



Design Patterns

CSE 440
 User Interface Design, Prototyping, & Evaluation
 Autumn 2008

October 30, 2008

Hall of Fame or Hall of Shame?



o java.sun.com

- o Good branding
 - * java logo
 - * value prop
- o Inverted pyramid writing style
- o Fresh content
 - * changing first read
 - * news in sidebar
- o Obvious Links

CSE440 - Autumn 2008

User Interface Design, Prototyping, and Evaluation

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Design Patterns

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Outline

- o Review of Heuristic Evaluation
- o Web Design Process, Specialties & Artifacts
- o Detailed Design Example
- o Web Design Patterns
- o Ubicomp Design Patterns
- o Mid-term Course Evaluation

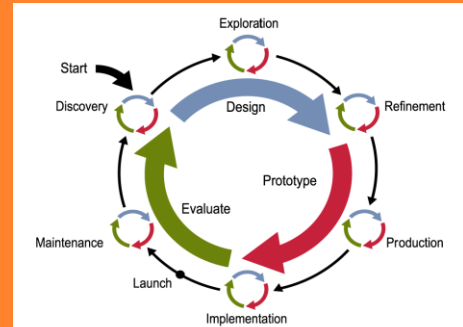
Grade Stats

- o #1 Project Proposal
 - * High: 100, Low: 78, Mean: 87
- o #2 Contextual Inquiry (Group)
 - * High: 94, Low: 74, Mean: 84
- o #3 ESM and Task Analysis
 - * High: 92, Low: 71, Mean: 85

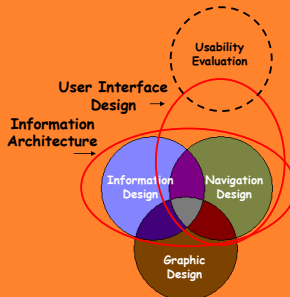
Review of Heuristic Evaluation

- o Have evaluators go through the UI twice ,
 - * phase 1 simply to get to know the overall UI
 - * phase 2 to carefully look for problems
- o Ask them to see if it complies with heuristics
 - * note where it doesn't & say why
- o Combine the findings from 3 to 5 evaluators ,
 - * different evaluators will discover different problems
- o Have evaluators independently rate severity
- o Combine results in a group meeting
- o Alternate HE with usability testing ,
 - * different techniques will find different problems
- o Tradeoffs ,
 - * HE inexpensive compared to usability testing
 - * HE may find issues hard to find otherwise (e.g., a font that may slow down performance)
 - * HE susceptible to finding false positives

Web Design Process



Design Specialties



- o Information Architecture
 - * encompasses information & navigation design
- o User Interface Design
 - * also includes some testing & evaluation

Artifacts of Design Practice

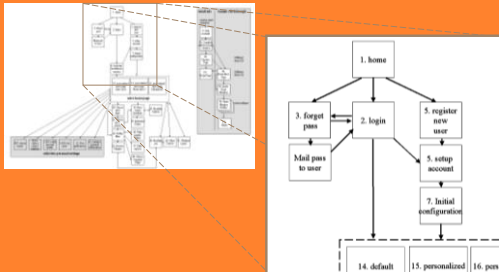
- o Designers create representations of sites at *multiple levels of detail*
- o Web sites are iteratively refined at all levels of detail

Site Maps Storyboards Schematics Mock-ups



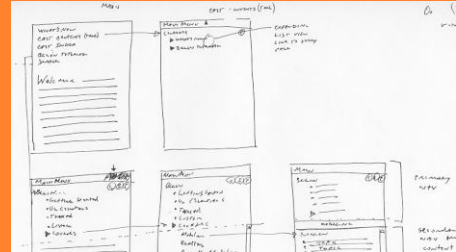
Site Maps

- o High-level, coarse-grained view of entire site



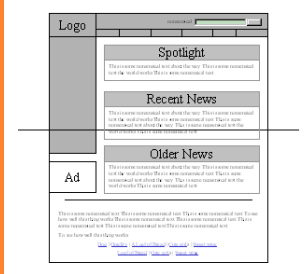
Storyboards

- o Interaction sequence, minimal page level detail



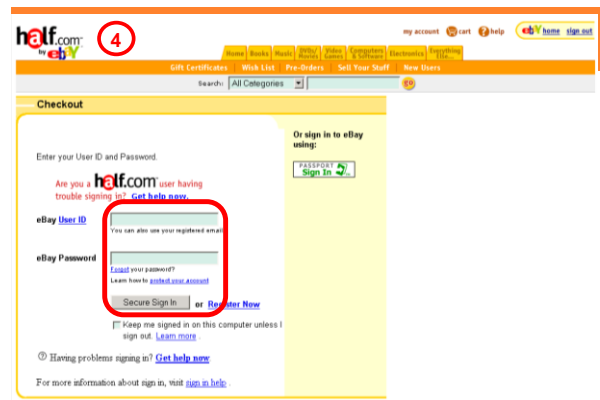
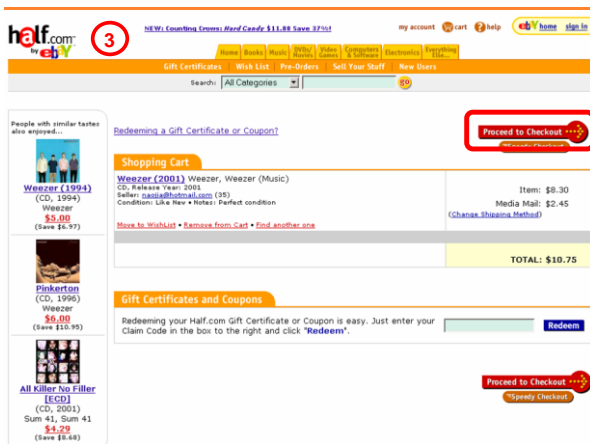
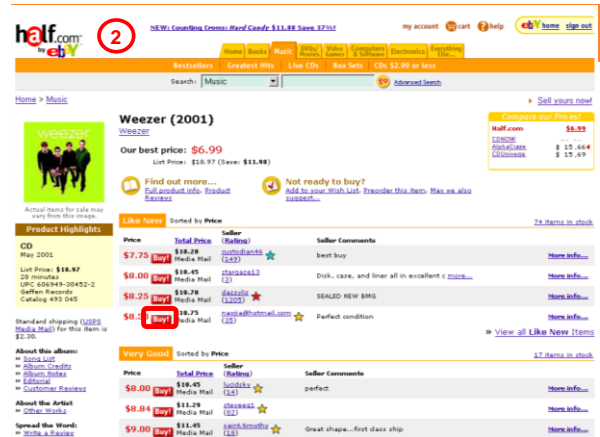
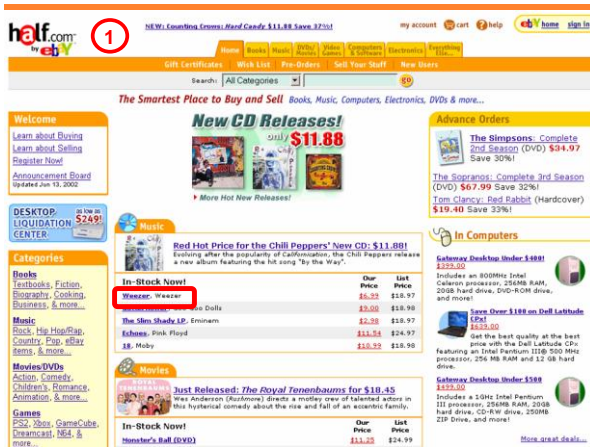
Schematics

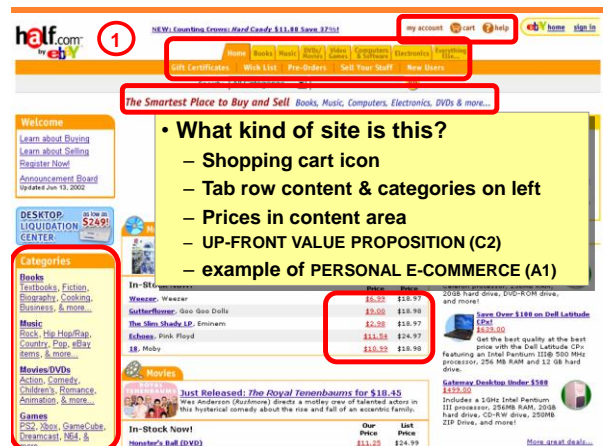
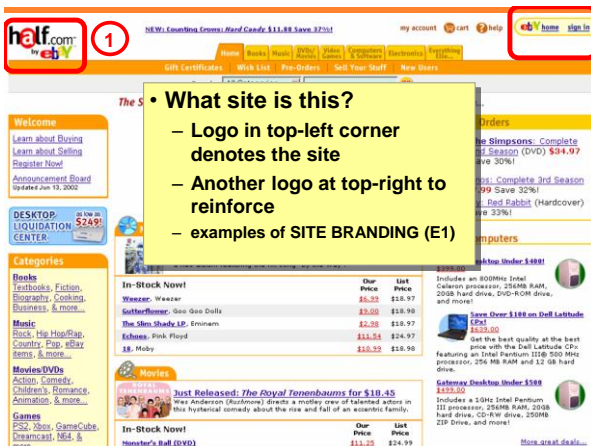
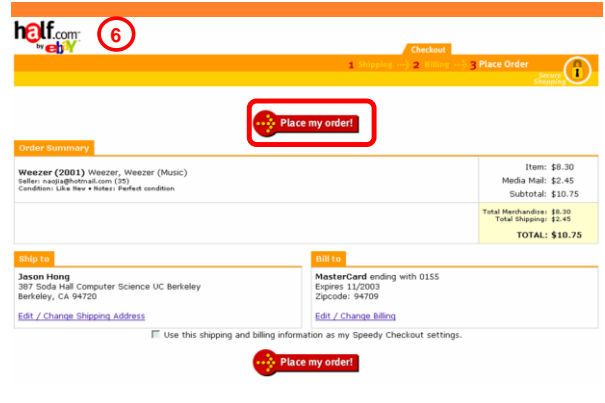
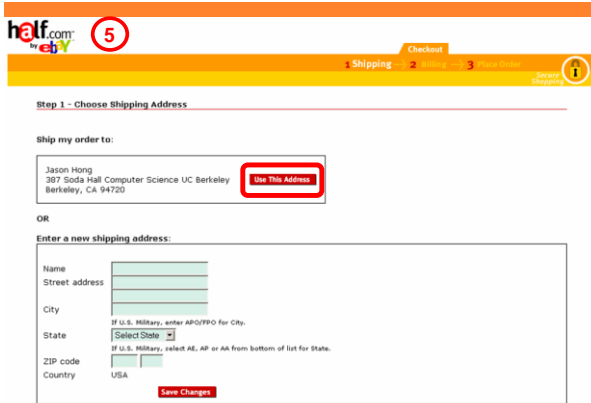
- o Page structure w/ respect to information & navigation



Mock-ups

- o High-fidelity, precise representation of page





1

What can I do here?

- Welcome for new visitors
- Tab row / Search on top
- “Categories”
- Prices
- Examples of OBVIOUS LINKS (K10)

Annotations include: Home, Books, Music, Movies, Electronics, Software, Gift Certificates, Wish List, Pre-Orders, Sell Your Stuff, New Users, Search, All Categories, Welcome, Learn about Buying, Learn about Selling, Register Now!, Announcement Board, DESKTOP LIQUIDATION CENTER, Categories (Books, Textbooks, Fiction, Biography, Cooking, Business & more...), Music (Rock, Hip Hop/Rap, Country, Pop, R&B, Jazz, & more...), Movies/DVDs (Action, Comedy, Children's, Romance, Animation, & more...), Games (PC, Xbox, GameCube, Dreamcast, NES, & more...), and a table of product prices.

1

Most important info visible without scrolling ABOVE THE FOLD (I2)

Annotations include: Home, Books, Music, Movies, Electronics, Software, Gift Certificates, Wish List, Pre-Orders, Sell Your Stuff, New Users, Search, All Categories, Welcome, Learn about Buying, Learn about Selling, Register Now!, Announcement Board, DESKTOP LIQUIDATION CENTER, Categories, Music (New CD Releases! \$11.88), Movies/DVDs (The Simpsons: Complete 2nd Season (DVD) \$34.97), Games (The Sims Shady ID, Eminem), and a table of product prices.

2

What site am I at?

- Logo in upper-left reinforces brand, can click to go to home
- Same font, layout, color scheme also reinforces
- examples of SITE BRANDING (E1)

Annotations include: Home > Music, Weezer (2001), Our best price: \$6.99, Find out more..., Not ready to buy?, Like New, Product Highlights, About this album, About the Artist, Spread the Word, and a table of seller prices.

2

Can I trust these sellers?

- Who am I buying from?
- Are they reputable?
- What about shipping?

Annotations include: Home > Music, Weezer (2001), Our best price: \$6.99, Find out more..., Not ready to buy?, Like New, Product Highlights, About this album, About the Artist, Spread the Word, and a table of seller prices.

2

Where am I in the site?

- “Home > Music” are LOCATION BREAD CRUMBS (K6)
- TAB ROW (K3) says “Music”
- Album cover, “Product Highlights”, and CD cover

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2

half.com by eBay

NEW! Countdown Expires: **Half Candy!** \$11.88 Save 37%!

my account cart help eBay home sign in

Home > Music

Search: Music

Home > Music

Weezer (2001)
 Weezer
 Our best price: **\$6.99**
 List Price: \$18.97 (Save: \$11.98)

Find out more...
 Full product info Product Page

Not ready to buy?
 Add to your Wish List - Remember this item - View us also contact us

Like New sorted by Seller

Price	Total Price	Seller	Seller Comments
\$7.75	\$18.18	bestbuy	best buy
\$8.00	\$18.45	bestbuy	
\$8.25	\$18.78	bestbuy	SEALED NEW BING
\$9.00	\$19.45	bestbuy	Great shape...first class ship

Very Good sorted by Price

Price	Total Price	Seller
\$8.00	\$18.45	bestbuy
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• The Fold
 – Hmm, what's below here?

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• Impulse buy
 • PERSONALIZED RECOMMENDATIONS (G3)
 • About this album
 • Lots of unused space
 • Still more info below...

About this album

Song List

1. Don't Let Go
2. Photograph
3. Harpique
4. Island In The Sun
5. Crab
6. Knock-Down Drag-Out
7. Smile
8. Simple Pages
9. Glorious Days
10. Girlfriend

Album Credits
 Ken Amadio: Engineer
 Ric Ocasek: Producer

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• Is this product any good?
 – Editorial reviews
 – Customer reviews
 – RECOMMENDATION COMMUNITY (G4)

Album Notes
 Weezer: Rivers Cuomo (vocals, guitar); Brian Bell (guitar); Matt Sharp (bass); Patrick Wilson (drums). Recorded at Cabo Studios, Los Angeles, California in December 2000. In 1994 Weezer burst onto the music scene, reaching platinum status with their debut, and in the process proving that there was still room in an airbrushed MTV world for unrepentant power pop played by decidedly non-airbrushed guys. Following a brief sojourn into semi-deconstructionism, 1997's PINKERTON, the four men who make up Weezer serve up a third offering, WEEZER 2001, returning to the sound and producer of their successful debut. However does producer Ric Ocasek define his trademark refined power pop style more than with Weezer, unlike the immediate, obvious pop hooks of the string of singles on the first album, though, the songs on WEEZER 2001 may take a few listens to settle in. However, once the subtle-yet-undeniable refrains of such tracks as "Crab," "Don't Let Go," and first single "Hash Pipe" make their way into your skull, they're there to stay, as furious, fuzzy, layered guitars compliment Rivers Cuomo's raw, vulnerable vocals. While this disc clocks in at less than a half-hour long, it packs more hunky wallop than many double live albums.

Product Reviews

Editorial Reviews...
 Spin (01/01/2002)
 Ranked #9 in Spin's 25 Best Albums of the Year of 2001... Rolling Stone (6/7/01, p.110) - 4... excellent tunes in less than half an hour... Rivers Cuomo's shrill, another hot tub... observed power pop of their '94 debut...

Customer Reviews...
 Rated 4.3 out of 5.0 by 29 raters.
 Read Customer Reviews
 Rate this item

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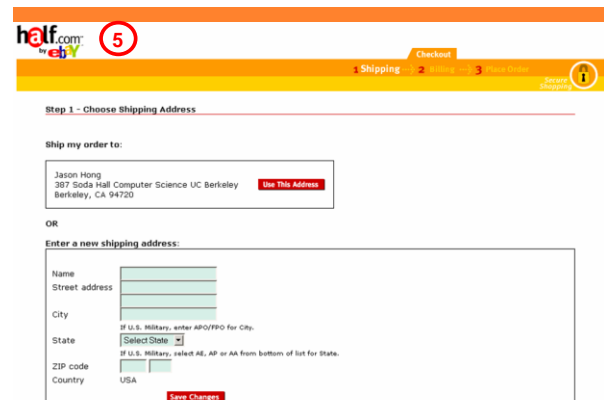
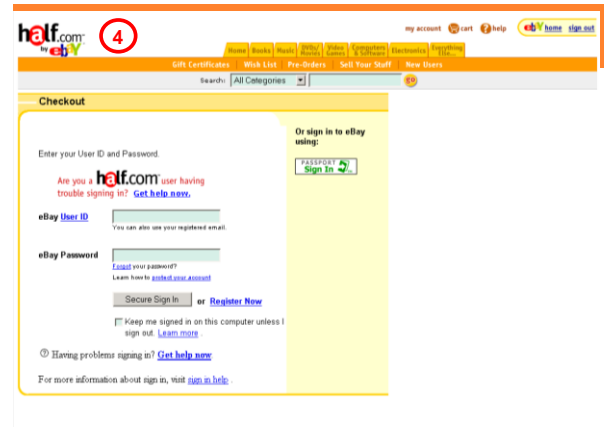
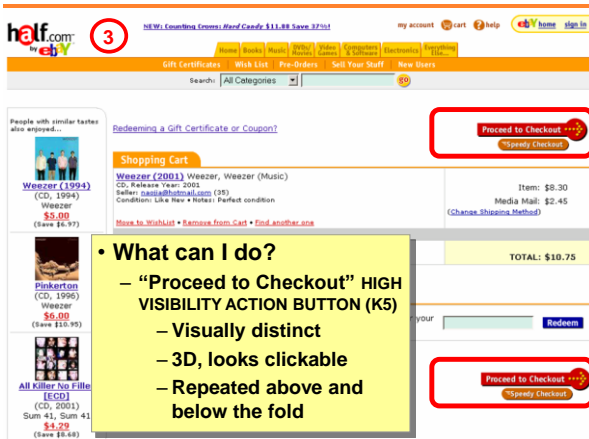
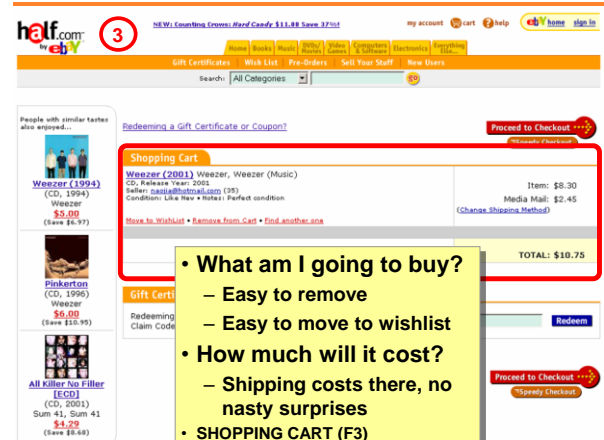
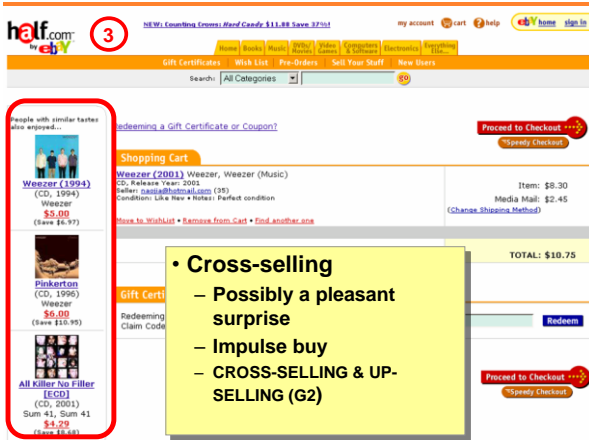
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• Where am I in the site?
 – Last link clicked was "Buy!"
 – "Shopping Cart" and "Proceed to Checkout" reinforce that this is "the right page"
 – SHOPPING CART (F3)



What site?

- Logo, layout, color, fonts

Where in site?

- Checkout, step 1 of 3
- “Choose shipping address”
- QUICK-FLOW CHECKOUT (F1)

Note what's different (?)

- No tab rows
- No impulse buys
- Only navigation on page takes you to next step
- This is a PROCESS FUNNEL (H1)
- Extraneous info and links removed to focus customers

Last step of process

- Step 3, “Place Order”
- “Place my order” button

Two HIGH-VISIBILITY ACTION BUTTONS (K5) for fold

Last step of process

- Step 3, “Place Order”
- “Place my order” button

Two HIGH-VISIBILITY ACTION BUTTONS (K5) for fold

No nasty surprises

- Can see order
- Total price is same as shopping cart
- ORDER SUMMARY (F7)

Easy to change shipping and billing

Easy to save this info

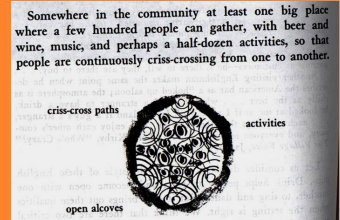
- Easier to setup info in context of specific task
- Clear to customers why this info is needed

Design = Solutions

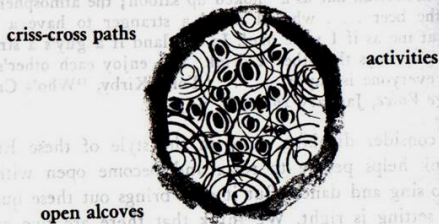
- o Design is about finding solutions
- o Unfortunately, designers often reinvent
 - + Hard to know *how* things were done before
 - + *Why* things were done a certain way
 - + *How* to reuse solutions

Design Patterns

- Design patterns communicate common design problems and solutions
 - First used in architecture [Alexander]
 - Ex. How to create a beer hall where people socialize?



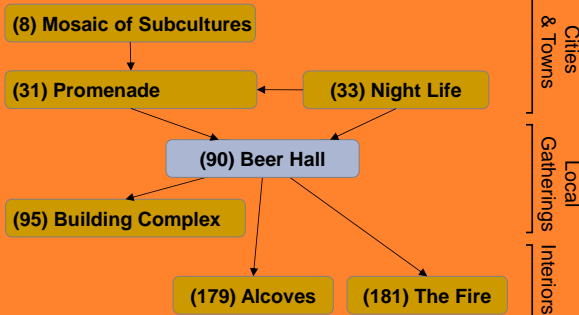
Somewhere in the community at least one big place where a few hundred people can gather, with beer and wine, music, and perhaps a half-dozen activities, so that people are continuously criss-crossing from one to another.



Using Design Patterns

- Not too general and not too specific
 - use a solution "a million times over, without ever doing it the same way twice"
- Design patterns are a *shared* language
 - for "building and planning towns, neighborhoods, houses, gardens, & rooms."
 - Ex. Beer hall is part of a center for public life...
 - Ex. Beer hall needs spaces for groups to be alone... **ALCOVES**

A Web of Design Patterns



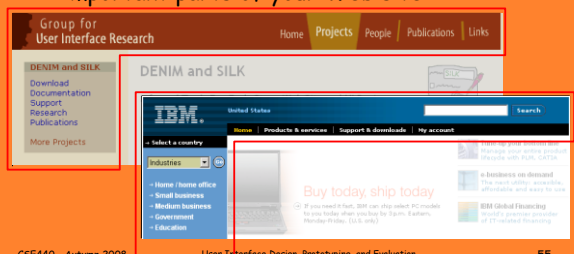
Web Design Patterns

- o Now used in UI design
- o Communicate design problems
 - * how to create navigation bars for finding relevant content...
 - * how to create a shopping cart that supports check out...
 - * how to make e-commerce sites where people return & buy...



NAVIGATION BAR (K2)

- o Problem: Customers need a structured, organized way of finding the most important parts of your Web site



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NAVIGATION BAR (K2)

- o Solution diagram
 - * Captures essence on how to solve problem



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Pattern Groups

Our patterns organized by group

- | | |
|---------------------------------|--------------------------------|
| A Site genres | G Advanced ecommerce |
| B Navigational framework | H Completing tasks |
| C Home page | I Page layouts |
| D Content management | J Search |
| E Trust and credibility | K Page-level navigation |
| F Basic ecommerce | L Speed |
| | M The mobile web |

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PROCESS FUNNEL (H1)

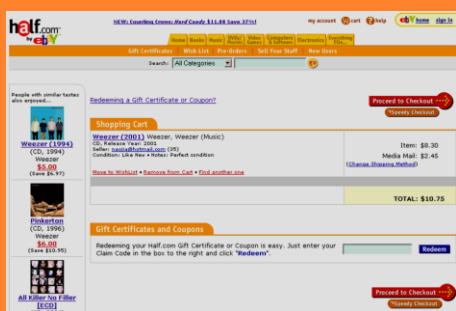
- Problem: Need a way to help people complete highly specific stepwise tasks
 - Ex. Create a new account
 - Ex. Fill out survey forms
 - Ex. Check out

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PROCESS FUNNEL (H1)



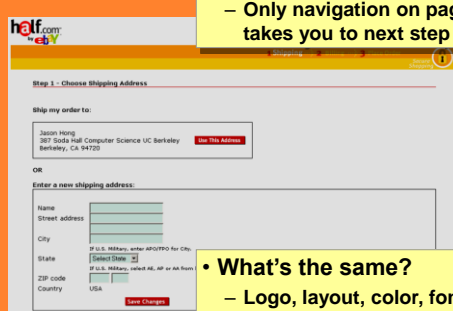
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PROCESS FUNNEL

- What's different?
 - No tab rows
 - No impulse buys
 - Only navigation on page takes you to next step



- What's the same?
 - Logo, layout, color, fonts

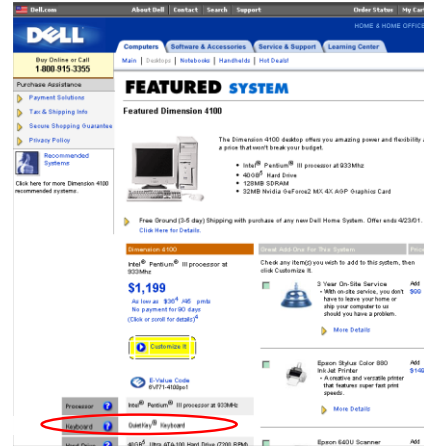
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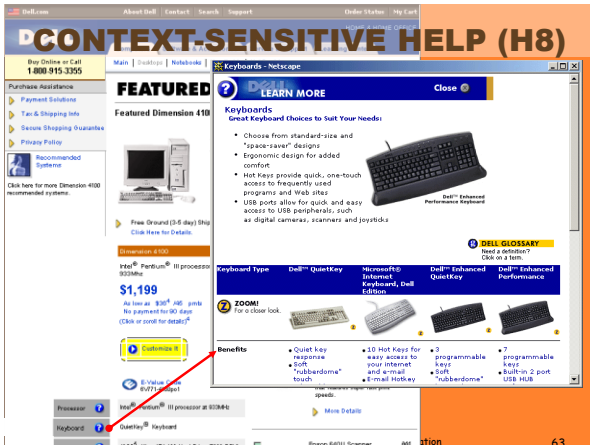
60

PROCESS FUNNEL (H1)

- o Problem: What if users need extra help?



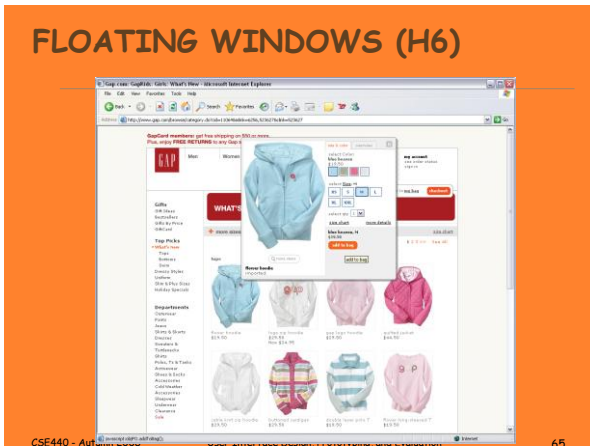
CONTEXT-SENSITIVE HELP (H8)



FLOATING WINDOWS (H6)

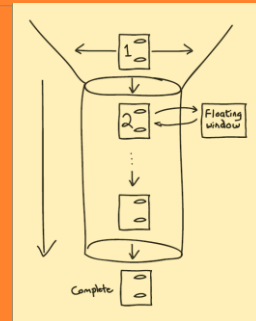


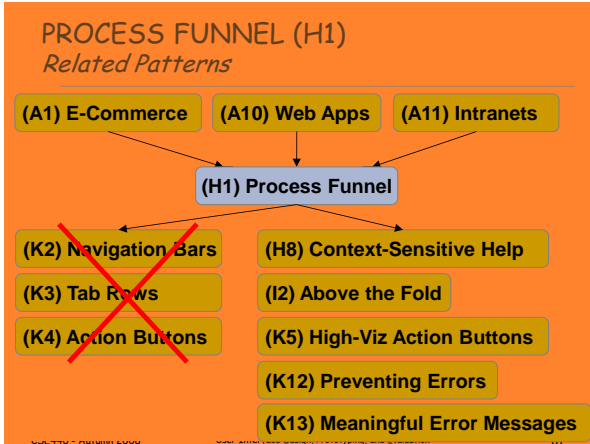
FLOATING WINDOWS (H6)



PROCESS FUNNEL (H1)

Solution Diagram





Patterns Support Creativity

- o Patterns come from successful examples
 - * sites that are so successful that lots of users are familiar with their paradigms (e.g., Yahoo)
 - * interaction techniques/metaphors that work well across many sites (e.g., shopping carts)
- o Not too general & not too specific
 - * you need to specialize to your needs
- o Patterns let you focus on the hard, unique problems to your design situation
 - * every real design will have many of these

Patterns Offer the Best of Principles, Guidelines, & Templates

- o Patterns help you get the details right, without over-constraining your solution
 - * unlike principles, patterns not too general, so will apply to your situation
 - * unlike guidelines, patterns discuss tradeoffs, show good examples, & tie to other patterns
 - * unlike style guides, patterns not too specific, so can still be specialized
 - * unlike templates, patterns illustrate flows among different pages
- o Patterns can serve as documentation for team-oriented environments

Format of Web Design Patterns

- Pattern Name and Number
- Exemplar
- Background
- Problem
- Forces
- Solution Diagram
- Related Patterns

Pattern Name and Number

Exemplar

Forces & Solution

Background

Problem Statement

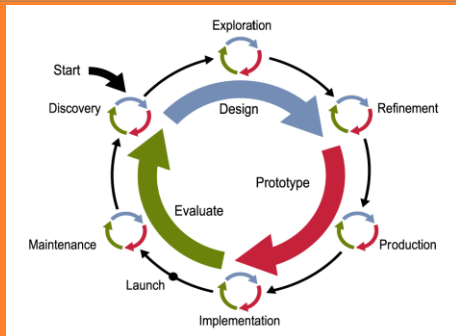
Bus Stops

Solution Diagram

Related Patterns

Solution Summary

Web Design Process



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Patterns in Exploration Phase

- o Use Exploration-level patterns to design overall structure
 - * different choices will give radically different designs
- o For example, how to organize information
 - * HIERARCHICAL ORGANIZATION (B3)
 - * TASK-BASED ORGANIZATION (B4)
 - * ALPHABETICAL ORGANIZATION (B5)
 - * ...

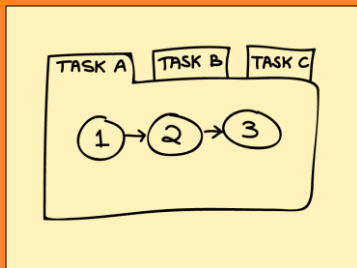
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Patterns in Exploration Phase

TASK-BASED ORGANIZATION (B4): Link the completion of one group of tasks to the beginning of the next related task(s)



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Design Exploration Example

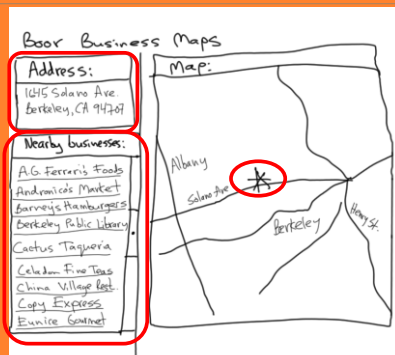
- o John given the task of designing a new subsite for showing maps to businesses
 - * listings found by typing in address
 - * key feature: show nearby businesses
- o John comes up with two design sketches
 - * Design #1 uses ALPHABETICAL ORGANIZATION (B5) for list of all nearby businesses
 - * Design #2 uses TASK-BASED ORGANIZATION (B4) for list of *related* nearby businesses

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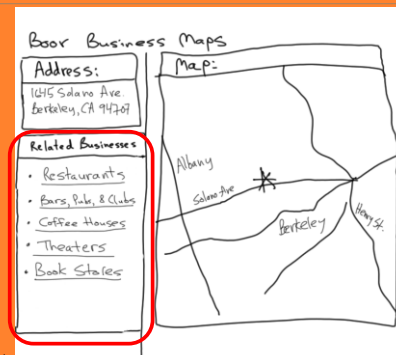
Design #1 ALPHABETICAL ORGANIZATION (B5)



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Design #2 TASK-BASED ORGANIZATION (B4)



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Evaluating Which Design to Choose

- o Low-fidelity Usability Test
 - * sketches the rest of the key screens on paper
 - * brings in 5 participants to his office
 - * asks each to carry out 3 tasks while John's colleague Sam "plays computer"
 - * John observes how they perform
- o Tasks
 - 1) look up 1645 Solano Ave., Berkeley CA
 - 2) look up 1700 California Ave, San Francisco CA & find Tadich Grill
 - 3) look up 2106 N 55th St, Seattle WA & find a Sushi restaurant nearby

Evaluating Which Design to Choose

- o Results with Design #1 (Alphabetical)
 - * Task 1: look up 1645 Solano Ave
 - + no difficulties encountered - warm-up task!
 - * Task 2: look up 1700 California & find Tadich Grill
 - + several users didn't notice that the list of nearby businesses was scrollable (due to paper affordances?)
 - + those that scrolled took awhile to find in list of over 500
 - * Task 3: look up 2106 55th St & find nearby Sushi restaurant
 - + 3 users only picked restaurants that had "restaurant" in the name & thus couldn't find "Kisaku"

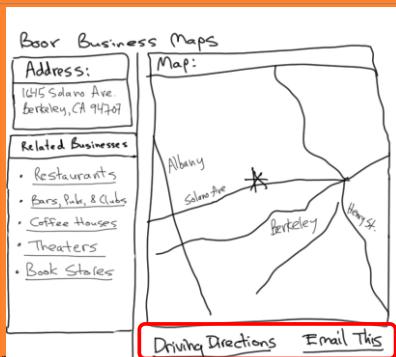
Evaluating Which Design to Choose

- o Results with Design #2 (Task-based)
 - * Task 1: look up 1645 Solano Ave
 - + no difficulties encountered - warm-up task!
 - * Task 2: look up 1700 California & find Tadich Grill
 - + 1 user took awhile to figure out that Tadich Grill was a restaurant & to click on the "Restaurants" link
 - + all others found it in 2 clicks (Restaurants->Tadich Grill)
 - * Task 3: look up 2106 55th St & find nearby Sushi restaurant
 - + 3 found "Kisaku" in 2 clicks
 - + 2 others asked for a listing of Japanese restaurants

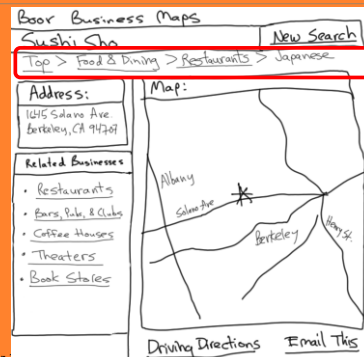
Evaluating Which Design to Choose

- o General comments
 - * 2 users said they often want to email maps to friends who they will be meeting (task-based)
 - * 3 users wanted driving directions (task-based)
- TASK-BASED ORGANIZATION (B4) worked better, but still had some minor problems

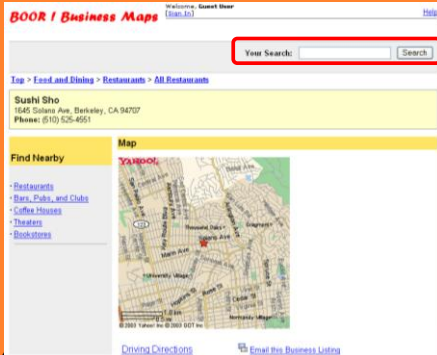
Design #2 - Revision 1 Adding More Related Tasks



Design #2 - Revision 2 Adding HIERARCHICAL ORGANIZATION (B3) & LOCATION BREAD CRUMBS (K6)



Design #2 - Revision 3 Hi-Fi Prototype Adding SEARCH ACTION MODULE (J1)



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Design Patterns Moving Beyond Web

E13 - Notification on Access of Personal Data

Forces
 A key design decision here is whether the person is simply notified or has choice over whether information is disclosed. There are plausible cases for each. For example, "always let my family know where I am," but "let me choose whether to reveal my current location if a co-worker asks." This is primarily an issue of trust and boundaries with other individuals.

Privacy Mitigations also act as a form of notification. Notification can also be combined with unobtrusive displays to provide constant feedback.

Figure 1. ATAT Wireless Find Friends service notifies your friend if you ask for his or her location.

Synopsis
 Systems can provide feedback about what is being monitored and recorded.

Background
 This pattern is one part of providing *Appropriate Privacy Feedback* to individuals.

Problem
 How can systems provide feedback about what is being monitored, as well as the current state of the system?

Solution
 There are at least two different times that notification can be used, during an access and afterwards.

Notification during an access means that users are notified as an access

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Design Patterns Moving Beyond Web

B6 • FIND A FRIEND

Displaying people's location • There are several different ways of displaying a person's location. A straightforward approach is to simply show the location in text, for example, "near corner of Euclid Ave and Hearst Ave" or "in Soda Hall". Another approach is to show the data on a map, or possibly even an ACTIVE MAP (AM) that is constantly updated.

Figure 1. AT&T Wireless mMode service allows customers to add friends to a friend list, find out who is nearby, and call or send messages to them. Users can make themselves invisible whenever they want.

BACKGROUND
 This pattern allows services that allow people to find where their friends are while allowing those friends some level of privacy. This pattern is useful for GUIDES FOR EXPLORATION AND NAVIGATION (A5).

PROBLEM
 People would like to know where their friends are, for impromptu communication and gatherings. At the same time, those people may not always want to be tracked.

Managing privacy concerns • There are many privacy concerns about find-a-friend applications, due to the potential for abuse. This is not just the fear of "Big Brother," but also so-

Figure 2. UC San Diego's ActiveCampus project shows your friends' location in real time. While useful, this visualization raises many privacy concerns.

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Summary

- o Lots of issues involved in designing web sites
- o Design patterns one way of capturing good design knowledge

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Further Reading Books on Web Design

- o *Design of Sites*. Doug Van Duyn, James Landay, Jason Hong. Addison-Wesley. 2nd edition. 2007.
- o *Information Architecture for the World Wide Web*. Louis Rosenfeld and Peter Morville. O'Reilly, 1998.
- o *Don't Make Me Think!* Steven Krug. Que, 2000.

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Further Reading Books on Web Design

- o *Community Building on the Web*. Amy Jo Kim. Peachpit Press, 2000.
- o *Designing Web Usability*. Jakob Nielsen. New Riders Publishing, 1999.

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Further Reading

Websites on Web Design

- o UsableWeb.com, links to other usability sites
- o Usability.gov, for building accessible websites
- o Web pages that suck, at <http://www.webpagesthatsuck.com/>
- o Net tips for designers, at <http://www.dsiegel.com/tips/>
- o User Interface Engineering, at <http://www.uie.com>
- o ZDNet Ecommerce Best Practices, at <http://www.zdnet.com/ecommerce>.

Further Reading

Websites on Web Design

- o New York Times Ecommerce Times, at
* <http://www.nytimes.com/pages-technology/cybertimes/commerce/>
- o Webword.com usability log
- o CNet Builder.com, info on building sites
- o ACM's CHI-Web Mailing List
* <http://www.acm.org/sigchi/web/chi-web.html>
- o Goodexperience.com web log
- o Jakob Nielsen useit.com

Next Time

- o Lo-fi Prototyping
 - * Read
 - + [Snyder, Paper Prototyping, Ch. 4](#)
 - + [Discussion of guidelines for user observation](#)
By Kathleen Gomoll and Anne Nichol