



THE UNIVERSITY OF WINNIPEG

ACS-1809-051
Web Design and Development

Chapter 3

DISCOVER • ACHIEVE • BELONG

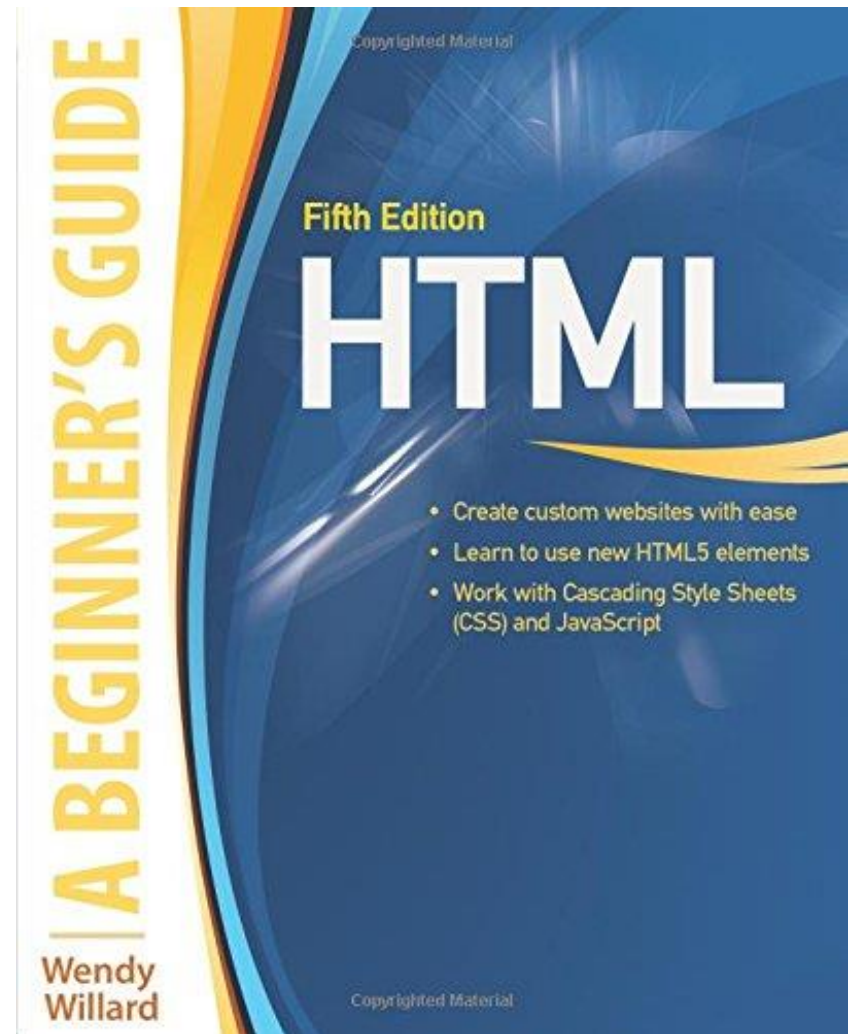
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Cascading Style Sheets

- CSS - style sheet language
 - maintained by World Wide Web Consortium (W3C)
 - today's standard
 - is a whole new way of formatting web pages
 - provides several tools not available with standard HTML
 - used as a design tool
 - makes website more flexible
 - easier to maintain and modify
 - more aesthetically interesting
 - consistent look
 - ***separates the document's style from its content***

Style Sheets

- The purpose of *cascading style sheets* (abbreviated CSS) is to separate the *style* of a web page from its *content*
- The current HTML “rules” dictate that we only use HTML to identify the content of a page, and then use a style sheet to specify the presentation of that content
- This not only makes web pages **more accessible** and **usable** to all users, but also to search engines and other types of software

Define the Style

- To define a basic formatting style, you first must identify which tag you want to affect. This tag is then called a *selector* in CSS
 - Level 2 headlines (<h2>) —————> Selector: h2
 - The selector is essentially the tag without the brackets

Define the Style

- Once you have a selector, you can define its **properties**
- Similar to how attributes work in HTML, CSS *properties* alter specific attributes of a selector
 - Font-family, font-style, font-size, color : **properties**
- When you specify values for properties, you are creating a *declaration* for that selector
- The declaration and selector together are then referred to as a set of *rules*, or *ruleset*

Example

h2 ← Selector (HTML: tag)

font-family ← Property (HTML: attribute)

Calibri ← Value (HTML: value)

{font-family : Calibri;} ← Declaration

All together:

```
h2 {font-family : Calibri;}
```

```
h2 {font-family : Calibri;
```

```
    font-size : 14pt;
```

```
    color : blue;
```

```
    font-style : italic; }
```

Note the “;” at the end of declaration or at the end of each multiple declaration .

Value

- Values are not placed between quotation marks
- Most values can be specified in terms of color, keyword, length, percentage, or URL
- Table 3-1 in the textbook shows the types of CSS values

CSS Structure

- CSS offers 3 types of style sheets:
 - **Inline**: Styles are embedded right within the HTML elements they affect
 - **Internal**: Styles are placed within the header information of the web page, and then affect all corresponding tags *on this single page it resides in*
 - **External**: Styles are coded in a separate document, referenced from within the header of the actual web page


Inline

- Inline styles are created right within the HTML elements of the page
- Inline declarations are enclosed in straight quotes using the *style* attribute of tag.

Example: `<p style="font-family:verdana;">`

- You can separate multiple rules by semicolons, but the entire declaration should be included within the quotes

Example: `<p style ="font-family:verdana; color:red;">`



Use quote to enclose the entire declaration and semicolon to separate the attributes.

- *Internal* or *embedded* style sheets
 - Instead of adding the style attribute to a tag, use the *style tag* to contain all the information for the page
 - *style tag*: in the header of the page, in between the opening and closing *head* tags

Example

```
<head>
```

```
<title>CSS Example</title>
```

```
<style type="text/css">
```

```
h2 {font-family: verdana; color: blue;}
```

```
h3 {font-family: Calibri; color: red;}
```

```
</style>
```

```
</head>
```

```
h2  
{font-family: verdana;  
color: blue;}
```

The entire ruleset can be on a single line or broken up into multiple lines.

```
h3 {font-family: Calibri;  
color: blue;}
```

- The selector is placed before the declaration.
 - Declaration in curly brackets.
h2 {font: verdana 12pt;}

External

- *An external* style sheet essentially holds the same information as an internal one.
 - With exception: the information is contained in its own text file(.css) and then referenced from within the web page
 - External style sheets don't use *style* tag or attribute
 - They simply list the rulesets as instructions for browser

Example

```
<head>
```

```
<title>Using an external style sheet</title>
```

```
<link rel="stylesheet" href="styles.css" >
```

```
</head>
```



This is where the name of
your style sheet is placed.

In file “styles.css” :

```
h1 { font: georgia 14pt bold; color: #0000FF}
```

```
h2 { font: georgia 12pt bold; color: #0066FF}
```

```
h3 { font: georgia 11pt bold; color: #6666FF}
```

Understand the Cascade

- Cascade
 - In some sense can be understood as “combined”
 - When multiple style declarations can be applied to one block of content in an html file
 - The web browser essentially combines all the style declarations into one single declaration
 - This can be analyzed using a very complex scale point system
 - But for now to simplify the analysis we would just say:
Inline > Internal > External

“!Important” Declaration

- It is used to declare a style more important
 - An **!important** declaration ultimately takes precedence over a normal style sheet declaration.
 - The keyword must be prefaced by an exclamation mark in order to be properly interpreted by the browser
- ```
P {color: blue !important;}
```



# Colors in HTML

---

- Using color will make your web pages:
  - visually interesting
    - eye-catching for the reader
- HTML is a text-based language, requiring you to define your colors in textual terms.
- HTML identifies a color in one of two ways:
  - by the color value
  - by the color name

# Colors in HTML

---

- You can define colour in the following format:
  - RGB (Red, Green, Blue) values
  - RGB percentages
  - Hexadecimal values
  - Hexadecimal shorthand
  - Color names

# Hexadecimal numbers

- Decimal:

$$2909 = 2 * 1000 + 9 * 100 + 0 * 10 + 9 * 1$$

or

$$2909 = 2 * 10^3 + 9 * 10^2 + 0 * 10^1 + 9 * 10^0$$

- Hexadecimal:

$$255(\text{dec}) = (15 * 16) + 15 = \text{FF}$$

$$21(\text{dec}) = (1 * 16) + 5 = 21$$

| Hex | Bin  | Dec |
|-----|------|-----|
| 0   | 0000 | 0   |
| 1   | 0001 | 1   |
| 2   | 0010 | 2   |
| 3   | 0011 | 3   |
| 4   | 0100 | 4   |
| 5   | 0101 | 5   |
| 6   | 0110 | 6   |
| 7   | 0111 | 7   |
| 8   | 1000 | 8   |
| 9   | 1001 | 9   |
| A   | 1010 | 10  |
| B   | 1011 | 11  |
| C   | 1100 | 12  |
| D   | 1101 | 13  |
| E   | 1110 | 14  |
| F   | 1111 | 15  |

# Convert Dec to Hex numbers

1. Divide the decimal number by 16. Treat the division as an integer division.
2. Write down the remainder (in hexadecimal).
3. Divide the result again by 16. Treat the division as an integer division.
4. Repeat step 2 and 3 until result is 0.
5. The hex value is the digit sequence of the remainders from the last to first.

Example: Convert the number 1128 DECIMAL to HEXADECIMAL

|         | Result | Reminder |
|---------|--------|----------|
| 1128/16 | 70     | 8        |
| 70/16   | 4      | 6        |
| 4/16    | 0      | 4        |

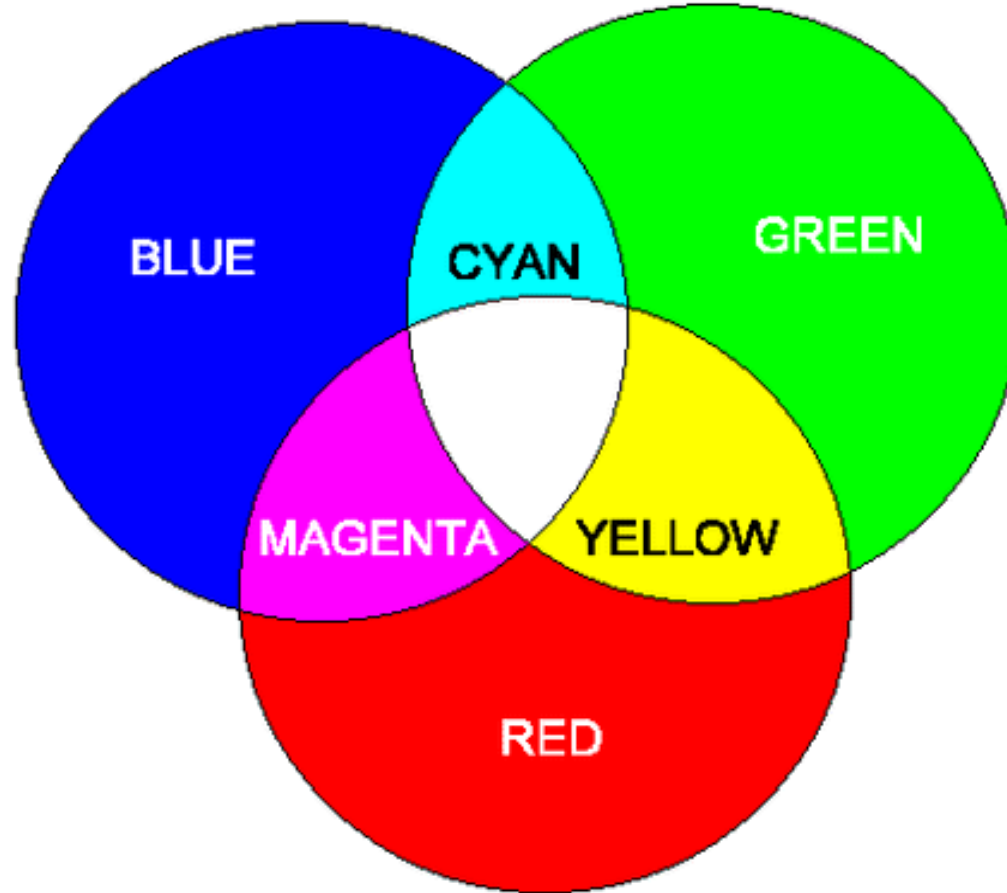
Hex = 468

# Basic Principles of Color Theory

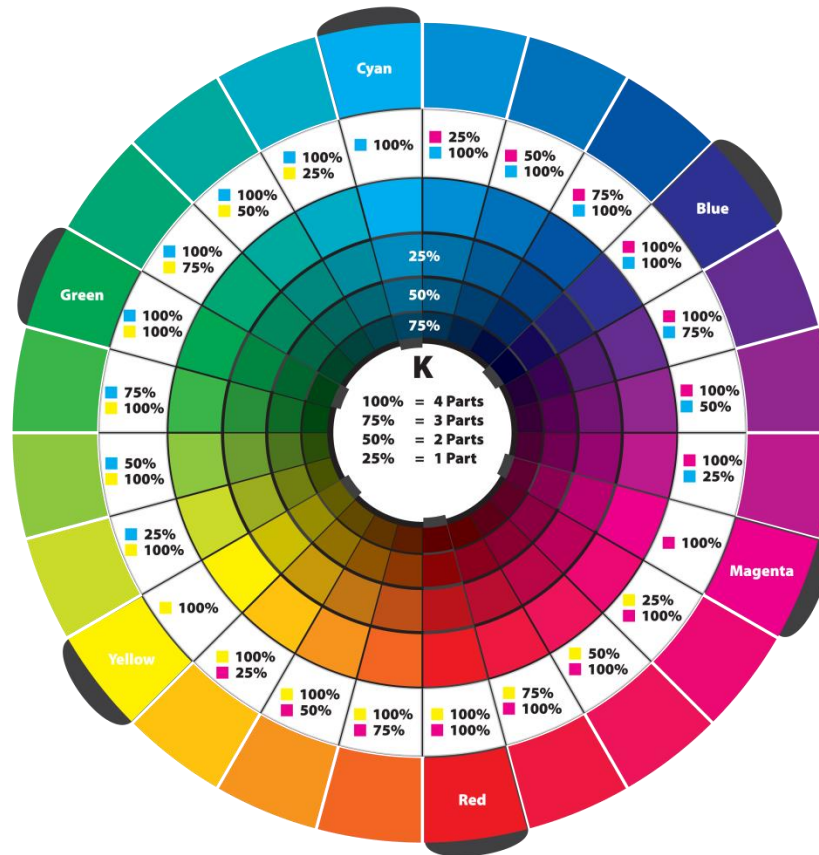
---

- Any color can be thought of as a combination of three primary colors: **red**, **green**, and **blue**
- This principle allows a computer monitor to combine pixels of red, green, and blue to create the array of colors you see on your screen
- Hence the term **RGB**

# Primary Color Model for Light



# Use of Color Wheel



# RGB (Red, Green, and Blue) Triplets

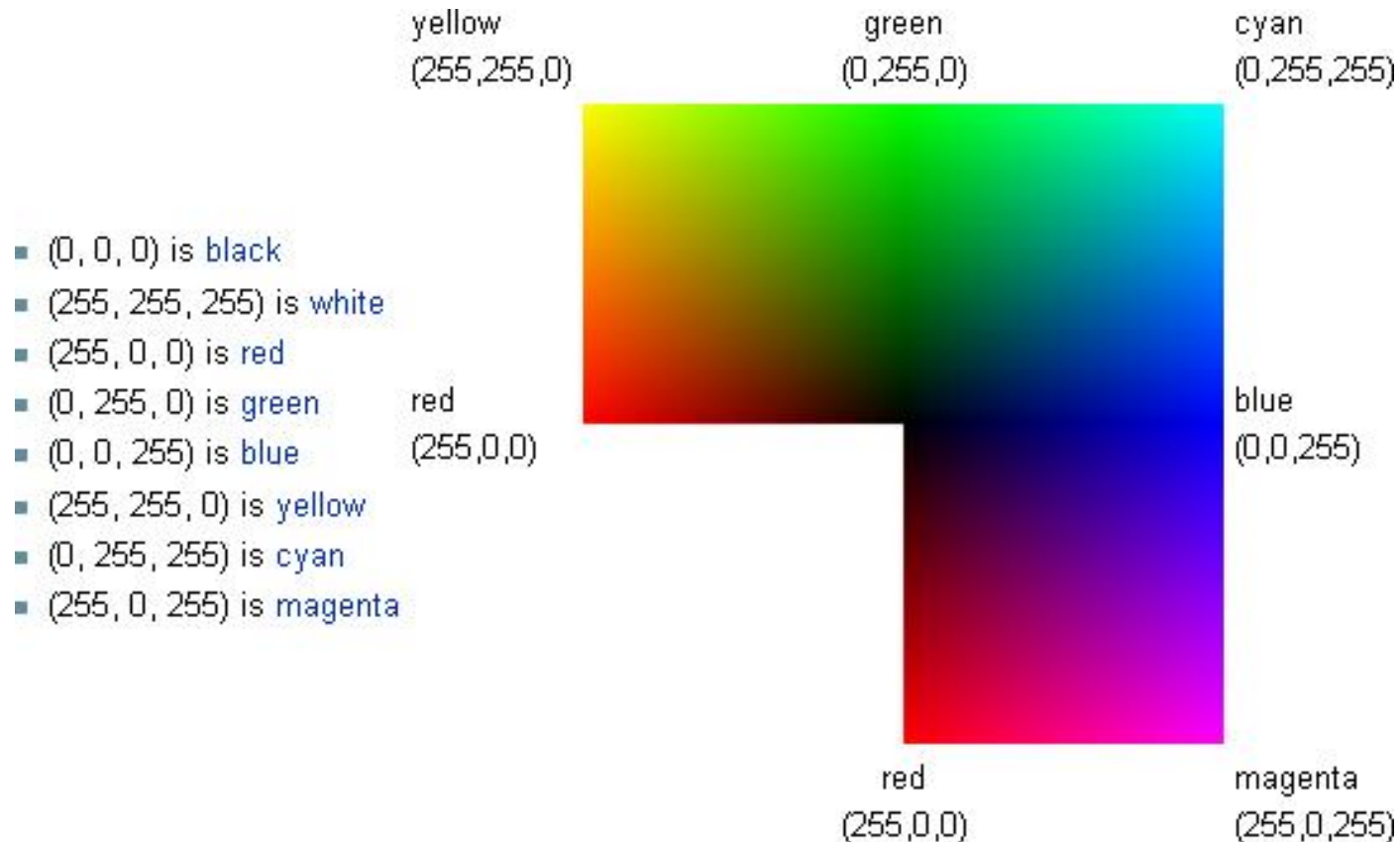
---

- Software programs, such as your Web browser, define color mathematically
- The intensity of each of three colors (RGB) is assigned a number from 0 (darkest) to 255 (lightest)
- In this way,  $255^3$ , or more than 16.7 million, distinct colors can be defined
- Each color is represented by a triplet of numbers, called an **RGB triplet**, based on the strength of its **R**ed, **G**reen, and **B**lue components



# Primary Color Model for Light

rgb (red, green, blue)



# RGB values and Percentages

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Example:

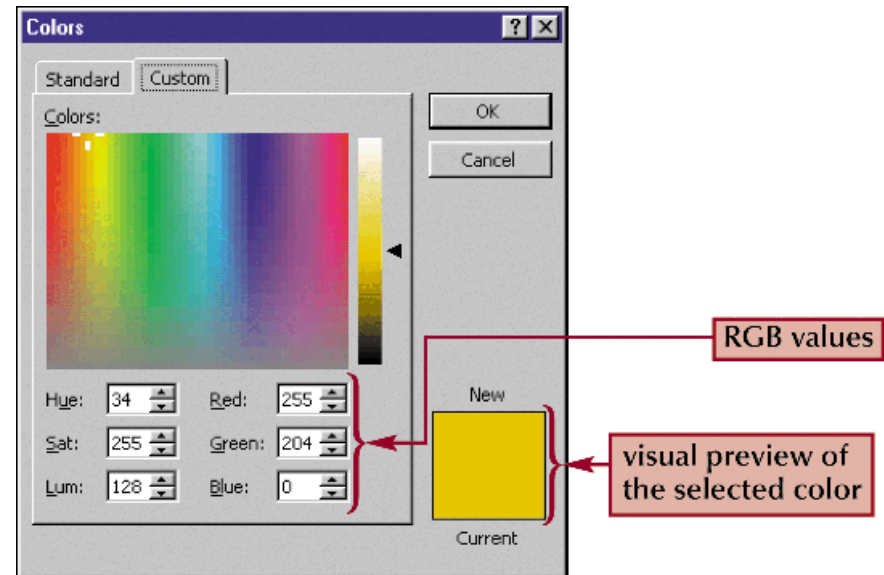
`<p style=" color: rgb(0,0,255);">` (using decimal values)

`<p style=" color: rgb(0%,0%,100%);">` (using percentage)

- RGB values and percentages are only used to describe color in style sheets, not the older HTML tags

# A Typical Colors Dialog Box

- In most programs, you make your color choices with visual clues, usually without being aware of the underlying RGB triplet
- This figure shows a typical dialog box in which you would make color selections based on the appearance of the color, rather than on the RGB values



# Hexadecimal Shorthand


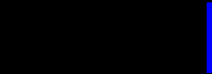



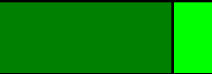


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- When referencing a color that has value pairs, you can use a bit of shorthand to reduce the amount of typing
  - #003366 → #036
  - #0000FF → #00F
  - #002277 → #027
  - #003466 → ? (This has no shorthand)

# 16 Basic Color Names + Orange



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|       |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Color |  |  |  |  |  |  |  |  |
| Name  | Aqua                                                                              | Black                                                                             | Blue                                                                              | Fuchsia                                                                            | Gray                                                                                | Green                                                                               | Lime                                                                                | Maroon                                                                              |
| RGB   | #00FFFF                                                                           | #000000                                                                           | #0000FF                                                                           | #FF00FF                                                                            | #808080                                                                             | #008000                                                                             | #00FF00                                                                             | #800000                                                                             |

|       |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Color |  |  |  |  |  |  |  |  |
| Name  | Navy                                                                              | Olive                                                                             | Purple                                                                            | Red                                                                                | Silver                                                                              | Teal                                                                                | White                                                                               | Yellow                                                                              |
| RGB   | #000080                                                                           | #808000                                                                           | #800080                                                                           | #FF0000                                                                            | #C0C0C0                                                                             | #008080                                                                             | #FFFFFF                                                                             | #FFFF00                                                                             |

# New and Notable Color Options

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- RGBA
  - you can specify the “alpha value” with RGBA
    - It is the transparency of a color
    - The transparency is defined by a number between 0.0 (completely transparent) and 1.0 (fully opaque).  
h1 {color: rgba (255, 68, 253, 0.5);}
  - Safari, Firefox, and Google Chrome have all supported RGBA color specification for a while
    - Internet Explorer only started supporting it in version 9

# New and Notable Color Options

---

- Opacity
  - Similar to the RGBA
  - Opacity values are defined between 0.0 (completely transparent) and 1.0 (fully opaque).  
h1 {color: rgb(255, 68, 253); opacity: 0.5;}

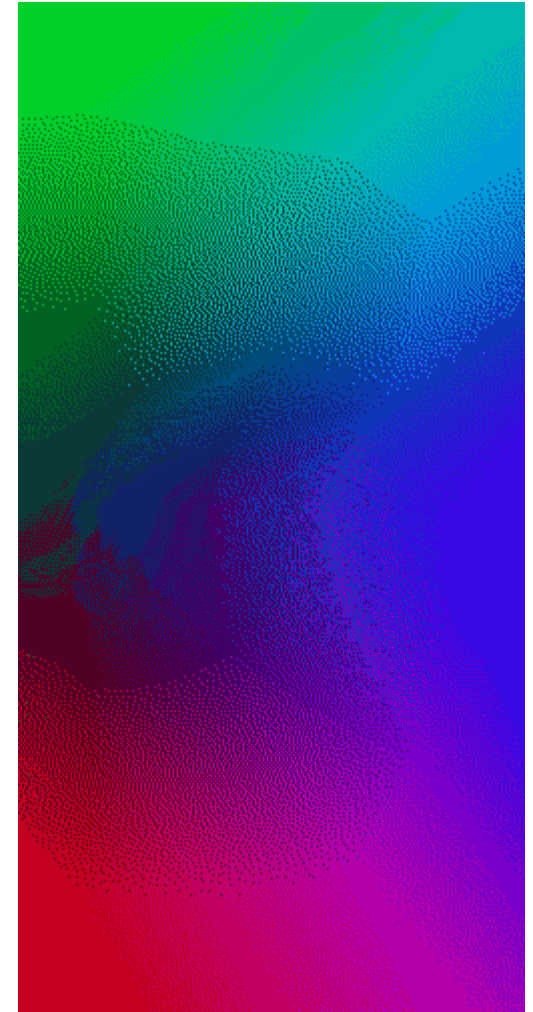
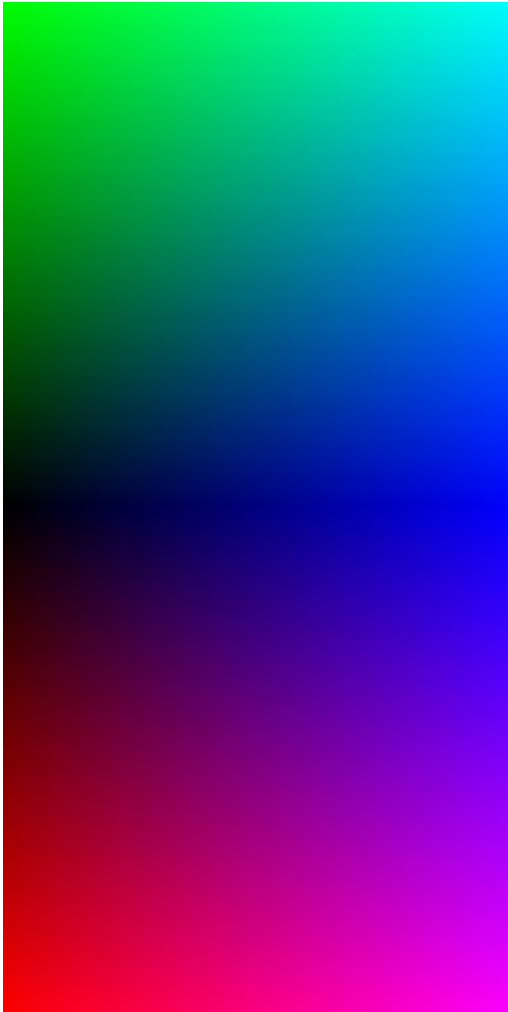
# Colors in HTML

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- Not all monitors can display all the colors
  - Some are not capable of displaying all 255 levels of all 3 primary colors
    - True color – 24 bit
    - A lesser (often seen on hand-held devices) – 16 bit
- Dithering – a way to combining similar colors from available palette to approximate the original color's appearance



# Dithering



# Web Safe Colors in HTML

---

- 216 colors guaranteed not to be dithered by any web browser
- Values for each color are limited to
  - 0, 51, 102, 153, 204, 255 in decimal
  - or
  - 00, 33, 66, 99, CC, FF in hexadecimal

# Colors in HTML (Name and hex)



| Color Name     | Color HEX | Color |
|----------------|-----------|-------|
| AliceBlue      | #F0F8FF   |       |
| AntiqueWhite   | #FAEBD7   |       |
| Aqua           | #00FFFF   |       |
| Aquamarine     | #7FFFD4   |       |
| Azure          | #F0FFFF   |       |
| Beige          | #F5F5DC   |       |
| Bisque         | #FFE4C4   |       |
| Black          | #000000   |       |
| BlanchedAlmond | #FFEBCD   |       |
| Blue           | #0000FF   |       |
| BlueViolet     | #8A2BE2   |       |
| Brown          | #A52A2A   |       |
| BurlyWood      | #DEB887   |       |
| CadetBlue      | #5F9EA0   |       |
| Chartreuse     | #7FFF00   |       |
| Chocolate      | #D2691E   |       |
| Coral          | #FF7F50   |       |
| CornflowerBlue | #6495ED   |       |
| Cornsilk       | #FFF8DC   |       |
| Crimson        | #DC143C   |       |
| Cyan           | #00FFFF   |       |
| DarkBlue       | #00008B   |       |
| DarkCyan       | #008B8B   |       |

| Color Name     | Color HEX | Color |
|----------------|-----------|-------|
| DarkGoldenRod  | #B8860B   |       |
| DarkGray       | #A9A9A9   |       |
| DarkGrey       | #A9A9A9   |       |
| DarkGreen      | #006400   |       |
| DarkKhaki      | #BDB76B   |       |
| DarkMagenta    | #8B008B   |       |
| DarkOliveGreen | #556B2F   |       |
| Darkorange     | #FF8C00   |       |
| DarkOrchid     | #9932CC   |       |
| DarkRed        | #8B0000   |       |
| DarkSalmon     | #E9967A   |       |
| DarkSeaGreen   | #8FBC8F   |       |
| DarkSlateBlue  | #483D8B   |       |
| DarkSlateGray  | #2F4F4F   |       |
| DarkSlateGrey  | #2F4F4F   |       |
| DarkTurquoise  | #00CED1   |       |
| DarkViolet     | #9400D3   |       |
| DeepPink       | #FF1493   |       |
| DeepSkyBlue    | #00BFFF   |       |
| DimGray        | #696969   |       |
| DimGrey        | #696969   |       |
| DodgerBlue     | #1E90FF   |       |
| FireBrick      | #B22222   |       |

# Colors in HTML (Name and hex)



| Color Name           | Color HEX | Color |
|----------------------|-----------|-------|
| LightCyan            | #E0FFFF   |       |
| LightGoldenRodYellow | #FAFAD2   |       |
| LightGray            | #D3D3D3   |       |
| LightGrey            | #D3D3D3   |       |
| LightGreen           | #90EE90   |       |
| LightPink            | #FFB6C1   |       |
| LightSalmon          | #FFA07A   |       |
| LightSeaGreen        | #20B2AA   |       |
| LightSkyBlue         | #87CEFA   |       |
| LightSlateGray       | #778899   |       |
| LightSlateGrey       | #778899   |       |
| LightSteelBlue       | #B0C4DE   |       |
| LightYellow          | #FFFFE0   |       |
| Lime                 | #00FF00   |       |
| LimeGreen            | #32CD32   |       |
| Linen                | #FAF0E6   |       |
| Magenta              | #FF00FF   |       |
| Maroon               | #800000   |       |
| MediumAquaMarine     | #66CDAA   |       |
| MediumBlue           | #0000CD   |       |
| MediumOrchid         | #BA55D3   |       |
| MediumPurple         | #9370D8   |       |
| MediumSeaGreen       | #3CB371   |       |

| Color Name    | Color HEX | Color |
|---------------|-----------|-------|
| FloralWhite   | #FFFAF0   |       |
| ForestGreen   | #228B22   |       |
| Fuchsia       | #FF00FF   |       |
| Gainsboro     | #DCDCDC   |       |
| GhostWhite    | #F8F8FF   |       |
| Gold          | #FFD700   |       |
| GoldenRod     | #DAA520   |       |
| Gray          | #808080   |       |
| Grey          | #808080   |       |
| Green         | #008000   |       |
| GreenYellow   | #ADFF2F   |       |
| HoneyDew      | #F0FFF0   |       |
| HotPink       | #FF69B4   |       |
| IndianRed     | #CD5C5C   |       |
| Indigo        | #4B0082   |       |
| Ivory         | #FFFFF0   |       |
| Khaki         | #F0E68C   |       |
| Lavender      | #E6E6FA   |       |
| LavenderBlush | #FFF0F5   |       |
| LawnGreen     | #7CFC00   |       |
| LemonChiffon  | #FFFACD   |       |
| LightBlue     | #ADD8E6   |       |
| LightCoral    | #F08080   |       |

# Colors in HTML (Name and hex)



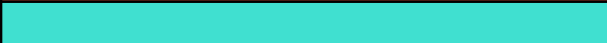








| Color Name  | Color HEX | Color |
|-------------|-----------|-------|
| Pink        | #FFC0CB   |       |
| Plum        | #DDA0DD   |       |
| PowderBlue  | #B0E0E6   |       |
| Purple      | #800080   |       |
| Red         | #FF0000   |       |
| RosyBrown   | #BC8F8F   |       |
| RoyalBlue   | #4169E1   |       |
| SaddleBrown | #8B4513   |       |
| Salmon      | #FA8072   |       |
| SandyBrown  | #F4A460   |       |
| SeaGreen    | #2E8B57   |       |
| SeaShell    | #FFF5EE   |       |
| Sienna      | #A0522D   |       |
| Silver      | #C0C0C0   |       |
| SkyBlue     | #87CEEB   |       |
| SlateBlue   | #6A5ACD   |       |
| SlateGray   | #708090   |       |
| SlateGrey   | #708090   |       |
| Snow        | #FFFAFA   |       |
| SpringGreen | #00FF7F   |       |
| SteelBlue   | #4682B4   |       |
| Tan         | #D2B48C   |       |
| Teal        | #008080   |       |

| Color Name        | Color HEX | Color |
|-------------------|-----------|-------|
| MediumSlateBlue   | #7B68EE   |       |
| MediumSpringGreen | #00FA9A   |       |
| MediumTurquoise   | #48D1CC   |       |
| MediumVioletRed   | #C71585   |       |
| MidnightBlue      | #191970   |       |
| MintCream         | #F5FFFA   |       |
| MistyRose         | #FFE4E1   |       |
| Moccasin          | #FFE4B5   |       |
| NavajoWhite       | #FFDEAD   |       |
| Navy              | #000080   |       |
| OldLace           | #FDF5E6   |       |
| Olive             | #808000   |       |
| OliveDrab         | #6B8E23   |       |
| Orange            | #FFA500   |       |
| OrangeRed         | #FF4500   |       |
| Orchid            | #DA70D6   |       |
| PaleGoldenRod     | #EEE8AA   |       |
| PaleGreen         | #98FB98   |       |
| PaleTurquoise     | #AFEEEE   |       |
| PaleVioletRed     | #D87093   |       |
| PapayaWhip        | #FFEFD5   |       |
| PeachPuff         | #FFDAB9   |       |
| Peru              | #CD853F   |       |

# Colors in HTML (Name and hex)



| Color Name  | Color HEX | Color                                                                               |
|-------------|-----------|-------------------------------------------------------------------------------------|
| Thistle     | #D8BFD8   |  |
| Tomato      | #FF6347   |  |
| Turquoise   | #40E0D0   |  |
| Violet      | #EE82EE   |  |
| Wheat       | #F5DEB3   |  |
| White       | #FFFFFF   |  |
| WhiteSmoke  | #F5F5F5   |  |
| Yellow      | #FFFF00   |  |
| YellowGreen | #9ACD32   |  |

# Foreground and Background Color

---

- To set the foreground color use style:
  - `color: col`
- To set the background color use style:
  - `background-color: col`where *col* is in the form: *color\_name*, #XXXXXX

- Attributes:
- `bgcolor="col"`
- `text="col"`
- `<font color="col">text</font>`

Deprecated

# Example

---

```
<style type="text/css">
 body {background-color: white; color: gray;}
 a:link {color: blue;}
 a:visited {color: purple;}
 a:active {color: orange;}
</style>
```



**QUESTIONS**

**now**