

# Graphical Screen Design

CRAP – contrast, repetition, alignment, proximity

Grids are an essential tool for graphical design

Other visual design concepts

- |                   |                            |
|-------------------|----------------------------|
| consistency       | relationships              |
| organization      | legibility and readability |
| navigational cues | appropriate imagery        |
| familiar idioms   |                            |

Major sources: Designing Visual Interfaces, Mullet & Sano, Prentice Hall / Robin Williams Non-Designers Design Book, Peachpit Press

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## CRAP

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### Contrast

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

### Repetition

- repeat design throughout the interface
- consistency
- creates unity

### Alignment

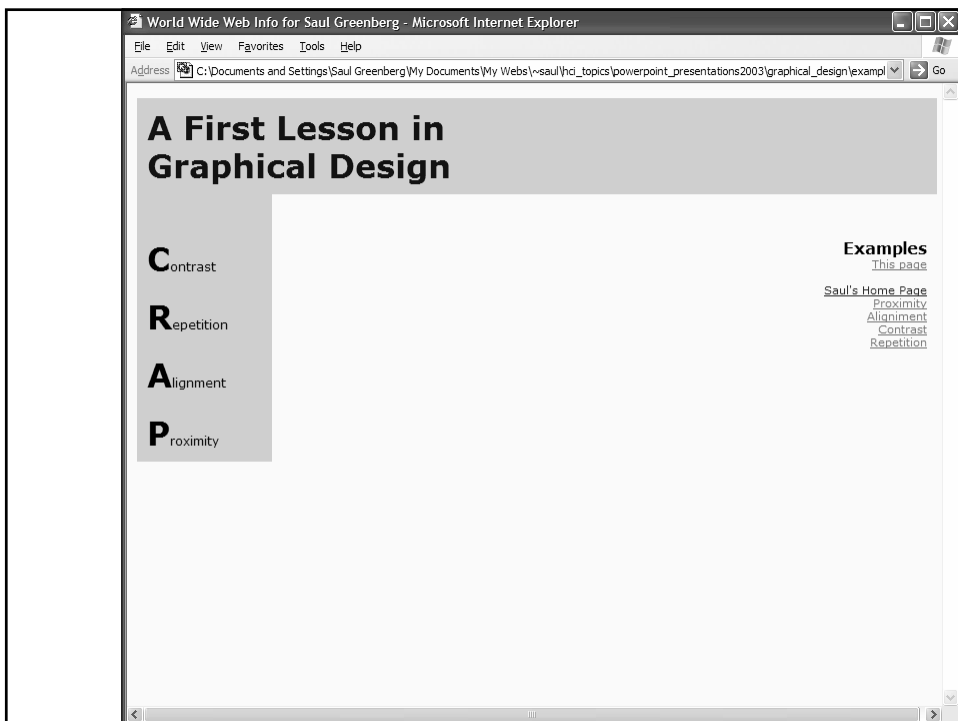
- visually connects elements
- creates a visual flow

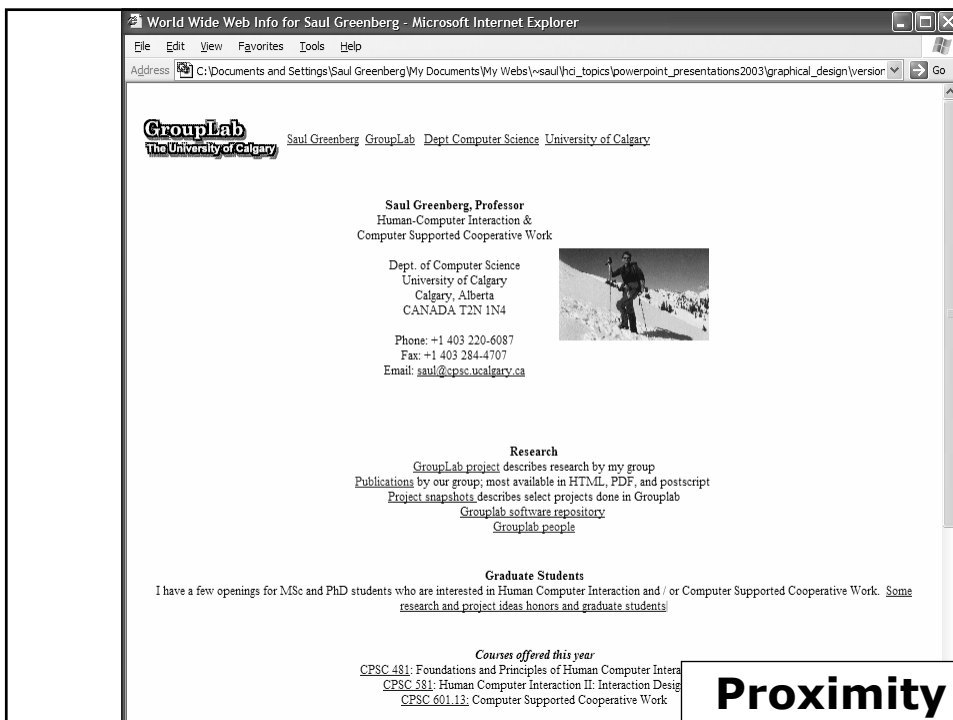
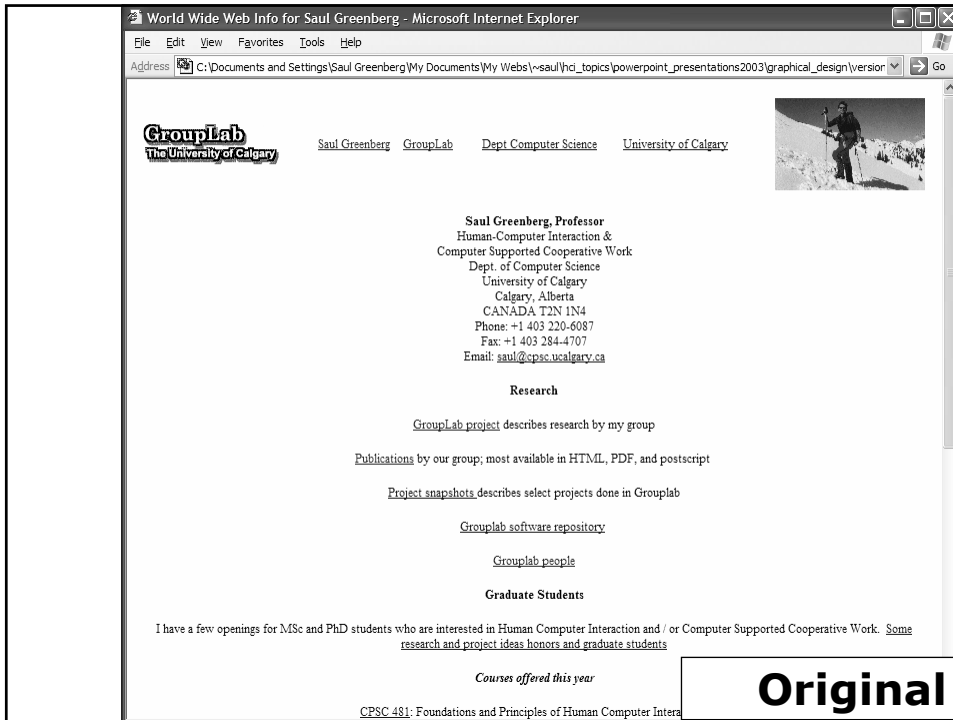
### Proximity

- groups related elements
- separates unrelated ones

Robin Williams Non-Designers Design Book, Peachpit Press

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World Wide Web Info for Saul Greenberg - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address C:\Documents and Settings\Saul Greenberg\My Documents\My Webs\~saul\hdi\_topics\powerpoint\_presentations2003\graphical\_design\version Go


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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 Interaction  
[CPSC 581](#): Human Computer Interaction II: Interaction Design  
[CPSC 601.13](#): Computer Supported Cooperative Work

**Previous Years:** [CPSC 681](#): Research Methodologies in Human Computer Interaction  
[CPSC 699](#): Research Methodology for Computer Science (old!)  
[CPSC 601.48](#): Special Topics: Heuristic Evaluation

**Alignment**

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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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[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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Saul Greenberg GroupLab  
The University of Calgary


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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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SENG 609.05 Graphical User Interfaces: Design and Usability  
SENG 609.06 Special Topics in Human Computer Interaction  
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**Administration** Ethics Committee for research with human subjects

Last updated: March 20, 1997

# Repetition

## Grids

Horizontal and vertical lines to locate window components

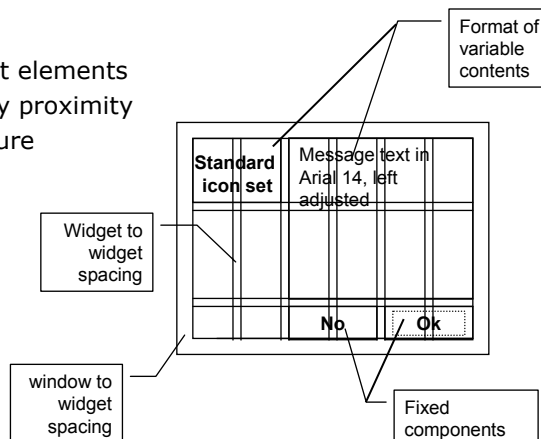
- aligns related components

Organization

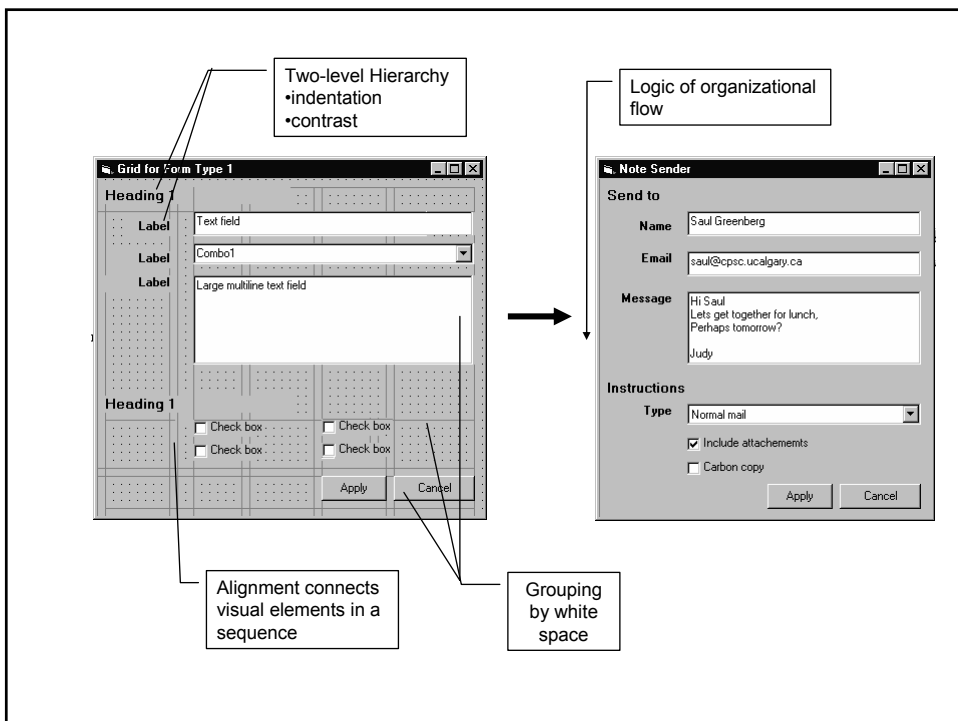
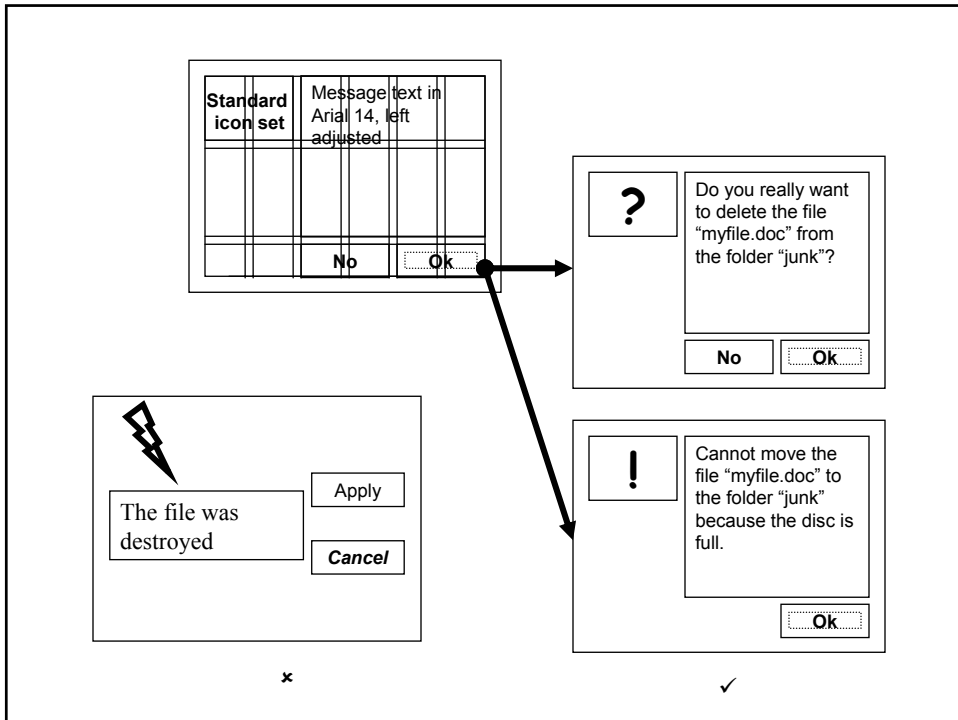
- contrast for dominant elements
- element groupings by proximity
- organizational structure
- alignment

Consistency

- location
- format
- element repetition
- organization



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## Visual consistency (repetition)

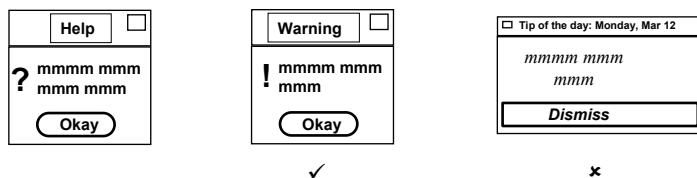
internal consistency

- elements follow same conventions and rules
- set of application-specific grids enforce this

external consistency

- follow platform and interface style conventions
- use platform and widget-specific grids

deviate only when it provides a clear benefit to user



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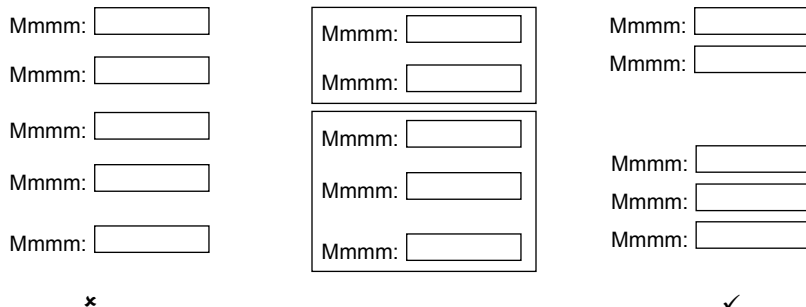
## Relating screen elements

proximal clusters

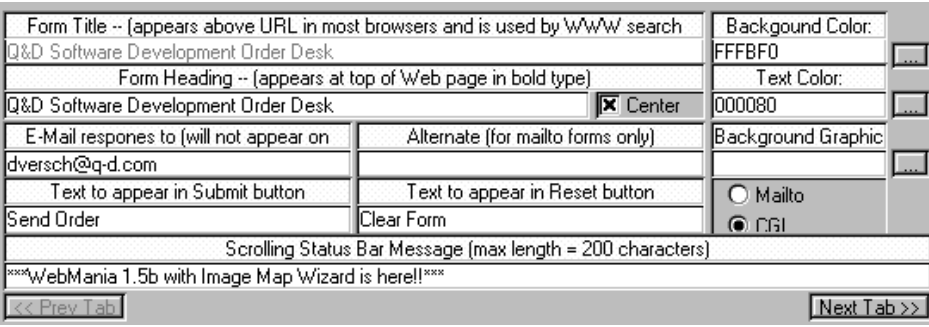
alignment

white (negative) space

explicit structure



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Form Title -- (appears above URL in most browsers and is used by WWW search)  
Q&D Software Development Order Desk

Form Heading -- (appears at top of Web page in bold type)  
Q&D Software Development Order Desk

E-Mail responses to (will not appear on)  
dversch@q-d.com

Text to appear in Submit button  
Send Order

Text to appear in Reset button  
Clear Form

Alternate (for mailto forms only)  
[X] Center

Background Color:  
FFFBF0

Text Color:  
000080

Background Graphic:  
[ ] Mailto  
[X] CGI

Scrolling Status Bar Message (max length = 200 characters)  
\*\*\*\*WebMania 1.5b with Image Map Wizard is here!!\*\*\*\*

Terrible alignment

- no flow

Poor contrast

- cannot distinguish colored labels from editable fields

Poor repetition

- buttons do not look like buttons

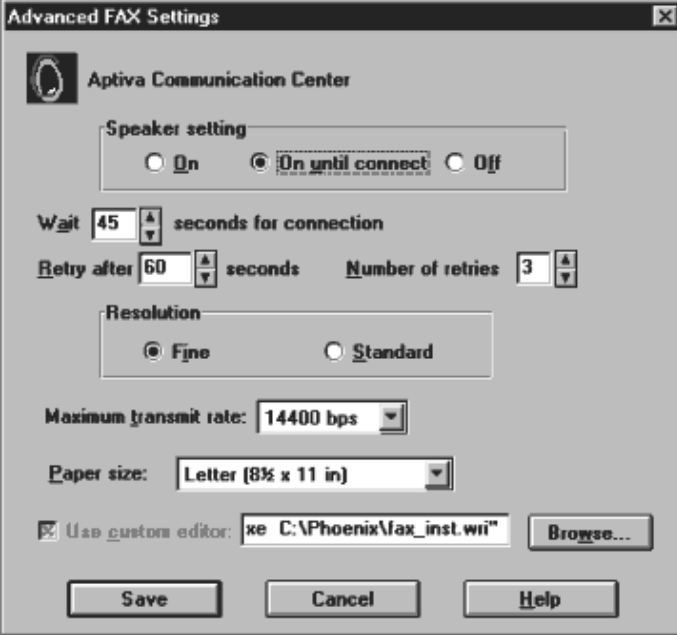
Poor explicit structure

- blocks compete with alignment

Webforms

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No regard for order and organization



Advanced FAX Settings

Aptiva Communication Center

Speaker setting  
[ ] On [X] On until connect [ ] Off

Wait 45 seconds for connection

Retry after 60 seconds Number of retries 3

Resolution  
[X] Fine [ ] Standard

Maximum transmit rate: 14400 bps

Paper size: Letter (8 1/2 x 11 in)

Use custom editor: xe C:\Phoenix\Vax\_inst.wri

Save Cancel Help

IBM's Aptiva Communication Center



Haphazard layout

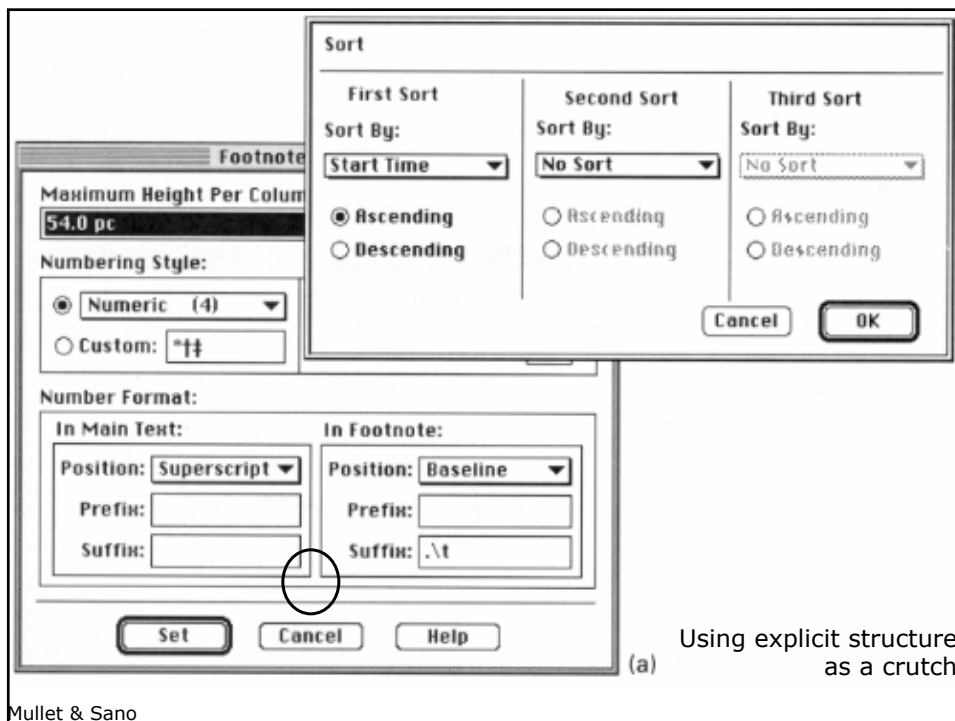
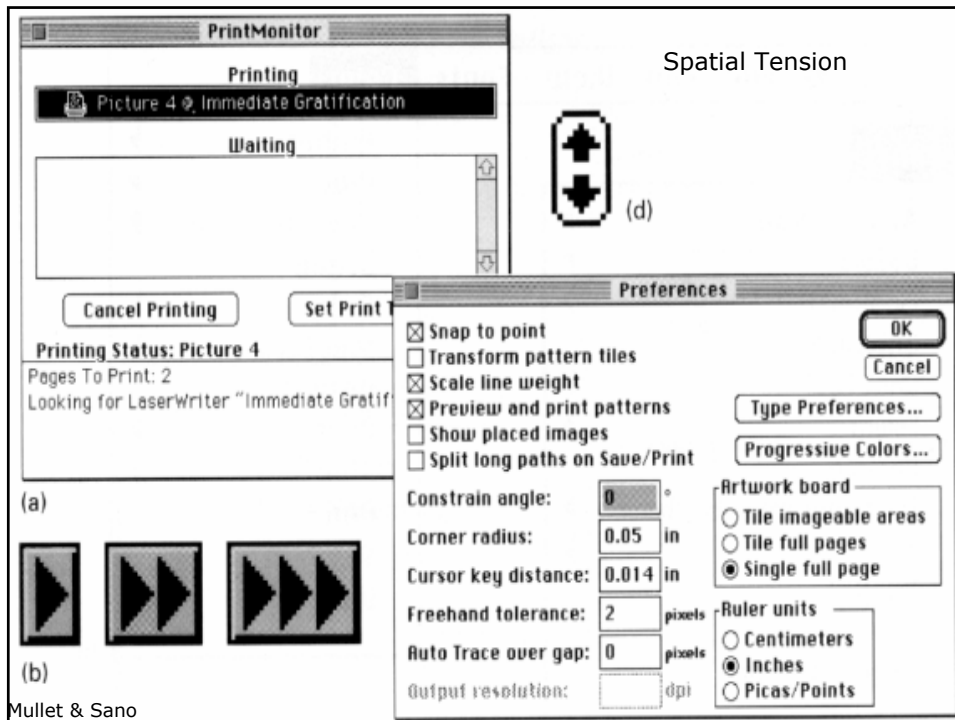
The screenshot shows the 'xbugtool 2.0 Beta 2' interface. The top bar contains a dense row of buttons: Load, Store, Submit, View, Print, Reset, Props, Gen. Help, and an Update lists button. Below this, the 'Bug id:' field is followed by 'Cc:' and 'Mode: Edit Create'. The main form area is crowded with various input fields and buttons. On the left, there are dropdowns for 'Category', 'Subcategory...', 'Resp Mgr...', and 'State'. To the right, there are priority and severity grids (1-5), a 'Bug/Rfe' field with 'bug' and 'rfe' options, and a 'Responsible Engineer:' field. The 'Synopsis:' field is followed by a 'Keywords:' field. Below these are tabs for 'Description', 'Work around', 'Suggested fix', 'Comments', and 'Public summary'. The 'State triggers:' section contains a list of buttons: Evaluation, Commit to fix in rel..., Fixed in releases..., Integrated in releases..., Verified in releases..., Closed because, and Incomplete because. Further down are 'Root cause...' and 'Fix affects docs' buttons. The bottom section includes 'Duplicate of:', 'Patch id:', 'History:', 'Generic SVR4 problem?' (with 'no' and 'yes' buttons), 'Dispatch operator', 'Evaluator', 'Committ operator', and 'Fix operator', each with a corresponding 'Date:' field. The 'Interest list:' and 'See also (bugids):' fields are also present.

Mullet & Sano

Repairing the layout

The screenshot shows the 'Bugtool' interface with a clean, organized layout. The top bar has buttons for Report, View, Props, Help, and Mode: Create Edit. The form is divided into clear sections. The top section contains 'Bug ID:', 'Category: XView', 'Subcategory: library', 'Release: 1.0', 'Status: Submitted', 'Type: Bug RFE', 'Priority: 1 2 3 4 5', and 'Severity: 1 2 3 4 5'. Below this are fields for 'Synopsis:', 'Keywords:', 'Pub Summary:', 'See also:', and 'Interest List:'. A tabbed interface at the bottom shows 'Description', 'Work Around', 'Suggested Fix', 'Comments', and 'Evaluation'. The 'Description' tab is active, showing a large text area. Below the text area, there are fields for 'Root Cause: documentation-confusing', 'Same as:', 'Resp Mgr: none', 'Resp Engr: none', 'Hook 1:', 'Hook 2:', 'Flags: Fix Affects Documentation', and 'Generic SVR4 Problem'.

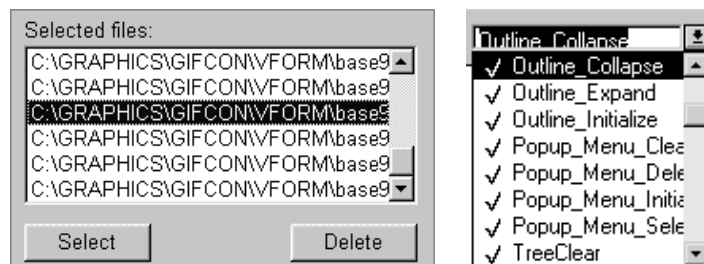
Mullet & Sano





Overuse of 3-d effects makes the window unnecessarily cluttered

WebForms



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

GIF Construction Set

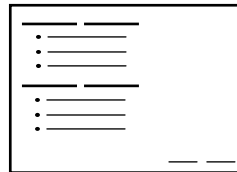
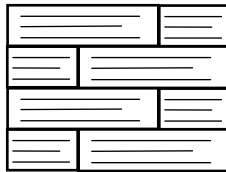
Microsoft Access 2.0

## Navigational cues

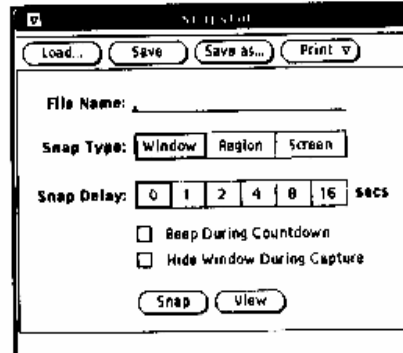
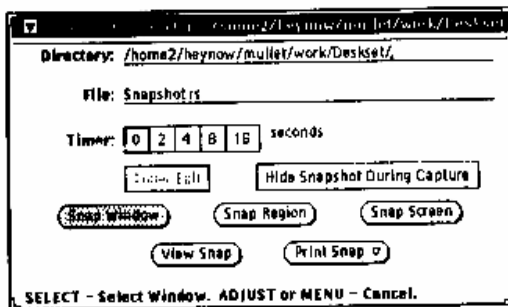
provide initial focus

direct attention as appropriate to important 2ndary, or peripheral items as appropriate

order should follow a user's conceptual model of sequences

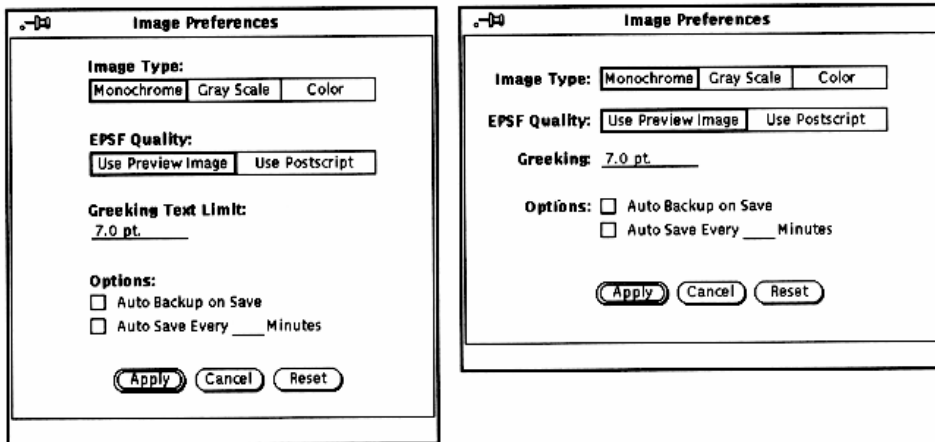


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Redesigning a layout using alignment and factoring

Mullet & Sano



The importance of negative space and alignment

Mullet & Sano

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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

- so information is not hidden

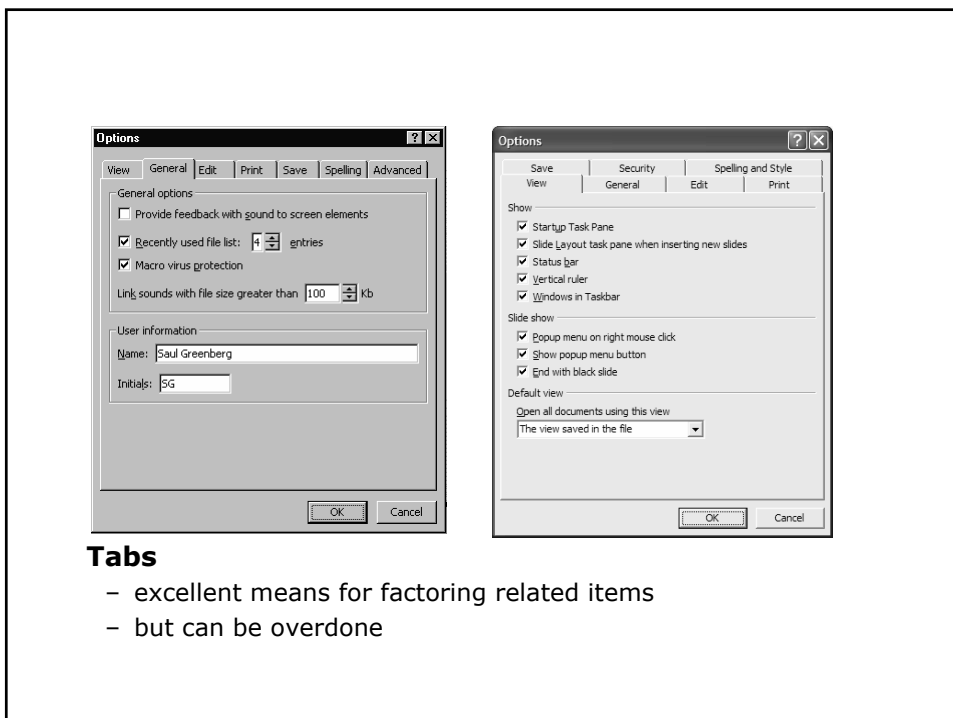
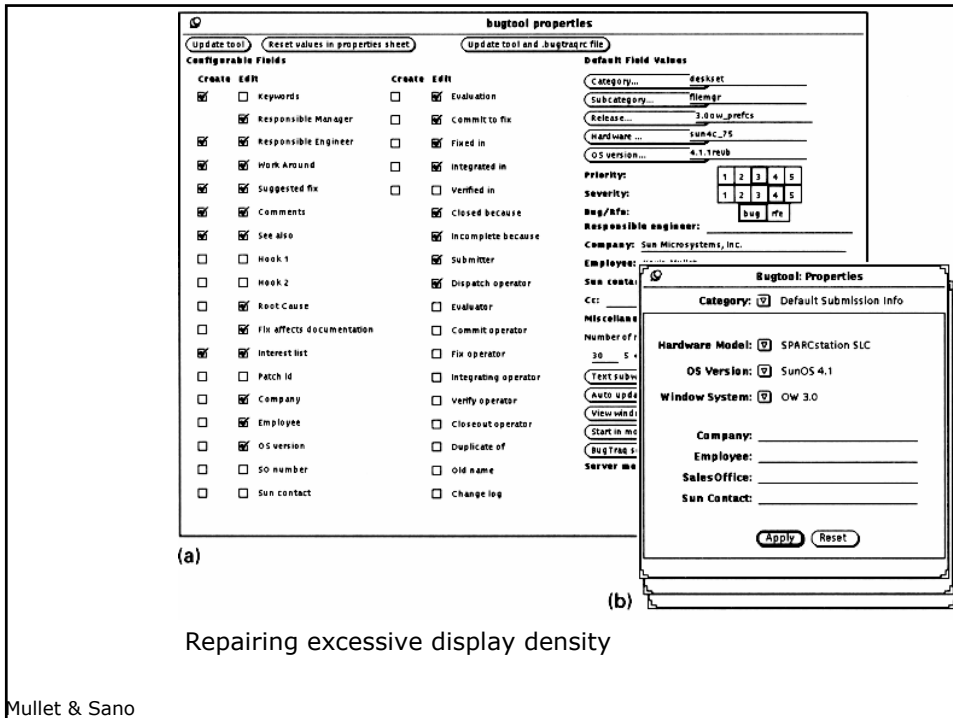
Diagram illustrating a cluttered interface layout (marked with an 'x' for poor design). It shows a form with multiple labels and input fields, including 'xxx: \_\_\_\_\_' and 'NNNN', with controls (radio buttons) placed below the labels, leading to a dense and less organized appearance.

Diagram illustrating a clean interface layout (marked with a checkmark for good design). It shows a form with labels and input fields, including 'NNNN' and 'MMMM', with controls (radio buttons) placed to the right of the labels, resulting in a more organized and less cluttered appearance.

x

✓

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## **Legibility and readability**

Characters, symbols, graphical elements should be easily noticable and distinguishable

Text set in  
Helvetica

Text set in  
Times Roman

✓

TEXT SET IN  
CAPITOLS

Text set in  
Braggadocio

Text set in  
Courier

✗

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## **Legibility and readability**

Proper use of typography

- 1-2 typefaces (3 max)
- normal, italics, bold
- 1-3 sizes max

Large  
Medium  
Small

### **Readable**

Design components to be  
inviting and attractive

Design components to be  
inviting and attractive

✓

Large  
Medium  
Small

### **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

✗

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*Whenever your local SMS Administrator sends you an actual software Package, the SMS Package Command Manager will appear (usually at network login 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.*



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.

These choices must be really important, or are they?

Time & Chaos

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

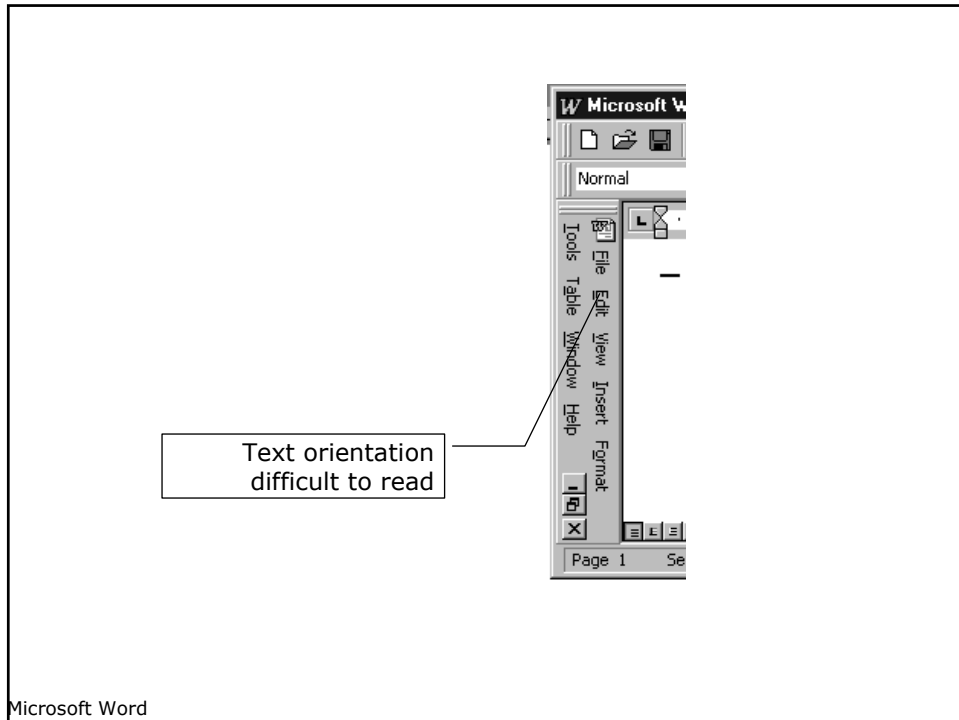
Appearance samples

Positive:	<input type="text" value="\$123,456,789.000"/>	Negative:	<input type="text" value="(\$123,456,789.000)"/>
-----------	--	-----------	--

Currency symbol:

No. of digits after decimal:

Regional preferences in Windows 95



## Imagery

Signs, icons, symbols

- right choice within spectrum from concrete to abstract

Icon design *very* hard

- except for most familiar, always label them

Image position and type should be related

- image "family"

Consistent and relevant image use

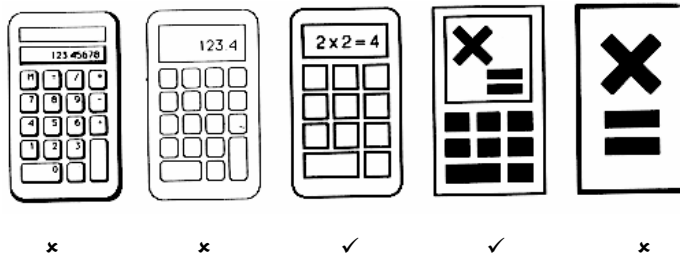
- identifies situations, offerings...



Partial icon family

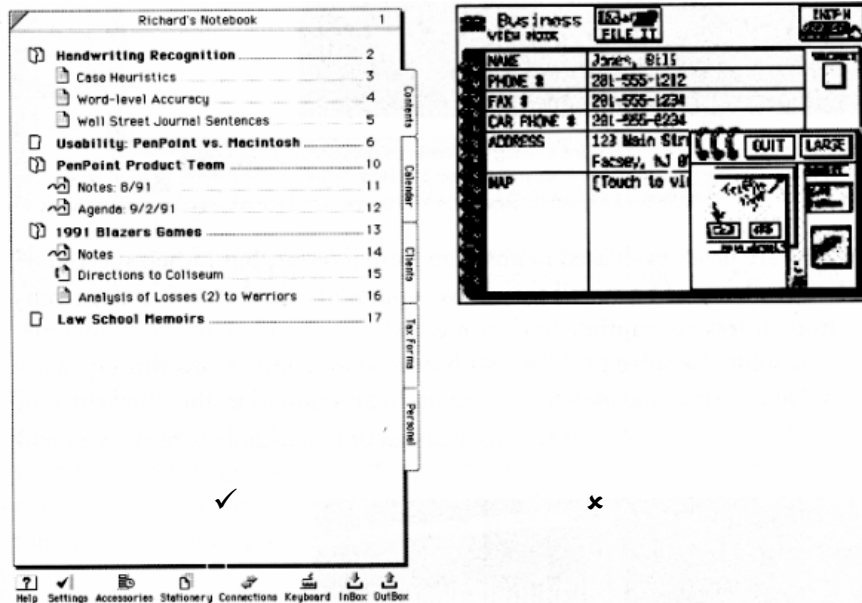
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### Choosing levels of abstraction

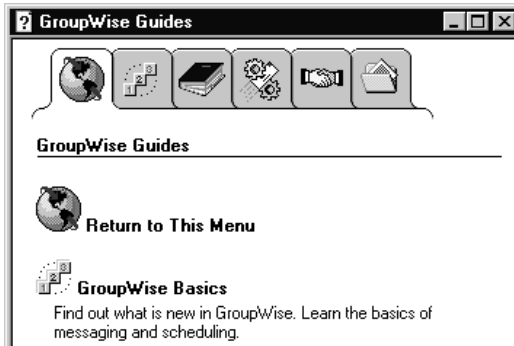


Mullet & Sano

### Refined vs excessive literal metaphors



Mullet & Sano



What do these images mean?

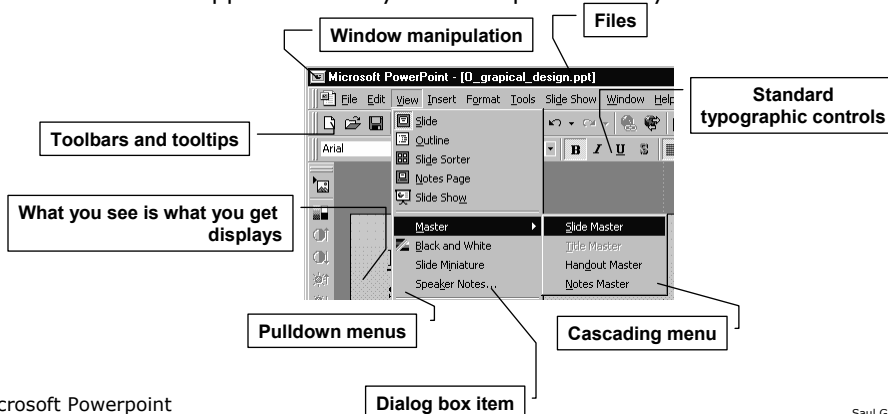
- no tooltips included
- one of the tabs is a glossary explaining these images! which one?

Novell GroupWise 5.1

## 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



Microsoft Powerpoint

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## How to choose between widgets

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

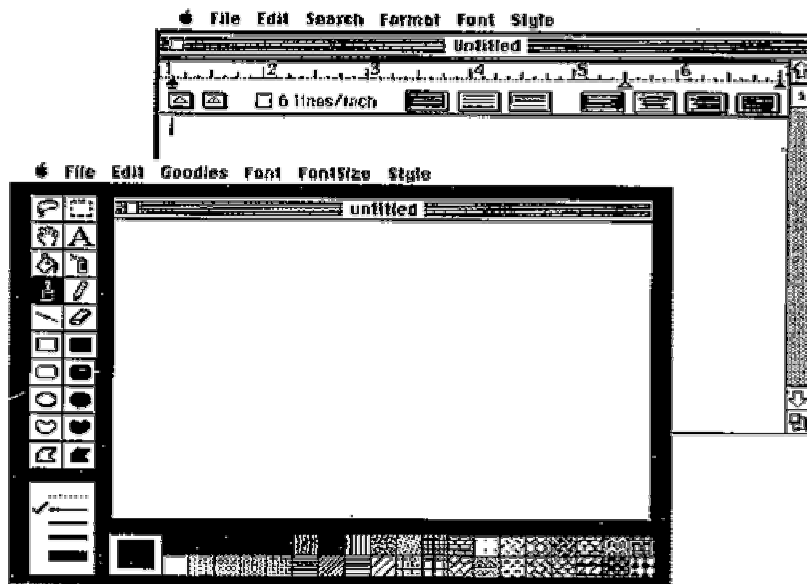
How are components related?

- organize related items as “chunks”

What are familiar and expected idioms?

- cross application look and feel

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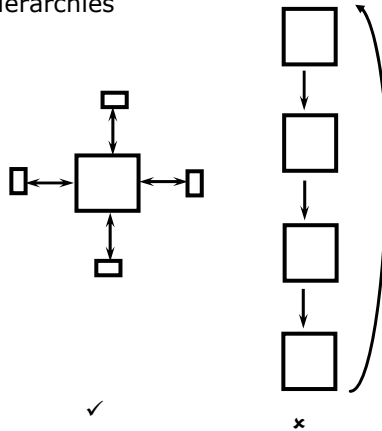
*Displaying core functionality*

Apple MacPaint & Macwrite, from

## Widgets and complexity

how can window navigation be reduced?

- avoid long paths
- avoid deep hierarchies



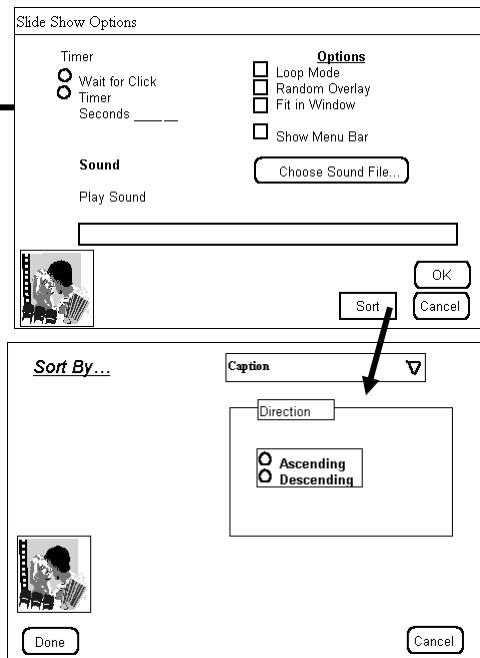
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## Exercise

Graphical redesign

Create a grid emphasising:

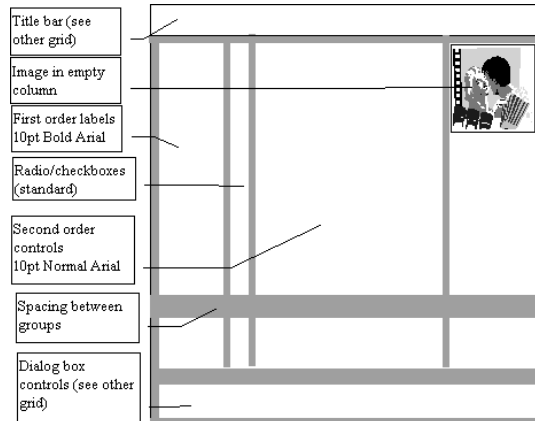
- visual consistency
- relationships between screen elements
- navigational cues
- economy
- legibility and readability
- imagery



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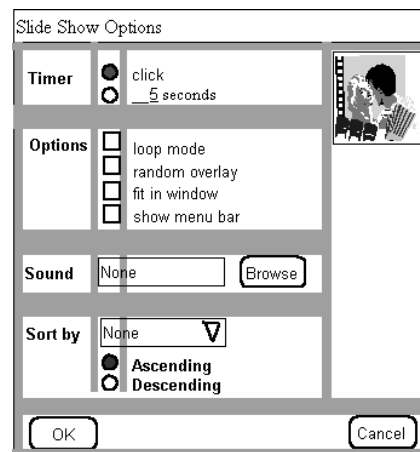
## Constructing a grid

1. Maintain consistency with GUI style
  - locate standard components - title bar, window controls, ...
2. Decide navigational layout + white space + legibility + typography
  - annotated grid shows location of generic components
  - these generic components may have their own grids.



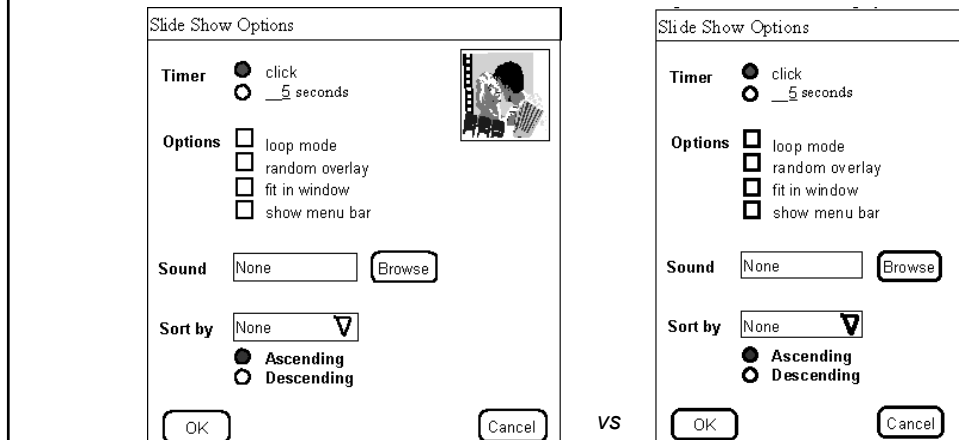
## Using the grid

3. Determine relationships, navigational structure
  - map navigational structure onto the grid
4. Economize
  - collapse two windows into one
  - trim sound dialog



## Using the grid

5. Evaluate by displaying actual examples
6. Economize further
  - decide which we prefer



## What you now know

CRAP

Grids are an essential tool for graphical design

Other 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

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