Q5. R = {A,B,C,D,E,F}
   FD = {A->BC, B->CE, A->E, AC->F, D->B}
   Find minimal cover.

Soln.

Step 1 : Reduce R.H.S

   F = {A->B, A->C, B->C, B->E, A->E, AC->F, D->B}

Step 2 : Reduce L.H.S

   AC+ = {A, B, C, E, F}

   AC->F
   ↗ A->F
   ↘ C->F

   A+ = {A, B, C, E, F}

   C+ = {C, F}

   F1 = { A->B, A->C, B->C, B->E, A->E, A->F, D->B}

Step 3: Try to reduce every FD of F1

   Check A->B:
   Before removing A->B : A+ = {A, B, C, E, F}
   After removing A->B: A+ = {A, C, E, F}

   Check A->C: (can remove)
   Before removing A->C : A+ = {A, B, C, E, F}
   After removing A->C: A+ = {A, B, C, E, F}

   F1 = { A->B, B->C, B->E, A->E, A->F, D->B}

   Check B->C:
   Before removing B->C : B+ = {B, C, E}
   After removing B->C: B+ = {B, E}

   Check B->E:
   Before removing B->E : B+ = {B, C, E}
   After removing B->E: B+ = {B, C}

Check A->E: (can remove)
Before removing A->E : A+ = {A, B, C, E, F}
After removing A->E: A+ = {A, B, C, E, F}

F1 = { A->B, B->C, B->E, A->F, D->B}

Check A->F:
Before removing A->F : A+ = {A, B, C, E, F}
After removing A->F: A+ = {A, B, C, E}

Check D->B:
Before removing D->B : D+ = {B, C, E, D}
After removing D->B: D+ = {D}

Minimal FD = { A->B, B->C, B->E, A->F, D->B}
        Or { A->BF, B->CE, D->B }

Q6. R = {A,B,C,D,E,F}
   FD = {AB->C, C->A, BC->D, ACD->B, BE->C, EC->FA, CF->BD, D->E}
   Find minimal cover.

Soln.

Step 1 : Reduce R.H.S

        F = {AB->C, C->A, BC->D, ACD->B, BE->C, EC->F, EC->A, CF->B, CF->D, D->E}

Step 2 : Reduce L.H.S
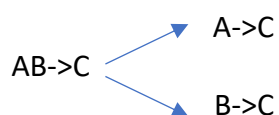
AB+ = {A, B, C, D, E, F}
A+ = {A, C}
B+ = {A, B, C, D, E, F}

F1 = {B->C, C->A, BC->D, ACD->B, BE->C, EC->F, EC->A, CF->B, CF->D, D->E}
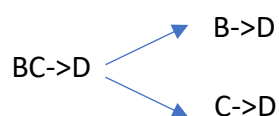
BC+ = {A, B, C, D, E, F }
B+ = {A, B, C, D, E, F}
C+ = {A, B, C, D, E, F}

F1 = {B->C, C->A, C->D, ACD->B, BE->C, EC->F, EC->A, CF->B, CF->D, D->E}

ACD->B
- A->B
- C->B
- D->B
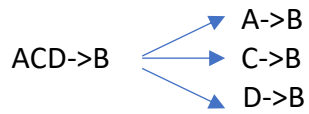
ACD+ = {A, B, C, D, E, F}
A+ = {A, B, C, D, E, F}
C+ = {A, C, B, D, E, F}
D+ = {A, B, C, D, E, F}

F1 = {B->C, C->A, C->D, C->B, BE->C, EC->F, EC->A, CF->B, CF->D, D->E}

BE->C
- B->C
- E->C
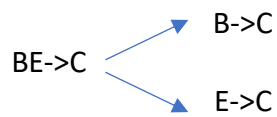
BE+ = {A, B, C, D, E, F}
B+ = {A, B, C, D, E, F}
E+ = {A, B, C, D, E, F}

F1 = {B->C, C->A, C->D, C->B, EC->F, EC->A, CF->B, CF->D, D->E}

EC->F
- E->F
- C->F
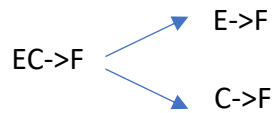
EC+ = {A, B,C, D, E, F}
E+ = {E, F}
C+ = {A, B, C, D, E, F}

F1 = {B->C, C->A, C->D, C->B, C->F, EC->A, CF->B, CF->D, D->E}

EC->A
- E->A
- C->A
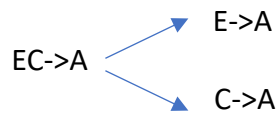
EC+ = {A, B, C, D, E, F}
E+ = {A, E}
C+ = {A, B, C, D, E, F}

F1 = {B->C, C->A, C->D, C->B, C->F, CF->B, CF->D, D->E}

CF->B
- C->B
- F->B
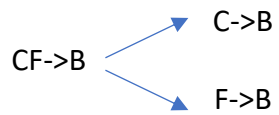
CF+ = {A, B, C, D, E, F}
C+ = {A, B, C, D, E, F}
F+ = {A, B, C, D, E, F}

F1 = {B->C, C->A, C->D, C->B, C->F, CF->D, D->E}

CF->D
- C->D
- F->D
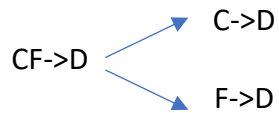
CF+ = {A, B, C, D, E, F}
C+ = {A, B, C, D, E, F}
F+ = {D, E, F}

F1 = {B->C, C->A, C->D, C->B, C->F, D->E}

Step 3: Try to reduce every FD of F1
We find that we couldn't further reduce the FDs.

Minimal FD = {B->C, C->A, C->D, C->B, C->F, D->E}
Or {B->C, C->ABDF, D->E}