

# Database Assignment2

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## Problem 1

- a. The actual value of some attributes may be unknown or not exist.
- b. Null values allow us to ignore unknown values when using aggregate functions or joins.

## Problem 2

- a. Data definition language
- b. Interactive data-manipulation language
- c. Integrity
- d. View definition
- e. Transaction control
- f. Embedded SQL and dynamic SQL
- g. Authorization

## Problem 3

- a. 

```
select * from r1
union
select * from r2
```
- b. 

```
select * from r1
intersect
select * from r2
```
- c. 

```
select * from r1
except
select * from r2
```
- d. 

```
select t1.A, t1.B, t2.C from
    (select distinct A,B from r1) t1,
    (select distinct B,C from r2) t2
where t1.B = t2.B
```

## Problem 4

Both  $r1$  and  $r2$  should be non-empty, else the cartesian product would be empty. And there should exist no element in all  $p.a1, r1.a1, r2.a1$  so that the selected values of  $p.a1$  are either in  $r1$  or in  $r2$ .

## Problem 5

- a. 

```
select name
from employee
where empno in
    (select empno from loan, books
     where loan.isbn = books.isbn and publisher = 'McGraw-Hill'
    )
```

```

b.  select name
    from employee
   where empno in
      (select empno from loan,books
        where loan.isbn = books.isbn and publisher = 'McGraw-Hill'
        group by empno having count(isbn) =
          (select count(isbn) from books
            where publisher = 'McGraw-Hill'
           )
       )
c.  select publisher, name
    from employee,
      (select publisher, empno, count(isbn) as cnt
        from loan, books
       where loan.isbn = books.isbn
       group by empno, publisher
      ) t
   where t.empno = employee.empno and cnt > 5

```

## Problem 6

```

select student_id, student_nam, count(course_id)
from student, registered
where student.student_id = registered.student_id
group by student_id
union
select student_id, student_nam, 0
from student where student_id not in
  (select student_id from registered)

```