**Common Table Expressions**

**Step 1: Answer the business questions from step 1 and 2 of task 3.8 using CTEs**

1. Rewrite your queries from steps 1 and 2 of task 3.8 as CTEs.
2. Copy-paste your CTEs and their outputs into your answers document.
3. Write 2 to 3 sentences explaining how you approached this step, for example, what you did first, second, and so on.

Graphical user interface, text, application

Description automatically generated

**STEP 2**

Graphical user interface, text, application

Description automatically generated

**EXPLANATION FOR STEP 1 and STEP 2**

The first thing I did was to copy the subquery I had in exercise 3.8 in pgAmin since I already check the data location before writing the subquery. Then I took out the outer query from the subquery and replaced it with CTE syntax and left the inner query as it is for the step 1 task but in the **step 2 task**, created 4 CTEs names before writing the main statement to query the information required from the CTE table created.

**Step 2: Compare the performance of your CTEs and subqueries.**

1. **Which approach do you think will perform better and why?**

CTE is easier to read than subquery. In CTE, you break it down before running the query while subquery you nest everything together and you have to keep writing the query while in CTE, you only reference the cte and run the query

1. **Compare the costs of all the queries by creating query plans for each one.**

**TASK 1**

**Find the average amount paid by the top 5 customers within the Top 10 cities from the top 10 countries**

**FOR SUBQUERY**

COST: cost=65.06...65.07 rows=1 width=32

TIME: Total query runtime: 298 msec. 22 rows affected.

**FOR CTE**

COST: cost=65.06…65.07 rows=1 width=32

TIME: Total query runtime: 267 msec. 22 rows affected.

**TASK 2**

**Find out how many of the top 5 customers are based within each country(Within the Top 10 cities from the top 10 countries).**

**FOR SUBQUERY**

COST: cost=180.55..180.56 rows=5 width=90

TIME: Total query runtime: 262 msec. 45 rows affected.

**FOR CTE**

COST: cost=166.83. 166.85 rows=5 width=25

TIME: Total query runtime: 157 msec. 46 rows affected

1. **The EXPLAIN command gives you an *estimated* cost. To find out the actual speed of your queries, run them in pgAdmin 4. After each query has been run, a pop-up window will display its speed in milliseconds.**
2. **Did the results surprise you? Write a few sentences to explain your answer.**

**Step 3:**

**Write 1 to 2 paragraphs on the challenges you faced when replacing your subqueries with CTEs.**

The task1 was straightforward as I just have one inner query and followed the example given in the study note. But on the other hand, task two gave me a tough time as I did not realize I had to rename the second inner query with another cte name only that I won’t start with the “WITH” statement. Combining the FOUR CTEs was difficult which makes time-consuming to get the output I wanted.