Due: Friday, 9/7/01

1. Fill in the table of Denavit-Hartenburg parameters for the three-link RPR robot shown below.

Joint	q_I	d_i	a_i	α_i
1				
2				
3				

2. Use the results from the table above and the D-H matrix given on page 18 of your notes to write the three Denavit-Hartenburg transformation matrices (one for each joint) for the RPR Planar Robot (shown below)

2. Write the overall transformation matrix which relates the final coordinates ($x_3y_3z_3$) to the "base" coordinates ($x_0y_0z_0$) for the RPR Planar Robot (shown below).

3. Check the RPR robot in the following configurations

   a) $\theta_1 = 0°$, $a_1 = 2$, $d_2 = 4$, $\theta_3=90°$, $a_3 = 2$

   a) $\theta_1 = 45°$, $a_1 = 2$, $d_2 = 4$, $\theta_3=45°$, $a_3 = 2$

   a) $\theta_1 = 90°$, $a_1 = 2$, $d_2 = 4$, $\theta_3=0°$, $a_3 = 2$

"Checking" involves:

- plug values into overall transformation matrix,
- sketch robot in configuration,
- identify position of final coordinate system ($X_3Y_3Z_3$)
- identify direction cosines for final coordinate system ($X_3Y_3Z_3$)