SQL Server

CTE in SQL Server

CTE stands for common table expression. A CTE allows you to define a temporary named result set that available temporarily in the execution scope of a statement such as SELECT, INSERT, UPDATE, DELETE, or MERGE.

Common syntax of a CTE

WITH expression_name[(column_name [,...])]
AS (CTE_definition) SQL_statement;

In this syntax:
- **First, specify the expression name (expression_name) to which you can refer later in a query.**
- **Next, specify a list of comma-separated columns after the expression_name. The number of columns must be the same as the number of columns defined in the CTE_definition.**
- **Then, use the AS keyword after the expression name or column list if the column list is specified.**
- **After, define a SELECT statement whose result set populates the common table expression.**
- **Finally, refer to the common table expression in a query (SQL_statement) such as SELECT, INSERT, UPDATE, DELETE, or MERGE.**

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Recursive CTE

A recursive <u>common table expression</u> (CTE) is a CTE that references itself. By doing so, the CTE repeatedly executes, returns subsets of data, until it returns the complete result set.

A recursive CTE is useful in querying hierarchical data such as organization charts where one employee reports to a manager or multi-level bill of materials when a product consists of many components, and each component itself also consists of many other components.

Syntax of recursive cte

```
WITH expression_name (column_list)
AS
(
    -- Anchor member
    initial_query
    UNION ALL
    -- Recursive member that references expression_name.
    recursive_query
)
-- references expression name
SELECT *
FROM   expression_name
```
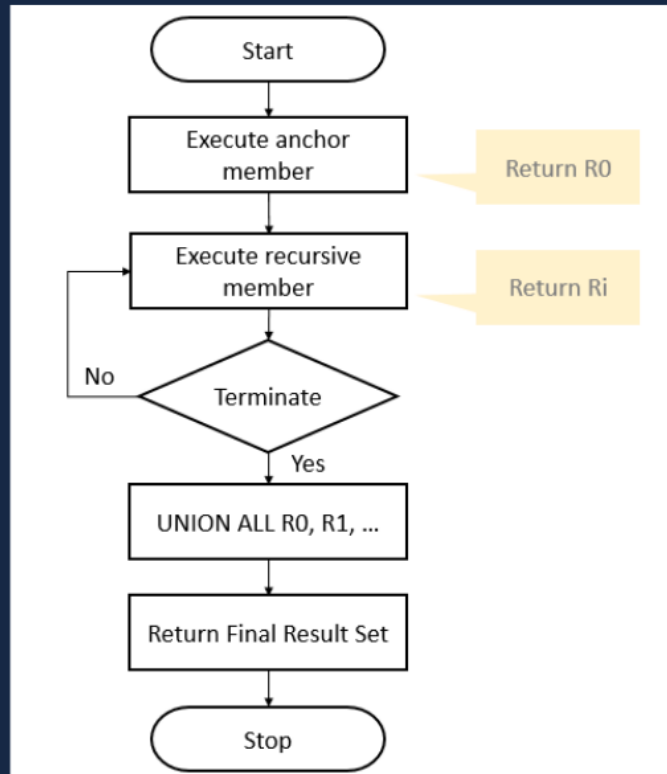
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In general, a recursive CTE has three parts:

1. An initial query that returns the base result set of the CTE. The initial query is called an anchor member.
2. A recursive query that references the common table expression, therefore, it is called the recursive member. The recursive member is union-ed with the anchor member using the UNION ALL operator.
3. A termination condition specified in the recursive member that terminates the execution of the recursive member.

The execution order of a recursive CTE is as follows:

- First, execute the anchor member to form the base result set (R0), use this result for the next iteration.
- Second, execute the recursive member with the input result set from the previous iteration (R_{i-1}) and return a sub-result set (R_i) until the termination condition is met.
- Third, combine all result sets R0, R1, ... Rn using UNION ALL operator to produce the final result set.

flowchart illustrates the execution of a recursive CTE: $\longrightarrow$

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SQL Server PIVOT operator

PIVOT operator rotates a table-valued expression. It turns the unique values in one column into multiple columns in the output and performs aggregations on any remaining column values.

category_name	product_count
Children Bicycles	59
Comfort Bicycles	30
Cruisers Bicycles	78
Cyclocross Bicycles	10
Electric Bikes	24
Mountain Bikes	60
Road Bikes	60

→

Children Bicycles	Comfort Bicycles	Cruisers Bicycles	Cyclocross Bicycles	Electric Bikes	Mountain Bikes	Road Bikes
59	30	78	10	24	60	60

Stay tuned for updates and
feel free to engage, ask
questions and more
THANK YOU