



SQL BOOK

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SQL (STRUCTURED QUERY LANGUAGE)



DATABASE

What is DATA ?

"Data is a raw-fact which describes the attributes of an Entity "

Properties or Attributes



The form is titled "Create a new account" and includes the following fields:

- First name
- Surname
- Mobile number or email address
- New password
- Birthday (with dropdown menus for year, month, and day)
- Gender (radio buttons for Female, Male, Custom)
- A "Sign Up" button at the bottom.



Example : **Water Bottle** Entity

Attributes

Entity

Height : 20cms

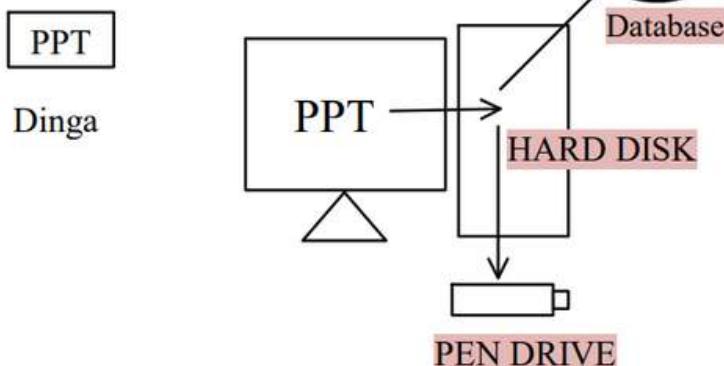
Color : blue

Capacity : 500ml

DATABASE :

"Database is a place or a medium in which we store the data in a Systematic and organized manner "

STUDENT : YOU HAVE TO PRESENT



➤ The basic operations that can be performed on a database are

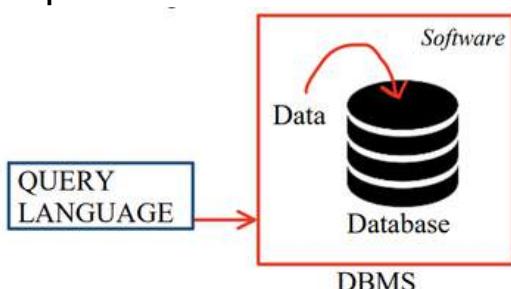
- **CREATE / INSERT**
- **READ / RETRIEVE**
- **UPDATE / MODIFY**
- **DELETE / DROP**



➤ These operations are referred as "CRUD" Operations .

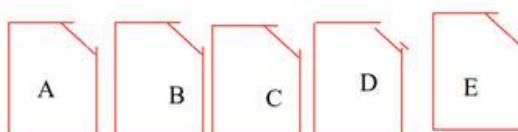
"It is a software which is used to maintain and manage
The database "

➤ Security and authorization are the two important features that
DBMS provides



➤ We use query language to communicate or interact with DBMS

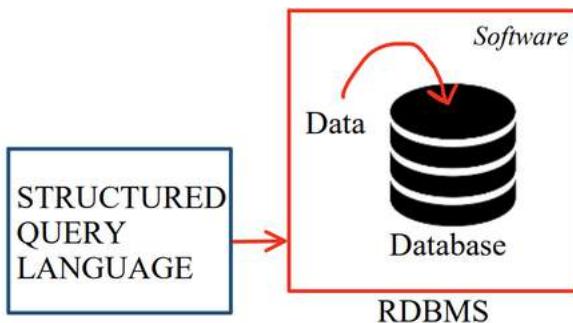
➤ DBMS stores the data in the form of files .



RELATIONAL DATABASE MANAGEMENT SYSTEM

(RDBMS):

"It is a type of DBMS software in which we store the data
In the form of Tables (rows & columns)"



- We use SQL to communicate or interact with RDBMS
- RDBMS stores the data in the form of Tables

Example :

<u>Names</u>
A
B
C
D
E

RELATIONAL MODEL :

Relational Model was designed by E.F CODD .

In Relational Model we can store the data in the form of tables .

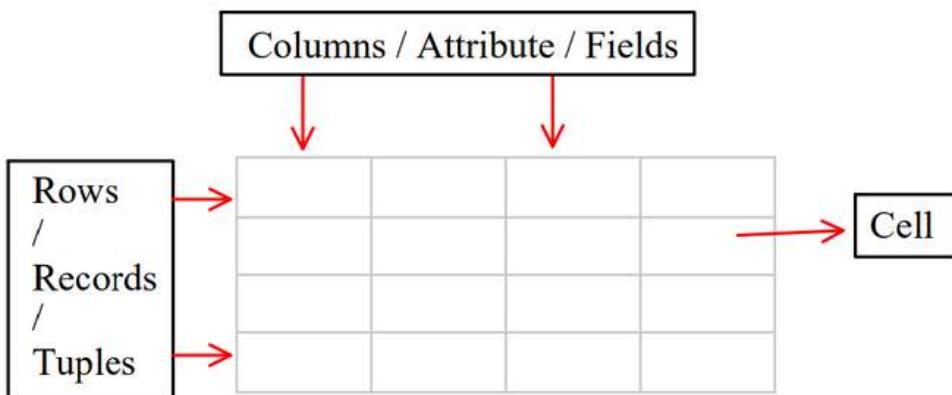
Any DBMS which follows Relational Model becomes RDBMS .



Any DBMS which follows rules of EF CODD becomes RDBMS .

TABLE : "It is a logical organization of data which consists of

Columns & Rows



Example :

Employee :

EID	ENAME	SALARY
1	SMITH	1000
2	ALLEN	1500
3	CLARK	2000

Emp (Entity)

- Eid
- Ename
- Salary

RULES OF E.F CODD :

- 1. The data entered into a cell must always be a single valued data .**

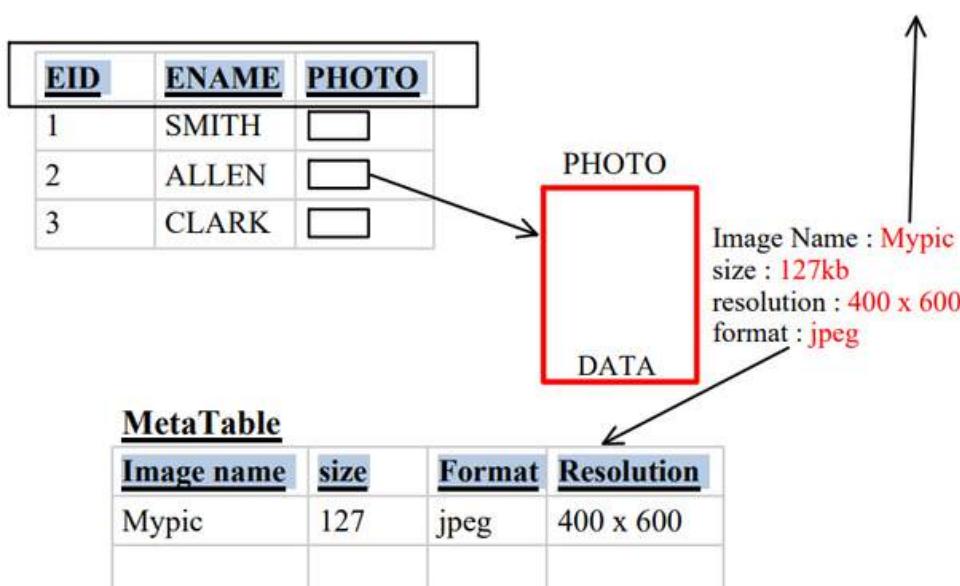
Example :

<u>EID</u>	<u>ENAME</u>	<u>PHONE NO</u>
1	SMITH	101
2	ALLEN	102 , 202
3	CLARK	103

<u>EID</u>	<u>ENAME</u>	<u>PHONE NO</u>	<u>ALTERNATE NO</u>
1	SMITH	101	
2	ALLEN	102	202
3	CLARK	103	

- 2. According to E.F CODD we can store the data in Multiple Tables , If needed we can establish a connection between the tables with the Help of **Key Attribute****
- 3. In RDBMS we store everything in the form of tables including Metadata .**

Example : Metadata : The details about a data is known as Metadata.





4. The data entered into the table can be validated in 2 steps .

- i. By assigning Datatypes .
- ii. By assigning Constraints .

Datatypes are mandatory , whereas Constraints are Optional .

DATATYPES :

**It is used to specify or determine the type of data that will be stored
In a particular memory location .**

Datatypes in SQL :

- 1. CHAR**
- 2. VARCHAR / VARCHAR2**
- 3. DATE**
- 4. NUMBER**
- 5. LARGE OBJECTS**

- i. Character Large Object .
- ii. Binary Large Object .

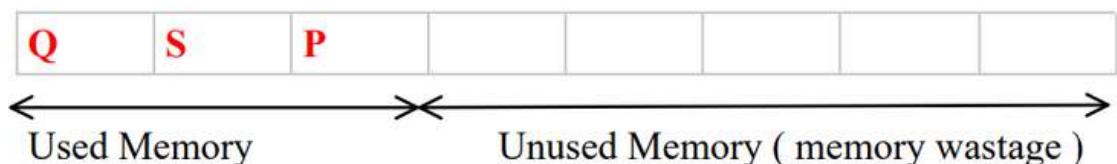
NOTE : SQL is not a Case Sensitive Language .

**1. CHAR : In character datatype we can store 'A-Z' , 'a-z' , '0-9'
And Special Characters(\$, & , @ , ! ...).**

- Characters must always be enclosed within single quotes '' .
- Whenever we use char datatype we must mention size
- **Size : it is used to specify number of characters it can store .**
 - The maximum number of characters it can store is **2000ch**.
 - Char follows fixed length memory allocation .

Syntax: CHAR (SIZE)

Example : CHAR (8)



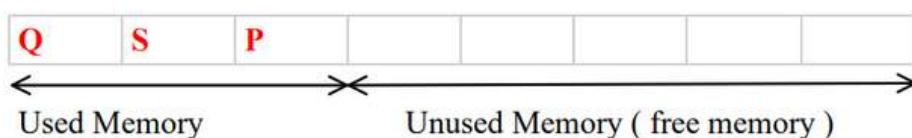


2. **VARCHAR** : In varchar datatype we can store 'A-Z' , 'a-z' , '0-9' And Special Characters(\$, & , @ , ! ...).

- Characters must always be enclosed within single quotes ''
- Whenever we use char datatype we must mention size
- **Size** : it is used to specify number of characters it can store .
 - The maximum number of characters it can store is 2000ch.
- VarChar follows variable length memory allocation.

Syntax: VARCHAR (SIZE)

Example : VARCHAR (8)



NOTE : VARCHAR2 : it is an updated version of varchar where in We can store up to 4000Ch.

Syntax: VARCHAR2(SIZE)

Example :

STUDENT

USN	SNAME	ADDRESS	PAN NO
CHAR(4)	VARCHAR(10)	VARCHAR(10)	CHAR(10)
QSP1	DINGA	BANGALORE	ABC123XYZ1
QSP2	DINGI	MYSORE	ABC123XYZ2



ASSIGNMENT :

1. DIFFERENTIATE BETWEEN CHAR & VARCHAR

ASCII : [American Standard Code For Information Interchange]

'A'	65
'Z'	90
'a'	97
'z'	122



3. NUMBER: It is used to store numeric values .

SYNTAX: NUMBER (Precision , [Scale])

[] - Not Mandatory .

Precision : it is used to determine the number of digits used To store integer value .

Scale : it is used to determine the number of digits used to store Decimal (floating) value within the precision

- Scale is not mandatory , and the default value of scale Is zero (0).

Example :	Number (3)	+/- 999
Example :	Number (5 , 0)	+/- 99999
Example :	Number (5 , 2)	+/- 999.99
Example :	Number (7 , 3)	+/- 9999.999
Example :	Number (4 , 4)	+/- .9999
Example :	Number (5 , 4)	+/- 9.9999
Example :	Number (3 , 6)	+/- .000999
Example :	Number (5 , 8)	+/- .00099999
Example :	Number (2 , 7)	+/- .0000099

EID	PHONE NO	SALARY
Number(3)	Number (10)	Number (7 , 2)
101	9876543210	9000.85

4. DATE: it is used to store dates in a particular format .

It used Oracle specified Format .

'DD-MON-YY'	OR	'DD-MON-YYYY'
'22-JUN-20'		'22-JUN-2020'

SYNTAX: DATE

Example :

DOB	Hiredate	Anniversary
Date	Date	Date
'01-JAN-1945'	'20-JUN-20'	'15-APR-2008'

5. LARGE OBJECTS

1. Character large object (CLOB):

It is used to store characters up to 4 GB of size .

2. Binary large object (BLOB):

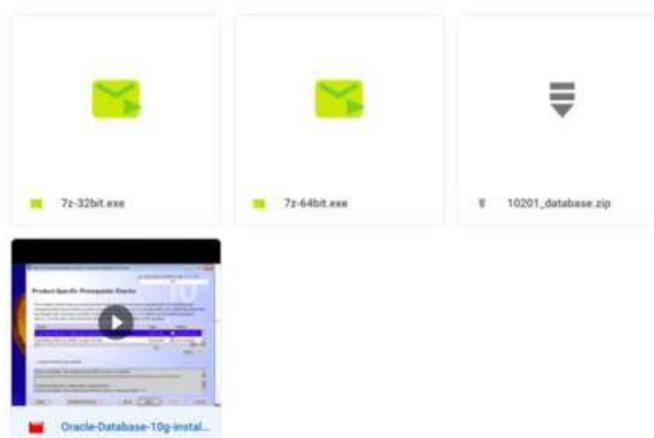
It is used to store binary values of images , mp3 , mp4
Documents etc Up to 4GB of size .

NOTE :

FOR WINDOWS :

Software : Oracle : Oracle 10g - Version

Name : SQL*Plus





CONSTRAINTS :

It is a rule given to a column for validation .

Types of Constraints :

- 1. UNIQUE**
- 2. NOT NULL**
- 3. CHECK**
- 4. PRIMARY KEY**
- 5. FOREIGN KEY .**

1. UNIQUE : "It is used to avoid duplicate values into the column "

2. NOT NULL : "It is used to avoid Null ".

3. CHECK : "It is an extra validation with a condition

If the condition is satisfied then the value is accepted else Rejected ".

4. PRIMARY KEY : "It is a constraint which is used to identify a record Uniquely from the table " .

Characteristics of Primary key :

- We can have only 1 PK in a table
- PK cannot accept duplicate / repeated values .
- PK cannot accept Null
- PK is always a combination of Unique and Not Null Constraint.

5. FOREIGN KEY : "It is used to establish a connection between the The tables "

Characteristics of Foreign key :

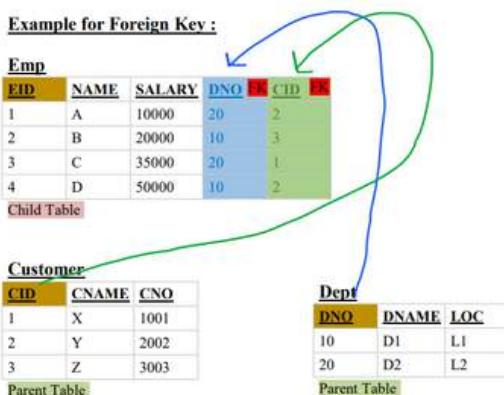
- We can have only Multiple FK in a table
- FK can accept duplicate / repeated values .
- FK can accept Null
- FK is not a combination of Unique and Not Null Constraint
- For an Attribute (column) to become a FK ,it is mandatory That it must be a PK in its own table .

Example :

EMP

Primary key				
		Check (Salary >0)		Check (length(phone) = 10)
Not Null	Not Null	Not Null	Not Null	Not Null
Unique				Unique
EID	NAME	SALARY	DOJ	PHONE
Number(2)	Varchar(10)	Number(7,2)	Date	Number(10)
1	A	10000	20-JUN-20'	9876543210
2	B	20000	20-JUN-19'	9876543222
3	C	35000	01-JAN-18'	9876543333
4	D	50000	01-OCT-19'	9876511111

Example for Foreign Key :



ASSIGNMENT :

1. Differentiate between Primary key and Foreign key .

PRIMARY KEY	FOREIGN KEY
It is used to identify a records Uniquely from the table.	It is used to establish a connection Between the tables
It cannot accept Null	It can accept Null
It cannot accept duplicate values	It can accept duplicate values
It is always a combination of Not Null and Unique constraint	It is not a combination of Not Null and Unique constraint
We can have only 1 PK in a table	We can have Multiple FK in a table

NOTE : NULL

Null Is a keyword which is used to represent Nothing / Empty Cell



Characteristics of Null :

- **Null doesn't represent 0 or Space .**
- **Any operations performed on a Null will result in Null itself**
- **Null doesn't Occupy any Memory .**
- **We cannot Equate Null .**



:

OVERVIEW OF SQL STATEMENTS :

- 1. DATA DEFINITION LANGUAGE (DDL)**
- 2. DATA MANIPULATION LANGUAGE (DML)**
- 3. TRANSCATION CONTROL LANGUAGE (TCL)**
- 4. DATA CONTROL LANGUAGE (DCL)**
- 5. DATA QUERY LANGUAGE (DQL)**

DATA QUERY LANGUAGE (DQL):

" DQL is used to retrieve the data from the database " .

It had 4 statements :

- 1. SELECT**
- 2. PROJECTION**
- 3. SELECTION**
- 4. JOIN**

1. SELECT : "It is used to retrieve the data from the table and display it.

2. PROJECTION : "It is a process of retrieving the data by selecting only the columns is known as Projection "

➢ In projection all the records / values present in a particular column are by default selected .

3. SELECTION : "It is a process of retrieving the data by selecting both the columns and rows is known as Selection " .

4. JOIN : "It is a process of retrieving the data from Multiple tables simultaneously is known as Join " .

PROJECTION

- "It is a process of retrieving the data by selecting only the columns is known as Projection " .
- In projection all the records / values present in a particular column are by default selected .

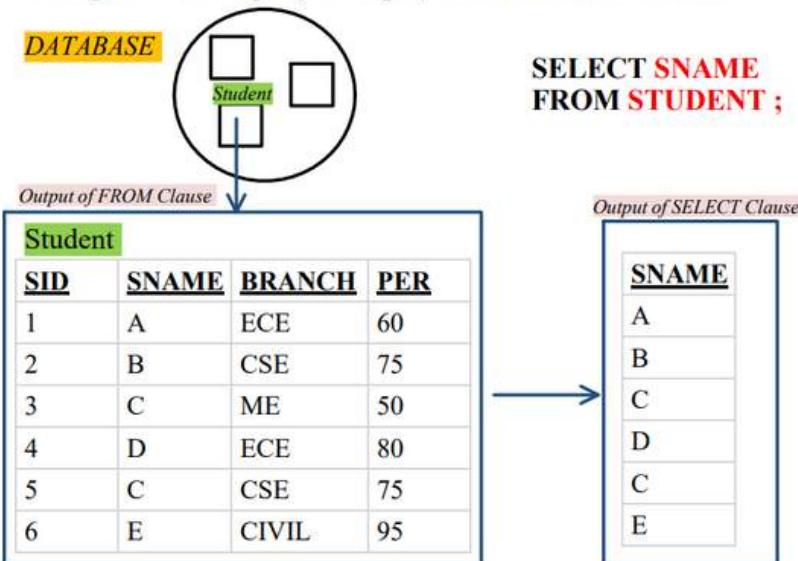
SYNTAX :

```
SELECT * / [DISTINCT] Column_Name / Expression [ALIAS]
FROM Table_Name ;
```

ORDER OF EXECUTION

1. **FROM Clause**
2. **SELECT Clause**

Example : Write a query to display names of all the students .



NOTE :

- **FROM Clause starts the execution .**
- **For FROM Clause we can pass Table_Name as an argument .**
- **The job of FROM Clause is to go to the Database and search for the table and put the table under execution .**
- **SELECT Clause will execute after the execution of FROM Clause**
- **For SELECT Clause we pass 3 arguments**
 - ◆ *
 - ◆ Column_Name
 - ◆ Expression
- **The job of SELECT Clause is to go the table under execution and select the columns mentioned .**
- **SELECT Clause is responsible for preparing the result table .**
- **Asterisk(*) : it means to select all the columns from the table .**
- **Semicolon : it means end of the query .**



➤ WAQTD student id and student names for all the students.

**SELECT SID , SNAME
FROM STUDENT;**

➤ WAQTD name and branch of all the students .

**SELECT SNAME , BRANCH
FROM STUDENT;**

➤ WAQTD NAME , BRANCH AND PERCENTAGE FOR ALL THE STUDENTS .

**SELECT SNAME , BRANCH , PER
FROM STUDENT;**

➤ WAQTD details of all the students from students table .

**SELECT *
FROM STUDENT ;**

➤ WAQTD sname , sid , per , branch of all the students .

**SELECT SNAME , SID , PER , BRANCH
FROM STUDENT ;**

EMP Table :

EMPNO	ENAME	JOB	HIREDATE	MGR	SAL	COMM	DEPTNO
7369	SMITH	CLERK	17-DEC-80	7902	800		20
7499	ALLEN	SALESMAN	20-FEB-81	7698	1600	300	30
7521	WARD	SALESMAN	22-FEB-81	7698	1250	500	30
7566	JONES	MANAGER	02-APR-81	7839	2975		20
7654	MARTIN	SALESMAN	28-SEP-81	7698	1250	1400	30
7698	BLAKE	MANAGER	01-MAY-81	7839	2850		30
7782	CLARK	MANAGER	09-JUN-81	7839	2450		10
7788	SCOTT	ANALYST	19-APR-87	7566	3000		20
7839	KING	PRESIDENT	17-NOV-81		5000		10
7844	TURNER	SALESMAN	08-SEP-81	7698	1500	0	30
7876	ADAMS	CLERK	23-MAY-87	7788	1100		20
7900	JAMES	CLERK	03-DEC-81	7698	950		30
7902	FORD	ANALYST	03-DEC-81	7566	3000		20
7934	MILLER	CLERK	23-JAN-82	7782	1300		10

➤ WAQTD name salary and commission given to all the employees .

**Select ename , sal , comm
From emp ;**



> WAQTD name of the employee along with their date of joining .

Select ename , hiredate

From emp ;

DEPT :

<u>DEPTNO</u>	<u>DNAME</u>	<u>LOC</u>
10	ACCOUNTING	NEW YORK
20	RESEARCH	DALLAS
30	SALES	CHICAGO
40	OPERATIONS	BOSTON

> WAQTD dname and location for all the depts .

Select dname , loc

From dept ;

QUESTIONS ON EMP AND DEPT TABLE:

- 1.WRITE A QUERY TO DISPLAY ALL THE DETAILS FROM THE EMPLOYEE TABLE.
- 2.WAQTD NAMES OF ALL THE EMPLOYEES.
- 3.WAQTD NAME AND SALARY GIVEN TO ALL THE EMPLOYEES.
- 4.WAQTD NAME AND COMMISSION GIVEN TO ALL THE EMPLOYEES.
- 5.WAQTD EMPLOYEE ID AND DEPARTMENT NUMBER OF ALL THE EMPLOYEES
IN EMP TABLE.
- 6.WAQTD ENAME AND HIREDATE OF ALL THE EMPLOYEES .
- 7.WAQTD NAME AND DESIGNATION OF ALL THE EMPLPOYES .
- 8.WAQTD NAME , JOB AND SALARY GIVEN ALL THE EMPLOYEES.
- 9.WAQTD DNames PRESENT IN DEPARTMENT TABLE.
- 10.WAQTD DNAME AND LOCATION PRESENT IN DEPT TABLE.

DISTINCT Clause

" It is used to remove the duplicate or repeated values from the Result table " .

Example :

Student

<u>SID</u>	<u>SNAME</u>	<u>BRANCH</u>	<u>PER</u>
1	A	ECE	60
2	B	CSE	75
3	C	ME	50
4	D	ECE	80
5	C	CSE	75
6	E	CIVIL	95

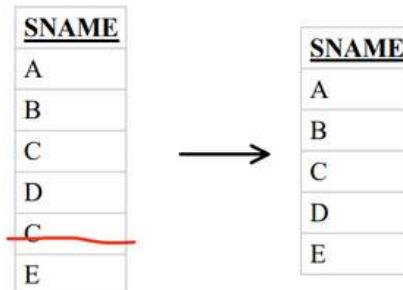
➢ Distinct clause has to be used As the first argument to select clause .

➢ We can use multiple columns As an argument to distinct clause, it will remove the combination of columns in which the records are duplicated .

➢ SELECT SNAME
FROM STUDENT ;

<u>SNAME</u>
A
B
C
D
C
E

➢ SELECT DISTINCT SNAME
FROM STUDENT ;



➤ **SELECT DISTINCT BRANCH
FROM STUDENT ;**

<u>BRANCH</u>
ECE
CSE
ME
ECE
CSE
CIVIL

<u>BRANCH</u>
ECE
CSE
ME
CIVIL



➤ **SELECT DISTINCT PER
FROM STUDENT ;**

<u>PER</u>
60
75
50
80
75
95

<u>PER</u>
60
75
50
80
95



➤ **SELECT DISTINCT BRANCH , PER
FROM STUDENT ;**

<u>BRANCH</u>	<u>PER</u>
ECE	60
CSE	75
ME	50
ECE	80
CSE	75
CIVIL	95

<u>BRANCH</u>	<u>PER</u>
ECE	60
CSE	75
ME	50
ECE	80
CIVIL	95



EXPRESSION

"A statement which gives result is known as Expression ".
Expression is a combination Operand and Operator .

Operand : These are the values that we pass .

**Operator : These are the Symbols which perform some Operation on
The Operand .**

Example : **5 * 10**

EMP

<u>EID</u>	<u>ENAME</u>	<u>SAL</u>
1	A	100
2	B	200
2	C	100

1. WAQTD name and salary given to the employees .

```
SELECT ENAME , SAL  
FROM EMP ;
```

2. WAQTD name and annual salary of the employees .

```
SELECT ENAME , SAL * 12
```

3. FROM EMP ;

<u>ENAME</u>	<u>SAL*12</u>
A	1200
B	2400
C	1200

4. WAQTD all the details of the employee along with annual salary

```
Select eid , ename , sal , sal*12  
From emp ;  
Select emp.* , sal*12  
From emp ;
```



5. WAQTD name and salary with a hike of 20% .

Select ename , Sal + Sal*20/100

From emp ;

Formulae to calculate percentage :

Sal + Sal * a / 100

Sal * 1.a

6. WAQTD name and salary of an employee with a deduction

Of 10% .

Select ename , sal - sal * 10 /100

From emp ;

ALIAS

"It is an alternate name given to a Column or an Expression In the result table " .

- We can assign alias name with or without using 'As' keyword .
- Alias names have to be a single string which is separated by An underscore or enclosed within double quotes .

Example :	ANNUAL_SALARY
	"ANNUAL SALARY"

➤ WAQTD annual salary for all the employees .

Select sal*12

From emp ;

SAL*12
1200
2400
1200

Select sal*12 Annual_Salary
From emp ;

Annual Salary
1200
2400
1200

Select sal + sal * 10 / 100 Hike
From emp ;

➤ WAQTD name and salary with a deduction 32% .

Select Ename , sal-sal*32/100 as deduction
From emp ;



ASSIGNMENT ON EXPRESSION & ALIAS

- 1.WAQTD NAME OF THE EMPLOYEE ALONG WITH THEIR ANNUAL SALARY.
- 2.WAQTD ENAME AND JOB FOR ALL THE EMPLOYEE WITH THEIR HALF TERM SALARY.
- 3.WAQTD ALL THE DETAILS OF THE EMPLOYEES ALONG WITH AN ANNUALBONUS OF 2000.
- 4.WAQTD NAME SALARY AND SALARY WITH A HIKE OF 10%.
- 5.WAQTD NAME AND SALARY WITH DEDUCTION OF 25%.
- 6.WAQTD NAME AND SALARY WITH MONTHLY HIKE OF 50.
- 7.WAQTD NAME AND ANNUAL SALARY WITH DEDUCTION OF 10%.
- 8.WAQTD TOTAL SALARY GIVEN TO EACH EMPLOYEE (SAL+COMM).
- 9.WAQTD DETAILS OF ALL THE EMPLOYEES ALONG WITH ANNUAL SALARY.
- 10.WAQTD NAME AND DESIGNATION ALONG WITH 100 PENALTY IN SALARY.

SELECTION :

"It is a process of retrieving the data by *selecting both the columns and rows* is known as Selection " .

SYNTAX :

```
SELECT * / [DISTINCT] Column_Name / Expression [ALIAS]
FROM Table_Name
WHERE <Filter_Condition>;
```

ORDER OF EXECUTION

1. FROM
2. WHERE
3. SELECT

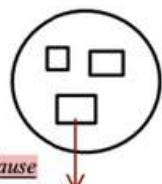
WHERE Clause

"Where clause is used to filter the records ".

Example :

- WAQTD names of the employees working in dept 20 .

Example :



Output of FROM Clause

EMP			
EID	ENAME	SAL	DNO
1	SMITH	100	10
2	ALLEN	250	20
3	BLAKE	300	30
4	MILLER	400	10
5	JONES	250	20

- 3- SELECT ENAME
 1- FROM EMP
 2- WHERE DNO = 20 ;

Filter Condition

DNO = 20

1	SMITH	100	10	X
2	ALLEN	250	20	✓
3	BLAKE	300	30	X
4	MILLER	400	10	X
5	JONES	250	20	✓

Output of SELECT Clause

ENAME
ALLEN
JONES

Output of WHERE Clause

EID	ENAME	SAL	DNO
2	ALLEN	250	20
5	JONES	250	20

- WAQTD names of the employees getting salary More than 300 .

**SELECT ENAME
 FROM EMP
 WHERE SAL > 300 ;**

- WAQTD names and salary of the employees working in dept 10.

**SELECT ENAME , SAL
 FROM EMP
 WHERE DEPTNO = 10 ;**

- WAQTD all the details of the employees whose salary is Less than 1000 rupees .

**SELECT *
 FROM EMP
 WHERE SAL < 1000 ;**



EMP :

EMPNO	ENAME	JOB	HIREDATE	MGR	SAL	COMM	DEPTNO
7369	SMITH	CLERK	17-DEC-80	7902	800		20
7499	ALLEN	SALESMAN	20-FEB-81	7698	1600	300	30
7521	WARD	SALESMAN	22-FEB-81	7698	1250	500	30
7566	JONES	MANAGER	02-APR-81	7839	2975		20
7654	MARTIN	SALESMAN	28-SEP-81	7698	1250	1400	30
7698	BLAKE	MANAGER	01-MAY-81	7839	2850		30
7782	CLARK	MANAGER	09-JUN-81	7839	2450		10
7788	SCOTT	ANALYST	19-APR-87	7566	3000		20
7839	KING	PRESIDENT	17-NOV-81		5000		10
7844	TURNER	SALESMAN	08-SEP-81	7698	1500	0	30
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7900	JAMES	CLERK	03-DEC-81	7698	950		30
7902	FORD	ANALYST	03-DEC-81	7566	3000		20
7934	MILLER	CLERK	23-JAN-82	7782	1300		10

- WAQTD name and hiredate of an employee hired on '09-JUN-1981'

```
SELECT ENAME , HIREDATE  
FROM EMP  
WHERE DATE = '09-JUN-1981' ;
```

- WAQTD details of the employee whose name is 'Miller'

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

- WAQTD details of the employee hired after '01-JAN-1982'

```
SELECT *  
FROM EMP  
WHERE HIREDATE > '01-JAN-1982' > ;
```

- WAQTD name sal and hiredate of the employees who were Hired before 1985 .

```
SELECT ENAME , SAL , HIREDATE  
FROM EMP  
WHERE HIREDATE < '01-JAN-1985' ;
```



- WAQTD name of the employees who was hired on Valentine's day 2020 .

```
SELECT ENAME  
FROM EMP  
WHERE HIREDATE = '14-FEB-2020' ;
```

ASSIGNMENT ON WHERE Clause .

- 1.WAQTD THE ANNUAL SALARY OF THE EMPLOYEE WHOS NAME IS SMITH
- 2.WAQTD NAME OF THE EMPLOYEES WORKING AS CLERK
- 3.WAQTD SALARY OF THE EMPLOYEES WHO ARE WORKING AS SALESMAN
- 4.WAQTD DETAILS OF THE EMP WHO EARNS MORE THAN 2000
- 5.WAQTD DETAILS OF THE EMP WHOS NAME IS JONES
- 6.WAQTD DETAILS OF THE EMP WHO WAS HIRED AFTER 01-JAN-81
- 7.WAQTD NAME AND SAL ALONG WITH HIS ANNUAL SALARY IF THE ANNUAL SALARY IS MORE THAN 12000
- 8.WAQTD EMPNO OF THE EMPLOYEES WHO ARE WORKING IN DEPT 30
- 9.WAQTD ENAME AND HIREDATE IF THEY ARE HIRED BEFORE 1981
- 10.WAQTD DETAILS OF THE EMPLOYEES WORKING AS MANAGER
- 11.WAQTD NAME AND SALARY GIVEN TO AN EMPLOYEE IF EMPLOYEE EARNS A COMMISSION OF RUPEES 1400
- 12.WAQTD DETAILS OF EMPLOYEES HAVING COMMISSION MORE THAN SALARY
- 13.WAQTD EMPNO OF EMPLOYEES HIRED BEFORE THE YEAR 87
- 14.WAQTD DETAILS OF EMPLOYEES WORKING AS AN N ANALYST
- 15.WAQTD DETAILS OF EMPS EARNING MORE THAN 2000 RUPEES PER MONTH



COMMANDS ON SQL*Plus :

1. CLEAR SCREEN [CL SCR] : *To clear the screen*
2. SET LINES 100 PAGES 100 : *To set the dimensions of the output page .*
3. EXIT / QUIT : *To Close the Software .*
4. When account is Locked !!!
 - Log in as SYSTEM
 - Password TIGER
 - ALTER USER SCOTT ACCOUNT UNLOCK ;
 - ALTER USER SCOTT IDENTIFIED BY TIGER ;
5. SELECT * FROM TAB ;
 - **EMP**
 - **DEPT**
 - SALGRADE
 - BONUS



OPERATORS IN SQL

OPERATORS IN SQL

1. ARITHMETIC OPERATORS :- (+, -, *, /)
2. CONCATENATION OPERATOR :- (||)
3. COMPARISON OPERATORS :- (=, != or <>)
4. RELATIONAL OPERATOR :- (>, <, >=, <=)
5. LOGICAL OP : (AND , OR , NOT)
6. SPECIAL OPERATOR :-

- 1.IN
- 2.NOT IN
- 3.BETWEEN
- 4.NOT BETWEEN
- 5.IS
- 6.IS NOT
- 7.LIKE
- 8.NOT LIKE

- 7.SUBQUERY OPERATORS:-

- 1.ALL
- 2.ANY
- 3.EXISTS
- 4.NOT EXISTS

CONCATENATION Operator :

" It is used to join the strings ".

Symbol : ||

Example : SELECT ENAME
 FROM EMP
 WHERE JOB ='MANAGER' ;

<u>Ename</u>
ALLEN
MARTIN
SMITH

```
SELECT 'Hi ' || ename  
FROM EMP  
WHERE JOB ='MANAGER' ;
```

<u>Ename</u>
Hi ALLEN
Hi MARTIN
Hi SMITH



- WAQTD name and deptno of the employees hired After '01-JAN-87' .

```
SELECT ENAME , DEPTNO  
FROM EMP  
WHERE HIREDATE > '01-JAN-1987' ;
```

- WAQTD name and hiredate of the employees hired before 31-JUL-88

```
SELECT ENAME , HIREDATE  
FROM EMP  
WHERE HIREDATE < '31-JUL-88' ;
```

LOGICAL OPERATORS

1. AND
2. OR
3. NOT

We use logical operators to write multiple conditions .

1. WAQTD name and deptno along with job for the employee working in dept 10 .

```
SELECT ENAME , DEPTNO , JOB  
FROM EMP  
WHERE DEPTNO = 10 ;
```

2. WAQTD name and deptno along with job for the employee working as manager in dept 10 .

```
SELECT ENAME , DEPTNO , JOB  
FROM EMP  
WHERE JOB ='MANAGER' AND DEPTNO = 10 ;
```

3. WAQTD name , deptno , salary of the employee working in dept 20 and earning less than 3000 .

```
SELECT ENAME, DEPTNO , SAL  
FROM EMP  
WHERE DEPTNO = 20 AND SAL < 3000 ;
```



4. WAQTD name and salary of the employee if emp earns More than 1250 but less than 3000 .

```
SELECT ENAME , SAL  
FROM EMP  
WHERE SAL > 1250 AND SAL < 3000 ;
```

5. WAQTD name and deptno of the employees if the works in dept 10 or 20 .

```
SELECT ENAME , DEPTNO  
FROM EMP  
WHERE DEPTNO = 10 OR DEPTNO = 20 ;
```

6. WAQTD name and sal and deptno of the employees If emp gets more than 1250 but less than 4000 and works in dept 20 .

```
SELECT ENAME , SAL , DEPTNO  
FROM EMP  
WHERE SAL > 1250 AND SAL < 4000 AND DEPTNO  
=20 ;
```

7. WAQTD name , job , deptno of the employees working as a manager in dept 10 or 30 .

```
SELECT ENAME , JOB , DEPTNO  
FROM EMP  
WHERE JOB ='MANAGER' AND ( DEPTNO = 10 OR  
DEPTNO = 20 ) ;
```

8. WAQTD name , deptno , job of the employees working in dept 10 or 20 or 30 as a clerk .

```
SELECT ENAME , JOB , DEPTNO  
FROM EMP  
WHERE JOB ='CLERK' AND ( DEPTNO = 10 OR  
DEPTNO = 20 AND DEPTNO = 30 ) ;
```



9. WAQTD name , job and deptno of the employees working as clerk or manager in dept 10 .

```
SELECT ENAME , JOB , DEPTNO  
FROM EMP  
WHERE ( JOB = 'CLERK' OR JOB ='MANAGER' )  
AND DEPTNO = 10 ;
```

10. WAQTD name , job , deptno , sal of the employees working as clerk or salesman in dept 10 or 30 and earning more than 1800 .

```
SELECT ENAME , JOB , SAL  
FROM EMP  
WHERE ( JOB ='CLERK' OR JOB ='SALESMAN')  
AND ( DEPTNO = 10 OR DEPTNO = 30 ) AND SAL >  
1800 ;
```

ASSIGNMENT ON LOGICAL OPERATORS :

- 1.WAQTD DETAILS OF THE EMPLOYEES WORKING AS CLERK AND EARNING LESS THAN 1500
- 2.WAQTD NAME AND HIREDATE OF THE EMPLOYEES WORKING AS MANAGER IN DEPT 30
- 3.WAQTD DETAILS OF THE EMP ALONG WITH ANNUAL SALARY IF THEY ARE WORKING IN DEPT 30 AS SALESMAN AND THEIR ANNUAL SALARY HAS TO BE GREATER THAN 14000.
- 4.WAQTD ALL THE DETAILS OF THE EMP WORKING IN DEPT 30 OR AS ANALYST
- 5.WAQTD NAMES OF THE EMPLOYEES WHOS SALARY IS LESS THAN 1100 AND THEIR DESIGNATION IS CLERK
- 6.WAQTD NAME AND SAL , ANNUAL SAL AND DEPTNO IF DEPTNO IS 20 EARNING MORE THAN 1100 AND ANNUAL SALARY EXCEEDS 12000
- 7.WAQTD EMPNO AND NAMES OF THE EMPLOYEES WORKING AS MANAGER IN DEPT 20
- 8.WAQTD DETAILS OF EMPLOYEES WORKING IN DEPT 20 OR 30 .
- 9.WAQTD DETAILS OF EMPLOYEES WORKING AS ANALYST IN DEPT 10 .



10. WAQTD DETAILS OF EMPLOYEE WORKING AS PRESIDENT WITH SALARY OF RUPEES 4000
11. WAQTD NAMES AND DEPTNO , JOB OF EMPS WORKING AS CLERK IN DEPT 10 OR 20
12. WAQTD DETAILS OF EMPLOYEES WORKING AS CLERK OR MANAGER IN DEPT 10 .
13. WAQTD NAMES OF EMPLOYEES WORKING IN DEPT 10 , 20 , 30 , 40 .
14. WAQTD DETAILS OF EMPLOYEES WITH EMPNO 7902,7839.
15. WAQTD DETAILS OF EMPLOYEES WORKING AS MANAGER OR SALESMAN OR CLERK
16. WAQTD NAMES OF EMPLOYEES HIRED AFTER 81 AND BEFORE 87
17. WAQTD DETAILS OF EMPLOYEES EARNING MORE THAN 1250 BUT LESS THAN 3000
18. WAQTD NAMES OF EMPLOYEES HIRED AFTER 81 INTO DEPT 10 OR 30
19. WAQTD NAMES OF EMPLOYEES ALONG WITH ANNUAL SALARY FOR THE EMPLOYEES WORKING AS MANAGER OR CLERK INTO DEPT 10 OR 30
20. WAQTD ALL THE DETAILS ALONG WITH ANNUAL SALARY IF SAL IS BETWEEN 1000 AND 4000 ANNUAL SALARY MORE THAN 15000

SPECIAL OPERATORS :

1. IN
2. NOT IN
3. BETWEEN
4. NOT BETWEEN
5. IS
6. IS NOT
7. LIKE
8. NOT LIKE



1. **IN :** It is a multi-valued operator which can accept multiple values At the RHS .

Syntax: Column_Name / Exp **IN** (v1 , v2 , . . Vn)

Example :

- WAQTD name and deptno of the employees working in dept 10 or 30 .

```
SELECT ENAME , DEPTNO  
FROM EMP  
WHERE DEPTNO = 10 OR DEPTNO = 30 ;
```

```
SELECT ENAME , DEPTNO  
FROM EMP  
WHERE DEPTNO IN ( 10 , 30 ) ;
```

- WAQTD name and job of the employee working as a clerk or manager Or salesman .

```
SELECT ENAME , JOB  
FROM EMP  
WHERE JOB IN ('CLERK' , 'MANAGER' ,  
'SALESMAN' ) ;
```

- WAQTD empno , ename and salary of the employees whose empno Is 7902 or 7839 and getting salary more than 2925.

```
SELECT EMPNO , ENAME , SAL  
FROM EMP  
WHERE EMPNO IN ( 7902 , 7839 ) AND SAL > 2925 ;
```

2. **NOT IN :** It is a multi-valued operator which can accept multiple values At the RHS . It is similar to IN op instead of selecting it Rejects the values .

Syntax: Column_Name / Exp **NOT IN** (v1 , v2 , . . vn)



Example :

- WAQTD name and deptno of all the employees except the emp Working in dept 10 or 40 .

```
SELECT ENAME , DEPTNO  
FROM EMP  
WHERE DEPTNO NOT IN ( 10 , 40 ) ;
```

- WAQTD name , deptno and job of the employee working in dept 20 but not as a clerk or manager .

```
SELECT ENAME , DEPTNO  
FROM EMP  
WHERE DEPTNO = 20 AND  
JOB NOT IN ( 'CLERK' , 'MANAGER' ) ;
```

ANSWERS :

1.WAQTD DETAILS OF THE EMPLOYEES WORKING AS CLERK AND EARNING LESS THAN1500

```
SELECT *  
FROM EMP  
WHERE JOB ='CLERK' AND SAL< 1500 ;
```

2.WAQTD NAME AND HIREDATE OF THE EMPLOYEES WORKING AS MANAGER IN DEPT 30

```
SELECT ENAME , HIREDATE  
FROM EMP  
WHERE JOB ='MANAGER' AND DEPTNO=30 ;
```

3.WAQTD DETAILS OF THE EMP ALONG WITH ANNUAL SALARY IF THEY ARE WORKING INDEPT 30 AS SALESMAN AND THEIR ANNUAL SALARY HAS TO BE GREATER THAN 14000

```
SELECT EMP.* , SAL*12 ANNUAL_SALARY  
FROM EMP  
WHERE DEPTNO = 30 AND JOB ='SALESMAN' AND SAL*  
12 > 14000 ;
```



4.WAQTD ALL THE DETAILS OF THE EMP WORKING IN DEPT 30 OR AS ANALYST

```
SELECT *  
FROM EMP  
WHERE DEPTNO = 30 OR JOB ='ANALYST' ;
```

5.WAQTD NAMES OF THE EMPLOYEES WHOS SALARY IS LESS THAN 1100 AND THEIR DESIGNATION IS CLERK

```
SELECT ENAME  
FROM EMP  
WHERE SAL< 1100 AND JOB ='CLERK' ;
```

6.WAQTD NAME AND SAL , ANNUAL SAL AND DEPTNO IF DEPTNO IS 20 EARNING MORE THAN 1100 AND ANNUAL SALARY EXCEEDS 12000

```
SELECT ENAME , SAL , SAL*12 , DEPTNO  
FROM EMP  
WHERE DEPTNO = 20 AND SAL > 1100 AND SAL*12 > 12000 ;
```

7.WAQTD EMPNO AND NAMES OF THE EMPLOYEES WORKING AS MANAGER IN DEPT 20

```
SELECT EMPNO , ENAME  
FROM EMP  
WHERE DEPTNO = 20 AND JOB ='MANAGER' ;
```

8.WAQTD DETAILS OF EMPLOYEES WORKING IN DEPT 20 OR 30

```
SELECT *  
FROM EMP  
WHERE DEPTNO = 10 OR DEPTNO = 30 ;
```

9.WAQTD DETAILS OF EMPLOYEES WORKING AS ANALYST IN DEPT 10

```
SELECT *  
FROM EMP  
WHERE DEPTNO = 10 AND JOB ='ANALYST' ;
```

10.WAQTD DETAILS OF EMPLOYEE WORKING AS PRESIDENT WITH SALARY OF RUPEES 4000

```
SELECT *  
FROM EMP  
WHERE SAL=4000 AND JOB ='PRESIDENT' ;
```



11. WAQTD NAMES AND DEPTNO , JOB OF EMPS WORKING AS CLERK IN DEPT 10 OR 20

**SELECT ENAME, DEPTNO, JOB
FROM EMP
WHERE JOB = 'CLERK' AND (DEPTNO =10 OR DEPTNO = 20);**

12. WAQTD DETAILS OF EMPLOYEES WORKING AS CLERK OR MANAGER IN DEPT 10

**SELECT *
FROM EMP
WHERE (JOB = 'CLERK' OR JOB = 'MANAGER') AND DEPTNO = 10;**

13. WAQTD NAMES OF EMPLOYEES WORKING IN DEPT 10 , 20 , 30 , 40

**SELECT ENAME
FROM EMP
WHERE DEPTNO = 10 OR DEPTNO = 20 OR DEPTNO = 30 OR DEPTNO =40 ;**

14. WAQTD DETAILS OF EMPLOYEES WITH EMPNO 7902, 7839

**SELECT *
FROM EMP
WHERE EMPNO = 7902 OR EMPNO = 7839;**

15. WAQTD DETAILS OF EMPLOYEES WORKING AS MANAGER OR SALESMAN OR CLERK

**SELECT *
FROM EMP
WHERE JOB = 'MANAGER' OR JOB = 'SALESMAN' OR JOB = 'CLERK';**

16. WAQTD NAMES OF EMPLOYEES HIRED AFTER 81 AND BEFORE 87

**SELECT ENAME
FROM EMP
WHERE HIREDATE > '31-DEC-81' AND HIREDATE < '01-JAN-87'**

17. WAQTD DETAILS OF EMPLOYEES EARNING MORE THAN 1250 BUT LESS THAN 3000

**SELECT *
FROM EMP
WHERE SAL > 1250 AND SAL < 3000 ;**



18.WAQTD NAMES OF EMPLOYEES HIRED AFTER 81
INTO DEPT 10 OR 30

```
SELECT ENAME  
FROM EMP  
WHERE HIREDATE > '31-DEC-81' AND ( DEPTNO = 10 OR  
DEPTNO = 20 ) ;
```

19.WAQTD NAMES OF EMPLOYEES ALONG WITH
ANNUAL SALARY FOR THE EMPLOYEES WORKING
AS MANAGER OR CLERK INTO DEPT 10 OR 30

```
SELECT ENAME , SAL*12  
FROM EMP  
WHERE ( JOB = 'MANAGER' OR JOB ='CLERK') AND  
( DEPTNO = 10 OR DEPTNO = 30 ) ;
```

20.WAQTD ALL THE DETAILS ALONG WITH ANNUAL
SALARY IF SAL IS BETWEEN 1000 AND 4000 ANNUAL
SALARY MORE THAN 15000

```
SELECT EMP.* , SAL*12  
FROM EMP  
WHERE SAL > 1000 AND SAL < 4000 AND SAL*12 > 15000 ;
```



3. **BETWEEN** : "It is used whenever we have range of values "
[Start value and Stop Value].

Syntax:

```
Column_Name BETWEEN Lower_Range AND Higher_Range ;
```

- **Between Op works including the range .**

Example :

- WAQTD name and salary of the employees if the emp is earning Salary in the range 1000 to 3000 .

```
SELECT ENAME , SAL  
FROM EMP  
WHERE SAL BETWEEN 1000 AND 3000 ;
```

- WAQTD name and deptno of the employees working in dept 10 And hired during 2019 (the entire year of 2019) .

```
SELECT ENAME , DEPTNO  
FROM EMP  
WHERE DEPTNO = 10 AND HIREDATE BETWEEN '01-  
JAN-2019' AND '31-DEC-2019' ;
```

- WAQTD name , sal and hiredate of the employees hired during 2017 into dept 20 with a salary greater than 2000 .

```
SELECT ENAME , SAL , HIREDATE  
FROM EMP  
WHERE DEPTNO = 20 AND SAL > 2000 AND HIREDATE  
BETWEEN '01-JAN2017' AND '31-DEC-2017' ;
```

4. **NOT BETWEEN** : It is Opposite of Between .

Syntax:

```
Column_Name NOT BETWEEN Lower_Range AND Higher_Range ;
```

Example :

- WAQTD name and salary of the employees if the emp is not earning Salary in the range 1000 to 3000 .

```
SELECT ENAME , SAL  
FROM EMP  
WHERE SAL NOT BETWEEN 1000 AND 3000 ;
```



- WAQTD name and deptno of the employees working in dept 10
And not hired during 2019 .

```
SELECT ENAME , DEPTNO
FROM EMP
WHERE DEPTNO = 10 AND HIREDATE NOT BETWEEN '01-
JAN-2019' AND '31-DEC-2019' ;
```

- WAQTD name , sal and hiredate of the employees who were not hired during 2017 into dept 20 with a salary greater than 2000 .

```
SELECT ENAME , SAL , HIREDATE
FROM EMP
WHERE DEPTNO = 20 AND SAL > 2000 AND HIREDATE NOT
BETWEEN '01-JAN-2017' AND '31-DEC-2017' ;
```

5. IS : "It is used to compare only NULL "

Syntax: Column_Name **IS** NULL ;

Example :

EID	ENAME	SAL	COMM
1	A	1000	100
2	B	null	null
3	C	null	200
4	D	2000	null

- WAQTD name of the employee who is not getting salary .

```
SELECT ENAME
FROM EMP
WHERE SAL IS NULL ;
```

- WAQTD name of the emp who doesn't get commission .

```
SELECT ENAME
FROM EMP
WHERE COMM IS NULL ;
```

- WAQTD name , sal and comm of the emp if the emp doesn't earn both .

```
SELECT ENAME , SAL , COMM
FROM EMP
WHERE COMM IS NULL AND SAL IS NULL ;
```



6. **IS NOT** : "It is used to compare the values with NOT NULL".

Syntax: Column_Name **IS NOT NULL** ;

Example :

- WAQTD name of the employee who is getting salary .

```
SELECT ENAME  
FROM EMP  
WHERE SAL IS NOT NULL ;
```

- WAQTD name of the emp who gets commission .

```
SELECT ENAME  
FROM EMP  
WHERE COMM IS NOT NULL ;
```

- WAQTD name , sal and comm of the emp if the emp doesn't earn commission but gets salary .

```
SELECT ENAME , SAL , COMM  
FROM EMP  
WHERE COMM IS NULL AND SAL IS NOT NULL ;
```

7. **LIKE** : "It is used for Pattern Matching".

To achieve pattern matching we use special characters .

- **Percentile (%)**
 - **Underscore (_)**
-

Syntax: Column_Name **LIKE 'pattern'** ;

Example :

- WAQTD details of an employee whose name is SMITH .

```
SELECT *  
FROM EMP  
WHERE ENAME ='SMITH' ;
```



- WAQTD details of the employee who's name starts with 'S' .

```
SELECT *  
FROM EMP  
WHERE ENAME LIKE 'S%' ;
```

- WAQTD details of the employee who's name ends with 'S' .

```
SELECT *  
FROM EMP  
WHERE ENAME LIKE '%S' ;
```

- WAQTD names of the employees who have character 'S' in their names .

```
SELECT *  
WHERE ENAME LIKE '%S%' ;
```

- WAQTD names that starts with 'J' and ends with 'S' .

```
SELECT ENAME  
FROM EMP  
WHERE ENAME LIKE 'J%S' ;
```

- WAQTD names of the employee if the emp has char 'A' as his second character .

```
SELECT ENAME  
FROM EMP  
WHERE ENAME LIKE '_A%' ;
```

- WAQTD names of the employee if the emp has char 'A' as his Third character .

```
SELECT ENAME  
FROM EMP  
WHERE ENAME LIKE '__A%' ;
```

- WAQTD names of the employee if the emp has char 'A' as his second character and 'S' is last character .

```
SELECT ENAME  
FROM EMP  
WHERE ENAME LIKE '_A%$' ;
```



- WAQTD names of the employee if the emp has char 'A' present at least 2 times .

```
SELECT ENAME  
FROM EMP  
WHERE ENAME LIKE '%A%A%' ;
```

- WAQTD names of the employee if the emp name starts with 'A' and ends with 'A' .

```
SELECT ENAME  
FROM EMP  
WHERE ENAME LIKE 'A%A' ;
```

- WAQTD names of the employee if the emp's salary's last 2 digit is 50 rupees .

```
SELECT ENAME  
FROM EMP  
WHERE SAL LIKE '%50' ;
```

- WAQTD names of the employees hired in November .

```
SELECT ENAME  
FROM EMP  
WHERE HIREDATE LIKE '%NOV%' ;
```

8. NOT LIKE :Opposite of Like .

Syntax: Column_Name **NOT LIKE** 'pattern' ;

ASSIGNMENT ON SEPCIAL OPERATORS :

- 1) LIST ALL THE EMPLOYEES WHOSE COMMISSION IS NULL
- 2) LIST ALL THE EMPLOYEES WHO DON'T HAVE A REPORTING MANAGER
- 3) LIST ALL THE SALESMEN IN DEPT 30
- 4) LIST ALL THE SALESMEN IN DEPT NUMBER 30 AND HAVING SALARY GREATER THAN 1500
- 5) LIST ALL THE EMPLOYEES WHOSE NAME STARTS WITH 'S' OR 'A'
- 6) LIST ALL THE EMPLOYEES EXCEPT THOSE WHO ARE WORKING IN DEPT 10 & 20.
- 7) LIST THE EMPLOYEES WHOSE NAME DOES NOT START WITH 'S'
- 8) LIST ALL THE EMPLOYEES WHO ARE HAVING REPORTING MANAGERS IN DEPT 10



- 9) LIST ALL THE EMPLOYEES WHOSE COMMISSION IS NULL AND WORKING AS CLERK
- 10) LIST ALL THE EMPLOYEES WHO DON'T HAVE A REPORTING MANAGER IN DEPTNO 10 OR 30
- 11) LIST ALL THE SALESMEN IN DEPT 30 WITH SAL MORE THAN 2450
- 12) LIST ALL THE ANALYST IN DEPT NUMBER 20 AND HAVING SALARY GREATER THAN 2500
- 13) LIST ALL THE EMPLOYEES WHOSE NAME STARTS WITH 'M' OR 'J'
- 14) LIST ALL THE EMPLOYEES WITH ANNUAL SALARY EXCEPT THOSE WHO ARE WORKING IN DEPT 30
- 15) LIST THE EMPLOYEES WHOSE NAME DOES NOT END WITH 'ES' OR 'R'
- 16) LIST ALL THE EMPLOYEES WHO ARE HAVING REPORTING MANAGERS IN DEPT 10 ALONG WITH 10% HIKE IN SALARY
- 17) DISPLAY ALL THE EMPLOYEE WHO ARE 'SALESMAN'S HAVING 'E' AS THE LAST BUT ONE CHARACTER IN ENAME BUT SALARY HAVING EXACTLY 4 CHARACTER
- 18) DISPLAY ALL THE EMPLOYEE WHO ARE JOINED AFTER YEAR 81
- 19) DISPLAY ALL THE EMPLOYEE WHO ARE JOINED IN FEB
- 20) LIST THE EMPLOYEES WHO ARE NOT WORKING AS MANAGERS AND CLERKS IN DEPT 10 AND 20 WITH A SALARY IN THE RANGE OF 1000 TO 3000.



SPECIAL OPERATOR ANSWERS

QUESTION 1:

- 1) LIST ALL THE EMPLOYEES WHOSE COMMISSION IS NULL

SELECT ENAME

FROM EMP WHERE

COMM IS NULL;

- 2) LIST ALL THE EMPLOYEES WHO DON'T HAVE A REPORTING MANAGER

SELECT ENAME

FROM EMP

WHERE MGR IS NULL;

- 3) LIST ALL THE SALESMEN IN DEPT 30

SELECT ENAME

FROM EMP

WHERE JOB IN 'SALESMAN' AND DEPTNO IN 30;

- 4) LIST ALL THE SALESMEN IN DEPT NUMBER 30 AND HAVING SALARY GREATER THAN 1500

SELECT ENAME

FROM EMP

WHERE JOB IN 'SALESMAN' AND DEPTNO IN 30 AND SAL > 1500;

- 5) LIST ALL THE EMPLOYEES WHOSE NAME STARTS WITH 'S' OR 'A'

SELECT ENAME

FROM EMP

WHERE ENAME LIKE 'S%' OR ENAME LIKE 'A%';

- 6) LIST ALL THE EMPLOYEES EXCEPT THOSE WHO ARE WORKING IN DEPT 10 & 20.

SELECT ENAME

FROM EMP

WHERE DEPTNO NOT IN (10,20);

- 7) LIST THE EMPLOYEES WHOSE NAME DOES NOT START WITH 'S'

SELECT ENAME

FROM EMP

WHERE ENAME NOT LIKE 'S%';

- 8) LIST ALL THE EMPLOYEES WHO ARE HAVING REPORTING MANAGERS IN DEPT 10

SELECT ENAME



*FROM EMP
WHERE MGR IS NOT NULL AND DEPTNO IN 10;*

9) LIST ALL THE EMPLOYEES WHOSE COMMISSION IS NULL AND WORKING AS CLERK

SELECT ENAME

FROM EMP WHERE

COMM IS NULL AND JOB IN 'CLERK';

10) LIST ALL THE EMPLOYEES WHO DON'T HAVE A REPORTING MANAGER IN DEPTNO 10 OR 30

SELECT ENAME

FROM EMP

WHERE MGR IS NULL AND DEPTNO IN (10,30);

11) LIST ALL THE SALESMEN IN DEPT 30 WITH SAL MORE THAN 2450

SELECT ENAME

FROM EMP

WHERE JOB IN 'SALESMAN' AND DEPTNO IN 30 AND SAL > 2450;

12) LIST ALL THE ANALYST IN DEPT NUMBER 20 AND HAVING SALARY GREATER THAN 2500

SELECT ENAME

FROM EMP

WHERE JOB IN 'ANALYST' AND DEPTNO IN 20 AND SAL > 2500;

13) LIST ALL THE EMPLOYEES WHOSE NAME STARTS WITH 'M' OR 'J'

SELECT ENAME

FROM EMP

WHERE ENAME LIKE 'M%' OR ENAME LIKE 'J%';

14) LIST ALL THE EMPLOYEES WITH ANNUAL SALARY EXCEPT THOSE WHO ARE WORKING IN DEPT 30

*SELECT ENAME, SAL * 12 AS ANNUAL_SAL*

FROM EMP

WHERE DEPTNO NOT IN 30;

15) LIST THE EMPLOYEES WHOSE NAME DOES NOT END WITH 'ES' OR 'R'

SELECT ENAME

FROM EMP

WHERE ENAME NOT LIKE '%ES' AND ENAME NOT LIKE '%R';

16) LIST ALL THE EMPLOYEES WHO ARE HAVING REPORTING MANAGERS IN DEPT 10 ALONG WITH 10% HIKE IN SALARY



SELECT ENAME, SAL-SAL*10/100

FROM EMP

WHERE MGR IS NOT NULL AND DEPTNO IN 10;

17) DISPLAY ALL THE EMPLOYEE WHO ARE 'SALESMAN'S HAVING 'E' AS THE LAST BUT ONE CHARACTER IN ENAME BUT SALARY HAVING EXACTLY 4 CHARACTER

SELECT ENAME

FROM EMP

WHERE JOB IN 'SALESMAN' AND ENAME LIKE '%E_' AND SAL LIKE '____';

18) DISPLAY ALL THE EMPLOYEE WHO ARE JOINED AFTER YEAR 81

SELECT ENAME

FROM EMP

WHERE HIREDATE > '31-DEC-81';

19) DISPLAY ALL THE EMPLOYEE WHO ARE JOINED IN FEB

SELECT ENAME

FROM EMP

WHERE HIREDATE LIKE "%FEB%";

20) LIST THE EMPLOYEES WHO ARE NOT WORKING AS MANAGERS AND CLERKS IN DEPT 10 AND 20 WITH A SALARY IN THE RANGE OF 1000 TO 3000

SELECT ENAME

FROM EMP

WHERE JOB NOT IN('MANAGER','CLERK') AND DEPTNO IN(20,10) AND SAL BETWEEN 1000 AND 3000;

FUNCTIONS

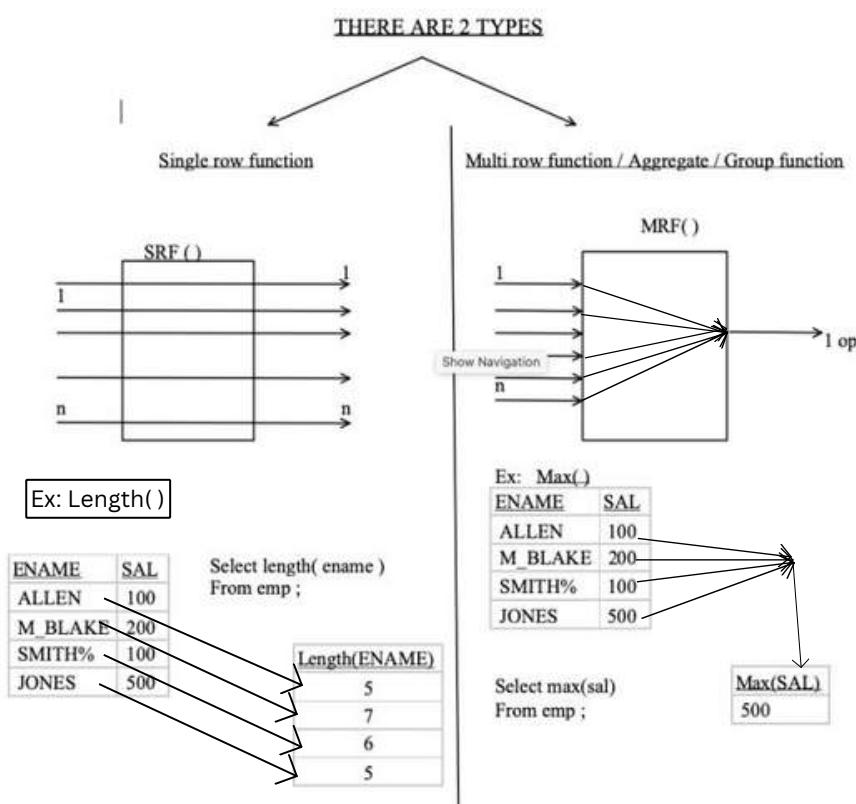
Are a block of code or list of instructions which are used to perform a specific task .

There are 3 main components of a function

1. Function_Name
2. Number_of_arguments (no of inputs)
3. Return type

Types of Functions in SQL :

1. SINGLE ROW FUNCTIONS
2. MUTLI ROW FUNCTIONS / AGGREGATE / GROUP FUNCTIONS.



Multi Row Functions:

It takes all the inputs at one shot and then executes and provides A single output .

- If we pass 'n' number of inputs to a MRF() it returns '1' Output .

List of MRF ()

1. **MAX()** : it is used to obtain the maximum value present in the column
2. **MIN()** : it is used to obtain the minimum value present in the column
3. **SUM()** : it is used to obtain the summation of values present in the column
4. **AVG()** : it is used to obtain the average of values present in the column
5. **COUNT()** : it is used to obtain the number of values present in the column

NOTE :

- Multi row functions can accept only one argument , i.e a Column_Name or an Expression

MRF (Column_Name / Exp)

- Along with a MRF() we are not supposed to use any other Column_Name in the select clause .
- MRF() ignore the Null .
- We cannot use a MRF() in where clause .
- COUNT() is the only MRF which can accept * as an Argument .



Examples :

1. WAQTD maximum salary given to a manager .

```
SELECT MAX( SAL )
FROM EMP
WHERE JOB ='MANAGER' ;
```

2. WAQTD Total salary given to dept 10

```
SELECT SUM( SAL )
FROM EMP
WHERE DEPTNO =10 ;
```

3. WAQTD number of employees earing more than 1500 in dept 20

```
SELECT COUNT(*)
FROM EMP
WHERE SAL > 1500 AND DEPTNO = 20 ;
```

4. WAQTD number of employee having 'E' in their names .

```
SELECT COUNT(*)
FROM EMP
WHERE ENAME LIKE '%E%' ;
```

5. WAQTD minimum salary given to the employees working as clerk in Dept 10 or 20 .

```
SELECT MIN( SAL )
FROM EMP
WHERE JOB='CLERK' AND DEPTNO IN ( 10 , 20 ) ;
```

6. WAQTD number of employees hired after 1982 and before 1985 into Dept 10 or 30 .

```
SELECT COUNT(*)
FROM EMP
WHERE JIREDATE >'31-DEC-1982' AND HIREDATE <'01-JAN-1985' AND DEPTNO IN ( 10 , 30 ) ;
```



7. WAQTD number of employees getting commission .

```
SELECT COUNT(*)  
FROM EMP  
WHERE COMM IS NOT NULL ;
```

```
SELECT COUNT( COMM )  
FROM EMP ;
```

8. WAQTD maximum salary given to employees if the emp has character 'S' in the name and works as a Manager in dept 10 with a salary of more than 1800 .

```
SELECT MAX( SAL )  
FROM EMP  
WHERE ENAME LIKE '%S%' AND JOB ='MANAGER' AND  
DEPTNO = 10 AND SAL> 1800 ;
```

9. WAQTD number of employees working in dept 10 or 30 and getting commission without the salary .

```
SELECT COUNT(*)  
FROM EMP  
WHERE DEPTNO IN ( 10 , 30 ) AND COMM IS NOT NULL  
AND SAL IS NULL ;
```

```
SELECT COUNT( COMM )  
FROM EMP  
WHERE DEPTNO IN ( 10 , 30 ) AND SAL IS NULL ;
```

10. WAQTD maximum salary given to a manager working in dept 20 and also his comm must be greater than his salary .

```
SELECT MAX( SAL )  
FROM EMP  
WHERE JOB ='MANAGER' AND DEPTNO = 20 AND COMM >  
SAL ;
```



ASSIGNEMENT ON MRF(.)

- 1.WAQTD NUMBER OF EMPLOYEES GETTING SALARY LESS THAN 2000 IN DEPTNO 10
- 2.WAQTD TOTAL SALARY NEEDED TO PAY EMPLOYEES WORKING AS CLERK
- 3.WAQTD AVERAGE SALARY NEEDED TO PAY ALL EMPLOYEES
- 4.WAQTD NUMBER OF EMPLOYEES HAVING 'A' AS THEIR FIRST CHARACTER
- 5.WAQTD NUMBER OF EMPLOYEES WORKING AS CLERK OR MANAGER
- 6.WAQTD TOTAL SALARY NEEDED TO PAY EMPLOYEES HIRED IN FEB
- 7.WAQTD NUMBER OF EMPLOYEES REPORTING TO 7839 (MGR)
- 8.WAQTD NUMBER OF EMPLOYEES GETTING COMISSION IN DEPTNO 30
- 9.WAQTD AVG SAL , TOTAL SAL , NUMBER OF EMPS AND MAXIMUM SALARY GIVEN TO EMPLOYEES WORKING AS PERSISTENT
- 10.WAQTD NUMBER OF EMPLOYEES HAVING 'A' IN THEIR NAMES
- 11.WAQTD NUMBER OF EMPS AND TOTAL SALARY NEEDED TO PAY THE EMPLOYEES WHO HAVE 2 CONSIGUTIVE L's IN THEIR NAMES
- 12.WAQTD NUMBER OF DEPARTMENTS PRESENT IN EMPLOYEE TABLE
- 13.WAQTD NUMBER OF EMPLOYEES HAVING CHARACTER 'Z' IN THEIR NAMES
- 14.WAQTD NUMBER OF EMPLOYEES HAVING '\$' IN THEIR NAMES .
- 15.WAQTD TOTAL SALARY GIVEN TO EMPLOYEES WORKING AS CLERK IN DEPT 30
- 16.WAQTD MAXIMUM SALARY GIVEN TO THE EMPLOYEES WORKING AS ANALYST
- 17.WAQTD NUMBER OF DISTINCT SALARIES PRESENT IN EMPLOYEE TABLE
- 18.WAQTD NUMBER OF JOBS PRESENT IN EMPLOYEE TABLE
- 19.WATQD AVG SALARY GIVEN TO THE CLERK
- 20.WAQTD MINIMUM SALARY GIVEN TO THE EMPLOYEES WHO WORK IN DEPT 10 AS MANAGER OR A CLERK



ANSWERS :

1.WAQTD NUMBER OF EMPLOYEES GETTING SALARY LESS THAN 2000 IN DEPTNO 10

```
SELECT COUNT(*)
FROM EMP
WHERE DEPTNO = 10 AND SAL < 2000 ;
```

2.WAQTD TOTAL SALARY NEEDED TO PAY EMPLOYEES WORKING AS CLERK

```
SELECT SUM(SAL)
FROM EMP
WHERE JOB = 'CLERK';
```

3.WAQTD AVERAGE SALARY NEEDED TO PAY ALL EMPLOYEES

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

4.WAQTD NUMBER OF EMPLOYEES HAVING 'A' AS THEIR FIRST CHARACTER

```
SELECT COUNT(*)
FROM EMP
WHERE ENAME LIKE 'A%';
```

5.WAQTD NUMBER OF EMPLOYEES WORKING AS CLERK OR MANAGER

```
SELECT COUNT(*)
FROM EMP
WHERE JOB IN ('MANAGER', 'CLERK');
```

6.WAQTD TOTAL SALARY NEEDED TO PAY EMPLOYEES HIRED IN FEB

```
SELECT SUM(SAL)
FROM EMP
WHERE HIREDATE LIKE '%FEB%';
```

7.WAQTD NUMBER OF EMPLOYEES REPORTING TO 7839 (MGR)

```
SELECT COUNT(*)
FROM EMP
WHERE MGR = 7839 ;
```

8.WAQTD NUMBER OF EMPLOYEES GETTING COMISSION IN DEPTNO 30

```
SELECT COUNT(*)
FROM EMP
WHERE COMM IS NOT NULL AND DEPTNO = 30 ;
OR
SELECT COUNT(COMM)
FROM EMP
WHERE DEPTNO = 30 ;
```



9.WAQTD AVG SAL , TOTAL SAL , NUMBER OF EMPS AND MAXIMUM SALARY GIVEN TO EMPLOYEES WORKING AS PERSISTENT

```
SELECT AVG(SAL) , SUM(SAL) , COUNT(*) , MAX(SAL)
FROM EMP
WHERE JOB = 'PRESIDENT' ;
```

10.WAQTD NUMBER OF EMPLOYEES HAVING 'A' IN THEIR NAMES

```
SELECT COUNT(*)
FROM EMP
WHERE ENAME LIKE '%A%' ;
```

11.WAQTD NUMBER OF EMPS AND TOTAL SALary needed to pay THE EMPLOYEES WHO HAVE 2 CONSICUTIVE L's IN THEIR NAMES

```
SELECT COUNT(*) , SUM(SAL)
FROM EMP
WHERE ENAME LIKE '%LL%' ;
```

12.WAQTD NUMBER OF DEPARTMENTS PRESENT IN EMPLOYEE TABLE

```
SELECT COUNT(DISTINCT DEPTNO )
FROM EMP ;
```

13.WAQTD NUMBER OF EMPLOYEES HAVING CHARACTER '_' IN THEIR NAMES

```
SELECT COUNT(*)
FROM EMP
WHERE ENAME LIKE '%!_%' ESCAPE '!' ;
```

14.WAQTD NUMBER OF EMPLOYEES HAVING ATLEAST 2 PERCENTILES IN THEIR NAMES

```
SELECT COUNT(*)
FROM EMP
WHERE ENAME LIKE '%!%%!%%' ESCAPE '%' ;
```

15.WAQTD TOTAL SALARY GIVEN TO EMPLOYEES WORKING AS CLERK IN DEPT 30

```
SELECT SUM(SAL)
FROM EMP
WHERE JOB ='CLERK' AND DEPTNO = 30 ;
```

16.WAQTD MAXIMUM SALARY GIVEN TO THE EMPLOYEES WORKING AS ANALYST

```
SELECT MAX(Sal)
FROM EMP
WHERE JOB ='ANALYST' ;
```

17.WAQTD NUMBER OF DISTINCT SALARIES PRESENT IN EMPLOYEE TABLE

```
SELECT COUNT(DISTINCT SAL )
FROM EMP ;
```



18.WAQTD NUMBER OF JOBS PRESENT IN EMPLOYEE TABLE

SELECT COUNT(DISTINCT JOB)

FROM EMP ;

19.WATQD AVG SALARY GIVEN TO THE CLERK

SELECT AVG(SAL)

FROM EMP

WHERE JOB ='CLERK' ;

20.WAQTD MINIMUM SALARY GIVEN TO THE EMPLOYEES

WHO WORK IN DEPT 10 AS MANAGER OR A CLERK

SELECT MIN(SAL)

FROM EMP

WHERE DEPTNO = 10 AND JOB IN ('MANAGER' , 'CLERK') ;

GROUP & FILTERING

GROUPING : GROUP BY Clause

Group by clause is used to *group the records* .

SYNTAX:

```
SELECT group_by_expression / group_function
FROM table_name
[WHERE <filter_condition>]
GROUP BY column_name/expression ;
```

ORDER OF EXECUTION:

- 1-FROM
- 2-WHERE(if used) [ROW-BY-ROW]
- 3-GROUP BY [ROW-BY-ROW]
- 4-SELECT [GROUP-BY-GROUP]

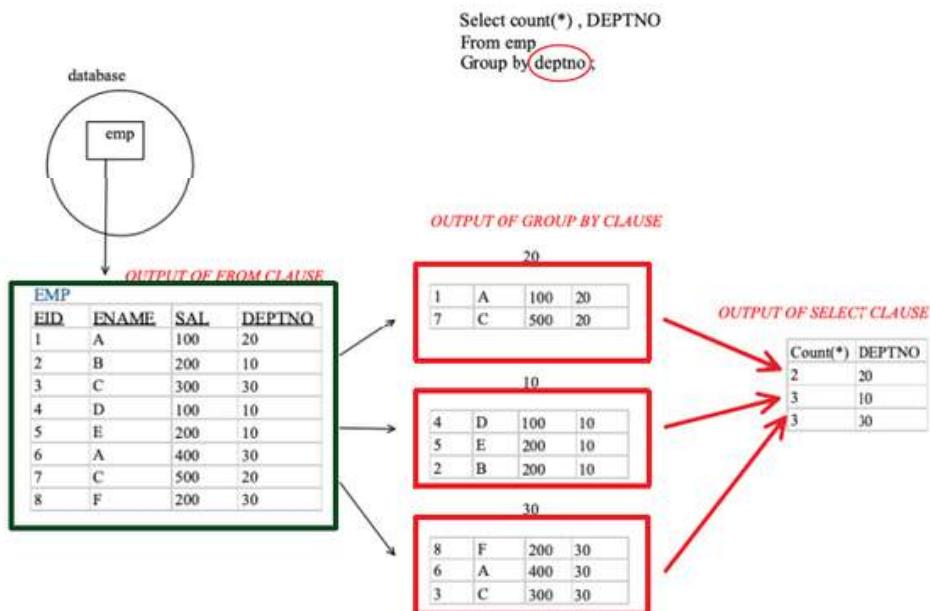
EMP

EID	ENAME	SAL	DEPTNO
1	A	100	20
2	B	200	10
3	C	300	30
4	D	100	10
5	E	200	10
6	A	400	30
7	C	500	20
8	F	200	30

Example :

- WAQTD number of employees working in each dept .

```
SELECT COUNT(*)
FROM EMP
GROUP BY DEPTNO ;
```



NOTE :

- Group By clause is used to group the records .
- Group By clause executes row by row .
- After the execution of Group By clause we get Groups .
- Therefore any clause that executes after group by must execute Group By Group .
- The Column_Name or expression used for grouping can be used In select clause .
- Group By clause can be used without using Where clause .

Questions :

- WAQTD number of employees working in each dept except the Employee working as analyst .

```
SELECT DEPTNO , COUNT(*)
FROM EMP
WHERE JOB NOT IN 'ANALYST'
GROUP BY DEPTNO ;
```

- WAQTD maximum salary given to each job .

```
SELECT JOB , MAX( SAL )
FROM EMP
GROUP BY JOB ;
```



3. WAQTD number of employees working in each job if the employees Have character 'A' in their names .

```
SELECT JOB , COUNT(*)  
FROM EMP  
WHERE ENAME LIKE '%A%'  
GROUP BY JOB ;
```

4. WAQTD number of employees getting commission in each dept .

```
SELECT DEPTNO , COUNT( COMM )  
FROM EMP  
GROUP BY DEPTNO ;
```

ASSIGNMENT QUESTIONS ON GROUP BY

- 1.WAQTD NUMBER OF EMPLOYEES WORKING IN EACH DEPARTEMENT EXCEPT PRESIDENT.
- 2.WAQTD TOTAL SALARY NEEDED TO PAY ALL THE EMPLOYEES IN EACH JOB.
- 3.WAQTD NUMBER OF EMPLOYEES WORKING AS MANAGER IN EACH DEPARTMENT .
- 4.WAQTD AVG SALARY NEEDED TO PAY ALL THE EMPLOYEES IN EACH DEPARTMENT EXCLUDING THE EMPLOYEES OF DEPTNO 20.
- 5.WAQTD NUMBER OF EMPLOYEES HAVING CHARACTER 'A' IN THEIR NAMES IN EACH JOB .
- 6.WAQTD NUMBER OF EMPLOYEES AND AVG SALARY NEEDED TO PAY THE EMPLOYEES WHO SALARY IN GREATER THAN 2000 IN EACH DEPT.
- 7.WAQDTD TOTAL SALARY NEEDED TO PAY AND NUMBER OF SALESMANS IN EACH DEPT.
- 8.WAQTD NUMBER OF EMPLOYEES WITH THEIR MAXIMUM SALARIES IN EACH JOB.
- 9.WAQTD MAXIMUM SALARIES GIVEN TO AN EMPLOYEE WORKING IN EACH DEPT.
- 10.WAQTD NUMBER OF TIMES THE SALARIES PRESENT IN EMPLOYEE TABLE .



FILTERING : **HAVING Clause**

" Having Clause is used to Filter the Group "

SYNTAX:

```
SELECT group_by_expression / group_function  
FROM table_name  
[WHERE <filter_condition>]  
GROUP BY column_name/expression  
HAVING <group_filter_condition>
```

ORDER OF EXECUTION:

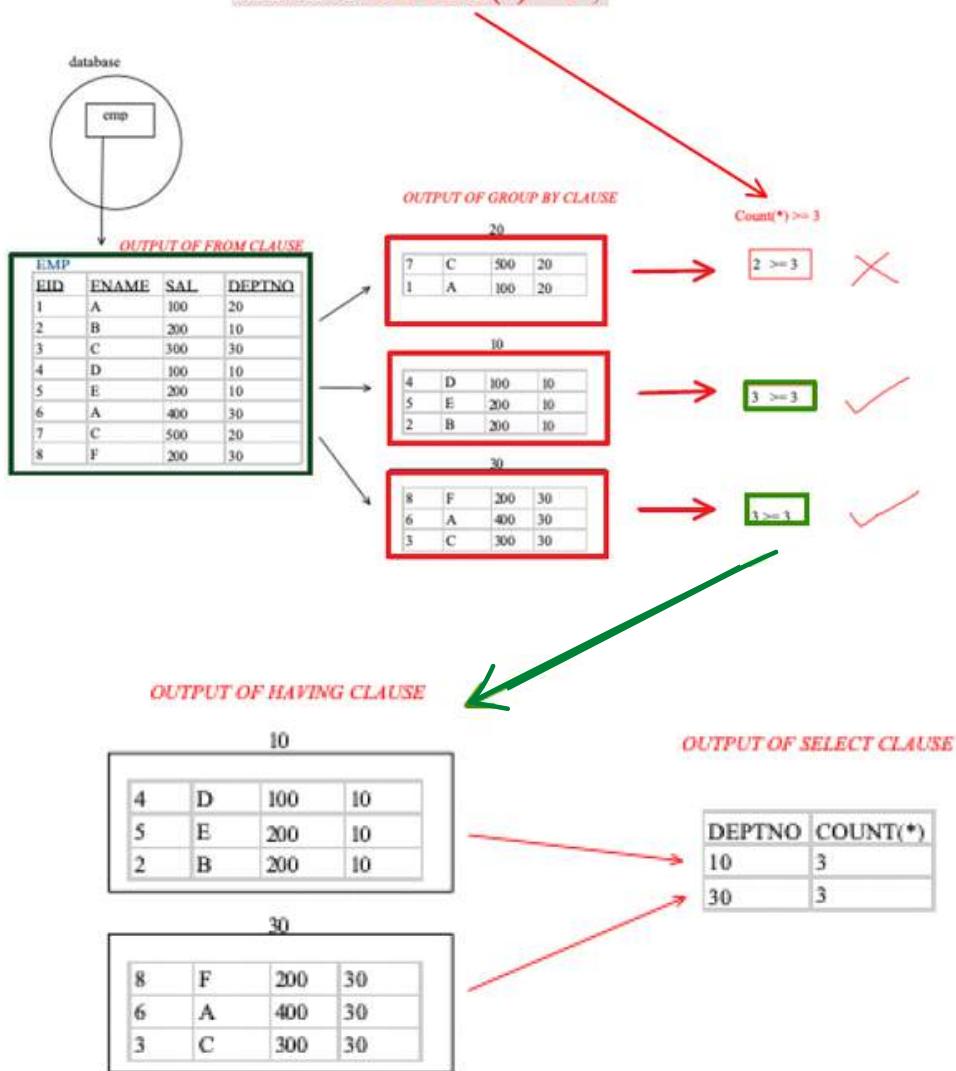
- 1-FROM
- 2-WHERE(if used) [ROW-BY-ROW]
- 3-GROUP BY(if used) [ROW-BY-ROW]
- 4-HAVING (if used) [GROUP-BY-GROUP]
- 5-SELECT [GROUP-BY-GROUP]

Example :

- WAQTD to find number of employees working in each Dept if there are at least 3 employees in each dept .

```

SELECT DEPTNO , COUNT(*)
FROM EMP
GROUP BY DEPTNO
HAVING COUNT(*)>=3 ;
  
```





Questions :

1. WAQTD the designations in which there are at least 2 employees Present .

```
SELECT JOB , COUNT(*)  
FROM EMP  
GROUP BY JOB  
HAVING COUNT(*)>=2 ;
```

2. WAQTD the names that are repeated .

```
SELECT ENAME , COUNT(*)  
FROM EMP  
GROUP BY ENAME  
HAVING COUNT(*) > 1 ;
```

3. WAQTD names that are repeated exactly twice .

```
SELECT ENAME , COUNT(*)  
FROM EMP  
GROUP BY ENAME  
HAVING COUNT(*) = 2 ;
```

4. WAQTD the salary that is repeated .

```
SELECT SAL, COUNT(*)  
FROM EMP  
GROUP BY SAL  
HAVING COUNT(*) > 1 ;
```

5. WAQTD number of employees working in each dept having At least 2 emp's Character 'A' or 'S' in their names .

```
SELECT DEPTNO , COUNT(*)  
FROM EMP  
WHERE ENAME LIKE '%A%' OR ENAME LIKE '%S%'  
GROUP BY DEPTNO  
HAVING COUNT(*)>=2 ;
```



6. WAQTD job and total salary of each job , if the total salary Of each job is greater than 3450 .

```
SELECT JOB , SUM( SAL )  
FROM EMP  
GROUP BY JOB  
HAVING SUM( SAL ) > 3450 ;
```

7. WAQTD job and total salary of the employees if the employees Are earning more than 1500.

```
SELECT JOB , SUM( SAL )  
FROM EMP  
WHERE SAL > 1500  
GROUP BY JOB ;
```

NOTE :

Differentiate between Where and Having .

<u>WHERE</u>	<u>HAVING</u>
➤ Where clause is used to Filter the records	➤ Having clause is used to Filter the groups .
➤ Where clause executes row By row .	➤ Having clause executes Group by group
➤ In Where Clause we cannot Use MRF()	➤ Can use MRF().
➤ Where clause executes before Group by clause .	➤ Having clause executes After group by clause .



8. WAQTD Job wise maximum salary if the maximum salary Of each job exceeds 2000 .

```
SELECT JOB , MAX( SAL )
FROM EMP
GROUP BY JOB
HAVING MAX( SAL ) > 2000 ;
```

9. WAQTD number of emp earning sal more than 1200 in each job and the total sal needed to pay emp of each job must exceeds 3800.

```
SELECT JOB , COUNT(*) , SUM( SAL )
FROM EMP WHERE SAL > 1200
GROUP BY JOB
HAVING SUM( SAL ) > 3800 ;
```

ASSIGNMENT QUESTIONS ON HAVING CLAUSE

1.WAQTD DNO AND NUMBER OF EMP WORKING IN EACH DEPT IF THERE

ARE ATLEAST 2 CLERKS IN EACH DEPT

2.WAQTD DNO AND TOTAL SAALARYNEEDED TO PAY ALL EMP

IN EACH DEPT IF THERE ARE ATLEAST 4 EMP IN EACH DEPT

3.WAQTD NUMBER OF EMP EARNING SAL MORE THAN 1200 IN EACH JOB

AND THE TOTAL SAL NEEDED TO PAY EMP OF EACH JOB MUST EXCEES 3800

4.WAQTD DEPTNO AND NUMBER OF EMP WORKING ONLY IF THERE ARE 2 EMP WORKING IN EACH DEPT AS MANAGER .

5.WAQTD JOB AND MAX SAL OF EMP IN EACH JOB IF THE MAX SAL EXCEEDS 2600

6.WAQTD THE SALARIES WHICH ARE REPEATED IN EMP TABLE

7.WAQTD THE HIREDATE WHICH ARE DUPLICATED IN EMP TABLE

8.WAQTD AVG SALARY OF EACH DEPT IF AVG SAL IS LESS THAN 3000

9.WAQTD DEPTNO IF THERE ARE ATLEAST 3 EMP IN EACH DEPT WHOS NAME HAS CHAR 'A' OR 'S' .

10.WAQTD MIN AND MAX SALARIES OF EACH JOB IF MIN SAL IS MORE THAN 1000 AND MAX SAL IS LESS THAN 5000 .



ANSWERS :

1.WAQTD NUMBER OF EMPLOYEES WORKING IN EACH DEPARTEMENT EXCEPT PRESIDENT

```
SELECT DEPTNO, COUNT(*)  
FROM EMP  
WHERE JOB NOT IN 'PRESIDENT'  
GROUP BY DEPTNO;
```

2.WAQTD TOTAL SALARY NEEDED TO PAY ALL THE EMPLOYEES IN EACH JOB

```
SELECT JOB , SUM(SAL)  
FROM EMP  
GROUP BY JOB
```

3.WAQTD NUMBER OF EMPLOYEES WORKING AS MANAGER IN EACH DEPARTMENT

```
SELECT DEPTNO, COUNT(*)  
FROM EMP  
WHERE JOB='MANAGER'  
GROUP BY DEPTNO;
```

4.WAQTD AVG SALARY NEEDED TO PAY ALL THE EMPLOYEES IN EACH DEPARTMENT EXCLUDING THE EMPLOYEES OF DEPTNO 20

```
SELECT DEPTNO, AVG(SAL)  
FROM EMP  
WHERE DEPTNO NOT IN 20  
GROUP BY DEPTNO;
```

5.WAQTD NUMBER OF EMPLOYEES HAVING CHARACTER 'A' IN THEIR NAMES IN EACH JOB

```
SELECT JOB, COUNT(*)  
FROM EMP  
WHERE ENAME LIKE '%A%'  
GROUP BY JOB;
```



6. WAQTD NUMBER OF EMPLOYEES AND AVG SALARY NEEDED TO PAY THE EMPLOYEES WHO SALARY IN GREATER THAN 2000 IN EACH DEPT

```
SELECT DEPTNO, COUNT(*) , AVG(SAL)
FROM EMP
WHERE SAL > 2000
GROUP BY DEPTNO;
```

7. WAQDTD TOTAL SALARY NEEDED TO PAY AND NUMBER OF SALESMANS IN EACH DEPT

```
SELECT DEPTNO, COUNT(*) , SUM(SAL)
FROM EMP
WHERE JOB='SALESMAN'
GROUP BY DEPTNO;
```

8. WAQTD NUMBER OF EMPLOYEES WITH THEIR MAXIMUM SALARIES IN EACH JOB

```
SELECT JOB, COUNT(*) , MAX(SAL)
FROM EMP
GROUP BY JOB;
```

9. WAQTD MAXIMUM SALARIES GIVEN TO AN EMPLOYEE WORKING IN EACH DEPT

```
SELECT DEPTNO, MAX(SAL)
FROM EMP
GROUP BY DEPTNO;
```

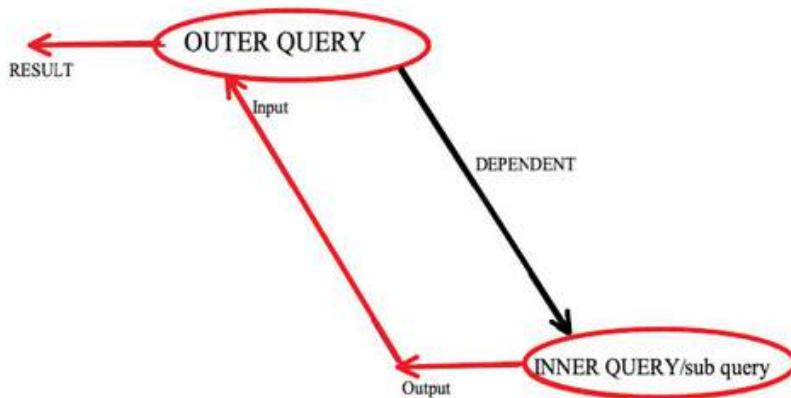
10. WAQTD NUMBER OF TIMES THE SALARIES PRESENT IN EMPLOYEE TABLE

```
SELECT SAL , COUNT(*)
FROM EMP
GROUP BY SAL;
```

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



- WAQTD names of the employees earning more than 2500 .

```
SELECT ENAME  
FROM EMP  
WHERE SAL > 2500 ;
```

- WAQTD names of the employees earning less than MILLER .

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

- 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' ) ;
```

- WAQTD name and hiredate of the employees if the employee Was hired after JONES .

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

- WAQTD all the details of the employee working in the same Designation 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 Earn more than 2000 and work in the same dept as JAMES .

```
SELECT ENAME , SAL , DEPTNO  
FROM 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' );
```

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

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 .



ASSIGNMENT ON CASE 1

- 1.WAQTD NAME OF THE EMPLOYEES EARNING MORE THAN ADAMS
- 2.WAQTD NAME AND SALARY OF THE EMPLOYEES EARNING LESS THAN KING
- 3.WAQTD NAME AND DEPTNO OF THE EMPLOYEES IF THEY ARE WORKING IN THE SAME DEPT AS JONES
- 4.WAQTD NAME AND JOB OF ALL THE EMPLOYEES WORKING IN THE SAME DESIGNATION AS JAMES
- 5.WAQTD EMPNO AND ENAME ALONG WITH ANNUAL SALARY OF ALL THE EMPLOYEES IF THEIR ANNUAL SALARY IS GREATER THAN WARDS ANNUAL SALARY.
- 6.WAQTD NAME AND HIREDATE OF THE EMPLOYEES IF THEY ARE HIRED BEFORE SCOTT
- 7.WAQTD NAME AND HIREDATE OF THE EMPLOYEES IF THEY ARE HIRED AFTER THE PRESIDENT
- 8.WAQTD NAME AND SAL OF THE EMPLOYEE IF THEY ARE EARNING SAL LESS THAN THE EMPLOYEE WHOS EMPNO IS 7839
- 9.WAQTD ALL THE DETAILS OF THE EMPLOYEES IF THE EMPLOYEES ARE HIRED BEFORE MILLER
- 10.WAQTD ENAME AND EMPNO OF THE EMPLOYEES IF EMPLOYEES ARE EARNING MORE THAN ALLEN
- 11.WAQTD ENAME AND SALARY OF ALL THE EMPLOYEES WHO ARE EARNING MORE THAN MILLER BUT LESS THAN ALLEN .
- 12.WAQTD ALL THE DETAILS OF THE EMPLOYEES WORKING IN DEPT 20 AND WORKING IN THE SAME DESIGNATION AS SMITH
- 13.WAQTD ALL THE DETAILS OF THE EMPLOYEES WORKING AS MANAGER IN THE SAME DEPT AS TURNER
- 14.WAQTD NAME AND HIREDATE OF THE EMPLOYEES HIRED AFTER 1980 AND BEFORE KING
- 15.WAQTD NAME AND SAL ALONG WITH ANNUAL SAL FOR ALL EMPLOYEES WHOS SAL IS LESS THAN BLAKE AND MORE THAN 3500
- 16.WAQTD ALL THE DETAILS OF EMPLOYEES WHO EARN MORE THAN SCOTT BUT LESS THAN KING
- 17.WAQTD NAME OF THE EMPLOYEES WHOS NAME STARTS WITH 'A' AND WORKS IN THE SAME DEPT AS BLAKE
- 18.WAQTD NAME AND COMM IF EMPLOYEES EARN COMISSION AND WORK IN THE SAME DESIGNATION AS SMITH
- 19.WAQTD DETAILS OF ALL THE EMPLOYEES WORKING AS CLERK IN THE SAME DEPT AS TURNER .
- 20.WAQTD ENAME, SAL AND DESIGNATION OF THE EMPLOYEES WHOS ANNUAL SALARY IS MORE THAN SMITH AND LESS THAN KING.



1.WAQTD NAME OF THE EMPLOYEES EARNING MORE THAN ADAMS

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

2.WAQTD NAME AND SALARY OF THE EMPLOYEES EARNING LESS THAN KING

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

3.WAQTD NAME AND DEPTNO OF THE EMPLOYEES IF THEY ARE WORKING

IN THE SAME DEPT AS JONES

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

4.WAQTD NAME AND JOB OF ALL THE EMPLOYEES WORKING IN THE SAME

DESIGNATION AS JAMES

```
SELECT ENAME , JOB  
FROM EMP  
WHERE JOB = ( SELECT JOB  
FROM EMP  
WHERE ENAME = 'JAMES' );
```

5.WAQTD EMPNO AND ENAME ALONG WITH ANNUAL SALARY

OF ALL THE

EMPLOYEES IF THEIR ANNUAL SALARY IS GREATER THAN WARDS

ANNUAL SALARY.

```
SELECT EMPNO , ENAME . SAL *12  
FROM EMP  
WHERE SAL * 12 > ( SELECT SAL *12  
FROM EMP  
WHERE ENAME = 'WARD' );
```



6.WAQTD NAME AND HIREDATE OF THE EMPLOYEES IF THEY ARE HIRED

BEFORE SCOTT

```
SELECT ENAME , HIREDATE  
FROM EMP  
WHERE HIREDATE < ( SELECT HIREDATE  
FROM EMP  
WHERE ENAME ='SCOTT' );
```

7.WAQTD NAME AND HIREDATE OF THE EMPLOYEES IF THEY ARE HIRED

AFTER THE PRESIDENT

```
SELECT ENAME , HIREDATE  
FROM EMP  
WHERE HIREDATE > ( SELECT HIREDATE  
FROM EMP  
  
WHERE JOB = 'PRESIDENT' );
```

8.WAQTD NAME AND SAL OF THE EMPLOYEE IF THEY ARE EARNING SAL

LESS THAN THE EMPLOYEE WHOS EMPNO IS 7839

```
SELECT ENAME , SAL  
FROM EMP  
WHERE SAL < ( SELECT SAL  
FROM EMP  
WHERE EMPNO = 7839 );
```

9.WAQTD ALL THE DETAILS OF THE EMPLOYEES IF THE EMPLOYEES ARE

HIRED BEFORE MILLER

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

10.WAQTD ENAME AND EMPNO OF THE EMPLOYEES IF EMPLOYEES ARE

EARNING MORE THAN ALLEN

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



11. WAQTD ENAME AND SALARY OF ALL THE EMPLOYEES WHO ARE EARNING

MORE THAN MILLER BUT LESS THAN ALLEN

```
SELECT ENAME , SAL  
FROM EMP  
WHERE SAL > ( SELECT SAL  
FROM EMP  
WHERE ENAME ='MILLER' ) AND SAL < ( SELECT SAL  
FROM EMP  
WHERE ENAME ='ALLEN' );
```

12. WAQTD ALL THE DETAILS OF THE EMPLOYEES WORKING IN DEPT 20

AND WORKING IN THE SAME DESIGNATION AS SMITH

```
SELECT *  
FROM EMP  
WHERE DEPTNO = 20 AND JOB = ( SELECT JOB  
FROM EMP  
WHERE ENAME ='SMITH');
```

13. WAQTD ALL THE DETAILS OF THE EMPLOYEES WORKING AS MANAGER

IN THE SAME DEPT AS TURNER

```
SELECT *  
FROM EMP  
WHERE JOB ='MANAGER' AND DEPTNO = ( SELECT DEPTNO  
FROM EMP  
WHERE ENAME ='TURNER') ;
```

14. WAQTD NAME AND HIREDATE OF THE EMPLOYEES HIRED AFTER 1980

AND BEFORE KING

```
SELECT ENAME , HIREDATE  
FROM EMP  
WHERE HIREDATE > '31-DEC-1980 ' AND HIREDATE < ( SELECT  
HIREDATE  
FROM EMP  
WHERE ENAME ='KING' );
```

15. WAQTD NAME AND SAL ALONG WITH ANNUAL SAL FOR ALL EMPLOYEES

WHOS SAL IS LESS THAN BLAKE AND MORE THAN 3500

```
SELECT ENAME , SAL , SAL*12  
FROM EMP  
WHERE SAL > 3500 AND SAL < ( SELECT SAL  
FROM EMP  
WHERE ENAME ='BLAKE' );
```



16.WAQTD ALL THE DETAILS OF EMPLOYEES WHO EARN MORE THAN SCOTT BUT LESS THAN KING

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

17.WAQTD NAME OF THE EMPLOYEES WHOS NAME STARTS WITH 'A' AND

WORKS IN THE SAME DEPT AS BLAKE

```
SELECT ENAME
FROM EMP
WHERE ENAME LIKE 'A%' AND DEPTNO = ( SELECT DEPTNO
FROM EMP
WHERE ENAME = 'BLAKE' );
```

18.WAQTD NAME AND COMM IF EMPLOYEES EARN COMISSION AND WORK IN

THE SAME DESIGNATION AS SMITH

```
SELECT ENAME , COMM
FROM EMP
WHERE COMM IS NOT NULL AND JOB = ( SELECT JOB
FROM EMP
WHERE ENAME = 'SMITH' );
```

19.WAQTD DETAILS OF ALL THE EMPLOYEES WORKING AS

CLERK IN THE
SAME DEPT AS TURNER

```
SELECT *
FROM EMP
WHERE JOB = 'CLERK' AND DEPTNO = ( SELECT DEPTNO
FROM EMP
WHERE ENAME = 'TURNER' );
```

20.WAQTD ENAME, SAL AND DESIGNATION OF THE EMPLOYEES WHOS

ANNUAL SALARY IS MORE THAN SMITH AND LESS THAN KING

```
SELECT ENAME , SAL , JOB
FROM EMP
WHERE SAL*12 > ( SELECT SAL *12
FROM EMP
WHERE ENAME = 'SMITH' ) AND SAL < ( SELECT SAL *12
FROM EMP
WHERE ENAME = 'KING' );
```

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

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

- WAQTD deptno of the employee whose name is Miller .

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

- WAQTD dname of the employee whose name is Miller .

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

- 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 same designation 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 same deptno 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' );
```



ASSIGNMENT ON CASE 2 :

- 21.WAQTD DNAME OF THE EMPLOYEES WHOS NAME IS SMITH
- 22.WAQTD DNAME AND LOC OF THE EMPLOYEE WHOS ENAME IS KING
- 23.WAQTD LOC OF THE EMP WHOS EMPLOYEE NUMBER IS 7902
- 24.WAQTD DNAME AND LOC ALONG WITH DEPTNO OF THE EMPLOYEE WHOS NAME ENDS WITH 'R' .
- 25.WAQTD DNAME OF THE EMPLOYEE WHOS DESIGNATION IS PRESIDENT
- 26.WAQTD NAMES OF THE EMPLOYEES WORKING IN ACCOUNTING DEPARTMENT
- 27.WAQTD ENAME AND SALARIES OF THE EMPLOYEES WHO ARE WORKING IN THE LOCATION CHICAGO
- 28.WAQTD DETAILS OF THE EMPLOYEES WORKING IN SALES
- 29.WAQTD DETAILS OF THE EMP ALONG WITH ANNUAL SALARY IF EMPLOYEES ARE WORKING IN NEW YORK
- 30.WAQTD NAMES OF EMPLOYEES WORKING IN OPERATIONS DEPARTMENT

ASSIGNMENT ON CASE 1 & 2

- 31.WAQTD NAMES OF THE EMPLOYEES EARNING MORE THAN SCOTT IN ACCOUNTING DEPT
- 32.WAQTD DETAILS OF THE EMPLOYEES WORKING AS MANAGER IN THE LOCATION CHICAGO
- 33.WAQTD NAME AND SAL OF THE EMPLOYEES EARNING MORE THAN KING IN THE DEPT ACCOUNTING
- 34.WAQTD DETAILS OF THE EMPLOYEES WORKING AS SALESMAN IN THE DEPARTEMENT SALES
- 35.WAQTD NAME , SAL , JOB , HIREDATE OF THE EMPLOYEES WORKING IN OPERATIONS DEPARTMENT AND HIRED BEFORE KING
- 36.DISPLAY ALL THE EMPLOYEES WHOSE DEPARTMET NAMES ENDING 'S'.
- 37.WAQTD DNAME OF THE EMPLOYEES WHOS NAMES HAS CHARACTER 'A' IN IT .
- 38.WAQTD DNAME AND LOC OF THE EMPLOYEES WHOS SALARY IS RUPEES 800 .
- 39.WAQTD DNAME OF THE EMPLOYEES WHO EARN COMISSION
- 40.WAQTD LOC OF THE EMPLOYEES IF THEY EARN COMISSION IN DEPT 40



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

- WAQTD maximum salary of an employee .

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

- 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 ) ;
```

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

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



ASSIGNMENT ON MAX & MIN :

- 41.WAQTD NAME OF THE EMPLOYEE EARNING MAXIMUM SALARY
- 42.WAQTD NAME OF THE EMPLOYEE EARNING MINIMUM SALARY
- 43.WAQTD NAME AND HIREDATE OF THE EMPLOYEE HIRED BEFORE ALL THE EMPLOYEES (FIRST EMP)
- 44.WAQTD NAME AND HIREDATE OF THE EMPLOYEES HIRED AT THE LAST
- 45.WAQTD NAME, COMM OF THE EMPLOYEE WHO EARNS MIN COMISSION
- 46.WAQTD NAME, SAL AND COMM OF THE EMPLOYEE EARNING MAXIMUM COMISSION
- 47.WAQTD DETAILS OF THE EMPLOYEE WHO HAS GREATEST EMPNO
- 48.WAQTD DETAILS OF THE EMPLOYEES HAVING THE LEAST HIREDATE
- 49.WAQTD DETAILS OF THE EMPLOYEES EARNING LEAST ANNUAL SALARY
- 50.WAQTD NAME , ANNUAL SALARY OF THE EMPLOYEES IF THEIR ANNUAL SALARY IS MORE THAN ALL THE SALESMAN

ASSIGNMENT ANSWERS ON CASE 2 :

- 21.WAQTD DNAME OF THE EMPLOYEES WHOS NAME IS SMITH

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

- 22.WAQTD DNAME AND LOC OF THE EMPLOYEE WHOS ENAME IS KING

```
SELECT DNAME ,LOC  
FROM DEPT  
WHERE DEPTNO = ( SELECT DEPTNO  
FROM EMP  
WHERE ENAME = "KING" ) ;
```



23.WAQTD LOC OF THE EMP WHOS EMPLOYEE NUMBER IS 7902

```
SELECT LOC  
FROM DEPT  
WHERE DEPTNO = ( SELECT DEPTNO  
FROM EMP  
WHERE EMPNO=7902 );
```

24.WAQTD DNAME AND LOC ALONG WITH DEPTNO OF THE EMPLOYEE WHO'S NAME ENDS WITH 'R'.

```
SELECT DNAME , LOC  
FROM DEPT  
WHERE DEPTNO = ( SELECT DEPTNO  
FROM EMP  
WHERE ENAME LIKE '%R' );
```

25.WAQTD DNAME OF THE EMPLOYEE WHOS DESIGNATION IS PRESIDENT

```
SELECT DNAME  
FROM DEPT  
WHERE DEPTNO = ( SELECT DEPTNO  
FROM EMP  
WHERE JOB = 'PRESIDENT' );
```

26.WAQTD NAMES OF THE EMPLOYEES WORKING IN ACCOUNTING DEPARTMENT

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

27.WAQTD ENAME AND SALARIES OF THE EMPLOYEES WHO ARE WORKING IN THE LOCATION 'CHICAGO'

```
SELECT ENAME ,SAL  
FROM EMP  
WHERE DEPTNO = ( SELECT DEPTNO  
FROM DEPT  
WHERE LOC = 'CHICAGO' );
```



28.WAQTD DETAILS OF THE EMPLOYEES WORKING IN SALES

```
SELECT *
FROM EMP
WHERE DEPTNO = ( SELECT DEPTNO
FROM DEPT
WHERE DNAME ='SALES');
```

29.WAQTD DETAILS OF THE EMP ALONG WITH ANNUAL SALARY IF EMPLOYEES

ARE WORKING IN NEW YORK

```
SELECT EMP.* , SAL*12
FROM EMP
WHERE DEPTNO = ( SELECT DEPTNO
FROM DEPT
WHERE LOC ='NEW YORK');
```

30.WAQTD NAMES OF EMPLOYEES WORKING IN OPERATIONS DEPARTMENT

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

ANSWERS ON CASE 1 & 2 :

31.WAQTD NAMES OF THE EMPLOYEES EARNING MORE THAN SCOTT IN ACCOUNTING DEPT

```
SELECT ENAME
FROM EMP
WHERE SAL > ( SELECT SAL
FROM EMP
WHERE ENAME ='SCOTT') AND DEPTNO = ( SELECT DEPTNO
FROM DEPT
WHERE DNAME =
'ACCOUNTING');
```



32.WAQTD DETAILS OF THE EMPLOYEES WORKING AS
MANAGER IN THE
LOCATION CHICAGO

*SELECT *
FROM EMP
WHERE JOB ='MANAGER' AND DEPTNO = (SELECT DEPTNO
FROM DEPT
WHERE LOC
='CHICAGO');*

33.WAQTD NAME AND SAL OF THE EMPLOYEES EARNING
MORE THAN KING
IN THE DEPT ACCOUNTING

*SELECT ENAME ,SAL
FROM EMP
WHERE SAL > (SELECT SAL
FROM EMP
WHERE ENAME ='KING') AND DEPTNO = (SELECT DEPTNO
FROM DEPT
WHERE DNAME =
'ACCOUNTING');*

34.WAQTD DETAILS OF THE EMPLOYEES WORKING AS
SALESMAN IN THE
DEPARTEMENT SALES

*SELECT *
FROM EMP
WHERE JOB ='SALESMAN' AND DEPTNO = (SELECT DEPTNO
FROM DEPT
WHERE DNAME
='SALES');*

35.WAQTD NAME , SAL , JOB , HIREDATE OF THE EMPLOYEES
WORKING IN OPERATIONS DEPARTMENT AND HIRED
BEFORE KING

*SELECT ENAME ,SAL , JOB , HIREDATE
FROM EMP
WHERE HIREDATE < (SELECT HIREDATE
FROM EMP
WHERE ENAME ='KING') AND DEPTNO = (SELECT DEPTNO
FROM DEPT
WHERE DNAME
='OPERATIONS');*



36.DISPLAY ALL THE EMPLOYEES WHOSE DEPARTMET NAMES ENDING 'S'.

```
SELECT ENAME  
FROM EMP  
WHERE DEPTNO = ( SELECT DEPTNO  
FROM DEPT  
WHERE DNAME LIKE '%S' );
```

37.WAQTD DNAME OF THE EMPLOYEES WHOS NAMES HAS CHARACTER 'A' IN IT .

```
SELECT DNAME  
FROM DEPT  
WHERE DEPTNO IN( SELECT DEPTNO  
FROM EMP  
WHERE ENAME LIKE '%A%' );
```

38.WAQTD DNAME AND LOC OF THE EMPLOYEES WHOS SALARY IS RUPEES 800 .

```
SELECT DNAME , LOC  
FROM DEPT  
WHERE DEPTNO = ( SELECT DEPTNO  
FROM EMP  
WHERE SAL = 800) ;
```

39.WAQTD DNAME OF THE EMPLOYEES WHO EARN COMISSION

```
SELECT DNAME  
FROM DEPT  
WHERE DEPTNO = ( SELECT DEPTNO  
FROM EMP  
WHERE COMM IS NOT NULL );
```

40.WAQTD LOC OF THE EMPLOYEES IF THEY EARN COMISSION IN DEPT 40

```
SELECT LOC  
FROM DEPT  
WHERE DEPTNO = 40 AND DEPTNO = ( SELECT DEPTNO  
FROM EMP  
WHERE COMM IS NOT NULL ) ;
```

```
SELECT LOC  
FROM DEPT  
WHERE DEPTNO = ( SELECT DEPTNO  
FROM EMP  
WHERE COMM IS NOT NULL AND DEPTNO = 40 ) ;
```



ANSWERS ON MAX & MIN :

41.WAQTD NAME OF THE EMPLOYEE EARNING MAXIMUM SALARY

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

42.WAQTD NAME OF THE EMPLOYEE EARNING MINIMUM SALARY

*SELECT ENAME
FROM EMP
WHERE SAL = (SELECT MIN(SAL)
FROM EMP);*

43.WAQTD NAME AND HIREDATE OF THE EMPLOYEE HIRED BEFORE

ALL THE EMPLOYEES (FIRST EMP)

*SELECT ENAME , HIREDATE
FROM EMP
WHERE HIREDATE = (SELECT MIN(HIREDATE)
FROM EMP);*

44.WAQTD NAME AND HIREDATE OF THE EMPLOYEES HIRED AT THE LAST

*SELECT ENAME , HIREDATE
FROM EMP
WHERE HIREDATE = (SELECT MAX(HIREDATE)
FROM EMP);*

45.WAQTD NAME, COMM OF THE EMPLOYEE WHO EARNS MIN COMISSION

*SELECT ENAME , COMM
FROM EMP
WHERE COMM= (SELECT MIN(COMM)
FROM EMP);*

46.WAQTD NAME, SAL AND COMM OF THE EMPLOYEE EARNING MAXIMUM

COMISSION

*SELECT ENAME ,SAL, COMM
FROM EMP
WHERE COMM= (SELECT MAX(COMM)
FROM EMP);*



47.WAQTD DETAILS OF THE EMPLOYEE WHO HAS GREATEST EMPNO

```
SELECT *
FROM EMP
WHERE EMPNO= ( SELECT MAX(EMPNO)
FROM EMP );
```

48.WAQTD DETAILS OF THE EMPLOYEES HAVING THE LEAST HIREDATE

```
SELECT *
FROM EMP
WHERE EMPNO= ( SELECT MIN(EMPNO)
FROM EMP );
```

49.WAQTD DETAILS OF THE EMPLOYEES EARNING LEAST ANNUAL SALARY

```
SELECT ENAME
FROM EMP
WHERE SAL*12= ( SELECT MIN(SAL*12)
FROM EMP );
```

50.WAQTD NAME , ANNUAL SALARY OF THE EMPLOYEES IF THEIR ANNUAL

SALARY IS MORE THAN ALL THE SALESMAN

```
SELECT ENAME , SAL*12
FROM EMP
WHERE SAL *12 > ( SELECT MAX(SAL*12)
FROM EMP
WHERE JOB ='SALESMAN' );
OR
SELECT ENAME , SAL*12
FROM EMP
WHERE SAL*12 > ALL ( SELECT SAL*12
FROM EMP
WHERE JOB ='SALESMAN' );
```

TYPES OF SUB - QUERY :

1. **SINGLE ROW SUB QUERY**
2. **MULTI ROW 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	SMITH	2500	10

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

1. WAQTD dname of ALLEN .

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

2. WAQTD dnames of allen and smith .

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

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 .

*Therefore we have to use **Sub Query Operators** For Comparing Relational Operators such as (>, <, >=, <=) .*

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 :

SELECT ENAME , SAL

FROM EMP

WHERE SAL

> ALL

(SELECT SAL

FROM EMP

WHERE DEPTNO = 10) ;

SAL
1000
2000
3000
1500
2500

2000
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

$2500 > \text{ALL} (2000 , 1500 , 2500)$

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

2. ANY :

"It is special Op used along with a relational Op ($>$, $<$, \geq , \leq) 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

2000
1500
2500

$> \text{ANY}$ (SELECT SAL
FROM EMP
WHERE DEPTNO = 10) ;

SAL
1000
2000
3000
1500
2500

$1000 > \text{ANY} (2000 , 1500 , 2500)$

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

$2000 > \text{ANY} (2000 , 1500 , 2500)$

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



$3000 > \text{ANY} (2000 , 1500 , 2500)$

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

$1500 > \text{ANY} (2000 , 1500 , 2500)$

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

$2500 > \text{ANY} (2000 , 1500 , 2500)$

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



1. WAQTD name of the employee if the employee earns less than The 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 than At 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' );
```



ASSIGNMENT ON TYPES OF SUB QUERY .

- 51.WAQTD NAME OF THE EMPLOYEES EARNING SALARY MORE THAN THE SALESMAN
- 52.WAQTD DETAILS OF THE EMPLOYEES HIRED AFTER ALL THE CLERKS
- 53.WAQTD NAME AND SALARY FOR ALL THE EMPLOYEES IF THEY ARE EARNING LESS THAN ATLEST A MANAGER
- 54.WAQTD NAME AND HIREDATE OF EMPLOYEES HIRED BEFORE ALL THE MANAGERS
- 55.WAQTD NAMES OF THE EMPLOYEES HIRED AFTER ALL THE MANAGERS AND EARNING SALARY MORE THAN ALL THE CLERKS
- 56.WAQTD DETAILS OF THE EMPLOYEES WORKING AS CLERK AND HIRED BEFORE ATLEST A SALESMAN
- 57.WAQTD DETAILS OF EMPLOYEES WORKING IN ACCOUNTING OR SALES DEPT
- 58.WAQTD DEPARTMENT NAMES OF THE EMPLOYEES WITH NAME SMITH , KING AND MILLER
- 59.WAQTD DETAILS OF EMPLOYEES WORKING NEWYORK OR CHICAGO
- 60.WAQTD EMP NAMES IF EMPLOYEES ARE HIRED AFTER ALL THE EMPLOYEES OF DEPT 10

NESTED SUB QUERY :

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

SAL
1000
2000
4000
3000
5000

➤ WE CAN NEST ABOUT 255 SUB QUERIES



1. WAQTD maximum salary given to an employee .

```
SELECT MAX( SAL ) 5000  
FROM EMP ;
```

2. WAQTD second maximum salary given to an employee .

4000
SELECT MAX(SAL)
FROM MP
WHERE SAL < (SELECT MAX(SAL)
FROM EMP);

SAL
1000
2000
4000
3000
5000

- ### 3. WAOTD 3rd maximum salary .

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

- #### **4. WAQTD 4th maximum salary .**

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



5. WAQTD 3 minimum salary .

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

6. 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()	>



ASSIGNMENT ON NESTED SUB QUERY :

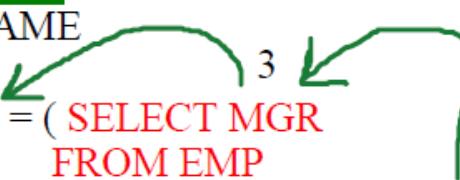
- 61.WAQTD 2ND MINIMUM SALARY
- 62.WAQTD 5TH MAXIMUM SALARY
- 63.WAQTD NAME OF THE EMPLOYEE EARNING 3RD MAXIMUM SALARY
- 64.WAQTD EMPNO OF THE EMPLOYEE EARNING 2D MAXIMUM SALARY
- 65.WAQTD DEPARTMENT NAME OF AN EMPLOYEE GETTING 4TH MAX SAL
- 66.WAQTD DETAILS OF THE EMPLOYEE WHO WAS HIRED 2nd
- 67.WAQTD NAME OF THE EMPLOYEE HIRED BEFORE THE LAST EMPLOYEE
- 68.WAQTD LOC OF THE EMPLOYEE WHO WAS HIRED FIRST
- 69.WAQTD DETAILS OF THE EMPLOYEE EARNING 7TH MINIMUM SALARY
- 70.WAQTD DNAME OF EMPLOYEE GETTING 2ND MAXIMUM SALARY

EMPLOYEE AND MANAGER RELATION :

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

CASE 1 :

- WAQTD name of Allen's manager .

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


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

- 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' ));
```



ASSIGNMENT ON EMP AND MANAGER RELATION .

- 71.WAQTD SMITHS REPORTING MANAGER'S NAME
- 72.WAQTD ADAMS MANAGER'S MANAGER NAME
- 73.WAQTD DNAME OF JONES MANAGER
- 74.WAQTD MILLER'S MANAGER'S SALARY
- 75.WAQTD LOC OF SMITH'S MANAGER'S MANAGER.
- 76.WAQTD NAME OF THE EMPLOYEES REPORTING TO BLAKE
- 77.WAQTD NUMBER OF EMPLOYEES REPORTING TO KING
- 78.WAQTD DETAILS OF THE EMPLOYEES REPORTING TO JONES
- 79.WAQTD ENAMES OF THE EMPLOYEES REPORTING TO BLAKE'S MANAGER
- 80.WAQTD NUMBER OF EMPLOYEES REPORTING TO FORD'S MANAGER

SUB QUERY :

- **What is Sub Query ?**
- **Explain ? (draw)**
- **Why ? When ?**
- **Types of Sub Query**
 - **Single Row Sub Query**
 - **Multi Row Sub Query**
- **Sub Query Operators**
 - **ALL**
 - **ANY**
- **Nested Sub Query .**

71.WAQTD SMITHS REPORTING MANAGER'S NAME

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



72. WAQTD ADAMS MANAGER'S MANAGER NAME

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

73. WAQTD DNAME OF JONES MANAGER

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

74. WAQTD MILLER'S MANAGER'S SALARY

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

75. WAQTD LOC OF SMITH'S MANAGER'S MANAGER.

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

76. WAQTD NAME OF THE EMPLOYEES REPORTING TO BLAKE

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



77. WAQTD NUMBER OF EMPLOYEES REPORTING TO KING
SELECT COUNT(ENAME)

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

78. WAQTD DETAILS OF THE EMPLOYEES REPORTING TO

JONES
SELECT *
FROM EMP
WHERE MGR=(SELECT EID
FROM EMP
WHERE ENAME ='JONES');

79. WAQTD ENAMES OF THE EMPLOYEES REPORTING TO
BLAKE'S MANAGER

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

OR

SELECT ENAME
FROM EMP
WHERE MGR =(SELECT MGR
FROM EMP
WHERE ENAME ='BLAKE');

80. WAQTD NUMBER OF EMPLOYEES REPORTING TO FORD'S
MANAGER

SELECT COUNT(ENAME)
FROM EMP
WHERE MGR =(SELECT MGR
FROM EMP
WHERE ENAME ='FORD');

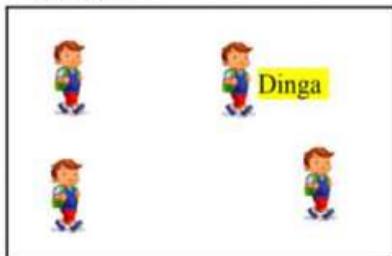
JOINS

"The process of retrieval of data from multiple tables simultaneously is known as JOINS".

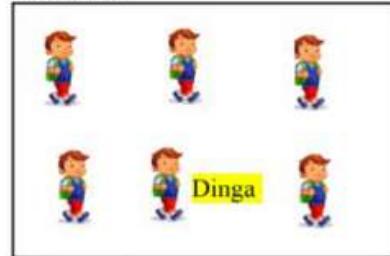
WHY ? WHEN ?

Whenever the attributes is to be selected from both the tables we use Joins

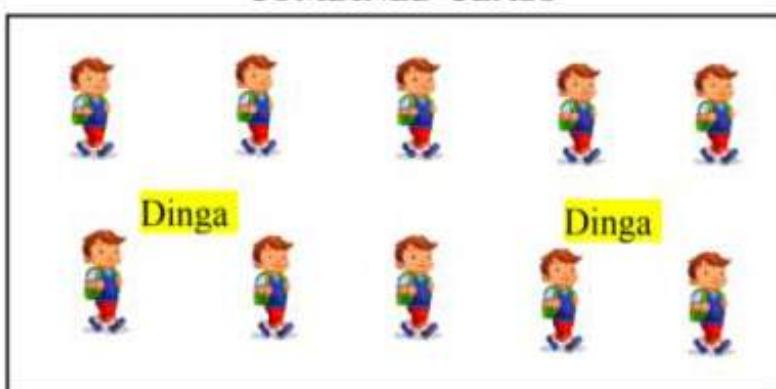
CLASS A



CLASS B



COMBINED CLASS



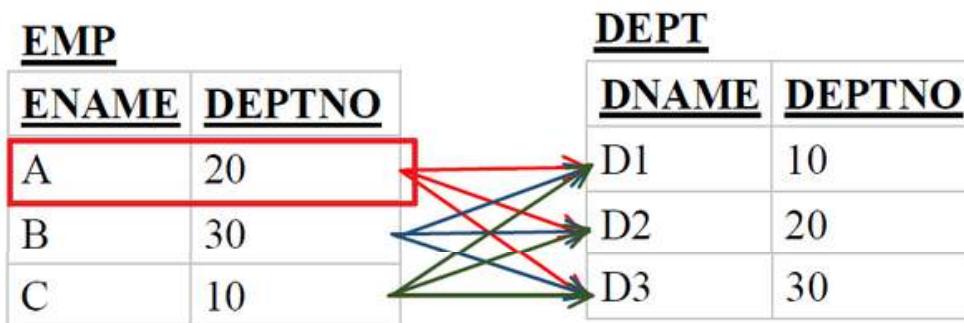
Types of JOINS .

We have 5 types of joins

1. CARTESIAN JOIN / CROSS JOIN
2. INNER JOIN / EQUI JOIN
3. OUTER JOIN
 - i. LEFT OUTER JOIN
 - ii. RIGHT OUTER JOIN
 - iii. FULL OUTER JOIN
4. SELF JOIN
5. NATURAL JOIN .

1. CARTESIAN JOIN / CROSS JOIN :

In Cartesian Join a record from table 1 will be merged with All the records of table 2 .



- **Number of Columns in the Result table :** will be equivalent to the summations of columns present in both the tables .

Number of Col = Number of Col T1 + Number of Col T2

$$\begin{aligned} & 2 + 2 \\ & = \underline{4 \text{ Columns}} \end{aligned}$$

- **Number of Rows in the Result table :** will be equivalent to the product of number of rows present in the both the tables .

Number of Rows = Number of Rows T1 x Number of Rows T2

$$\begin{aligned} & 3 \times 3 \\ & = \underline{9 \text{ Rows}} . \end{aligned}$$

Result Table :

<u>ENAME</u>	<u>DEPTNO</u>	<u>DNAME</u>	<u>DEPTNO</u>
A	20	D1	10
A	20	D2	20
A	20	D3	30
B	30	D1	10
B	30	D2	20
B	30	D3	30
C	10	D1	10
C	10	D2	20
C	10	D3	30

SYNTAX:

1. ANSI [American National Standard Institute]

```
SELECT Column_Name
FROM Table_Name1 CROSS JOIN Table_Name2 ;
```

2. Oracle

```
SELECT Column_Name
FROM Table_Name1 , Table_Name2 ;
```

Example :

- WAQTD ename and dept name for all the employees .

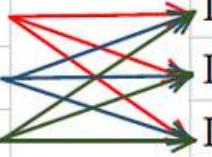
```
SELECT ENAME , DNAME
FROM EMP , DEPT ;
```

```
SELECT ENAME , DNAME
FROM EMP CROSS JOIN DEPT ;
```

2. INNER JOIN :

"It is used to Obtain only Matching Records "
Or " A records which has a Pair " .

<u>EMP</u>		<u>DEPT</u>	
<u>ENAME</u>	<u>DEPTNO</u>	<u>DNAME</u>	<u>DEPTNO</u>
A	20	D1	10
B	30	D2	20
C	10	D3	30





JOIN Condition : It is a condition on which the two tables Are merged .

Syntax: Table_Name1.Col_Name = Table_Name2.Col_Name

Join Condition : EMP.DEPTNO = DEPT.DEPTNO

20 = 10	False
20 = 20	True
20 = 30	False
30 = 10	False
30 = 20	False
30 = 30	True
10 = 10	True
10 = 20	False
10 = 30	False

Result Table :

<u>ENAME</u>	<u>EMP.DEPTNO</u>	<u>DNAME</u>	<u>DEPT.DEPTNO</u>
A	20	D2	20
B	30	D3	30
C	10	D1	10

SYNTAX:

1. ANSI [American National Standard Institute]

```
SELECT Column_Name
FROM Table_Name1 INNER JOIN Table_Name2
ON <JOIN CONDITION> ;

SELECT *
FROM EMP INNER JOIN DEPT
ON EMP.DEPTNO = DEPT.DEPTNO ;
```

2. Oracle

```
SELECT Column_Name
FROM Table_Name1 , Table_Name2
WHERE <JOIN_CONDITION> ;

SELECT *
FROM EMP , DEPT
WHERE EMP.DEPTNO = DEPT.DEPTNO ;
```

- WAQTD ename and dept name for all the employees .

```
SELECT ENAME , DNAME
FROM EMP , DEPT
WHERE EMP.DEPTNO = DEPT.DEPTNO ;
```

- WAQTD ename and loc for all the employees working as Manager .

```
SELECT ENAME , LOC
FROM EMP , DEPT
WHERE EMP.DEPTNO = DEPT.DEPTNO AND JOB
='MANAGER' ;
```

- WAQTD ename , sal and dname of the employee working as Clerk in dept 20 with a salary of more than 1800 .

```
SELECT ENAME , SAL , DNAME
FROM EMP , DEPT
WHERE EMP.DEPTNO =DEPT.DEPTNO AND
EMP.DEPTNO = 20 AND JOB ='CLERK' AND SAL > 1800 ;
```



4. WAQTD ename deptno , dname and loc of the employee earning more than 2000 in New York .

```
SELECT ENAME , EMP.DEPTNO , DNAME  
FROM EMP , DEPT  
WHERE EMP.DEPTNO = DEPT.DEPTNO AND SAL > 2000  
AND LOC ='NEW YORK' ;
```

ASSIGNMENT ON INNER JOIN :

- 1.NAME OF THE EMPLOYEE AND HIS LOCATION OF ALL THE EMPLOYEES .
- 2.WAQTD DNAME AND SALARY FOR ALL THE EMPLOYEE WORKING IN ACCOUNTING.
- 3.WAQTD DNAME AND ANNUAL SALARY FOR ALL EMPLOYEES WHOS SALARY IS MORE THAN 2340
- 4.WAQTD ENAME AND DNAME FOR EMPLOYEES HAVING CAHARACTER 'A' IN THEIR DNAME
- 5.WAQTD ENAME AND DNAME FOR ALL THE EMPLOYEES WORKING AS SALESMAN
- 6.WADTD DNAME AND JOB FOR ALL THE EMPLOYEES WHOS JOB AND DNAME STARTS WITH CHARACTER 'S'
- 7.WAQTD DNAME AND MGR NO FOR EMPLOYEES REPORTING TO 7839
- 8.WAQTD DNAME AND HIREDATE FOR EMPLOYEES HIRED AFTER 83 INTO ACCOUNTING OR RESEARCH DEPT
- 9.WAQTD ENAME AND DNAME OF THE EMPLOYEES WHO ARE GETTING COMM IN DEPT 10 OR 30
- 10.WAQTD DNAME AND EMPNO FOR ALL THE EMPLOYEES WHO'S EMPNO ARE (7839,7902) AND ARE WORKING IN LOC NEW YORK.



Answers :

1.NAME OF THE EMPLOYEE AND HIS LOCATION OF ALL THE EMPLOYEES .

```
SELECT ENAME , LOC  
FROM EMP , DEPT  
WHERE EMP.DEPTNO = DEPT.DEPTNO ;
```

2.WAQTD DNAME AND SALARY FOR ALL THE EMPLOYEE WORKING IN ACCOUNTING.

```
SELECT DNAME , SAL  
FROM EMP , DEPT  
WHERE EMP.DEPTNO = DEPT.DEPTNO  
AND DNAME ='ACCOUNTING';
```

3.WAQTD DNAME AND ANNUAL SALARY FOR ALL EMPLOYEES WHOS SALARY IS MORE THAN 2340

```
SELECT DNAME , SAL *12  
FROM EMP , DEPT  
WHERE EMP.DEPTNO = DEPT.DEPTNO  
AND SAL > 2340 ;
```

4.WAQTD ENAME AND DNAME FOR EMPLOYEES HAVING CAHARACTER 'A' IN THEIR DNAME

```
SELECT ENAME , DNAME  
FROM EMP , DEPT  
WHERE EMP.DEPTNO = DEPT.DEPTNO  
AND ENAME LIKE '%A%' ;
```

5.WAQTD ENAME AND DNAME FOR ALL THE EMPLOYEES WORKING AS SALESMAN

```
SELECT ENAME , DNAME  
FROM EMP , DEPT  
WHERE EMP.DEPTNO = DEPT.DEPTNO  
AND JOB ='SALESMAN' ;
```

Customer

CNAME	CID
X	101
Y	102

6.WADTD DNAME AND JOB FOR ALL THE EMPLOYEES WHOS JOB AND DNAME STARTS WITH CHARACTER 'S'

```
SELECT DNAME ,JOB  
FROM EMP , DEPT  
WHERE EMP.DEPTNO = DEPT.DEPTNO  
AND JOB LIKE 'S%' AND DNAME LIKE 'S%' ;
```



7.WAQTD DNAME AND MGR NO FOR EMPLOYEES REPORTING TO 7839

```
SELECT DNAME , MGR  
FROM EMP , DEPT  
WHERE EMP.DEPTNO = DEPT.DEPTNO  
AND MGR = 7839 ;
```

8.WAQTD DNAME AND HIREDATE FOR EMPLOYEES HIRED AFTER 83 INTO

ACCOUNTING OR RESEARCH DEPT

```
SELECT DNAME , HIREDATE  
FROM EMP , DEPT  
WHERE EMP.DEPTNO = DEPT.DEPTNO  
AND HIREDATE > '31-DEC-83' AND DNAME IN  
('ACCOUNTING','RESEARCH');
```

9.WAQTD ENAME AND DNAME OF THE EMPLOYEES WHO ARE GETTING COMM

IN DEPT 10 OR 30

```
SELECT ENAME , DNAME  
FROM EMP , DEPT  
WHERE EMP.DEPTNO = DEPT.DEPTNO  
AND COMM IS NOT NULL AND EMP.DEPTNO IN ( 10 , 30 ) ;
```

10.WAQTD DNAME AND EMPNO FOR ALL THE EMPLOYEES WHO'S EMPNO ARE

(7839,7902) AND ARE WORKING IN LOC NEW YORK.

```
SELECT DNAME , EMPNO  
FROM EMP , DEPT  
WHERE EMP.DEPTNO = DEPT.DEPTNO  
AND EMPNO IN (7839,7902) AND LOC = 'NEW YORK' ;
```

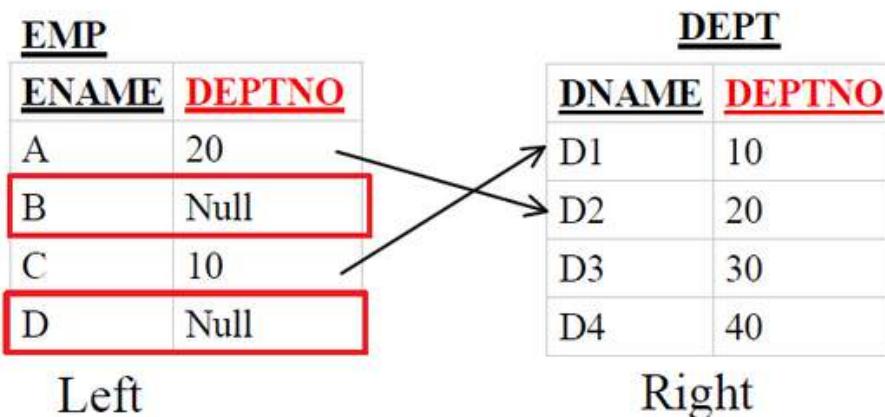
OUTER JOIN

"It is used to Obtain Un-Matched Records "

1. Left Outer Join :

"It is used to obtain Un-Matched Records of Left Table
Along with Matching Records ".

Example :



Result Table :

<u>ENAME</u>	<u>EMP.DEPTNO</u>	<u>DNAME</u>	<u>DEPT.DEPTNO</u>
A	20	D2	20
C	10	D1	10
B	Null	Null	Null
D	Null	Null	Null

SYNTAX:

1. ANSI [American National Standard Institute]

```
SELECT Column_Name
FROM Table_Name1 LEFT [OUTER] JOIN Table_Name2
ON <JOIN_CONDITION> ;
```

```
SELECT *
FROM EMP LEFT JOIN DEPT
ON EMP.DEPTNO = DEPT.DEPTNO ;
```

2. Oracle

```
SELECT Column_Name
FROM Table_Name1 , Table_Name2
WHERE Table1.Col_Name = Table2.Col_Name (+) ;
```

```
SELECT *
FROM EMP , DEPT
WHERE EMP.DEPTNO = DEPT.DEPTNO (+) ;
```



- WAQTD names and dnames of all the employees even though the employees Don't work in any dept .

```
SELECT ENAME , DNAME
FROM EMP , DEPT
WHERE EMP.DEPTNO = DEPT.DEPTNO(+) ;
```

<u>ENAME</u>	<u>DNAME</u>
A	D2
C	D1
B	Null
D	Null

2. Right Outer Join :

"It is used to obtain Un-Matched Records of Right Table Along with Matching Records ".

Example :

<u>EMP</u>		<u>DEPT</u>	
<u>ENAME</u>	<u>DEPTNO</u>	<u>DNAME</u>	<u>DEPTNO</u>
A	20	D1	10
B	Null	D2	20
C	10	D3	30
D	Null	D4	40

Left Right

Result Table :

<u>ENAME</u>	<u>EMP.DEPTNO</u>	<u>DNAME</u>	<u>DEPT.DEPTNO</u>
A	20	D2	20
C	10	D1	10
Null	Null	D3	30
Null	Null	D4	40

SYNTAX:

1. ANSI [American National Standard Institute]

```
SELECT Column_Name
FROM Table_Name1 RIGHT[OUTER] JOIN Table_Name2
ON <JOIN_CONDITION> ;
```

```
SELECT *
FROM EMP RIGHT JOIN DEPT
ON EMP.DEPTNO = DEPT.DEPTNO ;
```

2. Oracle

```
SELECT Column_Name
FROM Table_Name1 ,Table_Name2
WHERE Table1.Col_Name (+) = Table2.Col_Name ;
```

```
SELECT *
FROM EMP ,DEPT
WHERE EMP.DEPTNO(+) = DEPT.DEPTNO ;
```

- WAQTD names and dnames of all the employees even though there are no employees in a dept .

```
SELECT ENAME , DNAME
FROM EMP , DEPT
WHERE EMP.DEPTNO(+) = DEPT.DEPTNO ;
```

<u>ENAME</u>	<u>DNAME</u>
A	D2
C	D1
Null	D3
Null	D4

3. Full Outer Join :

"It is used to obtain Un-Matched Records of both Left & Right Table Along with Matching Records ".

Example :

<u>EMP</u>		<u>DEPT</u>	
<u>ENAME</u>	<u>DEPTNO</u>	<u>DNAME</u>	<u>DEPTNO</u>
A	20	D1	10
B	Null	D2	20
C	10	D3	30
D	Null	D4	40

Left Right

Result Table :

<u>ENAME</u>	<u>EMP.DEPTNO</u>	<u>DNAME</u>	<u>DEPT.DEPTNO</u>
A	20	D2	20
C	10	D1	10
B	Null	Null	Null
D	Null	Null	Null
Null	Null	D3	30
Null	Null	D4	40

SYNTAX:

1. ANSI [American National Standard Institute]

```
SELECT Column_Name
FROM Table_Name1 FULL [OUTER] JOIN Table_Name2
ON <JOIN_CONDITION> ;
```

```
SELECT *
FROM EMP FULL JOIN DEPT
ON EMP.DEPTNO = DEPT.DEPTNO ;
```

- WAQTD names and dnames of all the employees and depts even though the employees Don't work in any dept and a dept having no employees .

```
SELECT ENAME , DNAME
FROM EMP FULL OUTER DEPT
ON EMP.DEPTNO = DEPT.DEPTNO;
```

<u>ENAME</u>	<u>DNAME</u>
A	D2
C	D1
B	Null
D	Null
Null	D3
Null	D4

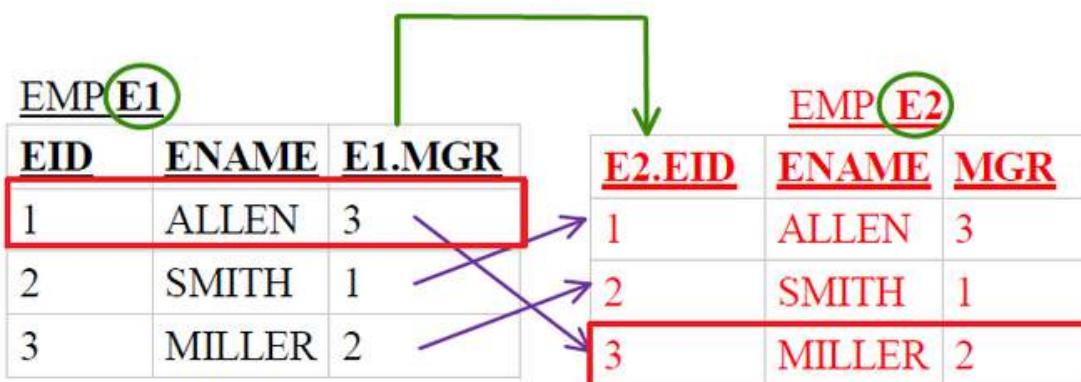
SELF JOIN :

"Joining a table by itself is known as Self Join "

Why ? / When ?

"Whenever the data to select is in the same table but present In different records we use self-join ".

Example :



Join Condition : **E1.MGR = E2.EID**

Result table :

E1.eid	E1.ename	E1.mgr	E2.eid	E2.ename	E2.mgr
1	ALLEN	3	3	MILLER	2
2	SMITH	1	1	ALLEN	3
3	MILLER	2	2	SMITH	1

Employees Details - E1

Managers Details - E2



SYNTAX:

1. ANSI [American National Standard Institute]

```
SELECT Column_Name  
FROM Table_Name1 JOIN Table_Name2  
ON < JOIN_CONDITION> ;
```

```
SELECT *  
FROM EMP E1 JOIN EMP E2  
ON E1.MGR = E2.EID ;
```

2. Oracle

```
SELECT Column_Name  
FROM Table_Name1T1 , Table_Name2 T2  
WHERE < Join_Condition > ;
```

```
SELECT *  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EID ;
```



1. WAQTD Ename and Manager's name for all the employees .

```
SELECT E1.ENAME , E2.ENAME  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO ;
```

2. WAQTD Ename , sal along with manager's name and manager's salary for all the employees .

```
SELECT E1.ENAME , E1.SAL , E2.ENAME , E2.SAL  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO ;
```

3. WAQTD ename , manager's name along with their deptno If employee is working as clerk .

```
SELECT E1.ENAME , E2.ENAME , E1.DEPTNO ,  
E2.DEPTNO  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO AND E1.JOB='CLERK' ;
```

4. WAQTD ename , manager's job if manager works as Analyst .

```
SELECT E1.ENAME , E2.JOB  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO  
AND E2.JOB ='ANALYST' ;
```

5. WAQTD ename and manager's name along with their job if emp and manager are working for same designation .

```
SELECT E1.ENAME , E2.ENAME , E1.JOB , E2.JOB  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO  
AND E1.JOB = E2.JOB ;
```



6. WAQTD ename emp salary manager's name manager's salary
If manager earns more than employee .

```
SELECT E1.ENAME , E1.SAL , E2.ENAME , E2.SAL  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO  
AND E2.SAL > E1.SAL ;
```

7. WAQTD ename and manager's name along with manager's commission if manager earns commission .

```
SELECT E1.ENAME , E2.ENAME , E2.COMM  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO  
AND E2.COMM IS NOT NULL ;
```

NOTE : TO join 'N' number of tables we need to write 'N-1' number of join conditions



ASSIGNMENT ON SELF JOIN :

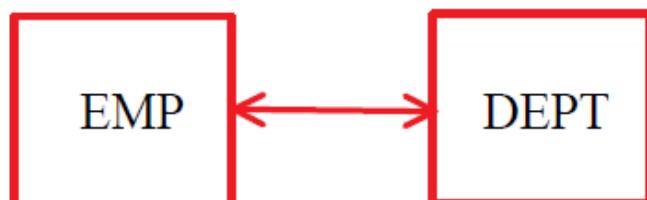
1. WAQTD NAME OF THE EMPLOYEE AND HIS MANAGER'S NAME IF EMPLOYEE IS WORKING AS CLERK
2. WAQTD NAME OF THE EMPLOYEE AND MANAGER'S DESIGNATION IF MANAGER WORKS IN DEPT 10 OR 20
3. WAQTD NAME OF THE EMP AND MANAGERS SALARY IF EMPLOYEE AND MANAGER BOTH EARN MORE THAN 2300
4. WAQTD EMP NAME AND MANAGER'S HIREDATE IF EMPLOYEE WAS HIRED BEFORE 1982
5. WAQTD EMP NAME AND MANAGER'S COMM IF EMPLOYEE WORKS AS SALESMAN AND MANAGER WORKS IN DEPT 30
6. WAQTD EMP NAME AND MANAGER NAME AND THEIR SALARIES IF EMPLOYEE EARNS MORE THAN MANAGER
7. WAQTD EMP NAME AND HIREDATE , MANAGER NAME AND HIREDATE IF MANAGER WAS HIRED BEFORE EMPLOYEE
8. WAQTD EMP NAME AND MANAGER NAME IF BOTH ARE WORKING IN SAME JOB
9. WAQTD EMP NAME AND MANAGER NAME IF MANAGER IS WORKING AS ACTUAL MANAGER
10. WAQTD EMP NAME AND MANAGER NAME ALONG WITH THEIR ANNUAL SALARIES IF EMPLOYEE WORKS IN DEPT 10 , 20 AND MANAGER'S SAL IS GREATER THAN EMPLOYEES SALARY .



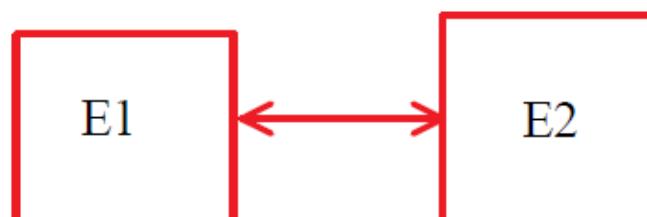
11.WAQTD EMPLOYEE'S NAME AND MANAGER'S DESIGNATION FOR ALL THE EMPLOYEES

12.WAQTD EMPLOYEE'S NAME AND MANAGER'S SALARY FOR ALL THE EMPLOYEES IF MANAGER'S SALARY ENDS WITH 50

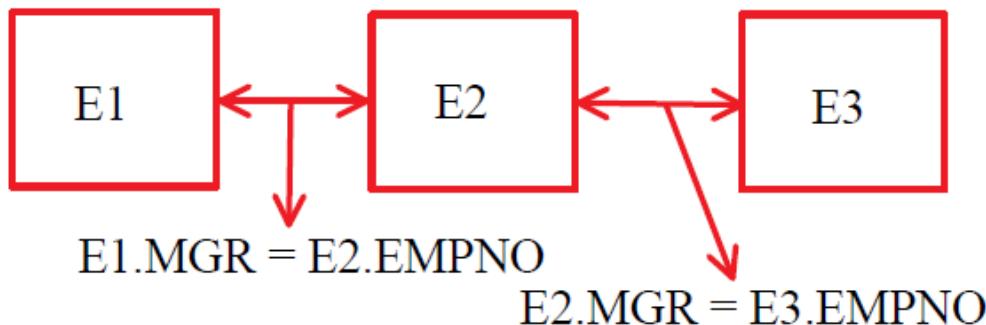
Examples :



$\text{EMP.DEPTNO} = \text{DEPT.DEPTNO}$

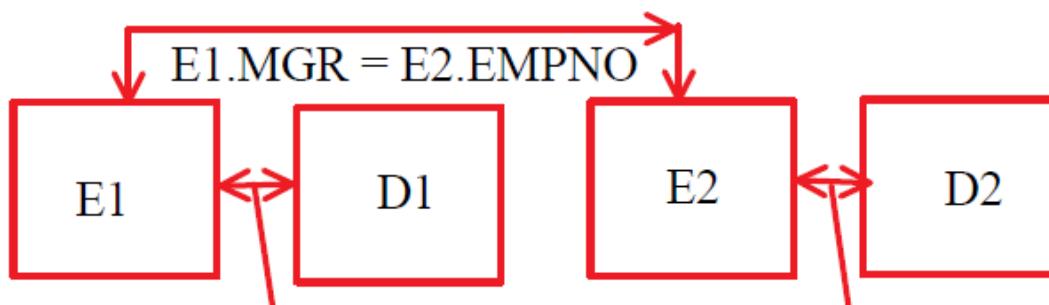


$\text{E1.MGR} = \text{E2.EMPNO}$



$\text{E1.MGR} = \text{E2.EMPNO}$

$\text{E2.MGR} = \text{E3.EMPNO}$



$\text{E1.DEPTNO} = \text{D1.DEPTNO}$ $\text{E2.DEPTNO} = \text{D2.DEPTNO}$

5. NATURAL JOIN :

"It behaves as INNER JOIN if there is a relation between the given two tables , else it behaves as CROSS JOIN" .

Syntax:

ANSI:

```
SELECT Col_Name
FROM Table_Name1 NATURAL JOIN Table_Name2;
```

<u>Emp</u>	
<u>ENAME</u>	<u>DEPTNO</u>
A	20
B	30
C	10

<u>DEPT</u>	
<u>DNAME</u>	<u>DEPTNO</u>
D1	10
D2	20
D3	30

Result Table : has a relation (inner join)

<u>DEPT NO</u>	<u>ENAME</u>	<u>DNAME</u>
20	A	D2
30	B	D3
10	C	D1

Emp

<u>ENAME</u>	<u>DEPTNO</u>
A	20
B	30
C	10

CUSTOMER

<u>CNAME</u>	<u>CID</u>
X	101
Y	102
Z	103

Result Table : has no relation (cross join)

<u>ENAME</u>	<u>DEPTNO</u>	<u>CNAME</u>	<u>CID</u>
A	20	X	101
A	20	Y	102
A	20	Z	103
B	30	X	101
B	30	Y	102
B	30	Z	103
C	10	X	101
C	10	Y	102
C	10	Z	103



QUESTIONS:

1. WAQTD NAME OF THE EMPLOYEE AND HIS MANAGER'S NAME IF EMPLOYEE IS WORKING AS CLERK

*SELECT E1.ENAME , E2.ENAME
FROM EMP E1 , EMP E2
WHERE E1.MGR = E2.EMPNO
AND E1.JOB = 'CLERK';*

2. WAQTD NAME OF THE EMPLOYEE AND MANAGER'S DESIGNATION IF MANAGER WORKS IN DEPT 10 OR 20

*SELECT E1.ENAME , E2.JOB
FROM EMP E1 , EMP E2
WHERE E1.MGR = E2.EMPNO
AND E2.DEPTNO IN (10 , 20);*

3. WAQTD NAME OF THE EMP AND MANAGERS SALARY IF EMPLOYEE AND MANAGER BOTH EARN MORE THAN 2300

*SELECT E1.ENAME , E2.SAL
FROM EMP E1 , EMP E2
WHERE E1.MGR = E2.EMPNO
AND E1.SAL > 2300 AND E2.SAL>2300 ;*

4. WAQTD EMP NAME AND MANAGER'S HIREDATE IF EMPLOYEE WAS HIRED BEFORE1982

*SELECT E1.ENAME , E2.HIREDATE
FROM EMP E1 , EMP E2
WHERE E1.MGR = E2.EMPNO
AND E1.HIREDATE < '01-JAN-82' ;*



5.WAQTD EMP NAME AND MANAGER'S COMM IF EMPLOYEE WORKS AS SALESMAN AND MANAGER WORKS IN DEPT 30

```
SELECT E1.ENAME , E2.COMM  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO  
AND E1.JOB = 'SALESMAN' AND E2.DEPTNO = 30 ; ;
```

6.WAQTD EMP NAME AND MANAGER NAME AND THEIR SALARIES IF EMPLOYEE EARNS MORE THAN MANAGER

```
SELECT E1.ENAME, E1.SAL , E2.ENAME , E2.SAL  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO  
AND E1.SAL > E2.SAL ;
```

7.WAQTD EMP NAME AND HIREDATE , MANAGER NAME AND HIREDATE IF

MANAGER WAS HIRED BEFORE EMPLOYEE

```
SELECT E1.ENAME ,E1.HIREDATE , E2.ENAME , E2.HIREDATE  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO  
AND E2.HIREDATE < E1.HIREDATE ;
```

8.WAQTD EMP NAME AND MANAGER NAME IF BOTH ARE WORKING IN SAME JOB

```
SELECT E1.ENAME , E2.ENAME  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO  
AND E1.JOB = E2.JOB ;
```



9.WAQTD EMP NAME AND MANAGER NAME IF MANAGER IS WORKING AS ACTUAL MANAGER

```
SELECT E1.ENAME , E2.ENAME  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO  
AND E2.JOB = 'MANAGER';
```

10.WAQTD EMP NAME AND MANAGER NAME ALONG WITH THEIR ANNUAL SALARIES IF EMPLOYEE WORKS IN DEPT 10 , 20 AND MANAGER'S SAL IS GREATER THAN EMPLOYEES SALARY .

```
SELECT E1.ENAME , E1.SAL*12 , E2.ENAME , E2.SAL*12  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO  
AND E1.DEPTNO IN ( 10,20) AND E2.SAL > E1.SAL ;
```

11.WAQTD EMPLOYEE'S NAME AND MANAGER'S DESIGNATION FOR ALL THE EMPLOYEES

```
SELECT E1.ENAME , E2.JOB  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO ;
```

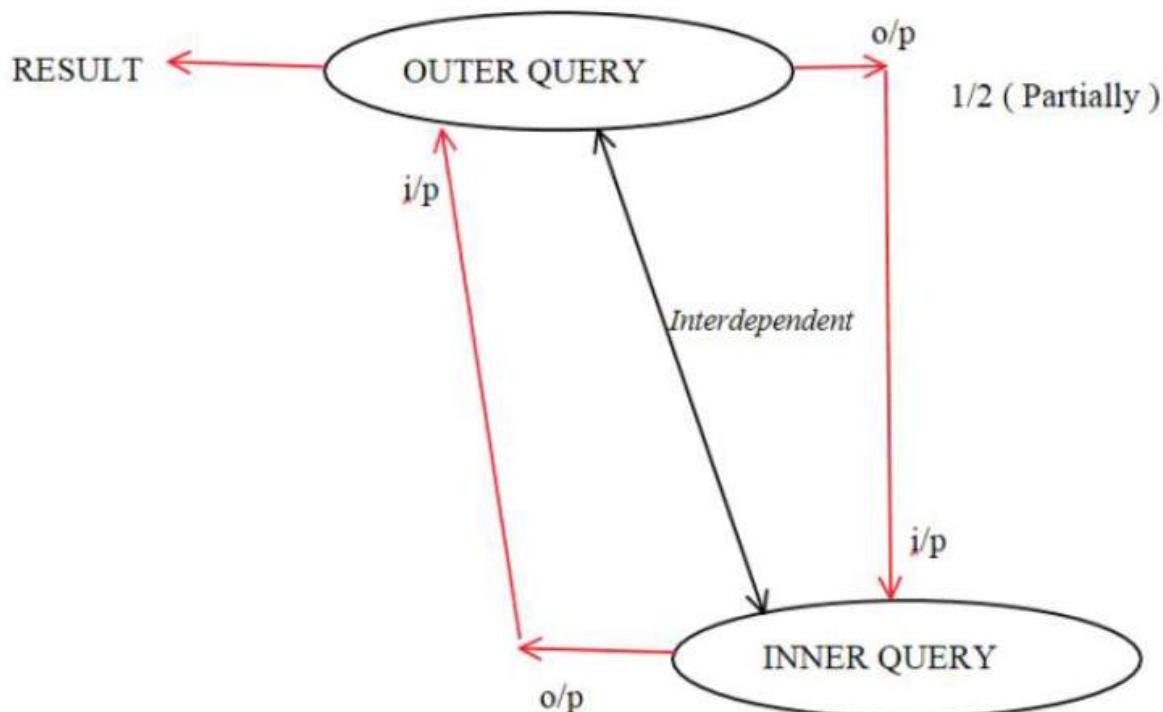
12.WAQTD EMPLOYEE'S NAME AND MANAGER'S SALARY FOR ALL THE EMPLOYEES IF MANAGER'S SALARY ENDS WITH 50

```
SELECT E1.ENAME , E2.SAL  
FROM EMP E1 , EMP E2  
WHERE E1.MGR = E2.EMPNO  
AND E2.SAL LIKE '%50' ;
```

CO - RELATED SUB QUERY

"A query written inside another query such that the outer query and the inner query are Dependent on each other , this is known as Co-Related Sub-Query".

WORKING PRINCIPLE :





Let us consider two queries inner and outer query respectively ,

1. Outer query executes first but partially
2. The partially executed output is given as an input to the inner Query
3. The inner query executes completely and generates an output
4. The output of inner query is fed as an input to the Outer query and Outer Query produces the result .
5. Therefore, we can state that the outer query and the inner query both are INTERDEPENDENT (dependent on each other) .

NOTE :

- i. In co-related sub query a Join condition is a must , And must be written only in the Inner Query .
- ii. Co-Related sub query works with the principles of both SUB QUERY & JOINS .

DIFFERENCE BETWEEN SUB QUERY AND CO RELATED SUB QUERY .

<u>SUB QUERY</u>	<u>CO-RELATED SUB QUERY</u>
Inner query executes first	Outer query executes first
Outer query is dependent on inner query	Both are interdependent
Join condition not mandatory	Join condition is mandatory and must be written in inner query
Outer query executes Once	Outer query executes Twice .

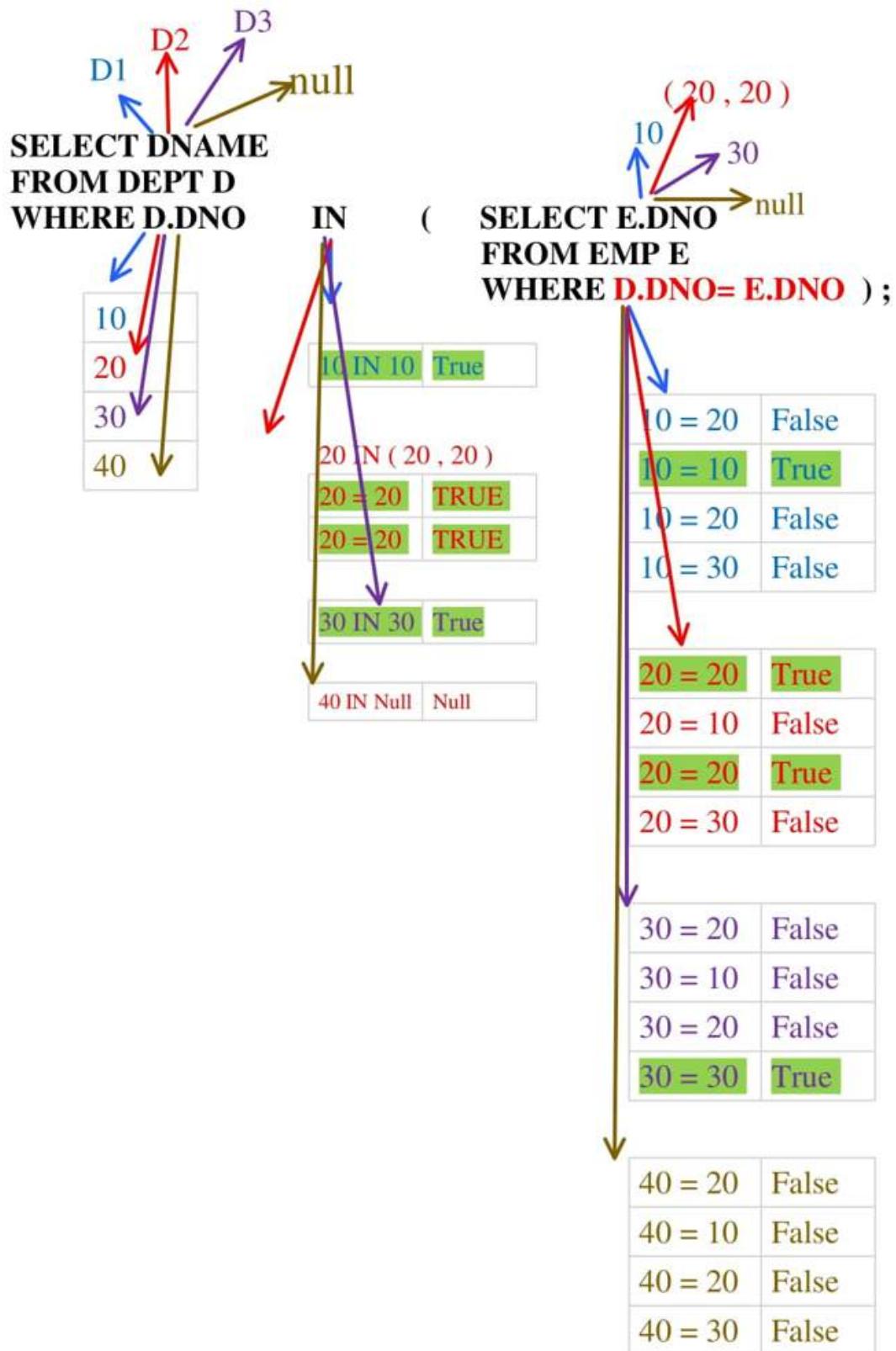
Example :

DEPT

<u>DNAME</u>	<u>DNO</u>
D1	10
D2	20
D3	30
D4	40

EMP

<u>ENAME</u>	<u>DNO</u>
A	20
B	10
C	20
D	30





1. WAQTD dnames in which there are employees working .

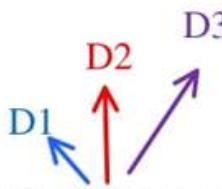
```
SELECT DNAME
FROM DEPT D
WHERE D.DEPTNO IN ( SELECT E.DEPTNO
                      FROM EMP E
                     WHERE D.DEPTNO = E.DEPTNO ) ;
```

2. WAQTD dname in which there are no employees working .

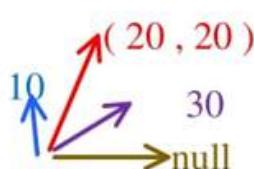
```
SELECT DNAME
FROM DEPT D
WHERE D.DEPTNO NOT IN ( SELECT E.DEPTNO
                           FROM EMP E
                          WHERE D.DEPTNO = E.DEPTNO ) ;
```

EXISTS & NOT EXISTS OPERATORS :

1. **EXISTS :** " Exists Op is a Unary Op (One Operand) which can accept One Operand Towards RHS and that Operand has to be A Co-related Sub Query "
 - *Exists Op returns true if the Sub Query returns Any value other than Null.*



**SELECT DNAME
FROM DEPT D
WHERE EXISTS**



**(SELECT E.DNO
FROM EMP E
WHERE D.DNO= E.DNO.) ;**

10 = 20	False
10 = 10	True
10 = 20	False
10 = 30	False

20 = 20	True
20 = 10	False
20 = 20	True
20 = 30	False

30 = 20	False
30 = 10	False
30 = 20	False
30 = 30	True

40 = 20	False
40 = 10	False
40 = 20	False
40 = 30	False



2. **NOT EXISTS :** " Not Exists Op is a Unary Op (One Operand) which can accept
One Operand Towards RHS and that Operand has to be
A Co-related Sub Query "
➤ *Not Exists Op returns true if the Sub Query returns NULL .*

To Find MAX & MIN salary :

To find MAXIMUM salary :

```

SELECT SAL
FROM EMP E1
WHERE ( SELECT COUNT( DISTINCT SAL )
FROM EMP E2
WHERE E1.SAL < E2.SAL ) = N-1 ;
  
```

<u>E1.SAL</u>
1000
3000
2000
3000
2000
4000
5000

3 MAX SAL :

3000

```

SELECT SAL
FROM EMP E1
WHERE ( SELECT COUNT( DISTINCT SAL )
FROM EMP E2
WHERE E1.SAL < E2.SAL ) = 2 ;
  
```

<u>E1.SAL</u>
1000
3000
2000
3000
2000
4000
5000

<u>E2.SAL</u>
1000
3000
2000
3000
2000
4000
5000

3 MAX SAL :

3000

2

```

SELECT SAL
FROM EMP E1
WHERE ( SELECT COUNT( DISTINCT SAL )
FROM EMP E2
WHERE E1.SAL < E2.SAL ) = 2 ;
  
```

3 MAX SAL :

3000

2

```

SELECT SAL
FROM EMP E1
WHERE ( SELECT COUNT( DISTINCT SAL )
FROM EMP E2
WHERE E1.SAL < E2.SAL ) = 2 ;
  
```



2nd , 4th , 5th , 7th MAX salary

```
SELECT SAL  
FROM EMP E1  
WHERE ( SELECT COUNT( DISTINCT SAL )  
        FROM EMP E2  
        WHERE E1.SAL < E2.SAL ) in ( 1 , 3 , 4 , 6 ) ;
```

To find MINIMUM salary :

```
SELECT SAL  
FROM EMP E1  
WHERE ( SELECT COUNT( DISTINCT SAL )  
        FROM EMP E2  
        WHERE E1.SAL > E2.SAL ) = N-1 ;
```