Computer Graphics Homework 2
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3.1)

$$
\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -x_C & -y_C & 1 \end{bmatrix}
\begin{bmatrix} S_x & 0 & 0 \\ 0 & S_y & 0 \\ 0 & 0 & 1 \end{bmatrix}
\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ x_C & y_C & 1 \end{bmatrix}
=
\begin{bmatrix} S_x & 0 & 0 \\ 0 & S_y & 0 \\ x_C(1-S_x) & y_C(1-S_y) & 1 \end{bmatrix}
= M
$$

3.2)
Similar to 3.1, this time add another row and add a transition and scale for z

$$
\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ -x_C & -y_C & -z_C & 1 \end{bmatrix}
\begin{bmatrix} S_x & 0 & 0 & 0 \\ 0 & S_y & 0 & 0 \\ 0 & 0 & S_z & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}
\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ x_C & y_C & z_C & 1 \end{bmatrix}
=
\begin{bmatrix} S_x & 0 & 0 & 0 \\ 0 & S_y & 0 & 0 \\ 0 & 0 & S_z & 0 \\ x_C(1-S_x) & y_C(1-S_y) & z_C(1-S_z) & 1 \end{bmatrix}
= M
$$