R(A, B, C, D, E) with the following FDs:

A → B, C → B, DE → C

Solution 1: $A^+ = \{A, B\}$ → $R_1 \{\underline{A}, B\}$

first, pick A → B

$R_2 \{A, C, D, E\}$

violate BCNF

decompose R_2: C → B not useful, $DE^+ = \{D, E, C\}$

$R_3 \{\underline{D, E}, C\}$, $R_4 \{\underline{D}, \underline{E}, \underline{A}\}$

Hence, BCNF is R_1, R_3, R_4 #

R(A, B, C, D, E) with the following FDs:

A → B, C → B, DE → C

Solution 2 : $C^+ = \{C, B\}$

decompose R : $R_1\{\underline{C}, B\}$, $R_2\{A, C, D, E\}$

use $C \to B$

↳ violate BCNF
decompose this

decompose R_2 using $DE \to C$

$R_3 = \{\underline{D}, \underline{E}, C\}$, $R_4\{\underline{D}, \underline{E}, \underline{A}\}$

∴ BCNF are R_1, R_3, R_4 #

R(A, B, C, D, E) FDs: **A → B, C → B, DE → C**

Decomposed into **R1(<u>A</u>, B), R2(<u>D, E</u>, C), R3(D, E, A)**

Check if the decomposition is lossless.

R (A,	B,	C,	D,	E)		
a	b	c_1	d_1	e_1	←	Because $R1 = \pi_{AB}(R)$
a_2	b_2	c	d	e	←	Because $R_2 = \pi_{cde}(R)$
a	$\cancel{b_3}$ b	$\cancel{c_3}$ c	d	e	←	$R_3 = \pi_{ade}(R)$

① apply $A \to B$ chase test

② apply $DE \to C$

$\therefore (a, b, c, d, e) \in R$. #

R(A, B, C, D, E, F, G) with the following FDs:

A → D, D → C, F → EG, DC → BF

① try pick $A \to D$: $A^+ = \{A, D, C, B, F, E, G\}$: R doesn't violate this !!

② $D \to C$: $D^+ = \{D, C, B, F, E, G\}$: R violates this! let's decompose.

R(A, B, C, D, E, F, G)

R_1(D, C, B, F, E, G)

violates BCNF
decompose further

R_2(D, A) ← in BCNF!

R(A, B, C, D, E, F, G) with the following FDs:

$\cancel{A \to D}$, $\cancel{D \to C}$, $F \to EG$, $DC \to BF$

$R_1(D, C, B, F, E, G)$ → let's use $F \to EG$

$R_3(\underline{F}, E, G)$

in BCNF :)

$F^+ = \{E, G, F\}$

$R_4(F, \underline{D}, \underline{C}, B)$ in BCNF! :)

$DC^+ = \{D, C, B, F\}$

therefore, R_2, R_3 and R_4 are in BCNF. #