

## Homework 2 on Distributed Database Querying

**Problem 8.3.** Simplify the following query:

```
SELECT  ENAME, PNAME
FROM    EMP, ASG, PROJ
WHERE   (DUR > 12 OR RESP = "Analyst")
        AND EMP.ENO = ASG.ENO
        AND (TITLE = "Elect. Eng." OR ASG.PNO < "P3")
        AND (DUR > 12 OR RESP NOT= "Analyst")
        AND ASG.PNO = PROJ.PNO
```

and transform it into an optimized operator tree using the restructuring algorithm.

**Problem 8.8.** Relation PROJ, ASG, and EMP are fragmented as follows.

Relation PROJ is indirectly fragmented as

$PROJ_1 = \sigma_{PNO \leq "p2"}(PROJ)$

$PROJ_2 = \sigma_{PNO > "p2"}(PROJ)$

Relation ASG is indirectly fragmented as

$ASG_1 = ASG \bowtie_{PNO} PROJ_1$

$ASG_2 = ASG \bowtie_{PNO} PROJ_2$

Relation EMP is vertically fragmented as

$EMP_1 = \Pi_{ENO, ENAME}(EMP)$

$EMP_2 = \Pi_{ENO, TITLE}(EMP)$

Transform the following query into a reduced query on fragments:

```
SELECT  ENAME
FROM    EMP, ASG, PROJ
WHERE   PROJ.PNO = ASG.PNO  AND  PNAME = "Instrumentation"
        AND  EMP.ENO = ASG.ENO
```

**Problem 9.2.** Consider the following join graph and the following information:  $\text{size}(EMP) = 100$ ,  $\text{size}(ASG) = 200$ ,  $\text{size}(PROJ) = 300$ ,  $\text{size}(EMP \bowtie ASG) = 200$ , and  $\text{size}(ASG \bowtie PROJ) = 200$ . Describe an optimal join program based on the objective function of total transmission time.

