M5 - Screen Colors

Once upon a time, computer monitors and television sets had just two colors – black and white. Later, the early "color" monitors struggled to reproduce photos as they were only capable of producing 16 colors. This has changed with modern devices on which several million color shades are possible.

It has long been known that by mixing different proportions of different primary color paints, new colors could be produced. In the electronics world the three primary colors used are Red, Green and Blue or "RGB".

Think of three flashlights, one of each of the RGB colors with the capability to control the intensity of light produced graduated from none (0) to fully on (255).

Why 0 to 255? In a 16 bit computer, one byte of data is 16 bits long and can be represented by the hexadecimal numbering system which counts as follows::-

0 1 2 3 4 5 6 7 8 9 a b c d e f

Use two bytes and you have the ability to count from 0 to 255. (16 x16 = 256 but one number is zero (0) so the highest number is 255. This is written as "ff" in hexadecimal.

The result is that with three colors each with 256 intensity levels you have the potential for 256 x 256 x 256 = 16777216 colors.

Let's check out **Stanford_Color.html** in our browser:-

All of the 3 colors are originally set at zero – no light – result = black.

Now slide the Red button all the way to the right and eventually you get bright red.

Now bring the Green button up to the red level. What Color do you get now?

Finally slide the Blue button up to the maximum value – and get – White!

Try various levels of the three colors and note the result. The bars at the sides and bottom of the color box show the proportions of each of the primary colors.

As you move the 3 sliders, note the color values and their hexadecimal equivalent

Note the "#" in front of the hexadecimal number. This will tell the computer that the number following is a hexadecimal color number.

The Stanford_Colors.html file lets you play with the RGB scheme, combining red, green, and blue light to make any color. The sliders control the red green and blue lights, each ranging from 0 (off) to 255 (maximum). The intersecting rectangles show the result of adding the red, green, and blue light together -- any color can be created in this way.

To make pure red, green, or blue light, just turn up that color, leaving the other two at 0. A few other common combinations:

All at max (255) = white

All at min (0) = black

red + green = yellow

red + blue = purple

green + blue turquoise

Dark yellow -- make yellow, then reduce both red and green

Orange -- make yellow, but more red, less green

Light, pastel green -- make pure green, then turn up both red and blue some equally (going towards white)

Light gray -- make white, then turn all three down a bit equally.

There are several methods commonly used to select colors for an HTML page, but let's look at a range of colors by opening **Color_Choice.html** in your browser.

At the bottom of the page you will see the 16 basic colors. Above is a range of possibilities.

Not the hexadecimal number for each of the colors. You can highlight the color number and use CTRL/C to copy the color number to the clipboard and CTRL/V to paste it into your HTML code.

Now look at **Color_Choice.html** in your editor.

The "" element is used to encapsulate the printed hexadecimal code and print it in either black or white so that is readable on the color background.

The "<table>", "<tr>" and "<td>" elements will be explored in the next module.