ROY LUO PORTFOLIO

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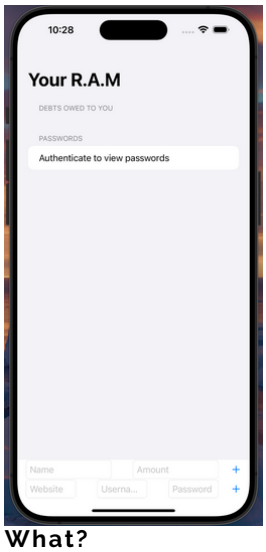
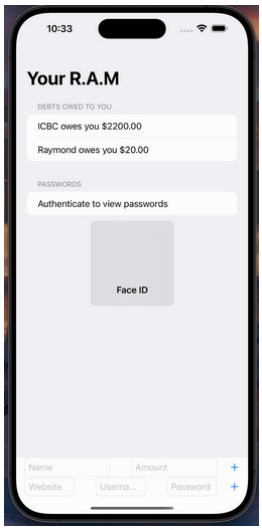
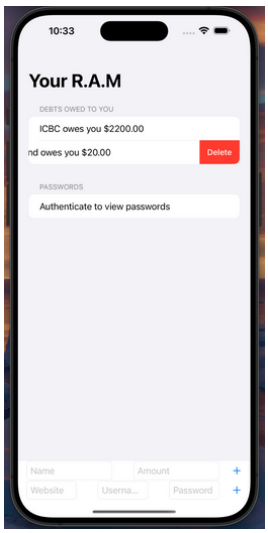
SWIFT BUILT IOS APP FOR DATA MANAGMENT - "RAM"







What?

- The app is a debt management and password storage application.
- It uses **Swift** and **SwiftUI** to create a user-friendly interface
- It utilizes two **data structures**, to store debts owed to the user and passwords securely.

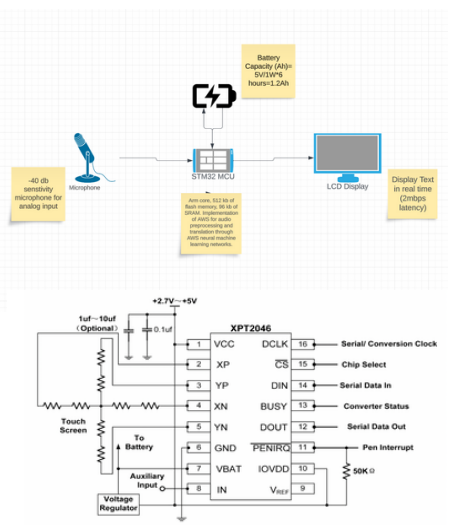
How?

- Utilized Swift UI to develop a minimalistic "apple-like" UI.
- Used **Data Serialization** and **Deserialization** for data storage and transmission.
- incorporated **biometric authentication** for data privacy.

Results

- Users can easily track and manage debts owed to them using the app's sleek interface.
- Passwords are stored securely, ensuring data privacy and security.
- increased the organization of user data.

SPEECH TO TEXT DEVICE - VOICETEXT VISION



What?

- Speech device to help the audio-impaired
- Translate analog audio input into text on an LCD screen

How?

- integrated STM32 microcontroller using **embedded programming** in **C++**
- **AWS Lambda function** to process incoming audio data and interface with **AWS Transcribe**

Results

- latency of **2 Mbps** for effective communication
- Battery Capacity optimized with storage space.

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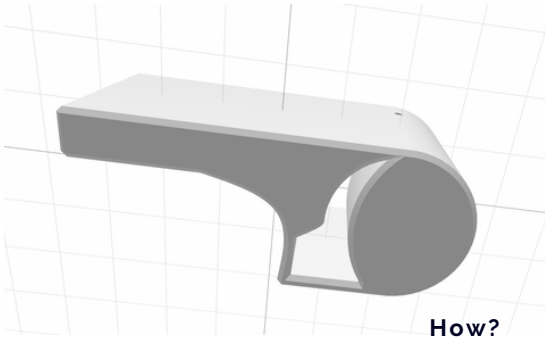
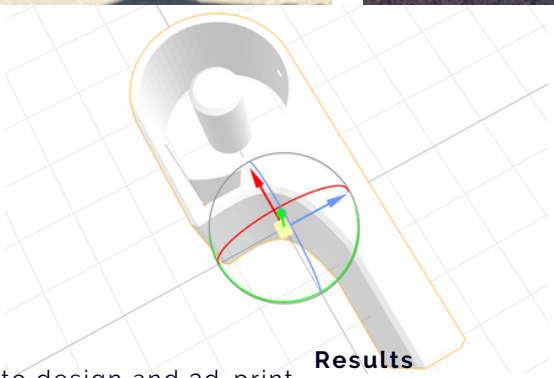
ELECTRIC GO KART | ARDUINO, CAD, C++, DFA



What?

- Founded BNS Engineering as President to bring like-minded individuals together to obtain hands-on experience and work towards a common goal.
- The Electric go kart was meant to exercise engineering **collaboration** as a team.

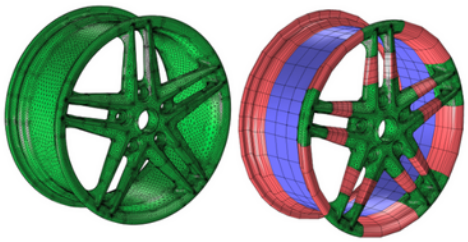
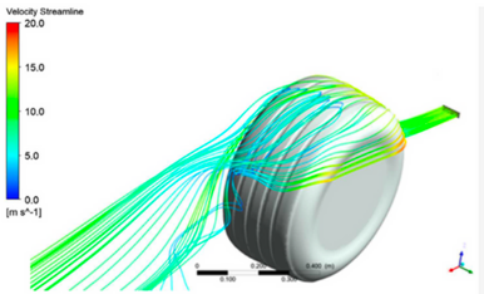
How?

- Used **AutoCad** to design and 3d-print the throttle, chain tensioner, and Speed controller housing.
- Used **Arduino** for voltage reading, and speedometer.
- Implemented **DFA** principles to reduce product assembly cost

Results

- Constructed a 48V, 1800W Go - Kart with regenerative braking that can run on full throttle for 30 minutes straight.
- Taught a group of students how to collaborate ideas and ask for help in an engineering team.

RESEARCH EXPERIENCE | CFD, CAD

What?

- **Analysis** and Quantitative Effects of Rim Geometry on the Aerodynamic Performance of Production Passenger Vehicles in North America.

How?

- Used **AutoCAD** to scale CAD models, and **Hexdominat Algorithm** to generate **meshing** for **Simscale CFD** simulations to calculate the cD for each rim.
- completed correlation analysis to determine the correlation between rim geometric characters and their coefficient of drag.

Results

- The study found that smaller rims, with increased surface area and rim offset, had lower **coefficients** of **drag**.
- The study is applicable to areas of automotive engineering and manufacturing helping bring improvements to create more **efficient** vehicles following the concerns in **energy sustainability**.