DATABASE MANAGEMENT SYSTEM - CSA0593

ASSIGNMENT 3

K.GAYATHRI

192311448

QUESTION:

Design a database to manage hotel bookings, rooms, customers, and payments.

Model tables for hotels, rooms, customers, and bookings.

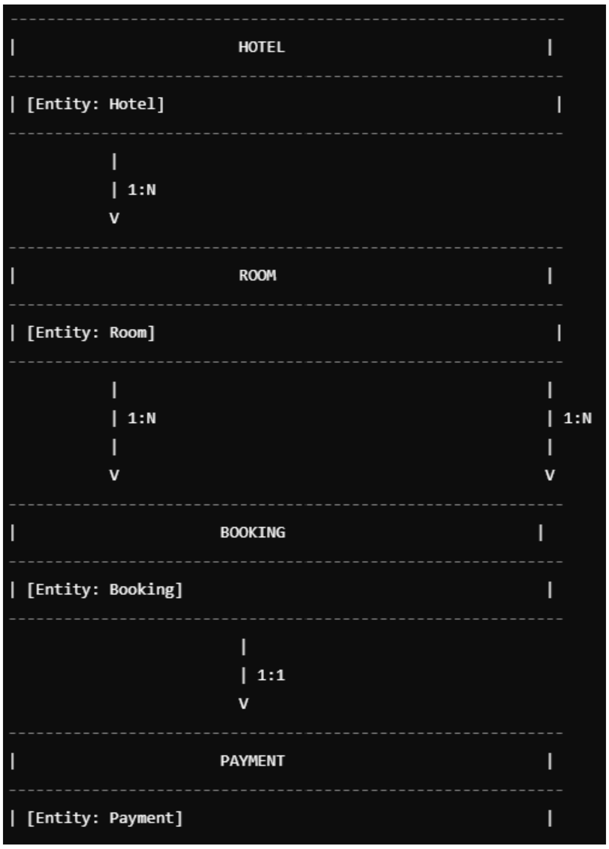
Write stored procedures for making and canceling hotel reservations.

Implement triggers to update room availability and payment status.

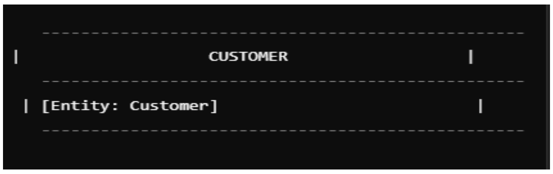
Write SQL queries to analyze booking trends and customer preferences.

ANSWER:

CONCEPTUAL E.R.DIAGRAM:

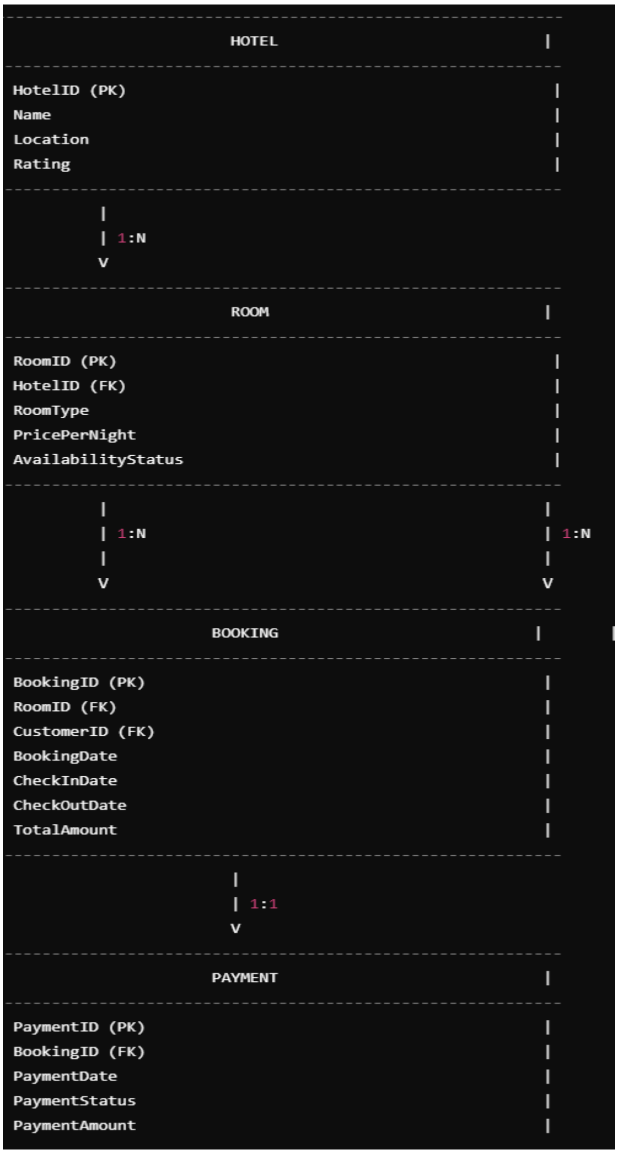


```
-------------------------------------------------------------
|                      HOTEL                                |
-------------------------------------------------------------
| [Entity: Hotel]                                           |
-------------------------------------------------------------
           |
           | 1:N
           V
-------------------------------------------------------------
|                      ROOM                                 |
-------------------------------------------------------------
| [Entity: Room]                                            |
-------------------------------------------------------------
           |                                               |
           | 1:N                                           | 1:N
           |                                               |
           V                                               V
-------------------------------------------------------------
|                    BOOKING                               |
-------------------------------------------------------------
| [Entity: Booking]                                         |
-------------------------------------------------------------
                         |
                         | 1:1
                         V
-------------------------------------------------------------
|                    PAYMENT                                |
-------------------------------------------------------------
| [Entity: Payment]                                         |
```

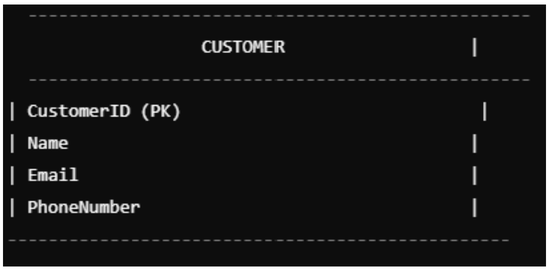


```
    ---------------------------------------------------
|                       CUSTOMER                    |
    ---------------------------------------------------
 | [Entity: Customer]                                 |
    ---------------------------------------------------
```

LOGICAL E.R.DIAGRAM:

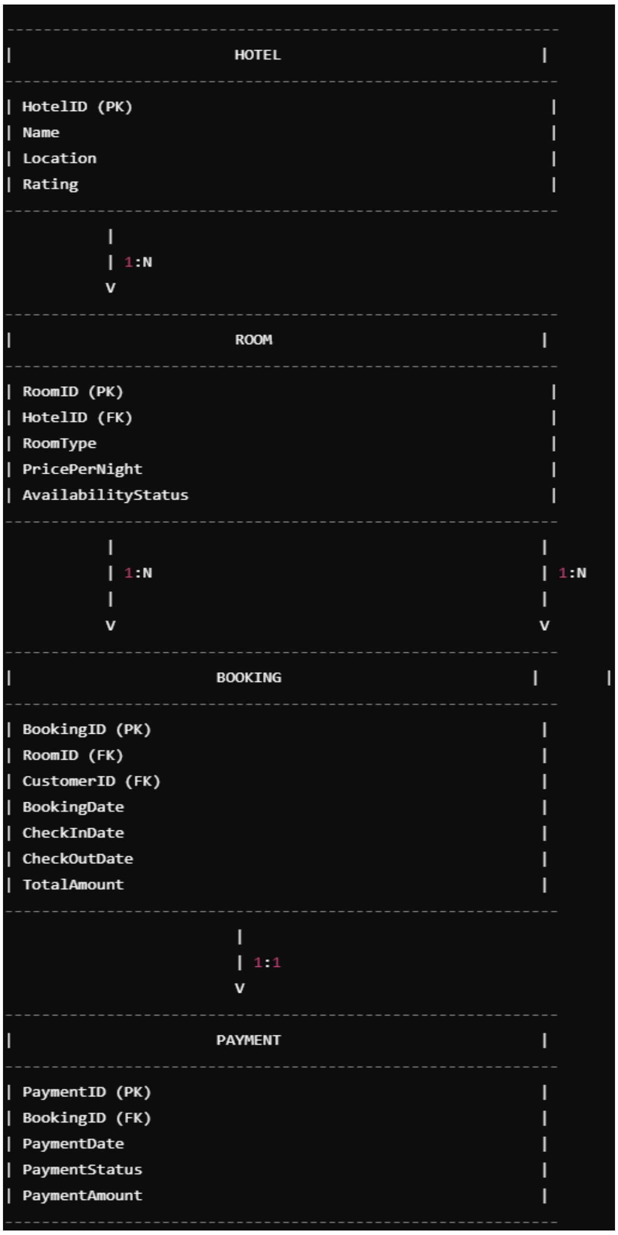


```
-----------------------------------------------------------
                       HOTEL                          |
-----------------------------------------------------------
HotelID (PK)                                           |
Name                                                   |
Location                                               |
Rating                                                 |
-----------------------------------------------------------
         |
         | 1:N
         V
-----------------------------------------------------------
                       ROOM                           |
-----------------------------------------------------------
RoomID (PK)                                            |
HotelID (FK)                                           |
RoomType                                               |
PricePerNight                                          |
AvailabilityStatus                                     |
-----------------------------------------------------------
         |                                            |
         | 1:N                                        | 1:N
         |                                            |
         V                                            V
-----------------------------------------------------------
                      BOOKING                        |
-----------------------------------------------------------
BookingID (PK)                                        |
RoomID (FK)                                           |
CustomerID (FK)                                       |
BookingDate                                           |
CheckInDate                                           |
CheckOutDate                                          |
TotalAmount                                           |
-----------------------------------------------------------
                       |
                       | 1:1
                       V
-----------------------------------------------------------
                      PAYMENT                         |
-----------------------------------------------------------
PaymentID (PK)                                        |
BookingID (FK)                                        |
PaymentDate                                           |
PaymentStatus                                         |
PaymentAmount                                         |
```

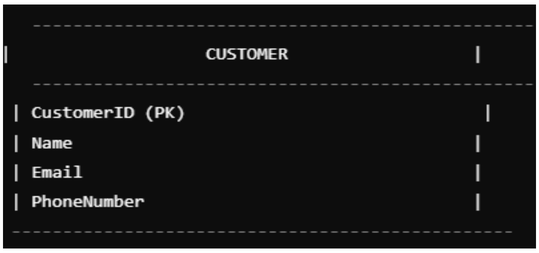


```
  -----------------------------------------------
                 CUSTOMER                  |
  -----------------------------------------------
| CustomerID (PK)                           |
| Name                                     |
| Email                                    |
| PhoneNumber                              |
-----------------------------------------------
```

PHYSICAL E.R.DIAGRAM:



```
-----------------------------------------------------------
|                        HOTEL                            |
-----------------------------------------------------------
| HotelID (PK)                                             |
| Name                                                     |
| Location                                                 |
| Rating                                                   |
-----------------------------------------------------------
           |
           | 1:N
           V
-----------------------------------------------------------
|                        ROOM                             |
-----------------------------------------------------------
| RoomID (PK)                                              |
| HotelID (FK)                                             |
| RoomType                                                 |
| PricePerNight                                            |
| AvailabilityStatus                                       |
-----------------------------------------------------------
           |                                              |
           | 1:N                                          | 1:N
           |                                              |
           V                                              V
-----------------------------------------------------------
|                      BOOKING                           |       |
-----------------------------------------------------------
| BookingID (PK)                                          |
| RoomID (FK)                                             |
| CustomerID (FK)                                         |
| BookingDate                                             |
| CheckInDate                                             |
| CheckOutDate                                            |
| TotalAmount                                             |
-----------------------------------------------------------
                         |
                         | 1:1
                         V
-----------------------------------------------------------
|                      PAYMENT                            |
-----------------------------------------------------------
| PaymentID (PK)                                          |
| BookingID (FK)                                          |
| PaymentDate                                             |
| PaymentStatus                                           |
| PaymentAmount                                           |
-----------------------------------------------------------
```



```
  ------------------------------------------------
|                  CUSTOMER                      |
  ------------------------------------------------
 | CustomerID (PK)                                |
 | Name                                          |
 | Email                                         |
 | PhoneNumber                                   |
 ------------------------------------------------
```

MYSQL STATEMENTS:

Database Design

CREATE DATABASE hotel_management;

```
USE hotel_management;

CREATE TABLE hotels (
  hotel_id INT PRIMARY KEY,
  hotel_name VARCHAR(255),
  location VARCHAR(255),
  rating INT
);

CREATE TABLE rooms (
  room_id INT PRIMARY KEY,
  hotel_id INT,
  room_type VARCHAR(20),
  capacity INT,
  rate DECIMAL(10, 2),
  availability INT,
  FOREIGN KEY (hotel_id) REFERENCES hotels(hotel_id)
);

CREATE TABLE customers (
  customer_id INT PRIMARY KEY,
  name VARCHAR(255),
  email VARCHAR(255),
  phone VARCHAR(20),
  address VARCHAR(255)
);

CREATE TABLE bookings (
  booking_id INT PRIMARY KEY,
  customer_id INT,
  hotel_id INT,
  room_id INT,
  check_in DATE,
  check_out DATE,
  status VARCHAR(20),
  payment_method VARCHAR(20),
  total_cost DECIMAL(10, 2),
  FOREIGN KEY (customer_id) REFERENCES customers(customer_id),
  FOREIGN KEY (hotel_id) REFERENCES hotels(hotel_id),
  FOREIGN KEY (room_id) REFERENCES rooms(room_id)
);

CREATE TABLE payments (
  payment_id INT PRIMARY KEY,
  booking_id INT,
  payment_date DATE,
  amount DECIMAL(10, 2),
  status VARCHAR(20),
  FOREIGN KEY (booking_id) REFERENCES bookings(booking_id)
);
```

Stored Procedures

```
DELIMITER //

CREATE PROCEDURE make_reservation(
  IN customer_id INT,
  IN hotel_id INT,
  IN room_id INT,
  IN check_in DATE,
  IN check_out DATE
)
BEGIN
  DECLARE available_rooms INT;
  SELECT availability INTO available_rooms
  FROM rooms
  WHERE room_id = room_id;

  IF available_rooms > 0 THEN
    INSERT INTO bookings (customer_id, hotel_id, room_id, check_in, check_out, status, total_cost)
    VALUES (customer_id, hotel_id, room_id, check_in, check_out, 'Reserved', (SELECT rate FROM rooms WHERE room_id = room_id) * (check_out - check_in));

    UPDATE rooms
    SET availability = availability - 1
    WHERE room_id = room_id;
  ELSE
    SIGNAL SQLSTATE '45000' SET MESSAGE_TEXT = 'Room not available';
  END IF;
END //

CREATE PROCEDURE cancel_reservation(
  IN booking_id INT
)
BEGIN
  DECLARE room_id INT;
  SELECT room_id INTO room_id
  FROM bookings
  WHERE booking_id = booking_id;

  UPDATE rooms
  SET availability = availability + 1
  WHERE room_id = room_id;

  DELETE FROM bookings
  WHERE booking_id = booking_id;
END //
```

Triggers

```
DELIMITER //

CREATE TRIGGER update_room_availability
AFTER INSERT ON bookings
FOR EACH ROW
BEGIN
  UPDATE rooms
  SET availability = availability - 1
  WHERE room_id = NEW.room_id;
END //

CREATE TRIGGER update_payment_status
AFTER UPDATE ON payments
FOR EACH ROW
BEGIN
  IF NEW.status = 'Paid' THEN
    UPDATE bookings
    SET status = 'Confirmed'
    WHERE booking_id = NEW.booking_id;
  END IF;
END //
```

SQL Queries

```
-- Analyze booking trends
SELECT
  hotels.hotel_name,
  COUNT(bookings.booking_id) AS total_bookings,
  SUM(bookings.total_cost) AS total_revenue
FROM
  hotels
  JOIN bookings ON hotels.hotel_id = bookings.hotel_id
GROUP BY
  hotels.hotel_name;

-- Customer preferences
SELECT
  customers.name,
  COUNT(bookings.booking_id) AS number_of_bookings,
  SUM(bookings.total_cost) AS total_spent
FROM
  customers
  JOIN bookings ON customers.customer_id = bookings.customer_id
GROUP BY
  customers.name;
```

Conclusion:

Designing a database to manage hotel bookings, rooms, customers, and payments requires careful consideration of various factors.

Key benefits of this system include:

1. Efficient room reservation and management.
2. Automated updates to room availability and payment status.
3. Centralized storage of customer information and booking history.
4. Data-driven insights into booking trends and customer preferences.

By implementing this database management system, hotels can improve operational efficiency, enhance customer experiences, and increase revenue.