DATABASE MANAGEMENT SYSTEM - CSA0593

ASSIGNMENT 5

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QUESTION:

Design a database for managing hotel bookings, guests, rooms, and amenities.

- Model tables for rooms, guests, bookings, and available amenities.

- Write stored procedures for reserving rooms and handling check-ins/check-outs.

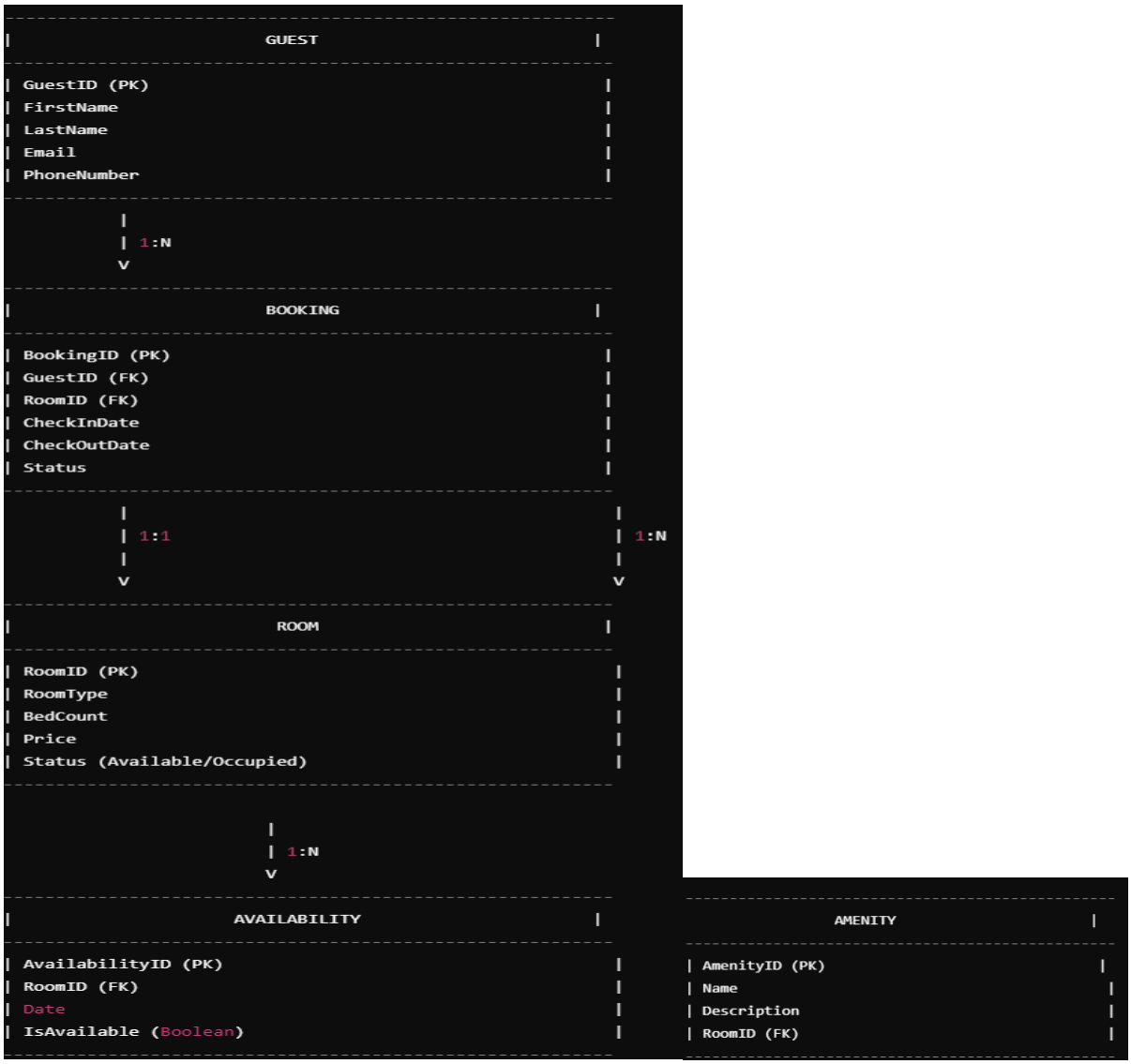
- Implement triggers to update room availability and occupancy status.

- Write SQL queries to analyze booking rates, popular room types, and guest preferences."

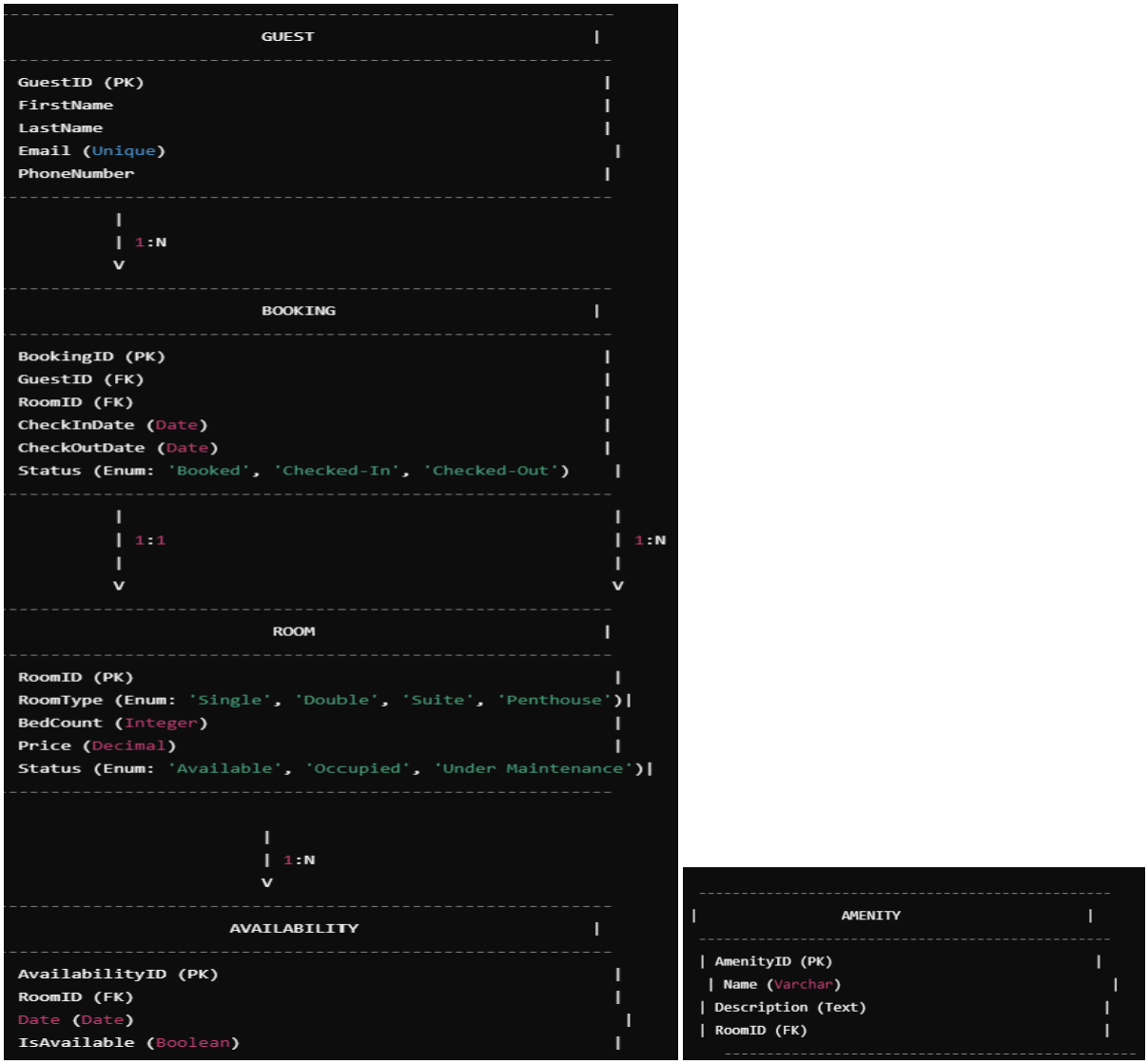
ANSWER:

CONCEPTUAL E.R.DIAGRAM:

LOGICAL E.R.DIAGRAM:



PHYSICAL E.R.DIAGRAM:



MYSQL STATEMENTS:

Here are the MySQL statements and conclusion for the topic:

Database Design

```
CREATE DATABASE hotel_management;

USE hotel_management;

CREATE TABLE rooms (
  room_id INT PRIMARY KEY,
  room_type VARCHAR(255),
  capacity INT,
  rate DECIMAL(10, 2),
  status VARCHAR(20)
);

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

CREATE TABLE bookings (
  booking_id INT PRIMARY KEY,
  room_id INT,
  guest_id INT,
  check_in DATE,
  check_out DATE,
```

```
  status VARCHAR(20),
  FOREIGN KEY (room_id) REFERENCES rooms(room_id),
  FOREIGN KEY (guest_id) REFERENCES guests(guest_id)
);

CREATE TABLE amenities (
  amenity_id INT PRIMARY KEY,
  amenity_name VARCHAR(255),
  description TEXT
);

CREATE TABLE room_amenities (
  room_id INT,
  amenity_id INT,
  FOREIGN KEY (room_id) REFERENCES rooms(room_id),
  FOREIGN KEY (amenity_id) REFERENCES amenities(amenity_id)
);

CREATE TABLE guest_preferences (
  guest_id INT,
  amenity_id INT,
  FOREIGN KEY (guest_id) REFERENCES guests(guest_id),
  FOREIGN KEY (amenity_id) REFERENCES amenities(amenity_id)
);
```

Stored Procedures

```
DELIMITER //

CREATE PROCEDURE reserve_room(
  IN room_id INT,
  IN guest_id INT,
  IN check_in DATE,
  IN check_out DATE
)
BEGIN
  INSERT INTO bookings (room_id, guest_id, check_in, check_out, status)
  VALUES (room_id, guest_id, check_in, check_out, 'Reserved');
END //

CREATE PROCEDURE check_in(
  IN booking_id INT
)
BEGIN
  UPDATE bookings
  SET status = 'Checked In'
  WHERE booking_id = booking_id;
END //

CREATE PROCEDURE check_out(
```

```
  IN booking_id INT
)
BEGIN
  UPDATE bookings
  SET status = 'Checked Out'
  WHERE booking_id = booking_id;
END //
```

Triggers

```
DELIMITER //

CREATE TRIGGER update_room_availability
AFTER INSERT ON bookings
FOR EACH ROW
BEGIN
  UPDATE rooms
  SET status = 'Occupied'
  WHERE room_id = NEW.room_id;
END //

CREATE TRIGGER update_occupancy_status
AFTER UPDATE ON bookings
FOR EACH ROW
```

```
BEGIN
  IF NEW.status = 'Checked Out' THEN
    UPDATE rooms
    SET status = 'Available'
    WHERE room_id = NEW.room_id;
  END IF;
END //
```

SQL Queries

```
-- Analyze booking rates
SELECT
  rooms.room_type,
  COUNT(bookings.booking_id) AS number_of_bookings,
  SUM(bookings.check_out - bookings.check_in) AS total_nights
FROM
  rooms
  JOIN bookings ON rooms.room_id = bookings.room_id
GROUP BY
  rooms.room_type;

-- Popular room types
SELECT
  rooms.room_type,
```

```
  COUNT(bookings.booking_id) AS number_of_bookings
FROM
  rooms
  JOIN bookings ON rooms.room_id = bookings.room_id
GROUP BY
  rooms.room_type
ORDER BY
  number_of_bookings DESC;

-- Guest preferences
SELECT
  guests.name,
  amenities.amenity_name
FROM
  guests
  JOIN guest_preferences ON guests.guest_id = guest_preferences.guest_id
  JOIN amenities ON guest_preferences.amenity_id = amenities.amenity_id;
```

Conclusion:

Designing a database for managing hotel bookings, guests, rooms, and amenities 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 occupancy status.
3. Centralized storage of guest information and preferences.
4. Data-driven insights into booking rates, popular room types, and guest preferences.

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