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Line Following Robot
Robot with:

- Chassis, 4 motors and wheels
- Infrared line sensor with 0-5V output
- 10 V and 6 V power source
- Dragon 12- Light Board
- H bridge
Infrared sensor for line detection

- Used an infrared emitter and phototransistor to measure the infrared reflectivity of a surface.
- The voltage output ranged from 4.8 to 4.95 volts depending on whether the sensor was on white tape or on the carpet.
I designed an op amp to provide a 0-5v output. This sensor is used as an input for the HSC12 and then the Analog to Digital converter is used to determine the voltage level of each sensor.

A comparator is utilized in the C code to decide which sensor in over the line.
Turning car based on the LED status

Check which line sensor is on the line

- LED 1: Sharp left turn
- LED 2: Slight left turn
- LED 3: Drive straight
- LED 4: Slight right turn
- LED 5: Sharp right turn
In the C code I completed the Analog to Digital conversions and compared the output of the sensor values to determine which sensor has the highest input. Then with the highest value sensor I light the LEDs and command the motor torque to drive the vehicle right or left.

```c
led[0] = ATD1DR0;
led[1] = ATD1DR1;
led[2] = ATD1DR2;
led[3] = ATD1DR3;
led[4] = ATD1DR4;
//PORTB = 0x01;

```
H Bridge

The board did not have enough current to drive the motors so I used an H-bridge to drive the motors. Using a PWM signal I can send the H-bridge a signal so that it can feed the motors with a higher power level than what the board can. The H Bridge has multiple modes. I used the dual-analog mode to drive the motors. 0V for reverse, 2.5V stop the motor and 5V runs the motor forward. I used a PWM to achieve the correct voltage output from the PP0/1 ports and into the H bridge.