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CSCD 327 Lab 7 (16 points)

1. (6 points) A given relation R={A, B, C, D, E} is decomposed into three relations: R1={A, B, C}, R2={B, C, D}, and R3={A, C, E}

    - Based on the given set of FDs F={B→E, CE→A}, is the above decomposition a lossless-join decomposition?

    R1 intersect R2 = {B, C}

    BC+: BC

    R1 intersect R3 = {A, C}

    AC+: AC

    R2 intersect R3 = {C}

    C+: C

    NO, lossy.

    - Based on the given set of FDs F={AC→E, BC→D }, is the above decomposition a lossless-join decomposition?

    R1 intersect R2 = {B,C}

    BC+: BCD

    R1 intersect R3 = {A, C}

    AC+: ACE

    Can fully reconstruct R with joins so lossless-join decomposition

2. (10 points) A given relation R={A, B, C, D, E}, and a given set of FDs F={AB→C, DE→C, B→D}.

    - Is R in BCNF? If not, do the decomposition accordingly.

A, B, E will be part of candidate key since they are only on the left side.

ABE+: ABECD

None of the attributes on the left in F are superkeys, not in BCNF.

Decomposition:

R1 = {A, B, C} R2 = {D, E, C} R3 = {B, D}

- Is your decomposition a lossless-join decomposition? Why?

Yes because if you join the three new relations together you can reconstruct R.

- Is your decomposition a dependency-preserving decomposition? Why?

Yes because each relation holds a single unique functional dependency from F that allows for the child relations to be able to be reconstructed and fully represent F and R if need be.

- List all the candidate keys of relation R.

ABE

- Is R in the 3rdNF? Why?

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AB+: ABCD

No, after computing the closure on AB (AB+), alpha (AB) is not a super key of the table. For each alpha -> beta, alpha must be a super key for the table in order to be in 3rdNF.