(2) Suppose the scaling matrix is

$$S = \begin{bmatrix} S_x & 0 \\ 0 & S_y \end{bmatrix}$$

Now $S_1 S_2 = \begin{bmatrix} S_{x_1} & 0 \\ 0 & S_{y_1} \end{bmatrix} \begin{bmatrix} S_{x_2} & 0 \\ 0 & S_{y_2} \end{bmatrix} = \begin{bmatrix} S_{x_1} S_{x_2} & 0 \\ 0 & S_{y_1} S_{y_2} \end{bmatrix}$

And $S_2 S_1 = \begin{bmatrix} S_{x_2} & 0 \\ 0 & S_{y_2} \end{bmatrix} \begin{bmatrix} S_{x_1} & 0 \\ 0 & S_{y_1} \end{bmatrix} = \begin{bmatrix} S_{x_2} S_{x_1} & 0 \\ 0 & S_{y_2} S_{y_1} \end{bmatrix}$

It is clearly seen that $S_{x_1} S_{x_2} = S_{x_2} S_{x_1}$ and $S_{y_1} S_{y_2} = S_{y_2} S_{y_1}$

$\therefore$ We can say that two successive scaling operations are commutative