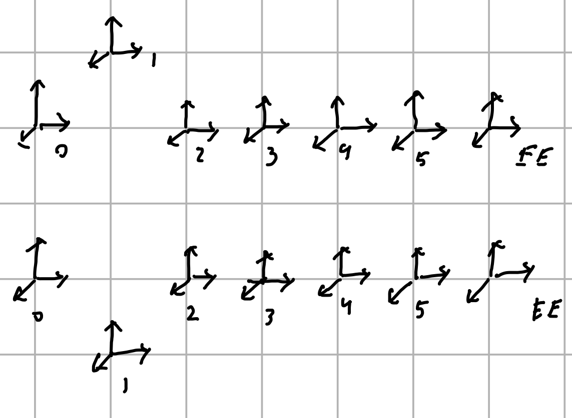
1) a)

$$\begin{bmatrix} \cos(\frac{\pi}{4}) & -\sin(\frac{\pi}{4}) & 0 & 0 \\ \sin(\frac{\pi}{4}) & \cos(\frac{\pi}{4}) & 0 & 4 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \boxed{\begin{bmatrix} \frac{\sqrt{2}}{2} & -\frac{\sqrt{2}}{2} & 0 & 0 \\ \frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} & 0 & 4 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} = T_{SB}}$$

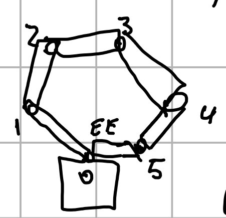
b) origin of B in S is $\langle 0, -9, 7 \rangle$

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & \cos\frac{\pi}{2} & -\sin\frac{\pi}{2} & -9 \\ 0 & \sin\frac{\pi}{2} & \cos\frac{\pi}{2} & 7 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \boxed{\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & -9 \\ 0 & 1 & 0 & 7 \\ 0 & 0 & 0 & 1 \end{bmatrix} = T_{SB}}$$

c) No. For example two solutions could look like this. The full translation is the same as it defines the same robot, but the intermediary ones are defined by engineers.



d) It would mean the endeffector frame is in the exact same position as the frame 0. Not just position, but rotation as well. Essentially coordinate frame are equivalent



Hard to draw the rotation part as well, but assume frames were same