CSI2532— Base de Données I, Hiver 7, Université d'Ottawa

Solutions du Devoir #2

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Question I: Schéma:

$Suppliers(\underline{sid} : \texttt{integer}, sname : \texttt{string}, address : \texttt{string}, rating : \texttt{real})$
$Parts(\underline{pid} : \texttt{integer}, pname : \texttt{string}, color : \texttt{string})$
$Catalog(\underline{sid} : \texttt{integer}, \underline{pid} : \texttt{integer}, cost : \texttt{real})$

Réponses:

1.

$$\Pi_{sname}(((\Pi_{sid,pid}Catalog)/(\Pi_{pid}(\sigma_{color='rouge'}Parts))) \bowtie Suppliers)$$

$$\{< Sn > | < S, Sn, A, R >\in Suppliers \wedge \\ \forall < P, Pn, C >\in Parts(C =' rouge' \longrightarrow \exists < S', P', Cs >\in Catalog(S = S' \wedge P = P'))\}$$

2.

$$\rho(Fourniture, \Pi_{pid,sname,sid}(Parts, Catalog))$$
$$\rho(PairdeFournitures, (1 \rightarrow pid_1, 2 \rightarrow pname_1, \\ 3 \rightarrow sid_1, 4 \rightarrow pid_2, \\ 5 \rightarrow sname_2, 6 \rightarrow sid_2, Fournitures \times Fournitures))$$
$$\Pi_{pid_1}\sigma_{(pid_1=pid_2 \wedge sid_1 \neq sid_2)}PairdeFournitures$$

$$\{< P > |\exists Pn, C(< P, Pn, C >\in Parts \wedge \\ \exists S, Cs, S', Cs'(< S, P, Cs >\in Catalog \wedge < S', P, Cs' >\in Catalog \wedge S = S'))\}$$

3.

$$\rho(Tempred, \Pi_{sid}((\sigma_{color='rouge'}Parts) \bowtie Catalog))$$
$$\rho(Tempgreen, \Pi_{sid}((\sigma_{color='vert'}Parts) \bowtie Catalog))$$
$$Tempred \cap Tempgreen$$

$$\{< S > |\exists Sn, A, R(< S, Sn, A, R >\in Suppliers \wedge \\ \exists P, Pn, Cs, C(< S, P, Cs >\in Catalog \wedge < P, Pn, C >\in Parts \wedge C =' rouge' \wedge \\ \exists P', Pn', Cs', C'(< S, P', Cs' >\in Catalog \wedge < P', Pn', C' >\in Parts \wedge C =' vert') \wedge \\ P \neq P'))\}$$

4.

$$\Pi_{sid}(Catalog) - \Pi_{sid}(Catalog \bowtie \sigma_{color \neq' red'} Parts)$$

$$\{< S > | \exists S, P, Pn, Cs, C(< S, P, Cs > \in Catalog \wedge < P, Pn, C > \in Parts \wedge C =' rouge' \wedge \\ \neg \exists P', Pn', Cs', C'(< S, P', Cs' > \in Catalog \wedge < P', Pn', C' > \in Parts \wedge C \neq' rouge'))\}$$

Contraintes d'intégrié:

5
```
CREATE TABLE Catalog
  ( sid INTEGER,
    pid INTEGER,
    cost REAL,
    PRIMARY KEY(pid)
    FOREIGN KEY(sid) REFERENCES Suppliers,
    FOREIGN KEY(pid) REFERENCES Parts,
    CHECK ((SELECT COUNT(C.pid)
            FROM Catalog C
            GROUP BY C.pid
            HAVING COUNT(*)<2)=0
            AND
           (SELECT COUNT(C.pid)
            FROM Catalog C
            GROUP BY C.pid
            HAVING COUNT(*)>5)=0))
```

6
```
CREATE ASSERTION everyoneMustSupply111
   ( CHECK (NOT EXISTS
           ((SELECT S.sid
            FROM Suppliers S)
            EXCEPT
           (SELECT C.sid
            FROM CATALOG C, PARTS P
            WHERE C.pid = P.pid
                  AND P.pid = '111'))))
```

7
```
CREATE TABLE Catalog
   ( sid INTEGER,
     pid INTEGER,
     cost REAL,
     PRIMARY KEY(pid)
     FOREIGN KEY(sid) REFERENCES Suppliers,
     FOREIGN KEY(pid) REFERENCES Parts,
     CHECK ((SELECT COUNT(C.sid)
             FROM Catalog C
             GROUP BY C.sid
             HAVING COUNT(*)>100)=0))
```

8
```
CREATE TRIGGER supRatingIncrease
AFTER UPDATE ON Suppliers
```

```
WHEN OLD.rating < NEW.rating
FOR EACH ROW
BEGIN
UPDATE Catalog C
SET C.cost = C.cost * 1.10
WHERE C.sid IN (SELECT C1.sid
        FROM Suppliers S1, Catalog C1
        WHERE S1.sid = NEW.sid
                       AND S1.sid = C1.sid);
END
```

Question II: Voir document séparé.

Question III:

1.
```
SELECT  A.aid
FROM  Aircraft A
WHERE  NOT EXISTS
        (( SELECT  E.eid
           FROM  Employees E
           WHERE E.salary > 100000)
          EXCEPT
           (SELECT  C.eid
            FROM  Certified C
            WHERE  C.aid=A.aid))
```

Note: L'exercice 4.5(4) consiste à identifier les avions et non les vols.

2.
```
SELECT  E.eid, E.salary
FROM  Employees E
WHERE E.salary = (SELECT  MAX(E2.salary)
                  FROM  Employees E2)
```