Subquery

it is also known as nested query or inner query.

```
select * from
students;
where s_id=101;
```

student table

s_id	s_name	age	marks
1	A	22	87 ← ✓
2	B	24	70 ← ✗
3	C	23	62 ← ✗
4	D	24	89 ← ✓
5	E	22	75 ← ✗
6	F	21	55 ← ✗
7	G	23	92 ← ✓

find all the student who scored greater than 75 ?

```
select *
from students
where marks >75;
```

Q) find the marks of the student whose st_id is 1 ?.

```
select  marks
from    students
where   sb_id=1;
```

Q) find all the student who scored greater than the mark of st_id = 1.

Student table S1

s_id	s_name	age	marks
1	A	22	87 ✓
2	B	24	70 ✗
3	C	23	62 ✗
4	D	24	89 ✓
5	E	22	75 ✗
6	F	21	55 ✗
7	G	23	92 ✓

Student table S2

s_id	s_name	age	marks
1	A	22	87 ✓
2	B	24	70 ✗
3	C	23	62 ✗
4	D	24	89 ✓
5	E	22	75 ✗
6	F	21	55 ✗
7	G	23	92 ✓

```
select  s1.name, s1.marks
from    students  s1
join    students  s2.
on      s1.marks > s2.marks  and  s2.s_id = 1;
```

find all the student who scored greater than x ?.

Q) find the marks of the student whose st_id is 1 ?. = x

```
select *
from students
where marks > (select marks
               from students
               where sb_id=1);
```

for( )
  for( )

- subquery is used to get list values and perform any operation based on result of other query.

- it's break complex logic in smaller or manageable chunks.
  - this is easier to understand and more readable

- generally it is used for small data set. and it is not good in terms of space and performance.

- select the students who have marks greater than the average marks of students?

```
select *
from students
where masks > (select avg(mark)
               from students);
```

employees table

e_id	e_name	salary	manager_id
2	A	45K	7
5	B	40K	10
7	C	90K	null
8	D	25K	15
10	E	20K	9
11	F	80K	null
13	G	50K	6
6	aa	30K	7
9	bb	40K	10
15	cc	70K	6

find the id of the employees whose salary < 30K and whose manger left the company.

when a manager is left the company their information is deleted from the employees table but the their id still present in man_id.

```
Select e_id
from employees
where salary < 30,000
And manager_id not in( select e_id
                       from employees )
```

break till 9:14

instructor table

i_id	i_name	salary	dept_id
2	A	45K	103
5	B	40K	102
7	C	90K	null
8	D	25K	105
10	E	20K	102
11	F	80K	null
13	G	50K	105
6	aa	30K	102
9	bb	40K	107
15	cc	70K	105

(25K, 50K, 70K)

Q) display instructor name who have salary greater than salary of all the instructor of dept-id = 105;

ALL

```
select i_name
from instructor
where salary > ALL ( select salary
                     from instructor
                     where dept_id = 105 )
```

$ 25K, 30K, 70K)

```
select i_name
from instructor
where salary > ( select max(salary)
                 from instructor
                 where d_id = 105);
```

↓

max

display instructor name who have salary greater than salary of any instructor of dept-id = 105;

```
select i_name
from instructor
where salary > Any ( select salary
                     from instructor
                     where dept-id = 105)
```

↓

$ 25K, 30K, 70K)

correlated query

if any query is related with column of other query.

Q) display instructor name who have salary greater than salary of avg salary of their respective department.

avg salary of a specific department

```
select inst_name
from instructors a
where salary > (select avg(salary)
                from instructors
                where department_id = a.department_id);
```

Q) find the number of instructor where dept_id = 110 ?.

```
select count(*)
from instructor
where dep_id = 110;
```

Q) find the number of instructor of all departments. and with department_name?

```
select dept_id, count(*)
from instructors
group by dept_id;
```

dept_id = x → 0 instructor

```
select dept_id, ( x )
from departments d;
```

```
x = select count(i.instructor_id)
    from instructors i
    where department_id = d.department_id);
```

dept_id = x → 0 instructor

```sql
-- find st_id f_name , marks the stud who scored greater than st-id 33;
select st_id , f_name , marks
from students
where marks > (select marks from students  where st_id = 33)
order by marks desc;

-- find st_id f_name , marks all students who have scored greater than the avg marks of students

select st_id , f_name , marks
from students
where marks > (select avg(marks) from students);

-- display inst_name who have earn more than the salary of all inst of dept_108;
select instructor_name , salary
from instructors
where salary > all(select salary from instructors where department_id = 108);

select instructor_name , salary
from instructors
where salary > (select max(salary) from instructors where department_id = 108);

-- display inst_name who have earn more than the salary of any inst of dept_108;
select instructor_name , salary
from instructors
where salary > any(select salary from instructors where department_id = 108);

-- find all the depathment with number of instructor
select d.department_id , count(i.instructor_id)
from departments d
left join instructors i
on d.department_id = i.department_id
group by department_id;

select department_id , (select count(*) from instructors
where department_id = d.department_id )
from departments d;
```