UNIVERSITY OF CRETE
FACULTY OF SCIENCES AND ENGINEERING
COMPUTER SCIENCE DEPARTMENT

COURSE CS-464 (OPTIONAL)

HUMAN – COMPUTER INTERACTION

Course Convenor: Constantine Stephanidis

Visual and Information Design

Contents

- Visual Design
  - Vision
  - Purpose
  - The three basic tools of Visual Design
    - Typography
    - Layout
    - Colour
- Information Design
  - Organizing and structuring information
  - Information foraging and information scent

Visual Design

“A minute to learn – a lifetime to master”

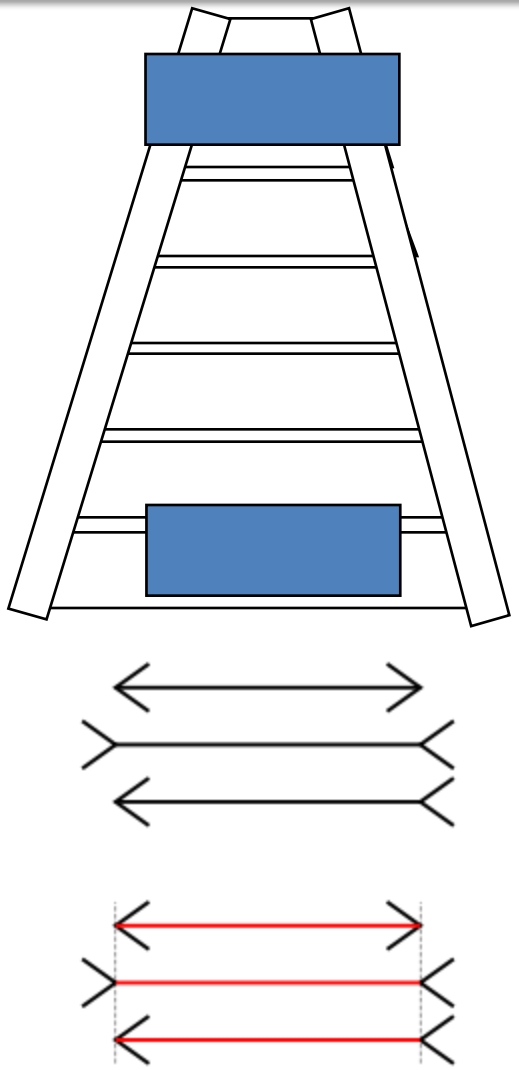
Vision

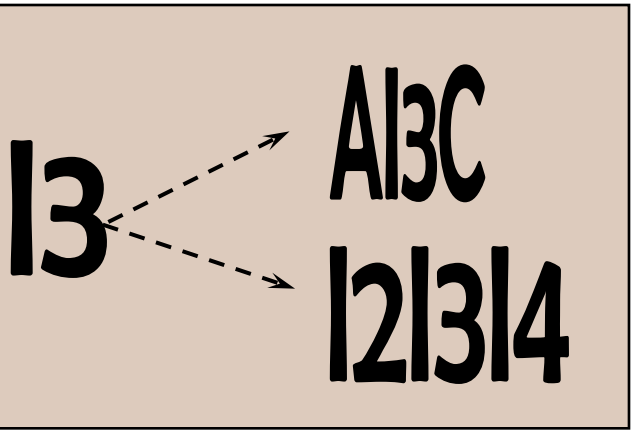
Primary source of information (for 'normally' sighted persons)

- Vision is a two-step process:

1. Begins with the physical characteristics of the eye, which enables us to see objects *(physical reception of stimulus)*
   - objects have to be large enough, with enough contrast, in a visible colour, and so on, that the eyes can register them
2. In the second step, retinal signals are transferred to the brain *(processing and interpretation of stimulus)*
   - once we see an object clearly, we have to interpret what we see (*e.g. what is this icon?)*

The capabilities and limitations of visual processing





The quick brown
fox jumps over the
the lazy dog

Movement

Pie menu in the game Crysis

Pie menu in the game the Sims

- Users find it difficult to manipulate small objects. Consequently:
  - Targets should generally be as large as possible and
  - the distance to be moved as small as possible
- This has led to suggestions that pie-chart-shaped menus are preferable to lists, since all options are equidistant
- However, if lists are used, the most frequently used options can be placed closest to the user's start point (for example, at the top of the menu)

Three goals for visual design

- Guide
  - Convey Structure, relative importance, relationships
- Pace
  - Draw people in, help orient, provide hooks to dive deep
- Message
  - Express meaning and style, breathe life into the content

Three basic tools of visual design

- Typography
  - Whitespace
  - Weight and scale
  - Typefaces
- Layout
  - Grids and alignments
  - Considerations and trade-offs
- Color
  - Considerations and challenges
  - Tips

Typography

Typography: The invitation exercise

- How might we improve this? And would the objective function be?

You are cordially invited to Robert and Alexandra's delectable after-dinner party. Wine and nibbles will be served. when: June 30th, 2012 at 9:30pm. Where: The Pad. if you need directions, ping us! Kindly let us know if you'll be attending by June 1st.

Exercise adopted from Scott Klemmer's (Stanford) Visual Design, inspired by Jennifer Tidwell's Designing Interfaces

The invitation exercise: Whitespace

You are cordially invited to Robert and Alexandra's delectable after-dinner party.

Wine and nibbles will be served.

When: June 30th, 2012 at 9:30pm.
Where: The Pad. if you need directions, ping us!

Kindly let us know if you'll be attending by June 1st.

Whitespace conveys grouping

Scale and weight variation

You are cordially invited to:

Robert and Alexandra's
delectable after-dinner party

Wine and nibbles will be served.

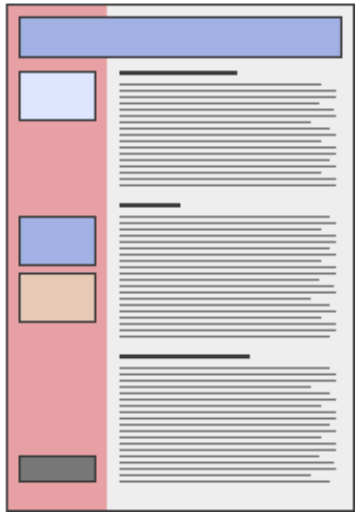
When: **June 30th, 2012 at 9:30pm**
Where: **The Pad** *if you need directions, ping us!*

Kindly let us know if you'll be attending by June 1st.

Typography: Introduction

Too patchy, inconsistent

Predictable modular structure



- Good typography depends on the visual contrast between one font and another and between text blocks, headlines, and the surrounding white space
- Nothing attracts the eye and brain of the reader like strong contrast and distinctive patterns
- When your content is primarily text, typography is the tool you use to “paint” patterns of organization on the page
- The first thing the reader sees is not the title or other details on the page but the overall pattern and contrast of the page

Typography: Alignment (1/2)

Justification and "rivers":

The relatively primitive justification available today on the Web creates word-space problems that result in "rivers" of white space that seem to run down the page.

Left-justified text is the most legible option for Web pages

Typography: Alignment (2/2)

- Titles and headings over left-justified body text should also be flush left
- Centered headings pair well with justified text, but justified text should not be used on Web pages.
- Centered display type contrasts with the asymmetry of the ragged right margin of left-justified body text and produces an unbalanced page

Typography: Line length (1/3)

- Text on the computer screen is hard to read not only because of the low resolution of computer screens but also because the layout of most Web pages violates a fundamental rule of book and magazine typography: the lines of text on most Web pages are far too long for easy reading
- In conventional print layouts, columns of thirty to forty characters per line are considered ideal

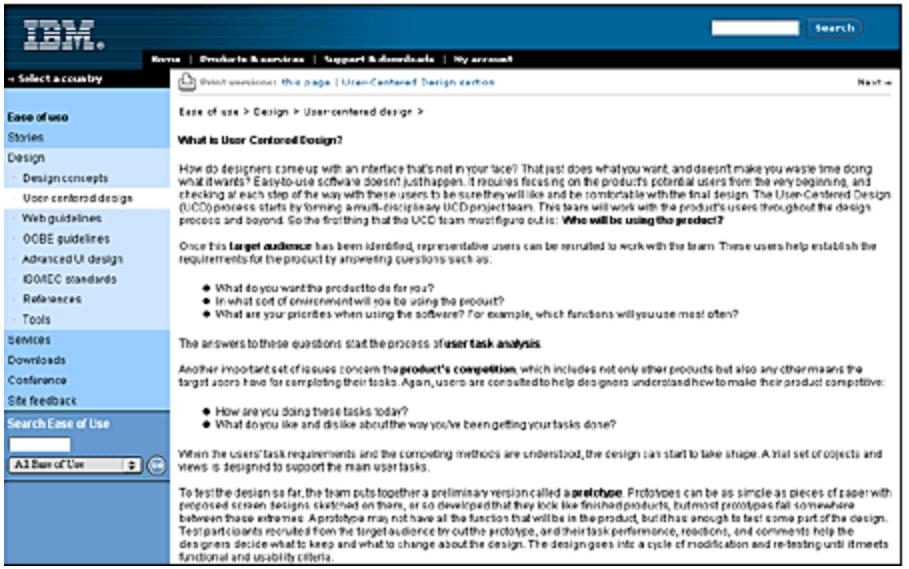
Typography: Line length (2/3)

- Users should be able to structure their own view
  - Users with a large monitor may not want their text blocks circumscribed if it means that a large portion of their screen goes unused
  - A low-vision user with fonts set large will not appreciate being forced to view long pages with short lines of text
  - So although leaving text free to fill the browser window may affect readability, following conventions may also affect the accessibility and legibility of your documents

Typography: Line length (3/3)

Fixed text block, large portion of the screen unused

Unrestricted text fills browser window, long lines of text



Additional line spacing allows a somewhat longer line length without sacrificing legibility

Typography: White space

- The vertical space in a text block is called leading, and it is the distance from one baseline of text to the next
- Leading strongly affects the legibility of text blocks:
  - Too much leading makes it hard for the eye to locate the start of the next line
  - Too little leading confuses the lines
- Indenting paragraphs. There are two major schools of thought on denoting paragraphs:
  - The classic typographic method uses indents to signal the beginning of a new paragraph
  - However, many technical, reference, and trade publications now use a blank line of white space to separate paragraphs
  - Either approach is valid as long as the paragraph style is implemented consistently throughout the site

Typography: Type faces (1/2)

- Each typeface has a unique tone that should produce a harmonious fit between the verbal and visual flow of your content
- A layout that is carefully designed using one face may not format correctly in another
- In specifying typefaces you should choose from the resident default fonts for most operating systems
  - If you specify a font that is not on the user's machine, the browser will display your pages using the user-specified default font
  - Users may set their browser preferences to ignore font tags and display all pages using their designated default font

Typography: Type faces (2/2)

- Adapted traditional typefaces
  - Times New Roman is a good example of a traditional typeface that has been adapted for use on computer screens
  - Times New Roman is a good font to use in text-heavy documents that will probably be printed by readers rather than read from the screen
- Designed for the screen
  - Typefaces such as Georgia and Verdana were designed specifically for legibility on the computer screen
  - These fonts offer excellent legibility for Web pages designed to be read directly from the screen
  - However, these fonts look massive and clumsy when transferred to the high-resolution medium of paper

Choosing type faces

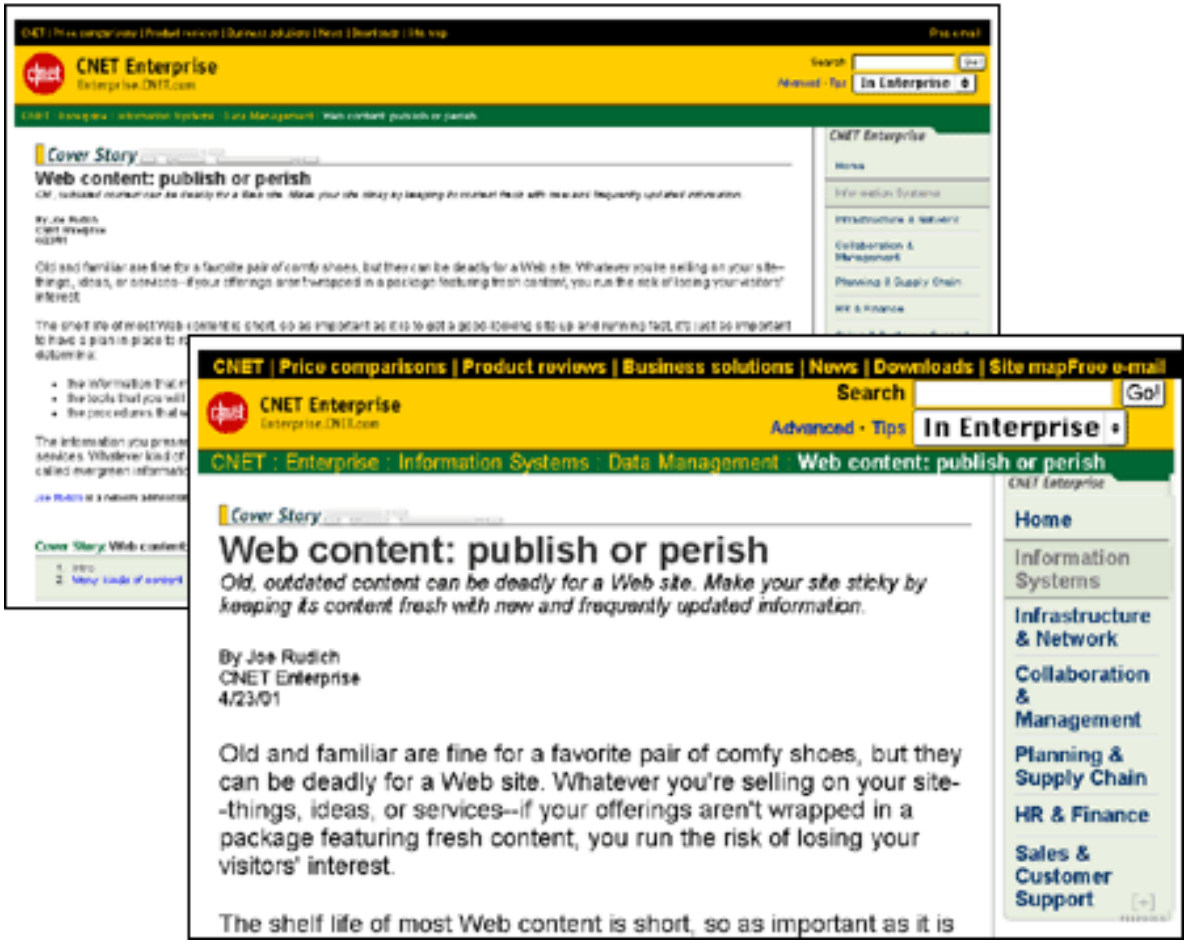
- Which typeface to use?
  - No one definite answer
  - Observe a typeface in multiple places to see its range
  - Look at how the same text with different typefaces to change its effect
  - In any case, it is safest to use a single typographic family and vary its weight and size for display type and emphasis
  - Also, it is safest to use a typeface that will be present in most operating systems

Typography: Type size (1/2)

- Setting the size of type is a matter of some controversy
  - The Web is supposed to be a universal medium where users of all kinds have equal access to information
  - For example, low-vision users can set the type of Web documents to display at a size that they find legible
  - But these adjustments can skew a page layout
- With the introduction of the FONT tag, designers also gained the ability to set the font size
- The W3C recommends that you let users set the base font size in their browser and that you set all variations using the "em" unit
  - For example, if the user-set default is 12-point, then a 2-em text indent would be 24-point, but if the user used the text zoom feature of the browser to change the size to 16-point, the indent would change to 32-point to reflect the larger type size
  - If you try this approach, use a flexible page layout that will hold up to large type

Typography: Type size (2/2)

With a well-designed flexible layout, the design remains intact even when the text is enlarged



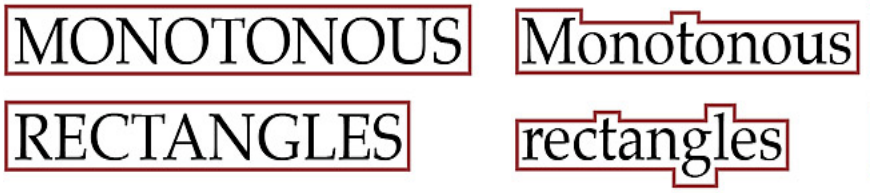
Typography: Emphasis (1/4)

- A Web page of solid body text is hard to scan for content structure and will not engage the eye
- Adding display type to a document will provide landmarks to direct the reader through your content
- A good rule of thumb when working with type is to add emphasis using one parameter at a time
- Italics: Italicized text attracts the eye because it contrasts in shape from body text
  - Use italics for convention — when listing book or magazine titles, for example — or within text for stressed or foreign words or phrases
  - Avoid setting large blocks of text in italics because the readability of italicized text is much lower than in comparably sized roman text

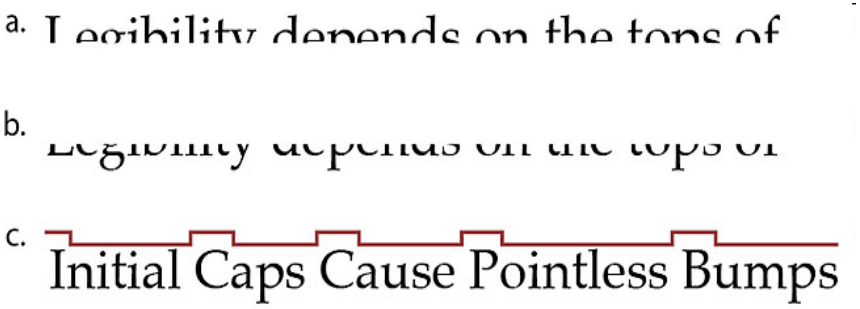
Typography: Emphasis (2/4)

- Bold: Boldface text gives emphasis because it contrasts in color from the body text
  - Section subheads work well set in bold
  - Boldface text is readable on-screen, though large blocks of text set in bold lack contrast and therefore lose their effectiveness
- Underlined: Underlining has a special functional meaning in Web documents. Most readers have their browser preferences set to underline links. If you include underlined text on your Web page it will certainly be confused with a hypertext link
- Colored text: You should avoid putting colored text within text blocks because readers will assume that the colored text is a hypertext link and click on it
  - Colored text does work well as a subtle means to distinguish section heads, however. Choose dark shades of color that contrast with the page background, and avoid using colors close to the default Web link colors of blue and violet

Typography: Emphasis (3/4)



- Capital letters: Capitalized text is one of the most common and least effective methods for adding typographical emphasis
- Words set in all capitals should generally be avoided because they are hard to scan
  - Words formed with capital letters are monotonous rectangles that offer few distinctive shapes to catch the eye
- Down-style typing (capitalize only the first word and any proper nouns) is recommended for large areas of text
  - Down style is more legible because as we read we primarily scan the tops of words



Typography: Emphasis (4/4)

- Spacing and indentation: One of the most effective and subtle ways to vary the visual contrast and relative importance of a piece of text is simply to isolate it or treat it differently from the surrounding text
  - If you want your major headers to stand out more without making them larger, add space before the header to separate it from any previous copy
  - Indentation is another effective means of distinguishing bulleted lists, or quotations

Typography: Consistency

- As in traditional print publishing, high-quality Web sites adhere to established type style settings consistently throughout the site
- Consistency gives polish to a site and encourages visitors to stay by creating an expectation about the structure of a text
- If sloppy, inconsistent formatting confounds this expectation, you will confuse your readers and they may not return
- You should decide on such settings as fonts, inter-paragraph spacing, the size of subheads, and so on and then create a written style guide to help you maintain these settings as you develop the site. This step is especially critical for large sites that incorporate numerous pages

Typography: Accessibility (1/3)

- When considering type, the main accessibility issues are size and color. These attributes come into play for users who have vision disabilities such as low vision or color blindness
- Vision-impaired users need to be able to transform text that they find illegible into a format that they can read
  - Low-vision users need to be able to increase the type size and set the text and page background colors for maximum contrast
  - Colorblind users also need control over text and background color
- Scalable text. Users cannot easily enlarge text that is set using absolute size values
  - To ensure scalability, use relative units
  - Use text graphics sparingly, and always offer a text-only equivalent

Typography: Accessibility (2/3)

- Structural markup. Text formatting done using presentation-style markup instead of style sheets limits users' ability to transform a layout to meet their needs
  - Some browsers have a feature that allows users to override author-defined style sheets with their own style sheet. This means that users can define a custom style sheet that meets their viewing needs
  - But these measures will not work, or will only work partially, on pages that are formatted using presentation markup
  - If text color is set using <FONT COLOR> and headings are set using <FONT SIZE> and <B> for emphasis, the user-defined style sheet will have nothing to apply itself to (no paragraph or heading tags)
  - If you set presentation properties using style sheets, users who need to customize the page can do so

Typography: Accessibility (3/3)

- Emphasis. If you use color alone to achieve typographic emphasis, users who cannot distinguish the colors will miss the emphasis.
  - To emphasize text so that it won't be overlooked, use bold formatting as well as color
  - Also be sure that there is sufficient contrast between the background and text on your page. Although contrast is particularly important for vision-impaired users, all users will benefit from greater readability
- Adaptable layouts. Most Web page layouts are not designed with large type in mind
  - For example, fixed layouts that limit the text column to a specified width are typically sized to accommodate 12-point type or smaller
  - Indeed, at large type sizes a fixed text column may contain only a few words, which makes the text awkward to read
  - For adaptable pages, use a flexible layout that transforms gracefully to accommodate larger type sizes

Layout

Grids, alignment and web page layout

Introduction

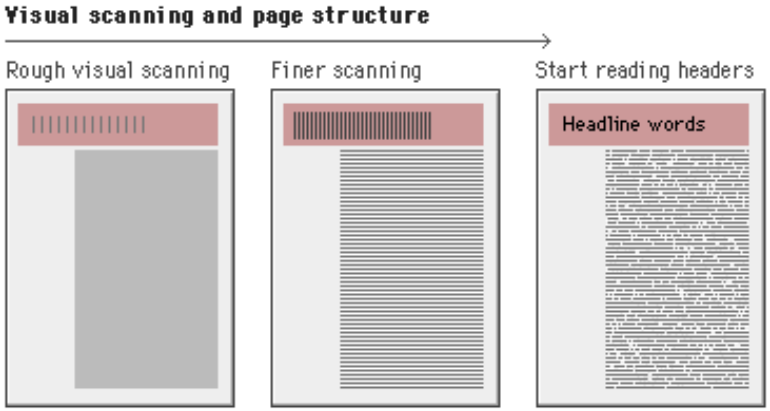
- Users seek clarity, order, and trustworthiness in information sources, whether they are traditional paper documents or Web pages
- The spatial organization of graphics and text on the Web page can engage the user with graphic impact, direct the user's attention, prioritise information, and make the user's interactions with your Web site more enjoyable and more efficient

Establish a visual hierarchy (1/4)

- The primary task of graphic design is to create a strong, consistent visual hierarchy, where important elements are emphasized, and content is organized logically and predictably.
- Graphic design is visual information management using the tools of layout, typography, and illustration to lead the reader's eye through the page.

Establish a visual hierarchy (2/4)

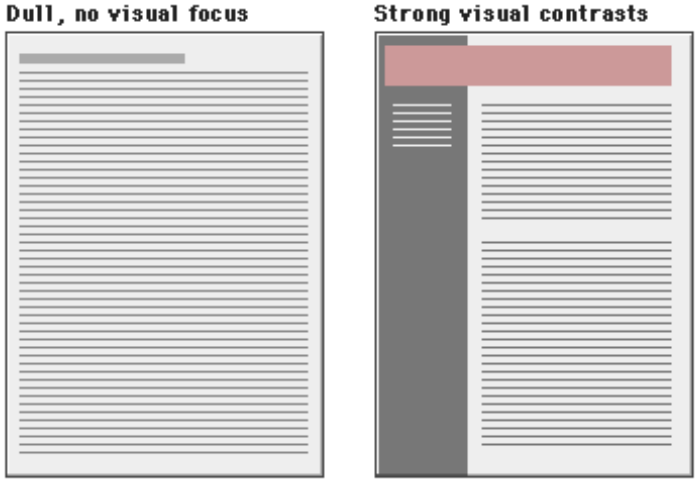
- Readers see pages first as large masses of shape and colour, with foreground elements contrasted against the background field



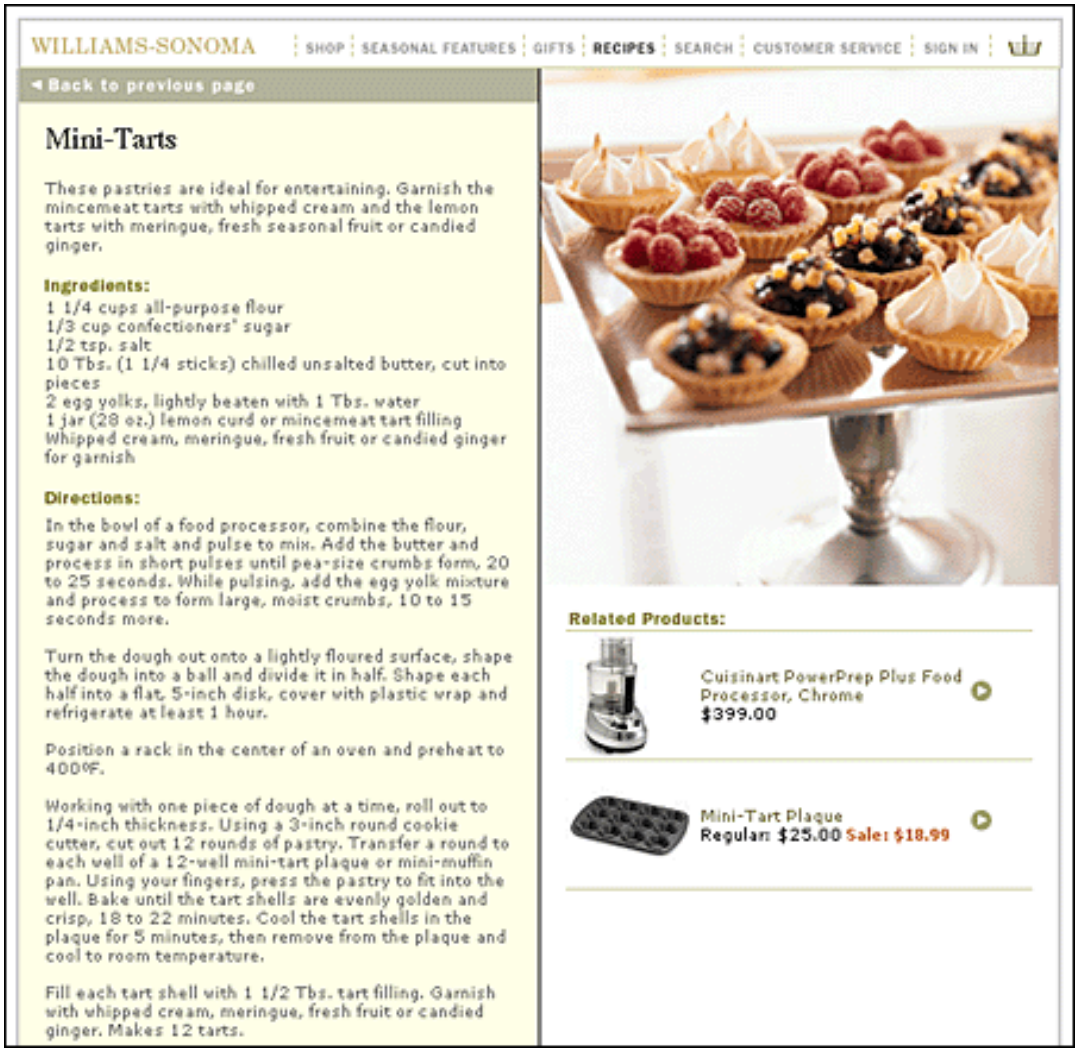
- Only secondarily do they begin to pick out specific information, first from graphics if they are present, and only afterward do they start parsing the "harder" medium of text and begin to read individual words and phrases

Establish a visual hierarchy (3/4)

- The overall graphic balance and organization of the page is crucial to drawing the reader into your content
- A dull page of solid text will repel the eye as a mass of undifferentiated grey, but a page dominated by poorly designed or overly bold graphics or type will also repel sophisticated users looking for substantive content
- What you want is an appropriate balance that attracts the eye with visual contrast and provides a sense of organization

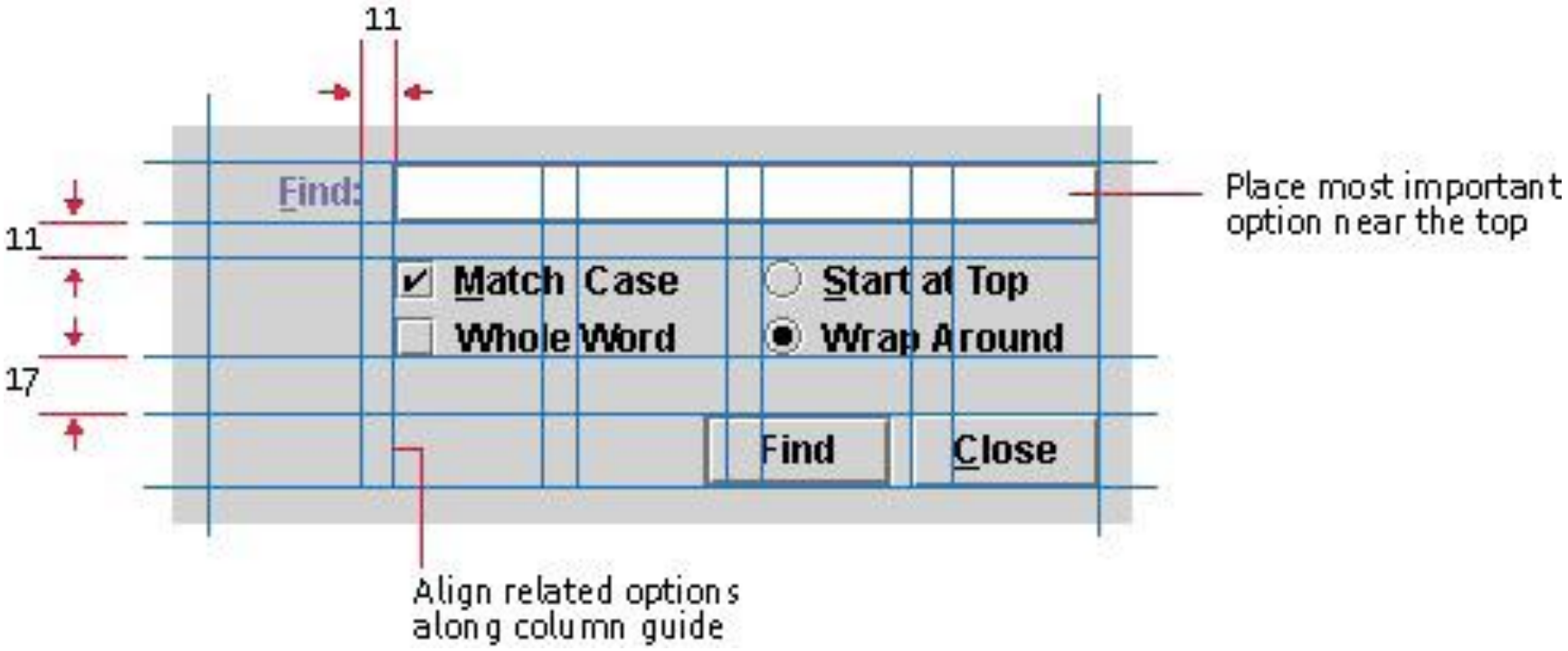


Establish a visual hierarchy (4/4)



Grids

- Designing with grids, using grouping and alignment to convey structure



Design grids for Web pages (1/4)

Poor page layout, no visual hierarchy

Better page layout; predictable, modular, clear visual structure

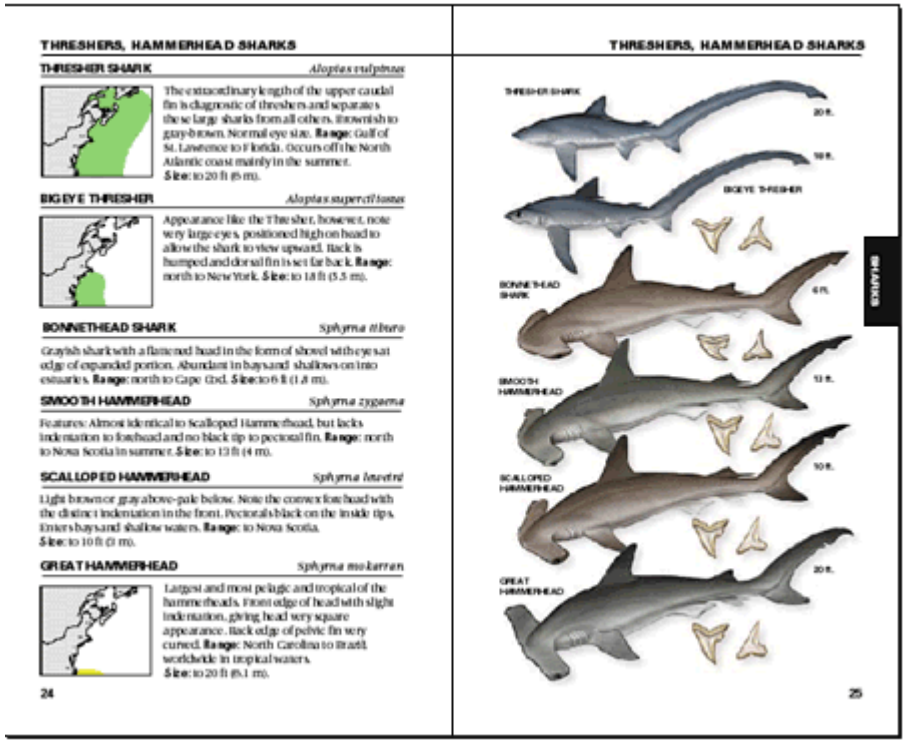
- Consistency and predictability are essential attributes of any well-designed information system
- When used inappropriately or inconsistently, the typographic controls and inlined graphics of Web pages can create a confusing visual jumble, without apparent hierarchy of importance
- Haphazardly mixed graphics and text decrease usability and legibility, just as they do in paper pages. A balanced and consistently implemented design scheme will increase readers' confidence in your site

Design grids for Web pages (2/4)

- No one design grid system is appropriate for all Web pages. Your first step is to establish a basic layout grid
- To start, gather representative examples of your text, along with some graphics, scans, or other illustrative material, and experiment with various arrangements of the elements on the page
- In larger projects it isn't possible to exactly predict how every combination of text and graphics will interact on the screen, but examine your Web layout "sketches" against both your most complex and your least complex pages
- Your goal is to establish a consistent, logical screen layout, one that allows you to "plug in" text and graphics without having to stop and rethink your basic design approach on each new page
- Without a firm underlying design grid, your project's page layout will be driven by the problems of the moment, and the overall design of your Web site will seem patchy and confusing

Design grids for Web pages (3/4)

Book page spread



THRESHERS, HAMMERHEAD SHARKS

THRESHER SHARK *Alopias vulpinus*

The extraordinary length of the upper caudal fin is diagnostic of threshers and separates these large sharks from all others. Brownish to gray-brown. Normal eye size. **Range:** Gulf of St. Lawrence to Florida. Occurs off the North Atlantic coast mainly in the summer. **Size:** to 20 ft (6 m).

BIGEYE THRESHER *Alopias superciliosus*

Appearance like the Thresher, however, note very large eyes, positioned high on head to allow the shark to view upward. Back is humped and dorsal fin is set far back. **Range:** north to New York. **Size:** to 18 ft (5.5 m).

BONNETHEAD SHARK *Sphyrna tiburo*

Grayish shark with a flattened head in the form of shovel with eyes at edge of expanded portion. Abundant in bays and shallows on into estuaries. **Range:** north to Cape Cod. **Size:** to 6 ft (1.8 m).

SMOOTH HAMMERHEAD *Sphyrna zygaena*

Features: Almost identical to Scalloped Hammerhead, but lacks indentation to forehead and no black tip to pectoral fin. **Range:** north to Nova Scotia in summer. **Size:** to 13 ft (4 m).

SCALLOPED HAMMERHEAD *Sphyrna lewini*

Light brown or gray above, pale below. Note the concave forehead with the distinct indentation in the front. Pectorals black on the inside tips. Enters bays and shallow waters. **Range:** to Nova Scotia. **Size:** to 10 ft (3 m).

GREAT HAMMERHEAD *Sphyrna mokarran*

Largest and most pelagic and tropical of the hammerheads. Front edge of head with slight indentation, giving head very square appearance. Back edge of pelvic fin very curved. **Range:** North Carolina to Brazil; worldwide in tropical waters. **Size:** to 20 ft (6.1 m).

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THRESHERS, HAMMERHEAD SHARKS

THRESHER SHARK

BIGEYE THRESHER

BONNETHEAD SHARK

SMOOTH HAMMERHEAD

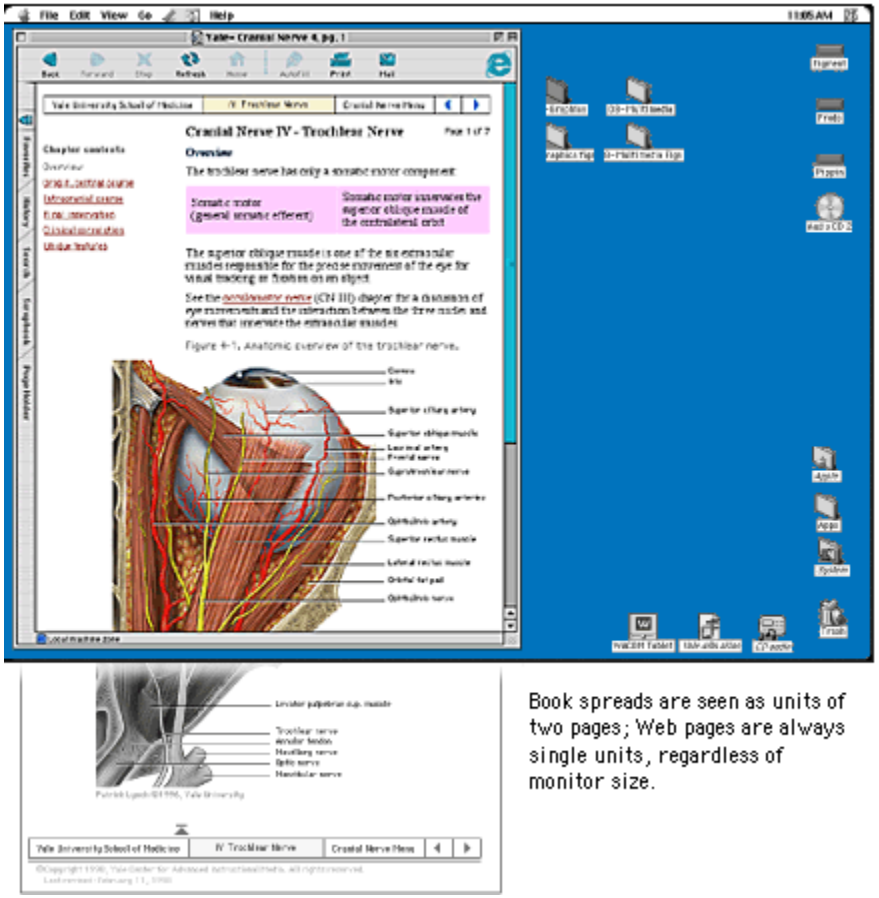
SCALLOPED HAMMERHEAD

GREAT HAMMERHEAD

SHARKS

25

Web page on a seventeen-inch monitor (1024 x 768 pixels)



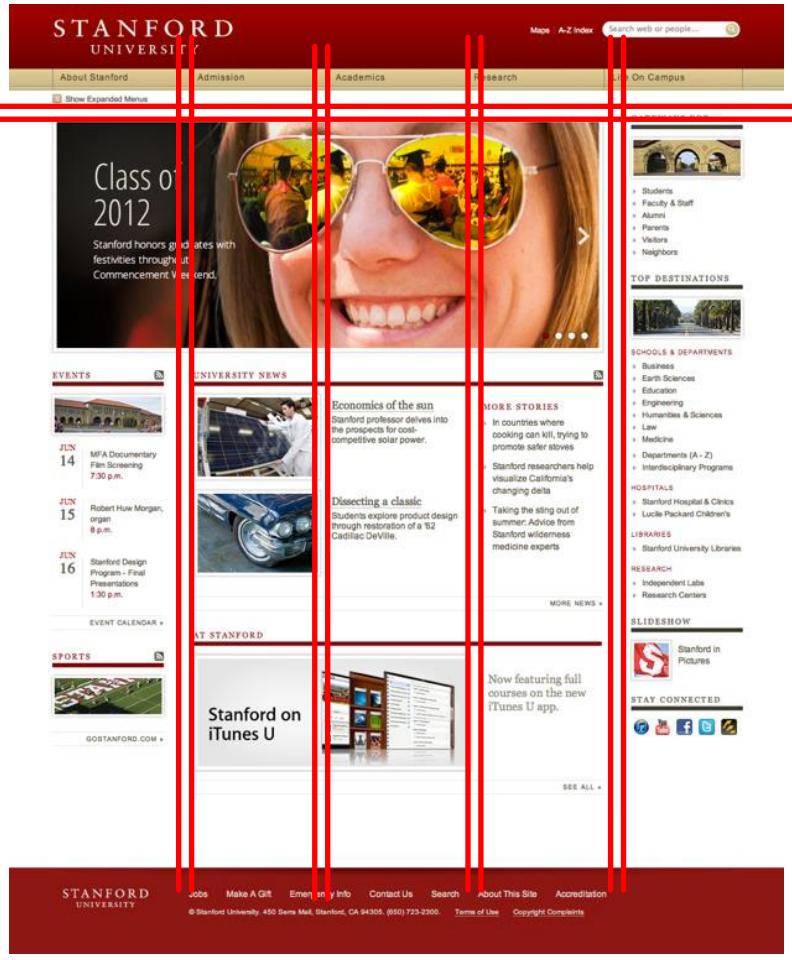
Book spreads are seen as units of two pages; Web pages are always single units, regardless of monitor size.

Design grids for Web pages (4/4)

- Most Web page designs can be divided vertically into zones with different functions and varying levels of graphics and text complexity
- As vertical scrolling progressively reveals the page, new content appears and the upper content disappears

Notice the vertical structure of the home page reproduced beside. The top screen of information is much denser with links because it is the only area that is sure to be visible to all users:

Examples


STANFORD
UNIVERSITY
About Stanford
Admission
Academics
Research
Life On Campus
Class of 2012
EVENTS
UNIVERSITY NEWS
Economics of the sun
Dissecting a classic
MORE STORIES
AT STANFORD
Stanford on iTunes U
SPORTS
TOP DESTINATIONS
SCHOOLS & DEPARTMENTS
SLIDESHOW
STAY CONNECTED


The New York Times
Thursday, June 14, 2012
BANG BANG
MARCJACOBS.COM
Court Dissolves Parliament in Egypt in Blow to Islamists
With Justices Set to Rule on Health Law, 2 Parties Strategize
U.N. Monitors Find Vast Devastation in Syrian Village
CAMPAIGN 2012
Candidates Go Head to Head on Economy
Merkel Stresses Limits to Germany's Strength
At U.S. Airports, a Building Boom Takes Hold
Stanford Gets 110 Years in $7 Billion Ponzi Case
SundayReview
News Analysis: Iran's High Card at the Nuclear Negotiation Table
MARKETS »
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MOVIES »
Heroes, Villains and the Invisible
A Smell of Wine and Cheap Perfume
A Solitary Retreat
Get there fast. Get there first.
DealB%k
dealbook.nytimes.com

Page layout: Introduction (1/2)

- HTML was designed by engineers and scientists who never envisioned it as a page layout tool. Their aim was to provide a way to describe structural information about a document, not a tool to determine a document's appearance
- Once the real world started to work on the Web, graphic designers began adapting the primitive tools of HTML to produce documents that looked more like their print counterparts. The point was not to produce "jazzier" or "prettier" pages

Page layout: Introduction (2/2)

- Unlike a printed document, which is "fixed" in its medium, the look of a Web page depends on such elements as the display size, resolution, and color settings, the height and width of the browser window, software preferences such as link and background color settings, and available fonts
- Indeed, there is no way to have complete control over the design of a Web page. The best approach, then, is to design flexible pages that are accessible to all users
- One of the visual properties that Cascading Style Sheets are meant to describe is how elements are positioned on the page
  - Style sheet positioning should provide all the design control needed to lay out visually appealing and legible Web pages
  - In practice, however, there are a few browser inconsistencies that the designer should take into consideration
  - See http://www.glish.com/css/

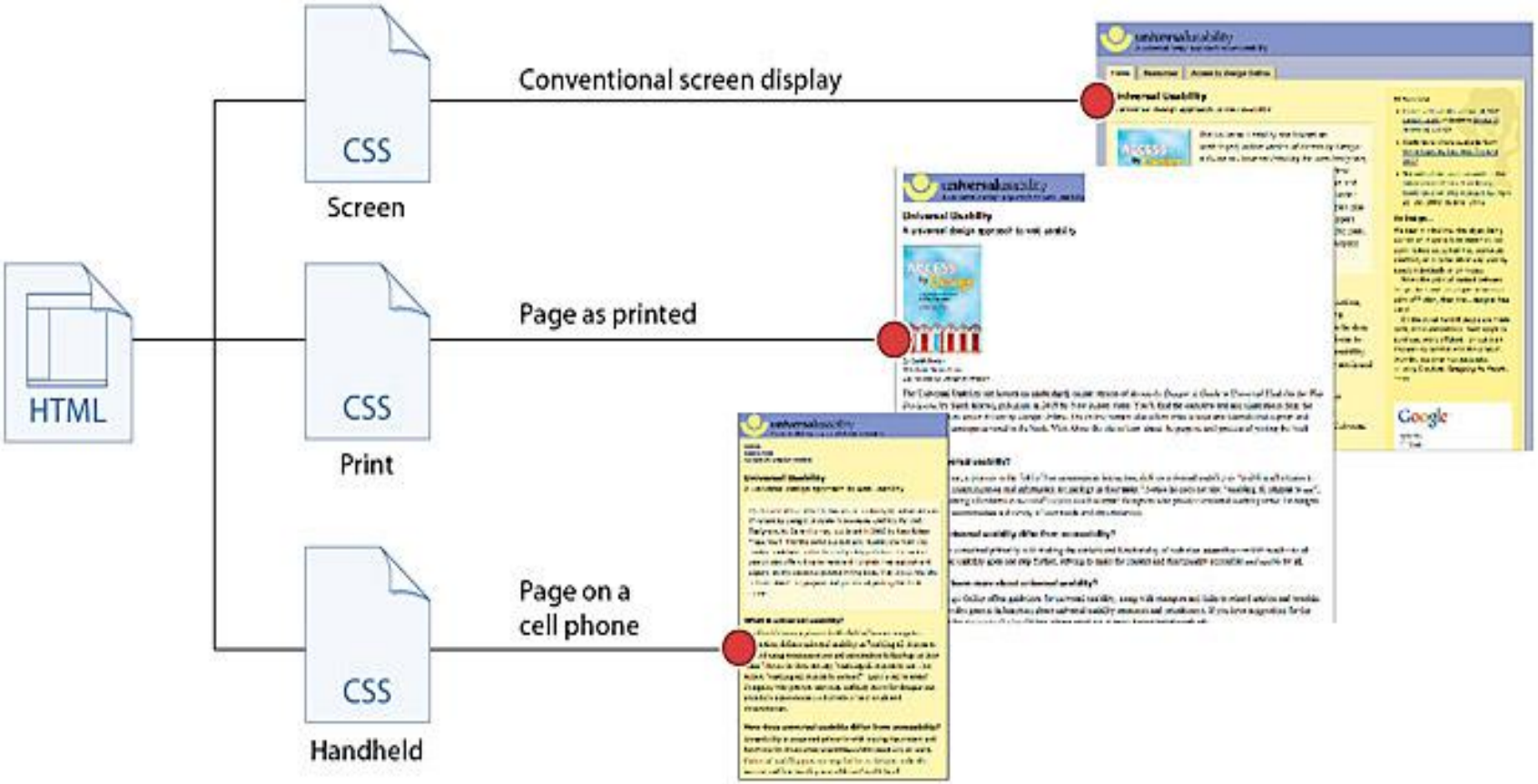
Page layout: Don’t use tables!

- Tables existed in HTML for one reason: To display tabular data. But then border="0" made it possible for designers to have a grid upon which to lay out images and text
- Still the most dominant means of designing visually rich Web sites, the use of tables is now actually interfering with building a better, more accessible, flexible, and functional Web
- Table-based pages are much less accessible to users with disabilities and viewers using cell phones and PDAs to access the Web
- Visitors using screen readers (as well as those with slow connections) do not have to wade through countless table cells and spacers to get at the actual content of our pages
- Modern browsers are much better at rendering Web standards and you don't need to use these archaic methods any more

Page layout: Use CSS!

- Instead of nesting tables within tables and filling empty cells with spacer GIFs, you can use much simpler markup and CSS to lay out beautiful sites that are faster to load, easier to redesign, and more accessible to everyone
- By using structural markup in your HTML documents and Cascading Style Sheets to lay out your pages, you can keep the actual content of your pages separated from the way they are presented
- By removing presentational markup from your pages, redesigns of existing sites and content is much less labor intensive (and much less expensive). To change the layout of the site, all you need to do is change the style sheets; you do not need to edit the pages themselves at all. (see http://www.csszengarden.com)
- Using Web standards also makes it extremely easy to maintain visual consistency throughout a site. Since pages use the same CSS document for their layout, they are all formatted the same

CSS


CSS
Screen
Conventional screen display
HTML
CSS
Print
Page as printed
CSS
Handheld
Page on a
cell phone

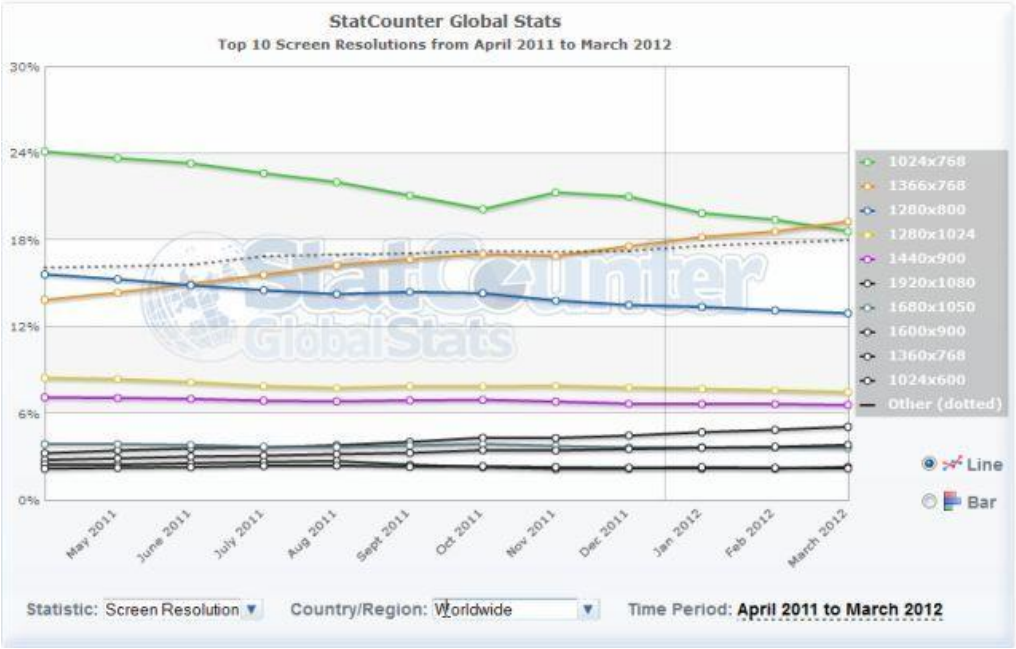
Page layout considerations (1/3)

- Line length
  - Research shows that reading slows and retention rates fall as line lengths begin to exceed the ideal width. Quantitative studies show that moderate line lengths significantly increase the legibility of text
  - Try to limit the line length, ideally to ten to twelve words per line
- Margins
  - Margins define the reading area of your page by separating the main text from non-text elements, such as interface elements and other unrelated graphics
  - Margins also provide contrast and visual interest
  - Take advantage of the options CSS provides to establish margins, and use them consistently throughout your site to provide unity

Page layout considerations (2/3)

Source: W3Counter, March 2013

Screen Resolutions		
1	1366x768	19.28%
2	1024x768	12.26%
3	1280x800	9.55%
4	1280x1024	6.49%
5	1920x1080	6.24%
6	1440x900	5.69%
7	320x480	4.99%
8	768x1024	4.54%
9	1600x900	4.00%
10	1680x1050	3.08%



Source: W3Schools

Screen Resolution

Today, most visitors have a screen resolution higher than 1024x768 pixels:

Date	Higher	1024x768	800x600	640x480	Other
January 2013	90%	9%	0.5%	0%	0.5%
January 2012	85%	13%	1%	0%	1%
January 2011	85%	14%	0%	0%	1%
January 2010	76%	20%	1%	0%	3%

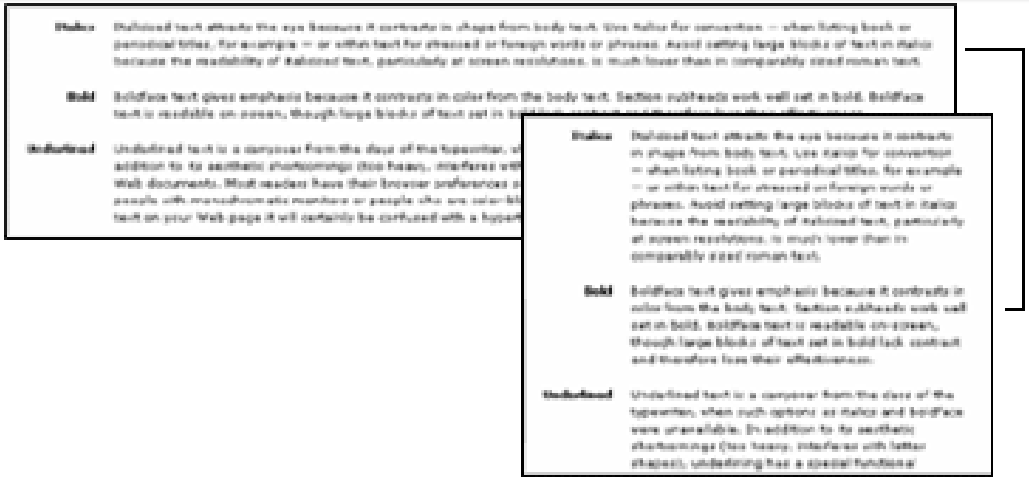
Page layout considerations (3/3)

- Monitor Size
  - There is no definite study about the size of monitors
  - It seems the most prevalent sizes are 17 and 19 inch monitors, but there is no doubt that there is a substantial amount of users still using old 15 inch monitors and much larger ones
- Keep these in mind when deciding the layout of your site and the width of every area, particularly the content area, where the user will spend time reading

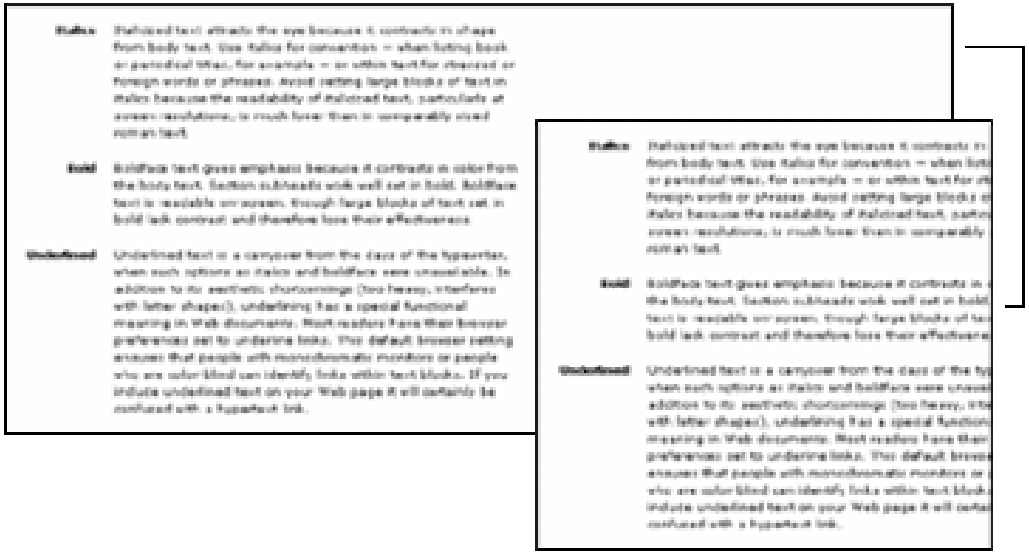
Page layout: Fixed vs. flexible (1/5)

- An important choice that must be taken early in the design process is to decide if the layout of the page will be flexible or fixed
- In flexible (or fluid) layouts, the content flows to fit the width of the window
- In fixed layouts the width is predetermined by the designer

Page layout: Fixed vs. flexible (2/5)



Variable-width containers reflow to fill the browser window



Fixed-width containers maintain their dimensions regardless of the browser window

Page layout: Fixed vs. flexible (3/5)

Fixed layout

- Advantages
  - Maximum control over page layout and design
  - Much easier to implement than flexible, especially when designing graphics in Photoshop
  - The content area can be designed to narrow the line lengths in which content is presented, which is easier to read
  - Tabs in browsers are becoming increasingly common, so rarely do users resize the browser window
    - Maximized windows seem (but not definitely) to be the usual setting
- Disadvantages
  - Users with lower resolutions or monitor sizes might have to use the very annoying horizontal scrollbar
  - Real estate will go unused for users with larger monitors and higher resolutions than the fixed width
    - You can avoid the "wasteland" effect of a fixed layout by centering the container in the browser window or by designing a background graphic to fill the empty areas of the screen

Page layout: Fixed vs. flexible (4/5)

Flexible layout

- Advantages
  - takes advantage of 'screen real estate' and the capabilities of a user's computer, not to mention giving users the freedom to decide the overall presentation
  - Minimizes the possibility of vertical scrolling
  - presents more information above the fold
    - Although wheels on mice have become standard so vertical scrolling is not a problem anymore
- Disadvantages
  - text spanning across a wide distance in larger monitors and high resolutions is very difficult to read
  - The designer loses freedom and control over the final presentation of the content.
  - Difficult to implement a graceful *and* graphic intense design that looks great on several resolutions and browser window sizes

Page layout: Fixed vs. flexible (5/5)

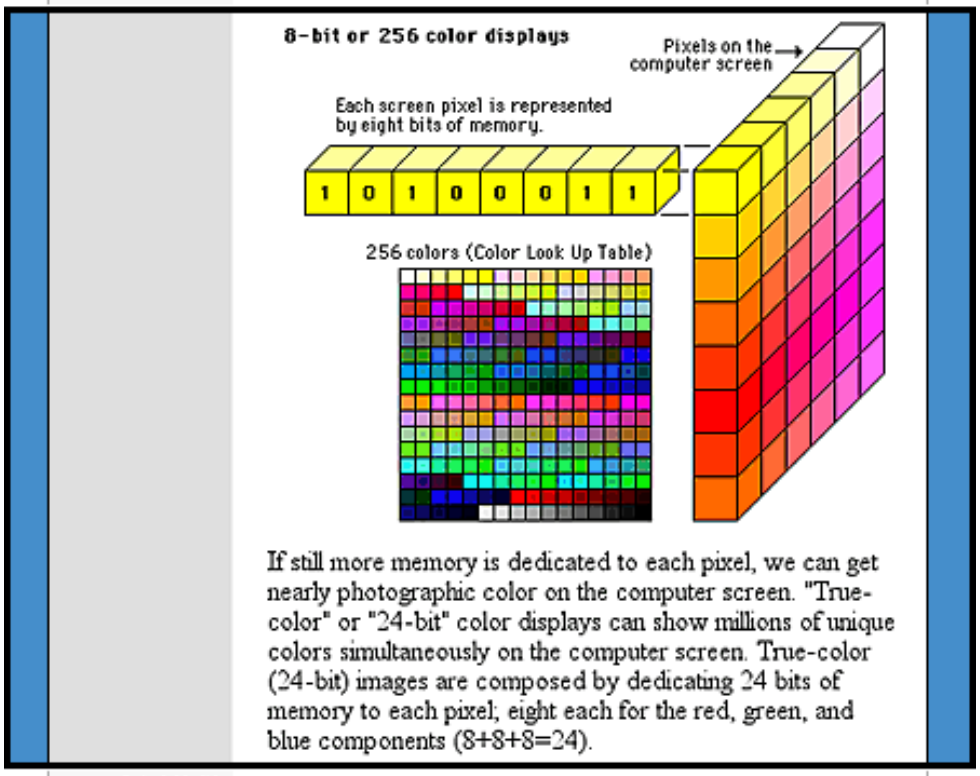
- Which one?
  - There is no standard answer, designers still argue over the best solution
  - The final decision will depend on various factors
  - If your site is intended to grab attention, be “arty”, promotional or something similar, you should think seriously about a fixed layout
  - If your site is geared towards a wider audience and its primary purpose is to convey information, you need to make it as flexible as possible

Page length (1/7)

- Determining the proper length for any Web page requires balancing four factors:
  1. The relation between page and screen size
  2. The content of your documents
  3. Whether the reader is expected to browse the content online or to print or download the documents for later reading
  4. The bandwidth available to your audience
- Researchers have noted the disorientation that results from scrolling on computer screens
- The reader's loss of context is particularly troublesome when such basic navigational elements as document titles, site identifiers, and links to other site pages disappear off-screen while scrolling

Page length (2/7)

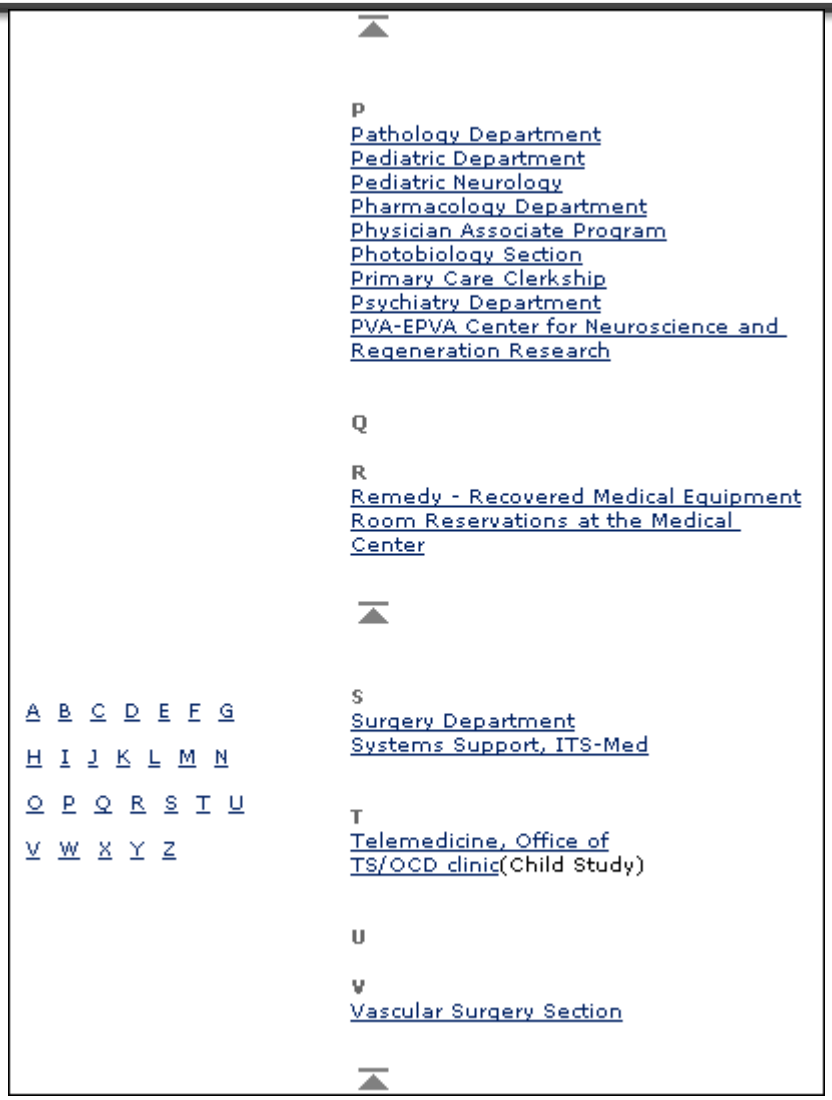
computer display is called an "eight-bit" or "256-color" display, and is very common in current microcomputing, especially on lap-top computers and older desktop machines.



Page length (3/7)

- Long Web pages do have their advantages, however
- They are often easier for creators to organize and for users to download. Web site managers don't have to maintain as many links and pages with longer documents, and users don't need to download multiple files to collect information on a topic
- Long pages are particularly useful for providing information that you don't expect users to read online (realistically, that means any document longer than two printed pages)
- You can make long pages friendlier by positioning "jump to top buttons" at regular intervals down the page. That way the user will never have to scroll far to find a navigation button that quickly brings him or her back to the top of the page

Page length (4/7)



P
Pathology Department
Pediatric Department
Pediatric Neurology
Pharmacology Department
Physician Associate Program
Photobiology Section
Primary Care Clerkship
Psychiatry Department
PVA-EPVA Center for Neuroscience and Regeneration Research

Q

R
Remedy - Recovered Medical Equipment
Room Reservations at the Medical Center

A B C D E F G
H I J K L M N
O P Q R S T U
V W X Y Z

S
Surgery Department
Systems Support, ITS-Med

T
Telemedicine, Office of
TS/OCD clinic(Child Study)

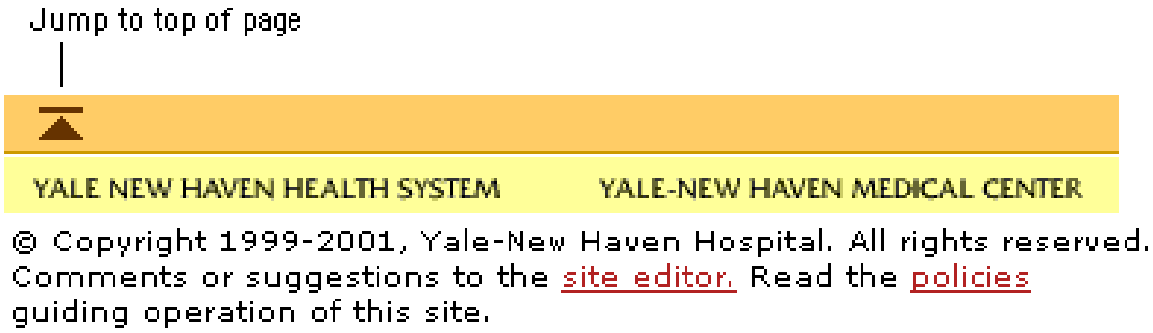
U

V
Vascular Surgery Section

info.med.yale.edu

Page length (5/7)

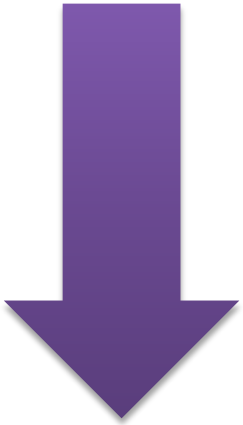
- All Web pages longer than two vertical screens should have a jump button at the foot of the page:



Page length (6/7)

- If you wish to provide both a good online interface for a long document and easy printing or saving of its content:
  - Divide the document into chunks of no more than one to two printed pages' worth of information, including inlined graphics or figures. Use the power of hypertext links to take advantage of the Web medium
  - Provide a link to a separate file that contains the full-length text combined as one page designed so the reader can print or save all the related information in one step. Don't forget to include the URL of the online version within the text of that page so users can find updates and correctly cite the source

Page length (7/7)



Shorter Web pages should be favored for:

- Home pages and menu or navigation pages elsewhere in your site
- Documents to be browsed and read online
- Pages with very large graphics

Longer documents are:

- Easier to maintain (content is in one piece, not in linked chunks)
- More like the structure of their paper counterparts (not chopped up)
- Easier for users to download and print

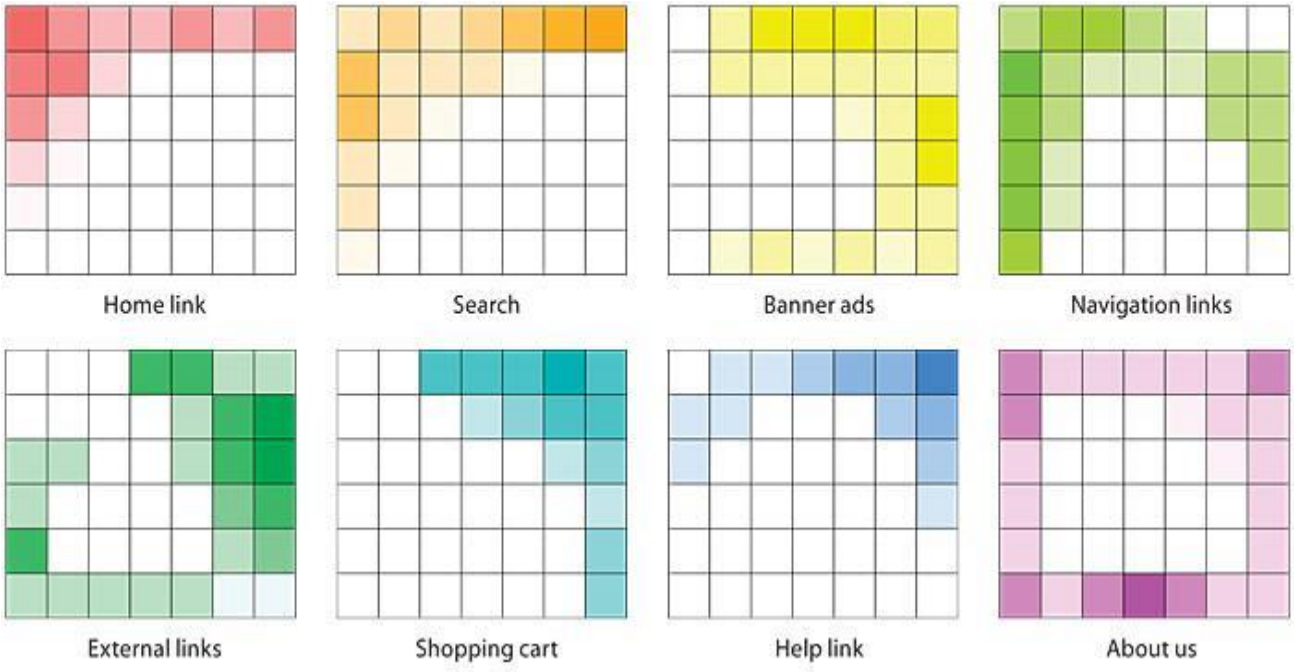
Where to put things, and why (1/3)

- Eye-tracking studies by Jakob Nielsen show that web pages dominated by text information are scanned in an “F” pattern of intense eye fixations across the top header area, and down the left edge of the text

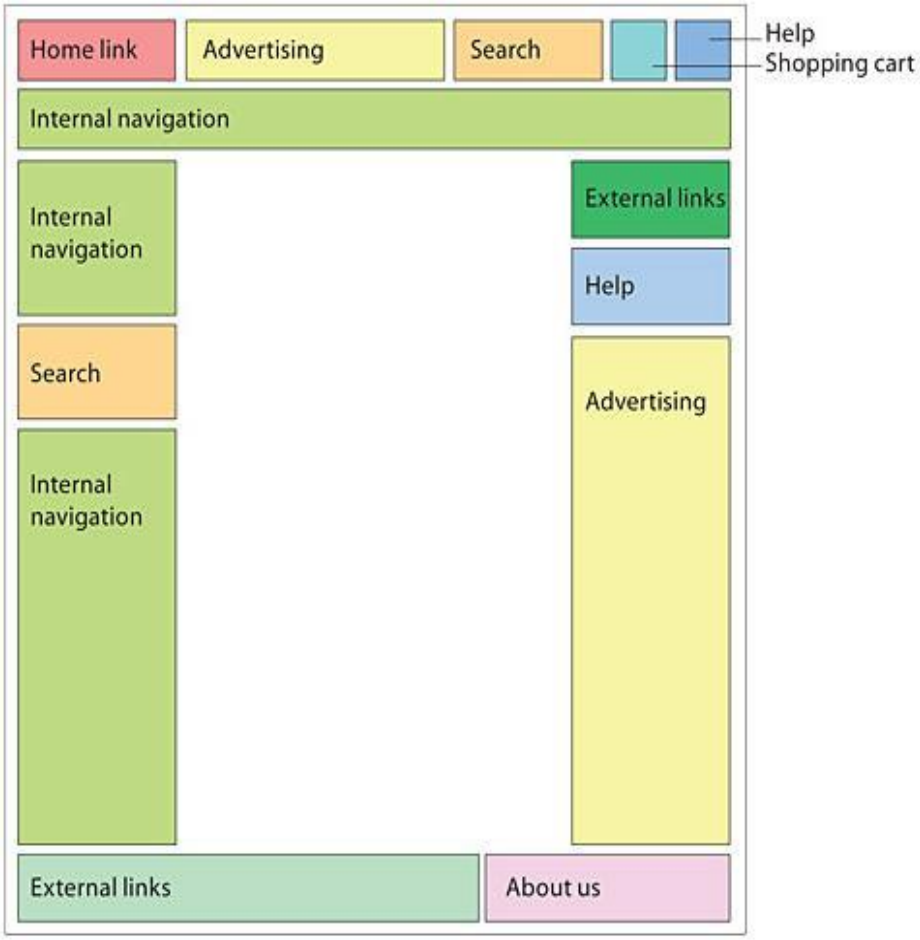
About Us page (left), Product page (center), search engine results (rights)

Where to put things, and why (2/3)

- When readers scan web pages they are clearly using a combination of classic Gutenberg z page scanning, combined with what they have learned from the emerging standards and practices of web designers



Where to put things, and why (3/3)



- Users have developed clear expectations about where common content and interface elements are likely to appear
- Violate these expectations at your peril

Colour

Colour vision

- A person with 'normal' colour vision is able to perceive over 7 million different shades of colour
  - But, only 8 to 10 different colours can be identified accurately, without prior training
  - About 8% of men and 1% of women are colour blind, most commonly being unable to discriminate between red and green
- At the periphery the eye is least sensitive to red, green, and yellow light and most sensitive to blue light
  - Blue is a good background color, especially on big screens
- At the front of the eye, where colour vision is at its best, the eye is most sensitive to red and yellow and is least sensitive to blue
  - Small blue objects tend to disappear on the screen, and this is especially true where the blue is pale
  - Small changes in shades of blue are difficult to distinguish but the eye is sensitive to small changes in red

Colour vision considerations

- Spectrally extreme colours should not be placed together
  - Thus, blue and red must never be placed together

Last checked: 0 minutes ago. No mails fetched. View history Check mail now

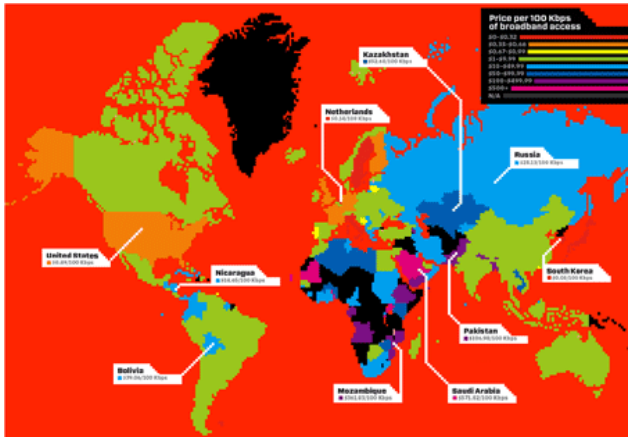
Authentication error. Mail from this account has not been retrieved since 9:18 am.
View details

  - Red, orange, and yellow can be viewed comfortably together
  - Dark or dim colours should be used for the background and bright colours for the foreground

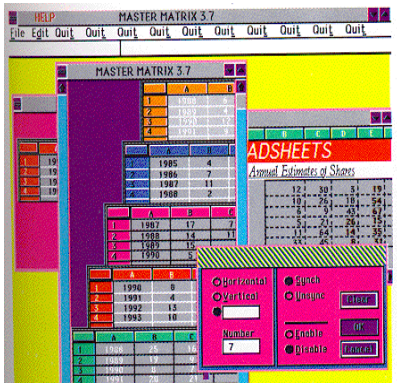
National Archives: Insufficient contrast

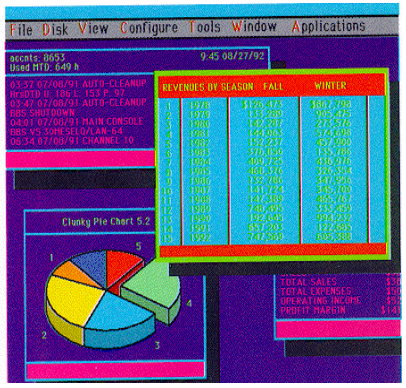
Colour segmentation and colour pollution

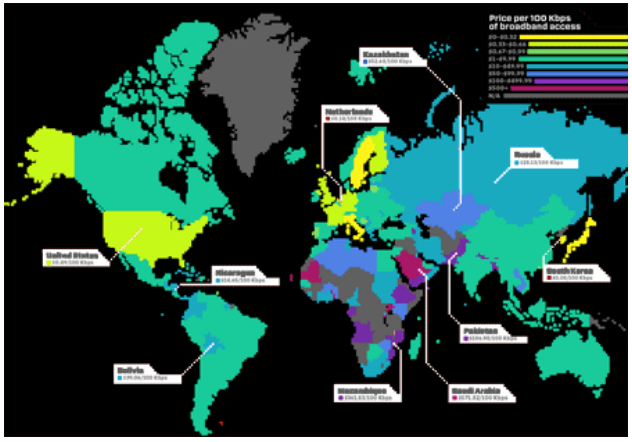
- Segmentation colour: is a very powerful way of dividing a display into separate regions. Areas that need to be seen as belonging together should have the same colour



- Amount of colour: too many colours in a display increase search times, so they should be used conservatively. Excessive use of colour can result in Colour Pollution



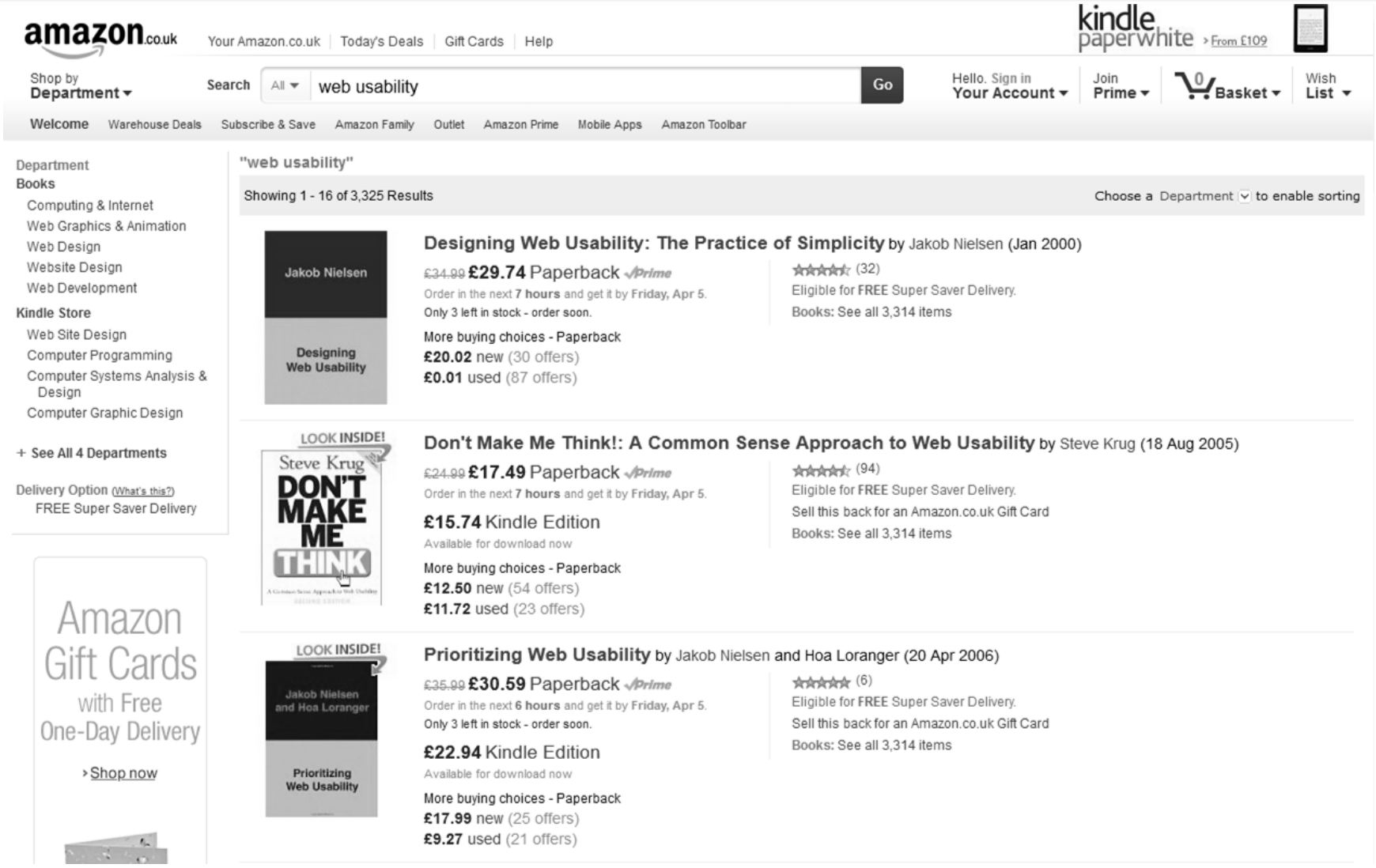




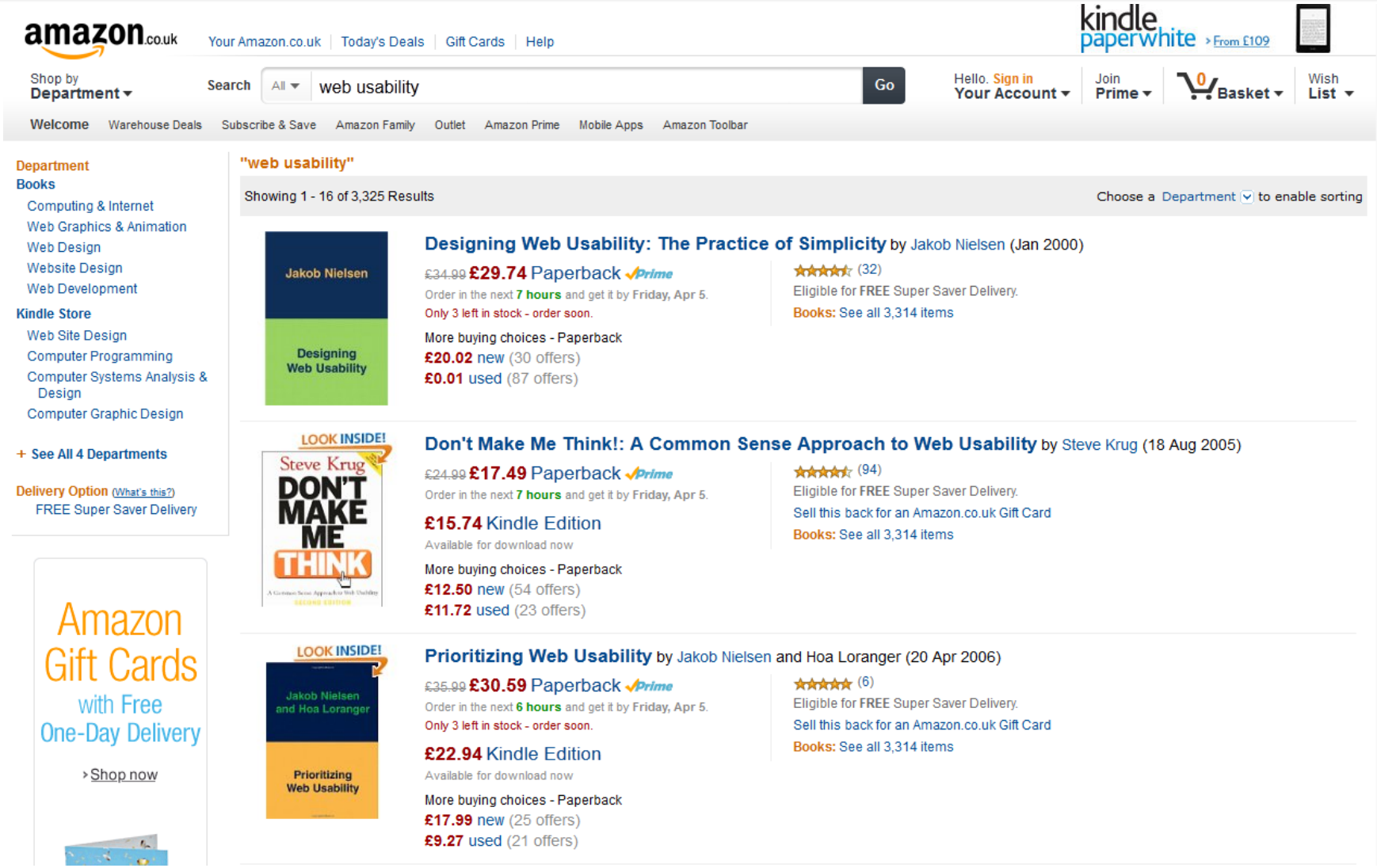
Tips

- Design in grayscale first
  - Often people rely on colour as a crutch for making visual distinctions in designs
  - That is fine but it should happen after the other tools have been used: typography and layout
  - Use luminance to distinguish between what's more and less important
    - Add colour later, preserving the luminance distinctions, in order to provide additional redundant coding for salience

Example: Amazon in Grayscale



Amazon in colour



Information Design

Organizing information and information scent

Steps in organizing information

- There are five basic steps in organizing your information:

1. **Inventory your content:** What do you have already? What do you need?
2. **Establish a hierarchical outline of your content** and create a **controlled vocabulary** so the major content, site structure, and navigation elements are always identified consistently;
3. **Chunking**: Divide your content into logical units with a consistent modular structure;
4. **Draw diagrams** that show the **site structure** and rough outlines of pages with a **list of core navigation links**; and
5. **Analyze** your system **by testing the organization** interactively **with real users**; **revise** as needed

Five hat racks: Themes to organize information (1/2)

1. **Category**
   - **Organization by the similarity of characteristics or relatedness of the items**
   - A particularly useful approach when all the things being organized are of equal or unpredictable importance
   - Examples include topics of books in a bookstore or library and items in a department or grocery store
2. **Time**
   - **Organization by timeline or history, where elements are presented in a sequential step-by-step manner**
   - This approach is commonly used in training
   - Other examples include television listings, a history of specific events, and measuring the response times of different systems
3. **Location**
   - **Organization by spatial or geographic location, most often used for orientation and direction**
   - Obviously lends itself to maps but is also used extensively in training, repair, and user manual illustrations and other instances where information is tied to a place

Five hat racks: Themes to organize information (2/2)

4. **Alphabetic**
   - **Organization based on the initial letter of the names of items**
   - Obvious examples are telephone and other name-oriented directories, dictionaries, and thesauri, where users know the word or name they are seeking
   - Alphabetic systems are simple to grasp and familiar in everyday life
   - This method of organization is less effective for short lists of unrelated things but is powerful for long lists
5. **Continuum**
   - **Organization by the quantity of a measured variable over a range, such as price, score, size, or weight**
   - Continuum organization is most effective when organizing many things that are all measured or scored the same way
   - Examples include rankings and reviews of all kinds, such as the best movies in a given year, darkest or lightest items, and other instances where a clear weight or value can be assigned to each item

Give users direct access (1/2)

- Provide the user with the information they want in the fewest possible steps, and in the shortest time
- Design an efficient hierarchy of information, to minimize the number of steps through menu pages
- Interface studies have shown that users prefer menus that present a minimum of five to seven links, and that users prefer a few very dense screens of choices over many layers of simplified menus

Give users direct access (2/2)

- In the table below note that you do not need many levels of menus to incorporate large numbers of choices:

Number of nested menus	Number of menu items listed			
	5	7	8	10
1	5	7	8	10
2	25	49	64	100
3	125	343	512	1000

Chunking information (1/2)

- Long before the Web was invented, technical writers discovered that readers appreciate short "chunks" of information that can be located and scanned quickly. This method for presenting information translates well to the Web for several reasons:
  - Few Web users spend time reading long passages of text on-screen. Most users either save long documents to disk, or print them for more comfortable reading
  - Discrete chunks of information lend themselves to Web links
  - The user of a link usually expects to find a specific unit of related information, not a whole book's worth of information to filter through
  - But don't subdivide your information too much, or you will frustrate your readers

Chunking information (2/2)

- Chunking can help organize and present information in a uniform format. This allows users not only to apply past experience with a site to future searches and explorations but also to predict how an unfamiliar section of a Web site will be organized
- Concise chunks of information are better suited to the computer screen, which provides only a limited view of long documents
  - Very long Web pages tend to be disorienting, because they require the user to scroll long distances, and to remember the organization of things that have scrolled off-screen

Hierarchy of importance

- Most sites depend on hierarchies, moving from the most general overview of the site (the home page), down through increasingly specific submenus and content pages

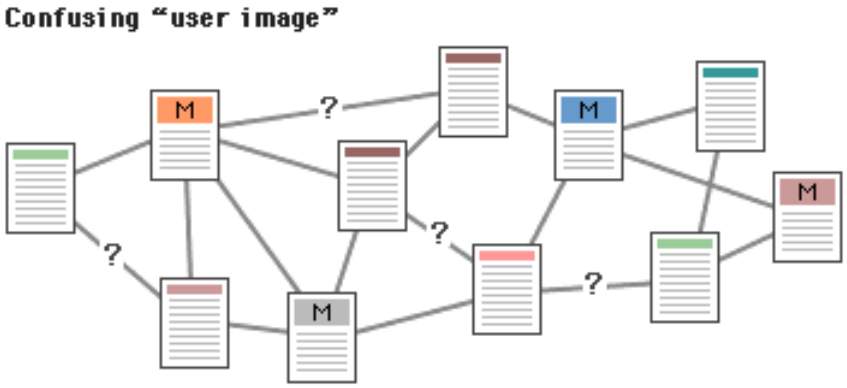
- Chunks of information should be ranked in importance and organized by the interrelations among units
- Once you have determined a logical set of priorities, you can build a hierarchy from the most important or general concepts down to the most specific or detailed topics

Relationships (1/2)

- When confronted with a new and complex information system users begin to build mental models. They use these models to assess relationships among topics, and to make guesses about where to find things they haven't seen before
- The success of your Web site as an organization of information will largely be determined by how well your actual organization system matches your user's expectations
- A logical site organization allows users to make successful predictions about where to find things

Relationships (2/2)

- Consistent methods of displaying information permit users to extend their knowledge from familiar pages to unfamiliar ones
- If you mislead users with a structure that is not logical (or have no comprehensible structure at all), users will be constantly frustrated by the difficulties of find their way around
- You don't want your user's mental model of your site to look like this:



Information Organization Summary

- The most important step in planning your site is to organize your information
  - Thinking carefully about what you want to say and how you want to say it requires that you become intimately acquainted with your site content
  - Create outlines, chunk your information into sections and subsections, think about how the sections relate to one another, and create a table of contents
- A well-organized table of contents can be a major navigation tool in your Web site
  - The table is more than a list of links — it gives the user an overview of the organization, extent, and narrative flow of your presentation

Web site structures

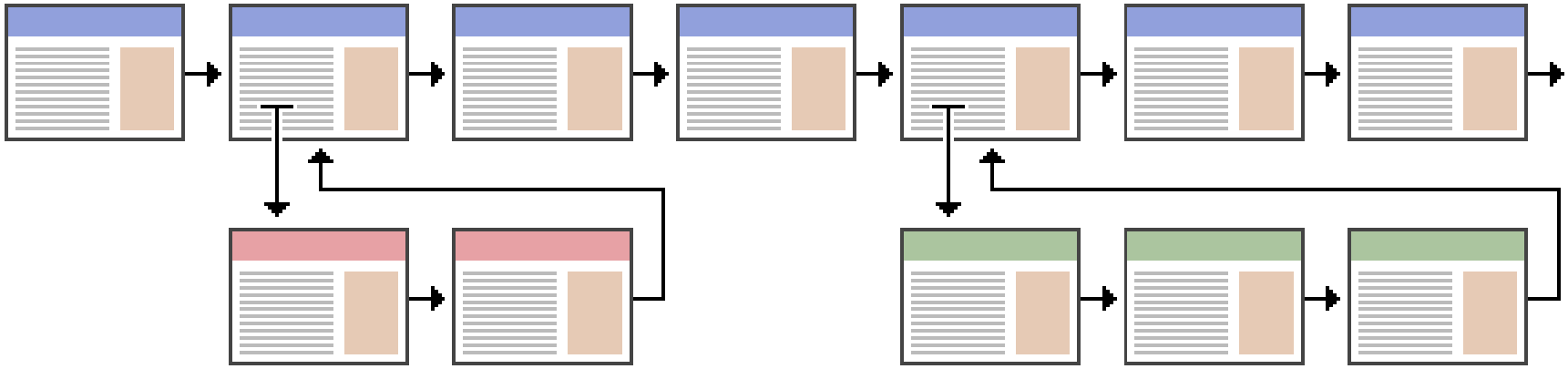
- Web sites are built around basic structural themes
- These fundamental architectures govern the navigational interface of the Web site and mold the user's mental models of how the information is organized
- Three essential structures can be used to build a Web site:
  - sequences,
  - hierarchies, and
  - webs.

Sequence (1/2)

- The simplest way to organize information is to place it in a sequence
- Sequential ordering may be chronological, a logical series of topics progressing from the general to the specific, or alphabetical, as in indexes, encyclopedias, and glossaries
- Straight sequences are the most appropriate organization for training sites, for example, in which the reader is expected to go through a fixed set of material and the only links are those that support the linear navigation path:

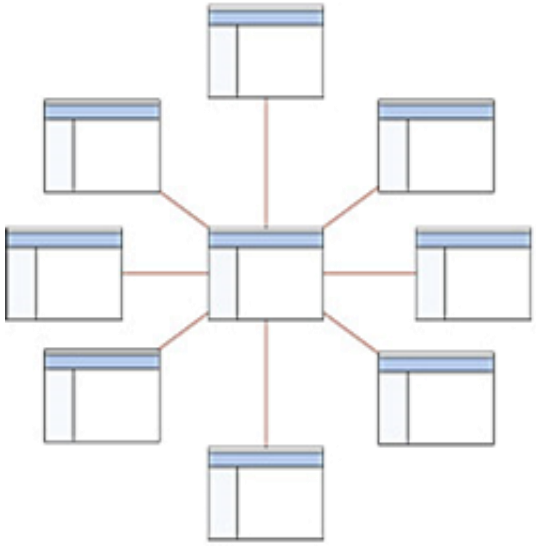
Sequence (2/2)

- More complex Web sites may still be organized as a logical sequence, but each page in the main sequence may have links to one or more pages of digressions, parenthetical information, or information on other Web sites:



Hierarchy (1/2)

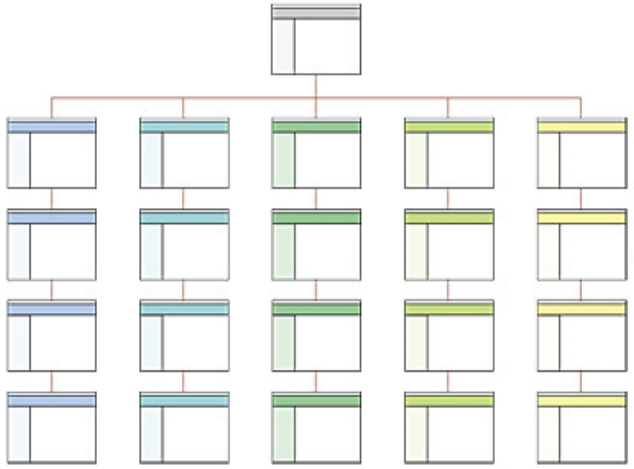
- Information hierarchies are the best way to organize most complex bodies of information. Because Web sites are usually organized around a single home page, hierarchical schemes are particularly suited to Web site organization.
- The simplest form of hierarchical site structure is a star, or hub-and-spoke, set of pages arrayed off a central home page. The site is essentially a single-tier hierarchy. Navigation tends to be a simple list of subpages, plus a link for the home page



Hierarchy (2/2)

- Most web sites adopt some form of multitiered hierarchical or tree architecture. This arrangement of major categories and subcategories has a powerful advantage for complex site organization in that most people are familiar with hierarchical organizations, and can readily form mental models of the site structure

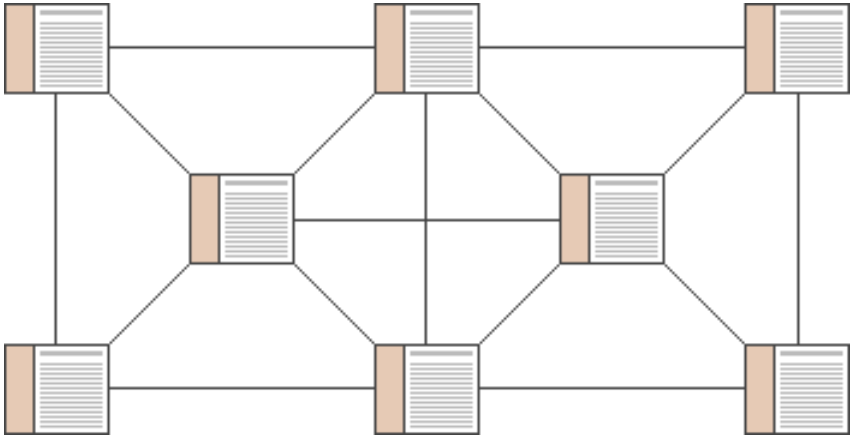
- Although hierarchical sites organize their content and pages in a tree of site menus and submenus off the home page, this hierarchy of content subdivisions should not become a navigational straitjacket for the user who wants to jump from one area of the site to another



- Most site navigation interfaces provide global navigation links that allow users to jump from one major site area to another without being forced to back up to a central home page or submenu

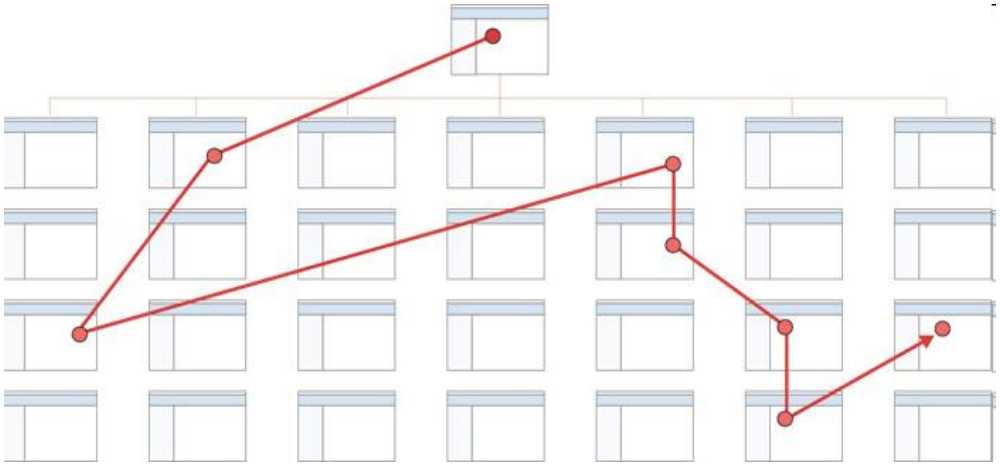
Web

- The goal is often to mimic associative thought and free flow of ideas, where users follow their interests in a heuristic, idiosyncratic pattern unique to each person who visits the site
- This organizational pattern develops in Web sites with very dense links both to other information within the site, and information on other World Wide Web sites
- Webs work best for small sites dominated by lists of links, aimed at highly educated or experienced users looking for further education or enrichment, not for a basic understanding of your topic



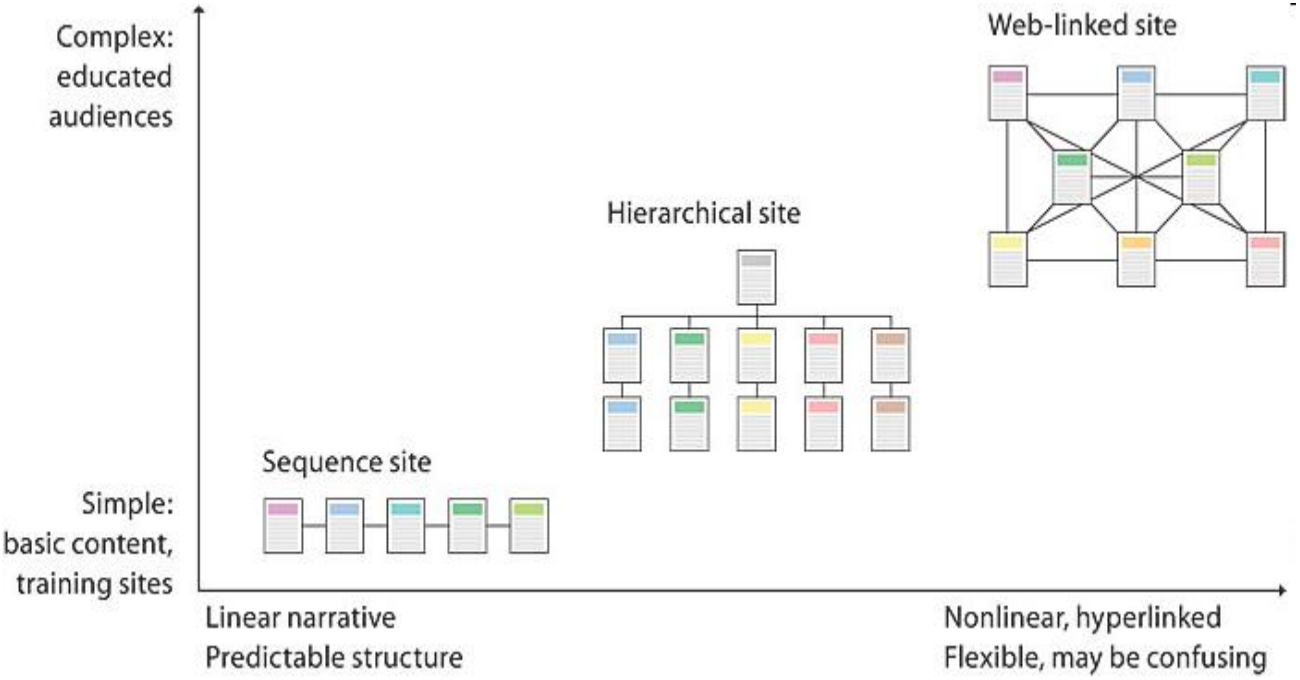
Site structure summary (1/2)

- Most complex Web sites share aspects of all three types of information structures
- Except in sites that rigorously enforce a sequence of pages, your users are likely to use any Web site in a free-form "web-like" manner, just as they would skip through chapters in a reference book
- Ironically, the clearer and more concrete your site organization is, the easier it is for users to jump freely from place to place without feeling lost



Site structure summary (2/2)

- The chart below summarizes the three basic organization patterns against the "linearity" of the narrative, and the complexity of the content



Information foraging

- Informavores try to find and devour information
  - How to get lots of it quickly
- One of the major attributes that informavores use to guide their searching is what is called “information scent”
  - Predicting a path’s success
  - Links, titles and context provide the information scent in a web page

Detecting poor scent

- User observation tell-tale signs:
  - Flailing around the page
    - not knowing what to do or where to look in the page
  - Low confidence
    - Checking their confidence before and after they click on a link
    - Before-clicking confidence will reveal whether the link has high scent
    - After the click will reveal if the page beacons the information the user is trying to get to
  - Back button overuse
    - Major problems in navigation

Low vs High information scent: Links

- Poor information scent
  - Generic, uninformative links
    - “Click here”, “Picture 1”
  - Made-up words and jargon
    - Slogans, designers jargon, marketing embellishments
    - Spade: “digging implement”, “excavation solution”
    - Users scan for words they know or expect to find
- Improving link information scent
  - Multi-word links
    - With specific, recognizable terms
    - Trigger words, not “clever” terms
    - Helps accessibility as well