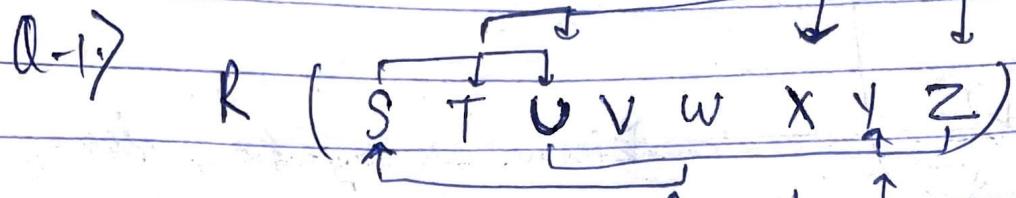


## Assignment - 6

Group - 22



$UZ \rightarrow Y$

$S \rightarrow TU$

$T \rightarrow UXZ$

$W \rightarrow S$

$X \rightarrow WY$

Checking for  $VW$  as candidate key :-

$(VW)^+ \rightarrow VWSTUVXZ$

$(Vs)^+ \rightarrow VS\cancel{TUVXZ}XYW$

$(VX)^+ \rightarrow VWSTUVXZ$

$(TV)^+ \rightarrow VWSTUVXZ$

Candidate keys

$(V, W, S, X, T, \cancel{U}) \rightarrow$  Prime attributes

$(U, Y, Z) \rightarrow$  Non Prime Attributes

$UZ \rightarrow Y$        $\Rightarrow$  Not in 3NF  
 $(N.P.)$        $(N.P.)$

↳ Transitive Dependency.

$S \rightarrow TU$

By Decomposition rule :-

$S \rightarrow T$

$S \rightarrow U$  (Partial Dependency)

(P) (N.P.)

It is not in 2NF.

-2.)  $R(m, n, o, p)$

$$m \rightarrow n$$

$$o \rightarrow p$$

$$p \rightarrow n$$

→ Cond<sup>n</sup> for dependency preserving :

$$F^+ = \{ \overline{\pi}_{R_1}(F) \cup \overline{\pi}_{R_2}(F) \cup \overline{\pi}_{R_N}(F) \}^+$$

$$(mn)^+ = \{ m, n, o, p \}^+, (mn)^+ = \{ m, n, o, p \}^+$$
$$(mn)^+ = \{ m_n p \}^+, (mnop)^+ = \{ m_n o p \}^+$$

$$(N)^+ = (NO)^+ = (OPN)^+ \subseteq \{P, O, N\}$$

$$(ON)^+ = (OPN)^+ = (O)^+ \subseteq \{O, P, N\}$$

$$(P)^+ = (NP)^+ = (P, O, N)^+ \subseteq \{N, O, P\}$$

$$(M)^+ = (MNO)^+ \subseteq \{M, N, O, P\}$$

$$(M, P)^+ = (M, P, N)^+ \subseteq \{M, N, O, P\}$$

$$(OP)^+ = \{O, N, P\}$$

$$(MOP)^+ = \{M, N, O, P\}.$$

$$\therefore F^+ = \left( R_1(F_1) \cup R_2(F_2) \right)^+$$

$\Leftrightarrow$  Dependency Preserving.

Q.4) (a) Yes, dependency preserving (using algo-1 & algo-2).

$$F_1 = \{A, B, C\}, R_2 = \{A, D, E\}, R_3 = \{B, F\}$$

$$R_4 = \{F, G, H\}, R_5 = \{D, I, J\}$$

$$F \rightarrow GH, D \rightarrow IJ, AB \rightarrow C, A \rightarrow DE, B \rightarrow F$$

$$R_1 = \{A, B, C\}$$

$$AB \rightarrow C \Rightarrow \text{Candidate Key} = \{A, B\}$$

$$C \rightarrow B \text{ & } C \text{ is a S.O.K.} \rightarrow R_1 \rightarrow BCNF$$

$$R_2 = \{ A, D, E \}$$

$$A \rightarrow DE \Rightarrow C.R. = \{ A \}$$

$\therefore R_2$  is in BCNF

$$R_3 = \{ B, F \}$$

$$B \rightarrow F$$

$$C.R. = \{ B \}$$

$\therefore R_3$  is in BCNF

$$R_4 = \{ F, G, H \}$$

$$F \rightarrow GH, \quad C.R. = \{ F \}$$

$\therefore R_4$  is in BCNF

$$R_5 = \{ D, I, J \}$$

$$D \rightarrow IJ, \quad C.R. = \{ D \}$$

$\therefore R_5$  is in BCNF