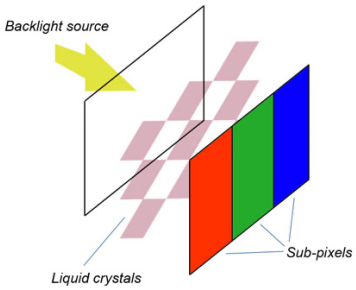
exercise::03

Exploring Grayscale Images within Color Photographs

Introduction ::
Color channels in digital images are just stacked grayscale images. On the computer, each channel of a color image is not in color. Each channel is a grayscale image which are stacked on top of each other and colorized for our benefit. This scheme makes perfect sense in light of monitor and printing technology.

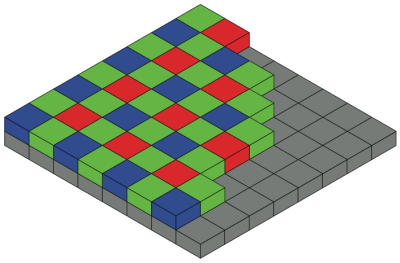
LCD monitors are made up of red, green and blue sub-pixels that control how much light from the backlight is allowed through to the viewer's eyes. Sub-pixels just receive intensity information, not color information. The red channel shows the signal that is sent to the red sub-pixels, green to the green sub-pixels, and blue to the blue sub-pixels. Operating systems take advantage of this when anti-aliasing text on-screen (it's called sub-pixel anti-aliasing).



Color printers work in a similar way, except that instead of charge controlling transmission of light, dot size controls *absorption* of light. In fact, if one examines the plates used to print from, one will see a set of images (perhaps in negative) that closely duplicate the channels in the digital file.

Additive & Subtractive Color ::
If you compare an RGB channel to a CMYK channel, you will notice that dark colors in an RGB channel are represented by low numbers, but darks in a CMYK channel are represented by high numbers. In RGB, higher values go toward white. In CMYK, higher values go toward black (even with only C, M, and Y). This reversal illustrates the difference between additive and subtractive color.

Even Digital Cameras Capture Grayscale Information ::
At the heart of a digital camera is an array of light intensity sensors. Some of the sensors have a red filter and send their information to the red channel (but it is just intensity information, and therefore grayscale). Some of the sensors have green filters and some have blue filters, and each sends its information to the appropriate channel of the digital file. The most common is the Bayer filer pattern (shown to the right). Some CMOS cameras rely on the depth that different light penetrates silicon to distinguish the quantity and location of red, green and blue light in an image.



Think of the Colorized Channels When Adjusting Color ::
It is helpful to think of adjusting three grayscale images rather than one full color image when adjusting overall image color. As we learn new color correcting skills, we will appreciate this simplification more and more, and even learn to use it to are advantage.

Process ::

1. Create a new folder named `lastname_firstname_03`. Select a photo that is landscape in orientation from either your personal library or one of the sample images from this week's examples, and move a copy of it to this new folder.

2. Open the image in **Photoshop**. Select the Crop tool, and in the Control Bar, change Ratio to *W x H x Resolution*, with a width of **4.875"** and a height of **3"** (you do not need to specify a resolution).

3. Convert it to CMYK (Image > Mode > CMYK). Save this image into your exercise folder as a TIFF file, naming it `composite.tif`.

4. Make the Channels panel visible (Window > Channels) and select the **Cyan** channel. You should see a grayscale image, and the other three channels should not be visible.

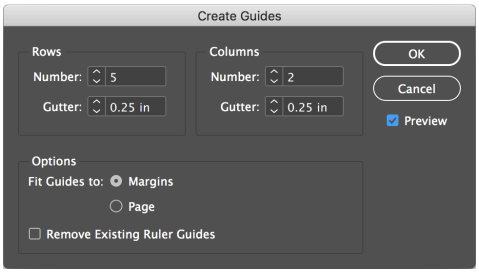
5. Convert the image to Grayscale (Image > Mode > Grayscale).

6. Select File > Save As..., and save the file as a TIFF image, naming it `cyan.tif`.

7. **Undo the last two steps**, going back to the color version of the image.

8. Repeat Steps 04 through 07 for the **Magenta**, **Yellow**, and **Black** channels.

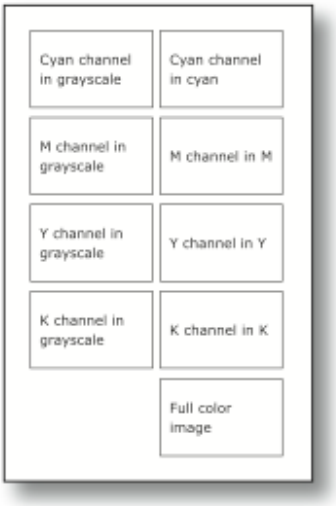
9. Open **InDesign** and create an 11x17 document (portrait; 1 page; no facing pages), with margins of 0.5" on all sides. Save this file as `ex03_layout.indd` to your exercise folder.



10. We need **guides** to help keep our layout organized. Select Layout > Create Guides..., and using the settings shown in the screenshot to automatically create a 2x5 grid. (*Rows: 5, Columns: 2; Gutter: .25" for all; Fit Guides to Margins)*

11. Place the `cyan.tif` image at the top-left, and another copy on the top-right of the page. Repeat this going down with `magenta.tif`, `yellow.tif` and `black.tif`, keeping 0.25" of space between each image. (we will colorize the images in the next step).

    Place your `composite.tif` image at the bottom of the right column. Also, put your name somewhere in the layout. In the end, your layout should look similar to the example to the right.



12. Make visible the **Swatches** panel (Window > Swatches). For the top three grayscale images on the right, select the image with the Direct Selection tool (▷ ; A), then select the color in the Swatch panel that corresponds with that image (E.g.: `cyan.tif` should be colored with the cyan swatch, `magenta.tif` with magenta, and `yellow.tif` with yellow). The images on the right should now be colored with their printing inks, with the images on the left in grayscale.

13. Print the layout in color at 11x17 on the VC color laser printer.

14. Copy the folder containing your work (InDesign document plus all TIFF images) for this lab to your shared Drop Box on Google Drive for this class.

    This lab exercise is due by the end of class.