Introduction to User Interface Design

CSCE A401

Material adapted from Saul Greenberg, Univ. of Calgary

User Interfaces

- "Today, user needs are recognized to be important in designing interactive computer systems, but as recently as 1980, they received little emphasis." J. Grudin
- "We can't worry about these user interface issues now. We haven't even gotten this thing to work yet!" Mulligan

Why is usability important?

- poor usability results in
  - anger and frustration
  - decreased productivity in the workplace
  - higher error rates
  - physical and emotional injury
  - equipment damage
  - loss of customer loyalty
  - costs money

What is usability?

Usability is a measure of the **effectiveness**, **efficiency** and **satisfaction** with which specified users can achieve specified goals in a particular environment.

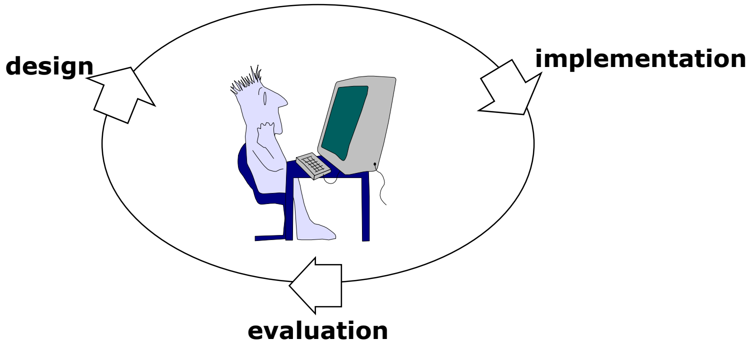
- ISO 9241

UI

- The User Interface today is often one of the most critical factors regarding the success or failure of a computer system
- Good UI design:
  - Increases efficiency
  - Improves productivity
  - Reduces errors
  - Reduces training
  - Improves acceptance
- Approach: The UI is the system
  - Design with the UI in mind
- Things to consider
  - Technical issues in creating the UI
  - User’s mental model
  - Conceptual model

Human Computer Interaction

- A discipline concerned with interactive computing systems for human use

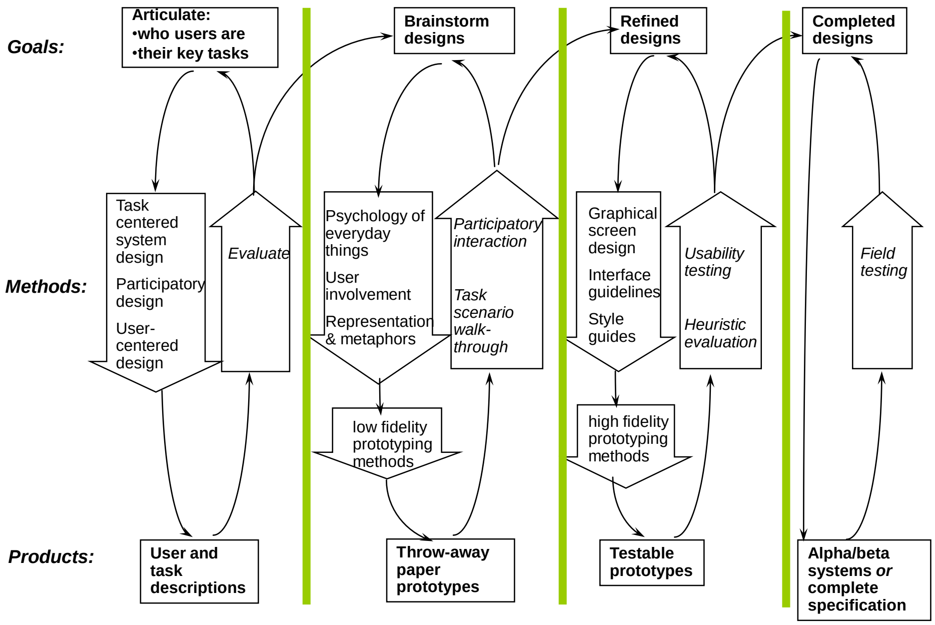


design

implementation

evaluation

An interface design process



Goals:

Articulate:
•who users are
•their key tasks

Brainstorm designs

Refined designs

Completed designs

Methods:

Task centered system design

Participatory design

User-centered design

Evaluate

Psychology of everyday things

User involvement

Representation & metaphors

Participatory interaction

Task scenario walk-through

Graphical screen design

Interface guidelines

Style guides

Usability testing

Heuristic evaluation

Field testing

low fidelity prototyping methods

high fidelity prototyping methods

Products:

User and task descriptions

Throw-away paper prototypes

Testable prototypes

Alpha/beta systems *or* complete specification

User and Task Descriptions

- First Goal: Articulate who the users are and what their tasks are
- We've discussed this to some degree – it is the same problem of collecting **requirements**
- Methods
  - Task Centered Design
  - Participatory Design
  - User-Centered Design

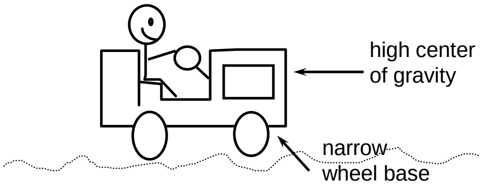
Design

- Poor UI design can make an otherwise well-written system unusable
  - Pathological designs
  - Many human errors result from design errors
  - Designers help through a good conceptual model

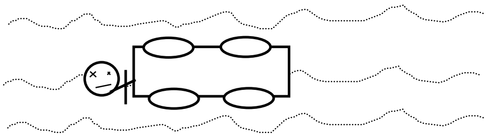
Early tractors

- Original design

  Terrain
  - un-surfaced
  - rough
  - hilly



Result



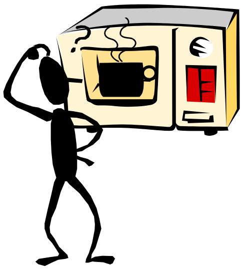
Used to be called **driver's error** *but*
accidents now infrequent as designs now have
low center of gravity, wider wheel bases

Lessons Learned

- Lesson 1
  - Most failures of human-machine system are due to poor designs that don’t recognize peoples’ capabilities and fallibilities
  - This leads to apparent machine misuse and “human error”
- Lesson 2
  - Good design always accounts for human capabilities.

Psychopathology of everyday things

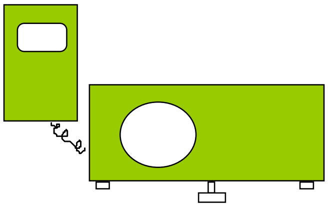
- Typical frustrations
  - The engineer who founded DEC confessed at the annual meeting that he can’t figure out how to heat a cup of coffee in the company’s microwave oven
  - How many of you can program or use all aspects of your
    - digital watch?
    - DVR/DVD Player?
    - answering machine?
    - stereo system?
    - cell phones?



•Slide idea from Donald Norman

Other pathological examples:

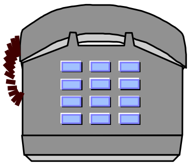
- Remote control from Leitz slide projector
  - How do you forward/reverse?



- Instruction manual:
  - *short press*: slide change forward
  - *long press:* slide change backward

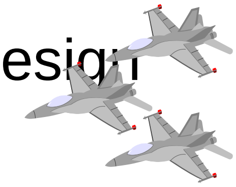
•Slide idea from Donald Norman

Still more pathological examples



- Modern telephone systems
  - standard number pad
  - two additional buttons * and #
- Problem
  - many hidden functions
  - operations and outcome completely invisible
    - *72+number = call forward
      - can I remember that combination?
      - if I enter it, how do I know it caught?
      - how can I remember if my phone is still forwarded?
    - Ok, I'll read the manual
      - but what does *call park* mean? what's a link?
      - where is that manual anyway?

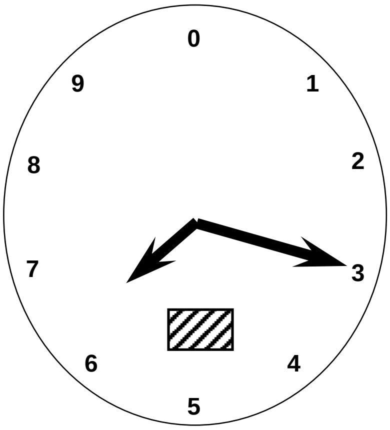
Getting serious about design



- World War II
  - complex machines (airplanes, submarines...)
    - taxed people’s sensorimotor abilities to control them
    - frequent (often fatal) errors occurred even after high training
  - example airplane errors:
    - if booster pump fails, turn on fuel valve within 3 seconds
      - test shows it took ~five seconds to actually do
    - Spitfire: narrow wheel base
      - easy to do violent ground loops which breaks undercarriage
    - Altimeter gauges difficult to read
      - caused crashes when pilots believe they are at a certain altitude
- Result
  - human factors became critically important

•Slide ideas from David

What’s the altitude?

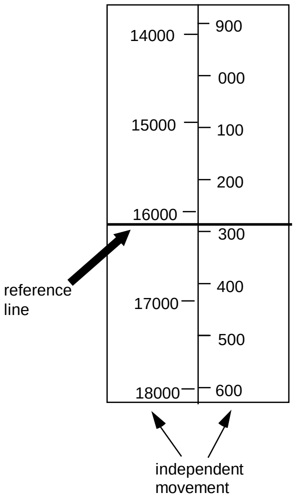


- Early days (< 1000’):
  - only one needle needed
- As ceilings increased over 1000’
  - small needle added
- As they increased beyond 10,000’
  - box indicated 10,000’ increment through color change

□ < 10,000’

▨ > 10,000’

Tape altimeter



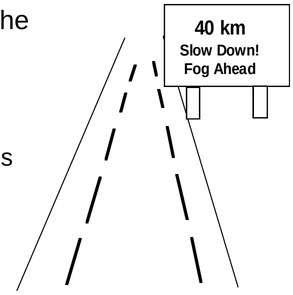
- Human factors test showed:
  - – eliminated reading errors
  - – was faster to read

- But not in standard use! Why?

The Psychopathology of computers

- Britain 1976
  - – Motorway communication system operated 40% of it's highways
  - – police controlled it in real time to
    - change lane signs, direction signs, speed limits, etc

  - – On December 10th, police failed to change the speed limit signs when fog descended
    - 34 vehicles crashed
    - 3 people killed
    - 11 people injured and trapped in their vehicles
    - motorway closed for 6.5 hours



•Slide ideas from David

Some quotes

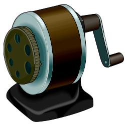
- Police (at inquest)
  - “The system did not accept the instruction”
- Dept of Transport (after examining computer logs)
  - “There is no evidence of technical failure”
- System designers
  - after emphasizing that they have no responsibility for the system
    - “We supplied it over 5 years ago and have never been called to look at that problem”
- The Coroner’s court
  - judged it as "operator error"
    - the police operator:
      “failed to follow written instructions for entering the relevant data”
- *Where have we heard this before?*

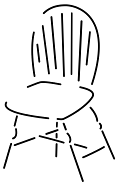
Example problems

- cryptic input codes
  - XR300/1: change (X) sign 300 on highway M5 (R) to code 1
  - i.e. change particular sign to indicate fog condition
- no feedback
  - operator entered command, no visible effect of system response
- cryptic error messages
  - “Error code 7”
- teletype machine was old, text illegible
  - people could not see what they typed or system’s reply
- operator overloaded with other chores
  - also handled radio and telephone traffic

Visual Affordance

- the perceived and actual fundamental properties of the object that determine how it could be used
  - Appearance indicates how the object should be used
    - chair for sitting
    - knobs for turning
    - slots for inserting things into
    - buttons for pushing
  - Just by looking the user should know
    - State of the system
    - Possible actions
    - Don’t violate these principles to make something “look cool”!
  - Complex things may need explaining but simple things should not
    - when simple things need labels & instructions, then design has failed

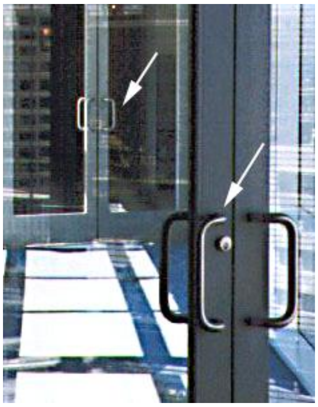




Many ideas in this deck are adapted from Don Norman’s book: The Design of Everyday things

Poor Visual Affordance

- Trapped between doors!
- Handles **afford** pulling
- Using a flat plate would **constrain** the user to push

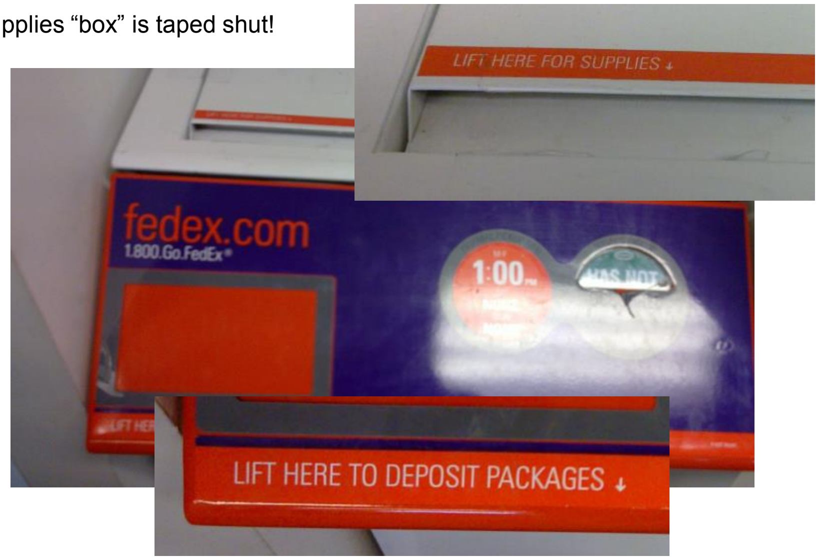


How fast are we going?

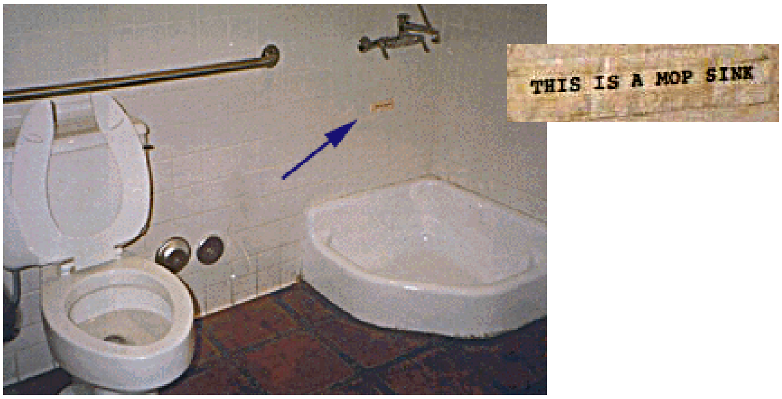
The well-trodden path

Fedex Dropbox

Supplies “box” is taped shut!

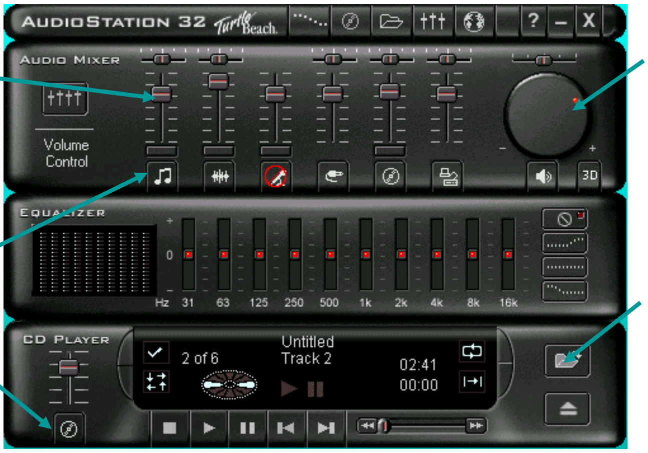


The unusual urinal



Visual affordance

- needs familiar idiom and metaphor to work



sliders for sliding

dials for turning

are these buttons?

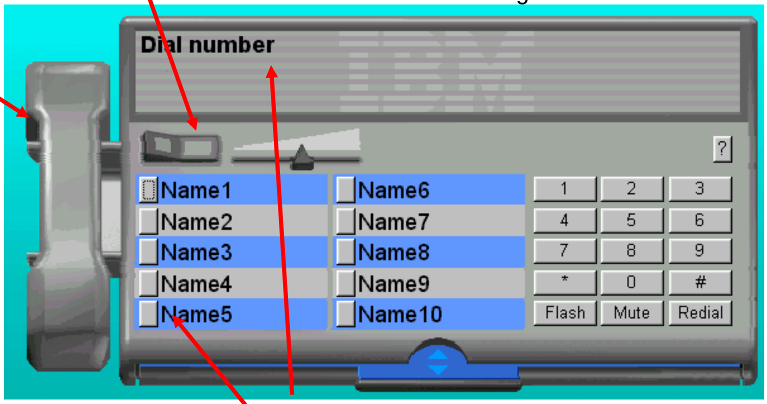
what does this button do?

Visual affordance problems

Is this a graphic or a control?

A button is for pressing, but what does it do?

Visual affordances for window controls are missing!

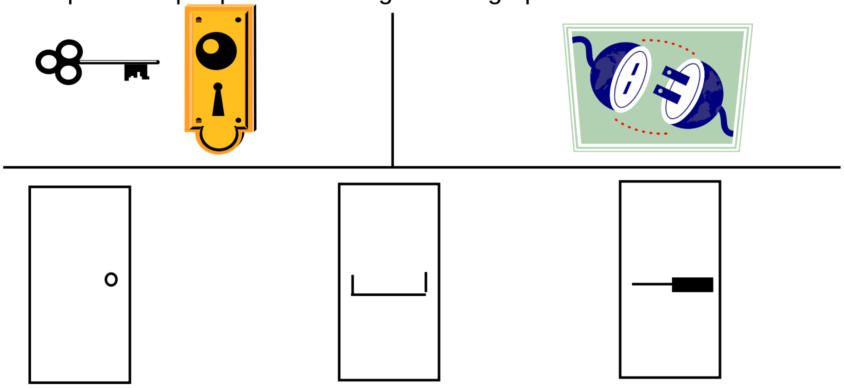


text is for editing, but it doesn't do it.

IBM Real Phone

Visible constraints

- limitations of the actions possible perceived from object's appearance
  - provides people with a range of usage possibilities

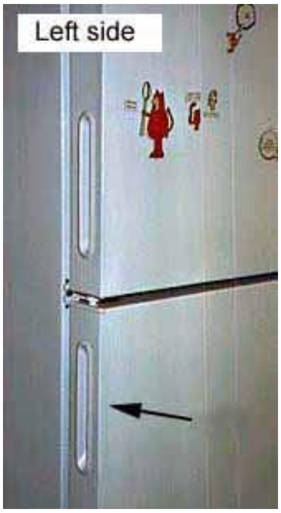


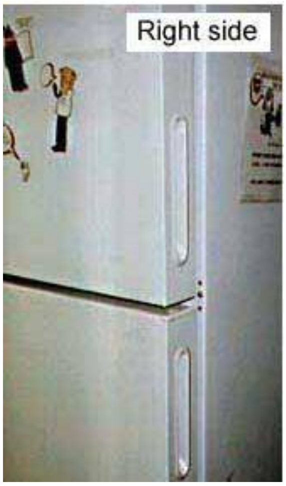
Push or pull?

Which side?

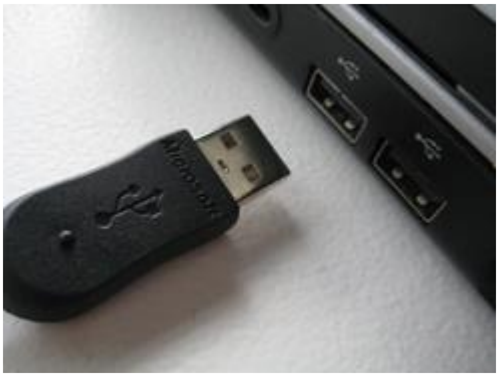
Can only push,
side to push clearly visible

On which side does the door open?



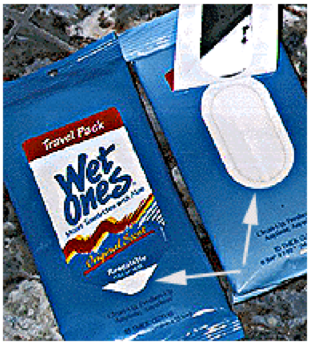


Which Way?



How do you open this package?

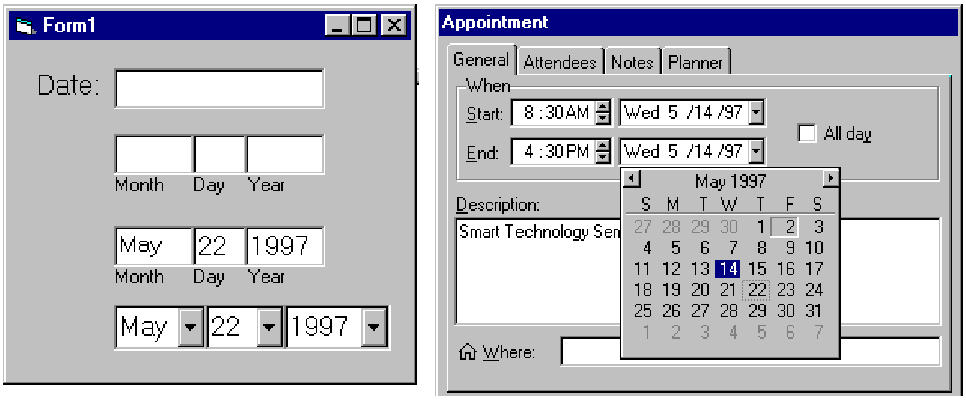
- If you are like me, by ripping it open



But that will dry out the wet pack – the proper way is to use the flap

Remove tearable perforations at top, add hand or more attention to location of flap

Visible constraints: Entering a Date



Form1

Date:

Month Day Year

May 22 1997
Month Day Year

May ▾ 22 ▾ 1997 ▾

Appointment

General | Attendees | Notes | Planner

When

Start: 8 :30AM Wed 5 /14 /97

End: 4 :30PM Wed 5 /14 /97

□ All day

Description:

Smart Technology Sen

Where:

May 1997

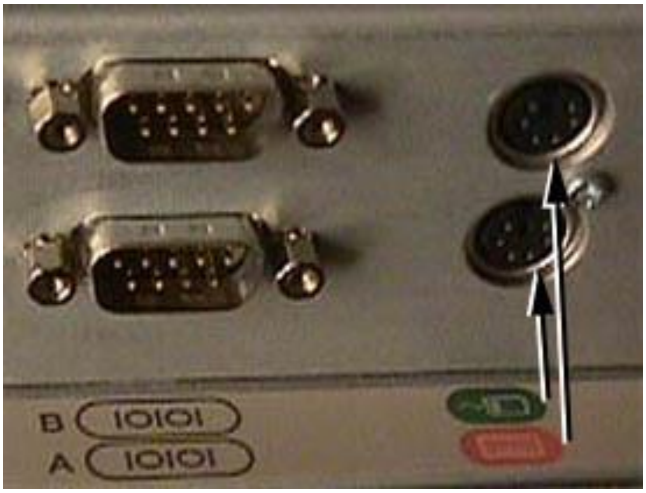
S	M	T	W	T	F	S
27	28	29	30	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7

Controls constructed in Visual Basic

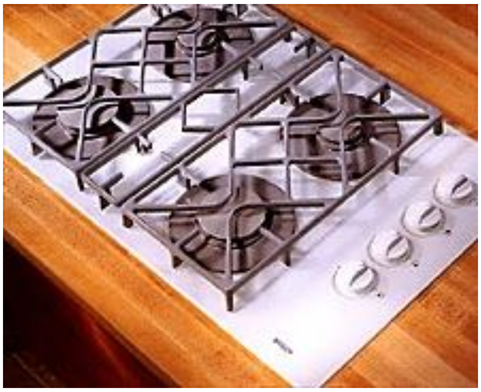
Mapping

- Controls and displays should exploit natural mapping
- Natural mapping takes advantage of physical analogies and cultural standards
  - Physical: Steering wheel
  - Cultural: red means stop, green means go

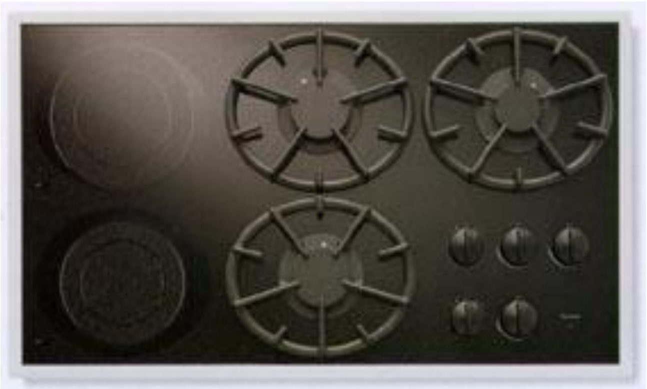
Mouse or Keyboard?



What Knob Goes Where?

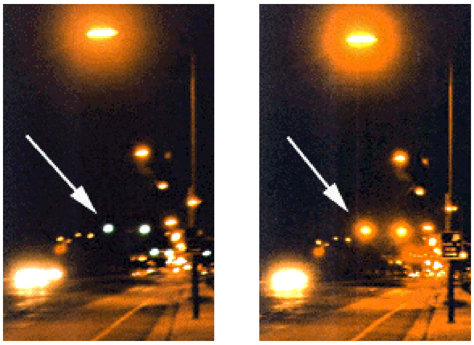


Exploiting Natural Mapping

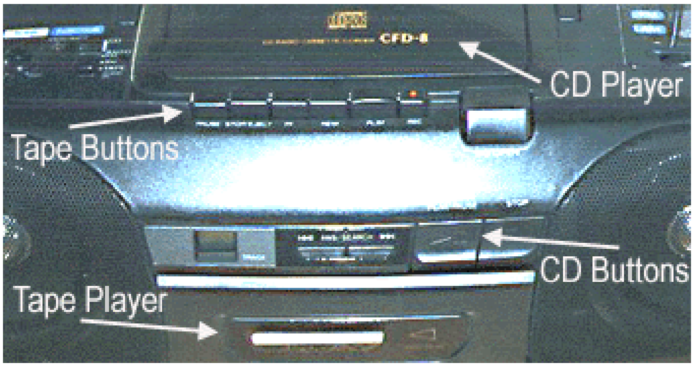


Yellow Street Lights

- Possible to confuse with stoplight

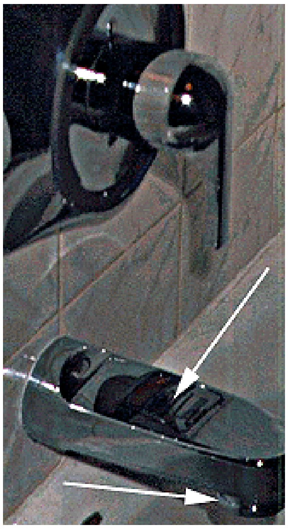


How do you play the CD?



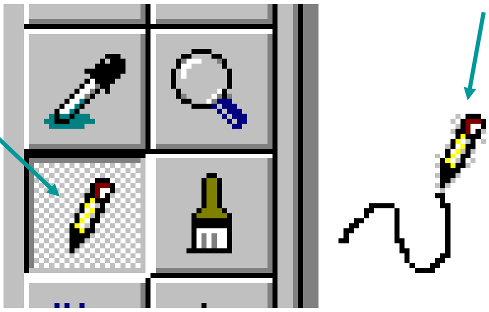
How do you turn on the shower?

- Must reach down where the water comes out and pull down!



Instructions!

Mapping of Selected Mode to Icon



Only active palette items visible

Depressed button indicates current mapped item

Cursor re-enforces selection of current item

Microsoft Paint

Causality

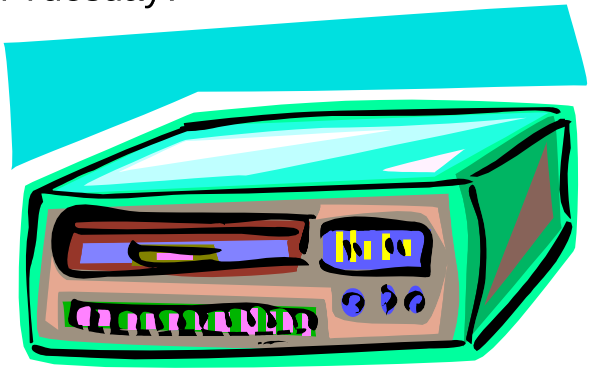
- the thing that happens right after an action is assumed by people to be caused by that action
  - interpretation of “feedback”
  - false causality
    - incorrect effect
      - invoking unfamiliar function just as computer hangs
      - causes “superstitious” behaviors
    - invisible effect
      - command with no apparent result often re-entered repeatedly
      - e.g., mouse click to raise menu on unresponsive system

Feedback Examples

- Telephone button press tones
  - Telephone clicks
- Buzz typing virtual keys on a slate/tablet
- Clicker on your turn signal
- Animated icon while waiting for a web page to load

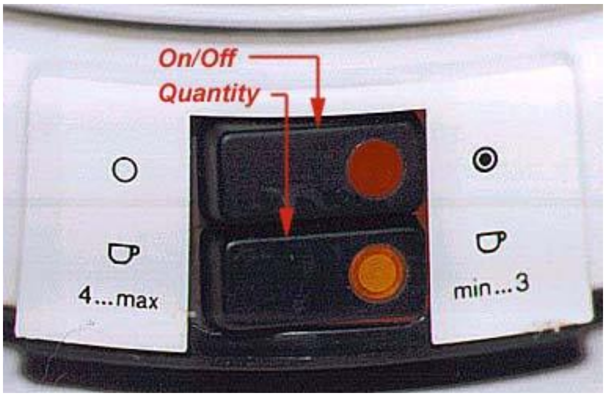
VCR Feedback

- Did I really set it correctly to record at 8PM on Tuesday?



More or Less Coffee?

- Does the light on the bottom indicate 4-max cups, or min-3 cups?

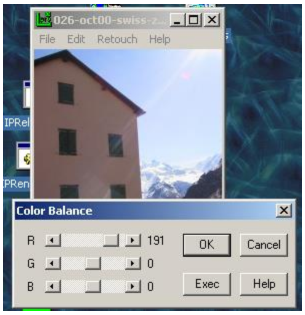


On=min to 3

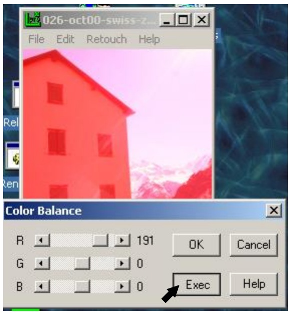
Poor Feedback in LViewPro

Effects visible only after Exec button is pressed

- Ok does nothing!
- awkward to find appropriate color level



R 191
G 0
B 0

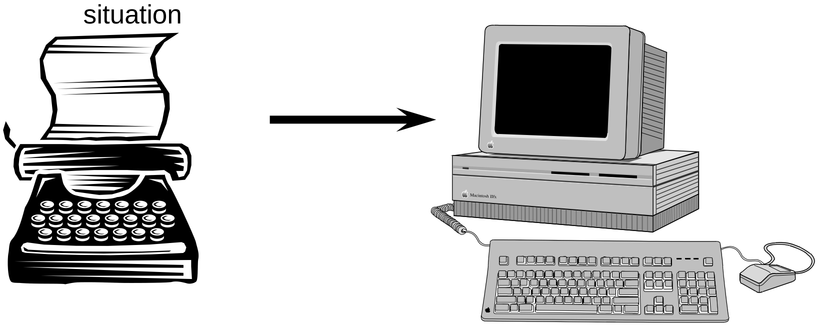


R 191
G 0
B 0

LViewPro

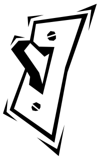
Transfer effects

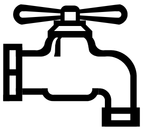
- people transfer their learning/expectations of similar objects to the current objects
  - positive transfer: previous learning's also apply to new situation
  - negative transfer: previous learning's conflict with the new situation



Population stereotypes and idioms

- Populations learn idioms that work in a certain way
  - red means danger
  - green means safe
  - Idioms vary in different cultures
    - Light switches
      - America: down is off
      - Britain: down is on
    - Faucets
      - America: anti-clockwise on
      - Britain: anti-clockwise off

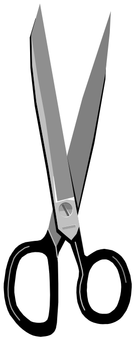




Conceptual model

- People have “mental models” of how things work, built from
  - affordances
  - causality
  - constraints
  - mapping
  - positive transfer
  - population stereotypes/cultural standards
  - instructions
  - interactions
- models allow people to mentally simulate operation of device
- models may be wrong
  - particularly if above attributes are misleading

Good example: Scissors



- affordances:
  - holes for something to be inserted
- constraints:
  - big hole for several fingers, small hole for thumb
- mapping:
  - between holes and fingers suggested and constrained by appearance
- positive transfer and cultural idioms
  - learnt when young
  - constant mechanism
- conceptual model:
  - implications clear of how the operating parts work

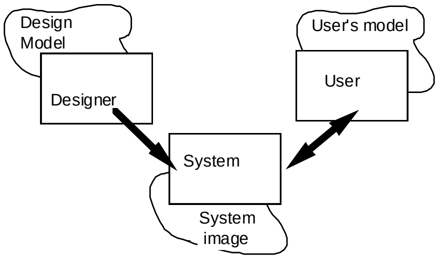
Bad example: Digital watch

- affordances:
  - four push buttons to push, but not clear what they will do
- constraints and mapping unknown
  - no visible relation between buttons, possible actions and end result
- transfer of training
  - little relation to analog watches
- cultural idiom
  - somewhat standardized core controls and functions
  - but still highly variable
- conceptual model:
  - must be learnt

Designing a good conceptual model

- communicate model through visual image
  - visible affordances, mappings, and constraints
  - visible causality of interactions
  - cultural idioms, transfer
  - instructions augments visuals

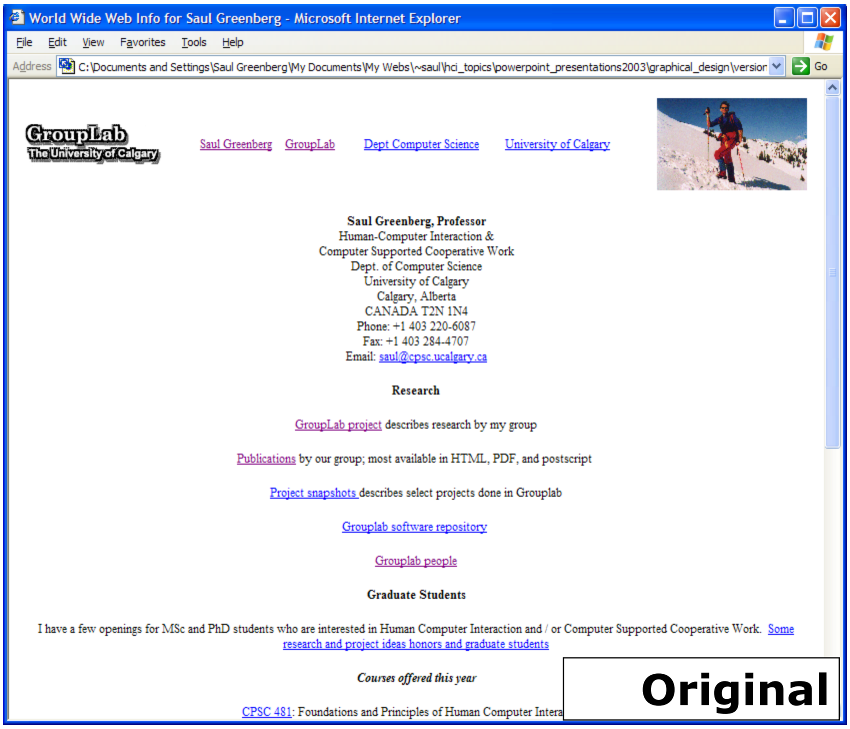
    all work together to remind a person of what can be done and how to do it



Graphical Screen Design

- **C**ontrast
  - make different things different
  - brings out dominant elements
  - mutes lesser elements
  - creates dynamism
- **R**epetition
  - repeat design throughout the interface
  - consistency
  - creates unity
- **A**lignment
  - visually connects elements
  - creates a visual flow
- **P**roximity
  - groups related elements
  - separates unrelated ones

Robin Williams Non-Designers Design Book, Peachpit Press


World Wide Web Info for Saul Greenberg - Microsoft Internet Explorer
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GroupLab The University of Calgary

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Research

GroupLab project describes research by my group

Publications by our group; most available in HTML, PDF, and postscript

Project snapshots describes select projects done in Grouplab

Grouplab software repository

Grouplab people

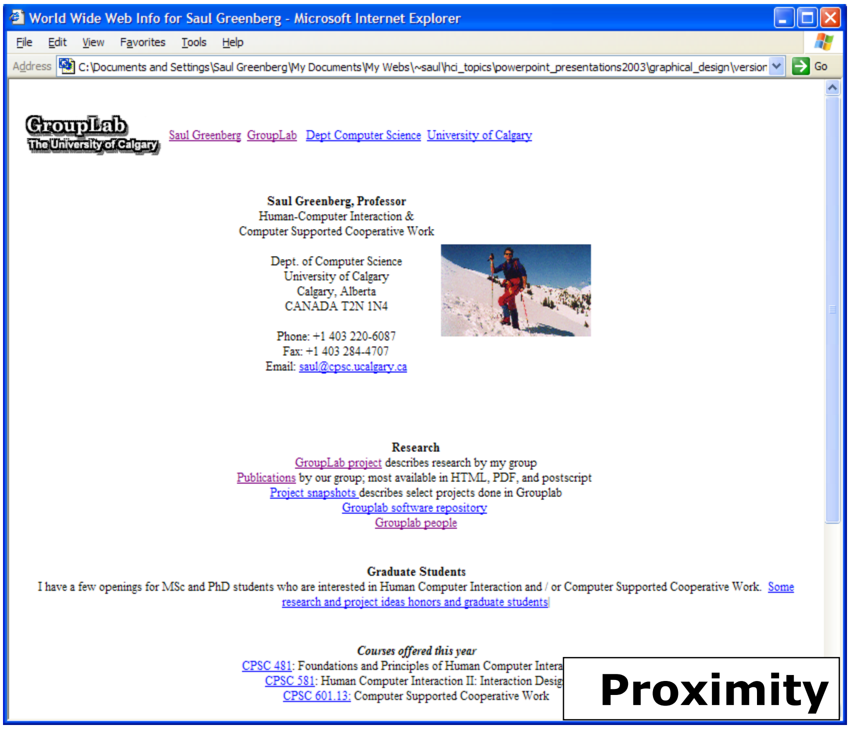
Graduate Students

I have a few openings for MSc and PhD students who are interested in Human Computer Interaction and / or Computer Supported Cooperative Work. Some research and project ideas honors and graduate students

Courses offered this year

CPSC 481: Foundations and Principles of Human Computer Intera

Original


World Wide Web Info for Saul Greenberg - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address
Go

C:\Documents and Settings\Saul Greenberg\My Documents\My Webs\~saul\hci_topics\powerpoint_presentations2003\graphical_design\version

GroupLab The University of Calgary

Saul Greenberg GroupLab Dept Computer Science University of Calgary

Saul Greenberg, Professor
Human-Computer Interaction &
Computer Supported Cooperative Work

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Calgary, Alberta
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Email: saul@cpsc.ucalgary.ca

Research
GroupLab project describes research by my group
Publications by our group; most available in HTML, PDF, and postscript
Project snapshots describes select projects done in Grouplab
Grouplab software repository
Grouplab people

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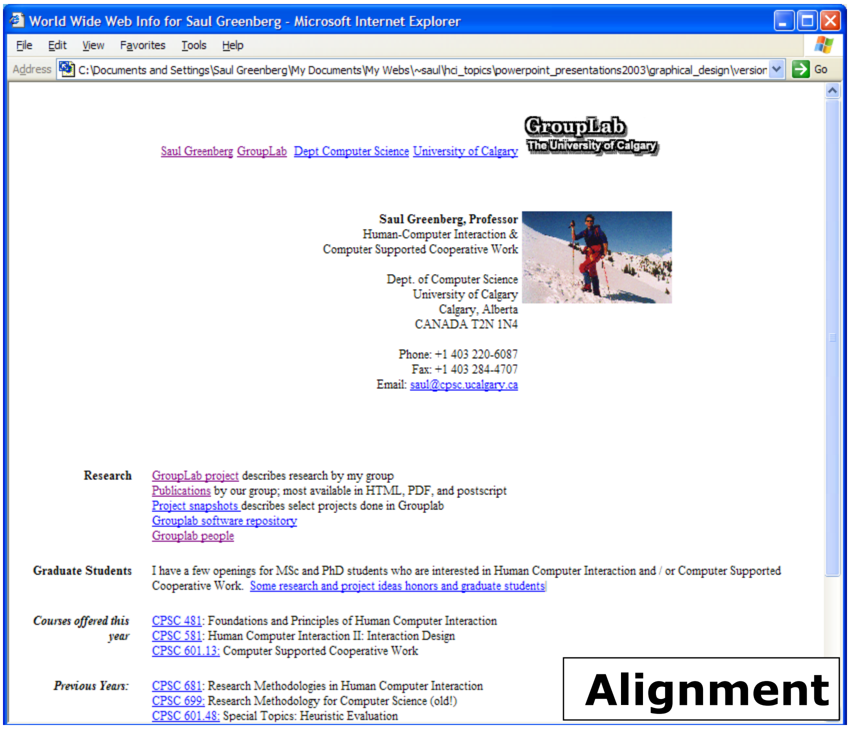
CPSC 581: Human Computer Interaction II: Interaction Desig
CPSC 601.13: Computer Supported Cooperative Work

Proximity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Previous Years:
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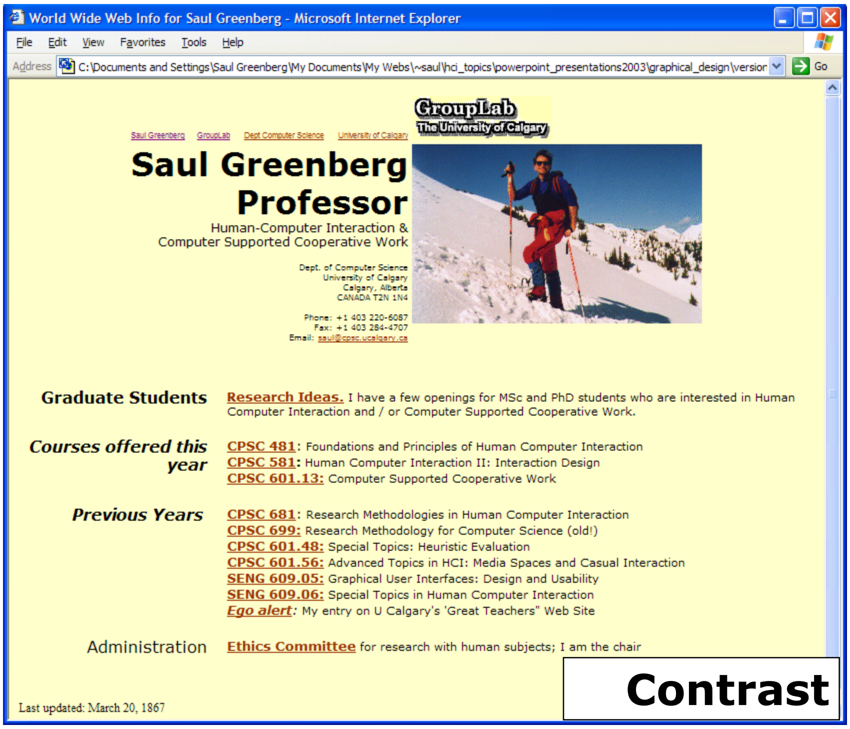
CPSC 699: Research Methodology for Computer Science (old!)
CPSC 601.48: Special Topics: Heuristic Evaluation

Alignment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Research Ideas. I have a few openings for MSc and PhD students who are interested in Human Computer Interaction and / or Computer Supported Cooperative Work.

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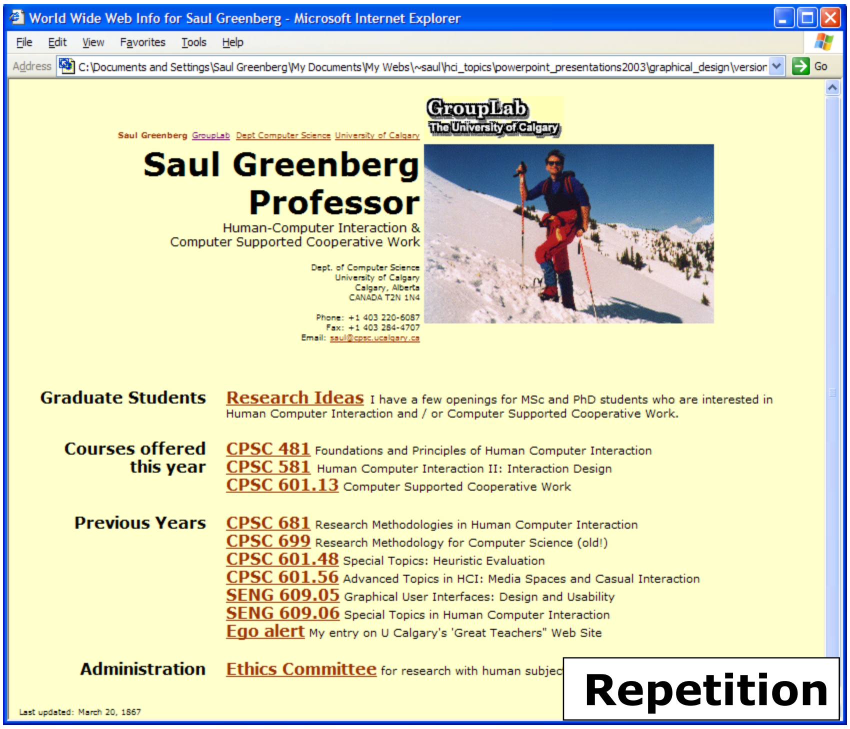
CPSC 601.56: Advanced Topics in HCI: Media Spaces and Casual Interaction
SENG 609.05: Graphical User Interfaces: Design and Usability
SENG 609.06: Special Topics in Human Computer Interaction
Ego alert: My entry on U Calgary's 'Great Teachers" Web Site

Administration
Ethics Committee for research with human subjects; I am the chair

Last updated: March 20, 1867

Contrast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Graduate Students Research Ideas I have a few openings for MSc and PhD students who are interested in Human Computer Interaction and / or Computer Supported Cooperative Work.

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Last updated: March 20, 1867

Repetition

Representations

- Solving a problem simply means representing it so as to make the solution transparent

  (Simon, 1981)

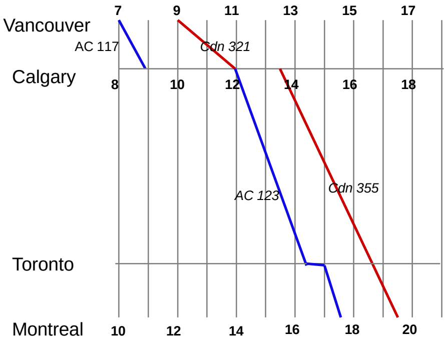
- Good representations
  - allow people to find relevant information
    - information may be present but hard to find
  - allow people to compute desired conclusions
    - computations may be difficult or “for free” depending on representations

Which is the best flight?

- length
- stop-overs
- switches...

		depart	arrive
AC 117	Vancouver - Calgary	7:00	9:00
Cdn 321	Vancouver - Calgary	9:00	12:00
Cdn 355	Calgary - Montreal	13:30	19:30
AC 123	Calgary - Toronto	12:30	16:30
AC 123	Toronto - Montreal	16:45	17:30

*time zone: +1 van-cal, +2 cal-tor, mtl



This idea made it into a real site! http://www.hipmunk.com

When do I take my drugs?

•10 - 30% error rate in taking pills, same for pillbox organizers

•Inderal	-	1 tablet 3 times a day
Lanoxin	-	1 tablet every a.m.
Carafate	-	1 tablet before meals and at bedtime
Zantac	-	1 tablet every 12 hours (twice a day)
Quinag	-	1 tablet 4 times a day
Couma	-	1 tablet a day

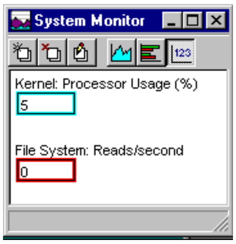
	Breakfast	Lunch	Dinner	Bedtime
Lanoxin	O			
Inderal	O	O	O	
Quinag	O	O	O	O
Carafate	O	O	O	O
Zantac		O		O
Couma				O

Breakfast	Lunch	Dinner	Bedtime
Lanoxin			
Inderal	Inderal	Inderal	
Quinag	Quinag	Quinag	Quinag
Carafate	Carafate	Carafate	Carafate
	Zantac		Zantac
			Couma

Adapted from Donald Norman

Which representation is best?

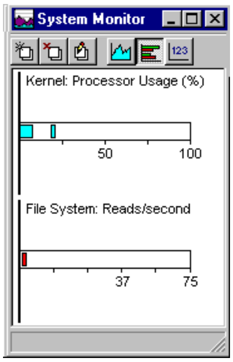
- depends heavily on task



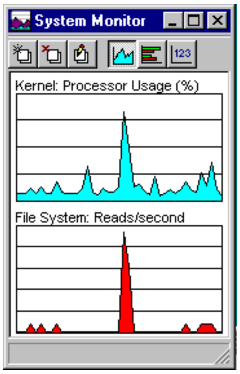
Kernel: Processor Usage (%): 5

File System: Reads/second: 0

What is precise value?



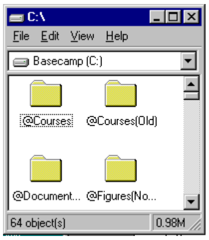
How does the performance now compared to its peak?

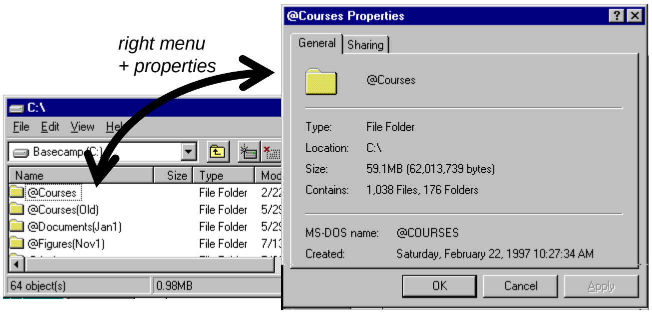


How does performance change over time?

Windows 95 System Monitor

Which folder has the most documents?





right menu
+ properties

Name	Size	Type	Mod
@Courses		File Folder	2/22
@Courses(Old)		File Folder	5/29
@Documents(Jan1)		File Folder	5/29
@Figures(Nov1)		File Folder	7/13

64 object(s) 0.98MB

@Courses Properties

@Courses

Type: File Folder

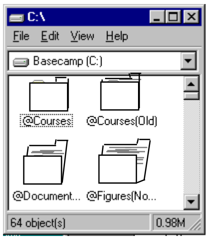
Location: C:\

Size: 59.1MB (62,013,739 bytes)

Contains: 1,038 Files, 176 Folders

MS-DOS name: @COURSES

Created: Saturday, February 22, 1997 10:27:34 AM



Windows 95 File Viewer

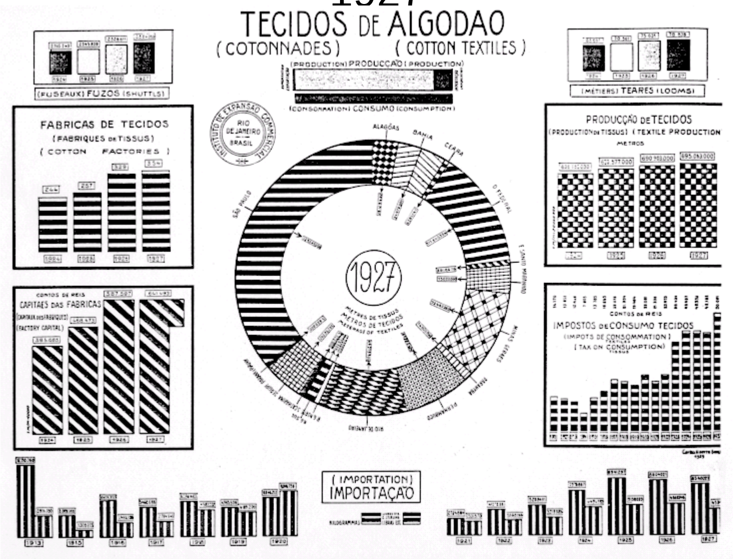
Information Visualization

- Graphics should reveal the data
  - show the data
  - not get in the way of the message
  - avoid distortion
  - present many numbers in a small space
  - make large data sets coherent
  - encourage comparison between data
  - supply both a broad overview and fine detail
  - serve a clear purpose

E. Tufte
Visual Display of Quantitative Information

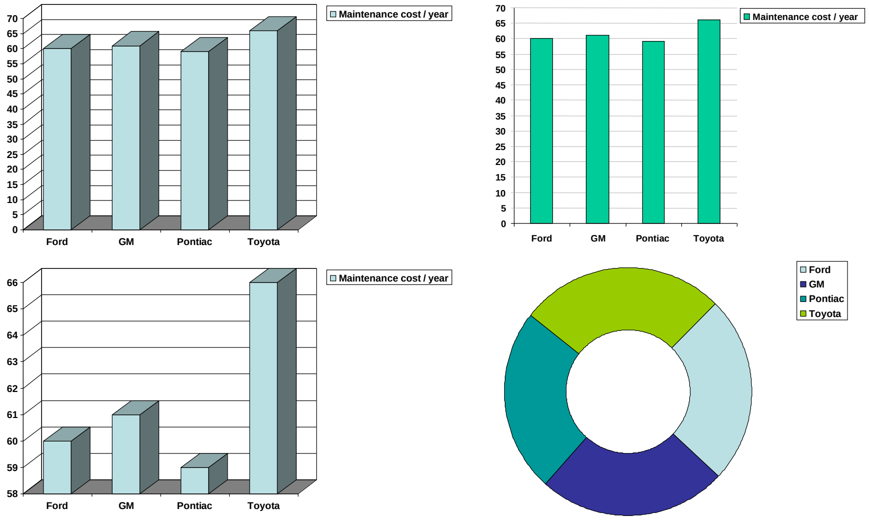
many examples on the following slides are taken from Tufte's books

Chart Junk: Cotton production in Brazil, 1927



E. Tufte Visual Display of Quantitative Information

Chart Junk: Removing deception and simplification

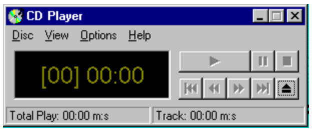


Lessons on Representation

- Good representations
  - captures essential elements of the event / world & mutes the irrelevant
  - appropriate for the person, their task, and their interpretation
- Information visualization
  - Tufte’s principles
  - overview first, zoom and filter, then details on demand
  - many techniques now available

1 Simple and natural dialogue

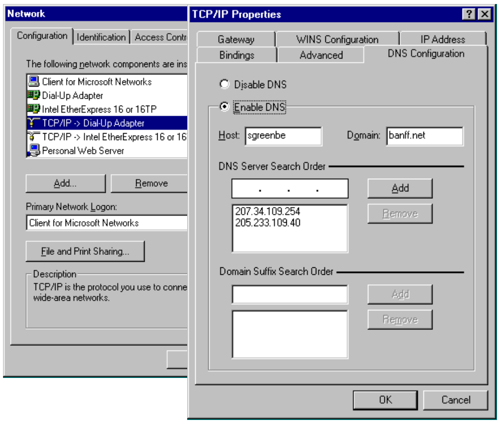
- use the user’s conceptual model
- match the users’ task sequence
- minimize mapping between interface and task semantics



[00] 00:00

Total Play: 00:00 m:s

Track: 00:00 m:s



The following network components are ins

- Client for Microsoft Networks
- Dial-Up Adapter
- Intel EtherExpress 16 or 16TP
- TCP/IP -> Dial-Up Adapter
- TCP/IP -> Intel EtherExpress 16 or 16
- Personal Web Server

Add... Remove

Primary Network Logon: Client for Microsoft Networks

File and Print Sharing...

Description
TCP/IP is the protocol you use to conne
wide-area networks.

○ Disable DNS

● Enable DNS

Host: sgreenbe Domain: banff.net

DNS Server Search Order

. . .

207.34.109.254
205.233.109.40

Add Remove

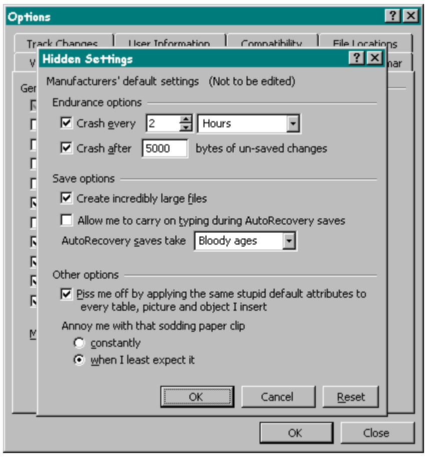
Domain Suffix Search Order

Add Remove

OK Cancel

From Microsoft applications

Hidden Settings



Hidden Settings

Manufacturers' default settings (Not to be edited)

Endurance options

☑ Crash every 2 Hours

☑ Crash after 5000 bytes of un-saved changes

Save options

☑ Create incredibly large files

☐ Allow me to carry on typing during AutoRecovery saves

AutoRecovery saves take Bloody ages

Other options

☑ Piss me off by applying the same stupid default attributes to every table, picture and object I insert

Annoy me with that sodding paper clip

○ constantly

● when I least expect it

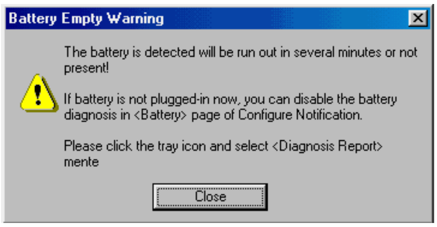
OK Cancel Reset

OK Close

1 Simple and natural dialogue

- Present exactly the information the user needs
  - less is more
    - less to learn, to get wrong, to distract...
  - information should appear in natural order
    - related information is graphically clustered
    - order of accessing information matches user’s expectations
  - remove or hide irrelevant or rarely needed information
    - competes with important information on screen
  - remove modes
  - use windows frugally
    - don’t add unneeded navigation and window management

2 Speak the users’ language



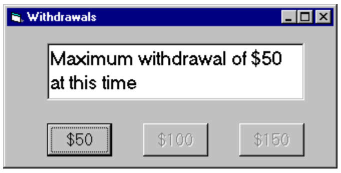
The battery is detected will be run out in several minutes or not present!

If battery is not plugged-in now, you can disable the battery diagnosis in <Battery> page of Configure Notification.

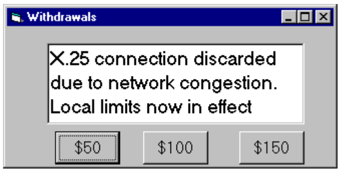
Please click the tray icon and select <Diagnosis Report> mente

2 Speak the users’ language

- Terminology based on users’ language for task
  - e.g. withdrawing money from a bank machine


Withdrawals

Maximum withdrawal of $50 at this time

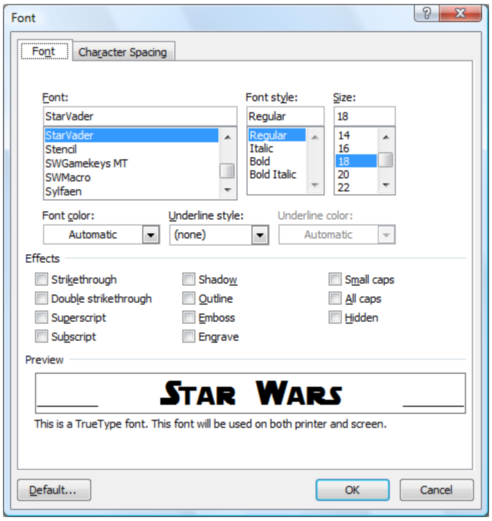

Withdrawals

X.25 connection discarded due to network congestion. Local limits now in effect

- Use meaningful mnemonics, icons & abbreviations
  - eg File / Save
    - Ctrl + S (abbreviation)
    - Alt FS (mnemonic for menu action)

3 Minimize user’s memory load

- Computers good at remembering, people are not!
- Promote recognition over recall
  - menus, icons, choice dialog boxes vs. commands, field formats
  - relies on visibility of objects to the user (but less is more!)


Font

Font: StarVader

Font style: Regular

Size: 18

Font color: Automatic

Underline style: (none)

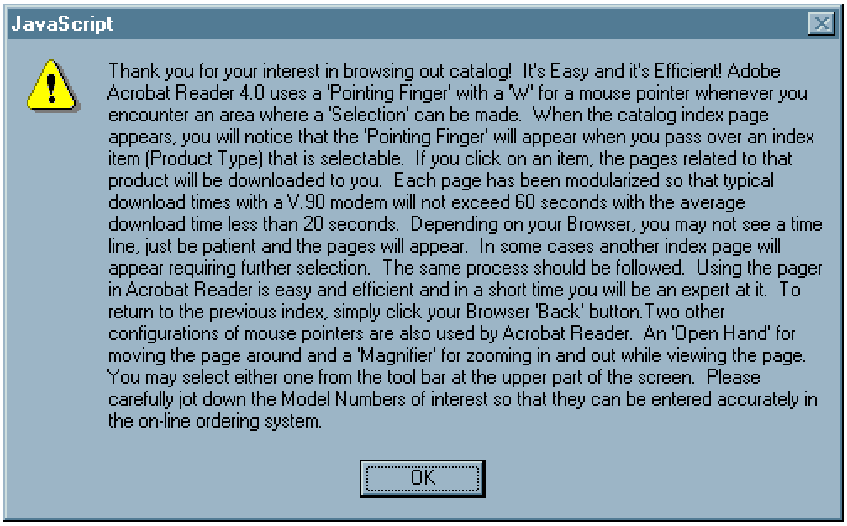
Underline color: Automatic

Preview: STAR WARS

This is a TrueType font. This font will be used on both printer and screen.

From Microsoft applications

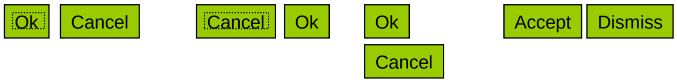
3: Minimize user's memory load



Thank you for your interest in browsing out catalog! It's Easy and it's Efficient! Adobe Acrobat Reader 4.0 uses a 'Pointing Finger' with a 'W' for a mouse pointer whenever you encounter an area where a 'Selection' can be made. When the catalog index page appears, you will notice that the 'Pointing Finger' will appear when you pass over an index item (Product Type) that is selectable. If you click on an item, the pages related to that product will be downloaded to you. Each page has been modularized so that typical download times with a V.90 modem will not exceed 60 seconds with the average download time less than 20 seconds. Depending on your Browser, you may not see a time line, just be patient and the pages will appear. In some cases another index page will appear requiring further selection. The same process should be followed. Using the pager in Acrobat Reader is easy and efficient and in a short time you will be an expert at it. To return to the previous index, simply click your Browser 'Back' button.Two other configurations of mouse pointers are also used by Acrobat Reader. An 'Open Hand' for moving the page around and a 'Magnifier' for zooming in and out while viewing the page. You may select either one from the tool bar at the upper part of the screen. Please carefully jot down the Model Numbers of interest so that they can be entered accurately in the on-line ordering system.

4: Be consistent

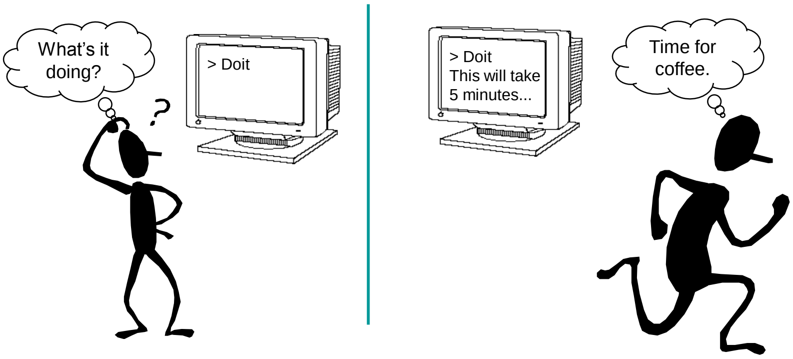
- Consistent syntax of input
- Consistent language and graphics
  - same visual appearance across the system (e.g. widgets)
  - same information/controls in same location on all windows



- Consistent effects
  - commands, actions have same effect in equivalent situations
    - predictability

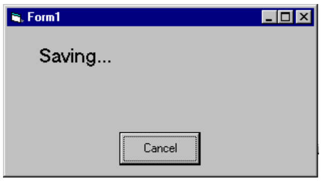
5: Provide feedback

- Continuously inform the user about
  - what it is doing
  - how it is interpreting the user's input
  - user should always be aware of what is going on

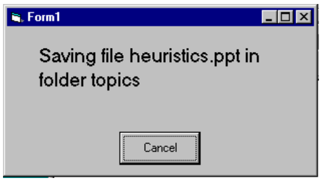


5. Provide feedback

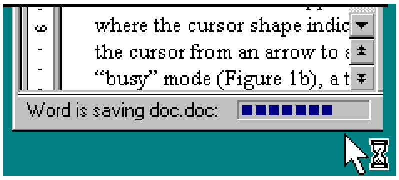
- Be as specific as possible, based on user's input



Saving...



Saving file heuristics.ppt in folder topics



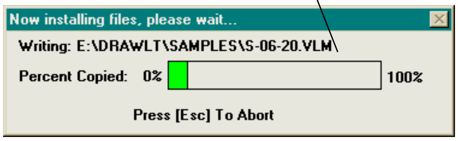
where the cursor shape indic
the cursor from an arrow to a
"busy" mode (Figure 1b), a t

Word is saving doc.doc: ■■■■■■■

Best within the context of the action

Provide feedback

Multiple files being copied, but feedback is file by file.



Now installing files, please wait...

Writing: E:\DRAWLT\SAMPLES\S-06-20.VLM

Percent Copied: 0% 100%

Press [Esc] To Abort

Drawing Board LT

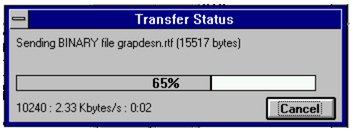
5. Provide feedback

- Response time
  - how users perceive delays

<0.1s	perceived as “instantaneous”
1s	user’s flow of thought stays uninterrupted, but delay noticed
10s	limit for keeping user’s attention focused on the dialog
> 10s	user will want to perform other tasks while waiting

5. Provide feedback

- Dealing with long delays
  - Cursors ⌛
    - for short transactions
  - Percent done dialogs
    - time left
    - estimated time



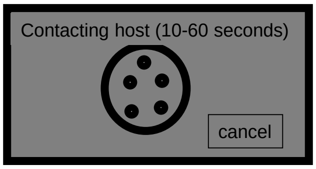
Transfer Status

Sending BINARY file grapdesn.rtf (15517 bytes)

65%

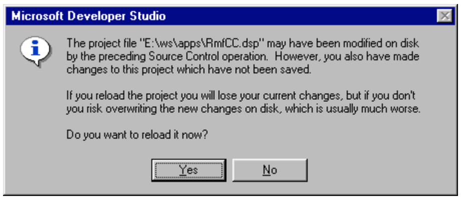
10240 : 2.33 Kbytes/s : 0:02

  - Random
    - for unknown times



Contacting host (10-60 seconds)

6. Provide clearly marked exits



Microsoft Developer Studio

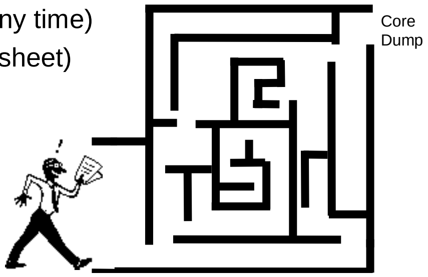
The project file "E:\ws\apps\RmfCC.dsp" may have been modified on disk by the preceding Source Control operation. However, you also have made changes to this project which have not been saved.

If you reload the project you will lose your current changes, but if you don't you risk overwriting the new changes on disk, which is usually much worse.

Do you want to reload it now?

6. Provide clearly marked exits

- Users don’t like to feel trapped by the computer!
  - should offer an easy way out of as many situations as possible
- Strategies:
  - Cancel button (for dialogs waiting for user input)
  - Universal Undo (can get back to previous state)
  - Interrupt (especially for lengthy operations)
  - Quit (for leaving the program at any time)
  - Defaults (for restoring a property sheet)



7. Provide shortcuts

- Experienced users - perform frequent operations quickly
- Strategies:
  - keyboard and mouse accelerators
    - abbreviations
    - command completion
    - context menus
    - function keys
    - double clicking vs menu selection
  - type-ahead (entering input before the system is ready for it)
  - navigation jumps
    - e.g., going to window/location directly, and avoiding intermediate nodes
  - history systems
    - WWW: ~60% of pages are revisits

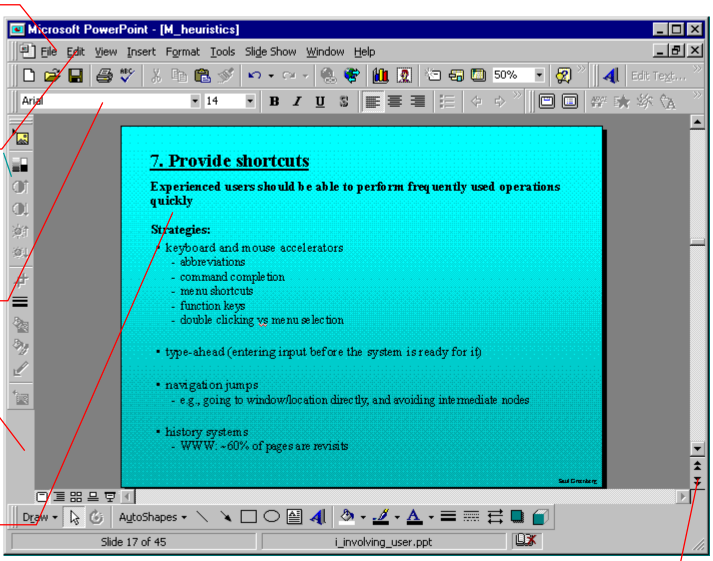
Keyboard accelerators for menus

Customizable toolbars and palettes for frequent actions

Split menu, with recently used fonts on top

Double-click raises toolbar dialog box

Double-click raises object-specific menu


Microsoft PowerPoint - [M_heuristics]
File Edit View Insert Format Tools Slide Show Window Help
50%
Edit Text...
Arial
14
Draw
AutoShapes
Slide 17 of 45
i_involving_user.ppt

7. Provide shortcuts

Experienced users should be able to perform frequently used operations quickly

Strategies:

- keyboard and mouse accelerators
  - abbreviations
  - command completion
  - menu shortcuts
  - function keys
  - double clicking vs menu selection
- type-ahead (entering input before the system is ready for it)
- navigation jumps
  - e.g., going to window/location directly, and avoiding intermediate nodes
- history systems
  - WWW: ~60% of pages are revisits

Saul Greenberg

Scrolling controls for page-sized increments

Microsoft Powerpoint

8: Deal with errors in a positive manner

- People will make errors!

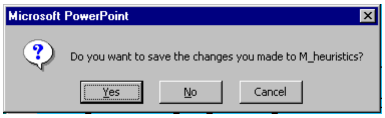
- Errors we make
  - Mistakes
    - conscious deliberations lead to an error instead of correct solution
  - Slips
    - unconscious behaviour gets misdirected en route to satisfying goal
      - e.g. drive to store, end up in the office
    - shows up frequently in skilled behaviour
      - usually due to inattention
    - often arises from similar actions

Designing for slips

- General rules
  - prevent slips before they occur
  - detect and correct slips when they do occur
  - user correction through feedback and undo

Types of slips

- Capture error
  - frequently done activity takes charge instead of one intended
  - occurs when common & rarer actions have same initial sequence
    - change clothes for dinner and find oneself in bed (William James, 1890)
    - Confirm overwrite existing file when meant to save to a different file
  - minimize by
    - make actions undoable instead of confirmation
    - allows reconsideration of action by user
      - e.g. open trash to undelete a file



Microsoft PowerPoint

Do you want to save the changes you made to M_heuristics?

Types of slips

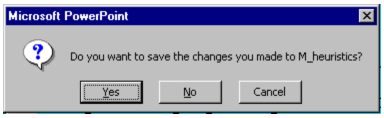
- Description error
  - intended action similar to others that are possible
    - usually occurs when right & wrong objects physically near each other
      - pour juice into bowl instead of glass
      - move file to wrong folder with similar name
  - minimize by
    - rich feedback
    - check for reasonable input, etc.
    - undo

Types of slips

- Mode errors
  - people do actions in one mode thinking they are in another
    - vi command mode vs. edit mode
    - Refer to file that’s in a different directory
    - Look for commands / menu options that are not relevant
  - Minimize by
    - Have as few modes as possible (preferably none)
    - Make modes highly visible

Generic system responses for errors

- General idea: Forcing functions
  - prevent / mitigate continuation of wrongful action
- Gag
  - deals with errors by preventing the user from continuing
    - eg cannot get past login screen until correct password entered
- Warn
  - warn people that an unusual situation is occurring
  - when overused, becomes an irritant
    - e.g.,
      - audible bell
      - alert box



Do you want to save the changes you made to M_heuristics?

Generic system responses for errors

- Do nothing
  - illegal action just doesn’t do anything
  - user must infer what happened
    - enter letter into a numeric-only field (key clicks ignored)
    - put a file icon on top of another file icon (returns it to original position)
- Self-correct
  - system guesses legal action and does it instead
  - but leads to a problem of trust
    - spelling corrector

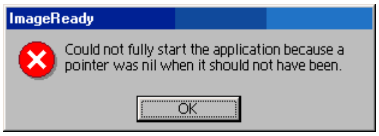
Generic system responses for errors

- Lets talk about it
  - system initiates dialog with user to come up with solution to the problem
    - compile error brings up offending line in source code
- Teach me
  - system asks user what the action was supposed to have meant
  - action then becomes a legal one

Error Dialog Boxes

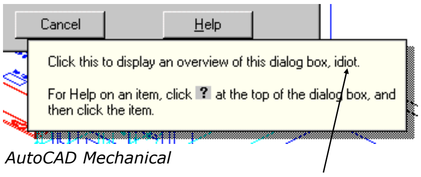
- Cooper
  - You should feel as guilty as for using a goto – an admission of failure in design
- Why are they problematic?
- How related to locus of attention?
- What are the alternatives?

8: Deal with errors in a positive manner



Could not fully start the application because a pointer was nil when it should not have been.

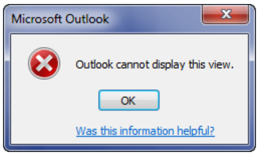
Adobe's *ImageReady*



Click this to display an overview of this dialog box, idiot.

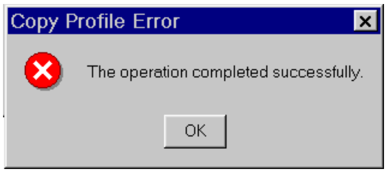
For Help on an item, click ? at the top of the dialog box, and then click the item.

AutoCAD Mechanical



Outlook cannot display this view.

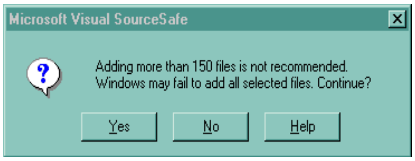
Microsoft Outlook 2013



The operation completed successfully.

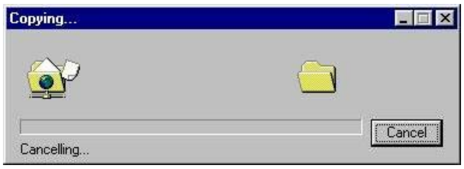
Microsoft's *NT Operating System*

Inane Dialog Boxes



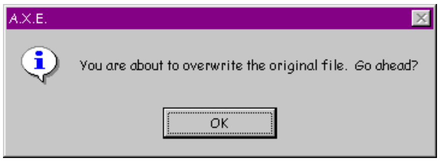
Adding more than 150 files is not recommended. Windows may fail to add all selected files. Continue?

Umm, thanks for the warning, but what should I do?



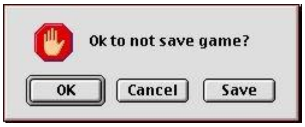
Cancelling...

What happens when you cancel a cancelled operation?



You are about to overwrite the original file. Go ahead?

Do I have any choice in this?

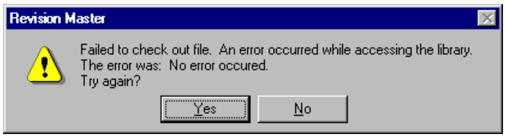

Ok to not save game?

Uhhh... I give up on this one

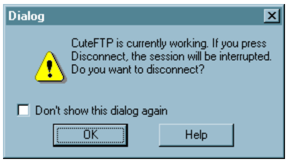
•Some of these interfaces were posted on Interface Hall of Shame

Inane Dialog Boxes

- These are too good not to show

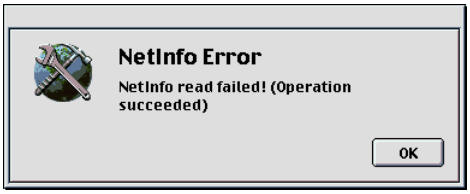


Failed to check out file. An error occurred while accessing the library.
The error was: No error occured.
Try again?



CuteFTP is currently working. If you press Disconnect, the session will be interrupted. Do you want to disconnect?

□ Don't show this dialog again

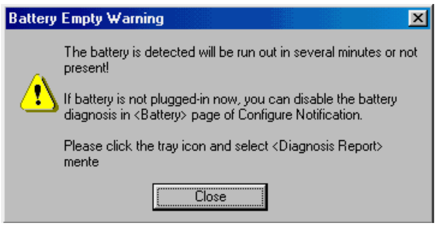


NetInfo Error

NetInfo read failed! (Operation succeeded)

•Some of these interfaces were posted on Interface Hall of Shame

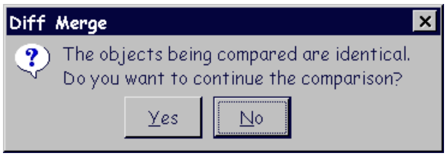
Inane Dialog Boxes



The battery is detected will be run out in several minutes or not present!

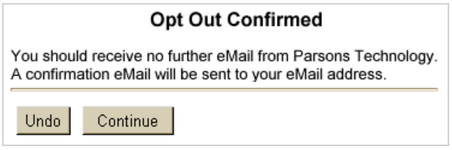
If battery is not plugged-in now, you can disable the battery diagnosis in <Battery> page of Configure Notification.

Please click the tray icon and select <Diagnosis Report> mente



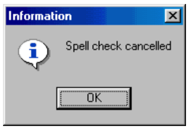
The objects being compared are identical.
Do you want to continue the comparison?

ClearCase, source-code control Rational Software



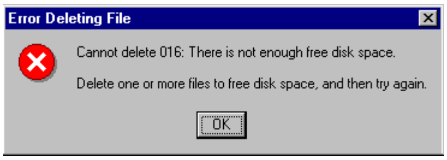
Opt Out Confirmed

You should receive no further eMail from Parsons Technology.
A confirmation eMail will be sent to your eMail address.



Spell check cancelled

After clicking “Cancel” on *Allaire’s HomeSite 4.0*



Cannot delete 016: There is not enough free disk space.

Delete one or more files to free disk space, and then try again.

•Some of these interfaces were posted on Interface Hall of Shame

8: Deal with errors in a positive manner

- Provide meaningful error messages
  - error messages should be in the user’s task language
  - don’t make people feel stupid

Try again, bonehead!

Error 25

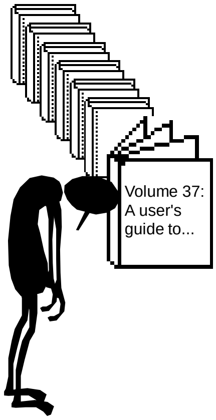
Cannot open this document

Cannot open “chapter 5” because the application “Microsoft Word” is not on your system

Cannot open “chapter 5” because the application “Microsoft Word” is not on your system. Open it with “Notepad” instead?

9. Provide help

- Help is not a replacement for bad design!
- Simple systems:
  - walk up and use; minimal instructions
- Most other systems
  - feature rich
  - simple things should be simple
  - learning path for advanced features



Documentation and how it is used

- Many users do not read manuals
  - prefer to spend their time pursuing their task

- Usually used when users are in some kind of panic
  - paper manuals unavailable in many businesses!
    - e.g. single copy locked away in system administrator's office
  - online documentation better
  - good search/lookup tools
  - online help specific to current context

- Sometimes used for quick reference
  - syntax of actions, possibilities...
  - list of shortcuts ...

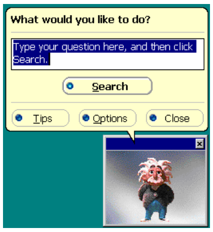
Types of help

- Tutorial and/or getting started manuals
  - short guides that people are likely to read when first obtaining their systems
    - encourages exploration and getting to know the system
    - tries to get conceptual material across and essential syntax

  - on-line "tours", exercises, and demos
    - demonstrates very basic principles through working examples

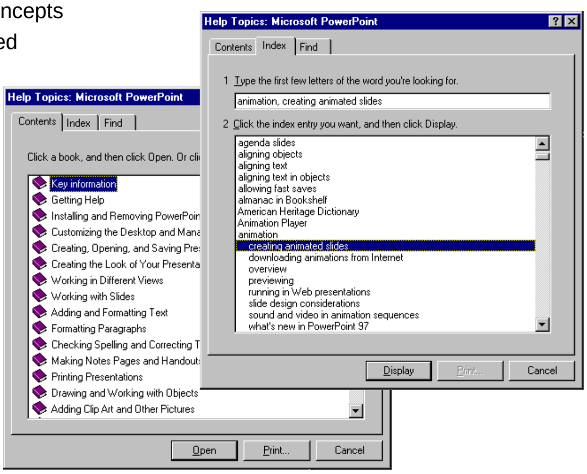
Types of help

- Reference manuals
  - used mostly for detailed lookup by experts
    - rarely introduces concepts
    - thematically arranged
  - on-line hypertext
    - search / find
    - table of contents
    - index
    - cross-index



What would you like to do?

Type your question here, and then click Search.



Help Topics: Microsoft PowerPoint

Click a book, and then click Open. Or cli

- Key information
- Getting Help
- Installing and Removing PowerPoir
- Customizing the Desktop and Mana
- Creating, Opening, and Saving Pre
- Creating the Look of Your Presenta
- Working in Different Views
- Working with Slides
- Adding and Formatting Text
- Formatting Paragraphs
- Checking Spelling and Correcting T
- Making Notes Pages and Handout
- Printing Presentations
- Drawing and Working with Objects
- Adding Clip Art and Other Pictures

Help Topics: Microsoft PowerPoint

1 Type the first few letters of the word you're looking for.

animation, creating animated slides

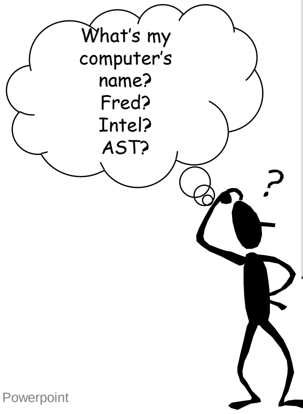
2 Click the index entry you want, and then click Display.

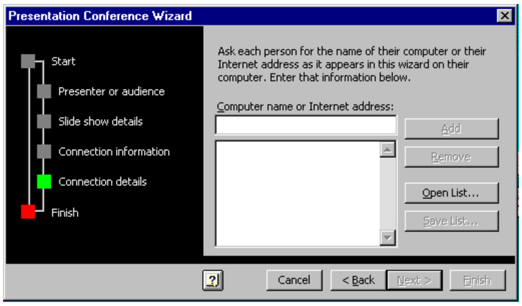
agenda slides
aligning objects
aligning text
aligning text in objects
allowing fast saves
almanac in Bookshelf
American Heritage Dictionary
Animation Player
animation
creating animated slides
downloading animations from Internet
overview
previewing
running in Web presentations
slide design considerations
sound and video in animation sequences
what's new in PowerPoint 97

Microsoft Help

Types of help

- Wizards
  - walks user through typical tasks
  - *but* dangerous if user gets stuck





Presentation Conference Wizard

- Start
- Presenter or audience
- Slide show details
- Connection information
- Connection details
- Finish

Ask each person for the name of their computer or their Internet address as it appears in this wizard and on their computer. Enter that information below.

Computer name or Internet address:

Microsoft Powerpoint

You now know

- Nine principles of design
  - Simple and natural dialog
  - Speak the user's language
  - Minimize user's memory load
  - Be consistent
  - Provide feedback
  - Provide clearly marked exits
  - Provide shortcuts
  - Deal with errors in a positive manner
  - Provide help

Summary

- UI Design is a creative process, with many options
- Your design should reflect
  - The results of the interviews, task analysis
  - Existing conventions when applicable
  - Design guidelines when applicable
- Usability testing helps you decide which of several options to pursue

References

- The Design of Everyday Things
  - By Donald Norman
- Bad Design Studies

  http://www.baddesigns.com
- Usability Studies

  http://www.useit.com/

Sources for examples:
Sachen Macdonald, Univ. of Victoria
Dey Alexander, Monash University