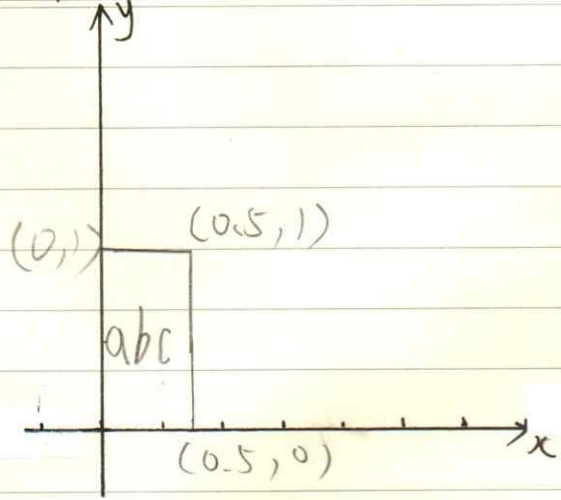
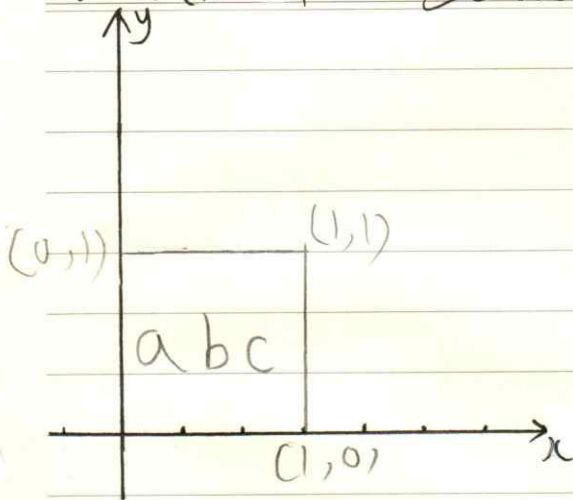


缩放矩阵

Scale Matrix



$$\begin{bmatrix} x' \\ y' \end{bmatrix} = \begin{bmatrix} A & B \\ C & D \end{bmatrix} \times \begin{bmatrix} x \\ y \end{bmatrix}$$

e.g. $\begin{bmatrix} 0.5 \\ 0 \end{bmatrix} = \begin{bmatrix} A & B \\ C & D \end{bmatrix} \times \begin{bmatrix} 1 \\ 0 \end{bmatrix}$

$$\begin{bmatrix} 0 \\ 1 \end{bmatrix} = \begin{bmatrix} A & B \\ C & D \end{bmatrix} \times \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

$$\therefore \begin{cases} 0.5 = A \times 1 + B \times 0 & \text{①} \\ 0 = A \times 0 + B \times 1 & \text{②} \end{cases}$$

由②得: $0 = B \times 1$

$$B = 0 \quad \text{③}$$

将③代入①, 得: $0.5 = A \times 1$
 $A = 0.5$

$$\therefore \begin{cases} A = 0.5 \\ B = 0 \end{cases}$$

$$\therefore \begin{cases} 0 = C \times 1 + D \times 0 & \text{④} \\ 1 = C \times 0 + D \times 1 & \text{⑤} \end{cases}$$

由④得: $0 = C \times 1$

$$C = 0 \quad \text{⑥}$$

将⑥代入⑤, 得: $\therefore \begin{cases} C = 0 \\ D = 1 \end{cases}$

$$\begin{cases} 1 = D \times 1 \\ D = 1 \end{cases}$$

\therefore 矩阵为 $\begin{bmatrix} 0.5 & 0 \\ 0 & 1 \end{bmatrix}$, 推广到其它缩放: $\begin{bmatrix} S_x & 0 \\ 0 & S_y \end{bmatrix}$.