Mini Project

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SQL

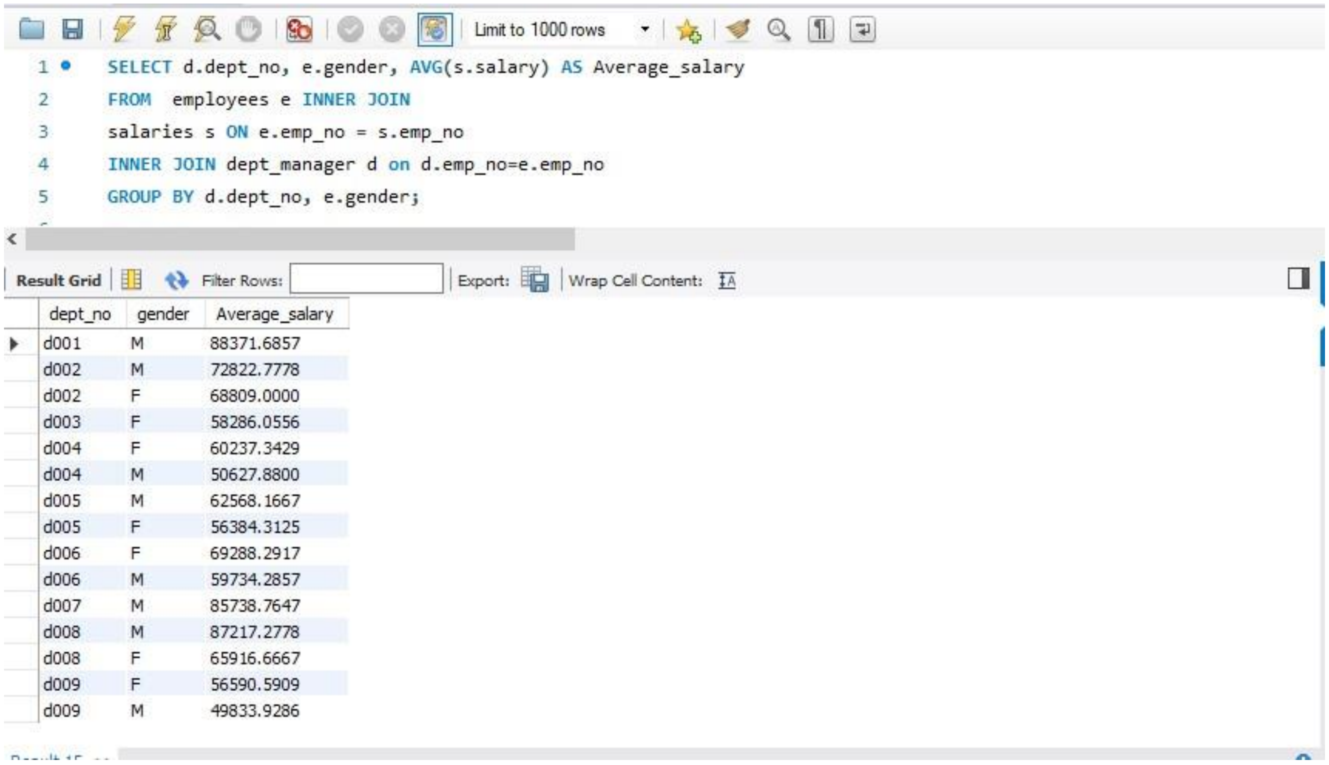
Data used: https://dev.mysql.com/doc/employee/en/employees-validation.html
Data used: https://learn.microsoft.com/en-us/sql/samples/adventureworks-install-configure?view=sql-server-ver16&tabs=ssms

Question 1. Find the average salary of the male and female employees in each department.

Solution:

- Table used (employees, dept_manager, salaries)
- select d.dept_no, e.gender, AVG(s.salary) AS Average_salary from employees e INNER JOIN salaries s on e.emp_no = s.emp_no
  INNER JOIN dept_manager d on d.emp_no=e.emp_no
  GROUP BY d.dept_no, e.gender ;

Output:



```
SELECT d.dept_no, e.gender, AVG(s.salary) AS Average_salary
FROM  employees e INNER JOIN
salaries s ON e.emp_no = s.emp_no
INNER JOIN dept_manager d on d.emp_no=e.emp_no
GROUP BY d.dept_no, e.gender;
```

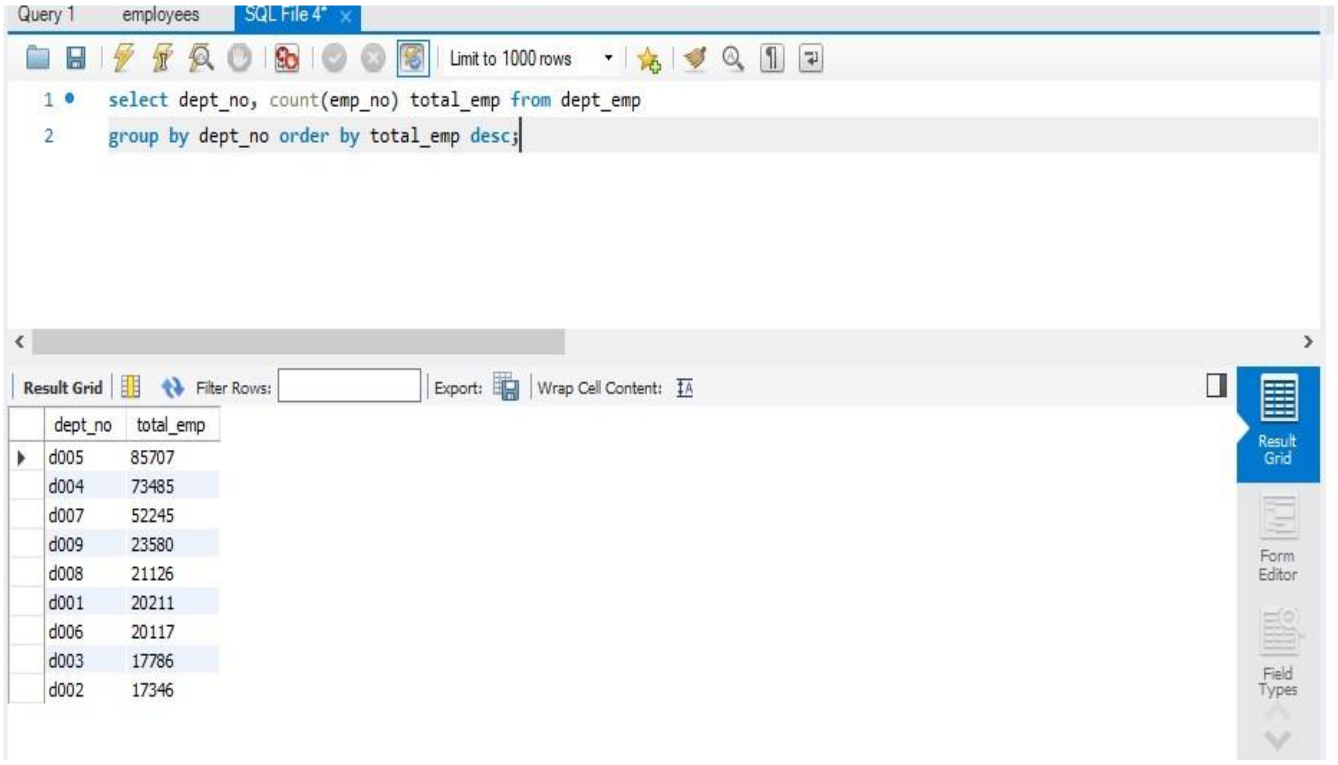
dept_no	gender	Average_salary
d001	M	88371.6857
d002	M	72822.7778
d002	F	68809.0000
d003	F	58286.0556
d004	F	60237.3429
d004	M	50627.8800
d005	M	62568.1667
d005	F	56384.3125
d006	F	69288.2917
d006	M	59734.2857
d007	M	85738.7647
d008	M	87217.2778
d008	F	65916.6667
d009	F	56590.5909
d009	M	49833.9286

Question 2. Find the total employees encountered in the 'dept_emp' table.

Solution:

- Table used (dept_emp)
- select dept_no, count(emp_no) total_emp from dept_emp group by dept_no order by total_emp desc;

Output:



```
select dept_no, count(emp_no) total_emp from dept_emp
group by dept_no order by total_emp desc;
```

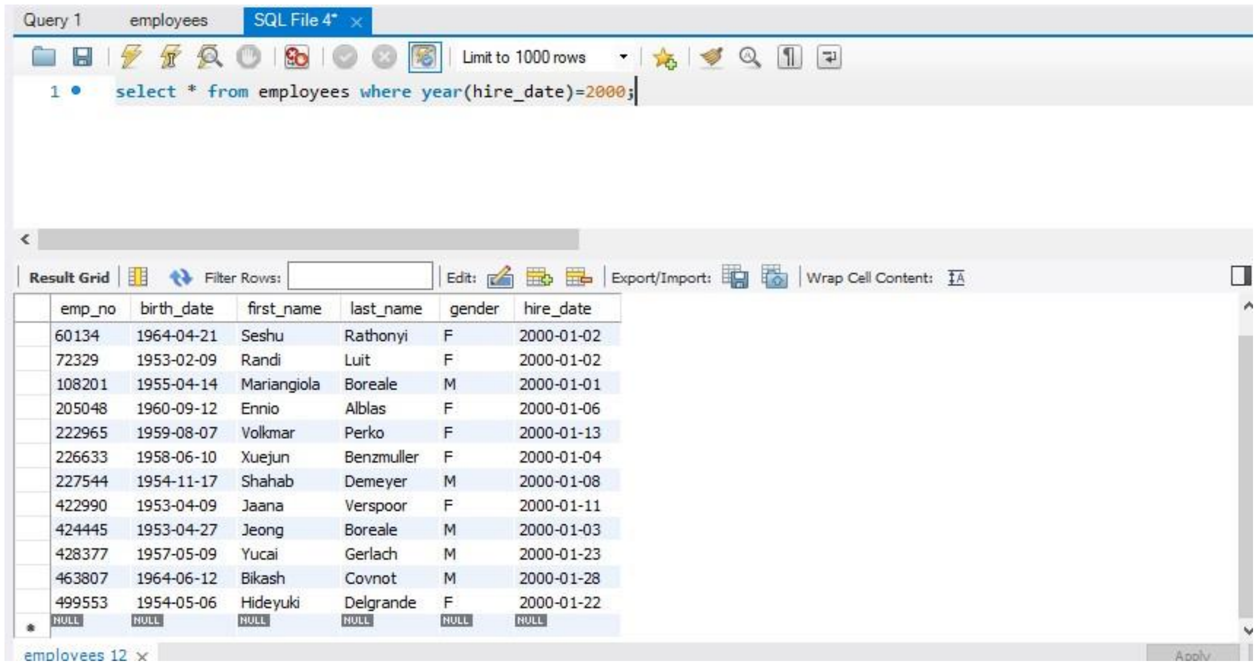
dept_no	total_emp
d005	85707
d004	73485
d007	52245
d009	23580
d008	21126
d001	20211
d006	20117
d003	17786
d002	17346

Question 3. Retrieve a list of all employees that have been hired in 2000.

Solution:

- Table used (employees)
- select * from employees where year(hire_date)=2000;

Output:



Query 1 | employees | SQL File 4*

```
select * from employees where year(hire_date)=2000;
```

emp_no	birth_date	first_name	last_name	gender	hire_date
60134	1964-04-21	Seshu	Rathonyi	F	2000-01-02
72329	1953-02-09	Randi	Luit	F	2000-01-02
108201	1955-04-14	Mariangiola	Boreale	M	2000-01-01
205048	1960-09-12	Ennio	Alblas	F	2000-01-06
222965	1959-08-07	Volkmar	Perko	F	2000-01-13
226633	1958-06-10	Xuejun	Benzmuller	F	2000-01-04
227544	1954-11-17	Shahab	Demeyer	M	2000-01-08
422990	1953-04-09	Jaana	Verspoor	F	2000-01-11
424445	1953-04-27	Jeong	Boreale	M	2000-01-03
428377	1957-05-09	Yucai	Gerlach	M	2000-01-23
463807	1964-06-12	Bikash	Covnot	M	2000-01-28
499553	1954-05-06	Hideyuki	Delgrande	F	2000-01-22
NULL	NULL	NULL	NULL	NULL	NULL

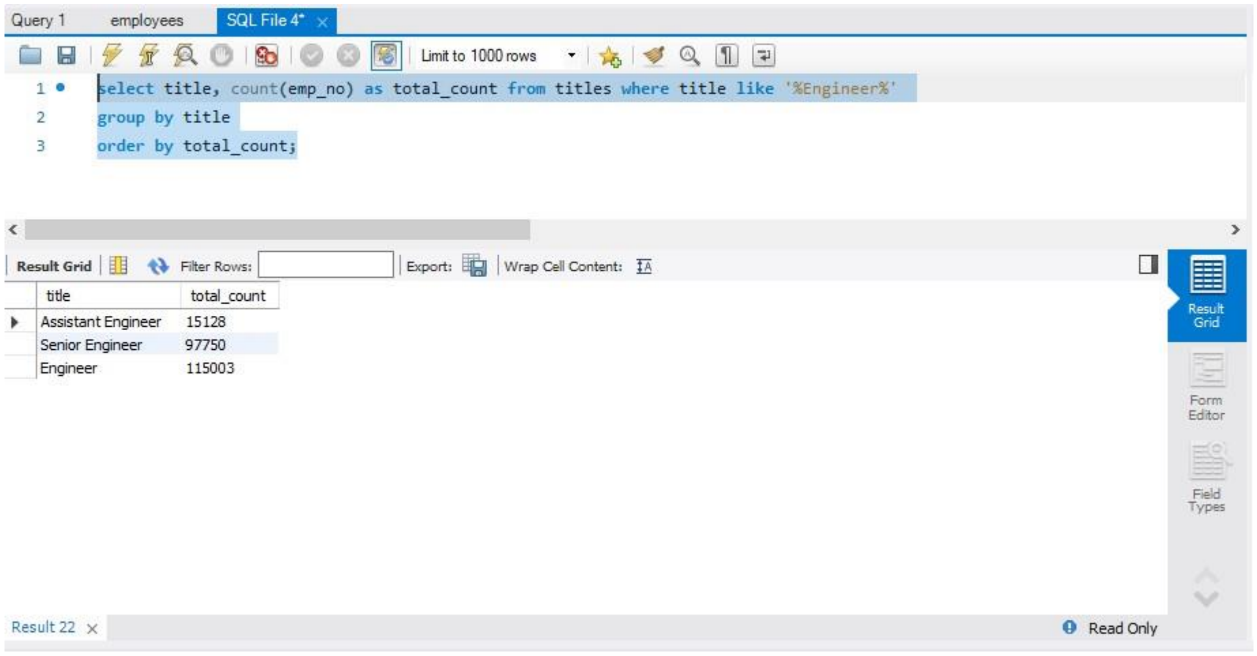
employees 12

Question 4. Retrieve a distinct count of all employees from the 'titles' table who are engineers.

<u>Solution:</u>

- Table used (titles)
- Select title, count(emp_no) as total_count from titles where title like '%Engineer%' group by title order by total_count;

<u>Output:</u>



Query 1 | employees | SQL File 4*

```
select title, count(emp_no) as total_count from titles where title like '%Engineer%'
group by title
order by total_count;
```

title	total_count
Assistant Engineer	15128
Senior Engineer	97750
Engineer	115003

Result 22 | Read Only

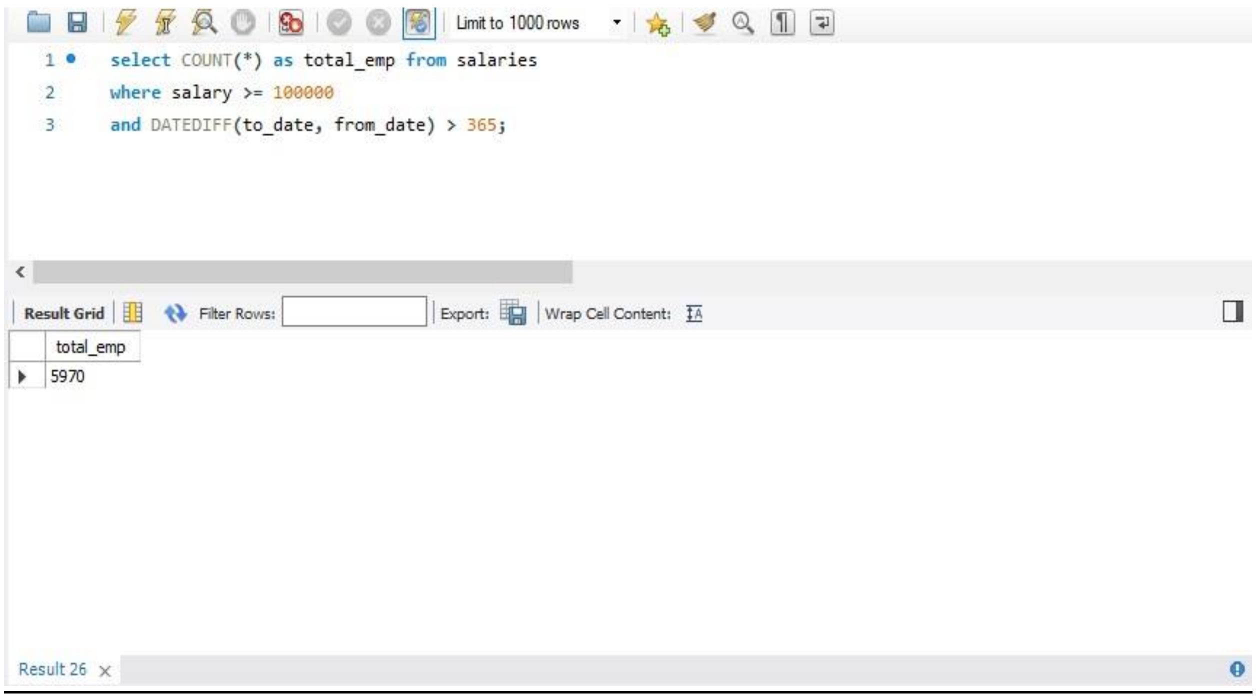
Question 5. How many contracts have been registered in the 'salaries' table with duration of more than one year and of value higher than or equal to $100,000?

Solution:

- Table used (salaries)
- select count(*) as total_emp from salaries

where salary >= 100000 and DATEDIFF(to_date, from_date) > 365;

Output:



```
select COUNT(*) as total_emp from salaries
where salary >= 100000
and DATEDIFF(to_date, from_date) > 365;
```

```
total_emp
5970
```

Result 26

Question 6. Obtain a table containing the following three fields for all individuals whose employee number is not greater than 10040

- Employee number
- Lowest department number among the departments where the employee has worked
- Assign '110022' as 'manager' to all individuals whose employee number is lower than or equal to 10020, and '110039' to those whose number is between 10021 and 10040 inclusive.

Solution:

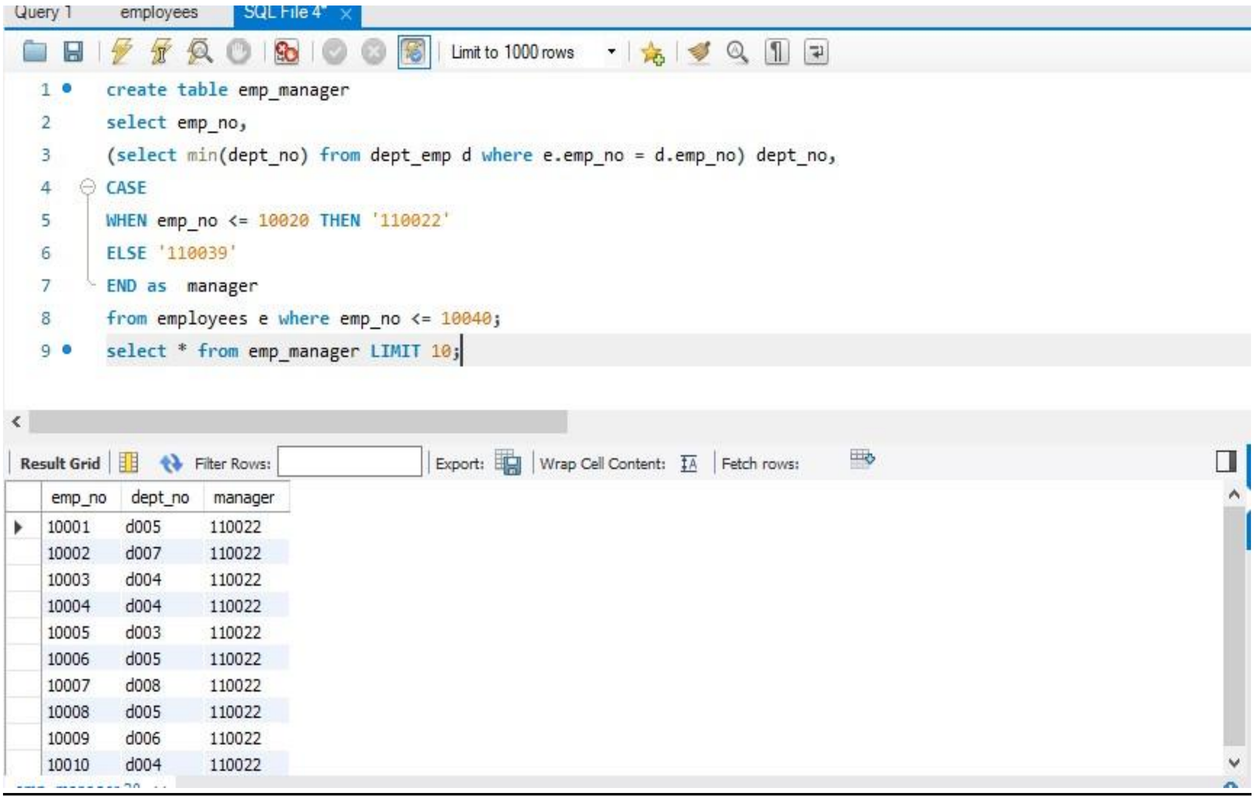
- Table used (dept_emp) and newly created table named emp_manager
- create table emp_manager

select emp_no,
(select min(dept_no) from dept_emp d where e.emp_no = d.emp_no) dept_no,
CASE
WHEN emp_no <= 10020 THEN '110022'

ELSE '110039' END as manager from employees e where emp_no <= 10040;

- select * from emp_manager LIMIT 10;

<u>Output:</u>



```
create table emp_manager
select emp_no,
(select min(dept_no) from dept_emp d where e.emp_no = d.emp_no) dept_no,
CASE
WHEN emp_no <= 10020 THEN '110022'
ELSE '110039'
END as  manager
from employees e where emp_no <= 10040;
select * from emp_manager LIMIT 10;
```

emp_no	dept_no	manager
10001	d005	110022
10002	d007	110022
10003	d004	110022
10004	d004	110022
10005	d003	110022
10006	d005	110022
10007	d008	110022
10008	d005	110022
10009	d006	110022
10010	d004	110022

Question 7. Write an SQL query to list the customers who will be getting 10% discount. Customers eligible for 10% discount are those who have done shopping for three consecutive months and transaction amount of successive months must be greater than the previous month.

<u>Solution:</u>

```
with test1 as (
select custname,txnmonth,txnamount,MONTH('1' + [txnmonth] + '00' )as rn
from customer)
select a.custnam from test1 a join test1 b
on a.custname = b.custname and a.rn+1 = b.rn and b.txnamount>a.txnamount
join test1 c
on c.custname = a.custname and a.rn+2 = c.rn and c.txnamount>b.txnamount;
```

Question 8. What should be the output of below query:

select distinct Deptname from Dept where upper (Deptname) = 'hr'

a) HR   b) Hr   c) hr   d) No Data Found

Solution: No data found but SQL server is case sensitive so it will return HR in output

Question 9. How many items with ListPrice more than $1000 have been sold?

Solution:
```
SELECT COUNT(salesorderid) Total FROM Sales.SalesOrderDetail s JOIN Production.Product
p ON s.productid = p.productid WHERE listprice > 1000;
```

Question 10. Give the CompanyName of those customers with orders over $100000.

Solution:
```
SELECT sh.SalesOrderID
FROM Sales.Customer c JOIN Sales.SalesOrderHeader sh ON c.customerid = sh.customerid
WHERE subtotal + taxamt + freight > 100000;
```

Question 11. Show the SalesOrderID and the UnitPrice for every Single Item Order.

Solution:
```
WITH cte AS (
  SELECT salesorderid, SUM(orderqty) as items
  FROM Sales.SalesOrderDetail
  GROUP BY salesorderid
  HAVING SUM(orderqty)=1
)
SELECT salesorderid, unitprice
FROM Sales.SalesOrderDetail
WHERE salesorderid IN (SELECT salesorderid FROM cte);
```

Question 12. List the product name and the CompanyName for all Customers who ordered ProductModel 'Racing Socks'.

Solution:
```
SELECT p.Name FROM Sales.Customer c JOIN Sales.SalesOrderHeader sh on
c.CustomerID=sh.CustomerID JOIN Sales.SalesOrderDetail sd
ON sh.salesorderid = sd.salesorderid JOIN Production.Product p ON sd.ProductID=p.ProductID JOIN
Production.ProductModel pm
ON p.ProductModelID=pm.ProductModelID
WHERE pm.Name='Racing Socks';
```

Question 13. Show the product description for culture 'fr' for product with ProductID 736.

Solution:
```
SELECT description FROM Production.Product p JOIN Production.ProductModel pm
ON p.productmodelid = pm.productmodelid
JOIN Production.ProductModelProductDescriptionCulture pmpdc ON pm.productmodelid =
pmpdc.productmodelid JOIN Production.ProductDescription pd ON pmpdc.productdescriptionid =
pd.productdescriptionid WHERE (productid = 736) AND (CultureID = 'fr');
```

Question 14. How many products in ProductCategory 'Accessories' have been sold to an address in 'London'?

Solution:
```
SELECT SUM(orderqty) total
FROM Person.Address a JOIN Sales.SalesOrderHeader sh ON a.addressid = sh.billtoaddressid
JOIN Sales.SalesOrderDetail sd ON sh.salesorderid = sd.salesorderid
JOIN Production.Product p ON sd.productid = p.productid
JOIN Production.ProductCategory pc ON pc.ProductCategoryID = pc.productcategoryid
WHERE (city = 'London') AND (pc.name = 'Accessories');
```

Question 15. For each order show the SalesOrderID and SubTotal calculated three ways:
A) From the SalesOrderHeade B) Sum of OrderQty*UnitPrice
C) Sum of OrderQty*ListPrice

Solution:
```
WITH tempA AS (
  SELECT salesorderid, subtotal A_total
  FROM Sales.SalesOrderHeader
), tempB AS (
  SELECT salesorderid, SUM(orderqty * unitprice) B_total
  FROM Sales.SalesOrderDetail
  GROUP BY salesorderid
), tempC AS (
  SELECT salesorderid, SUM(orderqty * listprice) C_total
  FROM Sales.SalesOrderDetail sd JOIN Production.Product p ON sd.productid = p.productid
  GROUP BY salesorderid
)
SELECT tempA.salesorderid, A_total, B_total, C_total
FROM tempA JOIN tempB ON tempA.salesorderid = tempB.salesorderid
JOIN tempC ON tempB.salesorderid = tempC.salesorderid;
```

Question 16. Show the bestselling item by value.

Solution:
```
SELECT Top 1 name, SUM(orderqty * unitprice) total_value
FROM SALES.SalesOrderDetail sd JOIN Production.Product p ON sd.productid = p.productid
GROUP BY name
ORDER BY total_value DESC;
```

Question 17. Show the total order value for each CountryRegion. List by value with the highest first.

Solution:
```
SELECT countyregion, SUM(subtotal) as total
FROM Person.Address a JOIN Sales.SalesOrderHeader sh ON a.addressid = sh.shiptoaddressid
GROUP BY countyregion order by total desc;
```

Question 18. Show OrdeQty, the Name and the ListPrice of the order made by CustomerID 16518

Solution:
```
SELECT OrderQty,Name,ListPrice
  FROM Sales.SalesOrderHeader JOIN Sales.SalesOrderDetail
          ON SalesOrderDetail.SalesOrderID = SalesOrderHeader.SalesOrderID
                       JOIN Production.Product
          ON SalesOrderDetail.ProductID=Product.ProductID
WHERE CustomerID=16518;
```

Question 19. Find the best customer in each region.

Solution:
```
WITH temp1 AS (
  SELECT countyregion, companyname, SUM(subtotal) total,
    RANK() OVER (PARTITION BY countyregion ORDER BY total DESC) rnk
  FROM Person.Address a JOIN Sales.SalesOrderHeader sh ON a.addressid = sh.shiptoaddressid
  JOIN Sales.Customer c ON sh.customerid = c.customerid
  GROUP BY countyregion, companyname
)
SELECT countyregion, companyname, total
FROM temp1
WHERE rnk = 1;
```

Question 20. List the SalesOrderNumber for the customers 'Good Toys' and 'Bike World'.

Solution:
```
SELECT companyname, salesorderid
FROM Sales.Customer c LEFT JOIN Sales.SalesOrderHeader sh ON c.customerid = sh.customerid
WHERE companyname LIKE '%Good Toys%' OR companyname LIKE '%Bike World%';
```

Question 21. Pivot the Occupation column in OCCUPATIONS so that each Name is sorted alphabetically and displayed underneath its corresponding Occupation. The output column headers should be Doctor, Professor, Singer, and Actor, respectively.

Note: Print NULL when there are no more names corresponding to an occupation.

Solution: Select
max(case when temp.Occupation = "Doctor" then temp.Name end) as NAME,
max(case when temp.Occupation = "Professor" then temp.Name end)as NAME,
max(case when temp.Occupation = "Singer" then temp.Name end) as NAME,
max(case when temp.Occupation = "Actor" then temp.Name end) as NAME
FROM
(select *, row_number() over (partition by Occupation order by Name) row_num
from OCCUPATIONS) temp group by row_num;

Question 22. Delete duplicate data from cars table. Duplicate record is identified based on the model and brand name.

Solution1: Using SELF join

```
delete from cars where id in (
select c2.id from cars c1
        join cars c2 on c1.model = c2.model and c1.brand = c2.brand
        where c1.id < c2.id);
```

Solution2: Using Window function

delete from cars where id in (
Select id from (select id, brand, model, row_number() over(partition by model, brand order by id) as rn from cars) a where a.rn > 1);

Question 23. Delete duplicate data from cars table. Duplicate record is identified based on the all of the columns.

Solution1: Creating a backup table without dropping the original table.

```
create table cars_bkp as
select distinct * from cars;
truncate table cars;
insert into cars
select distinct * from cars_bkp;
drop table cars_bkp;
```

Question 24. Write query for those students who have scored more than average marks in each subject.

Solution:
```
with cte as (
select subject, AVG(marks) as avg_marks from students group by subject)
select s.studentid, s.studentname,s.marks from students s JOIN cte c on
s.subject=c.subject where s.marks>c.avg_marks;
```

Question 25. Write query for second highest marks and second lowest marks in each subject.

Solution:
```
select subject,
sum(case when rnk2=2 then marks else NULL end) as second_highest_marks,
sum(case when rnk1=2 then marks else NULL end) as second_lowest_marks
from (
select subject, marks,
rank() over(partition by subject order by marks asc) as rnk1,
rank() over(partition by subject order by marks desc) as rnk2
from students) A
group by subject;
```

Question 26. Why rank skips the sequence in SQL?
Solution: When there are duplicate values same ranking is assigned, and a gap appears in the sequence for each duplicate ranking in database.

Question 27. Why column name alias can't be used in WHERE CLAUSE but can be used in ORDER BY CLAUSE?
Solution: WHERE CLAUSE is a filtered condition which is applied on database columns which filters only to column with actual name.
Where as ORDER BY CLAUSE will sort the data based on the specifications of the SELECT STATEMENT.

Question 28. In which scenario IN operator fails?
Solution: The IN operator fails because there is a limited number of inputs and it won't handle null values. To overcome this issue, we can use exists operator in SQL.

Question 29. Can we use aggregate functions without Group by clause?
Solution: Yes, we can use aggregate functions without Group by clause.
Ex: Select count(emp_no), max(salary), min(salary), avg(salary) from salaries;

Question 30. Can we use Group by clause without aggregate functions?
Solution: Yes, We can use Group by clause without aggregate functions
Ex: Select emp_no, salary from salaries group by emp_no, salary LIMIT 50;