Designing GUIs

Embedded Interface Design

with **Bruce Montgomery**

Learning Objectives

Students will be able to…

- Consider design issues and best practices in creating GUIs
- Review common issues in different interface interactions

Interface design best practices – Usability.gov

- Keep the interface simple - the best interfaces are almost invisible to the user
- Create consistency and use common UI elements - make users feel more comfortable and able to get things done more quickly
- Be purposeful in page layout - consider the spatial relationships between items on the page and structure the page based on importance
- Strategically use color and texture
- Use typography to create hierarchy and clarity.
- Make sure that the system communicates what's happening - always inform your users of location, actions, changes in state, or errors
- Think about the defaults – reduce user burden

- Reference [2]

7 Laws of UI Design

- Law of **clarity** - the user will avoid interface elements without a clear meaning
- Law of **preferred action** - the user will feel more comfortable when they understand what the preferred action is
- Law of **context** - the user expects to see interface controls close to the object they want to control
- Law of **defaults** - the user will rarely change default settings
- Law of **guided action** - the user will probably do something if they are asked to do it
- Law of **feedback** - the user will feel more confident if you provide clear and constant feedback
- Law of **easing** - the user will be more inclined to perform a complex action if it's broken down into smaller steps
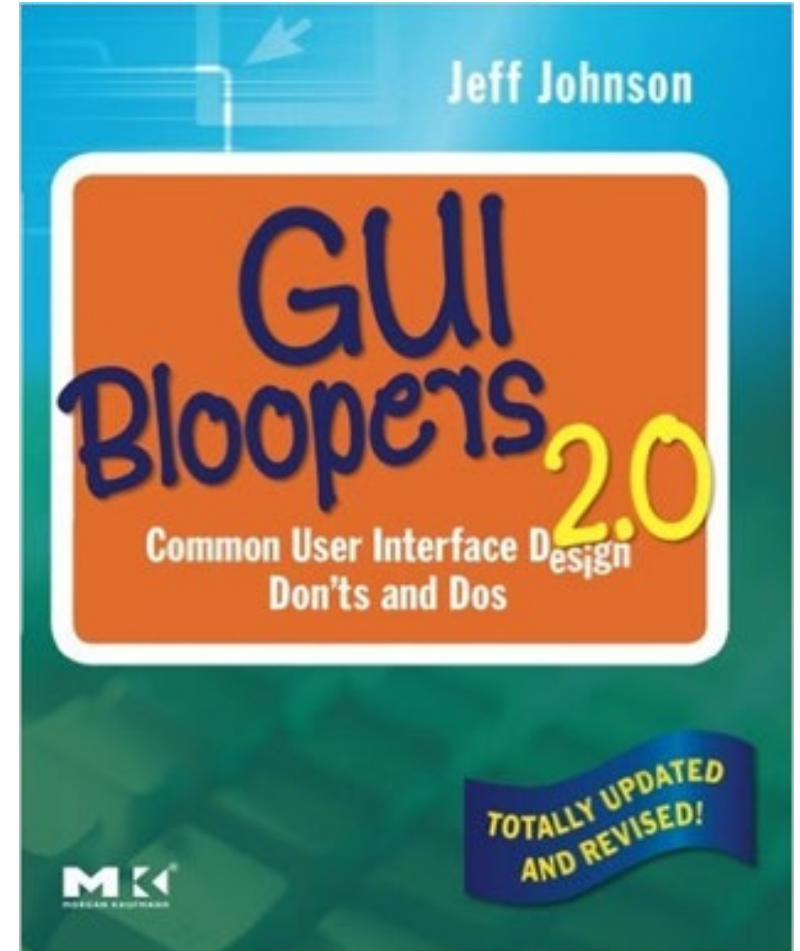
Reference [3]

UX design principles from understanding people

Johnson's first principles:
- Focus on the users and their tasks, not the technology
- Consider function first, presentation later
- Conform to the users' view of the task
- Don't complicate the users' task
- Promote learning
- Deliver information, not just data
- Design for responsiveness
- Try it out on users, then fix it

Reference [1]

Book is available on CU
Skillsoft site

Categories of GUI Issues

- GUI Control
- Navigation
- Textual
- Graphic Design & Layout
- Interaction
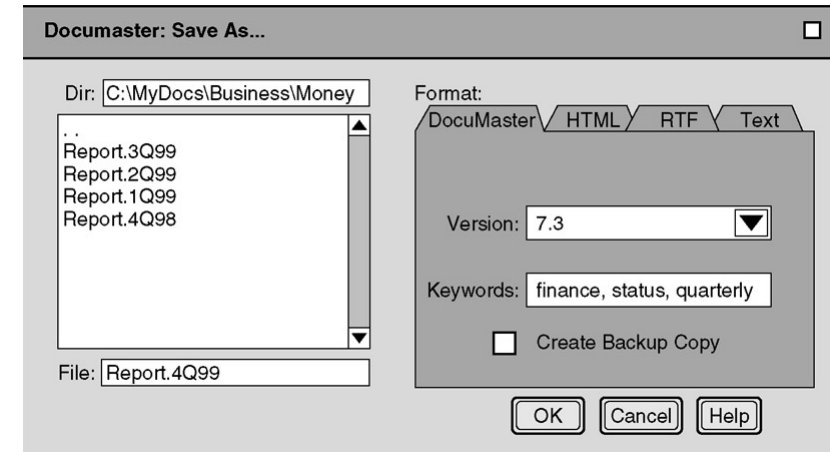- Responsiveness
- Management

Reference [1]

GUI Control Issues

- Using the wrong control
  - Confusing checkboxes and radio buttons
  - Using checkboxes for something not ON/OFF
  - Using command buttons as toggles
  - Using tabs as radio buttons
  - Too many tabs
  - Using input controls for display only data
  - Overusing text fields for constrained input

Reference [1]

GUI Control Issues

- Using controls wrongly
  - Dynamic menus
  - Intolerant data fields
  - Input fields and controls without defaults
  - Poor defaults
  - Negative checkboxes

Navigation Issues

- Not Showing Users Where They are
  - Window or page not identified
  - Same title on different windows
  - Window title doesn't match command or link
- Leading Users Astray and Not Showing the Way
  - Distracting off-path buttons or links
  - Self-links
  - Too many levels of dialog boxes

- Poor Search Navigation
  - Competing search boxes
  - Poor search results browsing
  - Noisy search results

Reference [1]

University of Colorado **Boulder**

Textual Issues

- Uncommunicative Text
  - Inconsistent Terminology
    - Different terms for same service
  - Unclear Terminology
  - Bad writing
  - Too much text
- Developer-centric Text
  - Speaking geek
  - Calling users "user" to their face
  - Vague error messages

- Misleading Text
  - Erroneous messages
  - Text doesn't make sense with GUI
  - Misuse of "…" on command labels
    - "…" usually implies a dialog will occur

Reference [1]

University of Colorado **Boulder**

Graphical Design Issues

- Bad layout and window placement
  - Easily missed information
  - Mixing dialog box control buttons with content control buttons
  - Misusing group boxes
  - Radio buttons too far apart
  - Labels too far from data fields
  - Inconsistent label alignment
  - Bad initial window location

- Troublesome typography
  - Tiny fonts

Reference [1]

University of Colorado **Boulder**

Interaction Issues

- Deviating from Task Focus
  - Exposing implementation
  - Needless restrictions
  - Confusing concepts
- Requiring Unnecessary Steps
  - Asking users for unneeded data
  - Asking users for random seeds
  - Pointless choices

- Burdening Users' Memory
  - Hard to remember ID
  - Long instructions that go away too soon
  - Unnecessary or poorly marked modes
- Taking Control Away from Users
  - Automatic display rearrangement
  - Dialog boxes that trap users
  - Cancel doesn't cancel

Reference [1]

Responsiveness Issues

- Cursor doesn't keep up
- On screen buttons acknowledge clicks too late
- Menus, sliders, or scrollbars lag behind
- Moving and sizing doesn't keep up
- Application doesn't indicate busy
- Application unresponsive with internal housekeeping
- Long operations without progress
- Long operations without cancel
- Application wastes idle time
- No feedback when application hangs
- Web site with huge images and animations
- Website reloads in response to small edits

Reference [1]

Next Steps

- Quiz Extra Credit - Article Review assignment is posted…
- Sign up in Google Docs for Alan Kay lecture Quiz Extra Credit
- Project 5 active (due 11/20 for demos), Project 6 coming (will be due 12/11)
- New Quiz is up – another next weekend
- Class staff available to help
  - Shubham - Tues 12-2 PM, Fri 3-5 PM in ECEE 1B24
  - Sharanjeet - Tues 2-3 PM, Thur 2-3 PM in ECEE 1B24
  - Bruce - Tue 9:30-10:30 AM, Thur 1-2 PM in ECOT 242
- Final Exam is set
  - Tuesday Dec 17 7:30 PM - 10 PM ECCR 1B51
  - Final will be open notes and Canvas based, you'll need a PC

References

[1] GUI Bloopers 2.0, Johnson, 2008, Morgan Kaufmann
[2] https://www.usability.gov/what-and-why/user-interface-design.html
[3] https://99designs.com/blog/tips/7-unbreakable-laws-of-user-interface-design/

Other design sites:
- Interaction Design Foundation - https://www.interaction-design.org/literature/article/bad-design-vs-good-design-5-examples-we-can-learn-frombad-design-vs-good-design-5-examples-we-can-learn-from-130706
- Nielsen Norman Group - https://www.nngroup.com/