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)
```