SQL

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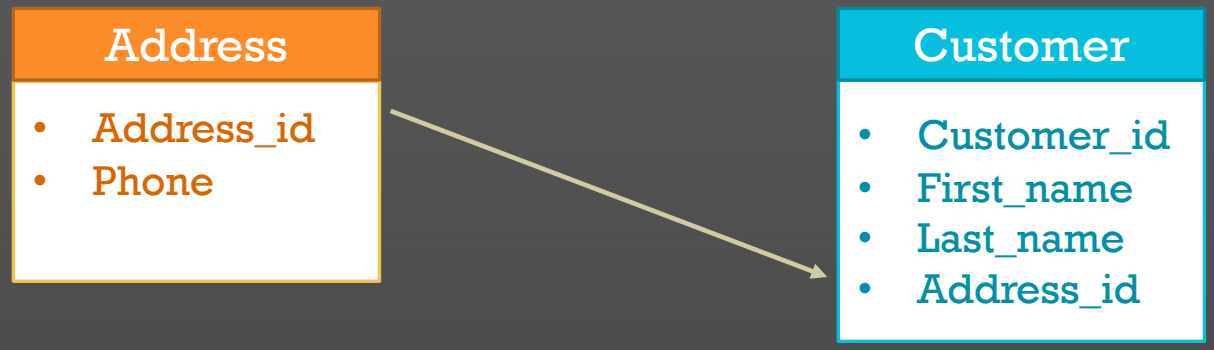
JOINS

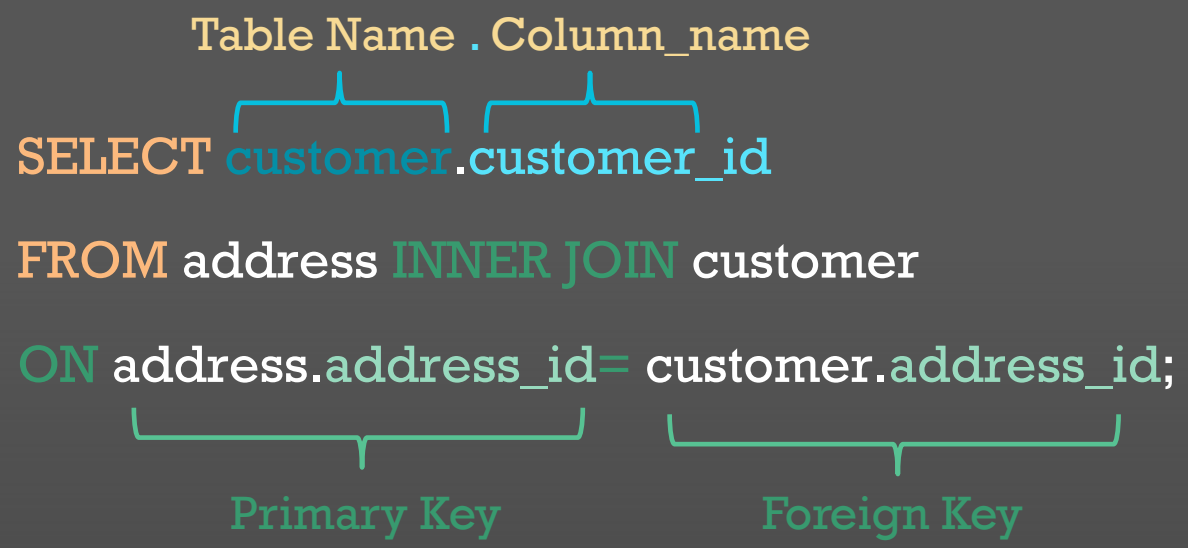
- There are several kinds of joins including INNER JOIN, OUTER JOIN and self-join.

- Suppose we want to get data from Address and Customer tables. The Customer table has the address_id field that relates to the primary key of the Address table.



INNER JOIN

- To get data from both tables, we use the INNER JOIN clause in the SELECT statement as follows:



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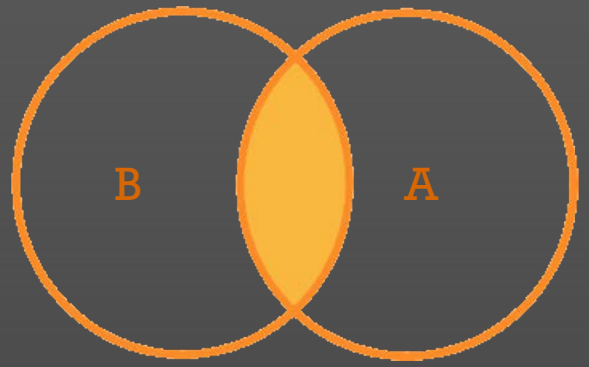
INNER JOIN

- **Inner Join** produces only the set of records that match in both Table Customer and Table Address.



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INNER JOIN

Customer			
c_id	first_name	last_name	address_id
1	Mary	Smith	**5**
2	Patricia	Johnson	NULL
3	Linda	Williams	**7**
4	Barbara	Jones	**8**
5	Elizabeth	Brown	NULL

Address		
address_id	address	phone
5	1913 Hanoi Way	28303384
7	692 Joliet Street	44847719
8	1566 Inegl Manor	70581400
10	1795 Santiago	86045262
11	900 Santiago	16571220

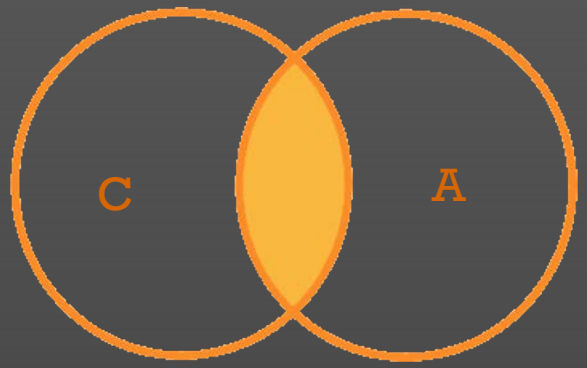
INNER JOIN

Customer			
c_id	**first_name**	**last_name**	**address_id**
1	Mary	Smith	**5**
2	Patricia	Johnson	NULL
3	Linda	Williams	**7**
4	Barbara	Jones	**8**
5	Elizabeth	Brown	NULL

Address		
address_id	**address**	**phone**
5	1913 Hanoi Way	28303384
7	692 Joliet Street	44847719
8	1566 Inegl Manor	70581400
10	1795 Santiago	86045262
11	900 Santiago	16571220

INNER JOIN

Customer				Address		
c_id	first_name	last_name	address_id	address_id	address	phone
1	Mary	Smith	**5**	**5**	1913 Hanoi Way	28303384
3	Linda	Williams	**7**	**7**	692 Joliet Street	44847719
4	Barbara	Jones	**8**	**8**	1566 Inegl Manor	70581400



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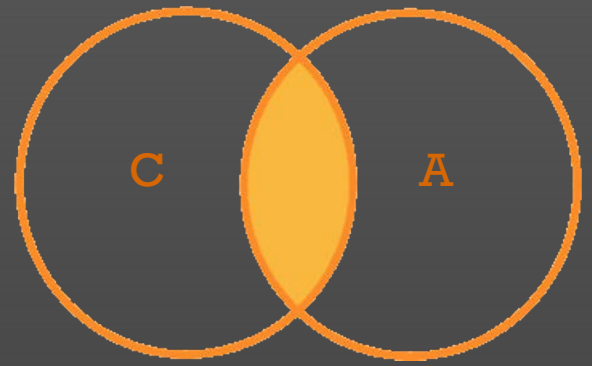
INNER JOIN

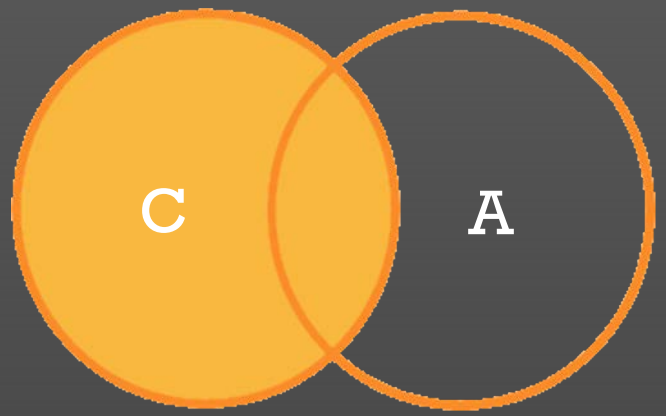
Inner Join Table				
c_id	first_name	last_name	address	phone
1	Mary	Smith	1913 Hanoi Way	28303384
3	Linda	Williams	692 Joliet Street	44847719
4	Barbara	Jones	1566 Inegl Manor	70581400

```
SELECT customer_id, first_name, last_name, address, phone
FROM customer INNER JOIN address
ON customer.address_id = address.address_id;
```



LEFT OUTER JOIN

- **Left outer join** produces a complete set of records from Table customer, with the matching records (where available) in Table Address. If there is no match, the right side will contain null.



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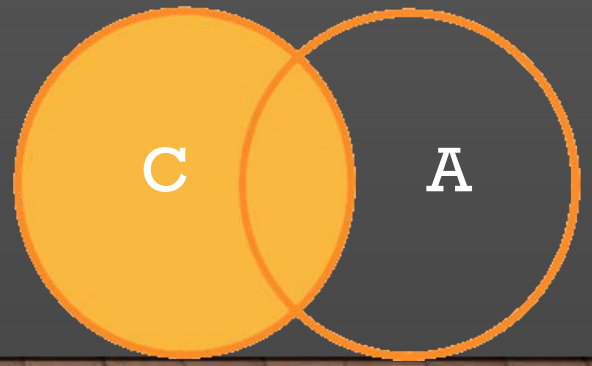
LEFT OUTER JOIN

Customer			
c_id	**first_name**	**last_name**	**address_id**
1	Mary	Smith	**5**
2	Patricia	Johnson	**NULL**
3	Linda	Williams	**7**
4	Barbara	Jones	**8**
5	Elizabeth	Brown	**NULL**

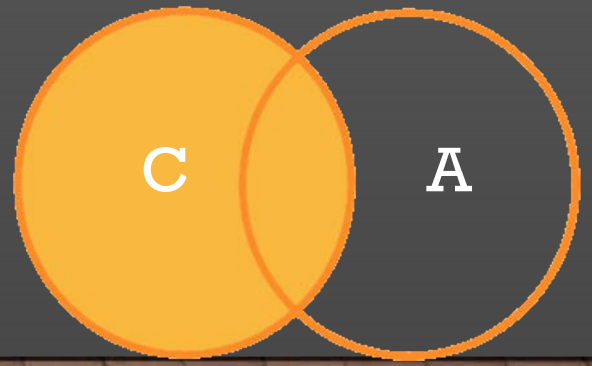
Address		
address_id	**address**	**phone**
5	1913 Hanoi Way	28303384
7	692 Joliet Street	44847719
8	1566 Inegl Manor	70581400
10	1795 Santiago	86045262
11	900 Santiago	16571220



LEFT OUTER JOIN

Customer			
c_id	**first_name**	**last_name**	**address_id**
1	Mary	Smith	**5**
2	Patricia	Johnson	**NULL**
3	Linda	Williams	**7**
4	Barbara	Jones	**8**
5	Elizabeth	Brown	**NULL**

Address		
address_id	**address**	**phone**
5	1913 Hanoi Way	28303384
7	692 Joliet Street	44847719
8	1566 Inegl Manor	70581400



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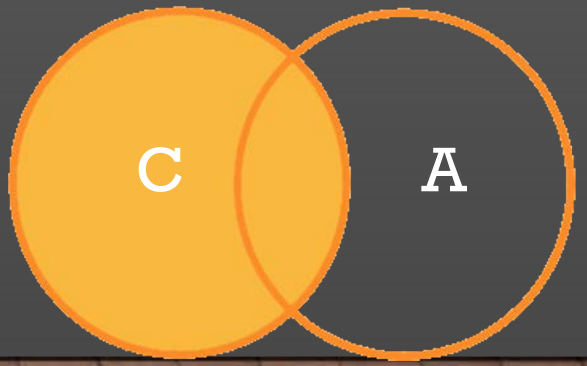
LEFT OUTER JOIN

Customer				Address		
c_id	first_name	last_name	address_id	address_id	address	phone
1	Mary	Smith	**5**	5	1913 Hanoi Way	28303384
2	Patricia	Johnson	**NULL**	NULL	NULL	NULL
3	Linda	Williams	**7**	7	692 Joliet Street	44847719
4	Barbara	Jones	**8**	8	1566 Inegl Manor	70581400
5	Elizabeth	Brown	**NULL**	NULL	NULL	NULL

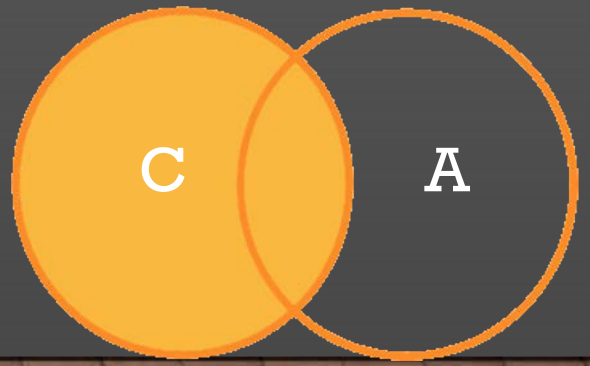
```
SELECT  * FROM customer LEFT OUTER JOIN address
ON customer.address_id = address.address_id;
```



LEFT OUTER JOIN

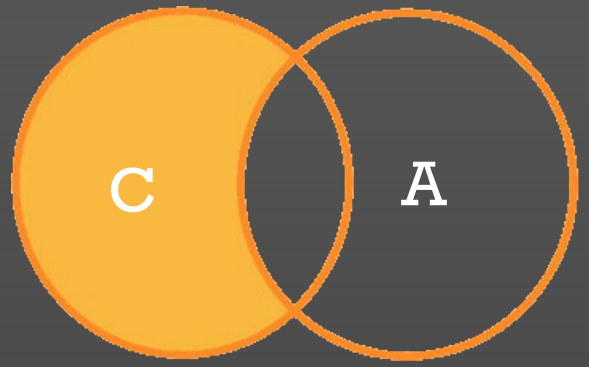
Left Outer Join Table				
c_id	**first_name**	**last_name**	**address**	**phone**
1	Mary	Smith	1913 Hanoi Way	28303384
2	Patricia	Johnson	NULL	NULL
3	Linda	Williams	692 Joliet Street	44847719
4	Barbara	Jones	1566 Inegl Manor	70581400
5	Elizabeth	Brown	NULL	NULL

```
SELECT customer_id, first_name, last_name, address, phone
FROM customer LEFT OUTER JOIN address
ON customer.address_id = address.address_id;
```



LEFT OUTER JOIN WITH WHERE

- To produce the set of records only in Customer Table, but not in Address Table, we perform the same left outer join, then **exclude the records we don't want from the right side via a where clause.**



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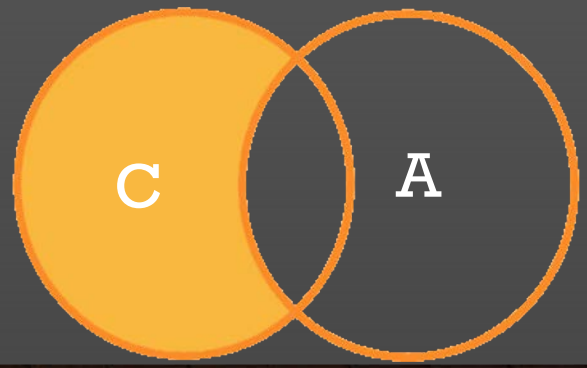
LEFT OUTER JOIN WITH WHERE

Customer

c_id	first_name	last_name	address_id
1	Mary	Smith	**5**
2	Patricia	Johnson	NULL
3	Linda	Williams	**7**
4	Barbara	Jones	**8**
5	Elizabeth	Brown	NULL

Address

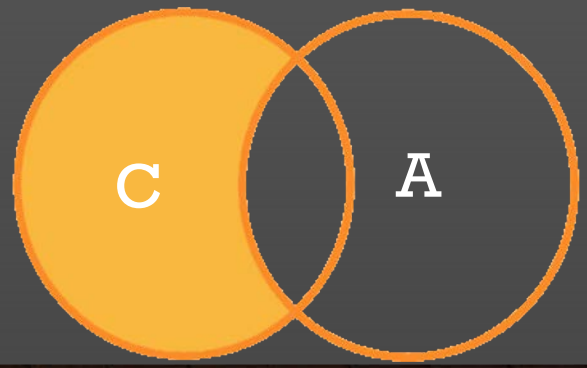
address_id	address	phone
5	1913 Hanoi Way	28303384
7	692 Joliet Street	44847719
8	1566 Inegl Manor	70581400
10	1795 Santiago	86045262
11	900 Santiago	16571220



LEFT OUTER JOIN WITH WHERE

Customer			
c_id	**first_name**	**last_name**	**address_id**
2	Patricia	Johnson	NULL
5	Elizabeth	Brown	NULL

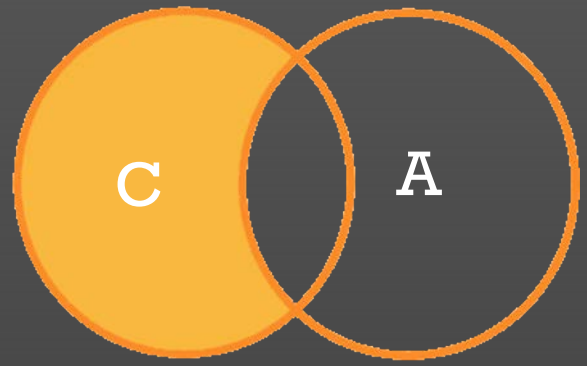
Address		
address_id	**address**	**phone**
5	1913 Hanoi Way	28303384
7	692 Joliet Street	44847719
8	1566 Inegl Manor	70581400
10	1795 Santiago	86045262
11	900 Santiago	16571220



LEFT OUTER JOIN WITH WHERE

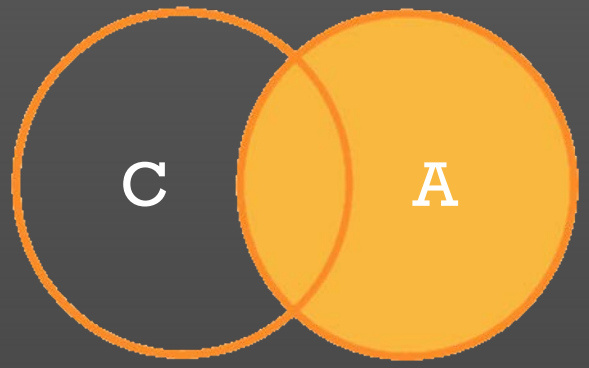
After Where Statement				
c_id	**first_name**	**last_name**	**address**	**phone**
2	Patricia	Johnson	NULL	NULL
5	Elizabeth	Brown	NULL	NULL

```
SELECT customer_id, first_name, last_name, address, phone
FROM customer LEFT OUTER JOIN address
ON customer.address_id = address.address_id
WHERE address.address_id IS NULL;
```



RIGHT OUTER JOIN

- **Right outer join** produces a complete set of records from Table Address, with the matching records (where available) in Table Customer. If there is no match, the left side will contain null.



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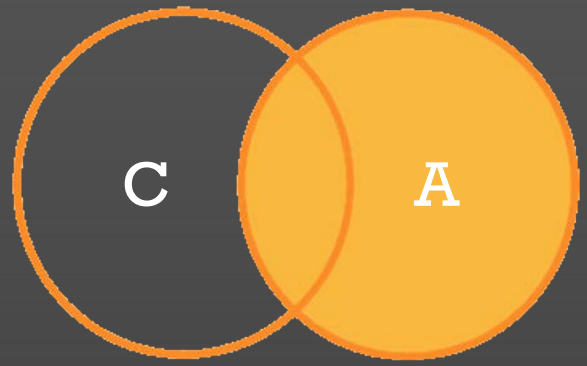
RIGHT OUTER JOIN

Customer			
c_id	**first_name**	**last_name**	**address_id**
1	Mary	Smith	5
2	Patricia	Johnson	NULL
3	Linda	Williams	7
4	Barbara	Jones	8
5	Elizabeth	Brown	NULL

Address		
address_id	**address**	**phone**
5	1913 Hanoi Way	28303384
7	692 Joliet Street	44847719
8	1566 Inegl Manor	70581400
10	1795 Santiago	86045262
11	900 Santiago	16571220



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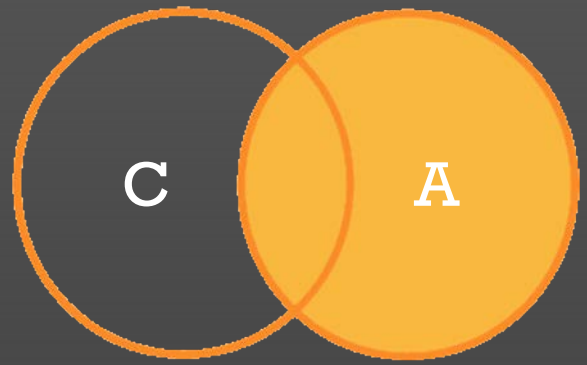
RIGHT OUTER JOIN

Customer			
c_id	**first_name**	**last_name**	**address_id**
1	Mary	Smith	**5**
2	Patricia	Johnson	NULL
3	Linda	Williams	**7**
4	Barbara	Jones	**8**
5	Elizabeth	Brown	NULL

Address		
address_id	**address**	**phone**
5	1913 Hanoi Way	28303384
7	692 Joliet Street	44847719
8	1566 Inegl Manor	70581400
10	1795 Santiago	86045262
11	900 Santiago	16571220



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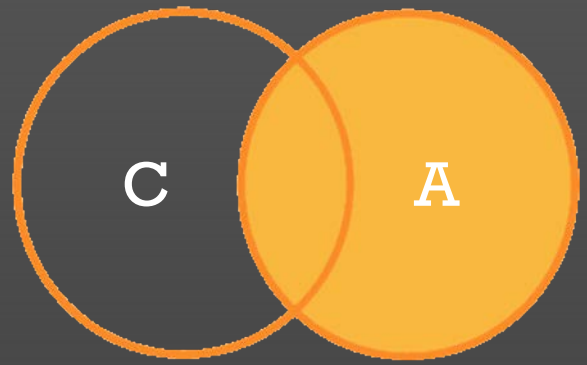
RIGHT OUTER JOIN

Customer				Address		
c_id	first_name	last_name	address_id	address_id	address	phone
1	Mary	Smith	5	5	1913 Hanoi Way	28303384
3	Linda	Williams	7	7	692 Joliet Street	44847719
4	Barbara	Jones	8	8	1566 Inegl Manor	70581400
NULL	NULL	NULL	NULL	10	1795 Santiago	86045262
NULL	NULL	NULL	NULL	11	900 Santiago	16571220

```
SELECT  * FROM customer RIGHT OUTER JOIN address
ON customer.address_id = address.address_id;
```



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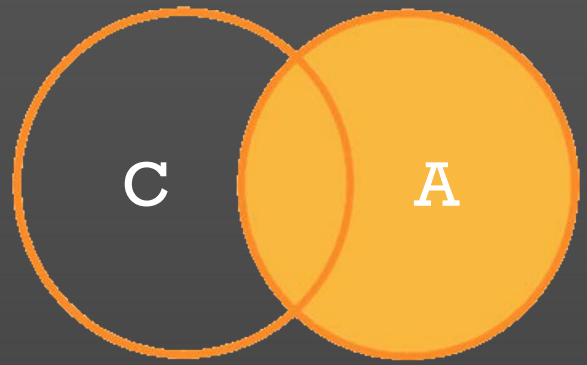
RIGHT OUTER JOIN

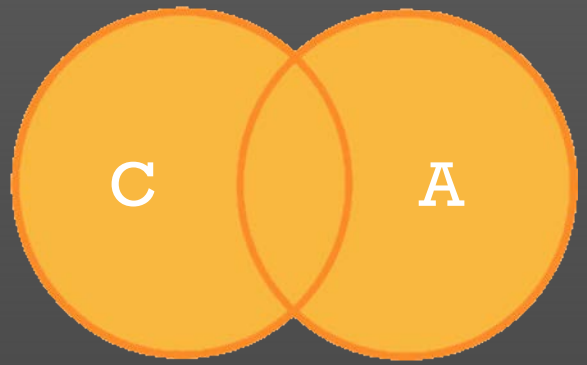
Right Outer Join Table				
c_id	**first_name**	**last_name**	**address**	**phone**
1	Mary	Smith	1913 Hanoi Way	28303384
3	Linda	Williams	692 Joliet Street	44847719
4	Barbara	Jones	1566 Inegl Manor	70581400
NULL	NULL	NULL	1795 Santiago	86045262
NULL	NULL	NULL	900 Santiago	16571220

```
SELECT customer_id, first_name, last_name, address, phone
FROM customer RIGHT OUTER JOIN address
ON customer.address_id = address.address_id;
```



FULL OUTER JOIN

- **Full outer join** produces the set of all records in Table Customer and Table Address with matching records from both sides where available. If there is no match, the missing side will contain null.



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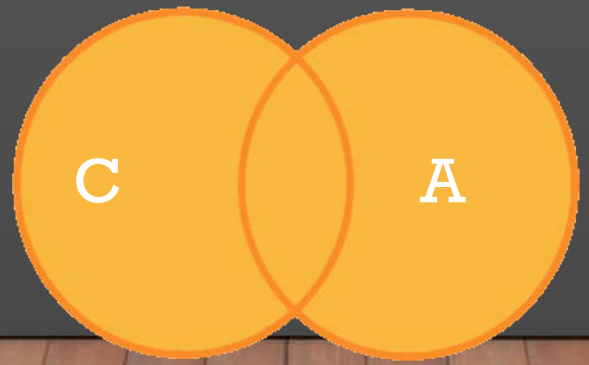
FULL OUTER JOIN

Customer			
c_id	**first_name**	**last_name**	**address_id**
1	Mary	Smith	5
2	Patricia	Johnson	**NULL**
3	Linda	Williams	7
4	Barbara	Jones	8
5	Elizabeth	Brown	**NULL**

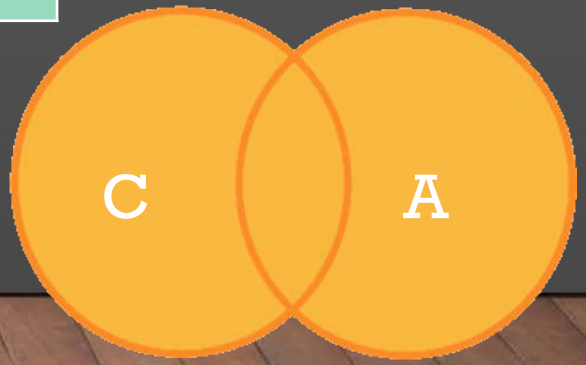
Address		
address_id	**address**	**phone**
5	1913 Hanoi Way	28303384
7	692 Joliet Street	44847719
8	1566 Inegl Manor	70581400
10	1795 Santiago	86045262
11	900 Santiago	16571220



FULL OUTER JOIN

Customer				Address		
c_id	first_name	last_name	address_id	address_id	address	phone
1	Mary	Smith	5	5	1913 Hanoi Way	28303384
2	Patricia	Johnson	NULL	NULL	NULL	NULL
3	Linda	Williams	7	7	692 Joliet Street	44847719
4	Barbara	Jones	8	8	1566 Inegl Manor	70581400
5	Elizabeth	Brown	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	10	1795 Santiago	86045262
NULL	NULL	NULL	NULL	11	900 Santiago	16571220

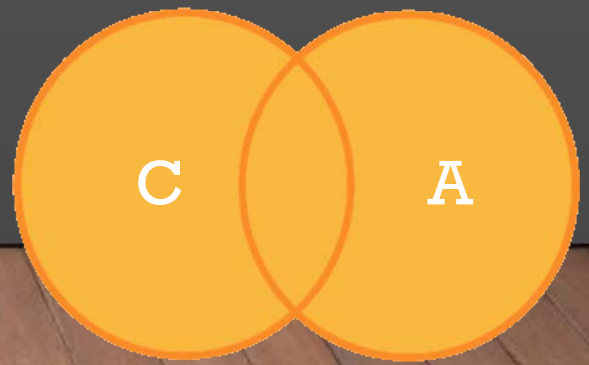
```
SELECT * FROM customer FULL OUTER JOIN address
ON customer.address_id = address.address_id;
```



FULL OUTER JOIN

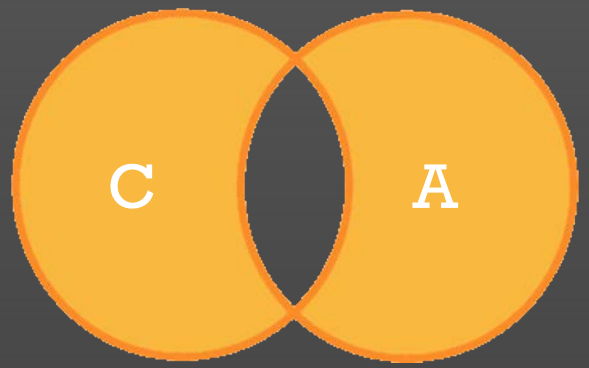
Full Outer Join				
c_id	**first_name**	**last_name**	**address**	**phone**
1	Mary	Smith	1913 Hanoi Way	28303384
2	Patricia	Johnson	NULL	NULL
3	Linda	Williams	692 Joliet Street	44847719
4	Barbara	Jones	1566 Inegl Manor	70581400
5	Elizabeth	Brown	NULL	NULL
NULL	NULL	NULL	1795 Santiago	86045262
NULL	NULL	NULL	900 Santiago	16571220

```
SELECT customer_id, first_name, last_name, address, phone
FROM customer FULL OUTER JOIN address
ON customer.address_id = address.address_id;
```



FULL OUTER JOIN WITH WHERE

- To produce the set of records unique to Customer Table and Address Table, we perform the same full outer join, then **exclude the records we don't want from both sides via a where clause.**



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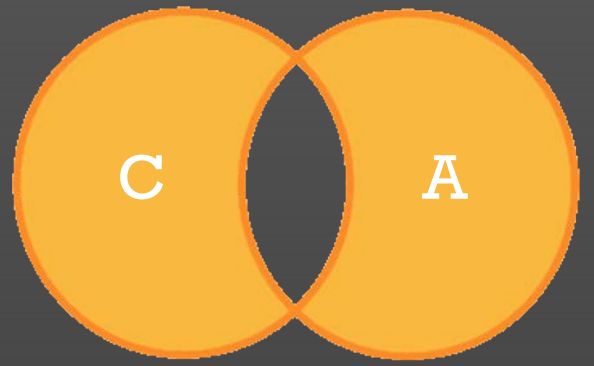
FULL OUTER JOIN WITH WHERE

Customer

c_id	first_name	last_name	address_id
1	Mary	Smith	5
2	Patricia	Johnson	NULL
3	Linda	Williams	7
4	Barbara	Jones	8
5	Elizabeth	Brown	NULL

Address

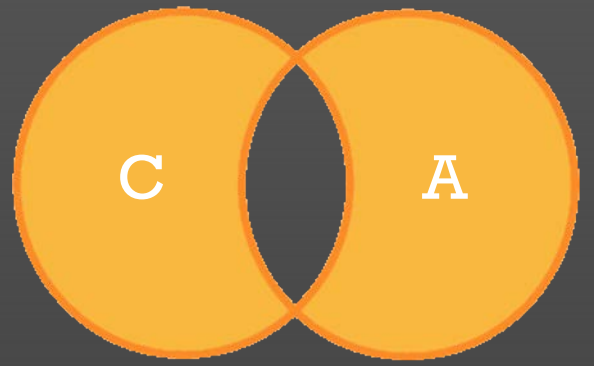
address_id	address	phone
5	1913 Hanoi Way	28303384
7	692 Joliet Street	44847719
8	1566 Inegl Manor	70581400
10	1795 Santiago	86045262
11	900 Santiago	16571220



FULL OUTER JOIN WITH WHERE

Customer			
c_id	**first_name**	**last_name**	**address_id**
2	Patricia	Johnson	**NULL**
5	Elizabeth	Brown	**NULL**

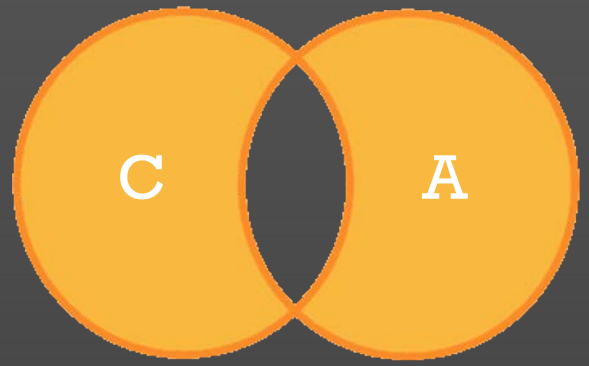
Address		
address_id	**address**	**phone**
10	1795 Santiago	86045262
11	900 Santiago	16571220



FULL OUTER JOIN WITH WHERE

Customer				Address		
c_id	first_name	last_name	address_id	address_id	address	phone
2	Patricia	Johnson	NULL	NULL	NULL	NULL
5	Elizabeth	Brown	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	10	1795 Santiago	86045262
NULL	NULL	NULL	NULL	11	900 Santiago	16571220

```
SELECT  * FROM customer FULL OUTER JOIN address
ON customer.address_id = address.address_id
WHERE customer.address_id IS NULL  OR
address.address_id IS NULL;
```



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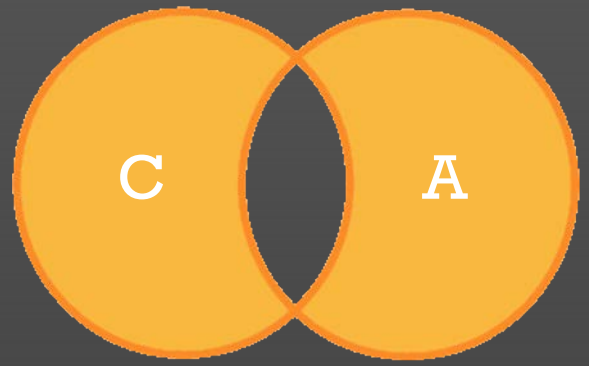
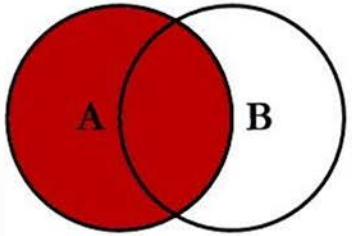
FULL OUTER JOIN WITH WHERE

Full Outer with Where				
c_id	**first_name**	**last_name**	**address**	**phone**
2	Patricia	Johnson	NULL	NULL
5	Elizabeth	Brown	NULL	NULL
NULL	NULL	NULL	1795 Santiago	86045262
NULL	NULL	NULL	900 Santiago	16571220

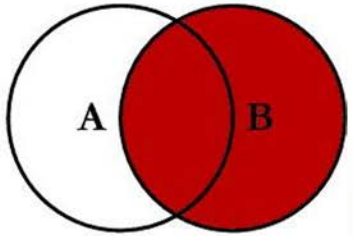
```
SELECT customer_id, first_name, last_name, address, phone
FROM customer FULL OUTER JOIN address
ON customer.address_id = address.address_id
WHERE customer.address_id IS NULL  OR address.address_id
IS NULL;
```



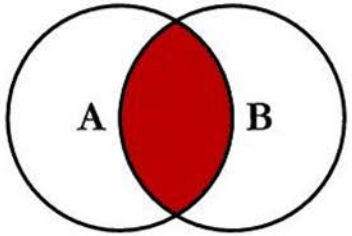
SQL JOINS



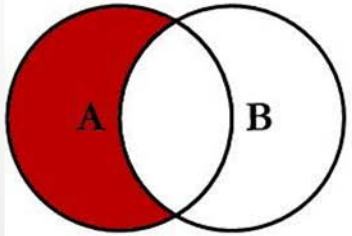

```
SELECT <select_list>
FROM TableA A
LEFT JOIN TableB B
ON A.Key = B.Key
```



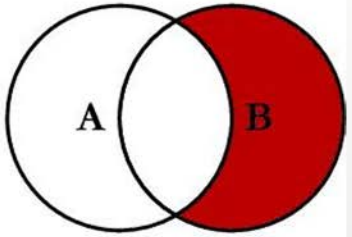

```
SELECT <select_list>
FROM TableA A
RIGHT JOIN TableB B
ON A.Key = B.Key
```



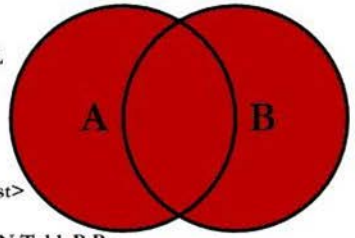

```
SELECT <select_list>
FROM TableA A
INNER JOIN TableB B
ON A.Key = B.Key
```



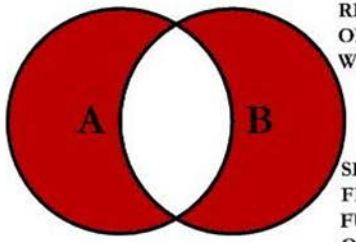

```
SELECT <select_list>
FROM TableA A
LEFT JOIN TableB B
ON A.Key = B.Key
WHERE B.Key IS NULL
```




```
SELECT <select_list>
FROM TableA A
RIGHT JOIN TableB B
ON A.Key = B.Key
WHERE A.Key IS NULL
```




```
SELECT <select_list>
FROM TableA A
FULL OUTER JOIN TableB B
ON A.Key = B.Key
```




```
SELECT <select_list>
FROM TableA A
FULL OUTER JOIN TableB B
ON A.Key = B.Key
WHERE A.Key IS NULL
OR B.Key IS NULL
```

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