## Question 3:

Generalized scaling matrix: $M = \begin{bmatrix} S_x & 0 & 0 \\ 0 & S_y & 0 \\ T_x(1-S_x) & T_y(1-S_y) & 1 \end{bmatrix}$

$P = \begin{bmatrix} 2 & 2 & 1 \\ 4 & 2 & 1 \\ 3 & 31 & 1 \end{bmatrix} \Rightarrow P_{final} = P * M$ with $S_x = 2$, $S_y = 0,5$ and $T_x = T_y = 2$

$$\Rightarrow P_{final} = \begin{bmatrix} 2 & 2 & 1 \\ 4 & 2 & 1 \\ 3 & 31 & 1 \end{bmatrix} * \begin{bmatrix} 2 & 0 & 0 \\ 0 & 0,5 & 0 \\ 2(1-2) & 2(1-0,5) & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 2 & 2 & 1 \\ 4 & 2 & 1 \\ 3 & 31 & 1 \end{bmatrix} * \begin{bmatrix} 2 & 0 & 0 \\ 0 & 0,5 & 0 \\ -2 & 1 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 2 & 2 & 1 \\ 6 & 2 & 1 \\ 4 & 16,5 & 1 \end{bmatrix}$$

$\Rightarrow$ new 2D cooridinates:

$A'(2;2)$; $B'(6;2)$; $C'(4;16,5)$