



SCHOOL OF COMPUTING & IT

DEPARTMENT OF COMPUTER SCIENCE, INFORMATION TECHNOLOGY, AND

BUSINESS INFORMATION TECHNOLOGY

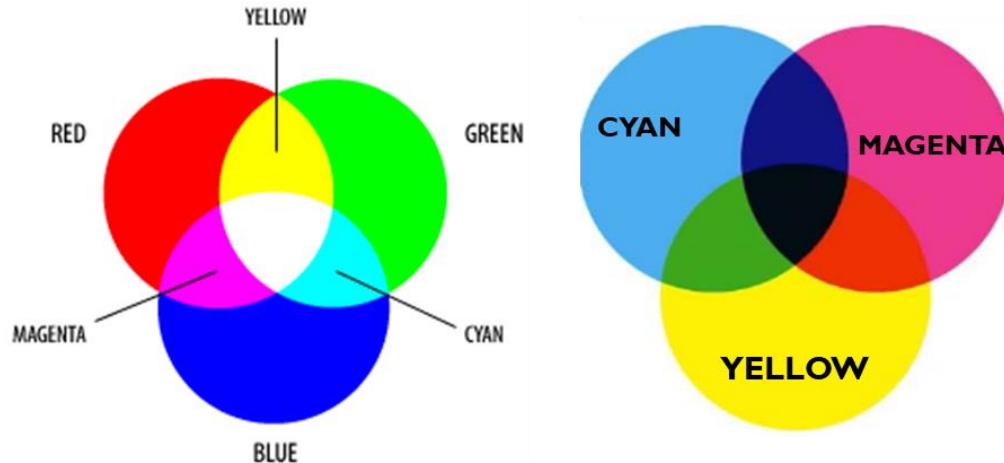
MODULE:

MULTIMEDIA & COMPUTER GRAPHICS

From Saturday: 05th April 2025 - To : Sunday 27th April 2025

By MWESIGE THIERRY, MScIT

CAT DATE: 20th April 2025 & Exam Date: 27th April 2025



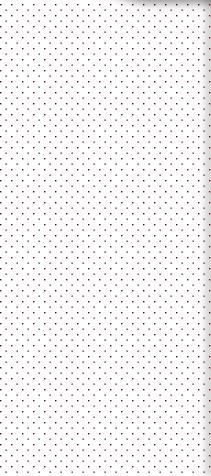
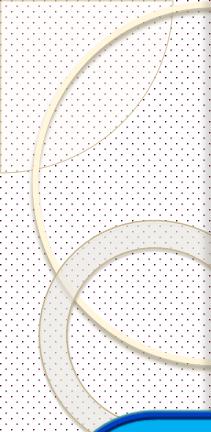
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CHAP IV: COLOR IN IMAGE & VIDEO

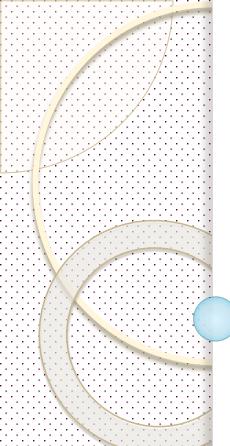
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By MWESIGE THIERRY

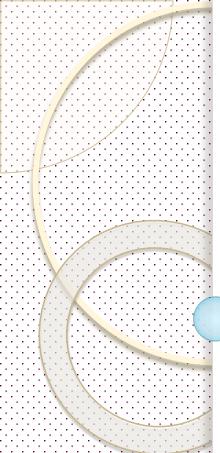


Why we need to have skills about colors in Multimedia?



4.0 The Importance of Colour in Graphic Design

Colour is a universal language and a powerful communication tool. Of all the elements that make up a visual design, colour is perhaps the most vital and influential. Research conducted by psychologists and marketers have highlighted how colour can influence our emotions and perceptions. Colour schemes are often used to place emphasis on particular aspects of a design or to evoke a desired mood or emotion in the viewer. Designers use colour selectively to create harmony, balance, and consistency.

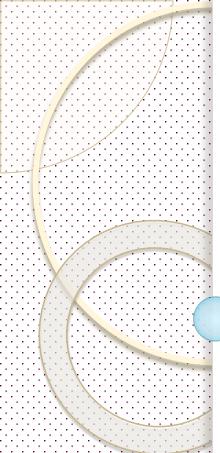


4.0 The Importance of Colour in Graphic Design

- **What colours should you choose for your designs?**

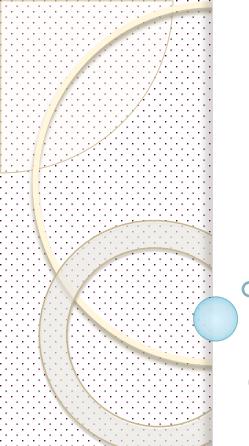
How can colour influence moods and perceptions?

How can you use this knowledge to create more effective and compelling designs that connect with your target audience?



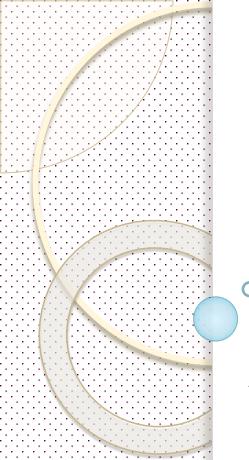
4.0 The Importance of Colour in Graphic Design

It's clear that colour is a crucial feature to consider when designing marketing assets or building a brand. This blog is about colour psychology, and how insights gained from colour psychology can help identify the most effective colour schemes for designing your branding and marketing collateral. Graphic designers and marketers should always be conscious of the subtle but significant influence colour plays in how viewers will perceive and feel about a marketing message or brand. **What colours should you choose for your designs? How can colour influence moods and perceptions? How can you use this knowledge to create more effective and compelling designs that connect with your target audience?**



4.0.1 Colour, Psychology and Emotion

Colour psychology is the study of how colours affect behaviors and perceptions. It's important to be aware that colour associations are often influenced by personal experience and cultural factors and it is too simplistic to assume that colour associations are universal. Nevertheless, research has found consistent associations. '**Warm colours**' like red, orange and yellow excite and arouse, while '**Cool colours**' like blue and green have a relaxing and calming effect. A survey conducted on colour and word association found that 43% of people associated blue with reliability and 76% associated red with speed.



4.0.1 Colour, Psychology and Emotion

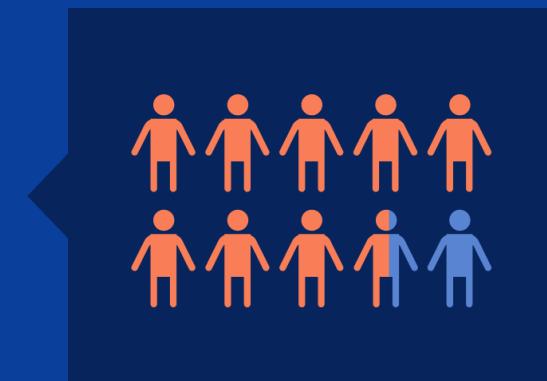
Another study found that colours can have a strong impact on determining consumer behavior. Red signs in window displays in stores attracted more impulse purchases. Colours can be used to increase or decrease our appetite, raise or reduce our heart rate, and enhance our mood or calm us down. When it comes to designing marketing assets, a carefully selected colour scheme can stir viewers emotions and can subconsciously influence how they feel about the brand and the message. As a guide, colour directs the eye and helps to emphasize what is important. Designers and marketers are increasingly seeing the importance of the impact of colour in forming consumer perceptions.



Psychology Of Color



Of Consumers
cite color as the
primary reason they
buy a particular
product.





When People Buy:



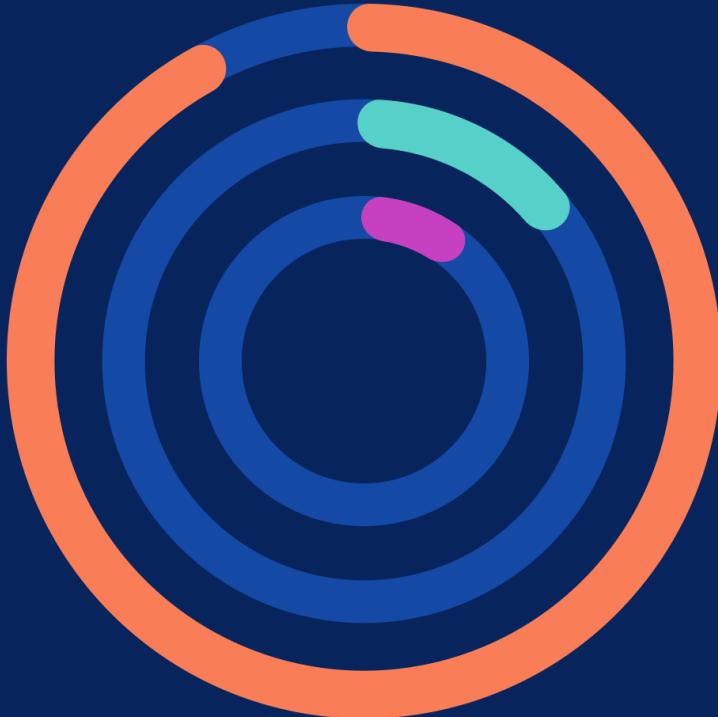
Look at Visual Appearance



Look at Texture



Decide on
"Sound/Smell"



80%

Think color increases
brand recognition.



52%

Of shoppers did not
return to a store due to
overall aesthetics.



Research reveals people make a sub-conscious judgement about an environment or product within **90 Seconds** of initial viewing.

Between **62%** and **90%** of that assessment is based on color alone.



Ads in color are read up to

42% more often

than the same ads in black and white



Color can improve:

Comprehension



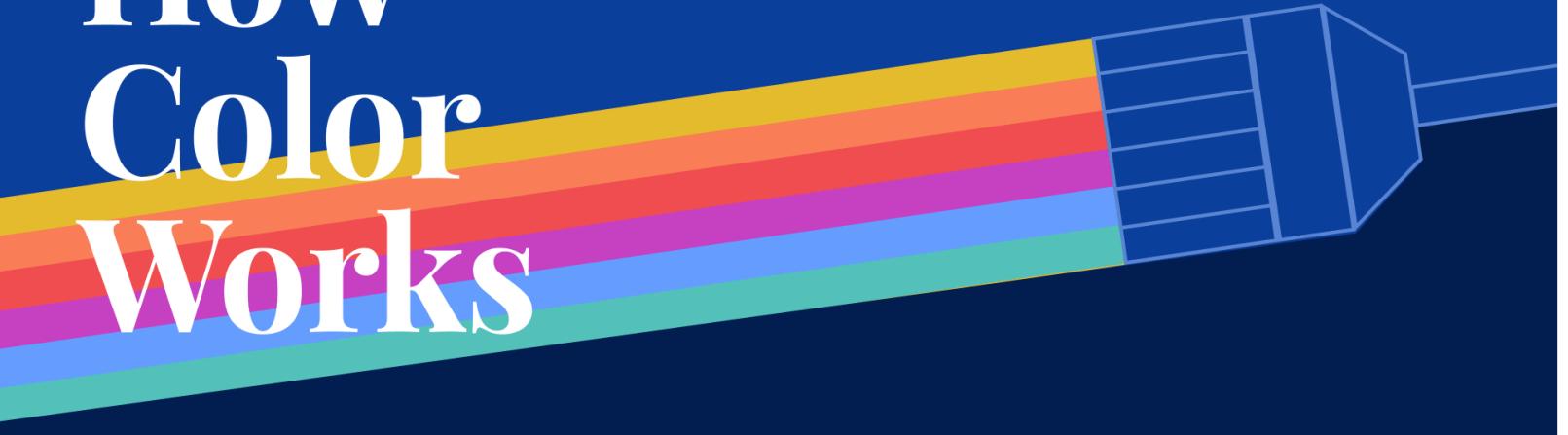
Learning



Reading



How Color Works



**Primary
COLORS**

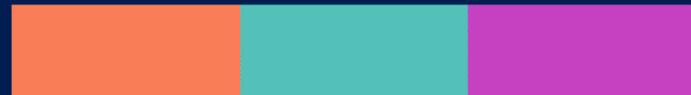


RED

YELLOW

BLUE

**Secondary
COLORS**



ORANGE

GREEN

PURPLE

4.0.2 Colour in Marketing and Branding

- There are many academic studies and surveys that give weight to the idea that people strongly associate colours and emotions. Let's take a look at some common colours used in marketing and summarize some of the key findings.

Red

Red is one of the most highly visible colours on the spectrum. It is a warm colour, strongly associated with excitement, action, danger and passion. Red increases heart rate and blood pressure and creates a sense of urgency. It is widely used on warning signs and stop signs as it quickly captures attention and prompts action. In marketing, brands like Red Bull and Ferrari use red in a similar way, to attract attention, and to convey a sense of energy and excitement.



Red

PRIMARY COLOR

PERSONALITY/EMOTIONS

- Evokes strong emotions
- Encourages appetite
- Increases passion and intensity
- Red roses symbolize love



MARKETING

- Increases heart rate
- Used by restaurants to stimulate appetite
- Creates urgency often seen in clearance sales
- Used for impulsive shoppers



POLITICS

- Represents communist or socialist parties worldwide
- Used for Republicans in the USA



CHAKRA

ROOT CHAKRA

- Located at base of the spine
- Related to survival safety, physical self



COMPANIES

Coca-Cola

Kellogg's

NETFLIX

TOYOTA

TARGET

LEGO

4.0.2 Colour in Marketing and Branding cont.

Yellow

Yellow is also a warm colour and is associated with optimism and youthfulness. Fun, smiley faces and sunshine. Yellow is often used on children's toys and to advertise children's products. Its brightness sparks enthusiasm and is widely used in promoting special offers to catch customers eyes. It is also associated with mental clarity and logical thinking. Bright, energetic, and eye-catching, yellow is more effective when used sparingly, or with a darker tone for balance.





Yellow

PRIMARY COLOR

PERSONALITY/EMOTIONS

- Increases cheerfulness, warmth
- Causes fatigue and strain on the eyes
- Makes babies cry
- Stimulates mental processes
- Stimulates nervous system
- Encourages communication



MARKETING

- Represents optimism, youthfulness
- Used to grab attention of window shoppers
- Shows clarity



POLITICS



- Represents liberalism

CHAKRA

SOLAR PLEXUS

- Located in upper abdomen between navel and sternum
- Related to personal power, will, self esteem



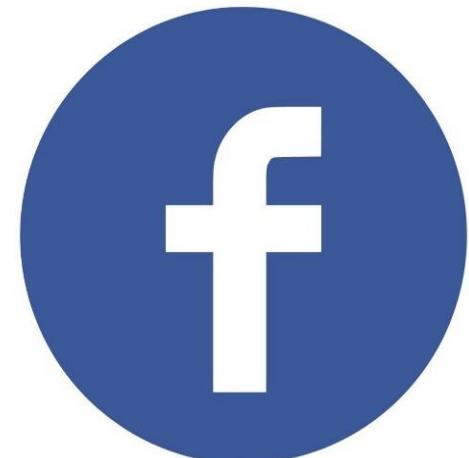
COMPANIES



4.0.2 Colour in Marketing and Branding cont.

Blue

Blue is a cool colour and has a more calming and relaxing effect compared to warmer colours like red and yellow. It is strongly associated with maturity, integrity, and trustworthiness. It is no coincidence that so many large organisations choose blue in their branding. IBM, Facebook, Twitter, Samsung, Intel, Ford, RBS. Blue is soothing and reassuring. It creates a sense of security and conveys honesty, professionalism, and reliability.



Blue

PRIMARY COLOR

PERSONALITY/EMOTIONS



- Associated with water, peace
- Most preferred by men
- Represent calmness or serenity
- Curbs appetite
- Known as a "cold" color
- Perceived as constant in human life due to sky and ocean being blue
- Most-used color for offices

MARKETING



- Often used in corporate business because it's productive and non-invasive
- Creates sense of security and trust in a brand

POLITICS



- Represents conservative parties worldwide
- Used for Democrats in USA

CHAKRA



THROAT CHAKRA

- Base of throat
- Related to communication, truth, self-expression

COMPANIES

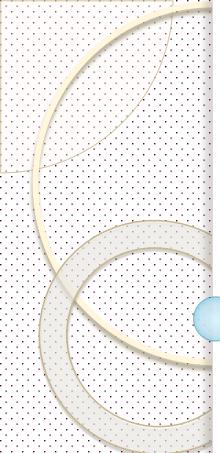


4.0.2 Colour in Marketing and Branding cont.

Orange

Orange is a warm, confident and cheerful colour. It sits between red and yellow on the colour spectrum and combines the excitement of red with the brightness and cheerfulness of yellow. Fun, friendly and uplifting, orange is a popular colour in sports, and is often used by brands targeted at young people. Fanta soft drink, Nickelodeon Television and Mozilla use orange in their branding to share their sense of enthusiasm and energy with their audience.





Orange

SECONDARY COLOR

PERSONALITY/EMOTIONS



- Reflects excitement, enthusiasm
- Shows warmth
- Warns of caution



POLITICS



- Orange is the national color of the Netherlands and its royal family.



MARKETING



- Signifies aggression
- Creates a call to action: Buy, Sell, Subscribe, etc
- Found in impulsive shoppers
- Represents a friendly, cheerful, confident brand

CHAKRA



THE SACRAL CHAKRA

- Located around lower back and reproductive organs
- Related to sexuality, creativity, pleasure



COMPANIES



4.0.2 Colour in Marketing and Branding cont.

Green

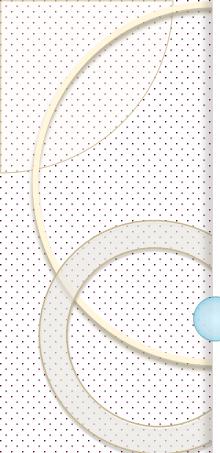
Green is a cool colour, and, like blue, has a calming effect. Green is the dominant colour in nature, and is closely associated with the environment, growth, freshness and good health. Green is commonly used to highlight environmental issues, and to promote health and fitness products. BP, the oil and gas company, use green in their branding to highlight that they take their environmental responsibilities very seriously. Starbucks, Subways and other food companies use green to emphasize the fresh ingredients they use to make their products.



STARBUCKS

Green

SECONDARY COLOR



PERSONALITY/EMOTIONS



- Constitutes health, tranquility
- Symbolizes money
- Denotes nature
- Alleviates depression
- Workers in a green environment have fewer stomach aches
- Green is used in night vision goggles because the human eye is most sensitive to and able to discern the most shades of it
- Represents new growth

MARKETING



- Used to relax in stores
- Associated with wealth
- Green M&M's are said to send a sexual message
- Has long been a symbol of fertility
- Was once the preferred color choice for wedding gowns in the 15th century.

POLITICS



- Connected to environmentalists

CHAKRA

HEART CHAKRA



- Center of body, heart level
- Related to unconditional love, healing

COMPANIES



Purple

SECONDARY COLOR

PERSONALITY/EMOTIONS



- Shows royalty, wealth, success, wisdom
- Many kings wore purple robes



POLITICS



- Used for royalty, but hardly used in modern politics



COMPANIES

yahoo!

Hallmark

craigslist

Crown Royal

T-Mobile

Welch's

MARKETING



- Used often in beauty or anti-aging products
- Used to soothe or calm
- Represents a creative, imaginative, wise brand

CHAKRA

THE CROWN CHAKRA



- Top of the head
- Related to spiritual life and experience, connection to the divine, pure consciousness, transcendence

4.0.2 Colour in Marketing and Branding cont.

Black

Black isn't a warm colour, or a cool colour. Technically, it isn't a colour at all. Black is neutral and stable and is often used in marketing for its clarity and ability to provide a high contrast effect, in combination with a more vibrant colour that might otherwise be overpowering. Black is used often as a background to enhance legibility. In branding, black is associated with quality, sophistication, and elegance. Think black tie events. Luxury brands like Chanel, Prada and Louis Vuitton use black in their branding to align with these qualities.





4.0.2 Colour in Marketing and Branding cont.

The above summary of colours gives you a brief overview of some of the kinds of associations and emotional responses that colours can evoke in a customer. When carefully used, designers can apply their understanding of these emotional associations to develop more effective designs. When you also consider other aspects of colour theory, like the effects of colour harmony, complementary colours, and tints and shades, you can begin to appreciate the tools available and why colour is such an important element in any design or visual communication. Colour plays a central role in how we evaluate what we see.

4.0.3 COLOR THEORY

COLOR MIXING



CMYK

Cyan, Magenta, Yellow, Black
Print Process Model



RGB

Red, Green, Blue
Light Generated Model



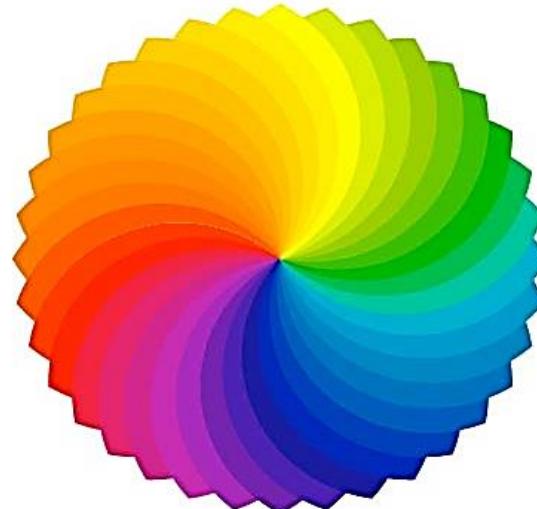
GREY SCALE

Black and white only



HSB

Hue (color), Saturation (how much color), Black (tint and shade)



MEANINGS



LOVE, BLOOD, FIRE, ENERGY,
STRONG, INTENSE.



POWER, WEALTH, AMBITION,
NOBLE, ROYALTY.



SEA, TRUST, SKY, STABILITY,
TRANQUIL, DEPTH.



FRESHNESS, NATURE, MONEY,
GROWTH, SAFETY.

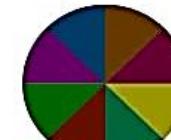


ENERGY, SUNSHINE, BRIGHT,
CHEERFUL, JOY.



WARM, HAPPINESS, SUCCESS,
AUTUMN, CREATIVE.

COLOR PROPERTIES



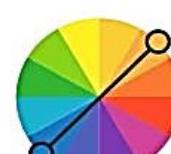
COLOR RELATIONSHIPS



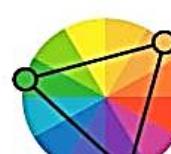
PRIMARY



SQUARE



COMPLEMENTARY



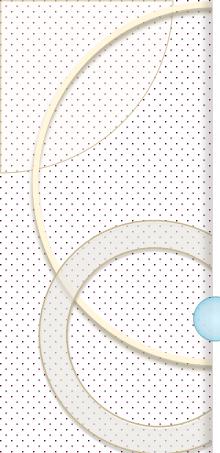
TRIAD



ANALOGOUS



TETRADIC



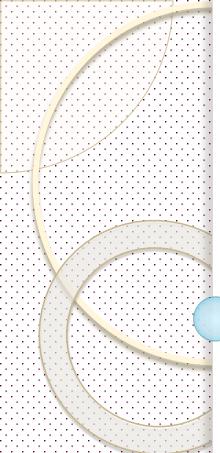
4.0.4 Colour and the Customer

Whether developing a brand from scratch, or designing marketing collateral for an existing brand, it's difficult to overstate the importance of colour. **80%** of consumers believe colour increases brand recognition, and **84.7%** cite colour as the primary reason they buy a particular product. Carefully selected brand colours help create the right impression and differentiate a brand from its competitors.

4.0.5 Colour Emotion Guide

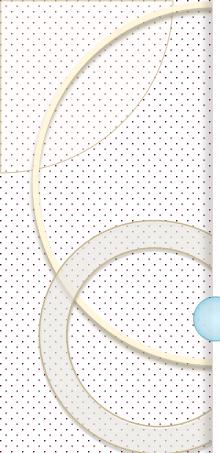


It's important to be aware that colour associations are not universal. Colour associations can be culturally specific. In the UK, Europe and North America, for example, the colour orange is generally associated with enthusiasm and fun. However, in China orange symbolizes love, health and humility. Gender also plays a role in colour associations. In a study on colour preferences, 57% of men said blue was their favorite colour, but only 35% of women shared this preference. The study also showed a much stronger preference for the colour purple among women than men. Men generally prefer cool colours, while women favour warm colours.



Are Your Colours Appropriate For Your Brand?

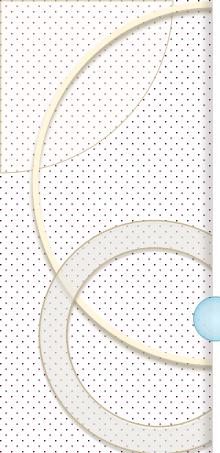
- Colours don't influence customers in isolation. Context is important. The key questions to ask when brainstorming colour schemes – Are these colours an appropriate fit for your brand or your message? Will these colours evoke the right moods and emotions that I want my customers to associate with my brand? Your brand colours should be perceived as appropriate for the message you are broadcasting. Colours amplify your marketing message. To make the most of colour psychology in your marketing, it helps to have a clear understanding of your brand values and personality. Is your brand youthful or mature? Sophisticated? Energetic? Who is your typical customer and what audience segment are you targeting? Understanding these things will offer invaluable information that will help you in creating messaging and marketing collateral that hits the right tone with your audience.



Are Your Colours Appropriate For Your Brand? Cont.

- As you can see, colour is a crucial element of a successful design and can have a powerful effect on how people feel and process information. Colour can be used to associate your brand or message with moods and emotions, and can be employed to capture attention, prompt action, and increase a desired response. Colour affects the perceptions of the viewer in subtle ways. If you know your audience and know what kind of emotional response you want to get across, insights from the psychology of colour can be a highly effective tool in marketing. For the best results, your colour scheme should be visually pleasing and should complement and reinforce the message you want to promote.

Colour is a key element in any design. See our articles on the importance of layout and typography in graphic design for more on some of the other important elements available for graphic designers to use to create their designs.



Color Psychology: How it's Used in Marketing [Infographic]

- Perhaps no choice is as vital to marketing as color. Whether you are selecting the color for a product or for your email marketing campaign, color has a tremendous impact on all of us. Subconsciously, we associate different colors with different things.
- Our infographic examines color and branding, looking at some common associations of different colors. It shows the overall importance of color to consumers and characteristics of many individual colors, and it also helps show the connection between graphic design and psychology.
- The numbers are pretty fascinating!



Colors can affect how we feel

While color can be appealing to us visually, a lot more is going on behind the scenes than just an aesthetic.

Powerful psychological cues are triggered when we view different colors. Colors evoke emotions, moods, and feelings. Whether you are a designer or a consumer, knowing the power of colors can help you make better decisions.

Photoshop :

A Guarantee

What is Photoshop?

The Photoshop Home Screen

What's the Workspace?

The 3 Major Things of Workspace

How to Set Up Your Workspace

Status Bar

Menu Bar

Options Bar

The OCS of Photoshop

How to Open a File

How to Create a File

How to Save: Save / Save As / Save a Copy

Quick Refresher

Photoshop Tools in Detail

The Move Tool

The Brush Tool

The Text Tool

The Zoom Tool

Photoshop Panels in Detail

Layers Panel

History Panel / Undo & Redo

The Canvas

Canvas Tip for Social Media

Transform

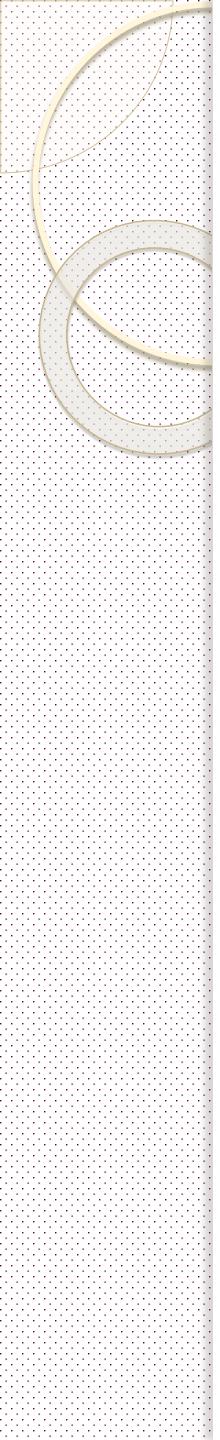
Let's Do a Fun Project!

How to Master Photoshop

Playwork

One Favor

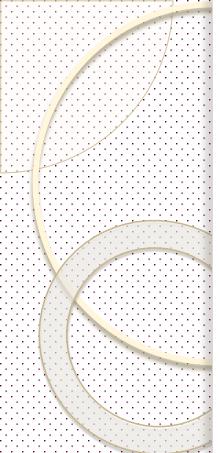




What is Photoshop?

Photoshop is an image creation, graphic design and photo editing software developed by Adobe. The software provides many image editing features for pixel-based images, raster graphics and vector graphics.

Photoshop is part of the Adobe Creative Cloud, which includes other popular tools such as Adobe Illustrator, Photoshop Lightroom and Adobe Dreamweaver. Photoshop Creative Cloud allows users to work on image and graphic content from anywhere.



How does Photoshop work?

Photoshop has been the industry standard image manipulation program for so long that its name has become a verb. It is common parlance to say that an image has been "photoshopped," or even just "shopped," meaning that it's been edited or manipulated.

It uses a layer-based editing system that enables raster image creation and altering with multiple overlays that support transparency.

Layers can also act as masks or filters, changing underlying colors. Shadows and other effects can be added to the layers.

Adobe promotes Photoshop as a tool for professionals. However, beginners can use Photoshop as well with many helpful tutorials on the market that train users in how to use Photoshop's various features.

Photoshop

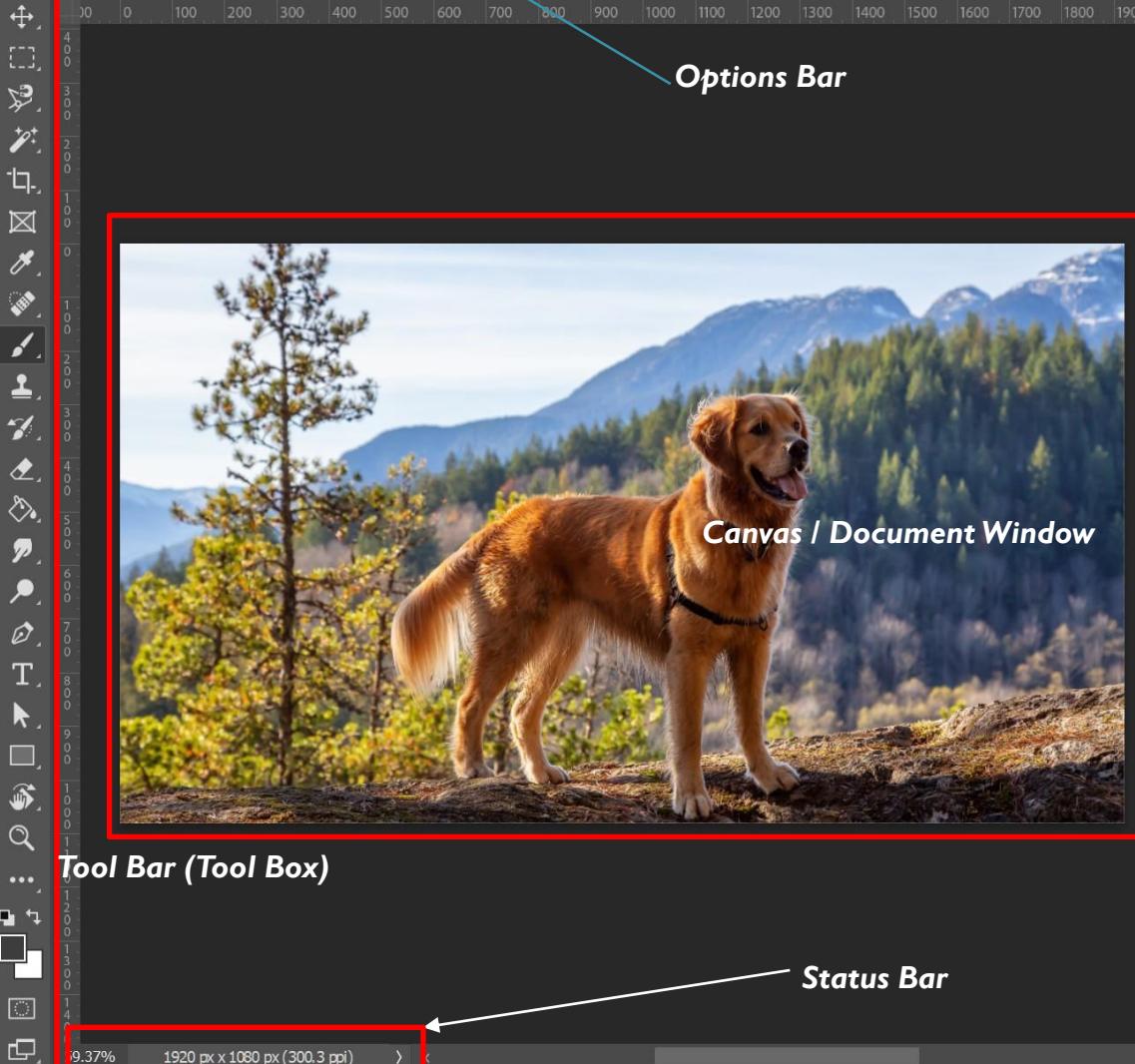
Menu Bar

File Edit Image Layer Type Select Filter 3D View Plugins Window Help

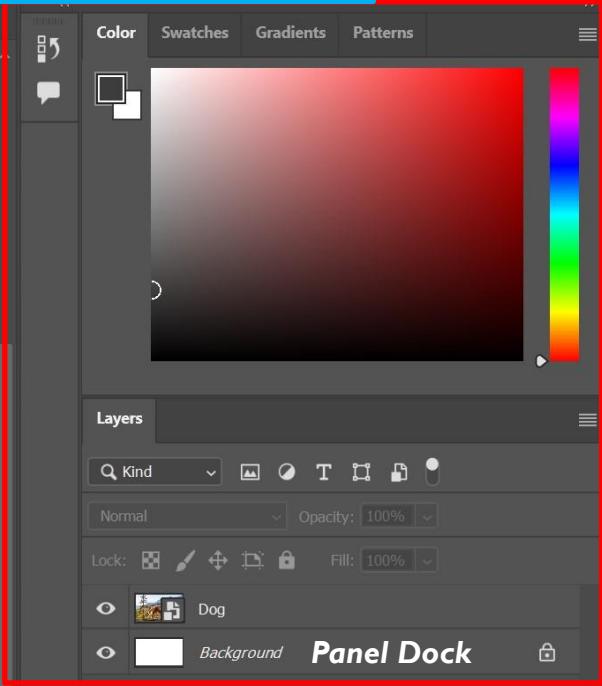
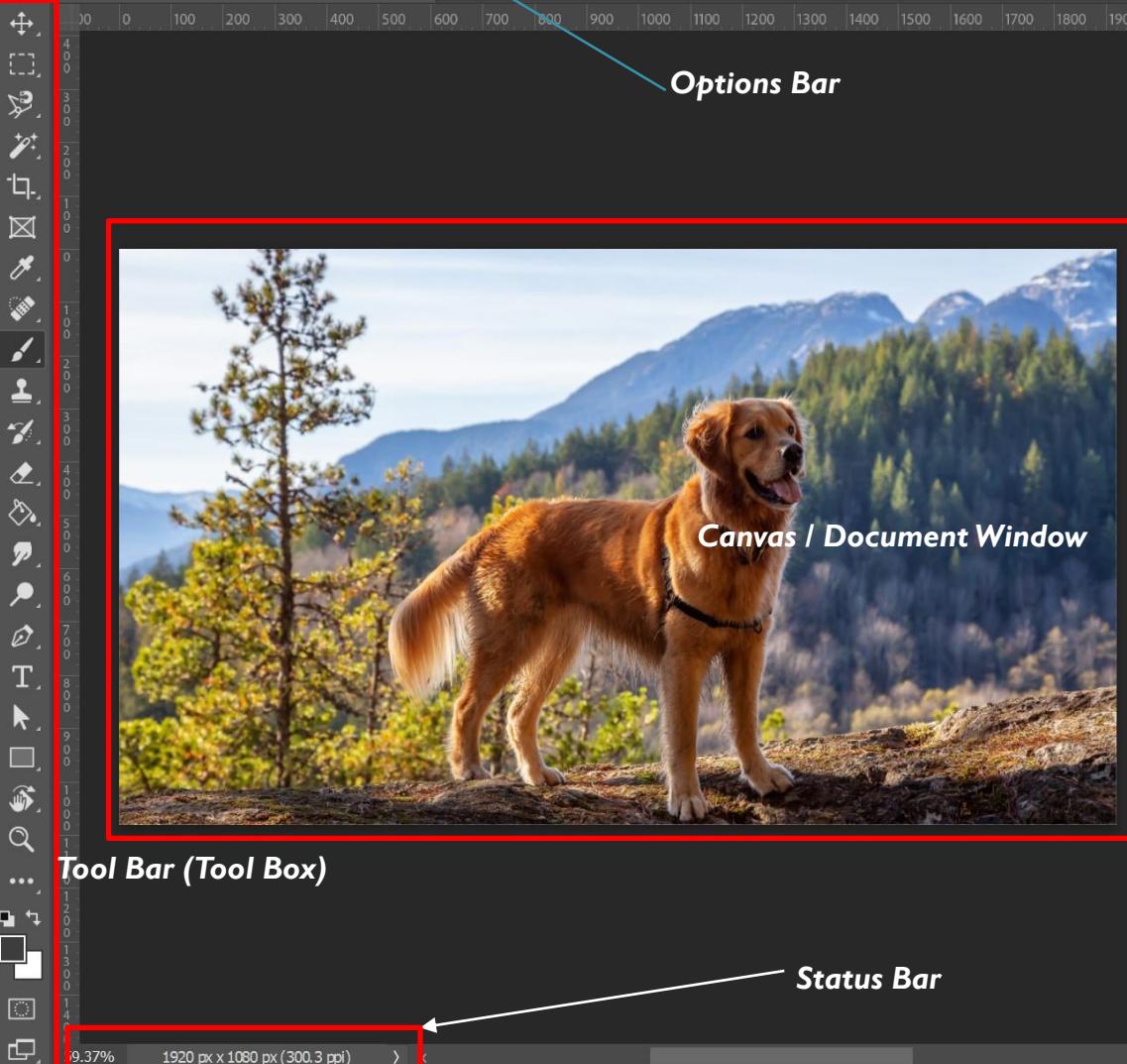
Mode: Normal Opacity: 100% Flow: 100% Smoothing: 0% 0° Share

edu.gcfglobal.org.psd @ 59.4% (RGB/8) * X Color Swatches Gradients Patterns

26 0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900



Options Bar

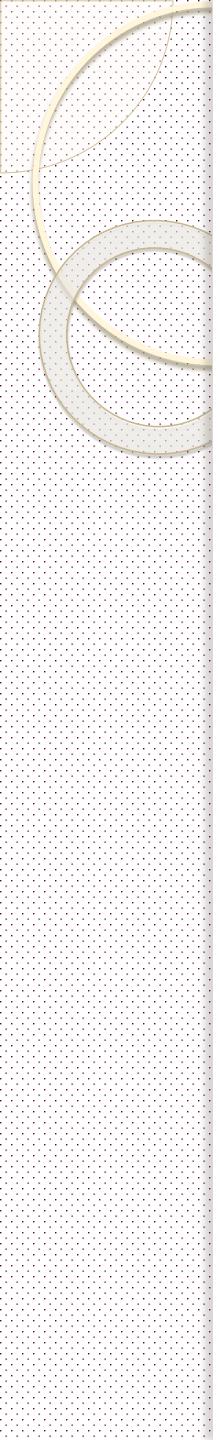


Tool Bar (Tool Box)

Status Bar

9.37% 1920 px x 1080 px (300.3 ppi)

Go fx o f

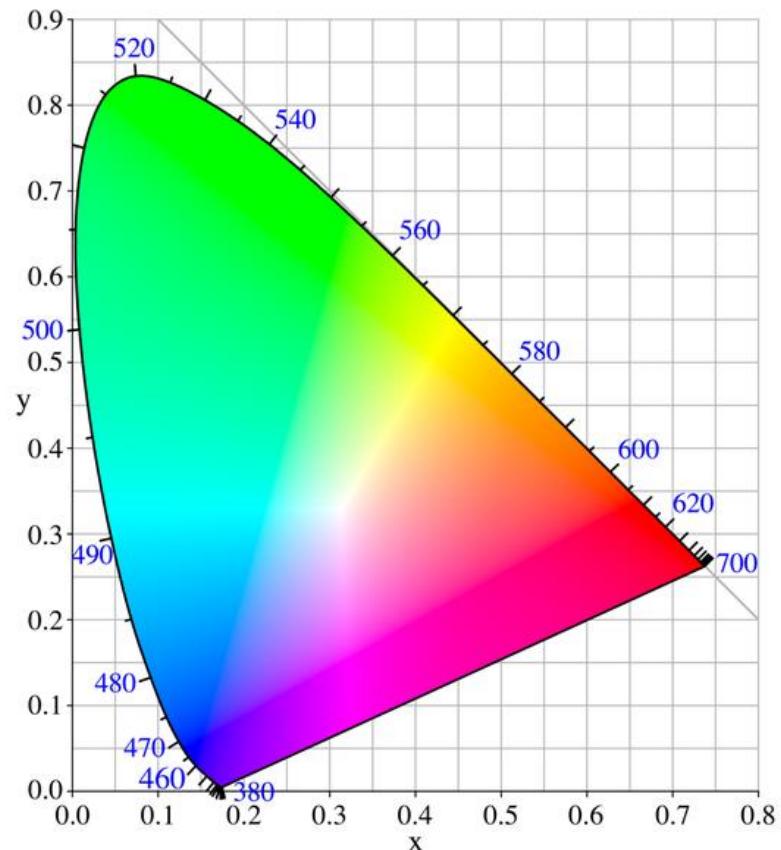


4.1 Color Models in Images

- Colors models and spaces used for stored, displayed, and printed images.
- **RGB Color Model for CRT Displays**
 - We expect to be able to use 8 bits per color channel for color that is accurate enough.
 - However, in fact we have to use about 12 bits per channel to avoid an aliasing effect in dark image areas — contour bands that result from gamma correction.
 - For images produced from computer graphics, we store integers proportional to intensity in the frame buffer. So should have a gamma correction LUT between the frame buffer and the CRT.

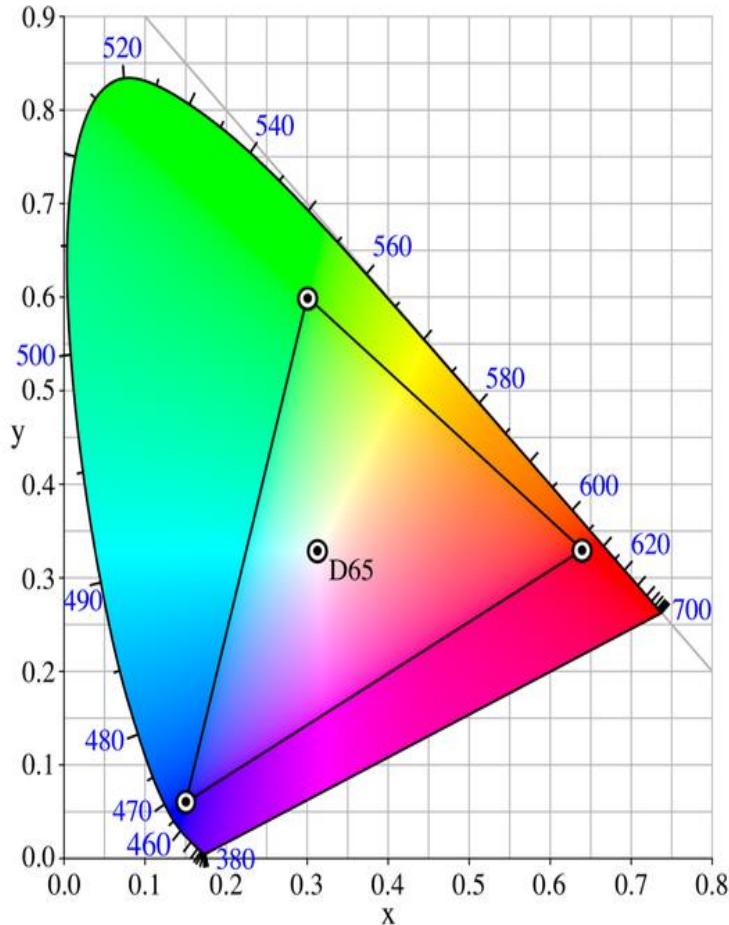
Color matching

- How can we compare colors so that the content creators and consumers know what they are seeing?
- Many different ways including CIE chromacity diagram



sRGB color space

- Extremities of the triangle define the primaries and lines describe the boundaries of what the display can show. D65 is a “white” point
- Each display different
- Out-of-gamut colors outside triangle



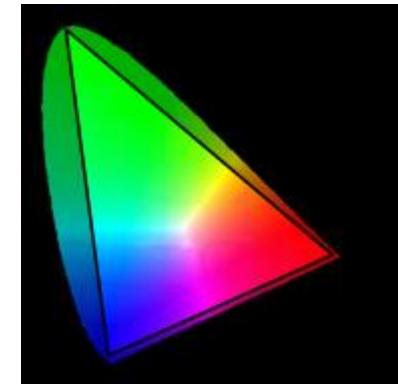
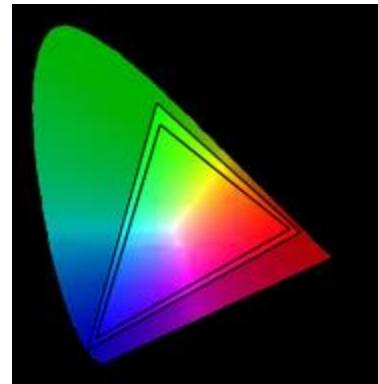
- Table 4.I: Chromacities and White Points of Monitor Specifications

	Red		Green		Blue		White Point	
System	xr	yr	xg	yg	xb	yb	xW	yW
NTSC	0.67	0.33	0.21	0.71	0.14	0.08	0.3101	0.3162
SMPTE	0.630	0.340	0.310	0.595	0.155	0.070	0.3127	0.3291
EBU	0.64	0.33	0.29	0.60	0.15	0.06	0.3127	0.3291

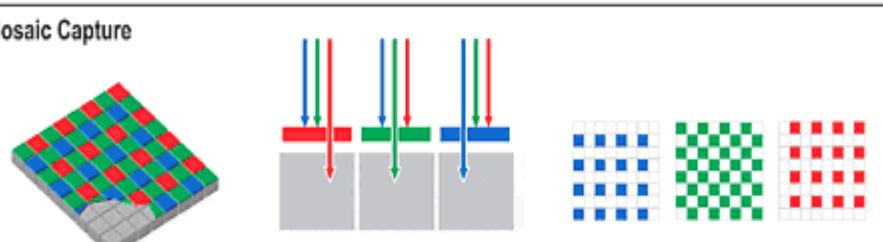
Monitor vs Film

- Monitor vs Film
- Digital cameras use monochromatic pixels and extrapolate
- Twice as much green pixels as eye is sensitive to green

GRGR
BGBG



Mosaic Capture

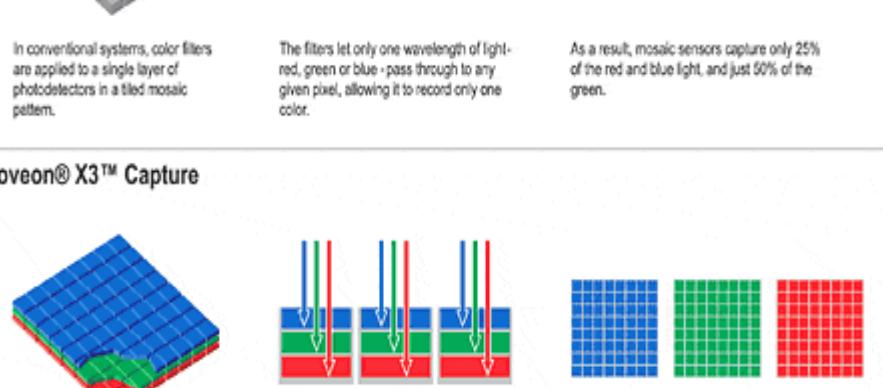


In conventional systems, color filters are applied to a single layer of photodetectors in a tiled mosaic pattern.

The filters let only one wavelength of light - red, green or blue - pass through to any given pixel, allowing it to record only one color.

As a result, mosaic sensors capture only 25% of the red and blue light, and just 50% of the green.

Foveon® X3™ Capture



A Foveon® X3™ image sensor features three separate layers of photodetectors embedded in silicon.

Since silicon absorbs different colors of light at different depths, each layer captures a different color. Stacked together, they create full-color pixels.

As a result, only Foveon X3 image sensors capture red, green and blue light at every pixel location.

Understanding the Difference Between RGB and CMYK

Working in CMYK is like painting on paper.

You start with a white sheet, and any colors you add, make the paper darker.

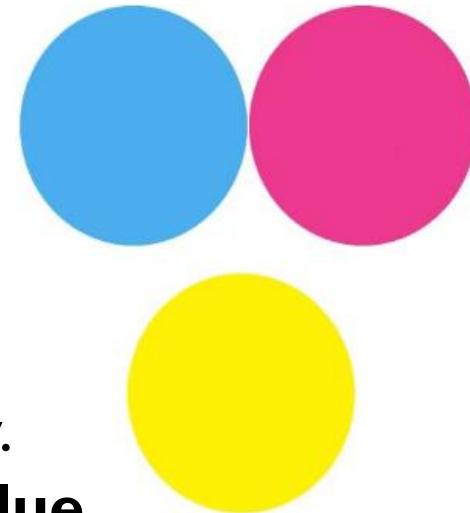
Here are circles in Cyan, Magenta and Yellow.

If you combine Cyan and Magenta, you get **blue**.

If you combine Cyan and Yellow, you get **green**.

If you combine Yellow and Magenta, you get **red**.

If you combine all three colors – Cyan, Magenta and Yellow – you get black. Actually, you don't; you get a dark brown instead. That's why commercial printing adds a fourth color, Black, to make shadows richer. And that's how we arrive at CMYK.



Understanding the Difference Between RGB and CMYK

Working in RGB is exactly the opposite. You start with black, and any colors you add, make the darkness brighter. Here are circles in Red, Green and Blue.

If you combine Red and Green, the result is brighter still: you get **yellow**.

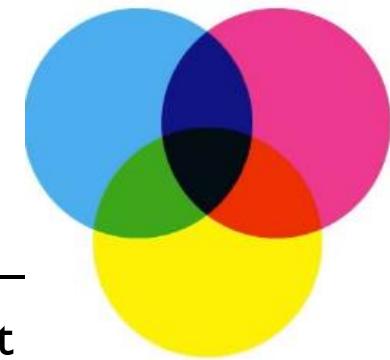
If you combine Blue and Green, you get **cyan**

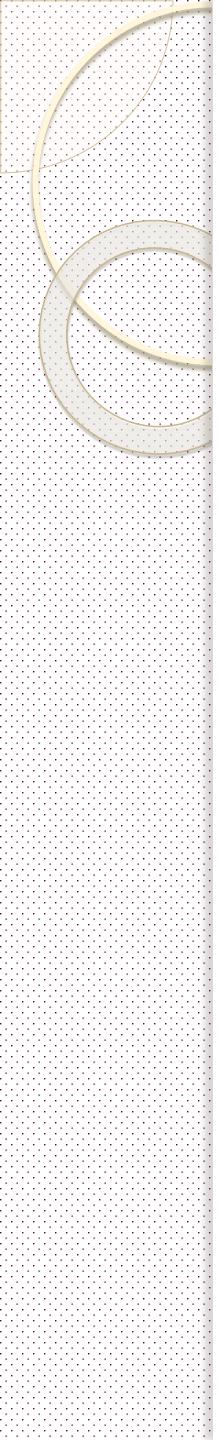
If you combine Blue and Red, you get **magenta**.

If you combine all three colors – Red, Green and Blue – white. Therefore, the RGB and CMYK are almost exact overlaps inside the CMY circles make red, green and blue, and the combinations inside the RGB circles make cyan, magenta and yellow.

When you're creating artwork for print, you need to be aware that the RGB range of color is much wider than the CMYK range.

This means you can create much brighter, more saturated colors in RGB than can ever be printed in CMYK.



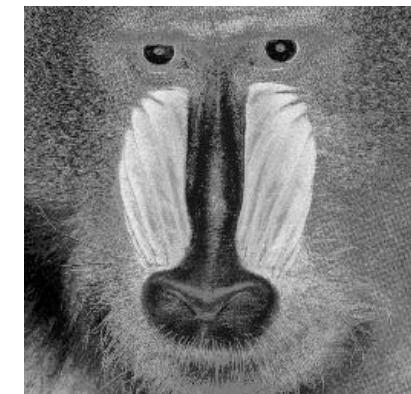
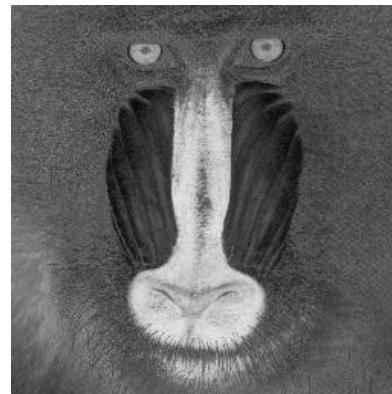
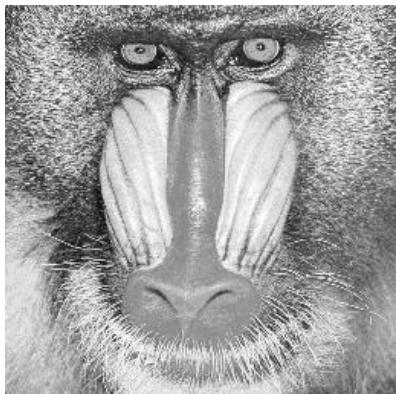
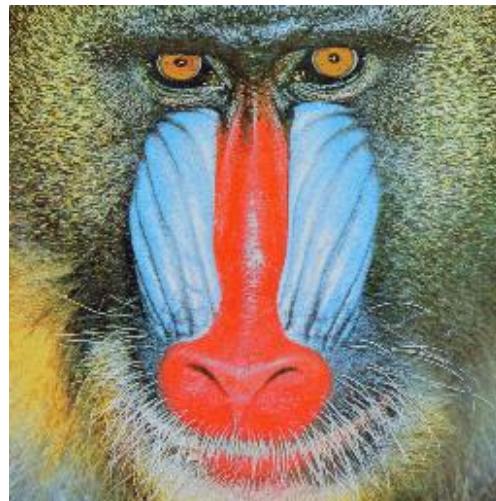


4.2 Color Models in Video

- **Video Color Transforms**

- Largely derived from older analog methods of coding color for TV. Luminance is separated from color information.
- YIQ is used to transmit TV signals in North America and Japan. This coding also makes its way into VHS video tape coding in these countries since video tape technologies also use YIQ.
- In Europe, video tape uses the PAL or SECAM codings, which are based on TV that uses a matrix transform called YUV.
- Finally, digital video mostly uses a matrix transform called YCbCr that is closely related to YUV

YUV (related to YCbCr)





Color spaces

- RGB - 8 bits per color
- YCbCr - Y is the luminance component and Cb and Cr are Chroma components
- Human eye is not sensitive to color



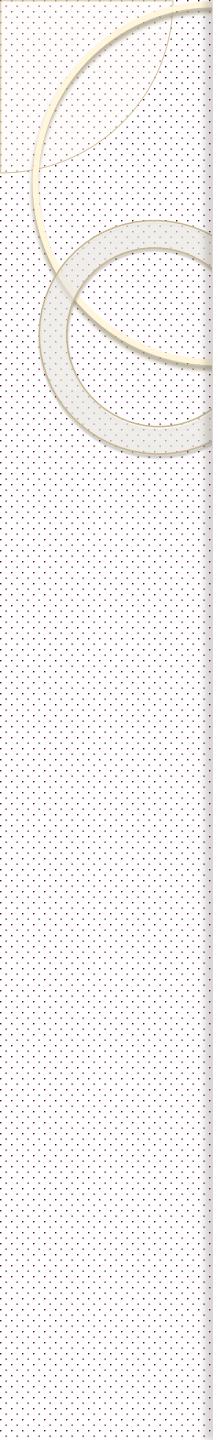
Graphics/Image Data Representations

8 bit gray-level image



One Bit Image (bitmaps) -
use 1 bit per pixels





Images

- Bitmap: The two-dimensional array of pixel values that represents the graphics/image data.
- Image resolution refers to the number of pixels in a digital image (higher resolution always yields better quality)
 - Fairly high resolution for such an image might be 1600×1200 , whereas lower resolution might be 640×480
- **dithering** is used to print: which trades intensity resolution for spatial resolution to provide ability to print multi-level images on 2-level (1-bit) printers
- TrueColor (24 bit image)



(a)



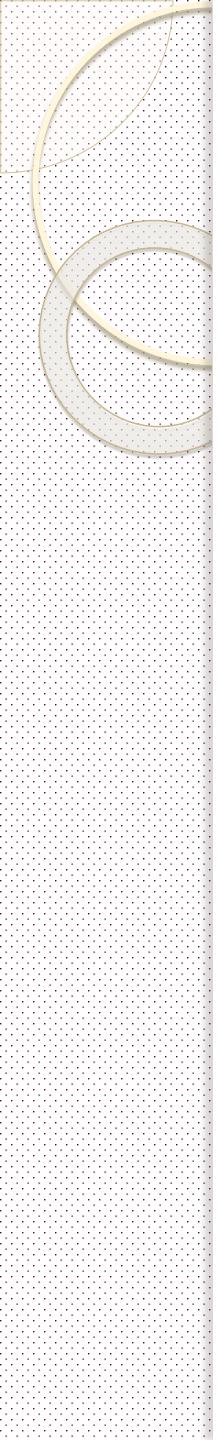
(b)

Fig. 3.4: Dithering of grayscale images.

(c)

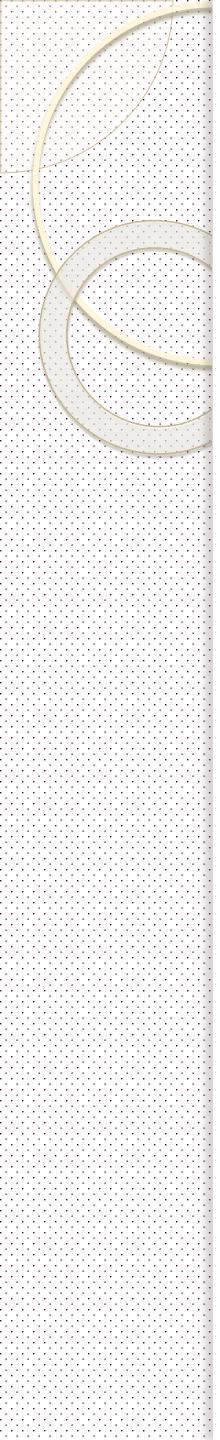


- (a): 8-bit grey image “lenagray.bmp”.
- (b): Dithered version of the image.
- (c): Detail of dithered version.



8-bit color image

- Can show up to 256 colors
- Use color lookup table to map 256 of the 24-bit color (rather than choosing 256 colors equally spaced)
 - Back in the days, displays could only show 256 colors. If you use a LUT for all applications, then display looked uniformly bad. You can choose a table per application in which case application switch involved CLUT switch and so you can't see windows from other applications at all



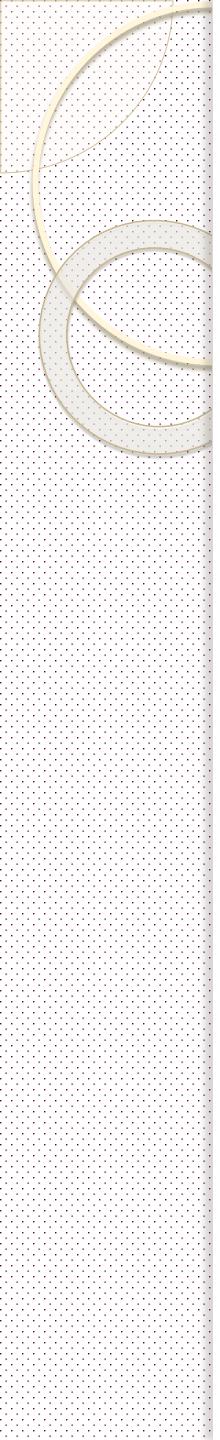
24-bit Color Images

- In a color 24-bit image, each pixel is represented by three bytes, usually representing RGB.
 - - This format supports $256 \times 256 \times 256$ possible combined colors, or a total of 16,777,216 possible colors.
 - - However such flexibility does result in a storage penalty: A 640×480 24-bit color image would require 921.6 kB of storage without any compression.
- An important point: many 24-bit color images are actually stored as 32-bit images, with the extra byte of data for each pixel used to store an alpha value representing special effect information (e.g., transparency)

Popular Image Formats

- GIF
 - Lossless compression
 - 8 bit images
 - Can use standard LUT or custom LUT
 - LZW compression





JPEG

- Lossy compression of TrueColor Image (24 bit)
 - Human eye cannot see high frequency
 - Transform from spatial to frequency domain using discrete cosine transformation (DCT) (fast fourier approximation)
 - In frequency domain, use quantization table to drop high frequency components. The Q-table is scaled and divided image blocks. Choice of Q-table is an art. Based on lots of user studies. (lossy)
 - Use entropy encoding - Huffman encoding on Quantized bits (lossless)
 - Reverse DCT to get original object
 - Human eye cannot discern chroma information
 - Aggressively drop chroma components. Convert image from RGB to YCbCr. Drop Chroma using 4:2:0 subsampling

JPEG artifacts (from Wikipedia)

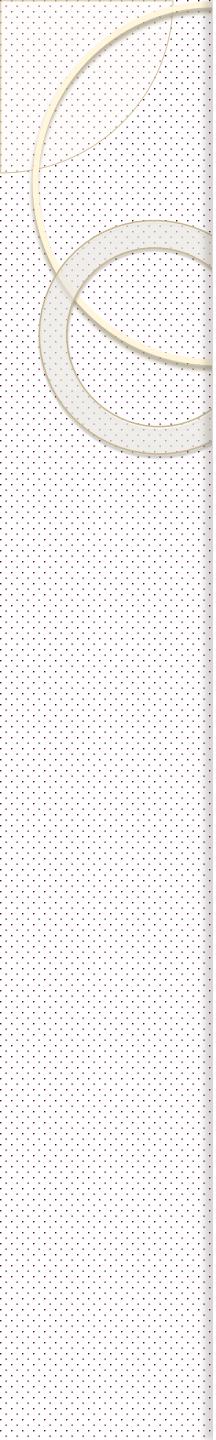
- Original



JPEG artifacts (Q=50)

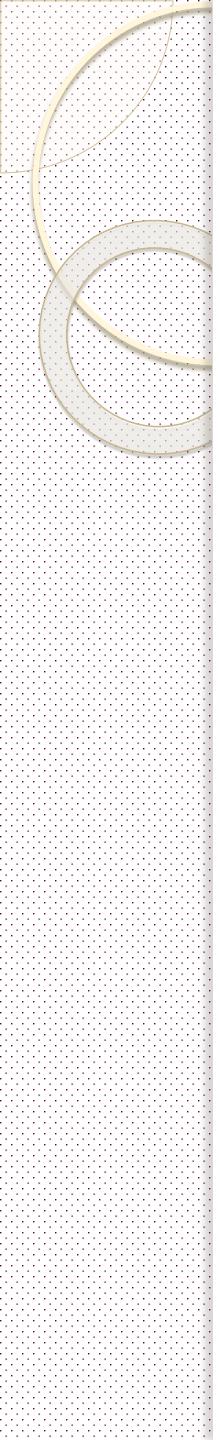
- Differences (darker means more changes)





Other formats

- PNG
- TIFF
 - Container for JPEG or other compression
- JPEG is a compression technique, JFIF is the file format. A JPEG file is really JFIF file. TIFF is a file format.
- Postscript is a vector graphics language
 - Encapsulated PS adds some header info such as bounding box
- PDF is a container for PS, compression and other goodies



Summary

- Multimedia technologies use the limitations of human vision and devices in order to achieve good compression
- What does this mean for surveillance applications? Are the assumptions made by JPEG still true for applications that are analyzing images for other purposes



**THANK'S FOR
YOUR ATTENTION**



