

1) Assume the following tables for this problem:

Employee(person-name, age, street, city)
Work(person-name, company-name, salary)
Company(company-name, city)
Manage(person-name, manager-name)

- a) ((SELECT DISTINCT company-name
FROM Work)
EXCEPT
(SELECT DISTINCT company-name
FROM Work
WHERE salary <= 150000))
- b) $\pi_{company-name}(Work) - \pi_{company-name}(\sigma_{salary \leq 15000} Work)$
- c) Yes they are the same because they both set semantics. There might be a difference in SQL with duplicate results but is fixed with the DISTINCT keyword.

2)

- a) WITH s AS (SELECT person-name, SUM(salary) AS total
FROM Work W
GROUP BY person-name)
SELECT DISTINCT person-name
FROM s
WHERE s.total > ALL (SELECT SUM(salary)
FROM Employee E, Work W2
WHERE E.person-name = W2.person-name
AND E.city = 'Los Angeles'
GROUP BY W2.person-name);

WITH s AS (SELECT person-name, SUM(salary) AS total
FROM Work W
GROUP BY person-name)
SELECT DISTINCT person-name
FROM s
WHERE NOT EXISTS
(SELECT *
FROM Employee E, Work W2
WHERE E.person-name = W2.person-name
AND E.city = 'Los Angeles'
GROUP BY W2.person-name
HAVING SUM(Salary) >= s.total
)

- b) WITH s AS (SELECT manager-name, SUM(salary) AS total
FROM Work W
WHERE W.person-name IN (SELECT manager-name
FROM Manage)
GROUP BY W.person-name)
SELECT DISTINCT manager-name

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FROM s
WHERE s.total > SOME( SELECT SUM(salary)
                      FROM Work W2
                      WHERE W2.person-name IN (SELECT M.person-name
                                                FROM Manage M
                                                WHERE s.manager-name = m.manager-name)
                      GROUP BY W2.person-name);

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WITH s AS (SELECT manage-name, SUM(salary) AS total
           FROM Work W
           WHERE W.person-name IN (SELECT manager-name
                                   FROM Manage)
           GROUP BY W.person-name)
SELECT DISTINCT manager-name
FROM s
WHERE EXISTS
  ( SELECT *
    FROM Work W2
    WHERE W2.person-name IN (SELECT M.person-name
                              FROM Manage M
                              WHERE s.manager-name = m.manager-name)
    GROUP BY W2.person-name
    HAVING SUM(Salary) < s.total);

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3)

a)

- i) (SELECT name
 FROM MovieStar
 WHERE gender='F')
 INTERSECT
 (SELECT name
 FROM MovieExec
 WHERE netWorth > 1000000)
- ii) SELECT name
 FROM MovieStar S, MovieExec E
 WHERE S.name = E.name
 AND S.gender = 'F'
 AND E.netWorth > 1000000

b)

- i) (SELECT name
 FROM MovieStar)
 EXCEPT
 (SELECT name
 FROM MovieExec)
- ii) SELECT name
 FROM MovieStar
 WHERE name NOT IN (SELECT name
 FROM MovieExec)

4)

- a) SELECT AVG(speed)
FROM Desktop
- b) SELECT AVG(price)
FROM ComputerProduct
WHERE manufacturer='Dell'
- c) SELECT AVG(price)
FROM ComputerProduct C, Laptop L
WHERE C.model = L.model
AND L.weight > 3
- d) SELECT AVG(price)
FROM Laptop L, ComputerProduct C
WHERE L.model = C.model
GROUP BY speed
- e) SELECT manufacturer
FROM ComputerProduct
GROUP BY manufacturer
HAVING COUNT(model) >= 3

5)

- a) INSERT INTO ComputerProduct VALUES ('HP',1100,1000);
INSERT INTO Desktop VALUES (1100,1.2,256,40);
- b) DELETE FROM ComputerProduct
WHERE manufacturer='IBM'
AND price < 1000
AND model IN (SELECT model FROM Desktop);
DELETE FROM Desktop
WHERE Desktop.model NOT IN (SELECT ComputerProduct.model
FROM ComputerProduct
WHERE manufacturer='IBM');
- c) UPDATE Laptop
SET hdd=hdd-1
WHERE Laptop.model IN (SELECT ComputerProduct.model
FROM ComputerProduct
WHERE manufacturer='Gateway')