Query: List emp without dependents.

Select Fname	Select Fname
from Emp	from Emp
where SSN NOT IN	where NOT EXISTS
(Select essn from Dependent)	(Select * from Dependent where SSN = essn);

print $x \in$ Emp if $x.$SSN $\notin$ Dep

print $x \in$ Emp if $\exists (y \in$ Dep s.t $x.$SSN $= y.$SSN$)$;

Query: Select emp who have dependents of the same sex.

Select Fname	Select Fname
from Emp E	from Emp E
where SSN IN	where EXISTS
(Select essn from Dependent D where D.sex = E.sex);	(Select * from Dep D where D.sex = E.sex and SSN = essn);

print $x \in$ Emp if $\exists y \in$ Dep s.t $y.$sex $= x.$sex and $y.$essn $= x.$ssn

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Query: List Fname of emp who are managers.

Select Fname
from Emp
where EXISTS
(Select * from Department
where mgrssn = ssn);

Query: List Dname of depts is 'Houston'.

```
Select Dname
from Department
where EXISTS
(Select * from Dept_Loc
 where Dlocation = 'Houston' and
 Dept. Dnumber = Dept Loc. Dnumber);
```

Query 1: List projects where wong is worker or manager.

Query 2: List projects where wong is neither a worker nor a manager.

```
Select    Pnumber
from      Project
where     Pnumber IN    NOT IN
(Select  Pnumber
 from Proj, Dept, Emp                                            Ⓐ
 where (mgrSSN = SSN and
        Lname = 'wong' and dnum = Dnumber)
 AND
 OR    Pnumber IN   NOT IN
(Select Pno                                                      Ⓑ
 from works_on, Emp
 where (Essn = SSN and Lname = 'wong');
```

Query 1:   print x ∈ Project   if   x.pnumber ∈ (A ∪ B)

Query 2:   print $x \in$ Project   if $x.$pnumber $\in (A \cup B)$

Select Pnumber
from Project P
where EXISTS   ~~NOT EXISTS~~
(Select *
    from Proj, Dept, Emp
    where Dnum = Dnumber and
    mgrSSN = SSN   and   Lname = wong and
AND   P. Pnumber = Pnumber)
OR   EXISTS   NOT EXISTS
(Select *
    from Works, Emp
    where essn = SSN   and   Lnaname = wong and
    P. Pnumber = Pno);

Project   A   B

x   y   z

x if $(\exists \ y \in A$ s.t. $y.Pnumber = x.Pnumber$
                        OR
        $\exists \ z \in B$ s.t. $x.Pnumber = z.Pno)$

NOT EXISTS

$$x \quad \text{if} \quad (\exists \; y \in A \quad \text{s.t.} \quad y.Pnumber = x.Pnumber$$
$$\text{OR} \quad \text{AND}$$
$$\exists \; z \in B \quad \text{s.t.} \quad x.Pnumber = z.Pno \;)$$

Query: List Projects that are not is the same location
as its department.

Select Pname
from Proj
where Dnum NOT IN
(Select Dnumber
  from Dept LOC
  where Dlocation = Plocation);

Select Pname
from Proj
where NOT EXISTS
(Select * from Dept LOC
  where Dlocation = Plocation
  and Dnumber = Dno);

Query 1: List SSN of emp who work on a project in dep 4.

Select essn
from workson
where EXISTS
(Select * from Proj
where dnum = 4 and Pno = Pnumber);

Select essn
from works-on
where Pno ~~IN~~ NOT IN
(Select Pnumber from Project where Dnum=4);

Query 2: List SSN of emp who do not work on any proj in dep 4.

Select essn from Emp
where NOT EXISTS
(Select * from works, Proj
where dnum = 4 and Pno = Pnumber
and SSN = essn);

Select SSN
from Emp
where SSN NOT IN
(Query 1);

for i=1 to n_emp
    for j=1 to n_w * n_p

Select SSN from Emp
where not exists
(Select * from works
where ssn = essn and exists
(

for i=1 to n_emp
    for j=1 to n_w
        for k=1 to n_p