/\* Arduino Project - Pat's M&M Colour Sorting Machine

 \* Modified by Pat McMahon 20/6/2020

 \* A030

 \* by Dejan Nedelkovski, www.HowToMechatronics.com

 \* and No 26 Adeept Stepper Motor

 \*/

#include <Servo.h>

#define S0 2

#define S1 3

#define S2 4

#define S3 5

#define sensorOut 6

int Pin0 = 8;//definition digital 8 pins as pin to control the Stepper Motor IN1 (ULN24L01)

int Pin1 = 9;//definition digital 9 pins as pin to control the Stepper Motor IN2 (ULN24L01)

int Pin2 = 10;//definition digital 10 pins as pin to control the Stepper Motor IN3 (ULN24L01)

int Pin3 = 11;//definition digital 11 pins as pin to control the Stepper Motor IN4 (ULN24L01)

int \_step = 512;

int \_speed = 1;

Servo bottomServo;

int frequency = 0;

int color=0;

void setup() {

 pinMode(S0, OUTPUT);

 pinMode(S1, OUTPUT);

 pinMode(S2, OUTPUT);

 pinMode(S3, OUTPUT);

 pinMode(sensorOut, INPUT);

 // Setting frequency-scaling to 20%

 digitalWrite(S0, HIGH);

 digitalWrite(S1, LOW);

 pinMode(Pin0, OUTPUT);//Set digital 8 port mode, the OUTPUT for the output of the Stepper Motor

 pinMode(Pin1, OUTPUT);//Set digital 9 port mode, the OUTPUT for the output of the Stepper Motor

 pinMode(Pin2, OUTPUT);//Set digital 10 port mode, the OUTPUT for the output of the Stepper Motor

 pinMode(Pin3, OUTPUT);//Set digital 11 port mode, the OUTPUT for the output of the Stepper Motor

 //pinMode(bottomServo, OUTPUT);//Set digital 5 port mode, the OUTPUT for the output of the Servo Motor

}

//bottomServo.attach(5);

//Serial.begin(9600);

void loop() {

 Speed(15);//Stepper motor speed = 15 fast (note:speed from 1 to 15)

 Step(64);//Stepper motor forward 512/8=64 steps ---- 45 angle

 delay(2000);// delay 2S

 Speed(1); //Stepper motor speed = 1 slow (note:speed from 1 to 15)

 delay(2000);//delay 2S

}

void Speed(int stepperspeed)//set Stepper speed

{

 \_speed = 15 - stepperspeed;

 if( \_speed<1){

 \_speed = 1;

 }

 if( \_speed>15){

 \_speed = 15;

 }

}

void setStep(int a, int b, int c, int d)

{

 digitalWrite(Pin0, a);

 digitalWrite(Pin1, b);

 digitalWrite(Pin2, c);

 digitalWrite(Pin3, d);

}

void Step(int \_step)//Stepper motor rotation

{

 if(\_step>=0){ // Stepper motor forward

 for(int i=0;i<\_step;i++){

 delay(\_speed);

 setStep(1, 0, 0, 1);

 delay(\_speed);

 setStep(1, 0, 0, 0);

 delay(\_speed);

 setStep(1, 1, 0, 0);

 delay(\_speed);

 setStep(0, 1, 0, 0);

 delay(\_speed);

 setStep(0, 1, 1, 0);

 delay(\_speed);

 setStep(0, 0, 1, 0);

 delay(\_speed);

 setStep(0, 0, 1, 1);

 delay(\_speed);

 setStep(0, 0, 0, 1);

 delay(\_speed);

 }

 //}

 delay(500);

 //int readColor();

 delay(10);

 switch (color) {

 case 1:

 bottomServo.write(0);

 break;

 case 2:

 bottomServo.write(29);

 break;

 case 3:

 bottomServo.write(45);

 break;

 case 4:

 bottomServo.write(63);

 break;

 case 5:

 bottomServo.write(83);

 break;

 case 6:

 bottomServo.write(100);

 break;

 case 0:

 break;

 }

 delay(300);

 int readColor();

 color=0;

}

// Custom Function - readColor()

 int readColor();

 // Setting red filtered photodiodes to be read

 digitalWrite(S2, LOW);

 digitalWrite(S3, LOW);

 // Reading the output frequency

 frequency = pulseIn(sensorOut, LOW);

 int R = frequency;

 // Printing the value on the serial monitor

 Serial.print("R= ");//printing name

 Serial.print(frequency);//printing RED color frequency

 Serial.print(" ");

 delay(50);

 // Setting Green filtered photodiodes to be read

 digitalWrite(S2, HIGH);

 digitalWrite(S3, HIGH);

 // Reading the output frequency

 frequency = pulseIn(sensorOut, LOW);

 int G = frequency;

 // Printing the value on the serial monitor

 Serial.print("G= ");//printing name

 Serial.print(frequency);//printing RED color frequency

 Serial.print(" ");

 delay(50);

 // Setting Blue filtered photodiodes to be read

 digitalWrite(S2, LOW);

 digitalWrite(S3, HIGH);

 // Reading the output frequency

 frequency = pulseIn(sensorOut, LOW);

 int B = frequency;

 // Printing the value on the serial monitor

 Serial.print("B= ");//printing name

 Serial.print(frequency);//printing RED color frequency

 Serial.println(" ");

 delay(50);

 if(R<925 & R>845 & B<910 & B>870){

 color = 1; // Red

 }

 if(G<955 & G>860 & B<840 &B>803){

 color = 2; // Green

 }

 if(R<1055 & R>1020 & B<750 & B>675){

 color = 3; // Blue

 }

 if(R<770 & R>645 & G<930 & G>820){

 color = 4; // Yellow

 }

 if(G<1090 & G>1045 & B<875 & B>840){

 color = 5; // Orange

 }

 if (R<995 & R>960 & B<1180 &B>1105){

 color = 6; // Brown

 }

 return color;

}