

* Aggregate Functions

□ count, max, min, avg, sum

□ Does not consider null values

□ General rule in SQL

Select min(salary), did from employee XXX

When we have another column with an aggregate function we must

Group by that column

Select min(salary), did from employee
group by did

Grouping hides the rows & then
applies the aggregate functions

<https://vjudge.net> to this problem

Where can't be applied with
an aggregate function within
it

```
Select Sum(salary), did  
from employee  
group by did  
where sum(salary) >= 22000
```

↗
This part is wrong because where
clause works on each row
while the aggregate function
works on the whole column

Instead of using where with
aggregate function, we have
the having clause, which
~~works~~ works on the aggregate
functions

```
Select sum(salary), did  
from employee  
group by did  
where having sum(salary) >= 22000
```


- Where is condition over rows
- Having is a condition over groups and can have aggregate functions

* Subqueries

- We can use its output as a part of another query
- Can be used with select, insert, update, where, having, etc.

```
Select * From student
where st-age < (select avg(st-age)
from student)
```

Outer
query

Inner
query

The inner query executes first

- Subqueries could be used with or without aggregate functions
- Join are faster than subqueries

□ Subqueries are the last thing that you should think about it

* Union

□ Used when we want all the output of multiple queries into one table

□ Before
select stname
from student // result 1
in a table

select insname
from instructor // result 2
in another table

□ After

select stname from student
union all
select insname from instructor

// ~~two~~ one result
in one table