"Keep it simple" *

* Slogans by Myers (1997) from
http://www-2.cs.cmu.edu/~bam/uicourse/1997spring/lect03moreslogalsbig.html
How to design a good user interface?

• According to instructions
  – … in this course
  – … given by experienced designers

• Support also from
  – Design principles
  – Design guidelines
  – Style guides
  – Design patterns
Design Principles

• General rules ("rules of thumb"), easy to remember

• No detailed instructions on how to deal with in a specific situation

• Require specification and application

• Principles appear in several sources starting from the basic textbooks in the area e.g. Shneiderman, Nielsen

“The idea is to empower the user, not speed up the system.”
Nielsen’s Ten Heuristic Rules (1993)

1. Simple and natural dialog
2. Speak the user’s language
3. Minimize user’s memory load
4. Consistency
5. Feedback
6. Clearly marked exits
7. Shortcuts
8. Good error messages
9. Prevent errors
10. Help and documentation

“No -- you can't just explain it in the manual.”
Nielsen’s Ten (reformed 1999) Heuristics

1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose, and recover from errors
10. Help and documentation

Shneiderman’s Eight Golden Rules

1. Strive for consistency
2. Enable frequent users to use shortcuts
3. Offer informative feedback
4. Design dialog to yield closure
5. Offer simple error handling
6. Permit easy reversal of actions
7. Support internal locus of control
8. Reduce short-term memory load
Tog’s Principles (”checklist”)

- Anticipation
- Autonomy
- Color Blindness
- Consistency
- Defaults
- Efficiency of the User
- Explorable Interfaces
- Fitts's Law
- Human Interface Objects
- Latency Reduction
- Learnability
- Metaphors, Use of
- Protect Users' Work
- Readability
- Track State
- Visible navigation

[Tognazzini: http://www.asktog.com/basics/firstPrinciples.html]

“Color is information.”
Guidelines

- Guidelines are more precise instructions about the appearance and structure of the user interface than design principles.

- Guidelines do not take into account user interface environment specific techniques or visual surroundings ("themes") in the design of the user interface: between *principles* and *style guides*.

- Example: Smith & Mosier (1986); guidelines initially for text-based UIs but applicable also for GUIs.

"Everything in its place, and a place for everything."
1. Data Entry (199)
   • user actions involving input of data to a computer, and computer responses to such inputs
2. Data Display (298)
   • computer output of data to a user, and assimilation of information from such outputs
3. Sequence Control (184)
   • user actions and computer logic that initiate, interrupt, or terminate transactions
4. User Guidance (110)
   • error messages, alarms, prompts, and labels, as well as to more formal instructional material provided to help guide a user's interaction with a computer
5. Data Transmission (83)
   • computer-mediated communication among system users, and also with other systems
6. Data Protection (70)
   • attempts to ensure the security of computer-processed data from unauthorized access, from destructive user actions, and from computer failure

N=944: Not all of the guidelines can be applied in designing any particular system. Some of the guidelines will be relevant and some will not.

“Things that look the same should act the same.”
SaM Examples: Data Display

- 2.0/1 Necessary Data Displayed
- 2.0/2 + Only Necessary Data Displayed
- 2.0/3 Data Displayed in Usable Form
  - Error 459 in column 64.
  - Also: do not make users convert displayed data
- 2.0/4 Data Display Consistent with User Conventions
  - am/pm; date formats
- 2.0/6 Consistent Display Format
  - consistent format from one display to another
- 2.0/8 User Control of Data Display
  - flexibility
- 2.0/12 Familiar Wording

[http://www.hcibib.org/sam/]

“Dialogues should not contain information that is irrelevant or rarely needed.”
SaM Examples: Response Time

• 1.0/4 + Fast Response
  – Ensure that the computer will acknowledge data entry actions rapidly, so that users are not slowed or paced by delays in computer response; for normal operation, delays in displayed feedback should not exceed 0.2 seconds.
  – A key press should be followed by seemingly immediate display of its associated symbol, or by some other appropriate display change.

• 3.0/18 Appropriate Computer Response Time
  – Ensure that the speed of computer response to user control entries is appropriate to the transaction involved; in general, the response should be faster for those transactions perceived by a user to be simple.
  – Computer response to a likely control entry, such as NEXT PAGE, should be within 0.5-1.0 second; response to other simple entries should be within 2.0 seconds; error messages should be displayed within 2-4 seconds.
  – Interface designers may need to consult with the intended system users to decide upon appropriate computer response times for different transactions.

• 4.2/2 Fast Response
  – Ensure that computer response to user entries will be rapid, with consistent timing as appropriate for different types of transactions.

http://hcilib.org/sam/
SaM Example: Lists

2.1/19 Lists for Related Items

For a series of related items (words, phrases, instructions, etc.), display those items in a list rather than as continuous text.

Comment
A list format will facilitate rapid, accurate scanning.

2.1/24 + Vertical Ordering in Multiple Columns

If a list is displayed in multiple columns, order the items vertically within each column.

Example
(Good)

| S.R. Abbott       | B.M. Drake    |
| C.N. Abernethy    | S.M. Dray     |
| C.A. Adams        | M.G. Dumoff   |
| H.L. Ammerman     | R.C. Eakins   |
| C.J. Arbak        | S.L. Ehrenreich |
| etc.              |               |

(Bad)

| S.R. Abbott       | C.N. Abernethy |
| C.A. Adams        | H.L. Ammerman  |
| C.J. Arbak        | A.J. Aretz     |
| A.F. Aucella      | J.A. Ballas    |
| M.C. Bardales     | S.H. Barry     |
| etc.              |               |

[http://www.hcibib.org/sam/]

"Keep it neat. Keep it organized."
Style Guides

- Applicable in a specific user interface environment
- Applicable in specific company/vendor/application environment
- Define the user interface from functional, visual, technical, structural viewpoints
- May contain also procedural instructions for design work as well as for UI functionality
- Visual consistency about ”logo consistency” and ”functionality consistency”
- Technical consistency: the use of specific UI libraries and APIs to external systems
Style Guides

A user interface style guide can serve as:

• A tool for ensuring consistency across a product set
• A way to get groups to work together
• The repository for design guidelines and standards
• A training aid for new members of the product team

http://www.stcsig.org/usability/newsletter/0104-style.html
Usability Interface, Vol 7, No. 4, April 2001
Goal of Style Guides: Consistency

• Enforce consistency across a set of products

• user expectations, across applications that are related, across applications that are not related but come from the same company, multiple style guides (note that there are often multiple style guides—the corporate logo/trademark style guide is a common one), de facto standards (for example the use of blue links to denote unvisited links), terminology, interaction (same keyboard activation methods throughout—everyone uses the same tree control and it is programmed consistently), Visual consistency (general GUI layout), between pages/dialogs/windows, within pages/dialogs/windows, Icon consistency, Error message consistency
## Benefits of a Style Guide

<table>
<thead>
<tr>
<th>End Users</th>
<th>Developers</th>
<th>Business Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced errors</td>
<td>Maintain control over look and feel</td>
<td>Produce usable systems that reduce support costs and increase user satisfaction</td>
</tr>
<tr>
<td>Less frustration</td>
<td>Minimize re-invention</td>
<td>Increase market awareness</td>
</tr>
<tr>
<td>Increased morale</td>
<td>Capitalize on learning</td>
<td>Increase product awareness</td>
</tr>
<tr>
<td>Improved efficiency</td>
<td>Enable production of reusable software</td>
<td>Reduce training costs</td>
</tr>
<tr>
<td>Increased confidence</td>
<td>Reduce development time</td>
<td>Improve staff retention</td>
</tr>
<tr>
<td>Reduced resistance to new technology</td>
<td>Reduce arbitrary design decisions</td>
<td>Increase user acceptance of new systems</td>
</tr>
</tbody>
</table>

Gale (1996)

http://www.stcsig.org/usability/newsletter/0104-style.html
Topics in a Style Guide

http://www.construx.com/survivalguide/uistyleguide.htm

• Related Windowing Environment
  – MS Windows, Apple, GNOME, KDE, Motif, Palm, S40, …?

• Windows
  – MDI, SDI, colors, sizes, …

• Dialogs
  – Interaction between dialogs, transitions, functions in a dialog, visual appearance

• Menus
  – Bar/pop-up, shortcuts, context-sensitivity

• Buttons
  – Size, distance, text/icon, vertical/horizontal placement, standard buttons

• Colours
  – Amount, themes

• Error handling
  – Form, modality, information, confirmation

• Function bars
  – Quick-access-functions: what, how to modify,

• Status panels
  – What information, how to update

• Scroll bars
  – When to use, where to place
MS Windows User Experience Guidelines

• Design Principles
• Controls
• Commands
• Text
• Messages

• Interaction
• Windows
• Visuals
• Experiences
• Windows Environment

Windows UX Design Principles

• Reduce concepts to increase confidence
• Small things matter, good and bad
• Be great at "look" and "do"
• Solve distractions, not discoverability
• UX before knobs and questions
• Personalization, not customization
• Value the life cycle of the experience
• Time matters, so build for people on the go

Guidelines for Various Platforms

- Lists available at
  - [http://www.usabilitynet.org/tools.htm](http://www.usabilitynet.org/tools.htm)
  - [http://www.simonwhatley.co.uk/user-interface-guidelines-for-mobile-and-tablet-devices](http://www.simonwhatley.co.uk/user-interface-guidelines-for-mobile-and-tablet-devices)

- HP webOS/Palm: [https://developer.palm.com/content/api/design/mojo/user-interface-summary.html](https://developer.palm.com/content/api/design/mojo/user-interface-summary.html)
- KDE user interface guidelines: [http://techbase.kde.org/Projects/Usability/HIG](http://techbase.kde.org/Projects/Usability/HIG)
- **Web-based** user interfaces and applications: [http://usability.gov](http://usability.gov)
Design Patterns

• It has all been done before...

• A design pattern refers to a reusable and applicable solution to general real-world problems

• A reference or basic 'toolkit' you can use when designing user experiences.

• No substitute for creative design: it seeks to describe what we know and have learned about solutions you will find abundantly on the web and even beyond.

The user should be in a good mood when done.

Slogan #32
(Myers 1997)