Suppose you are given a relation R with four attributes ABCD and the following set of FDs:

F={B→A, AC→D}.

a. Identify the candidate key(s) for R

K=?

F+ =?

b. Is R in BCNF? Is R in 3NF? If it is not in BCNF, decompose to BCNF.

X	**X+**
A	A
B	B, A
C	C
D	D
AB	A,B
AC	A,C,D
AD	A,D
BC	B,C,A,D
BD	B,D,A
CD	C,D
ABC	
ABD	A,B,D
ACD	A,C,D
BCD	

K=BC

F+ = {B→A, AC→D, BC->D}

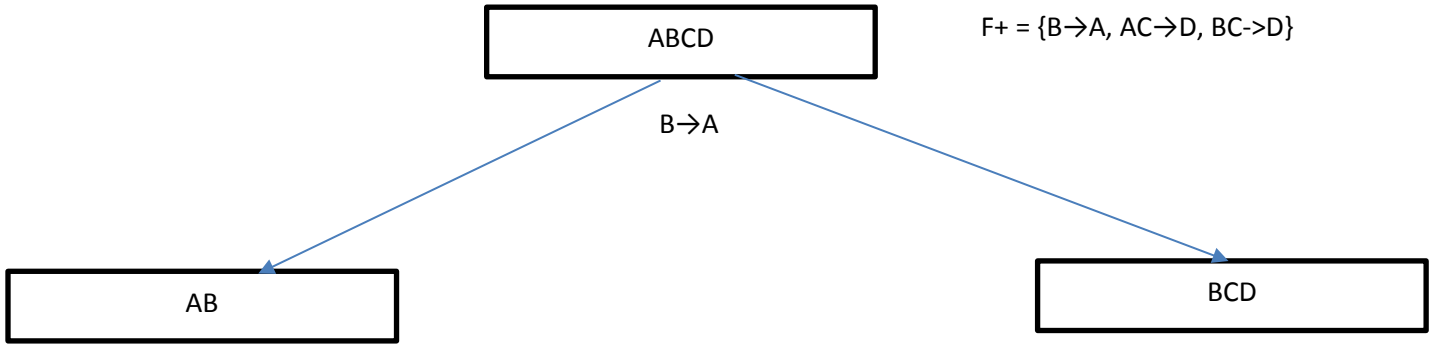
BCNF?

	BCNF Violation?	3NF Violation?
B->A	YES	YES
AC->D	YES	YES
BC->D	NO	NO (not BCNF violation)

NOT BCNF and NOT 3NF

If not BCNF, decompose.

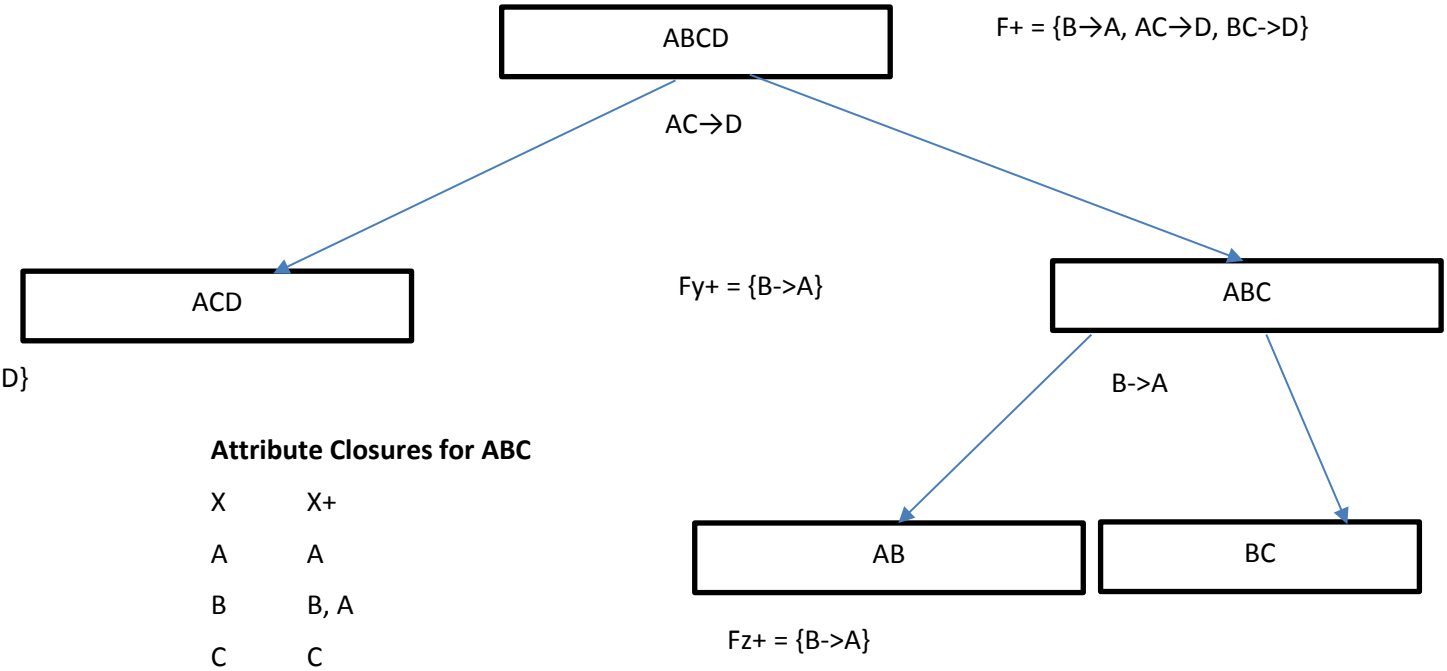
Case 1:



Fx = {B→A}

Fy+ = {BC->D}

Case 2:



Fx+ = {AC→D}

Fz+ = {B->A}

Attribute Closures for ABC

X	X+
A	A
B	B, A
C	C
AB	A,B
AC	A,C
BC	B,C,A