**CSCI 5333.4 DBMS**

**Suggested Solution for HW #3**

(1) For example:

1. π SCITY, COLOR( SUPPLIER |X| SUPPLY |X| PART )
2. π SNAME ( SUPPLIER |X|π SNUM (σ PNUM = ‘P1’ (SUPPLY))) ∩ π SNAME ( SUPPLIER |X|π SNUM (σ PNUM = ‘P2’ (SUPPLY)))
3. π SNAME ( SUPPLIER |X|(π SNUM, PNUM (SUPPLY)) / ( π PNUM (σ COLOR = ‘RED’ (PART))))
4. π SNAME ( SUPPLIER |X|π SNUM (σ PNUM <> ‘P1’ (SUPPLY))) - π SNAME ( SUPPLIER |X|π SNUM (σ PNUM = ‘P1’ (SUPPLY)))

(2) For example:

1. PROJECT [SCITY, COLOR] (SUPPLIER JOIN SUPPLY JOIN PART);
2. PROJECT [SNAME] (SUPPLIER JOIN (SELECT [PNUM = 'P1'] (SUPPLY)))

 INTERSECT

 PROJECT [SNAME] (SUPPLIER JOIN (SELECT [PNUM = 'P2'] (SUPPLY)));

1. PROJECT [SNAME]

 (SUPPLIER

 JOIN

 (PROJECT [SNUM] (SUPPLIER))

 MINUS

 (PROJECT [SNUM]

 (((PROJECT [SNUM] (SUPPLIER))

 TIMES

 (PROJECT [PNUM] (SELECT [COLOR='Red'] (PART))))

 MINUS

 (PROJECT [SNUM, PNUM] (SUPPLY)))));

1. PROJECT [SNAME]

 (SUPPLIER

 JOIN

 ((PROJECT [SNUM] (SELECT [PNUM <> 'P1'](SUPPLY)))

 MINUS

 (PROJECT [SNUM] (SELECT [PNUM = 'P1'](SUPPLY)))));

(3) For example:

1. { ( S.CITY, P.COLOR ) | S ϵ SUPPLIER , U ϵ SUPPLY, P ϵ PART, SUPPLIER. SNUM = U.SNUM, U.PNUM = P.PNUM}
2. { (S.SNUM ) | S ϵ SUPPLIER, U1 ϵ SUPPLY, U2 ϵ SUPPLY, S.SNUM = U1.SNUM, S.SNUM = U2.SNUM, U1.PNUM = ‘P1’, U2.PNUM = ‘P2’ }
3. { (S.SNAME) | S ϵ SUPPLIER, ~ (Ǝ P) (P ϵ PART, P.COLOR = ‘RED’, ~ (Ǝ U) ( U ϵ SUPPLY, U.SNUM = S.SNUM, U.PNUM = P.PNUM)) }
4. { (S.SNAME) | S ϵ SUPPLIER, (Ǝ U) (U ϵ SUPPLY, S.SNUM = U.SNUM, U.PNUM <> ‘P1’ ), ~ (Ǝ Uˈ) (Uˈ ϵ SUPPLY, S.SNUM = Uˈ.SNUM, Uˈ.PNUM = ‘P1’ ) }

(4) For example:

1. { (SCITY, COLOR) | (SNUM, \_ , SCITY, \_ ) ϵ SUPPLIER, (SNUM, \_, SCITY, \_ ) ϵ SUPPLY, (SNUM, PNUM, \_ ) ϵ SUPPLY, (PNUM, \_, COLOR, \_) ϵ PART }
2. { (SNAME) | (SNUM, SNAME, \_, \_ ) ϵ SUPPLIER, (SNUM, ‘P1’, \_ ) ϵ SUPPLY, (SNUM, ‘P2’, \_ ) ϵ SUPPLY }
3. { (SNAME) | (SNUM, SNAME, \_, \_ ) ϵ SUPPLIER, ~ (Ǝ PNUM ) ( (PNUM, \_, ‘Red’, \_ ) ϵ PART, (SNUM, PNUM, \_ ) ∉ SUPPLY ) }
4. { (SNAME) | (SNUM, SNAME, \_, \_ ) ϵ SUPPLIER, ( SNUM, PNUM, \_ ) ϵ SUPPLY, PNUM <> ‘P1’, (SNUM, ‘P1’, \_ ) ∉ SUPPLY }