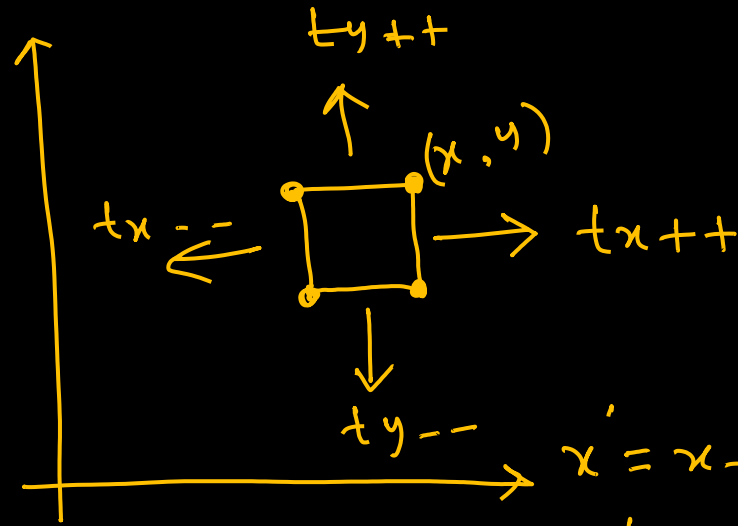


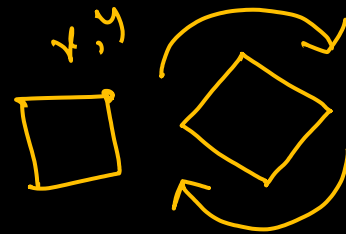
Transformation

① Translation



$$\left. \begin{aligned} x' &= x + \boxed{tx} \\ y' &= y + \boxed{ty} \end{aligned} \right\}$$

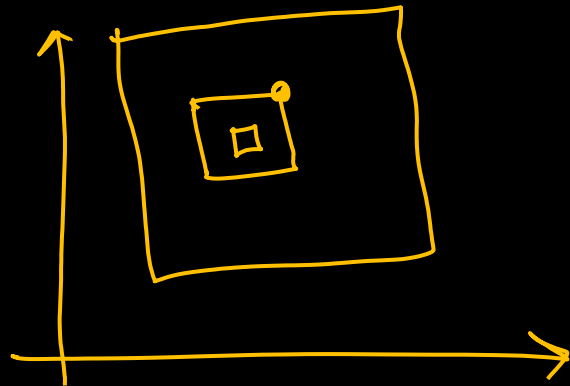
② Rotation



clockwise θ (ve--)
anticlockwise θ (ve++)

③ Scaling

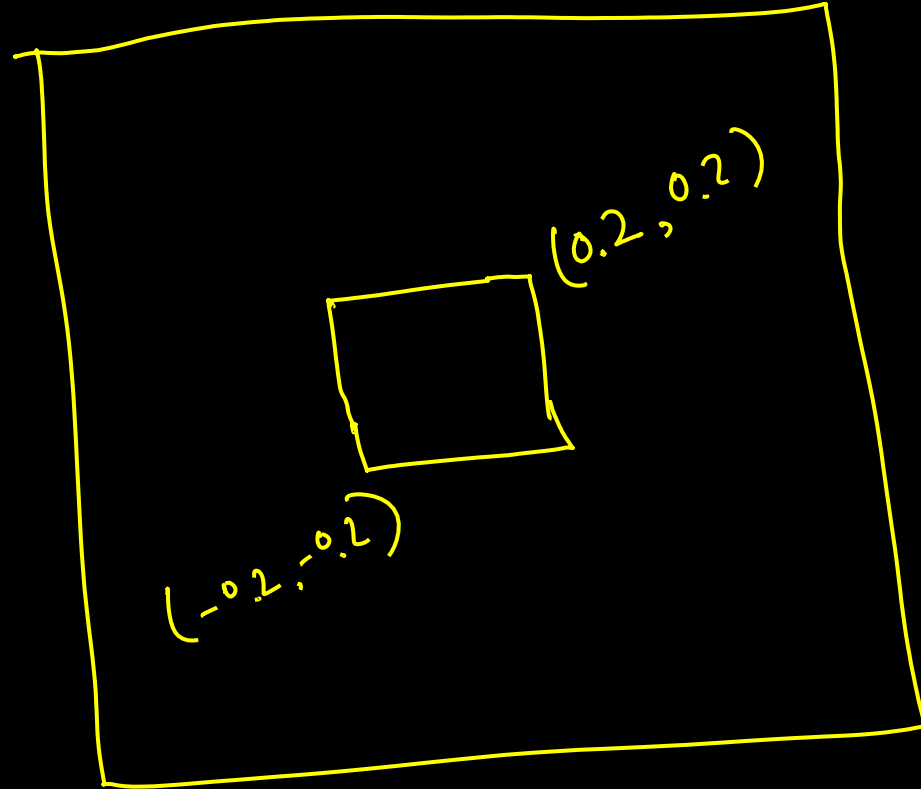
$$\left. \begin{aligned} x' &= x \cdot S_x \\ y' &= y \cdot S_y \end{aligned} \right\}$$



$$\left. \begin{aligned} x' &= x \cos \theta + y \sin \theta \\ y' &= x \sin \theta + y \cos \theta \end{aligned} \right\}$$

$S = 1$ same
 $S > 1$ magnify
 $S < 1$ shrink

500px



500px

