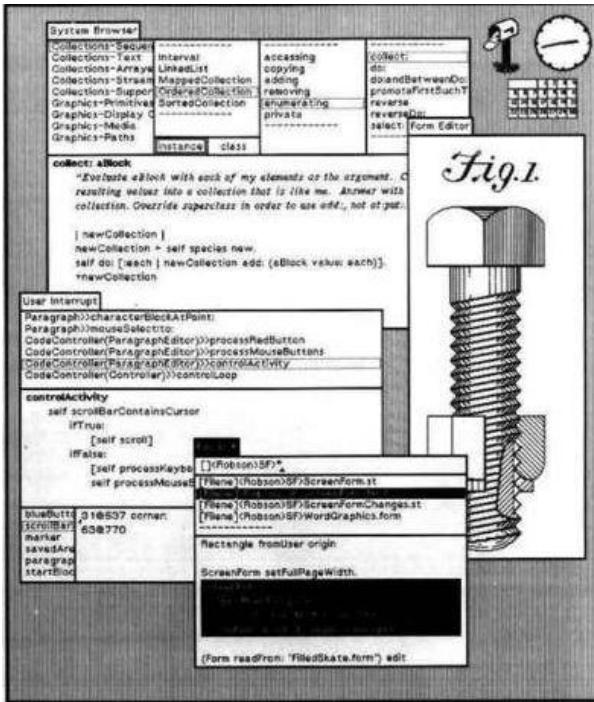
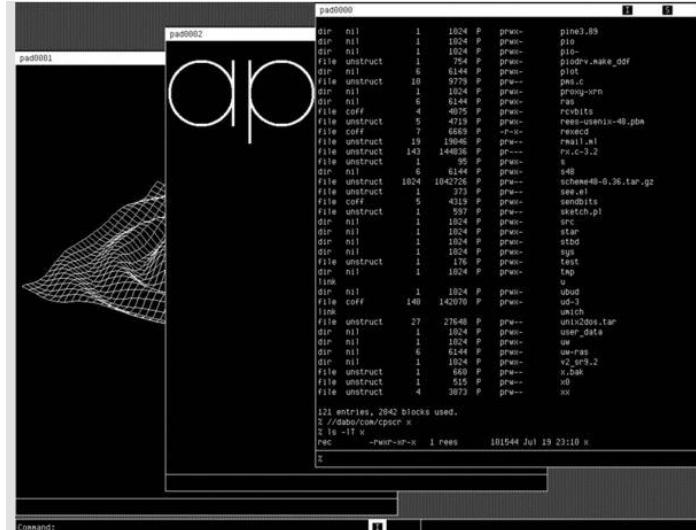


I MARKET
ZB PRODUCE
ZB1 ORANGES
ZB2 APPLES
ZB3 BANANAS
ZB4 CARROTS
ZB5 LETTUCE
ZB6 BEANS
ZB CANS
ZB7 APPLE SAUCE
ZB8 BEAN SOUP
ZB9 TOMATO SOUP
ZC CEREALS
ZC1 BREAD
ZC2 NOODLES (ELBOW FIN)
ZC3 FRENCH BREAD
ZD COLD LUNCH
ZD1 MILK
ZD2 BUTTER

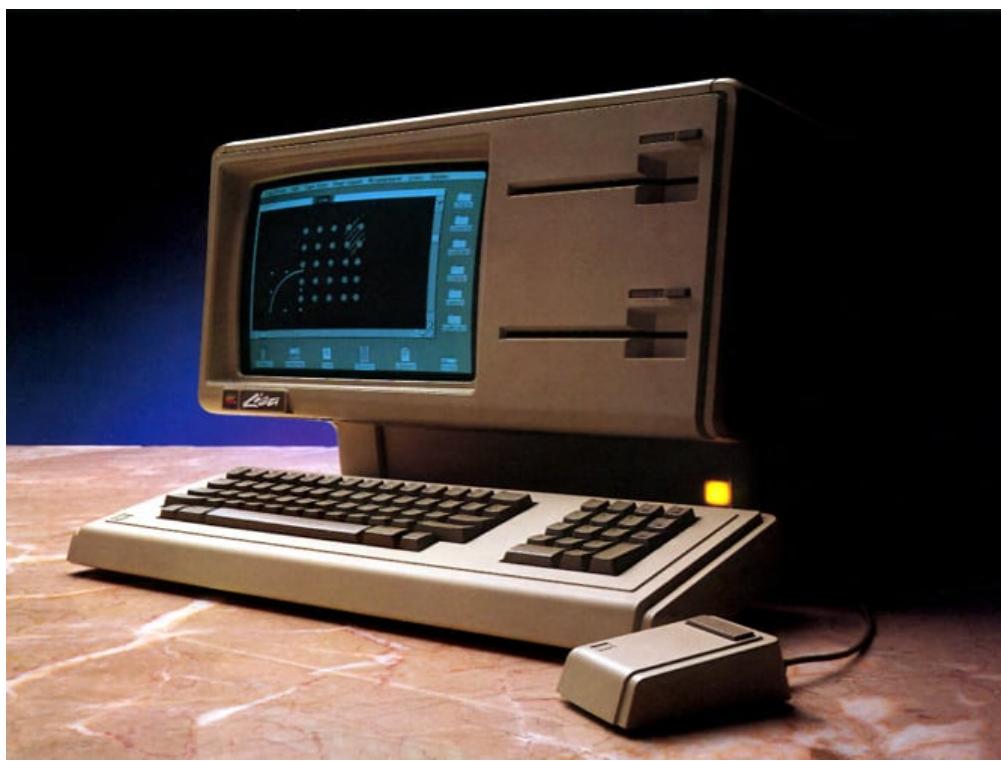
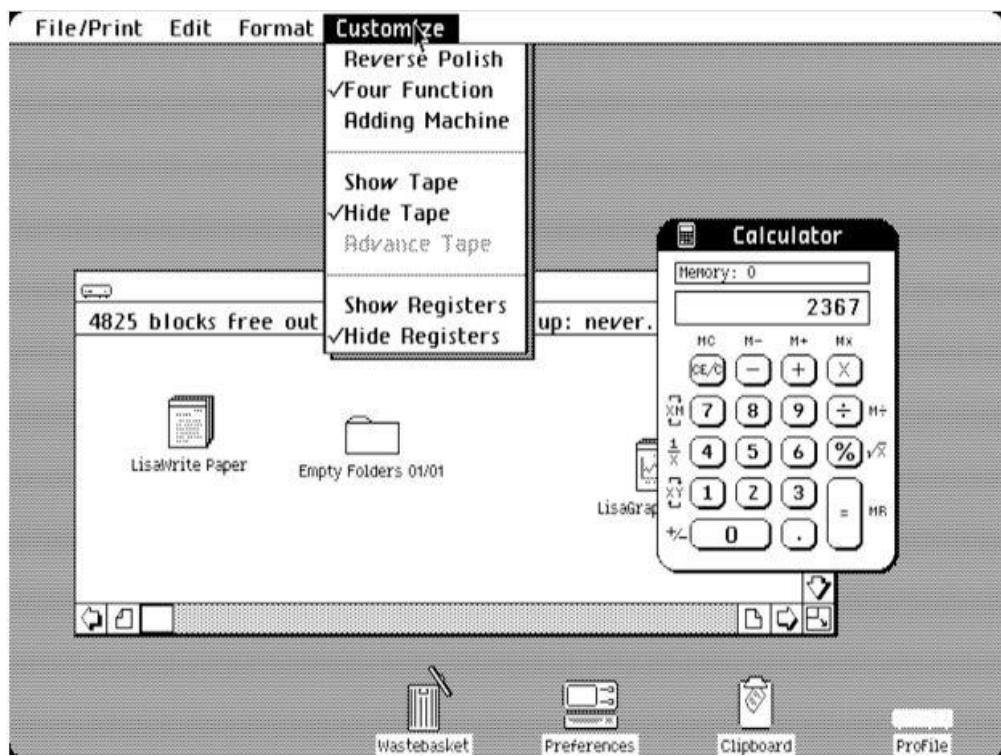
"The Mother of All Demos" is a name retroactively applied to a landmark computer demonstration, given at the Association for Computing Machinery / Institute of Electrical and Electronics Engineers (ACM/IEEE)—Computer Society's Fall Joint Computer Conference in San Francisco, by Douglas Engelbart, on December 9, 1968. The live demonstration featured the introduction of a complete computer hardware and software system called the oN-Line System or, more commonly, NLS. The 90-minute presentation demonstrated for the first time many of the fundamental elements of modern personal computing: windows, hypertext, graphics, efficient navigation and command input, video conferencing, the computer mouse, word processing, dynamic file linking, revision control, and a collaborative real-time editor. Engelbart's presentation was the first to publicly demonstrate all of these elements in a single system. The demonstration was highly influential and spawned similar projects at Xerox PARC in the early 1970s. The underlying concepts and technologies influenced both the Apple Macintosh and Microsoft Windows graphical user interface operating systems in the 1980s and 1990s.



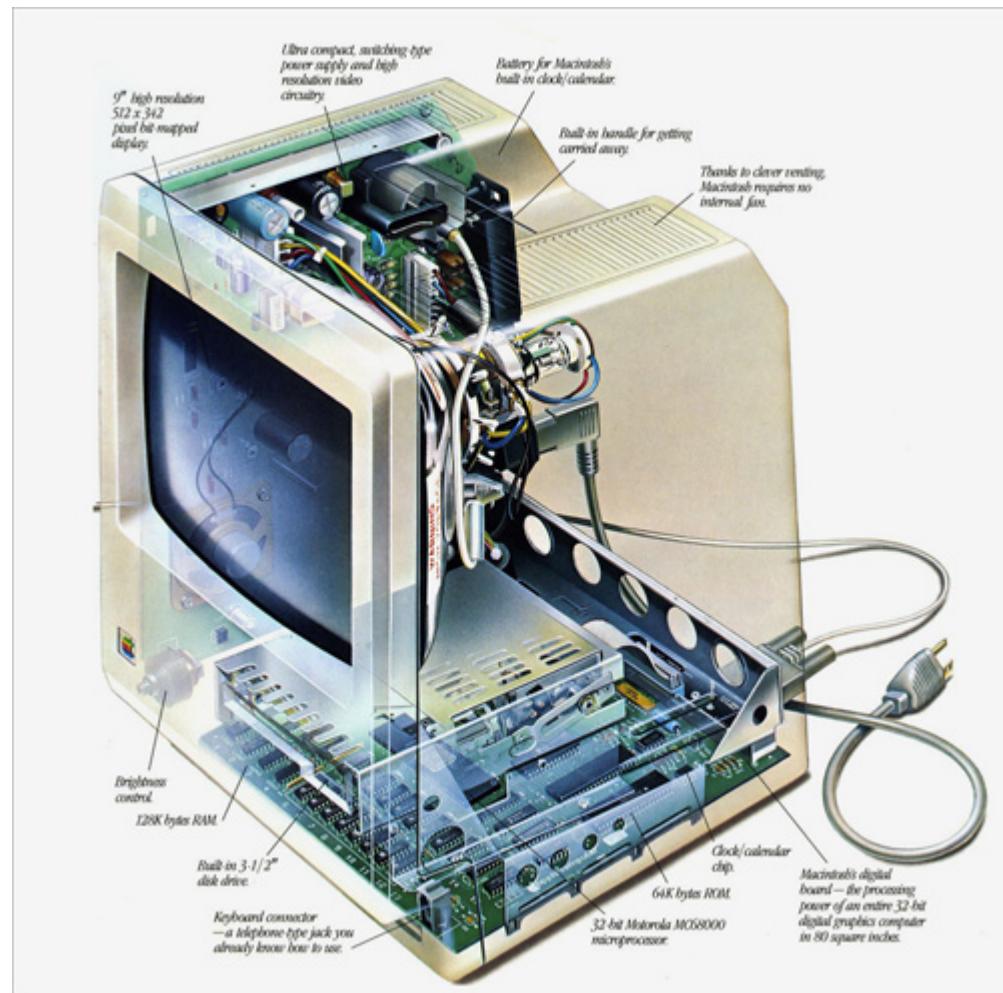
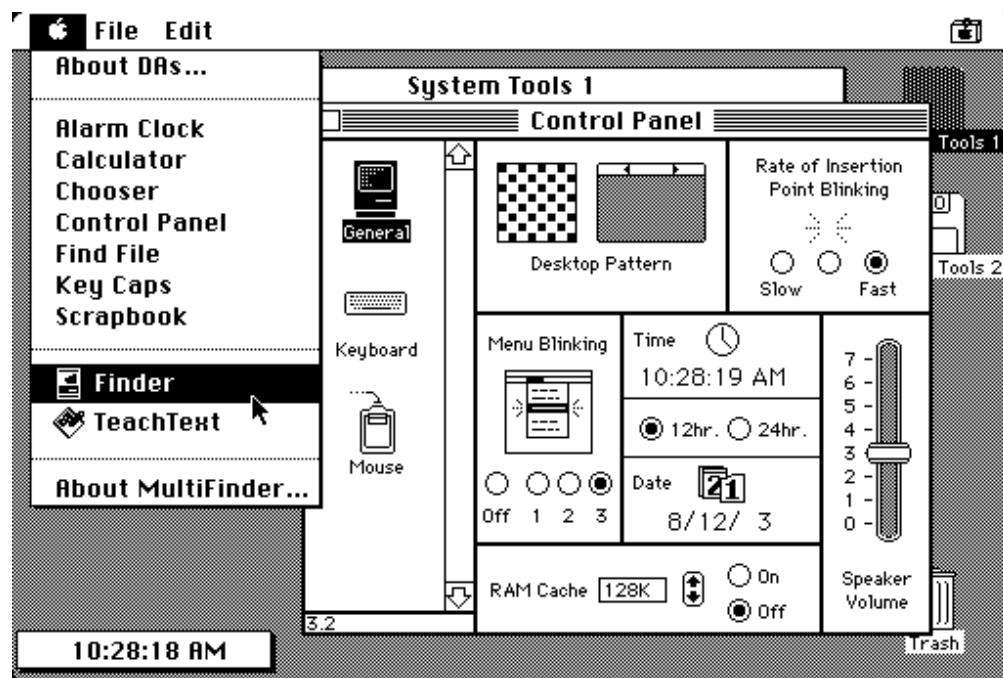
The Xerox Alto was a computer designed from its inception to support an operating system based on a graphical user interface (GUI), later using the desktop metaphor. The first machines were introduced on 1 March 1973, a decade before mass-market GUI machines became available. The Alto is contained in a relatively small cabinet and uses a custom central processing unit (CPU) built from multiple SSI and MSI integrated circuits. Each machine cost tens of thousands of dollars despite its status as a personal computer. Only small numbers were built initially, but by the late 1970s, about 1,000 were in use at various Xerox laboratories, and about another 500 in several universities. Total production was about 2,000 systems. The Alto became well known in Silicon Valley and its GUI was increasingly seen as the future of computing.



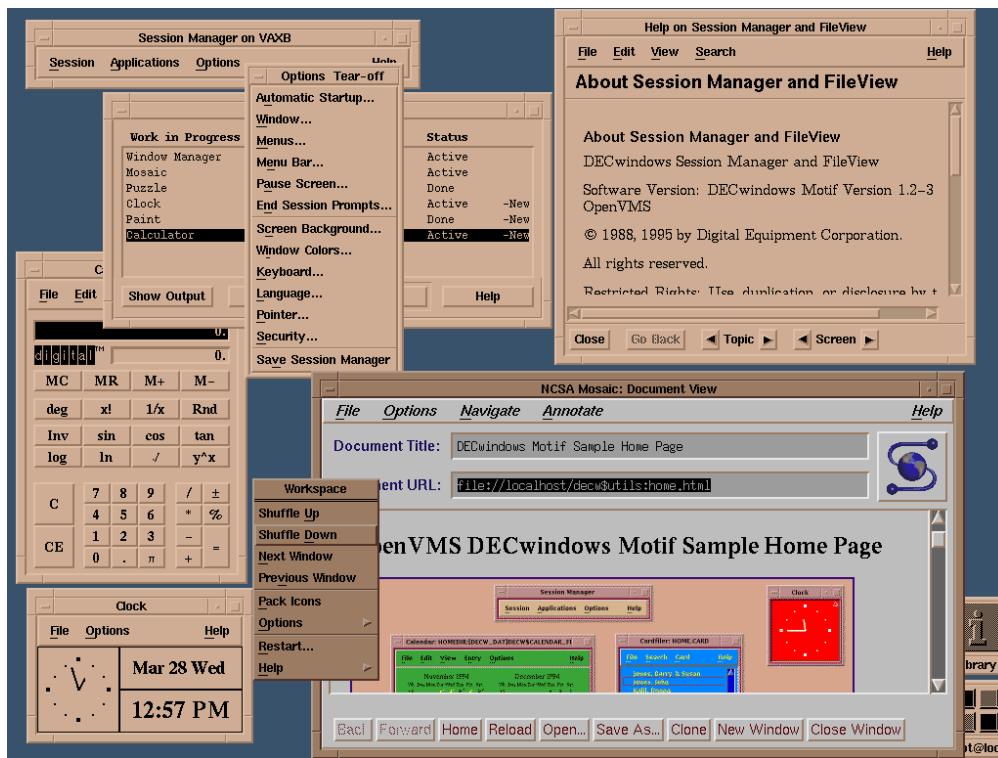
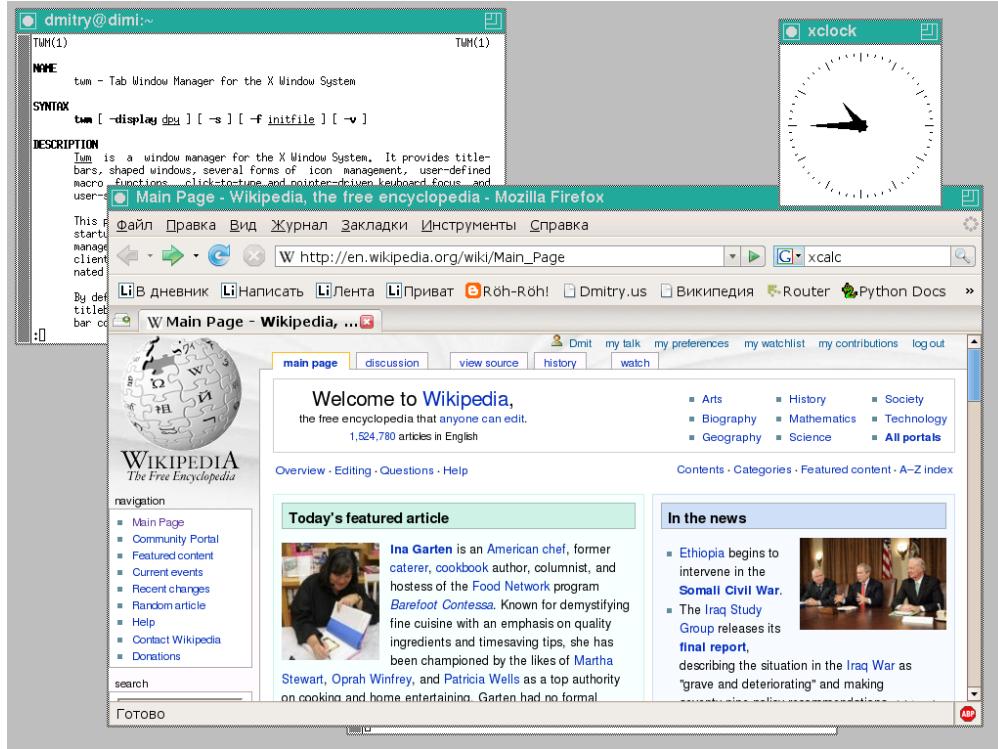
AEGIS was distinctive mainly for being designed for the networked computer, as distinct from its competitors, which were essentially standalone systems with added network features. The prime examples of this were the file system, which was fully integrated across machines, as opposed to Unix which even now draws a distinction between file systems on the host system and on others, and the user administration system, which was fundamentally network-based. So basic was this orientation that even a standalone Apollo machine could not be configured without a network card. Domain/OS implemented functionality derived from both System V and early BSD Unix systems. It improved on AEGIS by providing a core OS upon which the user could install any or all of three environments: AEGIS, System V Unix, and BSD Unix. This was done in order to provide greater compatibility with Unix; AEGIS version SR9, which immediately preceded Domain/OS (itself numbered SR10) had had an optional product called Domain/IX available, which provided a similar capability, but with some drawbacks, principally the fact that core administrative tasks still required AEGIS commands.



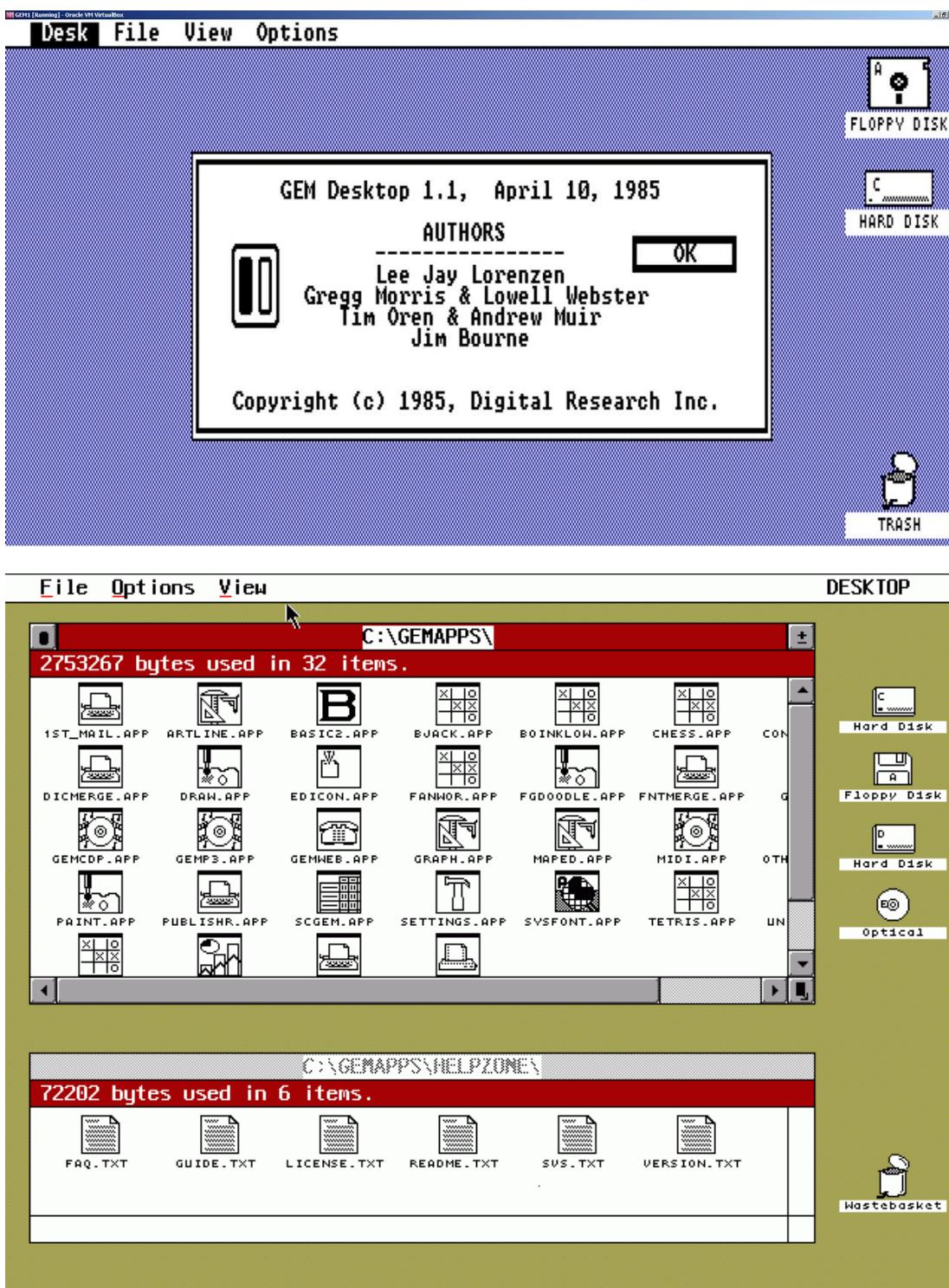
Lisa is a desktop computer developed by Apple, released on January 19, 1983. It is one of the first personal computers to present a graphical user interface (GUI) in a machine aimed at individual business users. Development of the Lisa began in 1978, and it underwent many changes during the development period before shipping at US\$9,995 (equivalent to \$27,190 in 2021) with a five-megabyte hard drive. Lisa was affected by its high price, insufficient software, unreliable Apple FileWare floppy disks, and the immediate release of the cheaper and faster Macintosh. Only 10,000 Lisas were sold in two years. Considered a commercial failure (albeit one with technical acclaim), Lisa introduced a number of advanced features that would later reappear on the Macintosh and eventually IBM PC compatibles. Among these is an operating system with protected memory and a document-oriented workflow. The hardware was more advanced overall than the forthcoming Macintosh 128K; the Lisa included hard disk drive support, capacity for up to 2 megabytes (MB) of random-access memory (RAM), expansion slots, and a larger, higher-resolution display.



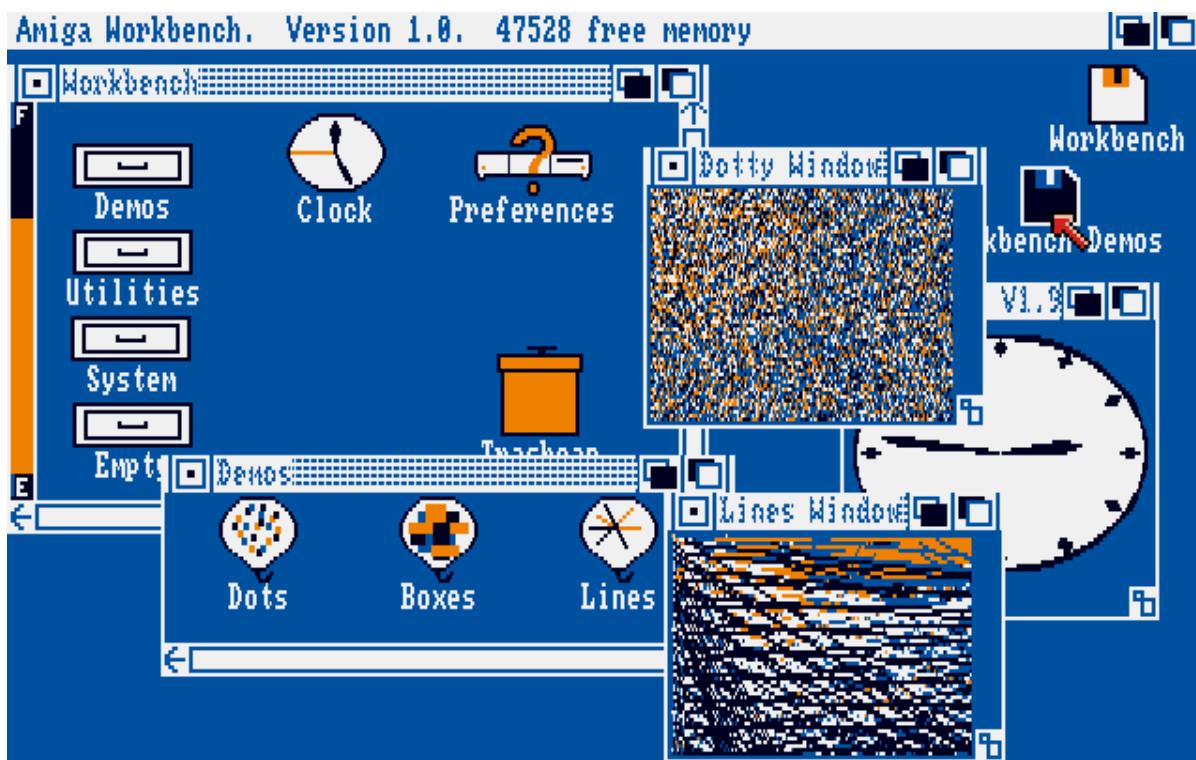
The Macintosh 128K, originally released as the Apple Macintosh, is the original Apple Macintosh personal computer. Its beige case consisted of a 9 in (23 cm) CRT monitor and came with a keyboard and mouse. It played a pivotal role in establishing desktop publishing as a general office function. A handle built into the top of the case made it easier for the computer to be lifted and carried. It had an initial selling price of US\$2,495 (equivalent to \$6,508 in 2021).



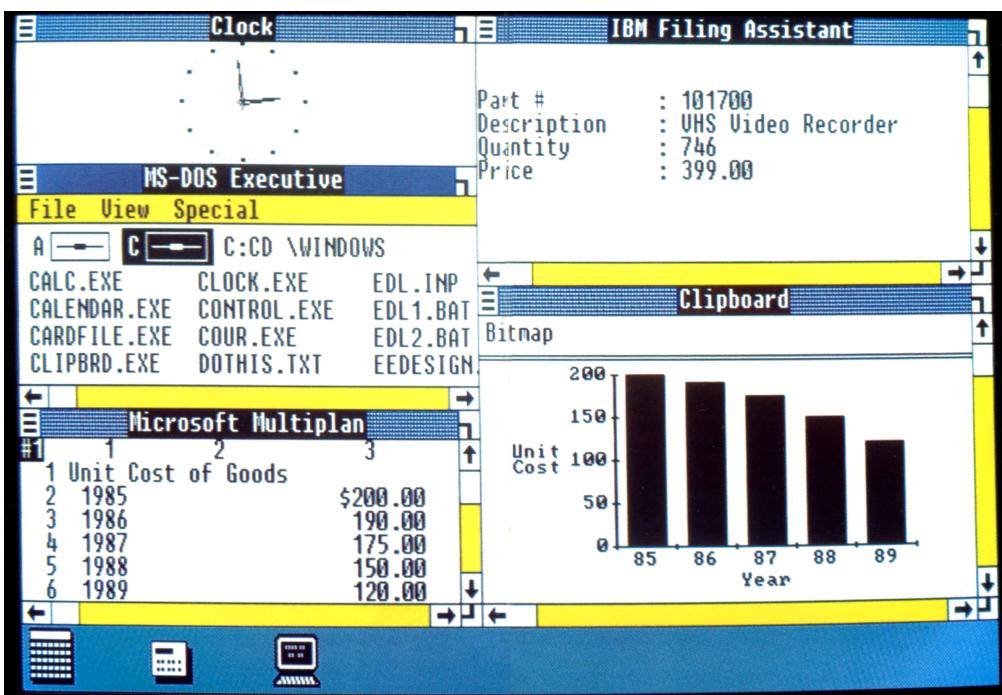
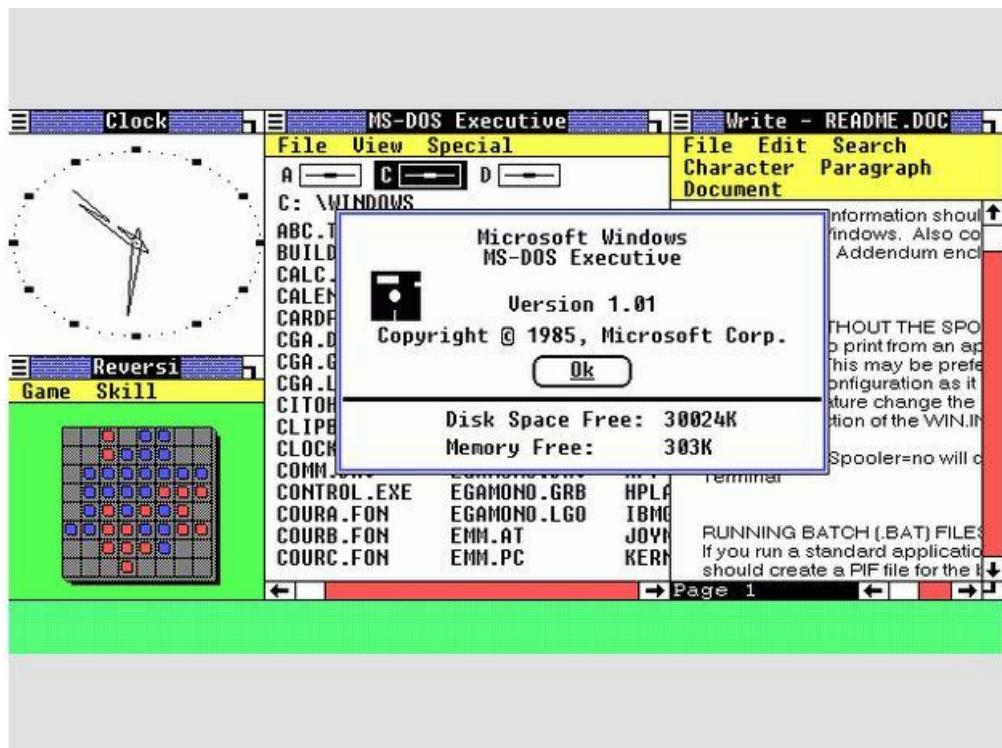
The X Window System (X11, or simply X) is a windowing system for bitmap displays, common on Unix-like operating systems. X provides the basic framework for a GUI environment: drawing and moving windows on the display device and interacting with a mouse and keyboard. X does not mandate the user interface – this is handled by individual programs. As such, the visual styling of X-based environments varies greatly; different programs may present radically different interfaces. X originated as part of Project Athena at Massachusetts Institute of Technology (MIT) in 1984. The X protocol has been at version 11 (hence "X11") since September 1987. The X.Org Foundation leads the X project, with the current reference implementation, X.Org Server, available as free and open-source software under the MIT License and similar permissive licenses.



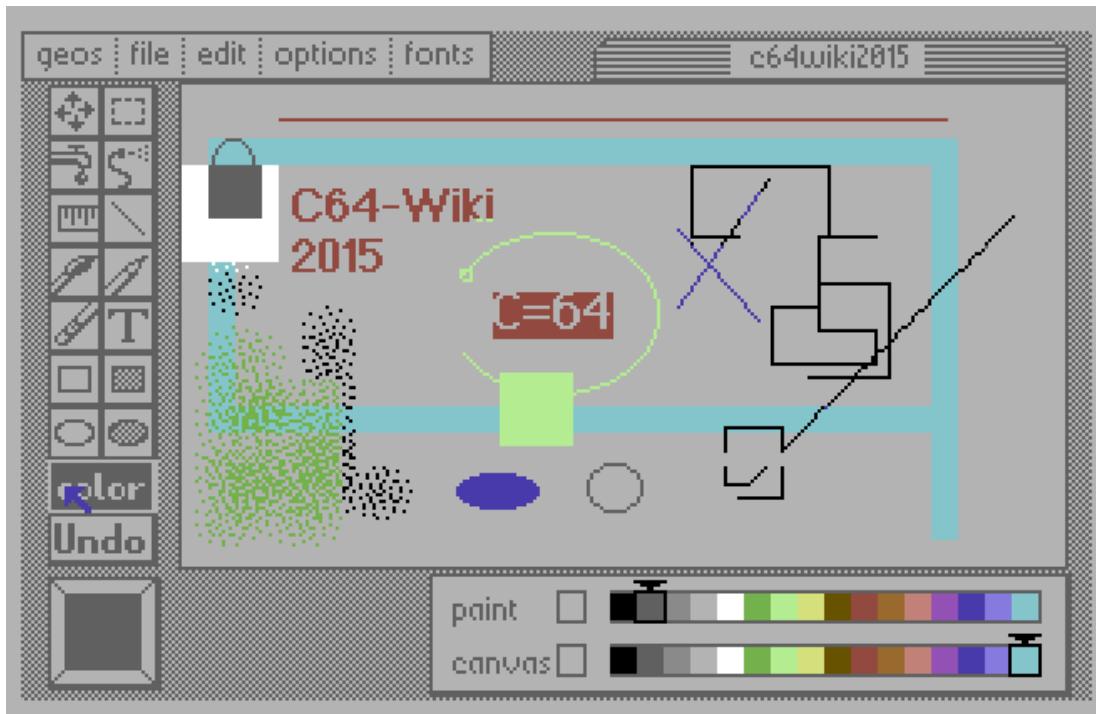
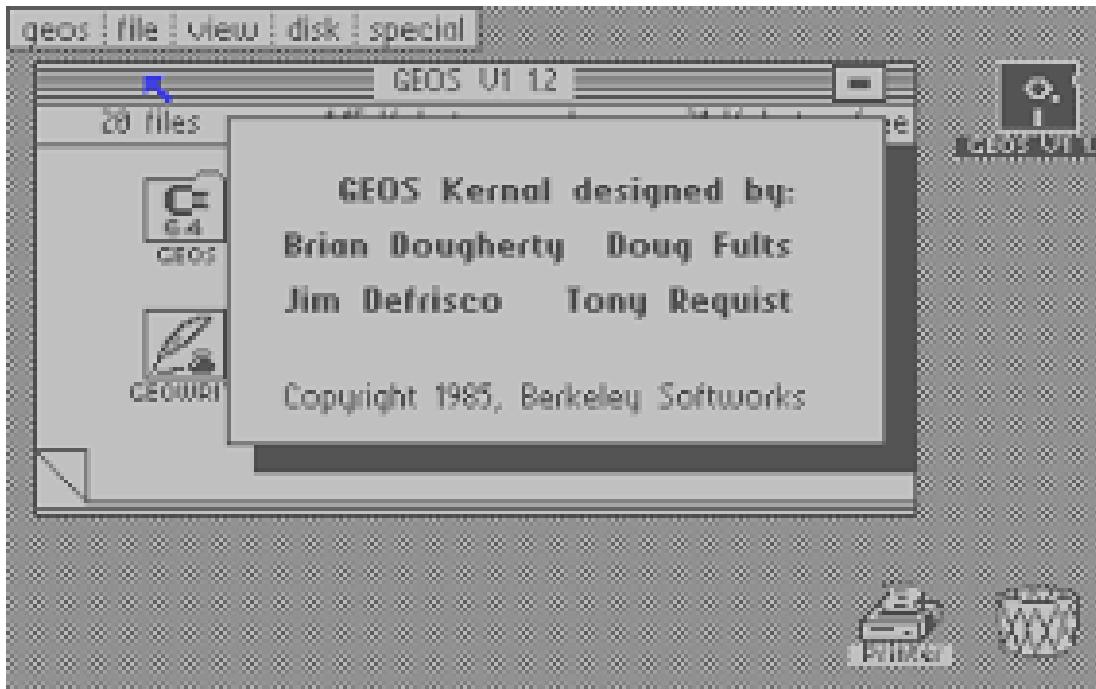
GEM (for Graphics Environment Manager) is an operating environment which was created by Digital Research (DRI) since 1984 for use with the DOS operating system on Intel 8088 and Motorola 68000 microprocessors. GEM is known primarily as the graphical user interface (GUI) for the Atari ST series of computers, and was also supplied with a series of IBM PC-compatible computers from Amstrad. It was also available for the standard IBM PC, at a time when the 6 MHz IBM PC AT (and the very concept of a GUI) was brand new. It was the core for a small number of DOS programs, the most notable being Ventura Publisher. It was ported to a number of other computers that previously lacked graphical interfaces, but never gained popularity on those platforms. DRI also produced X/GEM for their FlexOS real-time operating system with adaptations for OS/2 Presentation Manager and the X Window System under preparation as well. The 16-bit version of GSX 1.3 evolved into one part of what would later be known as GEM, which was an effort to build a full GUI system using the earlier GSX work as its basis. Originally known as Crystal as a play on an IBM project called Glass, the name was later changed to GEM.



Workbench is the graphical file manager of AmigaOS developed by Commodore International for their Amiga line of computers. Workbench provides the user with a graphical interface to work with file systems and launch applications. It uses a workbench metaphor (in place of the more common desktop metaphor) for representing file system organisation. The Amiga Workbench uses the metaphor of a workbench (i.e. a workbench for manual labor), rather than the now-standard desktop metaphor, for representing file system organization. The desktop itself is called Workbench and uses the following representations: drawers (instead of folders) for directories, tools for executable programs, projects for data files, and a trash can as a folder intended to contain deleted files. These representations may be considered somewhat unusual by a modern user, but at the time there were no commonly accepted metaphors and Commodore chose to use different idioms from their competitors (Apple had already pursued legal action to prevent other software companies from offering graphical user interfaces similar to its own).



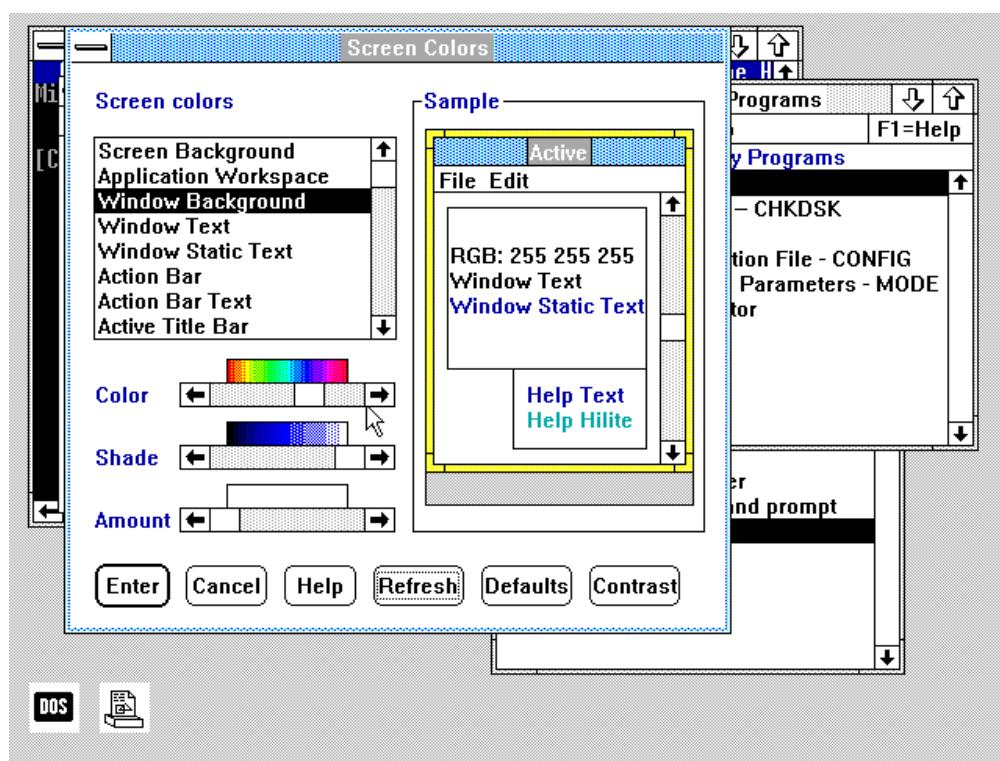
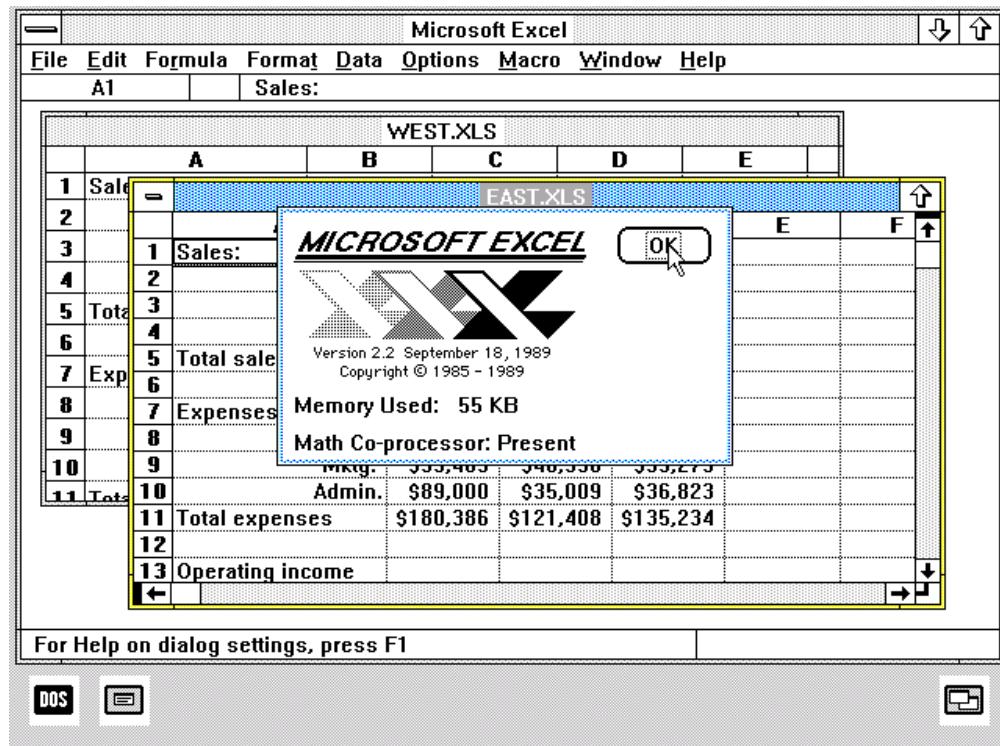
Windows 1.0 is the first major release of Microsoft Windows, a family of graphical operating systems for personal computers developed by Microsoft. It was first released to manufacturing in the United States on November 20, 1985, while the European version was released as Windows 1.02 in May 1986. Its development began after the Microsoft co-founder and spearhead of Windows 1.0, Bill Gates, saw a demonstration of a similar software suite, Visi On at COMDEX in 1982. The operating environment was showcased to the public in November 1983, although it ended up being released two years later. Windows 1.0 runs on MS-DOS, as a 16-bit shell program known as MS-DOS Executive, and it provides an environment which can run graphical programs designed for Windows, as well as existing MS-DOS software. It introduced multitasking and the use of the mouse, and various built-in programs such as Calculator, Paint, and Notepad. The operating environment does not allow its windows to overlap, and instead, the windows are tiled. Windows 1.0 also contains four releases, which contain minor updates to the system.



GEOS (Graphic Environment Operating System) is an operating system from Berkeley Softworks (later GeoWorks). Originally designed for the Commodore 64 with its version being released in 1986, enhanced versions of GEOS later became available in 1987 for the Commodore 128 and in 1988 for the Apple II series of computers. A lesser-known version was also released for the Commodore Plus/4. GEOS closely resembles early versions of the classic Mac OS and includes a graphical word processor (geoWrite) and paint program (geoPaint). A December 1987 survey by the Commodore-dedicated magazine *Compute!'*s Gazette found that nearly half of respondents used GEOS. For many years, Commodore bundled GEOS with its redesigned and cost-reduced C64, the C64C. At its peak, GEOS was the third-most-popular microcomputer operating system in the world in terms of units shipped, trailing only MS-DOS and Mac OS (besides the original Commodore 64's KERNAL). Written by a group of programmers, GEOS was revered for what it could accomplish on machines with 64–128 kB of RAM memory and 1–2 MHz of 8-bit processing power.



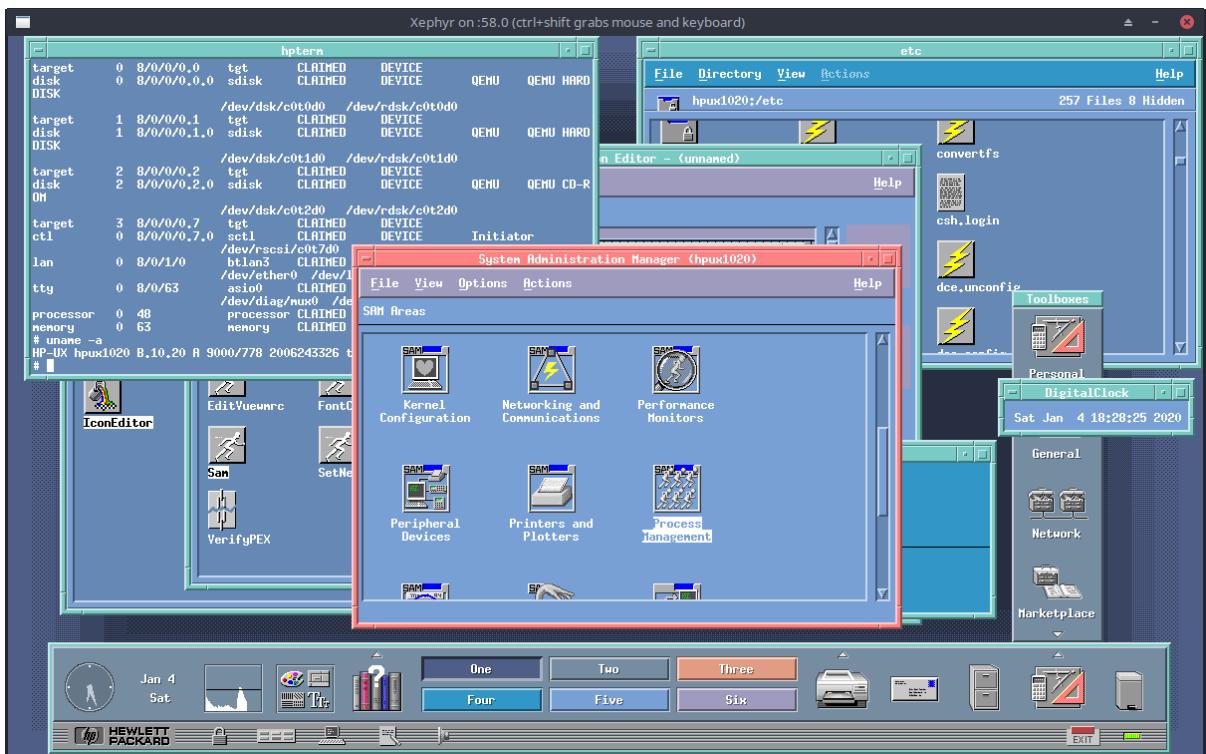
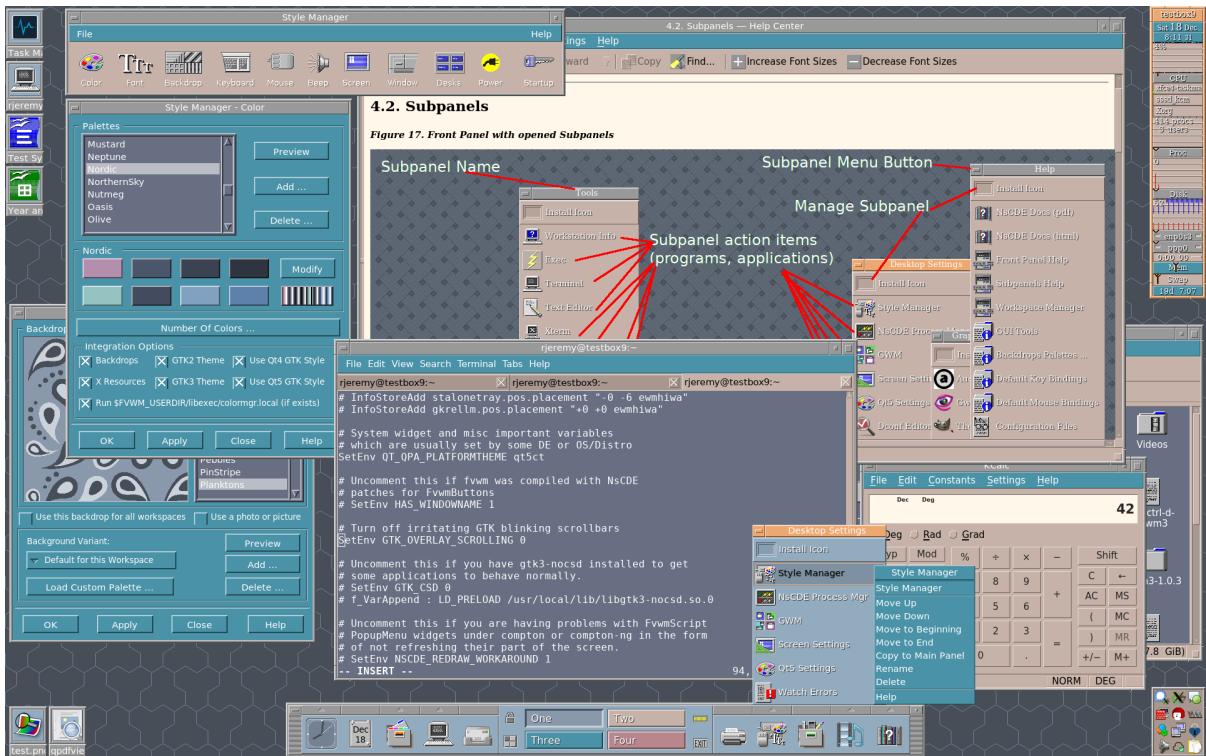
RISC OS was designed in the United Kingdom by Acorn for the 32-bit ARM based Acorn Archimedes, and released in its first version in 1987, as the Arthur operating system. The first public release of the OS was Arthur 1.20 in June 1987. It was bundled with a desktop graphical user interface (GUI), which mostly comprises assembly language software modules, and the Desktop module itself being written in BBC BASIC. It features a colour-scheme typically described as "technicolor". The graphical desktop runs on top of a command-line driven operating system which owes much to Acorn's earlier MOS operating system for its BBC Micro range of 8-bit microcomputers.



OS/2 (Operating System/2) is a series of computer operating systems, initially created by Microsoft and IBM under the leadership of IBM software designer Ed Iacobucci. As a result of a feud between the two companies over how to position OS/2 relative to Microsoft's new Windows 3.1 operating environment, the two companies severed the relationship in 1992 and OS/2 development fell to IBM exclusively. The name stands for "Operating System/2", because it was introduced as part of the same generation change release as IBM's "Personal System/2 (PS/2)" line of second-generation personal computers. The first version of OS/2 was released in December 1987 and newer versions were released until December 2001. OS/2 was intended as a protected-mode successor of PC DOS. Notably, basic system calls were modeled after MS-DOS calls; their names even started with "Dos" and it was possible to create "Family Mode" applications – text mode applications that could work on both systems. Because of this heritage, OS/2 shares similarities with Unix, Xenix, and Windows NT. IBM discontinued its support for OS/2 on 31 December 2006.



NeXTSTEP is an object-oriented, multitasking operating system based on the Mach kernel and the UNIX-derived BSD. It was developed by NeXT Computer in the late 1980s and early 1990s and was initially used for its range of proprietary workstation computers such as the NeXTcube. It was later ported to several other computer architectures. Although relatively unsuccessful at the time, it attracted interest from computer scientists and researchers. It was used as the original platform for the development of the Electronic AppWrapper, the first commercial electronic software distribution catalog to collectively manage encryption and provide digital rights for application software and digital media, a forerunner of the modern "app store" concept. It was also the platform on which Tim Berners-Lee created the first web browser, and on which id Software developed the video games Doom and Quake.



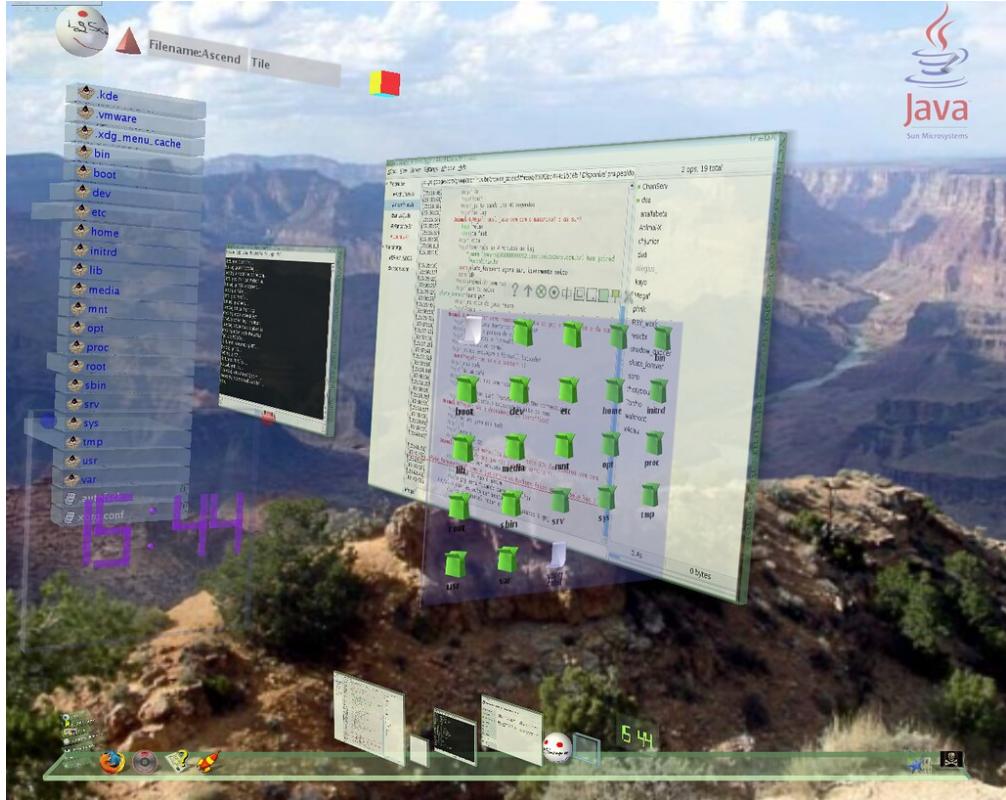
The Common Desktop Environment (CDE) is a desktop environment for Unix and OpenVMS, based on the Motif widget toolkit. It was part of the UNIX 98 Workstation Product Standard, and was for a long time the Unix desktop associated with commercial Unix workstations. Hewlett-Packard, IBM, SunSoft, and USL announced CDE in June 1993 as a joint development within the Common Open Software Environment (COSE) initiative. Each development group contributed its own technology to CDE: HP contributed the primary environment for CDE, which was based on HP's Visual User Environment (VUE). HP VUE was itself derived from the Motif Window Manager. IBM contributed its Common User Access model from OS/2's Workplace Shell. Sun contributed its ToolTalk application interaction framework and a port of its DeskSet productivity tools, including mail and calendar clients, from its OpenWindows environment. USL provided desktop manager components and scalable systems technologies from UNIX System V.



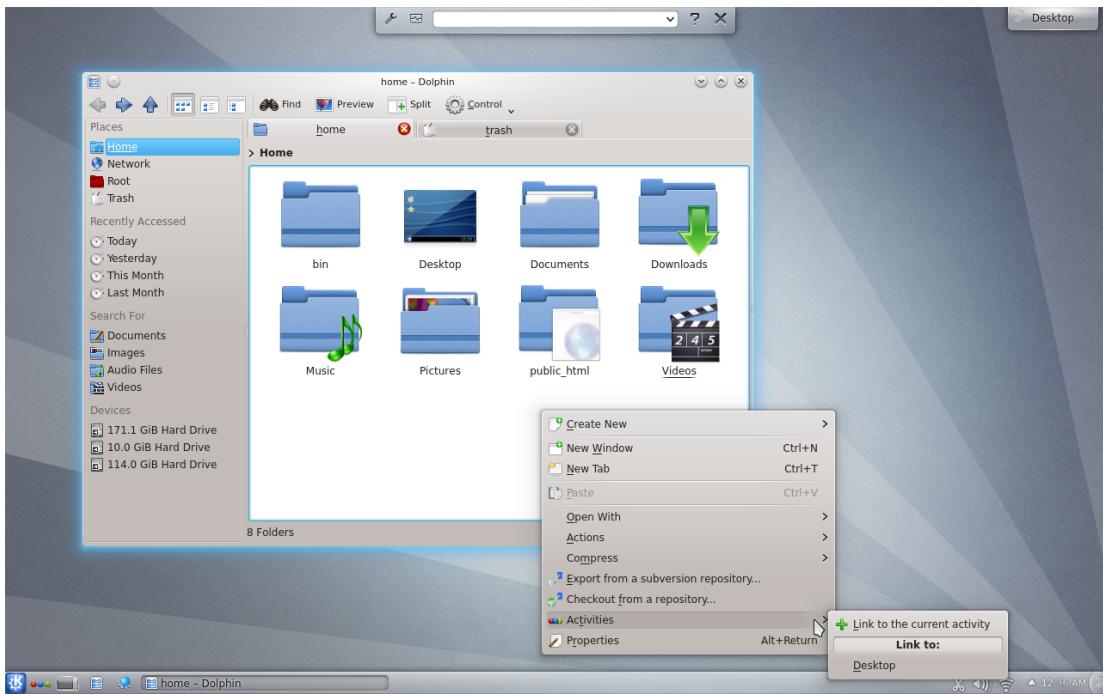
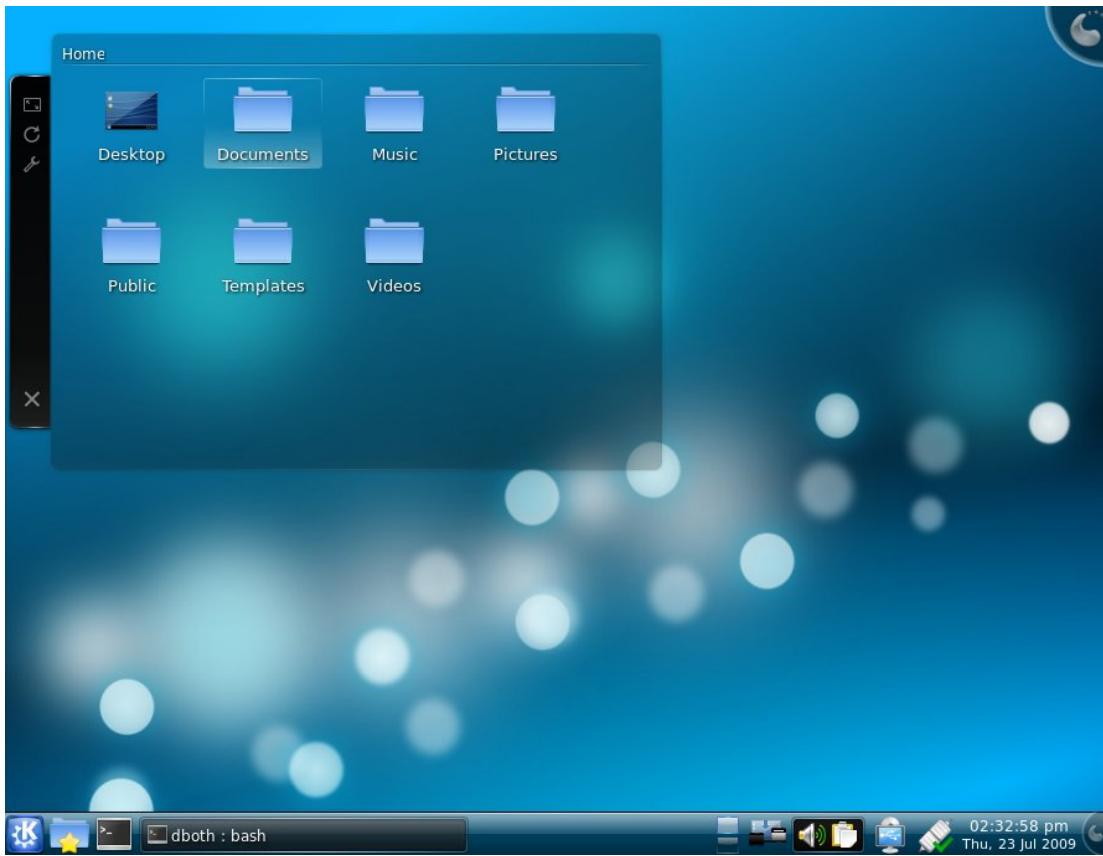
Windows 95 is a consumer-oriented operating system developed by Microsoft as part of its Windows 9x family of operating systems. The first operating system in the 9x family, it is the successor to Windows 3.1x, and was released to manufacturing on July 14, 1995, and generally to retail on August 24, 1995, almost three months after the release of Windows NT 3.51. Windows 95 merged Microsoft's formerly separate MS-DOS and Microsoft Windows products, and featured significant improvements over its predecessor, most notably in the graphical user interface and in its simplified "plug-and-play" features. Windows 95 introduced numerous functions and features that were featured in later Windows versions, such as the taskbar, notification area, and the "Start" button.



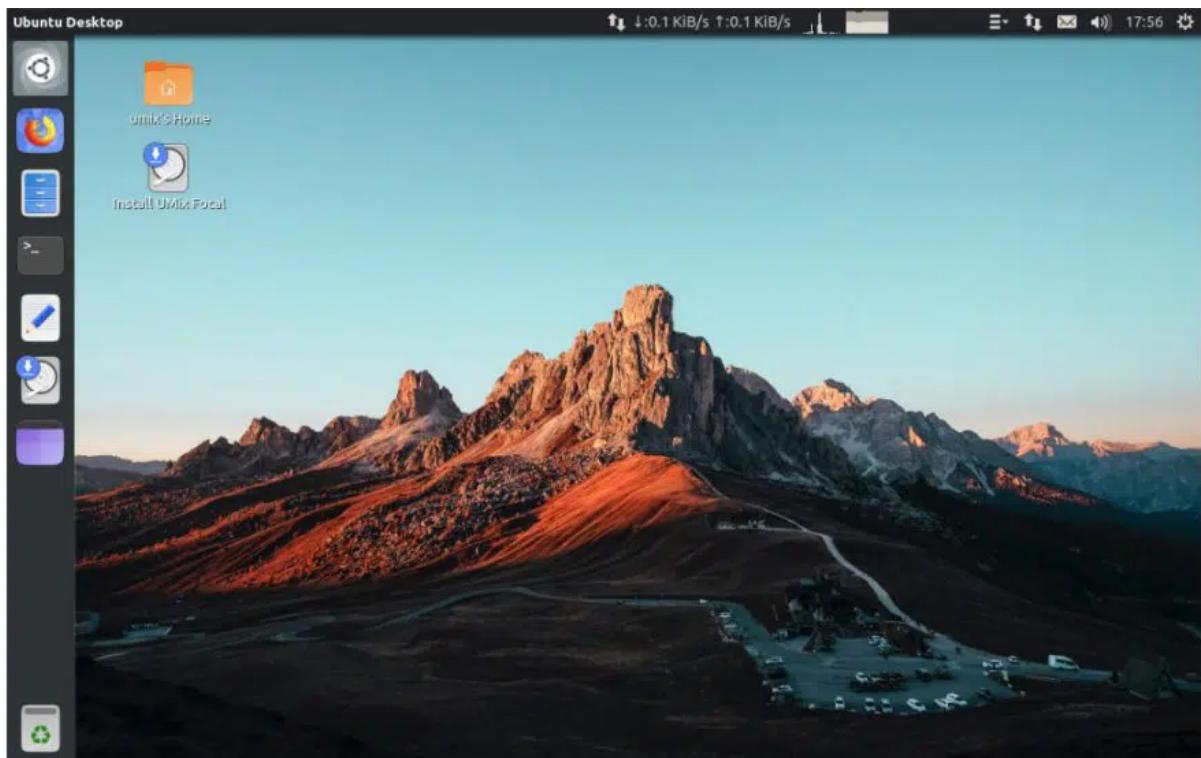
Enlightenment, also known simply as E, is a compositing window manager for the X Window System first released by Rasterman (Carsten Haitzler) in 1997. Enlightenment includes functions to provide a graphical shell, and it can be used in conjunction with programs written for GNOME or KDE. When used together with the Enlightenment Foundation Libraries (EFL), Enlightenment can refer to an entire desktop environment. Enlightenment provides features that you don't even see in many "advanced" desktop environments to this day. It allows the user to create a grid of workspaces known as "virtual desktops". Switching between them is achieved by hurling the mouse cursor to the edge of the screen, after which the desktop appears to slide across to reveal the next. All the desktops are connected, meaning that if a window is too big for the screen size you can go to the adjacent desktops to find the rest of it.



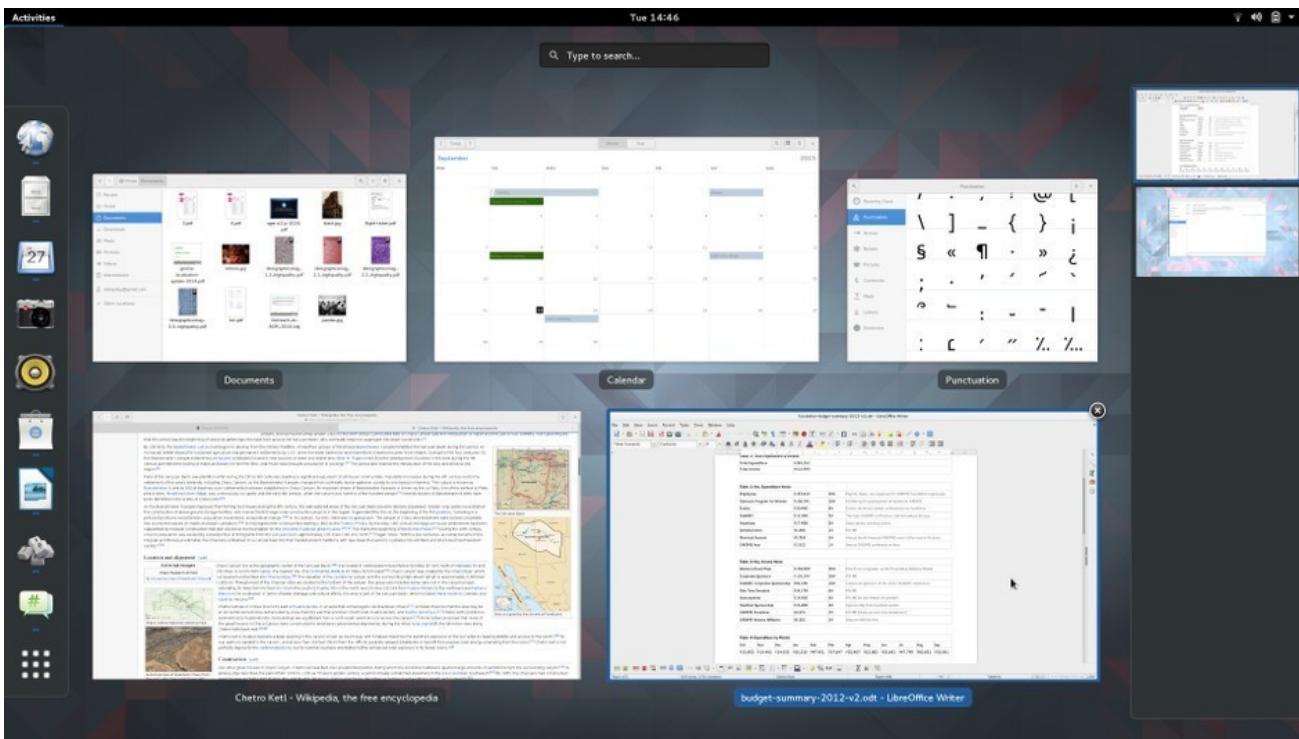
Project Looking Glass is a now inactive free software project under the GPL to create an innovative 3D desktop environment for Linux, Solaris, and Windows. It was sponsored by Sun Microsystems. Looking Glass is programmed in the Java language using the Java 3D system to remain platform independent. Despite the use of graphics acceleration features, the desktop explores the use of 3D windowing capabilities for both existing application programs and ones specifically designed for Looking Glass. One of its most notable features is the creation of reversible windows. This capability can be used for features like allowing the user to write notes and comments on the windows' backs, or displaying application dialogs without risking their being detached from the application they relate to. All windows start by looking like a normal 2D or 2.5D window, but can be manipulated as thin slate-like 3D objects which can be set at any angle or turned completely around by the user.



KDE Plasma 5 is built using Qt 5 and KDE Frameworks 5, predominantly plasma-framework. It improves support for HiDPI displays and ships a convergent graphical shell, which can adjust itself according to the device in use. 5.0 also includes a new default theme, dubbed Breeze. Qt 5's QtQuick 2 uses a hardware-accelerated OpenGL(ES) scene graph (canvas) to compose and render graphics on the screen, which allows for the offloading of computationally expensive graphics rendering tasks onto the GPU, freeing up resources on the system's main CPU. KDE Plasma 5 uses the X Window System and Wayland. Support for Wayland was prepared in the compositor and planned for a later release. It was made initially available in the 5.4 release. Stable support for a basic Wayland session was provided in the 5.5 release (December 2015).



Unity is a graphical shell for the GNOME desktop environment originally developed by Canonical Ltd. for its Ubuntu operating system, and now being developed by the Unity7 Maintainers (Unity7) and UBports (Unity8/Lomiri). Unity debuted in the netbook edition of Ubuntu 10.10. It was initially designed to make more efficient use of space given the limited screen size of netbooks, including, for example, a vertical application switcher called the launcher, and a space-saving horizontal multipurpose top menu bar. Unity was part of the Ayatana project, an initiative with the stated intention of improving the user experience within Ubuntu. On 5 April 2017, Mark Shuttleworth announced that Canonical's work on Unity would end. Ubuntu 18.04 LTS, a year away from release at the time, would abandon the Unity desktop and employ the GNOME 3 desktop instead. Unity7 Maintainers took over Unity7 development, while UBports founder Marius Gripsgård announced that the organization would continue Unity8 development. On 27 February 2020, UBports announced that it renamed Unity8 to Lomiri.



GNOME Shell is the graphical shell of the GNOME desktop environment starting with version 3, which was released on April 6, 2011. It provides basic functions like launching applications, switching between windows and is also a widget engine. GNOME Shell replaced GNOME Panel and some ancillary components of GNOME 2. GNOME Shell is written in C and JavaScript as a plugin for Mutter. In contrast to the KDE Plasma Workspaces, a software framework intended to facilitate the creation of multiple graphical shells for different devices, the GNOME Shell is intended to be used on desktop computers with large screens operated via keyboard and mouse, as well as portable computers with smaller screens operated via their keyboard, touchpad or touchscreen. However, a fork of the GNOME Shell, known as Phosh was created in 2018 for specialization with touchscreen smartphones.

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