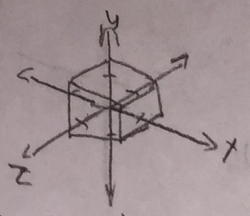
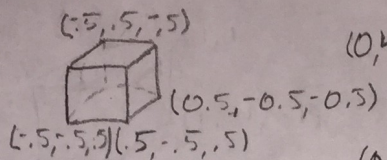
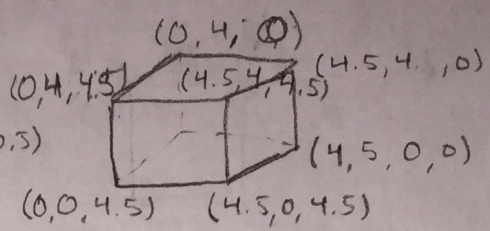
Patrick Capps
CSE 5542 HW







$(l, h, w) = (1, 1, 1) \rightarrow (4.5, 4, 4.5)$

$P_0 \rightarrow P_f \ (0.5, 0.5, 0.5) \rightarrow (4.5, 4, 4.$

$$S = \begin{bmatrix} 4.5 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 \\ 0 & 0 & 4.5 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \qquad P_0 = \begin{bmatrix} 0.5 \\ 0.5 \\ 0.5 \\ 1 \end{bmatrix}$$

$$P_1 = \begin{bmatrix} 4.5 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 \\ 0 & 0 & 4.5 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0.5 \\ 0.5 \\ 0.5 \\ 1 \end{bmatrix} = \begin{bmatrix} 2.25 \\ 2 \\ 2.25 \\ 1 \end{bmatrix}$$

$$P_f = \begin{bmatrix} 2.25 \\ 2 \\ 2.25 \end{bmatrix} + T \qquad T = \begin{bmatrix} 2.25 \\ 2 \\ 2.25 \end{bmatrix}$$

$$T = \begin{bmatrix} 1 & 0 & 0 & 2.25 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 2.25 \\ 0 & 0 & 0 & 1 \end{bmatrix} \qquad P_f = \begin{bmatrix} 1 & 0 & 0 & 2.25 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 2.25 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 2.25 \\ 2 \\ 2.25 \\ 1 \end{bmatrix} = \begin{bmatrix} 4.5 \\ 4 \\ 4.5 \\ 1 \end{bmatrix}$$

$$P_F = \begin{bmatrix} 1 & 0 & 0 & 2.25 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 2.25 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 4.5 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 \\ 0 & 0 & 4.5 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} P_0 = \begin{bmatrix} 4.5 & 0 & 0 & 2.25 \\ 0 & 4 & 0 & 2 \\ 0 & 0 & 4.5 & 2.25 \\ 0 & 0 & 0 & 1 \end{bmatrix} P_0$$

$$\text{Transformation Matrix} = \begin{bmatrix} 4.5 & 0 & 0 & 2.25 \\ 0 & 4 & 0 & 2 \\ 0 & 0 & 4.5 & 2.25 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

2. $T_0 = (V_0, V_1, V_2)$
$T_1 = (V_2, V_1, V_3)$
$T_2 = (V_1, V_7, V_3)$
$T_3 = (V_1, V_5, V_7)$
$T_4 = (V_3, V_7, V_2)$
$T_5 = (V_7, V_6, V_2)$
$T_6 = (V_0, V_4, V_1)$
$T_7 = (V_1, V_4, V_5)$
$T_8 = (V_0, V_2, V_4)$
$T_9 = (V_2, V_6, V_4)$
$T_{10} = (V_6, V_7, V_3)$
$T_{11} = (V_7, V_5, V_3)$