

# Gone but not Forgotten: 10 Operating Systems the World Left Behind

Matt Lake  
(Computerworld)

You're not really supposed to love an operating system. It's like your car's hydraulic system, your digestive system or the global financial system. It's supposed to do its job -- and not get in your way while you're doing yours. But like your car, your guts and the economy, computers are more complicated than they seem. And so are our feelings about them.

As the tech community gears up to celebrate Unix's 40th birthday this summer, one thing is clear: People do love operating systems. They rely on them, get exasperated by them and live with their little foibles. If that's not the basis of a lasting love, I don't know what is.

So now that we're more than 30 years into the era of the personal computer, Computerworld writers and editors, like all technology aficionados, find ourselves with lots of memories and reactions to the operating systems of yesteryear. We have said goodbye to some of them with regret. (So long, AmigaOS!) Some of them we tossed carelessly aside. (Adios, Windows Me!) Some, we threw out with great force. (Don't let the door hit you on the way out, MS-DOS 4.0!)

Today we want to honor a handful of the most memorable operating systems and interfaces that have graced our desktops over the years. Some of them lasted for years. Some of them had remarkably short lives but inspired trends that we are benefiting from to this day. And a few of them ... well, they were just cool for school.

The world may have left these operating systems behind, but some of us didn't. A few die-hards are hanging onto ancient hardware just to keep those beloved operating systems running. Others have reverse-engineered the OS code in open-source projects. And some of us still have those old Install disks, waiting for the right computer to come along so we can relive those days of yore. So, what's on the far side of your software shelf?

## Oh say, can you CP/M?

In the era when The Ramones and Blondie were regulars at CBGB, our Altairs and Ataris needed something to make programming applications easier. A rogue mind at Digital Research named Gary Kildall developed the Control Program for Microcomputers to do just that -- and the era of the microcomputer operating system began.

It's no exaggeration to say that CP/M was there at the beginning of the personal computing revolution. With CP/M to provide a layer of insulation over the processor, independent software developers just concentrated on making programs that worked for their users. Two of our early favorite programs -- WordStar and dBase -- were developed for CP/M; thanks to the operating system, they could run unaltered on 8080-, 8088- and 8086-based computers.

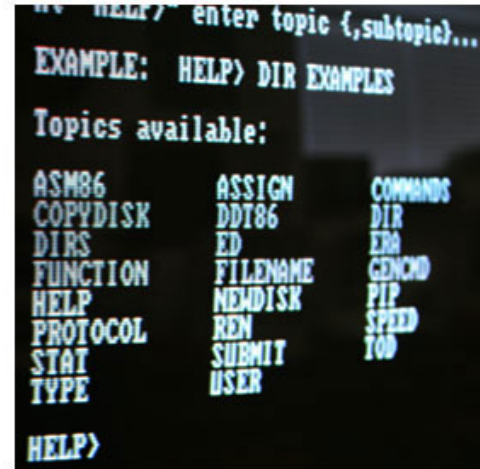
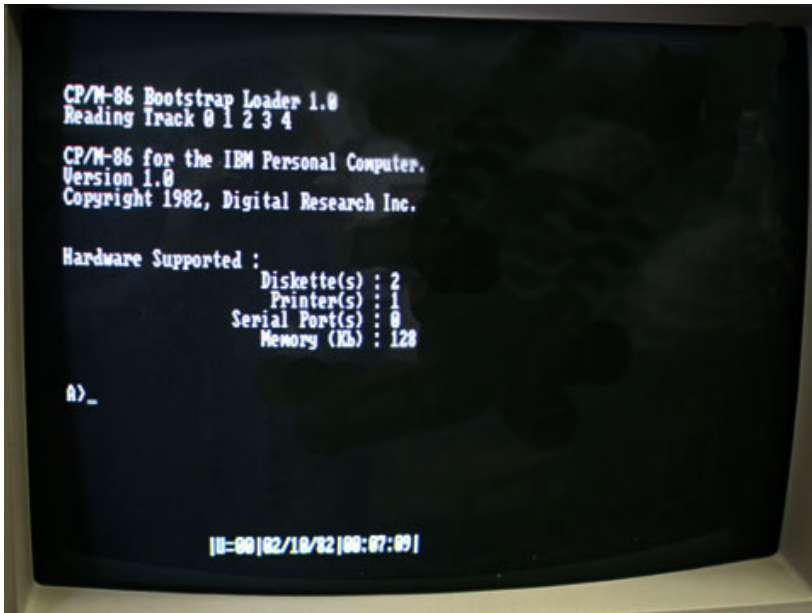
CP/M also gave us the command line options we came to know and love. The perennial favorite DIR command made its microcomputer debut in CP/M, and so did the eight-character maximum file name plus three-character extension that we lived with for so long.

It's not stretching a point to say that CP/M is the godfather of DOS -- the family of operating systems that ran generations of PCs. In fact, it may be understating the case to call it the godfather: MS-DOS could have been CP/M's twin. It used the same APIs and shared many of the same commands. Only one significant command was different: To copy files, DOS used the COPY command and CP/M used an old DEC minicomputer program name, PIP.

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A decade later, look-and-feel lawsuits were won on less evidence than that. Too bad the lawyers back then were not as far ahead of their time as Gary Kildall.



CP/M was there at the beginning of the personal computing revolution, giving us the command line options we came to know and love and providing a template for two decades of DOS variations. Shown here: CP/M-86 Version 1.0 running on an original IBM PC 5150 (top left and right); CP/M 2.2 on an Osborne 1 (bottom left); CP/M 2.2G on a Kaypro 10 (bottom right).

DOS was dealt a death blow when Windows 95 came out in 1995, but many of us old keyboard jockeys still drop out to the command line from Windows to flex our old DOS muscles occasionally. It just feels more efficient to type a quick command than to monkey around with the mouse and menus. We may be fooling ourselves -- like the people who wait in line for self-checkout at the supermarket when the Express checkout clerk is twiddling her thumbs -- but it's all about perception, right?

Of course, DOS wasn't a single homogeneous operating system. It came in many flavors from several different vendors. Even the iconic PC-DOS, introduced to the world in 1981 along with the IBM PC,

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didn't come from one vendor: It was branded by IBM and developed by Microsoft from its MS-DOS, which was in turn licensed from Seattle Computer, where it was called QDOS -- which was by some accounts ripped off from Digital Research's CP/M.



DOS, which ruled the command-line roost for a decade and a half, wasn't a single homogeneous operating system; it came in many flavors from several different vendors. Shown here: An original IBM PC 5150 running PC-DOS Version 1.10. Inset: MS-DOS 4.01 on a 286-based NCR Personal Computer.

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Most old propeller-heads cite 1987's MS-DOS 3.3 as their favorite. It introduced support for more than one logical drive per hard disk and could handle those high-capacity 3.5-inch floppy disks. (You remember, the double-density HD ones with a massive 1.44MB capacity?) No matter how many bug fixes Microsoft came up with for DOS 4.0, it was shunned; 3.3 was the MS-DOS of choice until DOS 5.0 came around in 1991.

And then there were the people who used DR-DOS instead. When Digital Research's DOS 5 debuted in 1990, it left so much more memory free than any version of Microsoft DOS that it made many instant converts. Purists were quick to point out it was a Digital Research product, the firstborn son of CP/M, not like the Microsoft's versions of DOS, the clones of CP/M's clone.

And besides, DR-DOS pioneered the MOVE command, a vast improvement over MS-DOS's convoluted two-step COPY and DEL. What's not to love about that?

Some of us favored the Tandy/Radio Shack brand of DOS, TRS-DOS (called triss-DOS by its friends and trash-DOS by its detractors). Now this was a DOS with some pedigree -- and no relationship to MS-DOS at all. It appeared in 1977, and its popularity may have had something to do with the fact it came on cheap retail machines four years before IBM entered the PC arena. Or perhaps people just liked TRS-DOS's dramatically named KILL command, which beat MS-DOS's more prosaic DEL hands-down.

But by any of its names, the DOS family was never for dummies. So if you miss it as badly as we do, pretend it's still around on your Windows machine: Hold down the Window key, press R, and type in CMD for old time's sake. Or go all the way and try out FreeDOS, an open-source project that's bringing DOS back to life on modern PCs.

## **Not just any system... THE System Ah, we remember Mac OS fondly.**

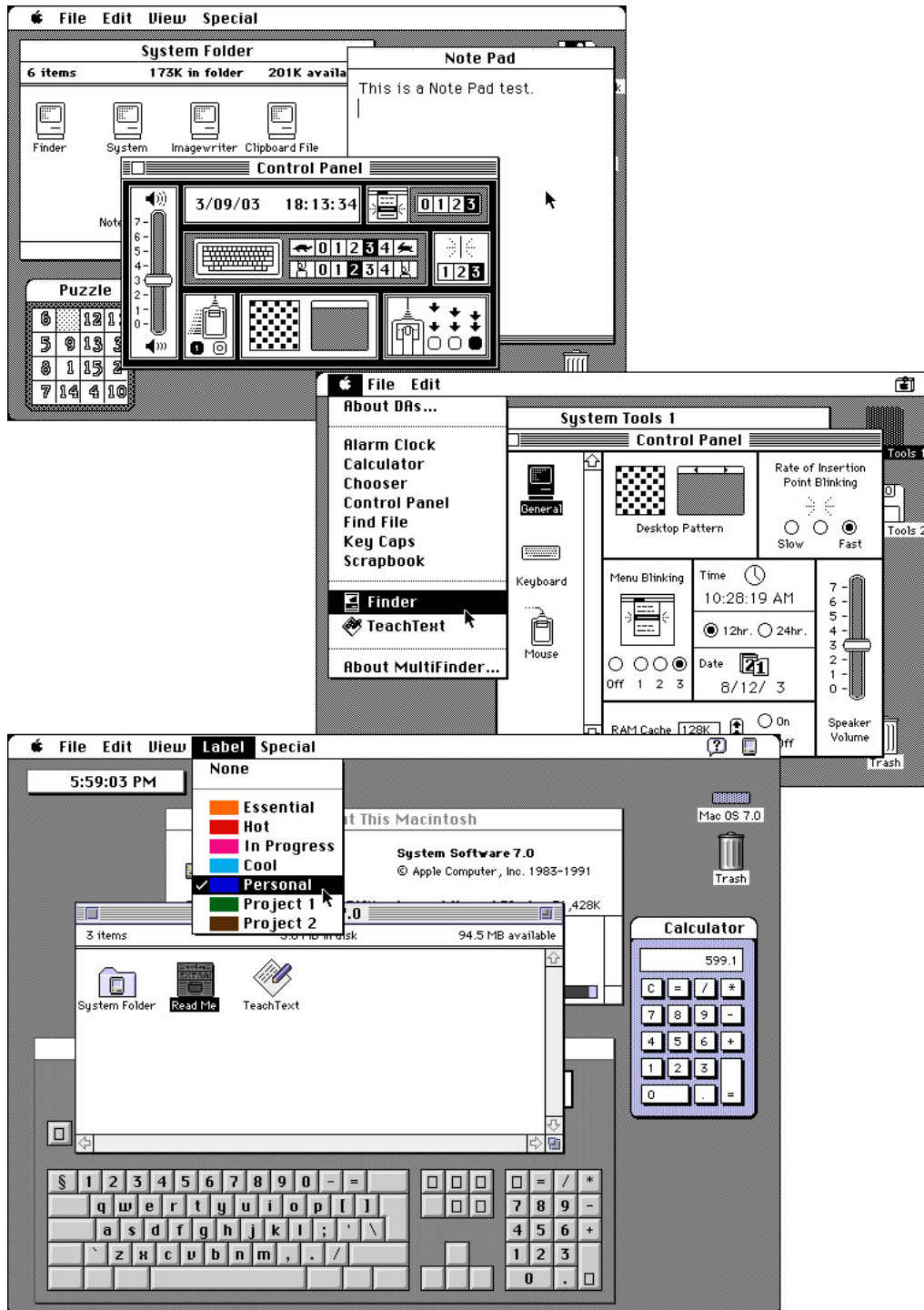
Yes, we know there's still a Mac OS, but we're talking about the classic Mac OS. It ran on Motorola chips. It wasn't built on BSD Unix; it was built on itself. And it was so self-evident, we just called it the System.

Now don't get us wrong ... we love the Tigers and Leopards and the other jungle cats of the OS world, but we still have a soft spot for the versions before Mac OS X. After all, it first inspired technolust in 1984, it lasted till the end of the millennium, and it spawned a rash of imitators -- and look-and-feel lawsuits.

Sure, we remember having to rebuild our desktops after our systems froze, which in the System 7 days seemed to happen fairly often. And it was always a bit of a pain trying to share Mac files with other platforms. But those were minor gripes compared to the smooth running of our System of choice -- and the fun of seeing how much rougher everyone else's ride was.

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The Mac OS "classic" operating system, introduced in 1984, powered Macs for 16 years and spawned a rash of imitators. For many years it was known simply as "the System." Shown here, from top to bottom: System 1.1, System 4.2 and System 7.0.

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Of the 16 years and nine versions of the System we lived through, we'd say System 7 brings the warmest waves of nostalgia. In the heady dot-com days of the mid '90s, the System was powering a market of clone machines that rapidly expanded the Mac platform. Even though it all ended abruptly when Apple introduced System 8 without renewing the clone builders' contracts, it was an exciting time to be a Mac buff.

The clone era also gave the old System its new name with the release of Version 7.6 -- when you fired up a beige machine called a PowerPC, it helped to see "Mac OS" on the start-up screen to be sure you were dealing with a real Mac.

And, of course, System 7 was the one we were running in 1995 when bumper stickers began appearing with the words "Windows 95 = Mac OS 89" on them.

## Adios, Amiga

We tend to take multitasking for granted these days, but 20 years ago, it was a Holy Grail for the personal computing platforms. With its DOS foundation, Windows could only wish for it. The Mac and OS/2 fumbled their way around it. You could switch around among programs, but if one of them was actually doing something like downloading a file or recalculating a spreadsheet, it would slow down or stop cold until you turned back to it.

Meanwhile, a four-year-old gaming platform was running rings around them all. The Amiga operating system was so tightly coded that it took the big corporate computers almost a decade to catch up. By then, Amiga computers had been used to generate backgrounds for popular TV shows like SeaQuest, Babylon 5 and Max Headroom, and they were routinely being used for titling and cheesy real-time effects on live network broadcasts.

Naturally, the Amiga's video subsystem and NewTek's Video Toaster hardware deserve much of the credit for the system's popularity among video professionals, but the AmigaOS played a major part. Its multithreaded multitasking made it a natural for heavy graphics work. And it could strut its stuff in as little as 250K of address space.

Small wonder, then, that the Amiga gained a fiercely loyal following. It wasn't until the late 1990s that Windows NT, OS/2 and the Mac OS were able to multitask as well -- and they required vast hardware resources to do it.

Sadly, the technical prowess of the Amiga makers was overwhelmed by cash-flow problems. Beginning in 1994, bankruptcies shunted Amiga through many owners, from Commodore to Escom to Gateway and beyond. Development on AmigaOS 4 continued on the PowerPC platform, but there's currently some kind of dispute over who actually owns the operating system, so it's in a holding pattern.

Nevertheless, Amiga users remain committed to their platform of choice, as shown by the reader responses to our blog asking if anyone still uses AmigaOS -- many say they still use it every day. We only hope that the world at large hasn't said a final adios to Amiga. Any operating system that could bring us Max Headroom is worth seeing again. And again. And ag-g-g-gain.

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AmigaOS's multithreaded multitasking abilities made it a natural for heavy graphics work and earned it a fiercely loyal following. Shown here, from top to bottom: Amiga Workbench 1.2, 2.0 and 3.9, which ran on Motorola processors, and AmigaOS 4.0, which runs on the PowerPC.

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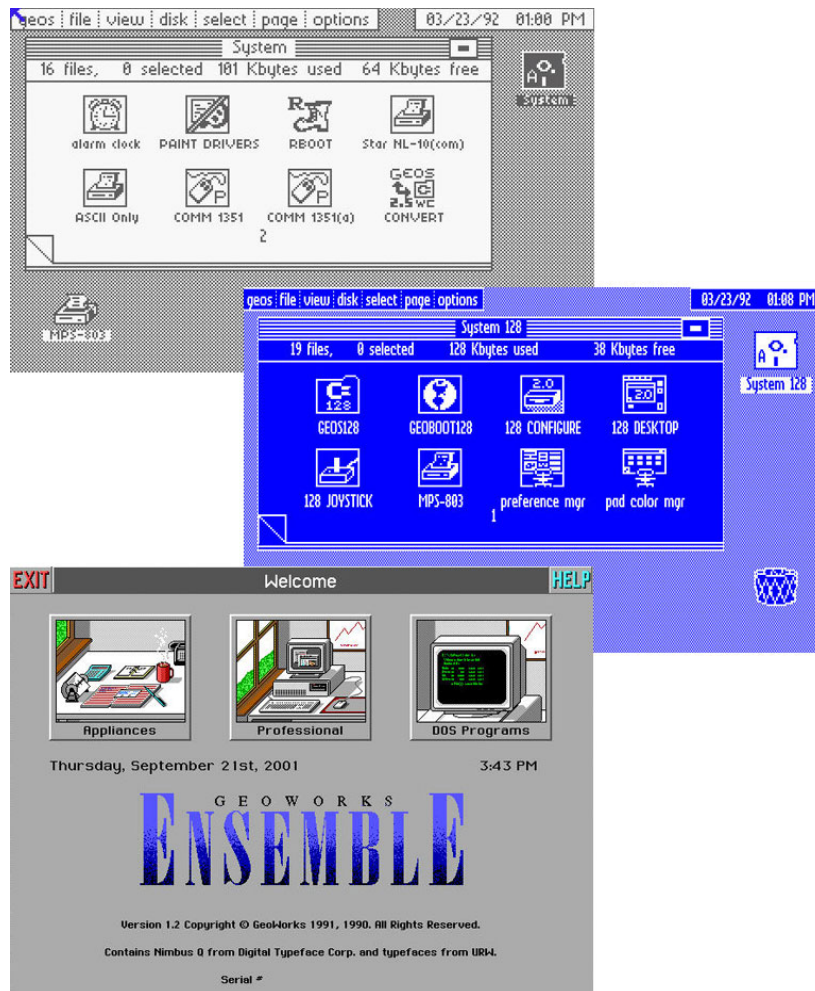
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## Golly GEOS

It was two years after the debut of the Macintosh. It was the year after the first Microsoft Windows shipped -- and long before Windows was widely used. And somehow, a band of wily California programmers managed to release a credible graphical OS that would run on a 1-MHz gaming platform.

In 1986, when Commodore released a revamped version of its flagship eight-bit games machine, the company threw in a Mac-like operating system from Berkeley Softworks. The Commodore 64C could perform WYSIWYG word processing, desktop publishing and spreadsheets -- and run some kicking games to boot. And you could buy 10 of them for the price of a loaded Mac or Windows machine.

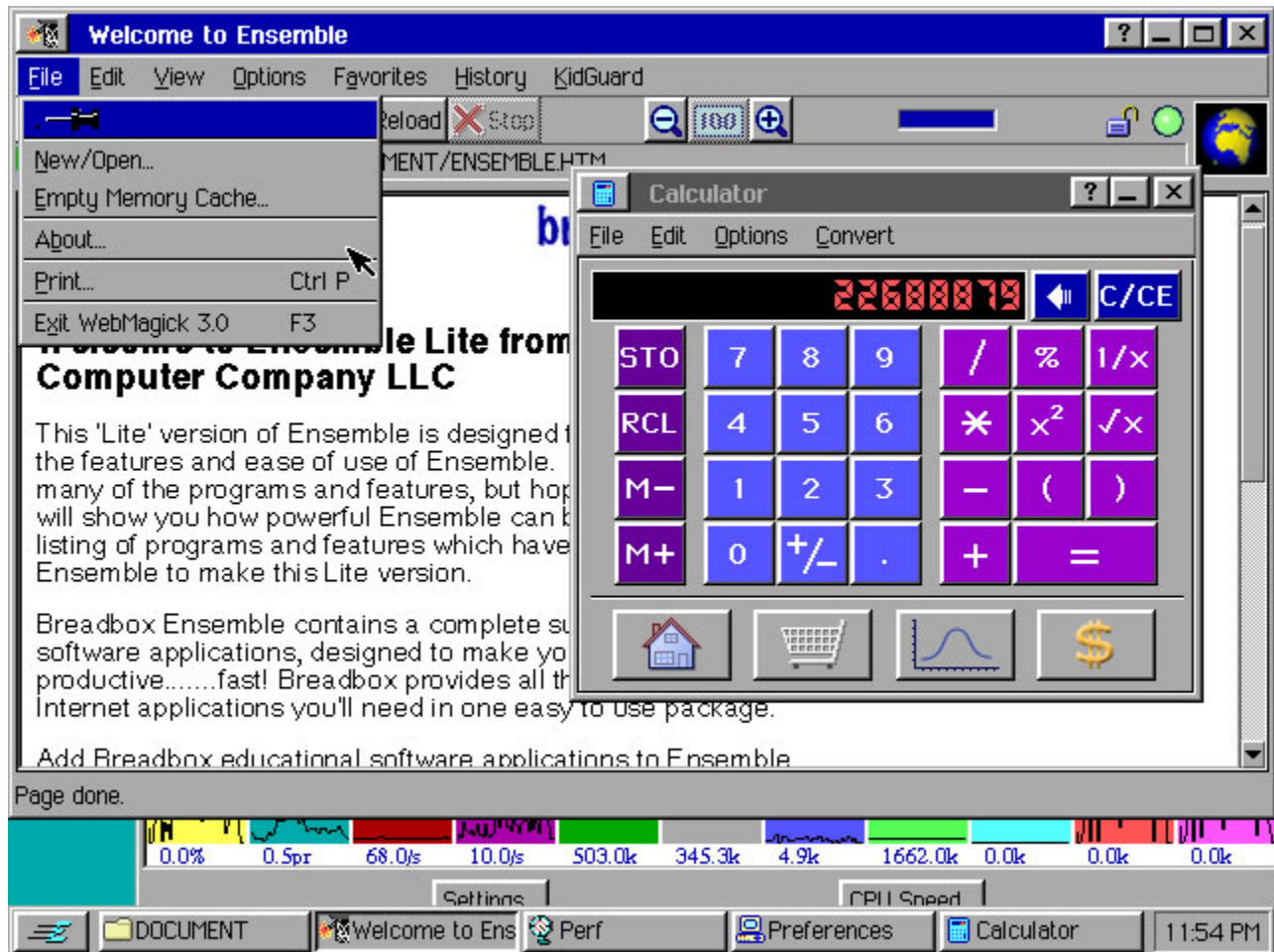
The operating system that supported this was called GEOS, and within a few years it became the third-best-selling operating system in the world. Strange, then, that few people have even heard of it these days.



**GEOS, originally a Mac-like operating system for eight-bit Commodore computers, was later ported over to the PC platform as GeoWorks Ensemble, which ran on top of DOS. Shown here stacked: GEOS 1.2 for the Commodore 64C (top); GEOS 2.0 for the Commodore 128 (middle); GeoWorks Ensemble 1.2 (bottom).**

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**GeoWorks went through a few more iterations in the late '90s and the current decade. Shown below is BreadBox Ensemble Lite.**

GEOS suffered from its greatest strength: Because it squeezed a lot of performance out of 64K of RAM, it was associated with being a lightweight option in the ring with heavyweight opponents.

When GEOS was ported over to the PC platform in 1990, it was already a little too late. The PC version, called PC/GEOS or GeoWorks Ensemble, was actually an operating environment layered over DOS, not an operating system -- like Microsoft's Windows of the time but much more tightly coded.

But it had a killer office suite that zoomed even on 286 machines, and the company, now called GeoWorks, forged ahead into pen computing years before Microsoft. Still, GEOS never really took hold on the PC platform.

That is, except in one way that was impossible to ignore: It was the power behind the America Online client. Every time you installed one of those free trial floppy disks, you were in front of GEOS.

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In that capacity, the operating system took desktops by storm, but only until Steve Case's crew jumped on the Windows and Mac OS bandwagon. GEOS meandered onto handheld computers and mobile phones and then dropped off the personal computing map in the early 1990s.

Or so we thought. But GEOS never quite went away. It popped up in the education market in 1996 under the name NewDeal (discontinued around the turn of the century), and again at its current owner Breadbox Computer, which is touting it as a way to leverage the potential of old hardware. It seems you just can't keep a good OS down.

## Ahead Warp Factor 3

In any discussion of operating systems, it's easy to overlook the fact that beneath the icons, menus and graphics, operating systems are basically there to run programs on hardware. In that respect, OS/2 was an operating system to be reckoned with.

Did you want to run several DOS programs at once? A couple of Windows apps? One of the small but perfectly formed band of OS/2 apps? And did you want to do that on early 1990s hardware without seeing a Blue Screen of Death? Well, IBM had you covered.

Yes, considering it began life as the child of an uneasy marriage between IBM and Microsoft, OS/2 was pretty stable and well adjusted. Born in 1987, the young OS didn't lose its cool even in 1995, when its spoiled half-brother, Windows 95, came along and got all the attention.

By that time, OS/2 Warp 3 was plugging along nicely, gaining ground in large and stable industries like banking, insurance and telecommunications. It powered tens of thousands of ATMs across the world throughout the 1990s and well into the new millennium. It kept accounting and auditing companies running.

But somehow, it failed to create a buzz among consumer-level software developers. They were spitting out Windows programs, which OS/2 Warp ran like a pro, but many people failed to see the advantage of getting Warp when Windows was pre-installed on their PCs.

OS/2 soldiered valiantly on until IBM pulled the plug at the end of 2001 and withdrew support five years later. We may not see it at work when we pull cash out of the money machines anymore, but those of us who liked it still have the box on our shelves for old time's sake.

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Born of a partnership between IBM and Microsoft, OS/2 quietly provided computing power for the banking and insurance industries throughout the '90s, but it failed to capture the interest of consumer software developers. Shown here: OS/2 2.1 (top) and two views of OS 2 Warp 4.

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## What NeXTStep?

By 1989, the brave new world of windows, icons and menus was getting a bit stale. Then Steve Jobs came along with the NeXT Computer, and we took a collective intake of breath so deep that our ears popped from the loss of air pressure.

NeXT hardware -- the original NeXT Computer, a.k.a. "the Cube," and its younger brother the NeXTstation -- was black, sleek and beautiful. The machines' gray-scale displays were so subtle and clear that we could get up close and stare at them without hurting our eyes.

And the operating system, called NeXTStep, was frankly exciting. Its graphical interface was built around Display PostScript, so it was sharp and scalable. Underneath, it was built on a solid structure of Unix, including a Mach kernel and BSD code. And for the developers, it had an object-oriented application layer and tool kit. This made it much easier to code for than other platforms.

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NeXTStep was the crisp operating system developed by Steve Jobs' post-Apple company, NeXT, to power its impressive hardware. Reborn as OpenStep, it became the model for today's Mac OS X. Shown here: three views of the NeXTStep 3.3 desktop, two taken on a color monitor and one on a black-and-white display.

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NeXT hardware didn't take off as meteorically as Jobs had hoped, but it did find a place in higher education and academia. In fact, it was a favorite at a Swiss research facility called CERN, where an English researcher named Tim Berners-Lee used NeXT products to develop a little project of his called the World Wide Web. NeXTStep has earned its place in the stars on the strength of that alone.

NeXT's sluggish hardware sales meant that applications developed for this cool platform had fewer computers to run on. So the company focused its attention on developing a cross-platform operating system. This is how NeXTStep was reborn for the ages.

In collaboration with Sun, NeXT turned its NeXT-branded operating system into OpenStep, which could run on Sun Solaris systems and other hardware. OpenStep's spec was made public in 1994; this development became the linchpin of a 1996 deal that brought Steve Jobs back to Apple. OpenStep was the model for Apple's impressive new operating system, when the lurching old Mac OS classic gave way to Mac OS X.

And when folks at Stanford Linear Accelerator Center wanted to port their NeXT applications to another hardware platform, NeXTStep was re-reborn as GNUstep. Instead of rewriting the applications, they rewrote the NeXTStep object layer, which they laid on top of Unix code and glued together with X Window. Presto! A more open OpenStep than OpenStep

## **Whatever will be will BeOS**

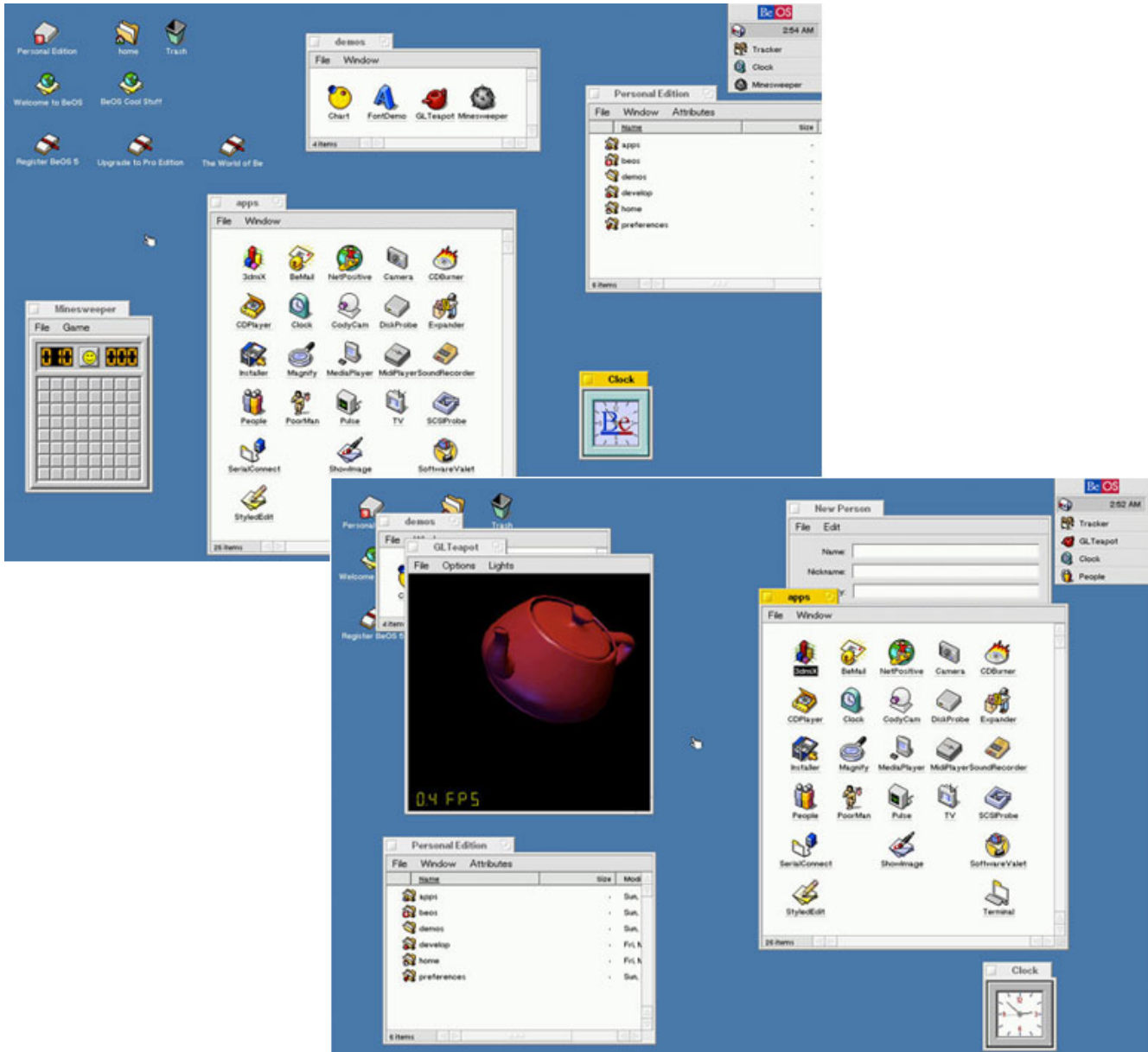
In 1991, when Apple released its PowerPC reference platform so hardware vendors could make Mac clones, one company had another idea. Be Inc. decided to port its own operating system, BeOS, to the Mac platform.

Perhaps Be was anticipating that Apple would never quite deliver on the promise of Copland, its Holy Grail of a next-gen operating system, and that it might want to buy Be's off-the-shelf alternative instead. Perhaps Be was just trying to find a market for the operating system it had designed for a failing product line. Whatever the company's motives, BeOS became one of personal computing's favorite near-miss stories.

In 1990, an ex-Apple exec, Jean-Louis Gassée, founded Be Inc. to develop a new computing platform starring BeOS and a machine called the BeBox. But the AT&T Hobbit processors at the core of the BeBox were discontinued, so Be had to redevelop the platform to run on PowerPC processors.

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BeOS, a multithreaded, media-friendly operating system, could run multiple videos without a stutter or crash on its original BeBox hardware and on the PowerPC and Pentium platforms. Shown here: two views of the BeOS 5 Personal Edition desktop.

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**BeOS lovers refused to let the operating system die, re-creating it as an open-source offering called Haiku.**

When cash flow dictated that the company couldn't market its own hardware anymore, it retooled BeOS to run on other companies' PowerPC and Pentium platforms. The fact that this multithreaded, media-friendly OS could run multiple videos without a stutter or crash on clunky old Pentium IIs wowed many digital media developers and enthusiasts.

Sadly, Be didn't capture a lot of money. BeOS did attract interest from Apple in the mid '90s, but its price tag didn't. Be was firm on its asking price, Apple was firm on its offer, and the difference had a lot of zeros after it -- at which point Apple cozied up to NeXT and its OS instead.

And so Be shot for the moon, missed and was eventually sold to Palm Inc., in 2001. Palm halted development on the platform, and it died.

However, Be enthusiasts kept the beast alive online at sites like BeBits.com. After Palm abandoned them, they began to improve their favorite OS in a series of reverse-engineered open-source projects unofficially called OpenBeOS. On Linux or BSD kernels, they built Be-compatible APIs and gave the results winking names like Blue-Eyed OS.

Palm wasn't keen on trademark infringement, so the Be fan community picked a name that wouldn't offend: Haiku. And it's in this guise that BeOS lives on. Without actually being Be, Haiku certainly seems to be Be -- and with the real thing on ice in Palm's vaults, that's as good as it's going to get.

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## The Spirit of '95

Oh, we know what you're thinking: The Windows 95 phenomenon was a lot of fuss to make over a steppingstone between 16- and 32-bit computing. The technical aspects of the thing were washed away in a marketing tsunami -- and on the subject of flooding, it cost more to develop than 1995's other bloated headline-grabber, the Kevin Costner film *Waterworld*.

But we appreciated Windows 95 back then, and we still think of it fondly. It enabled people on home PCs to name their files with something more flexible than an eight-character name and a three-character extension.

And it was the first time Microsoft had given consumers a graphical operating system with a decent foundation. Up till then, mainstream (that is, non-NT) Windows was just an operating environment -- an easy-to-navigate structure that was built on stilts over the wet-sand footing of DOS. The whole structure had a nasty habit of collapsing right before you'd clicked the Save button. Before 95, Windows really was the dog that ate everyone's homework.

Oh, we still had our gripes, and Windows 95 certainly didn't solve them all. We had been promised no more UAEs (unavoidable application errors), and we were annoyed to discover that something that looked and quacked like a UAE was still a regular guest -- but now it was called a GPF (general protection fault).

And it would be two more revs of Windows before we could make reliable use of those spiffy little USB slots that were beginning to appear.

But Windows 95 was a turning point in the world of Windows, and it brought us where we are today. Of course, there have been a few missteps along the way (Me? Vista?), but perhaps Windows 10 -- I mean Windows 7 -- will open new vistas for us.

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Windows 95 was a turning point in the world of Windows, greatly improving the operating system's stability. Windows 95 also marked the debut of both the Start menu and the taskbar. Shown here: two views of the Windows 95 desktop.

## Forgotten but not gone: X marks the spot

We know... the X Window System, or X Window for short -- or just plain X for shortest -- is not actually an operating system. But its creators started out with a manifesto, so for that reason alone, we can't ignore it.

While IBM and Microsoft and Apple were conducting parallel revolutions out in the marketplace in 1984, MIT boffins Bob Scheifler and Jim Gettys were crafting a work of philosophy: Cut away

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complexity. Don't get bogged down with every cool idea you can bolt onto your system. Leave the actual user interface to the user. Just make it work.

Consider these Ben Franklin-style nuggets of wisdom, laid out by Scheifler and Gettys:

**"Do not add new functionality unless you know of some real application that will require it."**

**"If you can get 90% of the desired effect for 10% of the work, use the simpler solution."**

**"If a problem is not completely understood**

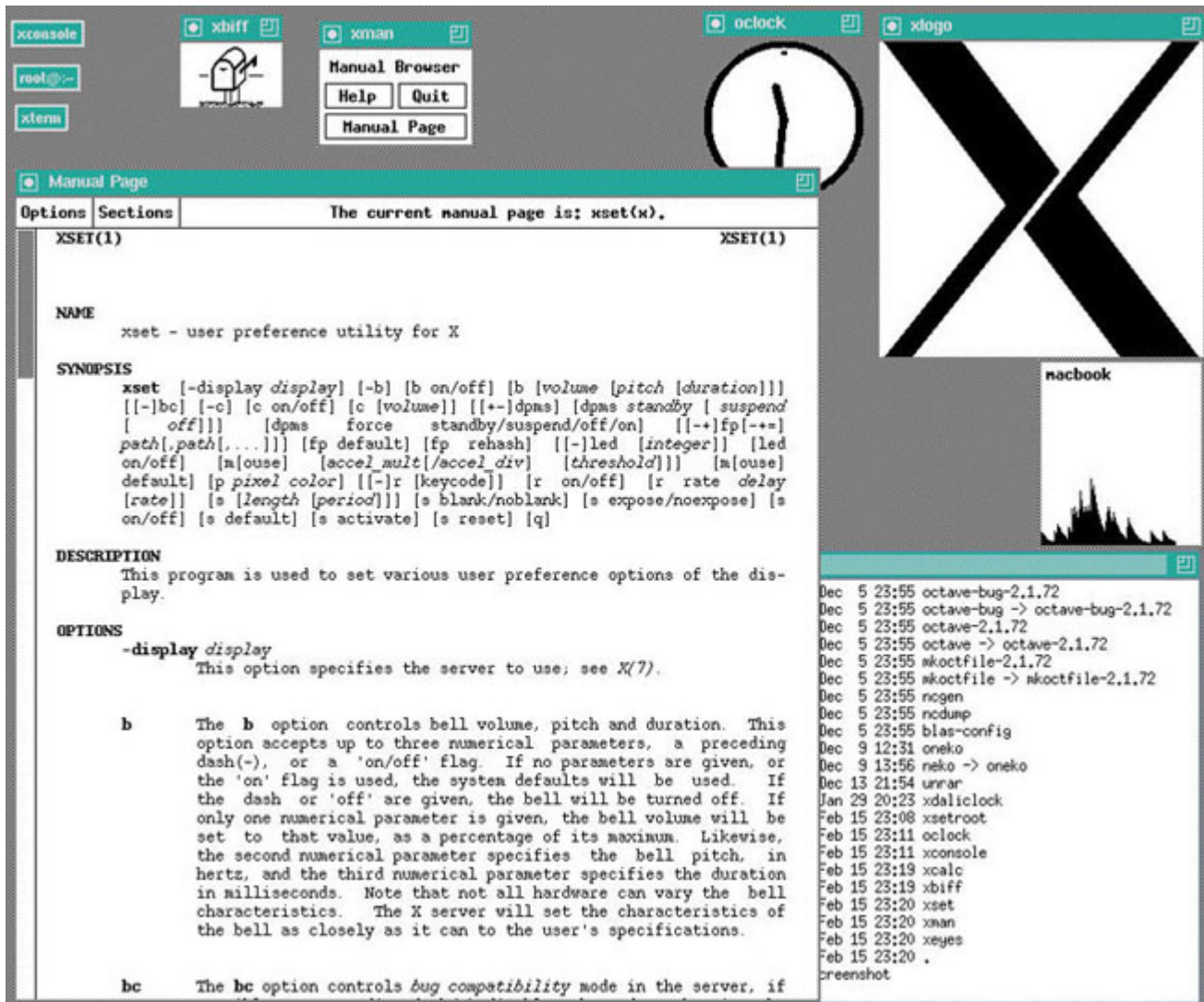
X ended up doing exactly what it set out to do: make a Unix operating system kernel and the user interface work together. So it's surprising we don't hear a whole lot about it anymore.

Or perhaps it isn't so surprising. The pace of development hasn't exactly whizzed by recently: In its first four years, X went through 11 iterations. In the following 21 years, it slid glacially up to release 11.7.4.

But don't think that X has actually gone: It's just lurking beneath the surface. And it lurks everywhere -- most famously beneath all of the free Unix and Linux releases, and on many installations of Mac OS X. And long may it continue!

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OK, the X Window System isn't actually an OS; it's a graphical interface. It's not really gone, either -- while the world may have forgotten about it, X is still alive and well beneath the surface all the free Unix and Linux releases. Shown here: an X Window desktop running Tom's Window Manager (twm) and several client apps. According to this screenshot's author, what you see is "reminiscent of a typical Unix graphical desktop from the late 1980s to early 1990s."