

# CIS 4004: Web Based Information Technology Fall 2012

## Working With Color Values and Web Safe Color Charts

Instructor : Dr. Mark Llewellyn  
markl@cs.ucf.edu  
HEC 236, 407-823-2790  
<http://www.cs.ucf.edu/courses/cis4004/fall2012>

Department of Electrical Engineering and Computer Science  
University of Central Florida



# Working With Colors In HTML5 And CSS

- If you've ever mixed colors in anything from finger paints to a watercolor set, you have an idea of what happens when you mix colors. For computer screens, red, green, and blue lights are mixed to generate different colors. For example, mixing equal parts red and green will produce yellow.
- To mix colors for Web pages, different values are mixed using integers, percentages, and hexadecimal numbers. CSS3 also has a limited number of named colors available that can be used.
- The W3C has listed 16 valid color names for HTML5 and CSS that can be used in place of the hex notation.
- These colors are: [aqua](#), [black](#), [blue](#), [fuchsia](#), [gray](#), [green](#), [lime](#), [maroon](#), [navy](#), [olive](#), [purple](#), [red](#), [silver](#), [teal](#), [white](#), and [yellow](#).



# Working With Colors In HTML5 And CSS

- From this root base, you can also include another 131 names that seem to have no rhyme nor reason as to why they are called what they are called. They were all part of a set of colors created back in the 1980s called X11. They were adopted by early browsers and have been with us ever since. In the official W3C documentation, they're listed under Scalable Vector Graphics (SVG), and all the names were adopted from the original X11. (see <http://www.w3.org/TR/SVG/types.html> see section 4.4) .
- Rather than use these names, most webpage designers use either RGB or HSL percentages as shown on the next few pages.



# RGB Percentages

- In mixing paint colors, the amount of paint is sometimes listed in percentages. A certain percent of red, green, and blue will give different colors. In setting colors in CSS3, you can use percentages in two different ways.
- First, you can assign a color value using the following format:  
$$\text{rgb}(r\%, g\%, b\%);$$
- The first value is the percent red, the second green, the third, blue. For example, setting  $\text{rgb}(43.9\%, 50.2\%, 56.5\%)$  will generate the color that the Los Angeles Dodgers use.
- Note that the three percentages add up to more than 100%, so you know that the percentage is a percent of the color itself and not the total.



# RGB Percentages

- Also note that you can be very precise for the values, including fractions of percentages.
- The example on the following page illustrates the use of RGB percentages.

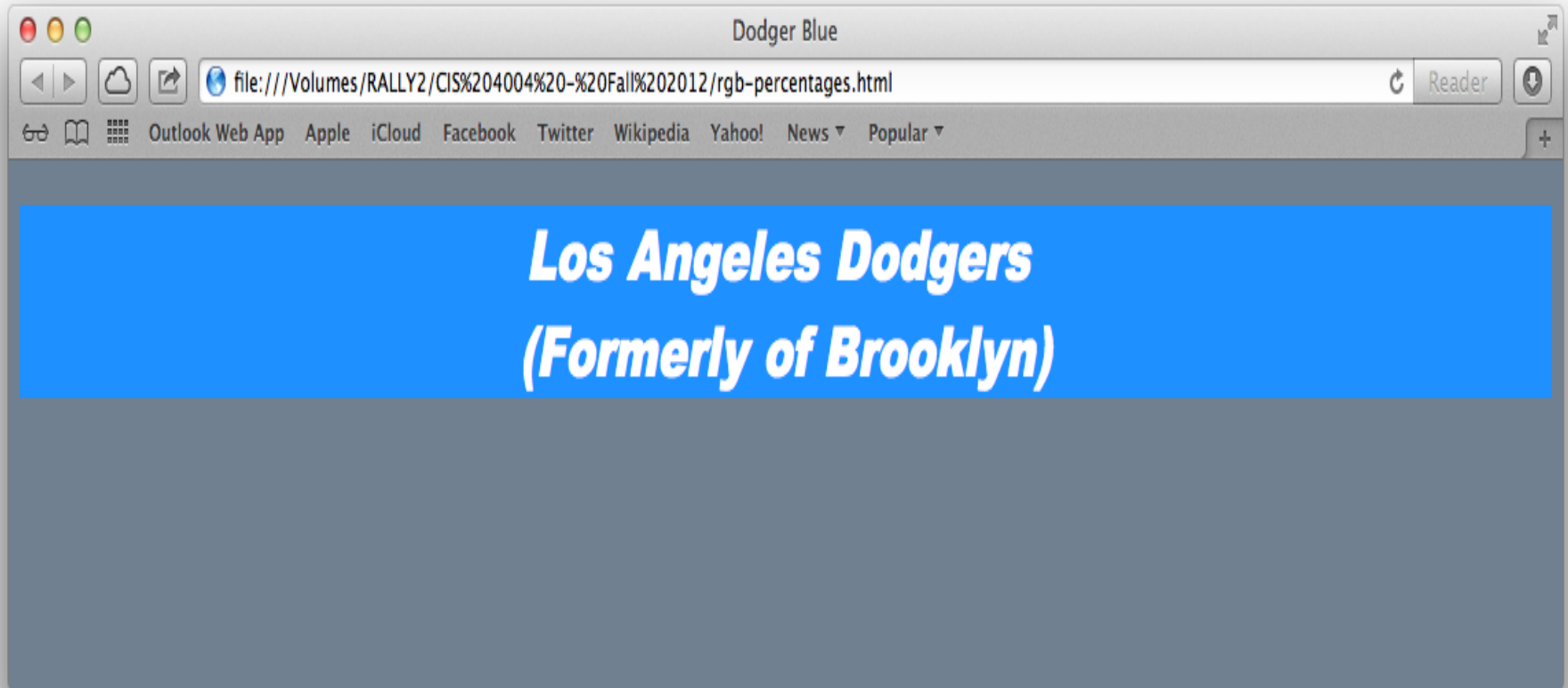


# RGB Percentages Example

```
<!DOCTYPE html>
<html>
<head>
  <title> Dodger Blue </title>
  <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
  <style type="text/css">
    <!--
    body {background-color: rgb(43.9%,50.2%,56.5%);
    }
    h1 { background-color: rgb(11.8%,56.5%,100%);
        color: rgb(100%, 100%, 100%);
        font-family: "Arial Black", Gadget, sans-serif;
        font-style: italic;
        text-align: center;
    }
    -->
  </style>
</head>
<body>
  <h1>Los Angeles Dodgers <br />
    (Formerly of Brooklyn)
  </h1>
</body>
</html>
```



# RGB Percentages Example



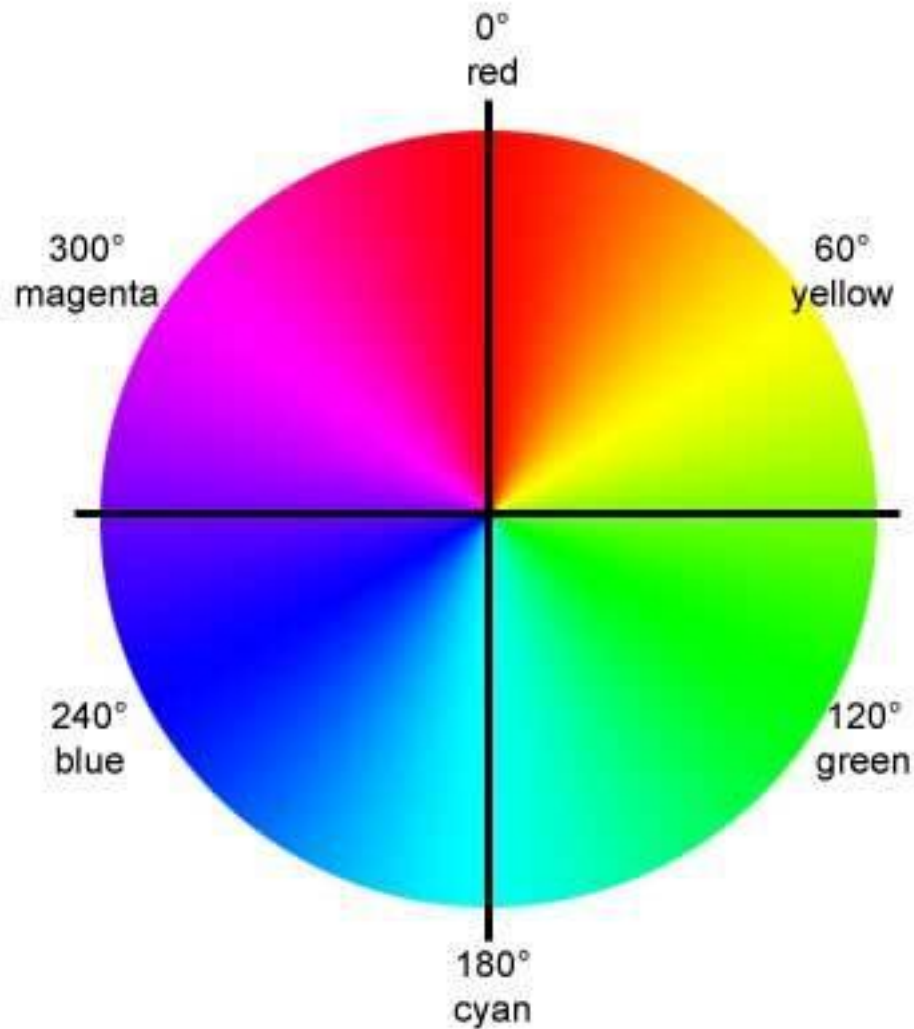
# HSL Percentages

- A second way to assign colors using percentages is to use a hue-saturation-light (HSL) model. The big advantage of HSL is that lightness is symmetrical. That makes it easier to tweak a color to what you'd like it to be.
- By thinking of a color circle arranged around 360 degrees like a compass, you select a hue. At the top, or 0 percent, you find the reds. Moving clockwise, at 30 percent (degrees) the hues turn red-yellow. At 60 percent (60 degrees), they're yellow.
- See the HSL color wheel on the next page.





# The HSL Color Wheel



# HSL Percentages

- For web designers who understand the color spectrum, the HSL model makes choosing colors much easier.
- To create a lighter color, increase the light value, decrease the light value to make the color darker.
- The example on the next page illustrates this concept. When trying to get just the right shade of red, start with the following assignment:

```
hsl(0, 100%, 50%);
```

- Notice that the first number is not a percentage. That's because it has values between 0 and 359 – the 360 degrees of the circle. (0 and 360 are the same point on the circle.)



# HSL Percentages

- By raising and lowering the light (the third parameter), you make the color lighter or darker – which is a bit more intuitive than changing RGB percentages.
- Examine the markup on the next page to see how the HSL model works. Try varying the hues and lightness for colors at different points on the color wheel.

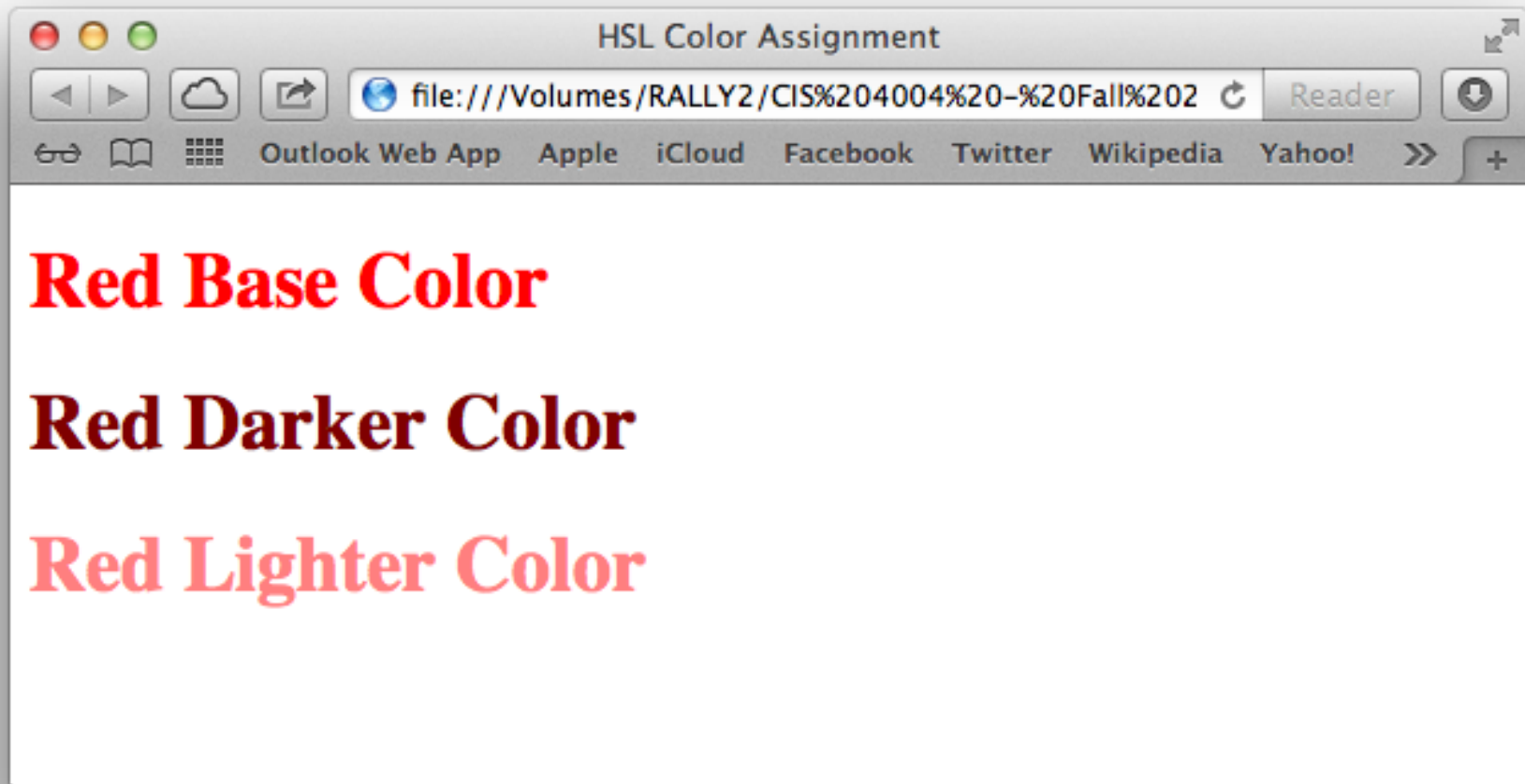


# HSL Percentages Example

```
<!DOCTYPE html>
<html>
<head>
  <title> HSL Color Assignment</title>
  <meta http-equiv="Content-Type" content="text/html; charset=utf-8">
  <style type="text/css">
    <!--
      .redBase { color:hsl(0, 100%, 50%);   }
      .redDarker { color:hsl(0, 100%, 25%); }
      .redLighter { color:hsl(0,100%,75%); }
    -->
  </style>
</head>
<body>
  <h1 class="redBase"> Red Base Color </h1>
  <h1 class="redDarker"> Red Darker Color </h1>
  <h1 class="redLighter"> Red Lighter Color </h1>
</body>
</html>
```



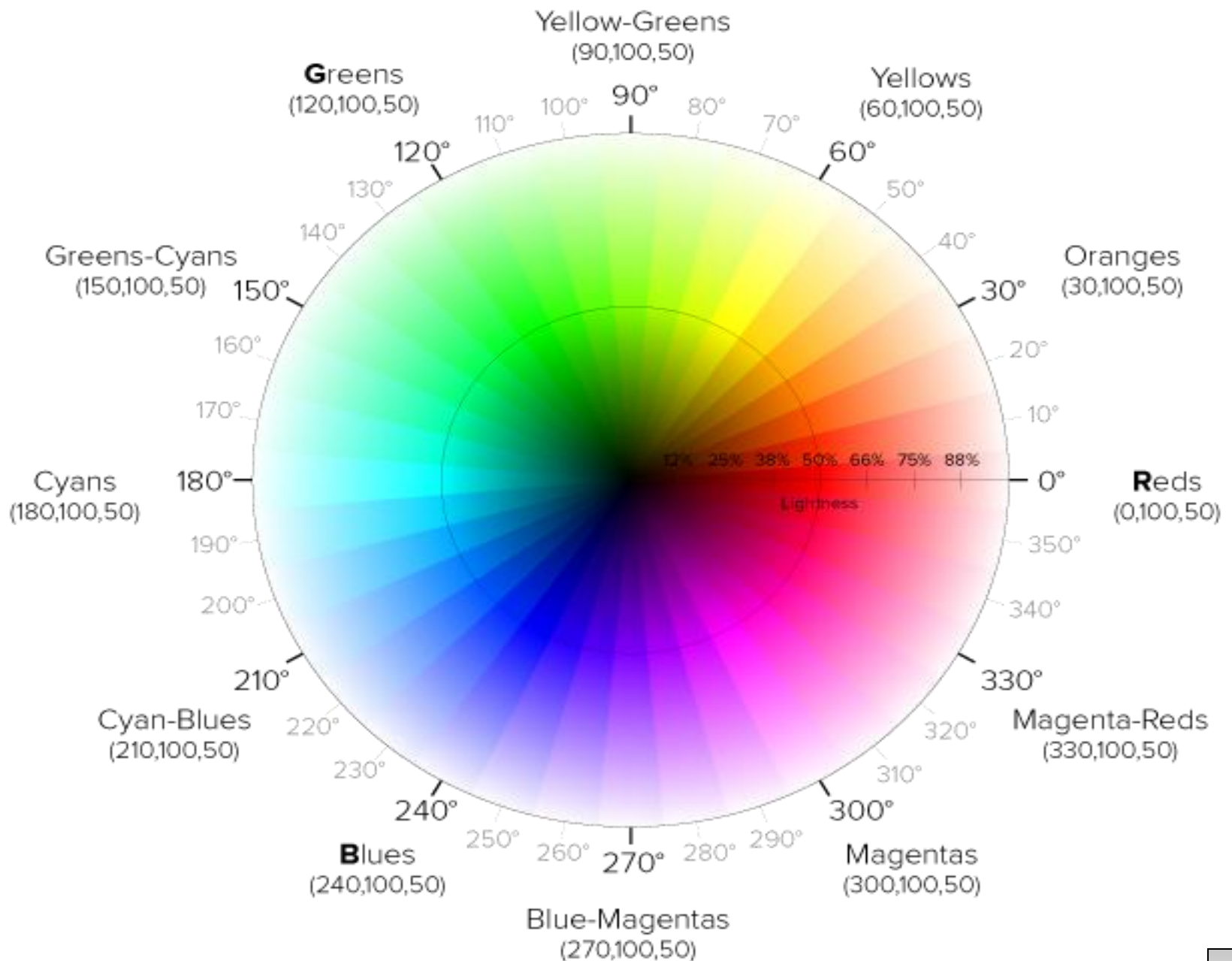
# HSL Percentages Example



# HSL Percentages

- When first using HSL, it helps to think of adding light by going higher to the sun or making it darker by going into a well.
- The tweaking process is easier for designers to get just what they want. Think of a slightly modified color wheel as shown on the next page.
- Hue and light are fairly intuitive to understand, but saturation can be a little murky. Essentially, saturation is the amount of colorfulness in a given color. A 100% saturation is the full colorfulness of a hue in a given light, while a lower percent subtracts from a hue – something like a color fading.
- For all colors, a midpoint light is going to be gray when saturation is 0%. Sometimes a faded or muted color is preferred, like blue jeans that have been washed many times.





# RGB Decimal Integer Settings

- A second way of mixing your colors using the `rgb()` value is to insert values from 0 to 255, instead of the percentage values that were illustrated earlier.
- Each color, red, green, and blue, then as a range of 256 different values, for a total of 16, 777, 216 different colors!
- This format of the `rgb()` value is:

```
rgb(integerR, integerG, integerB);
```

- For example, yellow, which mixes red and green would be `rgb(255, 255, 0)`.
- The example on the following page illustrates this technique for specifying colors in HTML5 and CSS3.





# RGB Decimal Integer Settings

- The RGB decimal notation is not as intuitive as HSL, but after a while, you'll get used to mixing colors based on 256 values rather than percentages.
- The only difference between using RGB with values from 0 to 255 and 0% to 100% is in perception. You might think that you can be more precise with your colors using the 256 values instead of the percentages, but that isn't the case because you can use fractional percentages.
- Which method you choose comes down mostly to personal preference.
- The example on the next page illustrates the RGB technique with integer values.



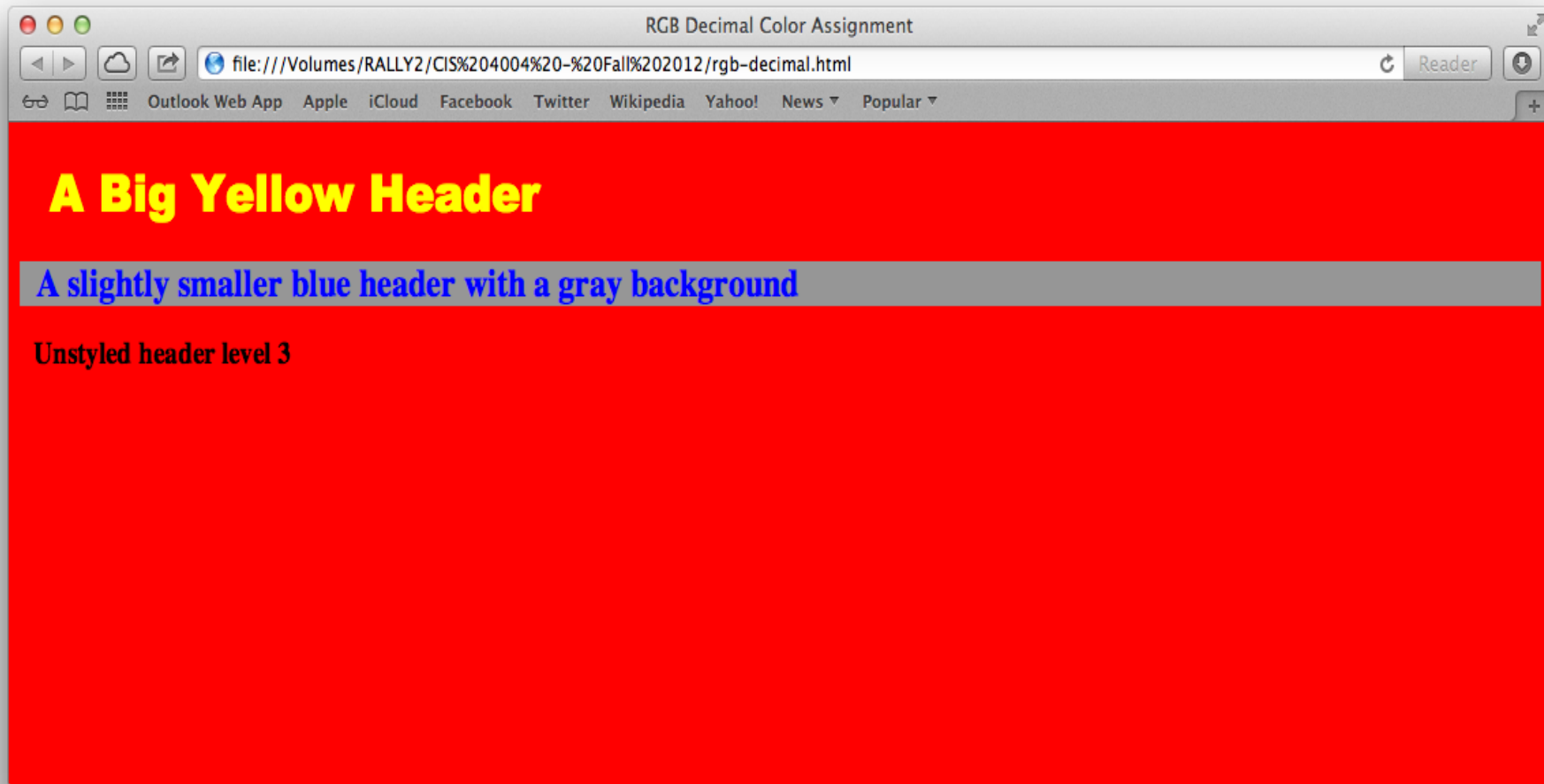
# RGB Decimal Integer Setting - Example

```
<!DOCTYPE html>
<html>
<head>
  <title> RGB Decimal Color Assignment</title>
  <meta http-equiv="Content-Type" content="text/html: charset=utf-8">
  <style type="text/css">
    <!--
      body { /* red background */
        background-color: rgb(255,0,0);

      }
      h1 { /* big yellow text */
        color: rgb(255,255,0);
        font-family: "Arial Black", Gadget, sans-serif;
      }
      h2 { /* blue text with a gray background */
        color: rgb(0,0,255);
        background-color: rgb(150,150,150);
      }
    -->
  </style>
</head>
<body>
  <h1> &nbsp; A Big Yellow Header </h1>
  <h2> &nbsp; A slightly smaller blue header with a gray background </h2>
  <h3> &nbsp; Unstyled header level 3 </h3>
</body>
</html>
```



# RGB Decimal Integer Setting - Example



# Hexadecimal Color Settings

- The final method specifying color assignments in HTML5 and CSS3 is using hexadecimal specification.
- There are 256 different values that can be expressed with two hexadecimal digits. (Each hex digit = 16 possible values,  $16 \times 16 = 256$ ).
- This technique is essentially the same as the `rgb()` technique, except that the color is simply specified with a hexadecimal number, where the first two hex digits specify the red value, the second two hex digits specify the green value, and the last two specify the blue value.
- Thus, the color 6F001C would be red: 6F, green: 00, and blue: 1C.
- The example on the next page illustrates the hexadecimal technique and the color chart beginning on page 24, lists the web safe colors using their hexadecimal representation.



```
File Edit Search View Encoding Language Settings Macro Run TextFX Plugins Window ? X
hsl-percentages.html HexPalette.html hexpalette.html
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4 <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
5 <title>Hexadecimal with Palette</title>
6 <style type="text/css"><!--
7 /* Palette -- only use these colors!
8 69675C, 69623D, ECE8CF, E8D986, B5AA69
9 gray, olive, cream, dark cream, khaki */
10 body {
11     font-family:"Comic Sans MS", cursive;
12     background-color:#ECE8CF;
13     color:#69675C;
14 }
15 h1 {
16     font-family:"Arial Black", Gadget, sans-serif;
17     color:#B5aa60;
18     background-color:#E8D986;
19     text-align:center;
20 }
21 h2 {
22     font-family:"Lucida Sans Unicode", "Lucida Grande", sans-serif;
23     color:#b5aa69;
24 }
25 -->
26 </style>
27 </head>
```

Hyper length : 878 lines : 33

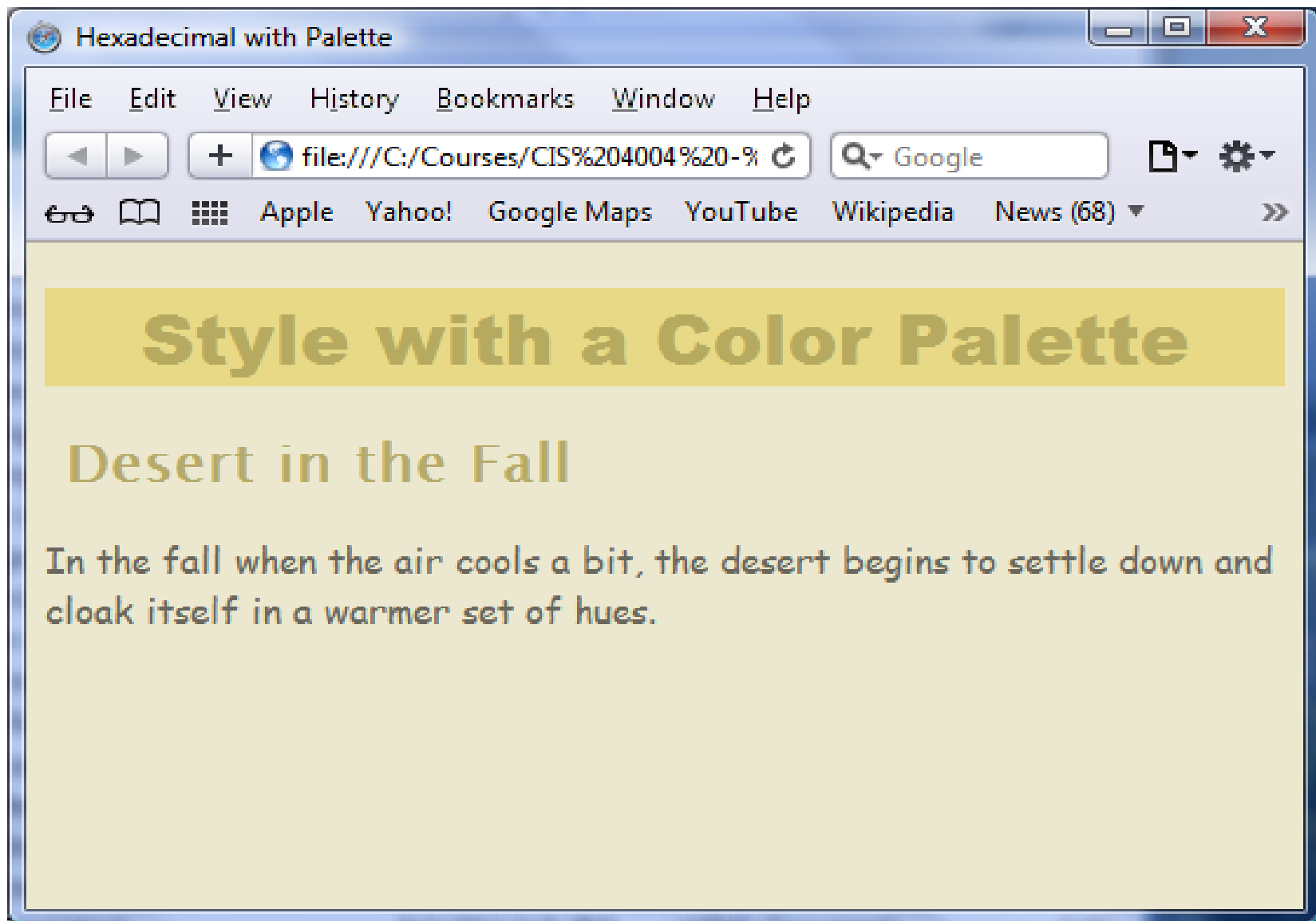
Ln : 3 Col : 7 Sel : 0

Dos\Windows

ANSI

INS





# Web Safe Colors – Page 1

For more information on colors visit: [http://www.w3schools.com/html/html\\_colors.asp](http://www.w3schools.com/html/html_colors.asp)

HTML5/CSS3 color values are defined using a hexadecimal (hex) notation for the combination of Red, Green, and Blue color values (RGB). The smallest value is 0 (00 in hex) and the largest value is 255 (FF in hex) for each of the RGB values.

The HTML5/CSS3 color values are written as 3 double digit hex numbers and must begin with a # sign. Example: #45F43C.

All possible combinations of values are possible which leads to more than 16 million different colors ( $256 * 256 * 256$ ). Most monitors available today will easily display more than 16000 colors.

The W3C has listed 16 valid color names for HTML5 and CSS3 that can be used in place of the hex notation.

These colors are: [aqua](#), [black](#), [blue](#), [fuchsia](#), [gray](#), [green](#), [lime](#), [maroon](#), [navy](#), [olive](#), [purple](#), [red](#), [silver](#), [teal](#), [white](#), and [yellow](#).

A set of 256 different colors that are considered “web safe” in that virtually every monitor in the world will be able to display these colors are shown on the next two pages. Note that this is not very important these days when monitors can display millions of colors, so any hex combination can be generally used and considered web safe.



# Web Safe Colors – Page 1

For more information on colors visit: [http://www.w3schools.com/html/html\\_colors.asp](http://www.w3schools.com/html/html_colors.asp)

000000	000033	000066	000099	0000CC	0000FF
003300	003333	003366	003399	0033CC	0033FF
006600	006633	006666	006699	0066CC	0066FF
009900	009933	009966	009999	0099CC	0099FF
00CC00	00CC33	00CC66	00CC99	00CCCC	00CCFF
00FF00	00FF33	00FF66	00FF99	00FFCC	00FFFF
330000	330033	330066	330099	3300CC	3300FF
333300	333333	333366	333399	3333CC	3333FF
336600	336633	336666	336699	3366CC	3366FF
339900	339933	339966	339999	3399CC	3399FF
33CC00	33CC33	33CC66	33CC99	33CCCC	33CCFF
33FF00	33FF33	33FF66	33FF99	33FFCC	33FFFF
660000	660033	660066	660099	6600CC	6600FF
663300	663333	663366	663399	6633CC	6633FF
666600	666633	666666	666699	6666CC	6666FF
669900	669933	669966	669999	6699CC	6699FF
66CC00	66CC33	66CC66	66CC99	66CCCC	66CCFF
66FF00	66FF33	66FF66	66FF99	66FFCC	66FFFF
990000	990033	990066	990099	9900CC	9900FF
993300	993333	993366	993399	9933CC	9933FF





# Web Safe Colors – Page 2

996600	996633	996666	996699	9966CC	9966FF
999900	999933	999966	999999	9999CC	9999FF
99CC00	99CC33	99CC66	99CC99	99CCCC	99CCFF
99FF00	99FF33	99FF66	99FF99	99FFCC	99FFFF
CC0000	CC0033	CC0066	CC0099	CC00CC	CC00FF
CC3300	CC3333	CC3366	CC3399	CC33CC	CC33FF
CC6600	CC6633	CC6666	CC6699	CC66CC	CC66FF
CC9900	CC9933	CC9966	CC9999	CC99CC	CC99FF
CCCC00	CCCC33	CCCC66	CCCC99	CCCCCC	CCCCFF
CCFF00	CCFF33	CCFF66	CCFF99	CCFFCC	CCFFFF
FF0000	FF0033	FF0066	FF0099	FF00CC	FF00FF
FF3300	FF3333	FF3366	FF3399	FF33CC	FF33FF
FF6600	FF6633	FF6666	FF6699	FF66CC	FF66FF
FF9900	FF9933	FF9966	FF9999	FF99CC	FF99FF
FFCC00	FFCC33	FFCC66	FFCC99	FFCCCC	FFCCFF
FFFF00	FFFF33	FFFF66	FFFF99	FFFFCC	FFFFFF

