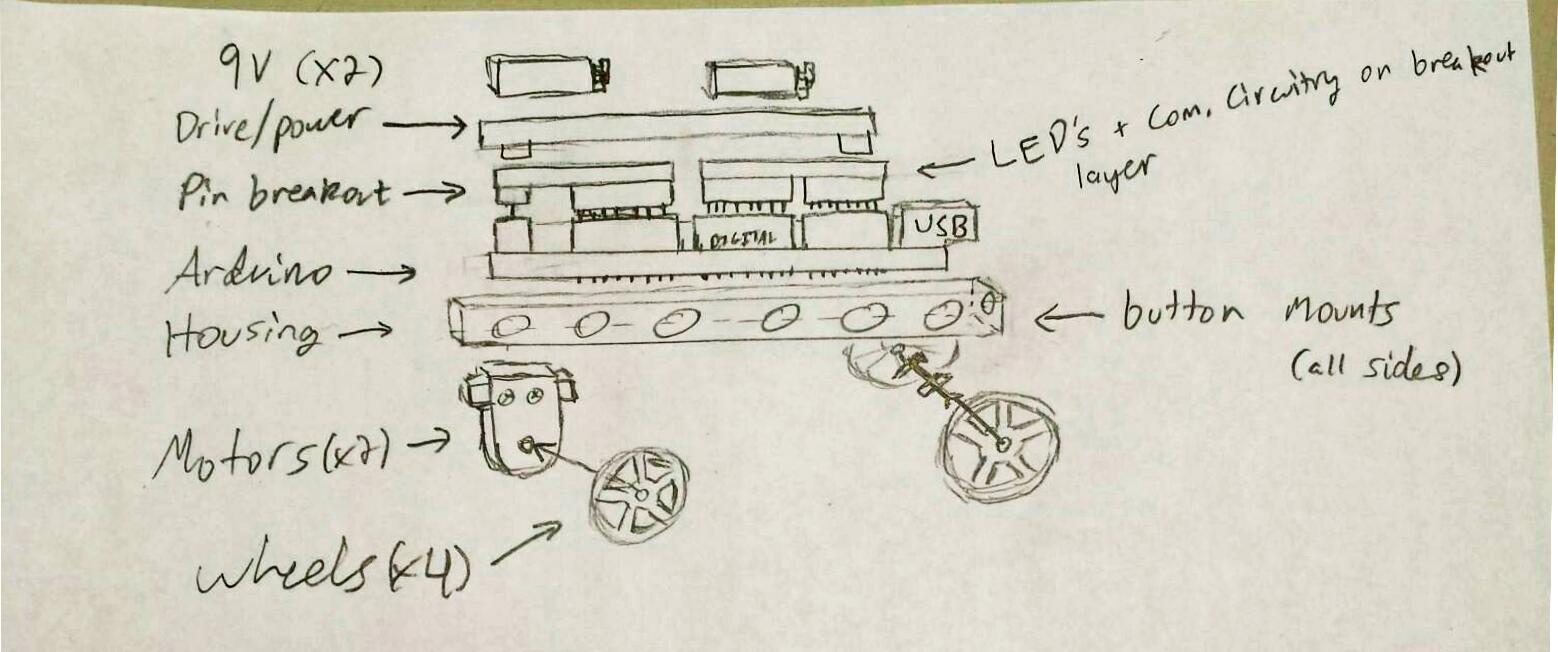
Phase 01B - Bot Technical Specification

**System Overview:**



The above figure details the overall layout for the bot. Two 9 volt batteries interface with a drive/power circuit via housing (for easy access/replacement). These batteries connect to a conditioning/isolation circuit which separates two power nets (for the digital logic and motor drive system respectively). These power nets then interface via header pins to a pin breakout which is shown above to rest atop the Arduino. One benefit of this plug-and-play design is the ability for users to easily 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 common axle to allow the bot to maintain proper balance and freedom of movement. The bot rotates via software control of the drive system (in which both motors are controlled independently).

**Drive System:**

Get into details/schematics etc

**Motor Control Module**

We will use an NMOS transistor to control the each of the motors. The transistor will act as a switch between the motors and their designated power supply. A PWM output from the Arduino will be attached to the gate of the transistor. We will alter the speed of the wheel by altering the duty cycle of the PWM output. We will use a frequency of the PWM that optimizes power usage.

**Collision**

The collision system is responsible for detecting when the bot has run into something. It is also responsible for communicating where the collision occurred. Collisions will be detected through the compression of buttons. We anticipate gluing bumper panels (long strips of poster board) onto groups of buttons to “fill in” the possible locations for collisions. The buttons will stick through the housing of the bot, and these bumper panels will be glued onto the buttons. There will be one panel glued to every two buttons. There will be three panels at the front of the bot (at various angles), and one panel at the back of the bot. This means that there are four total panel groups (locations for possible collisions), with eight total buttons. The collision system will communicate whenever there is a collision (a button is pressed down) in each panel.

**Deliverables:**

Have a timeline here