SUBQUERY:(11-11-2024)
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- a query inside another query is known as subquery / nested query.
- sql server supports the following two types of subqueries,
    1. Non-corelated subquery
    2. Co-related subquery

1. Non-corelated subquery:
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- In this mechanism first inner query is executed and later outer query will execute.
- NCSQ are again two types:
    i) Single row subquery
    ii) Multiple row subquery

i) Single row subquery:
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- when a subquery return a single value is known as SRSQ.
- in this subquery we will use the following operators are =,<,>,<=,>=,!=(or)<>.

syntax:
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select * from <table name> where <condition>(select * from.....(select * from .....));

EX:
waq to display employees details who are earning the first highest salary?

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subquery statement = outer query + inner query

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step1: INNER QUERY:
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SELECT MAX(SAL) FROM EMP;--------> 5000

step2: OUTER QUERY:
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SELECT * FROM EMP WHERE SAL=(inner query);

step3: SUBQUERY statement=(outer query + inner query):
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SELECT * FROM EMP WHERE SAL=(SELECT MAX(SAL) FROM EMP);

EX:
waq to display the senior most employee details from emp table?
SELECT * FROM EMP WHERE HIREDATE=(SELECT MIN(HIREDATE) FROM EMP);

EX:

waq to display employees details who are earning the second highest salary?
SELECT * FROM EMP WHERE SAL=
(SELECT MAX(SAL) FROM EMP WHERE SAL<(SELECT MAX(SAL) FROM EMP));

EX:
waq to display employees details from emp table whose employee salary is more than to the maximum salary of "SALESMAN"?
SELECT * FROM EMP WHERE SAL>(SELECT MAX(SAL) FROM EMP WHERE JOB='SALESMAN');

EX:
waq to find out 3rd highest salary from emp table?
SELECT MAX(SAL) FROM EMP WHERE SAL<
(SELECT MAX(SAL) FROM EMP WHERE SAL<
(SELECT MAX(SAL) FROM EMP));

EX:
waq to display employees details who are earning the 3rd highest salary?
SELECT * FROM EMP WHERE SAL=
(SELECT MAX(SAL) FROM EMP WHERE SAL<
(SELECT MAX(SAL) FROM EMP WHERE SAL<
(SELECT MAX(SAL) FROM EMP)));

Nth	N+1
===	====
1ST	2Q
2ND	3Q
3RD	4Q
30TH	31Q

How to overcome the above problem?
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12-11-2024:
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ii) Multiple row subquery:
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- when a subquery retrun more than one value is known as "MRSQ".
- in this subquery we will use the following operators are "IN,ANY,ALL".

Ex:
waq to display employees whose job is same as the job of the employees are

"SMITH","JONES"?
SELECT * FROM EMP WHERE JOB IN(SELECT JOB FROM EMP WHERE ENAME='SMITH' OR ENAME='JONES');
(OR)
SELECT * FROM EMP WHERE JOB IN(SELECT JOB FROM EMP WHERE ENAME IN('SMITH','JONES'));

Ex:
waq to display employees who are getting maximum salary from each job wise?
SELECT * FROM EMP WHERE SAL IN(SELECT MAX(SAL) FROM EMP GROUP BY JOB);

Ex:
waq to display the senior most employees details from each deptno wise?
SELECT * FROM EMP WHERE HIREDATE IN(SELECT MIN(HIREDATE) FROM EMP GROUP BY DEPTNO);

EX:
waq to display employees details who are getting minimum and maximum salary from emp table?
SELECT * FROM EMP WHERE SAL IN(SELECT MIN(SAL) FROM EMP UNION SELECT MAX(SAL) FROM EMP);

ANY operator:
==========
- it return a value if any one value is satisfied with the given value in the condition.

EX:
i)
X>ANY (10,20,30)

X=10 =====> FALSE
X=25 =====> TRUE
X=40 =====> TRUE

ALL operator:
==========
- it return a value if all values are satisfied with the given value in the condition.

EX:
i)
X>ALL (10,20,30)

X=10 =====> FALSE

X=25 =====> FALSE
X=40 =====> TRUE

Ex:
waq to display the list of employees whose salary is more than to all salesman salaries?
SELECT * FROM EMP WHERE SAL >ALL(SELECT SAL FROM EMP WHERE JOB='SALESMAN');

Ex:
waq to display the list of employees whose salary is more than to any salesman salary?
SELECT * FROM EMP WHERE SAL >ANY(SELECT SAL FROM EMP WHERE JOB='SALESMAN');

For "ANY" operator	For "ALL" operator
X>ANY(list of values)	X>ALL(list of values)
X>=ANY(list of values)	X>=ALL(list of values)
X<ANY(list of values)	X<ALL(list of values)
X<=ANY(list of values)	X<=ALL(list of values)
X=ANY(list of values)	X=ALL(list of values)
X!=ANY(list of values)	X!=ALL(list of values)

13-11-2024:
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2. Co-related subquery:
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- In CRSQ mechanism first outer query is executed and later inner query will execute.

How to find out "Nth" high / low salary:
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syntax:
======
SELECT * FROM <TN> <TABLE ALIAS NAME1> WHERE N-1=(SELECT COUNT(DISTINCT <COLUMN NAME>)
FROM <TN> <TABLE ALIAS NAME2> WHERE <TABLE ALIAS NAME2>.<COLUMN NAME> (< / >)
<TABLE ALIAS NAME1>.<COLUMN NAME>);+

Here,
< - for low salary
> - for high salary

DEMO_TABLE:

==========
CREATE TABLE EMP(EID INT,ENAME VARCHAR(20),SALARY MONEY);
SELECT * FROM EMP;

EID	ENAME	SALARY
1021	SMITH	85000.0000
1022	ALLEN	48000.0000
1023	JONES	67000.0000
1024	ADAMS	85000.0000
1025	JAMES	37000.0000
1026	MILLER	18000.0000

EX:
waq to find out the first highest salary employees details from emp table?
Solution:
========
If N=1 ===> N-1 ===> 1-1 ===> 0

SELECT * FROM EMP E1 WHERE 0=(SELECT COUNT(DISTINCT SALARY) FROM EMP E2 WHERE E2.SALARY>E1.SALARY);

EX:
waq to find out the 4th highest salary employees details from emp table?
Solution:
========
If N=4 ===> N-1 ===> 4-1 ===> 3

SELECT * FROM EMP E1 WHERE 3=(SELECT COUNT(DISTINCT SALARY) FROM EMP E2 WHERE E2.SALARY>E1.SALARY);

EX:
waq to find out the first lowest salary employees details from emp table?
Solution:
========
If N=1 ===> N-1 ===> 1-1 ===> 0

SELECT * FROM EMP E1 WHERE 0=(SELECT COUNT(DISTINCT SALARY) FROM EMP E2 WHERE E2.SALARY<E1.SALARY);

How to display "TOP n" high / low salaries:
==========

syntax:
======
SELECT * FROM <TN> <TABLE ALIAS NAME1> WHERE N>(SELECT COUNT(DISTINCT <COLUMN NAME>)
FROM <TN> <TABLE ALIAS NAME2> WHERE <TABLE ALIAS NAME2>.<COLUMN NAME> (< / >)
<TABLE ALIAS NAME1>.<COLUMN NAME>);

Here,
< - for low salary
> - for high salary

Ex:
waq to display top 3 highest salaries employees details from emp table?
Solution:
========
If N=3 ===> N> ===> 3>

SELECT * FROM EMP E1 WHERE 3>(SELECT COUNT(DISTINCT SALARY) FROM EMP E2 WHERE E2.SALARY>E1.SALARY);

Ex:
waq to display top 3 lowest salaries employees details from emp table?
Solution:
========
If N=3 ===> N> ===> 3>

SELECT * FROM EMP E1 WHERE 3>(SELECT COUNT(DISTINCT SALARY) FROM EMP E2 WHERE E2.SALARY<E1.SALARY);

NOTE:
======
1. To find out "Nth" high / low ----------> N-1
2. To display "TOP n" high / low ----------> N>

EXISTS operator:
==============
- it is a special operator which is used in co-related subquery only.
- it is used to check the required row / rows are existing in a table or not.
> if a row is existing in a table then it return TRUE.
> if a row is not existing in a table then it return FALSE.

syntax:

=======

WHERE EXISTS(<inner query>)

Ex:
waq to display departments details in which department the employees are working?
SELECT * FROM DEPT D WHERE EXISTS(SELECT DEPTNO FROM EMP E WHERE E.DEPTNO=D.DEPTNO);

Ex:
waq to display departments details in which department the employees are not working?
SELECT * FROM DEPT D WHERE NOT EXISTS(SELECT DEPTNO FROM EMP E WHERE E.DEPTNO=D.DEPTNO);

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