Tutorial 4

CSN-351/AID-523 Database Management Systems

1. State whether the following statements are True or False :

a. If a relation table is in higher normal form then by default it is in lower normal form.

b. If a relation table is in 3NF then for every functional dependency : X—>Y , X must be a super key.

c. The condition for a table to be in 2NF is : Table has no partial dependency.

d. A relation R with only 2 attributes is always in BCNF.

e. If very attribute is a prime attribute then relation is in 3NF.

f. If R is in 3NF and all it's candidate keys are simple, then R is also in BCNF.

g. If X->->YZ is a multivalued dependency (MVD) then this implies : X->->Y and X->->Z are also MVD.

h. If all attributes are atomic and FD set = {} for R, then R is in BCNF.

2. [MSQ] A relation R is in 3NF. Which characteristic(s) it must follow ?

A. All non-prime attributes must depend on a super key.

B. For all non-trivial FD's : X—>Y , either X is a super key or Y is a prime attribute.

C. No non-prime attribute is transitively dependent on any key

D. No non-prime attribute depends on other non-prime attribute.

3. Given R(ABCDEFG) with FD set = {AB—>C, B—>F, A—>E, E—>G}. Assume all attributes are atomic. Check whether R is in 2NF or not. If not then decompose R to achieve 2NF.

4. Given R(ABCDEF) with FD set = {AB—>C, C—>D, D—>E, B—>F}. Assume all attributes are atomic.

a. Check whether R is in 3NF or not. If not then decompose R to achieve 3NF.

b. If you decompose R into R1(ABC), R2(CDE), R3(BF). Does this decomposition will help us to achieve 3NF for R?

5. Given R(ABCD) with FD set = {AB—>CD, D—>A}. Assume all attributes are atomic.

a. Is R is in BCNF ?

b. Does decomposing R into R1(BC), R2(AD) help us achieve BCNF ?

c. Does decomposing R into R1(BCD), R2(AD) help us achieve BCNF ?

6. Given below R and FD set = {}:

L	C	B
L1	C1	B1
L1	C1	B2
L1	C2	B1
L1	C2	B2
L2	C2	B2

a. Find possible MVD in this R.

b. Determine whether R is in 4NF ?

c. If each cell of the table occupies 1Byte of memory. If we decompose R into R1(LC) , R2(LB) find all possible new MVD's. Also calculate how much memory (in Bytes) are we able to save with this decomposition ?