

# SQL JOINS in MySQL

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In SQL, **JOINS** are used to combine rows from **two or more tables** based on related columns — usually a **foreign key** in one table referencing a **primary key** in another.

We'll use the following two tables:

**users table**

id	name
1	Aarav
2	Sneha
3	Raj

**addresses table**

id	user_id	city
1	1	Mumbai
2	2	Kolkata
3	4	Delhi

Note: `user_id` is a **foreign key** that references `users.id`.

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## 1. INNER JOIN

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Returns **only the matching rows** from both tables.

```
SELECT users.name, addresses.city
FROM users
INNER JOIN addresses ON users.id = addresses.user_id;
```

## Output:

name	city
Aarav	Mumbai
Sneha	Kolkata

`Raj` is excluded because there is no matching address. `Delhi` is excluded because its `user_id` (4) is not in `users`.

## Visual Representation:

```
users          addresses
-----
| 1 |          | 1 |
| 2 |          | 2 |
|   |          |   |
=> only matching pairs
```

## 2. LEFT JOIN

Returns **all rows from the left table** ( `users` ), and matching rows from the right table ( `addresses` ). If no match is found, NULLs are returned.

```
SELECT users.name, addresses.city
FROM users
LEFT JOIN addresses ON users.id = addresses.user_id;
```

## Output:

name	city
Aarav	Mumbai
Sneha	Kolkata
Raj	NULL

`Raj` is shown even though he doesn't have an address.

## Visual Representation:

```
users          addresses
-----
| 1 |          | 1 |
| 2 |          | 2 |
| 3 |          |   |
=> all users + matched addresses (or NULL)
```

## 3. RIGHT JOIN

Returns **all rows from the right table** ( `addresses` ), and matching rows from the left table ( `users` ). If no match is found, NULLs are returned.

```
SELECT users.name, addresses.city
FROM users
RIGHT JOIN addresses ON users.id = addresses.user_id;
```

## Output:

name	city
Aarav	Mumbai
Sneha	Kolkata

name	city
NULL	Delhi

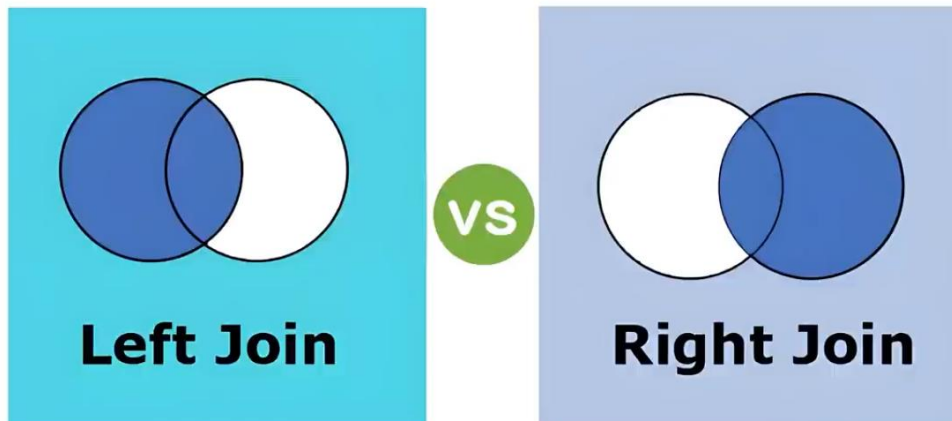
`Delhi` is shown even though it points to a `user_id` that doesn't exist.

## Visual Representation:

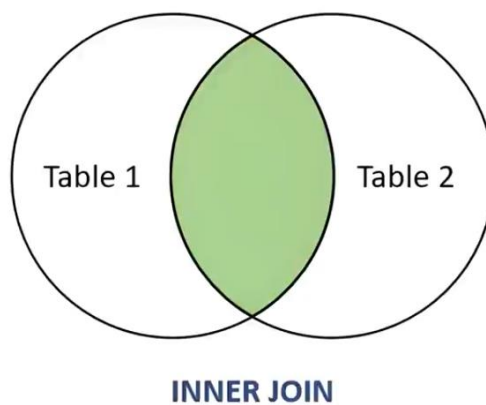
users	addresses
-----	-----
1	1
2	2
	4
=> all addresses + matched users (or NULL)	

## Summary Table

JOIN Type	Description
INNER JOIN	Only matching rows from both tables
LEFT JOIN	All rows from left table + matching from right
RIGHT JOIN	All rows from right table + matching from left



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