**Practice work RA AND SQL -Solution-**

1.

*πsname* (*πsid* ((*πpid σcolor*= *red Parts*) ⨝ *Catalog*) ⨝ *Suppliers*)

SELECT S.sname

FROM Suppliers S, Parts P, Catalog C

WHERE P.color= ’red’ AND C.pid=P.pid AND C.sid=S.sid

2.

*πsid*(*πpid*(*σcolor*= *red* ∨color= green*Parts*) ⨝ *Catalog*)

SELECT C.sid

FROM Catalog C JOIN Parts P ON P.pid = C.pid

WHERE (P.color = ‘red’ OR P.color = ‘green’)

3.

*ρ*(*R*1*, πsid* ((*πpid σcolor*= *red Parts*) ⨝ *Catalog*))

*ρ*(*R*2*,πsid σaddress*= 221*PackerStreet Suppliers*)

*R*1 ∪*R*2

SELECT S.sid

FROM Suppliers S

WHERE S.address = ‘221 Packer street’

OR S.sid IN ( SELECT C.sid

FROM Parts P JOIN Catalog C ON P.pid = C.pid

WHERE P.color= ’red’ )

4.

*ρ*(*R*1*,πsid*((*πpid σcolor*= *red Parts*) ⨝ *Catalog*))

*ρ*(*R*2*,πsid*((*πpid σcolor*= *green Parts*) ⨝ *Catalog*))

*R*1 *∩R*

SELECT C.sid

FROM Parts P JOIN Catalog C ON P.pid = C.pid

WHERE P.color = ‘red’

AND EXISTS ( SELECT P2.pid

FROM Parts P2, Catalog C2

WHERE P2.color = ‘green’ AND C2.sid = C.sid AND P2.pid = C2.pid)

5.

(*πsid,pidCatalog*)*/*(*πpidParts*)

SELECT C.sid

FROM Catalog C

WHERE NOT EXISTS (SELECT P.pid

FROM Parts P

WHERE NOT EXISTS (Select C1.sid

FROM Catalog C1

WHERE C1.sid = C.sid AND C1.pid = P.pid))

6.

(*πsid,pidCatalog*)*/*(*πpidσcolor*= *red Parts*)

SELECT C.sid

FROM Catalog C

WHERE NOT EXISTS (SELECT P.pid

FROM Parts P

WHERE P.color = ‘red’

AND (NOT EXISTS (SELECT C1.sid

FROM Catalog C1

WHERE C1.sid = C.sid AND C1.pid = P.pid)))

7.

(*πsid,pidCatalog*)*/*(*πpidσcolor*= *red V color = green Parts*)

SELECT C.sid

FROM Catalog C

WHERE NOT EXISTS (SELECT P.pid

FROM Parts P

WHERE (P.color = ‘red’ OR P.color = ‘green’)

AND (NOT EXISTS (SELECT C1.sid

FROM Catalog C1

WHERE C1.sid = C.sid AND C1.pid = P.pid)))

8.

*ρ*(*R*1*,*((*πsid,pid Catalog*)*/*(*πpidσcolor*= *red Parts*)))

*ρ*(*R*2*,*((*πsid,pid Catalog*)*/*(*πpid σcolor*= *green Parts*)))

*R*1 ∪*R*2

SELECT C.sid

FROM Catalog C

WHERE (NOT EXISTS (SELECT P.pid

FROM Parts P

WHERE P.color = ‘red’ AND

(NOT EXISTS (SELECT C1.sid

FROM Catalog C1

WHERE C1.sid = C.sid AND C1.pid = P.pid))))

OR ( NOT EXISTS (SELECT P1.pid

FROM Parts P1

WHERE P1.color = ‘green’ AND

(NOT EXISTS (SELECT C2.sid

FROM Catalog C2

WHERE C2.sid = C.sid AND C2.pid = P1.pid))))

9.

*ρ*(*R*1*, Catalog*)

*ρ*(*R*2*, Catalog*)

*πR*1.sid,R2.sid(*σR*1*.pid*=*R*2*.pid*∧R1.sid ≠R2.sid∧R1.cost>R2.cost(*R*1 *×R*2))

SELECT C1.sid, C2.sid

FROM Catalog C1 JOIN Catalog C2 ON C1.pid = C2.pid

WHERE C1.sid*<>*C2.sid

AND C1.cost *>* C2.cost

10.

*ρ*(*R*1*, Catalog*)

*ρ*(*R*2*, Catalog*)

*πR*1.pid*σR*1.pid=R2.pid∧R1.sid≠R2.sid(*R*1 *×R*2)

SELECT C.pid

FROM Catalog C

WHERE EXISTS (SELECT C1.sid

FROM Catalog C1

WHERE C1.pid = C.pid AND C1.sid *<>* C.sid )

11.

*ρ*(*R*1*,πsidσsname*= *YosemiteSham Suppliers*)

*ρ*(*R*2*, R*1 ⨝ *Catalog*)

*ρ*(*R*3*, R*2)

*ρ*(*R*4(1 *→ sid,* 2 *→ pid,* 3 *→ cost*)*, σR*3*.cost< R*2*.cost* (*R*3 *× R*2))

*π*pid *(R2 - π*sid,pid,cost*R*4)

SELECT C.pid

FROM Catalog C, Suppliers S

WHERE S.sname = ‘Yosemite Sham’ AND C.sid = S.sid

AND C.cost *≥* ALL (Select C2.cost

FROM Catalog C2 JOIN Suppliers S2 ON C2.sid = S2.sid

WHERE S2.sname = ‘Yosemite Sham’)