

**15-464 / 16-464      HW2: Inverse Kinematics**  
**due Tuesday, September 27, before class**

Build the Jacobian for the following system.

- The system has a moving base and five total degrees-of-freedom ( $x$ ,  $y$ ,  $\theta_1$ ,  $\theta_2$ ,  $\theta_3$ )
- All joints rotate about the  $z$ -axis
- There are two targets to be satisfied simultaneously  $C1=(x_1, y_1)$  and  $C2=(x_2, y_2)$
- Express the Jacobian in terms of joint positions  $p_1$ ,  $p_2$ , and  $p_3$  and tip position  $p_4$

