9311 Assignment2

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Question 1

1) No. Because $C^+=\{C\}$ and $J \notin C^+$.

2) $F_m = \{A \to B, A \to C, E \to A, E \to D, E \to H, BD \to E, H \to G, EI \to J\}$

3) Yes.
   Given $R_1=\{ABCDE\}$, $R_2=\{EGH\}$, $R_3=\{EIJK\}$ of R, we have:

	A	B	C	D	E	G	H	I	J	K
R1	a	a	a	a	a	a	a	b	b	b
R2	a	a	a	a	a	a	a	b	b	b
R3	a	a	a	a	a	a	a	a	a	a

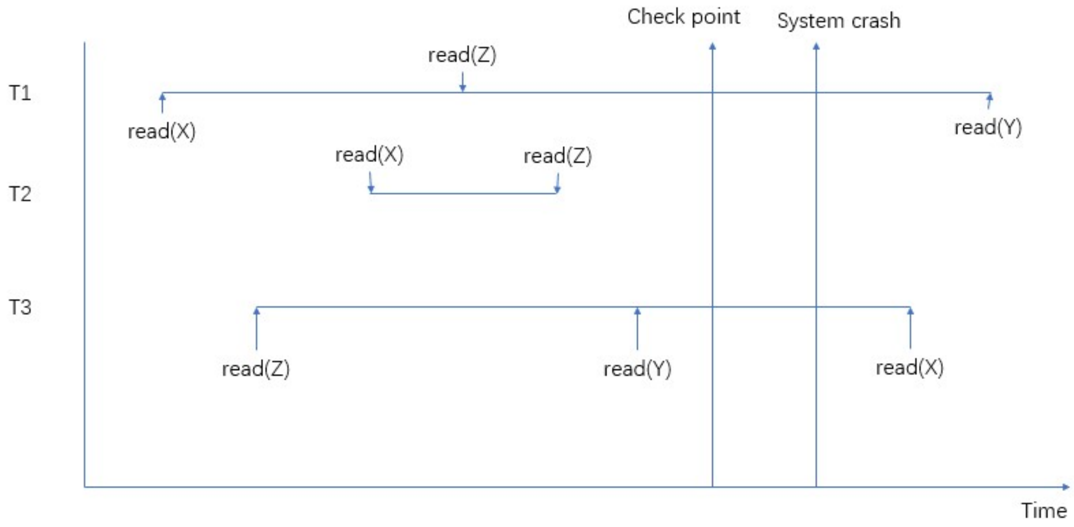
   (PS: The red 'a' means these 'a's change from 'b')
   We can see that the R_3 row is full of 'a' which means that this decomposition is lossless-join.

4) EIJK, EIK, AEIJK, EGHIJK, ABCDEGHIJK

5) No. It is impossible to get the satisfied decomposition of R.
   Let $R_0 = F_m = (ABCDEGHIJK)$
   1. From $A \to BC \in F_m$, we can delete B,C from R_0 and get $R_1 = (ABC)$
      So the R_0 changes to (ADEGHIJK)
   2. From $E \to ADH \in F_m$, we can delete A,D,H from R_0 and get $R_2 = (EADH)$
      So the R_0 changes to (EGIJK)
   3. From $EI \to J \in F_m$, we can delete J from R_0 and get $R_3 = (EIJ)$
      So the R_0 changes to (EGIK)

   However, consider these two sets: $BD \to E$ and $E \to D$. They can not satisfy the dependency preserving decomposition.
   For example, let $F_1= (E \to D)$, and R will be decomposed into $R_1 = (E, D)$ and $R_2 = (A, B, C, E, G, H, I, J, K)$. As a result of this, R_2 will not contain '$BD \to E$', which makes it not satisfied. Like the former one, let $F_1 = (BD \to E)$ will not lead to the dependency preserving decomposition.

Question 2



According to the schedule table, a coordinate system can be drawn like above, and we can get the solutions of recovering the system.

1) T1: UNDO
   T2: REDO
   T3: UNDO

2) T1: UNDO
   T2: No need to modify.
   T3: UNDO

Question 3

1) Scanning a database which has no redundancy or repetition alphabetically.

2) Scanning a database which only a minority of data of it repeat periodically.