DB - Assignment # 4

Submission deadline Sunday December 12, 2021 @ 11:55 PM

(ONLY Google Classroom SUBMISSIONS ALLOWED) (NO EMAIL SUBMISSIONS) (NO DEADLINE EXTENSIONS)

Question # 1: Using the *Hotel* relational database schema shown below, specify the following queries using the relational operators discussed in the class.

Hotel (hotelNo, hotelName, city)
Room (roomNo, hotelNo, type, price)
Booking (hotelNo, guestNo, dateFrom, dateTo, roomNo)
Guest (guestNo, guestName, guestAddress)

where Hotel *contains hotel details and* hotelNo *is the primary key;*
Room contains room details for each hotel and (roomNo, hotelNo) forms the primary key;
Booking contains details of bookings and (hotelNo, guestNo, dateFrom) forms the primary key;
Guest contains guest details and guestNo is the primary key.

Describe the relations that would be produced by the following relational algebra operations (Textual meaning required):

a) $\Pi_{hotelNo} (\sigma_{price > 50} (Room))$

b) $\sigma_{Hotel.hotelNo = Room.hotelNo}(Hotel \times Room)$

c) $\Pi_{hotelName} (Hotel \bowtie_{Hotel.hotelNo = Room.hotelNo} (\sigma_{price > 50} (Room)))$

d) $\Pi_{guestName, hotelNo} (Booking \bowtie_{Booking.guestNo = Guest.guestNo} Guest) \div$

$\Pi_{hotelNo} (\sigma_{city = 'London'}(Hotel))$

Question # 2: Generate the relational algebra expressions for the following queries, using the schema given above:

a. List all hotels
b. *List all single rooms with a price below £20 per night.*
c. *List the names and cities of all guests.*
d. *List the price and type of all rooms at the Grosvenor Hotel.*
e. *List all guests currently staying at the Grosvenor Hotel.*
f. *List the details of all rooms at the Grosvenor Hotel, including the name of the guest staying in the room, if the room is occupied.*
g. *List the guest details (guestNo, guestName, and guestAddress) of all guests staying at the Grosvenor Hotel.*
h. *Using relational algebra, create a view of all rooms in the Grosvenor Hotel, excluding price details. What would be the advantages of this view?*