

CS148: Reading Response, Thursday 10 July

Shirley Ch. 6: Transformations

optional: “Homogeneous Coordinates and Computer Graphics” by Tom Davis

Shirley Ch. 6 describes everything you’ll need for this week’s assignment (2D rasterization and transformations.) However, homogeneous coordinates can be difficult to visualize, and reading another perspective on the topic is always helpful. Davis provides a very thorough and well-motivated walkthrough of the derivation process, along with some interesting comments on projective geometry (beyond the scope of this class, but very cool!) So, if you have the time, take a look and see what you think of his explanation.

Consider the following transformations:

$$T_1 = \text{Ref}_x * S(2,2) * \text{Rot}(\pi/2) \quad T_3 = \text{Tr}(1,1) * \text{Ref}_y * \text{Rot}(-3\pi/2)$$

$$T_2 = \text{Rot}(\pi/2) * S(2,2) * \text{Ref}_x \quad T_4 = \text{Rot}(\pi) * \text{Tr}(4, 0) * S(2,0.5)$$

With: $\text{Ref}_x, \text{Ref}_y$ are reflections about the x and y axes, respectively

$\text{Rot}(\theta)$ is a rotation about the x-axis (remember, positive θ is anticlockwise)

$S(a, b)$ scales the x coordinate by a and the y coordinate by b

$\text{Tr}(a, b)$ translates a vector by (a, b)

In the following, vectors \mathbf{v} and \mathbf{w} are given, where $\mathbf{w} = T_i * \mathbf{v}$. Please identify the transformation that was applied:

