

Three main threads in the program

- Ethical and social issues in computing
- CS/IS Application areas:
 - **Information architecture**
 - Human-computer interaction
 - Data science
 - Artificial intelligence (natural language processing, information retrieval, machine learning)
- Computer programming

Web design

Information architecture

- Organize, structure, and label content in an effective and sustainable way. Goal is to help users find information and complete tasks
- **In a library**: combination of the catalog system and the physical layout that holds the books
- **On the web**: combination of organizing a site's content into categories and creating an interface to support those categories
- **For a database**: designing the categories and the relationships among them; designing an interface for effective query and maintenance

Information Architecture--Web Design

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Information architecture

- Has origin in library science
- Early
 - need for organizing printed material
- Now
 - both printed and digital material
 - Large quantity of material
 - Frequent update to collection
 - Highly domain specific
 - E.g., university library system vs. the information system of a business corporation

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Information architecture draws from many fields

- Library science
- Human-computer interaction
- Computer science
- Media and communication science
- Psychology
- Organizational behavior

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What are the tasks involved in creating a website?

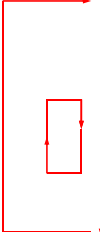
- Define the purpose
- Define the audience
- Design the physical layout
- Design the outline of contents--categories
- Generate and gather materials (text, image, sound, video)
- Test

(more details to follow...)

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User-centered web development

- 
1. Define mission and target user population
 2. Collect user requirements
 3. Create and modify conceptual design
 4. Create and modify physical design
 5. Perform usability testing
 6. Implement and market website
 7. Evaluate and improve website

After Lazar, *Web Usability—A User-Centered Design Approach*

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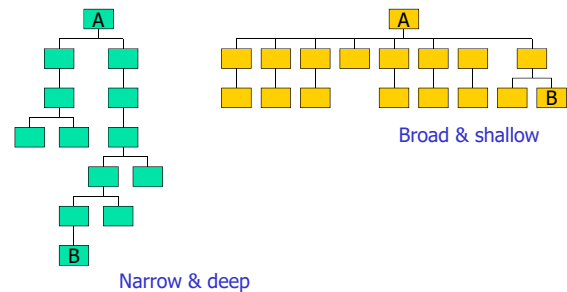
Focus on web design & evaluation

- Organizational & structural systems
 - What are the different ways in which digital content can be organized?
 - What kind of structural arrangements facilitate access and use?
- Navigation and labeling systems
 - What are the relationships among the chunks or containers

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Site hierarchy



After Lazar, *Web Usability—A User-Centered Design Approach*

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Navigation

- Dictionary:
 - Getting from one place to another
 - Figuring out where you are
- Website:
 - Where have I been?
 - Where am I?
 - Where can I go?

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Navigational schemes (on a homepage)

- Topical navigation is most common
 - Organized based on topics or interests
 - www.ebay.com, www.cdc.gov
- Audience-splitting navigation
 - Organize by who will use the information
 - Not so common anymore, but often used on subpages
 - www.engineering.cornell.edu
- Metaphor navigation

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Metaphor-based navigation



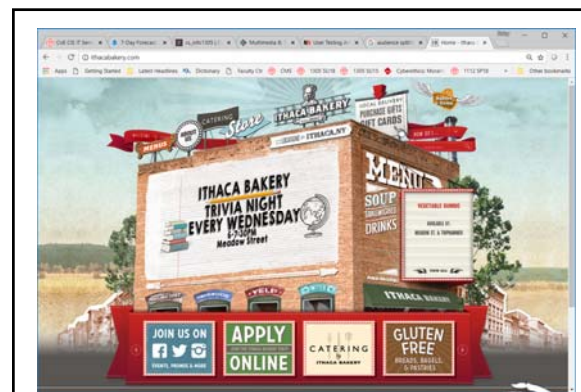
1999

What fun!!!! But restrictive and is now rarely used.

www.southwest.com

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2018

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 - www.ebay.com, www.cdc.gov
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 - Organize by who will use the information
 - Not so common anymore, but often used on subpages
 - www.engineering.cornell.edu
- Metaphor navigation
- Organizational structure navigation
 - Usually for intranet
- Sitemaps
 - Not technically a navigational scheme, but can be used as one
 - <http://www.delta.com/>

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Difficulty of searching in virtual space

How does searching in physical space compare with searching in virtual space?

- No sense of scale
- No sense of direction
- No sense of location

→ Good navigation elements on a website is important!

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Navigation: basic elements

- Site ID
- Sections (and subsections)
- Utilities
- “You are here” indicator
- Page name
- Local navigation

<http://www.noaa.gov/education>
<http://www.barnesandnoble.com/>

After Krug, *Don't Make Me Think*

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Persistent navigation

- Navigation elements that appear on every page (except the home page and forms)
- Five important elements:
 - Site ID
 - A way home
 - A way to search
 - Utilities
 - Sections

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Navigation: accessories

- Breadcrumbs

<https://www.weather.gov/wrn/force>

- Tabs



Once popular
but not so
much anymore

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Having arrived at a well designed page, you should be able to answer these questions almost immediately:

- What site is this?
- What page am I on?
- What are the major sections of this site?
- What are my options at this level?
- Where am I in the scheme of things?
- How can I search?

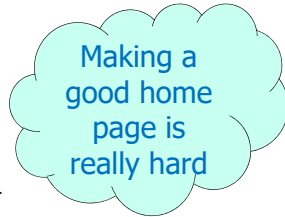
<https://www.usability.gov/what-and-why/index.html>

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The Home page has to accommodate many things...

- Site identity and mission
- Site hierarchy
- Search
- "Teases"—promos
- Timely content
- Deals
- Shortcuts
- Registration
- Show me what I'm looking for
- ... and what I'm not looking for
- Show me where to start
- Establish credibility and trust



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The message of the Home page

- Tag line
 - <http://www.refdesk.com/>
 - <http://www.netmarket.com/>
 - <https://www.usability.gov/>
- Welcome blurb
 - <https://www.nngroup.com/>
- Where do I start?
 - Where to start if I want to search
 - Where to start if I want to browse
 - Where to start if I want to sample the best stuff

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Accessibility

- How do you make a webpage accessible to a broad spectrum of audience?
 - What are the advantages and disadvantages of scroll-over tabs/menus?
 - How should images interact with screen readers?
 - Synchronize multi-media elements

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Principles of display design



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Principles of display designs

- Perceptual principles
 - Make displays legible (or audible)
 - Redundancy gain
- Mental models principles
 - Principle of pictorial realism
 - Principle of the moving part
- Attention-based principles
- Memory principles



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Principles of display designs

- Perceptual principles
 - Make displays legible (or audible)
 - Redundancy gain
- Mental models principles
 - Principle of pictorial realism
 - Principle of the moving part
- Attention-based principles
 - Minimize information access cost
- Memory principles
 - Replace memory with visual information
 - Principle of predictive aiding



Intro to Human Factors Engineering
by C. Wickens et al., 2004

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