

Graphical Screen Design

CRAP – contrast, repetition, alignment, proximity

Grids are an essential tool for graphical design

Other important graphical screen design concepts

visual consistency

visual relationships

visual organization

legibility and readability

appropriate imagery

navigational cues

familiar idioms

Saul Greenberg, James Tam

The Squint Test

Used to determine what stands out or what elements appear to belong together



Saul Greenberg, James Tam

CRAP: An Important Tool For Graphical Screen Design

Contrast

- make different things different
- brings out dominant elements
- mutes lesser elements

Repetition

- repeat design throughout the interface
- consistency

Alignment

- visually associate related elements

Proximity

- group related elements
- separate unrelated elements

Saul Greenberg, James Tam

Graphical Design

Must account for:

- a comprehensible mental image
 - metaphor (known <-> unknown)
- appropriate organization of data, functions, tasks and roles
 - cognitive model (how do I think it works)
- quality appearance characteristics
 - the “look”
- effective interaction sequencing
 - the “feel”

Sources:

- Principle of Effective Visual Communication for GUI design
Marcus in Baecker, Grudin, Buxton and Greenberg
- Designing Visual Interfaces
Mullet & Sano, Prentice Hall

Saul Greenberg, James Tam

Components of Visible Language

Layout

- formats, proportions, and grids

scarves: 10.75
hats: 5.43

Typography

- typefaces and typesetting

bold serif fixed
italic sans-serif variable

Imagery

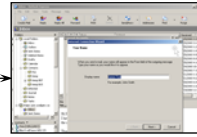
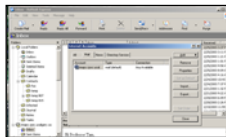
- signs, icons, symbols; concrete to abstract



BOOZE!

Sequencing

- how the interface unfolds

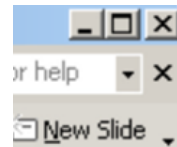


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Components Of Visible Language (2)

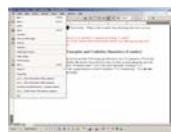
Visual identity

- unique appearance



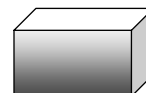
Animation

- dynamics of display



Color and Texture

- convey complex information and pictorial reality



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Grids

Horizontal and vertical lines to locate window components

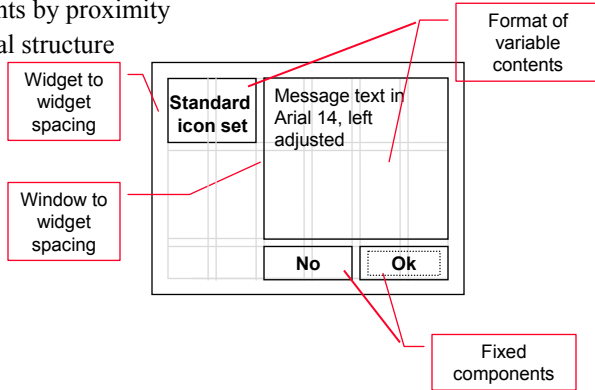
- aligns related components

Organization

- contrast to bring out dominant elements
- grouping of elements by proximity
- show organizational structure
- alignment

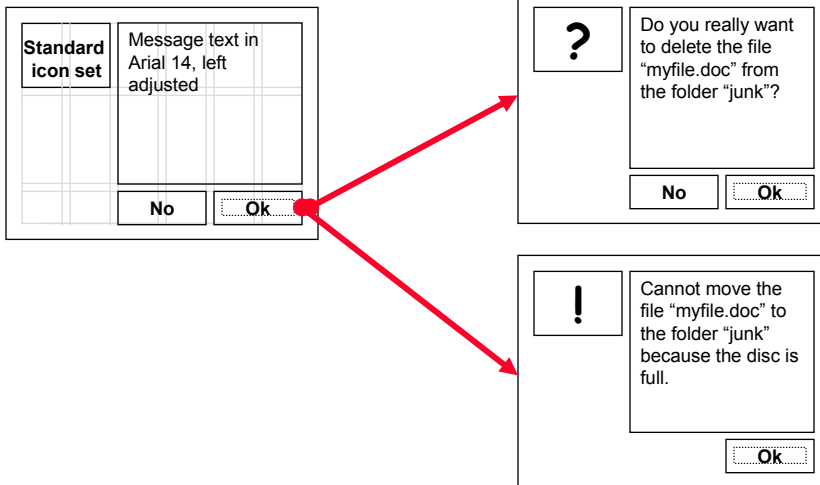
Consistency

- location
- format
- repetition
- organization



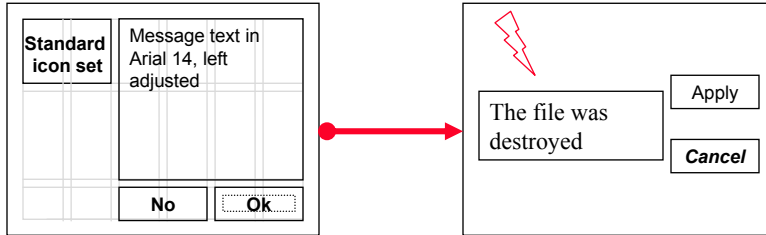
Saul Greenberg, James Tam

Uses A Grid: Consistent



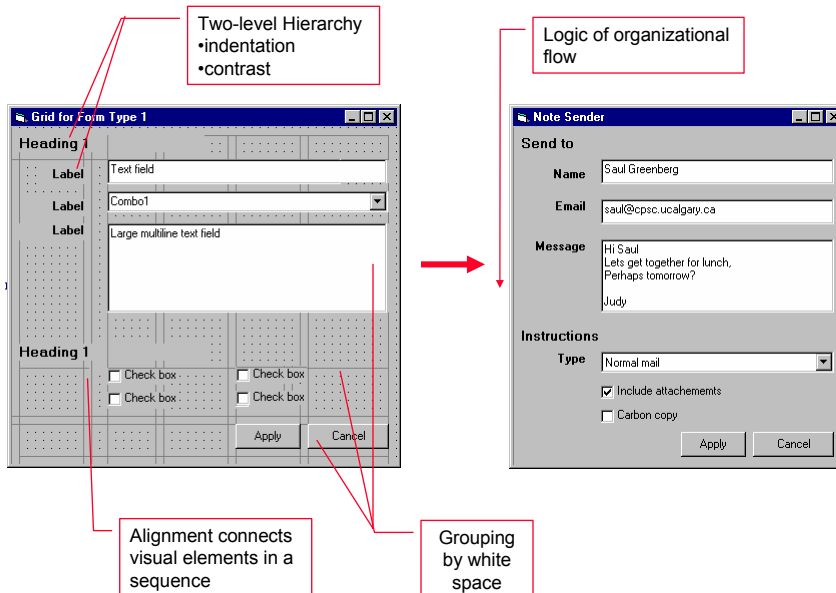
Saul Greenberg, James Tam

No Grid: Inconsistent



Saul Greenberg, James Tam

Another Grid Example

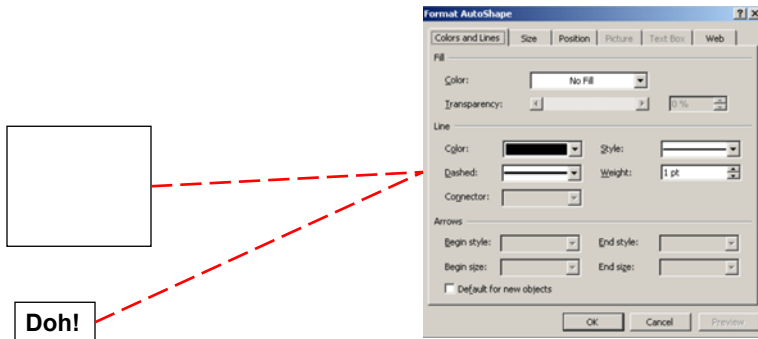


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Visual Consistency: Internal Consistency

Unless there is a compelling reason all elements of the same program follow the same rules and conventions

Application specific grids can be used to enforce this



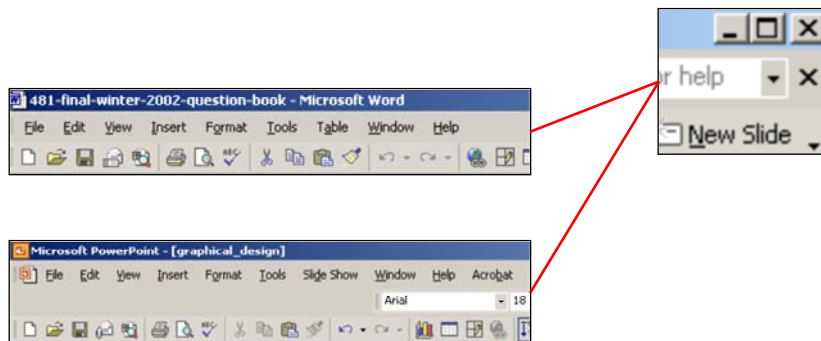
Saul Greenberg, James Tam

Visual Consistency: External Consistency

Follow interface and platform style conventions

Use grids that are platform (e.g., Windows) and widget (e.g., Java Swing) specific

Deviate from these conventions only when there is a clear benefit to the user



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External Consistency Violated

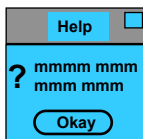
The screenshot displays a software interface for a project titled "LIGANDFIT-SMALLPOX". It is divided into several sections:

- Primary Task Information:** Includes the project name "LIGANDFIT-SMALLPOX" and "SMALLPOX RESEARCH PROJECT". A description states: "This project employs computational chemistry on a massive computing grid to analyze candidates for a medical therapy to fight the smallpox virus. The strongest candidates will be turned over to the U.S. Department of Defense for further evaluations." It shows a "Task CPU Time" of "11 hrs: 50 mins: 21 secs" and a "Task Execution Progress" bar at 96%.
- Member Information:** Lists the member as "JimmyT" with "Total Points: 371477" and "Total CPU Time: 2 years: 295 days: 11 h: 43 m: 17 s". A link "View your scores and rewards" is present.
- Device Information:** Shows "Overall Performance" with a score of 100 for "Processor" and 113 for "Storage". A comparison device is listed as "High-end Desktop System". A link "View your device list" is also present.

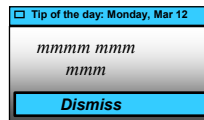
At the bottom, the "UNITED DEVICES" logo is visible, along with the status "Primary task is executing..." and a set of system icons.

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A Tool For Ensuring Consistency: Mumble Text



✓



x

Relationships Between Screen Elements

- explicit structure (e.g., the use of frames)

Mmmm:

Mmmm:

Mmmm:

Mmmm:

Mmmm:

×

Mmmm:

Mmmm:

Mmmm:

Mmmm:

Mmmm:

Mmmm:

Mmmm:

Mmmm:

Mmmm:

Mmmm:

✓

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Webforms

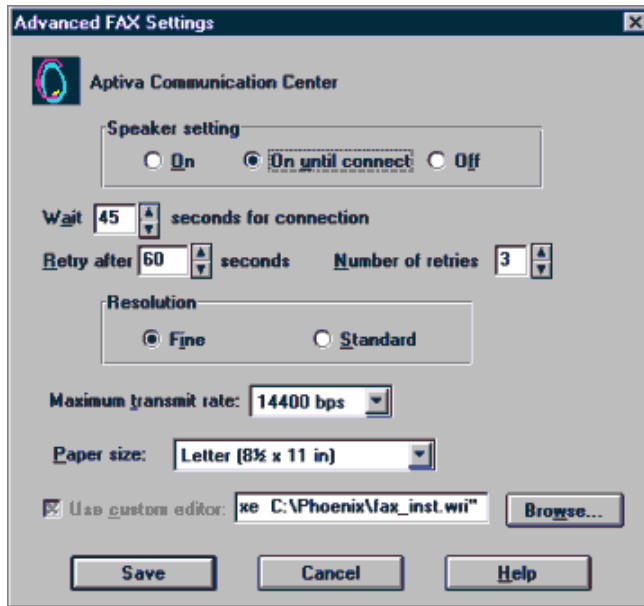
Form Title -- (appears above URL in most browsers and is used by WWW search)		Background Color:
Q&D Software Development Order Desk		FFFBF0
Form Heading -- (appears at top of Web page in bold type)		Text Color:
Q&D Software Development Order Desk <input checked="" type="checkbox"/> Center		000080
E-Mail responses to (will not appear on)	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 >>"/>

Bad alignment

Poor choice of colors to distinguish labels from editable fields

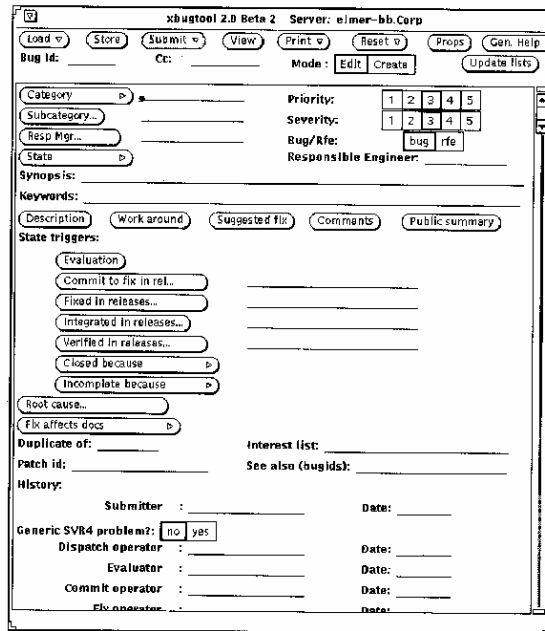
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No regard for order and organization



IBM's *Aptiva Communication Center*

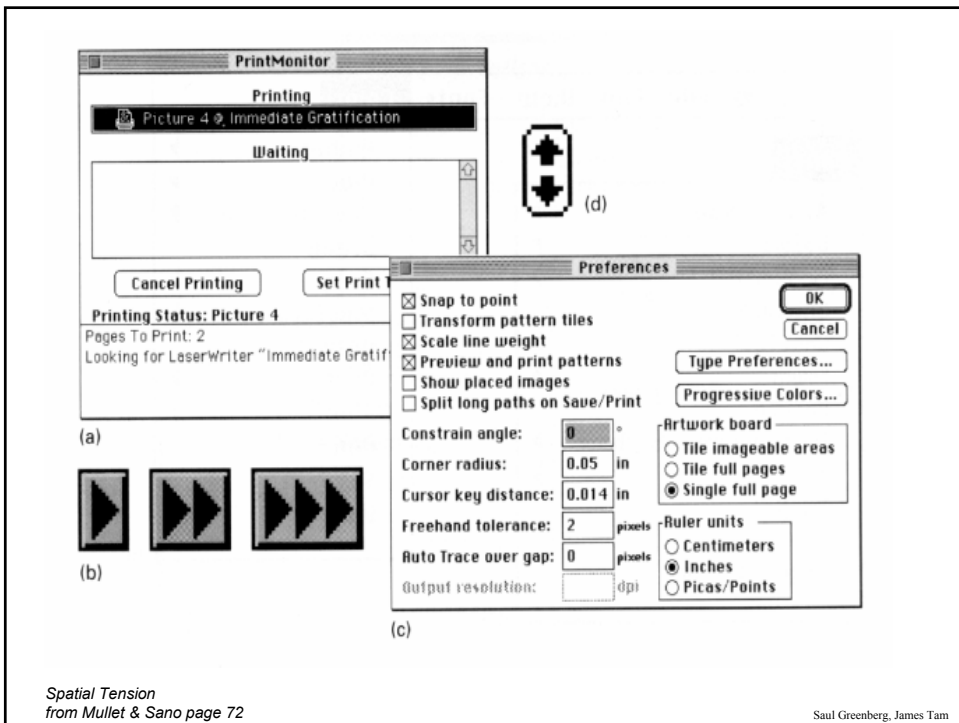
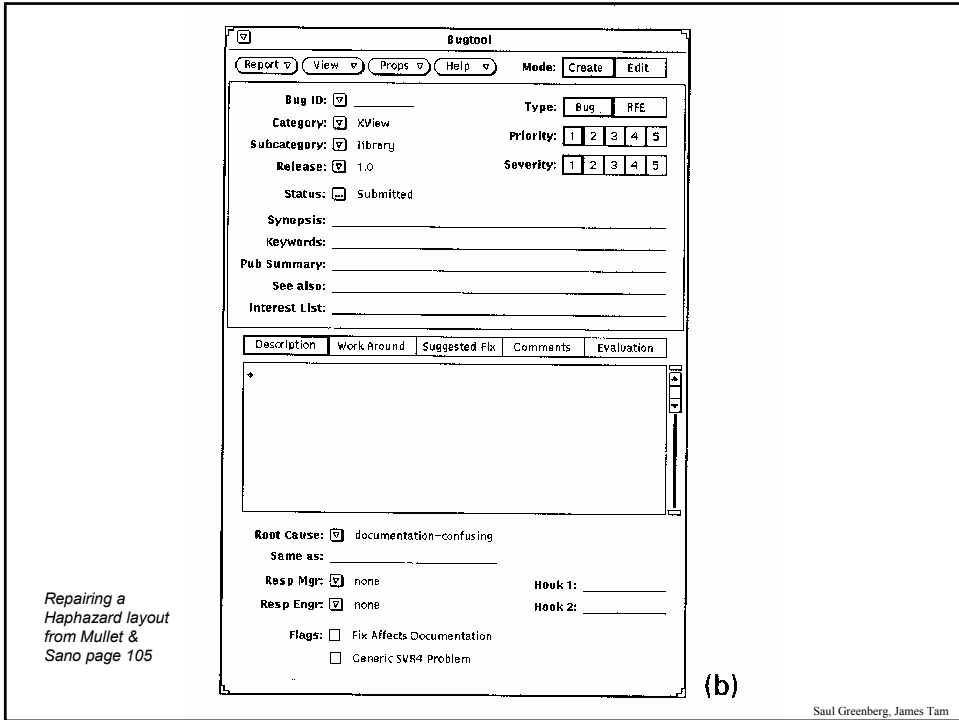
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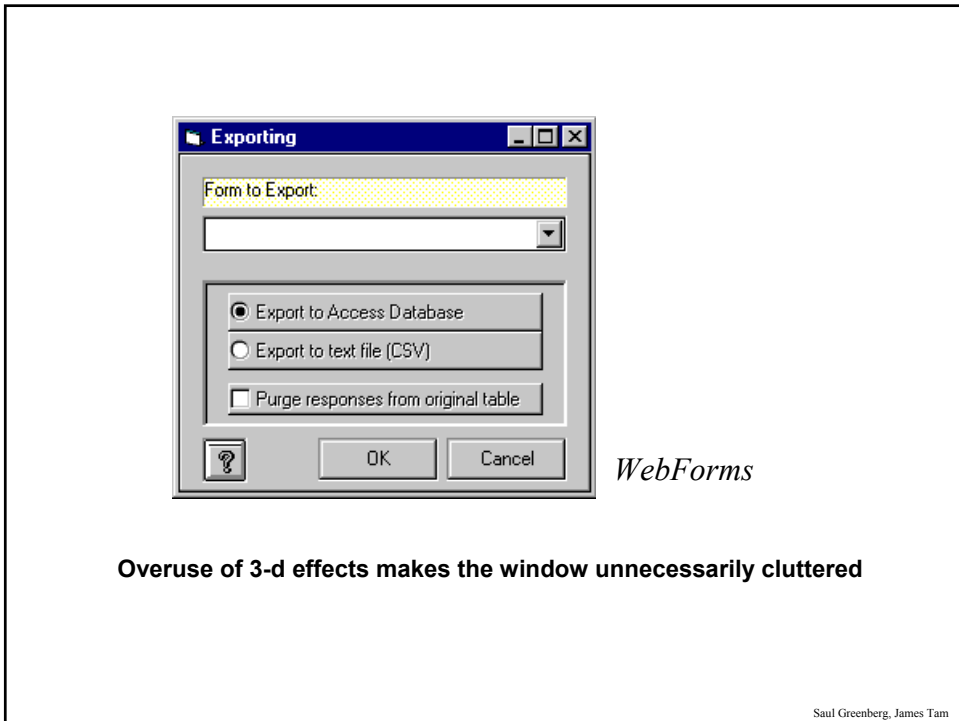
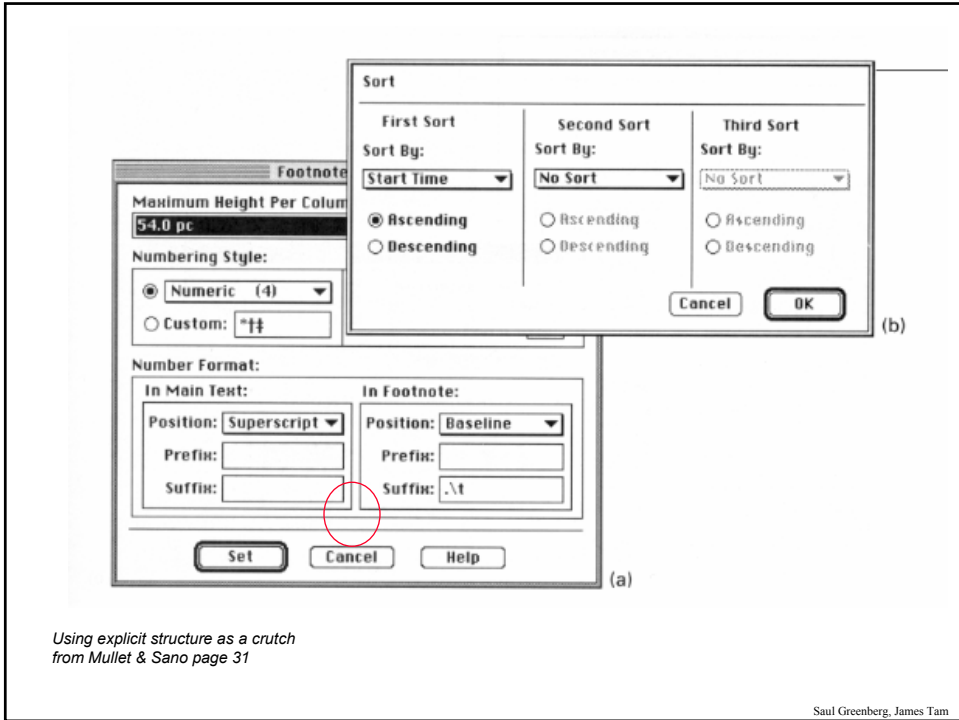


Haphazard layout
from Mullet & Sano page 105

(a)

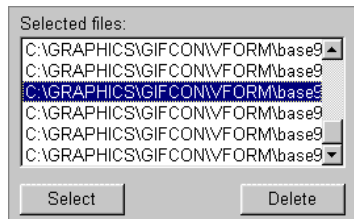
Saul Greenberg, James Tam



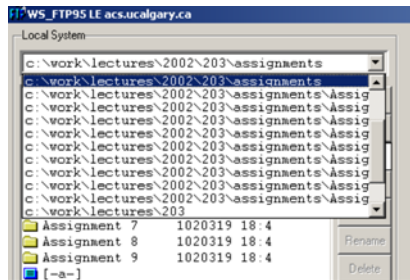


Relationships Between Screen Elements

How do you choose when you cannot discriminate screen elements from each other?



GIF Construction Set

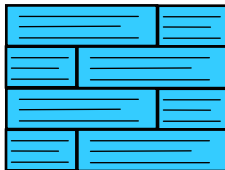


WS-FTP

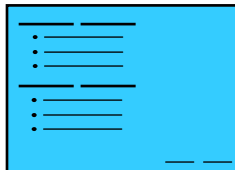
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Navigational Cues

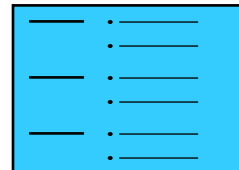
- provide initial focus
- direct attention to important, secondary, or peripheral items as appropriate
- assist in navigation through material



x

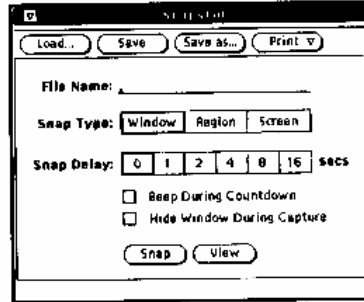
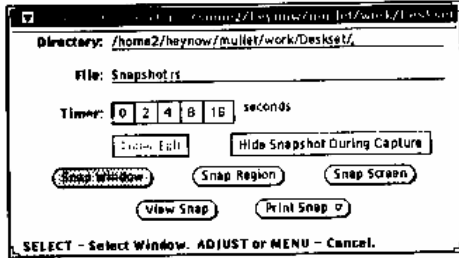


✓



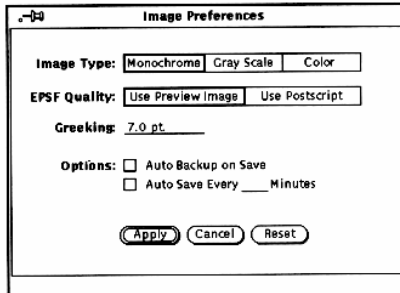
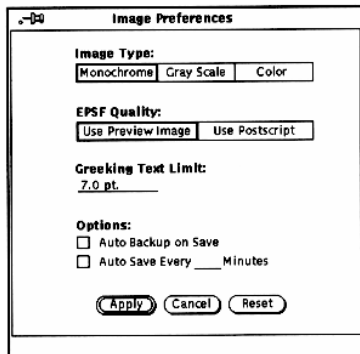
✓

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Redesigning a layout using alignment and factoring from Mullet & Sano Page 119

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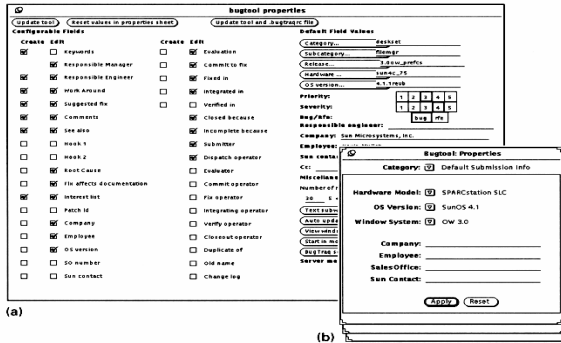


The importance of negative space from Mullet & Sano page 129

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Economy Of Visual Elements

- minimize number of controls
- include only those that are necessary
 - eliminate, or relegate others to secondary windows
- minimize clutter

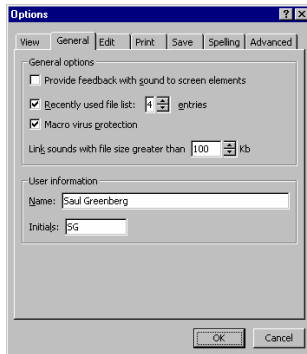


Repairing excessive display density from Mullet & Sano Page 111

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Economy Of Visual Elements (Tabs)

Excellent means for factoring related items



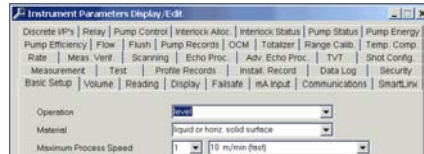
Saul Greenberg, James Tam

Economy Of Visual Elements (Tabs)

Excellent means for factoring related items



But can be overdone



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Legibility And Readability

Whenever your local SMS Administrator sends you an actual software Package, the SMS Package Command Manager will appear (usually at network logon time) displaying the available Package(s). The following screenshots display scenes similar to what you will see when you receive an actual SMS Package.

To start the demonstration, click the "OK" button of the screen.

Popkin Software's System Architect

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Legibility And Readability

If you wish to add/change network information, please select one of the following options.

- I WANT TO CONNECT TO AN EXISTING TIME & CHAOS WORKGROUP OR MODIFY THE CONNECTION SETTINGS.
- I WANT TO BUILD A BRAND NEW WORKGROUP.

Time & Chaos

These choices must be really important, or are they?

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Upper Case Text

THIS IS AN EXAMPLE OF TEXT THAT IS SHOWN ALL IN CAPITAL LETTERS. AS YOU CAN PROBABLY TELL, THE LACK OF VARIATION IN HEIGHT MAKES IT SOMEWHAT MORE DIFFICULT TO READ. THIS WHOLE PARAGRAPH JUST GOES ON AND ON WITHOUT SAYING ANYTHING SIGNIFICANT. THE OTHER SIDE EFFECT OF ALL CAPITALS IS THAT SOME PEOPLE THINK THAT IT IS THE TEXT EQUIVALENT OF SHOUTING AT SOMEONE. ALSO OTHER PEOPLE MAY THINK THAT IT IS MORE SIGNIFICANT BECAUSE IT IS ALL IN CAPITALS. THAT IS PROBABLY WHY SOME PEOPLE DO IT - IN ORDER TO GIVE THE IMPRESSION THAT THEIR MESSAGE IS REALLY IMPORTANT. BUT AS YOU HAVE PROBABLY ASCERTAINED (ASSUMING THAT YOU HAVE EVEN READ THIS FAR) THAT PUTTING TEXT ALL IN CAP'S IS SIMPLY TOO PAINFUL TO READ.

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Legibility And Readability

- Characters, symbols, graphical elements should be easily noticeable and distinguishable

Text set in
Helvetica

TEXT SET IN
CAPITOLS

Text set in
Times Roman

Text set in
Braggadocio

Text set in
Courier

✓

✗

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Legibility And Readability

Proper use of typography

- 1-2 typographical effects (typeface or typography) - 3 max
 - Font types, normal, italics, bold, underline
- 1-3 fonts sizes max

Large
Medium
Small

Large
Medium
Small

Readable

Design components to be
inviting and attractive

Design components to be
inviting and attractive

✓

Unreadable

Design components to be
inviting and attractive

Design components to be
inviting and **attractive**

✗

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Legibility And Readability

- typesetting
 - point size
 - word and line spacing
 - line length
 - indentation
 - color

Readable

Design components to be inviting and attractive

Design components to be inviting and attractive

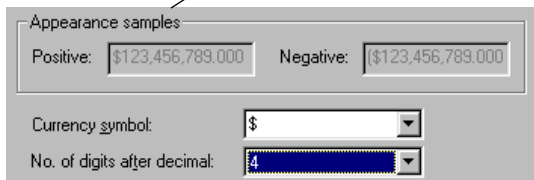


Unreadable: Design components to be easy to interpret and understand. Design components to be inviting and attractive



Legibility And Readability

Grayed-out example text hard to read. Why not make it black?



Regional Preferences applet in *Windows95*

Text orientation makes it difficult to read



Imagery

Signs, icons, symbols

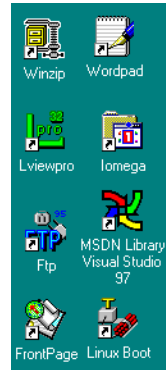
- right choice within spectrum from concrete to abstract



BOOZE!

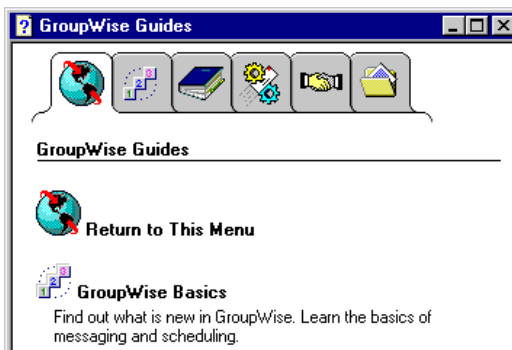
Icon design *very* hard

- except for most familiar, always label them



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An Example Of Why Icon Design Is Hard



Novell GroupWise 5.1:

What do these images mean?

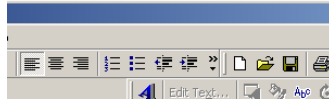
- No tool tips included
- One of the tabs is a glossary explaining these images! Which one?

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Imagery (Continued)

Image position and type should be related

- image “family”

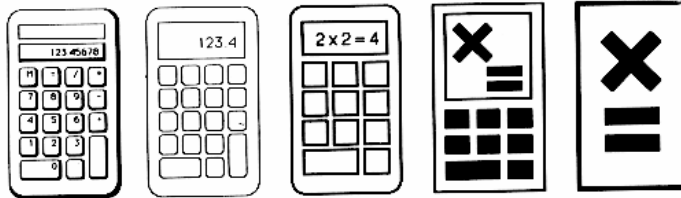


- don't mix metaphors

Consistent and relevant image use

- not gratuitous
- identifies situations, offerings...

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x

x

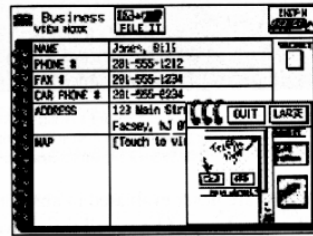
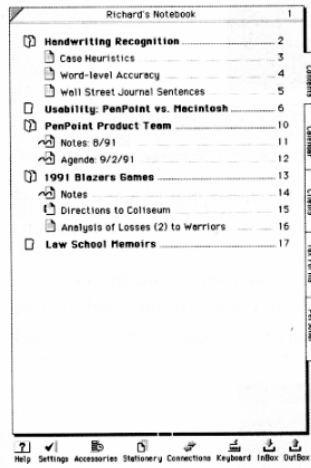
✓

✓

x

*Choosing levels of abstraction
from Mullet & Sano Page 174*

Saul Greenberg, James Tam



✓

✗

Refined vs excessive literal metaphors
from Mullet & Sano page 25

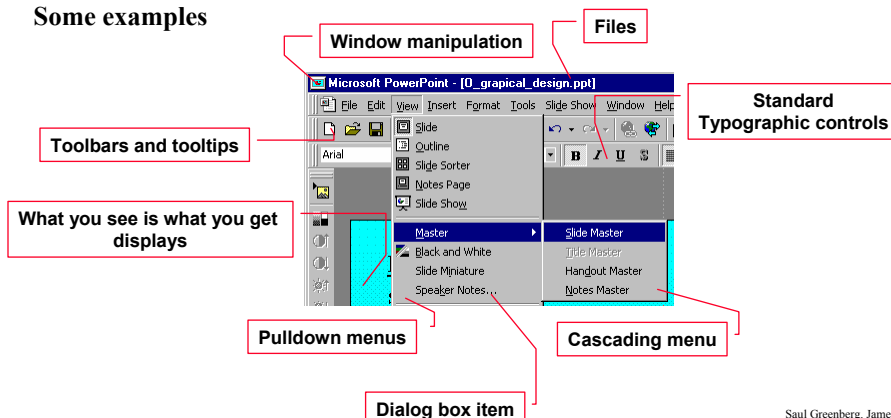
Saul Greenberg, James Tam

Idioms

Familiar ways of using GUI components

- appropriate for casual to expert users
- builds upon computer literacy
- must be applied carefully in walk up and use systems

Some examples

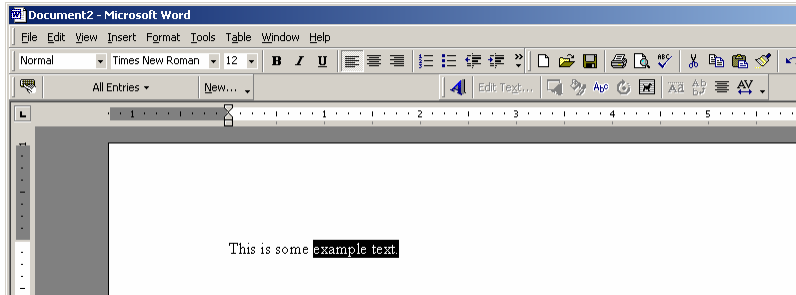


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How To Choose Between Widgets

1 What components *must* be in the display

- necessary visual affordances
- frequent actions
 - direct manipulation for core activities
 - buttons/forms/toolbar/special tools for frequent/immediate actions
 - menus/property window for less frequent actions
 - secondary windows for rare actions



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How To Choose Between Widgets (Continued)

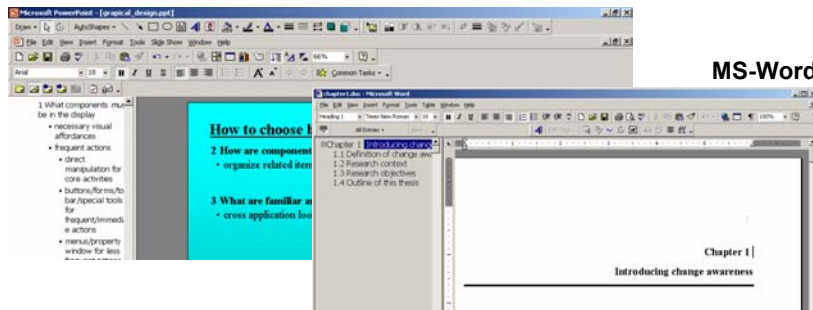
2 How are components related?

- organize related items as “chunks”

3 What are familiar and expected idioms?

- cross application look and feel

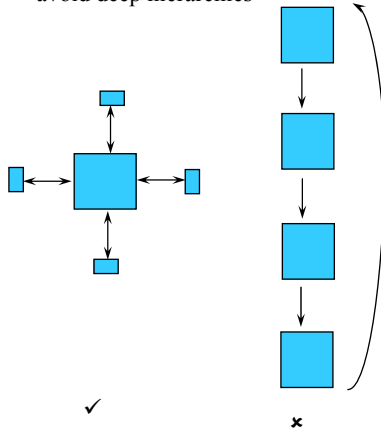
MS-PowerPoint



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Widgets And Complexity

- how can window navigation be reduced?
 - avoid long paths
 - avoid deep hierarchies



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What You Now Know

Grids are an essential tool for graphical design

Important visual concepts include

- visual consistency
 - repetition
- visual organization
 - contrast, alignment and navigational cues
- visual relationships
 - proximity and white space
- familiar idioms
- legibility and readability
 - typography
- appropriate imagery

Saul Greenberg, James Tam

Interface Design and Usability Engineering

