IMAGES AND COLORS

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OVERVIEW

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- Work out your graphical approach by planning your approach, organizing your tools, and configuring your computer workspace
- Differentiate among bitmap, vector, and 3-D images and describe the capabilities and limitations of all three
- Describe the use of colors and palettes in multimedia
- Cite the various image file types used in multimedia

IMAGE

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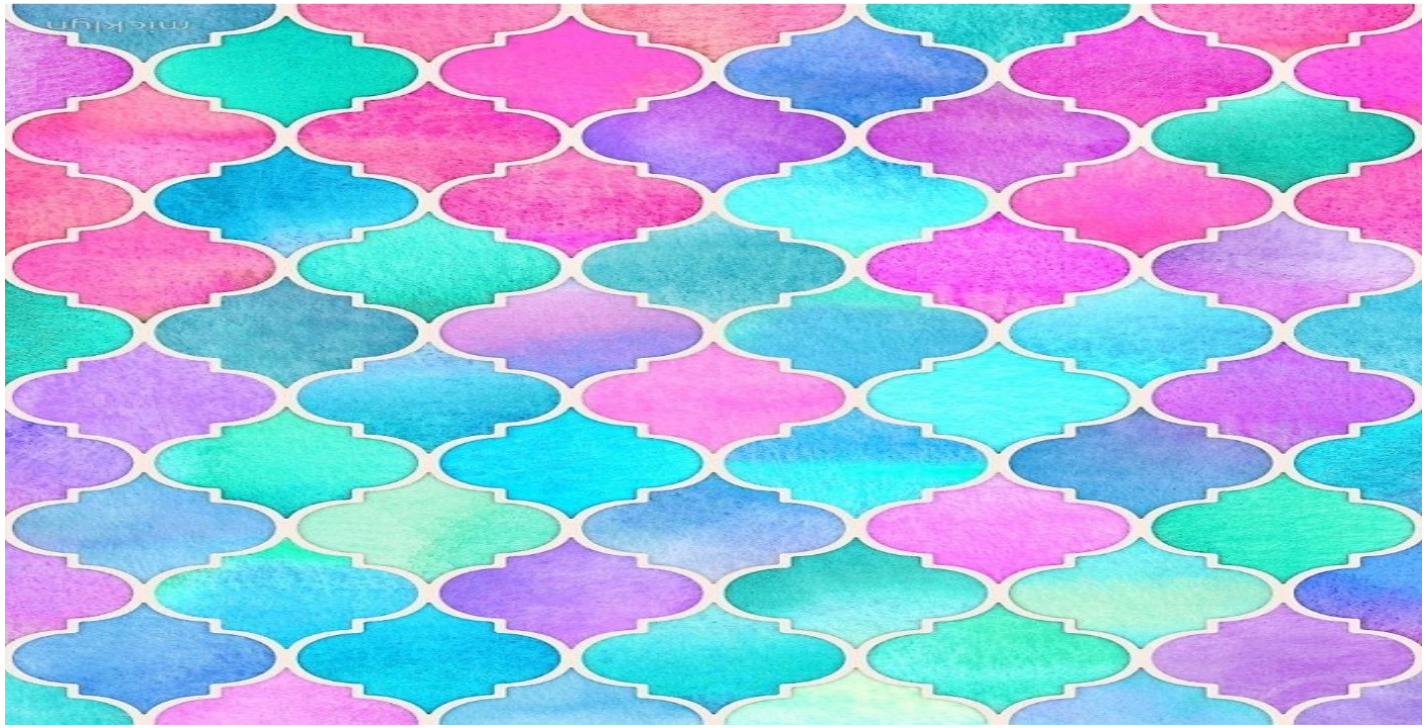
Multimedia on a computer screen is a composite of elements: text, symbols, photograph-like bitmaps, vector-drawn graphics, three-dimensional renderings, distinctive buttons to click, and windows of motion video.

IMAGE EXAMPLES

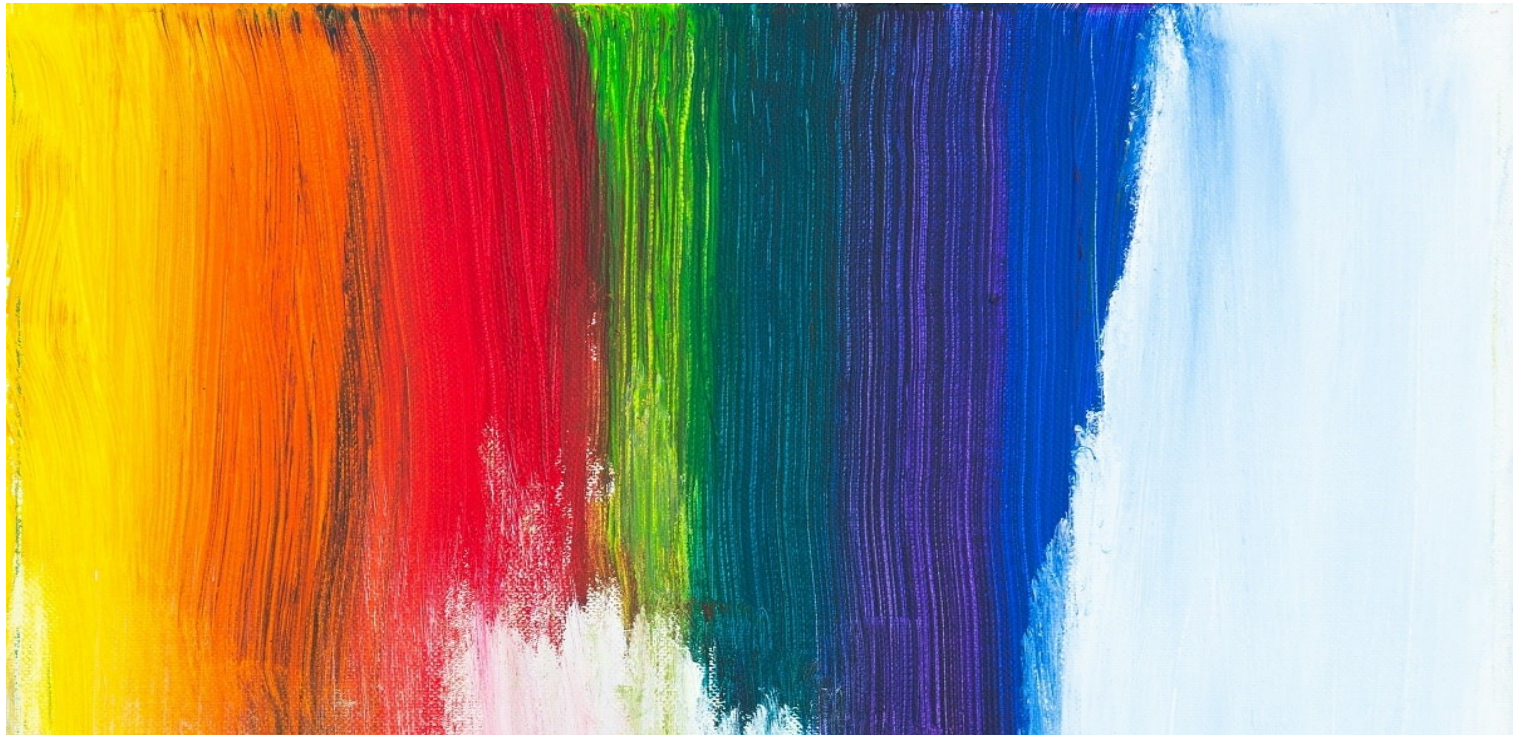
Some parts of this image may even twitch or move so that the screen never seems still and tempts your eye.

IMAGE EXAMPLES



A very colorful screen with gentle pastel washes of mauve and puce

IMAGE EXAMPLES

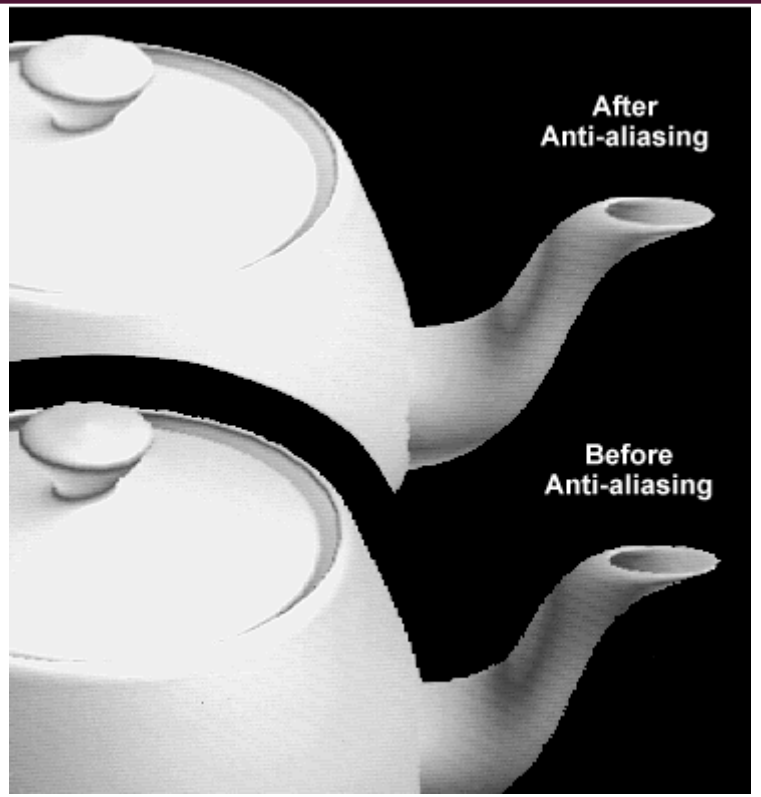


Splashes of Crayola red and blue and yellow and green.

IMAGE EXAMPLES

Stark black and white, full of sharp angles

IMAGE EXAMPLES



Softened with gray-scale blends and anti-aliasing

BEFORE YOU START

Plan your approach

- Flow charts, storyboards, note cards, pencil and paper, script
- Intended audience/ target market
- Look at examples and templates (templatemonster. Com)

BEFORE YOU START

Organize the available tools:

- Clip art, stock art, presets, buttons, software
- Widow/pallet layout and arrangement’

Configure your computer workspace:

- When developing multimedia, it is helpful to have more than one monitor to provide lots of screen real estate
- Learning to use keyboard shortcuts enable you to work efficiently

MAKING OF STILL IMAGES

Still images may be the most important element of a multimedia project

The appearance of still images depends on the display resolution and capabilities computers' graphics hardware and monitors.

Still images are stored in various file formats (JPEG, PNG, BMP...)

Types of still images:

- Bitmaps (raster)
- Vector-drawn graphics

CREATION OF STILL IMAGES

Bitmaps:

A bit is an electronic digit that is either on or off, black or white, or true (1) or false (0).

A map is a two dimensional matrix of these bits.

A bitmap is a simple matrix of the tiny dots that form an image and are displayed on a computer screen or printed.

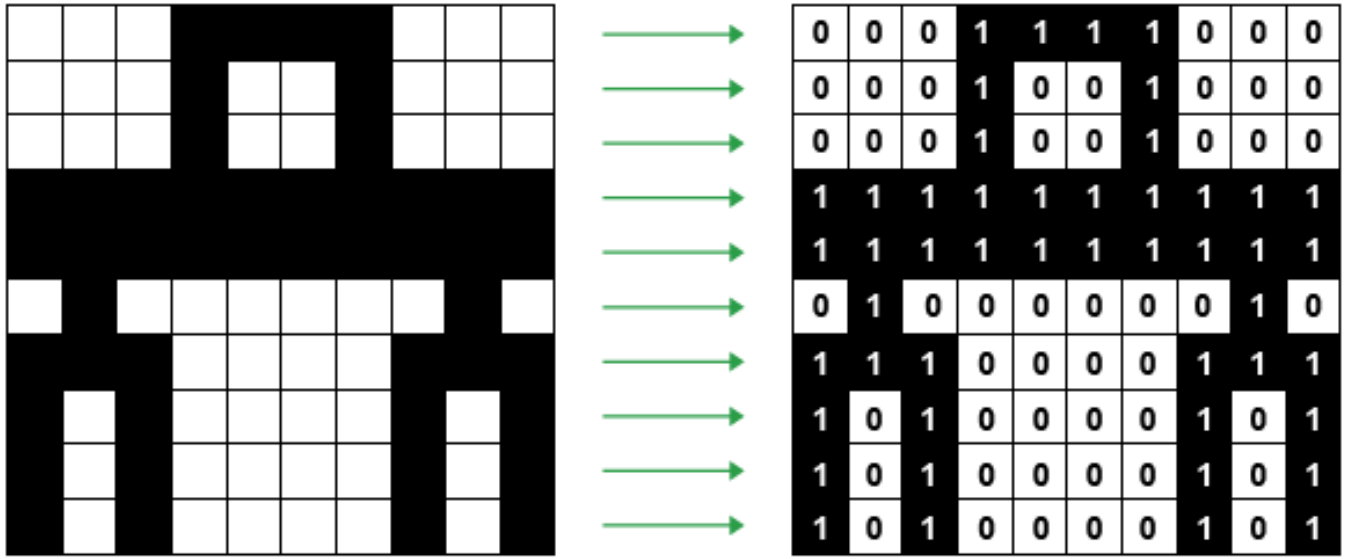
CREATION OF STILL IMAGES

Bitmaps (continued):

- A bitmap image is made up of hundreds of individual picture elements known as pixels or pels
- A pixel is the smallest component and thus shows the smallest details and are arranged in columns and rows
- 1 image can have varying bit and color depths
- More bit provide more color depth, hence more photo-realism but require more space and processing power

Bit Depth	Number of Colors Possible	Available Binary Combinations for Describing a Color
1-bit	2	0, 1
2-bit	4	00, 01, 10, 11
4-bit	16	0000, 0001, 0011, 0111, 1111, 0010, 0100, 1000, 0110, 1100, 1010, 0101, 1110, 1101, 1001, 1011

CREATION OF STILL IMAGES



In a 1 bit image (1 bit/pixel), every pixel is either black or white.

Image source: bbc.co.uk/education/guides

BITMAP

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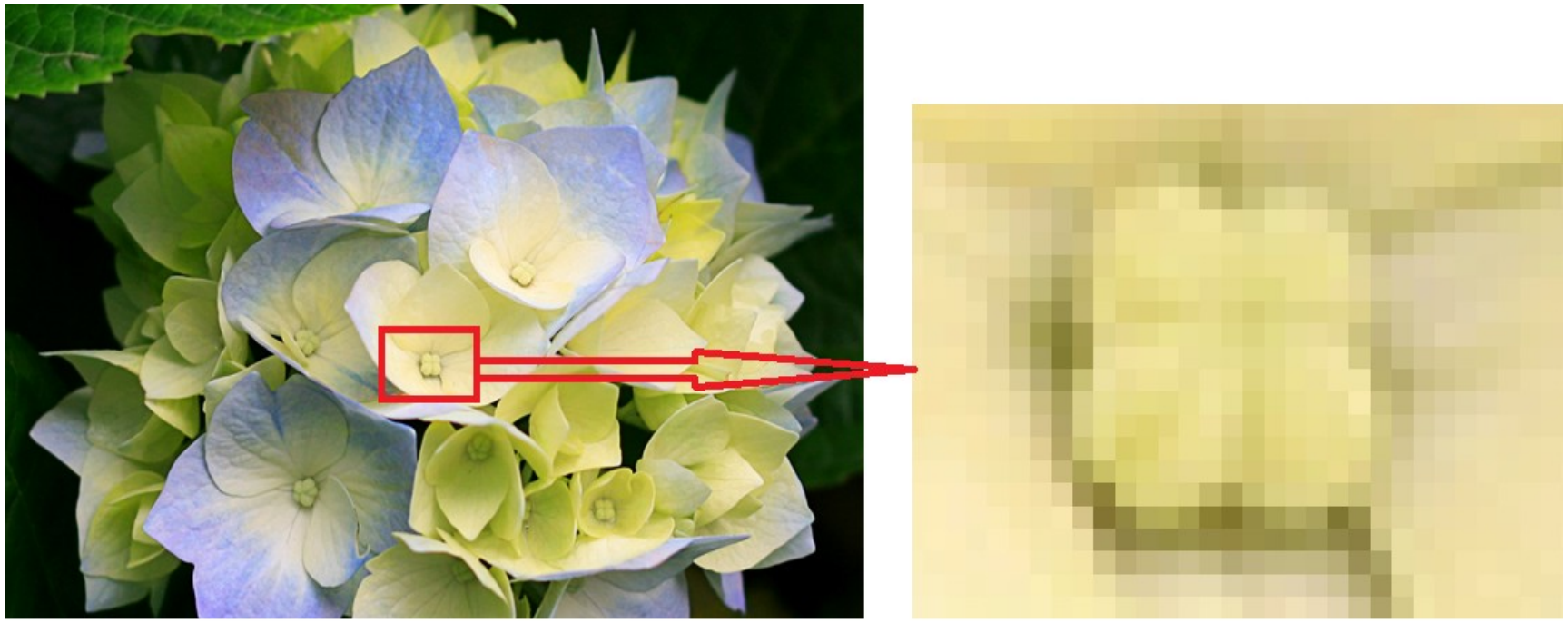
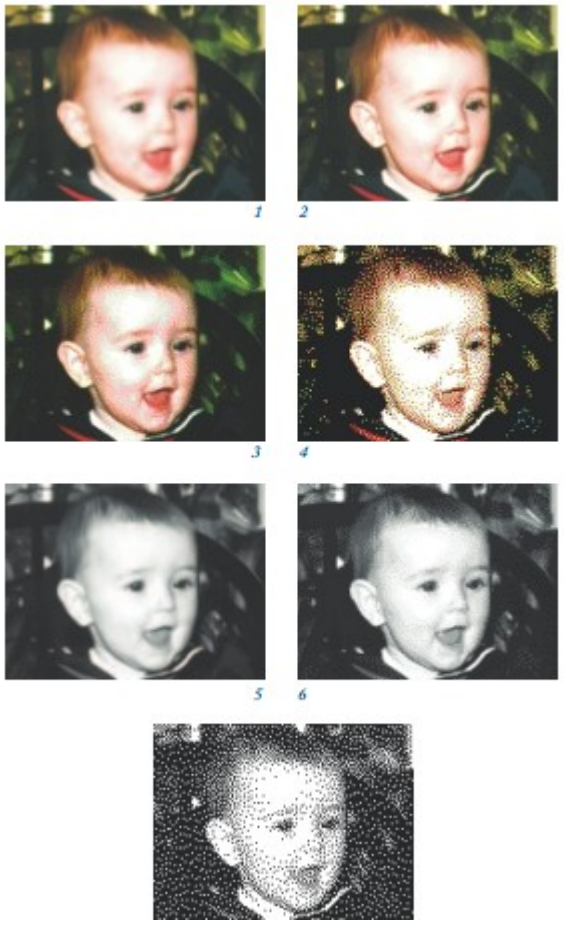


In a 32-bit image , there are trillions of colors.

BITMAP



CREATION OF STILL IMAGES

Bitmaps are suitable for creating:

- Photo-realistic image (Photographs)
- Complex drawings
- Images that require fine detail
- Painterly graphics

CREATION OF STILL IMAGES

Bitmaps come from:

- Clip art (licensing restrictions may apply)
- Bitmap software (PS,FW)
- Capturing images (digital camera, video, screen)
- Scanning images
- Copying to clipboard

CREATION OF STILL IMAGES

Using clip art galleries:

- A clip art gallery is an assortment of graphics, photographs, sound, and/or video
- Alternative for users who do not want to create their own images
- Collections available on CD_ROMS and the internet

CREATION OF STILL IMAGES

- The industry-standard programs for bitmap painting and editing are:
  - Adobe photoshop, illustrator and fireworks
  - Corel painter and ConrelDraw

CREATION OF STILL IMAGES

Image editing programs enable the user to:

- Enhance and make composites
- Alter and distort images
- Add and delete elements
- Morph (manipulate still images to created animated transformations)

Image source: https://www.shutterbug.com/content/how-make-colors-pop-your-images-using-secret-code-photoshop

CREATION OF STILL IMAGES

Users can scan images from conventional sources and make necessary alterations and manipulations

CREATION OF STILL IMAGES

- Vector-drawn graphics
  - Applications of vector-drawn images
  - How vector-drawn images work
  - Vector-drawn images versus bitmaps

CREATION OF STILL IMAGES

Vector-drawn objects are used for lines, boxes, circles, polygons, and other graphic shapes that can be mathematically expressed in angles, coordinates, and distances

Vector-drawn images are used in:

- Computer-aided design (CAD) programs
- Graphics artists designing for the print media to avoid jagged
- 3-D animation programs
- Applications requiring drawing of graphic shapes

CREATION OF STILL IMAGES

Drawing software such as Adobe Illustrator can save vector graphics in PDF, SVG and SWF format

CREATION OF STILL IMAGES

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How vector-drawn images work:

Vector graphics are defined using formulas

SVG

```
<svg xmlns="http://www.w3.org/2000/svg"
xmlns:xlink=http://www.w3.org/1999/xlink
width="200"
height="200"
viewBox="-100 -100 300 300">
<rect x="0" y="0" fill="yellow" stroke="red" width="200" height="100"/>
<text transform="matrix(1 0 0 1 60 60)" font-family="'TimesNewRomanPS-
BoldMT'" font-size="36">SVG</text>
</svg>
```

CREATION OF STILL IMAGES

How vector-drawn images work:

Vector drawn objects are drawn to the computer screen using a fraction of the memory space required by a bitmap.

A vector is a line described by its endpoints, and sometimes direction

CREATION OF STILL IMAGES

Compare Bitmaps and vector image?

CREATION OF STILL IMAGES

Vector-drawn images versus bitmaps:

- Vector images often use less memory and have a smaller file size as compared to bitmap
- Web vector graphics often download and draw faster than bitmaps when used for animation
- Vector-drawn cannot be used for photorealistic images
- Vector-drawn Require a plugin for web-based display
- Bitmaps are not easily scalable and resizable like vector objects
- Bitmaps can be converted to vector images using auto tracing
- Vector images can be filled, stroked, and selected.

CREATION OF STILL IMAGES

Converting between images:

- Vector to bitmap
  - Easy
  - Perfect presentation
- Bitmap to vector
  - Poor quality
  - Highly loss

CREATION OF STILL IMAGES

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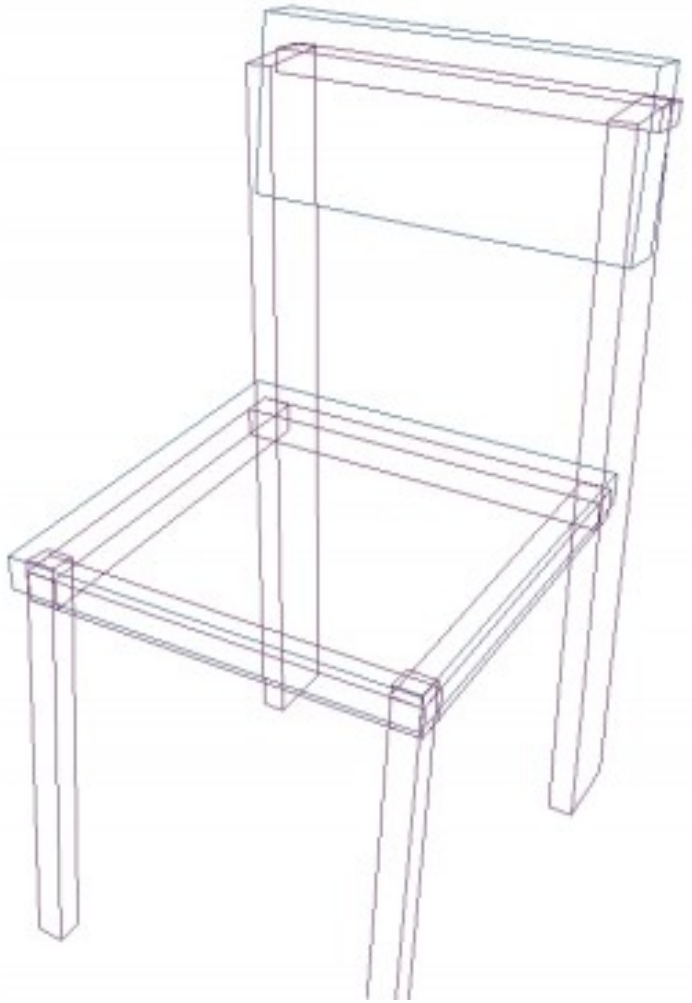
3-D drawing and rendering:

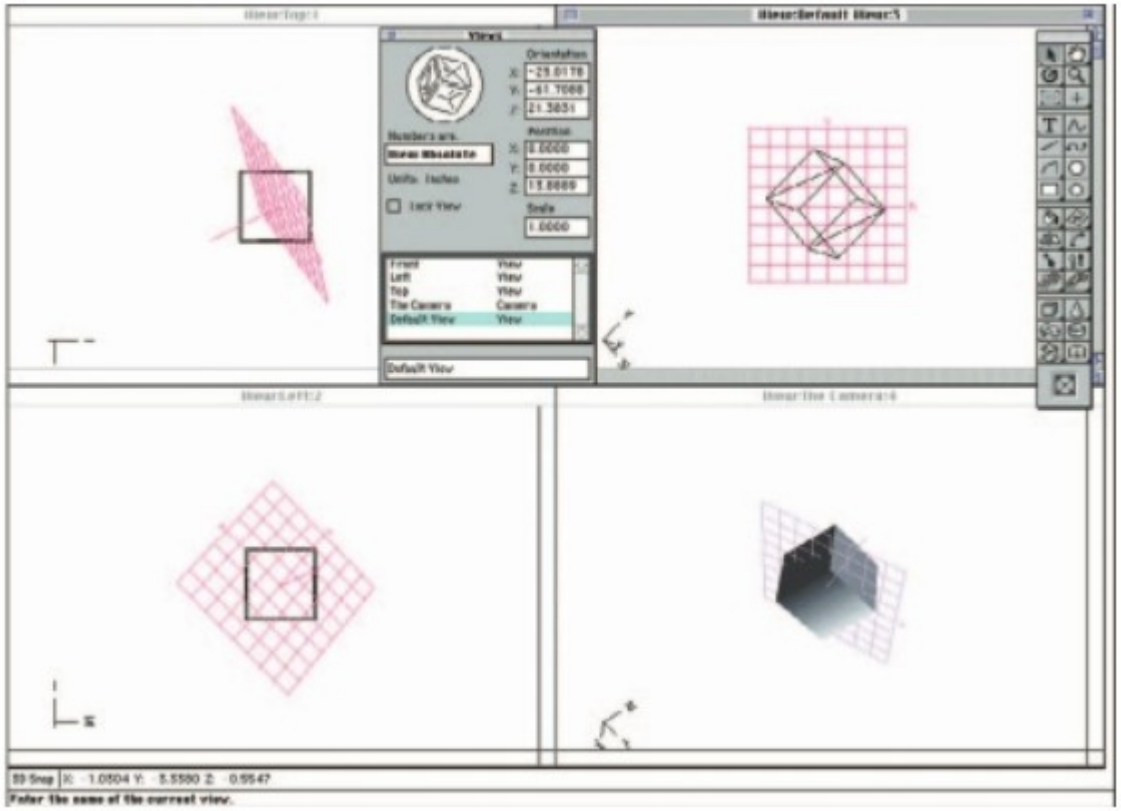
- 3-D-rendered provides more lifelike substance and feel to projects
- Objects in 3-D space carry many properties, shape color, texture, location… and a scene often contains many objects



CREATION OF STILL IMAGES

3-D animation, drawing, and rendering tools include:

- 3DSMax/Maya
- Blender
- Lightware
- Sketchup
- Cinema 4D
- Animation Master
- Zbrush/Modo



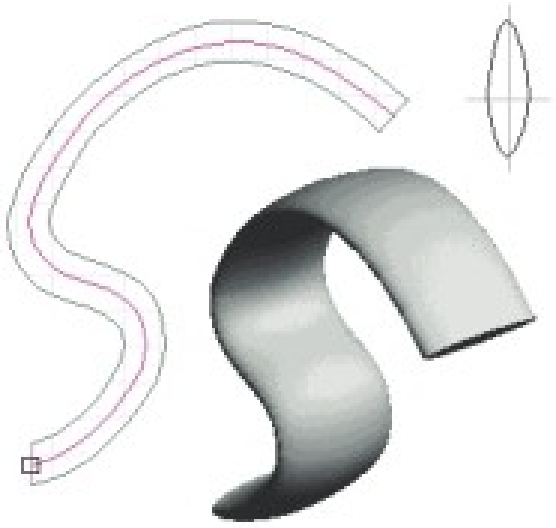
3-D DRAWING AND RENDERING

Features of a 3-D application:

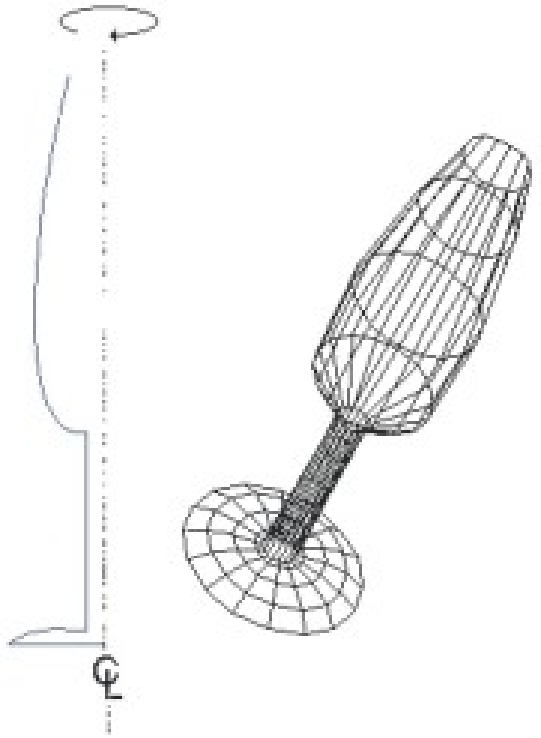
- Modeling (primitive) – Placing all the elements into 3-D space
- Extruding –extends the shape perpendicular to or along the shapes outline
- Lathing – A profile of the shape is rotated around a defined axis
- Apply Color, Textures, Lighting, Rigging, Animation, Dynamics and Rendering

CREATION OF STILL IMAGES

Extruding



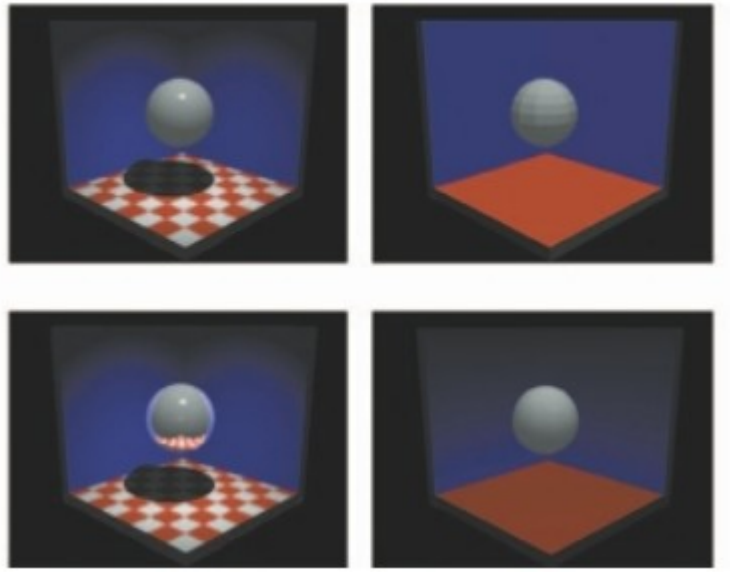
Lathing



CREATION OF STILL IMAGES

Rendering – produces a final output of a scene and is more compute intensive

Ex: A: gouranud shading, B Flat shading, C Ray Tracing, D Phong shading



CREATION OF STILL IMAGES

- Panoramas
  - Panoramas images are created by stitching together a sequence of photos around a circle and adjusting them into a single seamless bitmap
  - Quictime VR
  - CubicConverter
  - Pano2VR
  - Krpano.com

COLORS AND PALETTES IN MULTIMEDIA

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- Computerized colors
- Color palettes
- Color in different cultures

COLORS AND PALETTES IN MULTIMEDIA

Basic methods of making colors :

- Additive color
  - a color is created by combining colored light sources in three primary colors: red, green, and blue
  - This is the process used for cathode ray tube (CRT), liquid crystal (LCD), and plasma displays.

COLORS AND PALETTES IN MULTIMEDIA

Basic methods of making colors :

- Subtractive color
  - Color is created by combining colored media such as paints or ink
  - Color media absorb (or subtract) some parts of the color spectrum of light and reflect the others back to the eye
  - Subtractive color is the process used to create color in printing
  - The printed page consists of tiny halftone dots of three primary colors: cyan, magenta, and yellow

COLORS AND PALETTES IN MULTIMEDIA

Computer colors model: Different ways of representing information about colors in computers

Models used to specify color in computers are:

- RGB
- HSB and HSL
- Other models include CMYK, CIE, YIQ, YUV, and YCC

COLORS AND PALETTES IN MULTIMEDIA

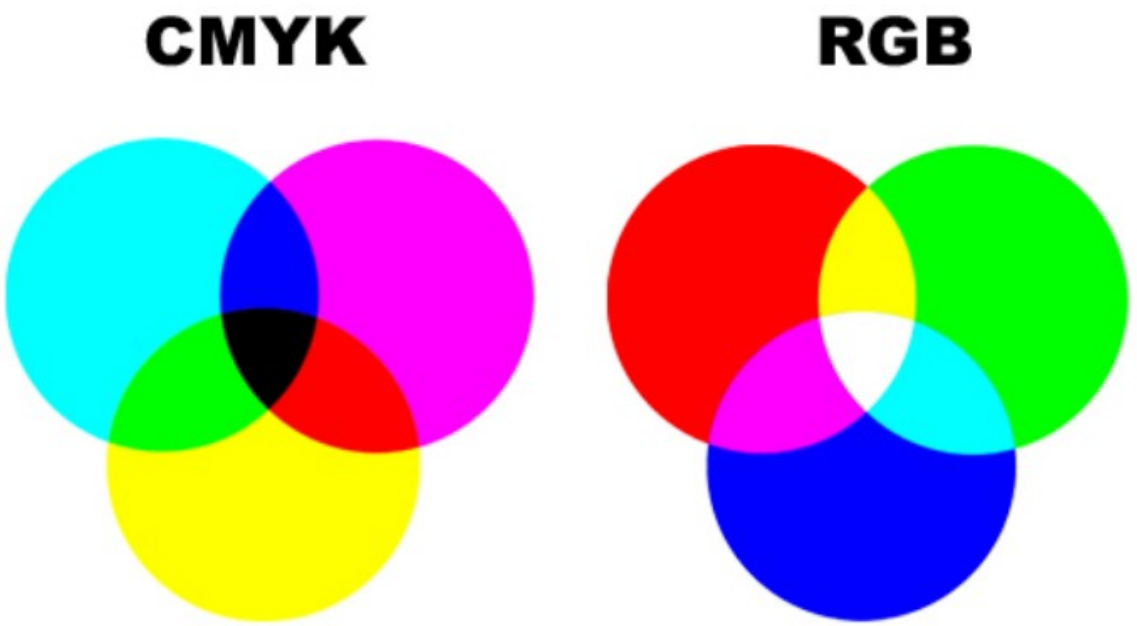
RGB model – in 24 bit, one color is specified in terms of red, green, and blue values fror

RGB Combination (R,G,B)	Perceived Color
Red only (255,0,0)	Red
Green only (0,255,0)	Green
Blue only (0,0,255)	Blue
Red and green (blue subtracted) (255,255,0)	Yellow
Red and blue (green subtracted) (255,0,255)	Magenta
Green and blue (red subtracted) (0,255,255)	Cyan
Red, green, and blue (255,255,255)	White
None (0,0,0)	Black

COLORS AND PALETTES IN MULTIMEDIA

CMYK model:

- Based on light-absorbing quality of ink printed on paper
- Associated with printing



COLORS AND PALETTES IN MULTIMEDIA

Color palettes

- Palettes are mathematical tables that define the color of pixels displayed on the screen
- Palettes are called “color lookup tables” or CLUTs, on the Macintosh
- The most common palettes are 1, 4, 8, 16 and 24 bit deep

COLORS AND PALETTES IN MULTIMEDIA

Computerized colors are pretty tricky to manage

More colors requires more memory

Colors you see on the screen may different from your printout

COLORS AND PALETTES IN MULTIMEDIA

Dithering:

Dithering is a process whereby the color value of each pixel is changed to the closet matching color value in a more limited palette

Accomplished using a mathematical algorithm

COLORS EXPRESSION

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Red signifies inner warmth, active, vivacity, **passionate**, dynamic force, mars, revolution

Orange express radiant activity, communication, active energy, fire burning, solar luminosity, **self-respect** and **generosity**

Yellow symbolizes **understanding, knowledge and intelligence**. It is most aggressive and luminous on black

COLORS EXPRESSION

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Green symbolizes **growth, hope**, sympathy and compassion. It is the fusion and interpenetration of knowledge and faith.

Blue expresses **relaxation**, passive, **submissive faith**, stability

Violet is a **mysterious**, meditative, **emotional**, piety color and the color of dignity. Its tints symbolize the brighter aspects of life, whereas shades represent the dark, negative forces and terrors

IMAGE FILE TYPES USED IN MULTIMEDIA

Macintosh format:

- PICT: a complicated and versatile format developed by apple
- Almost every Mac image app can import or export PICT files
- In a PICT file, both vector objects and bitmaps can reside side-by-side

IMAGE FILE TYPES USED IN MULTIMEDIA

- Windows format
  - Commonly used image file format: DIB, BMP
  - Other common windows bitmap format: BMP, TIFF, PCX

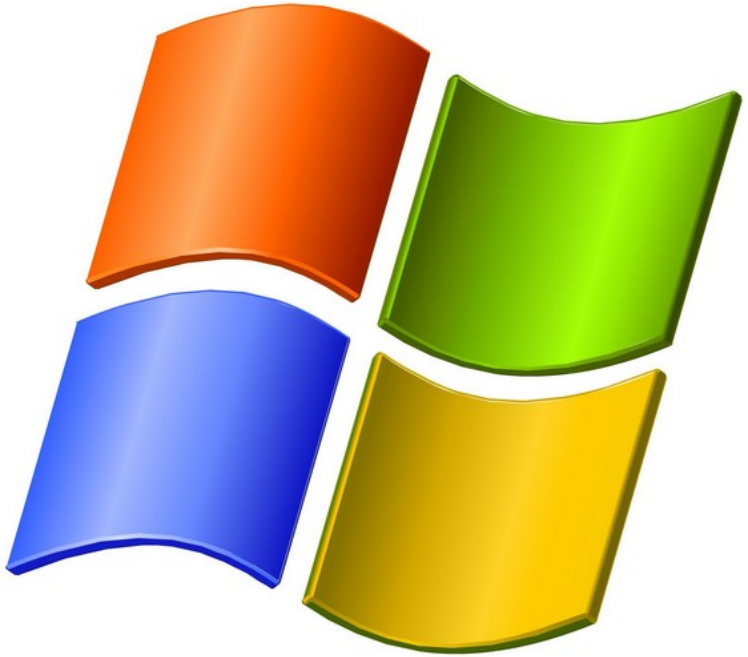

IMAGE FILE TYPES USED IN MULTIMEDIA

Cross-platform format:

JPEG, GIF, TIFF and PNG are the most commonly used format on the web

Adobe PDF: manage multimedia content

PSD, AI, CDR, DXF: Proprietary formats used by application

SUMMARY

The type of image used for photo-realistic images and for complex drawings requiring fine detail is the _____

The picture elements that make up a bitmap are called _____

A collection of color values available for display is called a _____

A 24-bit image is capable of representing _____colors

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