

# RC ARDUINO CAR

Project By:

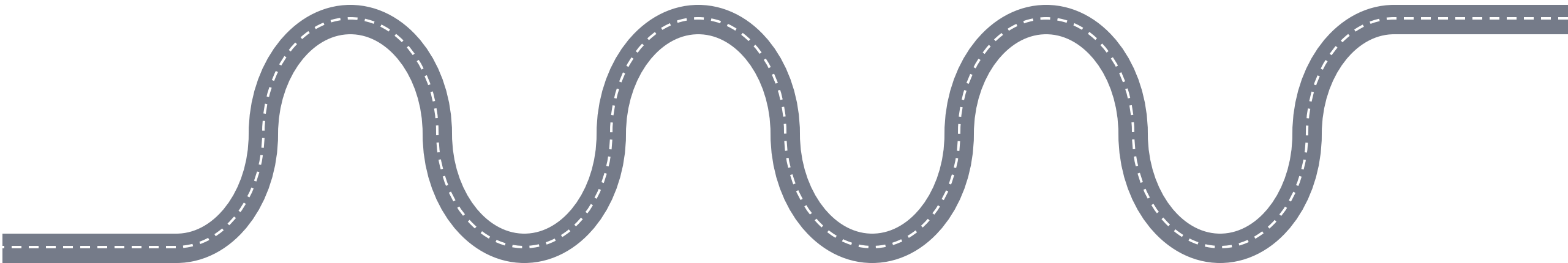
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# The main idea

To create a car using Arduino, along with a speed sensor to measure and perform tasks according to the measured speed



# The sensor of choice

## The LM393 Speed sensor

Its simply an IR LED placed Infront of a phototransistor with its sensitivity set to the IR wavelength. When IR hits the phototransistor, its resistance drop from 5 k ohm to  $\sim 0$ , both of which are placed on a board with a LM393 IC, it's a comparator circuit used in many sensors.

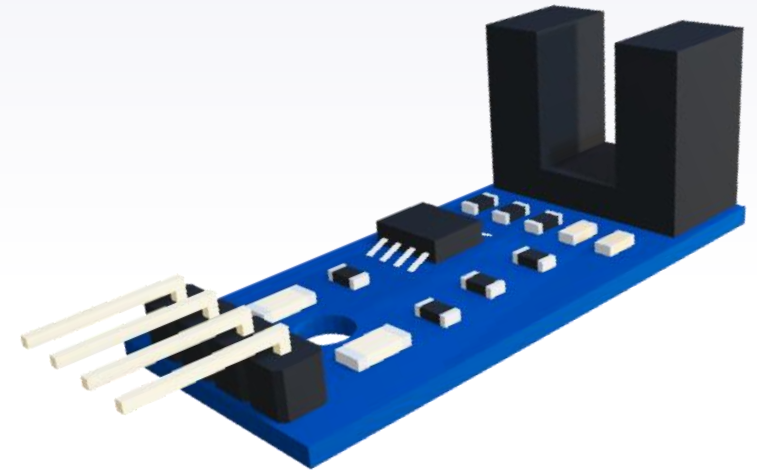
### Additional information

Working Voltage: DC 3.3V-5V

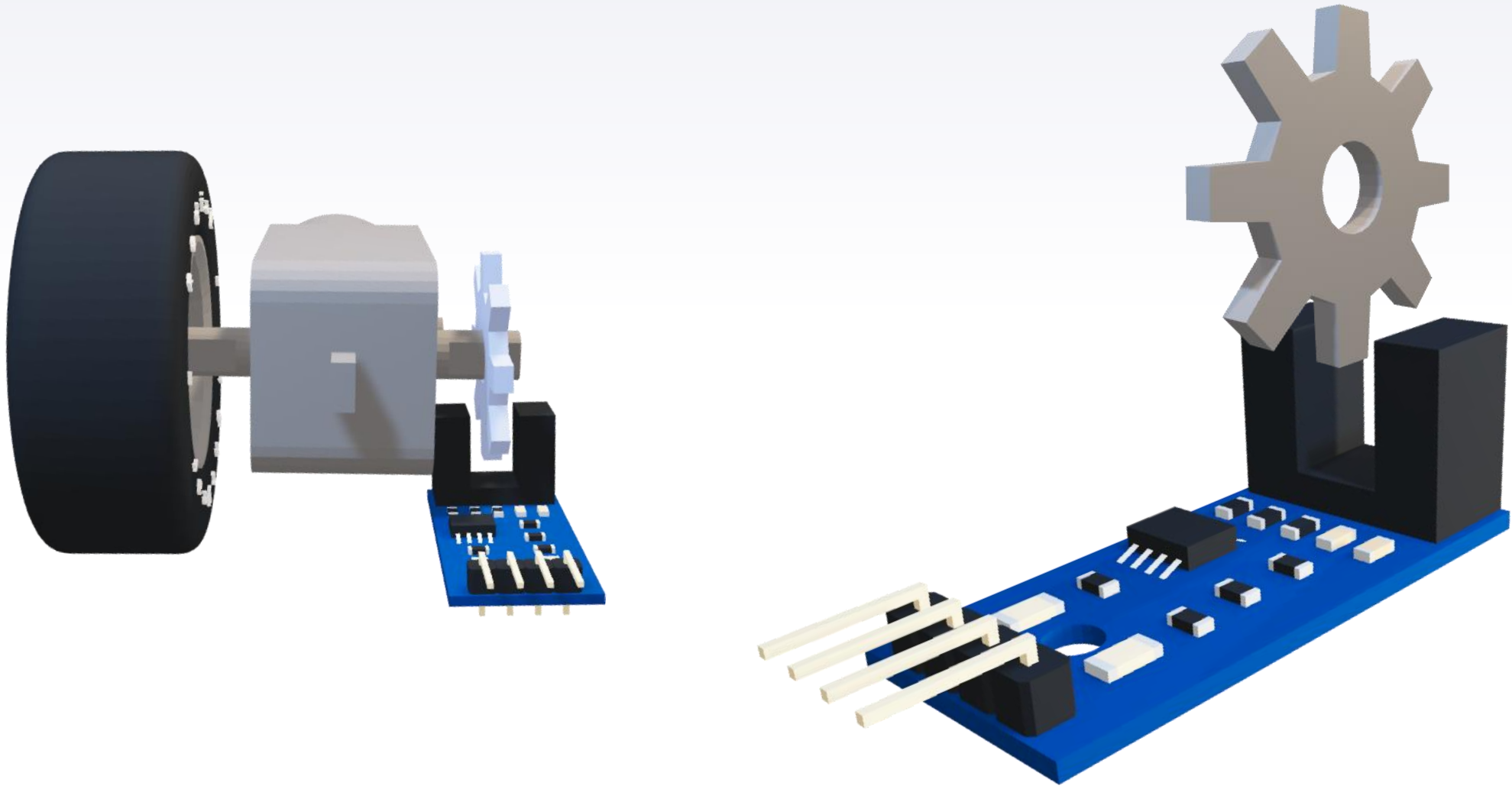
Dimensions: 3.8 cm x 1.4 cm x 0.7 cm.

Includes power indication LED (Red) and RPM LED (Green).

Weight: 50g.

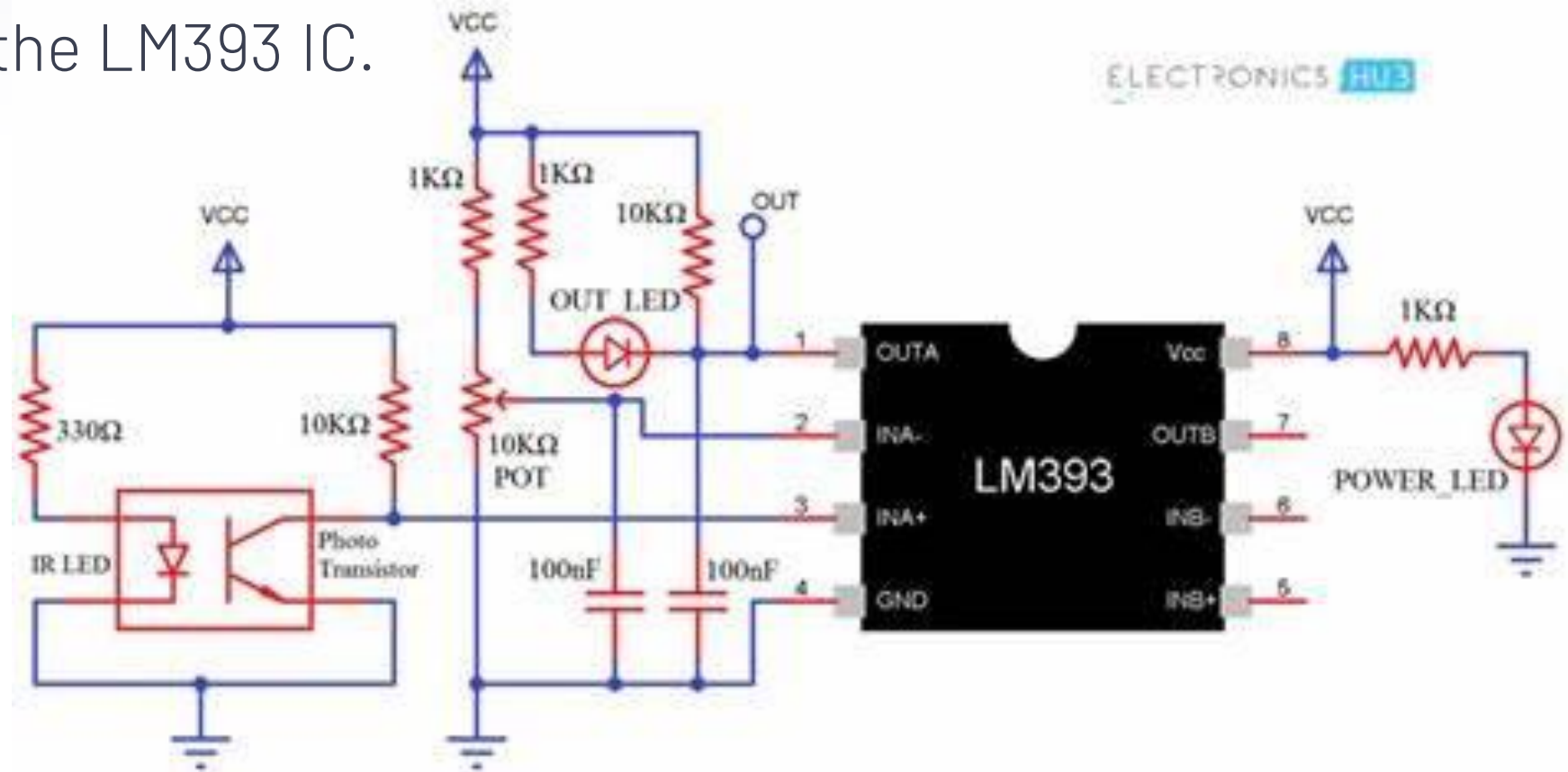


# How the sensor works



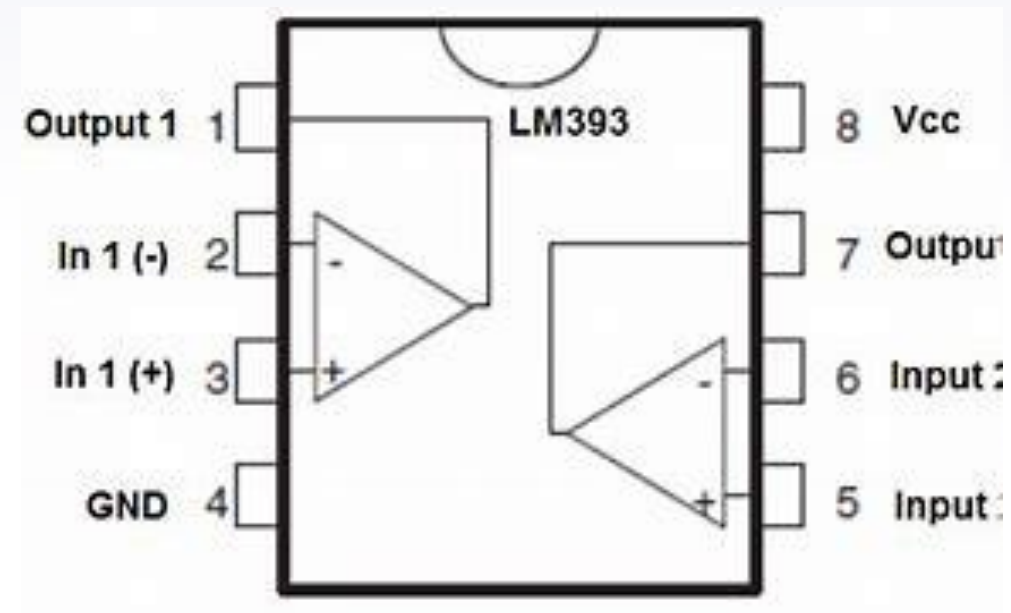
# The schematics for the Speed sensor

As shown in the circuit, the IR LED and the phototransistor are connected to a series of resistors and the LM393 IC.



# The schematic of LM393

In a nutshell, a comparator takes the input and compares it with a reference voltage, if the input is lower than the reference, it outputs a 0, otherwise it outputs a 1, so it basically takes an analog input and converts it into a digital output.

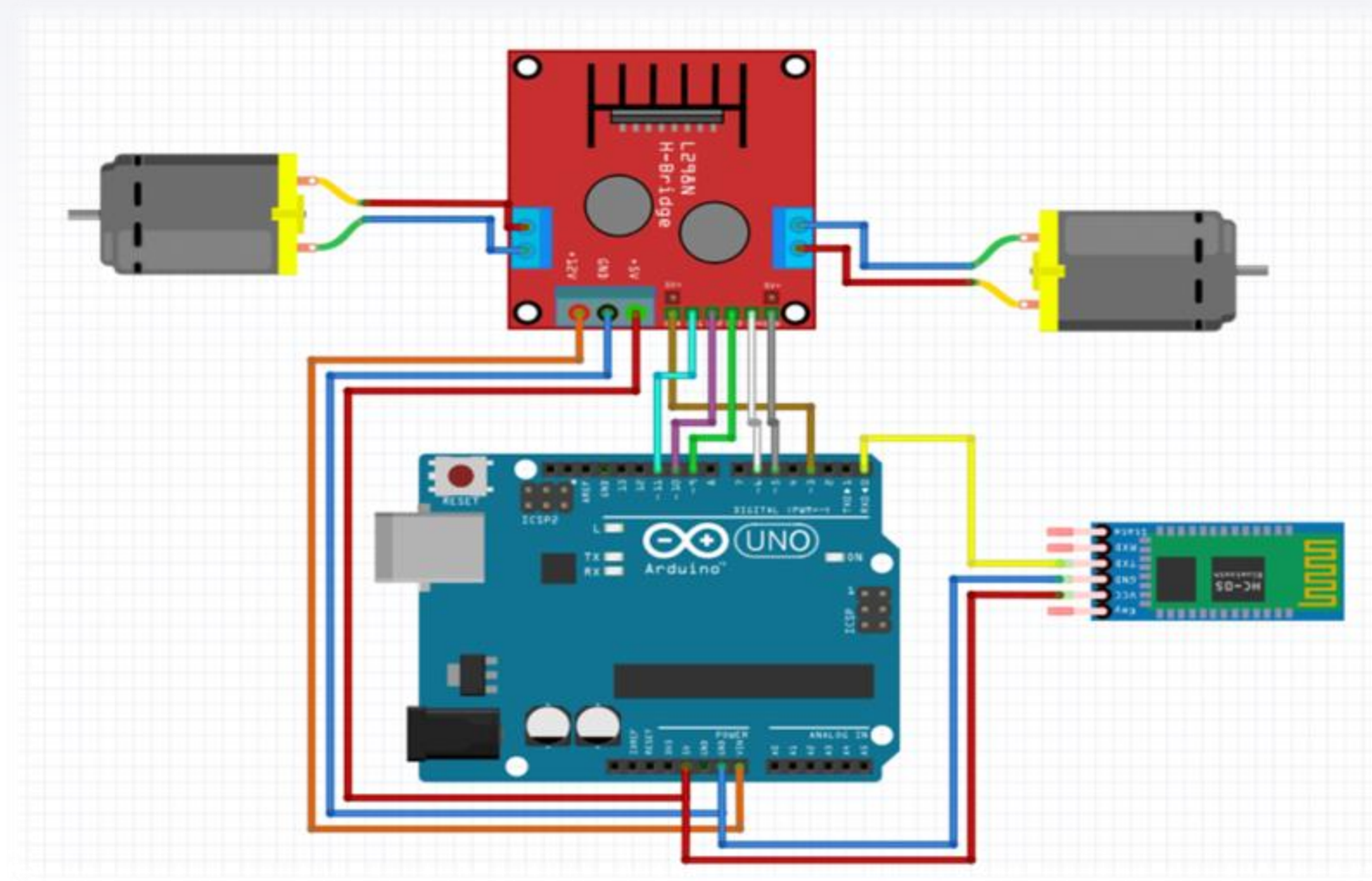


# Components of the project

1. Arduino UNO.
2. H-Bridge.
3. LM393 Speed Sensor & Gear.
4. Jumpers.
5. Breadboard.
6. Bluetooth HC-05 module.
7. 2x DC Motor & Wheels.
8. Batteries

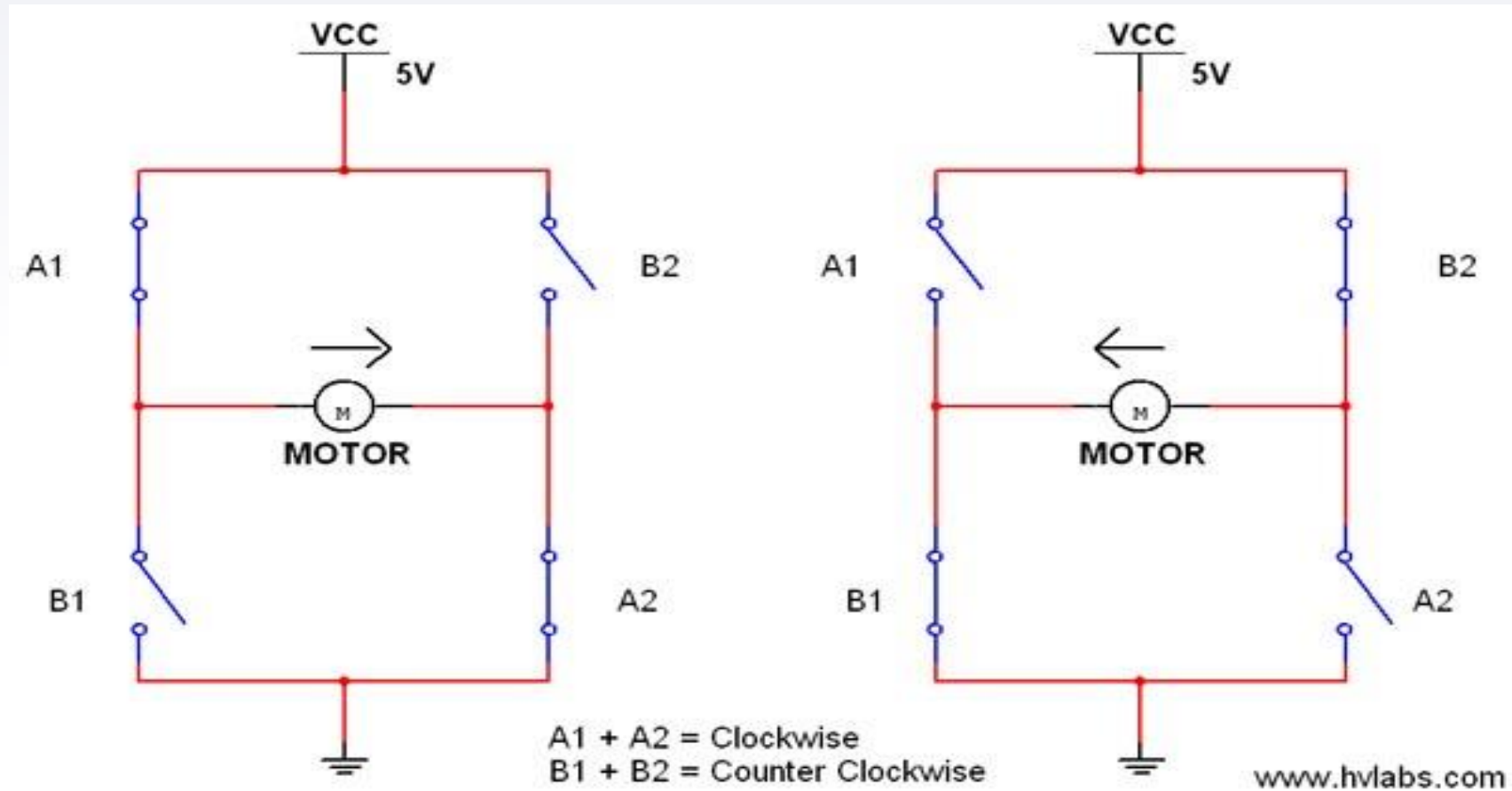


# Diagram of the car





# Schematics of H-Bridge



# Sensor's code overview

```
void count(){counter++;} // increment Motor counter value

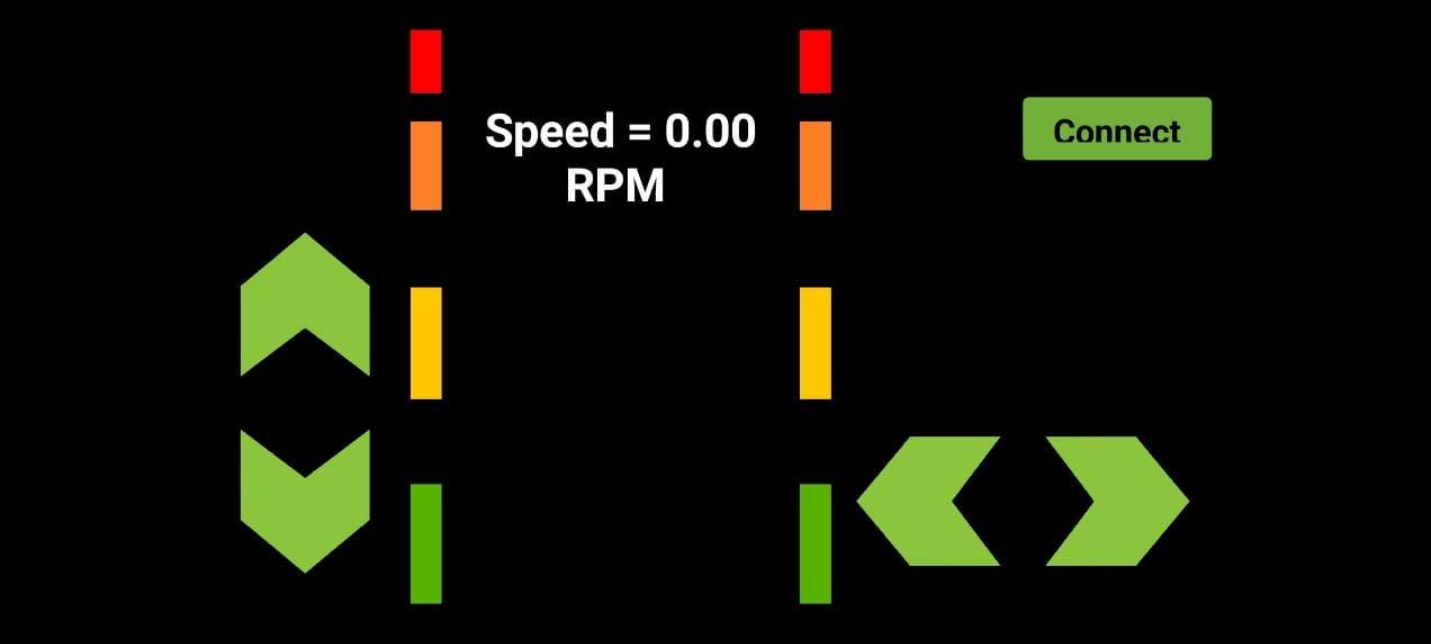
void calculateRpm(){
    Timer1.detachInterrupt(); // Stop the timer
    Serial.print("Speed = ");
    float rotation = (counter / diskslots) * 60.00; // calculate RPM for Motor
    Serial.print(rotation);
    Serial.print(" RPM");
    counter = 0;
    Timer1.attachInterrupt( calculateRpm ); // Enable the timer
}

void setup(){
    Serial.begin(9600);
    Timer1.initialize(1000000); // set timer for 1sec
    attachInterrupt(digitalPinToInterrupt (sensor), count, RISING); // Increase counter 1 when speed sensor pin goes High
    Timer1.attachInterrupt( calculateRpm ); // Enable the timer
}
```

# Motor's code overview

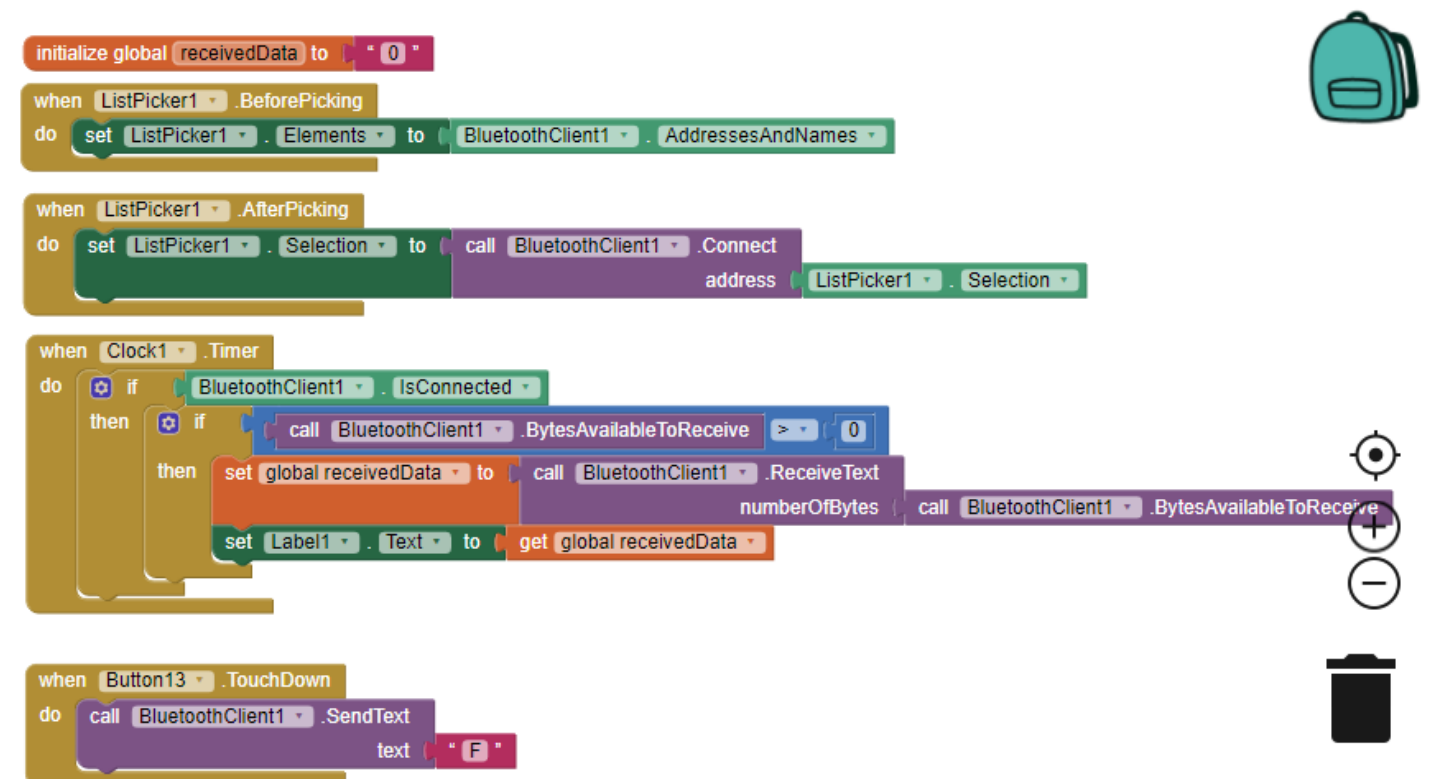
```
char t;
void loop(){
    if(Serial.available()){
        t = Serial.read();
        Serial.print(t);

if(t == 'F'){                //move forward(all motors rotate in forward direction)
    digitalWrite(10,HIGH);
    digitalWrite(12,HIGH);
}
else if(t == 'B'){          //move reverse (all motors rotate in reverse direction)
    digitalWrite(11,HIGH);
    digitalWrite(13,HIGH);
}
else if(t == 'L'){          //turn right (left side motors rotate in forward direction, right side motors doesn't rotate)
    digitalWrite(10,HIGH);
}
```



# Mobile Application

Used to control the car using Bluetooth, it also shows the speed in RPM



# The project's timeline



# Done by

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➤ Thank You!