



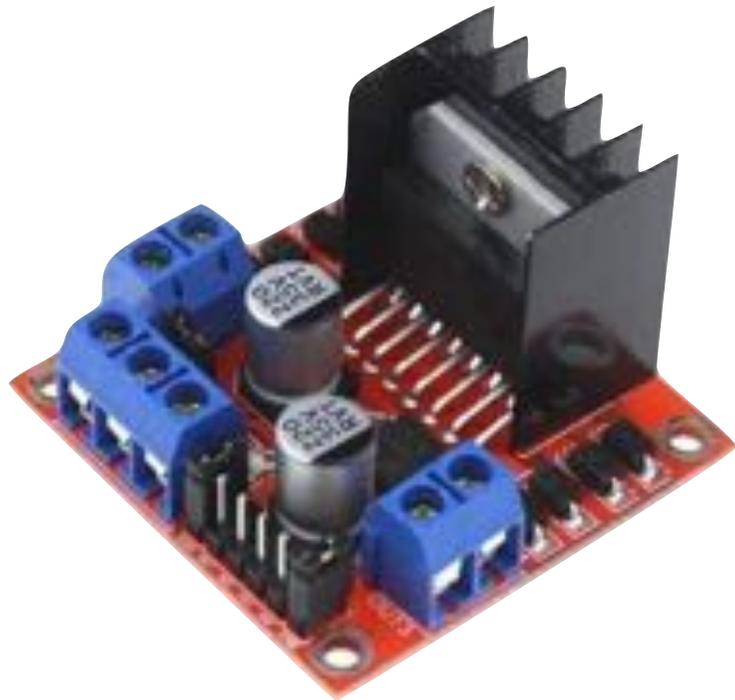
Timeless Lifeskills
FOUNDATION

www.TimelessLifeskills.org

ARDUINO L298N Motor Driver Board

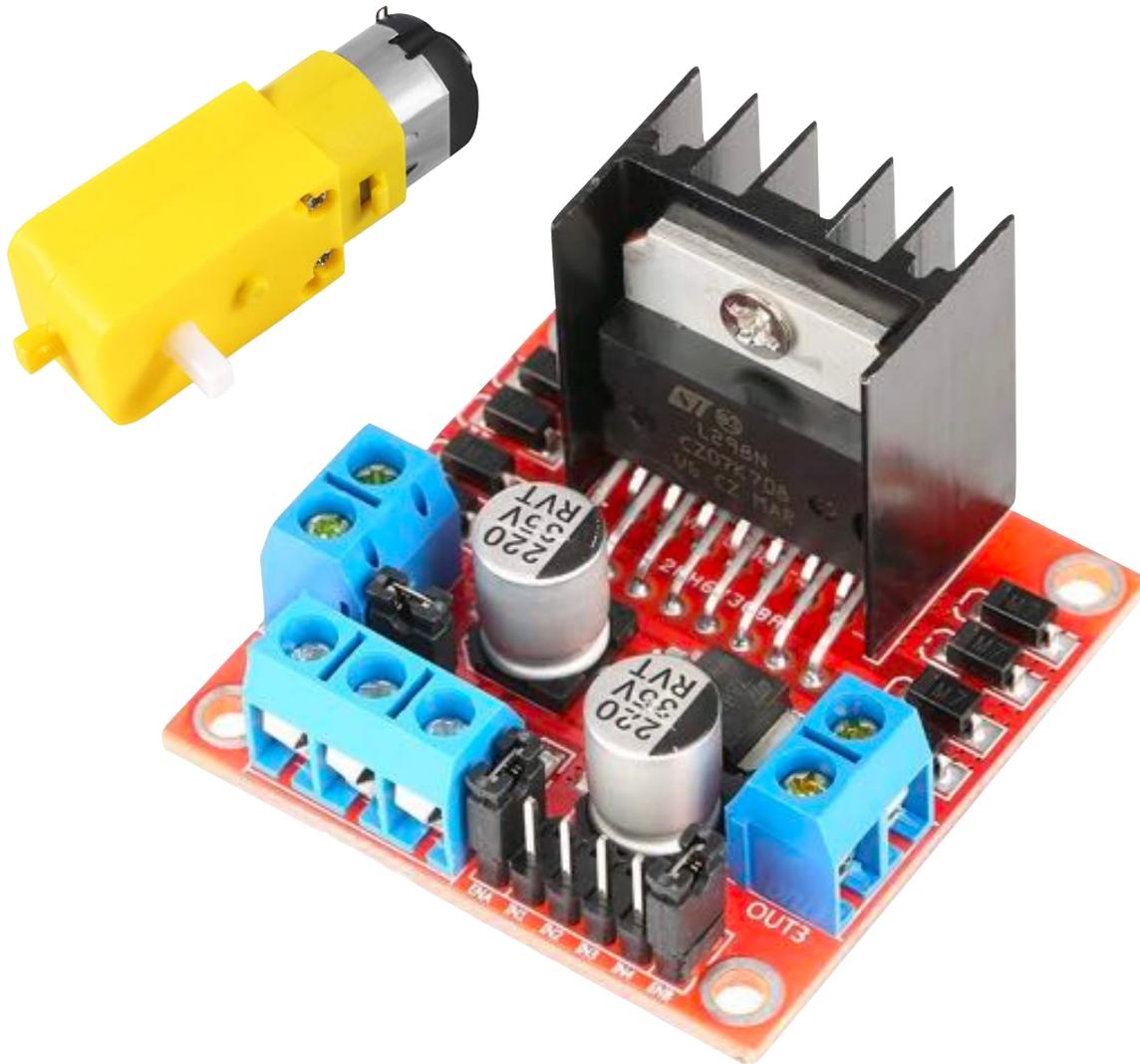
Instructor Guide





L298N Motor Driver Board

Controlling Direction (clockwise and counter-clockwise motion) of two DC Motors



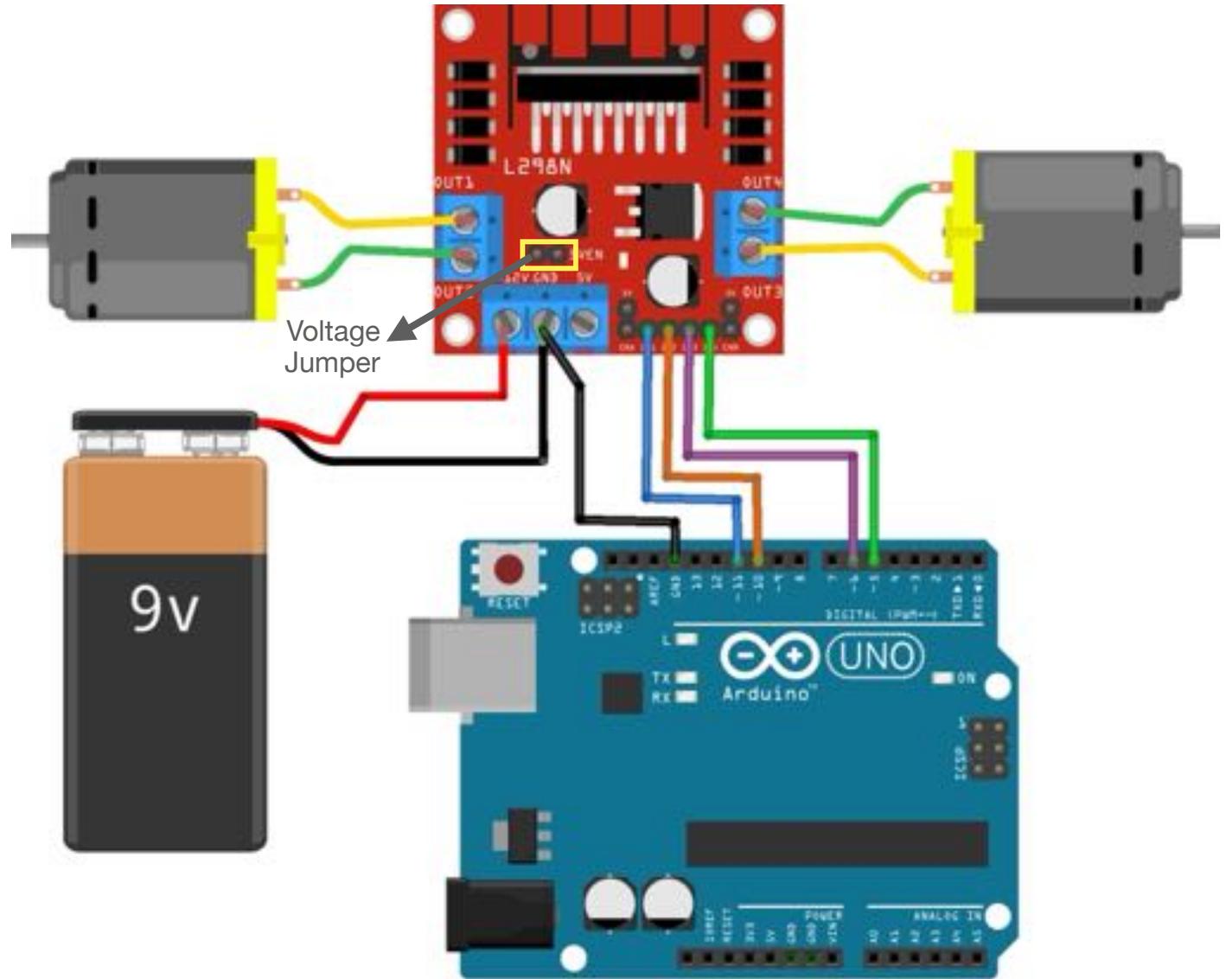
L298N Motor Driver Board

- Geared DC Motors need high current, around 200 mA with no load
- Arduino outputs max 40 mA current
- You cannot connect geared DC motors directly to an Arduino
- You need a Motor Driver board. L298N is a relatively cheap board (Rs 250)
- Motor Driver board converts low current input signal from a microbit into a high current signal to run different types of motors
- With L298N Motor Driver board, you can control both the direction (H-Bridge) and speed of a motor

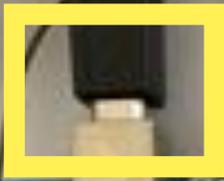
Wiring Option-1

You will need to supply voltage to the Arduino board and to the L298N board.

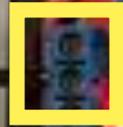
Voltage jumper is in place.



Arduino is connected to its own power supply



L298 is connected to Power Supply



Voltage jumper is in place



Arduino GND connected with GND of L298N



- L298N board (battery pack) and Arduino board (USB), both have their own power supply.
- Voltage jumper is in place
- GND of Arduino and GND of L298N are connected

Tinkercad Code

The image displays two screenshots of Tinkercad code blocks. The left screenshot shows a 'forever' loop containing four 'set pin' blocks (pins 5, 6, 10, 11) and a 'wait 3 secs' block. The right screenshot shows a sequence of 'set pin' blocks (pins 10, 11, 5, 6, 10, 11) and two 'wait' blocks (3 secs and 2 secs).

```
forever loop:  
  set pin 5 to HIGH  
  set pin 6 to LOW  
  set pin 10 to HIGH  
  set pin 11 to HIGH  
  wait 3 secs  
  set pin 5 to LOW  
  set pin 6 to HIGH  
end loop
```

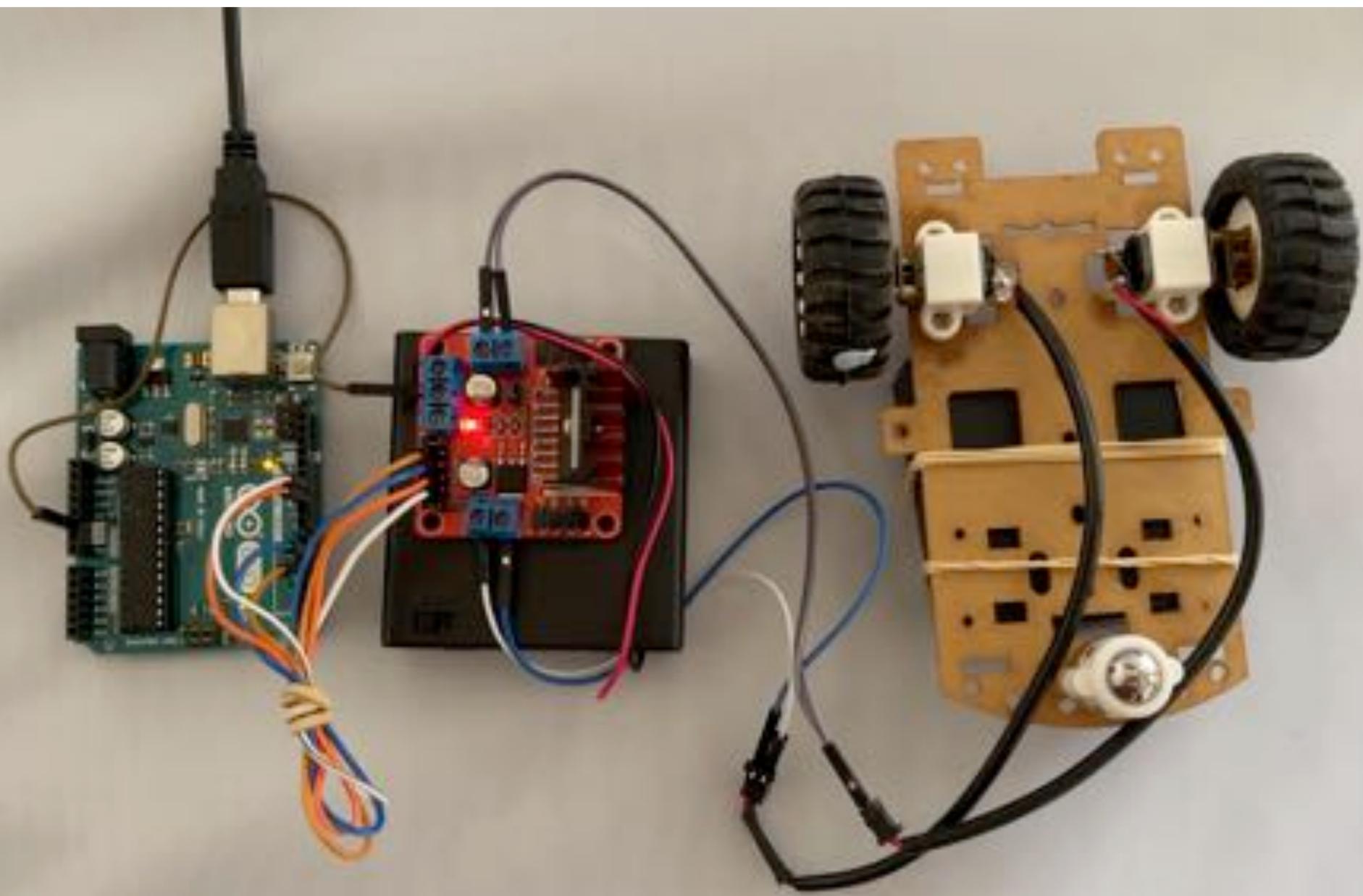
```
set pin 10 to LOW  
set pin 11 to HIGH  
wait 3 secs  
set pin 5 to LOW  
set pin 6 to LOW  
set pin 10 to LOW  
set pin 11 to LOW  
wait 2 secs
```

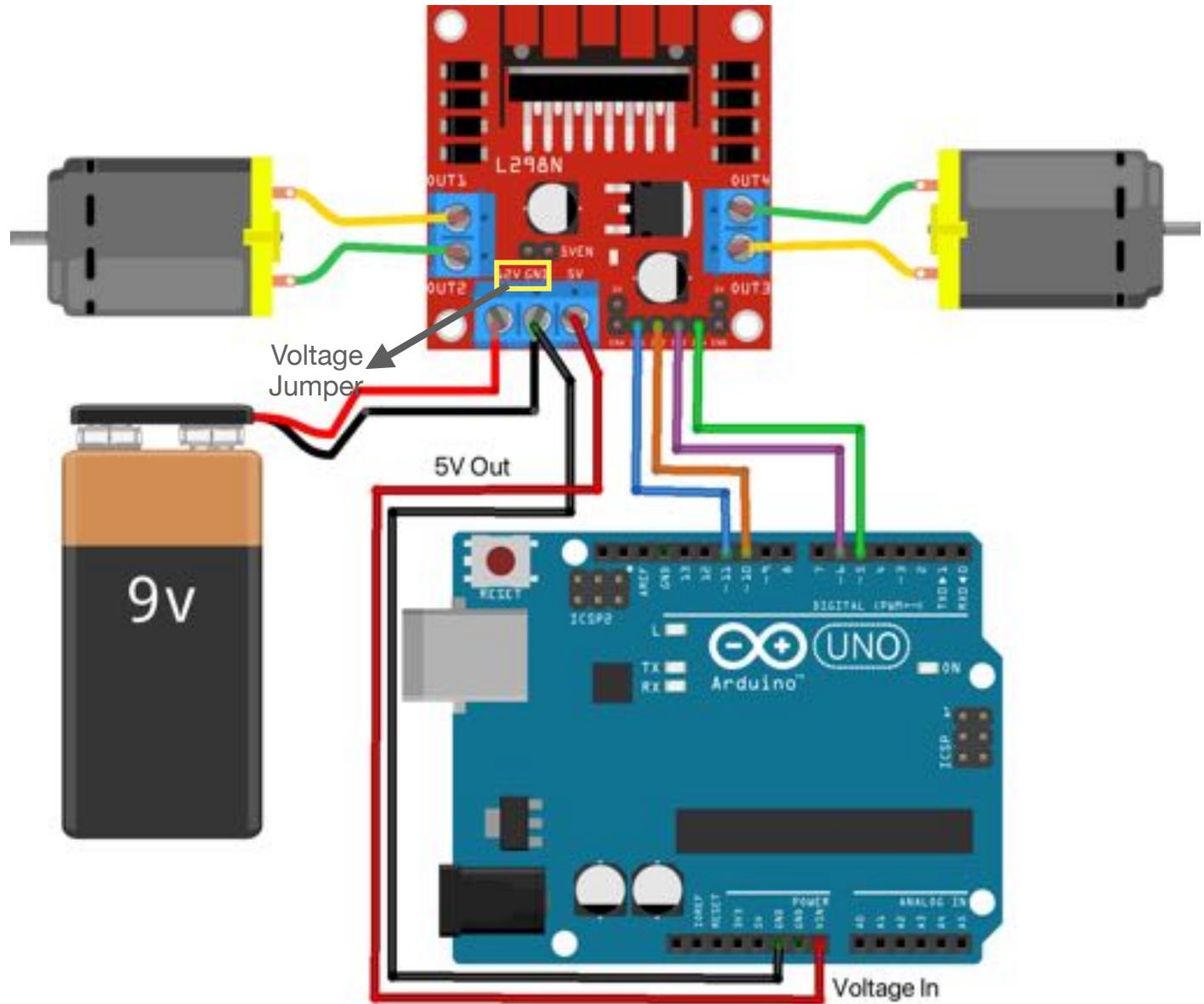
Arduino Code

```
// C++ code
//
void setup()
{
    pinMode(5, OUTPUT);
    pinMode(6, OUTPUT);
    pinMode(10, OUTPUT);
    pinMode(11, OUTPUT);
}
void loop()
{
    digitalWrite(5, HIGH);
    digitalWrite(6, LOW);
    digitalWrite(10, HIGH);
    digitalWrite(11, LOW);
    delay(2000);
}
```

```
digitalWrite(5, LOW);
digitalWrite(6, LOW);
digitalWrite(10, LOW);
digitalWrite(11, LOW);
delay(1000); // Wait for 3000
millisecond(s)
digitalWrite(5, LOW);
digitalWrite(6, HIGH);
digitalWrite(10, LOW);
digitalWrite(11, HIGH);
delay(2000); // Wait for 3000
millisecond(s)
digitalWrite(5, LOW);
digitalWrite(6, LOW);
digitalWrite(10, LOW);
digitalWrite(11, LOW);
delay(1000); // Wait for 2000
millisecond(s)
}
```



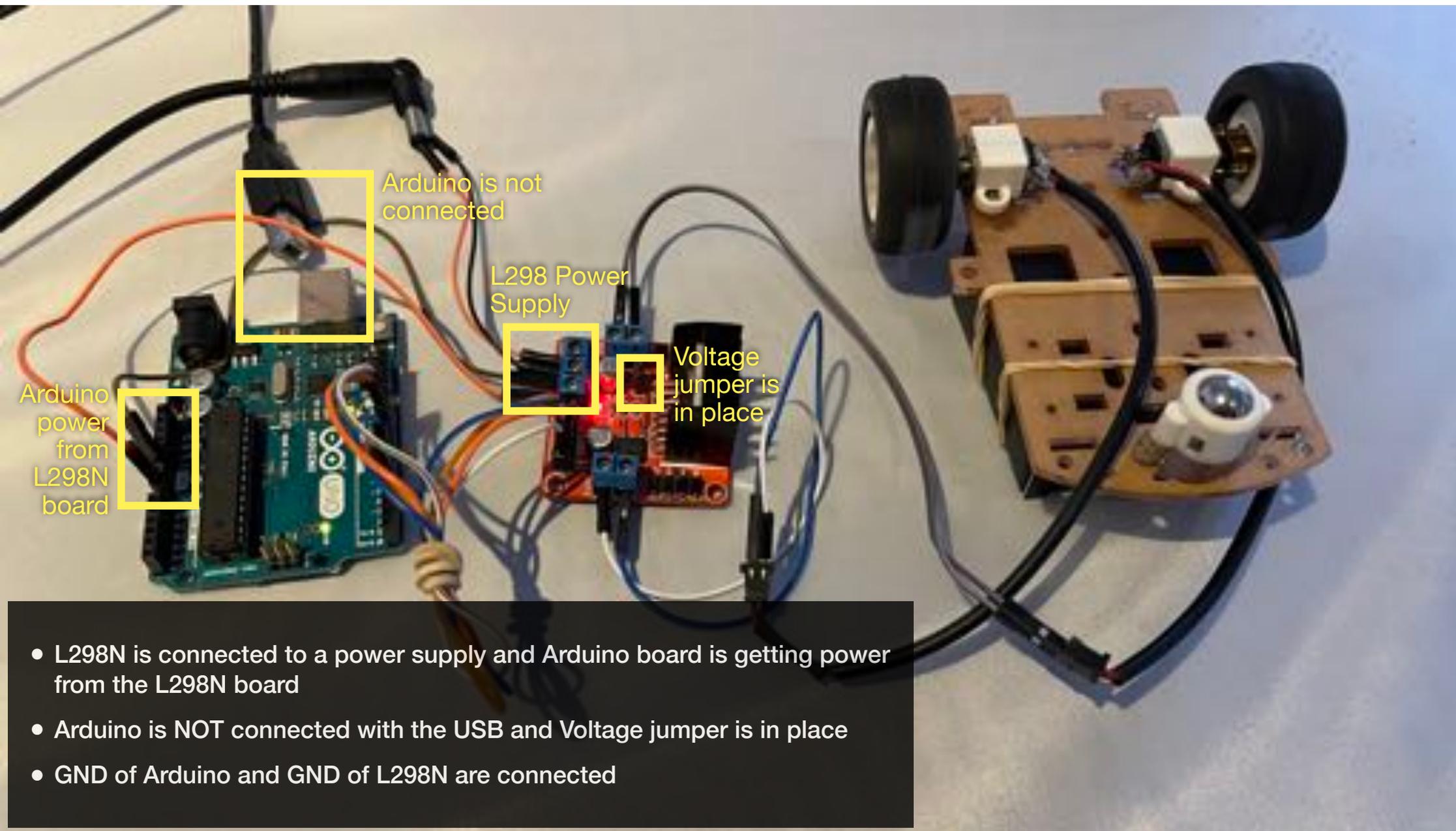




Wiring Option-2

Arduino Board is NOT connected to USB. It is getting voltage supply from L298N Board, from the 5V out pin.

Voltage jumper is in place.



Tinkercad Code

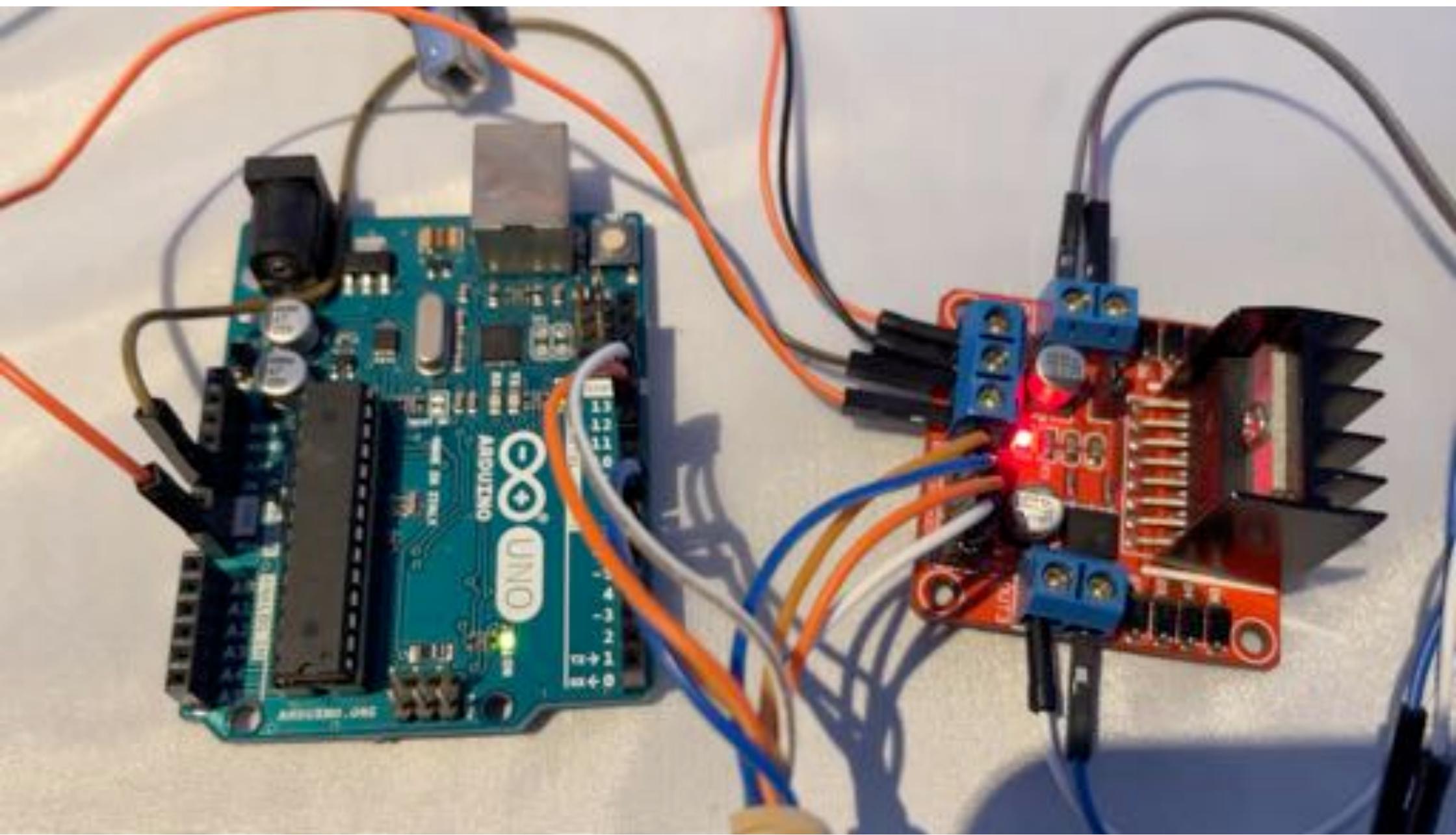
```
forever loop:  
  set pin 5 to HIGH  
  set pin 6 to LOW  
  set pin 10 to HIGH  
  set pin 11 to HIGH  
  wait 3 secs  
  set pin 5 to LOW  
  set pin 6 to HIGH  
end loop  
  
set pin 10 to LOW  
set pin 11 to HIGH  
wait 3 secs  
set pin 5 to LOW  
set pin 6 to LOW  
set pin 10 to LOW  
set pin 11 to LOW  
wait 2 secs
```

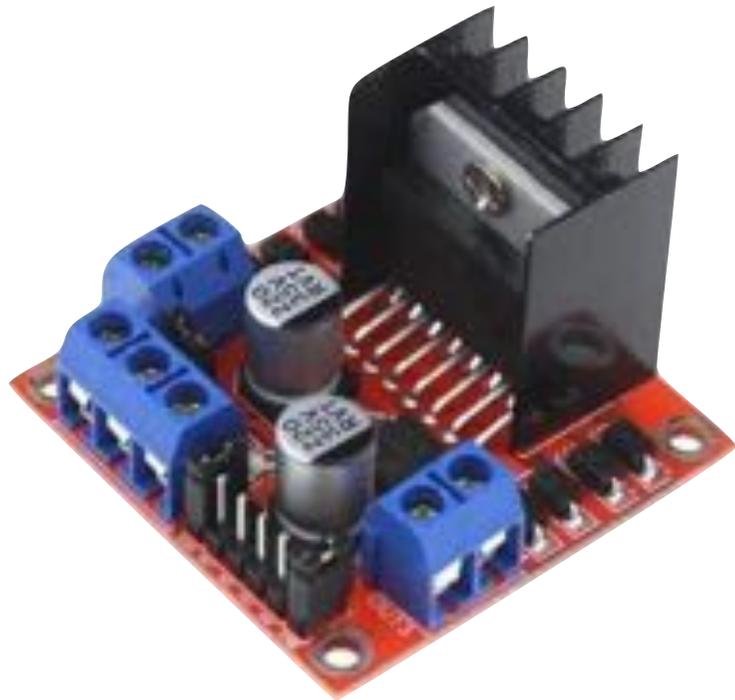
Arduino Code

```
// C++ code
//
void setup()
{
    pinMode(5, OUTPUT);
    pinMode(6, OUTPUT);
    pinMode(10, OUTPUT);
    pinMode(11, OUTPUT);
}
void loop()
{
    digitalWrite(5, HIGH);
    digitalWrite(6, LOW);
    digitalWrite(10, HIGH);
    digitalWrite(11, LOW);
    delay(2000);
}
```

```
digitalWrite(5, LOW);
digitalWrite(6, LOW);
digitalWrite(10, LOW);
digitalWrite(11, LOW);
delay(1000); // Wait for 3000
millisecond(s)
digitalWrite(5, LOW);
digitalWrite(6, HIGH);
digitalWrite(10, LOW);
digitalWrite(11, HIGH);
delay(2000); // Wait for 3000
millisecond(s)
digitalWrite(5, LOW);
digitalWrite(6, LOW);
digitalWrite(10, LOW);
digitalWrite(11, LOW);
delay(1000); // Wait for 2000
millisecond(s)
}
```





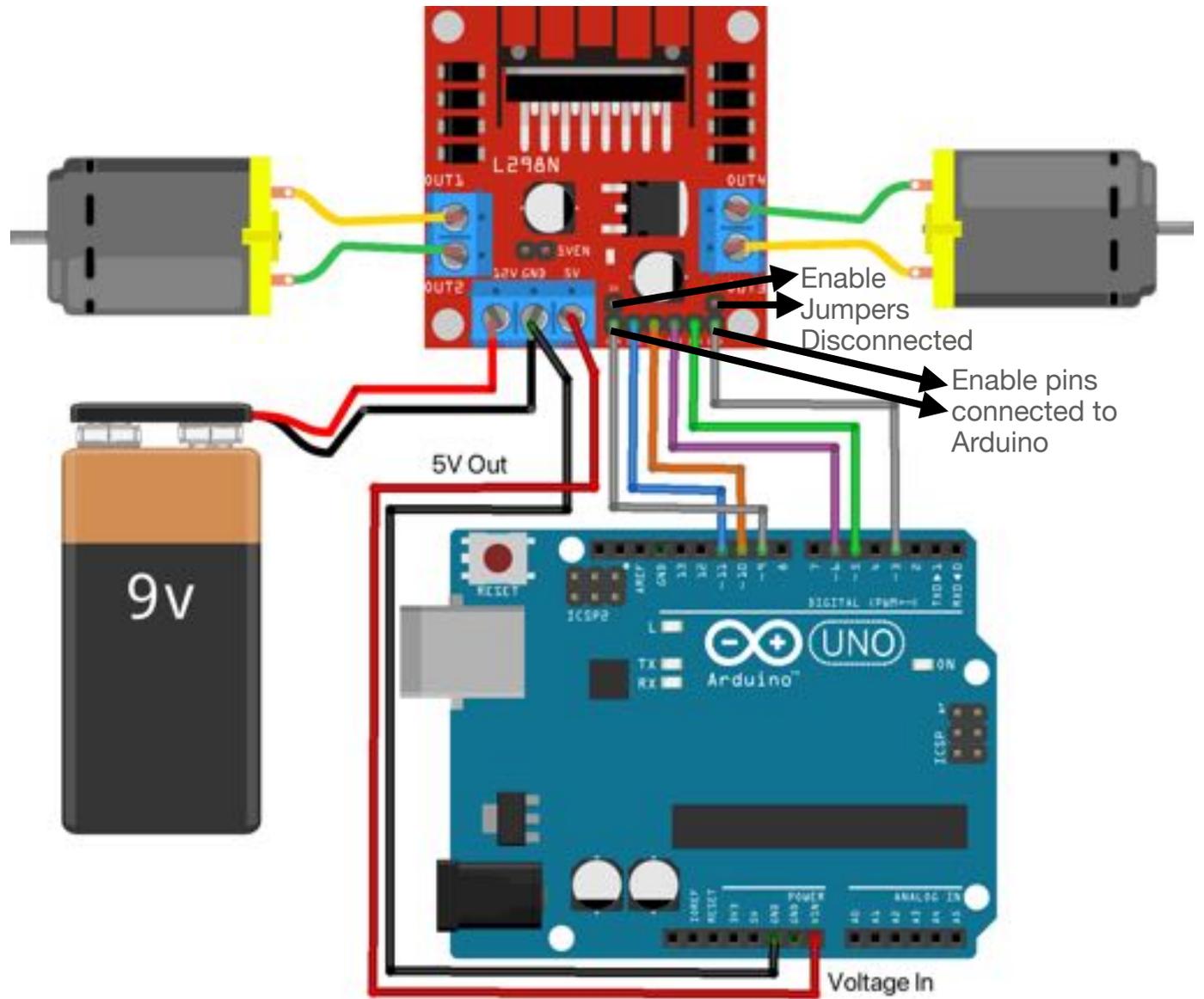


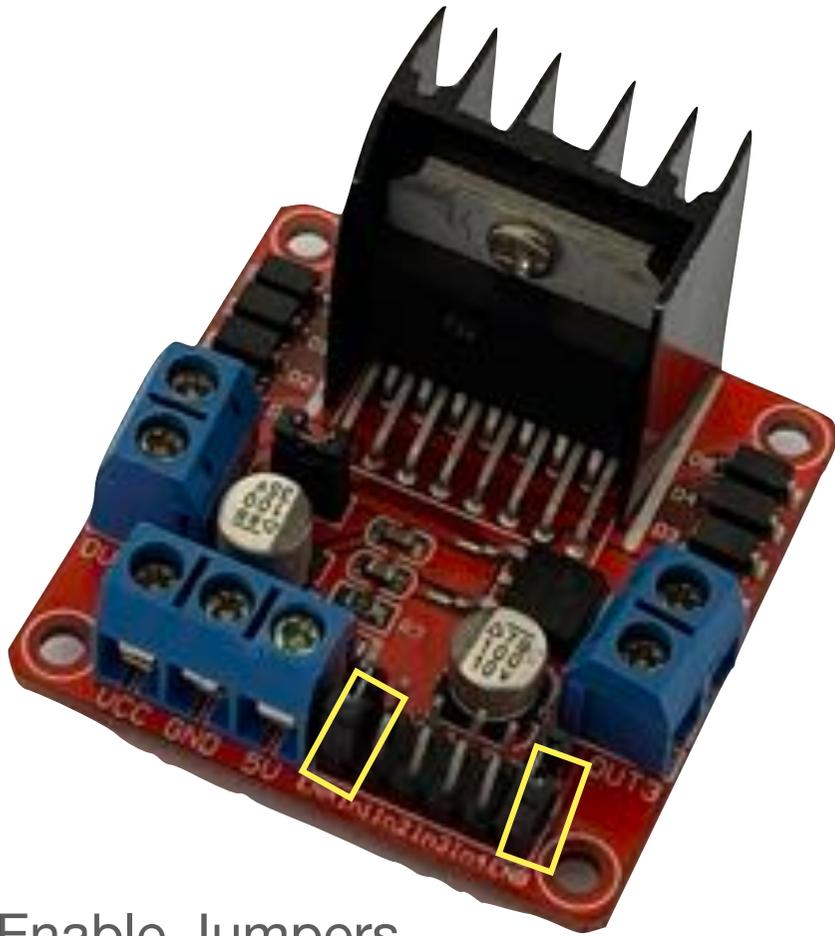
L298N Motor Driver Board

Controlling the Speed of two DC Motors (required for turning a vehicle left or right to different degrees)

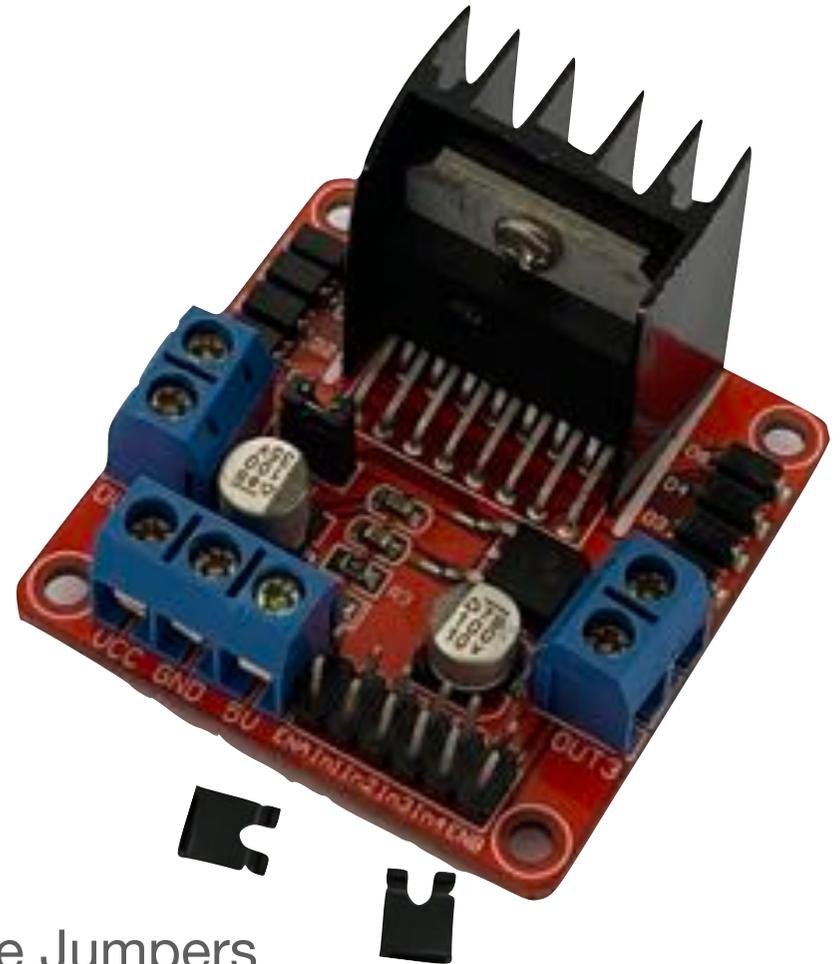
Controlling Speed

- Both Enable jumpers are disconnected.
- Enable pins are connected to Arduino.
- Voltage jumper is in place.
- Arduino voltage supply can be from the L298N board, or Arduino can have its own supply.

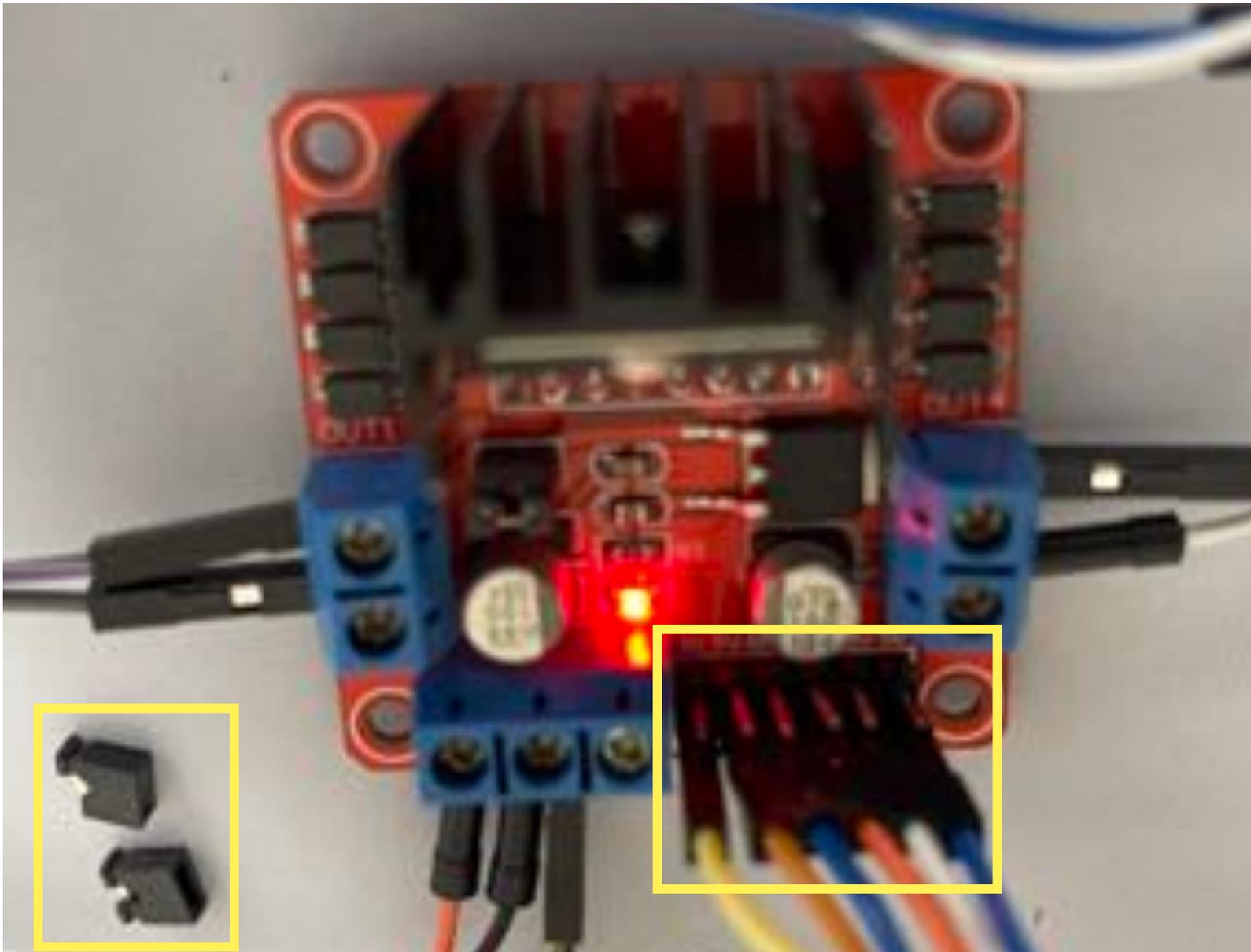




Enable Jumpers
in place



Enable Jumpers
disconnected



Both Enable Pin Jumpers are disconnected.

Enable pins are connected to Arduino pins.

Arduino Code

```
// C++ code
//
void setup()
{
  pinMode(3, OUTPUT);
  pinMode(9, OUTPUT);
  pinMode(5, OUTPUT);
  pinMode(6, OUTPUT);
  pinMode(10, OUTPUT);
  pinMode(11, OUTPUT);

  digitalWrite(3, HIGH);
  digitalWrite(9, HIGH);
}

void loop()
```

Enable Pins need to be HIGH



```
{
  analogWrite(5, 50);
  analogWrite(6, 0);
  analogWrite(10, 50);
  analogWrite(11, 0);
  delay(2000); // Wait for 2000 millisecond(s)
  analogWrite(5, 0);
  analogWrite(6, 0);
  analogWrite(10, 0);
  analogWrite(11, 0);
  delay(2000); // Wait for 2000 millisecond(s)
  analogWrite(5, 0);
  analogWrite(6, 200);
  analogWrite(10, 0);
  analogWrite(11, 200);
  delay(2000); // Wait for 2000 millisecond(s)
  analogWrite(5, 0);
  analogWrite(6, 0);
  analogWrite(10, 0);
  analogWrite(11, 0);
  delay(2000); // Wait for 2000 millisecond(s)
}
}
```

To change speed, vary the values from 0 (stop) to 255 (max speed)



Turning a Vehicle

```
void loop()  
{  
  analogWrite(5, 100);  
  analogWrite(6, 0);  
  analogWrite(10, 50);  
  analogWrite(11, 0);  
  delay(2000);  
}
```

By varying the speed of the two motors, you can turn the vehicle left or right, at different angles.

Speed of one motor at X and speed of the second motor at 0 will turn the vehicle 360° in one direction

