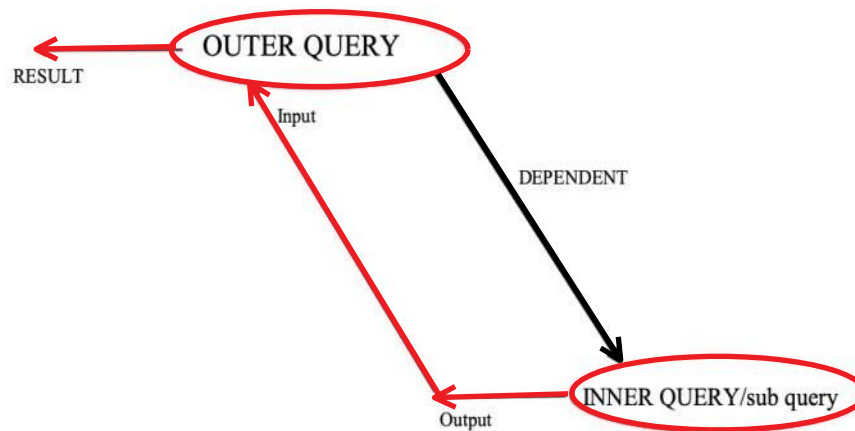


SUB-QUERY

A QUERY WRITTEN INSIDE ANOTHER QUERY IS KNOWN AS SUB QUERY .

Working Principle :



Let us consider two queries Outer Query and Inner Query .

- Inner Query executes first and produces an Output .
- The Output of Inner Query is given / fed as an Input to Outer Query .
- The Outer Query generates the Result.
- Therefore we can state that 'the Outer Query is dependent on Inner Query' and this is the Execution Principle of Sub Query .

Why / When Do we use SUB QUERY :

Case 1 : Whenever we have Unknowns present in the question, we use sub query to find the Unknown .

Example :

EMP

EID	ENAME	SAL	DEPTNO
1	ALLEN	1000	20
2	BLAKE	2000	10
3	CLARK	3000	30
4	MILLER	1500	10
5	SMITH	2500	10

1. WAQTD names of the employees earning more than 2500 .

```
SELECT ENAME  
FROM EMP
```

WHERE SAL > 2500 ;

2. WAQTD names of the employees earning less than MILLER .

```
SELECT ENAME
FROM EMP
WHERE SAL < ( SELECT SAL
              FROM EMP
              WHERE ENAME = 'MILLER' );
```

3. WAQTD name and deptno of the employees working in the same Dept as SMITH .

```
SELECT ENAME , DEPTNO
FROM EMP
WHERE DEPTNO = ( SELECT DEPTNO
                FROM EMP
                WHERE ENAME ='SMITH' );
```

4. WAQTD name and hiredate of the employees if the employee was hired after JONES .

```
SELECT ENAME , HIREDATEFROM EMP
WHERE HIREDATE > ( SELECT HIREDATE
                  FROM EMP
                  WHERE ENAME ='JONES' );
```

5. WAQTD all the details of the employee working in the sameDesignation as KING .

```
SELECT * FROM EMP
WHERE JOB = ( SELECT JOB
             FROM EMP
             WHERE ENAME ='KING' );
```

6. WAQTD name , sal , deptno of the employees if the employees earning more than 2000 and work in the same dept as JAMES .

```
SELECT ENAME , SAL , DEPTNOFROM EMP
WHERE SAL > 2000 AND DEPTNO = ( SELECT DEPTNO
                                FROM EMP
                                WHERE ENAME ='JAMES' );
```

7. WAQTD all the details of the employees working in the Same designation as MILLER and earning more than 1500.

```
SELECT * FROM EMP
WHERE SAL > 1500 AND JOB = (SELECT JOB
                           FROM EMP
                           WHERE ENAME ='MILLER' );
```

8. WAQTD details of the employees earning more than SMITH but less than KING .

```
SELECT *  
FROM EMP  
WHERE SAL > ( SELECT SAL  
FROM EMP  
WHERE ENAME ='SMITH' ) AND SAL < ( SELECT SAL  
FROM EMP  
WHERE ENAME ='KING' );
```

9. WAQTD name , sal and deptno of the employees if the employee is earning commission in dept 20 and earning salary more than Scott .

```
SELECT ENAME , SAL , DEPTNO  
FROM EMP  
WHERE COMM IS NOT NULL AND DEPTNO = 20 AND  
SAL > ( SELECT SAL  
FROM EMP  
WHERE ENAME ='SCOTT' );
```

10. WAQTD name and hiredate of the employees who's name ends with 'S' and hired after James .

```
SELECT ENAME , HIREDATE  
FROM EMP  
WHERE ENAME LIKE '%S' AND  
HIREDATE > ( SELECT HIREDATE  
FROM EMP  
WHERE ENAME ='JAMES' );
```

11. WAQTD names of the employees working in the same dept as JAMES and earning salary more than ADAMS and working in the same job role as MILLER and hired after MARTIN .

```
SELECT ENAME  
FROM EMP  
WHERE DEPTNO = (SELECT DEPTNO  
FROM EMP  
WHERE ENAME='JAMES') AND SAL > (SELECT SAL  
FROM EMP  
WHERE ENAME= 'ADAMS') AND JOB = (SELECT JOB  
FROM EMP  
WHERE ENAME='MILLER') AND
```

```
HIREDATE> (SELECT HIREDATE
FROM EMP
WHERE ENAME='MARTIN');
```

12. WAQTD all the details of the employees working as salesman in the dept 20 and earning commission more than Smith and hired after KING .

```
SELECT * FROM EMP
WHERE JOB ='SALESMAN' AND DEPTNO = 20 AND COMM > (SELECT
COMM
FROM EMP
WHERE ENAME ='SMITH') AND HIREDATE > (SELECT HIREDATE
FROM EMP
WHERE ENAME ='KING');
```

13. WAQTD number of employees earning more than SMITH and less than MARTIN .

```
SELECT COUNT(*)FROM EMP
WHERE SAL > ( SELECT SAL
FROM EMP
WHERE ENAME ='SMITH') AND SAL < (SELECT SAL
FROM EMP
WHERE ENAME ='MARTIN')
```

14. WAQTD Ename and SAL for all the employees earning more than JONES

```
SELECT ENAME , SAL
FROM EMP
WHERE SAL > (SELECT SAL
FROM EMP
WHERE ENAME ='JONES') ;
```

15. WAQTD all the details of the employees working as a manager .

```
SELECT * FROM EMP
WHERE JOB
='MANAGER';
```

NOTE :

- In the Inner Query / Sub Query we cannot select more than ONE column .
- The corresponding columns need not be same , but the datatypes of those has to be same .

SUBQUERY CASE 2

CASE-2 : Whenever the data to be selected and the condition to be executed are present in different tables we use Sub Query .

Example :

Emp

EID	ENAME	SAL	DEPTNO
1	ALLEN	1000	20
2	BLAKE	2000	10
3	CLARK	3000	30
4	MILLER	1500	10
5	ADAMS	2500	20

DEPT

DEPTNO	DNAME	LOC
10	D1	L1
20	D2	L2
30	D3	L3

1. WAQTD deptno of the employee whose name is Miller .

```
SELECT DEPTNO
FROM EMP
WHERE ENAME ='MILLER' ;
```

2. WAQTD **dname** of the employee whose name is **Miller** .

```
SELECT DNAME
FROM DEPT
WHERE DEPTNO = ( SELECT DEPTNO
                  FROM EMP
                  WHERE ENAME ='MILLER' ) ;
```

3. WAQTD Location of ADAMS

```
SELECT LOC
FROM DEPT
WHERE DEPTNO = ( SELECT DEPTNO
                  FROM EMP
                  WHERE ENAME ='ADAMS' ) ;
```

4. WAQTD names of the employees working in Location L2.

```
SELECT ENAME
FROM EMP
WHERE DEPTNO = ( SELECT DEPTNO
                  FROM DEPT
                  WHERE LOC ='L2' ) ;
```

5. WAQTD number of employees working in dept D3 .

```
SELECT COUNT(*)
FROM EMP
WHERE DEPTNO = ( SELECT DEPTNO
```

```
FROM DEPT
WHERE DNAME ='D3' ) ;
```

6. WAQTD ename , sal of all the employee earning more than Scott and working in dept 20 .

```
SELECT ENAME , SAL
FROM EMP
WHERE DEPTNO = 20 AND SAL > ( SELECT SAL FROM EMP
WHERE ENAME ='SCOTT' ) ;
```

7. WAQTD all the details of the employee working as a Manager In the dept Accounting .

```
SELECT *
FROM EMP
WHERE JOB ='MANAGER' AND DEPTNO = ( SELECT DEPTNO FROM DEPT
WHERE DNAME ='ACCOUNTING' ) ;
```

8. WAQTD all the details of the employee working in the samedesignation as Miller and works in location New York .

```
SELECT *
FROM EMP
WHERE JOB = ( SELECT JOB FROM EMP WHERE ENAME ='MILLER' )
AND DEPTNO = ( SELECT DEPTNO FROM DEPT WHERE LOC ='NEW
YORK' ) ;
```

9. WAQTD number of employees working as a clerk in the samedeptno as SMITH and earning more than KING hired after MARTIN in the location BOSTON .

```
SELECT COUNT(*)
FROM EMP
WHERE JOB ='CLERK' AND DEPTNO = ( SELECT DEPTNO FROM EMP
WHERE ENAME ='SMITH') AND
SAL > ( SELECT SAL FROM EMP WHERE ENAME ='KING' ) AND
HIREDATE > ( SELECT HIREDATE
FROM EMP WHERE ENAME ='MARTIN' )
AND DEPTNO = ( SELECT DEPTNO FROM DEPT WHERE LOC
='BOSTON' ) ;
```

10. WAQTD maximum salary given to a person working in DALLAS .

```
SELECT MAX(SAL)
FROM EMP
WHERE DEPTNO = ( SELECT DEPTNO
FROM DEPT
WHERE LOC ='DALLAS' ) ;
```

MAX & MIN

EID	ENAME	SAL	DEPTNO
1	ALLEN	1000	20
2	BLAKE	2000	10
3	CLARK	3000	30
4	MILLER	1500	10
5	ADAMS	2500	20

1. WAQTD maximum salary of an employee .

```
SELECT MAX( SAL )  
FROM EMP ;
```

2. WAQTD name of the employee getting maximum salary .

```
SELECT ENAME , MAX( SAL )  
FROM EMP ;
```

```
SELECT ENAME  
FROM EMP  
WHERE SAL = MAX( SAL ) ;
```

```
SELECT ENAME  
FROM EMP  
WHERE SAL = ( SELECT MAX( SAL )  
FROM EMP ) ;
```

3. WAQTD name and salary earned by the employee getting Minimum salary .

```
SELECT ENAME , SAL  
FROM EMP  
WHERE SAL = ( SELECT MIN( SAL )  
FROM EMP ) ;
```

TYPES OF SUB - QUERY

1. SINGLE ROW SUB QUERY

2. MULTI ROW SUB QUERY

Examples :

Emp

EID	ENAME	SAL	DEPTNO
1	ALLEN	1000	20
2	BLAKE	2000	10
3	CLARK	3000	30
4	MILLER	1500	10
5	SMITH	2500	10

DEPT

DEPTNO	DNAME	LOC
10	D1	L1
20	D2	L2
30	D3	L3

1. WAQTD dname of ALLEN(single row) .

```
SELECT DNAME
FROM DEPT
WHERE DEPTNO = ( SELECT DEPTNO
                  FROM EMP
                  WHERE ENAME = 'ALLEN' );
```

20

2. WAQTD dnames of Allen and Smith(multi row).

```
SELECT DNAME
FROM DEPT
WHERE DEPTNO = ( SELECT DEPTNO
                  FROM EMP
                  WHERE ENAME IN
                    ( 'ALLEN' , 'SMITH' ) );
```

20

10

DEPTNO
20
10
30
10
10

Here , since the sub query returns 2 records we cannot use '=' Op .
We've to use IN Op .

1. SINGLE ROW SUB QUERY :

- If the sub query returns exactly 1 record / value we call it as Single Row Sub Query .
- If it returns only 1 value then we can use the normal operators Or the Special Operators to compare the values .

2. MULTI ROW SUB QUERY :

- If the sub query returns more than 1 record / value we call it as Multi Row Sub Query .
- If it returns more than 1 value then we **cannot use the normal operators** We have to **use only Special Operators** to compare the values .

Note : It is difficult to identify whether a query Belongs Single or Multi row So , it is always recommended to use Special Operators to Compare The values .

1. WAQTD ename and salary of the employees earning *more than* Employees of dept 10 .

EID	ENAME	SAL	DEPTNO
1	ALLEN	1000	20
2	BLAKE	2000	10
3	CLARK	3000	30
4	MILLER	1500	10
5	SMITH	2500	10

SELECT ENAME , SAL
FROM EMP
WHERE SAL

>

(SELECT SAL
FROM EMP
WHERE DEPTNO = 10) ;

2000

1500

2500

Here we cannot use > symbol to compare Multiple values .

We cant use IN or. NOT IN as well because It is used for = and != symbols .

Sub Query Operators

1. ALL :

"It is special Op used along with a relational Op (> , < , > = , < =) to compare the values present at the RHS ".

- ALL Op returns true if all the values at the RHS have satisfied the condition .

Example :

CLARK ,3000

2000
1500
2500

```
SELECT ENAME , SAL
FROM EMP
WHERE SAL > ALL ( SELECT SAL
                  FROM EMP
                  WHERE DEPTNO = 10 ) ;
```

SAL
1000
2000
3000
1500
2500

1000 > ALL (2000 , 1500 , 2500)

1000 > 2000	False
1000 > 1500	False
1000 > 2500	False

2000 > ALL (2000 , 1500 , 2500)

2000 > 2000	False
2000 > 1500	True
2000 > 2500	False

3000 > ALL (2000 , 1500 , 2500)

3000 > 2000	True
3000 > 1500	True
3000 > 2500	True

1500 > ALL (2000 , 1500 , 2500)

1500 > 2000	False
1500 > 1500	False
1500 > 2500	False

2500 > ALL (2000 , 1500 , 2500)

2500 > 2000	True
2500 > 1500	True
2500 > 2500	False

2. **ANY:**

"It is special Op used along with a relational Op (> , < , > = , < =) to compare the values present at the RHS ".

- ANY Op returns true if one of the values at the RHS have satisfied the condition .

Example :

SELECT ENAME , SAL
FROM EMP
WHERE SAL

> ANY

(SELECT SAL
FROM EMP
WHERE DEPTNO = 10) ;

2000
1500
2500

SAL
1000
2000
3000
1500
2500

1000 > ANY (2000 , 1500 , 2500)

1000 > 2000	False
1000 > 1500	False
1000 > 2500	False

2000 > ANY (2000 , 1500 , 2500)

2000 > 2000	False
2000 > 1500	True
2000 > 2500	False

3000 > ANY (2000 , 1500 , 2500)

3000 > 2000	True
3000 > 1500	True
3000 > 2500	True

1500 > ANY (2000 , 1500 , 2500)

1500 > 2000	False
1500 > 1500	False
1500 > 2500	False

2500 > ANY (2000 , 1500 , 2500)

2500 > 2000	True
2500 > 1500	True
2500 > 2500	False

1. WAQTD name of the employee if the employee earns less thanThe employees working as salesman .

SELECT ENAME
FROM EMP
WHERE SAL < ALL (SELECT SAL

```
FROM EMP
WHERE JOB='SALESMAN' );
```

2. WAQTD name of the employee if the employee earns less thanAt least a salesman .

```
SELECT ENAME
FROM EMP
WHERE SAL < ANY ( SELECT SAL
FROM EMP
WHERE JOB ='SALESMAN' );
```

3. WAQTD names of the employees earning more than ADAMS .

```
SELECT ENAME
FROM EMP
WHERE SAL > ALL ( SELECT SAL
FROM EMP
WHERE ENAME ='ADAMS' );
```

NESTED SUB QUERY

A sub query written inside a sub query is known as Nested Subquery.

- WE CAN NEST ABOUT **255** SUB QUERIES

SAL
1000
2000
4000
3000
5000

3. WAQTD maximum salary given to an employee .

```
SELECT MAX( SAL )FROM EMP ;
```

4. WAQTD second maximum salary given to an employee .

```
SELECT MAX( SAL )  
FROM EMP  
WHERE SAL < ( SELECT MAX( SAL )  
FROM EMP ) ;
```

SAL
1000
2000
4000
3000
5000

5. WAQTD 3rd maximum salary .

```
SELECT MAX( SAL ) 3000FROM EMP  
WHERE SAL < ( SELECT MAX( SAL ) 4000FROM EMP  
WHERE SAL < ( SELECT MAX( SAL ) 5000FROM EMP ) )
```

6. WAQTD 4th maximum salary .

```
SELECT MAX( SAL ) 2000FROM EMP  
WHERE SAL < ( SELECT MAX( SAL ) 3000FROM EMP  
WHERE SAL < ( SELECT MAX( SAL ) 4000FROM EMP  
WHERE SAL < ( SELECT MAX( SAL ) 5000FROM EMP ) ) )
```

7. WAQTD 3 minimum salary .

```
SELECT MIN(SAL )FROM EMP  
WHERE SAL > ( SELECT MIN(SAL )FROM EMP  
WHERE SAL > ( SELECT MIN ( SAL )  
FROM EMP ) ) ;
```

8. WAQTD Dept name of the employee getting 2nd Minimum salary .

```
SELECT DNAME FROM DEPT
WHERE DEPTNO = ( SELECT DEPTNO FROM EMP
WHERE SAL = (SELECT MIN( SAL ) FROM EMP
WHERE SAL > ( SELECT MIN( SAL )
FROM EMP ) ) );
```

REMEMBER :

MAXIMUM	MAX()
MINIMUM	MIN()

EMPLOYEE AND MANAGER RELATION

CASE 1 : TO IDENTIFY MANAGER

- WAQTD name of Allen's manager .

JAMES

```
SELECT ENAME
FROM EMP
WHERE EID = ( SELECT MGR
              FROM EMP
              WHERE ENAME ='ALLEN' )
```

<u>EID</u>	<u>ENAME</u>	<u>MGR</u>
1	ALLEN	3
2	SMITH	1
3	JAMES	2
4	KING	3

<u>EID</u>
1
2
3
4

- WAQTD name of SMITH's manager .

```
SELECT ENAME
FROM EMP
WHERE EID = ( SELECT MGR
              FROM EMP
              WHERE ENAME ='SMITH' );
```

- WAQTD name of SMITH's manager's manager .

<u>EID</u>	<u>ENAME</u>	<u>MGR</u>
1	ALLEN	3
2	SMITH	1
3	JAMES	2
4	KING	3

```
SELECT ENAME
FROM EMP
WHERE EID = ( SELECT MGR
              FROM EMP
              WHERE EID = ( SELECT MGR
                            FROM EMP
```



```
WHERE ENAME ='SMITH' ) ) ;
```

- WAQTD dname of King's Manager .

```
SELECT DNAME
FROM DEPT
WHERE DEPTNO = ( SELECT DEPTNO
FROM EMP
WHERE EID = ( SELECT MGR
FROM EMP
WHERE ENAME ='KING' ) ) ;
```


- WAQTD Location of Adams's manager's manager .

```
SELECT LOC
FROM DEPT
WHERE DEPTNO = ( SELECT DEPTNO
FROM EMP
WHERE EID = ( SELECT MGR
FROM EMP
WHERE EID = ( SELECT MGR
FROM EMP
WHERE ENAME ='ADAMS' ) ) ) ;
```

CASE -2: TO IDENTIFY EMPLOYEES REPORTING TO A MANAGER

- WAQTD Names of the employees reporting to KING.

```
SELECT ENAME
FROM EMP
WHERE MGR = ( SELECT EID
FROM EMP
WHERE ENAME ='KING' ) ;
```



- WAQTD Name and salary given to the employees reporting To James .

```
SELECT ENAME , SAL
FROM EMP
WHERE MGR = ( SELECT EID
FROM EMP
WHERE ENAME ='JAMES' ) ;
```

To find Manager	Select MGR in Sub Q
To find Employees	Select EID in Sub Q

- WAQTD dname of the employee reporting to President .

```
SELECT DNAME
FROM DEPT
WHERE DEPTNO = ( SELECT DEPTNO
```

```
FROM EMP
WHERE MGR = ( SELECT EID
FROM EMP
WHERE JOB ='PRESIDENT' ) ) ;
```

- WAQTD Department details of the employees who are reporting to MILLER .

```
SELECT *
FROM DEPT
WHERE DEPTNO = ( SELECT DEPTNO
FROM EMP
WHERE MGR = ( SELECT EID
FROM EMP
WHERE ENAME ='MILLER' ) );
```