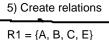1. Let R = {A, B, C, D, E, F, G}
Let the FD set = {AB -> CE, A -> DF, CE -> DF, F -> G}
Create a set of 3NF tables from R based on the FD set.
Neatly show your work!

1) Decompose RHS
AB -> C
AB -> E
A -> D
A -> F
CE -> D
CE -> F
F-> G

2) Remove redundant LHS
AB => A (removed B) => A+ = A,D,F,G   [not redundant]
AB => B (removed A) => B+ = B   [not redundant]

CE => C (removed E) => C+ = C   [not redundant]
CE => E (removed C) => E+ = E   [not redundant]

   No redundant LHS

3) Remove redundant Dependencies
 AB -> C => AB+ = A,B,E,D,F,G [not redundant]
 AB -> E => AB+ = A,B,C,D,F,G [not redundant]
 A -> D => A+ = A,F,G   [not redundant]
 A -> F => A+ = A,D   [not redundant]
 CE -> D => CE+ = C,E,F,G   [not redundant]
 CE -> F => CE+ = C,E,D   [not redundant]
 F->G => F+ = F   [not redundant]

 No redundant dependencies

4) Combine LHS

AB -> CE
A -> DF
CE -> DF
F -> G

5) Create relations

R1 = {A, B, C, E}
R2 = {A, D, F}
R3 = {C, E, D, F}
R4 = {F, G}

6) Check if table has universal key

R1 = {A, B, C, E} => ABCE+ = A,B,C,E,D,F,G which is a super key.

We are done with the relations in 5)

This question is the optional question I mentioned in the quiz 4 solution video. You can use it to get 3 additional points (up to a max score of 20) for quiz 3.

Write a trigger called checkStaff. The trigger is called when the mid column in the Staff table is changed. The trigger checks that the new manager (mid) works in the same library as the staff member(s) he/she manages. That is in the new row or rows the library of the mid (also a staff member) must be the same as the library of the sid. If the update is consistent (i.e. the library of the sid and mid are the same) the update succeeds otherwise it fails.