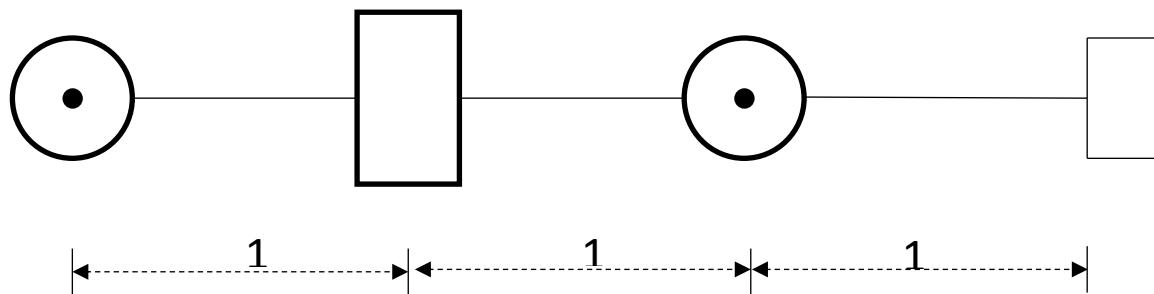


ME604: Introduction to Robotics

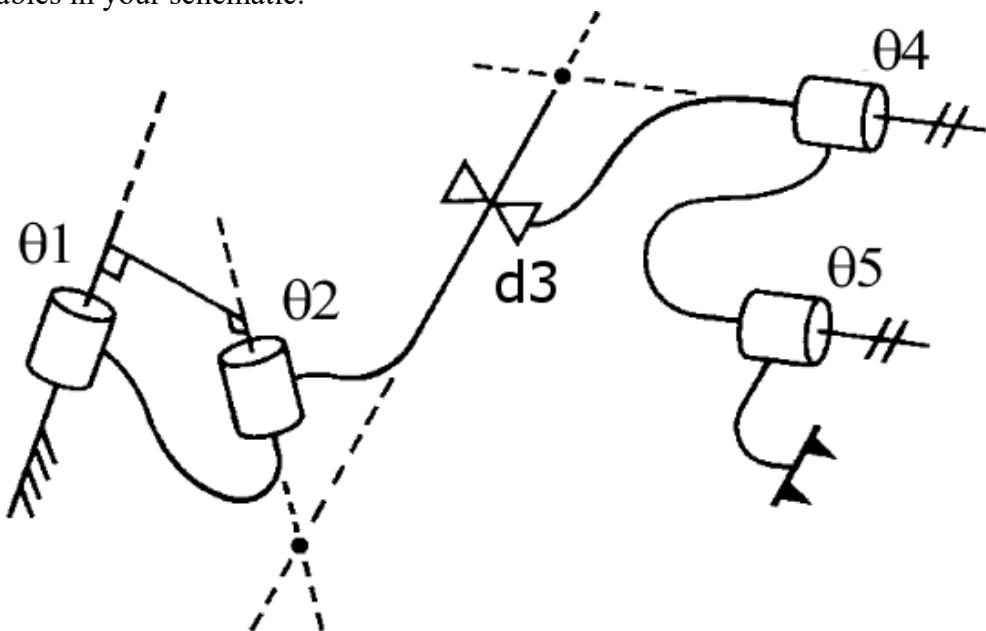
Spring 2025

Assignment 3

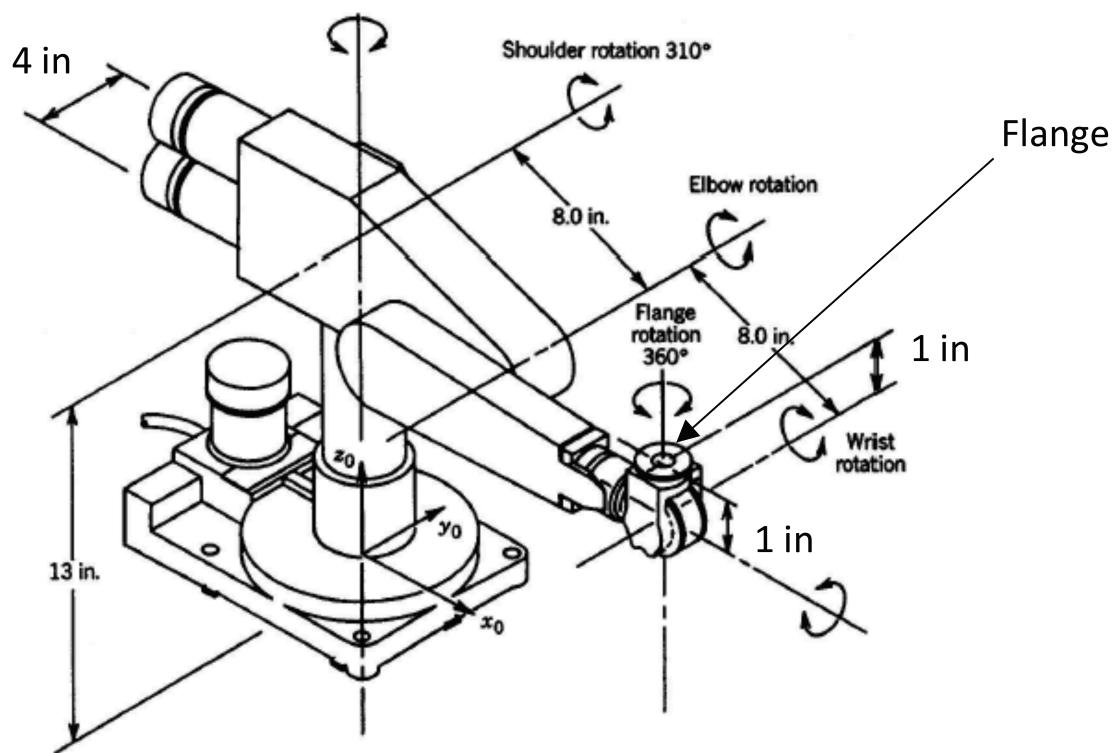
1. Assign DH frames and find the DH parameters for this manipulator. Derive the forward kinematics, 0T_3 , of this manipulator (frame $\{3\}$ being the end-effector frame)



2. Consider the 2RP2R manipulator shown below. Draw a schematic of this manipulator, with the axes for frames $\{0\}$ through $\{5\}$ labeled. Assign DH frames, and make a table of link parameters. Include all non-zero DH parameters and joint variables in your schematic.



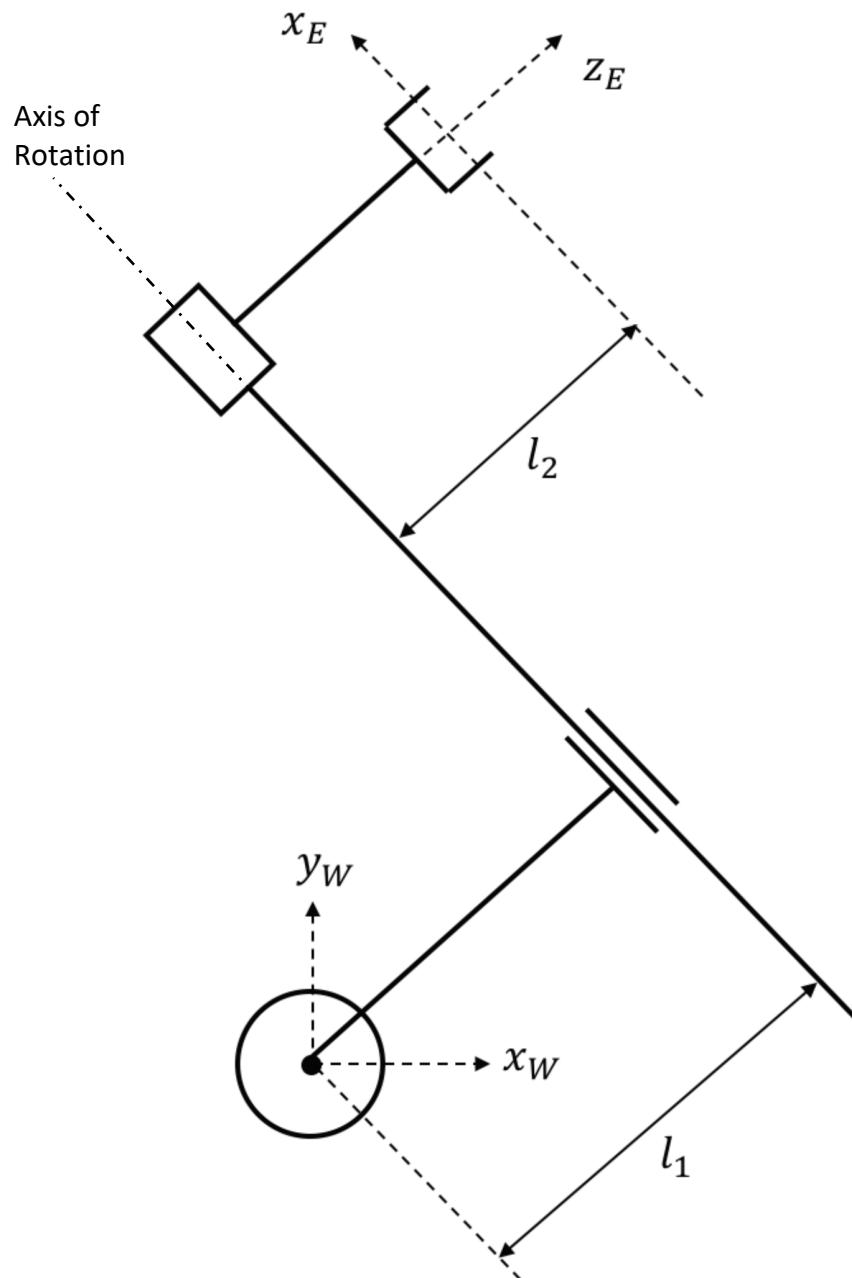
3. Consider the PUMA manipulator shown below:



- Draw a sketch depicting the kinematic structure of the robot, and assign DH frames.
- Make a table of DH parameters corresponding to the frames assigned in part a.

4. The figure below shows a RPR manipulator.

- Assign DH frames, and make a table of DH parameters for this manipulator.
- Derive the forward kinematics, ${}^W_E T$, of this manipulator (E refers to the end-effector frame, and W to the world frame as shown in the figure; Note that x_E may not be as per DH convention).



5. The figure below shows an industrial manipulator. Draw a sketch depicting the kinematic structure of the robot. Assign DH frames, and make a table of DH parameters.

