELECT Name, Price
FROM Product
WHERE Price > (
    SELECT AVG(Price)
    FROM Product
);
```

Outpot :

```
+-------------------------+---------+
| Name                    | Price   |
+-------------------------+---------+
| Wireless Headphones     | 150.00  |
| Smartwatch              | 199.99  |
| Office Chair            | 120.00  |
```

12. PL SQL Procedure :

Check if a product is in stock

```
DECLARE
    v_stock NUMBER;
BEGIN
    SELECT Stock_Quantity INTO v_stock
    FROM Product
    WHERE Product_ID = 101;

    IF v_stock > 0 THEN
        DBMS_OUTPUT.PUT_LINE('Product is available.');
    ELSE
        DBMS_OUTPUT.PUT_LINE('Product is out of stock.');
    END IF;
END;
/
```

Attributes in Table

Separate attributes using a comma (,)

customer_id, cutomer_name, cart, cart_item, order, order_item, product, product_id, product_name

Functional Dependencies

customer_id × → cutomer_name × cart × cart_item × order × order_item × product × product_id × product_name ×

Delete

Check Normal Form

2NF
The table is in 2NF

3NF
The table is in 3NF

BCNF
The table is in BCNF

Show Steps

2NF

find all candidate keys. The candiates keys are { customer_id}, The set of key attributes are: { customer_id }
for each non-trivial FD, check whether the LHS is a proper subset of some candidate key or the RHS are not all key attributes
checking FD: customer_id –>
cutomer_name,cart,cart_item,order,order_item,product,product_id,product_name

3NF

find all cadnidate keys. The candiates keys are { customer_id}, The set of key attributes are: { customer_id }
for each FD, check whether the LHS is superkey or the RHS are all key attributes
checking functional dependency customer_id –>
cutomer_name,cart,cart_item,order,order_item,product,product_id,product_name

BCNF

A table is in BCNF if and only if for every non-trivial FD, the LHS is a superkey

Normaliza to 2NF :

Normalize to 2NF

Attributes

customer_id, product_name, cutomer_name, cart, cart_item, order, order_item, product, product_id

Functional Dependencies

customer_id, product_name → cutomer_name, cart, cart_item, order, order_item, product, product_id

Show Steps

First, find the minimal cover of the FDs, which includes the FDs
customer_id --> cutomer_name
customer_id --> cart
customer_id --> cart_item
customer_id --> order
customer_id --> order_item
customer_id --> product
customer_id --> product_id
customer_id --> product_name

Initially rel[1] is the original table:

Round1: checking table rel[1]

***** The table is in 2NF already, send it to output *****

Normalize to 3NF :

1NF to 3NF

Attributes

customer_id, product_name, cutomer_name, cart, cart_item, order, order_item, product, product_id

Functional Dependencies

customer_id → cutomer_name
customer_id → cart
customer_id → cart_item
customer_id → order
customer_id → order_item
customer_id → product
customer_id → product_id
customer_id → product_name

Show Steps

Table already in 3NF

Normalize to BCNF :

Thus, the normalization to 1NF, 2NF, 3NF, BCNF is completed successfully.

5.Document database using MONGODB :

CRUD,Which stands for Create,Read,Update,and Delete,represents a set of fundamental operations used to insert with and manipulate data stored in a database.These operations serve as the building blocks upon which countless applications,from simple to highly complex,rely.

Create :

```
db.createcollection("customers");
db.customers.insertmany([
{
 customer_id: "C001",
 name:"koti",
 contact_no: "8956495236",
 address:"chennai"
},
{
 customer_id:"C002",
 name:"shivaya",
contact_no:"9999999999",
address:"kasi"
}
]);
```

Output:

```
        "acknowledged" : true,
        "insertedIds" : [
                ObjectId("68f785e0196f2fe7a371c0ac"),
                ObjectId("68f785e0196f2fe7a371c0ad"),
                ObjectId("68f785e0196f2fe7a371c0ae")
        ]
```

```
"_id" : ObjectId("68f785e0196f2fe7a371c0ac"), "empId" : 1, "name" : "clark", "dept" : "Sales" }
"_id" : ObjectId("68f785e0196f2fe7a371c0ae"), "empId" : 3, "name" : "Ava", "dept" : "Sales" }
```

Read :

db.customers.find().pretty();

output :

```
{
        "_id" :objectId("68efbd7a10027ef18f9360dc"),
        "customer_id" : "C001",
        "name" :"koti",
        "contact_no" :"8956495236",
        "address" : "Chennai"
}
```

Update :

```
db.customers.updateOne(
 { customer_id: "C001" },
 { $set: { email: "koti@gmail.com" } }
);
```

Output :

```
{ "acknowledged" : true, "matchedCount" : 1, "modifiedCount" : 1 }
```

Delete :

```
db.customers.deleteOne({ customer_id: "C001" });
```

output :

```
{ "acknowledged" : true, "deletedCount" : 1 }
```

6.Graph Database using MONGODB(using neo4j online compiler)

a)Create a graph database :

```
CREATE (1:customer{id:"C001",name:"koti"})
```

Output :

```
Created 1 node, set 2 properties, added 1 label
```

```
CREATE (a1:Animal{id:"A001",bread:"jersey",gender:"Female",age:4})
```

Output :

```
reated 1 node, set 4 properties, added 1 label
```

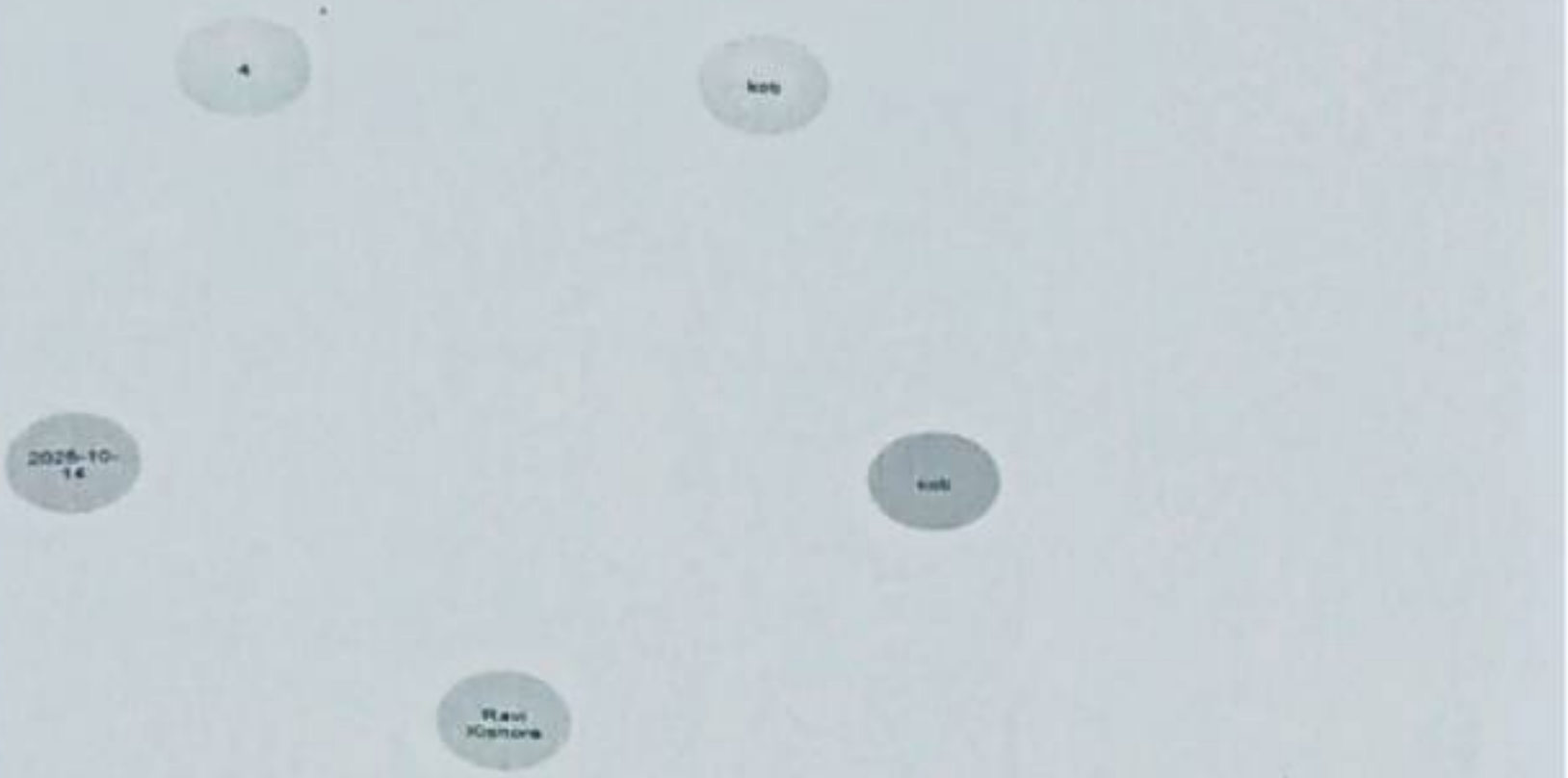
```
REATE (m1:MilkProduction {id: "MP001", quantity: 15, date: "2025-10-14"})
```

utput :

```
eated 1 node, set 3 properties, added 1 label
```

```
tch(n) return(n)
```

put :




```
MATCH (c:customer), (a:Animal)
WHERE c.name = 'koti' AND a.id = 'A001'
CREATE (c)-[:OWNS]->(a)
RETURN c, a
```

Output :

b) Delete a node from Farmer :

Syntax :

```
MATCH (c:customer)
WHERE c.name = 'kotti'
DELETE c
```

Output :Deleted 1 node, deleted 1 relationship

4

koti

Thus, the document database and graph database by using mongodb is implemented.

VEL TECH	
EX NO.	12
PERFORMANCE (5)	5
RESULT AND ANALYSIS (5)	5
VIVA VOCE (5)	5
RECORD (5)	20
TOTAL (20)	
SIGN WITH DATE	23/10/24

Result :

Thus, micro project for Online Grocery System was developed and implemented successfully.