

Graphics: Creating Images

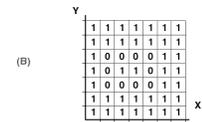
Graphic images

- (for display) graphic images are composed of pixels

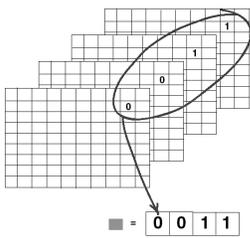
11111111 11111110 00011101 10111000 (A)
01111111 11111111 1... 1...

- this type of graphic is called bit-mapped or raster graphics

- the image is stored as a sequence of bits (a) representing the pixel properties (b)



Graphic Images



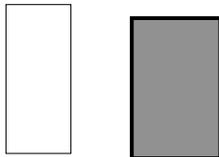
- in most bit-mapped images, each pixel requires a sequence of feature bits
- the number of bits needed corresponds to the bitplanes for the image

Graphic Images

- object-oriented or vector graphics treat the image as a collection of graphic objects such as lines, curves, and figures
- vector graphics are resolution independent and scalable
- vector graphics are more easily edited and often more compact in storage
- vector graphic images must often be converted to bitmapped images for display

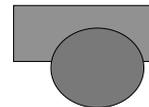
Vector Graphics

- the image is composed of graphic objects (lines, curves, figures, etc.)
- each object is defined by its graphic properties
- these properties may be changed and scaled easily



Vector Graphics

- each object occupies a separate layer
- layers may be moved, scaled, and arranged in different orders
- objects may be deleted and inserted easily

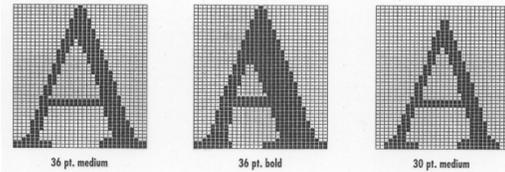


Vector Graphics

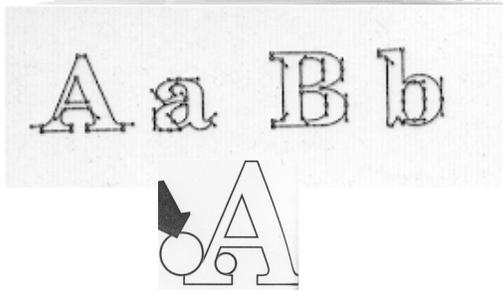
- are simple vector graphic programs
- best-suited for basic illustrations
- Tools: Shapes, lines, Textboxes, fill, etc
- an image is a set of graphic objects that are created individually and composed together



Bit Mapped Fonts



Outline Fonts



Painting Programs

- two-dimensional, bitmapped images/ files
- best for detail art work
- Tools: brushes, pencils, eraser, Fill etc.
- colors, patterns, and textures selected from palettes
- image is divided into foreground and background layers

3-D Graphics

- 3-D graphic programs automate creating images with perspective projection and special effects of lighting and shading
- these applications employ either volume-based or surface-based 3-D graphics

3-D Graphics

volume-based

- 3-D image is defined by voxels
 - 3-D picture elements having location, color, intensity, transparency, opacity
- used for scientific visualization and modeling

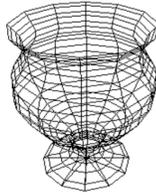
surface-based

- 3-D image is composed of objects defined in 3 dimensions
- regular shapes form the facets or components of each object
- rendering involves adding texture, shading, and lighting effects

Surface-based 3-D Graphics

3-D image is created in stages

- model description
 - each object is defined in 3 dimensions
- scene description
 - objects are placed in scene [Wire demo](#)
- rendering
 - perspective, and special effects added [Interactive Wire demo](#)
[3-D Baby Demo](#)
[Human animation](#)



Animation



- animations are composed of individual graphic images called frames
- frames are displayed at a rate fast enough to be perceived as continuous motion
- animation software help to automate the creation of animated graphics