

SQL

Table Variables and Set Operators

SQL: Table Vars and Set Operators

```
Select A1,A2,...,An  
From R1,R2, ...,Rm  
where condition
```

Table variables

Set Operators:
Union, Intersect, Except

Demo: simple college admissions database

College(cName, state, enrollment)

Student(sID, sName, GPA, sizeHS)

Apply(sID, cName, major, decision)

```

select Student.sID, sName, GPA, Apply.cName, enrollment
from Student, College, Apply
where Apply.sID = Student.sID and Apply.cName = College.cName;
    
```

Apply \bowtie Student.
Apply.sID = student.sID
Apply \bowtie College
Apply.cName = College.cName

sID	sName	GPA	cName	enrollment
123	Amy	3.9	Stanford	15000
123	Amy	3.9	Stanford	15000
123	Amy	3.9	Berkeley	36000
123	Amy	3.9	Cornell	21000
234	Bob	3.6	Berkeley	36000
345	Craig	3.5	MIT	10000
345	Craig	3.5	Cornell	21000
345	Craig	3.5	Cornell	21000
345	Craig	3.5	Cornell	21000
678	Fay	3.8	Stanford	15000
987	Helen	3.7	Stanford	15000
987	Helen	3.7	Berkeley	36000
...

```

select S.sID, sName, GPA, A.cName, enrollment
from Student S, College C, Apply A
where A.sID = S.sID and A.cName = C.cName;

```

table variable.

sID	sName	GPA	cName	enrollment
123	Amy	3.9	Stanford	15000
123	Amy	3.9	Stanford	15000
123	Amy	3.9	Berkeley	36000
123	Amy	3.9	Cornell	21000
234	Bob	3.6	Berkeley	36000
345	Craig	3.5	MIT	10000
345	Craig	3.5	Cornell	21000
345	Craig	3.5	Cornell	21000
345	Craig	3.5	Cornell	21000
678	Fay	3.8	Stanford	15000
987	Helen	3.7	Stanford	15000
987	Helen	3.7	Berkeley	36000
...

```

select S1.sID, S1.sName, S1.GPA, S2.sID, S2.sName, S2.GPA
from Student S1, Student S2
where S1.GPA = S2.GPA;

```

자신들끼리 Cross product
student × student

→ 같은 table 비교하는 거면
table variable이 반드시 필요.

sID	sName	GPA	sID1	sName1	GPA1
123	Amy	3.9	123	Amy	3.9
123	Amy	3.9	456	Doris	3.9
123	Amy	3.9	876	Irene	3.9
123	Amy	3.9	654	Amy	3.9
234	Bob	3.6	234	Bob	3.6
345	Craig	3.5	345	Craig	3.5
456	Doris	3.9	123	Amy	3.9
456	Doris	3.9	456	Doris	3.9
456	Doris	3.9	876	Irene	3.9
456	Doris	3.9	654	Amy	3.9
567	Edward	2.9	567	Edward	2.9
567	Edward	2.9	765	Jay	2.9
678	Eau	3.8	678	Eau	3.8

자신들끼리 Cross product

⋮

```

select S1.sID, S1.sName, S1.GPA, S2.sID, S2.sName, S2.GPA
from Student S1, Student S2
where S1.GPA = S2.GPA and S1.sID <> S2.sID;

```

같은 사람을 제외함.

det. (=not equal)

앞과 다른
것은 차이
입니다.

제외하는
것입니다.

XPM

sID	sName	GPA	sID1	sName1	GPA1
123	Amy	3.9	456	Doris	3.9
123	Amy	3.9	876	Irene	3.9
123	Amy	3.9	654	Amy	3.9
456	Doris	3.9	123	Amy	3.9
456	Doris	3.9	876	Irene	3.9
456	Doris	3.9	654	Amy	3.9
567	Edward	2.9	765	Jay	2.9
789	Gary	3.4	543	Craig	3.4
876	Irene	3.9	123	Amy	3.9
876	Irene	3.9	456	Doris	3.9
876	Irene	3.9	654	Amy	3.9
765	Jay	2.9	567	Edward	2.9
654	Amy	3.0	123	Amy	3.0

⋮

```
select cName from College  
union  
select sName from Student;
```

union은 이름이 같아야 끌어온다.

```
select cName as name from College  
union  
attribute name을 정해준다.  
select sName as name from Student;
```



cName
name
Amy
Berkeley
Bob
Cornell
Craig
Doris
Edward
Fay
Gary
Helen
Irene
Jay
MIT

```
select cName from College  
union all  
select sName from Student;
```

```
select cName as name from College
```

Union all

```
select sName as name from Student
```

```
order by name;
```

오름차순.

A → B → C

order by.

↓

name
Comell
Amy
Bob
Craig
Doris
Edward
Fay
Gary
Helen
Irene
Jay
Amy
Craig
...

order by

name
Amy
Amy
Berkeley
Bob
Cornell
Craig
Craig
Doris
Edward
Fay
Gary
Helen
Irene
Jay
Amy
Craig
...

b2f1

:

```
select sID from Apply where major = 'CS'
```

```
intersect ⋂(교집합)
```

```
where sID from Apply where major = 'EE';
```

sID
123
345

```

select A1.sID
from Apply A1, Apply A2
where A1.sID = A2.sID and A1.major = 'CS'
      and A2.major = 'EE'; CS, EE에 둘다 사용한
                           sID.

```

중복
제거

sID
123
123
123
123
345

```

select distinct A1.sID → 중복된 것 제거
from Apply A1, Apply A2
where A1.sID = A2.sID and A1.major = 'CS'
      and A2.major = 'EE';

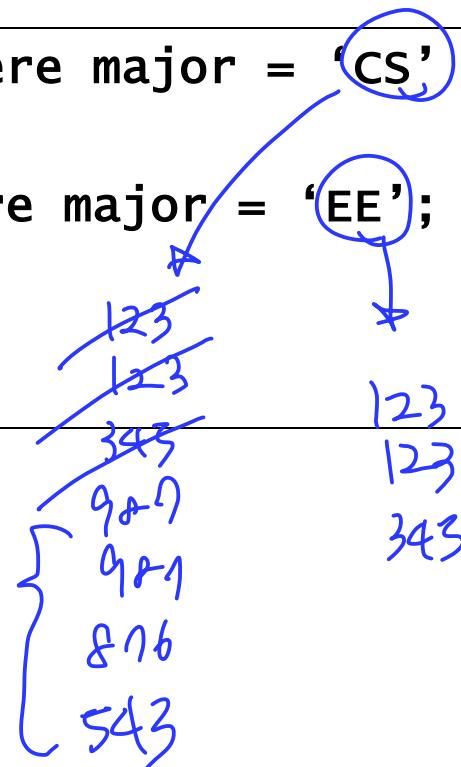
```

sID
123
345

```
select sID from Apply where major = 'CS'
```

except

```
where sID from Apply where major = 'EE';
```



sID
543
876
987

CS에는 apply 했지만
EE에는 apply 하지 않은상태

```

select A1.sID
from Apply A1, Apply A2
where A1.sID = A2.sID and A1.major = 'CS'
      and A2.major <> 'EE';

```

A1 A2

*A1 는 CS에 지원했고
A2 는 EE에 지원하지 않았다*

123	CS	123	CS
		123	EE
		123	CS
		123	EE
123	CS	123	CS
		123	EE
		123	CS
		123	EE

sID
123
123
123
123
345
345
345
987
987
987
876

```
select distinct A1.sID  
from Apply A1, Apply A2  
where A1.sID = A2.sID and A1.major = 'CS'  
      and A2.major <> 'EE';
```

sID
123
345
543
876
987