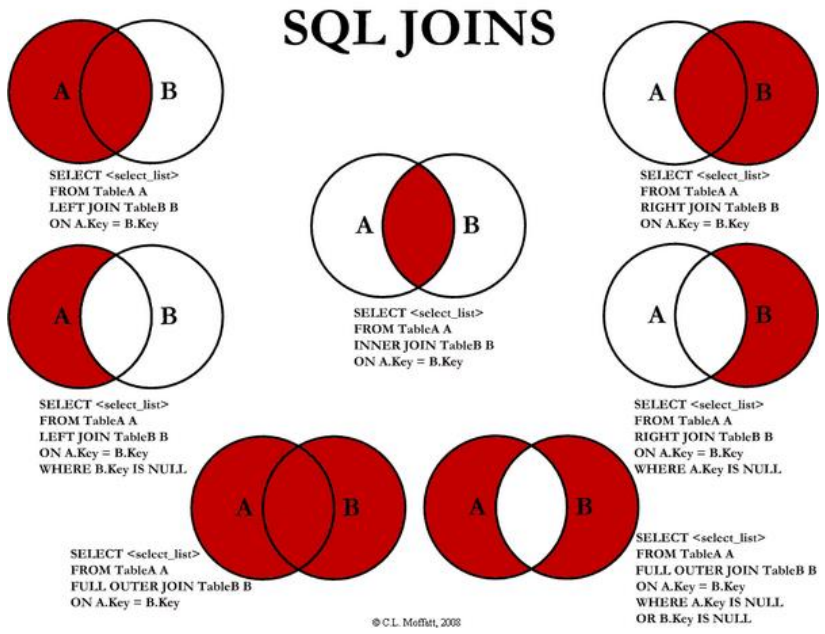
JOINS IN SQL SERVER

LEARNING GOALS

By the end of this lecture students should be able to:

- ✓ Understand about SQL joins in SQL Server
- ✓ Using smoothly SQL joins and apply to project

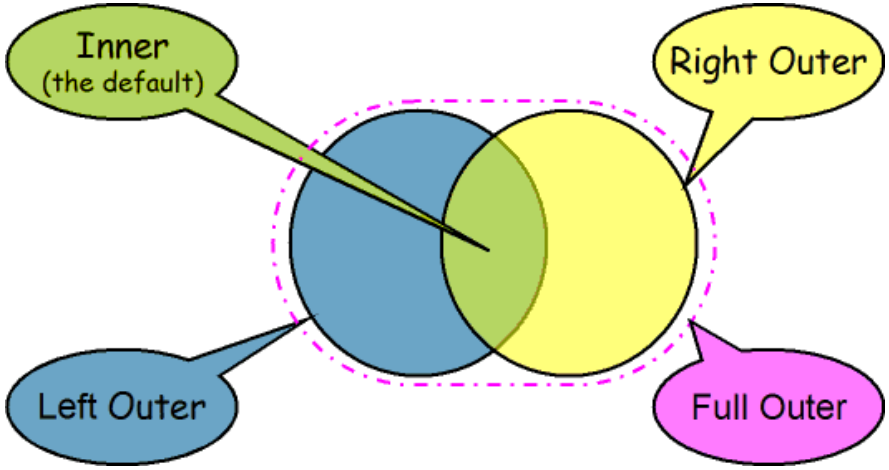


Lesson Agenda

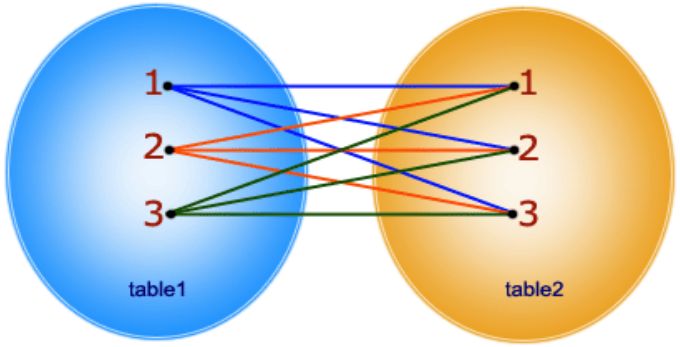
- What's SQL Join?
- Inner Join
- Outer Join
- Cross Join
- Self Join
- Excluding JOIN

Options ?

- SQL Joins are used to combine rows from two or more tables based on logical relationships between the tables.
- Types of Join in SQL:
  - ✓ Inner Join
  - ✓ Outer Join
  - ✓ Cross Join
  - ✓ Self Join




```
SELECT * FROM table1 CROSS JOIN  table2;
```



In CROSS JOIN, each row from 1st table joins with all the rows of another table.
If 1st table contain x rows and y rows in 2nd one the result set will be x * y rows.

Column Name	Data Type	Nullable	Default	Primary Key
EMP_ID	VARCHAR (5)	No	-	1
EMP_NAME	VARCHAR (20)	Yes	-	-
DT_OF_JOIN	DATE	Yes	-	-
EMP_SUPV	VARCHAR (5)	Yes	-	-
				1 - 4

Constraint	Type	Table
SYS_C004074	C	EMPLOYEE
EMP_ID	P	EMPLOYEE
EMP_SUPV	R	EMPLOYEE

Primary key

Foreign key
Referencing EMP_ID of this table

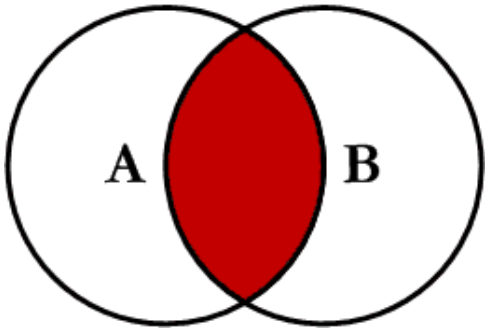
Section 1

INNER JOIN

INNER JOIN

- The INNER JOIN selects all rows from both tables as long as there is a match between the columns in both tables.
- Eliminate the rows that do not match with a row from the other table
  - ✓ **Syntax**

```
SELECT col_names
FROM Table_A  A
  INNER JOIN Table_B  B
        ON A.Col1 = B.Col1
```



INNER JOIN (2/2)

- **Example:**

Customer

CustID	CustName	BirthDate	Country
1	Davolio Nancy	12/8/1968	Germany
2	Fuller Andrew	2/19/1952	Mexico
3	Leverling Janet	8/30/1963	Mexico

[Order]

OrderID	CustID	OrderDate	ShipperID
10308	2	2013-09-18	3
10309	3	2013-09-19	1
10310	77	2013-09-20	2

```
SELECT c.CustName, o.OrderID
FROM Customer c
        INNER JOIN [Order] o
                ON c.CustID = o.CustID
ORDER BY c.CustName;
```

- **Result:**

Results | Messages

	CustName	OrderID
1	Fuller Andrew	10308
2	Leverling Janet	10309

Section 2

OUTER JOIN

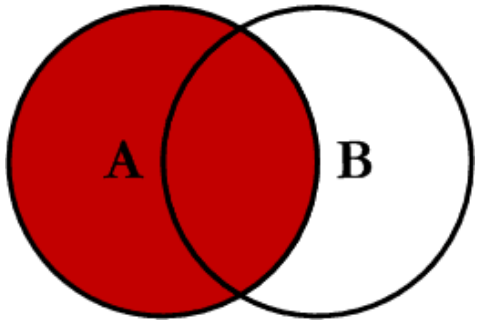
OUTER JOIN

- **Outer Join:** Return all rows from at least one of the tables mentioned in the FROM clause, as long as those rows meet any WHERE or HAVING search conditions:
  - ✓ **LEFT OUTER JOIN (or LEFT JOIN)**
  - ✓ **RIGHT OUTER JOIN (or RIGHT JOIN)**
  - ✓ **FULL OUTER JOIN (or FULL JOIN)**

LEFT OUTER JOIN

- Return all of the records in the left table (table A) regardless if any of those records has a match in the right table (table B)
  - ✓ In the results where there is no matching condition, the row contains NULL values for the right table's columns.
- **Syntax**

```
SELECT col_names
FROM Table_A  A  LEFT JOIN Table_B  B
ON A.Col1 = B.Col1
```



LEFT OUTER JOIN

- **Example:**

Customer

CustID	CustName	BirthDate	Country
1	Davolio Nancy	12/8/1968	Germany
2	Fuller Andrew	2/19/1952	Mexico
3	Leverling Janet	8/30/1963	Mexico

[Order]

OrderID	CustID	OrderDate	ShipperID
10308	2	2013-09-18	3
10309	3	2013-09-19	1
10310	77	2013-09-20	2

```
SELECT c.CustName, o.OrderID
FROM Customer c LEFT JOIN [Order] o
ON c.CustID = o.CustID
ORDER BY c.CustName;
```

- **Result:**

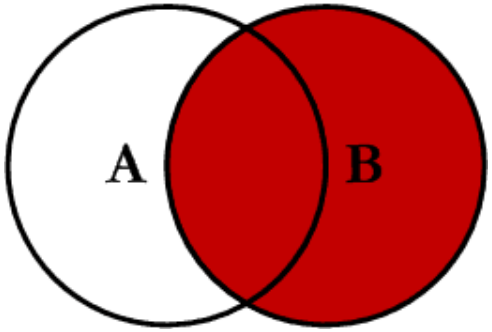
Results | Messages

	CustName	OrderID
1	Davolio Nancy	NULL
2	Fuller Andrew	10308
3	Leverling Janet	10309

RIGHT OUTER JOIN

- Return all of the records in the right table (table B) regardless if any of those records have a match in the left table (table A)
  - ✓ In the results where there is no matching condition, the row contains NULL values for the left table's columns.
- **Syntax**

```
SELECT col_names
FROM Table_A  A  RIGHT JOIN Table_B  B
ON A.Col1 = B.Col1
```



RIGHT OUTER JOIN

- **Example:**

Customer

CustID	CustName	BirthDate	Country
1	Davolio Nancy	12/8/1968	Germany
2	Fuller Andrew	2/19/1952	Mexico
3	Leverling Janet	8/30/1963	Mexico

[Order]

OrderID	CustID	OrderDate	ShipperID
10308	2	2013-09-18	3
10309	3	2013-09-19	1
10310	77	2013-09-20	2

```
SELECT c.CustName, o.OrderID
FROM Customer c RIGHT JOIN [Order] o
ON c.CustID = o.CustID
ORDER BY c.CustName;
```

- **Result:**

Results | Messages

	CustName	OrderID
1	NULL	10310
2	Fuller Andrew	10308
3	Leverling Janet	10309

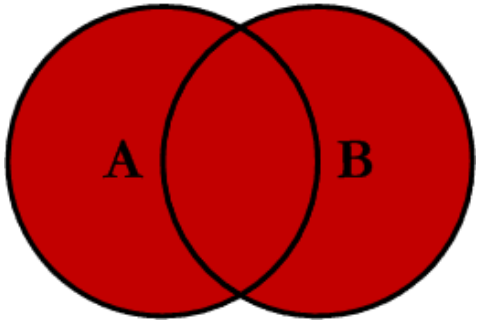
FULL OUTER JOIN

- Return all of the records from both tables, joining records from the left table (table A) that match records from the right table (table B)
- **Syntax**

```
SELECT col_names

FROM Table_A  A  FULL JOIN Table_B  B

ON A.Col1 = B.Col1
```



FULL OUTER JOIN (2/2)

- **Example:**

Customer

CustID	CustName	BirthDate	Country
1	Davolio Nancy	12/8/1968	Germany
2	Fuller Andrew	2/19/1952	Mexico
3	Leverling Janet	8/30/1963	Mexico

[Order]

OrderID	CustID	OrderDate	ShipperID
10308	2	2013-09-18	3
10309	3	2013-09-19	1
10310	77	2013-09-20	2

```
SELECT c.CustName, o.OrderID
FROM Customer c FULL JOIN [Order] o
ON c.CustID = o.CustID
ORDER BY c.CustName;
```

- **Result:**

Results | Messages

	CustName	OrderID
1	NULL	10310
2	Davolio Nancy	NULL
3	Fuller Andrew	10308
4	Leverling Janet	10309

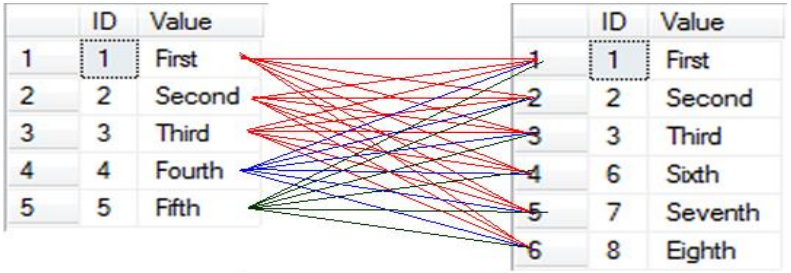
Section 3

CROSS JOIN

CROSS JOIN

- Return records that are multiplication of record number from both the tables
  - ✓ No need any condition to join
- **Syntax**

```
SELECT col_names
FROM Table_A  A  CROSS JOIN Table_B  B
```



	ID	Value
1	1	First
2	2	Second
3	3	Third
4	4	Fourth
5	5	Fifth

	ID	Value
1	1	First
2	2	Second
3	3	Third
4	6	Sixth
5	7	Seventh
6	8	Eighth

	ID	Value	ID	Value
1	1	First	1	First
2	1	First	2	Second
3	1	First	3	Third
4	1	First	6	Sixth
5	1	First	7	Seventh
6	1	First	8	Eighth
7	2	Second	1	First
8	2	Second	2	Second
9	2	Second	3	Third
10	2	Second	6	Sixth
11	2	Second	7	Seventh
12	2	Second	8	Eighth

CROSS JOIN

Example:

Customer

CustID	CustName	BirthDate	Country
1	Davolio Nancy	12/8/1968	Germany
2	Fuller Andrew	2/19/1952	Mexico
3	Leverling Janet	8/30/1963	Mexico

[Order]

OrderID	CustID	OrderDate	ShipperID
10308	2	2013-09-18	3
10309	3	2013-09-19	1
10310	77	2013-09-20	2

```
SELECT c.CustName, o.OrderID
FROM Customer c CROSS JOIN [Order] o
```

Result:

Results | Messages

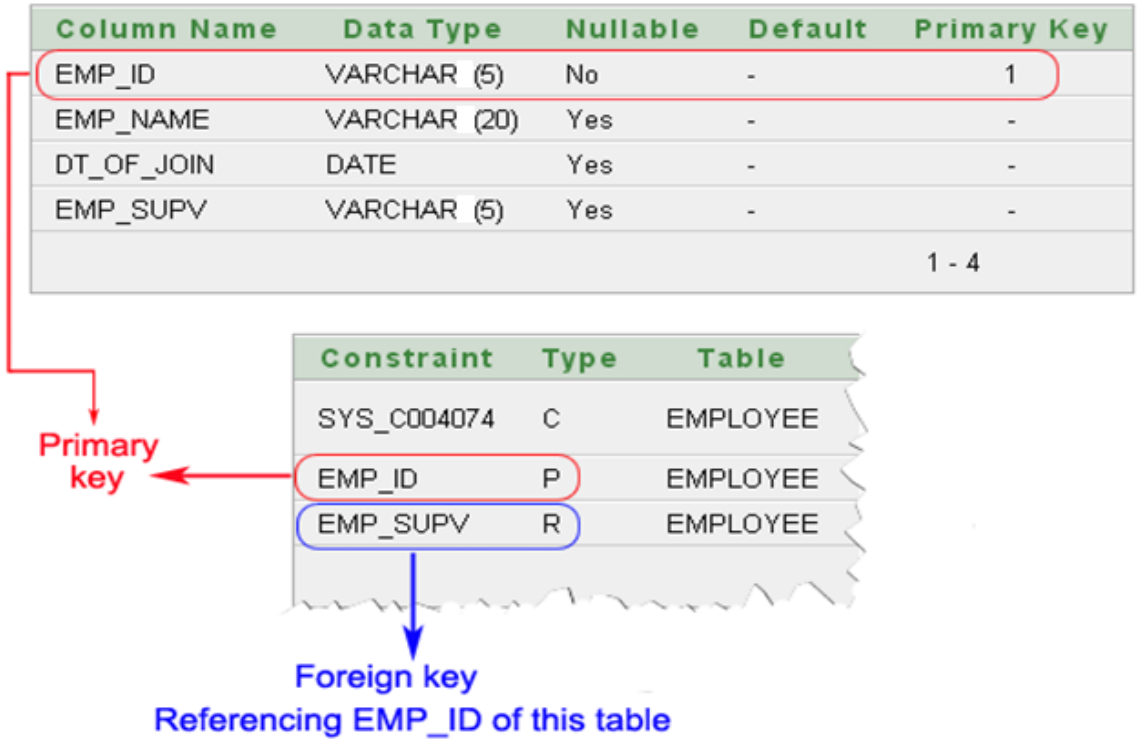
	CustName	OrderID
1	Davolio Nancy	10308
2	Fuller Andrew	10308
3	Leverling Janet	10308
4	Davolio Nancy	10309
5	Fuller Andrew	10309
6	Leverling Janet	10309
7	Davolio Nancy	10310
8	Fuller Andrew	10310
9	Leverling Janet	10310

Section 4

SELF JOIN

Self JOIN

- A SELF JOIN is a join of a table to itself. In SELF JOIN, we can use:
  - ✓ **INNER JOIN**
  - ✓ **OUTER JOIN**
  - ✓ **CROSS JOIN**



Column Name	Data Type	Nullable	Default	Primary Key
EMP_ID	VARCHAR (5)	No	-	1
EMP_NAME	VARCHAR (20)	Yes	-	-
DT_OF_JOIN	DATE	Yes	-	-
EMP_SUPV	VARCHAR (5)	Yes	-	-

1 - 4

Constraint	Type	Table
SYS_C004074	C	EMPLOYEE
EMP_ID	P	EMPLOYEE
EMP_SUPV	R	EMPLOYEE

Self JOIN

❖ **Example:**

Results | Messages

	EMP_ID	EMP_NAME	DT_OF_JOIN	EMP_SUPV
1	10120	Hansen Ola	2013-01-01	NULL
2	10121	Svendson Tove	2013-02-01	10120
3	10122	Pettersen Kari	2013-03-01	10120
4	10123	Alfreds Futterkiste	2013-04-01	10121

```
SELECT   e1.EMP_NAME AS Employee_Name,
         e2.EMP_NAME AS Manager_Name
FROM Employee e1 LEFT JOIN Employee e2
ON e1.EMP_SUPV = e2.EMP_ID
```

❖ **Result:**

Results | Messages

	Employee_Name	Manager_Name
1	Hansen Ola	NULL
2	Svendson Tove	Hansen Ola
3	Pettersen Kari	Hansen Ola
4	Alfreds Futterkiste	Svendson Tove

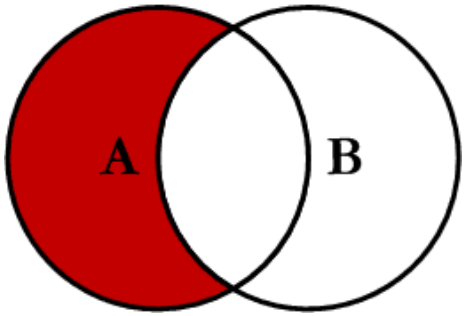
Section 5

EXCLUDING JOIN

LEFT Excluding JOIN

- Return all of the records in the left table (table A) that do not match any records in the right table (table B)
- **Syntax**

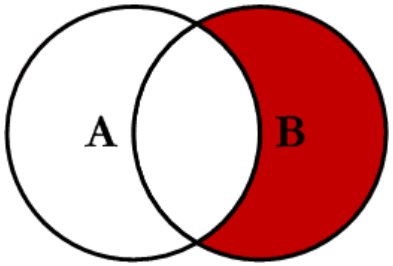
```
SELECT col_names
FROM Table_A  A  LEFT JOIN Table_B  B
ON A.Col1 = B.Col1
WHERE B.Col1 IS NULL
```



RIGHT Excluding JOIN

- Returns records in the right table (table B) that do not match any records in the left table (table A)
  - ✓ In the results where there is no matching condition, the row contains NULL values for the right table's columns.
- **Syntax**

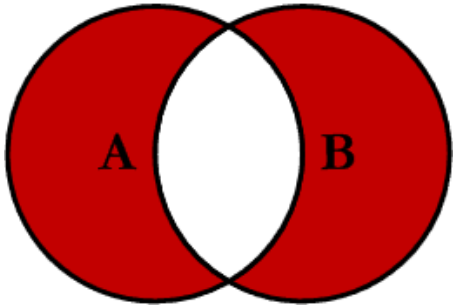
```
SELECT col_names
FROM Table_A  A  RIGHT JOIN Table_B  B
ON A.Col1 = B.Col1
WHERE A.Col1 IS NULL
```



OUTER JOIN EXCLUDING JOIN

- Return all of the records in the left table (table A) and all of the records in the right table (table B) that do not match
- **Syntax**

```
SELECT col_names
FROM Table_A  A
FULL OUTER JOIN Table_B  B
ON A.Col1 = B.Col1
WHERE A.Col1 IS NULL OR B.Col1 IS NULL
```

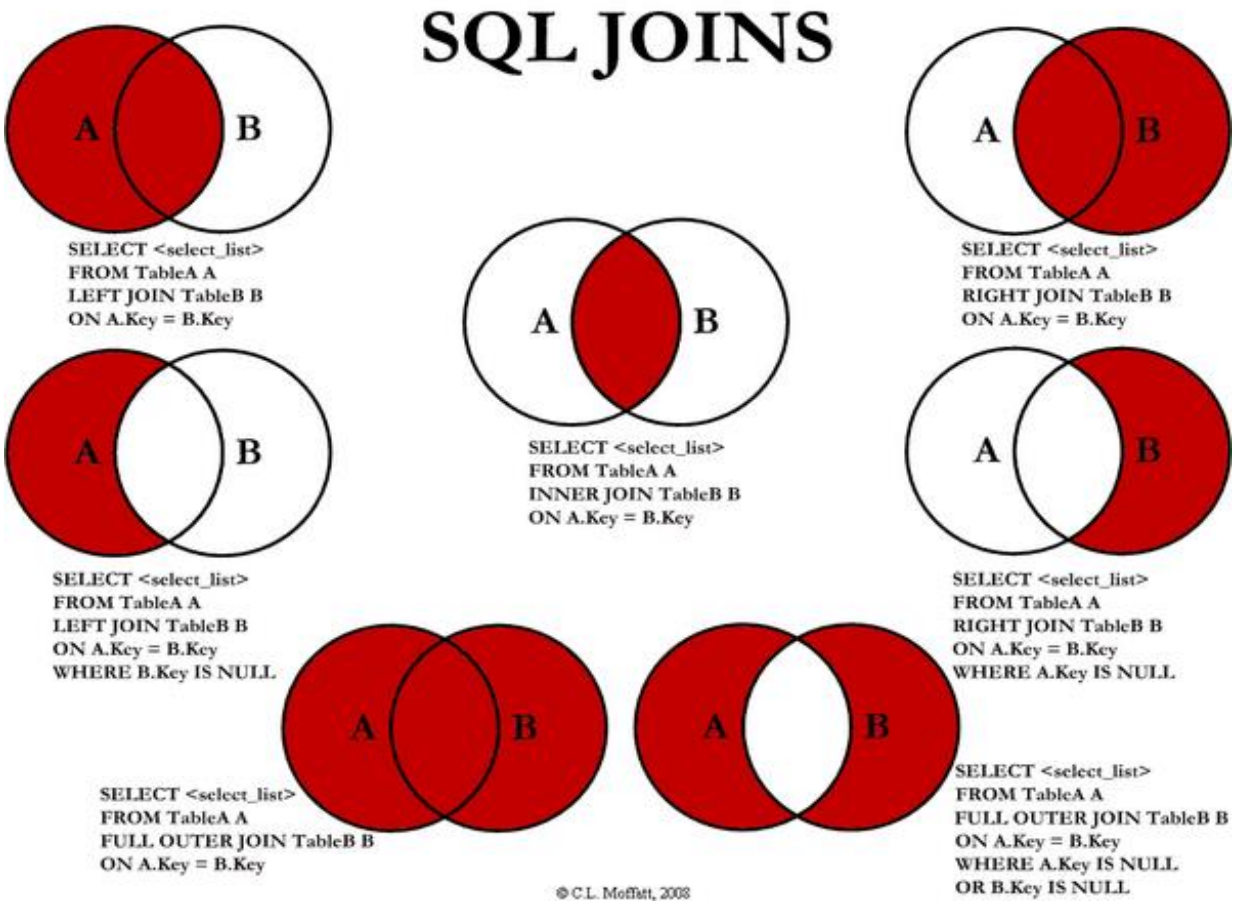


Joining Three or More Tables

- Since FROM clauses can contain multiple join specifications, this allows many tables to be joined for a single query.
- **Syntax**

```
SELECT col_names
FROM Table_A  A  JOIN Table_B  B
ON A.Col1 = B.Col1 LEFT JOIN Table_C C
ON B.Col2 = C.Col2
....
```

SUMMARY


SQL JOINS
A
B
SELECT <select_list>
FROM TableA A
LEFT JOIN TableB B
ON A.Key = B.Key
SELECT <select_list>
FROM TableA A
INNER JOIN TableB B
ON A.Key = B.Key
SELECT <select_list>
FROM TableA A
RIGHT JOIN TableB B
ON A.Key = B.Key
SELECT <select_list>
FROM TableA A
LEFT JOIN TableB B
ON A.Key = B.Key
WHERE B.Key IS NULL
SELECT <select_list>
FROM TableA A
RIGHT JOIN TableB B
ON A.Key = B.Key
WHERE A.Key IS NULL
SELECT <select_list>
FROM TableA A
FULL OUTER JOIN TableB B
ON A.Key = B.Key
SELECT <select_list>
FROM TableA A
FULL OUTER JOIN TableB B
ON A.Key = B.Key
WHERE A.Key IS NULL
OR B.Key IS NULL
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Q&A
Thank you