(3) $A_i = \begin{bmatrix} \cos\theta_i & -\sin\theta_i\cos\alpha_i & \sin\theta_i\sin\alpha_i & a_i\cos\theta_i \\ \sin\theta_i & \cos\theta_i\cos\alpha_i & -\cos\theta_i\sin\alpha_i & a_i\sin\theta_i \\ 0 & \sin\alpha_i & \cos\alpha_i & d_i \\ 0 & 0 & 0 & 1 \end{bmatrix}$

$^0A_1 = \begin{bmatrix} \cos30° & -\sin30°\cos0° & \sin30°\sin0° & 10\cos30° \\ \sin30° & \cos30°\cos0° & -\cos30°\sin0° & 10\sin30° \\ 0 & \sin0° & \cos0° & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

$\alpha_i = 0$
$a_1 = 1$
$d_1 = 0$
$\theta_1 = 3$

$^0A_1 = \begin{bmatrix} \dfrac{\sqrt{3}}{2} & -\dfrac{1}{2} & 0 & 5\sqrt{3} \\ \dfrac{1}{2} & \dfrac{\sqrt{3}}{2} & 0 & 5 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

$^1A_2 = \begin{bmatrix} \cos45° & -\sin45°\cos0° & \sin45°\sin0° & 8\cos45° \\ \sin45° & \cos45°\cos0° & -\cos45°\sin0° & 8\sin45° \\ 0 & \sin0° & \cos0° & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

$\alpha_2 = 0°$
$a_2 = 8$
$d_2 = 0$
$\theta_2 = 45°$

$^1A_2 = \begin{bmatrix} \dfrac{\sqrt{2}}{2} & -\dfrac{\sqrt{2}}{2} & 0 & 4\sqrt{2} \\ \dfrac{\sqrt{2}}{2} & \dfrac{\sqrt{2}}{2} & 0 & 4\sqrt{2} \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

$$^2A_3 = \begin{bmatrix} \cos10^\circ & -\sin10^\circ\cos0^\circ & \sin10^\circ\sin0^\circ & 3\cos10^\circ \\ \sin10^\circ & \cos10^\circ\cos0^\circ & -\cos10^\circ\sin0^\circ & 3\sin10^\circ \\ 0 & \sin0^\circ & \cos0^\circ & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} ; \quad \begin{matrix} \alpha_3 = 0^\circ \\ a_3 = 3 \\ d_3 = 0 \\ \theta_3 = 10^\circ \end{matrix}$$

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$$^2A_3 = \begin{bmatrix} 0.985 & -0.174 & 0 & 2.934 \\ 0.174 & 0.985 & 0 & 0.521 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$^0A_3 = (^0A_1)(^1A_2)(^2A_3) \Rightarrow {}^0A_3 = \begin{bmatrix} 0.0868 & -0.996 & 0 & 10.992 \\ 0.9969 & 0.0868 & 0 & 15.715 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

final position $= {}^0A_3 \begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \end{bmatrix} = \begin{bmatrix} 10.992 \\ 15.715 \\ 0 \\ 1 \end{bmatrix}$