LDR Color Detector

John Poirier
Department of Electrical and Computer Engineering
jlpoirie@uvm.edu

***Abstract*—This project outlines a light-dependent resistor based color detector. This device utilizes a light dependent resistor that changes resistance depending on the measured light to read the relative intensity of reflected light at red, green, and blue wavelengths. These relative intensities are then used to map to a corresponding color, and that color and the measured RGB values are displayed using a 16x2 LCD.**

I. Background

Any color can be described in terms of its red, green, and blue intensities. Intensities are commonly mapped to values between 0 (absence of color) and 255 (maximum color). Light dependent resistors have the unique characteristic of decreasing resistance as light intensity increases. This behavior can be used to read light intensities by sequentially flashing red, green, blue, and white (RGB all at once) light onto a surface, and recording the intensity of light reflected back. Those relative intensities can then be mapped to RGB color values, and a color match can be found.

II. Design

A. Hardware Design

Parts:

- Arduino UNO or equivalent microcontroller
- Push Button
- 3x 2N7000 MOSFET
- 3x 220Ω Resistors
- 1MΩ Resistor
- 1 LED Segment from a 5V 5050 Addressable LED Strip (other LEDs of a similar form factor can be used)
- 10k LDR (photocell)
- LCD 16x2 Display with I2C Backpack
- 3D Printed Shroud - file can be downloaded here (modify as needed) [1]

The above parts, along with a breadboard and the necessary wires were used to create the color detector. Additionally, the 3D printed shroud was used with the LED strip and the LDR to limit ambient light as much as possible and properly align the LED with the LDR for reflections. The circuit diagram for this device is shown in **Figure 1**.

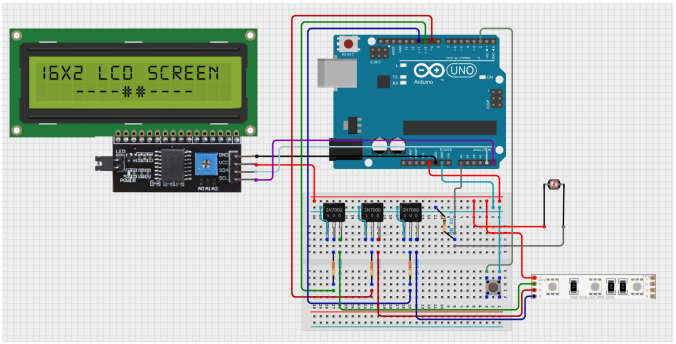

Figure 1: LDR Color Detector Circuit Diagram

The first portion of the device that was designed was the LED control. The LED strip used has a 5V pad, and a G, R, and B pad. These pads were soldered, and the 5V wire was connected to the 5V output of the Arduino. The G wire is connected to a 220Ω resistor, which is then connected to the gate pin of a 2N7000 MOSFET. The same is done for the R and B wires. The 2N7000 is necessary to control the LEDs, as the LED strip requires a higher current than the Arduino pin is capable of outputting directly. The MOSFET acts as a switch, allowing the Arduino to control the LED using the 5V output from the Arduino for power, while using the designated LED pins for signal control. The source of the MOSFET is connected to common ground. The drain pin of the 2N7000 is connected to the digital signal pin for the LED (D9 for red, D10 for green, D11 for blue). This completes the necessary connections for control of the LEDs.

The next system that was designed was the LDR input. This simple connection has one terminal of the LDR connected to 5V from the Arduino. The other terminal of the LDR is connected to a node which also has connections to one terminal of a 1MΩ resistor and the A0 pin of the Arduino. The other terminal of the 1MΩ resistor is connected to common ground. This creates a voltage divider circuit between the 1MΩ resistor and pin A0, which allows for variable reading of the input signal to A0 from the LDR. This completes the necessary connections for the LDR reading.

The final components to connect are the push button and the LCD. The push button is connected with one terminal to common ground and one terminal to pin D2 on the Arduino. This allows for button input to be read by the Arduino. The LCD is connected via I2C to the Arduino, with the GND pin connected to common ground, the VCC pin connected to 5V, the SDA pin connected to A4, and the SCL pin connected to A5. With these connections complete, the full LDR color detector hardware is set up.

B. Software Design

With the hardware complete, the code must be created. The first step of the code is to take a list of color names and RGB values and parse them in a way that is usable for the Arduino. The color list was collected from *99Colors*, and a total of

672 named colors were collected with their corresponding RGB values [2]. The Python script, provided in **appendix section B-A**, takes the full list and strips it to the necessary content and structure for the Arduino to be able to effectively scan through it.

With the color list set up, the Arduino code is then designed. This code can be found in **appendix section A-A**. First, the necessary libraries are included, the pins are defined, the LCD is initialized, and constants are defined. Then, various helper functions are defined. Functions for turning on the LED in states of red, green, blue, and white are defined, as well as a function to turn off the LED. A sampling function is defined, which sets up how the LDR will read the reflected light from the LED. Mathematical functions are defined to assist with finding the closest matching color to the detected RGB values. Functions for detecting button presses and double-presses are defined. A calibration function is defined, which creates a mode to calibrate the detector. This function activates on startup and when the button is pressed twice quickly. To calibrate, the sensor first sets up to read the RGB values of a pure white surface (such as a piece of paper). The observed values are stored for later use. These values should be the maximum values, as white reflects all colors. Then, the sensor is set up to read the RGB values of a pure black surface, and the observed values are stored for later use. These values should be the minimum values, as pure black would reflect none of the colors. These maximum and minimum values are later used for mapping the LDR readings to the 0-255 RGB values.

The next function of the code is the progressive searching for the nearest color. The color list used does not have a color associated with every possible RGB value, so the closest one to the reading must be found. To do this, the function begins with a narrow search range, only looking within 5 of the detected RGB values. It searches through the full list to find if any color matches within the search tolerance, and if it does not find a match, the function loosens the tolerance and searches again. This repeats until a color match is found. The "closeness" of the colors are evaluated using the Manhattan distance (L1 norm).

With those functions defined, the setup and loop are designed. The setup contains the pin setups for the LED, the initialization for the LCD, and serial initialization for debugging. It then enters calibration mode just before entering the loop. Inside the loop, the Arduino waits for the button to be pressed. If it is pressed once, it initializes a scan and returns the closest matching color, displaying the RGB values and the color name to the LCD. If the button is pressed twice, it re-enters the calibration state.

III. Use

To properly read the reflected light intensity, the device needs to be calibrated. To calibrate, double-press the button quickly, then place the detector shroud over a pure white surface, and press the button again. This records the reflected intensities for each red, green, and blue that correspond to white. Repeat this process on a black surface and the device is now calibrated with accurate intensity bounds for mapping to 0-255 RGB codes. The device is now able to read the red, green, and blue intensities and display the corresponding color on the LCD. To do so, place the detector shroud over whatever surface you wish to find the color of, and press the button once. This will scan the surface and report the closest matched color.

IV. Performance

Overall, this device succeeds at detecting the color of the surface beneath it. There are some cases where the detector will be inaccurate, primarily when scanning colors that are too dark or too light. The reason for this has to do with the color mapping. The mapping normalizes the intensities, which means the most important aspect becomes the difference between the red, green, and blue intensities. For pure white, the RGB values are 255, 255, 255, and for pure black, the RGB values are 0, 0, 0. These are very different RGB values, but when you compare the difference between red, green, and blue for white and black, they are the same. This leads to issues detecting colors that are either too dark or too light. However, the range of colors in which the detector is effective is significant, and most trials are successful.

V. Conclusion

This project can be concluded as a success. Although there are some troubles with detecting certain colors, the device works under a considerable range of color conditions. Furthermore, the code was optimized to allow a library of 672 color names and their corresponding RGB values to live locally on an Arduino UNO without memory issues, and the scanning process was made efficient enough to have no noticeable delay between the end of scanning and finding the matching value. Some possible next steps in this project could be to stabilize the button inputs, as they currently exhibits erratic behavior, unreliably detecting inputs. Further work in the detection of dark colors would also greatly improve the accuracy of the detector as those are the points of major weakness. Additionally, the physical device primarily uses jumper wires and electrical tape to connect everything, which could also be significantly improved to increase stability.

References

[1] HackMakeMod, "LDR Color Checker," HackMakeMod, 2025, accessed: Dec. 12, 2025. [Online]. Available: https://hackmakemod.com/blogs/projects/ldr-color-checker

[2] 99Colors, "List of named colors with hex codes, rgb values, and names," 2025, accessed: Dec. 12, 2025. [Online]. Available: https://www.99colors.net/color-names

APPENDIX A
ARDUINO SOURCE CODE

A. Color_Detector_v2

```
// John Poirier
// Color Detector using RGB LED + LDR
// 12/12/25
//
// Requires colors.h generated with Color_List_Parser.py (lets you change/add/remove color naming and RGB values)


#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include "colors.h" //672 colors!!!

// define pins
const int redPin   = 9;
const int greenPin = 10;
const int bluePin = 11;
const int buttonPin = 2;

// initialize LCD
LiquidCrystal_I2C lcd(0x27, 16, 2);

// LED flash timings
const uint16_t SETTLE_RGB_MS = 30;
const uint16_t SETTLE_W_MS   = 30;

// calibration definitions (defaults)
uint16_t R_max = 800, G_max = 800, B_max = 800; // white reference (should be higher)
uint16_t R_min = 100, G_min = 100, B_min = 100; // black reference (should be lower)

// LED controls
void ledOff(){digitalWrite(redPin,HIGH); digitalWrite(greenPin,HIGH); digitalWrite(bluePin,HIGH);}
void ledR(){digitalWrite(redPin,LOW); digitalWrite(greenPin,HIGH); digitalWrite(bluePin,HIGH);}
void ledG(){digitalWrite(redPin,HIGH); digitalWrite(greenPin,LOW); digitalWrite(bluePin,HIGH);}
void ledB(){digitalWrite(redPin,HIGH); digitalWrite(greenPin,HIGH); digitalWrite(bluePin,LOW);}
void ledW(){digitalWrite(redPin,LOW); digitalWrite(greenPin,LOW); digitalWrite(bluePin,LOW);}

// sampling
uint16_t sampleWith(void (*fn)(), uint16_t settle){
 fn();
 delay(settle);
 uint16_t v = analogRead(A0);
 ledOff();
 return v;
}

// finds median of 3 values (noise stability)
uint16_t median3(uint16_t a, uint16_t b, uint16_t c){
 uint16_t t;
 if(a > b){ t = a; a = b; b = t; }
 if(b > c){ t = b; b = c; c = t; }
 if(a > b){ t = a; a = b; b = t; }
 return b;
}

// reads three times, finds median (noise stability)
uint16_t readMedian3(void (*fn)(), uint16_t settle){
 uint16_t a = sampleWith(fn, settle); delay(3);
 uint16_t b = sampleWith(fn, settle); delay(3);
 uint16_t c = sampleWith(fn, settle);
 return median3(a,b,c);
}

// read for medians
uint16_t readR(){return readMedian3(ledR, SETTLE_RGB_MS);}
uint16_t readG(){return readMedian3(ledG, SETTLE_RGB_MS);}
uint16_t readB(){return readMedian3(ledB, SETTLE_RGB_MS);}
uint16_t readW(){return readMedian3(ledW, SETTLE_W_MS);}

// button functions
bool waitForPress(){
 if(digitalRead(buttonPin)==LOW){
  while(digitalRead(buttonPin)==LOW);
  delay(20); //debouncing
  return true;
 }
 return false;
}

// double-press button
bool checkDoublePress(unsigned long timeout_ms = 300){
 unsigned long startTime = millis();
 if(waitForPress()){
  // got first press, wait for second
  while(millis() - startTime < timeout_ms){
   if(digitalRead(buttonPin)==LOW){
    while(digitalRead(buttonPin)==LOW); // wait for release
    delay(20);
    return true; // valid double press
   }
  }
 }
 return false;
}

// calibration mode
void calibrationMode(){
 lcd.clear();
 lcd.print("Calibration Mode");
 lcd.setCursor(0,1);
 lcd.print("Place on WHITE");
 Serial.println("\n--- Calibration Mode ---");
 Serial.println("Place on WHITE surface and press button.");

 while(!waitForPress());

```

```
  // scan white
  R_max = readR();
  G_max = readG();
  B_max = readB();

  lcd.clear();
  lcd.print("WHITE: R/G/B");
  char buf[16];
  snprintf(buf,16,"%4d %4d %4d",R_max,G_max,B_max); // show LDR readings (raw)
  lcd.setCursor(0,1);
  lcd.print(buf);
  Serial.print("WHITE (MAX): R:"); Serial.print(R_max);
  Serial.print(" G:"); Serial.print(G_max);
  Serial.print(" B:"); Serial.println(B_max);
  Serial.println("Place on BLACK surface and press button.");
  delay(1000); // display result for a bit, auto move on

  lcd.clear();
  lcd.print("Calibration Mode");
  lcd.setCursor(0,1);
  lcd.print("Place on BLACK");

  while(!waitForPress());

  // scan black
  R_min = readR();
  G_min = readG();
  B_min = readB();

  lcd.clear();
  lcd.print("BLACK: R/G/B");
  snprintf(buf,16,"%4d %4d %4d",R_min,G_min,B_min);
  lcd.setCursor(0,1);
  lcd.print(buf);
  Serial.print("BLACK (MIN): R:"); Serial.print(R_min);
  Serial.print(" G:"); Serial.print(G_min);
  Serial.print(" B:"); Serial.println(B_min);
  delay(1000); // show result, auto move on

  // check for reversed min/max (in case you calibrate wrong, won't be any errors (still won't work right though, need to recalibrate))
  if (R_max <= R_min) R_max = R_min + 1;
  if (G_max <= G_min) G_max = G_min + 1;
  if (B_max <= B_min) B_max = B_min + 1;

  lcd.clear();
  lcd.print("Calibration Done");
  delay(1000);
  lcd.clear();
  lcd.print("Ready");
  Serial.println("Calibration Done");
}

// progressive nearest color search
// start with a small search tolerance, then repeatedly search, increasing the tolerance, until a match is found
const uint8_t INITIAL_RANGE = 5; //initial search range (within _ of the defined color RGB value)
const uint8_t RANGE_INCREMENT = 5;
const uint8_t MAX_RANGE = 50; //max search range

const char* nearestColorProgressive(uint8_t R8, uint8_t G8, uint8_t B8){
 static char bestName[32];

 for(uint8_t range = INITIAL_RANGE; range <= MAX_RANGE; range += RANGE_INCREMENT){
  int bestDist = 1000;
  int found = 0;
  uint16_t bestIdx = 0;

  for(uint16_t i=0; i<NUM_COLORS; i++){
   Color c;
   memcpy_P(&c, &colors[i], sizeof(Color));

  // skip colors outside current search range
   if(abs((int)R8 - c.r) > range) continue;
   if(abs((int)G8 - c.g) > range) continue;
   if(abs((int)B8 - c.b) > range) continue;

  // find manhattan distance, log closest match
   int dist = abs((int)R8 - c.r) + abs((int)G8 - c.g) + abs((int)B8 - c.b);
   if(dist < bestDist){
    bestDist = dist;
    bestIdx = i;
    found = 1;
   }
  }

  // if a match is found, give the name
  if(found){
   const char* ptr = (const char*)pgm_read_pt
    r(&colors[bestIdx].name);
   strcpy_P(bestName, ptr);
   return bestName;
  }
 }
 // if match not found, return unknown (super unlikely to happen with 627 colors)
 strcpy(bestName, "unknown");
 return bestName;
}


// setup things
void setup(){
 pinMode(redPin,OUTPUT);
 pinMode(greenPin,OUTPUT);
 pinMode(bluePin,OUTPUT);
 pinMode(buttonPin,INPUT_PULLUP);

 lcd.init();
 lcd.backlight();

 Serial.begin(115200);
 lcd.print("Initializing...");
 Serial.println("Initializing.");

 // calibrate on startup
```

```
 calibrationMode();
 Serial.println("Ready.");
}

// main
void loop(){

 // check for double click
 if(checkDoublePress(300)){
  calibrationMode();
  return;
 }

 if(!waitForPress()) return;

 // read raw reflectances
 uint16_t Rraw = readR();
 uint16_t Graw = readG();
 uint16_t Braw = readB();

 // red - scale max, min LDR values to 0-255 for RGB vals
 long R_range = (long)R_max - R_min;
 uint8_t R8 = constrain(255L * ((long)Rraw - R_min) / R_range, 0, 255);

 // green - scale max, min LDR values to 0-255 for RGB vals
 long G_range = (long)G_max - G_min;
 uint8_t G8 = constrain(255L * ((long)Graw - G_min) / G_range, 0, 255);

 // blue - scale max, min LDR values to 0-255 for RGB vals
 long B_range = (long)B_max - B_min;
 uint8_t B8 = constrain(255L * ((long)Braw - B_min) / B_range, 0, 255);

 // find nearest color name
 const char* cname = nearestColorProgressive(R8, G8, B8);

 // show off the color RGB vals and the name found
 lcd.clear();
 char buf[16];
 snprintf(buf,16,"R%3d G%3d B%3d",R8,G8,B8);
 lcd.print(buf);

 lcd.setCursor(0,1);
 lcd.print(cname);

 // serial debug outputs
 Serial.print("Raw: R"); Serial.print(Rraw); Serial.print(" G"); Serial.print(Graw); Serial.print(" B"); Serial.print(Braw);
 Serial.print(" Scaled: R"); Serial.print(R8); Serial.print(" G"); Serial.print(G8); Serial.print(" B"); Serial.print(B8);
 Serial.print(" Closest: ");
 Serial.println(cname);
}
```

APPENDIX B
PYTHON SOURCE CODE

A. *Color_List_Parser*

```
'''
John Poirier
LDR Color Detector

This script takes the data string (edit as desired) which contains content direclty copy-pasted from https://www.99colors.net/color-names
'''

import re
import os

#The color list, gotten from https://www.99colors.net/color-names
data = r"""
Air Force blue        5D8AA8        93, 138, 168
Alice blue        F0F8FF        240, 248, 255
Alizarin crimson        E32636        227, 38, 54
Almond        EFDECD        239, 222, 205
Amaranth        E52B50        229, 43, 80
Amber        FFBF00        255, 191, 0
American rose        FF033E        255, 3, 62
Amethyst        9966CC        153, 102, 204
Android Green        A4C639        164, 198, 57
Anti flash white        F2F3F4        242, 243, 244
Antique brass        CD9575        205, 149, 117
Antique fuchsia        915C83        145, 92, 131
Antique white        FAEBD7        250, 235, 215
Ao        008000        0, 128, 0
Apple green        8DB600        141, 182, 0
Apricot        FBCEB1        251, 206, 177
Aqua        00FFFF        0, 255, 255
Aquamarine        7FFFD4        127, 255, 212
Army green        4B5320        75, 83, 32
Arsenic        3B444B        59, 68, 75
Arylide yellow        E9D66B        233, 214, 107
Ash gray        B2BEB5        178, 190, 181
Asparagus        87A96B        135, 169, 107
Atomic tangerine        FF9966        255, 153, 102
Auburn        A52A2A        165, 42, 42
Aureolin        FDEE00        253, 238, 0
AuroMetalSaurus        6E7F80        110, 127, 128
Awesome        FF2052        255, 32, 82
Azure        007FFF        0, 127, 255
Azure mist        F0FFFF        240, 255, 255
Baby blue        89CFF0        137, 207, 240
Baby blue eyes        A1CAF1        161, 202, 241
Baby pink        F4C2C2        244, 194, 194
Ball Blue        21ABCD        33, 171, 205
Banana Mania        FAE7B5        250, 231, 181
```

```
Banana yellow FFE135 255, 225, 53
Battleship gray 848482 132, 132, 130
Bazaar 98777B 152, 119, 123
Beau blue BCD4E6 188, 212, 230
Beaver 9F8170 159, 129, 112
Beige F5F5DC 245, 245, 220
Bisque FFE4C4 255, 228, 196
Bistre 3D2B1F 61, 43, 31
Bittersweet FE6F5E 254, 111, 94
Black 000000 0, 0, 0
Blanched Almond FFEBCD 255, 235, 205
Bleu de France 318CE7 49, 140, 231
Blizzard Blue ACE5EE 172, 229, 238
Blond FAF0BE 250, 240, 190
Blue 0000FF 0, 0, 255
Blue Bell A2A2D0 162, 162, 208
Blue Gray 6699CC 102, 153, 204
Blue green 00DDDD 0, 221, 221
Blue violet 8A2BE2 138, 43, 226
Blush DE5D83 222, 93, 131
Bole 79443B 121, 68, 59
Bondi blue 0095B6 0, 149, 182
Boston University Red CC0000 204, 0, 0
Brandeis blue 0070FF 0, 112, 255
Brass B5A642 181, 166, 66
Brick red CB4154 203, 65, 84
Bright cerulean 1DACD6 29, 172, 214
Bright green 66FF00 102, 255, 0
Bright lavender BF94E4 191, 148, 228
Bright maroon C32148 195, 33, 72
Bright pink FF007F 255, 0, 127
Bright turquoise 08E8DE 8, 232, 222
Bright ube D19FE8 209, 159, 232
Brilliant lavender F4BBFF 244, 187, 255
Brilliant rose FF55A3 255, 85, 163
Brink pink FB607F 251, 96, 127
British racing green 004225 0, 66, 37
Bronze CD7F32 205, 127, 50
Brown 964B00 150, 75, 0
Bubble gum FFC1CC 255, 193, 204
Bubbles E7FEFF 231, 254, 255
Buff F0DC82 240, 220, 130
Bulgarian rose 480607 72, 6, 7
Burgundy 800020 128, 0, 32
Burlywood DEB887 222, 184, 135
Burnt orange CC5500 204, 85, 0
Burnt sienna E97451 233, 116, 81
Burnt umber 8A3324 138, 51, 36
Byzantine BD33A4 189, 51, 164
Byzantium 702963 112, 41, 99
Cadet 536872 83, 104, 114
Cadet blue 5F9EA0 95, 158, 160
Cadet gray 91A3B0 145, 163, 176
Cadmium Green 006B3C 0, 107, 60
Cadmium Orange ED872D 237, 135, 45
Cadmium Red E30022 227, 0, 34
Cadmium Yellow FFF600 255, 246, 0
Cal Poly Pomona green 1E4D2B 30, 77, 43
Cambridge Blue A3C1AD 163, 193, 173
Camel C19A6B 193, 154, 107
Camouflage green 78866B 120, 134, 107
Canary yellow FFEF00 255, 239, 0
Candy apple red FF0800 255, 8, 0
Candy pink E4717A 228, 113, 122
Capri 00BFFF 0, 191, 255
Caput mortuum 592720 89, 39, 32
Cardinal C41E3A 196, 30, 58
Caribbean green 00CC99 0, 204, 153
Carmine 960018 150, 0, 24
Carmine pink EB4C42 235, 76, 66
Carmine red FF0038 255, 0, 56
Carnation pink FFA6C9 255, 166, 201
Carnelian B31B1B 179, 27, 27
Carolina blue 99BADD 153, 186, 221
Carrot orange ED9121 237, 145, 33
Ceil 92A1CF 146, 161, 207
Celadon ACE1AF 172, 225, 175
Celestial blue 4997D0 73, 151, 208
Cerise DE3163 222, 49, 99
Cerise pink EC3B83 236, 59, 131
Cerulean 007BA7 0, 123, 167
Cerulean blue 2A52BE 42, 82, 190
CG Blue 007AA5 0, 122, 165
CG Red E03C31 224, 60, 49
Chamoisee A0785A 160, 120, 90
Champagne F7E7CE 247, 231, 206
Charcoal 36454F 54, 69, 79
Chartreuse DFFF00 223, 255, 0
Cherry blossom pink FFB7C5 255, 183, 197
Chestnut CD5C5C 205, 92, 92
Chocolate 7B3F00 123, 63, 0
Chrome yellow FFA700 255, 167, 0
Cinereous 98817B 152, 129, 123
Cinnabar E34234 227, 66, 52
Cinnamon D2691E 210, 105, 30
Citrine E4D00A 228, 208, 10
Classic rose FBCCE7 251, 204, 231
Cobalt 0047AB 0, 71, 171
Coffee C86428 200, 100, 40
Columbia blue 9BDDFF 155, 221, 255
Cool black 002E63 0, 46, 99
Cool gray 8C92AC 140, 146, 172
Copper B87333 184, 115, 51
Copper rose 996666 153, 102, 102
Coquelicot FF3800 255, 56, 0
Coral FF7F50 255, 127, 80
Coral pink F88379 248, 131, 121
Coral red FF4040 255, 64, 64
Cordovan 893F45 137, 63, 69
Corn FBEC5D 251, 236, 93
```

```
Cornflower blue        6495ED        100, 149,
↪ 237
Cornsilk        FFF8DC        255, 248, 220
Cosmic latte        FFF8E7        255, 248,
↪ 231
Cotton candy        FFBCD9        255, 188,
↪ 217
Cream        FFFDD0        255, 253, 208
Crimson        DC143C        220, 20, 60
Crimson glory        BE0032        190, 0, 50
Cyan        00B7EB        0, 183, 235
Daffodil        FFFF31        255, 255, 49
Dandelion        F0E130        240, 225, 48
Dark blue        00008B        0, 0, 139
Dark brown        654321        101, 67, 33
Dark byzantium        5D3954        93, 57, 84
Dark candy apple red        A40000        164,
↪ 0, 0
Dark cerulean        08457E        8, 69, 126
Dark champagne        C2B280        194, 178,
↪ 128
Dark chestnut        986960        152, 105,
↪ 96
Dark coral        CD5B45        205, 91, 69
Dark cyan        008B8B        0, 139, 139
Dark electric blue        536878        83,
↪ 104, 120
Dark goldenrod        B8860B        184, 134,
↪ 11
Dark gray        A9A9A9        169, 169, 169
Dark green        013220        1, 50, 32
Dark jungle green        1A2421        26, 36,
↪ 33
Dark khaki        BDB76B        189, 183, 107
Dark lava        483C32        72, 60, 50
Dark lavender        734F96        115, 79,
↪ 150
Dark magenta        8B008B        139, 0, 139
Dark midnight blue        003366        0, 51,
↪ 102
Dark olive green        556B2F        85, 107,
↪ 47
Dark orange        FF8C00        255, 140, 0
Dark orchid        9932CC        153, 50, 204
Dark pastel blue        779ECB        119,
↪ 158, 203
Dark pastel green        03C03C        3, 192,
↪ 60
Dark pastel purple        966FD6        150,
↪ 111, 214
Dark pastel red        C23B22        194, 59,
↪ 34
Dark pink        E75480        231, 84, 128
Dark powder blue        003399        0, 51,
↪ 153
Dark raspberry        872657        135, 38,
↪ 87
Dark red        8B0000        139, 0, 0
Dark salmon        E9967A        233, 150, 122
Dark scarlet        560319        86, 3, 25
Dark sea green        8FBC8F        143, 188,
↪ 143
Dark sienna        3C1414        60, 20, 20
Dark slate blue        483D8B        72, 61,
↪ 139
Dark slate gray        2F4F4F        47, 79,
↪ 79
Dark spring green        177245        23,
↪ 114, 69
Dark tan        918151        145, 129, 81
Dark tangerine        FFA812        255, 168,
↪ 18
Dark terra cotta        CC4E5C        204, 78,
↪ 92
Dark turquoise        00CED1        0, 206,
↪ 209
Dark violet        9400D3        148, 0, 211
Dartmouth green        00693E        0, 105,
↪ 62
Davy's gray        555555        85, 85, 85
Debian red        D70A53        215, 10, 83
Deep carmine        A9203E        169, 32, 62
Deep carmine pink        EF3038        239,
↪ 48, 56
Deep carrot orange        E9692C        233,
↪ 105, 44
Deep cerise        DA3287        218, 50, 135
Deep champagne        FAD6A5        250, 214,
↪ 165
Deep chestnut        B94E48        185, 78, 72
Deep fuchsia        C154C1        193, 84, 193
Deep jungle green        004B49        0, 75,
↪ 73
Deep lilac        9955BB        153, 85, 187
Deep magenta        CC00CC        204, 0, 204
Deep peach        FFCBA4        255, 203, 164
Deep pink        FF1493        255, 20, 147
Deep saffron        FF9933        255, 153, 51
Denim        1560BD        21, 96, 189
Desert sand        EDC9AF        237, 201, 175
Dim gray        696969        105, 105, 105
Dodger blue        1E90FF        30, 144, 255
Dogwood rose        D71868        215, 24, 104
Dollar bill        85BB65        133, 187, 101
Drab        967117        150, 113, 23
Duke blue        00009C        0, 0, 156
Earth yellow        E1A95F        225, 169, 95
Eggplant        614051        97, 64, 81
Eggshell        F0EAD6        240, 234, 214
Egyptian blue        1034A6        16, 52, 166
Electric blue        7DF9FF        125, 249,
↪ 255
Electric crimson        FF003F        255, 0,
↪ 63
Electric green        00FE00        0, 254, 0
Electric indigo        6F00FF        111, 0,
↪ 255
Electric lime        CCFF00        204, 255, 0
Electric purple        BF00FF        191, 0,
↪ 255
Electric ultramarine        3F00FF        63,
↪ 0, 255
Electric violet        8F00FF        143, 0,
↪ 255
Electric yellow        FFFE00        255, 254,
↪ 0
Emerald        50C878        80, 200, 120
Eton blue        96C8A2        150, 200, 162
Falu red        801818        128, 24, 24
Fandango        B53389        181, 51, 137
Fashion fuchsia        F400A1        244, 0,
↪ 161
Fawn        E5AA70        229, 170, 112
Feldgrau        4D5D53        77, 93, 83
Fern green        4F7942        79, 121, 66
```

```
Ferrari Red        FF2800        255, 40, 0
Field drab        6C541E        108, 84, 30
Firebrick        B22222        178, 34, 34
Fire engine red        CE2029        206, 32, 41
Flame        E25822        226, 88, 34
Flamingo pink        FC8EAC        252, 142, 172
Flavescent        F7E98E        247, 233, 142
Flax        EEDC82        238, 220, 130
Floral white        FFFAF0        255, 250, 240
Folly        FF004F        255, 0, 79
Forest green        014421        1, 68, 33
French beige        A67B5B        166, 123, 91
French blue        0072BB        0, 114, 187
French lilac        86608E        134, 96, 142
French rose        F64A8A        246, 74, 138
Fuchsia        FF00FF        255, 0, 255
Fuchsia pink        FF77FF        255, 119, 255
Fulvous        E48400        228, 132, 0
Fuzzy Wuzzy        CC6666        204, 102, 102
Gainsboro        DCDCDC        220, 220, 220
Gamboge        E49B0F        228, 155, 15
Ghost white        F8F8FF        248, 248, 255
Ginger        B06500        176, 101, 0
Glaucous        6082B6        96, 130, 182
Gold        D4AF37        212, 175, 55
Golden brown        996515        153, 101, 21
Golden poppy        FCC200        252, 194, 0
Goldenrod        DAA520        218, 165, 32
Golden yellow        FFDF00        255, 223, 0
Granny Smith Apple        A8E4A0        168, 228, 160
Gray        808080        128, 128, 128
Gray asparagus        465945        70, 89, 69
Green        00FF00        0, 255, 0
Green yellow        ADFF2F        173, 255, 47
Grullo        A99A86        169, 154, 134
Guppie green        00FF7F        0, 255, 127
Halaya ube        663854        102, 56, 84
Han blue        446CCF        68, 108, 207
Han purple        5218FA        82, 24, 250
Harlequin        3FFF00        63, 255, 0
Harvard crimson        C90016        201, 0, 22
Harvest Gold        DA9100        218, 145, 0
Heliotrope        DF73FF        223, 115, 255
Honeydew        F0FFF0        240, 255, 240
Hooker's green        007000        0, 112, 0
Hot magenta        FF1DCE        255, 29, 206
Hot pink        FF69B4        255, 105, 180
Hunter green        355E3B        53, 94, 59
Iceberg        71A6D2        113, 166, 210
Icterine        FCF75E        252, 247, 94
Inchworm        B2EC5D        178, 236, 93
India green        138808        19, 136, 8
Indian yellow        E3A857        227, 168, 87
Indigo        00416A        0, 65, 106
International Klein Blue        002FA7        0, 47, 167
International orange        FF4F00        255, 79, 0
Iris        5A4FCF        90, 79, 207
Isabelline        F4F0EC        244, 240, 236
Islamic green        009000        0, 144, 0
Ivory        FFFFF0        255, 255, 240
Jade        00A86B        0, 168, 107
Jasmine        F8DE7E        248, 222, 126
Jasper        D73B3E        215, 59, 62
Jazzberry jam        A50B5E        165, 11, 94
Jonquil        FADA5E        250, 218, 94
June bud        BDDA57        189, 218, 87
Jungle green        29AB87        41, 171, 135
Kelly green        4CBB17        76, 187, 23
Khaki        C3B091        195, 176, 145
KU Crimson        E8000D        232, 0, 13
Languid lavender        D6CADD        214, 202, 221
Lapis lazuli        26619C        38, 97, 156
La Salle Green        087830        8, 120, 48
Laser Lemon        FEFE22        254, 254, 34
Lava        CF1020        207, 16, 32
Lavender        B57EDC        181, 126, 220
Lavender blue        CCCCFF        204, 204, 255
Lavender blush        FFF0F5        255, 240, 245
Lavender gray        C4C3D0        196, 195, 208
Lavender indigo        9457EB        148, 87, 235
Lavender magenta        EE82EE        238, 130, 238
Lavender mist        E6E6FA        230, 230, 250
Lavender pink        FBAED2        251, 174, 210
Lavender purple        967BB6        150, 123, 182
Lavender rose        FBA0E3        251, 160, 227
Lawn green        7CFC00        124, 252, 0
Lemon        FFF700        255, 247, 0
Lemon chiffon        FFFACD        255, 250, 205
Light apricot        FDD5B1        253, 213, 177
Light blue        ADD8E6        173, 216, 230
Light brown        B5651D        181, 101, 29
Light carmine pink        E66771        230, 103, 113
Light coral        F08080        240, 128, 128
Light cornflower blue        93CCEA        147, 204, 234
Light Crimson        F56991        245, 105, 145
Light cyan        E0FFFF        224, 255, 255
Light fuchsia pink        F984EF        249, 132, 239
Light goldenrod yellow        FAFAD2        250, 250, 210
Light gray        D3D3D3        211, 211, 211
Light green        90EE90        144, 238, 144
Light khaki        F0E68C        240, 230, 140
Light mauve        DCD0FF        220, 208, 255
Light pastel purple        B19CD9        177, 156, 217
Light pink        FFB6C1        255, 182, 193
Light salmon        FFA07A        255, 160, 122
Light salmon pink        FF9999        255, 153, 153
```

Light sea green 20B2AA 32, 178, 170
Light sky blue 87CEFA 135, 206, 250
Light slate gray 778899 119, 136, 153
Light taupe B38B6D 179, 139, 109
Light Thulian pink E68FAC 230, 143, 172
Light yellow FFFFED 255, 255, 237
Lilac C8A2C8 200, 162, 200
Lime BFFF00 191, 255, 0
Lime green 32CD32 50, 205, 50
Lincoln green 195905 25, 89, 5
Linen FAF0E6 250, 240, 230
Liver 534B4F 83, 75, 79
Lust E62020 230, 32, 32
Magenta CA1F7B 202, 31, 123
Magic mint AAF0D1 170, 240, 209
Magnolia F8F4FF 248, 244, 255
Mahogany C04000 192, 64, 0
Majorelle Blue 6050DC 96, 80, 220
Malachite 0BDA51 11, 218, 81
Manatee 979AAA 151, 154, 170
Mango Tango FF8243 255, 130, 67
Maroon 800000 128, 0, 0
Mauve E0B0FF 224, 176, 255
Mauvelous EF98AA 239, 152, 170
Mauve taupe 915F6D 145, 95, 109
Maya blue 73C2FB 115, 194, 251
Meat brown E5B73B 229, 183, 59
Medium aquamarine 66DDAA 102, 221, 170
Medium blue 0000CD 0, 0, 205
Medium candy apple red E2062C 226, 6, 44
Medium carmine AF4035 175, 64, 53
Medium champagne F3E5AB 243, 229, 171
Medium electric blue 035096 3, 80, 150
Medium jungle green 1C352D 28, 53, 45
Medium lavender magenta DDA0DD 221, 160, 221
Medium orchid BA55D3 186, 85, 211
Medium Persian blue 0067A5 0, 103, 165
Medium purple 9370DB 147, 112, 219
Medium red violet BB3385 187, 51, 133
Medium sea green 3CB371 60, 179, 113
Medium slate blue 7B68EE 123, 104, 238
Medium spring bud C9DC87 201, 220, 135
Medium spring green 00FA9A 0, 250, 154
Medium taupe 674C47 103, 76, 71
Medium teal blue 0054B4 0, 84, 180
Medium turquoise 48D1CC 72, 209, 204
Medium violet red C71585 199, 21, 133
Melon FDBCB4 253, 188, 180
Midnight blue 191970 25, 25, 112
Midnight green 004953 0, 73, 83
Mikado yellow FFC40C 255, 196, 12
Mint 3EB489 62, 180, 137
Mint cream F5FFFA 245, 255, 250
Mint green 98FF98 152, 255, 152
Misty rose FFE4E1 255, 228, 225
Moonstone blue 73A9C2 115, 169, 194
Mordant red 19 AE0C00 174, 12, 0
Moss green ADDFAD 173, 223, 173
Mountain Meadow 30BA8F 48, 186, 143
Mountbatten pink 997A8D 153, 122, 141
MSU Green 18453B 24, 69, 59
Mulberry C54B8C 197, 75, 140
Mustard FFDB58 255, 219, 88
Myrtle 21421E 33, 66, 30
Nadeshiko pink F6ADC6 246, 173, 198
Napier green 2A8000 42, 128, 0
Navajo white FFDEAD 255, 222, 173
Navy 000080 0, 0, 128
Neon Carrot FFA343 255, 163, 67
Neon fuchsia FE59C2 254, 89, 194
Neon green 39FF14 57, 255, 20
Non photo blue A4DDED 164, 221, 237
Ocean Boat Blue 0077BE 0, 119, 190
Ochre CC7722 204, 119, 34
Old gold CFB53B 207, 181, 59
Old lace FDF5E6 253, 245, 230
Old lavender 796878 121, 104, 120
Old mauve 673147 103, 49, 71
Old rose C08081 192, 128, 129
Olive 808000 128, 128, 0
Olive Drab 6B8E23 107, 142, 35
Olive Drab 7 3C341F 60, 52, 31
Olivine 9AB973 154, 185, 115
Onyx 0F0F0F 15, 15, 15
Opera mauve B784A7 183, 132, 167
Orange FF7F00 255, 127, 0
Orange peel FF9F00 255, 159, 0
Orange red FF4500 255, 69, 0
Orchid DA70D6 218, 112, 214
OU Crimson Red 990000 153, 0, 0
Outer Space 414A4C 65, 74, 76
Outrageous Orange FF6E4A 255, 110, 74
Oxford Blue 002147 0, 33, 71
Pakistan green 006600 0, 102, 0
Palatinate blue 273BE2 39, 59, 226
Palatinate purple 682860 104, 40, 96
Pale blue AFEEEE 175, 238, 238
Pale brown 987654 152, 118, 84

```
Pale cerulean        9BC4E2        155, 196, 226
Pale chestnut        DDADAF        221, 173, 175
Pale copper        DA8A67        218, 138, 103
Pale cornflower blue        ABCDEF        171, 205, 239
Pale gold        E6BE8A        230, 190, 138
Pale goldenrod        EEE8AA        238, 232, 170
Pale green        98FB98        152, 251, 152
Pale magenta        F984E5        249, 132, 229
Pale pink        FADADD        250, 218, 221
Pale red violet        DB7093        219, 112, 147
Pale robin egg blue        96DED1        150, 222, 209
Pale silver        C9C0BB        201, 192, 187
Pale spring bud        ECEBBD        236, 235, 189
Pale taupe        BC987E        188, 152, 126
Pansy purple        78184A        120, 24, 74
Papaya whip        FFEFD5        255, 239, 213
Pastel blue        AEC6CF        174, 198, 207
Pastel brown        836953        131, 105, 83
Pastel gray        CFCFC4        207, 207, 196
Pastel green        77DD77        119, 221, 119
Pastel magenta        F49AC2        244, 154, 194
Pastel orange        FFB347        255, 179, 71
Pastel pink        FFD1DC        255, 209, 220
Pastel purple        B39EB5        179, 158, 181
Pastel red        FF6961        255, 105, 97
Pastel violet        CB99C9        203, 153, 201
Pastel yellow        FDFD96        253, 253, 150
Patriarch        800080        128, 0, 128
Payne's gray        40404F        64, 64, 79
Peach        FFE5B4        255, 229, 180
Peach orange        FFCC99        255, 204, 153
Peach puff        FFDAB9        255, 218, 185
Peach yellow        FADFAD        250, 223, 173
Pear        D1E231        209, 226, 49
Pearl Aqua        88D8C0        136, 216, 192
Peridot        E6E200        230, 226, 0
Persian blue        1C39BB        28, 57, 187
Persian green        00A693        0, 166, 147
Persian indigo        32127A        50, 18, 122
Persian orange        D99058        217, 144, 88
Persian pink        F77FBE        247, 127, 190
Persian plum        701C1C        112, 28, 28
Persian red        CC3333        204, 51, 51
Persian rose        FE28A2        254, 40, 162
Persimmon        EC5800        236, 88, 0
Phlox        DF00FF        223, 0, 255
Phthalo blue        000F89        0, 15, 137
Phthalo green        123524        18, 53, 36
Piggy pink        FDDDE6        253, 221, 230
Pine green        01796F        1, 121, 111
Pink        FFC0CB        255, 192, 203
Pink pearl        E7ACCF        231, 172, 207
Pink Sherbet        F78FA7        247, 143, 167
Pistachio        93C572        147, 197, 114
Platinum        E5E4E2        229, 228, 226
Plum        8E4585        142, 69, 133
Portland Orange        FF5A36        255, 90, 54
Powder blue        B0E0E6        176, 224, 230
Princeton orange        FF8F00        255, 143, 0
Prussian blue        003153        0, 49, 83
Puce        CC8899        204, 136, 153
Pumpkin        FF7518        255, 117, 24
Purple        9F00C5        159, 0, 197
Purple Heart        69359C        105, 53, 156
Purple mountain majesty        9678B6        150, 120, 182
Purple pizzazz        FE4EDA        254, 78, 218
Purple taupe        50404D        80, 64, 77
Quartz        51484F        81, 72, 79
Radical Red        FF355E        255, 53, 94
Raspberry        E30B5D        227, 11, 93
Raspberry pink        E25098        226, 80, 152
Raspberry rose        B3446C        179, 68, 108
Raw umber        826644        130, 102, 68
Razzle dazzle rose        FF33CC        255, 51, 204
Razzmatazz        E3256B        227, 37, 107
Red        FF0000        255, 0, 0
Redwood        AB4E52        171, 78, 82
Regalia        522D80        82, 45, 128
Rich black        004040        0, 64, 64
Rich brilliant lavender        F1A7FE        241, 167, 254
Rich carmine        D70040        215, 0, 64
Rich electric blue        0892D0        8, 146, 208
Rich lavender        A76BCF        167, 107, 207
Rich lilac        B666D2        182, 102, 210
Rich maroon        B03060        176, 48, 96
Rifle green        414833        65, 72, 51
Robin egg blue        00CCCC        0, 204, 204
Rose bonbon        F9429E        249, 66, 158
Rose ebony        674846        103, 72, 70
Rose gold        B76E79        183, 110, 121
Rose pink        FF66CC        255, 102, 204
Rose quartz        AA98A9        170, 152, 169
Rose taupe        905D5D        144, 93, 93
Rosewood        65000B        101, 0, 11
Rosso corsa        D40000        212, 0, 0
Rosy brown        BC8F8F        188, 143, 143
Royal azure        0038A8        0, 56, 168
Royal blue        002366        0, 35, 102
Royal fuchsia        CA2C92        202, 44, 146
Royal purple        7851A9        120, 81, 169
Ruby        E0115F        224, 17, 95
Ruddy        FF0028        255, 0, 40
Ruddy brown        BB6528        187, 101, 40
```

```
Ruddy pink        E18E96        225, 142, 150
Rufous        A81C07        168, 28, 7
Russet        80461B        128, 70, 27
Rust        B7410E        183, 65, 14
Sacramento State green        00563F        0
↪  86, 63
Saddle brown        8B4513        139, 69, 19
Safety orange        FF6700        255, 103, 0
Saffron        F4C430        244, 196, 48
Salmon        FF8C69        255, 140, 105
Salmon pink        FF91A4        255, 145, 164
Sandstorm        ECD540        236, 213, 64
Sandy brown        F4A460        244, 164, 96
Sangria        92000A        146, 0, 10
Sap green        507D2A        80, 125, 42
Sapphire        082567        8, 37, 103
Satin sheen gold        CBA135        203,
↪  161, 53
Scarlet        FF2400        255, 36, 0
School bus yellow        FFD800        255,
↪  216, 0
Screamin' Green        76FF7A        118, 255,
↪  122
Sea green        2E8B57        46, 139, 87
Seal brown        321414        50, 20, 20
Seashell        FFF5EE        255, 245, 238
Selective yellow        FFBA00        255,
↪  186, 0
Sepia        704214        112, 66, 20
Shadow        8A795D        138, 121, 93
Shamrock green        009E60        0, 158, 96
Shocking pink        FC0FC0        252, 15,
↪  192
Sienna        882D17        136, 45, 23
Silver        C0C0C0        192, 192, 192
Sinopia        CB410B        203, 65, 11
Skobeloff        007474        0, 116, 116
Sky blue        87CEEB        135, 206, 235
Sky magenta        CF71AF        207, 113, 175
Slate blue        6A5ACD        106, 90, 205
Slate gray        708090        112, 128, 144
Smokey topaz        933D41        147, 61, 65
Smoky black        100C08        16, 12, 8
Snow        FFFAFA        255, 250, 250
Spiro Disco Ball        0FC0FC        15, 192,
↪  252
Splashed white        FEFDFF        254, 253,
↪  255
Spring bud        A7FC00        167, 252, 0
Steel blue        4682B4        70, 130, 180
St. Patrick's blue        23297A        35,
↪  41, 122
Straw        E4D96F        228, 217, 111
Sunglow        FFCC33        255, 204, 51
Tan        D2B48C        210, 180, 140
Tangelo        F94D00        249, 77, 0
Tangerine        F28500        242, 133, 0
Tangerine yellow        FFCC00        255,
↪  204, 0
Taupe gray        8B8589        139, 133, 137
Tea green        D0F0C0        208, 240, 192
Teal        008080        0, 128, 128
Teal blue        367588        54, 117, 136
Teal green        006D5B        0, 109, 91
Tenné        CD5700        205, 87, 0
Terra cotta        E2725B        226, 114, 91
Thistle        D8BFD8        216, 191, 216
Thulian pink        DE6FA1        222, 111,
↪  161
Tickle Me Pink        FC89AC        252, 137,
↪  172
Tiffany Blue        0ABAB5        10, 186, 181
Tiger's eye        E08D3C        224, 141, 60
Timberwolf        DBD7D2        219, 215, 210
Titanium yellow        EEE600        238, 230,
↪  0
Tomato        FF6347        255, 99, 71
Toolbox        746CC0        116, 108, 192
Topaz        FFC87C        255, 200, 124
Tractor red        FD0E35        253, 14, 53
Tropical rain forest        00755E        0,
↪  117, 94
True Blue        0073CF        0, 115, 207
Tufts Blue        417DC1        65, 125, 193
Tumbleweed        DEAA88        222, 170, 136
Turkish rose        B57281        181, 114,
↪  129
Turquoise        30D5C8        48, 213, 200
Turquoise blue        00FFEF        0, 255,
↪  239
Turquoise green        A0D6B4        160, 214,
↪  180
Tuscan red        66424D        102, 66, 77
Twilight lavender        8A496B        138,
↪  73, 107
Tyrian purple        66023C        102, 2, 60
UA blue        0033AA        0, 51, 170
UA red        D9004C        217, 0, 76
Ube        8878C3        136, 120, 195
UCLA Blue        536895        83, 104, 149
UCLA Gold        FFB300        255, 179, 0
UFO Green        3CD070        60, 208, 112
Ultramarine        120A8F        18, 10, 143
Ultramarine blue        4166F5        65, 102,
↪  245
Ultra pink        FF6FFF        255, 111, 255
Umber        635147        99, 81, 71
United Nations blue        5B92E5        91,
↪  146, 229
University of California
↪  Gold        B78727        183, 135, 39
Unmellow Yellow        FFFF66        255, 255,
↪  102
UP Maroon        7B1113        123, 17, 19
Upsdell red        AE2029        174, 32, 41
Urobilin        E1AD21        225, 173, 33
Utah Crimson        D3003F        211, 0, 63
Vegas gold        C5B358        197, 179, 88
Venetian red        C80815        200, 8, 21
Verdigris        43B3AE        67, 179, 174
Veronica        A020F0        160, 32, 240
Violet        7F00FF        127, 0, 255
Viridian        40826D        64, 130, 109
Vivid auburn        922724        146, 39, 36
Vivid burgundy        9F1D35        159, 29,
↪  53
Vivid cerise        DA1D81        218, 29, 129
Vivid tangerine        FFA089        255, 160,
↪  137
Vivid violet        9F00FF        159, 0, 255
Warm black        004242        0, 66, 66
Wenge        645452        100, 84, 82
Wheat        F5DEB3        245, 222, 179
White        FFFFFF        255, 255, 255
White smoke        F5F5F5        245, 245, 245
```

```
Wild blue yonder        A2ADD0        162, 173, 208
Wild Strawberry        FF43A4        255, 67, 164
Wild Watermelon        FC6C85        252, 108, 133
Wine        722F37        114, 47, 55
Wisteria        C9A0DC        201, 160, 220
Xanadu        738678        115, 134, 120
Yale Blue        0F4D92        15, 77, 146
Yellow        FFFF00        255, 255, 0
Yellow green        9ACD32        154, 205, 50
Yellow Orange        FFEF02        255, 239, 2
Zaffre        0014A8        0, 20, 168
Zinnwaldite brown        2C1608        44, 22, 8
"""

#output location
script_dir = os.path.dirname(os.path.abspath(__file__)) #put it in the current folder for GitHub repo cloning purposes
OUTPUT_PATH = os.path.join(script_dir, "Color_Detector_v2", "colors.h")
print(f"Saving output to: {OUTPUT_PATH}")

#start parsing data
color_entries = []

# regex: name, hex, R, G, B
regex = r"^(.*?)\s+[0-9A-Fa-f]{3,6}\s+(\d+),\s*(\d+),\s*(\d+)$"

for line in data.splitlines():
    line = line.strip()
    if not line or line.startswith("#"):
        continue

    m = re.match(regex, line)
    if m:
        name = m.group(1).strip()
        r = int(m.group(2))
        g = int(m.group(3))
        b = int(m.group(4))
        color_entries.append((name, r, g, b))

print(f"Parsed {len(color_entries)} color entries.")

#write list for arduino

os.makedirs(os.path.dirname(OUTPUT_PATH), exist_ok=True)

with open(OUTPUT_PATH, "w", encoding="utf-8") as f:
    f.write("// Auto-generated color table (stored in PROGMEM)\n")
    f.write("#pragma once\n\n")
    f.write("#include <avr/pgmspace.h>\n\n")

    # write each name string
    for i, (name, _, _, _) in enumerate(color_entries):
        safe_name = name.replace('"', '\\"')
        f.write(f'const char name_{i}[] PROGMEM = "{safe_name}";\n')

    f.write("\n")

    # structure definition
    f.write("struct Color {\n")
    f.write("  const char* name;  // PROGMEM pointer to string\n")
    f.write("  uint8_t r;\n")
    f.write("  uint8_t g;\n")
    f.write("  uint8_t b;\n")
    f.write("};\n\n")

    f.write(f"#define NUM_COLORS {len(color_entries)}\n\n")

    # write the table in PROGMEM
    f.write("const Color colors[NUM_COLORS] PROGMEM = {\n")

    for i, (_, r, g, b) in enumerate(color_entries):
        f.write(f"  {{ name_{i}, {r}, {g}, {b} }},\n")

    f.write("};\n")

print(f"File written to: {OUTPUT_PATH}")
```