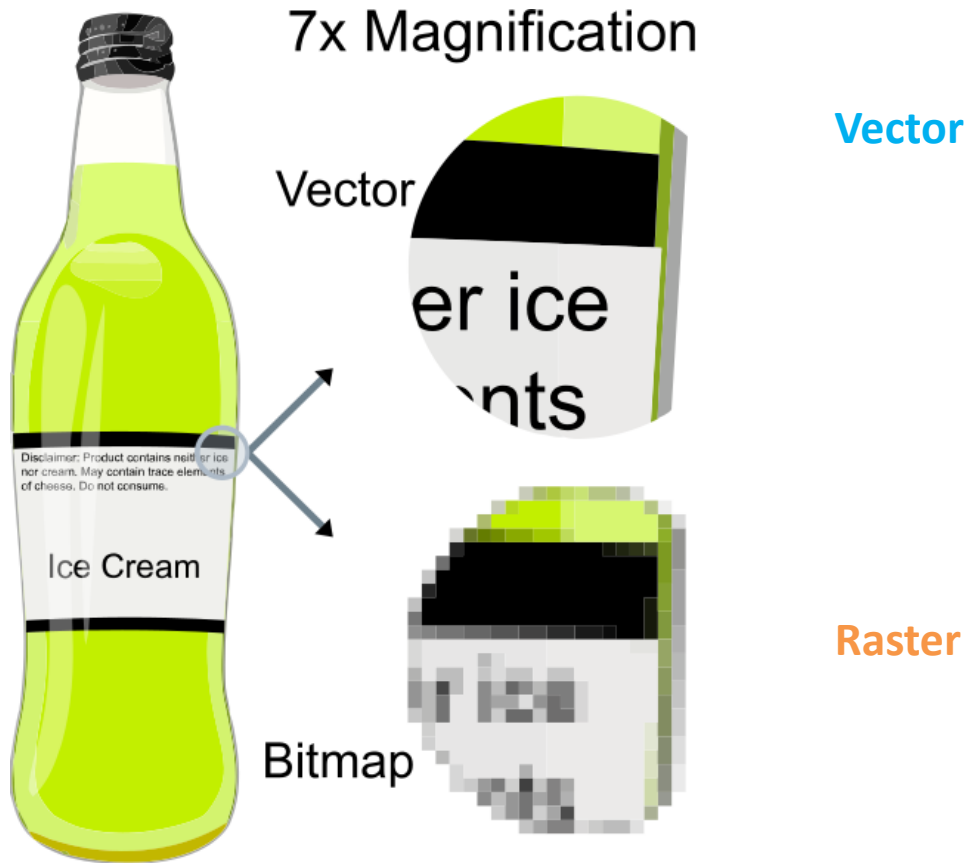


RenR 480/711

Raster Images vs. Vector Graphics

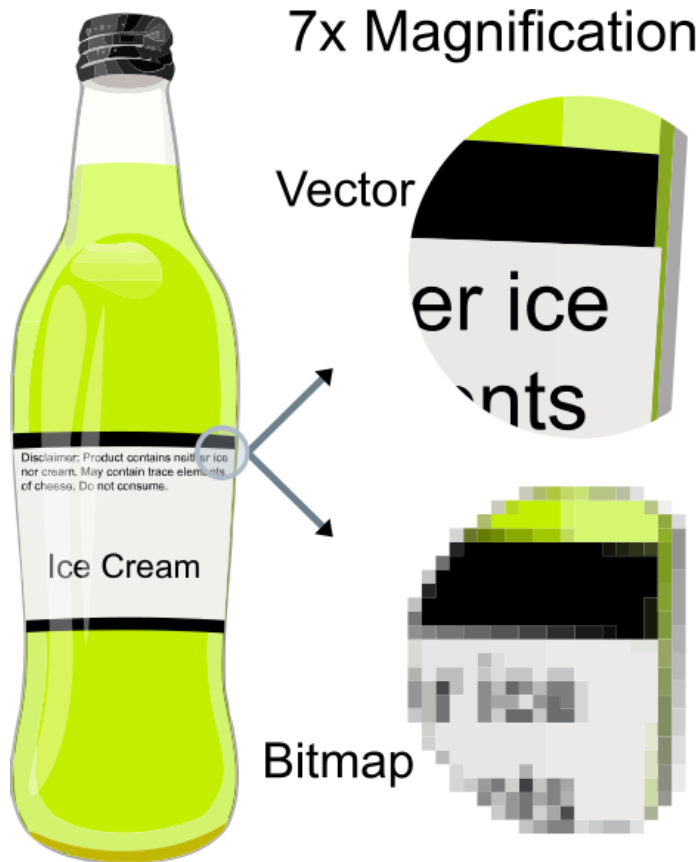
Raster Images vs Vector Graphics

Let's start with an example...



Raster Images vs Vector Graphics

Descriptions



Vector

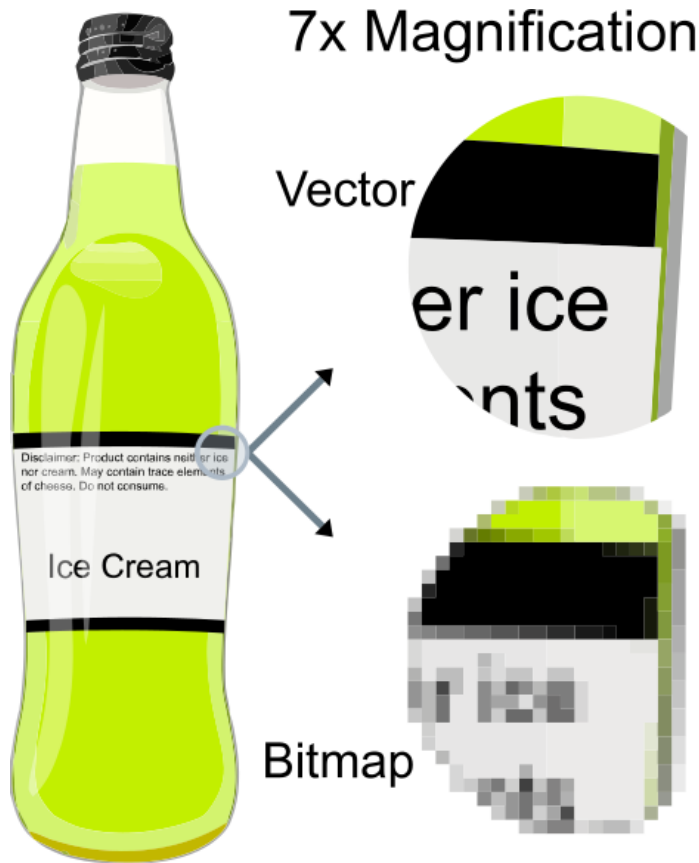
- Path-based
- Mathematically defined points, lines, areas (polygons)
- Programs know how to read these specifications to visualize them

Raster

- Pixel based
- Grids where every cell (pixel) has a defined colour

Raster Images vs Vector Graphics

Best Uses



Vector

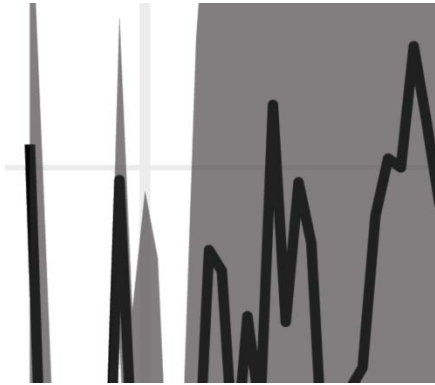
- Best for graphs, diagrams, text
- Best for drawings outlining shapes (line-art)
- Best for publications

Raster

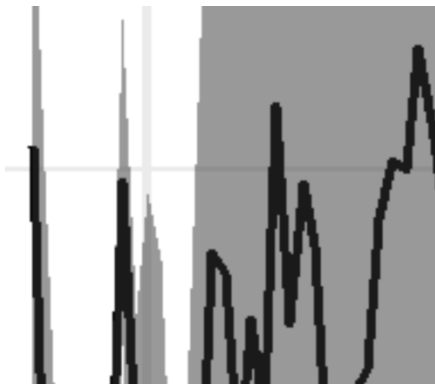
- Best for painting (artwork)
- Best for seamless colour transitions
- Best for complicated imagery (photos)
- Good for websites

Raster Images vs Vector Graphics

An example from the last lab



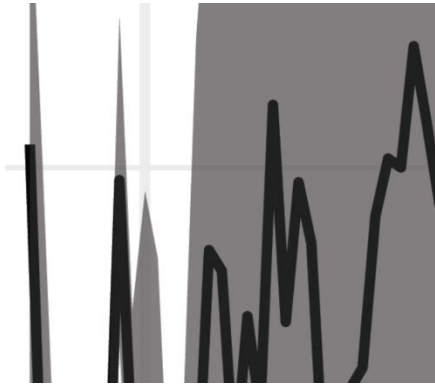
Vector



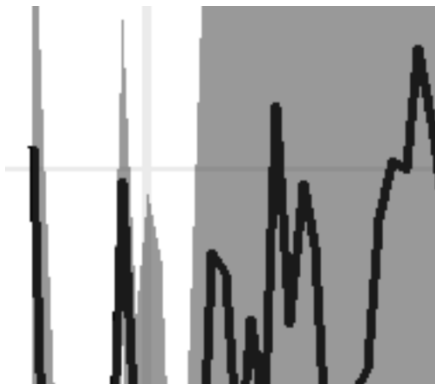
Raster

Raster Images vs Vector Graphics

Example: Good use of vector



Vector Much better for scientific graphs or text



Raster Not good for scientific graphs or text

Raster Images vs Vector Graphics

Example: Good use of raster



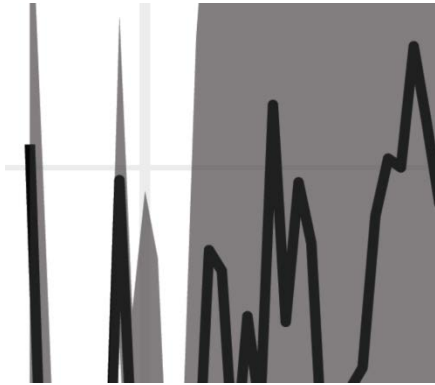
Vector Not good for photographs or blended artwork



Raster Great for photographs and blended artwork

Raster Images vs Vector Graphics

Common Filetypes



Vector

Common filetypes:

- .pdf (portable document format)
- .svg (scalable vector graphics)
- .wmf (windows metafile)
- .emf (enhanced metafile)
- .eps (encapsulated postscript)
- ...and more!



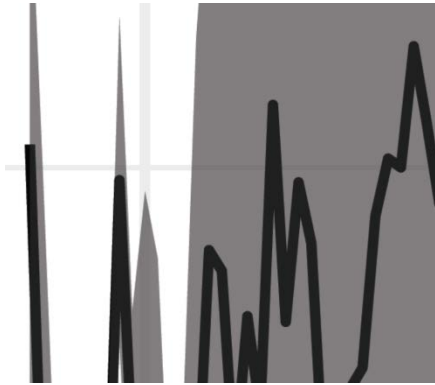
Raster

Common filetypes:

- .png (portable network graphics)
- .jpg (joint photographic experts group)
- .bmp (bitmap)
- .gif (graphic interchange format)
- .tif (tagged image file format)
- ...and more!

Raster Images vs Vector Graphics

Compatible Software



Vector

Compatible Vector-Graphic Editing Software:

- Microsoft Powerpoint
- Adobe Illustrator
- Inkscape (free)
- (Can also be opened in Adobe Acrobat)



Raster

Compatible Raster Image Editing Software:

- Adobe Photoshop
- Microsoft Paint
- Gimp (free)

Raster Image Sub-Categories

Lossy vs Lossless Compression

Lossy

- Lossy = lost information
- Becomes granulated under compression
- Irreversible

Lossless

- Lossless = no lost information
- Does not become granulated
- Reversible data compression

Raster Image Sub-Categories

Lossy vs Lossless Compression

Lossy

- Lossy = lost information
- Irreversible
- Smaller file size



https://en.wikipedia.org/wiki/Lossy_compression#/media/File:Ruby-HighCompression-Tiny.jpg

Lossless

- Lossless = no lost information
- Reversible data compression
- Larger file size



<https://commons.wikimedia.org/wiki/File:Ruby-HighCompression-Tiny.jpg#/media/File:Ruby-Lossless.png>

Raster Image Sub-Categories

Lossy vs Lossless Compression

Lossy

- Sometimes can be compressed without major losses in quality



https://en.wikipedia.org/wiki/Lossy_compression#/media/File:Ruby-HighCompression-Tiny.jpg

Lossless

- Good to have one lossless file for storage



<https://commons.wikimedia.org/wiki/File:Ruby-HighCompression-Tiny.jpg#/media/File:Ruby-Lossless.png>

Raster Image Sub-Categories

Lossy vs Lossless Compression

Lossy

- .jpg



https://en.wikipedia.org/wiki/Lossy_compression#/media/File:Ruby-HighCompression-Tiny.jpg

Lossless

- .png (patent-free version of GIF, best for storage)
- .tif (flexible format, usually lossless)
- .gif (best for large areas with a single color)
- .bmp (large and lossless)



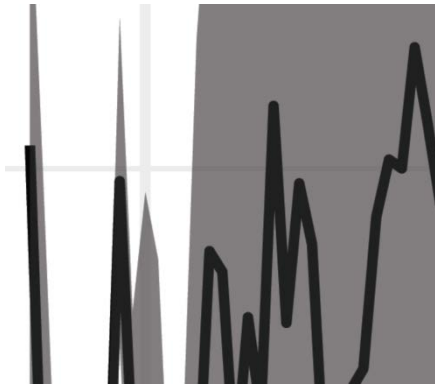
<https://commons.wikimedia.org/wiki/File:Ruby-HighCompression-Tiny.jpg#/media/File:Ruby-Lossless.png>

Summary

- Vector Graphics:
 - Best for drawing points, lines, polygons
 - Best for scientific graphs and text
- Raster Images:
 - Best for photographs or blended artwork
 - Lossy vs lossless:
 - Trade-off: file size vs information preservation
- More details available online:
 - https://en.wikipedia.org/wiki/Image_file_formats

Raster Images vs Vector Graphics

Vector
Path based

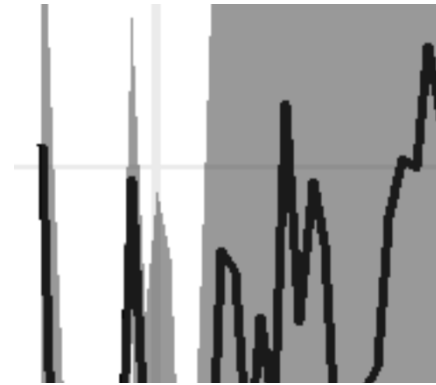


Good for journals

Common filetypes:

.pdf
.svg
.wmf
.emf
.eps
and more!

Raster
Pixel based



Good for websites
(some formats)

Common filetypes:

.jpg
.bmp
.png
.gif
.tif
and more!