**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}

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

R1 and R2 and R3 = C  
 (C)\* = (C, A, B, D, E)

No, because B -> E is not a key in R1, R2, or R3.

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

With the information above, this is a lossless-join composition since both AC -> E and BC -> D are both keys from R3 and R1 respectively.

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

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

R1 and R2 and R3 = {}, therefore R3 = {C, D} so R1 and R2 and R3 = {C}  
(C)\* = {C, A, B, D, E}

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

Yes, since all FD’s are keys in all R1, R2, and R3

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

AB -> C not preserved  
DE -> C not preserved  
C -> D preserved

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

{C}

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

(C)\* = (C)

(AC)\* = A, C, B, D, E

(BC)\* = B, C, A, D, E

(DC)\* = D, C, A, B, E

(EC)\* = E, C, A, B, D

Yes, because A, B, D, E are prime attributes.