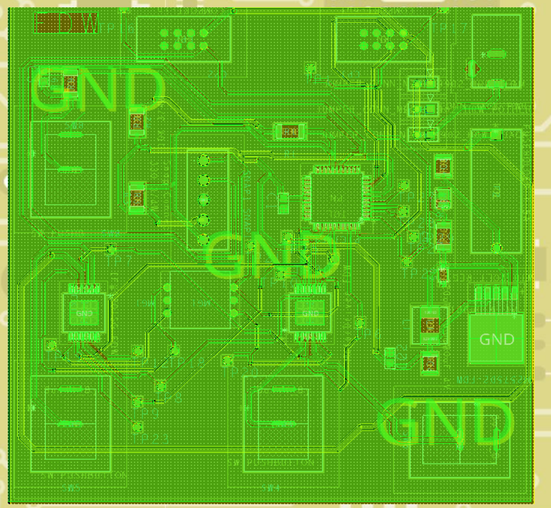
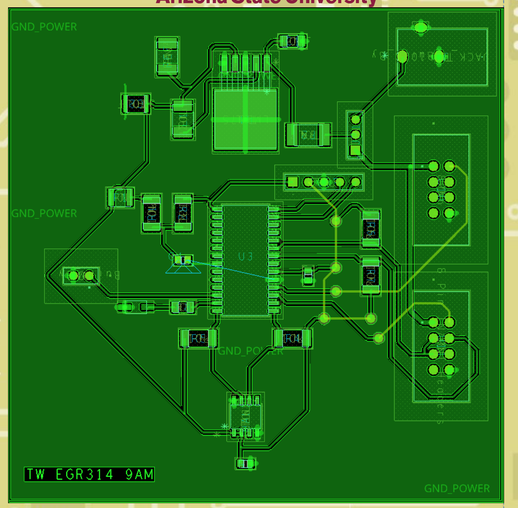
Dam Marbles

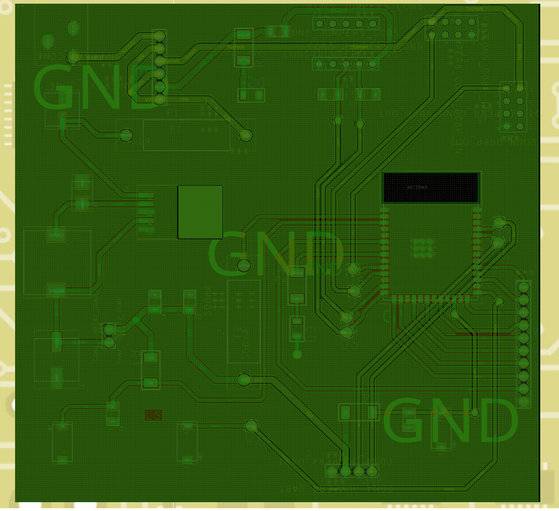
EGR314 Spring 2025:
Embedded Systems
Design Project II

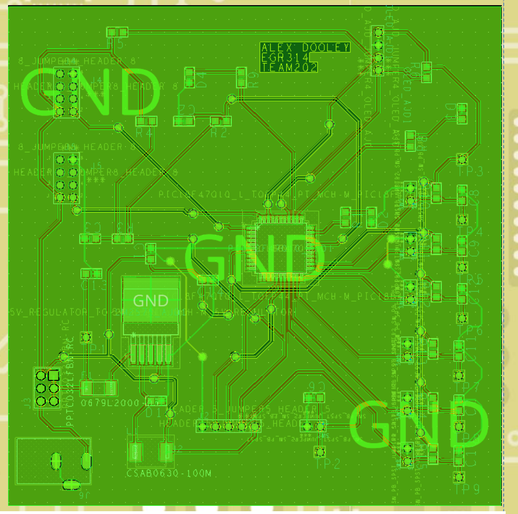
Alexander Dooley, Frank Wade, Luis Saenz, Tyler Whipple

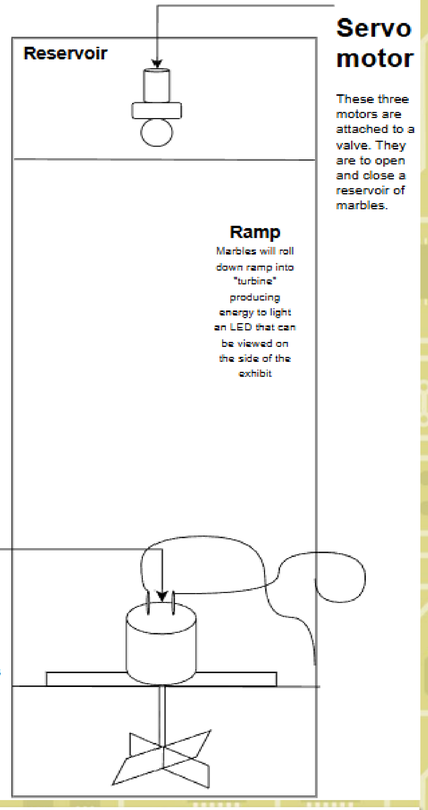
Ira A. Fulton Schools of Engineering
Arizona State University

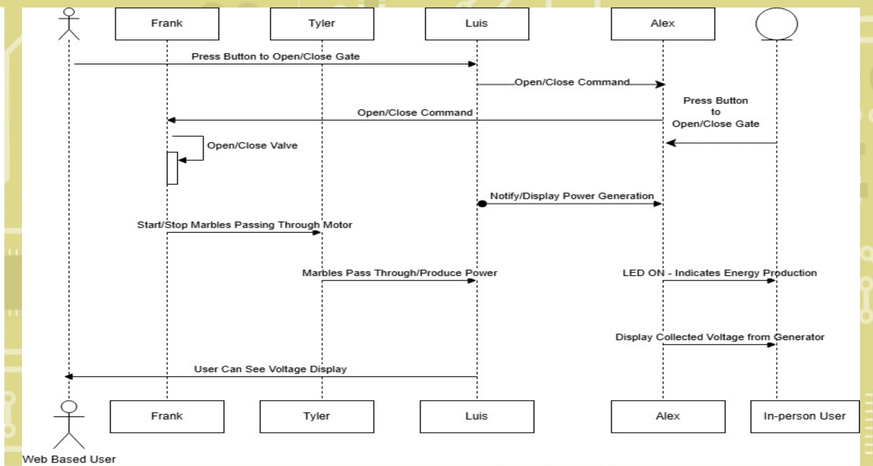












Block Diagram

- Message Type 1:
  - Set specified motors direction
- Message Type 2:
  - Sends specified sensor ID and its value
- Message Type 3:
  - Wifi error message
- Message Type 4:
  - Wifi Status
- Message Type 5:
  - Indicates uncommunicating subsystem
- Message Type 6:
  - Status of motor
- Message Type 7:
  - Status of sensor
- Message Type 8:
  - This is broadcast message

Concept Sketch and Ideation

This exhibit is a way to show young adults that everything, both large or small can have energy. The *energy* on display is **gravitational potential** energy which can change if the height of the spheres changes. The transfer of energy between the falling sphere and the lightbulb is done with the aid of a generator.. **The audience** for this exhibit are middle schoolers to highschoolers. Hydroelectric plants have been turning out kilowatts of power for almost 150 years. Today the southwest uses wind power, solar power, and nuclear power to provide energy. The user can control how much "water" flows out by changing the valve opening via the user interface. Then the hall effect senor reads the rpm and ADC on the micro controller can give the voltage produces by the simple motor. A LCD screen on the interface displays all the relevant information while a separate chip connects the device to Wi-Fi.

Block Diagram

- Actuator - Frank
  - Servo motor
  - PIC
- Sensor - Tyler
  - Magnet Sensor
  - PIC
- HMI - Alex
  - OLED
  - PIC
- MQTT - Luis
  - ESP32