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CS143 Homework 6

(A) (A) The TC can be halted indefinitely due to either F2 or F3 after it sends its prepare message. It will wait for a response from all of the cohorts (either proceed or abort). If a line goes bad or a cohort fails after Step1, and can't proceed with step 2, then the TC is halted indefinitely (since 3-Phase commits were introduced).

(B) A TM can be halted indefinitely due to F1 or F3 after the TC sends the commit, and then crashes. The TMs (in this case) all were ready to proceed, but the crash of the TC in the transition from Step3 to 4 could halt a TM indefinitely.

(B) (Q1) (C) AB→A (as A is a subset of {A, B})

(Q2) T(A, C, B, D, E) Candidate Key : B

AD→CE BC→D AB→A B→E

① ~~AD→CE~~ ③ ~~BC→D~~ ⑦ B→E

2a D→C 4a B→D D+ = {D, C, E} (A, B missing)

2b D→E 4b C→D R1(D, C, E) R2(D, B, A)

2c A→C 5 ~~AB→A~~ A+ = {A, C, E, D} (B missing)

2d A→E 6a B→A R3(A, C, E, D) R4(A, B) R5(C, D)

B+ = {B, D, C, E, A} C+ = {C, D} R6(A, B, E).

Not BCNF as not all FDs include candidate key B

(Q3) No

(Q3) ~~Yes~~, as AD is not in the BCNF

(Q3) D→C A→E B→A

D→E B→D B→E

A→C C→D

(Q4) R2(D, B, A), R3(A, C, E, D) R5(C, D) R6(A, B, E)

(Q5) Yes with a normal join operation

(Q6) ① by R5 ② by R3 ④ by R2 ⑥ by R6

③ by R3 ⑤ by R3 ⑧ by R5 ⑦ by R6

. Therefore, yes all FDs preserved as the FDs are derived by the decomposition implying the specific keys