

Design Challenge: Two Degree-of-Freedom Drawing Robot

Your team is tasked with designing a two-degree-of-freedom drawing robot capable of creating intricate drawings on a flat surface. The robot should utilise two micro servo motors (see schematics), maintain tidy wiring, and securely hold an Arduino Uno microcontroller and an L298N motor driver. Each of the robot's arms should have a reach of 78mm. Your team will then discuss your designs' features and strengths with us for feedback as part of the iterative design process. You will not need to create any PowerPoint presentations for this.

Design Requirements:

- **Two-Degree-of-Freedom:** The robot should have two independently controllable degrees of freedom to hold a pen/pencil.
- **Micro Servo Motors:** Your design must incorporate two micro servo motors to control the robot's movements precisely. Consider their placement, attachment, and how they will be powered and connected.
- **Tidy Wiring:** Ensure that the wiring within your design is organised, secure, and easily maintainable. Messy or tangled wires should be avoided for ease of troubleshooting and future modifications.
- **Arduino Uno and L298N motor controller Integration:** The robot must include a secure holder or mount for the Arduino Uno and L298N motor driver. It should be easily accessible for programming and maintenance.
- **Reach:** Each arm of the robot should have a reach of precisely 78mm, allowing for a wide range of drawing motion.

Presentation Requirements:

- **Conceptual Drawings:** Present a manual drawing of your design concept, including the robot's physical structure and the placement of motors, wiring, and components.
- **Functional Description:** Explain how the robot's two degrees of freedom will work to create drawings on a flat surface. Discuss the range of motion, precision, and potential limitations.
- **Innovation and Unique Features:** Highlight any innovative or unique features of your design that set it apart from the other concepts.
- **Potential Challenges and Solutions:** Anticipate any challenges your design might face during construction or operation and propose solutions for these challenges.

