

2. Given $R(b, c, d, e, f, k)$. There are two keys: (b, c) and d . Given the following set of functional dependencies $F = \{FD1: \{b, c\} \rightarrow \{d, e, f, k\} \text{ FD2: } d \rightarrow \{b, c, e, f, k\} \text{ FD3 } e \rightarrow b\}$ Is R in 3NF? Justify your answer

Prime Attributes: b, c, d

Considering $\{b, c\} \rightarrow \{d, e, f, k\}$:

The left-hand side is a super key and fulfills the criteria for 3NF

Considering $d \rightarrow \{b, c, e, f, k\}$:

The left-hand side is a super key and fulfills the criteria for 3NF

Considering $e \rightarrow b$:

The left-hand side is NOT a super key

The right-hand side is a prime attribute and fulfills the criteria for 3NF

Therefore, since all FDs in R are either super keys on the left-hand side and/or prime attributes on the right hand side the relation is in 3NF.