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09 September 2023 20:27

$R(ABC)$ $F = \{ A \to B, \; B \to C \}$

$\phi^+ = \{\phi\}$ → (1)

$A^+ = \{A, B, C\}$ → (4)

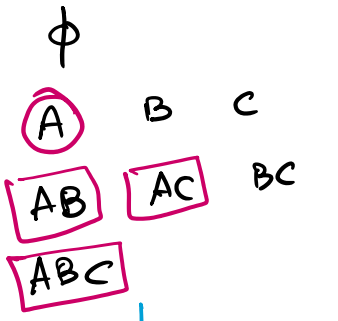
$B^+ = \{B, C\}$ → (2)

$C^+ = \{C\}$ → (1)

$BC^+ = \{B, C\}$ → (4)

$8 \times 4 = 32$

43 functional dependencies



4 super keys

1 candidate key

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candidate key

(1) attributes neither on left / right.

(2) attributes only on right.

(3) attributes only on left.

(4) 1 ∪ 3

(5) Test if closure on (4) includes all attributes, if yes → candidate key

else

(i) find attributes that are on both sides

(ii) find closure of core attributes + one exterior attribute taken one at a time (4) (5) (2)

$R = \{ W, H, O, S, E \}$

$F = \{ WH \rightarrow S,\ HOS \rightarrow E \}$

① ϕ ② E ③ WHO ④ WHO

$(WHO)^+ = \{ W, H, O, S, E \}$

↳ candidate key

$R(ABCDEFG)$

$F = \{ AB \rightarrow F,\ AD \rightarrow E,\ F \rightarrow G \}$

① C ② EG ③ ABD ④ ABCD

$(ABCD)^+ = \{ A, B, C, D, E, F, G \}$

$R(ABCD)$ $\quad F = \{ ABC \rightarrow D,\ D \rightarrow A \}$

① ϕ ② ϕ ③ BC ④ BC

$(BC)^+ = \{ B, C \}$

⑤ (i) A, D

$(ABC)^+ = \{ A, B, C, D \}$

$(BD)^+ = \{ A, B, C, D \}$

ABD

3 super keys & Candidate keys

$R(ABCDEF)$

$F = \{ DF \rightarrow C,\ BC \rightarrow F,\ E \rightarrow A,\ ABC \rightarrow E \}$

③ BD ④ BD

$t = \{ DF \ldots$

① ϕ ② ϕ ③ BD ④ BD

$(BD)^+ = \{B, D\}$ ✗

⑤ (i) ACEF

$(BDA)^+ = \{A, B, D, \} \times$ BDA

$(BDC)^+ = \{B, C, D, F\} \times$ BDC

$(BDE)^+ = \{B, D, E, \} \times$ BDE

$(BDF)^+ = \{B, D, F, C\} \times$ BDF

$(BDAC)^+ = \{A, B, C, D, E, F\}$ ✓ BDAC

$(BDAE)^+ = \{A, B, D, E\}$ BDAE

$(BDAF)^+ = \{A, B, D, F, C, E\}$ ✓ BDAF

$(BDCE)^+ = \{B, C, D, E, F, A\}$ ✓ BDCE

$(BDCF)^+ = \{B, C, D, F\}$ ✗ BDCF

$(BDEF)^+ = \{B, D, E, F, C, A\}$ ✓ BDEF

BDACE

BDACF

BDAEF

BDCEF

BDACEF

4 candidate keys

9 super keys

$R(ABCDE)$ $\{AB \rightarrow C, C \rightarrow D, B \rightarrow AE\}$

① ϕ ② DE ③ B ④ B

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

candidate key = B

super keys = B [A + CD + E] ✱

16 super keys

1 candidate key
