BRIGHTSIDE STEERING WHEEL ↗

What?
- The steering wheel assembly for UBC Solar's third generation car; Brightside

How?
- Consulted with drivers to come up with shape
- Worked with electrical subteam to integrate a PCB on the wheel

Results
- Reduced weight from previous generation
- Achieved 6th place at the 2024 Formula Sun GP

INERTIAL DATA LOGGER ↗

What?
- A custom IMU-based telemetry system to log suspension motion
- Built to validate UBC Solar's vehicle dynamics models

How?
- Designed in Fusion 360, made to be 3D printed
- Used Adafruit Feather RP2040 Adalogger with BNO055 IMU

Results
- Captured race telemetry throughout 2025 Formula Sun Grand Prix
- Compact and low-cost solution

HEADPHONE STAND ⬈

What?
- An elegant display for my headphones on my desk
- Strong enough to hold 350g with minimal flexing

How?
- Modeled in Fusion 360
- Printed in two parts due to footprint limitations
- Held together with tight tolerances and internal metal reinforcement

Results
- Flexes <1mm under load
- Cheaper and prettier than consumer alternatives

MAGNETIC LEVITATOR

What?
- A desk-sized electromagnetic object levitator
- Created as part of MECH 220 – Technical Skills Practicum

How?
- Followed technical drawings to ensure precise fabrication
- Machined components using a lathe, mill, brake, and hand tools
- Populated a PCB with circuit components

Results
- Tuned the amplification of a Hall effect sensor to achieve continuous levitation
- Achieved long-term stable levitation

STEERING LINKAGE SIMULATION ↗

Steering Linkage @ 0.0° Yoke

Wheel Steer
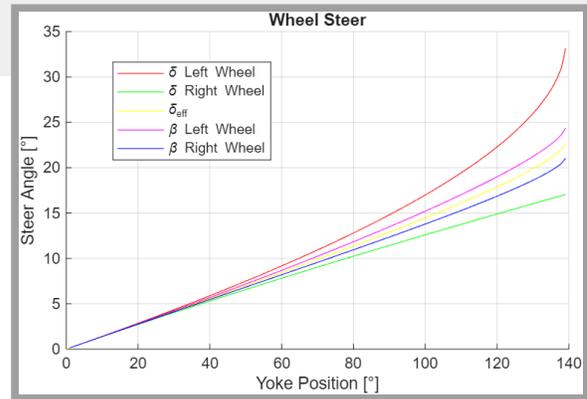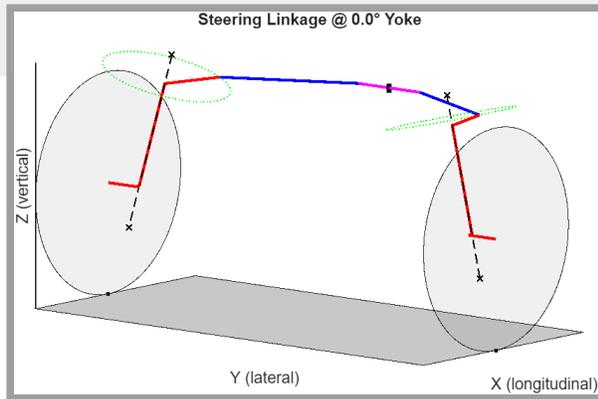
What?
- A MATLAB simulation of a solar car steering linkage
- Interactive, allowing to tweak geometry and analyze downstream impacts

How?
- Created interactive 3D visualizations to optimize linkage dimensions and analyze Ackermann compliance
- Implemented 3D Multi-Line Brush Tire model to model tire interactions

Results
- Informed steering geometry of UBC Solar's next racecar
- Allowed for balancing of trade-offs while finalizing the steering linkage

TRIANGLE CALCULATOR ↗
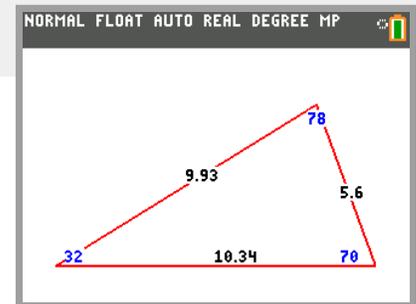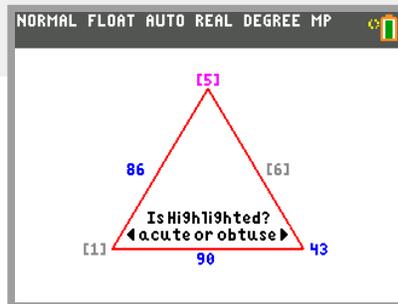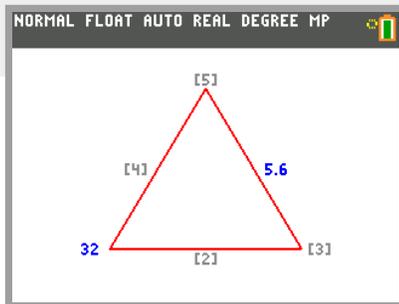
What?
- A program for TI calculators to solve and render scale triangles when passed 3 dimensions

How?
- Written in TI-BASIC
- 300 lines of code
- Handles ambiguous case

Results
- Scales render to fill screen completely
- Checks whether provided dimensions will create a real triangle
- Very useful for adding vectors

TRAIL SIGN

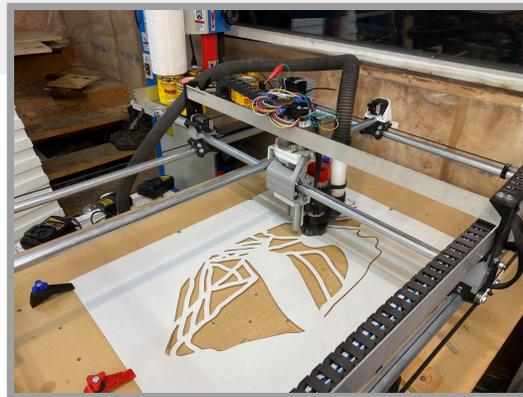**What?**
- A trail sign for my local mountain biking network

How?
- Designed in EstlCAM
- Milled on an MPCNC

Results
- A professional-looking sign that has lasted multiple seasons

CNC ARTWORK

What?
- Recreated the trail map of Powder King Mountain Resort in a single sheet of 1/8" hardboard

How?
- Designed with Autodesk Fusion 360
- Generated machine toolpaths in EstlCAM for efficient milling
- Manufactured on a DIY MPCNC milling machine

Results
- Created a nice piece of wall art inspired by a special place to my family

TRAYSYM ↗

What?
- A lightweight Windows system tray application for symbol insertion
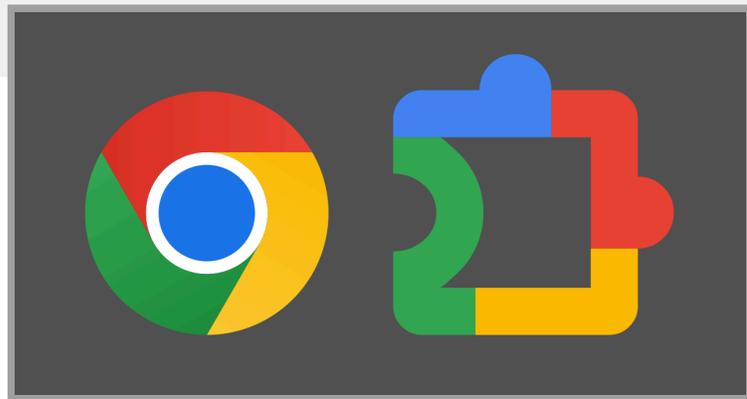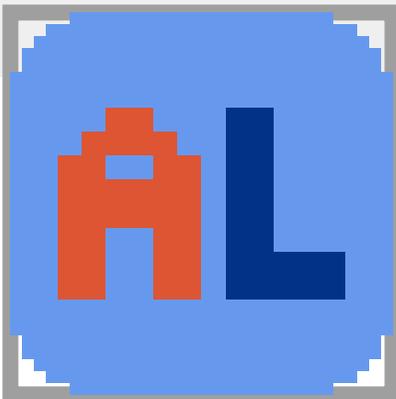- Built for QoL while typing equations etc.

How?
- Written in pure C, with the Win32 API
- Dynamically generates symbol grid from customizable YAML configuration

Results
- One-click clipboard insertion with clean system tray interface
- Fully customizable symbol layout via simple YAML syntax
- Produces a 44 KB standalone executable

WEBWORK ALPHALINK ↗

What?
- A Manifest-V3 Chrome Web Extension to augment the online homework system WeBWorK
- Incorporated education tools such as Desmos and Wolfram| Alpha directly into the user experience

How?
- Made with JavaScript OOP
- Improved the website's user experience by injecting custom HTML+CSS to enhance user interface elements

Results
- Successful closed beta testing, with a public release at some point on the horizon