Practice 6: Relational Algebra and SQL

I. The following tables form part of a database held in a relational DBMS:

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.

Identify the foreign keys in this schema.

II. Generate the relational algebra expressions for the following queries:

1. List all hotels in London.
2. List all single rooms with a price below £20 per night.
3. List the names and address of all guests.
4. List the price and type of all rooms at the Grosvenor Hotel.
5. List all guests currently staying at the Grosvenor Hotel.
6. 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.
7. List the guest details (guestNo, guestName, and guestAddress) of all guests staying at the Grosvenor Hotel.

SQL statements

Exercises: Use Northwind database to solutions.

1. Create a query to list the CustomerId, Companyname and Contactname of Customers!
2. Create a query to list those customers (CustomerID, Companyname) whose CustomerID beginning with [B-E] letter.
3. List those customers, whose customerID starting with BO characters.
4. Display those employees (EmployeeID and FullName) from the Employee table, whose Lastname contains at least two **a** letters.
5. Create a query to list the products (ProductID, ProductName, UnitPrice) ordered by ProductName.

6. Create a query to list those products (ProductID, ProductName, UnitPrice) from the Products table, which name not beginning with the letters A,B or C.
7. Create a query to list the ProductID, productName, Unitprice, UnitsOnOrder and UnitsInStock of those products which UnitsOnOrder greater than 0 and the UnitsInStock value is less than 10. Order descending the result by UnitsOnOrder.
8. Write a query displaying the productID, ProductName, UnitPrice from the products table. Retrieve only those rows where the UnitPrice is between 50 and 90 $.
9. Write a query displaying the orderID, CustomerID, Order date, from the Orders table. Retrieve only those rows where the order was placed between 10th of December and 20th of December in 1996. Ordering the result according to the date then according to the CustomerID in descending order.
10. Display the number of products!
11. Display the number of products for each product category!
12. Display the average Unitprice for each product category!
13. Display the average Unitprice for each product category! Retrieve only those product category and average unitprice, where the average unitprice is more than 30 dollars!
14. Display the number of Customers!
15. How many customers have fax?
16. Display those customers (CustomerID, Companyname and Contactname) from the Customers table who has not fax.
17. Display those orders which are not shipped.
18. List customers (CustomerID, and Companyname) who has not any orders!
19. List the number of orders per customers! Modify your solution, list only those customers, who have more than 5 orders!