



CLASS:BCA3rdSem

Batch: 2019-21

PC Assembly & Troubleshooting

Notes as per IKGPTU Syllabus

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Notes PC Assembly & Troubleshooting

Unit-I

Assemble/setup and upgrade personal computer systems:

Computer system modules/ components and its operations, need of hardware and software for computer to work, **different hardware components within a computer and connected to a computer as peripheral devices**, different processors used for personal computers and note book computers.

Unit-II

Perform installation, configuration, and upgrading of microcomputer/ computer: Hardware and software requirement, Assemble/setup microcomputer/ computer systems, accessory boards, types of motherboards, selection of right motherboard, Installation & replacement of motherboard, troubleshooting problems with memory.

Unit-III

Install/connect associated peripherals: Working of printers and scanners, Installation of printers and scanners, sharing a printer over a local area network, troubleshooting printer and scanner problems, troubleshooting hard drive problems. Drivers role and types

Unit-IV

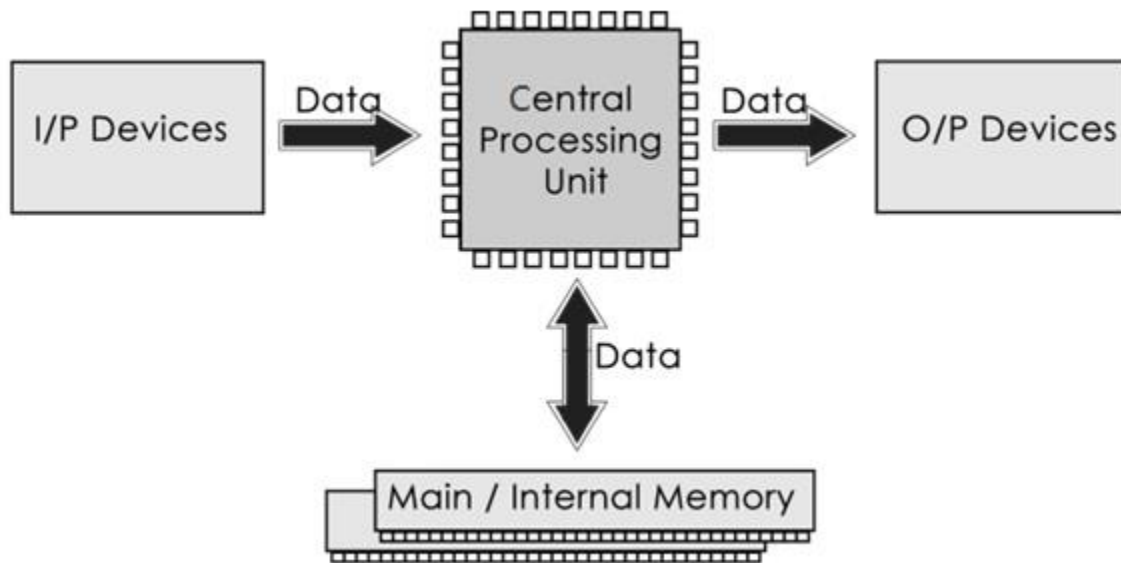
Diagnose and troubleshooting of microcomputer/ computer systems hardware & software and other peripheral equipment: Approaches to solve a PC problem, troubleshooting a failed boot before the OS is loaded, different approaches to installing and supporting I/O device, managing faulty components.

Unit-1

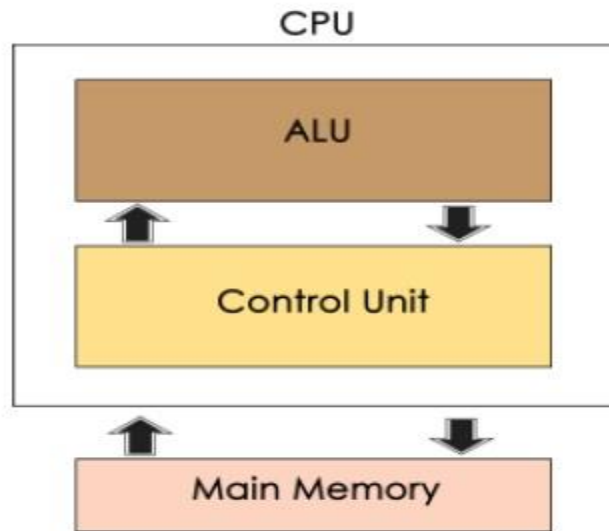
Computer system modules/ components and its operations

What is a computer?

A computer is any machine that can be programmed to carry out a set of algorithms and arithmetic instructions.



Central Processing Unit, Input devices and Output devices. Input devices provide data input to processor, which processes data and generates useful information that's displayed to the user through output devices. This is stored in computer's memory.



Arithmetic Logic Unit (ALU)

Data entered into computer is sent to RAM, from where it is then sent to ALU, where rest of data processing takes place. All types of processing, such as comparisons, decision-making and processing of non-numeric information takes place here and once again data is moved to RAM.

Control Unit

As name indicates, this part of CPU extracts instructions, performs execution, maintains and directs operations of entire system.

Functions of Control Unit

Control unit performs following functions –

- It controls all activities of computer
- Supervises flow of data within CPU
- Directs flow of data within CPU
- Transfers data to Arithmetic and Logic Unit
- Transfers results to memory
- Fetches results from memory to output devices

Memory Unit

This is unit in which data and instructions given to computer as well as results given by computer are stored. Unit of memory is "Byte".

Input/output devices are required for users to communicate with the computer. In simple terms, input devices bring information INTO the computer and output devices bring information OUT of a computer system. These input/output devices are also known as peripherals.

Need of Hardware and Software in Computer System

Hardware

1. Hardware refers to the physical elements of a computer.
2. This is also sometime called the machinery or the equipment of the computer. Examples of hardware in a computer are the keyboard, the monitor, the mouse and the **central processing unit**.
3. It is not an external element of the computer, but rather an internal one, A computer's hardware is comprised of many different parts, but perhaps the most important of these is the **motherboard**.
4. The motherboard is made up of even more parts that power and control the computer.

Different Computer External hardware

Input devices

Keyboard

Keyboard is the most common and very popular input device which helps to input data to the computer. The layout of the keyboard is like

that of traditional typewriter, although there are some additional keys provided for performing additional functions.

Mouse

Mouse is the most popular **pointing device**. It is a very famous cursor-control device having a small palm size box with a round ball at its base, which senses the movement of the mouse and sends corresponding signals to the CPU when the mouse buttons are pressed.

Joystick

Joystick is also a pointing device, which is used to move the cursor position on a monitor screen. It is a stick having a spherical ball at its both lower and upper ends. The lower spherical ball moves in a socket. The joystick can be moved in all four directions.



Light Pen

Light pen is a pointing device similar to a pen. It is used to select a displayed menu item or to show objects on the monitor screen. It consists of a photocell and an optical system placed in a small tube.



Track Ball

Track ball is an input device that is mostly used in notebook or laptop computer, instead of a mouse. This is a ball which is half inserted and by moving fingers on the ball, the pointer can be moved.



Scanner

Scanner is an input device, which works more like a photocopy machine. It is used when some information is available on paper and it is to be transferred to the hard disk of the computer for further manipulation.



Microphone

Microphone is an input device to input sound that is then stored in a digital form.



The microphone is used for various applications such as adding sound to a multimedia presentation or for mixing music.

Bar Code Readers

Bar Code Reader is a device used for reading bar coded data (data in the form of light and dark lines). Bar coded data is generally used in labelling goods, numbering the books, etc. It may be a handheld scanner or may be embedded in a stationary scanner.



Output Devices

Monitors

Monitors, commonly called as **Visual Display Unit (VDU)**, are the main output device of a computer. It forms images from tiny dots, called pixels that are arranged in a rectangular form. The sharpness of the image depends upon the number of pixels.

There are two kinds of viewing screen used for monitors.

- Cathode-Ray Tube (CRT)
- Flat-Panel Display

Cathode-Ray Tube (CRT) Monitor

The CRT display is made up of small picture elements called pixels. The smaller the pixels, the better the image clarity or resolution. It takes more than one illuminated pixel to form a whole character, such as the letter 'e' in the word help.



A finite number of characters can be displayed on a screen at once. The screen can be divided into a series of character boxes - fixed location on the screen where a standard character can be placed. Most screens are capable of displaying 80 characters of data horizontally and 25 lines vertically.

There are some disadvantages of CRT –

- Large in Size
- High power consumption

Flat-Panel Display Monitor

The flat-panel display refers to a class of video devices that have reduced volume, weight and power requirement in comparison to the CRT. You can hang them on walls or wear them on your wrists. Current uses of flat-panel displays include calculators, video games, monitors, laptop computer, and graphics display.



The flat-panel display is divided into two categories –

- **Emissive Displays** – Emissive displays are devices that convert electrical energy into light. For example, plasma panel and LED (Light-Emitting Diodes).
- **Non-Emissive Displays** – Non-emissive displays use optical effects to convert sunlight or light from some other source into graphics patterns. For example, LCD (Liquid-Crystal Device).

Printers

Printer is an output device, which is used to print information on paper.

There are two types of printers –

- Impact Printers
- Non-Impact Printers

Impact Printers

Impact printers print the characters by striking them on the ribbon, which is then pressed on the paper.

Characteristics of Impact Printers are the following –

- Very low consumable costs
- Very noisy
- Useful for bulk printing due to low cost
- There is physical contact with the paper to produce an image

These printers are of two types –

- Character printers
- Line printers

Character Printers

Character printers are the printers which print one character at a time.

These are further divided into two types:

- Dot Matrix Printer(DMP)
- Daisy Wheel

Dot Matrix Printer

In the market, one of the most popular printers is Dot Matrix Printer. These printers are popular because of their ease of printing and economical price. Each character printed is in the form of pattern of dots and head consists of a Matrix of Pins of size (5*7, 7*9, 9*7 or 9*9) which come out to form a character which is why it is called Dot Matrix Printer.



Advantages

- Inexpensive
- Widely Used
- Other language characters can be printed

Disadvantages

- Slow Speed
- Poor Quality

Daisy Wheel

Head is lying on a wheel and pins corresponding to characters are like petals of Daisy (flower) which is why it is called Daisy Wheel Printer. These printers are generally used for word-processing in offices that require a few letters to be sent here and there with very nice quality.



Advantages

- More reliable than DMP
- Better quality
- Fonts of character can be easily changed

Disadvantages

- Slower than DMP
- Noisy
- More expensive than DMP

Line Printers

Line printers are the printers which print one line at a time.



Laser Printers

These are non-impact page printers. They use laser lights to produce the dots needed to form the characters to be printed on a page.



Advantages

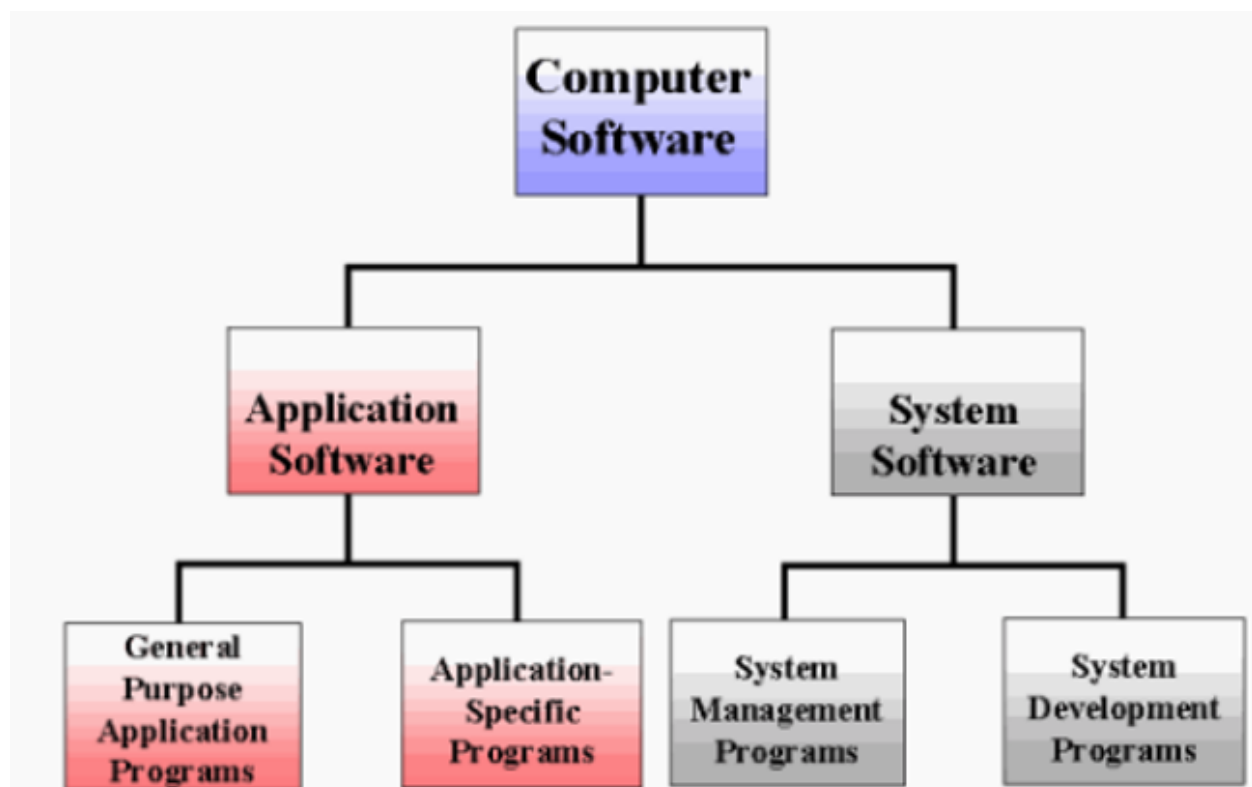
- Very high speed
- Very high quality output
- Good graphics quality
- Supports many fonts and different character size

Disadvantages

- Expensive
- Cannot be used to produce multiple copies of a document in a single printing

Need of Software

Software, commonly known as programs or apps, consists of all the instructions that tell the hardware how to perform a task. These instructions come from a software developer in the form that will be accepted by the *platform* (operating system + CPU) that they are based on.



Practical computer systems divide software systems into two major classes:

- **System software:** Helps run the computer hardware and computer system itself. System software includes operating systems, device drivers, diagnostic tools and more. System software is almost always pre-installed on your computer.

Types of System Software

1.System Management Software: It is a collection of software that handles resources and provides general services for the other applications that run over them.

2.System Development Software: these are programs on which software programs rely to translate high-level language code to simpler machine-level code.for example complier .

- **Application software:** Allows users to accomplish one or more tasks. It includes word processing, web browsing and almost any other task for which you might install software. (Some application software is pre-installed on most computer systems.)

1.Genral purpose Software: IT also known as end-user programs or productivity programs are software that helps the user in completing tasks such as doing online research, jotting down notes, setting an alarm, designing graphics, keeping an account log, doing calculations or even playing games.

2. Special purpose application software: It is a type of software created to execute one specific task. For example, a camera application on your phone will only allow you to take and share pictures. Another example would be a chess game, it would only allow you to play chess or training software .

Different hardware components Connected to a computer as peripheral devices

Buses

A bus is a subsystem that transfers data between computer components inside a computer or between computers. Each bus defines its set of connectors to physically plug devices, cards or cables together.

PCI

PCI (Peripheral Component Interconnect) is common in modern PCs. This kind of bus is being succeeded by PCI Express. Typical PCI cards used in PCs include: **network cards, sound cards, modems, extra ports** such as USB or serial, TV tuner cards and disk controllers.

Input

Input devices are absolutely crucial to computers. The most common input devices are mice and keyboards which barely every computer has. A new popular pointing device that may eventually replace the mouse is touch screen which you can get on some tablet notebooks. Other popular input devices include microphones, webcams, and fingerprint readers which can also be built in to modern laptops and desktops. A scanner is another popular input device that might be built-in to your printer.

Output

There are lots of different kinds of output devices that you can get for your computer. The absolute most common external output device is a monitor. Other very popular output devices are printers and speakers. There are lots of different kinds of printers and different sizes of speakers for your computer. Monitors are connected usually through the HD-15 connector on your video card. Printers are usually connected through a USB port. Speakers have their own audio out port built-in to the sound card.

USB

USB (Universal Serial Bus) is a serial bus standard to interface devices. USB was designed to allow many peripherals to be connected using a single

standardized interface socket and to improve the plug-and-play capabilities by allowing devices to be connected and disconnected without rebooting the computer.

Video Card

A video card (also known as graphics card) is an expansion card whose function is to generate and output images to a display. Some video cards offer added functions, such as video capture, TV tuner adapter, ability to connect multiple monitors, and others. Most video cards all share similar components.

Sound Card

A sound card is an expansion card that facilitates the input and output of audio signals to/from a computer under control of computer programs. Typical uses for sound cards include providing the audio component for multimedia applications such as music composition, editing video or audio, presentation/education, and entertainment.

Network Card

A network card is an expansion card that allows computers to communicate over a computer network. It allows users to connect to each other either by using cables or wirelessly. Although other network technologies exist, Ethernet has achieved near-ubiquity for a while now.

What is a Processor?

Definition: The processor is a chip or a logical circuit that responds and processes the basic instructions to drive a particular computer. The main functions of the processor are fetching, decoding, executing, and write back the operations of an instruction.

Types of Processors

There are different types of processors in the embedded system which include the following.

General Purpose Processor

There **are five types** of general-purpose processors they are, **Microcontroller, Microprocessor, Embedded Processor, DSP and Media Processor.**

1. Microprocessor

The general-purpose processors are represented by the microprocessor in embedded systems. There are different varieties of microprocessors available in the market from different companies. The microprocessor is also a general-purpose processor that consists of a **control unit, ALU, a bunch of registers, control registers and status registers.**

2. Microcontroller

The microcontroller is basically **a computer that comes in various packages and sizes.** The reading input and responding to output is the basic function of the microcontroller. Generally, it is known as General Purpose Input Output (GPIO). Some of the microcontrollers are Microchip Atmega328-AU, Microchip P1C16F877A-I/P, Microchip P1C16F1503-I/P, Microchip P1C16F671-I/SN, Microchip P1C18F45K22-I/P, etc.

3. Embedded Processor

An embedded processor is one type of processor which is **designed to control mechanical functions and electrical functions.** It consists of several blocks they are the processor, timer, an interrupt controller, program memory and data memory, power supply, reset and clock oscillator circuits, system application-specific circuits, ports and interfacing circuits.

4. Digital Signal Processor

The digital signal processor is one type of processor used for measuring, filtering and/or compress digital or analog signals. The signal processing means analysis and manipulation of signal. This processing can be done via computer.

Applications of DSP

The applications of the digital signal processor are

- Speech processing

- Image processing
- Medical processing
- Biometric Processing

5. Media Processor

The image/video processor is the media processor that is designed or created to deal with the data in real-time. The voice user interface and professional audio are the applications of the audio processor.

6. Core Processor

The core is the brain of the Central Processing Unit. There are different types of cores they are octa-core(8 processors, dual-core (2), quad-core(4) etc.

7. MultiProcessor

The multiprocessor is a computer with more than one CPU, each shares main memory, a computer bus, and peripherals to simultaneously process the programs and these systems are also known as tightly coupled systems. The advantages of multiprocessors are increased throughput, increased reliability and economy of scale. These processors are used when very high speed is required to process a large volume of data.

8. ASIC Processors

The application-specific integrated circuits are built for **specific applications**. These chips are small in size and consume low power. The design cost of ASIC is high and this is the main disadvantage. The application-specific integrated circuit chips are **used in satellites, modems, computers, etc.**

How to Assemble a PC?

Step 1: Remove Side Panels on Case

After removing the case from the box, the panels are removed from this case with thumb screws. Your specific model's manual will have more information if you are unsure for your case.

Step 2: Insert Motherboard

In my assembly process, as I was just transferring the parts from one case to another, leaving the CPU cooler installed was the easiest option. Depending on the motherboard, case, CPU and CPU fan, this might need to be done before installing or once in place.

Step 3: Check Clearances

Being that this computer includes high performance components, some of them are large enough that clearance can become an issue. For this reason once the board was installed I fitted the graphics card so there would not be more surprises later in the process.

Step 4: Front Panel Connections

Once the graphics card was removed again, it is time to attach the connections for the **buttons, lights, USB ports and audio connections**. As every case and motherboard differ slightly, it is best to refer to the manual for the placement and orientation of connections.

Step 5: Install Power Supply

The power supply from the previous case was modular so only the cables that are needed are plugged into the unit. As well this makes cable management cleaner in the end.

Step 6: Power Motherboard

With the motherboard power being the largest cable and sometimes just long enough, I suggest running this cable first and plugging it into the board, if there is a second cable for the CPU remember to connect it as well.

Step 7: Installing Optical Drive

The optical drive for this computer is a DVD/CD read/write combo. Some people prefer to only connect an optical drive when installing items but one being in place at all times comes in handy when something comes up and you do not want to open the case and connect the drive.

Step 8: Installing the Hard Drives

The size and number of hard drives your computer contains is completely dependent on your style of use and storage needs. This computer uses 4 drives, two in raid and the rest for a main drive and miscellaneous storage.

Step 9: Connect Cables

It is time to connect the cables for **the hard drives and optical drives**. The cables are keyed so they will only fit in one direction into the board, don't forget the cable that is attached to the optical drive.

Step 10: Install RAM

It is time for the ram to be inserted. If your computer uses more than one stick like mine, refer to the manual for which slot to install the stick. If only one stick is going to be inserted, place it in the slot closest to the CPU.

Step 11: Install Graphics Card and Expansion Cards

If your computer does not come with a graphics card integrated into the motherboard or you are adding an additional card, this is the time to do so.

With **some high performance cards**, additional power cables might need to be installed.

How to Upgrade a PC?

Step 1: Install RAM

If you're having difficulty loading pages, live streaming, or switching among applications, one gaming PC upgrade to consider is increasing or replacing your computer memory (RAM). RAM stores data that is currently being used. Many games store textures and maps in RAM.

Step 2: Upgrade storage

If your current storage drive is nearly full or if it is just too slow and you're experiencing freezing or hangs, upgrade it. If you have a traditional hard drive

(HDD), this is a good time to look into a solid state drive (SSD). SSDs start up faster and are more reliable and durable than HDDs.

Step 3: Upgrade graphics card

If you're having trouble with lag, freezing graphics, or screen tearing, consider upgrading your graphics card. Unless a computer is built specifically for gaming, manufacturers will frequently put in a low-end graphics card. If the rest of your computer is functioning well, a graphics card upgrade can really improve your gaming experience.

Step 4: Upgrade the processor

Although upgrading your processor (CPU) can improve the efficiency of your computer, it can be quite involved. You need to make sure that your motherboard and memory are compatible with the new processor, or replace everything at the same time. Also, check that your current cooling system will accommodate the upgraded CPU.

Step 5: Upgrade the peripherals

Another way to give your **PC gaming a boost is to upgrade your peripherals. If you're using an older monitor**, a new one can improve visibility in games.

A gaming mouse and keyboard can make a big difference in your play. If you're using a standard mouse and keyboard, upgrading to gaming-specific tools can enhance your play.

Step 6: Install Graphics Card and Expansion Cards

If your computer does not come with a graphics card integrated into the motherboard or you are adding an additional card, this is the time to do so.

With **some high performance cards**, additional power cables might need to be installed.

7.Upgrade modems:

Firmware is the software programmed into your modem that makes it run. Occasional updates are important to add new features and keep the modem's performance at its best.

8.Upgrade Sound card :

When you are considering upgrading your computer's audiovisual components, the first consideration is your PC's sound card (naturally). You need to know what to look for when comparing sound cards.

Unit -2

What is Microcomputer?

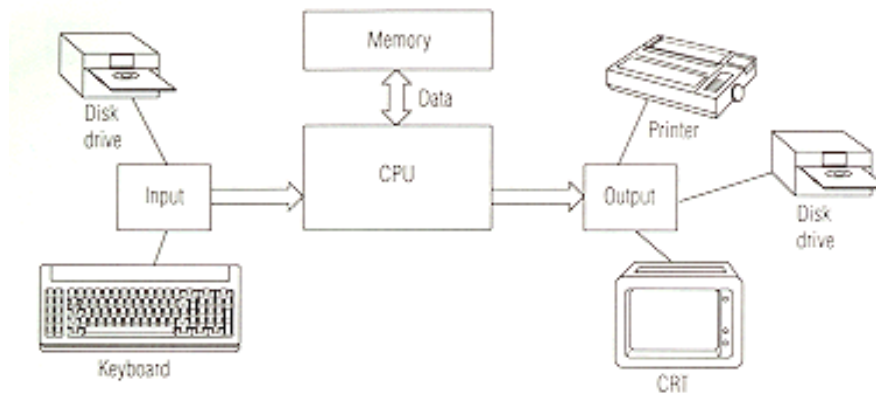
A microcomputer is a computer with a central processing unit (CPU) as a microprocessor. Designed for individual use, a microcomputer is smaller than a **mainframe or a minicomputer**.

The term microcomputer is not as commonly used as it was during the **1970s-1980s**. We now refer to microcomputers as, simply, computers, or personal computers (PC).

Hardware requirements of Microcomputer

Microcomputer Parts

All microcomputers, regardless of the brand, share a common overall design. This design is illustrated in Figure 1.5. The CPU, shown in the middle of the diagram, is the brain of the computer. CPU stands for central processing unit and it is the chip that contains all the circuitry for performing arithmetic and logic operations and for directing data to and from memory. In a microcomputer, the CPU is contained on a single chip. Minicomputers and mainframe computers have CPU's that occupy several chips.



1. Input Devices

When a microcomputer is first turned on, its memory is empty. Before it can begin processing any data, the data must somehow get into the memory of the microcomputer. The four most common methods of entering data into a computer are shown below.

1. Information is typed in from the keyboard.
2. Data are read in from secondary storage devices like **floppy disks, hard disks, or tape drives.**
3. Data are collected and entered into the computer from interface devices such as analog to digital converters.
4. Information is entered into the computer from drawing devices such as a digitizer (a type of drawing pad), a mouse, or a light pen.

2. Output Devices

For the user to view the results of the microcomputer's work, data must be sent from the microcomputer to an output device. Typical output devices are video monitors, printers, plotters, and secondary storage devices that can hold the data for future viewing. The output device found on nearly all microcomputers is the video monitor or just monitor. For the video monitor to operate, a video display adapter card must be installed in the computer. There are two primary types of monitors available for use with microcomputers.

They are television style **cathode ray tube (CRT)** monitors and the **liquid crystal display (LCD) monitors.**

3. Dot matrix printers These printers produce images by printing small dots in matrix patterns. Figure 1.8 shows what a typical set of 5 X 7 matrix characters would look like if they were magnified. The greater the potential number of dots In

the matrix, the better the printed copy will look. Therefore, printed copy from a 5 X 7 dot matrix printer will not look as good as that from a 7 X 9 dot matrix printer. Dot matrix printers will also produce high resolution graphics. Dot matrix printers differ in the technology used to produce the dots. Printers that are traditionally called dot matrix produce their dots by firing small pins against the ribbon and paper. These printers are capable of printing at over 3.00 characters per second (cps). Inkjet printers produce their dots by spraying ink on the paper.

4. Primary Memory(RAM,ROM)

A microcomputer would be incapable of performing even the simplest task if it did not contain some type of memory. A microcomputer uses memory to store the programs that control its operation, to store data waiting for processing, and to store the results of operations performed by the CPU.

5. Secondary Memory

Secondary memory (or storage) refers to nonvolatile storage devices that are usually mechanical in nature and therefore, are much slower at transferring data to the CPU." The most common secondary storage device for use with microcomputers is **the floppy disk** (usually just called disk). Disks come in a variety of sizes including 8 inch, 5.25 inch, and 3.5 inch. The disk is made of a flexible plastic that is coated with a magnetizable substance like oxides of iron or chromium. Signals can be recorded onto the disk in much the same way that signals are recorded on magnetic tape.

Software requirements of Microcomputer

SOFTWARE REQUIREMENTS The software requirements resulting from an analysis of the two control applications may be subdivided into the three following categories:

- **processor requirements**, i.e. architecture and instruction set requirements,
- **system-software requirements**,
- **application-software requirements** - Additional requirements result from the software development phase .

1.Processor requirements

Both applications are characterized by a high portion of arithmetic and logic operations per sample interval, whereas I/O- and internal data-movement requirements are relatively low. An analysis of the microprocessor instructions executed per unit time shows however a large amount of data movement instructions.

2.System software requirements

A strict partition of the software to be developed into system software (organization tasks) and application software (executing tasks) seems to be mandatory even in relative simple control applications. In the two applications presented, basically the same system software modules were used. types of System software's Mac, Windows .

3.Application software requirements

To keep the application software portion low in terms of CPU-time and memory requirements, i.e. to avoid "hardware overkill" the specific control problem has to be carefully analyzed. for example Microsoft Office, tally.

Inside the case go the following internal parts of MicroComputer :

- **Power Supply Unit/PSU** – *Power Supply Unit*, converts outlet power, which is alternating current (AC), to direct current (DC) which is required by internal components, as well as providing appropriate voltages and currents for these internal components.
- **Motherboard/mainboard** – As the name indicates, this is **the electronic centerpiece** of the computer: everything else connects to the motherboard.

- **Processor**/CPU – *central processing unit*, the "brain" of the computer, most actual computation takes place here.
- **RAM** – *random access memory*, the "short-term memory" of a computer, used by the CPU to store program instructions and data upon which it is currently operating. Data in RAM is lost when the computer is powered off, thus necessitating a *hard drive*.
- **Storage** - either **HDD** (Hard disk drive - slower of the two but less expensive) and/or **SSD** (solid state drive. Very fast but not as cheap) – the "long-term memory" of the computer, used for persistent storage – i.e. the things stored on it remain even when the computer is powered down. The operating system, and all your programs and data are stored here. OSes can be booted and use storage from inexpensive **USB Drives**, although this is only with extremely lightweight systems.

Optional components follow: (Components that depend on the function that will be given to the machine)

- **Optical Drive** – device for reading/writing optical disks. May read **CDs**, **DVDs**, or other optical media, depending on the type. It is essential for installing many operating systems and programs, although the vast majority can be run from USB. It may be able to write some of these discs, as well. Some people like to have two such drives for copying disks.
- **GPU/Graphics Card/GPU** – does processing relating to video output. Some motherboards and processors have an "on-board" GPU built in so you don't need (but may add) a separate **video card**. Otherwise, you will need a video card. **These plug into a slot on** the motherboard and provide a place to connect a monitor to your computer.
- **Sound card** - Comes with motherboard but may want to be upgraded

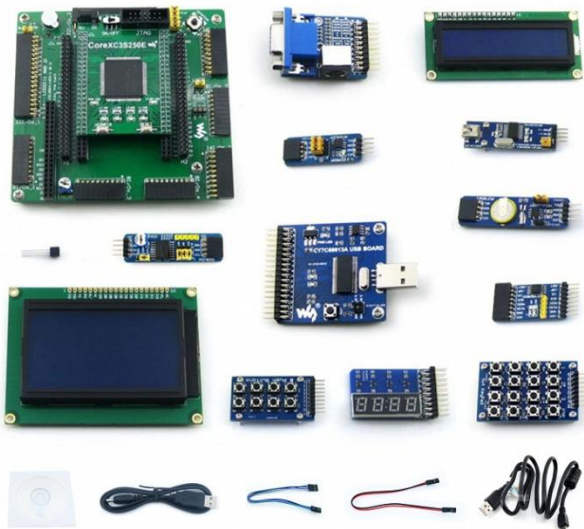
On top of the internal components listed above, you will also need these external components:

- **Keyboard** – for typing on. Some motherboards will not complete the boot process without a keyboard attached (option often found on the BIOS) and most will report an error on boot if not set otherwise.
- **Mouse** – for pointing and clicking. Unless you chose a text-based operating system, you will likely want one of these.

- **Monitor** – it is an output device that displays the information after it is processed. They come in many forms, the most common being **CRT** and **LCD**,LED.

What are Accessory boards/ motherboards?

Accessory boards for embedded motherboards are often recommended for the first sample. In this packet there will be all the cables and the software on a disc. After finding out which cables are needed then it's possible to order the ones you require.



Types of motherboards

1. AT Motherboard(for mainframe computers with large size)

AT motherboards have dimensions of a few hundred millimeters thus they are **not advised for mini desktops** since they don't fit. Their large dimensions also make it difficult to install new drivers. This type of motherboard uses sockets and six pin plugs which work as power connectors.

The power connectors are considered hard to distinguish and therefore prove very difficult for people to properly connect and use. **Produced in the 80's**, these motherboards lasted for quite a long period of time.

2. ATX Motherboard

Also known as Advanced Technology extended, these motherboards were produced in **the 90's by Intel** and is considered a huge improvement from the AT motherboard.

They allow for interchangeability when it comes to the connected parts and are **smaller in size** compared to the AT motherboards. The connector system was also greatly improved.

3. LPX Motherboard(with more slots)

These motherboards differ from the previous boards in that they contain **output and input ports at its back**. Riser card was also introduced to ensure placement of more slots was initiated and made easier. AT motherboards later on adapted several features from the LPX motherboards.

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4. BTX Motherboard(with less power requirements)

Balanced Technology extended motherboards were created to cope up with the changing technologies that demanded a lot of power and generated a lot of heat. Intel, however, cancelled further development of BTX motherboards **in late 2006** so that they could focus on lower-power CPU's.

5. Pico BTX Motherboard

The term "Pico" is used due to the **small size** of these motherboards. They support a maximum of two expansion slots, although they share a similar common top half as the BTX line. Specifically designed for riser-card or half-height applications, Pico BTX motherboards are considered as a digital line.

6. Mini TX Motherboard

It is a low-power form factor motherboard with dimensions of **17*17cm**. Mini TX motherboards were designed in the year **2001** by VIA Technologies. Generally, they are used in SFF computer systems because they have a **low power consumption rate and cool very fast**.

Selection of right motherboard

1. Looking at motherboard from the top down, you'll see a collection of **circuits, transistors, capacitors, slots, connectors, heat sinks**, and more that all combine to route signals and power throughout the PC and allow you to plug in all of the required components.
2. It's a complicated product, and many of the technical details are beyond the scope of this how-to. Some of these details are important for your buying decision.
3. As you're deciding on the right motherboard, you'll want to make sure that it meets your needs both today and tomorrow.
4. If you know that you'll never want to upgrade your PC beyond its **original configuration**, then you can choose a motherboard that provides exactly what you need to get up and running.
5. But if you think you might want to expand your PC later, then you'll want to make sure your motherboard will support your needs as they grow.

Installing/Replacing a Motherboard

The exact steps required to replace a motherboard depend on the specifics of the motherboard and case, the peripheral components to be connected, and so on. In general terms, the process is quite simple, if time-consuming:

- **Disconnect all cables** and remove all expansion cards from the current motherboard.
- **Remove the screws** that secure the old motherboard and remove the motherboard.
- If you are reusing the CPU and/or memory, remove them from the old motherboard and install them on the new one.
- Replace the old back-panel I/O template with the template supplied with the new motherboard.

- Remove and install motherboard mounting posts as necessary to match the mounting holes on the new motherboard.
- Install the new motherboard and secure it with screws in all mounting hole positions.
- Reinstall all of the expansion cards and reconnect the cables.

COMMON MEMORY PROBLEMS

When you have a problem with memory, the cause is usually one of three things:

1.Improper Configuration:

You have the wrong part for your computer or did not follow the configuration rules.

2.Improper Installation:

The memory may not be seated correctly, a socket is bad, or the socket may need cleaning.

3.Defective Hardware:

The memory module itself is defective.

The fact that many computer problems manifest themselves as memory problems makes troubleshooting difficult. For example, a problem with **the motherboard** or software may produce a **memory error message**.

This chapter is designed to help you figure out if you have a memory problem, and if so, what kind of problem it is, so you can get to a solution as quickly as possible.

Other causes of Memory Problems

- **Excessive heat in your machine can cause a variety of problems.**
- **Random reboots can be caused by a failing power supply.**
- **Dirt and dust can also cause issues that look like memory problems.**
- **Your computer can also have a virus. It causes memory damage.**

BASIC TROUBLESHOOTING

To troubleshoot is solving a problem or determining a problem to an issue.

Troubleshooting often involves the process of elimination, where a technician follows a set of steps to determine the problem or resolve the problem.

The following basic steps apply to almost all situations:

1. Make sure you have the right memory part for your computer.

At the manufacturer's Web site you can look up the **part number**. Many memory manufacturers

have configurators, which indicate the compatibilities of your module.

If not, phone the memory manufacturer, or refer to your computer manual.

2. Confirm that you configured the memory correctly.

Many computers require module installation in banks of equal-capacity modules.

Some computers require the highest capacity module to be in the lowest labeled bank.

Other computers require that all sockets be filled; still others require single-banked memory..

3. Re-install the module.

Push the module firmly into the socket. In most cases you hear a click when the module is in position.

To make sure you have a module all the way in the socket, compare the height of the module

to the height of other modules in neighboring sockets.

4. Swap modules.

Remove the new memory and see whether the problem disappears. Remove the old memory,

reinstall the new, and see whether the problem persists. Try the memory in different sockets.

Swapping reveals whether the problem is a particular memory module or socket, or whether two types of memory aren't compatible.

5. Clean the socket and pins on the memory module.

Use a soft cloth to wipe the pins on the module. Use a **PC vacuum** or compressed air to blow

dust off the socket. Do NOT use solvent, which may corrode the metal or prevent the leads from making full contact. Flux Off is a cleaner used specifically for contacts. You can purchase it at electronics or computer equipment stores.

6. Update the BIOS.

Computer manufacturers update BIOS information frequently and post revisions on their Web sites.

Make sure you have the most recent BIOS for your computer.

7.Is the computer turning on

If the computer or display is not turning on, you can quickly determine that the computer has a connection or other hardware issue.

8.Reboot the computer

If the computer is acting strange, frozen, or encountering errors and can boot, reboot the computer. Often rebooting the computer can solve many computer issues

9.Have there been any power outages or electrical storms?

A computer that is not running on a **UPS** (uninterruptible power supply) may improperly turn off during a power supply . When a computer is improperly shut down, data corruption, and in some cases, hardware failure can occur.

10Update drivers or install latest patches

Hardware manufacturers frequently release updated device drivers to keep their hardware compatible with changes in technology.

Unit-III

How does a printer work?

In terms of technologies, printers tend to be narrowed down into one of two categories: **inkjet and laser**. There are other smaller subcategories such as **Dot Matrix and Solid Ink**, too.

The Basics

The way in which printers work is quite simple.

In short, printers work by **converting digital images and text into physical copies**. They do **this using a driver or specialized software** that has been designed to convert the file into a language that the printer can understand.

The image or text is then recreated on to the page using a series of miniscule dots.

Inkjet

- ✓ Inkjet printers each feature a print head containing thousands of tiny holes.
- ✓ These tiny openings drop microscopic droplets of ink onto the paper in the printer at a speed.
- ✓ Inkjet machines use a liquid ink produced either by either a colored dye or a liquid that contains solid pigments in suspension.
- ✓ As the print head moves horizontally in the machine, the paper passes through perpendicular to it.

- ✓ As the page passes through, the individual holes in the print head are activated (usually by heat electrical current depending on the manufacturer) and a small drop of ink is pushed out onto the page.
- ✓ This process if performed at high speed with thousands of droplets that form together to recreate the digital text or image that is being transferred onto the media.

Laser/LED

- ✓ Laser and LED machines work in a similar way to inkjet in that the image is made up of lots of tiny dots, which, when viewed as a whole, *appear* to be a solid image.
- ✓ However, the method in which is adopted in creating those tiny dots is vastly different
- ✓ where an inkjet uses liquid dots, a laser machine uses dots made up of toner – a fine powder of solid particles.
- ✓ When compared with an inkjet machine, lasers are much more complex.
- ✓ These machines rely on many more stages during the process than inkjet.
- ✓ In simple terms, the basic process uses a light source (laser/LED), drum (mono) or **multiple drums (color) and toner.**

Printer problems, troubleshooting, solutions

- The quality of your equipment is highly important, and sometimes, even brand-new, unscratched plastic carriers can degrade scan quality. Here's how you can ensure they are up and running, always!

1] The paper Logjam

- When working with any printer/scanner, it is inevitable that you will encounter a paper jam. It's an event where a paper or other printed material gets stuck or lodged into a printer and is unable to eject. In most cases, your User Guide or control panel instructions should walk you through this erroneous task easily enough. Most, scanners/printer, provide video assistance to make jam clearance a hassle-free experience.

- Start by inspecting the paper path and remove any jammed material, being careful in not tearing it. If it's caught between rollers, release the pressure slowly to remove it.
- If the misalignment of the papers has caused the jam, remove the tray and position the papers correctly and reseal the tray. Also, check to see if they are squared properly and repositioned.

2] Slow Print Time

- On many occasions, slow print time can be caused by a high-resolution setting. High-resolution images consume more data and require more time to process. This invariably leads to slow print times. So, if you aren't so hell-bent on getting gallery quality images, print with plain paper in Normal or Draft quality for faster print speeds.
- Second, it's equally important to check the print driver settings as they determine speed outcome. For instance, high-end lasers are available with-
- PostScript
- PCL and the manufacturer's host-based driver.
- In general, PCL is suitable for faster office printing while the latter, PostScript is best suited for graphics-intensive applications and industries.
- Lastly, switch from two-sided to simplex mode. Why? One-Sided printing takes considerably less time.

3] Bad/Inappropriate looking prints

- Often, your printer works just fine but fails to yield desired results. The images might appear faded or very poor in quality. This can turn even the best creations into something undesirable. To avoid this, check the cable connection. A scanner most likely has two connections located on its rear side.
1. A cable plugged into a power outlet
 2. A cable plugged into the computer

4] Wi-Fi printing takes an unusually long time

If the connection is weak and you do not get the right print, placing your printer very close to your router can increase throughput and reduce printing time.

5] Ink/Toner Issues

If the way images look on screen differs from the way they look in print, there's likely an issue with the ink/toner cartridge. At such times, calibrating your printer can ensure what you print remains consistent with what you get on screen.

Also, an ink/toner cartridge problem may arise if new ink/toner has just been inserted incorrectly. To avoid such instances, fix it correctly.

6] Remove other devices

As a precautionary measure, you can also check if other devices connected to the computer are interfering with the functioning of the scanner. If there are any additional, unwanted devices connected to your computer, try shutting it down and disconnecting non-essential devices. Parallel, SCSI, Firewire, and other USB devices may interfere with the scanner operations.

Setup to install printer with PC

Step 1. Unplug and restart your printer

Step 2. Check cables or wireless connection

Step 3. Uninstall and reinstall your printer

Step 4. Install the latest driver for your printer

Step 5. Run the printing troubleshooter

Step 6. Clear and reset the print spooler

Step 7. Fix printer problems after updating Windows 10

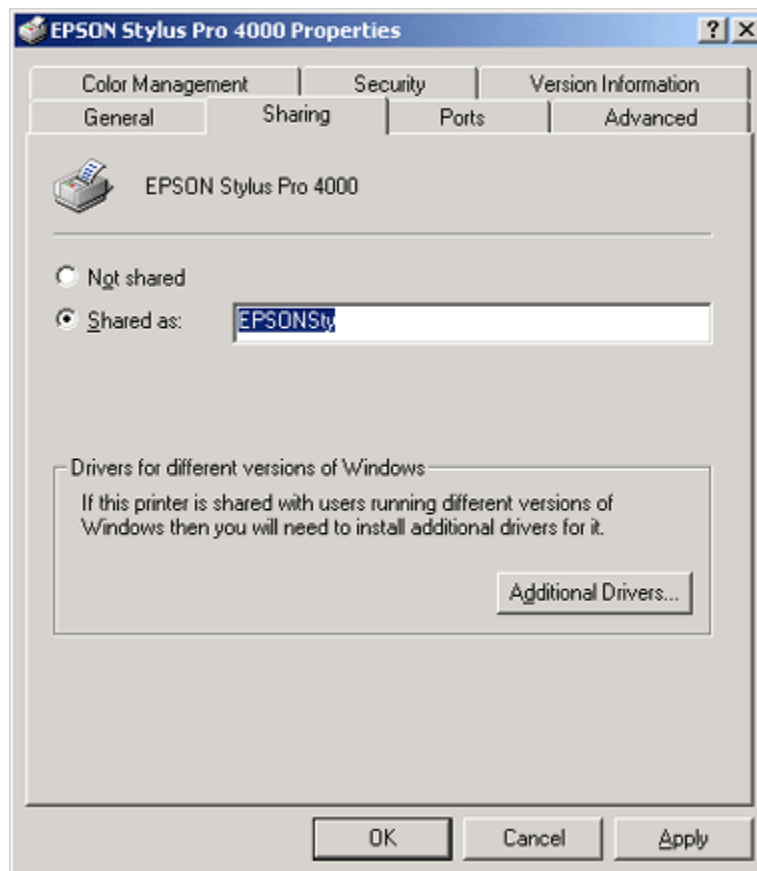
Step 8. Change a printer's status to "online"

Share a printer with Local Network

Setting up your printer as a shared printer

To share a printer that is connected directly to your computer with others on a network, follow these steps.

- 1 Click the Start button, point to Settings, and click Printers.
- 2 Select your printer, then click Sharing on the File menu.
- 3 Select Shared as, and enter the name in the Share Name text box.



4 Click OK.

Note:

Do not choose any drivers from the Additional Drivers list.

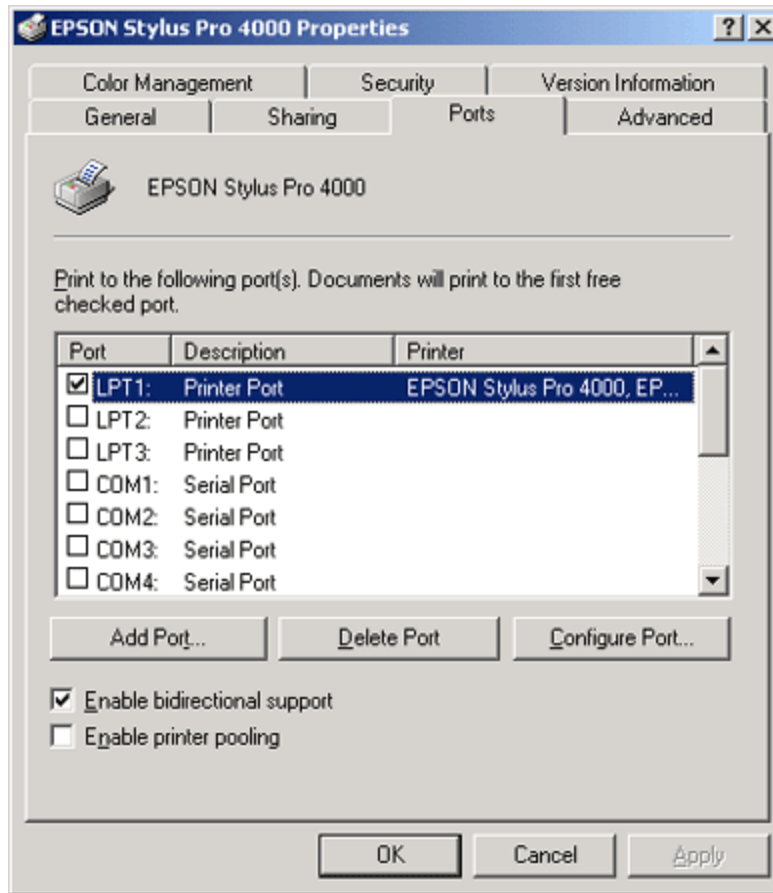
Accessing the shared printer

To access the shared printer from another computer on a network, follow these steps.

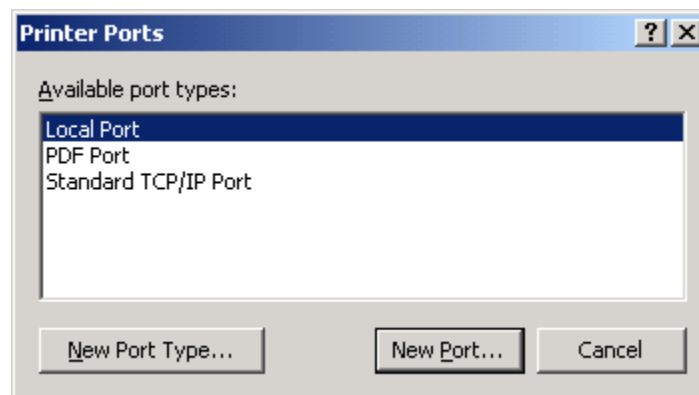
Note:

Your printer must be set up as a shared resource on the computer to which it is directly connected before you can access it from another computer.

- 1 Install the printer driver to the client computer from the software CD-ROM.
- 2 Open the Printer folder from the Control Panel, right-click your printer's icon, and open the Properties for your printer.
- 3 Click the Ports tab, and click Add Port.



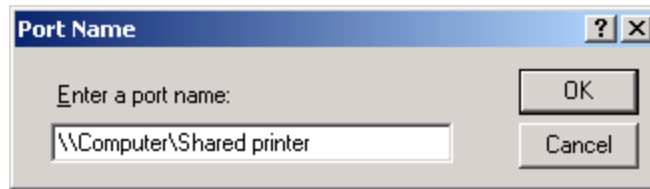
4 Select **Local Port**, and click **New Port**.



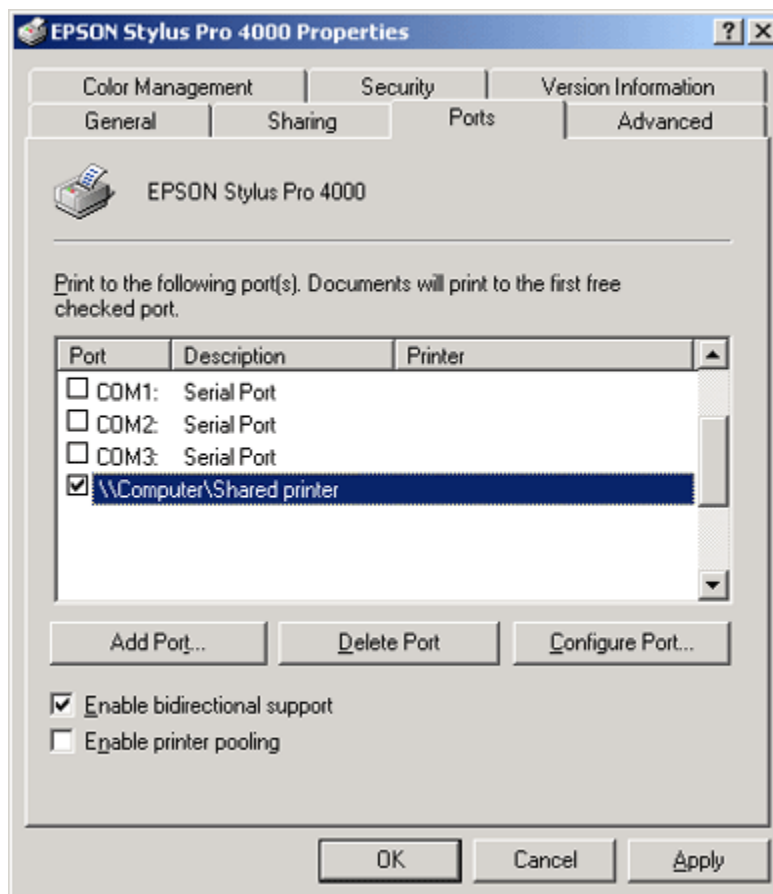
5 In the text box, type the following information:

\\name of computer that is connected to the printer\name of the shared printer

Then click **OK**.



- 6 When you enter the information, the Cancel button on the Printer Ports dialog box changes to the Close button. Click Close to return to the Ports menu.
- 7 On the Ports menu, make sure that the new port is added and the check box is selected. Click OK to close the printer driver.



How Scanner is work?

Scanners have become an important part of the home office over the last few years. Scanner technology is everywhere and used in many ways:

The basic principle of a scanner

- ✓ The basic principle of a scanner is to analyze an image and process it in some way.
- ✓ Image and text capture (optical character recognition or OCR) allow you to save information to a file on your computer.
- ✓ You can then alter or enhance the image, print it out or use it .

Types of Scanner

- **Flatbed scanners**, also called desktop scanners, are the most versatile and commonly used scanners. In fact, this article will focus on the technology as it relates to flatbed scanners.
- **Sheet-fed scanners** are similar to flatbed scanners except the document is moved and the scan head is immobile. A sheet-fed scanner looks a lot like a small portable printer.
- **Handheld scanners** use the same basic technology as a flatbed scanner, but rely on the user to move them instead of a motorized belt. This type of scanner typically does not provide good image quality. However, it can be useful for quickly capturing text.
- **Drum scanners** are used by the publishing industry to capture incredibly detailed images. They use a technology called a **photomultiplier tube** (PMT). In PMT, the document to be scanned is mounted on a glass cylinder. At the center of the cylinder is a sensor that splits light bounced from the document into three beams. Each beam is sent through a color filter into a photomultiplier tube where the light is changed into an electrical signal.

Install or add a local scanner

In most cases, all you have to do to set up a scanner is to connect it to your device. Plug the USB cable from your scanner into an available USB port on your device, and turn the scanner on. If that doesn't work, here's a way to do it manually.

1. Select **Start**
2. > **Settings**
3. > **Devices**
4. > **Printers & scanners** or use the following button.
Open the Printers & scanners settings
5. Select **Add a printer or scanner**. Wait for it to find nearby scanners, then choose the one you want to use and select **Add device**.

If your scanner is included in a multifunction or All-In-One printer, you may only see the name of your printer. To see your scanner, under **Printers & scanners**, select your installed printer, select **Manage**, and then choose your scanner.

6.Install or add a network, wireless, or Bluetooth scanner

7.Verify your scanner is installed

8.Scan a picture or document with Windows Scan app

9.Find saved scans

If none of these instructions solved your scanner problem, there could be an issue with the scanner itself. Go to the scanner manufacturer's website for specific troubleshooting info.

Troubleshooting with Scanners

1.The Start button light does not come on

- Make sure the AC adapter is connected to the scanner and the power cord is plugged into an electrical outlet.

- Make sure the scanner is turned on.

2.The scanner does not scan

Try one or more of these solutions:

- Wait until the Start button light stays green (ready for scanning).
- Your system may not work properly if you use a USB cable is not working. Use the USB cable that came with your scanner.

3.Pressing the button does not start scanning

Try one or more of these solutions:

- Make sure driver is installed.

4.You cannot scan multiple images

Try one or more of these solutions:

- Position each photo at least an inch (20 mm) apart from adjacent photos.
- Make sure your application is available to scan multiple images.

5.You cannot scan from the Automatic Document Feeder

- If the Automatic Document Feeder is open, close it and then try again. If the Automatic Document Feeder is already open while you are scanning, remove any jammed paper; reload any document not yet scanned and then restart EPSON Scan.

6.The scanner software does not work properly

- Make sure your computer meets the memory and other system requirements specified for the software you are using.
- Make sure the computer has enough memory for your software. If the computer does not have enough memory available, see your software and computer documentation for details.

7.You cannot scan an image or you only get a few dots for the scanned image

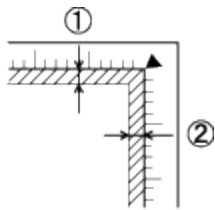
Try one or more of these solutions:

- Make sure a document is placed on the document table of the scanner.
- In the Home Mode or the Professional Mode, select **Black&White** and change the Threshold setting.

8. Edges of the document are not scanned

Place documents away from the edges of the document table to avoid unwanted image cropping.

The area with a width of maximum .08 inch (2.1 mm) from the horizontal guide and .06 inch (1.5 mm) from the vertical guide is not scanned.



1. Maximum unreadable area of .08 inch (2.1 mm)
2. Maximum unreadable area of .06 inch (1.5 mm)

9. The image does not look the same as the original

Try one or more of these solutions:

- Try different image setting combinations on your scanner software.
- Your software may not have sufficient color matching and color management features, or these components may not be installed correctly. See the documentation that comes with your software and computer.

Troubleshooting with hard drive in computer system

It may be hard to believe, but a completely dead hard drive may be the best option for a hard drive failure. When your drive is dead, it could be a problem with the computer power supply or the cables, or the drive itself could have just stopped.

1. Pay Attention to the Sounds the Drive is Making

If the drive makes clicking and grinding noises when it starts up, then shut your computer down immediately and contact one of our certified technicians to have

your data preserved. Those clicking and grinding noises indicate damage to the read/write heads of your drive, and that is a mechanical issue that an expert should fix.

2.Turn Off Your Computer

The operating system on your computer is constantly scanning, accessing, and writing data to your hard drive. When your hard drive starts to fail, your operating system could wind up interpreting bad sectors as blank sectors and start writing to them. That means that your drive will sustain more damage and you will lose more data by the second.

3.Check Your Connections

Open up your computer and make sure that the power and data connection cables for your hard drive are plugged in and working. Look at your cables and make sure that they are not frayed or damaged in some way. It is always best to start with the obvious things first when you are trying to figure out how to recover data from a damaged hard drive.

4.Look For Your Drive in Your BIOS

When you first turn on your computer, a message will flash for a few seconds that will tell you what button to push to access your computer's BIOS. Press that button and then follow the on-screen instructions to find your hard drive listing. If you want to learn how to recover a hard drive, it is important to first make sure that the computer can see the drive.

5.Put the Drive in an External Enclosure

To recover hard drive data safely, you need to connect your hard drive to a second computer that has a working operating system. Remove your damaged hard drive and put it in an external enclosure that can be connected to a second computer through a USB port.

When you connect the hard drive to a second computer, you will be able to:

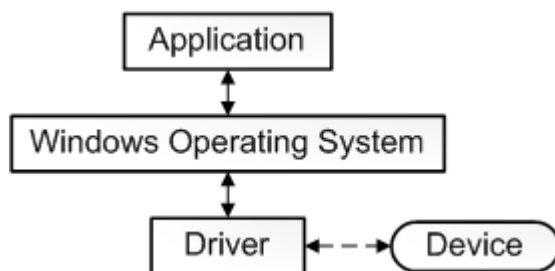
- Mirror the damaged drive to a fresh drive to salvage your data
- Scan the damaged drive with scanning software you can find online to see if data can be recovered
- Analyze the drive with computer software without damaging the data

6. Don't Ever Open Your Drive

As certified hard drive technicians, we know how complicated these little devices are. We understand the platters, the read/write heads, and the circuit boards. That is why we are telling you that opening your hard drive to try and retrieve your data is a bad idea. There are many different moving parts in your hard drive that you could damage, and you may lose all of your data for good.

Drivers

In the most fundamental sense, a driver is a software component that lets the operating system and a device communicate with each other. For example, suppose an application needs to read some data from a device.



The device drivers can be mainly **classified into three groups** as below :-

1. **Character driver** – This category deals with the character devices i.e., which transfer data character-by-character. Examples include consoles, serial port, sensors etc.
2. **Block driver** – For the devices that transfer data by a block size (thus called block devices), the corresponding driver is called block device driver. For example, CD-ROM, USB devices etc.
3. **Network driver** – The devices that allows us to connect to a network and use the network interface services (called network devices) have a network

driver in place for them. Example – **Ethernet card, NIC (Network Interface Card)** etc.

Roles of drivers

1. An automatic driver search program will handle all of your driver updates without you doing anything except running the program.
2. you'd have to update each driver one at a time, but these programs do it all at once.
3. generally work by searching a huge database of drivers for the ones your computer needs, then downloading and installing them
4. You don't have to deal with the individual install programs, either—the program usually does all of that for you, too.
5. Another helpful thing a program like Driver Detective does for you is that it can find missing drivers that you didn't know about.
6. Sometimes, you may only lose one file or two, and that file may not be one of the critical drivers for a device. These automatic driver programs will double-check all the drivers to see if any are missing, and if any are, they will download replacement drivers.
7. This can help prevent computer errors or crashes from occurring.

Unit-IV

How to diagnose and troubleshooting of micro computer

Troubleshooting Hard Disk

Hard disks make normally the following types of troubles:

□ Some sectors of the hard disk become incapable of storing and retrieving data. To recover from this problem any disk scanning software can be used.

The hard disk is not installed properly. This □ problem can be recovered by reinstalling the hard disk.

The hard disk is crashed. □

2.2. Cabling

cable normally has 3 slots – one to connect it with the motherboard, two others are to

connect it with two hard drives (master and slave).

2.2.1. Connecting Cable to Motherboard

During cabling you should be careful about connecting the cable to the motherboard in such a way that the **pin-1** of cable connects with the pin-1 of slot.

2.2.2. Connecting Cable to Hard Disk

Two hard disks can be connected with a cable : one master and another slave. Again there are **2 slots** on a cable for hard drives. Any hard drive (master or slave) can be connected to any one of the 2 slots of the cable. The motherboard distinguishes between them by their configuration. So if one hard disk on a cable is configured (by jumper setting) as master then the other must be configured as slave.

2.3Configuring CMOS

CMOS is part of BIOS which is help to start and restart PC.

Two methods to configure CMOS . One for ‘plug and play’ BIOS and another for non-’plug and play’ BIOS.

2.4Troubleshooting Keyboard

The Motherboard Keyboard Interface

The interface between the keyboard cable and the system, unit.

This is a DIN plug which has five pins, all numbered oddly.

2.5Troubleshooting Mouse

First, check the driver. Is the mouse driver set up correctly? Is it there in the first place? Next, clean the mouse.

Second, check the interface. If it's a serial port, then check the serial port.

2.6Troubleshooting Monitor

If the display screen remains dark after the system is turned on:

- **Make sure that the monitors power switch is on.**
- **The picture seems to be constantly moving:**
- **Make sure your video card's output frequencies are supported by this monitor.**

2.6Troubleshooting Printers

Make sure printer driver is properly installed

Make sure printer wire is connected

Check all printer settings

Methods to Solve Trouble shooting in microcomputer

Hardware Troubleshooting Tools

The level of troubleshooting most often performed on PC hardware is exchanging *Field Replaceable Units (FRUs)*. Due to the relative low cost of computer components, it is normally not practical to troubleshoot failed components to the IC level. The cost of using a technician to diagnose the problem further, and repair it, can quickly exceed the cost of the new replacement unit.

However, a few hardware diagnostic tools can be very helpful in isolating defective hardware components. These tools include

- Software diagnostic disk
- Multimeter
- Cable tester
- POST card

Software Diagnostic Packages

Several commercially available disk-based diagnostic routines can check the system by running predetermined tests on different areas of its hardware. The diagnostic package evaluates the response from each test and attempts to produce a status report for all of the system's major components.

The most common software-troubleshooting packages test the system's memory, **microprocessor, keyboard, display monitor, and the disk drive's speed. If at least the system's CPU, disk drive, and clock circuits are working**, you might be able to use one of these special software-troubleshooting packages to help localize system failures.

Using a Multimeter in a PC

A number of test instruments can help you isolate computer hardware problems. One of the most basic pieces of electronic troubleshooting equipment is the multimeter. **These test instruments are available in both analog and digital readout form and can be used to directly measure electrical values of voltage (V).** Therefore, these devices are referred to as VOMs (volt-ohm-milliammeters) for analog types, or DMMs (digital multimeters) for digital types.

This particular DMM contains facilities built in to the meter to test transistors and diodes. These facilities are in addition to its standard functions of current, voltage, and resistance measurement; however, in computer repair work, only the voltage and resistance functions are used extensively.

Cable Testers

The most frequent hardware-related **cause of network problems involves bad cabling and connectors**. Several specialized, handheld devices designed for testing the various types of data communication cabling are available. These devices range from inexpensive *continuity testers*, to moderately priced *data cabling testers*, to somewhat expensive *time domain reflectometers (TDR)*.

POST Cards

A POST card is a diagnostic device that plugs into the system's expansion slot and tests the operation of the system as it boots up. These cards can be as simple as interrupt and direct memory access (DMA) channel monitors, or as complex as full-fledged ROM BIOS diagnostic packages that carry out extensive tests on the system.

POST cards are normally used when the system appears to be dead, or when the system cannot read from a floppy or hard drive. The firmware tests on the card replace the normal BIOS functions and send the system into a set of tests. The value of the card lies in the fact that the tests can be carried out without the system resorting to software diagnostics located on the hard disk or in a floppy drive.

Troubleshooting Power-Supply Problems

Typical symptoms associated with power-supply failures include the following:

- No indicator lights are visible, with no disk drive action and no display on the screen. Nothing works, and the system is dead.
- The On/Off indicator lights are visible, but there is no disk drive action and no display on the monitor screen. The system fan might or might not run.

Troubleshooting in BIOS or While Loading OS

Main problems when PC Operating system is not loaded

- Boot Configuration Data (BCD) missing or corrupted

- Boot file or MBR corrupted
- Operating system Missing
- Boot sector missing or corrupted
- Bootmgr missing or corrupted
- Unable to boot due to system hive missing or corrupted

Methods to Solve this problems

Method 1: Startup Repair tool

The Startup Repair tool automatically fixes many common problems. The tool also lets you quickly diagnose and repair more complex startup problems. When the computer detects a startup problem, the computer starts the Startup Repair tool. When the tool starts, it performs diagnostics.

Method 2: Repair Boot Codes

To repair boot codes, run the following command:

```
dosCopy
```

```
BOOTREC /FIXMBR
```

To repair the boot sector, run the following command:

```
dosCopy
```

```
BOOTREC /FIXBOOT
```

Method 3: Fix BCD errors

If you receive BCD-related errors, follow these steps:

- Scan for all the systems that are installed. To do this, run the following command:

```
Bootrec /ScanOS
```

Method 4: Replace Bootmgr

If methods 1, 2 and 3 do not fix the problem, replace the Bootmgr file from drive C to the System Reserved partition.

To do this, follow these steps:

- At a command prompt, change the directory to the System Reserved partition.

Rename the Bootmgr file as Bootmgr.old:

```
ren c:\bootmgr bootmgr.old
```

Method 5: Restore System Hive

If Windows cannot load the system registry hive into memory, you must restore the system hive. To do this, use the Windows Recovery Environment or use Emergency Repair Disk (ERD) to copy the files from the C:\Windows\System32\config\RegBack to C:\Windows\System32\config.

Different installing methods of input/output units in computers

1. Programmed I/O

The **programmed I/O method** controls the transfer of data between connected devices and the computer. Each I/O device connected to the computer is continually checked for inputs. Once it receives an input signal from a device, it carries out that request until it no longer receives an input signal. Let's say you want to print a document. When you select print on your computer, the request is sent through the central processing unit (CPU) and the communication signal is acknowledged and sent out to the printer.

2. Interrupt-Based I/O

The **interrupt-based I/O method** controls the data transfer activity to and from connected I/O devices. It allows the CPU to continue to process other work instead and will be interrupted only when it receives an input signal from an I/O device. For example, if you strike a key on a keyboard, the interrupt I/O will send a signal to the CPU that it needs to pause from its current task and carry out the request from the keyboard stroke.

3. Direct Memory Access (DMA) I/O

The name itself explains what the **direct memory access I/O method** does. It directly transfers blocks of data between the memory and I/O devices without having to involve the CPU. If the CPU was involved, it would slow down the computer

4.PNP method

Shut down the pc

Turn off the power

Connect the device

Start the PC

OS automatically installed the drivers

5.Device Manager

Check the device driver files ,then device manager automatically install these drivers and help to work I/O devices.

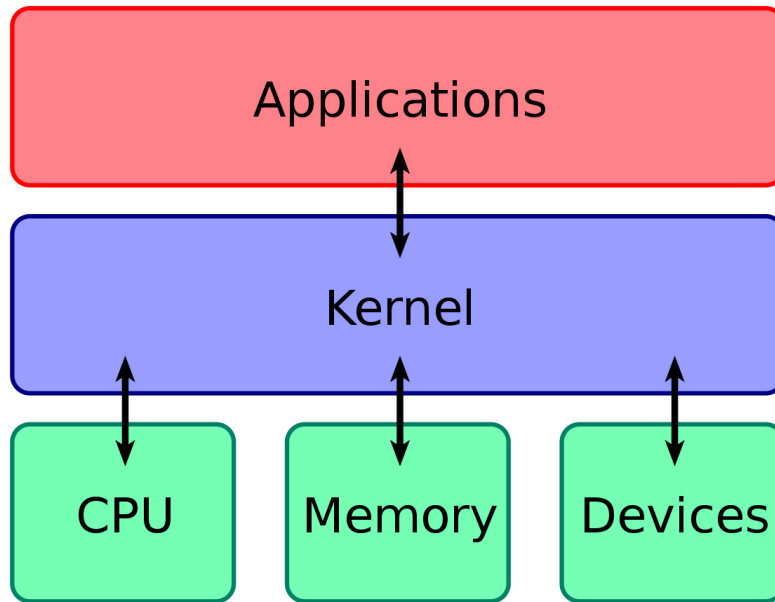
Operating Systems Managing faulty components

Windows operating systems come with many individual software packages, some of which are used to manage hardware interactions. These packages are called operating system components. Operating systems vary, but will likely include the kernel, the shell, and the file system.

1.What is the Kernel?

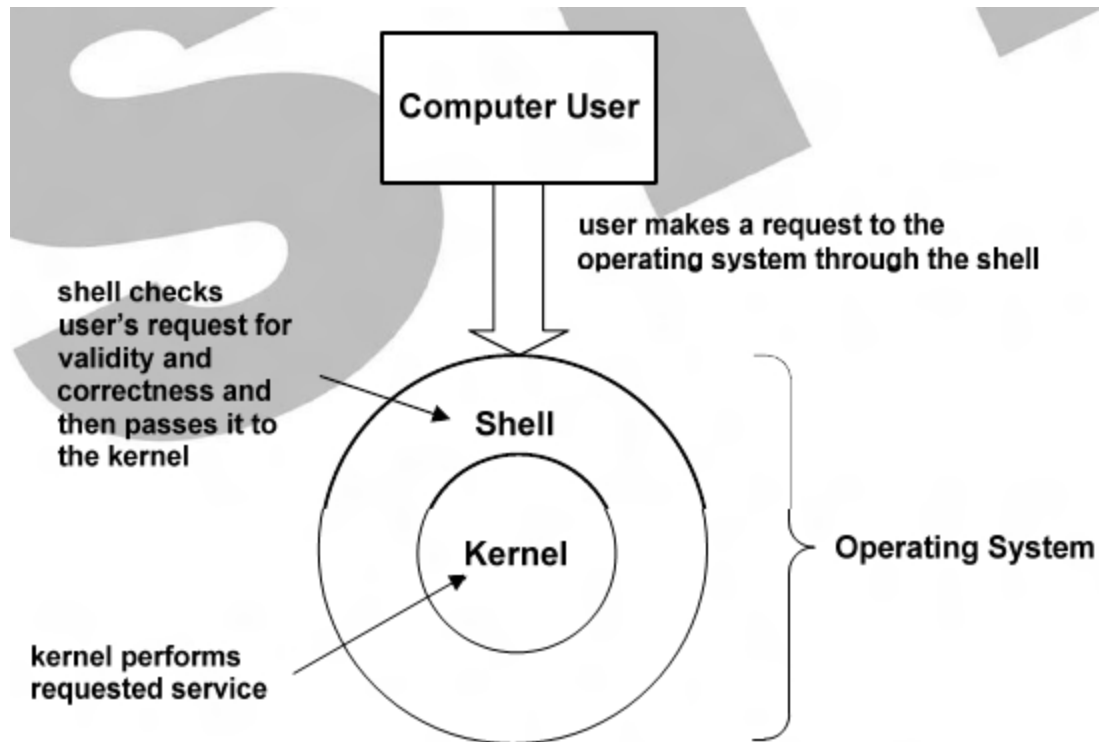
The kernel is the **heart of your computer operating system**. This operating system component acts as a bridge between your **computer applications** and the actual processing of data by your **computer hardware**. Among the responsibilities assigned to the kernel is the management of system resources or the communication between software and hardware components.

The kernel handles low-level computer functions. Without the kernel, your computer cannot perform even the most basic functions. In some cases, a faulty kernel component will necessitate the reinstallation of the Windows operating system.



2. What is the Shell?

The Shell refers to what is known as **the graphical user interface** (GUI) that you know as your desktop, the various desktop icons, your system tray and taskbar. Think of the shell as the face of Windows. The shell makes all your programs and files user-friendly by using easy-to-identify icons and pop-up menus you can access with the click of a mouse.



The Kernel and the Shell

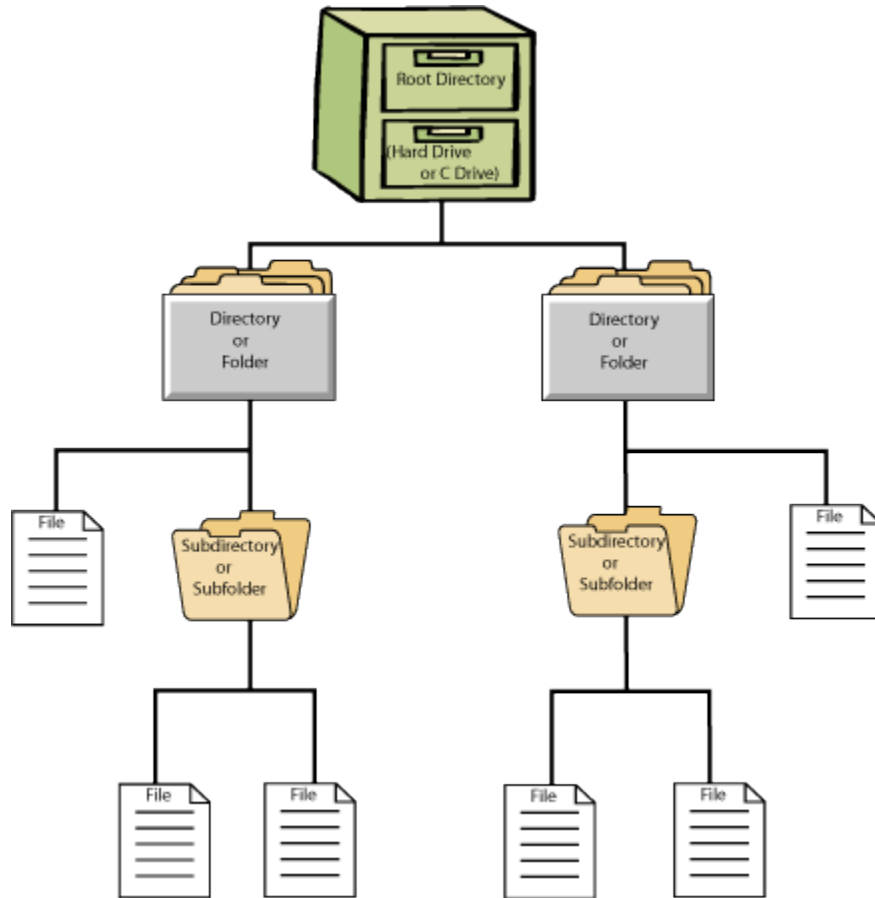
The shell is something we all depend upon to operate our computers. But what happens when the shell malfunctions? For instance, if you click on a folder and it refuses to open? Without the shell, it is difficult, if not impossible, for you to operate your computer. If you have a shell error message or your shell doesn't function as it should, your computer may be infected with a virus or other malware that has taken control of your system. A virus scan may remove the virus, but if the damage is extensive, you may need to reinstall Windows or at least specific shell files.

3.What is the File System?

Every Windows operating system depends on some type of file system. **A file system is crucial for storing, accessing, writing, and deleting files.** While different operating systems have their own file systems, they have many similarities in design and in the way the user can access files within the operating system. At a basic level, a file system is the manner in which you store data as individual files on your computer's hard drive and the way the data is accessed in future.

If your computer develops a problem with its file system, there may be actual physical damage to the hard disk of your computer. Such damage could cause the corruption of your file system and make it impossible to access computer files.

Sometimes, a corrupted file system can be restored by replacing or reinstalling specific Windows operating system files.



<https://www.techopedia.com/definition/4614/microcomputer>

cpu -task1,task2,task3

Lifo,fifo,pr