

a)

A is the 3D modeling object's coordinates. Responsible for transforming model into world coordinates.

B is the 3D world coordinates. Responsible for transforming model into eye coordinates. .

C is the View orientation matrix. Responsible for view reference coordinates which provides perspective.

D is the view mapping matrix. Responsible for normalized projection coordinates.

E is the 2D device coordinates. Transform model into 2D screen coordinates.

b)

$$\textcircled{A} \quad A = \begin{bmatrix} 1 & 0 & 0 & -x \\ 0 & 1 & 0 & -y \\ 0 & 0 & 1 & -z \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$B = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$C = \begin{bmatrix} \cos \theta_w & 0 & -\sin \theta_w & 0 \\ 0 & 1 & 0 & 0 \\ \sin \theta_w & 0 & \cos \theta_w & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$D = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & \cos \theta_h & \sin \theta_h & 0 \\ 0 & -\sin \theta_h & \cos \theta_h & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

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

