

1.
 - a. SELECT company-name
FROM Company
WHERE company-name NOT IN (SELECT company-name
FROM Work
WHERE salary <= 100000);
 - b. $\Pi_{company-name}(Company) - \Pi_{company-name}(\sigma_{salary \leq 100000}(Work))$
 - c. They are not the same because SQL uses bag semantics and relation algebra uses set semantics.
2.
 - a. SELECT person-name
FROM (SELECT SUM(salary) AS sum
FROM Work
GROUP BY person-name) AS Total
WHERE sum > ALL (SELECT salary
FROM Employee, Total
WHERE Employee.person-name = Total.person-name
AND Employee.city = 'Los Angeles');
 - b. SELECT person-name AS manager
FROM (SELECT SUM(salary) AS sum
FROM Work
GROUP BY person-name) AS Total
WHERE sum > SOME (SELECT salary
FROM Manage, Total
WHERE Manage.person-name = Total.person-name
AND manager = manager-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 IN (SELECT name, address
FROM MovieExec
WHERE 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 Laptop, ComputerProduct
WHERE weight < 2
AND Laptop.model = ComputerProduct.model;
 - c. SELECT AVG(price)
FROM ((SELECT model, price
FROM Desktop, ComputerProduct
WHERE Desktop.model = ComputerProduct.model
AND manufacturer = 'Dell')
UNION
(SELECT model, price
FROM Laptop, ComputerProduct
WHERE Laptop.model = ComputerProduct.model
AND manufacturer = 'Dell')) AS DellModels;
 - d. SELECT speed, AVG(price)
FROM Laptop, ComputerProduct
WHERE Laptop.model = ComputerProduct.model
GROUP BY speed;
 - e. SELECT manufacturer
FROM ComputerProduct
GROUP BY manufacturer
HAVING COUNT(model) >= 3;
- 5.
 - a. 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 model NOT IN (SELECT model FROM ComputerProduct);
 - c. UPDATE Laptop
SET weight = weight + 1
WHERE model IN (SELECT model
FROM ComputerProduct
WHERE manufacturer = 'Gateway');