Checkpoint 1:

$$P_{xy} = R_y R_x P$$

$$= R_x P = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\pi/4 & -\sin\pi/4 \\ 0 & \sin\pi/4 & \cos\pi/4 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.707 & -0.707 \\ 0 & 0.707 & 0.707 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1 \\ 0 \\ 1.414 \end{bmatrix}$$

Now, $R_y R_x P = \begin{bmatrix} \cos\pi/4 & 0 & \sin\pi/4 \\ 0 & 1 & 0 \\ -\sin\pi/4 & 0 & \cos\pi/4 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 1.414 \end{bmatrix}$

$$= \begin{bmatrix} 0.707 & 0 & 0.707 \\ 0 & 1 & 0 \\ -0.707 & 0 & 0.707 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 1.414 \end{bmatrix}$$

$$= \begin{bmatrix} 1.706 \\ 0 \\ 0.292 \end{bmatrix}$$

$$P_{xy} = \begin{bmatrix} 1.706 \\ 0 \\ 0.292 \end{bmatrix}$$

Checkpoint 2:

$$P_{yx} = R_y P = \begin{bmatrix} \cos\pi/4 & 0 & \sin\pi/4 \\ 0 & 1 & 0 \\ -\sin\pi/4 & 0 & \cos\pi/4 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 0.707 & 0 & 0.707 \\ 0 & 1 & 0 \\ -0.707 & 0 & 0.707 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1.414 \\ 1 \\ 0 \end{bmatrix}$$

Now, $$R_x R_y P = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\pi/4 & -\sin\pi/4 \\ 0 & \sin\pi/4 & \cos\pi/4 \end{bmatrix} \begin{bmatrix} 1.414 \\ 1 \\ 0 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.707 & -0.707 \\ 0 & 0.707 & 0.707 \end{bmatrix} \begin{bmatrix} 1.414 \\ 1 \\ 0 \end{bmatrix}$$

$$= \begin{bmatrix} 1.414 \\ 0.707 \\ 0.707 \end{bmatrix}$$

$$P_{yx} = \begin{bmatrix} 1.414 \\ 0.707 \\ 0.707 \end{bmatrix}$$

Checkpoint 4:

$$t_{2cube}^{world} = \begin{bmatrix} 3 \\ -0.41421 \\ 2 \end{bmatrix}$$

Checkpoint 3:

$$t_{1cube}^{world} = \begin{bmatrix} 3 \\ 0 \\ 3 \end{bmatrix}$$

Checkpoint 6:

As we changed the focal length and gradually increased it, the front part of the face is going behind, basically the camera is going back, so we can see the monkey face with more detail.