

philoBot

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01

Application & Background

Background

- **Lack of accessibility** of diagnostic blood testing
- Blood testing services are **crucial** for diagnosing various types of diseases and conditions - the first step to early detection and life-saving treatment.
- Quality of life and healthcare **decreases drastically** and can even contribute to the undetected continuous spread of communicable diseases.

Constraints & Considerations

Low cost

Simple assembly

Efficient packaging and shipping

Applications

Humanitarian crises

Overstaffed hospitals

Travelling medical kit

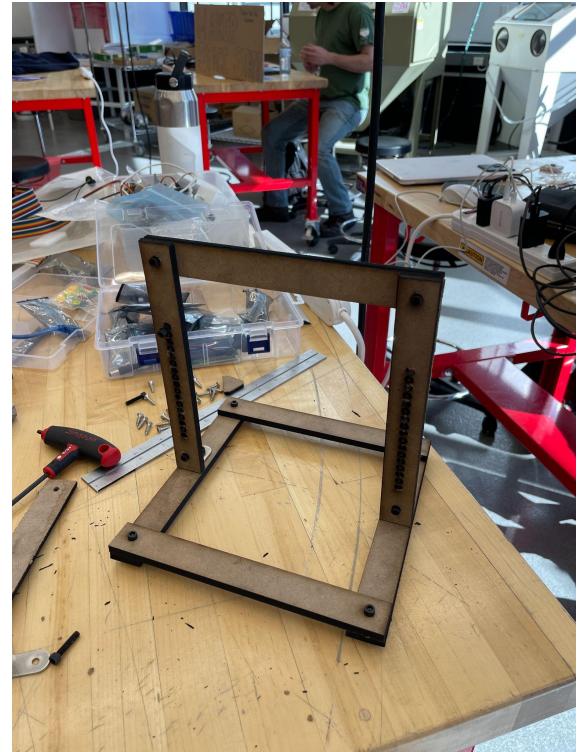
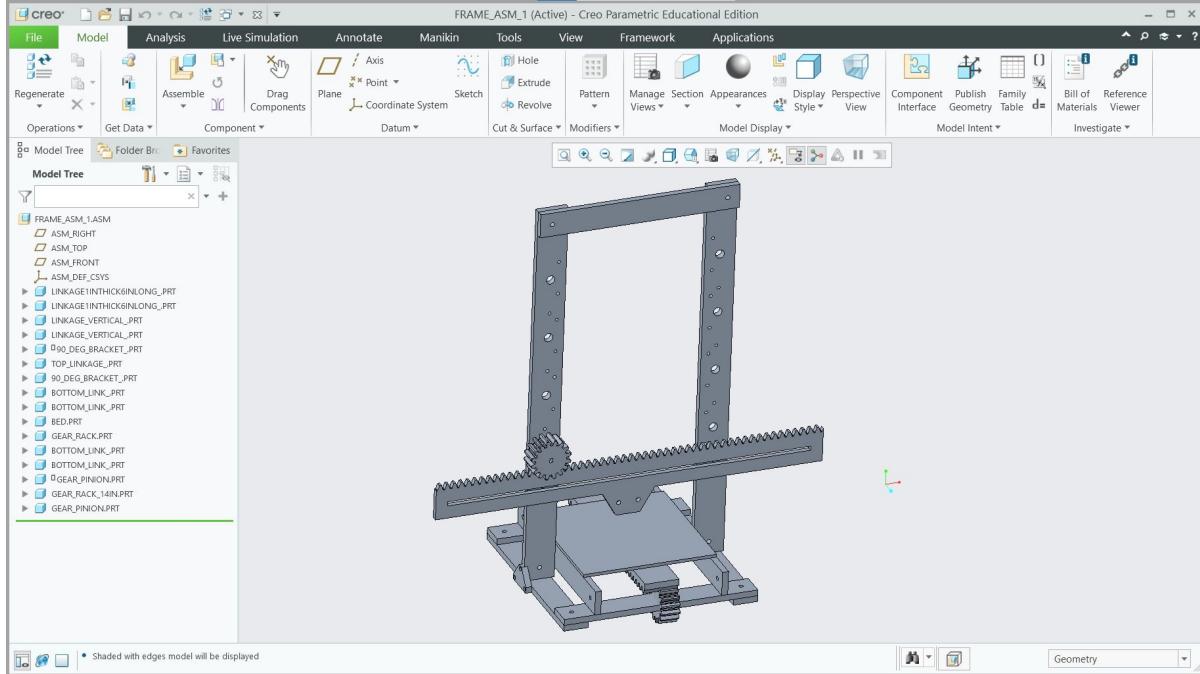
At home blood testing

Blood donation center

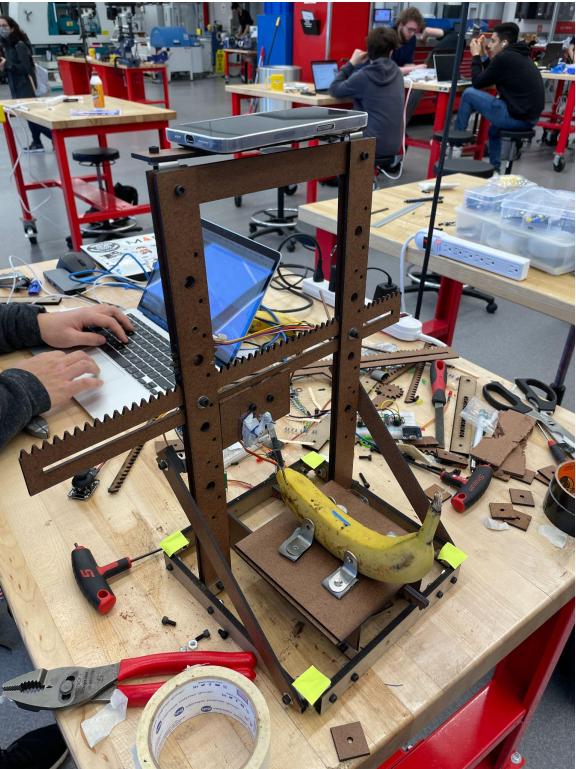
02

Design Process

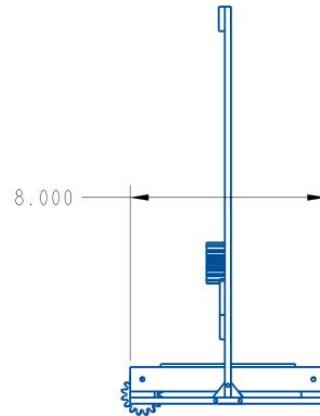
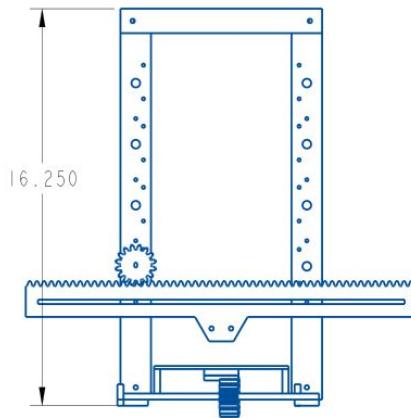
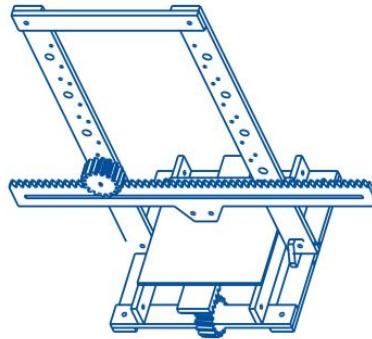
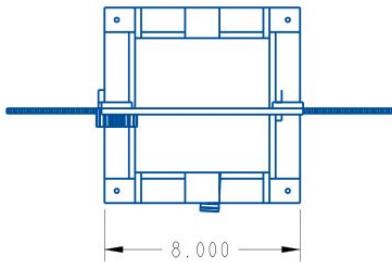
Initial Prototype



Final Design

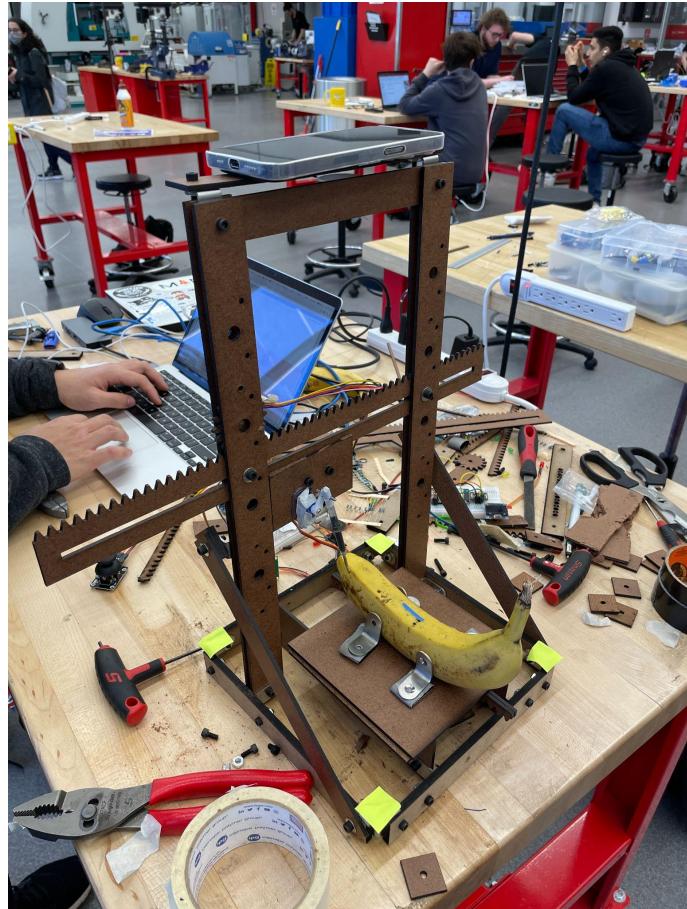
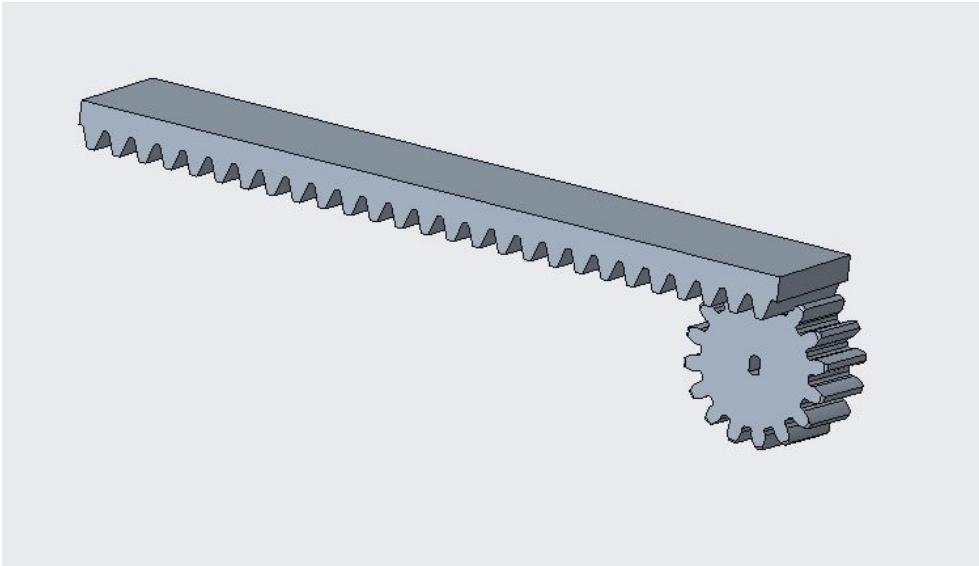


Specifications

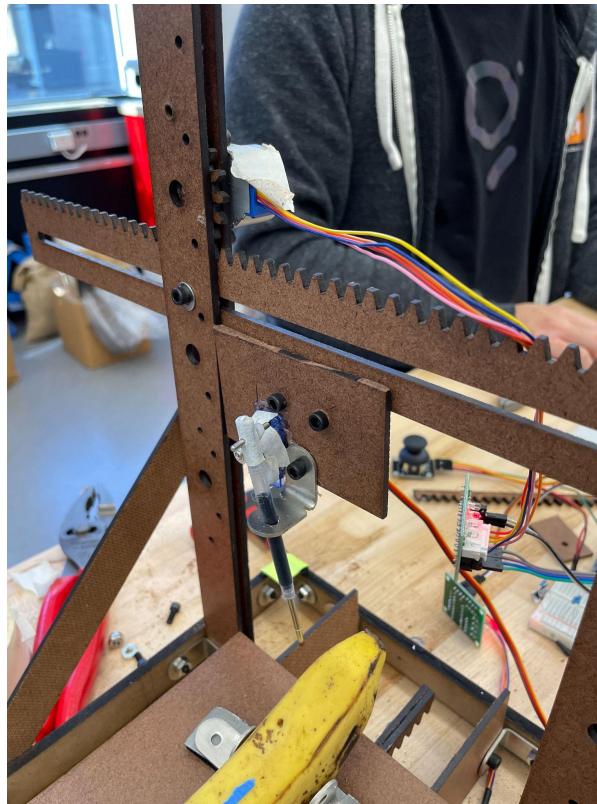


Mechanics

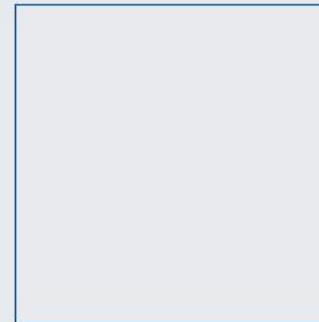
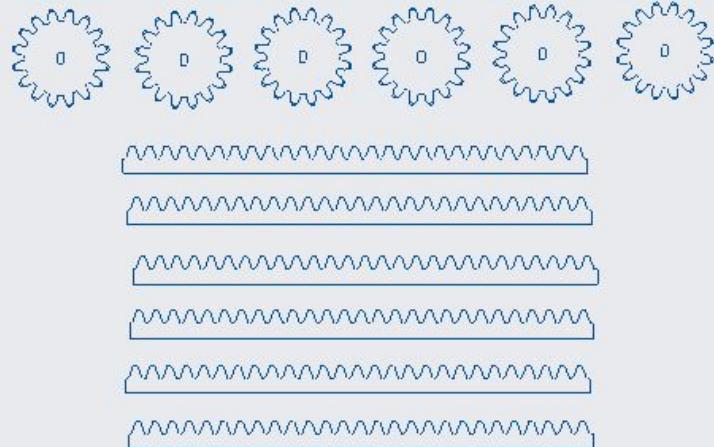
- 3-axis control
- Stepper motor
- Gear interface-rack and pinion



Needle Mechanism

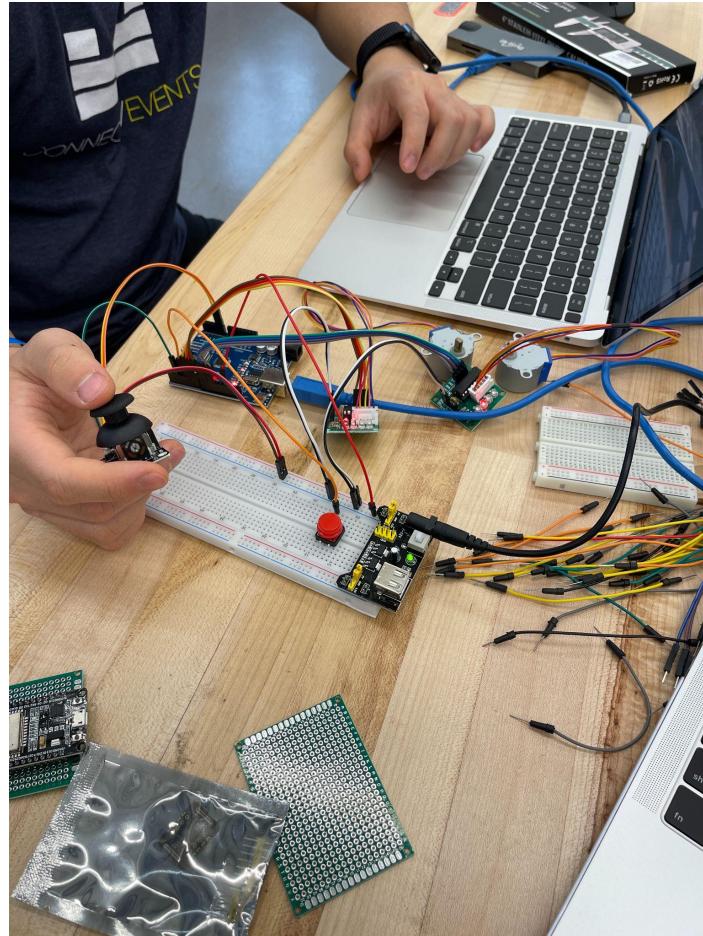


Manufacturing



Challenges

- Assembly process
- Fine tuning tolerances
- Debugging
- Simplification

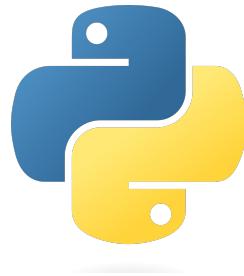


03

Software Development

Software Development

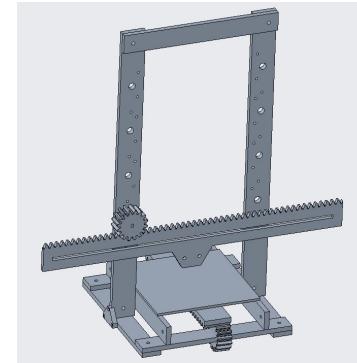
- Arduino board loaded with a Standard Firmata image
- Allowed offloading of complex computation and computer vision



Software



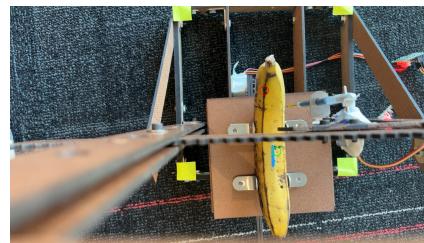
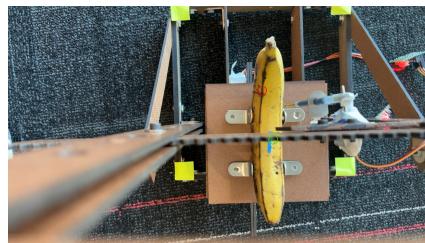
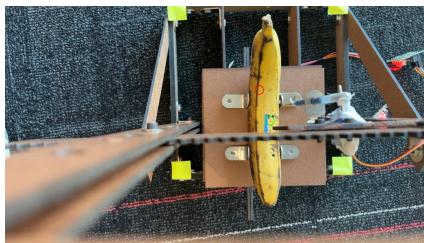
Firmware



Firmware

Software Development

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04

Demonstration



05

Comments & Questions

Thank you!