WEEK 6

DOMAIN RELATIONAL CALCULUS

STUDENT OBJECTIVES

- Upon completion of this video, you should be able to:
  - Write a domain relational calculus expression that requires a join
  - Show what rows would be returned when given a domain relational calculus expression

DOMAIN RELATIONAL CALCULUS

- **In Domain Calculus an expression is of the form:**

$\{x_1, x_2, \ldots, x_n \mid \text{COND}(x_1, x_2, \ldots x_n, x_{n+1}, \ldots x_{n+m})\}$

- **Retrieve the birth date and address of the employee whose name is 'Jon R. Mortensen' :**

$\{u,v \mid (\exists q)(\exists r)(\exists s)\ (\text{EMPLOYEE}(qrstuvwxyz) \text{ and } q = \text{'Jon'} \text{ and } r = \text{'R.'} \text{ and } s=\text{'Mortensen'})\}$

order of columns is important.

or alternative notation would be:

$\{u,v \mid \text{EMPLOYEE('Jon','R.','Mortensen'}, t,u,v,w,x,y,z)\}$

Employee

FName	Minit	Lname	SSN	BDate	Address	Sex	Salary	SuperSSN*	DNO*

Department

DName	DNumber	MGRSSN*	MgrStartDate

Works_On

ESSN*	PNO*	Hours

DepartmentLocation

Dnumber*	Dlocation

Project

PName	PNumber	Plocation	Dnum*

Dependent

ESSN*	DependentName	Sex	BDate	Relationship

DOMAIN CALCULUS EXAMPLES

- For every project located in 'London', list the project number, the controlling department number, and the department manager's last name.

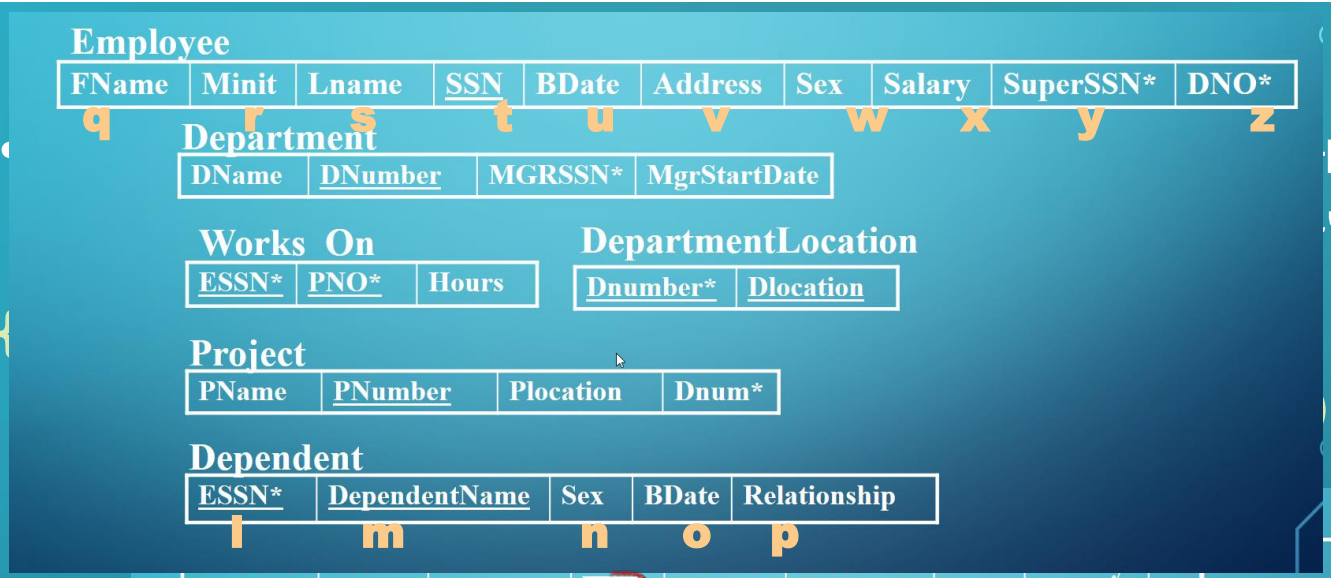
{i,k,s | (∃j) (PROJECT(hijk) and (∃t)(EMPLOYEE(qrstuvwxyz) and (∃b) (∃c)(DEPARTMENT(abcd) and k=b and c=t and j='London'))))}

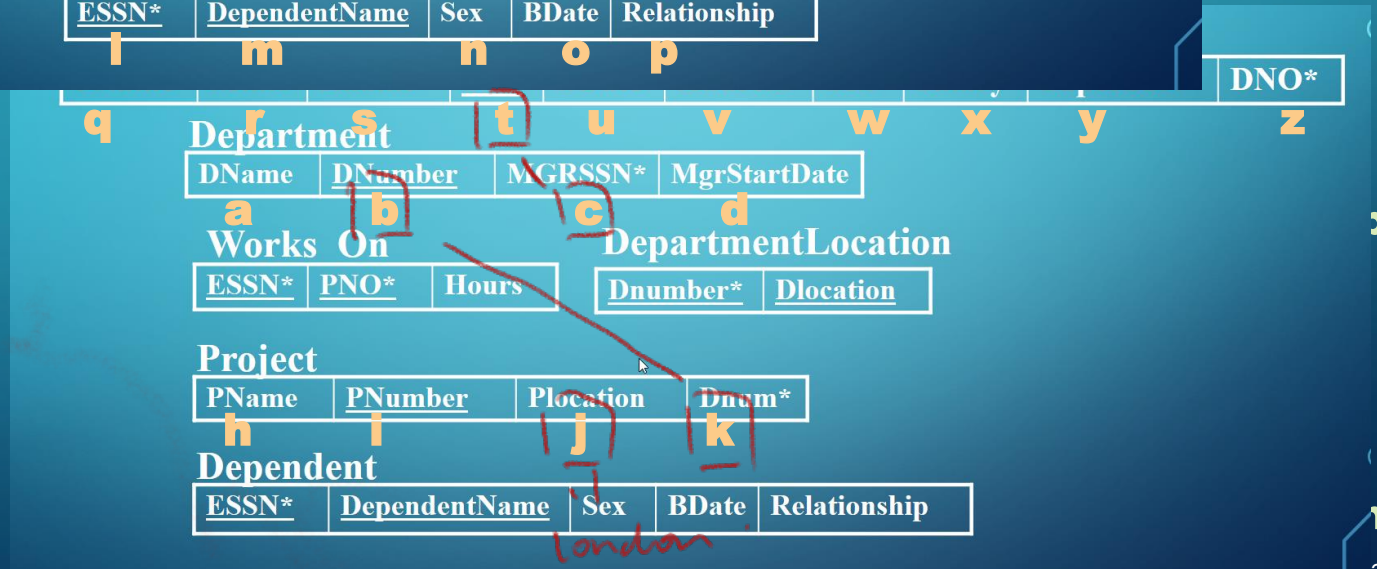
- Find the name of employees who have no dependents

{q,s | (∃t) (EMPLOYEE(qrstuvwxyz) and (not (∃l) DEPENDENT(lmnop) and t=l))))}

OR

{q,s | (∃t) (EMPLOYEE(qrstuvwxyz) and (∀ l) (not (DEPENDENT(lmnop) or not(t=l))))}





- Find

{q,s |

and

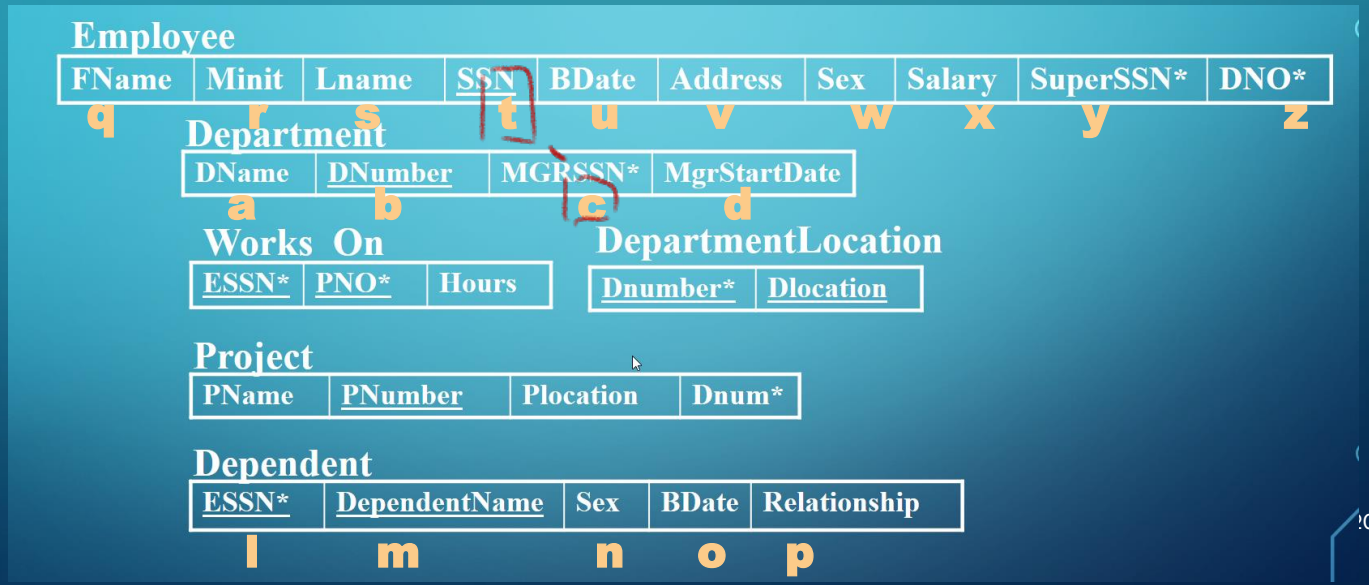
OR

{q,s |

or not(r=1))))}

QUESTION: List the names of managers who have at least one dependent:

$$\{q,s \mid (\exists t)(EMPLOYEE(qrstuvwxyz) \text{ and } (\exists c)(DEPARTMENT(abcd) \text{ and } (\exists l)(DEPENDENT(lmnop) \text{ and } c=t \text{ and } l=t)))\}$$



REVIEW

AA

A	B	C
Pig	22	Pink
Cat	22	Green
Cat	55	Blue

BB

A	B	C	D
Pig	22	Blue	14
Cat	22	Green	33
Cat	22	Blue	22

{h | (∃j)(AA(hij) and j="Pink"))}

A
Pig

{h,m,p | (∃i)(AA(hij) and (∃n) (∃o)(BB(mnop) and i=n and o="Blue"))}

AA.A	BB.A	D
Pig	Pig	14
Pig	Cat	22
Cat	Pig	14
Cat	Cat	22