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Exercise 3.8

Directions

Step 1: Find the average amount paid by the top 5 customers.

1. Copy the query you wrote in step 3 of the task from Exercise 3.7: Joining Tables of Data into the Query Tool. This will be your subquery, so give it an alias, “total_amount_paid,” and add parentheses around it.
2. Write an outer statement to calculate the average amount paid.
3. Add your subquery to the outer statement. It will go in either the SELECT, WHERE, or FROM clause. (Hint: When referring to the subquery in your outer statement, make sure to use the subquery’s alias, “total_amount_paid”.)
4. If you’ve done everything correctly, pgAdmin 4 will require you to add an alias after the subquery. Go ahead and call it “average”.

```
SELECT AVG (total_amount_paid) AS average_amount_paid
FROM
(SELECT B.customer_id,
        B.first_name,
        B.last_name,
        D.city,
        E.country,
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 D.city **IN**

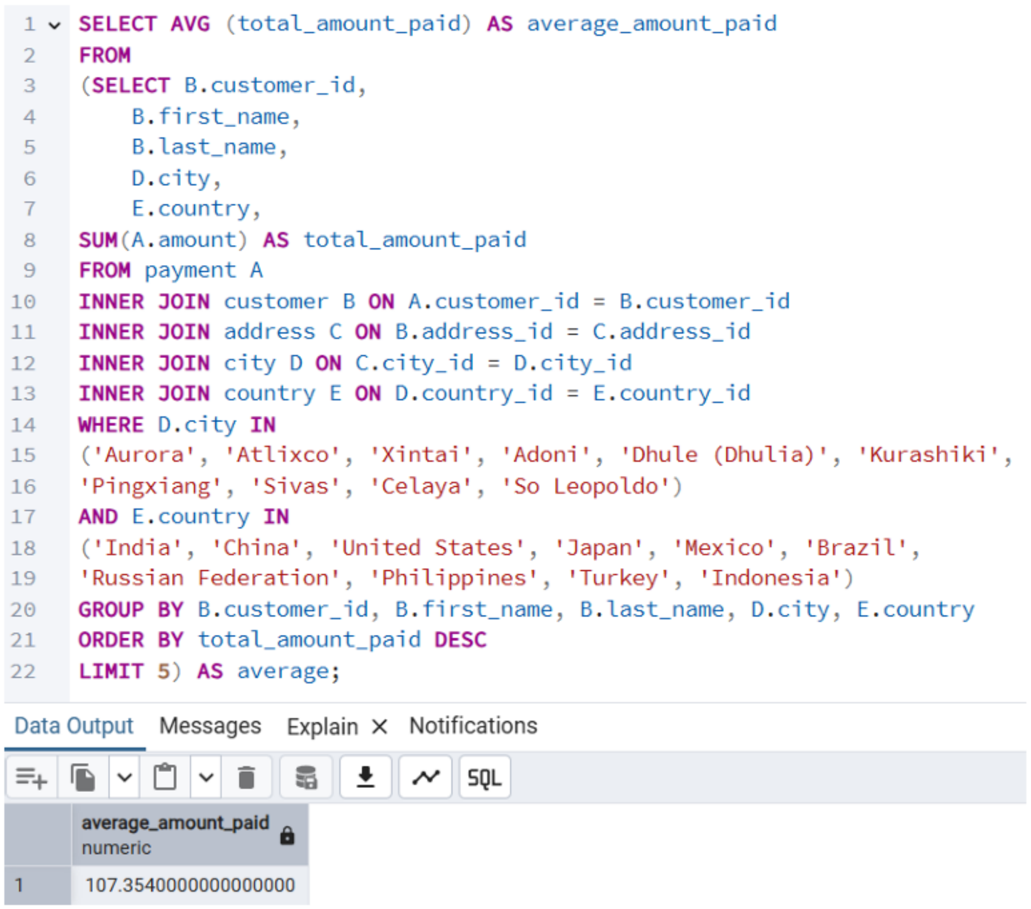
('Aurora', 'Atlixco', 'Xintai', 'Adoni', 'Dhule (Dhulia)', 'Kurashiki', 'Pingxiang', 'Sivas', 'Celaya', 'So Leopoldo') AND E.country IN ('India', 'China', 'United States', 'Japan', 'Mexico', 'Brazil', 'Russian Federation', 'Philippines', 'Turkey', 'Indonesia')

GROUP BY B.customer_id, B.first_name, B.last_name, D.city, E.country

ORDER BY total_amount_paid **DESC**

LIMIT 5) **AS** average;

5. Copy-paste your queries and the final data output from pgAdmin 4 into your answers document.



```
SELECT AVG (total_amount_paid) AS average_amount_paid
FROM
(SELECT B.customer_id,
    B.first_name,
    B.last_name,
    D.city,
    E.country,
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 D.city IN
('Aurora', 'Atlixco', 'Xintai', 'Adoni', 'Dhule (Dhulia)', 'Kurashiki',
'Pingxiang', 'Sivas', 'Celaya', 'So Leopoldo')
AND E.country IN
('India', 'China', 'United States', 'Japan', 'Mexico', 'Brazil',
'Russian Federation', 'Philippines', 'Turkey', 'Indonesia')
GROUP BY B.customer_id, B.first_name, B.last_name, D.city, E.country
ORDER BY total_amount_paid DESC
LIMIT 5) AS average;
```

```
   average_amount_paid
   numeric
1  107.3540000000000000
```

Step 2: Find out how many of the top 5 customers you identified in step 1 are based within each country.

Your final output should include 3 columns:

- “country”

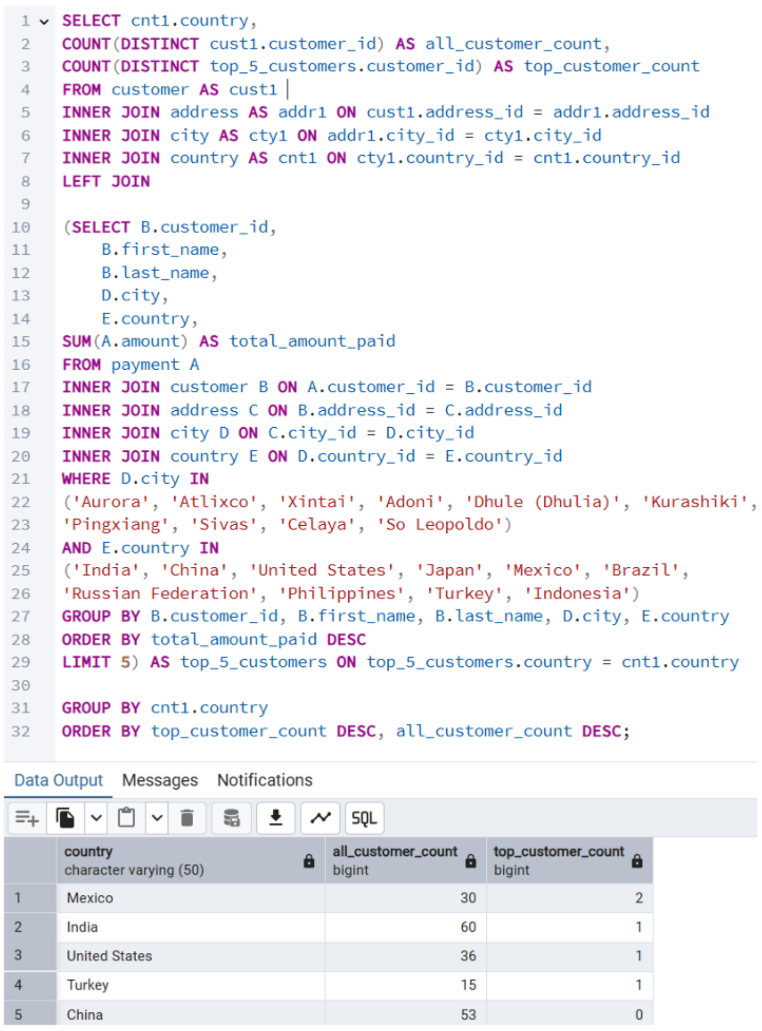
- "all_customer_count" with the total number of customers in each country
- "top_customer_count" showing how many of the top 5 customers live in each country

You'll notice that this step is quite difficult. We've broken down each part and provided you with some helpful hints:

1. Copy the query from step 3 of task 3.7 into the Query Tool and add parentheses around it. This will be your inner query.
2. Write an outer statement that counts the number of customers living in each country. You'll need to refer to your entity relationship diagram or data dictionary in order to do this. The information you need is in different tables, so you'll have to use a JOIN. To get the count for each country, use COUNT(DISTINCT) and GROUP BY. Give your second column the alias "all_customer_count" for readability.
3. Place your inner query in the outer query. Since you want to merge the entire output of the outer query with the information from your inner query, use a left join to connect the two queries on the "country" column. You'll need to add a LEFT JOIN after your outer query, followed by the subquery in parentheses.
4. Give your subquery an alias so you can refer to it in your outer query, for example, "top_5_customers".
5. Remember to specify which columns to join the two tables on using ON. Both ON and the column names should follow the alias.
6. Count the top 5 customers for the third column using GROUP BY and COUNT (DISTINCT). Give this column the alias "top_customer_count".

```
SELECT cnt1.country,

COUNT(DISTINCT cust1.customer_id) AS all_customer_count,

COUNT(DISTINCT top_5_customers.customer_id) AS top_customer_count

FROM customer AS cust1

INNER JOIN address AS addr1 ON cust1.address_id = addr1.address_id

INNER JOIN city AS cty1 ON addr1.city_id = cty1.city_id

INNER JOIN country AS cnt1 ON cty1.country_id = cnt1.country_id

LEFT JOIN
```

```sql
( SELECT
      B.customer_id,
      B.first_name,
      B.last_name,
      D.city,
      E.country,
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 D.city IN
('Aurora', 'Atlixco', 'Xintai', 'Adoni', 'Dhule (Dhulia)', 'Kurashiki', 'Pingxiang', 'Sivas', 'Celaya', 'So Leopoldo)
  AND E.country IN
('India', 'China', 'United States', 'Japan', 'Mexico', 'Brazil', 'Russian Federation', 'Philippines', 'Turkey', 'Indonesia' )
GROUP BY  B.customer_id, B.first_name, B.last_name,  D.city, E.country
ORDER BY total_amount_paid DESC
LIMIT 5)  AS top_5_customers
ON top_5_customers.country = cnt1.country
GROUP BY cnt1.country
ORDER BY top_customer_count DESC, all_customer_count DESC;
```



```sql
SELECT cnt1.country,
COUNT(DISTINCT cust1.customer_id) AS all_customer_count,
COUNT(DISTINCT top_5_customers.customer_id) AS top_customer_count
FROM customer AS cust1
INNER JOIN address AS addr1 ON cust1.address_id = addr1.address_id
INNER JOIN city AS cty1 ON addr1.city_id = cty1.city_id
INNER JOIN country AS cnt1 ON cty1.country_id = cnt1.country_id
LEFT JOIN

(SELECT B.customer_id,
    B.first_name,
    B.last_name,
    D.city,
    E.country,
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 D.city IN
('Aurora', 'Atlixco', 'Xintai', 'Adoni', 'Dhule (Dhulia)', 'Kurashiki',
'Pingxiang', 'Sivas', 'Celaya', 'So Leopoldo')
AND E.country IN
('India', 'China', 'United States', 'Japan', 'Mexico', 'Brazil',
'Russian Federation', 'Philippines', 'Turkey', 'Indonesia')
GROUP BY B.customer_id, B.first_name, B.last_name, D.city, E.country
ORDER BY total_amount_paid DESC
LIMIT 5) AS top_5_customers ON top_5_customers.country = cnt1.country

GROUP BY cnt1.country
ORDER BY top_customer_count DESC, all_customer_count DESC;
```

	country character varying (50)	all_customer_count bigint	top_customer_count bigint
1	Mexico	30	2
2	India	60	1
3	United States	36	1
4	Turkey	15	1
5	China	53	0

Step 3:

1. Write 1 to 2 short paragraphs on the following:

    ○ Do you think steps 1 and 2 could be done without using subqueries?

    ○ When do you think subqueries are useful?

I think steps 1 and 2 could be done without subqueries by just using filters and JOINs, but the query would probably get longer and more difficult to read or update. For queries that might need to be reused or maintained over time, that's not ideal.

Subqueries are especially helpful when you need one query to feed into another—basically when the result of one step is used to shape or limit the results of the main (outer) query. They let you break a complex problem into smaller pieces and keep the logic more organized.