50 Macintosh Advantages

Why Macintosh computers are better than PCs running Windows 95

Apple Computer, Inc.

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"To see tomorrow's PC, look at today's Macintosh."

—*BYTE,* October 1995, Copyright ©1995 by The McGraw-Hill Companies, Inc.

INTRODUCTION

Some people think that Microsoft's Windows 95 operating system makes PCs just like Apple's Macintosh computers.

This brochure will give you 50 reasons why that isn't true.

That Macintosh computers have so many advantages over PCs running Windows 95 should come as no surprise. While Microsoft has spent years trying to imitate the interface and duplicate the features pioneered on the Macintosh in the 1980s, Apple has taken the Macintosh to the next generation of personal computing. This next generation of personal computing, based on RISC processors and component software, means that Macintosh computers bring you more advanced features than PCs running Windows 95, and that those features are easier to use on Macintosh systems.

A 10-year head start is only one reason why Macintosh computers have the edge on PCs running Windows 95. The other reason is that Apple is the only major personal computer company to craft both the hardware and operating system software—together. That makes it easier for Macintosh users to start using new features.

As we'll see, Apple's head start, history of innovation, and integration of hardware and software give the Macintosh an advantage in four key areas:

Ease of use. It's true that Windows 95 makes the PC more usable by insulating users from some of the complexity of DOS. But make no mistake: DOS is still there in Windows 95—and users still need to know how to live by its rules. The Macintosh interface is graphical from the ground up, so users never need to deal with the inherent difficulties of a system like DOS. In addition, the Macintosh hardware and software integration makes it easier to add peripherals, use applications, and troubleshoot and maintain your computer.

Power. Independent tests show that Apple's PowerPC processor–based Power Macintosh computers outperform comparable PCs based on Pentium processors. And with the RISC-based PowerPC chip at the beginning of its life cycle, that performance advantage is expected to grow over time. Macintosh computers also include many powerful built-in features that cost extra or aren't even available for Windows PCs.

Advanced multimedia. Every Macintosh sold today is built for multimedia, with advanced sound, great video and graphics, and easy integration of CD-ROM drives and other peripherals. You'd have to buy products from different companies—and integrate them yourself—to rival those capabilities on a PC. That's why multimedia software, for example, installs more easily on a Macintosh, looks better, and runs better, too. It may also be why 63 percent of all multimedia software developers do their development work on Macintosh computers (Source: Dataquest, November 1993), and why Apple sold more multimedia personal computers worldwide in 1994 than any other company. (Source: Dataquest, March 1995)

Compatibility. New hardware and software innovations make it easier than ever for Macintosh users to work with PCs running MS-DOS and Windows. With a Macintosh, you can read from and write to PC disks. You can share data over a network with PCs. You can run applications for MS-DOS and Windows, by using SoftWindows software from Insignia Solutions, by adding a DOS Compatibility Card to your Macintosh, or by purchasing one of the DOS Compatible Macintosh systems.

In examining these four areas—ease of use, power, advanced multimedia, and compatibility—we have tried to use the best hardware and software that the PC world has to offer, and we relied heavily on the documentation and support materials provided for Windows 95.

Although you may not want to examine all of our examples in detail, we think that even a quick review will show you why you should buy a Macintosh rather than a PC running Windows 95. Because a Macintosh computer will help you do things more easily than a PC running Windows 95.

EASE OF USE

Some people claim that Windows 95 makes the PC as easy to use as a Macintosh. But while Windows 95 is an improvement over previous Windows and MS-DOS software, it still can't match the Macintosh computer for ease of use.

Why? Because it takes more than a graphical user interface to make a computer easy to use. It takes tight integration between software and hardware. It requires an operating system that's graphical "from the ground up," so that users don't have to deal with character-based code. And it requires a company that focuses on the user, and helps guide software developers to make the user experience more consistent.

As we'll see, Macintosh computers are superior to PCs running Windows 95 on all three counts.

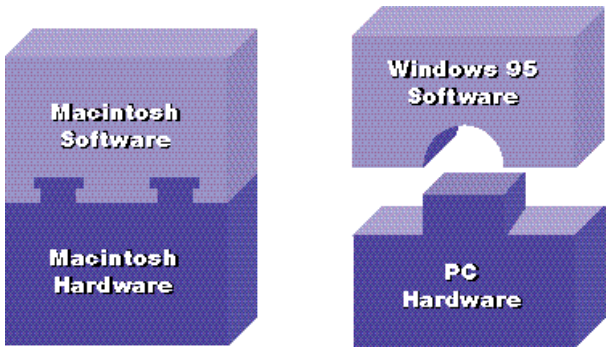
Macintosh hardware and software is better integrated

"The Mac is still more elegant and stylish [than Windows 95], still more tightly integrated, with better links between software and hardware, because a single company makes both the computer and operating system."

—*The Wall Street Journal,* July 13, 1995, Copyright ©1995 by The Wall Street Journal.

"Windows 95 is an 'edifice of bailing wire,chewing gum and prayer.'"

—*The New York Times,* August 2, 1995, Copyright ©1995 by The New York Times Company. Reprinted by permission.



Macintosh hardware and software work together (left). With Windows, the user has to make sure all of the pieces work together (right).

Because Apple makes both the hardware and the operating system, the two work together easily—when a change is made at the hardware level, the software automatically recognizes it and acts accordingly. In the PC world, Microsoft develops Windows 95 and many different manufacturers make the hardware systems. So the software and hardware don't always work well together.

In this section, we'll mention many areas in which the Macintosh advantage in hardware and software integration is strong:

- Floppy disks
- Memory management
- Monitor support
- Mouse support
- Adding peripherals
- Connecting to a network
- Infrared networking
- Internet access and publishing

1 Floppy disk management is easier with Macintosh computers

Although Windows 95 has been billed as a revolutionary advance for PCs, it still cannot recognize when a user does something as basic as insert a floppy disk into the floppy disk drive.

The Mac OS recognizes when a floppy disk has been inserted and automatically shows the disk's icon on screen. When you eject the disk, the Mac OS indicates that it has been removed. But when you insert a floppy disk into a PC running Windows 95, nothing happens. To see the contents of the disk, you have to double-click "My Computer," then double-click the correct disk drive icon. And if you eject the disk, Windows 95 leaves its window unchanged on the screen—even after you've placed a different disk in the floppy disk drive. To view the true contents of the disk, you have to select the Refresh command, or close and reopen the floppy disk drive window.

There are many opportunities for confusion when working with floppy disks on a PC running Windows 95. For example, here are just a few of the things you could run into if you forget to close or refresh the floppy disk's window after ejecting the disk from your machine.

What happens if you forget to close or refresh the floppy disk's window after ejecting the disk

When you...	Windows 95...
Double-click a Microsoft Word file...	Delivers the message: "a:\pathname\filename.txt. The directory name is invalid."
Double-click a folder...	Tells you the folder "does not exist."
Double-click a Notepad file with a different floppy disk in the drive...	Delivers the message: "Cannot find the [pathname/filename] file. Do you want to create a new file?" Even if you select "No," it will still create a new "Untitled" file.

Virtually every aspect of dealing with data on floppy disks is easier with a Macintosh. Here are a few more examples.

If you...	Macintosh will...	But with Windows 95, you have to...
Leave a floppy disk's window open when you eject it...	Automatically open the window the next time you insert the floppy disk.	Open "My Computer" and double-click the floppy disk drive icon each time.
Install a new application from floppy disks...	Automatically eject each disk when finished with it, and begin copying the new disk when you insert it.	Manually eject each disk when prompted, insert the next disk, and tell the computer you have inserted the disk to continue installation.
Start up your computer with a data disk in the floppy disk drive...	Automatically eject it and finish starting up.	Respond to the error message "Non-system disk or disk error" by manually ejecting the floppy disk and pressing a key to continue.

With Macintosh, dealing with floppy disks is easier in virtually every way.

2 Checking memory is easier on a Macintosh

As applications demand more memory, users are more concerned with how much memory is available at any given time and how their applications are using memory. As the chart below shows, you get much more useful information on a Macintosh than on a PC running Windows 95.

Macintosh **Windows 95**

The Macintosh computer shows you exactly how much memory your system has, and how much each open application is using. With Windows 95, the closest you can get is the Resource Meter, which presents information that is difficult for most people to interpret.

3 Macintosh computers offer more flexible monitor support

Many users want to increase their on-screen work space by adding a second monitor, to handle larger documents such as spreadsheets or desktop publishing pages. With the Macintosh, it's easy, and inexpensive. All you have to do on the Macintosh is add a video card for the second monitor. The system will automatically treat the two displays as a single, contiguous workspace, so you can drag objects from one screen to another, or even work

across screens on the same document. And Macintosh computers can support different types of monitors simultaneously—regardless of bit depth, or color or black and white. That means you can add screen space as you need it, while preserving your investment in the monitor or monitors you already own.

Standard PCs aren't designed to support more than one monitor at a time, so adding a second monitor is much more expensive and complex. You would need to buy a special video card that costs hundreds of dollars more than standard cards. And since these PC cards may not support the monitor you already have, you might also have to buy two brand-new monitors.

Macintosh computers are designed to support multiple displays simultaneously.

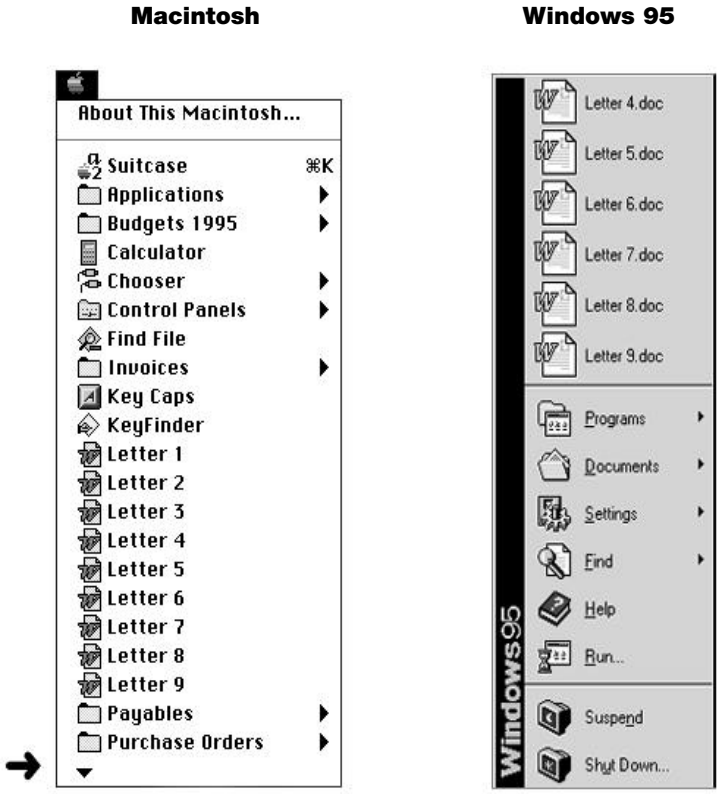
4 Changing your mouse is easier and faster on a Macintosh

The Apple Desktop Bus (ADB) port that comes with your Macintosh computer lets you change the mouse or pointing device without disrupting your work. Simply plug the new pointing device into the ADB port and continue working.

On most PCs, if you try to change pointing devices in the middle of a Windows session—or if your mouse accidentally becomes disconnected—the pointer will freeze and won't reactivate until you restart Windows using keyboard commands. If you start up a laptop computer running Windows 95 but haven't yet connected your mouse, you'll have to restart just to use your mouse.

5 Macintosh menus scroll, so they're easier to use than Windows 95 menus

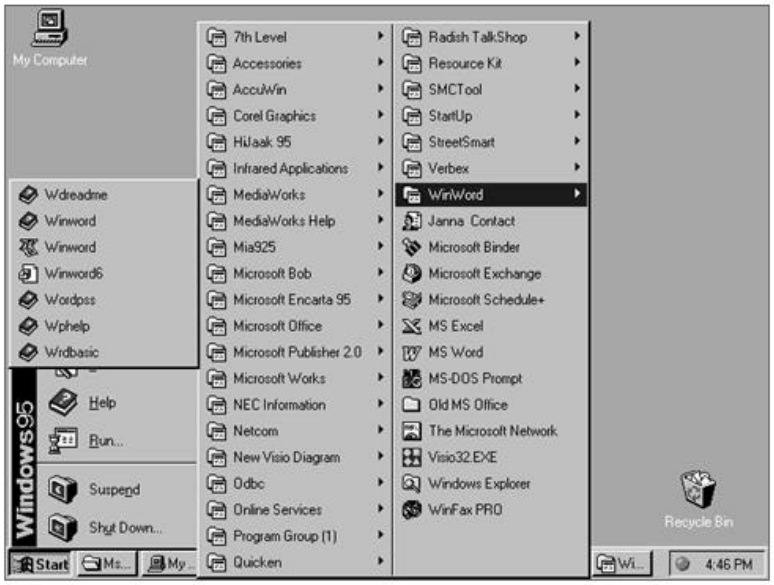
If a Macintosh menu is too long to fit on the screen, you can scroll down to see all of the items. Windows 95 menus, by contrast, don't scroll up or down. So if you put too many items into the Windows 95 Start button, some will remain out of reach—permanently.



Macintosh menus allow you to scroll to access items. Windows menus do not scroll. In this example, we put nine files, named Letter 1 through Letter 9, into the Apple menu and the Windows 95 Start button. In this case, the Macintosh computer gives you access to all the Letter files, but even if some were hidden, you could scroll to access the rest. With the Windows 95 Start button, you can't even get to Letter 1, Letter 2, and Letter 3.

Windows 95 hierarchical menus can become confusing as they become more crowded. When you install many applications onto a PC—so they form two columns from the Start Programs menu—the menus may not be contiguous. You'll have to jump quickly across from menu list to menu list, which can be difficult to do.

Windows 95



Windows 95 hierarchical menus can be discontiguous. Here the WinWord submenu is displayed on the left edge of the screen. It can be difficult to access an item on the left side of the screen while pulling down a menu on the right.

Another example: Take a look at what *InfoWorld* recommends to give you a hierarchical Control Panel in the Windows 95 Start button—something the Apple menu on the Macintosh computer provides by default. (Note that you must enter the 32-character hexadecimal code exactly as printed.)

"Because the Control Panel is so central to Windows 95, it's too bad that it's buried deep in the new Start Button menu. You must click Start, then Settings, then Control Panel, after which you get a folder window full of several icons to choose from. But if you implement the simple trick I show below, you instantly gain a 'live,' cascading Control Panel menu directly below the Start Button itself. Try it.

"Step 1. Click the Start Button once with your right mouse button. You should see a right-button menu (called a context menu because it offers different choices in different contexts).

"Step 2. You should see the items Open, Explore, and Find on the context menu. Click Explore with your left mouse button.

"Step 3. An Explorer file management window should open. A directory tree should appear in the left pane, with the right pane displaying the contents of the Start Menu folder.

"Step 4. Right-click any empty space within the right pane. A context menu should appear. Click New and then Folder.

"Step 5. The Explorer will create a highlighted icon called New Folder. Type in the following string, all on one line, replacing the words New Folder with this new line. You must type the period, the curly braces, all four hyphens, and the hexadecimal numbers exactly as shown. After the closing curly brace, press Enter.

Control Panel.{21EC2020-3AEA-1069-A2DD-08002B30309D}

"Step 6. That's it! Click the Start button to pull down the Start menu, and you'll see your new Control Panel item immediately. A right arrow points to a cascading submenu, from which you can pick Printers, Fonts, System, or any of the other Control Panel applets.

"Why does this work? The Control Panel is a special kind of folder in Windows 95. Executables such as Control Panel and other resources have their own unique ID numbers. To see these, click Start, Run, type REGEDIT, and click OK. In the Registry Editor that appears, click Edit Find and search for 21EC2020. This takes you to a section that identifies Control Panel's special number and that of many other resources. Unlike on the Control Panel, however, these other numbers are not useful on the Start menu. Adding a Printers folder, for example, does not work. For now, you'll have to find Printers through the Control Panel item you just added to the Start Button menu."

—*InfoWorld,* June 26, 1995

6 Macintosh supports plug-and-play peripherals today

"The full benefit of Plug and Play technology in Windows 95 is still two years away."

—Computerworld, May 1, 1995, Copyright ©1994 by ComputerWorld, Inc., Framingham, MA 01701, reprinted from *ComputerWorld.*

"While Plug and Play with Windows 95 is still in transition, the Mac is a no-questions-asked Plug and Play machine."

—Newsweek, August 21, 1995

Plug and Play is one of the most eagerly awaited features of Windows 95—and with good reason. For years, PC users have wanted to be able to expand their systems as easily as Macintosh users expand theirs—without worrying about configurations, DIP switches, or drivers. But to achieve true Plug and Play in the PC world, you'll need a PC with the latest ROM BIOS as well as all-new Plug and Play peripherals.

Even if you do have a Plug and Play PC, adding peripherals is still more difficult than on a Macintosh computer. Unlike Macintosh computers, most PCs don't come with built-in SCSI ports. That means you'll have to open up the PC and install adapter cards.

Compare what it takes to add an additional hard disk to a Macintosh computer with the steps required to add an additional hard disk to a PC running Windows 95.[1] Note that the hard disk selected for the Windows 95 installation was a "Designed for Windows 95" Western Digital 850-megabyte hard disk.[2]

Installing an additional hard disk

The Easy Way: Macintosh	The Hard Way: Windows 95
1. Turn off the Macintosh. 2. Plug the hard disk into the SCSI port, and into a power source. 3. Turn on the hard disk and the Macintosh.	1. Turn off the computer. Disconnect the power cord. 2. Open the computer. Keep yourself grounded to avoid damaging components. 3. Set the new hard disk's jumpers to "slave" setting. (Note: This setting will vary depending on the manufacturer of the disk.) 4. Locate an open IDE adapter port on the controller card or motherboard. If necessary, add a dual-headed IDE connector ribbon so that the original hard disk and the new hard disk can share the same port.

1. This example assumes that the hard disk is the first peripheral device added to the computer. For the purposes of this comparison, we have installed an external hard disk on the Macintosh and an internal enhanced IDE drive on the PC, since these are the most common ways to add new hard disks to each system.
2. We also installed a "Designed for Windows 95" Quantum Fireball Enhanced IDE 1-gigabyte hard disk drive into a NEC Ready 7022, and had to follow similar steps.

(continued on next page)

The Easy Way: Macintosh	The Hard Way: Windows 95
	5. Plug the new hard disk into the IDE connector ribbon. (Make sure the red strip on the ribbon is closest to the power supply port on the hard disk.) 6. Locate an unused power connector. If necessary, buy a Y adapter for your computer's power connector. 7. Plug the power connector into the power supply port on the new hard disk. 8. Attach the faceplate, LED light, and, if necessary, mounting hardware, to the new hard disk. Then mount it in an open bay. 9. Replace the cover of the computer and plug in the power cord. Turn on the computer. 10. Before the "Starting Windows 95" message appears, enter the System Setup screen. 11. Press tab until the IDE Hard Disk (slave) entry is highlighted. Configure the new hard disk as a slave. Enter the number of cylinders, heads, and sectors the new hard disk will require. (Note: The number of steps involved in this procedure will depend on your computer's BIOS.) 12. Exit System Setup. 13. Restart the computer. 14. Select MS-DOS from the Start Programs menu. 15. At the C: prompt, type "FDISK" and press Enter. 16. Indicate the number of partitions you would like to create on the new hard disk. (Note: This procedure requires you to change the current fixed disk, to select the number of partitions for the new disk, and to select the size of each partition.) 17. Exit MS-DOS and restart Windows. 18. Select MS-DOS from the Start Programs menu. 19. At the C: prompt, execute the FORMAT command for all partitions you created. 20. When the hard disk has been formatted, exit MS-DOS. 21. Double-click "My Computer." An icon for your new hard disk should appear in the window.

Even with a Plug and Play PC and peripheral, you'll spend considerably more time and effort adding a new hard disk to a PC running Windows 95 than you would with a Macintosh computer.

Installing a new hard disk is only the first part of the battle. Most users would also want to move applications and data files to the new hard disk—to take advantage of its speed and storage capacity. As we'll see later (pages 25–26), the process of moving applications on a PC running Windows 95 is much more complex than on a Macintosh.

7 Macintosh computers are easier to network

No personal computer can be connected to a network more easily than a Macintosh. That's because all Macintosh computers come with a built-in network connection. Most PCs today are sold without built-in networking hardware. Compare what it takes to connect a Power Macintosh and a popular name-brand PC running Windows 95 to an Ethernet network.

Connecting a computer to an Ethernet network

The Easy Way: Macintosh	The Hard Way: Windows 95
1. Plug the network cable into the Ethernet connector on the back of the Macintosh. 2. Open the Network Control Panel, and select EtherTalk. When prompted, click OK. 3. Select the Chooser from the Apple Menu. Highlight the network resource to which you wish to connect.	1. Shut off and unplug the computer. 2. Open the cover of the computer. Keep yourself grounded to avoid damaging components. 3. Install a Plug and Play network adapter card in an appropriate expansion slot. 4. Plug in the Ethernet cable to the port on the adapter card. 5. Replace the cover of the computer. Plug in the computer and turn it on. 6. Windows 95 should identify your new hardware and load the appropriate driver. Be sure that your Windows 95 CD-ROM is in the CD-ROM drive. (If you installed the floppy disk version of Windows 95, the system will prompt you to insert the appropriate floppy disks.) 7. Restart the computer. Depending on your adapter and network, you may need to check for resource settings conflicts such as IRQ and I/O address. 8. You will be prompted to enter or verify the network identity of your computer, and the workgroup to which you are attached. (Note: Computer and workgroup names are limited to 15 characters, and cannot include spaces.) 9. Verify your Primary Network Logon. 10. Double-click Network Neighborhood. Select the network resource to which you wish to connect.

Note: For the purposes of this comparison, we installed a 3Com EtherLink III Plug and Play adapter into a Compaq Presario 7170 (90-MHz Pentium processor), and connected the system to an existing two-system Ethernet network, using Windows 95 built-in networking software. When we attempted the installation with other Plug and Play computers, we met with widely varying results. These included IRQ, I/O, and COM port conflicts, as well as the need to install adapter drivers from manufacturer-supplied disks, rather than built-in Windows 95 drivers.

8 The Mac OS keeps track of files and applications over a network

Because Windows 95 is built on DOS, working with files over a network is a much more difficult process with a PC running Windows than with a Macintosh computer.

With a Macintosh, you can move documents and applications, and the Mac OS will keep track of where they are. So, for example, if someone on the network moves or renames the Microsoft Excel folder on your server, you can still double-click your Excel alias or an Excel spreadsheet file—the Mac OS will find and launch Excel.

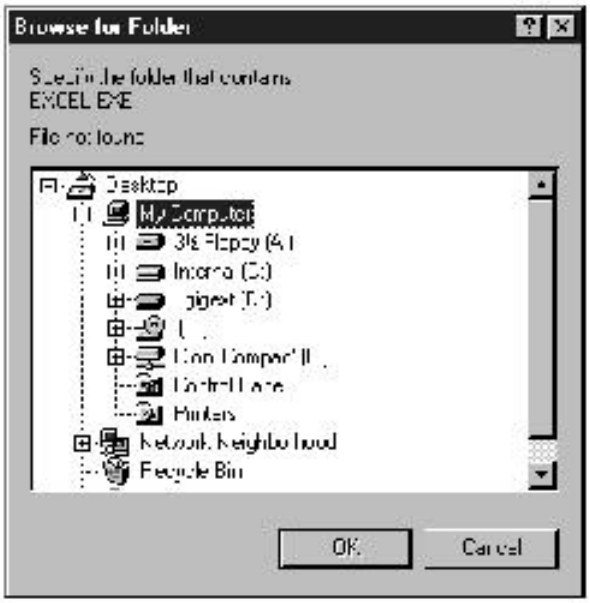
By comparison, Windows 95 will lose track of the application, so the links between your files and the application will be broken. Look what happens when you try to open an Excel spreadsheet on a PC running Windows 95 after the application's server location has changed:

Windows 95

1. When you try to open an Excel file after Excel has been moved on the server, you'll receive the message that Windows 95 cannot find the application. Windows 95 offers a location pathname and three choices: "OK," "Cancel," and "Locate."

2. If you choose OK (the default), Windows 95 gives you yet another message that it cannot find the application. Click OK.

3. You're back where you started. You might now choose to "Locate" the application.



4. But if you choose "Locate," Windows 95 won't search for you—you'll have to click through folders on the server—a process that could take a long time on a large server.

Here's a comparison of what happens when you try to open a document if the application that created that document has been moved on the server.

Opening a document after its application has been moved

The Easy Way: Macintosh	The Hard Way: Windows 95
1. Double-click the file or select it from the Recent Documents menu.	1. Double-click the file; or click the Start button, select Documents, and click the filename. 2. You'll receive the message: "The item 'filename' that this shortcut refers to has been changed or moved. The nearest match, based on size, date, and type, 'G:\Windows\Application\diagram.xxx.' Do you want the shortcut to point to this item?" 3. Click Yes. 4. You'll receive the message: "Windows cannot find Application.exe. The program is needed for opening the files of type 'application file.' Check the given pathname for the application." 5. Click OK. 6. You'll receive the message: "Cannot find the file 'G:\\Folder\Application.exe.'" 7. Click OK. 8. Click Locate, then search through folders on the network to find the application. Or contact your network administrator for assistance.

9 Infrared networking is more powerful and more versatile with Macintosh computers

Infrared (wireless) networking is the latest advance in mobile computing, and Apple is leading the way. Apple's new family of Macintosh PowerBook 5300 computers come with a built-in infrared (IR) transceiver, so that two computers can share files with each other without any cables. Like all of the other advanced features on the Macintosh, IR technology is seamlessly integrated into the operating system. When two or more IR-equipped PowerBook computers are placed within range of each other, they can automatically recognize each other and create guest folders, so users can share files by simply dragging and dropping them into these folders.

You can also attach a third-party infrared pod to a desktop Macintosh computer to tie your PowerBook directly into that machine's local area network, and do anything that desktop machine can do, including printing to a networked printer and accessing the Internet.

IR applications for PCs running Windows 95, by comparison, typically require configuration before you can make connections. And you can make only one connection, as opposed to multiple connections on the Macintosh.

10 Macintosh makes Internet access and publishing easier

More and more people today are using the Internet—for business, pleasure, and education. And in fact, independent surveys show that more users are surfing the World Wide Web with a Macintosh computer—between 26 percent and 40 percent of the people accessing the Web from a personal computer—than with any other computer.

Apple has introduced the Apple Internet Connection Kit, an integrated collection of high-quality software that makes Internet access easy. The kit includes Netscape Navigator, Claris Emailer, and a special Apple Guide solution that walks users through all the procedures for connecting to the Internet, step by step.

Macintosh computers also make Internet publishing easier. The Apple Internet Server Solution for the World Wide Web provides users with all the hardware and software they need to establish a presence on the Web, and it can be installed in a matter of minutes—with no knowledge of UNIX required. And two powerful Internet tools—Adobe's PageMill and SiteMill—are available only for the Macintosh. PageMill is a full WYSIWYG Web page authoring tool (no knowledge of HTML is required), and SiteMill automatically updates documents as Internet links change or become inactive. A task that would literally take hours for a larger site is completed in seconds on the Macintosh with SiteMill.

DOS is still part of Windows 95

"Windows 95 is merely a spiffed up version of the same old DOS and Windows....Windows 95's incremental capabilities, like the new GUI and support for Win32 applications, have been, in effect, grafted onto those ancient DOS/Win3.x roots."

—Marketing Computers, February 1995

According to much of the publicity surrounding Windows 95, DOS has finally been banished from the ordinary, everyday PC. But even a brief look at Windows 95 proves that the character-based DOS system is still lurking behind the scenes.

Here are a few examples of the continued presence of DOS in Windows 95.

11 Filename limitations

Because Windows 95 supports long filenames, many users assume that DOS filenames are no longer a limitation. But that isn't the case. Windows 95 tries to make naming files easier, but DOS still creates plenty of confusion for people who aren't aware of its rules.

Creating filenames

If you try to type a filename like this...	Macintosh does this...	But Windows 95*...
Completed?	Saves the file as you typed it.	Doesn't save the file, and doesn't respond at all.
Report 10/95	Saves the file as you typed it.	Gives you an error message: "C:\Pathname\Report 10/95 This filename is not valid."
Report\confidential	Saves the file as you typed it.	Gives you an error message: "C:\Pathname\report\confidential The path does not exist. Make sure that the correct path is given."
"hot report"	Saves the file as you typed it.	Gives you an error message: "Error opening C:\Pathname\'hot report'.cdr file." When you click OK, gives you another error message: "Error writing C:\Pathname\'hot report'.cdr file."

***Windows 95 files were created and saves attempted in CorelDRAW! 6 for Windows 95.**

Notice that none of these error messages tells you the cause of the problem—namely, that each of these filenames violates the conventions of DOS. Nor does Windows tell you how to fix the error; it simply leaves you to make your best guess.

12 Filename incompatibilities between Windows 95 and Windows 3.1

Illegal characters are just part of the confusion when it comes to Windows 95 filenames. Remember that none of the DOS and Windows 3.1 programs can view, create, or otherwise deal with long filenames. To make up for this shortcoming, Windows 95 keeps each long filename linked to a DOS (8.3) short filename.

The Microsoft documentation says that neither the user nor the application has control of these DOS 8.3 encoded names; the operating system maintains control of these names. As you can see from the table below, that can lead to extremely confusing results.

Sharing files with a computer running earlier versions of system software

When you share a file named...	Macintosh system 6 displays it as...	Windows 3.1 displays it as...
letter to Dave	letter to Dave	letter~1.txt
letter to Patricia	letter to Patricia	letter~2.txt
letter to Janet	letter to Janet	letter~3.txt

The more files travel between Windows 95 and older environments, the more confusing this process gets. For example, when you create a file named "Presentation for status meeting" with Microsoft Word on a PC running Windows 95, then save the file to a floppy disk and insert the floppy disk in a PC running Windows 3.1, the file will appear as PRESEN~1.DOC. When you edit the file on the PC running Windows 3.1, save it, and return to the PC running Windows 95, the long filename will no longer exist. Instead, the file will now be called PRESEN~1.DOC.

To make matters even more confusing, Windows 95 gives you the option of viewing files with their extensions visible or invisible—and the effect of name changes will vary depending on how the files are viewed. When extensions are visible, you can edit them directly—with serious effects on connections between files and applications. However, when extensions are hidden, adding an extension to a filename will change the name of the file itself—and leave the original extension untouched.

Unfortunately, the Win95 interface is plagued by serious inconsistencies. For example, Explorer defines file types by their three-character extensions, a relic of the old file naming system, which allowed a maximum of eight characters in the name and three in the extension. But the default behavior of the Explorer is to hide the underlying file system and hence some of the extensions. For instance, .TIF files display with their extensions and the .EXE files do not, because, by default, extensions registered in the Explorer aren't shown while those that aren't registered are shown. So if a user wanted to change the extension and hence the file type, he or she would have to figure out how to get Explorer to display the extension and then change it."

—*InfoWorld,* August 21, 1995

Microsoft recommends (in its Windows 95 Resource Kit, p. 684) that users, particularly those in workgroups, establish common naming conventions to deal with the problems associated with long filenames and the encoded names generated by the operating system. But that raises the question: If you need to create a code to use long filenames, what good are long filenames in the first place?

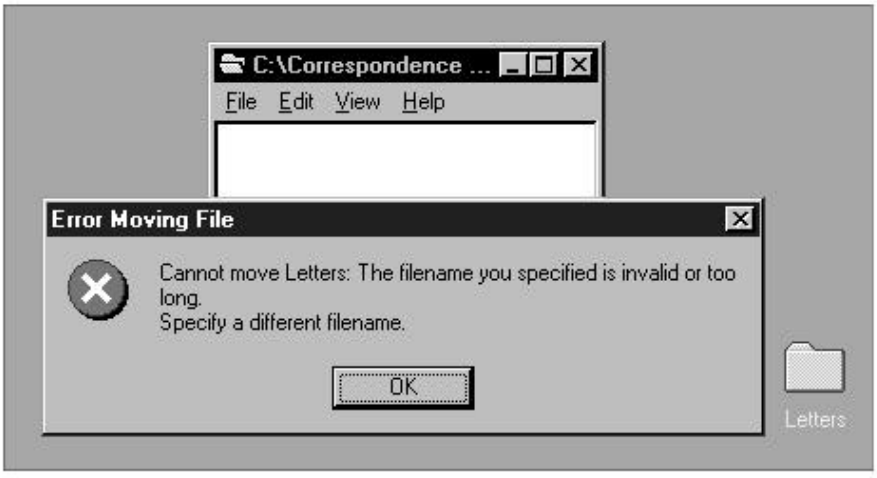
"Microsoft kindly suggests using naming conventions like 'Oct Status Report' instead of 'Status Report for Oct.' Or perhaps you might, as Microsoft puts it, 'give files a short file name as part of the long file name,' suggesting by way of example 'Mktgrpt-Marketing Report for our new project,' or MKTGR1.TXT. Macintosh users may be pardoned for snickering."

—The New York Times, June 20, 1995, Copyright ©1995 by The New York Times Company. Reprinted by permission.

13 Pathname limitations

With a Macintosh computer, you can create as many folders within folders as you like, without ever having to worry about long pathnames. In Windows 95, pathnames are limited to 260 characters, and since pathnames grow longer each time you add a folder to another, you might reach this limit sooner than expected. That means users who like to create nested folders within folders can encounter unexpected error messages. For example, you might try to move a folder with the short name "Letters" into a deeply nested folder, and receive the error message "Cannot move Letters. The filename you specified is invalid or too long. Specify a different filename." Notice that the message suggests a problem with the filename—but doesn't tell you the pathname is too long.

Windows 95



Windows 95 limits pathnames to 260 characters. So if you try to drag a folder with a short name, say "Letters," into a nest of folders, Windows 95 may still tell you that its filename is too long. The real problem is that the pathname is too long.

14 Macintosh files stay linked to the applications that created them; with Windows 95, that isn't always the case

Double-clicking a Macintosh document automatically opens the application that created it—no matter where the application resides on your hard disk (or connected server) and no matter what the file is called. With Windows 95, it's not that simple. The association between applications and files is still governed by pathnames and the three-character filename extension. That means that double-clicking a document sometimes opens the application that created it and sometimes doesn't.

For example, when you move an application on a PC running Windows 95 to a different directory—or even rename the directory it's in—and then try to open a document created by that application, you will usually receive an error message stating that Windows cannot find the application.

Windows 95

Windows 95 loses track of its applications even if you simply move an application to a different directory—or rename the directory it's in.

Here's an example of what's required for the simple task of moving an application and a file that the application created, then opening that file:

Moving an application

The Easy Way: Macintosh	The Hard Way: Windows 95
1. Move a folder (containing an application and its documents) to another location. 2. Double-click a file in that folder.	1. Launch Windows Explorer. 2. Move a folder (containing an application and its documents) to another location. 3. Double-click a document in that folder. You will usually receive an error message, the application will not launch, and the file will not open. 4. Click the Start button. 5. Select Programs and click the application you moved. 6. Windows 95 may launch a different application. 7. Click Start, select Settings, then click Taskbar.

(continued on next page)

The Easy Way: Macintosh	The Hard Way: Windows 95
	8. Click the Start Menu Programs tab. 9. Click the Add button. 10. Type the new pathname for the application that was moved. 11. Click Next. 12. Overwrite your old shortcut and click Finish. 13. Click OK. 14. Click the Start Programs menu, and launch the application. Then open the file.

Fragile links between applications and data files can become particularly annoying when you purchase a new hard disk drive and want to move applications to the new hard disk to take advantage of its storage space and speed. Imagine going through the process just described for all of your applications.

Problems encountered when moving applications to a new hard disk on a PC running Windows 95

Windows application	Here's what happens when you double-click a file created by that application...	Here's what happens when you try to launch that application through the Start Programs menu...
Microsoft Word 6.0	Searches. Message: "Program Not Found." Click OK. Message: "Cannot find file C:\pathname\WINWORD.EXE." Click OK. Click Locate, then browse through My Computer to find the folder that contains the application. Select it and click OK to launch the application.	Searches. Message: "Problems with Shortcut. The item 'WINWORD.EXE' that this shortcut refers to has been changed or moved. The nearest match, based on size, date, and type, is 'C:\pathname\PowerPoint.EXE.' Do you want this shortcut to point to this item?"
Microsoft Word 7.0	Searches. Message: "Program Not Found." Click OK. Message: "Cannot find file C:\pathname\WINWORD.EXE." Click OK. Click Locate, then browse through My Computer to find the folder that contains the application. Select it and click OK to launch the application.	Searches. Opens the MSTXTCNV.INI configuration file in Notepad, and changes the Word icon in the Start: Programs menu to a Notepad icon.
Microsoft Access 2.0	Searches. Message: "C:\ACCESS\system.mda isn't a valid path."	Searches. Message: "C:\ACCESS\system.mda isn't a valid path."

(continued on next page)

Windows application	Here's what happens when you double-click a file created by that application...	Here's what happens when you try to launch that application through the Start Programs menu...
Microsoft Works 3.0	Searches. Message: "OLE registration database incorrect. Run Setup. Continue anyway?"	Searches. Message: "Problems with Shortcut. The item 'MSWORKS.EXE' that this shortcut refers to has been changed or moved. The nearest match, based on size, date, and type, is 'C:\pathname\MSDRAW.EXE.' Do you want this shortcut to point to this item?"
Microsoft Excel 5.0	Searches. Message: "Program Not Found." Click OK. Message: "Cannot find file C:\pathname\EXCEL.EXE." Click OK. Click Locate, then browse through My Computer to find the folder that contains the application. Select it and click OK to launch the application.	Searches. Message: "Problems with Shortcut. The item 'EXCEL.EXE' that this shortcut refers to has been changed or moved. The nearest match, based on size, date, and type, is 'C:\pathname\PowerPoint.EXE.' Do you want this shortcut to point to this item?"
Microsoft Excel 7.0	Searches. Message: "Program Not Found." Click OK. Message: "Cannot find file C:\pathname\EXCEL.EXE." Click OK. Click Locate, then browse through My Computer to find the folder that contains the application. Select it and click OK to launch the application.	Searches. Message: "Can't open Cue Cards. You must provide a Cue Cards file name in the command line." The Excel icon in the Start: Programs menu is changed to a Cue Cards icon.
WinFAX Pro 4.0	Searches. Message: "Cannot create phone book files. Check that the drive still has free space. If on a LAN ensure that you have write rights." (Note: This message delivered in response to double-clicking the WinFAX application. WinFAX does not generate document files per se.)	Searches. Message: "Problems with Shortcut. The item 'FAXMNG.EXE' that this shortcut refers to has been changed or moved. The nearest match, based on size, date, and type, is 'C:\pathname\GOSERVE.EXE.' Do you want this shortcut to point to this item?"
CorelDRAW! 6.0	Message: "Cannot find the file 'filename' or one of its components."	Opens a font called "Architecture True Type."

Note: Results and error messages may vary from system to system.

15 Macintosh aliases are easier to work with than Windows 95 shortcuts

Apple introduced aliases in 1991 with Macintosh System 7 software, to give users a quick and easy way to access files, applications, or network servers. The alias acts as a pointer to the actual file or resource, so you don't have to spend time finding the item itself. Macintosh aliases keep track of their original files, even if they are moved to another disk or their names are changed.

Windows 95 tries to imitate aliases with a feature called "shortcuts." However, Windows 95 shortcuts have fragile links—again, because they're based on the rigid file-management system of DOS. So if the original file is moved to a different disk, or its name is changed on the other disk, the shortcut won't be able to find it.

Sometimes shortcuts launch a completely unexpected application—with no explanation as to why. For example, try creating a shortcut of the Winlogo file in the Windows folder. Then move the original Winlogo file out of the folder and double-click the shortcut. An incorrect application will often launch. And when you move the Winlogo original back into the Windows file, the shortcut continues to open the wrong application—with no explanation.

16 The complexity of the Windows 95 Registry is a disadvantage compared with Macintosh

The Windows 95 Registry is touted as a significant enhancement over Windows 3.1. It is designed to contain all the information that Windows 3.1 contains in WIN.INI, SYSTEM.INI, AUTOEXEC.BAT, CONFIG.SYS, and program-specific .INI files. However, in the transition period from 16- to 32-bit applications, the Registry will coexist with some or all of the above files. Unlike the files listed above, the Registry files SYSTEM.DAT, USER.DAT, and POLICY.POL are binary, not text. A special editor, REGEDIT.EXE, is provided with Windows 95 for modifying the Registry files. The Registry Editor is not designed for typical users and is not made easily accessible; no icon is provided for it in the Start menu.

The place where a typical user may have to cope with the Registry Editor is in a support call. End users calling for PC support are frequently directed to edit their system files to resolve conflicts, timing problems, or other incompatibilities. Macintosh users asking for support will typically be told to throw away a file (such as a preferences file) or change settings from within a graphical user interface, while Windows 95 users are likely to be directed to modify system files by typing or modifying text or, even worse, numerical data. The chances for erroneous entries are much greater in the Windows 95 case. Compounding the problem is the possibility of making an erroneous entry or deletion that will prevent Windows 95 from running properly—or at all.

As an example of the kind of complexity Windows users may have to deal with, consider this fact: In a quick survey of seven PCs running Windows 95, we discovered that the WINDOWS\SYSTEM directory contained an average of 269 .DLL files. This large number of files makes tracing a .DLL conflict very difficult.

Focus on the user

"Bottom line: The carefully controlled Macintosh environment is still the usability standard."

—Reprinted from *PC Computing,* August 1995, Copyright ©1995 Ziff-Davis Publishing Company.

"Because I've been through the mental misery of DOS and RAM and ROM, I know what a tortuous journey it can be. So I offer any computer novice some good advice: buy a Mac and you won't go nuts....the very best PC is nothing but a poor imitation of the Mac."

—*The Chicago Tribune,* March 30, 1995

From its beginning, Apple has been known for its commitment to making computers easy to understand and use. For example, we make it easier to add new resources and capabilities to your computer. We've worked with developers to make applications consistent, and we've made our help system more helpful, so that it doesn't just show users how to accomplish a task—it actually helps them accomplish that task.

In this section, we'll see how Apple's focus on the user makes the Macintosh easier to use than a PC running Windows 95.

17 The Mac OS provides active assistance; Windows 95 doesn't

"Most Macintosh DTP software has evolved to the point where it anticipates things you might do wrong, and either (1) doesn't allow you to do them, or (2) tells you what you're doing and gives you time to reconsider. All sorts of little things like drag-and-drop for icons and text, the fact that you never see a cryptic DOS prompt, plug-n-play networking and peripheral attachment."

—*MacHome Journal,* January 1995

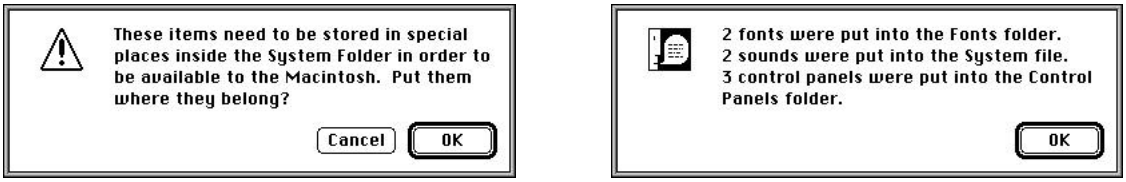
"The error messages in Windows could have been written by a Senate subcommittee, if only they weren't so brief. When Windows 95 tosses an error message your way, it's usually just a single sentence. Windows 95 rarely describes what you did to cause the error. And even worse, Windows 95 hardly ever says how to make the error go away for good."

—*Windows 95 for Dummies,* Copyright ©1995 by IDG Books Worldwide, Inc. All rights reserved.

Macintosh System 7.5 includes Apple Guide, an innovative help system that not only tells you what to do, but also coaches you through the process by showing you exactly where to click the mouse and where to type. In fact, in many cases, users can simply ask Apple Guide to perform tasks for them. The Windows 95 help system doesn't offer the same level of active assistance.

18 It's easier to add fonts and other resources to a Macintosh

When you add capabilities to your Macintosh, it seems to anticipate what you're doing and even try to help. For example, to add fonts or desk accessories to the Macintosh, all you have to do is drag them to the System Folder. The Mac OS places all of the items where they need to go—automatically.



When you want to add fonts or other resources to your computer, Macintosh actually does the job for you. With Windows 95, you must install each resource yourself.

As another example, here are the steps required to add a single font to your Macintosh or a PC running Windows 95.

Adding a font

The Easy Way: Macintosh	The Hard Way: Windows 95
1. Drag the font into the System Folder. 2. Click OK.	1. Double-click on the C: drive in "My Computer." 2. Open the Windows folder. 3. Open the Fonts folder. 4. Click Install New Font in the File menu. 5. Click the drive and the folder that contain the font you want to add. 6. Double-click the name of the font you want to add.

19 It's easier to add an application to the Apple menu than to the Windows 95 Start Programs menu

Here's an example of how to add a frequently used application to the Apple menu on the Macintosh and to the Start Programs menu on the PC. (Note: The Windows 95 instructions are adapted from the Windows 95 on-line help system.)

Adding a program to the Apple menu or the Windows 95 Start Programs menu

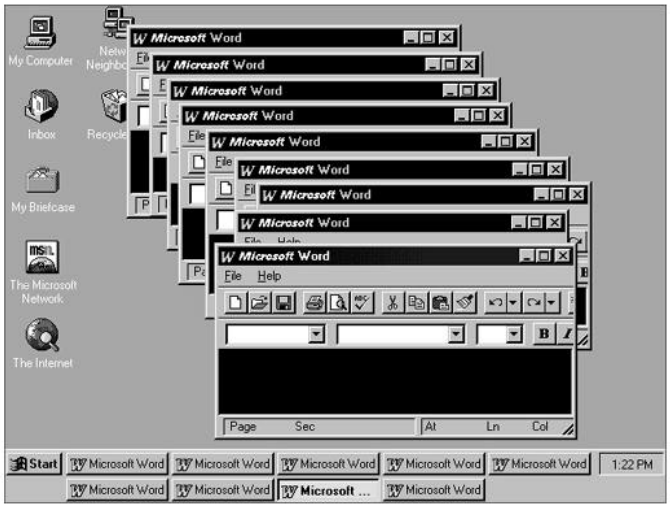
The Easy Way: Macintosh	The Hard Way: Windows 95
1. Highlight the program. 2. Click the Apple menu and select Automated Tasks: "Add Alias to Apple menu." 3. Click OK, and select the program from the Apple menu.	1. Click the Start button and then point to Settings. 2. Click Taskbar and then click the Start Menu Programs Tab. 3. Click Add and then click Browse. 4. Locate the program you want to add, and then double-click it. 5. Click Next. 6. Double-click the menu on which you want the program to appear. 7. Type the name that you want to see on the menu. Then click Finish. 8. If Windows prompts you, select an icon for the program. Then click Finish. 9. Click the Start button, point to Programs, then select the program.

Note: If you want to add a program to the first level of the Start button, you can drag it directly to the Start button. But Microsoft recommends the procedure described above first in its help system—presumably because adding multiple items to the first level could push some items on the Start menu beyond the bounds of your screen (see page 11).

20 Applications launch once on the Macintosh; with Windows 95, some applications may launch multiple times

If you double-click an application on your Macintosh and that application is already open, the Finder will simply take you to the running application. Windows 95 will often launch additional instances of the application each time you open it, which adds confusion and consumes memory.

Windows 95



Windows 95 often launches additional instances of applications, which is inefficient and can be confusing. This example shows how Windows 95 has launched nine separate instances of Microsoft Word 7.0.

21 It's easier to cut and paste graphics between applications on the Macintosh

On a Macintosh computer, the PICT file format is supported by most software applications that can deal with graphics. That means you can cut and paste between applications easily. Apple's system software–level integration of three-dimensional and video data formats even allows you to cut and paste three-dimensional data and motion video. There is no such dominant standard in the PC world; when moving a graphic using Windows 95, you need to choose from a wide array of file types.

"The most significant differences between the two platforms [Macintosh and Windows 95] when running mainstream business apps involve exchanging and sharing data between programs. Under Windows there are often contending standards for various kinds of data. Text files may use standard ASCII, extended ASCII, or ANSI character sets; bitmaps may be .BMP, .DIM, .PCX, TIFF, or any one of a dozen other formats. On the Mac, there's a well-established standard format for each data type. Text files use the standard Mac character set, bitmaps use TIFF, and so on. The practical effect of this standardization is that on the Mac you can cut and paste more kinds of data between more programs with fewer problems. You can retain formatting when copying text, copy complex drawings without losing the ability to edit the separate objects of which they're composed, and copy bitmaps without the colors going awry due to palette differences."

—*WINDOWS Magazine,* December 1994, Copyright © by CMP Publications, Inc., 600 Community Drive, Manhasset, NY 11030. Reprinted from *WINDOWS Magazine* with permission.

22 An advanced industrial design makes Macintosh computers easier to work with

"The PowerBook 540c was upheld by the jurors as the designer's laptop of choice and an illustration of how Apple has maintained a well-designed place in the arena through its immediately identifiable styling. Apple has been skillful in continuing a product strategy, and using advanced styling to stay at the forefront of this genre."

—*International Design,* 1995 Annual Design Review

Apple has received many design awards during the past decade, not only for the attractive appearance of its computers, but also for the efficient and ergonomic design of these systems. For example, the industrial design magazine *ID* cited five Apple products as "Best of Category" in its 40th Annual Design Review. In 1995 alone (through October), Apple received 27 industrial design awards. Here are just a few of the industrial design advantages of Macintosh computers:

Easy-to-open design. The design of the Macintosh enclosure allows you to open its case and access its internal slots more easily than with most PCs. Many Macintosh systems have no screws to remove, while most PCs still have screws to remove when you open the case.

Easy-to-connect peripherals. Macintosh cables and connectors are all clearly identified with internationally recognized visual icons. All you have to do is match the icon on the cable with the one on the computer. PCs usually don't have any icons on their cables.

Reduced "cable clutter." Macintosh desktop computers have a mouse connector on the keyboard. PCs usually connect the mouse to the back of the computer, which sometimes requires the mouse cord to stretch a long distance. In addition, Macintosh keyboards can be plugged into most Apple displays; they don't have to be plugged into the computer as PC keyboards do, so you can "hide" your Macintosh computer in an out-of-the-way place and have only your display, keyboard, and mouse on your desk.

Software shutdown. On most Macintosh computers, you can shut down the computer with a simple software command. While Windows 95 has a shut-down command in the Start menu, most users still have to wait for Windows 95 to go through the lengthy shutdown process, and then manually press the Power button to turn the computer off.

Ergonomic features. User convenience and ergonomics are high priorities for Apple. For example, Apple's all-in-one Power Macintosh 5200/75 LC has a tilt-and-swivel base, so it can be adjusted for the individual user's comfort. We're not aware of any all-in-one computers in the PC world that have tilt-and-swivel bases. This means they're more difficult to adjust for different users.

23 The Macintosh desktop metaphor is easier to use

"Macintosh System 7.5.2 is by far the easiest, smoothest, most usable operating system out there."

—Reprinted from *PC Computing,* September 1995, Copyright ©1995 Ziff-Davis Publishing Company.

The Mac OS displays a desktop with icons that represent hard disks, floppy disks, and a trash can. These are all things you can use. With Windows 95, the desktop shows things that may or may not be accessible; for example, the "Network Neighborhood" may appear even if you aren't on a network.

The Macintosh also lets you easily customize icons for files, folders, applications, and even your hard disk. You can use your own or existing icons, and you perform the same cut-and-paste task to change icons for any item. Simply highlight the item, choose File/Get Info, and paste an icon from the clipboard.

Windows 95 only lets you change icons for shortcuts. If you want to change icons for other items, such as "My Computer," you'll have to purchase special software, or use the Registry Editor to make changes within the Registry—an intricate operation.

"[To change icons]...run REGEDIT.EXE, the Windows 95 Registry Editor. Then click Edit, Find, and type in the name of the object you wish to change, such as My Computer. Under the HKEY_CLASSES_ROOT folder, in the CLSID subfolder, the Find operation should highlight 'My Computer' in the right pane of REGEDIT.

"The left pane should show an opened folder with a long, four-part hexadecimal number within curly braces. Click the plus sign to the left of this number. Highlight the folder named Default Icon. Right-click the word Default, then click Modify. You can now type in the name of any icon file, followed by the number of the position within the file of the icon you want (the first icon is 0, and so on). Exit REGEDIT and restart Windows."

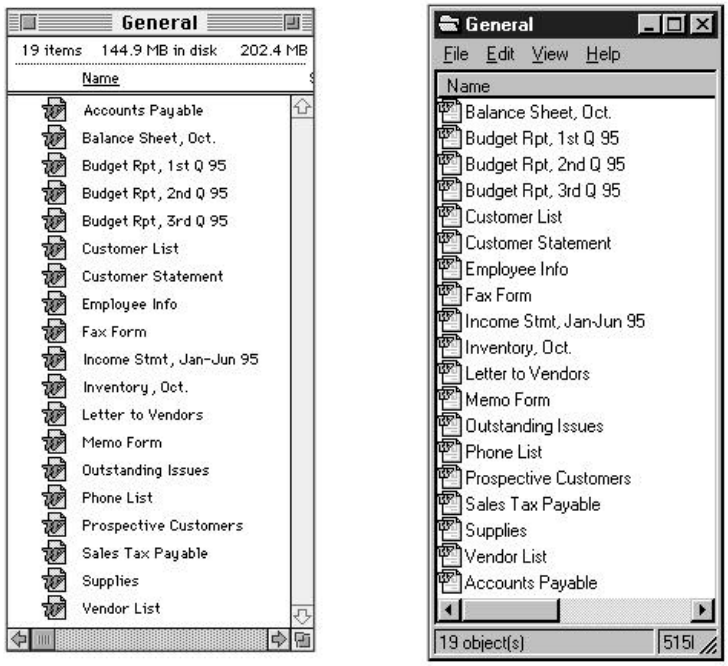
—*InfoWorld,* October 30, 1995

In addition, dragging and dropping is probably the easiest way to move or copy files on the Macintosh. But Windows 95 has inconsistent rules for this feature. For example, you can't drag files onto "My Computer," into the Control Panel folder, or into the Printers folder. On the Macintosh, you can drag files into any folder.

24 Macintosh re-sorts folders when you add a new item; Windows 95 doesn't

When you add a new file to a Macintosh folder, the Mac OS automatically knows where to put the new file in the list. For example, if you are viewing a list in "Last Modified" mode, the newest file instantly appears at the top of the list. In Windows 95, however, the file is always dropped to the bottom of the list (regardless of how the folder is supposed to be sorted), where you may not be able to see it until you refresh the window.

Macintosh **Windows 95**

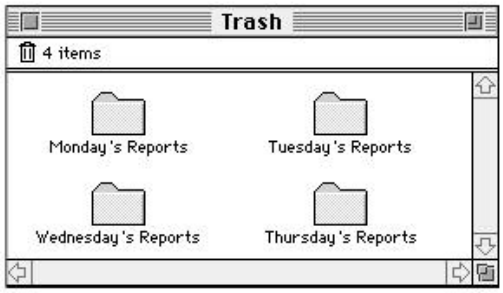


Both of these windows are sorted alphabetically, and we dragged a file called "Accounts Payable" into each. The Macintosh re-sorts automatically, so the file appears at the top of the folder, where it's easy to find.

25 The Macintosh Trash is easier to use

On a Macintosh, you can put any files or folders into the Trash, secure in the knowledge that they'll remain there, in their original condition, until you decide to retrieve them or delete them.

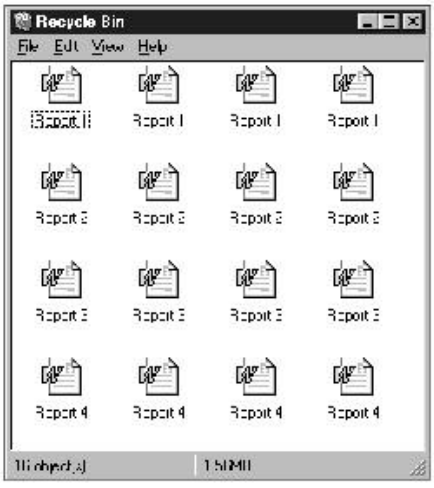
Macintosh



The Mac OS keeps files and folders in their original condition in the Trash. If you need any of these items again before they've been deleted, they're easy to retrieve.

When you put files or folders into the Windows 95 Recycle Bin, however, that's not the case. All the folders vanish, leaving only their files in the Recycle Bin. For example, say you "Recycle" four folders at the same time, each containing several files with similar names. Later, you need to recover one of the folders and the specific files it contained. You may not remember which files were in which folder, and the folders aren't there. Here's what you'll see in the Windows 95 Recycle Bin.

Windows 95



Windows 95 folders vanish when you put them into the Recycle Bin. This makes it difficult to recover the file you need in its original folder.

If you need to use any of these files again and want the original folder, you'll have to select the item you want, then select Restore.

In addition, if you drag items from a floppy disk to the Recycle Bin, you'll see them "flying" to the Recycle Bin. But they are being deleted, not moved to the Bin. You will not be able to recover these items.

26 Easier security and customization with the Macintosh

Apple's At Ease software, which comes with many Macintosh computers, is a security program that protects important applications and documents in a shared environment against unauthorized users and unauthorized configuration changes. At Ease also includes a choice of customizable, simplified interfaces with powerful features that make the computer easier for users of any age and experience level.

Unlike Windows 95, At Ease lets you easily match the user interface to each person's age and level of computer experience. The At Ease shell has large one-click buttons to make it easy for children to access files and applications. Talking buttons are also available for those just learning to read. And each person's files are in a single folder so they can easily organize their own documents. With At Ease, it's a simple matter to authorize access to specific programs and files, protect system settings, and assign passwords.

Menus let you quickly designate which desktop each person will use. You can easily control each user's ability to open, delete, copy, or rename specific files. You can also assign passwords to each user. At Ease can control where documents are saved, and can even limit saving to only floppy disks.

27 Macintosh has easier access to alternate character sets

Many users want easy access to characters that aren't available on a standard keyboard, such as bullets (•) and trademark symbols (™ and ®). It's much easier to produce these characters on a Macintosh. For example, take a look at what's required to insert a "special" character on both types of systems:

Inserting the √ character into a file from any application

The Easy Way: Macintosh	The Hard Way: Windows 95
1. Press Option and V.	1. Select Wingdings font. 2. Press ALT, and type 0252 (you MUST type the numbers on numeric keypad, NOT on upper numeric keys.) 3. Change font back to previous or desired font choice.

You can type characters with accents, special symbols, and intelligent script in two keypresses or less in most Macintosh applications. Also worth noting is that special characters are much less generally available across multiple fonts in Windows 95 than is the case with Macintosh. For example, nearly all Macintosh fonts include "√" and many other useful special characters that are likely to be found only in the Wingdings font on PCs running Windows 95.

POWER

Ask any expert in the industry for advice about purchasing a computer, and the recommendation you'll get is to buy a computer with all the power you can afford—because even if you don't need all that power today, you'll want it soon. Without doubt, the most powerful mainstream personal computer you can buy today is the Macintosh.

- Today's Power Macintosh computers, with their RISC-based PowerPC processors, are the fastest mainstream personal computers in the world. According to many studies, they are significantly faster than Pentium processor–based PCs—even if the PCs have identical clock speeds and the same amount of RAM and cache.
- Thousands of 32-bit applications are available today for Macintosh systems. The vast majority of applications used in the PC world are still based on older, slower, 16-bit technology. To take advantage of the Pentium processor's capabilities, you'd have to buy new 32-bit applications—assuming they were available.
- The Macintosh has a built-in scripting language that makes users more productive. A PC running Windows 95 does not.
- Today's Power Macintosh computers come with many powerful built-in features that cost extra to add to most PCs running Windows 95.

28 Macintosh computers are faster

"The [Power Macintosh 9500] 120-MHz beta unit we tested was so damn speedy we were forced to revamp our suite of benchmarks to accommodate it."

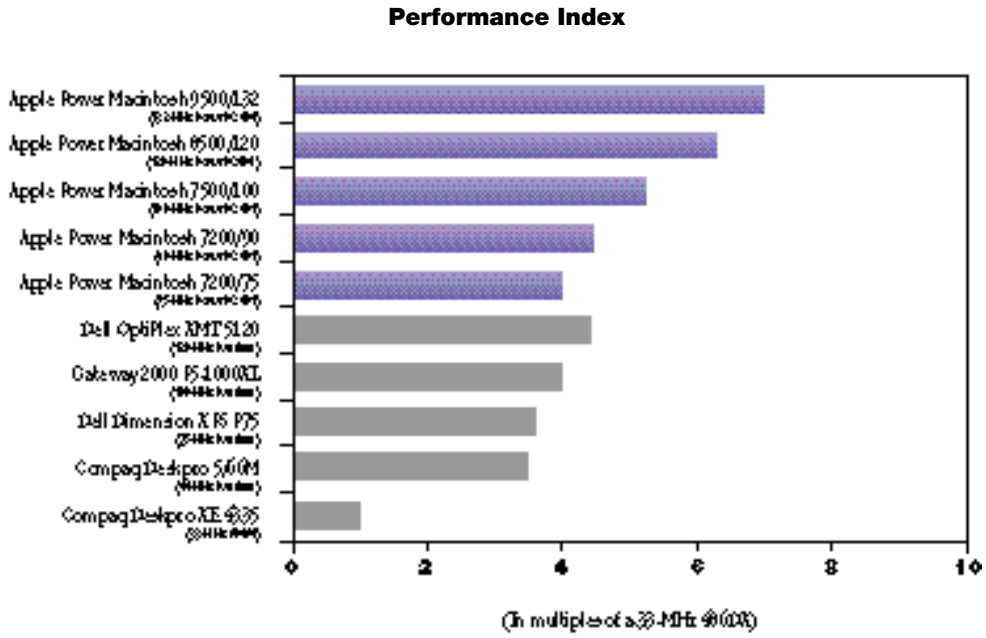
—InfoWorld, June 19, 1995

"And in most lab tests, software running on a PowerPC runs substantially faster than on a Pentium-based machine, making the decision to use a Mac a no-brainer...."

—MacHome Journal, January 1995

Independent tests prove that today's Power Macintosh computers, based on the PowerPC processor, outperform comparable machines based on the Intel Pentium processor.

In a benchmark test conducted in June 1995 using 10 applications available for both Macintosh and Windows 3.1 systems, the 120-megahertz Power Macintosh 9500/120 was, on average, 51 percent faster than a 120-megahertz Pentium processor–based PC. The 132-megahertz Power Macintosh 9500/132 was 80 percent faster when running scientific and engineering applications, and 102 percent faster when running graphics and publishing applications.



(Source: Competitive Assessment Services, July 1995)

An independent benchmark study showed that Power Macintosh computers are the fastest mainstream personal computers in the world, surpassing computers based on the Pentium processor by as much as 102 percent.

Tests by *BYTE* magazine showed similar results. In October 1995, *BYTE* editors wrote, "Running BYTE's Native Performance Benchmark at similar clock speeds, the [132-MHz Power Mac 9500]'s integer performance is 87 percent faster than that of a 133-MHz Pentium machine, and floating-point performance is 72 percent faster." (Source: *BYTE,* October 1995, Copyright ©1995 by The McGraw-Hill Companies, Inc.)

Why do these Macintosh systems beat the PCs by such a wide margin? Two reasons: the tight integration of the Macintosh hardware and software, and the RISC (Reduced Instruction Set Computing) processors used in Power Macintosh computers. RISC is the architecture used in the processors of today's high-performance workstations, servers, and supercomputers. In 1994, Apple brought the power of RISC to mainstream computer users with RISC-based Power Macintosh computers. PCs based on Intel's processors, meanwhile, remain tied to the CISC (Complex Instruction Set Computing) architecture, which has been in use for more than 20 years.

29 The Macintosh speed advantage will increase

"Industry experts and analysts agree: In the microprocessor war, Intel has lost the price/performance battle to RISC."

—BYTE, April 1994, Copyright ©1994 by The McGraw-Hill Companies, Inc.

The PowerPC processor in Power Macintosh computers is at the beginning of its life cycle, and will keep getting faster for a relatively low cost. Apple is moving ahead to future versions of the PowerPC chip, and has already shipped PowerBook and Power Macintosh computers based on the second generation of PowerPC chips (the PowerPC 603 and PowerPC 604). In contrast, CISC processors such as the Pentium are nearing the end of their life cycle, and making them faster is very expensive. Intel's announcement of the Pentium Pro (formerly known as P6), a complex two-chip processor that follows the Pentium, demonstrates how expensive it is to increase CISC performance. The Pentium Pro processor requires 50 percent more transistors than the PowerPC 604, which will make it much more expensive.

To make matters worse, users of Windows 95 may well find that the added cost of the Pentium Pro doesn't bring any major advantages in performance, because the Pentium Pro is designed to run fully 32-bit operating systems, and Windows 95 does not fit that bill. In fact, according to some reports, the Pentium Pro actually appears to run slower with 16-bit code than the original Pentium processor. As *BYTE* put it, "BYTE's cross-platform BYTEmark CPU and FPU benchmarks confirm that a 90-MHz Pentium outperforms a 150-MHz Pentium Pro-based system running 16-bit code." (Source: *BYTE,* October 1995, Copyright ©1995 by The McGraw-Hill Companies, Inc.)

30 Macintosh offers 32-bit computing today; PCs don't

Macintosh has already made the transition to a 32-bit operating system and RISC processors, and thousands of 32-bit applications are available today for Macintosh computers. What will it take for the Intel and Windows world to reach the same point? Let's see.

On the hardware side, small quantities of Intel's Pentium Pro processor were slated to ship sometime in late 1995, with the same sort of price and availability problems that the original Pentium processor had when it was first launched. After that, the picture becomes less clear. Intel has hinted at two different next-generation chips—one called the P7, the other sometimes referred to as the HP/Intel Processor, which is supposed to deliver the first rendition of the advanced VLIW (very long instruction word) architecture. However, as of the date of this publication, Intel has not indicated which chip will ship first, or indeed, when either chip will ship at all.

On the software side, the path to a true 32-bit platform is even more confusing for PCs running Windows. Windows 95 is the solution for now, but the migrating to it can be expensive. According to *The New York Times,* "fewer than 40 percent of the PCs currently in use in homes or business meet the technical requirements for Windows 95"—a 486-series processor and a minimum of 8MB of RAM. (Source: *The New York Times,* July 1995, Copyright ©1995 by The New York Times Company. Reprinted with permission.) META Group estimates that the average cost of migration to Windows 95 and Windows 95 applications is $1,462 per user. (Source: META Group, August 28, 1995) And a report released by Microsoft indicates that of an estimated 2,500 applications for Windows 3.1 and MS-DOS 6.2, about one-third have some sort of incompatibility with Windows 95.

In addition, the journey isn't over with Windows 95. Just as customers finish their evaluation of Windows 95, they'll need to consider migrating to Windows NT, because Windows 95 is not a fully 32-bit operating system and so will not capitalize on the power of new processors. There will be pitfalls on the path to Windows NT, too. For example, Windows NT doesn't support all of the same software or the Plug and Play architecture that Windows 95 does. After that, the next migration will apparently be to Microsoft's object-oriented "Cairo" system, with even more upgrade costs and compatibility issues.

31 With the RISC-based platform, Macintosh computers are better equipped to run more powerful applications

The extra power of the PowerPC processor is enabling software developers to create great new products that simply weren't possible before. As a result, the Macintosh has gained a clear lead over PCs in terms of powerful applications—from three-dimensional rendering to flight simulators to speech recognition. The speed of the PowerPC processor also gives Macintosh computers a performance advantage in digital video, component software, and software emulators. Three examples of the Macintosh advantage in software appear below:

- **Home entertainment.** More than 70 unique home entertainment titles are currently available that run only on the Macintosh. Two popular examples are F/A-18 Hornet 2.0 flight simulator by Graphic Simulations and Marathon, a three-dimensional action game by Bungie Software. Even when games are available for both platforms, they are often more engaging on Macintosh systems because of their high-resolution graphics, stereo sound, and more realistic physical modeling. And the built-in networking of the Macintosh makes it easy for multiple players to join in the same game.

"...PCs can only dream of a time when they'll be as easy to hook together as Macs have been for years."

—Electronic Entertainment, May 1995

"...the images of ships shown during Dark Forces' mission-loading screens become razor-sharp on the Mac. And gamers lucky enough to own a Power Mac can view all the Dark Forces action in high-resolution graphics. Similarly, Doom II on the Mac makes it a bit easier to discern enemies from long distances."

—Electronic Entertainment, September 1995

- **Scientific computing.** Mathematica from Wolfram Research is one of the premier programs for solving complex mathematical equations and then graphing the results in three dimensions. It is used heavily by engineers, scientists, educators, and students, and is available in versions that run on Macintosh, PCs with Windows, and many different brands of workstations. Mathematica uses a lot of computing power, and its users actively benchmark it on different computer systems and share their results on the Internet. In the findings Apple has seen, Power Macintosh computers generally produced results comparable to those of computer workstations costing thousands of dollars more, and Power Macintosh systems easily outperformed PCs running Windows.
- **Graphics and multimedia.** The speed of Power Macintosh computers also makes it possible to bring workstation-style graphics and multimedia capabilities to the personal computer for the first time. Just as desktop publishing evolved from a workstation-level task to something anyone could do, advanced multimedia and three-dimensional graphics are likely to become commonplace capabilities that can help anyone communicate more effectively. More than 150 multimedia and graphics programs are available that run exclusively on the Macintosh platform. One good example is Strata's StudioPro, a very powerful two- and three-dimensional drawing and animation program. Its features include raytracing, antialiasing, morphing, and Hollywood-style special effects.

32 Macintosh has integrated scripting

"End-user automation in Windows lags far behind that in OS/2 and the Mac OS. And it'll get worse before it gets better.... Mac power users, meanwhile, have AppleScript built into System 7.5. Even the Finder can now be scripted using AppleScript. Many third-party vendors (including Microsoft) are creating AppleScript-aware programs that use the language to automate tasks."

—*WINDOWS Magazine,* June 1, 1995, Copyright © by CMP Publications, Inc., 600 Community Drive, Manhasset, NY 11030. Reprinted from *WINDOWS Magazine* with permission.

A big part of the next generation of personal computing is end-user automation—giving users the ability to program their computers and automate tasks using plain English and point-and-click commands. AppleScript—the built-in, systemwide scripting capability of the Mac OS—allows users to automate routine and highly complex tasks, giving them extremely powerful ways to extend and customize the features of the Macintosh.

For example, you can write a script that backs up your hard disk onto a server every night, or imports information directly into a database. You can execute Windows commands using AppleScript and SoftWindows software. You can also combine AppleScript solutions with the built-in Apple Guide active help system, to help other users work through your AppleScript solution, step by step. The Mac OS also ships with a set of AppleScript examples that transform multiple-step procedures (such as turning on file sharing) into single-step commands.

Windows 95 does not include systemwide scripting.

33 Macintosh computers include features that cost extra on PCs

"Apple can now brag that it has high-speed computers in the low range that are less expensive than most of the competition. The low-end Power Mac 7200 model, equipped with a 75-megahertz PowerPC chip and multimedia gear, is priced at $1,699, about $100 to $300 below comparably configured computers from International Business Machines Corp. and Hewlett-Packard Co."

—*The Wall Street Journal,* August 7, 1995, Copyright ©1995 by The Wall Street Journal.

It's a common belief that PCs cost less than Macintosh computers. But while some PC clones offer a lower "base price" than Macintosh computers, a feature-by-feature comparison shows that Macintosh computers provide the better overall value. That's because Macintosh computers include many key features that either cost extra or simply aren't available with most PCs.

Built-in features on a Power Macintosh 7500/100 that aren't included in an average Pentium processor–based PC

What it is...	What it allows you to do...	What it would cost to add to a PC running Windows 95...
Ethernet networking	Connect your computer to an Ethernet network.	$94.95[3]
SCSI expansion port	Add up to seven peripherals without opening the cover.	$89.95[4]
AppleScript scripting	Automate tasks.	$99.95[5]
Apple Desktop Bus (ADB) port	Daisy-chain a keyboard, a mouse, a drawing tablet, and other input devices, and use them all interchangeably.	Not available
Speech recognition and synthesis	Operate your computer through spoken commands, and have your computer read text aloud.	$249.99[6]
Video-input port	Capture video clips on your Macintosh.	$429.95[7]
Videoconferencing	See and hear colleagues in remote locations through a video window on screen; work with colleagues on the same document at the same time.	$999.00[8]
TOTAL		$1,963.79

You'd need to spend almost $2,000 to equip the average Pentium processor–based PC with just some of the features that are already built into this popular Power Macintosh system.

And remember: These cost figures don't include the time spent installing and troubleshooting the additional products required by the PC. Since these extra features are already built into the Macintosh, there's no additional installation or configuration required.

Your prices may vary. Apple attempted to find typical U.S. street prices, and these prices were verified by a third-party analyst.

3. Intel EtherExpress PRO adapter card. (Price as of November 1995, from DataComm Warehouse)
4. SIIG SCSI Pro adapter card. (Price as of November 1995, from MicroSystems Warehouse)
5. Microsoft Visual Basic 3.0, Standard version. (Price as of November 1995, from DataComm Warehouse)
6. Creative Labs kit: Text Assist, Voice Assist, AWE 32 16-bit PnP IDE sound card. (Price as of November 1995, from Software Etc.)
7. Intel Smart Video Recorder card. (Price as of November 1995, from PC Connection)
8. Intel ProShare 1.8 System 150. Note: As of November 1995, this product does not support Windows 95, and no other videoconferencing product is available for Windows 95. ProShare includes a camera, which the Power Macintosh 7500 does not include, so we have subtracted $400 (the approximate value of the camera) from the actual $1,399 price. (Price as of November 1995, from RCS [Rockwell])

ADVANCED MULTIMEDIA

34 Macintosh is the world's most popular platform for multimedia

Most multimedia developers create their applications on a Macintosh. According to one research company, Apple's Macintosh is the leading development platform for multimedia CD-ROM titles by a 72-percent-to-28-percent margin. (Source: *GISTICS,* 1995) As a recent article in the *San Francisco Examiner* puts it, "Walk into any newsroom, desktop publishing center, design studio, or online service office, and nine times out of 10 you will see a wall of Macs." (Source: *The San Francisco Examiner,* June 28, 1995)

There are two main reasons why experts choose the Macintosh for multimedia. First, Macintosh hardware and software is more tightly integrated than PCs running Windows 95, making multimedia applications easier to run. And second, the PowerPC processor is better equipped than the Pentium or x86 processor to meet the demands of multimedia applications.

"Although the Mac has obvious appeal to the computer novice, the people who really understand computers also tend to prefer Macs. At the recent Electronic Entertainment Expo in Los Angeles, most of the new, unfinished multimedia computer software—even software destined for PCs—was demonstrated on Macs rather than PCs."

—The Seattle Times, June 18, 1995, Copyright ©1995 by Cary Lu.

"...growing numbers of American consumers, lured into the home-computer marketplace by inflated claims to 'ease of use,' are learning: Getting a Windows PC to work with sound and video can be a source of infinite technical headaches. If you are shopping for a home computer because you want to 'join the multimedia revolution,' there is only one sensible choice: Get a Mac."

—The San Francisco Examiner, June 28, 1995

35 It's easier to add CD-ROM drives to a Macintosh system

"To enjoy all of its benefits, Plug and Play must be supported by the PC's BIOS software, its operating system, and all its peripherals—that's just about a whole new computer. And even then, it only prevents obvious hardware conflicts, combinations of device settings that aren't supposed to work. It can't stop the more subtle and mysterious incompatibilities that really give us fits, the times when all the ports and channels are set correctly and the system should work, but it locks up or crashes anyway."

— CD-ROM Today, February 1995

Most computers today, Macintosh and PC alike, ship with a built-in CD-ROM drive. But many users want to upgrade their CD-ROM drives as faster ones become available. Macintosh makes it much easier to do this—even compared with a PC that supports Windows 95 Plug and Play.

Upgrading to a faster CD-ROM drive

The Easy Way: Macintosh	The Hard Way: Windows 95
1. Turn off the Macintosh. 2. Plug the new CD-ROM drive into the SCSI port on the Macintosh and a power source. Make sure the drive uses a free SCSI ID number. 3. Turn on the CD-ROM drive and the Macintosh. 4. Load the driver that came with the CD-ROM drive. 5. Restart the Macintosh.	1. Turn off and unplug the computer. 2. Ground yourself to avoid damaging components. 3. Open the computer. 4. Install a SCSI adapter card into an appropriate expansion slot. 5. Plug the SCSI cable into the CD-ROM drive and into the adapter card. 6. Replace the computer's cover and plug in the power cord. Plug in the CD-ROM drive's power cord. 7. Turn on the CD-ROM drive and the computer. 8. In Windows 95, click Start, select Settings, and click Control Panel. 9. Double-click "Add New Hardware." 10. Perform a search for new hardware. This may take several minutes, and could cause your machine to stop responding. If the progress indicator stops for a long time, you will need to restart. 11. When prompted, insert the Windows 95 installation disk and load the appropriate driver. 12. Restart Windows.

36 Installing and using CD-ROM titles is easier with Macintosh computers

"I still happily recommend Macs to new computer users, and I'm considering one for my next home PC. This stems from a recent experience with a multimedia CD-ROM. The CD supposedly was designed to run equally well on the Mac or a Windows machine. Its installation process trashed my Windows video setup, forcing me to reinstall part of Windows itself. I took the CD over to the Mac in the office, where it ran the first time, perfectly."

—The San Jose Mercury News, September 24, 1995

Installing and using CD-ROM titles is easier with Macintosh computers than with PCs running Windows 95. Today's PCs have multiple standards for sound and graphics, and each standard and each piece of hardware requires a different software driver. As a result, PC owners have problems matching the hardware and software in their systems to the hardware and software requirements of different CD-ROM titles, and different titles can run much differently.

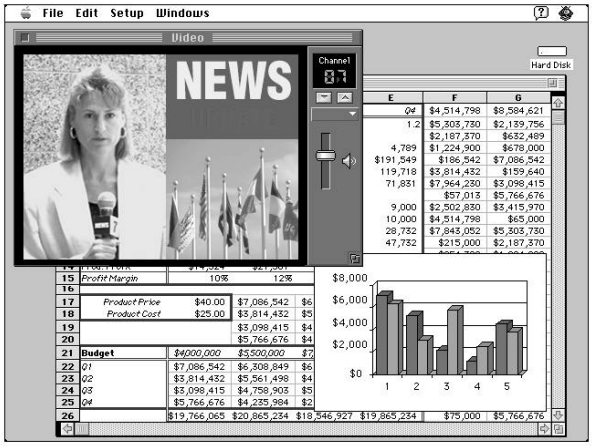
Even when the hardware works, software problems can easily arise. Among the CD-ROM programs tested by Microsoft that had problems on Windows 95 were versions of popular titles such as The 7th Guest, Dark Forces, Doom II, and Myst. CD-ROM titles written for DOS often require the PC to be restarted into a special "MS-DOS mode" before they can be run. And any program for Windows 95 that is running at the time must be stopped and relaunched after restarting Windows 95. Examples of such titles include NBA Live '95 and Rebel Assault 1.4. Titles written for Windows 3.1 don't take advantage of the capabilities of Windows 95 and often require special configuration. And very few titles for Windows 95 are available; none of the current Top 10 CD-ROM titles (as of this publication date) are written specifically for Windows 95.

In contrast, CD-ROM titles for Macintosh are easier to install and use. Macintosh computers have a single, built-in standard for sound and graphics, so no special drivers are required. And Macintosh was the first home computer to include built-in MPEG hardware playback for full-screen, full-motion video. Top titles such as Dark Forces, Flying Nightmares, and Doom II have faster play or higher resolution when run on the Macintosh. And titles such as WiggleWorks and Star Trek Omnipedia, shipping today, take advantage of such advanced Macintosh features as text-to-speech capabilities, speech recognition, and QuickTime VR (virtual-reality software).

37 Recording and playing back desktop video works better on Macintosh

On a PC running Windows 95, setting up and using desktop video is difficult. PCs don't ordinarily ship with video connectors for hooking up a camcorder or VCR, so it's up to the user to open the computer case, install a card, configure the software, and test the system. Since few PC peripherals adhere to the Plug and Play standard, the well-known difficulties of installing and configuring PC hardware remain. As of this publication, none of the popular video card add-ons included Windows 95 drivers.

On the Macintosh, built-in video connectors are optional on most models and standard on some. More advanced video options are readily available and can be installed without the need to configure software or change DIP switches. For example, there's no easier video-out solution than is offered by the Power Macintosh 8500/120—just connect a cable. This functionality makes "printing" to videotape as easy as printing to a laser printer. In K–12 schools in the United States, where Apple has more than 60 percent market share (Source: Dataquest, 1995), students are using Macintosh today to record video, integrate it into multimedia presentations and productions, and save their work to videotape.



"Everything you need for basic desktop video production is built into the new Power Macintosh: speech recognition ("Computer, do this," just like on Star Trek*); stereo sound Input and Output ports; S-Video Input and Output ports; a DAV (digital audio-video) connector for monitors with built-in stereo speakers and microphones..."*

—Camcorder Magazine, July 1994

38 Videoconferencing is easier on the Macintosh

Apple's Power Macintosh 7500/100 and 8500/120 computers include nearly everything a user needs to quickly and easily begin videoconferencing—QuickTime Conferencing software, high-speed communications capability, and video/sound input. Users need only connect a video camera to the Macintosh video-in connector.

With Apple's QuickTime Conferencing software, users can call other videoconference participants over their existing local area networks. Users can see multiple participants at once, take snapshots during sessions, record sessions, and work together on a shared document.

Compare this simplicity and power with videoconferencing products in the Windows 95 world, where users must still purchase expensive add-on cards and software totaling $1,400 or more, and deal with the complexities of integrating the hardware and software themselves.

39 Macintosh computers provide better representations of color on screen, and a better match between screen images and printed output

Apple's ColorSync technology ensures that you have consistent color from input to monitor to output device. Compare this technology with the maze of competing color standards on the PC side. Apple is also leading the way in output technologies with PhotoGrade and FinePrint, which help to ensure that your printed output of photos and text look as close to the original as possible.

40 It's easier to cut and paste multimedia data on a Macintosh

Every Macintosh sold today includes the multimedia Scrapbook, a program you can use to store text, graphics, sounds, three-dimensional objects, and video. And retrieving items stored in the Scrapbook is as easy as dragging them to a document, the desktop, a folder, or a disk.

Because Windows 95 doesn't have an equivalent to the Macintosh Scrapbook, you first have to find an application that can accept the kind of data—sound, video, graphics, text—you're working with. This makes cutting and pasting multimedia data more difficult.

41 Macintosh is ahead of Windows 95 in speech capabilities

Apple's competitors tout their platform's future speech capabilities. Someday, they say, you'll tell your computer what to do, and it will obey. Or you will receive a message, and your computer will read it for you. That future is available today with the processing power of RISC-based Power Macintosh computers and Apple's PlainTalk speech-recognition and speech-synthesis software.

Speech recognition. With PlainTalk, you can open any Macintosh document or application by speaking its name. Just move an alias of the item into the Speakable Items folder, and the built-in PlainTalk and Speakable Items technologies take care of the rest. For example, a user who wants to check her stock portfolio without opening several folders and launching an application can just say "check stocks," and the Macintosh will execute the necessary commands. Speakable items can also be AppleScript files, so users can execute an almost unlimited series of actions—including copying files, cleaning up the desktop, and so on—simply by speaking a command.

By comparison, Windows 95 does not have built-in speech recognition. And much of the third-party speech-recognition software that is available for the Windows 95 platform requires dedicated hardware support, is poorly integrated with the overall computer system, and must be trained repeatedly to eliminate "misfires" (when the computer mistakes a background noise for a command). Macintosh speech-recognition technology can recognize virtually any English-speaking voice, even those with an accent, and includes features that nearly eliminate misfires.

Speech synthesis. Apple's speech-synthesis software allows your computer to read text aloud as it appears on screen. You can select from 22 reading voices, ranging from serious business tone to the sounds of robots and people speaking underwater, and decide whether you want higher speech quality or smaller memory usage. A good example of the power of speech synthesis is Scholastic's WiggleWorks for the Macintosh, a series of "electronic books" for beginning readers, which not only read stories aloud to children, but can even read aloud sentences and stories children write themselves. Apple is now providing text-to-speech capabilities for Latin American Spanish, and is working to add other languages, including Chinese, French, Italian, and Japanese.

By comparison, Windows 95 does not have built-in speech synthesis.

42 Macintosh is much better at handling three-dimensional graphics

To work effectively with three-dimensional graphics, you need a powerful processor that can handle images of tens or hundreds of megabytes in size. You'll also need advanced software to make three-dimensional graphics intuitive and available systemwide. The only personal computer that offers both those capabilities today is the Power Macintosh—with the PowerPC processor and QuickDraw 3D software.

QuickDraw 3D is an application programming interface (API) for creating and rendering workstation-class three-dimensional graphics in real time. Developers can use QuickDraw 3D to integrate three-dimensional rendering capabilities into existing or new software programs. QuickDraw 3D includes a human interface that makes it easy and intuitive to draw and edit three-dimensional graphics, and software tools for drawing three-dimensional objects (including high-end features such as shading, texture mapping, and lighting effects). QuickDraw 3D also includes a cross-platform file format, so users can share three-dimensional drawings, and has an open architecture that lets Apple and others accelerate its performance.

Windows 95 by itself does not include integrated three-dimensional graphics capabilities. QuickDraw 3D will be available in a version for the Windows platform in the future. However, because the technology has been designed to take advantage of the extra performance of the RISC-based PowerPC processor, QuickDraw 3D will be faster on the Macintosh.

43 Virtual-reality software is more realistic on the Macintosh

QuickTime VR, Apple's virtual-reality software, offers users superior speed and smoothness on the Macintosh, thanks to the powerful RISC architecture. QuickTime VR lets personal computers display 360-degree panoramic movies. Users can move forward and backward through the images, pan left to right and up and down, and select objects for close-up 360-degree views. The images can be either photographs taken with a standard 35-mm camera or computer-generated images.

Panoramic movies made with QuickTime VR use as little as 150 kilobytes of storage space. That means thousands of panoramas can fit on a single CD-ROM, providing developers with the opportunity to create a rich and realistic three-dimensional user experience. And all of these capabilities are available on the Macintosh without the need to purchase add-on hardware or graphics accelerator cards.

Although QuickTime VR runs on both Macintosh computers and PCs running Windows 95, it is enhanced to take advantage of the higher performance of the PowerPC processor in Macintosh systems. Apple's in-house testing shows that users can get smoother, more realistic motion from Power Macintosh computers than from Pentium processor–based computers. Microsoft has demonstrated software for Windows 95 that it says will be similar to QuickTime VR, but it was not available as of the date of this publication, and no shipment date has been announced. In addition, it may require special, expensive, panoramic cameras.

44 Macintosh computers provide more sophisticated type and graphics capabilities

Macintosh computers have always been the systems of choice for publishing professionals, and Apple is extending its lead in this arena with QuickDraw GX—a drawing environment that provides advanced graphics and text capabilities.

QuickDraw GX provides a richer drawing environment than Windows 95, and handles type fonts, even those for character-based languages such as Cyrillic and Chinese, much more flexibly. For example, QuickDraw GX provides scale, skew, and perspective functions, which are not included in Windows 95, as well as the ability to mix colors on the screen in real time by overlaying objects of different colors. The technology also automatically produces ligatures and other advanced typographical elements, and supports international script systems and reading directions (right to left, left to right, vertical, above and below a baseline, and so on). In addition, QuickDraw GX allows you to run printing extensions that modify a print job beyond what the application does. For example, a printing extension can add a custom watermark to each page or provide password protection for a document.

Windows 95 does not have equivalent functionality. Microsoft's closest answer to QuickDraw GX is a font format called TrueType Open, which allows the creation of fonts with ligatures and other advanced characters. But while QuickDraw GX actually provides new functionality for end users and developers alike, TrueType Open is simply a specification for a font format. That means developers have to write their own display technology in order to use the fonts—the programming equivalent of selling someone a sack of flour instead of a chocolate cake.

COMPATIBILITY

45 You can buy a Macintosh and still be compatible with MS-DOS 6.2, Windows 3.1, and Windows 95

"Overall, the DOS Compatible Power Mac makes a superb PC, especially with a Mac wrapped around it to handle the messy details of attaching peripherals."

—*BYTE,* April 1995, Copyright © 1995 by The McGraw-Hill Companies, Inc.

"If you're splitting your time between a Mac and PC, Apple's new Power Macintosh 6100 DOS Compatible can save you money and desk space, with no performance trade-offs on either side."

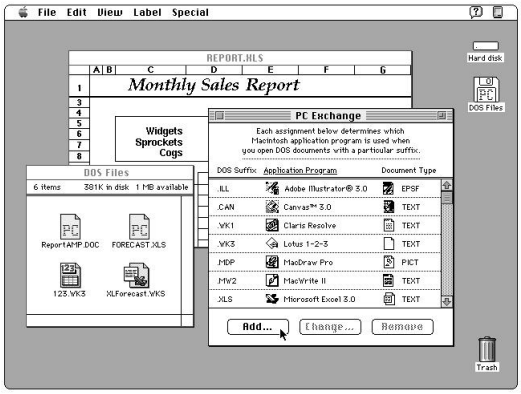
—Reprinted from *PC Computing,* April 13, 1995, Copyright ©1995 Ziff-Davis Publishing Company.

The most compatible mainstream personal computer on the market today is a Power Macintosh 6100/66 DOS Compatible, because it's the only one set up to run software for MS-DOS, Windows, and the Mac OS.

Apple's cross-platform Macintosh personal computers let you keep your options open to choose the software you need—whether you're learning, working, or playing. These systems are unmatched in the versatility they provide by running more software than any other mainstream personal computer.

46 You can work with Windows 95 files on your Macintosh

With Macintosh System 7.5 software, every Macintosh sold today has the ability to read from and write to PC disks. In addition, file translators are available for most popular PC file formats. And Macintosh Easy Open, which is included in System 7.5, even suggests which of your Macintosh applications to use when opening unknown files. That means you can place DOS and Windows 95 files on a floppy disk, insert the disk into your Macintosh, and work on the same documents. And if you need an extra floppy disk to take your data back to the PC, you can use your Macintosh to format PC-compatible disks.



Many popular Macintosh applications also give you the ability to save data in a format used by the Windows version of the application. Here are just a few examples:

- Adobe Illustrator
- Adobe PageMaker
- Adobe Photoshop
- Adobe Premiere
- Claris FileMaker Pro
- ClarisWorks
- Microsoft Bookshelf
- Microsoft Creative Writer
- Microsoft Encarta
- Microsoft Excel
- Microsoft Fine Artist
- Microsoft FoxPro
- Microsoft PowerPoint
- Microsoft Project
- Microsoft Word
- Microsoft Works
- Novell WordPerfect
- QuarkXPress

47 You can run applications for the Mac OS, MS-DOS 6.2, and Windows 95 on a Macintosh

"...Apple has once again pushed closer to the Holy Grail of computing, a single machine that can operate DOS, Windows, and Macintosh programs."

—The New York Times, February 21, 1995, Copyright ©1995 by The New York Times Company. Reprinted by permission.

"With the Power Macintosh 6100/66 DOS Compatible, Apple Computer broadens the appeal of the Mac platform beyond the company's traditional user base....

"Apple's integration between the system's PC and Mac personalities comes across so well it is as if they were two sides of a coin. Switching between DOS/Windows and Mac programs requires just one hotkey combination, and you can cut and paste between Mac and Windows applications....

"If you're straddling the platform fence, unable to decide between DOS/Windows and Mac operating systems—or if you need access to both—you'll find that the Power Macintosh 6100/66 DOS Compatible is a compelling hybrid."

—Reprinted from *PC Magazine,* April 11, 1995, Copyright ©1995 Ziff-Davis Publishing Company.

A variety of hardware and software products allow Macintosh users to run applications written for DOS and Windows. These include hardware add-in boards and bundled systems from Apple, Reply Corporation, and Orange Micro, as well as software emulators from Insignia Solutions.

These products make it possible for a Macintosh to run more software than any other mainstream personal computer. They let people buy the most advanced personal computer—a Macintosh—without giving up anything else.

48 Macintosh computers are compatible with applications for Windows 3.1 and Windows 95

Of the 2,500 applications that Microsoft has tested, about one-third have displayed some incompatibilities with Windows 95, and of these, an unspecified number won't run under Windows 95 at all. The Macintosh computer alleviates that problem for users who want to run those applications, because the DOS Compatibility Card (which is available for many Macintosh models) allows you to run both Windows 3.1 and Windows 95 sessions on your Macintosh. That means you can choose the operating system you need to run the application you want to use.

49 You can connect a Macintosh computer to virtually any network

Macintosh computers can be connected to virtually any computer network system or host computer environment, often adding significant value and ease of use over other access methods. Novell NetWare and Windows NT Server support the Macintosh platform and are often popular methods for sharing information between Macintosh computers and PCs. Apple provides a range of options for connecting with networks supporting IBM's SNA, Digital Equipment Corporation's DECnet, Novell's IPX, and the TCP/IP and OSI protocols.

CONCLUSION

"Indeed, it would not be an exaggeration to describe the history of the computer industry for the past decade as a massive effort to keep up with Apple...(the Mac) went on to pioneer or popularize almost every innovation in personal computing."

—BYTE, December 1994, Copyright © 1994 by The McGraw-Hill Companies, Inc.

"Within the computer industry, the description, 'more like a Macintosh' is always high praise. The description 'more like Windows' is rarely used as praise."

—The Seattle Times, June 18, 1995, Copyright ©1995 by Cary Lu.

As we've seen, Macintosh computers have four key advantages over PCs running Windows 95. They're more powerful, easier to use, offer more advanced multimedia capabilities, and are more compatible.

And what do those advantages add up to? An installed base of more than 21 million Macintosh computers worldwide. And a community of Macintosh users who are more satisfied with their computers than users of PCs.

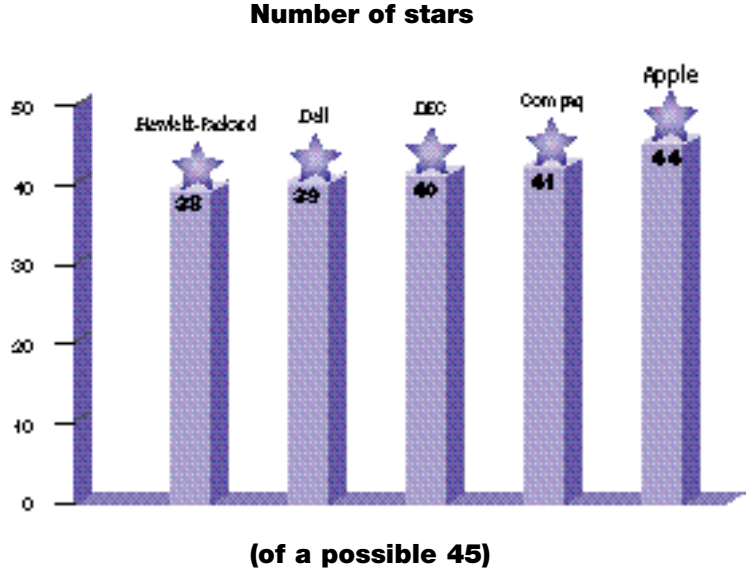
50 Macintosh users are more satisfied with their computers

A recent study by Computer Intelligence InfoCorp of 50,000 computer users shows that Macintosh computers led the PC industry in repeat purchase or brand loyalty ratings. Macintosh computers came in first in all three categories: business users, self-employed users, and home users.

	All users	Employer-provided	Self-employed	Home users
Apple Macintosh	87%	89%	91%	81%
Gateway 2000	85%	88%	71%	80%
Compaq	68%	76%	29%	41%
Dell	68%	70%	64%	56%
Hewlett-Packard	65%	68%	39%	58%

(Source: *Computer Intelligence InfoCorp's Consumer Technology Index,* July 1995)

Another 1995 study, this one by *PC World,* also showed that Macintosh users have the highest repeat purchase intent. "Nine out of ten Apple owners responding said they'd buy another machine from the company based on service received...." (Source: *PC World*, June 1995. Reprinted with the permission of PC World Communications, Inc.) The study covered nine categories, ranging from fewest problems with the logic board to fastest time to resolve a problem and highest overall satisfaction. Apple received five stars—the highest rating—in nearly every category:



(Source: *PC World,* June 1995)

Apple's lead in customer satisfaction is a sign of the quality of the Macintosh computer, and evidence of the strength of Apple's core business. And in the months and years ahead, Apple will be working to extend its leadership, with innovations that make the Macintosh even more powerful and even easier to use. These innovations will include:

- A next-generation operating system, that sets new standards for power, flexibility, and ease of use.
- Component software technology called OpenDoc that allows applications from different developers to work together better.
- A shared hardware design (developed with IBM and Motorola) that allows customers to run any major 32-bit operating system on a single computer.

So as Microsoft continues to work to introduce features that Apple pioneered a decade ago with the Macintosh, Apple is moving to the decade ahead—to define the next generation of personal computing, and to develop a whole new set of Macintosh advantages along the way.