Selection of Joins, Subqueries and Common Table Expressions

Joins and Queries

```
--Find the top 5 customers in the top 10 cities who have paid the highest total amounts
SELECT B.customer_id AS "Customer ID",
        B.first_name || ' ' || B.last_name AS "Customer First Name and Last Name",
        E.country AS "Country",
        D.city AS "City",
        SUM(A.amount) AS "Total Amount Paid"
FROM payment A
INNER JOIN customer B ON A.customer_id = B.customer_id
INNER JOIN address C ON B.address_id = C.address_id
INNER JOIN city D ON C.city_id = D.city_id
INNER JOIN country E ON D.country_id = E.country_id
WHERE E.country IN ('India',
                    'China',
                    'United States',
                    'Japan',
                    'Mexico',
                    'Brazil',
                    'Russian Federation',
                    'Philippines',
                    'Turkey',
                    'Indonesia')
AND D.city IN ('Aurora',
              'Atlixco',
              'Xintai',
              'Adoni',
              'Dhule (Dhulia)',
              'Kurashiki',
              'Pingxiang',
              'Sivas',
              'Celaya',
              'So Leopoldo')
GROUP BY B.customer_id,
        B.first_name,
        B.last_name,
        E.country,
        D.city
ORDER BY "Total Amount Paid" DESC
LIMIT 5 -- only top 5
```

Data Output   Explain   **Messages**   Notifications

	Customer ID integer	Customer First Name and Last Name text	Country character varying (50)	City character varying (50)	Total Amount Paid numeric
1	84	Sara Perry	Mexico	Atlixco	128.70
2	518	Gabriel Harder	Turkey	Sivas	108.75
3	587	Sergio Stanfield	Mexico	Celaya	102.76
4	537	Clinton Buford	United States	Aurora	98.76
5	367	Adam Gooch	India	Adoni	97.80

Performing Subqueries (Inner Queries)

```
--Find how many of the top 5 customers are based within each of the top ten countries
SELECT country.country,
        COUNT(DISTINCT customer.customer_id) AS all_customer_count,
        COUNT(DISTINCT top_10_cities.no_customers) AS top_customer_count
FROM customer
INNER JOIN address ON customer.address_id = address.address_id
INNER JOIN city ON address.city_id = city.city_id
```

```sql
INNER JOIN country ON city.country_id = country.country_id
LEFT JOIN (SELECT D.country,
                  C.city AS city_name,
                  COUNT(C.city) AS no_customers
           FROM  customer A
           INNER JOIN address B ON A.address_id = B.address_id
           INNER JOIN city C ON B.city_id = C.city_id
           INNER JOIN country D ON C.country_id = D.country_id
           INNER JOIN (SELECT DD.country AS countries,
                              COUNT(AA.customer_id) AS customers
                       FROM customer AA
                       INNER JOIN address BB ON AA.address_id = BB.address_id
                       INNER JOIN city CC ON BB.city_id = CC.city_id
                       INNER JOIN country DD ON CC.country_id = DD.country_id
                       GROUP BY DD.country
                       ORDER BY customers DESC
                       LIMIT 10) AS top_10_countries ON D.country = top_10_countries.countries
           GROUP BY C.city,
                    D.country
           ORDER BY no_customers DESC
           LIMIT 10) AS top_10_cities ON city.city = top_10_cities.city_name
GROUP BY country.country
ORDER BY all_customer_count DESC
LIMIT 5
```

	Data Output	Explain	Messages	Notifications

	country character varying (50)	all_customer_count bigint	top_customer_count bigint
1	India	60	1
2	China	53	1
3	United States	36	1
4	Japan	31	1
5	Mexico	30	1

Using Common Table Expressions

```sql
--To find the number of customers, number of stores, number of staff and total revenue per country
WITH staff_details_cte (country, number_of_stores, number_of_staff, total_revenue) AS
(SELECT country.country,
        COUNT(DISTINCT store_id) AS store,
        COUNT(DISTINCT staff.staff_id) AS number_of_staff,
        SUM(amount) AS total_revenue
FROM staff
INNER JOIN payment ON staff.staff_id = payment.staff_id
INNER JOIN address ON staff.address_id = address.address_id
INNER JOIN city ON address.city_id = city.city_id
INNER JOIN country ON city.country_id = country.country_id
GROUP BY country.country,
     store_id
ORDER BY total_revenue DESC)
SELECT E.country,
        COUNT(DISTINCT B.customer_id) AS number_of_customers,
        COUNT(DISTINCT number_of_stores) AS number_of_stores,
        COUNT(DISTINCT number_of_staff) AS number_of_staff,
        SUM(amount) AS total_revenue
FROM payment A
INNER JOIN customer B ON A.customer_id = B.customer_id
INNER JOIN address C ON B.address_id = C.address_id
INNER JOIN city D ON C.city_id = D.city_id
FULL JOIN country E ON D.country_id = E.country_id
FULL JOIN staff_details_cte ON E.country = staff_details_cte.country
GROUP BY E.country
ORDER BY total_revenue DESC
```