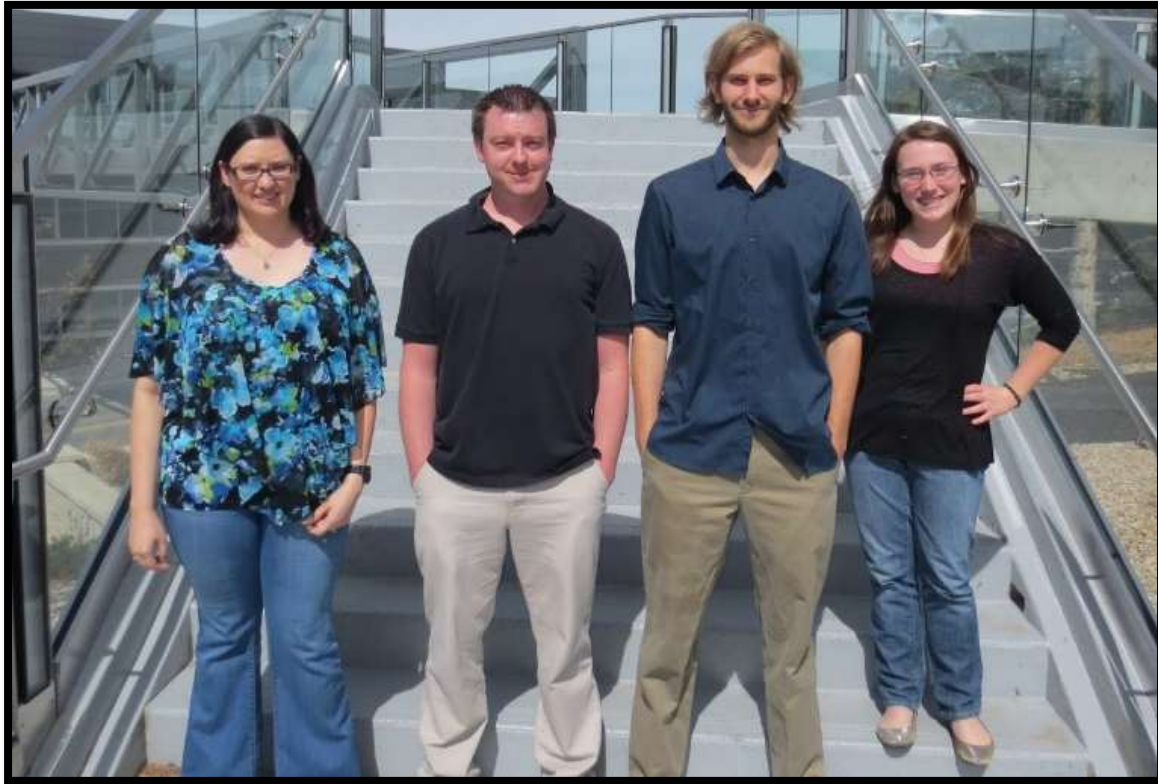


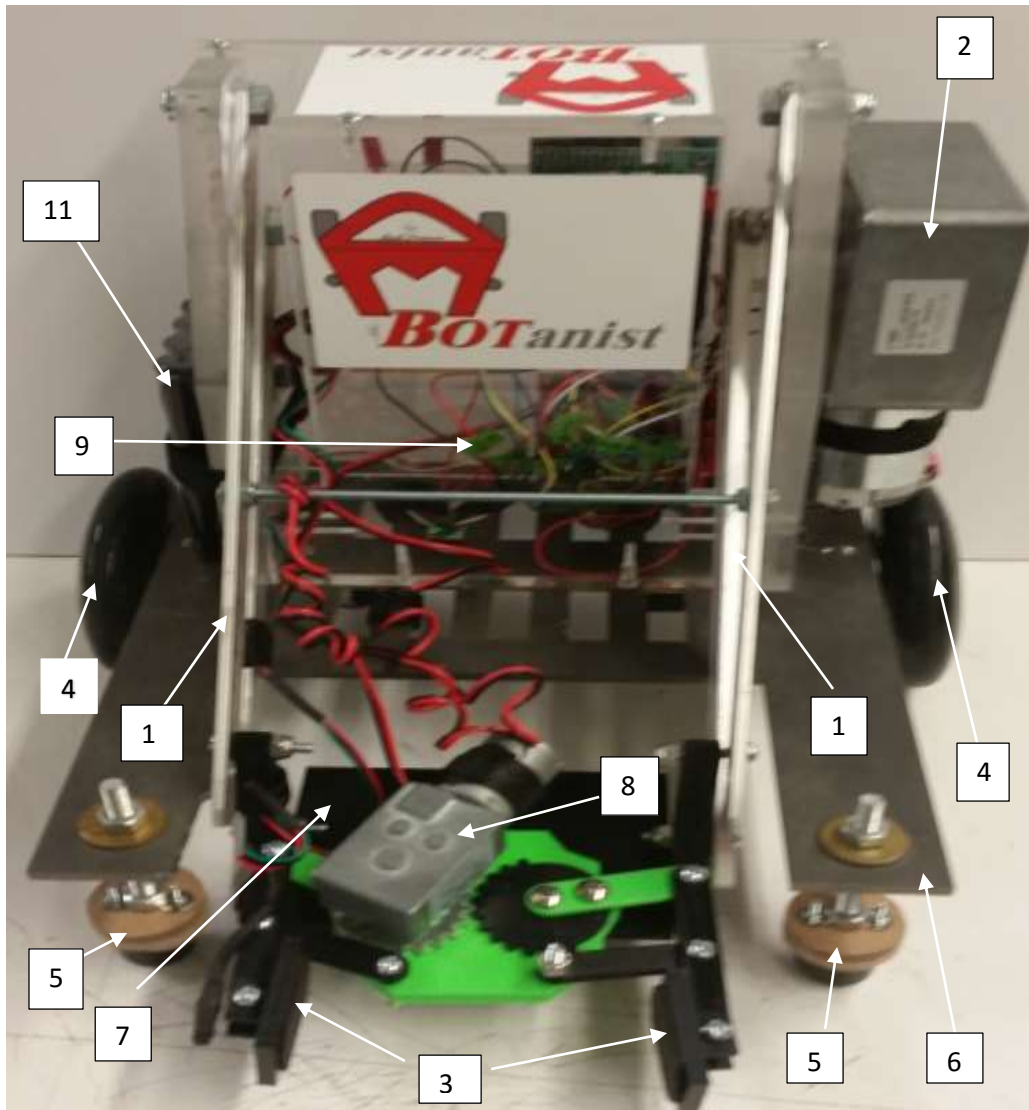
# The BOTanist!

By Team Matt Damon (9-3)



Cherry Gregory, Damien Whitehead, Jon Matthews, Amie Dresen

# General Robot and Controller Photos



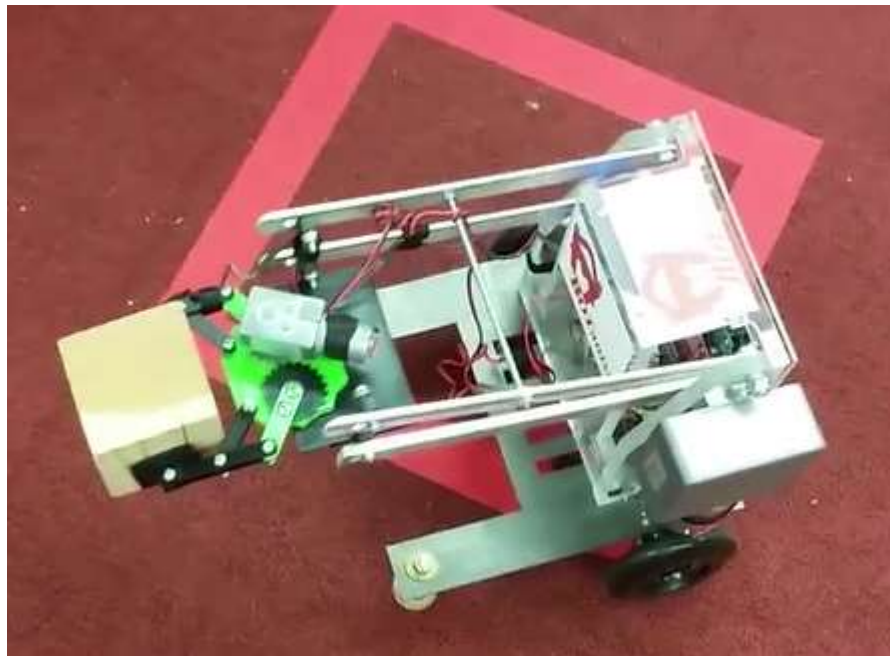
The BOTanist Robot



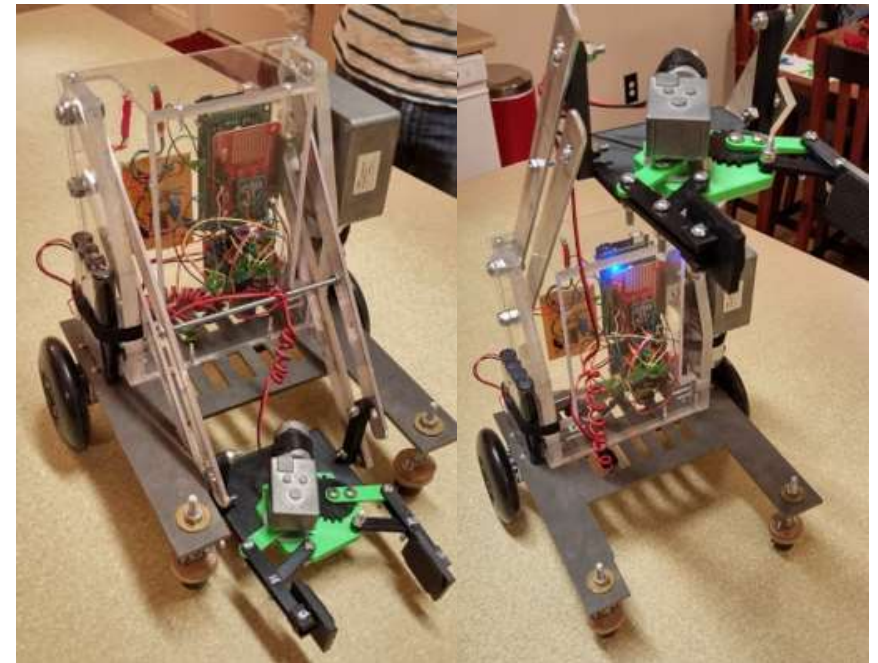
**Robot Controller:** (1) Power Switch, (2) Joystick Control/Button, (3) Status Lights, (4) Arm Up Button, (5) Arm Down Button, (6) Claw Open Button, (7) Claw Close Button

# Photos of Robot in Action

- The fourbar manipulator (1) is manipulated by a large motor (2), which enables it to lift itself and the claw (3)
- The Claw grips blocks to gather and build bases on Mars.



The BOTanist delivering a block to a desired location.



The manipulating arm lifts and lowers the claw.



The claw closes and opens.

# Robot Components

Component	Function
1. Fourbar Manipulator	Lifts and Lowers Robot Arm
2. Lifter Motor	Enables Fourbar to Lift
3. Claw	Grips and Releases Blocks for Placement
4. Back Right (a) and Left (b) Wheels	Move Robot According to Directions from the Controller
5. Front Right (a) and Left (b) Roller Wheels	
6. Baseplate	Hold Robot Base Components Together. Stabilize Robot
7. Claw Stabilizing Plate	Stabilize Claw and Claw Motor
8. Claw Motor	Enables Claw Motion by Turning Gears on Claw Mechanism
9. Electronics	Receives and Transmits Signals for Robot Function
10. Robot Controller	Communicates with Robot Electronics to Manipulate Robot
11. Battery	Power Source
12. Hall Effect Sensor	Senses if rock is magnetic

# Robot Characteristics

Characteristic	Function
Robot Weight	5.81 [kg]
Starting Dimensions	285 x 293 x 285 [mm]
Max Dimensions	275 x 293 x 491 [mm]
Max Forward Speed	0.39 [m/s]
Max Turning Speed	2.94 [rad/s]
Minimum Turning Radius	0 [m]
Max Pushing Force	40 [N]
Cost	\$359.60
Manipulator Capabilities	Arm: Up/Down Claw: Open/Close

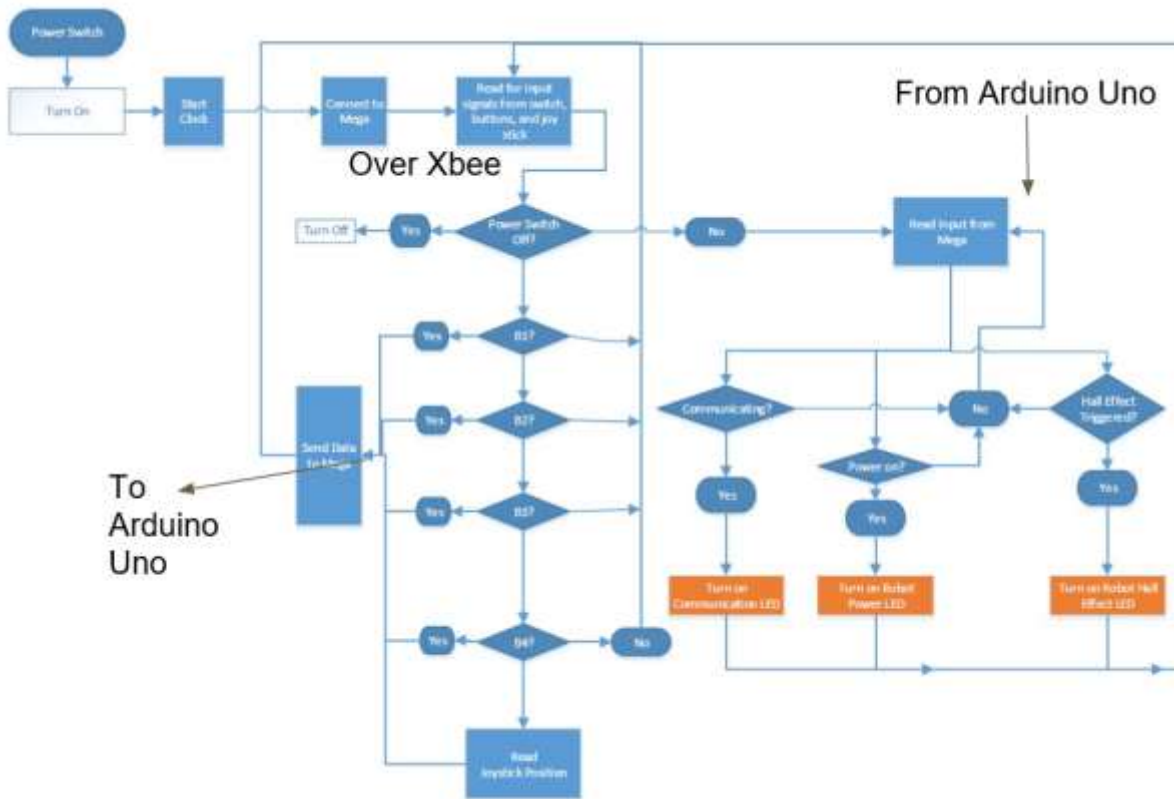
# Mobility System

- Two motors (4) attached to wheels drive the mobility platform
- Both wheels are controlled by a single joystick on the remote controller (10)
- Data from joystick is interpreted by the Arduino Microcontroller (9) located on the robot
- The first data sent by the joystick becomes the reference point for all other data sent by the joystick
- The joystick has a set range of values that can be used to determine direction after the reference point has been set by comparing the new point to the reference point set
- This allows the robot to move clean and accurately through this differential drive method

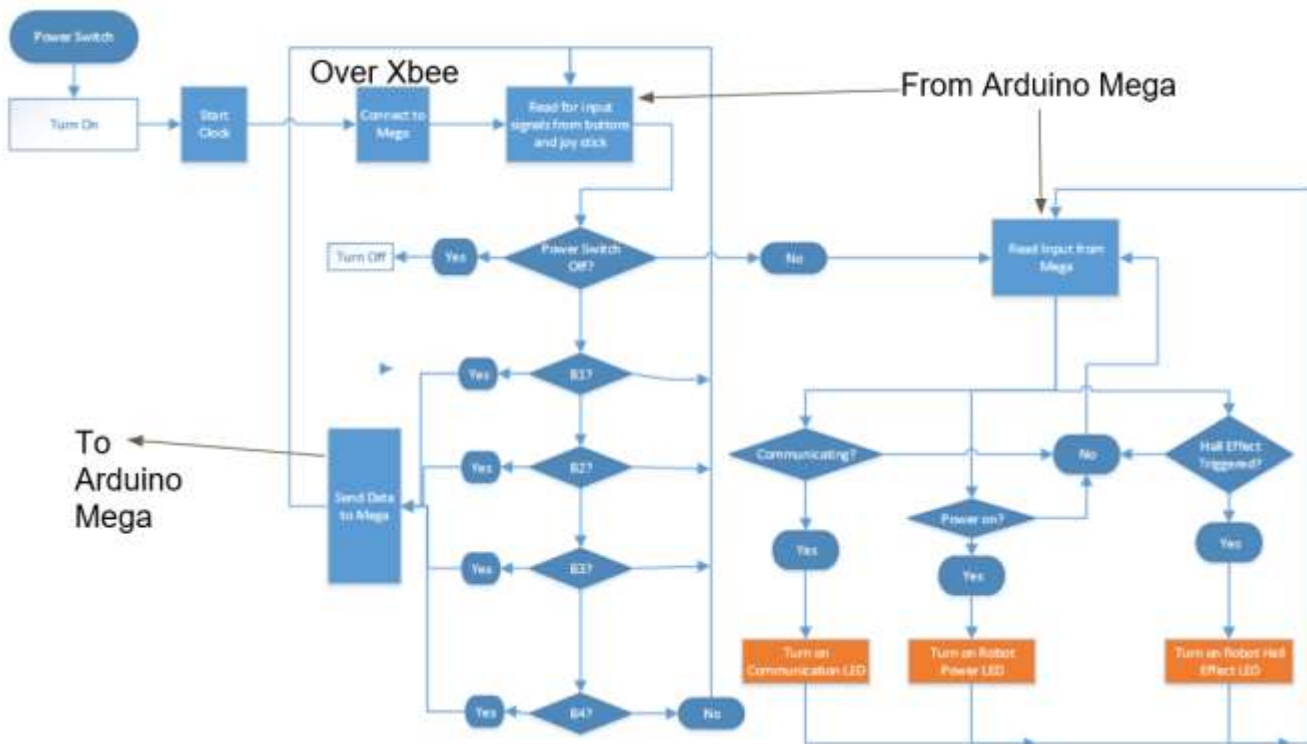
## Mechanisms & Sensors

- **Claw Mechanism** – One worm gear/motor combo (3) to open and close the claw
- **Arm Mechanism** – One worm gear/motor combo (1) & (2) to raise and lower the fourbars
- **Wheels** - Two Motor Drivers (4) to drive the robot in all directions
- **Hall Effect Sensor** – Senses if there is a magnetic rock, lights up blue LED on Remote Controller, attached to claw (3)

# Program Flowcharts

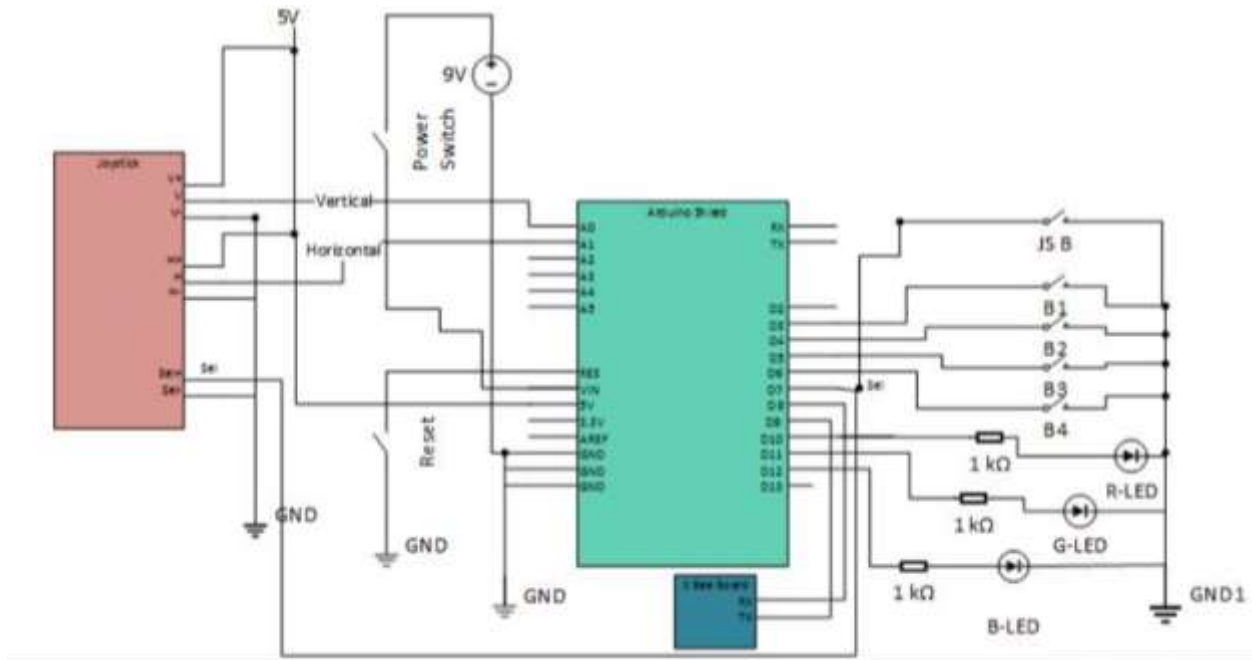


Robot Controller Flowchart

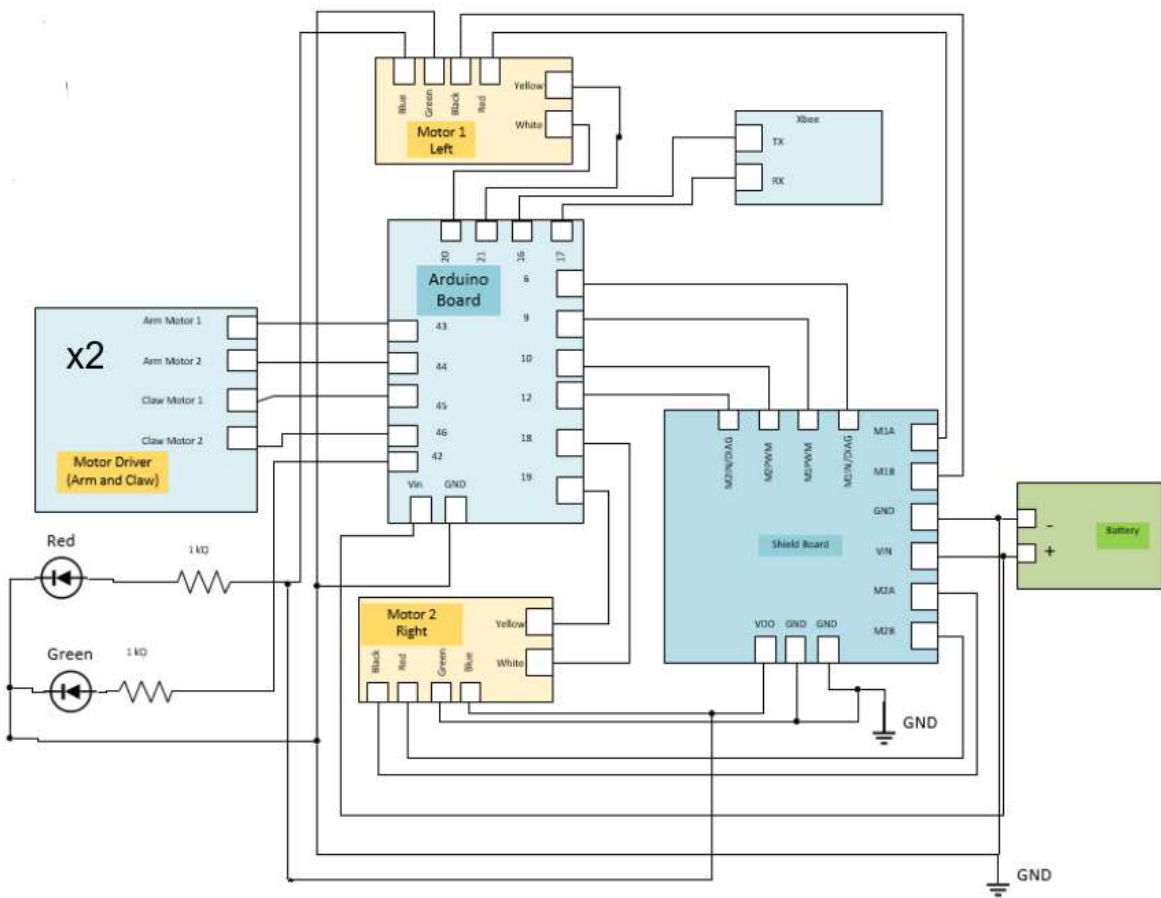


Robot Mobility Platform Flowchart

# Wiring Schematics



Robot Controller Wiring Schematic



Robot Mobility Platform Wiring Schematic