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CS143 HW2 (SQL)

1. a) names of companies (all employees (salary over $150,000))

work.company-name work.person-name work.salary > 150,000

```
• SELECT company-name
  FROM Work W1
  WHERE ALL (SELECT salary
             FROM Work W2
             WHERE W2.company-name = W1.company-name)
             > 150,000 ;
```

b) $\Pi_{company\text{-}name}(Work) - \Pi_{company\text{-}name}(\sigma_{salary<=150,000}(Work))$

(This uses the complement instead)

c) They do not have the exact same results. SQL does not automatically eliminate duplicates like relational algebra does. There is a chance for duplicates to appear in the results from (a).

2. a) names of employees (salary) > (employees$_{LA}$ (salary))

```
• SELECT person-name
  FROM Work
  GROUP BY person-name
  HAVING SUM(salary) > ALL (SELECT sum(salary
                            FROM Work W1, Employee E1
                            WHERE W1.person-name = E1.person-name
                              AND city = 'Los Angeles'
                            GROUP BY W1.person-name);
```

all salaries >

LA salaries

```
• SELECT person-name
  FROM Employee E1 WHERE NOT EXISTS
  (SELECT Work.person-name FROM Work, Employee
   WHERE Work.person-name = Employee.person-name
     AND city = 'Los Angeles'
   GROUP BY Work.person-name HAVING SUM(salary) >
   (SELECT SUM(Salary) FROM Work
    WHERE person-name = E1.person-name));
```

negation of / complement of

LA workers' salaries >

all salaries

b) names of managers (total salary) > SOME their employees (total salary)

```
• SELECT manager-name
  FROM Manage M1
  WHERE (SELECT SUM(salary) FROM Work
        WHERE Work.person-name = M1.manager-name
        GROUP BY Work.person-name) > SOME
       (SELECT SUM(salary) FROM Work , Manage M2
        WHERE M1.manager-name = M2.manager-name
              AND Work.person-name = M2.person-name
        GROUP BY Work.person-name)
• SELECT manager-name
  FROM Manage M1
  WHERE EXISTS (
    SELECT person-name from Manage M2
    WHERE M1.manager-name = M2.manager-name AND (
    SELECT SUM(salary) from Work
    WHERE Work.person-name = M2.person-name
    GROUP BY Work.person-name) <
    (SELECT SUM(salary) FROM Work
     WHERE Work.person-name = M2.manager-name
     GROUP BY Work.person-name)
```

3.a) i) SELECT name, address FROM MovieStar WHERE gender = 'F'
INTERSECT
SELECT name, address FROM MovieExec WHERE netWorth > 1000000

ii) SELECT name, address FROM MovieStar WHERE gender = 'F'
AND (name, address) in
SELECT (name, address FROM MovieExec WHERE netWorth > 1000000)

b) i) Movies stars who are not movie execs

```
• SELECT name FROM MovieStar
  EXCEPT
  SELECT name FROM MovieExec ;
```

ii)

```
• SELECT name FROM MovieStar MS
  WHERE MS.name NOT IN
  (SELECT name FROM MovieExec) ;
```

4. a)

```
SELECT AVG(speed) FROM Desktop ;
```

b)

```
SELECT AVG(price) FROM ComputerProduct
WHERE model = 'Dell' ;
```

c)

```
SELECT AVG(price) FROM Laptop
WHERE weight > 3kg ;
```

d)

```
SELECT AVG(price) FROM Laptop
GROUP BY speed ;
```

e)

```
SELECT manufacturer FROM ComputerProduct
GROUP BY manufacturer
HAVING COUNT (model) >= 3
```

5. a)

```
INSERT INTO ComputerProduct ('HP', 1100, 1000 )
INSERT INTO Desktop (1100, '1.2 Ghz', '256 MB', '40 GB')
```

b)

```
DELETE FROM Desktop
WHERE model IN
(SELECT model FROM ComputerProduct
 WHERE manufacturer = 'IBM' and price < 1000)

DELETE FROM ComputerProduct
WHERE manufacturer= 'IBM' and price < 1000)
```

c)
```
UPDATE Laptop
SET hdd = hdd - 1
WHERE model IN
(SELECT model
 FROM ComputerProduct
 WHERE manufacturer = 'Gateway')
```