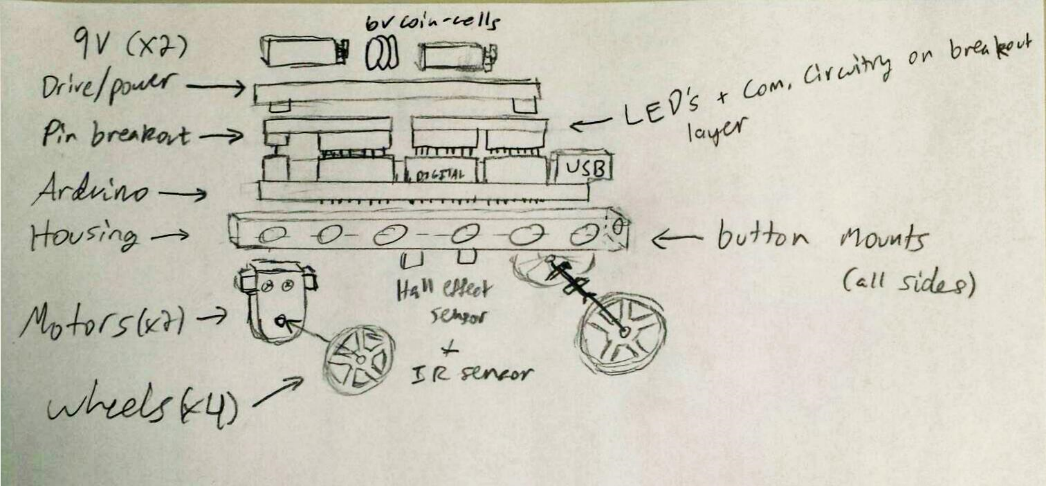
Phase 01B - Bot Technical Specification

**System Overview:**



The above figure details the overall layout for the bot. Two 9 volt batteries and a series of coin cell batteries (totaling 6 volts) interface with a drive/power circuit via housing (for easy access/replacement). These batteries connect to a conditioning/isolation circuit which separates three power nets (1 for the digital logic, 2 for the analog signal conditioners, and 3 for the motor drive system). These power nets then interface via header pins to a pin breakout which is shown above to plug directly into the Arduino. One benefit of this plug-and-play design is the ability for users to program/debug and prototype various modules with ease.

This pin breakout board connects drive/power nets with the Arduino. Additionally, it connects LEDs, sensing systems, and communication hardware to the Arduino. All of these circuits are mounted in an insulating housing. The Arduino connects to this housing via mounting screws, and multiple button cutouts are implemented within the housing such that a collision detection system may surround the entire bot.

Below this housing, two electric motors are attached via glue (and/or proper mechanical means) such that two back wheels can actuate the bot. Two front wheels interface via a freely-rotating fixed angle common axle to allow the bot to maintain proper balance and freedom of movement. The distance between front and back wheels in relation to the distance between respective side wheels are calculated to optimize the bot turning capabilities for high-precision movement. The bot rotates via software control of the drive system (in which both motors are controlled independently). Each module is detailed below.

**Drive System:**

Get into details/schematics etc

What frequency of pwm

What voltage can we run at? Does 5v work?

Schematic for mosfet/motor control (isolation from Arduino)

Figure out power supply/regulation stuff

**Collision System:**

Detail this for the outsource team

**Sensing System:**

One IR sensor or more?

Sound/communication

Signal amplifier for mic

How to control output of speaker – pwm?

**Deliverables:**

We plan to work according to the assignment due date listing posted on Trunk. The general layout for this timeline is as follows:

1. Motor Control – Complete design by 2/8
   1. How do we drive motors to go forwards, backwards, variable speeds, etc. etc.
   2. How do we ensure these motors don’t inject voltage spikes into our precious Arduino?
   3. How do we drive these motors with a separate power net so that we don’t compromise battery life?
2. Motion Control – Complete design by 2/11
   1. Ok, now that we can control our motors, how do we use them to move properly?
   2. How do we turn left at 45 degrees?
   3. How do we reverse in a straight line?
3. Sensor Measurements – Complete design by 2/25
   1. How do we detect magnets
   2. How do we detect sound signals?
   3. How do we emit sound signals?
   4. How do we detect infrared light and determine from this whether or not we are on top of the line?
4. Collision Detection Spec/Accepted – 2/25
   1. How do we process collision?
5. Outsourcing Collision-Detection Delivery – 3/15
6. Final Project – 4/26