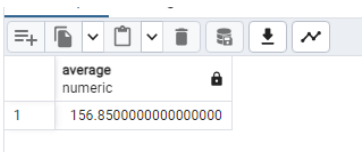
Asawer Maknoon **Task 3.8 : Performing Queries**

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

```
SELECT AVG (total_amount_paid) AS average
        FROM (SELECT A.customer_id, A.first_name, A.last_name, D.country, C.city,
        SUM(B.amount) AS total_amount_paid
FROM customer A
JOIN payment B ON A.customer_id = B.customer_id
JOIN address E ON A.address_id = E.address_id
JOIN city C ON E.city_id = C.city_id
JOIN country D ON C.country_id = D.country_id
WHERE C.city IN (SELECT city
FROM customer A
JOIN address E ON A.address_id = E.address_id
JOIN city C ON E.city_id = C.city_id
JOIN country D ON C.country_id = D.country_id
GROUP BY C.city
ORDER BY COUNT(A.customer_id) DESC
LIMIT 10)
GROUP BY
A.customer_id, A.first_name, A.last_name, D.country, C.city
ORDER BY total_amount_paid DESC
LIMIT 5) AS total_amount_paid;
```



	average numeric
1	156.8500000000000000

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

```
SELECT

   D.country,

   COUNT(DISTINCT A.customer_id) AS all_customer_count,

   COUNT(DISTINCT top_5_customers.customer_id) AS top_customer_count

FROM customer A

JOIN address E ON A.address_id = E.address_id

JOIN city C ON E.city_id = C.city_id

JOIN country D ON C.country_id = D.country_id

LEFT JOIN (SELECT A.customer_id, A.first_name, A.last_name, D.country, C.city,  SUM(B.amount) AS
total_amount_paid

FROM customer A

JOIN payment B ON A.customer_id = B.customer_id

JOIN address E ON A.address_id = E.address_id

 JOIN city C ON E.city_id = C.city_id

 JOIN country D ON C.country_id = D.country_id

 WHERE C.city IN ( SELECT city FROM customer A

 JOIN address E ON A.address_id = E.address_id

 JOIN city C ON E.city_id = C.city_id

 JOIN country D ON C.country_id = D.country_id

 GROUP BY  C.city

 ORDER BY

     COUNT(A.customer_id) DESC

     LIMIT 10)
```

```
    GROUP BY
        A.customer_id, A.first_name,  A.last_name,  D.country, C.city
    ORDER BY
     total_amount_paid DESC
    LIMIT 5) AS top_5_customers ON A.customer_id = top_5_customers.customer_id
GROUP BY
    D.country
ORDER BY
    all_customer_count DESC
    LIMIT 15;
```

Data Output | Messages | Notifications

	country character varying (50)	all_customer_count bigint	top_customer_count bigint
1	India	60	0
2	China	53	0
3	United States	36	0
4	Japan	31	0
5	Mexico	30	1
6	Russian Federation	28	0
7	Brazil	28	0
8	Philippines	20	0
9	Turkey	15	1
10	Indonesia	14	1
11	Nigeria	13	0
12	Argentina	13	0
13	South Africa	11	0
14	Taiwan	10	0
15	United Kingdom	9	0

Step 3:

Do you think steps 1 and 2 could be done without using subqueries? When do you think subqueries are useful?

- I think we could do step 1 and 2 without subqueries, but it would be more complex and unreadable. It would be also less optimized which means much time and cost.
- Subqueries are powerful tools for data retrieval across multiple tables. We can simplify complex queries and make them more readable. Subqueries can optimize the execution of the database engine which lead to better performance. In addition, it allows dynamic filtering to filter results based on values from other tables with the help of IN or NOT IN operator.