Aggregate Functions

Time to learn some more stuff again

It'll be fun. Probably. Hopefully.

COUNT

How many books are in the database???!

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

How many author_fnames?

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

Hmmm....is that really correct though?

How many DISTINCT author_fnames?

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

Let's try with author_lname

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

How many titles contain "the"?

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

GROUP BY

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"

Like I said, stay with me here!

```
SELECT author_lname FROM books
GROUP BY author_lname
```

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

The Namesake	Lahiri
Interpreter of Maladies	Lahiri

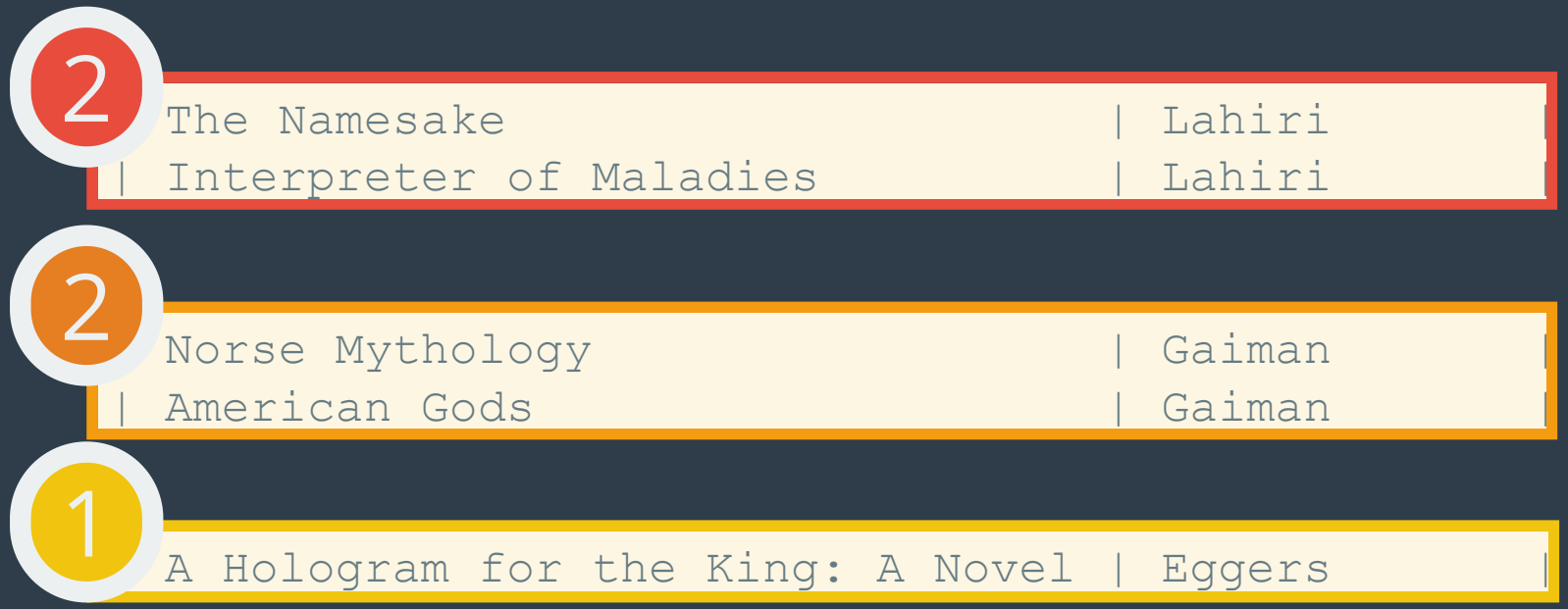
Norse Mythology	Gaiman
American Gods	Gaiman

A Hologram for the King: A Novel	Eggers

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

COUNT how many books each author has written

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



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

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

Find the longest book

```
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

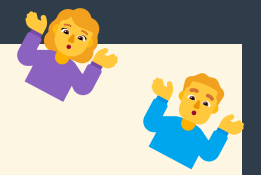
```
SELECT * FROM books
WHERE pages = (SELECT Min(pages)
               FROM books);
```

OR

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

MIN/MAX
With Group By

Find the year each author published their first book



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

Find the longest page count for each author

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

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

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

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

AVG

Calculate the average released_year across all books

```sql
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