LAB #4 (Motor Direction and Speed Control)

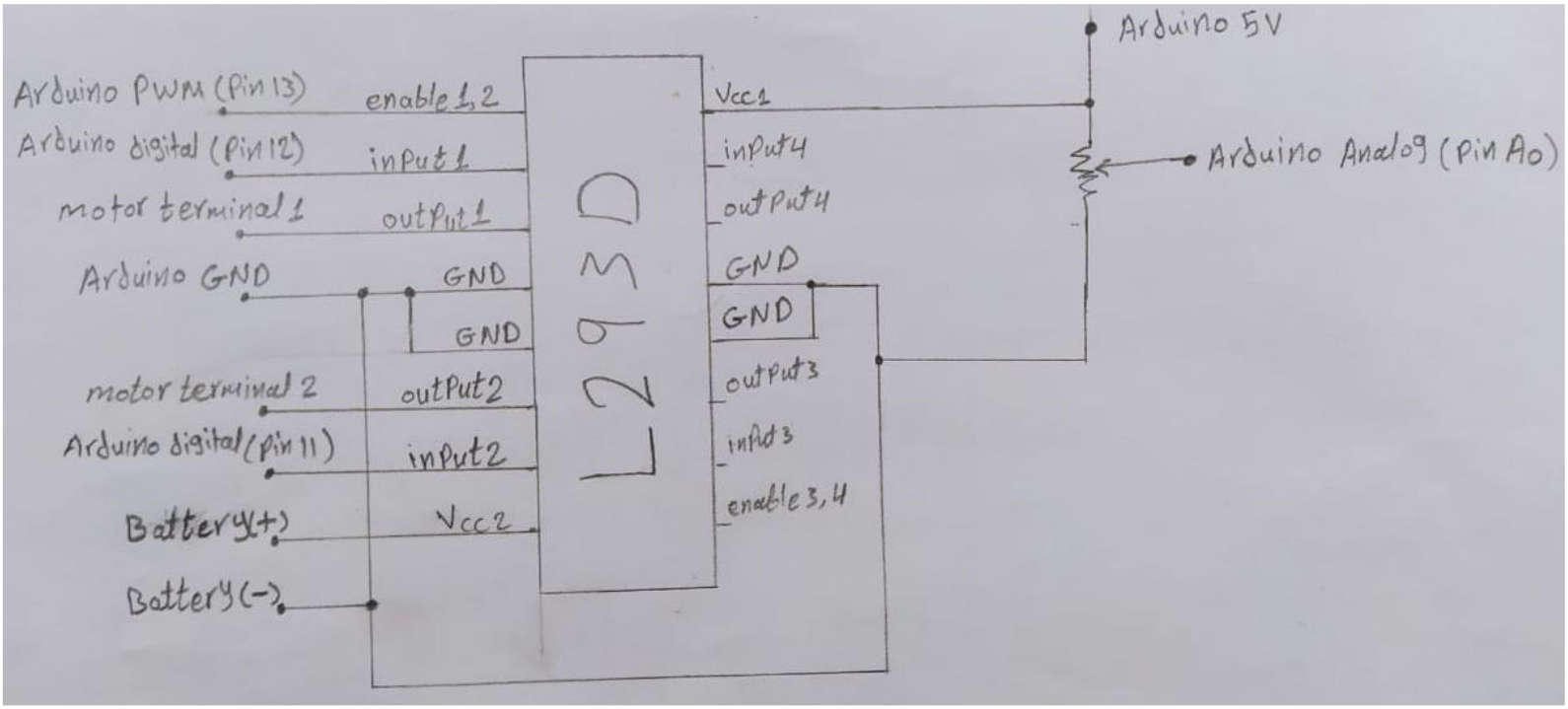
In this lab, we are going to control the direction and the speed of a DC motor using L293D IC:

- **Use a potentiometer to determine the when the motor reverse the direction and also the speed:**
  - **If potentiometer value is between 0 and 511 motor rotates in a certain direction and reverse the direction if it's more than 511.**
  - **As for the speed, map each range of each direction to 0~255 which is used for the PWM.**

Required components for this lab:

- **Breadboard**
- **Wires (male - male)**
- **1 Potentiometer**
- **1 L293D**
- **12V DC motor**
- **9V Battery**

Circuit diagram



Code

```
#define enable 13
#define inp1 12
#define inp2 11
#define pot A0

void setup() {
  // put your setup code here, to run once:

  pinMode(enable, OUTPUT);
  pinMode(inp1, OUTPUT);
  pinMode(inp2, OUTPUT);

  pinMode(pot, INPUT);

  //start communication with the motor
  Serial.begin(9600);

}


void dir1(){
  // rotate the motor in a certain direction (depending on motor terminals connetions to output1 and output2 to L293D)
  digitalWrite(inp1,HIGH);
  digitalWrite(inp2,LOW);
}

void dir2(){
  // rotate the motor in the reverse direction of dir1 function
  digitalWrite(inp1,LOW);
  digitalWrite(inp2,HIGH);
}
```

```
int potReading =0; // variable used to read the value from the potentiometer (0~1023)
int speed =0; // variable used to apply speed on the motor
void loop() {
  //read potentiometer value
  potReading = analogRead(pot);

  //print potentiometer value
  Serial.println(potReading);

  if(potReading < 512){
    // if the potentiometer value in range of 0 ~ 511 spin the motor in direction 1 otherwise direction 2

  //adjust speed based on the potentiometer value in its range (0~511) to (0~255)
  speed = map(potReading,0,511,0,255);
  //apply the speed
   analogWrite(enable,speed);

    dir1();
  }
  else{
    //adjust speed based on the potentiometer value in its range (512~1023) to (0~255)
   speed = map(potReading,512,1023,0,255);
   //apply the speed
   analogWrite(enable,speed);
    dir2();
  }

}
```