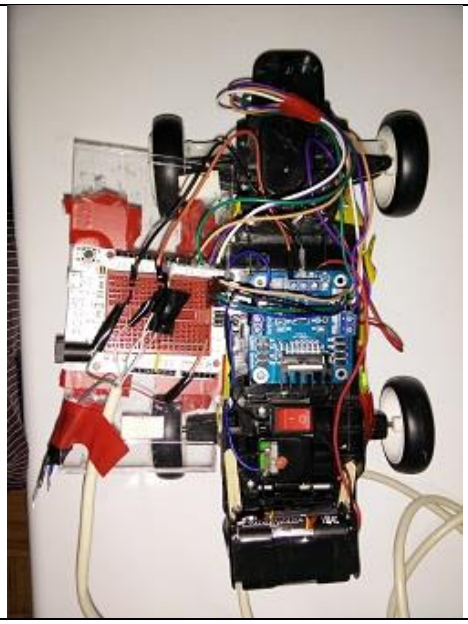
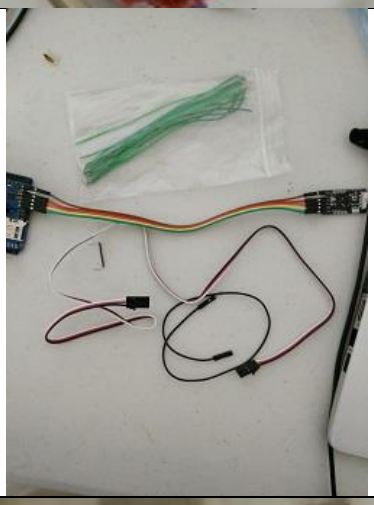
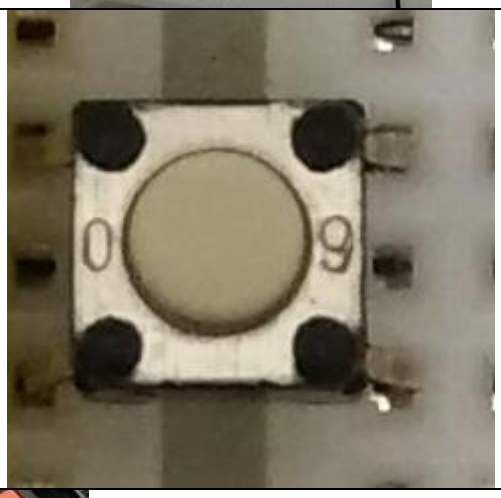
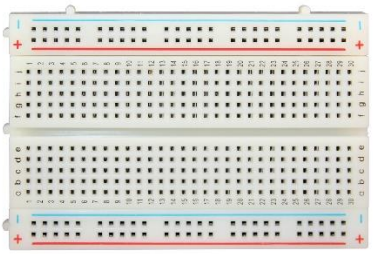
Arduino – Tethered Car

Contents

Parts List

Part	Image
Arduino UNO	
L298N H-Bridge (Motor Driver)	
Toy Car with 2 motors	

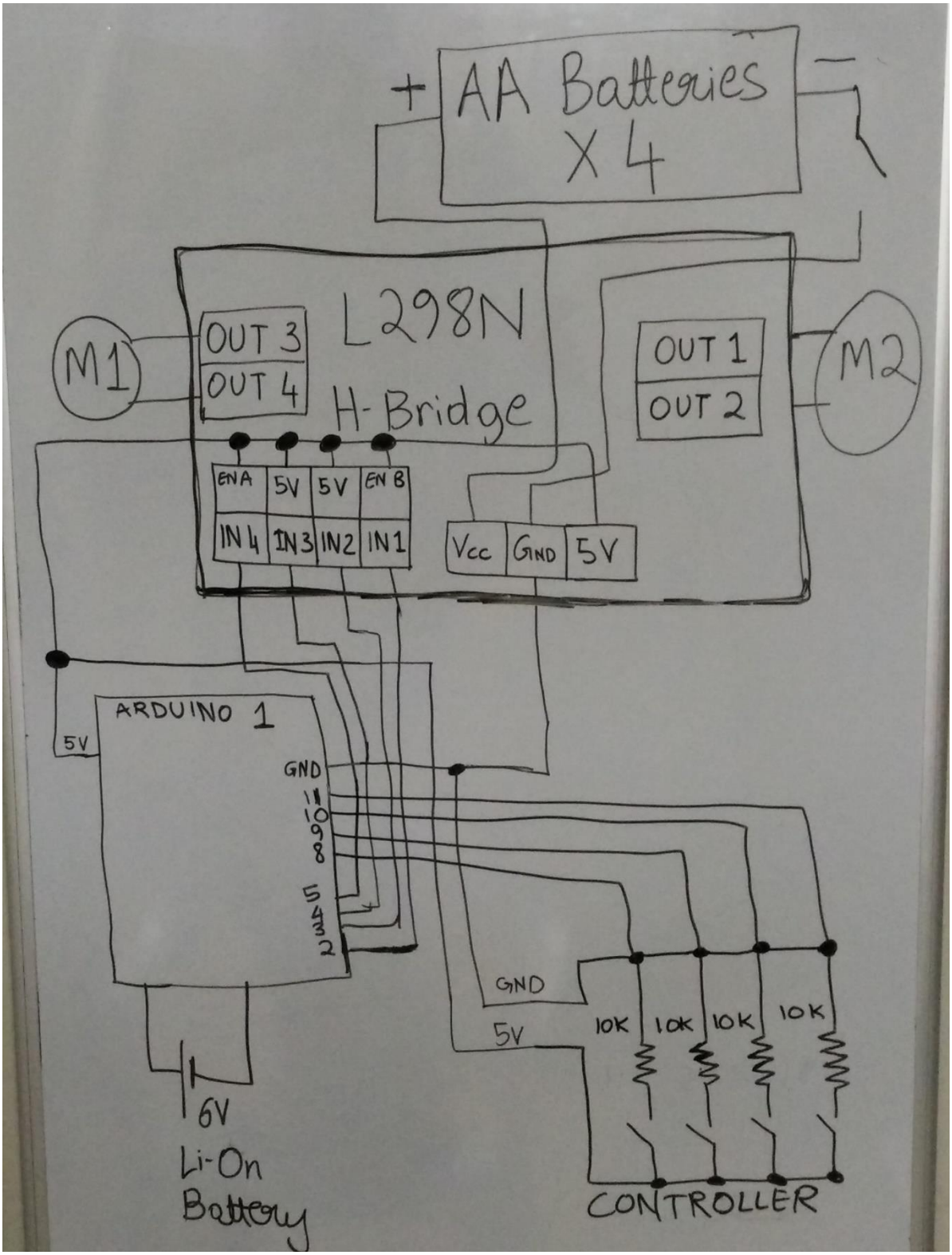
Batter case with 4 AA Batteries	
Wires	
4 Push buttons	
Vcc to Motors	

Li-on Batter (6V and 3000mAh) with a connector pin (the connector is optional. Wires alone would suffice)	
Breadboard x 2	
UTP Cable (At least 2m)	
Electrical Tape	

10K resistors x 4	
Male to Female Header Wires	

Instructions

1. Set up the circuit as shown below:



2. Upload this code onto Arduino:

```
//A toy car with two DC motors is operated with an H-Bridge

//buttons to go forward, backward, left and right.
int switch1;
int switch2;
int switch3;
int switch4;

void setup() {
  //setup pins
  pinMode(0, OUTPUT);
  pinMode(1, OUTPUT);
  pinMode(2, OUTPUT);
  pinMode(3, OUTPUT);

  //car starts in neutral .i.e. stationary position.
  neutralFR();
  neutralRL();
}

void loop () {

  //read digital value of switches
  switch1 = digitalRead(8);
  switch2 = digitalRead(9);
  switch3 = digitalRead(10);
  switch4 = digitalRead(11);

  //if switch1 is pressed, go forward, if not, see if switch2
  // is pressed. If not, remain in neutral with respects to forwards and backwards.

  if (switch1 == 1) {
    forward();
  } else if (switch2 == 1) {
    reverse();
  } else {
    neutralFR();
  }

   //if switch3 is pressed, go right, if not, see if switch4
  // is pressed. If not, remain in neutral with respects to left and right.

  if (switch3 == 1) {
    right();
  } else if (switch4 == 1) {
    left();
```

```
  } else {
    neutralRL();
  }

}


//configure H-bridhge for left
void left() {
  digitalWrite(4, LOW);
  digitalWrite(5, HIGH);
}

//configure H-bridhge for  right
void right() {
  digitalWrite(4, HIGH);
  digitalWrite(5, LOW);
}

//configure H-bridhge for forward
void forward() {
  digitalWrite(2, HIGH);
  digitalWrite(3, LOW);
}
//configure H-bridhge for  reverse
void reverse() {
  digitalWrite(2, LOW);
  digitalWrite(3, HIGH);
}

//configure H-bridhge for neutral with respects to left and right.
void neutralRL() {
  digitalWrite(4, LOW);
  digitalWrite(5, LOW);
}

//configure H-bridhge for neutral with respects to forward and backward.
void neutralFR() {
  digitalWrite(2, LOW);
  digitalWrite(3, LOW);
}
```

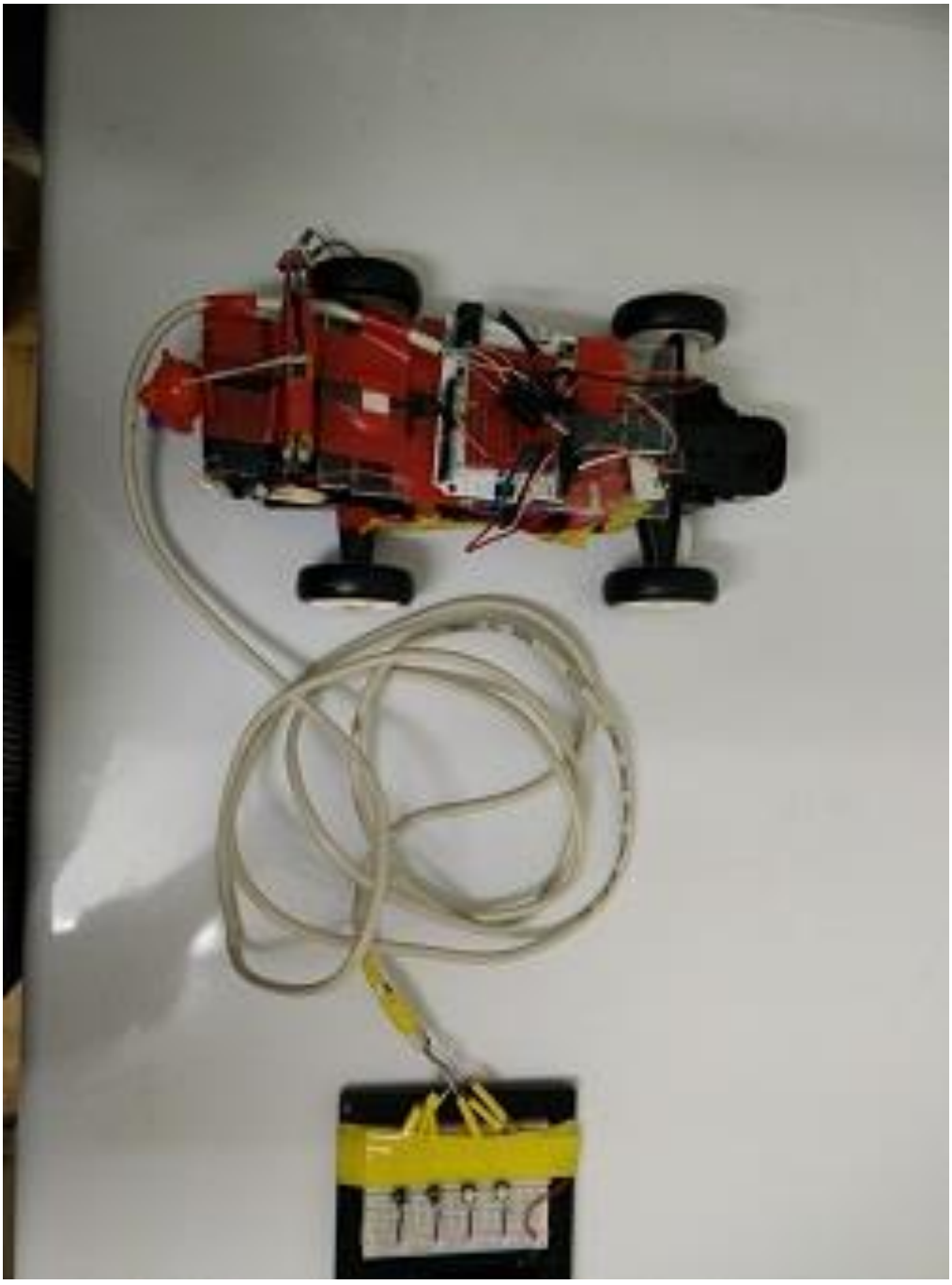
Theory

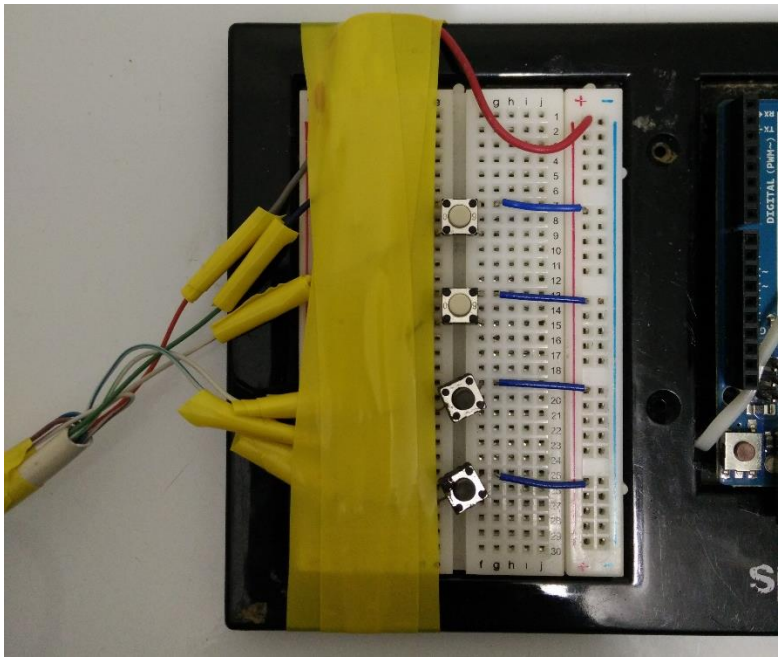
The L298N H-Bridge is used to control the motors by much higher currents than supported by the Arduino. The Arduino sends signals as following:

- There are four enable pins (two for each motor) which must be set to high before the motor can be used.
- Input pins 1 and 2 are used to control motor 1. If input 1 and 2 are of the same value (.i.e. both high or both low) then the motor will not move. If one is high and the other is low, the motor will rotate. If we switch the values, the motor will rotate in the opposite direction.
- The UTP cable is used in order to minimize EMI.
- The push buttons are used to send signals to the Arduino of forward, backward, left and right. Based on the signal, the Arduino changes the values of the inputs.

Practical

This is the entire project:




DIGITAL (PWM~)