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

0/4 points (graded)

[Q1] Here is an instance of a relation R(A,B,C):

A	B	C
1	2	3

1	3	2
1	2	2
3	2	1
3	2	3

Which of the following multivalued dependencies does this instance of R **not** satisfy?

- C ↠ A
- B ↠ C
- BC ↠ A ✖
- AB ↠ A

Answer-Selection Feedback

This MVD is trivial so it holds for any instance of R. Swapping the A values of any two tuples that have the same values for B and C (such as the first and last tuples) results in the same two tuples. (You may wish to review the formal definition of an MVD.)

[Q2] Here is an instance of a relation R(A,B,C,D):

A	B	C	D
1	2	3	4
1	3	3	3
1	3	3	4
1	2	3	3
2	2	4	4
2	4	2	4
2	4	4	4
2	2	2	4

Which of the following multivalued dependencies does this instance of R satisfy?

- A $\twoheadrightarrow$ B
- D $\twoheadrightarrow$ AB ✖
- BD $\twoheadrightarrow$ A
- B $\twoheadrightarrow$ A

Answer-Selection Feedback

This MVD does hold. There are only two pairs of tuples (first-and-fifth, second-and-third) that have the same values for C. In each case, swapping their A values yields the same two tuples. (You may wish to review the formal definition of an MVD.)

[Q3] Consider relation R(A,B,C,D,E) with multivalued dependencies:

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

Suppose R contains the tuples (0,1,2,3,4) and (0,5,6,7,8). Which of the following tuples must also be in R?

- (0,5,6,7,4)
- (0,1,6,7,4) ✖
- (0,5,2,3,8)
- (0,1,6,7,8)

Answer-Selection Feedback

Start with the two given tuples. Try to apply the given MVDs to any pair of tuples you can (i.e., any pair of tuples that have the same values for the attributes on the left side of the MVD). Each application of an MVD lets you add two tuples to the relation: the tuples formed by swapping the values for the attributes on the right side of the MVD. (You may wish to review the formal definition of an MVD.) Repeat this process until all of the tuples implied by the MVDs are already in the relation.

[Q4] Here is an instance of a relation R(A,B,C,D):

A	B	C	D
1	2	3	7
1	2	3	8
4	2	5	7
4	2	5	8

Consider the following three multivalued dependencies:

(1) AB ↠ C, (2) CD ↠ A, (3) D ↠ C

The following (M,n) pairs say that to satisfy multivalued dependency M (M=1, M=2, or M=3), a minimum of n tuples must be added to the given instance of R. Only one such pair is correct; which one?

- (2,0)
- (1,1) ✖
- (1,3)
- (2,4)

Answer-Selection Feedback

MVD (1) is satisfied without adding any tuples: swapping the C values for any pair of tuples whose A and B values match produces tuples already in the relation.

Submit