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Homework Assignment Submitted Successfully.

You obtained a score of 105.0 points, out of a possible 105.0 points.
You have answered all the questions correctly.

Congratulations, you have achieved the maximum possible score.

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Number of questions:	7
Positive points per question:	15.0
Negative points per question:	0.0
Your score:	105

1. 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 → M, M → X, X → Y, Y → Z, Z → 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 → W, W → X: a basis

b) W → M, M→ X ,X → W, X → Y, Y → X: NOT a basis

c) W → M, M→ Y, X → Y, Y → W, Y → X: a basis

d) W → X, W → Y, X → Y, Y → X, M→ X, M→ Y: a basis

Answer submitted: **c)**

You have answered the question correctly.

2. Determine the keys and superkeys of the relation R(MNOPST) with FD's: NS → T, MNO → P, NO → T, MPST → N Then, demonstrate your knowledge by selecting the true statement from the list below. Each statement must include all the possible values.

a) Superkeys: MOPS, MNPST

b) Keys: MNOT, MNOPS, MNOST

c) Superkeys: MNOP, NST, MOPT

d) Superkeys that are not keys: MNOPST, MNOPS, MNOST

Answer submitted: **d)**

You have answered the question correctly.

3. Which of the following relations is in Third Normal Form (3NF)?

a) R(VWXY) FD's: V → W; V → X; WX → Y

b) R(VWXYZ) FD's: V → WX; Z → VY; W → Z

c) R(VWXY) FD's: X → W; V → Y

d) R(VWXY) FD's: V → Y; Y → X; Y → W

Answer submitted: **b)**

You have answered the question correctly.

4. 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

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 AND C < G AND (D = 'e' OR D = 'f') AND (A = 'a' OR A = 'b') AND G > H?

a) (a, 3, 19, e, a, 20, 11)

b) (a, 1, 4, e, b,17,12)

c) (b, 2, 10, e, b, 4, 5)

d) (b, 2, 10, e, b, 5, 4)

Answer submitted: **a)**

You have answered the question correctly.

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

each of X → B and X → C is guaranteed to be satisfied by this relation schema.

a) NQS → PT

b) RST → MP

c) PQR → ST

d) MRT → NO

Answer submitted: **c)**

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: AB → D; D → C into R1(CD), R2(ABC)

b) R(ABCD) FD's: A → BD; D → C into R1(ABD), R2(CD)

c) R(ABCD) FD's: A → B; A → C; D → A into R1(AB), R2(AC), R3(DA)

d) R(ABCDE) FD's: B → CD; A → E into R1(ABCDE), R2(AE)

Answer submitted: **b)**

You have answered the question correctly.

7. Which of the following relations is in BoyceCodd Normal Form (BCNF)?

a) R(LMNO) FD's: LN → M; MO → L; MO → N; LM → O

b) R(LMNO) FD's: MNO → L; LNO → M; M → L

c) R(LMNOP) FD's: LM → P; N → O; MP → N

d) R(LMNOP) FD's: L → P; M → OP; OP → N; P → O

Answer submitted: **a)**

You have answered the question correctly.