Inner Join further divided into three subtypes:

- Theta join
- Natural join
- EQUI join

Inner join:

```
mysql> select *from project;
+-----+----------+------+
| pid | location | eid  |
+-----+----------+------+
|  11 | delhi    |    1 |
|  12 | delhi    |    2 |
|  13 | mng      |    3 |
|  14 | bng      |    4 |
+-----+----------+------+
4 rows in set (0.00 sec)

mysql> select *from emp;
+-----+-------+---------+
| eid | name  | address |
+-----+-------+---------+
|   1 | raju  | delhi   |
|   2 | ravi  | delhi   |
|   3 | arjun | bgk     |
|   4 | arya  | bgm     |
|   5 | advik | bng     |
+-----+-------+---------+
5 rows in set (0.00 sec)

mysql> select *from emp inner join project on emp.eid=project.eid;
+-----+-------+---------+-----+----------+------+
| eid | name  | address | pid | location | eid  |
+-----+-------+---------+-----+----------+------+
|   1 | raju  | delhi   |  11 | delhi    |    1 |
|   2 | ravi  | delhi   |  12 | delhi    |    2 |
|   3 | arjun | bgk     |  13 | mng      |    3 |
|   4 | arya  | bgm     |  14 | bng      |    4 |
+-----+-------+---------+-----+----------+------+
4 rows in set (0.00 sec)
```

Natural Join:

Example 1:

```
mysql> select *from emp natural join dept;
Empty set (0.00 sec)

mysql> select *from emp;
+-----+-------+---------+
| eid | name  | address |
+-----+-------+---------+
|   1 | raju  | delhi   |
|   2 | ravi  | delhi   |
|   3 | arjun | bgk     |
|   4 | arya  | bgm     |
|   5 | advik | bng     |
+-----+-------+---------+
5 rows in set (0.00 sec)

mysql> select *from dept;
+--------+-------+------+
| deptno | name  | eid  |
+--------+-------+------+
|     11 | hr    |    1 |
|     12 | markt |    2 |
|     13 | IT    |    3 |
+--------+-------+------+
3 rows in set (0.00 sec)
```

Example 2:

```
mysql> select *from emp natural join project;
+-----+-------+---------+-----+----------+
| eid | name  | address | pid | location |
+-----+-------+---------+-----+----------+
|   1 | raju  | delhi   |  11 | delhi    |
|   2 | ravi  | delhi   |  12 | delhi    |
|   3 | arjun | bgk     |  13 | mng      |
|   4 | arya  | bgm     |  14 | bng      |
+-----+-------+---------+-----+----------+
4 rows in set (0.00 sec)

mysql> select *from emp;
+-----+-------+---------+
| eid | name  | address |
+-----+-------+---------+
|   1 | raju  | delhi   |
|   2 | ravi  | delhi   |
|   3 | arjun | bgk     |
|   4 | arya  | bgm     |
|   5 | advik | bng     |
+-----+-------+---------+
5 rows in set (0.00 sec)

mysql> select *from project
    -> ;
+-----+----------+------+
| pid | location | eid  |
+-----+----------+------+
|  11 | delhi    |    1 |
|  12 | delhi    |    2 |
|  13 | mng      |    3 |
|  14 | bng      |    4 |
+-----+----------+------+
4 rows in set (0.00 sec)
```

Theta Join:

Example 1:

```
mysql> select *from laptop;
+---------+-------+
| model   | price |
+---------+-------+
| dell    | 10000 |
| asus    | 20000 |
| samsung | 35000 |
+---------+-------+
3 rows in set (0.00 sec)

mysql> select *from mobile;
+--------+-------+
| model  | price |
+--------+-------+
| nokia  | 10000 |
| iphone | 20000 |
+--------+-------+
2 rows in set (0.00 sec)
```

```
mysql> select *from mobile m,laptop l where m.price<l.price;
+--------+-------+---------+-------+
| model  | price | model   | price |
+--------+-------+---------+-------+
| nokia  | 10000 | asus    | 20000 |
| nokia  | 10000 | samsung | 35000 |
| iphone | 20000 | samsung | 35000 |
+--------+-------+---------+-------+
3 rows in set (0.00 sec)

mysql> select m.model,m.price from mobile m,laptop l where m.price<l.price;
+--------+-------+
| model  | price |
+--------+-------+
| nokia  | 10000 |
| nokia  | 10000 |
| iphone | 20000 |
+--------+-------+
3 rows in set (0.00 sec)
```

Example 2:

```
mysql> select *from emp inner join project on emp.eid>project.eid;
+-----+-------+---------+-----+----------+------+
| eid | name  | address | pid | location | eid  |
+-----+-------+---------+-----+----------+------+
|   2 | ravi  | delhi   |  11 | delhi    |    1 |
|   3 | arjun | bgk     |  11 | delhi    |    1 |
|   4 | arya  | bgm     |  11 | delhi    |    1 |
|   5 | advik | bng     |  11 | delhi    |    1 |
|   3 | arjun | bgk     |  12 | delhi    |    2 |
|   4 | arya  | bgm     |  12 | delhi    |    2 |
|   5 | advik | bng     |  12 | delhi    |    2 |
|   4 | arya  | bgm     |  13 | mng      |    3 |
|   5 | advik | bng     |  13 | mng      |    3 |
|   5 | advik | bng     |  14 | bng      |    4 |
+-----+-------+---------+-----+----------+------+
10 rows in set (0.00 sec)

mysql> select *from emp inner join project on emp.eid<project.eid;
+-----+-------+---------+-----+----------+------+
| eid | name  | address | pid | location | eid  |
+-----+-------+---------+-----+----------+------+
|   1 | raju  | delhi   |  12 | delhi    |    2 |
|   1 | raju  | delhi   |  13 | mng      |    3 |
|   2 | ravi  | delhi   |  13 | mng      |    3 |
|   1 | raju  | delhi   |  14 | bng      |    4 |
|   2 | ravi  | delhi   |  14 | bng      |    4 |
|   3 | arjun | bgk     |  14 | bng      |    4 |
+-----+-------+---------+-----+----------+------+
6 rows in set (0.01 sec)
```

Equi Join:

```
mysql> select *from emp,project where emp.address=project.location;
+-----+-------+---------+-----+----------+------+
| eid | name  | address | pid | location | eid  |
+-----+-------+---------+-----+----------+------+
|   1 | raju  | delhi   |  11 | delhi    |    1 |
|   1 | raju  | delhi   |  12 | delhi    |    2 |
|   2 | ravi  | delhi   |  11 | delhi    |    1 |
|   2 | ravi  | delhi   |  12 | delhi    |    2 |
|   5 | advik | bng     |  14 | bng      |    4 |
+-----+-------+---------+-----+----------+------+
5 rows in set (0.00 sec)

mysql> select *from emp inner join project on emp.address=project.location;
+-----+-------+---------+-----+----------+------+
| eid | name  | address | pid | location | eid  |
+-----+-------+---------+-----+----------+------+
|   1 | raju  | delhi   |  11 | delhi    |    1 |
|   1 | raju  | delhi   |  12 | delhi    |    2 |
|   2 | ravi  | delhi   |  11 | delhi    |    1 |
|   2 | ravi  | delhi   |  12 | delhi    |    2 |
|   5 | advik | bng     |  14 | bng      |    4 |
+-----+-------+---------+-----+----------+------+
5 rows in set (0.00 sec)
```

Using Left outer join:

The following statement retrieves all orders and employees data from both `orders` and `employees` tables:

If we see ORDERS salesman_id contains null values. If we use inner join then we will get only matching rows not non matching rows which contain salesman_id as NULL. We want retrieve all orders and employees data from both `orders` and `employees` tables. So, we will use left outer join instead of inner join.

SELECT order_id, status, first_name, last_name from ORDERS **left outer join** EMPLOYEES on employee_id = salesman_id;

```
mysql> SELECT  order_id, status, first_name, last_name from ORDERS left outer join EMPLOYEES on employee_id = salesman_id;
+----------+----------+------------+------------+
| order_id | status   | first_name | last_name  |
+----------+----------+------------+------------+
|        1 | Pending  | Gabriel    | Howard     |
|        2 | Shipped  | NULL       | NULL       |
|        3 | Shipped  | NULL       | NULL       |
|        5 | Canceled | Gabriel    | Howard     |
|        6 | Shipped  | NULL       | NULL       |
|        7 | Shipped  | NULL       | NULL       |
|        8 | Shipped  | NULL       | NULL       |
|        9 | Shipped  | NULL       | NULL       |
|       28 | Canceled | Charles    | Ward       |
|       44 | Pending  | Nathan     | Cox        |
|       87 | Canceled | Charles    | Ward       |
|      101 | Pending  | Nathan     | Cox        |
|      105 | Pending  | Louie      | Richardson |
+----------+----------+------------+------------+
13 rows in set (0.01 sec)
```

Using Inner Join:

SELECT order_id, status, first_name, last_name from ORDERS **inner join** EMPLOYEES on employee_id = salesman_id;

```
mysql> SELECT  order_id, status, first_name, last_name from ORDERS inner join EMPLOYEES on employee_id = salesman_id;
+----------+----------+------------+------------+
| order_id | status   | first_name | last_name  |
+----------+----------+------------+------------+
|        1 | Pending  | Gabriel    | Howard     |
|        5 | Canceled | Gabriel    | Howard     |
|       28 | Canceled | Charles    | Ward       |
|       44 | Pending  | Nathan     | Cox        |
|       87 | Canceled | Charles    | Ward       |
|      101 | Pending  | Nathan     | Cox        |
|      105 | Pending  | Louie      | Richardson |
+----------+----------+------------+------------+
7 rows in set (0.00 sec)
```

Right Outer Join

SELECT first_name, last_name, order_id, status from ORDERS right join EMPLOYEES on employee_id = salesman_id WHERE job_title = 'Programmer' ORDER BY first_name, last_name;

```
mysql> SELECT first_name, last_name, order_id, status from ORDERS right join EMP
LOYEES on employee_id = salesman_id WHERE job_title = 'Programmer' ORDER BY firs
t_name, last_name;
+------------+------------+----------+----------+
| first_name | last_name  | order_id | status   |
+------------+------------+----------+----------+
| Bobby      | Torres     |     NULL | NULL     |
| Charles    | Ward       |       28 | Canceled |
| Charles    | Ward       |       87 | Canceled |
| Gabriel    | Howard     |        1 | Pending  |
| Gabriel    | Howard     |        5 | Canceled |
| Louie      | Richardson |      105 | Pending  |
| Nathan     | Cox        |       44 | Pending  |
| Nathan     | Cox        |      101 | Pending  |
+------------+------------+----------+----------+
8 rows in set (0.00 sec)
```

Using Inner join:

```
mysql> SELECT first_name, last_name, order_id, status from ORDERS inner join EMPLOYEES on employee_id = salesman_id WHERE job_title = 'Program
mer' ORDER BY first_name, last_name;
+-----------+-----------+---------+----------+
| first_name | last_name  | order_id | status   |
+-----------+-----------+---------+----------+
| Charles    | Ward       |       28 | Canceled |
| Charles    | Ward       |       87 | Canceled |
| Gabriel    | Howard     |        1 | Pending  |
| Gabriel    | Howard     |        5 | Canceled |
| Louie      | Richardson |      105 | Pending  |
| Nathan     | Cox        |       44 | Pending  |
| Nathan     | Cox        |      101 | Pending  |
+-----------+-----------+---------+----------+
7 rows in set (0.00 sec)
```

The result includes all employees whose job title is `Programmer` and their orders.

If a salesman is not in charge of any sales order such as `Bobby`, the `order_id` and `status` columns are filled with NULL values.

Full outer join:

Now, let's say you just want to retrieve the names of all the employees and the names of available departments, regardless of whether they have corresponding rows in the other table, in that case you can use a full join as demonstrated below.

The following statement retrieves all the departments as well as the details of all the employees by joining the *employees* and *departments* tables together using the common *dept_id* field.

Example

```
SELECT t1.emp_id, t1.emp_name, t2.dept_name
FROM employees AS t1 FULL JOIN departments AS t2
ON t1.dept_id = t2.dept_id ORDER BY emp_name;
```

Some databases, such as Oracle, MySQL do not support full joins. In that case you can use the `UNION ALL` operator to combine the `LEFT JOIN` and `RIGHT JOIN` as follows:

Example

```
 select e.eid,e.name,d.deptno,d.name from emp as e left outer join dept as d on e.eid=d.eid union all select e.eid,e.name,d.deptno,d.name from emp as e right outer join dept as d on e.eid=d.eid;
```

```
mysql> select e.eid,e.name,d.deptno,d.name from emp as e left outer join dept as d on e.eid=d.eid union all select e.eid,e.name,d.deptno,d.nam
e from emp as e right outer join dept as d on e.eid=d.eid;
+------+-------+--------+-------+
| eid  | name  | deptno | name  |
+------+-------+--------+-------+
|    1 | raju  |     11 | hr    |
|    2 | ravi  |     12 | markt |
|    3 | arjun |     13 | IT    |
|    4 | arya  |   NULL | NULL  |
|    5 | advik |   NULL | NULL  |
|    1 | raju  |     11 | hr    |
|    2 | ravi  |     12 | markt |
|    3 | arjun |     13 | IT    |
+------+-------+--------+-------+
8 rows in set (0.00 sec)
```

Using Inner join:

```
mysql> select e.eid,e.name,d.deptno,d.name from emp as e, dept as d where e.eid=d.eid;
+-----+-------+--------+-------+
| eid | name  | deptno | name  |
+-----+-------+--------+-------+
|   1 | raju  |     11 | hr    |
|   2 | ravi  |     12 | markt |
|   3 | arjun |     13 | IT    |
+-----+-------+--------+-------+
3 rows in set (0.00 sec)
```