SCIENCE MEETS LIFE

Initiation GIMP and Inkscape

Fundamental image aspects

VIB

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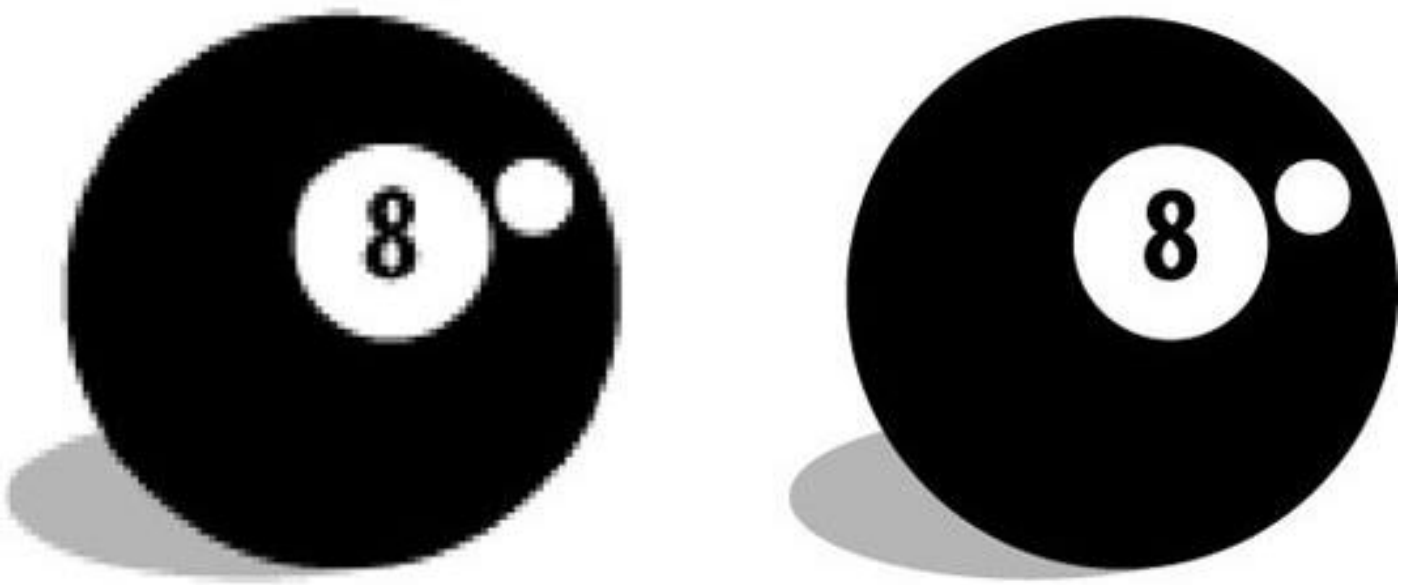
What to expect?

Fundamental image aspects

- Bitmap vs vector images
- Pixels: image quality/resolution
- File formats and compression
- VIB guidelines on image editing

GIMP vs Inkscape

Bitmap vs Vector



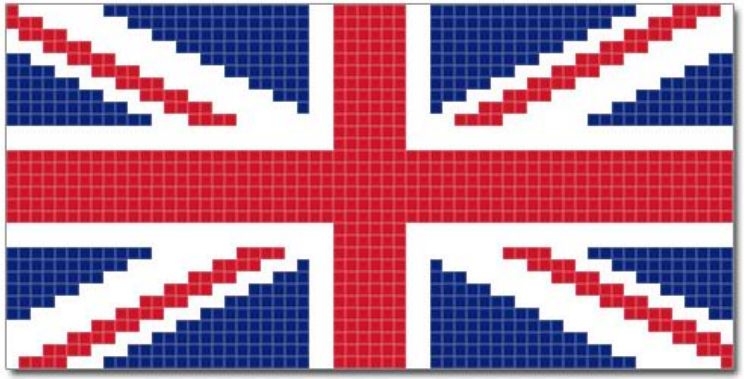
Bitmap vs Vector

Bitmap

pixels define image

each pixel has 1 colour

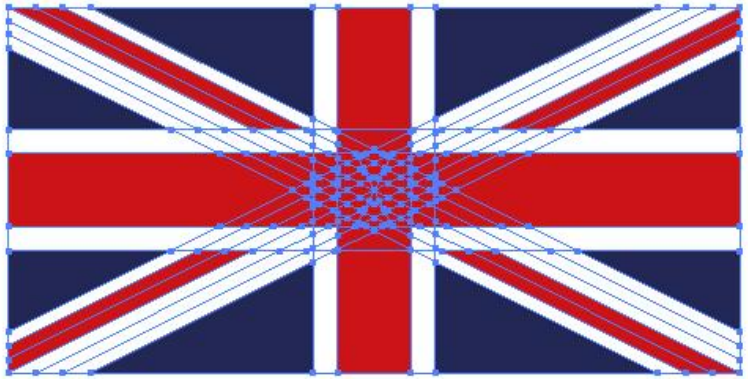
pixel has fixed position



Vector

mathematical equations and shapes define image

shapes can have multiple colours (e.g. gradient)



Bitmap images

Features

- Pixels in a grid/map
- Resolution dependent
- Restricted to rectangle
- Resizing reduces visual quality
- Easily converted
- Minimal support for transparency

File formats

- BMP, GIF, JPEG, JPG, PNG, TIFF

Bitmap images

Bit depth

Also called colour depth

Number of bytes used to indicate the colour of a single pixel

File size

1-bit (black/white) 4-bit (16 colours) 8-bit (256 colours) 24-bit (16M colours)

Vector images

Features

- Scalable
- Resolution independent
- No background
- Inappropriate for photo-realistic images
- Contain both bitmap and vector data

File formats

- SVG, AI, CGM, DXF, WMF, EMF

Vector images

XML format

```
<?xml version="1.0" encoding="utf-8"?>
<!-- Generator: Adobe Illustrator 17.0.2, SVG Export Plug-In . S
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.1//EN" "http://www.w3.or
<svg version="1.1" id="Layer_1"
     xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.
     viewBox="0 0 40 35" enable-background="new 0 0 40 35" xml:s
<g>
    <g transform="translate(0.000000, 4.000000)">
        <path fill="none" stroke="#444444" stroke-width="9" strok
        <path fill="none" stroke="#444444" stroke-width="9" strok
        <path fill="none" stroke="#444444" stroke-width="9" strok
    </g>
</g>
</svg>
```

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Pixels: Image Resolution

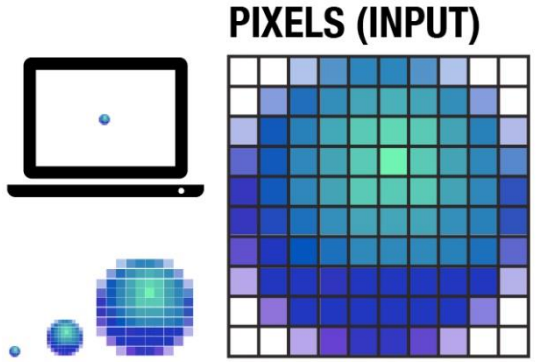
Resolution = number of pixels = how much detail an image holds

Pixels: Image Quality

PPI: pixel per inch

Screen pixel density (monitor/smartphone)

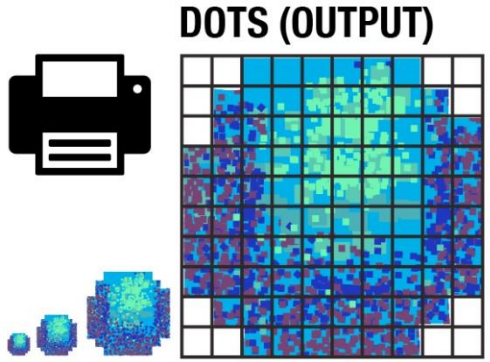
Tells you how large an image is



DPI: dots per inch

Print-out dots density (inkjet/laser printer)

Printer settings



Pixels: Image Quality

72 DPI

300 DPI

This image (300 PPI) will look fine on a monitor, but printing is another matter!

Print it on paper and you will notice the difference between 72 DPI and 300 DPI

File formats and compression

JPEG

- 16 million colours (24 bit)
- Lossy compression (information is lost from original file)
- Small file size (compressed)
- Photograph

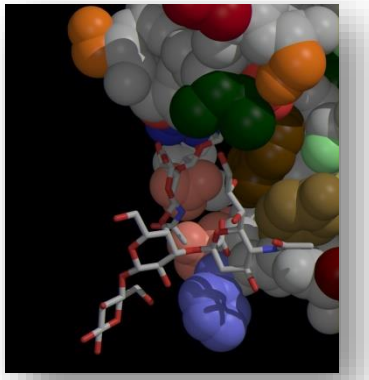
File formats and compression

BMP

- 8/16/24-bit
- Uncompressed
- Large file size

TIFF

- All colour and data information is stored
- Uncompressed and easy to compress (e.g. JPEG)
- Very large file size



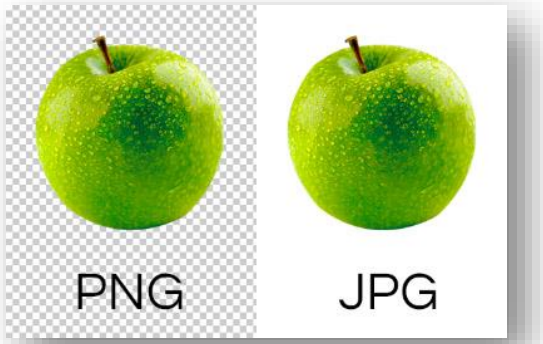
File formats and compression

GIF

- Only 256 colours (8-bit)
- Replace multiple occuring patterns into one
- Small file size
- Animation

PNG

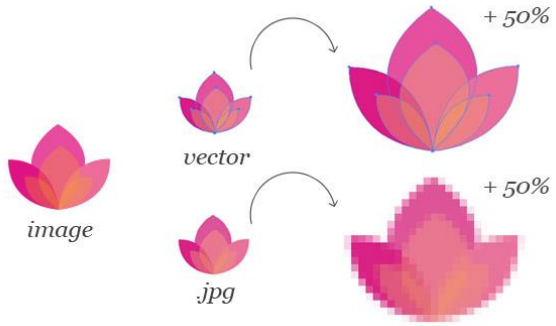
- 256 / 16M colours
- 8-bit transparancy
- Lossless compression



File formats and compression

SVG

- XML-based format
- Lossless data compression
- Creatable and editable with a text editor
- Can contain both bitmap and vector data



PDF

- Can contain both bitmap and vector data
- Bitmaps are not compressed

File formats and compression

RAW

- Raw image file (without white balance, color saturation, contrast settings, …)
- Camera brand specific
- Large file size
- Multiple options without taking the picture again

DNG

- Digital Negative
- Similar to RAW
- Universal raw image format
- Large file size

File formats and compression

Publication

- Raw/uncompressed image file (TIFF)
- High quality image (300 PPI)
- Lossless compression (e.g. PNG)
- Sometimes compression is allowed (check journal website)

Sharing/Presentation

- Normal quality image (72 PPI)
- Compression is allowed (e.g. JPEG)
- Smaller file size

VIB Guideline on image editing

No specific feature within an image may be enhanced, obscured, moved, removed or introduced

Adjustments of brightness, contrast or color balance are acceptable if they are applies to the whole image as long as they do not misrepresent information in the original

Grouping of images from different parts of the same or different gel, fields or exposures must be made explicit by the arrangement of the figure (dividing lines)

The original data must be available by the author when asked to provide it, otherwise acceptance of the publications may be revoked

GIMP vs Inkscape

GIMP

- Bitmap images
- Image editing
- Conversion/compression

Inkscape

- Vector images
- Image creating
- Scalable drawings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