*1: How does the device work?If a sensor, how is non-electrical information converted to electrical information?*

*2: What kind of interface does it have and how does that work?*

The 2 dc motors are connected using the Adafruit Motor Shield V2. In addition to providing safety and helpful libraries this shield greatly simplifies much of the circuitry we will require for driving out motors. For instance we will require the ability to drive our dc motors forwards and backwards. If we were to implement this ourselves it would require configuring pulse width modulation and a 4 transistor H-bridge or the use of a H-bridge integrated circuit such as the L293D chip. Furthermore the shield in our configuration is powered by the 5v voltage out pin on the Arduino for motor logic and directly from the 9v (6 AA batteries) power supply for the motors. To achieve a similar configuration without adding any of the safety features would require a moderate amount of additional circuitry, complexity, and additional space.

*3: What software libraries, drivers, basic code is required to use it?*

*4: If using a special library for the device, what functions are available to call?•What microcontroller platform are you using?*

Since we are using the Adafruit Motor Shield V2 we are using the software libraries supplies for interfacing with motor shield and motors. The library is included as a C++ object and supplies methods for interfacing with motors. The library is extensive and well documented available at: <https://github.com/adafruit/Adafruit_Motor_Shield_V2_Library>. The methods that are used in our program are listed as the following:

* **Adafruit\_MotorShield()** – the constructor used to initialize the motor shield object which the following methods are called on.
  + **begin()** – initiates the motor shield library which initiates some default parameters as well as the Wire class.
  + **getMotor(int pin)** – used to initialize a dc motor on a particular pin. The motor shield has its own headers for attaching motors and uses pins 1 and 2 on the Arduino board so this method is called with pins 1 and 2. This method creates and instance of Adafruit\_DCMotor which as the following methods:
    - **run(DIRECTION)** – sets the direction for the motor to run or releases the motor. Takes parameter FORWARD, BACKWARD, and RELEASE.
    - **setSpeed(int spd)** – sets the speed of the motors as an integer from 0-255.

*5: Is the device or microcontroller powered by 3.3v or 5v:*

*6: Any special current requirements? (may be needed for large LED displays or motors):*

*7: Names and functions of interface signals:*

*8: Demo code (commented). You must include code used to test each device independently of the others, as well as the top-level code used to demo the integration of the devices in your final team project. You must have verified the operation of the individual devices of your project before including them in your integrated team project. Omitting this independent verification of each device is a shortcut that leads to frustration and failure when problems occur!*

*9: Difficulties encountered: this is especially important if you couldn’t get the device to work. Problems and the actions taken to solve them must be well documented. Also, ask for help from your teammates and the instructor. If you can’t get it to work but have not asked for help, that’s your failure to communicate and is inexcusable.*