**CSCD 327 Lab 6 (14 points)**

**Due: November 25th, 2020**

1. (4 points) A given relation R={A, B, C, D, E} is decomposed into two relations: R1={A,

B, C, E}, R2={B, C, D}

* 1. Based on the given set of FDs F={BàE, CEàA}, is the above decomposition a lossless-join decomposition? Why?

R1 intersect R2 = {B,C}

{B,C}+ = {B,C,E,A} = R1

The decomposition is lossless-join

* 1. Based on the given set of FDs F={EàD, BCàA }, is the above decomposition a

lossless-join decomposition? Why?

R1 intersect R2 = {B,C}

{B,C}+ = {B,C,A} != R1 or R2

The decomposition is not lossless-join

1. (10 points) A given relation R={A, B, C, D, E}, and a given set of FDs F={ABàC, DEàC, BàD}.
   1. Is R in BCNF? If not, do the decomposition accordingly.

{A,B}+ = {A,B,C,D} != R, troublemaker

R1 = {A,B,C}, FD = AB -> C

{A,B}+ = {A,B,C} = R1, good

R1 is in BCNF

R2 = {A,B,D,E}, FD = B -> D

{B}+ = {B,D} != R2, troublemaker

R2a = {B,D}, FD = B -> D

{B}+ = {B,D} = R2, good

R2b = {A,B,E}, no FDs

Good

**Correct decomposition is R1{A,B,C}, R2a{B,D}, R2b{A,B,E}**

* 1. Is your decomposition a lossless-join decomposition? Why?

R2a intersect R2b = {B}

{B}+ = {B,D} = R2a, good

R2 intersect R1 = {A,B}

**{A,B}+ = {A,B,C,D} != R1 or R2, not lossless-join**

* 1. Is your decomposition a dependency-preserving decomposition? Why?

F2a union F2b = B -> D

**F2 union F1 = B -> D; AB -> C != F, not dependency-preserving**

* 1. List all the candidate keys of relation R.

Unused attributes: A,B,E

**(ABE)+ = {A,B,C,D,E} = R, Candidate Key**

* 1. Is R in the 3rdNF? Why?

(B)+ = {B,D} != R

**R is not in 3NF form. There is at least one FD whose left hand side is not a super key.**