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User Interface Design

Slides originally by Ken Wong

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A Software Design Manifesto

"The daily experience of using computers far too often is still fraught with difficulty, pain, and barriers for most people."

— Mitch Kapor, Lotus



Poor Usability

IT departments neglect usability in favor of cost

Samsung survey



Poor Usability

What if software engineers developed user interfaces ...



ATI Display Control Panel



"User Interface Design"

http://www.dilbert.com/strips/comic/2002-09-23/

http://www.dilbert.com/strips/comic/2002-09-24/

http://www.dilbert.com/strips/comic/2001-04-14/



Features

Complexity causes 50% of product returns

- Elke den Ouden, TU Eindhoven



Featuritus?





Features

Engineers, scientists, programmers ... are not representative of *normal people*



000	Google! Search Engine	
	Google!	
	Search the web using Google! 10 results Coogle Search (I'm feeling lucky) Index contains ~25 million pages (soon to be much bigger)	
	About Google! <u>Stanford Search Linux Search</u>	
	Get Google! updates monthly! your e-mail Subscribe Archive	
	Copyright ©1997-8 Stanford University	

"Googley User Experience"

Link:

http://www.google.com/corporate/ux.html



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Usability

Some approaches: focus on user tasks

conduct studies of users

get feedback from users during design

see good and bad examples use user interface design guidelines employ graphic design

apply principles from psychology & sociology



"Surprises"

Do we really need vowels?

H•p• y•• c•n r••d th•s s•nt•nc• w•th••t th• v•w•ls.

Cn y rd ths qstn?

"Surprises"

Do we really need to spell correctly?

"Aoccdrnig to rscheearch at an Elingsh uinervtisy, it deosn't mttaer in waht oredr the Itteers in a wrod are, the olny iprmoetnt tihng is taht the frist and Isat Itteer is at the rghit pclae."



"Surprises"

Link:

http://web.princeton.edu/sites/opplab /papers/Diemand-Yauman_Oppenheimer_2010.pdf

Disfluency through harder-to-read fonts can be better for longterm learning.



Many interaction styles over the years: rewiring

punched cards

programming

command line

choices and prompts

forms

. . .

graphical user interface

point and click

touch-based

gesture-based

Graphical User Interface

Underlying principles: user in control

> reduce certain "modes" that overly limit the user

manipulate objects

• syntax is select (noun), then act (verb)

visibility of the objects of interest

- exploit recognition, not recall
- affordance (appearance suggests form of interaction)

Graphical User Interface

Underlying principles: incremental action with rapid feedback

show objects as they are moved or resized

reversible actions (instant undo) and canceling

encourage safe exploration

every choosable action is legal

• gray out invalid choices

Graphical User Interface

Support learning through metaphors: familiar settings to teach new concepts

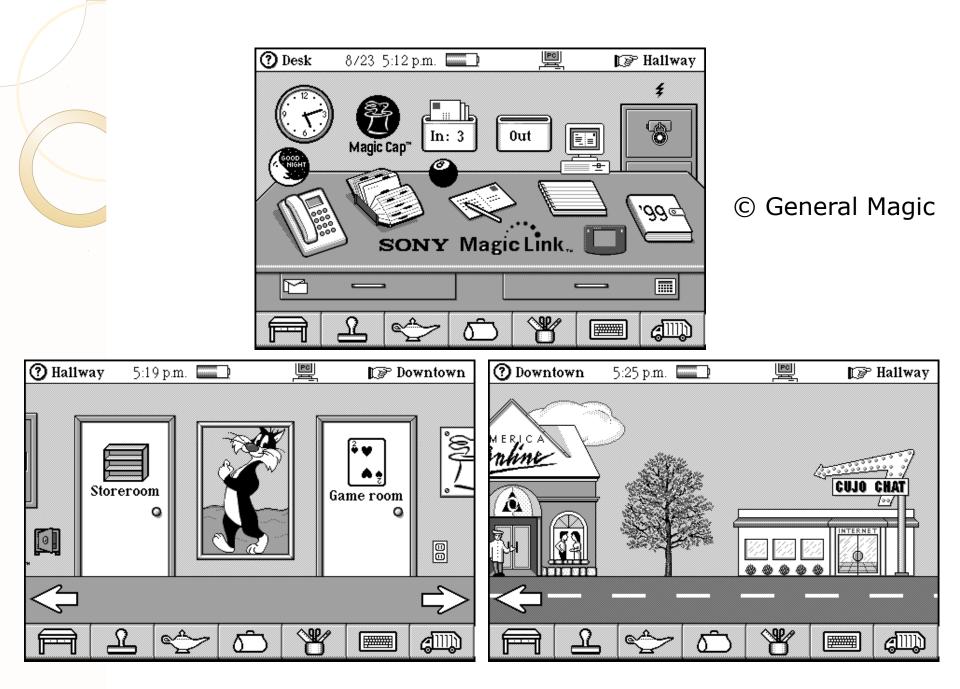
- desktop, menus, rooms, shopping carts metaphors can only go so far
 - trash can on the desktop?

carried to non-intuitive situations

• drag disk icon to trash to unmount it?

cultural differences

• menus imply the availability of choice





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About	10	Help

© Isys Information Architects



Exercise

Find user interface problems.

000

Book a Flight

Book Flights

Departure Date Morning 1 1	From To
Arrival Date Morning : Jan : 1 :	(enter IATA airport code) Fair class: ECONOMY 🛟
One way:	# of Passengers: (up to 9)
Round trip:	?

Consistency, Consistency, Consistency

Principles: predictable

> what comes next is clear from what came before

generalizable

• specific cases extend to new situations

stable

• consistently placed targets in the user interface

Consistency, Consistency, Consistency

Lexical consistency: consistent with common usage

• e.g., left = less, right = more

consistent abbreviation rules

• e.g., Jan, Feb, Mar, etc. (all equal length)

symbols used consistently

e.g., ellipsis (...) to bring up a dialog from a button

Consistency, Consistency, Consistency

Syntactic consistency:

e.g., consistent order of menus and menu items

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Platform Consistency

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● ● Colors □
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Snow

standard dialogs, sheets, and palettes in each platform

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1 of 1 • • •	
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Graphic Design

Graphic Design

Goal:

guide the user's attention and convey information clearly about the system's functionality and state

i.e., use layout and color to organize and communicate economically

Organize for neatness:

use grids and alignment, balance and symmetry, nothing placed arbitrarily

	Spelling: Englis	11 (03A)	
Not in Dictionary:	abc		
Change to:	abs	Ignore	Ignore All
Suggestions:	abs arc		Change All
	back act	Add	Suggest
Add words to:	Custom Dictionary	AutoCorrect	Close

Organize for grouping:

e.g., use labels, separators, proximity

000	Appearance
Show All	٩
Appearance:	For the overall look of buttons, menus, and windows
Highlight color:	
Place scroll arrows:	 Together At top and bottom
Click in the scroll bar to:	 Jump to the next page Jump to the spot that's clicked
	 Use smooth scrolling Double-click a window's title bar to minimize
Number of recent items:	None
	None Documents
Number of recent items: 	None Documents None Servers

Organize for grouping: e.g., use tabs, indentation, borders

Show AutoCorrect si	and the second	AutoFormat	as You Type	AutoText
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Organize for grouping: use repetition to show similarity and unity

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		New Folder	no extension is provided, use ".txt". Cancel Save

Organize for order and flow:

arrange elements in sequence to efficiently guide the user's eyes and support the task

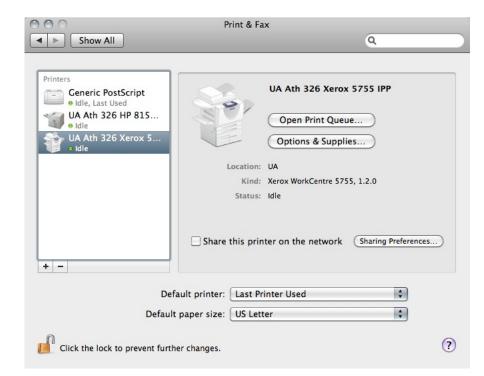
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Economize for clarity: get the most out of a minimal set of cues

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	Layout	•
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1 3	Layout Direction:	5 M N
2 4	Border: None	
	Two-Sided: Off	÷
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Economize for quick recognition:

use icons, pictures, previews, and affordances to remind



Economize for reducing clutter: focus on the essentials

000	Network	
Show All		۹
	Location: Automatic	•
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Not Connected		
• FireWire Not Connected	Kr If	sk to join new networks nown networks will be joined automatically. no known networks are available, you will e asked before joining a new network.
	802.1X: UWS	Connect
+ - &-	Show AirPort status in	menu bar Advanced) ?
Click the lock to prev	ent further changes.	ssist me Revert Apply

Economize for streamlining tasks: simplify the most common case

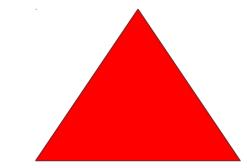
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Ken Wong Department of Computing Science University of Alorna University	Print What: Slide Show: Output:	: All Slides	•
I of 77 ✓ Show Quick Preview Page Setup ? PDF ▼ Preview		Cancel Print	nt

Distinctiveness:

if two nearby things are not the "same", make them look different

- position
- size
- shape
- color
- lightness
- texture
- etc.





Distinctiveness: the eye is attracted by

at is

isolated

color versus non-color

saturated colors

different typefaces

bigger elements

Using Color

Tips: be selective

> maximize the effect when used minimally be consistent in meaning

> > test passed, program stopped



avoid blue for foreground elements

Using Color

Tips:

in an alert, don't highlight the "dangerous" choice in red

avoid overuse of too many saturated colors

can cause visual fatigue

Tips:

Using Color

use foreground and background colors that contrast well

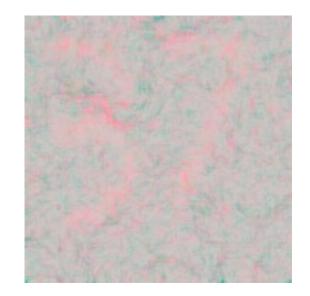


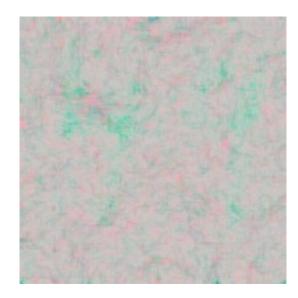
Using Color

Tips:

combine color with shape, brightness, position, text labels, etc. for redundancy

because of color blindness or poor vision





Bad Designs

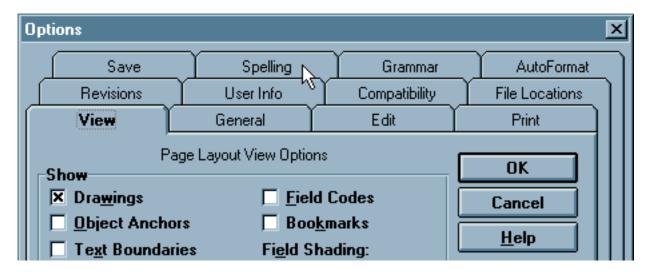
Interface Hall of Shame

Link:

http://homepage.mac.com/bradster/iarchitect/shame.htm

Poor Use of Tabs

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	(snip)	



Poor Use of Tabs

Contacts							
Name	City	State	Zip Code	Telephone	Fax	Туре	Date
Name			City	State	Zip Code	Primary Tel	
Albert Col		-	New Orleans	LA	43422	(809) 555-1	
Hound Do			Springfield	OH	01844	(212) 555-1	
James Col	tton	1	Nashville	TN	22321	(410) 555-1	212
Koko Tayl	or		Memphis	TN	34212	(321) 100-9	099
Professor	Longhair	(Chicago	IL	62000	(603) 555-1	212

Poor Use of Visual Elements

🛐 MIDI Orchestrator - (Untitled)
<u>File Options H</u> elp
Image: Solution Image: Solution Image: Solution Image: Solution
1 2 3 4 5 6 7 8 9 10 11 12

Now installing files, please wait	×
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Percent Copied: 0%	100%
Press [Esc] To Abort	

Bad Designs

Link:

http://www.baddesigns.com/



Visibility Problem





 $\ensuremath{\mathbb{C}}$ baddesigns.com

Affordance Problems







© baddesigns.com



Mapping Problems

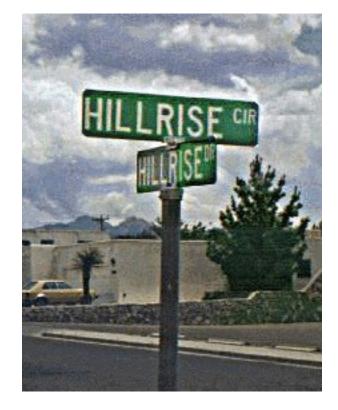




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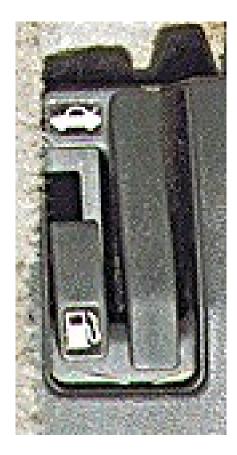
Distinctiveness Problems

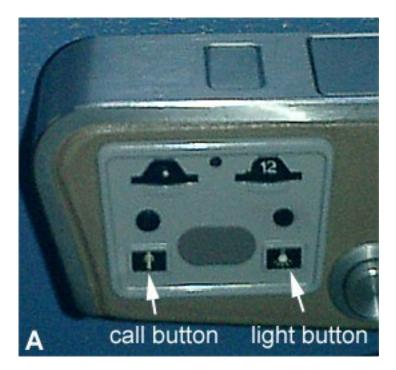




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Proximity Problems





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Books:

Java Look and Feel Design Guidelines

- Sun Microsystems
- Addison-Wesley, 2001

Interaction Design

- J. Preece, Y. Rogers, and H. Sharp
- Addison-Wesley, 2002

Books:

Graphic Design for Electronic Documents and User Interfaces

- A. Marcus
- ACM Press, 1992

Designing Visual Interfaces

- K. Mullet & D. Sano
- Prentice-Hall, 1995

Books:

The Essential Guide to User Interface Design

- W.O. Galitz
- Wiley, 2002

One-Minute Designer

- R.C. Parker
- MIS Press, 1997



Links:

User Interface Design for Programmers

 http://www.joelonsoftware.com/uibook /fog000000249.html