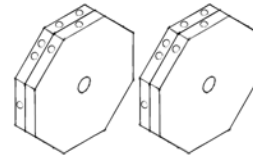


Braillebook



Refreshable Braille Display

March 1, 2016



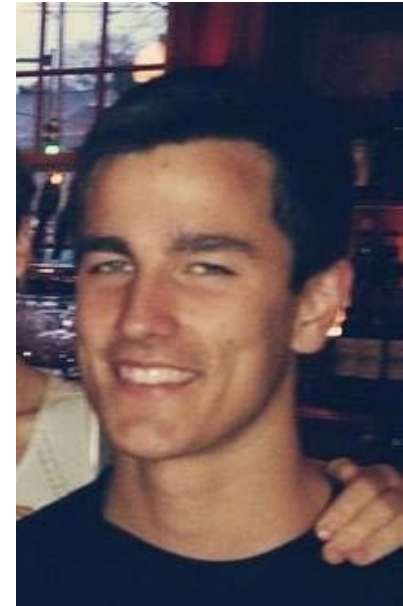
Team braillebook



Richard Lam
EE, '16
Team Manager



Raveena Kothare
EE, '16



Steven Golonka
EE, '16

Faculty Advisor: Professor Dennis Goeckel

Introduction

braillebook

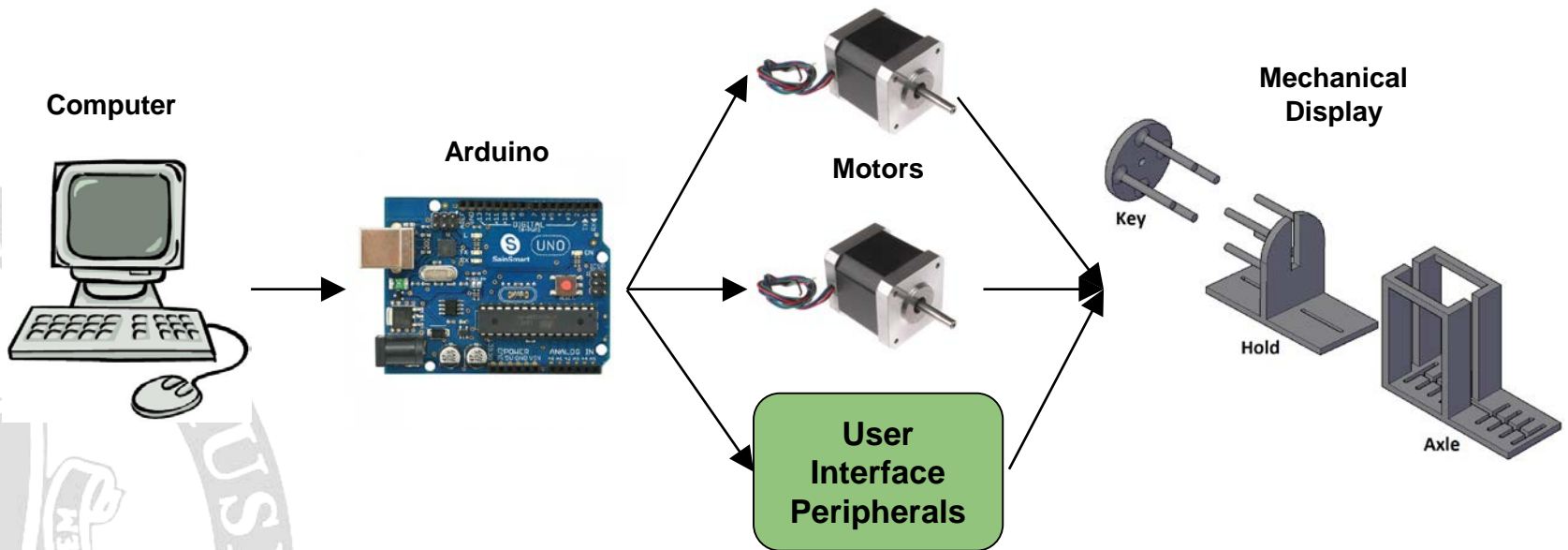
The Braille Tutor

- *“Only a quarter of blind Americans of working age actually have jobs, and it is surely no coincidence that almost all of them can read Braille.”*¹
- Today, 10% of blind children are taught Braille²
 - Compare to 50% in the 1950s
- Braille texts are expensive
 - Costs several times more than ordinary books
 - Electronic refreshable Braille displays cost \$2000-\$8000³

braillebook: A Learning Tool

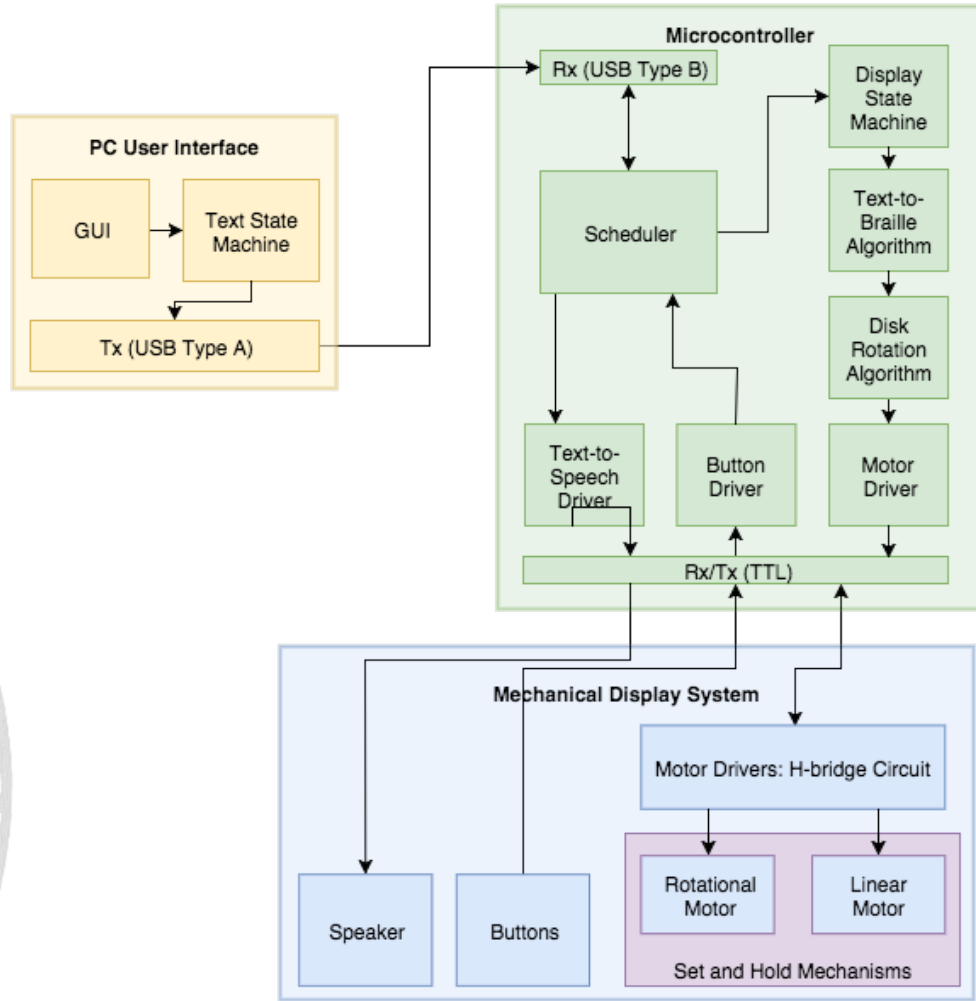
- User will be able to read the displayed line of Braille and compare it to the output of the text-to-speech output
- Market competition:
 - BraillePen 12 Touch: 12 cell display, bluetooth keyboard, compatible with text to speech software, \$1150
 - Smart Beetle 14-Cell Braille Display: compatible with popular screen reader software, audio prompt for menu, \$1200
 - Brailliant BI 40: 40 cell display, compatible with screen reader software, \$2995

System Overview





Current System Block Diagram



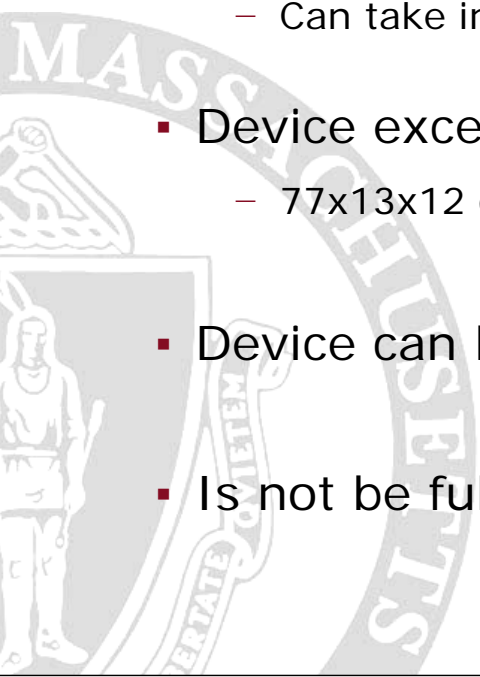
Proposed CDR Deliverables

- Fully functional electromechanical display
 - 20 characters
 - 7 buttons
 - On/Off, Menu, Yes, No, Previous Line, Next Line, Read Line
- Functional GUI
 - Can take in text file input and load corresponding display code onto device
- Device meets size requirement
 - No larger than 50x15x12 cm
- Device stores information for 1 text file
- Will not be fully packaged



Today's Demonstration

- Fully functional electromechanical display
 - 20 characters
 - Buttons for: Previous Line, Next Line, Read Line
- Functional GUI Executable
 - Can take in text file input and load appropriate instructions onto device
- Device exceeds one dimension of size requirement
 - 77x13x12 cm
- Device can load text files
- Is not be fully packaged



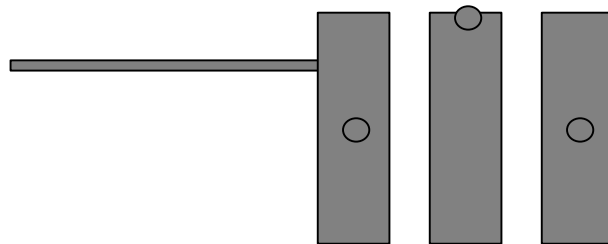
Proposed FPR Deliverables

- Fully functional electromechanical display
 - 20 characters
 - Buttons for: Previous Line, Next Line, Read Line
 - Switch for: Power ON/OFF
- Desktop Application
 - Line refreshes in 5 seconds
 - Fully packaged device
 - Production cost: <\$400



Disk Rotation Algorithm – Explained

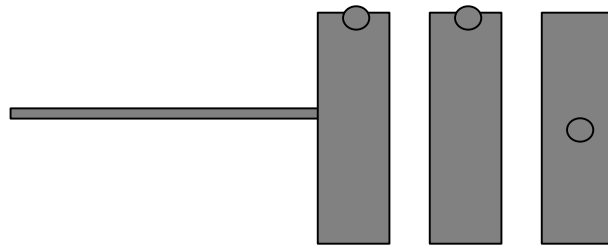
- Setting characters from left to right
 - Algorithm calculates number of rotations for each disk
 - Rotation of a given disk affects all disks to the left of it
 - Final positions of disks are achieved once rotation of rightmost disk is complete
- Example with four sided disk below:
 - Orient all dots at top





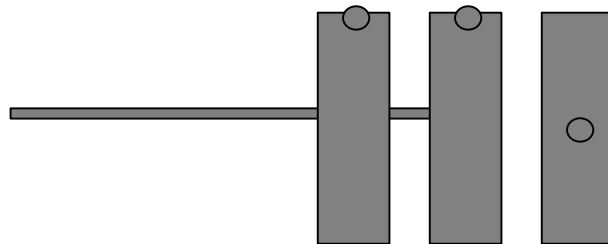
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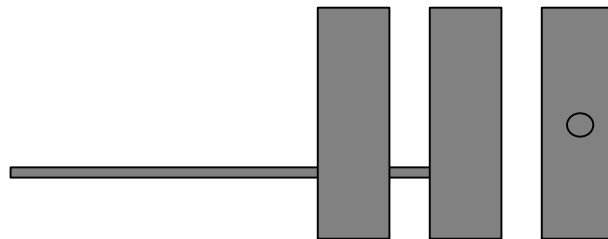
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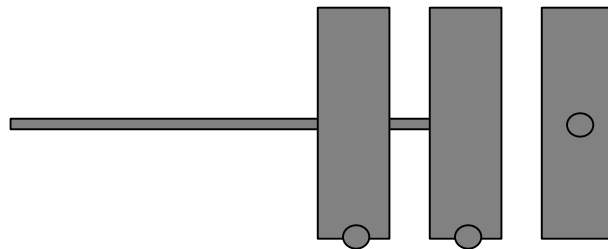
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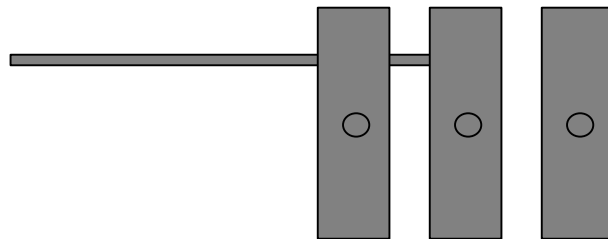
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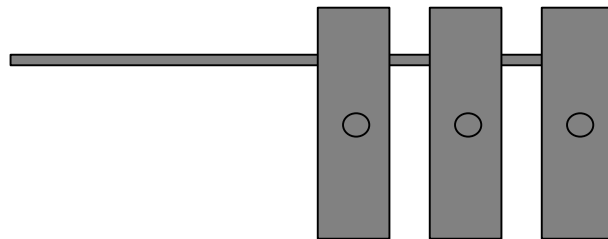
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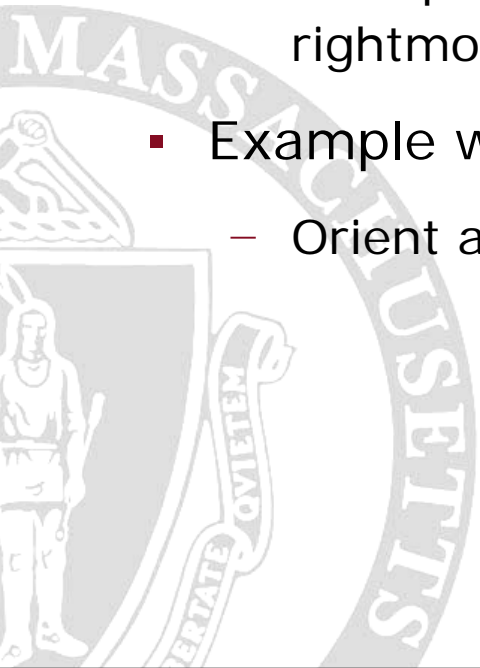
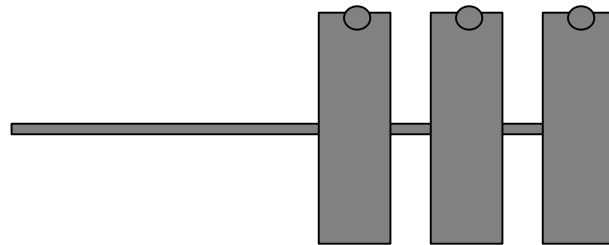
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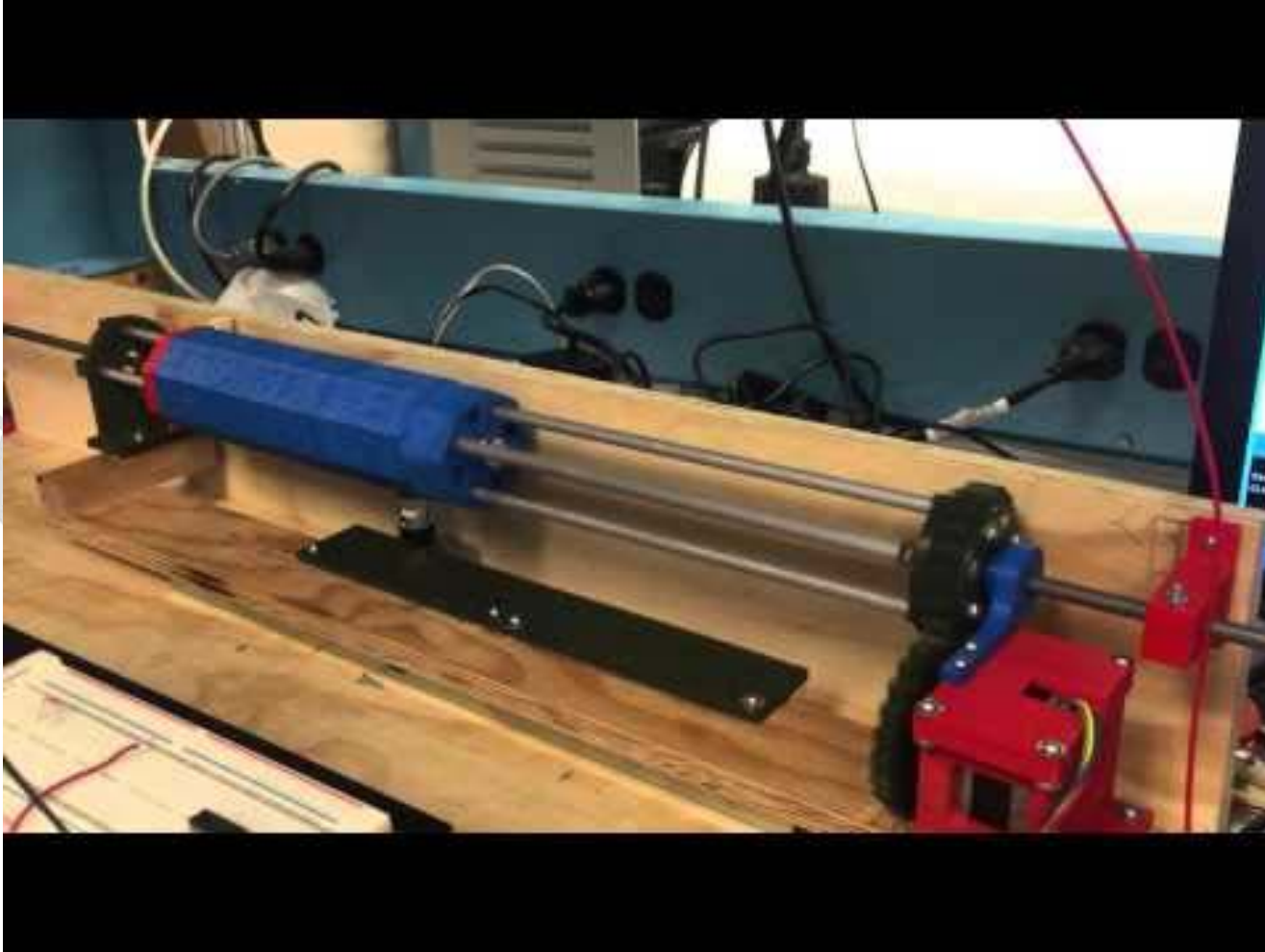


A	B	C	D	E	F	G	H	I	J
●○	●○	●●	●●	●○	●●	●●	●○	○●	○●
○●	○●	○●	○●	○●	○●	○●	○●	○●	○●
○●	○●	○●	○●	○●	○●	○●	○●	○●	○●
K	L	M	N	O	P	Q	R	S	T
●○	●○	●●	●●	●○	●●	●●	●○	○●	○●
○●	○●	○●	○●	○●	○●	○●	○●	○●	○●
○●	○●	○●	○●	○●	○●	○●	○●	○●	○●
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U	V	W	X	Y	Z				
●○	●○	●●	●●	●●	●○				
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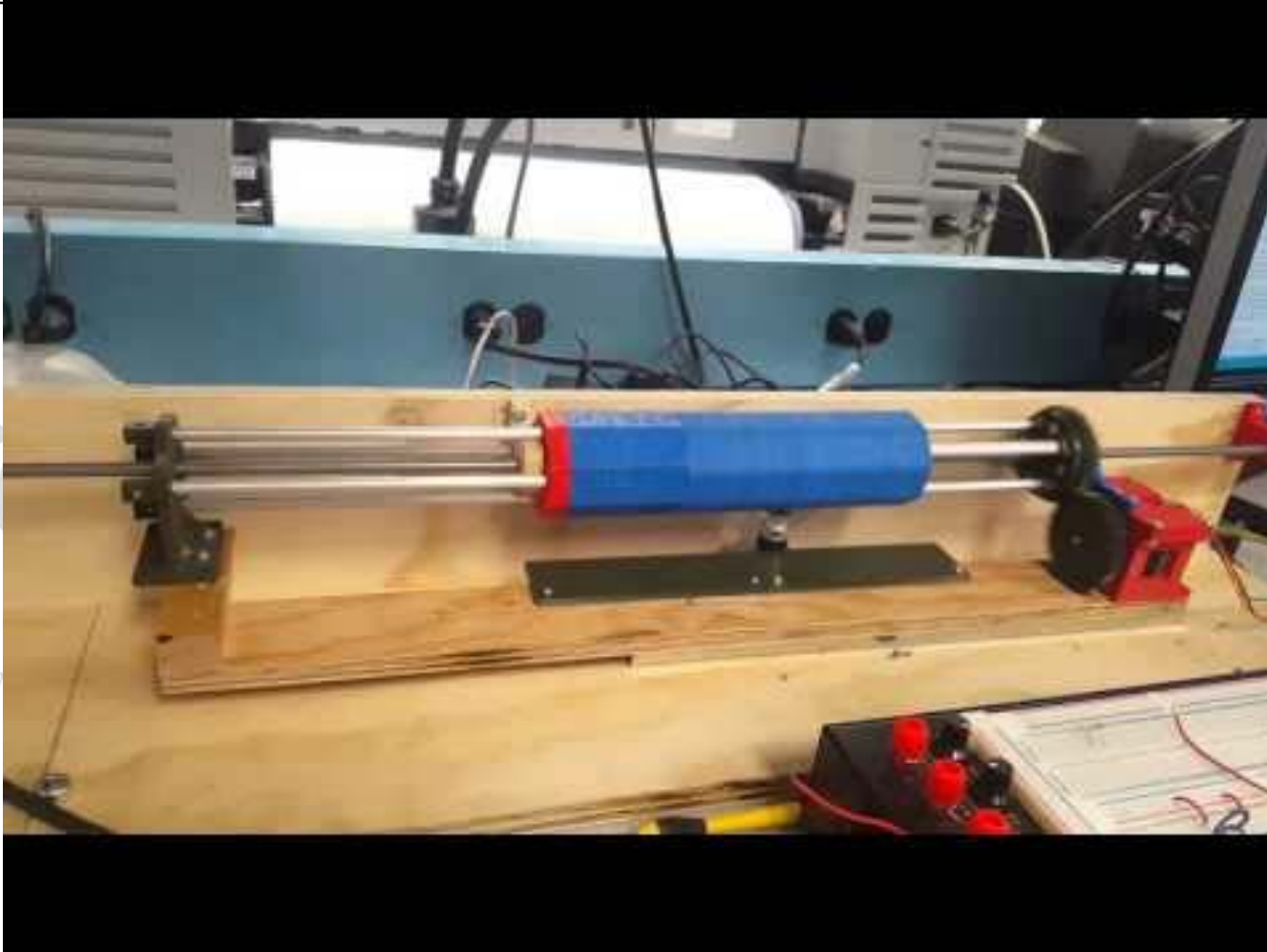


Demo

Demo Videos



Demo Videos



Demo Videos



Questions & Discussion



Thank You

