



## Gradiance Online Accelerated Learning

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- [Home Page](#)
- [Assignments Due](#)
- [Progress Report](#)
- [Handouts](#)
- [Tutorials](#)
- [Homeworks](#)
- [Lab Projects](#)
- [Log Out](#)

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### Help

1. Which of the following relations is in BoyceCodd Normal Form (BCNF)?
  - a) R(LMNOP) FD's:  $LM \rightarrow P$ ;  $N \rightarrow O$ ;  $MP \rightarrow N$
  - b) R(LMNO) FD's:  $LMN \rightarrow O$ ;  $LNO \rightarrow M$ ;  $MNO \rightarrow L$ ;  $L \rightarrow O$
  - c) R(LMNO) FD's:  $MNO \rightarrow L$ ;  $LNO \rightarrow M$ ;  $M \rightarrow L$
  - d) R(LMNO) FD's:  $LN \rightarrow M$ ;  $MO \rightarrow L$ ;  $MO \rightarrow N$ ;  $LM \rightarrow O$

Answer submitted: **d)**

You have answered the question correctly.

2. A basis for a set of FD's F is any set G of FD's whose closure is the same as the closure of F. That is, exactly the same FD's follow from F as from G. In addition, a basis must consist of a minimal set of nontrivial FD's. Suppose we have a relation R(W, M, X, Y, Z) with FD's  $W \rightarrow M$ ,  $M \rightarrow X$ ,  $X \rightarrow Y$ ,  $Y \rightarrow Z$ ,  $Z \rightarrow W$ . Suppose we project R onto attributes WMXY. Describe all the bases for the set of FD's that hold in WMXY. Given a set of FD's, select statements that correctly explain if the set is a basis or not.
  - a)  $Y \rightarrow W$ ,  $Y \rightarrow X$ ,  $M \rightarrow W$ ,  $W \rightarrow X$ ,  $X \rightarrow W$ : NOT a basis
  - b)  $W \rightarrow M$ ,  $M \rightarrow X$ ,  $X \rightarrow W$ ,  $X \rightarrow Y$ ,  $Y \rightarrow X$ : NOT a basis
  - c)  $W \rightarrow M$ ,  $M \rightarrow Y$ ,  $Y \rightarrow X$ ,  $X \rightarrow W$ : NOT a basis
  - d)  $W \rightarrow M$ ,  $M \rightarrow Y$ ,  $X \rightarrow Y$ ,  $Y \rightarrow W$ ,  $Y \rightarrow X$ : NOT a basis

Answer submitted: **a)**

You have answered the question correctly.

3. Suppose relation R(A,B,C,D) has the tuples:

A	B	C	D
a	1	4	e
b	2	10	e
c	7	6	f

a	3	19	e
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And the relation S(F, G, H) has tuples:

F	G	H
b	15	21
b	4	5
c	7	2
b	5	4
a	20	11
d	6	3
b	17	12

Which of the following tuples is in the theta-join of R and S with the condition  $A = F \text{ AND } C < G \text{ AND } (D = 'e' \text{ OR } D = 'f') \text{ AND } (A = 'a' \text{ OR } A = 'b') \text{ AND } G > H$ ?

- a) (c, 7, 6, f, c, 7, 2)
- b) (b, 2, 10, e, b, 17, 12)
- c) (a, 3, 19, e, b, 4, 5)
- d) (c, 7, 6, f, b, 5, 4)

Answer submitted: **b)**

You have answered the question correctly.

4. Let the relation A(MNOPQRST) satisfy the following functional dependencies:  $N \rightarrow P$ ,  $MO \rightarrow Q$ ,  $RS \rightarrow T$ ,  $Q \rightarrow S$ ,  $OP \rightarrow M$ ,  $PT \rightarrow R$ . Which of the following FD's is also guaranteed to be satisfied by A? Recall that an FD of the form  $X \rightarrow BC$ , where X is a set of attributes and where each of B and C is an attribute, is actually two FDs  $X \rightarrow B$  and  $X \rightarrow C$ . We say that an FD  $X \rightarrow BC$  is guaranteed to be satisfied by a relation schema if and only if each of  $X \rightarrow B$  and  $X \rightarrow C$  is guaranteed to be satisfied by this relation schema.

- a)  $OST \rightarrow PQ$
- b)  $NOT \rightarrow MS$
- c)  $QRS \rightarrow MT$
- d)  $RST \rightarrow MP$

Answer submitted: **b)**

You have answered the question correctly.

5. Which of the following relations is in Third Normal Form (3NF)?
- a) R(VWXY) FD's:  $VXY \rightarrow W$ ;  $W \rightarrow X$
  - b) R(VWXYZ) FD's:  $XY \rightarrow Z$ ;  $W \rightarrow XY$ ;  $Z \rightarrow VW$ ;  $X \rightarrow V$
  - c) R(VWXY) FD's:  $V \rightarrow Y$ ;  $Y \rightarrow X$ ;  $Y \rightarrow W$
  - d) R(VWXY) FD's:  $X \rightarrow W$ ;  $V \rightarrow Y$

Answer submitted: **a)**

You have answered the question correctly.

6. Which of the following relations is correctly decomposed into the minimal number of relations that are collectively in BCNF (BoyceCodd Normal Form)?
- a) R(ABCD) FD's:  $C \rightarrow D$ ;  $C \rightarrow A$ ;  $B \rightarrow C$  into R1(BC), R2(ACD)
  - b) R(ABCD) FD's:  $AB \rightarrow D$ ;  $D \rightarrow C$  into R1(CD), R2(ABC)
  - c) R(ABCD) FD's:  $A \rightarrow B$ ;  $A \rightarrow C$ ;  $D \rightarrow A$  into R1(AB), R2(AC), R3(DA)
  - d) R(ABCDE) FD's:  $B \rightarrow CD$ ;  $A \rightarrow E$  into R1(ABCDE), R2(AE)

Answer submitted: **a)**

You have answered the question correctly.

7. Determine the keys and superkeys of the relation R(MNOPST) with FD's:  $NS \rightarrow T$ ,  $MNO \rightarrow P$ ,  $NO \rightarrow T$ ,  $MPST \rightarrow N$  Then, demonstrate your knowledge by selecting the true statement from the list below. Each statement must include all the possible values.
- a) Keys: MNOPS
  - b) Superkeys: MOPST, MNOS, MNOPST, MNOPS, MNOST
  - c) Superkeys that are not keys: MOPST, MNOS
  - d) Superkeys: MOPS, MNPST

Answer submitted: **b)**

You have answered the question correctly.