Consider the schema S(A, B, C, D, E) together with the functional dependencies:

- ~~BD → A~~ } Redundant
- ~~AB → C~~ }
- D → A } Minimal cover.
- B → C
- C → E

$DB^+ = \{D\,B\,A\,C\,E\}$ only key

1) Is S in 3NF? Why or why not?

no, $D \rightarrow A$ not not part of DB superkey.

2) If S is not in 3NF, decompose into 3NF using the **lossless join decomposition** method.

- Decompose on $D \rightarrow A$.

$R_1(B, C, D, E)$ $R_2(D, A)$

decompose R_1 on $B \rightarrow C$

$R_3(B, D, E)$, $R_4(B, C)$

decompose R_3 on $B \rightarrow E$

$R_5(B, E)$, $R_6(B, D)$

Final R_{SCHEMA}.

$R_2(D, A)$, $R_4(B, C)$, $R_5(B, E)$, $R_6(B, D)$

$R_7(C, E)$ added.

3) If S is not in 3NF, decompose into 3NF using the **synthesis** method.

$R_1(\underline{D}, A), R_2(\underline{B}, C), R_3(\underline{C}, E)$

$R_4(\underline{D}, \underline{B})$