

Microsoft SQL Server 2019

Design & Develop



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Types of SQL Command



-
- DDL(Data Definition Language)
 - CREATE
 - DROP
 - ALTER
 - RENAME
 - TRUNCATE

Types of SQL Command



-
- DML(Data Manipulation Language)
 - INSERT
 - UPDATE
 - DELETE
 - MERGE
 - LOCK

Types of SQL Command



-
- DQL(Data Query Language)
 - SELECT

Types of SQL Command



-
- DCL(Data Control Language)
 - GRANT
 - REVOKE

Types of SQL Command



-
- TCL(Transaction Control Language)
 - BEGIN TRAN
 - COMMIT
 - ROLLBACK
 - SAVEPOINT

Types of Programming



-
- Procedural (Imperative)
 - HOW
 - Declarative
 - WHAT

Logical Query Processing



(5) **SELECT** (5-2) **DISTINCT** (7) **TOP**(<top_specification>)

(5-1) <select_list>

(1) **FROM**

(1-J) <left_table> <join_type> **JOIN** <right_table> **ON** <on_predicate>

(1-A) <left_table> <apply_type> **APPLY** <right_input_table> **AS** <alias>

(1-P) <left_table> **PIVOT**(<pivot_specification>) **AS** <alias>

(1-U) <left_table> **UNPIVOT**(<unpivot_specification>) **AS** <alias>

(2) **WHERE**

<where_predicate>

(3) **GROUP BY**

<group_by_specification>

(4) **HAVING**

<having_predicate>

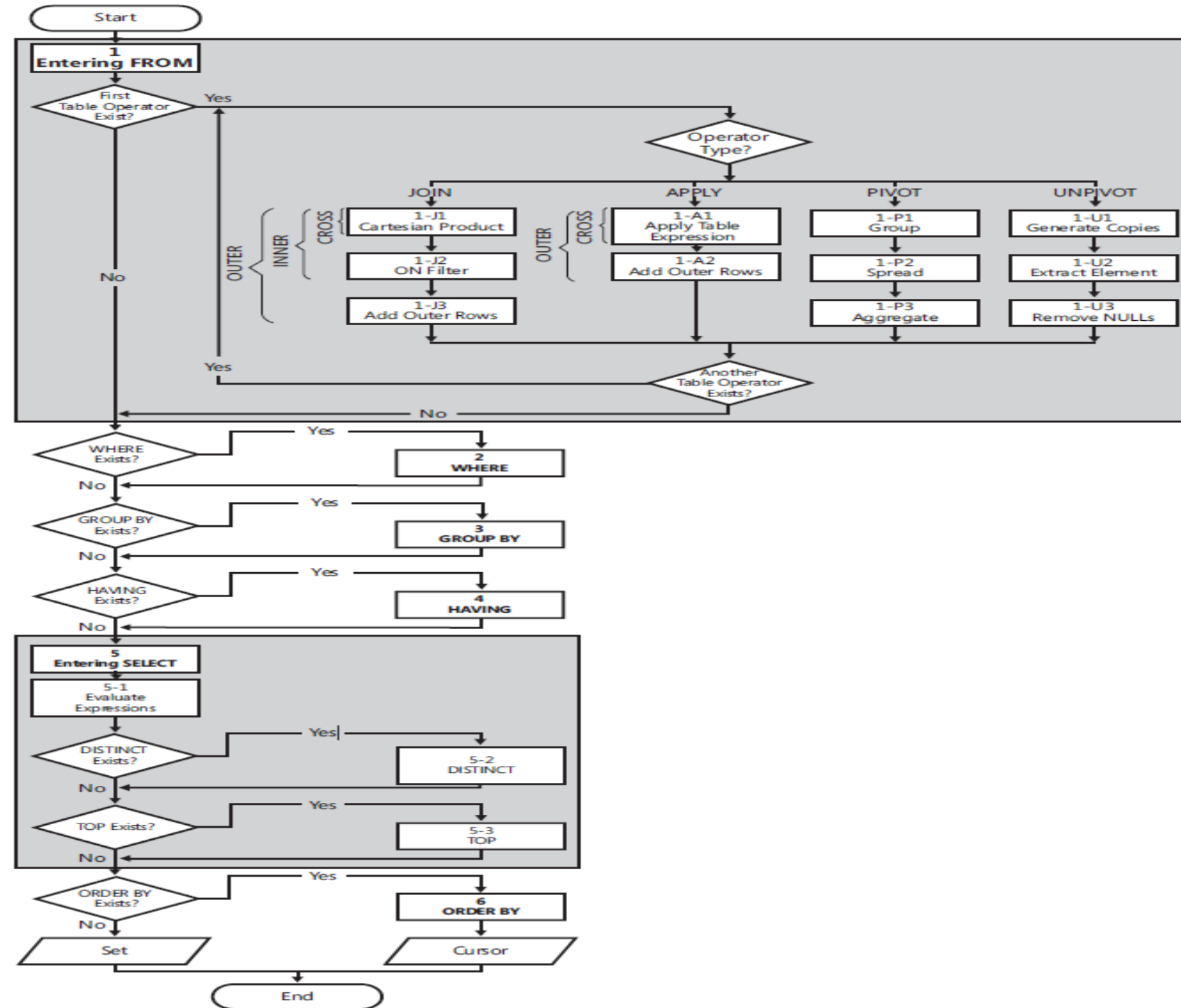
(6) **ORDER BY**

<order_by_list>

(7) **OFFSET**

<offset_specification> **ROWS FETCH NEXT** <fetch_specification> **ROWS ONLY;**

Logical Query Processing



(1) FROM



-
- Identify query's source tables (sets)
 - Process table (set) operators
 - JOIN
 - APLY
 - PIVOT
 - UNPIVOT

(5-1) <select_list>



-
- Evaluate Expressions
 - Column
 - Fixed value
 - SQL functions
 - Combination of one or more
 - Columns,
 - Fixed values
 - SQL functions

(5-1) <select_list>



-
- * (Asterisk)
 - Aliasing
 - **expression AS <alias>**
 - expression <alias>
 - <alias> = expression

(2) WHERE



-
- Filter the rows from previous step
 - Based on `<where_predicate>`
 - Only rows which evaluated to TRUE go to next step

(1-J) JOIN



Employee		
ID	Name	CityID
1	Ali	3
2	Omid	4
3	Reza	5

```
{      (1, Ali, 3),  
      (2, Omid, 4),  
      (3, Reza, 5)  
}
```

City	
ID	Name
3	Tehran
4	Shiraz
5	Tabriz

```
{      (3, Tehran),  
      (4, Shiraz),  
      (5, Tabriz)  
}
```

Result			
ID	Name	CityID	CityName
1	Ali	3	Tehran
2	Omid	4	Shiraz
3	Reza	5	Tabriz

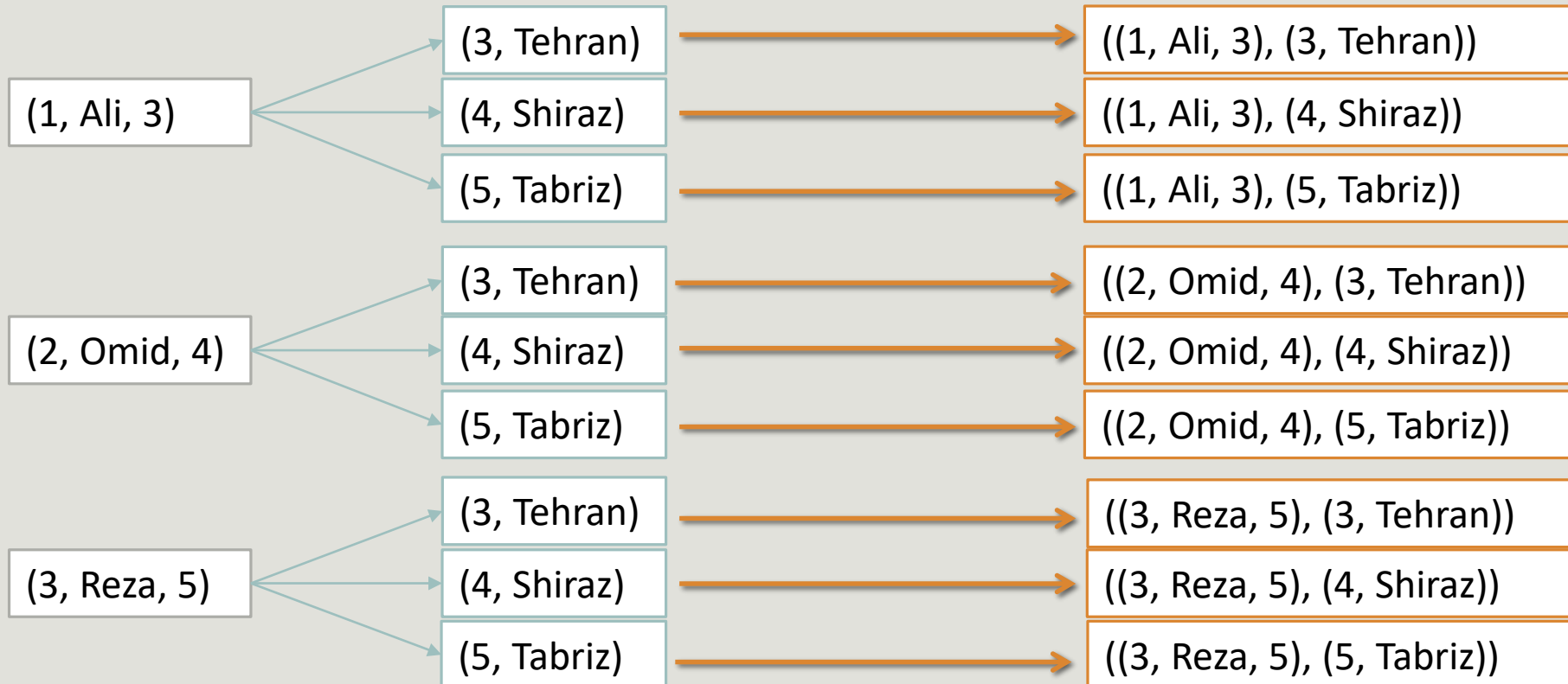
```
{      (1, Ali, 3, Tehran),  
      (2, Omid, 4, Shiraz),  
      (3, Reza, 5, Tabriz)  
}
```

(1-J1) Cartesian Product

$E = \{ (1, \text{Ali}, 3), (2, \text{Omid}, 4), (3, \text{Reza}, 5) \}$

$C = \{ (3, \text{Tehran}), (4, \text{Shiraz}), (5, \text{Tabriz}) \}$

$E * C = ?$



(1-J2) On Predicate

Employee			City		ON
ID	Name	CityID	ID	Name	Evaluation
1	Ali	3	3	Tehran	True
1	Ali	3	4	Shiraz	False
1	Ali	3	5	Tabriz	False
2	Omid	4	3	Tehran	False
2	Omid	4	4	Shiraz	True
2	Omid	4	5	Tabriz	False
3	Reza	5	3	Tehran	False
3	Reza	5	4	Shiraz	False
3	Reza	5	5	Tabriz	True



Employee			City	
ID	Name	CityID	ID	Name
1	Ali	3	3	Tehran
2	Omid	4	4	Shiraz
3	Reza	5	5	Tabriz

(1-J3) Add Outer Rows



Employee		
ID	Name	CityID
1	Ali	3
2	Omid	4

```
{      (1, Ali, 3),  
      (2, Omid, 4)  
}
```

City	
ID	Name
4	Shiraz
5	Tabriz

```
{      (4, Shiraz),  
      (5, Tabriz)  
}
```

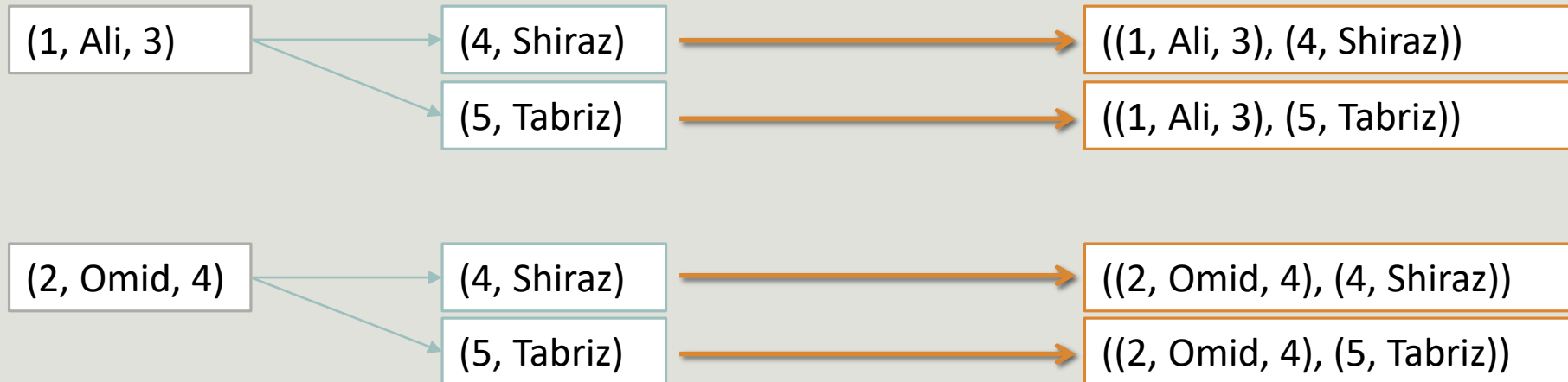
Result			
ID	Name	CityID	CityName
1	Ali	3	NULL
2	Omid	4	Shiraz

```
{      (1, Ali, 3, NULL),  
      (2, Omid, 4, Shiraz)  
}
```

(1-J3) Add Outer Rows

$E = \{ (1, \text{Ali}, 3), (2, \text{Omid}, 4) \}$
 $C = \{ (4, \text{Shiraz}), (5, \text{Tabriz}) \}$

$E * C = ?$



(1-J3) Add Outer Rows

Employee			City		ON
ID	Name	CityID	ID	Name	Evaluation
1	Ali	3	4	Shiraz	False
1	Ali	3	5	Tabriz	False
2	Omid	4	4	Shiraz	True
2	Omid	4	5	Tabriz	False

Employee			OUTER ROW
ID	Name	CityID	Evaluation
1	Ali	3	True
2	Omid	4	False

City		OUTER ROW
ID	Name	Evaluation
4	Shiraz	False
5	Tabriz	True

Employee			City	
ID	Name	CityID	ID	Name
2	Omid	4	4	Shiraz
1	Ali	3	NULL	NULL
NULL	NULL	NULL	5	Tabriz

JOINS



JOIN Type		Cartesian Product	On Predicate	Add Outer Rows
CROSS JOIN		OK		
INNER JOIN		OK	OK	
OUTER JOIN	LEFT OUTER JOIN	OK	OK	OK
	RIGHT OUTER JOIN			
	FULL OUTER JOIN			

JOINS



JOIN Type		Old Style	Very Old Style	
CROSS JOIN			,	
INNER JOIN		JOIN	,	=
OUTER JOIN	LEFT OUTER JOIN	LEFT JOIN	,	*=
	RIGHT OUTER JOIN	RIGHT JOIN	,	=*
	FULL OUTER JOIN	FULL JOIN	,	*=*



DataToInsight.ir

JOINS

SELECT

```
SOH.SalesOrderID,  
SOH.OrderDate,  
SOH.CustomerID,  
P.FirstName + ' ' + P.LastName AS CustomerName,  
SOD.ProductID,  
Pr.Name AS ProductName,  
SOD.UnitPrice,  
SOD.OrderQty,  
SOD.UnitPrice * SOD.OrderQty AS TotalPrice
```

FROM

```
Sales.SalesOrderHeader AS SOH
```

INNER JOIN

```
Sales.SalesOrderDetail AS SOD
```

ON

```
SOH.SalesOrderID = SOD.SalesOrderID
```

INNER JOIN

```
Sales.Customer AS C
```

ON

```
SOH.CustomerID = C.CustomerID
```

INNER JOIN

```
Person.Person AS P
```

ON

```
C.PersonID = P.BusinessEntityID
```

INNER JOIN

```
Production.Product AS Pr
```

ON

```
SOD.ProductID = Pr.ProductID
```

- [آموزش دستور SELECT](#)
- [آموزش JOIN در SQL](#)

- T-SQL Date Functions
- T-SQL String Functions

- تمرین:
 - لیست افرادی که کارمند نیستند.
 - نام کارمند هایی که فروشنده نیستند.