



Screen design and layout

Generic design guidelines

Readings:

Dix et al:

Chapter 5. Section on Screen Design and Layout

Chapter 7. Section 7.5 on Golden Rules and Heuristics (Schneiderman + Norman)



Basic principles at the screen level

- Ask: What is the user doing
- Think: What information is required
- Design: Form follows function



Tools for layout

- grouping of items
- order of items
- decoration - fonts, boxes etc.
- alignment of items
- white space between items

Key issue: combining structure and style

grouping and structure

logically together \Rightarrow physically together

Billing details:

Name

Address: ...

Credit card no

Delivery details:

Name

Address: ...

Delivery time

Order details:

item

size 10 screws (boxes)

.....

quantity cost/item cost

7 3.71 25.97

...

Grouping for data comparison

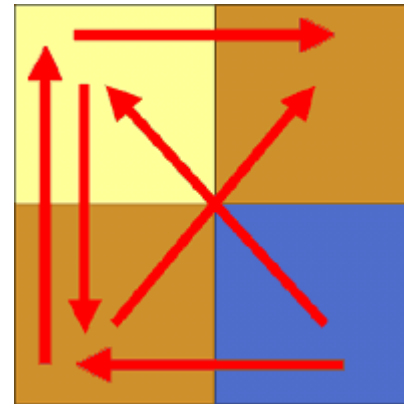
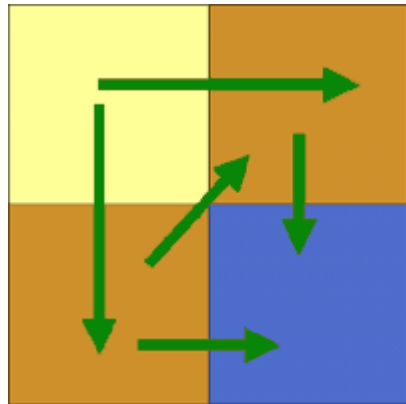
Cost		Output	
Actual	Predicted	Actual	Predicted
947	901	83	82
721	777	57	54
475	471	91	95

Order of groups and items

- Group data by the natural sequence of use (from task analysis, HTA)
- **Flow of control** –how users progress through a screen when doing their work
- Flow of control means that the focus of activity moves across a screen or page while the user performs a certain task.
- Flow of control is important for
- (1) efficiency in performing a task
- (2) transparency and understandability of a screen or page.

A “natural” flow of control

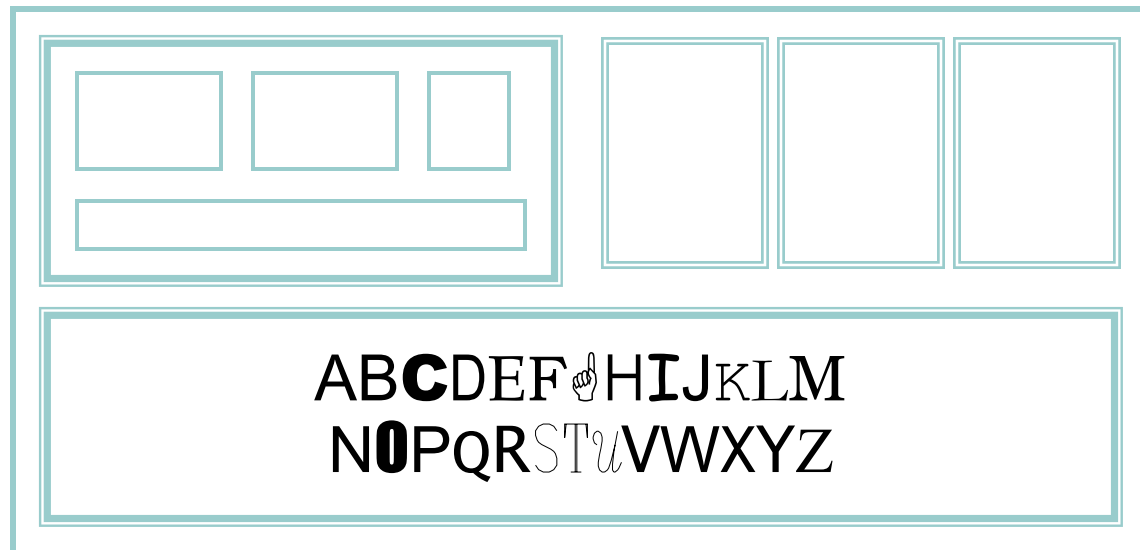
- cultural constraints
- for Western cultures the natural flow is from left to right and from top to bottom



Which flow of control is correct?

Layout Hierarchy

- use boxes to group logical items
- use fonts for emphasize groupings, headings
- but not too many!!



Containers and non-containers

- Screen or page elements can either be **containers** or **non-containers**.
 - containers can contain other elements; non-containers cannot.
- ! Too much nesting can visually overload a page

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[SAP University America](#)
[SAP Training Catalog](#)

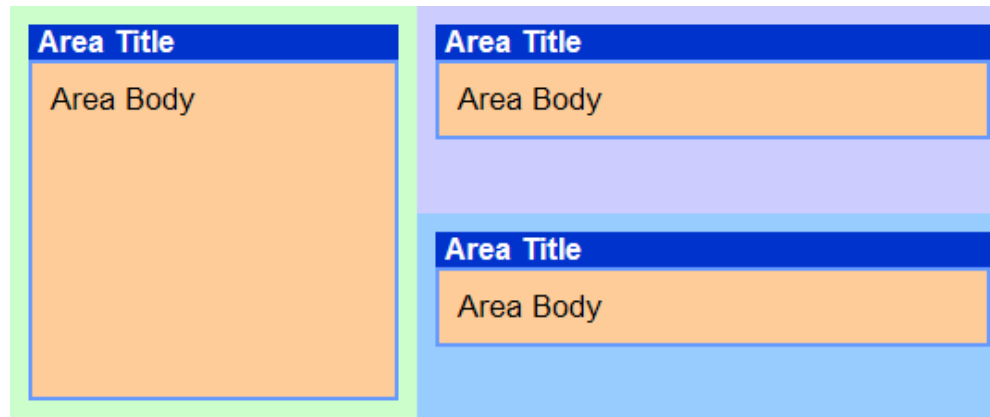


Table View

	Course	Course #	Location	Training Facility	Date
<input type="radio"/>	HTML Basics I	50000484	Walldorf	Training Center Walldorf	12/01/2001
<input type="radio"/>	HTML Basics II	50000485	Zürich	Training Center Zürich	12/01/2001
<input type="radio"/>	Web Design Beginners	50000486	Wien	Training Center Wien	12/01/2001
<input type="radio"/>	Web Design Advanced	50000733	Los Angeles	Training Center Los Angeles	12/01/2001
<input checked="" type="radio"/>	Java Basics	50000734	Philadelphia	Training Center Philadelphia	12/01/2001
<input type="radio"/>	Javascript Basics	50000736	Atlanta	Training Center Atlanta	12/01/2001

1/3

A simple application pattern



Area on the left: overview list (affords for selecting a certain item)

The selected item is displayed in the upper right area: it may contain other sub-items (nesting)

Details of the selected item (or its sub-items) can be inspected in the lower right area.

A real-world web application

The screenshot displays a web application titled "Goods Entry Application". It features a sidebar on the left with a list of 19 shipments, where "Shipment 5" is highlighted. The main content area is divided into three sections: "Shipment Overview", "Item Details", and "Detail Data".

Shipment Overview

- Order item 1
- Order item 2
- Order item 3**
- Order item 4

Buttons: Details, Cancel

Item Details

Order item:

Item name:

Detail Data

Description:

Number of items:

Price per item:

USD

Deduction: yes no

Buttons: Save, Reset

Decoration: changing the look but not the concept

Goods Entry Application

Shipments

- Shipment 1
- Shipment 2
- Shipment 3
- Shipment 4
- **Shipment 5**
- Shipment 6
- Shipment 7
- Shipment 8
- Shipment 9
- Shipment 10
- Shipment 11
- Shipment 12
- Shipment 13
- Shipment 14
- Shipment 15
- Shipment 16
- Shipment 17
- Shipment 18
- Shipment 19

Shipment Overview

- Order item 1
- Order item 2
- **Order item 3**
- Order item 4

Item Details

Order item

Item name

Detail Data

Description

Number of items

Price per item
USD

Deduction yes no

Decoration: changing the look but not the concept

The screenshot displays the 'Goods Entry Application' interface. On the left, a 'Shipments' list contains 19 items, with 'Shipment 5' highlighted in blue. The main area is divided into two sections: 'Shipment Overview' and 'Item Details'. The 'Shipment Overview' section shows a list of order items (1, 2, 3, 4), with 'Order item 3' selected and highlighted in blue. Below this list are 'Details' and 'Cancel' buttons. The 'Item Details' section contains input fields for 'Order item' (value: 3), 'Item name', 'Description', 'Number of items', and 'Price per item' (with a 'USD' label). It also includes radio buttons for 'Deduction' (options: 'yes', 'no') and 'Save' and 'Reset' buttons at the bottom.

Goods Entry Application

Shipments

- Shipment 1
- Shipment 2
- Shipment 3
- Shipment 4
- Shipment 5**
- Shipment 6
- Shipment 7
- Shipment 8
- Shipment 9
- Shipment 10
- Shipment 11
- Shipment 12
- Shipment 13
- Shipment 14
- Shipment 15
- Shipment 16
- Shipment 17
- Shipment 18
- Shipment 19

Shipment Overview

- Order item 1
- Order item 2
- Order item 3**
- Order item 4

Details Cancel

Item Details

Order item

Item name

Detail Data

Description

Number of items

Price per item

USD

Deduction yes no

Save Reset

Decoration: changing the look but not the concept

Goods Entry Application

Shipments

- Shipment 1
- Shipment 2
- Shipment 3
- Shipment 4
- **Shipment 5**
- Shipment 6
- Shipment 7
- Shipment 8
- Shipment 9
- Shipment 10
- Shipment 11
- Shipment 12
- Shipment 13
- Shipment 14
- Shipment 15
- Shipment 16
- Shipment 17
- Shipment 18
- Shipment 19

Shipment Overview

- Order item 1
- Order item 2
- **Order item 3**
- Order item 4

Item Details

Order item

Item name

Detail Data

Description

Number of items

Price per item

USD

Deduction yes no



Simplicity

- “Perfection is achieved not when there is nothing more to add, but when there is nothing left to take away” (Antoine de St-Exupery)
- “Simplicity does not mean the absence of any decor...It only means that the decor should be belong intimately to the design proper, and that anything foreign to it should be taken away”
- “Keep it simple, stupid” (KISS)

Techniques for simplicity: reduction

- Remove inessential elements
- Decide what essentially needs to be conveyed by design
- Examine every element (label, control, color, line width) to decide whether it serves an essential purpose
- Remove it if it is not essential

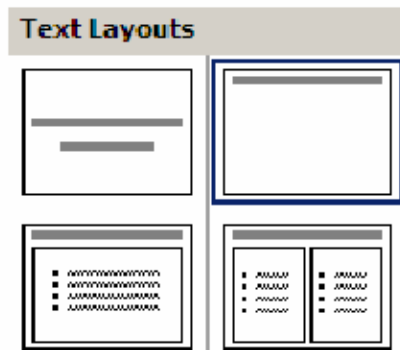


Techniques for simplicity: regularity

- Use a regular pattern in your screen layout
 - Use same font, color, line width, dimensions, orientation for items at an equal hierarchical level.
- Limit inessential variation among elements

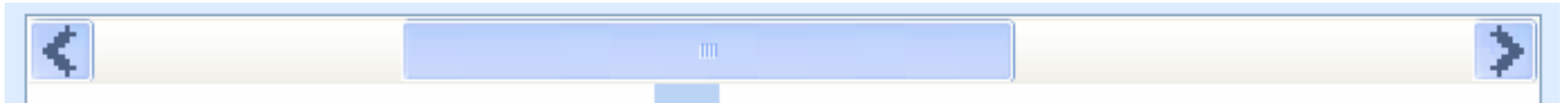
Why?

- irregularities in your design will be magnified in the user's eyes and assigned meaning and significance.



Techniques for simplicity: double-duty

- Combine elements and make them serve multiple roles in the design
- Example: scroll bar thumb
 - affords for dragging
 - indicates the position of the scroll window relative to the entire document
 - indicates the fraction of the document displayed in the scroll window.

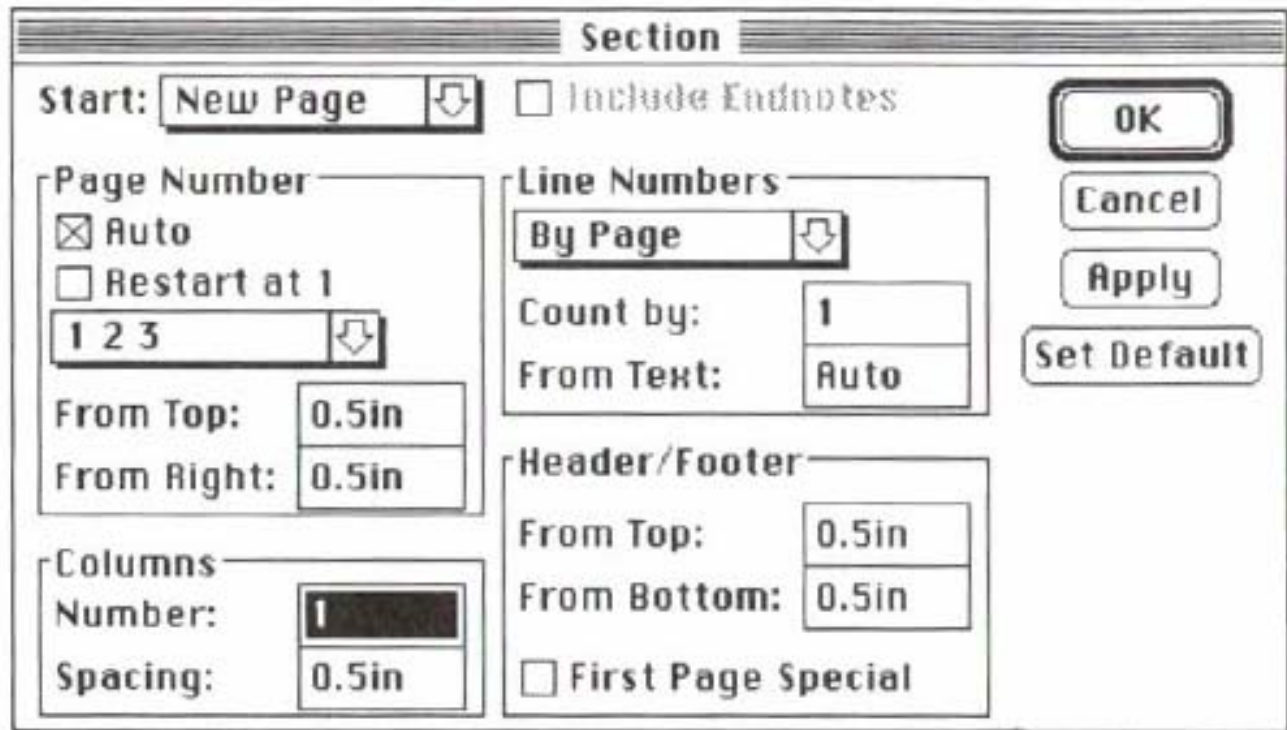




White space

- Essential role in screen layout
- Real estate issue vs insufficient white space
- Use margins to draw eye around design
- Integrate figure and ground
 - Object should be scaled proportionally to its background
- Don't crowd controls together
 - Crowding creates spatial tension and inhibits scanning

Crowded dialog



Source: Mullet & Sano, p. 110

Interface Design and Usability Engineering

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 tasks

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

Products:

User and task descriptions

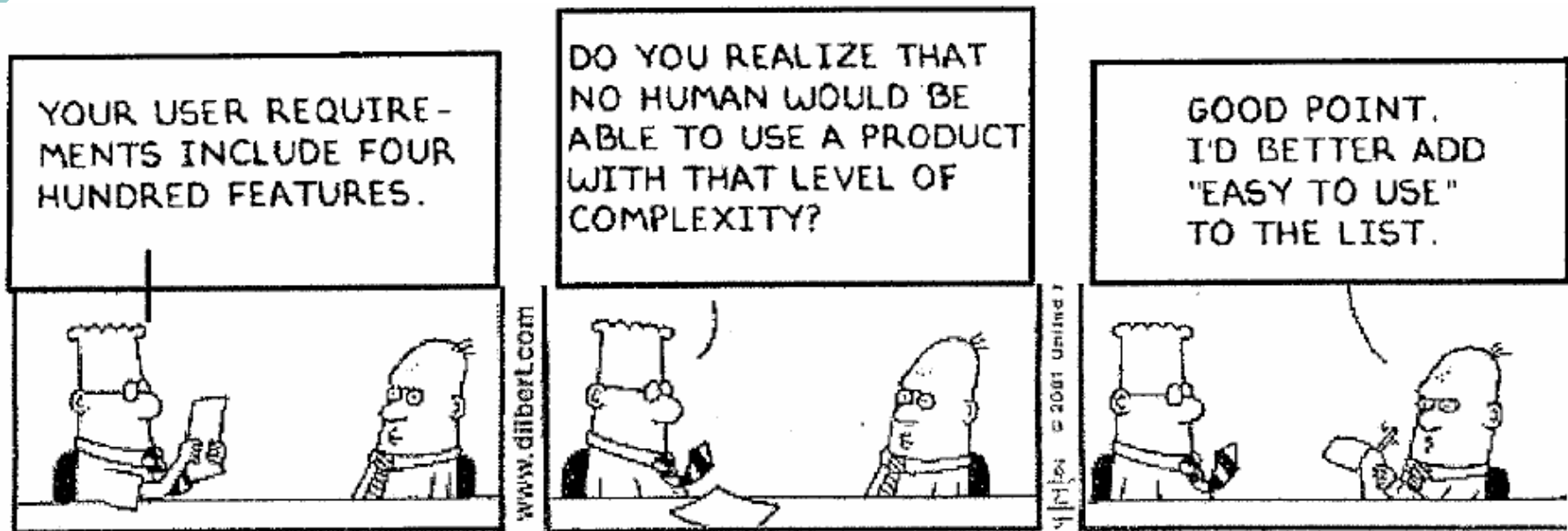
Throw-away paper prototypes

Testable prototypes

Alpha/beta systems or complete specification

Design guidelines

- Readings: Dix 7.5



Heuristics=usability guidelines

- Plenty to choose from
 - Nielsen's 10 principles
 - Norman's rules from Design of Everyday Things
 - Schneiderman's eight golden rules
 - Mac, Windows guidelines
- Help designers choose design alternatives
- Help evaluators find problems in interfaces ("heuristic evaluation")

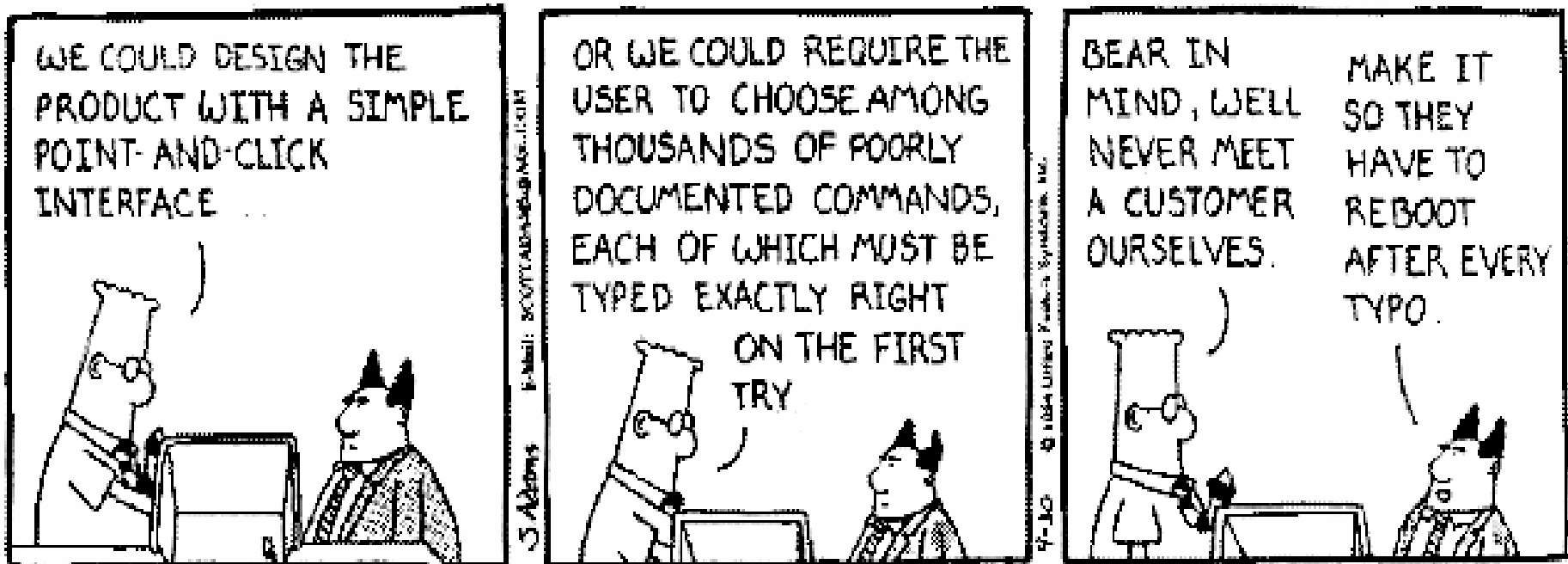
Guidelines from earlier lectures

- User-centred design
 - Know your users
 - Understand their task
- Fitz's Law
 - Tiny controls are hard to hit
 - Screen edges are precious
- Colour guidelines
 - Don't depend solely on colour cues (colour blindness)
 - Avoid red on blue text (chromatic aberration)
- Memory: use chunking to simplify information presentation
 - Minimize working memory
 - Recognition rather than recall
- Schneiderman's principles in direct manipulation

Schneiderman's eight golden rules

1. Strive for consistency

- Consistent sequences of actions should be required in similar situations;
- identical terminology should be used in prompts,



Schneiderman's eight golden rules

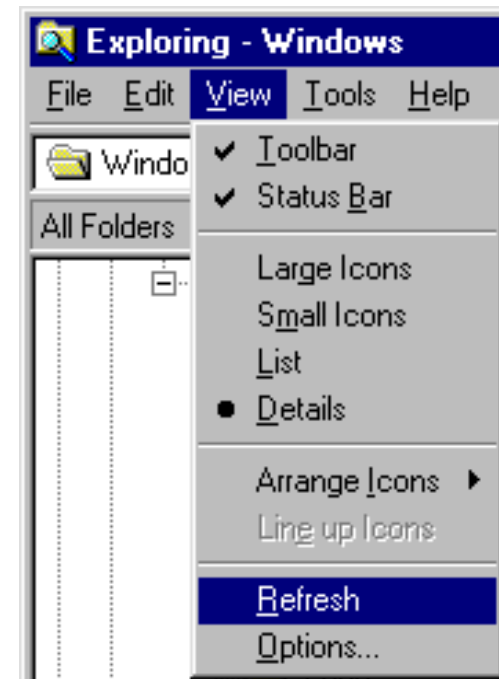
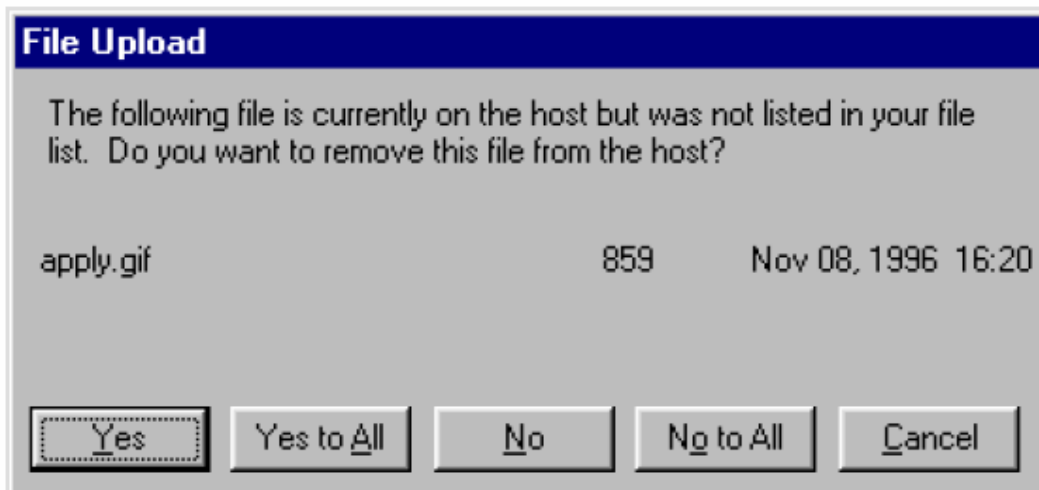
- Kinds of consistency: internal, external, metaphorical



Schneiderman's eight golden rules


2. Enable frequent users to use shortcuts.

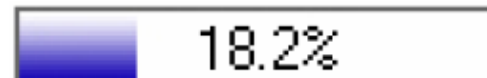
- Shortcuts should be easy to learn (keyboard accelerators, command abbreviations, bookmarks, history)
- Hall of Shame example:
Explorer (Windows 95)



Schneiderman's eight golden rules

3. Offer informative feedback for every user action

- Keep user informed of system state:
 - Cursor change
 - Selection highlight
 - Status bar
 - Don't overdo it...
- Response time:
 - <0.1 s: seems instantaneous
 - 0.1 – 1 s: user notices, but no feedback is needed
 - 1-5 s: display busy cursor 
 - >1-5 s: display progress bar



Schneiderman's eight golden rules

- **4. Design dialogs to yield closure**
- Sequences of actions should be organized into groups with a beginning, middle, and end.
- Ex: – Select “Open” on file menu. (beginning)
 - Complete dialog box. (middle)
 - Press “Open” button. (end)
- The informative feedback at the completion of a group of actions gives the operators the satisfaction of accomplishment, a sense of relief, the signal to drop contingency plans and options from their minds
- It is also an indication that the way is clear to prepare for the next group of actions.

Schneiderman's eight golden rules

5. Error prevention and handling

- Selection is less error-prone than typing
- But don't overdo it...

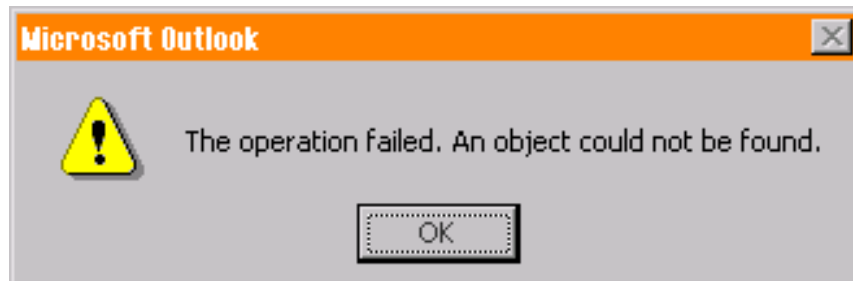


Source: Interface Hall of Shame

- Disable illegal commands (gray-out)
- Keep dangerous commands away from common ones

Schneiderman eight golden rules

- Error messages
 - Be precise: restate user's input
 - Not "cannot open file" but "Cannot open file named paper.doc"
 - Give constructive help
 - Why error occurred and how to fix it
 - Be polite and non-blaming
 - Not fatal error, not illegal
 - Hide technical details until requested



Source: Interface Hall of Shame

Schneiderman's eight golden rules

- **6. Permit easy reversal of actions**
- Relieves anxiety
- Encourages exploration of unfamiliar options
- Dimensions of reversibility:
 - a single action,
 - a data entry,
 - a complete group of actions.

Schneiderman's eight golden rules

- **7. Support internal locus of control**
- The user should be in control of the system, which should respond to his actions
- Long operations should be cancelable
- All dialogs should have a cancel button

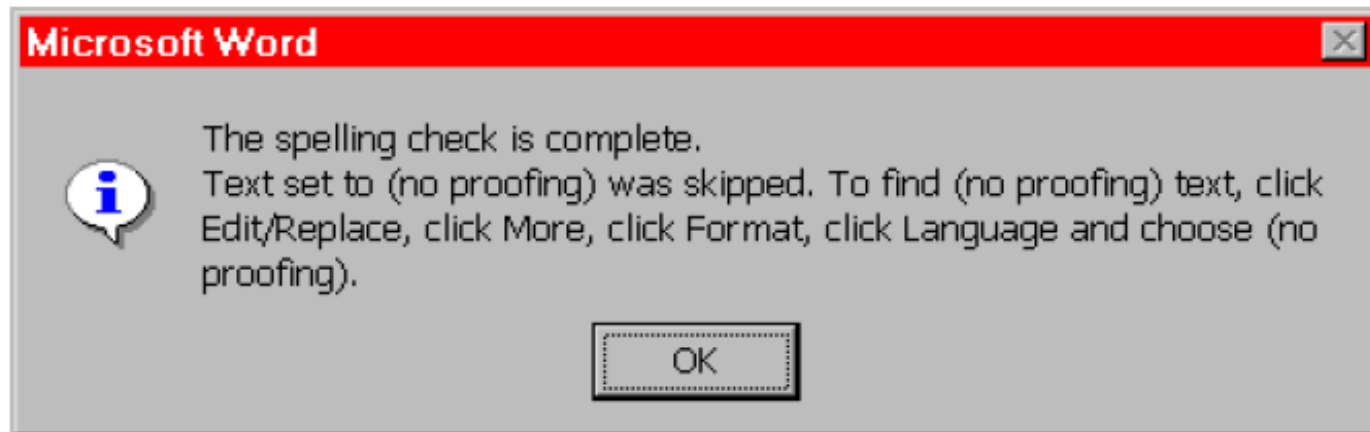


Source: Interface Hall of Shame

Schneiderman's eight golden rules

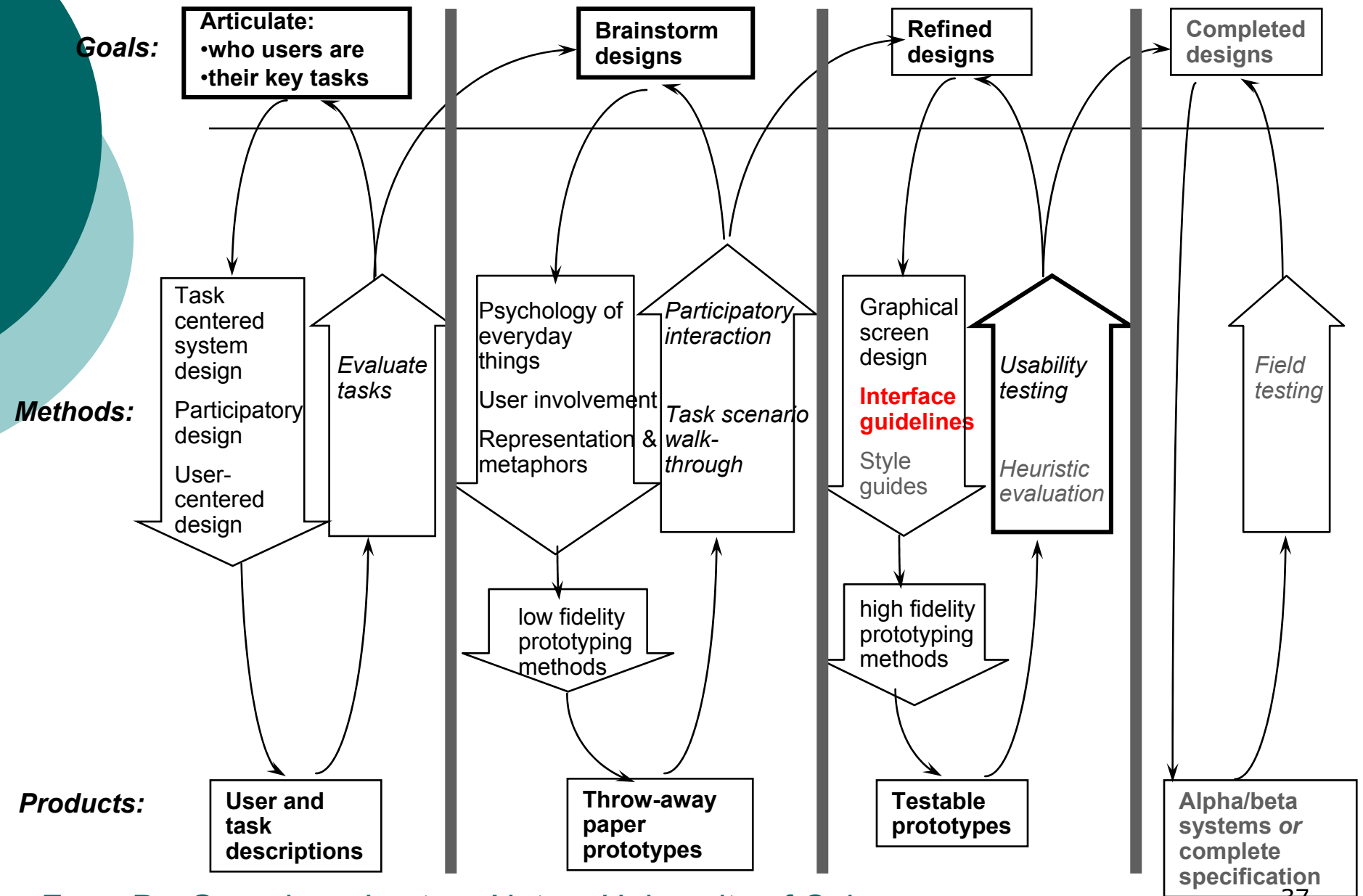
- **8. Reduce short-term memory load**
 - Keep displays simple
 - Consolidate multiple-pages display
 - Provide time for learning action sequences
 - Recognition, not recall
 - Use menus, not command languages
 - Use generic commands when possible (Open, Save, Copy, Paste)
 - All needed information should be visible

Schneiderman's eight golden rules



Source: Interface Hall of Shame

Interface Design and Usability Engineering



Sample questions for graphical design and screen layout

List two techniques for achieving greater simplicity in graphical design:

- *Reduction; regularity; using the same element for multiple purposes*
- Observe carefully the two design alternatives below. Which design scheme is better? Justify your response by using concepts related to graphic design and screen layout.



John Smith
Tennis Pro



5555 Town Road
Anywhere, USA 55555

555.555.5555 • 555.555.5555 Fax • info@tennisgroup.com

This design alternative features a clean, minimalist layout. The contact information is organized into three distinct sections: a name and title on the left, a logo and address in the center, and a footer with multiple contact methods. A thick blue horizontal bar is positioned at the bottom of the card.



Bring this card to
The Tennis Group for
one free lesson.



John Smith
Tennis Pro

555.555.5555 Voice
555.555.5555 Fax
555.555.5555 Mobile
info@tennisgroup.com
www.tennisgroup.com

5555 Town Road
Anywhere, USA 55555

*The Tennis group will help you
improve your tennis game, meet new
people, and have lots of fun!*

This design alternative includes a promotional message at the top left. The contact information is arranged in two columns on the right side. The logo and address are centered. A testimonial-style message is placed at the bottom right. A thick blue horizontal bar is located at the bottom of the card.

Sample questions for generic design guidelines

- Define internal, external, and metaphorical consistency. You don't need to give examples.
- State four out of the eight golden rules from Shneiderman's heuristics. Their names are enough.
- Long question: analyze a given UI (or a prototype) using generic design guidelines (heuristic rules)