

Site Design

SWE 432, Fall 2019
Web Application Development



Quiz

Go to:

b.socrative.com, Click student login

Room name: SWE432

Student Name: Your G-number (Including
the G)

Reminder: Survey can only be completed if you are in class. If you are not in class and do it you will be referred directly to the honor code board, no questions asked, no warning.

Today

- How do you help users understand if it is possible to do what they'd like to do?
- How do you help users find what they're looking for?
- How do you organize information in a site to maximize efficiency?

Site design

- If users can not find what they are looking for, they will leave.
- If users take a long time to find things, your software is not usable.
- Site design considers how users interact with information, including organization, labeling, and search

Site Design vs Real World

- Challenges (differences from physical world):
 - No spatial sense of scale. 50 pages? 500 pages? 50,000 pages?
 - No sense of direction. Which way did I just go?
 - No sense of location. No spatial anchoring of where I am now and how that relates to where I could go.

Planning

- Help users determine what they **can** do
- Support users in how they **determine** what to do

What can you do with this app?

The screenshot shows the CSS-Tricks website with a dark theme. At the top, the navigation bar includes links for Articles, Videos, Almanac, Snippets, Newsletter, Jobs, and Guides, along with a search bar. A banner at the top of the main content area reads "Fresh Article November 13, 2019". The main article title is "Thoughts After Looking at the Web Almanac's Chapter on CSS" by Chris Coyier. Below the article, there is a snippet of text and a "Read article" button. A sidebar on the right features a "DigitalOcean for Agencies" advertisement with a keyboard image and a call to action: "Grow your agency with DigitalOcean by joining a global developer community. Start saving time & resources today!". At the bottom, there is a "Popular this month" section sponsored by monday.com, followed by a grid of smaller article cards.

Popular this month
Sponsored by [monday.com](#)

Why Are Accessible Websites so Hard to Build? Article Oct 23, 2019 Author Robin Renne

Become a Front-end Master in 2020: These 10 Projects Article Nov 1, 2019 Author Chris Coyier

A Business Case for Dropping Internet Explorer Article Oct 28, 2019 Author Ollie Williams

The Trick to Adding the Dot on the "I" Article Nov 4, 2019 Author Ali Church

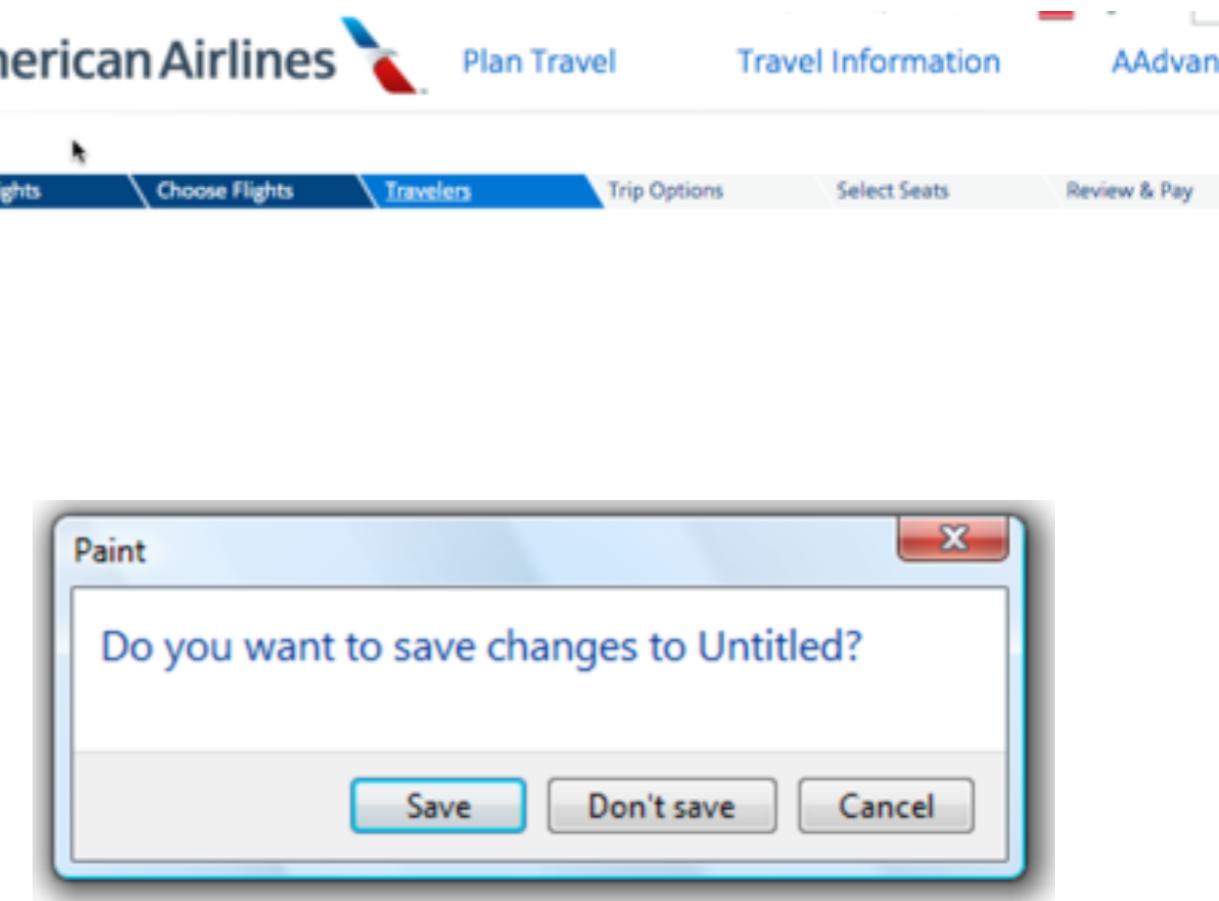
Introducing Semantic Web Badges Article Oct 7, 2019 Author Miriam Sutton

Clear system task model

- Help users accomplish goals by providing clear model of how users should view system in terms of tasks
- Design to match users' conception of high level task organization
- Help users understand what features exist and how they can be used
- Help users decompose long tasks into small pieces
- Keep task context visible to minimize memory load

Effective planning

- Help users plan most efficient ways to complete tasks
- Keep users aware of task progress, what has been done and what is left to do
- Provide constraints to avoid transaction completion slips
 - e.g., prevent users from starting task and accidentally throwing away work mid-task



Orchestration & interaction flow

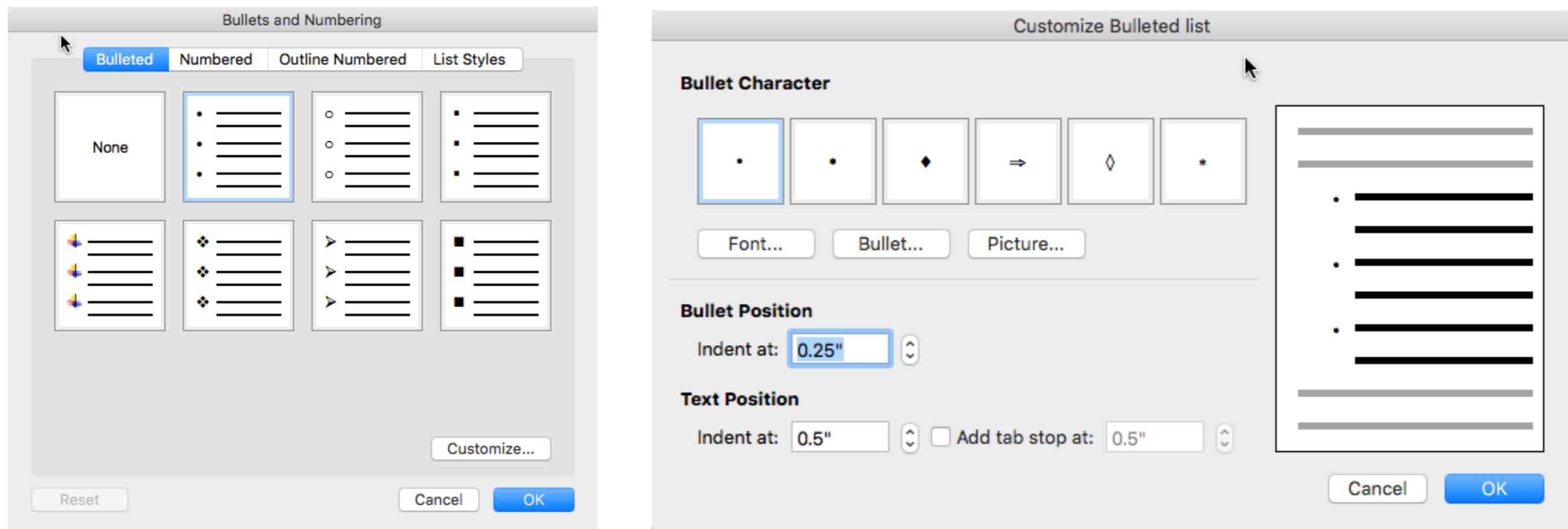
- Interaction flow - the next thing the interface wants to do is exactly what user expects
 - Follow users' mental model
 - Let user direct software
 - Keep all related tools available
- Surprises interrupt interaction flow
- Interfaces should be invisible

Interaction flow guidelines

- Don't use dialogs to report normal behavior
- Separate commands from configuration
- Don't ask questions, give users choices
 - Give users default input, show possible options
- Make dangerous choices hard to reach
- Design for the probable, provide for the possible

Progressive disclosure

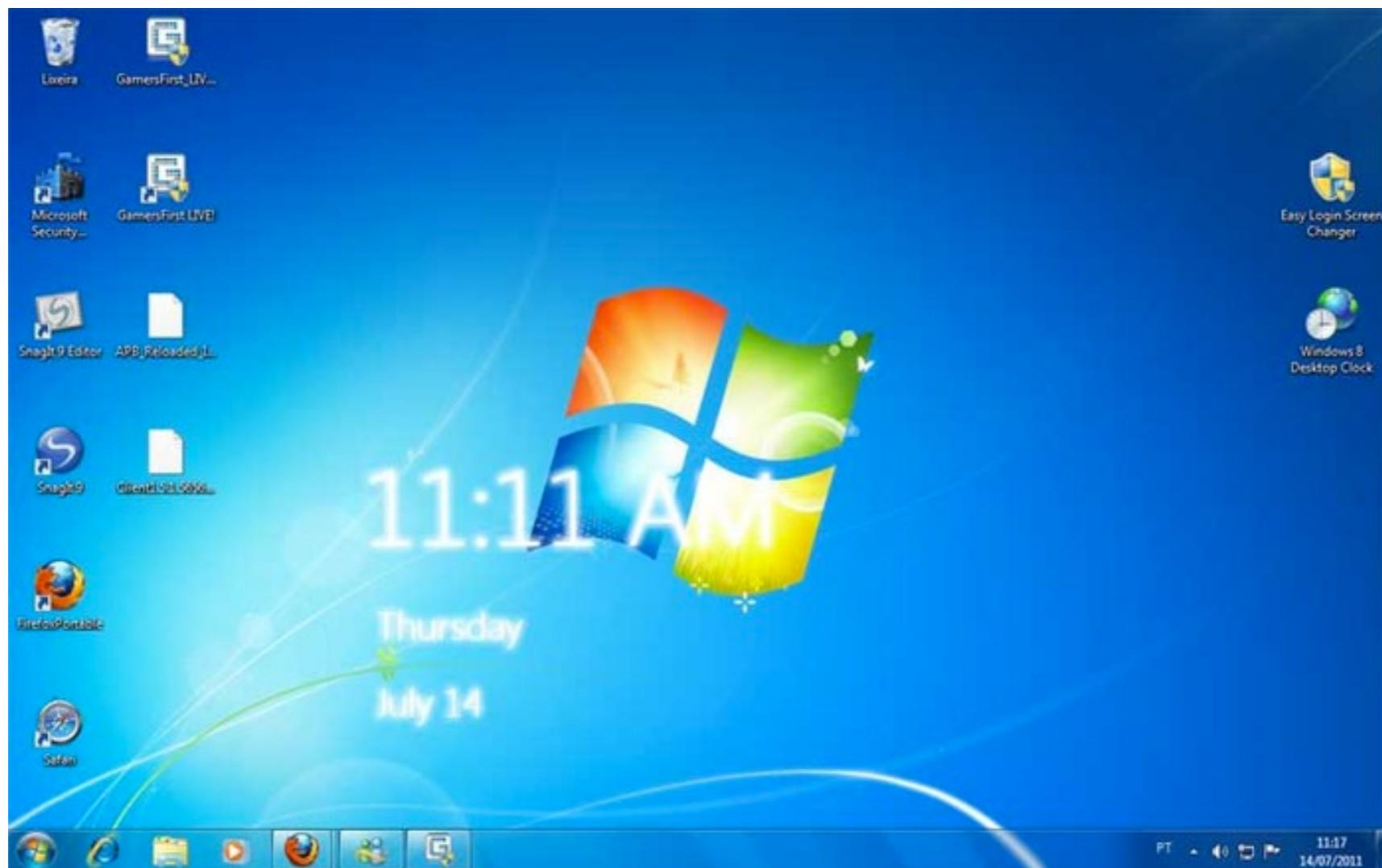
- a.k.a. details on demand
- Separate information & commands into layers
- Present most frequently used information & commands first



Metaphors & idioms

Metaphors

- One way to communicate interaction techniques is through metaphors to the real world



Metaphors - advantages

- Leverages understanding of familiar objects & their functions
 - File cabinets, desks, telephones
- Provides **intuitive** understanding of possible affordances & eases mapping tasks to actions
 - Open a folder, throw file in trash, momentum scrolling

Metaphors - disadvantages

- Tyranny of metaphor: ties interactions closely to workings of physical world
- Adds useless overhead in extra steps, wastes visual bandwidth
- Taken literally, becomes non-sensical
 - e.g., nesting folders 10 levels deep



Alternative - Idioms

- A consistent mental model of how something works
 - e.g., Files: open / close / save / save as
- Offers intuitive understanding of affordances & interactions
- Provides consistent vocabulary for describing interactions
- Only have to learn it **once**
- Might have originated in real world, but thought of in terms of mental model for UI interactions

Exercise: Examples of idioms

Examples of idioms

- Email
- Clipboard: cut / copy / paste
- Format painter
- Newsfeed
- Follow item

Metaphors examples - piles

- The context: Apple Computer, 1992, 3 researchers (Richard Mander, Gitta Salomon and Yin Yin Wang)
- The design problem: How should computers help users organize and file information?
- The method: How do users organize and file information best *without* computers?

Computer users are confronted with large amounts of information, but **currently are only provided with a hierarchical filing system for managing it [folders]**.

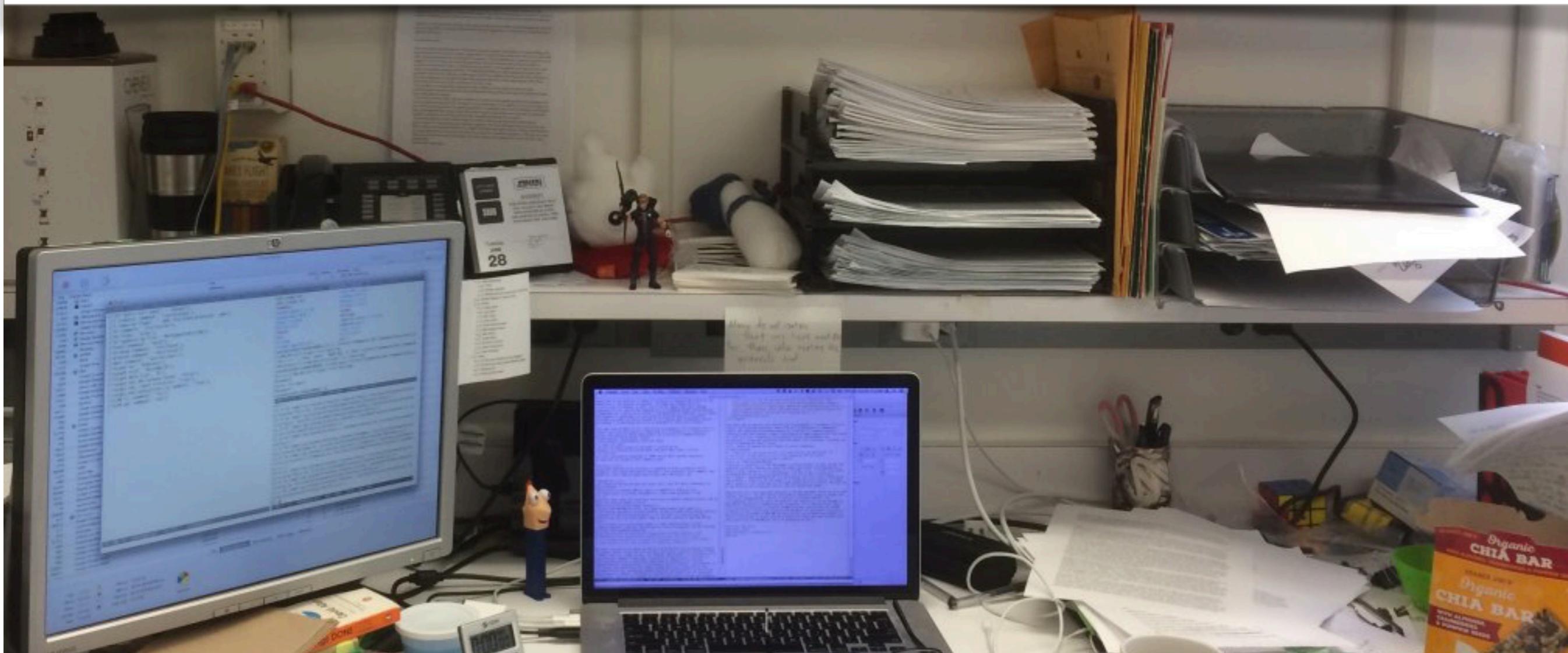
Piles - Methodology

- Interview 13 Apple employees in different departments for 30-60 minutes
- Studied:
 - How does information arrive in your work area?
 - What do you do with information once you get it?
 - Where does it go next?
 - Where and how is it stored?
 - How do you work with (or would work with) an **assistant**?

Piles - Study Results

- Users used many artifacts like:
 - Folders
 - File cabinets
 - File racks
 - Binders
 - Piles
- Problems with filing in folders/cabinets:
 - “I’m not always as good at categorizing things as I would like...it’s hard to get it right and I’m sort of a perfectionist, so I think that I should know exactly how I should do it...I like things in their place, but I can’t figure out exactly what place.”

“Seemingly disordered piles were often sensible to the person who created them, because they developed through many interactions over a long period of time.”



“...Most workers kept information they needed in a specific working area. A common strategy was to create separate piles for each project and place them within the working area, at distances that reflected their urgency.”

Piles as a Design Metaphor

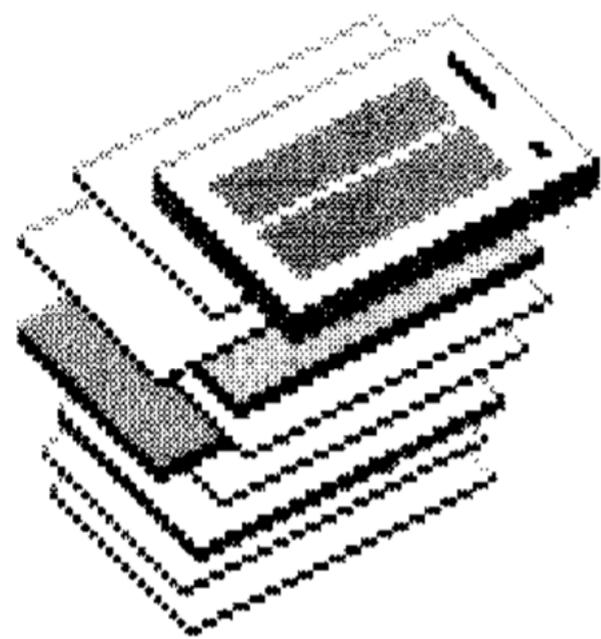
- Insight: Many tasks do not rely on hierarchy of files (e.g. organization in folders in cabinets)
 - Note, not first to suggest metaphor of piles, Thomas Malone (Xerox PARC) described nearly 10 years earlier in 1983
- How do workers use piles?
 - Edge browse - find cues from the edge of a pile (thickness, color, texture)
 - Restack - Start at the top, browse down by removing things
 - Hinge - Unfold the pile like a binder
 - Spread out - See all/many items at once

Assistance with Information Management

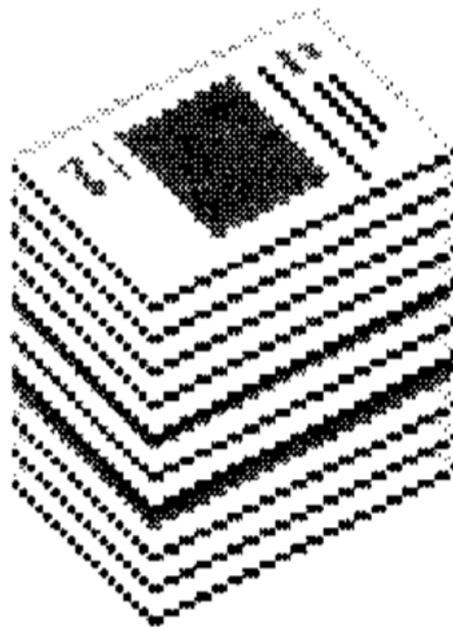
- Most participants in the study did not have an assistant but mentioned that they wanted one, why?
- Assistants might:
 - Sort incoming data into categories
 - Filtered incoming data
 - Create piles
 - All **in collaboration with** the worker
 - “I’ll go into his office and put [labels] on piles on his floor and he’ll look at it and say ‘no’ or he’ll say ‘that’s pretty good.’”

Piles - Sketches

- Created sketches to facilitate discussion and evaluation
- Example features:
 - System-created piles



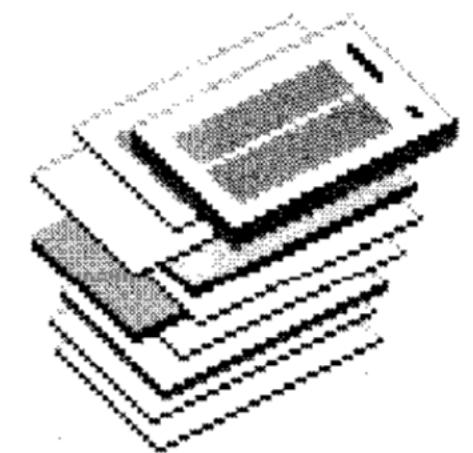
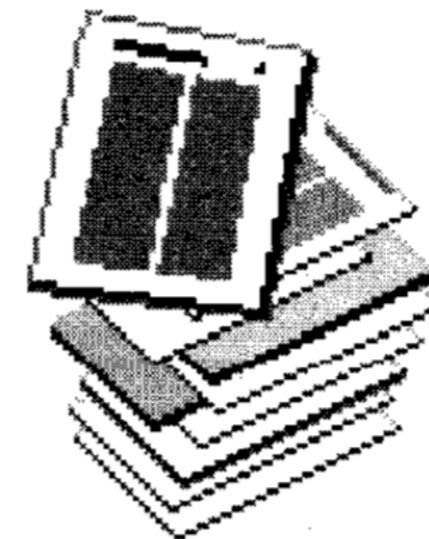
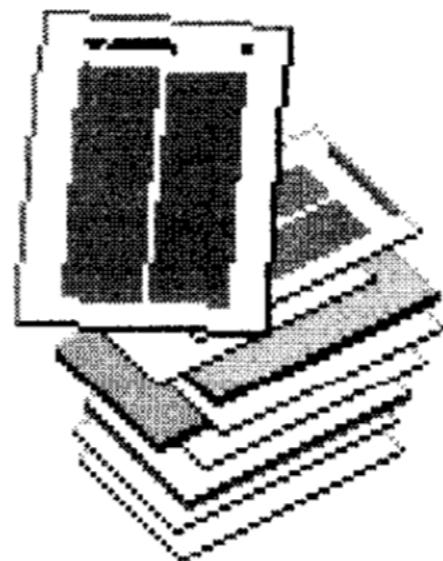
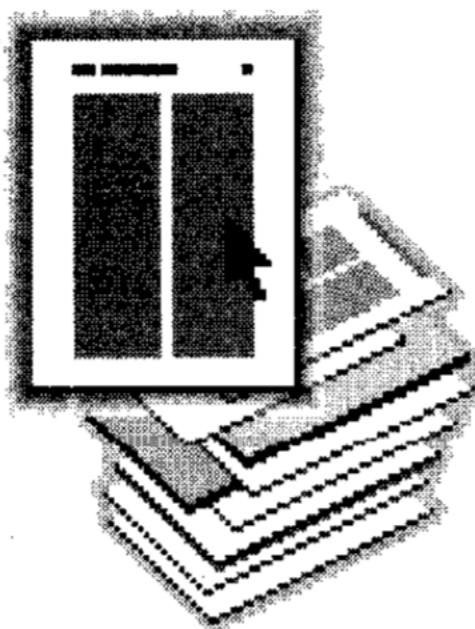
User-created pile
(messy)



System-created
pile (Organized)

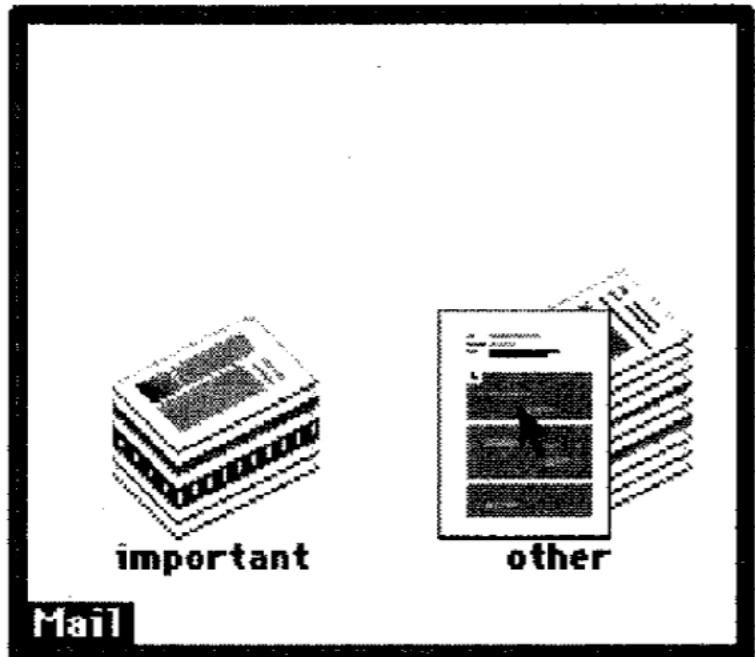
Piles - Sketches

- Created sketches to facilitate discussion and evaluation
- Example features:
 - New files added to the pile are directly visually represented

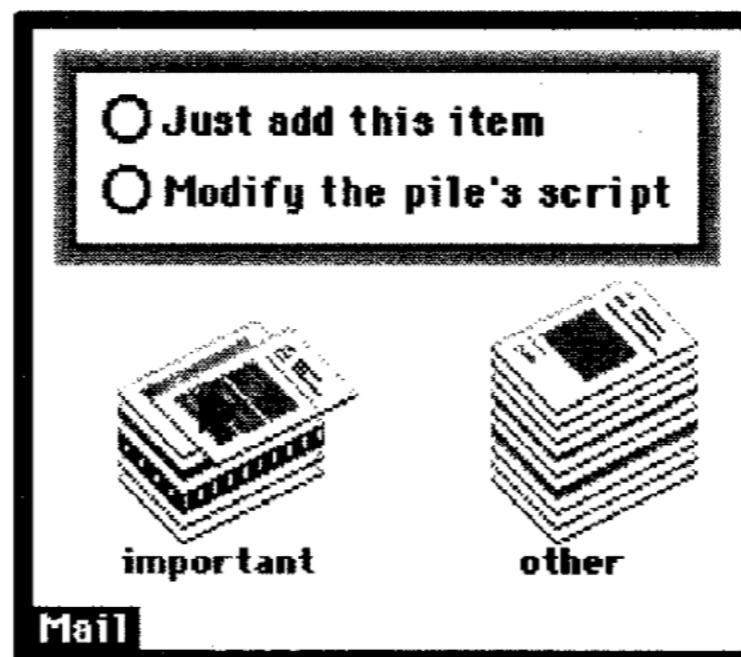


Piles - Sketches

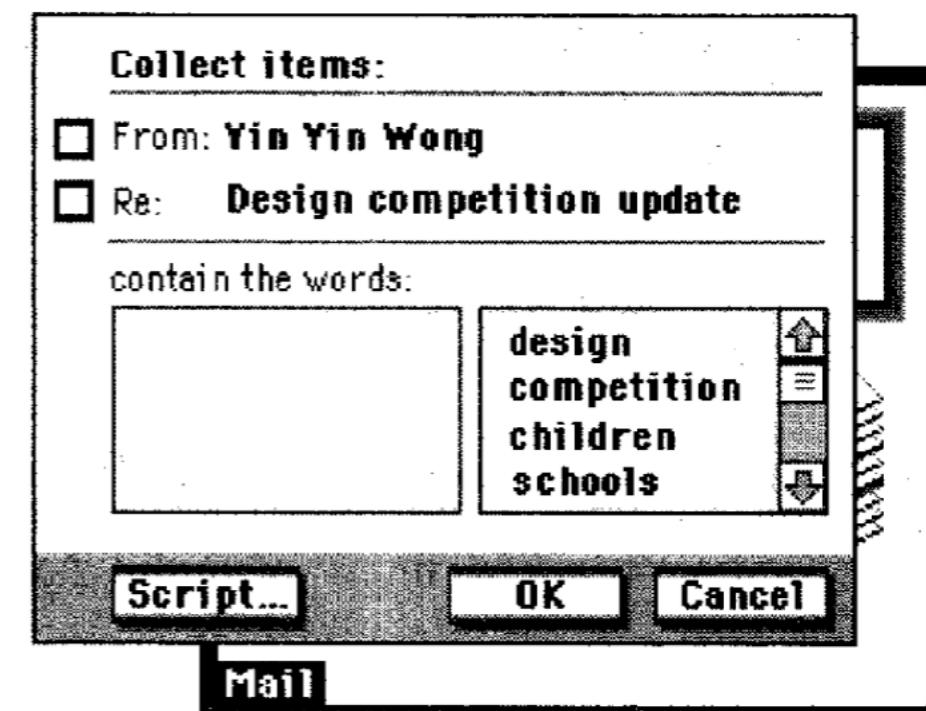
- Created sketches to facilitate discussion and evaluation
- Example features:
 - System-user collaboration for defining rules



Select an item from
a pile



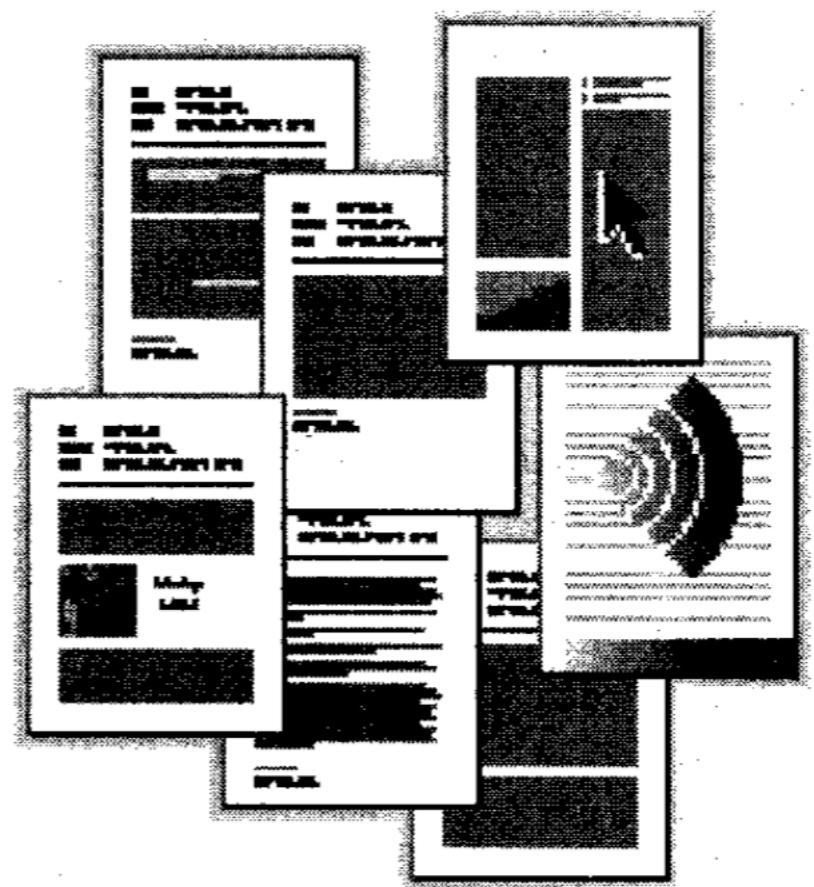
Move to new pile



Update pile script

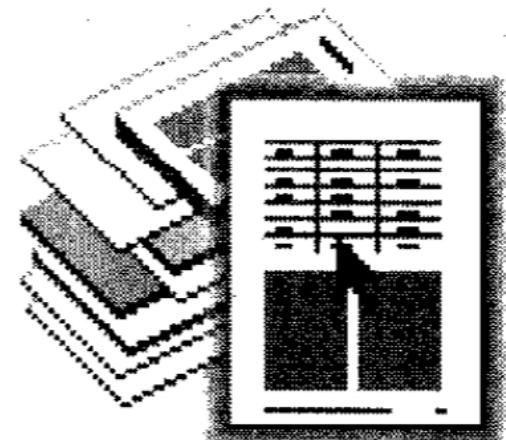
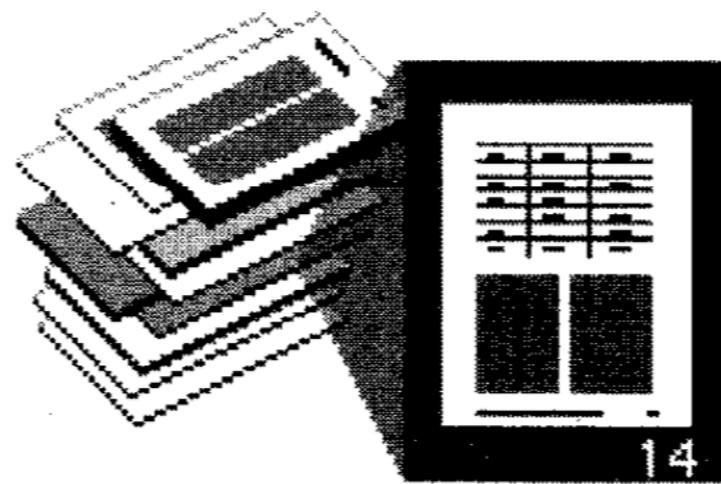
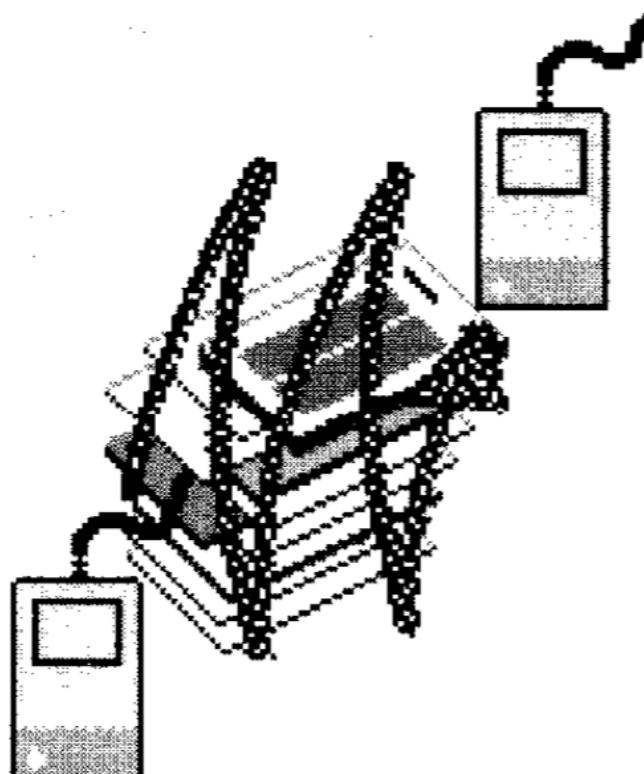
Piles - Sketches

- Created sketches to facilitate discussion and evaluation
- Example features:
 - Browsing by spreading a pile out



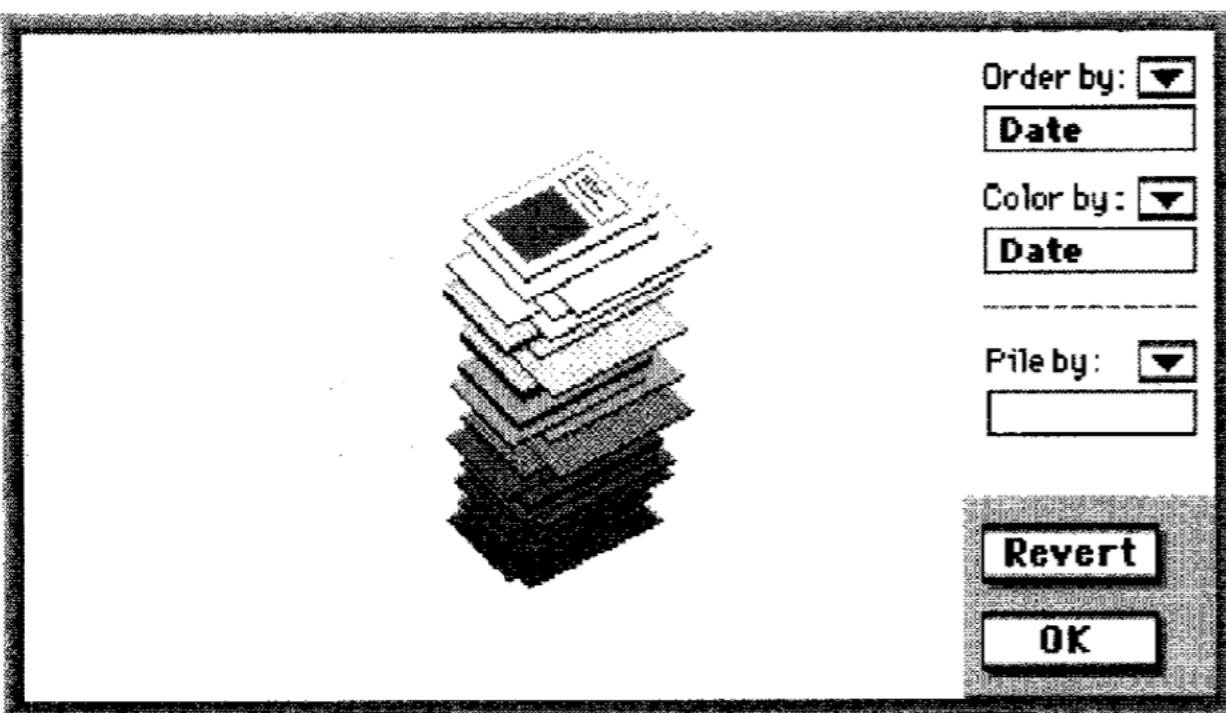
Piles - Sketches

- Created sketches to facilitate discussion and evaluation
- Example features:
 - Browsing and maintaining structure (kind of like hinge)

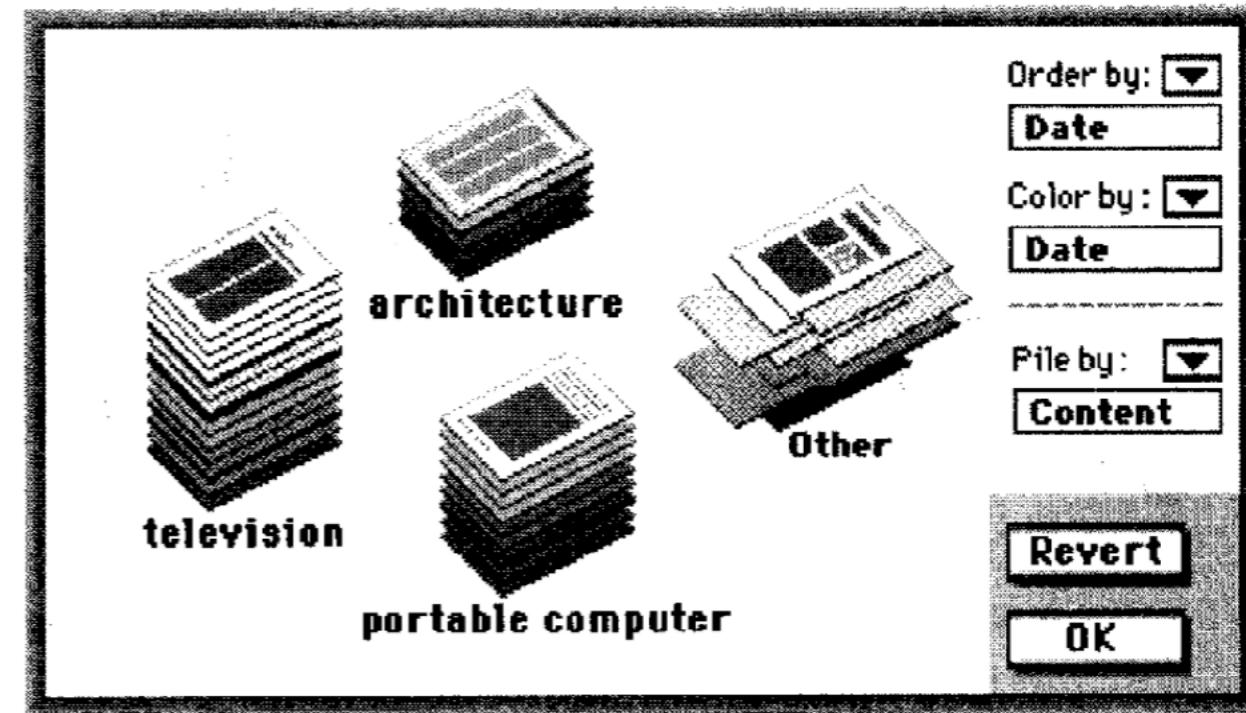


Piles - Sketches

- Created sketches to facilitate discussion and evaluation
- Example features:
 - Visualizing the contents of a pile



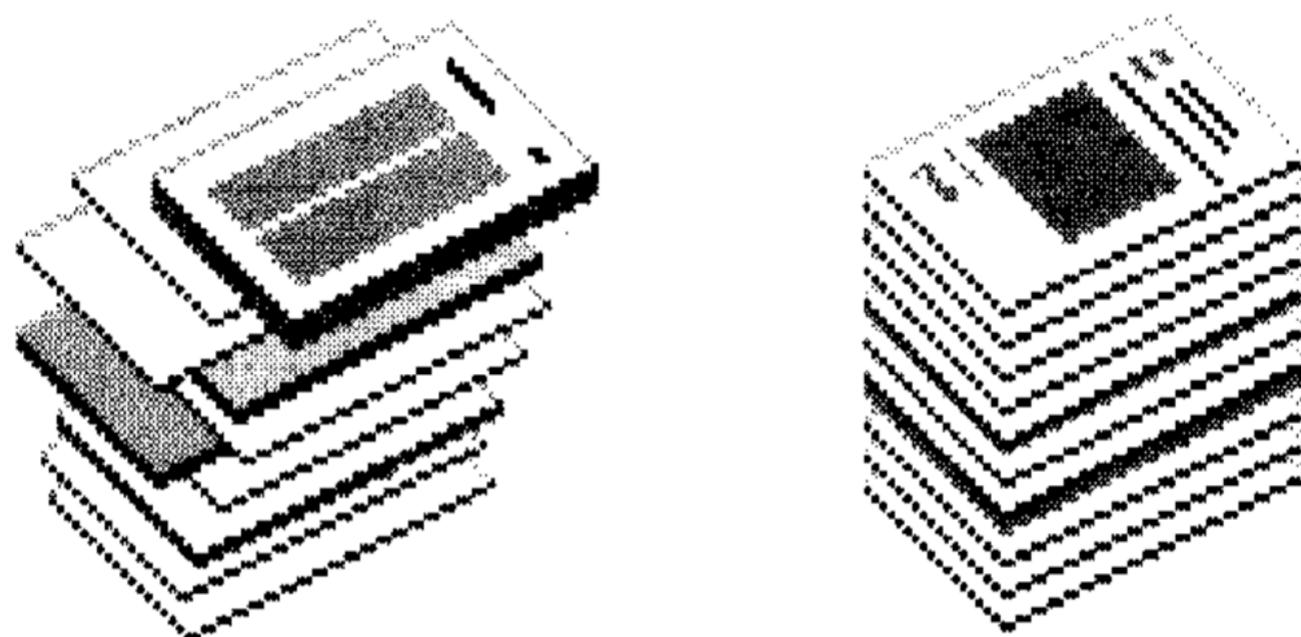
All data, ordered and colored by date



All data, ordered and colored by date, piled by content

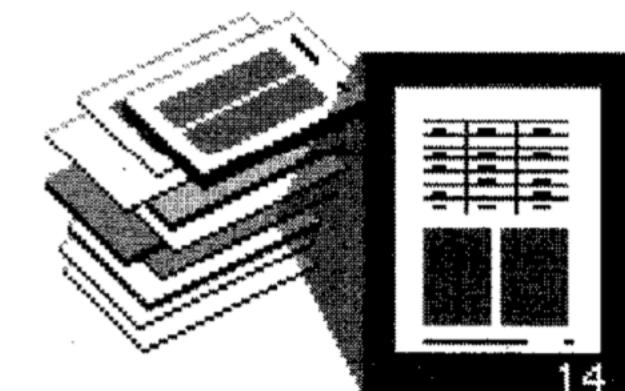
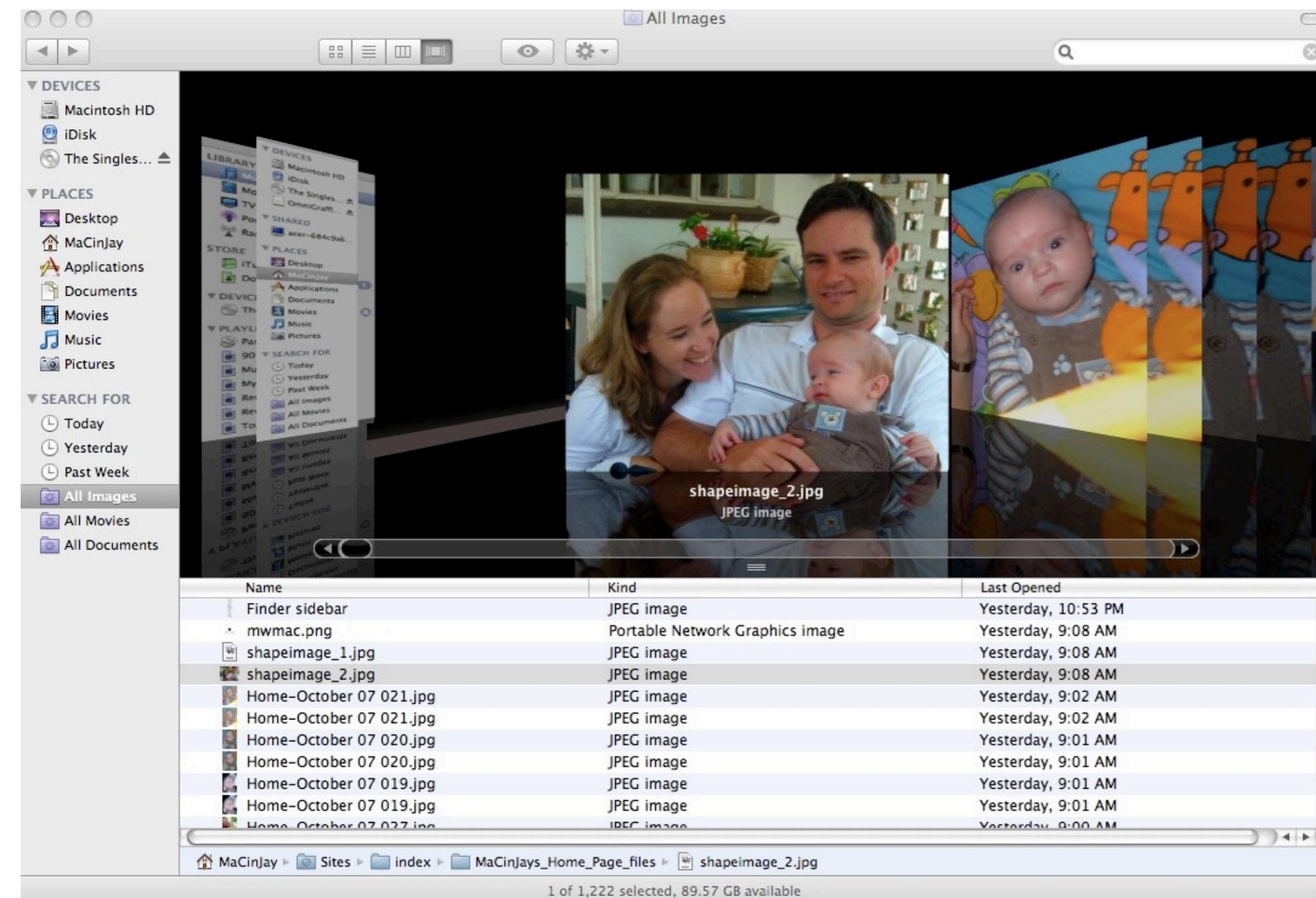
Piles - Evaluation

- Built prototypes, conducted studies
- What do YOU think are good/bad things about this metaphor?



Piles - Legacy

- Patent issued to Apple in 2001
- 2007 (OS 10.5) introduced Cover Flow



Piles - Legacy

- Patent issued to Apple in 2001
- 2007 (OS 10.5) also introduced stacks



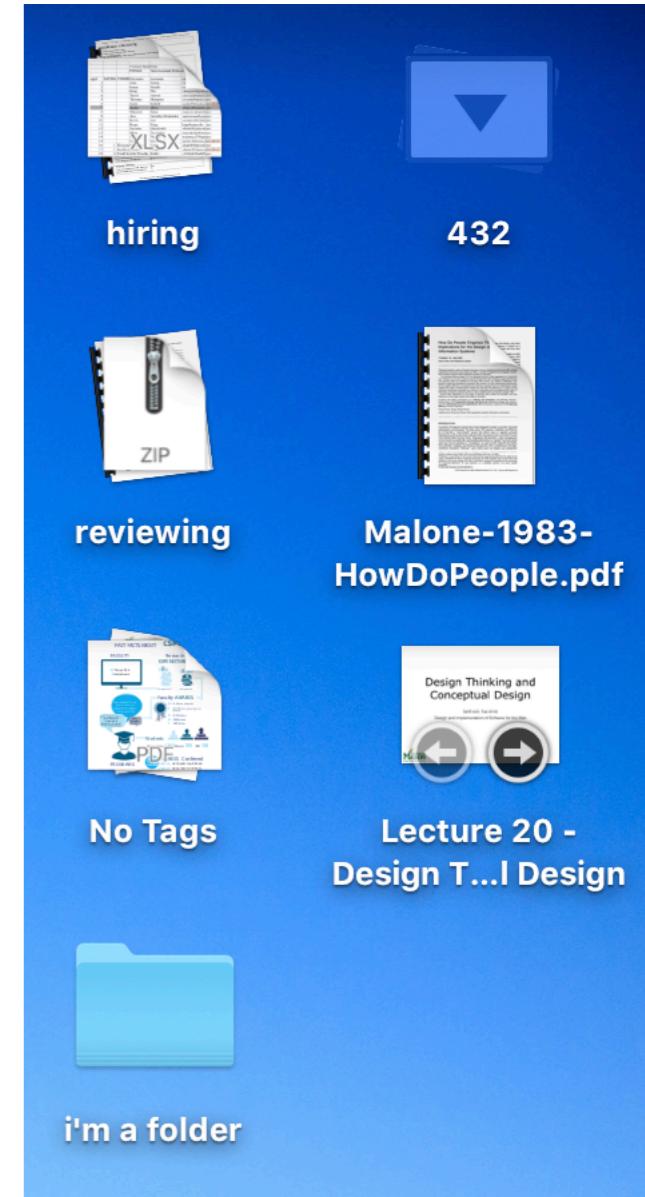
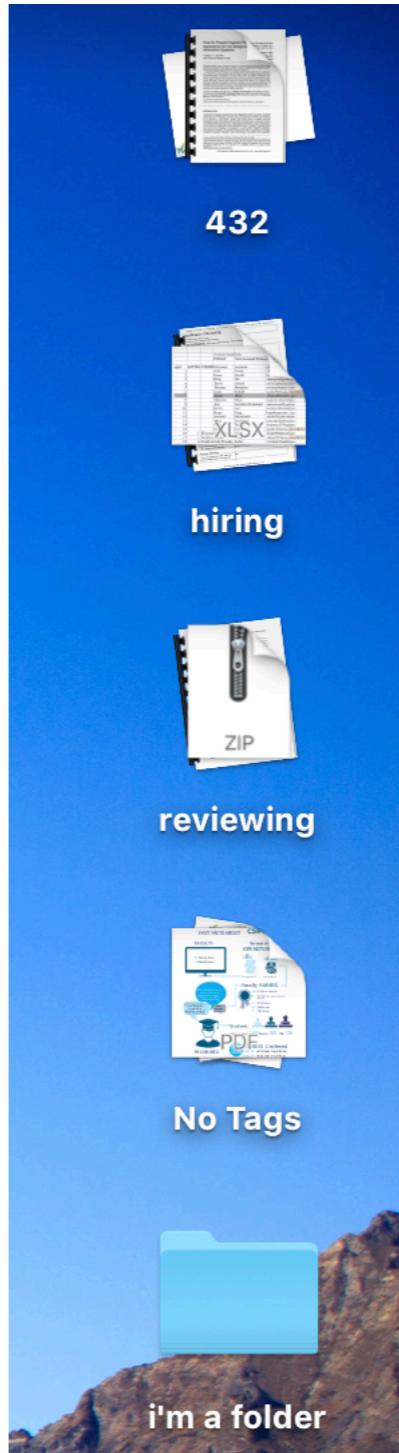
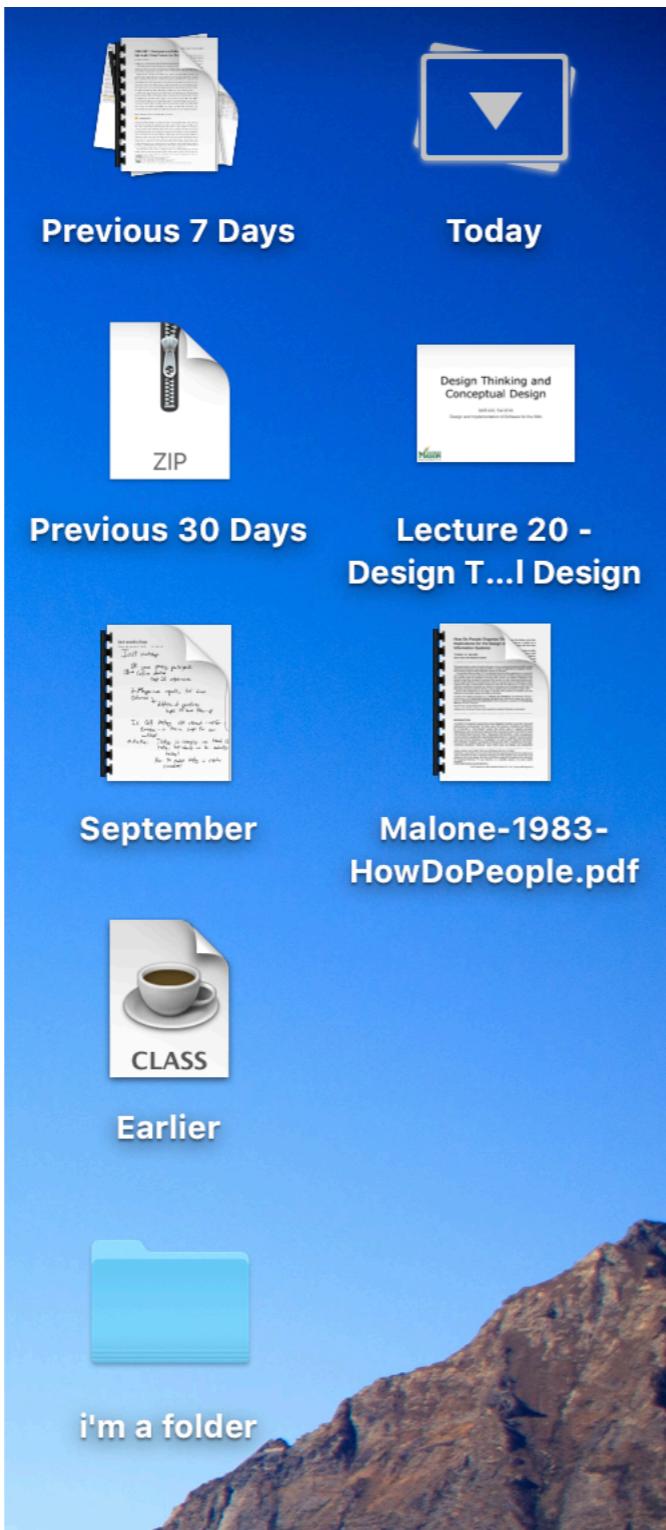
Piles - Legacy

- Patent issued to Apple in 2001
- 2018 (OS 10.14) introduces desktop stacks





Desktop Stacks



Open a stack

Stack by kind Stack by last opened Stack by tag

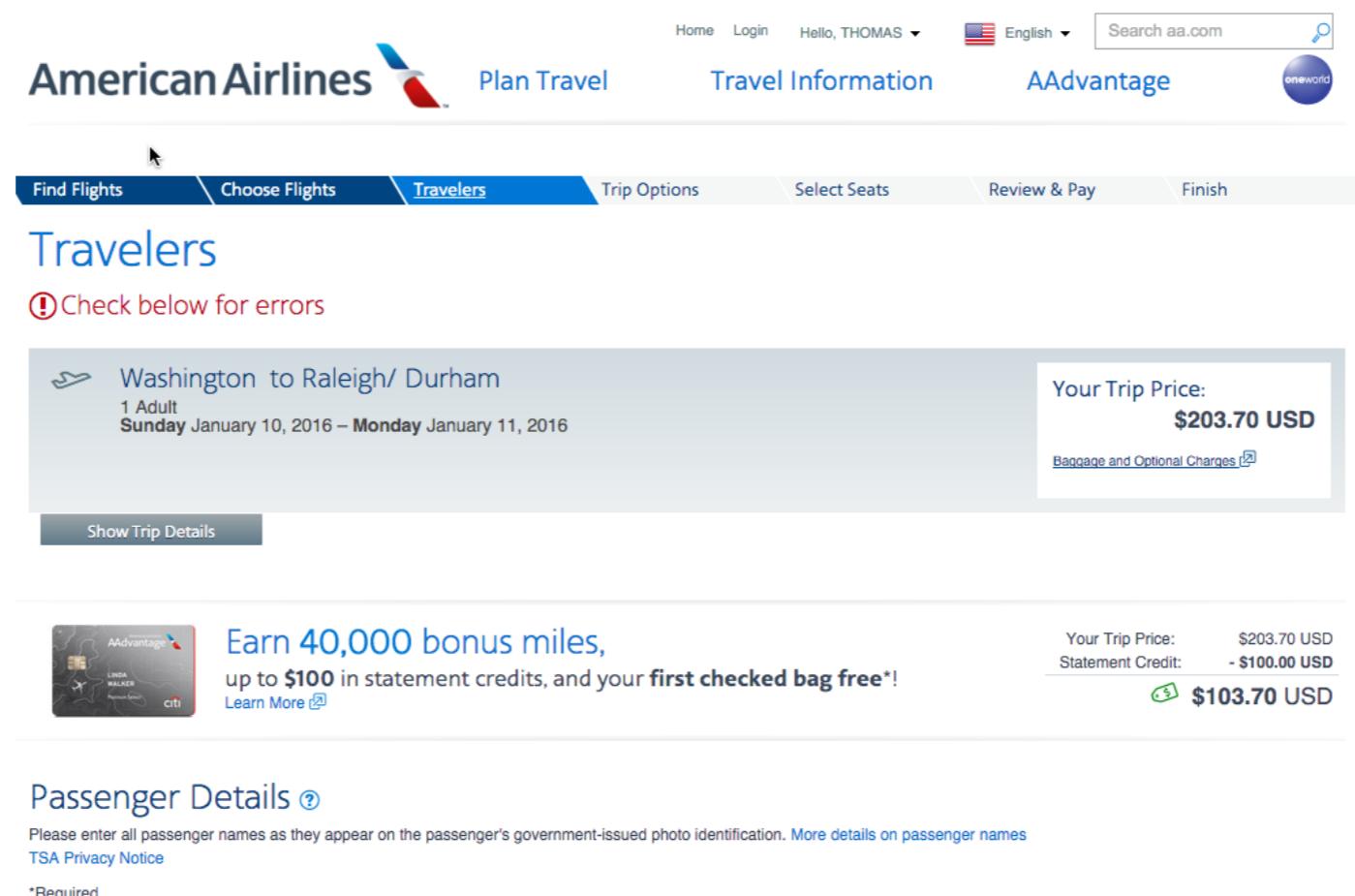
Task Structure

Task structure

- Flow of tasks and task steps
- Task design simplicity, flexibility, efficiency
- Maintenance of locus of control
- Direct manipulation

Separate long tasks into sequences

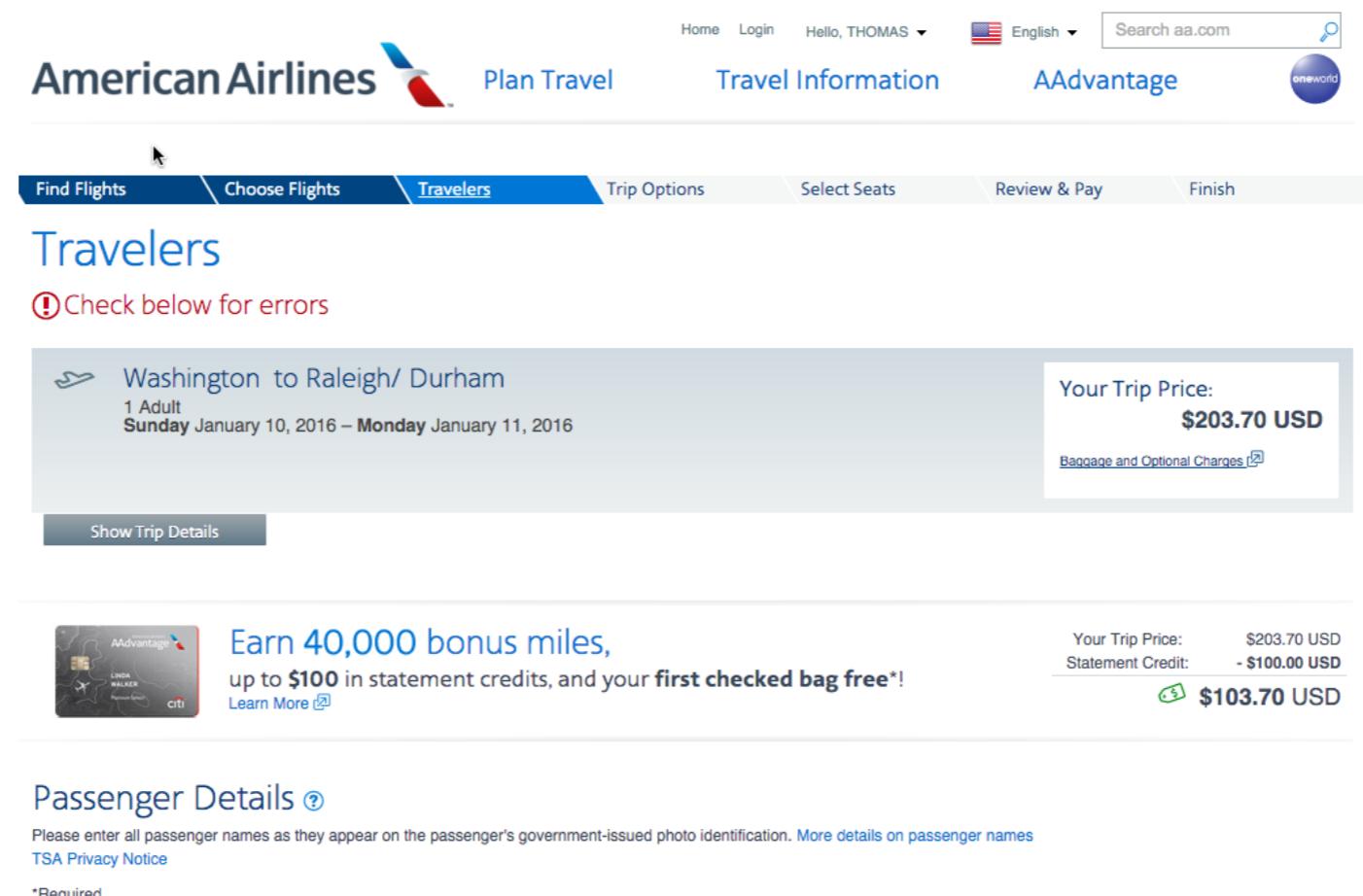
- Reduce short term memory demands by having user only work on one aspect of larger task at a time
- Don't interrupt users in the middle with unrelated tasks
- Provide closure of each subtask at the end



The screenshot shows the American Airlines website's 'Travelers' subtask. The top navigation bar includes links for Home, Login, Hello, THOMAS, English, and a search bar. Below the navigation is a horizontal progress bar with steps: Find Flights, Choose Flights, **Travelers** (which is highlighted in blue), Trip Options, Select Seats, Review & Pay, and Finish. The main content area is titled 'Travelers' and includes a note 'Check below for errors'. It displays flight details: 'Washington to Raleigh/ Durham', '1 Adult', 'Sunday January 10, 2016 – Monday January 11, 2016'. To the right, it shows 'Your Trip Price: \$203.70 USD' and a link for 'Baggage and Optional Charges'. A 'Show Trip Details' button is at the bottom of this section. At the bottom of the page, there's an advertisement for AAdvantage miles and a section for 'Passenger Details' with a note about government-issued photo identification.

Design for flexibility & efficiency

- Users may take paths never envisioned by designer
- Using studies to identify different task flows, design flexible support for each



The screenshot shows the American Airlines website interface for a travel booking. The top navigation bar includes links for Home, Login, Hello, THOMAS, English, and a search bar. The main menu features 'Plan Travel', 'Travel Information', 'AAdvantage', and the 'oneworld' logo. Below the menu, a progress bar indicates the steps: 'Find Flights', 'Choose Flights', 'Travelers' (which is the active step), 'Trip Options', 'Select Seats', 'Review & Pay', and 'Finish'. The 'Travelers' section displays flight details: 'Washington to Raleigh/ Durham', '1 Adult', 'Sunday January 10, 2016 – Monday January 11, 2016'. To the right, the 'Your Trip Price' is listed as '\$203.70 USD'. Below this, a promotional offer for AAdvantage members is shown: 'Earn 40,000 bonus miles, up to \$100 in statement credits, and your first checked bag free!'. The total price after statement credit is '\$103.70 USD'. The 'Passenger Details' section at the bottom requires entering passenger names, with a note that names must appear on government-issued photo identification. A 'TSA Privacy Notice' link is also present.

Delta: Flight Booking, New User

The screenshot shows the Delta.com website for flight booking. The top navigation bar includes links for 'SHOP', 'TRAVELING WITH US', 'SKYMILES', a 'Search' bar, and 'SIGN UP' and 'LOG IN' buttons. Below the navigation is a 'BOOK A TRIP' section with a 'BEST FAIR GUARANTEE' badge. A progress bar at the top indicates the current step is 'Passenger'. The main form is titled 'PASSENGERS' and shows details for 'Passenger 1'. It includes fields for Prefix, First Name, Middle Name, Last Name, and Suffix. Below these are fields for Frequent Flyer Program (set to 'Delta Air Lines / SkyMiles') and Frequent Flyer Number. There are dropdowns for Gender, Date of Birth (Month, Day, Year), and Known Traveler Number/Redress Number. The 'Contact Information' section includes fields for Device Type (Cell), Country (United States), and Phone Number. It also includes fields for Email and Confirm Email Address. A note states that notifications will be sent via the entered contact information. At the bottom, there is a checkbox for company membership in Delta SkyBonus or Air France/KLM BlueBiz programs, and buttons for 'START OVER', 'Skip to Payment', and 'NEXT: TRIP EXTRAS'.

delta.com

NEED HELP? | COMMENT/COMPLAINT?

DELTA SKYTEAM

SHOP | TRAVELING WITH US | SKYMILES® | Search

MY TRIPS | BOOK A TRIP | FLIGHT STATUS | CHECK IN | SIGN UP | LOG IN

BOOK A TRIP | BEST FAIR GUARANTEE

Start Over | Flights | Passengers | Extras | Payment

PASSENGERS

Passenger 1

Please make sure your full name is entered exactly as it appears on your government-issued identification. This [Secure Flight Passenger Data](#) is for use by the [Transportation Security Administration](#) only.

PREFIX *FIRST NAME MIDDLE NAME *LAST NAME SUFFIX

FREQUENT FLYER PROGRAM FREQUENT FLYER NUMBER

Delta Air Lines / SkyMiles

*GENDER *DATE OF BIRTH KNOWN TRAVELER NUMBER ? REDRESS NUMBER ?

Select One Month Day Year

*DEVICE TYPE *COUNTRY *PHONE NUMBER

Cell United States (1)

*EMAIL *CONFIRM EMAIL ADDRESS

You will receive [flight and mishandled baggage notifications](#) via the contact information entered above.

My company is a Delta SkyBonus® or Air France/KLM BlueBiz® program member.

START OVER | Skip to Payment | NEXT: TRIP EXTRAS

Delta: Flight Booking, Existing User

The screenshot shows the Delta.com website for flight booking. The top navigation bar includes links for 'MY TRIPS', 'BOOK A TRIP', 'FLIGHT STATUS', 'CHECK IN', 'NEED HELP? COMMENT/COMPLAINT?', 'SHOP', 'TRAVELING WITH US', 'SKYMILES®', and a search bar. A user profile for 'Jonathan Bell' is visible on the right, with an 'Express Checkout' button highlighted by a yellow box.

The main content area is titled 'BOOK A TRIP' and shows two flight segments:

- Flight 1:** DCA to ATL (FRI 02 DEC) - DL 1333, 1:50 PM to 3:53 PM, 2h 3m | NONSTOP. Cabin: Main Cabin (K). Price per Passenger: \$406.51. Taxes, Fees and Charges: \$58.69.
- Flight 2:** ATL to DCA (SUN 04 DEC) - DL 1911, 09:40 AM to 11:20 AM, 1h 40m | NONSTOP. Cabin: Main Cabin (U). Price per Passenger: \$406.51. Taxes, Fees and Charges: \$58.69.

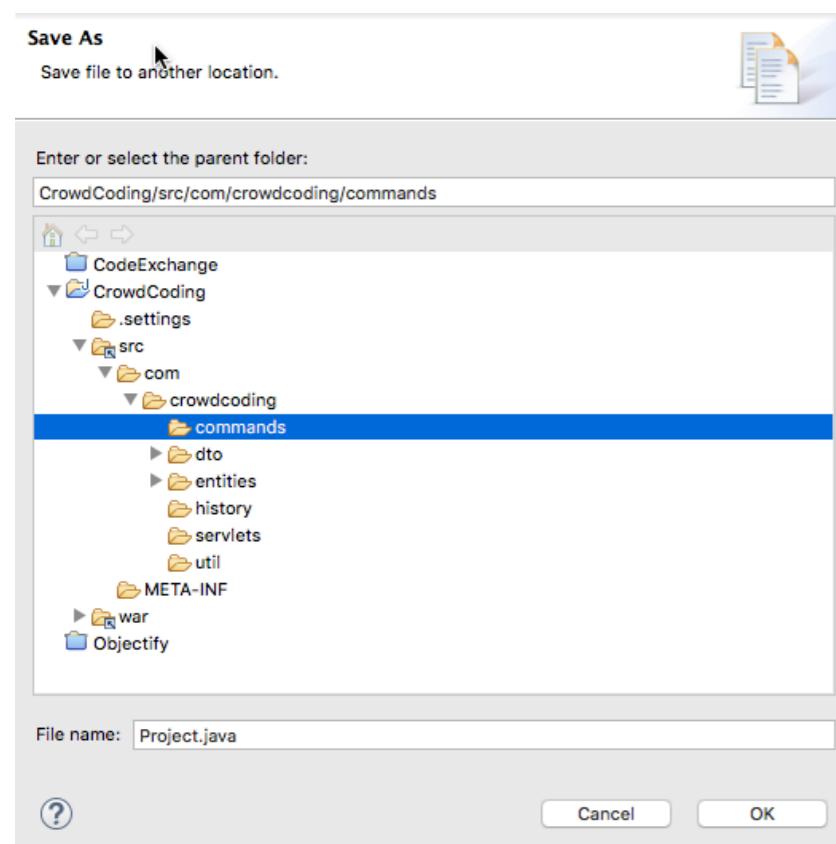
Below the flights, there are sections for 'PAY WITH MILES' (1094 Medallion® Qualification Miles (MQMs) earned, 3663 Miles earned) and a 'MILEAGE CALCULATOR'. The total price for the trip is \$465.20 USD.

The 'PASSENGERS' section is highlighted with a yellow box and asks 'Are You Traveling?' with 'YES' and 'NO' buttons. It shows passenger information for 1 passenger: Jonathan Bell, Male, born 01-01-1980, with a Delta Air Lines / SkyMiles frequent flyer program. The contact information section shows a device type of 'Cell', country of 'United States (1)', and phone number and email fields.

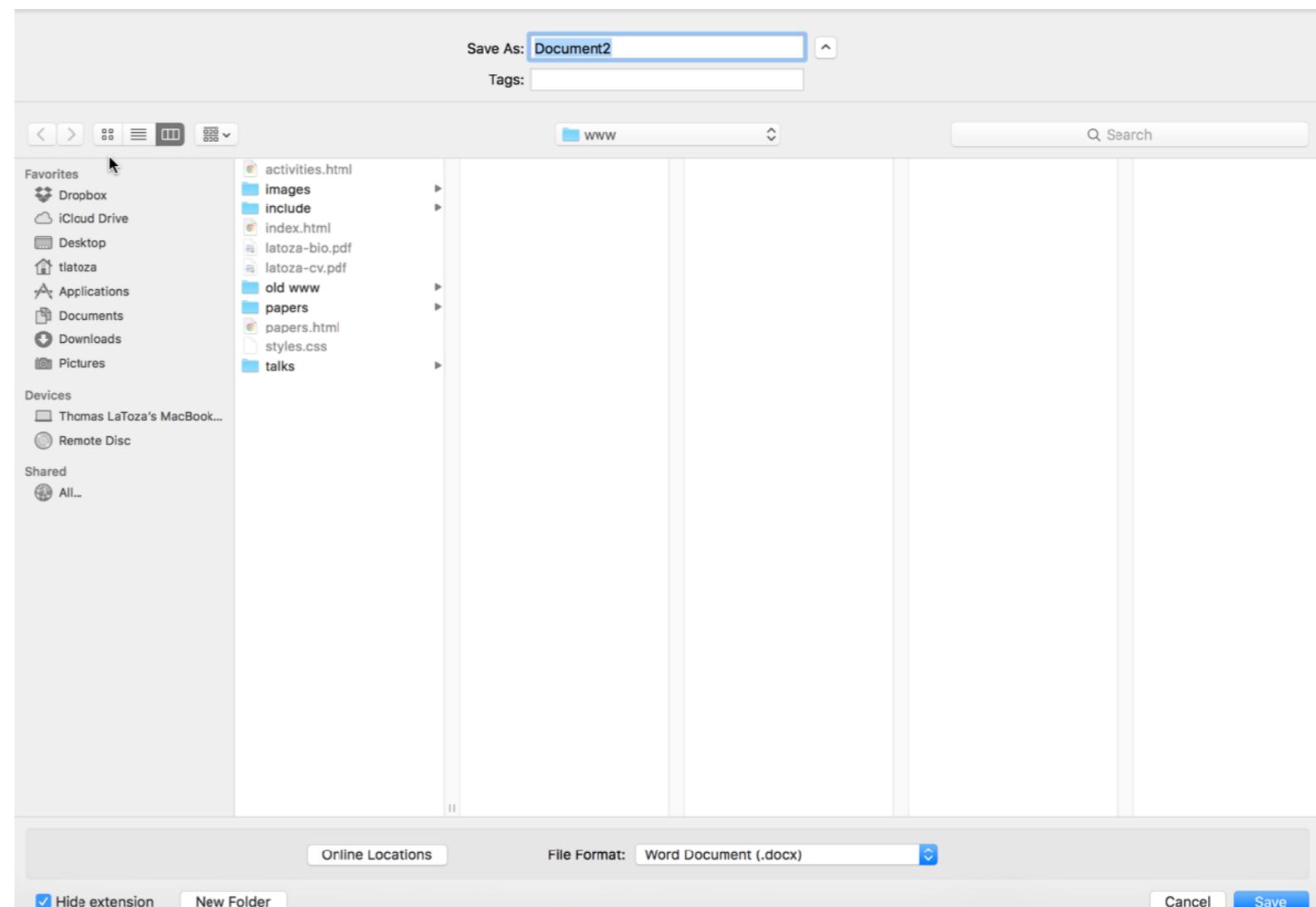
Anticipate likely next actions

- Based on typical observed task flows, surface options for user to take likely next steps

What if folder does not exist?

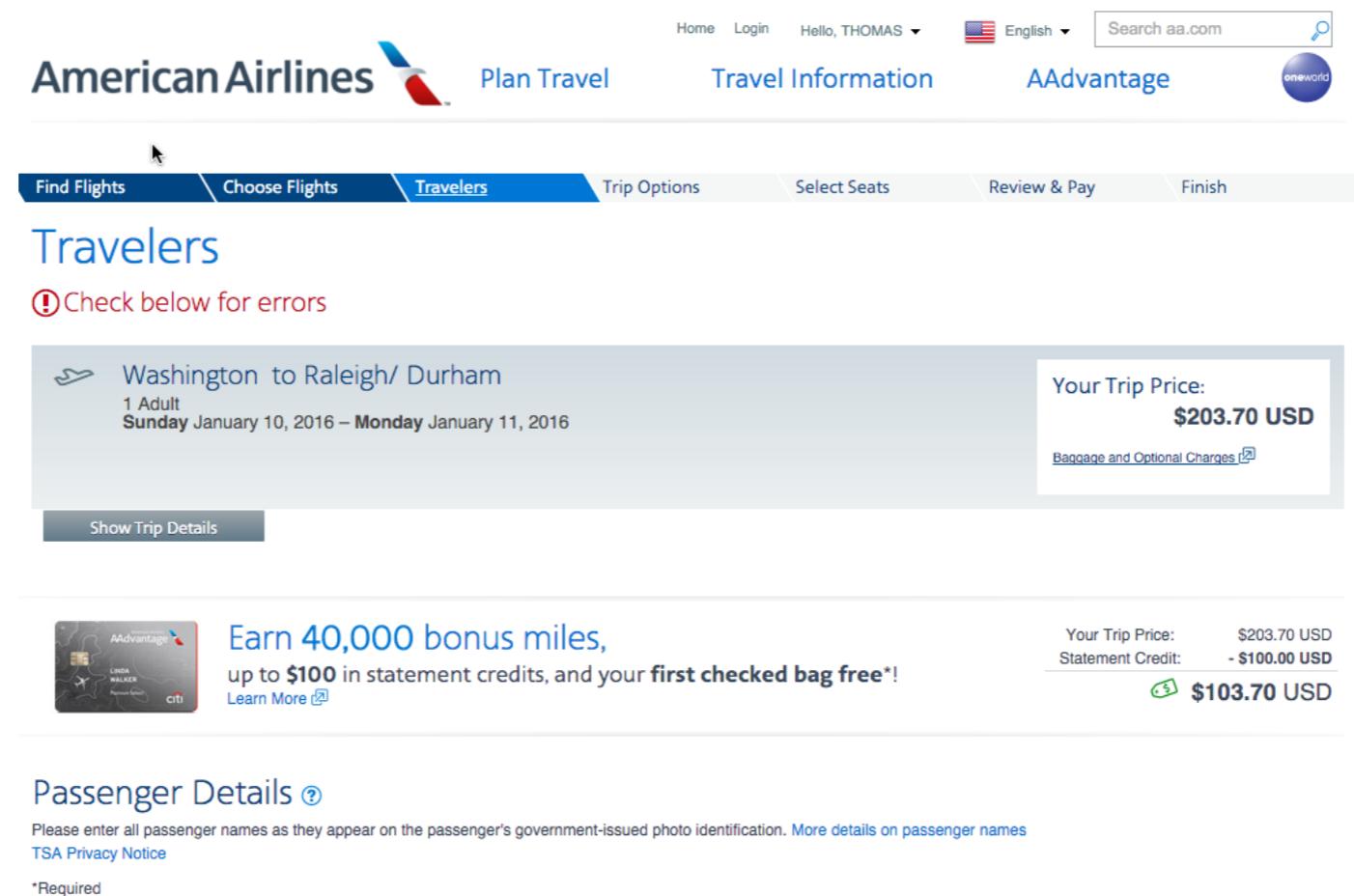


VS.



Keep users in control

- Important users do not feel constrained
- Want users to feel that they can do things the way they want to do them, not as software dictates to them



The image shows a screenshot of the American Airlines website's travel booking process. The top navigation bar includes links for Home, Login, Hello, THOMAS, English, and a search bar. Below the navigation is a horizontal progress bar with steps: Find Flights, Choose Flights, Travelers (which is the active step, highlighted in blue), Trip Options, Select Seats, Review & Pay, and Finish. The main content area is titled 'Travelers' and contains a message: 'Check below for errors'. It shows a flight search result for 'Washington to Raleigh/ Durham' on 'Sunday January 10, 2016 – Monday January 11, 2016' for '1 Adult'. The trip price is listed as '\$203.70 USD'. Below this, there's an offer for 'Earn 40,000 bonus miles, up to \$100 in statement credits, and your first checked bag free!' with a 'Learn More' link. The final price after a statement credit is '\$103.70 USD'. At the bottom, there's a section for 'Passenger Details' with a note: 'Please enter all passenger names as they appear on the passenger's government-issued photo identification. More details on passenger names' and a 'TSA Privacy Notice' link. A small note at the bottom left says '*Required'.

Navigation

Navigation usability problems

- User can't find desired location
- User loses track of location
- User can't remember information from another location

Navigation

- Many different contexts where navigation is important
 - Among windows & screens
 - Among panes or frames in a window
 - Among tools and menus
 - Within an information space

Traversing links

- Links - connection between patch offered by the information environment
- Cues - information features associated with outgoing links from patch
 - E.g., text label on a hyperlink
- User must choose which, of all possible links to traverse, has best chance of reaching prey

Web navigation conventions

NEW & INTERESTING FINDS ON AMAZON **EXPLORE**

amazon Prime

LED & LCD TVs ▾ lg tv 4k

BLACK FRIDAY DEALS WEEK

Hello, Thomas Your Account ▾ Prime ▾ Lists ▾ 0 Cart

Departments ▾ Browsing History ▾ Thomas's Amazon.com Today's Deals

Televisions & Video Deals Best Sellers Televisions ▾ Streaming Media Players ▾ Blu-ray Players ▾ Home Theater Systems ▾ A/V Accessories

1-24 of 147 results for Electronics : Television & Video : Televisions : LED & LCD TVs : "lg tv 4k"

Sort by Relevance

Show results for

- Any Category
- Electronics
- Television & Video
- Televisions
- LED & LCD TVs**

Refine by

Delivery Day

- Get It by Tomorrow

Amazon Prime

- Prime

Television Feature

- Smart TV (132)
- 3D (53)

Television Resolution

- 4K Ultra HD (70)
- 1080p (16)
- 1080i
- 760p
- 760i
- 720p (1)
- 720i
- 480p
- 480i

SPONSORED BY LG HOME ELECTRONICS

Save on LG Super UHD TVs

[Shop now](#)

LG Electronics 65UH7700... LG Electronics 55UH7700...

Ad feedback

Showing most relevant results. See all results for [lg tv 4k](#).

Television Feature: Smart TV | 3D

Sponsored i

LG Electronics 55UH6550 55-Inch 4K Ultra HD Smart LED TV (2016 Model)

by LG Electronics

\$747⁰⁰ \$897.00 Prime



★★★★★ 25

- Display Size: 55 inches
- Resolution: 4K Ultra HD
- Connectivity Technology: Built-in Wi-Fi
- Display Technology: LED
- Display Resolution Maximum: 4K Ultra HD

Sponsored i

LG Electronics 60UH8500 60-Inch 4K Ultra HD Smart LED TV (2016 Model)

by LG Electronics

\$1,297⁰⁰ \$1,697.00 Prime



★★★★★ 87

[Electronics Gift Guide](#)

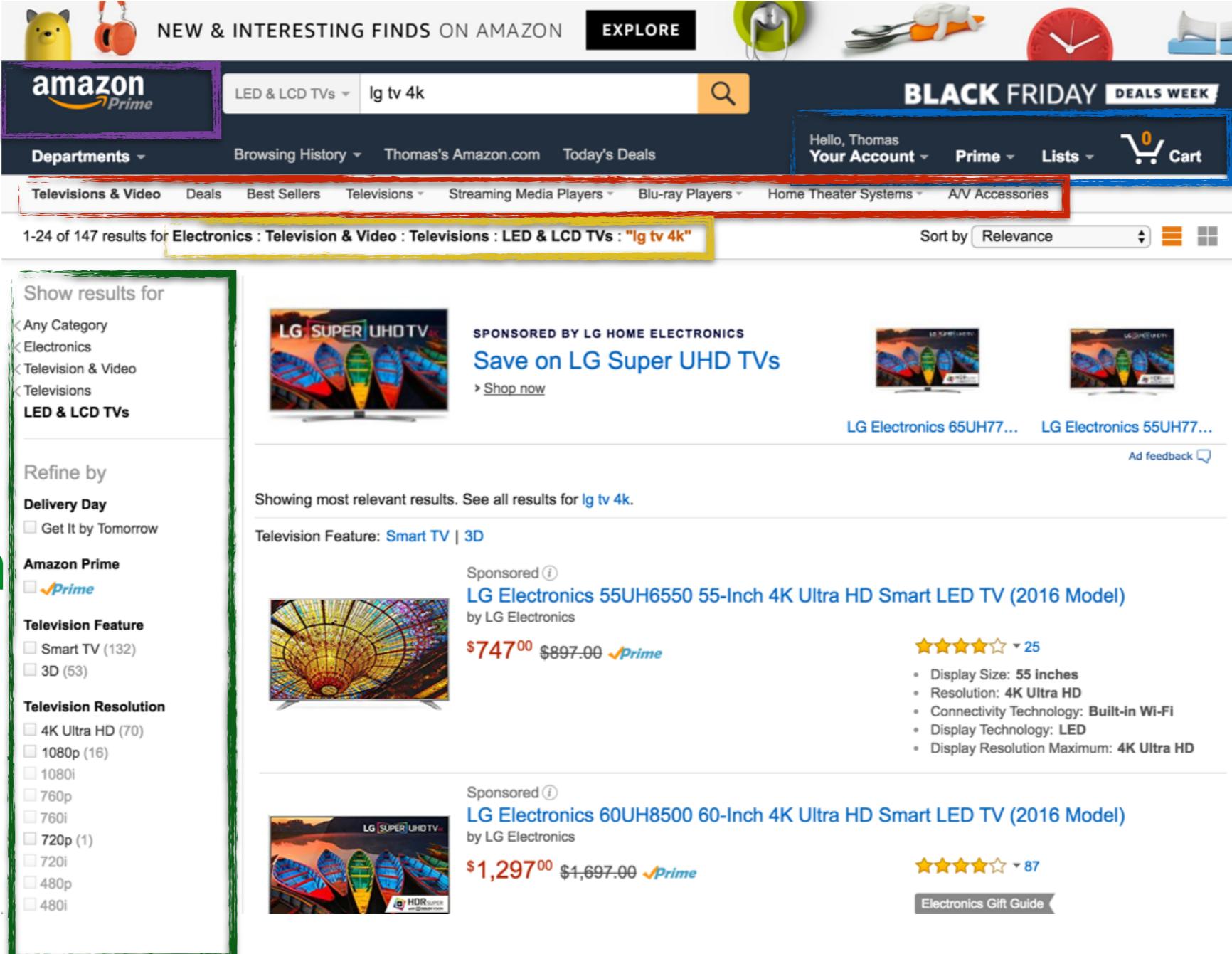
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Web navigation conventions

Site ID

You are here

Local navigation



The screenshot shows the Amazon.com search results for "lg tv 4k". The search bar at the top contains "lg tv 4k". The main content area displays a list of products, starting with a sponsored advertisement for LG Super UHD TVs. Below this, two LG 55UH77 models are shown. The main product listing features the LG Electronics 55UH6550 55-Inch 4K Ultra HD Smart LED TV (2016 Model) at \$747.00. Another sponsored product, the LG Electronics 60UH8500 60-Inch 4K Ultra HD Smart LED TV (2016 Model), is listed below it at \$1,297.00. The left sidebar contains a "Show results for" dropdown and various filtering options: "Any Category", "Electronics", "Television & Video", "Televisions", and "LED & LCD TVs". Under "Refine by", there are sections for "Delivery Day" (Get It by Tomorrow), "Amazon Prime" (Prime), "Television Feature" (Smart TV, 3D), and "Television Resolution" (4K Ultra HD, 1080p, 1080i, 760p, 760i, 720p, 720i, 480p, 480i).

Utilities Sections

Footer navigation

Conditions of Use Privacy Notice Interest-Based Ads © 1996-2016, Amazon.com, Inc. or its affiliates

Persistent navigation

- Forms a common idiom users already understand
- Gives instant confirmation that still on the same site
- Supports consistency and standards
 - If *all* of your pages function same way, users know how to do actions & what to expect
 - Ok for specialized page like forms that are clearly different to not follow conventions.

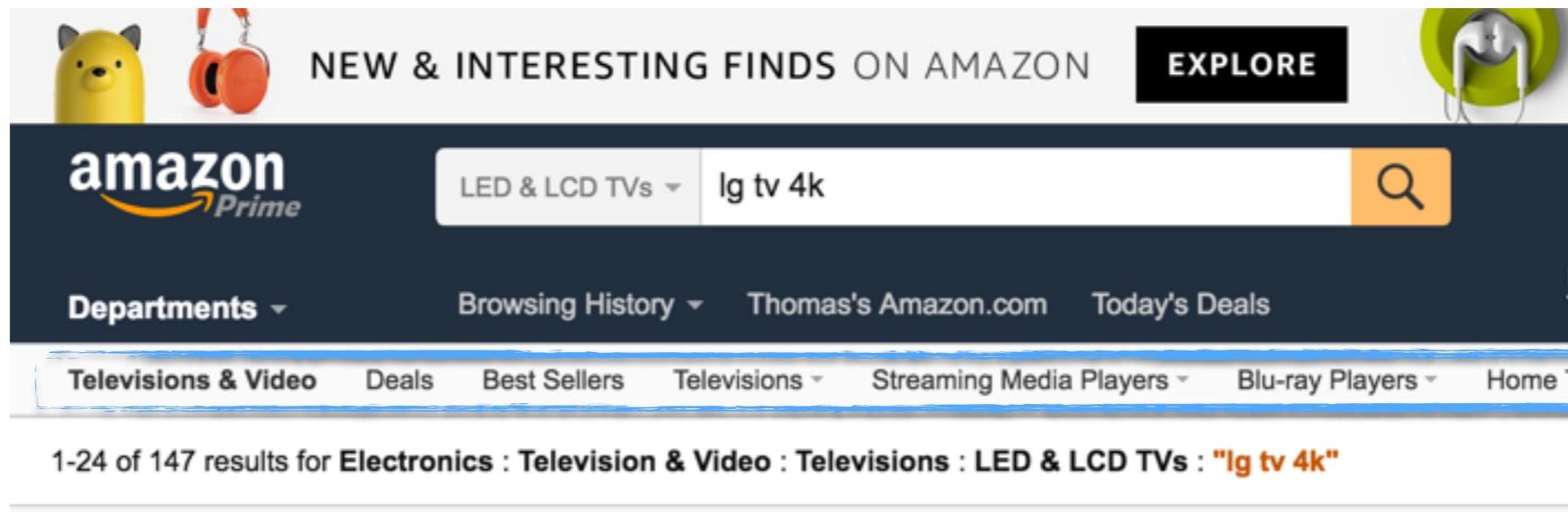
Breadcrumbs

- Offer trail of where the user has been and how they got there
- Shows hierarchy of information space
- Shows current location

The screenshot shows the Amazon search results for "lg tv 4k". The search bar at the top contains "lg tv 4k". The breadcrumb trail in the results page header is: Electronics > Television & Video > Televisions > LED & LCD TVs > "lg tv 4k". The results page displays several LG Super UHD TVs, with the first two being sponsored. The first sponsored result is the "LG Electronics 55UH6550 55-Inch 4K Ultra HD Smart LED TV (2016 Model)" for \$747.00. The second sponsored result is the "LG Electronics 60UH8500 60-Inch 4K Ultra HD Smart LED TV (2016 Model)" for \$1,297.00. The results page also includes a sidebar for refining search results by category, delivery day, and television features like Smart TV and 3D.

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Tabs



- Example of a metaphor: tab dividers in a three ring binder or folders in a file drawer
- Partition into sections
- Advantages
 - Easily understood and self-evident
 - (Usually) hard to miss

Questions for a good site design

- Answers to the following should be obvious for a good site design
 - What site is this? (Site ID)
 - What page am I on? (Page name)
 - What are the major sections of this site? (Sections)
 - What are my options at this level? (Local navigation)
 - Where am I in the site? (“You are here” indicators)
 - How can I search?