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3NF Decomposition Example:

R(A,B, C, D, E, F, G, H, K)
FDs: { ABH → CK, A → D, C → E, BGH → F, F → AD, E → F, BH → E}

Step 1: Find the minimal cover, U, for F.

Make right hand size one attribute:

ABH → C
ABH → K
F → A
F → D
Updated FDs : { ABH → C, ABH → K, A → D, C → E, BGH → F, F → A, F → D, E → F, BH → E}

Simplify left hand side:

ABH → C and ABH → K becomes BH → C and BH → K, since BH → E, E → F, F → A result in BH → A and BH → A, ABH → C result in BH → C

BGH → F becomes BH → F, since BH → E, E → F result in BH → F

Updated FDs : { BH → C, BH → K, A → D, C → E, BH → F, F → A, F → D, E → F, BH → E}

Eliminate redundant FDs:
Since BH → E, E → F result in BH → F, we can remove BH → F.
Since BH → C, C → E result in BH → E, we can remove BH → E.
Since F → A, A → D result in F → D, we can remove F → D.

Minimal cover U = { BH → C, BH → K, A → D, C → E, F → A, E → F}

Step 2: Partition U into sets U_1, U_2, ... U_n such that LHS of all elements of U_i are the same.

U_1= { BH --> C, BH --> K }
U_2= { A --> D }
U_3= { C --> E }
U_4= { F --> A }
U_5= { E --> F }

Step 3: For each U_i form a relation R_i

R_1(B, C, H, K) , R_2(A, D) , R_3(C, E) , R_4(A, F) , R_5(E, F)

Step 4: If no R_i contains a super key of the original relation R add scheme R_0 where attributes included in R_0 contains a super key of R.

Since superkey of R is BHG and no R_i contains it, add R_0(B, G, H). Note that adding R_0 provides lossless decomposition.