

# CS160

## USER INTERFACE DESIGN

### FALL 2015



# HEURISTIC EVALUATION

17 SEPT 2015

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[www.paulos.net](http://www.paulos.net)

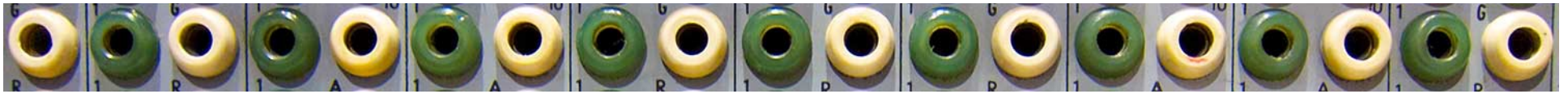
UNIVERSITY OF CALIFORNIA



Berkeley

# ANNOUNCEMENTS

FILL OUT GOOGLE CLASS GROUP PETITION  
STUDIO NEXT WEEK (MANDATORY ATTENDENCE)  
SECTION: ANDROID WEAR, SENSORS, APIs +  
HEURISTIC EVAL  
TEAM LAUNCH



# HEURISTIC EVALUATION

# USABILITY HEURISTICS

“Rules of thumb” describing features of usable systems

Can be used as design principles

Can be used to evaluate a design

Example: Minimize users' memory load

# HEURISTIC EVALUATION

Developed by Jakob Nielsen (1994)



Can be performed on working UI or on sketches

Small set (3-5) of evaluators (experts) examine UI

Evaluators check compliance with usability heuristics

Different evaluators will find different problems

Evaluators only communicate afterwards to aggregate findings

Designers use violations to redesign/fix problems

# NIELSEN'S TEN HEURISTICS

H1: Visibility of system status

H2: Match system and real world

H3: User control and freedom

H4: Consistency and standards

H5: Error prevention

H6: Recognition rather than recall

H7: Flexibility and efficiency of use

H8: Aesthetic and minimalist design

H9: Help users recognize, diagnose, recover from errors

H10: Help and documentation

# H-1: VISIBILITY OF SYSTEM STATUS

Keep users informed about what is going on.

Example: response time

0.1 sec: no special indicators needed

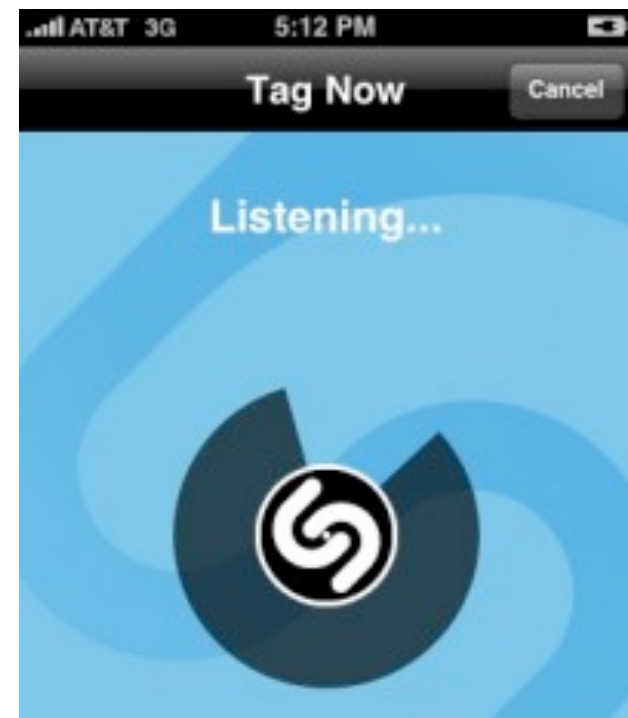
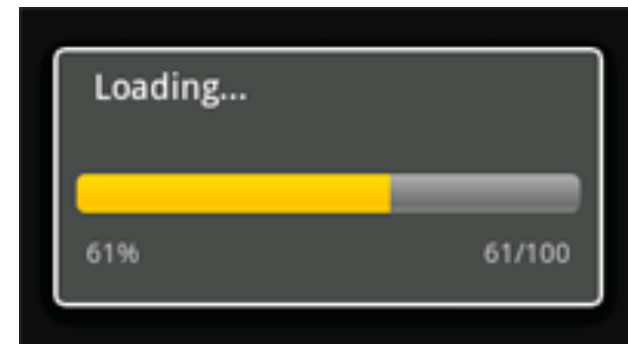
1.0 sec: user tends to lose track of data

10 sec: max. duration if user to stay focused on action

Short delays: Hourglass

Long delays: Use percent-done progress bars

Overestimate usually better



# H-1: VISIBILITY OF SYSTEM STATUS

Users should always be aware of what is going on

So that they can make informed decision

Provide redundant information

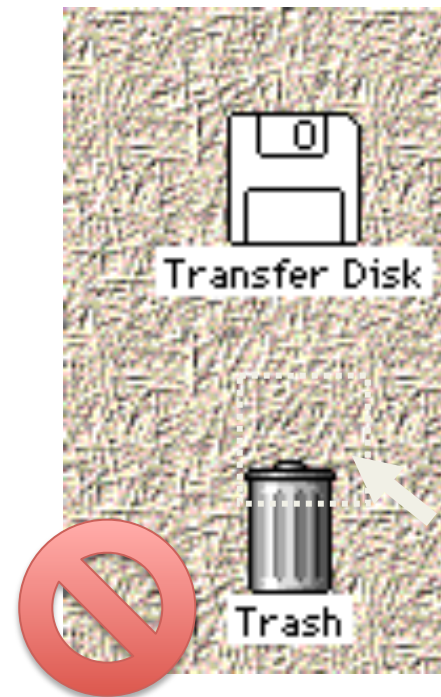




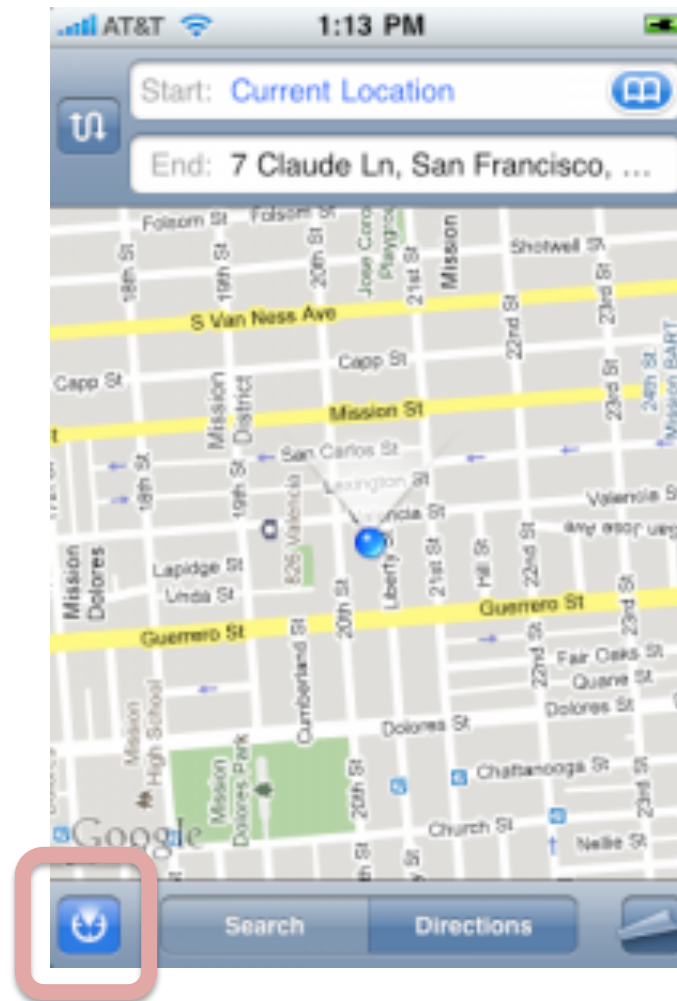
## H-2: MATCH SYSTEM & WORLD

Speak the users' language  
Follow real world conventions  
Pay attention to metaphors

Bad example: *Mac desktop*



# H2-2: MATCH SYSTEM & WORLD



# H-3: USER CONTROL & FREEDOM

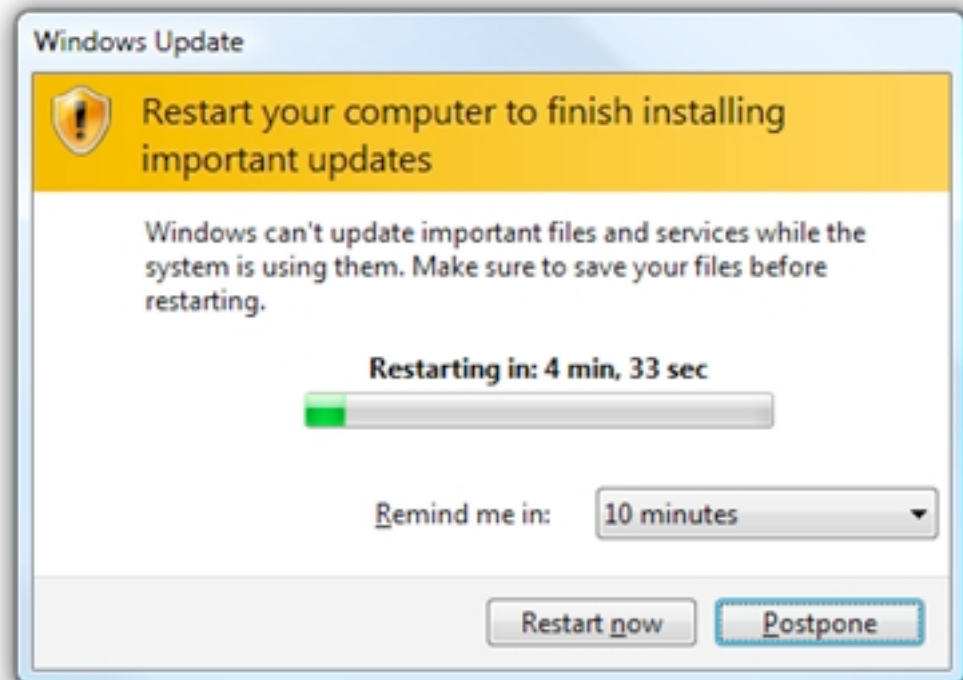
Users don't like to be trapped!

## Strategies

Cancel button  
(or Esc key) for dialog

Make the cancel button  
responsive!

Universal undo

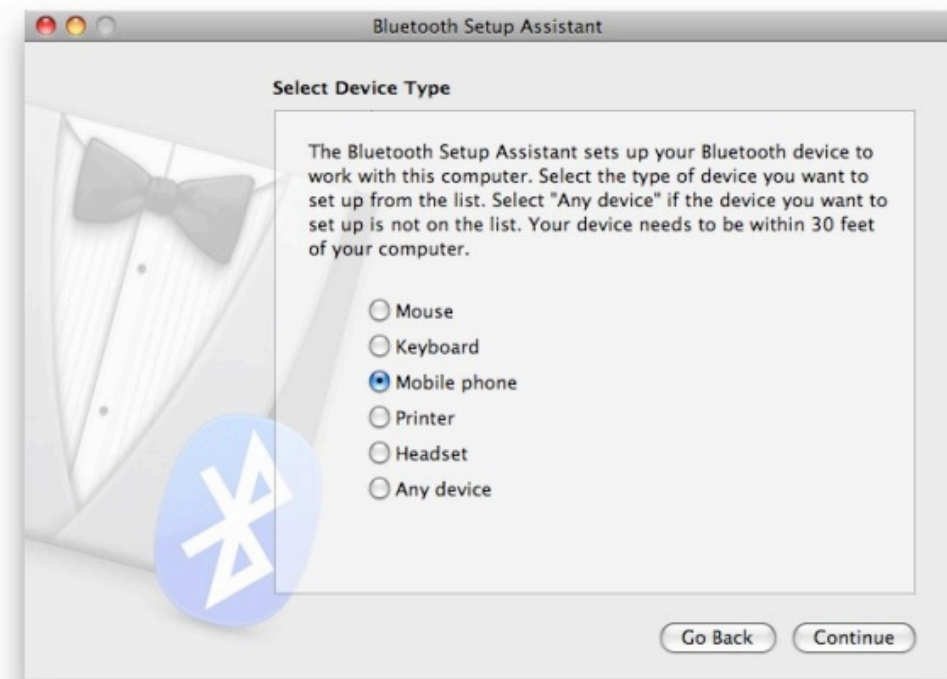


# H-3: USER CONTROL & FREEDOM

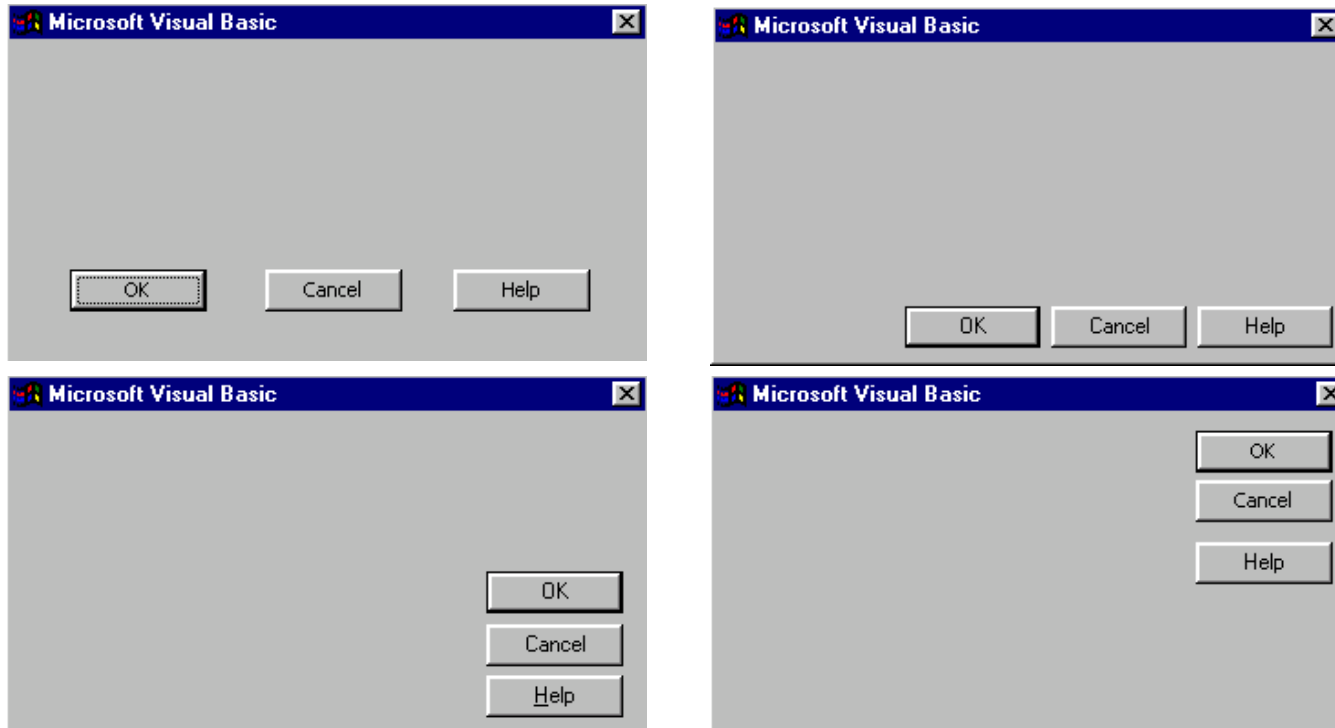
Offer "Exits" for mistaken choices, undo, redo  
Don't force the user down fixed paths

## Wizards

Must respond to Q before going to next step  
Good for infrequent tasks (e.g., network setup) & beginners  
Not good for common tasks (zip/unzip)



# H-4: CONSISTENCY AND STANDARDS



# H-4: CONSISTENCY AND STANDARDS

## NEW CUSTOMER

- **Give us your measurements**  
Take or ask someone to help take your measurements, by following our easy instructions . It takes just 5 minutes!
- **Send us your best fitting shirt\*** (go directly to cart)  
If you prefer not to take measurements, you can mail us your best fitting shirt. Our Master Tailor will take the necessary measurements and will return your shirt along with your order.
- \* : Your shirt will be used for measurements only. We will not copy it.
- **Visit our NYC showroom** (go directly to cart)  
Contact us at [contact@listerouge-paris.com](mailto:contact@listerouge-paris.com) to plan a private appointment at our New York showroom (Madison Ave & 40th St.).



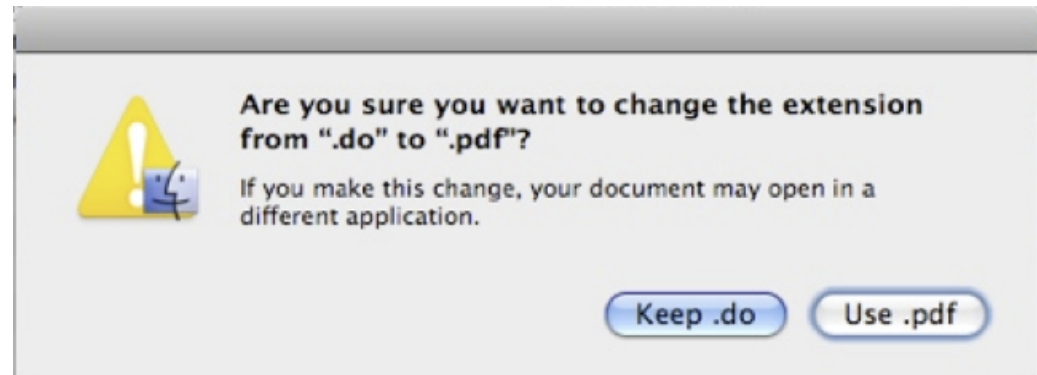
## EXISTING CUSTOMER

- **Your measurements are on file** (go directly to cart)  
If your last order fits perfectly, we will make the new shirts with exactly the same measurements.
- **If your measurements have changed**  
Simply note your measurements changes compared to your previous shirts.

<http://www.useit.com/alertbox/application-mistakes.html>


# H-5: ERROR PREVENTION

Eliminate error-prone conditions or check for them and ask for confirmation



# H-5: ERROR PREVENTION

Aid users with specifying correct input

**Trip information:**  
Find hotels near:  
   
What city?

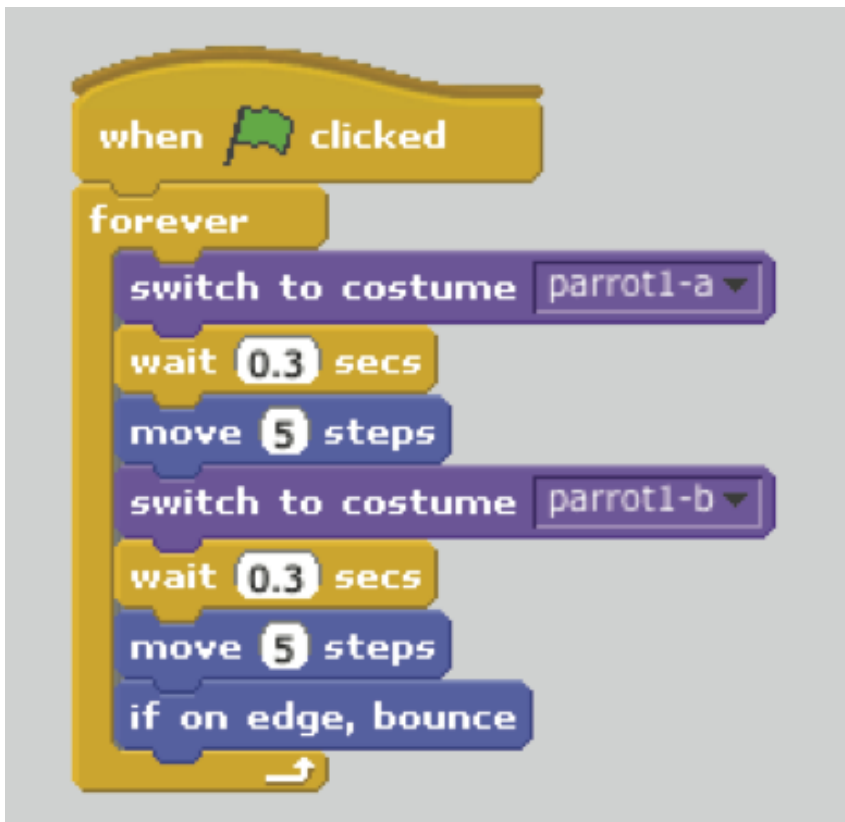
Check-in:  Check-out:

April 2010							May 2010						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
				1	2	3							1
4	5	6	7	8	9	10	2	3	4	5	6	7	8
11	12	13	14	15	16	17	9	10	11	12	13	14	15
18	19	20	21	22	23	24	16	17	18	19	20	21	22
25	26	27	28	29	30		23	24	25	26	27	28	29
							30	31					

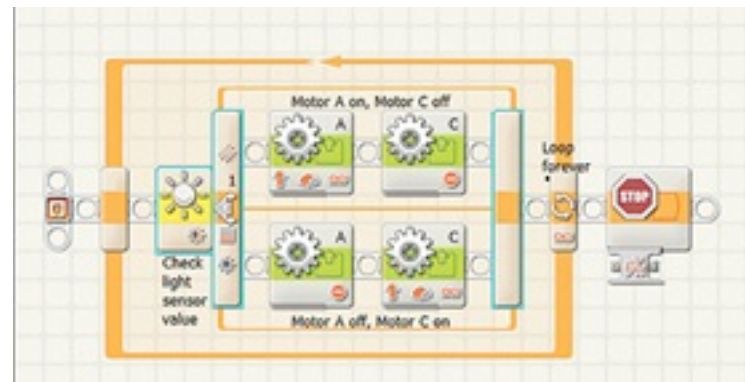
[Close](#)



# H2-5: ERROR PREVENTION



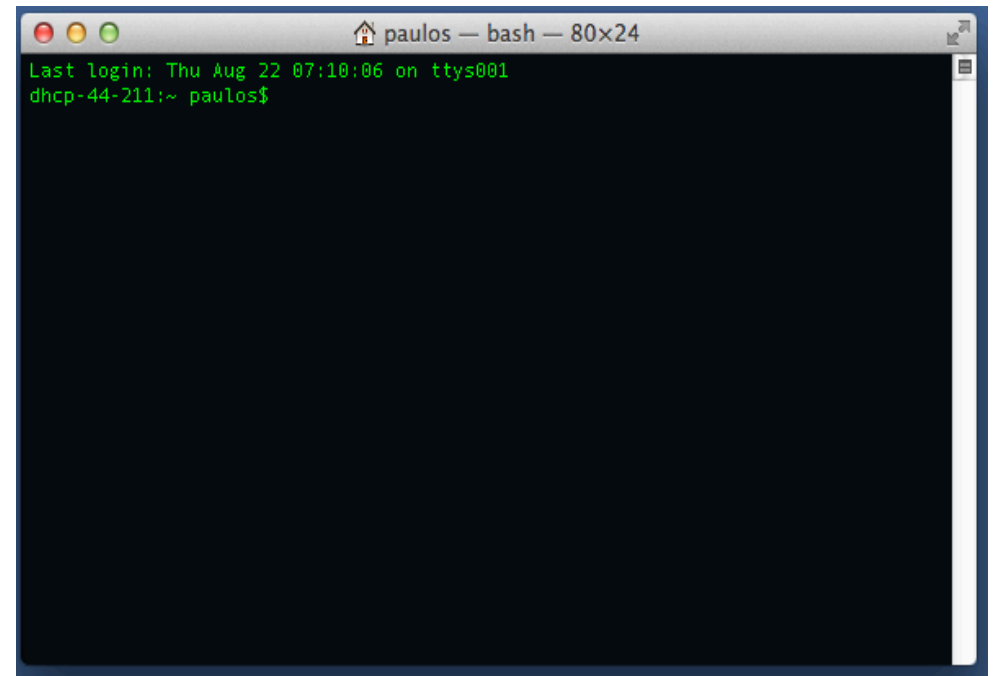
MIT Scratch



Lego Mindstorms

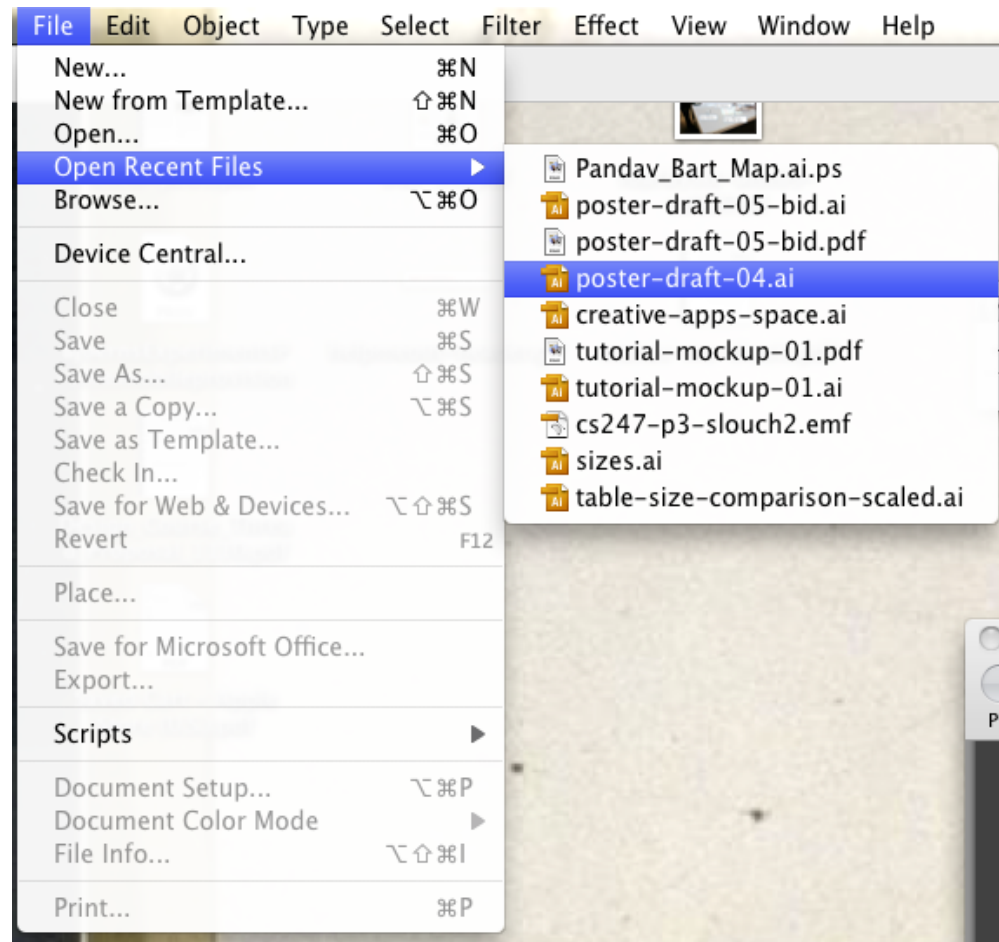
Don't allow  
incorrect input

# H-6: RECOGNITION OVER RECALL

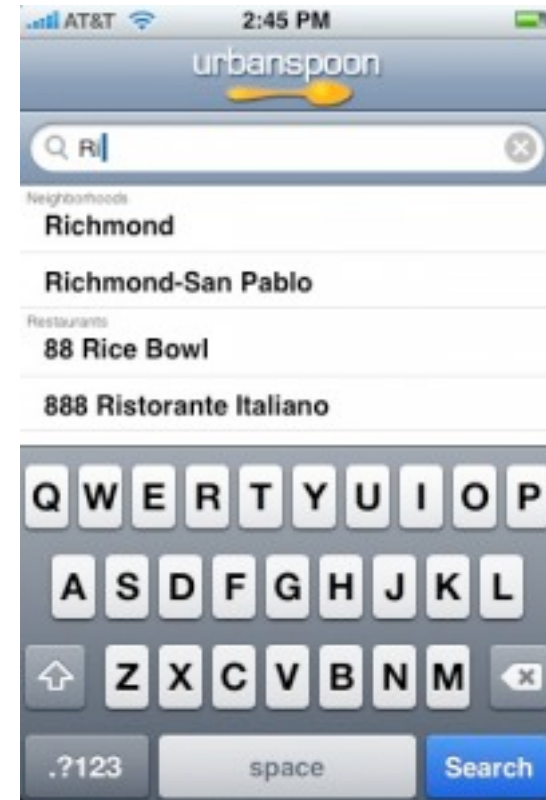
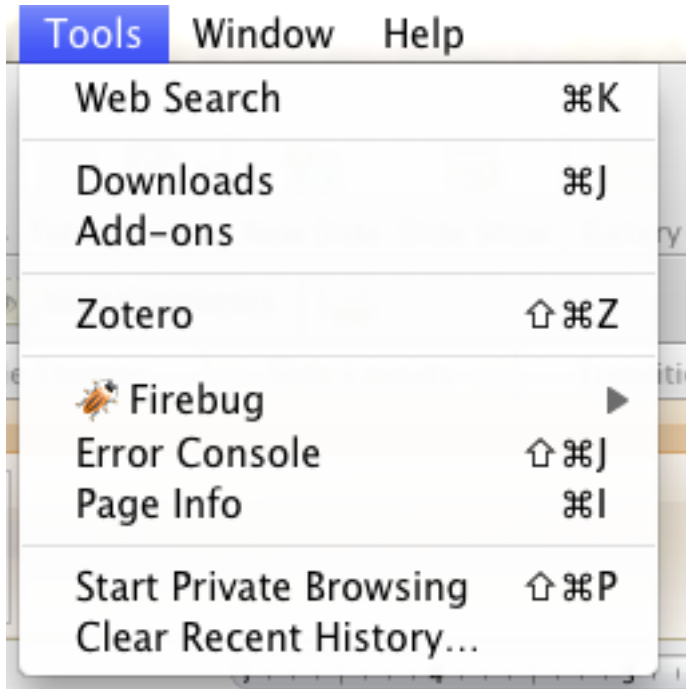


# H-6: RECOGNITION OVER RECALL

Minimize the user's memory load by making objects, actions, and options visible.

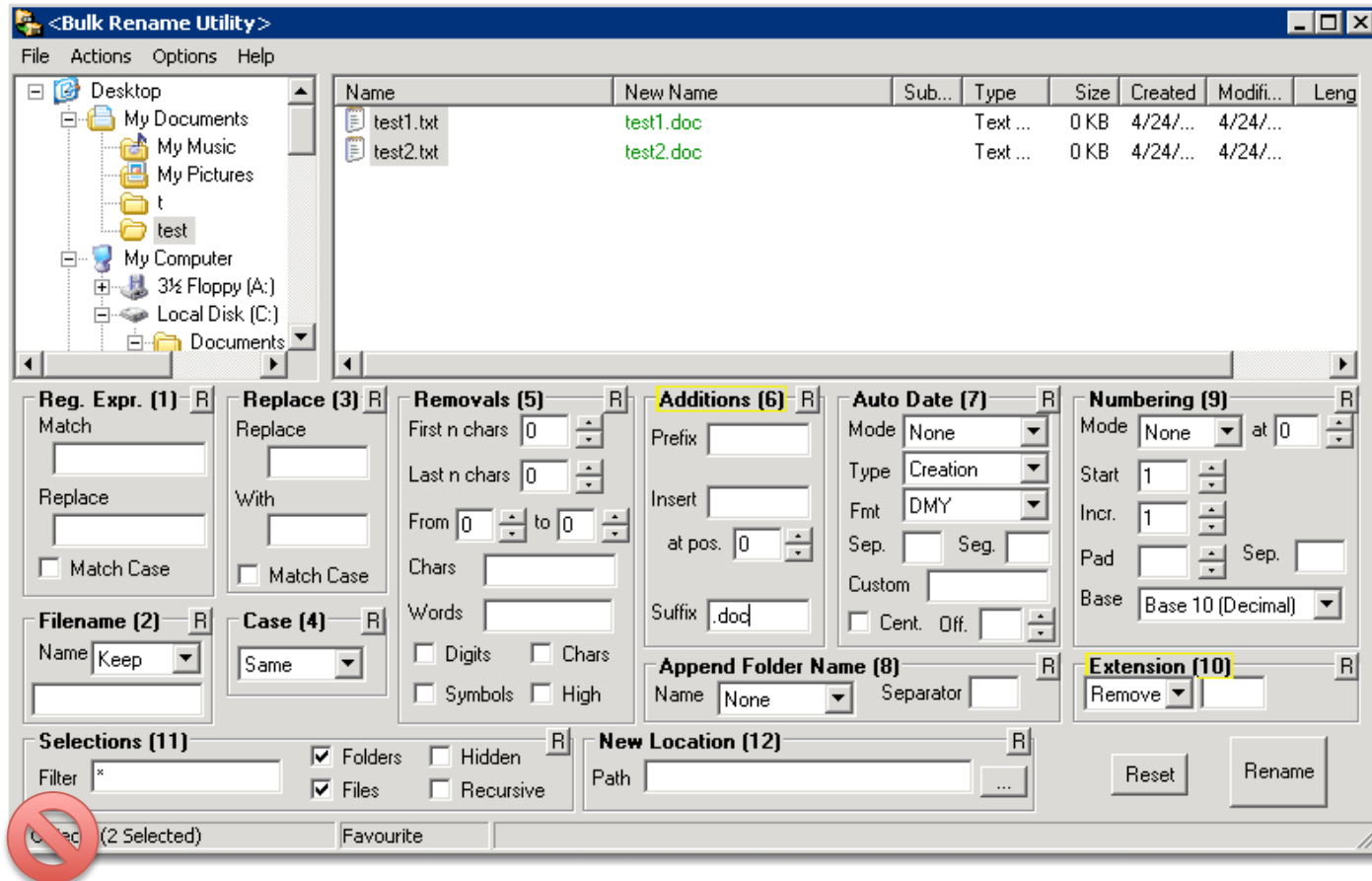


## H2-7: FLEXIBILITY AND EFFICIENCY OF USE



<http://www.iphoneuxreviews.com/?p=114>

# H-8: AESTHETIC AND MINIMALIST DESIGN



[http://4sysops.com/wp-content/uploads/2006/04/Bulk\\_Rename\\_UTILITY.gif](http://4sysops.com/wp-content/uploads/2006/04/Bulk_Rename_UTILITY.gif)

## H-8: AESTHETIC AND MINIMALIST DESIGN

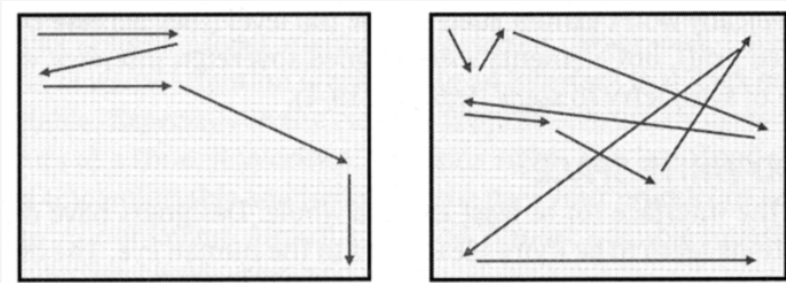
Form Title -- (appears above URL in most browsers and is used by 'www' search engines)		Background Color:
Q&D Software Development Order Desk		FFFBF0
Form Heading -- (appears at top of 'web page in bold type)		Text Color:
Q&D Software Development Order Desk <input checked="" type="checkbox"/> Center		000080
E-Mail responses to (will not appear on page)	Alternate (for mailto forms only)	Background Graphic
dversch@q-d.com		
Text to appear in Submit button	Text to appear in Reset button	<input type="radio"/> Mailto
Send Order	Clear Form	<input checked="" type="radio"/> CGI
Scrolling Status Bar Message (max length = 200 characters)		
****WebMania 1.5b with Image Map Wizard is here!!****		
<input type="button" value="Prev Tab"/>		<input type="button" value="Next Tab &gt;&gt;"/>



No irrelevant information in dialogues

## H-8: AESTHETIC AND MINIMALIST DESIGN

Present information in natural order



From Cooper's "About face 2."

Occam's razor

Remove or hide irrelevant or rarely needed information –  
They compete with important information on screen

Pro: Palm Pilot

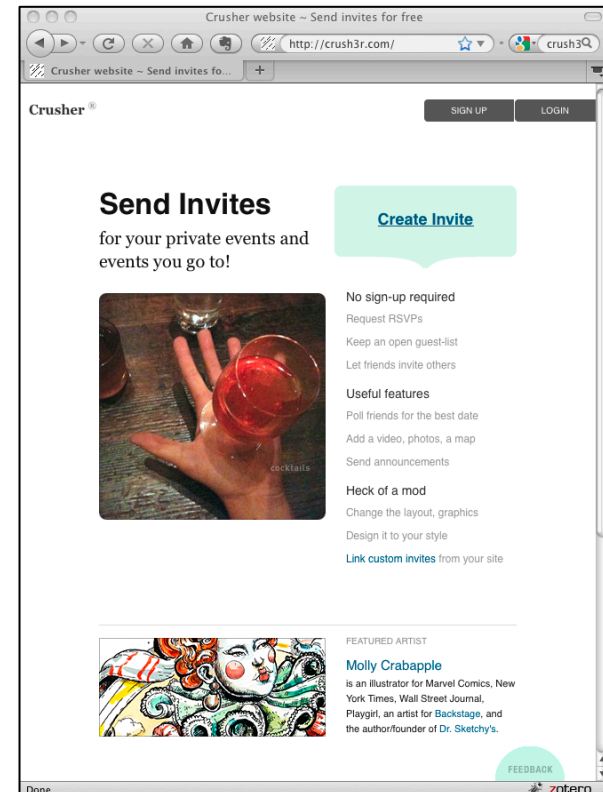
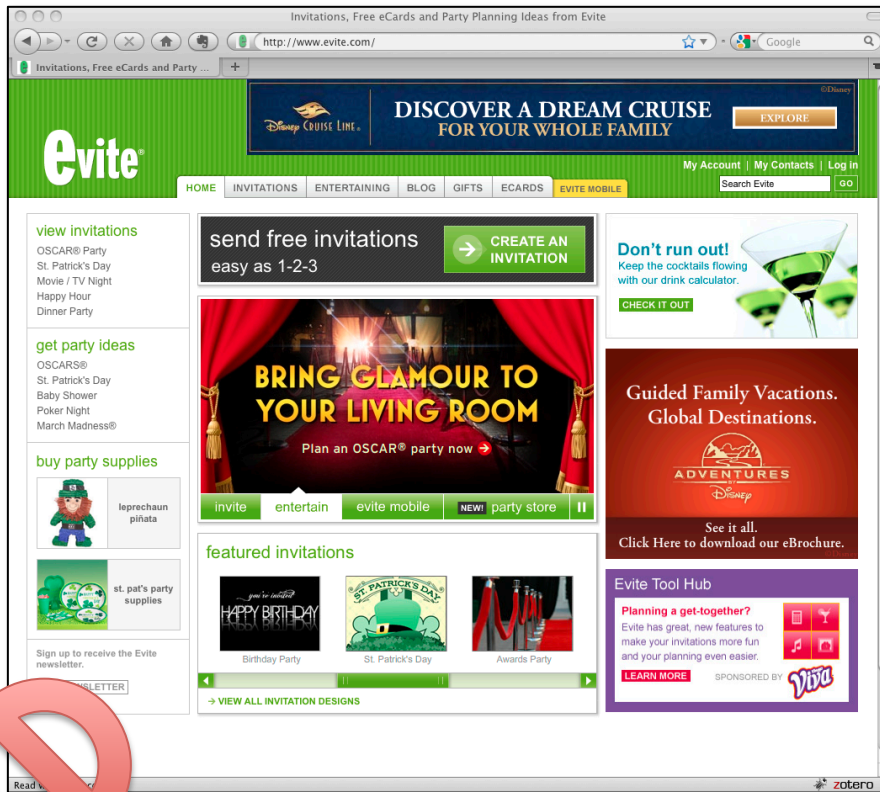
Against: Dynamic menus

Use windows frugally

Avoid complex window management



# H-8: AESTHETIC AND MINIMALIST DESIGN





mysql5.admin.server273.com / localhost / bjoern\_mt\_db / mt\_blog | phpMyAdmin 3.2.2.1

http://mysql5.admin.server273.com/index.php?db=bjoern\_mt\_db&token=d4ce39423c65ecc62d0b9cbfefe01

Database: mt\_db (49)

bjoern\_mt\_db (49)

- b\_book
- member
- mt\_asset
- mt\_asset\_meta
- mt\_association
- mt\_author
- mt\_author\_meta
- mt\_blog
- mt\_blog\_meta
- mt\_category
- mt\_category\_meta
- mt\_comment
- mt\_comment\_meta
- mt\_config
- mt\_entry
- mt\_entry\_meta
- mt\_fileinfo
- mt\_gbarlist
- mt\_log
- mt\_notification
- mt\_objectasset
- mt\_objectcore
- mt\_objecttag
- mt\_permission
- mt\_placement
- mt\_plugindata
- mt\_role
- mt\_session
- mt\_tag
- mt\_tping
- mt\_tping\_meta
- mt\_template
- mt\_templatemap
- mt\_template\_meta
- mt\_touch
- mt\_trackback
- mt\_ts\_error
- mt\_ts\_oxidstatus
- mt\_ts\_funcmap
- mt\_ts\_job
- phpwiki\_link
- phpwiki\_nonempty
- phpwiki\_page
- phpwiki\_rating
- phpwiki\_recent
- phpwiki\_session
- phpwiki\_version
- pref
- user

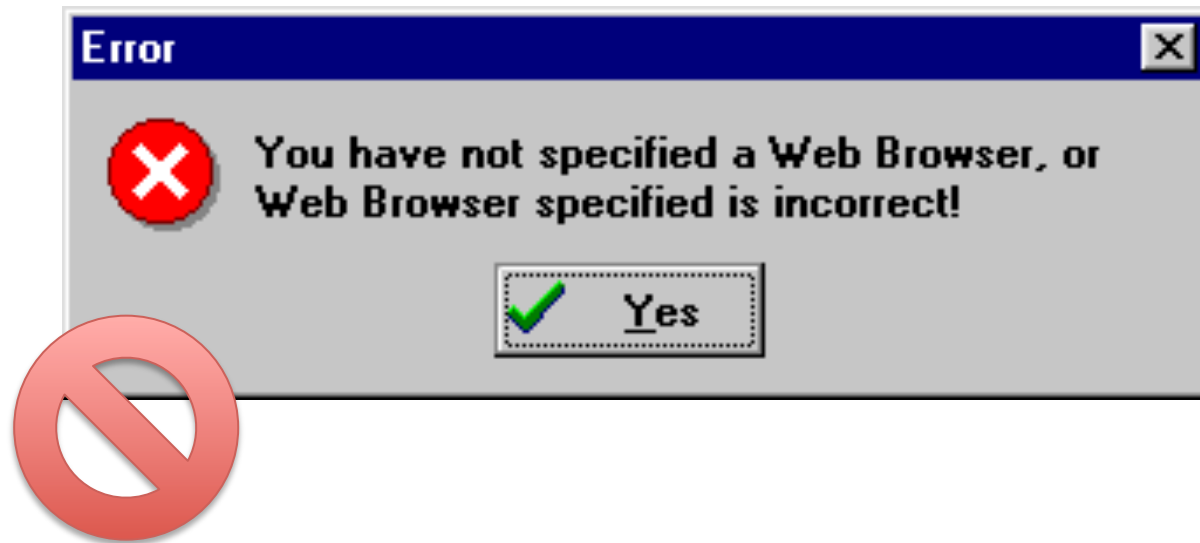
Do a "query by example" (wildcard: "%")

Field	Type	Collation	Operator	Value
blog_id	int(11)		=	
blog_name	varchar(255)	latin1_general_ci	LIKE	
blog_description	text	latin1_general_ci	LIKE	
blog_site_path	varchar(255)	latin1_general_ci	LIKE	
blog_site_url	varchar(255)	latin1_general_ci	LIKE	
blog_archive_path	varchar(255)	latin1_general_ci	LIKE	
blog_archive_url	varchar(255)	latin1_general_ci	LIKE	
blog_archive_type	varchar(255)	latin1_general_ci	LIKE	
blog_archive_type_preferred	varchar(25)	latin1_general_ci	LIKE	
blog_days_on_index	int(11)		=	
blog_language	varchar(5)	latin1_general_ci	LIKE	
blog_file_extension	varchar(10)	latin1_general_ci	LIKE	
blog_email_new_comments	tinyint(4)		=	
blog_email_new_pings	tinyint(4)		=	
blog_allow_comment_html	tinyint(4)		=	
blog_autolink_uris	tinyint(4)		=	
blog_sort_order_posts	varchar(8)	latin1_general_ci	LIKE	
blog_sort_order_comments	varchar(8)	latin1_general_ci	LIKE	
blog_allow_comments_default	tinyint(4)		=	
blog_allow_pings_default	tinyint(4)		=	
blog_server_offset	float		=	
blog_convert_paras	varchar(30)	latin1_general_ci	LIKE	
blog_convert_paras_comments	varchar(30)	latin1_general_ci	LIKE	
blog_status_default	smallint(6)		=	
blog_allow_anon_comments	tinyint(4)		=	
blog_words_in_excerpt	smallint(6)		=	
blog_ping_weblogs	tinyint(4)		=	
blog_ping_blogs	tinyint(4)		=	
blog_ping_others	text	latin1_general_ci	LIKE	
blog_mt_update_key	varchar(30)	latin1_general_ci	LIKE	
blog_autodiscover_links	tinyint(4)		=	
blog_welcome_msg	text	latin1_general_ci	LIKE	
blog_archive_tmpl_monthly	varchar(255)	latin1_general_ci	LIKE	
blog_archive_tmpl_weekly	varchar(255)	latin1_general_ci	LIKE	
blog_archive_tmpl_daily	varchar(255)	latin1_general_ci	LIKE	
blog_archive_tmpl_individual	varchar(255)	latin1_general_ci	LIKE	
blog_archive_tmpl_category	varchar(255)	latin1_general_ci	LIKE	
blog_google_api_key	varchar(32)	latin1_general_ci	LIKE	
blog_sanitize_spec	varchar(255)	latin1_general_ci	LIKE	
blog_cc_license	varchar(255)	latin1_general_ci	LIKE	
blog_is_dynamic	tinyint(4)		=	
blog_require_comment_emails	tinyint(4)		=	
blog_allow_reg_comments	tinyint(4)		=	
blog_junk_score_threshold	float		=	
blog_moderate_pings	tinyint(4)		=	
blog_moderate_unreg_comments	tinyint(4)		=	
blog_created_by	int(11)		=	

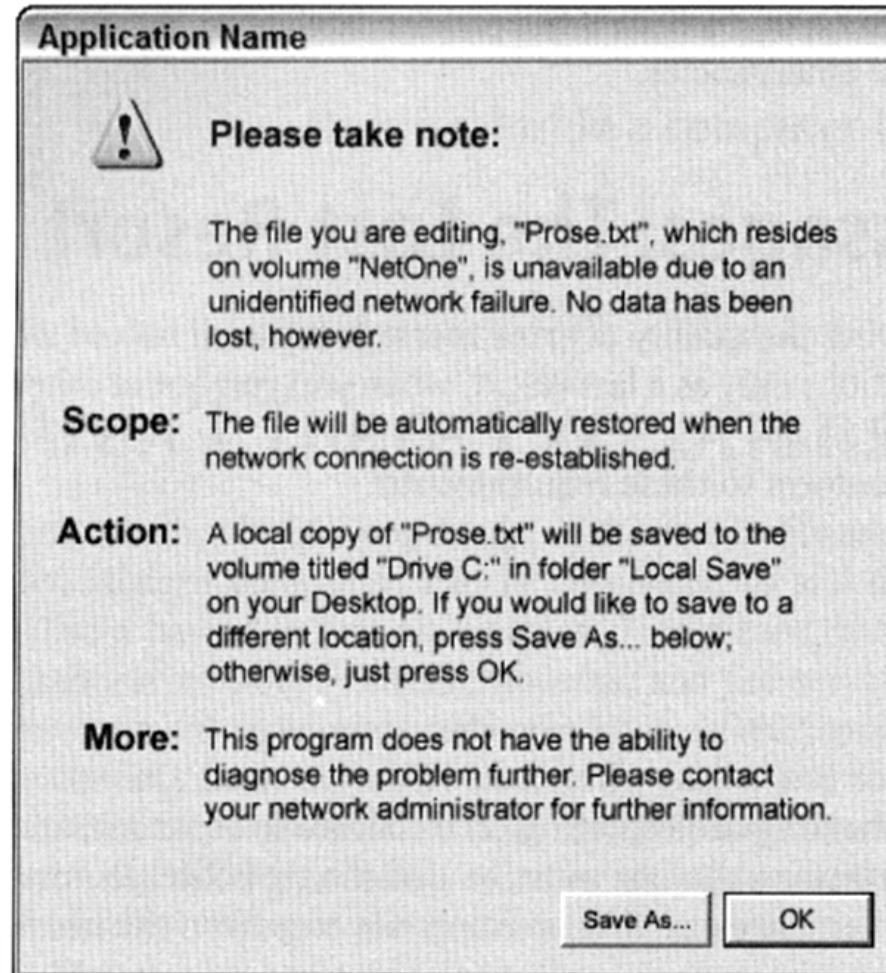
Done



## H-9: HELP USERS RECOGNIZE, DIAGNOSE, AND RECOVER FROM ERRORS

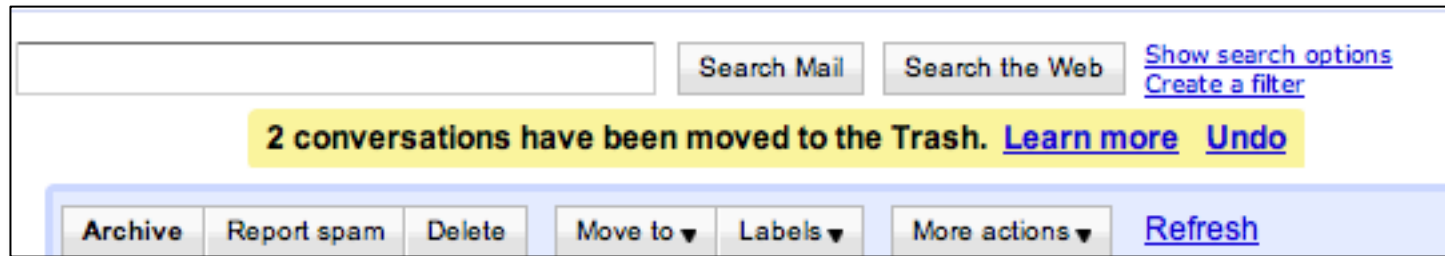


# GOOD ERROR MESSAGES



From Cooper's "About Face 2.0"

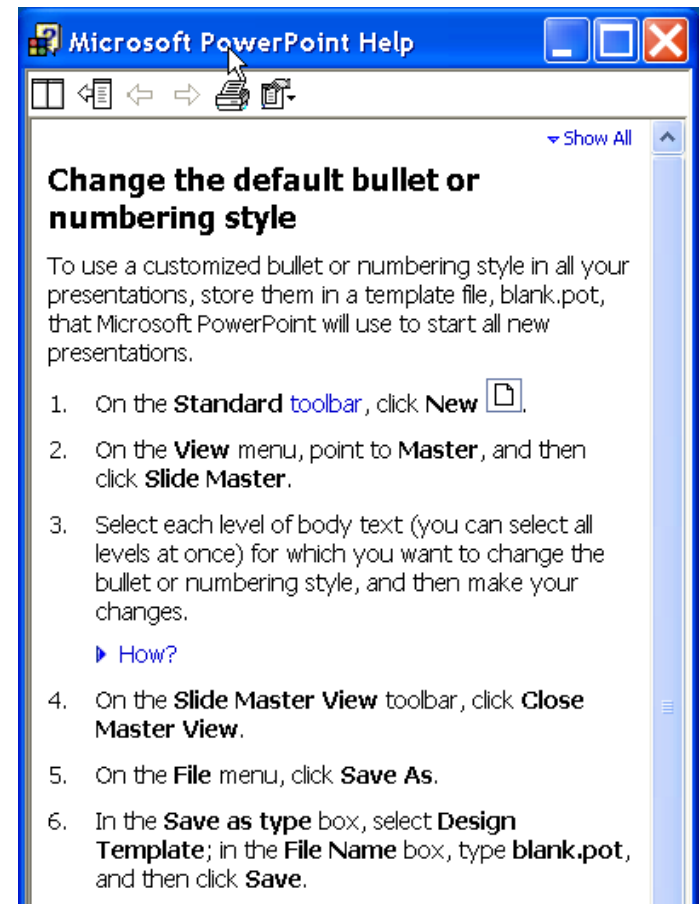
## H2-9: HELP USERS RECOGNIZE, DIAGNOSE, AND RECOVER FROM ERRORS



# H-10: HELP AND DOCUMENTATION

Help should be:

- Easy to search
- Focused on the user's task
- List concrete steps to carry out
- Not too long



# TYPES OF HELP

## Tutorial and/or getting started manuals

Presents the system conceptual model

Basis for successful explorations

Provides on-line tours and demos

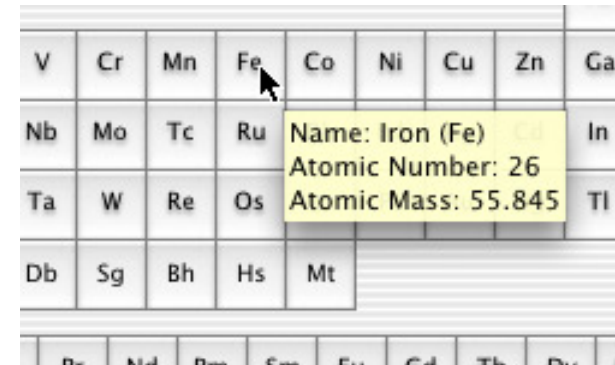
Demonstrates basic features

## Reference manuals

Designed with experts in mind

## Reminders

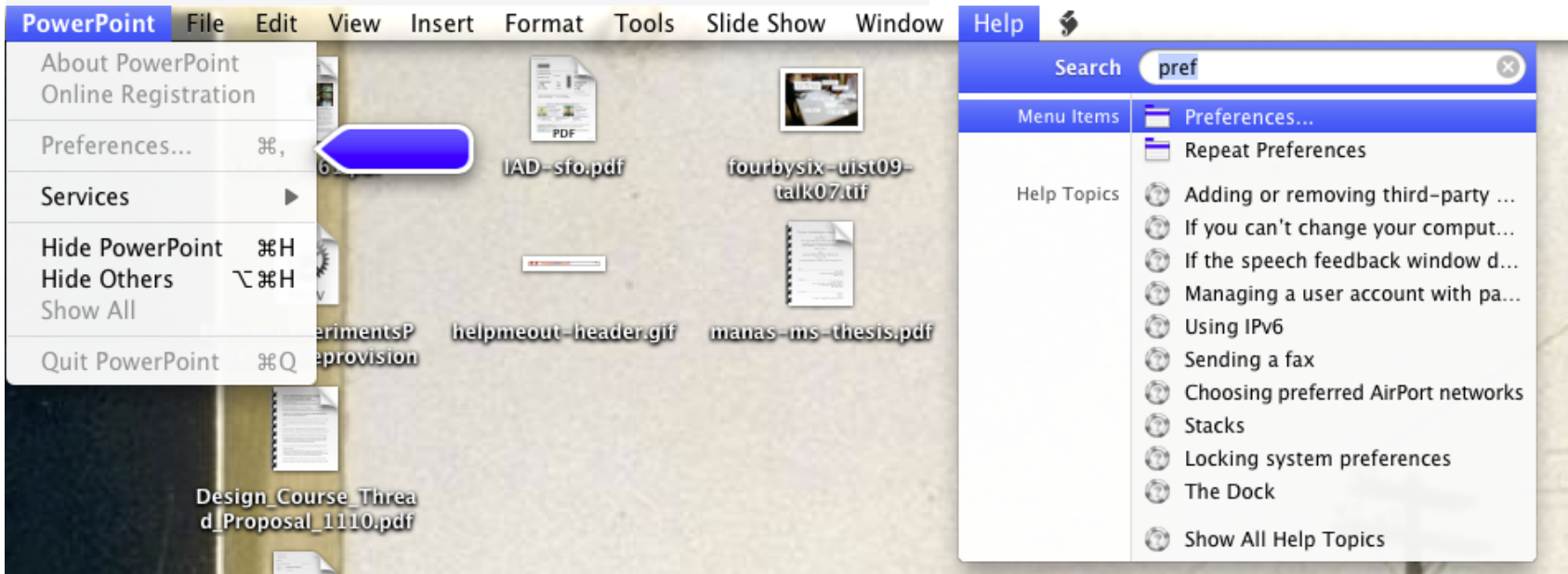
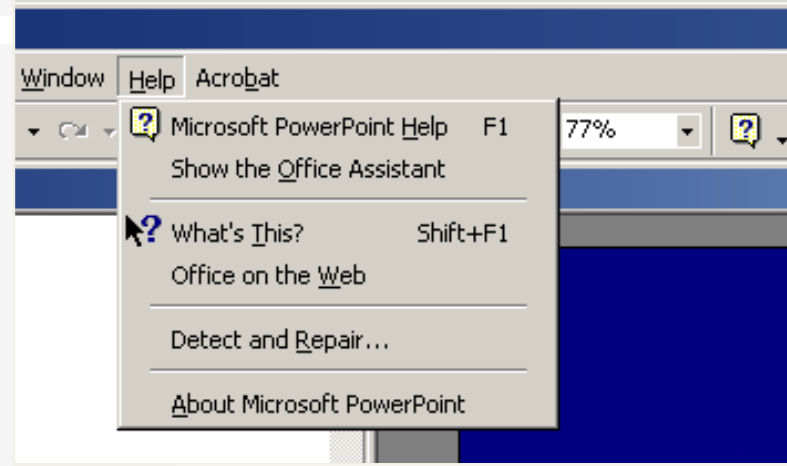
Short reference cards, keyboard templates, tooltips...



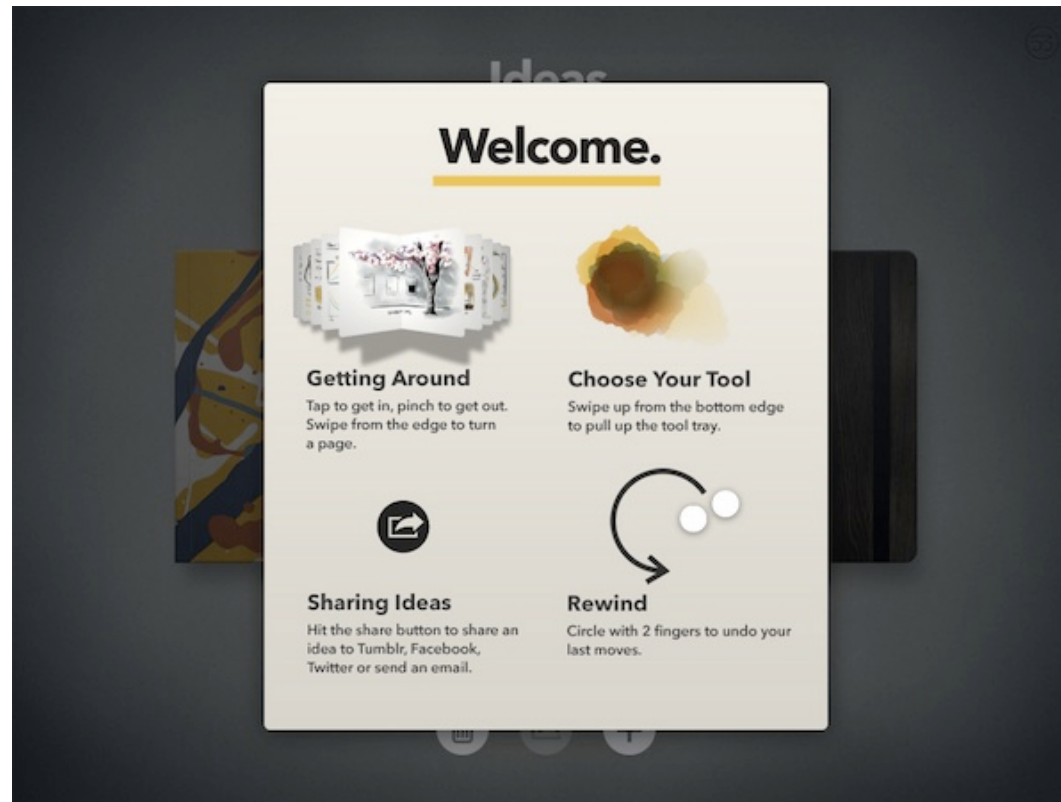
V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga
Nb	Mo	Tc	Ru	Name: Iron (Fe) Atomic Number: 26 Atomic Mass: 55.845				In
Ta	W	Re	Os					Tl
Db	Sg	Bh	Hs	Mt				

# TYPES OF HELP

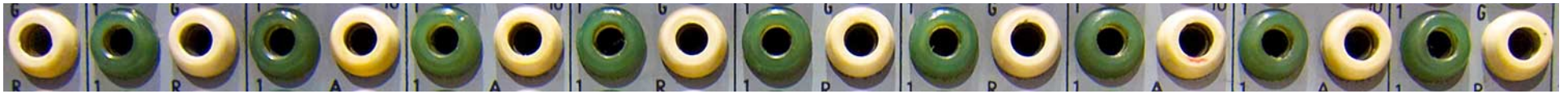
Context sensitive help  
Search



# NEW USER GUIDES







# THE PROCESS OF HEURISTIC EVALUATION

# PHASES OF HEURISTIC EVAL. (1-2)

## 1) Pre-evaluation training

Provide the evaluator with domain knowledge if needed

## 2) Evaluation

Individuals evaluate interface then aggregate results

Compare interface elements with heuristics

Work in 2 passes

First pass: get a feel for flow and scope

Second pass: focus on specific elements

Each evaluator produces list of problems

Explain why with reference to heuristic or other information

Be specific and list each problem separately

# PHASES OF HEURISTIC EVAL. (3-4)

## 3) Severity rating

Establishes a ranking between problems

Cosmetic, minor, major and catastrophic

First rate individually, then as a group

## 4) Debriefing

Discuss outcome with design team

Suggest potential solutions

Assess how hard things are to fix

# EXAMPLES

Typography uses mix of upper/lower case formats and fonts

Violates "Consistency and standards" (H-4)

Slows users down

Fix: pick a single format for entire interface

Probably wouldn't be found by user testing

# LEVELS OF SEVERITY

0 - don't agree that this is a usability problem

1 - cosmetic problem

2 - minor usability problem

3 - major usability problem; important to fix

4 - usability catastrophe; imperative to fix

# SEVERITY RATINGS EXAMPLE

## 1. [H-4 Consistency] [Severity 3]

The interface used the string "Save" on the first screen for saving the user's file, but used the string "Write file" on the second screen. Users may be confused by this different terminology for the same function.

# DEBRIEFING

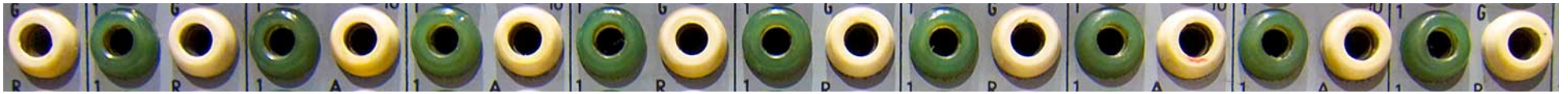
Conduct with evaluators, observers, and development team members

Discuss general characteristics of UI

Suggest improvements to address major usability problems

Development team rates how hard things are to fix

Make it a brainstorming session



# PROS AND CONS OF HEURISTIC EVALUATION



# HE VS. USER TESTING

## HE is much faster

1-2 hours each evaluator vs. days-weeks

## HE doesn't require interpreting user's actions

## User testing is far more accurate

Takes into account actual users and tasks

HE may miss problems & find "false positives"

## Good to alternate between HE & user-based testing

Find different problems

Don't waste participants

# NUMBER OF EVALUATORS

Single evaluator achieves poor results

Only finds 35% of usability problems

5 evaluators find ~ 75% of usability problems

Why not more evaluators???? 10? 20?

Adding evaluators costs more

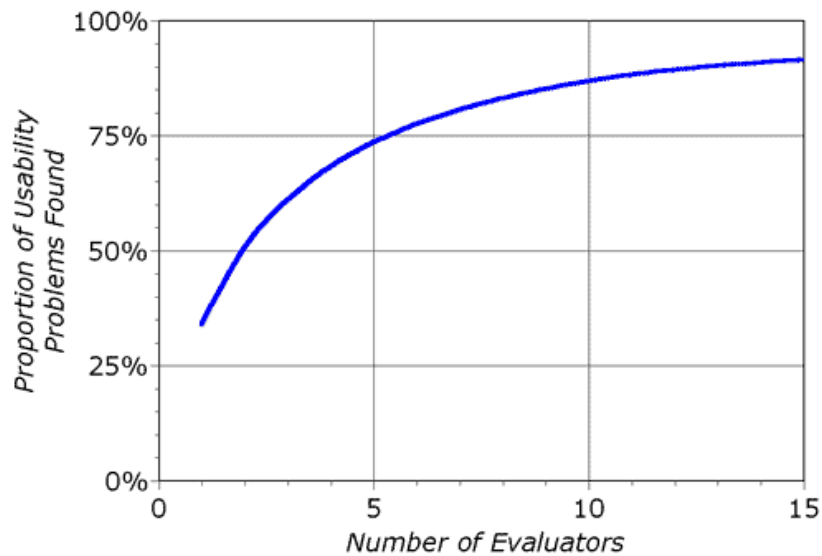
Many evaluators won't find many more problems

But always depends on market for product:

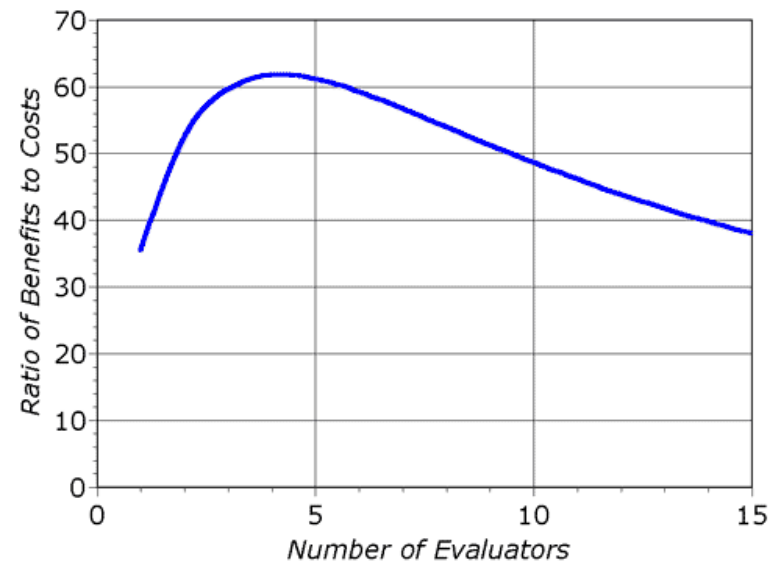
popular products → high support cost for small bugs

# DECREASING RETURNS

## Problems Found



## Benefits / Cost



Caveat: graphs are for one specific example!

# SUMMARY

Heuristic evaluation is a discount method

Have evaluators go through the UI twice

Ask them to see if it complies with heuristics

Note where it doesn't and say why

Have evaluators independently rate severity

Combine the findings from 3 to 5 evaluators

Discuss problems with design team

Cheaper alternative to user testing

Finds different problems, so good to alternate