

HyperText Design Suggestions

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SWE 632

User Interface Design and Development

Thanks in part to: Jorn Barger (inventor of the weblog)

**“Where is the wisdom we lost in knowledge?
Where is the knowledge we lost in information?”
– T.S. Eliot**

Motivation – Overview

**Hypertext provides freedom from linear representations of text.
It makes certain ways of accessing information more convenient.**

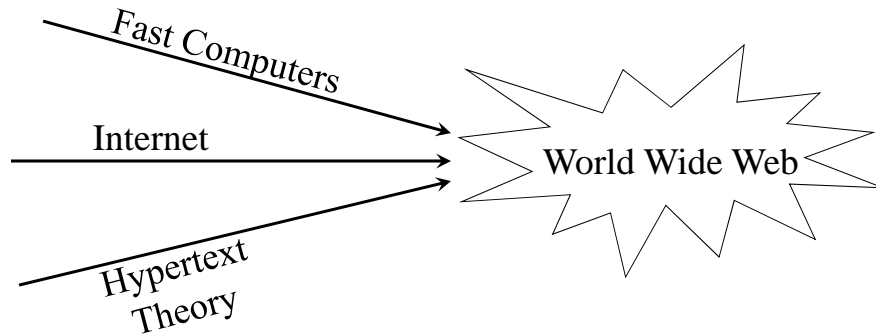
We often jump around when we read:

- Technical papers
- Textbooks
- Newspapers
- Encyclopedia
- Tax forms

Hypertext makes this more convenient

Formation of the WWW

**The World Wide Web is a result of
the *confluence* of three developments**



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Historical Highlights Hypertext, Internet, and the Web

- 1945: Vannevar Bush proposes hypertext
- 1965: Ted Nelson coins the term "Hypertext"
 - Douglas Engelbart invents mouse
 - (The ACM Douglas Engelbart award is given yearly at the HyperText conference)
- 1968: Engelbart's hypertext system "Augment/NLS"
 - Brown university's HES
- 1969: Arpanet
- 1970: Unix
- 1972: Tomlinson invents email
- 1977: UUCP
- 1978: First bulletin board system – Christensen and Sues

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Historical Highlights (cont.)

1979: Truscott and Bellovin's usenet news

1982: < 100 sites on "internet" (netnews)

1983: TCP / IP defines the internet

1986: NSFNET

SGML

1987: HyperCard (Apple)

First hypertext workshop

1989: WWW proposed by Berners-Lee

1990: HTML defined

1992: CERN (Switzerland) releases WWW

1993: NCSA Mosaic

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Historical Highlights (cont.)

1994: WWW surpasses gopher

1994: Netscape

1995: Lycos search engine

Java

DEC's Alta Vista search engine

15 million pages

1996: US Telecommunications Bill

1997: 31,000,000 pages, 476,000 servers, 14,000 news groups

2000: More than 100,000,000 hosts

Amount of back-end programming exceeds the front-end hypertext

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Hypertext Terminology – General

- Node : Atomic amount of text – smallest unit of information known to system (pages)
- Link : Connects one node to another. Depicted by buttons or highlighted region.
 - Link Region (anchor) : Location in a node where link starts.
- Traverse (visit or view) : Moving from one node to another
 - Backtrack : Following links in reverse
- Landmark : Semantically important nodes that are linked to many nodes
- Hypermedia : Incorporates sound, video, pictures, or other non-textual information

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Hypertext Terminology World Wide Web

- Web Page : Data that fits in one browser screen
 - Static Web Page : A web page whose HTML exists as a file on a computer
 - Dynamic Web Page : A web page that is created as needed
- Web Site : A number of web pages that are *semantically* related and *physically* linked

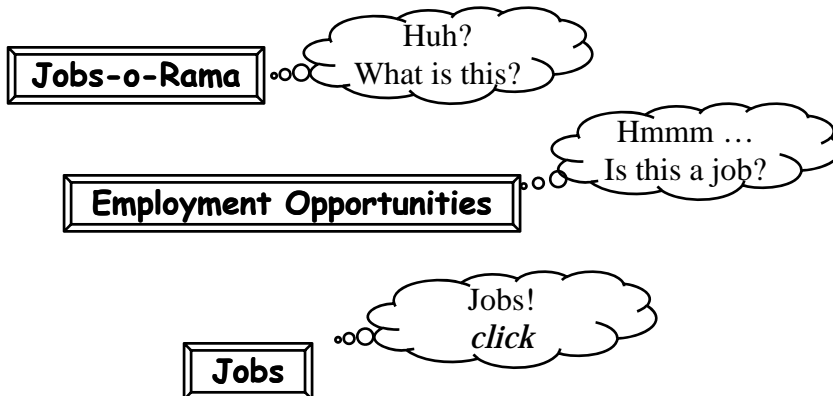
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Web Pages Shouldn't Make Us Think

We should immediately understand the purpose



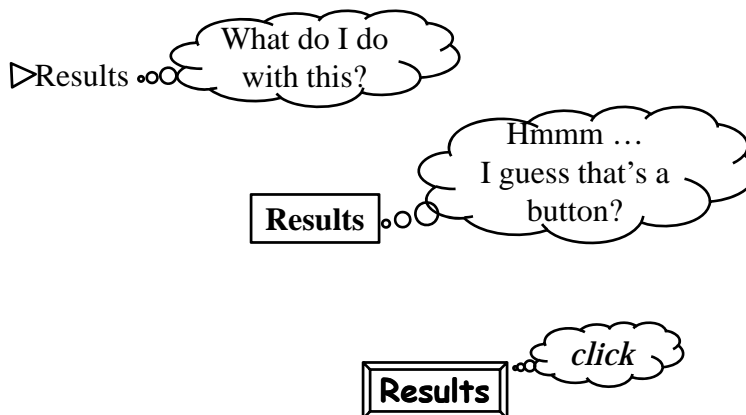
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Can I Click It ?

Clickable buttons should look clickable



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Layout and Text – Single Pages

- Reading from paper is easier than from screen
 - Don't use as much text on screens
- Organize text to let users get the summary first
 - Keep it short
 - Use the pyramid structure
 - First a summary paragraph
 - who, what, when, where, why, and how of the topic
 - Later paragraphs give more detail
- People browse web pages, they don't read

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Layout and Text (2)

- In the old days ... before the WWW
 - Small pages
 - Lots of clicking
- First realizations with the WWW
 - Minor links need to be in the same document
 - Sometimes we need to download entire long documents as a single PDF file, rather than lots of small HTML pages

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Layout and Text – Images

- Images can be used for
 - Title of the page
 - Illustrations
 - Navigation
 - Buttons
- Limit number of images for users with low-bandwidth
- Always use ALT attribute to provide a text alternative
- Use small size images

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Layout and Text – Animation

- Animation is usually annoying
 - It is as if the web page is shouting at you
- Things to animate: Shapes, logos, drawings, photographs
- Can be effective for
 - Attracting attention
 - Demonstrating transitions
 - Explaining complex systems
- Endlessly repeating animations will annoy the user
- Don't use animation in text

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Making Link Anchors

- “Click here” is intrusive – the control interferes with the content
- Press the blue text is even worse
- A link traversal should be ancillary
- Good approaches:
 1. Highlight glossary terms
 - Clicking on it will give a definition or go to a related page
 2. Allow the anchor to fit into the rest of the document naturally

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Navigating Within Pages

- Try to avoid horizontal scrolling
- Navigation buttons should always be visible
- Action buttons should always be visible
- Put most important content on the top
- Logos and headers should not use too much space
- Use intra-page links to help users keep their hands on the mouse
 - (“home” button is on the keyboard)

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Layout and Text – Writing

- Follow basic principles of communication:
 - Simple, direct style
 - Thorough proofreading for confusing grammar and misspellings
 - Use a spellchecker !
 - Avoid colloquialisms, slang, and culturalisms
- Text on a screen is more difficult to read
 - lower resolution
- Use 10 or 12 point font (14 for older readers)
 - Stick to standard font types, don't change too much
- Remember: If you make mistakes:
 - at best, people will think you are careless
 - at worst, they will think you are ignorant

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Navigation Among Pages

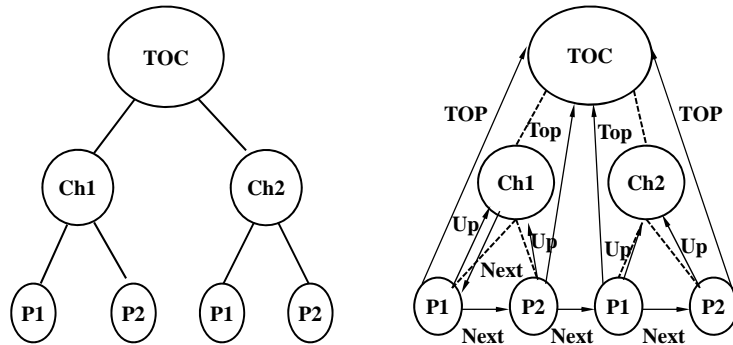
- Use a simple tree structure
 - Include buttons to go *home*, *up*, *previous* and *next*
 - Omit or gray out buttons that do not apply
- Add additional navigation for convenience that augment the tree structure
- Avoid the “stairmaster fallacy” ... where users have to navigate from a leaf node to the next leaf node by going all the way to the root and back down

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Navigation Among Pages

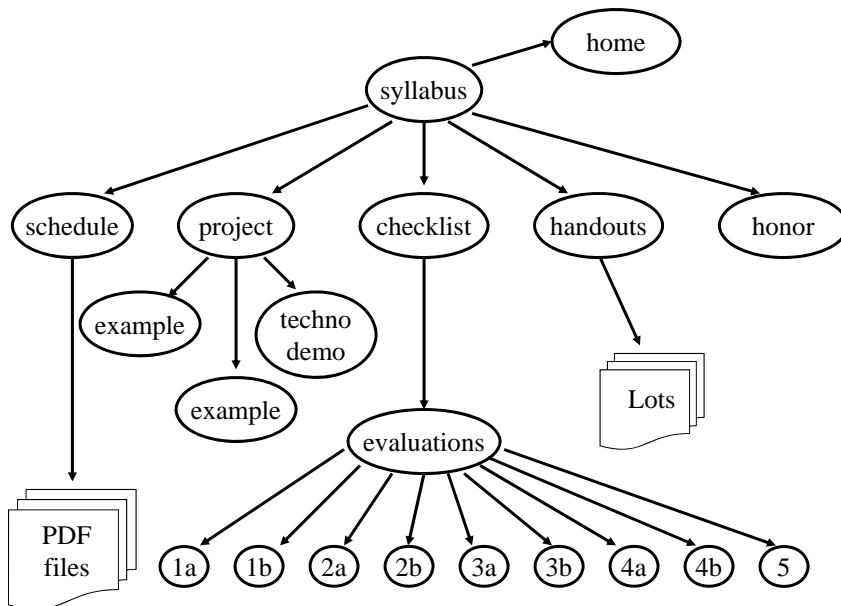


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Case Study – 632 Website

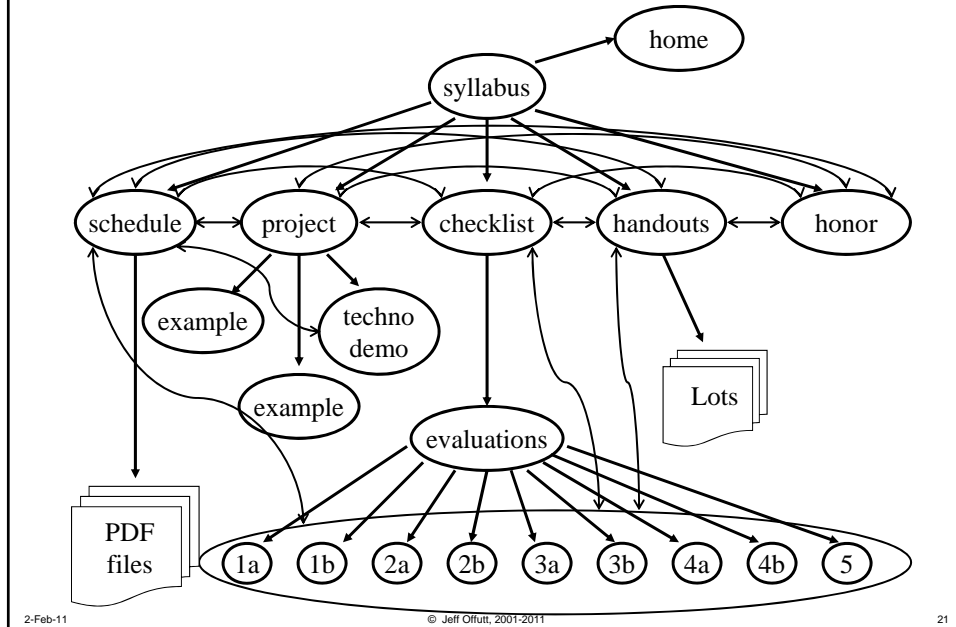


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Case Study – 632 Website



Connecting With the Rest of the World

- Remember that users do not always come in through the “front door”
 - Bookmarks, URLs emailed from friends, search engines
- Each page should have:
 - Clear identifiers to indicate its context
 - Titles that are meaningful without the context
 - Navigation to other pages in the website
- Every page must have a meaningful <TITLE> tag

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Connecting With the Rest of the World

- Do not break up information into chunks that are too small
- Do not use excessive graphics, applets, or other large files
- Clearly indicate non-HTML links
- We need a system to automatically update links when the target is relocated
- Add last modified notes – remember that creation is fun, but maintenance is hard

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Connecting With the Rest of the World – Browser Compatibility

- Each browser displays HTML differently
 - KISS – Keep It Simple Stupid
- There are many incompatibilities in the JavaScript DOM
 - Try not to get too fancy
- Browsers behave differently with broken HTML
 - IE tends to be more “forgiving” of mistakes
 - Firefox family tends to conform better to standards

Must test with multiple browsers !!

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HTML Design Hints

- Put searches on the landmark front page (speed)
 - Do not use frames (SS, errors, speed)
 - They confuse navigation
 - Bookmarks do not work
 - They make printing hard
 - Browsers render them differently
- Use <TABLE> or <DIV> to partition web pages
- On site maps, “low light” current page
 - Remember the page may be too big for one screen
 - Put navigation buttons on top and bottom
 - Put action buttons on top and bottom

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Jakob Nielsen

- A web usability author and consultant
- A fun and useful website : <http://www.useit.com/>
- We use his book, *Designing Web Usability*, in SWE 432, Design and Implementation of Software for the Web

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Nielsen's Top 10 Mistakes (2006)

1. Bad search
2. PDF files for online reading
3. Not changing the color of visited links
4. Text that cannot be scanned
5. Fixed font size
6. Page titles with low search engine visibility
7. Anything that looks like an advertisement
8. Violating design conventions
9. Opening new browser windows
10. Not answering users' questions

[More details ...](#)

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1. Bad Search

- Search engines must support the imprecision of human users
- Instead of strictly looking for the literal strings users enter, they must
 - Handle typos
 - Look for plurals
 - Look for hyphens
 - Allow for misspellings
- In PatriotWeb's student search, a stray space on the end of the name causes the search to fail
 - We pick up extra spaces when copying and pasting
 - "Nguyen " vs "Nguyen"

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2. PDF Files for Online Reading

- Users browse HTML documents and dislike PDF files
- It breaks their flow
- The text is laid out for paper, not screens
- PDF is a huge blob of content
- Offer a PDF alternative for large documents that users may want to print
- Example:
<http://www.cs.gmu.edu/programs/undergraduate/#BSACS>
– Click on: [BS ACS in Software Engineering](#)

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3. Not Changing the Color of Visited Links

- Users need to know what they've already visited
- It helps to decide where to go next
- Users do not want to visit the same pages twice
- Users must be able to tell if they have visited a link by the color

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4. Text That Cannot be Scanned

- A wall of text is deadly on-screen
 - Intimidating, boring, painful to read
 - Write for the web, not paper
- HTML writers should use
 - subheads
 - bulleted lists
 - highlighted keywords
 - short paragraphs
 - the inverted pyramid
 - a simple writing style
 - de-fluffed language without marketese

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5. Fixed Font Size

- The default font size in a web page is decided by the browser
 - Users can easily adjust this to be bigger or smaller
- CSS style sheets allow HTML writers to set the font to a specific size—almost always too small
- This reduces readability, especially for people over age 40
- Let users decide
- HTML authors should specify fonts in relative terms
 - For example: **font-size:90%**

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6. Page Titles With Low Search Engine Visibility

- Searching is the most common way users find websites
- The page title is the most important tool website designers use to attract users
- Page titles are used
 - By search engine indexers
 - By search engine result pages
 - As the default entry in bookmarks
 - As the entry in the tab in browsers
- Examples
 - <http://cs.gmu.edu/~pammann/>
 - <http://cs.gmu.edu/~dbarbara/>
 - <http://cs.gmu.edu/~tmaddox/>

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7. Anything That Looks Like an Advertisement

- Selective attention is powerful
 - Users have learned to ignore ads
- Users also ignore things that look like ads
- Avoid making content look like ads
 - Banners
 - Animated text or images
 - Pop-up windows

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8. Violating Design Conventions

- Consistency is power : Inconsistent behavior will confuse users
- Do not override the default color in a link
- Do not highlight non-link text with blue and underlines

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9. Opening New Browser Windows

- Users want to be able to control the browser windows they have
- Opening new browser windows disables Back buttons
 - This is the most common tool for users to return to your site

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10. Not Answering Users' Questions

- Web users are goal-driven
 - They visit a site because they have a goal to accomplish
- If the website does not answer users' questions, they cannot achieve their goal
- The information has to be present and visible
 - Price
 - Contact information (to a real person!)
 - Return information

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Nielsen's 10 Web-site Design Tips

1. Keep graphics and other bandwidth-intensive design elements to a minimum
2. Make search easy to find
3. Keep content current
 - Make archives of previously published content available
4. Don't use frames
 - Navigation, bookmarking, printing ...
5. Minimize the need to scroll

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10 Web-site Design Tips

6. Structure content into hierarchies, but don't make things too complex
7. Put your company's name and logo on every page
8. Key functions such as shopping carts and help buttons should be easy to find
9. Avoid pop-ups that open new browser windows
10. Links to pages not yet seen should be blue; links to pages already viewed should be red or purple

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A Wishlist for HTML

- There should be two ways to select a link, one that causes you to go there, and the other to “inspect” the nature of the link
 - where it leads, how big it is, what kind of document
- Navigation commands need to be standardized and built into HTML, so that we don't have to put our own “up,” “next,” and “home” buttons on every page
 - This would require supplying a map of the topology, which the browser could translate into buttons

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A Wishlist for HTML (2)

- A “virtual anchor” like “*http://... bigtext.html#%75*” that would allow you to link to a particular position (here 75% down from the top) in someone else’s document, without the owner having to insert a real anchor
 - <http://cs.gmu.edu/~offutt/classes/632/sched.html#%50>
- A “temporary bookmark” that expires at the end of a session. Used when you have to choose between following an interesting link and continuing to read an interesting page. It would make sure you get back to the branch-not-chosen, eventually ...
- Allow me to print one page of an HTML document

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A Wishlist for HTML (3)

HTML Variable tag (a self-defined entity reference):

```
<VARIABLE>  
  <NAME>BaseURL</NAME>  
  <VALUE>http://www.cs.gmu.edu/~offutt/classes/632/</VALUE>  
</VARIABLE>
```

To be used anywhere in the document:

```
<A Href=&BaseURL;/sched.html>schedule</A>
```

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A Wishlist for HTML (4)

Improved radio tag syntax

```
<INPUT Type="radio" Name="major" Value="SWE">  
<INPUT Type="radio" Name="major" Value="CS">  
<INPUT Type="radio" Name="major" Value="INFS">
```

This leads to errors with the Name attribute. We should use the "select" model:

```
<RADIO Name="major">  
  <Option Value="SWE">  
  <Option Value="CS">  
  <Option Value="INFS">  
</RADIO>
```

ASP has a specially designed control that looks similar to this

Summary

**HTML must be designed,
not simply written**