MySQL

String Functions

But First...A Helpful Tip

Running SQL files

```
source file_name.sql
```

CONCAT

Combine Data For Cleaner Output

```
+---------------+------------------+
| author_fname  | author_lname     |
+---------------+------------------+
| Jhumpa        | Lahiri           |
| Neil          | Gaiman           |
| Neil          | Gaiman           |
| Jhumpa        | Lahiri           |
| Dave          | Eggers           |
| Dave          | Eggers           |
| Michael       | Chabon           |
| Patti         | Smith            |
| Dave          | Eggers           |
| Neil          | Gaiman           |
| Raymond       | Carver           |
| Raymond       | Carver           |
| Don           | DeLillo          |
| John          | Steinbeck        |
| David         | Foster Wallace   |
| David         | Foster Wallace   |
| Adam          | Smith            |
+---------------+------------------+
```

What if I want full names?

🤔

`CONCAT(x,y,z)`

```
CONCAT(column, anotherColumn)
```

```
CONCAT(author_fname, author_lname)
```

```
CONCAT(author_fname, author_lname)
```

DaveEggers

```
CONCAT(author_fname, author_lname)
```

DaveEggers

JhumpaLahiri

```
CONCAT(column, 'text', anotherColumn, 'more text')
```

```
CONCAT(author_fname, ' ', author_lname)
```

```
CONCAT(author_fname, ' ', author_lname)
```

Dave Eggers

```
CONCAT(author_fname, ' ', author_lname)
```

Dave Eggers

Jhumpa Lahiri

```sql
SELECT
  CONCAT(author_fname, ' ', author_lname)
FROM books;
```

CONCAT_WS

Concat With Separator

```
SELECT
    CONCAT_WS(' - ', title, author_fname, author_lname)
FROM books;
```

SUBSTRING

Work With Parts Of Strings

```sql
SELECT SUBSTRING('Hello World', 1, 4);
```

```
SELECT SUBSTRING('Hello World', 1, 4);
```

Hell

```sql
SELECT SUBSTRING('Hello World', 7);
```

```
SELECT SUBSTRING('Hello World', 7);
```

World

```sql
SELECT SUBSTRING('Hello World', -3);
```

```
SELECT SUBSTRING('Hello World', -3);
```

rld

SUBSTR() also works

If SUBSTRING is just too much typing for you

short title
The Namesa...
Norse Myth...
American G...
Interprete...
A Hologram...
The Circle...
The Amazin...
Just Kids...
A Heartbre...
Coraline...
What We Ta...
Where I'm ...
White Nois...
Cannery Ro...
Oblivion: ...
Consider t...

REPLACE
Replace parts of strings

```sql
SELECT REPLACE('Hello World', 'Hell', '%$#@');
```

That's a Bad Word 😱

```sql
SELECT REPLACE('Hello World', 'Hell', '%$#@');
```

That's a Bad Word 😱

```
SELECT REPLACE('Hello World', 'Hell', '%$#@');
```

%$#@o World

```
SELECT
  REPLACE('cheese bread coffee milk', ' ', ' and ');
```

```sql
SELECT
  REPLACE('cheese bread coffee milk', ' ', ' and ');
```

cheese and bread and coffee and milk

REVERSE
Super Straightforward!

REVERSE
Super Straightforward!

Joke

```sql
SELECT REVERSE('Hello World');
```

```sql
SELECT REVERSE('Hello World');
```

dlroW olleH

That's Pretty Much It....

CHAR_LENGTH
Counts Characters in String

```sql
SELECT CHAR_LENGTH('Hello World');
```

```
SELECT CHAR_LENGTH('Hello World');
```

11

UPPER() and LOWER()
Change A String's Case

```sql
SELECT UPPER('Hello World');
```

```sql
SELECT UPPER('Hello World');
```

HELLO WORLD

```sql
SELECT LOWER('Hello World');
```

```sql
SELECT LOWER('Hello World');
```

hello world

That was a lot of stuff!

String Function

Exercises! Exercises!

Reverse and Uppercase the following sentence

"Why does my cat look at me with such hatred?"

What Does This Print Out?

```sql
SELECT
  REPLACE
  (
  CONCAT('I', ' ', 'like', ' ', 'cats'),
  ' ',
  '_'
  );
```

Replace spaces in titles with '->'

```
+----------------------------------------------------------------+
| title                                                          |
+----------------------------------------------------------------+
| The->Namesake                                                  |
| Norse->Mythology                                               |
| American->Gods                                                 |
| Interpreter->of->Maladies                                      |
| A->Hologram->for->the->King:->A->Novel                         |
| The->Circle                                                    |
| The->Amazing->Adventures->of->Kavalier->&->Clay                |
| Just->Kids                                                     |
| A->Heartbreaking->Work->of->Staggering->Genius:                |
| Coraline                                                       |
| What->We->Talk->About->When->We->Talk->About->Love:->Stories   |
| Where->I'm->Calling->From:->Selected->Stories                  |
| White->Noise                                                   |
| Cannery->Row                                                   |
| Oblivion:->Stories                                             |
| Consider->the->Lobster                                         |
```

Print This Out

forwards	backwards
Lahiri	irihaL
Gaiman	namiaG
Gaiman	namiaG
Lahiri	irihaL
Eggers	sreggE
Eggers	sreggE
Chabon	nobahC
Smith	htimS
Eggers	sreggE
Gaiman	namiaG
Carver	revraC
Carver	revraC
DeLillo	olliLeD
Steinbeck	kcebnietS
Foster Wallace	ecallaW retsoF
Foster Wallace	ecallaW retsoF
Smith	htimS

You Know What To Do!

```
+----------------------+
| full name in caps    |
+----------------------+
| JHUMPA LAHIRI        |
| NEIL GAIMAN          |
| NEIL GAIMAN          |
| JHUMPA LAHIRI        |
| DAVE EGGERS          |
| DAVE EGGERS          |
| MICHAEL CHABON       |
| PATTI SMITH          |
| DAVE EGGERS          |
| NEIL GAIMAN          |
| RAYMOND CARVER       |
| RAYMOND CARVER       |
| DON DELILLO          |
| JOHN STEINBECK       |
| DAVID FOSTER WALLACE |
| DAVID FOSTER WALLACE |
```

Make This Happen!

```
+------------------------------------------------------------------------------+
| blurb                                                                        |
+------------------------------------------------------------------------------+
| The Namesake was released in 2003                                            |
| Norse Mythology was released in 2016                                         |
| American Gods was released in 2001                                           |
| Interpreter of Maladies was released in 1996                                 |
| A Hologram for the King: A Novel was released in 2012                        |
| The Circle was released in 2013                                              |
| The Amazing Adventures of Kavalier & Clay was released in 2000               |
| Just Kids was released in 2010                                               |
| A Heartbreaking Work of Staggering Genius: was released in 2001              |
| Coraline was released in 2003                                                |
| What We Talk About When We Talk About Love: Stories was released in 1981     |
| Where I'm Calling From: Selected Stories was released in 1989                |
| White Noise was released in 1985                                             |
| Cannery Row was released in 1945                                             |
| Oblivion: Stories was released in 2004                                       |
| Consider the Lobster was released in 2005                                    |
```

Print book titles and the length of each title

```
+-------------------------------------------------+----------------+
| title                                           | character count |
+-------------------------------------------------+----------------+
| The Namesake                                    |             12 |
| Norse Mythology                                 |             15 |
| American Gods                                   |             13 |
| Interpreter of Maladies                         |             23 |
| A Hologram for the King: A Novel                |             32 |
| The Circle                                      |             10 |
| The Amazing Adventures of Kavalier & Clay       |             41 |
| Just Kids                                       |              9 |
| A Heartbreaking Work of Staggering Genius:      |             42 |
| Coraline                                        |              8 |
| What We Talk About When We Talk About Love: Stories |         51 |
| Where I'm Calling From: Selected Stories        |             40 |
| White Noise                                     |             11 |
| Cannery Row                                     |             11 |
| Oblivion: Stories                               |             17 |
| Consider the Lobster                            |             20 | |
+-------------------------------------------------+----------------+
```

Last One, I Promise!

```
+----------------+----------------+----------------+
| short title    | author         | quantity       |
+----------------+----------------+----------------+
| American G...  | Gaiman,Neil    | 12 in stock    |
| A Heartbre...  | Eggers,Dave    | 104 in stock   |
+----------------+----------------+----------------+
```

Refining Selections
More Weapons In The Arsenal

But First...

Some New Books!

```
INSERT INTO books
    (title, author_fname, author_lname, released_year, stock_quantity, pages)
    VALUES ('10% Happier', 'Dan', 'Harris', 2014, 29, 256),
           ('fake_book', 'Freida', 'Harris', 2001, 287, 428),
           ('Lincoln In The Bardo', 'George', 'Saunders', 2017, 1000, 367);
```

DISTINCT

```sql
SELECT DISTINCT author_lname FROM books;
```

What About DISTINCT Full Names??????

What About DISTINCT Full Names??????

🤔

ORDER BY

Sorting Our Results

```
SELECT author_lname FROM books ORDER BY author_lname;
```

ASCENDING By Default

But, you can change that...

```sql
SELECT author_lname FROM books ORDER BY author_lname DESC;
```

Numbers Too

```sql
SELECT released_year FROM books ORDER BY released_year;
```

```sql
SELECT title, author_fname, author_lname
FROM books ORDER BY 2;
```

One Last Thing!

```
SELECT author_fname, author_lname FROM books
ORDER BY author_lname, author_fname;
```

LIMIT

```sql
SELECT title, released_year FROM books
ORDER BY released_year DESC LIMIT 5;
```

```sql
SELECT title, released_year FROM books
ORDER BY released_year DESC LIMIT 0,5;
```

```sql
SELECT title, released_year FROM books
ORDER BY released_year DESC LIMIT 5,7;
```

```sql
SELECT * FROM tbl LIMIT 95,18446744073709551615;
```

LIKE

Better searching

There's a book I'm looking for...

There's a book I'm looking for...

But I can't remember the title!

There's a book I'm looking for...

But I can't remember the title!

I know the author's first name is David...

There's a book I'm looking for...

But I can't remember the title!

I know the author's first name is David...

Or wait, maybe it's Dan...or Dave

LIKE

```
WHERE author_fname LIKE '%da%'
```

LIKE

```
WHERE author_fname LIKE '%da%'
                              ↑
```

LIKE

```
WHERE author_fname LIKE '%da%'
```

LIKE

`WHERE author_fname LIKE '%da%'`

WILDCARDS

LIKE

`WHERE author_fname LIKE 'da%'`

"I want names that start with *da* "

LIKE

```
WHERE stock_quantity LIKE '____'
```

Yes, that is 4 underscores

But What If...

But What If...

I'm searching for a book with a '%' in it

But What If...

I'm searching for a book with a '%' in it

I'm searching for a book with an '_' in it

```
WHERE title LIKE '%\%%'
```

```
WHERE title LIKE '%\_%'
```

Your Turn!

🤡🤡🤡🤡🤡🤡

Select All Story Collections

Titles That contain 'stories'

```
+------------------------------------------------------+
| title                                                |
+------------------------------------------------------+
| What We Talk About When We Talk About Love: Stories  |
| Where I'm Calling From: Selected Stories             |
| Oblivion: Stories                                    |
+------------------------------------------------------+
```

Find The Longest Book

Print Out the Title and Page Count

```
+------------------------------------------+-------+
| title                                    | pages |
+------------------------------------------+-------+
| The Amazing Adventures of Kavalier & Clay |   634 |
+------------------------------------------+-------+
```

Print a summary containing the title and year, for the 3 most recent books

```
+---------------------------------+
|  summary                        |
+---------------------------------+
|  Lincoln In The Bardo - 2017    |
|  Norse Mythology - 2016         |
|  10% Happier - 2014             |
+---------------------------------+
```

Find all books with an author_lname that contains a space(" ")

```
+-----------------------+----------------+
| title                 | author_lname   |
+-----------------------+----------------+
| Oblivion: Stories     | Foster Wallace |
| Consider the Lobster  | Foster Wallace |
+-----------------------+----------------+
```

Don't Cheat!

Find The 3 Books With The Lowest Stock

Select title, year, and stock

```
+--------------------------------------------------+---------------+----------------+
| title                                            | released_year | stock_quantity |
+--------------------------------------------------+---------------+----------------+
| American Gods                                    |          2001 |             12 |
| Where I'm Calling From: Selected Stories         |          1989 |             12 |
| What We Talk About When We Talk About Love: Stories |       1981 |             23 |
+--------------------------------------------------+---------------+----------------+
```

Print title and author_lname, sorted first
by author_lname and then by title

```
+---------------------------------------------------------+----------------+
| title                                                   | author_lname   |
+---------------------------------------------------------+----------------+
| What We Talk About When We Talk About Love: Stories     | Carver         |
| Where I'm Calling From: Selected Stories                | Carver         |
| The Amazing Adventures of Kavalier & Clay               | Chabon         |
| White Noise                                             | DeLillo        |
| A Heartbreaking Work of Staggering Genius               | Eggers         |
| A Hologram for the King: A Novel                        | Eggers         |
| The Circle                                              | Eggers         |
| Consider the Lobster                                    | Foster Wallace |
| Oblivion: Stories                                       | Foster Wallace |
| American Gods                                           | Gaiman         |
| Coraline                                                | Gaiman         |
| Norse Mythology                                         | Gaiman         |
| 10% Happier                                             | Harris         |
| fake_book                                               | Harris         |
| Interpreter of Maladies                                 | Lahiri         |
| The Namesake                                            | Lahiri         |
| Lincoln In The Bardo                                    | Saunders       |
| Just Kids                                               | Smith          |
| Cannery Row                                             | Steinbeck      |
+---------------------------------------------------------+----------------+
```

Make This Happen...
Sorted Alphabetically By Last Name

```
+--------------------------------------------+
| yell                                       |
+--------------------------------------------+
| MY FAVORITE AUTHOR IS RAYMOND CARVER!      |
| MY FAVORITE AUTHOR IS RAYMOND CARVER!      |
| MY FAVORITE AUTHOR IS MICHAEL CHABON!      |
| MY FAVORITE AUTHOR IS DON DELILLO!         |
| MY FAVORITE AUTHOR IS DAVE EGGERS!         |
| MY FAVORITE AUTHOR IS DAVE EGGERS!         |
| MY FAVORITE AUTHOR IS DAVE EGGERS!         |
| MY FAVORITE AUTHOR IS DAVID FOSTER WALLACE! |
| MY FAVORITE AUTHOR IS DAVID FOSTER WALLACE! |
| MY FAVORITE AUTHOR IS NEIL GAIMAN!         |
| MY FAVORITE AUTHOR IS NEIL GAIMAN!         |
| MY FAVORITE AUTHOR IS NEIL GAIMAN!         |
| MY FAVORITE AUTHOR IS FREIDA HARRIS!       |
| MY FAVORITE AUTHOR IS DAN HARRIS!          |
| MY FAVORITE AUTHOR IS JHUMPA LAHIRI!       |
| MY FAVORITE AUTHOR IS JHUMPA LAHIRI!       |
| MY FAVORITE AUTHOR IS GEORGE SAUNDERS!     |
| MY FAVORITE AUTHOR IS PATTI SMITH!         |
| MY FAVORITE AUTHOR IS JOHN STEINBECK!      |
+--------------------------------------------+
```

Aggregate Functions

Aggregate Functions

Time to learn some more stuff again

Aggregate Functions

Time to learn some more stuff again

It'll be fun. Probably. Hopefully.

COUNT

How many books are in the database???!

How many books are in the database???!

```
SELECT COUNT(*) FROM books;
```

How many author_fnames?

How many author_fnames?

```
SELECT COUNT(author_fname) FROM books;
```

How many author_fnames?

```
SELECT COUNT(author_fname) FROM books;
```

Hmmm....is that really correct though?

How many DISTINCT author_fnames?

How many DISTINCT author_fnames?

```
SELECT COUNT(DISTINCT author_fname) FROM books;
```

Let's try with author_lname

Let's try with author_lname

```
SELECT COUNT(DISTINCT author_lname) FROM books;
```

How many titles contain "the"?

How many titles contain "the"?

```
SELECT COUNT(*) FROM books
WHERE title LIKE '%the%';
```

GROUP BY

Take A Deep Breathe

Take A Deep Breathe

Stay with me here...this is a tough one to teach!

"GROUP BY summarizes or aggregates identical data into single rows"
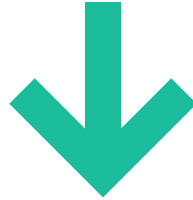
"GROUP BY summarizes or aggregates identical data into single rows"

Like I said, stay with me here!

```sql
SELECT title, author_lname FROM books;
```

```
SELECT title, author_lname FROM books;
```

↓

```
SELECT title, author_lname FROM books;
```

⬇

```
+----------------------------------+--------------+
| title                            | author_lname |
+----------------------------------+--------------+
| The Namesake                     | Lahiri       |
| Norse Mythology                  | Gaiman       |
| American Gods                    | Gaiman       |
| Interpreter of Maladies          | Lahiri       |
| A Hologram for the King: A Novel | Eggers       |
+----------------------------------+--------------+
```

```
SELECT title, author_lname FROM books
GROUP BY author_lname
```

```
SELECT title, author_lname FROM books
GROUP BY author_lname
```

```
SELECT title, author_lname FROM books
GROUP BY author_lname
```

⬇

```
+------------------------------------+--------------+
| title                              | author_lname |
+------------------------------------+--------------+
| The Namesake                       | Lahiri       |
| Norse Mythology                    | Gaiman       |
| A Hologram for the King: A Novel   | Eggers       |
+------------------------------------+--------------+
```

```
SELECT title, author_lname FROM books
GROUP BY author_lname
```

⬇

```
+-----------------------------------+--------------+
| title                             | author_lname |
+-----------------------------------+--------------+
| The Namesake                      | Lahiri       |
| Norse Mythology                   | Gaiman       |
| A Hologram for the King: A Novel  | Eggers       |
+-----------------------------------+--------------+
```

WAIT WHAT?! WHAT IS GOING ON?!

```
+------------------------------------+--------------+
| title                              | author_lname |
+------------------------------------+--------------+
| The Namesake                       | Lahiri       |
| Norse Mythology                    | Gaiman       |
| A Hologram for the King: A Novel   | Eggers       |
+------------------------------------+--------------+
```

```
+---------------------------------+--------------+
| title                           | author_lname |
+---------------------------------+--------------+
| The Namesake                    | Lahiri       |
| Norse Mythology                 | Gaiman       |
| A Hologram for the King: A Novel | Eggers      |
+---------------------------------+--------------+
```

```
| The Namesake                    | Lahiri       |
| Interpreter of Maladies         | Lahiri       |
```

```
+----------------------------------+--------------+
| title                            | author_lname |
+----------------------------------+--------------+
| The Namesake                     | Lahiri       |
| Norse Mythology                  | Gaiman       |
| A Hologram for the King: A Novel | Eggers       |
+----------------------------------+--------------+
```

```
| The Namesake                     | Lahiri       |
| Interpreter of Maladies          | Lahiri       |
```

```
| Norse Mythology                  | Gaiman       |
| American Gods                    | Gaiman       |
```

```
+--------------------------------+--------------+
| title                          | author_lname |
+--------------------------------+--------------+
| The Namesake                   | Lahiri       |
| Norse Mythology                | Gaiman       |
| A Hologram for the King: A Novel | Eggers     |
+--------------------------------+--------------+
```

```
| The Namesake                   | Lahiri       |
| Interpreter of Maladies        | Lahiri       |
```

```
| Norse Mythology                | Gaiman       |
| American Gods                  | Gaiman       |
```

```
| A Hologram for the King: A Novel | Eggers     |
```

Now the data is grouped, we can do things like...

Just go to the next slide already

COUNT how many books each author has written

```
SELECT author_lname, COUNT(*)
FROM books GROUP BY author_lname;
```

| The Namesake | Lahiri |
| Interpreter of Maladies | Lahiri |

| Norse Mythology | Gaiman |
| American Gods | Gaiman |

| A Hologram for the King: A Novel | Eggers |

```
SELECT author_lname, COUNT(*)
FROM books GROUP BY author_lname;
```

2

| The Namesake | Lahiri |
| Interpreter of Maladies | Lahiri |

| Norse Mythology | Gaiman |
| American Gods | Gaiman |

| A Hologram for the King: A Novel | Eggers |

```
SELECT author_lname, COUNT(*)
FROM books GROUP BY author_lname;
```

2

| The Namesake | Lahiri |
| Interpreter of Maladies | Lahiri |

2

| Norse Mythology | Gaiman |
| American Gods | Gaiman |

| A Hologram for the King: A Novel | Eggers |

```
SELECT author_lname, COUNT(*)
FROM books GROUP BY author_lname;
```

2

```
  The Namesake                       | Lahiri   |
| Interpreter of Maladies            | Lahiri   |
```

2

```
  Norse Mythology                    | Gaiman   |
| American Gods                      | Gaiman   |
```

1

```
  A Hologram for the King: A Novel | Eggers   |
```

```
+------------------+----------+
| author_lname     | COUNT(*) |
+------------------+----------+
| Lahiri           |        2 |
| Gaiman           |        2 |
| Eggers           |        1 |
+------------------+----------+
```

We're Only Getting Started With GROUP BY

Let's See Some Code!

MIN
AND
MAX

Without Group By

Find the minimum released_year

```
SELECT MIN(released_year)
FROM books;
```

Find the longest book

```sql
SELECT MAX(pages)
FROM books;
```

What if I want the title of the longest book?

This seems like it could work...

```
SELECT MAX(pages), title
FROM books;
```

The largest emoji slides.com allows for...

⬇️

🤦‍♂️ ♂

One Potential Solution

```
SELECT * FROM books
WHERE pages = (SELECT Min(pages)
               FROM books);
```

OR

```
SELECT * FROM books
ORDER BY pages ASC LIMIT 1;
```

MIN/MAX
With Group By

Find the year each author published their first book

```sql
SELECT author_fname,
       author_lname,
       Min(released_year)
FROM   books
GROUP  BY author_lname,
          author_fname;
```

```sql
SELECT author_fname,
       author_lname,
       Min(released_year)
FROM   books
GROUP  BY author_lname,
          author_fname;
```
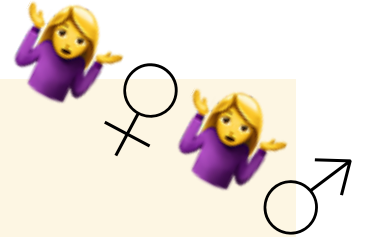
Find the longest page count for each author

```sql
SELECT
    author_fname,
    author_lname,
    Max(pages)
FROM books
GROUP BY author_lname,
         author_fname;
```

```sql
SELECT
    CONCAT(author_fname, ' ', author_lname) AS author,
    MAX(pages) AS 'longest book'
FROM books
GROUP BY author_lname,
         author_fname;
```

SUM

SUM

Adds Things Together!

Sum all pages in the entire database

```
SELECT SUM(pages)
FROM books;
```

SUM + GROUP BY

Sum all pages each author has written

```sql
SELECT author_fname,
       author_lname,
       Sum(pages)
FROM books
GROUP BY
    author_lname,
    author_fname;
```

AVG

Calculate the average released_year across all books

```
SELECT AVG(released_year)
FROM books;
```

Calculate the average stock quantity for books released in the same year

```sql
SELECT AVG(stock_quantity)
FROM books
GROUP BY released_year;
```

YOUR
TURN

Print the number of books in the database

Print out how many books were released in each year

Print out the total number of books in stock

Find the average released_year for each author

Find the full name of the author who wrote the longest book

Make This Happen

year	# books	avg pages
1945	1	181.0000
1981	1	176.0000
1985	1	320.0000
1989	1	526.0000
1996	1	198.0000
2000	1	634.0000
2001	3	443.3333
2003	2	249.5000
2004	1	329.0000
2005	1	343.0000
2010	1	304.0000
2012	1	352.0000
2013	1	504.0000
2014	1	256.0000
2016	1	304.0000
2017	1	367.0000