

SQL2

Pear Deck Session
Training Clarusway
Pear Deck - June 22, 2022 at 11:02AM

Part 1 - Summary

Use this space to summarize your thoughts on the lesson

Part 2 - Responses

Slide 1



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Table of Contents



- ▶ What are type of Aggregate Functions, why do we need them?
- ▶ Group By Clause
- ▶ What are type of Joins in SQL, why do we need them

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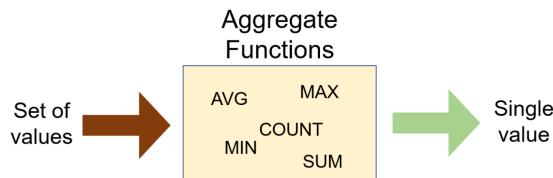
Aggregate Functions

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► What is an aggregate function? ➤



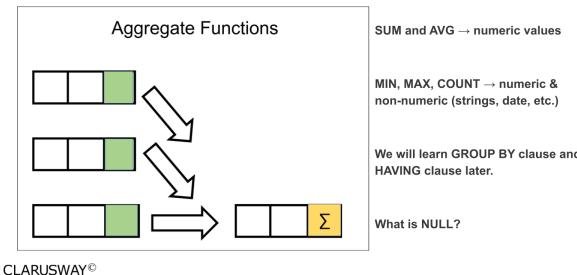
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► What is an aggregate function? ➤



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What is NULL?

NULL means no data and is a special value in SQL.
It shows us that a piece of information is unknown or missing or not applicable.

TrackId	Name	AlbumId	MediaTypeId	GenreId	Composer
1	For Those About To Rock (We Salute...)	1	1	1	Angus Young, Malcolm Young, Brian ...
2	Balls to the Wall	2	2	1	NULL
3	Fast As a Shark	3	2	1	F. Baltes, S. Kaufman, U. Dirksmeide...
4	Restless and Wild	3	2	1	F. Baltes, R.A. Smith-Diesel, S. ...
5	Princess of the Dawn	3	2	1	Deafly & R.A. Smith-Diesel
6	Put The Finger On You	1	1	1	Angus Young, Malcolm Young, Brian ...
7	Let's Get It Up	1	1	1	Angus Young, Malcolm Young, Brian ...

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- NULL value represents the unknown value or missing value or not applicable.
- NULL is not equal to zero or empty string.
- NULL is not equal to itself.



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► COUNT Function

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► COUNT Function



We use **COUNT** function to count the numbers of records (a.k.a row) in a table.

Syntax

```
1 SELECT COUNT(column_name)
2 FROM table_name;
3 |
```



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► COUNT Function

How many students have enrolled the courses?

student_id	first_name	last_name	Gender	State	Address	Enroll Date
1	LORI	Mel	Female	P	West Virginia	20/01/10
2	CLARUS	Dale	Male	P	West Virginia, Tucker	20/01/12
3	CLARUS	Mark	Male	P	West Virginia, Tucker	20/04/12
4	CLARUS	Angela	Female	P	West Virginia, Tucker	20/04/12
5	CLARUS	Heath	Male	P	West Virginia, Tucker	20/04/12
6	CLARUS	Morgan	Male	M	Virginia, Roanoke Valley	20/08/08
7	CLARUS	Richard	Male	M	Virginia, Roanoke Valley	20/08/08
8	CLARUS	Julie	Female	M	Virginia, Roanoke Valley	20/08/08
9	CLARUS	Paul	Male	M	Virginia, Roanoke Valley	20/08/08
10	CLARUS	David	Male	M	Virginia, Roanoke Valley	20/08/08
11	CLARUS	Steve	Male	M	Virginia, Roanoke Valley	20/08/08
12	CLARUS	Tom	Male	M	Virginia, Roanoke Valley	20/08/08
13	CLARUS	Bill	Male	M	Virginia, Roanoke Valley	20/08/08
14	CLARUS	Tucker	Male	M	Virginia, Roanoke Valley	20/08/08
15	CLARUS	Mike	Male	M	Virginia, Roanoke Valley	20/08/08
16	CLARUS	John	Male	M	Virginia, Roanoke Valley	20/08/08
17	CLARUS	Sam	Male	M	Virginia, Roanoke Valley	20/08/08
18	CLARUS	Tom	Male	M	Virginia, Roanoke Valley	20/08/08
19	CLARUS	Bill	Male	M	Virginia, Roanoke Valley	20/08/08
20	CLARUS	Tucker	Male	M	Virginia, Roanoke Valley	20/08/08
21	CLARUS	Mike	Male	M	Virginia, Roanoke Valley	20/08/08
22	CLARUS	John	Male	M	Virginia, Roanoke Valley	20/08/08
23	CLARUS	Sam	Male	M	Virginia, Roanoke Valley	20/08/08
24	CLARUS	Angela	Female	M	Virginia, Roanoke Valley	20/08/08

query :

```
1 SELECT COUNT(first_name)
```

```
2 FROM student_info;
```

Output :

```
1 COUNT(first_name)
```

```
2 -----
```

```
3 59
```

```
4
```



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► COUNT Function

There is another special character returning the number of rows in a table. That is * character. Use it inside the COUNT function as COUNT(*) .



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► COUNT Function



An important point for `COUNT(*)` function is that the result table includes `NULL`. If you want the number of non-null values, use the syntax:
`COUNT(column_name)`.

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► AS (Alias) Keyword

We can customize the column name or table name using `AS` keyword. `AS` is used to rename a column or table with an alias.

This is the syntax for aliasing a column name:
`column_name [AS] alias_name`

This is the syntax for aliasing a table name:
`table_name [AS] alias_name`

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► AS (Alias) Keyword



AS keyword is optional. Most programmers specify the AS keyword when aliasing a column name, but not when aliasing a table name.

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► Query Time

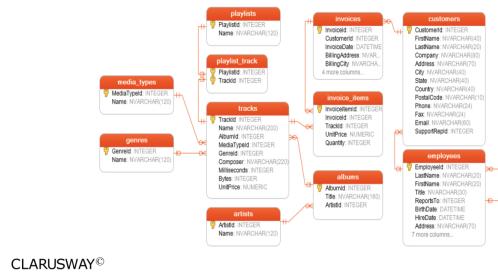


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How many invoices are in the digital music store?



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3 COUNT DISTINCT

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► COUNT DISTINCT

In some cases, we may want unique values. In those cases, we use COUNT DISTINCT function.

Syntax

COUNT (DISTINCT column_name)

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► COUNT DISTINCT

How many unique fields are there in the student_info table?

student_info table						
#	student_id	first_name	last_name	gender	marks	country
1	LE0001	Micheal	Outfield	M	Highgate	Australia
2	LE0002	Shira	Judd	F	West Virginia	USA
3	LE0003	Amber	Adams	M	Highgate	Australia
4	LE0004	Wesley	King	F	West Virginia	USA
5	LE0005	Megan	King	F	West Virginia	USA
6	LE0006	Micheal	Outfield	M	Highgate	Australia
7	LE0007	Amber	Adams	M	Highgate	Australia
8	LE0008	Wesley	King	F	West Virginia	USA
9	LE0009	Megan	King	F	West Virginia	USA
10	LE0010	Amber	Adams	M	Highgate	Australia
11	LE0011	Wesley	King	F	West Virginia	USA
12	LE0012	Micheal	Outfield	M	Highgate	Australia
13	LE0013	Amber	Adams	M	Highgate	Australia
14	LE0014	Wesley	King	F	West Virginia	USA
15	LE0015	Megan	King	F	West Virginia	USA
16	LE0016	Amber	Adams	M	Highgate	Australia
17	LE0017	Wesley	King	F	West Virginia	USA
18	LE0018	Micheal	Outfield	M	Highgate	Australia
19	LE0019	Amber	Adams	M	Highgate	Australia
20	LE0020	Wesley	King	F	West Virginia	USA
21	LE0021	Megan	King	F	West Virginia	USA
22	LE0022	Amber	Adams	M	Highgate	Australia
23	LE0023	Wesley	King	F	West Virginia	USA
24	LE0024	Micheal	Outfield	M	Highgate	Australia
25	LE0025	Amber	Adams	M	Highgate	Australia
26	LE0026	Wesley	King	F	West Virginia	USA
27	LE0027	Megan	King	F	West Virginia	USA
28	LE0028	Amber	Adams	M	Highgate	Australia
29	LE0029	Wesley	King	F	West Virginia	USA
30	LE0030	Micheal	Outfield	M	Highgate	Australia
31	LE0031	Amber	Adams	M	Highgate	Australia
32	LE0032	Wesley	King	F	West Virginia	USA
33	LE0033	Megan	King	F	West Virginia	USA
34	LE0034	Amber	Adams	M	Highgate	Australia
35	LE0035	Wesley	King	F	West Virginia	USA
36	LE0036	Micheal	Outfield	M	Highgate	Australia
37	LE0037	Amber	Adams	M	Highgate	Australia
38	LE0038	Wesley	King	F	West Virginia	USA
39	LE0039	Megan	King	F	West Virginia	USA
40	LE0040	Amber	Adams	M	Highgate	Australia
41	LE0041	Wesley	King	F	West Virginia	USA
42	LE0042	Micheal	Outfield	M	Highgate	Australia
43	LE0043	Amber	Adams	M	Highgate	Australia
44	LE0044	Wesley	King	F	West Virginia	USA
45	LE0045	Megan	King	F	West Virginia	USA
46	LE0046	Amber	Adams	M	Highgate	Australia
47	LE0047	Wesley	King	F	West Virginia	USA
48	LE0048	Micheal	Outfield	M	Highgate	Australia
49	LE0049	Amber	Adams	M	Highgate	Australia
50	LE0050	Wesley	King	F	West Virginia	USA
51	LE0051	Megan	King	F	West Virginia	USA
52	LE0052	Amber	Adams	M	Highgate	Australia
53	LE0053	Wesley	King	F	West Virginia	USA
54	LE0054	Micheal	Outfield	M	Highgate	Australia
55	LE0055	Amber	Adams	M	Highgate	Australia
56	LE0056	Wesley	King	F	West Virginia	USA
57	LE0057	Megan	King	F	West Virginia	USA
58	LE0058	Amber	Adams	M	Highgate	Australia
59	LE0059	Wesley	King	F	West Virginia	USA
60	LE0060	Micheal	Outfield	M	Highgate	Australia
61	LE0061	Amber	Adams	M	Highgate	Australia
62	LE0062	Wesley	King	F	West Virginia	USA
63	LE0063	Megan	King	F	West Virginia	USA
64	LE0064	Amber	Adams	M	Highgate	Australia
65	LE0065	Wesley	King	F	West Virginia	USA
66	LE0066	Micheal	Outfield	M	Highgate	Australia
67	LE0067	Amber	Adams	M	Highgate	Australia
68	LE0068	Wesley	King	F	West Virginia	USA
69	LE0069	Megan	King	F	West Virginia	USA
70	LE0070	Amber	Adams	M	Highgate	Australia
71	LE0071	Wesley	King	F	West Virginia	USA
72	LE0072	Micheal	Outfield	M	Highgate	Australia
73	LE0073	Amber	Adams	M	Highgate	Australia
74	LE0074	Wesley	King	F	West Virginia	USA
75	LE0075	Megan	King	F	West Virginia	USA
76	LE0076	Amber	Adams	M	Highgate	Australia
77	LE0077	Wesley	King	F	West Virginia	USA
78	LE0078	Micheal	Outfield	M	Highgate	Australia
79	LE0079	Amber	Adams	M	Highgate	Australia
80	LE0080	Wesley	King	F	West Virginia	USA
81	LE0081	Megan	King	F	West Virginia	USA
82	LE0082	Amber	Adams	M	Highgate	Australia
83	LE0083	Wesley	King	F	West Virginia	USA
84	LE0084	Micheal	Outfield	M	Highgate	Australia
85	LE0085	Amber	Adams	M	Highgate	Australia
86	LE0086	Wesley	King	F	West Virginia	USA
87	LE0087	Megan	King	F	West Virginia	USA
88	LE0088	Amber	Adams	M	Highgate	Australia
89	LE0089	Wesley	King	F	West Virginia	USA
90	LE0090	Micheal	Outfield	M	Highgate	Australia
91	LE0091	Amber	Adams	M	Highgate	Australia
92	LE0092	Wesley	King	F	West Virginia	USA
93	LE0093	Megan	King	F	West Virginia	USA
94	LE0094	Amber	Adams	M	Highgate	Australia
95	LE0095	Wesley	King	F	West Virginia	USA
96	LE0096	Micheal	Outfield	M	Highgate	Australia
97	LE0097	Amber	Adams	M	Highgate	Australia
98	LE0098	Wesley	King	F	West Virginia	USA
99	LE0099	Megan	King	F	West Virginia	USA
100	LE0100	Amber	Adams	M	Highgate	Australia

input:

```
1 SELECT COUNT(DISTINCT field) AS count_of_field  
FROM student_info;
```

3

output:

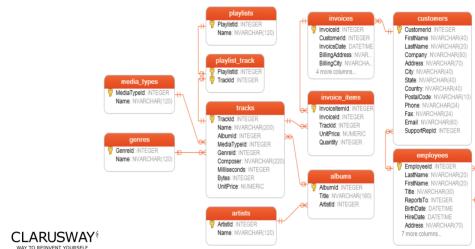
```
2 count_of_field  
3 6
```

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How many composers are there in the digital music store?



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MIN and MAX

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► MIN Function



MIN function returns the minimum value in the selected column. The MIN function ignores the NULL values.

Syntax

```
1 SELECT MIN(column_name)
2 FROM table_name;
3
```

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► MIN Function



Who gets paid the lowest wage in the company?

emp_id	first_name	last_name	salary	job_title	gender	hire_date
28650	Eduis	Ritter	86000	Sales Manager	Male	11/24/2017
70950	Reiley	Weaver	87000	Product Manager	Male	12/20/2018
97977	Bible	Lentz	87000	Web Developer	Female	6/25/2018
67303	Lisa	Wane	76000	Analyst	Female	6/9/2018
17679	Robert	Gilmore	110000	CEO	Male	6/4/2018
76889	Jean	Christie	99000	Project Manager	Male	1/21/2019
51871	Linda	Foster	95000	Data Scientist	Female	4/29/2019
71320	Gayle	Meyer	77000	IT Support Specialist	Female	6/26/2019
49714	Hugo	Forster	55000	IT Support Specialist	Male	11/22/2018
30840	David	Barrow	85000	Data Scientist	Male	12/2/2019

query :

```
1 SELECT MIN(salary) AS lowest_salary
2 FROM employees;
```

output :

```
1 lowest_salary
2 -----
3 55000
4
```

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► MIN Function

What is the earliest hired employee's date?

emp_id	first_name	last_name	salary	job_title	gender	hire_date
28650	Evelyn	Ritter	86000	Sales Manager	Male	11/24/2017
70950	Rodney	Weaver	87000	Project Manager	Male	12/20/2018
97927	Bible	Leving	87000	Web Developer	Female	8/25/2018
67223	Lisa	Werner	76500	Software Analyst	Female	8/9/2018
17679	Robert	Glover	110000	General Director	Male	9/4/2018
76849	Jean	Christian	98000	Project Manager	Male	1/21/2019
51821	Linda	Foster	95000	Data Scientist	Female	4/28/2019
73259	Gayle	Meyer	77000	HR Manager	Female	6/28/2019
49714	Hugo	Forster	55000	Research Specialist	Male	11/22/2019
30840	David	Barlow	85000	Data Scientist	Male	12/2/2019

```
query :
1 SELECT MIN(hire_date) AS earliest_date
2 FROM employees;
3
```

output :

```
1 earliest_date
2 -----
3 2017-11-24
4
```

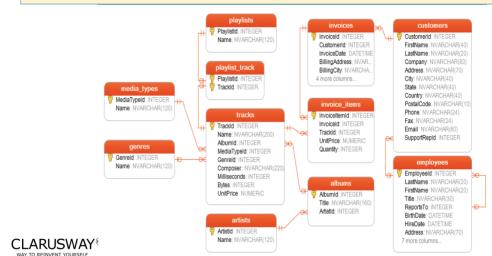
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Find the track name having the minimum duration.



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► MAX Function

MAX function returns the maximum value in the selected column.

Syntax

```
1 SELECT MAX(column_name)
2 FROM table_name;
3 |
```



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► MAX Function



What is the highest wage in the company?

emp_id	first_name	last_name	salary	job_title	gender	hire_date
28550	Ehls	Ritter	86000	Sales Manager	Male	11/24/2013
70950	Rodney	Weaver	87000	Project Manager	Male	12/20/2016
97927	Billie	Lanning	87000	Web Developer	Female	6/25/2016
87323	Lita	Werner	76000	Analyst	Female	8/8/2018
17974	Robert	Glimore	110000	General Manager	Male	8/4/2018
19599	Jean	Christien	96000	Project Manager	Male	1/21/2019
51821	Linda	Foster	95000	Software Engineer	Female	4/26/2019
71320	Gayle	Meyer	77000	HR Manager	Female	6/26/2019
49711	Hugo	Forster	55000	IT Support Specialist	Male	11/22/2016
30840	David	Barrow	85000	Data Scientist	Male	12/2/2019

query :

```
1 SELECT MAX(salary) AS highest_salary
2 FROM employees;
3 |
```

output :

```
1 highest_salary
2 -----
3 110000
```



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Slide 28

Find the track name having the maximum duration.



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SUM and AVG

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► SUM Function



SUM function returns the sum of a numeric column.

Syntax

```
1 SELECT SUM(column_name)
2 FROM table_name;
3
```

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► SUM Function



What is total amount salary of the employees?

emp_id	First name	Last name	salary	Job title	gender	hire date
29550	Elvis	Ritter	86000	Sales Manager	Male	11/24/2011
79940	Ridley	Weaver	87000	Project Manager	Male	12/20/2010
97972	Belle	Lamont	67000	Analyst	Female	6/25/2010
47220	Iba	Fowler	76000	Business	Female	10/10/2010
78770	Robert	Garrison	110000	Operations Director	Male	8/4/2010
76560	Christen	Christian	86000	Project Manager	Male	1/21/2010
51481	Lindy	Foster	86000	Data Architect	Female	4/7/2010
71320	Gayle	Meyer	77000	HR Manager	Female	6/28/2010
49114	Hugo	Forster	66000	IT Support Specialist	Male	11/22/2010
39840	David	Greene	85000	Sales Scientist	Male	12/2/2010

query:

```
1 SELECT SUM(salary) AS total_salary
2 FROM employees;
```

output:

```
1 total_salary
2 -----
3 836000
4
```

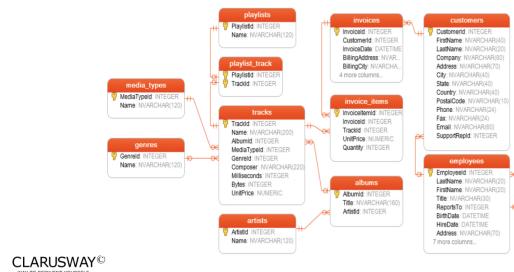
SELECT SUM(salary) as male_salary
FROM empless
WHERE gender='Male'

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How much money did our store earn?



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2 min Query Challenge:

How many distinct years in the invoices table?

Show your googling skills and build the query yourself

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▶ AVG Function

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▶ AVG Function



AVG function calculates the average of a numeric column.

Syntax

```
1 SELECT AVG(column_name)
2 FROM table_name;
3
```



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► AVG Function

What is the average salary of the employees?

emp_id	first_name	last_name	salary	job_title	gender	hire_date
26601	Eduardo	Ritter	86000	Sales Manager	Male	1/12/2016
70660	Rodney	Weaver	87000	Project Manager	Male	1/22/2016
31927	Billie	Levering	67000	Web Developer	Female	6/25/2019
61323	Lisa	Werner	76000	Business Analyst	Female	8/9/2011
11679	Robert	Olmos	110000	Regional Manager	Male	9/4/2011
16649	Jean	Christiaan	99000	Product Manager	Male	1/21/2019
51827	Linda	Foster	96000	Data Scientist	Female	4/29/2019
71329	Gayle	Meyer	77000	IT Manager	Female	6/28/2019
49714	Hugo	Forster	55000	Specialist	Male	11/22/2019
30840	David	Borrows	85000	Data Scientist	Male	12/2/2019

query:

```
1 SELECT AVG(salary) AS average_salary
```

```
2 FROM employees;
```

```
3
```

```
4 output:
```

```
1 average_salary
```

```
2 -----
```

```
3 83680.0
```

```
4
```

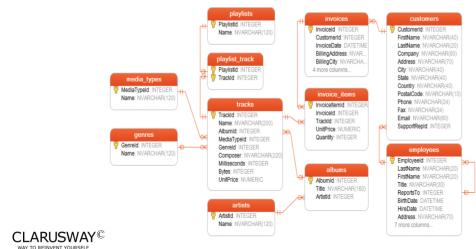
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Find the tracks having duration bigger than the average duration.



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1 ▶ GROUP BY Clause

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▶ GROUP BY Clause



The **GROUP BY** clause groups the rows into summary rows. It returns one value for each group and is typically used with aggregate functions (COUNT, MAX, MIN, SUM, AVG).

	Gender	COUNT(Gender)	→ 4
	Male	COUNT(Gender) WHERE Gender = 'Male'	→ 2
	Female	COUNT(Gender) WHERE Gender = 'Female'	→ 2
	Female	COUNT(Gender) WHERE Gender = 'Female'	→ 2

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► GROUP BY Clause

Syntax

```
1 SELECT column_1, aggregate_function(column_2)
2 FROM table_name
3 GROUP BY column_1;
4
```

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► GROUP BY Clause



- GROUP BY returns only one result per group of data.
- GROUP BY Clause always follows the WHERE Clause.
- GROUP BY Clause always precedes the ORDER BY.

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► GROUP BY with COUNT Function

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► GROUP BY with COUNT Function



What is the number of employees per gender?

query:

1	SELECT	gender	,	COUNT	(gender)
2	FROM	employees			
3	GROUP	BY	gender;		
4					

output:

1	gender	COUNT(gender)
2	-----	-----
3	Female	5
4	Male	6
5		



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► GROUP BY Clause

The GROUP BY clause groups results before calling the aggregate function. This allows you to apply aggregate function to groups than the entire query.

gender
Male
Female
Female
Female
Female

gender	COUNT(gender)
Male	6
Female	4

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► GROUP BY with COUNT Function

What is the number of employees working as a data scientist broken by gender?

query:

```
1: SELECT gender, COUNT(job_title)
2: FROM employees
3: WHERE job_title = 'Data Scientist'
4: GROUP BY gender;
5: 
```

Output:

```
1: gender      COUNT(job_title)
2: ----- -----
3: Female       1
4: Male        1
5: 
```

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► GROUP BY Clause



- WHERE clause operates on the data before the aggregation.
- WHERE clause happens before the GROUP BY clause.
- Only the rows that meet the conditions in the WHERE clause are grouped.

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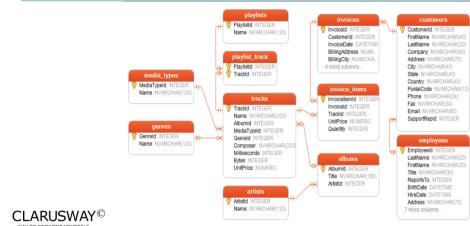
► Query Time



Use this space to take notes:

Slide 48

Find the total number of each composer's track.
Your result will include name of the composer
and number.



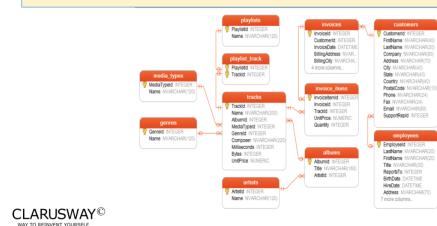
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Use this space to take notes:

Slide 49

How many customers do we have from each country? Your result will include name of the country and number.



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Slide 50



GROUP BY with MIN&MAX Functions

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Use this space to take notes:

Slide 51

► GROUP BY with MIN&MAX Functions ➤

Let's find the minimum salaries of each gender group using the **MIN** function.

Employee ID	First Name	Last Name	Job Title	Salary	Gender	Hire Date
28610	Laura	Pittner	Sales Manager	86000	Male	11/24/2001
70950	Rodney	Weaver	Sales Manager	87000	Male	12/20/2018
87927	Billie	Lanning	Web Developer	87000	Female	6/25/2018
67223	Lita	Winer	Business Development	76000	Female	8/9/2018
17679	Robert	Gilmores	Operations	110000	Male	8/4/2018
76589	Jean	Christian	Project Manager	96000	Male	1/21/2019
51821	Linda	Fester	Data Scientist	95000	Female	4/29/2019
71329	Oswy	Mayer	HR Manager	77000	Female	6/28/2019
49714	Hugo	Forster	IT Support Specialist	55000	Male	11/22/2018
30940	David	Barrow	Data Scientist	85000	Male	12/2/2019

query:

```
1 SELECT gender, MIN(salary) AS min_salary  
2 FROM employees  
3 GROUP BY gender;
```

OUTPUT

1	gender	min_salary
2	Female	67000
3	Male	55000
4



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Slide 52

► GROUP BY with MIN&MAX Functions ➤

Similarly, we can find the maximum salaries of each group using the `MAX` function. You may also use the `ORDER BY` clause to sort the salaries in descending or ascending order. The `ORDER BY` follows `GROUP BY`. For instance, sort the maximum salaries in descending order.

emp_id	first_name	last_name	salary	job_title	gender	hire_date
28650	Elvis	Kitter	86000	Sales Manager	Male	11/24/2017
70950	Rodney	Weaver	87000	Project Manager	Male	12/20/2018
97977	Billie	Lannin	87000	Web Developer	Female	6/25/2018
67223	Lita	Wine	76000	Analyst	Female	8/9/2018
17871	Robert	Glimore	110000	Operations Director	Male	6/4/2018
76549	Jean	Christian	99000	Project Manager	Male	1/21/2019
51821	Linda	Foster	95000	Data Architect	Female	4/29/2019
71220	Grady	Meyer	77000	Marketing Manager	Female	6/28/2019
49714	Hugo	Forrester	56000	IT Support Specialist	Male	11/22/2018
30840	David	Barrow	85000	Data Scientist	Male	10/2/2019

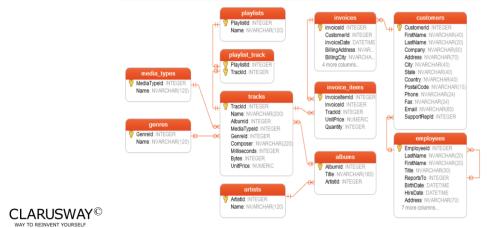
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Slide 53

Find the minimum duration of track for each album. Your result will include album id and min duration.



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► GROUP BY with SUM&AVG Functions

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Use this space to take notes:

Slide 55

► GROUP BY with SUM&AVG Functions ➤

Let's calculate the total salaries of each group (gender).

emp_id	first_name	last_name	salary	job_title	gender	hire_date
26650	Evelyn	Ritter	86000	Sales Manager	Male	11/24/2017
70950	Rodney	Wasser	87000	Project Manager	Male	12/20/2018
97927	Bible	Lannan	67000	Web Developer	Female	6/25/2018
87223	Lisa	Winer	76000	Business Analyst	Female	8/9/2018
17679	Robert	Glimore	110000	Operations Manager	Male	9/4/2018
76569	Jasen	Christian	99000	Project Manager	Male	1/21/2019
51821	Linda	Foster	95000	Data Scientist	Female	4/29/2019
71329	Gayle	Meyer	77000	HR Manager	Female	8/28/2019
49714	Hugo	Forster	55000	IT Support Specialist	Male	11/22/2018
30940	David	Berryew	85000	Data Scientist	Male	12/2/2019

query:
1 SELECT gender, SUM(salary) AS total_salary
2 FROM employees
3 GROUP BY gender;

output:
1 gender total_salary
2 _____
3 Female 314000
4 Male 522000
5

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Slide 56

► GROUP BY with SUM&AVG Functions ➤

Similarly, we can find the average salaries of each group using the **AVG** function.

emp_id	First Name	Last Name	Salary	Job Title	Gender	Hire Date
29850	Eduardo	Richter	86000	Sales Manager	Male	11/24/2011
70950	Rodney	Weaver	87000	Project Manager	Male	12/20/2010
87927	Belle	Lentz	87000	Web Developer	Female	6/25/2018
87323	Lisa	Werner	76500	Business Development	Female	8/9/2018
17679	Robert	Gleeson	110000	Operations Manager	Male	5/4/2018
76589	Jason	Christian	99000	Project Manager	Male	1/21/2019
51821	Linda	Foster	95000	Data Scientist	Female	4/29/2019
71329	Gayle	Meyer	77000	HR Manager	Female	6/28/2019
49714	Hugo	Forster	85000	IT Support	Male	11/22/2016
30840	David	Barreiro	85000	Data Scientist	Male	12/2/2019

QUERY:

```
1 SELECT gender, AVG(salary) AS average_salary
```

```
2 FROM employees
```

```
3 GROUP BY gender;
```

output:

```
1 gender: average_salary
```

```
2 -----
```

```
3 Female: 75800.0
```

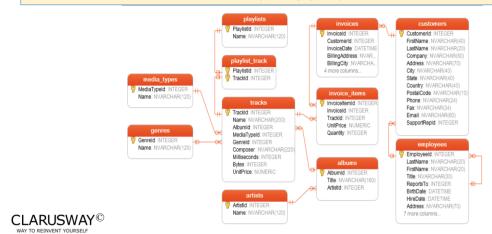
```
4 Male: 87800.0
```

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Slide 57

Find the total amount of invoice for each country.
Your result will include country name and total amount.



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Slide 58



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Slide 59



**A SQL query walks up to two
tables in a restaurant and asks:
“Mind if I join you?”**

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Slide 60

Table of Contents ➤

- ▶ Introduction
- ▶ JOIN Types
- ▶ Inner JOIN
- ▶ Left JOIN

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Use this space to take notes:

Slide 61



1 ➤ Introduction

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Slide 62

▶ Introduction



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

Joins are usually applied based on the keys that define the relationship between those tables or on common fields.

Use this space to take notes:

Slide 63

▶ Introduction



! In most cases joins are created using the primary key of one table and the foreign key of the table we want to join it with.

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Slide 64



2 JOIN Types

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▶ JOIN Types



- **INNER JOIN:** Returns the common records in both tables.
- **LEFT OUTER JOIN:** Returns all records from the left table and matching records from the right table.
- **RIGHT OUTER JOIN:** Returns all records from the right table and matching records from the left table.
- **FULL OUTER 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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Slide 66



3 ▶ INNER JOIN

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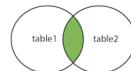
Use this space to take notes:

Slide 67

▶ INNER JOIN



INNER JOIN is the most common type of JOINS. The INNER JOIN selects records that have matching values in both tables. INNER keyword is optional for this type of JOIN.



Syntax

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

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Slide 68



students

name	exam	score
John	SQL	75
Mary	AWS	80
Clark	Python	60

tests

exam	passing_score
SQL	70
AWS	80
Python	70
Network	60

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Use this space to take notes:

Slide 69



```
SELECT students.name, students.exam,  
       students.score, tests.passing_score  
FROM students  
INNER JOIN tests ON students.exam = tests.exam;
```

students

name	exam	score
John	SQL	75
Mary	AWS	80
Clark	Python	60

tests

exam	passing_score
SQL	70
AWS	80
Python	70
Network	60

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Use this space to take notes:

Slide 70

```
SELECT students.name, students.exam,  
       students.score, tests.passing_score  
FROM students  
INNER JOIN tests ON students.exam = tests.exam;
```

students			tests	
name	exam	score	exam	passing_score
John	SQL	75	SQL	70
Mary	AWS	80	AWS	80
Clark	Python	60	Python	70
			Network	60

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Use this space to take notes:

Slide 71

```
SELECT students.name, students.exam,  
       students.score, tests.passing_score  
FROM students  
INNER JOIN tests ON students.exam = tests.exam;
```

students			tests	
name	exam	score	exam	passing_score
John	SQL	75	SQL	70
Mary	AWS	80	AWS	80
Clark	Python	60	Python	70
			Network	60

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Use this space to take notes:

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```
SELECT students.name, students.exam,  
       students.score, tests.passing_score  
FROM students  
INNER JOIN tests ON students.exam = tests.exam;
```

students		tests		
name	exam	score	exam	passing_score
John	SQL	75	SQL	70
Mary	AWS	80	AWS	80
Clark	Python	60	Python	70

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Use this space to take notes:

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```
SELECT students.name, students.exam,  
       students.score, tests.passing_score  
FROM students  
INNER JOIN tests ON students.exam = tests.exam;
```

output of the query

name	exam	score	passing_score
John	SQL	75	70
Mary	AWS	80	80
Clark	Python	60	70

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Use this space to take notes:

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▶ INNER JOIN

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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Important Concepts

Primary Key (PK):

The primary key is a column in our table that makes each row (aka, record) unique.

Foreign Key (FK):

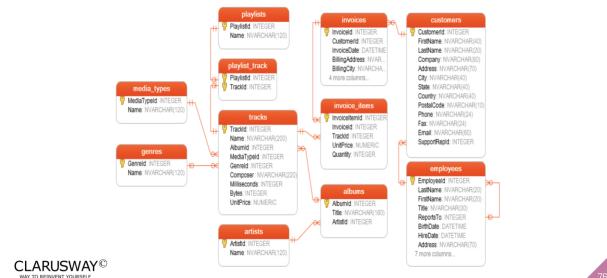
Foreign key is a column in a table that uniquely identifies each row of another table. That column refers to a primary key of another table. This creates a kind of link between the tables.



Use this space to take notes:

Slide 76

Find the genre of each track.



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Use this space to take notes:

Slide 77

tracks					genres	
TrackId	Name	AlbumId	MediaTypeId	GenreId	GenreId	Name
1	1 For Those About To Rock (We Salute You)	1	1	1	1	Rock
2	2 Balls to the Wall	2	2	1	2	Jazz
3	3 Fast As a Shark	3	2	1	3	Metal
4	4 Reckless and Wild	3	2	1	4	Alternative & Punk
5	5 Princess of the Dawn	3	2	1	5	Rock And Roll
6	6 Put The Finger On You	1	1	1	6	Blues
7	7 Let's Get It Up	1	1	1	7	Latin
8	8 Inject The Venom	1	1	1	8	Reggae
9	9 Snowballed	1	1	1	9	Pop
10	10 Evil Welps	1	1	1	10	Soundtrack

Use this space to take notes:

Slide 78

The diagram illustrates a many-to-many relationship between tracks and genres. It consists of three tables: tracks, genres, and a junction table named 'links'.

tracks				
TrackId	Name	AlbumId	MediaTypeId	GenreId
1	1 For Those About To Rock (We Salute You)	1	1	1
2	2 Balls To The Wall	2	2	1
3	3 Feat As A Shark	3	2	1
4	4 Restless and Wild	3	2	1
5	5 Prince of the Dawn	3	2	1
6	6 Put The Finger On You	1	1	1
7	7 Let's Get It Up	1	1	1
8	8 Inject The Venom	1	1	1
9	9 Snowballed	1	1	1
10	10 Evil Walks	1	1	1

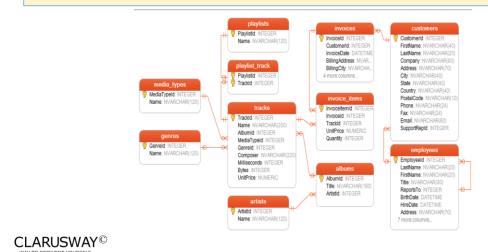
genres	
GenreId	Name
1	Rock
2	Jazz
3	Metal
4	Alternative & Punk
5	Rock And Roll
6	Blues
7	Latin
8	Reggae
9	Pop
10	Soundtrack

links	
TrackId	GenreId
1	1
1	2
1	3
1	4
1	5
2	1
2	2
2	3
2	4
2	5
3	1
3	2
3	3
3	4
3	5
4	1
4	2
4	3
4	4
4	5
5	1
5	2
5	3
5	4
5	5
6	1
6	2
6	3
6	4
6	5
7	1
7	2
7	3
7	4
7	5
8	1
8	2
8	3
8	4
8	5
9	1
9	2
9	3
9	4
9	5
10	1
10	2
10	3
10	4
10	5

Use this space to take notes:

Slide 79

**Find the customer name of each invoice.
Your result will include Invoice id and customer name.**



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Slide 80



▶ LEFT JOIN

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▶ LEFT JOIN



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
```

join_conditions

table_A.common_field = table_B.common_field

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Use this space to take notes:

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students

name	exam	score
John	SQL	75
Mary	AWS	80
Clark	Python	60

tests

exam	passing_score
SQL	70
AWS	80
Python	70
Network	60

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Use this space to take notes:

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```
SELECT tests.exam, tests.passing_score,  
       students.name, students.score  
FROM tests  
LEFT JOIN students ON tests.exam = students.exam;
```

tests

exam	passing_score
SQL	70
AWS	80
Python	70
Network	60

students

name	exam	score
John	SQL	75
Mary	AWS	80
Clark	Python	60

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```
SELECT tests.exam, tests.passing_score,  
       students.name, students.score  
FROM tests  
LEFT JOIN students ON tests.exam = students.exam;
```

tests		students		
exam	passing_score	name	exam	score
SQL	70	John	SQL	75
AWS	80	Mary	AWS	80
Python	70	Clark	Python	60
Network	60			

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4

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Slide 85

```
SELECT tests.exam, tests.passing_score,  
       students.name, students.score  
FROM tests  
LEFT JOIN students ON tests.exam = students.exam;
```

tests		students		
exam	passing_score	name	exam	score
SQL	70	John	SQL	75
AWS	80	Mary	AWS	80
Python	70	Clark	Python	60
Network	60	Null	Null	Null

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13
5

Use this space to take notes:

Slide 86



```
SELECT tests.exam, tests.passing_score,  
       students.name, students.score  
FROM tests  
LEFT JOIN students ON tests.exam = students.exam;
```

tests		students		
exam	passing_score	name	exam	score
SQL	70	John	SQL	75
AWS	80	Mary	AWS	80
Python	70	Clark	Python	60
Network	60	Null	Null	Null

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Use this space to take notes:

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```
SELECT tests.exam, tests.passing_score,  
       students.name, students.score  
FROM tests  
LEFT JOIN students ON tests.exam = students.exam;
```

output of the query			
exam	passing_score	name	score
SQL	70	John	75
AWS	80	Mary	80
Python	70	Clark	60
Network	60	Null	Null

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THANKS!

Any questions?

You can find me at:

- ▶ @mark
- ▶ mark@clarusway.com



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