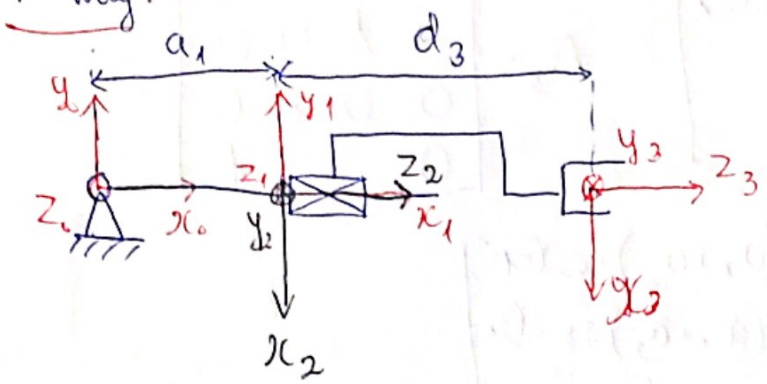
1st way:



	θ_i	d_i	a_i	α_i
1	$\theta_{1\,var}$	0	a_1	0
2	-90	0	0	-90
3	0	$d_{3\,var}$	0	0

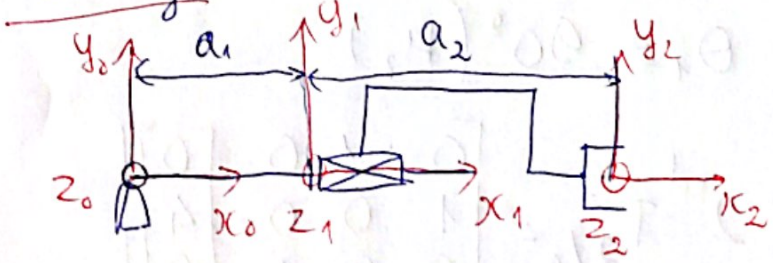
$$A_1 = \begin{bmatrix} \cos\theta_1 & -\sin\theta_1 & 0 & a_1\cos\theta_1 \\ \sin\theta_1 & \cos\theta_1 & 0 & a_1\sin\theta_1 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$A_2 = Rot_{z,-90}\; Rot_{x_1,-90} = \begin{bmatrix} 0 & 0 & 1 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$A_3 = Tran_z\, d_3 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & d_3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$T_{3/0} = A_1 A_2 A_3 = \begin{bmatrix} \sin\theta_1 & 0 & \cos\theta_1 & (a_1+d_3)\cos\theta_1 \\ -\cos\theta_1 & 0 & \sin\theta_1 & (a_1+d_3)\sin\theta_1 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

2nd way:



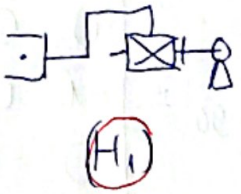
	θ_i	d	a	α_1
1	$\theta_{1\,var}$	–	a_1	–
2	–	–	$a_{2\,var}$	–

$$A_1 = \begin{bmatrix} \cos\theta_1 & -\sin\theta_1 & 0 & a_1\cos\theta_1 \\ \sin\theta_1 & \cos\theta_1 & 0 & a_1\sin\theta_1 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \qquad A_2 = \begin{bmatrix} 1 & 0 & 0 & a_2 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$T_{2/0} = \begin{bmatrix} \cos\theta_1 & -\sin\theta_1 & 0 & (a_1+a_2)\cos\theta_1 \\ \sin\theta_1 & \cos\theta_1 & 0 & (a_1+a_2)\sin\theta_1 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Ex$_1$: $a_1 = 1 \quad d_3 = 3 (a_2 = 3) \quad \theta_1 = 180^\circ \ (H_1)$

1st: $T_{3/0} = \begin{bmatrix} 0 & 0 & -1 & -4 \\ 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$



H_1

H_2

H_3

2nd: $T_{2/0} = \begin{bmatrix} -1 & 0 & 0 & -4 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

Ex$_2$: $a_1 = 1 \quad d_3 = 2 (a_2 = 2) \quad \theta_1 = -90^\circ \ (H_2)$

1st $T_{3/0} = \begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & 0 & -1 & -3 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ 2nd $T_{2/0} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ -1 & 0 & 0 & -3 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

Ex$_3$: $a_1 = 1 \quad d_3 = 3 (a_2 = 3) \quad \theta_1 = 90^\circ \ (H_3)$

1st $T_{3/0} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 4 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ 2nd $T_{2/0} = \begin{bmatrix} 0 & -1 & 0 & 0 \\ 1 & 0 & 0 & 4 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$