

CS 160: Web Design Patterns

Professor John Canny

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Model Human Processor

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The Model Human Processor

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Perceptual Causality

How soon must red ball move after cue ball collides with it?

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Perceptual Causality

Must move in $< T_p$ (100 msec)

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Perceptual Causality

Must move in $< T_p$ (100 msec)

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Perception

- ☐ Stimuli that occur within one PP cycle fuse into a single concept
 - * Frame rate necessary for movies to look real?
 - + time for 1 frame < T_p (100 msec) → 10 frame/sec.
 - * Max. morse code rate can be similarly calculated
- ☐ Perceptual causality
 - * Two distinct stimuli can fuse if the first event appears to *cause* the other
 - * Events must occur in the same cycle

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Simple Experiment

- ☐ Volunteer
- ☐ Start saying **colors** you see in list of words
 - * When slide comes up
 - * As fast as you can
- ☐ Say "done" when finished
- ☐ Everyone else time it...

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Paper
Home
Back
Schedule
Page
Change

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Simple Experiment

- ☐ Do it again
- ☐ Say "done" when finished

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Blue
Red
Black
White
Green
Yellow

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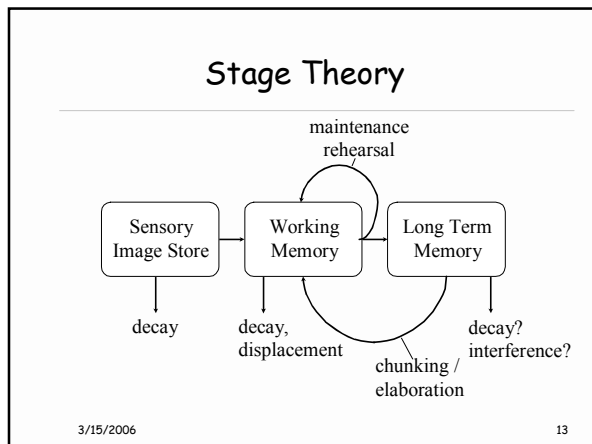
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Memory

- ☐ Interference
 - * Two strong cues in working memory
 - * Link to different chunks in long term memory

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- ### Stage Theory
- Working memory is small
 - * Temporary storage
 - + decay
 - + displacement
 - Maintenance rehearsal
 - * Rote repetition
 - * Not enough to learn information well
 - Answer to problem is organization
 - * Faith Age Cold Idea Value Past Large
 - * In a show of faith, the cold boy ran past the church
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- ### Elaboration
- Relate new material to already learned material
 - Recodes information
 - Attach meaning (make a story)
 - * e.g., sentences
 - Visual imagery
 - Organize (chunking)
 - Link to existing knowledge, categories
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- ### LTM Forgetting
- Causes for not remembering an item?
 - * 1) Never stored: encoding failure
 - * 2) Gone from storage: storage failure
 - * 3) Can't get out of storage: retrieval failure
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- ### Recognition over Recall
- Recall
 - * Info reproduced from memory
 - Recognition
 - * Presentation of info provides knowledge that info has been seen before
 - * Easier because of cues to retrieval
 - We want to design UIs that rely on recognition!
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- ### Facilitating Retrieval: Cues
- Any stimulus that improves retrieval
 - * Example: giving hints
 - * Other examples in software?
 - + icons, labels, menu names, etc.
 - Anything related to
 - * Item or situation where it was learned
 - Can facilitate memory in any system
 - What are we taking advantage of?
 - * Recognition over recall!
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Outline

- ▣ Motivation
- ▣ Design patterns in architecture & SE
- ▣ Web design patterns
- ▣ Home page patterns
- ▣ E-commerce patterns

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How can we Codify Design Knowledge?

- ▣ Now that you've worked on your project for > 6 weeks, you know a lot about your solution.
- ▣ How would you communicate your solution to another design team in a "portable" way?
- ▣ i.e. what specific elements should this description of your design have?
- ▣ Discuss this with some neighbors now, make a list!

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Motivation for Design Patterns

- ▣ Most articles in the UI literature are critiques
 - * Norman, Nielsen, etc.
- ▣ Design is about finding solutions
- ▣ Good designs borrow & steal from other designs
 - * But its hard to know how things were done before
 - * And hard to reuse specific solutions
- ▣ Design patterns are a solution
 - * Reuse existing knowledge of what works well



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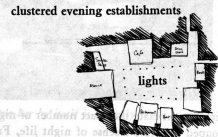
Design Patterns

- ▣ First used in architecture [Alexander]
- ▣ Communicate design problems & solutions
 - * How big doors should be & where...
 - * How to create a beer garden where people socialize...
 - * How to use handles (remember Norman)...
- ▣ Not too general & not too specific
 - * Use solution "a million times over, without ever doing it the same way twice"

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Example from Alexander: *Night Life*


Knit together shops, amusements, and services which are open at night, along with hotels, bars, and all-night diners to form centers of night life: well-lit, safe, and lively places that increase the intensity of pedestrian activity at night by drawing all the people who are out at night to the same few spots in the town. Encourage these evening centers to distribute themselves evenly across the town.



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Example from Alexander: *Alcoves*

Make small places at the edge of any common room, usually no more than 6 feet wide and 3 to 6 feet deep and possibly much smaller. These alcoves should be large enough for two people to sit, chat, or play and sometimes large enough to contain a desk or a table.



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Design Patterns

- ▣ Next used in software engineering [Gamma et al.]
- ▣ Communicate design problems & solutions
 - * Proxy: surrogate for another object to control access to it
 - * Observer: when one object changes state, its dependents are notified



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Design Patterns

- ▣ What software design patterns did we describe recently?
- ▣ Model-view controller
- ▣ Event Queues
- ▣ ??



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Design Patterns



- ▣ We can do the same for Web Design
 - * Communicate design problems & solutions
- ▣ How can on-line shoppers keep track of purchases?
 - * Use the idea of shopping carts in physical stores
- ▣ How do we communicate new links to customers?
 - * Use consistent colors and mouseover highlights
- ▣ Leverage people's usage habits on/off-line
 - * if Yahoo does things a way that works well, use it

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Pattern Format

1. Pattern Title
2. Context
3. Forces
4. Problem Statement
5. Solution
 - ⌘ Solution Sketch
6. Other Patterns to Consider

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Example - Alcoves

1. Pattern Title: Alcoves
2. Context:
 - Collaborative and common areas in buildings.
3. Forces
 - Open spaces are inviting, but people want a sense of enclosure for private discussions.
4. Problem Statement
 - Create a space that invites collaboration but also supports private discussion.

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Example - Alcoves

5. Solution + sketch

Make small places at the edge of any common room, usually no more than 6 feet wide and 3 to 6 feet deep and possibly much smaller. These alcoves should be large enough for two people to sit, chat, or play and sometimes large enough to contain a desk or a table.



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Pattern languages

- ❑ Alexander emphasized the importance of pattern *languages* - more than just collections of patterns.
- ❑ Languages are sets of patterns that fill out a design space, and are chosen to complement each other.
- ❑ Forces in each pattern may explain the relations with other patterns.

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Patterns and idioms

- ❑ Not every design idea that uses the pattern syntax is a pattern.
- ❑ If an idea is too specific (e.g. programming language specific), then it is not a pattern.
- ❑ Specific ideas are called *idioms*.
- ❑ Similarly, patterns cannot be too general.
- ❑ It must be clear how the pattern should be applied in a context.

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Home page design

1. Pattern Title: Home page
2. Context:
3. Forces
4. Problem Statement

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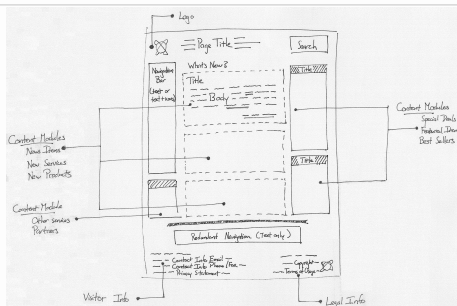
Home page design

1. Pattern Title: Home page
2. Context:
Pages that are the entry point for a web site.
3. Forces
People are attracted by novelty and good design, attention span is very short on the web, home pages are regularly updated.
4. Problem Statement
What to capture and hold visitors attention, encourage return visits, and be easy to maintain

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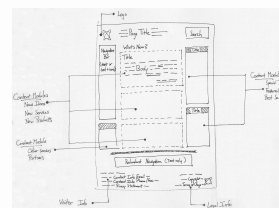
Solution sketch



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Home Page Design Rules




- Strong 1st impressions
 - * compelling titles & logos
 - * simple navigation
- Modularity simplifies updating

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Home Page Design Rules




- ☐ Breadth on left
- ☐ Highlights articles of general interest in center & right
- ☐ Links distinguished
- ☐ Subsections further down show more detail in particular areas

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Home Page Design Rules

- ☐ More Forces
 - * without a compelling home page (H/P), no one will ever go on to the rest of your site
 - * surveys show millions of visitors leave after H/P + most will never come back -> lost sales, etc.





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Six Ways to Make a Good Home Page

Make a positive first impression by:

- ☐ Testing
 - * Appropriate link names and familiar language?
- ☐ looking at GUEST PROFILES (another pattern)
 - * Appropriate colors & graphics?
 - * neon green & screaming graphics on a skateboarding site, but not on a business-to-business or health site





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Six Ways to Make a Good Home Page

Focus on a single item of interest

- ☐ Create a good "first read"
 - * Draw the eye to a single graphical item
- ☐ Make it clean & larger than rest on the page
- ☐ Cut down remaining elements to chosen few

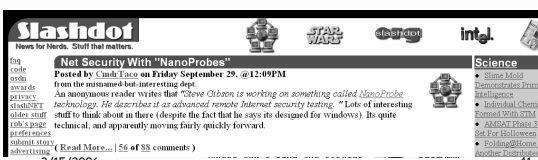


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Six Ways to Make a Good Home Page

Build your site brand

- ☐ Present the message of what your company does
- ☐ Include the value proposition (promise to visitors)
 - * Links to confidentiality information & site abuse policies to show you are trustworthy




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Six Ways to Make a Good Home Page

Make navigation easy

- ☐ Novices & experts must instantly "get it"
- ☐ Use multiple ways to navigate
- ☐ Basic features of site as embedded links
- ☐ Navigation bars
- ☐ Colored background (HTML tables) to delineate sections
- ☐ Reusable accent graphics to highlight new things



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Six Ways to Make a Good Home Page



- Lure visitors to return
 - With fresh content
 - Keep it updated so there is a reason to come back
 - By seducing with text (and graphics)
 - You have only seconds
 - Lively, sparkling, precise

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Six Ways to Make a Good Home Page

Make it download quickly (2-3 seconds)

* If not, they'll go elsewhere

Strategies

- * Use HTML text as much as possible
- * First thing to download
- * Images take 10 server-browser comms
- * Get a web-savvy graphic artist (font colors, styles, & b/g color)



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Pattern Examples

Shopping cart

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Shopping Cart

Context:

* Online stores

Forces

- * People like to browse and add items (like the supermarket) while shopping.
- * People want to review purchases before paying.
- * Make it very easy to add items (defer commitment).

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Shopping Cart

Problem:

* How to allow customers to add items without disrupting their browsing, and purchase multiple items in *one transaction*

Solution

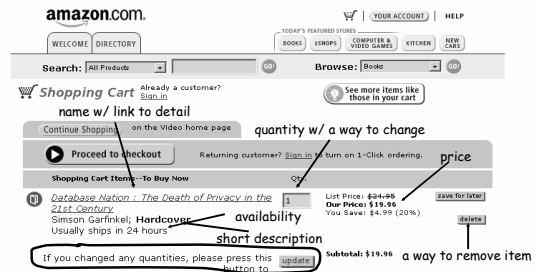
- * Use shopping cart metaphor to keep track of items before customer finalizes the purchase
- * Track name, quantity, availability, & price

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How to Apply Shopping Carts

Provide detailed info on each item in cart



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How to Apply Shopping Carts

- Provide info about all items in cart
 - * sub-totals
 - * shipping, taxes, other charges (if known)



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How to Apply Shopping Carts

- Provide a prominent link to **checkout**



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How to Apply Shopping Carts

- Have a link to let people continue shopping



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How to Apply Shopping Carts

- Don't put other recommended items in the checkout sequence (pulls users back to shopping and they may not complete checkout).

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How to Apply Shopping Carts

- Don't let unavailable things be added
 - * hard to find a good example of this



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Checkout

- Shopping Cart =>
 - * Details, quantity, availability, subtotal
- Sign-in =>
 - * New customers
 - * Returning customers
- Shipping =>
 - * Address, shipping method, gift wrap?, special instructions
- Payment =>
 - * Method, billing address, gift certificate, coupons
- Confirmation
 - * Confirm button, confirmation page, email, order tracking into, Thank you

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Checkout Heuristics

- ☐ Make it easy to cancel or change order at any time before final confirmation

- ☐ Don't have customers type things twice

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Summary

- ☐ Motivation for patterns
- ☐ Design patterns in architecture & SE
- ☐ Web design patterns
- ☐ Home page patterns
- ☐ E-commerce patterns

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