

# RDB&SQL Session -6 (Set Operators and Case)

SQL Session-6 (Set Operators & Case Expression)

Training Clarusway

Pear Deck - January 19, 2023 at 8:17PM

## Part 1 - Summary

Use this space to summarize your thoughts on the lesson

## Part 2 - Responses

Slide 1



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## Slide 2

### Set Operators



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### Your Response

I've completed the pre-class content?

True

False

 Students choose an option  
CLASS QUIZ

Pear Deck Interactive Slide  
Do not remove this bar

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## Slide 4

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- ▶ Introduction
- ▶ Union
- ▶ Union All
- ▶ Intersect
- ▶ Except

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## Slide 5

### 1 ➤ Introduction



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## Slide 6

### ▶ Introduction



- ★ Set operations allow the results of multiple queries to be combined into a single result set.
- ★ Set operators include UNION, UNION ALL, INTERSECT, and EXCEPT for MS SQL Server.

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### ▶ Important!



- Both SELECT statements must contain the **same number of columns**.
- In the SELECT statements, the corresponding columns must have the **same data type**.
- Positional ordering must be used to sort the result set. The individual result set ordering is not allowed with Set operators. **ORDER BY** can appear once at the end of the query.
- UNION and INTERSECT operators are commutative, i.e. the **order of queries is not important**: it doesn't change the final result.
- Performance-wise, UNION ALL shows better performance as compared to UNION because resources are **not wasted in filtering duplicates and sorting** the result set.
- Set operators can be the **part of subqueries**.

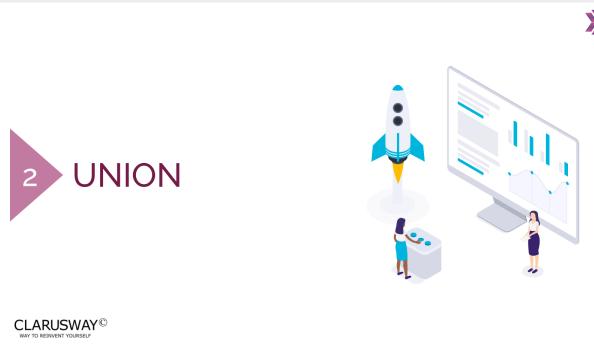


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## Slide 8



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## Slide 9

### ▶ Introduction



In some cases, you may need to **combine data from two or more tables** into a result set. **Union** clause is used to perform this operation.

The tables that you need to combine can be tables with similar data in the same database, or in different databases.

#### Syntax

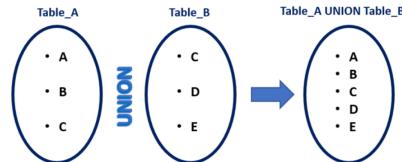
```
1 SELECT column1, column2, ...
2 FROM table_A
3 UNION
4 SELECT column1, column2, ...
5 FROM table_B
```



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## Slide 10

### ► UNION



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## Slide 11

### ► Sample Tables

"employees\_A" table:

1	emp_id	first_name	last_name	salary	job_title	gender
2						
3	17679	Robert	Gilmore	110000	Operations Director	Male
4	26650	Elvis	Ritter	86000	Sales Manager	Male
5	30840	David	Barrow	85000	Data Scientist	Male
6	49714	Hugo	Forrester	55000	IT Support Specialist	Male
7	51821	Linda	Foster	95000	Data Scientist	Female
8	67323	Lisa	Wiener	75000	Business Analyst	Female

"employees\_B" table:

1	emp_id	first_name	last_name	salary	job_title	gender
2						
3	49714	Hugo	Forrester	55000	IT Support Specialist	Male
4	67323	Lisa	Wiener	75000	Business Analyst	Female
5	70950	Rodney	Weaver	87000	Project Manager	Male
6	71329	Gayle	Meyer	77000	HR Manager	Female
7	76589	Jason	Christian	99000	Project Manager	Male
8	97927	Billie	Lanning	67000	Web Developer	Female

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## Slide 12

### ▶ Example

query :

```
1 SELECT emp_id, first_name, last_name, job_title
2   FROM employees_A
3 UNION
4 SELECT emp_id, first_name, last_name, job_title
5   FROM employees_B;
```

output:

emp_id	first_name	last_name	job_title
3	Robert	Gilmore	Operations Director
4	Elvis	Ritter	Sales Manager
5	David	Barrow	Data Scientist
6	Hugo	Forester	Data Support Specialist
7	Adela	Price	Data Scientist
8	Lisa	Wiener	Business Analyst
9	Rodney	Weaver	Project Manager
10	Gayle	Meyer	HR Manager
11	Christina	Fullerton	Project Manager
12	Billie	Lanning	Web Developer

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## Slide 13

### 3 UNION ALL



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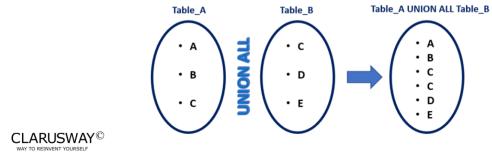
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## Slide 14

### ▶ Introduction

#### Syntax

```
1 SELECT column1, column2, ...
2   FROM table_A
3 UNION ALL
4 SELECT column1, column2, ...
5   FROM table_B
```



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## Slide 15

### ▶ Sample Tables



"employees\_A" table:

1	emp_id	first_name	last_name	salary	job_title	gender
2	17679	Robert	Gilmore	110000	Operations Director	Male
3	26650	Elvis	Ritter	86000	Sales Manager	Male
4	30840	David	Barrow	85000	Data Scientist	Male
5	49714	Hugo	Forrester	55000	IT Support Specialist	Male
6	51821	Linda	Foster	95000	Data Scientist	Female
7	67323	Lisa	Wiener	75000	Business Analyst	Female

"employees\_B" table:

1	emp_id	first_name	last_name	salary	job_title	gender
2	49714	Hugo	Forrester	55000	IT Support Specialist	Male
3	67323	Lisa	Wiener	75000	Business Analyst	Female
4	70950	Rodney	Weaver	87000	Project Manager	Male
5	71329	Gayle	Meyer	77000	HR Manager	Female
6	76589	Jason	Christian	99000	Project Manager	Male
7	97927	Billie	Lanning	67000	Web Developer	Female

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## Slide 16

### ▶ Example

query :

```
1 SELECT 'Employees A' AS Type, emp_id, first_name, last_name, job_title
2   FROM employees_A
3 UNION ALL
4 SELECT 'Employees B' AS Type, emp_id, first_name, last_name, job_title
5   FROM employees_B;
```

output:

Type	emp_id	first_name	last_name	job_title
Employees A	17679	Robert	Elmoire	Operations Director
Employees A	18311	Eduardo	Ritchie	Sales Manager
Employees A	38848	David	Barrow	Data Scientist
Employees A	49714	Hugo	Forester	IT Support Specialist
Employees A	49714	Lisa	Foster	Data Scientist
Employees A	47323	Lisa	Wiener	Business Analyst
Employees B	49714	Hugo	Forester	IT Support Specialist
Employees B	49714	Lisa	Wiener	Business Analyst
Employees B	70958	Rodney	Weaver	Project Manager
Employees B	71329	Gayle	Meyer	HR Manager
Employees B	71329	Jean	Christian	Project Manager
Employees B	97927	Billie	Lanning	Web Developer

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## Slide 17

### Query Time



Question: List Customer's last names in Charlotte and Aurora.

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▶

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### Query Time For You

Question: Write a query that returns customers who first name is Thomas or last name is Thomas. (don't use 'OR')

Expected Output:

#	first_name	last_name
1	Thomas	Rogers
2	Thomas	Chan
3	Thomas	Jefferson
4	Thomas	Moore
5	Thomas	Eriksson
6	Thomas	Newman
7	Thomas	McDaniel
8	Thomas	Davis
9	Thomas	Wadd
10	Thomas	Little
11	James	Thomas
12	Lidia	Thomas
13	Hildegard	Thomas

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### 4 Intersect



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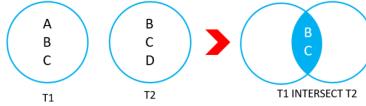
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## Slide 20

### ▶ Introduction



INTERSECT operator compares the result sets of two queries and returns distinct rows that are output by both queries.



Syntax

```
1 SELECT column1, column2, ...
2   FROM table_A
3 INTERSECT
4 SELECT column1, column2, ...
5   FROM table_B
```

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## Slide 21

### ▶ Sample Tables



"employees\_A" table:

1	emp_id	first_name	last_name	salary	job_title	gender
2	17679	Robert	Gilmore	110000	Operations Director	Male
3	26650	Elvis	Ritter	86000	Sales Manager	Male
4	30840	David	Barrow	85000	Data Scientist	Male
5	49714	Hugo	Forrester	55000	IT Support Specialist	Male
6	51821	Linda	Foster	95000	Data Scientist	Female
7	67323	Lisa	Wiener	75000	Business Analyst	Female

"employees\_B" table:

1	emp_id	first_name	last_name	salary	job_title	gender
2	49714	Hugo	Forrester	55000	IT Support Specialist	Male
3	67323	Lisa	Wiener	75000	Business Analyst	Female
4	70950	Rodney	Weaver	87000	Project Manager	Male
5	71329	Gayle	Meyer	77000	HR Manager	Female
6	76589	Jason	Christian	99000	Project Manager	Male
7	97927	Billie	Lanning	67000	Web Developer	Female

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## Slide 22

### ▶ Example



query:

```
1 SELECT emp_id, first_name, last_name, job_title
2   FROM employees_A
3  INTERSECT
4 SELECT emp_id, first_name, last_name, job_title
5   FROM employees_B
6  ORDER BY emp_id;
```

output:

	emp_id	first_name	last_name	job_title
1	49714	Hugo	Forrester	IT Support Specialist
2	67323	Lisa	Wiener	Business Analyst
3				
4				

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## Slide 23

### Query Time



Question: Write a query that returns brands that have products for both 2018 and 2019

Expected Output:

The screenshot shows a database query results window with the following data:

	brand_id	brand_name
1	1	Samsung
2	2	Apple
3	3	Sony
4	4	Logitech
5	5	Yamaha
6	6	Corsair
7	7	Jbl
8	8	Netgear
9	9	Sandisk
10	10	Asus
11	11	Razer
12	12	wd

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### Query Time For You

Question: Write a query that returns customers who have orders for all of 2018, 2019, and 2020

Expected Output:

#	first_name	last_name
1	Theresa	Schoenck
2	Elaine	Hold
3	Daren	Rollins
4	Petronia	Higgins
5	Gilbert	Brown
6	Tajana	Byers
7	Winnona	Chaplebaugh
8	Joshua	Mayo
9	Joewin	Centini
10	Ronald	Gilliam
11	Jerald	Berry
12	Elizabeth	Levy

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## Slide 25

### 5 Except



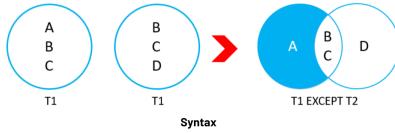
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## Slide 26

### ▶ Introduction

EXCEPT operator compares the result sets of the two queries and returns the rows of the previous query that differ from the next query.



Syntax

```
1 SELECT column1, column2, ...
2 FROM table_A
3 EXCEPT
4 SELECT column1, column2, ...
5 FROM table_B
```

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## Slide 27

### ▶ Sample Tables



\*employees\_A\* table:

1 emp_id	2 first_name	3 last_name	4 salary	5 job_title	6 gender
2 -----	3 Robert	4 Gilmore	5 110000	6 Operations Director	7 Male
3 17679	4 Elvis	5 Ritter	6 86000	7 Sales Manager	8 Male
4 26650	5 David	6 Barrow	7 85000	8 Data Scientist	9 Male
5 30840	6 Hugo	7 Forester	8 55000	9 IT Support Specialist	0 Male
6 49714	7 Linda	8 Foster	9 95000	0 Data Scientist	1 Female
7 51821	8 Lisa	9 Wiener	0 75000	1 Business Analyst	2 Female
8 67323					

\*employees\_B\* table:

1 emp_id	2 first_name	3 last_name	4 salary	5 job_title	6 gender
2 -----	3 Hugo	4 Foster	5 58000	6 IT Support Specialist	7 Male
3 49714	4 Linda	5 Wiener	6 75000	7 Business Analyst	8 Female
4 67323	5 Rodney	6 Weaver	7 87000	8 Project Manager	9 Male
5 70950	6 Gayle	7 Meyer	8 77000	9 HR Manager	0 Female
6 71329	7 Jason	8 Christian	9 99000	0 Project Manager	1 Male
7 76589	8 Billie	9 Lanning	0 67000	1 Web Developer	2 Female
8 97927					

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## Slide 28

### ▶ Example



query :

```
1 SELECT emp_id, first_name, last_name, job_title
2   FROM employees_A
3 EXCEPT
4 SELECT emp_id, first_name, last_name, job_title
5   FROM employees_B;
```

output:

emp_id	first_name	last_name	job_title
17679	Robert	Gilmore	Operations Director
26650	Elvis	Ritter	Sales Manager
30840	David	Barrow	Data Scientist
51821	Linda	Foster	Data Scientist

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## Slide 29

### Query Time



Question: Write a query that returns brands have a 2018 model product but not a 2019 model product.

Expected Output:

The screenshot shows a database results grid with two rows of data. The columns are labeled 'brand\_id' and 'brand\_name'. Row 1 contains '23' and 'DENAQ'. Row 2 contains '37' and 'Western Digital'. The grid has a header row and two data rows. The bottom right corner of the grid shows 'DESKTOP-J89HKO:DataSci... SampleRetail 00:00:00 | 2 rows'.

brand_id	brand_name
23	DENAQ
37	Western Digital

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## Slide 30

### Query Time For You

Question: Write a query that returns only products ordered in 2019 (not ordered in other years).

Expected Output:

	product_id	product_name
1	30	Sony Mini Digital Video Cassettes - DVC - 1 Hour
2	73	Logitech Focus Case with Integrated Keyboard for iPad ...
3	94	128GB iPod touch (Space Gray) (6th Generation)
4	83	Logitech Circle Black Portable WiFi Video Monitoring Ca...
5	74	32GB High Speed UHS-I SDHC U3 Memory Card (Class...

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### CASE Expression

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## Slide 33

### 1 ▶ Introduction

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## Slide 34

### Introduction

The **CASE** expression evaluates a list of conditions and returns a value when the first condition is met.

The CASE expression is similar to the **IF-ELSE** statement in other programming languages.

There are two kinds of **CASE** expression:

- **Simple CASE**
- **Searched CASE**

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## Slide 35



### 2 Simple CASE Expression

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## Slide 36

### Simple CASE Expression

#### Syntax

```
1 CASE case_expression
2 WHEN when_expression_1 THEN result_expression_1
3 WHEN when_expression_1 THEN result_expression_1
4 ...
5 [ ELSE else_result_expression ]
6 END
7 |
```

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## Slide 37

### Simple CASE Expression

department table

	id	name	dept_name	salary
1	10238	Doris	Economics	72000
2	11379	Karl	Music	42000
3	21491	Jason	Philosophy	40000
4	26299	Jane	Computer Science	91000
5	30764	Jack	Economics	68000
6	40307	Brian	Psychology	76000
7	42027	Brain	Math	55000
8	53053	Richard	Philosophy	54000
9	58248	Joseph	Political Science	58000
10	61312	David	Art History	65000
11	64370	Elias	Physics	87000
12	66440	John	Computer Science	80000
13	95211	Santosh	Computer Science	74000

query:

```
1 SELECT dept_name,
2 CASE dept_name,
3 WHEN 'Computer Science' THEN 'IT'
4 ELSE 'Others'
5 END AS category
6 FROM department;
```

output:

```
1 dept_name category
2 ..... .....
3 Economics others
4 Mathematics others
5 Music others
6 Philosophy others
7 IT IT
8 Economics others
9 Psychology others
10 Physics others
11 Political Science others
12 Art History others
13 Computer Science others
14 Computer S IT
15 Computer S IT
16 |
```

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## Slide 38

### Query Time

Question: Generate a new column containing what the mean of the values in the Order\_Status column.

1 = Pending; 2 = Processing; 3 = Rejected; 4 = Completed

Expected Output:

	order_id	order_status	order_status_desc
1	1	4	Completed
2	2	4	Completed
3	3	4	Completed
4	4	4	Completed
5	5	4	Completed
6	6	4	Completed
7	7	4	Completed
8	8	4	Completed
9	9	4	Completed
10	10	4	Completed

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## Slide 39

### Query Time For You

Question: Add a column to the sale.staff table containing the store names of the employees.

1 = Davi techno Retail; 2 = The BFLO Store; 3 = Burkes Outlet

Expected Output:

	first_name	last_name	store_id	Store_name
1	James	Garcia	1	Davi techno Retail
2	Charles	Ortiz	1	Davi techno Retail
3	Urgel	Santamento	1	Davi techno Retail
4	Davis	Thomas	1	Davi techno Retail
5	Williams	Destrey	2	The BFLO Store
6	Barbara	Rodriguez	2	The BFLO Store
7	Taylor	Mango	2	The BFLO Store
8	Elizabeth	Island	3	Burkes Outlet
9	Brown	Jackson	3	Burkes Outlet

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## Slide 40

### 3 Searched CASE Expression

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## Slide 41

### Searched CASE Expression

#### Syntax

```
1 CASE
2 WHEN condition_1 THEN result_1
3 WHEN condition_2 THEN result_2
4 WHEN condition_N THEN result_N
5 [ ELSE result ]
6 END
7 |
```

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Use this space to take notes:

## Slide 42

### Searched CASE Expression

query:

department table			
ID	Name	Dept_Name	Salary
1	10239 Eric	Economics	72000
2	11238 Karl	Music	42000
3	21491 Jason	Philosophy	45000
4	25291 Jane	Computer Science	91000
5	30746 Jack	Economics	68000
6	40284 Mary	Psychology	78000
7	50109 Tom	Math	85000
8	53091 Richard	Philosophy	54000
9	58240 Joseph	Political Science	58000
10	61317 David	Art History	65000
11	64370 Elvis	Physics	87000
12	66945 John	Computer Science	80000
13	99221 Senthil	Computer Science	74000

query:

```
1 SELECT first_name, last_name,
CASE
    WHEN salary < 55000 THEN 'Low'
    WHEN salary > 55000 AND salary < 80000 THEN 'Middle'
    WHEN salary >= 80000 THEN 'High'
END AS category
FROM employees;
```

output:

first_name	last_name	category
Robert	Gilmore	High
Robert	Ritter	High
Elvis	Ritter	High
Elvis	Barker	High
Hugo	Forester	Low
Linda	Foster	High
Linda	Wong	Middle
Rodney	Weaver	High
Gayle	Meyer	Middle
Gayle	Christian	High
Billie	Lanning	Middle

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Use this space to take notes:

## Slide 43

### Query Time



Question: Generate a new column containing what the mean of the values in the Order\_Status column. (use searched case ex.)

1 = Pending; 2 = Processing; 3 = Rejected; 4 = Completed

Expected Output:

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	order_id	order_status	order_status_desc
1	1	4	Completed
2	2	4	Completed
3	3	4	Completed
4	4	4	Completed
5	5	4	Completed
6	6	4	Completed
7	7	4	Completed
8	8	4	Completed
9	9	4	Completed
10	10	4	Completed

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## Slide 44

### Query Time For You

Question: Create a new column containing the labels of the customers' email service providers ("Gmail", "Hotmail", "Yahoo" or "Other")

Expected Output:

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	first_name	last_name	email	email_service_provider
1	Diane	Flosi	DianeFlosi@msn.com	Other
2	Nana	Gaines	NanaGaines@msn.com	Other
3	Teddy	Hoff	TeddyHoff@hotmail.com	Hotmail
4	Nicolas	Garrison	NicolasGarrison@express.com	Other
5	Tessie	Mullen	TessieMullen@aol.com	Other
6	Cyril	Kohl	CyrilKohl@msn.com	Other
7	William	Williams	WilliamWilliams@gmail.com	Gmail
8	Elizabeth	Levy	ElizabethLevy@yahoo.com	Yahoo



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## Slide 45

### Query Time For You

Question: List customers who ordered products in the computer accessories, speakers, and mp4 player categories in the same order.

Expected Output:

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	first_name	last_name
1	Eduardo	Shesty
2	Gail	Pitts
3	Rima	Miller
4	Carita	Foreman
5	Charles	Ruta
6	Cira	Lane
7	Tamar	Schultz
8	Rosanne	Updike
9	William	Jackson
10	Charles	Lawrence
11	Rosalie	Lepage
12	Ressie	Martinez



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## Slide 46

### Query Time

Question: Create a new column that contains labels of the shipping speed of products.

1. If the product has not been shipped yet, it will be marked as "Not Shipped".
2. If the product was shipped on the day of order, it will be labeled as "Fast".
3. If the product is shipped no later than two days after the order day, it will be labeled as "Normal"
4. If the product was shipped three or more days after the day of order, it will be labeled as "Slow".



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order_id	customer_id	order_status	order_date	required_date	shipped_date	store_id	staff_id	ORDER_LABEL	
166	1612	3	2020-10-21	2020-10-21	NULL	1	3	Not Shipped	
167	1613	1	3	2020-11-10	2020-11-10	NULL	2	6	Not Shipped
168	1614	135	3	2020-11-28	2020-11-28	NULL	3	8	Not Shipped
169	1615	89	3	2020-12-05	2020-12-05	NULL	3	9	Not Shipped
170	1407	18	3	2020-02-28	2020-02-28	NULL	2	6	Not Shipped
171	98	119	4	2018-02-28	2018-02-28	2018-02-28	2	6	Fast
172	100	129	4	2018-03-01	2018-03-01	NULL	2	7	Normal
173	105	306	4	2018-03-01	2018-03-05	2018-03-04	3	9	Normal
174	106	422	4	2018-03-04	2018-03-05	2018-03-05	2	6	Normal
175	108	12	4	2018-03-06	2018-03-09	2018-03-07	2	6	Normal

Use this space to take notes:

## Slide 47

### Query Time For You

Question: Write a query that returns the number distributions of the orders in the previous query result, according to the days of the week.

Expected Output:

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1	71	79	82	47	62	61	61

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## Slide 48

### Your Response

## Slide 48

## Your Response

Is everything clear so far?

Students choose an option

Peer Deck Interactive Slide  
Do not remove this bar

Use this space to take notes:

## Slide 49

**THANKS!**  
**Any questions?**

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