COMM1822

Term 2 2022

Introduction to Databases for Business Analytics

Week 7 Group Functi

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UNSW Business School acknowledges the Bidjigal (Kensington campus) and Gadigal (City campus) the traditional custodians of the lands where each campus is located.

We acknowledge all Aboriginal and Torres St Islander Elders, past and present and thei communities who have shared and practiced their teachings over thousands of years including business practices.

We recognise Aboriginal and Torres Strait Islander people's ongoing leadership and contributions, including to business, education and industry.

UNSW Business School. (2022, May 7). *Acknowledgement of Country* [online video]. Retrieved from https://vimeo.com/369229957/d995d8087f

SQL Query Structures

SELECT [DISTINCT | ALL] {| [column_expression AS new_name] [, …] }
FROM table_name [alias] [, …]
[**WHERE** condition]
[GROUP BY column_list]
[HAVING condition]
[ORDER BY column_list]

[ ] : indicates optional elements.
{ } : indicates that the element may or may not appear.
| : indicates “or”.
; : indicates the end of the statement.

SQL Aggregate Functions

COUNT : the **number of rows** containing a specified attribute.
MAX : the **maximum** value encountered.
MIN : the **minimum** value encountered.
AVG : the **arith** for the specified.
SUM : the **total** numeric attribute.

Numeric functions yield only one single value.

SQL Aggregate Functions

How many vendors referenced in the PRODUCT table have supplied products with prices that are less than or equal A$10.00?

SQL for DBMS Oracle:

```
SELECT    COUNT (DISTINCT V_Code)
FROM      PRODUCT
WHERE     P_Price <= 10.00;
```

UNIQUE vs. DISTINCT

SELECT DISTINCT XY is correct ANSI SQL syntax.
SELECT UNIQUE XY is old Oracle SQL syntax (otherwise identical to DISTINCT).

Note, you still do use UNIQUE s:

CREATE TABLE Test (Attribu E);
CREATE UNIQUE INDEX Unique_Index ON Ta TABLESPACE Tablespace;

Note: Unique indexes guarantee that no two rows of a table have duplicate values in the key column(s). Non-unique indexes do not impose this restriction.

SQL Aggregate Functions

Which product has the highest price?

```
SELECT      MAX (P_Price)
FROM        PRODUCT;
```


This query displays the highest product price from the ☺
…but does not give us the product details. ☹

What we need here is a **nested query** (query in a query). The nested (inner) query is performed first.

```
SELECT      P_Code, P_Description, P_Price
FROM        PRODUCT
WHERE       P_Price = (SELECT MAX(P_Price) FROM PRODUCT);
```

SQL Aggregate Functions

What is the total value of all the items carried in inventory?

```
SELECT      SUM(P_Onhand * P_Price)
FROM        PRODUCT;
```

* : here arithmetic operator for mul

What is the average of product price?

```
SELECT      AVG(P_Price)
FROM        PRODUCT;
```

Grouping Data in SQL

- **GROUP BY** <column>
- A query that includes the **GROUP BY** groups the data from SELECT table(s) and produces single summary row for each group
- SELECT clause may contai functions or constants.
- The GROUP BY clause is valid only when **us** **aggregate functions**.

Grouping Data in SQL

Find out how many product units are available from vendors with a vendor code of less than 21344.


```
SELECT     V_Code, P_                                    hand)
FROM       PRODUCT
WHERE      V_Code < 21344
GROUP BY   V_Code, P_Description;
```

Multiple Table Operations in SQL

"Multiple table operations" are "joining operations"! (see also earlier)

- **SELECT** clause identifi … isplayed.
- **FROM** clause identifies the tables fro… ributes are selected.
- **WHERE** clause specifies the joining c… r common columns.

Multiple Table Operations in SQL

For multiple tables queries, refer to attributes in the form table.attribute.

Student	(StdNo, StdName)
Registration	(StdNo, CourseNo, Major, Grade)
Course	(CourseNo, Cou

List the student details for course number ‘COMM182

```
SELECT    StdNo, StdName, Major, CourseNo,
FROM      Student, Registration
WHERE     Student.StdNo = Registration.StdNo AND Registration.CourseNo = ‘COMM1822’;
```

Multiple Table Operations in SQL

Alternatively, use aliases instead of the full table names

List the student and course details for student number 38214:


```
SELECT   StdName, Co
FROM     Student S, Registration R, C
WHERE    S.StdNo = R.StudentNo
         AND C.CourseNo = R.CourseNo
         AND R.StdNo = 38214
```

Exercise

Logistics Database

Consider the **Logistics Database** from https://www.w3schools.com/sql/sql_count_avg_sum.asp or https://www.w3schools.com/sql/trysql.asp?filename=trysql_select_sum

Tables in the database:

Customers (CustomerID, Custome s, City, PostalCode, Country)
Category (CategoryID, CategoryN
Employees (EmployeeID, LastName, FirstName, Birth otes)
Suppliers (SupplierID, SupplierName, ContactName, ostalCode, Country, Phone)
Products (ProductID, ProductName, SupplierID, CategoryID, Unit, Price)
Shippers (ShipperID, ShipperName, Phone)
Orders (OrderID, CustomerID, EmployeeID, OrderDate, ShipperID)
OrderDetails (OrderDetailID, OrderID, ProductID, Quantity)

Exercise 1

Determine how many categories in the logistics company.

```
SELECT    COUNT(*)
FROM      Categories;
```

Exercise 2

Display the number of products with a price of more than $36.00.


```
SELECT    COUNT(*)
FROM      Products
WHERE     Price > 36;
```

Exercise 3

Determine the total revenue generated by sales to customer 8. Note: Quantity should be reflected in the total revenue calculation.


```
SELECT    SUM(Price
FROM      Products,
WHERE     OrderDetails.ProductID          .ProductID
AND       OrderDetails.OrderID = Orders.OrderID
AND       CustomerID = 8;
```

Exercise 4

Determine the average revenue generated by orders in the ORDERS table. Note: The total revenue by order must be calculated before finding the average revenue.


```
SELECT AVG(RevenueSum
FROM
(
        SELECT      SUM(Price * Quantity      eSum
        FROM        Products, OrderDetails, Orders
        WHERE       Products.ProductID = OrderDetails.ProductID
        AND         Orders.OrderID = OrderDetails.OrderID
        GROUP BY    Orders.OrderID
);
```

Exercise 5

Determine the average price of products by supplier name and category name. Include only the categories Beverages and Condiments and the groups with an average price greater than $20.


```
SELECT      SupplierName,
FROM        Products INNER                                    erID) INNER JOIN Categories
USING (CategoryID)
WHERE       CategoryName IN ('Beverages', 'Co
GROUP BY    SupplierName, CategoryName
HAVING      AVG(Price) > 20;
```

Exercise 6

List the customers living in Berlin or London who have recently placed an order totalling more than $599.


```
SELECT      DISTINCT CustomerName
FROM        Customers, Pr
WHERE       Customers.Cu                    rID
AND         Orders.OrderID = OrderDetails.
AND         OrderDetails.ProductID = Produ
AND         (City = 'Berlin' OR City = 'London')
GROUP BY    Orders.OrderID, CustomerName
HAVING      SUM(Price * Quantity) > 599;
```

Result:

Number of Records: 5

CustomerName
B's Beverages
Around the Horn
Seven Seas Imports
Eastern Connection
Consolidated Holdings

Exercise 6 – More Explanation

List the customers living in Berlin or London who have recently placed an order totalling more than $599.

Use Around the Horn for verification

- Check City (London); Find CustomerID (
  - SELECT City, CustomerID FROM Cu … rd the Horn';
- Find Around the Horn's Order(s) (Only t … 0355, 10383)
  - SELECT OrderID FROM Orders WHERE CustomerID = 4;
- Find all relevant details, including product price and quantity, ad … rderID = 10355, 10383
  - SELECT * FROM OrderDetails JOIN Products USING (Produc … rID = 10355 or OrderID = 10383);

Result:

Number of Records: 5

OrderDetailID	OrderID	ProductID	Quantity	ProductName	SupplierID	CategoryID	Unit	Price
285	10355	24	25	Guaraná Fantástica	10	1	12 - 355 ml cans	4.5
286	10355	57	25	Ravioli Angelo	26	5	24 - 250 g pkgs.	19.5
358	10383	13	20	Konbu	6	8	2 kg box	6
359	10383	50	15	Valkoinen suklaa	23	3	12 - 100 g bars	16.25
360	10383	56	20	Gnocchi di nonna Alice	26	5	24 - 250 g pkgs.	38

Result with totalling > $599

Number of Records: 5

CustomerName
B's Beverages
Around the Horn
Seven Seas Imports
Eastern Connection
Consolidated Holdings

Total = Price * Quantity = $1,723.75

If we set totalling more than $1,723.75, Around the Horn will be disappeared from the result!

Result with totalling > $1,723.75

Number of Records: 2

CustomerName
Seven Seas Imports
Eastern Connection

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Questions

Source: petcare.com.au