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Aim: To Design ER diagram and convert it into Relational database .
(Restaurant Management System)

Objective:

- To understand how to visually represent a database's structure using Entity-Relationship (ER) diagrams, helping us to understand the relationships between different data and entities.
- To be able to transform the ER diagram into a relational database schema.

Tools Required: Google Docs, draw.io

Concept:

- **ER Diagram (Entity-Relationship Diagram):**

  An ER diagram is a visual representation used in database design to illustrate the logical structure of a database. It shows entities and their relationships, helping to plan how data should be organized and related in a database.

- **Relational Database:**

A relational database is a structured collection of data organized into tables with rows and columns. It uses a relational model to manage and relate data, where tables (relations) represent entities, rows represent records, and columns represent attributes. This approach allows for efficient data retrieval and manipulation while working on databases.

Problem Statement

Scenario :

Restaurant wants the database software for their restaurant. A customer came to the restaurant. Manager welcomes them and sees their reservation status.Customer checks the menu card. Accordingly he placed the order. Order was taken by the waiter. Waiter conveys the order to the chef. Chef prepares the order. Order was served by the waiter to the customer. Customer pays the bill to the Manager.Customer sends feedback to the manager.

Entity :

- Customer (strong entity)
- Manager (strong entity)
- Reservation (strong entity)
- Table (strong entity)
- Menu card(strong entity)
- Order(strong entity)
- Waiter(strong entity)
- Chef (strong entity)
- Payment(strong entity)
- Feedback (strong entity)

Attributes :

1. **Customer**
   ((customer_id, customer_name, customer_phoneNo,,customer_email,)

   Simple Attribute:
   Composite Attribute: customer_name(fname, lname)
   Single valued: customer_id
   Multivalued: customer_phoneNo, customer_email
   Derived:

2. **Manager**
   (manager_id,manager_name,manager_phoneno,manager_address,manager_email,manager_DOB,manager_age,manager_salary)
   Simple Attribute:manager_DOB,
   Composite Attribute: manager_name(fname, lname)
   Single valued: manager_id , manager_salary
   Multivalued: manager_phoneNo, manager_email,manager_address
   Derived:manager_age

3. **Reservation**
   (Reservation_ID ,Customer_ID ,Date and Time,No_of_Guests,Table_No)
   Simple Attribute:
   Composite Attribute:
   Single valued: Reservation_ID ,Customer_ID,Date and Time,No_of_Guests,Table_No
   Multivalued:
   Derived :

4. **Table :**

   (Table_no , Seating_Capacity ,Availability_Status)

   Simple Attribute:
   Composite Attribute:
   Single valued:Table_no ,Seating_Capacity ,Availability_Status
   Multivalued:
   Derived :

5. **Menu card**
   (Menu_ID ,Category ,Item_name,Price
   Simple Attribute:
   Composite Attribute:Category(Appetizers, Main Courses, Desserts)
   Single valued: Menu_ID ,Item_name,Price
   Multivalued:
   Derived :

6. **Order**
   (Order_ID ,Customer_ID ,Table_number ,Order_Date_and_Time ,Total_Amount,Status)
   Simple Attribute:
   Composite Attribute:Status (Pending, In Progress, Completed)

Single valued:Order_ID ,Customer_ID ,Table_number ,Order_Date_and_Time ,Total_Amount
Multivalued:
Derived :

7. Waiter

(Waiter_ID,Waiter_name,waiter_phoneno,waiter_address,waiter_email,waiter_DOB,waiter_age,Table_Assigned , Order_History, waiter_salary)
Simple Attribute: waiter_DOB
Composite Attribute: Waiter_name(fname,lname)
Single valued:Waiter_ID, waiter_salary
Multivalued: Table_Assigned ,Order_History,waiter_phoneno,waiter_address,waiter_email
Derived :waiter_age

8. Chef

(Chef_ID,chef_name,chef_phoneno, chef_address, chef_email,chef_DOB,chef_age , Order_Queue , chef_salary,)

Simple Attribute: chef_DOB
Composite Attribute: chef_name,(fname, lname)
Single valued:Chef_ID, chef_salary
Multivalued: chef_phoneno, chef_address, chef_email,Order_Queue ,
Derived : chef_age ,

9. Payment

(Payment_ID , Order_ID ,Payment_Date_and_Time , Amount_Paid , Payment_Method)
Simple Attribute:
Composite Attribute:
Single valued:Payment_ID , Order_ID ,Payment_Date_and_Time , Amount_Paid
Multivalued: Payment Method (e.g., Cash, Credit Card)
Derived :

10.Feedback

(Feedback_ID , Customer_ID , Date and Time , Comments , Ratings)
Simple Attribute:
Composite Attribute:

Single valued:Feedback_ID , Customer_ID , Date and Time, Ratings
Multivalued: Comments,
Derived :

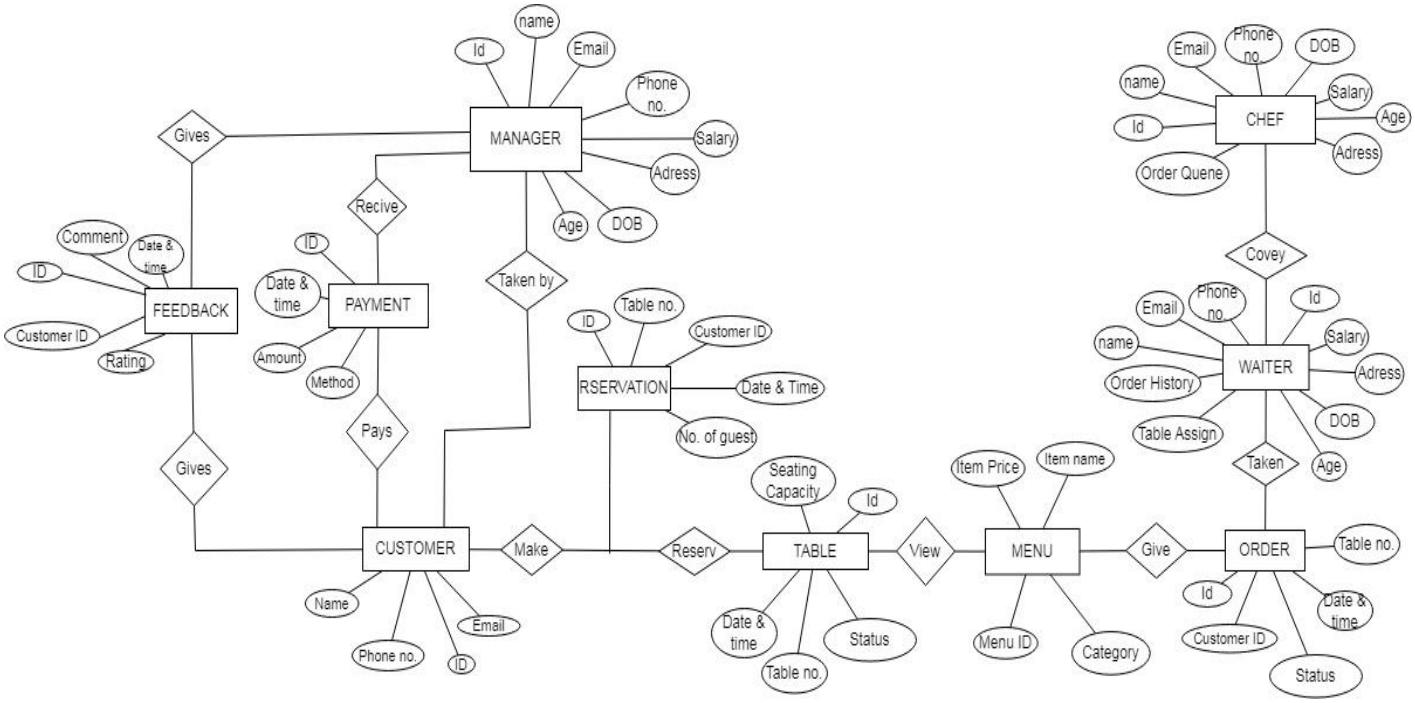
Relationships :

1.Customer **reserves** the table
2. Manager **check**s reservation status
3. Customer **gives** an order
4. order is **taken by** waiter
5. Waiter **conveys order** to chef
6. Chef **prepared** the order
7. Order is **served by** waiter
8. Customer **pays the bill** to manager
9. Customer **gives feedback** to manager

Mapping Cardinalities:

1. **One** customer reserves **one** table
2. **One** manager checks **many** reservations
3. **One** customer gives **many** orders.
4. **One** order is taken by **one** waiter
5. **One** waiter conveys order to **many** chef
6. **Many** chef prepare **one** order
7. **One** order is served by **one** waiter
8. **One** customer pays **one** bill to manager
9. **One** customer gives **many** feedback

ER DIAGRAM:



ER TO RELATIONAL MAPPING :

1. **Customer**

(customer_id, fname, lname,Table_no , Payment_ID)

2. **Manager**

(manager_id,fname,lname, manager_DOB,manager_age,manager_salary)

3. **Reservation**

(Reservation_ID ,Customer_ID ,Date and Time,No_of_Guests,Table_No ,manager_id)

4. **Table :**

(Table_no , Seating_Capacity ,Availability_Status , customer_id)

5. **Menu card**

(Menu_ID ,Appetizers, Main Courses, Desserts ,Item_name,Price

6. Order

(Order_ID ,Customer_ID ,Table_number ,Order_Date_and_Time ,Total_Amount, Pending, In Progress, Completed, Waiter_ID)

7. Waiter

(Waiter_ID,fname,lname ,waiter_DOB,waiter_age , waiter_salary , Order_ID)

8. Chef

(Chef_ID,fname, lname , chef_salary, Waiter_ID , Order_ID)

9. Payment

(Payment_ID , Order_ID ,Payment_Date_and_Time , Amount_Paid ,Cash, Credit Card , customer_id)

10.Feedback

(Feedback_ID , Customer_ID , Date and Time , Ratings)

11. customer_phone

(customer_phoneNo, customer_ID)

12. Customer_email_ID

(customer_email , customer_ID)

13. manager_phone

(manager_phoneNo, manager_ID)

14. Manager_email_ID

(manager_email, manager_ID)

15. Manager_add

(manager_address, manager_ID)

16. Table_Assign

(Table_Assigned , Table_no)

17.chef_phone

(chef_phoneno, chef_id)

18. Chef_add

(Chef_address , chef_id)

19. Chef_email_ID

(chef_email, chef_id)

20. Order_Que

(Order_Queue , order ID)

21. Payment Meth

(Payment Method , payment_id)

22. Comm

(Comments, feedback_id)

Observation:

- Each entity and its attributes were well-defined during the practical.
- Clear identification of relationships between entities.
- Proper mapping cardinalities were established, based on the given scenario.
- An ER diagram was successfully made, and relational mapping was accurately determined .