CS W4170
Direct Manipulation 2

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Desktop Publishing

- “Command line editors” vs. “display editors”
- WYSIWYG
  - “What you see is what you get.”
    — Flip Wilson (as Geraldine Jones), ca. 1970
WYSIWYG

- Theory: Fully formatted pages that look exactly like “real” (paper) output
- Practice
  - Low-res fonts, Low-quality images, imprecise positioning
    - WYSIMOLWYG (What you see is more or less what you get)
  - Fast and cheap, but low quality formatting (e.g., h&j)
    - WYSIAYG (What you see is all you get)
  - Additional information (e.g., mark up, comments)
    - WYSIMTWYG (What you see is more than what you get)
- Why must computers emulate paper?
  - What you see is what you get WHEN YOU PRINT IT OUT. . . . Imitating paper on a computer screen—as almost all consumer applications presently do—is like tearing the wings off a 747 and using it as a bus on the highway.”—T. Nelson

Spreadsheets

- Visicalc (Dan Bricklin and Bob Frankston, 1979)
  - Inspired by paper spreadsheets used in business school
  - The original “Killer App”
  - Apple ][, 48K RAM
Games

- Text-based
  - “Advent,” William Crowther and Don Woods, 1972–76
- Direct manipulation
  - “Tennis for 2,” William Higinbotham, 1958

Spatial Data Management System (SDMS)  
R. Bolt et al., MIT Architecture Machine Group, late 70s

- Pan around & zoom into/out of information space (“dataland”)
  - Zoom reveals conceptual details (aka “semantic zoom”)
- Worldview map shows/controls location

Spatial Data Management System (SDMS) C. Herot et al., Computer Corporation of America, late 70s–80s

- Installed on USS Carl Vinson
- Automated generation of graphics

- C. Herot, R. Carling, M. Friedell, and D. Kramlich, A prototype spatial data management system, Proc. SIGGRAPH 80, 63–70.

Explaining Direct Manipulation

- Virtuality
  - “Conceptual structure and feel” with which you interact (T. Nelson)
- Principle of transparency
  - “The user is able to apply intellect directly to the task; the tool itself seems to disappear.” (C. Rutkowski)
- Advantages of mapping to and interacting with a spatial representation
Problems with Direct Manipulation

- Big spatial reps
  - Take up lots of space
  - May require multiple displays, panning
- Resource intensive
- Need to learn visual reps
- Misunderstanding of visual reps
- Homing time from kbd to other devices (e.g., mouse)
- Manipulation time/effort vs. textual input time/effort
- Simple devices → simple manipulations
- Time/effort for design (choosing objects, actions, metaphors)

Icons

- Eikenai (to resemble)
- Not cryptic
- Create in a way that avoids confusion among set
- Can be parameterized
  - AaBbCc
  - AaBbCc
- Composition