

COSC265 Introduction to Databases

Tutorial 3: Normalization

1. A table R consists of four attributes (A, B, C, D) and the following set of functional dependencies is given: $\{A \rightarrow B, A \rightarrow C, A \rightarrow D\}$

a) Is A a candidate key?

b) Is R in 3NF?

2. A table R with four attributes (A, B, C, D) has the following set of functional dependencies: $\{A \rightarrow B, B \rightarrow C, C \rightarrow D\}$

a) Does $A \rightarrow D$?

b) Is A a candidate key?

3. A table R with two attributes (A, B) has the following set of functional dependencies: $\{A \rightarrow B, B \rightarrow A\}$

a) Are both A and B candidate keys?

b) Is R in BCNF?

4. A table R with three attributes (A, B, C) has the following set of functional dependencies: $\{AB \rightarrow C, AC \rightarrow B, BC \rightarrow A\}$

- a) Is A a candidate key?
- b) Is BC a candidate key?
- c) Is R in 3NF?

5. A table (A, B, C) has the following set of functional dependencies: $\{BC \rightarrow A\}$

- a) Is R in 3NF?
- b) Is BC a candidate key?
- c) Is R in BCNF?

6. Find a minimal cover for $F = \{AB \rightarrow C, A \rightarrow B, AD \rightarrow B\}$.

7. Determine the minimal set of 3NF relations given the following set of FDs: $F = \{A \rightarrow AC, B \rightarrow ABC, D \rightarrow ABC\}$.

8. Determine the minimal set of 3NF relations given the following set of FDs: $F = \{A \rightarrow BC, BC \rightarrow D\}$.