



# OPERATING SYSTEMS

## Windows 2000



Francisco Javier Herrero Zaragoza

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based upon

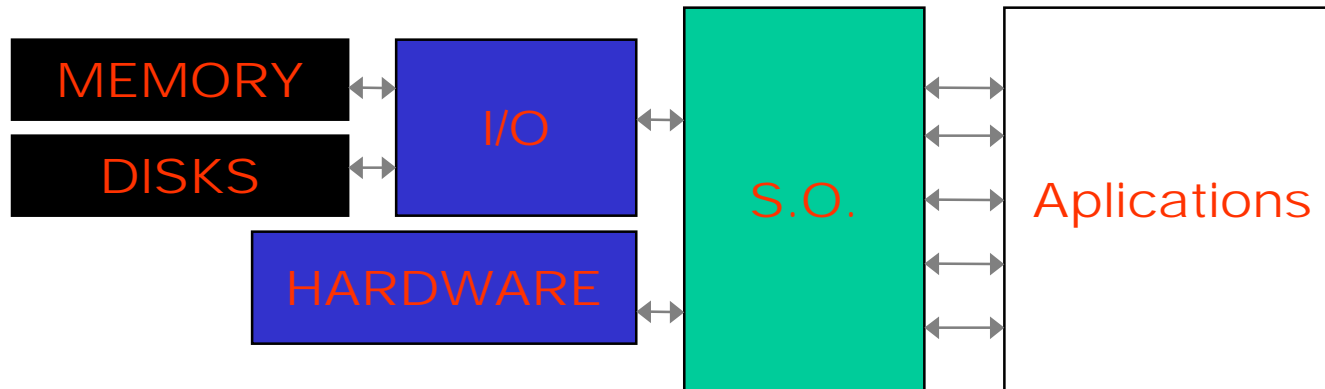
"Microsoft Windows 2000 Professional" Sergi Salas

## What is an Operating System (OS)?

An operating system (also known as OS) is basically software that makes everything in the computer work together smoothly and efficiently. Basically, it controls the "overall" activity of a computer. Operating systems have three basic jobs they must do:

- **Control Hardware** - The operating system controls all the parts of the computer and attempts to get everything working together.
- **Run Applications** - Another job the OS does is run application software. This would include Microsoft Office, WinZip, games, etc.
- **Manage Data and Files** - The OS makes it easy for you to organize your computer. Through the OS you are able to do a number of things to data including copy, move, delete, and rename it. This makes it much easier to find and organize what you have.

# What is an Operating System (OS)?

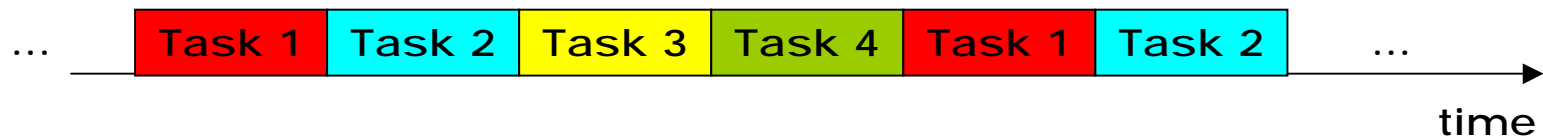


## What is an Operating System (OS)?

In simple terms, an operating system is a manager. It manages all the available resources on a computer. These resources can be the hard disk, a printer, or the monitor screen. Even memory is a resource that needs to be managed. Within an operating system are the management functions that determine who gets to read data from the hard disk, what file is going to be printed next, what characters appear on the screen, and how much memory a certain program gets.

## What is an Operating System (OS)?

Because of advances in both hardware design and performance, computers are able to process increasingly larger amounts of information. The speed at which computer transactions occur is often talked about in terms of *millionths* of a second. Because of this speed, today's computers can give the appearance of doing many things simultaneously by actually switching back and forth between each task extremely fast. This is the concept of **multitasking**. That is, the computer is working on multiple tasks "at the same time." This process is however "unreal" and we should have several microprocessors to allow real multitasking.



## What is an Operating System (OS)?

Another function of the operating system is to keep track of what each program is doing. That is, the operating system needs to keep track of whose program, or task, is currently writing its file to the printer or which program needs to read a certain spot on the hard disk, etc. This is the concept of **multi-users**, as multiple users have access to the same resources.

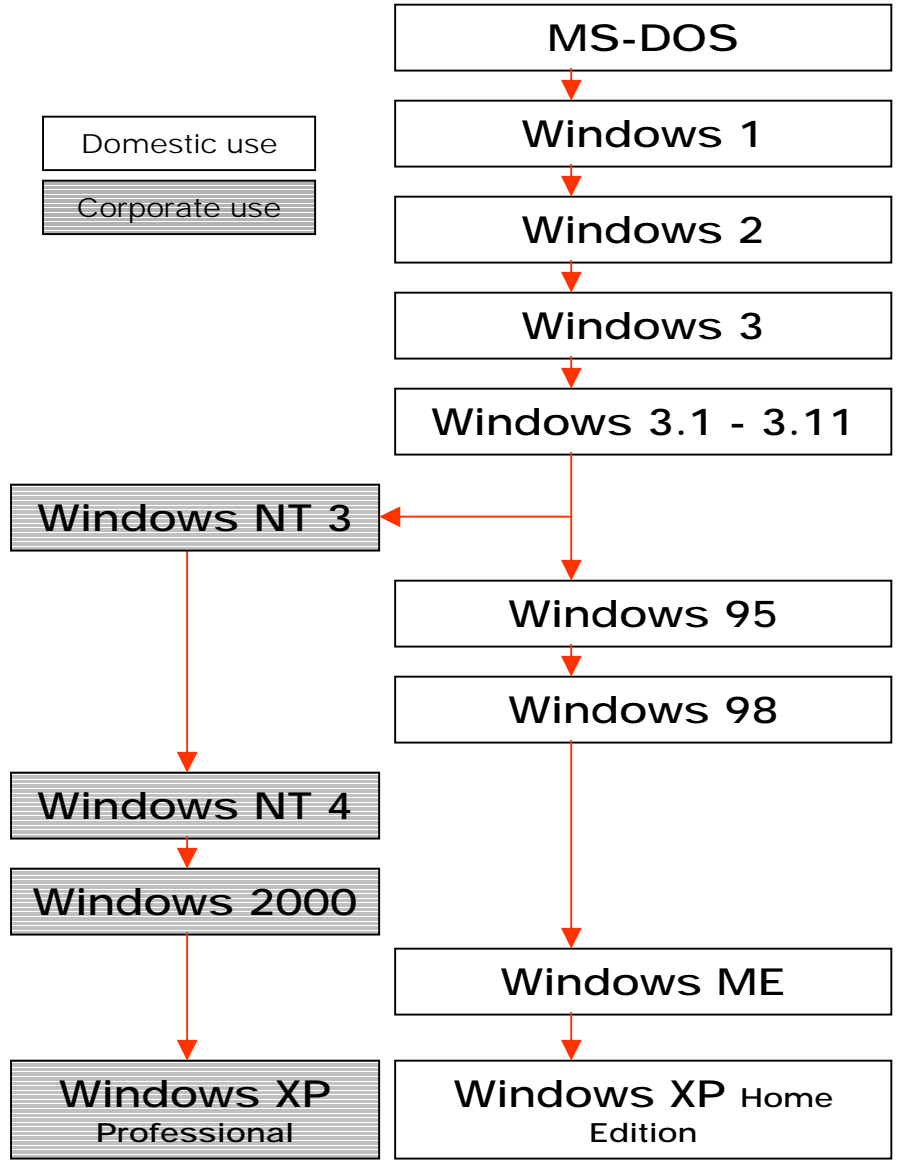


## Common Operating Systems

There are a vast number of OS's out there. Let's briefly go over a few of the more common ones:

- **Windows 3.1/3.11/95/98/ME** - This is what you will find on most new PC's today. It is a very popular OS, and there are many applications that run on it. It has an easy-to-use Graphical User Interface (GUI).
- **Windows NT/2000/XP** - Windows NT is another Microsoft operating system that is becoming really successful because of its networking capabilities. Microsoft is trying to phase out Windows 95/98/ME and replace it with this OS's based on NT.
- **Macintosh System 7/8** - This is the operating system found on the Macintosh brand of computers. This was one of the first GUI's to become popular. Macs have the history of being easy to use, and coming equipped with all the hardware you'll need.
- **\*NIX** - This includes the OS's like UNIX, LINUX, etc. These are commonly called "workstations". UNIX is a command prompt OS, much like the now defunct Microsoft DOS operating system. Unix is by far the oldest of the operating systems, having been in existence for a good 20 years. \*NIX systems are now becoming a little more popular as desktops with the invention of programs like X Windows, which allows \*NIX systems to have a GUI. \*NIX systems are still the kings of the networking world, and many of the world's servers run \*NIX.

1979  
1985  
1987  
1990  
1992  
1994  
1995  
1998  
2000  
2001



Commands typed through a **Prompt**

**Graphical User Interface and multitasking**

Overlaid windows and icons. Word and Excel are born.

Allows **multiple DOS sessions**. Program and Files Administrator. More than 16 colors.

OLE - Object Linking and Embedding. Multimedia and NET API (Application Program Interface). 3.11 was the first "Service Pack". **Workgroup edition allows network options.**

Not based on MS-DOS. Based on microkernel.

**Plug&Play. Internet Explorer.** DirectX Technology. Allows long named files

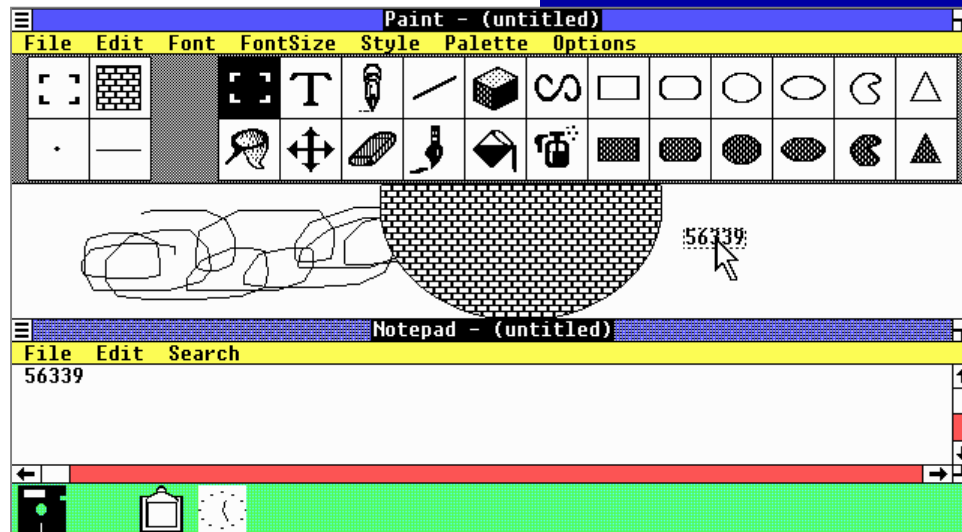
Last Windows based on MS-DOS. **Supports FAT 32 file system, USB, DVD. Allows desktop profile for each user.**

Object Oriented Windows. **NTFS.** Difficult to use because of managing, configuration and drivers.

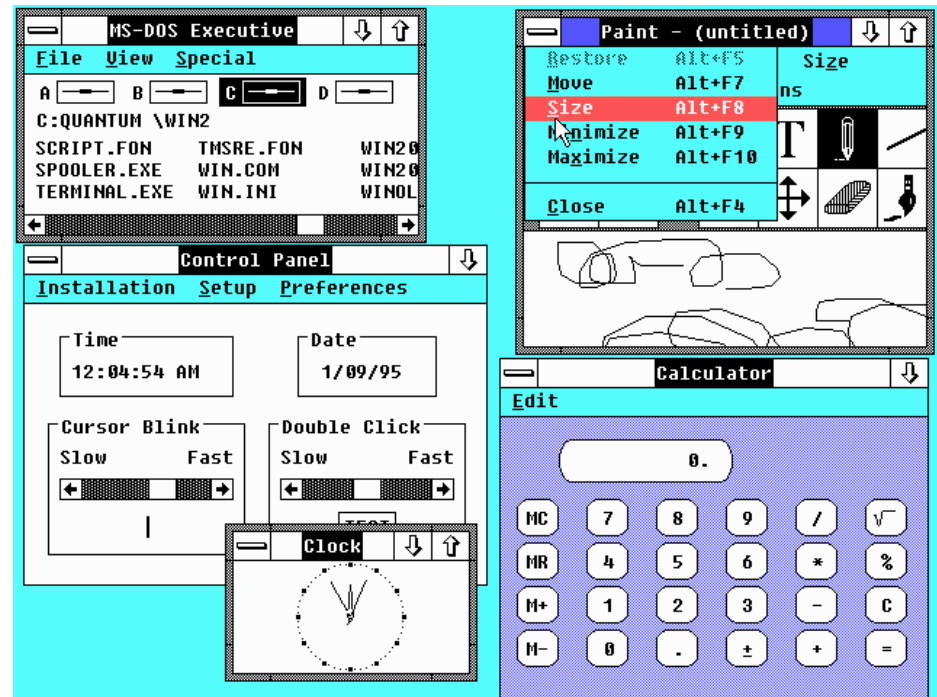
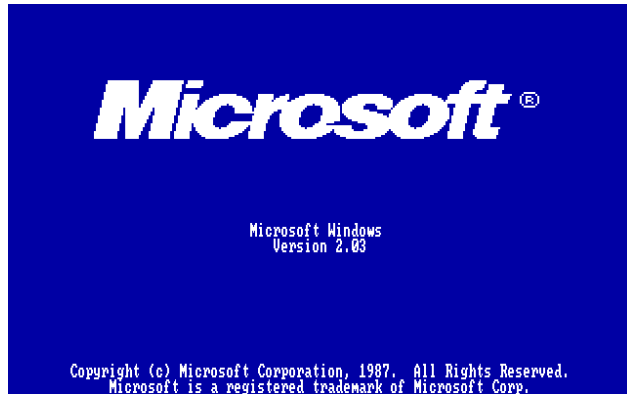
Solves NT problems. Based on NT (32 bits). Supports multimedia applications. HD dynamic managing. Enhanced **NTFS.**

Continues with NT technology. Professional and Home Editions are created.

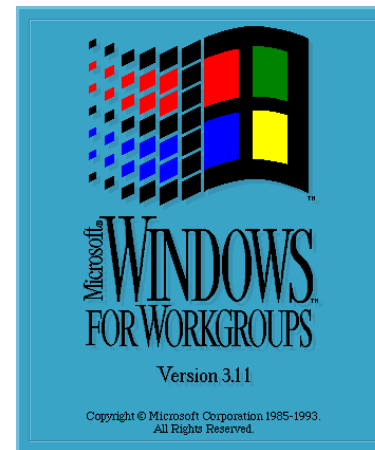
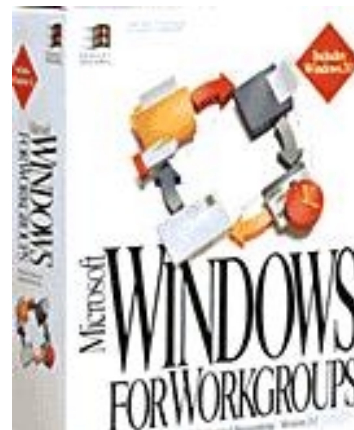
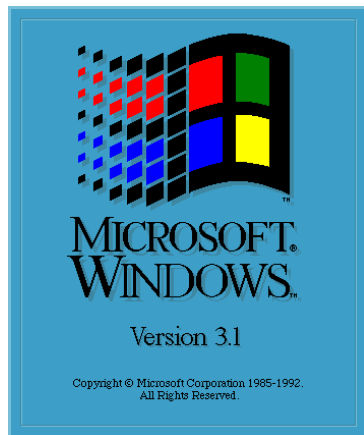
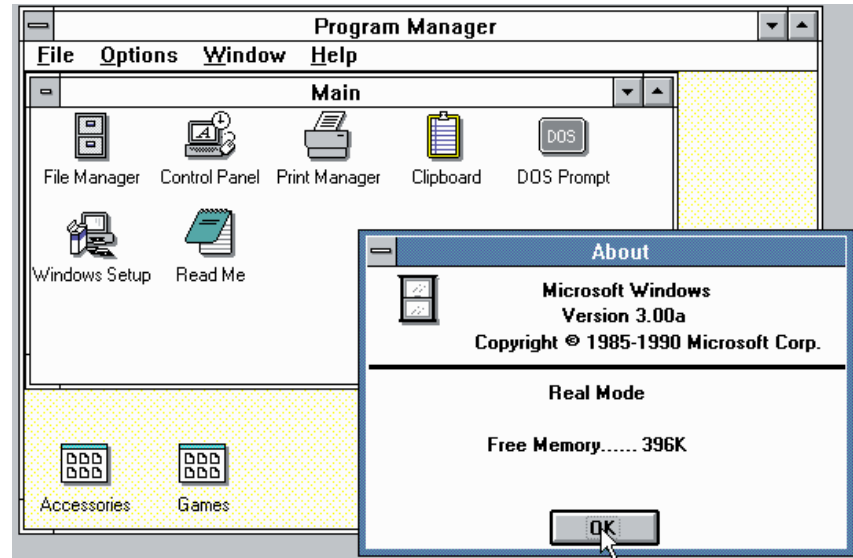
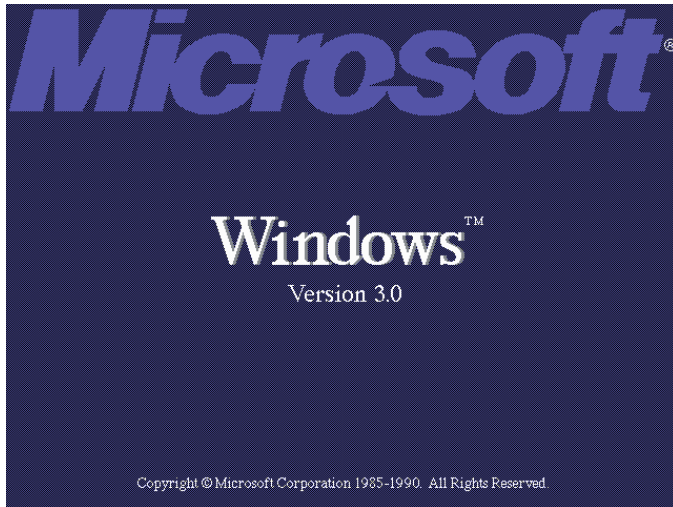
- Windows 1.0:



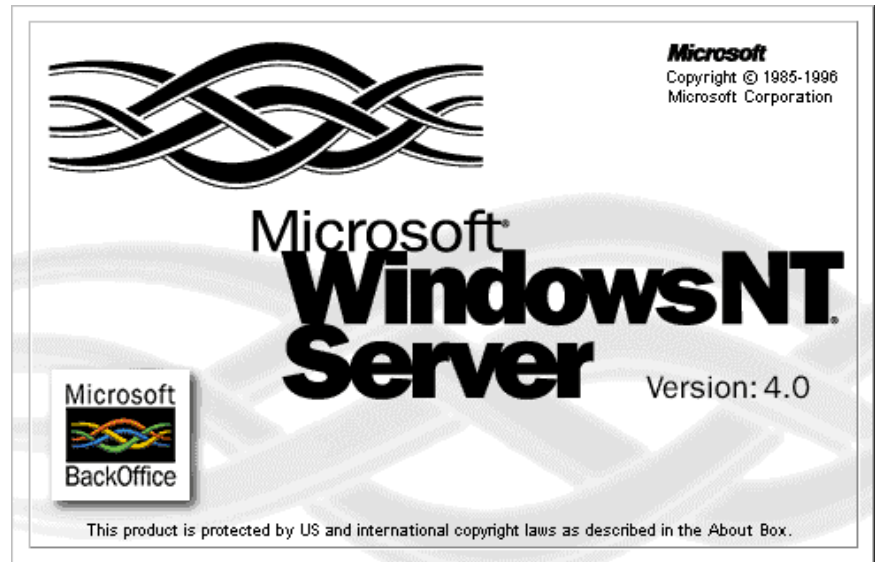
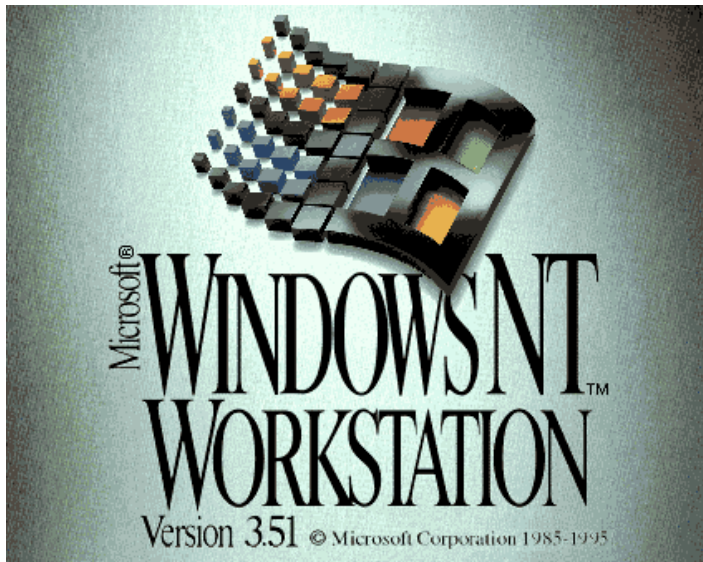
- Windows 2.0:



- Windows 3.X:

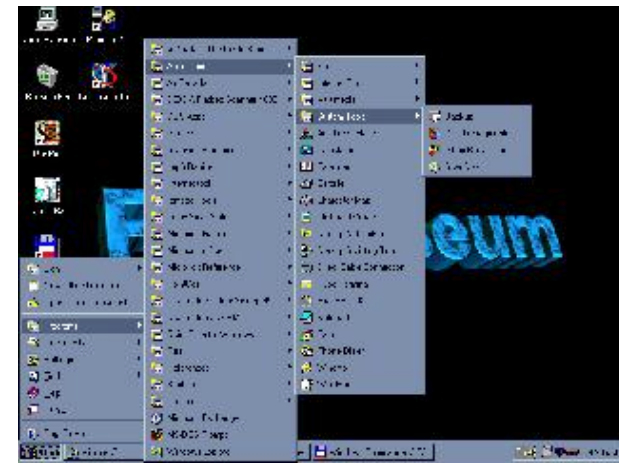
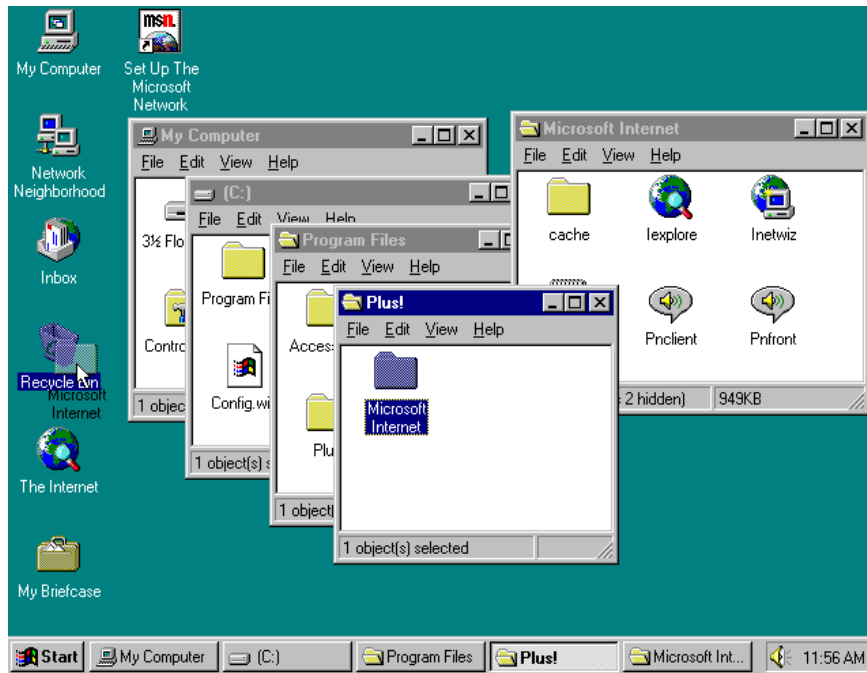


- Windows NT:

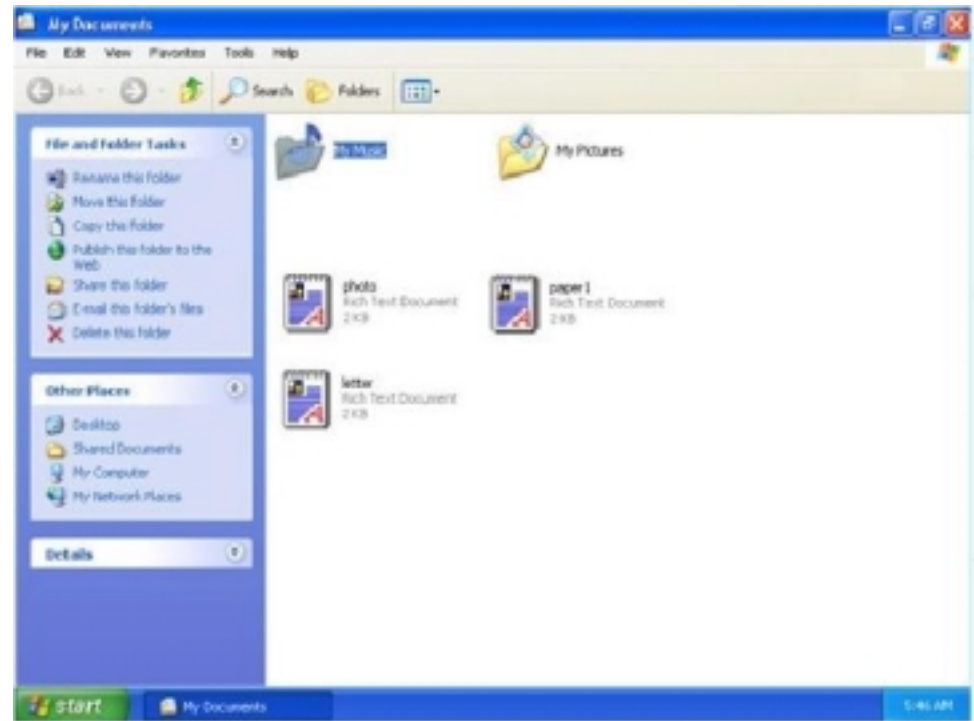
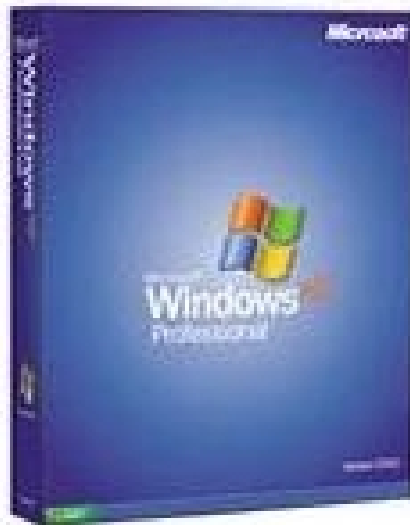




- Windows 95:



- Windows XP:



Domestic  
PC



Corporate  
PC



Servers



## File System

All the information kept in the storage units must be following an order to be found. Otherwise would be difficult to find a file when we are looking for it in our hard disk.

Like in a library, we need to follow a method or organization to manage information (alphabetical order, by author,...). It is possible we are not understanding what is the method the library is using but we can always ask for help at the librarian. He will probably have a catalog listing all the books available and where to find them.

The library is your hard disk, the librarian your operating system and the catalog the file system.



## File System

**FAT 16:** it is fairly universal with windows 3x, windows 95, and windows NT recognizing it. The only sore side is that FAT 16 waste a lot of useful space as the hard drive grows in size. FAT 16 will only allow partitions of 2 GB's.

Because the original FAT used 16-bit cluster addressing, the FAT system itself imposed limitations on how hard drives were used. (For convenience, this original FAT system is referred to as FAT16.) Since the FAT16 could handle only  $2^{16}$  (= 65,536) addresses, hard drives larger than 512MB needed to allocate file space in 16KB blocks.

**FAT 32:** handles 32-bit addresses ( $2^{32}$ ), again erasing the old limitations imposed by the FAT16 addressing. Allows to make better use of space (more than 2 GB's). Faster data transfer rates.

**NTFS:** uses 32-bit addresses ( $2^{32} = 4,294,967,296$ ) and is no longer limited to 16KB blocks. Additionally, the NTFS file system also supports long filenames; security-access restrictions; special flags governing file usage; and last-access, last-write, and file-creation date-time stamps. It is only accessible under Windows NT, 2000 and XP and cannot be read or even recognized from DOS or Windows 3.x, 95, or 98.

## File System

	FAT 16	FAT 32	NTFS
Windows 3.1	X		
Windows 95	X	X (W95 Release 2)	
Windows 98	X	X	
Windows NT	X		X
Windows 2000	X	X	X
Windows XP	X	X	X

## File System

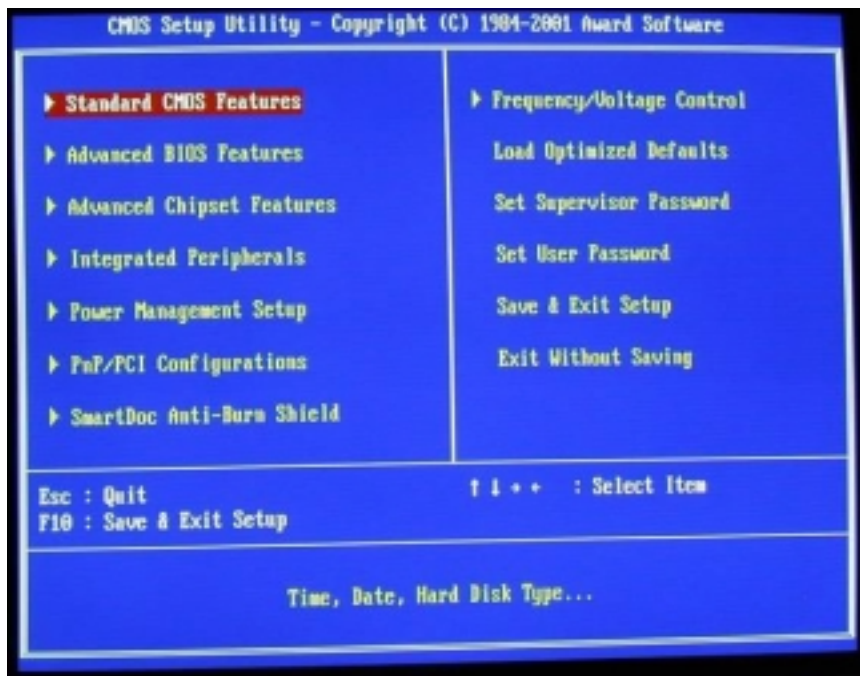
Not only hard disks need a file system. Also external storage devices need so.

- Floppy disk uses FAT 16
- CD-ROMs use CDFS

## Installing an Operating System

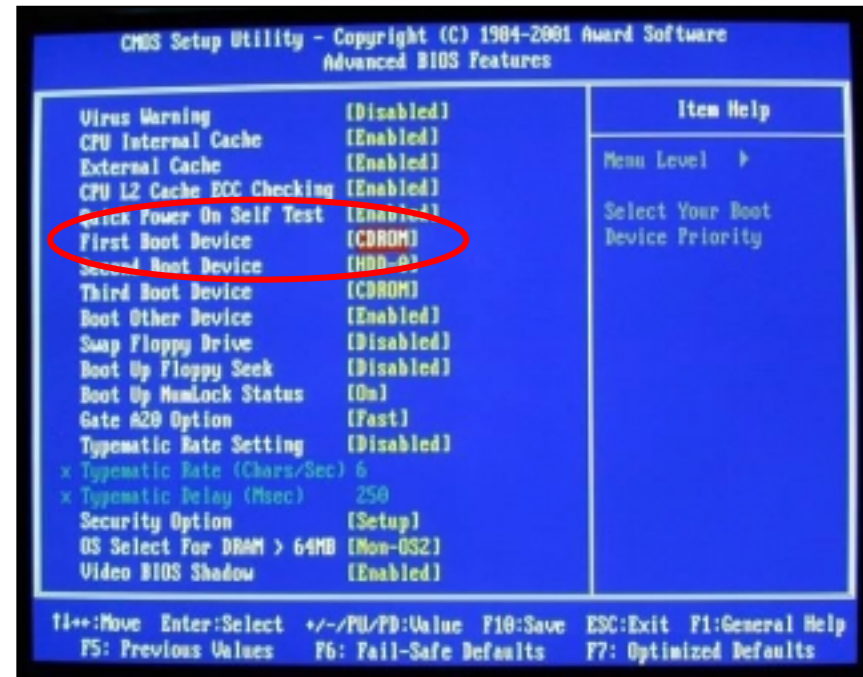
Latest Windows versions allow to boot from CD. That means we can actually insert the Operating System installation CD and the process will take place automatically.

Maybe we must have a look at the BIOS Setup to allow this option (DEL on booting).



# Installing an Operating System

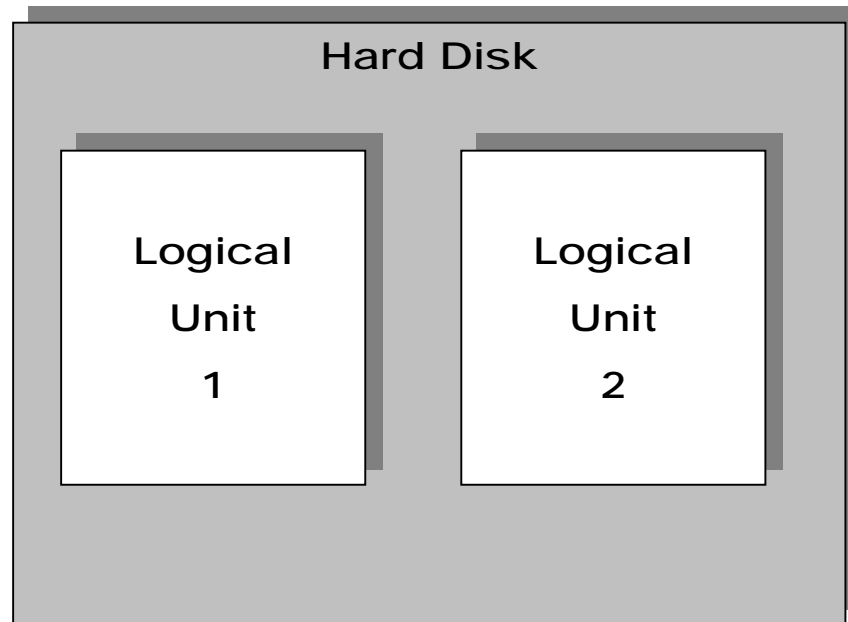
We must setup CD-ROM unit as the first boot device.



# Operating System

Could we have more than one operating system installed in our computer?

- To do so it is recommendable (if not compulsory) to have them in diferent storage units.
- If we have got only one physical unit we can create logical units, also called **Partitions**.

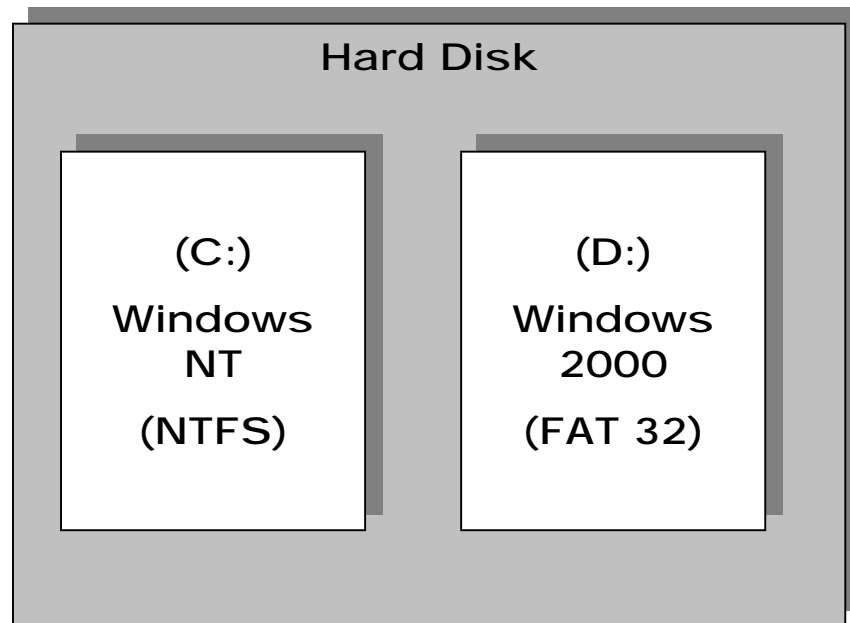




## Operating System

- When using several units we can use a different file system in each one of them. However we must remember some Operating Systems do not support all file systems.

- For example:



- Windows NT does not support FAT 32. (D:) unit will remain invisible for Windows NT.
- Windows 2000 allows FAT 32 and NTFS. Both units will be accessible from Windows 2000.

# Operating System

- Operating systems have been improving their security options. This will avoid malfunctions because of strange devices, not allowed users,...
- **HLC (Hardware Compatibility List)**. A data base containing the devices which have been tested by Microsoft. If a device does not appear in the list it does not mean it is not working properly, but Microsoft can not guarantee it works as it should.
- **NTFS** has supposed an important change in security. **Unix** allowed from the beginning to assign rights to files depending on the user. Read (r), write (w) and execution (x) rights could be chosen for every file for different profiles.

```

-rw-----
drwxr-xr-x
-rwxr-xr-x
-rw-----
-rw-r--r-
-rw-----
-rw-----
-rw-----

```

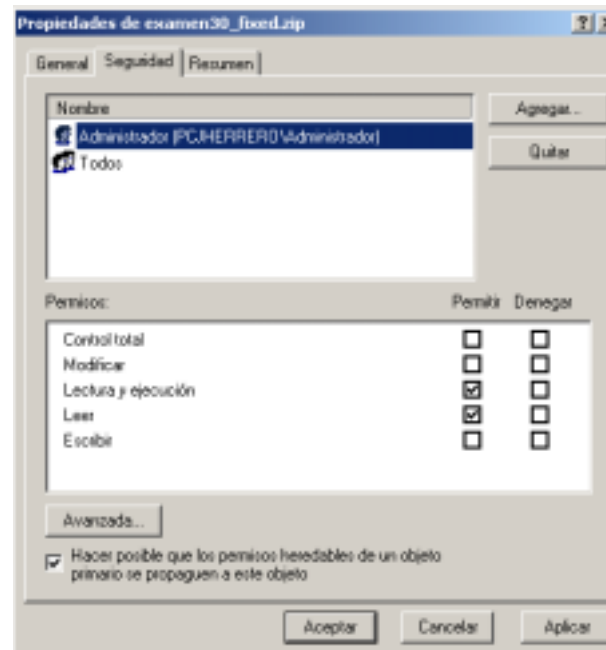
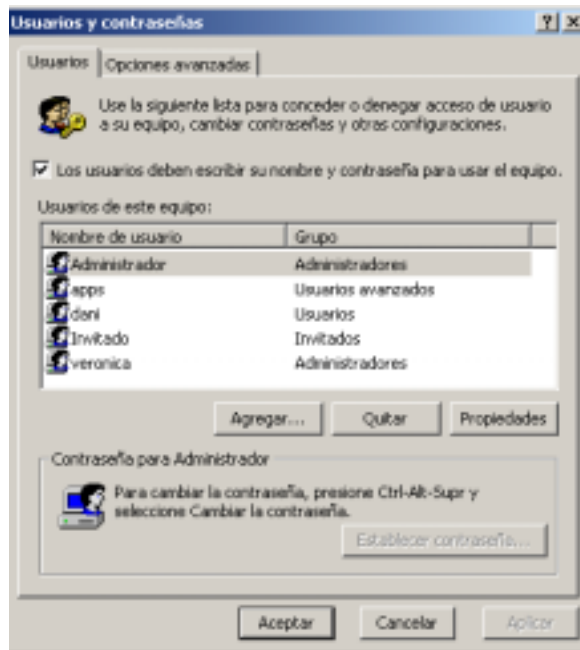
```

C:\WINNT\System32\telnet.exe
drwxr-xr-x 867 root root 14336 Jan 13 16:11 ..
-rw-r--r- 1 i185849 SI 6256 Aug 14 2001 .addressbook
-rw-r--r- 1 i185849 SI 4736 Aug 14 2001 .addressbook.lu
-rw-r--r- 1 i185849 SI 1307 Jan 22 20:42 .bash_history
drwxr-xr-x 10 i185849 SI 512 Nov 24 1999 .dt
-rw-r--r- 1 i185849 SI 3948 May 29 1998 .dtprofile
-rw-r--r- 1 i185849 SI 22 Oct 2 2001 .forward
-rw-r--r- 1 i185849 SI 8 Jan 19 1998 .news_time
-rw-r--r- 1 i185849 SI 11094 Feb 20 2002 .pine-debug1
-rw-r--r- 1 i185849 SI 13903 Dec 4 2001 .pine-debug2
-rw-r--r- 1 i185849 SI 10941 Aug 14 2001 .pine-debug3
-rw-r--r- 1 i185849 SI 15124 Aug 8 2001 .pine-debug4
-rw-r--r- 1 i185849 SI 15283 Feb 28 2002 .pinerc
-rwxr-xr-x 1 i185849 SI 1700 Nov 12 1998 .profile
-rw-r--r- 1 i185849 SI 8 Oct 17 1997 .signature
-rw-r--r- 1 i185849 SI 220672 Jun 16 2000 Winrisk.exe
-rw-r--r- 1 i185849 SI 566 Aug 14 2001 dead.letter
drwxr-xr-x 4 i185849 SI 512 Oct 31 2000 examplesC
-rw-r--r- 1 i185849 SI 75005 Jun 14 2000 filter.exe
drwxr-xr-x 2 i185849 SI 512 Feb 28 2002 nail
-rw-r--r- 1 i185849 SI 0192 Feb 16 1998 pinerc002240
-rwxr-xr-x 1 root root 45 Nov 27 2001 uuw -> /users/home/uuw/u
-rw-r--r- 1 i185849 SI 3691 Jan 22 1998 ~uuw
ue la:~>

```

## Operating System

- Former Windows versions using FAT file system did not offer any security options. Only the attrib command could be used but it was only useful to hide files and every user had the same rights on a file.
- Later versions, as Windows NT, 2000 or XP, used mainly in corporate sector allowed different profiles for different users. NTFS allows then to give different rights for each profile or group.



## Network config

- Today our computer is probably forming part of a community. A group of PC are connected forming a **LAN (Local Area Network)** in order to share information between them.
- The dialog between two computers will need something called a protocol in order to send information packets. Two of them would be:
  - **UDP:** Sends packets but it does not make sure they get the destiny. Used when high speed is required (audio or video in real time).
  - **TCP:** It is a *best effort* protocol. Takes care of packets and make the best it can to make them reach the final destiny.
- **IP (Internet Protocol)** works usually with TCP (**TCP/IP**). IP defines each computer must have an address. That address must be unique (it is illegal to take someone's IP address) and will allow our computer to be identified in the Internet. That address allows us to know the host and the net identifier.

## Network config

There are four IP addresses classes:

A Class (0-127)

<b>0 1 bit</b>	<b>@ net 7 bits</b>	<b>@ host 24 bits</b>
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B Class (128-191)

<b>10 2 bits</b>	<b>@ net 14 bits</b>	<b>@ host 16 bits</b>
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C Class (192-223)

<b>110 3 bits</b>	<b>@ net 21 bits</b>	<b>@ host 8 bits</b>
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D Class (224-239)

<b>1110 4 bits</b>	<b>@ broadcast</b>
--------------------	--------------------

# Network config

When working on a LAN we can find subnetting. That means we are splitting a net in smaller ones. To do so a subnet mask is used.

