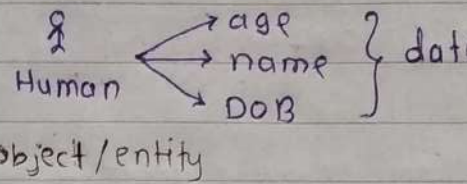
SQL Structured Query Language

* Data :- Data is a row fact which discribe the attribute of an entity. Piece of a information

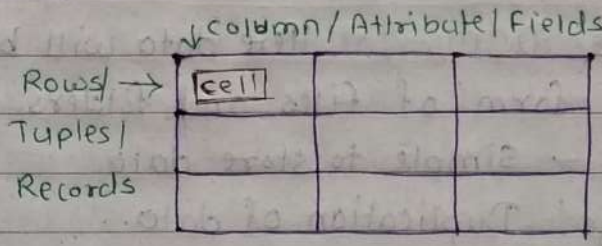


Data ⇒ Row facts
Information ⇒ meaningfull data / processed data

* Information :- Processed data is called information
eg. Qspider is a slw training institute

Data is classified into two types ⇒
① Structured data ② Unstructured data

① Structured Data :- Data which is arranged in a structured manner / way.
eg. Data stored in a table.



② Unstructured Data :- Data which is not arranged in a specific structure.
eg. Data store in PDF, TextFile, word file.

* Database :- Database is a plare where we can store the data in organised way for data retrival. (centralized Location).

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* DBMS :- Database Management System.
It is a system which is used to interact with the database using query language for data manipulation.

CRUD operation

C → Create
R → Retrive / Read
U → Update
D → Delete

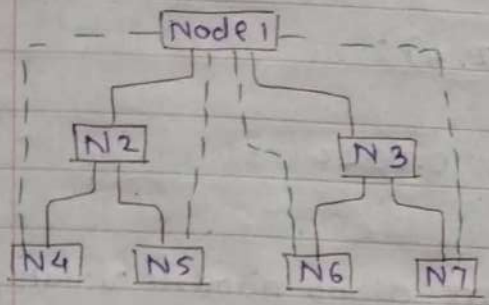
* Data Manupulation :-
Create , Insert , Update, delete

DBMS is classified into four types :-
① Flat File DBMS
② Heirarical DBMS
③ Network DBMS
④ RDBMS

① Flat file DBMS :- Here data will be stored in the form of files and folders.
Advantage - Simple to store data
Disadvantage - Duplication of data.
eg. Data store on drive of a computer.

② Hirarical DBMS :- Here data will be stored in the form of parent - child relation or in a tree structure.
Advantage - Data duplication not allowed
Disadvantage - Retrival time consuming.

③ Network DBMS :- Here data will be stored in a n/w structure. All the nodes (data) are interlinked with another data.



Advantages - Retrival data easy
Disadvantage - Complex

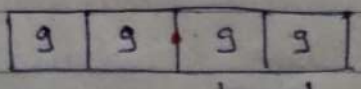
④ RDBMS :- Here data will be stored in the form of rows and columns. i.e. in a table structure.
- In RDBMS to perform some operations it should be done by using their relations.

* Data Intigrity :- It is used to get accuracy, correctness and consistancy of the column of the table and it can be achieved by datatype and constrints.

1) Datatypes :- It restricts particular type of data to be store in the column of a table.

Types ⇒ (A) Number — int, float
(B) char
(C) Varchar
(D) Date

(A) Number :- used to store numric values/data
eg. 1) ID Number(2); -99 to 99
We can store integer as well as float values
case 2) ID Number(4,2);



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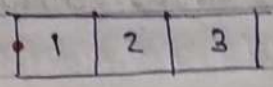
case 3) ID Number (3,3);



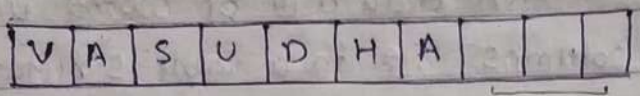
0.123

case 4) ID Number (2,4);

0.0 0 2 4 0.0024

(B) Char :- Used to store alpha numeric values / data

eg. Name char (10);



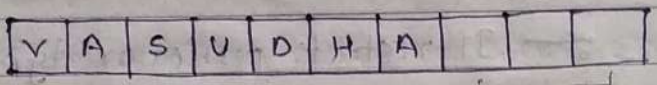
wasted memory block

Size of char is 2000

(C) Varchar :- Varchar is used to store alpha numerical values / data.

eg. Name varchar (10);

we can reuse these memory block



Reuse / Free memory space

Size of varchar is 4000

⇒ Difference between Char & Varchar

Char	Varchar
1) It's fixed length memory allocation	1) It's variable length memory allocation
2) Unused space will be wasted	2) Unused spaces will be release / free
3) In unused spaces blank space will be store	3) In unused space null will be stored.
4) Size 2000	4) Size 4000 (varchar & varchar2 are same)

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(D) Date :- By default date formate is -

DD-MON-YY

* Constrains :-

Constrains are the conditions we apply on a column of a table.

following are the types of constrains -

1) Not null
2) Unique
3) Primary key
4) Foraign key
5) check
6) Default

Only on a colum name we can apply not an a table name.

① Not Null :-

1) Null ⇒

① Null is nothing, neither zero nor blank space.
② It will not occupy any memory space.
③ Null represents unknown value.
④ Any arithmetic operation performed with null it results in null only.
eg. 100 + null = null.
⑤ Two nulls are never same

ID	Name
1	A
2	
3	

Two nulls never same

- Not null will insure some value should be present in a column of a table.
- values may be duplicate
- we can apply not null constrain on more than one columns of data.

Syntax :- column_name datatype Not null;

eg. ID number(2) Not null;

Not Null → | ID | Name |
|---|---|
| 1 | A |
| 2 | B |
| 3 | C |
| Not allowed → Null | D |

Not null constraints will not allow null value to be inserted in a column of a table but can accept duplicate value.

② Unique key :-
- It will not allow duplicate value in a column of a table
- Unique column can take multiple null. but not duplicate.
- We can apply unique constriant on more than one column. (distingt value)

eg.
ID number(2) unique;

unique → | ID | Name |
|---|---|
| 1 | A |
| 2 | B |
| 4 | C |
| → 5 | D |
| | E |
| → 5 | F |

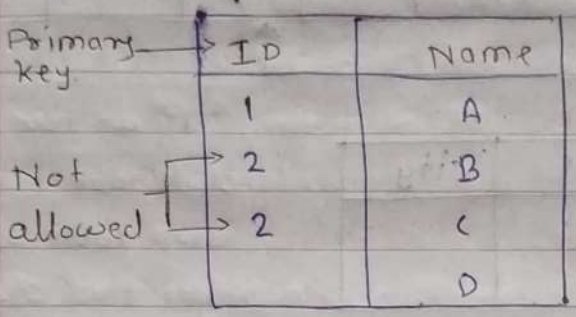
Duplicate not allowed

Two nulls are allow because two null never same

③ Primary key :-

- It is a combination of unique + not null
- We can apply primary only on a single column of a table.
- Primary key is used to uniquely identify the records.
- Creation of primary key is not mandatory but it highly recomonded to create primary key.

eg. ID number (2) primary key;



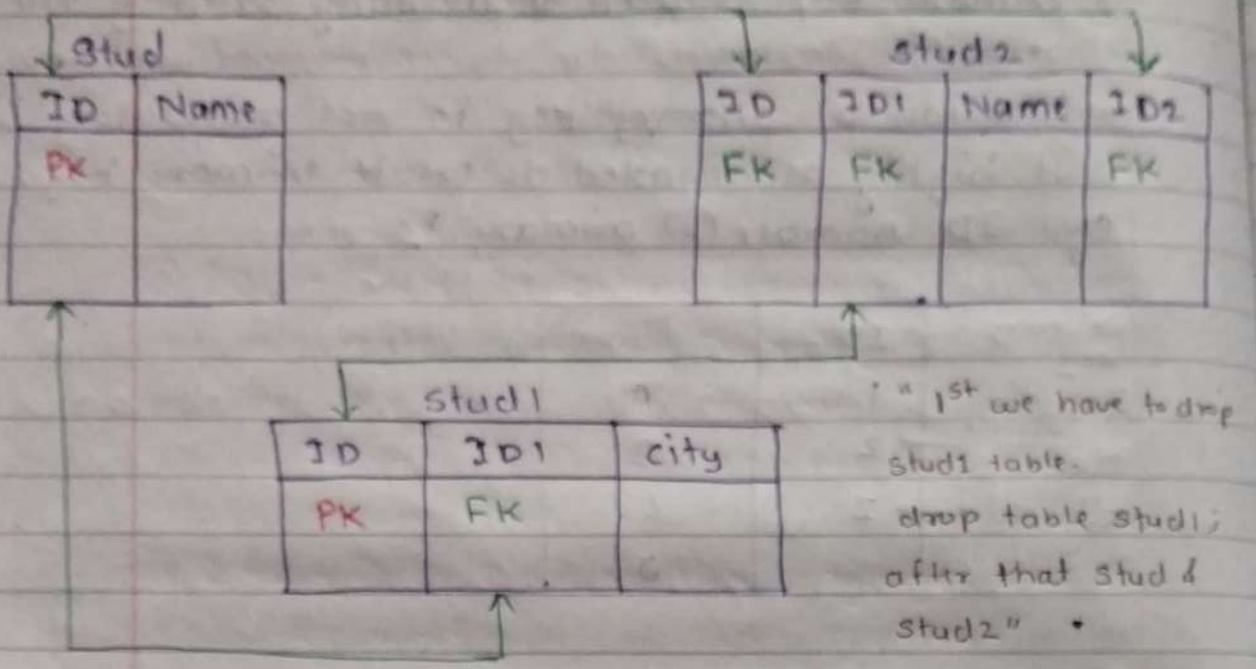
④ Foreign Key :-

- It is used to create relation between two tables.
- Foreign key is also called as referencibity intigrety constraints
- Foreign key is created on child table.
- To create a foreign key master table should have primary key defined on the common columns of a master table.
- We can have more than one foreign key
- Foreign key is a combination of Null & duplicate.

```
create table stud (ID number (2) primary key,
                   Name varchar (10));

create table stud1 (ID number (2) primary key,
                    ID1 number (2) references stud (ID),
                    city varchar (10));
```

create table stud2 (ID number(2) references stud(ID), ID1 number(2) references stud1(ID), Name varchar(10), ID2 number(2) references stud(ID));



⑤ check :-

- check is a user defined constraint. we can create for extra validation.
- It will not allow invalid data to be get inserted which not satisfied check constraint.

eg. Create table stud(ID number(2), marks number (3) check (marks >=35 AND & 99 marks <=99));

stud

ID	Marks ← marks >=35 & <=99
1	35
2	99
3	75
4	34 ← Not allow -

⑥ Default :-

- It is a user define constrain. If user will not provide any value for a column then default value can be consider / set.
- If user want to provide certain value user can provide the default value.

eg. create table stud (ID number (2), city varchar (10) default ('PUNE'));

ID	city
1	Mumbai
2	PUNE ← By default it will add

Simple Commands ⇒

1] set linesize 120;
set pagesize 20;

2] select * from tab; // check all tables / number of tables in database

3] Shift delete // clear screen.

4] desc emp; // describe table // check table details // all constrains, datatype // display table structure.

5] Create table demo(ID number (2), Name varchar (10));

create ↓ Duplicate Table

create table demo1 As select * from demo;

6] ed // To modify any query
/ Enter.

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SQL Structured Query Language (1970 → IBM)

1) SQL is used to perform manupulation operation on data which is stored in structured formate
2) On unstructured data we can not apply SQL
3) SQL is a query language is not a programming language.

SQL Statements ⇒

① DDL - Data Defination Language
- (A) create
- (B) alter
- (C) drop
- (D) Truncate
- (E) Rename

② DML - Data Manupulation Language
- (A) insert
- (B) update
- (C) delete

③ DCL - Data control language
- (A) Grant
- (B) Revoke

④ DQL - Data Query Language
- (A) select

⑤ TCL - Transaction Control Language
- (A) Commit
- (B) Rollback
- (C) Save point

① DDL ⇒

Ⓐ Create ⇒ It is used to create a table, views in a database.

* How to create table? ⇒

Create table Table_Name;

create table Demo (ID number(2) primary key, Name varchar(10) Not null, Contact varchar(10) unique, City varchar(10) default ('PUNE'), marks number(2) check (marks >35 AND marks <=99));

ID	Name	Contact	City	Marks
PK	Not Null	Uniaue	Default	check

* How to create duplicate table? ⇒

create table Demo1 as select * from Demo;

ID	Name	Contact	City	Marks
	Not Null			

- In duplicate table all the records, all the columns and only Not null constraint will get copy.
- After creating a duplicate tables both tables are independant.

(B) Alter :- Alter is used to add column, to rename a column, to modify a structure of a column, To delete a column.

Case 1 : ADD a column ⇒

Syntax ⇒

```
alter table table-name add col-name
    datatype(size);
```

eg.

1> create table stud (id number(2));

2> desc table stud;

Name	Null?	Type
ID		number

3> alter table stud add name varchar(10);

4> desc table stud;

Name	Null?	Type
ID		number
Name		varchar

Case 2 : Modify ⇒ Is used to modify the structure of a table. we can change the datatype, also size of a column

Syntax ⇒ To modify size.

```
alter table table-name modify (col-name
    datatype (size));
```

Syntax ⇒ To modify datatype

```
alter table table-name modify (col-name
    newdatatype (size));
```

" column should be empty to modify column datatype "

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Case 3 : Rename a column ⇒

Syntax ⇒

```
alter table table_name rename column
    old_col_name to new_col_name;
```

eg.

```
alter table stud rename column ID to ID1;
```

Case 4 : To drop a column ⇒

Syntax ⇒

```
alter table table_name drop column col_name;
```

Case 5: Add a constraint ⇒ Table should be empty.

Syntax ⇒

Primary key

```
alter table table_name add constraint
    constraint_name constraint (column_name);
```

eg.

```
alter table stud add constraint pk primary key (id);
```

Syntax ⇒

Foreign key

```
alter table table_name add constraint constraint_
_name constraint (column_name) references
table_name (column_name);
```

eg.

demo

ID (PK)	Name

stud

ID (FK)	marks

1> alter table stud add constraint FK Foreign key (ID) references demo (ID);

Unique ⇒

2> alter table stud add constraint UK unique (~~Name~~ colume);

- ~~alter~~

c) Drop ⇒ Drop is used to drop the structure of the table and add records of table.

Syntax ⇒

```
drop table table_name ;
```

eg.

```
drop table stud1 ;
```

SQL > show recyclebin ;

all the tables after drop will moves to recyclebin.

To restore table from recyclebin ⇒

Syntax ⇒

```
Flashback table table_name to before drop;
```

To delete the table from recyclebin ⇒

Syntax ⇒

```
purge table table_name ;
```

"permanatly delete a table"

D) Truncate ⇒ Is used to delete or clear only recordss of the table., Structure of table remains same.

Syntax ⇒

```
truncate table table_name;
```

E) Rename ⇒ Is used to rename the table name.

Syntax ⇒

```
rename old_table_name to new_table_name;
```

eg.

```
rename stud to stud1;
```

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② DML : Data Manupulation language

a) insert :- insert is used to insert the records at new line.

Case1 : insert record in all the columns.

```
insert into table-name values (value1, value2);
```

Case 2 :

insert into specific column

```
insert into tablename (column-name) values (value1);
```

b) Update :- Update is used to update the records

Case1 : Update all records.

```
update table-name set column-name = value;
```

Case 2 : Update specific records

```
update table-name set column-name = value where condition;
```

Eg.

1) update stud set city = 'PUNE' where ID=1 OR ID=2 ;
2) update stud set city = 'PUNE' where ID<=2;
3) update stud set city = 'PUNE' where ID=1 OR Name = 'B';

1) create table stud (ID number(2), Name varchar(10));
2) insert into stud values (1, 'A');
3) insert into stud values (2, 'B');
4) alter table stud add city varchar(10);
5) update stud set city = 'PUNE';
6) select * from stud;

ID	Name	City
1	A	PUNE
2	B	PUNE

← alter
} update

stud

c) delete : Delete is used to delete all the records from or specific records from table.

Case1 : To delete all records.

```
1) delete from table-name;   OR
2) delete table-name;
```

Case2 : To delete specific records

```
1) delete from table-name where condition;   OR
2) delete table-name where condition;
```

4/3/21 ③* TCL - Transaction Control Language

1) Commit
2) Rollback
3) Savepoint

① Commit -

Commit is used to save DML changes permanantly.

Syntax -

```
commit;
```

② Rollback - Is used to undo DML changes.

Syntax -

```
Rollback;
```

eg. 1) > create
> insert
> update
> delete
> Rollback

} All statements will be Rollbacked

eg 2) > create
> insert → DML - insert will be saved automatically because of alter (DDL)
> Alter → DDL Auto save
> update } Rollbacked.
> delete }.
> Rollback

Note ① DDL statements are auto commited, we need not to commit them.

② After commit their is no use of Rollback.

③ Savepoint - It act's as a break point.
- ~~Satem~~ Statements before savepoint nighter commited noe rollbacked.

Syntax:

```
Savepoint savepoint_name;
```

eg ①
> create
> insert
> update
> Savepoint x;
> delete
> Rollback to x; ← only delete will be rollbacked
> Rollback; ← All DML will be rollbacked.

No use of savepoint.

eg. ② > create
> insert
> Savepoint a;
> alter
> update
> Rollback to a; ← error
> Rollback;

error → Savepoint 'x' never established.

Savepoint is save records for temporary.

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④ DQL - Data Query language -

Select - Is used to display the records

Syntax -

Select * from table name;
select column-name from table name;
Selet column-name from table name where cond^n;

5/3/21 * Dual :-

1) Dual is a dummy table which is used to perform some operations which are not present on any existing table.
2) By default it have one row & one column.

* ALIA's :

1) ALIA's is a additional name provided to the columns.
2) ALIA's are applicable for single execution.
3) We have to provide ALIA's name after column name.

eg. > Select sal+comm As total_sal from emp;

TOTAL_SAL
1900
1700
—
2650

4) 'AS' keyword is not mandatory

eg > select sal+comm total_sal from emp;

TOTAL_SAL
1900
1700
—
2650

eg. Select sal+comm "TOTAL SAL" from emp;

TOTAL SAL
1900
1700
—

eg. Select sal + comm "Total Sal" from emp;

Total Sal
1800
1700
-
⋮

eg. select empname, sal + comm from emp where sal + comm > 1500;

emp-name	sal + comm
A	1800
-	⋮
-	
⋮	

* SQL Operators :-

1) Arithmetic Operator - -, +, *, /
2) Logical - AND, OR, NOT
3) Relational - <, >, ≤, ≥, !=, <>
4) Special - IS, IN, Between, like
5) Concat - ||

① Arithmetic Operator -

a) write a query to Display (WAQTD) incremented sal of all the emp by RS 100.
b) WAQTD decrement the commition of all the emp by RS 50.
c) Display anual sal of all the emp.
d) Display quardarly sal of all the emp's

a) ⇒ SQL > Select empname, sal + 100 "Increased sal" from emp;
b) SQL > Select comm - 50 "Decremented sal." from emp;
c) SQL > Select empname, sal * 12 from emp;
d) SQL > Select ename, sal, (sal * 12) / 4 "Quat. sal" from emp;
e) increment the sal of all emp by 10%

sal + sal * 0.1
sal * 11/10

e> Select ename, sal, * sal + (sal * 10/100) "10%." ~~emp~~ from emp;

② Relational Operator -

a) WAQTD emp who's sal is greter than 1250.
b) WAQTD emp who's sal is less than 3000
c) WAQTD emp who are not working in dept 30.
d) Display all the salesman (JOB)
e) Display all the emp who earn at least 1250.
d) Display all the emp who earn at most 3000.
f) Display all the emp who are not cleark.

a) ⇒ Select ename from emp where sal >= 1250;
b) ⇒ select ename from emp where sal < 3000;
c) ⇒ Select ename from emp where deptno != 30;
d) ⇒ Select ename, job from emp where job = 'salesman';
e) ⇒ Select ename from emp where sal >= 1250;
d) ⇒ Select ename from emp where sal <= 3000;
e) ⇒ select ename from emp where job != 'clerk';
(job <> 'clerk';).

③ Logical Operator -

a) Display all the employees who are working as a clerk or manager.
b) DATE who are salesmans and earning sal > 1250.
c) DATE who are from dept 10 & 20.
d) DATE who are not analist
e) DATE who are analist & earning sal > 2500 or < 5000

a ⇒ Select * from emp where job = 'CLERK' OR job = 'MANAGER';
b ⇒ Select * from emp where job = 'salesman' AND sal > 1250;
c ⇒ Select * from emp where deptno = 10 OR deptno = 20;
d ⇒ Select * from emp where not job = 'ANALIST';

e⇒ select * from emp where job = 'Analist' AND sal>2500 or sal <5000;

4)* Special Operator :- is, In, Between, like

i) Is : It is used to compare null.
We cannot compare any other value with is.

Syntax:

```
select */col-name from table-name
where col-name is null / is not null;
```

Q Write a query to display employees who are not earning any commision.
⇒ select * from emp where commision is null;

Q WAQTD who are earning some commision.
⇒ select * from emp where commision is not null;

ii) In : Instead of using multiple (||) or we can use single in operator.
In operator works as OR (||) operator.
If we want single LHS with multiple RHS we use in operator.

Syntax:

```
select */col-name from table-name where
col-name in (value1, value2---);
```

Q WAQTD the emp who are working as a clerk or analyst.
⇒ select * from emp where job in ('clerk', 'analyst');

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Q WAQTD the emp who are not working as a cleark or analyst.

⇒ select * from emp where job not in ('cleark', 'analyst');

iii) Between : Between operator selects the value within a given range.

Syntax :

```
Select * / col-name from table-name
where col-name between value1 and
value2 ;
```

Q WAQTD the emp whose salary between 1250 and 3000.

⇒ select * from emp where sal between 1250 and 3000;

Q WAQTD emp whose sal not between 1250 and 3000

⇒ select * from emp where sal not between 1250 and 3000;

Q WAQTD emp whose name in between 'A' to 'S';

⇒ select * ~~emp~~ from emp where ename between 'A' and 'S';

iv) like : Like operator is used for pattern matching. we use two wildcard characters for pattern matching (like spe char)

Following are the two like char

a) % = It matches with 0, 1, or n number of characters.

b) _ = It matches with single character

escape : escape char are used in Pattern string to indicate that any wildcard char that occurs after escape chare, in a pattern string should be treated as a regular char.

Q WAP to the emp whose name starts with A
⇒ select * from emp where ename like 'A%'
pattern string

Note i) Name ends with A = ename like '%A'
ii) Name starts with A = ename like 'A%A' and ends with A
iii) Whose name contains A anywhere in the name = ename like '%A%'
iv) Whose name contains exactly 4 char = ename like '____'
v) Name contains A at 2nd position = ename like '_A%'
vi) Name contains A at 2nd last position = ename like '%A_'
vii) Whose name contains 2 A = ename like '%A%A%'

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Q 1 list all the emp who don't have any reporting manager?

⇒ select * from emp where mgr is null;

Q 2 = list all the salesmans in dept 30 and having salary grater than 1500.

⇒ select * from emp where job='salesman' and Deptno=30 and sal > 1500;

Q 3 list all the emp whose name starts with 'S' or 'A'

⇒ select * from emp where ename like 'S%' or ename like 'A%';

Q 4 list all the emp whose name does not starts with 'ES' or 'R'

⇒ select * from emp where ename not like 'ES%' or ename not like 'R%';

Q 5 list all the emp with anual salary except those who are working in Dept 30.

⇒ ~~Select * from emp~~

Select sal*12 As Anual_Sal from emp where dept is not 30;

Q 6 Display all the emp who are joined after year 81.

⇒ Select * from emp where hiredate >= '31-Dec-1981';

Q 7 Display all the emp who are joined in Feb.

⇒ Select * from emp where hiredate like '%FEB%';

Q 8 list the emp who are not working as a manager & clerk in dept 10 & 20 with the salary in a range of 1000 to 3000.

⇒ Select * from emp where job not in ('Manager', 'clerk') and Deptno in (10, 20) And sal between 1000 And 3000;

Q9 List all the emp whose salary not in a range of 1000 to 2000 and working in dept 10, 20 or 30 except all salesmans.

⇒ Select * from emp where sal not between 1000 and 2000 and deptno in (10, 20, 30) and job not in ('salesman');

Q 10 Display all the emp whose job starts with man..

⇒ Select * from emp where job like 'MAN%.';

Q11 List the emp who are hired after 82 and before 87

⇒ Select * from emp

Q12 Display the emp whose commision is greater than sal

⇒ Select * from emp where comm > sal;

Q13 Display the emp whose annual sal ends with 0.

⇒ Select ename, sal, sal*12 'ANN.SAL" From emp where sal*12 like '%0';

Q.14 Display the emp whose name starts with vowels

⇒ Select * from emp where ename like 'A%' or ename like 'E%' or ename like 'I%' or ename like 'O%' or ename like 'U%';

Q.15 Display the emp who are hired in nov & Dec

⇒ Select * from emp where Hiredate like '%.nov%.' or hiredate like '%.Dec%.';

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Q 16 Display the emp whose Job contain manager.

⇒ select * from emp where job ~~is 'manager'~~ like '%MAN%';

Q.17 Display all the emp who are having reporting manager in dept 10 also g with 10% high in the salary.

⇒ ~~Select * from emp where~~ select ename, sal, sal+sal*0.1 "Hike 10%" from emp where deptno = 10 and mgr is not null;

Q 18 Display the emp whose name having exactly two L

⇒ Select * from emp where ename like '%L%L%';

Q.19 Display the name and desgnation of all the emp having reporting manager and also their names starts with 'S'.

⇒ select ename, job from emp where mgr is not null and ename like '%S';

Q.20 Display all the emp who are having reporting manager in dept 10.

⇒ Select * from emp where deptno = 10 and mgr is not null;

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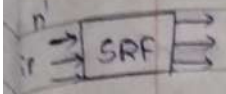
* SQL Functions :-

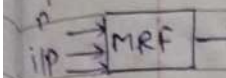
SQL functions are categorised into two types -

① Single Row function -



Here we are providing n number of inputs, & for every input we will get seprate output.

② Multi Row function -



To multi row function we are providing n number of inputs and we will get only one output for multiple inputs.

* Multi Row Function - (Agregate function / Group function)

1) Multi row functions are

min()
max()
avg()
sum()
count()

② Min() :- It returns minimum value or lowest character of given column. Syntax.

```
Select min(col-name) from Table-name;
```

eg.

```
> Select min(sal), min(hiredate), min(ename) from emp;
```

MIN(SAL)	MIN(HireDate)	min(ENAME)
800	17-DEC-80	ADAMS

↑ ASCII value

```
> Select min(Sal + comm) from emp;
```

min(Sal + comm)
1500

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(b) Max() It returns maximum value or largest character

Syntax:

```
select max(col-name), max(col-name) from
table_name;
```

eg.

```
> select max(SAL), max(Hiredate), max(Ename), max(comm)
  from emp;
```

max(SAL)	max(Hiredate)	max(Ename)	max(comm)
5000			

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* Average :- It returns average value of specified colum

Syntax:

```
select avg(column_name) from Table_name;
```

eg.

```
select avg(sal) from emp;
select avg(mgr) from emp;
select avg(sal + comm) from emp;
```

* Sum : It returns summation of all the values in given column.

Syntax:

```
select sum(column_name) from Table_name;
```

eg.

```
select sum(sal) from emp;
```

* Count : It returns number of rows in a given column.

Note Count function will not count null values.

Syntax:

```
select count(column_name) from table_name;
```

eg.

1> Select count(empno) from emp;

→ 14

2) select count(comm) from emp;
→ 4

3) select count(*) from emp;
→ 14

4) select count(*) - count(comm) from emp;
→ 10

5) select count(*) from emp; where comm is null;
→ 10

* distinct : It is a keyword. It is used to select unique record from the column.

Syntax :

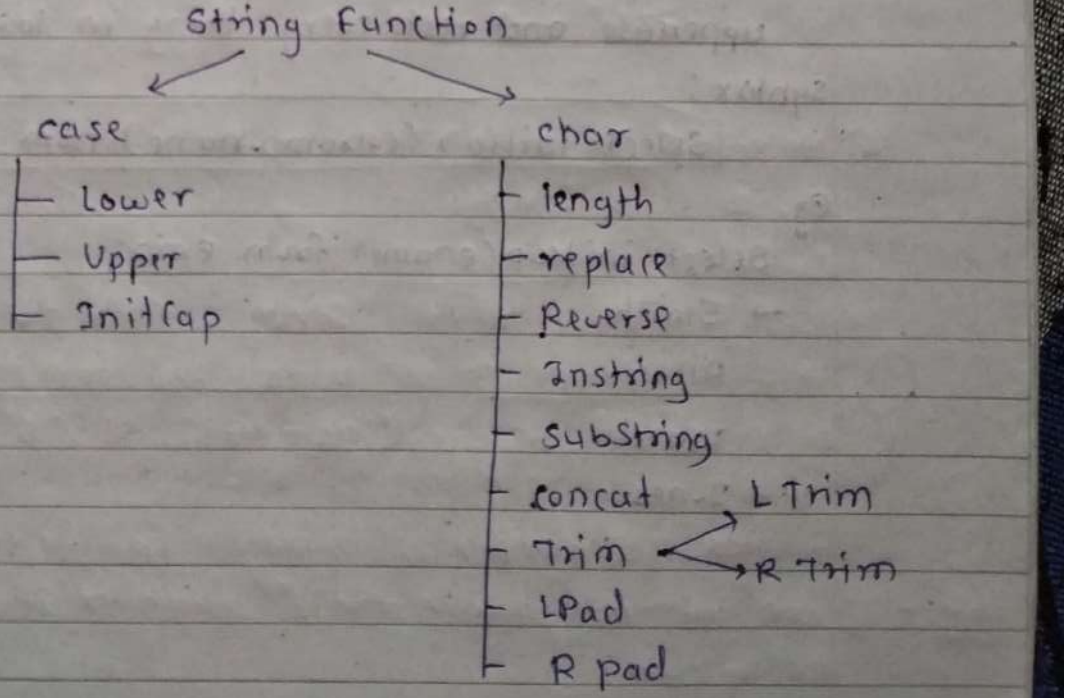
```
select distinct column-name from Table-name;
```

eg. 1) select distinct deptno from emp;
→ 30
20
10

nested function i.e. function under function

2) ~~select distinct de~~
select count(distinct (deptno)) from emp;
→ 3

* Single Row function :-



Case manipulation function :-

① Lower :- It returns character of string in a lower case letter.

Syntax :

```
Select Lower (column-name) from Table-name;
```

e.g.

> Select lower ('SQL') from dual;

→ sql

eg. update the smithname in lowercase in emp table..

→ update empl set ename = lower (ename) where ename = "SMITH";

② Upper :- It is used to convert character of string in uppercase letter.

Syntax :

```
Select upper (column-name) from Table-name;
```

eg. Select upper ('sql') from dual;

→ SQL

③ InitCap :- It returns first character of string in uppercase and rest every thing in lowercase.

syntax :

```
Select initCap (column-name) from emp;
```

eg.

Select initcap (ename) from emp;

→ Smith
Allen
ward
Jones
.
.

eg.
Select lower (ename) "Lower", Upper(ename) "Upper", initcap (ename) "Initcap" from emp;

→

lower	Upper	Initcap
smith	SMITH	Smith
allen	ALLEN	Allen
ward	WARD	Ward

* Character Manipulation Function -

① length:- It returns number of character in a given string.

Syntax -

```
Select length (column_name) from table_name;
```

eg.
Select length (ename), ename from emp;

Q Write a query to display an employee whose name is of 5 character.

→ Select ename from emp where length (ename) = 5;

→ SMITH
ALLEN
JONES
BLACK

② Concat : It is used to join two or more strings or columns.

Syntax :

```
Select concat (column_name1, column_name2)
from emp;
```

eg. Select concat ('QSP', 'Hadapsar') from dual;
→ QSPHadapsar

i) Nested concat :-

Syntax:
```
select concat (column-name1, concat (column-
    name2, column-name3));
```

eg.
Select concat ('QSP', concat ('Pune', 'Hadapsar'));
→ QSPPuneHadapsar

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③ Reverse : It reverse the characters of a String

Syntax:
```
select reverse (column-name) from Table-name;
```

eg.
Select reverse (ename) from emp;
→ HTIMS (SMITH)
→ NELLA (ALLEN)

If we want to reverse of number i.e 321 → (Reverse) 123 then we should pass with single cot i.e
'321' → 123

④ Replace : It is used to replace the character of a String.

Syntax:
```
Select replace (String, 'char to be replace',
'char to be replace by') from table-name;
```

eg. 1> Select replace ('qspiders', 's', '$') from dual;
→
q$pider$

Note - If we will not provide the 3rd parameter it will acts as remove.

eg. 2> select replace ('qspiders' , 'qspiders', 'qsp') from dual;

→ qsp

eg. 3) select replace ('ekata', 'ekta' , 'e') from dual;

→ ekata

eg. 4) select replace ('qspiders', 'pid', '*') from dual;

→ qs*ers

eg. 5) selecet replace ('qspiders', 's') from dual;

3rd parameter not provided so it will acts as remover

→ qpider

⑤ Instring: It is used to identify position of character in given string.

Syntax:

```
Instring ('string', 'char', start position,
          no. of occurances);
```

- Start position & number of occurances are optional
- By default start position will be 1 & number of occurances also.
- If start position is negative number it will start search from end.
- Start position and number of occurances cannot be zero (0);
- We cannot provide number of occurances as a negative number.

eg.

1) select instr ('qspiders', 's', 1, 1) from dual;
→ 2

2) select instr ('qspiders', 's', 1, 2) from dual;
→ 8

3) select instr ('qspiders', 's', 3, 1) from dual;
→ 8

4) select instr ('qspiders', 's', 3, 2) from dual;
→ 0

5) select instr ('qspiders', 'z', 1, 1) from dual;
→ 0

6) select instr ('qspiders', 's', -1, 1) from dual;
→ 8

7) select instr ('qspiders', 's', -1, 2) from dual;
→ 2

8) select instr ('qspiders', 's', -2, 1) from dual;
→ 2

9) select instr ('qspiders', 's') from dual;
→ 2

10) select instr ('qspiders', 's', 0, 1) from dual;
→ 0

11) select instr ('qspiders', 's', 0, 0)
→ error (Number of occurance cant be zero)

a) Substring :- It display substring from main string.

Syntax:

substr (string, start position, no. of char);

- If start position is negative number then it will start from end.
- number of characters are option
- By default it will display the string till end

eg. select ename, substr (ename, 1, 3), substr (ename, 2, 2) Substr (ename, 3) from dual;

ENAME	SUB	SU	SUBSTR
1) SMITH	SMI	MI	~~LEN~~ ITH
2) ALLEN	ALL	LL	LEN
3) WARD	WAR	AR	RD

eg. select ename, substr (ename, -3, 3), substr (ename, -3, 2) substr (ename, -1, 2), substr (ename, -1, 1) from emp;

→

ENAME	SUB	SU	S	S
SMITH	~~SMI~~ITH	IT	H	H
ALLEN	LEN	LE	N	N
WARD	ARD	AR	D	D

eg. 1) select substr ('@spiders', 0, 1) from dual;
→ @

2) select substr ('@spiders', 1, 1) from dual;
→ @

3) select substr ('@spiders', 1, 0) from dual;
→ no output.

4) select substr('@spiders', 1, -1) from dual;
→ $ no output
5) select substr('@spiders', 4, 1) from dual;
→ $ no output

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3 Display name of emp who's job starts with man:
→ select ename from emp where job like 'man%';
select ename, job from emp where substr(job, 1, 3) = 'MAN';

Ename	JOB
JONES	MANAGER
BLAKE	MANAGER
CLARK	MANAGER

⑥ Trim :- Is used to ~~trim~~ the character from given string.

Case 1 : To delete start char

Syntax:

select trim (leading 'char' from 'string')

Case 2 : To delete end char

Syntax

trim (trailing 'char' from 'string')

Case 3 : To delete start & end char

Syntax:

trim (both 'char' from 'string')

"To trim middle char we ~~use~~ make use of replace queary."

eg.

1) select trim(leading 'a' from 'akshaya') from dual;

→ TRIM(L
kshaya

2) select trim('a' from 'akshaya') from dual;

→ TRIM(
kshay

3) select trim('a' from 'ekata') from dual;

→ TRIM
ekat

4) select trim('a' from 'akshaya') from dual;

→ TRIM
kshay

5) select trim(leading 'a' from 'akshya') from dual;

→ TRIM
Kshaya

6) select trim(trailing 'a' from 'akshaya') from dual;

→ TRIM
akshay

7) select trim(both 'a' from 'akshya') from dual;

→ TRIM(
Kshay

8) select trim(leading 'ak' from 'akshya') from dual;

→ error → we can not take two char.

⊙ Replace a - @ and a - # in string 'Ekata'

Select ~~concat~~ replace ('Ekata', 'a', '@', replace
c

—

Ltrim : Used to ~~trim~~ trim the char from left side

Syntax :

ltrim('string', 'substring')

eg. 1) select ltrim('eaeaaaweaea', 'ae') from dual;

→ Ltrim
weaea

2) select ltrim('eaeaaaweaea', 'wae') from dual;

→ Ltrim

3) select ltrim('eaeaaaweaea', 'war') from dual;

Ltrim
eaeaaaweaea

It will trim substring upto new / ~~upper~~ chareactor found. It will starts from left side & check the 1st char present in substring or not.

Rtrim; Rtrim is wed to trim the char from right side.

Syntax :

rtrim ('string', 'substring')

eg. 1) select rtrim ('eaeaaaweaea', 'ae') from dual;

RTRIM
eaeaaaw

2) select rtrim('eaeaaaweaea', 'aew') from dual;

→ R

3) select rtrim('eaeaaaweaea', 'ew') from dual;

RTRIM

eaeaaweaea.

4) Select rtrim(ltrim('@spider', '@'), 'r') from dual;

→ Spide

spider

sider

* Rpad :- To upend the blank space.

eg. ***qsp***

→

Select rpad(lpad('qsp', 6, '*'), 9, '*') from dual;

LPAD(RPAD

******qsp***

Syntax: rpad('string', number of char, 'Padded char');

lpad('string', number of char, 'Padded char')

eg. Select lpad('qsp', 3, '*') from dual;

LPA

qsp

2) Select lpad('qsp', 1, '*') from dual;

→ q

3) select lpad('qsp', -6, '*') from dual;

→ —

4) Select lpad('qsp', 0, '*') from dual;

→ —

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* Number functions -

ceil

floor

Round

Trunc

ABS

mod

Power

Sqrt

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③ Round :-

eg. 1>	select round (123.456, 3) from dual;	123.456
②	select round (123.456, 2) from dual;	123.46
③	select round (123.425, 1) from dual;	123.4
④	select round (123.425, 0) from dual;	123
⑤	select round (123.541, 0) from dual;	124
⑥	select round (123.425, -1) from dual;	120
⑦	select round (123.345, 1.5) from dual;	123.3
⑧	select round (123.456, -1.5) from dual;	120
⑨	select round (123.456, -2) from dual;	100
⑩	select round (123.425, -3) from dual;	0
⑪	select round (123.425, -4) from dual;	0
⑫	select round (555.555, -3) from dual;	1000
⑬	select round (555.555, -4) from dual;	0

4) Trunc () ; It will goes on only deleting value, It will not roundup the value

①	Select trunc (123.456, 3) from dual;	123.456
②	select trunc (123.456, 2) from dual;	123.45
③	Select trunc (123.456, 1) from dual;	123.4
④	select trunc (123.456, 0) from dual;	123

-ve number - remove digits before decimal
+ve number - After decimal how many digits you want

⑤ Select trunc (123.456, -1) from dual ; 120

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⑤ Absolute Value :- abs()
convert -ve number to +ve
remove unwanted zero

① select abs(10.01) from dual; 10.01
② select abs(-10.01) from dual; 10.01
③ select abs(-10.10) from dual; 10.1
④ select abs(10.0001) from dual; 10.0001
⑤ select abs(-01.10) from dual; 1.1

⑥ Power() :- It will return power of no

① select power(12,2) from dual; 144
② select power(15,2) from dual; 225

⑦ Squar sqrt(): It returns squaroot

① select sqrt(625) from dual; 25
② select sqrt(1000) from dual; 10

⑧ Mod() :

① select mod(12,4) from dual; 0
② select mod(12,3) from dual; 0
③ select mod(12,5) from dual; 2

* General Functions :-
① NUL (exp1, exp2) or (arg1, arg2)
② NUL2
③ decode

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① NVL :-

NVL (arg1, arg2)

1) If value of argument 1 is null then it returns value of argument 2.
NVL means null value.

eg.
WAQTD Salary of employee (sal + comm) if employees are not earning commission give commission rs. 100
> Select ename, sal, comm, sal + nvl (comm, 100) from emp;

② NVL2 :-

Syntax:- nvl2 (arg1 , arg2, arg3)
null
not null

- If value of arg1 is null then it returns value of arg3.
- If value of argument1 is not null then it returns value of arg2

eg.
Display total sal of employee ~~if~~ give commission rs 100 to all employee.
> select ename, sal, comm, sal + nvl2 (comm, comm+100, 100) from emp;

③ Decode :- It act as a if else statement.

eg.
1) Increment salary of CLERK by rs 50, Increment salary of all SALESMAN by rs 100 & remaining all employees salary should be incremented by 10.
> Select ename, job, sal, decode (job, 'CLEARK', sal+50, 'SALESMAN', sal+100, sal+10) from emp;

2) Select ename, job, decode (job, 'CLERK', sal+50, sal+10) from emp;
(job, 'CLERK', sal+50 — if statement part; sal+10 — else part)

3) If job is CLERK return cc & if job is SALSMEN return ss.
> select ename, job, decode (job, 'CLERK', 'cc', 'SALESMAN', 'ss') from emp;

4) Select ename, job, decode (job, 'CLERK', sal+NVL ((comm), 10) from emp;

* Conversion Function -

① to-number :-
eg. Select to_number ('123') from dual;
(providing number in string format)
⇒ to-number
123 ← in integer format.

② to_date :- if date in 12-02-21 format then give the date format you want.
eg. 'mm-dd-yy'
If date in 12-MAR-2021 then it will print as it is no any format given by user.
eg.
1) select to-date ('12-02-21', 'mm-dd-yy') from dual;
mm dd yy
2) Select to-date ('02-MAR-21') from dual;

③ to-char:-

1> Select to-char (sysdate, 'dd-month-year') from dual;

op ⇒ 20-march-twenty twenty one

2> Select to-char (todate ('01-FEB-21'), 'ddspth-mon-year') from dual;

op ⇒ First-FEB-twenty twenty-one.

D - Day of week
DD - Day of month
DDD - Day of year

w - week of month
ww - week of year

DD → print 2 digit of date (20)
MM → print 2 digit of month (03)
YY → print 2 digit of year (21)

YYYY → 4 digit of year (2021)

Fm → Filter (0) zero remove unwanted zero
th → It is used for th, rd, nd, st
DDSP → Spellout date (suppose DD = 20 then DDSP = twenty)
MON → Abbrevated name of month (eg. FEB, MAR etc)
Year → year spell out
(suppose yyyy = 2021, twenty twenty-one)
Month ⇒ Name of month
(suppose Mon = MAR month = March)
Day - name of day (suppose 20 - Saturday)
Dy - Abbrevated name of day (20 - Sat)

3) to print 9th of sep

> select to_char (to_date ('09-sep-21'), 'ddth, "of", mon
from dual;

> select to_char (to_date ('09-09-21'), 'dd-mm-yy'),
('ddth "of" mon') from dual;

eg. Convert number into character

4) Select to_char (sal, '$9999.99') from emp;

⇒ $ 800.00
$ 1600.00
$ 1250.00

5) Select to_char (sal, '$999.99') from emp;

⇒ $ 800.00
#####

we can provide 3 digit number but in sal only 800.00 is a one 3 digit number other are grether than 3 digit so their print the #.

6) select to_char (sysdate, 'HS') from dual;
9:40:32 AM

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* Date Function :-
- Sysdate
- Arithmetic with sysdate
- Systimpstamp
- Add_months
- Months_between
- Next_day
- Last_day.

1) Sysdate: It returns current system date.

eg. select sysdate from dual;

> 22-MAR-21

2) Arithmatic with Sysdate:

eg. select sysdate +365 from dual;

> 22-MAR-22

3) Systimestamp :- It returns current system date & time in mili seconds also time zone

eg. select systimestamp from dual;

4) Add-months :- It returns a date after adding or substrating number of months.

eg 1) select add-months (sysdate, 2) from dual;

> 22-MAY-21

2) select add-months('21-MAR-21', -2) from dual;

> 21-JAN 21

3) select add-months (sysdate, -2) from dual;

> 22-JAN-21

4) select add-months ('21-MAR-2021', 2) from dual;

> 21-MAY-21

5) Months_Between :- It returns number of months between two given dates.

eg.

1) select month-between (sysdate, '22-MAR-2020') from dual;

op ⇒ 12

2) select month-between ('22-MAR-22', sysdate) from dual;

⇒ 12

3) select months-between ('22-Mar-21', '22-mar-22') from dual;

⇒ -12

⑥ next_day :- It returns next day on upcomming day.

1) select next_day (sysdate, 'mon') from dual;
> 29-MAR-21

2) select next_day (sysdate, 'sat') from dual;
> 27-MAR-21

⑦ Last_Day : It returns last date of given month

1) select last_day (sysdate) from dual;
op ⇒ 31-MAR-21

2) select last_day ('21-FEB-2020') from dual;
op ⇒ 29-FEB-2020

* General Function :-

4) nullif : It returns null if both parameters are same.

eg. 1) select nullif ('Mon', 'mon') from dual;
> null

2) select nullif ('Mon', 'Tues') from dual;
> Mon (1st arg print)

5) Coolesee :- It is similar to NVL but it excepts any number of parameters (at least 2) & it will returns 1st of them if it is not null
- If it is null then it return second parameter
- If all of them are null then it returns null.

eg. 1) select coalesce (null, 'A') from dual;
> A

2) select coalesce ('A', null) from dual;
> A

3) Select coalesce (null, null, 'A') from dual;
> A

4) select coalesce (null, 'A', 'B') from dual;

5) select coalesce (null, null, null, 'A', 'B') from dual;
> A

6) Select coalesce ('A', null, 'B') from dual;
> A

7) Select coalesce (null, null, null) from dual;
> null.

Queries

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Use Functions Only

1) List employees whose name having 4 characters (without like).

⇒ Select ename from emp where length(ename)=4;

2) List employees whose job is having 7 characters

⇒ Select ename, job from emp where length(job)=7;

3) Find out how many times letter 's' occurs in 'qspiders'.

⇒ Select length('Qspiders') - Length(Replace('Qspiders', 's')) from dual;

4) List the employees whose job is having last 3 characters as 'man'.

⇒ Select job from emp where substr(job, -3) = 'MAN';

5) List employees whose job is having first 3 char as 'man'.

⇒ Select job from emp where substr(job, 1, 3) = 'MAN');

6) Display all the names whose name is having exactly 1 'L' (without like)

⇒ Select ename from emp where length(ename) - length(Replace(ename, 'L')) = 1 ;

⇒ Select ename from emp where instr(ename, 'L', 1, 1) >0 and instr(ename, 'L', 1, 2) =0;

7) Display dept names which are having letter 'O'.

⇒ Select dname from dept where instr(dname, 'O', 1) >0;

8) Display the output as shown below,
Scott working as a clerk earns 3000 in dept 20.

⇒ Select concat(ename, concat('working as a', concat('clerk earns 3000 In deptno', deptno))) form emp where ename = 'scott';

9) Calculate number of L in string 'HELLLLL'

⇒ Select length(HELLLLL) - length(Replace(HELLLLL, 'L')) from dual;

10) Display all the employees whose job has a string 'MAN' (without like)

⇒ Select job from emp where instr(job, 'MAN', 1) >0;

11) Display all the employees whose job starts with string 'MAN' (without Like)

⇒ Select job from emp where substr(job, 1, 3) = 'MAN';

12) Display all the employees whose job ends with string 'MAN' (without Like)

⇒ Selet job from emp where substr(job, -3) = 'MAN';

13) Display first 3 characters of ename in lowercase & rest everything in uppercase. If ename is 'QSPIDERS' then display this as 'qspIDERS

⇒ Select concat(lower(substr('QSPIDERS', 1, 3)), substr('QSPIDERS', 4) from dual;

14) Display the result from emp table as below:
SMITH is a CLERK and gets salary 2000.
Here SMITH is ename column, CLERK is JOB and 2000 is SAL column and rest everything is literal strings.

⇒ Select concat(ename, concat('is a', concat(job, concat('and gets a salary of', 2000)))) from emp where ename = 'Smith and job = 'CLERK';

15) List the employees hired on a wednesday

⇒ Select ename, hiredate from emp wher to-char (Hiredate, 'DY') = 'WED';

16) List the employees hired on a sunday in the month of mgy.

⇒ Select ename, hiredate from emp where to-char (hiredate, 'DY') = 'SUN' and to-char (hiredate, 'mon') = 'MAY';

17) Display first half of name in lower and rest in Reverse.

⇒ Select concat(lower(substr(ename, 1, length(ename)/2)), reverse(substr(ename, length(ename)/2+1))) from emp;

18) WAQTD last 3 char of emp who are working as manager

⇒ Select substr(ename, -3) from emp where job = 'MANAGER';

19) WAQTD name of emp if name starts with VOWEL (without like):

⇒ Select ename from emp Where substr(ename, 1, 1) in ('A', 'E', 'I', 'O', 'U');

20) WAQTD 1st half of emp name

⇒ Select ename, substr(ename, 1, length(ename)/2) from emp;

21) WAQTD 2nd half of emp name.

⇒ Select ename, substr(ename, 1, length(ename)/2+1) from emp;

22) WAQTD name of emp without 1st and last char

⇒ Select ename, substr(ename, 2, length(ename)-2) from emp;

23) WAQTD name of the ~~end~~ emp with char 'A' in name

⇒ Select ename from emp where instr(ename, 'A', 1, 1)>0;

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Subquery

1) Display all the employees whose department name ending 'S'.

⇒ Select ename from emp where deptno in (select deptno from dept where dname like '%S');

2) Query to display the emp names who is having maximum salary in dept name 'Accounting'.

⇒ Select * from emp where sal = (select max(sal) from emp where deptno = (select deptno from dept where dname = 'Accounting'));

3) Query to display the dept name who is having highest commission

⇒ select dname from dept where deptno = (select deptno from emp where comm = (select max(comm) from emp));

4) Query to display the employee names whose dept name has 2nd char as 'O'.

5) Query to display all the emp's who's dept no is same as SCOTT.

⇒ Select * from emp where deptno = (select deptno from emp where ename = 'SCOTT');

6) Query to display all the employees in 'Operations & Accounting' dept.

⇒ Select ename, deptno, from emp where deptno in (select deptno from dept where dname in ('Accounting', 'Operations'));

7) List the employees who has salary greater the miller
⇒ select * from emp where sal > (select sal from emp where ename = 'MILLER');

8) Display the dname of employees who has noreporting man.

9) List all the employees who are reporing to jones manager.
⇒ select * form emp where empno = (select mgr from emp where ename = 'Jones');

10) Display dname of emp whose name does not starts with 'S' and sal between 1500 and 3000
⇒ select dname from dept where deptno in (select deptno from emp where ename not like 'S%' and sal between 1500 and 3000;

11) Display location of emp whose sal is min but sal > 2000
⇒ select loc from dept where deptno = (select deptno from emp where sal in (select min(sal) from emp where sal > 2000));

12) Display the location of an employee in accounting dept.
⇒ select loc from dept where deptno in (select deptno from dept where dname = 'Accounting Department');

13) WAQTD all the employee whose job not same as ALLEN and salary is greater than MARTIN.
⇒ select ename, job, sal from emp where job != (select job from ~~emp~~ emp where ename = 'ALLEN') and sal > (select sal from emp where ename = 'MARTIN');

14) Display all the employees who is having location is same as ADAM's manager?

⇒ Select ename /* from emp where deptno = (
Select deptno from dept where loc = (
Select loc from dept where deptno = (
Select deptno from emp where empno = (
Select mgr from emp where ename = 'ADAMS'))));

15) Display the job, manager, number of employees who is working for jones?

⇒ Select job, mgr from emp where mgr = (
Select empno from emp where ename = 'JONES');

16) Display the employee names, hired date, commission of ford's manager?

⇒ Select empno, hiredate, comm /* from emp where empno = (Select mgr from emp where ename = 'FORD');

17) Display the number of employees who are getting salary less than the blake's manager.

⇒ Select count(*) from emp where sal < (
select sal from emp where mgr = (
select mgr from emp where ename = 'BLAKE'));

18) List employees who located in CHICAGO and their commision is zero.

⇒ Select ename from emp where comm in 0 and deptno in (select deptno from dept where loc = 'CHICAGO');

19) List employees who work for sales department and their salary greater than average salary of their department.

⇒ Select ename from emp where deptno in (
select deptno from dept where dename = 'SALES')
and sal > (select avg(sal) from emp where
deptno in (select deptno from dept where dname
= 'SALES'));

20) List employees who are working in research dept and they are manager.

⇒ Select ename from emp where Job = 'manager' and deptno in (select deptno from dept where dname = 'Research');

21) Display dept name of the employees who earn commission.

⇒ Select dname from dept where deptno in (select deptno from emp where comm is not null);

Select dname from dept where deptno in (select deptno from emp where comm != null);

22) Display department name of the employee who earn maximum salary and have no reporting manager.

⇒ Select dname from dept where deptno in (
Select deptno from emp where sal = (
Select max(sal) from emp where mgr is null));

23) Display employee details who are reporting to blake and have commission without using null or not null.

⇒ Select * from emp where mgr in (select empno from emp where ename = 'BLAKE') and comm >= 0;

24) list all the deptname and loc of all the salesmen managers manager.

⇒ Select dname, loc from dept where deptno = (Select deptno from emp where empno = (Select mgr from emp where empno in (Select mgr from emp where job = 'SALESMAN')));

25) Display 2nd max sal.

⇒ Select max(sal) from emp where sal < (select max (sal) from emp);

26) Display 2nd min sal.

⇒ Select min(sal) from emp where sal != (select min (sal) from emp);

27) Display max sal of Sales department

⇒ Select max (sal) from emp where deptno in (Select deptno from dept where dname = 'SALES');

28) Display all the emp whose job same as smith, dept same as Jones and sal > Turner

⇒ Select * from emp where job in (select job from emp where ename = 'SMITH') and dept in (select deptno from emp where ename = 'Jones') and sal > (select sal from emp where ename = 'Turner');

29) Display no of emp who comm is more than sal

30) Display the location of emp who earn max sal & have no reporting manager.

⇒ Select loc from dept where deptno in (select deptno from emp where mgr is null and sal = (select max(sal) from emp));

31) Display ename & empno of employee working as a CLEARK and earn highest sal amoung all the clerks.

⇒ Select ename, empno from emp where job='CLERK' and sal in (select max(sal) from emp where job='CLEARK');

32) Display all emp who are living in location which is having at least two '0' in it.

⇒ select ename from emp where ~~location~~ deptno in (select deptno in (select deptno from dept where loc like '%0%0%'));

33) List the emp who has comm > max sal of all the salesmans and do not report to king.

⇒ Select ename from emp where comm > (select max(sal) from emp where job='SALESMAN') and mgr != (select empno from emp where ename='KING');

34) List all the dept name that are having salesmans.

⇒ Select dname from dept where deptno in (select deptno from emp where job='SALESMAN');

35) List all the emp who are earning sal more than any of the analyst.

⇒ Select ename, sal from emp where sal > Any (select sal from emp where job='Analyst');

1) Display all the employees who are joined before the last person?

⇒ Select * from emp where hiredate < (select max(hiredate) from emp);

2) Display all the employees who are earning more than any of the manager.

⇒ Select * from emp where sal > any (select sal from emp where job = 'MANAGER');

3) List employees who joined after 4 years of 1st emp of the company and less than Blake salary.

⇒ Select * from emp where hiredate > select add_months(min(hiredate), 4*12) from emp) and sal < (select sal from emp where ename = 'BLAKE');

4) Display all the emp whose dept is sales and who is earning some comm (i.e. comm is not null or zero) and who is hired before the last person hired.

⇒ Select * from emp where comm is not null and hiredate < (select max(hiredate) from emp) and deptno in (select deptno from dept where dname = 'SALES');

5) Display all the dept names for ward's man's manager & manager who is

⇒ Select dname, mgr from emp e, dept d where e.deptno = d.deptno and empno in (select mgr from emp where empno in (select mgr from emp where ename = 'WARD'));

6) Display dept name of the employee who earn minimum sal and have reporting manager.

⇒ Select dname from dept where deptno in (select deptno from emp where sal = (select min(sal) from emp where mgr is not null));

7) Display the dname of emp's whose salary is max salary but Lesser than 3000.

⇒ Select dname from dept where deptno in(select deptno from emp where sal in (select max(sal) from emp where sal < 3000));

8) Display last employee record according to empno

⇒ Select * from emp where empno = (select max(empno) from emp);

9) Select ename of emp who earns 2nd max salary & works for location 'DALLAS'

⇒ ~~Select ename from emp e where e.deptno =~~

Select ename, dname from emp e, dept d where e.deptno = d.deptno and e.sal in(select max(sal) from emp where sal < (select max(sal) from emp)) and loc = 'DALLAS';

10) List emp's who have commission greater than max sal of all the salesmal & who do not report to king.

⇒ Select * from emp where comm > (select sal from emp where sal = (select max(sal) from emp where job = 'SALESMAN')) and mgr <> (select empno from emp where ename = 'KING');

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Subqueries - Group By -

1) list deptname having atleast 3 salesman.
Select dname from dept where deptno in (select deptno from emp where job = 'SALESman' Group By deptno having count(*) >= 3);

2) list employees from research & accounting having at least 2 reporting.
Select * from emp where deptno in (select deptno from dept where dname in ('RESEARCH', 'ACCOUNTING')) and empno in (select mgr from emp group by mgr having count(*) >= 2);

3) Display the department location that is having greater than four employees in it.
Select loc from dept where deptno in (select depino form emp group by deptno having count(*) > 4);

4) Display all the employees of dept 30, 20 with there anual salary and having at least 3 employees.

5) List the dept name that are having at least 3 emp's but not more than 5 employees in it
⇒ Select dname from dept where deptno in (select deptno from emp Group By deptno hauing count(*) between 3 and 5);

6) List the dept names that are having at least 3 employes in it.

⇒ Select dname from dept where deptno in (select deptno from emp Group By deptno having count(*)>=3);

7) List employees from research and accounting dept having atleast two reporting

⇒ Select ename from emp where deptno in (select deptno from dept where dname in ('ACCOUNTING', 'RESEARCH')) and empno in (select mgr from emp Group By mgr having count(*)>=2);

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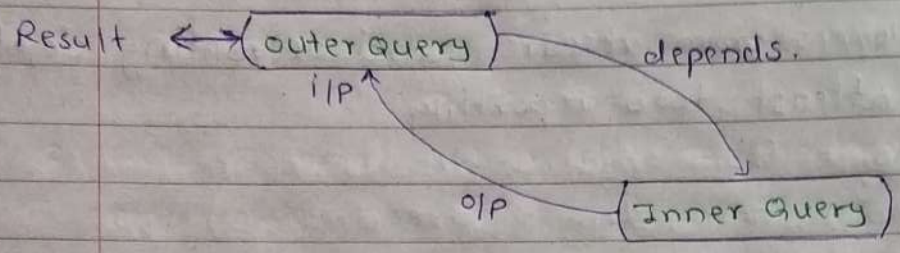
* Subqueries ⇒

1) A queries which is written inside another query is called as a subQueries.

Working Principle of subqueries ⇒



1) Inner query executes first and output of a inner query is given to outer query as a input.
2) Outer query executes completely and provide the result, theirfore we can say outer query depends on a inner query.

Reasons to use Subqueries -

1) If we have unkown values in problem statements
2) When data is in one table and condition is in another table. #

Note = To compare two columns in subqueries column should be same or datatype should be same.

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* Group By

1) Group by is used to group similar type of a data.

Emp

ename	Sal	deptno
A	100	10
B	200	20
C	300	10
D	400	20
E	500	30

Emp

ename	Sal	deptno
A	100	10
B	200	20
C	300	10
D	400	20

Emp

ename	Sal	deptno
A	100	10
C	300	10
B	200	20
D	400	20

eg Select count(*), deptno from emp where deptno != 30 group by deptno;

Deptno	count(*)
20	2
10	2

Syntax —

Select col.name, group funtion from tablename where <filter-condition> group by col.name;

Order of Execution

4) select
1) from
2) where
3) group by

② Any clause after group by clase nature of execution will be group by group only.

③ We have to mention a column name which is used in a group by in a select clause. Other than that it will not alloco.

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4) We can use multirow function in a group by clause.

Nature of execution -
Where ⇒ Row by row execution
group by ⇒ Row by row execution
Select ⇒ Group by group execution ⇒ After group by all clauses will execute group by group only.

ex. Q1 WAQTD total sal needed to pay each job in the emp table.

Q2 Display emp working in each dept & its avg sal excluding all the emp whose sal is less than their commision.

Q3 Display number of emp only if they are working as manager ~~and~~ or analyst and thier anual sal should ends with zero in each dept.

Q4 Display number of clerks working in each dept.

Q5 Display number of employee working in each dept except for those who are working in dept 10

Q6 Display number of employees getting commission in each dept

Q7 Display number of employees getting sal more than 1600 excluding all the managers in each dept.

Q8 Display avg sal needed to pay all the employee's who are having reporting manager in each job.

Q9 Display max sal given in each designation excluding those whose name starts with 'K'.

Ans ⇒

① Select sum(sal) from emp ~~where~~ group by ~~dept~~job.
Select sum(sal), job from emp group by job;

② select emp, avg(sal) from emp where sal < comm group by
~~Select~~ select count(ename), avg(sal), deptno from emp where sal > comm
group by deptno;

③ Select count(*), deptno from emp where job in ('Manager', 'Analyst') and sal * 12 like '%0' group by deptno;

④ Select count(job), deptno from emp where job = 'CLERK' group by deptno;

⑤ Select count(*), deptno
from emp
where deptno != 10
group by deptno;

⑥ Select count(*), deptno
from emp
where comm is not null
group by deptno;

⑦ Select count(*), deptno
from emp
where sal > 1600 and job != 'MANAGER'
group by deptno

⑧ Select avg(sal), job
from emp
where mgr is not null
group by job;

⑨ Select max(sal), job
from emp
where ename not like 'K%'
group by job;

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* Having Clause :-

1) Having clause is similar to where clause but it is a group by filter condition. i.e. we can apply having clause only on ~~having~~ a groups.

Difference between having and where clause.

Having	Where
① use after group by clause	① use before group by clause
② Order of execution or nature of execution is	② Order of execution or nature of execution is
③ group by group	③ row by row.
④ used to filter the groups	④ used to filter the records
⑤ Multirow f° are allow	⑤ Multirow functions are not allow
⑥ Dependents on group by	⑥ Independent

Synatax = Select col.name, group function
from Table name
where <filter_condition>
group by col.name
having <group filter condition>

Order of execution	Nature of execution
⑤ select	where → Row by row
① from	Group → Row by row
② where	having → Group by group
③ group by	Select → group by group
④ having	

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Questions ⇒

1) WAQTD hiredate on which atleast 3 emp got hire
2) Display deptno which has more than 2 emp & total amt required to pay monthly sal of all the employees in that dept should be more than 9000.
3) Display the salaries which has repetation in the sal column of the emp table.
4) Display the name only if more than one person in the emp of the company has same name.
5) Display the number of employees hire into same dagte
6) Display number of employees getting same salary working in same dept.
7) Display number of employees whose name starts with vowel in each dept.

Ans:

① Select hiredate, count(*) from emp group by hiredate having count(hiredate) >= 3;

② Select deptno, count(*) from emp group by deptno having count(*) > 2 and sum(sal)

③ Select count(sal) from emp group by sal having count(sal) > 1.

④ Select ename from emp group by ename having count(*) > 1;

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⑤ Select count(*), hiredate from emp group by hiredate having count(hiredate) > 1;

⑥ Select count(*), sal, deptno from emp group by sal, deptno having count(sal) >

⑥ Select count(*), deptno, sal from emp group by deptno, sal having count(sal)>1;

⑦ Select count(*), ename, deptno from emp where substr(ename, 1, 1) in ('A', 'E', 'I', 'O', 'U') group by deptno, ename;

1. Having

* Order by Clause

① Is used to arrange the records according to order (Assending ~~ordersns~~ or desending)

② asc → used to display records in asending order.

desc → used to display records in desending order

③ By default records will arranged in asending order

example

① Select * from emp order by ename; //default asending
② Select * from emp order by ename asc; // Asending order
③ Select * from emp order by ename desc; // desending
④ select * from emp order by 5; // used to display 5th column order in asc.
⑤ ~~Seat~~ select * from emp order by comm asc;

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* Joins :

Joins are used to join (combine) ~~to of~~ two or more tables.

1) Cartesian Join / cross Join
2) Inner Join
3) Outer Join
   a) Left Outer Join
   b) Right outer Join
   c) Full outer Join
4) Natural Join
5) Self Join

① Cross Join / Cartesian Join :-

1) It is a type of a join where we get mashed records as well as unmashed records.
2) 1st record of one table is joined will all other records of another table

Syntax :

Orcele - Select * from table1, table2;

ANSI - Select * from table1 cross join table2;

example: Q⇒ Select * from emp cross join dept;

A⇒ Select * from emp, dept;

EMP

ename	deptno
A	10
B	20

Dept

deptno	dname
10	Sales
20	Acc
30	Research

⇒

ename	dname	
A	Sales	✓
B	Sales	✗
A	Acc	✗
B	Acc	✓
A	Research	✗
B	Research	✗

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(2) Inner Join :-

1) It is a type of join where we get only matched records of both the tables by specifing join cond^.

(,) replaced by inner join

(where) Replaced by where cond^

Syntax :-

Orc Select * from table1, table2 where <Join cond^>

(Replaced by) →

ANSI Select * from table1 inner join table 2 on <join cond^> where <filter condition>

example: Select ename, dname from emp e, dept d where e.deptno =d.deptno;

Orc →

ename	dname
A	Acc
B	Sales

ANSI- Select ename, dname from emp e inner join dept d on e.deptno=d.deptno;

Inner Join Queries

Q ① Name of the emp and loc of all the employees.

⇒ Select ename, loc from emp e, dept d where e.deptno = d.deptno;

Q ② WAQTD dname & sal for all the emp working in acc.

⇒ Select dname, sal from emp e, dept d where e.deptno = d.deptno and dname = 'ACCOUNTING';

⇒ Select dname, sal from emp e ~~inter~~ inner join dept d on e.deptno = d.deptno ~~and~~ where dname = 'ACCOUNTING';

Q ③ WAQTD dname, and anual sal for all the employee whose sal is more than 2340.

⇒ Select dname, sal * 12 from emp e, dept d where e.deptno = d.deptno and sal > 2340;

⇒ Select dname, sal * 12 from emp e inner join dept d on e.deptno = d.deptno where sal > 2340;

Q ④ WAQTD ename, dname for employees having character A in their dname.

⇒ Select ename, dname from emp e, dept d where e.deptno = d.deptno and dname like '%A%';

⇒ Select ename, dname from emp e inner join dept d on e.deptno = d.deptno where dname like '%A%';

Q ⑤ WAQTD ename, dname for all the employees working as salesman.

⇒ Select ename, dname from emp e, dept d where e.deptno = d.deptno and job = 'SALESMAN';

Q.⑥ WAQTD dname & job for all the employees whosee job and dname starts with charactr S.

⇒ Select dname, job from emp e, dept d where e.deptno = d.deptno and job like 'S%' and dname like 'S%';

∴ substr(job, 1, 1) in ('S')

Q⑦ WAQTD dname & mgr no for employees reporting to 7839.

⇒ Select dname, mgr from emp e, dept d where e.deptno = d.deptno and mgr=7839

Q⑧ WAQTD dname & hiredate for employee hiredate after 83 into accounting or research dept.

⇒ Select dname, hiredate from emp e, dept d where e.deptno = d.deptno and hiredate to_char(hiredate, 'yy') > 83 and dname in ('Accounting', 'Research');

Q⑨ WAQTD ename & dname of the employees who are getting comm in dept 10, 30

⇒ Select ename, dname from emp e, dept d where e.deptno = d.deptno and comm is not null and e.deptno in (10, 30);

Q.⑩ WAQTD dname & empno for all the employees whosee empno are (7839, 7902) and are working in loc new york.

⇒ Select dname, empno from emp e, dept d where e.deptno = d.deptno and empno in (7839, 7902) and loc = 'new york';

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Q.11 WAQTD loc & avg(sal) given for each location by excluding all the employees whos second char is A in their name.

⇒ Select loc, avg(sal) from emp e, dept d where e.deptno = d.deptno ~~and~~ group by loc and ename not like '_A%' group by loc ~~sal~~;

Q.12 WAQTD name of the emp and His loc if employee is working as manager and working under the employee whoese empno is 7839

⇒ Select ename, loc from emp e dept d where e.deptno = d.deptno and job = 'MANAGER' and mgr = 7839;

Q13 WAQTD dname and employee id's of all the employees who are clerks & having reporting managers.

⇒ Select dname, empno from emp e, dept d where e.deptno = d.deptno and job = 'CLERK' and mgr is not null;

Q.14 WAQTD dname and total salary given to that dept if there are atleast 4 employees working for each dept.

⇒ Select dname, sum(sal) from emp e, dept d where e.deptno = d.deptno group by dname having count(*) >= 4;

Q.15 WAQTD dname & number of employees working in each dept only if there are manager or clerks.

⇒ Select dname, count(*) from emp e, dept d where e.deptno = d.deptno and job in ('MANAGER', 'CLERK') group by dname;

2/04/21 * Outer Join

① Left Outer Join :- we will get matched records ~~of~~ of both the table as well as unmatched records of the left table.

Syntax :-

ANS1 - Select * from table1 left join table2 on table1.col-name = table2.col-name;

Orc - Select * from table1, table2 where table1.colname = table2.colname (+);

emp

ename	deptno
A	10
B	20
C	30
D	50

dept

dname	deptno
CS	10
IT	20
Mech	30
Civil	40

⇒

Left Join

ename	dname
A	CS
B	IT
C	MECH
D	

example ⇒ Select ename, dname from emp1 e, dept d where e.deptno = d.deptno (+);

Orc ⇒

Select ename, dname from emp1 e left join dept d on e.deptno = d.deptno;

Ans1 ⇒

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② Right Outer Join :- In this we will get matched records of both the tables as well as unmatched records of right table.

Syntax :-

ANSI : Select * from table1 right join table2 on table1.col-name = table2.col-name ;

Orc : Select * from table1, table2 where table1.colname(+) = table2.col-name ;

Right Join

ename	dname
A	CS
B	IT
C	mech
	civil

example ⇒ Stlect ename, dname from emp1e, dept d where e.deptno(+) d.deptno

orc →

Select ename, dname from emp1 e Right join dept d on e.deptno = d.deptno ;

ANSI →

③ Full Outer Join :- We will get matched records of both the tables as well as unmatched records of both the table (right & left).

For full outer join we don't have a oracle syntax.

Syntax :-

ANS1 - Select * from table1 full join table2 on table1.col-name = table2.col-name ;

Full outer Join

ename	dname
A	CS
B	IT
C	MECH
D	
	Civil

example Select ename, dname from empl e full join dept d on e.deptno = d.deptno ;

ANS2

Natural Join

demo

ename	deptno	loc
A	10	Pune
B	20	Mumbai
C	30	Pune
D	40	Nagpur

demo1

dname	deptno	~~Address~~ loc
CS	10	Pune
IT	20	Mumbai
MECH	30	Pune
Civil	40	~~Nagpur~~ Kolhapur

Select * from demo natural join demo1;

⑤ Self Join :- Joining - same table

> Select emp.*, sal+100 from emp;

> select e1.empno, e1.ename, e2.empno, e2.ename from emp e1, emp e2 where e1.mgr = e2.empno;

E1

Empno	Ename	MGR
1	A	4
2	B	5
3	C	2
4	D	1
5	E	

emp

E2

Empno	Ename	MGR
1	A	4
2	B	5
3	C	2
4	D	1
5	E	

mgr

> Select e1.empno, e1.ename, e2.empno, e2.ename, e3.empno, e3.ename from emp e1, emp e2, emp e3 where e1.mgr = e2.empno and e2.mgr = e3.empno;

> Select e1.ename, e2.ename from emp e1, emp e2 where e1.mgr = e2.empno and e1.ename = 'BLAKE';

1] Join to same tables is called as a self join
2] Self join is mejorly used to identify employee manager relation.

Q Display the name and salary of the employee who is working as a ~~plarks~~ blacks manager.

⇒

select e1.ename, e2.sala, e2.ename from emp e1, emp e2 where e1.mgr = e2.empno and e1.ename = 'BLAKE';

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Q Display name of the emp who are working under king.

⇒ Select e1.ename, from emp e1, emp e2
where e1.mgr = e2.empno and e2.ename='KING';

Q Display name of the emp as well as deptname who is working as a fords manager.

⇒ Select e2.ename, dname .from emp e1, ~~emp~~ emp e2, deptd
where e1.mgr = e2.empno and e2.deptno = d.deptno,
e1.ename = 'FORD';

Q Display details of the employee as well as its manager managers location and sal.

⇒ Select * e1.*, d.loc, e3.sal from emp e1, emp e2, emp e3, dept d,
from where e1.mgr=e2.empno and e2.mgr=e3.empno and
e3.deptno = d.deptno

Q Display details of 'ADAMS' manager & location of managers manager

Q Display details of the emp who are working for 'SMITH'S managers manager.

⇒ select e4.* from emp e1, emp e2, emp e3, emp e4
where e1.mgr = e2.empno and e2.mgr = e3.empno and
e4.mgr = e3.empno and e1.ename = 'SMITH';

Q Display name and location of the employee who is working as a 'BLACK'S manager.

⇒ Select e2.name, loc from emp e1, emp e2, dept d where
e1.mgr = e2.empno and e1.ename = 'BLAKE' and
e2.deptno = d.deptno;

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Q Display details of the employees who was hired before smith manager.

⇒ Select e3.* from emp e1, emp e2, emp e3 where e1.mgr = e2.empno and ~~e3.mgr = e2.empno and~~ e1.ename = 'SMITH' and e3.hiredate < e2.hiredate ;

Assignment

Q List ename, job, anual sal, deptno, dname who earn 30000 per year and who are not clerks.

⇒ Select ename, job, sal*12 annual_sal, emp.deptno, dname. from emp, dept where emp.deptno = dept.deptno and sal*12 > 30000 and job != 'CLERK';

Q List out the all employees by name and employee number along with their manager's name and empno.

⇒ Select e1.ename, e1.empno, e2.ename, e2.empno from emp e1, emp e2 where e1.mgr = e2.empno(+);

Q Display ename, dname even if there no employees working in a particular department

⇒ Select ename, dname from emp e, dept d where e.deptno(+) = d.deptno ;

Q Display the department name along with total salary in each department.

⇒ Select dname, sum(e1.sal) from emp e1, dept d where e1.deptno = d.deptno group by dname;

Q. Display employee name and department name for each emp.

⇒ Select ename, d.dname from emp e, dept d where e1.deptno = d.deptno;

6) Display location name of the emp who earn comm.

⇒ select d.loc, e.ename from dept d, emp e where e.deptno = d.deptno and comm is not null;

7) Display dept name of the emp who earn min salary and have no reporting manager.

⇒ select d.dname from dept d, emp e where e.deptno = d.deptno and sal = (select min(sal) from emp) where mgr is null);

8) Display dept name, loc of all the employees who are reporting to smith.

⇒ select d.dname, d.loc from dept d where emp.deptno = d.deptno and mgr = (select empno from emp where ename = 'SMITH');

→ No rows selected.

9) List all the dept name and location of all the salesman manager's manager.

⇒ Select dname, loc from dept d, emp e where d.deptno = e.deptno and job in ('SALESMAN', 'MANAGER') and empno in(Select mgr from emp where job = 'MANAGER');

10) List employees who are working in research dept and they are manager.

⇒ select ename from emp e, dept d where d.deptno = e.deptno and dname = 'RESEARCH' and job = 'MANAGER';

11) Display the number of emp who are getting salary less then the blake's manager.

⇒ Select count(*) from emp e where sal < (select sal from emp where empno = (select mgr from emp where ename = 'BLAKE'));

→ 13

12). list the employee deptname and location of all the emp's who are analyst, reporting to BLAKE.

⇒ Select ename, dname, loc from emp e, dept d where e.deptno = d.deptno and job = 'ANALYST' and mgr = (Select empno from emp where ename = 'BLAKE');

13) Display the employee names, Hiredate, comm of FORD's manger.

⇒ Select ename, hiredate, comm from emp e where empno = (Select mgr from emp where ename = 'FORD')

14) Display ename, dname of all the employees whose sal less than avg sal of dept 30.

⇒ Select ename, dname from emp e, dept d where e.deptno = d.deptno and sal < (select avg(sal) from emp where deptno = 30 group by deptno);

15) Display ename, dname and loc of all the emp's who are working for jones.

⇒ Select ename, dname, loc from empe, dept d where e.deptno = d.deptno and mgr = (select empno from emp where ename = 'JONES');

16) Display ename, dname of all the employees whose name starts with S.

⇒ Select ename, dname from emp e, dept d where e.deptno = d.deptno and ename like 'S%';

17) list the dname who are not having any employee in it.

⇒ Select dname from dept where deptno not in (select distinct deptno from emp);

⇒ Select dname from emp, dept where emp.deptno(+) = dept.deptno and ename is null;

18) Display all the dept names irrespective of any emp working in it or not, if an emp is working display his name.

⇒ select dname, ename from empe right outer join dept d on e.deptno = d.deptno;

19) WAQTD emp name, job, dname, loc of all employees who are working as actual managers and works at chicago.

⇒ Select ename, job, dname, loc from empe, dept d where e.deptno = d.deptno and empno in (select mgr from emp) and LOC='CHICAGO';

20) list the dept names in which the employees are hired betn 1st of JAN 1981 and 31st Dec 1982 with salary more than 1800.

⇒ Select dname, hiredate. from emp e, dept d where e.deptno = d.deptno and hiredate between '01-JAN-1981' and '31-DEC-1982' and sal > 1800;

21) Display 2nd least salary from emp table.

⇒ Select min(sal) from emp where sal > (select min(sal) from emp);

⇒ Select min(e2.sal) from emp e1, emp e2, ~~emp e3~~ where e1.sal < e2.sal;

22) List the employees whose annual sal is greater than 1500 and who are joined before 1982 only.

⇒ Select ename, hiredate from emp where sal * 12 > 1500 and hiredate < '01-JAN-1982';

23) Display emp name along with their manager name.

⇒ Select e1.ename, e2.ename from emp e1, emp e2 where e1.mgr = e2.empno;

24) Display emp name and his dept name for the employees whose name starts with 's'.

1) ⇒ Select ename, dname from emp e, dept d where e.deptno = d.deptno and substr(ename, 1, 1) = 'S';

2) ⇒ —"— substr(ename, 'S', 1, 1) = 1;

3) ⇒ Select ename, dname from empe, dept d where e.deptno = d.deptno and ename like 'S%';