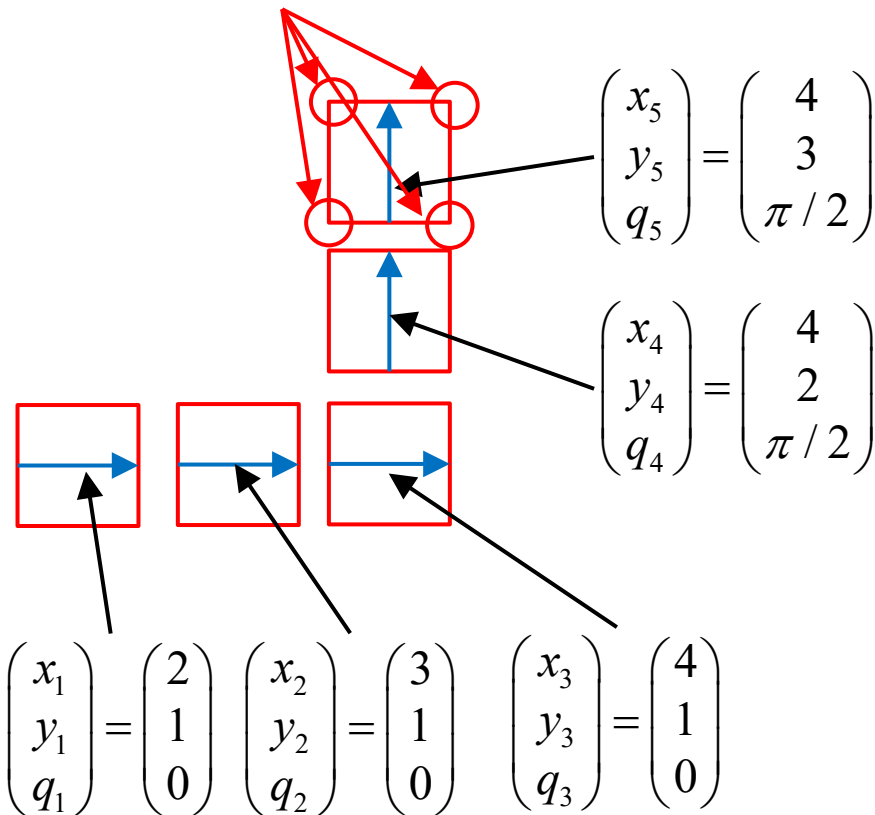# Quiz #1: Frame Transformation in 2D

$$\begin{pmatrix} 0.8 \\ 0.8 \end{pmatrix}, \begin{pmatrix} -0.8 \\ 0.8 \end{pmatrix}, \begin{pmatrix} -0.8 \\ -0.8 \end{pmatrix}, \begin{pmatrix} 0.8 \\ -0.8 \end{pmatrix}$$

$$\begin{pmatrix} x_5 \\ y_5 \\ q_5 \end{pmatrix} = \begin{pmatrix} 4 \\ 3 \\ \pi/2 \end{pmatrix}$$

$$\begin{pmatrix} x_4 \\ y_4 \\ q_4 \end{pmatrix} = \begin{pmatrix} 4 \\ 2 \\ \pi/2 \end{pmatrix}$$

$$\begin{pmatrix} x_1 \\ y_1 \\ q_1 \end{pmatrix} = \begin{pmatrix} 2 \\ 1 \\ 0 \end{pmatrix} \quad \begin{pmatrix} x_2 \\ y_2 \\ q_2 \end{pmatrix} = \begin{pmatrix} 3 \\ 1 \\ 0 \end{pmatrix} \quad \begin{pmatrix} x_3 \\ y_3 \\ q_3 \end{pmatrix} = \begin{pmatrix} 4 \\ 1 \\ 0 \end{pmatrix}$$

- Suppose a vehicle moves as in the left figure
- At each of the positions, it measures the four points from its local frame
- Make an integrated map of sensed points with homogeneous transformation matrix

Example of Result

K.Naruse(UAizu) Advanced Robotics: #2 Frame Transformation