

DATABASE3NF

$$R = \{A, B, C, D, E, F, G, H, I, J\}$$

$$F = \{ABD \rightarrow E, AB \rightarrow G, B \rightarrow F, C \rightarrow S, C \cancel{S} \rightarrow I, G \rightarrow H\}$$

① RICOPRIMENTO MINIMALE

$$A^+ = \{A\}$$

$$B^+ = \{B, F\}$$

$$D^+ = \{D\}$$

$$AB^+ = \{A, B, G, H\}$$

$$BD^+ = \{D, B, F\}$$

$$AD^+ = \{A, D\}$$

$$ABD^+ = \{A, B, D, E, G, F, H\}$$

$$C^+ = \{C, S, I\}$$

$$S^+ = \{S, I\}$$

$$CS^+ = \{C, S, I\}$$

$$F = \{ABD \rightarrow E, AB \rightarrow G, B \rightarrow F, C \rightarrow S, C \rightarrow I, G \rightarrow H\}$$

| L | H | R |
|---|---|---|
| A | G | E |
| B | J | F |
| C | | H |
| D | | I |

$$ABCD^+ = \{A, B, C, D, E, F, G, H, S, I\}$$

$ABCD$ è chiave

② Chiusure

$$ABD^+ = \{A, B, D, E, G, F, H\} \quad ; \quad AB^+ = \{A, B, G, F, H\}$$

$$B^+ = \{B, F\} \quad ; \quad C^+ = \{C, S, I\} \quad ; \quad G^+ = \{H, G\} \quad [ABCD]$$

$$F = \{ABD \rightarrow E, AB \rightarrow G, B \rightarrow F, C \rightarrow S, C \rightarrow I, G \rightarrow H\}$$

③ sottogruppi

$$G' = \{A, B, D\}$$

$$F' = \{ABD \rightarrow E, AB \rightarrow G, B \rightarrow F\}$$

$$R' = (A, B, D, E, G, F)$$

$$G'' = \{A, B\}$$

$$F'' = \{\underline{ABD \rightarrow E, AB \rightarrow G, B \rightarrow F}\}$$

$$R'' = \emptyset$$

(se si trova già una relazione non si prende)

$$G''' = \{B\}$$

$$F''' = \{ - - \}$$

$$R''' = \emptyset$$

$$G^{IV} = \{C\}$$

$$F^{IV} = \{C \rightarrow S, C \rightarrow I\}$$

$$R^{IV} = (C, S, I)$$

$$G^V = \{G\}$$

$$F^V = \{G \rightarrow H\}$$

$$R^V = (G, H)$$

$$G^{VI} = \{A, B, C, D\}$$

$$F^{VI} = \{ \}$$

$$R^{VI} = (A, B, C, D)$$

per la chiave prendiamo sempre tutti i suoi attributi in una relazione

$$\left\{ \begin{array}{l} R' = (A, B, D, E, G, F) \\ R^{IV} = (C, S, I) \\ R^V = (G, H) \\ R^{VI} = (A, B, C, D) \end{array} \right.$$

BCNF

$$F: \{ ABD \rightarrow E, AB \rightarrow G, B \rightarrow F, C \rightarrow I, C \rightarrow S, G \rightarrow H \}$$

$$K = ABCD$$

$$AB \rightarrow G$$

$$AB^+ = \{ A, B, G, F, H \}$$

$$R' = (A, B, G, F, H)$$

$$F' = \{ AB \rightarrow G$$

$$B \rightarrow F$$

$$G \rightarrow H \}$$

$$G \rightarrow H$$

$$G^+ = \{ G, H \}$$

$$R''' = (G, H)$$

$$F''' = \{ G \rightarrow H \}$$

BCNF

$$R'' = R' - (R' - G)$$

$$R'' = R' - H$$

$$R'' = (A, B, G, F)$$

$$F'' = \{ AB \rightarrow G$$

$$B \rightarrow F \}$$

$$B \rightarrow F$$

$$B^+ = \{ B, F \}$$

$$R^V = (B, F)$$

$$F^V = \{ B \rightarrow F \}$$

BCNF

$$R^V = R'' - (R'' - B)$$

$$R^V = R'' - F$$

$$R^V = (A, B, G)$$

$$F^V = \{ AB \rightarrow G \}$$

BCNF

$$R'' = R - (R' - AB)$$

$$R'' = R - (G, F, H)$$

$$R'' = (A, B, C, D, E, I, S)$$

$$F'' = \{ ABD \rightarrow E$$

$$C \rightarrow I$$

$$C \rightarrow S \}$$

$$ABD \rightarrow E$$

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

$$R^{VII} = (A, B, D, E)$$

$$F^{VII} = \{ ABD \rightarrow E \}$$

BCNF

$$R^{VIII} = R'' - (R'' - \begin{matrix} A \\ B \\ D \end{matrix})$$

$$R^{VIII} = (A, B, C, D, I, S)$$

$$F^{VIII} = \{ C \rightarrow I$$

$$C \rightarrow S \}$$

$$C \rightarrow I$$

$$C^+ = \{ C, I, S \}$$

$$R^{IX} = (I, C, S)$$

$$F^{IX} = \{ C \rightarrow I$$

$$C \rightarrow S \}$$

BCNF

$$R^X = R^{VIII} - (R^{VIII} - C)$$

$$R^X = (A, B, C, D)$$

$$F^X = \{ \}$$

BCNF

$$\left\{ \begin{array}{l} R''' = (G, H) ; R^{VII} = (A, B, D, E) ; R^{IX} = (I, C, S) \\ R^V = (B, F) ; R^V = (A, B, G) ; R^X = (A, B, C, D) \end{array} \right\}$$