Warning: This printout does not say the whole story

These greyscale miniature printouts of the overheads about colour graphics in world wide web often do not tell you the intended story. Many of the overheads cannot be understood unless you view then in colour. But the high cost of printing in colour has forced us to provide these miniature printouts in greyscale only. Providing them in colour would have increased the price of the course documents by about 100 SEK, and the students have told us they are not willing to pay this price to get the printouts in colour.

The overheads are however available, in colour, as a Microsoft Word file at URL http://www.dsv.su.se/~jpalme/internet-course/P96-part-06b-OH-HTML.co

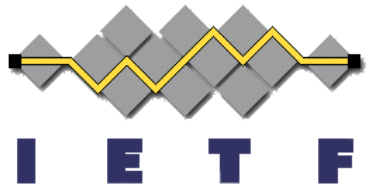
Varning: Filen är över 5 megabyte store, så ladda inte ner den till din dator hemifrån via modem om du inte har mycket stort tålamod!

Graphics

Graphics in HTML are stored in separate files, one file for each graphic. The main HTML document only contains links to the graphics, not the actual images.

Example:

```
<IMG SRC=
"http://www.ietf.cnri.reston.va.us/images/ietflogo.gif"
 ALT="The IETF logo">
<H1>Internet Engineering Task Force</H1>
```



Internet Engineering Task Force

Object versus bitmapped graphics

Object graphics: Describe a picture with commands like “draw a line of width 1 from point 12,44 to point 12,99” or “draw a circle segment ...” or “fill an area with colour ...”.

Bitmapped graphics: Split image into raster points, indicate colour of each raster point. Usually combined with compression to reduce file size.

Formats for object graphics usually also allow bitmapped graphics within the object graphics.

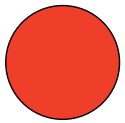
Formats for bitmapped graphics: GIF, JPEG.

Formats for object graphics: Adobe Acrobat, Postscript, PICT.

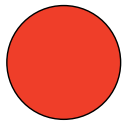
Best supported formats on theWWW is GIF and JPEG, both of which are bitmapped, usually with 72 DPI. This is OK for screeens, but not so good for printing.

Object graphics will automatically get sharper when imaged on screens or printers with high resolution. Bitmapped graphics can never get more sharp than the raster used. Example:

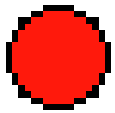
High resolution



Bitmapped 72 DPI

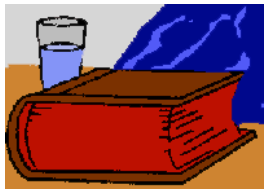


Bitmapped 16 DPI

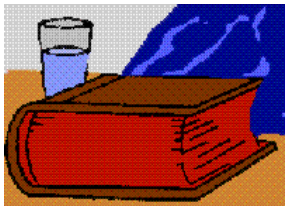


Dithering

Original picture, 72 DPI, 16 bits colour depths

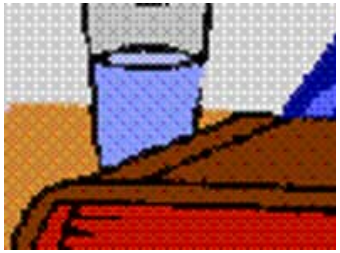


The same picture as shown on a 256-colour (8 bit colour depths) screen



Part of the picture above 3 x enlarged

Part of the picture above 3 x enlarged

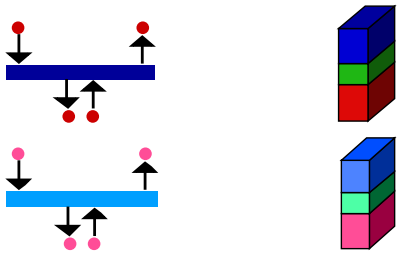
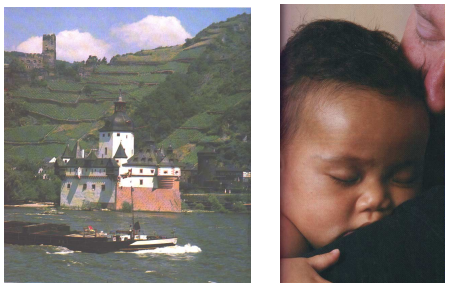


Some image formats used in the WWW:

Name		Description
Graphic Interchange Format	GIF	Bitmapped image with no-loss compression. Requires UNISYS patent to implement.
Joint Photo-graphers Experts Group	JPEG, JPG	Bitmapped image with information-losing compression based on deficiencies in the human eye. Can for photographs, especially color photograph, give much more compression than GIF without difference visible to the human eye.
Portable Document Format	PDF	Used by Adobe Acrobat. Can render full manuscripts including text and pictures. Proprietary format, reader freeware.
Portable Network Graphics	PNG	Proposal for a new format to replace GIF. See URL `http://raptor.csc.flint.umich.edu/~yost/png-docs/intropng.html` for more info.
Postscript	PS	Can render full manuscript including text and pictures. Large file sizes. Proprietary Adobe format, but widely used by non-Adobe products.

For more info see URL `http://www.berkana.com/class2/media.html`

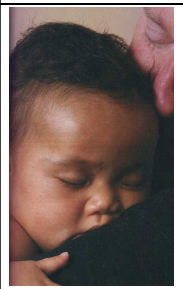
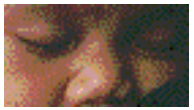
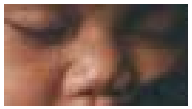
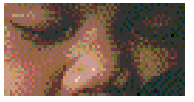
Two kinds of graphics

Properties	Graphics sharp borders, low number of different colours and large fields with the same colour.	Graphics with many different colours, soft transitions between colours.
Examples	Drawings, diagrams	Photographs, paintings
Quality requirements	Sharp borders, even fields, exact colour matching not important	Many colours, exact colour matching often important
Best web encoding	Usually GIF	Usually JPEG
Examples		

The path from original to web-picture

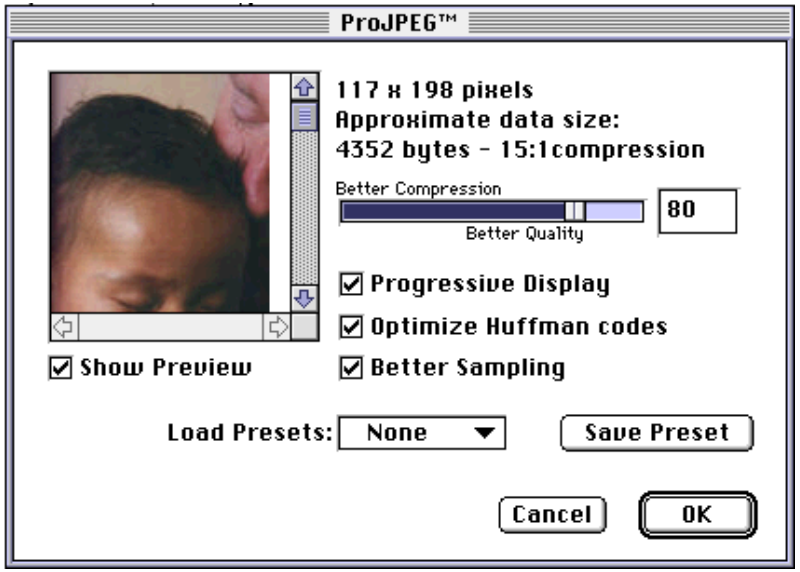
Original	Line drawing	Photo or painting
Common formats:	Illustrator, Freehand or Photoshop	Photoshop, JPEG
Web format:	GIF	JPEG
Conversion to bitmap:	Photoshop, Superpaint, Graphic Converter.	Picture is already in bitmapped format.
Effect of conversion to Web format:	Colour depth reduced to 8 bits or less. Can cause dithering.	Loss of detail, dependent on compression factor.
Also during this conversion:	Bit density usually changed to 72 BPI	
Effect when rendering on the screen for a user who has only 256 colours:	Colour may be converted from one to another 256 colour palette. Can cause dithering and sometimes bad distortion.	Colour converted to the palette available on the user screen.

A comparison of GIF and JPEG

Form	300 BPI	GIF 72 DPI, custom palette	GIF 72 DPI, Netsc. palette	JPEG, high quality	JPEG very high comp.
File size	1,2 Mbyte Pho-toshop format	19369 bytes	9445 bytes	3882 bytes	1812 bytes
1 x, 16 bit screen depth					
2 x, 16 bit screen					
2 x, 8 bit screen					

How to get small graphics file sizes for JPEG

Carefully adjust the compression ration. Example of user interface (ProJPEG):

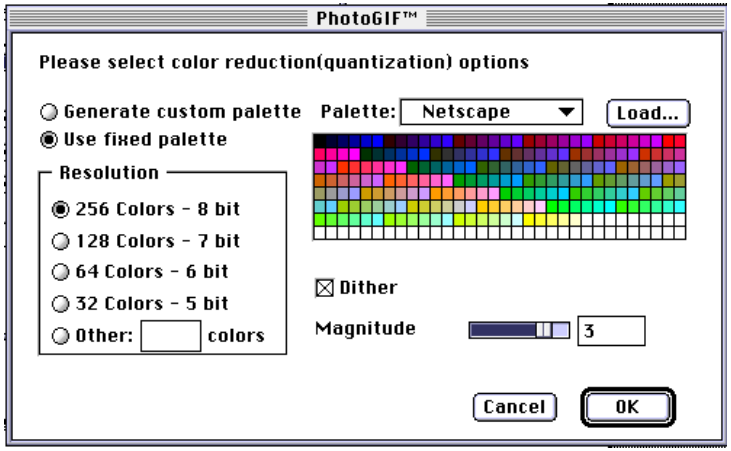


How to get small graphics file sizes for GIF

1. Avoid dithering in production of the GIF file.
2. Reduce number of different colours.
3. Use custom palette.

Warning: Custom palette may cause two palette changes, one when producing the GIF file, one when the picture is put on the user screen. This can cause dithering and bad distortion of the colours. The only 100 % secure way to avoid this is to only use colours from the so-called Netscape palette. This palette, which contains 216 colours, is a kind of smallest common set of colours which almost all colour screens can show.

Example of user interface when saving in GIF format

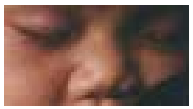


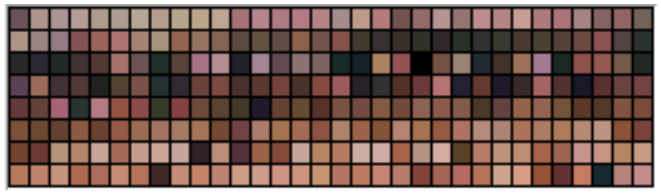
There are special tools for creating graphics with only colours from the Netscape palette.

Example of creating a custom GIF palette

Picture with 256 colour custom palette adjusted to the needs of this picture

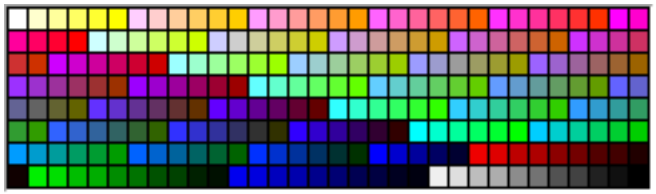
2x below:



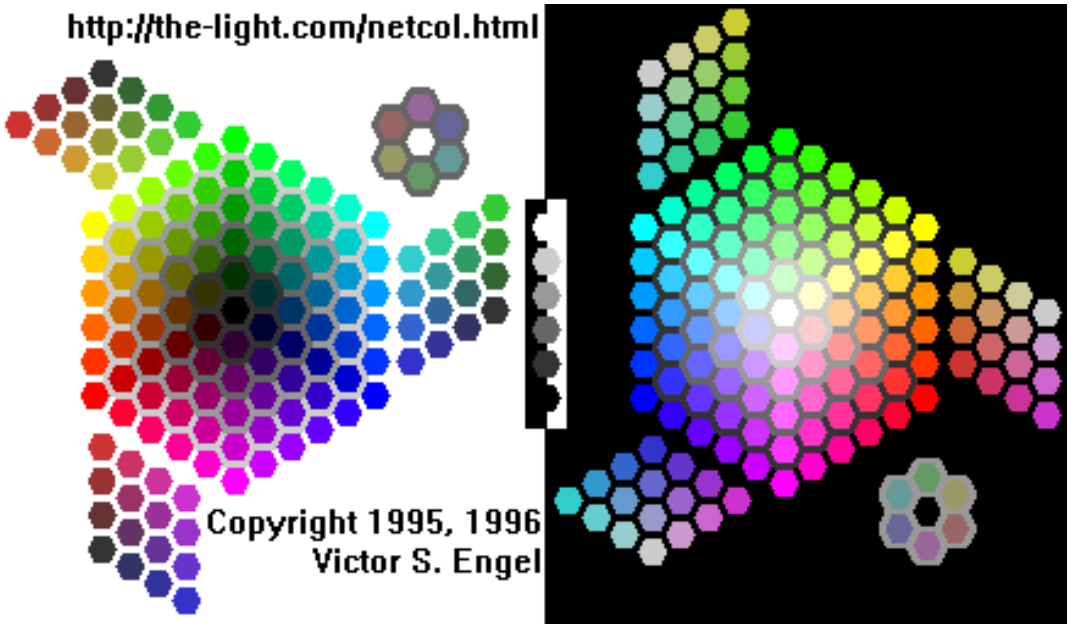


What happens when this picture is in a second step converted to the Netscape palette

2 x below

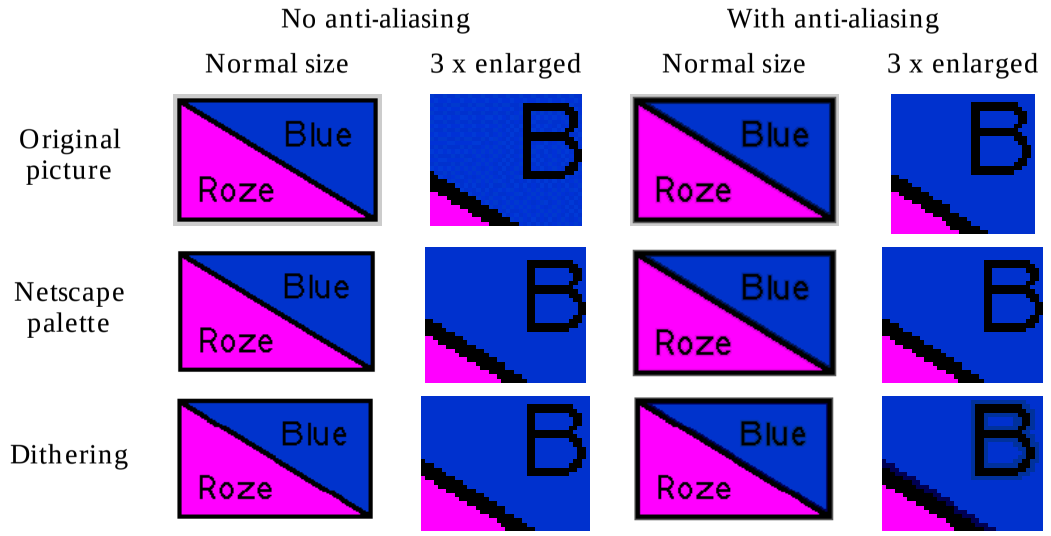


The Web safe Netscape 216 color palette at http://www.onr.com/user/lights/netcol.html



Anti-aliasing followed by conversion to Netscape palette and dithering

On a picture which without anti-aliasing only used web-safe colours (Netscape palette)

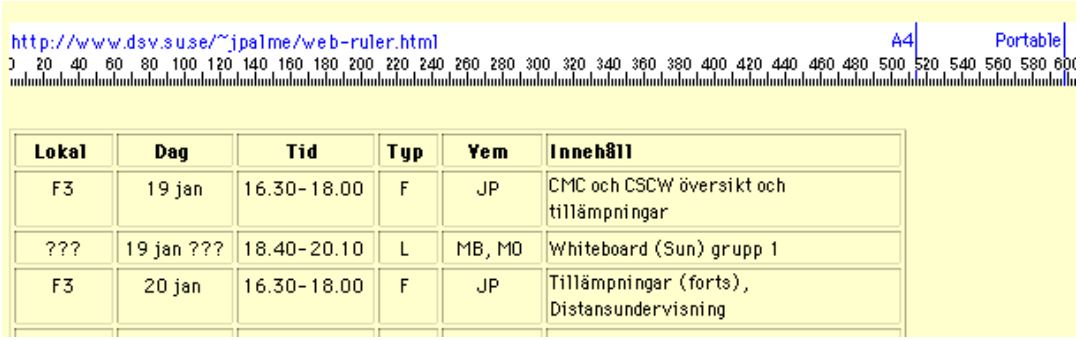


Web pages printable and visible on small screens

Web pages less wide than 514 pixels can be printed on both A4 and US Letter sized paper without loss of information.

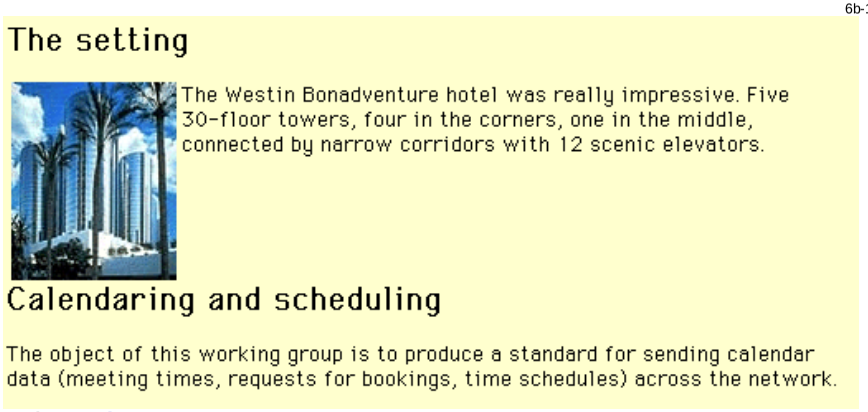
Web pages less wide than 600 pixels can be shown on portable computers with 640x480 screen sizes without any need for horizontal scrolling.

At http://www.dsv.su.se/~jpalme/web-ruler.html you can find a ruler, which you can use to test the width of your web pages, as shown by the example below.



For more information see http://www.dsv.su.se/~jpalme/web-ruler.html.

Text flowing around pictures




```
<H2>The setting</H2>
<P><IMG
SRC="http://www.westin.com/graphics/hotels/LABONleft.jpg"
ALIGN="LEFT"></P>
<P>The Westin Bonadventure hotel
was really impressive. Five 30-floor towers, four in the
corners, one in the middle, connected by narrow corridors with
12 scenic elevators.</P>
<P><BR clear = "all">
<H2>Calendaring and scheduling</H2>
```