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#include <Servo.h>
// Define Color Sensor Pins
#define S0 4
#define S1 5
#define S2 6
#define S3 7
#define SensorOut 3
#define LED 8
#define SlideSwitch 2
//Calibration Values
int RedMin = 15;
int RedMax = 160;
int GreenMin = 16;
int GreenMax = 170;
int BlueMin = 12;
int BlueMax = 135;
//Variables for Color Pulse Width Measurements
int RedPulse = 0;
int GreenPulse = 0;
int BluePulse = 0;
Servo servo;
void setup() {

  // Setting S0 - S3 as outputs
  pinMode(S0, OUTPUT);
  pinMode(S1, OUTPUT);
  pinMode(S2, OUTPUT);
  pinMode(S3, OUTPUT);
  pinMode(SensorOut, INPUT);

  //Setting Pulse Width Scaling to 20%
  digitalWrite(S0,HIGH);
  digitalWrite(S1, LOW);

  //Setting SlideSwitch as input and LED as OutPut
  pinMode(SlideSwitch, INPUT);
  pinMode(LED, OUTPUT);

  //Servo Settings
  servo.attach(9);
  //Begins Serial Communication
  Serial.begin(9600);
}

void loop() {
  if (digitalRead(2)) { // if the switch is pressed
    digitalWrite(8, HIGH);

    RedPulse = getRedPulse(); //Read Red PulseWidth
    delay (100);
    GreenPulse = getGreenPulse();//Read Green PulseWidth
    delay(100);
    BluePulse = getBluePulse(); //Read Blue PulseWidth
    delay(100);
    //Printing outputs to Serial Monitor
    Serial.print("Red = ");
    Serial.print(RedPulse);
    Serial.print(" Green = ");
    Serial.print(GreenPulse);
    Serial.print(" Blue = ");
    Serial.println(BluePulse);
    if (RedPulse>16 && RedPulse<22 && GreenPulse>17 &&GreenPulse<22 && BluePulse>12 &&BluePulse<19) { //Requirements for White Color
      servo.write(11.25); //rotate in between 0-45 degrees
    }
    else if (RedPulse>140 && RedPulse<170 && GreenPulse>150 &&GreenPulse<180 && BluePulse>115 &&BluePulse<135) { //Requirements for Black Color
      servo.write(33.75); //rotate in between 45-90 degrees
    }
    else if (RedPulse>23 && RedPulse<40 && GreenPulse>70 &&GreenPulse<85 && BluePulse>50 &&BluePulse<65) { //Requirements for Red Color
      servo. write(56.25); // rotate in between 90-135 degrees
    }
    else if (RedPulse>53 && RedPulse<70 && GreenPulse>73 &&GreenPulse<95 && BluePulse>30 &&BluePulse<45) { //Requirements for Purple Color
      servo. write(78.75); // rotate in between 135-180 degrees
    }
    else if (RedPulse>65 && RedPulse<85 && GreenPulse>45 &&GreenPulse<60 && BluePulse>60 &&BluePulse<80) { //Requirements for Green Color
      servo.write(101.25); //rotate 180-225 degrees
    }
    else if (RedPulse>95 && RedPulse<110 && GreenPulse>65 &&GreenPulse<90 && BluePulse>30 &&BluePulse<50) { //Requirements for Blue Color
      servo.write(123.75); //rotate 225-270 degrees
    }
    else if (RedPulse>20 && RedPulse<33 && GreenPulse>50 &&GreenPulse<70 && BluePulse>50 &&BluePulse<70) { //Requirements for Orange Color
      servo.write(146.25); //rotate 270-315 degrees
    }
    else if (RedPulse>35 && RedPulse<50 && GreenPulse>70 &&GreenPulse<95 && BluePulse>70 &&BluePulse<90) { //Requirements for Brown Color
      servo.write(168.75); //rotate 315-360 degrees
    }
    else{
      // Vservo.write(0); //if no colors are sensed(no button is pressed, the servo position will return back to 0 deg)
    }
  }
  else {
    digitalWrite(8, LOW); //LED turns off if the slide switch is off
  }
}

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    }  
  }  
  
  // Function for Red  
  int getRedPulse() {  
    digitalWrite(S2, LOW); //Setting Sensor to read Red Only  
    digitalWrite(S3, LOW);  
    int RPW;  
    RPW = pulseIn(SensorOut, LOW); //Read the output pulse Width  
    return RPW;  
  }  
  //Function for Green  
  int getGreenPulse() {  
    digitalWrite(S2, HIGH); //Setting Sensor to read Green Only  
    digitalWrite(S3, HIGH);  
    int GPW;  
    GPW = pulseIn(SensorOut, LOW); //Read the output pulse Width  
    return GPW;  
  }  
  //Function for Blue  
  int getBluePulse() {  
    digitalWrite(S2, LOW); //Setting Sensor to read Blue Only  
    digitalWrite(S3, HIGH);  
    int BPW;  
    BPW = pulseIn(SensorOut, LOW); //Read the output pulse Width  
    return BPW;  
  }  
}
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