Homework 8

Solution

18.13 Part B

Q1: SELECT FNAME, LNAME, ADDRESS
    FROM EMPLOYEE, DEPARTMENT
    WHERE DNAME = 'Research' AND DNUMBER = DNO

Initial tree:

```
  π FNAME, LNAME, ADDRESS
     ↘
      σ DNAME='Research' AND DNUMBER = DNO
          ×
       DEPARTMENT  EMPLOYEE
```

Optimized tree:

```
  π FNAME, LNAME, ADDRESS
     ↘
      σ DNAME='Research'
         ↘
          π DNUMBER
            ↘
             σ DNUMBER = DNO
                π FNAME, LNAME, ADDRESS, DNO
                    ↘
                     EMPLOYEE
                        DEPARTMENT
```

Q8: SELECT E.FNAME, E.LNAME, S.FNAME, S.LNAME
    FROM EMPLOYEE AS E, EMPLOYEE AS S
WHERE E.SUPERSSN = S.SSN

Initial tree:

```
 n  E.FNAME, E.LNAME, S.FNAME, S.LNAME
    |                          |
   σ  E.SUPERSSN = S.SSN    ρ  E
      |                          |   ρ  S
          EMPLOYEE            EMPLOYEE
```

Optimized tree:

```
 n  E.FNAME, E.LNAME, S.FNAME, S.LNAME
    |                          |
   σ  E.SUPERSSN = S.SSN    ρ  E
      |                          |   ρ  S
          EMPLOYEE            EMPLOYEE
```

Q1B: SELECT E.FNAME, E.NAME, E.ADDRESS
     FROM EMPLOYEE E, DEPARTMENT D
     WHERE D.NAME='Research' AND D.DNUMBER=E.DNUMBER

Initial tree:
Q4: (SELECT DISTINCT PNUMBER
    FROM PROJECT, DEPARTMENT, EMPLOYEE
    WHERE DNUM=DNUMBER AND MGRSSN=SSN AND
    LNAME='Smith')

UNION
(SELECT DISTINCT PNUMBER
    FROM PROJECT, WORKS_ON, EMPLOYEE)
WHERE PNUMBER=PNO AND ESSN=SSN AND LNAME='Smith')

Initial tree:

Optimized tree:
Q27: SELECT PNUMBER, PNAME, COUNT(*)
    FROM PROJECT, WORKS_ON, EMPLOYEE
    WHERE PNUMBER=PNO AND SSN=ESSN AND DNO=5
    GROUP BY PNUMBER, PNAME

Initial tree:
\[
P\text{NUMBER, PNAME} \quad \land \quad P\text{NUMBER} = \text{PNO} \quad \land \quad \text{SSN} = \text{ESSN} \quad \land \quad \text{DNO} = 5
\]