

WIKI Les Portes Logiques

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<https://www.instructables.com/id/Low-Cost-Arduino-Compatible-Drawing-Robot/>
<http://archive.monograph.io/joshburker/logoturtle>

<http://joshburker.pbworks.com/w/page/103156198/Logo%20Turtle%20Robot>
<http://joshburker.pbworks.com/w/page/103854757/ArduinoLogo>

title

```
// Download and install Trinket Pro drivers from
// https://learn.adafruit.com/introducing-pro-trinket/starting-the-bootloader

// [Tools] -> [Programmer] -> "USBtinyISP"
// [Tools] -> [Board] -> "Pro Trinket 3V/12 Mhz (USB)"

#include <Servo.h>

// setup servo
int servoPin = 8;
int PEN_DOWN = 170; // angle of servo when pen is down
int PEN_UP = 80; // angle of servo when pen is up
Servo penServo;

int wheel_dia=66.25; // # mm (increase = spiral out)
int wheel_base=112; //, # mm (increase = spiral in)
int steps_rev=128; //, # 512 for 64x gearbox, 128 for 16x gearbox
int delay_time=6; // # time between steps in ms

// Stepper sequence org->pink->blue->yel
int L_stepper_pins[] = {10, 12, 13, 11};
int R_stepper_pins[] = {3, 5, 6, 4};

int fwd_mask[][4] = {{1, 0, 1, 0},
                    {0, 1, 1, 0},
                    {0, 1, 0, 1},
                    {1, 0, 0, 1}};

int rev_mask[][4] = {{1, 0, 0, 1},
                    {0, 1, 0, 1},
                    {0, 1, 1, 0},
                    {1, 0, 1, 0}};

void setup() {
  randomSeed(analogRead(1));
  // put your setup code here, to run once:
  Serial.begin(9600);
  for(int pin=0; pin<4; pin++){
    pinMode(L_stepper_pins[pin], OUTPUT);
    digitalWrite(L_stepper_pins[pin], LOW);
    pinMode(R_stepper_pins[pin], OUTPUT);
    digitalWrite(R_stepper_pins[pin], LOW);
  }
  penServo.attach(servoPin);
  Serial.println("setup");
}

void loop(){ // draw a calibration box 4 times
  pendown();
  for(int x=0; x<12; x++){
    forward(100);
    left(90);
  }
  penup();
  done(); // releases stepper motor
  while(1); // wait for reset
}

// ----- HELPER FUNCTIONS -----
int step(float distance){
  int steps = distance * steps_rev / (wheel_dia * 3.1412); //24.61
  /*
  Serial.print(distance);
  Serial.print(" ");
  Serial.print(steps_rev);
  Serial.print(" ");
  Serial.print(wheel_dia);
  Serial.print(" ");
  Serial.println(steps);
  delay(1000);*/
}
```

```

    return steps;
}

void forward(float distance){
    int steps = step(distance);
    Serial.println(steps);
    for(int step=0; step<steps; step++){
        for(int mask=0; mask<4; mask++){
            for(int pin=0; pin<4; pin++){
                digitalWrite(L_stepper_pins[pin], rev_mask[mask][pin]);
                digitalWrite(R_stepper_pins[pin], fwd_mask[mask][pin]);
            }
            delay(delay_time);
        }
    }
}

void backward(float distance){
    int steps = step(distance);
    for(int step=0; step<steps; step++){
        for(int mask=0; mask<4; mask++){
            for(int pin=0; pin<4; pin++){
                digitalWrite(L_stepper_pins[pin], fwd_mask[mask][pin]);
                digitalWrite(R_stepper_pins[pin], rev_mask[mask][pin]);
            }
            delay(delay_time);
        }
    }
}

void right(float degrees){
    float rotation = degrees / 360.0;
    float distance = wheel_base * 3.1412 * rotation;
    int steps = step(distance);
    for(int step=0; step<steps; step++){
        for(int mask=0; mask<4; mask++){
            for(int pin=0; pin<4; pin++){
                digitalWrite(R_stepper_pins[pin], rev_mask[mask][pin]);
                digitalWrite(L_stepper_pins[pin], rev_mask[mask][pin]);
            }
            delay(delay_time);
        }
    }
}

void left(float degrees){
    float rotation = degrees / 360.0;
    float distance = wheel_base * 3.1412 * rotation;
    int steps = step(distance);
    for(int step=0; step<steps; step++){
        for(int mask=0; mask<4; mask++){
            for(int pin=0; pin<4; pin++){
                digitalWrite(R_stepper_pins[pin], fwd_mask[mask][pin]);
                digitalWrite(L_stepper_pins[pin], fwd_mask[mask][pin]);
            }
            delay(delay_time);
        }
    }
}

void done(){ // unlock stepper to save battery
    for(int mask=0; mask<4; mask++){
        for(int pin=0; pin<4; pin++){
            digitalWrite(R_stepper_pins[pin], LOW);
            digitalWrite(L_stepper_pins[pin], LOW);
        }
        delay(delay_time);
    }
}

void penup(){
    delay(250);
    Serial.println("PEN_UP()");
    penServo.write(PEN_UP);
    delay(250);
}

void pendown(){
    delay(250);
    Serial.println("PEN_DOWN()");
    penServo.write(PEN_DOWN);
    delay(250);
}

```

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