SQL Day 14

```
Create Table Employee101(
emp_no number, emp_name varchar(250), salary number,
city varchar(250),dept_id number
);
```

EMP_NO	EMP_NAME	SALARY	CITY	DEPT_ID
101	Alex	5000	Pune	1
102	Robin	6000	Mumbai	1
103	Ajay	10000	Mumbai	2
104	Mohit	10000	Mumbai	3
105	Reena	7000	Nashik	4

Group by Clause

Purpose : Group by Clause is used to group records

Group by Clause is used with group functions like sum, avg, count, min, max

Examples for group function without group by clause

```
Q. Find sum of salary of All employee's

-> Select sum(salary) from Employee101;

Q. Find sum of salary of All  Employee's
   who are working in department 1

-> select sum(salary) from Employee101 where dept_id=1;

Q. Find sum of salary of All employee's who
   belongs to Pune City

-> select sum(salary) from Employee101 where city='Pune'
```

Group by clause

=> group by clause is used to divide rows into smaller smaller group

=> Syntax:

```
select column_names, group_function(column_name)
from table_name  group by column_names;
```

Group by Clause Examples

```
Q. Find city wise sum of salary of all Employee's

select sum(salary),city from Employee101
group by city;

Q. Find department wise avg salary of Employee

select avg(salary),dept_id from Employee101
group by dept_id;

Q. Find city wise and department wise sum of salary
   of Employee

Select sum(salary), city, dept_id From Employee101
group by city, dept_id
```

```
Group By and Where clause Example

Q. Find city wise sum of salary of Employee
   whose salary is greater than 6000

Select sum(salary),city From Employee101 where salary>6000
group by city


Note: When we are using where cluase and group by clause
then order is -> First use where clause
then use group by clause as above
```

Where clause, group by Clause and Order By clause

```
Select sum(salary),city From Employee101 where salary>6000
group by city; --> valid

Select sum(salary),city From Employee101 group by city
where salary>6000; Invalid
```

Note: If we are using group by, Order by and where cluase then sequence is
First Where clause then Group by Clause and then Order by cluase.
But In Order by we need to specify column name which is mentioned
in Select list.

Examples

```
Select sum(salary),city From Employee101 where salary>6000 group by city Order by
emp_no  desc; Invalid

Select sum(salary),city From Employee101 where salary>6000 group by city Order by city
desc; valid

Select sum(salary),city From Employee101 where salary>6000 group by city Order by
salary  desc; invalid
```

Note: Group by clause is always used with group functions

```
Select length(emp_name),salary from Employee101 group by salary; -> Invalid
```

Not a group function

Now consider the below table Employee and its records

EMP_NO	FIRST_NAME	SALARY	CITY	DEPT_ID	DESIGNATION
110	Atul	8500	Nashik	1	Developer
107	Arjun	6500	Chenai	1	Team Lead
101	Alex	4000	Pune	1	Cleark
104	Payal	8000	Chenai	1	Tester
101	Alex	4000	Pune	1	Cleark
111	Ganesh	9500	Pune	1	Tester
108	Ajay	3500	Mumbai	2	Manager
102	Martin	5000	Mumbai	2	Developer
105	Laila	8500	Pune	2	Tester
109	Robbert	10000	Nashik	3	Developer
103	Melisa	7000	JayPur	3	Developer
106	Katrina	9000	JayPur	3	Team Lead

More Examples on Group By

Suppose if we want to find sum of salary of all employee then we write query as below

```
Select  sum(salary) as Total_salary from Employee;
```

Results | Explain | Describe | Saved SQL | History

TOTAL_SALARY
83500

1 rows returned in 0.14 seconds

Now, suppose I want **department wise** salary sum of Employee then I need to use group clause as below

```
Select dept_id ,sum(salary) as Total_salary from Employee
group by dept_id;
```

DEPT_ID	TOTAL_SALARY
1	40500
2	17000
3	26000

3 rows returned in 0.05 seconds

group by clause create group based on department id and applied Group function on that.

Important points about while using group by clause.

1) All column name in select list that are not in group function must be in group by clause.

Below query is valid query

```
select dept_id, sum(salary) from Employee
group by dept_id;
```

But below query is not valid query

```
select dept_id, sum(salary) from Employee
group by city;
```

In the above query problem is in select list we have used dept_id column but not mentioned by group by

2) But we take other column names also after the group by keyword which are not in select list

```
select dep_id, sum(salary) from Employee
group by dept_id,city
```

```
select dep_id,city sum(salary) from Employee
group by dept_id,city;
```

```
select dep_id, sum(salary) from Employee
group by city
```

```
select dep_id, sum(salary) from Employee
group by dept_id,city, salary
```

Examples of Group by clause

Q. Find City wise sum of Salary of Employee

Ans: select city, sum(salary) from Employee
group by city;

Q. Find department wise avg salary of Employee

Ans: select dept_id, avg(salary) from Employee
group by dept_id

Q. Count City wise employee

Ans: select city, count(*) from Employee
group by city;

Q. Find department wise max salary

Ans: Select dept_id, max(Salary) from Employee
group by dept_id;

Group by and Where Clause in one Query

Q. Find department wise sum of salary of those employee who belongs to Pune City

Ans: select dept_id, sum(salary) from Employee
where city='Pune' group by dept_id;

Q. Find department wise max of salary of those employee who belongs to Mumbai City

Ans: select dept_id, max(salary) from Employee
where city='Mumbai' group by dept_id;

Group by clause, Where Clause and Order by Clause in one Query

Q. Find department wise sum of salary of Pune city Employee and display result in ascending order of dept_id

```
Ans: select dept_id,sum(salary) from Employee
       where city='Pune' group by dept_id order by dept_id asc;
```

Q. Find department wise avg of salary of Pune city Employee and display result in ascending order of City

```
Ans: select dept_id,sum(salary) from Employee
       where city='Pune' group by dept_id order by city asc;
```

Note: When we are using Group by , Order by and where clause then

Sequence should be - where Group by Order by

Note: We can use group function in Order by clause

Example: find department wise average salary of employee and display records in ascending order of Average salary

```
Ans: select dept_id, avg(salary) from Employee
       group by dept_id order by avg(salary) asc;
```

Grouping more than one column

Q. Find department wise and city wise sum of salary of Employee

```
Ans:  select dept_id,city , sum(salary) from  Employee
       Group by dept_id,city;
```

Having Clause

1) Why Having clause is required?

Ans: In where clause we cannot use group function,
so below query is invalid

```
select dept_id, sum(salary) from Employee
where avg(salary) >50 group by dept_id;
```

Above query give an error, because in where clause we have used group function. so if we want to use group function to apply a condition then use having clause instead of where clause as below

```
select dept_id, sum(salary) from Employee
having avg(salary) >50 group by dept_id;
```

If we are using where clause, having clause group by clause and Order by clause then follow the below sequence

Ans: Where having group by and Order by

Example: Find department wise sum of salary of Pune city and salary is greater than average salary and display data in ascending order of Department id

Ans:
```
select dept_id, sum(salary) from Employee
where city='Pune'
having avg(salary) >50 group by dept_id order by dept_id asc;
```

Note: After where clause we have applied normal condtion but not used group function that's why it is valid. by mistake if we use group function after where clause then it become invalid

Rollup and Cube Operator
==========
Rollup Operator
1) This operator is an extention of Group by cluase

2) Rollup operator is used to find sub-total and grand total

3) It uses single column name for finding sub-total and grand total.

Example: Find department wise sub-total and grand total of
Employee Salary

Ans: select dept_id, sum(salary) from Employee
group by rollup(dept_id);

Note: We have to use rollup after after group by clause.
Rollup operator is always used with group by, without group by we can't use rollup,

select dept_id, sum(salary) from Employee group by rollup(dept_id);	
select dept_id, sum(salary) from Employee rollup group by(dept_id) ;	
select dept_id, sum(salary) from Employee rollup(dept_id);	
select dept_id, sum(salary) from Employee group by(dept_id);	
select dept_id, sum(salary) from Employee group by dept_id;	

Cube Operator

1) Cube operator is an extention of group by clause.

2) This operator is used to find sub-total and grand total

3) This operator is used after group by clause.

```
select dept_id,sum(salary) from Employee
group by cube(dept_id)
```

```
select dept_id,sum(salary) from Employee
 cube group by (dept_id)
```

Q. What is difference between Rollup and Cube Operator?

1) If we are using single column in rollup and cube then there is no difference in the output
But if we are using two or more column names in rollup and cube function then there is difference.

2) Difference- If we are using two or more columns in rollup then rollup is using one for column for finding sub-total and grand total
but cube operator using all column names to find sub-total and grand total.

Example:

select dept_id,city,sum(salary) from Employee
group by rollup(dept_id,city)

DEPT_ID	CITY	SUM(SALARY)
1	Pune	17500
1	Chenai	14500
1	Nashik	8500
1	-	40500
2	Pune	8500
2	Mumbai	8500
2	-	17000
3	JayPur	16000
3	Nashik	10000
3	-	26000
-	-	83500

Department 1 total

Department 2 total

Department 3 total

Grand Total

select dept_id,city,sum(salary) from Employee
group by cube(dept_id,city)

DEPT_ID	CITY	SUM(SALARY)
-	-	83500
-	Pune	26000
-	Chenai	14500
-	JayPur	16000
-	Mumbai	8500
-	Nashik	18500
1	-	40500
1	Pune	17500
1	Chenai	14500
1	Nashik	8500
2	-	17000
2	Pune	8500
2	Mumbai	8500
3	-	26000
3	JayPur	16000

Grand Total

Citi wise total

Department 1 total

Department 2 total

Department 3 total