Module 12

Using Set Operators

Module Overview

- Writing Queries with the UNION Operator
- Using EXCEPT and INTERSECT
- Using APPLY

Lesson 1: Writing Queries with the UNION Operator

- Interactions Between Sets
- Using the UNION Operator
- Using the UNION ALL Operator
- Demonstration: Using UNION and UNION ALL

Interactions Between Sets

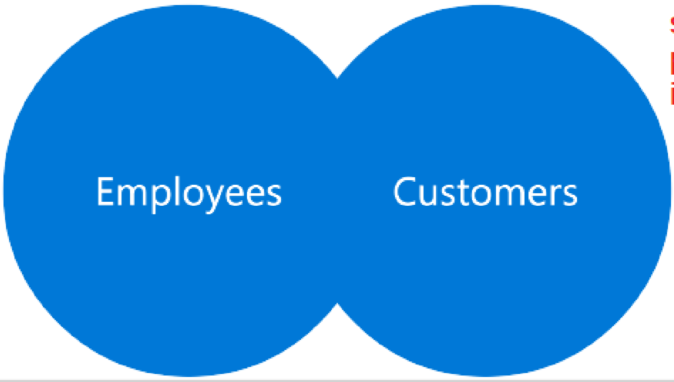
- The results of two input queries may be further manipulated
- Sets may be combined, compared, or operated against each other
- Both sets must have the same number of compatible columns
- ORDER BY not allowed in input queries, but may be used for result of set operation
- NULLs considered equal when comparing sets

```
<SELECT query_1>
<set_operator>
<SELECT query_2>
[ORDER BY <sort_list>];
```

Using the UNION Operator

- UNION returns a result set of distinct rows combined from both input sets (Traz valores distintos)
- Duplicates are removed during query processing (affects performance)

UNION - As consultas devem ser iguais. No caso de não ser, pode até executar, mas pode gerar um retorno inconsistente.



```
-- only distinct rows from both queries are returned
SELECT country, region, city FROM HR.Employees
UNION
SELECT country, region, city FROM Sales.Customers;
```

Using the UNION ALL Operator

- UNION ALL returns a result set with all rows from both input sets (Traz todas as linhas)
- To avoid the performance penalty caused by filtering duplicates, use UNION ALL over UNION whenever requirements allow it

```
-- all rows from both queries will be returned
SELECT country, region, city FROM HR.Employees
UNION ALL
SELECT country, region, city FROM Sales.Customers;
```

Demonstration: Using UNION and UNION ALL

In this demonstration, you will see how to:

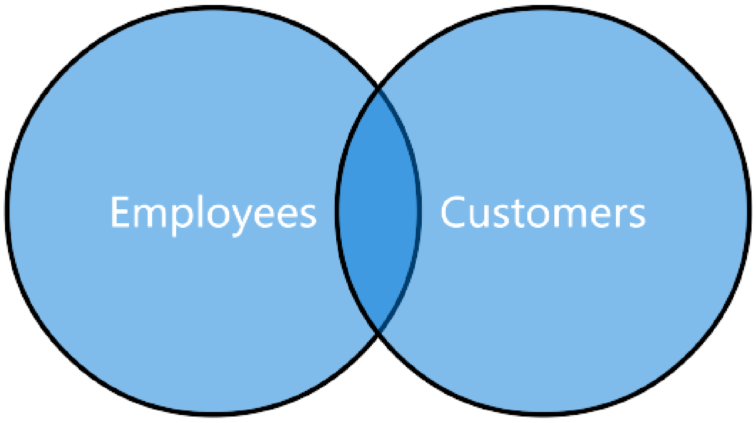
- Use UNION and UNION ALL

Lesson 2: Using EXCEPT and INTERSECT

- Using the INTERSECT Operator
- Using the EXCEPT Operator
- Demonstration: Using EXCEPT and INTERSECT

Using the INTERSECT Operator

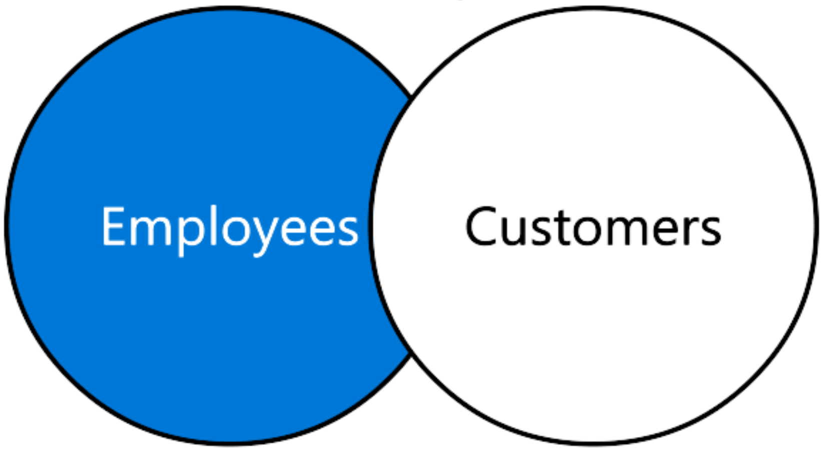
- INTERSECT returns the distinct set of rows that appear in both input result sets



```
-- only rows that exist in both queries will be returned
SELECT country, region, city FROM HR.Employees
INTERSECT
SELECT country, region, city FROM Sales.Customers;
```

Using the EXCEPT Operator

- EXCEPT returns only distinct rows that appear in the left set but not the right
  - The order in which sets are specified matters



```
-- only rows from Employees will be returned
SELECT country, region, city FROM HR.Employees
EXCEPT
SELECT country, region, city FROM Sales.Customers;
```

Demonstration: Using EXCEPT and INTERSECT

In this demonstration, you will see how to:

- Use INTERSECT and EXCEPT

Lesson 3: Using APPLY

- Using the APPLY Operator
- The CROSS APPLY Operator
- The OUTER APPLY Operator
- CROSS APPLY and OUTER APPLY Features
- Demonstration: Using CROSS APPLY and OUTER APPLY

Using the APPLY Operator

- APPLY is a table operator used in the FROM clause
- Two forms—CROSS APPLY and OUTER APPLY
- Operates on two input tables, referred to as left and right
- Right table may be any table expression including a derived table or a table-valued function

```
SELECT <column_list>
FROM <left_table_source> AS <alias>
[CROSS]|[OUTER] APPLY
    <right_table_source> AS <alias>;
```

CROSS APPLY e **OUTTER APPLY** - Saindo da linguagem ANSII e se aproximando da linguagem Transact (menor custo)

The CROSS APPLY Operator

- CROSS APPLY applies the right table source to each row in the left table source
  - Only rows with results in both the left table source and right table source are returned
- Most INNER JOIN statements can be rewritten as CROSS APPLY statements

```
SELECT o.orderid, o.orderdate,
od.productid, od.unitprice, od.qty
FROM Sales.Orders AS o
CROSS APPLY (SELECT productid, unitprice, qty
FROM Sales.OrderDetails AS so
WHERE so.orderid = o.orderid
) AS od;
```

The OUTER APPLY Operator

- OUTER APPLY applies the right table source to each row in the left table source
  - All rows from the left table source are returned—values from the right table source are returned where they exist, otherwise NULL is returned
- Most LEFT OUTER JOIN statements can be rewritten as OUTER APPLY statements

```sql
SELECT DISTINCT s.country AS supplier_country,
c.country as customer_country
FROM Production.Suppliers AS s
OUTER APPLY (SELECT country
FROM Sales.Customers AS cu
WHERE cu.country = s.country
) AS c
ORDER BY supplier_country;
```

CROSS APPLY and OUTER APPLY Features

- CROSS APPLY and OUTER APPLY allow query expressions that could not appear in a JOIN to return as part of a single result set
  - For example, table-valued functions (TVFs)

```sql
SELECT S.supplierid, s.companyname,
P.productid, P.productname, P.unitprice
FROM Production.Suppliers AS S
CROSS APPLY dbo.fn_TopProductsByShipper(S.supplierid) AS P;
```

Demonstration: Using CROSS APPLY and OUTER APPLY

In this demonstration, you will see how to:

- Use forms of the APPLY Operator

Lab: Using Set Operators

- Exercise 1: Writing Queries That Use UNION Set Operators and UNION ALL Multi-Set Operators
- Exercise 2: Writing Queries That Use the CROSS APPLY and OUTER APPLY Operators
- Exercise 3: Writing Queries That Use the EXCEPT and INTERSECT Operators

Logon Information
Virtual machine: **20761C-MIA-SQL**
User name: **ADVENTUREWORKS\Student**
Password: **Pa55w.rd**

Estimated Time: 60 minutes