DATABASE MANAGEMENT SYSTEM

CS – 631

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Assignment 2 Solutions

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EXERCISE 1 (SQL Queries)
Consider the following schema:

SUPPLIERS (SID : *integer*, SNAME : *string*, CITY : *string*)
PARTS (PID : *integer*, PNAME : *string*, COLOR : *string*)
CATALOG (SID : *integer*, PID : *integer*, COST : *real*)

The key fields are underlined, and the domain of each field is listed after the field name. Thus, SID is the key for SUPPLIERS, PID is the key for PARTS, and SID and PID together form the key for CATALOG. The CATALOG relation lists the prices charged for parts by suppliers. CATALOG.SID is a foreign key referring to SUPPLIERS.SID and CATALOG.PID is a foreign key referring to PARTS.PID.

Write the following queries in SQL.

1. Find the SIDs of suppliers who supply a red part and a green part.

Solution 1.

(***SELECT*** C.SID

FROM PARTS P, CATALOG C

WHERE P.PID=C.PID ***AND*** P. COLOR = ‘red’)

INTERSECT

(***SELECT*** C.SID

FROM PARTS P, CATALOG C

WHERE P.PID=C.PID ***AND*** P. COLOR = ‘green’)

2. Find the SIDs of suppliers who supply a red part or a green part.

Solution 2.

SELECT C.SID

FROM PARTS P, CATALOG C

WHERE P.PID=C.PID ***AND*** (P. COLOR = ‘red’ ***OR*** P. COLOR= ’green’)

3. Find the SNAMEs of suppliers who supply every red part and every green part.

Solution 3.

SELECT S.SNAME

FROM Supplier S

WHERE NOT EXIST ((***SELECT*** P.PID

FROM PARTS P

WHERE P. COLOR=’red’ ***OR*** P. COLOR='green')

EXCEPT

(***SELECT*** C.PID

FROM CATALOG C

WHERE C.SID = S.SID))

4. Find the SNAMEs of suppliers who do not supply every red part.

Solution 4.

SELECT S.SNAME

FROM Supplier S

WHERE NOT EXIST ((***SELECT*** P.PID

FROM PARTS P

WHERE P. COLOR=’red’)

EXCEPT

(***SELECT*** C.PID

FROM CATALOG C

WHERE C.SID = S.SID))

5. For every supplier that only supplies red parts, print the SID and the name of the supplier and the average cost of parts that she supplies.

Solution 5.

```
SELECT  S.SNAME , S.SID, AVG(COST) as SUM_TOTAL
FROM SUPPLIER S, CATALOG C
WHERE S.SID=C.SID AND C.SID NOT IN ((SELECT  C1.SID
                                    FROM PARTS P1, CATALOG C1
                                    WHERE C1.SID=S1.SID AND P1.COLOR <> 'Red' )
GROUP BY S.SID, S.SNAME
```

6. For each part, find the SNAMEs of the suppliers who do not charge the most for that part. The answer of this query should have two columns: PID and SNAME.

Solution 6.

```
SELECT   S. SNAME, C.PID
FROM SUPPLIER S, CATALOG C
WHERE S.SID=C.SID AND C. COST < ((SELECT   MAX(COST)
                                 FROM CATALOG
                                 WHERE PID=C.PID)
```

7. For every part supplied by a supplier who is at the city of Newark, print the PID and the SID and the name of the suppliers who sell it at the highest price.

Solution 7.

```
SELECT   S. SNAME, C.PID, S.SID
FROM SUPPLIER S, CATALOG C
WHERE S.SID=C.SID AND C.PID IN (SELECT  PID
                                FROM CATALOG NATURAL JOIN SUPPLIERS
                                WHERE ADDRESS = 'NEWARK') AND
                    C.COST = (SELECT MAX(COST)
                              FROM CATALOG
                              WHERE PID=C.PID)
```

8. For every part which has at least two suppliers, find its PID, its PNAME and the total number of suppliers who sell it.

Solution 8.

```
SELECT  PID, PNAME, COUNT(SID)
FROM PARTS NATURAL JOIN CATALOG
GROUP BY PID
HAVING COUNT (SID) >= 2
```

9. Find the PIDs of parts supplied by every supplier who is at the city of Newark or by every supplier who is at the city of Trenton.

Solution 9.

```
(SELECT P.PID
FROM PARTS P
WHERE NOT EXISTS   (SELECT SID
                    FROM SUPPLIERS
                    WHERE ADDRESS = 'Newark'
                    EXCEPT
                    (SELECT  SID
                     FROM  CATALOG
                     WHERE PID = P.PID)))
UNION
(SELECT P.PID
FROM PARTS P
WHERE NOT EXISTS   (SELECT SID
                    FROM SUPPLIERS
                    WHERE ADDRESS = 'Trenton'
                    EXCEPT
                    (SELECT  SID
                     FROM  CATALOG
                     WHERE PID = P.PID)))
```

10. Find the PIDs of parts supplied by every supplier who is at the city of Newark and by every supplier who is at the city of Trenton.

Solution 10.

```
(SELECT P.PID
FROM PARTS P
WHERE NOT EXISTS    (SELECT SID
                     FROM SUPPLIERS
                     WHERE ADDRESS = 'Newark' OR ADDRESS = 'Trenton'
                     EXCEPT
                    (SELECT  SID
                     FROM  CATALOG
                     WHERE  PID = P.PID)))
```

11. Find the SIDs of suppliers who supply a red part but do not supply a blue part.

Solution 11.

```
SELECT SID
FROM PARTS NATURAL JOIN CATALOG
WHERE COLOR = 'red' AND   SID NOT IN (SELECT  SID
                                      FROM PARTS NATURAL JOIN CATALOG
                                      WHERE COLOR ='blue')
```

12. For every supplier who supplies at least 4 parts, find his SID, SNAME and the PID of the most expensive part(s) that he supplies.

Solution 12.

```
SELECT S.SID, S.SNAME, C.PID
FROM  SUPPLIERS S, CATALOG C
WHERE  S.SID = C.SID AND    (SELECT COUNT(PID)
                             FROM CATALOG
                             WHERE SID = S.SID) >= 4 AND
                            C.COST = (SELECT MAX(COST)
                                      FROM CATALOG
                                      WHERE SID = S.SID)
```

13. For every distinct color of the parts, find the total number of suppliers who supply a part of this color.

Solution 13.

SELECT COLOR, ***COUNT***(SID)

FROM PARTS ***NATURAL JOIN*** CATALOG

GROUP BY COLOR

14. Find the SIDs of suppliers who supply at least two parts of different color.

Solution 14.

SELECT SID

FROM PARTS ***NATURAL JOIN*** CATALOG

GROUP BY SID

HAVING COUNT(DISTINCT P.COLOR***)*** ***>= 2***

15. For every part which has a supplier, find its PID, PNAME, its average cost, maximum cost and minimum cost.

Solution 15.

SELECT PID, PNAME, ***MAX***(COST), ***MIN***(COST)

FROM PARTS ***NATURAL JOIN*** CATALOG

GROUP BY PID