Arduino Microcontroller

1. How do we make our vehicle autonomous?
   1. Propulsion system (motors)
   2. Control system (programming)
2. Learning objectives
   1. Create electrical circuits.
   2. Read simple circuit diagrams.
   3. Describe simple functions of simple electronics.
   4. Interface electrical components with microcontroller
3. What is an Arduino?
   1. The Arduino is like a brain.
   2. Simple CPU
4. What can an Arduino do?
   1. Inputs:
      1. Listen for a button press.
      2. Read sensor data.
   2. Outputs:
      1. Control a motor.
      2. Control an LED.
5. The field of play are found on the course link.

Arduino Introduction

1. Self-direct your own learning.
2. Required resources will be provided.
3. Dos and don’ts of Arduinos can be found on course link.
4. Motor tutorial can be found on course link.
5. Arduino help office hours are on course link.

Electrical Components

1. Resistors
   1. Reducing current flow, adjusting signal levels
2. Capacitors
   1. Store and release electric charge, current flow in AC vs DC, remove noise.
   2. Ceramic vs Electrolytic
   3. Picofarad (pF)
3. Diodes
   1. Allows current flow in single direction.
   2. Anode (+), Cathode (-)

Sensors

1. Ultrasonic
   1. Emits sound wave and records time to get back.
2. Infrared
3. Photoresistor
4. Sound sensor
   1. Not permitted for the challenge

Motor controller

The motor controller allows the code from the Arduino to control the DC motors.