CS4400 Intro Database Systems
In Class Practice Questions – Functional Dependencies & Normalization

14.26. Consider the following relation:

A	B	C	TUPLE#
10	b1	c1	1
10	b2	c2	2
11	b4	c1	3
12	b3	c4	4
13	b1	c1	5
14	b3	c4	6

a. Given the previous extension (state), which of the following dependencies *may hold* in the above relation? If the dependency cannot hold, explain why *by specifying the tuples that cause the violation.*

i. $A \rightarrow B$, ii. $B \rightarrow C$, iii. $C \rightarrow B$, iv. $B \rightarrow A$, v. $C \rightarrow A$

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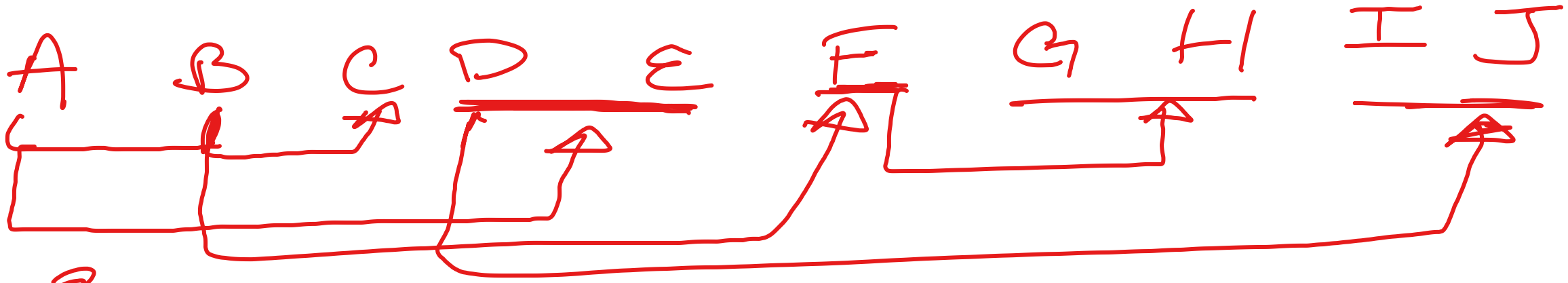
14.24. Consider the universal relation $R = \{A, B, C, D, E, F, G, H, I, J\}$ and the set of functional dependencies $F = \{\{A, B\} \rightarrow \{C\}, \{A\} \rightarrow \{D, E\}, \{B\} \rightarrow \{F\}, \{F\} \rightarrow \{G, H\}, \{D\} \rightarrow \{I, J\}\}$. What is the key for R? Decompose R into 2NF and then 3NF relations.



{A}+ = {A, D, E, I, J}

{B}+ = {B, F, G, H}

A { A, D, E, F, I, J }

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14.25. Repeat Exercise 14.24 for the following different set of functional dependencies $G = \{\{A, B\} \rightarrow \{C\}, \{B, D\} \rightarrow \{E, F\}, \{A, D\} \rightarrow \{G, H\}, \{A\} \rightarrow \{I\}, \{H\} \rightarrow \{J\}\}$.

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14.27. Consider a relation $R(A, B, C, D, E)$ with the following dependencies:

$$AB \rightarrow C,\ CD \rightarrow E,\ DE \rightarrow B$$

Is AB a candidate key of this relation? If not, is ABD? Explain your answer.