Visual Design for Interactive Media

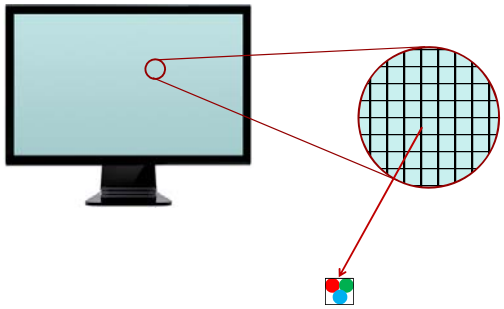
Image

Vector and raster images

- There are two basic types of computer images
  - vector images
  - raster images
- Vector images
  - created using software such as Adobe Illustrator
  - consist of individual objects
  - each object has its own attributes
    - shape
    - colour
    - size
    - placement

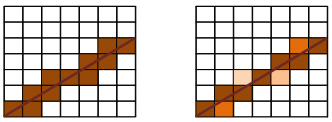
Vector and raster images

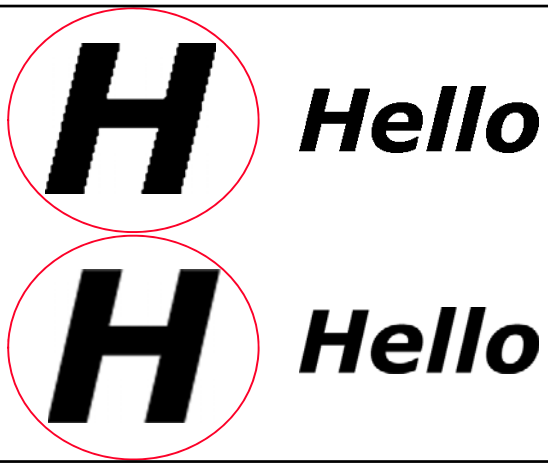
- Raster images
  - created using software such as Adobe Photoshop
  - consist of individual points (pixels)
  - each pixel has its own attributes
    - colour
    - placement
- Vector images are converted to raster images before they are
  - displayed on a computer screen
  - printed



Anti-aliasing

- Anti-aliasing is the process of colouring each pixel with a different tone of its colour, proportional to its area of intersection with the pixel area





Raster images

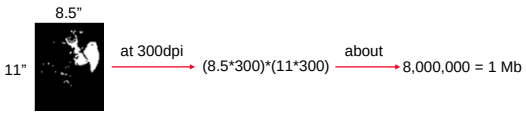
- In raster images enough information must be kept about each pixel to represent it properly
  - size of a pixel is constant
  - shape of a pixel is constant
  - location of a pixel is constant
  - colour of a pixel can be changed
- Based on the colour of their pixels raster images can be divided into
  - black and white
  - greyscale
  - colour
    - chromatic

Raster images

- In black and white images each pixel can be either black or white
- To record the colour of each pixel we only need one computer bit
  - bit is the smallest unit of data
    - a bit of memory or disk space
  - each bit can be either one or zero
    - on or off
  - 8 bits represent 1 byte

20 pixels

20 bits
3 bytes

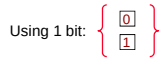


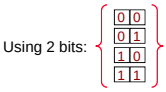
Greyscale images

- Greyscale images may contain over 200 different tones of grey

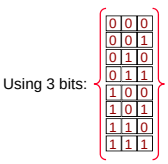
- With less than 200 tones of grey, images will not look continuous

- Banding or shade-stepping occurs when we can see different bands of lighter and darker grey

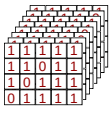




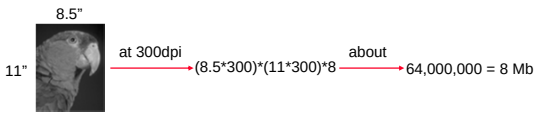
Bits per pixel	Tones of grey
1	2
2	4
3	8
4	16
5	32
6	64
7	128
8	256



20 pixels

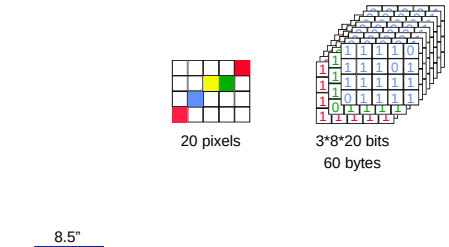


8*20 bits
20 bytes



Colour images

- In colour images each pixel has a colour, which is a combination of its primary colours
  - depending on the colour model used
  - RGB is the standard colour model for digital technology
    - three primaries are Red, Green, Blue
- To be able to show true colours we need to have all the tones of each primary colour
  - 256 tones per primary
  - 256 tones of Red, Green, and Blue in RGB model



Bits per pixel (colour depth)	Number of colours
1	2
2	4
4	16
8	256
16	65,536
24	16,777,216
32	4,294,967,296

Colour images

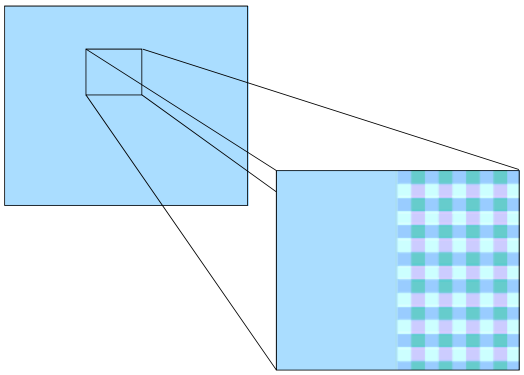
- Colour depth refers to the number of bits per pixel
  - high colour (16 bits/pixel)
  - true colour (24+ bit/pixel)
- The higher the colour depth the larger the image size
  - websites use smaller sized images for faster download
- Colour reduction is the process of reducing the colour depth to reduce the image size
  - from 16+ to 8 bits/pixel (256 colours)

24-bit image: 16.8 million colours

8-bit image: 256 colours

Colour images

- Dithering is the process of simulating colours that are not available
- Dithering can improve the quality of colour-reduced images
  - few available colours are put next to each other
  - our eyes perceive the missing colour



24-bit image: 16.8 million colours

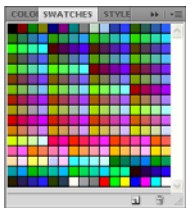
8-bit image: 256 colours with dithering

24-bit image: 16.8 million colours

8-bit image: 256 colours with dithering

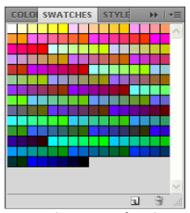
Colour images

- Limited but selective colours can be used to further improve the quality of low-depth images
  - system colour palettes
    - Macintosh OS
    - Windows OS
    - mobile devices (e.g. phones, tables, etc.)
  - web colour palette
    - browser-safe colours
  - custom colour palettes
    - depending on those used in the image



256 Windows OS colours

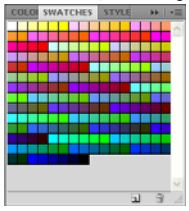
256 Macintosh OS colours



216 browser-safe colours

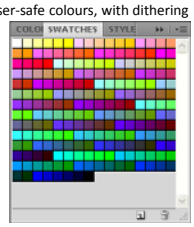
24-bit image: 16.8 million colours

216 browser-safe colours, no dithering



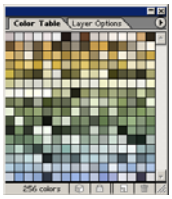
24-bit image: 16.8 million colours

216 browser-safe colours, with dithering



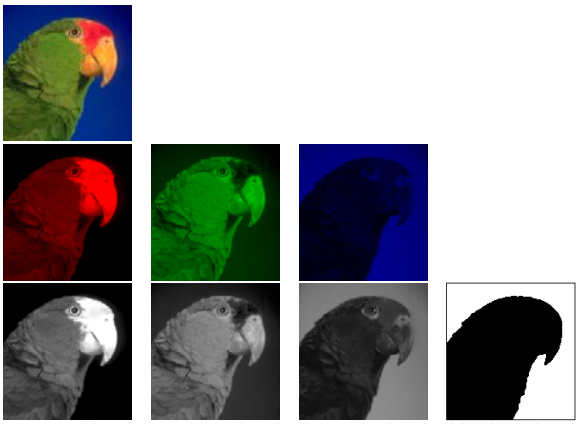
24-bit image: 16.8 million colours

256 custom colours, with dithering



Raster image channels and layers

- Raster images are generally a collection of channels
  - channels are like simpler images
  - one channel for each of the primary colours
  - there may also be additional channels
    - alpha channel for transparency
    - Z-depth channel for determining the relative distance of each pixel from a fixed location
    - user defined channels such as selection paths
- Raster images can also include a collection of layers
  - separate images
  - correction layers, etc.



Red channel Green channel Blue channel Alpha selection channel

Image file formats

- There are two main groups of file formats
  - vector image file format
  - raster image file format
- Vector image file formats store the image as a set of individual objects (object-based)
  - smaller file size
- Raster image file formats store the image as a set of individual pixels (bitmap)
  - larger file size

Raster image file formats

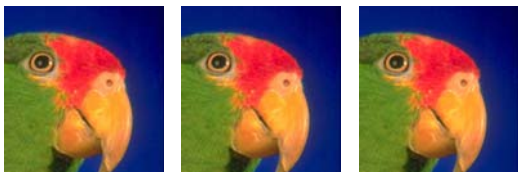
- Raster image file formats often rely on compression techniques to reduce their size
- Lossless compression techniques compress images without discarding any image data
- Lossy compression techniques discard some image data to reduce file size

Raster image file formats for the web

- Graphic Interchange Format (GIF)
  - limited colour palette (256 colours, 8-bit)
  - allows transparency for specified colours
    - either a colour is shown or not
  - allows animation by iterating through images
- Portable Networks Graphics (PNG)
  - can be either 8-bit (limited colours) or 24-bit
  - 8-bit version allows transparency similar to GIF
  - 24-bit version allows transparency using alpha channel
    - transparency levels can be set

Raster image file formats for the web

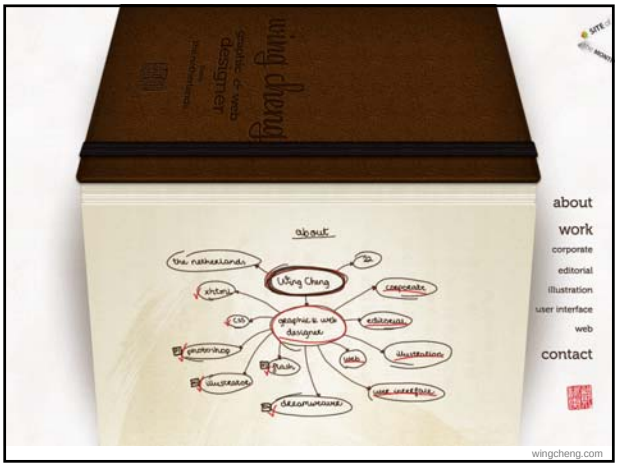
- Joint Photographic Experts Group (JPEG)
  - provides different levels of compression
  - allows small file size for true colour images
  - no limit on the number of colours

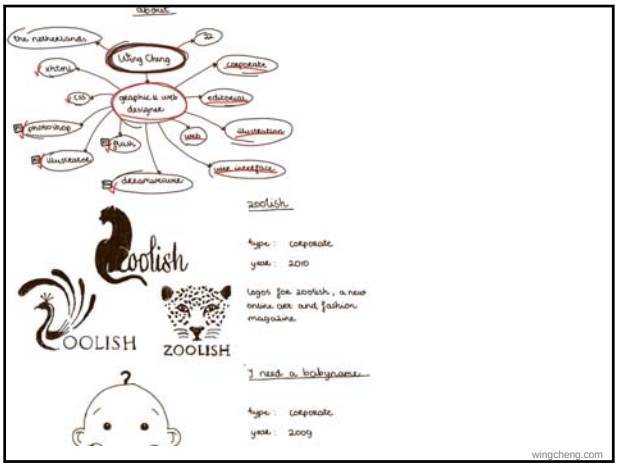


Low quality: 32KB | Medium quality: 36KB | High quality: 140KB

Use of images in web pages

- HTML used to have limited support for inclusion of images
- CSS provided much better support for use of images
  - image overlays
    - with the use of 24-bit PNG alpha channel transparency
  - image borders
    - different styles, width, colours
    - need to limit using too many combinations
  - rotation, scale, and other transformations
  - animation



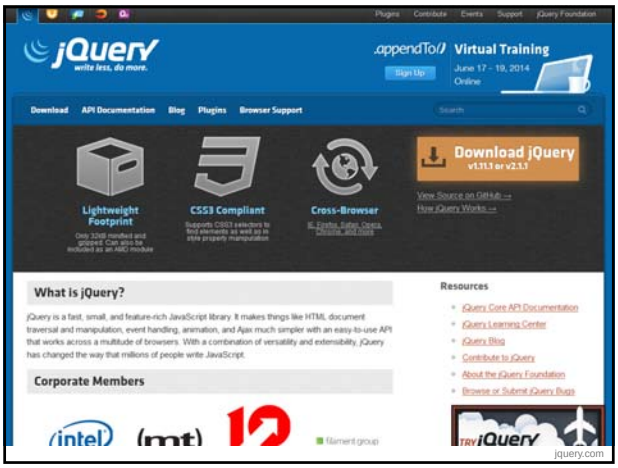


standardista.com/sandbox/rotation.html

24ways.org/2009/going-nuts-with-css-transitions

media.24ways.org/2009/14/3/

wowslider.com



jquery.com