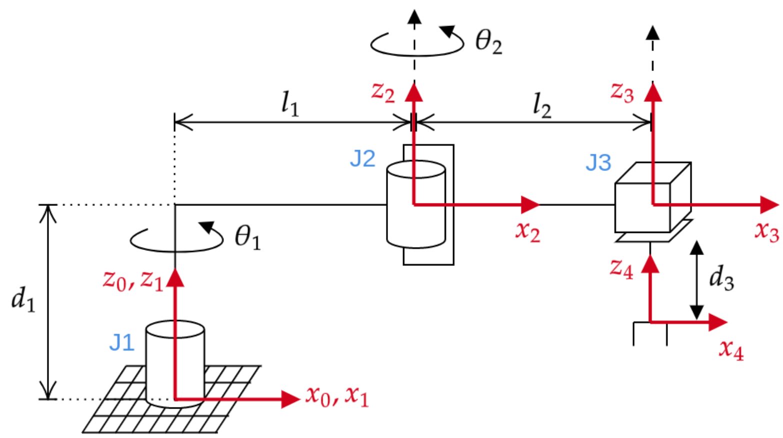
- We begin by assigning coordinate frames to the manipulator:



- We can then formulate the DH parameters coordinating to the links:

Link	θ_i	d_i	a_i	α_i
1	θ_1^*	d_1	l_1	0
2	θ_2^*	0	l_2	0
3	0	$-d_3^*$	0	0

- Next, we can calculate the transformations for each frame:

$$T_{i+1}^{i} = \text{Rot}_z(\theta_i)\text{Trans}_z(d_i)\text{Trans}_x(a_i)\text{Rot}_x(\alpha_i) = \begin{bmatrix} \cos\theta_i & -\sin\theta_i\cos\alpha_i & \sin\theta_i\sin\alpha_i & a_i\cos\theta_i \\ \sin\theta_i & \cos\theta_i\cos\alpha_i & -\cos\theta_i\sin\alpha_i & a_i\sin\theta_i \\ 0 & \sin\alpha_i & \cos\alpha_i & d_i \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$T_2^1 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$T_2^1 = \begin{bmatrix} \cos\theta_1 & -\sin\theta_1\cos 0 & \sin\theta_1\sin 0 & l_1\cos\theta_1 \\ \sin\theta_1 & \cos\theta_1\cos 0 & -\cos\theta_1\sin 0 & l_1\sin\theta_1 \\ 0 & \sin 0 & \cos 0 & d_1 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} \cos\theta_1 & -\sin\theta_1 & 0 & l_1\cos\theta_1 \\ \sin\theta_1 & \cos\theta_1 & 0 & l_1\sin\theta_1 \\ 0 & 0 & 1 & d_1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$T_3^2 = \begin{bmatrix} \cos\theta_2 & -\sin\theta_2\cos 0 & \sin\theta_2\sin 0 & l_2\cos\theta_2 \\ \sin\theta_2 & \cos\theta_2\cos 0 & -\cos\theta_2\sin 0 & l_2\sin\theta_2 \\ 0 & \sin 0 & \cos 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} \cos\theta_2 & -\sin\theta_2 & 0 & l_2\cos\theta_2 \\ \sin\theta_2 & \cos\theta_2 & 0 & l_2\sin\theta_2 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$T_4^3 = \begin{bmatrix} \cos 0 & -\sin 0\cos 0 & \sin 0\sin 0 & 0\cos 0 \\ \sin 0 & \cos 0\cos 0 & -\cos 0\sin 0 & 0\sin 0 \\ 0 & \sin 0 & \cos 0 & -d_3 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & -d_3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$