Each multiple-choice quiz problem is based on a "root question," from which the system generates different correct and incorrect choices each time you take the quiz. Thus, you can test yourself on the same material multiple times. We strongly urge you to continue testing on each topic until you complete the quiz with a perfect score at least once. Simply click the "Reset" button at the bottom of the page for a new variant of the quiz.

After submitting your selections, the system will score your quiz, and for incorrect answers will provide an "explanation" (sometimes for correct ones too). These explanations should help you get the right answer the next time around. To prevent rapid-fire guessing, the system enforces a minimum of 10 minutes between each submission of solutions.

Multiple Choice

6/6 points (graded)

[Q1] Consider relation R(A,B,C,D,E) with multivalued dependencies:

A $\twoheadrightarrow$ B, B $\twoheadrightarrow$ D

and no functional dependencies. Suppose we decompose R into 4th Normal Form. Depending on the order in which we deal with 4NF violations, we can get different final decompositions. Which one of the following relation schemas could be in the final 4NF decomposition?

○ BCE

○ ABCDE

⦿ AB

○ ABD

[Q2] Let R(A,B,C,D,E) be a relation in Boyce-Codd Normal Form (BCNF). Suppose ABC is the only key for R. Which of the following functional dependencies is guaranteed to hold for R?

○ ABD → E

○ ABE → D

◉ ABC → E

○ ACDE → B

[Q3] Consider a relation R(A,B,C,D). For which of the following sets of FDs is R in Boyce-Codd Normal Form (BCNF)?

○ A → C, B → A, A → D, AD → C

◉ BD → C, AB → D, AC → B, BD → A

○ C → D, CD → A, AB → C, BD → A

○ C → B, BC → A, A → C, BD → A

Answer-Selection Feedback
For each given FD, the closure of the left-side attributes is ABCD. Thus, the left-side attributes of each FD contain a key, and the relation is in BCNF.

[Q4] Consider relation R(A,B,C,D) with functional dependencies:

A → B, C → D, AD → C, BC → A

Suppose we decompose R into Boyce-Codd Normal Form (BCNF). Which of the following schemas could **not** be in the result of the decomposition?

- ○ CD

- ○ AB

- ◉ ACD

- ○ AC

Answer-Selection Feedback
C → D but C is not a key.

[Q5] Consider a relation R(A,B,C,D,E). For which of the following sets of FDs is R in Boyce-Codd Normal Form (BCNF)?

- ◉ AC → D, BCE → A, CD → E, CE → B

- ○ ABD → C, ACD → E, ACE → B, BC → E

- ○ BE → D, B → E, D → E, CD → A

- ○ ACD → E, AE → C, CE → B, A → D

Answer-Selection Feedback
For each given FD, the closure of the left-side attributes is ABCDE. Thus, the left-side attributes of each FD contain a key, and the relation is in BCNF.

[Q6] Consider relation R(A,B,C,D) with functional and multivalued dependencies:

A → B, C → D, B ↠ C

Suppose we decompose R into 4th Normal Form. Depending on the order in which we deal with 4NF violations, we can get different final decompositions. Which one of the following relation schemas could be in the final 4NF decomposition?

- ABC

- BCD

- BD

- ABD

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