

Site Design

SWE 432, Fall 2016

Design and Implementation of Software for the Web

What's left?

- Project Reflection now out, due 12/8
- Of by one errors:
 - 2 more quizzes
 - No HW12
- Final exam

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?

Analogy: Buying a chainsaw

- You walk in to a hardware store to buy a chainsaw.
What do you do?

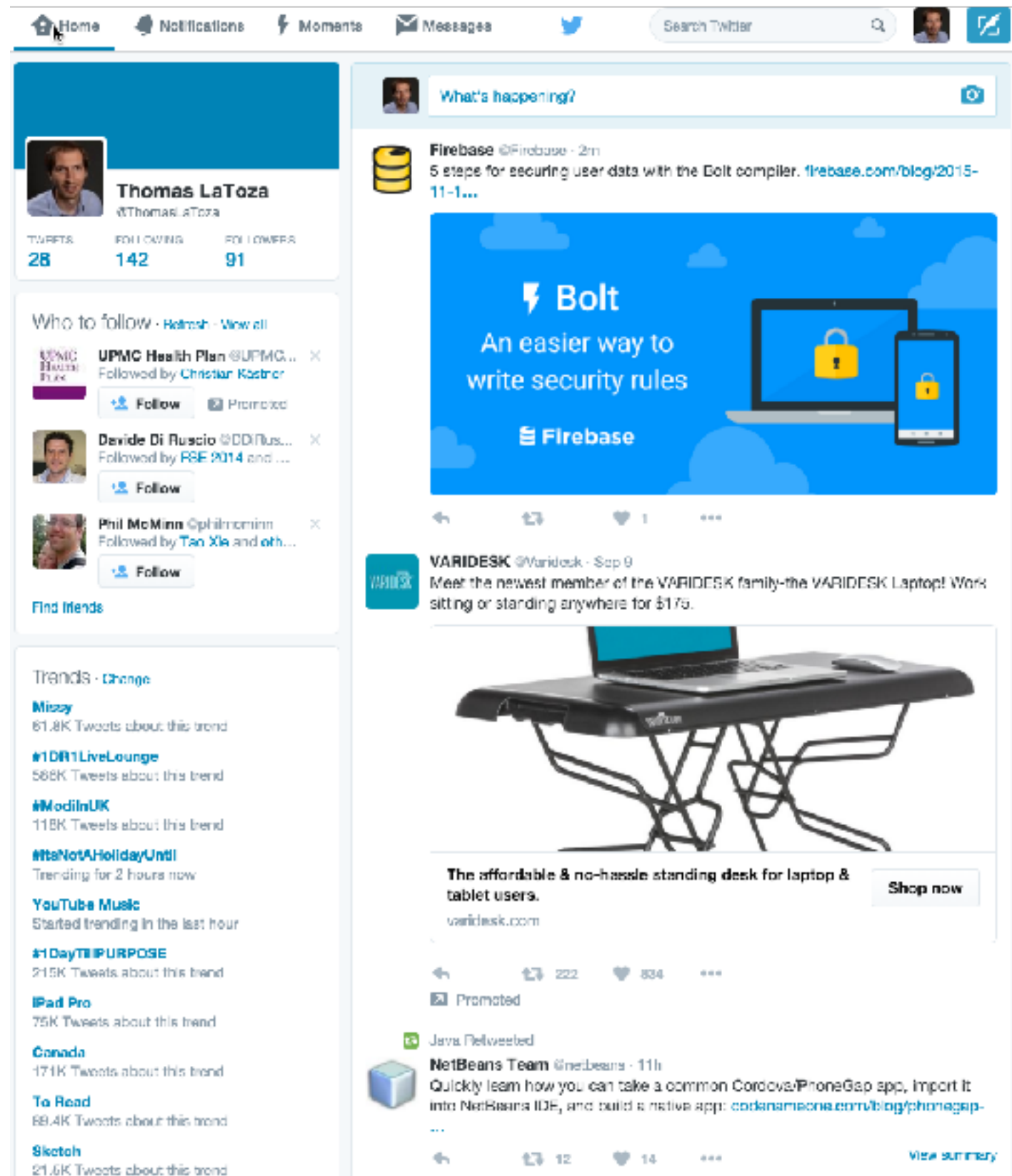
Site design

- 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
- 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?

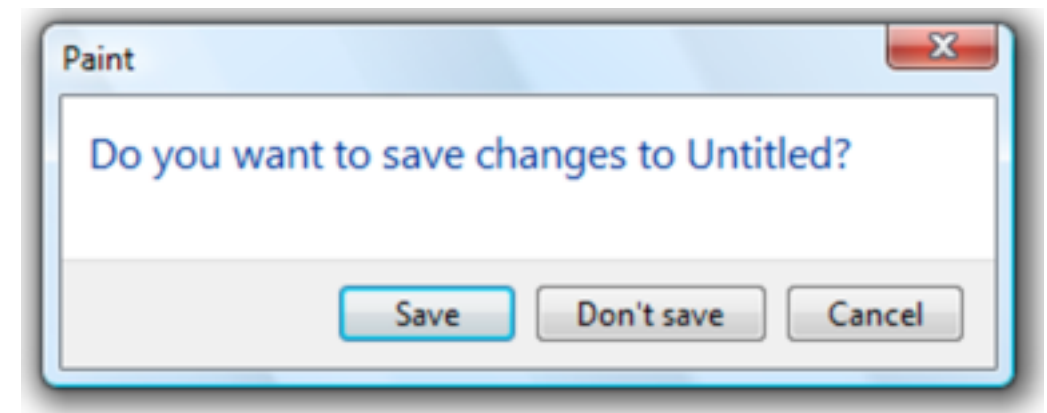
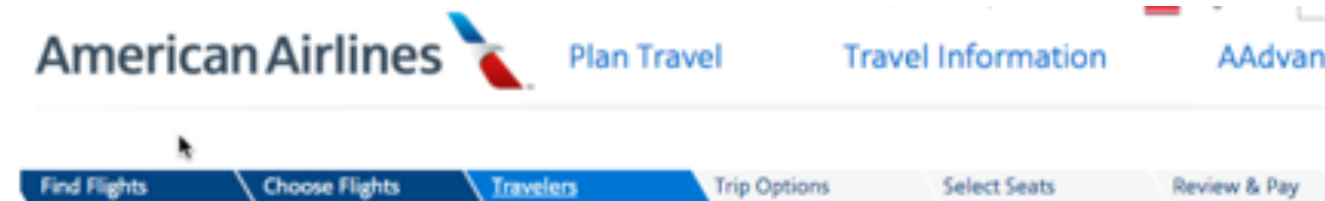


Clear system task model

- 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

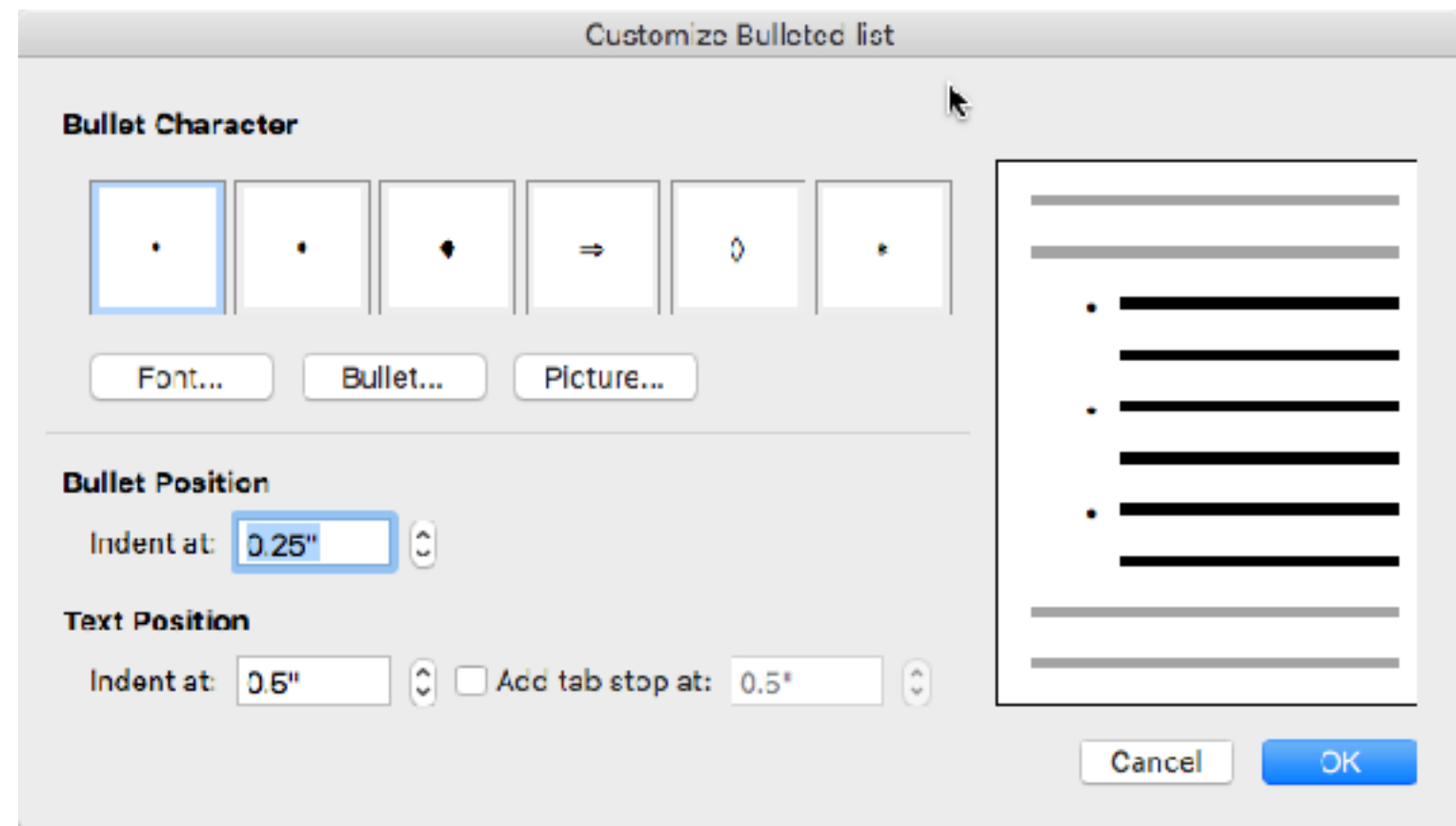
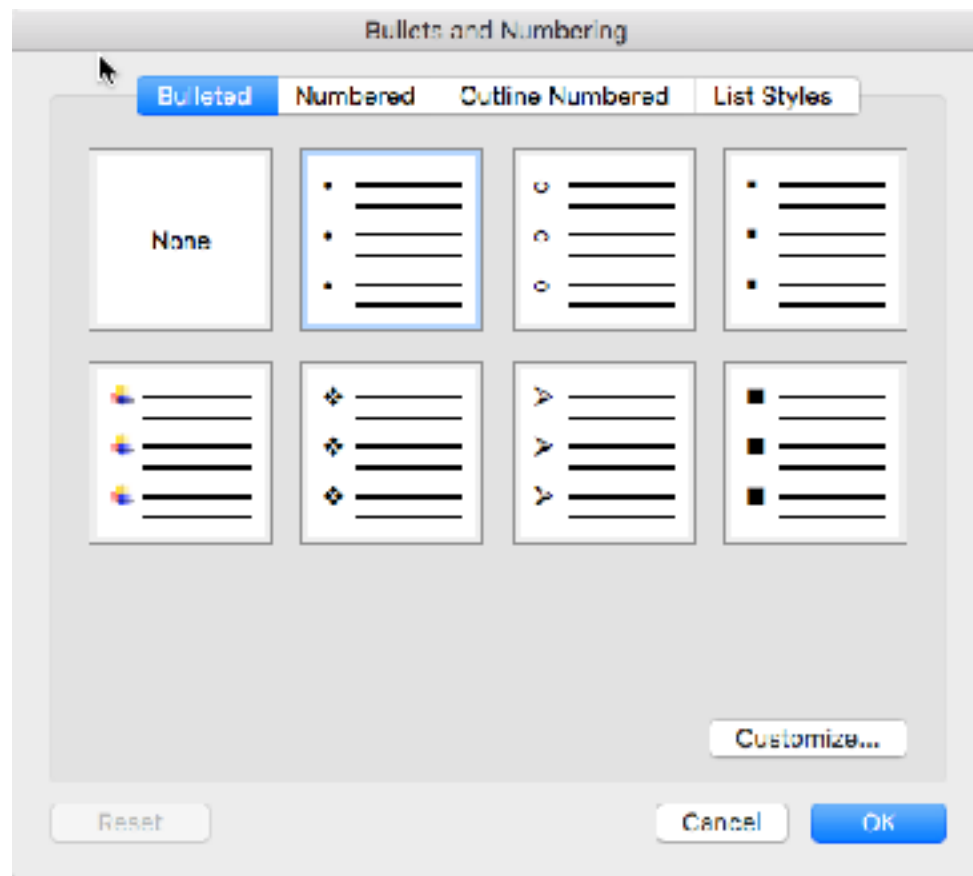
- Interaction flow - the next thing the interface wants to do is exactly what user expects
 - Follow users' mental model
 - Let user direct software
 - Keep all related tools available
- Surprises interrupt interaction flow
- Interfaces should be invisible

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

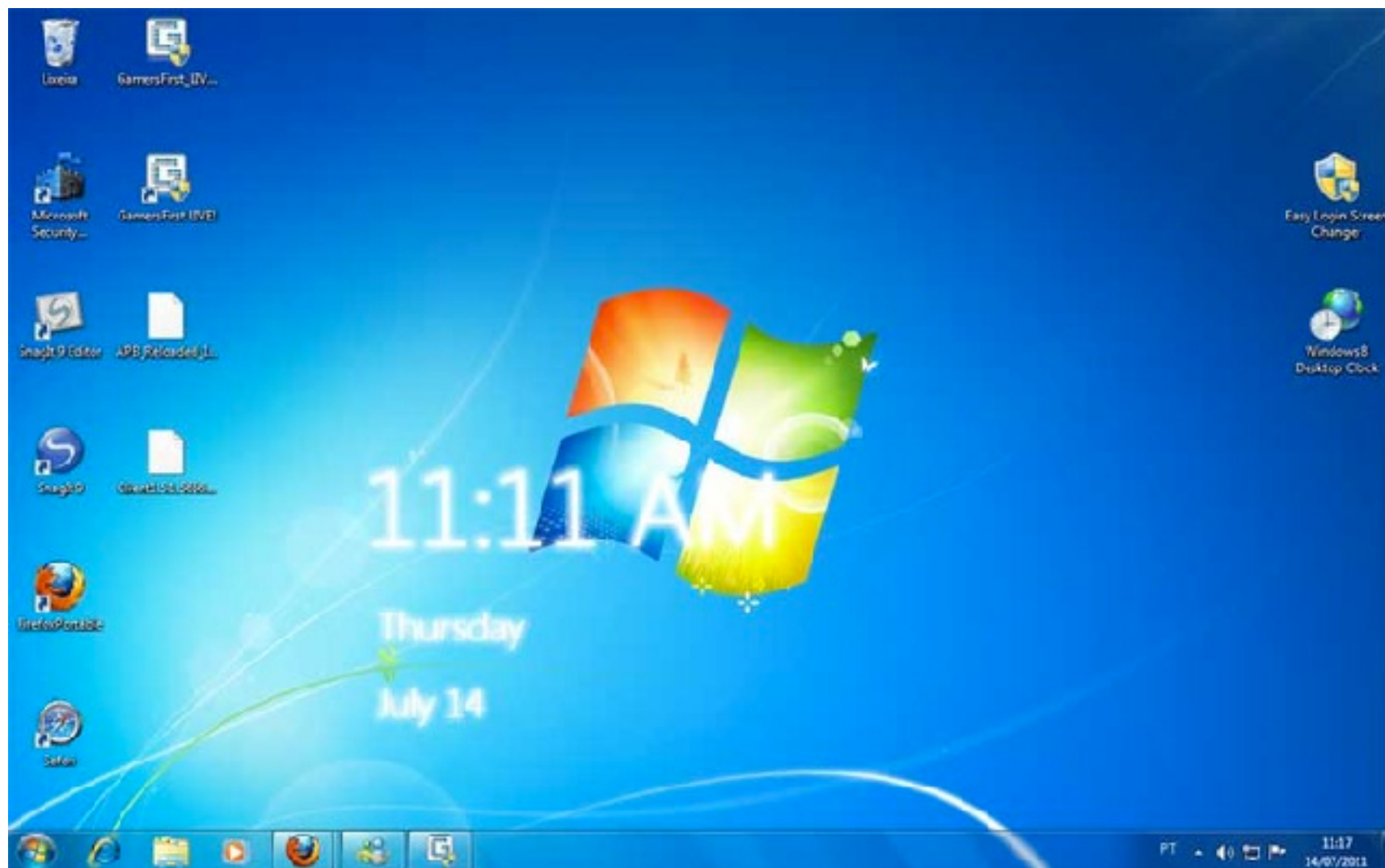
- a.k.a. details on demand
- Separate information & commands into layers
- Present most frequently used information & commands first



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

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 STM 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 interface during a flight booking process. The top navigation bar includes the American Airlines logo, links for 'Plan Travel', 'Travel Information', and 'AAdvantage', and a search bar. Below this, a progress bar indicates the current step is 'Travelers', with previous steps being 'Find Flights', 'Choose Flights', and 'Review & Pay', and the final step being 'Finish'. The 'Travelers' section displays a flight from Washington to Raleigh/Durham for 1 adult on Sunday January 10, 2016 to Monday January 11, 2016. The trip price is \$203.70 USD. A 'Show Trip Details' button is visible. Below the flight details, there is a promotional banner for AAdvantage miles and a statement credit. The bottom section is titled 'Passenger Details' and includes a note about entering names as they appear on government-issued photo identification.

American Airlines Plan Travel Travel Information AAdvantage

Find Flights Choose Flights **Travelers** Trip Options Select Seats Review & Pay Finish

Travelers

ⓘ Check below for errors

Washington to Raleigh/ Durham
1 Adult
Sunday January 10, 2016 – Monday January 11, 2016

Your Trip Price:
\$203.70 USD

Show Trip Details

Earn 40,000 bonus miles,
up to \$100 in statement credits, and your first checked bag free*!

Your Trip Price: \$203.70 USD
Statement Credit: - \$100.00 USD
\$103.70 USD

Passenger Details

Please enter all passenger names as they appear on the passenger's government issued photo identification. More details on passenger names
TSA Privacy Notice

*Required

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 displays the American Airlines website interface during a flight booking process. At the top, the American Airlines logo is on the left, and navigation links for 'Plan Travel', 'Travel Information', and 'AAdvantage' are on the right. A progress bar below the header shows steps: 'Find Flights', 'Choose Flights', 'Travelers' (current step), 'Trip Options', 'Select Seats', 'Review & Pay', and 'Finish'. The 'Travelers' section shows a flight from Washington to Raleigh/Durham for 1 adult on Sunday January 10, 2016 to Monday January 11, 2016. The trip price is \$203.70 USD. Below this, there is a section for AAdvantage miles, offering 40,000 bonus miles, up to \$100 in statement credits, and a free checked bag. The final price after these benefits is \$103.70 USD. At the bottom, there is a 'Passenger Details' section with a note about entering names as they appear on government-issued photo identification.

American Airlines Plan Travel Travel Information AAdvantage

Find Flights Choose Flights Travelers Trip Options Select Seats Review & Pay Finish

Travelers

Check below for errors

Washington to Raleigh/Durham
1 Adult
Sunday January 10, 2016 – Monday January 11, 2016

Your Trip Price:
\$203.70 USD

Show Trip Details

Earn 40,000 bonus miles,
up to \$100 in statement credits, and your first checked bag free*!

Your Trip Price: \$203.70 USD
Statement Credit: - \$100.00 USD
\$103.70 USD

Passenger Details

Please enter all passenger names as they appear on the passenger's government issued photo identification. More details on passenger names

TSA Privacy Notice

*Required

Delta: Flight Booking, New User

NEED HELP? | COMMENT/COMPLAINT?

DELTA

SHOP | TRAVELING WITH US | SKYMILES | Search

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

BOOK A TRIP BEST FARE GUARANTEE

Start Over | Flights | **Passengers** | Extras | Payment

PASSENGERS *REQUIRED

1 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

*GENDER *DATE OF BIRTH KNOWN TRAVELER NUMBER REDRESS NUMBER

*DEVICE TYPE *COUNTRY *PHONE NUMBER

*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 website's flight booking interface for an existing user, Jonathan Bell. The page is titled "BOOK A TRIP" and features a "BEST FARE GUARANTEE" badge. The user's name, "Jonathan Bell", is displayed in the top right corner. A yellow box highlights the "Express Checkout" button in the top right corner. The main content area displays two flight options: "DCA - ATL" (DL 1333, 1:50 PM - 3:53 PM, Main Cabin (K)) and "ATL - DCA" (DL 1911, 09:40 AM - 11:20 AM, Main Cabin (J)). The "Express Checkout" button is highlighted with a yellow box. Below the flight options, there is a "PAY WITH MILES" section showing the user's current miles balance (341,312) and a "MILEAGE CALCULATOR" button. The "PASSENGERS" section is highlighted with a yellow box, showing a form for "Are You Traveling?" with "YES" and "NO" buttons. Below this, the "Passenger Information" form is visible, including fields for "PREFIX", "FIRST NAME", "MIDDLE NAME", "LAST NAME", "SUFFIX", "FREQUENT FLYER PROGRAM", "FREQUENT FLYER NUMBER", "SKYMILES/BLUEMILES NUMBER", "GENDER", "DATE OF BIRTH", "KNOWN TRAVELER NUMBER", and "ADDRESS NUMBER". The "Contact Information" section is also visible, including fields for "DEVICE TYPE", "COUNTRY", "PHONE NUMBER", and "EMAIL".

DELTA

NEED HELP? | COMMENT/COMPLAINT?

SHOP | TRAVELING WITH US | SKYMILES | Search

MY TRIPS | BOOK A TRIP | FLIGHT STATUS | CHECK IN | Jonathan Bell

BOOK A TRIP | BEST FARE GUARANTEE

Start Over | Express Checkout

FLIGHTS | SKY PRIORITY

FRI 02 DEC

DCA - ATL

DL 1333

1:50 PM - 3:53 PM

2h 3m | NONSTOP

Main Cabin (K)

Changeable / Nonrefundable

View Upgrade Eligibility

Complete Delta Air Lines Baggage Information

Price per Passenger: \$406⁵¹

Taxes, Fees and Charges: \$58⁶⁴

SUN 04 DEC

ATL - DCA

DL 1911

09:40 AM - 11:20 AM

1h 40m | NONSTOP

Main Cabin (J)

Changeable / Nonrefundable

View Upgrade Eligibility

Complete Delta Air Lines Baggage Information

1094 Medallion® Qualification Miles (MQMs) earned

3553 Miles earned¹

\$ 452 Medallion Qualification Dollars (MQDs) earned

MILEAGE CALCULATOR

PAY WITH MILES

You've selected a Pay With Miles eligible Itinerary. Main Cabin tickets purchased using Pay With Miles may not be eligible for Upgrades. Pay with Miles tickets are eligible for mileage accrual for any portion of the base fare or surcharges paid in currency.

YOUR CURRENT MILES BALANCE: 341,312

MAXIMUM DISCOUNT PER PASSENGER: \$485.20

Select one

Total Price: \$465.20 USD

PASSENGERS

Are You Traveling?

YES NO

1

Passenger Information

If the full name below is not an exact match to the name on your government-issued identification, edit your Passenger Info. This Secure Flight Passenger Data is for use by the Transportation Security Administration Only.

PLATINUM

PREFIX: -- FIRST NAME: JONATHAN MIDDLE NAME: LAST NAME: BELL SUFFIX: --

FREQUENT FLYER PROGRAM: Delta Air Lines / SkyMiles FREQUENT FLYER NUMBER: SKYMILES/BLUEMILES NUMBER: --

GENDER: Male DATE OF BIRTH: KNOWN TRAVELER NUMBER: ADDRESS NUMBER: --

Contact Information

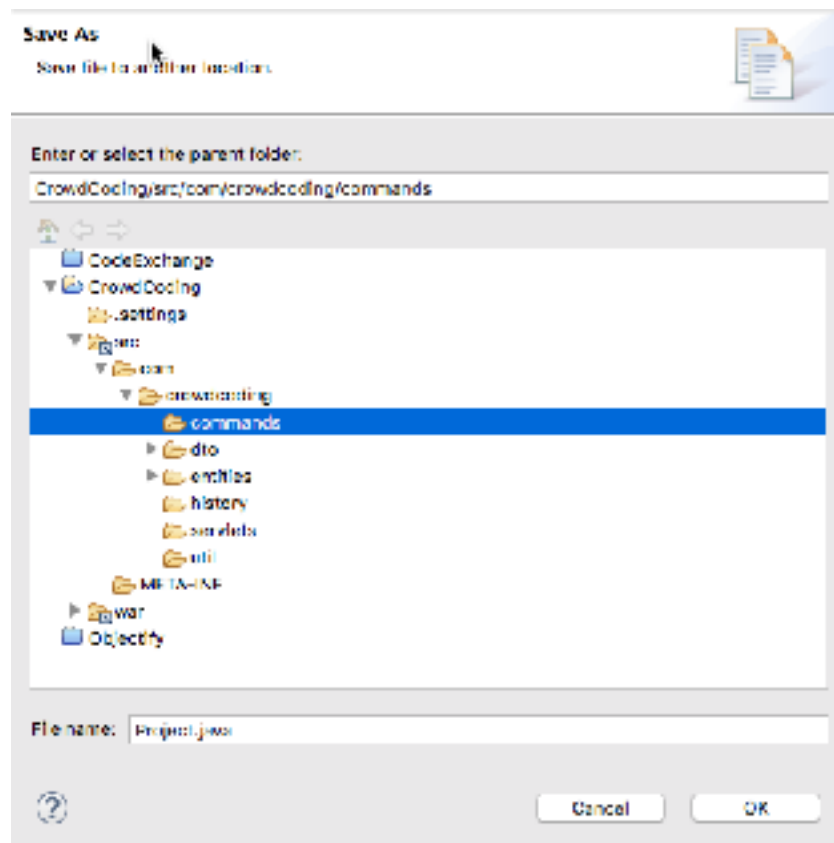
DEVICE TYPE: Cell COUNTRY: United States (1) PHONE NUMBER: 202-960-4107

EMAIL: jonathan.bell@delta.com

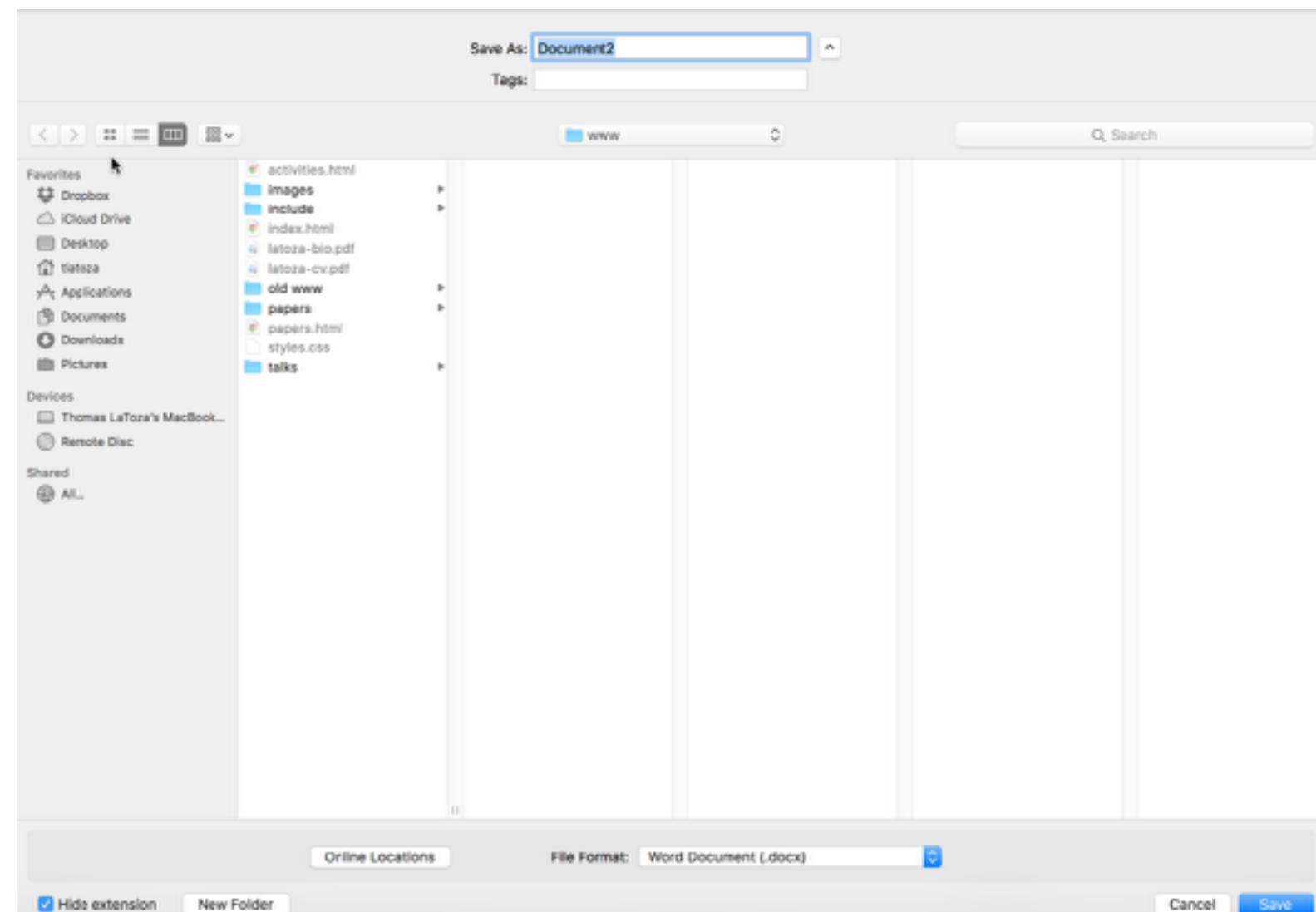
Anticipate likely next actions

- 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 screenshot shows the American Airlines website interface during a flight booking process. At the top, the American Airlines logo is on the left, and navigation links for Home, Login, Hello, THOMAS, English, and Search aa.com are on the right. Below the logo are links for Plan Travel, Travel Information, and AAdvantage. A progress bar indicates the current step is 'Travelers', with other steps being Find Flights, Choose Flights, Trip Options, Select Seats, Review & Pay, and Finish. The 'Travelers' section shows a flight from Washington to Raleigh/Durham for 1 Adult on Sunday January 10, 2016 to Monday January 11, 2016. A 'Show Trip Details' button is below this. To the right, the 'Your Trip Price' is \$203.70 USD, with a link to 'Reveal and Collect Status'. Below this, a promotion for AAdvantage cards offers 40,000 bonus miles, up to \$100 in statement credits, and a free first checked bag. The final price calculation shows: Your Trip Price: \$203.70 USD, Statement Credit: -\$100.00 USD, resulting in a total of \$103.70 USD. The 'Passenger Details' section is partially visible at the bottom, with a note to enter names as they appear on government-issued photo identification and a link to TSA Privacy Notice.

American Airlines Plan Travel Travel Information AAdvantage

Find Flights Choose Flights **Travelers** Trip Options Select Seats Review & Pay Finish


Travelers

ⓘ Check below for errors

Washington to Raleigh/Durham
1 Adult
Sunday January 10, 2016 – Monday January 11, 2016

Show Trip Details

Your Trip Price: **\$203.70 USD**
[Reveal and Collect Status](#)

 Earn 40,000 bonus miles,
up to \$100 in statement credits, and your first checked bag free*! [Learn More](#)

Your Trip Price: \$203.70 USD
Statement Credit: -\$100.00 USD
\$103.70 USD

Passenger Details ⓘ

Please enter all passenger names as they appear on the passenger's government issued photo identification. [More details on passenger names](#)
[TSA Privacy Notice](#)

*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

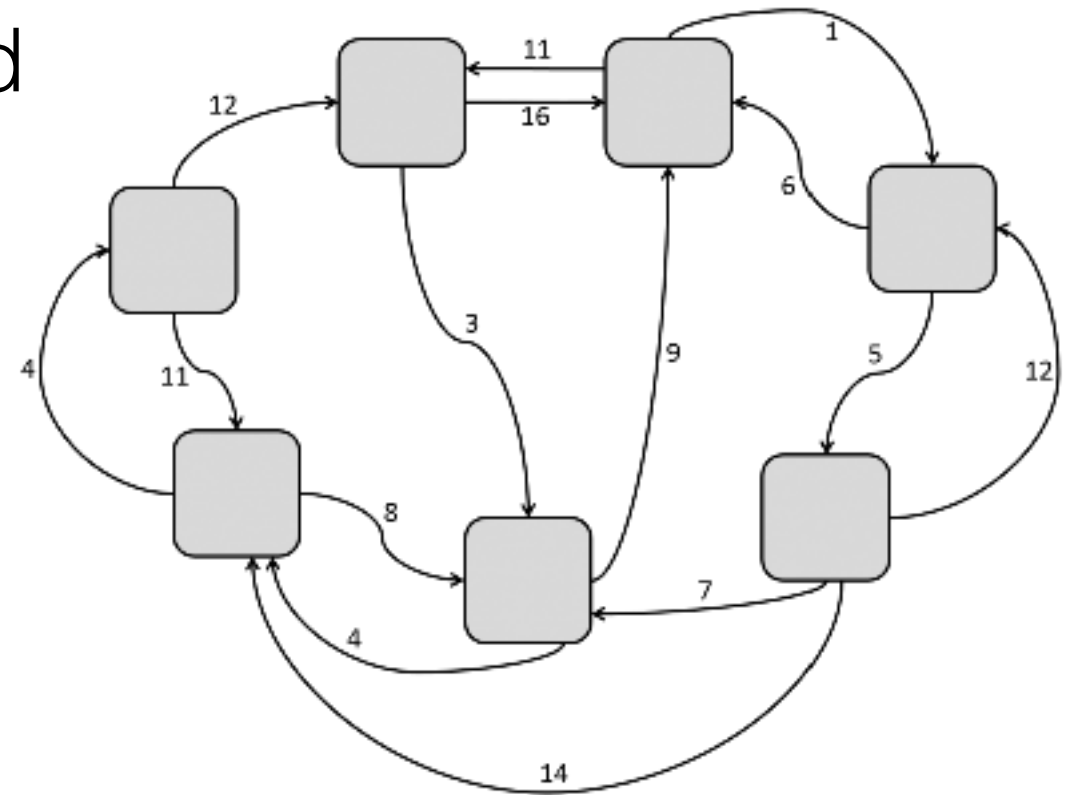
- Many different contexts where navigation is important
 - Among windows & screens
 - Among panes or frames in a window
 - Among tools and menus
 - Within an information space

Information foraging

- Mathematical model describing navigation
- Analogy: animals foraging for food
 - Can forage in different patches (locations)
 - Goal is to maximize chances of finding **prey** while minimizing time spent in hunt
- Information foraging: navigating through an information space (patches) in order to maximize chances of finding prey (information) in minimal time

Information environment

- Information environment represented as **topology**
 - Information patches connected by traversable **links**
- Examples
 - Web pages, connected by links
 - Menu options & dialogs connected by commands
 - Locations on map, connected by search, scroll, move interactions with map



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

Scent

- User interprets cues on links by likelihood they will reach prey
 - e.g., do I think that the “Advanced” options are likely to have the option I’m looking for?

Simplified mathematical model

- Users make choices to maximize **possibility** of reaching prey per cost of interaction
- Predators (idealized) choice = $\max [V / C]$
 - V - value of information gain, C - cost of interaction
- Don't usually know ground truth, have to estimate
- Predator's desired choice = $\max [E[V] / E[C]]$

Some design implications of information foraging theory

- Organize information into functionally **related** groups
- Design effective **cues**, describing what will be found by traversing links
- Match **expectations** of user's mental model
- Provide **search**

Web navigation conventions

NEW & INTERESTING FINDS ON AMAZON EXPLORE

amazon Prime

LED & LCD TVs lg tv 4k

BLACK FRIDAY DEALS WEEK

Departments [Browsing History](#) [Thomas's Amazon.com](#) [Today's Deals](#) [Hello, Thomas Your Account](#) [Prime](#) [Lists](#) [Cart](#)

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 (63)

Television Resolution

- ☐ 4K Ultra HD (70)
- ☐ 1080p (16)
- ☐ 1080i
- ☐ 760p
- ☐ 780i
- ☐ 720p (*)
- ☐ 720i
- ☐ 480p
- ☐ 480i

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

Television Feature: [Smart TV](#) | [3D](#)

Sponsored

Save on LG Super UHD TVs

[Shop now](#)

LG Electronics 65UH77... LG Electronics 55UH77...

Ad feedback

Sponsored

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

LG Electronics 80UH8500 80-Inch 4K Ultra HD Smart LED TV (2016 Model)

by LG Electronics

\$1,297⁰⁰ ~~\$1,697.00~~ Prime

★★★★☆ 87

[Electronics Gift Guide](#)

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

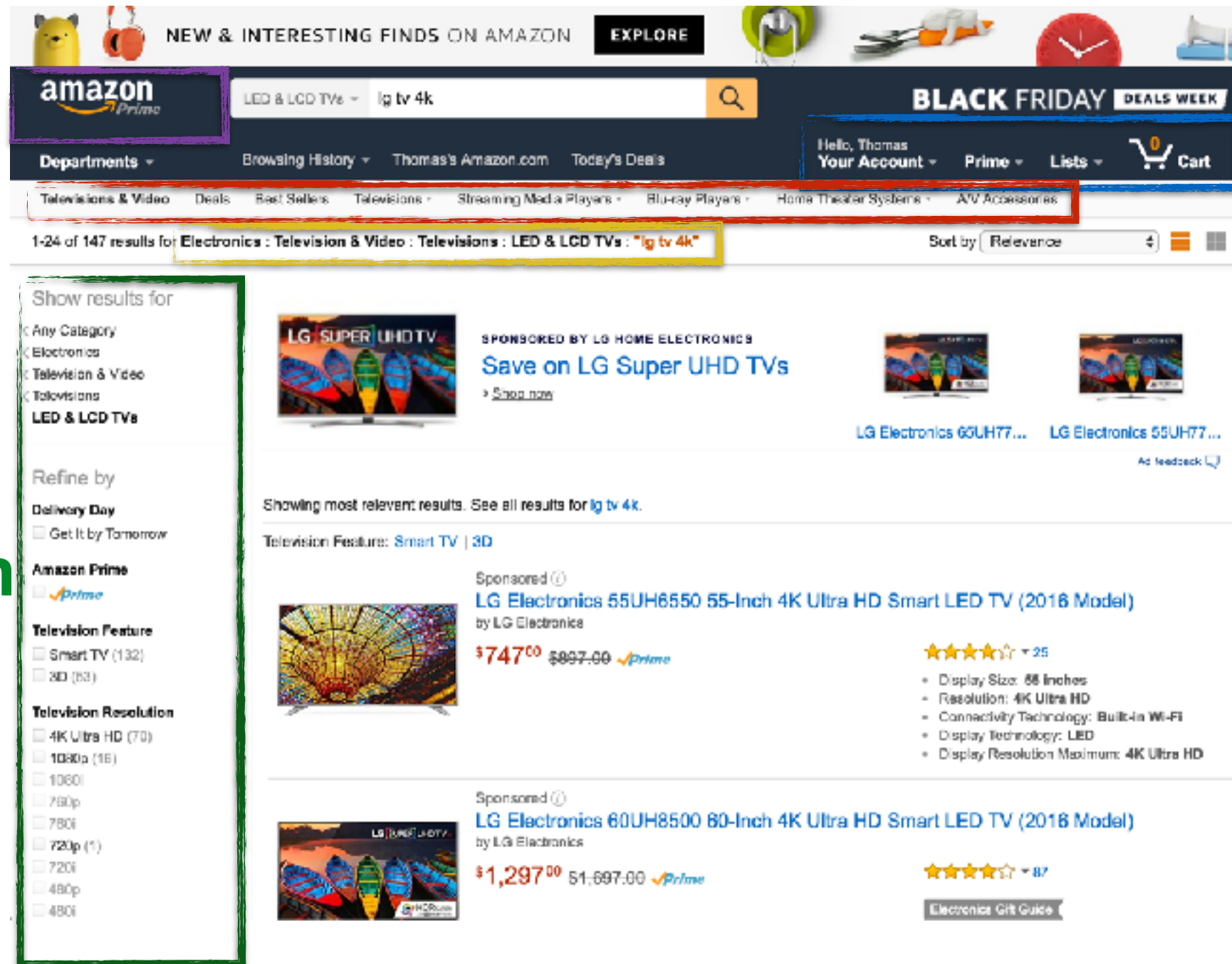
Web navigation conventions

Site ID

You are here

Local navigation

Footer navigation



Utilities
Sections

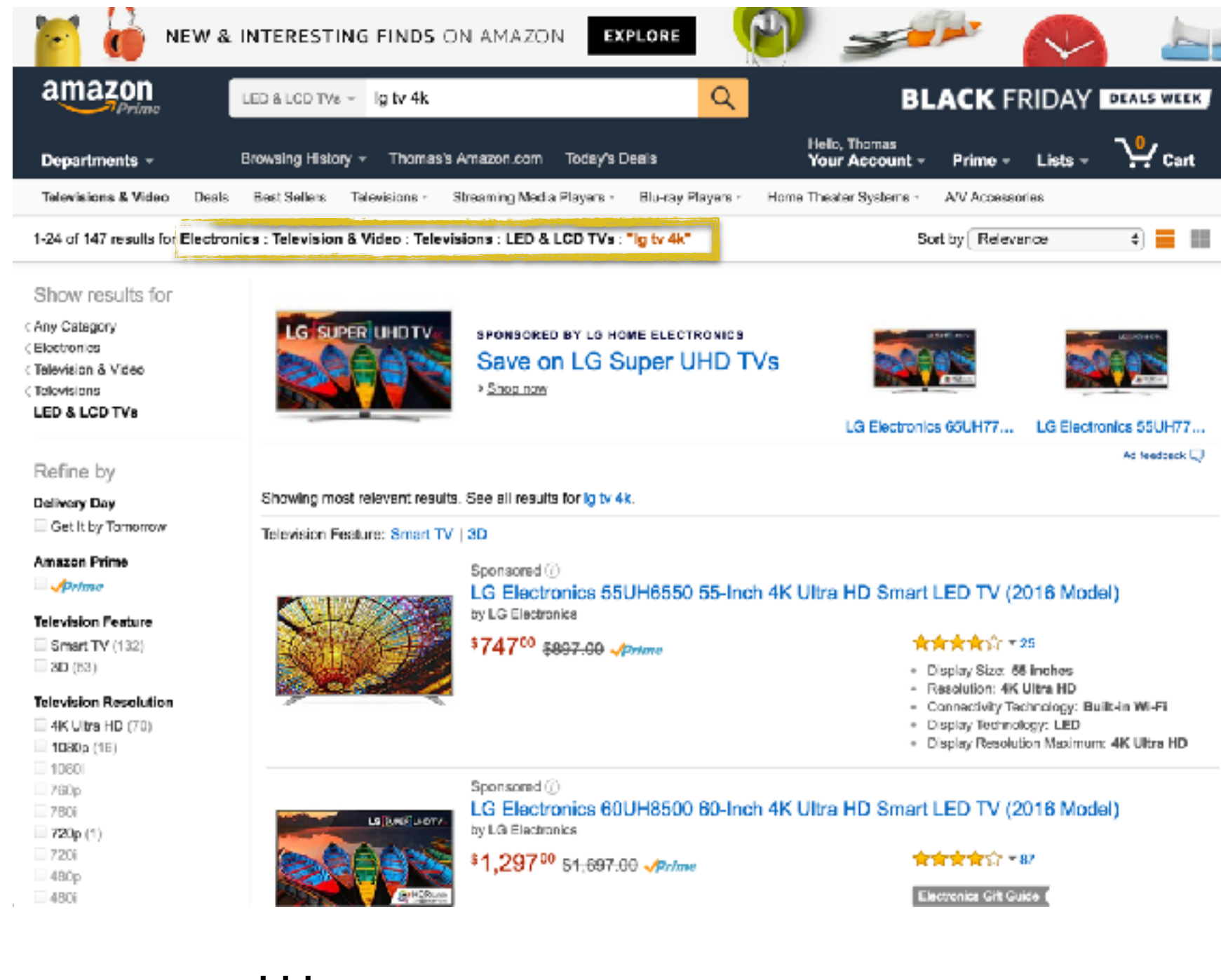
...

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.

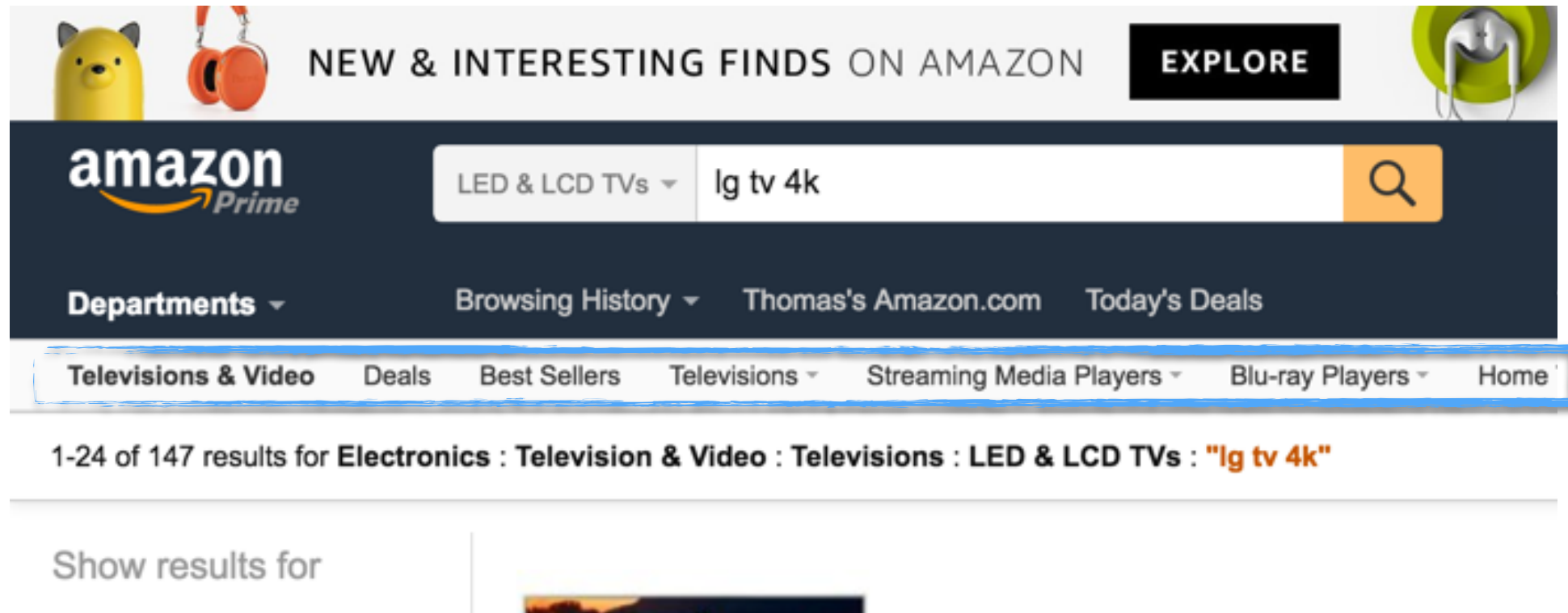
Breadcrumbs

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



...

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?

In Class Activity: Design a course catalog & registration system

- In groups of 2 or 3
 - Design a course catalog & registration system
 - Create sketches showing key screens
 - Should support
 - browsing course catalog, registering for classes, waitlists
 - building plan of courses to take over multiple semesters to fulfill degree requirements