Types of Joins

- Inner Join
  - Natural Join
- Left (Outer) Join
- Right (Outer) Join
- (Full) Outer Join
- Left (Outer) Join Excluding Inner Join
- Right (Outer) Join Excluding Inner Join
- (Full) Outer Join Excluding Inner Join
- Cross Join
- Equi-Join

Sample Tables

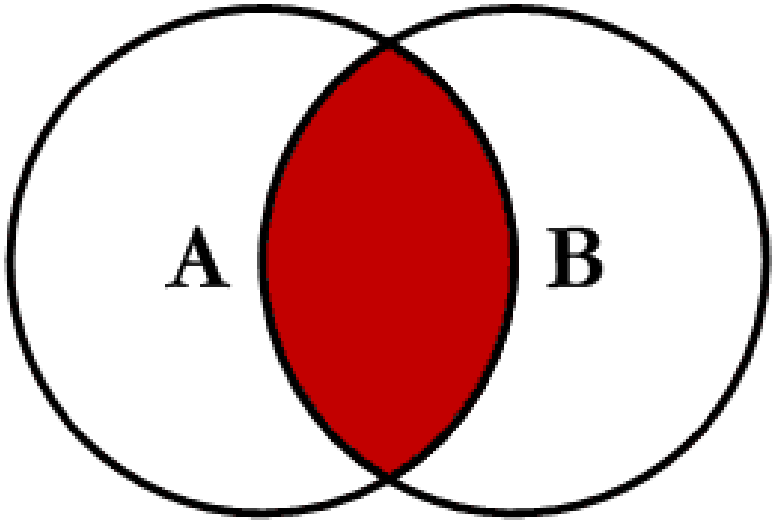
TableA

PK	Value
1	FOX
2	COP
3	TAXI
6	WASHINGTON
7	DELL
5	ARIZONA
4	LINCOLN
10	LUCENT

TableB

PK	Value
1	TROT
2	CAR
3	CAB
6	MONUMENT
7	PC
8	MICROSOFT
9	APPLE
11	SCOTCH

Inner Join



- **Inner join** produces only the set of records that match in both Table A and Table B
- Most commonly used, best understood join

Inner Join

TableA Value	PK	TableB PK	Value
FOX	1	1	TROT
COP	2	2	CAR
TAXI	3	3	CAB
WASHINGTON	6	6	MONUMENT
DELL	7	7	PC

SELECT * FROM TableA **INNER JOIN** TableB ON TableA.PK = TableB.PK

- This is the same as doing SELECT * FROM TableA, TableB **WHERE** TableA.PK = TableB.PK

Inner Join (continued)

- Inner Joins do not have to use equality to join the fields
- Can use <, >, <>

Inner Join (continued)

SELECT * FROM TableA **INNER JOIN** TableB ON TableA.PK > TableB.PK

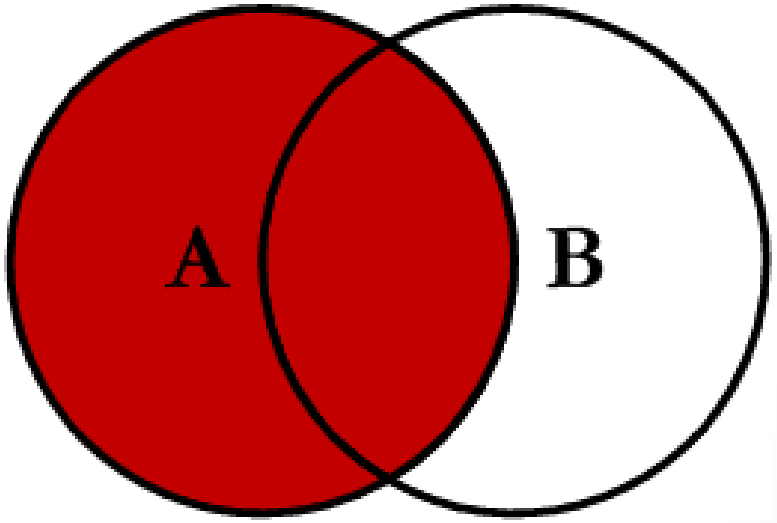
TableA PK	Value	TableB PK	Value
2	COP	1	TROT
3	TAXI	1	TROT
3	TAXI	2	CAR
4	LINCOLN	1	TROT
4	LINCOLN	2	CAR
4	LINCOLN	3	CAB
5	ARIZONA	1	TROT
5	ARIZONA	2	CAR
5	ARIZONA	3	CAB
…	More…	Rows…	

Inner Join/Natural Join

- A NATURAL join is just an inner equi-join where the join is implicitly created using **any** matching columns between the two tables
- Example:
  - SELECT * FROM TableA **NATURAL JOIN** TableB
  - Same results as inner equi-join?
  - Which columns match?

Left Outer Join

- Left outer join produces a complete set of records from Table A, with the matching records (where available) in Table B. If there is no match, the right side will contain null.



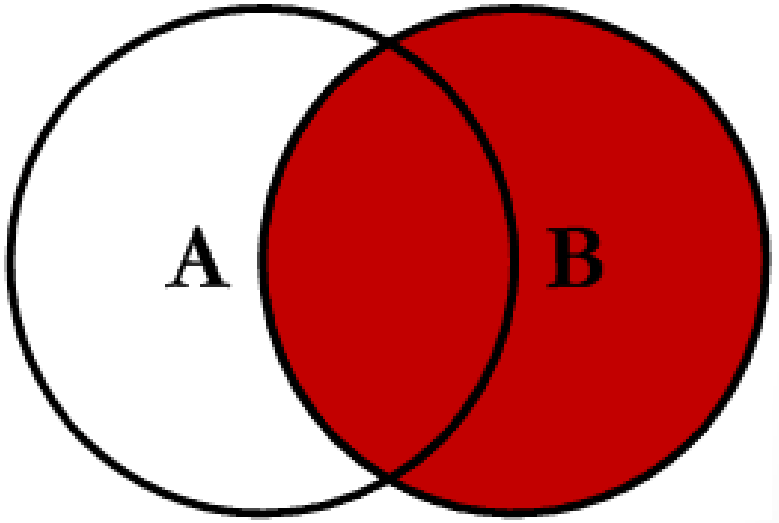
Left Outer Join

TableA Value	PK	TableB PK	Value
FOX	1	1	TROT
COP	2	2	CAR
TAXI	3	3	CAB
LINCOLN	4	NULL	NULL
ARIZONA	5	NULL	NULL
WASHINGTON	6	6	MONUMENT
DELL	7	7	PC
LUCENT	10	NULL	NULL

- SELECT * FROM TableA LEFT OUTER JOIN TableB ON TableA.PK = TableB.PK

Right Outer Join

- Right outer join produces a complete set of records from Table B, with the matching records (where available) in Table A. If there is no match, the left side will contain null.



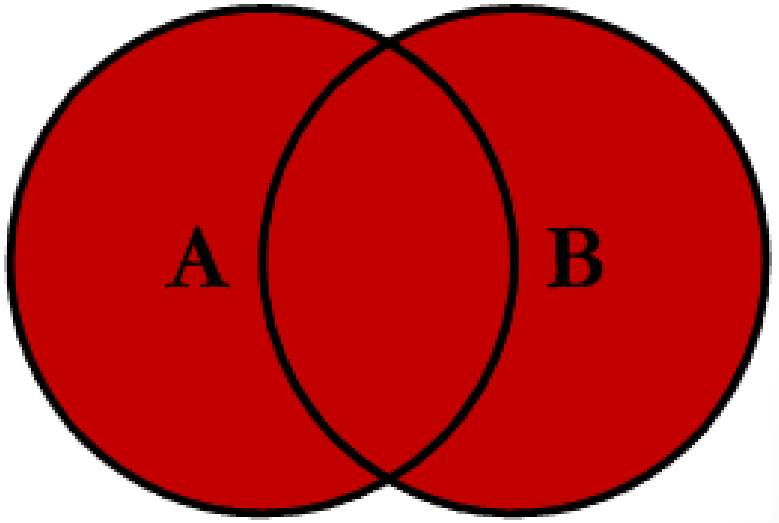
Right Outer Join

TableA Value	PK	TableB PK	Value
FOX	1	1	TROT
COP	2	2	CAR
TAXI	3	3	CAB
WASHINGTON	6	6	MONUMENT
DELL	7	7	PC
NULL	NULL	8	MICROSOFT
NULL	NULL	9	APPLE
NULL	NULL	11	SCOTCH

- SELECT * FROM TableA RIGHT OUTER JOIN TableB ON TableA.PK = TableB.PK

Full Outer Join

- Full outer join produces the set of all records in Table A and Table B, with matching records from both sides where available. If there is no match, the missing side will contain null.



Full Outer Join

TableA Value	PK	TableB PK	Value
FOX	1	1	TROT
COP	2	2	CAR
TAXI	3	3	CAB
LINCOLN	4	NULL	NULL
ARIZONA	5	NULL	NULL
WASHINGTON	6	6	MONUMENT
DELL	7	7	PC
LUCENT	10	NULL	NULL
NULL	NULL	8	MICROSOFT
NULL	NULL	9	APPLE
NULL	NULL	11	SCOTCH

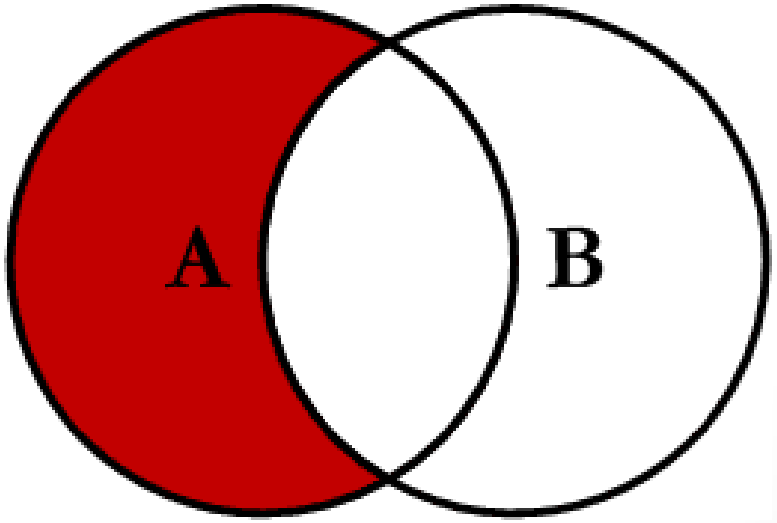
- SELECT * FROM TableA FULL OUTER JOIN TableB ON TableA.PK = TableB.PK

Full Outer Join in MySQL

- MySQL doesn't have FULL OUTER JOIN
- Simulate using UNION, LEFT and RIGHT JOINs
- SELECT * FROM TableA LEFT JOIN TableB
  ON TableA.PK = TableB.PK
  UNION
  SELECT * FROM TableA RIGHT JOIN TableB
  ON TableA.PK = TableB.PK

Left Join Excluding Inner Join

- This query will return all of the records in the left table (table A) that do not match any records in the right table (table B).



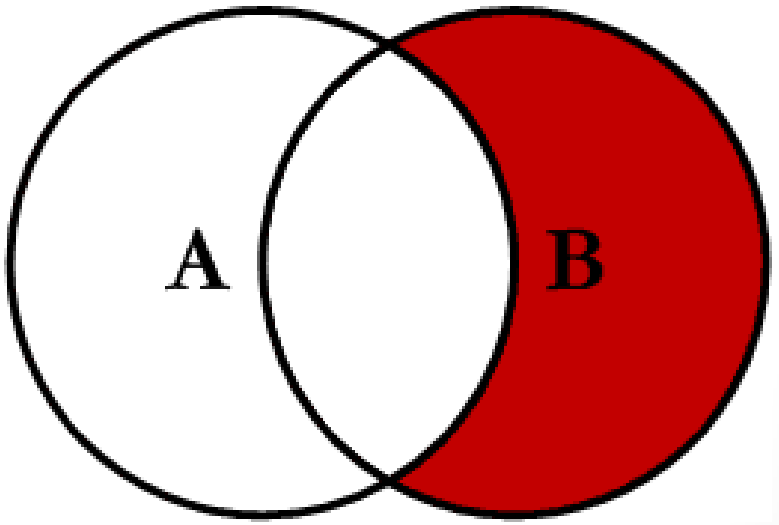
Left Join Excluding Inner Join

TableA Value	PK	TableB PK	Value
LINCOLN	4	NULL	NULL
ARIZONA	5	NULL	NULL
LUCENT	10	NULL	NULL

- SELECT * FROM TableA LEFT JOIN TableB
  ON TableA.PK = TableB.PK
  WHERE TableB.PK IS NULL
- Perform left outer join, then exclude the records we don't want from the right side via a where clause.

Right Join Excluding Inner Join

- This query will return all of the records in the right table (table B) that do not match any records in the left table (table A).



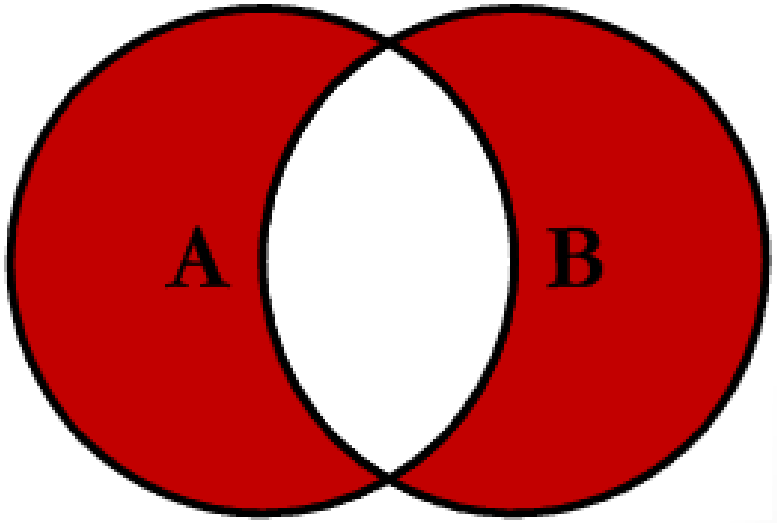
Right Join Excluding Inner Join

TableA Value	PK	TableB PK	Value
NULL	NULL	8	MICROSOFT
NULL	NULL	9	APPLE
NULL	NULL	11	SCOTCH

- SELECT * FROM TableA RIGHT JOIN TableB
  ON TableA.PK = TableB.PK
  WHERE TableA.PK IS NULL
- Perform right outer join, then exclude the records we don't want from the left side via a where clause.

Full Outer Excluding Inner Join

- This query will return all of the records in Table A and Table B that do not have a matching record in the other table.
- (If you find a useful application, let me know! ☺)



Full Outer Excluding Inner Join

TableA Value	PK	TableB PK	Value
NULL	NULL	8	MICROSOFT
NULL	NULL	9	APPLE
NULL	NULL	11	SCOTCH
LINCOLN	4	NULL	NULL
ARIZONA	5	NULL	NULL
LUCENT	10	NULL	NULL

- SELECT * FROM TableA FULL OUTER JOIN TableB ON TableA.PK = TableB.PK
  WHERE TableA.PK IS NULL OR
  TableB.PK IS NULL

How Can We Do This in MySQL?

- MySQL doesn't have FULL OUTER JOIN
- Simulate using UNION, LEFT and RIGHT JOINs
- SELECT * FROM TableA LEFT JOIN TableB
  ON TableA.PK = TableB.PK
  WHERE TableB.PK IS NULL
  UNION
  SELECT * FROM TableA RIGHT JOIN TableB
  ON TableA.PK = TableB.PK
  WHERE TABLEA.PK IS NULL

Cross Join

- A cross join is a Cartesian Product join – it is every record in Table A combined with every record in Table B.
- It gives the same results as not using a WHERE clause when querying two tables in MySQL
- SELECT * from TableA CROSS JOIN TableB
- SELECT * from TableA, TableB