

## What is JOIN?

A **JOIN** in SQL is used to combine rows from two or more tables based on a related column between them.

## Types of JOINS

1. **INNER JOIN** → Returns only matching rows.
2. **LEFT JOIN** (or LEFT OUTER JOIN) → Returns all rows from the left table + matching rows from the right table.
3. **RIGHT JOIN** (or RIGHT OUTER JOIN) → Returns all rows from the right table + matching rows from the left table.
4. **FULL JOIN** (or FULL OUTER JOIN) → Returns all rows when there is a match in one of the tables.

## Example Scenario

We have two tables:

### Students Table

StudentID	Name	Class
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1	Amit	10
2	Priya	10
3	Rohan	11
4	Neha	12

### Marks Table

MarkID	StudentID	Subject	Marks
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101	1	Math	85
102	2	Science	90
103	3	Math	78
104	5	English	88

## ❶ INNER JOIN (only matching StudentID)

```
SELECT s.StudentID, s.Name, m.Subject, m.MarksFROM Students sINNER JOIN Marks mON s.StudentID = m.StudentID;
```

✅ Output:

StudentID	Name	Subject	Marks
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1	Amit	Math	85
2	Priya	Science	90
3	Rohan	Math	78

(StudentID = 5 in Marks has no match, so it's excluded.)

## ❷ LEFT JOIN (all students, even if no marks)

```
SELECT s.StudentID, s.Name, m.Subject, m.MarksFROM Students sLEFT JOIN Marks mON s.StudentID = m.StudentID;
```

✅ Output:

StudentID	Name	Subject	Marks
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1	Amit	Math	85
2	Priya	Science	90
3	Rohan	Math	78
4	Neha	NULL	NULL

(Neha has no marks → NULL returned.)

### ③ RIGHT JOIN (all marks, even if no student exists)

```
SELECT s.StudentID, s.Name, m.Subject, m.MarksFROM Students sRIGHT JOIN Marks mON s.StudentID = m.StudentID;
```

✅ Output:

StudentID	Name	Subject	Marks
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1	Amit	Math	85
2	Priya	Science	90
3	Rohan	Math	78
NULL	NULL	English	88

(MarkID 104 belongs to StudentID=5, but that student does not exist in `Students` table → NULL returned.)

### ④ FULL OUTER JOIN (all students + all marks)

```
SELECT s.StudentID, s.Name, m.Subject, m.MarksFROM Students sFULL OUTER JOIN Marks mON s.StudentID = m.StudentID;
```

✅ Output:

StudentID	Name	Subject	Marks
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1	Amit	Math	85
2	Priya	Science	90
3	Rohan	Math	78
4	Neha	NULL	NULL
NULL	NULL	English	88