CS143, Fall 2017: Homework 6

Problem A: 2 questions

Take a look at two-Phase Commit Protocol in Pictures described at:

http://www.exploredatabase.com/2014/07/two-phase-commit-protocol-in-pictures.html

and consider the following three types of indefinitely long failures:

F1. Indefinitely long failure of coordinator,

F2. Indefinitely long failure of a cohort,

F3. Indefinitely long failure of communication lines,

Can any to these failures result in:

(A) the non-failing coordinator to halt indefinitely , or

(B) a non-failing cohort to halt indefinitely ?

Describe at which Step of the "Protocol in Picture," F1 or F2 or F3 will cause (A) or (B) and explain the reasons for the problem.

Problem B: 6 questions

We are given the $T(A, C, B, D, E)$

(a) $AD \rightarrow CE$

(b) $BC \rightarrow D$

(c) $AB \rightarrow A$

(d) $B \rightarrow E$

Q1. is any of the previous FDs trivial?

Q2. Is this schema BCNF? (To receive credit you must justify your answer.)

Q2. Are all these FDs key FDs (Key FD: its left side contains a key)?

Q3. Is this schema 3NF?

Q3: Transform the given FDs into an equivalent set of elementary FDs (no trivial FD, only one attribute on the right side, minimal left side).

Q4. Compute a lossless decompositions of T into BCNF relations where **no two relations share the same keys.**

Q5. Can you reconstruct the original relation from those obtained in the decomposition? What RA operation will you be using for that?

Q6. Is your decomposition FD preserving? To receive credit you must justify your answer.