HCI+D: USER INTERFACE DESIGN + PROTOTYPING + EVALUATION

Design Patterns

Prof. James A. Landay
Computer Science Department
Stanford University

Autumn 2014

November 7, 2014

Hall of Fame or Shame?

Sony Google TV Remote

Hall of Shame!

- Very complex
- So large that it requires two hands
- So many controls that you can't use in the dark (watching movie?)
- Two navigation pads. When do you use which?
- But, does have typing input…

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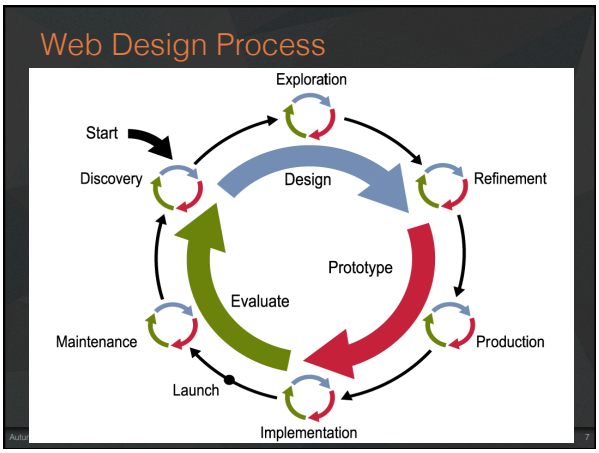
Outline

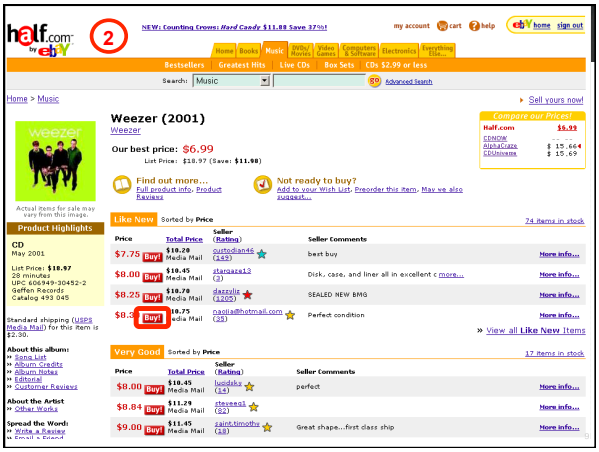
- Review of Usability Testing
- Detailed Design Example
- Web Design Patterns
- Break
- Administrivia
- Midterm Exam Overview / Questions
- Using Patterns during Design Exploration

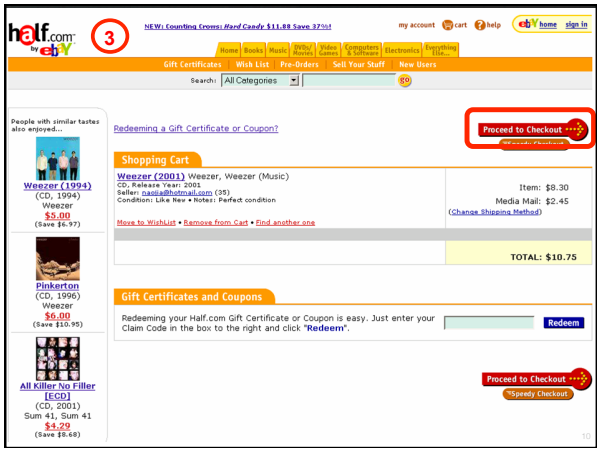
Review of Usability Testing

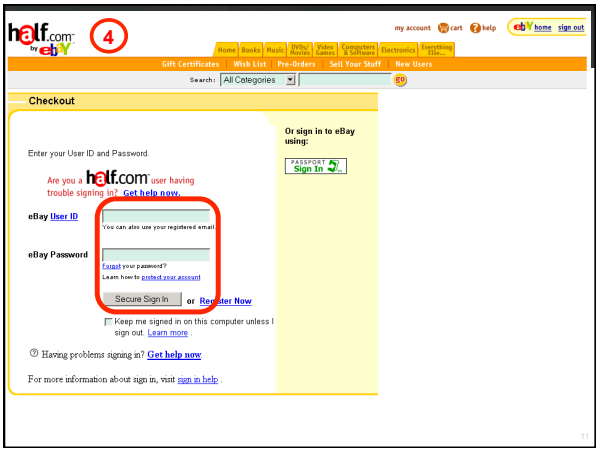
- User testing is important, but takes time/effort
- Use ????? tasks & ????? participants
  - real tasks & representative participants
- Be ethical & treat your participants well
- Want to know what people are doing & why? collect
  - process data
- Bottom line data requires ???? to get statistically reliable results
  - more participants
- Difference between between & within groups?
  - between groups: everyone participates in one condition
  - within groups: everyone participates in multiple conditions

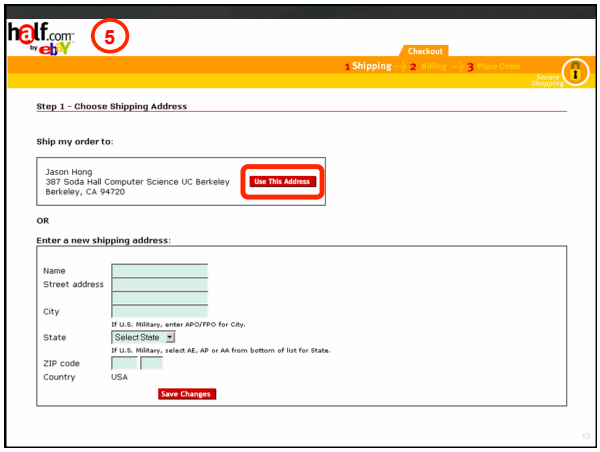

Web Design Process
Exploration
Start
Discovery
Design
Refinement
Prototype
Evaluate
Maintenance
Production
Launch
Implementation

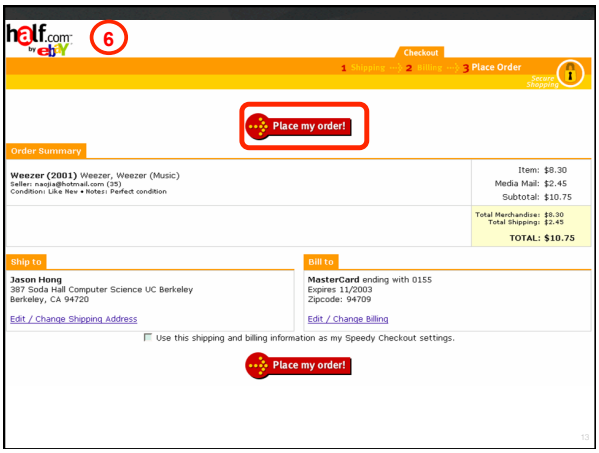
1
New CD Releases!
$11.88
Welcome
Advance Orders
Music
In Computers
Movies
Categories

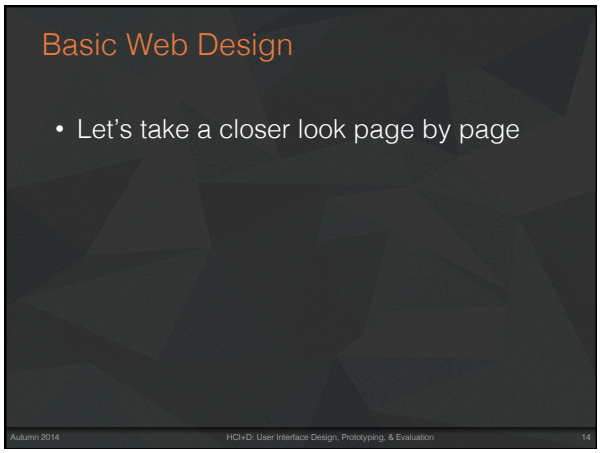

2
Weezer (2001)
Our best price: $6.99
Like New
Very Good


3
Shopping Cart
Gift Certificates and Coupons
Proceed to Checkout


4
Checkout
Enter your User ID and Password.
eBay User ID
eBay Password
Secure Sign In


5
Step 1 - Choose Shipping Address
Ship my order to:
Jason Hong
387 Soda Hall Computer Science UC Berkeley
Berkeley, CA 94720
Use This Address
OR
Enter a new shipping address:
Name
Street address
City
State
ZIP code
Country
USA
Save Changes


6
Checkout
1 Shipping 2 Billing 3 Place Order
Place my order!
Order Summary
Weezer (2001) Weezer, Weezer (Music)
Item: $8.30
Media Mail: $2.45
Subtotal: $10.75
TOTAL: $10.75
Ship to
Jason Hong
387 Soda Hall Computer Science UC Berkeley
Berkeley, CA 94720
Edit / Change Shipping Address
Bill to
MasterCard ending with 0155
Expires 11/2003
Zipcode: 94709
Edit / Change Billing
Use this shipping and billing information as my Speedy Checkout settings.
Place my order!


Basic Web Design
• Let's take a closer look page by page
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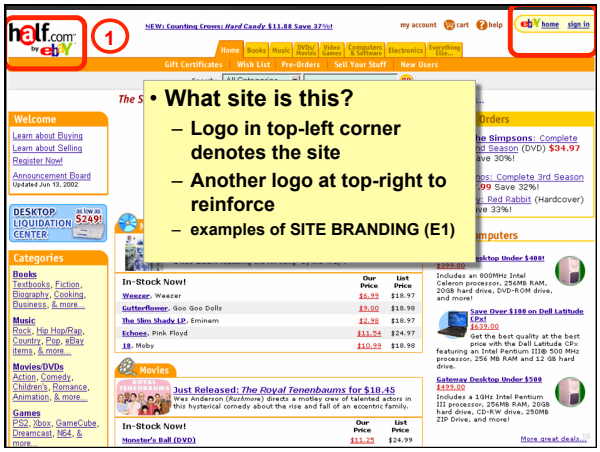
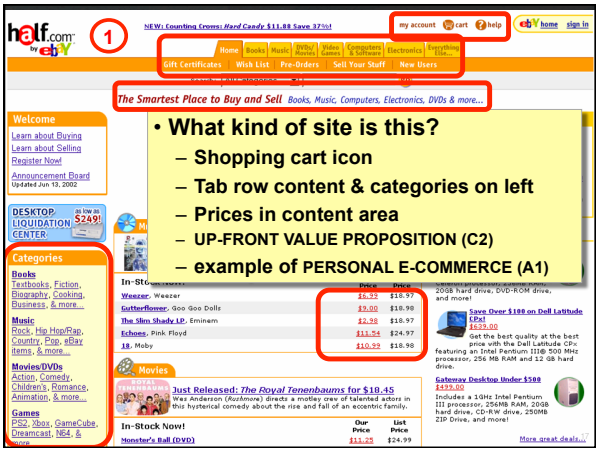
14

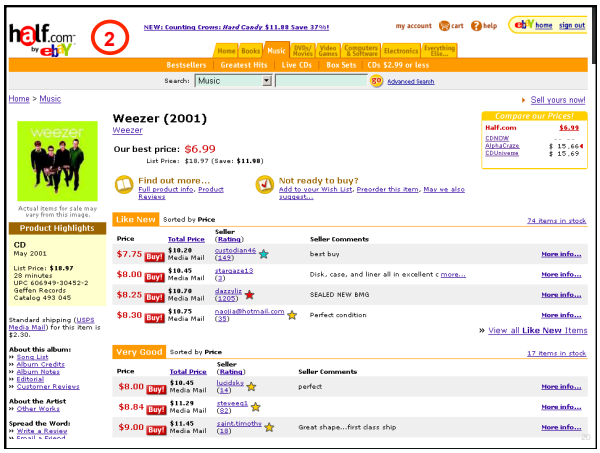
1
The Smartest Place to Buy and Sell Books, Music, Computers, Electronics, DVDs & more...
New CD Releases!
only $11.88
Advance Orders
Welcome
Categories
In-Stock Now!
Movies
Just Released: The Royal Tenenbaums for $18.45


1
• What site is this?
– Logo in top-left corner denotes the site
– Another logo at top-right to reinforce
– examples of SITE BRANDING (E1)


1
• What kind of site is this?
– Shopping cart icon
– Tab row content & categories on left
– Prices in content area
– UP-FRONT VALUE PROPOSITION (C2)
– example of PERSONAL E-COMMERCE (A1)

1
• What can I do here?
– *Welcome* for new visitors
– Tab row / Search on top
– "Categories"
– Prices
– Examples of OBVIOUS LINKS (K10)

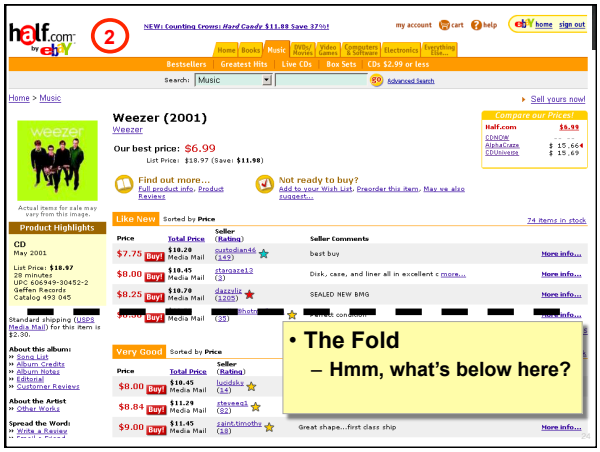
1
• Most important info visible without scrolling
• ABOVE THE FOLD (I2)

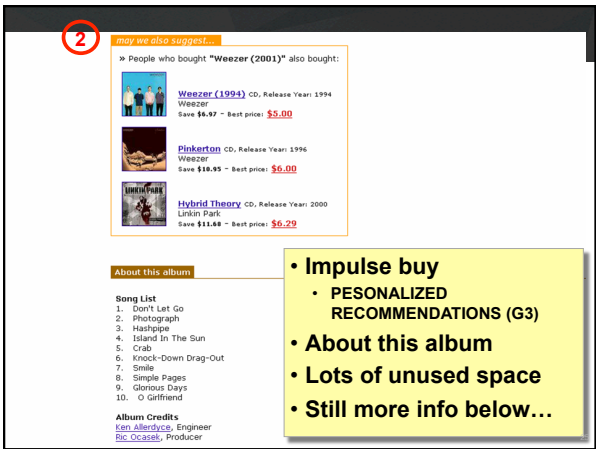

2

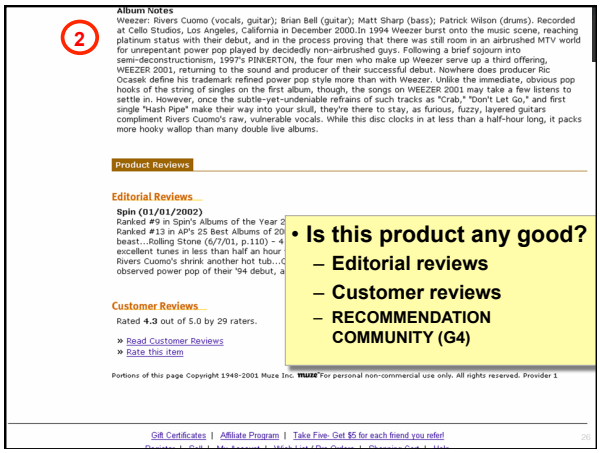
2
• What site am I at?
– Logo in upper-left reinforces brand, can click to go to home
– Same font, layout, color scheme also reinforces
– examples of SITE BRANDING (E1)

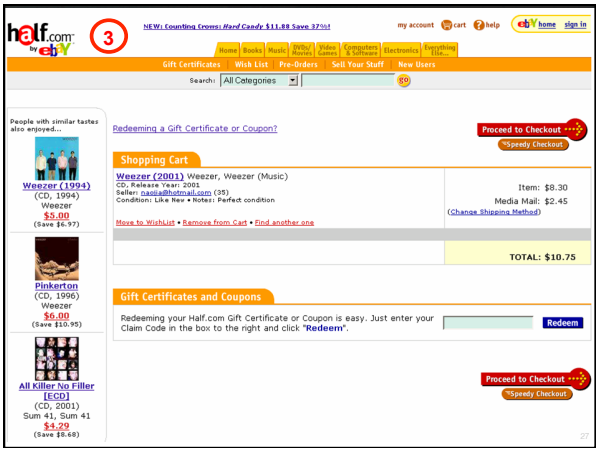
2
• Where am I in the site?
– "Home > Music" are LOCATION BREAD CRUMBS (K6)
– TAB ROW (K3) says "Music"
– Album cover, "Product Highlights", and CD cover

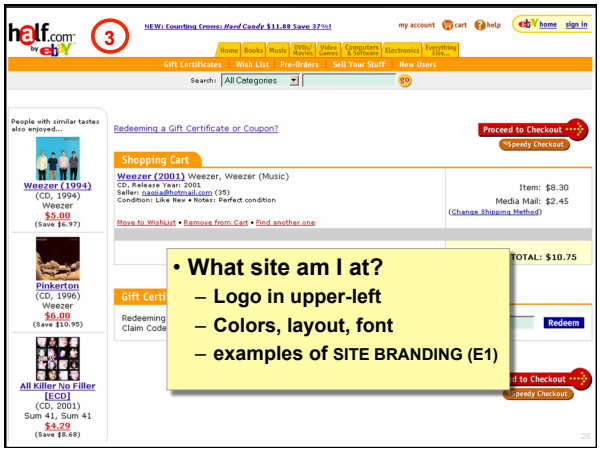
2
• Can I trust these sellers?
– Who am I buying from?
– Are they reputable?
– What about shipping?


2
• The Fold
– Hmm, what's below here?


2
may we also suggest...
» People who bought "Weezer (2001)" also bought:
Weezer (1994) CD, Release Year: 1994
Weezer
Save $6.97 - Best price: $5.00
Pinkerton CD, Release Year: 1996
Weezer
Save $10.95 - Best price: $6.00
Hybrid Theory CD, Release Year: 2000
Linkin Park
Save $11.68 - Best price: $6.29
About this album
Song List
1. Don't Let Go
2. Photograph
3. Hashpipe
4. Island In The Sun
5. Crab
6. Knock-Down Drag-Out
7. Smile
8. Simple Pages
9. Glorious Days
10. O Girlfriend
Album Credits
Ken Allardyce, Engineer
Ric Ocasek, Producer
• Impulse buy
• PESONALIZED RECOMMENDATIONS (G3)
• About this album
• Lots of unused space
• Still more info below…


2
Album Notes
Product Reviews
Editorial Reviews
Customer Reviews
Rated 4.3 out of 5.0 by 29 raters.
» Read Customer Reviews
» Rate this item
Gift Certificates | Affiliate Program | Take Five- Get $5 for each friend you refer!
• Is this product any good?
– Editorial reviews
– Customer reviews
– RECOMMENDATION COMMUNITY (G4)


half.com by ebay
3
Redeeming a Gift Certificate or Coupon?
Proceed to Checkout
Shopping Cart
Weezer (2001) Weezer, Weezer (Music)
Item: $8.30
Media Mail: $2.45
TOTAL: $10.75
Gift Certificates and Coupons
Redeeming your Half.com Gift Certificate or Coupon is easy. Just enter your Claim Code in the box to the right and click "Redeem".
Redeem
Weezer (1994)
Pinkerton
All Killer No Filler [ECD]


half.com by ebay
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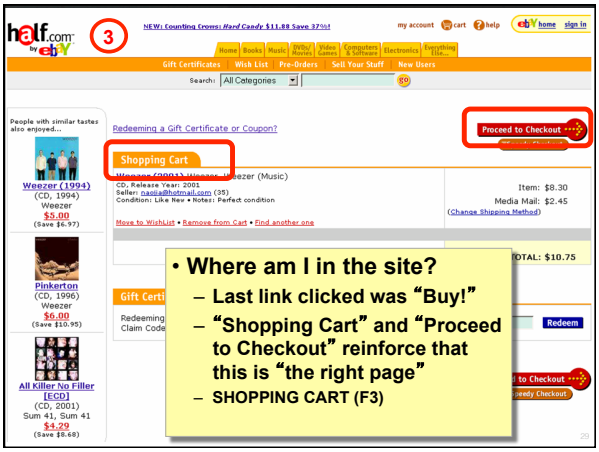
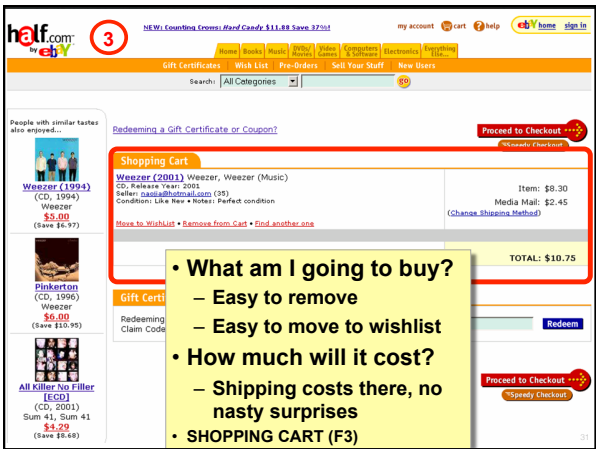
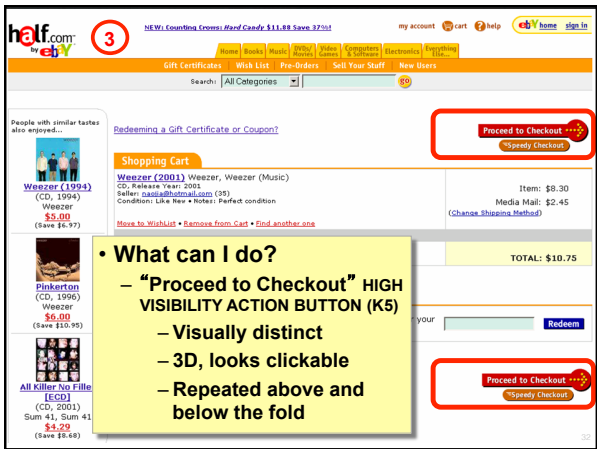
Redeeming a Gift Certificate or Coupon?
Proceed to Checkout
Shopping Cart
Weezer (2001) Weezer, Weezer (Music)
Item: $8.30
Media Mail: $2.45
TOTAL: $10.75
Redeem
Weezer (1994)
Pinkerton
All Killer No Filler [ECD]
• What site am I at?
– Logo in upper-left
– Colors, layout, font
– examples of SITE BRANDING (E1)

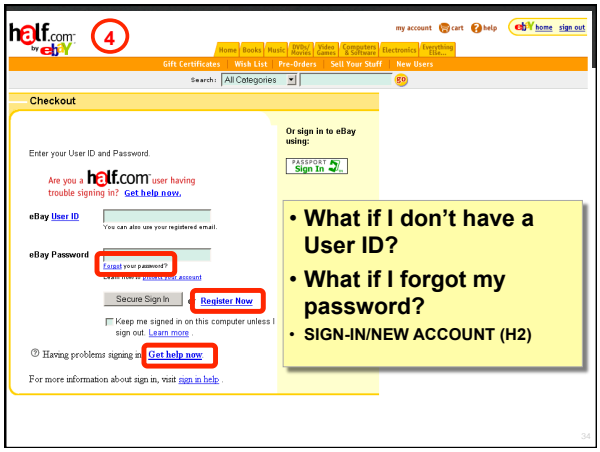

half.com by ebay
3
Redeeming a Gift Certificate or Coupon?
Proceed to Checkout
Shopping Cart
Weezer (2001) Weezer, Weezer (Music)
Item: $8.30
Media Mail: $2.45
TOTAL: $10.75
Redeem
Weezer (1994)
Pinkerton
All Killer No Filler [ECD]
• Where am I in the site?
– Last link clicked was "Buy!"
– "Shopping Cart" and "Proceed to Checkout" reinforce that this is "the right page"
– SHOPPING CART (F3)

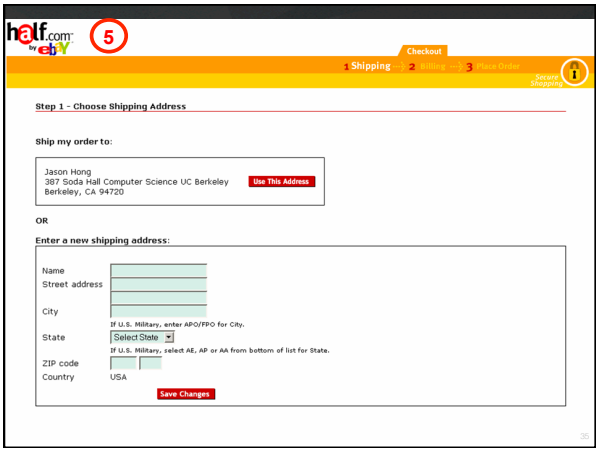
half.com by ebay
3
Redeeming a Gift Certificate or Coupon?
Proceed to Checkout
Shopping Cart
Weezer (2001) Weezer, Weezer (Music)
Item: $8.30
Media Mail: $2.45
TOTAL: $10.75
Redeem
Weezer (1994)
Pinkerton
All Killer No Filler [ECD]
• Cross-selling
– Possibly a pleasant surprise
– Impulse buy
– CROSS-SELLING & UP-SELLING (G2)

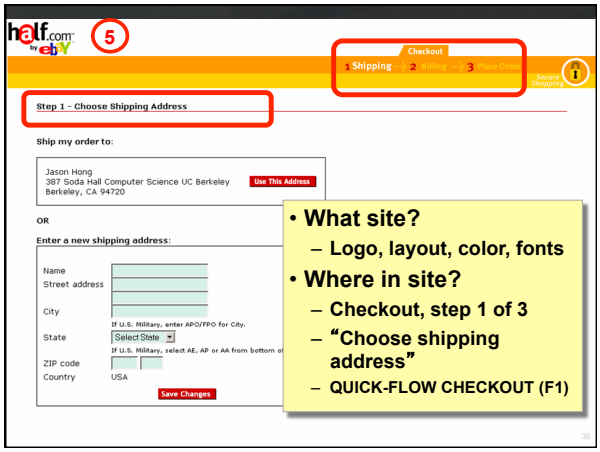

3
Shopping Cart
Proceed to Checkout
• What am I going to buy?
– Easy to remove
– Easy to move to wishlist
• How much will it cost?
– Shipping costs there, no nasty surprises
• SHOPPING CART (F3)

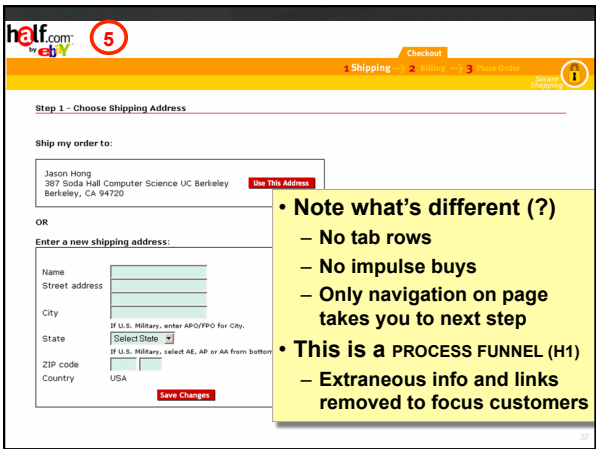

3
Shopping Cart
Proceed to Checkout
• What can I do?
– "Proceed to Checkout" HIGH VISIBILITY ACTION BUTTON (K5)
– Visually distinct
– 3D, looks clickable
– Repeated above and below the fold

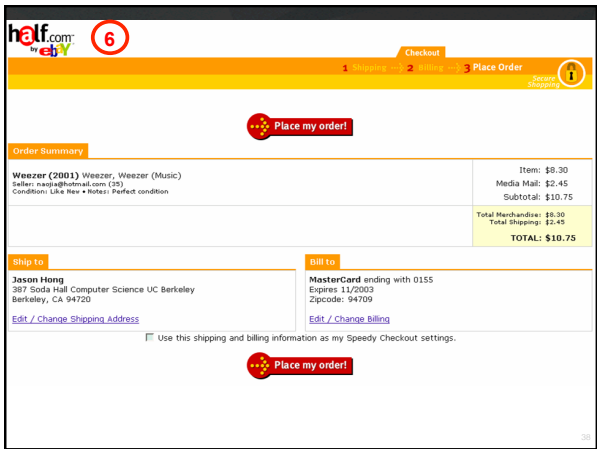
4
Checkout
Secure Sign In
Register Now


4
Checkout
Secure Sign In
Register Now
• What if I don't have a User ID?
• What if I forgot my password?
• SIGN-IN/NEW ACCOUNT (H2)

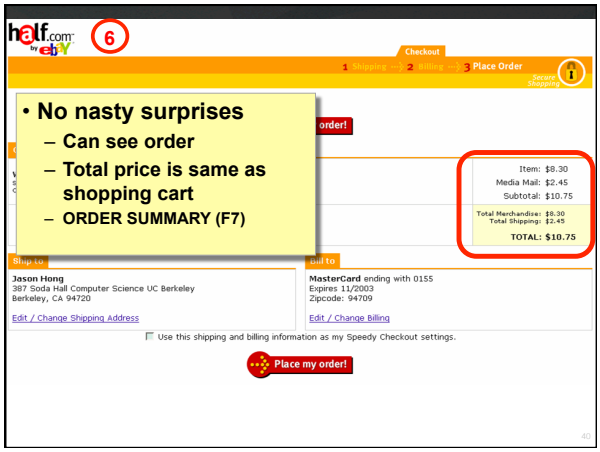

5
Checkout
Step 1 - Choose Shipping Address
Use This Address
Save Changes

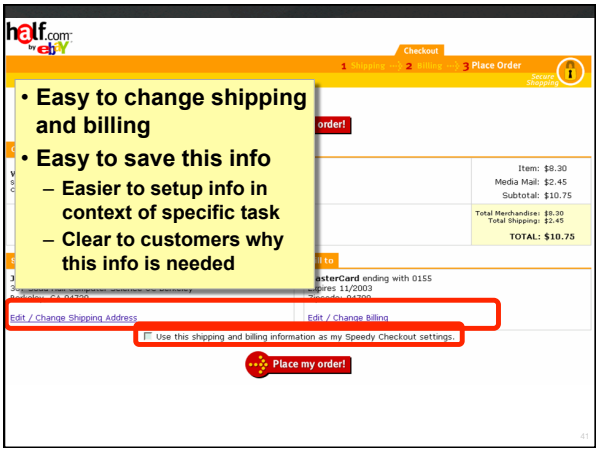

5
Checkout
Step 1 - Choose Shipping Address
Use This Address
Save Changes
• What site?
– Logo, layout, color, fonts
• Where in site?
– Checkout, step 1 of 3
– "Choose shipping address"
– QUICK-FLOW CHECKOUT (F1)


5
Step 1 - Choose Shipping Address
Ship my order to:
Use This Address
OR
Enter a new shipping address:
Save Changes
• 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


6
Place my order!
Order Summary
Ship to
Bill to
Edit / Change Shipping Address
Edit / Change Billing
Place my order!

6
Place my order!
Order Summary
• Last step of process
– Step 3, "Place Order"
– "Place my order" button
• Two HIGH-VISIBILITY ACTION BUTTONS (K5) for fold
Place my order!


6
• No nasty surprises
– Can see order
– Total price is same as shopping cart
– ORDER SUMMARY (F7)
Place my order!


• 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
Edit / Change Shipping Address
Edit / Change Billing
Place my order!

Design = Solutions
• Design is about finding solutions
• Unfortunately, designers often reinvent
• Hard to know *how* things were done before
• *Why* things were done a certain way
• *How* to reuse solutions
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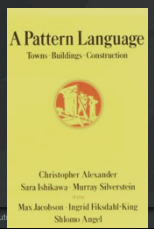
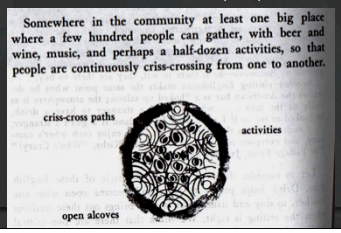
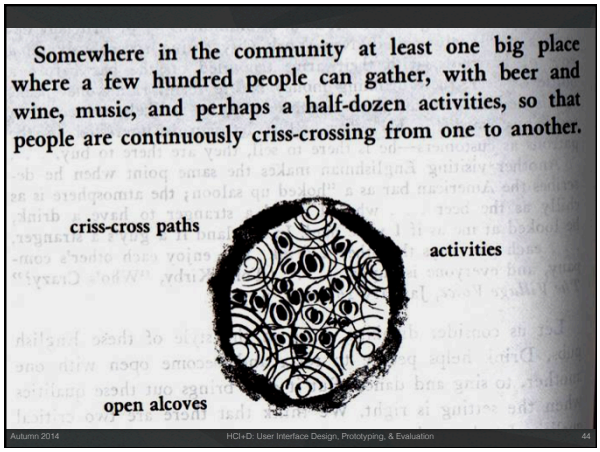
42

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?



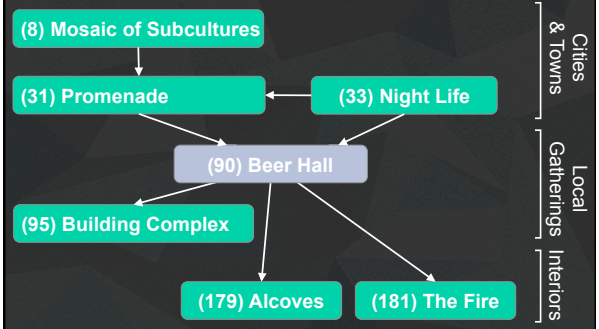




Using Design Patterns

- 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

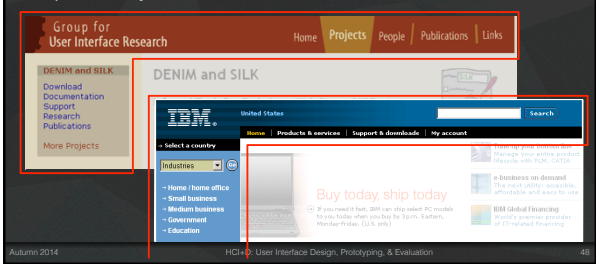


Web Design Patterns

- Now used in UI design
- Communicate design problems & solutions
  - 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…

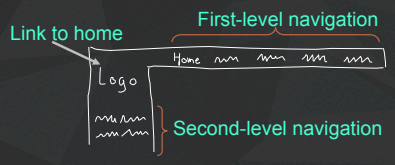
NAVIGATION BAR (K2)

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



NAVIGATION BAR (K2)

Solution diagram
– captures essence on how to solve problem



Pattern Groups

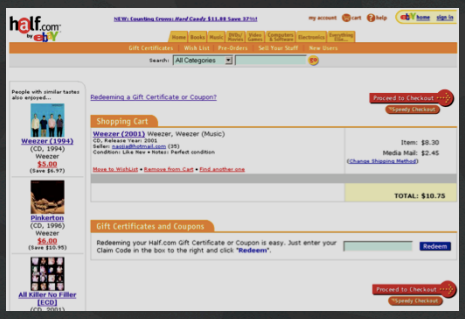
Our patterns organized by group

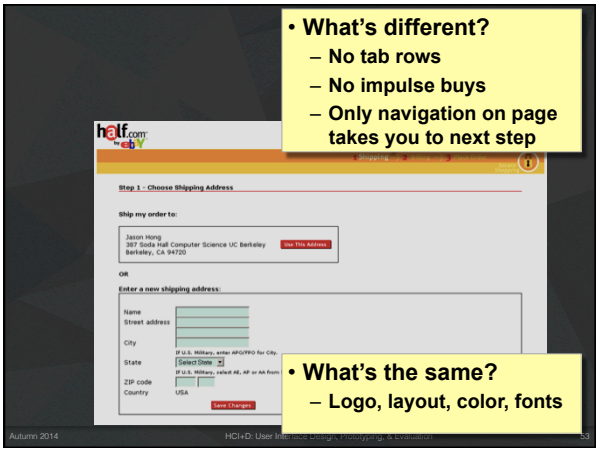
- A Site genres
- B Navigational framework
- C Home page
- D Content management
- E Trust and credibility
- F Basic ecommerce
- G Advanced ecommerce
- H Completing tasks
- I Page layouts
- J Search
- K Page-level navigation
- L Speed
- M The mobile web

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

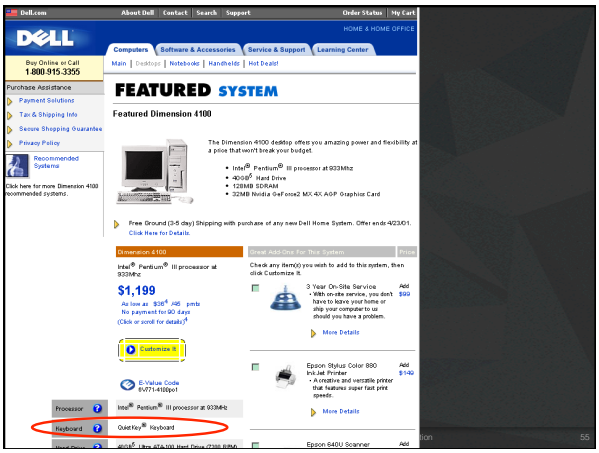
PROCESS FUNNEL (H1)

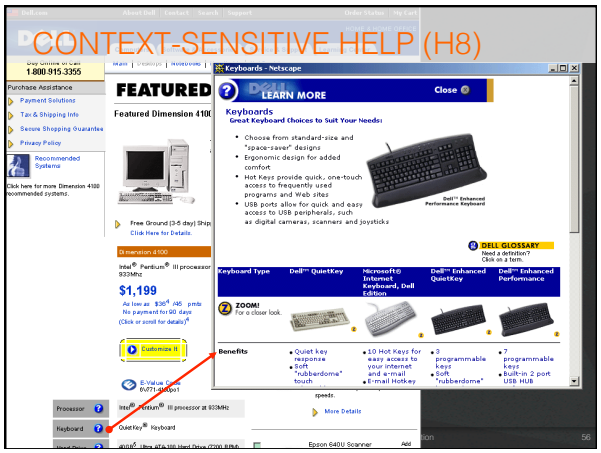




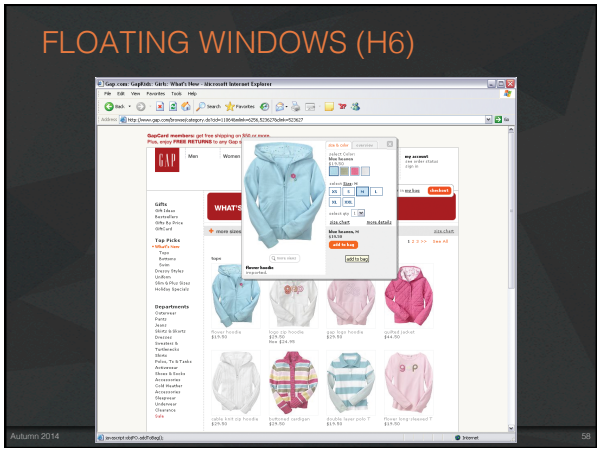
PROCESS FUNNEL (H1)

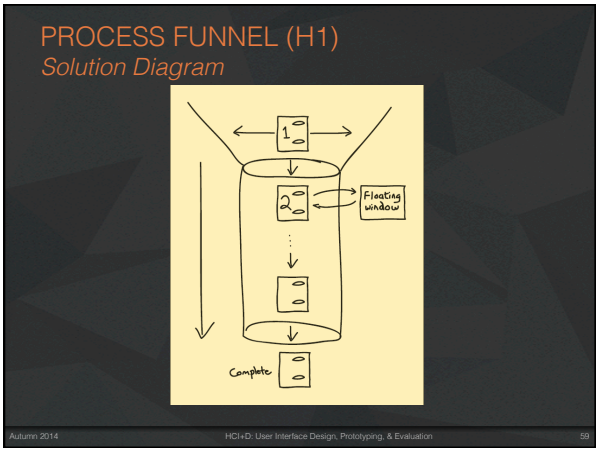
Problem: What if users need extra help?

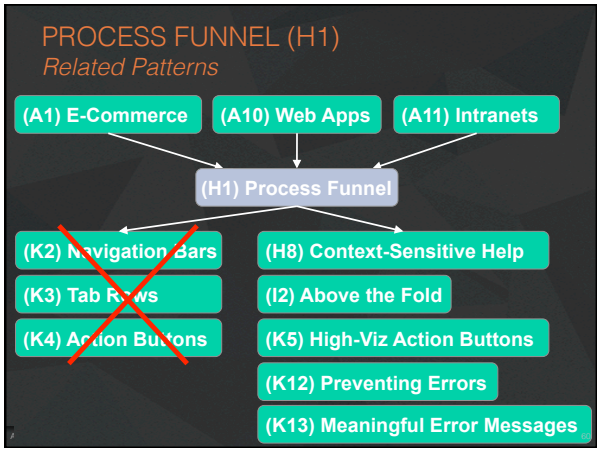

FEATURED SYSTEM
Featured Dimension 4100
$1,199


CONTEXT-SENSITIVE HELP (H8)
LEARN MORE
Keyboards
Great Keyboard Choices to Suit Your Needs!
DELL GLOSSARY

FLOATING WINDOWS (H6)
NETFLIX
Recommendations
Gladiator: Extended Edition
(2000)


FLOATING WINDOWS (H6)


PROCESS FUNNEL (H1)
Solution Diagram
1
2
Floating window
Complete


PROCESS FUNNEL (H1)
Related Patterns
(A1) E-Commerce
(A10) Web Apps
(A11) Intranets
(H1) Process Funnel
(K2) Navigation Bars
(K3) Tab Rows
(K4) Action Buttons
(H8) Context-Sensitive Help
(I2) Above the Fold
(K5) High-Viz Action Buttons
(K12) Preventing Errors
(K13) Meaningful Error Messages

Patterns Support Creativity

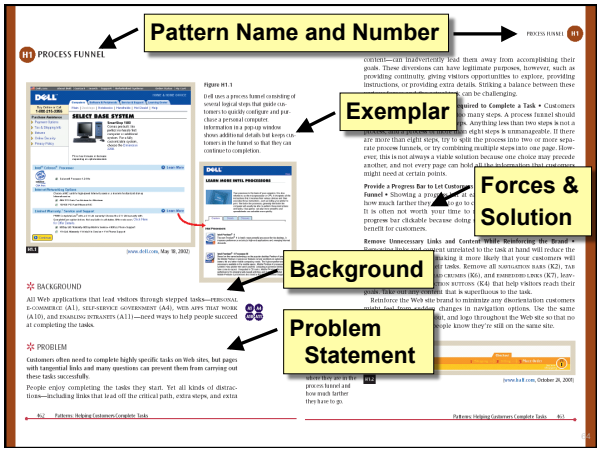
- Patterns come from successful examples
  - sites that are so successful that lots of users are familiar with their paradigms (e.g., Google, Amazon, Yahoo, Facebook…)
  - interaction techniques/metaphors that work well across many sites (e.g., shopping carts)
- Not too general & not too specific
  -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

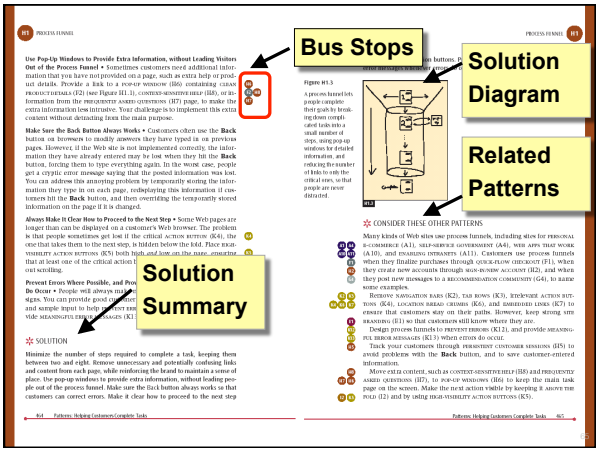
Patterns Offer the Best of Principles, Guidelines & Templates

- Patterns help you get the details right, without over-constraining your solution
  - unlike principles, patterns not too general, so can see how to 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 page templates, patterns illustrate flows among different pages
- Patterns can serve as documentation for team-oriented environments

Format of Web Design Patterns

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





TEAM BREAK (20 MINUTES)

DISCUSS WEB SITES & HI-FIGH PROTOTYPE

2014 CS 147 Film Festival Awards

- **Best Acting**
  - Speakeasy
- **Best Music/Soundtrack**
  - Creative Confidence
- **Most Humorous**
  - Runner up: Unguided
  - Token
- **Best Production Value**
  - Tie: InvestorScope, Tongues
- **Best Editing**
  - Runners Up: Creative Confidence, Tongues
  - InvestorScope
- **Best FX**
  - Runners up: mWork, Skill-It
  - SpeakEasy
- **Best Project Concept**
  - SpringBoard
- **Best Foreign Language Film**
  - Runner up: SpeakEasy
  - Tongues
- Most Prolific Actor
  - Nico!
- **Best Overall Video**
  - Runners Up: Springboard, Token
  - InvestorScope

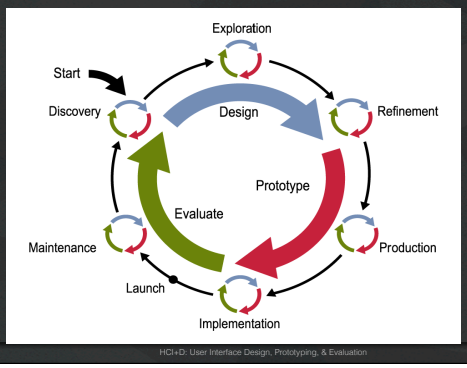
Quiz #3 Results & Answers

- Stats (n = 138)
  - average: 3.96
  - median: 4.00
  - std. dev.: 1.12
  - but 30 had 3 or lower on this quiz (19 <= 2)
- Answers
  - Using lots of whitespace in a visual design
    - Emphasizes the elements surrounded by the whitespace
  - Using color for ordering elements
    - Works poorly because humans are bad at using hue to order objects
  - Heuristic Evaluation was
    - Developed to be less expensive in time and cost than Usability Testing
  - The Human Visual System
    - Uses *cones* to perceive color, Uses *rods* to perceive movement, Most of the cones are centered at the fovea (center of the Retina), The irregular distribution of cones leads to color deficiency
  - The Model Human Processor
    - Has processor cycle times of approximately 100ms

Midterm on Thursday, 11/13 in Class

- 100 points in 100 minutes
- Know the lecture material, readings, & homework project assignments
- Do not need to memorize Heuristics, Pattern numbers/titles, names of every inventor beyond Bush, Engelbart, & Kay…
- Combination of knowledge & application
  - multiple choice
  - fill in the blank
  - short answer (~ 1-4 sentences)
  - design/evaluation problems (longer)
- Questions?

Web Design Process

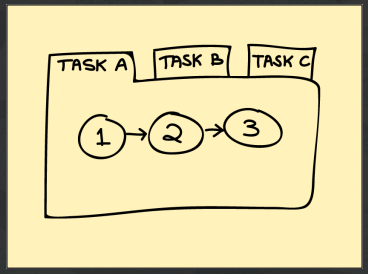


Patterns in Exploration Phase

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

Patterns in Exploration Phase

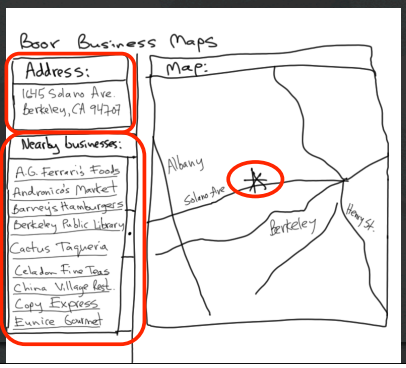
TASK-BASED ORGANIZATION (B4): Link the completion of one group of tasks to the beginning of the next related task(s)



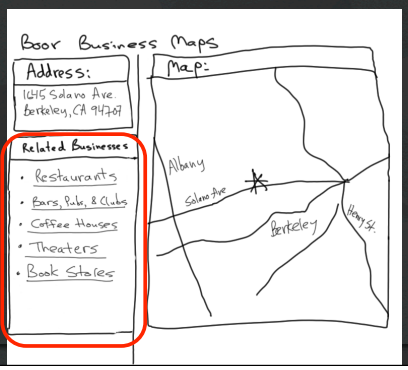
Design Exploration Example

- 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
- 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

Design #1 ALPHABETICAL ORGANIZATION (B5)



Design #2 TASK-BASED ORGANIZATION (B4)



Evaluating Which Design to Choose

- 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
- 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

- 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

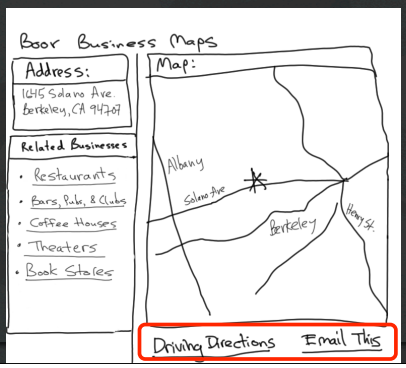
- Results with Design #2 (Task-based)
  - Task 1: look up 1645 Solano Ave
    - no difficulties encountered – warm-up task!
  - Task 2: look up 1700 California & find Tadich Grill
    - 1 user took awhile to figure out that Tadich Grill was a restaurant & to click on the "Restaurants" link
    - all 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

- General comments
  - 2 users said they often want to email/SMS maps to friends who they will be meeting (task-based)
  - 3 users wanted driving directions (task-based)

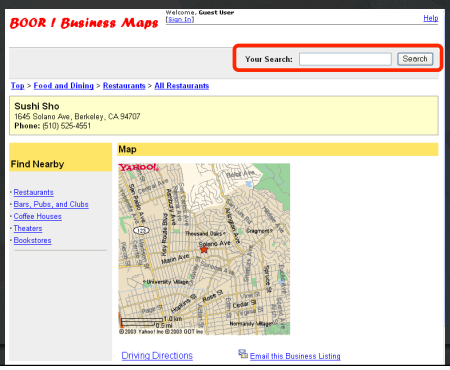
→ TASK-BASED ORGANIZATION (B4) worked better, but still had some minor problems

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)



Summary

- Lots of issues involved in designing compelling, usable web sites
- Design patterns are one way of capturing good design knowledge
  - generative (help you create new designs)
  - consider trade-offs
  - concrete examples of successful uses
  - a networked language that works together

Further Reading
Books on Web Design

- *The Design of Sites*. Doug Van Duyne, James Landay, Jason Hong. Addison-Wesley. 2nd edition. 2007.
- *Information Architecture for the World Wide Web*. Louis Rosenfeld and Peter Morville. O'Reilly. 3rd edition. 2006
- *Don't Make Me Think!, Revisited*. Steven Krug. Que. 3rd edition. 2014.
- *Prioritizing Web Usability*. Jakob Nielsen & Hoa Loranger. New Riders Publishing, 2006.

Further Reading
Websites on Web Design

- UsableWeb.com, links to other usability sites
- Usability.gov, for building accessible websites & more
- User Interface Engineering, at http://www.uie.com
- Mark Hurst's creativegood.com
- Jakob Nielsen's www.nngroup.com

Next Time

- Two guest lectures from IDEO
  - no reading
  - come listen & meet with your team during the break