

Name 1:

Date:

Name 2:

Let relation $R = (A, B, C, D)$ with the following FDs:

$A \rightarrow BC$

$BC \rightarrow A$

$B \rightarrow D$

1. Is this relation BCNF?

✓ $A \rightarrow BC$ $\{A\}^+ = \{A, B, C, D\}$

✓ $BC \rightarrow A$ $\{BC\}^+ = \{B, C, A, D\}$

$B \rightarrow D$ $\{B\}^+ = \{B, D\}$ Not BCNF.

2. Decompose this relation into a set of BCNF subrelations

$ABCD$

$B \rightarrow D$

BD

Compute its FDs:

$\begin{matrix} + \\ BD \end{matrix}$	
BD	BD
B	BD
D	D

$B \rightarrow D$ BCNF

BAC

Compute its FDs.

BAC	$BACD$
BA	$BACD$
B	$BCAD$
C	BD
B	BD
AC	$ACBD$
A	$ABCD$
C	C

$BA \rightarrow C$ } is it BCNF?

$BC \rightarrow A$ } all are SKs.

$AC \rightarrow B$ } BAC is BCNF.

$A \rightarrow BC$

is it FD preserving?

Yes. we can generate the original FDs from the derived FDs.