Consider a relation R(C, T, H, R, S, G) and FD’s C → T, HR → C, HR → T, HT → R, HS→ R, CH → R, and CS → G, answer the following question

1. What are all they keys for R?
   1. The only key is {H, S}
2. List all the 3NF violations from given FDs:
   1. C → T
   2. HR → C
   3. HR → T
   4. HT → R
   5. HC → R
   6. CS → G
3. Are the given FD’s their own minimal basis? Why?
   1. The given FD’s are not their own minimal basis. This is because they FD HR -> T, can be derived from the given FD’s HR -> C and C -> T.
   2. Another derived FD is HC -> R, derived from C->T and HT->R. This is done by adding the attribute H to the FD C->T to make HC->HT, then using that to make HC->R; therefore HC->R is derived.
   3. The FD’s HR -> T and HC -> R would need to be removed to become a minimal basis.
4. Find a lossless-join and dependency-preserving decomposition of R into 3NF relations.
   1. (H, S, R)
   2. (C, T)
   3. (H, R, C)
   4. (H, T, R)
   5. (C, S, G)