**CS 540 Assignment 1**

Teammates:

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Consider the following relational schema:

Emp (eid: integer, ename: string, age: integer, salary: real)  
Works (eid: integer, did: integer, pc\_time: integer)  
Dept (did: integer, dname: string, budge: real, managerid: integer)

1. Return names of every employee who works in the "Hardware", "Software", and "Research" departments. (1.5 points)  
     
   a) Datalog :  
     
   Q1(b):- Emp(a, b, c, d), Works(a, x, y), Dept(x, ”Hardware”, w, s)  
   Q2(b):- Emp(a, b, c, d), Works(a, x, y), Dept(x, ”Software”, w, s)  
   Q3(b):- Emp(a, b, c, d), Works(a, x, y), Dept(x, ”Research”, w, s)  
   Q(b):- Q1(b), Q2(b), Q3(b)

b) Relational Algebra :

c) Relational Calculus :

1. Return the names of every department without any employee. (1.5 points)  
     
   a) Datalog :  
     
   Q1(a, b, c, d):- Dept(a, b, c, d), Works(p, a, q)  
   Q(b):- Dept(a, b, c, d), not Q1(a, b, c, d)

b) Relational Algebra:

c) Relational calculus :

1. Print the managerid of managers who manage only departments with budgets greater than $1.5 million. (1.5 points)  
     
   Dept (did, dname, budge, managerid) => Dept(x, y, z, w)  
     
   Datalog:

Q1(w): - Dept (x, y, z, w), not Q2(w).

Q2(w): - Dept (x, y, z, w), z < = 1500000.

Relational Algebra:

ρ(managerid, D.w) (((D) - ( ≤ 1500000 (D)))

Relational Calculus :

Q(W) = 1500000000

1. Print the name of employees whose salary is less than or equal to the salary of every employee. (1.5 points)  
     
   in sql :

DataLog:

Q(ename) :- Emp(eid, ename, salary, age), not (Emp(eid, ename, salary1, age), salary1 > salary)

Q1(salary) :- Emp(eid, ename, salary1, age), salary1 > salary.

Q(b) :- Emp(a, b, c, d), not Q1(c).

Q1(c) :- Emp(a, b, p, d), p > c.

Relational Algebra :

Relational Calculus: