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COMS4731 – Computer Vision
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It should be simple to do just the three necessary transformations (resize, rotate, translate). But since the rotation and scaling happen with regards to the origin, doing either the translation first and the resize/rotation, or doing the resize/rotation and then the translation, would modify in some unintended way the other transformations.

Therefore instead there should be four transformations:

1. Translation so center of square is at the origin $\begin{bmatrix} 1 & 0 & -x_1 \\ 0 & 1 & -y_1 \\ 0 & 0 & 1 \end{bmatrix}$
2. Rotate counterclockwise $\begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$
3. Scale by 2 $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix}$
4. Translation so center of square is at c2 $\begin{bmatrix} 1 & 0 & x_2 \\ 0 & 1 & y_2 \\ 0 & 0 & 1 \end{bmatrix}$

Note that steps 2 and 3 are interchangeable.