

Paula Chen

CS 355 HW3

$$1. \begin{bmatrix} \frac{-1}{\sqrt{2}} & 0 & \frac{-1}{\sqrt{2}} & 0 \\ 0 & 1 & 0 & 0 \\ \frac{-1}{\sqrt{2}} & 0 & \frac{1}{\sqrt{2}} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & -10 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Rotation                  Translation

world-space point  $\left(\frac{-40}{\sqrt{2}}, 10, \frac{60}{\sqrt{2}}\right)$

$$2. \text{ Clip matrix } \begin{bmatrix} \sqrt{3} & 0 & 0 & 0 \\ 0 & \frac{9}{16}\sqrt{3} & 0 & 0 \\ 0 & 0 & \frac{1001}{999} & 0 \\ 0 & 0 & \frac{2000}{999} & 0 \end{bmatrix}$$

clip-space coordinates  $\left(10\sqrt{3}, \frac{45}{8}\sqrt{3}, \frac{20020}{999}, \frac{40000}{999}\right)$

Yes

canonical view  $\left(\frac{999\sqrt{3}}{4000}, \frac{8991\sqrt{3}}{64000}\right)$

$$3. \begin{bmatrix} 960 & 0 & 0 \\ 0 & 540 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 960 & 0 & 960 \\ 0 & 540 & 540 \\ 0 & 0 & 1 \end{bmatrix}$$

$\left(\frac{959040\sqrt{3}}{4000} + 960, \frac{4855140\sqrt{3}}{64000} + 540\right)$

4.  $\left(\frac{-2}{\sqrt{17}}, \frac{2}{\sqrt{17}}, \frac{3}{\sqrt{17}}\right)$  back-facing