**3.9 Answers**

**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.

CTE for “step 1” of task 3.8:

Graphical user interface, text, application, email

Description automatically generated

First, I took the query from step 1 of task 3.8 and put it into parentheses. Next, I used the WITH function to create my CTE. The WITH function was put before the query in parentheses. After that, I used the SELECT function to find the average of the sum of amounts in the paid table and gave is an alias (average\_total\_amount\_paid). Last, I used the FROM function to find what exact table I used to pull this information.

CTE for “step 2” of task 3.8:

Graphical user interface, text, application

Description automatically generated

First, I put the query from step 2 of task 3.8 in parentheses. Then, I used a WITH function to create a CTE. I put the WITH function before the query in parentheses. Next, I created another CTE with an alias called customer\_count\_cte. The query used in this CTE was from finding the count of customers, and the top customer count. I then used the FROM function to pull data from the customer table. Inner join was used next to link all the tables with their foreign keys to map the highest grain table to lowest grain table. From here I group them by country.

Graphical user interface, application, table, Excel

Description automatically generated

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

1. Which approach do you think will perform better and why?
2. Compare the costs of all the queries by creating query plans for each one.
3. 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.
4. Did the results surprise you? Write a few sentences to explain your answer.

* Both the approaches are very lucrative ways to query. Initially, I did not look and see which query performed better than the other. I did notice that the CTE made the script much cleaner and formal. The CTE in my opinion took entirely too long. Subqueries seems to be a better option unless the CTE is more cost efficient than using a subquery.
* Task 1 (Subquery & CTE)
  + CTEGraphical user interface, text, application, email

    Description automatically generated
  + Subquery

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Task 2 (Subquery & CTE)

* + CTE

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* + Subquery

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**Step 3:**

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

* + The results did not surprise me because after learning about subqueries and CTE’s I know that naturally CTE’s will run a little faster. Now the costs were roughly the same so there was no significant distinction between the two of the query methods. Just processing speed to finality can be justified to be a big enough difference between the two. CTE are a better but slower method when query with multiple lines. CTE’s also help clean up scripts and make queries more readable by other professionals.