DoL pt. 2

parent motion: $T_p R_p (-T_p)$ (ignoring scaling for now)
= model ~~matrix~~ view matrix

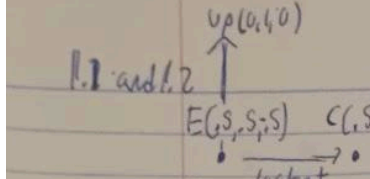
on children:
- rotate about the centroid = parent: $T_p R_p (-T_p)$
- about centroid = child: $T_c R_c (-T_c)$
- Both?: $T_p R_p (-T_p) T_c R_c (-T_c)$ => model view matrix of child

so with translation + scaling

Translate

$T_{parent}(position) \cdot T_{parent}(centroid) \cdot R_p \cdot S_p \cdot T_{parent}(-centroid) \cdot T_{child}(pos) \cdot T_{child}(centroid) \cdot R_c \cdot S_c \cdot T_{child}(-centroid)$

1.1 and 1.2



direction of lookAt is along z so
it should be $\begin{pmatrix}0\\0\\1\end{pmatrix}$ (along z+)

$at = norm(C - pos) = \begin{pmatrix}.5\\.5\\0\end{pmatrix} - \begin{pmatrix}.5\\.5\\.5\end{pmatrix} = \begin{pmatrix}0\\0\\.5\end{pmatrix} \xrightarrow{\text{normalize}} \begin{pmatrix}0\\0\\1\end{pmatrix} = at$

1.3 camera origin

frame $z = -norm(at) = \begin{vmatrix}0\\0\\-1\end{vmatrix}$

$y = (0,1,0)$

$x = y \times z = \begin{vmatrix}i & j & k\\0 & 1 & 0\\0 & 0 & -1\end{vmatrix} = \begin{vmatrix}1\\0\\0\end{vmatrix}$: $Frame = \begin{vmatrix}1 & 0 & 0 & .5\\0 & 1 & 0 & .5\\0 & 0 & -1 & -.5\\0 & 0 & 0 & 1\end{vmatrix}$

1.4

$view = \begin{bmatrix}X_x & Y_x & Z_x & E_x\\X_y & Y_y & Z_y & E_y\\X_z & Y_z & Z_z & E_z\\0 & 0 & 0 & 1\end{bmatrix} = \begin{bmatrix}1 & 0 & 0 & 0.5\\0 & 1 & 0 & 0.5\\0 & 0 & -1 & -0.5\\0 & 0 & 0 & 1\end{bmatrix}$

2. $\begin{bmatrix}1 & 0 & 0 & 1\\0 & 1 & 0 & 0\\0 & 0 & 1 & 0\\0 & 0 & 0 & 1\end{bmatrix}\begin{bmatrix}1 & 0 & 0 & -1.5\\0 & 1 & 0 & 0.5\\0 & 0 & 1 & 0.5\\0 & 0 & 0 & 1\end{bmatrix}\begin{bmatrix}1 & 0 & 0 & 0\\0 & 0.5 & -0.5 & 0\\0 & 0.5 & 0.5 & 0\\0 & 0 & 0 & 1\end{bmatrix}\begin{bmatrix}2 & 0 & 0 & 0\\0 & 2 & 0 & 0\\0 & 0 & 2 & 0\\0 & 0 & 0 & 1\end{bmatrix}\begin{bmatrix}1 & 0 & 0 & 1.5\\0 & 1 & 0 & -0.5\\0 & 0 & 1 & -0.5\\0 & 0 & 0 & 1\end{bmatrix}\begin{bmatrix}1 & 0 & 0 & .5\\0 & 1 & 0 & -0.5\\0 & 0 & 1 & -0.5\\0 & 0 & 0 & 1\end{bmatrix}$

↳ translation change x+1 ↳ translate to origin s.t rotation and scaling will be off of origin ↳ rotate 45° ↳ scale by 2 ↳ translate back to assigned position model matrix

very long math...

$= \begin{bmatrix}-2 & 0 & 0 & 3\\0 & 1 & -1 & -1\\0 & 1 & -1 & -1\\0 & 0 & 0 & 1\end{bmatrix}$