Unit-5  
Mastering DOS and windows

Operating system

* Introduction
* Functions of an operating system
* Types of operating system
* Difference between CUI/TUI and GUI

Already discussed

MS-DOS (Microsoft Disk Operating System)

* Dos means Disk operating system. It is a single user interface. It introduced in 1981(Microsoft & IBM).It is also known as CUI (Character User Interface).It is a text based interface.

In MS-DOS there are two types of commands: **internal** and **external**. Some internal commands are given below.

**EXIT**

This is an internal command. This command quits the command interpreter. For example, **C:\>exit**.

**CLS**

This is an internal command. This command is used to clear the screen. For example, **C:\>cls**.

**CD** or **CHDIR**

This is an internal command. This command is used to display the name of current directory and to change the current directory. Its general form is **cd [drive:] [path]**. For example,

 **C:\windows>cd** displays the name of current directory

 **C:\>cd D:** displays the working directory on D:

 **C:\>cd D:\backup** changes the working directory on D: to backup

 **C:\>cd windows** changes the working directory from C: to windows

 **C:\windows\system32>cd..** changes the current working directory to the parent directory (up one directory level)

 **C:\windows\system32>cd\** changes the current working directory to the root (top level) directory of the current drive.

 **Note:** We can change a drive by using the drive name followed by colon. For example, C :\>D: changes drive from C to D.

**DIR**

This is an internal command. This command displays a list of files and subdirectories in a directory. Its general form is **dir [drive:] [path] [filename] [parameters]**. For example,

 **C:\>dir D:\backup** displays all the files and subdirectories in the backup directory in D drive.

 **C:\>dir** displays all the files and directories in the current directory. In this case, the current directory is called main or **root** directory.

 We can use **/p** parameter with dir command to view the directory one screen at a time. For example, **C:\> dir windows /p** or **C:\windows>dir/p**.

 We can also use **/w** parameter with dir command to view the directory in a wide list format. For example, **C:\windows>dir/w**.

 We can also use both **/p** and **/w** parameters at the same time. For example, **C:\windows>dir/p/w**.

 Use **/s** attribute to view the contents of a specified directory and all subdirectories.

**MD** or **MKDIR**

This is an internal command. This command is used to create a new directory. Its general form is **md [drive:] [path] directoryname(s)**. For example,

 **C:\>md D:\backup** creates a new directory backup in D: drive

 **C:\user>md BBA** creates a new directory BBA in current working directory

**RD** or **RMDIR**

This is an internal command. This command is used to remove (delete) a directory. Its general form is **rd [drive:] [path] directoryname(s)**. For example,

 **C:\>rd D:\backup** deletes backup directory in D: drive if it is empty.

 **C:\user>rd BBA** deletes BBA directory in current working directory if it is empty.

 We can use **/s** parameter to remove all subdirectories and files in the specified directory in addition to the directory itself. For example, **C:\user>rd /s BBA**.

 We can also use **/q** parameter with **/s.** In this case, the system do not ask if ok to remove the directory tree. For example, **C:\user>rd /s/q BBA**.

**COPY CON**

This is an internal command. This command is used to create a file. Its general form is **copy con [drive:] [path] filename**. For example,

 Type **C:\>copy con D:\backup\test.txt**, type some message, press F6 and then enter key. This process creates a file named test.txt in backup directory in D: drive.

 Type **C:\user>copy con best.txt**, type some message, press F6 and then enter key. This process creates a file named best.txt in directory user.

**TYPE**

This is an internal command. This command is used to display the contents of a file. Its general form is **type [drive:] [path] filename**. For example,

 **C:\>type D:\backup\test.txt** displays the contents of the file test.txt in backup directory in D: drive.

 **C:\user>type best.txt** displays the contents of the file best.txt in the directory user.

**MORE**

This is an external command. This command is used to display the contents of a file one screen at a time. Its general form is **more [drive:] [path] filename**. For example,

 **C:\>more D:\backup\test.txt** displays the contents of the file test.txt in backup directory in D: drive one screen at a time.

 **C:\user>more best.txt** displays the contents of the file best.txt in the directory user one screen at a time.

**EDIT**

This is an external command. This command is used to change the contents of existing file. Its general form is **edit [drive:] [path] filename**. For example,

 **C:\>edit D:\backup\test.txt** is used to change the contents of the file test.txt in backup directory in D: drive.

 **C:\user>edit best.txt** is used to change the contents of the file best.txt in the directory user.

 **Note:** After editing, choose **File**  **Save** and **File**  **Exit**.

**DEL** or **ERASE**

This is an internal command. This command is used to delete a file. Its general form is **del [drive:] [path] filename(s)**. For example,

 **C:\>del D:\backup\test.txt** is used to delete the file test.txt in backup directory in D: drive.

 **C:\user>del best.txt** is used to delete the file best.txt in the directory user.

 We can also use directoryname instead of filename(s). In this case, all the files within the directory are deleted.

 We can also use wildcards instead of filename(s). Here \*.\* removes all files, \*.txt removes all files with extension “txt”, and test.\* removes all files with name “test”. For example, **C:\user>del \*.txt** deletes all files with extension “txt” in the user directory in C: drive.

**REN** or **RENAME**

This is an internal command. This command is used to rename files and directories. Its general form is **ren [drive:] [path] filename1 filename2**. For example,

 **C:\>ren D:\backup\test.txt best.txt** is used to rename the file test.txt in backup directory in D: drive to bext.txt.

 **C:\user>ren test.txt best.txt** is used to rename the file text.txt in the user directory to best.txt.

 We can also rename directories instead of files. For example, **C:\user>ren BBA BCIS** renames BBA directory in the user directory to BCIS.

**COPY**

This is an internal command. This command is used copy one or more files from one directory to another. Its general form is **copy source destination**. For example,

 **C:\user>copy text.txt D:\backup\best.txt** is used to copy the file test.txt from user directory in C: drive to the backup directory in D: drive with its name changed to best.txt.

 **C:\user>copy text.txt D:\backup** is used to copy the file test.txt from user directory in C: drive to the backup directory in D: drive.

 We can also use wildcards instead of filename. Here \*.\* copies all files, \*.txt copies all files with extension “txt”, and test.\* copies all files with name “test”. For example, **C:\user>copy \*.txt D:\backup** copies all files with extension “txt” in the user directory in C: drive to backup directory in D: drive.

**MOVE**

This is an internal command. This command is used move one or more files from one directory to another. Its general form is **move source destination**. For example,

 **C:\user>move text.txt D:\backup\best.txt** is used to move the file test.txt from user directory in C: drive to the backup directory in D: drive with its name changed to best.txt.

 **C:\user>move text.txt D:\backup** is used to move the file test.txt from user directory in C: drive to the backup directory in D: drive.

 We can also use wildcards instead of filename. Here \*.\* moves all files, \*.txt moves all files with extension “txt”, and test.\* moves all files with name “test”. For example, **C:\user>move \*.txt D:\backup** moves all files with extension “txt” in the user directory in C: drive to backup directory in D: drive.

**XCOPY**

This is an external command. This command is used copy files and directory tree. Its general form is **xopy source destination**. For example,

 **C:\>xcopy user D:\backup** is used to copy files and directory tree from user directory in C: drive to the backup directory in D: drive.

 We can use **/s** parameter to copy directories and subdirectories except empty ones and **/e** parameter to copy directories and subdirectories including empty ones. For example, **C:\>xcopy user D:\backup /s** copies files and directory tree from user directory in C: drive to the backup directory in D: drive except empty directories and subdirectories.

**TIME**

This is an internal command. This command is used to display or set the system time. Its general form is **time [/t | time]**. For example,

 **C:\>time** is used to display the current time setting and a prompt for a new one. Press ENTER to keep the same time.

 **C:\>time /t** is used to display the current time, without prompting for a new time.

 **C:\>time 12:25:30** is used to set a time 12:25:30 without prompting.

**DATE**

This is an internal command. This command is used to display or set the system date. Its general form is **date [/t | date]**. For example,

 **C:\>date** is used to display the current date and a prompt for a new one. Press ENTER to keep the same date.

 **C:\>date /t** is used to display the current date, without prompting for a new date.

 **C:\>date 01/03/2010** is used to set a date 01/03/2010 without prompting.

**COLOR**

This is an internal command. This command is used set default console background and foreground colors. Its general form is **color [attributes]**. Attributes are specified by TWO hex digits – the first corresponds to the background and the second the foreground. Each digit can be any of the following values: 0 = Black, 1 = Blue, 2 = Green, 3 = Aqua, 4 = Red, 5 = Purple, 6 33 = Yellow, 7 = White, 8 = Gray, 9 = Light Blue, A = Light Green, B = Light Aqua, C = Light Red, D = Light Purple, E = Light Yellow, F = Bright White. For example,

 **C:\>color 01** produces black background and blue foreground colors.

 **C:\>color** restores the color to what it was when DOS started.

**TITLE**

This is an internal command. This command is used set the window title for the command prompt window. Its general form is **title [string]**. For example,

 **C:\>title Shiva** sets the title Shiva for the command prompt window.

**VER**

This is an internal command. This command displays the windows version. Its general form is **ver**. For example,

 **C:\>ver** displays the windows version.

**VOL**

This is an internal command. This command displays the disk volume label and serial number, if they exist. Its general form is **vol [drive:]**. For example,

 **C:\user>vol** displays disk volume label and serial number of C: drive.

 **C:\>vol D:** displays disk volume label and serial number of D: drive.

**LABEL**

This is an external command. This command is used to display, create, change or delete the volume label of a disk. Its general form is **label [drive:] [label]**. For example,

 **C:\>label** displays disk volume label and serial number of C: drive. We can also create new label and delete existing label.

 **C:\>label D:** displays disk volume label and serial number of D: drive. We can also create new label and delete existing label.

 **C:\>label System** sets the disk volume label of C: drive to System.

 **C:\>label D: Backup** sets the disk volume label of D: drive to Backup.

**ATTRIB**

This is an external command. This command is used to display or change file and directory attributes. Its general form is **attrib [+R | -R] [+A | -A] [+S | -S] [+H | -H] [drive:] [path] filename(s)**. Here, **+** sets an attribute, **-** clears an attribute, **R** is read-only file attribute, **A** is archive attribute, **S** is system attribute, and **H** is hidden attribute. For example,

 **C:\>attrib +H +A D:\backup\test.txt** sets the file attribute of text.txt file in backup directory in D: drive to hidden and achieve.

 **C:\user>attrib -H test.txt** clears hidden attribute of best.txt in user directory.

 We can also use wildcards with **attrib** command. For example, **C:\user>attrib –H \*.txt** clears hidden attribute of all text files in user directory in C: drive.

**HELP**

This is an external command. This command is used to provide help information for DOS commands. Its general form is **help [command]**. For example,

 **C:\>help cd** provides help information for **cd** command.

 **C:\>help** displays a list of DOS commands.

**PROMPT**

This is an internal command. This command is used to change the command prompt. Its general form is **prompt [text]**. Here, text specifies new command prompt. We can also use special codes in place of text. We can use $A for & (ampersand), $B for | (pipe), $C for ( (left parenthesis), $D for current date, $E for escape code, $F for ) (right parenthesis), $G for > (greater than sign), $H for backspace, $L for < (less than sign), $N for current drive, $P for current drive and path, $Q for = (equal sign), $S for space, $T for current time, $V for windows version number, $ for carriage return and linefeed, and $$ for $ (dollar sign). For example,

 **C:\>prompt hello** changes the command prompt to “hello”.

 **C:\>prompt $D** changes the command prompt to current date.

**TREE**

This is an external command. This command graphically displays the directory structure of a drive or path. Its general form is **tree [drive:] [path]**. For example,

 **C:\>tree D:\backup** displays the directory structure of backup directory in D: drive.

 **C:\user>tree** displays the directory structure of user directory in C: drive.

 We can also use **/f** option to display the names of the files in each directory. For example, **C:\user>tree /f** display the directory structure and names of the files of user directory in C: drive.

**CHKDSK**

This is an external command. This command checks a disk and displays a status report. Its general form is **chkdsk [drive:]**. For example,

 **C:\user>chkdsk** checks C: drive and displays status report.

 **C:\user>chkdsk D:** checks D: drive and displays status report.

 We can use **/f** option to fix errors on the disk. For example, **C:\user>chkdsk /f** checks C: drive and fixes errors found.

 We can also use **/r** option to locate bad sectors and recover readable information.

**FORMAT**

This is an external command. This command formats a disk for use with windows. Its general form is **format drive:** For example,

 **C:\user>format D:** formats D: drive.

 We can use **/q** option to perform quick format. For example, **C:\user>format D: /q** performs quick format on D: drive.

 We can use **/fs: filesystem** option to specify the file system to use. For example, **C:\user>format D: /fs: NTFS** to specify NTFS filesystem to D: drive. Other file systems are FAT and FAT32.

 We can use **/v: label** option to specify the volume label. For example, **C:\user>format D: /v: backup** to specify volume label of D: drive to backup.

**SYSTEMINFO**

This is an external command. This command displays information about the computer and operating system of your computer. Its general form is **system info**. For example,

 **C:\user>systeminfo** displays information about your computer system.

**SCANDISK**

This is an external command. This command checks disks for any disk errors. Its general form is **scandisk [drive:] [path] filename**. For example,

 **C:\user>scandisk D:\bakkup\test.txt** checks the file text.txt in backup directory in D: drive for errors.

 **C:\user>scandisk** checks the C: drive for errors.

 We can use **/all** option to check and repair all local drives at once. For example, **C:\user>scandisk /all**.

 We can use **/checkonly** option to check drives for errors but not to make repairs.

 We can use **/autofix** option to fix errors without asking you first.

**DISKCOPY**

This is an external command. This command copies the contents of one floppy disk to another. Its general form is **disk copy [drive1: [drive2:]] [/v]**. **/v** option verifies that the information is copied correctly. For example,

 **C:\user>diskcopy A: B: /v** copies the contents of disk in drive A: to the disk in drive B: and verifies that the information is copied correctly.

 You can specify the dame drive drive1 and drive2. For example **C:\user>diskcopy A: /v** copies the contents of disk in drive A: to the disk in drive A: and verifies that the information is copied correctly.

**DELTREE**

This is an external command. This command deletes a directory including all files and subdirectories that are in it. Its general form is **deltree [/Y] [drive:] [path]**. **/y** option carries out the DELTREE command without providing a prompt to confirm the deletion. For example,

 **C:\user>deltree D:\backup** deletes the backup directory in D: drive with a prompt to confirm the deletion.

 **C:\>deltree /y user** deletes the user directory in C: drive without a prompt to confirm the deletion.

**SYS**

This is an external command. This command is used to copy the system files (command.com, io.sys, msdos.sys, and drvspace.bin) from one drive to another drive, allowing that drive to be bootable. Its general form is **sys [drive1:][path] drive2:** Here, [drive1:][path] specifies the location of the system files and drive2: specifies the drive the files are to be copied. For example,

 **C:\>sys A:** copies the system files to A: making the disk bootable.

**MEM**

This is an external command. This command displays amount of used and free memory in your computer system. Its general form is **mem**. For example,

 **C:\>mem** displays memory status in your computer.

**DOS Advantages**

 It takes less space than windows operating system.

 It is very fast even on relatively slow machines.

 It addresses hardware directly.

 It is very stable operating system.

 Its commands are simple to remember and use.

 It is very portable. We can move it in diskettes.

 It is free operating system. We can get it for free through Internet.

 Programs that run under DOS are faster and take less disk space than windows programs.

**DOS Disadvantages**

 It has no GUI (Graphical User Interface).

 It is more difficult to use than windows.

 Programs that run under DOS are not very user friendly.

 We need to remember commands and parameters for each operation.

 It has no security.

Microsoft Windows

Microsoft Windows is a series of operating systems developed by Microsoft Corporation to run personal computers (PCs). Microsoft Windows is based on **graphical user interface (GUI)**.

GUI is a method of interaction with a computer that uses pictorial buttons (icons) and command lists controlled by a mouse and keyboard. We select buttons and command lists to execute some specific task. It is generally regarded as simpler as and easier to learn than **command line interfaces (CLI)** or **command user interface (CUI)**, where commands have to be typed. CLI is a mechanism for interaction with a computer by typing commands to perform specific tasks. In CLI, a command line interpreter receives, analyses, and executes the requested command. Upon completion, the command returns the summary of the operation in the form of text lines on the CLI.

Now, Microsoft Windows has dominated the PC market. Approximately **90** percent of PCs run some version of Windows. The first version of Windows, released in 1985, was simply a GUI offered as an extension of Microsoft disk operating system (MS-DOS). Examples of Microsoft windows are Windows 286, Windows 386, Windows 3.0 and 3.11, Windows 95, Windows 98, Windows NT, Windows 2000, Window s XP, Windows Vista etc.

**Advantages**

 It has GUI (Graphical User Interface).

 It is user friendly and easy to use.

 Programs that run under Windows are very user friendly.

 We do no need to remember commands and parameters for operations.

 It has higher security.

 It includes different easy to use system tools or utility programs to increase the performance of your computer system.

Windows System Tools

These are also called utility programs. For a smooth performance of your computer system, periodic maintenance is necessary. Here we use different system tools like Disk Defragmenter, Disk Cleanup, and Scandisk etc. These tools increase the performance of your computer system. Some of the tools are described below.

**Disk Defragmenter**

Disk gets fragmented as users create and delete files and folders in a computer. When a file or a folder is deleted from the hard disk, the space that was occupied by it will be used to store any new files. When a file gets saved, it uses the first contiguous free space that is large enough for the file and the remaining part of the file is saved in the next available free space.

The fragmented disk brings down the performance of the system and it takes a long time to retrieve the fragmented data from the disk even if the CPU or the memory is more than sufficient. Hence, periodic disk defragmentation is necessary to keep up the performance of the system. **Disk Defragmenter** is a tool that rearranges the data on your hard disk and reunites fragmented files so your computer can run more efficiently. Disk defragmentation describes the process of consolidating fragmented files on your computer's hard disk.

You can run Disk Defragmenter tool by following the path **start**  **all programs**  **accessories**  **system tools**  **disk defragmenter** in Windows XP.

**Disk Cleanup**

If you want to reduce the number of unnecessary files on your hard disk to free up disk space and help your computer run faster, use Disk Cleanup. It removes temporary files, empties the Recycle Bin, and removes a variety of system files and other items that you no longer need. Using Disk Cleanup increases the free space of the hard disk in your computer system.

You can run Disk Cleanup tool by following the path **start**  **all programs**  **accessories**  **system tools**  **disk cleanup** in Windows XP.

**Scandisk**

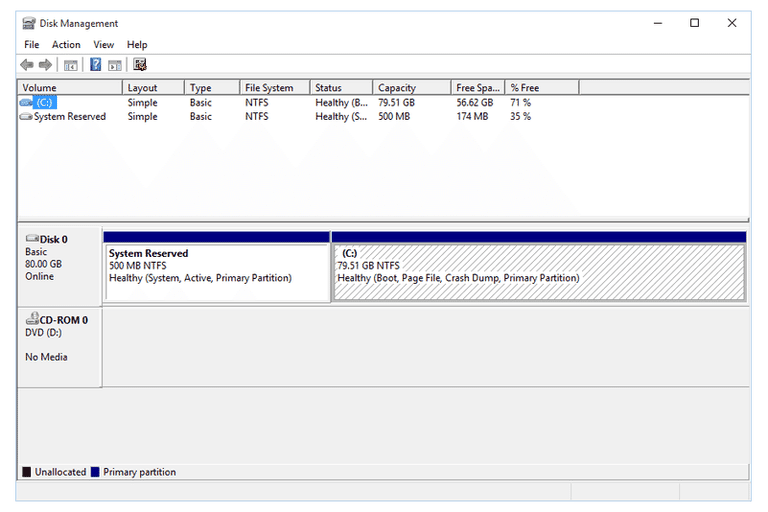
It is utility in MS-DOS and Microsoft Windows systems which checks and repairs file systems and bad clusters on the hard drive. It was introduced in MS-DOS version 6.2. Previous versions of MS-DOS supplied only the simpler, purely text-based program CHKDSK. Scandisk included a more user-friendly interface than MS-DOS CHKDSK. It has the ability to detect and sometimes recover from physical errors on the disk.

In Windows 95 onwards, Scandisk also had a graphical user interface. Scandisk can’t check NTFS disk drivers and therefore is not available for computers running Windows 2000, Windows XP etc. In these versions, a newer CHKDSK is provided instead.

**Disk Management**

**Everything you need to know about Disk Management in Windows**

Bottom of Form



Disk Management is an extension of the Microsoft Management Console that allows full management of the disk-based [hardware](https://www.lifewire.com/computer-hardware-2625895) recognized by Windows.

Disk Management is used to manage the drives installed in a computer - like [hard disk drives](https://www.lifewire.com/what-is-a-hard-disk-drive-2618152) (internal and [external](https://www.lifewire.com/what-is-an-external-drive-2625867)), [optical disk drives](https://www.lifewire.com/what-is-an-optical-disc-drive-2618157), and [flash drives](https://www.lifewire.com/what-is-a-flash-drive-2625794). It can be used to [partition](https://www.lifewire.com/what-is-a-partition-2625958) drives, [format](https://www.lifewire.com/what-does-it-mean-to-format-something-2625882) drives, assign drive letters, and much more.

**Note:** Disk Management is sometimes spelling incorrectly as *Disc* Management.

Also, even though they might sound similar, Disk Management is not the same as [Device Manager](https://www.lifewire.com/device-manager-2625860).

**How to Open Disk Management**

The most common way to access Disk Management is via the Computer Management utility. See [How To Access Disk Management in Windows](https://www.lifewire.com/how-to-open-disk-management-2626080) if you're not sure how to get there.

Disk Management can also be started by executing **diskmgmt.msc** via the [Command Prompt](https://www.lifewire.com/command-prompt-2625840) or another [command line](https://www.lifewire.com/what-is-a-command-line-interpreter-2625827) interface in Windows. See [How To Open Disk Management From the Command Prompt](https://www.lifewire.com/how-to-open-disk-management-from-command-prompt-2626097) if you need help doing that.

**How to Use Disk Management**

Disk Management has two main sections - a top and a bottom:

* The top section of Disk Management contains a list of all the partitions, formatted or not, that Windows recognizes.
* The bottom section of Disk Management contains a graphical representation of the physical drives installed in the computer.

Performing certain actions on the drives or partitions make them available or unavailable to Windows and configures them to be used by Windows in certain ways.

Here are some common things that you can do in Disk Management:

* [Partition a Drive](https://www.lifewire.com/how-to-partition-a-hard-drive-2626081)
* [Format a Drive](https://www.lifewire.com/how-to-format-a-hard-drive-2626077)
* [Change a Drive's Letter](https://www.lifewire.com/how-to-change-a-drive-letter-2626069)
* Shrink a Partition
* Delete a Partition
* Change a Drive's [File System](https://www.lifewire.com/what-is-a-file-system-2625880)

**Disk Management Availability**

Disk Management is available in most versions of Microsoft Windows including [Windows 10](https://www.lifewire.com/windows-10-2626217), [Windows 8](https://www.lifewire.com/windows-8-2626235), [Windows 7](https://www.lifewire.com/windows-7-2626265), [Windows Vista](https://www.lifewire.com/windows-vista-2626311), [Windows XP](https://www.lifewire.com/windows-xp-2626354), and Windows 2000.

**Note:** Even though Disk Management is available in multiple Windows [operating systems](https://www.lifewire.com/operating-systems-2625912), some small differences in the utility do exist from one Windows version to the next.

**More Information on Disk Management**

The Disk Management tool has a graphical interface like a regular program and is similar in function to the command line utility *disk part*, which was a replacement of an earlier utility called *fdisk*.

You can also use Disk Management to check free hard drive space. You can see the total storage capacity of all the disks as well as how much free space is remaining, which is expressed in units (i.e. MB and GB) as well as a percentage.

Disk Management is where you can create and attach virtual hard disk files in Windows 10 and Windows 8. These are single files that act as hard drives, which mean you can store them on your main hard drive or in other places like external hard drives.

To build a virtual disk file with the VHD or [VHDX](https://www.lifewire.com/vhdx-file-2622849) file extension, use the **Action > Create VHD** menu. Opening one is done through the **Attach VHD** option.

**Alternatives to Disk Management**

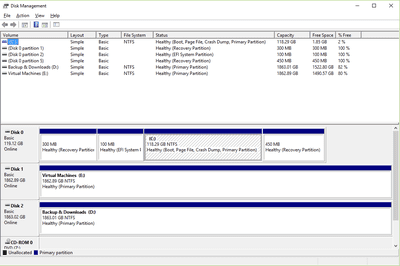
Some [free disk partitioning tools](https://www.lifewire.com/free-disk-partition-software-tools-2624950) let you perform most of the same tasks supported in Disk Management but without even needing to open Microsoft's tool at all.

Plus, some of them are even easier to use than Disk Management.

[MiniTool Partition Wizard Free](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947), for instance, lets you make a bunch of changes to your disks to see how they'll affect the sizes, etc., and then you can apply all the changes at once after you're satisfied.

One thing you can do with that program is [wipe a partition or whole disk clean](https://www.lifewire.com/how-to-wipe-a-hard-drive-2624527)with [DoD 5220.22-M](https://www.lifewire.com/dod-5220-22-m-2625856), which is a [data sanitization method](https://www.lifewire.com/data-sanitization-methods-2626133) not supported with Disk Management.

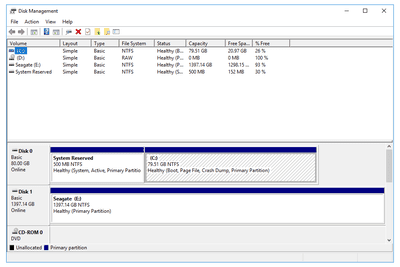
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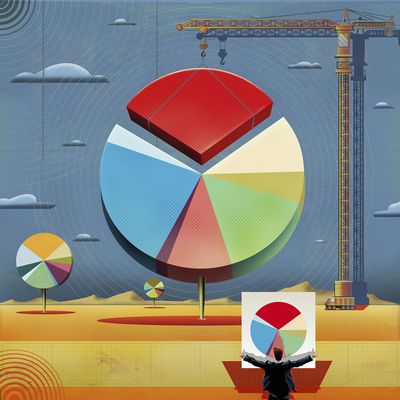
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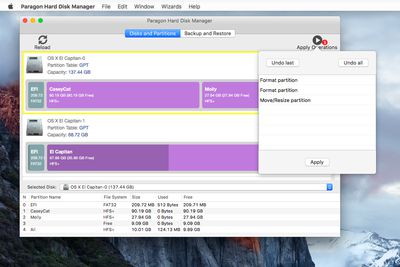
**[How to Open Disk Management in Windows to Make Changes to Drives](https://www.lifewire.com/how-to-open-disk-management-2626080)**

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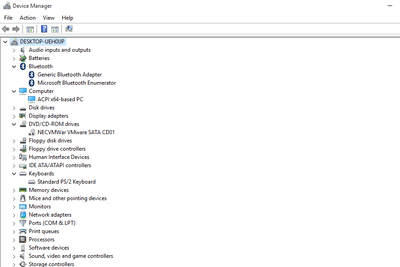
**[Disk Partitions: What They Are & How They Work](https://www.lifewire.com/what-is-a-partition-2625958)**

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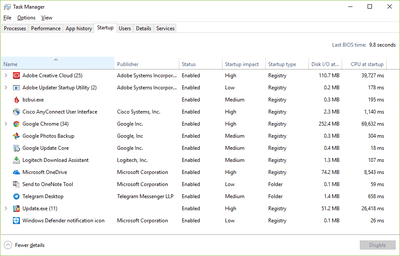
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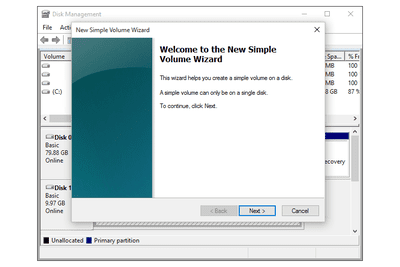
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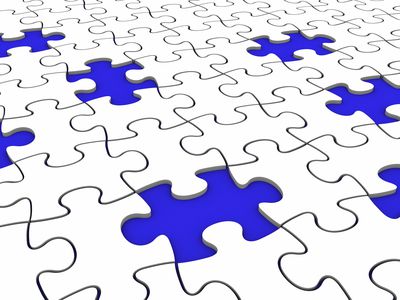
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**[The NTFS File System: Everything You Need to Know](https://www.lifewire.com/ntfs-file-system-2625948)**

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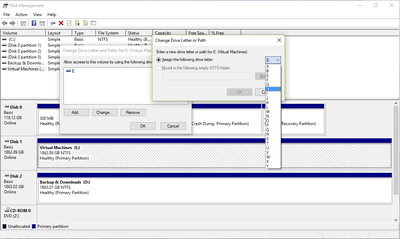
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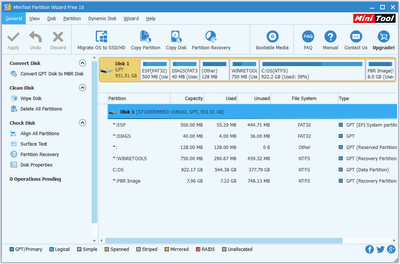
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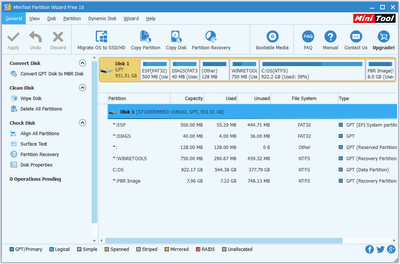
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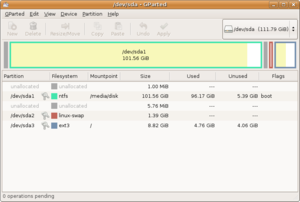
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# [A Full Review of MiniTool Partition Wizard Free Disk partitioning](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[[](https://en.wikipedia.org/wiki/File:GParted.png)](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

**[Disk partitioning](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[or](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[disk slicing](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[is the creation of one or more regions on a](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[hard disk](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Hard_disk_drive)[or other](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[secondary storage](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Computer_data_storage)[, so that an](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[operating system](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Operating_system)[can manage information in each region separately. Partitioning is typically the first step of preparing a newly manufactured disk, before any](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[files](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Computer_file)[or](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[directories](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Directory_(computing))[have been created. The disk stores the information about the partitions' locations and sizes in an area known as the](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[partition table](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Partition_table)[that the operating system reads before any other part of the disk. Each partition then appears in the operating system as a distinct "logical" disk that uses part of the actual disk.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[System administrators](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/System_administrator)[use a program called a](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[partition editor](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Partition_editor)[to create, resize, delete, and manipulate the partitions. When a hard drive is installed in a computer, it must be partitioned before you can format and use it. Partitioning a drive is when you divide the total storage of a drive into different pieces. These pieces are called partitions. Once a partition is created, it can then be formatted so that it can be used on a computer.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

* [[1Benefits of multiple partitions](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#Benefits_of_multiple_partitions)
* [[2Disadvantages of multiple partitions](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#Disadvantages_of_multiple_partitions)
* [[3PC partition types](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#PC_partition_types)
  + [[3.1Primary partition](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#Primary_partition)
  + [[3.2Extended partition](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#Extended_partition)
* [[4Partitioning schemes](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#Partitioning_schemes)
  + [[4.1DOS, Windows, and OS/2](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#DOS,_Windows,_and_OS/2)
  + [[4.2Unix-like systems](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#Unix-like_systems)
  + [[4.3Multi-boot and mixed-boot systems](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[clarification needed](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[]](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#Multi-boot_and_mixed-boot_systems[clarification_needed])
  + [[4.4GUID Partition Table](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#GUID_Partition_Table)
* [[5Partition recovery](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#Partition_recovery)
* [[6Compressed disks](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#Compressed_disks)
* [[7See also](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#See_also)
* [[8References](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#References)
* [[9Further reading](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#Further_reading)
* [[10External links](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_partitioning#External_links)

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[Creating more than one partition has the following advantages:](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

* [Separation of the](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[operating system](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Operating_system)[(OS) and program files from user files. This allows](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[image](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_image)[[backups](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Backup)[(or](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[clones](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_cloning)[) to be made of only the operating system and installed software.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [Having a separate area for operating system](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[virtual memory](https://en.wikipedia.org/wiki/Virtual_memory" \o "Virtual memory)[[swapping/paging](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Paging)[.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [Keeping frequently used programs and data near each other.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [Having cache and log files separate from other files. These can change size dynamically and rapidly, potentially making a file system full.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [Use of](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[multi-boot](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Multi-boot)[setups, which allow users to have more than one operating system on a single computer. For example, one could install](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[BSD](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/BSD)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Linux](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Linux)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[macOS](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/MacOS)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Microsoft Windows](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Microsoft_Windows)[or other operating systems on different partitions of the same HDD and have a choice of booting into any compatible operating system at power-up.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [Protecting or isolating files, to make it easier to recover a corrupted file system or operating system installation. If one partition is corrupted, other file systems may not be affected.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [Raising overall computer performance on systems where smaller file systems are more efficient. For instance, large HDDs with only one](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[NTFS](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/NTFS)[file system typically have a very large](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[sequentially accessed](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Sequential_access)[[Master File Table](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Master_File_Table)[(MFT) and it generally takes more time to read this MFT than the smaller MFTs of smaller partitions.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [Partitioning for significantly less than the full size available when disk space is not needed can reduce the time for diagnostic tools such as](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[checkdisk](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Checkdisk)[to run or for full image backups to run.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

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[Creating more than one partition has the following disadvantages, as compared to having a single partition spanning the same disk area:](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

* [Reduces the total space available for user storage on the disk, as it forces the operating system to duplicate certain file system administration areas on the disk for each partition.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [Reduces overall disk performance on systems where data is accessed regularly and in parallel on multiple partitions, because it forces the disk's read/write](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[head](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_read-and-write_head)[to move back and forth on the disk to access data on each partition and to maintain and update file system administration areas on each partition. It also prevents disk optimizers from moving all frequently accessed files closer to each other on the disk, which could reduce the number and distance of required](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[head](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Disk_read-and-write_head)[movements. Files can still be moved closer to each other on each partition, but those areas themselves will still be far apart on the disk (see also the concept of "](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[short stroking](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Short_stroking)["). This issue does not apply to](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Solid-state drives](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Solid-state_drive)[as access times on those are neither affected by nor dependent upon relative sector positions.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [Increases](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[disk fragmentation](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/File_system_fragmentation)[because it lowers the average size of contiguous free blocks on each partition – as compared to a single partition of the same overall size – after the same amount of data has been written to them.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [May prevent using the whole disk capacity, because it may break free capacities apart. For example, if one has a disk with two partitions, each with 3 GB free (hence 6 GB in total), one can't copy a 4 GB DVD image file on that disk, because none of the partitions will actually provide enough space for that – even though there is more than enough free capacity in total on the disk. If the same files on those two partitions would have been stored on a single partition spanning the whole disk, then the 4 GB file could be easily stored in the 6 GB of free space.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [Hurts portability and might impose constraints on how entities might be linked together inside the file system. For example, Unix file systems and the NTFS file system allow](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[hard links](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Hard_link)[to be created only as long as both the link and the referenced file reside inside the same volume/partition. Also, under Windows if one is referencing a file on another partition, one can do that only by specifying the partition's assigned drive letter (or](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[mount point](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/NTFS_volume_mount_point)[) – which, however, might change with time and depending on the drives installed. This renders references invalid and dependent on actual drive letter assignment, which is not an issue if one has to reference files/directories only on the same partition, as in this case one can use directory-relative or root-relative references, without including the drive/partition letter.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [Moving files across volumes will require actual copying (of bytes), whereas moving files within a volume generally requires only the "meta-data" to be updated.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[PC partition types [](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[edit](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/w/index.php?title=Disk_partitioning&action=edit&section=3)[]](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[This section describes the](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[master boot record](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Master_boot_record)[(MBR) partitioning scheme, as used historically in](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[DOS](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/DOS)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Microsoft Windows](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Microsoft_Windows)[and](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Linux](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Linux)[(among others) on](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[PC-compatible](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/PC-compatible)[computer systems. As of the mid-2010s, most new computers use the](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[GUID Partition Table](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/GUID_Partition_Table)[(GPT) partitioning scheme instead. For examples of other partitioning schemes, see the general article on](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[partition tables](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Partition_table)[.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[The total data storage space of a PC HDD on which MBR partitioning is implemented can contain at most four](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[primary partitions](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[, or alternatively three primary partitions and an](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[*[extended partition](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*](https://en.wikipedia.org/wiki/Disk_partitioning#Extended_partition)[. The](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[Partition Table](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[, located in the master boot record, contains 16-byte entries, each of which describes a partition.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[The](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[partition type](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[is identified by a 1-byte code found in its partition table entry. Some of these codes (such as](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[0x05](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Partition_type#PID_05h)[and](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[0x0F](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Partition_type#PID_0Fh)[) may be used to indicate the presence of an](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[extended partition](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Extended_boot_record)[. Most are used by an operating system's boot loader (that examines partition tables) to decide if a partition contains a file system that can be used to](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[mount / access](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[for reading or writing data.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

**[Primary partition](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)** [[](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[edit](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/w/index.php?title=Disk_partitioning&action=edit&section=4)[]](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

*[Further information:](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[*[Partition type](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*](https://en.wikipedia.org/wiki/Partition_type)

[A primary partition contains one file system. In](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[DOS](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/DOS)[and all early versions of](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Microsoft Windows](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Microsoft_Windows)[systems,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Microsoft](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Microsoft)[required what it called the](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[system partition](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/System_partition)[to be the first partition. All Windows operating systems from Windows 95 onwards can be located on (almost) any partition, but the boot files (io.sys, bootmgr, ntldr, etc.) must reside on a primary partition. However, other factors, such as a PC's](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[BIOS](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/BIOS)[(see](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Boot sequence on standard PC](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Booting#Boot_sequence)[) may also impose specific requirements as to which partition must contain the primary OS.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[The partition type](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[code](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[for a primary partition can either correspond to a file system contained within (e.g.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[0x07](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Partition_type#PID_07h)[means either an](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[NTFS](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/NTFS)[or an OS/2](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[HPFS](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/High_Performance_File_System)[file system) or indicate that the partition has a special use (e.g. code](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[0x82](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Partition_type#PID_82h)[usually indicates a Linux](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[swap](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[partition). The](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[FAT16](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/FAT16)[and](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[FAT32](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/FAT32)[file systems have made use of a number of partition type codes due to the limits of various DOS and Windows OS versions. Though a Linux operating system may recognize a number of different file systems (](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[ext4](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Ext4)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[ext3](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Ext3)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[ext2](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Ext2)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[ReiserFS](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/ReiserFS)[, etc.), they have all consistently used the same partition type code:](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[0x83](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Partition_type#PID_83h)[(](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Linux native file system](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/File_system#Linux)[).](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

**[Extended partition](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)** [[](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[edit](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/w/index.php?title=Disk_partitioning&action=edit&section=5)[]](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

*[Further information:](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[*[Extended Boot Record](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*](https://en.wikipedia.org/wiki/Extended_Boot_Record)

[An HDD may contain only one extended partition, but that extended partition can be subdivided into multiple logical partitions. DOS/Windows systems may then](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[assign a unique drive letter](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Drive_letter_assignment)[to each logical partition.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[Partitioning schemes[](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[edit](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/w/index.php?title=Disk_partitioning&action=edit&section=6)[]](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

**[DOS, Windows, and OS/2](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[[](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[edit](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/w/index.php?title=Disk_partitioning&action=edit&section=7)[]](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[With](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[DOS](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/DOS)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Microsoft Windows](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Microsoft_Windows)[, and](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[OS/2](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/OS/2)[, a common practice is to use one primary partition for the active](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[file system](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/File_system)[that will contain the operating system, the page/swap file, all utilities, applications, and user data. On most Windows consumer computers, the](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[drive letter](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Drive_letter_assignment)[C: is routinely assigned to this primary partition. Other partitions may exist on the](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[HDD](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Hard_disk_drive)[that may or may not be visible as drives, such as recovery partitions or partitions with diagnostic tools or data. (Microsoft drive letters do not correspond to partitions in a one-to-one fashion, so there may be more or fewer drive letters than partitions.)](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[Microsoft](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Windows 2000](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Windows_2000)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[XP](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Windows_XP)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Vista](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Windows_Vista)[, and](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Windows 7](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Windows_7)[include a '](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Disk Management](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Logical_Disk_Manager)[' program which allows for the creation, deletion and resizing of FAT and NTFS partitions. The Windows Disk Manager in Windows Vista and Windows 7 utilizes a](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[1 MB partition alignment](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/1_MB_partition_alignment)[scheme which is fundamentally](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[incompatible](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Logical_Disk_Manager#Compatibility_problems)[with Windows 2000, XP, OS/2, DOS as well as many other operating systems.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

**[Unix-like systems](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[[](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[edit](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/w/index.php?title=Disk_partitioning&action=edit&section=8)[]](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[On](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Unix](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Unix)[-based and](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Unix-like](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Unix-like)[operating systems such as](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Linux](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Linux)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[macOS](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/MacOS)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[BSD](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/BSD)[, and](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Solaris](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Solaris_(operating_system))[, it is possible to use multiple partitions on a disk device. Each partition can be formatted with a](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[file system](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/File_system)[or as a](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[swap partition](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Swap_partition)[.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[Multiple partitions allow directories such as](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[/boot](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/boot)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[/tmp](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/tmp)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[/usr](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/usr)[,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[/var](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/var)[, or](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[/home](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/home)[to be allocated their own filesystems. Such a scheme has a number of advantages:](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

* [If one file system gets corrupted, the data outside that filesystem/partition may stay intact, minimizing data loss.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [Specific file systems can be mounted with different parameters e.g.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[read-only](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/File_system_permissions)[, or with the execution of](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[setuid](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Setuid)[files disabled.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)
* [A runaway program that uses up all available space on a non-system filesystem does not fill up critical filesystems.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[A common configuration for Linux desktop systems is to use two partitions: one holding a file system mounted on "/" (the](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[root directory](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Root_directory)[) and a](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[swap partition](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Swap_partition)[.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

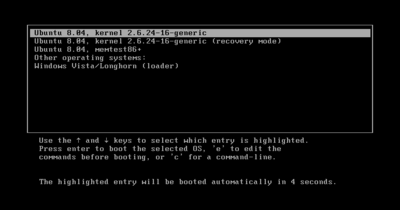
[By default, macOS systems also use a single partition for the entire filesystem and use a](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[swap file](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Swap_file)[inside the file system (like Windows) rather than a swap partition.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[In Solaris, partitions are sometimes known as](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[slices](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[. This is a conceptual reference to the slicing of a cake into several pieces.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[The term "slice" is used in the](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[FreeBSD](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/FreeBSD)[operating system to refer to](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Master Boot Record](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Master_Boot_Record)[partitions, to avoid confusion with FreeBSD's own](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[disklabel](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/BSD_disklabel)[-based partitioning scheme. However,](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[GUID Partition Table](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/GUID_Partition_Table)[partitions are referred to as "partition" worldwide.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

**[Multi-boot and mixed-boot systems](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[***[clarification needed](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)***](https://en.wikipedia.org/wiki/Wikipedia:Please_clarify)**[]](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[[](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[edit](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/w/index.php?title=Disk_partitioning&action=edit&section=9)[]](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

*[Main article:](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[*[Multi-boot](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*](https://en.wikipedia.org/wiki/Multi-boot)

[[](https://en.wikipedia.org/wiki/File:GRUB_with_ubuntu_and_windows_vista.png)](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[A](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[GRUB](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/GNU_GRUB)[startup menu showing](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Ubuntu](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Ubuntu_(operating_system))[Linux (with three different boot modes) and](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Windows Vista](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Windows_Vista)[options](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[Multi-boot systems are computers where the user can boot into one of two or more distinct operating systems (OS) stored in separate storage devices or in separate partitions of the same storage device. In such systems a menu at](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[startup](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Booting)[gives a choice of which OS to boot/start (and only one OS at a time is loaded).](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[This is distinct from](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[virtual operating systems](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Virtual_machine)[, in which one operating system is run as a self-contained virtual "program" within another already-running operating system. (An example is a Windows OS "virtual machine" running from within a Linux OS.)](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

**[GUID Partition Table](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[[](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[edit](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/w/index.php?title=Disk_partitioning&action=edit&section=10)[]](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

*[Main article:](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[*[GUID Partition Table](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*](https://en.wikipedia.org/wiki/GUID_Partition_Table)

[The](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[GUID Partition Table](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[(](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[**[G](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[lobally](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[U](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[nique](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[ID](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)**[entifier](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Globally_unique_identifier)[) is a part of the](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Unified Extensible Firmware Interface](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Unified_Extensible_Firmware_Interface)[(UEFI) standard for the layout of the](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[partition table](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Partition_table)[on a physical](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[hard disk](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Hard_disk)[. Many operating systems now support this standard.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[Partition recovery [](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[edit](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/w/index.php?title=Disk_partitioning&action=edit&section=11)[]](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[When a partition is deleted, its entry is removed from a table and the data is no longer accessible. The data remains on the disk until being overwritten.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Specialized recovery utilities](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Undeletion)[, may be able to locate](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[lost](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)*[file systems and recreate a partition table which includes entries for these recovered file systems. Some disk utilities may overwrite a number of beginning sectors of a partition they delete. For example, if Windows Disk Management (Windows 2000/XP, etc.) is used to delete a partition, it will overwrite the first sector (relative sector 0) of the partition before removing it. It still may be possible to restore a](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[FAT](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/File_Allocation_Table)[or](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[NTFS](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/NTFS)[partition if a backup boot sector is available.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[Compressed disks [](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[edit](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/w/index.php?title=Disk_partitioning&action=edit&section=12)[]](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[HDDs can be compressed to create additional space. In DOS and early Microsoft Windows, programs such as](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Stacker](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Stac_Electronics)[(DR-DOS except 6.0),](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[SuperStor](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/SuperStor)[(DR DOS 6.0),](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[DoubleSpace](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/DoubleSpace)[, or](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[DriveSpace](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/DriveSpace)[(Windows 95) were used. This compression was done by creating a very large file on the partition, then storing the disk's data in this file. At startup, device drivers opened this file and assigned it a separate letter. Frequently, to avoid confusion, the original partition and the compressed drive had their letters swapped, so that the compressed disk is C:, and the uncompressed area (often containing system files) is given a higher name.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)

[Versions of](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)[[Windows](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)](https://en.wikipedia.org/wiki/Microsoft_Windows)[using the NT kernel, including the most recent versions, XP and Vista, contain intrinsic disk compression capability. The use of separate disk compression utilities has declined sharply.](https://www.lifewire.com/minitool-partition-wizard-free-review-2624947)