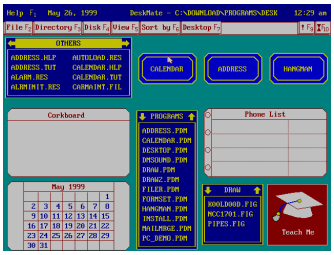
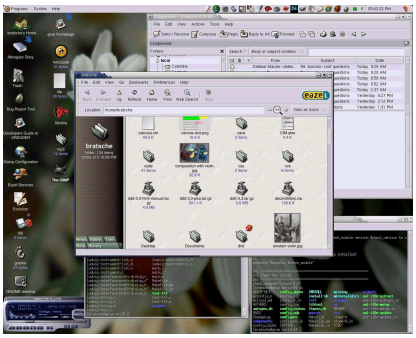
- Graphical User Interfaces
  - windows/menus/controls
  - mouse/keyboard





- Pre-historic times
  - Douglas Engelbart, Stanford, **1962 - 1968**
    - 1st "mouse": wooden box on wheels
  - Ivan Sutherland, MIT, **1963**
    - Sketchpad

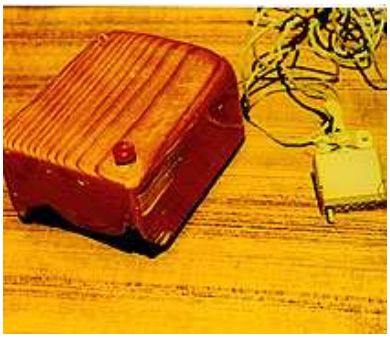
Sketchpad: Ivan Sutherland, MIT, 1963

- Create engineering drawings (2000 : 1 scale)
- Ran on experimental “online” computer
- Physically huge due to 320 KB memory
- CRT, light pen
- First GUI
- New concepts: rubber-banding, zoom in/out, sketching perfect lines, corners, and joints.

3

4

- Demo: mouse, text editing, copy/paste, etc.
  RealVideo clip:
  http://sloan.stanford.edu/mousesite/1968Demo.html



5

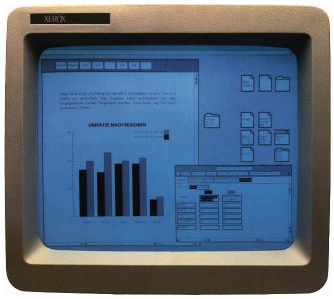
Features:

- 8½ x 11 Bit-mapped display (WYSIWYG)
- Windows, icons, menus, pointer (WIMP)
- Ethernet…

6

EECS 487 | Timeline | GUIs

- 1979: Jobs and Wozniak visit PARC
- June 1981: Xerox Star
  - Double-clickable icons
  - Overlapping windows
  - Dialog boxes
  - 1024x768 monochrome display
  - High price



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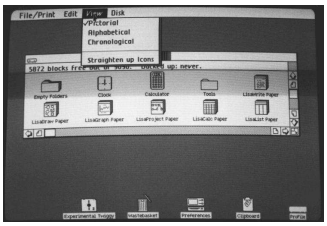
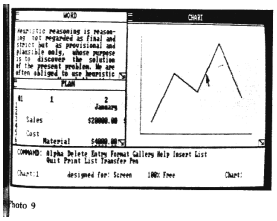
EECS 487 | Timeline | GUIs

- January 1983
  - Apple's Lisa
    - pull down menus
    - menu bars
  - Microsoft announces Windows
    - supposedly has overlapping/resizable windows





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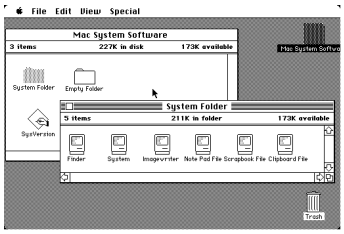
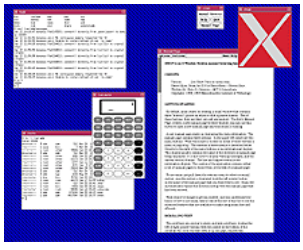
Introduced: January 1983
Released: June 1983
Price: US $9,995
How many? 100,000 in two years
CPU: Motorola 68000, 5 MHz
RAM: 1 Meg
Display: 12" monochrome, 720 X 364

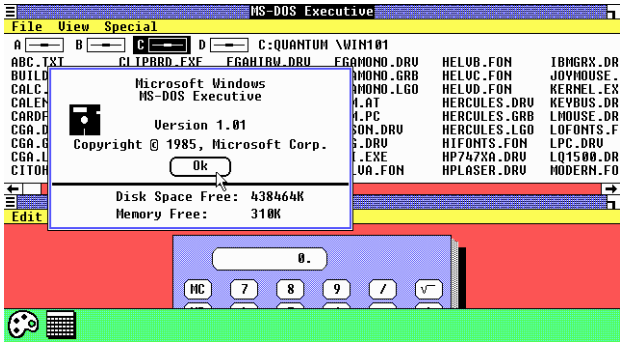
- January 1984
  - Apple's Macintosh
  - 128Kb memory
  - $2,495.00.
- June 1984
  - X windows (MIT)
  - Customizable





EECS 487 | August 1985: MS Windows ships | GUIs

- Windows can be tiled, not overlapped
- Iconized programs on the bottom



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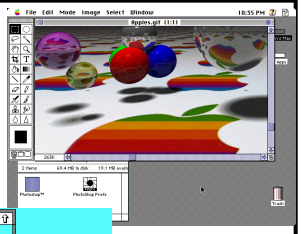
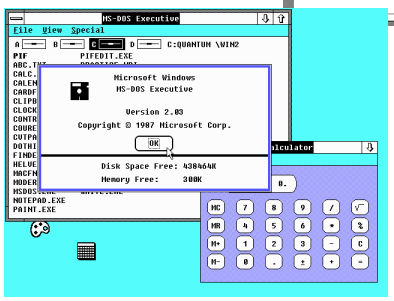
EECS 487 | 1987 | GUIs

- Apple Mac II (color)
- Microsoft Windows 2.03
- 1988: Apple sues Microsoft and HP





12

- Today: faster, cheaper, higher-resolution, so cool you “want to lick it.”
- Same WIMPy setup
- (Amazing revolution in 3D graphics HW)

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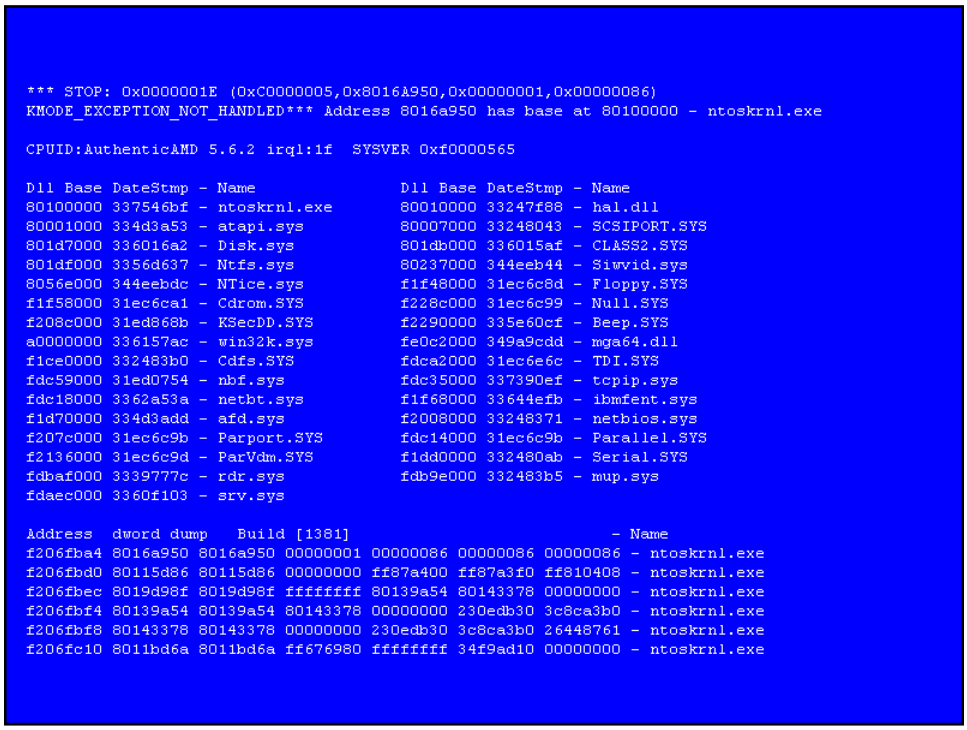
- Design for what the user knows
  - artists, businessmen, kids

14



EECS 487 | **Ideas for good GUI design** | GUIs

- Design for what the user knows
  - artists, businessmen, kids
- Avoid too many features at the top level
  - VCRs 1985/2001
- Distinguish beginner/power user, support both:
  - mouse menus for novice
  - keyboard, rapid data input for power user

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- Study the user - a human
  - people learn more easily by recognition
    - list of data values rather than prompt for a number
- Different prospectives
  - use mnemonic
    - "of or helping the memory"
  - do not assume metaphor
    - "one thing is spoken of as if it were another"

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- Metaphor:

- Mnemonic:
  - small
  - not irritating to anyone

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EECS 487 | Mnemonics | GUIs

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EECS 487 | GUI | GUIs

- Be Consistent (example from Windows…)
- Visual feedback (how often? 7-10 seconds)
  - progress indicator that really works

- Audio feedback
  - use sparingly, e.g. warning for serious problems

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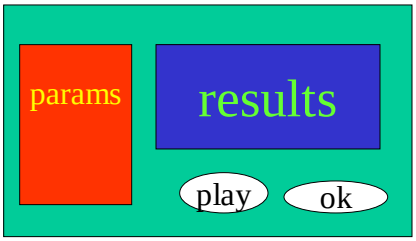
- Very important for some power users: ability to customize
  - Emacs
  - VC++ ?
- Some power users like mouse
  - need both

- Employ technical writers to do text
- Presentation model
  - again:
    - **be consistent**



- Modal dialog
  - finite task
    - file open, save as dialogs
      - okay people handle one window at a time
- Modeless dialog
  - no fixed duration
    - search, history list
- Application window
  - data, multiple views, comparison

- Visual elements that user interacts with
  - Menu bar
    - max 10 items
  - Pull-down menu
    - max 12 items
  - Check Box
    - max 12 per group box
  - Radio Button
    - max 6 per group box
  - No more than three modeless windows at one time

EECS 487 | 3D Modeling | GUIs

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EECS 487 | 3D Modeling | GUIs

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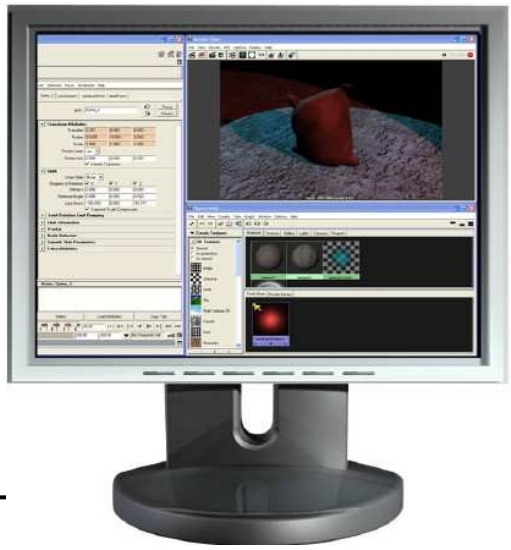
EECS 487 | 3D Modeling | GUIs



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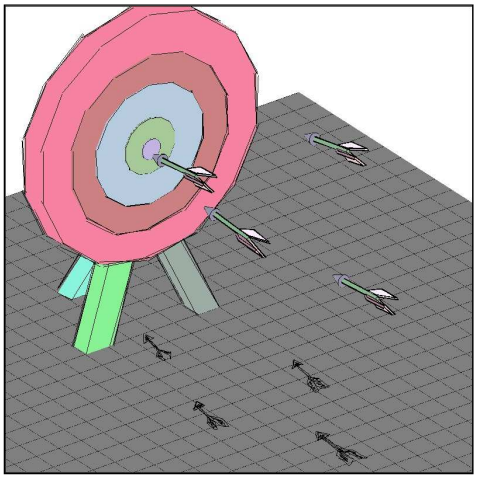
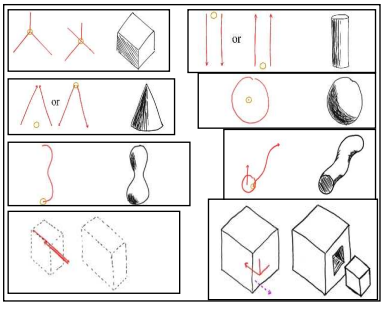
SKETCH: An Interface for Sketching 3D Scenes.
Zeleznik, Herndon & Hughes. SIGGRAPH 1996.





- Teddy: A Sketching Interface for 3D Freeform Design. Igarashi, Matsuoka & Tanaka. SIGGRAPH 1999.