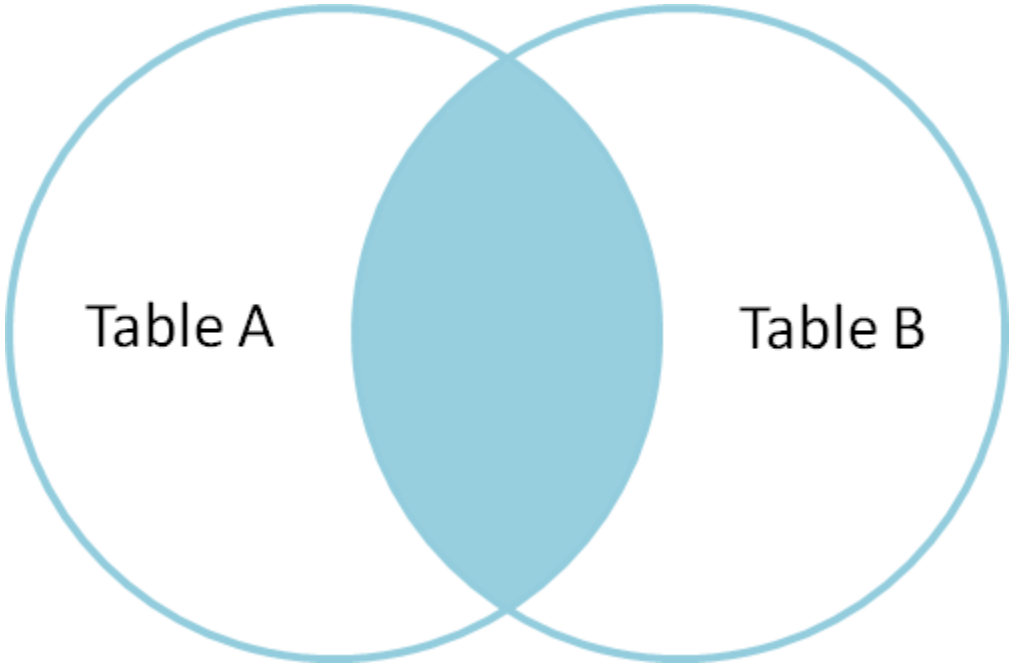
Simple Joins

Databases



Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204
4	Excel VB	$145	

User

UserID	Name
203	Al BeBack
204	Joe Kerr
205	Sid Down

What are the primary keys?

What is the foreign key?

Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204
4	Excel VB	$145	

User

UserID	Name
203	Al BeBack
204	Joe Kerr
205	Sid Down

What is the SQL to find out the number of users?

Select _____(*)
From _____

Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204
4	Excel VB	$145	

User

UserID	Name
203	Al BeBack
204	Joe Kerr
205	Sid Down

What is the SQL to find out the number of users?

```
Select count(*)

From User
```

Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204
4	Excel VB	$145	

What is the SQL to print the Book table in order by title?

User

UserID	Name
203	Al BeBack
204	Joe Kerr
205	Sid Down

Select ___

From _____

Order by _____

Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204
4	Excel VB	$145	

User

UserID	Name
203	Al BeBack
204	Joe Kerr
205	Sid Down

What is the SQL to print the Book table in order by title?

```
Select *

From Book

Order by Title
```

Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204
4	Excel VB	$145	

How many books are out?

User

UserID	Name
203	Al BeBack
204	Joe Kerr
205	Sid Down

Select _____(*)
From _____
Where _____<> ___

Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204
4	Excel VB	$145	

User

UserID	Name
203	Al BeBack
204	Joe Kerr
205	Sid Down

How many books are out?

```
Select count(*)
From Book
Where Out <> ""
```

Joins

- Allow us to get information from multiple tables
- We join tables by linking the primary and foreign keys.

Joining the Tables

```
Select *

From Book, User

Where Out = UserID
```

1. Put in both tables in the from clause

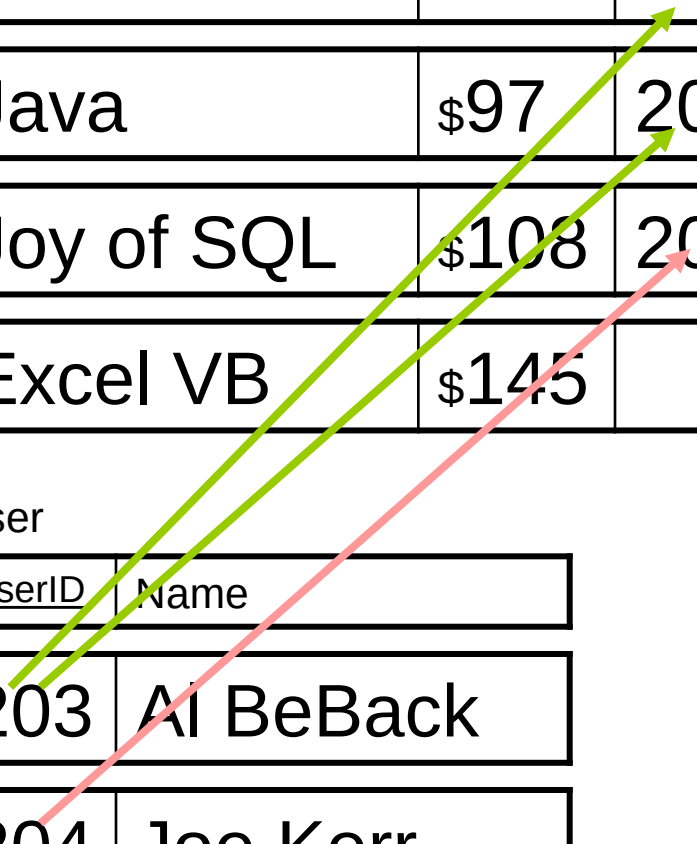
2. Set the foreign key equal to the primary key

Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204
4	Excel VB	$145	

User

UserID	Name
203	Al BeBack
204	Joe Kerr
205	Sid Down



Select *

From Book, User

Where Out=UserID

Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204
4	Excel VB	$145	

User

UserID	Name
203	Al BeBack
203	Al BeBack
204	Joe Kerr

User

UserID	Name
203	Al BeBack
204	Joe Kerr
205	Sid Down

Select *

From Book, User

Where Out=UserID

Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204
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User

UserID	Name
203	Al BeBack
203	Al BeBack
204	Joe Kerr

User

UserID	Name
203	Al BeBack
204	Joe Kerr
205	Sid Down

```
Select *
From Book, User
Where Out=UserID
```

Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204

User

UserID	Name
203	Al BeBack
203	Al BeBack
204	Joe Kerr

```
Select *
From Book, User
Where Out=UserID
```

Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204
4	Excel VB	$145	

What is the SQL to find out the number of books each user has out, listed with their name?

User

UserID	Name
203	Al BeBack
204	Joe Kerr
205	Sid Down

Select <fields, aggregates>

From <table>

Where <Condition, Join>

Group By <field>

Book

BookID	Title	Cost	Out
1	C++ is Fun	$102	203
2	Java	$97	203
3	Joy of SQL	$108	204
4	Excel VB	$145	

What is the SQL to find out the number of books each user has out, listed with their name?

User

UserID	Name
203	Al BeBack
204	Joe Kerr
205	Sid Down

Select count(*), Name

From User, Book

Where UserID = Out

Group by Name

Multi-table Joins

- Require more than two tables in the from clause
- Require a boolean expression for each link in the where clause (3 tables = 2 BE; 4 tables = 3 BE)

Train

TrainID	Name	Seats	Purchase
1	Thomas	200	2003
2	Percy	500	2004
3	Gordon	400	2003

DriverAssignment

TID	DID	Date
1	101	1/10/10
1	101	2/10/10
2	102	3/10/10

Driver

DriverID	First	Last	Years
101	Ben	Dover	3
102	Stan	Dupp	5
103	Sarah	Soda	4

Who drives Thomas on 1/10/10?

What are linking fields?

Train

TrainID	Name	Seats	Purchase
1	Thomas	200	2003
2	Percy	500	2004
3	Gordon	400	2003

DriverAssignment

TID	DID	Date
1	101	1/10/10
1	101	2/10/10
2	102	3/10/10

Driver

DriverID	First	Last	Years
101	Ben	Dover	3
102	Stan	Dupp	5
103	Sarah	Soda	4

Who drives Thomas on 1/10/10?

What are linking fields?

Train

TrainID	Name	Seats	Purchase
1	Thomas	200	2003
2	Percy	500	2004
3	Gordon	400	2003

DriverAssignment

TID	DID	Date
1	101	1/10/10
1	101	2/10/10
2	102	3/10/10

Driver

DriverID	First	Last	Years
101	Ben	Dover	3
102	Stan	Dupp	5
103	Sarah	Soda	4

Who is driving each train?

Select _____, _____, _____

From _____, _____, _____

Where _____ = _____

And _____ = _____

Train

TrainID	Name	Seats	Purchase
1	Thomas	200	2003
2	Percy	500	2004
3	Gordon	400	2003

DriverAssignment

TID	DID	Date
1	101	1/10/10
1	101	2/10/10
2	102	3/10/10

Driver

DriverID	First	Last	Years
101	Ben	Dover	3
102	Stan	Dupp	5
103	Sarah	Soda	4

Who is driving each train?

```
Select Name, First, Last

From Train,
        DriverAssignment,
        Driver

Where TrainID = TID

And DriverID = DID
```

Train

TrainID	Name	Seats	Purchase
1	Thomas	200	2003
2	Percy	500	2004
3	Gordon	400	2003

DriverAssignment

TID	DID	Date
1	101	1/10/10
1	101	2/10/10
2	102	3/10/10

Driver

DriverID	First	Last	Years
101	Ben	Dover	3
102	Stan	Dupp	5
103	Sarah	Soda	4

What would this print?

```
Select Name, Last
From Train,
        DriverAssignment,
        Driver
Where TrainID = TID
And DriverID = DID
```

Name	Last

What would this print?

```
Select Name, Last
From Train,
        DriverAssignment,
        Driver
Where TrainID = TID
And DriverID = DID
```

Train

TrainID	Name	Seats	Purchase
1	Thomas	200	2003
2	Percy	500	2004
3	Gordon	400	2003

DriverAssignment

TID	DID	Date
1	101	1/10/10
1	101	2/10/10
2	102	3/10/10

Driver

DriverID	First	Last	Years
101	Ben	Dover	3
102	Stan	Dupp	5
103	Sarah	Soda	4

Name	Last

What would this print?

Train

TrainID	Name	Seats	Purchase
1	Thomas	200	2003
2	Percy	500	2004
3	Gordon	400	2003

DriverAssignment

TID	DID	Date
1	101	1/10/10
1	101	2/10/10
2	102	3/10/10

Driver

DriverID	First	Last	Years
101	Ben	Dover	3
102	Stan	Dupp	5
103	Sarah	Soda	4

```
Select Name, Last
From Train,
        DriverAssignment,
        Driver
Where TrainID = TID
And DriverID = DID
```

Name	Last
Thomas	Dover
Thomas	Dover
Percy	Dupp

Car Database

Car

LicensePlate	Colour	Model	Manufacturer
AERT 345	Red	Corvette	General Motors
456 A4GH	Silver	Hummer	General Motors
T455 YUIP	Green	Jeep	Daimler-Chrysler
RETW 3G6	Green	Camry	Toyota
TYI 56NM	Red	Corvette	General Motors

DriverCar

Person	Plate
120	AERT 345
123	AERT 345
120	T455 YUIP
123	T455 YUIP
124	TYI 56NM

Driver

License	First	Last	Address	City	Points
120	Alan	Turing	122 First Street	Brampton	4
123	Mr	Young	122 First Street	Brampton	0
121	Douglas	Englebart	234 Second Street	Brampton	2
124	Ivan	Sutherland	345 Third Street	Waterloo	0
122	George	Boole	456 Main Street	Kincardine	15

How do the tables link up?

Who drives the Red Corvette?

Car Database

Car

LicensePlate	Colour	Model	Manufacturer
AERT 345	Red	Corvette	General Motors
456 A4GH	Silver	Hummer	General Motors
T455 YUIP	Green	Jeep	Daimler-Chrysler
RETW 3G6	Green	Camry	Toyota
TYI 56NM	Red	Corvette	General Motors

DriverCar

Person	Plate
120	AERT 345
123	AERT 345
120	T455 YUIP
123	T455 YUIP
124	TYI 56NM

Driver

License	First	Last	Address	City	Points
120	Alan	Turing	122 First Street	Brampton	4
123	Mr	Young	122 First Street	Brampton	0
121	Douglas	Englebart	234 Second Street	Brampton	2
124	Ivan	Sutherland	345 Third Street	Waterloo	0
122	George	Boole	456 Main Street	Kincardine	15

How do the tables link up?

Who drives the Red Corvette?

Car Database

Car

LicensePlate	Colour	Model	Manufacturer
AERT 345	Red	Corvette	General Motors
456 A4GH	Silver	Hummer	General Motors
T455 YUIP	Green	Jeep	Daimler-Chrysler
RETW 3G6	Green	Camry	Toyota
TYI 56NM	Red	Corvette	General Motors

DriverCar

Person	Plate
120	AERT 345
123	AERT 345
120	T455 YUIP
123	T455 YUIP
124	TYI 56NM

Driver

License	First	Last	Address	City	Points
120	Alan	Turing	122 First Street	Brampton	4
123	Mr	Young	122 First Street	Brampton	0
121	Douglas	Englebart	234 Second Street	Brampton	2
124	Ivan	Sutherland	345 Third Street	Waterloo	0
122	George	Boole	456 Main Street	Kincardine	15

List the car colour with the address for each car?

Select <fields, aggregates>

From <table>

Where <Condition, Join>

Group By <field>

Car Database

Car

LicensePlate	Colour	Model	Manufacturer
AERT 345	Red	Corvette	General Motors
456 A4GH	Silver	Hummer	General Motors
T455 YUIP	Green	Jeep	Daimler-Chrysler
RETW 3G6	Green	Camry	Toyota
TYI 56NM	Red	Corvette	General Motors

DriverCar

Person	Plate
120	AERT 345
123	AERT 345
120	T455 YUIP
123	T455 YUIP
124	TYI 56NM

Driver

License	First	Last	Address	City	Points
120	Alan	Turing	122 First Street	Brampton	4
123	Mr	Young	122 First Street	Brampton	0
121	Douglas	Englebart	234 Second Street	Brampton	2
124	Ivan	Sutherland	345 Third Street	Waterloo	0
122	George	Boole	456 Main Street	Kincardine	15

List the car colour with the address for each car?

Select Colour, Address

From Car, DriverCar, Driver

Where LicensePlate = Plate

And Person = License

Car Database

Car

LicensePlate	Colour	Model	Manufacturer
AERT 345	Red	Corvette	General Motors
456 A4GH	Silver	Hummer	General Motors
T455 YUIP	Green	Jeep	Daimler-Chrysler
RETW 3G6	Green	Camry	Toyota
TYI 56NM	Red	Corvette	General Motors

DriverCar

Person	Plate
120	AERT 345
123	AERT 345
120	T455 YUIP
123	T455 YUIP
124	TYI 56NM

Driver

License	First	Last	Address	City	Points
120	Alan	Turing	122 First Street	Brampton	4
123	Mr	Young	122 First Street	Brampton	0
121	Douglas	Englebart	234 Second Street	Brampton	2
124	Ivan	Sutherland	345 Third Street	Waterloo	0
122	George	Boole	456 Main Street	Kincardine	15

What would this print?

```
Select Model, Last
From Car, DriverCar, Driver
Where LicensePlate = Plate
And Person = License
```

Model	Last

Car Database

Car

LicensePlate	Colour	Model	Manufacturer
AERT 345	Red	Corvette	General Motors
456 A4GH	Silver	Hummer	General Motors
T455 YUIP	Green	Jeep	Daimler-Chrysler
RETW 3G6	Green	Camry	Toyota
TYI 56NM	Red	Corvette	General Motors

DriverCar

Plate	Person
AERT 345	120
AERT 345	123
T455 YUIP	120
T455 YUIP	123
TYI 56NM	124

Driver

License	First	Last	Address	City	Points
120	Alan	Turing	123 First Street	Brampton	4
123	Mr	Young	122 First Street	Brampton	0
121	Douglas	Englebart	234 Second Street	Brampton	2
124	Ivan	Sutherland	345 Third Street	Waterloo	0
122	George	Boole	456 Main Street	Kincardine	15

What would this print?

Select Model, Last
From Car, DriverCar, Driver
Where LicensePlate = Plate
And Person = License

Model	Last

Car Database

Car

LicensePlate	Colour	Model	Manufacturer
AERT 345	Red	Corvette	General Motors
456 A4GH	Silver	Hummer	General Motors
T455 YUIP	Green	Jeep	Daimler-Chrysler
RETW 3G6	Green	Camry	Toyota
TYI 56NM	Red	Corvette	General Motors

DriverCar

Plate	Person
AERT 345	120
AERT 345	123
T455 YUIP	120
T455 YUIP	123
TYI 56NM	124

Driver

License	First	Last	Address	City	Points
120	Alan	Turing	123 First Street	Brampton	4
123	Mr	Young	122 First Street	Brampton	0
121	Douglas	Englebart	234 Second Street	Brampton	2
124	Ivan	Sutherland	345 Third Street	Waterloo	0
122	George	Boole	456 Main Street	Kincardine	15

What would this print?

Select Model, Last
From Car, DriverCar, Driver
Where LicensePlate = Plate
And Person = License

Model	Last
Corvette	Turing
Hummer	Young
Jeep	Turing
Jeep	Young
Corvette	Sutherland