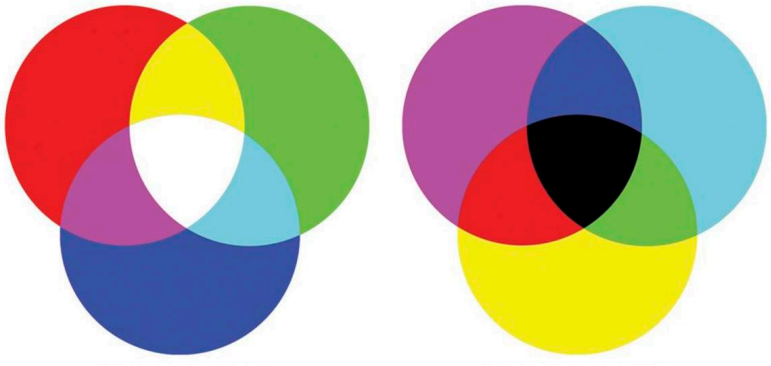
HANDOUT 3

ADDITIVE AND SUBTRACTIVE COLOR

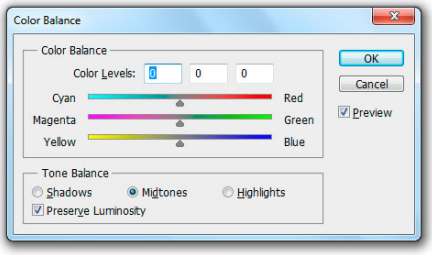


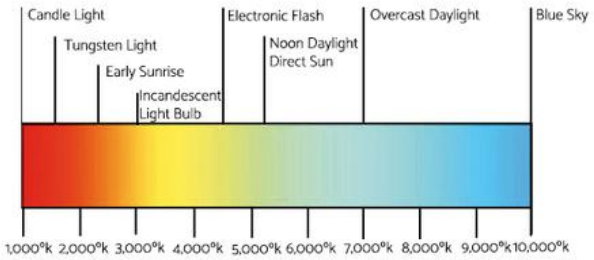
additive	subtractive
light	pigment
RGB	CMY(K)

If you have a light on in a room, and then you turn on another light, the room gets brighter. Light mixes in an *additive* fashion. Paints and inks are *subtractive* – the more pigment you mix together, the darker the result will be.

Primary colors are colors from which all other colors can be obtained by mixing. Red, Green, and Blue are the primary colors in additive processes – you can get every other color of light from those three. Subtractive color is handled on digital editors using the primary colors Cyan, Magenta, and Yellow. Professional printing services print with these three tones, and then add a layer of black to make the image's tonal range more dynamic, so digital subtractive color is conventionally discussed as CMYK (K for black, so as not to be confused with Blue).

Colors in both spaces have opposites that negate each other. Blue pigment will negate yellow pigment (while resulting in a darker tone) and blue light will negate yellow light (while resulting in a lighter tone). Some digital editors show this explicitly. Below is the Adobe Photoshop's interface for color balancing:





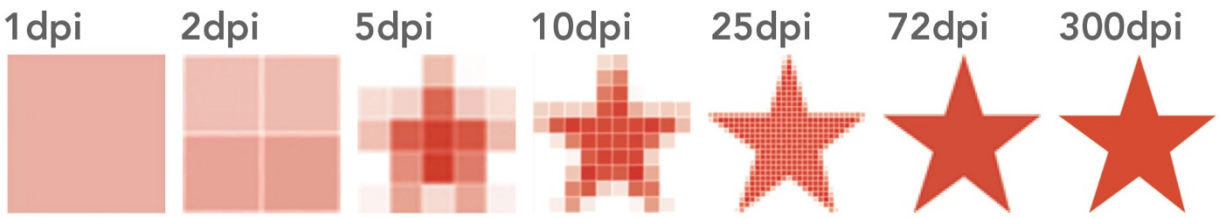
Different light sources emit different colors:

Fluorescent lights produce an unusual color tint – green. In an additive space, the opposite of green is magenta, so the green light directly cancels out the magenta pigments in skin tones.

Green is not a flattering color cast in portraiture.

IMAGE RESOLUTION

Resolution can refer to an image's aesthetic composition, or it can refer to the density of information stored per unit of area in an image. Images with more pixels can either be higher resolution (more dense), or they can be displayed as a larger image at an equivalent resolution.



BIT DEPTH

Each pixel typically consists of 8 bits (1 byte) for a Black and White (B&W) image or 24 bits (3 bytes) for a color image – one byte each for Red, Green, and Blue. 8 bits represents 28 = 256 tonal levels (0-255).

Uncompressed images can hold larger amounts of information , like 16-bit and 32-bit per channel images, or 2-4 bytes of information per pixel per channel (Red being one channel, Green another, Blue another, or a single channel grayscale image). This means that more colors can be represented.

8-bit B&W image – 256 tones

16-bit B&W image – 65,536 tones

8-bit color image – 16,000,000 colors

16-bit color image – 28,000,000,000 colors