

RELATIONSHIPS AND JOINS

Finally.

So Far We've Been
Working With Very
Simple Data

But that's
about to
change

Real World Data
Is Messy and
Interrelated

Books

Books

Versions

Books

Authors

Versions

Books

Authors

Customers

Versions

Orders

Books

Customers

Authors

Versions

Orders

Reviews

Books

Customers

Authors

Versions

Genres

Orders

Reviews

Books

Customers

Authors

Versions

Colt, show that one
schema diagram you
love to show

So Where Do We Start?

Relationship Basics

This is not marriage counseling

Relationship Basics

This is not marriage counseling

1. One to One Relationship

Relationship Basics

This is not marriage counseling

1. One to One Relationship
2. One to Many Relationship

Relationship Basics

This is not marriage counseling

1. One to One Relationship
2. One to Many Relationship
3. Many to Many Relationship

Genres

Orders

Reviews

Books

Customers

Authors

Versions

Genres

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Reviews

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Versions

Genres

Orders

Reviews

Books

Customers

Authors

Versions

1:MANY

The Most Common Relationship

CUSTOMERS
& ORDERS

We Want To Store...

- A customer's first and last name
- A customer's email
- The date of the purchase
- The price of the order

We Could Use One Table...

first_name	last_name	email	order_date	amount
Boy	George	george@gmail.com	'2016/02/10'	99.99
Boy	George	george@gmail.com	'2017/11/11'	35.50
George	Michael	gm@gmail.com	'2014/12/12'	800.67
George	Michael	gm@gmail.com	'2015/01/03'	12.50
David	Bowie	david@gmail.com	NULL	NULL
Blue	Steele	blue@gmail.com	NULL	NULL

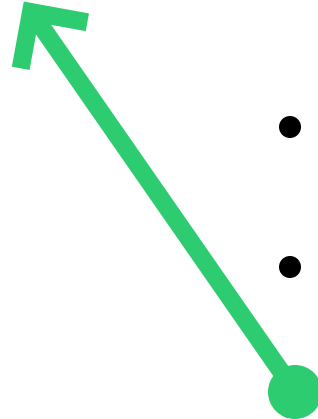
NOT A GOOD IDEA

Customers

- customer_id
- first_name
- last_name
- email

Orders

- order_id
- order_date
- amount
- customer_id



CUSTOMERS

customer_id	first_name	last_name	email
1	Boy	George	george@gmail.com
2	George	Michael	gm@gmail.com
3	David	Bowie	david@gmail.com
4	Blue	Steele	blue@gmail.com

ORDERS

order_id	order_date	amount	customer_id
1	'2016/02/10'	99.99	1
2	'2017/11/11'	35.50	1
3	'2014/12/12'	800.67	2
4	'2015/01/03'	12.50	2

**PRIMARY
KEY**

CUSTOMERS

customer_id	first_name	last_name	email
1	Boy	George	george@gmail.com
2	George	Michael	gm@gmail.com
3	David	Bowie	david@gmail.com
4	Blue	Steele	blue@gmail.com

ORDERS

order_id	order_date	amount	customer_id
1	'2016/02/10'	99.99	1
2	'2017/11/11'	35.50	1
3	'2014/12/12'	800.67	2
4	'2015/01/03'	12.50	2

**FOREIGN
KEY**

CUSTOMERS

id	first_name	last_name	email
1	Boy	George	george@gmail.com
2	George	Michael	gm@gmail.com
3	David	Bowie	david@gmail.com
4	Blue	Steele	blue@gmail.com

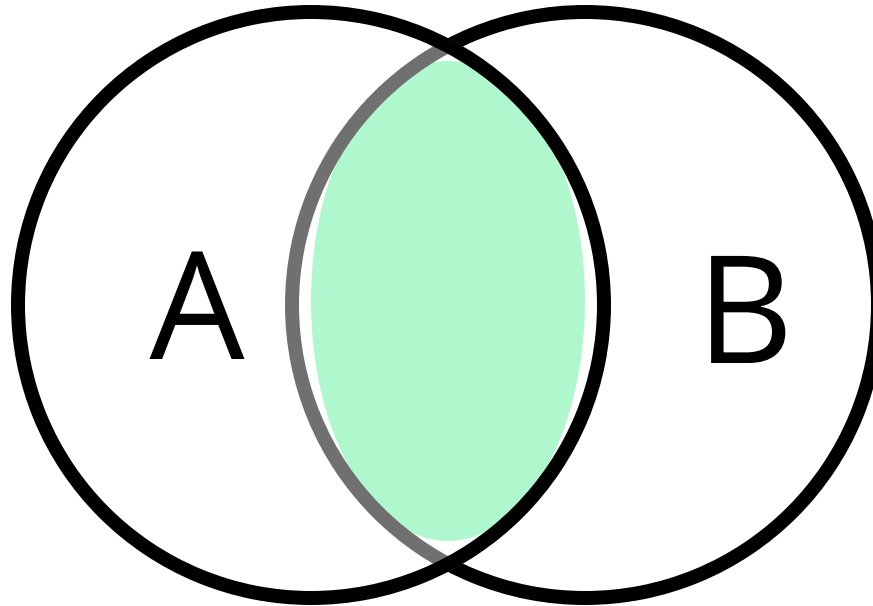
ORDERS

id	order_date	amount	customer_id
1	'2016/02/10'	99.99	1
2	'2017/11/11'	35.50	1
3	'2014/12/12'	800.67	2
4	'2015/01/03'	12.50	2

Let's Get Coding!

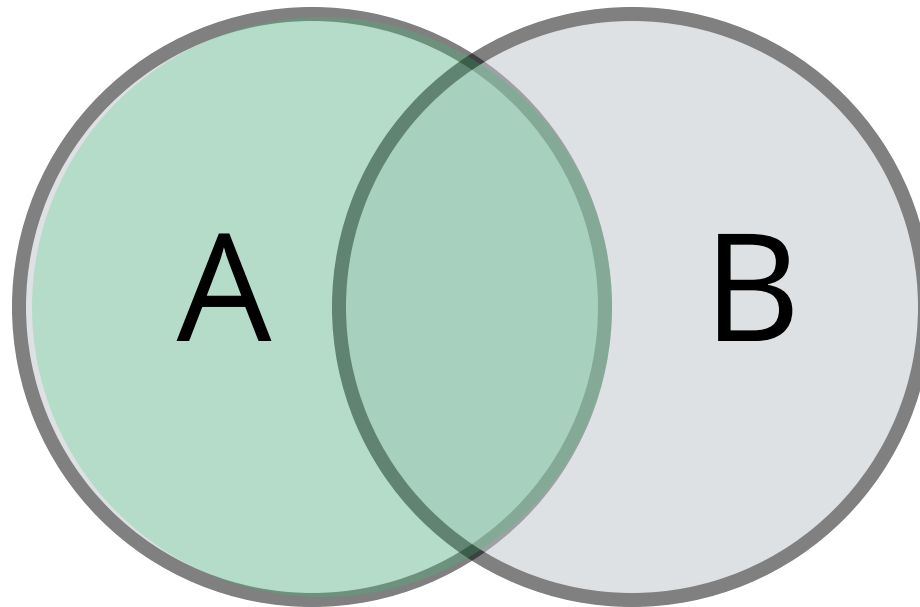
INNER JOIN

I'm Sorry This Diagram Is So Ugly



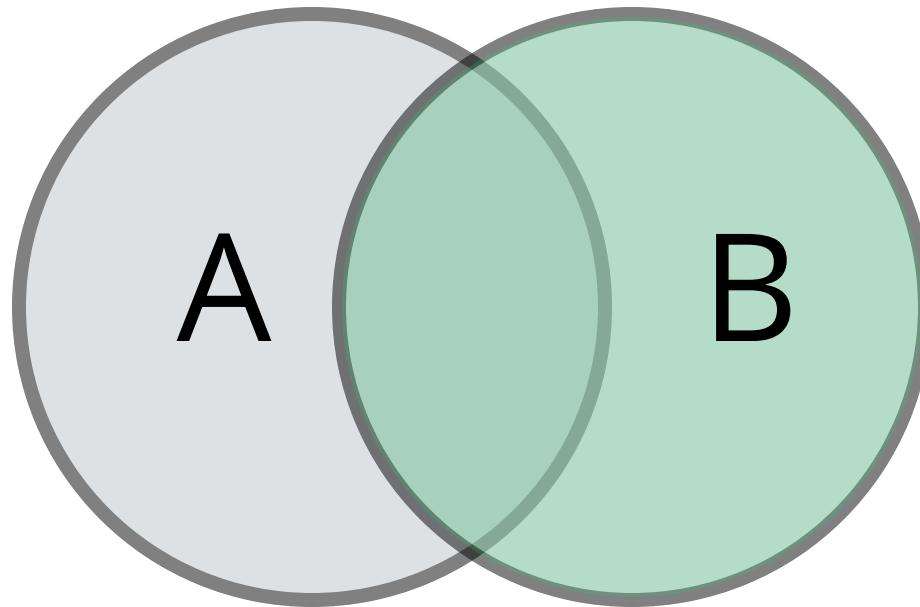
Select all records from A and B where the
join condition is met

LEFT JOIN



Select everything from A, along with any
matching records in B

RIGHT JOIN



Select everything from B, along with any
matching records in A

YOUR
TURN

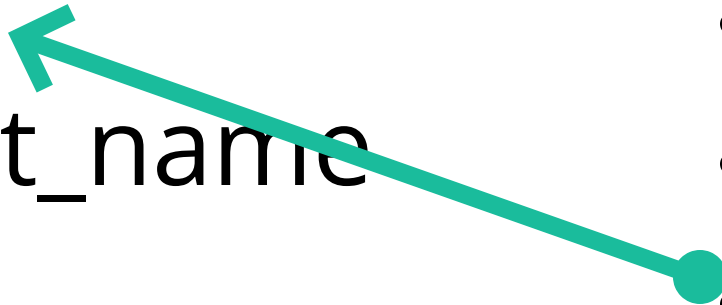
WRITE THIS SCHEMA

STUDENTS

- id
- first_name

PAPERS

- title
- grade
- student_id



INSERT THIS DATA

(COPY AND PASTE IT)

```
INSERT INTO students (first_name) VALUES  
( 'Caleb' ), ( 'Samantha' ), ( 'Raj' ), ( 'Carlos' ), ( 'Lisa' );
```

```
INSERT INTO papers (student_id, title, grade ) VALUES  
(1, 'My First Book Report', 60),  
(1, 'My Second Book Report', 75),  
(2, 'Russian Lit Through The Ages', 94),  
(2, 'De Montaigne and The Art of The Essay', 98),  
(4, 'Borges and Magical Realism', 89);
```


PRINT THIS

first_name	title	grade
Samantha	De Montaigne and The Art of The Essay	98
Samantha	Russian Lit Through The Ages	94
Carlos	Borges and Magical Realism	89
Caleb	My Second Book Report	75
Caleb	My First Book Report	60

PRINT THIS

first_name	title	grade
Caleb	My First Book Report	60
Caleb	My Second Book Report	75
Samantha	Russian Lit Through The Ages	94
Samantha	De Montaigne and The Art of The Essay	98
Raj	NULL	NULL
Carlos	Borges and Magical Realism	89
Lisa	NULL	NULL

PRINT THIS

first_name	title	grade
Caleb	My First Book Report	60
Caleb	My Second Book Report	75
Samantha	Russian Lit Through The Ages	94
Samantha	De Montaigne and The Art of The Essay	98
Raj	MISSING	0
Carlos	Borges and Magical Realism	89
Lisa	MISSING	0

PRINT THIS

first_name	average
Samantha	96.0000
Carlos	89.0000
Caleb	67.5000
Raj	0
Lisa	0

PRINT THIS

first_name	average	passing_status
Samantha	96.0000	PASSING
Carlos	89.0000	PASSING
Caleb	67.5000	FAILING
Raj	0	FAILING
Lisa	0	FAILING

MANY:MANY

The Tiny Bit Trickier Relationship

Some Examples

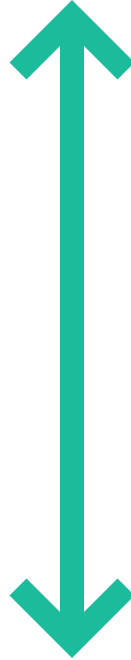
Books <-> Authors

Blog Post <-> Tags

Students <-> Classes

Imagine we're building
a tv show reviewing
application

Series Data



Reviewers Data

Series Data



Reviews Data

Reviewers Data

Reviewers

id
first_name
last_name

Series

id
title
released_year
genre

Reviews

id
rating
series_id
reviewer_id

Reviewers

id
first_name
last_name

Reviews

id
rating
series_id
reviewer_id

Series

id
title
released_year
genre



Reviewers

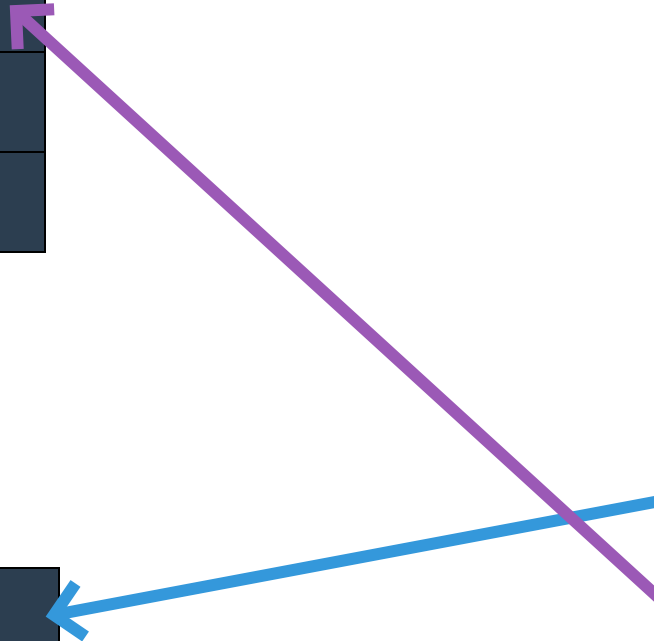
id
first_name
last_name

Reviews

id
rating
series_id
reviewer_id

Series

id
title
released_year
genre



Reviewers

id	first_name	last_name
1	Blue	Steele
2	Wyatt	Earp

Series

id	title	released_year	genre
1	Archer	2009	Animation
2	Fargo	2014	Drama

Reviews

id	rating	reviewer_id	series_id
1	8.9	1	2
2	9.5	2	2

INSERT SERIES

```
INSERT INTO series (title, released_year, genre) VALUES
('Archer', 2009, 'Animation'),
('Arrested Development', 2003, 'Comedy'),
('Bob's Burgers', 2011, 'Animation'),
('Bojack Horseman', 2014, 'Animation'),
('Breaking Bad', 2008, 'Drama'),
('Curb Your Enthusiasm', 2000, 'Comedy'),
('Fargo', 2014, 'Drama'),
('Freaks and Geeks', 1999, 'Comedy'),
('General Hospital', 1963, 'Drama'),
('Halt and Catch Fire', 2014, 'Drama'),
('Malcolm In The Middle', 2000, 'Comedy'),
('Pushing Daisies', 2007, 'Comedy'),
('Seinfeld', 1989, 'Comedy'),
('Stranger Things', 2016, 'Drama');
```

INSERT REVIEWERS

```
INSERT INTO reviewers (first_name, last_name) VALUES
    ('Thomas', 'Stoneman'),
    ('Wyatt', 'Skaggs'),
    ('Kimbra', 'Masters'),
    ('Domingo', 'Cortes'),
    ('Colt', 'Steele'),
    ('Pinkie', 'Petit'),
    ('Marlon', 'Crafford');
```


INSERT REVIEWS

```
INSERT INTO reviews(series_id, reviewer_id, rating) VALUES
  (1,1,8.0),(1,2,7.5),(1,3,8.5),(1,4,7.7),(1,5,8.9),
  (2,1,8.1),(2,4,6.0),(2,3,8.0),(2,6,8.4),(2,5,9.9),
  (3,1,7.0),(3,6,7.5),(3,4,8.0),(3,3,7.1),(3,5,8.0),
  (4,1,7.5),(4,3,7.8),(4,4,8.3),(4,2,7.6),(4,5,8.5),
  (5,1,9.5),(5,3,9.0),(5,4,9.1),(5,2,9.3),(5,5,9.9),
  (6,2,6.5),(6,3,7.8),(6,4,8.8),(6,2,8.4),(6,5,9.1),
  (7,2,9.1),(7,5,9.7),
  (8,4,8.5),(8,2,7.8),(8,6,8.8),(8,5,9.3),
  (9,2,5.5),(9,3,6.8),(9,4,5.8),(9,6,4.3),(9,5,4.5),
  (10,5,9.9),
  (13,3,8.0),(13,4,7.2),
  (14,2,8.5),(14,3,8.9),(14,4,8.9);
```

NOW LET'S
DO STUFF

+-----+-----+	
title	rating
+-----+-----+	
Archer	8.0
Archer	7.5
Archer	8.5
Archer	7.7
Archer	8.9
Arrested Development	8.1
Arrested Development	6.0
Arrested Development	8.0
Arrested Development	8.4
Arrested Development	9.9
Bob's Burgers	7.0
Bob's Burgers	7.5
Bob's Burgers	8.0
Bob's Burgers	7.1
Bob's Burgers	8.0
+-----+-----+	

+-----+-----+	
title	avg_rating
+-----+-----+	
General Hospital	5.38000
Bob's Burgers	7.52000
Seinfeld	7.60000
Bojack Horseman	7.94000
Arrested Development	8.08000
Curb Your Enthusiasm	8.12000
Archer	8.12000
Freaks and Geeks	8.60000
Stranger Things	8.76667
Breaking Bad	9.36000
Fargo	9.40000
Halt and Catch Fire	9.90000
+-----+-----+	

first_name	last_name	rating
Thomas	Stoneman	8.0
Thomas	Stoneman	8.1
Thomas	Stoneman	7.0
Thomas	Stoneman	7.5
Thomas	Stoneman	9.5
Wyatt	Skaggs	7.5
Wyatt	Skaggs	7.6
Wyatt	Skaggs	9.3
Wyatt	Skaggs	6.5
Wyatt	Skaggs	8.4
Wyatt	Skaggs	9.1
Wyatt	Skaggs	7.8
Wyatt	Skaggs	5.5
Wyatt	Skaggs	8.5
Kimbra	Masters	8.5
Kimbra	Masters	8.0
Kimbra	Masters	7.1
Kimbra	Masters	7.8
Kimbra	Masters	9.0
Kimbra	Masters	7.8

```
+-----+  
|  unreviewed_series  |  
+-----+  
|  Malcolm In The Middle  |  
|  Pushing Daisies        |  
+-----+
```

genre	avg_rating
Animation	7.86000
Comedy	8.16250
Drama	8.04375

first_name	last_name	COUNT	MIN	MAX	AVG	STATUS
Thomas	Stoneman	5	7.0	9.5	8.02000	ACTIVE
Wyatt	Skaggs	9	5.5	9.3	7.80000	ACTIVE
Kimbra	Masters	9	6.8	9.0	7.98889	ACTIVE
Domingo	Cortes	10	5.8	9.1	7.83000	ACTIVE
Colt	Steele	10	4.5	9.9	8.77000	ACTIVE
Pinkie	Petit	4	4.3	8.8	7.25000	ACTIVE
Marlon	Crafford	0	0.0	0.0	0.00000	INACTIVE

title	rating	reviewer
Archer	8.0	Thomas Stoneman
Archer	7.7	Domingo Cortes
Archer	8.5	Kimbra Masters
Archer	7.5	Wyatt Skaggs
Archer	8.9	Colt Steele
Arrested Development	8.4	Pinkie Petit
Arrested Development	9.9	Colt Steele
Arrested Development	8.1	Thomas Stoneman
Arrested Development	6.0	Domingo Cortes
Arrested Development	8.0	Kimbra Masters
Bob's Burgers	7.0	Thomas Stoneman
Bob's Burgers	8.0	Domingo Cortes
Bob's Burgers	7.1	Kimbra Masters
Bob's Burgers	7.5	Pinkie Petit
Bob's Burgers	8.0	Colt Steele