# Mechanism Phase

## Objectives:

To design a conceptual sketch model of the robotic arm system while following the fixed dimensions and movement constraints provided. The focus is on translating the requirements into a functional design, while leaving freedom in the choice of materials and overall structure. Your design should demonstrate a clear understanding of the system's functionality, proper labeling of dimensions and components, and thoughtful justification of the selected materials and design choices.

## Main Task:

Sketch the conceptual design that you will be fabricating later with clear labeling of materials and lengths of the following elements of your robotic arm system:

1. The main robotic Arm (operator arm with the servo motors).
2. Controller Arm (using the potentiometers).
3. Joysticks controller.

## Requirements:

- **4 Servo Joints**
  - Servo-1: Base (180° max)
  - Servo-2: Shoulder (140° max)
  - Servo-3: Elbow (180° max)
  - Servo-4: Gripper (180° max)

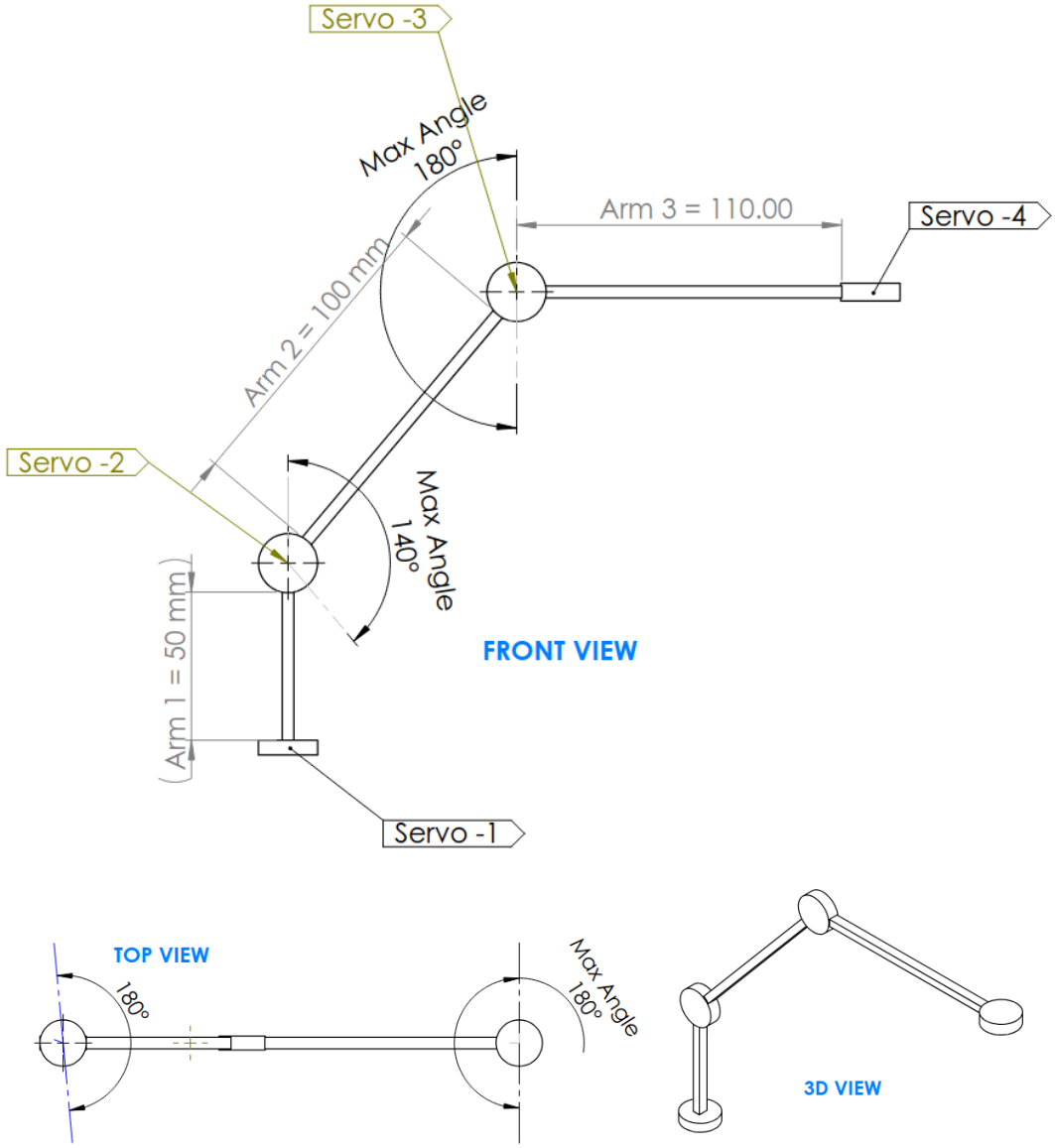
- **Fixed Arm Lengths (center-to-center):**

  - Arm 1: connects Servo-1 to Servo-2.
  - Arm 2: connects Servo-2 to Servo-3.
  - Arm 3: connects Servo-3 to Servo-4.

The overall design (shape, layout, and material selection) is up to you. Provide a brief justification for your choices (e.g., stiffness, weight, ease of fabrication, cost).

## Reference diagram:

The sketch attached below is the dimension reference of the robotic arm design. It's for understanding only, do not copy the structure. This reference diagram has the suitable dimensions of the robotic arm to be operating properly in the final competition, however, you may have your own dimensions and joints placement.




Note: The circles represent the servo motor and joint locations, with their orientations indicating the direction of servo rotation.

**Tip:** Try searching for terms like “DIY robotic arm design,” “servo motor robotic arm sketch,” or “Arduino robotic arm project.” Platforms like Google Images, Pinterest, YouTube, and GrabCAD have plenty of creative ideas and sketches. Use these designs only as references to spark ideas, then adapt them to fit your own dimensions, constraints, and style.

## Optional Task:

Redesign your robotic arm model in any 3D CAD software of your choice (e.g., SolidWorks, Onshape, Fusion 360, Tinkercad) and export views/screenshots to accompany your sketch. The design should at least show %70 of the actual details.

## Submission:

- Complete and submit this task in one PDF file for both main and optional (if done) tasks.
- Add a picture of your design sketch to the PDF file.
- Export your 3D design (if done) as a STL file and send it to your mentor.
- Add a screenshot of your 3D design (if done) to the PDF file.
- Name the PDF files with task7_groupx_your_name, (replace x with your group number).
- This task should be submitted before 2nd Sept 10:00pm (Malaysia time), 05:00pm (Makkah time).
- Your mentor must approve your task answer file before submission.
- Submit the PDF file to the Google form.