

<i>Wall_drawing Robot</i>	
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Project components



Lifts and lowers the pen for drawing or moving.



The main microcontroller that controls the entire system.



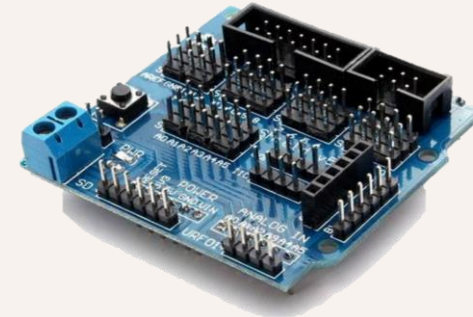
Used to transfer precise rotational motion from the stepper motors to the threads, ensuring accurate pen positioning.



Drives the stepper motors by providing enough current.



Move the pen by winding and unwinding threads.



Makes it easier to connect multiple components to the Arduino.



Scientific Principle



X and Y coordinates are determined by measuring string lengths from each motor



The machine calculates the pen's position using the Pythagorean theorem



Similar to drawing circles using two strings.

Electrical Connections

Stepper motors connected via ULN2003 drivers.

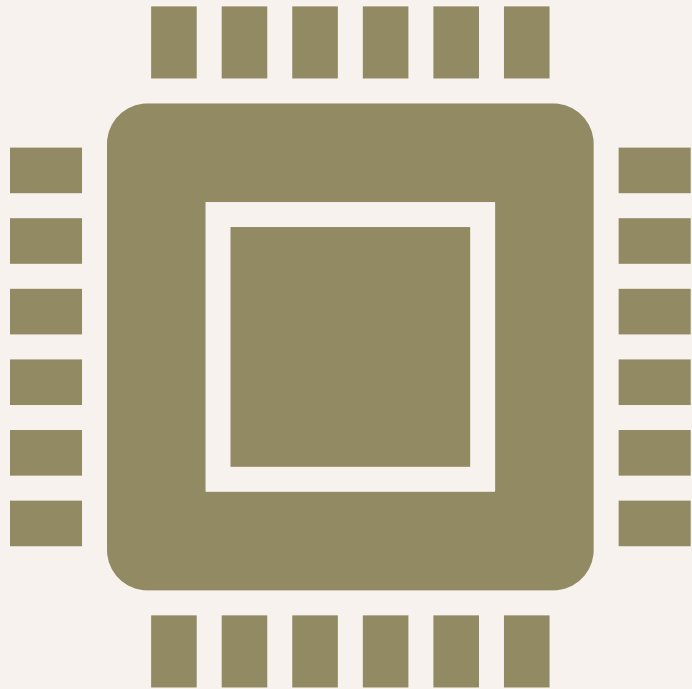
A light gray downward-pointing arrow indicating a flow from the first step to the second.

Servo connected to pin 10.

A light gray downward-pointing arrow indicating a flow from the second step to the third.

Common ground is essential to avoid malfunction.

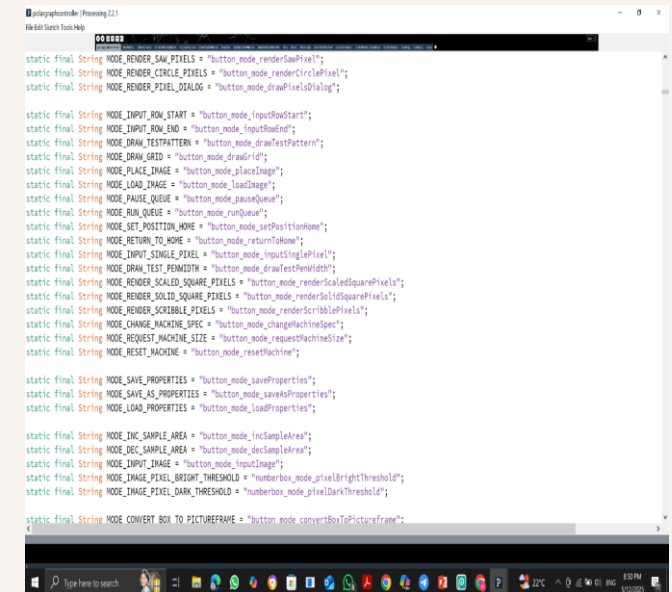
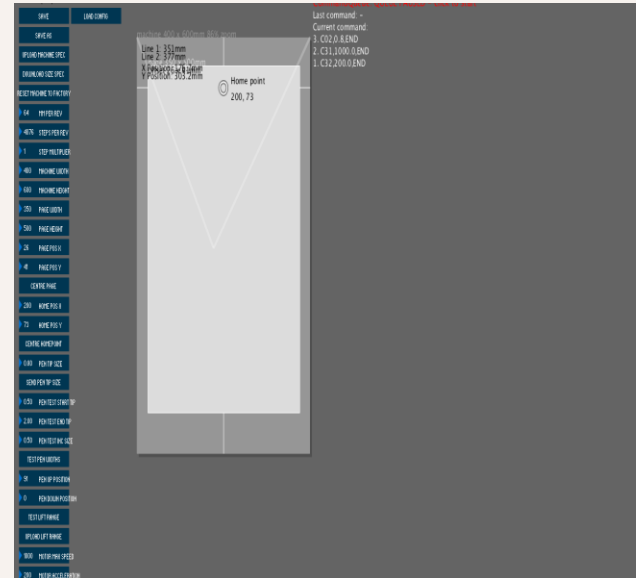
Arduino Code



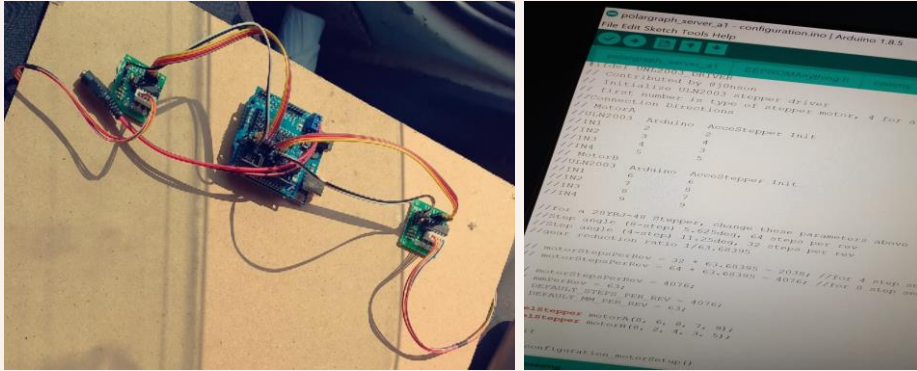
- Based on the Polargraph Server firmware.
- Defined board and driver type.
- Angles and speed stored in EEPROM settings.

Software Interface

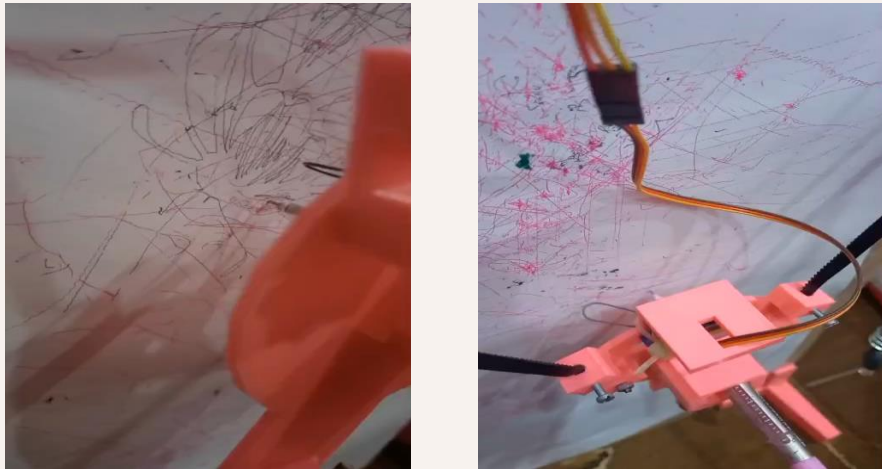
- Used Polargraph Controller (Processing-based).
- Load image, resize, and select drawing area.
- Control commands: pen up, pen down, start drawing.



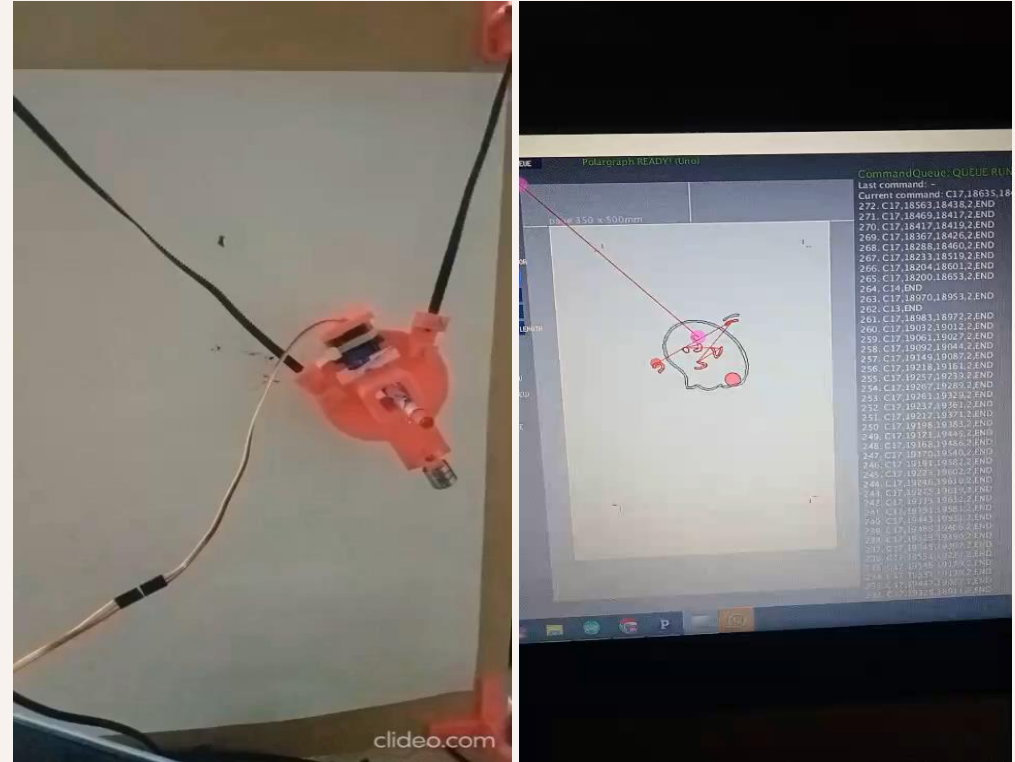
Testing & Issues



Inverted movement solved by rewiring motors.



Servo issue fixed by adjusting angles and power.



Drawings exceeded paper size—solved by resizing images.

Results

- Machine successfully drew clear images.
- Gradual tuning improved speed and accuracy.
- Final drawing closely matched the original image.

Conclusion

- Learned how to wire and program a complete system.
- Useful for education and artistic drawing.
- Can be expanded with color or larger canvas support.

