

SQL Queries

Join Expressions

Cross Join

- `select * from Product, PC`
- `select * from Product cross join PC`
- The two statements are identical
- **cross join** is Cartesian product
- **cross join** is only *syntactic sugaring*

Join and Inner Join

- select * from Product P, PC where P.model=PC.model
- select * from Product P **join** PC **on** P.model=PC.model
- select * from Product P **inner join** PC **on** P.model=PC.model
- The three statements are identical
- **join** and **inner join** are only *syntactic sugaring*
- **Cross join, join, and inner join do not provide any additional functionality beyond what can be expressed in WHERE**

Natural Join

- select * from Product P, PC where P.model=PC.model
- select * from Product P **join** PC **on** P.model=PC.model
- select * from Product P **natural join** PC
- The three statements are almost identical
- **natural join** implies equality predicates between the attributes with the same name across the two tables
- select * from Product **natural join** Printer
- select * from Product P, Printer Pr where P.model = Pr.model and **P.type = Pr.type**
 - This is probably not intended
- Only one copy of the join attribute is kept in result since they are equal
 - {P.model, PC.model} → {model}

Outer Joins

R(A,B)	S(B,C)	R ⋈ S [natural join] (A,B,C)	R ⋈ S [full outer join] (A,B,C)
0 1	0 1	2 3 4	2 3 4
2 3	2 4	2 3 4	0 1 -
0 1	2 5	2 3 4	0 1 -
2 4	3 4		2 4 -
2 4	0 2		3 4 -
3 4	3 4		- 0 1
			- 2 4
			- 2 5
			- 0 2

Left (Right) Outer Joins

R(A,B)		S(B,C)		R ⋈ S [full outer join] (A,B,C)			R ⋈ _L S [left outer join] (A,B,C)			R ⋈ _R S [right outer join] (A,B,C)		
0	1	0	1	2	3	4	2	3	4	2	3	4
2	3	2	4	0	1	-	2	3	4	2	3	4
0	1	2	5	0	1	-	2	3	4	2	3	4
2	4	3	4	2	4	-	0	1	-	-	0	1
3	4	0	2	3	4	-	0	1	-	-	2	4
		3	4	-	0	1	2	4	-	-	2	5
				-	2	5	3	4	-	-	0	2
				-	0	2						

SQLite

- Only **left outer join** is supported
- `select * from Product P left outer join PC on P.model = PC.model
where P.type = 'pc'`
- `select * from Product P left outer join PC on P.model = PC.model`
- `select * from Product P natural left outer join PC`
- `select * from Product P natural left outer join PC
where P.type = 'pc'`

Examples

- Computers
- TPCH