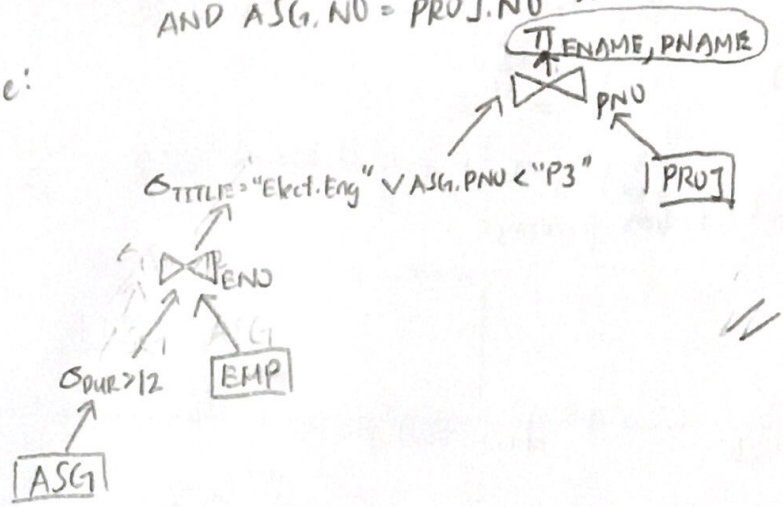
Problem 8.3

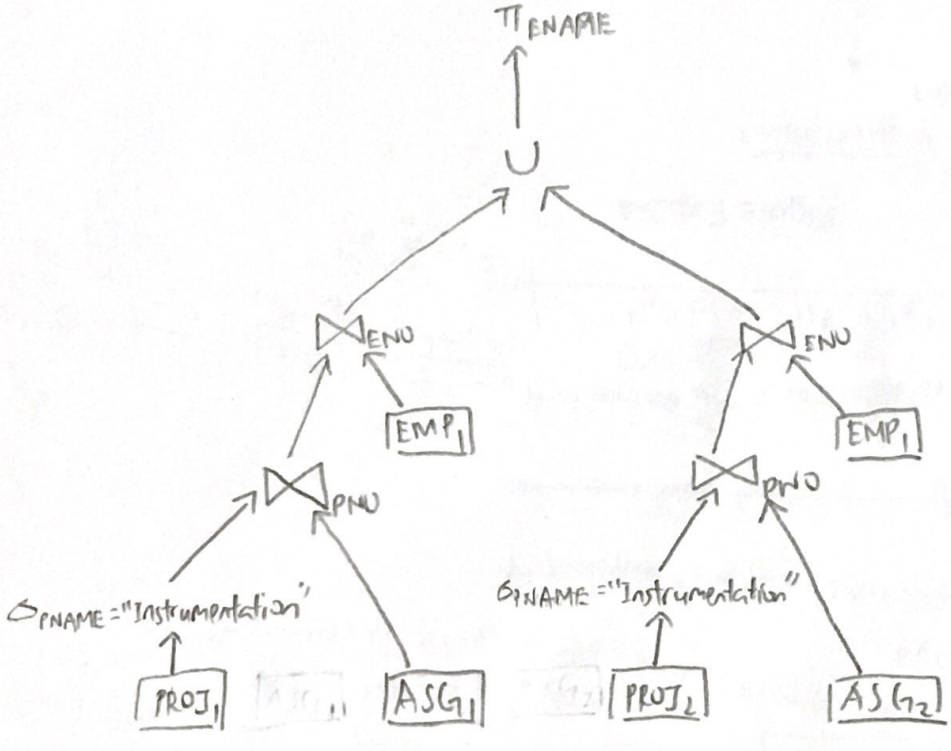
Simplify query into:

```
SELECT ENAME, PNAME
FROM   EMP, ASG, PROJ
WHERE  DUR > 12
       AND (TITLE = "Elect. Eng" OR ASG.PNO < 'P3')
       AND EMP.NO = ASG.NO
       AND ASG.NO = PROJ.NO
```

optimised operator tree:



Problem 8.8



Problem 9.2

Goal: Want to achieve $EMP \bowtie ASG \bowtie PROJ$ optimally.
Assume transmission time is 1 unit along each path.

Applying Hill Climbing Algorithm:

Initial Feasible Solution:

① All move to site 1: Total cost = 200 + 2×300 = 800
② All move to site 2: Total cost = 100 + 300 = 400
③ All move to site 3: Total cost = 100×2 + 200 = 400
] Same cost.

If choose ②:

Determine candidate splits:

2.1 EMP → site 2, $EMP \bowtie ASG$
PROJ → site 2, $ASG \bowtie PROJ$
Total cost = 200 + 200 = 400 No improvement.

If choose ③:

Determine candidate splits:

3.1 EMP → site 2, $(EMP \bowtie ASG)$ → site 3
Total cost = 100 + 200 = 300 ⇒ Improvement.
Optimal.

∴ Optimal join program:

EMP → site 2
$ASG' = EMP \bowtie_{ENO} ASG$ → site 3
At site 3, $PROJ' = ASG' \bowtie_{PNO} PROJ$.