

A Short History of GUI Design

Traditional progression from command line to direct manipulation of screen elements and its acceptance into the Graphic Designers Tool kit

Hardware Interfaces: Teletype & Punch Cards

hardware interface using a typewriter and paper



teletype machine



Command line interface

Navigation using teletype machine...

You type in a line of code and hit the return key

Wait for the mainframe to respond

Teletype types out the mainframe's response

You type in another line of code. *Repeat.*

Similar to an exchange or conversation with the machine
(like direct user interaction)

Direct Manipulation? What is it?

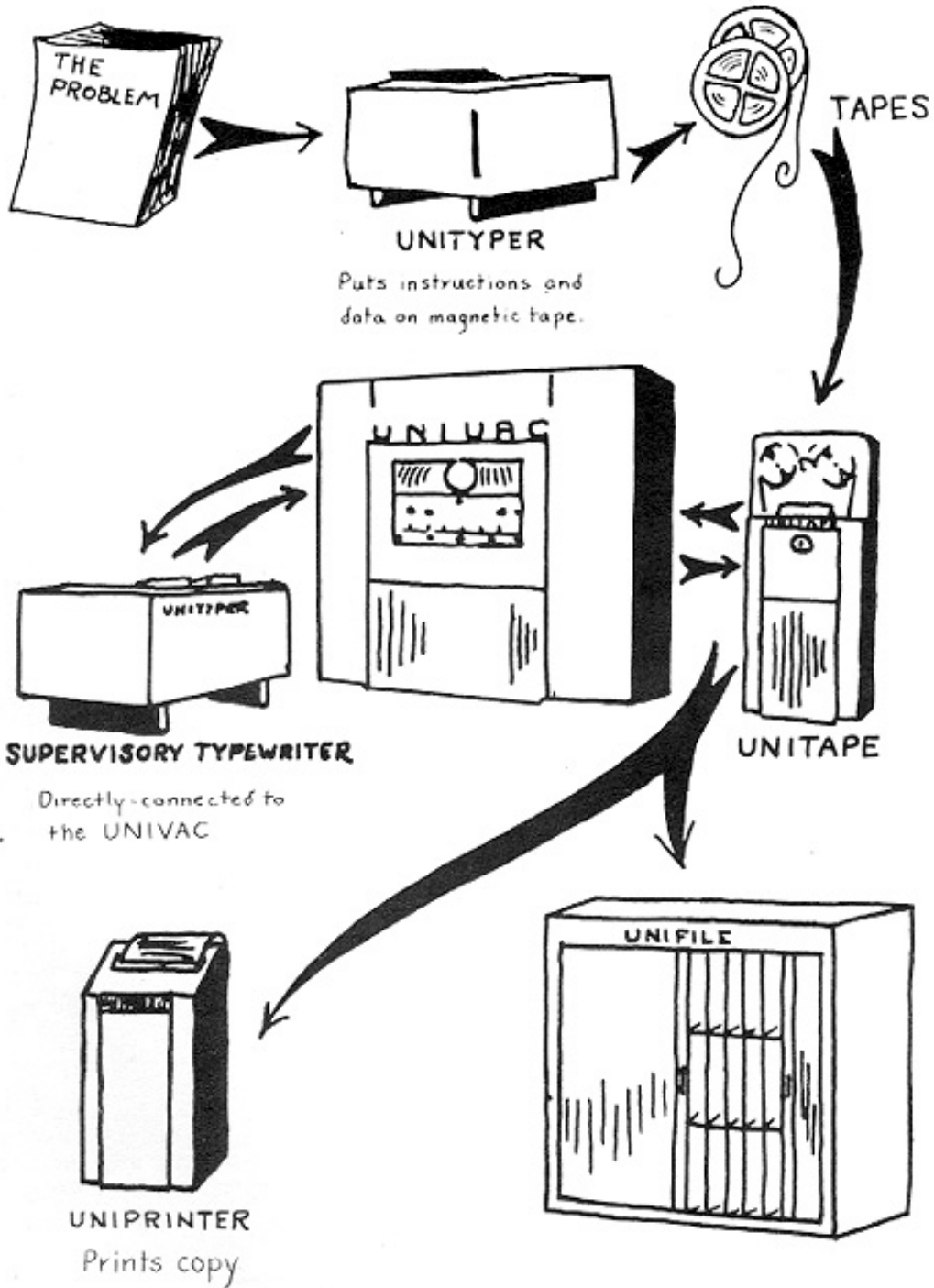
Modern Day Operating Systems are Direct Manipulation

How removed is it from direct manipulation?

1. Sit at home not in front of a computer and think very hard what you want the computer to do.
2. Translate these intentions into a computer language (alphanumeric symbols on a page).
3. Go to teletype machine and type these alphanumeric symbols into a 'machine' not a computer.
4. These alphanumeric symbols are then translated into binary numbers and recorded visibly onto tape.
5. Using a 'rubber-cup' modem send manually the numbers to the mainframe computer.
6. The mainframe computer does arithmetic on them and send them back to the teletype.
7. The teletype converts these numbers back to letters and hammer them out on a page.
8. You sit down with new page and translate the letters as meaningful symbols.

FLOW CHART FOR UNIVAC OPERATION

UNIVAC SYSTEM



Flow chart depicting the flow and processing of information through multiple machines
(networking of modern days is more and more popular...)

What does this mean?

Computers do arithmetic on bits of information.

Humans construe the bits as meaningful symbols.

Distinction blurred by modern operating systems that use and abuse power of metaphor to make computers accessible to a larger audience.

Operating systems = works of art

people become emotionally attached to operating systems

ENIAC

one of the principal inventors, John W. Mauchly (1907-1980) worked at the Moore School of Electrical Engineering between 1941 and 1946



Past - switches physically switched on and off in the ENIAC machine

Present day - we use a mechanical mouse to route these digital messages based on location and mouse manipulation.

ENIAC was a large-scale, general-purpose digital electronic computer. Built out of 17,468 electronic vacuum tubes, ENIAC was the largest single electronic apparatus in the world.

If-Then Conditional Statements

Some time during the ENIAC's development, the project's engineers and mathematicians (possibly including its female programmers) discovered that with some minor modifications they could perform what would be considered a conditional branch--the IF-THEN statement in modern programming languages.

Batch Processing: Punch Cards

1. Punch a whole stack of cards and run them through the reader all at once (otherwise known as batch processing)
2. Modern day equivalent called *Macros*



punchcard machine

Multiplexing

before multiplexing there were two separate monitors with two separate displays: one displaying alpha-numeric and the other displaying graphics.

multiplexing = ability to see simultaneously two views on one monitor (equivalent to MS-DOS or UNIX screen in a windows GUI environment)

Xerox Parc and Apple Computers

GUI (Graphical User Interface) direct manipulation style user interface

World of Objects - not linear streams of information bytes
(ie. *WYSIWYG display*)

- Simple reversible and instantly resulting actions (undo)

Metaphor and Direct Manipulation Systems

Problems arise from over-dependence on metaphor

Before: PCs using Work Perfect where a typeface can not be previewed on the monitor but viewed only when printed out on the dot-matrix printer.

After: Macintosh includes a program called Mac Paint where pixels were actually painted or erased from a window using a metaphorical paintbrush

Before: Computers were no better than a toaster

After: Computers were more human-centered and had a personality - a face

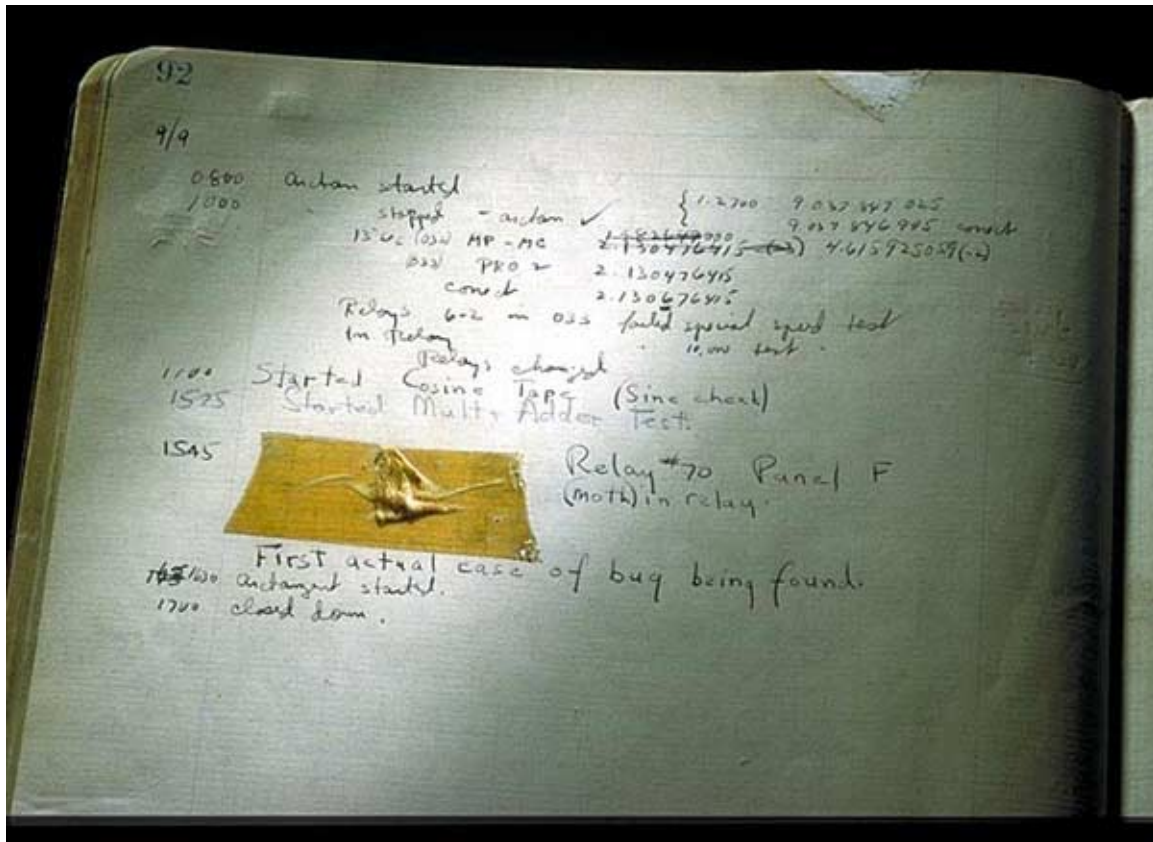
Before: teletype and ASCII drawings

After: bitmap programs and places to put graphics

Mouse

Mouse invented by Douglas C. Engelbar in '60s at the federal government 'Augmentation Research Center'. Before it was coined a mouse it was called an "X-Y Position Indicator for a Display System"

What is in a Metaphor?



Early 'Metaphorical' Bug

Bug - small flaws in machines

Thomas Edison talked about bugs in electrical circuits in the 1870s.

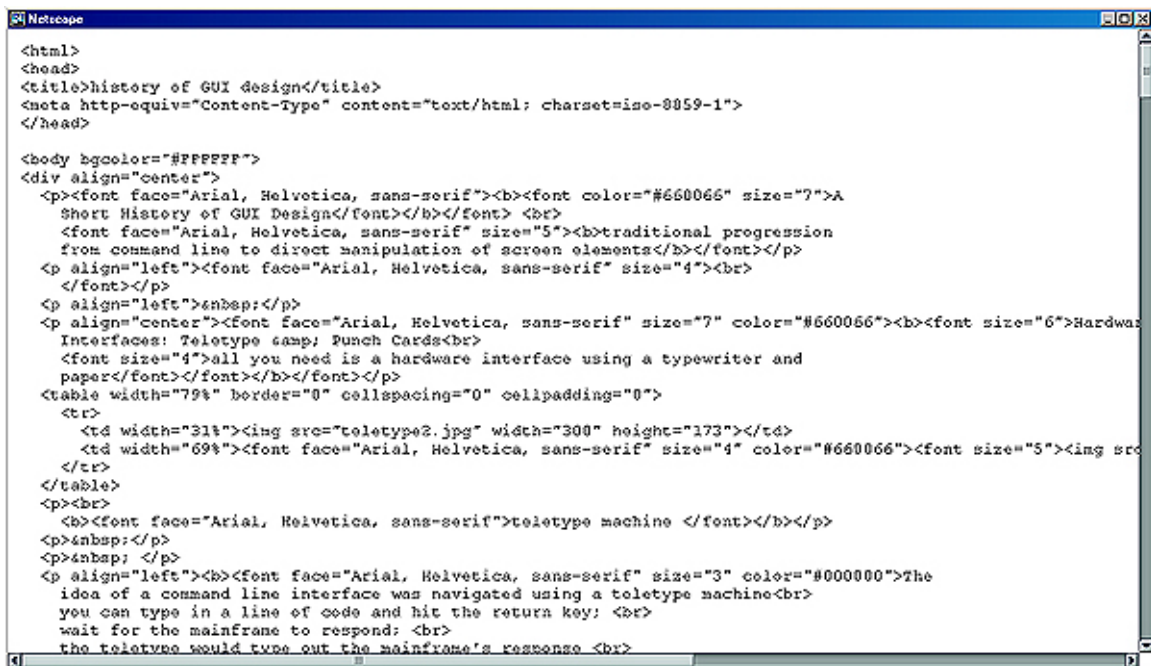
Engineers (1947) working on the Mark II computer - Harvard University - found a moth stuck in one of the components. They taped the insect in their logbook and labeled it "first actual case of bug being found."

"bug" and "debug" now standard to computer programming language.

GUI Metaphor: the ups and the downs or how the literal meaning can disrupt what the actual process is (or how we forgot that we are still manipulating indirectly a very small but elegant teletype machine)

a string of bytes is a file or streams -the programmer has to figure out how to take the information that is being worked on (image, spreadsheet, etc.) and convert it into a stream of linear bytes.

Everything you see on your computer screen whether (audio, graphics, etc.) is from the computer's point of view just like telegrams, except with much longer and demanding of more arithmetic.



```
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<title>history of GUI Design</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#FFFFFF">
<div align="center">
  <p><font face="Arial, Helvetica, sans-serif"><b><font color="#660066" size="7">A
  Short History of GUI Design</font></b></font> <br>
  <font face="Arial, Helvetica, sans-serif" size="5"><b>traditional progression
  from command line to direct manipulation of screen elements</b></font></p>
  <p align="left"><font face="Arial, Helvetica, sans-serif" size="4"><br>
  </font></p>
  <p align="left">&nbsp;</p>
  <p align="center"><font face="Arial, Helvetica, sans-serif" size="7" color="#660066"><b><font size="6">Hardware
  Interfaces: Teletype &amp; Punch Cards<br>
  <font size="4">all you need is a hardware interface using a typewriter and
  paper</font></b></font></p>
  <table width="79%" border="0" cellspacing="0" cellpadding="0">
    <tr>
      <td width="31%"></td>
      <td width="69%"><font face="Arial, Helvetica, sans-serif" size="4" color="#660066"><font size="5"><img src
      </tr>
    </table>
  <p><br>
  <b><font face="Arial, Helvetica, sans-serif">teletype machine </font></b></p>
  <p>&nbsp;</p>
  <p>&nbsp;</p>
  <p align="left"><b><font face="Arial, Helvetica, sans-serif" size="3" color="#000000">The
  idea of a command line interface was navigated using a teletype machine<br>
  you can type in a line of code and hit the return key: <br>
  wait for the mainframe to respond: <br>
  the teletype would type out the mainframe's response <br>
```

Example: look at a web page in the browser then view source

HTML is but a telegram

The OS (operating system) = stack of metaphors and abstractions that stand between you and the telegrams

OS embodies tricks the programmer uses to translate information you are manipulating (image, text, sound, video) into strings of bytes (the only things computers know how to work with).

Interaction with the machine now is highly mediated.

Everything we do is interpreted and translated as it is filtered down through all the metaphors and abstractions.

Metaphors that don't make sense!

Trash Can

Dragging the disk to the Trash Can

Can you think of others????



Macintosh trashcan verses windows recycle bin

Metaphors

Different Strokes for Different Folks

Intelligentsia verses working class

Splash Screen for Microsoft Word 6

Picture of expensive enamel pen lying across a

Couple of sheets of fancy-looking handmade

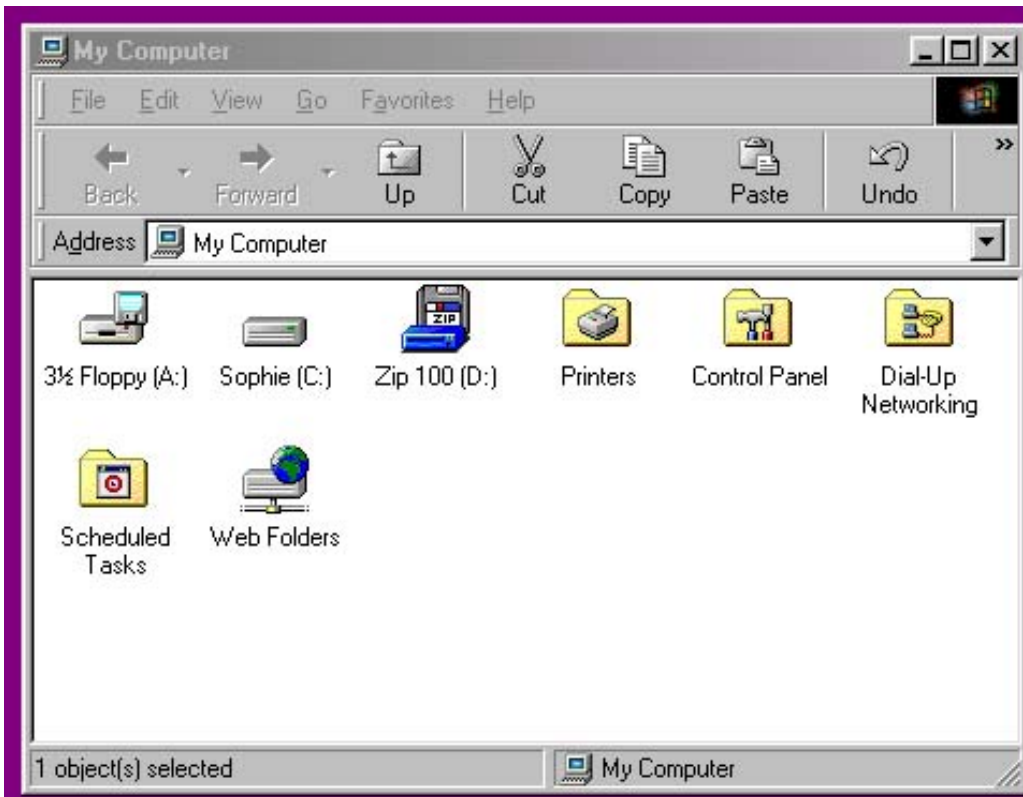
Paper is really a ballpoint pen

Control panel for windows

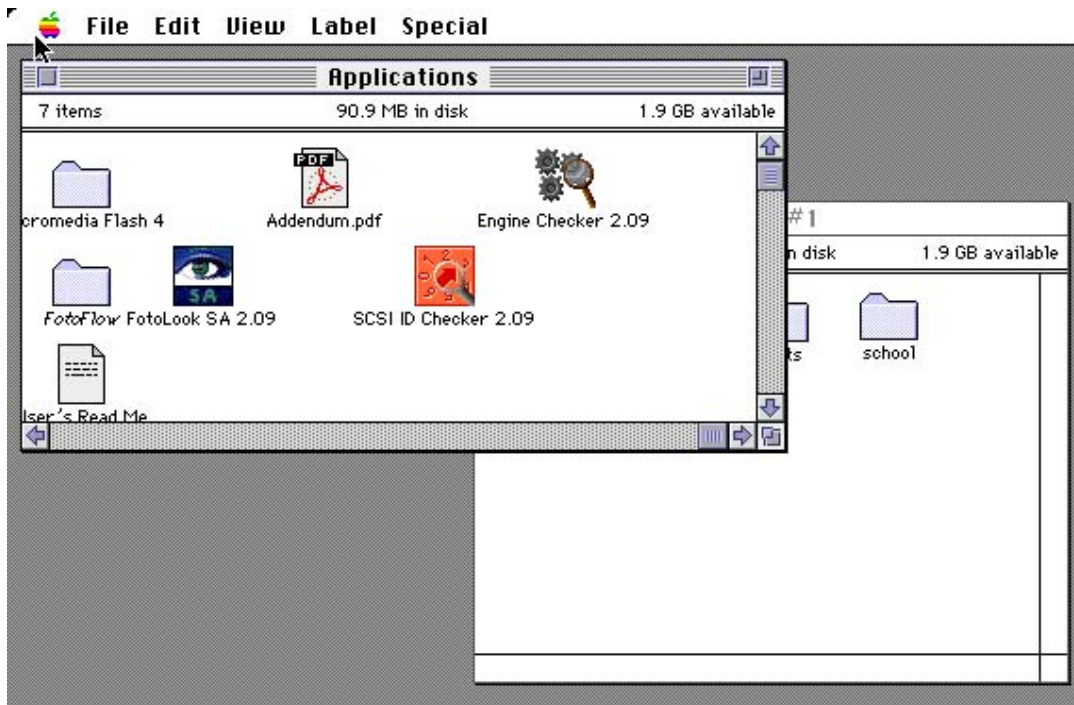
Icon of a claw hammer and a chisel or screwdriver

Resting on top of a file folder (still in windows 98)

Operating System GUIs (Direct Manipulation Interfaces)



Windows GUI



Macintosh GUI

business computing conventions = PC and Windows

Microsoft's BOB

Bring out the personality in your computer agent based interfaces

The OS that Couldn't

Graphic Designers and the New Digital Medium

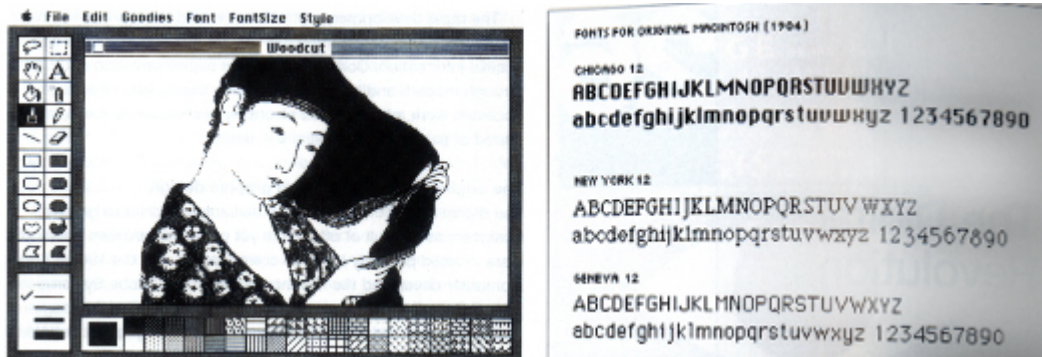
Initial Resistance by traditional designers to new digital medium (computer aided graphic design)

Macintosh

First Macintosh (Lisa) revolutionized with 72 dpi screen resolution and bit-mapped graphics (dots or pixels) in black and white

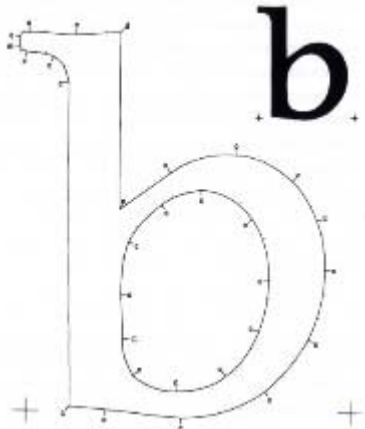
early bitmapped fonts = letterform dictated by matrix of dots in early fonts

Because of mouse and object oriented work space designer could focus on creative work and not on machine operation and programming.



Apple released software for word processing, drawing and painting

Adobe Postscript



postscript (page description programming language) enabled printers to output text, images and graphic elements (also determine page placement)

postscript not bitmapped dots but stored as electronic instructions and data; generated as outlines filled with solid forms. Curved lines of the characters formed of bezier splines that can create complex shapes with smooth endpoints.

Desktop publishing

Aldus company created first page layout program (PageMaker) for Macintosh. Could alter type size, font choice, column length and width. Could include images.

Desktop metaphor could allow for creation of elements on screen, position in manner similar to traditional methods. Electronic combining of type and image on screen before printing became desktop publishing (coined by Brainerd who formed company Aldus)

- Saved time and money in preparing pages for printing
- Became more assessable to more public uses
- Precise color control came with graphic Paintboxes – images could be overlapped and altered

Pioneers of Digital Graphic Design

Susan Kare – designer of Macintosh and PC iconography and typefaces



original macintosh icons designed by Susan Kare (www.kare.com)

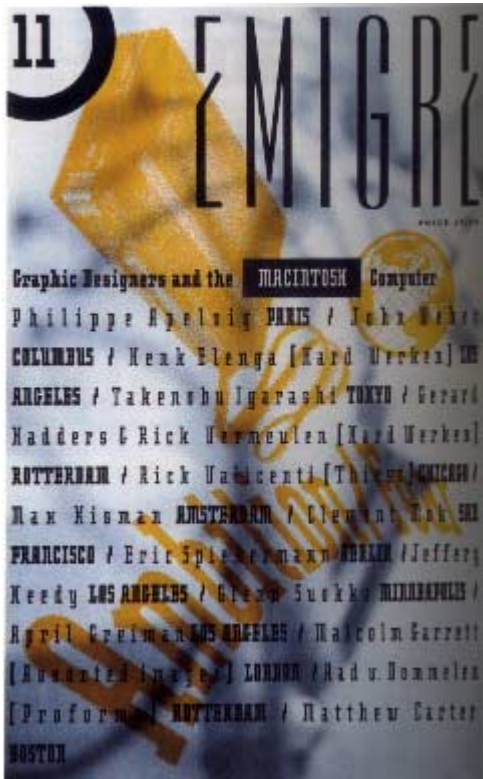


April Greiman

Explored visual properties of bitmapped fonts, layering and overlapping of computer-screen information, synthesis of video and print, tactile patterns and shapes made possible by new medium.

Poster composed of digitalized images output by low-resolution printer on 8 ½ x 11 paper. For Design Quarterly 133, 1987

Rudy VanderLans - Émigré magazine
used typewriter type and copier images in first issue and then low resolution Macintosh type for subsequent issues



cover for Émigré 11 magazine, 1989

Zuzana Licko

Designer of fonts – low resolution and high resolution
Dissatisfied with limited fonts for Macintosh used public domain font generator (FontEditor) to create digital typefaces

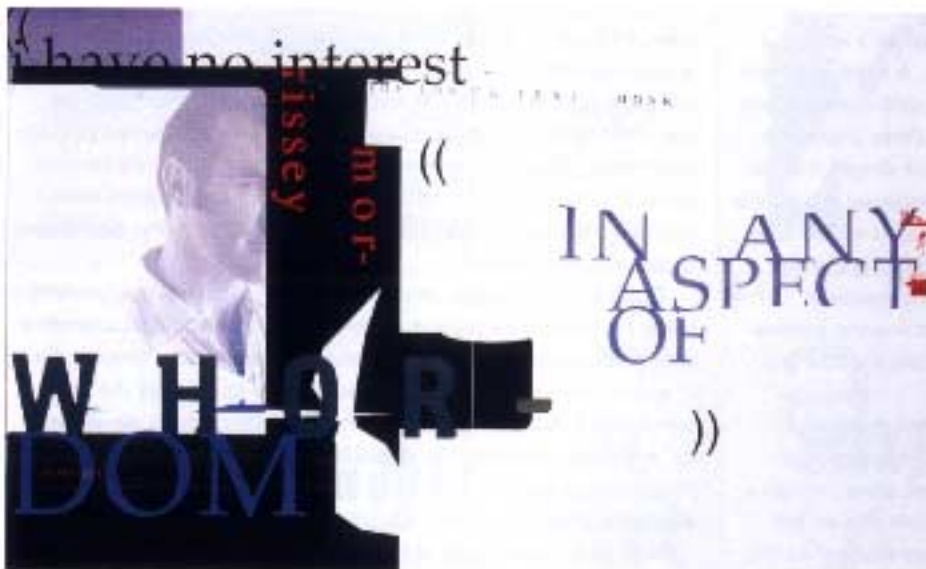


David Carson

Went against conventions (grids, layouts and typography styles)
Ray Gun (and other magazine) set page numbers large, erratically spaced items, reversed kerning, etc.



26-15



David Carson and John Ritter (above) "is techno dead," Ray Gun, 1994

David Carson and Chris Cuffaro, (below) "Morrissey: The Loneliest Monk," Ray Gun, 1994

Milestones in Digital Technology

Digital Type

Adobe became digital type foundry

- partly due to digital typography and its new elasticity
- allowed outline letters in rolling stone article – digital designers could ‘paint with type’
- change scale, color, overlap forms squash stretch

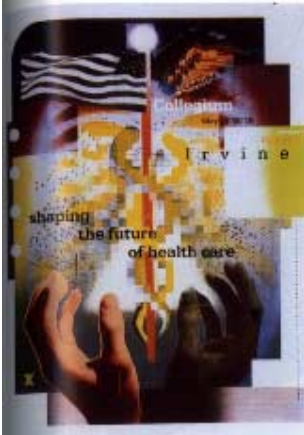


Fred Woodward (art director) and Lee Bearson (designer), "Cyber Nation," in Rolling Stone, 1994.

Digital Imaging

Before advent of Macintosh computer little creative potential exploited because of high costs in mainframe computers and video editing.

Photoshop and Desktop Publishing made image manipulation available to most at little overhead cost.



April Greiman, Shaping the Future of Health Care poster, 1987.

Interactive Media and the Internet

Hypertext is text on a computer screen containing pointers to other text, which are instantly available simply by placing a cursor on the key word or icon and clicking the mouse. Non-linear access.

Hypercard

Macintosh came with program called Hypercard – early application of this concept



Hugh, Dubberly, Clement Mok, and Doris Mitch (graphic Designers) design the Apple Computer Annual Report supplement in Hypercard (1987)

Interactive Media (CD-Roms)

CD storing images, video, sound animation, illustration, text and programming

Allows viewer to pursue information along a personal path



Bill Hill and Terry Irwin (creatives) and Jeff Zwerner (designer), Metadesign San Francisco, CD-ROM 1995. Coordinated Design System unifies booklets, packaging, screen design.

World Wide Web

Graphical environment consisting of animation, graphics, sound, text and video

Posed significant constraints on designers

- Screen size
- Typographic defaults (typically times, Helvetica, courier)
- Layout that is reconfigured based on browser and setup



26-40

Discovery Channel Site demonstrated capability of graphic designers to create identity, aid navigation, and bring visual interest to the web.



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Became influential as paradigm of design



26-42



26-43



26-44



Jessica Helfand (Creative Director),
 Melissa Tardiff (art Director), Jessica
 Helfand Studio; Interactive Bureau
 (agency); John Lyle Sanford (Discovery
 Channel design director)

Richard Saul Wurman (1996)

coined term information architecture

predicted it would become a new profession of individuals who made complex information understandable

Clement Mok

Apple Computer Creative director left to open Clement Mok Design (Studio Archetype)

Early advocate graphic designer's role in changing world of interactive media

Realized digital revolution merging commerce, technology, design in symbiotic whole

f



Mok and Internet Shopping site for iQVC



Mok, NBC News Intercast screen, 1995

The Future of GUI Design

- Talking, Gesturing and looking all wrapped into one concise package

Artificial Intelligence Agents

GUIs that interact with you and learn more about you the more you interact with them!

www.zabaware.com/home.html

Welcome to Zabaware, Inc. We are a company that aims at bringing out the person in your PC. Our chatterbot software will give your computer a personality using artificial intelligence technology, speech recognition technology, and real-time animation. Our software can speak and understand the English language. Like most chatterbots available on the market today, our software can hold intelligent conversations with you. You can chat with your computer about anything and you can always expect an intelligent response. However, only our chatterbot software can actually do something useful for you. Please take a look around our web site to find out more about our new technology. You can chat with one of our chatterbots right over the Internet, or download free software for your PC.

excerpted from zabaware home page



Ultra Hal Assistant is your digital secretary

- Remember and remind you of appointments.
- Keep an address book and phone book + dial phone numbers
- Run programs and recent documents on command
- Help you browse the Internet
- All of this from natural language
- Built in speech recognition

Present Day: Naturally Speaking Program

motion sensor devices with instant feed-back correlating to body motion



V-Toy

Visually Interactive Toy
Developed by University of Maryland and IBM.

Audio-visually interactive Robot that reacts to human presence and 'understands' simple communication messages. It replicates the functions of the upper part of the human body with a rotating neck, 2 controllable eyes, 2 cameras, deformable eyebrows, and mouth. V-toy detects motion and greets engaging the person visually and verbally.

Neil Stephenson, In the Beginning... Was the Command Line,

Philip B. Meggs, A History of Graphic Design, 3rd edition, John Wiley and Sons, 1998.