# Going Beyond: Robotic Arm

Introduction:
Robotic arms can be found in many industries including manufacturing. They can be used to conduct processes and operations such as welding, painting, transporting, packaging, and more. Robotic arms can aid in executing repetitive movements and have human-like dexterity. Each axis joint on a robotic arm can be rotated with a servo motor and can be referred to as the waist, shoulder, and elbow.

Problem:
Using the materials provided, build a 3 axis robotic arm with a gripper mechanism. Incorporate 4 servo motors to your robot - one servo for each axis of rotation and one servo for your gripper. Use the concepts learned in Arduino Control Systems - Block Coding to program the control movements of the robotic arm using 4 potentiometers as input and 4 servo motors for output. Each servo motor will have a dedicated potentiometer used to control its rotation. Use Tinkercad.com to create your circuit and program.
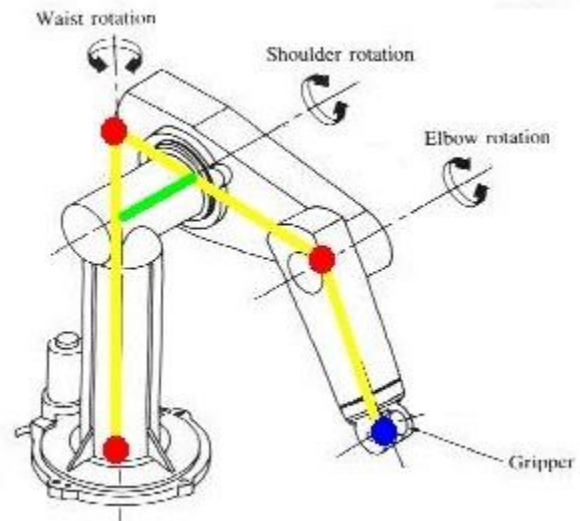
Materials:

- 12 Popsicle Sticks
- 4 Micro Servos (with arms and screws)
- 4 Potentiometers
- 1 Breadboard
- 1 Arduino Uno Microcontroller
- Jumper Cables / Wires

Tools:

- Hot Glue Gun + Hot Glue Sticks
- Arduino IDE
- USB A to B, Arduino Cable

Rules & Limitations:
- Build and program your circuit in TinkerCAD.com

- Include 4 potentiometers and 4 servo motors in your circuit
- Make each potentiometer control each of the servo motors
- Must be wired and built as neatly as possible.
- Program must utilize what you have learned in previous experiments and should contain loops, variables, and counters.
- Connect your circuit to your robotic arm build
- Ensure that each of the joints of your robotic arm is controllable by each of the potentiometers.
- Ensure that your gripper is capable of picking up objects.
- Test your robotic arm by picking something up from a table top and dropping it into a cup.

Ideas and Tips: