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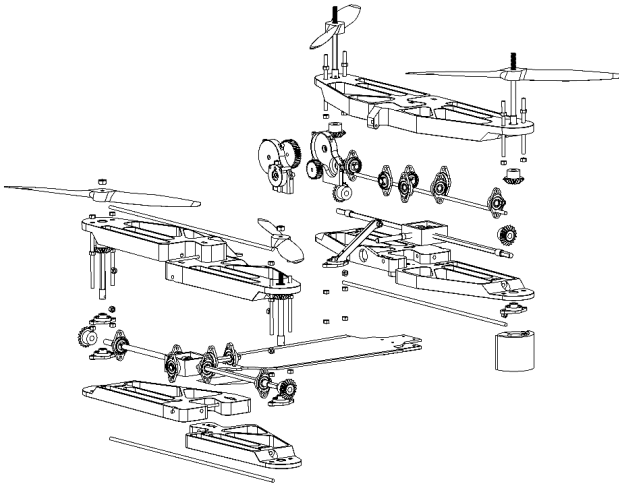
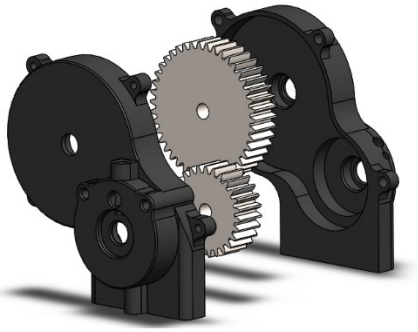
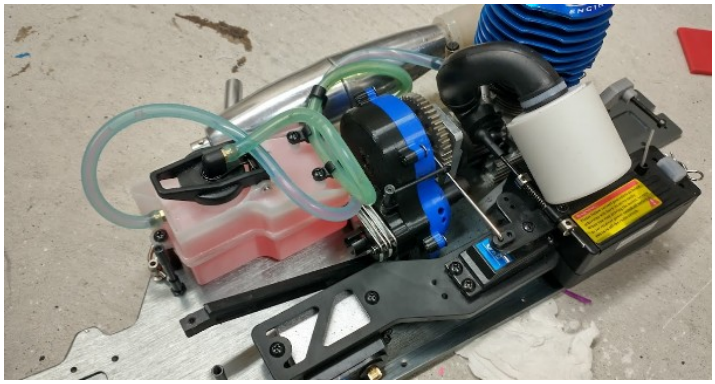
Gas Powered Lifting Device

Project type: Capstone (School) Date: Jan. 2023 - Apr. 2023







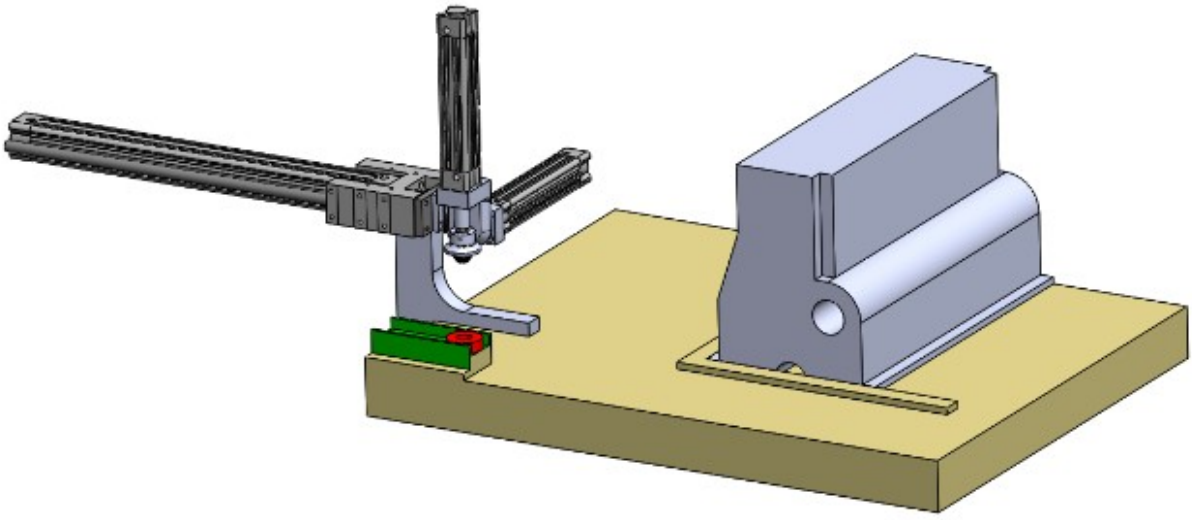
Objective: Demonstrate the potential of applying gas-power to multi-propeller lifting devices through the construction and benchmarking of a physical prototype. The prototype was constructed by retrofitting new components onto the chassis of a 1/8th scale nitro engine RC car. Project completed as part of the requirements for MEC830: Mechanical Design, the Bachelor's of Mechanical Engineering Capstone Project course at Toronto Metropolitan University.

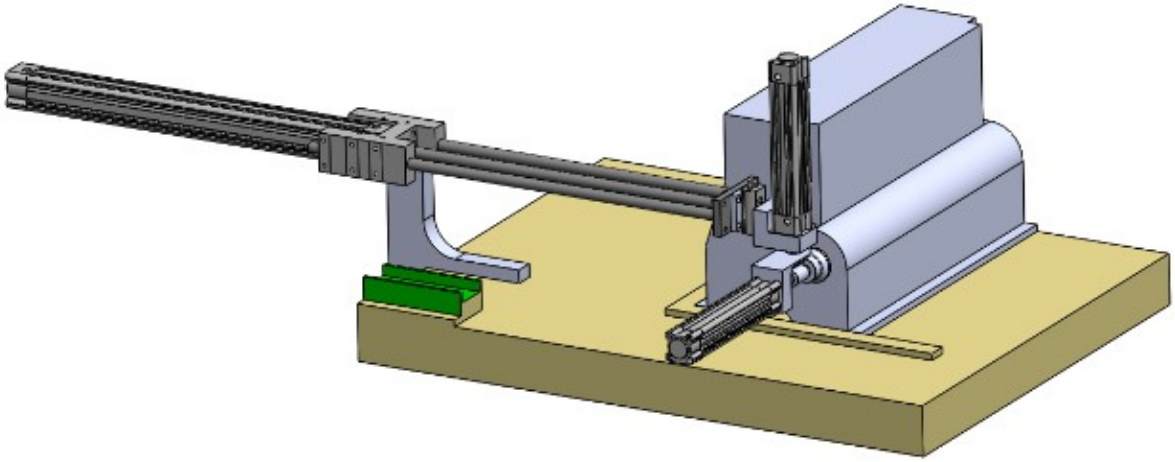
Contributions: Lead CAD designer, design consultant, and 3D printing specialist. Applied strong visualization skills, DFA intuition, knowledge of mechanical linkages and various manufacturing processes to conceptualize and aid in the design and fabrication of the Gas Powered Lifting Device. The design choices that were contributed informed how the device would be manufactured, what materials would be used where, what mechanical linkages would be used to achieve the desired transmission of forces, Spearheaded the fabrication of 3D printed components for the gas powered lifting device. Also designed and fabricated tools and procedures for benchmarking.

Result: A functional prototype of a gas powered propeller lifting device was successfully created by retrofitting 3d printed and machined components onto the chassis of a 1/8th scale nitro engine RC car.

Electro-Pneumatic Bearing Press

Project type: School Date: Dec. 2022





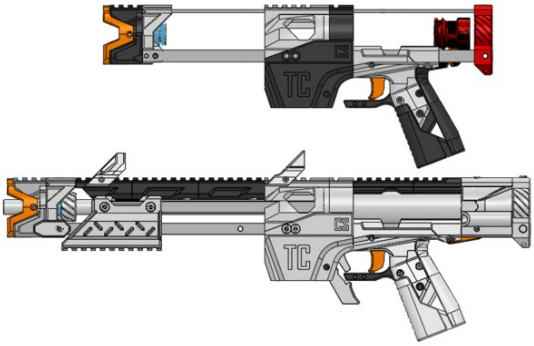
Objective: Apply knowledge of electro-pneumatic components and PLCs to design a machine that can pick up a bearing from a feeder and press it into a stationary engine block using components from the FESTO catalog. Project completed as part of the requirements for MEC617: Manufacturing Control Systems, a 4th year Bachelor's of Mechanical Engineering course at Toronto Metropolitan University.

Contributions: Lead CAD designer, process designer. Conceptualized the general kinematics and functions of the bearing press. Gained expertise on FESTO electro pneumatic components; including pistons, limit switches, and bellows grippers to select appropriate parts for bearing press function. Created pseudocode for the ladder logic PLC programming.

Result: Successfully designed an electro-pneumatic bearing press in a virtual environment, with its functionality being demonstrated in an animation created within SOLIDWORKS.

Mini Claw 3D Printed Foam Dart Blaster

Project type: Personal Date: Mar. 2023



Motivation: There currently exists many designs for foam dart blasters capable of over 250fps muzzle velocity that can be constructed from 3D printed parts and simple hardware. The Talon Claw is one such blaster; an open-source design using a spring loaded “plunger” to push air from a “plunger tube” into a barrel to propel the foam dart. However, the stroke length of the plunger, the length of the barrel, and the air volume of the plunger tube make it difficult for the Talon Claw to be tuned to muzzle velocities <150fps with adequate precision. The Mini Claw was created as a remix to the Talon Claw to provide an option for lower fps usage.

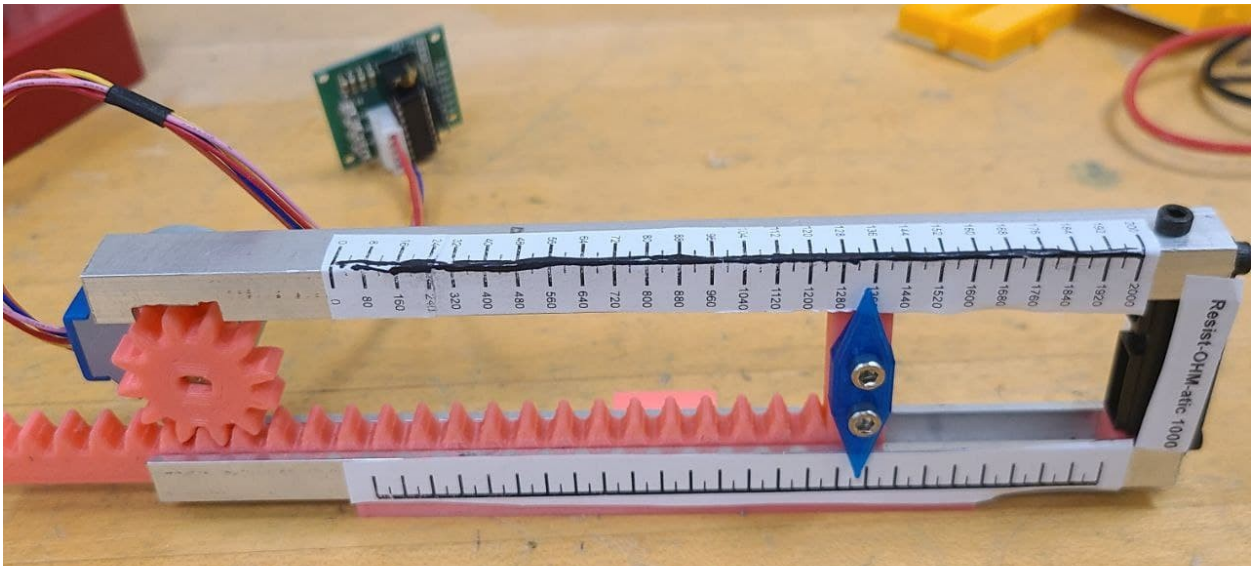
Result: A fully functional foam dart blaster was designed, built and tested at multiple indoor Nerf Wars. The blaster was benchmarked with a ballistic chronograph and proven capable of propelling foam darts at a 130fps muzzle velocity with a 5fps deviation using a spring that had a draw weight of 9kg. Every component of the original Talon Claw was modified to accommodate the design changes required to reduce its size. Extensive experience was gained in modifying open-source CAD files and designing components in the context of an assembly. The design was shared to online communities and met with positive reception.

3D Printed HMS Beyblades

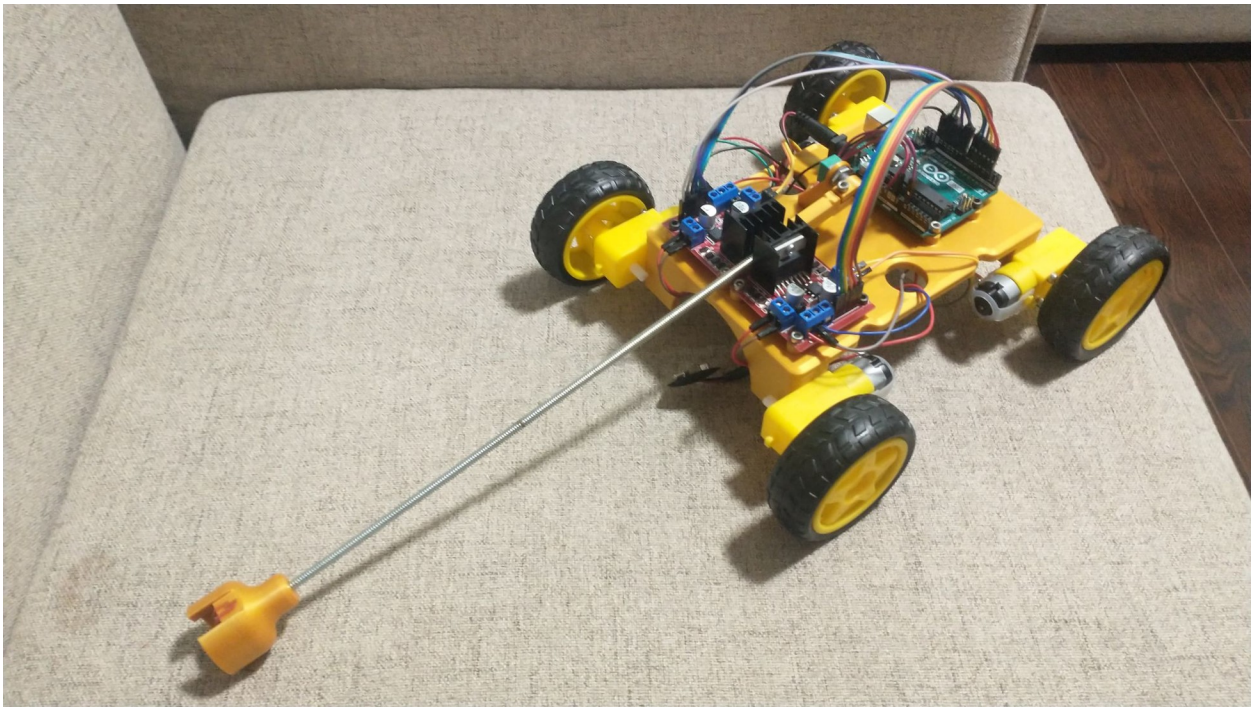
Project type: Personal Date: Mar. 2023

Motivation: The Heavy Metal System (HMS) line of Beyblade, a plastic spinning top toy, saw a very limited run in North America and thus purchasing them second hand can be extremely financially prohibitive. Upon finding a couple of the more common HMS Beyblades at a thrift store, I became inspired to make 3D printed replicas of them to recapture a part of my childhood I never got to fully experience.

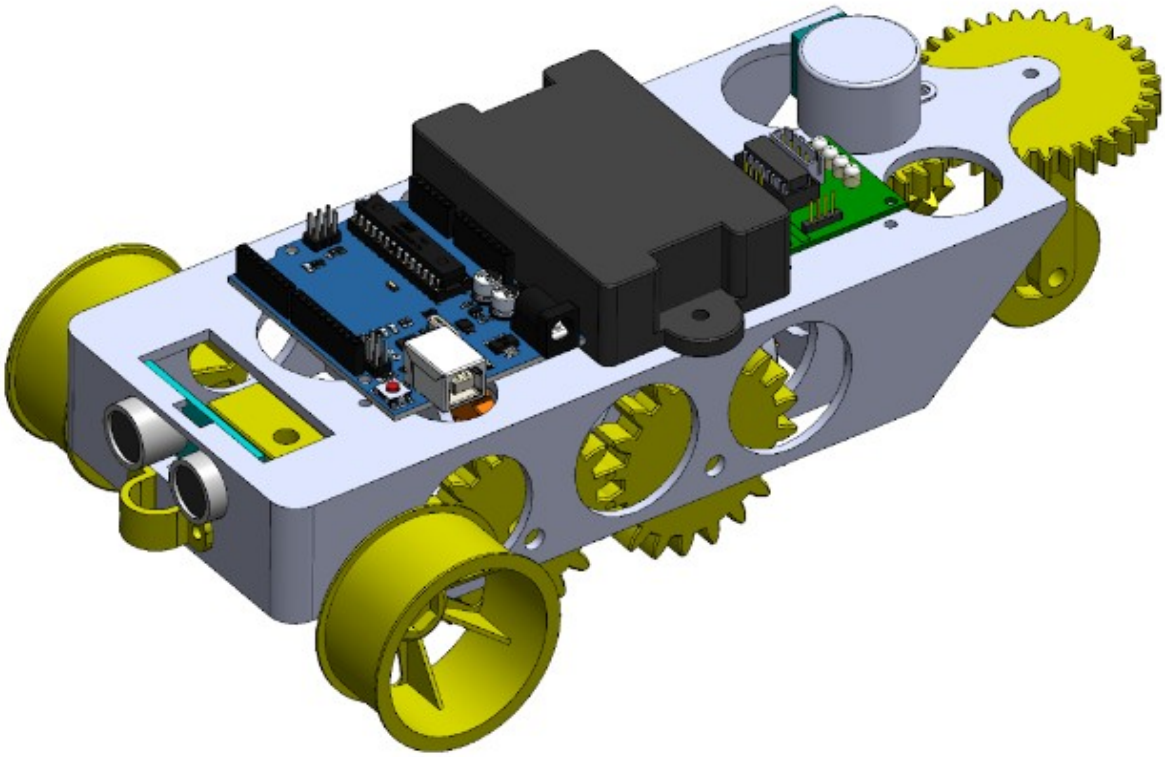
Result: Leveraging a multitude of pictures of HMS Beyblades available online and a small number of 3D models that can be interacted with in-browser, I utilized SOLIDWORKS' "Sketch Picture" tool, an Expert-level tool, to meticulously create 3D printed replicas of popular HMS Beyblades. The parts were accurately toleranced for 3D printing, ensuring full cross-compatibility with official HMS Beyblade parts. These 3D printed replicas not only recaptured the nostalgia of my childhood but also served as a potential foundation for exploring investment casting methods to create even more authentic replicas.

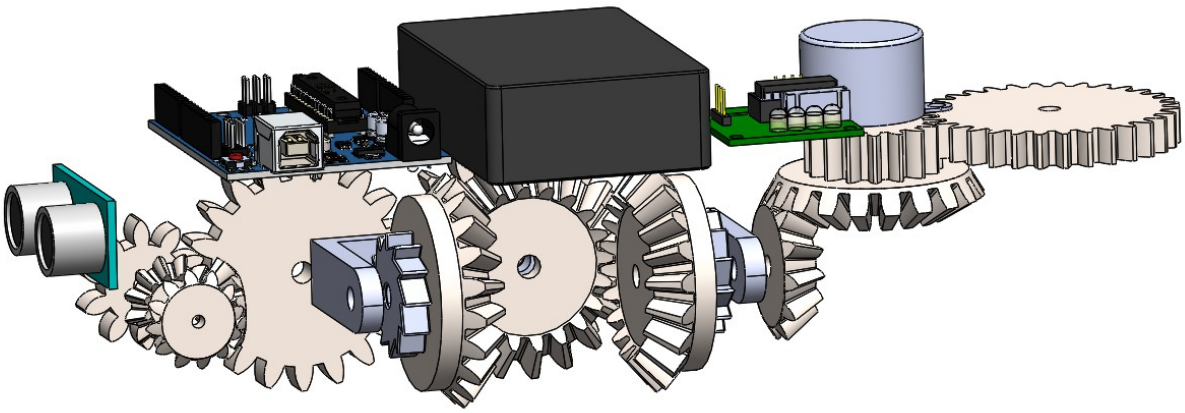


What is it: Electromechanical Ohmmeter
Project type: School
Date: Nov. 2022 - Dec. 2022



What is it: Self-Balancing Pendulum car
Project type: School
Date: Nov. 2022

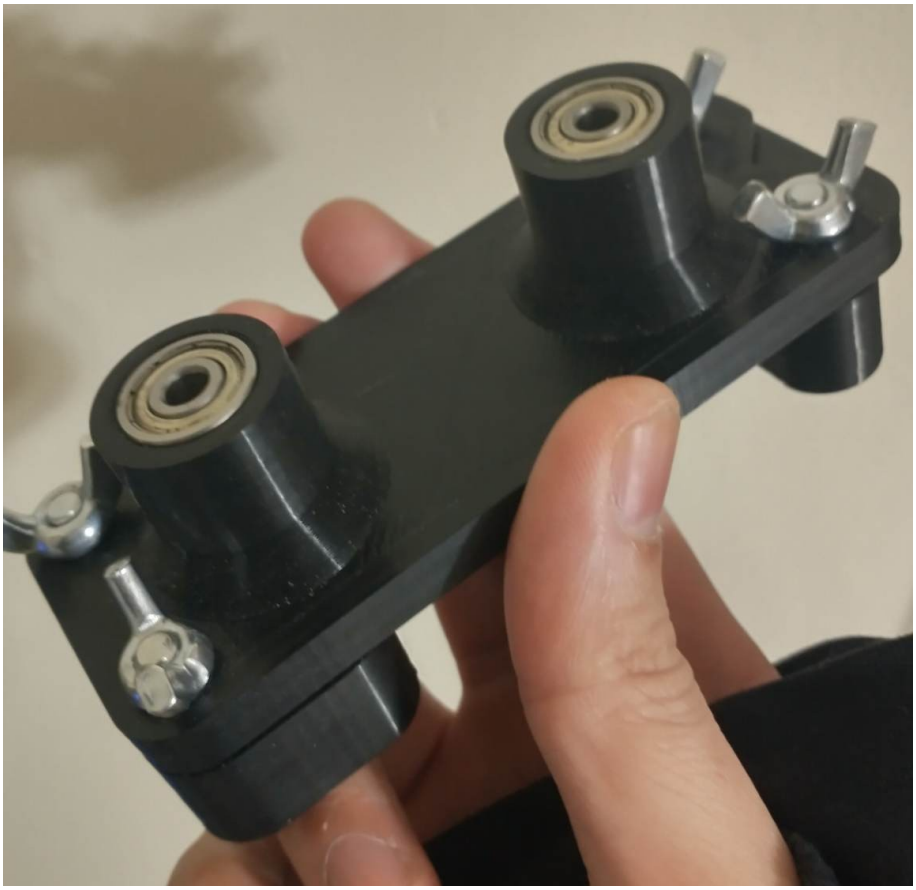




What is it: Single-Actuator object avoidance robot
Project type: School
Date: Dec. 2022

What is it: 3D printed case for aftermarket batteries for the Nerf Prometheus
Project type: Personal
Date: Mar. 2020

What is it: 3D Printed Gaming Keychains
Project type: School
Date: Feb. 2022



What is it: 3D printed drilling jigs
Project type: Personal
Date: Jan. 2023