DATABASE MANAGEMENT SYSTEMS PROJECT

HOTEL DATABASE

Project Members:

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General Hotel Database System:

A hotel database system is designed to manage various aspects of hotel operations efficiently. It typically includes modules for managing reservations, guest information, room inventory, staff details, billing and payments, and other related functions. The database system provides a centralized repository for storing and retrieving data, enabling hotel staff to perform their tasks smoothly and ensuring a seamless experience for guests.

Key components of a hotel database system may include:

- ***Reservation Management:*** This module handles the process of making and managing reservations, including checking availability, booking rooms, modifying reservations, and cancelling bookings.
- ***Guest Management*** This module stores guest information such as names, contact details, preferences, and special requests. It helps in providing personalized services and maintaining guest satisfaction.
- ***Room Inventory*** This module tracks the availability and status of rooms in the hotel, including information about room types, rates, occupancy, and maintenance schedules.
- ***Staff Management*** This module manages employee information, including details about their roles, schedules, salaries, and performance evaluations.
- ***Billing and Payments*** This module handles billing processes, generates invoices, tracks payments, and manages accounts receivable. It may also integrate with payment gateways for online payments.
- ***Reporting and Analytics*** This module provides tools for generating reports and analysing data related to hotel operations, such as occupancy rates, revenue performance, guest demographics, and customer feedback.

Overall, a hotel database system plays a crucial role in streamlining hotel operations, improving guest satisfaction, and maximizing revenue.

ENTITIES , ATTRIBUTES AND RELATIONAL DATABASE :

Hotel:

Attributes:

HotelId (Primary Key): Unique identifier for each hotel.

Address: Address of the hotel.

PhoneNo: Contact phone number of the hotel.

Rating: Rating of the hotel.

BranchName: Name of the hotel branch.

The Hotel entity represents individual hotels. Each hotel is uniquely identified by its HotelId. Other attributes include the hotel's address, contact number, rating, and branch name.

Room:

Attributes:

RoomId (Primary Key): Unique identifier for each room.

RoomNo: Number assigned to the room.

Status: Indicates whether the room is booked or not.

RoomType: Type of the room.

HotelId (Foreign Key): References the Hotel table.

The Room entity represents individual rooms within hotels. Each room is uniquely identified by its RoomId. Other attributes include the room number, status (booked or not), room type, and the hotel it belongs to.

Staff:

Attributes:

StaffId (Primary Key): Unique identifier for each staff member.

MobileNo: Contact mobile number of the staff.

DOB: Date of birth of the staff.

Position: Job position or role of the staff.

Salary: Salary of the staff.

StaffName: Name of the staff.

HotelId (Foreign Key): References the Hotel table.

The Staff entity represents staff members employed by hotels. Each staff member is uniquely identified by their StaffId. Other attributes include their contact number, date of birth, position, salary, name, and the hotel they work for.

Reservation:

Attributes:

RId (Primary Key): Unique identifier for each reservation.

Price: Price of the reservation.

CheckIn: Date of check-in for the reservation.

CheckOut: Date of check-out for the reservation.

RoomId (Foreign Key): References the Room table.

CustomerId (Foreign Key): References the Customer table.

The Reservation entity represents bookings made by customers for specific rooms in hotels. Each reservation is uniquely identified by its RId. Other attributes include the price, check-in and check-out dates, and references to the room and customer associated with the reservation.

Customer:

Attributes:

CustomerId (Primary Key): Unique identifier for each customer.

Name: Name of the customer.

MobileNo: Contact mobile number of the customer.

Address: Address of the customer.

The Customer entity represents individuals who make reservations and payments at hotels. Each customer is uniquely identified by their CId. Other attributes include their name, contact number, and address.

Payment:

Attributes:

TransactionId (Primary Key): Unique identifier for each payment transaction.

Date: Date of the payment transaction.

Amount: Amount of the payment.

CustomerId (Foreign Key): References the Customer table.

The Payment entity represents payments made by customers for their reservations. Each payment transaction is uniquely identified by its TransactionId. Other attributes include the date of the payment, the payment amount, and a reference to the customer who made the payment.

❖ RELATIONSHIPS :

✓ *Hotel - Room:*

Type: One-to-Many (1:M)

Reason: Each hotel can have multiple rooms, but each room belongs to only one hotel..

✓ *Hotel - Staff:*

Type: One-to-Many (1:M)

Reason: Each hotel employs multiple staff members, but each staff member works at only one hotel.

✓ *Room - Reservation:*

Type: One-to-Many (1:M)

Reason: Multiple reservations can be made for a single room, but each reservation is for only one room.

✓ *Reservation - Customer:*

Type: Many-to-One (M:1)

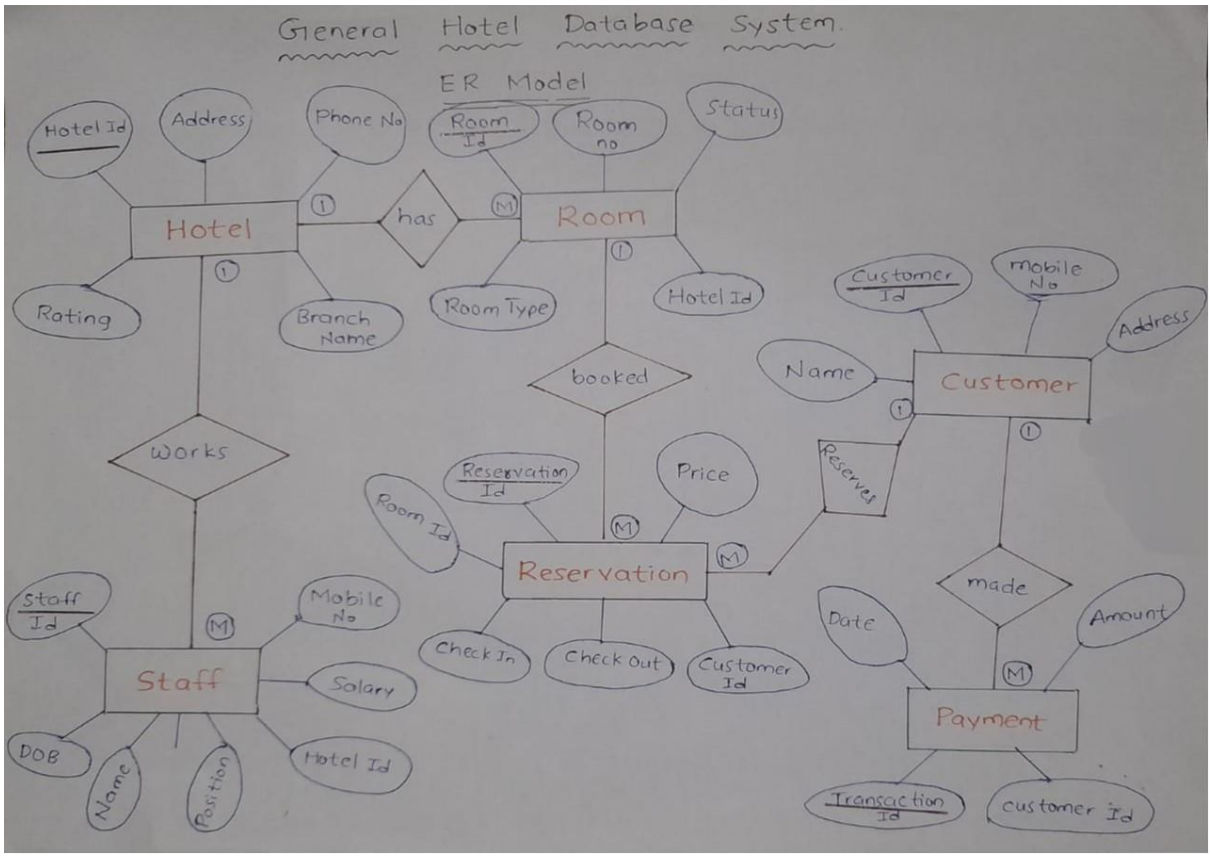
Reason: Each reservation is made by a single customer, but multiple reservations can be made by the same customer.

✓ *Customer - Payment:*

Type: One-to-Many (1:M)

Reason: Each payment is made by a single customer, but a customer can make multiple payments.

❖ ER DIAGRAM:



NORMALISATION:

Normalization in databases refers to the process of organizing the attributes and tables of a relational database to minimize redundancy and dependency. It aims to ensure that data is stored logically and efficiently, reducing the risk of data anomalies and inconsistencies.

Normalization typically involves breaking down large tables into smaller ones and establishing relationships between them.

The ultimate goal of normalization is to reduce data redundancy, improve data integrity, and facilitate efficient data manipulation and querying.

Let's normalize each table according to the rules of normalization:

Hotel Table:

The Hotel table already appears to be in its normalized form. Each attribute seems to depend only on the primary key ***HotelId***, and there are no repeating groups or composite attributes.

Room Table:

We can normalize the Room table by removing the ***RType*** attribute and creating a new table for room types. This way, we ensure that each attribute is atomic and there are no multi-valued dependencies.

Room Table (after normalization) :

Room(RoomId, RoomNo, Status, RType, HotelId)

RoomType Table (after normalization) :

RoomType(RType, RoomName, Price)

In this normalized form, the Room table doesn't contain the RoomType attribute directly but references the RoomType table through RoomTypeId. This eliminates any potential redundancy and ensures data consistency.

Staff Table:

The Staff table seems to be normalized as each attribute appears to depend only on the primary key ***StaffId***.

Reservation Table:

The Reservation table seems to be normalized as each attribute appears to depend only on the primary key ***RId***.

Customer Table:

The Customer table seems to be normalized as each attribute appears to depend only on the primary key ***CId***.

Payment Table:

The Payment table seems to be normalized as each attribute appears to depend only on the primary key ***TransactionId***.

Overall, most of the provided tables seem to be in a normalized form. The only modification we made was to normalize the Room table by creating a separate RoomType table.

❖TABLES:

1. HOTEL:

```
CREATE TABLE Hotel
(
        HotelId INT PRIMARY KEY,
        BranchName VARCHAR(25),
        BranchAddr VARCHAR(25),
        Rating DECIMAL(3,2),
        PhoneNo INT
);
```

2. ROOM:

```
CREATE TABLE Room
(
        RoomNo INT,
        RType VARCHAR(25),
        RoomId VARCHAR(25) PRIMARY KEY,
        Status VARCHAR(25),
        HotelId VARCHAR(25),
        FOREIGN KEY (HotelId) REFERENCES
```

```
                    Hotel(HotelId),
    FOREIGN KEY (Rtype) REFERNECES
                    RoomType (RType)
);
```

3. STAFF :

```
CREATE TABLE Staff
(
    StaffId INT PRIMARY KEY,
    MobileNo INT,
    DOB Date,
    Posn VARCHAR(25),
    Salary INT,
    StaffName VARCHAR(25),
    HotelId INT,
    FOREIGN KEY (HotelId) REFERENCES
                    Hotel(HotelId)
);
```

4. RESERVATION :

```
CREATE TABLE Reservation
```

```
(
    Rid INT PRIMARY KEY,
    Price INT,
    CheckIn DATE,
    CheckOut DATE,
    RoomId VARCHAR(25),
    CustomerId INT,
    FOREING KEY (RoomId) REFERENCES
            Room (RoomId),
    FOREING KEY (CustomerId) REFERENCES
            Customer (CustomerId),
);
```

5. ROOMTYPE:

```
CREATE TABLE RoomType
(
    RType VARCHAR(25) PRIMARY KEY,
    Price INT,
    Capacity INT
);
```

6. CUSTOMER:

```
CREATE TABLE Customer
(
        CustomerId INT PRIMARY KEY,
        CustomerName VARCHAR(25),
        PhoneNo INT,
        Address VARCHAR(25)
);
```

7. PAYMENT:

```
CREATE TABLE Payment
(
        PaymentId VARCHAR(25) PRIMARY KEY,
        Amount INT,
        PaymentDate DATE,
        CustomerId INT,
        FOREIGN KEY  (CustomerId) REFERNCES
                                Customer (CustomerId)
```

);

** INSERTING DATA INTO TABLES:

1.Insertion into Hotel table:

INSERT INTO Hotel (HotelId, Address, PhoneNo, Rating, BranchName) ***VALUES***

(1, '123 Main St', 123456789, 4.2, 'City Centre Hotel'),

(2, '456 Elm St', 987654321, 3.8, 'Seaside Resort'),

(3, '789 Oak St', 246813579, 4.5, 'Mountain View Lodge'),

(4, '321 Pine St', 135792468, 4.0, 'Urban Oasis Hotel'),

(5, '567 Maple St', 369258147, 4.7, 'Grand Plaza Hotel'),

(6, '890 Cedar St', 951357246, 4.1, 'Riverfront Inn'),

(7, '234 Birch St', 785214369, 3.9, 'Lakeview Resort'),

(8, '876 Walnut St', 582469173, 4.3, 'Highland Hotel'),

(9, '543 Spruce St', 147258369, 4.6, 'Valley Retreat'),

(10, '432 Ash St', 369147258, 4.4, 'Downtown Suites'),

(11, '789 Cherry St', 258369147, 4.2, 'Harbor View Hotel'),

(12, '654 Fir St', 741852963, 4.8, 'Luxury Palace');

2.*Insertion into RoomType table*:

INSERT INTO RoomType (RType, Price,Capacity) ***VALUES***

('Single', 100.00,1),

('Double', 150.00,2),

('Suite', 200.00,3),

('Penthouse', 500.00,2);

3.Insertion into Room Table:

INSERT INTO Room (RoomId, RoomNo, Status, RType, HotelId) ***VALUES***

(1, 101, 'Available', 'Single', 1),

(2, 102, 'Booked', 'Double', 1),

(3, 103, 'Available', 'Suite', 1),

(4, 201, 'Available', 'Single', 2),

(5, 202, 'Booked', 'Double', 2),

(6, 203, 'Available', 'Suite', 2),

(7, 301, 'Available', 'Single', 3),

(8, 302, 'Booked', 'Double', 3),

(9, 303, 'Available', 'Suite', 3),

(10, 401, 'Available', 'Single', 4),

(11, 402, 'Booked', 'Double', 4),

(12, 403, 'Available', 'Suite', 4),

(13, 501, 'Available', 'Single', 5),

(14, 502, 'Booked', 'Double', 5),

(15, 503, 'Available', 'Suite', 5);

4.Insertion into Staff Table:

INSERT INTO Staff (StaffId, MobileNo, DOB, Posn, Salary, StaffName, HotelId) ***VALUES***

(1, 123456789, '1980-05-15', 'Manager', 60000.00, 'John Doe', 1),

(2, 987654321, '1992-09-20', 'Receptionist', 35000.00, 'Jane Smith', 1),

(3, 246813579, '1985-02-10', 'Housekeeper', 30000.00, 'David Johnson', 2),

(4, 135792468, '1990-07-25', 'Chef', 45000.00, 'Mary Brown', 2),

(5, 369258147, '1982-11-30', 'Manager', 62000.00, 'Michael Wilson', 3),

(6, 951357246, '1994-04-18', 'Concierge', 38000.00, 'Lisa Taylor', 3),

(7, 785214369, '1978-08-05', 'Housekeeper', 31000.00, 'Richard Martinez', 4),

(8, 582469173, '1987-01-12', 'Chef', 48000.00, 'Patricia Garcia', 4),

(9, 147258369, '1993-06-22', 'Manager', 63000.00, 'Robert Lee', 5),

(10, 369147258, '1989-03-17', 'Receptionist', 36000.00, 'Jennifer Clark', 5),

(11, 258369147, '1984-10-08', 'Housekeeper', 32000.00, 'Karen Rodriguez', 6),

(12, 741852963, '1991-12-03', 'Chef', 47000.00, 'Daniel Hernandez', 6),

(13, 123654789, '1983-07-25', 'Manager', 60000.00, 'Christopher Brown', 7),

(14, 987321456, '1990-02-14', 'Receptionist', 35000.00, 'Sarah Wilson', 7),

(15, 369852147, '1986-11-09', 'Housekeeper', 30000.00, 'Jessica Thompson', 8);

5.Insertion into Reservation Table:

INSERT INTO Reservation (RId, Price, CheckIn, CheckOut, RoomId, CustomerId) ***VALUES***

(1, 150.00, '2024-04-01', '2024-04-05', '1', 1),

(2, 200.00, '2024-04-02', '2024-04-06', '2', 2),

(3, 250.00, '2024-04-03', '2024-04-07', '3', 3),

(4, 300.00, '2024-04-04', '2024-04-08', '4', 4),

(5, 350.00, '2024-04-05', '2024-04-09', '5', 5),

(6, 400.00, '2024-04-06', '2024-04-10', '6', 6),

(7, 450.00, '2024-04-07', '2024-04-11', '7', 7),

(8, 500.00, '2024-04-08', '2024-04-12', '8', 8),

(9, 550.00, '2024-04-09', '2024-04-13', '9', 9),

(10, 600.00, '2024-04-10', '2024-04-14', '10', 10),

(11, 650.00, '2024-04-11', '2024-04-15', '11', 11),

(12, 700.00, '2024-04-12', '2024-04-16', '12', 12),

(13, 750.00, '2024-04-13', '2024-04-17', '13', 13),

(14, 800.00, '2024-04-14', '2024-04-18', '14,' 14),

(15, 850.00, '2024-04-15', '2024-04-19', '15', 15);

6.Insertion into Customer Table:

INSERT INTO Customer (CustomerId, CustomerName, PhoneNo, Address) ***VALUES***

(1, 'Alice Smith', 112233445, '123 Oak St'),

(2, 'Bob Johnson',223344556, '456 Elm St'),

(3, 'Charlie Brown', 334455667, '789 Maple St'),

(4, 'David Miller', 445566778, '987 Pine St'),

(5, 'Emma Wilson', 556677889, '654 Cedar St'),

(6, 'Frank Thomas', 667788990, '321 Birch St'),

(7, 'Grace Lee', 778899001, '543 Spruce St'),

(8, 'Henry White', 889900112, '876 Walnut St'),

(9, 'Ivy Davis', 990011223, '234 Cherry St'),

(10, 'Jack Taylor', 001122334, '890 Elm St'),

(11, 'Kate Clark', 112233445, '345 Oak St'),

(12, 'Liam Moore', 223344556, '678 Maple St'),

(13, 'Mia Garcia', 334455667, '901 Pine St'),

(14, 'Noah Martinez', 445566778, '234 Cedar St'),

(15, 'Olivia Hernandez', 556677889, '567 Birch St');

7.Insertion into Payment Table:

INSERT INTO Payment (TransactionId, Date, Amount, CustomerId) ***VALUES***

('1', '2024-04-05', 150.00, 1),

('2', '2024-04-06', 200.00, 2),

('3', '2024-04-07', 250.00, 3),

('4', '2024-04-08', 300.00, 4),

('5', '2024-04-09', 350.00, 5),

('6', '2024-04-10', 400.00, 6),

('7', '2024-04-11', 450.00, 7),

('8', '2024-04-12', 500.00, 8),

('9', '2024-04-13', 550.00, 9),

('10', '2024-04-14', 600.00, 10),

('11', '2024-04-15', 650.00, 11),

('12', '2024-04-16', 700.00, 12),

('13', '2024-04-17', 750.00, 13),

('14', '2024-04-18', 800.00, 14),

('15', '2024-04-19', 850.00, 15);

❖ TABLES DISPLAY :

1. HOTEL TABLE :

HotelId	BranchName	BranchAddr	Rating	PhoneNo
1	City Centre Hotel	123 Main St	4.20	123456789
2	[illegible]	456 Elm St	3.80	987654321
3	Mountain View Lodge	789 Oak St	4.50	246813579
4	Urban Oasis Hotel	321 Pine St	4.00	135792468
5	Grand Plaza Hotel	567 Maple St	4.70	369258147
6	Riverfront Inn	890 Cedar St	4.10	951357246
7	Lakeview Resort	234 Birch St	3.90	785214369
8	Highland Hotel	876 Walnut St	4.30	582469173
9	Valley Retreat	543 Spruce St	4.60	147258369
10	Downtown Suites	432 Ash St	4.40	369147258
11	Harbor View Hotel	789 Cherry St	4.20	258369147
12	Luxury Palace	654 Fir St	4.80	741852963
NULL	NULL	NULL	NULL	NULL

2. ROOM TABLE :

RoomNo	RType	RoomId	Status	HotelId
101	Single	1	Available	1
102	Double	2	Booked	1
103	Suite	3	Available	1
201	Single	4	Available	2
202	Double	5	Booked	2
203	Suite	6	Available	2
301	Single	7	Available	3
302	Double	8	Booked	3
303	Suite	9	Available	3
401	Single	10	Available	4
402	Double	11	Booked	4
403	Suite	12	Available	4
501	Single	13	Available	5
502	Double	14	Booked	5
503	Suite	15	Available	5

3. ROOMTYPE TABLE :

RType	Price	Capacity
Double	150	2
Penthouse	500	2
Single	100	1
Suite	200	3
NULL	NULL	NULL

4. CUSTOMER TABLE :

CusomterId	CustomerName	PhoneNo	Address
1	Alice Smith	112233445	123 Oak St
2	Bob Johnson	223344556	456 Elm St
3	Charlie Brown	334455667	789 Maple St
4	David Miller	445566778	987 Pine St
5	Emma Wilson	556677889	654 Cedar St
6	Frank Thomas	667788990	321 Birch St
7	Grace Lee	778899001	543 Spruce St
8	Henry White	889900112	876 Walnut St
9	Ivy Davis	990011223	234 Cherry St
10	Jack Taylor	1122334	890 Elm St
11	Kate Clark	112233445	345 Oak St
12	Liam Moore	223344556	678 Maple St
13	Mia Garcia	334455667	901 Pine St
14	Noah Martinez	445566778	234 Cedar St
15	Olivia Hernandez	556677889	567 Birch St
NULL	NULL	NULL	NULL

5. STAFF TABLE :

StaffId	MobileNo	DOB	Posn	Salary	StaffName	HotelId
1	123456789	1980-05-15	Manager	60000	John Doe	1
2	987654321	1992-09-20	Receptionist	35000	Jane Smith	1
3	246813579	1985-02-10	Housekeeper	30000	David Johnson	2
4	135792468	1990-07-25	Chef	45000	Mary Brown	2
5	369258147	1982-11-30	Manager	62000	Michael Wilson	3
6	951357246	1994-04-18	Concierge	38000	Lisa Taylor	3
7	785214369	1978-08-05	Housekeeper	31000	Richard Martinez	4
8	582469173	1987-01-12	Chef	48000	Patricia Garcia	4
9	147258369	1993-06-22	Manager	63000	Robert Lee	5
10	369147258	1989-03-17	Receptionist	36000	Jennifer Clark	5
11	258369147	1984-10-08	Housekeeper	32000	Karen Rodriguez	6
12	741852963	1991-12-03	Chef	47000	Daniel Hernandez	6
13	123654789	1983-07-25	Manager	60000	Christopher Brown	7
14	987321456	1990-02-14	Receptionist	35000	Sarah Wilson	7
15	369852147	1986-11-09	Housekeeper	30000	Jessica Thompson	8
NULL	NULL	NULL	NULL	NULL	NULL	NULL

6. RESERVATION TABLE :

Rid	Price	CheckIn	CheckOut	RoomId	CustomerId
1	150	2024-04-01	2024-04-05	1	1
2	200	2024-04-02	2024-04-06	2	2
3	250	2024-04-03	2024-04-07	3	3
4	300	2024-04-04	2024-04-08	4	4
5	350	2024-04-05	2024-04-09	5	5
6	400	2024-04-06	2024-04-10	6	6
7	450	2024-04-07	2024-04-11	7	7
8	500	2024-04-08	2024-04-12	8	8
9	550	2024-04-09	2024-04-13	9	9
10	600	2024-04-10	2024-04-14	10	10
11	650	2024-04-11	2024-04-15	11	11
12	700	2024-04-12	2024-04-16	12	12
13	750	2024-04-13	2024-04-17	13	13
14	800	2024-04-14	2024-04-18	14	14
15	850	2024-04-15	2024-04-19	15	15
NULL	NULL	NULL	NULL	NULL	NULL

7. PAYMENT TABLE :

PaymentId	Amount	PaymentDate	CustomerId
1	150	2024-04-05	1
10	600	2024-04-14	10
11	650	2024-04-15	11
12	700	2024-04-16	12
13	750	2024-04-17	13
14	800	2024-04-18	14
15	850	2024-04-19	15
2	200	2024-04-06	2
3	250	2024-04-07	3
4	300	2024-04-08	4
5	350	2024-04-09	5
6	400	2024-04-10	6
7	450	2024-04-11	7
8	500	2024-04-12	8
9	550	2024-04-13	9
NULL	NULL	NULL	NULL