

Conceptual Models & Interface Metaphors

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CS 147
Autumn 2017
November 8, 2017

Hall of Fame or Shame?



Add/Update Shipping Information

We found an error while verifying your shipping address.

We've marked the problem in red for you.

Update the address book of

Required information is marked in GREEN CAPS.

[HELP](#) for questions about shipping.

NICKNAME:

Please assign a "nickname" for the person you're shipping to.
You may change or delete this information at any time.

FIRST NAME:

MIDDLE INITIAL:

LAST NAME:

ADDRESS:

(International use only)

CITY:

STATE/PROVINCE:

Includes APO and FPO. Use "Other" if country is not USA or Canada.

ZIP/POSTAL CODE:

COUNTRY:

SHIPPING METHOD:
 In the U.S.: [HELP](#)
 Standard UPS
(2 business days plus

International: [HELP](#)
 Canada Post
(4-10 business days)

- Design based on a top retailer's site

Hall of Shame!



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SHIPPING METHOD: In the U.S.: [HELP](#) International: [HELP](#)
 Standard UPS Canada Post
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- Design based on a top retailer's site
- Color deficiency
 - can't distinguish between red & green
- In study, user could not get by this screen!
- How to fix?
 - redundant cues

Hall of Fame or Shame?



<http://africanbusinessmagazine.com/wordpress/wp-content/uploads/2014/07/mobile-payment.png>



<http://blog.unibulmerchantservices.com/m-pesa-by-the-numbers/>

Hall of Fame or Shame?



- M-Pesa mobile payments
- Common in Africa

Hall of Fame!



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<http://blog.unibulmerchantservices.com/m-pesa-by-the-numbers/>

- M-Pesa mobile payments
- Common in Africa
- Simple UI, but brings banking services to the unbanked!

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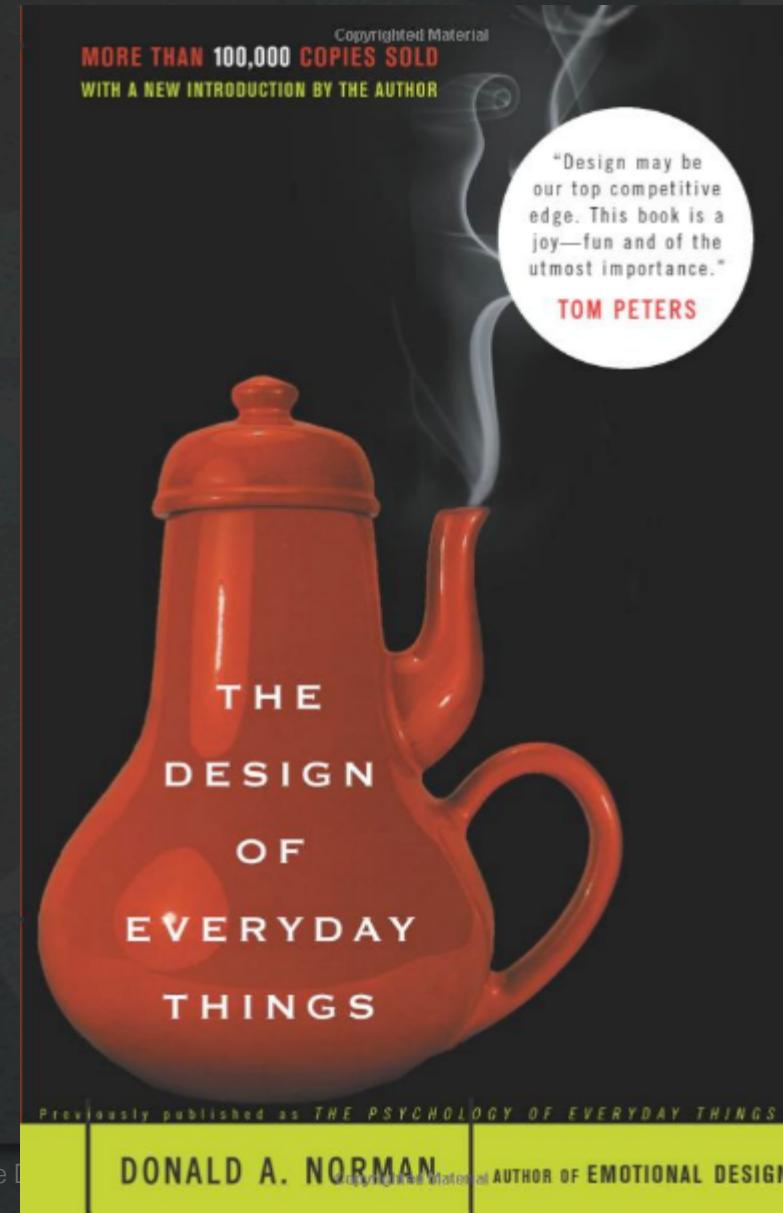
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Outline

- *Design of Everyday Things*
- Conceptual models
- Team break
- Interface metaphors
- UI consistency

Design of Everyday Things

- By Don Norman (UCSD, Apple, HP, NN Group, NU, UCSD)
 - Design of everyday objects illustrates problems faced by designers of systems
 - Explains conceptual models
 - doors, washing machines, digital watches, telephones, ...
 - Resulting design guides
- Highly recommended



Conceptual Model?

- *Mental representation of how an artifact works & how interface controls affect it*
- People may have preconceived models that are hard to change
 - (4 + 5) vs. (4 5 +)
 - dragging to trash?
 - deletes file but ejects disk
- Interface must communicate model
 - visually (& possibly physically or using sound)

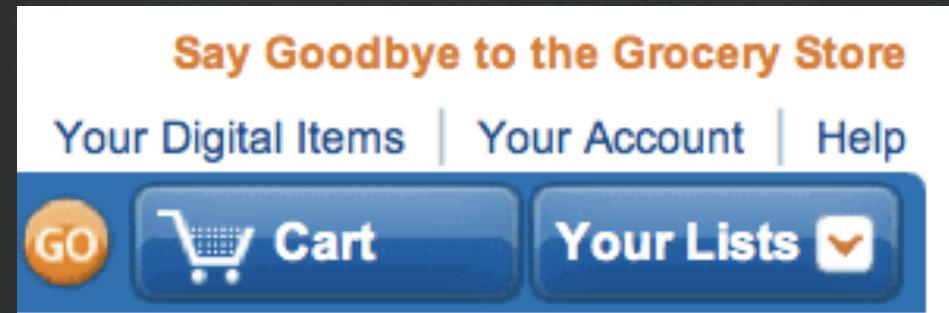


David Shillinglaw

Affordances as Perceptual Clues

Well-designed objects have **affordances**

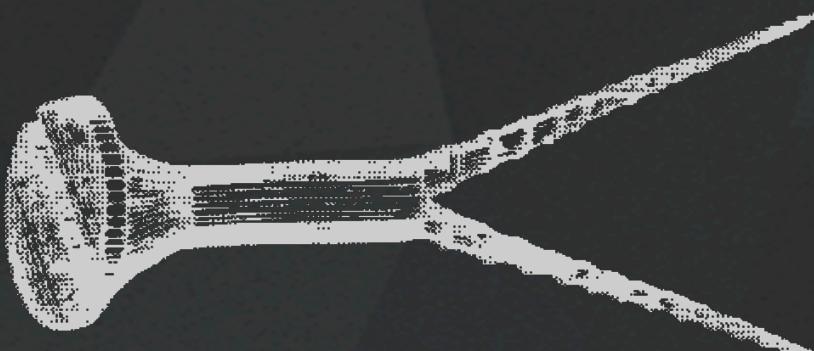
- clues to their operation
- often visual, but not always (e.g., speech)



What affordances do you see here?

Affordances as Perceptual Clues

- Poorly-designed objects
 - no clues or misleading clues

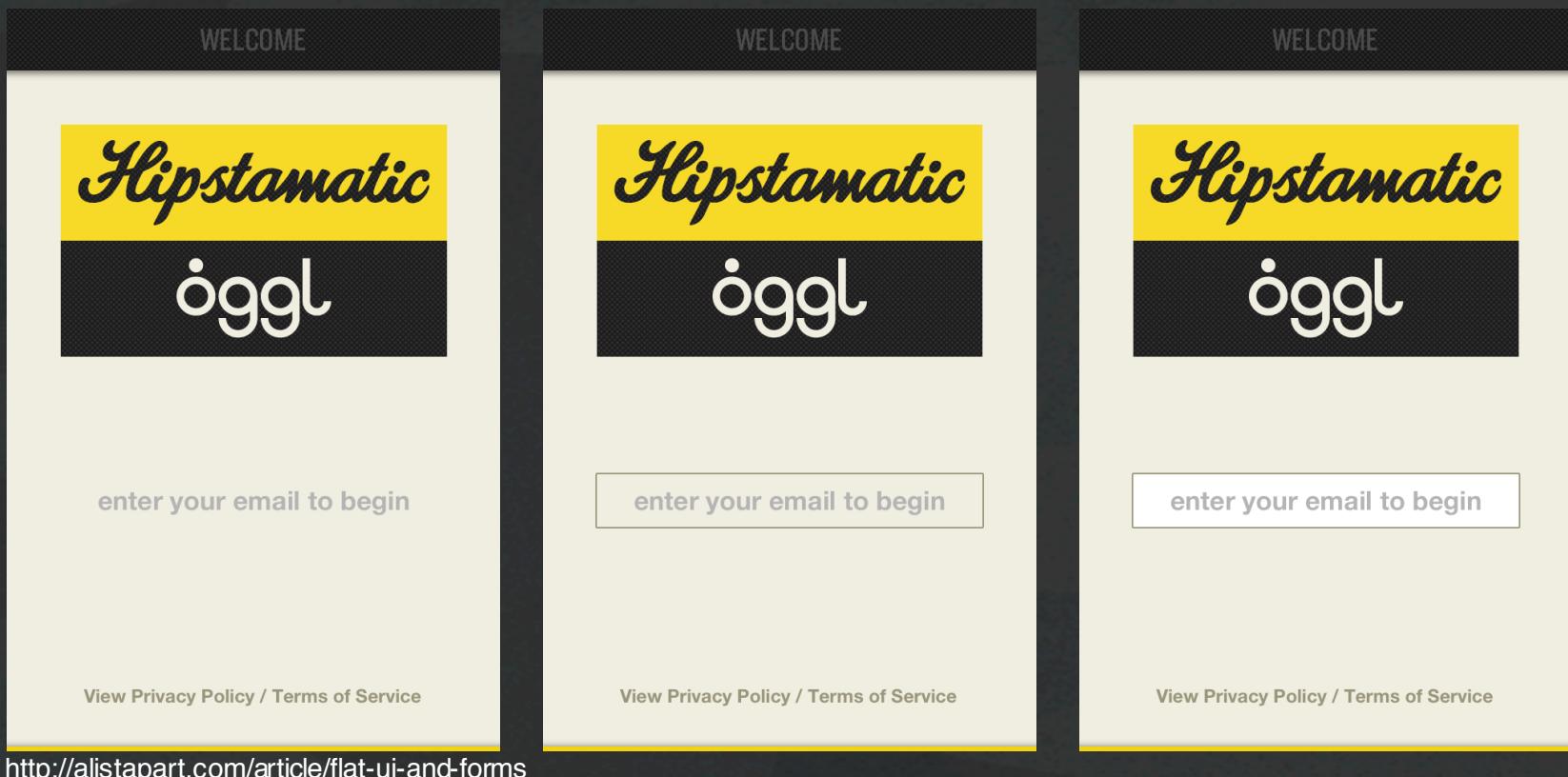


French artist Jacques Carelman
Crazy design for a screw punch!



Affordances as Perceptual Clues

- Poorly-designed objects
 - no clues or misleading clues



<http://alistapart.com/article/flat-ui-and-forms>

Refrigerator



Problem: freezer too cold, but fresh food just right

Refrigerator Controls

Normal Settings

C and 5

Colder Fresh Food

C and 6-7

Coldest Fresh Food

B and 8-9

Colder Freezer

D and 7-8

Warmer Fresh Food

C and 4-1

OFF (*both*)

0

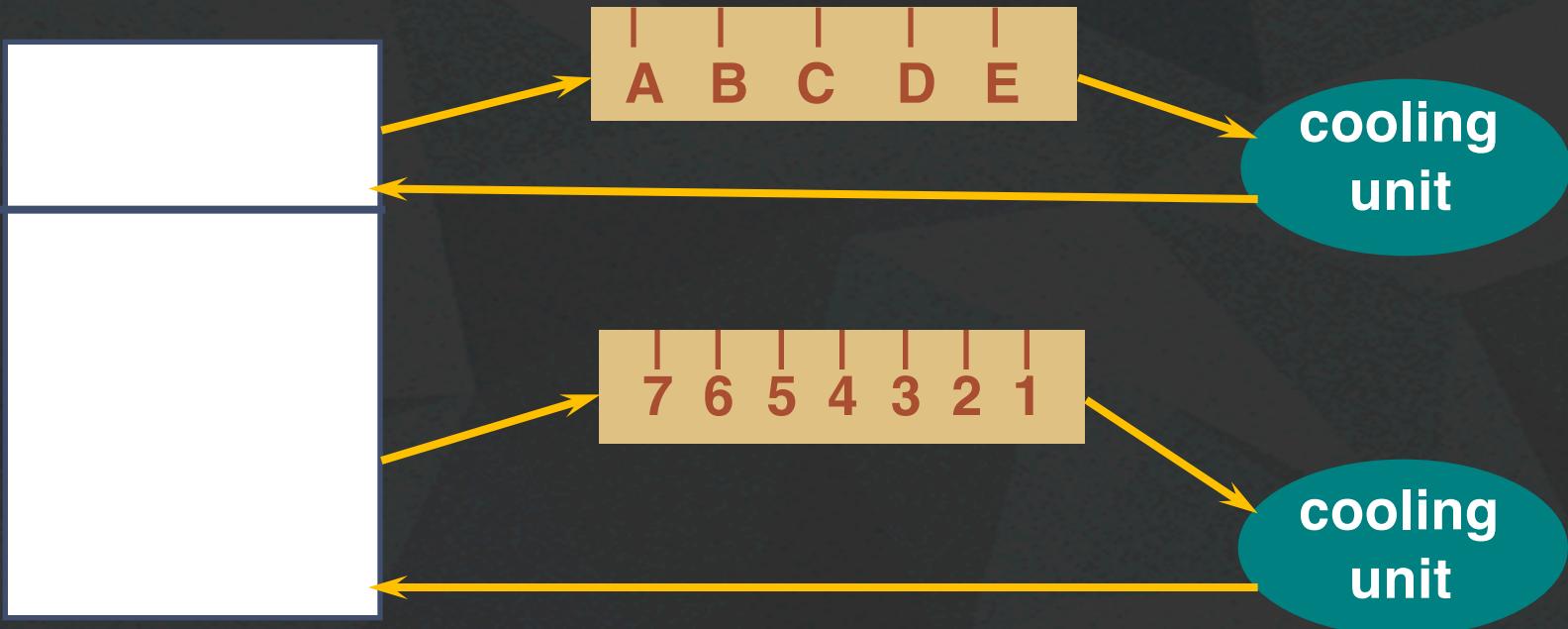


What is your conceptual model?

Spend 30 sec. drawing a diagram showing your model
(where the cooling units are & how controlled)

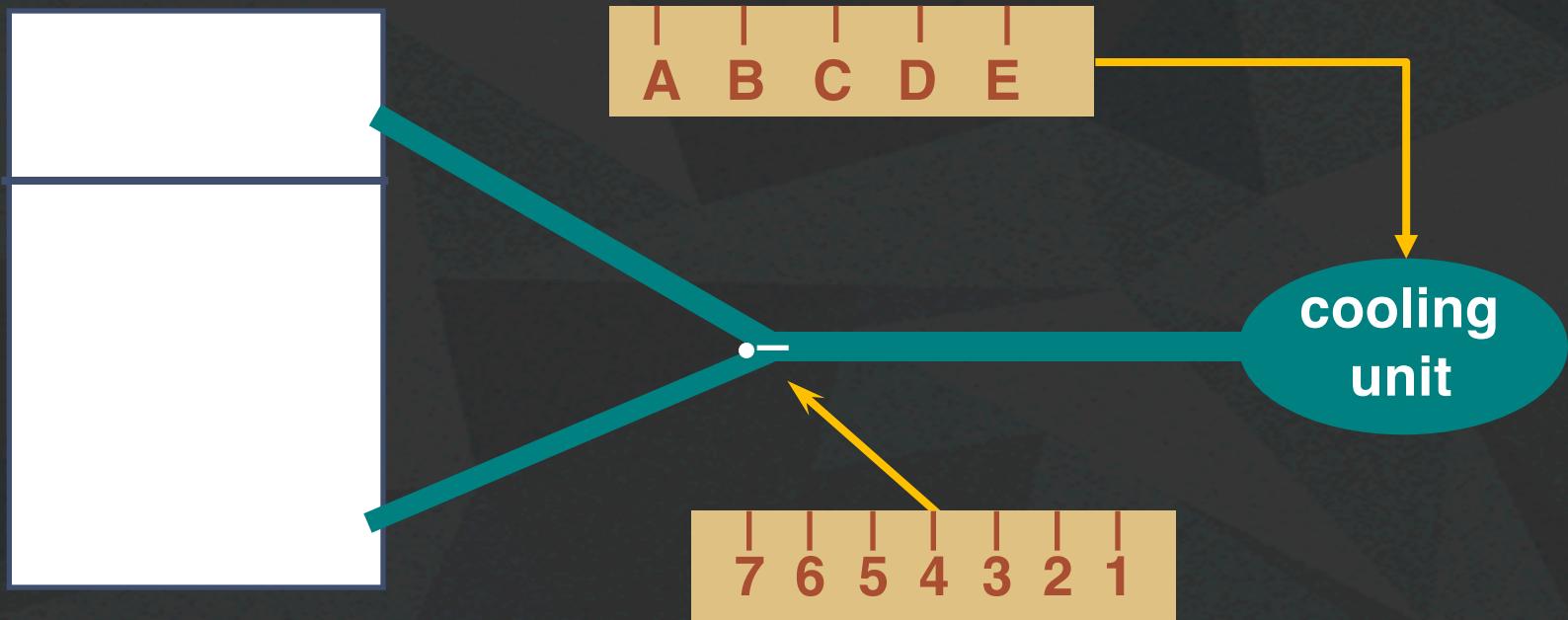
Share with your neighbor

A Common Conceptual Model



independent cooling units

Actual Conceptual Model

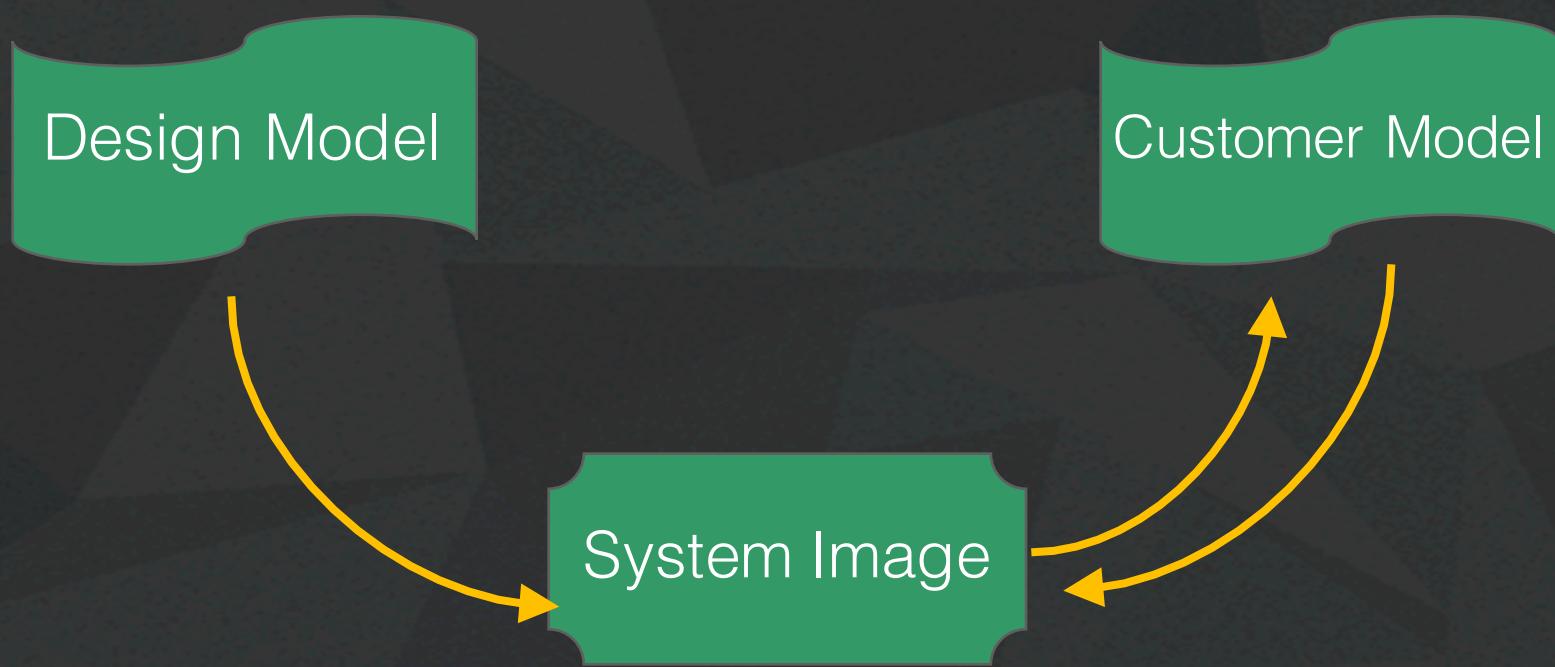


Can you fix the problem?

Possible solutions

- make controls map to customer's model
- make controls map to actual system

Design Model & Customer Model



- Customers get model from experience & usage
 - through system image
- What if the two models don't match?

Conceptual Model Mismatch

- Mismatch between designer's & customer's conceptual models leads to...
 - slow performance
 - errors
 - frustration
 - ...



Notorious Example

OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

ELECTORS
FOR PRESIDENT
AND
VICE PRESIDENT

(A vote for the candidates will
actually be a vote for their electors.)

(Vote for Group)

(REPUBLICAN)

GEORGE W. BUSH - PRESIDENT

3 →

DICK CHENEY - VICE PRESIDENT

(DEMOCRATIC)

AL GORE - PRESIDENT

5 →

JOE LIEBERMAN - VICE PRESIDENT

(LIBERTARIAN)

HARRY BROWNE - PRESIDENT

7 →

ART OLIVIER - VICE PRESIDENT

(GREEN)

RALPH NADER - PRESIDENT

9 →

WINONA LaDUKE - VICE PRESIDENT

(SOCIALIST WORKERS)

JAMES HARRIS - PRESIDENT

11 →

MARGARET TROWE - VICE PRESIDENT

(NATURAL LAW)

JOHN HAGELIN - PRESIDENT

13 →

NAT GOLDHABER - VICE PRESIDENT

A

OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

(REFORM)

PAT BUCHANAN - PRESIDENT

EZOLA FOSTER - VICE PRESIDENT

(SOCIALIST)

DAVID McREYNOLDS - PRESIDENT

MARY CAL HOLLIS - VICE PRESIDENT

(CONSTITUTION)

HOWARD PHILLIPS - PRESIDENT

J. CURTIS FRAZIER - VICE PRESIDENT

(WORKERS WORLD)

MONICA MOOREHEAD - PRESIDENT

GLORIA La RIVA - VICE PRESIDENT

WRITE-IN CANDIDATE

To vote for a write-in candidate, follow the
directions on the long stub of your ballot card.

Car Automatic Shifter



Design Guides



- Provide good conceptual model
 - customer wants to understand how controls affect object
- Make things visible
 - if object has function, interface should show it
- Map interface controls to customer's model
 - infix vs. postfix calculator – whose model is that?
- Provide feedback
 - what you see is what you get! (WYSIWYG)

Make Things Visible

- Refrigerator (?)
 - make the A..E dial something about percentage of cooling between the two compartments?
- Controls available on watch w/ 3 buttons?
 - too many and they are not visible!



Make Things Visible



- Compare to controls on old car radio
 - $\# \text{controls} = \# \text{functions}$
 - controls are labeled (?) and grouped together
 - tradeoffs of the “glass UI” (e.g., Tesla)?

Make Things Visible



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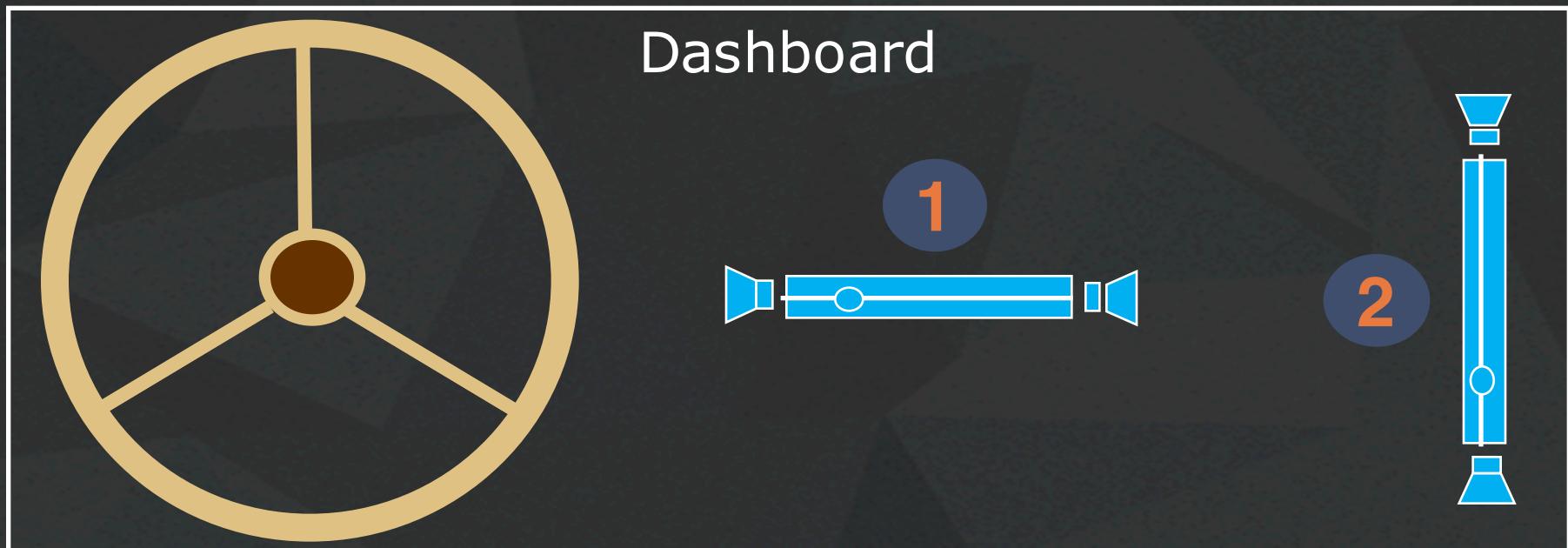
Make Things Visible



- Compare to controls on old car radio
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Map Interface Controls to Customer's Model

- Which is better for car dashboard speaker front / back control?
- Control should mirror *real-world*



Map Interface Controls to Customer's Model

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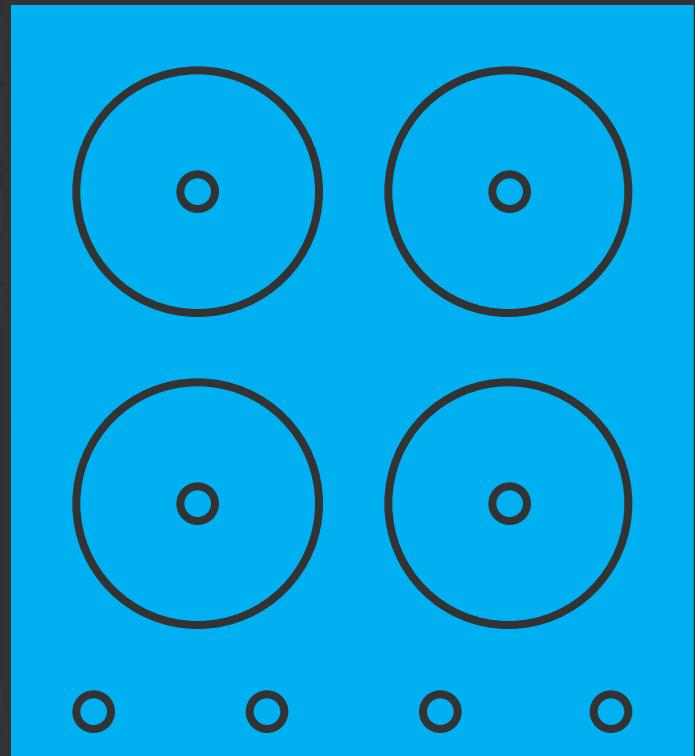


Mercedes Benz Seat Control

Map Interface Controls to Customer's Model



Problem?

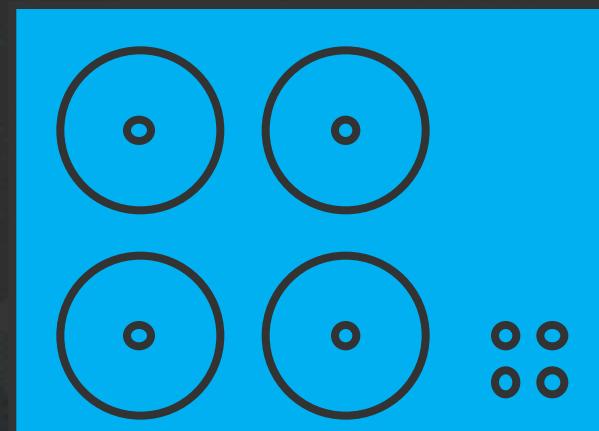
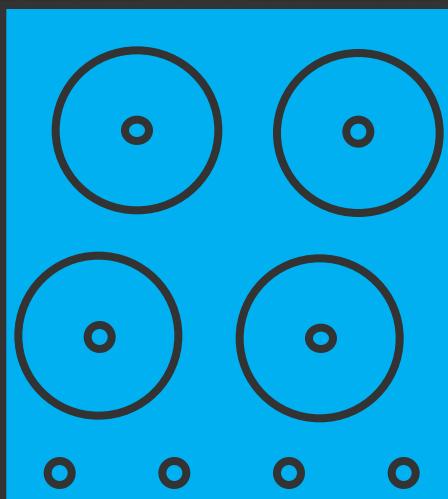


Which knob controls which burner?

Map Interface Controls to Customer's Model



Possible fixes?

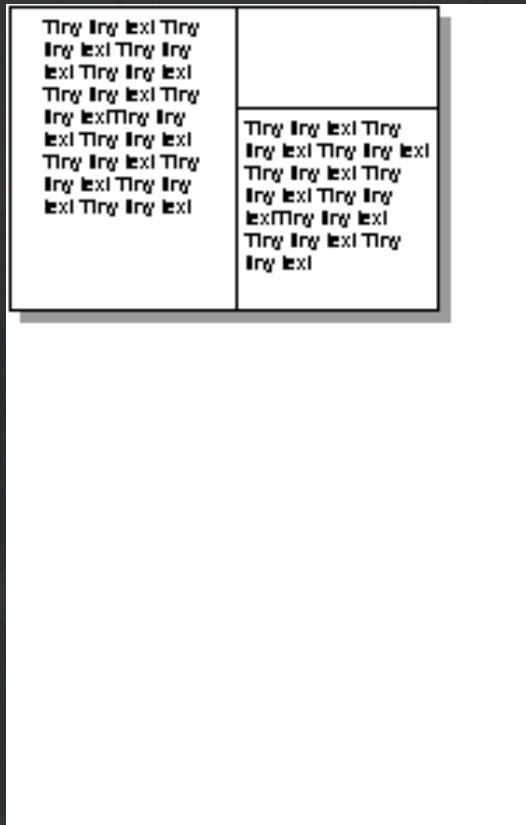


Metaphor



- Definition ?
 - “The transference of the relation between one set of objects to another set for the purpose of brief explanation.”
- Lakoff & Johnson, *Metaphors We Live By*
 - “...the way we think, what we experience, and what we do every day is very much a matter of metaphor.”
 - in our language & thinking – “argument is war”
 - ... he attacked every weak point
 - ... criticisms right on target
 - ... if you use that strategy
- We can use metaphor in interface design to leverage existing conceptual models

Desktop Metaphor

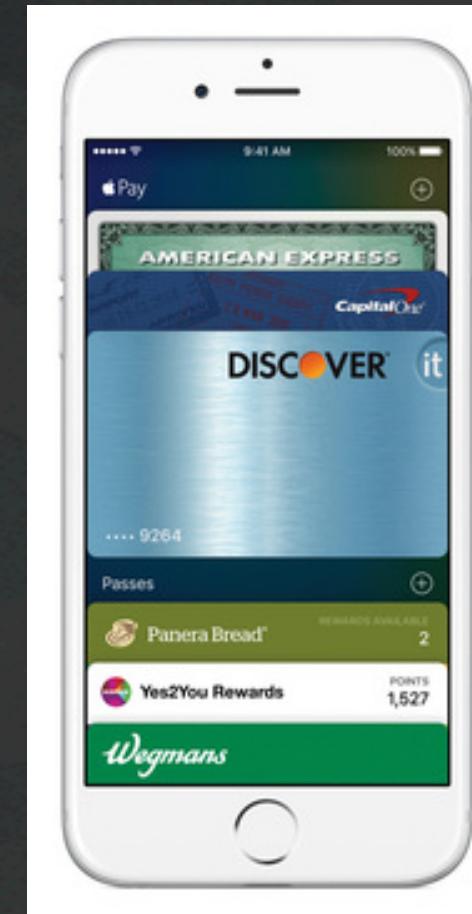


Suggests a conceptual model

- not really an attempt to simulate a real desktop
- a way to explain why some windows overlapped
- leverages existing knowledge about files, folders & trash

Example Metaphors

- Global metaphors
 - personal assistant, wallet, clothing, pens, cards, telephone, eyeglasses
- Data & function
 - rolodex, to-do list, calendar, applications documents, find, assist
- Collections
 - drawers, files, books, newspapers, photo albums



How to Use Metaphor

- Develop interface metaphor tied to conceptual model
- Communicate that metaphor to the user
- Provide high-level task-oriented operations, not low-level implementation commands

Metaphor for Metaphor's Sake

- Skeuomorphism:
 - “making items resemble their real-world counterparts”
 - or
 - “a physical ornament or design on an object made to resemble another material or technique”
- Argument against: takes up space & leads to inconsistent look
- Argument for: helps people learn



Apple iBooks2

Is Consistent Always Better?

NO

- Palm PDA example: should “new appointment” & “delete appointment” be in the same place?
- New (add) is common, but delete is not



Is Consistent Always Better?

NO

Event Details i

Time: 12:00 pm - 1:00 pm

Date: Thu 6/24/99

Alarm:

Repeat:

None Day Week Month Year

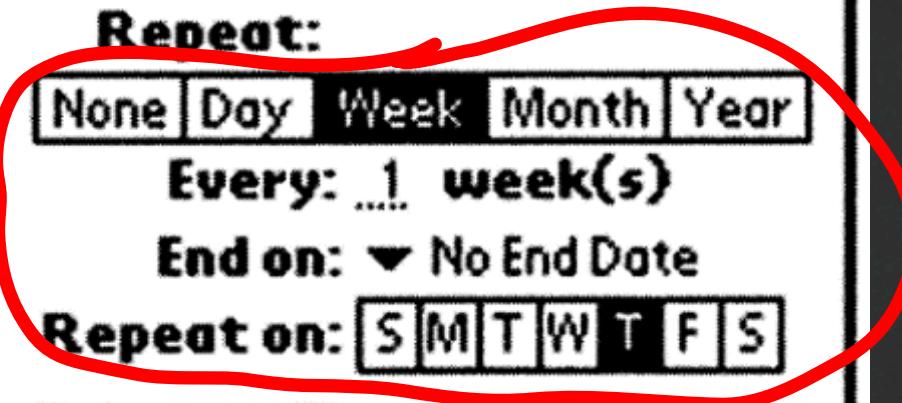
Every: ...1 week(s)

End on: ▼ No End Date

Repeat on: S M T W T F S

Private:

OK **Cancel** **Delete...** **Note**



Early Palm design
(like desktop version)

Event Details i

Time: 12:00 pm - 1:00 pm

Date: Thu 6/24/99

Alarm:

Repeat: None

Private:

OK **Cancel** **Delete...** **Note**



Streamlined design

Is Consistent Always Better?

NO

A screenshot of a Firefox 3 browser window. The title bar shows the search query: "university of washington graduate school minimum requirements for a degree - Google Search". The toolbar has several buttons, with the back and forward buttons circled in red. The address bar displays the URL: "http://www.google.com/search?scion=psy&t". The menu bar includes "Most Visited", "Getting Started", "Latest Headlines", "Andrew's Blog", "Gmail - Priority Inbo...", and other tabs like "Wireless login", "university o...", "Master's Degr...", "Master's Degr...", and "CSE 440 Proj...". The navigation bar shows "Web", "Images", "Videos", "Maps", "News", "Shopping", "Gmail", and "more". The user profile "James Landay" is visible. The main content area shows the Google search results for "university of washington graduate". The search bar contains the query, with an "X" button and a "Search" button. Below the search bar, it says "About 2,250,000 results (0.24 seconds)" and a "Advanced search" link. A sidebar on the left offers "Everything" and "Images" search options. The first result is a link to "Graduate Admissions Information | The Graduate School". The snippet from the page reads: "The University of Washington awarded its first graduate degree in 188 requirements should he or she be accepted into a graduate program. ..".

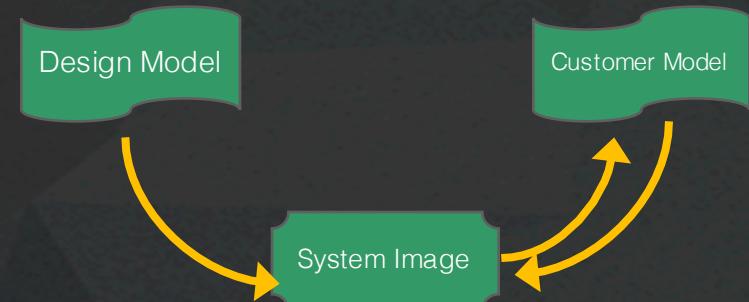
Firefox 3 Back/Forward Buttons

Ways of Being Consistent

- Interfaces should be consistent in a *meaningful way*
 - e.g., ubiquitous use of same keys for cut/copy/paste
- Types of consistency
 - consistent internally
 - e.g., same terminology and layout throughout app
 - consistent with other apps
 - ex. works like MS Word, uses keyboard conventions
 - design patterns (across many apps)
 - consistent with physical world

Summary

- Conceptual models ?
 - mental representation of how the object works & how interface controls effect it
- Design model should equal customer's model ?
 - mismatches lead to errors
 - use customer's likely conceptual model to design
- Design guides ?
 - make things visible
 - map interface controls to customer's model
 - provide feedback



Further Reading

- *Design of Everyday Things*, Donald Norman
- Design as Practiced, Donald Norman
 - Talks about failure to make changes to Macintosh
 - http://www.jnd.org/dn.mss/Design_as_Practiced.html
- Computing the Case Against User Interface Consistency, Jonathan Grudin
 - Talks about why interfaces should not always be consistent
 - <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.90.6480&rep=rep1&type=pdf>