# ME729 Advanced Robotics - Project #1 description

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❑ Objectives

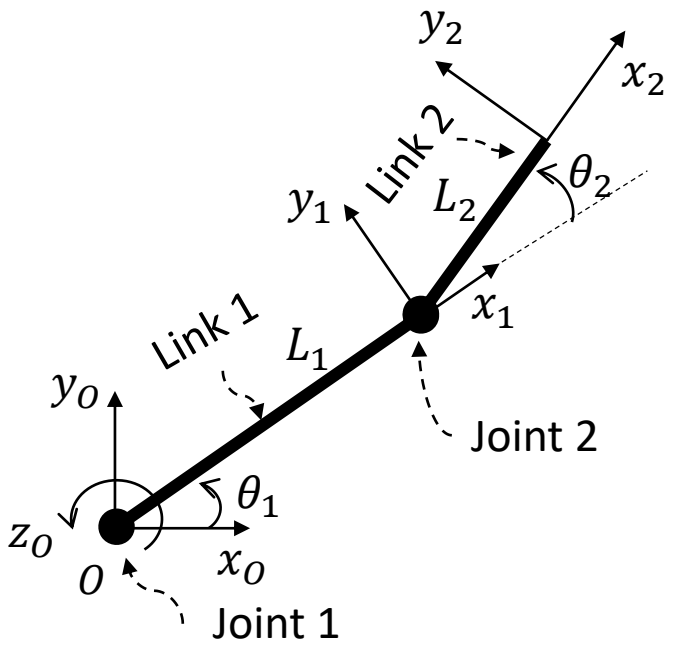
- The purpose of this project is to understand the Jacobi method, which is the most important in inverse kinematics, and implement its algorithm to the 2-link planar manipulator.

❑ Presentation

- Present all of your tasks with a code explanation, and show your demo.
- Submit your presentation file before start the class, i.e. before 3/5/18 6 p.m.

❑ Tasks

- Math problems: consider the 2-link planar manipulator (see a figure).
  1) Derive a Jacobian matrix of the manipulator.
  2) Derive a inverse Jacobian matrix.



❑ Tasks - continued

- Programming problems: based on ”Inv_Kine_closed_form.nxc”.
  1) Write a subroutine named as “IK_2R_Planar_jacobi” to find a solution with the Jacobi method.
     - Link 1 : 21 studs * 8 mm = **168 mm**
     - Link 2 : 4 studs * 8 mm = **32 mm**.

  2) In Figure 1. there are four points: (-120 mm, 120 mm), (-72 mm, 136 mm), (56 mm, 136 mm), and (160 mm, 96 mm). As Figure 2., whenever a right or a left arrow button is pressed, let the manipulator’s tip place at each point. That is, when the first right press, it places at point 1. Next when the second press, at point 2. But if the left press, it places again at point 1.
     Note that DO NOT use the ”IK_2R_Planar_closed” function to move the manipulator.

- Think why the manipulator’s tip is not exactly located at desired positions and describe the reasons.

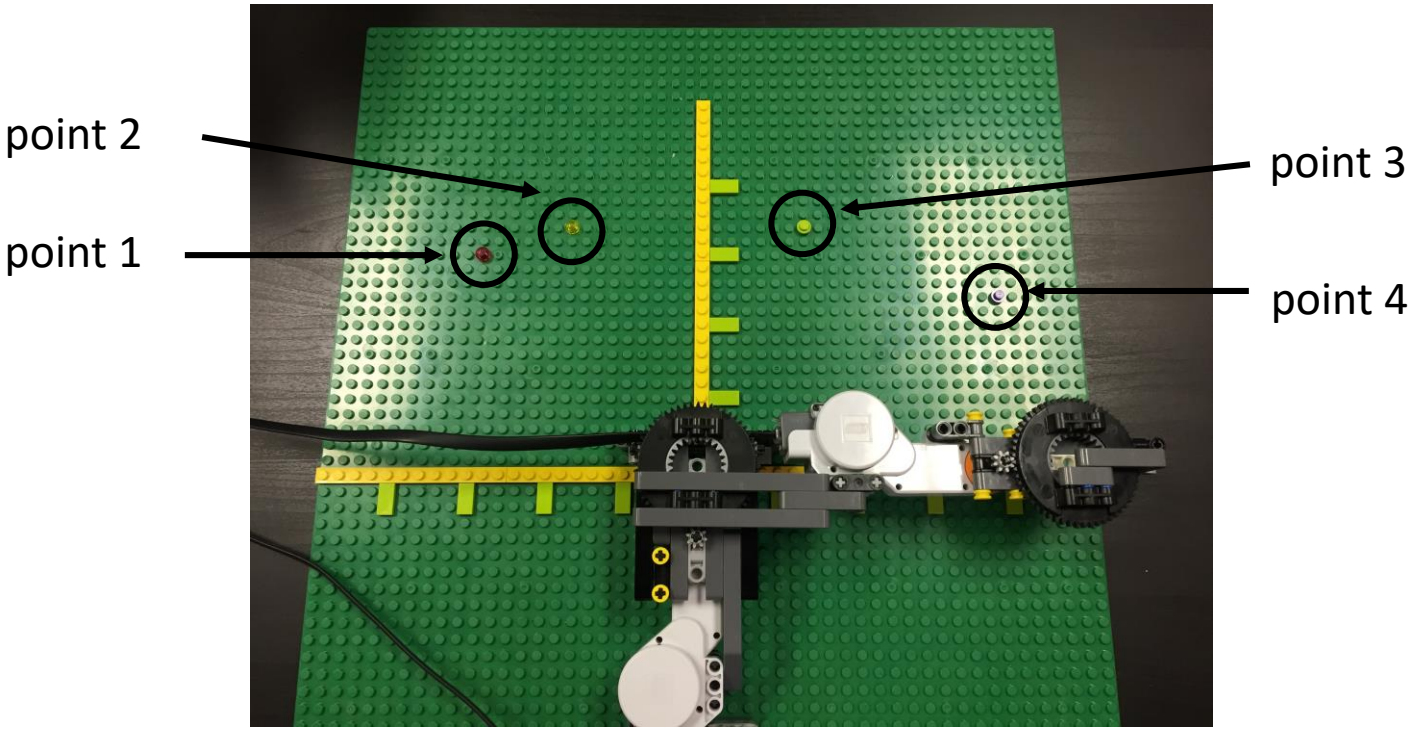



Figure 1.

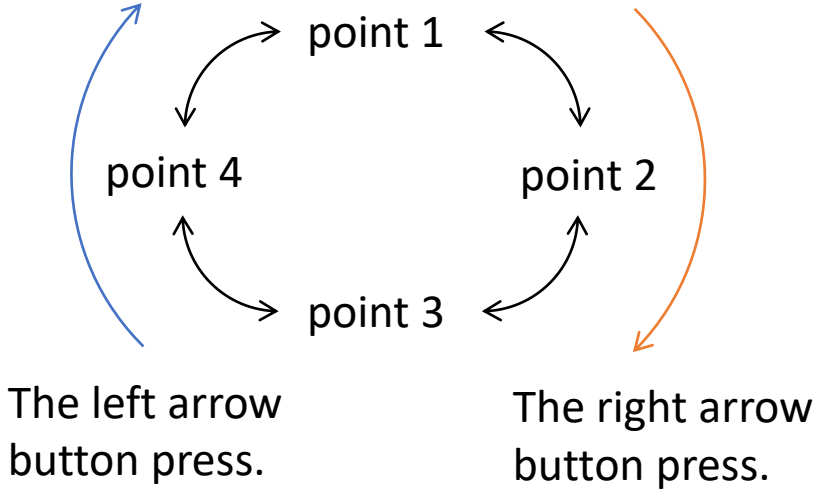



Figure 2.