BINUS UNIVERSITY

Course : 0553T / Multimedia System
Year : 2015

IMAGE
Session 03

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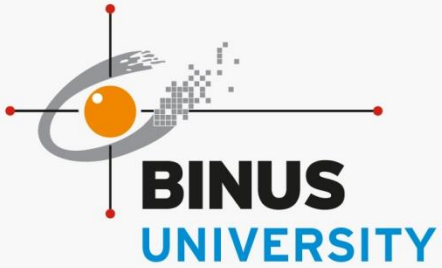

OUTLINE

- Image Definition
- Image Media Types
- 3-D Drawing and Rendering
- Color
- Image File Format
- Guidelines for the Use of Graphics

Image Definition

- What is an Image

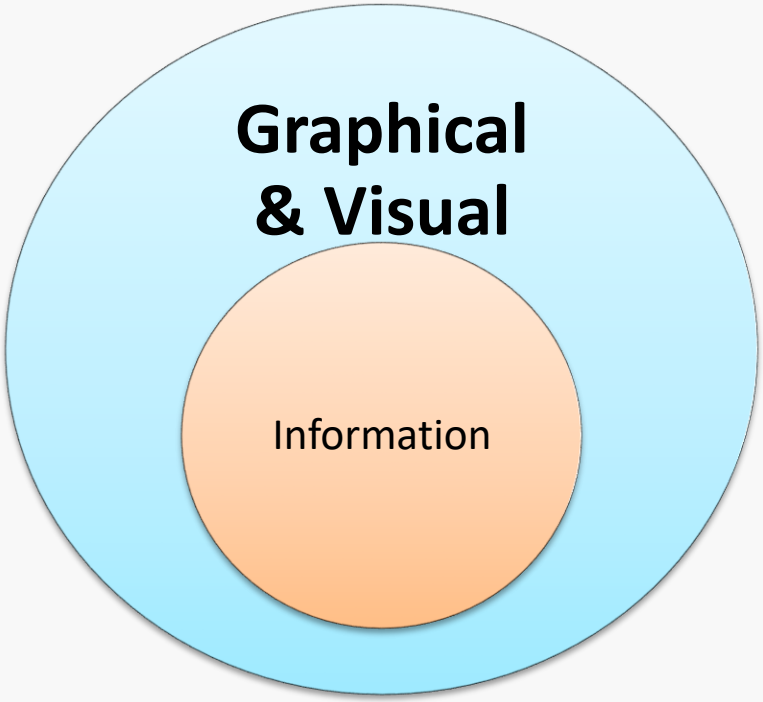

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Image Media Types

- The images are generated by computer in two ways :

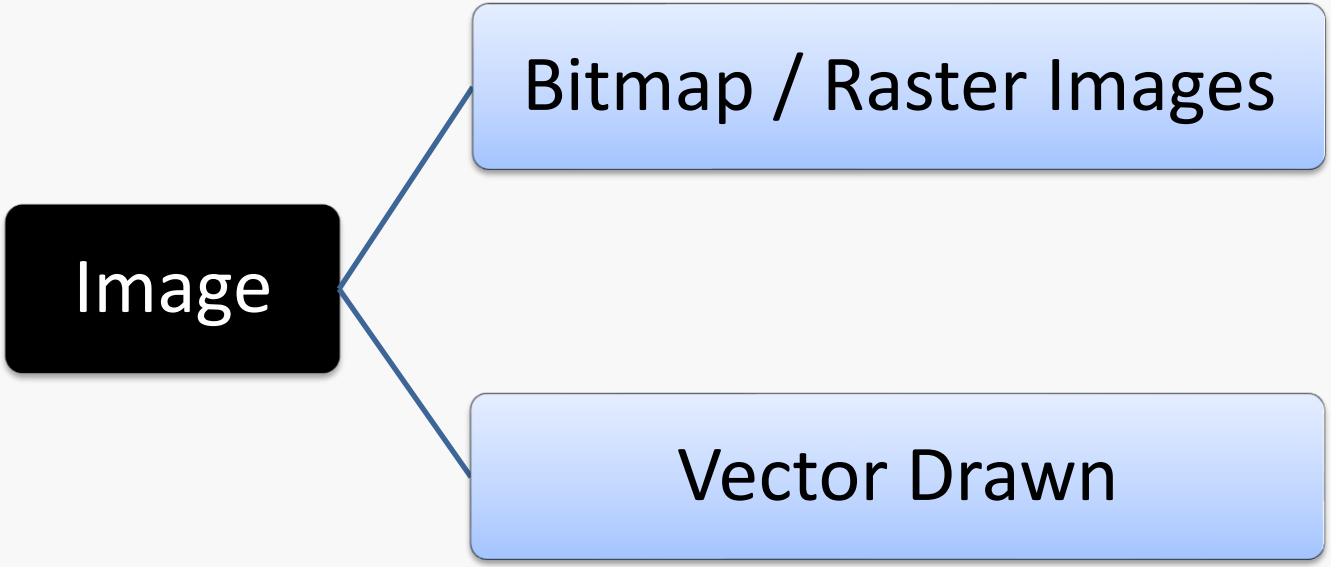

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Image Media Types

- Bitmaps / Raster Image
  - Sometimes called “painting program”
  - Used for photorealistic images and for complex drawings requiring fine detail.
- Vector Drawn
  - Sometimes called “drawing program”
  - Vector Drawn objects are used for lines, boxes, circles, polygons and other graphic shapes that can be mathematically expressed in angles, coordinates, and distances.

Image Media Types

- **Bitmaps** : a simple matrix of the tiny dots that form an image and are displayed on a screen or printed

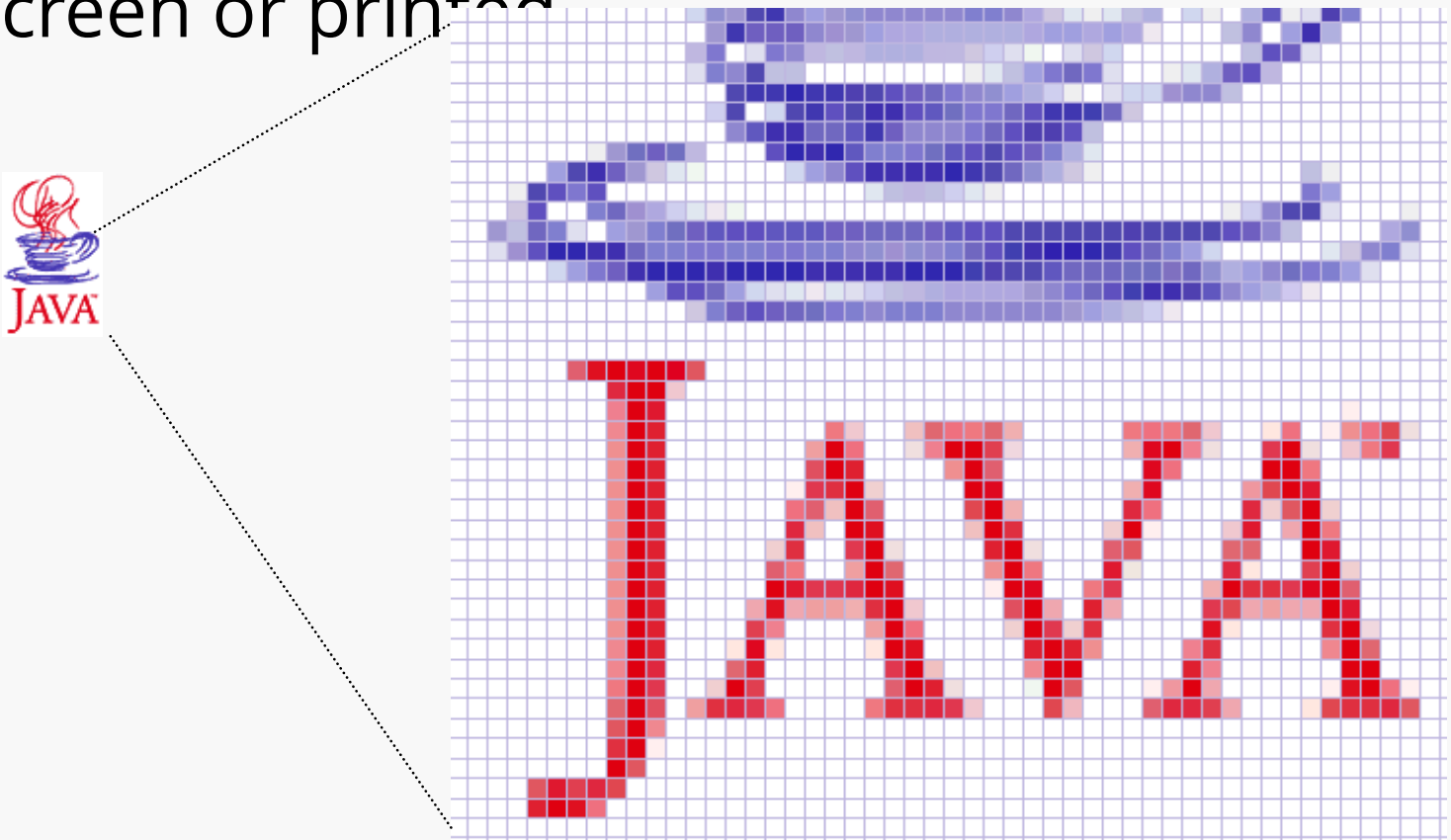

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Image Media Types

- Bitmaps
  - Each bit is most commonly set to black or white.
  - a one dimensional matrix (1-bit depth) is used to display monochrome images

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

Image Media Types

- Bitmap Software :
  - Director : a powerful image editor that provides advanced tools such as “onion-skinning”
  - Adobe Photoshop : the most widely used image-editing tool among designers worldwide.
  - Photoshop Elements

Image Media Types

- Photoshop Elements 10 (www.macworld.com)

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Image Media Types

- Photoshop Elements 10 (www.macworld.com)

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Image Media Types

- The quality of Bitmapped Images :
  - Spatial resolution
    - the measure of spatial resolution is ppi (pixels per inch).
    - When the image is printed , spatial resolution is given as dpi (dots per inch).
    - In general, higher spatial resolutions captures more detail and produces sharper, more accurate images.

Image Media Types

– Example of an image with several ppi (community.giffgaff.com)

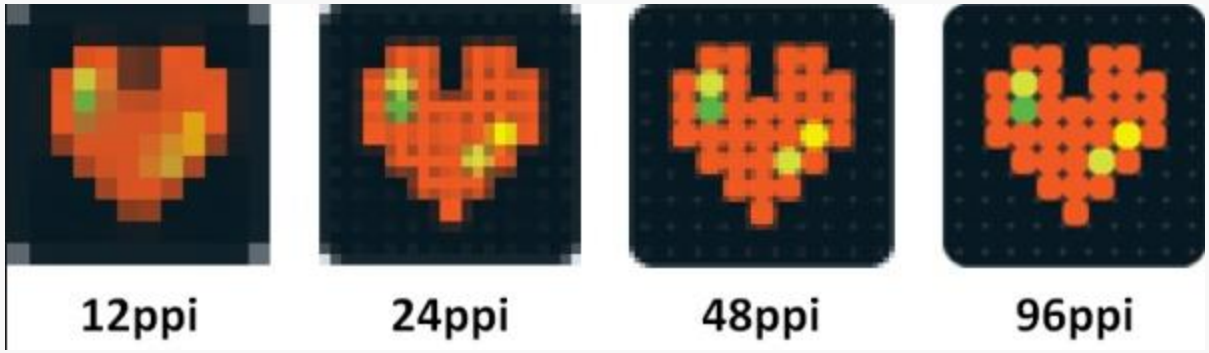

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Image Media Types

- Color Resolution
  - A measure of the number of different colors that can be represented by an individual pixel.
- The effect of low color resolution
  - Low color resolution means that fewer colors will be available. If the image being displayed contains small number of colors, low color resolutions is not a problem.
  - The effect of low color resolution can often be mitigated by color indexing or by another process known as dithering.

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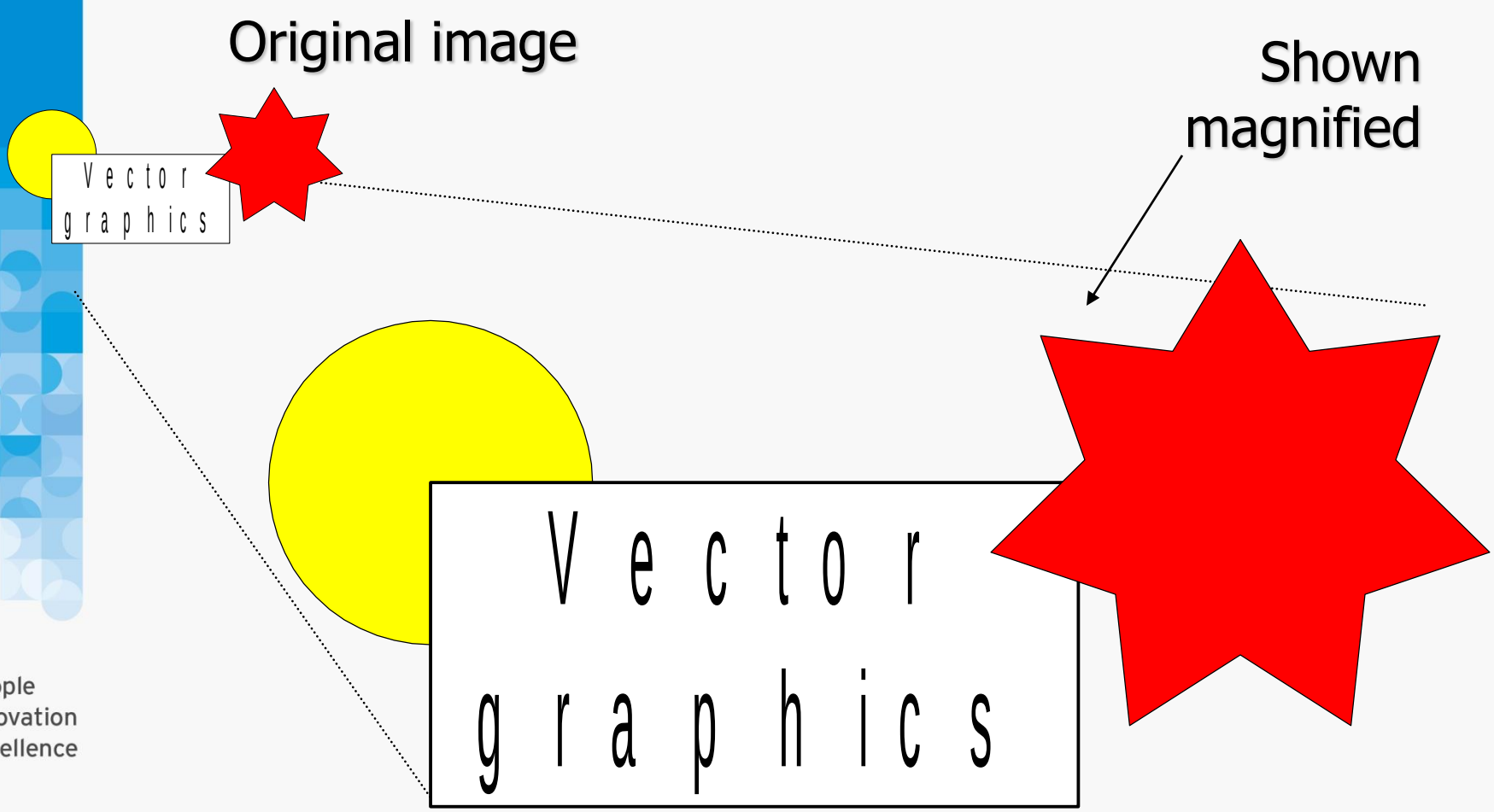
Image Media Types

- The effect of low color resolution
  - In Color Indexing, a specific palette color is chosen to optimize the appearance of the lower-resolution image.
  - Dithering is the process of combining pixels of different colors to produce another color that is not available.
  - Color indexing and Dithering are still important considerations for developers who need to reduce image file size to optimize the performance of their application, particularly on the web.

Image Media Types

- Vector-Drawn graphics
  - The computer is given a set of command that it executes to draw the image.
  - A vector is a line that is described by the location of its two endpoints.
  - Vector drawing uses Cartesian Coordinates where a pair of numbers describes a point in two dimensional space as the intersection of horizontal and vertical lines. (the x and y axes).

Image Media Types



Scaling vector drawn graphics

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Image Media Types

- Software to create vector images :
  - Adobe Illustrator
  - Adobe Freehand
  - Adobe flash
  - Microsoft Silverlight

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Image Media Types

- Autotracing :
  - Produces drawn graphics from bitmapped images.
  - Autotraced files are particularly useful in web based application where their smaller size reduces download times.
- Rasterizing :
  - Convert vector graphics to bitmapped images.

Image Media Types

- Comparison Bitmapped and Vector Graphics

Bitmapped	Vector Graphics
Advantages	**Advantages**
• Accurate representation of complex contone images such as photographs	• Smooth scaling and reshapin
• Full-featured photo editing (sizing, cropping, tone, color adjustments	• Ease of editing objects
• Wide range of artistic effects	• Low file sizes
• Precision editing	• Device-independent image resolution

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Image Media Types

- Comparison Bitmapped and Vector Graphics

Bitmapped	Vector Graphics
Disadvantages	**Disadvantages**
• Large file sizes	• Less detailed representation of complex contone images
• Loss of precise shape when scaled or rotated	• No Photo-editing capability
• Device-dependent image resolution	• Limited artistic control

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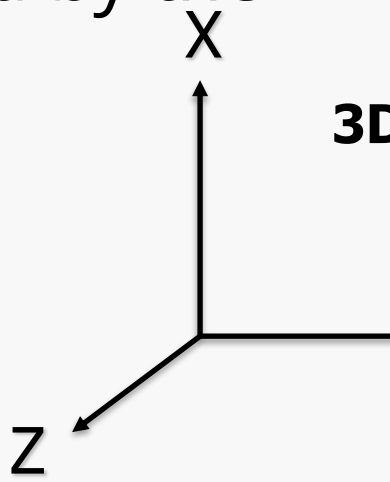
3-D Drawing and Rendering

- 3-D graphics application are the sophisticated, powerful programs. In 2-D graphics the computer is a helpful assistant. In 3-D graphics, it becomes a virtual partner in the creative process, using complex algorithms to create the finished images specified by the artist.



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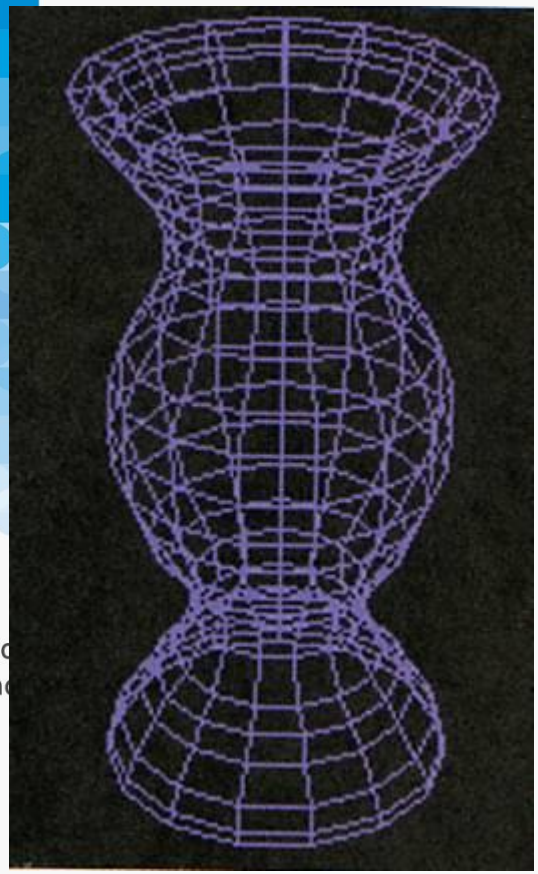
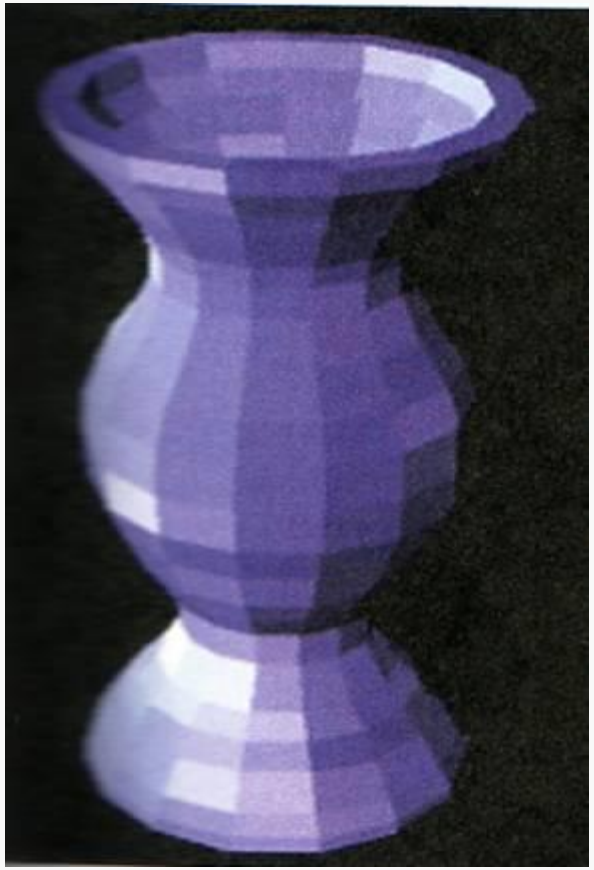
3-D Drawing and Rendering

- To model an object to place into a scene , start with a shape.
- When extrude a plane surface, it extends its shape some distance, either perpendicular to the shape's outline or along a defined path.
- When lathe a shape, a profile of the shape is rotated around a defined axis (you can set a direction) to create the 3-D object.
- Once the 3-D object was created, apply textures and colors to make it seem more realistic whether rough and coarse or shiny and smooth.

3-D Drawing and Rendering

- 3-Dimensional Graphic models





3-D Drawing and Rendering

- There are four interconnected steps in the creation of 3-D images :
  - Modeling
    - Defines the three-dimensional shape of an object but not its surface texture.
  - Surface definition
    - Developers specify textures that are then applied to the model's surface.
  - Scene composition
    - Objects are arranged, backgrounds are introduced, environmental effects are added, and lighting is established.
  - Rendering
    - After the modeling was completed, render it for final output. When the computer finally uses intricate algorithms to apply the effect that specified on the objects that created.

COLOR

- Color :
  - A vital component of multimedia.
  - The frequency of a light wave within the narrow band of the electromagnetic spectrum to which the human eye responds.

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COLOR

- There are two basic methods of making color :
  - **Additive color**
    - A color is created by combining colored light sources in three primary colors : red, green, and blue (RGB).
  - **Subtractive color**
    - a color is created by combining colored media such as paints or ink that absorb (subtract) some parts of the color spectrum of light and reflect the others back to the eye.
    - Four color printing includes black there are Cyan, magenta, yellow and black (CMYK)

COLOR

- The fact that a paint program uses RGB to create the colors on your monitor while your printer uses CMYK to print out your image.

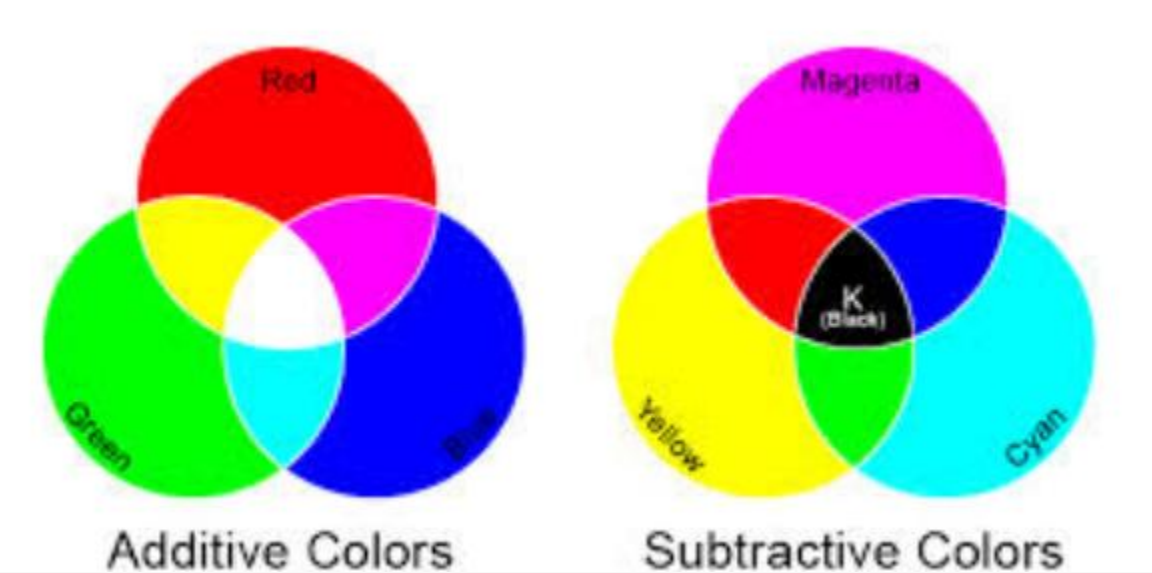

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IMAGE FILE FORMAT

- Most application on any operating system can manage JPEG, GIF, PNG and TIFF image format.
- PICT : a older format used on the Macintosh
- BMP : a common windows palette based image file format similar to PNG.
- PCX : originally developed for use in Z-soft MS-DOS pain packages
- TIFF : Tagged Interchange File Format, a universal bitmapped image format and used in desktop publishing packages.
- PSD : file created by Adobe for Photoshop
- AI : file created by Illustrator
- CDR : file created by Corel

Color

- Terminology of color in graphics design
  - Primary Colors
  - Secondary Colors
  - Tertiary color
  - Tints and shades
  - Monochromatics color
  - Analogous colors
  - Complementary Colors
  - etc

Guidelines for the Use of Graphics

- Guidelines for the use of graphics :
  - Identify the purpose of the graphic
  - Choose the best format for each image
  - Match graphic design to purpose
  - Locate graphic design to purpose
  - Preserve image quality
  - Economize. Use graphics efficiently
  - Organize graphics.

SUPPORTING MATERIA

- http://www.scantips.com/basics09.html
- http://graphicssoft.about.com/od/aboutgraphics/a/bitmapvector_2.htm
- http://www.webstyleguide.com/wsg3/11-graphics/index.html
- http://en.wikipedia.org/wiki/Color_depth
- http://www.cdli.ca/depted/g7/ortho.htm
- http://graphicssoft.about.com/od/aboutgraphics/a/bitmapvector.htm
- http://en.wikipedia.org/wiki/Image_compression

Exercise

- Describe the capabilities and limitation of bitmap, vector and 3-D images!
- Cite the various image file type used in multimedia.