Exercise 6: Normalization

Introduction to Database Systems
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Suppose you are given a relation R with four attributes ABCD. For each of the following sets of FDs, assuming that those are the only dependencies that hold for R, do the following: (a) Identify *all* candidate key(s) for R. (b) Identify the best normal form that R satisfies (1NF, 2NF, 3NF, BCNF). (c) If R is not in 3NF/BCNF, then follow the methodology presented in the lecture to decompose it into a set of 3NF/BCNF relations that preserve the dependencies.

1. $C \rightarrow D, C \rightarrow A, B \rightarrow C$
2. $B \rightarrow C, D \rightarrow A$
3. $ABC \rightarrow D, D \rightarrow A$
4. $A \rightarrow B, BC \rightarrow D, A \rightarrow C$
5. $AB \rightarrow C, AB \rightarrow D, C \rightarrow A, D \rightarrow B$

Note: This exercise is adapted from the textbook of Ramakrishan and Gehrke.