Introduction

Pictures:

- **Pictures** are found in the world which is external to the computers.

Images :

- **Images** are the 2-Dimensional digital representations of pictures found in computers.
- Computer attempts to duplicate the "look and feel" of a picture via storing and processing.
- Therefore, an image is a "realistic" version of the original picture ; dependent on the quality and capabilities of the computer and the graphic artist's ability to use the software.

Graphics in Multimedia Applications

- **Graphical images** - used to add emphasis, direct attention, illustrate concepts, and provide background content

- Two types of graphics:
  1) **Draw-type graphics or vector graphics** – represent an image as a geometric shape
  2) **Raster (Bitmap) graphics** – represents the image as an array of dots, called pixels

Representations in graphics

Draw-type Graphics Or Vector Graphics

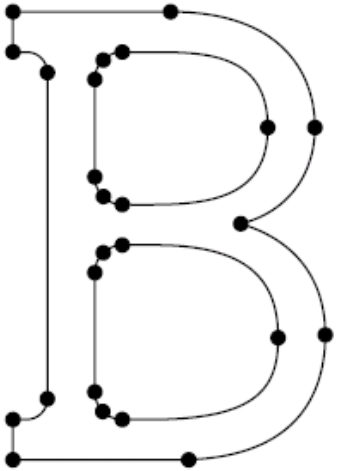
- *Image is represented by continuous geometric objects: lines, curves, etc.*

Raster (Bitmap) Graphics

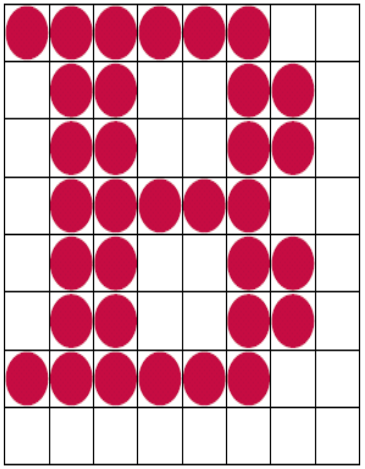
- *Image is represented as an rectangular grid of coloured squares*

Bit-Mapped vs. Draw Type Graphics

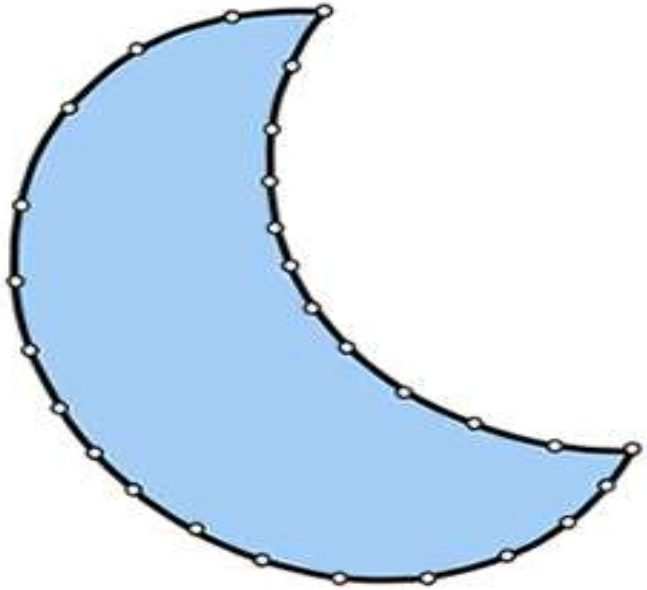
- Drawing programs
  - object-based representation
  - e.g., Powerpoint, outline fonts



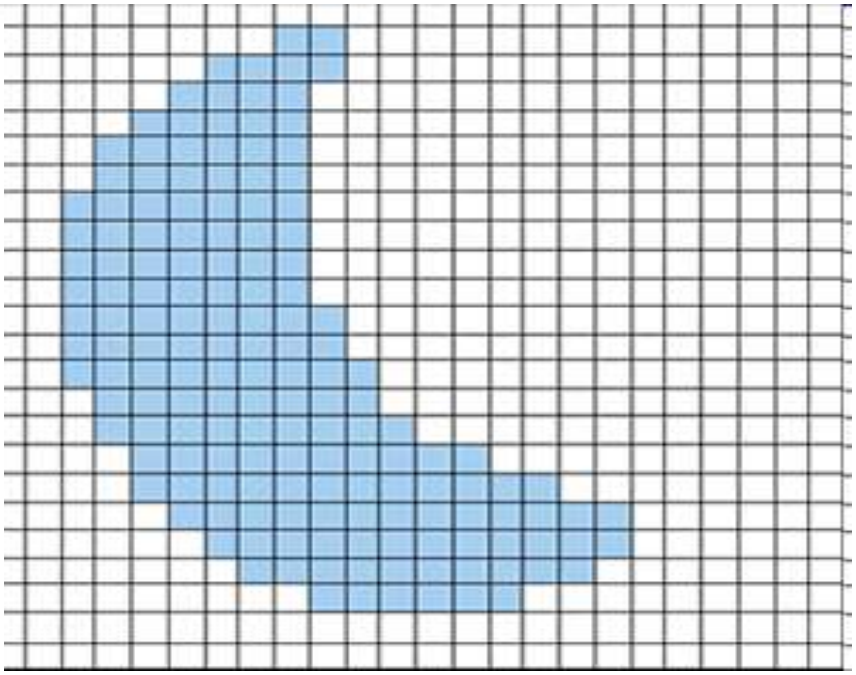
- Painting programs
  - bit-mapped representation
  - e.g., Adobe Photoshop, bit-map fonts



Vector vs Raster

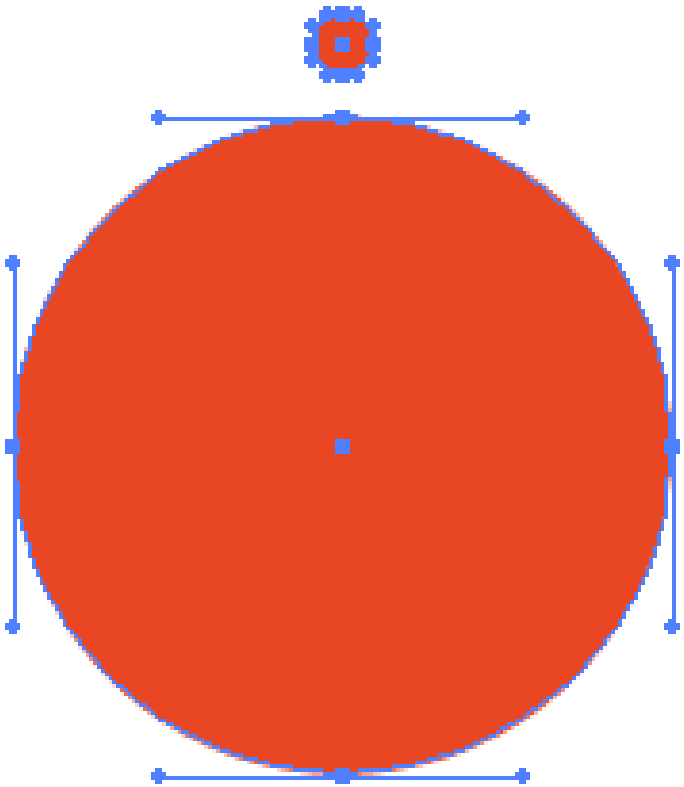


vector

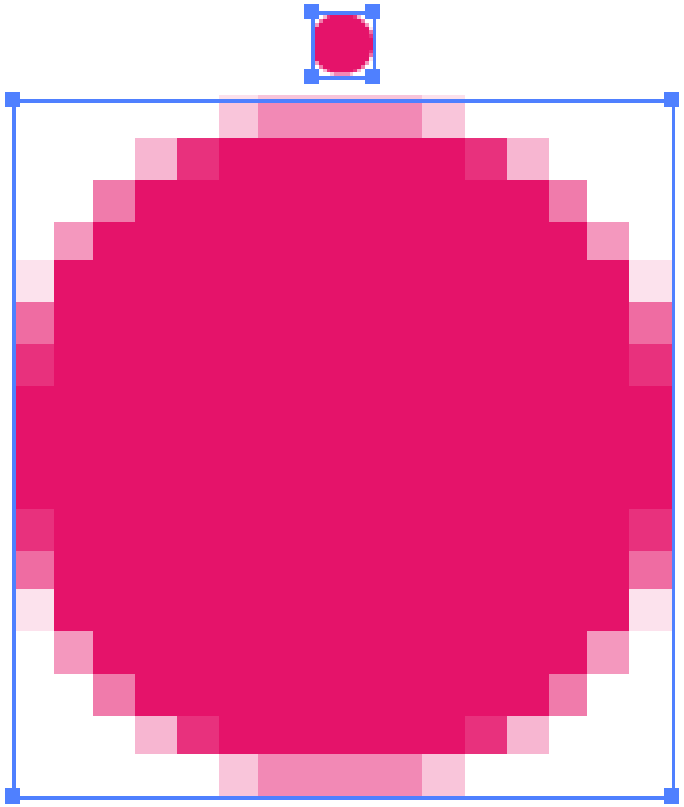


raster

Vector vs Raster

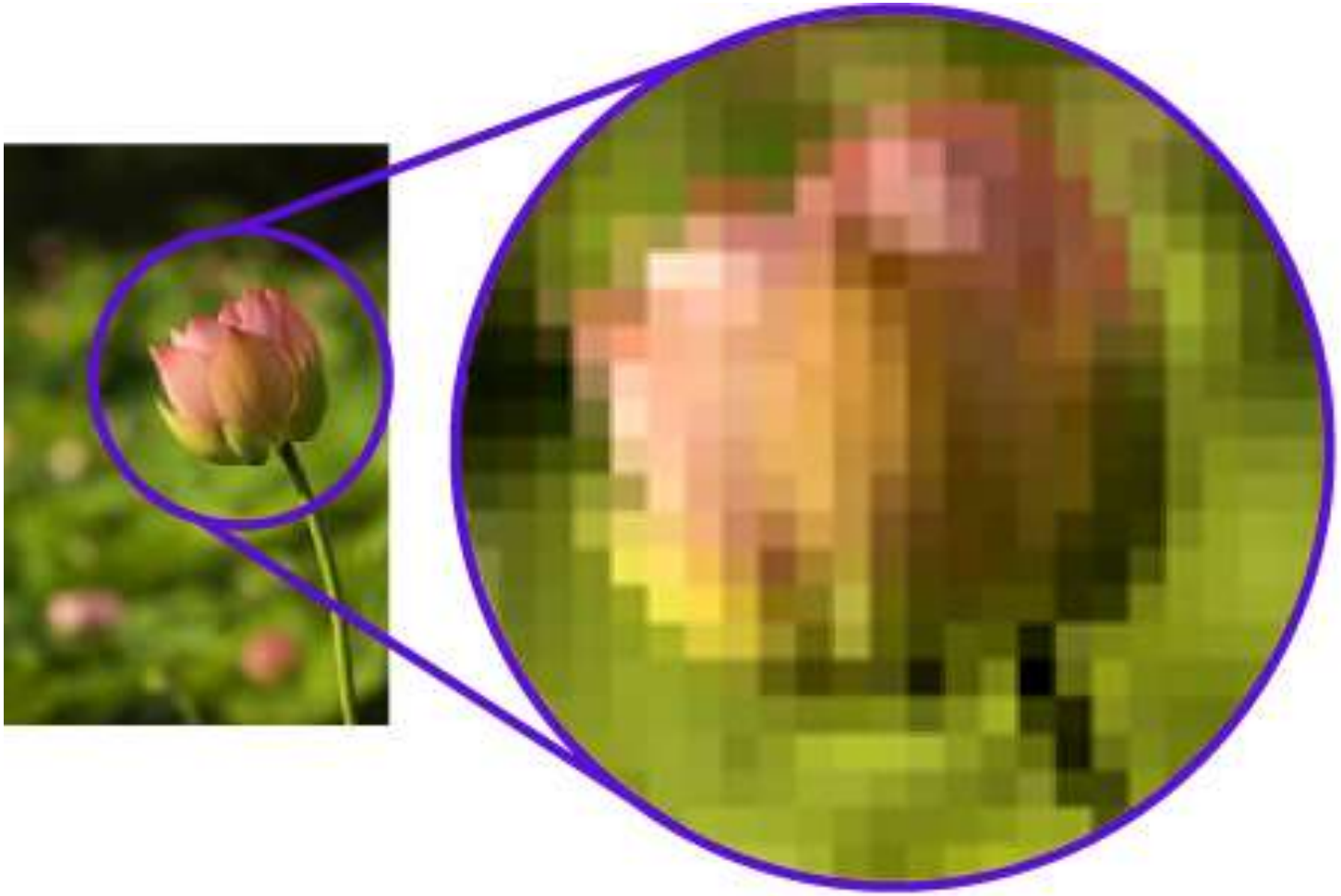


VECTOR

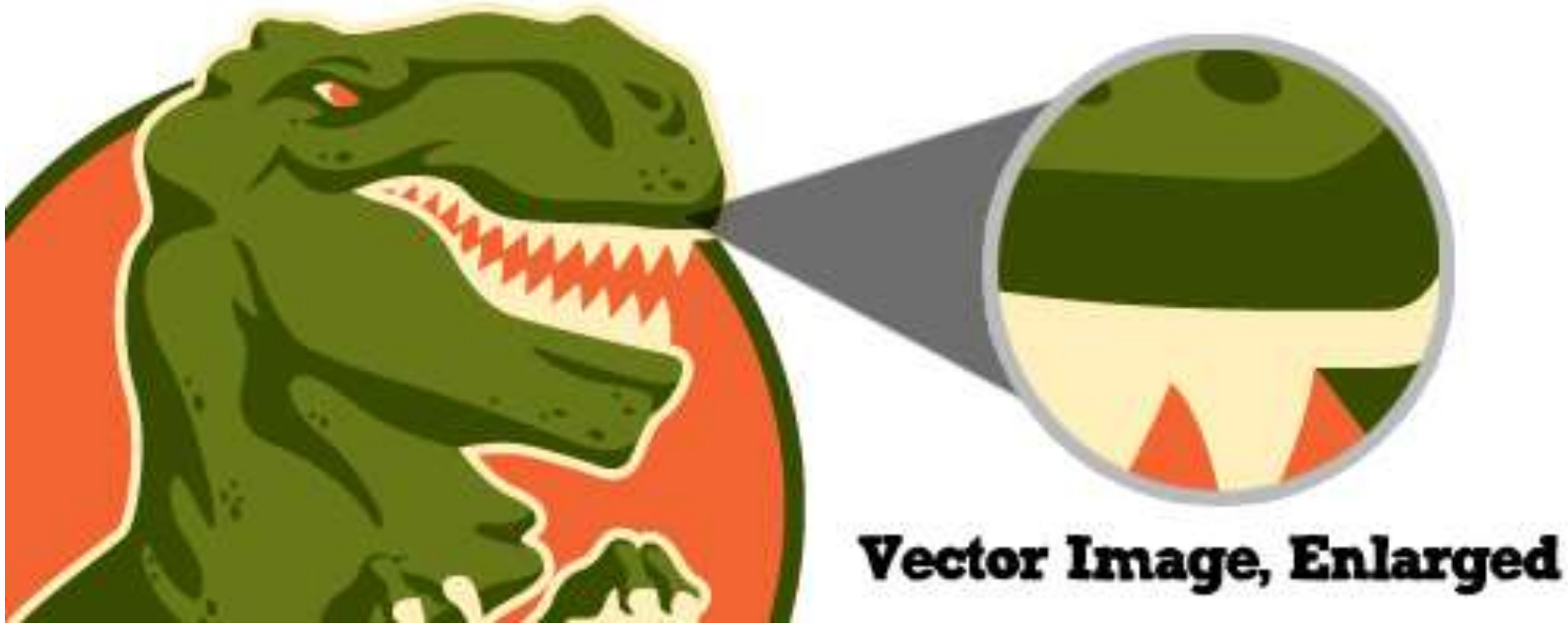


RASTER

Raster : Zooming on it

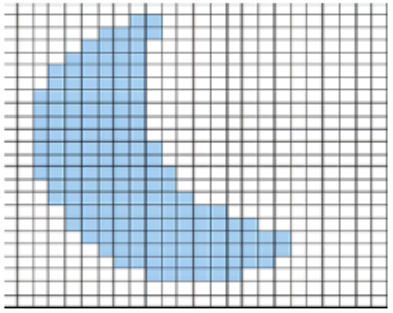
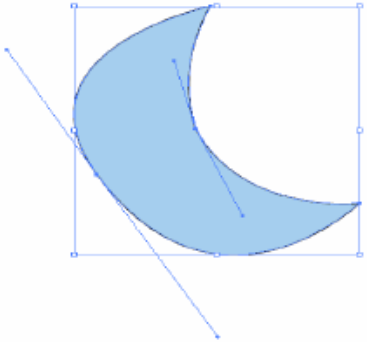


Vector : Zooming on it



Raster vs Vector

Raster and Vector Graphics

Raster	Vector
	
Made up of a ***grid*** of pixels	Geometric shapes and lines that are defined ***mathematically***
Resolution dependent	Resolution ***independent***
When scaled, visual quality and sharpness is degraded	When scaled, visual quality and sharpness is ***unaffected***
File size is relatively ***large***	File size is relatively ***small***
File Formats: ***GIF, TIF, BMP, PSD***	File Formats: ***EPS, WMF, AI***
Pixel-oriented	***Object*** -oriented

Raster (Bitmap) Graphics

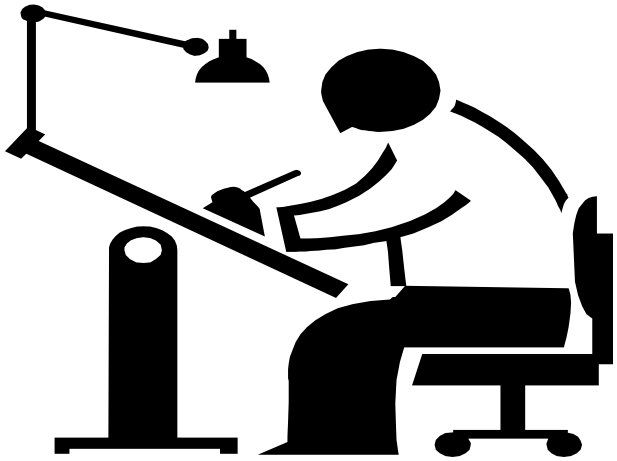
- Bitmaps – array of dots or pixels
- Color depth per pixel
- High quality pictures
- Photo realistic
- Larger than draw-type
- File size = pixels x color depth / 8

Raster (Bitmap) graphics

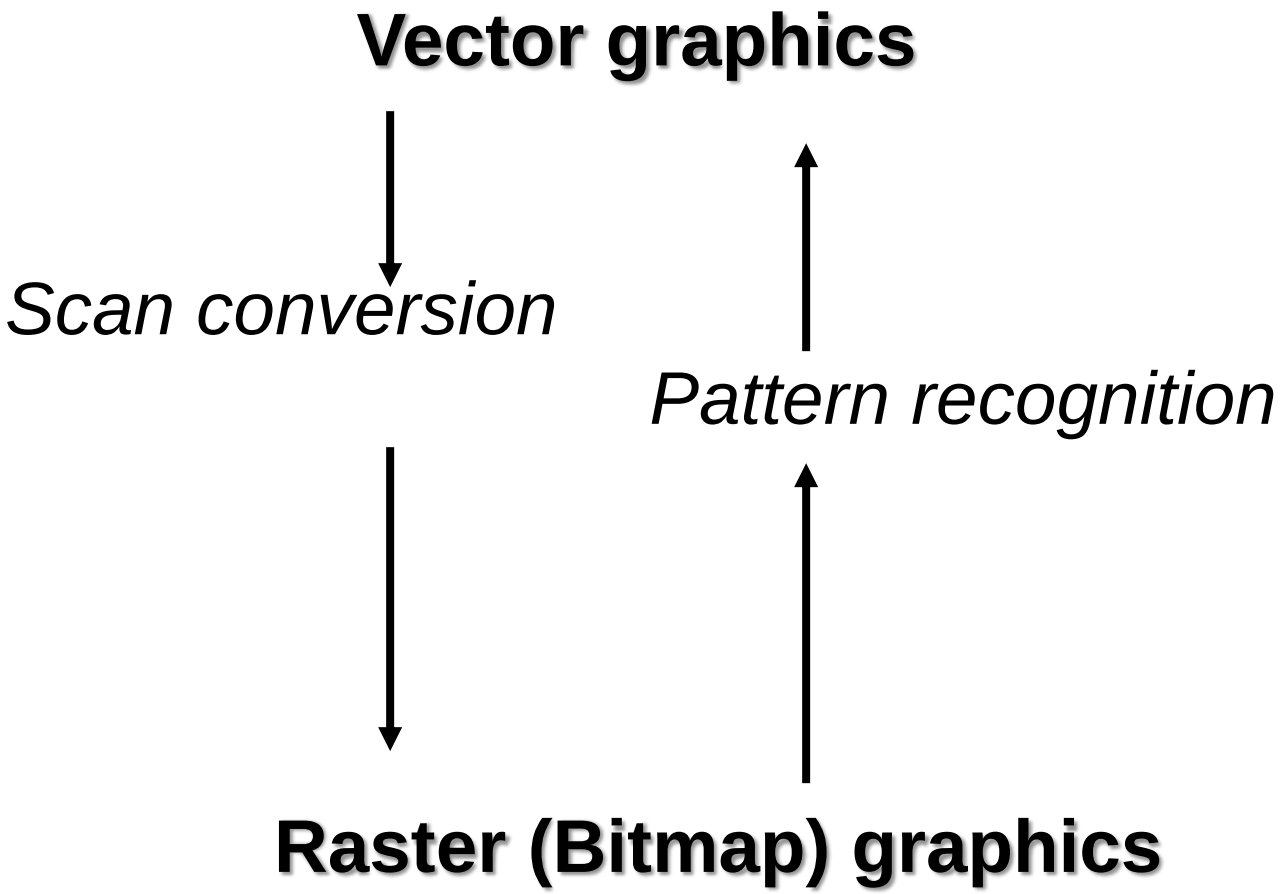
- **Advantage**
  - Can have different textures on the drawings; detailed and comprehensive.
- **Disadvantage**
  - Large file size.
  - Not easy to make modification to objects/drawings.
  - Graphics become "blocky" when the size is increased.

Draw Type Or Vector Graphics

- Draw type or vector graphics
  - Geometric shape stored as set of instructions
  - Smaller than bitmap
  - Resize, rotate, no distortion
  - No photo quality



Conversion

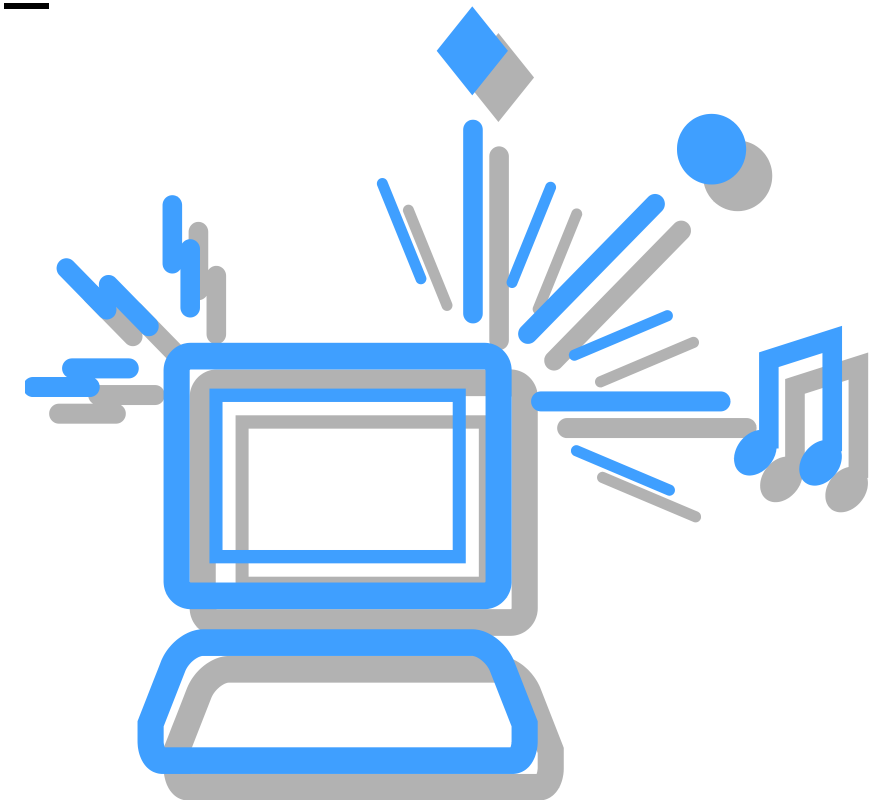

Vector graphics
Scan conversion
Pattern recognition
Raster (Bitmap) graphics

Graphics Software

- Drawing programs – used to create draw-type graphics (Adobe Illustrator)
- Paint programs – used to create bitmap images (Paint Shop Pro)
- Image editing programs – useful in making changes, or applying textures or patterns to existing images

Graphics Software Programs Examples

- **Drawing programs** – Adobe Illustrator
- **Paint programs** – Paint Shop Pro
- **Image-editing programs** – Photoshop (does the work of all 3)



Popular Vector Graphic Software

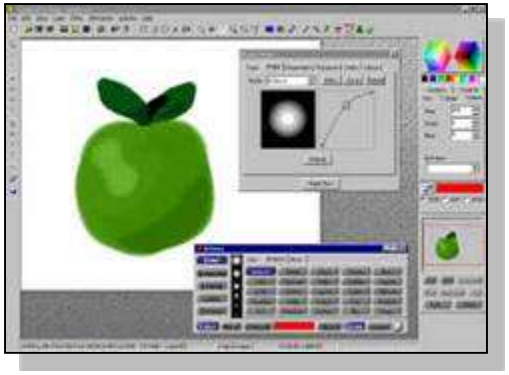
- Xara Xtreme
- Adobe Illustrator
- CorelDraw
- DXF - AutoCAD
- Inkscape – open source software similar to Adobe Illustrator.

Uses of Vector Graphics

- Graphics that will be scaled (or resized)
  - Architectural drawings and CAD programs
  - Flow charts
  - Logos that will be scaled (resized)
- Cartoons and clip art
- Graphics on websites
  - Because they have very small file sizes.
  - This allows them to load quickly.
- Fonts and specialized text effects

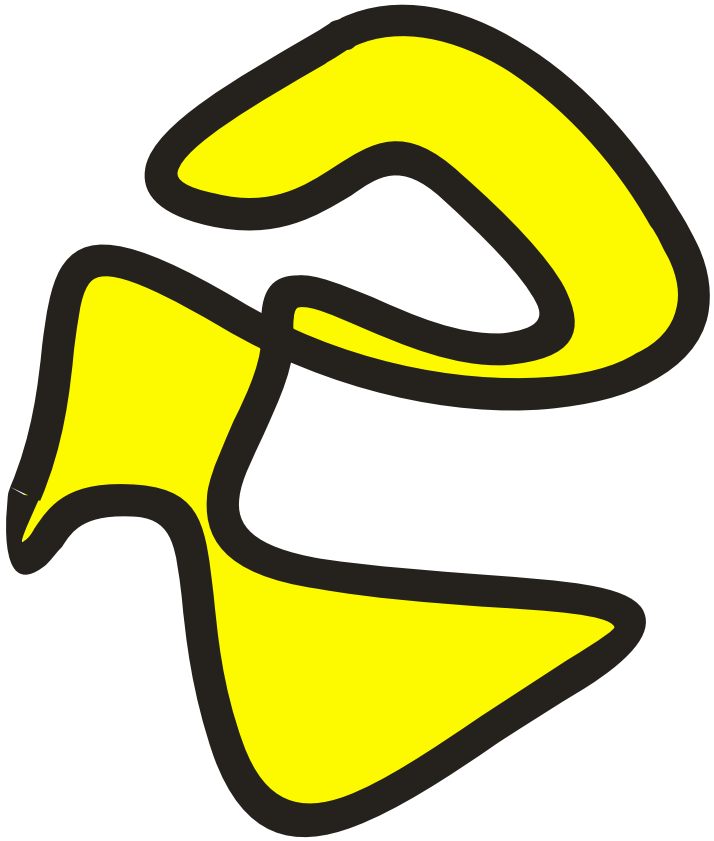
Advantages of Vector Images

- Vector graphics are resolution independent, which means they can be output to the highest quality at any scale.
- Vector graphic images normally have much smaller file sizes than raster-based bitmaps.
- Changing or transforming the characteristics of a vector object does not effect or distort the object.



Advantages of Vector Images

- Vector images are not limited to rectangular shapes like bitmaps.
- An image can be enlarged or reduced without affecting the quality of the image.
- There is no background unless it is placed behind the image as a layer

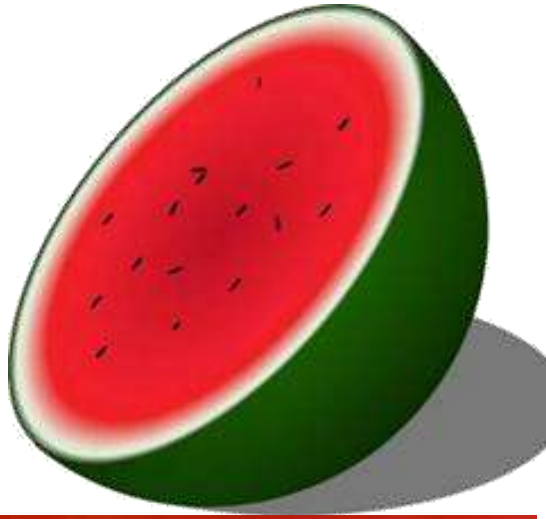


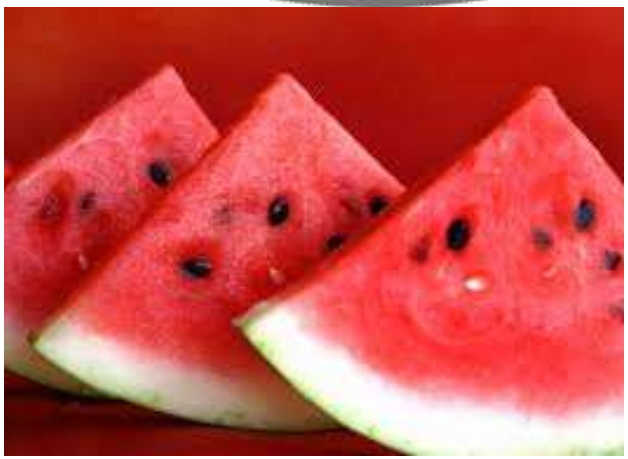
Advantages of Vector Images

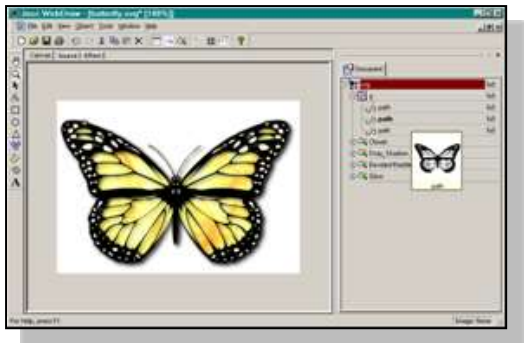
- Vector images have the appearance of artistic form such as cartoons.
- Vector images can be easily converted to bitmap images.
- Lines and curves are easily defined and will always be smooth and retain their continuity.

Disadvantages of Vector Images

- The main disadvantage is they are not photorealistic.
- Vector images are usually filled with solid or gradient colors but lack in depth and appearance in the values and colors of a true continuous tone image.



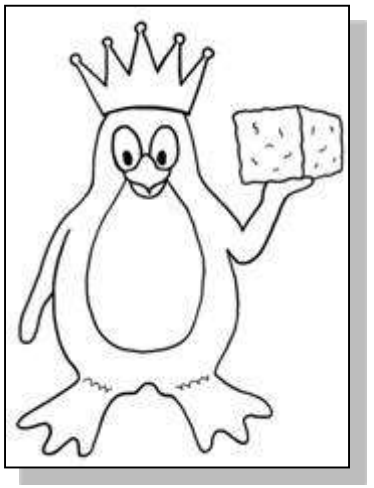




Lecture Two

Classifications of Vector Images

- **Simple line art** is a 1 bit graphic image with large areas of black and White.
- **Complex line art** is made up of many curves with linear contrast but still maintains the quality of a black and white image.



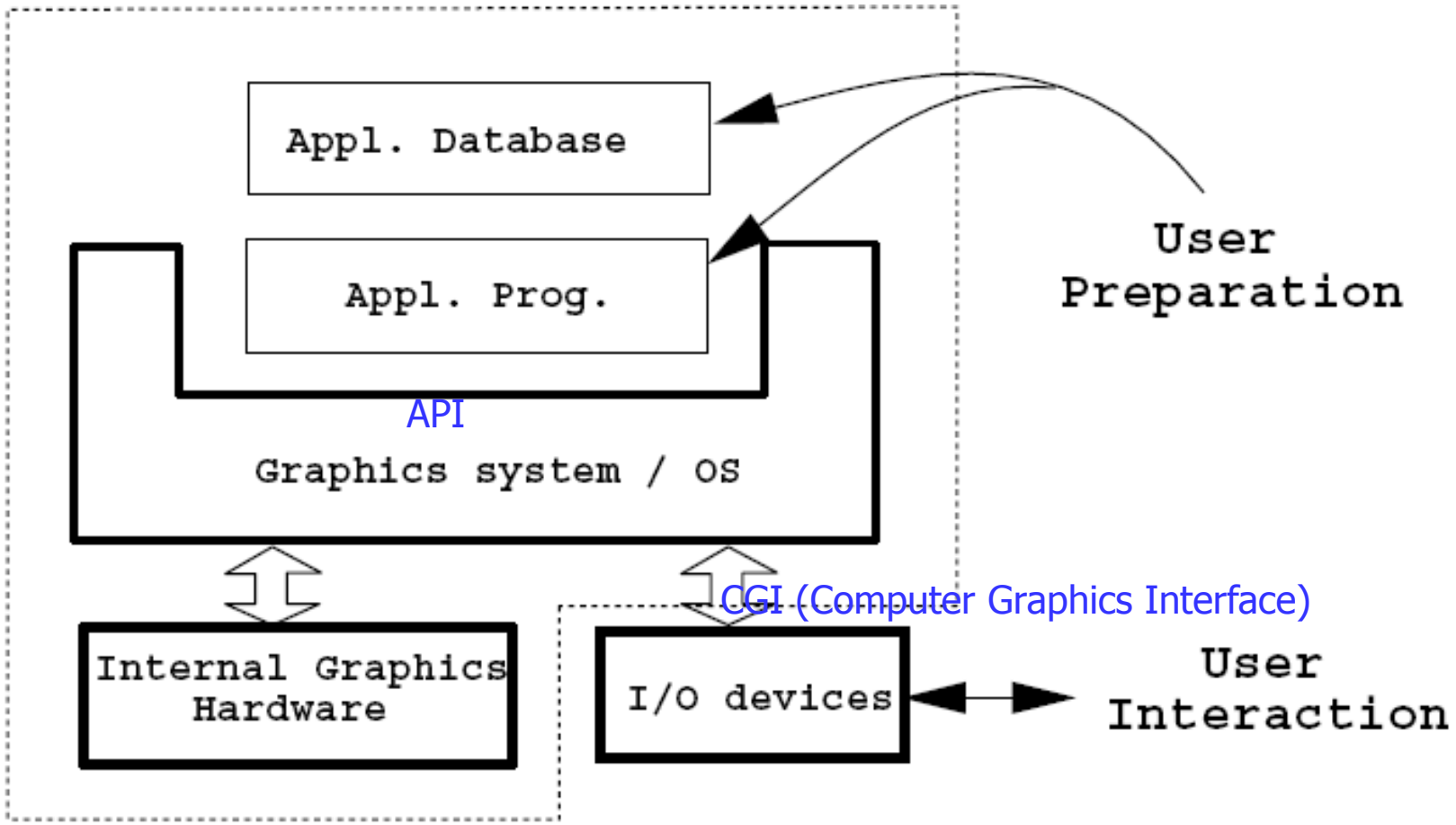
Classifications of Vector Images

- **High detail line art** is composed of curves and stippled dots (simulates different styles of etching) to form values.
- **Colored vector images** are composed of lines, solid colors, blended or gradient colors to simulate tonal changes and are produced using different color methods (opaque or transparent).

Meta Graphics

- Can contain vector and raster data.
- Shapes in vector graphics can be filled with textures and patterns that are raster graphics.
- Useful when layering text on top of raster graphics.
- Examples
  - WMF – Windows Metafile
  - EPS – Encapsulated Postscript

Graphics System



Graphics system: a library of graphics functions