CS3743 Hwk 7 Normalization (20 pts) - due 4/30

Convert the schema containing relation R to 3NF relations without loss of information:

* Show **each relation** with attributes and **underline** its **keys**. If there is an option for a key, underline only one of the options and state that the other option could have been the key for a bonus.
* Under **each relation**, show its **FDs**
* **Show your work.**

R(A, B, C, D, E, F, G, H, J, K, L, M, N)

A, B, C, D 🡪 E, F, G, H, J, K, L, M, N

A, B 🡪 E, F

B 🡪 C, F

A🡪 G , H, J

G🡪H, J

K 🡪 L, M

L 🡪 K, M

Rules:

1. Remove bad transitive functional dependencies:

* Given:
  + X🡪 Y, Z
  + Y 🡪 Z
* Remove X 🡪 Z unless it isn't bad because:
  + Y 🡪 X, or
  + Z 🡪 X

2. If X → Y and X, Z → Y, then X → Y is a stronger FD. Remove the weaker dependency X, Z → Y.

3. If X → Y and X, Y → Z, then reduce X, Y → Z to the stronger X → Z. (Also, keep X → Y ).

**Work:**

A, B, ~~C,~~ D 🡪 ~~E, F,~~ ~~G, H, J~~, ~~K, L, M~~, N

A, B 🡪 E, ~~F~~

B 🡪 C, F

A🡪 G , ~~H, J~~

G🡪H, J

K 🡪 L, M

L 🡪 K, M

**New Schema:**

**R1(A,B,D,N)**

**A,B,D** →**N**

**R2(A,B,E)**

**A,B** →**E**

**R3(B,C,F)**

**B** →**C,F**

**R4(A,G)**

**A** →**G**

**R5(G,H,J)**

**G** →**H,J**

**R6(K,L,M) L could also be key but not both**

**K** →**L,M**

**L** →**K,M**