Graphics: Creating Images

- For display, graphic images are composed of pixels.
- This type of graphic is called bit-mapped or raster graphics.
- The image is stored as a sequence of bits representing the pixel properties.

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
- 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

### Outline Fonts
- 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

### 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
- rendering
  - perspective, and special effects added

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