Assignment No. 2 for Ch. 04-1 (Spring 2024)

EMP

ENO	ENAME	TITLE
E1	J. Doe	Elect. Eng
E2	M. Smith	Syst. Anal.
E3	A. Lee	Mech. Eng.
E4	J. Miller	Programmer
E5	B. Casey	Syst. Anal.
E6	L. Chu	Elect. Eng.
E7	R. Davis	Mech. Eng.
E8	J. Jones	Syst. Anal.

ASG

ENO	PNO	RESP	DUR
E1	P1	Manager	12
E2	P1	Analyst	24
E2	P2	Analyst	6
E3	P3	Consultant	10
E3	P4	Engineer	48
E4	P2	Programmer	18
E5	P2	Manager	24
E6	P4	Manager	48
E7	P3	Engineer	36
E8	P3	Manager	40

PROJ

PNO	PNAME	BUDGET
P1	Instrumentation	150000
P2	Database Develop.	135000
P3	CAD/CAM	250000
P4	Maintenance	310000

PAY

TITLE	SAL
Elect. Eng.	40000
Syst. Anal.	34000
Mech. Eng.	27000
Programmer	24000

1. For the following query, expressed in SQL, on the example database above:
   1) Simplify WHERE clause.
   2) Provide its query result.

```
SELECT ENO
FROM ASG
WHERE RESP = "Analyst"
AND NOT(PNO="P2" OR DUR=12)
AND PNO ≠ "P2"
AND DUR=12
```

2. For the following query, expressed in SQL, on the example database above.

```
SELECT ENAME, PNAME
FROM EMP, ASG, PROJ
WHERE DUR > 12 AND EMP.ENO = ASG.ENO AND PROJ.PNO = ASG.PNO
```

   1) Provide a query graph for the above query.
   2) Provide a generic query (operator) tree for the above query.

3. Assume that relation PROJ of our example database above is horizontally fragmented as follows:

   $PROJ1 = \sigma_{PNO \leq \text{“P2”}} (PROJ)$

   $PROJ2 = \sigma_{PNO > \text{“P2”}} (PROJ)$

   For the following query,

```
SELECT ENO, PNAME
FROM PROJ, ASG
WHERE PROJ.PNO = ASG.PNO AND PNO = "P4"
```

   1) Provide a generic query (operator) tree for the above query.
   2) Provide a reduced query (operator) tree on fragments of PROJ using union,
   3) Provide a query (operator) tree using the result of 2) in which the join is distributed over union.
   4) Provide a query (operator) tree using the result of 3) in which the unnecessary join is eliminated.