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CS143 HW 2

1.
a) SELECT person-name FROM Work WHERE salary < 20000;
b) $\prod_{person-name}(\sigma_{salary < 20000}Work)$
c) No, a) will include duplicates but $\prod$ in relational algebra removes duplicates.

2.
a) SELECT person-name
FROM Work
WHERE (SELECT SUM(salary) FROM Work GROUP BY person-name)
> ALL(SELECT SUM(salary) FROM Work GROUP BY person-name WHERE person-name
IN (SELECT person-name FROM Employee WHERE city = "Los Angeles"));

b) SELECT person-name AS manager
FROM (SELECT SUM(salary) AS sum FROM Work GROUP BY person-name) AS Salaries
WHERE sum >
SOME (SELECT salary FROM Salaries INNER JOIN Manage ON Manage.person-name = Salaries.person-name AND Manage.manager-name = manager);

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

ii)

```sql
SELECT MovieStar.name, MovieStar.address
FROM MovieStar
INNER JOIN MovieExec ON MovieExec.name = MovieStar.name AND
MovieStar.gender = 'F' AND MovieExec.netWorth > 1000000;
```

b i)
```sql
SELECT name FROM MovieStar EXCEPT SELECT name FROM MovieExec;
```

ii)
```sql
SELECT MovieStar.name FROM MovieStar
WHERE MovieStar.name NOT IN (SELECT MovieExec.name FROM
MovieExec);
```

4
a)
```sql
SELECT AVG(speed) FROM Desktop
```

b)
```sql
SELECT  AVG(price) FROM ComputerProduct INNER JOIN Laptop ON
ComputerProduct.model = Laptop.model AND Laptop.weight < 2;
```

c)
```sql
SELECT AVG(price) FROM ComputerProduct WHERE
ComputerProduct.manufacturer = 'Dell';
```

d)
```sql
SELECT speed, AVG(price) FROM ComputerProduct INNER JOIN
Laptop ON ComputerProduct.model = Laptop.model GROUP BY
Laptop.speed;
```

e)
```sql
SELECT manufacturer FROM ComputerProduct WHERE (SELECT
COUNT(model) FROM ComputerProduct GROUP BY manufacturer) >= 3;
```

5)
a)
```sql
INSERT INTO ComputerProduct VALUES ('HP', 1200, 1000);
INSERT INTO Desktop VALUES (1200, 1.2, 256, 80);
```

b) DELETE FROM ComputerProduct WHERE manufacturer='IBM' AND price < 1000;
DELETE FROM Desktop WHERE Desktop.model NOT IN (SELECT ComputerProduct.model FROM ComputerProduct);

c) UPDATE Laptop SET weight = weight+1 WHERE Laptop.model IN (SELECT model FROM ComputerProduct WHERE ComputerProduct.manufacturer = 'Gateway');

6)
a) SELECT sid FROM Enroll WHERE sid NOT IN (SELECT sid FROM Enroll WHERE dept <> 'CS')

b) SELECT sid FROM Enroll AS id
WHERE NOT EXISTS (
 (SELECT cnum FROM Enroll WHERE dept = 'CS')
 EXCEPT
 (SELECT cnum FROM Enroll WHERE sid = id));

c) SELECT sid AS id FROM Enroll WHERE (SELECT COUNT(DISTINCT) dept FROM Enroll WHERE sid=id GROUP BY sid) = 1

SELECT sid AS id FROM Enroll WHERE (SELECT COUNT(cnum) FROM Enroll WHERE dept = 'CS' AND sid=id GROUP BY sid) = (SELECT COUNT(cnum) FROM Enroll WHERE dept = 'CS')