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// Arduino Nano PWM pins
// There are 6 PWM pins on the Arduino Nano board that can supply PWM voltage output.
// These pins are numbered 3, 5, 6, 9, 10 and 11.
// 490 Hz (pins 5 and 6: 980 Hz)

// the Arduino Nano has two interupt pins:  (pins 2 and 3)

// L298N Motor Driver

// if HL1 = LOW and HL2 = HIGH the motor will rotate forward
// if HL1 = HIGH and HL2 = LOW the motor will rotate backward
// if HL1 & HL2 are both LOW the motor will stop
// if HL1 & HL2 are both HIGH the motor will stop

const int aEncA  =  2;            // ( input ) use pin 2 to receive encoder A signal from motor a
const int aEncB  =  4;            // ( input ) use pin 4 to receive encoder B signal from motor a

int PWMccw = 200;
int PWMcw = 250;

const int aSpeed = 10;            // ( output ) use pin 10 to send a PWM signal to motor a
const int aHL1   =  6;            // ( output ) use pin 6 & 7 to send a rotation direction to motor a
const int aHL2   =  7;            // ( output ) use pin 6 & 7 to send a rotation direction to motor a

int sClockwise = 8;
int sCounterclockwise = 9;

volatile long aCount = 0L;        // declare a variable that keeps track of the encounter count for motor a

bool clockwise = true;


void setup()
  {
  pinMode(aEncA, INPUT);          // set the aEncA pin as an input pin
  pinMode(aEncB, INPUT);          // set the aEncB pin as an input pin

  pinMode(aSpeed, OUTPUT);        // set the aSpeed pin as an output pin
  pinMode(aHL1,   OUTPUT);        // set the aHL1 pin as an output pin
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  pinMode(aHL2,   OUTPUT);        // set the aHL2 pin as an output pin

  analogWrite(aSpeed, 0);         // set speed of motor a to zero
  digitalWrite(aHL1, HIGH);        // set rotation direction of motor a
  digitalWrite(aHL2, LOW);        // set rotation direction of motor a

  pinMode(sClockwise, INPUT);
  pinMode(sCounterclockwise, INPUT);

  attachInterrupt(digitalPinToInterrupt(aEncA), aUpdateCount, RISING);

  Serial.begin(9600);
  }

void loop()
  {
  if (digitalRead(sClockwise) == HIGH)
  {
    digitalWrite(aHL1, HIGH);
    digitalWrite(aHL2, LOW);
    analogWrite(aSpeed, 180);
    aCount = 0L;
  }
  else if (digitalRead(sCounterclockwise) == HIGH)
  {
    digitalWrite(aHL1, LOW);
    digitalWrite(aHL2, HIGH);
    analogWrite(aSpeed, 180);
    aCount = 0L;
  }
  else
  {
   if (clockwise == true)
    {
    digitalWrite(aHL1, HIGH);
    digitalWrite(aHL2, LOW);

    if (aCount < 715)
      {
        analogWrite(aSpeed, PWMcw);
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      }
    else
      {
      clockwise = false;
      digitalWrite(aHL1, LOW);
      digitalWrite(aHL2, LOW);
      delay(5000);
      }
    }
  else
    {
    digitalWrite(aHL1, LOW);
    digitalWrite(aHL2, HIGH);

    if (aCount > 20)
      {
        analogWrite(aSpeed, PWMccw);
      }
    else
      {
      clockwise = true;
      digitalWrite(aHL1, LOW);
      digitalWrite(aHL2, LOW);
      delay(5000);
      }
    }
  }
 }

void aUpdateCount()
  {
  if (digitalRead(aEncB) == LOW)      // the motor is turning clockwise
    {
    aCount++;                         // increment the count
    }
  else                                // the motor is turning counterclockwise
    {
    aCount--;                         // decrement the count
    }
  }
```