

## LAB 4

Student name:

EMP

<u>ENO</u>	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

<u>ENO</u>	<u>PNO</u>	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

<u>PNO</u>	PNAME	BUDGET	LOC
P1	Instrumentation	150000	Montreal
P2	Database Develop.	135000	New York
P3	CAD/CAM	250000	New York
P4	Maintenance	310000	Paris

PAY

<u>TITLE</u>	SAL
Elect. Eng.	40000
Syst. Anal.	34000
Mech. Eng.	27000
Programmer	24000

Let us consider relations EMP(ENO, ENAME, TITLE, CITY) and ASG(ENO, PNO, DUR) assuming that ENO is the primary key of EMP and (ENO, PNO) is the primary key of ASG. Write the following SQL query:

The corresponding query in Datalog can be expressed as:

Q(ENO; TITLE; PNO) : EMP(ENO;ENAME; 'Programmer' , CITY);  
ASG(ENO; PNO;DUR)

Q(ENO; TITLE; PNO) : EMP(ENO;ENAME;TITLE;CITY);  
ASG(ENO; PNO;24)

```
SELECT EMP.ENO, EMP.TITLE, ASG.PNO
FROM EMP
JOIN ASG ON EMP.ENO = ASG.ENO
WHERE EMP.TITLE = 'Programmer'
```

```
SELECT EMP.ENO, EMP.TITLE, ASG.PNO
FROM EMP
JOIN ASG ON EMP.ENO = ASG.ENO
WHERE ASG.DUR = 24;
```

#### Analysis: Query

i) Write a query to display project name with CADCAM and employee name from the EMP and PROJ table.

```
SELECT PROJ.PNAME, EMP.ENAME FROM EMP
JOIN ASG ON EMP.ENO = ASG.ENO
JOIN PROJ ON PROJ.PNO = ASG.PNO
WHERE PROJ.PNAME LIKE '%CAD%';
```

ii) Write a query to display project name with CADCAM and employee name from the EMP and PROJ table and duration should be 36 or more than 36.

```
SELECT PROJ.PNAME, EMP.ENAME
FROM EMP
JOIN ASG ON EMP.ENO = ASG.ENO
JOIN PROJ ON ASG.PNO = PROJ.PNO
WHERE PROJ.PNAME LIKE '%CADCAM%' AND ASG.DUR >= 36;
```

4. Restructuring: Example Find the names of employees other than J. Doe who worked on the CADCAM project

```
SELECT EMP.ENAME
FROM EMP
JOIN ASG ON EMP.ENO = ASG.ENO
JOIN PROJ ON ASG.PNO = PROJ.PNO
WHERE PROJ.PNAME LIKE '%CAD%' AND EMP.ENAME != 'J. Doe';
```

5. Find the names of employees who worked on the 'Instrumentation' project for either 1 or 2 years.

```
SELECT EMP.ENAME
FROM EMP
JOIN ASG ON EMP.ENO = ASG.ENO
JOIN PROJ ON ASG.PNO = PROJ.PNO
WHERE PROJ.PNAME = 'Instrumentation' AND (ASG.DUR = 1 OR ASG.DUR = 2);
```

## 6. Reduction for PHF and DHF:

i. Write a query to display employee number E3 from EMP table.

```
SELECT *  
FROM EMP  
WHERE ENO = 'E3';
```

ii. Write a query to display details of employee with the same employee number from EMP and ASG tables.

```
SELECT EMP.*, ASG.*  
FROM EMP  
JOIN ASG ON ASG.ENO = EMP.ENO  
WHERE EMP.ENO = 'E3';
```

iii. Write a query to display details of employee with the same employee number and title is 'Mech.Eng' from EMP and ASG tables.

```
SELECT EMP.*, ASG.*  
FROM EMP  
JOIN ASG ON EMP.ENO = ASG.ENO  
WHERE EMP.ENO = 'E3' AND EMP.TITLE = 'Mech. Eng.';
```

7. Query Optimization Process-Search space: Write a query to display details of employee name and responsibility from the ASG and PROJ table employee number and project number from EMP and ASG tables

```
SELECT EMP.ENAME, ASG.RESP, EMP.ENO, ASG.PNO  
FROM EMP  
JOIN ASG ON EMP.ENO = ASG.ENO  
JOIN PROJ ON ASG.PNO = PROJ.PNO;
```

8. Dynamic Algorithm–Decomposition-Detachment: Write a query to display employee name whose project name is CAD/CAM (CAD CAM) from EMP, ASG and PROJ tables.

```
SELECT EMP.ENAME  
FROM EMP  
JOIN ASG ON EMP.ENO = ASG.ENO  
JOIN PROJ ON ASG.PNO = PROJ.PNO  
WHERE PROJ.PNAME LIKE '%CAD%';
```

### 9. Tuple Substitution:

q11 is a mono-variable query

q12 and q13 is subject to tuple substitution

Assume GVAR has two tuples only:  $\langle E1 \rangle$  and  $\langle E2 \rangle$

Then q13 becomes by writing query to display:

i) Employee number E1 and employee name from employee table

```
SELECT ENO, ENAME FROM EMP WHERE ENO = 'E1';
```

ii) Employee number E3 and employee name from employee table

```
SELECT ENO, ENAME FROM EMP WHERE ENO = 'E3';
```