Gernot Hoffmann
Internet Programming

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This doc:
http://www.fho-emden.de/~hoffmann/pip05.pdf

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At least page 17 should be printed by color

1. Lecture

1.1 Lecture / Introduction

My name is Gernot Hoffmann

1944	Born in Germany
1963 .. 1969	Study of aircraft engineering
1970 .. 1976	Aircraft research, PhD degree in engineering
1977	A short time in a company for navigational instruments
1977 .. 1985	Independent engineer
1986	To Fachhochschule Ostfriesland, now FH OOW

Teaching Mathematics, Control Systems, Electrical Drives, Production Measurement, Electronics, Computer Vision, Industrial Design and Internet Programming.

The purpose of this lecture:
Get some basic knowledge about typography, image processing and internet programming. It is not a lecture about HTML.
Improving English for German students and improving German for students from abroad.

I apologize for mistakes in English language. Corrections are appreciated.

A few remarks for our guests from abroad on addressing people :

Postal address	Herrn Prof.Dr.G.Hoffmann	Herrn E.Müller
Letter	Dear Professor Hoffmann	Dear Mr.Müller
Talking	Good morning, Mr.Hoffmann	Good morning, Mr.Müller

Some colleagues expect a more formal addressing:
Good morning, Professor Lehmann

In Ostfriesland we use also the very short form „Moin Herr Müller“, which could be used from morning to evening, but this is local colloquial language and not common in Germany.

1.2 Lecture / Homework

The lecture consists of 2 hours (90 minutes) per week in the first part of the semester. At present the number of these lectures has not yet been fixed.

Afterwards the students have no lectures, but we work interactively in the Laboratory for Computer Vision, Room T51, at lecture hours and additionally at open hours on request or as offered.

Then the students have to show the intermediate results of their projects.

Everybody must get an access to a computer with Internet Explorer and Netscape Communicator. Internet Explorer is recommended as editor.

In Room T51 we discuss only the results. Data should be saved on floppy disks 3.5“ without folders.

Homework

Task

Application for a job or for the practical semester.

1.	Title Page	Introduction, good illustration, good photo Don’t call this ‘homepage’
2.	Application	Letter of application, one page, eventually a good photo
3.	Curr. Vitae	Curriculum vitae, one page, overview
4.	Education	Longer list, including project descriptions
5.	Contact	All communication channels, one page
6.	Any title	Optional page, just an exercise (e.g. my home town)

Screen 1024 x 768 (used area 750 x 560)
True Color 24 or 32 bit per pixel
Each page fits to the common available space for two different browsers
Use JPEG compressed photos with excellent quality
The content depends on each student
Cooperation is allowed
It is not allowed to copy images from books, newspapers and so on
The images must be personal property
No Java, no Cascaded Style Sheets, no Frames, pure HTML

1.3 Lecture / Homework Rating

Last date of delivery
End of June, actual year
Room T51
Date and time as announced
The final delivery is combined with a conversation/examination in English
Therefore it is recommended to come earlier

Data
Disk with full name and number, no subdirectories (!)
A typical good source listing with full name and number

First Name	**Family Name**	**Number**

Rating

1.	**Advertising concept for assumed target group**	**10**	____
2.	**Hierarchical page concept, no page size violation**	**10**	____
3.	**Graphics and color concept**	**10**	____
4.	**Image quality and compression**	**10**	____
5.	**Text readability**	**10**	____
6.	**Text content quality**	**10**	____
7.	**Compatibility with two browsers**	**10**	____
8.	**HTML Standard, Syntax, Code readability**	**10**	____
9.	**Conversation**	**20**	____
Sum		**100**	____

Mark

1.0	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7	4.0	5.0
100-96	**95-91**	**90-86**	**85-81**	**80-76**	**75-71**	**70-66**	**65-61**	**60--56**	**55-50**	**<50**

G.Hoffmann

This table can be modified without further announcement.

2. Web

2.1 Web / Internet Address

This is my complete Internet Address or URL:

http://www.fho-emden.de/~hoffmann/index.html

Input ~ by either ALTGr + or ALT 126 (press ALT and dial 126)

URL Uniform Resource Locator
http HyperText Transfer Protocol
www World Wide Web

In modern browsers you can simply type

www.fho-emden.de/~hoffmann

'http://' is added automatically and 'index.*' is always the first page, if this is the default for the server.,

No user must know the associated IP-Address 123.123.123.123,
each number in the range of 0 to 255.

IP Internet Protocol

The IP-Address is not fixed but temporarily assigned by the server manager.
The server has a fixed IP-Address.
In a local network, e.g. a PC and a printer, IP-Adresses can be used with a different meaning.

The Internet files are located on the server.
The loading is done by a FTP-URL:
FTP File Transfer Protocol

ftp://@server:port/path;type=typecode
Input @ by either ALTGr Q or ALT 64 (press ALT and dial 64)

The server asks then for a user name and a password.

2.2 Web / Browser

We do not talk here about the transfer of neutral binary files but only about Internet page files. Such a file is written in pure ASCII code in

HTML Hypertext Markup Language

Thus a simple text editor is the only necessary tool. MS Internet Explorer is a reasonable editor and browser as well.
HTML is not a programming language, it is neither an interpreter nor a compiler. You can write down any stuff ! This will not be checked during or after editing ! The file must be checked by a browser, which tries to interprete the stuff.

A browser has to perform different tasks:

Edit files (but this can be done by any editor)

Interprete edited files for check

Receive and interpret files in on-line mode

Send files in on-line mode

Connect software to net hardware in on-line mode

The HTML file consists of different types of objects

Comments (readable in source file only)
e.g. This page is still full of mistakes

Texts (readable at receiving)
e.g. Hello, good morning

Images (visible at receiving)
e.g. GIF or JPEG

Layout directives (interpreted by browser)
e.g. fonts, colors, tables, frames

A browser ignores generally erroneous or not understandable directives and tries to show texts and images under all circumstances completely.

3. Typography

3.1 Typography / History of Writing

-3000	Iran, Iraq: Cuneiform characters	Keilschrift
	Egypt: Hieroglyphes	Hieroglyphen
-2500	Pakistan, North-India: Indus	Indus-Schrift
-2000		
	Crete: Linear A	Linear A
-1500	Crete,Greece: Linear B	Linear B
	Near East, Africa: Phoenician	Phönizisch
-1000	Greece: Greek	Griechisch
	China: Old Chinese	Chinesisch
	Israel: Old Hebraic	Alt-Hebräisch
-500	Italy: Latin	Lateinisch
	India:Brahmi	Indisch
0	China: Simplified Chinese	Chinesisch
	Israel: New Hebraic	Neu-Hebräisch
+500		
	Iran, Iraq: Arabian	Arabisch
	Japan: Kanji	Japanisch
+1000	Japan: Hiragana, Katakana	Japanisch
	Mexico: Maya	Maya
	1450 Gutenberg, lead letters	Bleilettern
+1500	1750 Typewriter	Schreibmaschine
	1850 Modern Typewriter	Schreibmaschine
	1955 China: Pinyin	Chinesisch
+2000	1977 PC Commodore, Bitmap	
	1981 PC IBM, Bitmap	
	1985 PostScript	

3.2 Typography / Typefaces

SansSerif Typeface (proportional spacing)

H h 1 T m ATi — Arial, 24 pt, normal

H h 1 T m iTA — Arial, 24 pt, bold

H h 1 T m ATi — Arial, 24 pt, italic

Other typefaces:
Helvetica, Univers,
Verdana (designed for Internet pages), News Gothic,
Frutiger, Tahoma

Serif Typeface (proportional spacing)

H h 1 T m ATi — Times New Roman, 24 pt, normal

H h 1 T m iTA — Times New Roman, 24 pt, bold

H h 1 T m ATi — Times New Roman, 24 pt, italic

Other typefaces:
Times, Garamond, Bodoni
Bookman, Rockwell

Typewriter (fixed spacing)

H h 1 T m ATi — Courier New, 24 pt, normal

H h 1 T m iTA — Courier New, 24 pt, bold

H h 1 T m ATi — Courier New, 24 pt, italic

Other typefaces:
Courier New, Lucida Sans Typewriter

Katakana

Japanese, about 50 characters (instead of 5000)

The height of characters is measured by points.
1 pt ~ 0.35 mm
Three slightly different standards exist: DIN, US, PostScript.
Mostly we use PostScript:
1 pt = 1/72 inch
The illustration shows the bounding box for 100pt.

3.3 Typography / Fonts

Pronounce ’fontt’. Do not pronounce ’fong’ .

’Font“ or ’fount’ (american) means ’letter case’ = ’Setzkasten’, the set of lead letters for printing newspapers or books by old book printing techniques.
’Setzen’ = ’composing’ means assembling a page.

A font includes one typeface with attributes (normal or bold or italic or narrow ...) in a specified size. Larger or smaller characters cannot be generated generally by simple scaling.

Font means typeface + size + attribute.
In less precise wording font means typeface.

Internet pages do not need a font directive. In this case the browser shows the text with the local font which may be Sansserif or Serif or Typewriter .

Normally the readability of Serif fonts is not the best, especially for small sizes.

Thus it is recommendable to write a specified directive for the type:

Font Face = „Arial, Helvetica“

This directive means for the browser:

If	Arial	available	Then	Arial	Else	
If	Helvetica	available	Then	Helvetica	Else	Browser´s default

We will see that it is not as easy to specify the size.

The browser should be adjusted to 12pt or ’normal’ .

The special typeface Verdana is (like Arial) available on all modern Windows computers. This typeface is well readable in all sizes, but not everybody likes the esthetical appearance.

Bitmap Fonts are defined by pixels, they cannot be scaled.
Courier has been originally a Bitmap font, but the example on the previous page is scaleable.

Truetype Fonts are scaleable, usually included in Windows.
PostScript Fonts are scaleable, handled by ATM (Adobe Type Manager).

4. Graphics

4.1 Graphics / Graphics Card

The screen (the graphics card) card can work with different resolutions by pixels:

1600 x 1200	4 : 3
1280 x 1024	5 : 4
1024 x 768	4 : 3
800 x 600	4 : 3
640 x 480	4 : 3

For Internet applications the most common resolution is 1024 x 768 .

The vertical frequency (refresh rate) should be 75 Hz or more for flicker-free appearance. This means: at least 75 full screen images per second.

The color representation is on the screen always RGB (red, green blue), but this can be coded in different manners for the graphics card:

True Color	3 byte (or 4 byte) per pixel	max. 16.7 millions of colors
Indexed Color	1 byte per pixel	max. 256 colors
High Color	2 byte per pixel	max. 65536 colors

Indexed Color files deliver a palette to the graphics card, which contains three values RGB for 0..255 entries.

GIF	GIF89a	Graphics Interchange Format	always Indexed Color
JPG	JPEG	Joint Photographic Experts Group	always True Color

Other graphics formats are not common.
High Color or Indexed Color with only 16 colors should not be used.

Thus we expect this setting:
True Color 1024 x 768, 3 byte per pixel (24 bit) or 4 byte per pixel (32 bit).

True color is good for realistic images (continuous tone images). Grayscale images can be handled properly (a subset of 16.7 millions of colors).
Indexed color is good for drawings or business graphics with few selected colors.
If the screen can show only Indexed Color, than continuous tone images cannot be shown correctly. GIF can transmit transparent areas, JPEG cannot.

4.2 Graphics / File Formats

JPEG and GIF
As mentioned above. Compression will be explained later

Bitmap
This expression is used by three different meanings.

a) Bitmap means: information is defined for each pixel, opposed to Vector Graphics, where no pixels are defined, but coordinates and attributes.

b) Windows Bitmap means: *.BMP, *.RLE
BMP codes each pixel by 1 bit (black/white, monochrome), 8 bits (IndexedColor) 24 bits (TrueColor).
1 bit is used for rastered print, like black/white newspaper.
It is not professional to scan Vector Graphics 1 bit per pixel.
Better use Indexed Color Gray and increase contrast by image processing.
Some programs understand BMP with 32 bits per pixel. This is not Windows standard, but reasonable, because the file header includes the information bits per pixel. 4 byte per pixel files can be read faster than 3 byte per pixel files.
In rare cases we encounter BMP files with 2 to 4 bits per pixel.
RLE means Runlength Encoding, reasonable for 1 to 8 bits per pixel.

c) Bitmap means: 1 bit per pixel rastered image, like black/white newspaperprint.
This is important for applications, where the original raster must be transfered to a printer without aliasing. This is called 'screened' or 'halftoned'.

TIFF
The Tag Image File Format is the most versatile format. A *.TIF file can contain several images with different internal codings, like TrueColor, Indexed Color, BMP, RLE, JPEG, LZW compression, CCITT compression (Fax).
For Desktop Publishing of continuous tone images it is highly recommended to use one TIFF for one image and no compression.
LZW is quite useless for continuous tone but helpful for business graphics.
TIFF is not used in HTML files.

PNG
This format shall replace GIF for advanced applications in future. PNG supports TrueColor and Transparency.

HTML
HTML can use JPEG (TrueColor) or GIF(Indexed Color). Some browsers read PNG.

Refer to [5] for nearly 100 Graphics File Formats.

4.3 Graphics / Background

A background is defined either by a color or by a small image. In both cases the screen is filled automatically by repetition. Of course the underlying images must look good using repetition. Normally only little saturated colors are recommendable and the ornaments should be decent.
The image must be transfered with the first page. Then the browser takes it from the cache. It should be small by file size, otherwise waiting for the first page is boring. Generally avoid full screen background images.

The automatic repetition offers a good facility for fading colors. Assume a vertical fading background, top lighter and bottom darker.
Define a GIF file with a height of 1024 pixels and a width of 1 pixel with this feature. This will be repeated from left to right.
Unfortunately the whole screen shows bands, because GIF offers only 256 colors and therefore not enough color resolution. The edges of bands are perceptionally enhanced by the so called Mach band effect.

Now define a GIF file with a height of 1024 pixels and a width of 5 pixels and select additionally the dither mode. The available colors are scattered over the area with the global fading effect. Then the screen will not show banding.

A horizontally fading background is defined by a horizontol row with height 5 pixels and width 1280 pixels, which is fading from left to right.
The mentioned number of pixels 1280 horizontally and 1024 vertically is enough for any screen up to 1280 x 1024. These numbers can be slightly reduced.

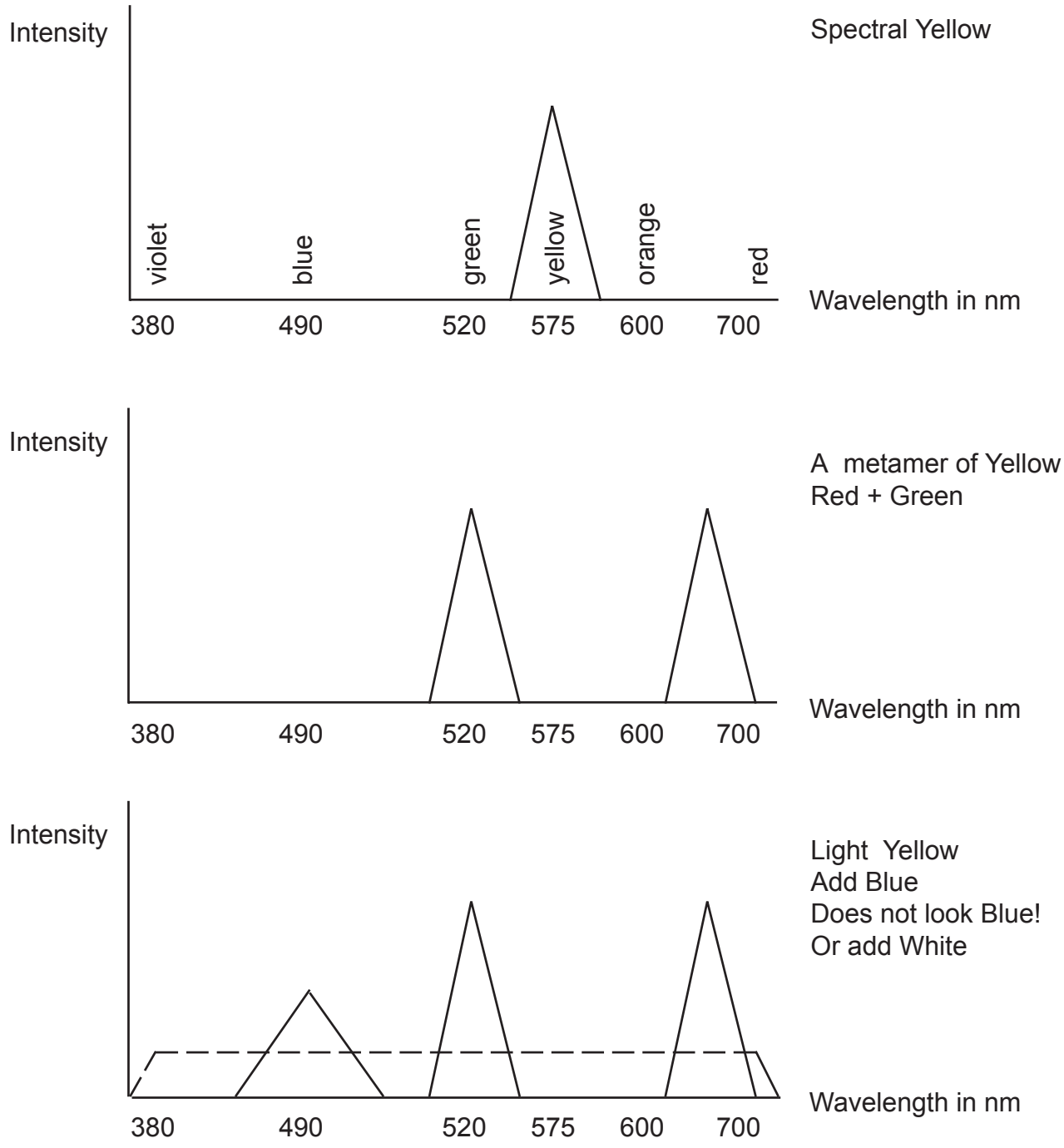
4.4 Graphics / Interlaced or Progressive

GIF files and JPEG files can be generated interlaced or multi pass. This means:
In e.g. three passes the first pass shows a fast but crude preview. The next passes improve the impression until the final quality is reached. This can be done for GIF files by showing only each third row in the first pass and so on. For JPEG files (progressive mode) the first pass shows the low frequency content. By tests it has been proved that multi pass files are not larger than one pass files.
There is some danger that a low quality first pass may offend a sensible observer, then he will stop the transfer immediately.

By special tools a sequence of GIF images can be assembled in one GIF file and shown fully automatically, either once or restarting.
Because GIF photos have a low compression rate and all the images must be transfered once, the size and number of images in the movie is rather limited and the esthetical quality is usually very bad - that´s up to the designer!

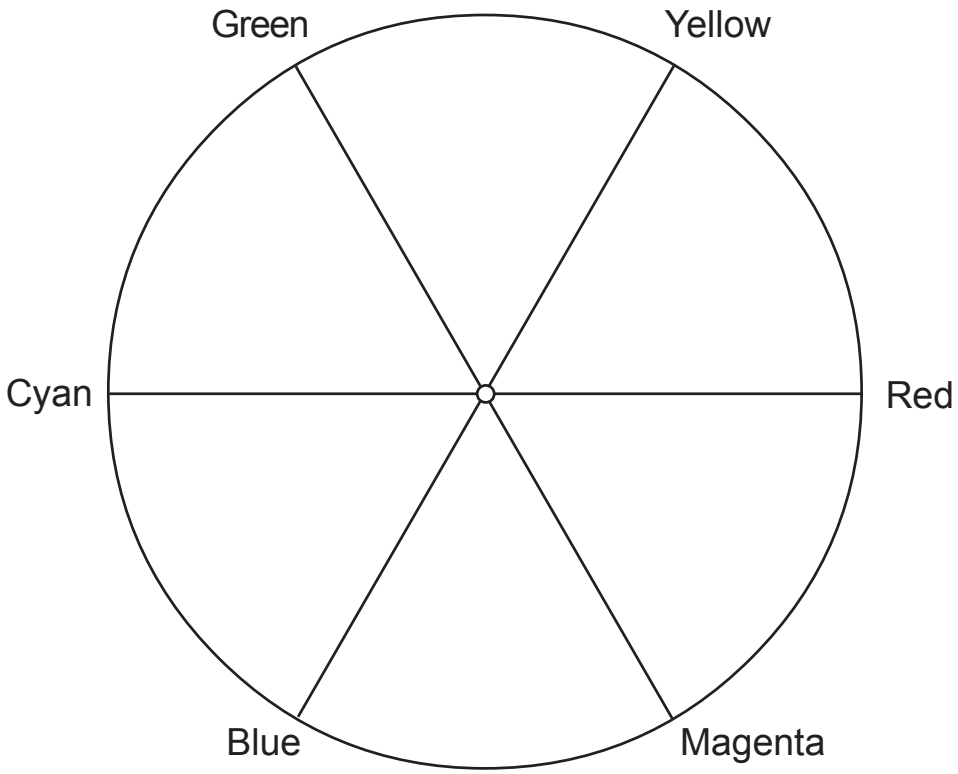
5. Color

5.1 Color / Spectra and Metamerism



The color Yellow can be spectral pure or mixed by Red and Green.
Different „metamers“ of any color means: the same perception, but different physical spectra.
Less intensity makes the color darker. Adding White makes Yellow lighter. Adding Blue makes Yellow also lighter. Thus Yellow can be generated on an RGB screen.

5.2 Colors / Color Circle



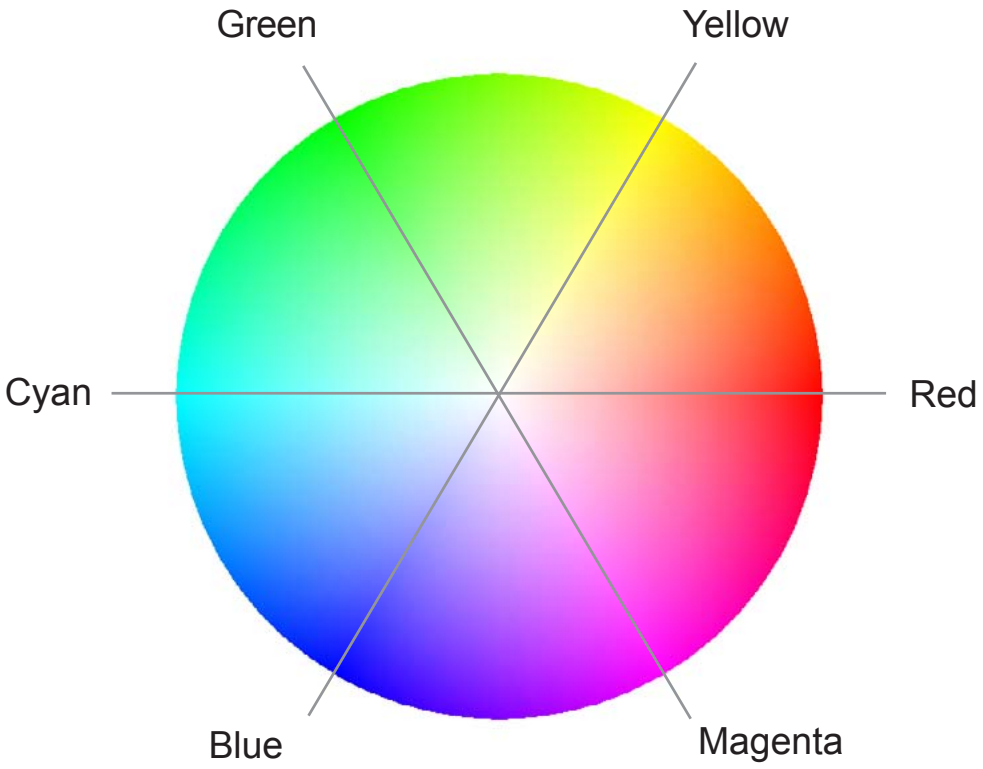
Primary colors: Red, Green, Blue
Secondary colors: Cyan, Magenta, Yellow

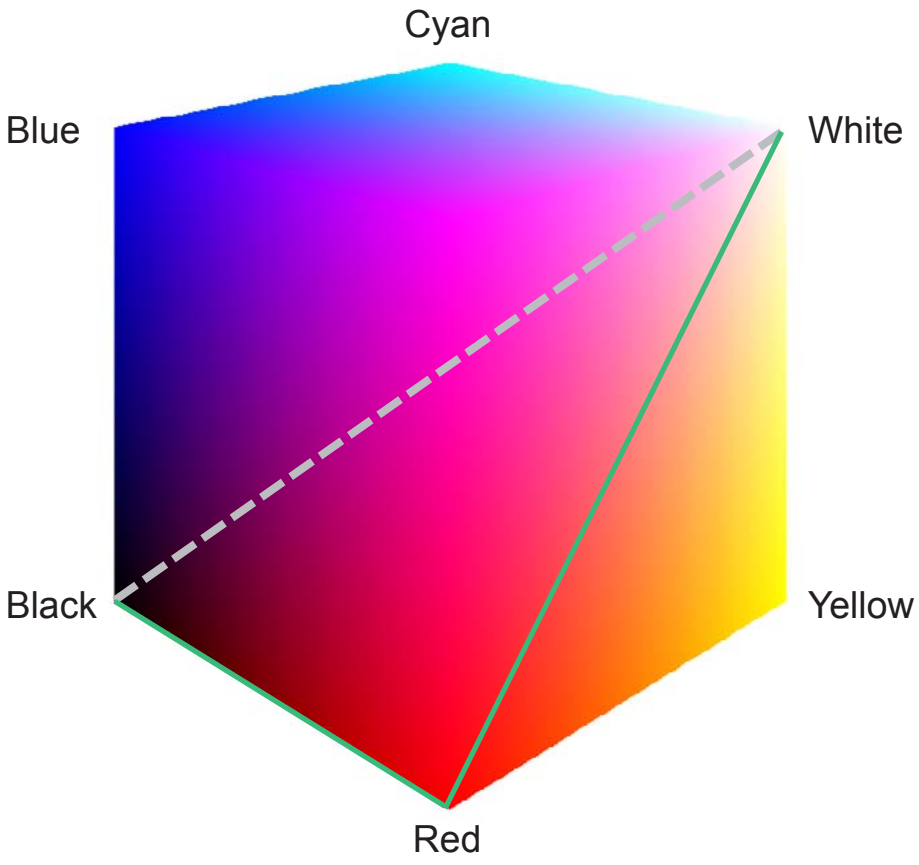
The spectrum is on both sides infinite, but beyond Blue and beyond Red not visible. We can close the ends on a circle, because Blue and Red generate a new impression which we call Magenta. Magenta is not available as pure spectral color.

Equal amounts of Red and Cyan generate White or Gray - they are complementary, as well as all the other colors which are opposed 180° on the circle.
Of course this is a very crude model - the arrangement for exactly 60° per color is not physically based. It is a computer color model.

Now we use equal amounts of Red and Green. This is medium light Yellow. Then we add a small amount of Blue. What happens ?
The resulting vector is shorter, but the color must be a lighter Yellow. To show this we need the third dimension - the RGB Cube.

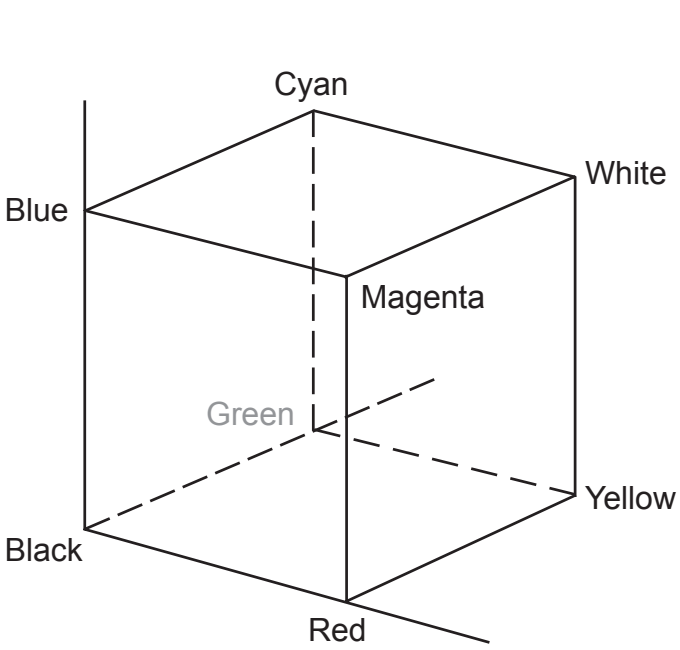
5.3 Colors / Color Wheel and Color Cube

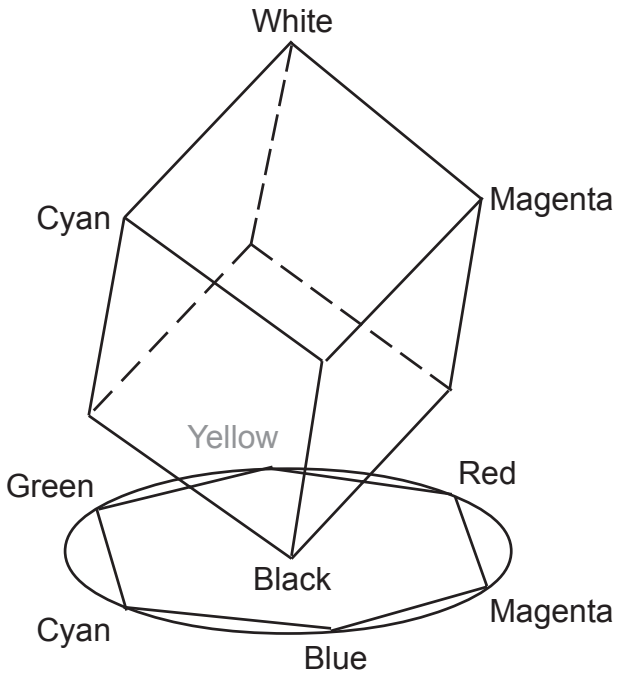




Here we see in green the path from Dark Red to Light Red
All colors in the 3D triangle reach from Gray to Red

5.4 Colors / RGB Cube





Equal amounts of Red, Green, Blue deliver Black to White along the main diagonal Looking along this diagonal we see a hexagon, which can be embedded in the color circle.
Thus we find the threedimensional representation of a color vector.
The angle in the color circle is called Hue. H=0°: Red H=180°: Cyan
The vertical axis is called Lightness. L =0 : Black L =1: White
The radial distance (but not the radius) is called Saturation.
On the main diagonal we have S=0 and on all surface points S=1.

Each primary color RGB has an intensity of 0 to 255.

	R	G	B
Black	0	0	0
White	255	255	255
Dark Red	100	0	0
Red	255	0	0
Light Red	255	100	100

We discuss now the question, how to define colors in HTML.

5.5 Colors / Colors in HTML

HTML offers a set of 16 standard colors by name:
aqua, black, blue, fuchsia, gray, green, lime, maroon, navy, olive, purple, red, silver, teal, white, yellow.
Many browsers support hundreds of colors by names like
aquamarine, chartreuse, lawngreen, navajowhite and other fantasy names.
Refer for all names to [1].

One cannot be sure whether browser understand these names.

It is much better to define families of colors by numbers. For example the family of Red as mentioned on the previous page. If you like the Red with a shade of Blue then add Blue. If you like the Red lighter then add Cyan = Green + Blue.

Unfortunately, in standard HTML the colors are coded hexadecimal.

Dec	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

A number N = 0...255 is coded by two hex halfbytes Y and X:

$N = Y \cdot 16 + X$

$0 = 0 \cdot 16 + 0 = 00h$
$10 = 0 \cdot 16 + 10 = 0Ah$
$100 = 6 \cdot 16 + 4 = 64h$
$255 = 15 \cdot 16 + 15 = FFh$

We see immediately, that Y produces large steps and X only small differences. Thus the members of our color family can jump in steps of Y, but for accuracy we need X as well.

Altogether:

Imagine the color by the vector representation in the RGB space.
Code the estimated numbers hexadecimal.
Make primarily lightness differences for family members.
Try out the effect on a calibrated screen and try out corrections.
Be always aware that a color impression depends on the size of the color area and the neighbour color as well.
A color page can be constructed only by theory plus trial and error.

6. Compression

6.1 Compression / Handling Photos

A color photo of 4.5“ x 3“ = 11.43 cm x 7.62 cm shall be shown in an Internet page with the size 450 x 300 pixels.

Scan the image TrueColor (16.7 millions of colors) with a resolution 300 dpi = 300 pixels per inch. The size is then 1350 x 900 pixels or 1.215 Mpixels or 3.645 MByte (here we use M = 1000 x 1000 instead of M = 1024 x 1024).
.
Perform necessary image processing using full size. Downsample, using bicubic interpolation, for 450 x 300 pixels. Compress JPEG with medium or high quality.
In Photoshop use ’Save for Web’ and choose appropriate parameters.

The browser can scale by any factor, but he will do this without interpolation. Therefore the browser should never scale or resample.

For high quality the compression ratio may be 15. The size is now 450 x 300 pixels or 0.135 Mpixels or 0.405 MByte uncompressed and 27 kByte compressed.

The size is reasonable because the transfer rate, using ISDN, is about 7kByte/second, here 4 seconds.

Do not scan photos with low resolution. It is much better to downsample after image processing, which may include sharpening .

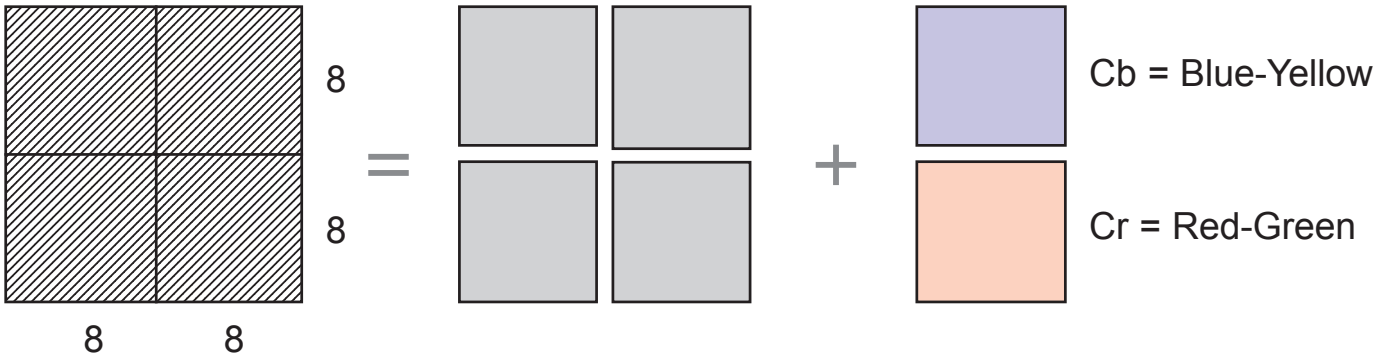
We are talking here about continuous tone photos, not about printed photos from books or newspapers, which are already rastered (screened, halftoned).
For these the process would need much care in order to avoid aliasing (Moiré patterns):
Scan with 600 dpi. Apply a blurring filter until no raster is visible.
This has to be done by actual pixel view. Then downsample as mentioned above.
The original file is rather large but it can be deleted after image processing.

Never save scanned photos originally in compressed form like JPEG.

6.2 Compression / JPEG

JPEG delivers not exactly predictable compression rates, always with quality loss.
Compression rate = uncompressed file size / compressed file size.

Excellent quality	Rate 10
Medium quality	Rate 20..30
Crude quality	Rate up to 100



Original part 16x16	4 Gray images 8x8	2 Color images 8x8
3 byte per pixel	1 byte per pixel	1 byte per pixel

The image is split in parts of 16x16 pixels. 4 Gray images represent the lightness or grayscale. The remaining informations are two synthetical colors Cb,Cr, but only each second column and second row is used (by averaging columns and rows). Thus we have 2 Color images Cb,Cr instead of 4.

With very little loss the information is reduced from 256·3=768 to 256·1+128·1= 384 byte, exactly 50% or a compression rate of two.
Then each 8x8 block is treated by a sort of Fourier analysis by cosine functions only. 8 functions in each direction, altogether 64 coefficients. The information is retained completely - so far no further compression.
The coefficients are divided by integer numbers which increase with the order from low to high frequency and rounded. If a high frequency part is small then this will produce a zero because of rounding. In common photos we will get many zeros because the high frequencies contribute in only few parts of the image. This is the loss. Now we have integer coefficients. This code sequence contains many small numbers, a few large, and additionally long sequences of zeros.
The small numbers are coded by 1 to 3 bits, the large numbers eventually by 16 bits instead of 8 bits for all. This so-called Huffman Encoding reduces the code length. Finally the sequences of zeros are coded by Runlength Encoding:
00000 is coded by 50.
All tables, for the integer division and for the Huffman Encoding, are included in the file and used for decoding.

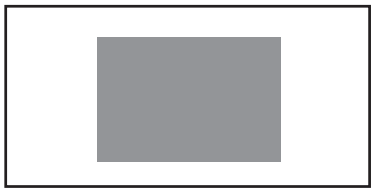
As a result we can say: The relation between quality and compression rate depends much on the content of the image. It can be predicted only roughly.

6.3 Compression / GIF

Never compress photos by GIF! This graphics format is coded by Indexed Color, usually for up to 256 colors. The conversion from TrueColor to Indexed Color produces of course losses, which are visible in quality images.
But the major issue is this: A GIF coded photo is despite the bad quality much larger than a JPEG result. GIF89a is used for graphics which have larger parts of equal colors, like business graphics, drawings or buttons on Internet pages.

Fachhochschule
University of Applied Sciences
Oldenburg
Ostfriesland
Wilhelmshaven

GIF 1200x700 pixel, 14 kBytes



This image has many white lines and some gray lines. It could be compressed by lossless Runlength Encoding.
But GIF uses the much better lossless LZW compression (Lempel, Ziv, Welch).

The LZW compression searches for sequences of equal code. For example the code AbAbCdAbAb will deliver two entries in a code table:
1 AbAb
2 Cd
The code is then transfered 121 and thus much shorter.

GIF images can be produced by Photoshop. Define an area with given pixel width and pixel height. Fill with any pattern, respecting the limited number of 256 colors, which is in any case enough. Avoid too rough patterns because of bad compression.
The area can be originally transparent. Transparent GIF images are used on Internet pages for placeholders - they have the color of the background (‘unvisible GIF’).

A very important trick is the generation of uniform rectangles: Define a 1 x 1 pixel GIF with the appropriate color. Scale up in the HTML file for any width and height.
Buttons with light or dark edges must be defined in true scale, e.g. 16 x 16 pixels. They cannot be scaled.

There is one rare exception where we can use GIF for photos: If it is possible to generate the background by a uniform color, then this area can be converted to transparent. Thus a person may appear hovering over the background.
The major problem is the interactive process of cleaning the background, especially for faces with hairs. It is a significant disadvantage that no edge softening can be applied, because transparency is 0% or 100% and nothing between. Better avoid transparency at all.

7. Image Processing

7.1 Image Processing / General

Never save scanned prints by JPEG. Always save as TrueColor TIFF (or BMP).

If a digital camera delivers only JPEGs then save these immediately as TIFFs.
Don´t save again as JPEG during image processing.

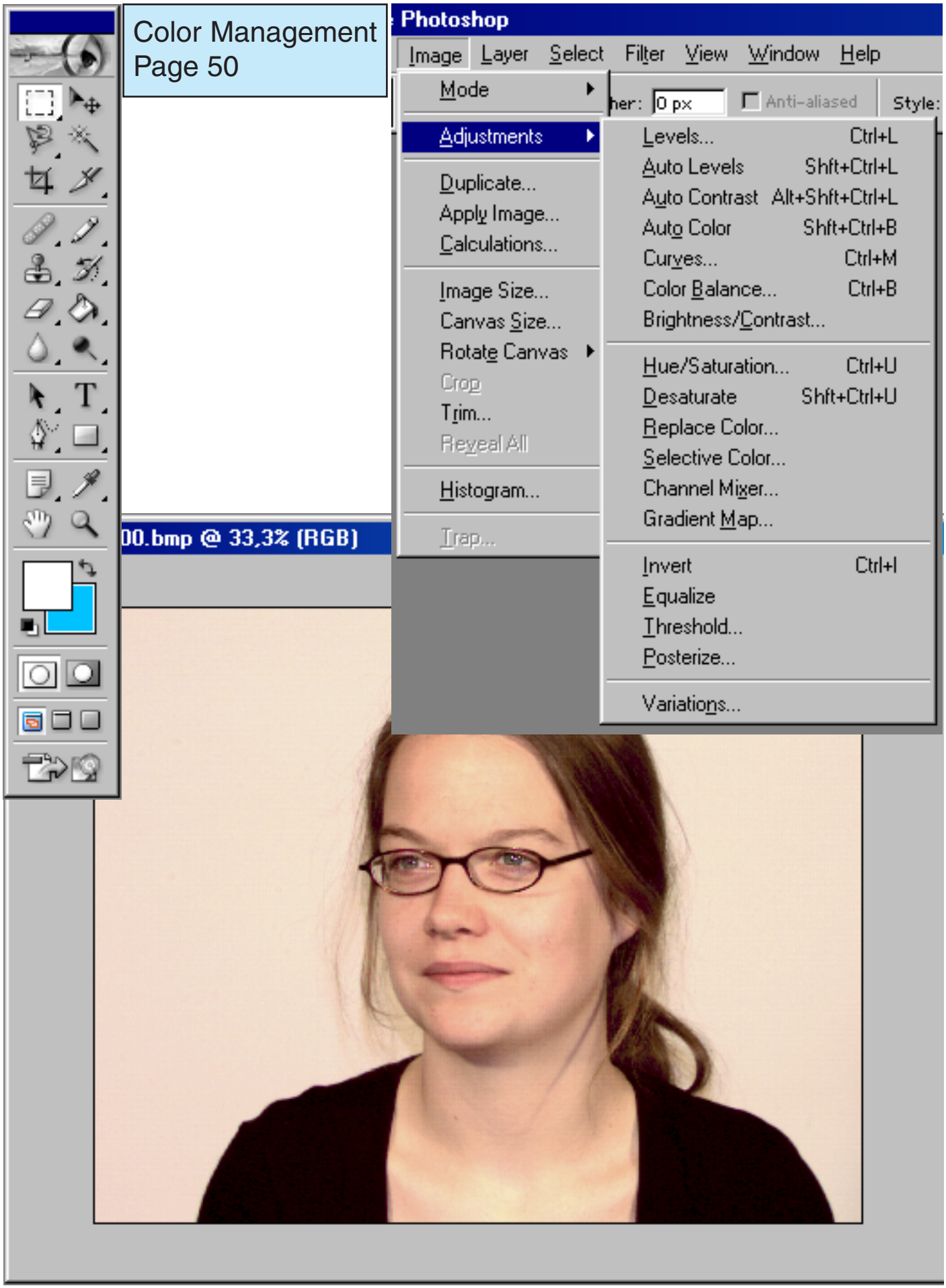
The end product for the Web is a JPEG, but any change has to be done in the intermediate TIFFs.

Images like the portrait on the next page need mostly several improvements and manipulations by Photoshop:

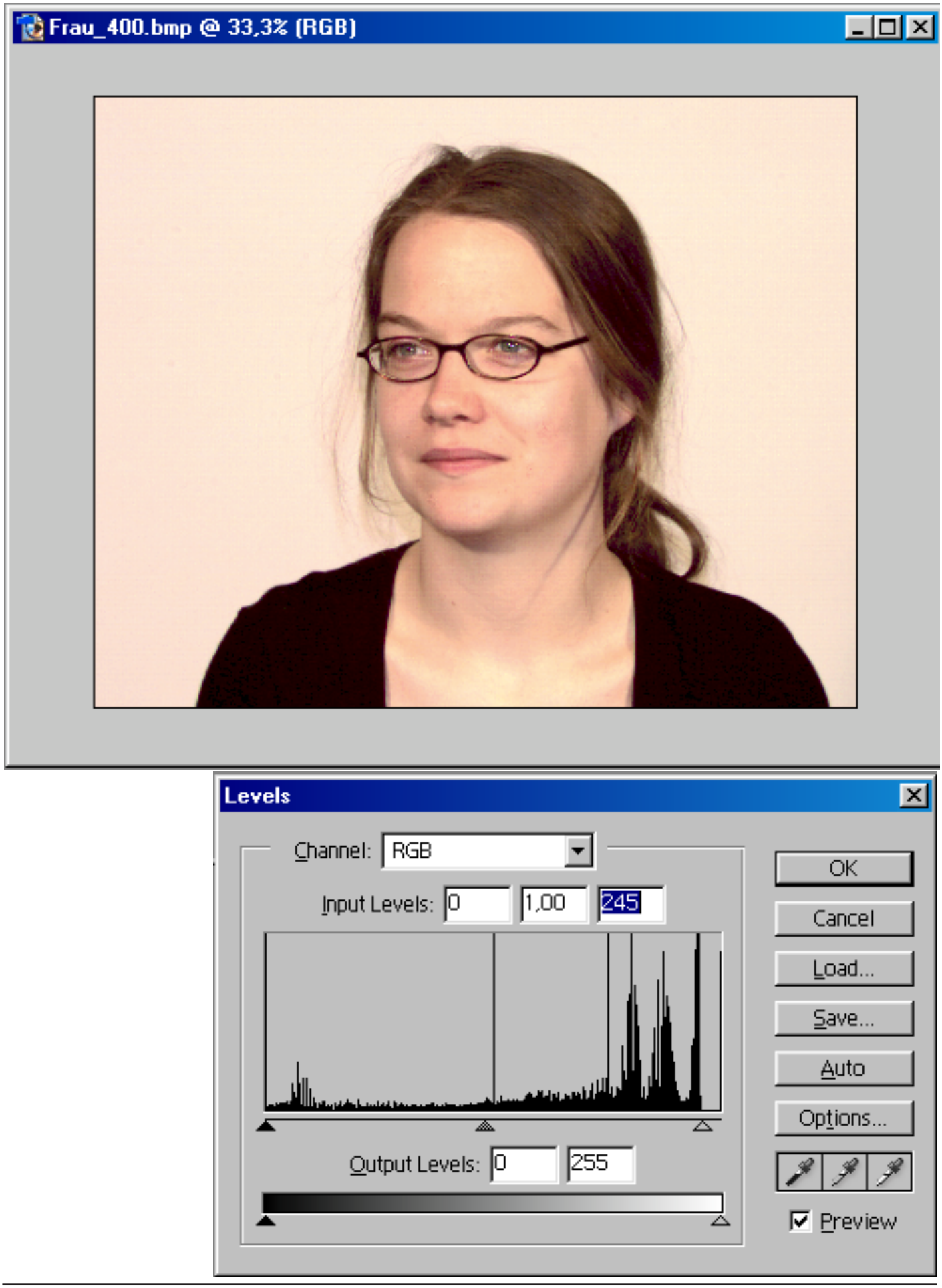
- Level correction
- White point adjustment
- Saturation control
- Contrast improvement
- Sharpening
- Cropping
- Downsampling
- JPEG compression

All the details for the examples on the next page will be explained in the lecture.

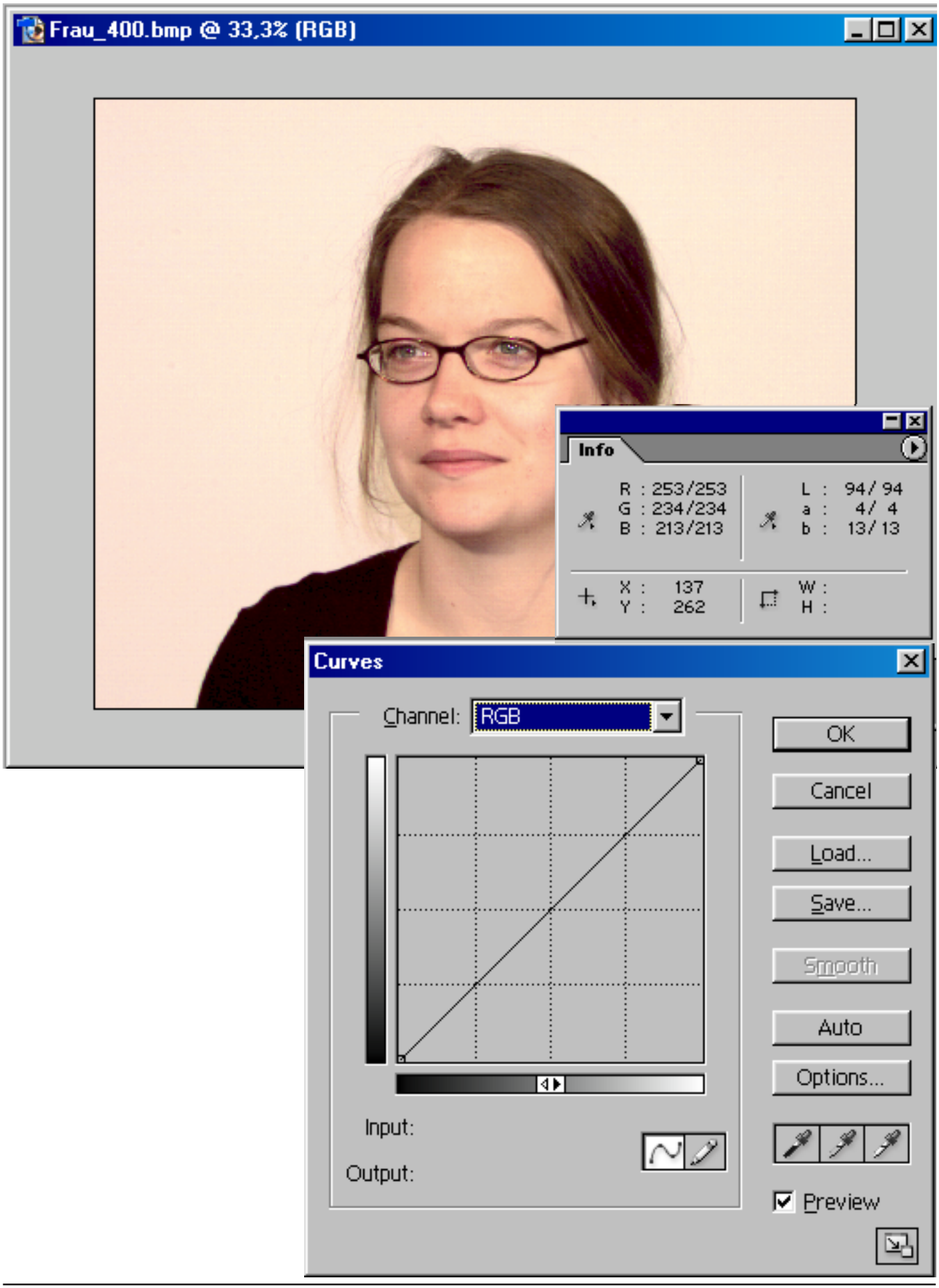
7.2 Image Processing / Menues



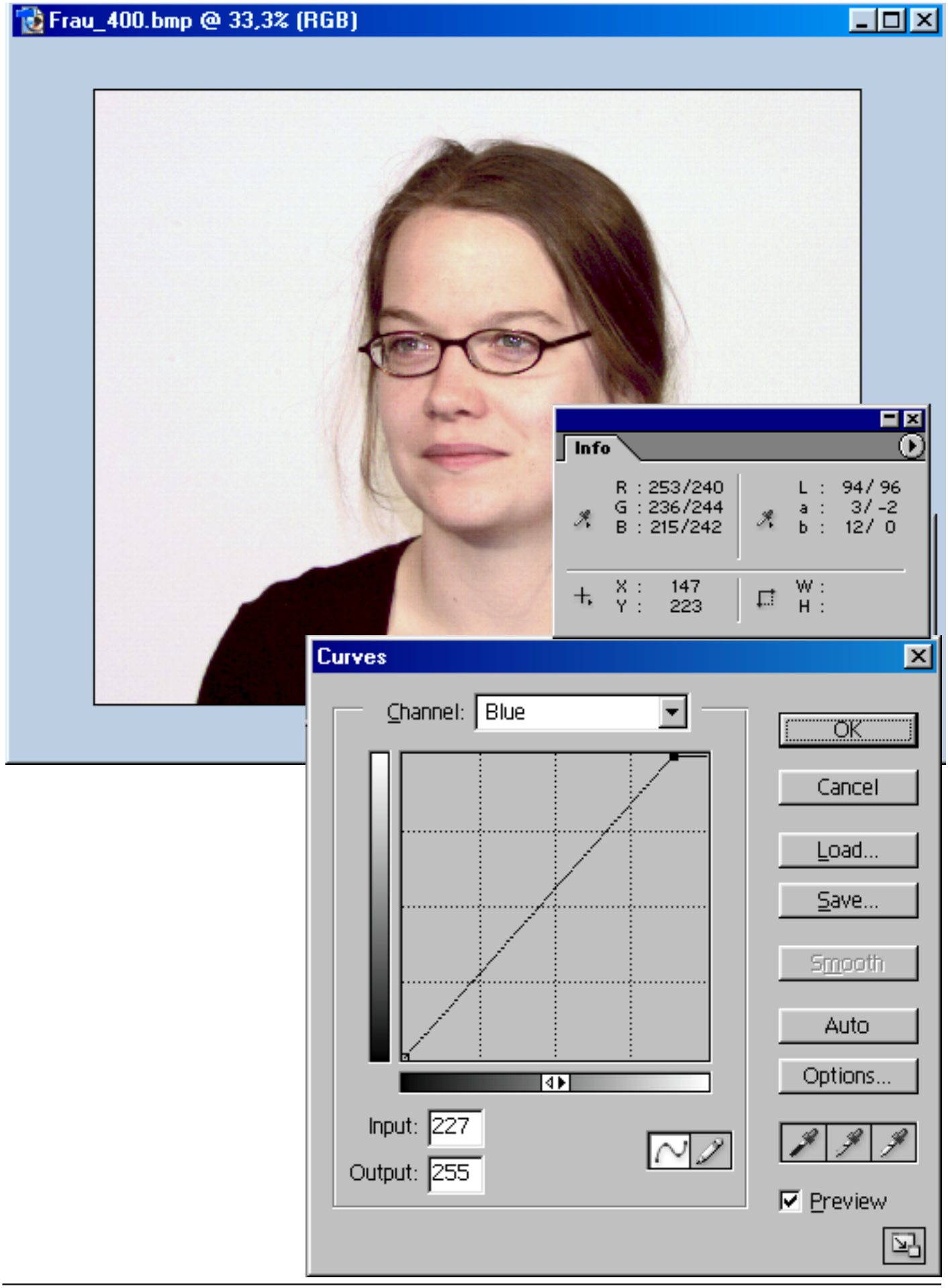
7.3 Image Processing / Levels



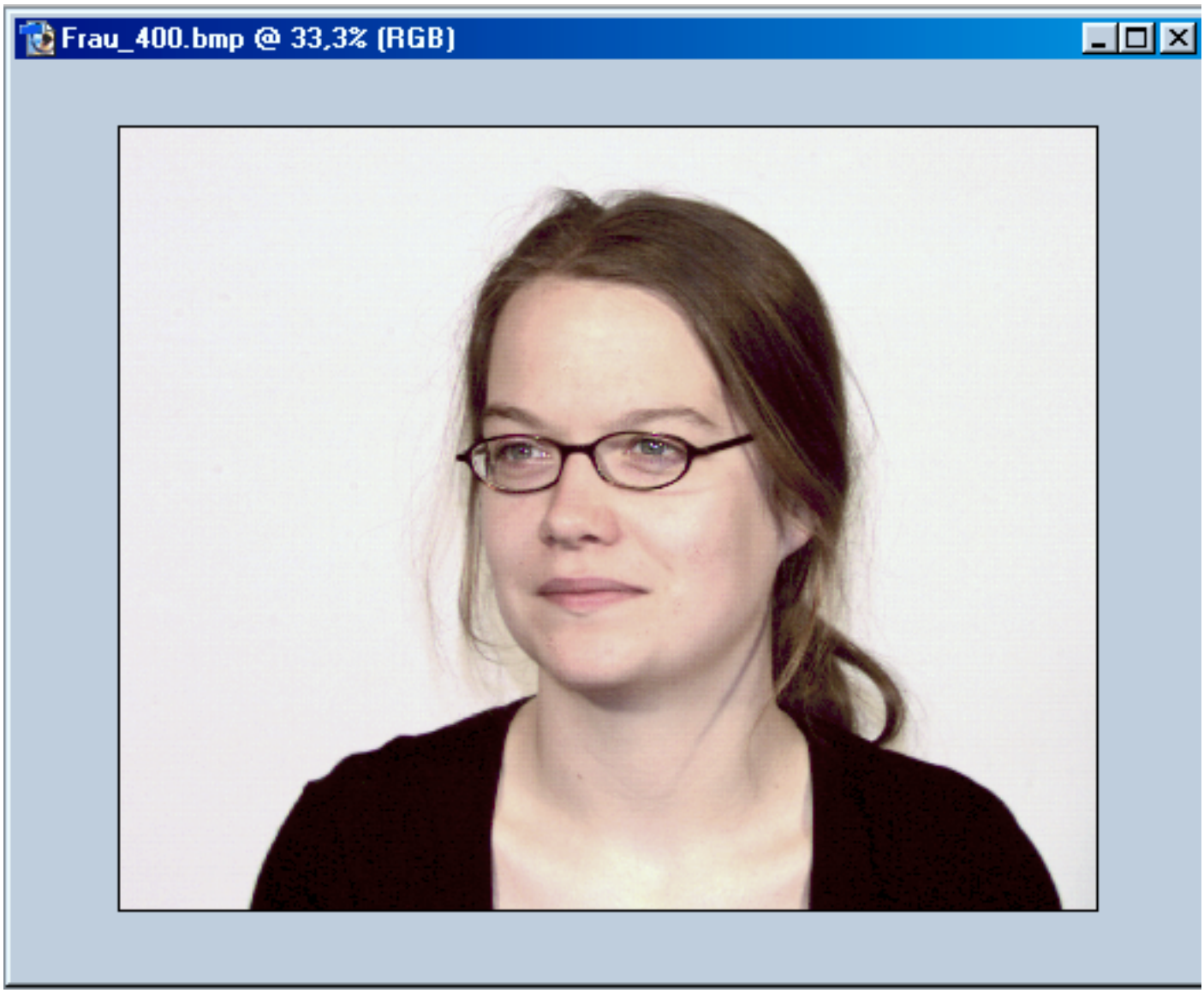
7.4 Image Processing / Curves

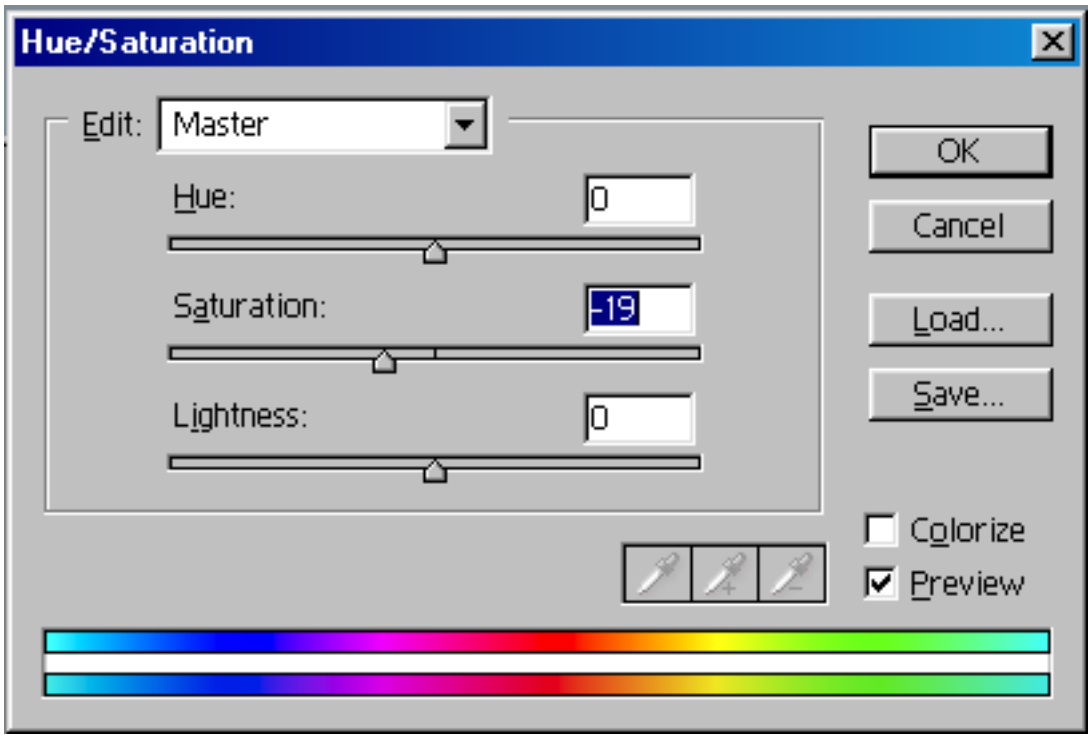


7.5 Image Processing / White Balance

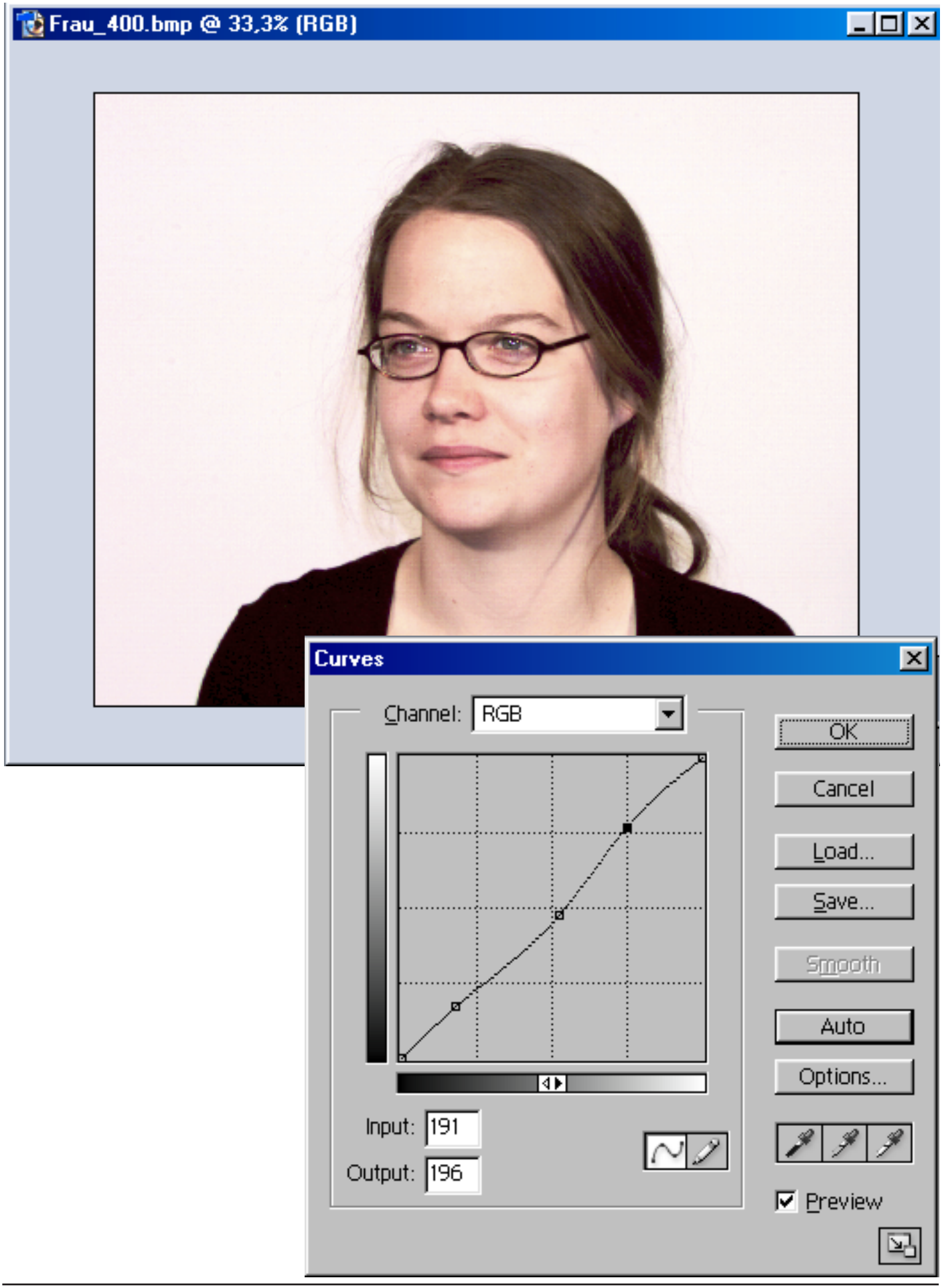


7.6 Image Processing / Saturation

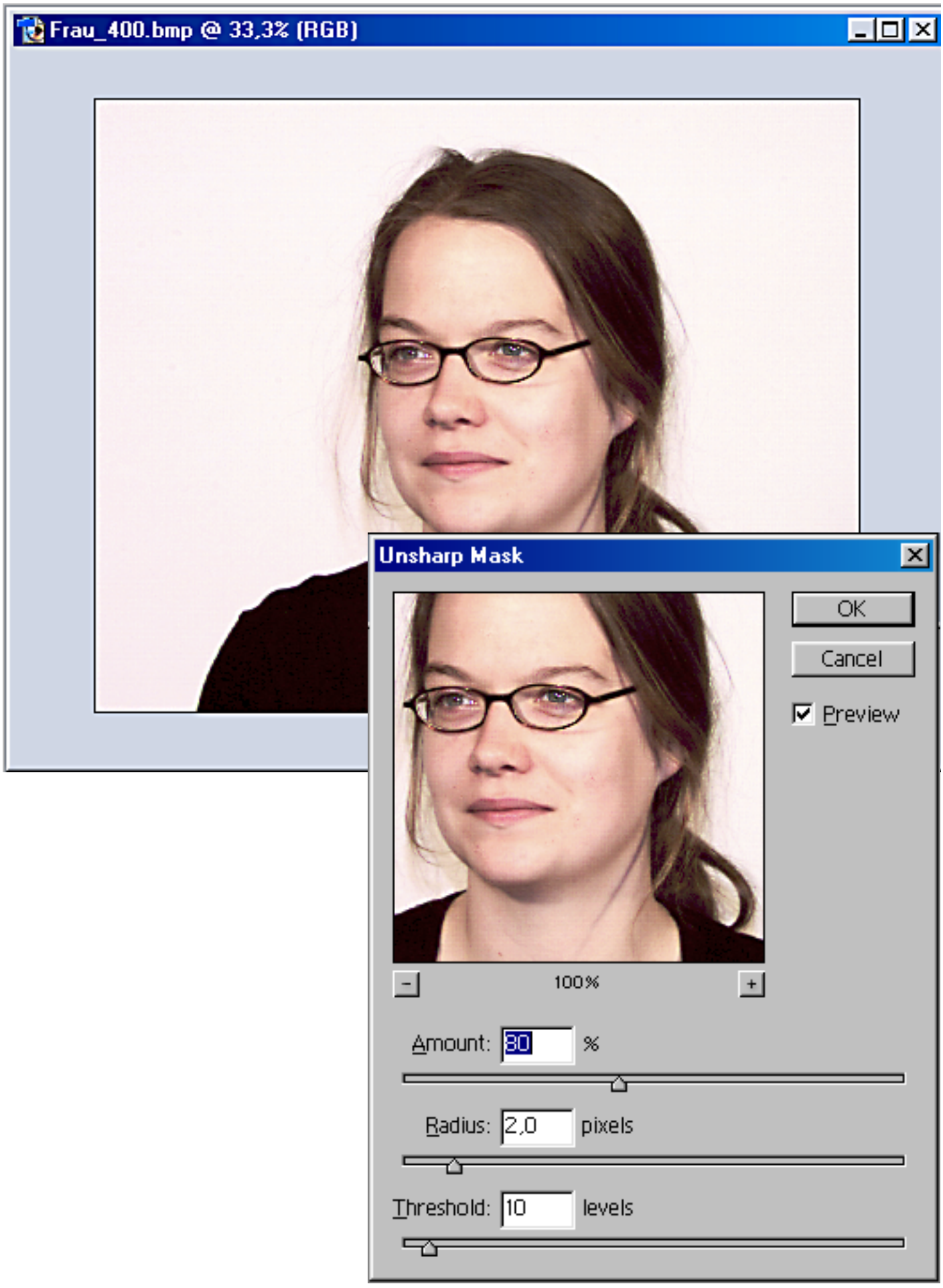




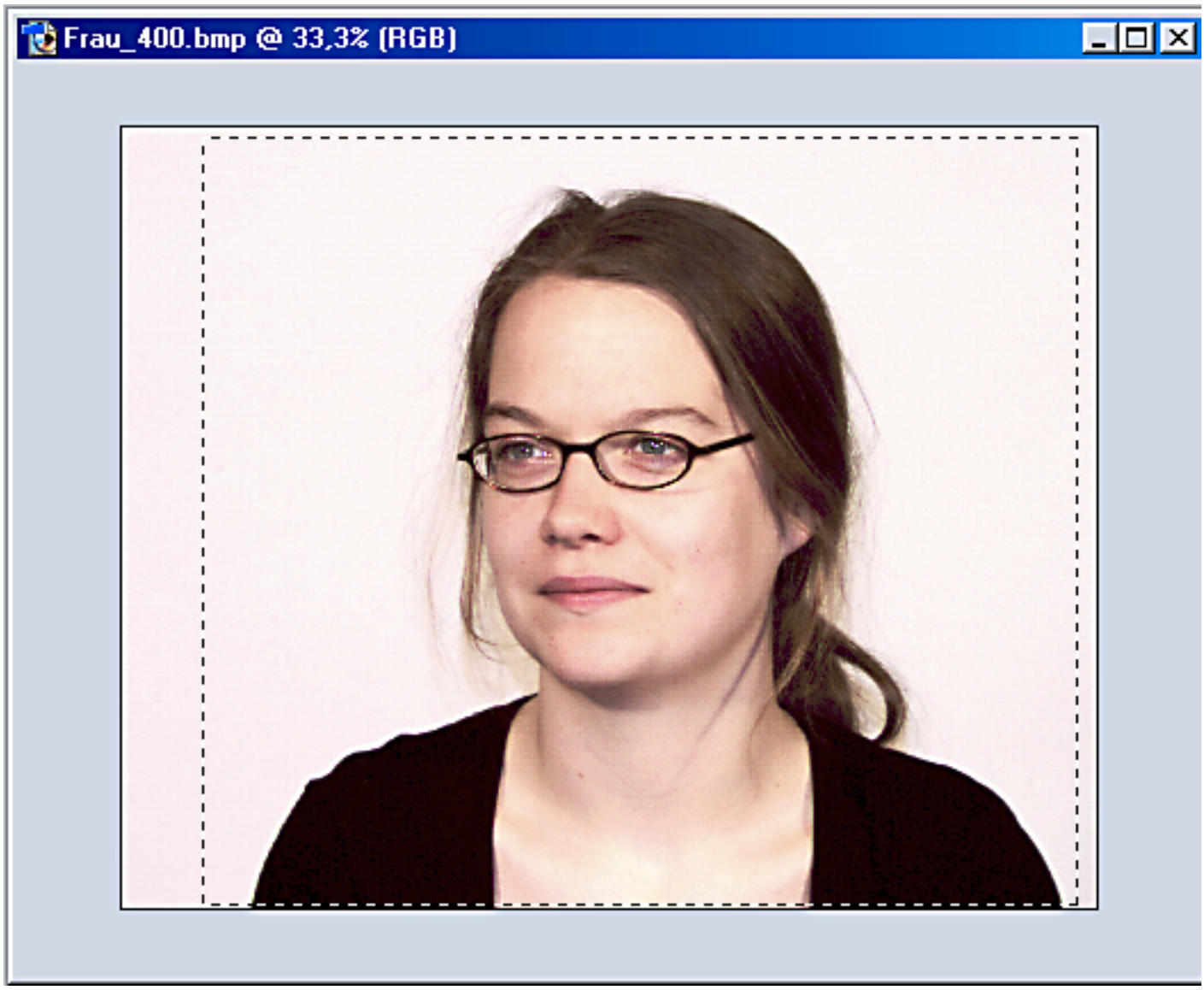
7.7 Image Processing / Contrast by Curves



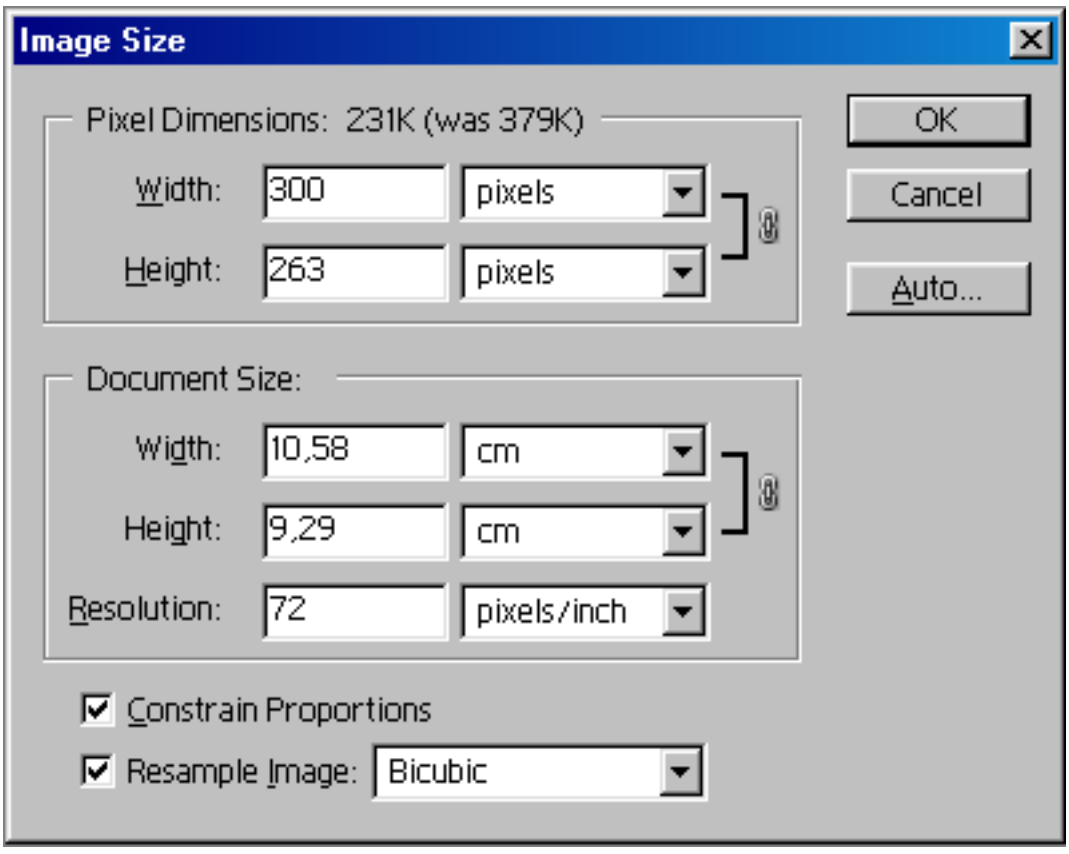
7.8 Image Processing / Sharpening



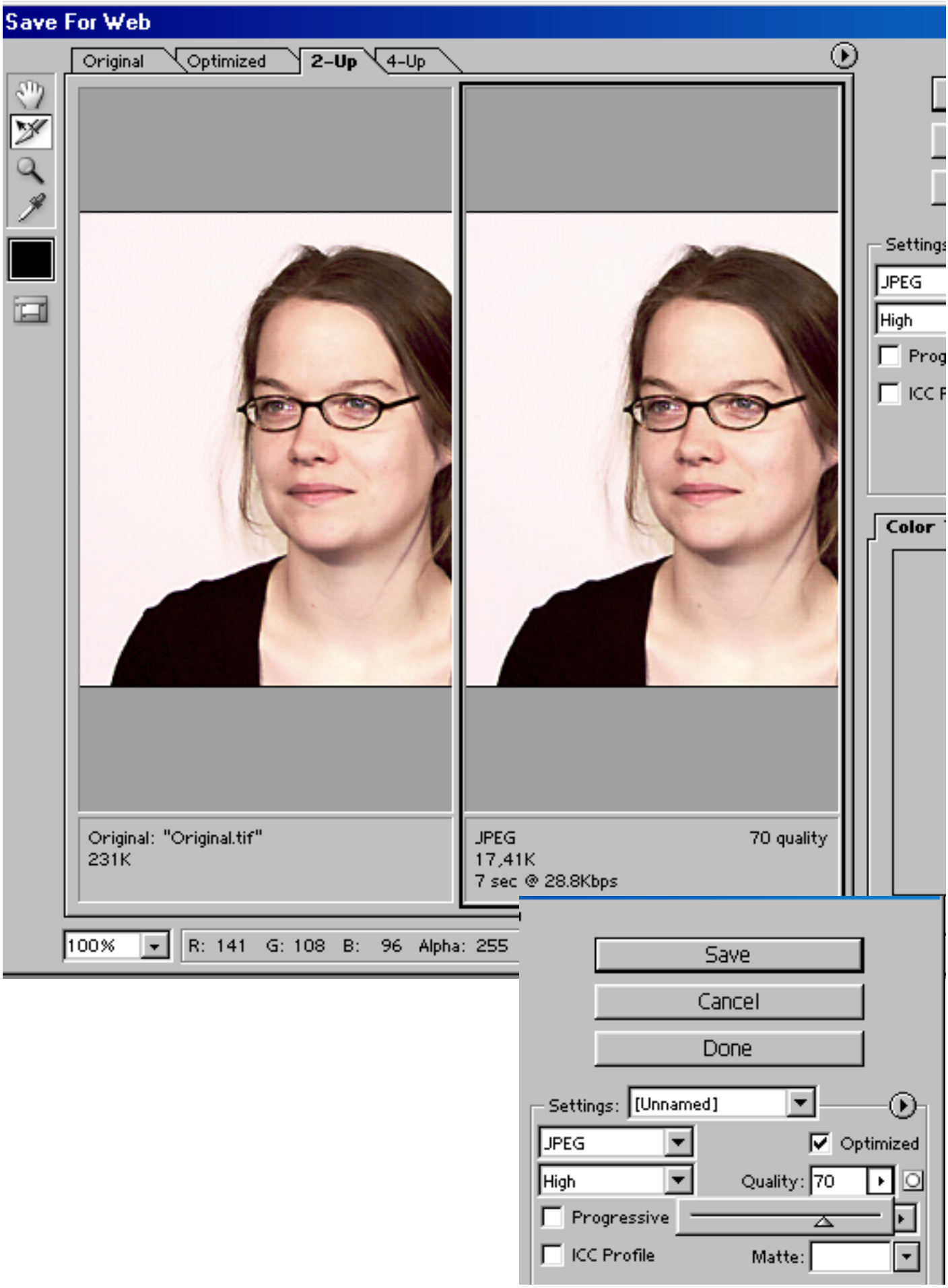
7.9 Image Processing / Cropping



7.10 Image Processing / Downsampling



7.11 Image Processing / JPEG Compression



8. Hierarchy of Pages

8.1 Introduction

This topic is closely related to Hyperlinks. A Hyperlink points to another URL.
We can distinguish „Intralinks“ and „Extralinks“. An Intralink points to one of the owner´s pages, usually in the same directory. An Extralink points to anything else.
Be very careful with the usage of Extralinks, because the address may be lost, the actual content modified and the copyright may be violated. Extralinks cannot be tested off-line.

Page size
Avoid pages of arbitrary length. The page should be as large as the available area or eventually of double length. Then top and bottom are reached by PageUp and Page-Down, overlapping in the middle page.
The available area for 1024 x 768 is about 750 x 560 .

Random access
You can place Hyperlinks everywhere on all pages. This results in a spaghetti structure and should be avoided.

Booklike access
The first page shows the complete content including all subchapters. This is not very attractive, because images cannot be included and very soon we have lack of space. Once we are in one subchapter the next page must be accessible by „Next Item“ . Back to the content by „Content“ or „Title Page“.
This is a programmed „Next Item“ which is different to the browser´s „next“ and „previous“ which means the sequence of calling in time.

Hierarchical access
Refer to next page.

Hoffmann´s access
Uses the same list of items on all pages.
One item includes a linear sequence of following pages. This is a result of non-perfect planning but hopefully understandable.
All PDF Intralinks are on the page „Documents“, with some exceptions.
PDF files are complete pages with text and images, packed in Postscript format.

8.2 Hierarchical Access

Let´s talk about agricultural products: apple, banana, barley, bean, cabbage, carrot, lady finger, mango, mungo, papaya, plum, potato, rye, rice, salad, sorghum, wheat. This is an unordered list.
It is not recommanded to use random access.

Each row in this list is exactly one page: each page shows the content for the next lower hierarchical level.

Agricultural products	about agriculture in the world
European crops	about agriculture in Europe
Cereals	about European cereals
Barley	everything about barley...
Rye	
Wheat	
Vegetables	about European vegetables
Bean	
Cabbage	
Carrot	
Potatoe	
Fruits	about European fruits
Apple	
Pear	
Plum	
Asian crops	about agriculture in Asia
Cereals	about Asian cereals
Mungo	
Rice	
Sorghum	
Vegetables	about Asian vegetables
Cabbage	
Carrot	
Lady Finger	
Fruits	about Asian fruits
Banana	
Mango	
Papaya	

We encounter one problem: e.g. carrots are growing in Europe and Asia as well.
No problem - we edit the page once and point by the same Hyperlink to carrots.

We can draw this structure by a logical tree.

8.3 Sequential Call of Pages

Now it is very easy to find a selected page by following the hierarchy.
Perhaps we want to install the functions „Next item“ and „Previous item“ .

Linear sequence:	**Previous item**	**Next item**
Agricultural products=Title Page		European crops
European crops	Agricultural products	Cereals
Cereals	European crops	Barley
Barley	Cereals	Rye
Rye	Barley	Wheat
Wheat	Rye	Vegetables
Vegetables	Wheat	Bean
Bean	Vegetables	Cabbage
Cabbage	Bean	Carrot
Carrot	Cabbage	Potatoe
Potatoe	Carrot	Fruits
Fruits	Potatoe	Apple
Apple	Fruits	Pear
Pear	Apple	Plum
Plum	Pear	Asian crops

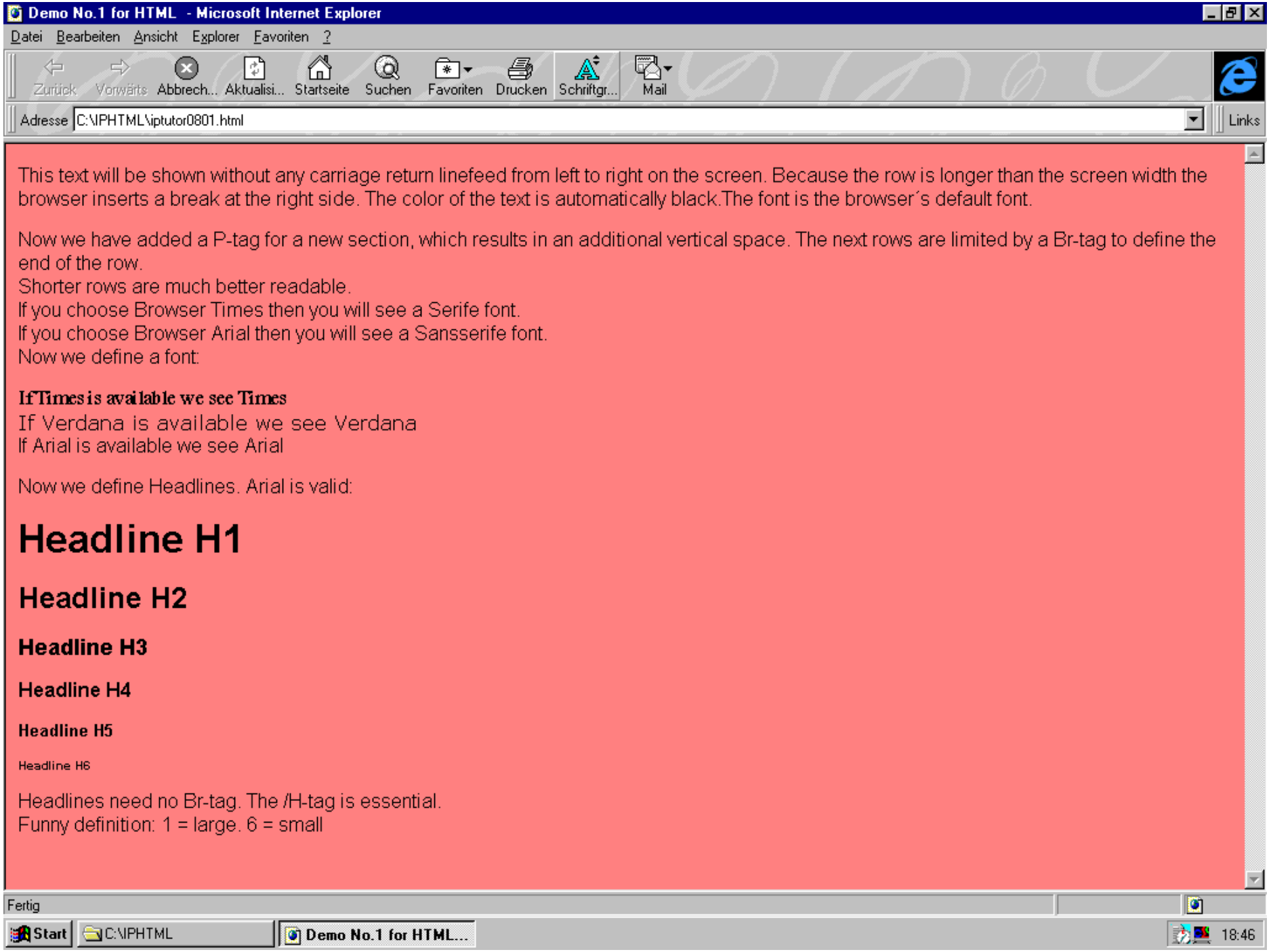
Hierarchical sequence:	**Previous item**	**Next item**
Agricultural products=Title Page		
European crops ...		
Asian crops	European crops	None
Cereals	None	Vegetables
Mungo	None	Rice
Rice	Mungo	Sorghum
Sorghum		
Vegetables	Cereals	Fruits
Cabbage	None	Carrot
Carrot	Cabbage	Lady finger
Lady Finger	Carrot	None
Fruits	Vegetables	None
Banana	None	Mango
Mango	Banana	Papaya
Papaya	Mango	None

The linear sequence reminds to reading a book. The hierarchical sequence has a more transparent structure. In either case we need „Title Page“.

9. HTML

9.1 HTML / Basic Features / Text

```
<HTML>
<HEAD>
<TITLE>Demo No.1 for HTML
</TITLE>
<META name=keywords content="Internet, HTML, Gernot Hoffmann">
</HEAD>
<BODY BgColor="#FF8080">
<!--  Title should be significant - not „My homepage"
      META  includes a set of keywords which may be useful for Searchmachines
      This is a light red or pink background, consisting of R=FFhex and G=B=80hex-->

This text will be shown without any carriage return linefeed from left to right on the screen.
Because the row is longer than the screen width the browser inserts a break at the right
side. The color of the text is automatically black.The font is the browser´s default font.<P>
Now we have added a P-tag for a new section, which results in an additional vertical space.
The next rows are limited by a Br-tag to define the end of the row.<Br>
Shorter rows are much better readable.<Br>
If you choose Browser Times then you will see a Serife font.<Br>
If you choose Browser Arial then you will see a Sansserife font.<Br>
<!--The last row does not need a break -->
<!--The tags P and Br do not need an end tag -->
Now we define a font:<P>

<Font Face="Times, Times New Roman">
If Times is available we see Times<Br>
<Font Face="Verdana, Arial">
If Verdana is available we see Verdana<Br>
<Font Face="Arial, Helvetica">
If Arial is available we see Arial<P>
Now we define Headlines. Arial is valid:
<H1>Headline H1 </H1>
<H2>Headline H2 </H2>
<H3>Headline H3 </H3>
<H4>Headline H4 </H4>
<H5>Headline H5 </H5>
<H6>Headline H6 </H6>
Headlines need no Br-tag. The /H-tag is essential.<Br>
Funny definition: 1 = large. 6 = small

</BODY>
</HTML>
```


Demo No.1 for HTML - Microsoft Internet Explorer
Datei Bearbeiten Ansicht Explorer Favoriten ?
Zurück Vorwärts Abbrech... Aktualisi... Startseite Suchen Favoriten Drucken Schriftgr... Mail
Adresse C:\IPHTML\iptutor0801.html
Links
This text will be shown without any carriage return linefeed from left to right on the screen. Because the row is longer than the screen width the browser inserts a break at the right side. The color of the text is automatically black.The font is the browser´s default font.
Now we have added a P-tag for a new section, which results in an additional vertical space. The next rows are limited by a Br-tag to define the end of the row.
Shorter rows are much better readable.
If you choose Browser Times then you will see a Serife font.
If you choose Browser Arial then you will see a Sansserife font.
Now we define a font:
If Times is available we see Times
If Verdana is available we see Verdana
If Arial is available we see Arial
Now we define Headlines. Arial is valid:
Headline H1
Headline H2
Headline H3
Headline H4
Headline H5
Headline H6
Headlines need no Br-tag. The /H-tag is essential.
Funny definition: 1 = large. 6 = small
Fertig
Start C:\IPHTML Demo No.1 for HTML... 18:46

9.2 HTML / Tables / Text / 1

Please use these URLs as actual templates:

http://www.fho-emden.de/~hoffmann
http://www.fho-emden.de/~mabi

The examples in this brochure are not necessarily optimized

```
<HTML>
<HEAD>
<TITLE>Demo No.2 for HTML</TITLE>
</HEAD>

<BODY BgColor="#FF8080" >

<TABLE COLS=3 BORDER=1
        Bordercolor     ="#808080"
        BorderColorLight="#606060"
        BorderColorDark ="#A0A0A0"
        CELLSPACING=0 CELLPADDING=7
        Width=980 Height=550 >
<TR VALIGN="TOP" ALIGN="LEFT">
<TD VALIGN="TOP" COLSPAN=1 width=400 Height=20 Align=Left>
<!--(Minimum) height is the same for all columns in one row-->
<FONT COLOR="#0000FF">
<Font Face="Arial,Helvetica">
<H4>Row 1, Column 1</H4>
Text
</TD>
<TD VALIGN="TOP" COLSPAN=1 width=400 Height=20 Align=Left>
<FONT COLOR="#00FF00">
<Font Face="Arial,Helvetica">
<H4>Row 1, Column 2</H4>
Text
</TD>
<TD VALIGN="TOP" COLSPAN=1 width=180 Height=20 Align=Left>
<FONT COLOR="#FF0000">
<Font Face="Arial,Helvetica">
<H4>Row 1, Column 2</H4>
Text
</TD>
</TR>
```

Continue next page

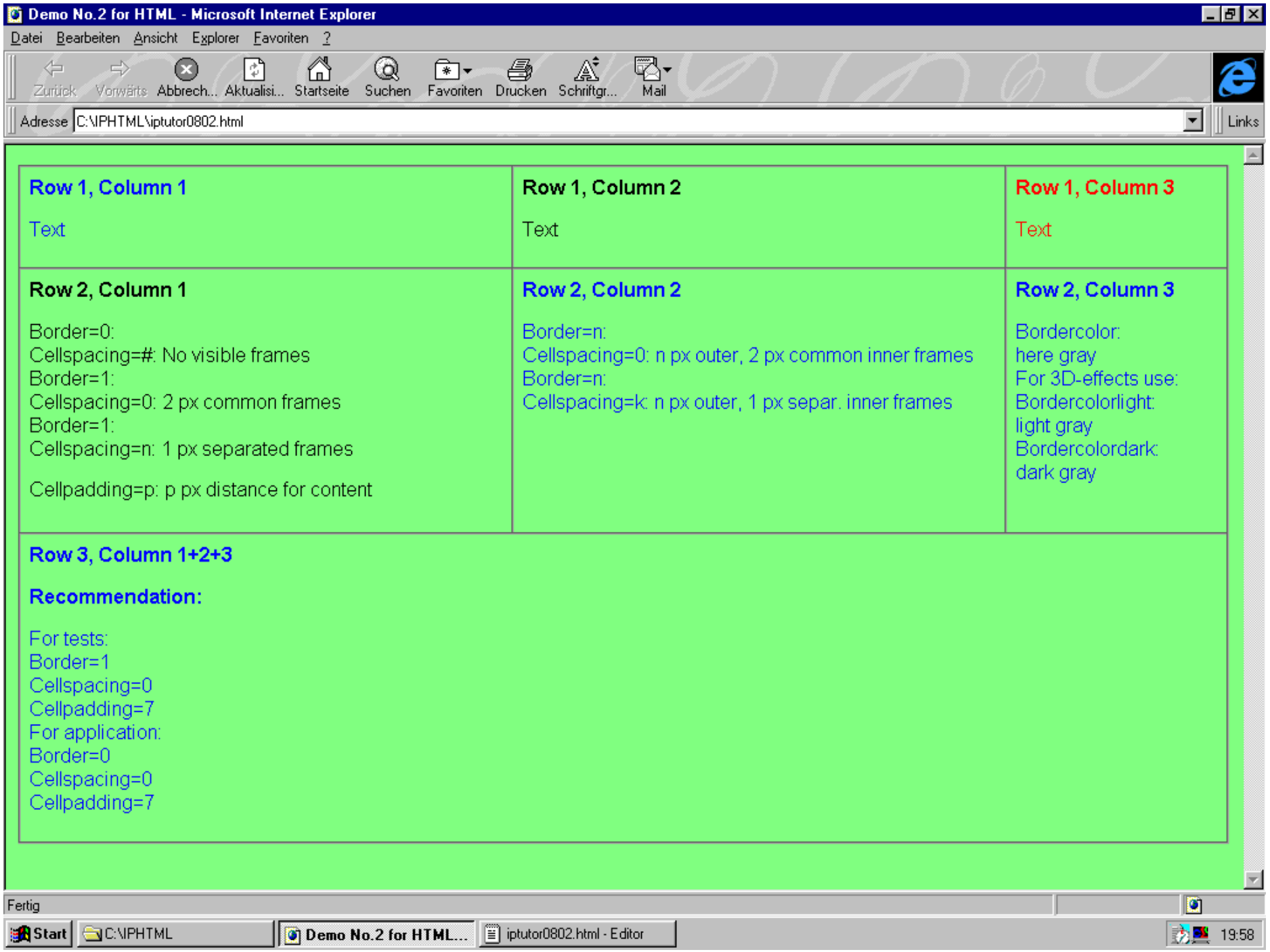
9.2 HTML / Tables / Text / 2

```
<TR VALIGN=“TOP“ ALIGN=“LEFT“>
<TD VALIGN=“TOP“ COLSPAN=1 width=400 Height=200 Align=Left>
<FONT COLOR=“black“>
<Font Face=“Arial,Helvetica“>
<H4>Row 2, Column 1</H4>
Border=0:<Br>
Cellspacing=#: No visible frames<Br>
Border=1:<Br>
Cellspacing=0: 2 px common frames<Br>
Border=1:<Br>
Cellspacing=n: 1 px separated frames<P>
Cellpadding=p: p px distance for content<Br>
</TD>
<TD VALIGN=“TOP“ COLSPAN=1 width=400 Height=200 Align=Left>
<FONT COLOR=“#0000FF“>
<Font Face=“Arial,Helvetica“>
<H4>Row 2, Column 2</H4>
Border=n:<Br>
Cellspacing=0: n px outer, 2 px common inner frames<Br>
Border=n:<Br>
Cellspacing=k: n px outer, 1 px separ. inner frames<Br>

</TD>
<TD VALIGN=“TOP“ COLSPAN=1 width=180 Height=200 Align=Left>
<FONT COLOR=“#0000FF“>
<Font Face=“Arial,Helvetica“>
<H4>Row 2, Column 3</H4>
Bordercolor:<Br>
here gray<Br>
For 3D-effects use:<Br>
Bordercolorlight:<Br>
light gray<Br>
Bordercolordark:<Br>
dark gray
</TD>
</TR>
```

Continue next page

9.2 HTML / Tables / Text / 3

```
<TR VALIGN=“TOP“ ALIGN=“LEFT“>
<TD VALIGN=“TOP“ COLSPAN=3 width=980 Height=230 Align=Left>
<FONT COLOR=“#0000FF“>
<Font Face=“Arial,Helvetica“>
<H4>Row 3, Column 1+2+3</H4>
<H4>Recommendation:</H4>
For tests:<Br>
Border=1<Br>
Cellspacing=0<Br>
Cellpadding=7<Br>
For application:<Br>
Border=0<Br>
Cellspacing=0<Br>
Cellpadding=7
</TD>
</TR>

</TABLE>
</BODY>
</HTML>
```


Demo No.2 for HTML - Microsoft Internet Explorer
Datei Bearbeiten Ansicht Explorer Favoriten ?
Zurück Vorwärts Abbrech... Aktualisi... Startseite Suchen Favoriten Drucken Schriftgr... Mail
Adresse C:\IPHTML\iptutor0802.html
Links
Row 1, Column 1
Text
Row 1, Column 2
Text
Row 1, Column 3
Text
Row 2, Column 1
Border=0:
Cellspacing=#: No visible frames
Border=1:
Cellspacing=0: 2 px common frames
Border=1:
Cellspacing=n: 1 px separated frames
Cellpadding=p: p px distance for content
Row 2, Column 2
Border=n:
Cellspacing=0: n px outer, 2 px common inner frames
Border=n:
Cellspacing=k: n px outer, 1 px separ. inner frames
Row 2, Column 3
Bordercolor:
here gray
For 3D-effects use:
Bordercolorlight:
light gray
Bordercolordark:
dark gray
Row 3, Column 1+2+3
Recommendation:
For tests:
Border=1
Cellspacing=0
Cellpadding=7
For application:
Border=0
Cellspacing=0
Cellpadding=7
Fertig
Start
C:\IPHTML
Demo No.2 for HTML...
iptutor0802.html - Editor
19:58

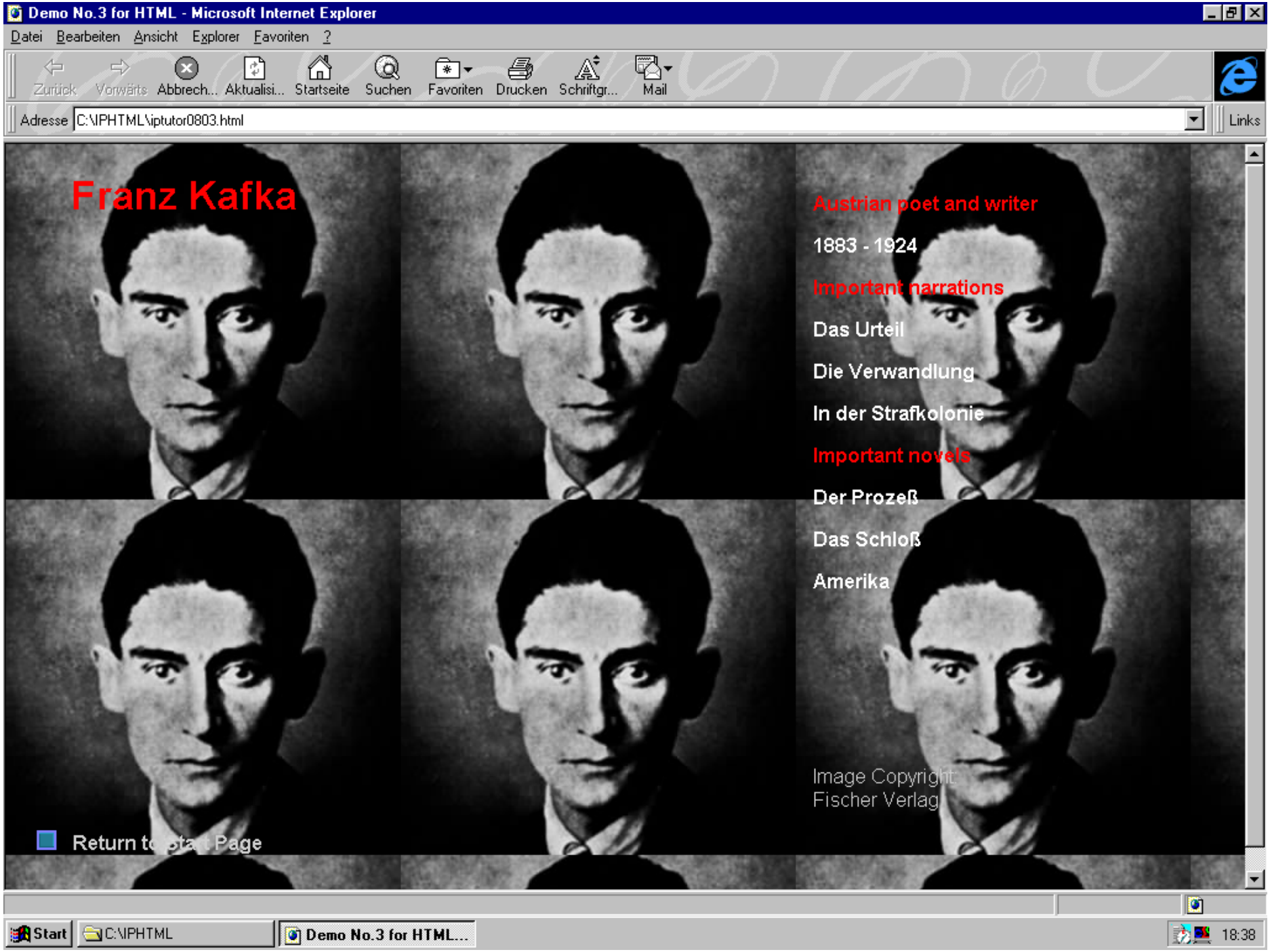
9.3 HTML / Images / Text / 1

```
<HTML>
<HEAD>
<TITLE>Demo No.3 for HTML</TITLE>
</HEAD>

<BODY Background="image202.jpg">

<TABLE COLS=2 BORDER=0 BorderColor="#FFFFFF"
        CELLSPACING=0 CELLPADDING=7
        width=980 height=550>
<!--The background is larger than the visible window
   The table covers only 95% in height--

<TR VALIGN="TOP" ALIGN="LEFT">
<TD VALIGN="TOP" COLSPAN=1 width=65% Height=85% Align=Left>
<FONT COLOR="#FF0000">
<Font Face="Arial,Helvetica">
<H1><IMG SRC="dotunvi.gif" width=15 hspace=8 >Franz Kafka</H1>
</TD><!—Unvisible image for spacing—>
<TD VALIGN="TOP" COLSPAN=1 width=35% Height=85% Align=Left>
<Font Face="Arial,Helvetica">
<FONT COLOR="#FF0000">
<IMG SRC="dotunvi.gif" height=2 > <!--adjust Start of text -->
<H4>Austrian poet and writer</H4>
<FONT COLOR="white">
<H4>1883 - 1924</H4>
<FONT COLOR="#FF0000">
<H4>Important narrations</H4>
<FONT COLOR="white">
<H4>Das Urteil</H4>
<H4>Die Verwandlung</H4>
<H4>In der Strafkolonie</H4>
<FONT COLOR="#FF0000">
<H4>Important novels</H4>
<FONT COLOR="white">
<H4>Der Prozeß</H4>
<H4>Das Schloß</H4>
<H4>Amerika</H4>
</TD>
</TR>
```

Continue next page

9.3 HTML / Images / Text / 2

```
<TR VALIGN=“TOP“ ALIGN=“LEFT“>
<TD VALIGN=“TOP“ COLSPAN=2 height=10%>
<FONT COLOR=“#CFCFCF“>
<Font Face=“Arial,Helvetica“>
<H4>
<NoBr>
<P><U>
<A href=“iptutor0801.html“><IMG SRC=“dotbut0.gif“ hspace=8 ></A>
</U>Return to Start Page
</NoBr>
</TD>
</TR>

</TABLE>
</BODY>
</HTML>
```


Demo No.3 for HTML - Microsoft Internet Explorer
Datei Bearbeiten Ansicht Explorer Favoriten ?
Zurück Vorwärts Abbrech... Aktualisi... Startseite Suchen Favoriten Drucken Schriftgr... Mail
Adresse C:\IPHTML\iptutor0803.html
Links
Franz Kafka
Austrian poet and writer
1883 - 1924
Important narrations
Das Urteil
Die Verwandlung
In der Strafkolonie
Important novels
Der Prozeß
Das Schloß
Amerika
Image Copyright:
Fischer Verlag
Return to Start Page
Start
C:\IPHTML
Demo No.3 for HTML...
18:38

9.4 HTML / Anchors

Anchor for Hyperlinks

a-tag is an anchor which points to any file or URL.

 <IMG SRC=but0.gif border=0 hspace=8>
Return to start page

```
<U>
<a href="howww31a.html" ><IMG SRC="dotunvi.gif" width=16 height=1 border=0
hspace=8 >This Link</a>
</U>
```

<U>	Underline text which is used as anchor. The text „This Link" is underlined even if the browser is set to „no underline" Border=0 disables underlining (fraMING) for graphics, e.g. but0.gif and dotunvi.gif
href	Name of file which is called by pressing the button, followed by „URL"
img	Image
src	Source
hspace	Horizontal distance of following text
</U>	Finish underline, should not be applied in the next row. Otherwise we get tiny graphics errors because of double underline.

The underline color is controlled in the body-tag:

link	Color of underline of a link which has not been used
vlink	Color of underline of a link which has been visited in the session
alink	Color of underline of a link which is activated by mouse button down

Anchor for Email

 hoffmann@fho-emden.de
Type @ ALT+Q
mailto: Keyword for Email URL

In principle this would work too:

 Hoffmann´s Email

9.5 HTML / Special Characters

Italic

<i> Makes text content italic.

<address> Makes text content italic (most browsers) and enables perhaps search machines access to addresses.
Italic addresses do not look good.

<cite> Similar as italic, access to bibliography.

Space

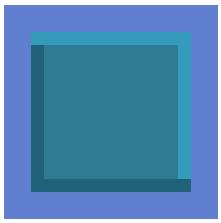
  Next space is *not* ignored.
Otherwise more than one space will be ignored.

Mutated vowel

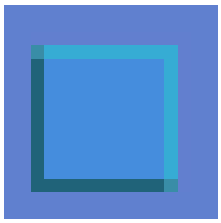
Führer Führer (u-Umlaut, we are talking about the Studienführer)
F&#252hrer Führer

ä	&#228	Ä	&#196
ö	&#246	Ö	&#214
ü	&#252	Ü	&#220

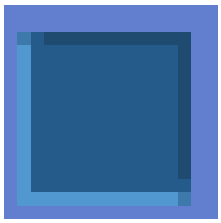
9.6 HTML / Buttons



but0.gif
16 x 16



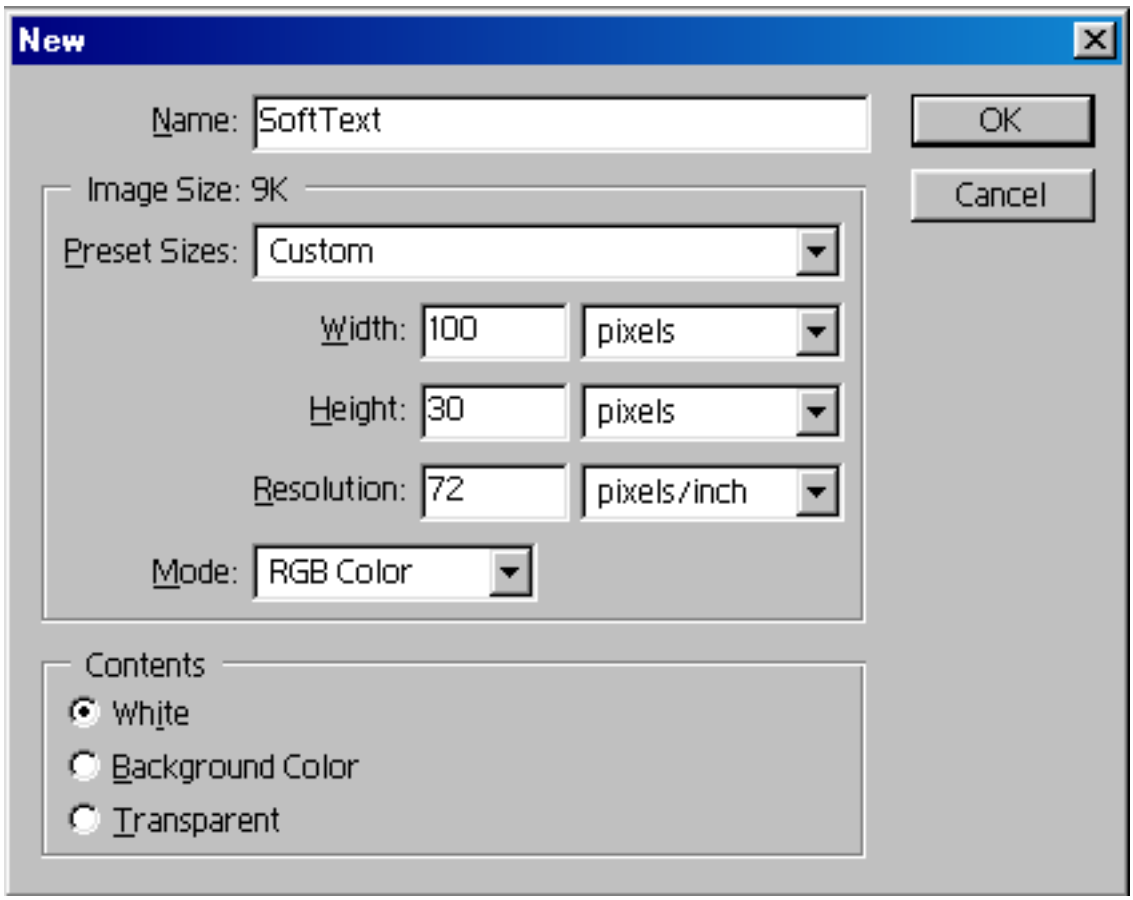
but1.gif
16 x 16



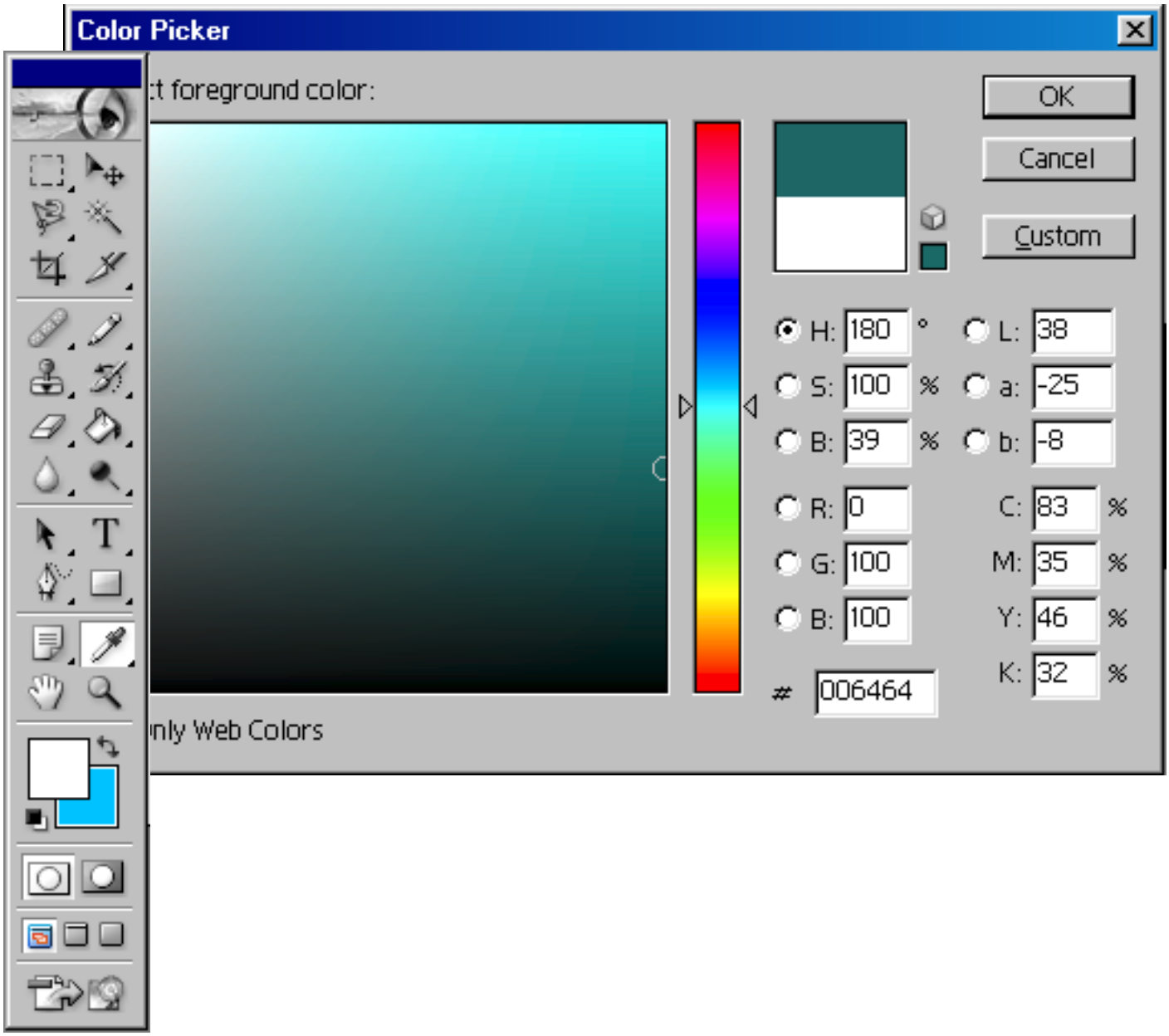
but2.gif
16 x 16

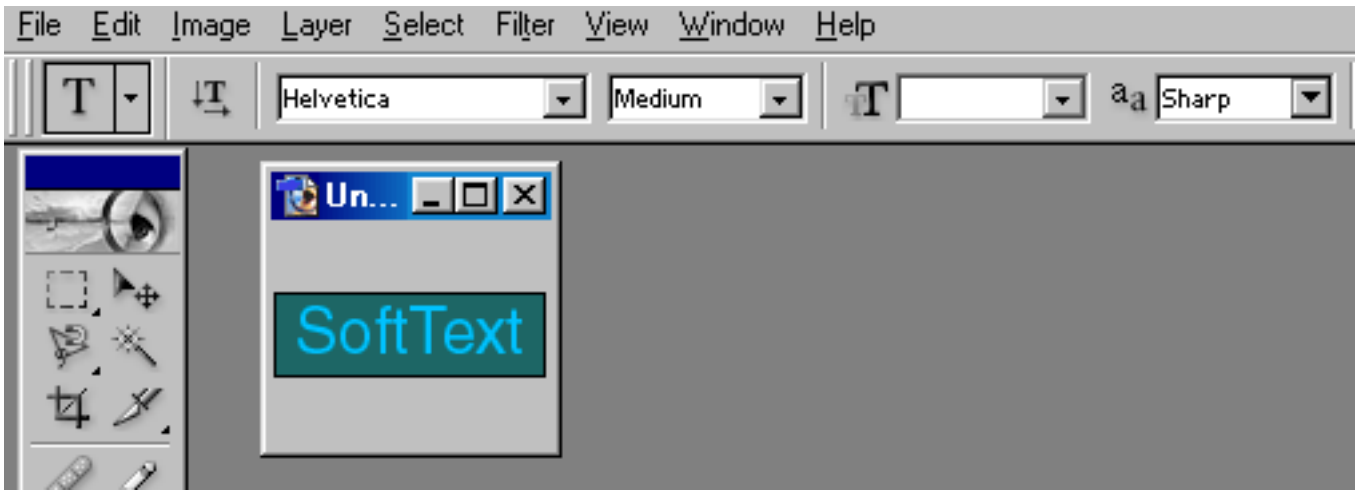
The right button is not clickable. The left and the middle buttons are used clickable (anchor). To prevent the browser from surrounding a clickable buttons by a frame (underline feature) use the border=0 statement (previous page).

9.7 HTML / Anti-Aliased Text / Size

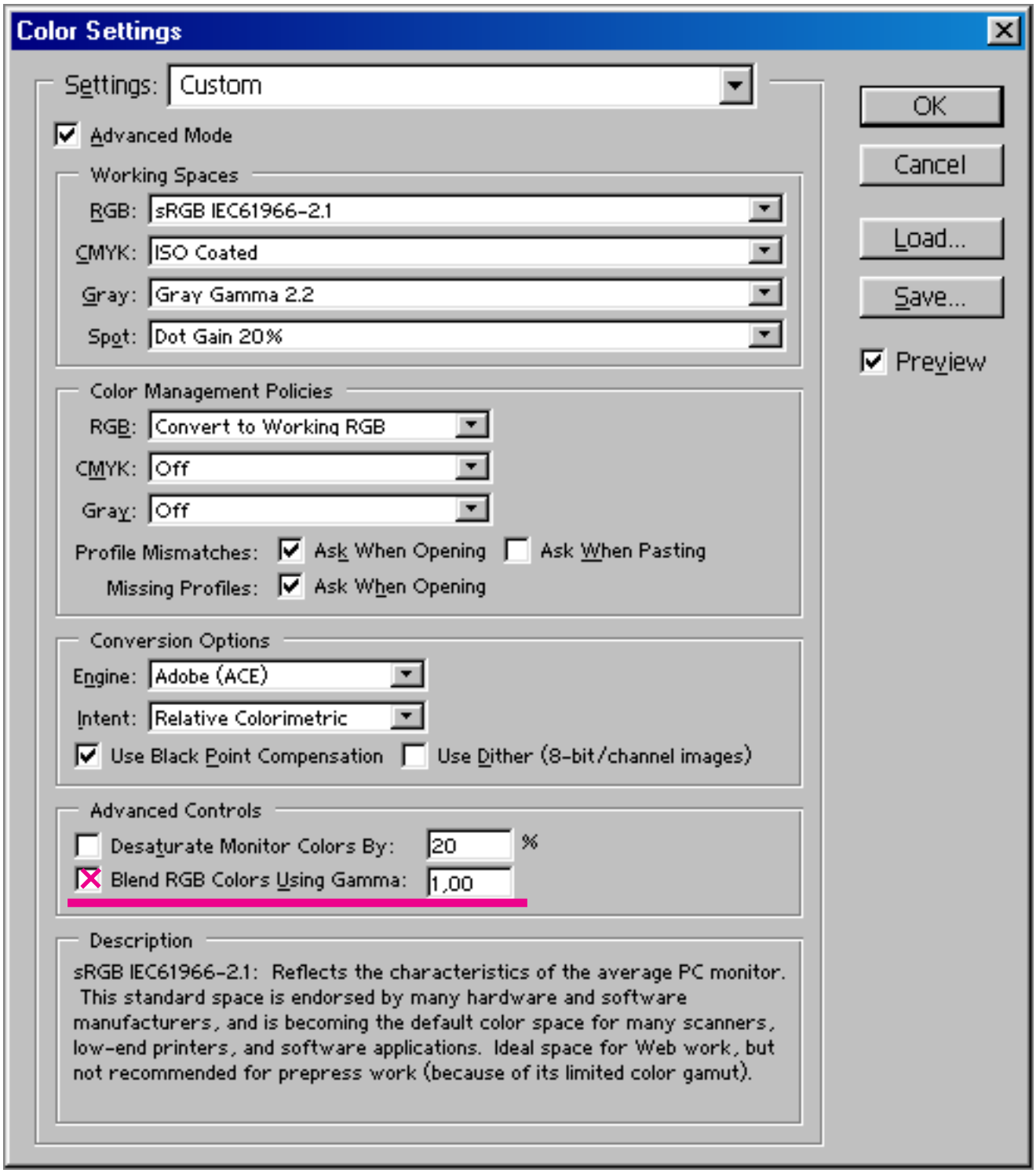


9.7 HTML / Anti-Aliased Text / Colors

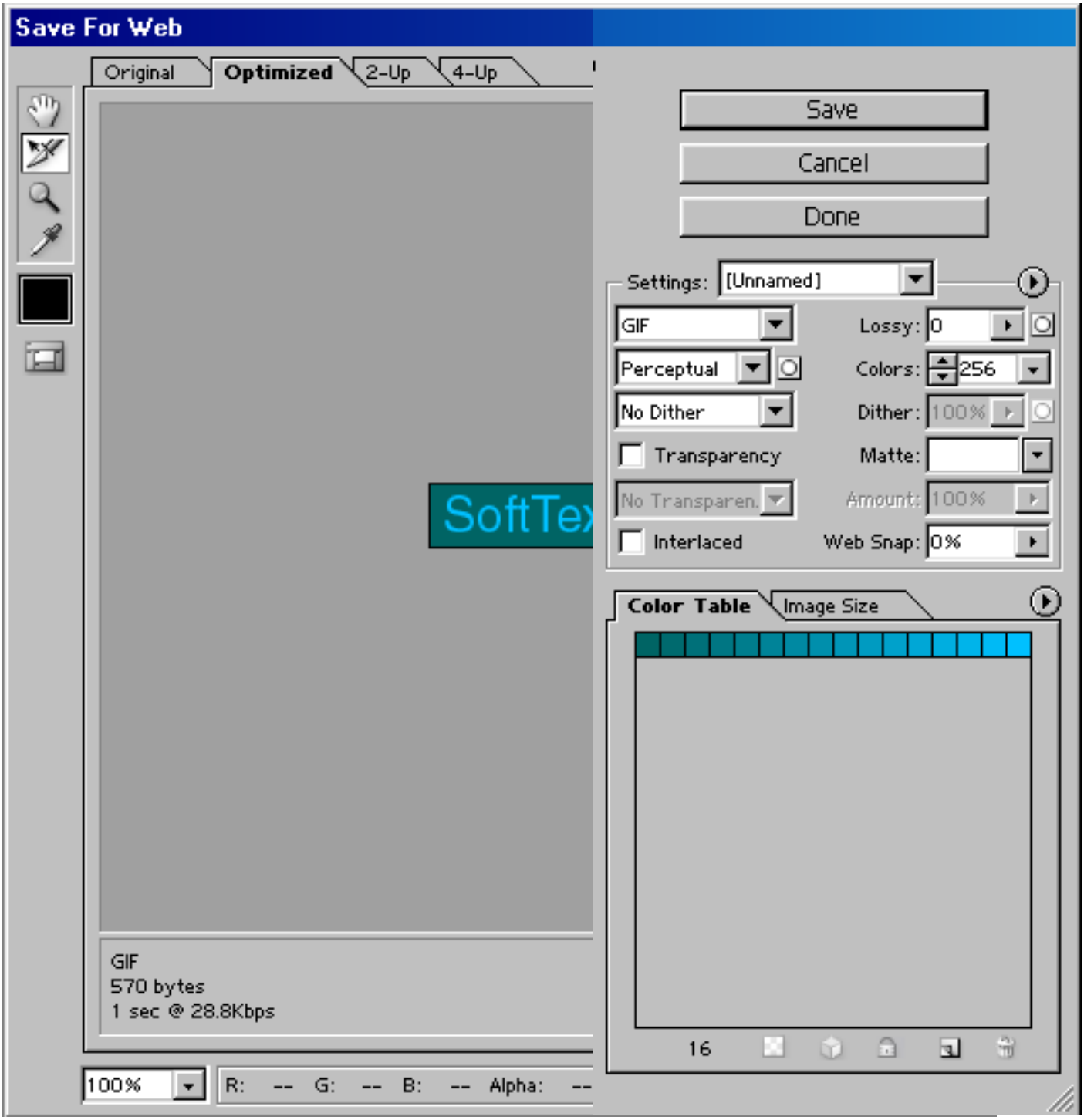




9.7 HTML / Anti-Aliased Text / Interpolation



9.7 HTML / Anti-Aliased Text / Save For Web



9.8 HTML / Example / Text / 1

```
<HTML>
<HEAD>
<TITLE>G.Hoffmann: Machine Design, Computer Vision, Title Page</TITLE>
</HEAD>

<BODY Background="lineblue.gif" link="#6080CF" vlink="#6080CF" alink="#4040FF">

<TABLE COLS=3 BORDER=0 BorderColor="#606090"
        CELLSPACING=0 CELLPADDING=7
        Width=750 Height=550 >
<TR VALIGN="TOP" ALIGN="LEFT">
<TD VALIGN="TOP" COLSPAN=1 width=250 Height=30 Align=Left>
<FONT COLOR="#6080CF">
<Font Face="Arial,Helvetica">
<H4><IMG SRC="dotunvi.gif" width=15 hspace=8 >Title Page
</TD>

<TD VALIGN="TOP" COLSPAN=1 width=250 Height=30 Align=Left>
<FONT COLOR="#6080CF">
<Font Face="Arial,Helvetica">
<H4>Personal background
</TD>

<TD VALIGN="TOP" COLSPAN=1 width=250 Height=30 Align=Left>
<FONT COLOR="#6080CF">
<Font Face="Arial,Helvetica">
<H4>Communication
</TD>
</TR>

<TR VALIGN="TOP" ALIGN="LEFT">
<TD VALIGN=´TOP" COLSPAN=1 width=250 height=470>
<FONT COLOR="#00B0B0">
<Font Face="Arial,Helvetica">
<H4>
<NoBr>
<IMG SRC="dottran.gif" hspace=8 >Please select item<Br>
<Font Color="#6080CF">
<P><U>
<A href="index.html"        ><IMG SRC="dotbut0.gif"  hspace=8 ></A></U>Return to Start Page
<P><U>
<A href="howww02a.html" ><IMG SRC="dotbut0.gif" hspace=8 ></A></U>Dancing Marionette
<P><U>
```

Continue next page

9.8 HTML / Example / Text / 2

```
<P><U>
<A href="howww04a.html" ><IMG SRC="dotbut0.gif" hspace=8 ></A></U>Image Processing
<P><U>
<A href="howww05a.html" ><IMG SRC="dotbut0.gif" hspace=8 ></A></U>Computer Graphics
<P><U>
<A href="howww06a.html" ><IMG SRC="dotbut0.gif" hspace=8 ></A></U>Geometry Scanner
<P><U>
<A href="howww07a.html" ><IMG SRC="dotbut0.gif" hspace=8 ></A></U>Photo Equipment
<P><U>
<A href="howww08a.html" ><IMG SRC="dotbut0.gif" hspace=8 ></A></U>Machines and Tools
<P><U>
<A href="howww09a.html" ><IMG SRC="dotbut0.gif" hspace=8 ></A></U>Electronics
<P><U>
<A href="howww21a.html" ><IMG SRC="dotbut0.gif" hspace=8 ></A></U>Info + Help + Print
<P><U>
<A href="howww31a.html" ><IMG SRC="dotbut0.gif" hspace=8 ></A></U>Exit + Links
</NoBr>
</TD>

<TD VALIGN="TOP" COLSPAN=1 width=250 height=470 >
<IMG SRC="image284.jpg" width=230 vspace=2>
<IMG SRC="dotnone.gif"  width=1 height=188>
<!-- dotnone=1x1 transparent-- makes right side space consumer -->
<FONT COLOR="#00B0B0">
<Font Face="Arial,Helvetica">
<H4>
<NoBr>
Gernot Hoffmann:   born 1944<Br>
Study of Aircraft Engineering<Br>
PhD Aircraft Control Systems<Br>
Then... Independent Engineer<Br>
1986 to Fachhochschule OOW<Br>
University of Applied Sciences<Br>
<IMG SRC="dotcyandark.gif" width=10 hspace=1 >  Mathematics<Br>
<IMG SRC="dotcyandark.gif" width=10 hspace=1 >  Control Systems<Br>
<IMG SRC="dotcyandark.gif" width=10 hspace=1 >  Electrical Drives<Br>
<IMG SRC="dotcyandark.gif" width=10 hspace=1 >  Product. Measurement<Br>
<IMG SRC="dotcyandark.gif" width=10 hspace=1 >  Computer Vision<Br>
<IMG SRC="dotcyandark.gif" width=10 hspace=1 >  Industrial Design
</NoBr>
</TD>
```

Continue next page

9.8 HTML / Example / Text / 3

```
<TD VALIGN="TOP" COLSPAN=1 width=250 height=470>
<Font Color="#00B0B0">
<Font Face="Arial,Helvetica">
<H4>
<NoBr>
Fachhochschule Oldenburg /<Br>
Ostfriesland / Wilhelmshaven<Br>
University of Appl. Sciences<Br>
Dept.of Mechan. Engineering<Br>
<Font Color=darkgray>
Previous name until 1999:<Br>
Fachhochschule Ostfriesland
<Font Color="#00B0B0">
<P>
Prof.Dr.G.Hoffmann<Br>
Fachbereich Maschinenbau<Br>
Fachhochschule OOW<Br>
Constantiaplatz 4<Br>
D-26723 Emden, Germany<Br>
<FONT COLOR=darkgray>
Tel   +49 •4921 807 1341<Br>
<a href="mailto:hoffmann@fho-emden.de"> hoffmann@fho-emden.de</a>
<FONT COLOR="#00B0B0">
<P>
Prof.Dr.G.Hoffmann<Br>
Bentinksweg 29<Br>
D-26721 Emden, Germany<Br>
<FONT COLOR=darkgray>
Tel   +49 •4921 28584<Br>
Fax  +49 •4921 996954<Br>
<!--
<a href="mailto:hoffmann@emsnet.de"> hoffmann@emsnet.de</a>
-->
<Font Color="#00B0B0">
<P>
International code··49··4921<Br>
National code·····04921
</NoBr>
</TD>
</TR>
```

Continue next page

9.8 HTML / Example / Text / 4

```
<TR VALIGN="TOP" ALIGN="LEFT">
<TD VALIGN=´TOP" COLSPAN=3 width=750 Height=50 >
<Font Color="#6080CF">
<Font Face="Arial,Helvetica">
<H4>
<P><U>
<A href="howww01b.html" <P><IMG SRC="dotbut0.gif" hspace=8 ></A></U>Exhibition (53kByte)
<Font Color="#A05050">
    <<<   Images on demand always here
</TD>
</TR>


</TABLE>
</BODY>
</HTML>
```

G.Hoffmann: Machine Design, Computer Vision, ... - Microsoft Internet Explorer

Datei Bearbeiten Ansicht Explorer Favoriten ?

Zurück Vorwärts Abbrech... Aktualisi... Startseite Suchen Favoriten Drucken Schriftgr... Mail

Adresse C:\HTML\howww01a.html Links

Title Page

- Please select item
- Return to Start Page
- Dancing Marionette
- Learning Marionette
- Image Processing
- Computer Graphics
- Geometry Scanner
- Photo Equipment
- Machines and Tools
- Electronics
- Info + Help + Print
- Exit + Links

Personal background

Gernot Hoffmann: born 1944
Study of Aircraft Engineering
PhD Aircraft Control Systems
Then... Independent Engineer
1986 to Fachhochschule OOW
University of Applied Sciences

- Mathematics
- Control Systems
- Electrical Drives
- Production Measurement
- Computer Vision
- Industrial Design

Communication

Fachhochschule Oldenburg / Ostfriesland / Wilhelmshaven
University of Appl. Sciences
Dept.of Mechan. Engineering
Previous name until 1999:
Fachhochschule Ostfriesland

Prof.Dr.G.Hoffmann
Fachbereich Maschinenbau
Fachhochschule OOW
Constantiaplatz 4
D-26723 Emden, Germany
Tel +49 □4921 807 1341
hoffmann@fho-emden.de

Prof.Dr.G.Hoffmann
Bentinksweg 29
D-26721 Emden, Germany
Tel +49 □4921 28584
Fax +49 □4921 996954

International code··49··4921
National code·····04921

Exhibition (53kByte) <<< Images on demand always here

Fertig

Start C:\HTML G.Hoffmann: Machine... 07:29

9.9 HTML / Hot Spots

We can define hot spots in an image: A hot spot is an area, the whole or a part of the image, where events are commanded by mouse actions.
We use mainly the standard: a click on this area points to an URL.

```
<IMG SRC="pict01.gif" hspace=8 width=336 height=416
  usemap="#map1"  border=0 >

<Map name="map1" >
<Area shape=rect coords="0, 0,336,208" href="other01.htm" >
<Area shape=circ coords="168,312,50"   href="other02.htm" >
</Map >
```

The parameters hspace, width and height are optional.
Border=0 disables the anchor-frame for the image.
In #map1 the character # is essential.

The first Area-Tag defines x1,y1,x2,y2 for a rectangle in the upper half of the image.
Click in this area points to „other01.htm".
The second Area-Tag defines xc,yc,radius for a circle in the lower half of the image.
Click in this area points to „other02.htm".

Warning: Circ does not work on all browsers, thus use Rect .

Moving the mouse over the defined areas shows the hand and the URL-name
in the bottom line of the browser.

10. PostScript

10.1 PostScript / PostScript

Postscript is a page description language. A Postscript document is written in readable (but not necessarily understandable) ASCII-code. It contains mainly:

- Header
- Procedures
- Fonts
- Texts
- Images
- Vector Graphics
- Images are Bitmaps e.g. BMP, TIF, GIF, JPG.

Vector Graphics include fillpatterns for closed objects and colors.
Such a file uses never a rastered plane, the accuracy depends on the resolution of the destination printing device. Of course the original quality of Bitmaps cannot be improved by a high quality printer.

EPS

Encapsulated Postscript is a device independent format which includes no information about a printing device.
Many programs can import *.EPS .
Images may be coded binary.Then, a True Color image 1280 x 1024 with 3.75MB needs in the Postscript file the same size. But binary code may confuse some programs. Thus ASCII is recommended, refer to next section.
It is recommendable to include all fonts (TrueType, Postscript) in the file, because then the appearance is the same as during editing. Sometimes fonts have the same name but a slightly different appearance.
E.g. TrueType (Windows) News Gothic is different to ATM (Postscript) News Gothic. ATM means Adobe Type Manager.

PS

A Standard Postscript file is made for a distinct printer or exposer.
The Postscript file can be sent directly to this device.
Many programs can import *.PS also, then the printer directives are ignored.
The raster process with device accuracy is always done in the device.
Thus a Postscript laser printer for DIN A3, CMYK, with a resolution of 1200 dpi needs about 200 MB of memory for assembling the rastered page before printing.
A True Color image 1280 x 1024 with 3.75MB needs in the Postscript file 7.50MB, because each byte is coded by two ASCII bytes.
An imported *EPS file is included nearly unmodified in the *.PS file.

10.2 PostScript / EPS

Instead of HTML a page description language should have been used. PostScript is well-known since 1985. This is an Encapsulated Post-Script example (EPS).


```
%!PS-Adobe-3.0  EPSF-3.0
%%BoundingBox:  0 0 596 842
%%Creator:      Gernot Hoffmann
%%Title:        PS-Page
%%CreationDate: February 26,2003
/mm {2.834646 mul} def
/x0  20 mm def
/y0 270 mm def
/Helvetica-Bold findfont 9 mm scalefont setfont
 1 0 0 setrgbcolor
 x0 y0 moveto (Headline is red and bold) show
/Helvetica findfont 6 mm scalefont setfont
/y0 y0 10 mm sub def
 0 setgray
 x0 y0 moveto (This is the first line, Helvetica normal) show
/y0 y0  6 mm sub def
 x0 y0 moveto (Coordinates count from bottom left) show
/xa  x0    def
/ya 200 mm def
/xw 103 mm def
/yw  50 mm def
newpath
 xa ya moveto
 xw 0  rlineto
 0  yw rlineto
 xw neg 0 rlineto
 closepath
 gsave
 0.8 0.8 1 setrgbcolor
 fill
 grestore
 0.5 0.5 1 setrgbcolor
 stroke
 0 setgray
/y0 ya 7 mm sub def
 x0 y0 moveto  (This is a filled and stroked box) show
showpage
```

10.3 PostScript / PDF

PDF means Portable Document Format.
This kind of files includes the following features:

Consists of pages
Each page can contain Text, Vector Graphics and Images
Images are compressed JPG or ZIP/LZW
Readable by Adobe Acrobat
Text looks anti-aliased (no sharp edges and pixel structures)
Printable by Adobe Acrobat
Printing quality depends on the device (and the quality of images)
The compression is highly effective
Can contain Hyperlinks
Directly transportable in the Internet, on disks, on CDs

PDFconsists of Postscript files, combined in a new file format. The intermediate PS files are deleted after distilling automatically. PDF contains precise font informations and a downsampled image quality, compressed mainly by JPEG.

This document was made by the following steps:

Edit each page by PageMaker
Screenshots are made key 'Print'
Placed in an empty Photoshop doc and saved as TIFF
TIFF placed on the respective PageMaker page
Export to PDF

Adjust view in Acrobat::

Default	Shows about 75% of height of DIN A4 page
Fit page	One page per screen, still readable, optimum for first view
Fit width	larger
Any scale	Scale by number

Printing PDF files:

Use the Acrobat printer driver (not the Browser printer driver). Select „Shrink to fit".

11. References

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O´Reilly & Associates, Sebastobol (USA), 1998

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O´Reilly & Associates, Sebastobol (USA), 1996

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Postscript Language Reference Manual
Addison-Wesley, Reading Mass...,1998

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Computer Graphics
Addison Wesley, Reading, Mass...,1993

[8] Robinson, Andrew:
Die Geschichte der Schrift
Verlag Paul Haupt, Bern, Stuttgart, Wien, 1996

Old links:

http://www.fho-emden.de/~hoffmann/

http://www.fho-emden.de/~hoffmann/filename.pdf

Please use since February 2013

New links:

http://docs-hoffmann.de/

http://docs-hoffmann.de/filename.pdf