2) *The second way by matrix:*

$$MR = \begin{array}{c|cccc} & a & b & c & d \\ \hline 1 & 1 & 0 & 0 & 0 \\ 2 & 0 & 0 & 0 & 1 \\ 3 & 1 & 1 & 0 & 1 \\ 4 & 0 & 0 & 0 & 0 \end{array} \qquad MS = \begin{array}{c|ccc} & x & y & z \\ \hline a & 0 & 0 & 0 \\ b & 1 & 0 & 1 \\ c & 0 & 1 & 0 \\ d & 0 & 0 & 1 \end{array}$$

$R \, oS = \; MR \cdot MS =$

$$\begin{array}{c|ccc} & x & y & z \\ \hline 1 & 0 & 0 & 0 \\ 2 & 0 & 0 & 1 \\ 3 & 1 & 0 & 2 \\ 4 & 0 & 0 & 0 \end{array}$$

$R \, oS = \{(2,z),(3,x),(3,z)\}$

***Theorem** : Let A, B, C and D be sets· Suppose R is a relation from A to B, S is arelation from B to C, andT is a relation from C to D· Then*

$(R \circ S) \circ T = R \circ (S \circ T)$