

RDB&SQL Session -4 (Joins & Views)

SQL Session-4 (JOINS)

Training Clarusway

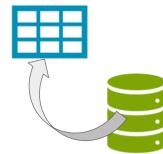
Pear Deck - January 16, 2023 at 7:54PM

Part 1 - Summary

Use this space to summarize your thoughts on the lesson

Part 2 - Responses

Slide 1



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Your Response

I've completed the pre-class content.

True

False

Students choose an option

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▶ Joins

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Introduction to Joins

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► What is Join?



A JOIN clause is used to combine two or more tables into a single table.

This process is carried out based on a related column between tables.

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► JOIN Types



- **INNER JOIN:** Returns the common records in both tables.
- **LEFT JOIN:** Returns all records from the left table and matching records from the right table.
- **RIGHT JOIN:** Returns all records from the right table and matching records from the left table.
- **FULL JOIN:** Returns all records of both left and right tables.
- **CROSS JOIN:** Returns the Cartesian product of records in joined tables.
- **SELF JOIN:** A join of a table to itself.

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▶ Inner Join

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▶ Introduction



INNER JOIN is the most common type of JOINS. It creates a new result table based on the values in common columns from two or more tables.

INNER JOIN returns a table that contains only joined rows that meet the specified join conditions.

Syntax

```
1 SELECT columns  
2 FROM table_A  
3 INNER JOIN table_B ON join_conditions
```



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▶ Syntax

Syntax of Join of Multiple Tables

```
1 SELECT columns
2   FROM table_A
3   INNER JOIN table_B
4     ON join_conditions1 AND join_conditions2
5   INNER JOIN table_C
6     ON join_conditions3 OR join_conditions4
7 ...|
```

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▶ Sample Tables

	emp_id	first_name	last_name	salary	job_title	gender	hire_date
1	100	John	Doe	11000	Executive Director	Male	2017-01-01
2	101	Jane	Doe	11000	Executive Director	Female	2017-01-01
3	26658	Elvis	Ritter	85000	Sales Manager	Male	2017-11-24
4	30848	David	Barrow	85000	Data Scientist	Male	2019-12-02
5	42421	Hilma	Pontzer	95000	Data Analyst	Female	2018-04-22
6	51821	Linda	Pontzer	95000	Data Specialist	Male	2019-04-29
7	67323	Lisa	Wiener	75000	Business Analyst	Female	2018-08-09
8	71326	Mark	Wiener	77000	Project Manager	Male	2018-12-20
9	71328	Gayle	Wiener	77000	Project Manager	Female	2019-01-28
10	76589	Jason	Christie	99000	Project Manager	Male	2019-01-21
11	97927	Billie	Lanning	67000	Web Developer	Female	2018-06-25

	emp_id	dept_name	dept_id
1	100	Operations	13
2	101	Operations	14
3	26658	Marketing	14
4	30848	Operations	13
5	42421	Operations	13
6	51821	Operations	13
7	67323	Operations	13
8	71323	Marketing	14
9	71326	Marketing	14
10	76589	Operations	13
11	97927	Technology	12

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▶ Inner Join



Visual Representation of Inner JOIN

```
Query:
```

```
1 SELECT
2   employees.emp_id,
3   employees.first_name,
4   employees.last_name,
5   departments.dept_name,
6   departments.dept_id
7   FROM
8   INNER JOIN departments
9   ON employees.emp_id = departments.emp_id;
```

Output:

emp_id	first_name	last_name	dept_name	dept_id
1	Robert	Silmore	Operations	1
2	Elivia	Harrelson	Marketing	13
3	Donald	Barrow	Operations	13
5	Linda	Foster	Operations	13
6	Patricia	Yandel	Marketing	14
8	Jason	Christian	Operations	13
9	Willie	Lanning	Technology	12

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Query Time

Make a list of products showing the product ID, product name, category ID, and category name.

A screenshot of a database query results window. The table has columns: product_id, product_name, category_id, and category_name. The data is as follows:

	product_id	product_name	category_id	category_name
1	1	DENAQ - AC Adapter for T...	4	Computer Accessories
2	2	NS-SP1800BL 5.1-Channel ...	5	Speakers
3	3	Acoustimass 6 Series V Ho...	5	Speakers
4	4	Corsair Vengeance LPX 16...	4	Computer Accessories
5	5	Details About Samsung Gear...	14	Bluetooth
6	6	2TB Red 5400 rpm SATA III ...	4	Computer Accessories
7	7	Details About Alpine 480w 6...	5	Speakers
8	8	Kenwood KFC-1653MRW 6...	5	Speakers

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Query Time For You ➤

How many employees are in each store?



	store_name	num_of_emp
1	Burke's Outlet	3
2	Davi Techno Retail	4
3	The BFLO Store	3

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Left Join ➤

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▶ Introduction



In this JOIN statement, all the records of the left table and the common records of the right table are returned in the query.
If no matching rows are found in the right table during the JOIN operation, these values are assigned as NULL.

Syntax

```
1 SELECT columns  
2 FROM table_A  
3 LEFT JOIN table_B ON join_conditions
```

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▶ Sample Tables



emp_id	first_name	last_name	salary	job_title	gender	hire_date
1	Robert	Gilmore	110000	Operations Director	Male	2018-09-04
2	John	Smith	60000	Software Developer	Male	2018-01-12
3	David	Barrou	85000	Data Scientist	Male	2019-12-02
4	Hugo	Forster	55000	IT Support Specialist	Male	2019-11-22
5	Robert	Wiedera	70000	Marketing Manager	Female	2018-08-29
6	Lisa	Wiener	75000	Business Analyst	Female	2018-08-09
7	Rebecca	Yeager	67000	Project Manager	Male	2018-12-20
8	Mark	Holland	52000	Customer Support	Female	2018-07-28
9	Christian	Christiansen	99000	Project Manager	Male	2019-01-21
10	Jason	Lanning	67000	Web Developer	Female	2018-06-25
11	Billie	Lanning	67000	Web Developer	Female	2018-06-25
12						

dept_id	dept_name	dept_id
1	Operations	13
2	Marketing	14
3	Operations	13
4	Marketing	14
5	Operations	13
6	Technology	14
7	Operations	13
8	Marketing	14
9	Administrative	11
10	Operations	13
11	Technology	12
12		

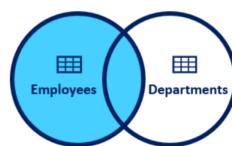
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► Left Join



Visual Representation of Left JOIN

query:

```
1 SELECT
2   employees.emp_id,
3   employees.first_name,
4   employees.last_name,
5   departments.dept_name,
6   departments.dept_id
7   FROM
8   LEFT JOIN departments
9   ON employees.emp_id = departments.emp_id;
```

output:

emp_id	first_name	last_name	dept_name	dept_id	
1	1	Robert	Glennore	Operations	13
2	2	David	Barrou	Operations	13
3	3	David	Bartter	Operations	13
4	4	Linda	Potter	Operations	13
5	5	Sarah	Weller	Marketing	14
6	6	Linda	Kleene	Marketing	14
7	7	David	Haley	Marketing	14
8	8	David	Meyer	Marketing	14
9	9	David	Christian	Operations	13
10	10	David	Lanning	Technology	12
11	11	David	Glennore	Operations	13
12	12	Willie	Lanning	Technology	12

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Query Time



Write a query that returns products that have never been ordered

Select product ID, product name, orderID

(Use Left Join)

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A screenshot of a database query results window. The results table has columns: product_id, product_name, and order_id. The data shows 10 rows of products with their names and a corresponding order ID that is NULL, indicating they have not been ordered yet.

	product_id	product_name	order_id
1	355	Samsung T5 Portable SSD - 500GB	NULL
2	378	Samsung 860 EVO 250GB 2.5" SATA III Internal Solid State Drive (SSD)	NULL
3	401	Sony MDRXB950N1 Headphones	NULL
4	501	Polk Audio - 7.3-Way Floor Speaker	NULL
5	361	Yamaha - Natural Sound 5.2-Channel Home Theater System	NULL
6	418	WD - Red Pro 4TB Internal SAT...	NULL
7	424	Marantz - 11.2-Ch Network-Rea...	NULL
8	464	X850F-Series 75-Class HDR U...	NULL
9	438	Apple - iPad Pro 12.9-inch (Late 2017) Sil...	NULL
10	507	13.3 MacBook Air (Mid 2017) Sil...	NULL

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Query Time For You

Report the total number of products sold by each employee.

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#	Results	# Messages
	staff_id	num_of_product
1	1	0
2	2	685
3	3	831
4	4	0
5	5	0
6	6	2419
7	7	2360
8	8	412
9	9	371
10	10	0

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4 Right Join

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▶ Introduction



In simple terms, **RIGHT JOIN** is the opposite of **LEFT JOIN**.
In this join statement, all the records of the right table and the common records of the left table are returned in the query.

Syntax

```
1 SELECT columns  
2   FROM table_A  
3   RIGHT JOIN table_B ON join_conditions;
```

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Use this space to take notes:

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Query Time



Write a query that returns products that have never been ordered

Select product ID, product name, orderID

(Use Left Join)

	product_id	product_name	order_id
1	355	Samsung T5 Portable SSD - 500GB	NULL
2	378	Samsung 860 EVO 250GB 2.5" SATA III Internal Solid State Drive (SSD)	NULL
3	401	Sony MDRXB950N1 Headphones	NULL
4	501	Polk Audio - 7.3-Way Floor Speaker	NULL
5	361	Yamaha - Natural Sound 5.2-Way Surround Sound Speaker	NULL
6	418	WD - Red Pro 4TB Internal SAT...	NULL
7	424	Marantz - 11.2-Ch Network-Rea...	NULL
8	464	X850F-Series 75-Class HDR U...	NULL
9	438	Apple - iPad Pro 12.9-inch (Late...	NULL
10	507	13.3 MacBook Air (Mid 2017, Sil...	NULL

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▶ Full Outer Join

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▶ Introduction



A **FULL OUTER JOIN** returns all rows from both tables.

The output table will include rows with null data, so nothing is left out. Null values may be important to detect missing data in tables.

FULL OUTER JOIN is likely to generate large data sets based on the number of rows in the tables you want to join.

Syntax

```
1 SELECT columns  
2 FROM table_A  
3 FULL OUTER JOIN table_B ON join_conditions
```

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► Sample Tables

employees

emp_id	first_name	last_name	salary	job_title	gender	hire_date
1	Robert	Gilmores	110000	Operations Director	Male	2018-09-04
2	Elvis	Ritter	80000	Marketing Manager	Male	2019-01-12
3	David	Barrow	85000	Data Scientist	Male	2019-12-02
4	Hugo	Forster	55000	IT Support Specialist	Male	2019-11-22
5	Lisa	Wiener	75000	Business Analyst	Female	2018-08-09
6	Rodney	Meyer	67000	Project Manager	Male	2018-12-20
7	Jason	Christian	90000	Project Manager	Female	2018-05-28
8	Lise	Wiener	75000	Business Analyst	Female	2018-08-09
9	Rodney	Meyer	67000	Project Manager	Male	2018-12-20
10	Elvis	Ritter	80000	Marketing Manager	Male	2019-01-12
11	David	Barrow	85000	Data Scientist	Male	2019-12-02
12	Jason	Christian	90000	Project Manager	Male	2019-01-21
13	Billie	Lanning	67000	Web Developer	Female	2018-06-25

dept_id	dept_name	dept_id
1	Operations	13
2	Marketing	14
3	Operations	13
4	Marketing	14
5	Operations	13
6	Technology	12
7	Technology	12
8	Marketing	14
9	Administrative	11
10	Operations	13
11	Technology	12
12	Technology	12
13	Marketing	14
14	Administrative	11
15	Operations	13
16	Technology	12
17	Technology	12

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► Full Outer Join



Visual Representation of Full Outer JOIN

query:

```
1 SELECT
2   employees.emp_id,
3   employees.first_name,
4   employees.last_name,
5   employees.job_title,
6   departments.dept_id
7 FROM employees
8 FULL OUTER JOIN departments
9 ON employees.emp_id = departments.emp_id;
```



output:

emp_id	first_name	last_name	dept_name	dept_id
1	Robert	Gilmores	Operations	13
2	Elvis	Ritter	Marketing	14
3	David	Barrow	Technology	12
4	Hugo	Forster	IT Support	15
5	Lisa	Wiener	Business	14
6	Rodney	Meyer	Project	13
7	Jason	Christian	Manager	13
8	Lise	Wiener	Business	14
9	Rodney	Meyer	Project	13
10	Elvis	Ritter	Marketing	14
11	David	Barrow	Technology	12
12	Jason	Christian	Operations	13
13	Billie	Lanning	Web Dev	11
14	Elvis	Ritter	Marketing	14
15	David	Barrow	Technology	12
16	Jason	Christian	Operations	13
17	Billie	Lanning	Web Dev	11

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Query Time

Report the stock quantities of all products.



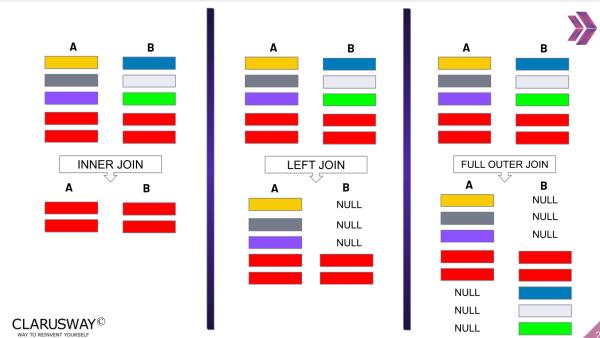
	Product_id	stock_quantity
1	1	55
2	2	45
3	3	34
4	4	36
5	5	26
6	6	38
7	7	28
8	8	13
9	9	51
10	10	49
11	11	59
12	12	48
13	13	33
14	14	30

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6 Cross Join

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▶ Introduction



In SQL, the **CROSS JOIN** is used to combine each row of the first table with each row of the second table.

Syntax

```
1 SELECT columns  
2   FROM table_A  
3   CROSS JOIN table_B
```



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▶ Sample Tables



"colors" table:

1	id	color
2	--	-----
3	1	white
4	2	black
5	3	red

"brands" table:

1	id	brand
2	--	-----
3	1	Mercedes
4	2	BMW
5	3	Audi

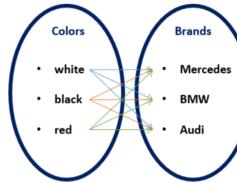
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▶ Cross Join



Visual Representation of Cross JOIN

query :

```
1 SELECT colors.color, brands.brand
```

```
2 FROM colors
```

```
3 CROSS JOIN brands;
```

output:

1	color	brand
2	--	-----
3	white	Mercedes
4	white	BMW
5	white	Audi
6	black	Mercedes
7	black	BMW
8	black	Audi
9	red	Mercedes
10	red	BMW
11	red	Audi

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Query Time



In the stocks table, there are not all products store on the product table and you want to insert these products into the stock table.

You have to insert all these products for every three stores with "0 (zero)" quantity.

Write a query to prepare this data.

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	store_id	product_id	quantity
1	1	443	0
2	1	443	0
3	3	443	0
4	1	444	0
5	2	444	0
6	3	444	0
7	1	445	0
8	2	445	0
9	3	445	0
10	1	446	0
11	2	446	0
12	3	446	0
13	1	447	0

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7 Self Join



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▶ Introduction

- **SELF JOIN** is a join of a table to itself. **Joining a table to itself** means that each row of the table is combined with itself and the other rows of the table.
- **SELF JOIN** can be defined as a combination of two copies of the same table.

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▶ Self Join

query :

Modified 'employees' table:					
#	emp_id	first_name	last_name	job_title	reports_to
1	1	Robert	Oliver	Operations Director	
2	2	David	Forrester	IT Support Specialist	3
3	3	Hugo	Forrester	IT Support Specialist	2
4	4	Linda	Wiemer	Business Analyst	2
5	5	Elvis	Meyer	HR Manager	7
6	6	Rodney	Meyer	HR Manager	7
7	7	Gayle	Meyer	HR Manager	7
8	8	Christian	Lanning	Web Developer	7
9	9	Billie	Lanning	Web Developer	7
10	10				
11	11				
12	12				
13	13				
14	14				
15	15				
16	16				
17	17				
18	18				
19	19				
20	20				

```
1 SELECT
2   A.first_name,
3   A.last_name,
4   A.job_title,
5   A.job_title AS manager_name
6   FROM employees A
7   INNER JOIN employees B ON B.emp_id = A.reports_to;
```

output:

#	first_name	last_name	job_title	manager_name
1	Robert	Oliver	Operations Director	
2	David	Forrester	IT Support Specialist	Robert
3	Hugo	Forrester	IT Support Specialist	Robert
4	Linda	Wiemer	Business Analyst	Robert
5	Elvis	Meyer	HR Manager	Robert
6	Rodney	Meyer	HR Manager	Robert
7	Gayle	Meyer	HR Manager	Robert
8	Christian	Lanning	Web Developer	Robert
9	Billie	Lanning	Web Developer	Robert

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Query Time ➤

Write a query that returns the staff names with their manager names.

Expected columns: staff first name, staff last name, manager name



	staff_name	manager_name
1	James	NULL
2	Charles	James
3	Jhon	Charles
4	Davis	Charles
5	Williams	James
6	Barbara	Williams
7	Taylor	Williams
8	Elizabeth	James
9	Brown	Taylor
10	Linda	Taylor

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Views ➤



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▶ Introduction



- Views are useful tool for accessing multiple data types.
- Complex queries can be stored within views.
- We can invoke the view instead of recreating the queries every time we need them.

Syntax

```
1 CREATE VIEW view_name AS  
2   SELECT columns  
3   FROM tables  
4   [WHERE conditions];
```

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▶ Advantages of Views



Advantages of Views:

Performance



Security



Simplicity



Storage



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Query Time

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Your Response

Is everything clear so far?

A semi-circular rating scale with segments colored green, yellow, orange, and red. Below the scale are five small square icons, each containing a smiley face that corresponds to the color of the segment above it.

Students choose an option

Pear Deck Interactive Slide
Do not remove this bar

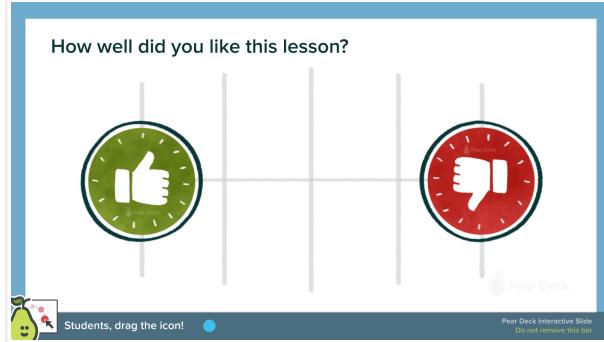
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Your Response

Slide 44

Your Response

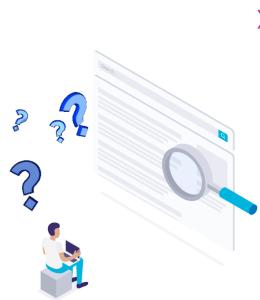


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THANKS!
Any questions?

You can find me at:
▶ @adsum
▶ @owen



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