Example of Different Joins (Cross, Natural, Inner, Outer)

Assume 2 tables A and B has values with the 1st column of each table as the common column , in the following:

Table A:

2	β
3	γ

Table B:

1	A	I
2	B	II
4	D	IV

1. **Cross Join**: append at the end of every row of Table A by every row of Table B.

SQL command: select * from A cross join B;

Result:

2	β	1	A	I
2	β	2	B	II
2	β	4	D	IV
3	γ	1	A	I
3	γ	2	B	II
3	γ	4	D	IV

2. **Natural Join**: after Cross Join, pick up only rows with the same (or matching) common column values. Show the common column value only once

SQL command: select * from A natural join B;

Result:

2	β	B	II

3. **Inner Join**: after Cross Join, pick up only rows with the same (or matching) common column values. However, show the common column values for both tables. You must specify the common column(s).

SQL command: select * from A inner join B
On A.commoncolumn=B.commoncolumn;

Result:

2	β	2	B	II

Assume 2 tables A and B has values with the 1st column of each table as the common column , in the following:

Table A:

2	β
3	γ

Table B:

1	A	I
2	B	II
4	D	IV

Concrete Example:

Table **Course**:

NAME	COURSE NUMBER
John	ITEC 122
Cindy	ITEC 120

Table **Student**:

NAME	PHONE NUMBER	GPA
John	6391111	2.0
David	8311111	3.0
Cindy	7311111	4.0

1. **Cross Join**: append at the end of every row of Table A by every row of Table B.

SQL command: select * from A cross join B;

Result:

2	β	1	A	I
2	β	2	B	II
2	β	4	D	IV
3	γ	1	A	I
3	γ	2	B	II
3	γ	4	D	IV

2. **Natural Join**: after Cross Join, pick up only rows with the same (or matching) common column values. Show the common column value only once. Must have common names between 2 tables.

SQL command: select * from A natural join B;

Result:

2	β	B	II

Concrete Example: SQL: select * from Course natural join Student;

Result:

NAME	COURSE NUMBER	PHONE NUMBER	GPA
John	ITEC 122	6391111	2.0
Cindy	ITEC 120	7311111	4.0

3. **Inner Join**: after Cross Join, pick up only rows with the same (or matching) common column values. However, show the common matched column values for both tables. You must specify the common column(s).

SQL command: select * from A inner join B

On A.commoncolumn=B.commoncolumn;

Result:

2	β	2	B	II

Concrete Example: SQL: select * from Course inner join Student

On Course.Name= Student. Name;

Result:

NAME	COURSE NUMBER	NAME	PHONE NUMBER	GPA
John	ITEC 122	John	6391111	2.0
Cindy	ITEC 120	Cindy	7311111	4.0

4. **Outer Join**:

(1) **Left Outer Join**: after Inner Join, add rows of the left Table (A) which is non-matching common column values from row of Cross Join with all fields of Table B blanked. You must specify the common column(s).

SQL command: select * from A left outer join B

On A.commoncolumn=B.commoncolumn;

Result:

2	β	2	B	II
3	γ			

Concrete Example: If you want to find out who are new in the school (who don't have any GPA yet)

SQL: select * from Course left outer join Student

On Course.Name= Student. Name;

Result:

NAME	COURSE NUMBER	PHONE NUMBER	GPA
John	ITEC 122	6391111	2.0
Cindy	ITEC 120	7311111	4.0

(2) **Right Outer Join**: after Inner Join, add rows of the right Table (B) which is non-matching common column values from row of Cross Join with all fields of Table A blanked. You must specify the common column(s).

SQL command: select * from A right outer join B

On A.commoncolumn=B.commoncolumn;

Result:

2	β	2	B	II
		1	A	I
		4	D	IV

Concrete Example: If you want to find out students who are not taking any class

SQL: select * from Course right outer join Student

On Course.Name= Student. Name;

Result:

NAME	COURSE NUMBER	PHONE NUMBER	GPA
John	ITEC 122	6391111	2.0
David		8311111	3.0
Cindy	ITEC 120	7311111	4.0

(3) **Full Outer Join**: after Inner Join, add rows of the left Table (A) and the right Table (B) which are non-matching common column values from row of Cross Join with all fields of the other Table blanked. You must specify the common column(s).

SQL command: select * from A full join B

On A.commoncolumn=B.commoncolumn;

Result:

2	β	2	B	II
3	γ			
		1	A	I
		4	D	IV

Different types of Inner Join are :
1) Equi Join
2) Natural Join
3) Cross Join

One of the most common interview questions that is being asked is explain Equi Join, Natural Join and Cross Join in sql. I will break the question in different meaningful easy to understand concepts.

Consider the below tables
Employee

EmpId	EmpName
1	John
2	David
3	Peter
4	Eric

Area

AreaId	AreaName	EmpId

3	New York	1
4	Canada	3
5	Australia	3
6	England	4

Equi join

Equi join is the first type of Inner Join.
It joins two or more tables where the specified columns are equal.
In this type of join, you can only use '=' operator in comparing the columns.
Operators like '>', '<' are not allowed in this type of join.

```
Example query: Select * from Employee emp

INNER JOIN Area area on area.EmpId = emp.EmpId
```

Result:

EmpId	EmpName	AreaId	AreaName	EmpId
3	Peter	4	Canada	3
3	Peter	5	Australia	3
4	Eric	6	England	4

As shown above, EmpId column is appearing twice.

Natural join

It is same as equijoin but the difference is that in natural join, the common attribute appears only once.

```
Example query: Select * from Employee emp
```

```
NATURAL JOIN Area area on area.EmpId = emp.EmpId
```

Result:

EmpId	EmpName	AreaId	AreaName
3	Peter	4	Canada
3	Peter	5	Australia
4	Eric	6	England

As shown above, EmpId column is appearing only once.

Cross join

A cross join that produces Cartesian product of the tables.. The size of a Cartesian product is the number of the rows in first table multiplied by the number of rows in the second table.

```
Example query: Select * from Employee emp

CROSS JOIN Area area
```

Result:

EmpId	EmpName	AreaId	AreaName	EmpId
1	John	3	New York	1
1	John	4	Canada	3
1	John	5	Australia	3
1	John	6	England	4

2	David	3	New York	1
2	David	4	Canada	3
2	David	5	Australia	3
2	David	6	England	4
3	Peter	3	New York	1
3	Peter	4	Canada	3
3	Peter	5	Australia	3
3	Peter	6	England	4
4	Eric	3	New York	1
4	Eric	4	Canada	3
4	Eric	5	Australia	3
4	Eric	6	England	4

As shown in the results above, the number of rows returned in the result are 4 * 4 = 16.