

More Practice 3NF and BCNF

CS 4750 Database Systems

Practice 1: 3NF and BCNF

Consider a relation $\text{Stocks}(B, O, I, S, Q, D)$, whose attributes may be thought of informally as broker, office (of the broker), investor, stock, quantity (of the stock owned by the investor), and dividend (of the stock). Let the set of FDs for Stocks be

$\text{FDs} = \{ S \rightarrow D, I \rightarrow B, IS \rightarrow Q, B \rightarrow O \}$

1. Verify that the given set of FDs is a minimal basis

Practice 1: 3NF and BCNF (2)

$\text{Stocks}(B, O, I, S, Q, D)$
 $\text{FDs} = \{ S \rightarrow D, I \rightarrow B, IS \rightarrow Q, B \rightarrow O \}$

2. Use 3NF, decompose the given Stocks relation into proper relations

Practice 1: 3NF and BCNF (3)

$\text{Stocks}(B, O, I, S, Q, D)$
 $\text{FDs} = \{ S \rightarrow D, I \rightarrow B, IS \rightarrow Q, B \rightarrow O \}$

3. Show that the decomposed relations are in 3NF

Practice 1: 3NF and BCNF (4)

Stocks(B, O, I, S, Q, D)
FDs = { $S \rightarrow D$, $I \rightarrow B$, $IS \rightarrow Q$, $B \rightarrow O$ }

4. Are the decomposed relations in BCNF?

Practice 2: 3NF

Consider the following relation and functional dependencies
 $R(A, B, C, D)$
FDs = { $C \rightarrow A$, $C \rightarrow D$, $C \rightarrow C$, $AB \rightarrow C$ }

1. Decompose the given relation $R(A, B, C, D)$ using 3NF

Practice 2: 3NF (2)

2. Discuss to show that the decomposed relations are in 3NF

Practice 3: BCNF

Consider the following relation and functional dependencies
 $R(A, B, C, D)$
FDs = { $C \rightarrow A$, $C \rightarrow D$, $C \rightarrow C$, $AB \rightarrow C$ }

1. Decompose the given relation $R(A, B, C, D)$ using BCNF

Practice 3: BCNF (2)

2. Discuss to show that the decomposed relations are in BCNF

Practice 4: 3NF

Consider the following relation and functional dependencies

$R(A, B, C, D)$

$FDs = \{ A \rightarrow ABC, C \rightarrow D, A \rightarrow C, D \rightarrow D \}$

1. Decompose the given relation $R(A, B, C, D)$ using 3NF

Practice 4: 3NF (2)

2. Discuss to show that the decomposed relations are in 3NF

Practice 5: BCNF

Consider the following relation and functional dependencies

$R(A, B, C, D)$

$FDs = \{ A \rightarrow ABC, C \rightarrow D, A \rightarrow C, D \rightarrow D \}$

1. Decompose the given relation $R(A, B, C, D)$ using BCNF

Practice 5: BCNF (2)

2. Discuss to show that the decomposed relations are in BCNF

Practice 6: BCNF

Given $R(A,B,C,D,E)$

FDs = $\{ B \rightarrow DE, C \rightarrow A, A \rightarrow BC, D \rightarrow E \}$

Convert the relation into BCNF

Practice 7: BCNF

Given $R(A,B,C,D,E)$

FDs = $\{ A \rightarrow CE, A \rightarrow B, B \rightarrow D, D \rightarrow CD, C \rightarrow E \}$

Convert the relation into BCNF

Practice 8: 3NF

Given $R(A,B,C,D,E)$

FDs = $\{ A \rightarrow CE, A \rightarrow B, B \rightarrow D, D \rightarrow CD, C \rightarrow E \}$

Convert the relation into BCNF