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HW 3

2/26/18

Problem 1:

1. FDs: C-> A, DB-> C, CB -> C, CB->CB, BD->AB
2. Attribute Closure:

{AD}+ = A,D

{C}+ = C,D,A

{AB}+ = C,D,A,B

1. Candidate Keys: AB, CB, DB

Problem 2:

FirstName = F, Surname =S, Address = A, Department = D

* 1. Lossy, because of the duplication in the union between the surnames Eastland. This causes the new data to not be equivalent to the original data. S is not a candidate key for the smaller relation.
  2. Lossless, Because the union causes a replication of the original data with no loss or adition.

1. FDs: D -> S, D-> F, D-> A, F-> A, F->S
   1. Preserves all but, Does not Preserve D->A and F->A due to the S being the subset of both two tables and not unique causing repetition in the A and gives Sydney address 27
   2. Preserves all dependences due F and S being a subset of both tables and are unique to hold all attributes.

Problem 3

1. R(A, B, C, D): AB → C, C → D and D → A
   1. Candidate Keys: AB,CB,DB
   2. Violations: C->D, D->A
   3. Decomposition: CD
      1. R1(ABC) R2(CD)
2. R(A, B, C, D): AB → C, BC → D and CD → A and AD → B
   1. Candidate Keys: AB,BC,DA,CD
   2. NO Violation
   3. Decomposition:
      1. R1(ABCD) NO Decomposition
3. R(A, B, C, D, E): AB → C, C → D, D → B and D → E
   1. Candidate Keys: AB,AD,AC
   2. Violations: C->D,D->B,D->E
   3. Decomposition: DE
      1. R1(ABCD) R2(DE)
      2. R1 = R3(CD), R4(ABC)