

Class will start at 9:05 PM

Agenda

- Subqueries
- Subqueries and IN
- " in FROM
- ALL and ANY
- Correlated Sub queries
- Exists.

students

id	name	psp	b_id.

Q) find all students who have psp greater than max psp of students of batch 2.

- ① $x = \text{max psp of batch 2}$
- ② write a query to return all students whose psp $> x$

① select max(psp) from students
where b_id = 2;

② select * students
where psp $> x$

outer query. [select * students
where psp $> ($
select max(psp)
from students
where b_id = 2] \rightarrow Inner query.

Q) find all students whose psp > psp of student with id = 18;

```
select *  
from students  
where id = 18;
```

```
select * from  
students where  
psp > X
```

```
( select * from Students  
  where psp > (  
    select *  
    from students  
    where id = 18;  
  );
```

Without subquery.

```
select * from student  
where psp > x
```

```
ans = []
```

```
for s : student  
    if s.psp > x  
        ans.add(s);
```

```
return ans;
```

With subquery.

```
1 ans1 = [];
```

```
2 for s : students {  
    . psp = null;
```

```
3 [ for (s1 : students)  
4   if s1.id == 18  
5     psp = s1.psp
```

```
6 if (s.psp > psp)  
7   ans1.add(s);
```

outer query.

$O(n)$ inner query

return ans;

$$O(n \times n) = O(n^2);$$

IN

users		↓	↓	
	id	name	is stud	is_ta
X	1	Ishan	false.	true
✓	2	Naman	true	true
X	3	Ajit	true	false
X	4	Harish	true	false
X	5	Rishi.	true.	false.
✓	6	Alok	true	true.

find the names of all the students who are also TA.

```
select distinct s.name
from users s
join user t
on s.id = t.id
AND s.is-student = true <
AND T.is-TA = true;
```

① ^{tas =} find name of all TA

② Get student whose name are present in tas;

```
select distinct name  
from users u where u.is_ta = true.
```

[Ishan, Namam, Alok.]

②

```
select name  
from users u  
where u.is_stud = true  
and u.name in [ ]
```

```
select name  
from users u  
where u.is_stud = true  
and u.name in (  
    select distinct name  
    from users u where u.is_ta = true.  
)
```

Q find all the students whose psp is not less than ^{min} psp of any batch.

① → Find min psp of every batch.

② → $x = \text{select max psp. from } \underline{1}$

③ → find all student where $\text{psp} > x$

①

select min (psp)
from students
group by (b-id);

min_psp b_id	

② select max (psp)
from Table;

select max (psp)

from (

select min (PSP) as psp.

from students
group by (b-id);

)

③

N | select *
from student
where psp > (

N [select max (psp)
from (

N [select min (PSP) as psp.
from students
group by (b-id);
) minpsp.

)

N³
Note

you need to give a name to
subquery in FROM.

	min psp	batch
⋮	2	A
⋮	3	B
⋮	1	C
→	4	D

Break of 10 min.

resume at 10:30 PM

ALL

select *
from students

where psp > ALL

(select min (psp)
from students
group by (batch-id)

);

psp > ^{ALL} [10, 20, 1, 10]

psp > 10

AND psp > 20

AND psp > 1

AND psp > 10

7
PSP > ANY (10, 1, 20)
TRUE

X = ANY (10, 20, 30)
|||

X IN (10, 20, 30)

Q1) find all students whose psp >
avg psp of their own batch;

Outer Query 1: \rightarrow Get students whose psp > X
Inner Query 2: \rightarrow Find avg psp of student's batch.

Q1 \rightarrow select * from
students where
psp > X

Q2 \rightarrow { select avg(psp)
from students
where batch_id = 21
|||

select * from
 → students s where psp >

(
 [select avg(psp)
 from students
 where batch_id = s.batch_id
)

	id	Name	psp	b_id.
X	1	A	10	1
X	2	B	20	2
X	3	C	10	1
✓	4	D	30	2 →

EXISTS

students

id	name	psp
----	------	-----

tas

id	name	st_id
1	A	NULL
2	B	2
3	C	NULL

find all students who are also a TA.

```
select *  
from student  
where id in (  
    select s_id  
    from Tas  
    where s_id IS NOT NULL  
)
```

```
select *  
from students s,  
where EXISTS (  
    select s_id  
    from tas  
    where tas.s_id = s.s_id  
)
```

if INNER query returns
even 1 row, then EXISTS is
marked true.

Students

	id	name
✓	1	A
X	2	B
X	3	C

Tas.

id	Name	S_id
4	A	<u>1</u>
5	B	NULL
6	C	NULL