

10. CROSS APPLY and OUTER APPLY in SQL Server

In this article we are going to learn how to join two tables using CROSS APPLY and OUTER APPLY in SQL Server with examples. SQL Server introduced the APPLY operator in 2005.

Notes:

CROSS APPLY is equivalent to INNER JOIN.

OUTER APPLY is equivalent to LEFT JOIN.

Refer below tables for the following examples.

Denormalized Data

Table: EmployeeData table

Id	Code	DepartmentId	DepartmentName
1	0001	1	Producing
2	0002	2	HR
3	0003	1	Producing
4	0004	NULL	NULL
5	0005	3	Marketing
6	0006	NULL	NULL

Table: Employees

Id	Code	DepartmentId
1	0001	1
2	0002	2
3	0003	1
4	0004	NULL
5	0005	3
6	0006	NULL

Sample data for employees

Table: Departments

Id	Name
1	Producing
2	HR
3	Marketing
4	IT
5	Accounting

Sample data for departments

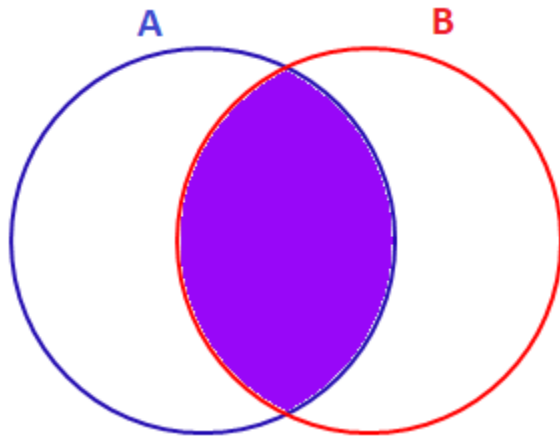
Use SQL Server or MySQL to run the following query to create sample tables for given examples.

```
CREATE TABLE Departments(  
    Id int NOT NULL,  
    Name varchar(10) NOT NULL,  
    PRIMARY KEY (Id)  
);  
  
CREATE TABLE Employees(  
    Id int NOT NULL,  
    Code varchar(10) NOT NULL,  
    DepartmentId int NULL,  
    PRIMARY KEY (Id)  
);  
  
INSERT Departments VALUES (1, 'Production'), (2, 'HR'), (3, 'Marketing')  
, (4, 'IT'), (5, 'Accounting');  
  
INSERT Employees VALUES (1, '0001', 1), (2, '0002', 2), (3, '0003', 1)  
, (4, '0004', NULL), (5, '0005', 3), (6, '0001', NULL);
```

Query to create tables with sample data

CROSS APPLY / INNER JOIN

INNER JOIN / CROSS APPLY selects all matching rows from both tables. CROSS APPLY is equivalent to INNER JOIN.



INNER JOIN/CROSS APPLY

Example #1: INNER JOIN

The following SQL statement shows how to create an INNER JOIN using two tables.

SQL Statement / Example(s)
<pre>SELECT Employees.Id, Employees.Code, Departments.Name AS Department FROM Employees INNER JOIN Departments ON Employees.DepartmentId = Departments.Id</pre>

INNER JOIN in SQL

Example #2: CROSS APPLY

The following SQL statement shows how to create a CROSS APPLY using two tables.

SQL Statement / Example(s)
<pre>SELECT E.Id, E.Code, A.Name FROM Employees E CROSS APPLY (SELECT * FROM Departments D WHERE E.DepartmentId = D.Id) A</pre>

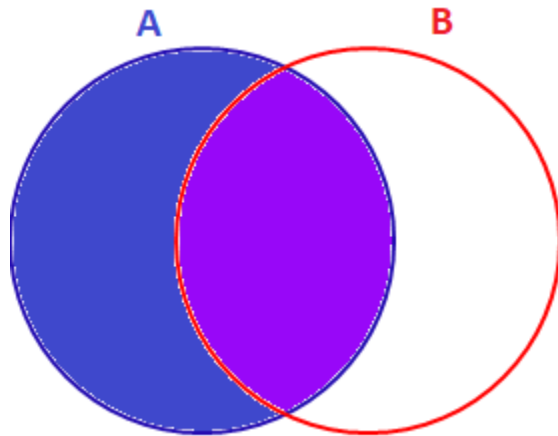
CROSS APPLY in SQL

Id	Code	Department
1	0001	Production
2	0002	HR
3	0003	Production
5	0005	Marketing

Query Result

LEFT JOIN / OUTER APPLY

LEFT JOIN / OUTER APPLY selects all matching rows from the left table. OUTER APPLY is equivalent to LEFT JOIN.



LEFT JOIN / LEFT APPLY

Example #3: LEFT JOIN

The following SQL statement shows how to create an LEFT JOIN using two tables.

SQL Statement / Example(s)

```
SELECT Employees.Id, Employees.Code, Departments.Name AS Department
FROM Employees
LEFT JOIN Departments
ON Employees.DepartmentId = Departments.Id
```

LEFT JOIN in SQL

Example #4: OUTER APPLY

The following SQL statement shows how to create an OUTER APPLY using two tables.

SQL Statement / Example(s)

```
SELECT E.Id, E.Code, A.Name FROM Employees E
OUTER APPLY
(
    SELECT * FROM Departments D
    WHERE E.DepartmentId = D.Id
) A
GO
```

OUTER APPLY in SQL

Id	Code	Department
1	0001	Production
2	0002	HR
3	0003	Production
4	0004	NULL
5	0005	Marketing
6	0006	NULL

Query Result