Lab 7: SQL Joins and Group By

CS355/CE373 Database Systems
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Contents

1 Instructions

- This lab will contribute 1% towards the final grade.
- The deadline to submit this lab is at the end of your lab.
- The lab must be submitted online via CANVAS. The SQL file should be named as *Lab_07_aa01234.sql* where *aa01234* will be replaced with your student id. ***Files which don't follow the appropriate naming convention will not be graded***.

1.1 Marking scheme

This lab will be marked out of 100.

- 50 Marks are for completion of the lab.
- 10 Marks are for filling the feedback form within the lab timings.
- 40 Marks are for progress and attendance during the lab.

1.2 Late submission policy

No late submissions are allowed.

2 Objective

This lab activity is prepared on Northwind Sample Database of SQL Server. The database will be analyzed for the following SQL constructs:

- Joins (Inner / Outer)
- Group By
- Having

3 Query Syntax Examples

- **Join**
  - select Customers.CompanyName, Customers.CustomerID, Orders.OrderID, Orders.OrderDate from Customers,Orders

where Customers.CustomerID = Orders.CustomerID
and Country = 'Germany'

- **Table Alias**
  - Select C.customerID, OrderID,OrderDate , E.FirstName
    from Orders O
    Inner Join Customers C On C.CustomerID = O.CustomerID
    Inner Join Employees E On E.EmployeeID = O.EmployeeID
    Where C.country = 'Germany'
- **Left Outer Join**
  - Select C.customerID, OrderID,OrderDate, E.FirstName
    from Customers C
    Left Outer Join Orders O On C.CustomerID = O.CustomerID
    Left Outer Join Employees E On E.EmployeeID = O.EmployeeID
    Order by O.OrderID
- **Cross Join**
  - Select * from Employees Cross Join Products;
- **Aggregates**
  - Select count(*) from customers
  - select count(*) AS NoOfOrders, max(orderdate) as LastOrder, min(orderdate) as FirstOrder from orders
- **Group By**
  - select customerid,count(*) AS NoOfOrders, max(orderdate) as LastOrder, min(orderdate) as FirstOrder
    from orders
    group by customerid
    order by customerid

  - select customerid,o.employeeid, e.firstname,count(*) as Totalorders
    from orders o, employees e
    where o.employeeid = e.employeeid
    group by customerid, o.employeeid, e.firstname
    order by customerid
- **Having**
  - Select CompanyName,count(*) as NumberOfOrders
    from orders o, customers c
    where o.customerid = c.customerid
    group by CompanyName
    Having Count(*) > 5
- **Order By**
  - Select * From Employees Order by EmployeeID ASC
  - Select * From Orders where ShipRegion is not NULL order by OrderID DESC

4 Exercises

The ERD Diagram for the Northwind Database is as shown in Fig 1.

1. **Retrieve the total number of orders placed in 1998.**
   Output: Count of Orders in 1998.
   Result contains 1 row.

2. **Retrieve the total number of units of all available items.**
   Output: Sum of all units.
   Result contains 1 row.

3. **Retrieve the worth of all available stock (total number of available units × their prices).**
   Output: Worth of all available products.
   Result contains 1 row.

4. **Fetch the following details:**
   Output: OrderID, OrderDate, ProductName.
   Result contains 2155 rows.

5. **Select all orders having products belonging to 'Beverages' category.**
   Output: OrderID, OrderDate, ProductName, CategoryName.
   Result contains 404 rows.

6. **List suppliers in the order of no. of products supplied (Supplier Name, No of Products) in descending order.**
   Output: CompanyName, No. of Products.
   Result contains 29 rows.

7. **List number of products supplied by different suppliers in different categories.**
   Output: CompanyName, CategoryName, No.of Products, AveragePrice, Total Units in Stock.
   Result contains 49 rows.

8. **Fetch no. of employees working in each region in ascending order i.e. "Southern", "Western", "Northern", or "Eastern".**
   Output: RegionDescription, No. of employees.
   Result contains 4 rows.

9. **Select total amount of each order. [Total amount is calculated by summing up (Unit Price * Qty)-Discount in order details.]**
   Output: OrderID, Total Amount.
   Result contains 830 rows.

10. **Find total number of products in each category.**
    Output: Category Name, No of Products.
    Result contains 8 rows.

11. **Find number of orders placed by different customers for different suppliers.**
    Output: ContactName, CompanyName, No. of orders.
    Result contains 1236 rows.

12. **Find number of orders handled by different employees in different years.**
    Output: EmployeeName, Year, No. of Orders.
    Result contains 27 rows.

13. **Find number of orders, in descending order, handled by different employees under different managers.**
    Output: Manager Name, Employee Name, No. of orders.
    Result contains 8 rows.

14. **Fetch Customers who have not placed any order.**
    Output: CustomerName.
    Result contains 2 rows.

15. **Find all possible combinations of employees and customer.**
    Output: Employee Full Name, Customer Name.
    Note: The Full name is generated by concatenating First Name and Last Name.
    Result contains 819 rows.

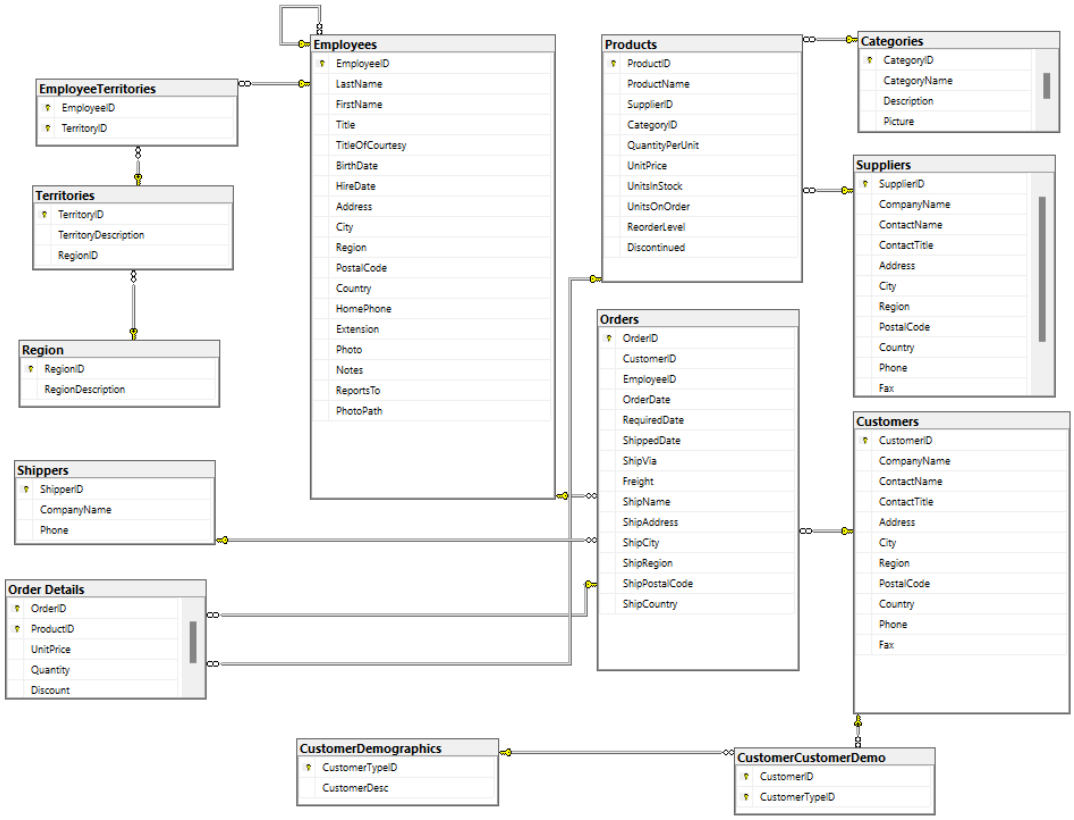

Figure 1: Northwind Database ERD