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Smart Office Professional

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1. Introduction

A Computer is a machine that performs tasks, such as simple and complicated scientific calculations, electronic communication, and transactions under the set of instructions called "a program". These days Computers are used to perform versatile activities with reliability, accuracy and speed.

In Business, computers track inventories with bar codes and scanners, billing of customers and transfer funds electronically, track attendance and generate payroll, store records/data in extensive quantities with a never before ease.

At **Homes**, tiny embedded computers control the indoor temperature, operate home security systems, turn videocassette recorders on and off. Computers also **Entertain** working as a music system, video player gaming zone, etc.

Computers in Automobiles regulate the flow of fuel, thereby increasing gas mileage.

Academicians and Institutions use computers to track grades and prepare notes; with computer-controlled projection units, they can add graphics, sound and animation to their lectures. Computer based trainings is the futuristic method of training and imparting education. It has reduced the cost of spreading education without compromising on the quality phenomenally.

Computers are used extensively in **Scientific Research** to solve mathematical problems, display complicated data, or model systems that are too costly or impractical to build, such as testing the air flow around the next generation of space shuttles. **The Military** employs computers in sophisticated communications to encode and unscramble messages, and to keep track of personnel and supplies.

In **Routine Lives**, computers come in usage while booking train & airplane tickets, withdrawing cash from bank, driving cars, traffic lights, watching TV, listening Radio, although their usage cannot be seen or felt, but it completes the requested transaction in the backend.

In **Communication**, Computers play an intrinsic role in provision of Internet, Email, Mobile, SMS, Telephone services today, the primary means of communications.

2. Types of Computer

- 1. **Personal Computer-** A personal computer is a small, affordable computer that is intended for personal or individual use. Typically, the main element of a personal computer system consists of a box that contains the main memory, hard drives, processor (CPU), circuit boards, and related devices required to run software programs.
- **2. Mainframe Computers** Mainframe computers are found at the opposite end of th computer spectrum from the PC (personal computer). Unlike a personal computer, a mainframe computer is large and expensive. A mainframe may be larger than a refrigerator in size, and can cost several millions of dollars.
- **3. Network Computers-** A network computer is a desktop machine that resembles a personal computer in outward appearance, with a screen, keyboard and box. However, it does not have the same quantity of hard disk storage, main memory or processing power that a personal computer can offer.
- **4. Laptop** A laptop is a small (usually between 5 and 10 pounds) portable computer that can be operated on battery power for a period of time without any dependence on an external power supply. When a laptop's battery loses power, the laptop can be plugged into an external power source by using an external AC/DC adapter.
- 5. Personal Digital Assistant (PDA)- PDA stands for Portable Digital Assistant. It refers to a small hand held device that offers many of the features of larger laptops and personal computers. Many PD As incorporate a touch screen device into their design, allowing the user to interact with the items displayed on the viewing screen by touching it.



Because PD As are so small, touch screens help to provide a more manageable user interface. Because of its small size, a PDA will have much less processing power, main memory, and storage capacity than a personal computer

3. Characteristics of a Computer

The characteristics of computer are high speed of operations, accuracy, reliability, flexibility and economy coupled with efficiency in storing and processing data.

- **Speed**: The speed of a computer is virtually instantaneous. It is measured in terms of microseconds (1/10-6 second), nanoseconds (1/10-9 second) and picosecond (1/10-12 second). An average Personal Computer can conduct 100 million instructions per second
- **Storage**: One of the prime characteristics of a computer is its ability to store information which it can access very quickly.
- **Accuracy**: Computers are very accurate. They seldom make mistakes, though they do occasionally break down.
- **Versatility**: For all practical purposes, computers can perform any task that can be reduced to a series of logical steps.
- **Automation**: Once loaded with a program, no human intervention is required until the process is completed.
- **Diligence**: A computer can work endlessly without suffering from the human traits of tiredness, boredom and lack of concentration.

4. How Does a Computer Work?

Before we try to explain the process in technical terms let us try and understand how a computer works in a layman's terms

Assuming a **Professor** is given a very difficult assignment to solve, for which he requires a **Team of People** with access to **Library** for referring **Stored Data** and preset instructions/logic/ and formulae to draw analysis, solving many problems in sequence in the process to derive the final result of the given assignment, than in a layman's terms

You the user gives an assignment (command) to the Computer, The Professor (The Processor) directs the Team (RAM) to fetch information from the Library/ Storage space (Hard Disk) using the help of the Librarian, "The Software". The Information gathered by "The Team" (RAM) is then compiled using set of instructions (The Program) by The Professor (The Processor) and the final Output is given to the user. The co-ordinator between different people, i.e. The Professor (The Processor), The Team (RAM), Librarian (Software/Drivers), Library (The Hard Disk/Storage Space) is The Motherboard, which translates each's work without any problem. The whole stage is the computer, where Monitor Screen shows the input and the output result, Keyboard and Mouse are instrumental in inputting requests only, the rest is done by the CPU, as explained here above.

Generally speaking, once an instruction is given to a computer via an input device such as keyboard or mouse which is processed by the components of the computer such as processor, motherboard, hard disk, RAM, Software Program, etc and the result is shown via an output device such as a monitor or printer. More information on how it actually works is dealt with in the next chapter

5. Components of a Computer (PLEASE REFER A/V)

To understand more logically we can divide computer components in two Sections.

- Hardware
- Software



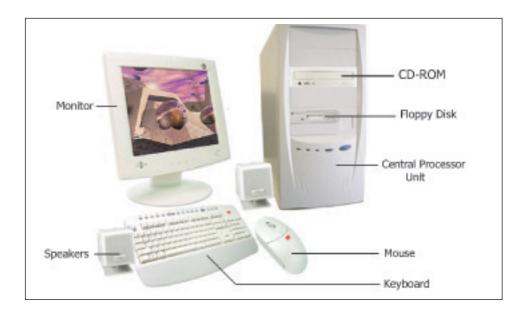


Fig. 1.1

Let us take the hardware component First. The physical (visible) components of the computer are termed as hardware. Broadly emphasized by the diagram as below

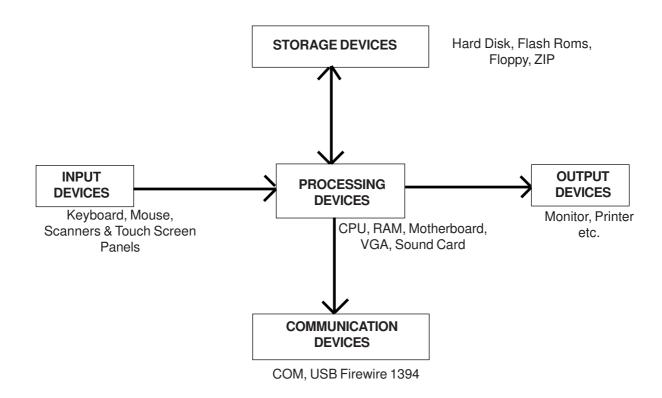


Fig. 1.2

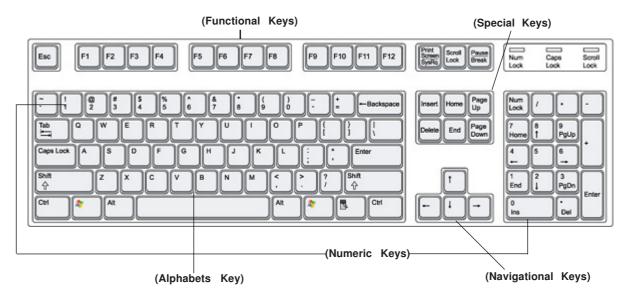
Let us understand the functions of each of this one at a time. One must realize that all components and their correct functioning/compatibility is required in order for the computer to perform its function. So all the components are equally important



I. Input Devices (Please Refer A/V)

1. Keyboard

Your Windows keyboard comprises of various keys sets. Sets as we say are a group of keys assigned a particular function. Broadly the key sets are as follows:



The image shown here is a standard "QWERTY" style keyboard, used by over 80% of English using Computer users. "QWERTY" is derived from the first six letters of the first lines of the alphabet set as shown here. Alphabet Keys Set: This set comprises of alphabet keys arranged on the layout of a traditional typewriter as shown in the image, and is used to print the alphabet pressed, on the screen. Combined with Shift key these keys change the case of alphabet pressed. By default the keys use "lower case". On pressing the Shift Key they Change to "Upper Case"

Number Keys Set Available in 02 sets these, one of the sets print numbers on the screen, Combined with Shift, it prints the special characters as marked on it. The other set is combined with "Navigation keys" functions. By default the "Navigation Keys" is activated. To activate the number keys on this set, one must press **num lock**, as this.

Navigation Keys Set: These keys help in moving the mouse cursor/pointer on the screen in the direction in which the arrow points. This set is also used widely in computer games.

Function Keys Set: This set comprises of all keys numbered with F1 to F12 All keys have special function as determined by the operating software. For example F1 for Help

Enter	Enter - Used to send the cursor to the beginning of the next line (hard line break or paragraph). It is also used to confirm or execute a command. There are usually two of these keys, one next to the Qwerty pad and one next to the Numeric pad.
Backspace	Backspace - Used to delete one character at a time to the left of the cursor.
Tab	Tab - Used to set tab positions in a Word document or PowerPoint presentation and indent in outline view. Also used to move between fields in dialog boxes and tables.



Shift	Shift - Changes lower case letters to upper case and numbers to symbols. There are usually two of these keys on either side of the Qwerty pad.
Caps Lock	Caps Lock - Changes lower case letters to upper case (numbers are not affected). Caps Lock mode is activated by pressing the key once and is indicated by a light on the panel above the numeric keypad. Press the key again to turn it
Esc	Esc (Escape) - Primarily used to cancel a command or to escape from a process you don't wish to execute.
Alt	Alt (Alternate) - Used in conjunction with other keys for alternate functions of those keys. There are usually two of these keys on either side of the space bar.
Ctrl	Ctrl (Control) - Used in conjunction with other keys to carry out a specific function and allow greater control of your keyboard. Usually enhances or expands the key's original function. There are usually two of these keys on either side of the
Num Lock	NumLock - Allows the numeric keys to be used on the numeric keypad. NumLock mode is activated by pressing the key once and is indicated by a light on the panel above the numeric keypad. Press the key again to turn it off and use the keypad for navigation.
Scroll Lock	Scroll Lock - Can control the way the navigation keys operate in some programs. Many

Table. 1.1 Extra Keys Set: This Comprise of keys not used very frequently

Delete	Delete -(Del) -Deletes the character to the right of the cursor or used to delete a highlighted section.
Insert	Insert/Ins - Toggles between Overtype and Insert mode. Insert mode will insert text at the cursor's position when you type. Overtype mode will replace one character to the right of the cursor with what you type.
Print Screen	SysRq - (System Request) - Used by the operating system and applications - actions vary depending on program used.
Print Screen SysRq	Print Screen - (PrtScn) - Prints everything displayed on the screen to your computer's clipboard. The image captured must then be pasted into a program that allows graphics, such as Microsoft Word.
Home	Home -Moves your cursor to the beginning of the current line.
Page UP	Page Up -(Page Up) - Moves your cursor up one screen of information.
Page Down	Page Down - (Page Down) - Moves your cursor down one screen of information.
End	End -Moves your cursor to the end of the current line.
Window	Windows Logo -Display or hide the Start Menu.

Table. 1.2



- **2. Mouse** is a handheld pointing device for computers, involving a small object fitted with one or more buttons and shaped to sit naturally under the hand. Mouse is used to move a cursor on the computer screen, and make various operations possible such as drawing, selecting text and graphics, opening and closing files and giving other commands. The wire connecting it to the computer or keyboard looks like a mouse's tail. A mouse is moved over a flat horizontal surface, usually a rubber mouse pad, and its position is read by the computer as relative x and y coordinates. There are predominantly two kinds of mouse.
- **a. Normal Mouse:** This mouse typically has a roller ball, which requires regular cleaning for proper functioning.
- **b. Optical Mouse:** This mouse typically has optical light through whichthe it sends the computer its x and y coordinates
- **c.** Cordless mouse: This mouse is typically one of the above, but instead of using a cord for connecting itself to the PC, it uses RadioFrequency or Infra Red technology to communicate. However this has a problem, one it consumes too many batteries, and second it causes interference with other RF or IR devices.



- **3.** In case of **Touch Screen Panels/Monitors**, the screen also senses the location of the contact point as one touches the screen and takes the corresponding action as suggested. Typical example of a touch screen panel, is an ATM machine.
- **4. Joysticks** as the name suggests are devices used to playing games on the computer, initially they started with single stick with a few buttons, each designated a particular function in the game, these days more upgraded ones offer, car steering options as well.
- **5. Scanner** are devices used to convert documents or images into binary files which are stored and reproduced as exact duplicate images in the computer.

II. Processing Devices (Please Refer a/v)

- 1. CPU: Central Processing Unit, or in short the CPU, is the core processor of the Computer, and computes all that is requested. It is the brain of the computer and its speed in measured in Hz (hertz) the faster the CPU, the faster is the processing power. Major manufacturers of the CPU in the world are INTEL, AMD, IBM, MOTOROLA. Out of which Intel sells more all of them put together. Intel Pentium-4 (2.4Ghz) is the common current generation of Processor which is used in wide variety of applications such as graphic intensive jobs, office applications, Multimedia Applications etc.
- **2. RAM :** Random Access Memory or commonly known as RAM, is like the number of working hands in a computer. The more the hands the faster the information shall flow, between the input and the output. It commonly comes in SIMM (Single Integrated Memory Module) and DIMM (Dual Integrated Memory Module). High end RAM for servers comes with "Error Correction Control" a safety feature designed to handle large flow of Instruction without any loss or stability.
- **3. MOTHERBOARD :** As the terms suggests is the coordinator of the computer which houses all the elements of the computer, including the CPU, RAM, connections to Storage devices, Input and Output Devices. It has empty slots for connecting accessories such as scanners, printers, TV's, Multimedia, Projectors etc
- **4.** VGA refers to Video Graphic Adapter, which is built on the motherboard, in which case it shares memory from RAM. The other form is when it is present independently on a card and can be inserted in one of the available empty slots on the motherboard. In both the cases the function is the same, it connects the monitor to the CPU. High end VGA cards are used in doing graphic intensive applications such as designing or playing 3d games and watching movies.
- **5. SOUND CARD** is a device used to play music, voice on the computer or for recording through a micro phone through its input and output ports. Bundled together with matching speakers, software, and DVD drive, they can convert an ordinary PC to a great home theater system offering upto 7.1 Channel Dolby digital technologytes



III. Output Devices (Please Refer a/v)

Components used to display the information as processed by the computer after the execution of the request/program are commonly referred to as **Output Devices**. Most common Output Devices are:

- 1. Monitor is a device that looks like TV. It has a Screen and may have built in speakers. It allows the user to see the result of his input and the output generated by the computer. Monitors can be classified into Regular style, which consist of a screen curving at the corners, flat screens which are purely flat as the name goes, LCD, TFT and Plasma displays, but in all cases the function remains the same.
- **2. Printer** is a device attached to a Computer used to take output of the executed request on any Printable material such as paper/transparency/cloth etc. Printers are material specific, not all printers can print on all materials. They may print in Color or Black /Grey using either Laser/ Bubblejet /Inkjet/ Ribbon Technology. These are job specific and one may buy as per his requirement of Media Size, Color, Duty Cycle & Price.
- **3. Speaker** is a device through which one can hear sound played by the computer. These require a sound card and can go from a simple pair to a complex 7.1 Dolby Digital Home Theater System.
- **4. Firewire 1394 Port :** Firewire 1394 Port is a new global standared for Transmitting Extensive data to the computer such as data from Camcorder

III. Communication Ports

Components used to communicate with other external devices such as Input/Output devices, external fax Modems (Device used to convert PC into a fax machine, and internet surfing), Removable Storage Devices etc. There are primarily two kinds of ports, **COM** ports and **USB** ports.

- **1. COM** Ports as the name suggests stands for Communication port. Present on a motherboard, these are generally two in number, one is connected to a nine pin port (Used by Mouse), and the other to a 25 pin port (Used by printers). The data transfer speed in these is slow as compared to other ports.
- **2. Serial Ports** are also available on the motherboard, used primarily to connect Mouse Keyboard. These are faster than the **com** ports
- **3. USB Port**, stands for Universal Serial Bus, which is the new Industry Standard for connection of high speed devices to the computer, these include mouse, keyboard, camera, removable storage devices, and many other accessories.
- **4. Fierwire 1394 port :** Fierwire 1394 port is a new global standard for transmitting extensive data to the computer such as data from camcorder.

S.No	Description	Com Port	Serial Port USB Port		Firewire 1394 Port
1	DataTransfer/ Access Speed	Slow	Normal	Fast	Super
2	Reliability of data flow	Poor	Standard	High	High
3	Limitation	02 per computer	02 per computer	Asmany possible using a USB hub	01
4	Can be activety plugged in, or plugged out while		No	Yes	Yes

Table. 1.3

As seen from the comparison, it is clear that the USB Port is the clear winner amongst all, thanks to the continuous need for innovation and achievement in the technology.



V. Storage Devices

Driver Type	Capacity	Read/Write Speed	
Hard Drive	Extermely high storage capacity (hundreds of gigabytes)	Faster than CD, DVD, Or floppy	
DVD Drive	High Capacity (a writable DVD can have a capacity of	Slower then a hard dirve	
Note: Many DVD drives can read from CDs (Compact disk) as well as DVDs.	4+gigabytes). Published (professionalally made) DVDs can have even higher capacties	Some DVD drives are red only (Cannot be used to store data on DVD). However, writable DVD drives are increasing in popularity	
CD Drive	Fire capacity (a typical writable CD can have a capacity of around 650 megabytes)	Slower then a hard disk drive Some CD drives are read only, but many newer CD and DVD drives allow you to write to a disk	
Floppy Drive Note: Many early floppy disk dives are now obsolete	Very low by current standards (only 1.44 megabytes)	Slower then a hard disk drive	

Table. 1.4

Memory Measurement: Storage is measured bytes, or the unit for storage is bytes. Typically 1 byte = 8 bits (Each bit represents 0, or 1) There are 256 combinations of bits in 1 Byte for example 00110011, 10101010, 01010101, all represent individual bytes)

Measurement	Explanation		
Bit	Can store a 1 or a 0		
Byte	can store 8 bits. This is enough room to store a single letter of symbol.		
Killobyte (KB)	Roughly a thousand bytes. Files like spreadsheed, word processing documents, and images are often a few to a few hundred kilobytes in size.		
Megabyte (MB) Roughly a thousand kilo bytes (or a million bytes). Folders and very files may be several megabytes in size. A floppy disk can hold about megabytes. Frequently, computers will have 256 or 512 megaby RAM.			
Gigabyte (GB)	A gigabyte is roughly a thousend megabytes (or roughly a billion bytes). Current generation computers often.		

Table. 1.5



The chart shows different kinds of Storage and their respective comparative analysis based on the attributes that help us understand their function and utilization.

Fig. 1.5

Storage	Spee	Capacit	Type	Cost	Reliability	Physical Attribute
Registers	Fastest	Lowest	Volatile	Highest	Yes	Onboard
RAM	Very Fast	Low/ Moderate	Volatile	High	Yes	Onboard
Floppy Disk	Very Slow	Low	Non Volatile & Erasable	Low	Medium	A:\ Internal/ External
Hard Disk	Fast	40 GB Upwards	Non Volatile & Erasable	Very Low	Yes	C:\Internal
CD Roms	Moderate	740 MB	Non Volatile & Erasable	Very Low	Medium	D:\ Internal/ External
DVD	Moderate	4 Gb	Non Volatile & Erasable	Very Low	Yes	D:\ Internal/ External
Flash Roms	Moderate	128 Mb Upwards	Non Volatile & Erasable	Very Low	Yes	E:\ External
Zip Drive	slow	200Mb- 4GB	Non Volatile & Erasable	Low	Yes	E:\ External

Table. 1.6

CABINET: The box that houses the motherboard, hard disk, CD-Rom, Floppy Drive, VGA, including the power supply (SMPS) is called the cabinet. Computer cabinets are designed to rest all these things in different preassigned areas as per the industry standard. The color, and style of the cabinet has nothing to do with its performance. SMPS in built the computer cabinet, controls and converts the AC current in the 9/12 Volt DC current as required by the components of the computer.

UPS: Last but not the least, it is the external device which regulates, streamlines and corrects the input voltage and current from the power source and gives to the computer. Its power or units are measured in KVA Smaller UPS come with an inbuilt battery back up of around 20 minutes, larger ones come with external battery attachments and the size of the battery bank determines the back up it provides in case of power failure. The concept of UPS is crucial in regions experiencing frequent power cuts, fluctuations and surges primarily because

- Switching off the computer without proper shutting down, leads to corruption of software, and may require technical support or reinstallation.
- A Surge/Spike or a fluctuation may lead to short circuit on the motherboard or hard disk crash, or damaging the monitor or any other component.
- To Increase the life and efficiency of the hardware.



Important:

It is important to understand that computers components must match in capability and performance with each other before they can perform best as part of whole computer. For example, a 2.4 GHz Intel Pentium Processor shall not be able to perform to its fullest with 128 Mb RAM, or 400 MHz Motherboard with onboard VGA for graphic Intensive applications such as Corel Draw or Photoshop. A better combination would be 1024 Mb RAM with a VGA card with its individual 256 Mb RAM. For office applications, even the last generation Intel Celerons work well with 128 Mb RAM. So before you decide to buy your computer, you must define what you intend to use it for.

5. How to Turn on and Shut Down the Computer?

I. Turn On

As you see it is apparent from the language that you "Turn On" a computer. It is taken for granted, that all the connecting cables between the computer, monitor, keyboard and mouse, speakers are firm and secured properly in the right place.

Just press the **power button** and the computer comes to life, making a beep sound. The first initial display on the computer Monitor provides us the information on the BIOS loaded in the computer, which recalls all the hardware which the computer tests and loads before coming to a command prompt which is **c:/**, or in case the computer is loaded with Microsoft Windows Operating system, it automatically loads the same, and your **log in** screen shall be visible.

Presuming that we are running the Windows, we enter the password (by default it is blank) in the respective field, by clicking the designated user, and pressing the **enter Key** on the keyboard, we come to the main **desktop** screen. This is the platform from where we run the desired application.

II. Shutting Down

Left Click on the **Start Button** on the bottom left corner of the desktop, and press the **red** button next to "**Turn Off the Computer**" command and Viola you shall see that the computer shall close all applications actively running on the computer, if it can, otherwise it shall seek your assistance on the same and then shut down the computer, cutting off even the power supply

