Data Management Homework 4

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1. (a) Following closures are computed:
   i. $(BC)^+ = BCD$
   ii. $(BDEFG)^+ = BCDEFG$
   iii. $(HEFG)^+ = BCDEFGH$
   iv. $(EFG)^+ = DEFG$
   v. $(EFGH)^+ = BCDEFGH$

   (b) I is not in any functional dependency, it must be part of the key. H is only on the left side, therefore it must be part of the key, while D is only on the right side, hence it does not appear in any key.

   Now, we have to add attributes to HI to get keys while ignoring D: HICEF, HICEG, HICFG we remove because C is in the closure of EFG which we can always get if we have at least two attributes of EFG.

   The remaining keys are: HIEF, HIEG, HIFG. They are all fit the requirements.

   (a) Following Five FDs are computed:
   i. $Us \rightarrow YeBa$
   ii. $Ye \rightarrow ReMo$
   iii. $UsRe \rightarrow Ba$
   iv. $Da \rightarrow Ye$
   v. $Us \rightarrow Mo$

   (b) Combine 1+5:
   i. $Us \rightarrow YeBaMo$
   ii. $Ye \rightarrow ReMo$
   iii. $UsRe \rightarrow Ba$
   iv. $Da \rightarrow Ye$

   Now, 1+3 LHS:

i. $Us \rightarrow YeBaMo$
ii. $Ye \rightarrow ReMo$
iii. $Da \rightarrow Ye$

Now, 1+2 RHS

i. $Us \rightarrow YeBa$
ii. $Ye \rightarrow ReMo$
iii. $Da \rightarrow Ye$

We cannot perform any further steps, so this is minimal cover.