
Home Computing Guide

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Preface

This document is intended to help new home computer users understand and learn how to operate a Personal Computer (PC). Advanced users should look elsewhere, although some information may be of use to intermediate users. This document can be used as a self-study guide, but is most effective when used under the guidance of a tutor. While this guide is intended for beginners, the following assumptions are made:

1. The user already owns or has access to a PC. This is not a PC buyer's guide.
2. The user knows how to power on and login to Microsoft Windows.
3. The user can at least type on the keyboard and use the mouse.

As the title of this document suggests, the fundamental or rudimentary concepts of home computing are presented in an abridged format. The topics presented represent the author's view of what a beginning computer user should be familiar with. Some concepts are just too broad to describe in great detail here, so just enough information is presented to introduce the reader to the subject matter. Readers are encouraged to do their own research into areas where they have a greater interest.

Even though many helpful hints and suggestions are included in this document, not all aspects of PC hardware and software are covered. The user is encouraged to obtain a good PC hardware and software reference. One of the best resources out there is *Upgrading and Repairing PCs* by Scott Mueller.

Introduction

Even though the IBM PC has been in circulation since 1981, it's still possible to meet people who confuse basic computer terms and concepts, for example, disk and memory. Currently the maximum amount of memory or RAM that can be used by a PC is 4GB. So, if you hear someone saying that they have more than 4GB of memory in their PC, they are really referring to their hard disk. A philosophical explanation for this may be that some users think memory is where their saved information resides because the computer remembers that information, hence the association with the word memory. Realistically, this misconception may have simply originated with the CHKDSK command in DOS, which reported the number of bytes total memory in the machine along with hard disk information.

Note:

Byte = 8 bits

Kilobyte (KB) = 1024 Bytes

Megabyte (MB) = 1024 Kilobytes

Gigabyte (GB) = 1024 Megabytes

Terabyte (TB) = 1024 Gigabytes

In this guide, the terms *computer* and *PC* are used interchangeably. Although many concepts discussed in this guide also apply to other computers such as the MAC, the discussion here is aimed at PCs running the Microsoft Windows operating system. The examples provided in this document refer to Windows XP.

I've organized this document around the following topics:

- Basic Computer Concepts
- Hardware Components
 - BIOS
- Operating System
- GUI (Graphical User Interface) Objects
 - Windows, Menus, Dialog Boxes, Text Fields, Drop-down Lists, etc.
- Command Line Interpreter (CMD)
- File System
 - Basic Mouse Operations
- System Tools
 - Disk Cleanup
 - Disk Defragmenter
- Advanced Concepts
 - Task Manager
- Networking and Internet
- Security
- Recycling

Conventions Used In This Document

The following notation is used to specify navigation:

[Root > Menu_1 > Menu_2 > . . . Menu_n]

For example:

[Start > All Programs > Accessories > Notepad]

Literal commands and key sequences are displayed in italics e.g., *systeminfo*.

Important terms and concepts are underlined.

Basic Computer Concepts

What is computing? Simply put, computing is any activity relating to the development or use of computer technology. For the general population however, computing is mostly data processing, as in:

Input -> Processing -> Output

Input is raw or unprocessed data that enters the computer through some input device; Processing is work that is done to the raw data; and Output is the result of that work normally referred to as information.

Computerized data processing is performed on a PC or any other type of computer for that matter. The PC is not a single entity but a system consisting of many components both hardware and software that enables a user to perform automated tasks or processes. The on-line encyclopedia Wikipedia gives the following definition:

“System is a set of interacting or interdependent entities, real or abstract, forming an integrated whole.”

To illustrate, let's take a look at another of a type of system that most people are familiar with and that is a Home Theater System. A Home Theater System is a group of individual components that work together to create an audio and video experience from information encoded on removable optical disc storage media. A Home Theater System consists of the following components:

- Television - LED, LCD or Plasma
- Speakers
- AV Receiver
- DVD / Blu-ray Player

In a Home Theater System, the TV, speakers, and DVD / Blu-ray player are the primary input / output devices in a sense that the keyboard, mouse, and monitor are on a computer system. The AV Receiver can also be considered an input device since it can receive radio signals. It's also both a processing and output device since it amplifies the audio signals that drive the speakers. All the components, with the possible exception of the speakers, have processors that run embedded software or firmware that controls the device and accepts user commands (input) from hand-held remotes.

Hardware Components

You can build a basic desktop PC using the following minimal hardware components:

1. Case or enclosure
2. Power Supply
3. Motherboard or system board
4. Processor or CPU
5. Memory (RAM)
6. BIOS (Basic Input/Output System)
7. Disk controller
8. Video Graphics controller
9. USB controller
10. Hard Drive
11. Network Interface card
12. Keyboard
13. Mouse
14. Monitor

Note: a network interface card is not really required but is necessary if you want to connect to a network or broadband Internet connection.

The case is usually a steel enclosure, although it could be plastic or aluminum, which is designed to hold the motherboard (MOBO) and other internal components. New cases are made to accommodate the ATX motherboard form factor. Cases are generally available in either tower or desktop configurations.

The power supply provides the electricity to the PC. They come in various wattages. The most common are the 90w to 750w varieties, subject to change of course.

The motherboard is the central component of the system. All components inside a PC communicate with each other over one or more data pathways or buses on the motherboard.

The processor is the heart of the system. This component is the actual computer in the PC. The processor executes program instructions in the system.

Memory is temporary or volatile storage also known as RAM (Random Access Memory). All computer programs are loaded into memory before they can run. The processor reads or fetches each program instruction from memory directly, unless that information is currently cached.

The BIOS or Basic Input / Output System is software that resides on a chip or integrated circuit. This software or firmware provides low-level interfaces to various system components.

The disk controller can be built-in to the motherboard or less likely on a separate interface card. The interfaces are either Serial Advanced Technology Attachment or SATA and Integrated Drive Electronics or IDE.

Note: Some newer laptops are now using solid-state drives.

The USB (Universal Serial Bus) controller provides an interface to USB peripherals such as printers / scanners, external hard drives, mice, and many other devices. The USB interface also provides power for low consumption devices, which eliminates the need for an external power supply.

The video graphics controller is a card that provides an interface to the monitor.

The hard drive provides the primary means of data and program storage in a PC.

The network interface card provides the interface to a local area network. Local area networks are networks with two or more computers that are normally located within close proximity of one another.

Keyboard, Mouse, Monitor, and Printer are all examples of input / output devices. These devices shouldn't need further explanation.

The following components are now commonly integrated into the motherboard:

- SATA and ATA / IDE controllers
- USB controllers
- FireWire controllers
- Bluetooth adapters
- LAN controllers

By taking advantage of these on-board device controllers, you free up the limited number of expansion slots available, which can then be used for other interface cards.

Hardware technology changes more rapidly than software. Over the years, many common devices and components have been replaced with newer technologies. For example, the following components can still be found on PCs but have, for the most part, become obsolete:

- Floppy drive controller
- Serial & Parallel I/O controllers
- Various removable storage media, e.g., 3.5"/5.25" floppy disks, CDs, Zip disks, etc.
- Dial-up Modems

The floppy controller is a card that provides an interface to the floppy disk drive. CDs and DVDs have replaced floppy disks and Zip disks due to their higher storage capacities. The demise of the floppy disk was accelerated by the availability of USB thumb drives and BIOSs that enable booting from CD / DVD media.

The serial / parallel controller is a card that provides the serial and parallel ports on the PC. In times past, mice were connected to serial ports, and printers were connected to parallel ports. Now, these devices are commonly connected to USB ports.

Modem is an acronym for **M**odulate/**d**emodulate. A modem is a device that converts binary information used by the computer to analog information that can be transmitted over standard phone lines. A modem is required in order for your PC to access the Internet over a dial-up connection. Broadband or high-speed connections have replaced dial-up in most parts of the U.S.

BIOS

The BIOS or Basic Input/Output System is probably one of the least understood components in a PC. The BIOS is actually software or firmware that resides on an EEPROM (Electrically Erasable Programmable Read Only Memory) or EPROM (Electrically Alterable Programmable Read Only Memory) chip on the motherboard. The newer BIOS versions can be upgraded without having to replace the physical chip. This type of BIOS is called a flash BIOS and the process of upgrading this type of BIOS is referred to as **flashing**. BIOS upgrades were necessary on older machines to enable support for larger hard drive capacities, for example. And in the late '90s, the primary reason to upgrade was to support Y2K.

The BIOS is responsible for initiating the bootstrap sequence, i.e., loading the operating system whenever the PC is restarted or powered on. In addition to loading the OS, the BIOS also:

- Performs a power-on self-test (POST)
- Identifies, tests and initializes system devices
- Checks CMOS (complementary metal oxide semiconductor) settings

If you have a desktop or tower PC, then it is more important that you know how to configure the BIOS settings. Desktop and tower PC owners are more likely to replace or upgrade any hardware component in the PC. Laptops are usually not upgraded except for the possible exception of adding extra RAM or replacing the hard drive for one with more capacity.

The BIOS identification and status messages are the first things you see when booting a PC. You can access the CMOS settings at boot time by pressing a predetermined key, usually the Delete key or a function key such as F2. Most BIOSs will display the key you need to press in order to enter the CMOS configuration. If you catch it in time you will be presented with the CMOS configuration screen.

Once inside the CMOS setup program your mouse will not work. You will need to navigate using the arrow keys on your keyboard. Try accessing the CMOS setup the next time you boot your PC. Don't worry if you happen to change some settings inadvertently. When you exit the program choose the "Exit Without Saving" or equivalent option so that your changes are not saved. If you

really mess things up you can always reset the settings to their default values by choosing the appropriate option in the configuration program.

The CMOS is where the system date and time is stored and is also the reason why desktop PCs have motherboards that contain a small on-board battery. The battery provides enough power to enable the CMOS to preserve system settings even when the PC is powered off.

After about 5 years or so, the battery will drain out and won't provide enough power for the CMOS to hold its settings. You will know this has happened because whenever you boot your PC you will be prompted to reset the system date/time, which is very annoying. The CMOS battery is a user serviceable component. That is, you don't have to take your PC to a service technician to replace it. If you have enough confidence to open your case and expose the motherboard then you are probably capable enough to replace the battery. All motherboards are different but most likely yours uses a CR2032 Lithium 3-Volt Coin Cell Battery which can be purchased at Target, Wal-Mart, and other stores.

Operating System

The most important piece of software that runs on a computer is the operating system. Everyone knows some examples of the more famous (or infamous) PC compatible operating systems. The following is a list of some of the more popular ones:

- MS-DOS, PC-DOS, DR-DOS
- iRMX 86 (Intel)
- Microsoft Windows versions: 3.x/3.1x, 95, 98, 98SE, Me, NT, 2000, XP, Vista, 7 and 8
- OS/2 Warp (IBM)
- UNIX
- OS X Lion (Apple)
- FreeBSD
- Linux
- Inferno (Lucent)
- Coherent (Mark Williams Company)

“An operating system is a computer program that provides an environment in which other computer program can run...”¹ From a programmer’s perspective, the OS simplifies the application development process by providing services, using application program interfaces or APIs, that application code can use to access the computer’s hardware resources. From a user’s perspective, the OS *is* their interface to the computer. All modern PC operating systems are multitasking OSes. Multitasking allows multiple programs to run at the same time. For example, a user can be printing a document from Word while surfing the Internet in Firefox. The perception is that both programs are running simultaneously when in fact only one program is running at any give time—assuming a computer with a single processor. OSes perform multitasking by allowing multiple programs or applications to share the processor for short periods of time, called a time slice, using round-robin or other scheduling algorithms.

Windows XP is a 32-bit operating system. This means that the instruction set is 32 bits long, which translates into faster program execution. The PC’s processor architecture must be compatible with the OS. For example, 16-bit OSes can run on 32-bit processors but 32-bit OSes will not run on 16-bit processors. Windows Vista and 7 are 64-bit operating systems.

Hint: run the system information command, [Start > All Programs > Accessories > System Tools > System Information], to determine if you are running a 32-bit or 64-bit operating system. If the System Type is “X86-based PC” then it is a 32-bit OS.

Windows 8

If you can believe the reviews on Amazon.com, Windows 8 is a major stumbling block for a lot of desktop users. Technology changes all the time and by now it should be expected. Microsoft is criticized if it puts out new versions of Windows that look and feel a lot like previous versions. Now, they put out a new Windows version that is really different and the same folks start whining and complaining that it’s *too* different. More troubling is the fact that you also hear these complaints from seasoned computer users.

I’m an IT professional who is also old school; but it didn’t take me very long to figure out how to use the new interface. All it took was a little patience and a few Google searches to uncover the secrets to finding the familiar features that we have all come to know and love.

¹ Inside Windows NT by Helen Custer

Windows 8 Tips

The following tips assume that you are using Windows 8 with only a keyboard and mouse, not a touch screen.

Windows 8 has replaced the Start Menu with a Start screen or view.


Right-clicking in the lower leftmost corner of the screen in either Desktop or Start displays a popup with the following options:

Programs and Features
Power Options
Event Viewer
System
Device Manager
Disk Management
Computer Management
Command Prompt
Command Prompt (Admin)
Task Manager
Control Panel
File Explorer
Search
Run
Desktop

Access the Windows 8 Charm Bar by moving the mouse pointer to the upper edge of the screen and then move the mouse pointer over to the right corner; it is not necessary to click. The Charm Bar will open along the right edge of the screen. The following charms are provided:

- Search
- Share
- Start
- Devices
- Settings

If you are in Start and you need to access an app, setting or file, you can just start typing the name and Windows 8 will display the results, including the number of results found in each category.

There are a number of Windows Logo key  shortcuts that are useful. Here are a few of the more useful ones:

Windows logo key	Open or close the Start menu
Windows logo key + D	Display the desktop
Windows logo key + M	Minimize all windows
Windows logo key + E	Open Computer
Windows logo key + F	Search for a file or folder
Windows logo key + L	Lock your computer or switch users
Windows logo key + R	Open the Run dialog box
Windows logo key + T	Cycle through programs on the taskbar

To close an application from the Start screen, click on the top of the application and drag it to the bottom of the screen.

Right-click on a tile in Start and a list of options displays across the bottom of the screen. Some of the available options are: Uninstall, Open file location and Unpin from Start. There is also an All Apps choice.

File System

Before the operating system or any application can be loaded on a PC, the hard disk must be partitioned and formatted. The operating system installation process normally performs hard disk partitioning and formatting.

There are many types of file systems. Windows XP supports the FAT32 file system. The FAT32 file system supports hard drives up to 2 terabytes in size. One of the earliest and most simplistic file systems was FAT (File Allocation Table). FAT uses the traditional 8.3 file naming convention. Later file systems such as NTFS and FAT32 support file names up to 255 characters.

The best way to view and manipulate the file system on a Windows PC is by using the Windows Explorer, [**Start > All Programs > Accessories > Windows Explorer**]. Windows Explorer provides a hierarchical tree structure representation of the file system using an object or control derived from the Windows Treeview class (refer to the GUI Objects section later in this document). Using the Treeview control in Windows Explorer, users can create, delete, rename, and copy and move files and folders. Right mouse click on a file or folder and then select Properties from the menu displays the object's properties.

System Tools

In this section we will look at two tools for performing disk maintenance. Both tools are accessible from the [**Start > All Programs > Accessories > System Tools**] menu. The two tools are:

- Disk Cleanup
- Disk Defragmenter

The Disk Cleanup utility allows you to free up space on your disk, usually volume C: but it could be any partition on your hard drive. Figure 1 below shows the amount of disk space that can be released after running Disk Cleanup on volume C:

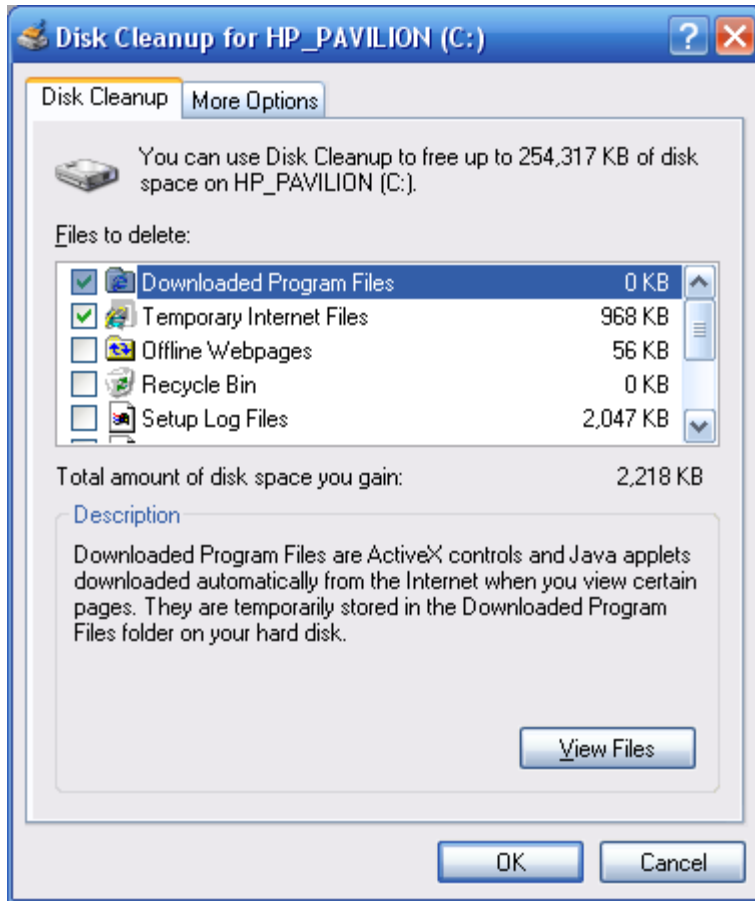


Figure 1

It is recommended that the Temporary Internet Files and Temporary Files options be selected for cleanup. You may want to examine the contents of the Recycle Bin before deleting just to make sure that you don't need to restore any previously deleted files or directories. Once the Disk Cleanup utility executes, the files or locations selected for cleanup are deleted and can't be recovered—at least not by conventional methods.

The Disk Defragmenter compresses non-contiguous or fragmented files and folders by physically reorganizing them into contiguous locations on the hard drive. This differs from the copy and move commands where only the file allocation tables are updated but the physical files or folders remain in their original locations. The theory behind file compression is that the seek time of the disk's read/write head is optimized resulting in improved system performance.

Hint: prior to running the Disk Defragmenter, it's only logical to run the Disk Cleanup first. It doesn't make any sense to compress files that will only be deleted later. Also, prior to running Disk Defragmenter, close all running applications and backup critical data files.

Advanced Concepts

In this section we will look at the Windows Task Manager. The Task Manager is invoked using the *Ctrl-Alt-De*/key sequence. This key sequence was affectionately known as the "three-finger salute" on earlier DOS and Windows operating systems because it was used to reboot the machine. On Windows XP, the command is used to invoke the Task Manager.

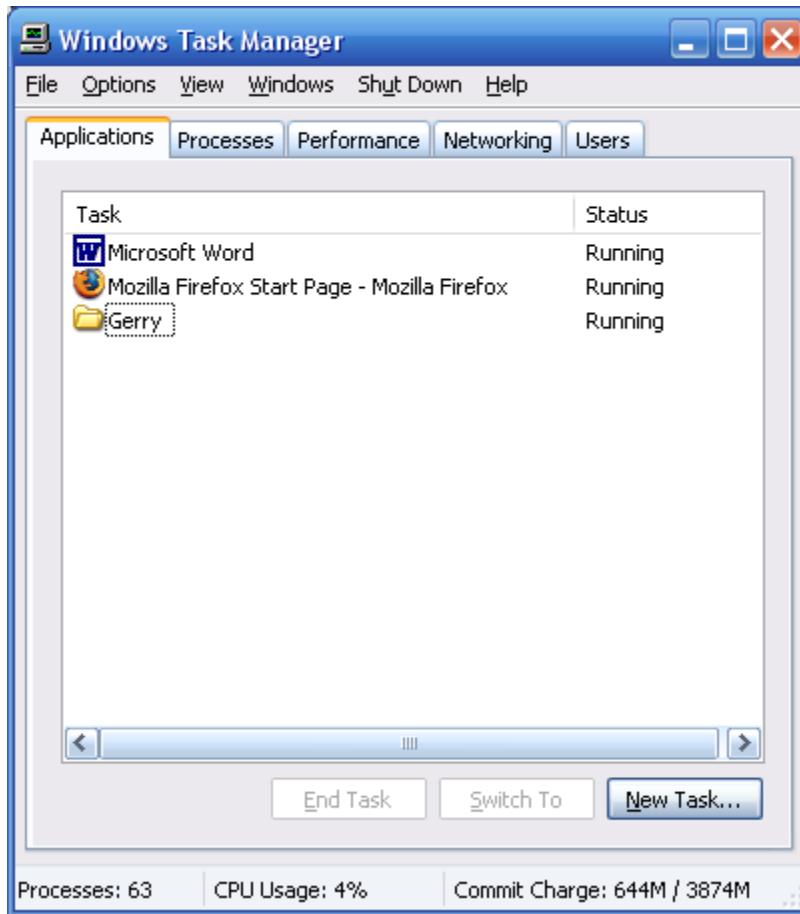


Figure 2

The Task Manager display shown in Figure 2 lists the running applications: MS Word, Firefox, and a folder.

The Task Manager is primarily used to *kill* hung applications and processes. You may have had, on occasion, a program that seemed to stop working or was not responding to your mouse or keyboard actions. Instead of trying to reboot your PC, invoke the Task Manager first and if the application status is listed as "Not Responding" then select that application and click the End Task button.

Another frustrating situation is when an application refuses to launch after you double-click on a program icon multiple times. The problem may be that the process is already running and the application in question won't allow multiple instances to run at the same time. In this case, click on the Processes tab in the Task Manager and try to find the process name that resembles the application you are having trouble with. For example, Microsoft Word is listed as WINWORD.EXE as shown in Figure 3.

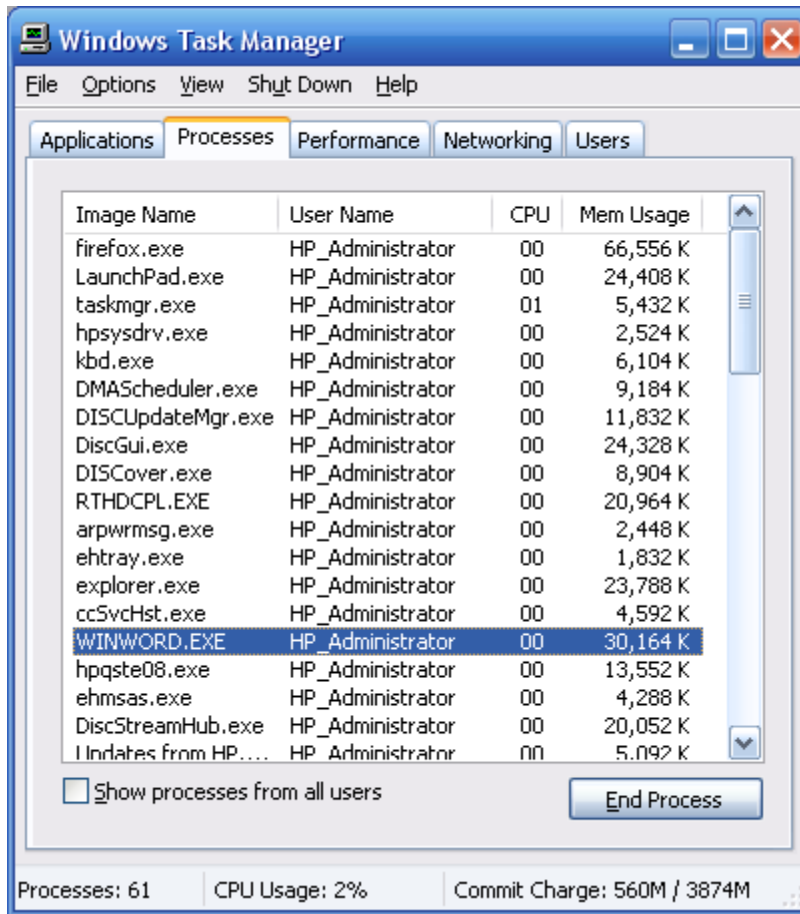


Figure 3

Once you have identified the offending process, select that entry and click the End Process button. Care must be taken when killing processes. If you kill a system process your PC may stop working correctly. In that case, you have no choice but to reboot the machine to recover.

Windows Desktop

The Windows desktop is what is presented to the user after the user logs in to the system. The desktop contains the Windows Start menu; file, folder and program icons; and the taskbar. The taskbar will also contain rectangular icons for all running applications, such as Internet Explorer, Word, and File Explorer. A list of Quick Launch icons will be displayed on the far right side of the taskbar.

GUI Objects

Window

It is useful to be able to identify the different objects that appear in the Windows GUI (Graphical User Interface). In Microsoft Windows, the fundamental object is the Primary or Main Window. Applications such as Microsoft Word and Internet Explorer are displayed in a main window. Formally, there are many different window types. However, in this document the window object is referred to generically. The only exception being a special window called a dialog box.

Most non-modal windows (discussed later) will have three icons or boxes in the right-hand corner of the window title bar. These icons allow you to perform the following operations window described in order from left to right:

Minimize	Minimizes the window to an icon in the toolbar.
Restore/Maximize	Toggles between restore or maximize depending on the window's current state. Maximize displays the window to the full size of the display. Restore brings the window to the size the user previously configured.
Close	Closes the window.

If the window is already maximized, the middle box will look like the icon in Figure 4. If the window is restored down, the middle box will look like the icon as shown in Figure 5.



Figure 4



Figure 5

Input-Output Controls

A window can contain any number of objects or controls. The common data input-output controls are:

- Text box
- List box
- Check box
- Drop-down list
- Combo box
- Radio list
- Scrollbar
- Slider
- Spinner

Text box - is probably the most common data input control. This control allows the user to pass text information to an application. The example below shows the text string “ullldddllll” entered in the Password Blueprint text box.



Figure 6

List box - a control that allows the user to select from a static multi-line text box. If enabled, the control allows multiple selections using the Shift key along with a left-button mouse click. In the example below, the item “Autumn” is selected. This list box also includes both horizontal and vertical scroll bars.

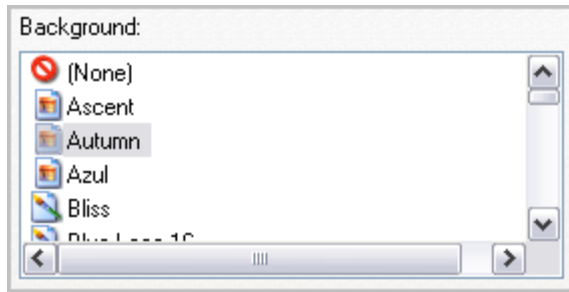


Figure 7

Check box - a control that allows the user to make multiple choices by checking boxes from a number of available options. Check boxes can be either checked or unchecked as show below.

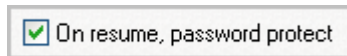


Figure 8

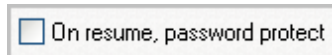


Figure 9

Drop-down list - a control that allows the user to choose only one value from a list of options.

The options are visible when the user clicks on the (activation) part of the control.



Figure 10

Combo box - a control that is a combination of a drop-down list and text box. This control allows the user to either type in a value, in the text box, or select from the drop-down list. The combo box looks exactly like a drop-down list without a default selection.

Radio list - a control, identical in functionality to a drop-down list, which presents the user with options that are displayed as circular buttons. This control was named after older car radios that had buttons you would push in to select preset stations. When a new button is pushed in the previously pushed in button would pop out. Figure 11 shows a radio list with two choices. The user can only select one option. If the "I am a new customer" option is selected, then the "I am a returning customer..." is automatically deselected.

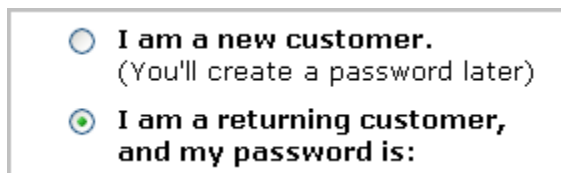


Figure 11

Scrollbar - a control allowing the user to scroll through a display of information, either horizontally or vertically. The user scrolls by either clicking on one of the scroll arrows, top or bottom, or by

dragging the scroll box along the trough. The scroll box changes size proportionally based on the quantity (vertical) or width (horizontal) of data available.

Figure 12 shows a vertical scroll bar and Figure 13 shows a horizontal scroll bar.



Figure 12



Figure 13

Slider - a control that allows the user to drag a pointer or indicator along a track representing different values.

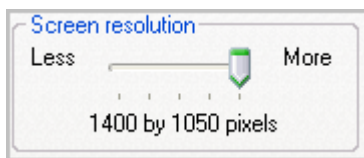


Figure 14

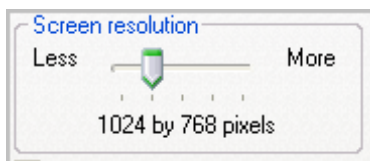


Figure 15

Spinner - a control that allows the user to adjust the values in an adjacent text box. The user can click the up or down arrow which causes the values in the text box to either increase or decrease, or values can be typed directly in the text box.

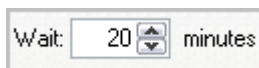


Figure 16

Menu

The menu is probably one of the most used objects on the GUI. The menu provides an unordered list of commands that the user can select from. For example, when you click on the Start button in the toolbar, what appears is the Windows Start Menu, Figure 17. From this menu, you can select from a number of commonly used functions and programs.



Figure 17

Figure 18 shows the IE (Internet Explorer) menus.

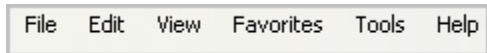


Figure 18

Dialog Box

As mentioned at the beginning of this section, the dialog box is a special type of window. As the name implies, the dialog box is used to present information and/or solicit responses from the user. That is to say, the system is having a *dialog* with the user.

Figure 19 shows a dialog box informing the user that he/she is about to overwrite an existing file. The user must respond with Yes or No. Closing the window means No. This dialog box is modal. That is, you must dismiss the dialog box in order to return to the window that caused it to appear.

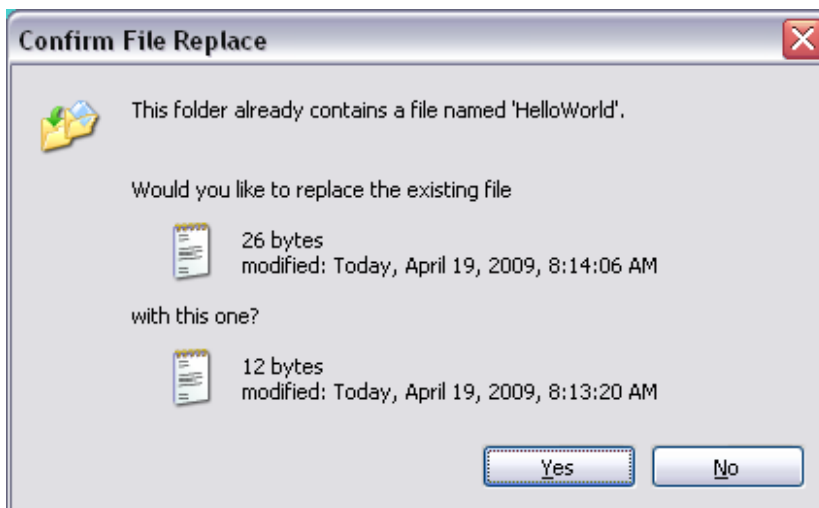


Figure 19

Another common dialog box is the Confirm file Delete. Again the user must respond to continue with the operation.



Figure 20

Using the Mouse

As mentioned earlier in this document, the mouse is an I/O device similar to the keyboard in that they both allow the user to provide input to the system. The input can be either data or commands. In the case with the mouse the input takes the form of commands as in point and click. Some of the common commands and functions are discussed later in this section.

Mouse Types

Technically, there are many types of mice, but really only two types are readily available today which are the following:

Optical Scrolling - USB
Optical Scrolling - Wireless

Hint: don't try to use your optical mouse on a clear glass top table. If you do, then use a mouse pad.

In the past there were two-button, three-button, trackball/roller ball, bus, serial, and PS/2 varieties. All these legacy mouse types have become obsolete. In addition, the 2-button roller ball species is all but extinct. This type of mouse required regular maintenance in the form of washing the roller ball and cleaning the contact wheels to keep it tracking accurately.

Note: most Microsoft Windows users don't realize that the scroll wheel on their scrolling mouse also functions as a 3rd button. However, users of X Windows applications on UNIX systems are well acquainted with the use of the middle or 3rd button.

Mouse Operations

In this section I'll discuss some basic mouse operations that every PC user should know how to perform. These operations are:

- Left click
- Right click
- Cut and paste
- Drag and drop
- Scrolling

The left mouse click is fundamental. The left mouse click is used to make selections; invoke operations; and open links in a browser. It is also used to position the insertion pointer in a text field or in a document. Double-clicking with the left mouse button on a program icon, such as Internet Explorer, launches the program. The double-click function is speed sensitive. That is, if there is too much or too little delay between the first and second click, the double-click function might not be recognized. On the other hand, executing a slow double-click on a file or icon name, in Windows Explorer for example, will allow you to edit the text. This can also be done with a right mouse click.

Hint: Your mouse settings can be customized in the Windows Control Panel, [Start > Control Panel], by double-clicking on the Mouse icon.

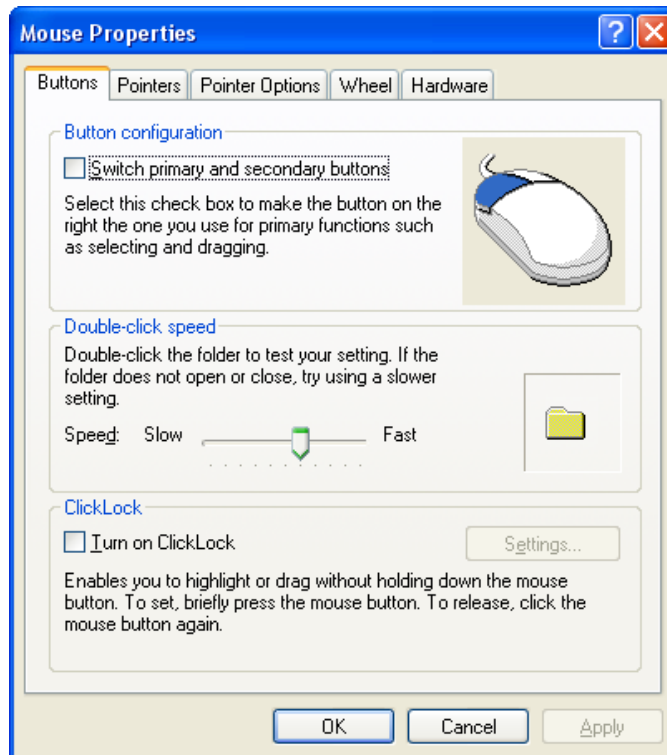


Figure 21

The right mouse click is context sensitive. That is, the functions that are available vary depending on what object you click on. You can right mouse click on any object at any time in Windows. The right mouse click is commonly used to perform operations on a file, such as Cut, Copy, Delete, Rename, etc. It is also useful for viewing an object's properties.

Cut and Paste are editing operations. The term cut and paste originated in the days when document editors would use scissors to cut out a section of text and then use glue to paste the cutout section in another area of the document. In computer terms, when the user cuts or copies text, the text is first placed in the Windows clipboard. When the user performs a paste operation, the text is retrieved from the clipboard. The clipboard is a temporary storage area that is available to Windows and all running applications. Each time an entry is placed in the clipboard, the previous entry is overwritten. The following is an example of cut and paste using Notepad, a simple text editor supplied with Windows.

The text string: " Every boy good deserves favour." was typed in to Notepad. Obviously, there is a typo in the text. What we want to do is move the word "good" in front of the word "boy." We could simply backspace out the text then retype the remaining words after "boy." but this time we will use cut and paste. The following steps illustrate the technique:

1. Using the mouse, left click and hold down the mouse button to position the insertion character before the word "good" then while still holding down the mouse button, drag the mouse over the word "good " including the space character to the right of the word. Release the left mouse button to complete the selection as shown in Figure 22 below.

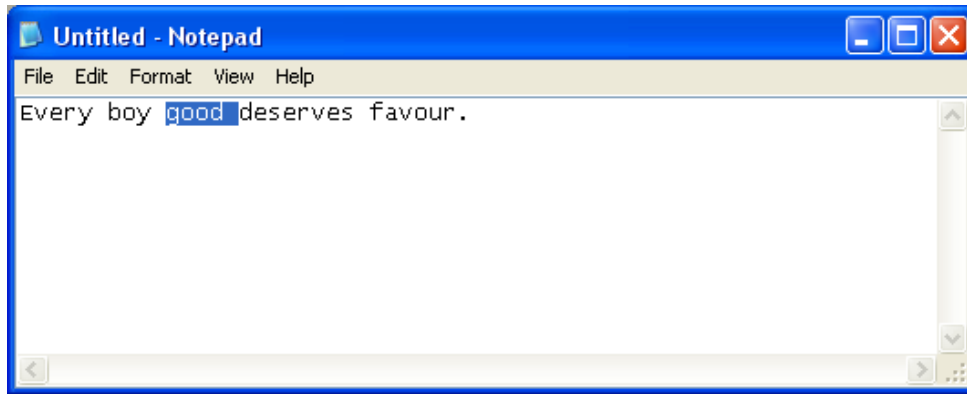


Figure 22

2. The next step is to cut out the text so that we can paste it in front of the word "boy." Some users prefer to do the cut operation using the key sequence *Ctrl-x*. This can also be done by right clicking on the selected text and then selecting Cut from the menu. After performing the cut operation, the selected text is removed from the document and placed in the Windows clipboard as shown in Figure 23.

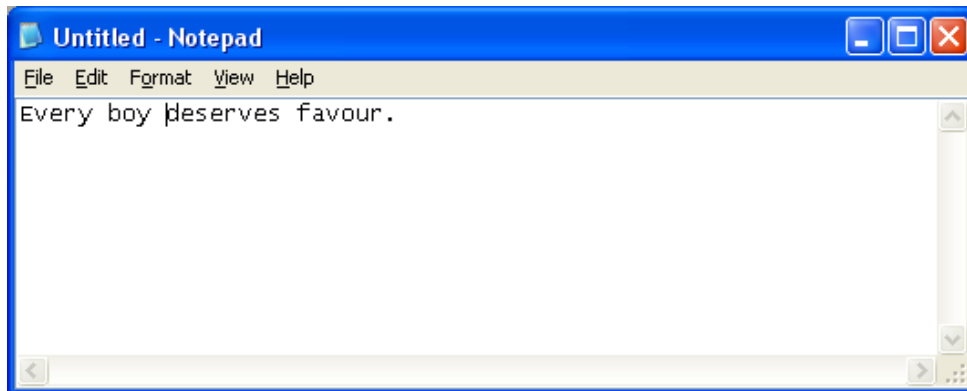


Figure 23

3. The final step is to paste the text in its new location in the document. Position the insertion character in front of the word "boy" using a left mouse click. As in the cut operation, there are two ways to do the paste. Again, some prefer to use the key sequence *Ctrl-v* but you can also right click and then select paste. The document should now look like Figure 24.

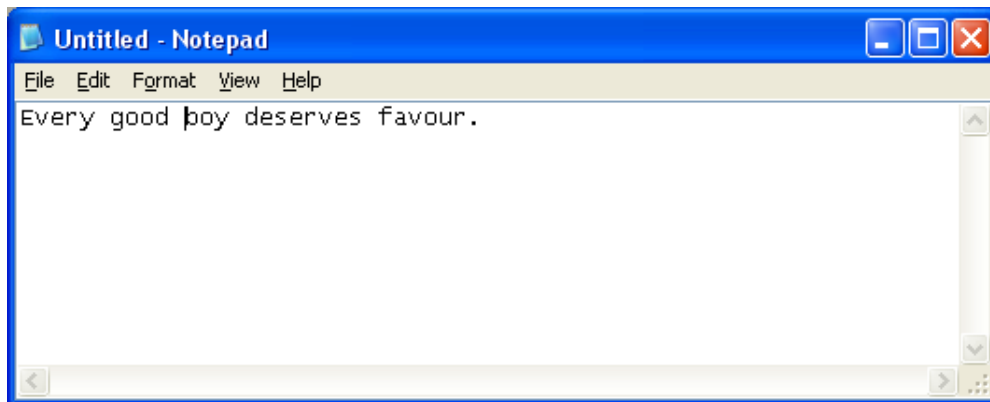


Figure 24

The copy and paste operation is very similar to the cut and paste operation. The difference is that *Ctrl-c* or the menu option Copy using the right mouse click is used to copy the text. In the copy operation the text is not removed from the document when placed on the clipboard.

Drag and drop is mostly used to move or copy virtual objects to a new location. This operation is used frequently in Windows Explorer for moving files to different locations in the file system. Drag and drop is performed using the following steps:

1. Right click on the virtual object without releasing the mouse button.
2. Drag the object using the mouse to the new location.
3. Release the right mouse button to drop the object in the new location.

Scrolling using the mouse is done with the scroll wheel (no surprise). The scroll wheel only performs vertical scrolling. You need to use the horizontal scroll bar in order to perform left-right scrolling. In order for the scroll to work, you must first left click to set the focus on the document, frame or control that allows vertical scrolling.

Note: setting the focus enables the window or control to accept mouse and/or keyboard input.

Windows Command Interpreter

The Windows Command Interpreter has been known by a number of different names in different versions of Windows including: Command Prompt, Shell, DOS Prompt, and DOS Window. To be clear, the command prompt in Windows XP is not DOS. DOS was a 16-bit operating system and Windows XP is a 32-bit protected mode system. This distinction should not be a concern for the average user, but there are technical differences between the two.

The command interpreter provides the average user with a number of useful built-in commands. Some of the more frequently used commands are:

File System

- *dir*
- *cd*
- *attrib*

File Viewing

- *type*

Configuration Information

- *ipconfig /all*
/release
/renew
- *systeminfo*
- *ver*

Disk Utilities

- *chkdsk*

The command interpreter is invoked from the following menu option: [**Start > All Programs > Accessories > Command Prompt**]. The command prompt runs in a window as shown in Figure 25.

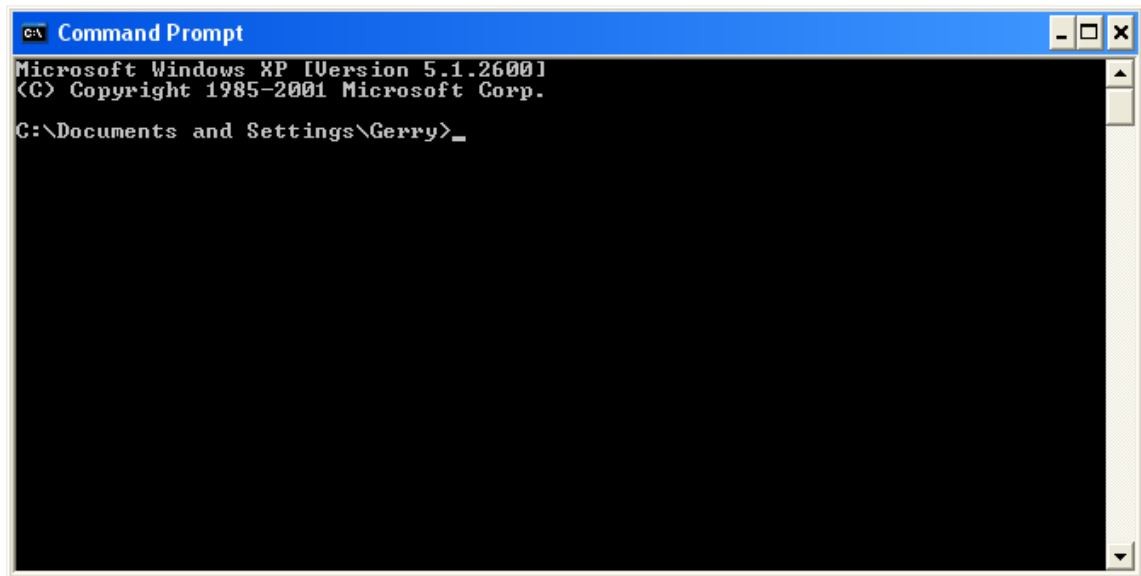


Figure 25

Notice that the insertion character now resembles an underscore character instead of the vertical bar as in other Windows applications.

File System

For the most part, advanced users use the command prompt to perform file and disk operations and to view information about the hardware and software environment. The *dir* command displays the contents of the current folder or directory. Figure 26 shows the *dir* command executed on the folder C:\Documents and Settings\Gerry.

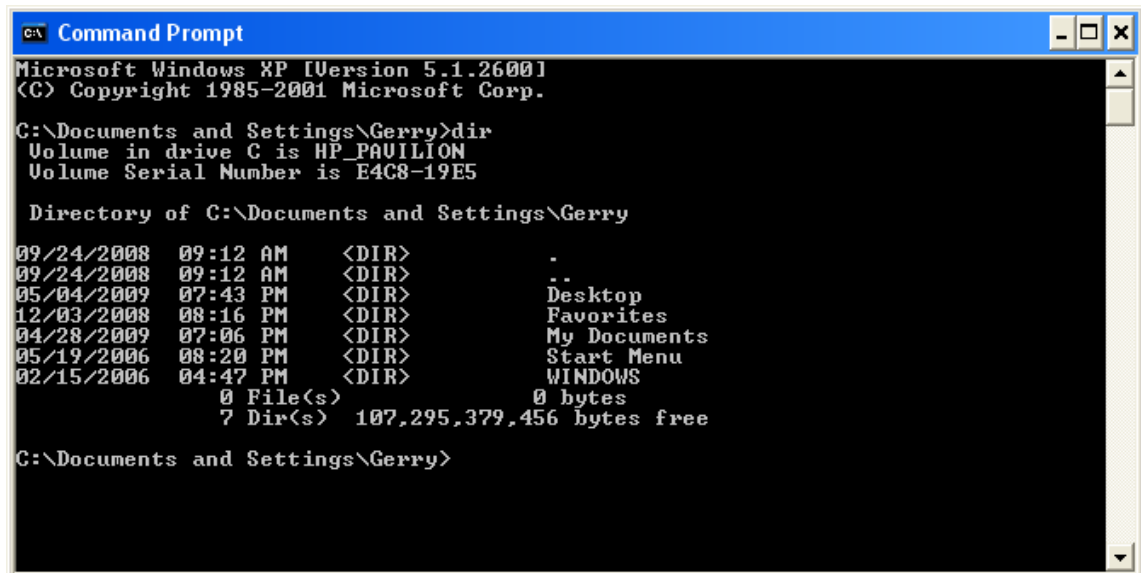


Figure 26

The *cd* or change directory command enables the user to navigate through the file system.

Note: the examples shown so far have been on the C:\ drive. The user can change the drive by simply typing in the drive letter, D: for example, and then pressing the Enter key.

The `cd..` command form is used to back up one directory level. Typing `cd\` backs up to the drive root, C: in our examples.

The `attrib` command allows the user to set the following file attributes:

- Read-only
- Archived
- Hidden
- System

Typing the `attrib` command alone without any options displays the properties for each file in the current directory.

Hint: most commands have options or switches. To display the available options for any valid command, type the command followed by a space then the characters: /?

The `type` command is used to display to contents of a file on the computer screen. This command is only useful for flat text files, e.g., files with a `.txt` extension. If the file contains more lines of data than can be displayed in one screen, then run the command and pipe the results as follows: `type | more`

Configuration Information

For network information, the command to use is `ipconfig` (IP Configuration). What the command does and how much information it displays depends on what switch is used with the command. For example, if you need to display all possible network configuration information use `ipconfig /all`. If you are having connection issues possibly as a result of an unexpected outage, you may have to renew the IP address. This is done using the following commands in the order given:

```
ipconfig /release  
ipconfig /renew
```

A quick way to find out what operating system version you are running is to use the `ver` command. This command is useful if you have to make a call to tech support. Instead of fumbling around trying to follow the tech's instructions over the phone, run the `ver` command before you call and you will have the information right at your fingertips.

For displaying more detailed system configuration information use the `systeminfo` command.

Disk Utilities

`Chkdsk` is a useful utility to run if you suspect that you're having disk problems. The `Chkdsk` utility performs a logical check of your disk and also provides a status of your disk usage. In order for the command to repair any errors, it must be run with the `/F` switch.

The following is an example of a `Chkdsk` report run on a small thumb drive. Note the command was run without the `/F` switch so no attempt would be made to fix errors if any were found. Also, the drive letter H: was specified in the command. Also note that the command no longer reports the total memory in the machine, as did the DOS version of the command.

```
C:\Documents and Settings\Gerry>chkdsk H:  
The type of the file system is FAT32.  
Volume Serial Number is 0DD1-0074  
Windows is verifying files and folders...
```

File and folder verification is complete.
Windows has checked the file system and found no problems.

2,041,733,120 bytes total disk space.
61,440 bytes in 6 hidden files.
278,528 bytes in 67 folders.
103,682,048 bytes in 583 files.
1,937,707,008 bytes available on disk.

4,096 bytes in each allocation unit.
498,470 total allocation units on disk.
473,073 allocation units available on disk.

In the days of DOS when a large hard drive was maybe 20MB, the *Chkdsk* command ran rather quickly. However with gigabyte and now terabyte hard drives filled with applications, photos, music and video files, the command will run forever, or just seem that way.

Hint: typing CTRL-c in the command window will terminate the currently executing command.

Home Networking

The most common type of network that is set up in a home or small office is a peer-to-peer (P2P) network. Using Windows, this is done by setting up a workgroup. Each PC in the workgroup can be configured to share resources such as files, printers, and other devices. Depending on how the PCs in the P2P network are set up, they may all have equal responsibilities for sharing resources. This differs from the concept of a client-server configuration where a single PC is responsible for acting as a file or print server, for example.

Internet

For anyone who has seen the film *Terminator 3: Rise of the Machines*, you already have some idea of what the Internet is. In the film, the characters John Connor and Kate Brewster tried unsuccessfully to find the location of Skynet. As they discovered, Skynet wasn't a single centralized computer but a vast network of computers being controlled by rogue software code or virus that spread throughout the network. The description of Skynet as being a vast distributed computer network is a not-so-subtle reference to the Internet—even though the term wasn't really mentioned in the movie. Therefore, put simply, the Internet can be considered a “network of networks.”

PCs in a home network access the Internet over a broadband connection through a router. A single PC can connect directly to a cable or DSL (Digital Subscriber Line) modem. Routers normally provide both wired and wireless access. The router is connected to either a DSL/cable modem directly or through a telephone adapter (TA) if the user has VoIP (Voice over IP) telephone service. The DSL/cable modem provides the connection to an Internet Service Provider.

Hint: if your VoIP provider supplied you with a Telephone Adapter/Router, such as the Vonage V-Portal Phone Adapter with 1 Port Router, then the TA should be placed behind your existing router.

Internet Service Providers (ISPs) provide access to the Internet for the general public. Tier 1 ISPs have direct access to the Internet backbone. Non-Tier 1 ISPs purchase Internet access from one or more upstream ISPs before reaching a Tier 1 carrier.

Network service providers including: telecommunications companies; wireless communications providers; Internet Service Providers (Tier 1); and cable television operators all provide direct backbone access to the Internet. Some of these carriers include AT&T, Comcast, and others.

To illustrate, the simplified diagram in Figure 27 shows 3 possible access paths that a home PC may take to connect to the Internet. The Router and Telephone Adapter are optional components.

Hint: if you're using a wireless router you need to secure it. Use WPA-Personal (Wi-Fi Protected Access) for the security mode, which is stronger than WEP (Wired Equivalent Privacy), and select a strong Passphrase. The following actions are also recommended: set up MAC Filtering to restrict access by MAC address; disable SSID (Service Set Identifier) Broadcasting; disable remote configuration; and assign a new router configuration password.

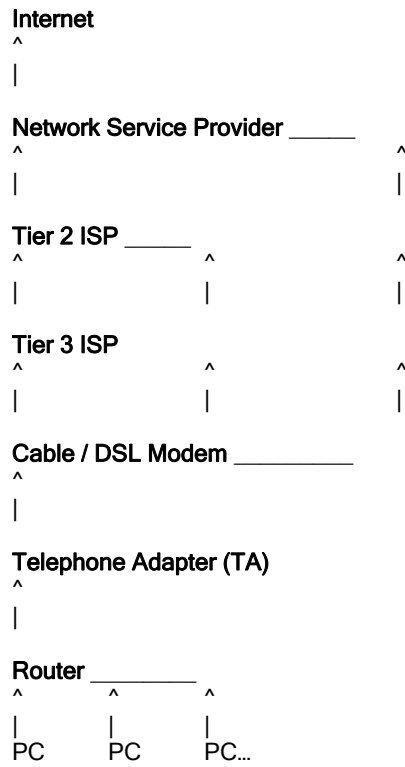


Figure 27

While high-speed or broadband Internet access is the norm in the U.S. and other countries, many ISPs continue to provide dial-up service and many laptop computers are still sold with built-in modems for dial-up access.

Note: PCs are connected to routers and cable/DSL modems using CAT-5 or CAT-6 Ethernet cables with RJ45 connectors. PCs connecting to the Internet using a dial-up modem connection use standard telephone cables with RJ11 connectors. Both connectors look similar but the RJ11 connector is smaller than the RJ45. Also, the telephone cable is a flat, narrow ribbon cable whereas the Ethernet cable is round. They are not interchangeable.

Security

Passwords

Even in this age of identity theft, a lot of people are still careless when it comes to creating passwords for their on-line accounts. At a minimum, no password should be less than 6 characters. Many sites require a minimum of 8 characters. Minimally, passwords should contain

upper case, lower case, and numbers. Strong passwords also include special characters, e.g., #, %, ^, and &. A good rule to follow is:

If a password is easy to remember then it is probably easy for a hacker to break.

Don't use your phone number, address or other information that can be easily guessed. Also, it isn't a good idea to use the same password for different accounts and/or Internet sites such as using the same password for Amazon.com and your on-line banking account.

Hint: if you can't think of good random passwords, then Google "password generators" and pick an application that you feel comfortable using.

You've probably been asked, at one time or another, to enter some answers to security questions when creating an on-line account. Were you ever tempted to enter *real* information? To be safe, create fictitious answers to those questions asked such as "Name of your first pet," "Mother's maiden name," "Where you went to high school," etc. Also, having to reenter all your credit card information in on-line shopping sites is annoying, but never select the option to save credit card information for future purchases.

Of course, creating many unique passwords presents the problem of maintaining and remembering them. Don't write them down and don't save them all in a text file on your hard drive. A file named "passwords.txt" is a Hacker's dream. You can search the Internet for password manager programs that can be downloaded free or at a reasonable cost. Most password managers allow you to export the information to a thumb drive, for example, which can then be secured in a safe deposit box.

Hint: never, ever send sensitive personal information in an unencrypted email!!

Virus Checkers

The only point to be made here is to keep your virus definitions up to date. That means renewing your subscription yearly. Letting your virus protection lapse is a good way to lose your hard drive. Don't think it's worth the money to renew? How much time, money, and aggravation do you think it will take to rebuild your PC from scratch? Especially if you haven't backed up your system or can't find your installation CD/DVD. Many ISPs now provide free virus software for their subscribers.

Data Deletion

Contrary to popular belief, deleting a file and then emptying the recycle bin does not remove the file from the drive. Deleting a file simply removes its reference in the file allocation table—the file is not physically removed. Reformatting the drive will not erase deleted files either. Running Disk Defragmenter on the drive may erase part or the entire file, but this is not guaranteed. The only way to ensure that the file is removed is to wipe it by overwriting the file with random information. Programs are available which allow you to view and/or recover deleted files. Identity thieves are well versed in the use of these data recovery techniques. Using products such as WipeDrive and MediaWiper from [White Canyon Software](#) is highly recommended to ensure drives are safely wiped clean. Removable media such as flash/thumb drives, floppy disks, Zip disks, and other rewriteable media containing sensitive information should also be wiped before being discarded, recycled or reused.

Recycling

All computers and other electronic equipment should be recycled. Computer equipment contains many toxic substances including lead, cadmium, and mercury. Not to mention the plastic, glass,

and metals that will probably last a thousand years in a landfill. Many local municipalities provide recycling services. In most cases, you will have to haul your stuff to a central recycling location.

[Office Depot](#) will recycle your unwanted computer equipment for a flat fee depending on the size of the box you need to hold your equipment. This is ideal for recycling laptops. Office Depot will also recycle rechargeable batteries separately at no charge.

[Staples](#) and [Walmart](#) are two stores that will recycle ink cartridges from any manufacturer.

When it comes time to recycle your cell phones, why not donate them to the [Cell Phones for Soldiers](#) calling card project.