

RDB&SQL Session -5 (Subqueries and CTE's)

SQL Session-5 (Subqueries & CTE's)
Training Clarusway
Pear Deck - January 18, 2023 at 7:58PM

Part 1 - Summary

Use this space to summarize your thoughts on the lesson

Part 2 - Responses

Slide 1



CLARUSWAY®
Your Path to Success

Use this space to take notes:

Slide 2

Your Response

I've completed the pre-class content?

True **False**

Pear Deck

 Students choose an option

Pear Deck Interactive Slide
Do not remove this bar

You Chose

- **False**

Other Choices

- True

Use this space to take notes:

Slide 3



CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 4

3 Subqueries



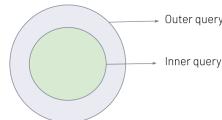
CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 5

▶ Introduction

A subquery is a **SELECT** statement that is nested within another statement. The subquery is also called the inner query or nested query.



CLARUSWAY®
way to reinvent yourself

5

Use this space to take notes:

Slide 6

▶ Syntax

```
1 SELECT column_name  
2 FROM table_1, table_2  
3 WHERE column_name OPERATOR (  
4     SELECT column_name  
5     FROM table_1, table_2 );  
6 |
```

Outer query or
enclosing query

Inner query,
nested
query or
subquery

- Subqueries are nested queries that provide data to the enclosing query.
- Subqueries can return individual values or a list of records
- Subqueries must be enclosed with parenthesis

CLARUSWAY®
way to success



8

Use this space to take notes:

Slide 7

A subquery may be used in:

- SELECT clause
- FROM clause
- WHERE clause



9

CLARUSWAY®
way to success

Use this space to take notes:

Slide 8

▶ Introduction

In SELECT statement

```
SELECT order_id,
       list_price,
       (
           SELECT AVG(list_price)
           FROM sale.order_item
       ) AS avg_price
  FROM sale.order_item
```

In WHERE clause

```
SELECT order_id, order_date
  FROM sale.orders
 WHERE order_date IN (
           SELECT TOP 5 order_date
           FROM sale.orders
          ORDER BY order_date DESC
      ),
```

In FROM clause

```
SELECT order_id, order_date
  FROM (
           SELECT TOP 5 *
           FROM sale.orders
          ORDER BY order_date DESC
      ) A;
```

CLARUSWAY®
WAY TO REINVENT YOURSELF



8

Use this space to take notes:

Slide 9

▶ Types of Subqueries

CLARUSWAY®
WAY TO REINVENT YOURSELF



Use this space to take notes:

Slide 10

► Types of Subqueries ➤

There are three main types of subqueries:

- Single-row subqueries
- Multiple-row subqueries
- Correlated subqueries

CLARUSWAY®
WAY TO REINVENT YOURSELF

10

Use this space to take notes:

Slide 11



► Single-row Subqueries ➤

CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 12

► Single-row Subqueries ➤

Single-row subqueries return one row with only one column and are typically used with single-row operators such as =, >, >=, <=, <>, != especially in WHERE clause.

CLARUSWAY®
WAY TO REINVENT YOURSELF

12

Use this space to take notes:

Slide 13

➤



Most queries using a join can be rewritten using a subquery (a query nested within another query), and most subqueries can be rewritten as joins.

CLARUSWAY®
WAY TO REINVENT YOURSELF

13

Use this space to take notes:

Slide 14

Query Time

Question: Write a query that shows all employees in the store where Davis Thomas works.

Expected Output:

	staff_id	first_name	last_name	email	phone	active	store_id	manager_id
1	1	James	Garcia	jgarcia@techno.shop	(916) 555-5554	1	1	NULL
2	2	Charles	Cussona	ccussona@techno.shop	(916) 555-5555	1	1	1
3	3	Jhon	Setamento	jsetamento@techno.shop	(916) 555-5556	1	1	2
4	4	Davis	Thomas	dthomas @techno.shop	(916) 555-5557	1	1	2

CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 15

Query Time

Question: Write a query that shows the employees for whom Charles Cussona is a first-degree manager. (To which employees are Charles Cussona a first-degree manager?)

Expected Output:

	staff_id	first_name	last_name	email	phone	active	store_id	manager_id
1	3	Jhon	Setamento	jsetamento@techno.shop	(916) 555-5556	1	1	2
2	4	Davis	Thomas	dthomas @techno.shop	(916) 555-5557	1	1	2

CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 16

Query Time For You



Question: Write a query that returns the list of products that are more expensive than the product named 'Pro-Series 49-Class Full HD Outdoor LED TV (Silver)'. (Also show model year and list price)

Expected Output:

	product_id	product_name	model_year	list_price
1	440	Samsung - 88 Class - LED - Q9F Series - 2160p - S...	2020	16999.95
2	494	LG Electronics OLED65E6P Flat 65-Inch 4K Ultra H...	2020	4296.99

Query executed successfully.

CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 17

Your Response

Is everything clear so far?



Students choose an option

Pear Deck Interactive Slide
Do not remove this bar

You Chose

- **so so**

Other Choices

- clear
- confused

Use this space to take notes:

Slide 18



Multiple-row Subqueries

CLARUSWAY®
WAY TO REINVENT YOURSELF

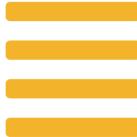
Use this space to take notes:

Slide 19

▶ Multiple-row Subqueries



Multiple-row subqueries return sets of rows and are used with multiple-row operators such as **IN, NOT IN, ANY, ALL**.



CLARUSWAY®
way to reinvent yourself

19

Use this space to take notes:

Slide 20

Query Time



Question: Write a query that returns customer first names, last names and order dates. The customers who are order on the same dates as Laurel Goldammer.

Expected Output:

#	first_name	last_name	order_date
1	Laurel	Goldammer	2019-02-28
2	Audrey	Darby	2019-02-28
3	Treasa	Marshall	2019-02-28
4	Amanda	Thompson	2019-02-28
5	Jane	Taylor	2019-02-28
6	Tajanae	Byers	2020-04-23
7	Laurel	Goldammer	2020-04-23
8	Jona	Garcia	2020-04-23
9	Daren	Rollins	2020-04-23
10	Trudy	Smith	2020-04-23
11	Derrick	Huff	2020-04-23

CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 21

Query Time



Question: List the products that ordered in the last 10 orders in Buffalo city.

Expected Output:

#	product_name
1	128GB Pod touch (Space Gray) (6th Generation)
2	151 SE Outdoor Environmental Speakers (White)
3	2TB Red 5400 rpm SATA III 3.5 Internal NAS H...
4	Antec QM41 - Gen 3 SATA III 6 Gb/s to-RCA A...
5	CORSAIR - MM800 Polaris RGB Gaming Mouse
6	CORSAIR - MM800 Polaris RGB Gaming Mouse
7	Details About "Brand New" Pny Anarchy 16gb ...
8	Details About Netgear 16 X 4 Docusis 3.0 Cable...
9	Details About Samsung Gear Iconx 2018 Edito...
10	HD 4.40 BT Wireless Bluetooth Headphones
11	Lenovo - USB-C Adapter for Select Lenovo Yogo L...
12	Lenovo - Yoga 710 2-in-1 13.3 Touch-Screen L...
13	Logitech - G500 LIGHTSYNC 2.1 Bluetooth Ga...
14	Logitech Circle Black Portable Wifi Video Mon...
15	Lumitek iQard Dual 12.9 inch Keyboard Cover Sl...

CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 22



► Correlated Subqueries

CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 23

► EXISTS



```
SELECT *  
FROM sale.customer  
WHERE EXISTS (SELECT 1)
```

```
SELECT *  
FROM sale.customer A  
WHERE EXISTS (SELECT 1  
    FROM sale.orders B  
    WHERE B.order_date > '2020-01-01'  
    AND A.customer_id = B.customer_id  
)
```

```
SELECT *  
FROM sale.customer A  
WHERE EXISTS (SELECT 1  
    FROM sale.orders B  
    WHERE B.order_date > '2020-01-01'  
)
```



Use this space to take notes:



Slide 24

▶ NOT EXISTS



```
SELECT *  
FROM sale.customer A  
WHERE NOT EXISTS (SELECT 1)
```

```
SELECT *  
FROM sale.customer A  
WHERE NOT EXISTS (  
    SELECT 1  
    FROM sale.orders B  
    WHERE B.order_date > '2020-01-01'  
    AND A.customer_id = B.customer_id  
)
```

```
SELECT *  
FROM sale.customer A  
WHERE NOT EXISTS (  
    SELECT 1  
    FROM sale.orders B  
    WHERE B.order_date > '2020-01-01'  
)
```

CLARUSWAY®
WAY TO REINVENT YOURSELF

24

Use this space to take notes:

Slide 25

Query Time



Question: Write a query that returns a list of States where 'Apple - Pre-Owned iPad 3 - 32GB - White' product is not ordered

Expected Output:

	state
1	IA
2	MD
3	NY
4	MI
5	CT
6	TN
7	IL

CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 26

Query Time



Question: Write a query that returns stock information of the products in Davi techno Retail store.
The BFLO Store hasn't got any stock of that products.

Expected Output:

	store_name	store_id	product_id	quantity
1	Davi techno Retail	1	22	29
2	Davi techno Retail	1	47	21
3	Davi techno Retail	1	91	8
4	Davi techno Retail	1	158	11
5	Davi techno Retail	1	175	2
6	Davi techno Retail	1	184	4
7	Davi techno Retail	1	192	20
8	Davi techno Retail	1	198	1
9	Davi techno Retail	1	251	2
10	Davi techno Retail	1	299	18
11	Davi techno Retail	1	314	2

CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 27

Query Time



Subquery in Select Statement:

Question: Write a query that creates a new column named "total_price" calculating the total prices of the products on each order.

Expected Output:

	order_id	total_price
1	1	1275.96
2	2	848.99
3	3	848.99
4	4	136.99
5	5	386.97
6	6	149.96
7	7	678.98
8	8	273.98
9	9	59.99
10	10	249.99
11	11	722.98
12	12	181.98

CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 28

3 ➤ CTE's



CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 29

▶ Introduction ➤

- **Common Table Expression** exists for the duration of a single statement.
- That means they are only usable inside of the query they belong to.
- It is similar to views. In this manner, it's defined as "**statement scoped views**".
- All CTEs (ordinary and recursive) start with a **WITH** clause **in front of a SELECT, INSERT, DELETE, or UPDATE statement**.
- There may be **one or more CTEs** in a single WITH clause.

29

Use this space to take notes:

Slide 30

► CTE Types

Ordinary

```
1 WITH query_name [(column_name,...)] AS  
2   (SELECT ...) -- CTE Definition  
3  
4 SQL_Statement;  
5
```

Recursive

```
1 WITH table_name (column_list)  
2 AS  
3  (  
4    ... Anchor member  
5    initial_query  
6    UNION ALL  
7    ... Recursive member that references table_name.  
8    recursive_query  
9  )  
10   ... references table_name  
11  ...  
12  FROM table_name
```

CLARUSWAY®
www.clarusway.com

30

Use this space to take notes:

Slide 31

► Ordinary CTE Example

```
1 emp_id first_name last_name salary job_title gender hire_date  
2 17979 Robert  Elmer ..... 110000 Operations Director Male 2010-09-04  
3 20650 Elvis  Kitter ..... 80000 Sales Manager Male 2017-11-24  
4 30001 Paul  Forrester ..... 40000 Sales Representative Male 2013-05-02  
5 49714 Hugo  Forester ..... 55000 IT Support Specialist Male 2017-11-22  
6 51376 Linda  Chen ..... 60000 Sales Representative Female 2013-05-29  
7 61995 Tim  Sweeney ..... 70000 Business Analyst Female 2013-08-09  
8 47323 Lisa  Glaven ..... 50000 Researcher Female 2013-05-20  
9 78998 Michael  Hayes ..... 60000 HR Manager Male 2010-06-28  
10 71329 Doyle  Meyer ..... 77000 HR Manager Female 2010-06-28  
11 13124 Jennifer  Petition ..... 60000 Web Developer Male 2013-05-21  
12 97927 Billie  Lawrence ..... 67000 Web Developer Female 2013-06-25
```

query :

```
1 WITH temp_table (avg_salary) AS  
2   (SELECT AVG(salary)  
3    FROM employees)  
4 SELECT salary  
5   FROM employees, temp_table  
6  WHERE employees.salary > temp_table.avg_salary;
```

output :

```
1 salary  
2 .....  
3 110000  
4 60000  
5 85000  
6 95000  
7 73000  
8 99000
```

31

Use this space to take notes:

Slide 32

Query Time

Question: List customers who have an order prior to the last order of a customer named Jerald Berray and are residents of the city of Austin.

Expected Output:

#	customer_id	first_name	last_name	city	order_date
1	696	Reanne	Anderson	Austin	2018-01-14
2	1413	Shawn	Ward	Austin	2018-01-10
3	78	Lynn	Hickman	Austin	2018-03-29
4	363	Diane	Callano	Austin	2018-05-10
5	1358	Felicia	Horton	Austin	2018-06-12
6	1314	Patricia	Ward	Austin	2018-06-05
7	1110	Mozelle	Schroeder	Austin	2018-07-28
8	551	Joshua	Dunlap	Austin	2018-08-03
9	14	Leontine	Ward	Austin	2018-08-25
10	14	Leonora	Vinson	Austin	2018-09-04
11	555	Nicki	Cox	Austin	2018-09-28
12	697	Elaine	Thompson	Austin	2018-10-30
13	1056	Nu	Lang	Austin	2018-10-24
14	4444	Leanne	Martinez	Austin	2018-11-05

CLARUSWAY®

WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 33

Query Time For You

Question: List the stores whose turnovers are under the average store turnovers in 2018.

Expected Output:

#	store_name	Store_earn	Avg_earn
1	Burkes Outlet	50162.6717	160625.685400
2	Davi techno Retail	98265.5069	160625.685400

CLARUSWAY®

WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 34

Query Time For You

Question: Write a query that returns the net amount of their first order for customers who placed their first order after 2019-10-01.

Expected Output:

	customer_id	first_name	last_name	order_id	net_price
1	3	Teddy	Mills	1468	1304.7931
2	15	Siobhan	Weber	1401	4674.0492
3	19	Tarra	Kannady	1211	1180.6415
4	21	Charlesetta	Warner	1177	104.7924
5	28	Parthenia	Paa	1306	1726.2038
6	34	Ryan	Wilcox	1190	27.8907
7	35	Lavonne	Anderson	1476	3000.2547
8	37	Venus	Martin	1295	600.1165

CLARUSWAY®
WAY TO REINVENT YOURSELF

Use this space to take notes:

Slide 35

Your Response

Is everything clear so far?



Students choose an option

Pear Deck Interactive Slide

Do not remove this bar

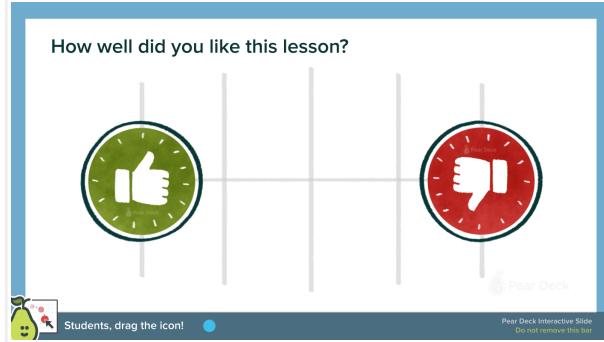
Use this space to take notes:

Slide 36

Your Response

Slide 36

Your Response



Use this space to take notes:

Slide 37

THANKS!
Any questions?

You can find me at:
▶ @adsum
▶ @owen



37

Use this space to take notes: