

15-292

History of Computing

The GUI and the rise of Microsoft

Based on slides originally published by Thomas J. Cortina in 2004 for a course at Stony Brook University. Revised in 2013 by Thomas J. Cortina for a computing history course at Carnegie Mellon University.



Early History of the GUI

- First real-time graphic display systems for computers are developed for the SAGE Project and Ivan Sutherland's Sketchpad system.
- Doug Engelbart's Augmentation of Human Intellect project at SRI in the 1960s developed the On-Line System, which incorporated a mouse-driven cursor and multiple windows.



Xerox PARC



- Xerox PARC (Palo Alto Research Center) was the birthplace of many foundations of modern computing
 - the mouse
 - the laser printer
 - the Smalltalk programming language
 - Interpress (a precursor to PostScript)
 - the Ethernet
- Xerox PARC invents prototype of the world's first personal computer: the Alto
 - the first WYSIWYG editor, first commercial use of a mouse, graphical user interface, bit-mapped display



Mouse



- The mouse was invented by Douglas Engelbart of Stanford Research Institute in 1963 after extensive usability testing.
 - He received a patent in Nov. 1970 for a "X-Y Position Indicator For A Display System".
 - He was the recipient of the 1997 ACM Turing Award.
- A later variation, invented in the early 1970s by Bill English at Xerox PARC, replaced the external wheels with a single ball which could rotate in any direction.



Engelbart

Laser Printer



- In 1938, Chester Carlson invented a dry printing process called xerography, commonly called a Xerox, the foundation technology for laser printers to come.
- The original laser printer called EARS was developed at the Xerox Palo Alto Research Center beginning in 1969 and completed in November, 1971.
- Xerox Engineer, Gary Starkweather adapted Xerox copier technology adding a laser beam to it to come up with the laser printer.
- The Xerox 9700, the first xerographic laser printer product, was released in 1977.

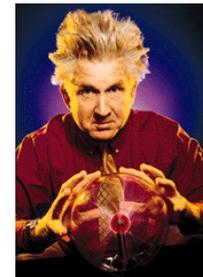


Starkweather

Ethernet



- Ethernet was originally developed as one of the many pioneering projects at Xerox PARC.
- Invented between 1973-1976 by Robert Metcalfe and David Boggs
- Metcalfe left Xerox in 1979 to promote the use of personal computers and local area networks (LANs), forming 3Com.
 - He successfully convinced DEC, Intel, and Xerox to work together to promote Ethernet as a standard, which was first published in 1980.



Metcalfe

Early History of the GUI (cont'd)



- At Xerox PARC, a research team codified the WIMP (windows, icons, menus and pointing device) paradigm, which eventually appeared commercially in the Xerox 8010 ('Star') system in 1981.
- Beginning in 1979, the Lisa and Macintosh teams at Apple Computer continued to develop such ideas.

Apple Macintosh

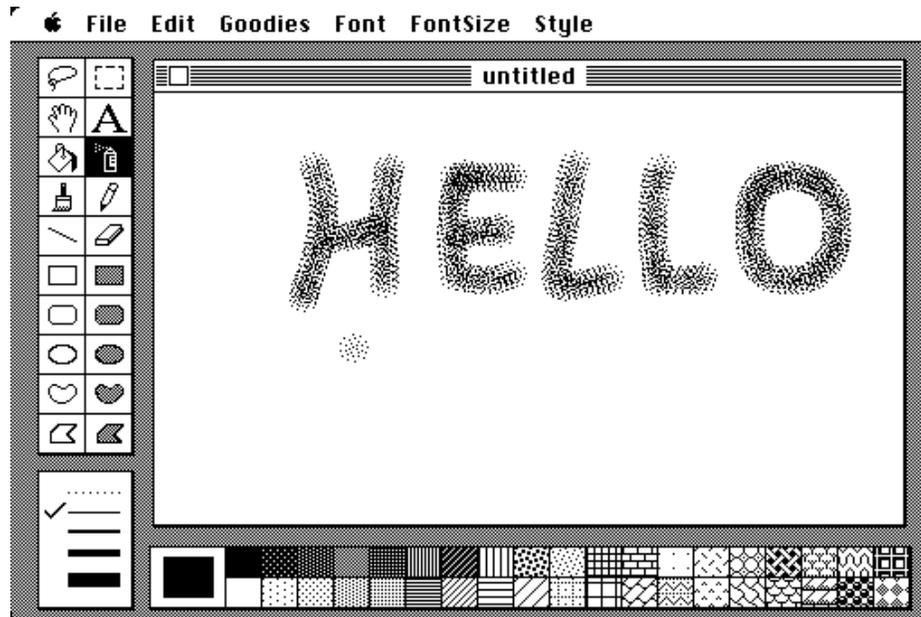


- Steve Jobs and a number of Apple engineers visited Xerox PARC by invitation in 1979.
- Introduced in 1984 at a price of \$2495
- Featured operation entirely by GUI
- Apple's policy was to thwart the design of clones

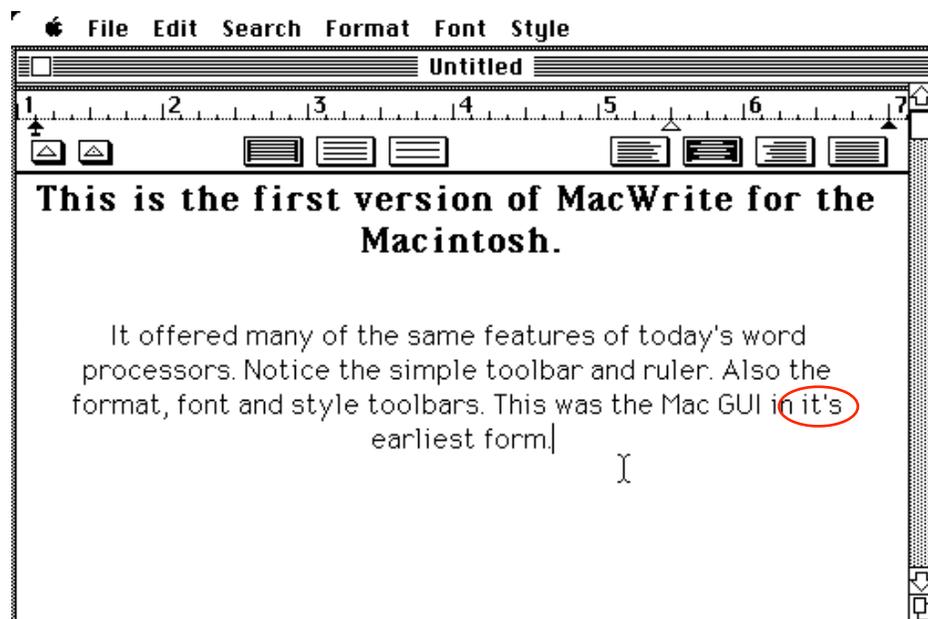


Original Apple Macintosh 128K

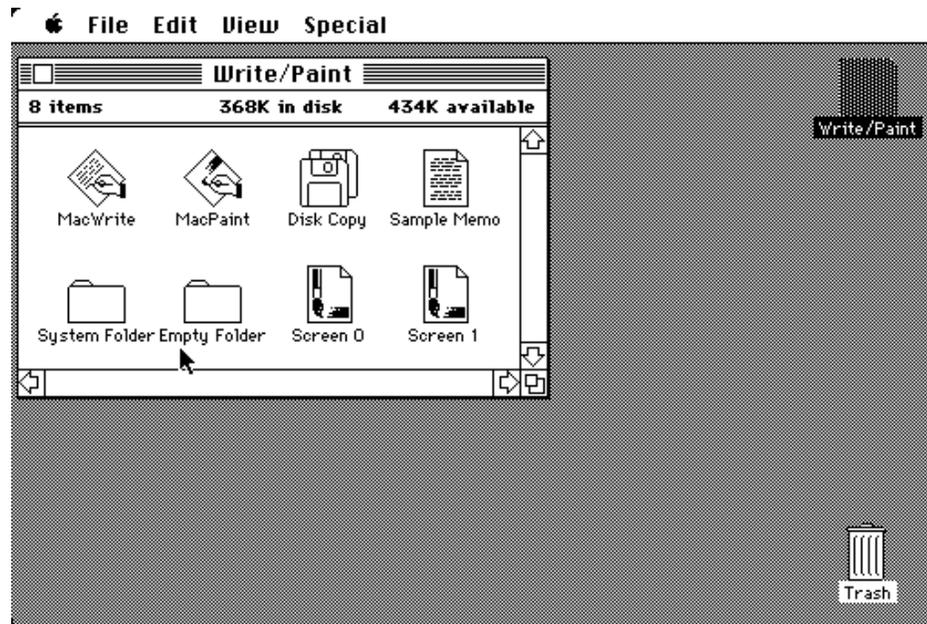
Apple Macintosh GUI



Apple Macintosh GUI



Apple Macintosh GUI



Microsoft Begins its Rise

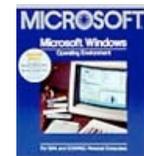


- Microsoft uses its income from sales of MS-DOS for PC clones to invest in new software projects in the early 1980s.
 - new versions of Microsoft BASIC
 - Multiplan, later Excel
 - Word
 - Windows

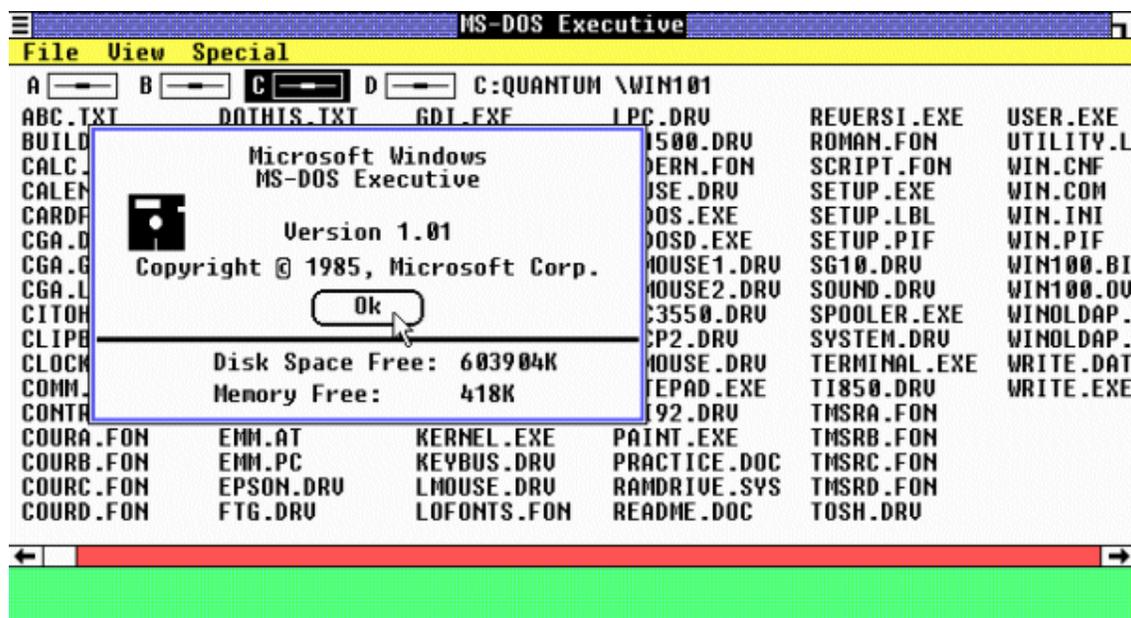
The Birth of MS Windows



- Microsoft announced its development of Windows for its own operating system MS-DOS in 1983.
- Microsoft modeled the GUI after that of Apple's MacOS.
 - Bill Gates had been shown a Macintosh prototype by Steve Jobs early in its development (around 1981)
 - Microsoft was partnered by Apple to create some of the important early Mac software, such as Word and Excel.
- The first independent version of Microsoft Windows, version 1.0, was released in 1985.



Microsoft Windows 1.0

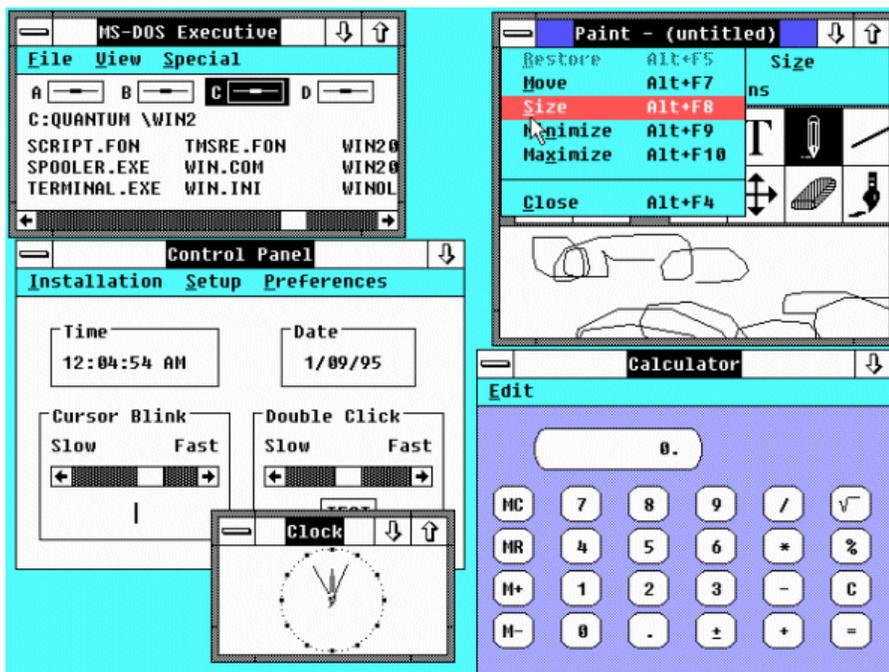


Microsoft Windows 2.0



- Microsoft Windows version 2 came out in 1987.
 - Much of the popularity for Windows 2.0 came by way of its inclusion as a "run-time version" with Microsoft's new graphical applications, Excel and Word for Windows.
 - Microsoft Windows received a major boost around this time when Aldus Pagemaker appeared in a Windows version, having previously run only on Macintosh.
- The Apple v. Microsoft copyright infringement lawsuit was in 1988. (More on this later.)

Microsoft Windows 2.0

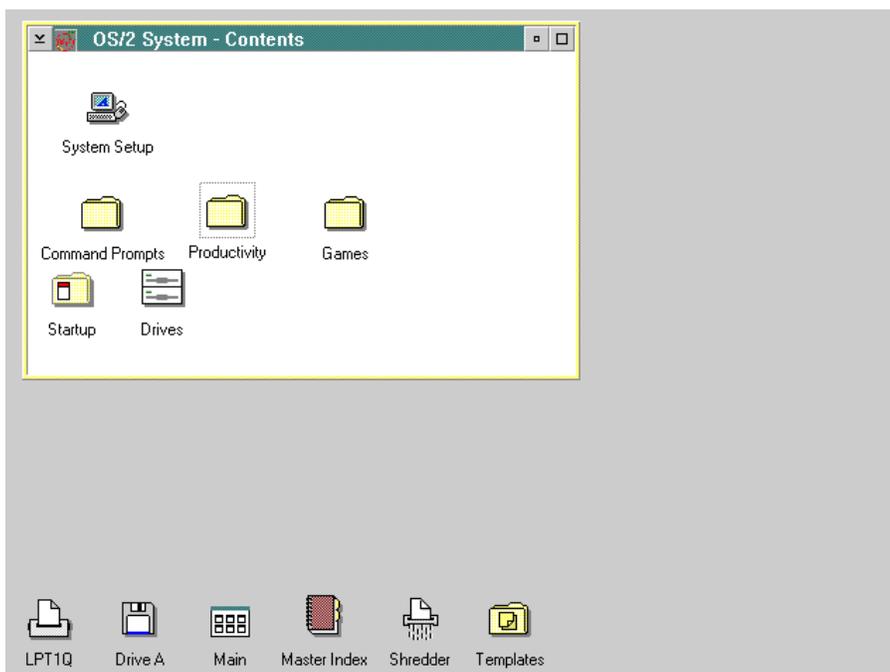


IBM & Microsoft: OS/2

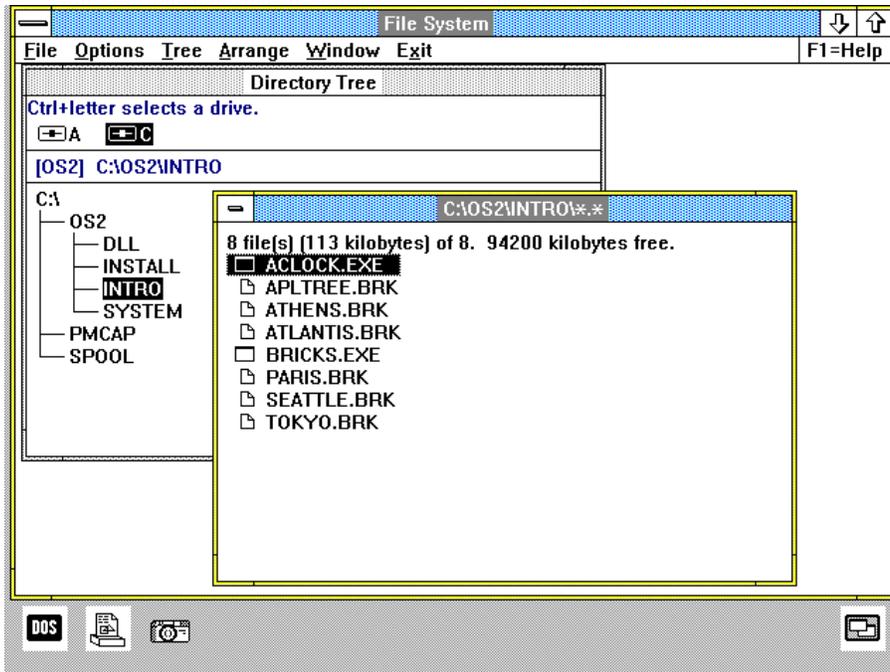


- During the mid to late 1980s, Microsoft and IBM had co-operatively been developing OS/2 as a successor to DOS
- OS/2 1.0, released in 1987, supported swapping and multitasking and allowed running of DOS executables.
 - A GUI, called the Presentation Manager (PM), was available with OS/2 version 1.1, released in 1988.
- By the early 1990s, tensions developed in the Microsoft/IBM relationship.
 - This agreement soon however fell apart, and the Microsoft/IBM relationship was terminated. IBM continued to develop OS/2, while Microsoft developed its operating system into Windows NT

OS/2 1.1 & 2.0



OS/2 1.1 & 2.0



Microsoft Windows 3.1 & NT

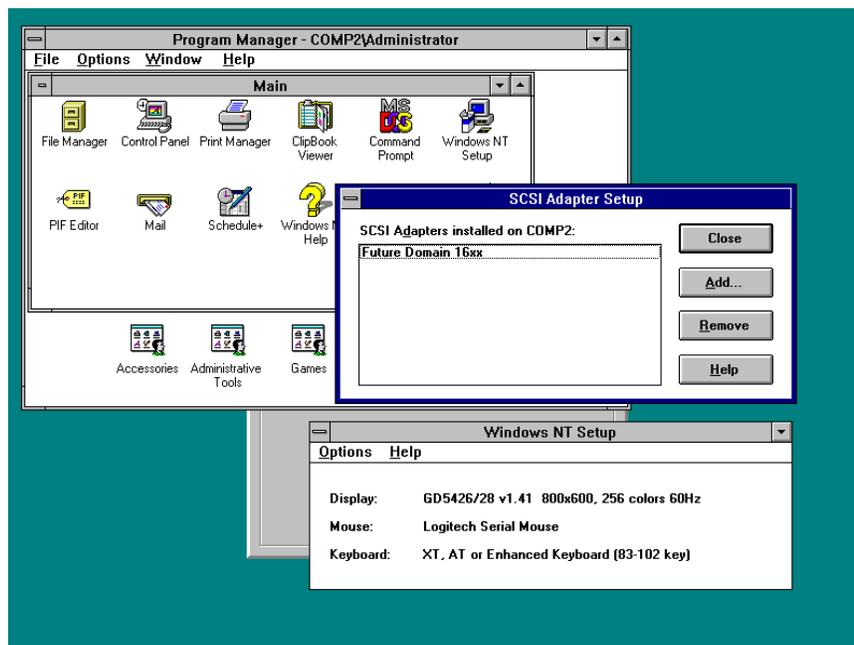


- Windows 3.1 was released in 1992
 - basic multimedia support for audio input and output
 - a CD audio player application
 - a TrueType font system for desktop publishing
- Windows for Workgroups, an extended version of Windows 3.11 included file sharing support
- Microsoft renamed their OS/2 version to MS Windows NT, changing the main API to a 32-bit version of its MS Win16 API.

Microsoft Windows 3.1



Microsoft Windows NT



Microsoft Windows NT



```

*** STOP: 0x00000019 (0x00000000,0xC0000000,0xFFFFFD4,0xC0000000)
BAD_POOL_HEADER

CPIUID: GenuineIntel 5.2.c irq1:1f SVSUER 0xf0000565

D11 Base DateStmp - Name D11 Base DateStmp - Name
80100000 3202c07e - ntoskrnl.exe 80010000 31ee6c52 - hal.dll
80001000 31e49eb4 - atapi.sys 80006000 31ee6c74 - CSIPORT.SYS
802c6000 31e406bf - aic78xx.sys 802cd000 31e4237c - Disk.sys
802d1000 31ee6c7a - CLASS2.SYS 8037c000 31eed8a7 - Ntfs.sys
fc998000 31ee6c7d - Floppy.SYS fc6a8000 31ee6ca1 - Cdrom.SYS
fc90a000 31ee6df7 - Fs_Rec.SYS fc9c9000 31ee6c99 - Null.SYS
fc064000 31e4868b - KSecDD.SYS fc9ca000 31ee6c78 - Beep.SYS
fcdd8000 31ee6e90 - idm42prt.sys fc86c000 31ee6c97 - noudclass.SYS
fc874000 31ee6e94 - kbdc1ass.sys fc6f0000 31f50722 - UIDEOPORT.SYS
fc064000 31ee6c62 - mva_nll.sys fc890000 31ee6c6d - vga.sys
fc708000 31ee6ecb - Mps.SYS fc4b0000 31ee6c67 - Mps.SYS
fcfb0000 31eed262 - NDIS.SYS a0000000 31f954f7 - win32k.sys
fc348000 31f91a51 - mva.dll fc031000 31eedd07 - Fastfat.SYS
fc8bc000 31ee6e6c - TDI.SYS feaf0000 31e40754 - nbt.sys
feac0000 31f130a7 - tcpip.sys feab3000 31f50a65 - netbt.sys
fc550000 31601130 - e159k.sys fc560000 31f8f864 -afd.sys
fc718000 31ee6e7a - netbios.sys fc850000 31ee6c9b - Pauport.sys
fc870000 31ee6e9b - Parallel.SYS fc954000 31ee6c9d - Paupdn.SYS
fc5b0000 31ee6eb1 - Serial.SYS fea40000 31f5003b - rdb.sys
fea3b000 31f7a1ba - nup.sys fe9da000 32031abe - svp.sys

Address duodd dump Build [1381] - Name
fc032d84 80143e00 80143e00 80144000 fdfdf000 00070b02 - KSecDD.SYS
801471c8 80144000 80144000 fdfdf000 c03000b0 00000001 - ntoskrnl.exe
801471dc 80122000 f0003fe9 f030ee08 e133c4b4 e133c440 - ntoskrnl.exe
80147304 803023f0 0000023c 00000034 00000000 00000000 - ntoskrnl.exe

Restart and set the recovery options in the system control panel
or the /CRASHDEBUG system start option.
    
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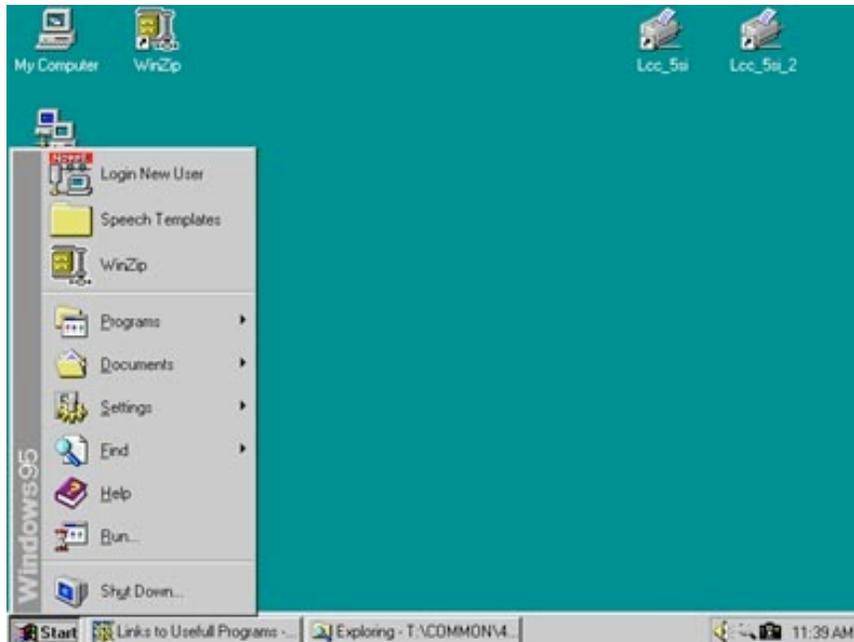
“Blue Screen of Death” - very common when things went wrong in NT

Microsoft Windows 95



- Microsoft began to develop a new version of the operating system (code name: Chicago).
- Released in August 1995 in a world-wide party-event.
 - First Microsoft OS not to run on top of DOS
- IBM continued to market OS/2, producing later versions in OS/2 3.0 and 4.0 (OS/2 Warp).
 - OS/2 ran Windows 3.1 programs
 - IBM did not have access to Windows 95 source code so compatibility became more difficult
- Microsoft is accused of unfair business practices by the Dept of Justice and a number of states (more on this later)

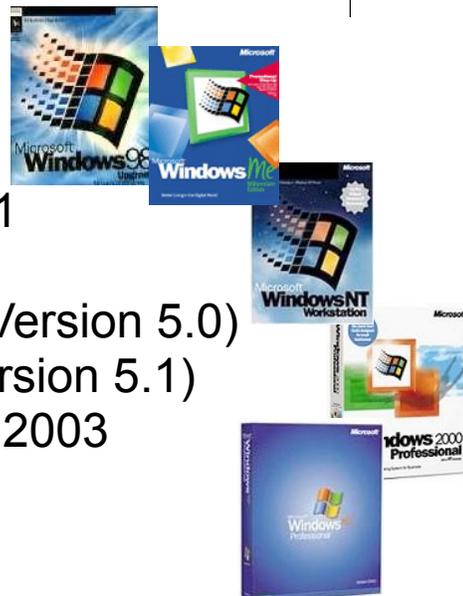
Microsoft Windows 95



Additional Windows Releases



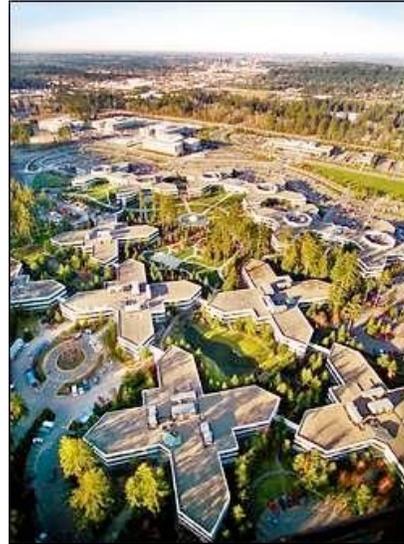
- 1998 Windows 98
- 2000 Windows ME
- 1993 Windows NT 3.1
- 1995 Windows NT 3.51
- 1996 Windows NT 4.0
- 2000 Windows 2000 (Version 5.0)
- 2001 Windows XP (Version 5.1)
- 2003 Windows Server 2003 (Version 5.2)
- 2007 Windows Vista
- 2009 Windows 7
- 2012 Windows 8 (tablet-based GUI)



Microsoft's Growth



The early Microsoft team from Albuquerque, NM (~1977).



The Microsoft campus in Redmond with Bellevue in the background. (2003 - Seattle Times)
Total employees: 55,000 (as of 2003)

Bill Gates' Net Worth



- According to *Forbes* list of the World's Wealthiest People:
 - 2001 - \$58.7 billion, ranked #1
 - 2002 - \$52.8 billion, ranked #1
 - 2003 - \$40.7 billion, ranked #1
 - 2004 - \$46.6 billion, ranked #1
 - 2005 - \$46.5 billion, ranked #1
 - 2006 - \$52.0 billion, ranked #1
 - 2007 - \$56.0 billion, ranked #1
 - 2008 - \$58.0 billion, ranked #3
 - 2009 - \$40.0 billion, ranked #1
 - 2010 - \$53.0 billion, ranked #2
 - 2011 - \$56.0 billion, ranked #2
 - 2012 - \$61.0 billion, ranked #2

640kb ought to be enough for anyone.

