SQL JOINS

Inner join

The following statement joins the first table (`basket_a`) with the second table (`basket_b`) by matching the values in the `fruit_a` and `fruit_b` columns:

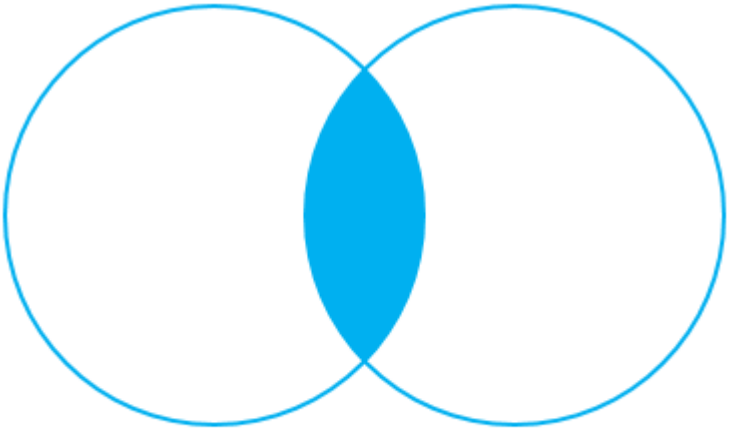
`SELECT a, fruit_a, b, fruit_b FROM basket_a INNER JOIN basket_b ON fruit_a = fruit_b;`

```
SELECT
    a,
    fruit_a,
    b,
    fruit_b
FROM
    basket_a
INNER JOIN basket_b
    ON fruit_a = fruit_b;
```

	a integer	fruit_a character varying (100)	b integer	fruit_b character varying (100)
1	1	Apple	2	Apple
2	2	Orange	1	Orange

The inner join examines each row in the first table (`basket_a`). It compares the value in the `fruit_a` column with the value in the `fruit_b` column of each row in the second table (`basket_b`). If these values are equal, the inner join creates a new row that contains columns from both tables and adds this new row the result set.

The following Venn diagram illustrates the inner join:



INNER JOIN

PostgreSQL left join

The following statement uses the left join clause to join the `basket_a` table with the `basket_b` table. In the left join context, the first table is called the left table and the second table is called the right table.

`SELECT a, fruit_a, b, fruit_b FROM basket_a LEFT JOIN basket_b ON fruit_a = fruit_b;`

```
SELECT
    a,
    fruit_a,
    b,
    fruit_b
FROM
    basket_a
LEFT JOIN basket_b
   ON fruit_a = fruit_b;
```

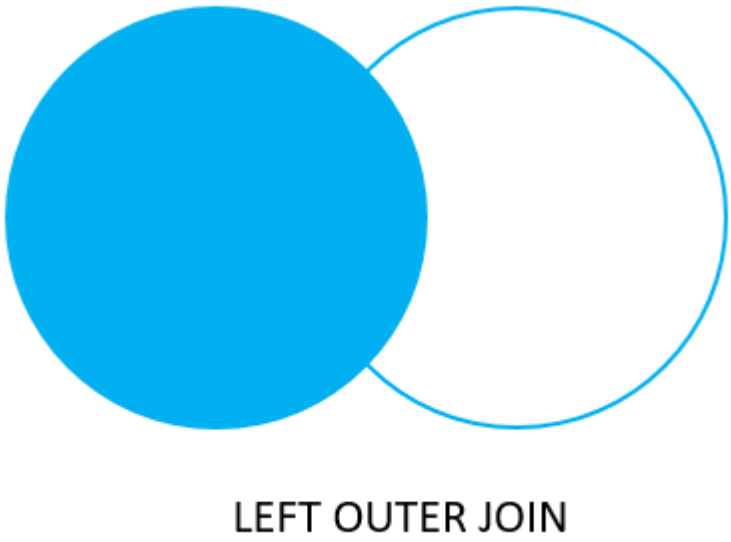
	a integer	fruit_a character varying (100)	b integer	fruit_b character varying (100)
1	1	Apple	2	Apple
2	2	Orange	1	Orange
3	3	Banana	[null]	[null]
4	4	Cucumber	[null]	[null]

The left join starts selecting data from the left table. It compares values in the fruit_a column with the values in the fruit_b column in the basket_b table.

If these values are equal, the left join creates a new row that contains columns of both tables and adds this new row to the result set. (see the row #1 and #2 in the result set).

In case the values do not equal, the left join also creates a new row that contains columns from both tables and adds it to the result set. However, it fills the columns of the right table (`basket_b`) with null. (see the row #3 and #4 in the result set).

The following Venn diagram illustrates the left join:



To select rows from the left table that do not have matching rows in the right table, you use the left join with a `[WHERE](https://www.postgresqltutorial.com/postgresql-where/)` clause. For example:

```
SELECT a, fruit_a, b, fruit_b FROM basket_a LEFT JOIN basket_b ON fruit_a = fruit_b
WHERE b IS NULL;
```

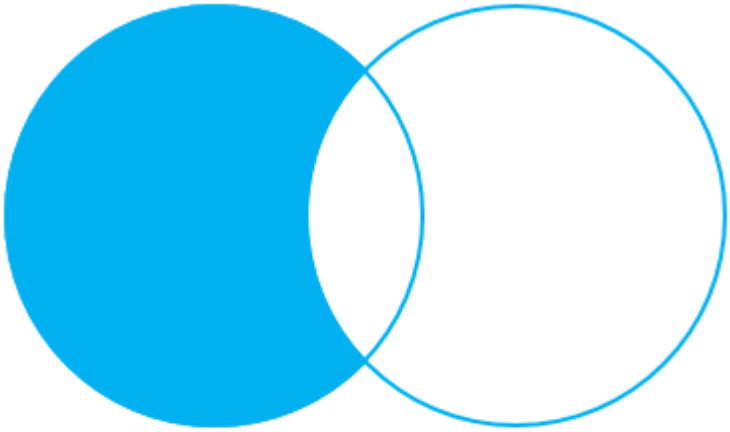
```
SELECT
    a,
    fruit_a,
    b,
    fruit_b
FROM
    basket_a
LEFT JOIN basket_b
    ON fruit_a = fruit_b
WHERE b IS NULL;
```

The output is:

	a integer	fruit_a character varying (100)	b integer	fruit_b character varying (100)
1	3	Banana	[null]	[null]
2	4	Cucumber	[null]	[null]

Note that the `LEFT JOIN` is the same as the `LEFT OUTER JOIN` so you can use them interchangeably.

The following Venn diagram illustrates the left join that returns rows from the left table that do not have matching rows from the right table:



PostgreSQL right join

The right join is a reversed version of the left join. The right join starts selecting data from the right table. It compares each value in the fruit_b column of every row in the right table with each value in the fruit_a column of every row in the fruit_a table.

If these values are equal, the right join creates a new row that contains columns from both tables.

In case these values are not equal, the right join also creates a new row that contains columns from both tables. However, it fills the columns in the left table with NULL.

The following statement uses the right join to join the `basket_a` table with the `basket_b` table:

`SELECT a, fruit_a, b, fruit_b FROM basket_a RIGHT JOIN basket_b ON fruit_a = fruit_b;`

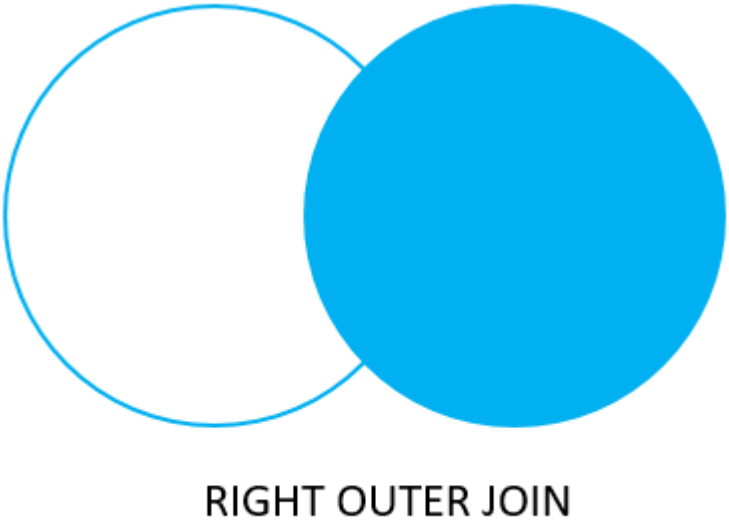
```
SELECT
    a,
    fruit_a,
    b,
    fruit_b
FROM
    basket_a
```

```
RIGHT JOIN basket_b
   ON fruit_a = fruit_b;
```

Here is the output:

	a integer	fruit_a character varying (100)	b integer	fruit_b character varying (100)
1	2	Orange	1	Orange
2	1	Apple	2	Apple
3	[null]	[null]	3	Watermelon
4	[null]	[null]	4	Pear

The following Venn diagram illustrates the right join:



Similarly, you can get rows from the right table that do not have matching rows from the left table by adding a `WHERE` clause as follows:

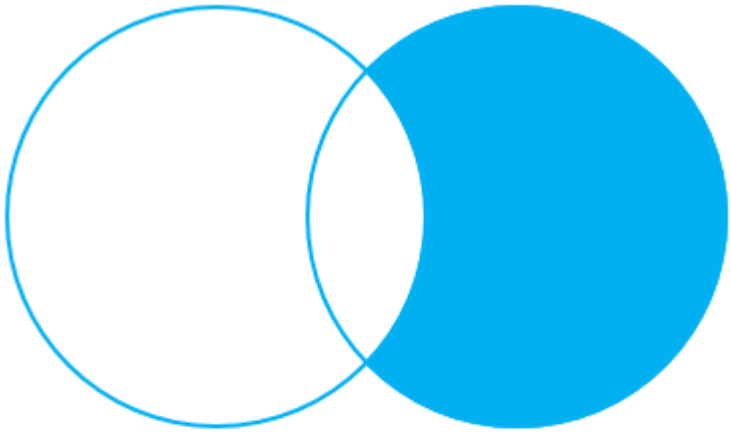
```
SELECT a, fruit_a, b, fruit_b FROM basket_a RIGHT JOIN basket_b ON fruit_a = fruit_b
WHERE a IS NULL;
```

```
SELECT
    a,
    fruit_a,
    b,
    fruit_b
FROM
    basket_a
RIGHT JOIN basket_b
    ON fruit_a = fruit_b
WHERE a IS NULL;
```

	a integer	fruit_a character varying (100)	b integer	fruit_b character varying (100)
1	[null]	[null]	3	Watermelon
2	[null]	[null]	4	Pear

The `RIGHT JOIN` and `RIGHT OUTER JOIN` are the same therefore you can use them interchangeably.

The following Venn diagram illustrates the right join that returns rows from the right table that do not have matching rows in the left table:



PostgreSQL full outer join

The full outer join or full join returns a result set that contains all rows from both left and right tables, with the matching rows from both sides if available. In case there is no match, the columns of the table will be filled with NULL.

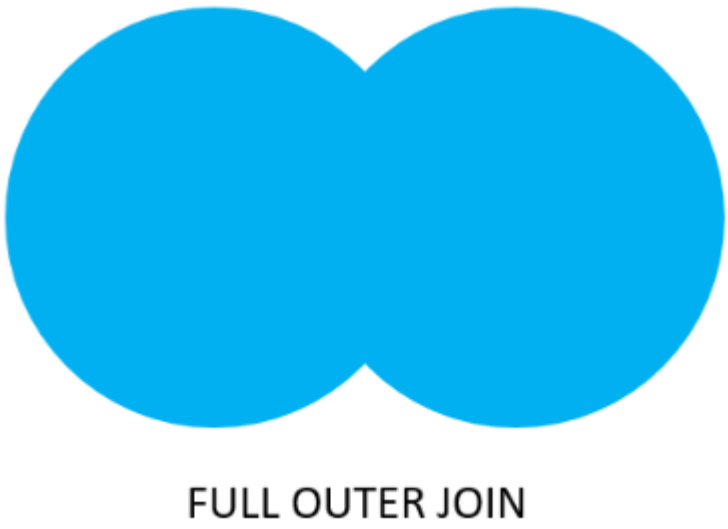
`SELECT a, fruit_a, b, fruit_b FROM basket_a FULL OUTER JOIN basket_b ON fruit_a = fruit_b;`

```
SELECT
    a,
    fruit_a,
    b,
    fruit_b
FROM
    basket_a
FULL OUTER JOIN basket_b
    ON fruit_a = fruit_b
```

Output:

	a integer	fruit_a character varying (100)	b integer	fruit_b character varying (100)
1	1	Apple	2	Apple
2	2	Orange	1	Orange
3	3	Banana	[null]	[null]
4	4	Cucumber	[null]	[null]
5	[null]	[null]	3	Watermelon
6	[null]	[null]	4	Pear

The following Venn diagram illustrates the full outer join:



To return rows in a table that do not have matching rows in the other, you use the full join with a `WHERE` clause like this:

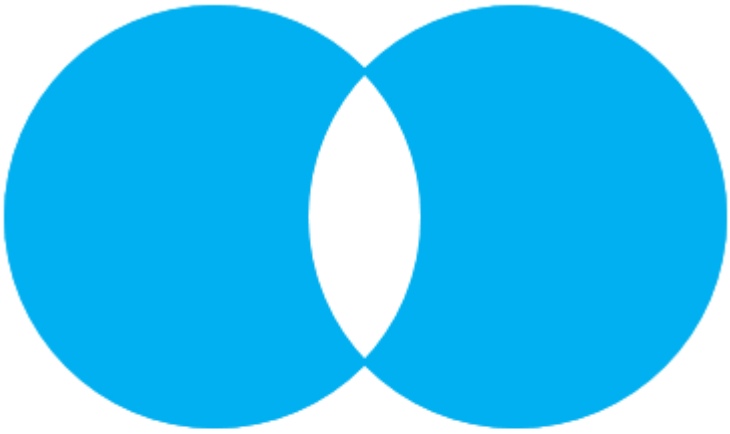
```
SELECT a, fruit_a, b, fruit_b FROM basket_a FULL JOIN basket_b ON fruit_a = fruit_b
WHERE a IS NULL OR b IS NULL;
```

```
SELECT
    a,
    fruit_a,
    b,
    fruit_b
FROM
    basket_a
RIGHT JOIN basket_b
    ON fruit_a = fruit_b
WHERE a IS NULL OR b IS NULL;
```

Here is the result:

	a integer	fruit_a character varying (100)	b integer	fruit_b character varying (100)
1	3	Banana	[null]	[null]
2	4	Cucumber	[null]	[null]
3	[null]	[null]	3	Watermelon
4	[null]	[null]	4	Pear

The following Venn diagram illustrates the full outer join that returns rows from a table that do not have the corresponding rows in the other table:



The following picture shows all the PostgreSQL joins that we discussed so far with the detailed syntax:

SELECT * FROM a
INNER JOIN b ON a.key = b.key

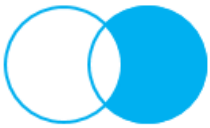
SELECT * FROM a
LEFT JOIN b ON a.key = b.key

SELECT * FROM a
RIGHT JOIN b ON a.key = b.key

POSTGRESQL JOINS

POSTGRESQL TUTORIAL

SELECT * FROM a
LEFT JOIN b ON a.key = b.key
WHERE b.key IS NULL



SELECT * FROM a
RIGHT JOIN b ON a.key = b.key
WHERE a.key IS NULL

SELECT * FROM a
FULL JOIN b ON a.key = b.key

SELECT * FROM a
FULL JOIN b ON a.key = b.key
WHERE a.key IS NULL OR b.key IS NULL