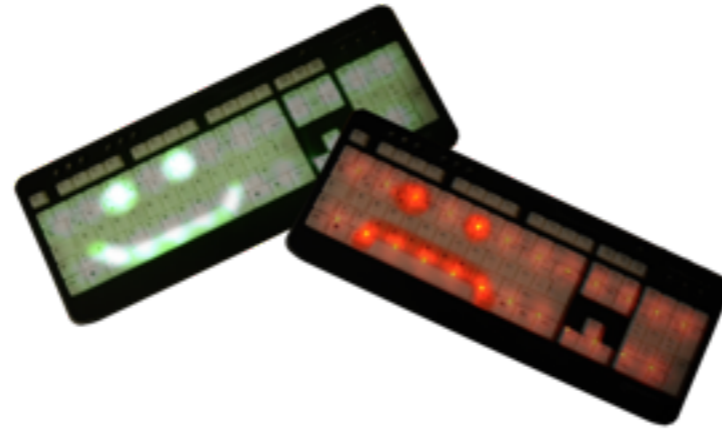


# Mensch-Maschine-Interaktion 2

## HCI and the Web

Prof. Dr. Andreas Butz, Prof. Dr. Michael Rohs

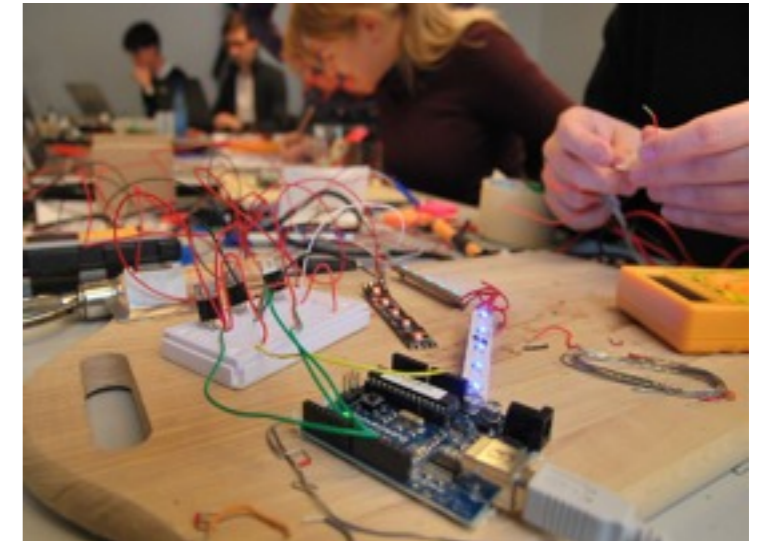
Über den Studiengang  
und das  
Forschungsgebiet  
Medieninformatik  
informieren



Studenten,  
Interessenten sowie  
deren Familie und  
Freunde sind herzlich  
eingeladen



OPEN  
LAB  
DAY



Tag der offenen Tür der  
Arbeitsgruppen Medieninformatik und  
Mensch-Maschine-Interaktion  
der LMU München



Montag, 13.12.2010  
18 – 21 Uhr

Amalienstrasse 17, 80333 München  
<http://www.medien.ifi.lmu.de>



# Announcements

- Guest lectures:
  - 22.12. Dr. Richard Atterer (Google)
  - 15.12. Prof. Steffen Werner (Idaho, human factors)
- Open lab day: 13.12.

# 1 HCI and the Web

1.1 HCI – A Quick Reminder

1.2 Web Technology – A Brief Overview

1.3 Web Usability: How Do We Use the Web?

1.4 Designing Web Sites for Usability (contd.)

1.5 Web Accessibility

## Literature:

- Jakob Nielsen: Designing Web Usability, New Riders 2000
- Steve Krug: Don't Make Me Think, New Riders 2006 (2nd ed.)

# Web Resources About Web Usability

- Jakob Nielsen: Alertbox – Current Issues in Web Usability  
<http://www.useit.com/alertbox/>
- Patrick Lynch, Sarah Horton: Web Style Guide  
<http://www.webstyleguide.com>
- U.S. Department of Health and Human Services: Research-Based Web Design & Usability Guidelines  
<http://www.usability.gov/pdfs/guidelines.html>

# Frames

- “My main recommendation with respect to frames is Frames: Just Say No.” (J. Nielsen)
- Reasons for using frames:
  - Identical layout structure for changing content details
  - Scrolling of content does not scroll other parts (e.g. navigation)
  - Shorter loading times by selective loading of frames
- Key argument against frames:
  - Frames violate a basic paradigm of the Web
- The concept of a Web page unifies four aspects:
  - The user’s view of information
  - The unit of navigation (link)
  - A textual address (URL)
  - The unit of storage and manipulation
- Frames disintegrate these aspects
  - Correspondence View/Navigation, URLs

# Example: Frames Can Make Sense

Overview (Java 2 Platform SE 5.0) - Mozilla Firefox 3 Beta 5

File Edit View History Bookmarks ScrapBook Tools Help

http://java.sun.com/j2se/1.5.0/docs/api/

Overview Package Class Use Tree Deprecated Index Help

PREV NEXT FRAMES NO FRAMES

## Java™ 2 Platform Standard Edition 5.0 API Specification

This document is the API specification for the Java 2 Platform Standard Edition 5.0.

See: [Description](#)

### Java 2 Platform Packages

<a href="#">java.applet</a>	Provides the classes necessary to create an applet and the classes an applet uses to communicate with its applet context.
<a href="#">java.awt</a>	Contains all of the classes for creating user interfaces and for painting graphics and images.
<a href="#">java.awt.color</a>	Provides classes for color spaces.
<a href="#">java.awt.datatransfer</a>	Provides interfaces and classes for transferring data between and within applications.
<a href="#">java.awt.dnd</a>	Drag and Drop is a direct manipulation gesture found in many Graphical User Interface systems that provides a mechanism to transfer information between two entities logically associated with presentation elements in the GUI.
<a href="#">java.awt.event</a>	Provides interfaces and classes for dealing with different types of events fired by AWT components.
<a href="#">java.awt.font</a>	Provides classes and interface relating to fonts.
<a href="#">java.awt.geom</a>	Provides the Java 2D classes for defining and performing operations on objects related to two-dimensional geometry.

# More Problems with Frames

- Printing is difficult
- Bookmarking can be difficult
- Frames are difficult to code and therefore error-prone
- Search engines have trouble to find the right level of composition
- Frames invite to copyright violation
  - Showing foreign content within own frame under own URL

Improving the correspondence URL  $\leftrightarrow$  content [Nielsen]:

- All hyperlinks have **TARGET**=" \_top" attribute
- For each link, a new frameset is defined (with a different name)
- Complete reload
  - New URL for destination
  - Bookmarking and linking to URL are possible



# Alternatives to Frames

- **<OBJECT>**
  - With HTML file as “data” attribute
  - Positioning of object with style sheet
  - Recommended by W3C, few problems with browsers
- **<TABLE>**
  - May lead to very complex pages with nested tables
- **<DIV>**
  - Container for pieces of HTML source
  - Container can be positioned by style sheets (CSS)
  - Order of **<DIV>** entries is relevant for screen readers (see below)
- **Note: <frame>, <frameset> “not to be used by authors” according to HTML 5 specification**  
<http://www.w3.org/TR/html5-diff/>

# What are potential problems? (1)

- From <http://www.siteusability.com/mistakes.html> (now offline)-:
- **Downright errors:**
  - Broken links or missing images.
  - Firewall errors, server cannot be contacted, directory browsing not allowed (or allowed?).
  - Scripting errors that pop up an error message, make the page unusable, or write strings of gibberish amongst the text.
  - HTML coding errors that mean the page doesn't display properly, or at all.

# What are potential problems? (2)

- **Annoying or inaccessible page design:**
  - An "entrance tunnel" or splash screen - lots of flashy imagery but no real content that requires a click to get to the real home page.
  - Pages with such poor contrast between background and text they are hard to read.
  - Text in tiny or illegible fonts.
  - Pages that take minutes to download (even worse if when they have finished, you weren't interested in the content anyway).
  - Content that requires a specialised plug-in to read it.
  - Pages that require a specific browser to display nicely.
  - Links that lead to "under construction" pages.
  - Link colour schemes where you can't tell which ones you have already visited.
  - Links with badly-chosen targets that display numerous hidden windows on the desktop, break the Back button, or display pages without the necessary menus to use them properly.
  - Forms where you don't know what the site owners want to do with the information you are asked to supply.
  - Forms that don't explain properly what you need to enter, or don't let you go back and amend any errors.
  - Pages with typographical or grammatical errors, confusing and poorly-written text, or inconsistent terminology.

# What are potential problems? (3)

- **Search engine problems:**

- Pages with no links to other pages in the site.
- Pages called "No title", "Untitled", "Insert document title here", and/or with a meaningless abstract, so the user has no idea if the link is relevant or not.
- Pages that no longer exist on your site because you moved or renamed them.
- Pages so poorly designed they will never even appear in a search engine listing.

# What are potential problems? (4)

- **Information architecture problems:**

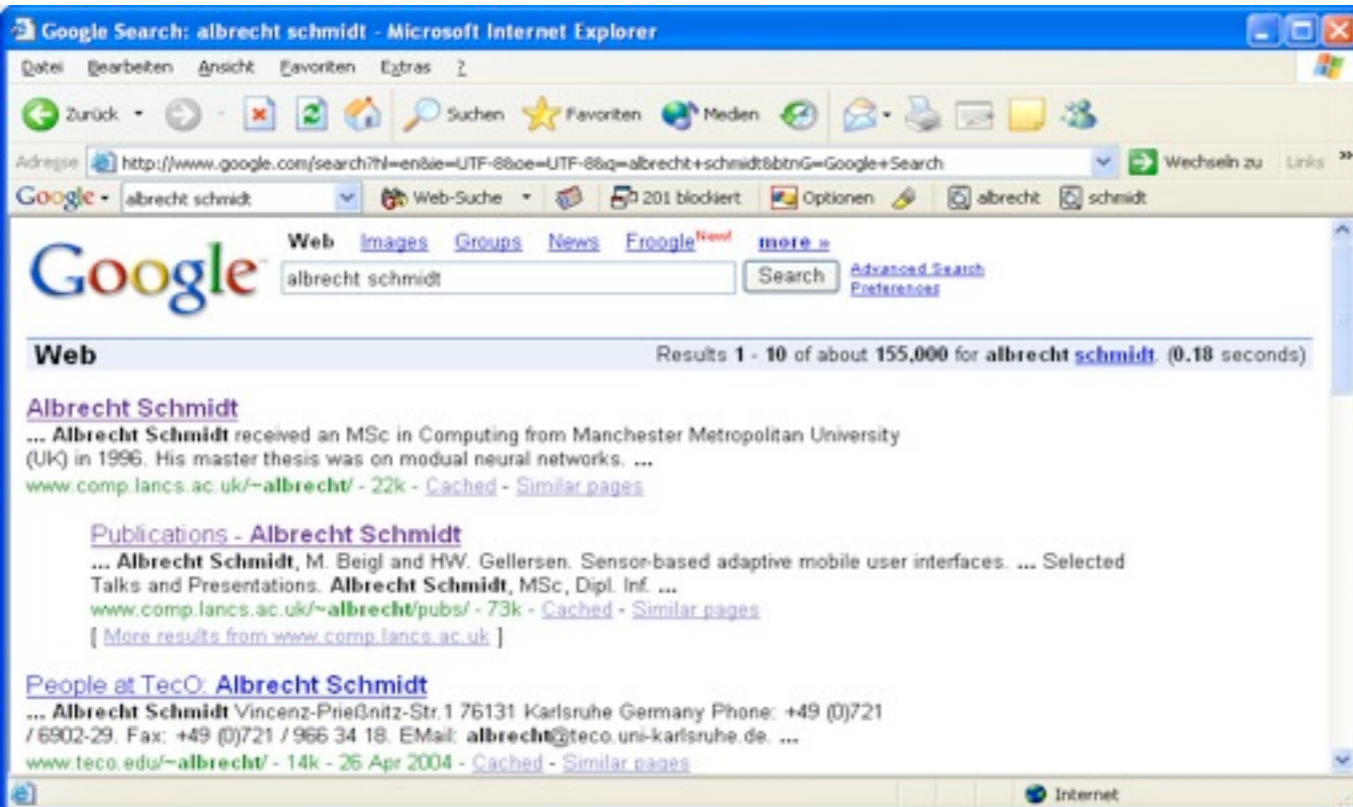
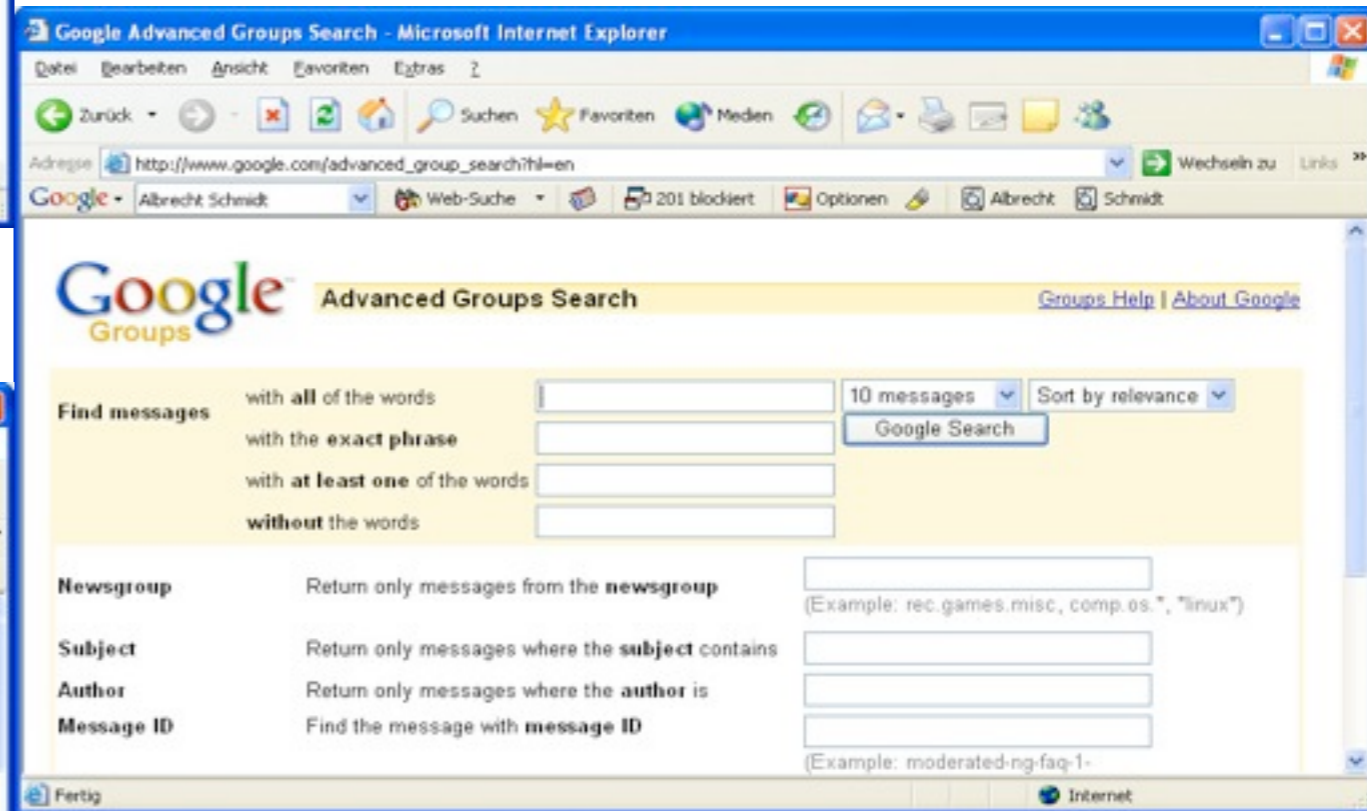
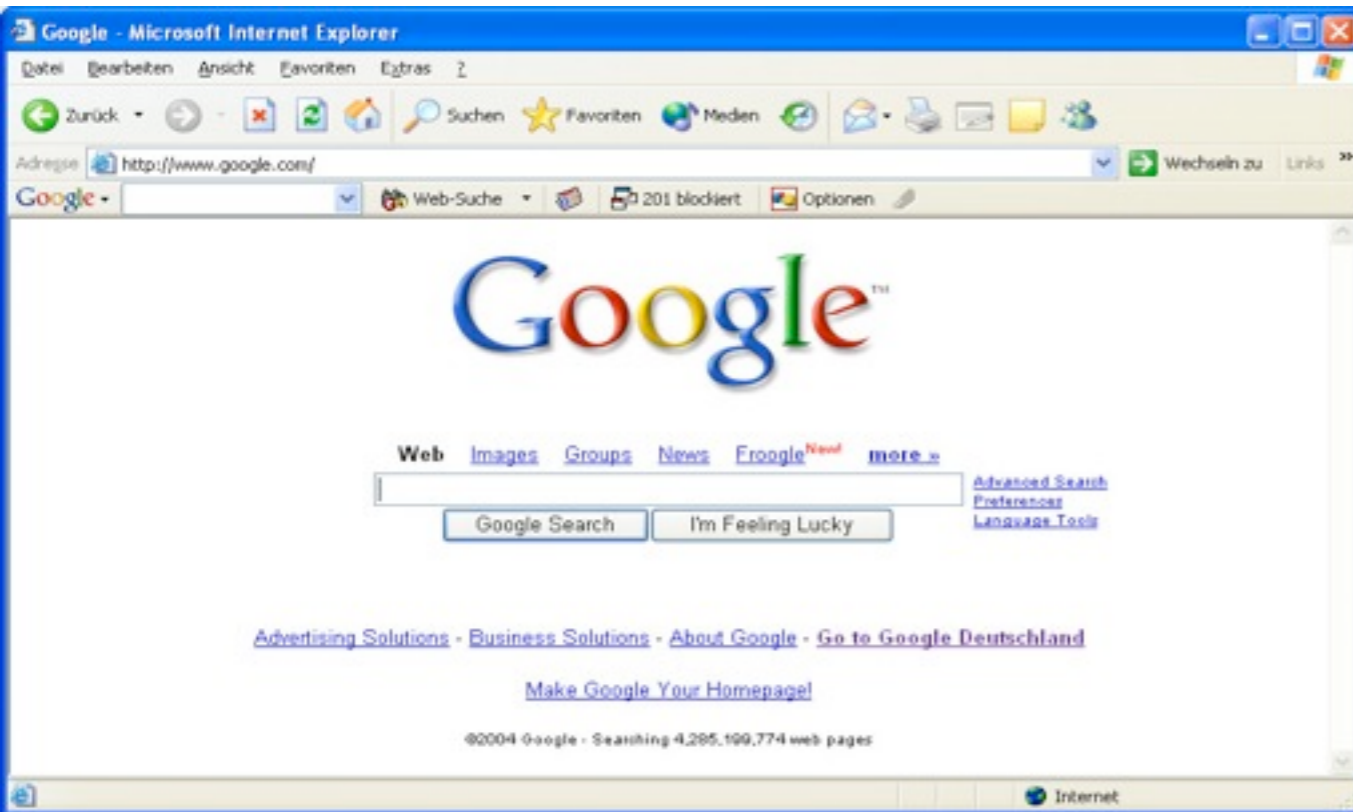
- Pages with different layouts and appearance for the same kind of information.
- Very long pages with no quick way to skip about them.
- Forms that don't work in a comprehensible way, and shopping cart systems that confuse in their complexity.
- Links that lead to mystery destinations (e.g. "click here"), or to other sites without warning.
- Overwhelming numbers of links on the home (or other) page.
- Menu options or navigation bar icons that mean little to the average visitor.
- No consistent way to move around the site on every page.
- No clear distinction between different kinds of information.
- Confusing site structure so the visitor cannot guess where to go for information.

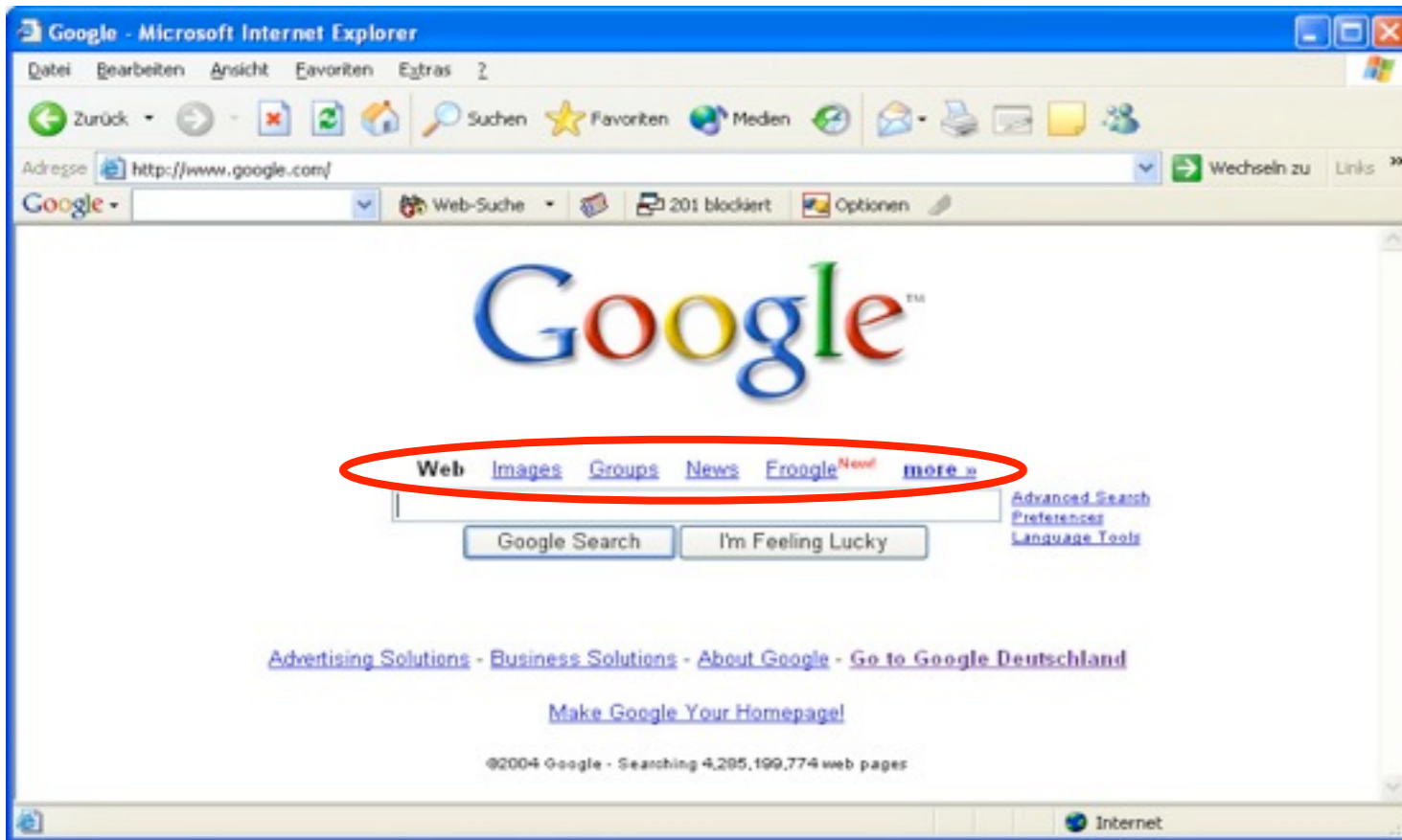
# What are potential problems? (5)

- **E-commerce problems:**

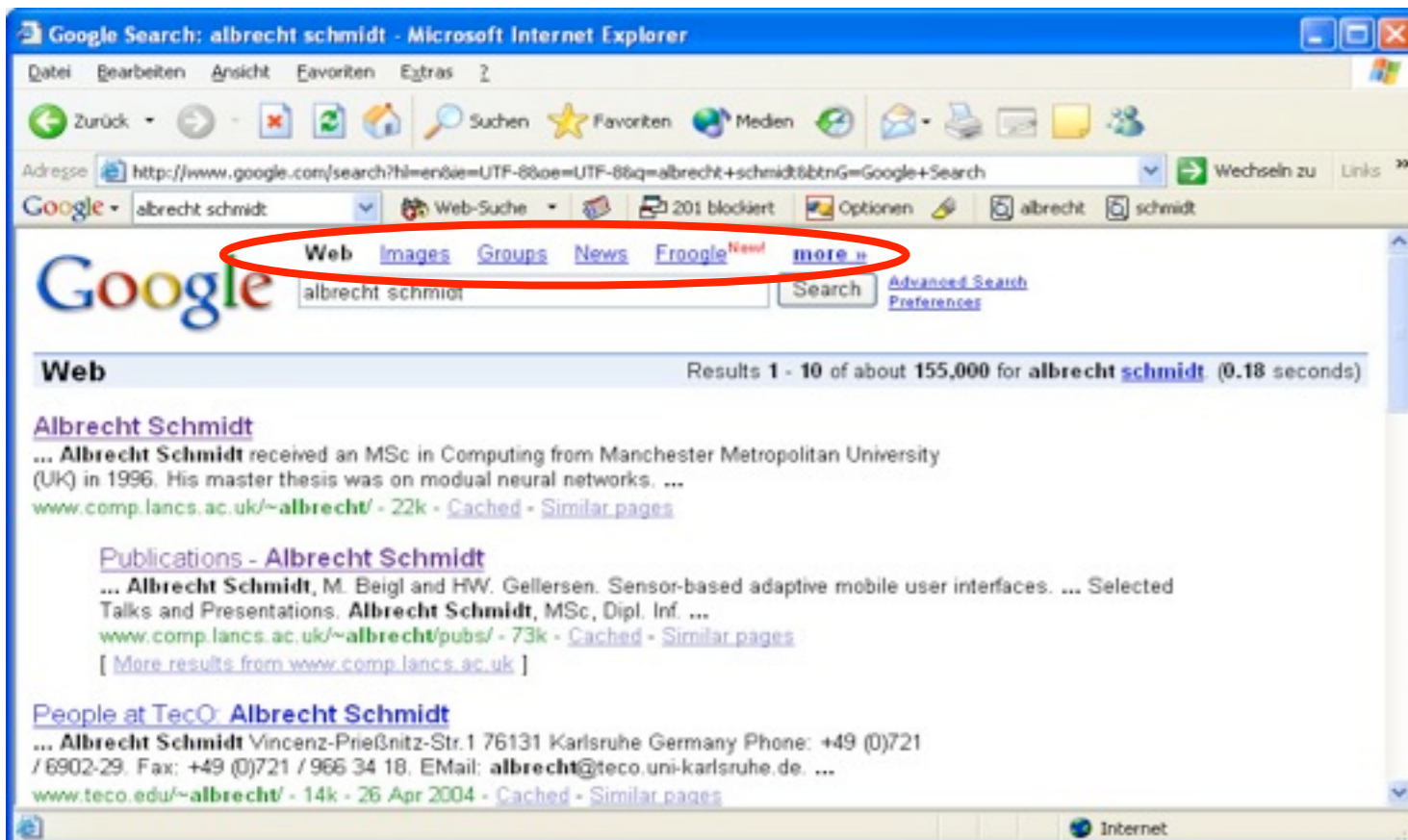
- Potential buyers can't find the product they want because they don't understand the categories you have chosen.
- Visitors leave without purchasing because they don't want to register.
- Visitors can't find your returns policy or how their privacy is protected if they buy from you.
- Buyers have to work out the shipping and handling charges for themselves when viewing an item in your online catalogue.
- Visitors from overseas don't understand the measurement system you use for sizes or weights.
- ... the list of potential problems is endless - this just skims the surface for sites selling to the consumer.

- Web Search

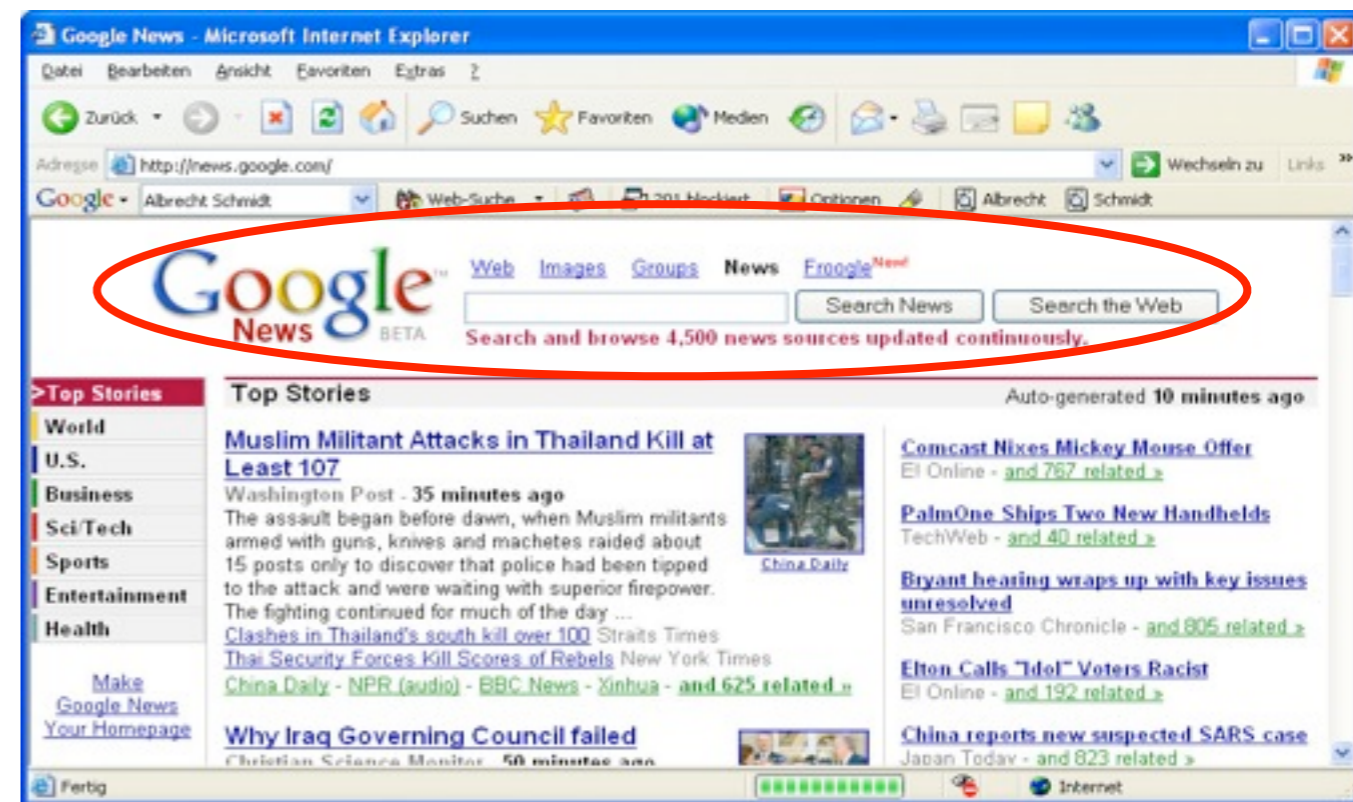
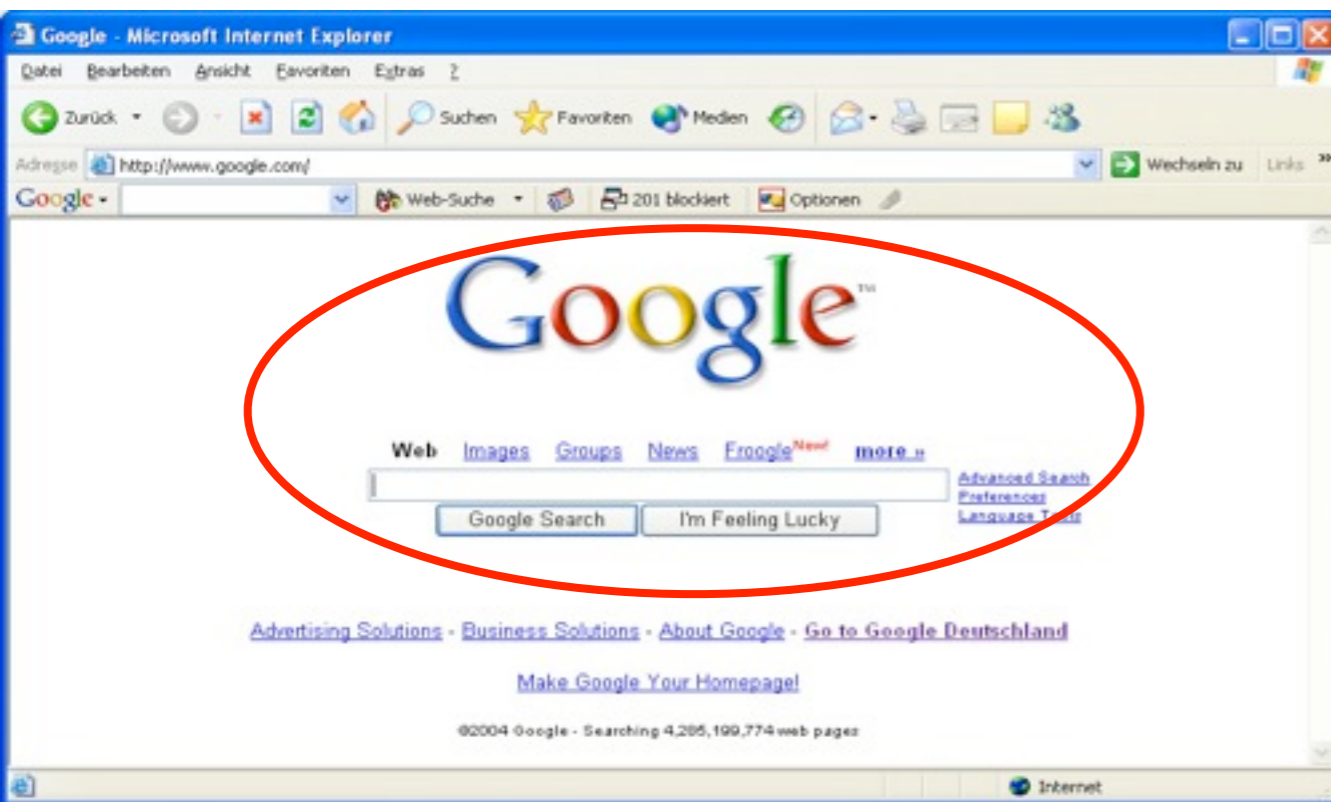




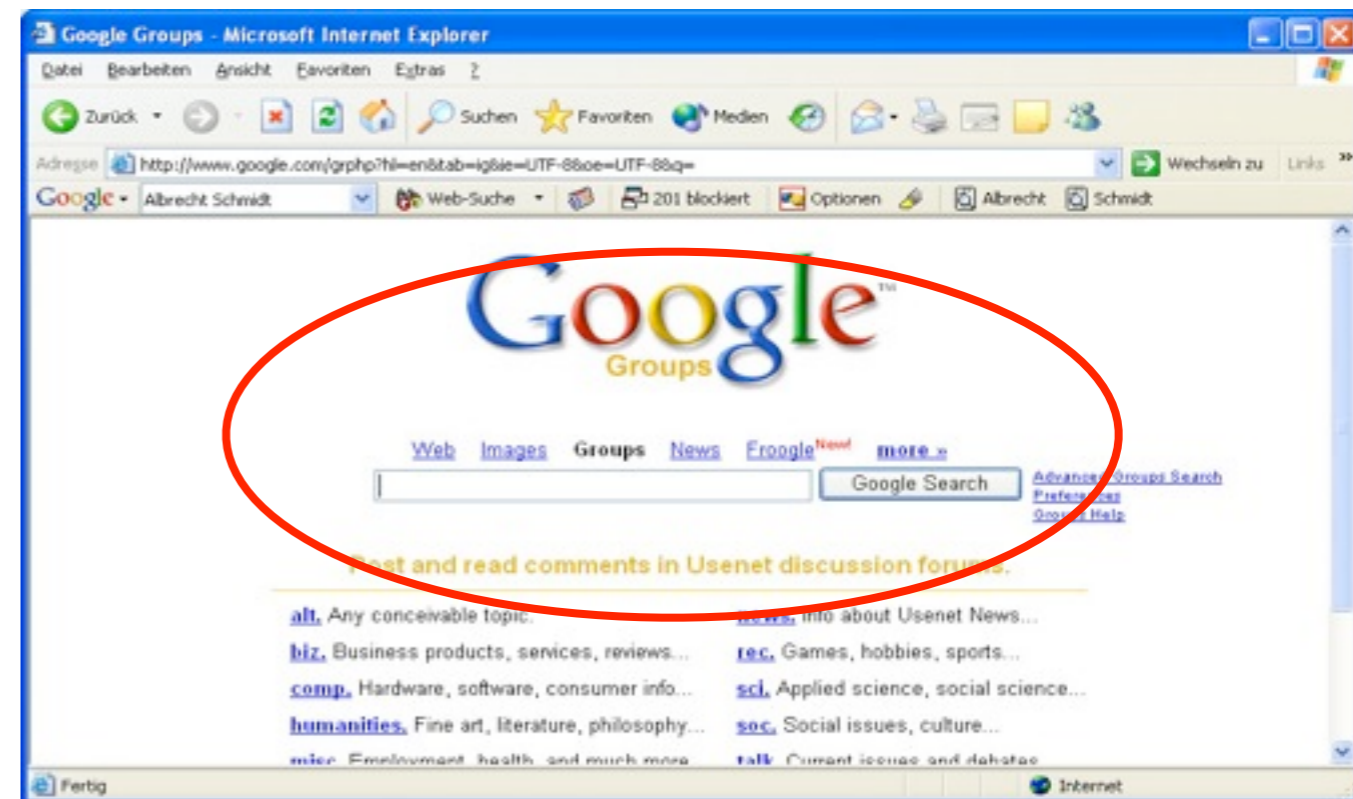
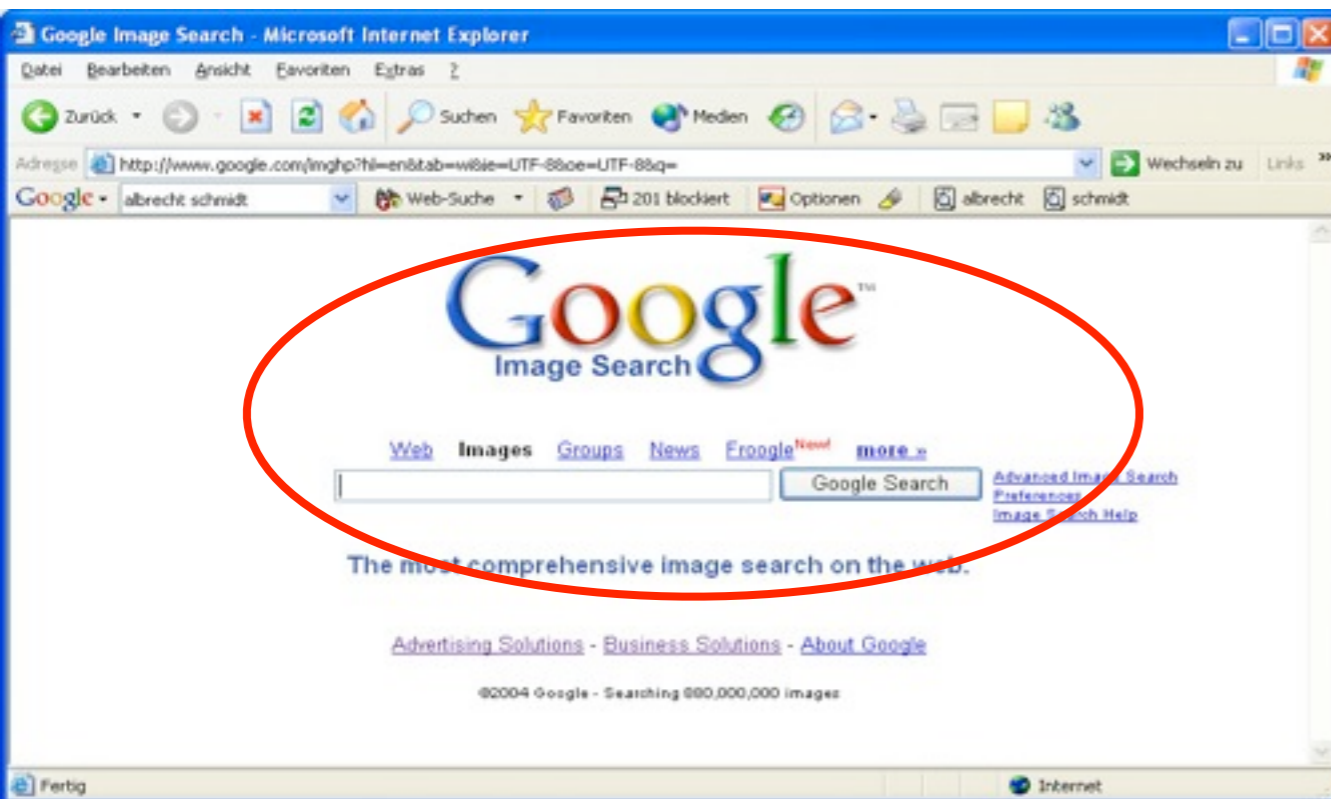
- Navigation

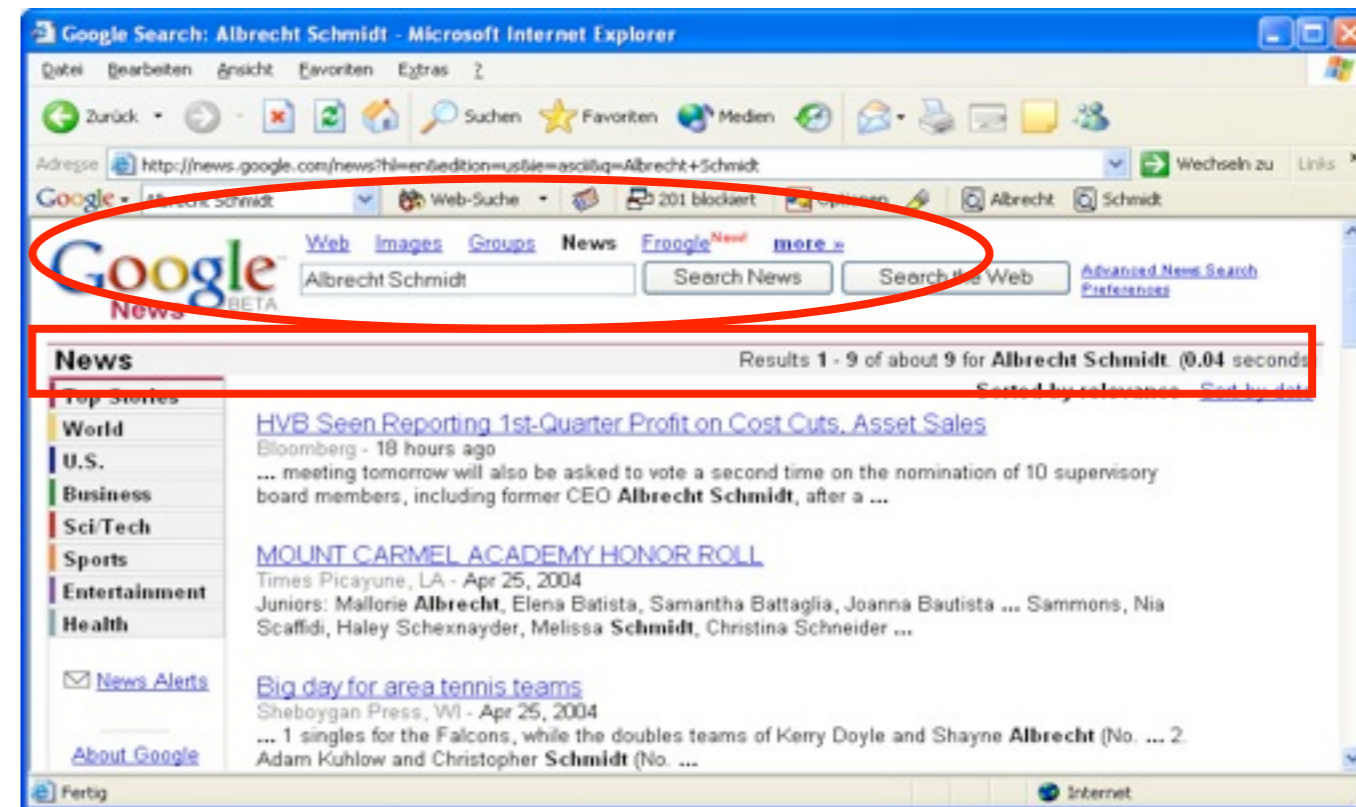
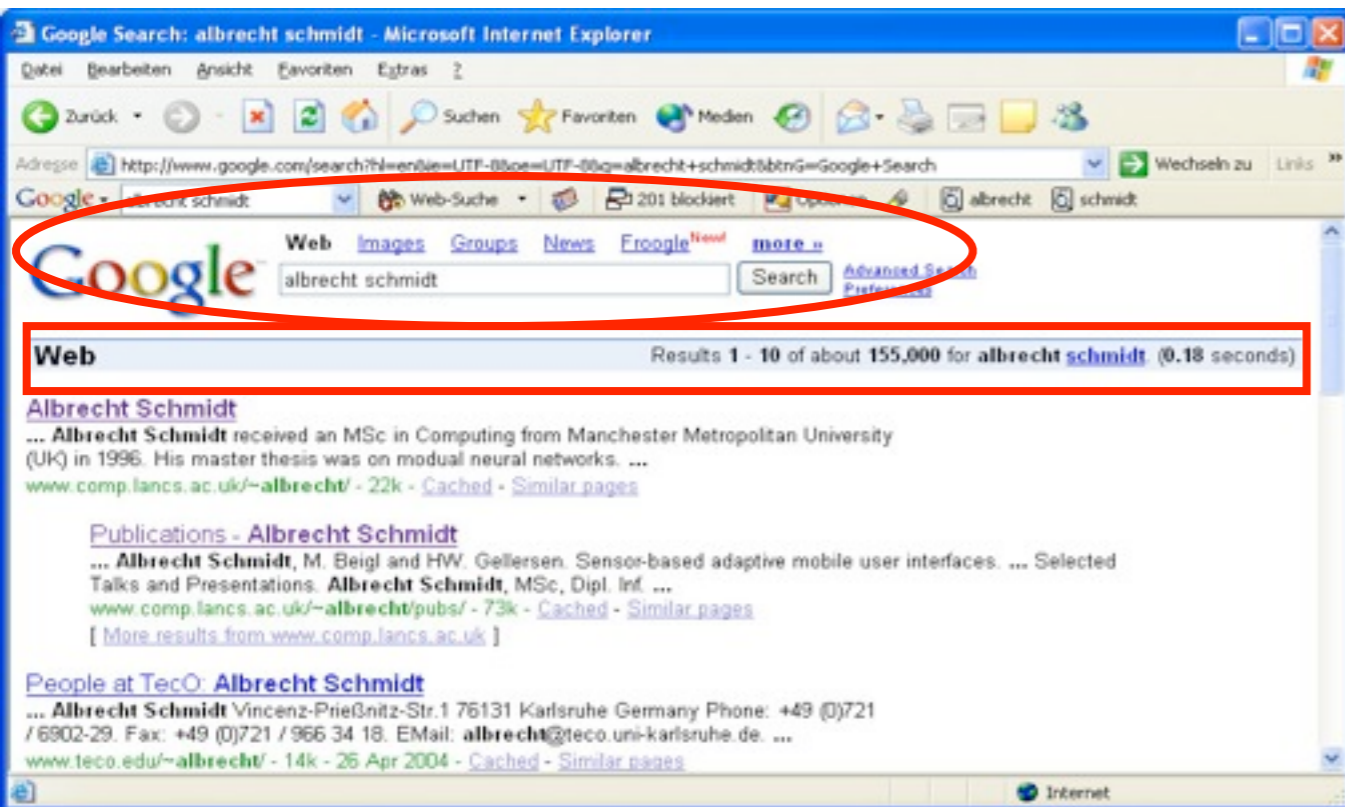




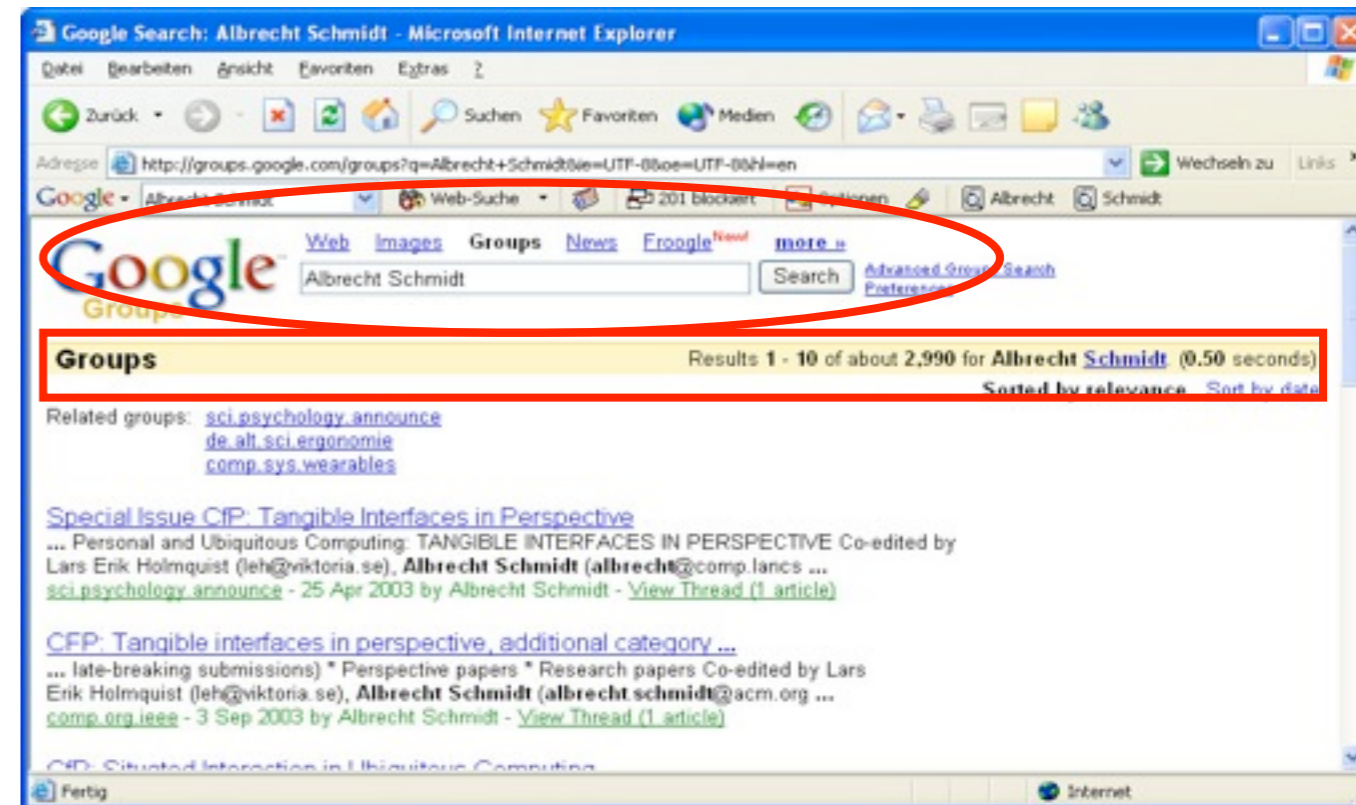
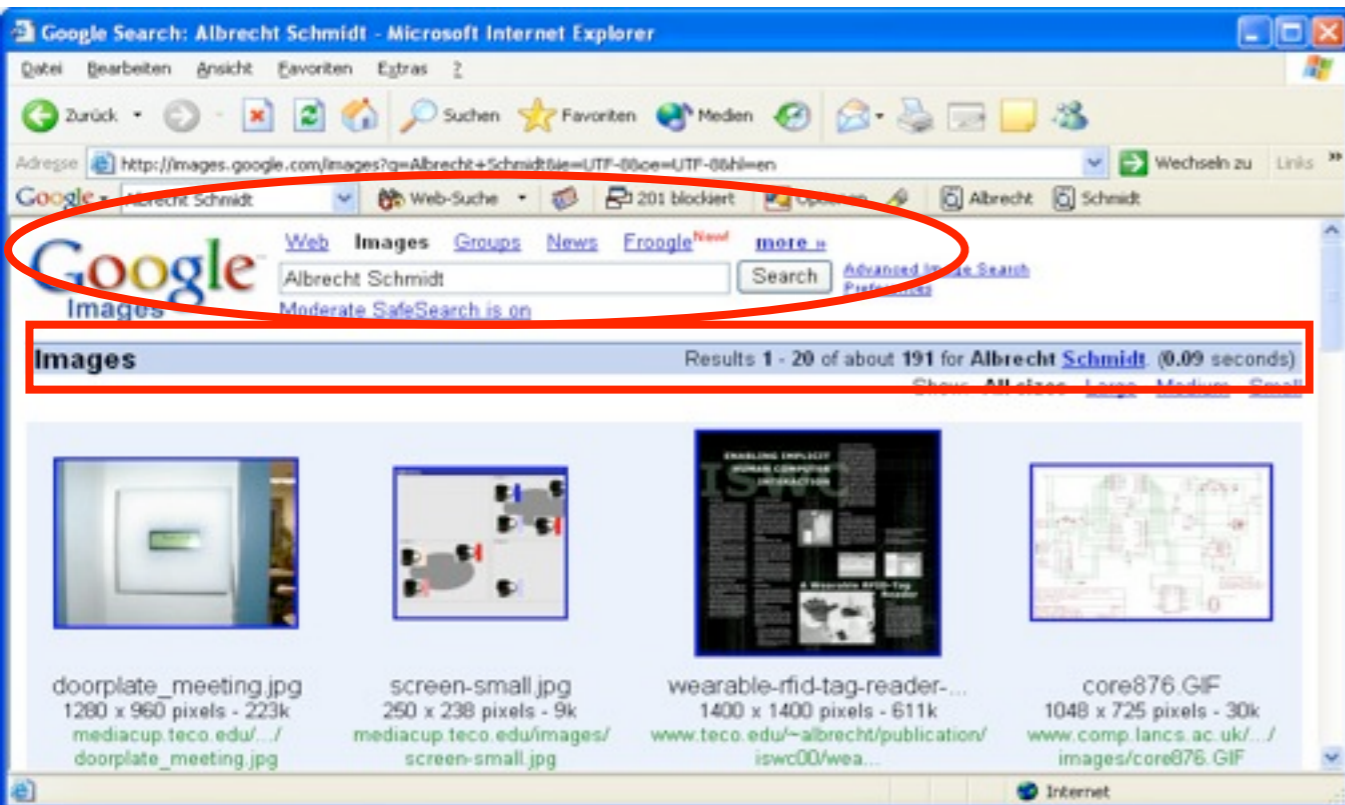


- Search form pages

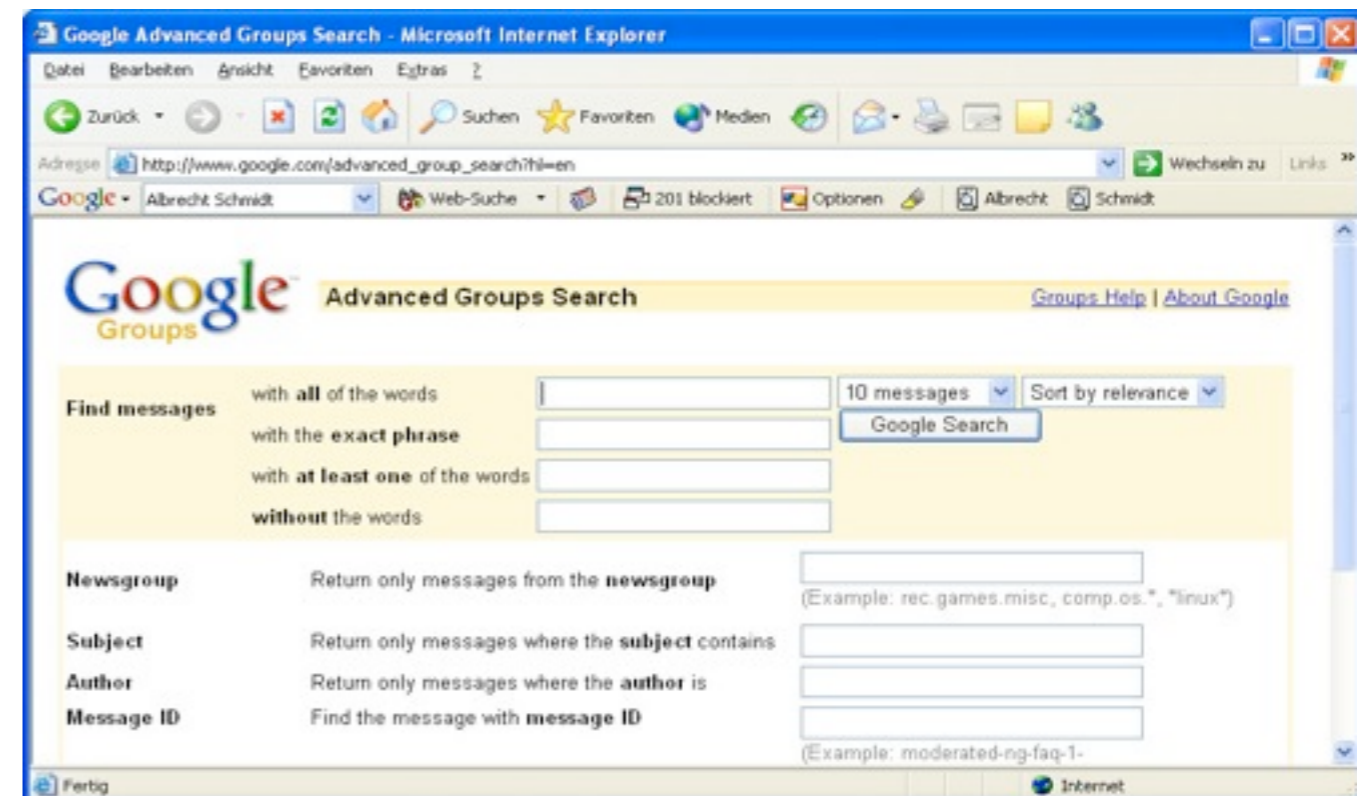
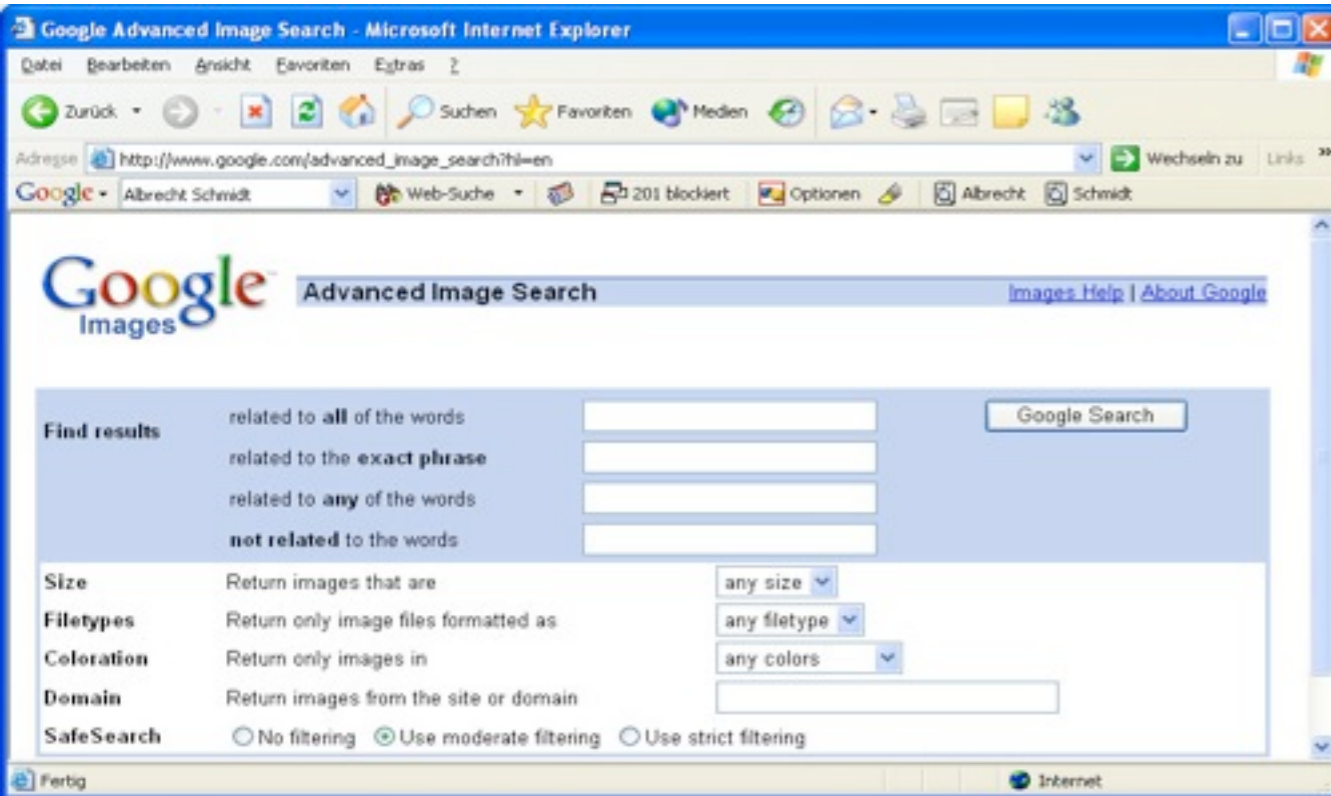
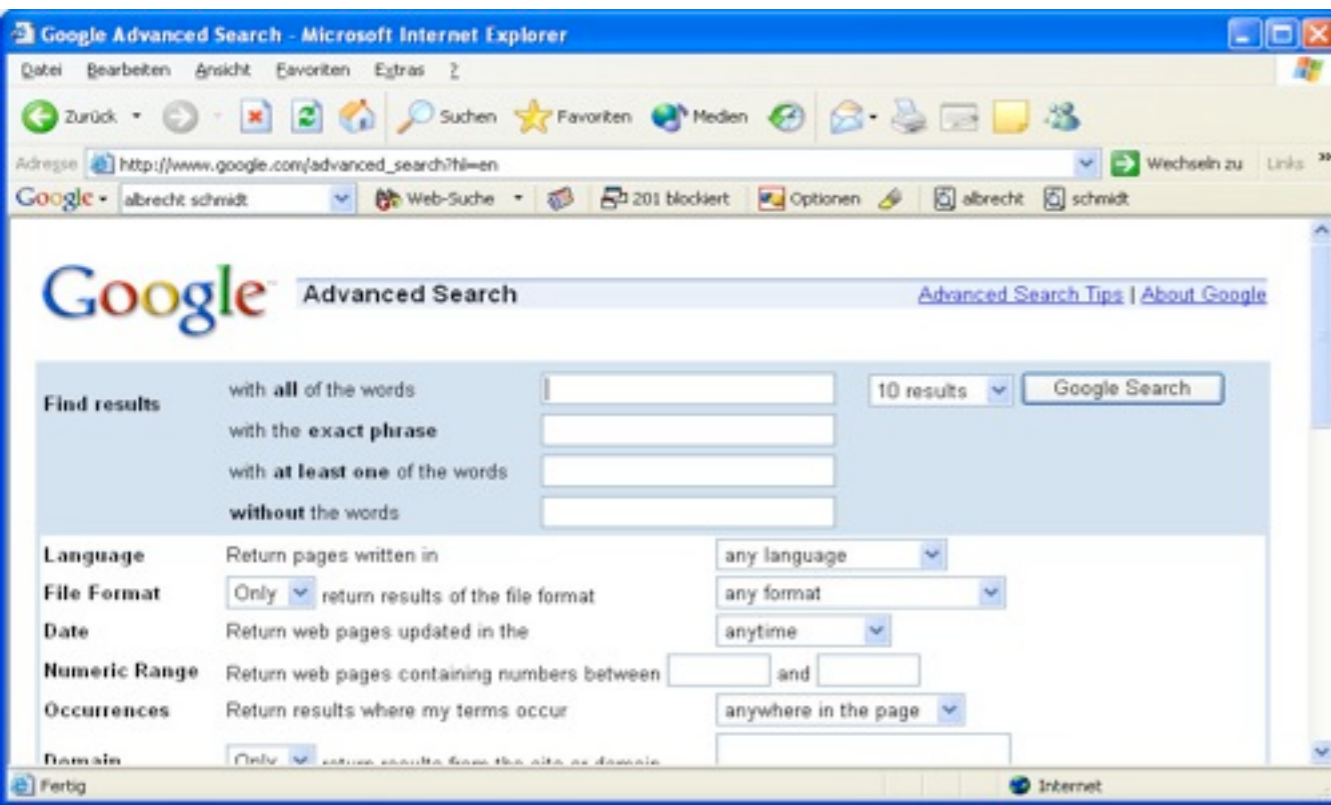


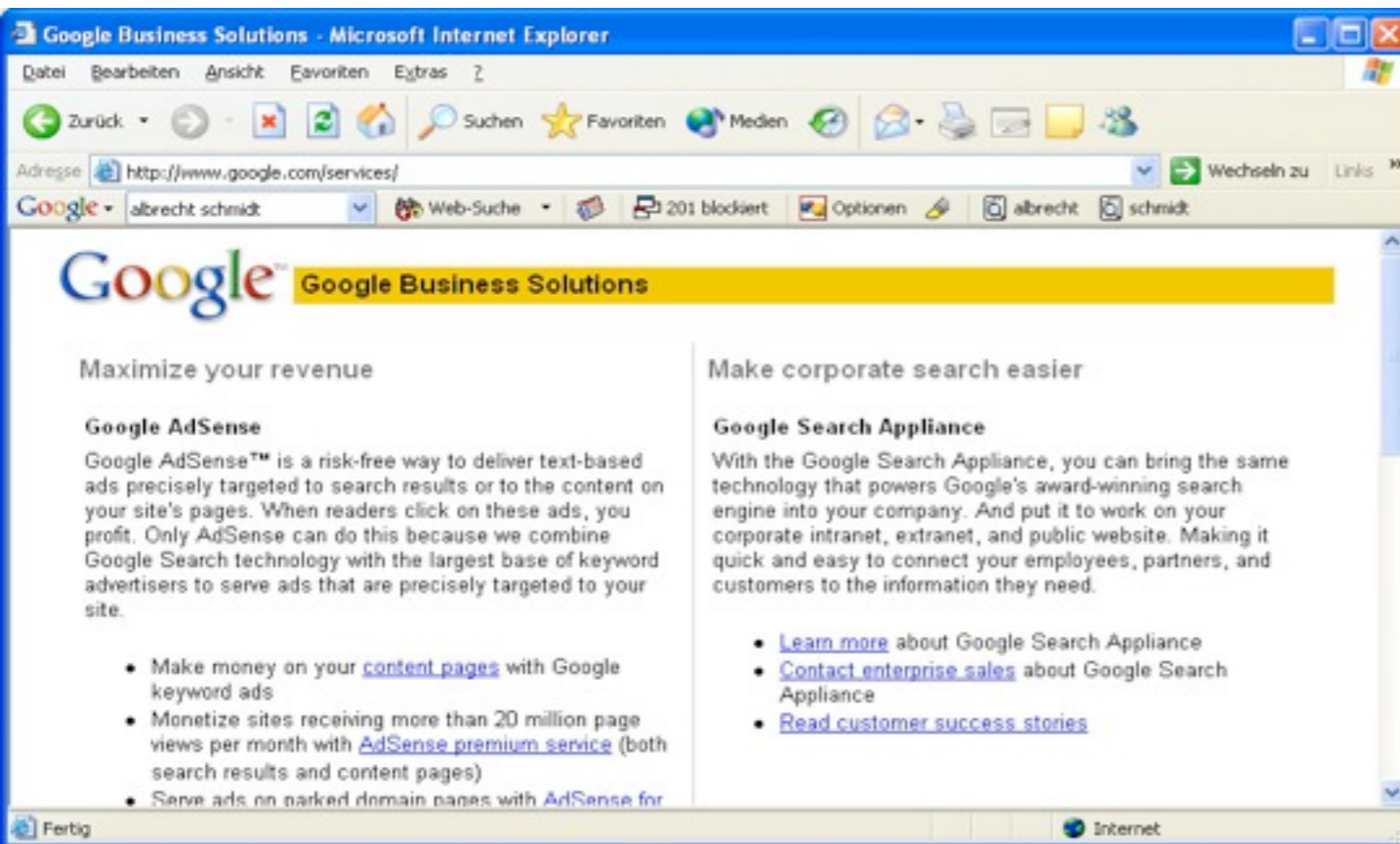


## • Result pages

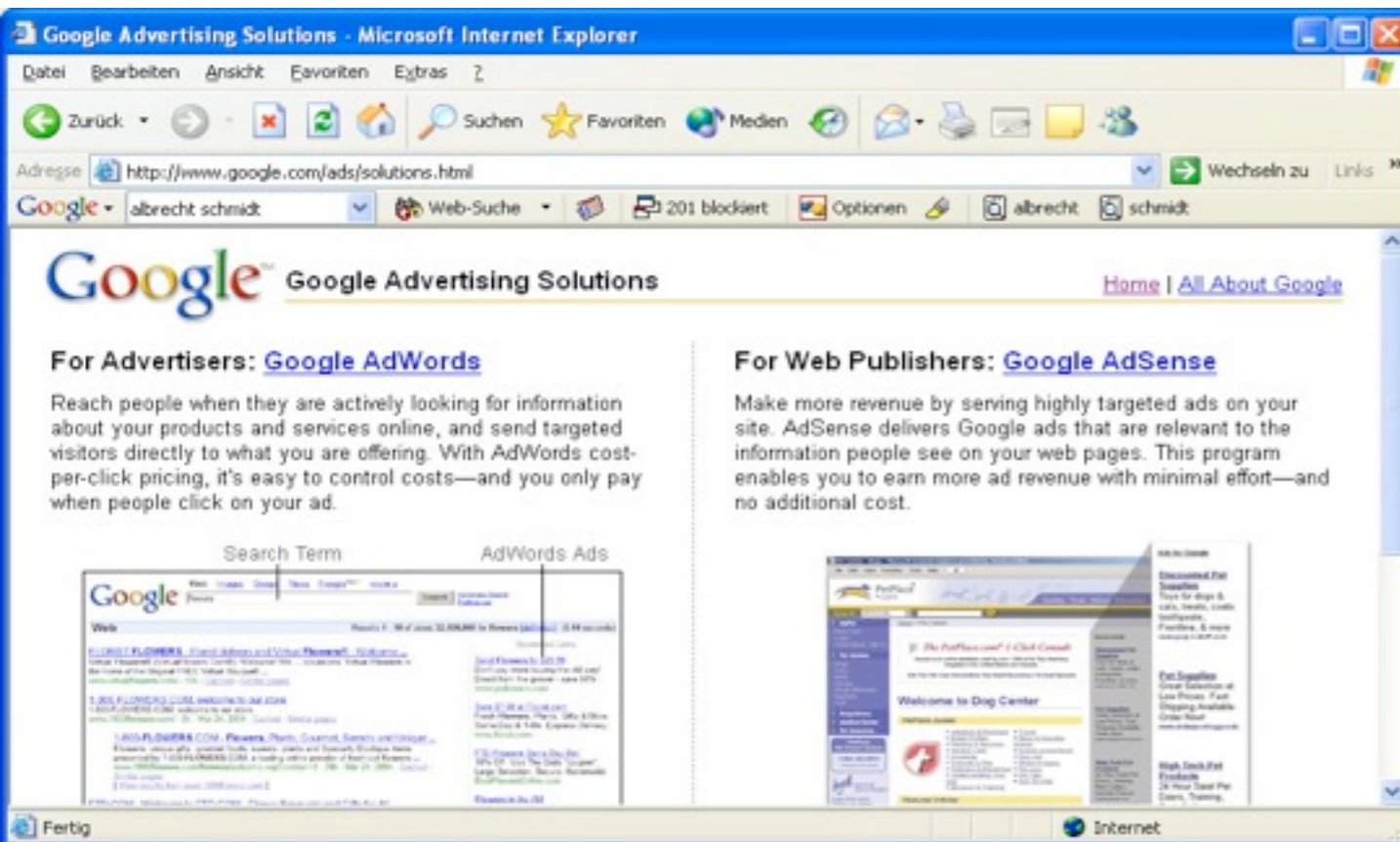


- Advanced search pages





- Information pages



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- Steve Krug: Don't Make Me Think, New Riders 2006 (2nd ed.)
- J. Thatcher et al.: Constructing Accessible Web

# General Goal

- Accessibility for users with disabilities – why?
  - Regulatory compliance – see below
  - Human decency
  - Business reasons
  - One of the main ideas of the web: Content adjusts to user/device
- Disability in web usage is different from “common definition” of disability
  - Example: Wheelchair usage
  - Many disabilities in general life do not affect web usage
  - For web usage, specific disabilities are relevant
    - » e.g. Problems with eyesight, handling keyboards
- Improving accessibility is important beyond the group of users with disabilities
  - Impetus to reduce information to the essential
  - Helpful also for “normal users”

# Statistics

- Online buyers are of relatively high age in average
  - Computerworld 1999:
    - »Age group with highest concentration of online buyers is 59–64
    - »Ernst & Young: 7 of 10 online buyers are over 40
- Percentage of people with disabilities increases with age
  - 18-24: 9,5%
  - 45-54: 21,2%
  - 55-64: 34%
  - 75+: 64%

# Types of Disabilities

- Vision
  - Blind users  
(using screen readers, audio browsers, text browsers, Braille output)
  - Colorblind users  
(in particular red-green)
  - Reduced eyesight  
(large fonts, high contrast)
  - People under special conditions (e.g. car browsers)
- Hearing
  - Deaf users  
(do not hear content of spoken audio explanations, or audio track of video)
- Physical abilities
  - Speech disabilities (problematic for speech input)
  - Problems in pointing with a mouse (motor disabilities)
- Cognitive abilities
  - Problems in understanding → Better comprehensibility for *all* users!

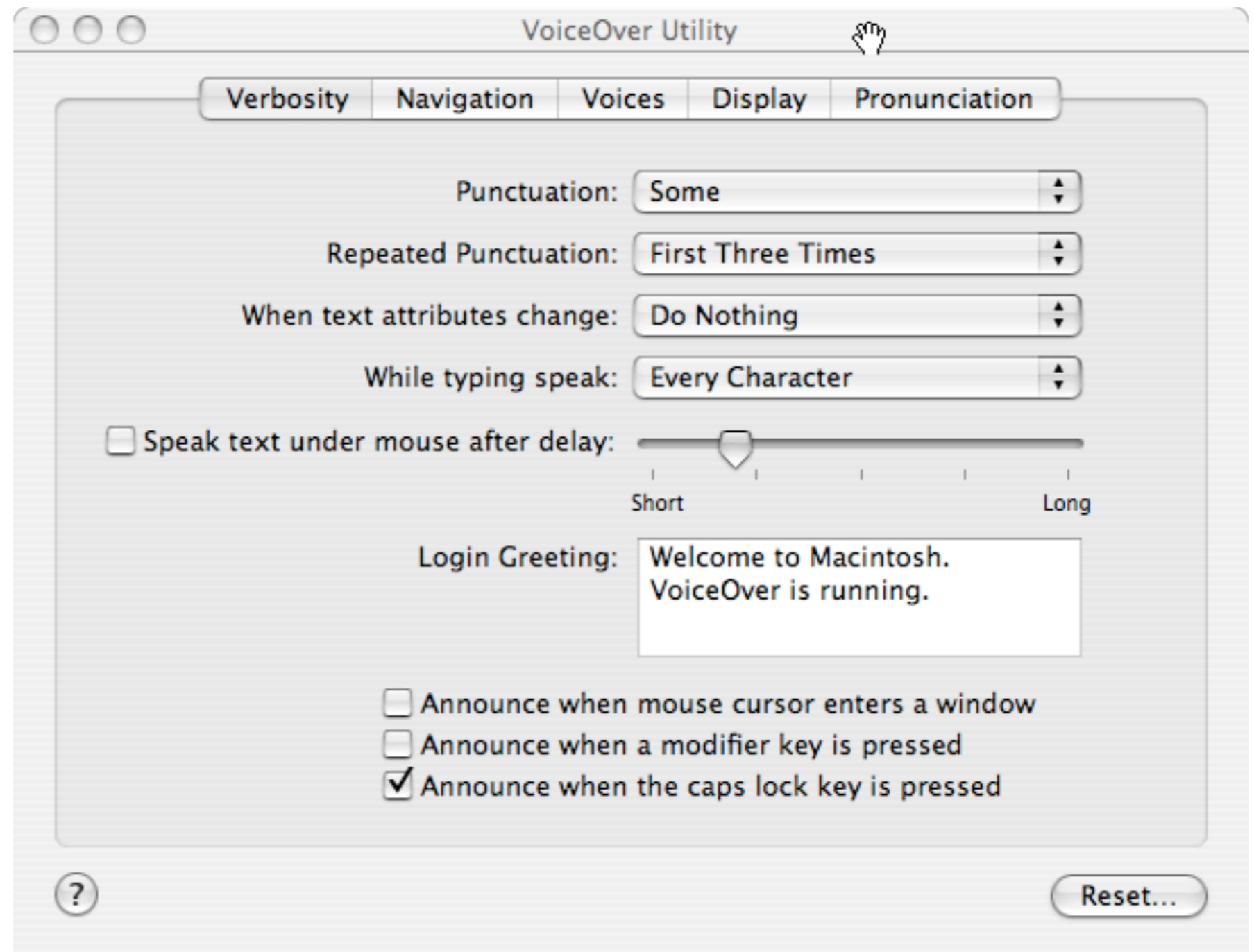


# Debunking Myths about Accessibility

- Myth: Accessible pages have to be plain
  - Good usage of colours helps the average user
  - Short and simple texts make pages better “scannable”
  - Optimization for text output reduces loading time (up to display of essential information)
  - See the power of CSS:  
<http://www.csszengarden.com/>
- Myth: You just have to add a text-only version
  - Order of text entries is important for text-based usability
  - There are other disabilities than blindness!
  - Two-version problem
  - “Extra” web site marginalizes disables users

# Assistive Technology: Audio Browsing with Screen Reader

- Listening to text
- Interaction?
- Browsing?
- Skipping over irrelevant entries?
- Why put distracting entries into the path?



# ALT tags

- Alternative way of “displaying” images
  - Gives some information to users who cannot see the picture
    - » “Photo of Jakob Nielsen”
  - Can help to support low-bandwidth browsing
  - Described images?
  - Decorative images: ALT text should be empty!
  - Trick: Audio information only for users not seeing images, as alt text for invisible graphic. (Usually, aural CSS is preferable!)
- Generalization:
  - Subtitles for video information

# Font Resizing

- Increasing font size for better readability:
  - Using global assistive technology like magnifier utility
    - » Independent of application
  - Increasing font size in browser settings/dialogue
    - » Should be supported by page design (no absolutely sized fonts)
    - » “Fluid” page design is helpful
  - Increasing font size through special controls on web page
    - » Special control may even disturb users relying on plain text
    - » Reminder of alternative viewing styles

# Regulatory Situation

- USA:
  - Section 508 of the Rehabilitation Act (1998)
    - » Federal agencies are required to comply with some accessibility rules
    - » [www.section508.gov](http://www.section508.gov)
- EU:
  - E-Europe Initiative (1999) – refers to WAI (see below)
- Deutschland:
  - Gesetz zur Gleichstellung behinderter Menschen und zur Änderung anderer Gesetze” (Behindertengleichstellungsgesetz BGG), 27.4.2002
    - » Verpflichtet Bundesverwaltung, alle Angebote barrierefrei zu gestalten
  - BITV: Verordnung zur Schaffung barrierefreier Informationstechnik nach dem Behindertengleichstellungsgesetz
    - » <http://bundesrecht.juris.de/bitv/>
- International:
  - W3C Web Accessibility Initiative (WAI)

# Web Accessibility Initiative (WAI)

- Set of standards developed by W3C (WWW consortium)
- Web Content Accessibility Guidelines (WCAG), 1999
  - Making Web content accessible, primarily for disabled users
  - WCAG 1.0: May 1999, 14 rules
  - WCAG 2.0: “Proposed Recommendation” in late 2008?  
4 principles, 12 guidelines, numerous accompanying documents
- Authoring Tool Accessibility Guidelines (ATAG)
  - Towards an HTML editor which is usable for disabled people
- User Agent Accessibility Guidelines (UAAG)
  - Recommendations for developers
- XML Accessibility Guidelines (XAG)
  - How to include features in XML which promote accessibility.
- Much more, e.g. evaluation-related standards
  - EARL (Evaluation and Report Language)
  - Accessibility of AJAX applications: ARIA

# Core WAI Content Recommendations 1.0

## 10 Quick Tips

The links in the Quick Tips below mostly go to the [techniques documents](#) that provide implementation guidance - including explanations, strategies, and detailed markup examples.

1. [Images & animations](#): Use the `alt` attribute to describe the function of each visual.
2. [Image maps](#). Use the [client-side map](#) and [text for hotspots](#).
3. [Multimedia](#). Provide [captioning and transcripts of audio](#), and [descriptions of video](#).
4. [Hypertext links](#). Use text that makes sense when read out of context. For example, avoid "click here."
5. [Page organization](#). Use [headings](#), [lists](#), and consistent structure. Use [CSS](#) for layout and style where possible.
6. [Graphs & charts](#). Summarize or use the `longdesc` attribute.
7. [Scripts, applets, & plug-ins](#). Provide [alternative content](#) in case active features are inaccessible or unsupported.
8. [Frames](#). Use the `noframes` element and meaningful [titles](#).
9. [Tables](#). Make line-by-line reading sensible. Summarize.
10. [Check your work. Validate](#). Use tools, checklist, and guidelines at <http://www.w3.org/TR/WCAG>

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# BITV (Auszug) (1)

Anforderung	6	Internetangebote müssen auch dann nutzbar sein, wenn der verwendete Benutzeragent neuere Technologien nicht unterstützt oder diese deaktiviert sind.
Bedingung	6.1	Es muss sichergestellt sein, dass mittels Markup-Sprachen geschaffene Dokumente verwendbar sind, wenn die zugeordneten Stylesheets deaktiviert sind.
	6.2	Es muss sichergestellt sein, dass Äquivalente für dynamischen Inhalt aktualisiert werden, wenn sich der dynamische Inhalt ändert.
	6.3	Es muss sichergestellt sein, dass mittels Markup-Sprachen geschaffene Dokumente verwendbar sind, wenn Scripts, Applets oder andere programmierte Objekte deaktiviert sind.
	6.4	Es muss sichergestellt sein, dass die Eingabebehandlung von Scripts, Applets oder anderen programmierten Objekten vom Eingabegerät unabhängig ist.
	6.5	Dynamische Inhalte müssen zugänglich sein. Insoweit dies nur mit unverhältnismäßig hohem Aufwand zu realisieren ist, sind gleichwertige alternative Angebote unter Verzicht auf dynamische Inhalte bereitzustellen.

- Must be adhered to by all websites run by government organisations, universities, other official bodies
- Most rules inspired by corresponding WCAG 1.0 rules



# BITV (Auszug) (2)

Anforderung	7	Zeitgesteuerte Änderungen des Inhalts müssen durch die Nutzerin/den Nutzer kontrollierbar sein.
Bedingung	7.1	Bildschirmflackern ist zu vermeiden.
	7.2	Blinkender Inhalt ist zu vermeiden.
	7.3	Bewegung in mittels Markup-Sprachen geschaffener Dokumente ist entweder zu vermeiden oder es sind Mechanismen bereitzustellen, die der Nutzerin/dem Nutzer das Einfrieren der Bewegung oder die Änderung des Inhalts ermöglichen.
	7.4	Automatische periodische Aktualisierungen in mittels Markup-Sprachen geschaffener Dokumente sind zu vermeiden.
	7.5	Die Verwendung von Elementen der Markup-Sprache zur automatischen Weiterleitung ist zu vermeiden. Insofern auf eine automatische Weiterleitung nicht verzichtet werden kann, ist der Server entsprechend zu konfigurieren.