



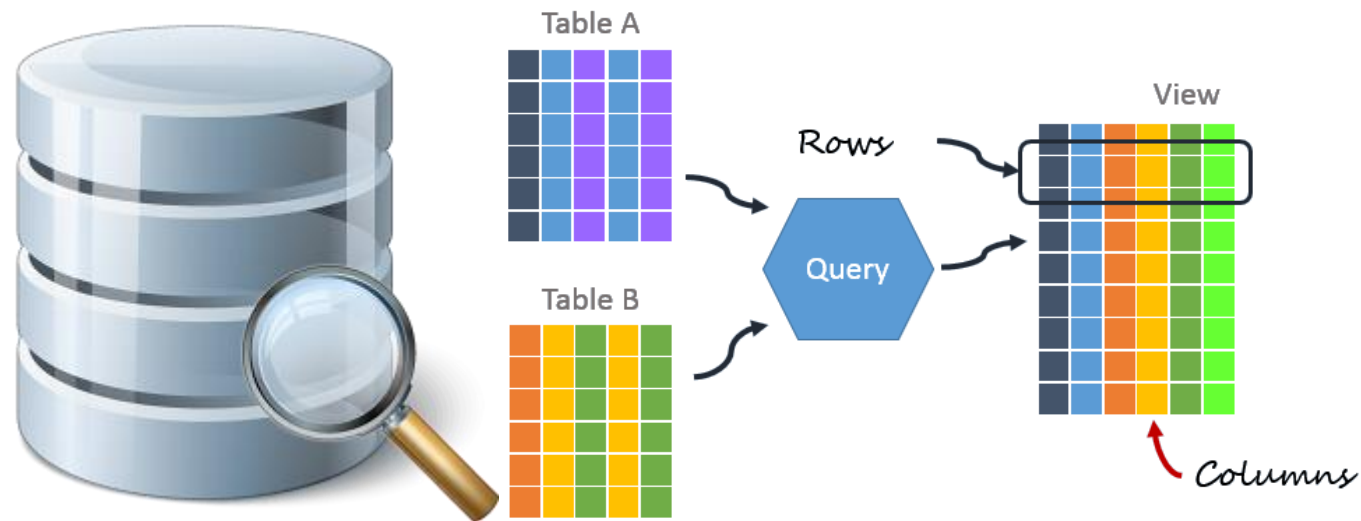
SELECT Command

Môn học: Hệ quản trị cơ sở dữ liệu [*Buổi 3-4*]

GV: Nguyễn Mai Huy

Query Data

SELECT – FROM – WHERE – ORDER



SELECT – FROM – WHERE – ORDER BY

- Syntax

SELECT *column1, column2, ...*

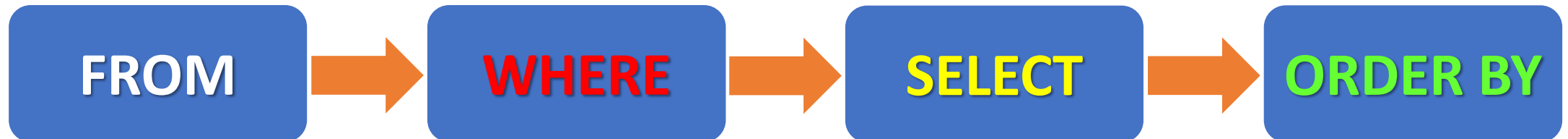
FROM *table_name*

WHERE *condition*

ORDER BY *column1, column2, ... [ASC | DESC];*

- Note:

- + Sử dụng từ khóa **ASC** để sắp tăng dần, **DESC** để sắp giảm dần
- + Có thể chỉ ra nhiều cột để quy định mức độ ưu tiên sắp xếp khi trùng dữ liệu



Filter data

Expression & Operators



AND, OR and NOT Operators

SELECT * **FROM** Customers **WHERE** Country='France' **And** City='Paris';

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
57	Paris spécialités	Marie Bertrand	265, boulevard Charonne	Paris	75012	France
74	Spécialités du monde	Dominique Perrier	25, rue Lauriston	Paris	75016	France



SELECT CustomerID, CustomerName, ContactName, Address, City, PostalCode, Country

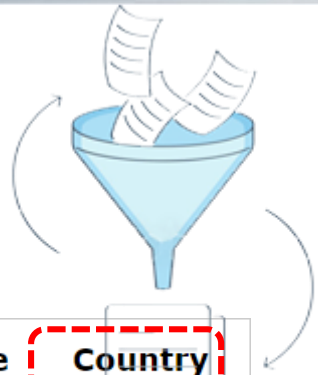
FROM Customers

WHERE City='Paris' **or** City='Marseille' **or** City='Lyon';

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
9	Bon app'	Laurence Lebihans	12, rue des Bouchers	Marseille	13008	France
57	Paris spécialités	Marie Bertrand	265, boulevard Charonne	Paris	75012	France
74	Spécialités du monde	Dominique Perrier	25, rue Lauriston	Paris	75016	France
84	Victuailles en stock	Mary Saveley	2, rue du Commerce	Lyon	69004	France

AND, OR and NOT Operators

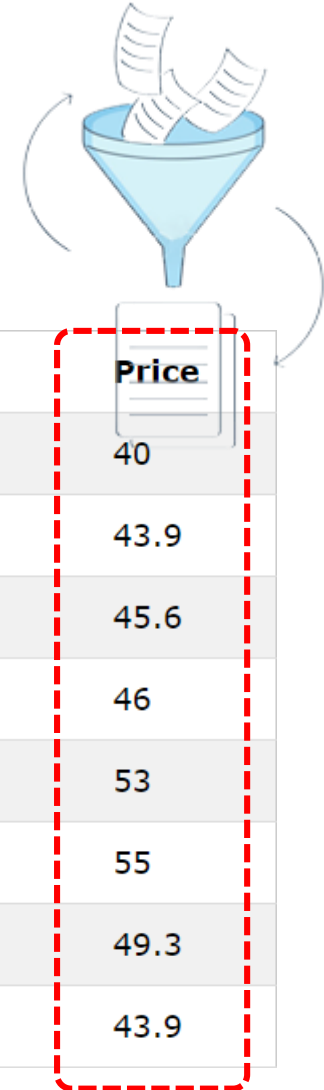
SELECT *
FROM Customers
WHERE Country = 'France' And NOT City='Paris';



CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
7	Blondel père et fils	Frédérique Citeaux	24, place Kléber	Strasbourg	67000	France
9	Bon app'	Laurence Lebihans	12, rue des Bouchers	Marseille	13008	France
18	Du monde entier	Janine Labrune	67, rue des Cinquante Otages	Nantes	44000	France
23	Folies gourmandes	Martine Rancé	184, chaussée de Tournai	Lille	59000	France
26	France restauration	Carine Schmitt	54, rue Royale	Nantes	44000	France
40	La corne d'abondance	Daniel Tonini	67, avenue de l'Europe	Versailles	78000	France
41	La maison d'Asie	Annette Roulet	1 rue Alsace-Lorraine	Toulouse	31000	France
84	Victuailles en stock	Mary Saveley	2, rue du Commerce	Lyon	69004	France
85	Vins et alcools Chevalier	Paul Henriot	59 rue de l'Abbaye	Reims	51100	France

Between ... And Operators

SELECT *
FROM Products
WHERE Price **Between** 40 **And** 50;



ProductID	ProductName	SupplierID	CategoryID	Unit	Price
8	Northwoods Cranberry Sauce	3	2	12 - 12 oz jars	40
27	Schoggi Schokolade	11	3	100 - 100 g pieces	43.9
28	Rössle Sauerkraut	12	7	25 - 825 g cans	45.6
43	Ipoh Coffee	20	1	16 - 500 g tins	46
51	Manjimup Dried Apples	24	7	50 - 300 g pkgs.	53
59	Raclette Courdavault	28	4	5 kg pkg.	55
62	Tarte au sucre	29	3	48 pies	49.3
63	Vegle-spread	7	2	15 - 625 g jars	43.9

Like Operators & Wildcard

SELECT *

FROM Customers

WHERE ContactName **Like** '%phil%';

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
39	Königlich Essen	Philip Cramer	Maubelstr. 90	Brandenburg	14776	Germany
55	Old World Delicatessen	Rene Phillips	2743 Bering St.	Anchorage	99508	USA



SELECT CustomerID, CustomerName, ContactName, Address, City, PostalCode, Country

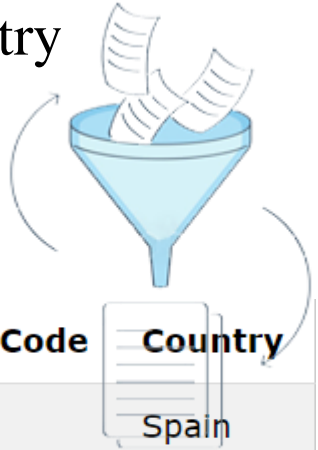
FROM Customers

WHERE CustomerName **Like** 'w%';

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
87	Wartian Herkku	Pirkko Koskitalo	Torikatu 38	Oulu	90110	Finland
88	Wellington Importadora	Paula Parente	Rua do Mercado, 12	Resende	08737-363	Brazil
89	White Clover Markets	Karl Jablonski	305 - 14th Ave. S. Suite 3B	Seattle	98128	USA
90	Wilman Kala	Matti Karttunen	Keskuskatu 45	Helsinki	21240	Finland
91	Wolski	Zbyszek	ul. Filtrowa 68	Walla	01-012	Poland

In Operators

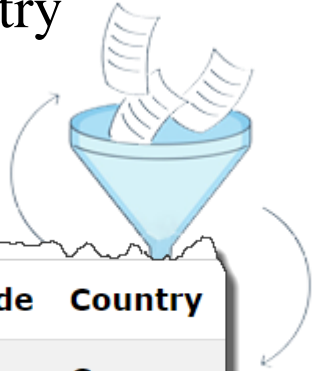
SELECT CustomerID, CustomerName, ContactName, Address, City, PostalCode, Country
FROM Customers
WHERE Country **In** ('Italy', 'Spain');



CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
8	Bólido Comidas preparadas	Martín Sommer	C/ Araquil, 67	Madrid	28023	Spain
22	FISSA Fabrica Inter. Salchichas S.A.	Diego Roel	C/ Morazarzal, 86	Madrid	28034	Spain
27	Franchi S.p.A.	Paolo Accorti	Via Monte Bianco 34	Torino	10100	Italy
29	Galería del gastrónomo	Eduardo Saavedra	Rambla de Cataluña, 23	Barcelona	08022	Spain
30	Godos Cocina Típica	José Pedro Freyre	C/ Romero, 33	Sevilla	41101	Spain
49	Magazzini Alimentari Riuniti	Giovanni Rovelli	Via Ludovico il Moro 22	Bergamo	24100	Italy
66	Reggiani Caseifici	Maurizio Moroni	Strada Provinciale 124	Reggio Emilia	42100	Italy
69	Romero y tomillo	Alejandra Camino	Gran Vía, 1	Madrid	28001	Spain

In Operators and subquery

SELECT CustomerID, CustomerName, ContactName, Address, City, PostalCode, Country
FROM Customers
WHERE Country **In** (**SELECT** Country **FROM** Suppliers);



CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden
6	Blauer See Delikatessen	Hanna Moos	Forsterstr. 57	Mannheim	68306	Germany
7	Blondel père et fils	Frédérique Citeaux	24, place Kléber	Strasbourg	67000	France
8	Bólido Comidas preparadas	Martín Sommer	C/ Araquil, 67	Madrid	28023	Spain
9	Bon app'	Laurence Lebihans	12, rue des Bouchers	Marseille	13008	France
10	Bottom-Dollar Marketse	Elizabeth Lincoln	23 Tsawassen Blvd.	Tsawassen	T2F 8M4	Canada
11	B's Beverages	Victoria Ashworth	Fauntleroy Circus	London	EC2 5NT	UK

Any Operators and subquery

Products [table]

ProductID	ProductName	SupplierID	CategoryID	Unit	Price
1	Chais	1	1	10 boxes x 20 bags	18
2	Chang	1	1	24 - 12 oz bottles	19
3	Aniseed Syrup	1	2	12 - 550 ml bottles	10
4	Chef Anton's Cajun Seasoning	2	2	48 - 6 oz jars	22
5	Chef Anton's Gumbo Mix	2	2	36 boxes	21.35

OrderDetails [table]

OrderDetailID	OrderID	ProductID	Quantity
1	10248	11	12
2	10248	42	10
3	10248	72	5
4	10249	14	9
5	10249	51	40

Any Operators and subquery

```
SELECT ProductName, Unit, Price
FROM Products
WHERE ProductID = ANY (SELECT ProductID
                        FROM OrderDetails
                        WHERE Quantity > 90);
```



ProductName	Unit	Price
Steeleye Stout	24 - 12 oz bottles	18
Pâté chinois	24 boxes x 2 pies	24

Exist Operators and subquery

Products [table]

ProductID	ProductName	SupplierID	CategoryID	Unit	Price
1	Chais	1	1	10 boxes x 20 bags	18
2	Chang	1	1	24 - 12 oz bottles	19
3	Aniseed Syrup	1	2	12 - 550 ml bottles	10
4	Chef Anton's Cajun Seasoning	2	2	48 - 6 oz jars	22
5	Chef Anton's Gumbo Mix	2	2	36 boxes	21.35

Suppliers [table]

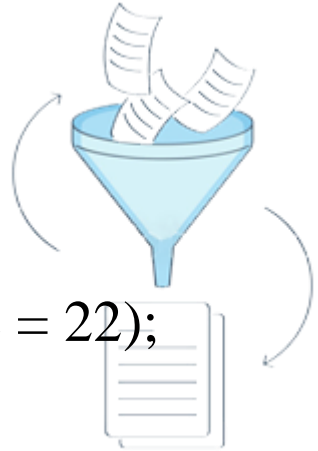
SupplierID	SupplierName	ContactName	Address	City	PostalCode	Country
1	Exotic Liquid	Charlotte Cooper	49 Gilbert St.	London	EC1 4SD	UK
2	New Orleans Cajun Delights	Shelley Burke	P.O. Box 78934	New Orleans	70117	USA
3	Grandma Kelly's Homestead	Regina Murphy	707 Oxford Rd.	Ann Arbor	48104	USA
4	Tokyo Traders	Yoshi Nagase	9-8 Sekimai Musashino-shi	Tokyo	100	Japan

Exist Operators and subquery

SELECT SupplierName, Address, City, Country

FROM Suppliers

WHERE EXISTS (**SELECT** ProductName
FROM Products
WHERE Products.SupplierID = Suppliers.supplierID **AND** Price = 22);



SupplierName	Address	City	Country
New Orleans Cajun Delights	P.O. Box 78934	New Orleans	USA

Exist Operators and subquery

SELECT SupplierName, Address, City, Country

FROM Suppliers s

WHERE EXISTS (**SELECT** ProductName

FROM Products p

WHERE (p.SupplierID = s.supplierID) **AND** (Price **between** 18 and 20));



SupplierName	Address	City	Country
Exotic Liquid	49 Gilbert St.	Londona	UK
Bigfoot Breweries	3400 - 8th Avenue Suite 210	Bend	USA
Svensk Sjöföda AB	Brovallavägen 231	Stockholm	Sweden
Aux joyeux ecclésiastiques	203, Rue des Francs-Bourgeois	Paris	France
New England Seafood Cannery	Order Processing Dept. 2100 Paul Revere Blvd.	Boston	USA
Leka Trading	471 Serangoon Loop, Suite #402	Singapore	Singapore
Karkki Oy	Valtakatu 12	Lappeenranta	Finland
Pasta Buttini s.r.l.	Via dei Gelsomini, 153	Salerno	Italy

Case statement

- Like an **IF-THEN-ELSE** statement in the others program language



CASE Syntax

```
CASE
  WHEN condition1 THEN result1
  WHEN condition2 THEN result2
  WHEN conditionN THEN resultN
  ELSE result
END;
```

Case statement

```
SELECT OrderID, Quantity, CASE WHEN Quantity > 30 THEN 'Sold to agents'  
                                WHEN Quantity = 30 THEN 'Quantity is 30'  
                                ELSE 'Retail'  
END AS Notification
```

FROM OrderDetails;



OrderID	Quantity	QuantityText
10248	12	Retail
10248	10	Retail
10248	5	Retail
10249	9	Retail
10249	40	Sold to agents
10250	10	Retail
10250	35	Sold to agents
10250	15	Retail

Distinct in Query result

SELECT DISTINCT Country **FROM** Customers;

Country
Germany
Mexico
UK
Sweden
France
Spain
Canada
Argentina
Switzerland
Brazil
Austria
Italy
Portugal
USA
Venezuela
Ireland



SQL Joins

Aggregate data from multiple tables

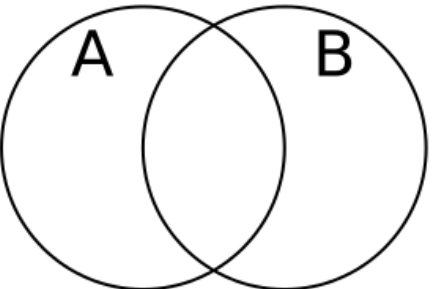
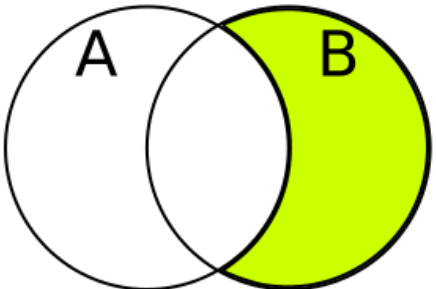
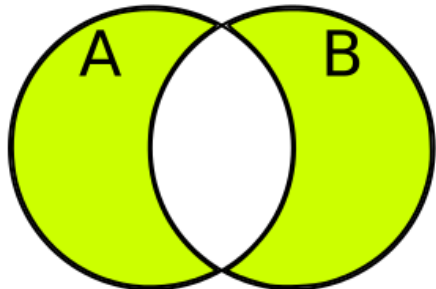
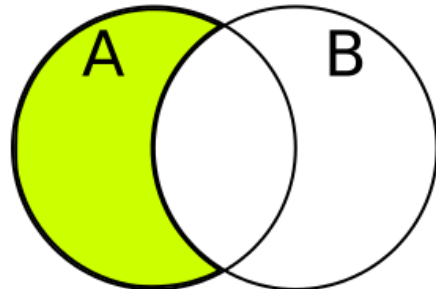
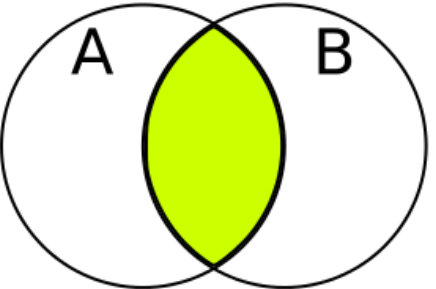
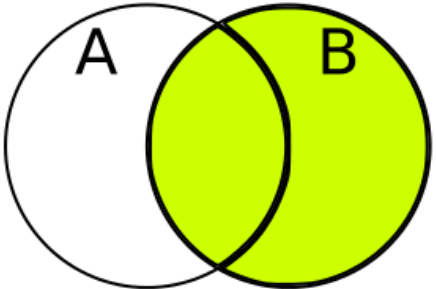
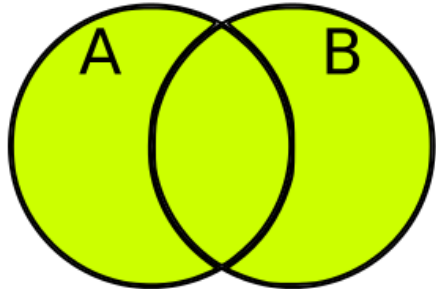
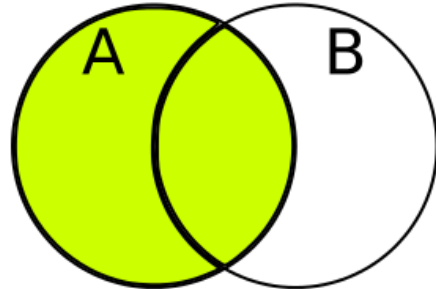


JOIN clause

- ❖ A JOIN clause is used to combine rows from two or more tables, based on a related column between them.
- ❖ Different Types of SQL JOINS
 - ✓ **(INNER) JOIN:** Returns records that have matching values in both tables
 - ✓ **LEFT (OUTER) JOIN:** Returns all records from the left table, and the matched records from the right table
 - ✓ **RIGHT (OUTER) JOIN:** Returns all records from the right table, and the matched records from the left table
 - ✓ **FULL (OUTER) JOIN:** Returns all records when there is a match in either left or right table



SQL JOIN

No join (\emptyset)	[Exclusive] Right Join ($\neg A$)	[Exclusive] Full Join ($A \oplus B$)	[Exclusive] Left Join ($\neg B$)
	 <pre>SELECT * FROM A RIGHT JOIN B ON A.key = B.key WHERE B.key IS NULL</pre>	 <pre>SELECT * FROM A FULL JOIN B ON A.key = B.key WHERE B.key IS NULL OR A.key IS NULL</pre>	 <pre>SELECT * FROM A LEFT JOIN B ON A.key = B.key WHERE B.key IS NULL</pre>
Inner Join ($A \cap B$)	[Inclusive] Right Join (B)	[Inclusive] Full Join ($A \vee B$)	[Inclusive] Left Join (A)
 <pre>SELECT * FROM A INNER JOIN B ON A.key = B.key</pre>	 <pre>SELECT * FROM A RIGHT JOIN B ON A.key = B.key</pre>	 <pre>SELECT * FROM A FULL JOIN B ON A.key = B.key</pre>	 <pre>SELECT * FROM A LEFT JOIN B ON A.key = B.key</pre>

INNER JOIN

- `SELECT column_name(s)`
`FROM table1`
`INNER JOIN table2`
`ON table1.column_name = table2.column_name;`



INNER JOIN

SELECT C.CustomerName, C.Address, C.City, O.OrderID, O.OrderDate
FROM Orders O
INNER JOIN Customers C **ON** (O.CustomerID = C.CustomerID);

CustomerName	Address	City	OrderID	OrderDate
Wilman Kala	Keskuskatu 45	Helsinki	10248	1996-07-04
Tradição Hipermercados	Av. Inês de Castro, 414	São Paulo	10249	1996-07-05
Hanari Carnes	Rua do Paço, 67	Rio de Janeiro	10250	1996-07-08
Victuailles en stock	2, rue du Commerce	Lyon	10251	1996-07-08
Suprêmes délices	Boulevard Tirou, 255	Charleroi	10252	1996-07-09
Hanari Carnes	Rua do Paço, 67	Rio de Janeiro	10253	1996-07-10
Chop-suey Chinese	Hauptstr. 29	Bern	10254	1996-07-11
Richter Supermarkt	Grenzacherweg 237	Genève	10255	1996-07-12
Wellington Importadora	Rua do Mercado, 12	Resende	10256	1996-07-15

INNER JOIN :: Multi-table



SELECT C.CustomerName, C.Address, C.City, O.OrderDate, P.ProductName,
P.Price, D.Quantity, D.Quantity*P.Price **as** Value

FROM Orders O **INNER JOIN** Customers C **ON** (O.CustomerID = C.CustomerID)

INNER JOIN OrderDetails D **ON** (O.OrderID = D.OrderID)

INNER JOIN Products P **ON** (P.ProductID = D.ProductID)

WHERE O.OrderID = 10248

CustomerName	Address	City	OrderDate	ProductName	Price	Quantity	Value
Wilman Kala	Keskuskatu 45	Helsinki	1996-07-04	Queso Cabrales	21.00	12	252.00
Wilman Kala	Keskuskatu 45	Helsinki	1996-07-04	Singaporean Hokkien Fried Mee	14.00	10	140.00
Wilman Kala	Keskuskatu 45	Helsinki	1996-07-04	Mozzarella di Giovanni	34.80	5	174.00

The UNION operator is used to combine the result-set of two or more SELECT statements.

- ❖ Each SELECT statement within UNION must have the same number of columns
- ❖ The columns must also have similar data types
- ❖ The columns in each SELECT statement must also be in the same order

```
SELECT column_name(s) FROM table1  
UNION  
SELECT column_name(s) FROM table2;
```

UNION City from Customers and Supplies

SELECT City **FROM** Customers
UNION
SELECT City **FROM** Suppliers
ORDER BY City;

City
Aachen
Albuquerque
Anchorage
Ann Arbor
Annecy
Barcelona
Barquisimeto
Bend
Bergamo
Berlin
Bern
Boise
Boston
Brandenburg
Bruxelles
Brussels

Statistics table

Group by and Having in **SELECT**

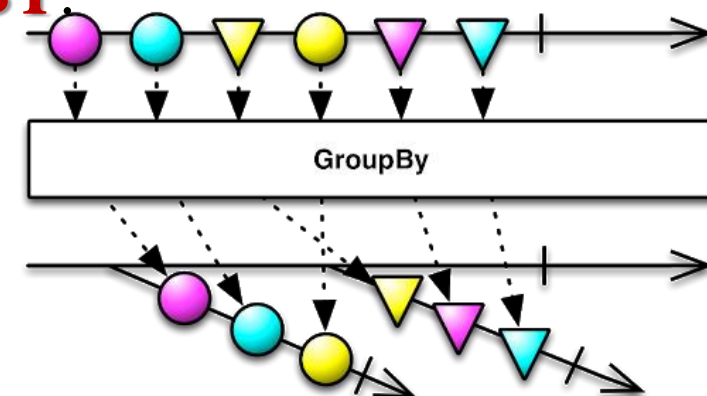


Group by clause

Mệnh đề **GROUP BY** trong SQL được sử dụng để sắp xếp những dữ liệu giống hệt nhau thành các nhóm nhằm phục vụ cho nhu cầu thống kê dựa trên tần suất xuất hiện của dữ liệu trên bảng. Như vậy, nếu một cột cụ thể có cùng giá trị trong các hàng khác nhau thì nó sẽ sắp xếp các hàng này thành một nhóm.

Lưu ý:

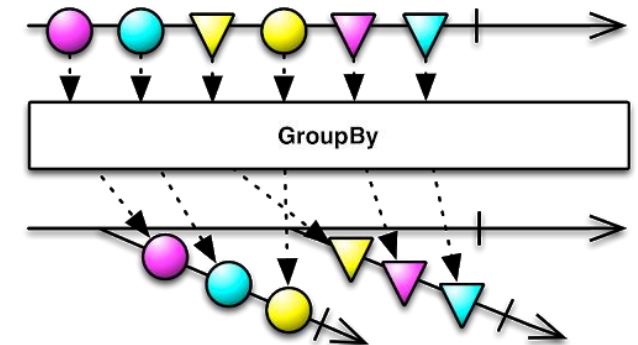
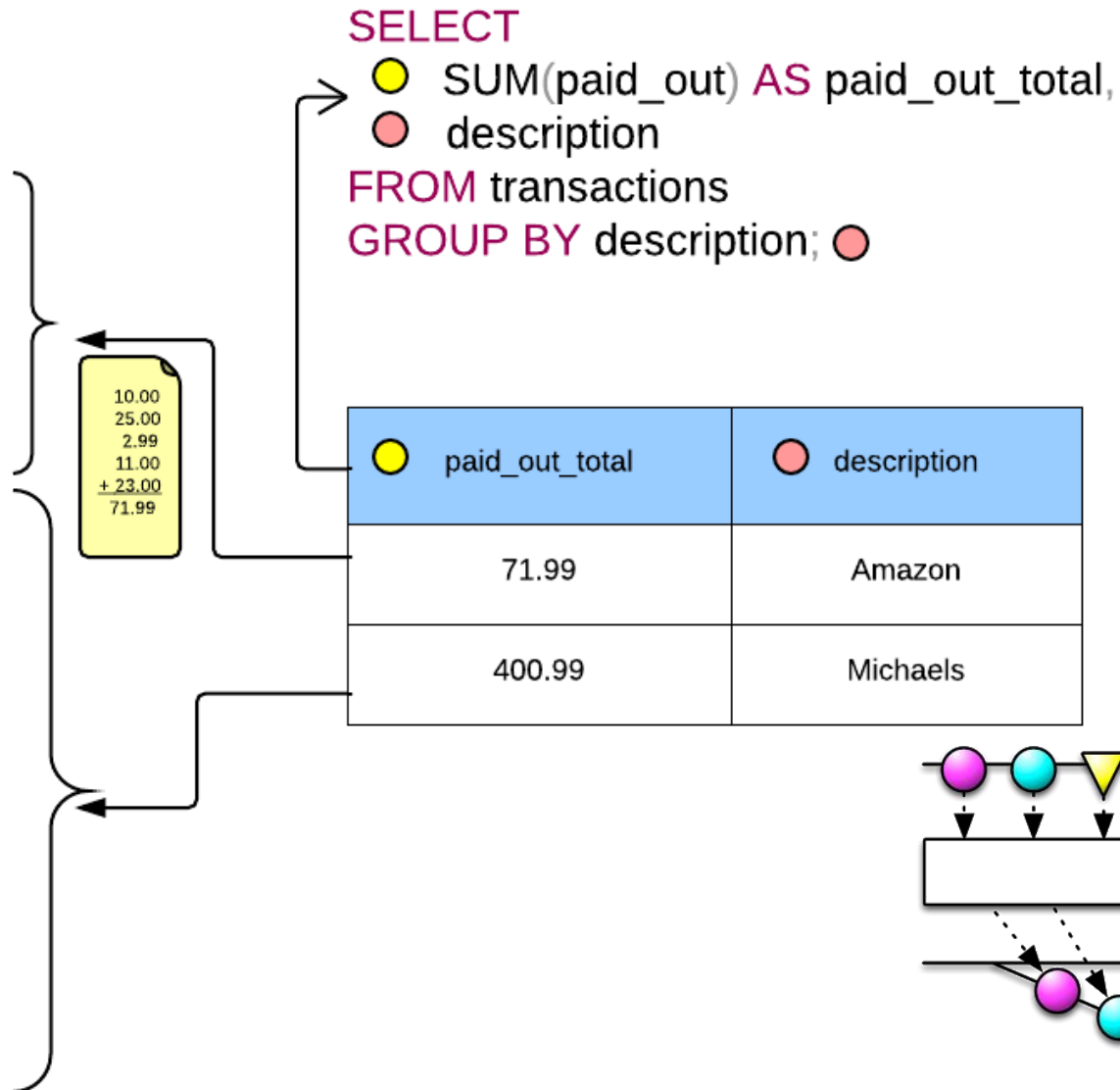
- ❖ Mệnh đề **GROUP BY** được sử dụng trong câu lệnh **SELECT**.
- ❖ Trong truy vấn, mệnh đề **GROUP BY** được đặt sau mệnh đề **WHERE**.
- ❖ Mệnh đề **GROUP BY** được đặt trước mệnh đề **ORDER BY**.



Group by clause

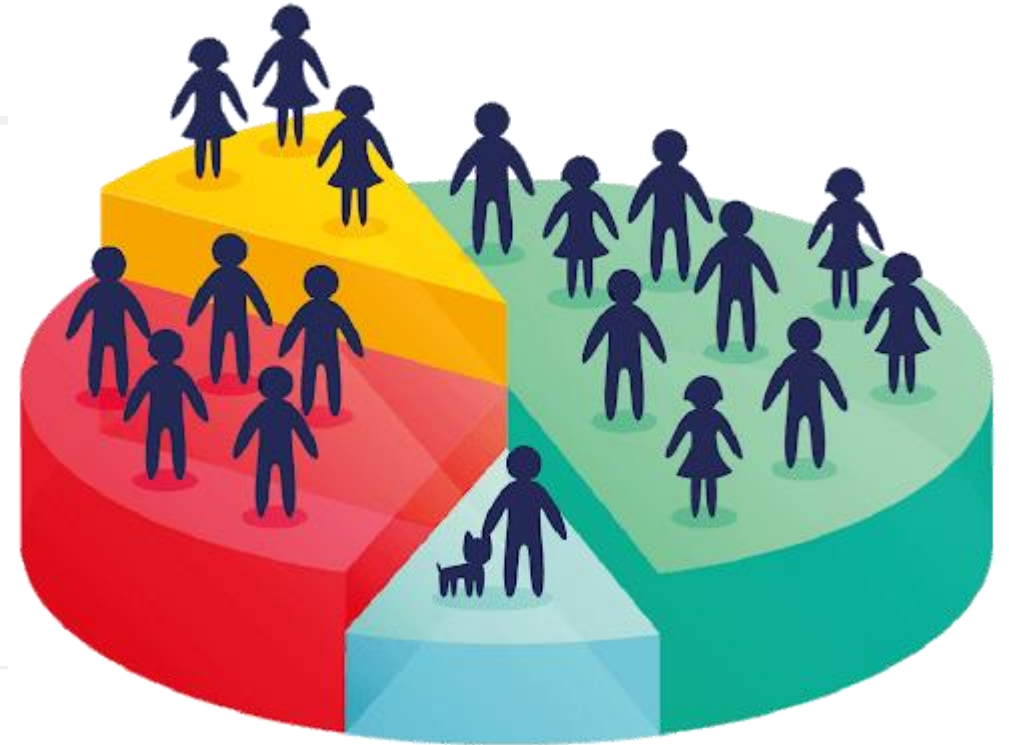
transactions

id	paid_out	description
1	10.00	Amazon
2	25.00	Amazon
3	2.99	Amazon
4	11.00	Amazon
5	23.00	Amazon
6	25.00	Michaels
7	300.00	Michaels
8	1.00	Michaels
9	11.00	Michaels
10	2.99	Michaels
11	25.00	Michaels
12	1.00	Michaels
13	25.00	Michaels
14	10.00	Michaels



Group by :: Syntax

```
SELECT column_name(s)  
FROM table_name  
WHERE condition  
GROUP BY column_name(s)  
ORDER BY column_name(s);
```



FROM



WHERE



SELECT



Group BY



ORDER BY

Group By :: Example

SELECT Country, **COUNT**(CustomerID)

As 'The Number of customers'

FROM Customers

GROUP BY Country;

Country	The Number of customers
Argentina	3
Austria	2
Belgium	2
Brazil	9
Canada	3
Denmark	2
Finland	2
France	11
Germany	11
Ireland	1
Italy	3
Mexico	5
Norway	1
Poland	1

Group By :: Example

SELECT Country, **COUNT**(CustomerID)
As 'The Number of customers'
FROM Customers
GROUP BY Country;

SELECT Country, **COUNT**(CustomerID)
As 'The Number of customers'
FROM Customers
GROUP BY Country
Order by **COUNT**(CustomerID) DESC;

Country	The Number of customers
USA	13
Germany	11
France	11
Brazil	9
UK	7
Spain	5
Mexico	5
Venezuela	4
Italy	3
Canada	3
Argentina	3
Switzerland	2
Sweden	2
Poland	1

Group By With **JOIN**

Orders table

OrderID	CustomerID	EmployeeID	OrderDate	ShipperID
10248	90	5	1996-07-04	3
10249	81	6	1996-07-05	1
10250	34	4	1996-07-08	2

Shippers table

ShipperID	ShipperName
1	Speedy Express
2	United Package
3	Federal Shipping

Group By :: Example

```
SELECT S.ShipperName, COUNT(O.OrderID) AS Number_Of_Orders  
FROM Orders O LEFT JOIN Shippers S ON O.ShipperID = S.ShipperID  
GROUP BY S.ShipperName;
```

ShipperName	Number_Of_Orders
Federal Shipping	68
Speedy Express	54
United Package	74

Having :: Syntax

```
SELECT column_name(s)  
FROM table_name  
WHERE condition  
GROUP BY column_name(s)  
HAVING condition  
ORDER BY column_name(s);
```



FROM

WHERE

SELECT

Group BY

HAVING

ORDER BY

Having :: **Function**

- ❖ **AVG**(expression) *Calculate the average of the expression.*
- ❖ **COUNT**(expression) *Count occurrences of non-null values returned by the expression.*
- ❖ **COUNT**(*) *Counts all rows in the specified table.*
- ❖ **MIN**(expression) *Finds the minimum expression value.*
- ❖ **MAX**(expression) *Finds the maximum expression value.*
- ❖ **SUM**(expression) *Calculate the sum of the expression.*

Having :: Example

```
SELECT E.LastName, COUNT(O.OrderID) AS Number_Of_Orders  
FROM Orders O INNER JOIN Employees E ON O.EmployeeID = E.EmployeeID  
GROUP BY E.LastName  
HAVING COUNT(O.OrderID) > 10;
```

LastName	NumberOfOrders
Buchanan	11
Callahan	27
Davolio	29
Fuller	20
King	14
Leverling	31
Peacock	40
Suyama	18

Having :: Example

```
SELECT E.LastName, COUNT(O.OrderID) AS Number_Of_Orders
FROM Orders O INNER JOIN Employees E ON O.EmployeeID = E.EmployeeID
WHERE LastName Like 'D%' OR LastName Like 'L%'
GROUP BY E.LastName
HAVING COUNT(O.OrderID) >= 25;
```

LastName	NumberOfOrders
Davolio	29
Leverling	31

Nhớ gì ?!!!

- Cho chế thực thi truy vấn thông tin của SELECT; Các phép toán & ký tự đại diện dùng cho truy vấn dữ liệu
- Phép JOIN đối với việc truy vấn thông tin có ý nghĩa gì, có bao nhiêu hình thức JOIN,
- Thống kê dữ liệu trên bảng; Group by & Having

Tài liệu tham khảo

- Itzik Ben-Gan, “**Microsoft® SQL Server ® 2012 T-SQL Fundamentals**”, O’Reilly Media Inc, 2012
- Itzik Ben-Gan, Dejan Sarka, Ed Katibah, Greg Low, Roger Wolter, and Isaac Kunen, “**Inside Microsoft SQL Server 2008: T-SQL Programming**”, Microsoft Press, 2010
- w3schools, “**Introduction to SQL**”,
https://www.w3schools.com/sql/sql_intro.asp, 10:54PM, 18/06/2020
- Microsoft SQL Server Tutorial, “**Tutorials for SQL Server**”,
<https://docs.microsoft.com/en-us/sql/sql-server/tutorials-for-sql-server-2016>,
10:54 PM, 18/06/2020