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CSC 134

Assignment 6

1.(20 pts) Given F = { a → b, b → c, c → {d, e} }. What is {b}+ (i.e. the closure of b)? Show your steps to achieve the answer.

{b}+ = {b, c}

{b}+ = {b, c, d, e}

2.(20 pts) Given F = { a → b, c → d, b → {d, e}, {a, b} → c }. What is {a}+ (i.e. the closure of a)? Show your steps to achieve the answer.

{a}+ = {a, b}

{a}+ = {a, b, d, e,}

{a}+ = {a, b, d ,e, c}

3.(30 pts) Given R(a, b, c, d, e) with two keys, (a,b) and c, and given the following set of functional dependencies F = { {a, b} → {c, d, e}, c → {a, b, d} }.

1.Is R in 1NF? Justify your answer.

Not enough info, we can't tell if there are multi valued attributes from functional dependencies alone.

2.Is R in 2NF? Justify your answer.

a,b → c
a,b → d
a,b → e
[c → ab] == c → e
c → d
assuming R is in 1NF. Yes, all non key attributes are dependent on (a,b)

3.Is R in 3NF? Justify your answer.

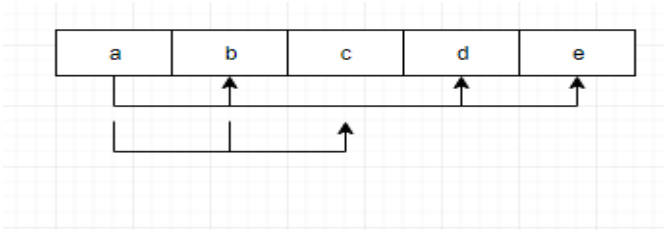
Yes it is in 3NF, the transitive property is with c, which is not a non prime attribute

4.(30 pts) Given R(a, b, c, d, e) with a key (a,b) and given the following set of functional dependencies F={ a → b, {a, b} → c, b → {d, e} }.

1.Is R in 1NF? Justify your answer.

Not enough info, we can't tell if there are multi valued attributes from functional dependencies alone.

2.Is R in 2NF? Justify your answer.



a → b
a,b → c
b → d
b → e
a → d
a → e

No, c is dependent on a and b, while d, b and e are dependent on only a

3.Is R in 3NF? Justify your answer.

No it is not in 3NF as 3NF requires 2NF