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Entities:

Hotel_Chain (hq_address, num_of_hotels, email, phone_number)

Hotel (hotel_id, hq_address, stars, num_of_rooms, address, email, phone_number)

Employee (employee_id, hotel_id, employee_name, address, SSN, position)

Room (room_number, hotel_id, customer_id, price, amenities, capacity, views, extension, damages)

Customer (customer_id, SSN, name, address, registration_date)

Relations:

Employee MANAGES Hotel. Hotel is MANAGED by an Employee.

Customer BOOKS Room. Room is BOOKED by a Customer.

Customer CHECKS_IN Hotel. Hotel is CHECKED_IN by a Customer. This relation has attributes such as employee_id, and date.

Room IS_IN Hotel. Hotel HAS a Room.

Customer RENTS Room. Room IS RENTED by a Customer. This relation has attributes such as date, cc_info, price, employee, id.

Employee HELPS Customer. Customer are HELPED by an Employee.

Primary Keys:

The primary keys for the entities are:

Hotel Chain → hq_address [CANDIDATE KEY]

Hotel → {hotel_id, hq_address} [SUPERKEY]

Employee → {employee_id, hotel_id} [SUPERKEY]

Room → {room_number, hotel_id, customer_id} [SUPERKEY]

Customer → customer_id [CANDIDATE KEY]

Cardinalities:

A hotel chain owns many hotels : A hotel is owned by 1 of the 5 hotel chains

A hotel contains many working employees : An employee can only work in 1 hotel

A hotel can be checked in by many customer : A customer check in to 1 hotel

A hotel can be managed by many employees : An employee can only manage 1 hotel

A customer can rent multiple rooms : Many rooms can be rented by many customers

A customer can book multiple rooms : Many rooms can be booked by many customers

A hotel has many rooms : A room is in 1 hotel

An employee helps 1 customer : A customer can be helped by many employees

A employee manages many(including 1) hotels | Many hotels is managed by 1 employee

Integrity Constraints:

Referential Integrity Constraint:

- Hotel: The hq_address attribute should reference the Hotel chain primary key hq_address.
- Room: The hotel_id attribute should reference the Hotel primary key hotel_id. The customer_id attribute should reference the Customer primary key customer_id.
- Employee: The hotel_id attribute should reference the Hotel primary key hotel_id.

Entity Integrity Constraint:

- Hotel Chain: The primary key {hq_address} attribute is NOT NULL
- Hotel: The primary key {hotel_id, hq_address} is NOT NULL.
- Customer: The primary key {customer_id} attribute is NOT NULL
- Employee: The primary key {employee_id} attribute is NOT NULL
- Room: The primary key {room_number, hotel_id} attribute is NOT NULL

Domain Integrity:

- Id and SSN INTEGER values are a unique number between 4-9 digits
- Price, and room number is INTEGER
- All unspecified attributes of type VARCHAR
- Hotel
 - Stars: D = {1,2,3,4,5} is INTEGER
- Room
 - Amenities: D = {television, air_conditioner, fridge, microwave, oven, dishwasher, laundry} is VARCHAR
 - Capacity: D = {single, double} is VARCHAR
 - Views: D = {sea_view, mountain_view, city_view} is VARCHAR
 - Extension: D = {yes, no} is VARCHAR
- Employee
 - Position: D = {manager, cleaner, front_desk, cook, repair_man, gardener} is VARCHAR

User Defined:

- First, middle, last names start with Capital
- Registration data in format: yyyy-mm-dd