

Module 1 – Computer Hardware Maintenance

After going through this module, students will be able to

- Use basic hand tools effectively.
- Disassemble and assemble a PC.
- Perform basic troubleshoot of PC.
- Work with different cables, connectors, and its crimping technique for PC.
- Install and maintain software for a PC.
- Manage files effectively in Windows and Linux environment.
- Work with Linux environment by using Linux commands.
- Create document, spreadsheets and make presentations using open office.

After going through this module, students will be able to

- Customize PC in Windows and Linux environment.
- Manage PC in Windows and Linux environment.
- Perform troubleshooting and maintenance of PC based on the faulty conditions.

Able to use basic PC hand tools effectively

(3 hours)

In this section, we will discuss:

- Specifications of Tweezers, Screw Driver, Cutting Pliers, Crimping Tool, Soldering Iron, Desoldering Pump
- Safety hazards on basic hand tools

Specifications of Tweezers, Screw Driver, Cutting Pliers, Crimping Tool, Soldering Iron, Desoldering Pump

What are the hand tools?

- The tools made up of simple levers which we use with our hands rather than motors are said to be hand tools.
- Some examples of hand tools are Tweezers, Screw Driver, Cutting Pliers, Crimping Tool, Knives, Soldering Iron, Desoldering Pump, etc.



Image Source: <https://nstidehradun.wordpress.com/2019/11/29/hand-tools-and-its-safety/>

Specifications of Tweezers, Screw Driver, Cutting Pliers, Crimping Tool, Soldering Iron, Desoldering Pump

Specifications of some Hand tools

- Tweezers
- Screw Driver
- Wire Pliers
- Crimping Tool
- Soldering Iron
- Desoldering pump



Image Source: <https://nstidehradun.wordpress.com/2019/11/29/hand-tools-and-its-safety/>

Specifications of Tweezers, Screw Driver, Cutting Pliers, Crimping Tool, Soldering Iron, Desoldering Pump

Safety in handling hand tools

- We should wear eyeglasses whenever needed.
- Without knowledge of any tool, we shouldn't use it.
- Cutting pliers should be sharp and in good condition.
- We shouldn't work with oily hands.



Image Source: <https://nstidehradun.wordpress.com/2019/11/29/hand-tools-and-its-safety/>

Specifications of Tweezers, Screw Driver, Cutting Pliers, Crimping Tool, Soldering Iron, Desoldering Pump

Safety in handling hand tools

- Also one shouldn't carry hand tools in a pocket.
- We shouldn't use damaged hand tools.
- After the work of a hand tool is completed clean it and return it to its proper storage place.



Safety hazards on basic hand tools

Hand Tool Safety Rules

- Carry all sharp tools in sheath or holsters.
- Do not use a tool if the handle surface has splinters, burrs, cracks or splits .
- Do not perform "make-shift" repairs to tools.
- When handing a tool to another person, direct sharp points and cutting edges away from yourself and the other person.



Image Source: <https://nstidehradun.wordpress.com/2019/11/29/hand-tools-and-its-safety/>

Safety hazards on basic hand tools

Hand Tool Safety Rules

- Do not throw tools from one location to another or from one employee to another.
- Transport hand tools only in toolboxes or tool belts.



Image Source: <https://nstidehradun.wordpress.com/2019/11/29/hand-tools-and-its-safety/>

Safety hazards on basic hand tools

Hand Tool Safety Rules

Some basic hand tools safety hazards

- Hammer Safety
- Power Drill Safety
- Power Saw Safety
- Hand Files & Rasp Safety
- Chisel Safety
- Toolboxes, Tool Chests & Cabinets

Hand and Power Tool Safety



OSHA Office of Training and Education

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Image Source: <https://nstidehradun.wordpress.com/2019/11/29/hand-tools-and-its-safety/>

Able to Disassemble and assemble PC (6 hours)

In this section, we will discuss:

- Introduction to computers, applications. Basic blocks of a digital computer.
- Different types and specifications of the cables and connectors used for interconnecting the devices, boards, cards, components inside a PC
- Network Cable Connectors Types and Specifications
- Importance of SMPS, Hard disk, Internal and external memory devices
- Different types of I/O Devices (Monitors, Printers, Mouse Keyboards, Scanners,
- Plotters, Speakers)
- Precautions to be taken while opening and closing PC cabinet.

Introduction to computers, applications. Basic blocks of a digital computer.

Introduction to Computer Fundamentals

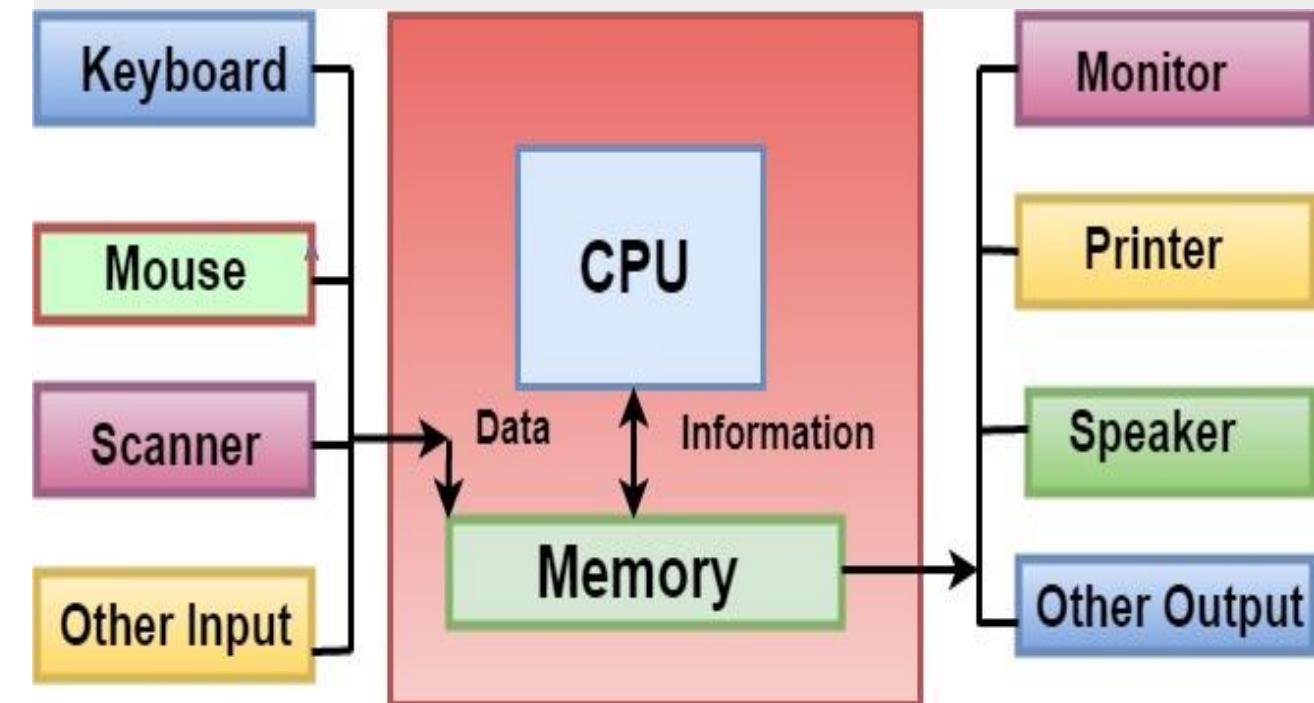
- A Computer is an electronic device that can perform activities that involve Mathematical, Logical and graphical manipulations.
- Generally, the term is used to describe a collection of devices that function together as a system.



Introduction to computers, applications. Basic blocks of a digital computer.

Introduction to Computer Fundamentals

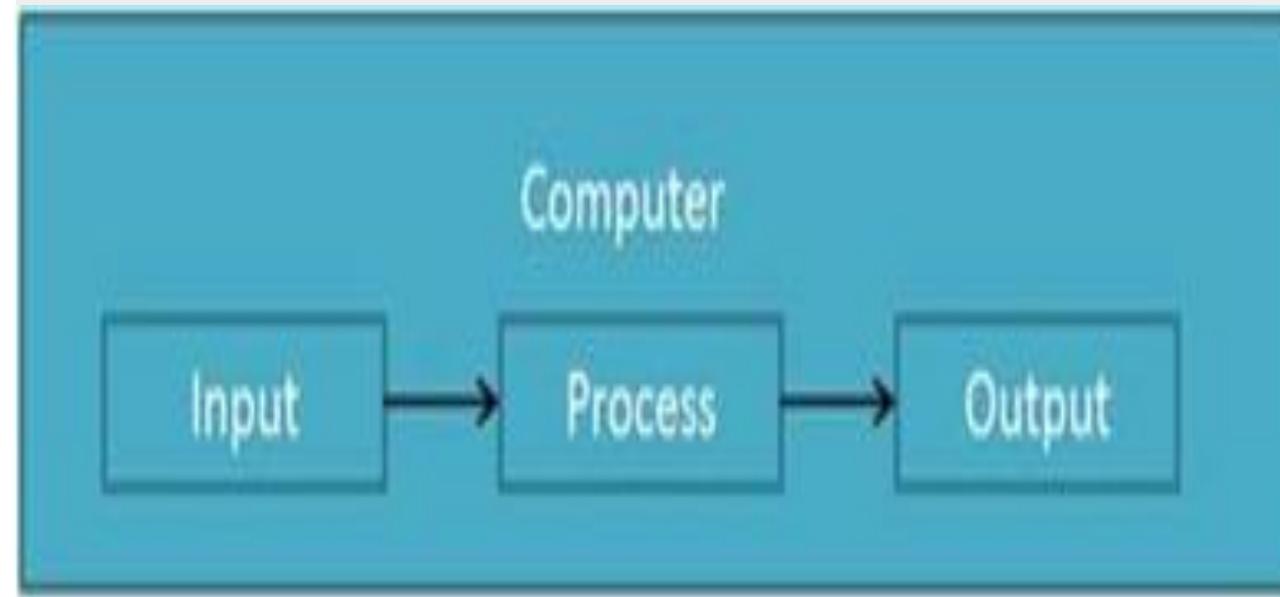
- Functionalities of a computer
- Advantages of computers
- Limitations of computers
- Generations of computers
- Computer - Applications



Introduction to Computer Fundamentals

Functionalities of a computer

- Takes data as input.
- Stores the data/instructions in its memory and uses them when required.
- Processes the data and converts it into useful information.
- Generates the output



Introduction to Computer Fundamentals

Advantages of computers

- High speed
- Accuracy
- Storage
- Automation
- Diligence
- Versatility
- Cost effectiveness

Advantages of Computer:

- Stores Huge Amounts of Data.
- Accuracy.
- Increases your Productivity.
- Internet Connection.
- Organizes the Information.
- Keeps Everyone Connected.
- Helps to Automate.
- Help Physically Challenged.



Introduction to Computer Fundamentals

Limitations of computers

- No I.Q
- Dependency
- Environment
- No Feeling

Limitation of computer

- No IQ
- No feelings
- No learning capacity
- Human dependent
- Hardware and software dependent

Introduction to Computer Fundamentals

Generations of computers

- First Generation(1946-1959) - Vacuum tube
- Second Generation(1959-1965) - Transistor
- Third Generation(1965-1971) - Integrated Circuit
- Fourth Generation(1971-1980) - VLSI microprocessor
- Fifth Generation(1980-onwards) - ULSI microprocessor

Computer Generations

Generation	Device	Hardware feature	Characteristics	System names
First (1942-1959)		► Vacuum Tubes ► Punch Cards	► Support machine language only ► Very costly ► Generate lot of heat ► Huge size ► Consumed lot of electricity	► ENIAC ► EDVAC ► TBM 701
Second (1959-1965)		► Transistors ► Magnetic Tapes	► Batch operating system ► Faster, smaller and reliable than previous generation ► Costly	► Honeywell 400 ► CDC 1604 ► IBM 7030
Third (1965-1975)		► ICs ► Large capacity disk and Magnetic Tapes	► Time Sharing OS ► Faster, smaller and reliable cheaper ► Easier to update	► IBM 360/370 ► CDC 6600 ► PDP 8/11
Fourth (1975-1988)		► ICs with VLSI Technology ► Semiconductor Memory ► Magnetic tapes and floppy as portable	► Multiprocessing & GUI OS ► Object oriented programs ► Small, affordable, easy to Use ► Easier to update	► Apple II ► VAX 9000 ► CRAY 1/2
Fifth (1988-Present)		► ICs with ULSI Technology ► Large capacity hard disk with RAID Support ► Optical disks as portable read-only storage media ► powerful servers, internet, Cluster computing	► Powerful, cheaper, reliable, easy to use, portable ► Rapid software development possible	► IBM ► Pentium ► PARAM

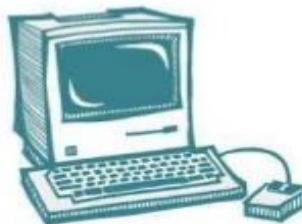
Introduction to Computer Fundamentals

Computer - Applications

- Business
- Banking
- Insurance
- Education
- Marketing
- Healthcare
- Engineering Design
- Military
- Communication
- Government

Application of Computers

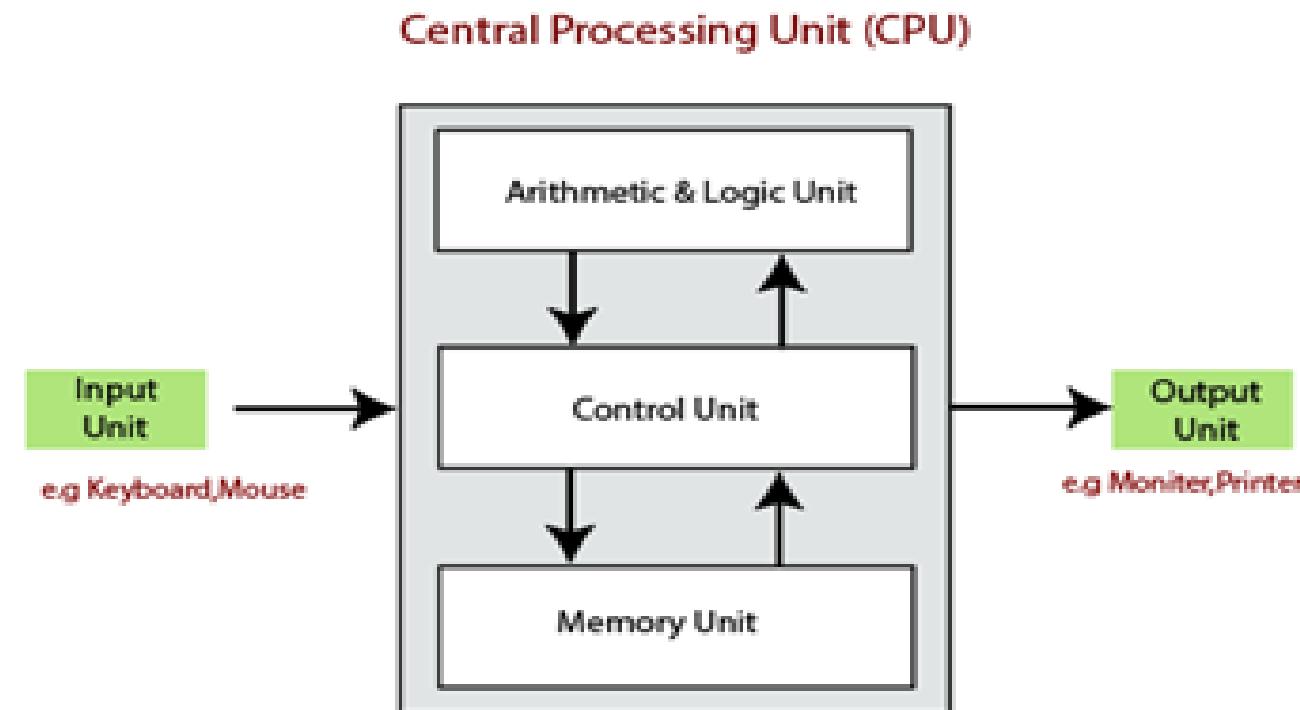
- * Universal Information Processing Machine.
- * Used in Various Educational Fields.
- * Various Softwares are formed as per Programming.
- * Source of Advanced Technology.
- * It has made more Easier and Transperant.



Introduction to computers, applications. Basic blocks of a digital computer.

Block Diagram of digital Computer

- CPU (Central Processing Unit)
- Storage Unit
- ALU(Arithmetic Logic Unit)
- Control Unit



Different types and specifications of the cables and connectors used for interconnecting the devices, boards, cards, components inside a PC

What is Network Cabling?

- Network cables are used to connect and transfer data and information between computers, routers, switches and storage area networks . These cables are essentially the carrier or media through which data flows.



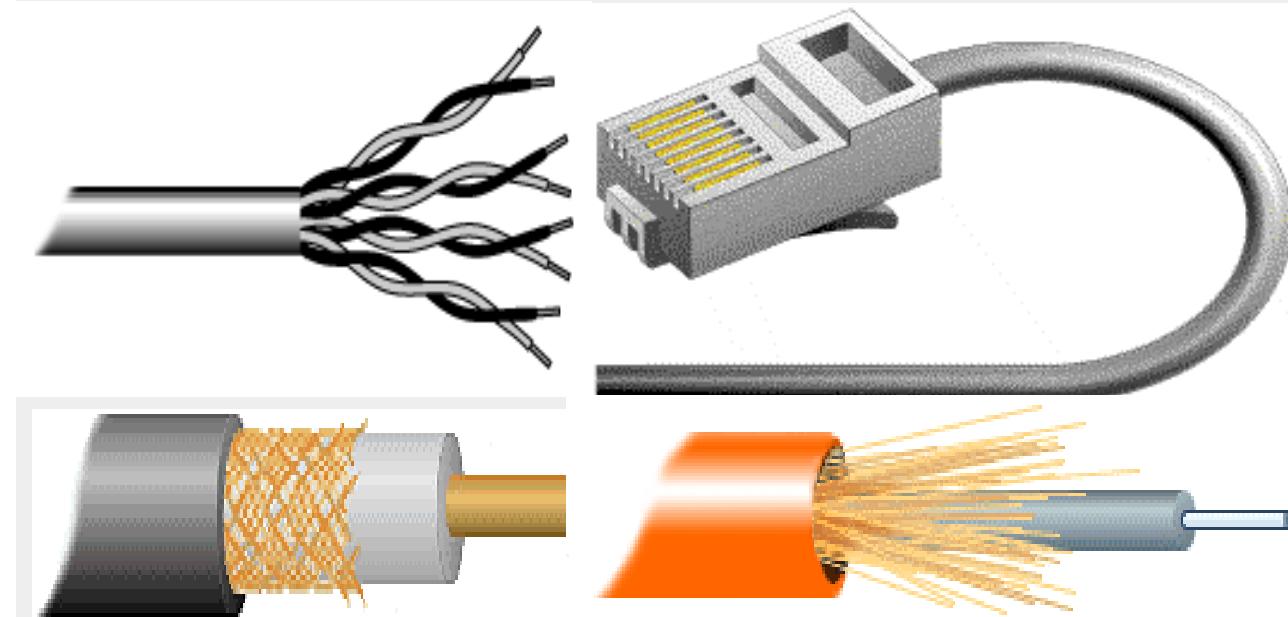
Image Source: <https://fcit.usf.edu/network/chap4/chap4.htm>

Different types and specifications of the cables and connectors used for interconnecting the devices, boards, cards, components inside a PC

What is Network Cabling?

The following sections discuss the types of cables used in networks and other related topics.

- Unshielded Twisted Pair (UTP) Cable
- Shielded Twisted Pair (STP) Cable
- Coaxial Cable
- Fiber Optic Cable



Network Cable Connectors Types and Specifications

Computer Cable types and descriptions

- VGA Cable
- DVI Cable
- HDMI Cable
- PS/2 Cable
- Ethernet Cable
- 3.5mm Audio Cable
- Computer Power Cord (Kettle Plug)
- ThunderBolt/USB-C
- Displayport



Image Source: <https://fcit.usf.edu/network/chap4/chap4.htm>

Importance of SMPS, Hard disk, Internal and external memory devices

SMPS-Switched Mode Power Supply

- SMPS or switched mode power supply is an electronics device that is used to convert AC to DC, AC to AC, DC to DC and DC to AC voltages.
- The circuit consists of a transformer, rectifier, voltage regulator and a filter
- The input supply is turned On and Off by MOSFETs and outputs a high efficiency, regulated voltage.
- The SMPS used in computers is of AC to DC type supply.

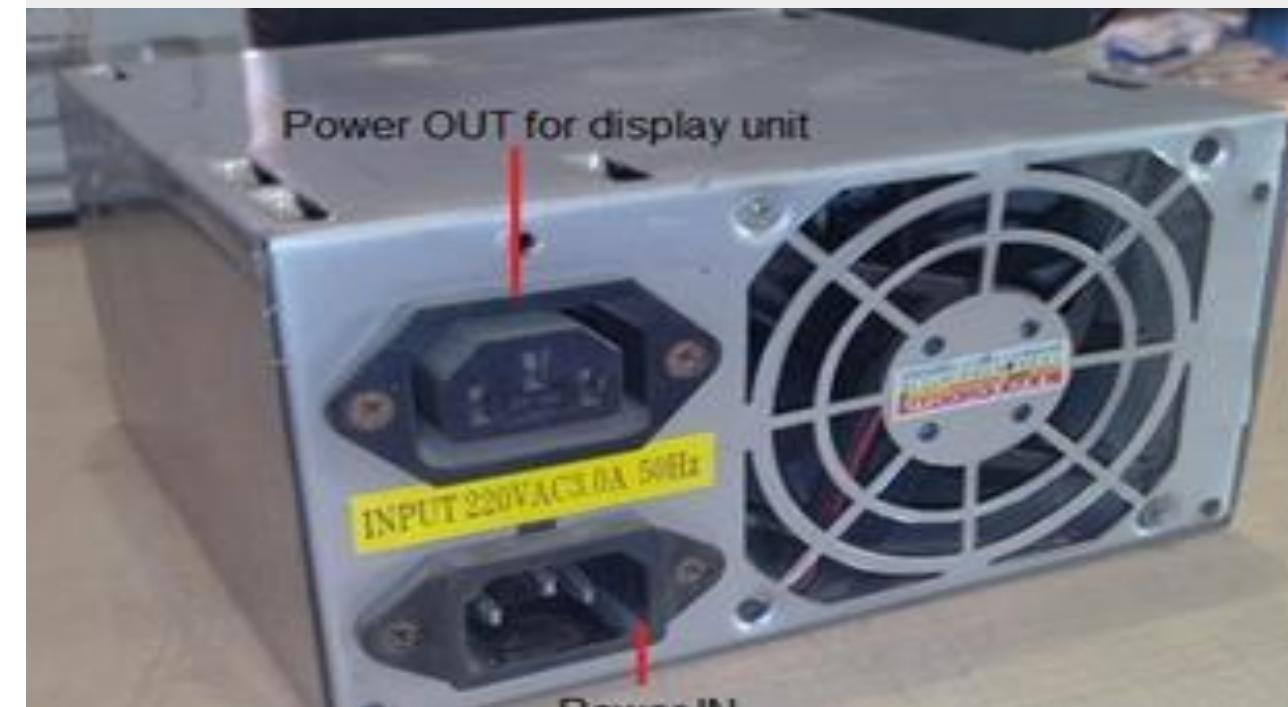


Image Source: <https://www.it4nextgen.com/computer-smps/>

Importance of SMPS, Hard disk, Internal and external memory devices

SMPS-Switched Mode Power Supply

- SMPS parts and Connectors
- How to test computer SMPS
- Advantages of SMPS
- Disadvantages of SMPS
- Applications of SMPS

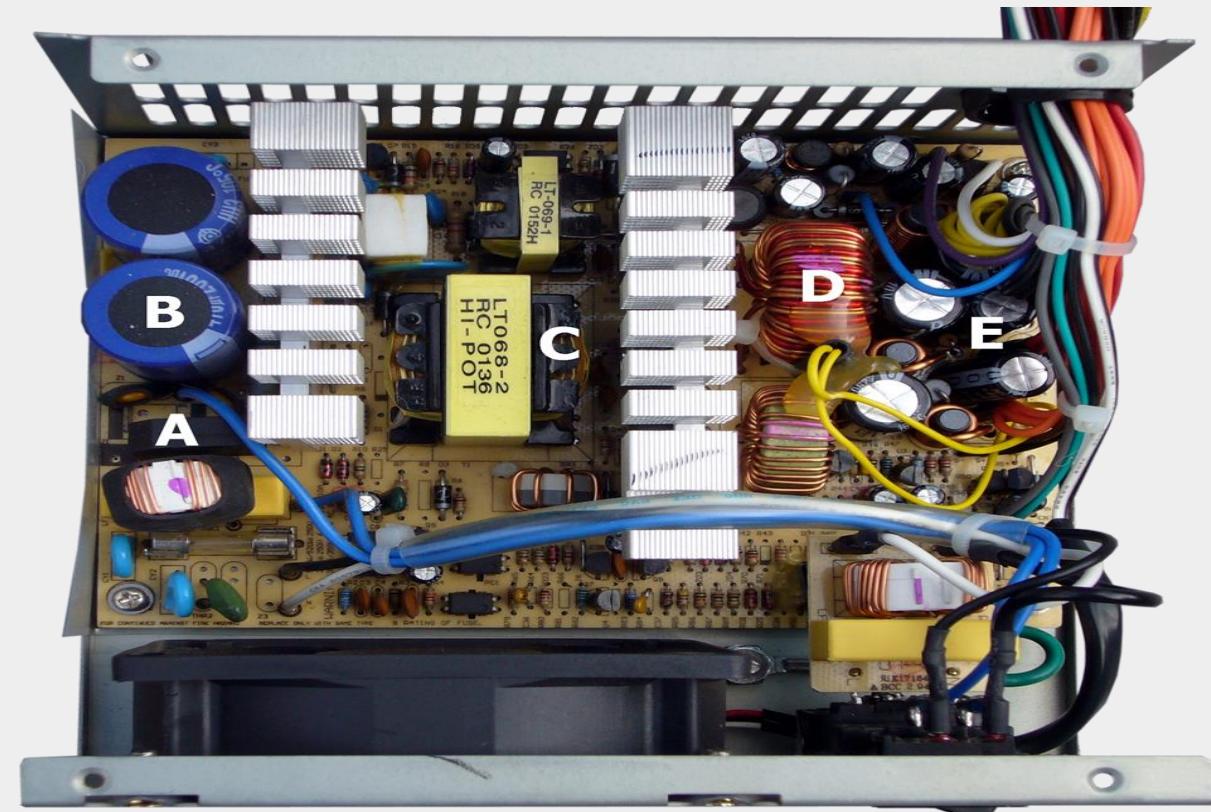
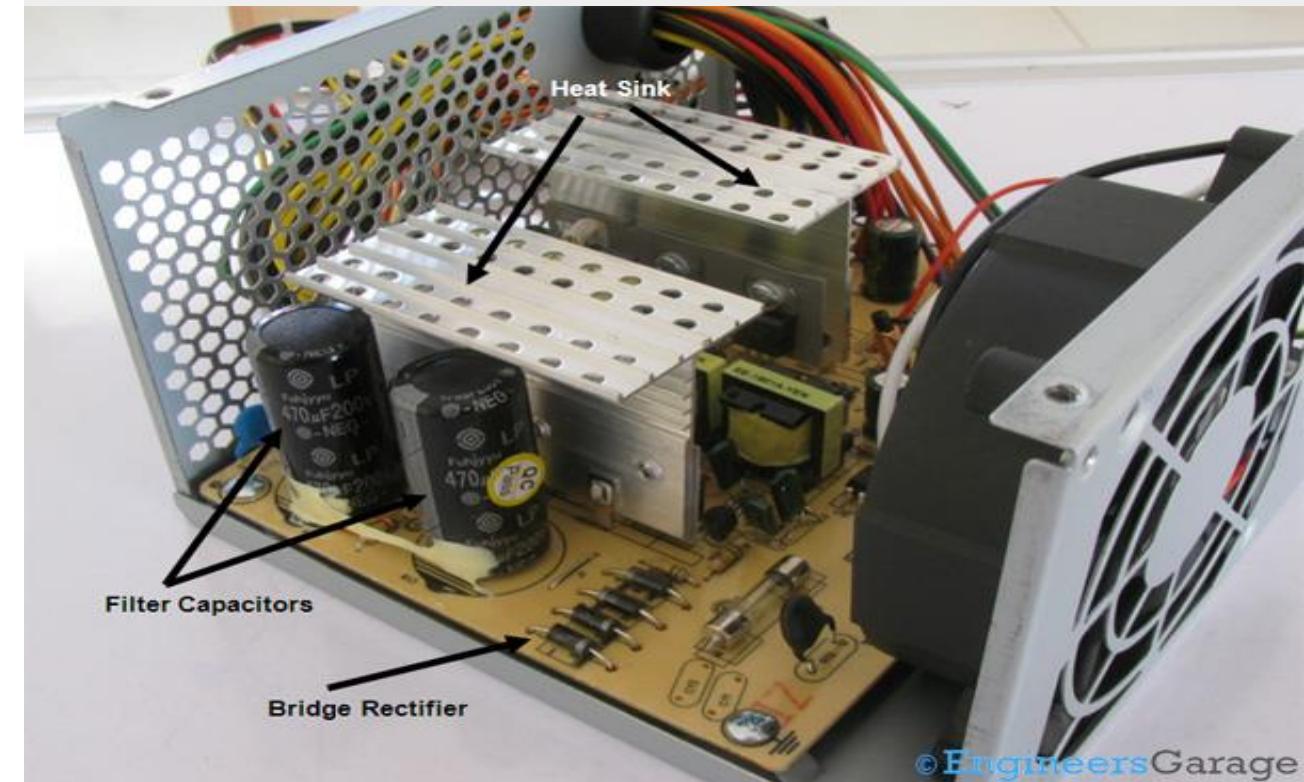


Image Source: <https://www.engineersgarage.com/insight/insight-how-smps-works/>

SMPS-Switched Mode Power Supply

SMPS parts and Connectors

- Power-IN
- Power-OUT
- FAN.
- ATX connector
- ATX-12V connector
- AT Connectors.
- 4-PIN connectors
- SATA-output connector



© Engineers Garage

Image Source: <https://www.engineersgarage.com/insight/insight-how-smps-works/>

SMPS-Switched Mode Power Supply

How to test computer SMPS

- To check the supply, whether it is working properly or not, you can test it before fitting it in the cabinet.
- There is a simple way to test the SMPS, you just must short the green wired connector to any black colored(ground) connector.
- If the SMPS is working perfectly, the fan of the supply will start working.



Image Source: <https://www.it4nextgen.com/computer-smps/>

SMPS-Switched Mode Power Supply

Advantages of SMPS

- Efficiency
- Compact
- Flexible technology
- Its power density is high.
- It has regulated and reliable outputs instead of variations in input supply voltage.
- It has a wide ac input voltage range.

Advantages of SMPS

- Lower weight
- Smaller size
- Higher efficiency
- Reduced costs
- Lower power dissipation
- Provide isolation between multiple outputs.

Disadvantages of SMPS

- Greater circuit complexity.

SMPS-Switched Mode Power Supply

Disadvantages of SMPS

- Noise
- External components
- Expert design needed
- Prices

Disadvantages:

The disadvantages of SMPS are,

- **It heats and cool each time it is used and receives the first in-rush of AC current when the personal computer switched.**
- **A typical failure of PC power supply is often burning smell just before the computers shutdown.**

SMPS-Switched Mode Power Supply

Applications of SMPS

- It is used in machine-tool industries.
- It is used for security systems.
- It is used in personal computers.
- It is used in closed circuit cameras.
- It is used in mobile phone chargers.
- It is used to support supplies with PLC's.



Image Source: <https://www.it4nextgen.com/computer-smps/>

Importance of SMPS, Hard disk, Internal and external memory devices

Hard disk

Hard drive is the primary computer storage device and is used to store files on the computer.

- Characteristics of Hard Disk
- Hard disk performance
- External and Removable Hard Disks
- Hard disk controllers
- Difference between SATA and HDD



Hard disk

Characteristics of Hard Disk

- It is much faster than the floppy disk.
- It is the primary media for storing data and programs.
- It is more reliable than a floppy disk.
- Data stored on the hard disk is safer than the floppy disk.



Hard disk

Hard disk performance

- Seek time
- Spindle speed
- Latency

Performance characteristics

▶ **Data rate**

The data rate is the number of bytes per second that the drive can deliver to the CPU. Rates between 5 and 40 megabytes per second are common.

▶ **Seek time**

The seek time is the amount of time between when the CPU requests a file and when the first byte of the file is sent to the CPU. Times between 10 and 20 milliseconds are common.

Hard disk

External and Removable Hard Disks

- An external hard disk is a separate hard disk that is connected to the USB port on the CPU. Some hard disks can also communicate with the system unit wirelessly.
- A removable hard disk is a type of hard disk that can be connected to the system unit using the USB port or firewire port.



Image Source: <https://www.slideshare.net/100002482341561/hard-disk-51946188>

Hard disk

Hard disk controllers

- It consists of chips and electronic circuits. It also controls the transfer of data, instructions, and information between system and system unit.

There are 4 types of hard disk interfaces for personal computer which are as follows:

- SATA
- EIDE
- SCSI
- Disk cache

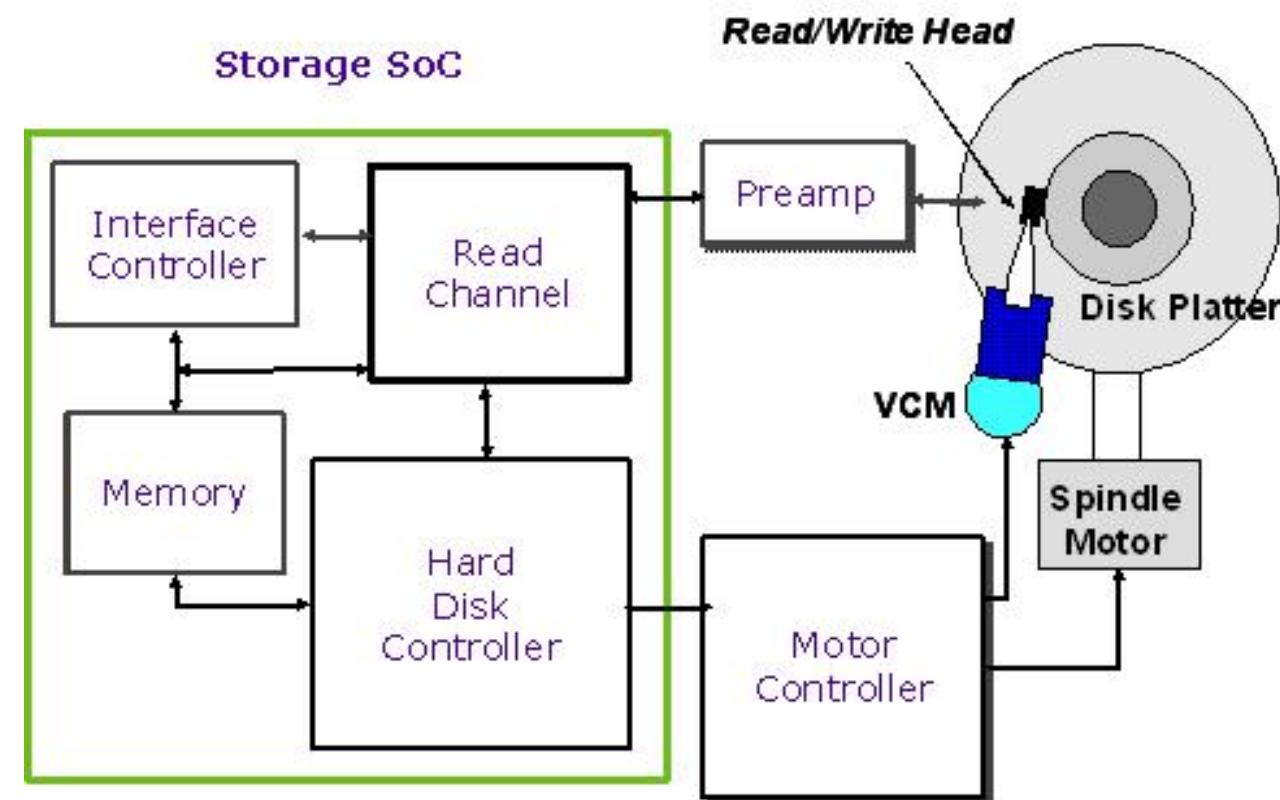


Image Source: <https://www.minitool.com/lib/hard-drive-controller.html>

Hard disk

Difference between SATA and HDD

- A hard disk drive (HDD) is an old-school storage device that uses mechanical platters and a moving read/write head to access data.
- A solid-state drive (SSD) is a newer, faster type of device that stores data on instantly-accessible memory chips.

	SSD	HDD
Price	\$0.25-\$0.27 per GB average	\$0.02-\$0.03 per GB average
Lifespan	30-80% test developed back block in their lifetime	3.5% developed bad sectors comparatively
Ideal for	High performance processing Residing in AFA or Tier 0/1 media in hybrid arrays	High capacity nearline tiers Long-term retained data
Read/write speeds	200 MB/s to 2500 MB/s	up to 200 MB/s
Benefits	Higher performance for faster read/write operations and fast load times	Less expensive Mature technology and massive installed user base
Drawbacks	May not be as durable/reliable as HDDs Not good for long-term archival data	Mechanical components take longer to read-write than SSDs

Importance of SMPS, Hard disk, Internal and external memory devices

Memory Devices

- A memory is just like a human brain. It is used to store data and instruction. Computer memory is the storage space in a computer where data is to be processed and instructions required for processing are stored.
- The memory is divided into a large number of small parts. Each part is called a cell.

COMPUTER STORAGE OR MEMORY DEVICES



Hard Disk



RAM



ROM



CD/DVD



Floppy



Memory Card



Pen Drive



Tape

Importance of SMPS, Hard disk, Internal and external memory devices

Memory Devices

Memory is primarily of two types

- Internal Memory – cache memory and primary/main memory
- External Memory – magnetic disk / optical disk etc.

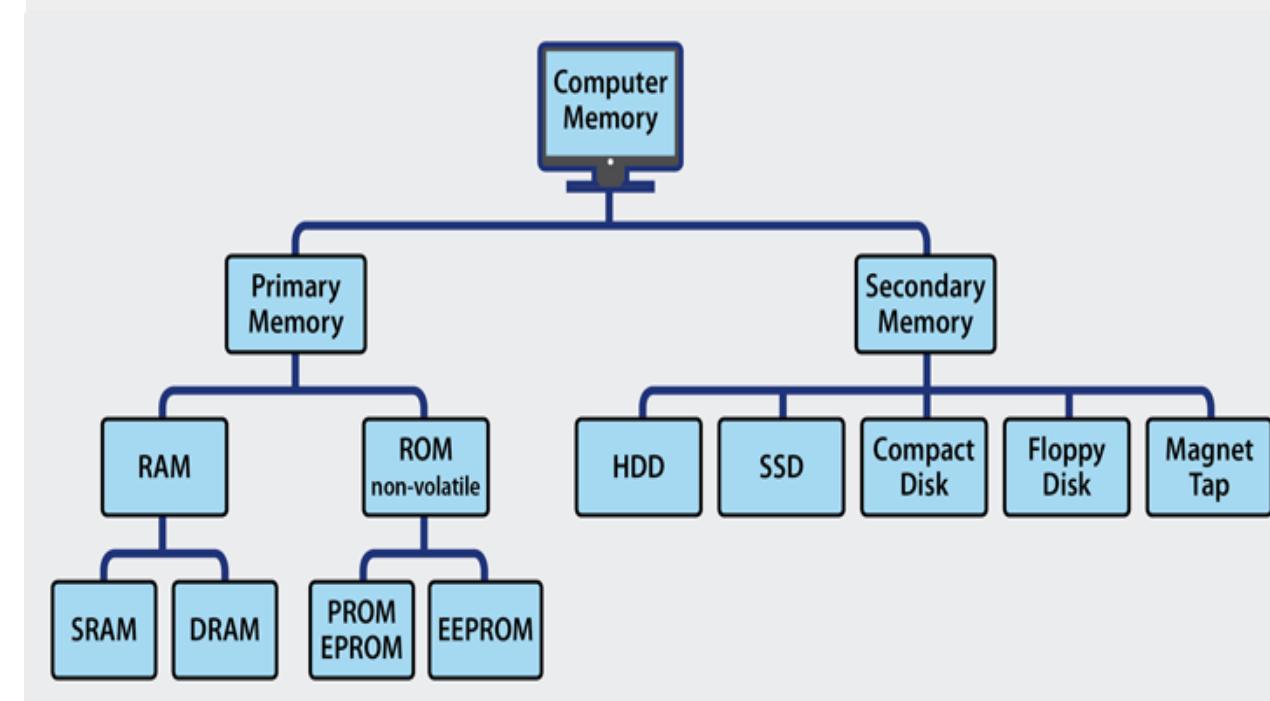


Image Source: <https://www.enterprisestorageforum.com/storage-hardware/types-of-computer-memory.html>

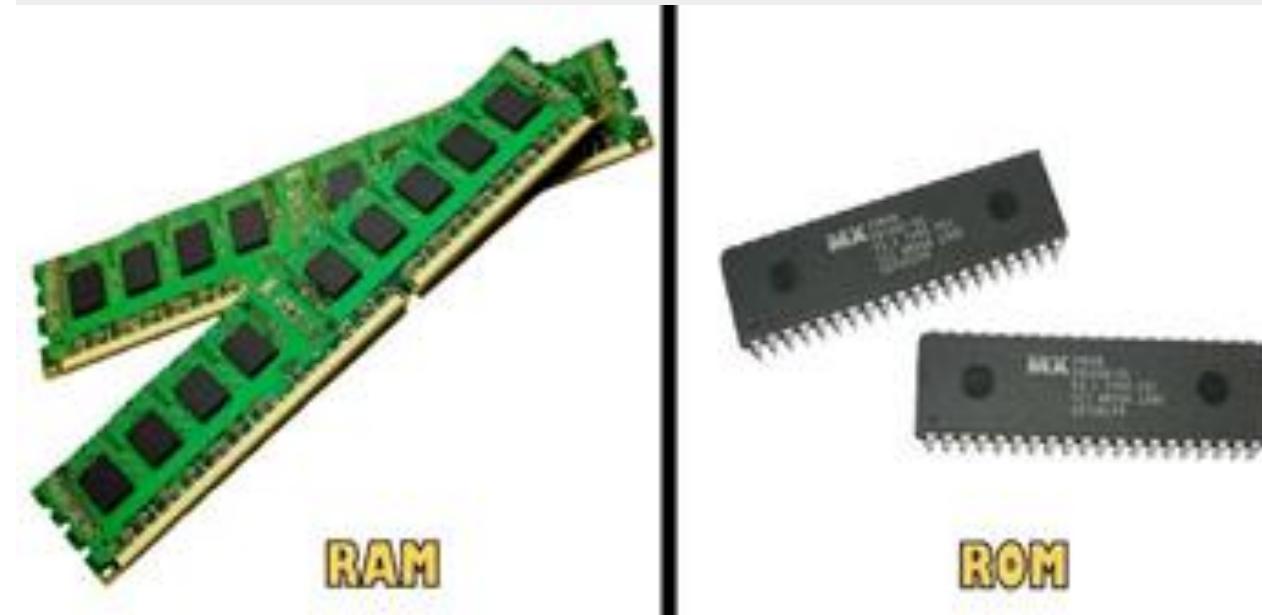
Memory Devices

Internal Memory

Internal memory (also known as primary or main memory) is available and attached inside the computer system.

Types of Internal Memory

- RAM
- ROM
- Cache Memory



Memory Devices

External Memory

External memory (also known as secondary memory) is a type of hard disk drive or other storage devices. Besides, this memory stores data externally, allowing permanent storage of broad information.

Types of External Memory

- Magnetic Tapes
- Magnetic Disks
- Hard Disk Drive
- Optical Drive

Types of External Memory

- **Magnetic Disk**
 - RAID
 - Removable
- **Optical**
 - CD-ROM
 - CD-Recordable (CD-R)
 - CD-R/W
 - DVD
- **Magnetic Tape**



Different types of I/O Devices(Monitors, Printers, Mouse Keyboards, Scanners, Plotters, Speakers)

Input device

- Input device is a device through which data and instruction are entered into the computer system.
- An input device converts the data and instructions into binary form that the computer can understand.
- This transformation is performed by "Input interface".



Different types of I/O Devices(Monitors, Printers, Mouse Keyboards, Scanners,Plotters, Speakers)

Input device

Some of the commonly input devices used are:-

- Keyboard
- Mouse
- Joystick
- Track ball
- Touch screen
- Light Pen
- Digitizer
- Scanner
- Speech Recognition Devices



Different types of I/O Devices

(Monitors, Printers, Mouse Keyboards, Scanners, Plotters, Speakers)

Output device

An output device is an electromechanical device which accepts data from a computer and translates them into a human acceptable form.

Following is list of most used output devices.

- Monitor
- Printer
- Plotter
- Speaker
- Projector



Precautions to be taken while opening and closing PC cabinet.

Safety Precautions

- Fully shutdown and unplug the computer before you make any attempts to disassemble the tower.
- Take off any metal objects on your arms or fingers such as bracelets, rings or watches. Even if your unit is unplugged, there may still be some remaining electric charge.
- Make sure your hands are completely dry to avoid damaging any mechanical parts as well as to avoid electrocution.



Image Source:- <https://schoolworkhelper.net/computer-hardware-safety-rules/>

Precautions to be taken while opening and closing PC cabinet.

Safety Precautions

- Work in a cool area to avoid perspiration for the same reason as seen in the previous number.
- Before touching any part within the tower, put your hands against another metal surface (such as the computer casing) to remove static charge, which may damage sensitive devices.
- Prepare a place to keep any screws you may remove. A container or piece of paper with labels for each part (casing, motherboard, CD drive, etc.) is ideal to avoid confusion between the similar-looking screws.



Image Source: <https://slickdeals.net/article/news/how-to-build-your-pc/>

Precautions to be taken while opening and closing PC cabinet.

Safety Precautions

- Handle all parts with care. Place each piece you remove carefully down onto a stable surface.
- If a component does not come out easily, do not forcefully remove it. Instead, check that you are removing it correctly and that no wires or other parts are in the way.
- Be careful when holding the motherboard, its underside actually quite pointy and able to hurt you.



Image Source: <https://slickdeals.net/article/news/how-to-build-your-pc/>

Precautions to be taken while opening and closing PC cabinet.

Computer Hardware Safety Rules

- Wear proper apparel. Avoid acrylic or wool sweaters when working with electronic parts. Do not wear loose fitting clothing, rings, bracelets etc.
- Unplug all computer equipment and peripherals before opening any cases.
- Keep your work area clean, organized and well lit. It's your workstation – keep it tidy.
- Check for damaged parts. Notify your teacher in case anything is wrong.

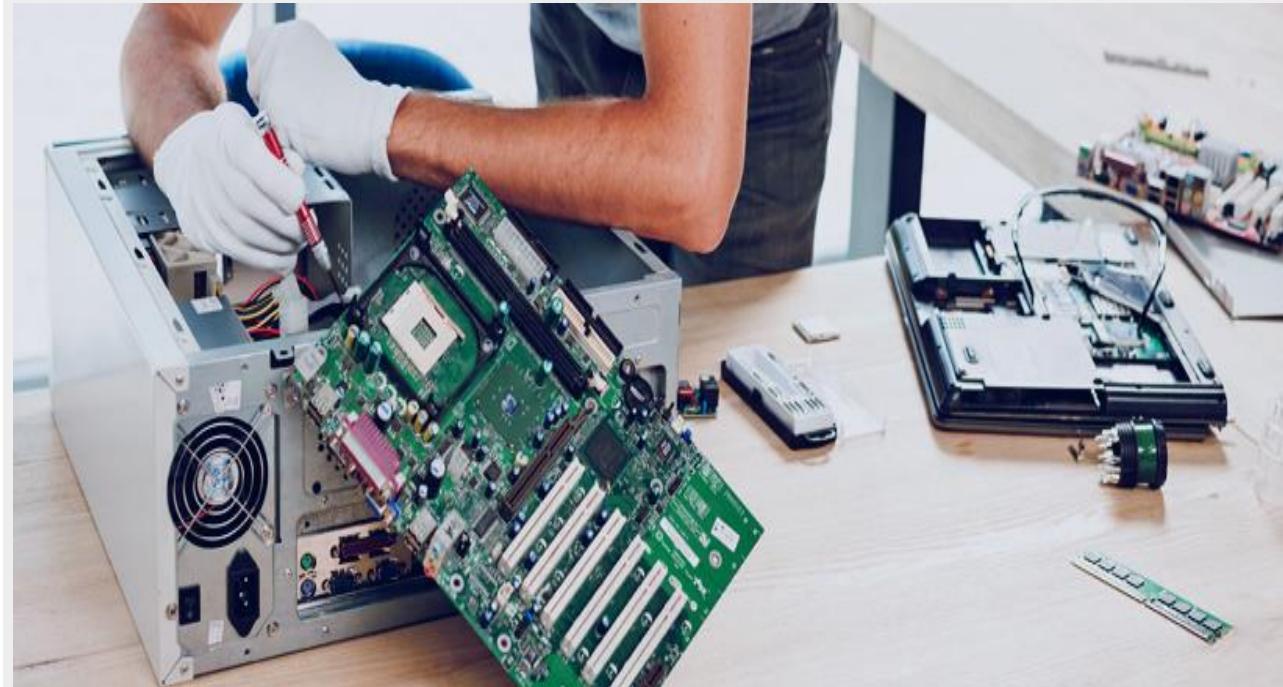


Image Source: <https://www.fieldengineer.com/skills/pc-support-technician>

Precautions to be taken while opening and closing PC cabinet.

Computer Hardware Safety Rules

- Power supplies produce several levels of voltage.
- Check all circuits and installations with the instructor before power is applied.
- Replace all cases or coverings after inspections or installations.
- Check for damaged parts. Notify your teacher in case anything is wrong.
- Retain all screws during a system disassembly.
- Electronic components should never become hot.
- Disconnect any power immediately.



Image Source: <https://www.fieldengineer.com/skills/pc-support-technician-devices-db57ecc1262d>

Able to perform basic troubleshoot of PC

(3 hours)

In this section, we will discuss:

- Proper troubleshooting Techniques for motherboards, I/O Devices.

Proper troubleshooting Techniques for motherboards, I/O Devices

How to Diagnose Motherboard or Processor Problems?

- The motherboard and processor are two of the most important hardware components inside the computer.
- The various pieces of hardware inside the PC communicate with one another through the circuits on the motherboard, while the CPU stores and executes programming instructions.
- The motherboard and CPU can both be expensive to replace, however, but diagnosing hardware failure on your own can reduce the potential repair costs for your business.



Image Source: <https://www.fieldengineer.com/skills/pc-support-technician-devices-db57ecc1262d>

Proper troubleshooting Techniques for motherboards, I/O Devices

How to Diagnose Motherboard or Processor Problems?

- Turn Off the Computer
- Touch a Bare Metal Surface
- Turn on the Computer
- Navigate to Motherboard Manufacturer's Website
- Uninstall Hardware
- Loosen the HeatSink and Processor Fan
- Touch the Processor
- Lift Out the CPU
- Lock the CPU in Place

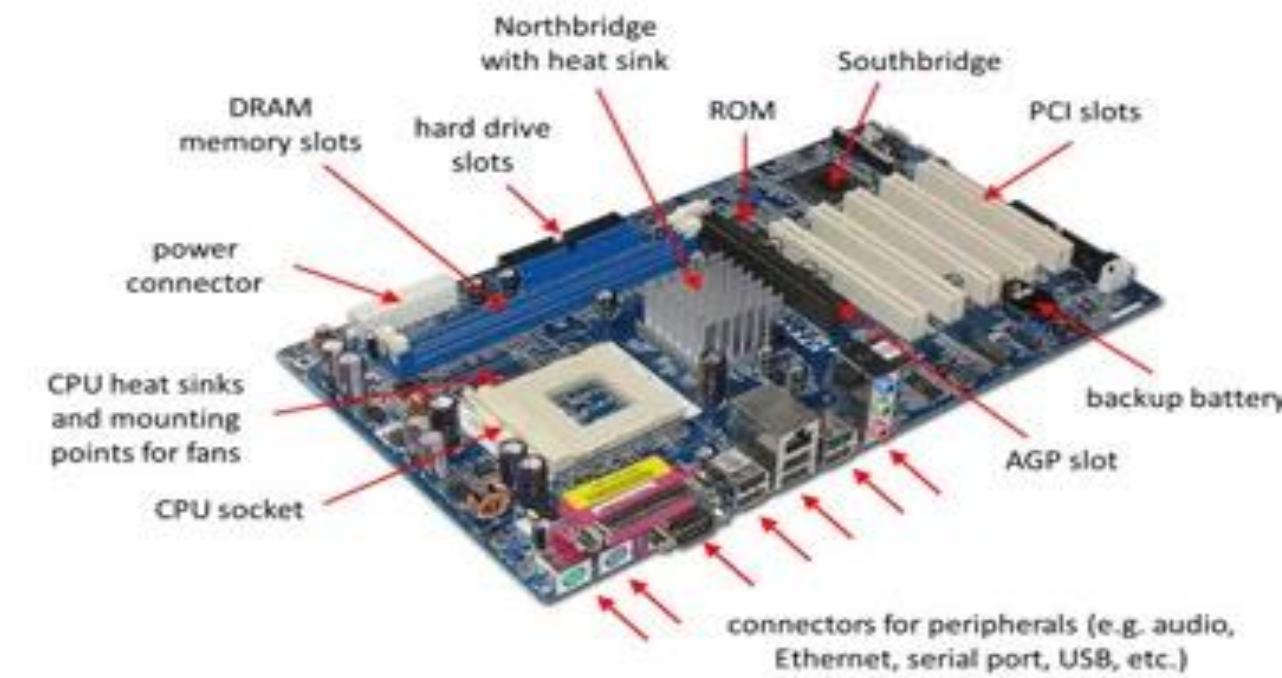


Image Source: <https://www.pearsonitcertification.com/articles/article.aspx?p=2731934&seqNum=28>

Proper troubleshooting Techniques for motherboards, I/O Devices

How to Diagnose Motherboard or Processor Problems?

- Reconnect the Power
- Check for Damage on Motherboard
- Remove the CLRTC Jumper
- Reconnect the Keyboard
- Load Fail-Safe Defaults
- Restart the Computer

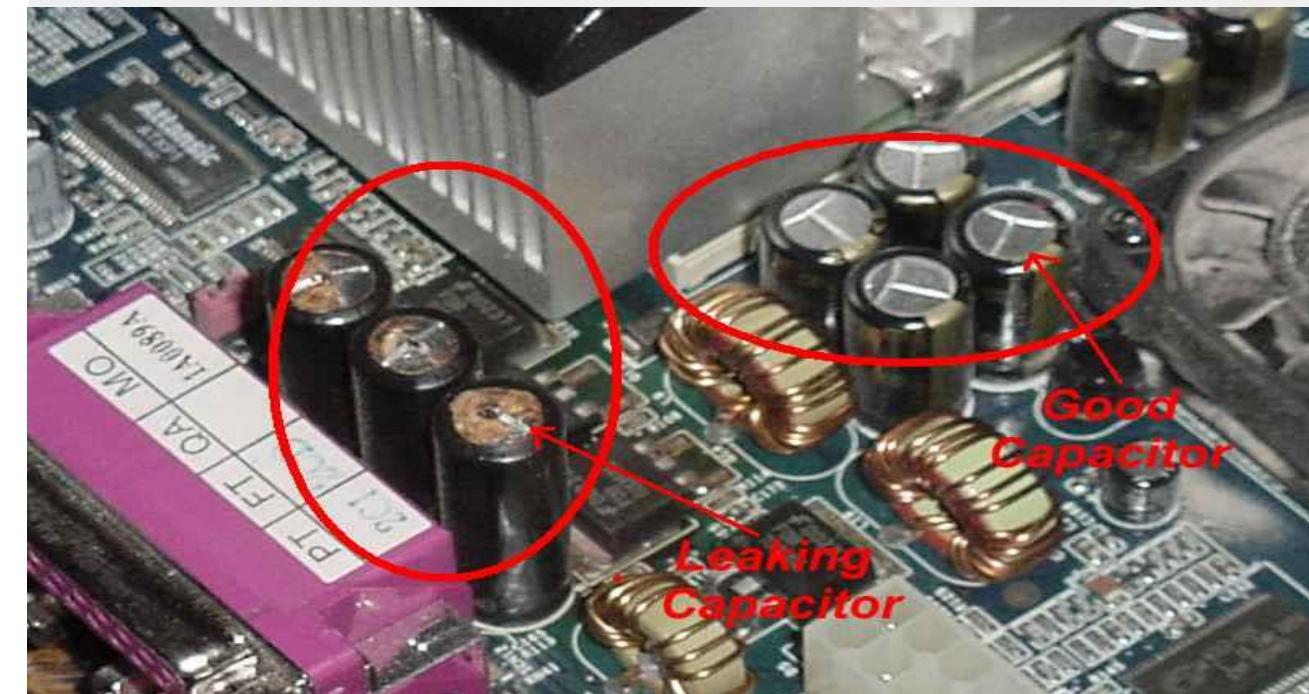


Image Source: <https://www.pearsonitcertification.com/articles/article.aspx?p=2731934&seqNum=28>

Proper troubleshooting Techniques for motherboards, I/O Devices

Motherboard Troubleshooting

- Check the power supply to see if the fan is turning. If the CPU or motherboard has a fan, see if it is turning. Check voltages going from the power supply to the motherboard.
- Check the BIOS/UEFI settings for accuracy
- Check for overheating. Power down the computer and allow the computer to cool. Power on the computer with the cover off.
- Check the motherboard for distended capacitors. These are small components that might appear to be bulging. If sighted, replace the motherboard as soon as possible.

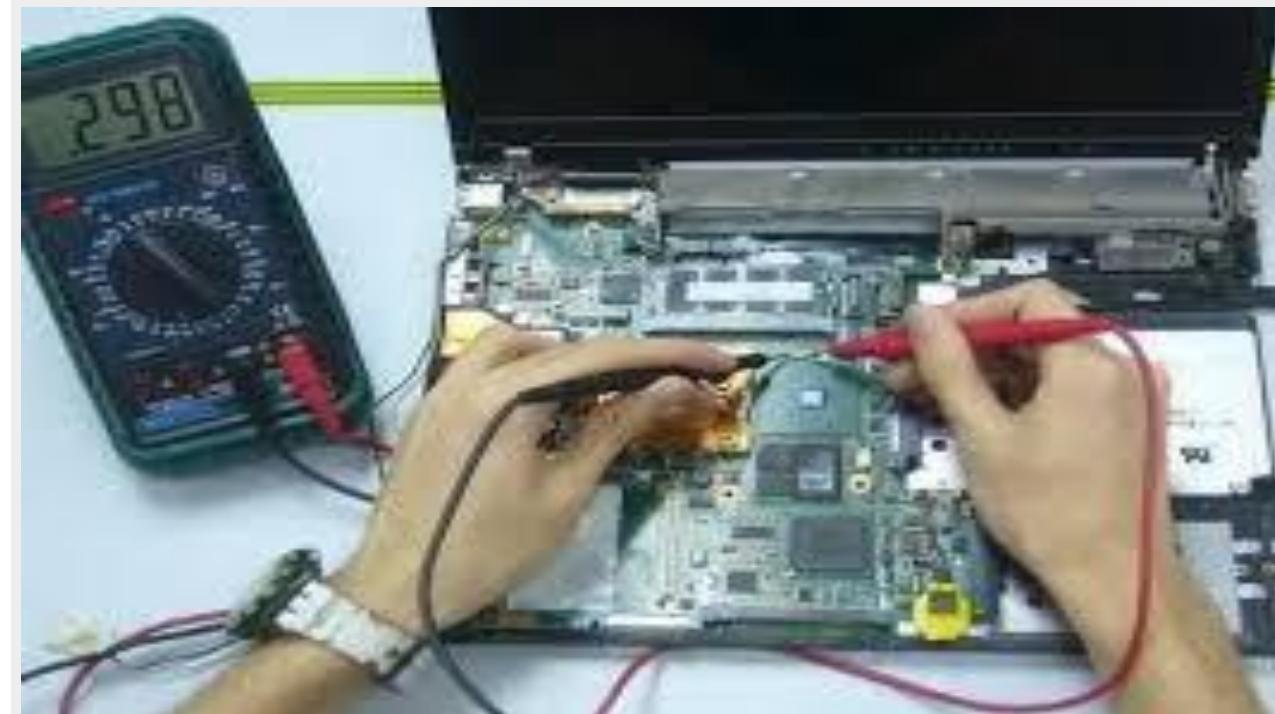


Image Source: <https://www.easypcmod.com/know-motherboard-bad-fix-troubleshooting-guide-282>

Proper troubleshooting Techniques for motherboards, I/O Devices

Motherboard Troubleshooting

- Reseat the CPU, adapters, and memory chips.
- Remove unnecessary adapters and devices and boot the computer.
- Plug the computer into a different power outlet and circuit, if possible.
- Check to determine whether the motherboard is shorting out on the frame.
- Check the CMOS battery
- With a motherboard that has diagnostic LEDs, check the output for any error code.

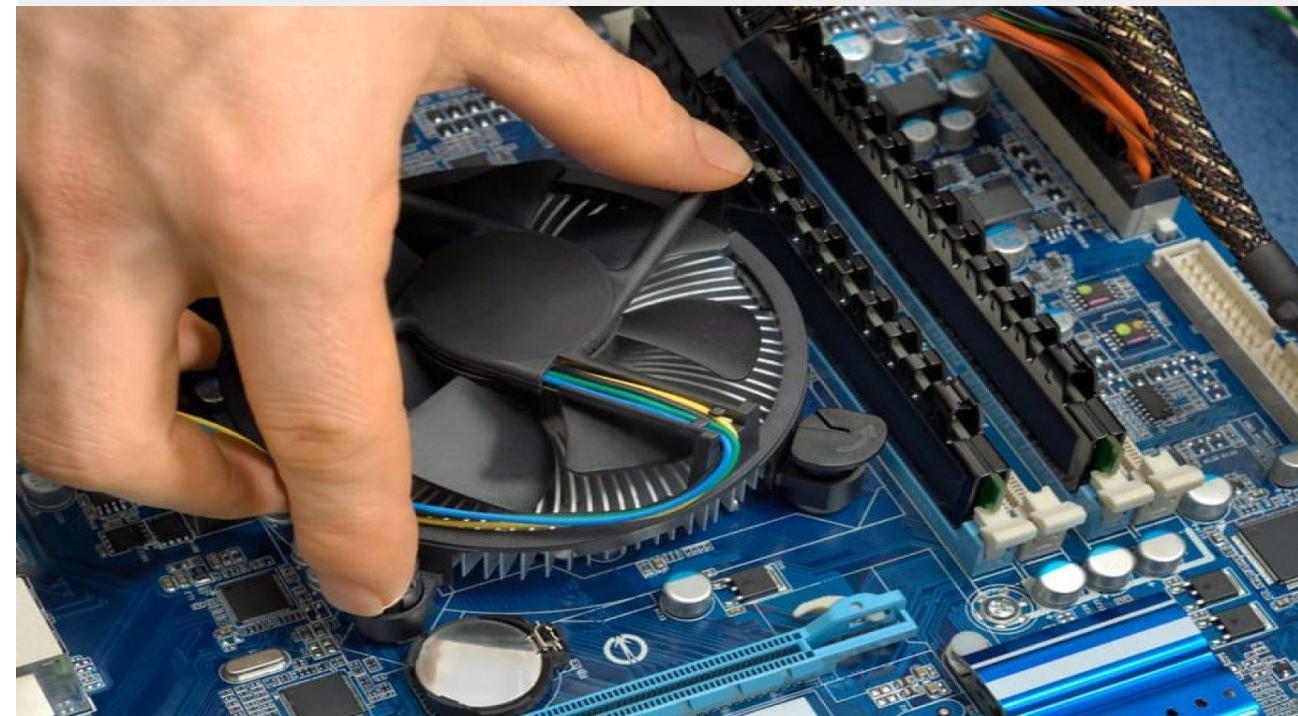


Image Source: <https://www.easypcm.com/know-motherboard-bad-fix-troubleshooting-guide-282>

Proper troubleshooting Techniques for motherboards, I/O Devices

Troubleshooting I/O Devices

- Solution 1: Make certain that all cables are connected correctly
- Solution 2: Start the computer in a clean boot state
- Solution 3: Change the transfer mode for the drive in IDE Channel Properties
- Solution 4: Check the status of the device in Device Manager
- Solution 5: Contact the hardware manufacturer

Generally, when troubleshooting an I/O devices, follow these steps:

- For new installation, suspect the drivers are not installed correctly, plug in or set in the expansion slot correctly
- For problems after an installation, ask the user what has just changed in the system
- Analyze the situation and try to isolate the problem.
- Check simple things first
- Try using Device Manager to uninstall the device. Then reboot and installs the drivers again
- Exchange the device for a known good once or install the suspect device in a working system
- After problems is fixed, document the symptoms, source of the problem, and the solutions.

Able to work with different cables, connectors and its Crimping techniques for PC

(6 hours)

In this section, we will discuss:

- Importance of Cables SATA/IDE Cables, CAT 6 cables, SVGA/HDMI cables
- Importance of RF connectors, USB ports, AV Ports

Importance of Cables SATA/IDE Cables, CAT 6 cables, SVGA/HDMI cables

- SATA Cables
- IDE Cables
- Cat6 cable
- SVGA
- HDMI



Image Source: <https://www.computer-hardware-explained.com/de-cables.html>

Importance of Cables SATA/IDE Cables, CAT 6 cables, SVGA/HDMI cables

SATA Cables

- Computers are all about connectivity and are loaded with cables both internally and externally that allow data to be exchanged between the computer's components and peripherals.
- Serial ATA (SATA, abbreviated from Serial AT Attachment) is a computer bus interface that connects host bus adapters to mass storage devices such as hard disk drives, optical drives, and solid-state drives.



Image Source: <https://www.startech.com/Cables/Drive/SATA/?page=all>

Importance of Cables SATA/IDE Cables, CAT 6 cables, SVGA/HDMI cables

IDE Cables

- IDE Cables connect from the motherboard of a computer to the hard drive, cd drive and/or floppy drive. IDE stands for Integrated Drive Electronics.
- IDE is a standard interface that connects the computer motherboard to a storage device.



Image Source: <https://www.istockphoto.com/photo/ide-cable-connectors-gm1065116890-284811204>

Importance of Cables SATA/IDE Cables, CAT 6 cables, SVGA/HDMI cables

Cat6 cable

- Category 6 cable, also commonly known as network, LAN or Ethernet data cable, is a 4 twisted pair sheathed copper wire cable which can support data transfer rates of up to 1 gigabits (1,000 megabits).
- This higher bandwidth allows for quick transferral of large files in an office network.



Image Source: <https://www.horizonte.com.co.uk/blog/what-is-cat-6-cabling/>

Importance of Cables SATA/IDE Cables, CAT 6 cables, SVGA/HDMI cables

SVGA

- A super video graphic array (SVGA) cable carries analog signals and supports resolutions up to and including 800 x 600.
- SVGA is also known as enhanced or ultra VGA.
- VGA and SVGA cables both use the same pin configuration.



Image Source: <https://www.aliexpress.com/item/32809518176.html>

Importance of Cables SATA/IDE Cables, CAT 6 cables, SVGA/HDMI cables

HDMI

- HDMI (High-Definition Multimedia Interface) is a proprietary audio/video interface for transmitting uncompressed video data and compressed or uncompressed digital audio data from an HDMI-compliant source device, such as a display controller, to a compatible computer monitor, video projector, digital television, or digital audio device.



Importance of RF connectors, USB ports, AV Ports

RF connectors

- RF connectors are connectors used to make electrical connections for signal transmission in radio frequency applications.
- These connectors are used in a wide variety of applications ranging from 0 to 18 GHz and above.



Importance of RF connectors, USB ports, AV Ports

RF connectors

- All types of RF connector have one male connector and one female connector.
- Male connectors are often called plug and female connectors as jack.
- Center pin and outer grounding with locking mechanism provides it a strong and reliable connection.



Importance of RF connectors, USB ports, AV Ports

USB Port

- A USB port is a standard cable connection interface for personal computers and consumer electronics devices.
- USB stands for Universal Serial Bus, an industry standard for short-distance digital data communications.
- USB ports allow USB devices to be connected to each other with and transfer digital data over USB cables.

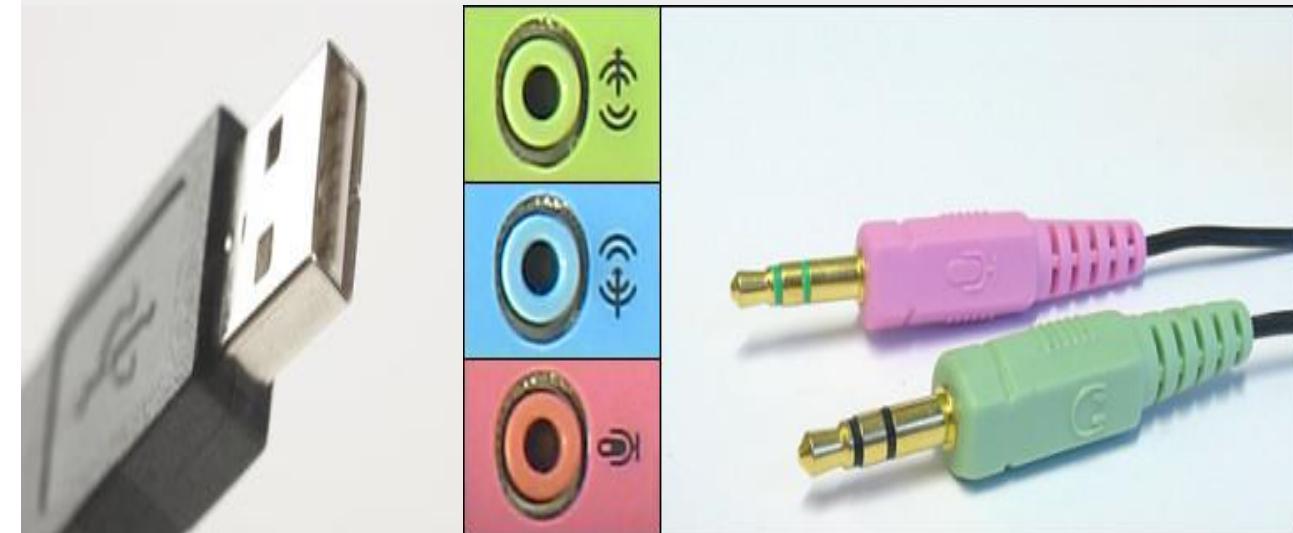


Importance of RF connectors, USB ports, AV Ports

Audio and Video Ports(AV Ports)

Audio Port

- An audio port on a computer is any receptacle or jack to which an audio device such as speakers, headphones or a microphone can be connected.
- All laptops and some desktops have built-in speakers, but for better sound or privacy, you will need to connect external audio through one of the ports.



Importance of RF connectors, USB ports, AV Ports

Audio and Video Ports(AV Ports)

Video port

- Video port is a port that can be used to connect a monitor or other display, such as a TV, to a computer.
- Video ports for desktop computers are located on the back, while laptop computers have them on back or side.

Modern Video Ports

USB-C DisplayPort HDMI



Able to install and maintain software's for a PC

(6 hours)

In this section, we will discuss:

- Distinguish between System Software and Application Software
- Differentiate between Linux and Windows OS
- Windows 32 bit, and 64 bit System
- FDISK, Format, Scandisk, FAT System, NTFS and Directories, Fragmentation and defragmentation disk

Distinguish between System Software and Application Software

System Software

- What is System Software?
- Types of System Software
- Features of System Software



System Software

What is System Software?

- System Software is a set of programs that control and manage the operations of computer hardware.
- It also helps application programs to execute correctly.
- System Software is designed to control the operation and extend the processing functionalities of a computer system.

Example: Operating system, programming language, Communication software, etc.



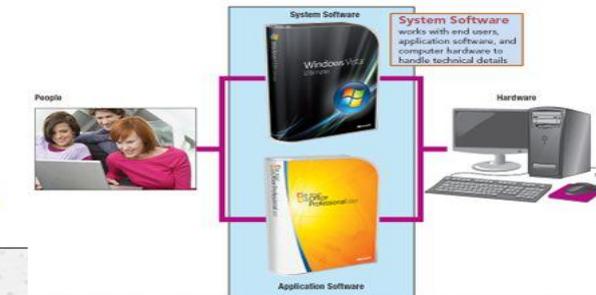
System Software

Types of System Software

- Operating systems
- Programming language translators
- Communication Software
- Utility programs

System Software

- Handles technical details
- Works with end users, application software, and computer hardware
- Four types of programs
 - Operating system
 - Utilities
 - Device drivers
 - Language translators



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Image Source: <https://eportfolio.utm.my/user/choy-wan-ling/chapter-5-system-software>

System Software

Features of System Software

- System Software is closer to the system
- Generally written in a low-level language
- The system software is difficult to design and understand
- Fast in speed
- Less interactive
- Smaller in size
- Hard to manipulate

Features of System Software

- Close to system
- Fast in speed
- Difficult to design
- Difficult to understand
- Less interactive
- Smaller in size
- Difficult to manipulate
- Generally written in low level language

Distinguish between System Software and Application Software

Application Software

- What is Application Software?
- Types of Application Software
- Features of Application Software



System Software

What is Application Software?

- Application Software is a program that does real work for the user. It is mostly created to perform a specific task for a user.
- Application Software acts as a mediator between the end-user and System Software. It is also known as an application package.
- This type of software is written using a high-level language like C, Java, VB. Net, etc.
- It is user-specific and is designed to meet the requirements of the user.

Example: Word-processing, Spreadsheet, Database, etc.



System Software

Types of Application Software

- Word-processing software
- Spreadsheet software
- Database software
- Graphics software
- Education software
- Entertainment software

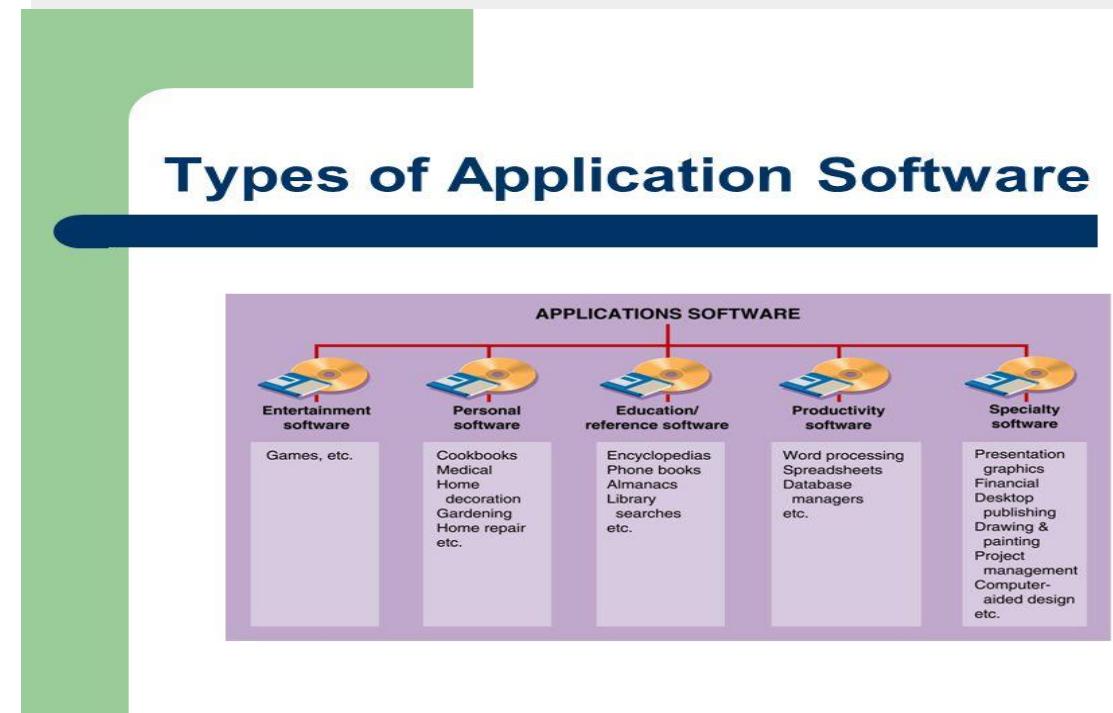
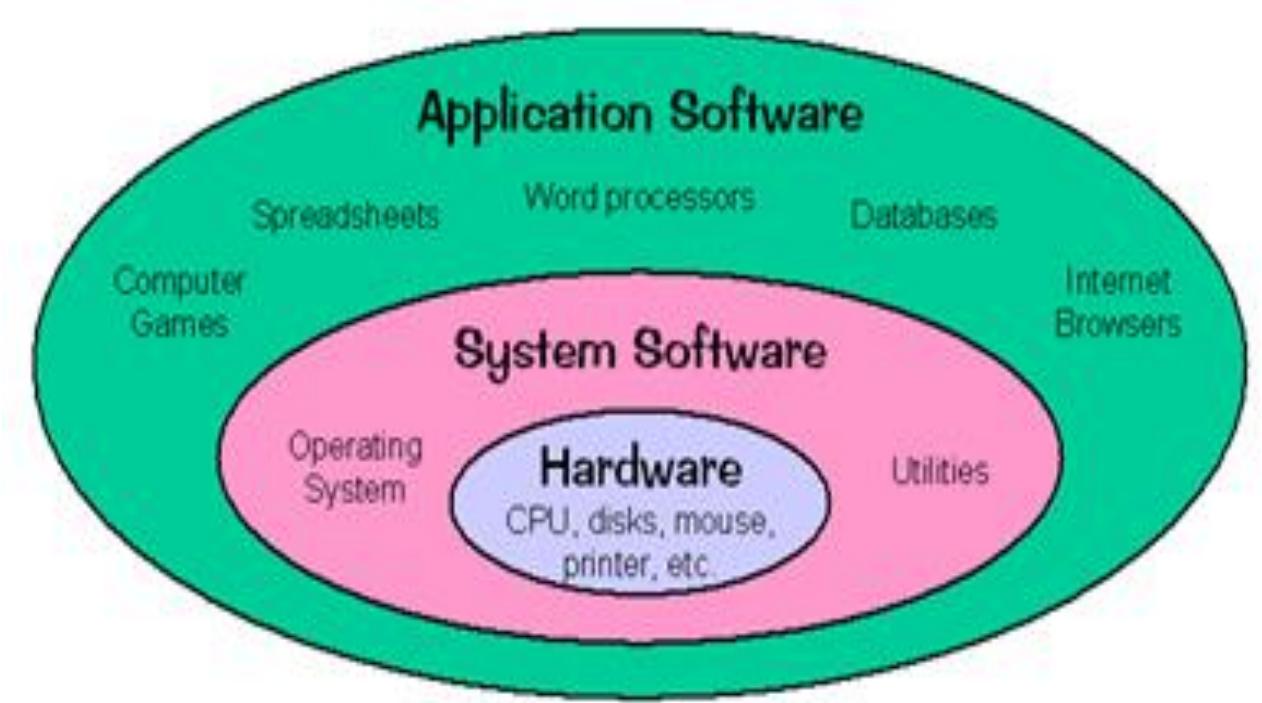


Image Source: <https://www.webopedia.com/TERM/A/application.html>

System Software

Features of Application Software

- An important feature of Application Software:
- Perform more specialized tasks like word processing, spreadsheets, email, photo editing, etc.
- It needs more storage space as it is bigger in size
- Easy to design and more interactive for the user
- Generally written in a high-level language



Distinguish between System Software and Application Software

Differences between System and Application software

- System software is meant to administer the system resources. It also serves as a kind of platform for running the application software.
- Application software is meant to enable the user to carry out some specific set of tasks or functions. System software is meant to manage the system resources

Differences between Syst. Software and Application Software	
System Software	Application Software
<ul style="list-style-type: none">• Supports the use in computer operations• Manages computer machine resources such as register, CPU, I/O syst• Written in Low level language. Eg: assembly language• Used as long as computer is turned on.• Performs more than one job or task related at a time(multitasking)• Control many processes at a time	<ul style="list-style-type: none">• Concern problem solving and the use of computer as a tools• Manages operation data such as insert, delete, update and sorting.• Written in high level language such as Pascal, C++, VB, Java• Use only when it's needed• Performs only one job or task at a time• Process done by following step by step at a time.

Differentiate between Linux and Windows OS

Linux vs Windows

- Linux could be a free and open supply OS supported operating system standards. It provides programming interface still as programmed compatible with operating system primarily based systems and provides giant selection applications
- Windows may be a commissioned OS within which ASCII text file is inaccessible. it's designed for the people with the angle of getting no programming information and for business and alternative industrial users

Windows	Linux
Windows uses different data drives like C: D: E to stored files and folders.	Unix/Linux uses a tree like a hierarchical file system.
Windows has different drives like C: D: E	There are no drives in Linux
Hard drives, CD-ROMs, printers are considered as devices	Peripherals like hard drives, CD-ROMs, printers are also considered files in Linux/Unix
There are 4 types of user account types 1) Administrator, 2) Standard, 3) Child, 4) Guest	There are 3 types of user account types 1) Regular, 2) Root and 3) Service Account
Administrator user has all administrative privileges of computers.	Root user is the super user and has all administrative privileges.
In Windows, you cannot have 2 files with the same name in the same folder	Linux file naming convention is case sensitive. Thus, sample and SAMPLE are 2 different files in Linux/Unix operating system.
In windows, My Documents is default home directory.	For every user /home/username directory is created which is called his home directory.

Windows 32 bit, and 64-bit System

32-bit vs 64 bit

- 32-bit is a type of CPU architecture which is capable of transferring 32 bits of data.
- It is the amount of information which can be processed by your CPU whenever it performs an operation.
- 64 bit refers to the number of bits which should be processed or transmitted in parallel or the number of bits used for a single element in a data format.
- A 64-bit microprocessor allows computers to process data and memory address which are represented by 64 bits.

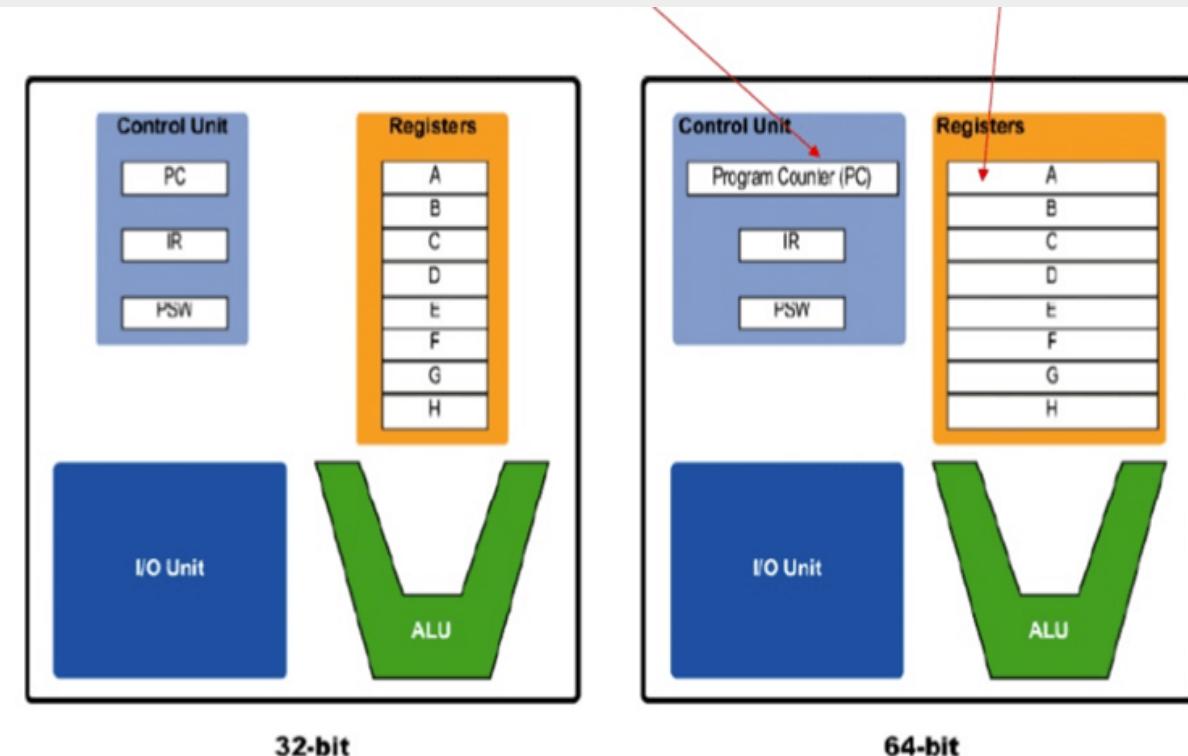


Image Source: <https://www.guru99.com/32-bit-vs-64-bit-operating-systems.html>

Windows 32 bit, and 64-bit System

Difference between 32-bit vs. 64-bit Operating System

- 32-bit processors have 4 GB addressable space while 64-bit processors have 16 GB addressable space.
- 32-bit systems limited to 3.2 GB of RAM while 64-bit systems will enable you to store up to 17 Billion GB of RAM
- 32-bit processors need a 32-bit operating system whereas 64-bit processors can run either on 32 or 64 64-bit operating systems.

32 BIT	VERSUS	64 BIT
32 bit is a type of CPU architecture that is capable of transferring 32 bits of data per clock cycle		64 bit is a type of CPU architecture that is capable of transferring 64 bits of data per clock cycle
Requires more time to process and response		Requires a minimum time to process and response
Can address memory up to 4 GB of RAM		Can address memory up to 16 Exabytes of RAM
Cheaper		Expensive
Can be used as a personal computer and to run office routine tasks		Can be used as personal computers and for video edition, audio editing, server applications etc.

Visit www.PEDIAA.com

Windows 32 bit, and 64-bit System

Difference between 32-bit vs. 64-bit Operating System

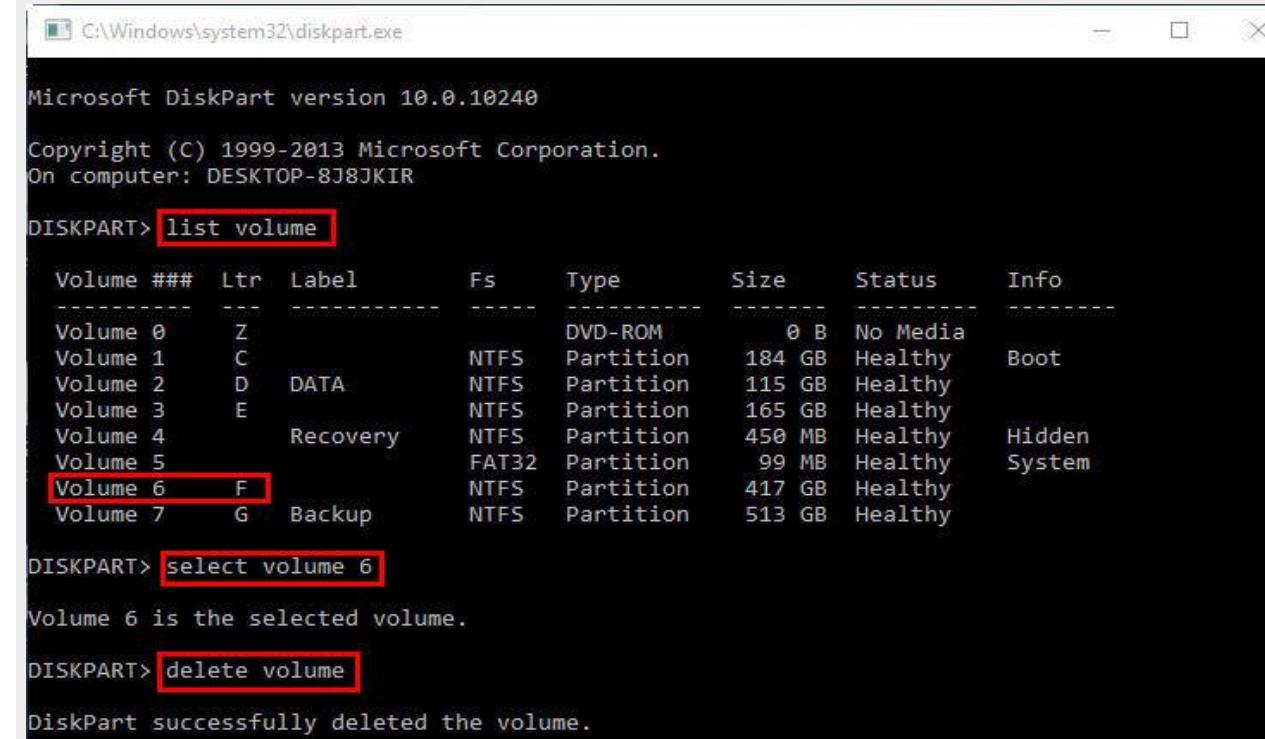
- 32-bit processors are not an ideal option for stress testing and multi-tasking whereas 64-bit processors are best for performing multitasking and stress testing.
- 32-bit operating systems and applications require 32-bit CPUs while 64-bit OS demands 64-bit CPU

Parameter	32-bit processors	64-bit processors
Addressable space	It has 4 GB addressable space	64-bit processors have 16 GB addressable space
Application support	64-bit applications and programs won't work.	32-bit applications and programs will work
OS support	Need a 32-bit operating system.	It can run on 32 and the 64-bit operating system.
Support for multi-tasking	Not an ideal option for stress testing and multi-tasking.	Works best for performing multi-tasking and stress testing.
OS and CPU requirement	32-bit operating systems and applications require 32-bit CPUs	64-bit OS demands 64-bit CPU, and 64-bit applications require 64-bit OS and CPU.
System available	Support Windows 7, 8 Vista, XP, and, Linux.	Windows XP Professional, Windows Vista, Windows 7, Windows 8, Windows 10, Linux, and Mac OS X.
Memory limits	32-bit systems limited to 3.2 GB of RAM 32 bit Windows. It addresses limitation doesn't allow you to use full 4GB of Physical memory space.	64-bit systems will enable you to store up to 17 Billion GB of RAM.

FDISK, Format, Scandisk, FAT System, NTFS and Directories, Fragmentation and defragmentation disk

Disk Part Commands in Windows 10

- The diskpart command interpreter helps you manage your computer's drives (disks, partitions, volumes, or virtual hard disks).
- Disk Part, replacing its predecessor - fdisk, is a command-line utility that provides the ability to manage disks, partitions or volumes in your computer running all versions of the operating system since Windows 2000, also including the latest Windows 10.



Volume #	Ltr	Label	Fs	Type	Size	Status	Info
Volume 0	Z			DVD-ROM	0 B	No Media	
Volume 1	C		NTFS	Partition	184 GB	Healthy	Boot
Volume 2	D	DATA	NTFS	Partition	115 GB	Healthy	
Volume 3	E		NTFS	Partition	165 GB	Healthy	
Volume 4		Recovery	NTFS	Partition	450 MB	Healthy	
Volume 5			FAT32	Partition	99 MB	Healthy	Hidden System
Volume 6	F		NTFS	Partition	417 GB	Healthy	
Volume 7	G	Backup	NTFS	Partition	513 GB	Healthy	

Image Source: <https://www.diskpart.com/windows-10/diskpart-windows-10-1203.html>

FDISK, Format, Scandisk, FAT System, NTFS and Directories, Fragmentation and defragmentation disk

Using Disk Management to Create Partition

- Disk Management is not as powerful as MiniTool Partition Wizard Free Edition, but as a Windows built-in partition manager, it can complete most simple and basic partition managements like create partition, delete partition, format partition, etc.

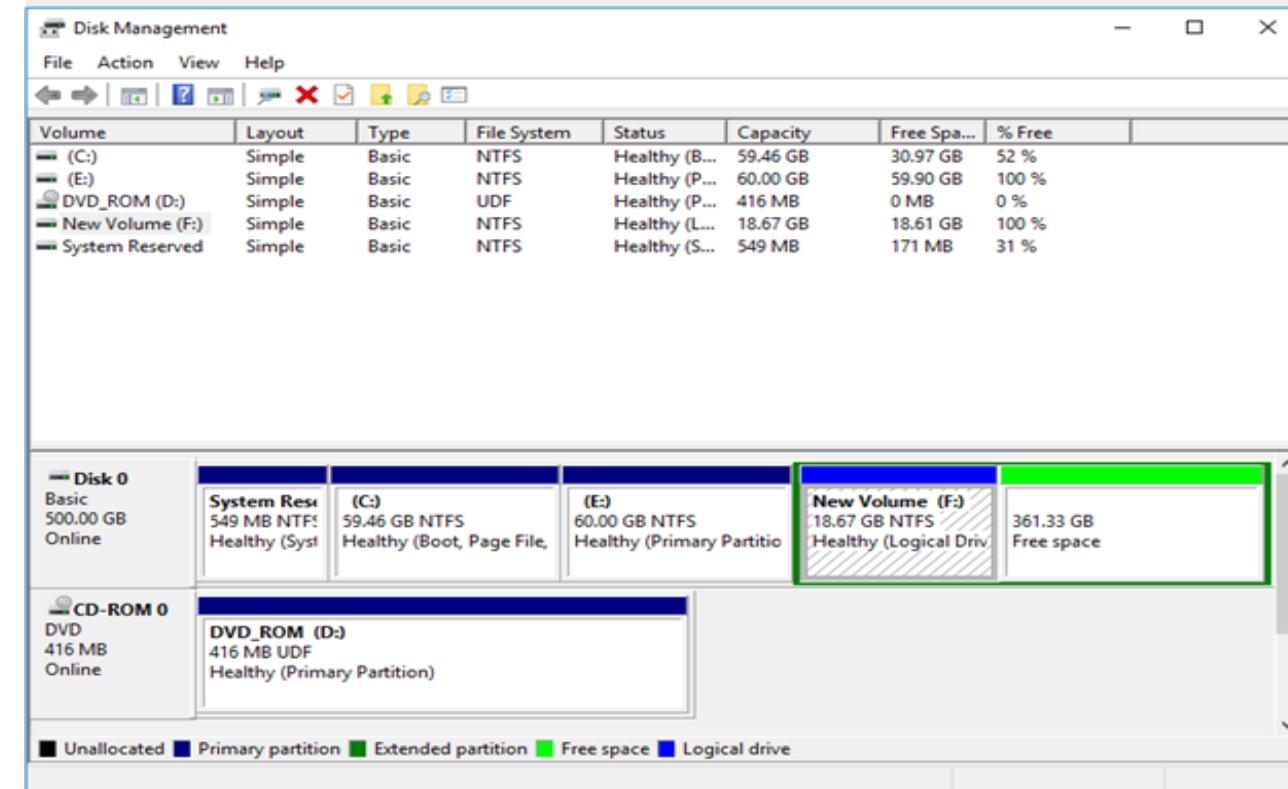
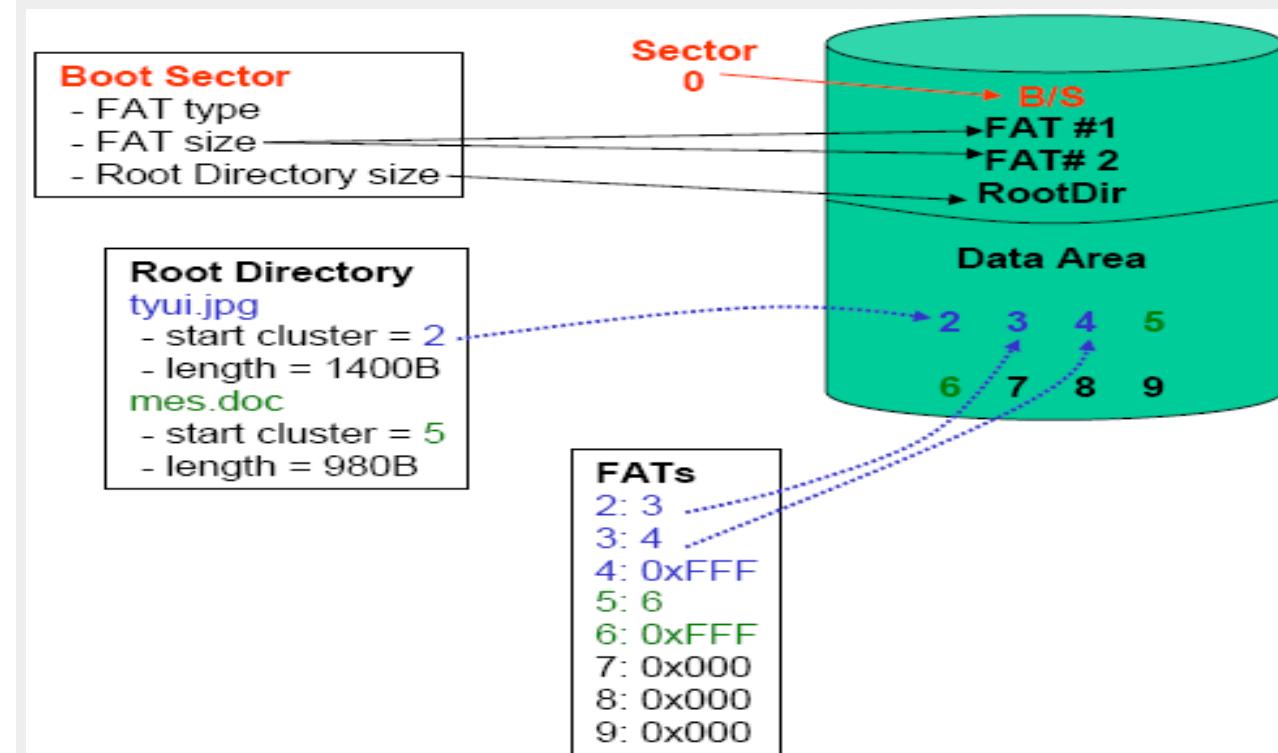


Image Source: <https://www.diskpart.com/windows-10/diskpart-windows-10-1203.html>

FDISK, Format, Scandisk, FAT System, NTFS and Directories, Fragmentation and defragmentation disk

FAT File Systems. FAT32, FAT16, FAT12

- A disk formatted with FAT is allocated in clusters, whose size are determined by the size of the volume. When a file is created, an entry is created in the directory and the first cluster number containing data is established.
- It is only used with FAT12 and FAT16, and imposes on the root directory a fixed maximum size which is pre-allocated at creation of this volume.



FDISK, Format, Scandisk, FAT System, NTFS and Directories, Fragmentation and defragmentation disk

FAT File Systems. FAT32, FAT16, FAT12

- FAT32 stores the root directory in the Data Region, along with files and other directories, allowing it to grow without such a constraint.
- NT file system (NTFS), which is also sometimes called the New Technology File System, is a process that the Windows NT operating system uses for storing, organizing, and finding files on a hard disk efficiently.

Attribute	FAT12	FAT16	FAT32
Used For	Floppies; small hard drives	Small to large hard drives	Large to very large hard drives
Size of Each FAT Entry	12 bits	16 bits	28 bits
Maximum Number of Clusters	~4,096	~65,536	~268,435,456
Supported Cluster Sizes	512 B to 4 KB	2 KB to 32 KB	4 KB to 32 KB
Maximum Volume Size	16,736,256 B (16 MB)	2,147,123,200 B (2 GB)	$\sim 2^{41}$ B (2 TB)

NTFS Structure



FDISK, Format, Scandisk, FAT System, NTFS and Directories, Fragmentation and defragmentation disk

Scandisk

- Scandisk can improve the performance of your hard drive and help maintain the Windows file system.

Command Prompt, follow these steps:

- Boot your computer.
- Go to Start.->Run.->cmd in the box:
- You can now type chkdsk to open the utility in a read-only mode. Press Enter.
- To repair errors



FDISK, Format, Scandisk, FAT System, NTFS and Directories, Fragmentation and defragmentation disk

Ways to improve your computer's performance

- Disk fragmentation occurs when a file is broken up into pieces to fit on the disk. Because files are constantly being written, deleted and resized, fragmentation is a natural occurrence.
- When a file is spread out over several locations, it takes longer to read and write.
- In the maintenance of file systems, defragmentation is a process that reduces the degree of fragmentation.

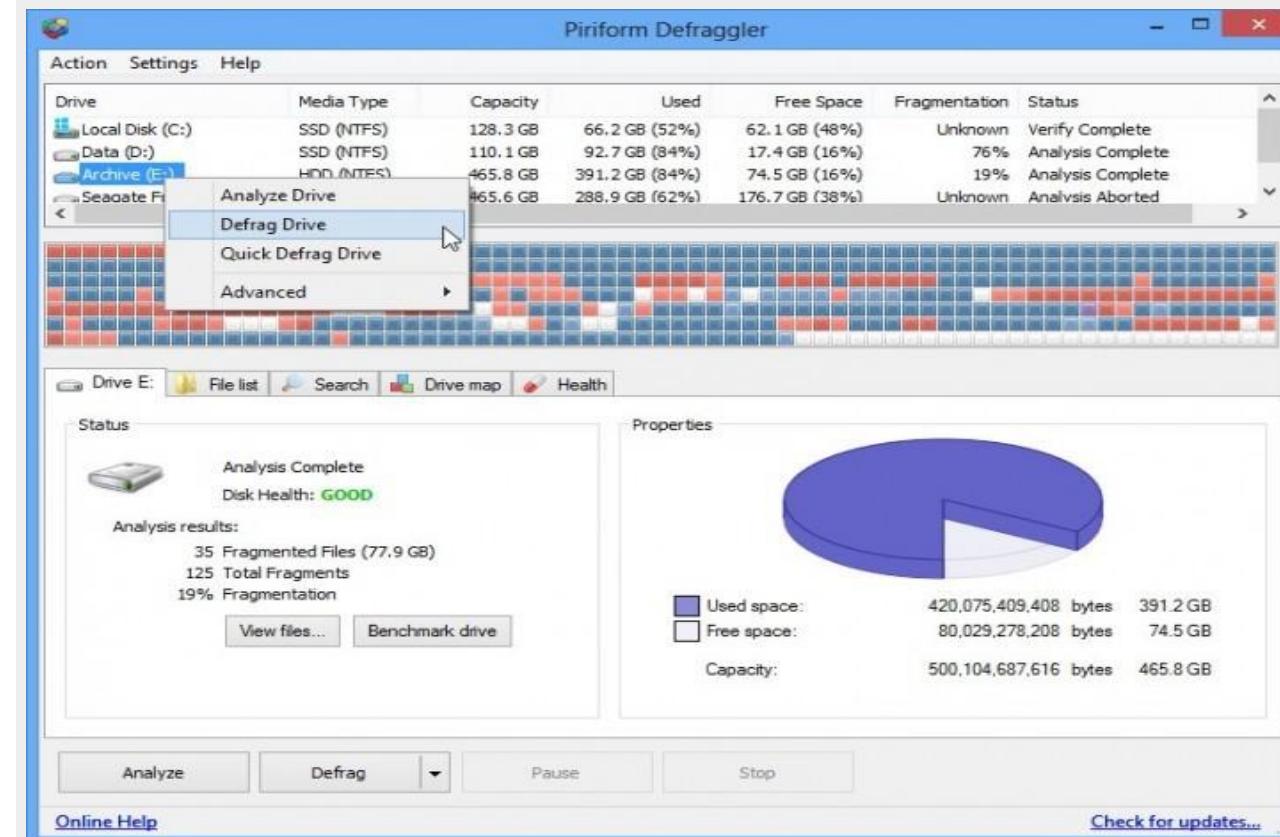


Image Source: <https://windowsreport.com/windows-10-defrag-tools/>

FDISK, Format, Scandisk, FAT System, NTFS and Directories, Fragmentation and defragmentation disk

Ways to improve your computer's performance

- It does this by physically organizing the contents of the mass storage device used to store files into the smallest number of contiguous regions (fragments, extents).
- Those fragmented, individual pieces of data are referred to generally as fragments. Defragmentation, then, is the process of unfragmenting or piecing together, those fragmented files so they sit closer, physically, on the drive or other media, potentially speeding up the drive's ability to access the file

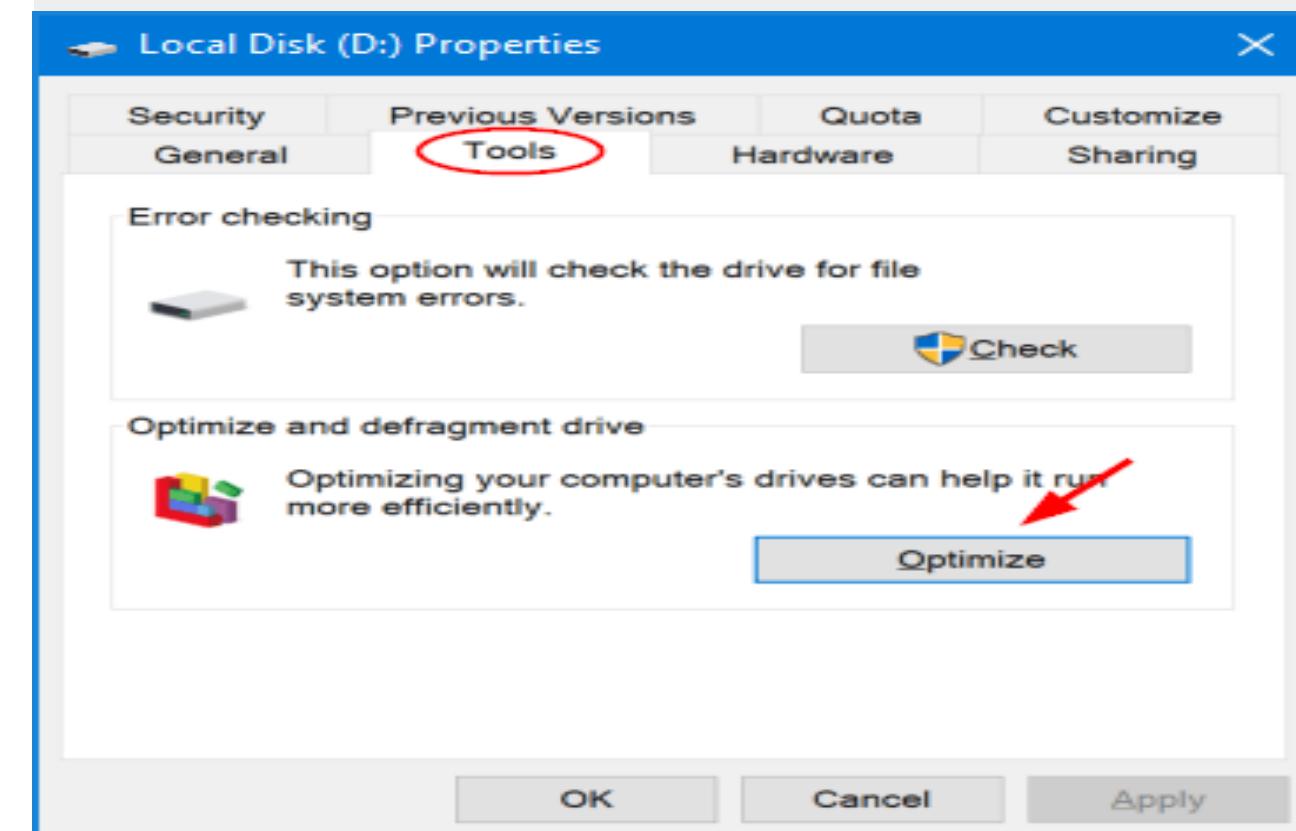


Image Source: <https://windowsreport.com/windows-10-defrag-tools/>

Able to manage files effectively in Windows and Linux environment

(15 hours)

In this section, we will discuss:

- Functions of key board and Mouse
- Applications MS Paint/Note pad
- Different text formats
- Different image file formats
- Advantages of compressing files
- X Distinguish between backup and cloning

Functions of key board and Mouse

Most interactions with a computer involve using a keyboard and a mouse.

The keyboard allows the user to type letters and numbers and the mouse allows the user to position the cursor, draw and execute program functions by clicking mouse buttons.



Image Source:

https://www.google.com/search?q=images+mouse+and+keyboard&sxsrf=ALeKk03-reQtUqBxc1vZak_8_TF-h3-_w:1600878495437&source=lnms&tbo=isch&sa=X&ved=2ahUKEwif7bGQ2f_rAhUljuYKHctfAs8Q_AUoAneECA4QBA&biw=1536&bih=722#imgrc=p3T9c5h29W42HM/

Functions of key board and Mouse

- A keyboard is for putting information including letters, words and numbers into your computer. You press the individual buttons on the keyboard when you type.
- The number keys across the top of the keyboard are also found on the right of the keyboard.
- The letter keys are in the centre of the keyboard.



Image Source:

https://www.google.com/search?q=images+mouse+and+keyboard&sxsrf=ALeKk03-reQtUqBxc1vZak_8_TF-h3-_w:1600878495437&source=lnms&tbo=isch&sa=X&ved=2ahUKEwif7bGQ2f_rAhUljuYKHctfAs8Q_AUoAneECA4QBA&biw=1536&bih=722#imgrc=p3T9c5h29W42HM

Functions of key board and Mouse

There are lots of different styles of mouse, but most have a left and a right button.

To hold your mouse, rest your hand over it and put your index finger on the left button and your thumb resting on the side. The cable needs to be pointing towards the computer. The mouse needs to always be in contact with a mouse mat, desk or hard surface

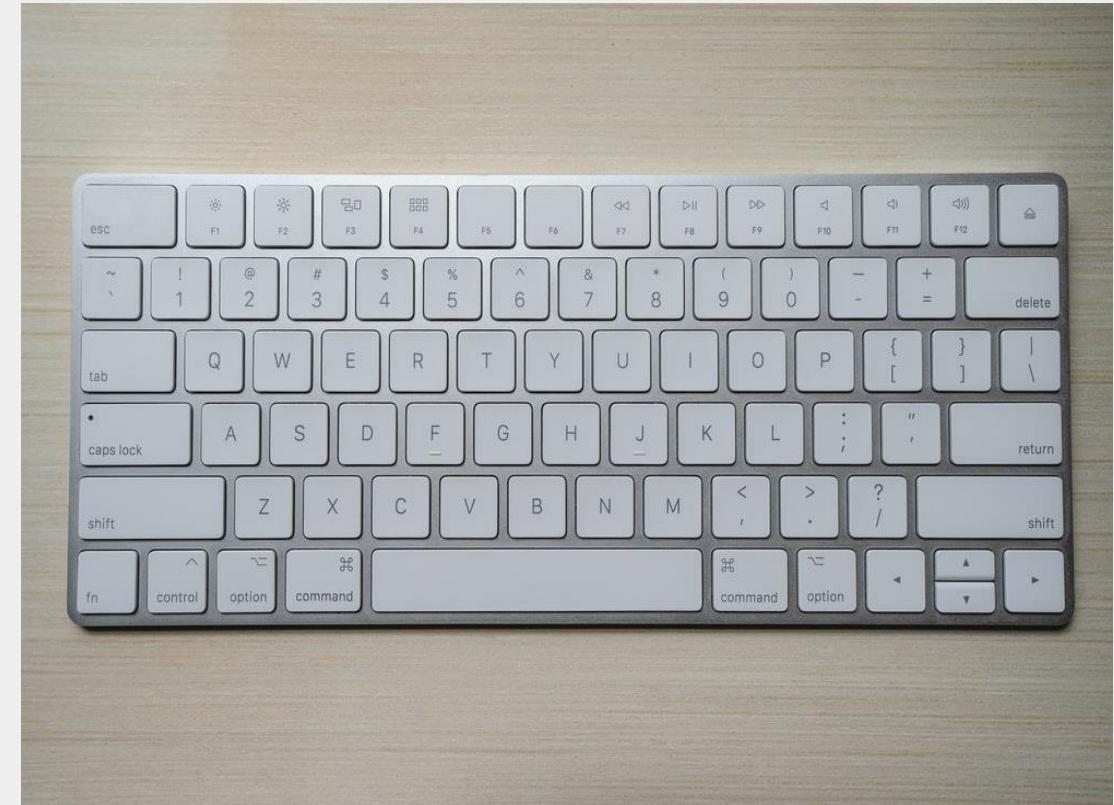


Image Source:

https://www.google.com/search?q=images+mouse+and+keyboard&sxsrf=ALeKk03-reQtUqBxc1vZak_8_TF-h3-_w:1600878495437&source=lnms&tbo=isch&sa=X&ved=2ahUKEwif7bGQ2f_rAhUljuYKHctfAs8Q_AUoAneECA4QBA&biw=1536&bih=722#imgrc=p3T9c5h29W42HM/

Functions of key board and Mouse

Keyboards differ by manufacturer and the operating system they are designed for. A keyboard's primary function is to act as an input device. Using a keyboard, a person can type a document, use keystroke shortcuts, access menus, play games and perform a variety of other tasks.



- https://www.google.com/search?q=images+of+keyboard&hl=en&sxsrf=AEKk00gwJ5h_H2_6cLROM2Hm5J0ZPhAGg:1600878739401&tbo=isch&source=iu&ictx=1&fir=NtuKJENu37krqM%252CLP-xoRA4j3oDHM%252C_&vet=1&usg=AI4-kQLPVwwX8jPMPJqAD_3Xas3usqK6A&s=1&ved=2ahUKEwjcdyE2vrAhVF6nMBHfZICxEQ9QF6BAgKEFQ&biw=1536&bih=722#imgrc=NtuKJENu37krqM

Functions of Mouse

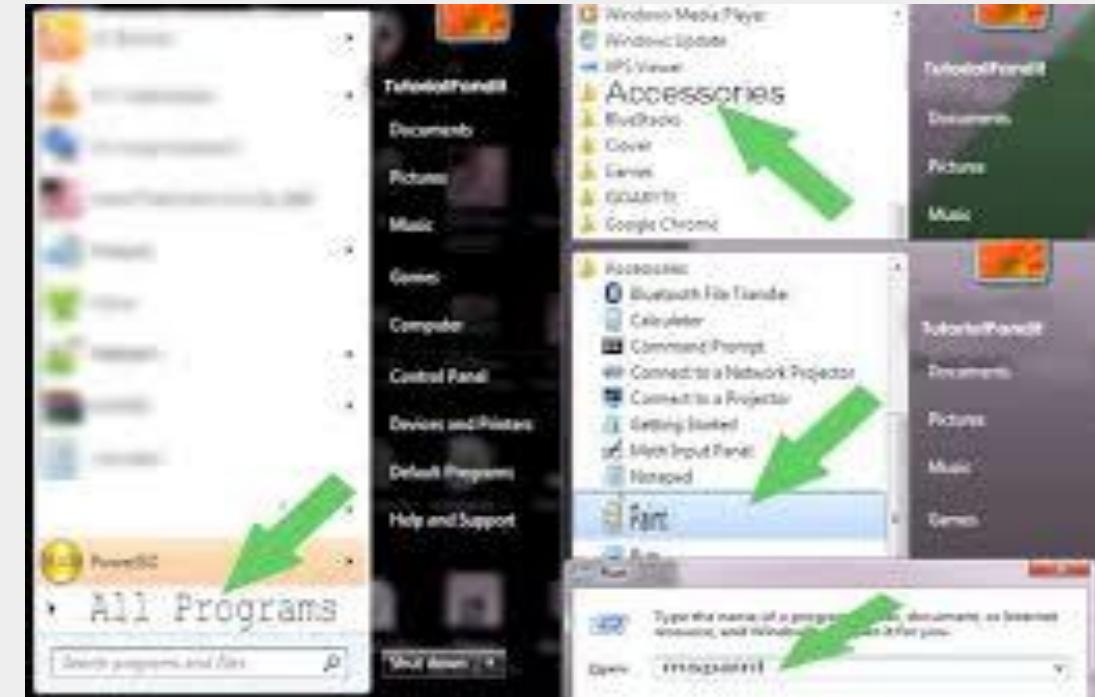
- A computer mouse is an **input** device that is used with a computer. Moving a mouse along a flat surface can move the cursor to different items on the screen. Items can be moved or selected by pressing the mouse buttons (called clicking).



https://www.google.com/imgres?imgurl=https%3A%2F%2Fupload.wikimedia.org%2Fwikipedia%2Fcommons%2F2%2F22%2F3-Tasten-Maus_Microsoft.jpg&imgrefurl=https%3A%2F%2Fen.wikipedia.org%2Fwiki%2FComputer_mouse&tbnid=YTLipZJcHTmN-M&vet=12ahUKEwjjp8aK6P7rAhUB5TgGHUcODKwQMygCegUIARDXAQ..i&docid=eLhYvDUfrVS5TM&w=800&h=701&q=images%20of%20mouse&ved=2ahUKEwjjp8aK6P7rAhUB5TgGHUcODKwQMygCegUIARDXAQ

Applications MS Paint/Note pad

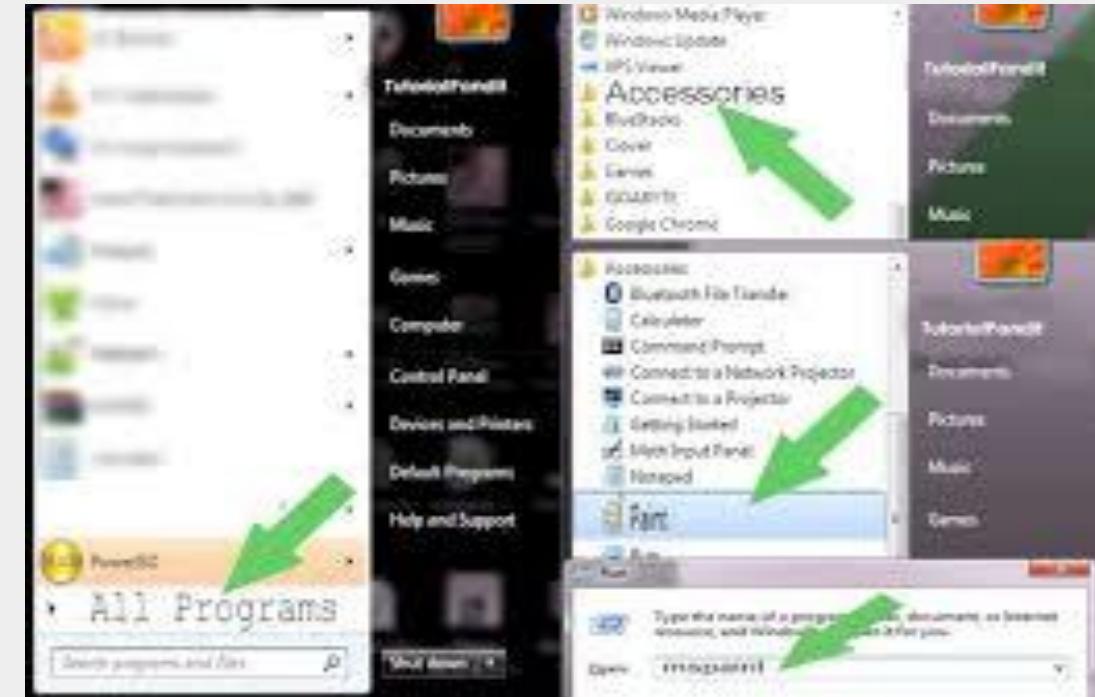
Microsoft Paint is a simple graphics editing program that is included with Microsoft Windows. Although Paint is not very sophisticated, like the Notepad text editor, you may get stuck someplace where you need to do graphics editing and all that is available is Paint.



https://www.google.com/search?q=Applications+MS+Paint%2FNote+pad&tbo=isch&ved=2ahUKEwilt_yI2v_rAhWZNXIKHYxLC4cQ2-cCegQIABAA&oq=Applications+MS+Paint%2FNote+pad&gs_lcp=CgNpbWcQA1DWggZY1oIGYIGMBmgAcAB4AIAB9weIAfcHkgEDNy0xmAEAoAEBqgELZ3dzLXdpei1pbWfAAQE&sclient=img&ei=nHrX4j5EpnryAOMI624CA&bih=722&biw=1536&hl=en#imgrc=aiBM3mBBpAHjvM

Applications MS Paint/Note pad

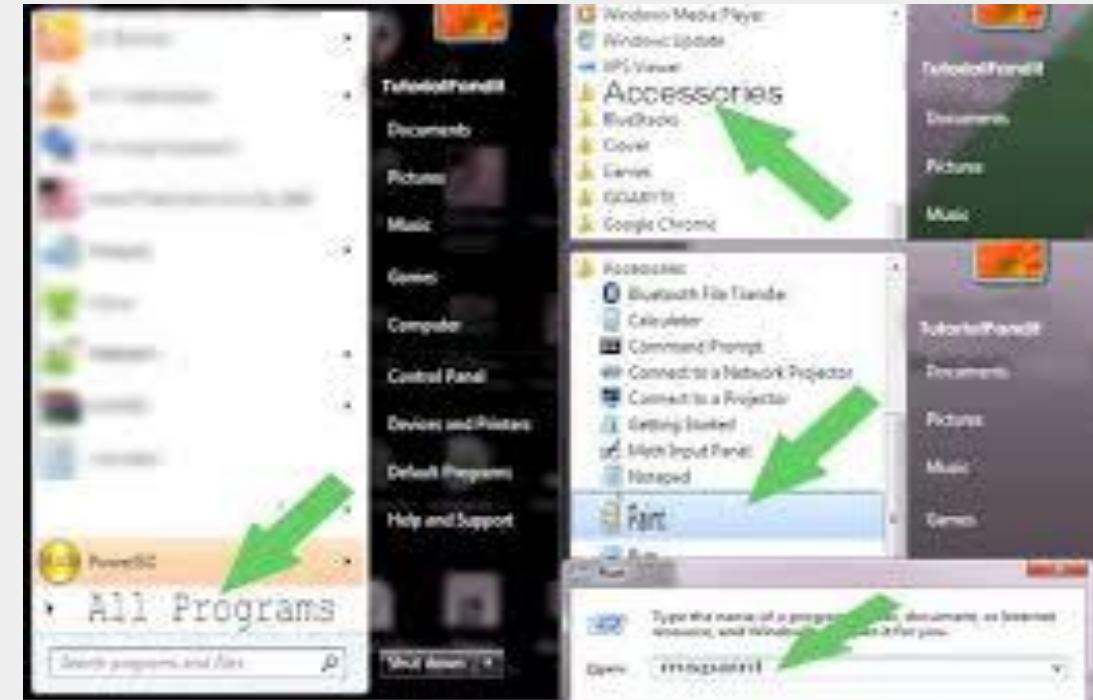
Notepad is a text editor, which is a program similar to a word processor but cannot perform any special editing. No embedded codes are inserted into the document. Text files also called: unformatted text files and ASCII (American Standard Code for Information Interchange)



https://www.google.com/search?q=Applications+MS+Paint%2FNote+pad&tbo=isch&ved=2ahUKEwilt_yI2v_rAhWZNXIKHYxLC4cQ2-cCegQIABAA&oq=Applications+MS+Paint%2FNote+pad&gs_lcp=CgNpbWcQA1DWggZY1oIGYIGMBmgAcAB4AIAB9weIAfcHkgEDNy0xmAEAoAEBqgELZ3dzLXdpei1pbWfAAQE&sclient=img&ei=nHrX4j5EpnryAOMI624CA&bih=722&biw=1536&hl=en#imgrc=aiBM3mBBpAHjvM

Applications MS Paint/Note pad

You can print any picture that you create or view in Paint. Graphics take much longer to print than text and the quality of the printout will depend on the quality of the printer. If the printer is not a color printer, the picture will print in shades of gray.



https://www.google.com/search?q=Applications+MS+Paint%2FNote+pad&tbo=isch&ved=2ahUKEwilt_yI2v_rAhWZNXIKHYxLC4cQ2-cCegQIABAA&oq=Applications+MS+Paint%2FNote+pad&gs_lcp=CgNpbWcQA1DWggZY1oIGYIGMBmgAcAB4AIAB9weIAfcHkgEDNy0xmAEAoAEBqgELZ3dzLXdpei1pbWfAAQE&sclient=img&ei=nHrX4j5EpnryAOMI624CA&bih=722&biw=1536&hl=en#imgrc=aiBM3mBBpAHjvM

Applications MS Paint/Note pad

MS Paint

Microsoft Paint, also called MS Paint or simply Paint is a computer program made by Microsoft. It allows people to create picture files as well as edit picture files saved on their computer. Microsoft Paint is also a program for adding texts to images saved on a computer.

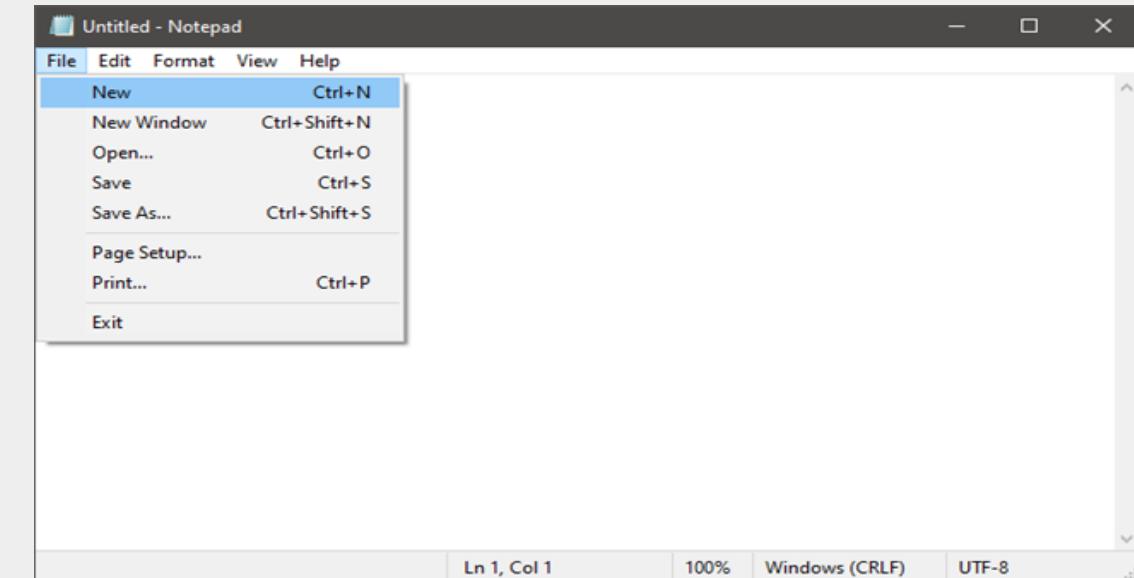


- https://www.google.com/search?q=images+of+ms+paint&tbo=isch&ved=2ahUKEwjjj4u52v_rAhV0lEsFHboyCPoQ2-cCegQIABAA&oq=images+of+ms+paint&gs_lcp=CgNpbWcQAzlCCAAyAggAMgIIADIIECAAQHjoFCAAQsQM6BAgAEEEM6BAgjECc6BggAEAgQHjoGCAAQChAYOgQIABAYULmFW1idqVtgvatbaABwAHgAgAGPBogBySuSAQ0wLjluOS41LjAuMS4xmAEAoAEBqgELZ3dzLXdpei1pbWfAAQE&sclient=img&ei=AXlrX6OLDfSortoPuuWg0A8&bih=722&biw=1536&hl=en#mgrc=Y3yXyDIRzXsK3M

Applications MS Paint/Note pad

Notepad

Notepad is a simple text editor for Microsoft Windows and a basic text-editing program which enables computer users to create documents. It was first released as a mouse-based MS-DOS program in 1983, and has been included in all versions of Microsoft Windows since Windows 1.0 in 1985.

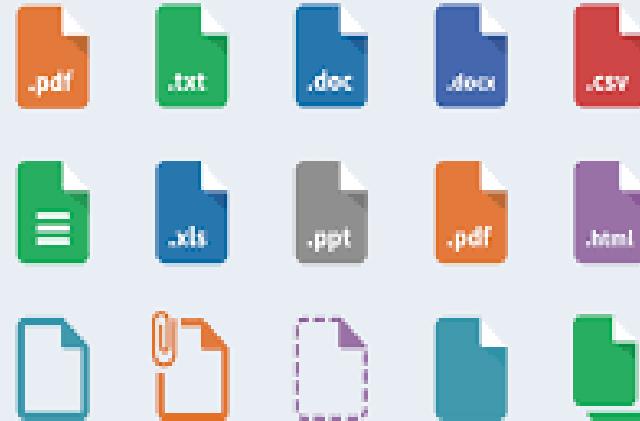


- https://www.digitalcitizen.life/sites/default/files/gdrive/notepad/notepad_3.png

Different text formats

The most common file format extensions for text files are:

- pdf.
- doc/. docx.
- odt.
- txt.
- rtf.
- ppt/pptx.
- odp.



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Different image file formats

- Common Image File Formats
- TIFF (.tif, .tiff)
- GIF (.gif) GIF or Graphics Interchange Format files are widely used for web graphics, because they are limited to only 256 colors, can allow for transparency, and can be animated
- PNG
- EPS RAW Image Files



- https://www.google.com/imgres?imgurl=https%3A%2F%2Fwww.colorexpertsbd.com%2Fwp-content%2Fuploads%2F2018%2F01%2Fraster-image-format.jpg&imgrefurl=https%3A%2F%2Fwww.colorexpertsbd.com%2Fblog%2Fdifferent-types-raster-image-file-formats&tbnid=Jq0mavibNXrMJM&vet=12ahUKEwj79oyE4v_rAhXM8zgGHZKDBXoQMygAegUIARCoAQ..i&docid=TJmIIES8PAWQtM&w=750&h=350&q=Different%20image%20file%20formats&hl=en&ved=2ahUKEwj79oyE4v_rAhXM8zgGHZKDBXoQMygAegUIARCoAQ

Advantages of compressing files

- Less disk space (more data in reality)
(*)
- Faster writing and reading (*)
- Faster file transfer.
- Variable dynamic range.
- Byte order independent.

Compression	
Definition	Lossy compression is a reduction in the file size which is caused by reducing the amount of information which is saved.
Advantage	The main advantage to compression is that it reduces the file size and the amount of memory in which the file requires.
Disadvantage	When compressed, images lose quality and appear more pixelated because less pixels are saved each time.

- https://www.google.com/imgres?imgurl=https%3A%2F%2Fimage.slideshare.net%2Ffiletypesproforma-2-140910151437-phpapp02%2F95%2Fdigital-graphics-file-formats-15638.jpg%3Fcb%3D1410362148&imgrefurl=https%3A%2F%2Fwww.slideshare.net%2Fkatyfleetham%2Ffile-types-pro-forma-2&tbnid=c4k7Cj2p6fd1M&vet=12ahUKEwi2kO6M4__rAhVKHHIKHXQGAawQMygAegUIARCgAQ..i&docid=GWM5coMCYrPAoM&w=638&h=479&q=Advantages%20%20compressing%20files&hl=en&ved=2ahUKEwi2kO6M4__rAhVKHHIKHXQGAawQMygAegUIARCgAQ

X Distinguish between backup and cloning

The Backup operation of Acronis software creates an image file for backup and disaster recovery purposes, while the Disk Clone tool simply copies/moves the entire contents of one hard disk drive to another. Here's how both tools work and when you should use them.



- https://www.google.com/imgres?imgurl=https%3A%2F%2Fwww.ubackup.com%2Farticles%2Fimages%2Fbackup-vs-clone%2Fbackup-clone.gif&imgrefurl=https%3A%2F%2Fwww.ubackup.com%2Farticles%2Fbackup-vs-clone-1128.html&tbnid=5gJUTo5qnxOiNM&vet=12ahUKEwinlrXI4__rAhVX5HM BHY_eBKkQMygAegUIARCfAQ..i&docid=MEKNgFD3UAG8NM&w=750&h=530&q=X%20Distinguish%20between%20backup%20and%20cloning&hl=en&ved=2ahUKEwinlrXI4__rAhVX5HMBHY_eBKkQMygAegUIARCfAQ

Able to work with Linux environment by using Linux commands

(15 hours)

In this section, we will discuss:

- X Introduction to Linux operating system
- X Familiarization with GUI environment
- Syntax of shell commands

X Introduction to Linux operating system

Linux is a community of open-source Unix like operating systems that are based on the Linux Kernel. It initially released by Linus Torvalds on September 17, 1991.



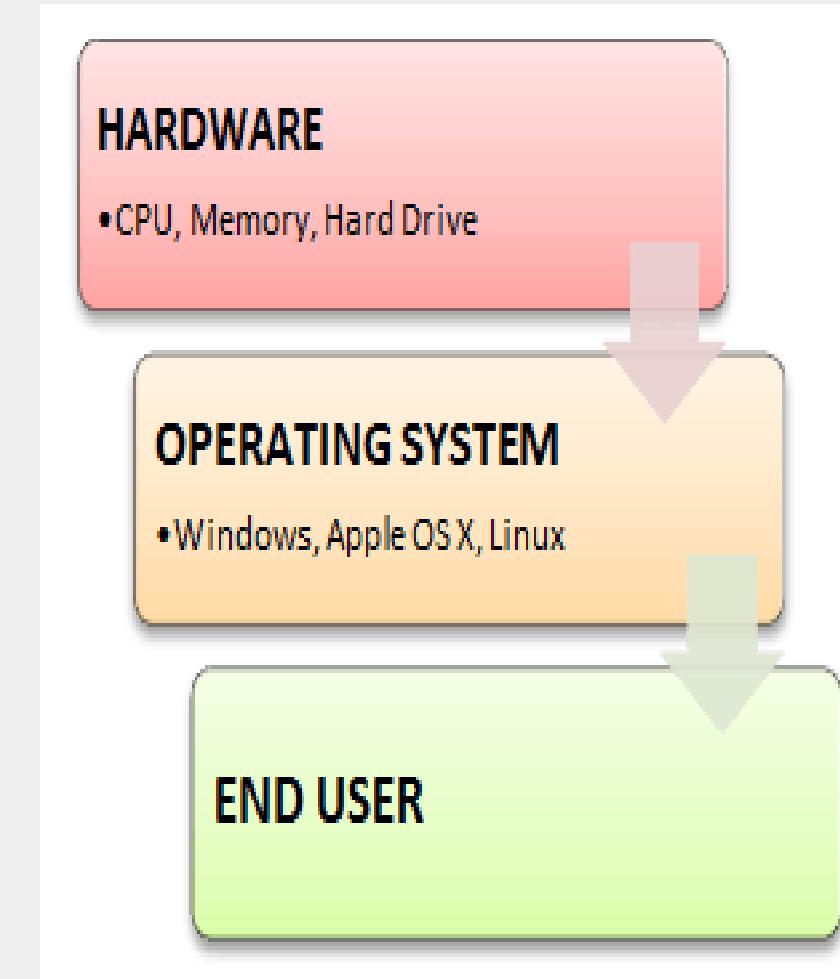
Image

Source: <https://www.google.com/imgres?imgurl=https%3A%2F%2Fimage.slidesharecdn.com%2Flinuxintro-01-slideshare-140730161840-phpapp01%2F95%2Flinux-introduction-class-1-4-638.jpg%3Fcb%3D1406737217&imgrefurl=https%3A%2F%2Fwww.slideshare.net%2Famikeliunas%2Flinux-intro-01slideshare&tbnid=JSBhNvd7bp3c8M&vet=12ahUKEwjvjaHssYHsAhXg-jgGHWQgCUUQMygBegUIARCIQ..i&docid=UKNOWZT3s7k4tM&w=638&h=479&q=X%20Introduction%20to%20Linux%20operating%20system&ved=2ahUKEwjvjaHssYHsAhXg-jgGHWQgCUUQMygBegUIARCIQ>

X Introduction to Linux operating system

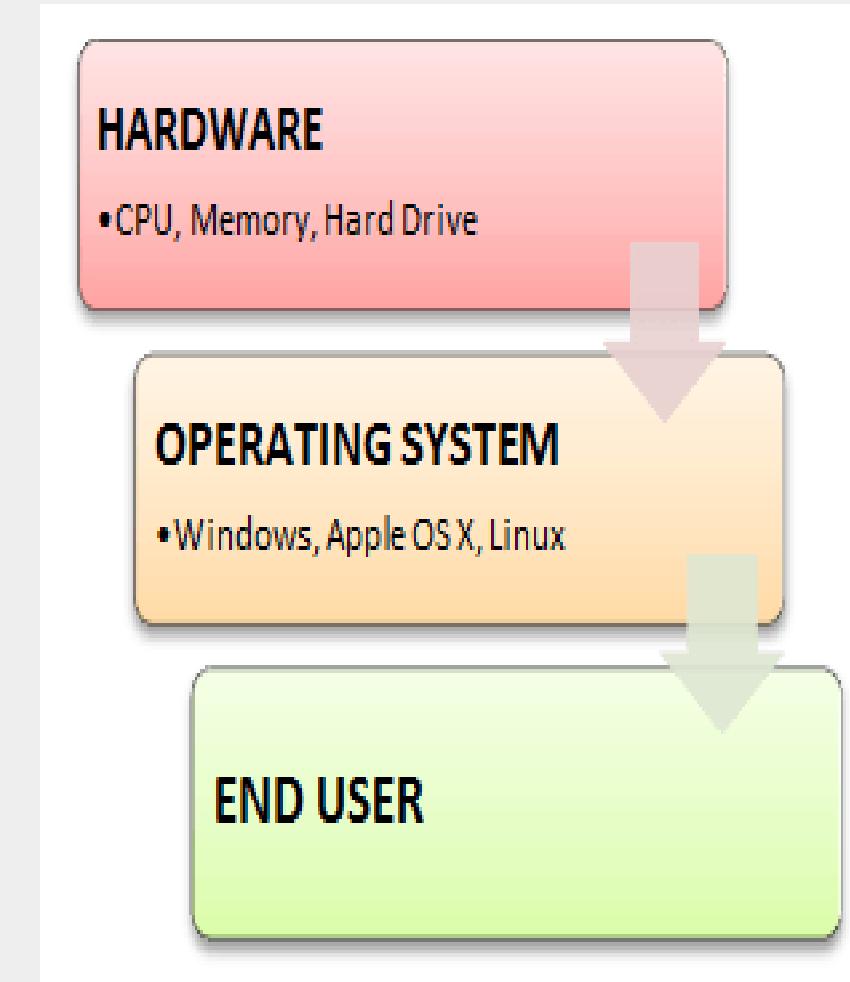
What is Linux?

- LINUX is an operating system or a kernel distributed under an open-source license.
- Its functionality list is quite like UNIX.
- The kernel is a program at the heart of the Linux operating system that takes care of fundamental stuff, like letting hardware communicate with software.



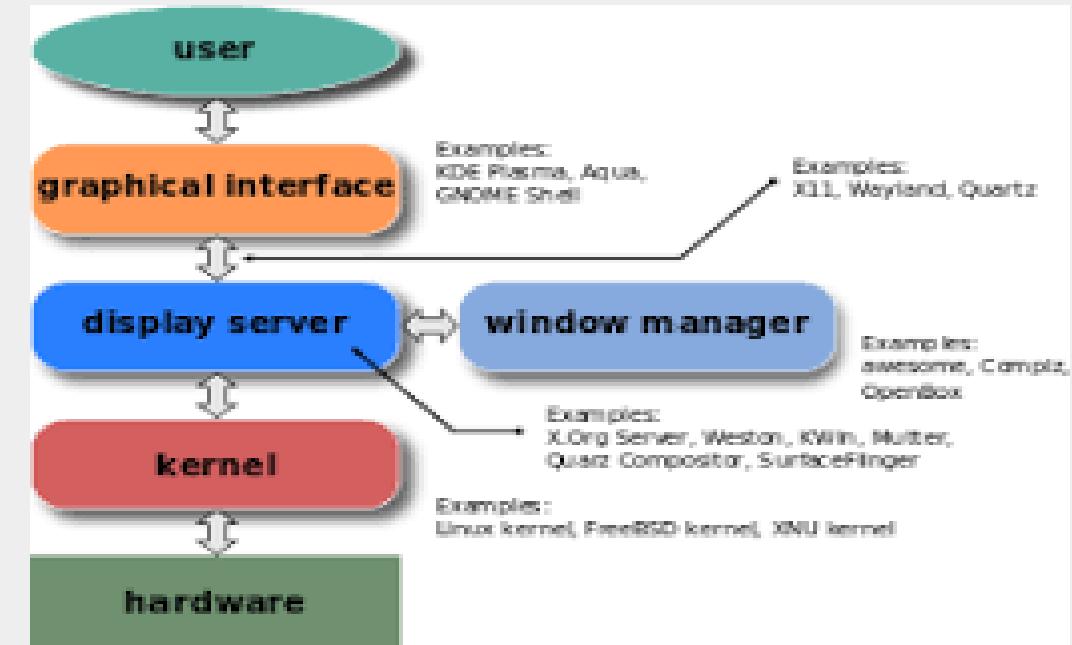
X Introduction to Linux operating system

Linux is an operating system or a kernel which germinated as an idea in the mind of young and bright Linus Torvalds when he was a computer science student. He used to work on the UNIX OS (proprietary software) and thought that it needed improvements. However, when his suggestions were rejected by the designers of UNIX, he thought of launching an OS which will be receptive to changes, modifications suggested by its users.



X Familiarization with GUI environment

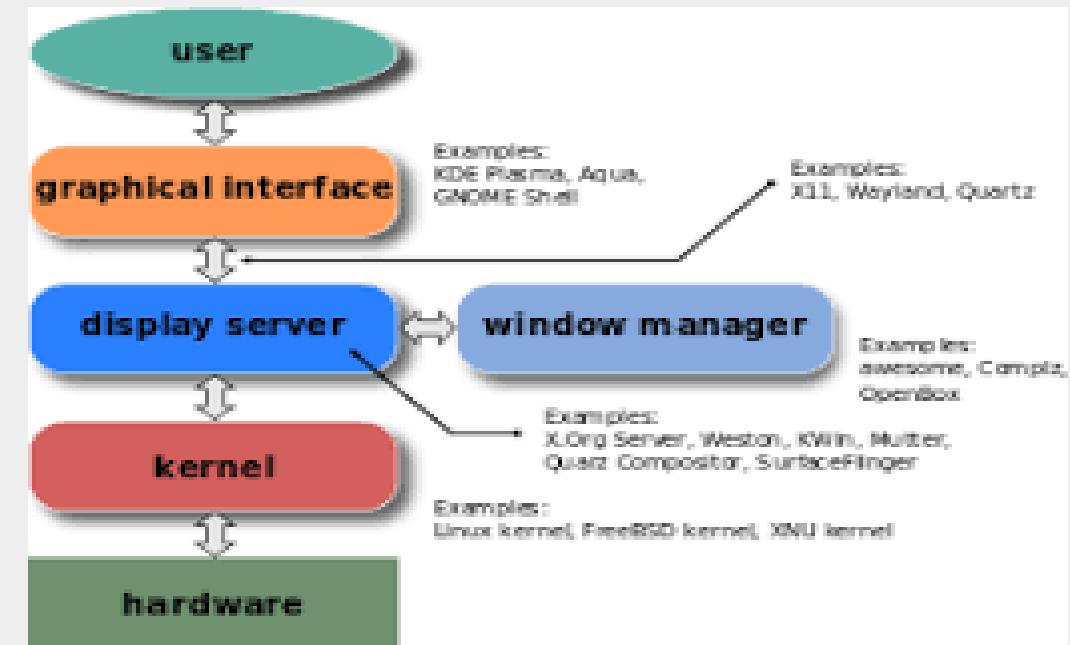
The GUIs familiar to most people as of the mid-late 2010s are Microsoft Windows, macOS, and the X Window System interfaces for desktop and laptop computers, and Android, Apple's iOS, Symbian, BlackBerry OS, Windows Phone/Windows 10 Mobile, Tizen, WebOS, and Firefox OS for handheld (smartphone) devices.



https://www.google.com/imgres?imgurl=https%3A%2F%2Fupload.wikimedia.org%2Fwikipedia%2Fcommons%2Fthumb%2F9%2F95%2FSchema_of_the_layers_of_the_graphical_user_interface.svg%2F300px-Schema_of_the_layers_of_the_graphical_user_interface.svg.png&imgrefurl=https%3A%2F%2Fen.wikipedia.org%2Fwiki%2FGraphical_user_interface&tbnid=64VM840qTwRkWM&vet=12ahUKEwiemwHs4HsAhWS7TgGHSd9DqsQMygAegUIARCgAQ..i&docid=EA1zHFirMQxLuM&w=300&h=225&q=X%20Familiarization%20with%20GUI%20environment&ved=2ahUKEwiemwHs4HsAhWS7TgGHSd9DqsQMygAegUIARCgAQ

X Familiarization with GUI environment

An interface that allows users to interact with the system visually through icons, windows, or graphics is a GUI. While the kernel is the heart of Linux, the face of the operating system is the graphical environment provided by the X Window System or X. A product by X.Org Foundation, an open source organization, X Window System is a protocol that allows interfaces to build on top of their X Server. You can use X through one of many window managers or desktop environments such as GNU Network Object Model Environment (GNOME) or Kool Desktop Environment (KDE). A desktop environment includes a window manager and is a far more deeply integrated system than a window manager.



https://www.google.com/imgres?imgurl=https%3A%2F%2Fupload.wikimedia.org%2Fwikipedia%2Fcommons%2Fthumb%2F9%2F95%2FSchema_of_the_layers_of_the_graphical_user_interface.svg%2F300px-Schema_of_the_layers_of_the_graphical_user_interface.svg.png&imgrefurl=https%3A%2F%2Fen.wikipedia.org%2Fwiki%2FGraphical_user_interface&tbnid=64VM840qTwRkWM&vet=12ahUKEwiemwHs4HsAhWS7TgGHSd9DqsQMygAegUIARCgAQ..i&docid=EA1zHFirMQxLuM&w=300&h=225&q=X%20Familiarization%20with%20GUI%20environment&ved=2ahUKEwiemwHs4HsAhWS7TgGHSd9DqsQMygAegUIAIRCgAQ

Syntax of shell commands

A shell is a special user program which provides an interface to the user to use operating system services. Shell accept human readable commands from the user and convert them into something which kernel can understand. It is a command language interpreter that execute commands read from input devices such as keyboards or from files. The shell gets started when the user logs in or start the terminal.



The screenshot shows a terminal window with a dark background and a light-colored text area. At the top, there is a menu bar with 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The window title is 'vagrant@vagrant:~/GeeksForGeeks\$'. The first command entered is 'cat Languages', which outputs a list of programming languages: Java, Python, Golang, Erlang, Javascript, C++, and C#. The second command entered is 'more Languages', which displays the same list again, with the text 'more' visible at the bottom of the list. The prompt 'vagrant@vagrant:~/GeeksForGeeks\$' is visible at the bottom of the window.

- <https://www.google.com/imgres?imgurl=https%3A%2F%2Fmedia.geeksforgeeks.org%2Fwp-content%2Fuploads%2Fcat-more-1.png&imgrefurl=https%3A%2F%2Fwww.geeksforgeeks.org%2Fbasic-shell-commands-in-linux%2F&tbnid=MYYzzw4CVNbGM&vet=12ahUKEwjp84eVtYHsAhUSCXIKHZA2Ce4QMygAegUIARCgAQ..i&docid=YwLL4OukObx7-M&w=789&h=384&q=Syntax%20of%20shell%20commands&ved=2ahUKEwjp84eVtYHsAhUSCXIKHZA2Ce4QMygAegUIARCgAQ>

Familiarization of open office tools for creating documents, spread sheet and presentation

(15 hours)

In this section, we will discuss:

- Using Open Office
- Creating documents,
- Creating spread sheet and
- Creating presentation

Creating Document

What is Writer?

- Writer is the word processor component of OpenOffice.org (OOo).

Image Source:

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https://www.tutorialspoint.com/internet_technologies/internet_overview.htm

Creating Document

The Writer interface

- The main Writer workspace is shown in figure.
- The menus and toolbars are described

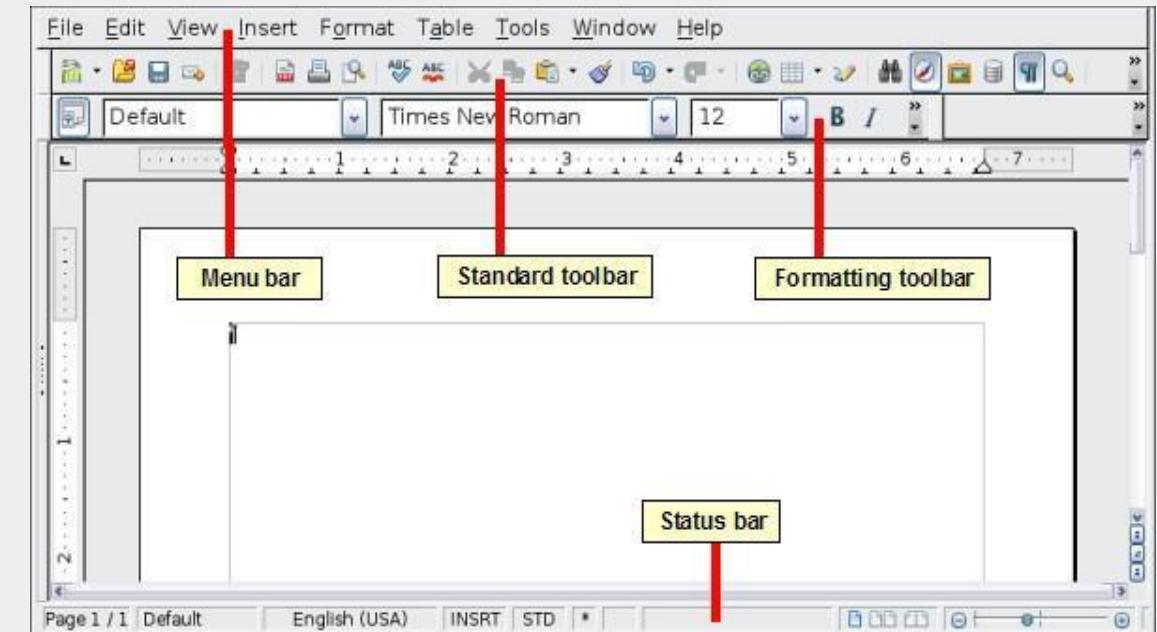


Image Source: <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Writer>

Creating Document

Status bar

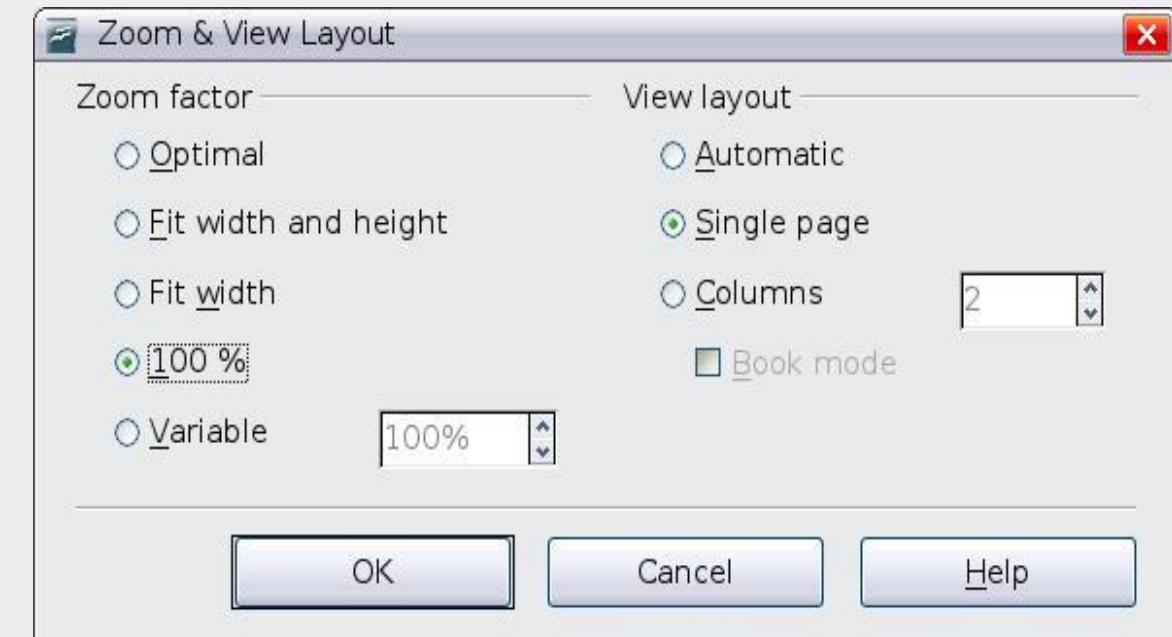


- The Writer status bar provides information about the document and convenient ways to quickly change some document features.

Creating Document

Changing document views

- You can also choose **View > Zoom** from the menu bar to display the Zoom & View Layout dialog
- Where you can set the same options as on the Status bar.



Creating Document

Working with documents

- Introducing OpenOffice.org includes instructions on starting new documents, opening existing documents, and saving documents.

Creating Document

Saving as a Microsoft Word file

- Important—First save your document in the file format used by OOo Writer (.odt). If you do not, any changes you made since the last time you saved will appear only in the Microsoft Word version of the document.
- Then choose File > Save As.

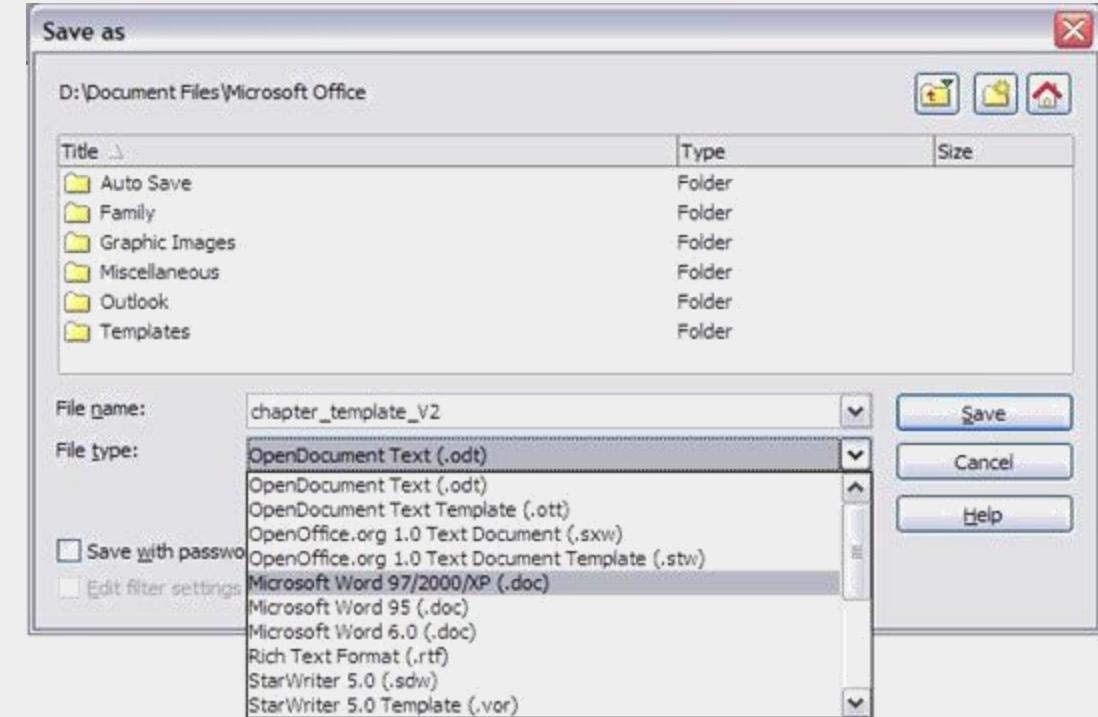
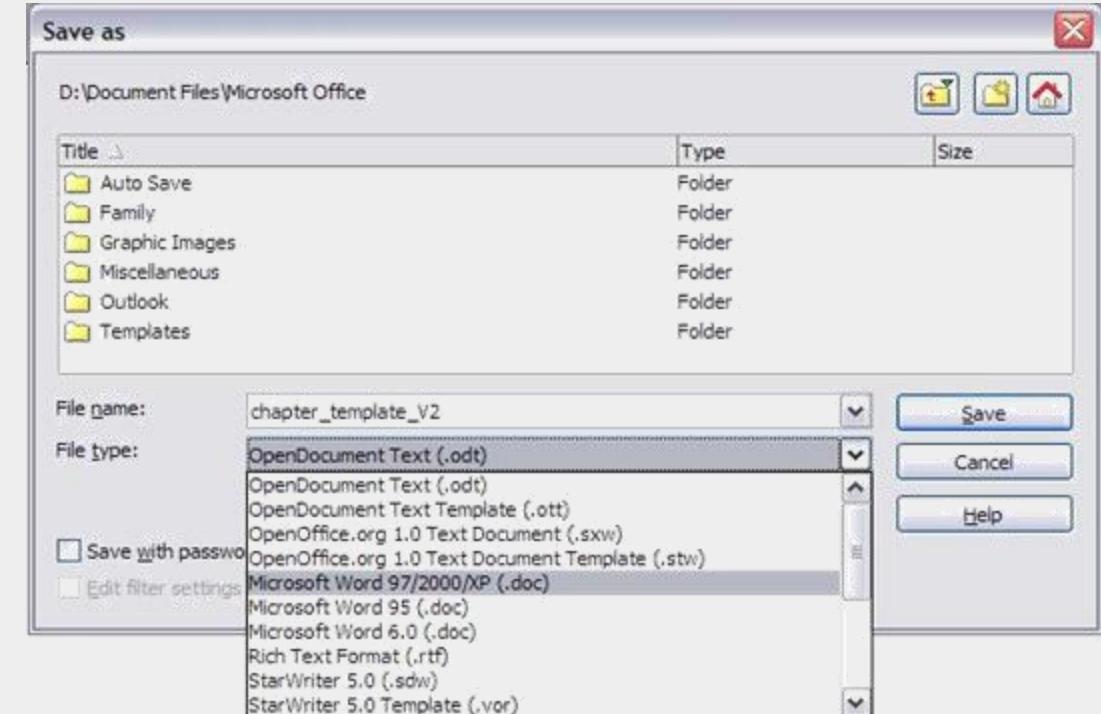


Image Source: <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Writer>

Creating Document

Saving as a Microsoft Word file

- On the Save As dialog figure, in the File type (or Save as type) drop-down menu, select the type of Word format you need.
- Choose Save.



Creating Document

Working with text

- Working with text (selecting, copying, pasting, moving) in Writer is similar to working with text in any other program.
- OOo also has some convenient ways to select items that are not next to each other, select a vertical block of text, and paste unformatted text.

Creating Document

Selecting items that are not consecutive

To select nonconsecutive items using the mouse:

- Select the first piece of text.
- Hold down the Control key and use the mouse to select the next piece of text.
- Repeat as often as needed.

The Country of the Blind

Three hundred miles and more from Chimborazo, one hundred from the snows of Cotopaxi, wastes of Ecuador's Andes, there lies that mysterious mountain valley, cut off from all the world, the **Country of the Blind**. Long years ago that valley lay so far open to the world that men might pass through frightful gorges and over an icy pass into its equable meadows, and thither indeed many a Peruvian half-breed fled from the lust and tyranny of an evil Spanish ruler. Then came a stupendous outbreak of Mindobamba, when it was night in Quito for seventeen days, and the earth at Yaguachi and all the fish floating dying even as far as Guayaquil; everywhere along the **P** there were land-slips and swift thawings and sudden floods, and one whole side of the old **Arauca** mountain came down in thunder, and cut off the **Country of the Blind** for ever from the exploring feet of these early settlers. These settlers had chanced to be on the hither side of the gorges when the world had so far slipped from under them, and he perforce had to forget his wife and his child and all the friends and possessions he had left behind him.

Creating Document

Selecting items that are not consecutive

- Select the first piece of text. (For more information about keyboard selection of text, see the topic “Navigating and selecting with the keyboard” in the Help.)
- Press Shift+F8. This puts Writer in “Add” mode. The word ADD appears on the status bar.
- Use the arrow keys to move to the start of the next piece of text to be selected. Hold down the Shift key and select the next piece of text.

The Country of the Blind

Three hundred miles and more from Chimborazo, one hundred from the snows of Cotopaxi, wastes of Ecuador's Andes, there lies that mysterious mountain valley, cut off from all the world, the *Country of the Blind*. Long years ago that valley lay so far open to the world that men might pass through frightful gorges and over an icy pass into its equable meadows, and thither indeed many a Peruvian half-breed fled from the lust and tyranny of an evil Spanish ruler. Then came a stupendous outbreak of Mindobamba, when it was night in Quito for seventeen days, and the earth at Yaguachi and all the fish floating dying even as far as Guayaquil; everywhere along the *Country of the Blind* were land-slips and swift thawings and sudden floods, and one whole side of the old Araucan mountain came down in thunder, and cut off the *Country of the Blind* for ever from the exploring feet of men. These early settlers had chanced to be on the hither side of the gorges when the world had so far slipped and shifted, and he perforce had to forget his wife and his child and all the friends and possessions he had left behind him.

Creating Document

Selecting items that are not consecutive

- Repeat as often as needed.
- Now you can work with the selected text.
- Press Esc to exit from this mode.

The Country of the Blind

Three hundred miles and more from Chimborazo, one hundred from the snows of Cotopaxi, wastes of Ecuador's Andes, there lies that mysterious mountain valley, cut off from all the world, the **Country of the Blind**. Long years ago that valley lay so far open to the world that men might pass through frightful gorges and over an icy pass into its equable meadows, and thither indeed many a Peruvian half-breed fled from the lust and tyranny of an evil Spanish ruler. Then came a stupendous outbreak of Mindobamba, when it was night in Quito for seventeen days, and the earth at Yaguachi and all the fish floating dying even as far as Guayaquil; everywhere along the **P**anama were land-slips and swift thawings and sudden floods, and one whole side of the old **Araucan** mountain came down in thunder, and cut off the **Country of the Blind** for ever from the exploring feet of the world. These early settlers had chanced to be on the hither side of the gorges when the world had so far to itself, and he perforce had to forget his wife and his child and all the friends and possessions he had left behind him.

Creating Document

Cutting, copying, and pasting text

Cutting and copying text in Writer is similar to cutting and copying text in other applications. You can use the mouse or the keyboard for these operations.

- To make the pasted text take on the formatting of the surrounding text where it is being pasted, choose either:
- **Edit > Paste Special**, or
- Click the triangle to the right of the **Paste** icon, or
- Click the **Paste** icon without releasing the left mouse button

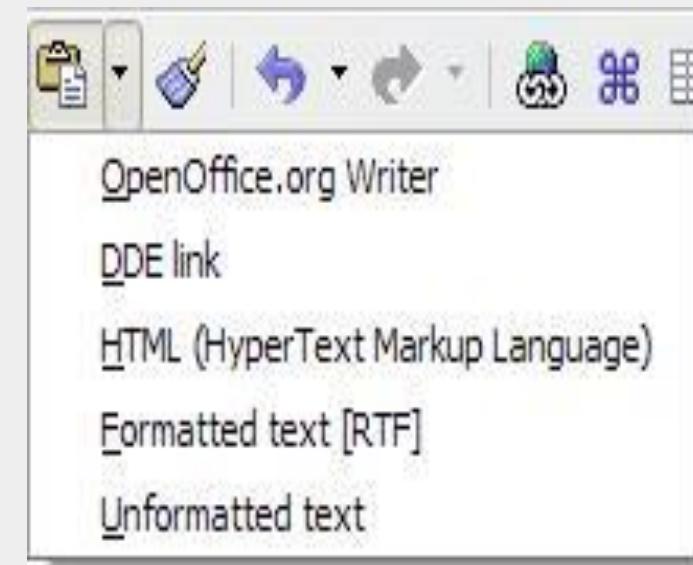


Image Source: <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Writer>

Creating Document

Finding and replacing text and formatting

Writer has a Find and Replace feature that automates the process of searching for text inside a document. In addition to finding and replacing words and phrases



Image Source: <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Writer>

Creating Document

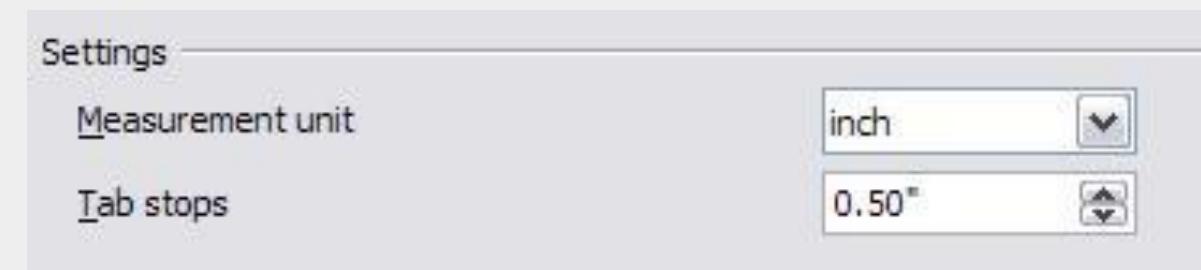
Finding and replacing text and formatting

- Type the text you want to find in the **Search for** box.
- To replace the text with different text, type the new text in the **Replace with** box.
- You can select various options such as matching the case, matching whole words only, or doing a search for similar words.
- When you have set up your search, click **Find**. To replace text, click **Replace** instead.



Creating Document

Changing the default tab stop interval



- To set the measurement unit and the spacing of default tab stop intervals, go to **Tools > Options > OpenOffice.org Writer > General**

Image Source: <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Writer>

Creating Document

- Checking spelling and grammar Writer provides a spelling checker, which can be used in two ways.
- **AutoSpellcheck** checks each word as it is typed and displays a wavy red line under any misspelled words. When the word is corrected, the line disappears.
- To perform a separate spelling check on the document (or a text selection) click the **Spelling and Grammar** button. This checks the document or selection and opens the Spelling and Grammar dialog if any misspelled words are found.

Creating Document

Using built-in language tools

- You can set the language for the whole document, for individual paragraphs, or even for individual words and characters, all from **Tools > Language** on the menu bar.
- Another way to change the language of a whole document is to use **Tools > Options > Language Settings > Languages**. In the *Default languages for documents* section of the Options dialog, you can choose a different language for all the text.

Creating Document

Using built-in language tools

- The spelling checker works only for those languages in the list that have the symbol next to them. If you do not see the symbol next to your preferred language, you can install the additional dictionary using **Tools > Languages > More dictionaries online**.

Creating Document

Using AutoCorrect

- Choose **Tools > AutoCorrect Options** to open the AutoCorrect dialog. There you can define which strings of text are corrected and how. In most cases, the defaults are fine.
- AutoCorrect is turned on when Writer is installed. To turn it off, uncheck **Format > AutoCorrect > While Typing**

Creating Document

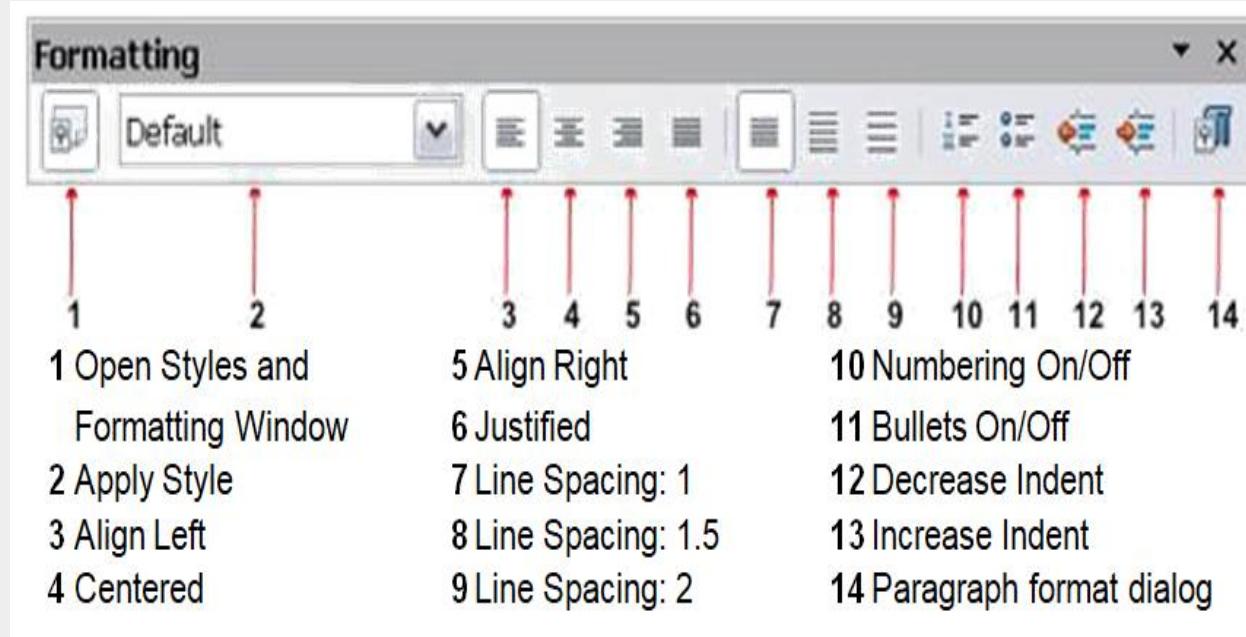
Using word completion

- To turn off Word Completion, select **Tools > AutoCorrect Options > Word Completion** and deselect **Enable word completion**.

Creating Document

Formatting Text

You can apply many formats to paragraphs using the buttons on the Formatting toolbar. Figure shows the Formatting toolbar as a floating toolbar, customized to show only the icons for paragraph formatting. The appearance of the icons may vary with your operating system and the selection of icon size and style in **Tools > Options > OpenOffice.org > View**.



Creating Document

Formatting pages

Writer provides several ways for you to control page layouts: page styles, columns, frames, tables, and sections

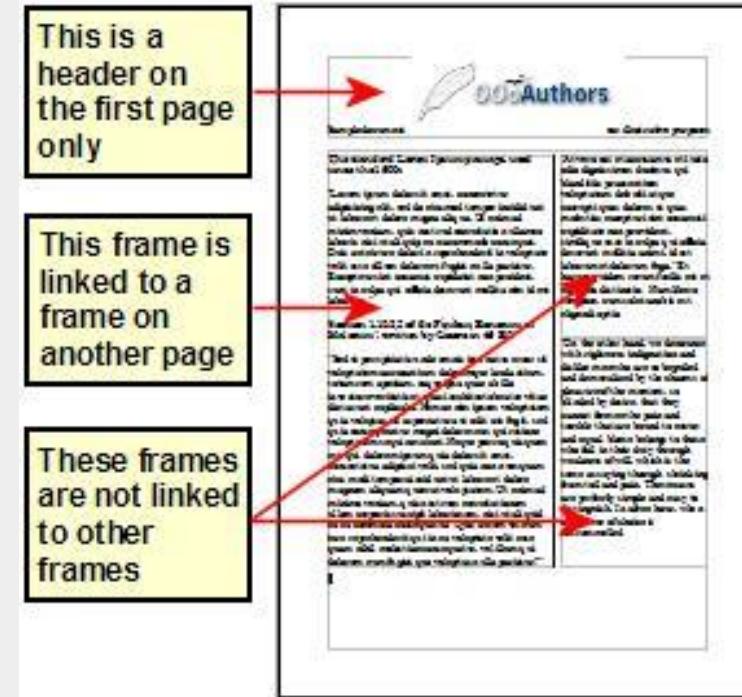


Image Source: <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Writer>

Creating Document

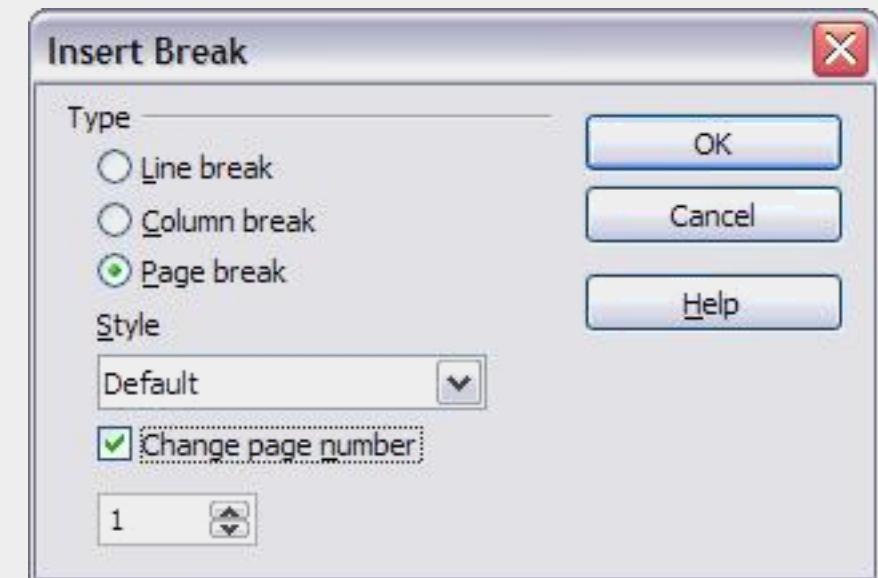
Creating headers and footers

- A header is an area that appears at the top of a page. A footer appears at the bottom of the page. Information, such as page numbers inserted into a header or footer, displays on every page of the document with that page style.
- To insert a header, choose **Insert > Header > Default** (or the page style, if not Default).

Creating Document

Numbering pages

- **Insert > Manual break.**
- By default, **Page break** is selected on the Insert Break dialog Figure
- Choose the required page **Style**.
- Select **Change page number**.
- Specify the page number to start from, and then click **OK**.



Creating Document

Changing page margins

- You can change page margins in two ways:
- Using the page rulers—quick and easy, but does not have fine control.
- Using the Page Style dialog—can specify margins to two decimal places.

Creating Document

Printing from Writer

- Writer provides a range of choices when printing
- Click the **Print File Directly** icon to send the entire document to the default printer defined for your computer.

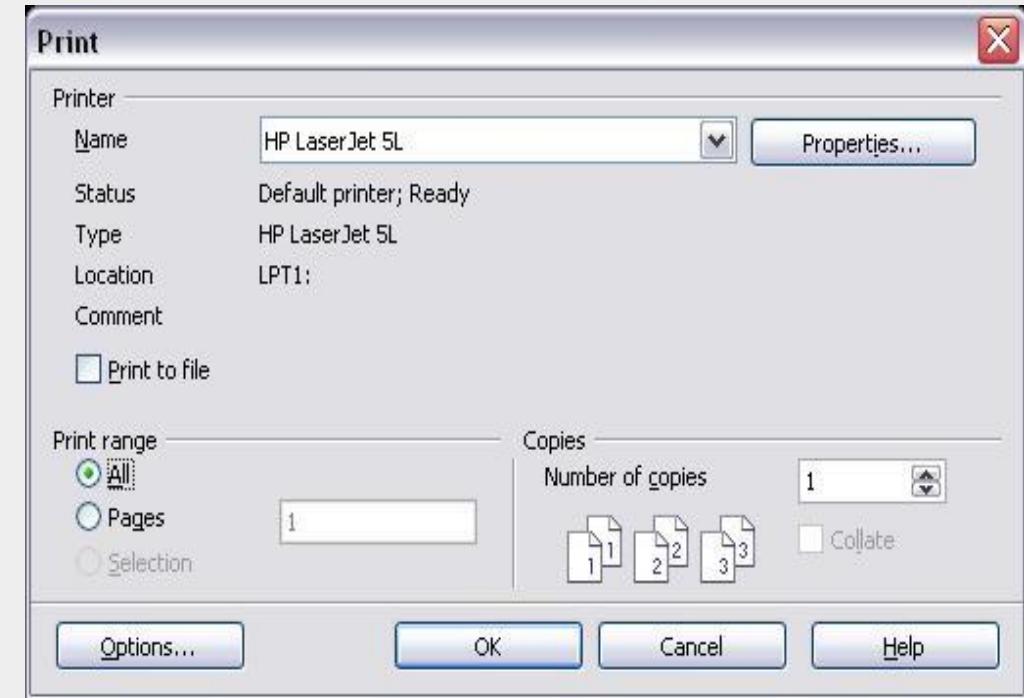


Image Source: <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Writer>

Creating Document

Sending a fax using Writer

To send a fax directly from OpenOffice.org, you need a fax modem and a fax driver that allows applications to communicate with the fax modem.

Creating Document

Sending a fax through the Print dialog

- Open the Print dialog by choosing **File** > **Print** and select the fax driver in the **Name** list.
- Click **OK** to open the dialog for your fax driver, where you can select the fax recipient.

Spreadsheets

What is Calc?

- Calc is the spreadsheet component of OpenOffice.org (OOo). You can enter data (usually numerical) in a spreadsheet and then manipulate this data to produce certain results.
- Alternatively you can enter data and then use Calc in a 'What If...' manner by changing some of the data and observing the results without having to retype the entire spreadsheet.

Spreadsheets

What is Features of Calc?

- Functions, which can be used to create formulas to perform complex calculations on data
- Database functions, to arrange, store, and filter data
- Dynamic charts: a wide range of 2D and 3D charts
- Macros, for recording and executing repetitive tasks
- Ability to open, edit, and save Microsoft Excel spreadsheets
- Import and export of spreadsheets in multiple formats, including HTML, CSV, PDF, and PostScript

Spreadsheets

Spreadsheets, sheets and cells

- Calc works with documents called *spreadsheets*. Spreadsheets consist of a number of individual *sheets*, each sheet containing cells arranged in rows and columns. A particular cell is identified by its row number and column letter.
- Cells hold the individual elements—text, numbers, formulas, and so on —that make up the data to display and manipulate.

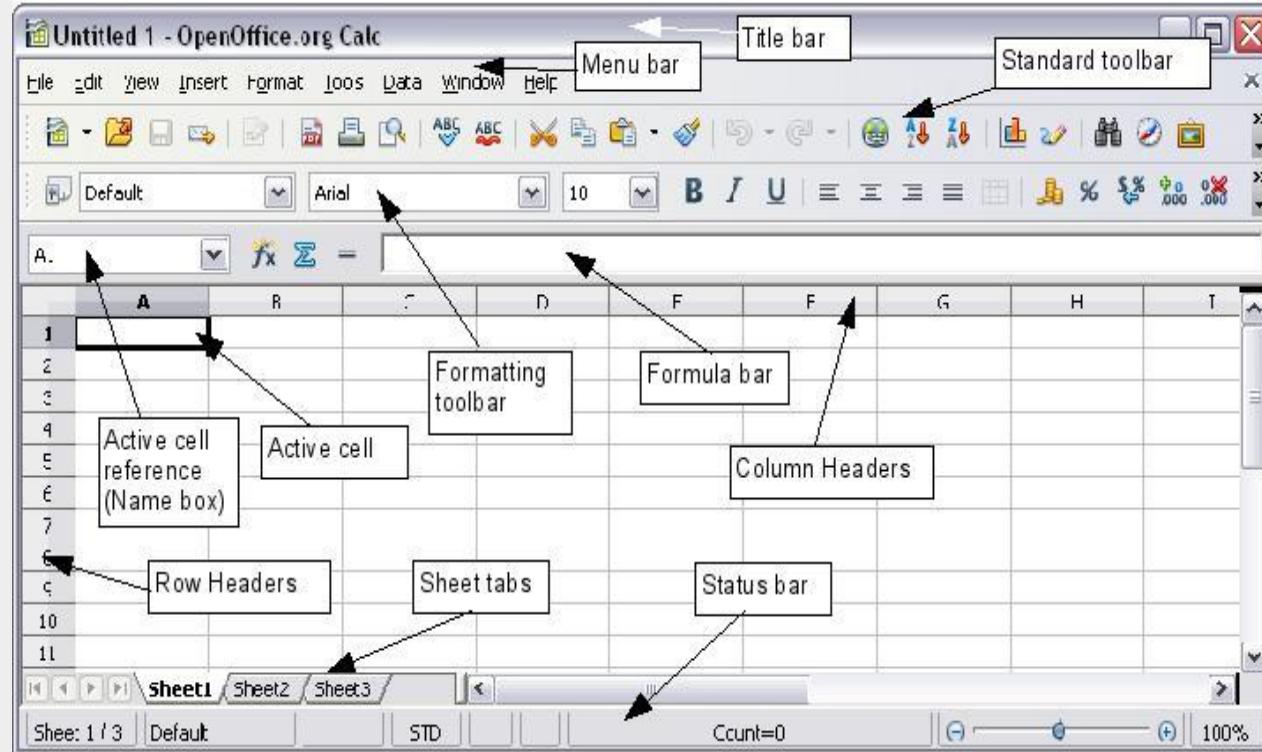
Spreadsheets

Spreadsheets, sheets and cells

- Each spreadsheet can have many sheets. and each sheet can have many individual cells. In Calc 3.x, each sheet can have a maximum of 65,536 rows and a maximum of 1024 columns, for a total of over 67 million cells

Spreadsheets

Parts of the main Calc window



- When Calc is started, the main window looks similar to Figure.

Image Source <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Calc>

Spreadsheets

Starting new spreadsheets

- A new spreadsheet can be opened from any component of OOo, for example from Writer or Draw.
- you can press Control+N to open a new spreadsheet in a new window.

Click the **Spreadsheet** icon



You can use the **New Document** button



Spreadsheets

Opening existing spreadsheets

- You can open an existing spreadsheet from the Start Center or from any component of OOo.

Click the **Open a document** icon



Click the **Open** button on the Standard toolbar



Spreadsheets

Saving new spreadsheets

- Spreadsheets can be saved in three ways.
- Choose **File > Save** (or **Save All** or **Save As**).
- Click the **Save** button on the Function bar
- Press the key combination *Control+S*.

Spreadsheets

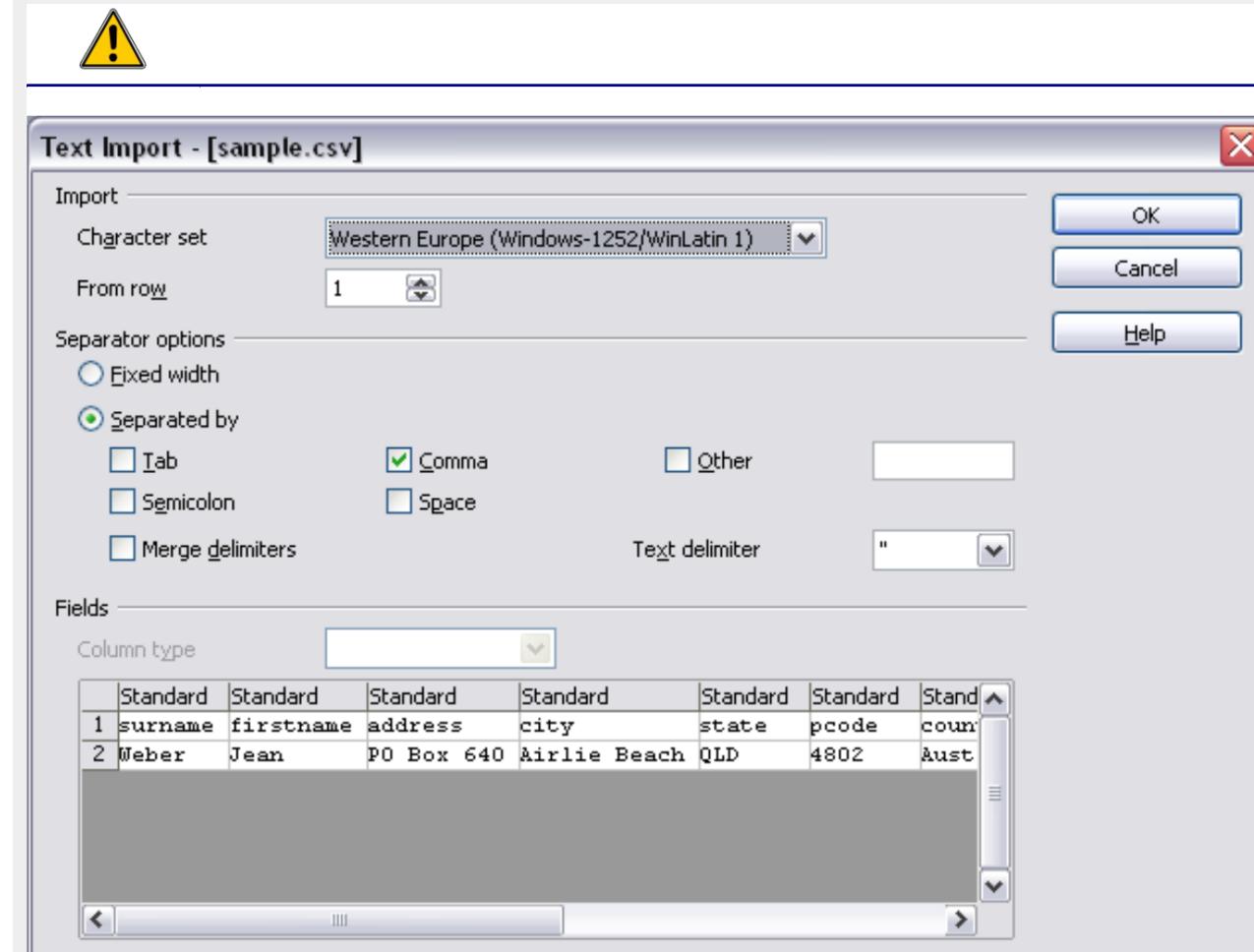
CSV

- Comma-separated-values (CSV) files are text files that contain the cell contents of a single sheet. Each line in a CSV file represents a row in a spreadsheet. Commas, semicolons, or other characters are used to separate the cells. Text is put in quotation marks, numbers are written without quotation marks.

Spreadsheets

Opening CSV

- Choose **File > Open**.
- Locate the CSV file that you want to open.
- If the file has a ***.csv** extension, select the file and click **Open**.
- If the file has another extension (for example, ***.txt**), select the file, select **Text CSV** in the File type box (scroll down into the spreadsheet section to find it) and then click **Open**.
- On the Text Import dialog (Figure, select the **Separator options** to divide the text in the file into columns



Spreadsheets

Opening CSV

- You can preview the layout of the imported data at the bottom of the dialog. Right-click a column in the preview to set the format or to hide the column.
- If the CSV file uses a text delimiter character that is not in the Text delimiter list, click in the box, and type the character.
- Click **OK** to open the file

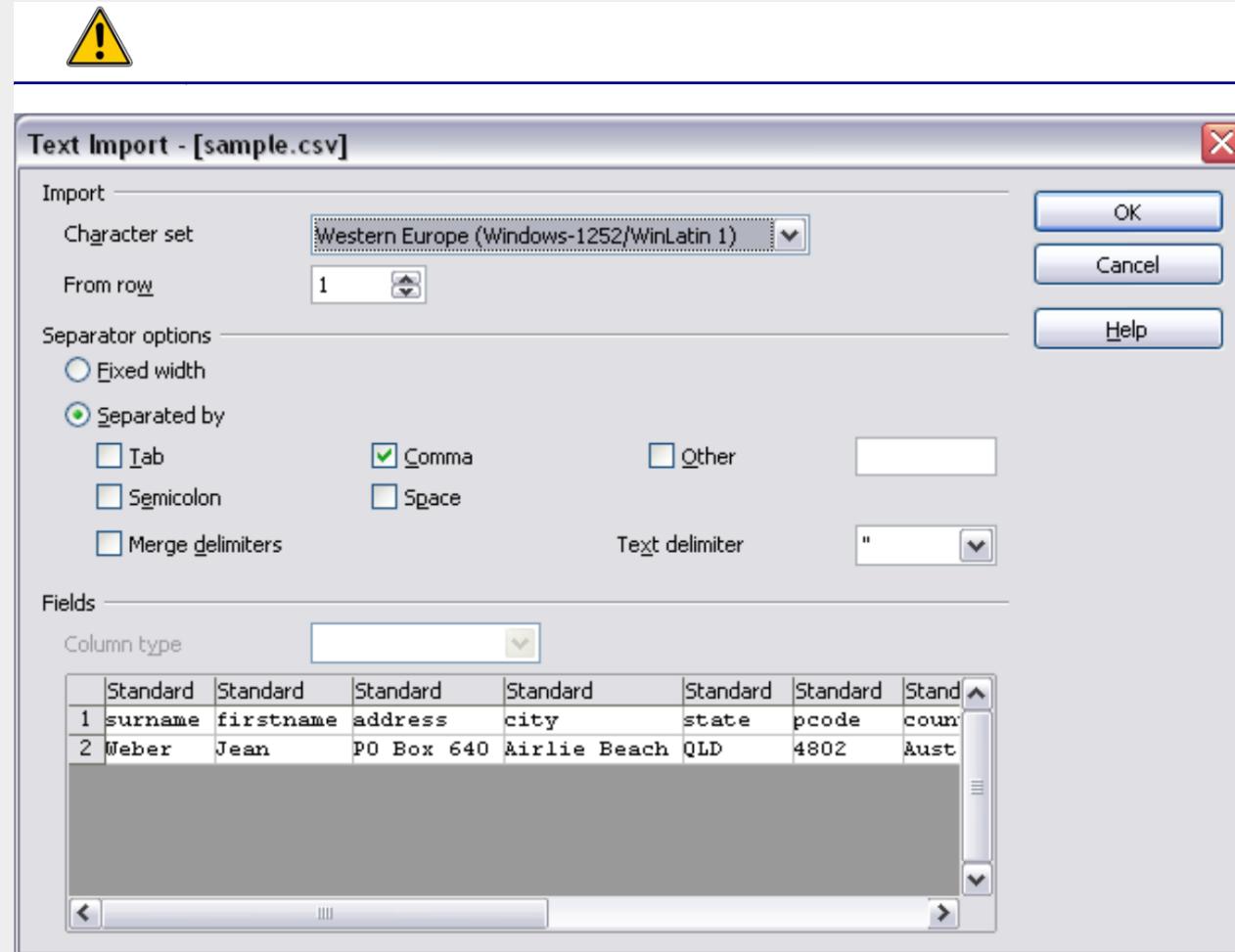


Image Source <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Calc>

Spreadsheets

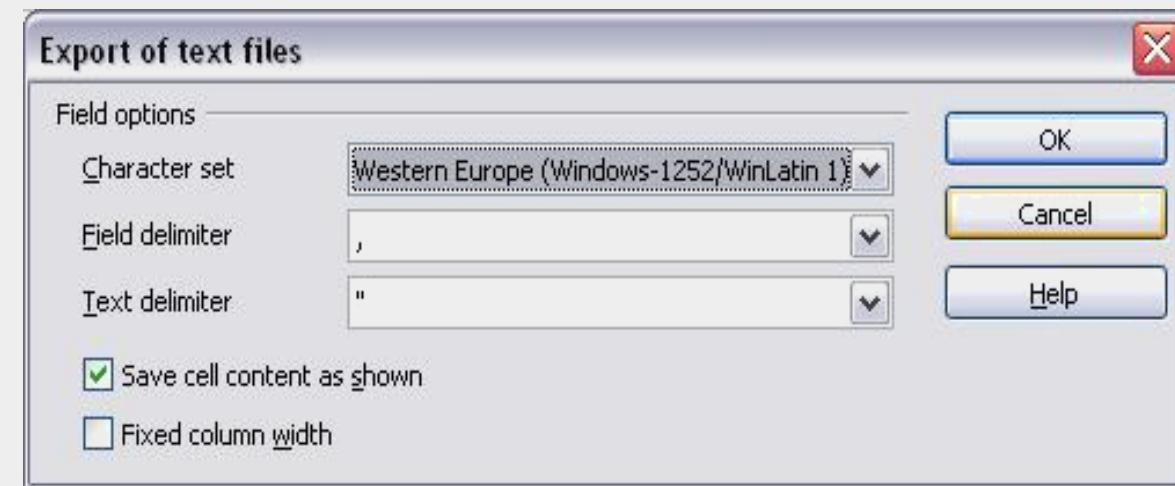
Saving CSV

- Choose **File > Save As**.
- In the File name box, type a name for the file
- In the File type list, select **Text CSV** and click **Save**.
- You may see the message box shown below. Click **Keep Current Format**.
- In the **Export of text files** dialog Figure select the options you want and then click **OK**.



Spreadsheets

Exporting CSV



- *Choosing options when exporting to Text CSV*

Spreadsheets

Navigating within spreadsheets

- Calc provides many ways to navigate within a spreadsheet from cell to cell and sheet to sheet. You can generally use whatever method you prefer.
- To open the Navigator, click its icon on the Standard toolbar, or press *F5*, or choose **View > Navigator** on the Menu bar, or double-click on the Sheet Sequence Number in the Status Bar.

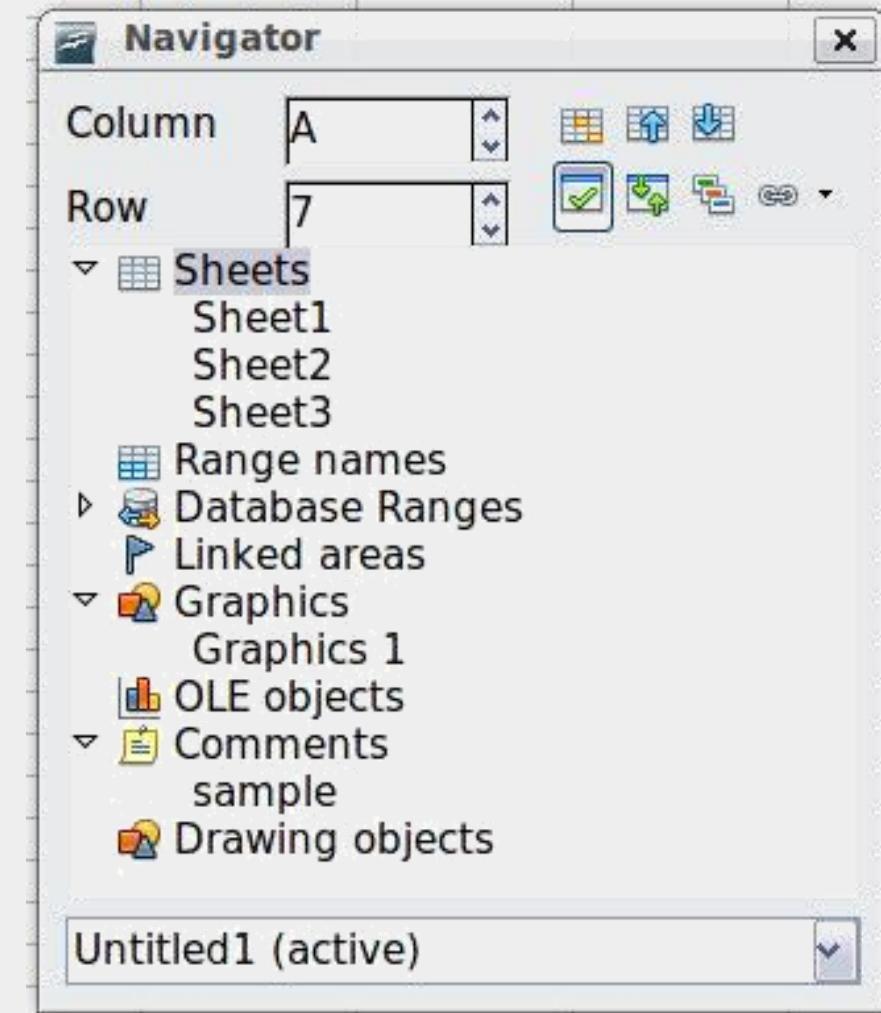
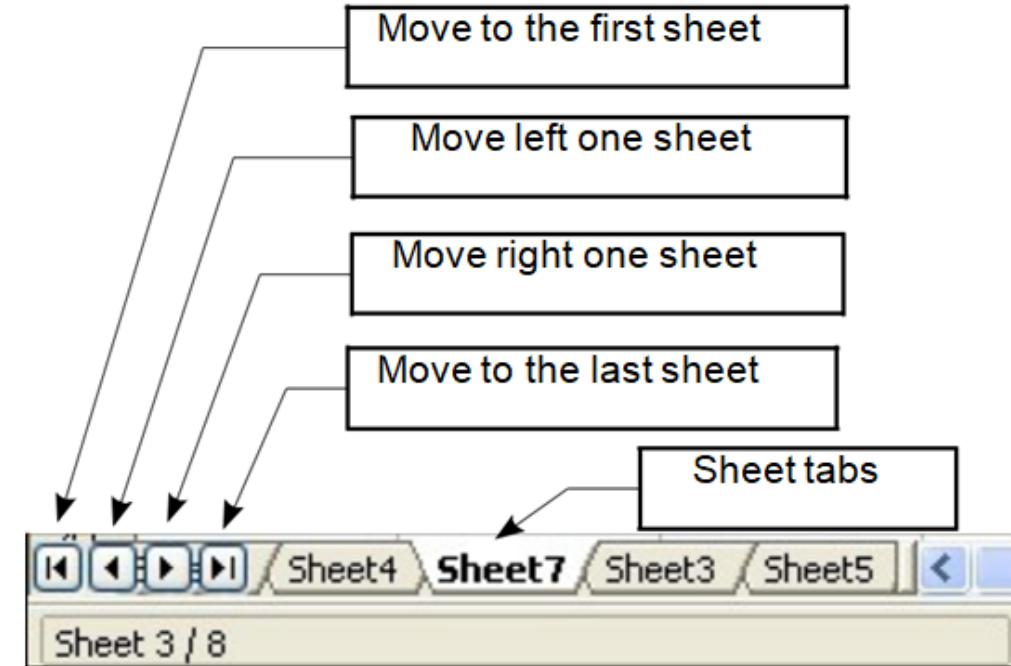


Image Source <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Calc>

Spreadsheets

Moving from sheet to sheet

- Each sheet in a spreadsheet is independent of the others though they can be linked with references from one sheet to another. There are three ways to navigate between different sheets in a spreadsheet



Spreadsheets

Selecting items in a sheet or spreadsheet

- Cells can be selected in a variety of combinations and quantities.

Spreadsheets

Working with columns and rows

- Columns and rows can be inserted individually or in groups.
- When you insert a single new column, it is inserted to the *left* of the highlighted column. When you insert a single new row, it is inserted *above* the highlighted row.
- Cells in the new columns or rows are formatted like the corresponding cells in the column or row before (or to the left of) which the new column or row is inserted.

Spreadsheets

Working with sheets

- Like any other Calc element, sheets can be inserted, deleted, and renamed.
- Choose **Insert > Sheet** from the menu bar.
- Right-click on the sheet tab and select **Insert Sheet**

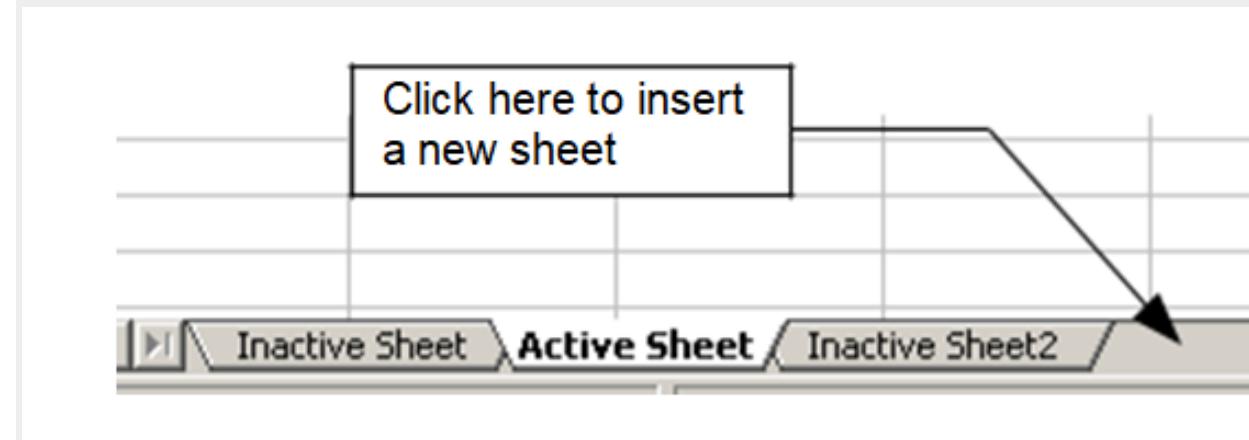


Image Source <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Calc>

Spreadsheets

Formatting data

- The data in Calc can be formatted in several ways. It can either be edited as part of a cell style so that it is automatically applied, or it can be applied manually to the cell.
- Some manual formatting can be applied using toolbar icons. For more control and extra options, select the appropriate cell or cells, right-click on it, and select **Format Cells**.

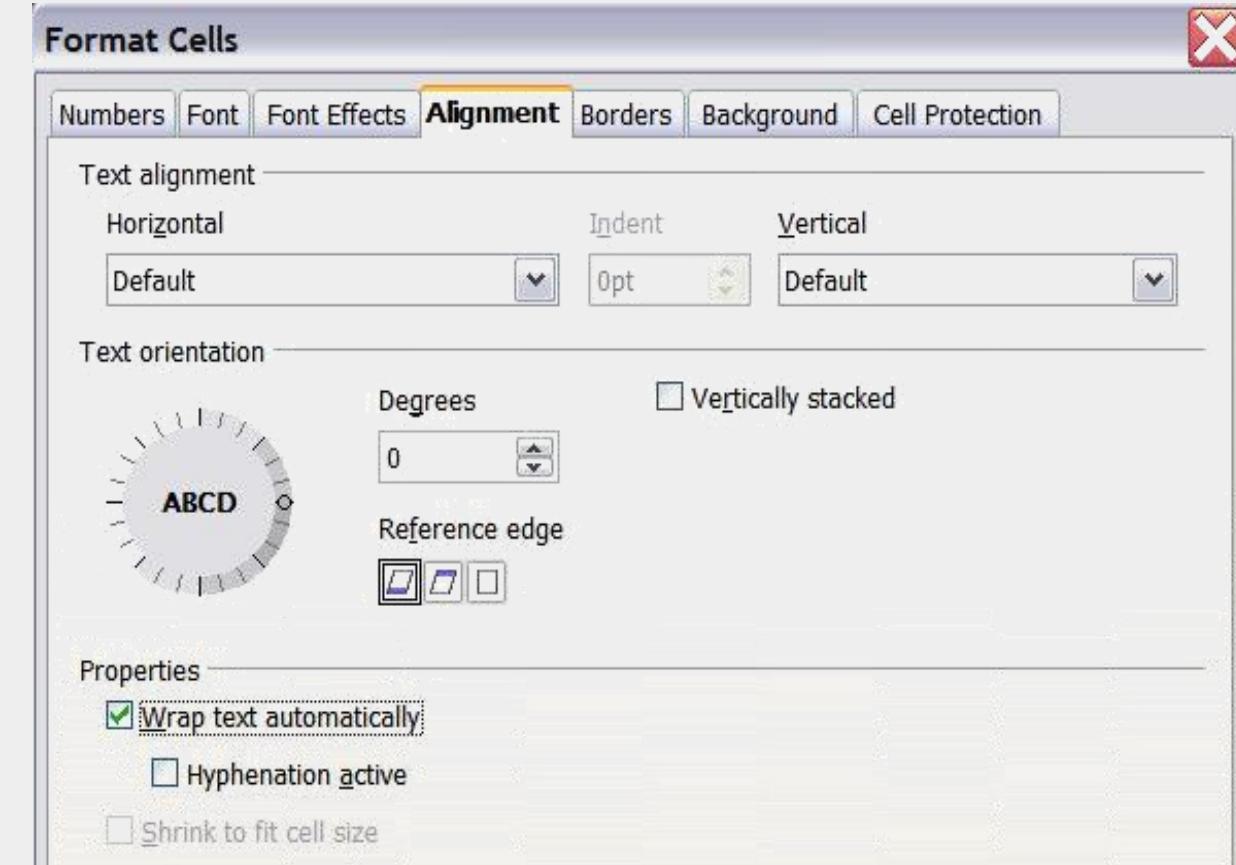


Image Source <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Calc>

Spreadsheets

Auto formatting cells and sheets

- You can use the AutoFormat feature to quickly apply a set of cell formats to a sheet or a selected cell range.
- Select the cells, including the column and row headers, that you want to format.
- Choose **Format > AutoFormat**
- To select which properties (number format, font, alignment, borders, pattern, autofit width and height) to include in an AutoFormat, click **More**. Select or deselect the required options.
- Click **OK**.

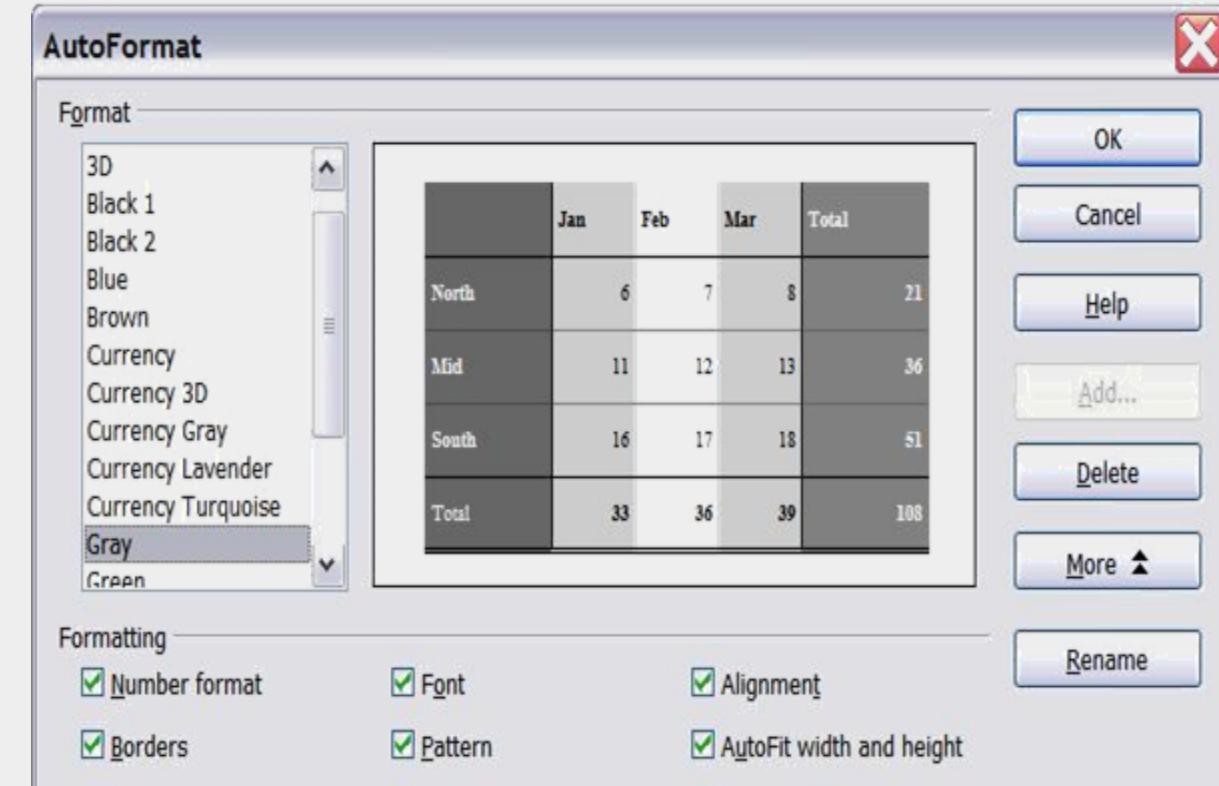


Image Source <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Calc>

Spreadsheets

Formatting Themes

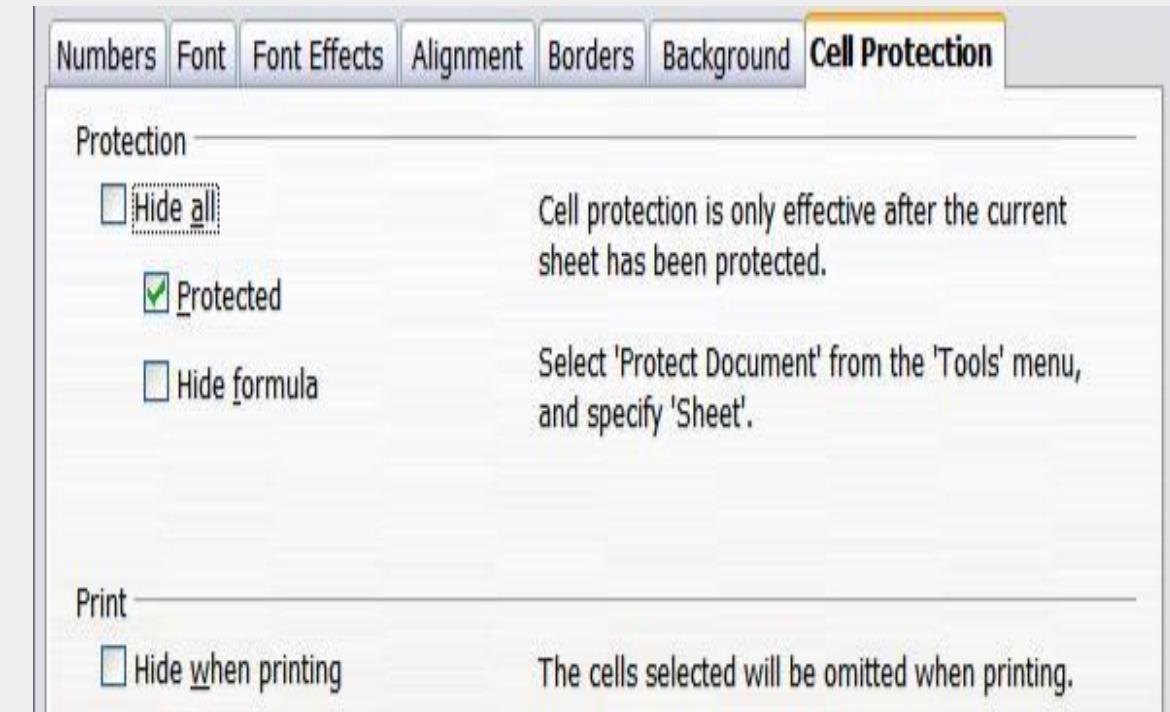
- Click the **Choose Themes** icon in the Tools toolbar. If this toolbar is not visible, you can show it using **View > Toolbars > Tools**. The Theme Selection dialog appears. This dialog lists the available themes for the whole spreadsheet.



Spreadsheets

Hiding and showing data

- To hide or show selected cells, choose **Format > Cells** from the menu bar (or right-click and choose **Format Cells**). On the Format Cells dialog, go to the *Cell Protection* tab.



Spreadsheets

Sorting Records

- Select the box, then choose one of the sort orders defined in **Tools > Options > Spreadsheet > Sort Lists** from the drop-down list

Spreadsheets

Printing

- Printing from Calc is the same as printing from other OOo components (see Chapter 10), but some details are different, especially regarding preparation for printing.
- The Print dialog Figure, reached from **File > Print**, has some Calc-specific options: which sheets to print.



Image Source <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Calc>

Impress

What is Impress?

- Impress is OpenOffice.org's slide show (presentations) program. You can create slides that contain many different elements, including text, bulleted and numbered lists, tables, charts, clip art, and a wide range of graphic objects. Impress also includes a spelling checker, a thesaurus, prepackaged text styles, and attractive background styles.

Impress

Parts of the main Impress window

- The main Impress window Figure has three parts: the *Slides pane*, *Workspace*, and *Tasks pane*.
- Additionally, several toolbars can be displayed or hidden during the creation of a presentation

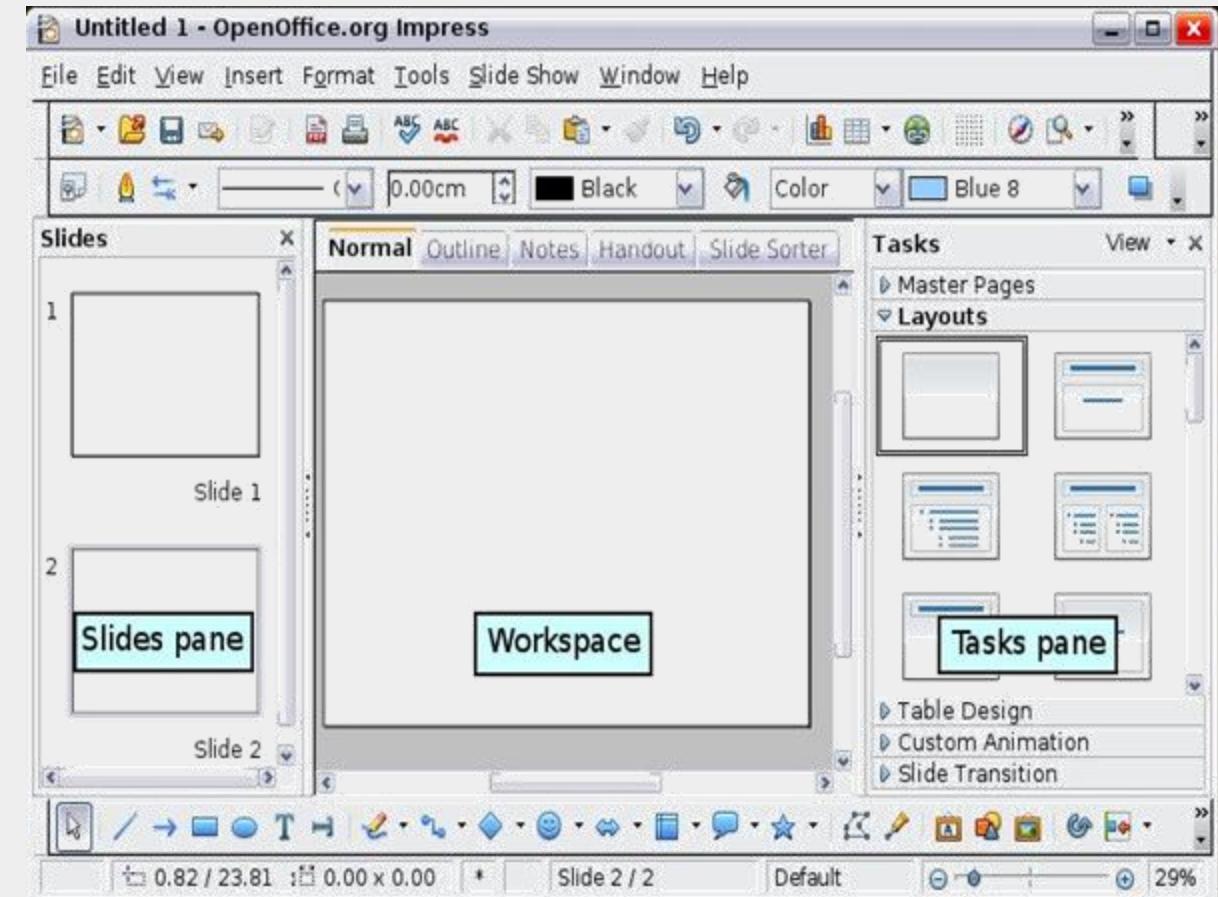


Image Source : <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Impress>

Impress

Working with Views

- This section describes the use of the five views
- Normal View
- Outline View
- Notes View
- Slide Sorter View
- Handout View

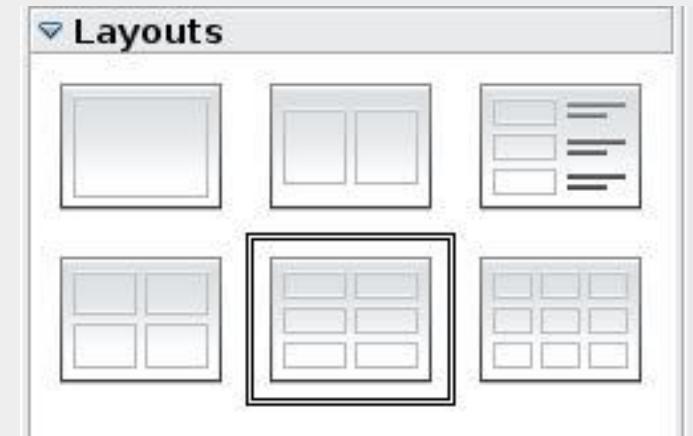


Image Source : <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Impress>

Impress

Creating a presentation

- choose **File > New > Presentation** from the menu bar.

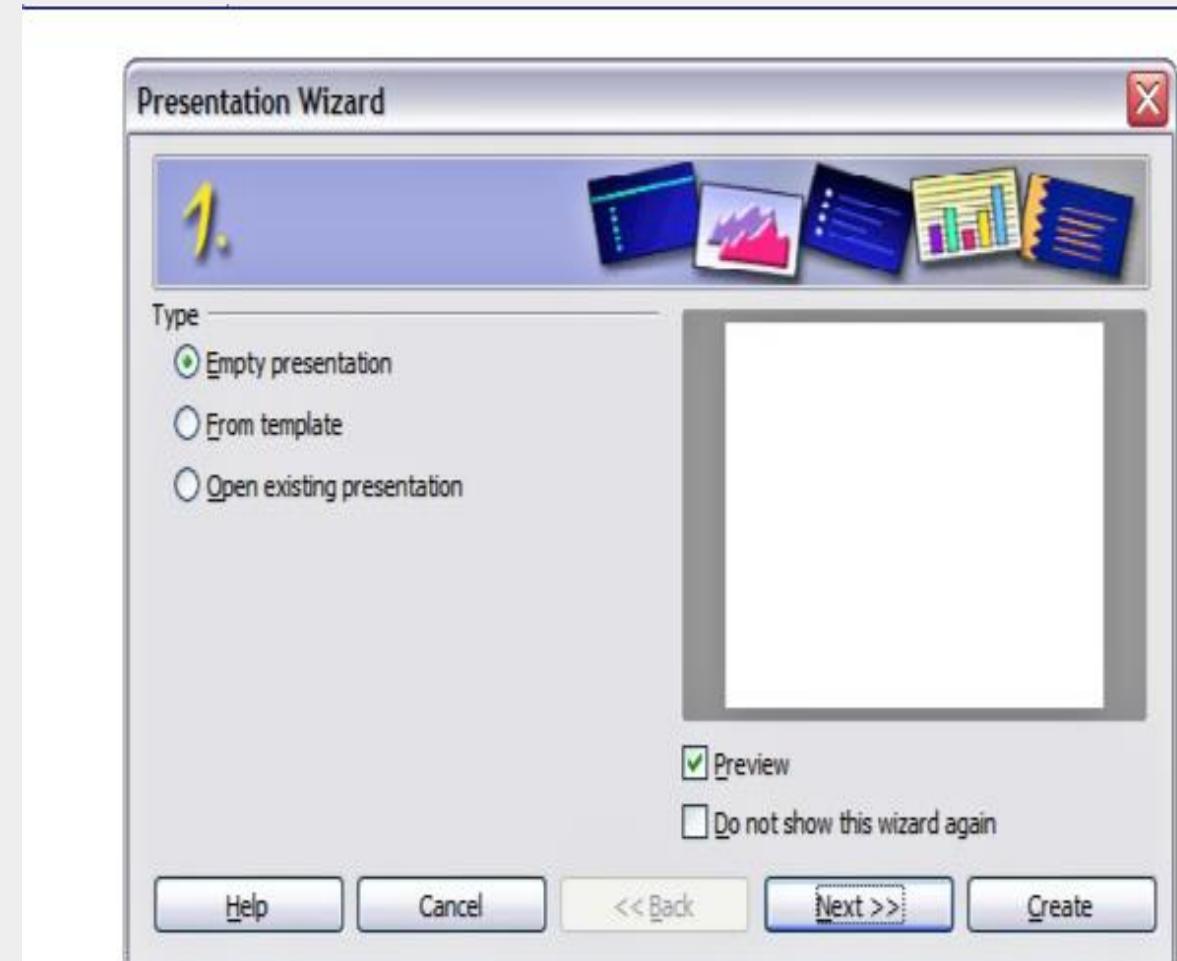


Image Source : <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Impress>

Impress

Creating a presentation

- Choose a design under **Select a slide design**. The slide design section gives you two main choices: *Presentation Backgrounds* and *Presentations*.



Image Source : <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Impress>

Impress

Creating a presentation

- Selecting a slide design.



Image Source : <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Impress>

Impress

Creating a presentation - Note

- Remember to save frequently while working on the **Caution** presentation, to prevent any loss of information should
- something unexpected occur. You might also want to activate the AutoRecovery function (**Tools > Options > Load/Save > General**). Make sure **Save AutoRecovery information** every is selected and that you have entered a recovery frequency.

Impress

Slide masters and styles

- You can create a new slide master in a similar way to modifying the default slide master.
- To start, enable editing of slide masters by **View > Master > Slide Master**.



Image Source : <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Impress>

Impress

Adding and formatting text

- Text in slides is contained in *text boxes*.
- There are two ways to add text boxes to a slide:
- Choose a predefined layout from the *Layouts* section of the Tasks pane. These text boxes are called **AutoLayout** text boxes.
- Create a text box using the text tool.
- Click in the text box that reads **Click to add text**, **Click to add an outline**, or a similar notation

Click on the **Text** icon  on the Drawing toolbar. If the toolbar with the text icon is not visible, choose **View > Toolbars > Drawing**.

Image Source : <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Impress>

Impress

Setting up the slide show



- Click **Slide Show > Slide Show**.
- Click the **Slide Show** button on the **Presentation toolbar**.
- **Presentation Toolbar**
- Press **F5** or **F9**.

Image Source : <https://wiki.openoffice.org/wiki/Documentation/UserGuide/Impress>

Able to customize PC in Windows and Linux environment.

(15 hours)

In this section, we will discuss:

- Concept of GUI, Modes of starting on different occasions.
- Desktop, Icon, selecting, choosing, drag and drop. My computer.
- Recycle bin, task bar, start menu, tool bar, and menus.
- Windows Explorer. Properties of files and folders.
- Applications under Windows / Linux accessories.
- Windows / Linux Help.
- Finding files, folders, computers.
- Control panel. Installed devices and properties.

Concept of GUI, Modes of starting on different occasions.

Concept of GUI

- GUI is an interface that allows users to interact with different electronic devices using icons and other visual indicators.
- In today's times, graphical user interfaces are used in many devices such as mobiles, MP3 players, gaming devices, smartphones etc.

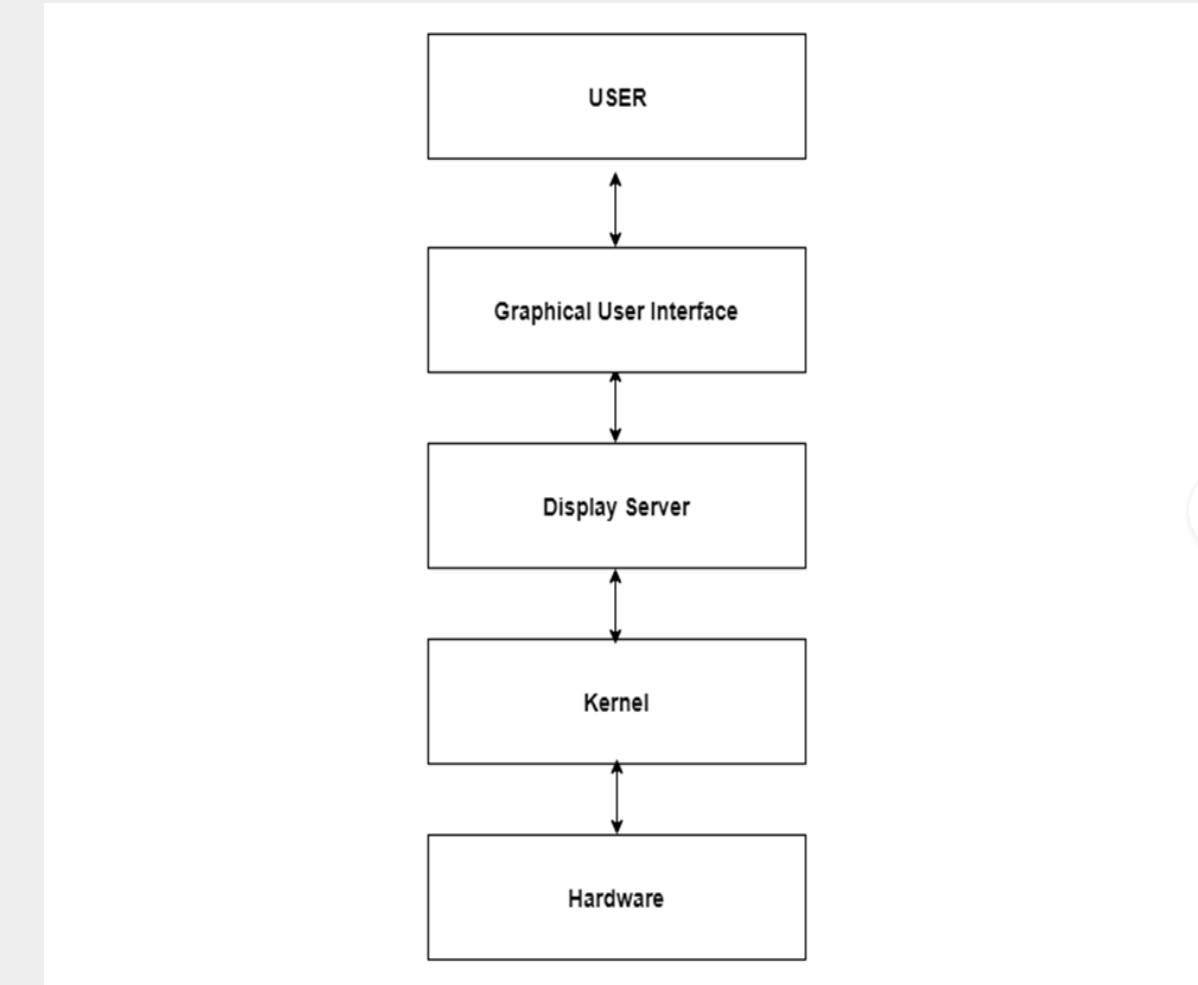


Image Source: <https://www.tutorialspoint.com/graphical-user-interface-gui>

Concept of GUI, Modes of starting on different occasions.

Modes of starting on different occasions

- Starting Your Computer in Normal Mode
 - Step 1: Make sure your computer is plugged into a power source.
 - Step 2: Locate your computer's power button.
 - Step 3: Press the power button.

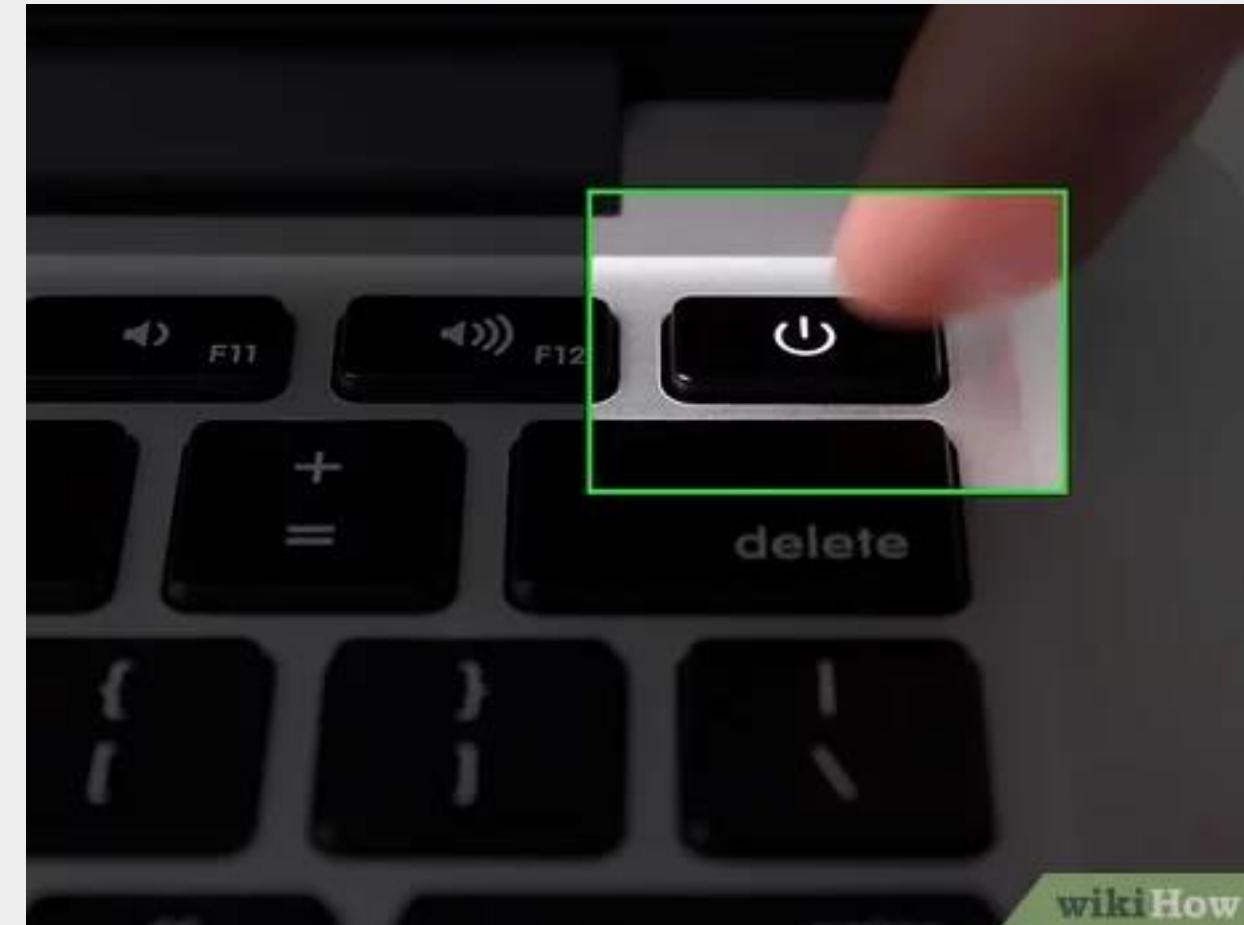


Image Source: <https://www.wikihow.tech/Start-a-Computer>

Concept of GUI, Modes of starting on different occasions.

Modes of starting on different occasions

- Restarting Your PC in Safe Mode
 - **Step 1:** Press your PC's power button.
 - **Step 2:** Click the start-up screen.
 - **Step 3:** Click the power icon.
 - **Step 4:** Locate the \uparrow Shift key.
 - **Step 5:** Hold down \uparrow Shift while clicking Restart.

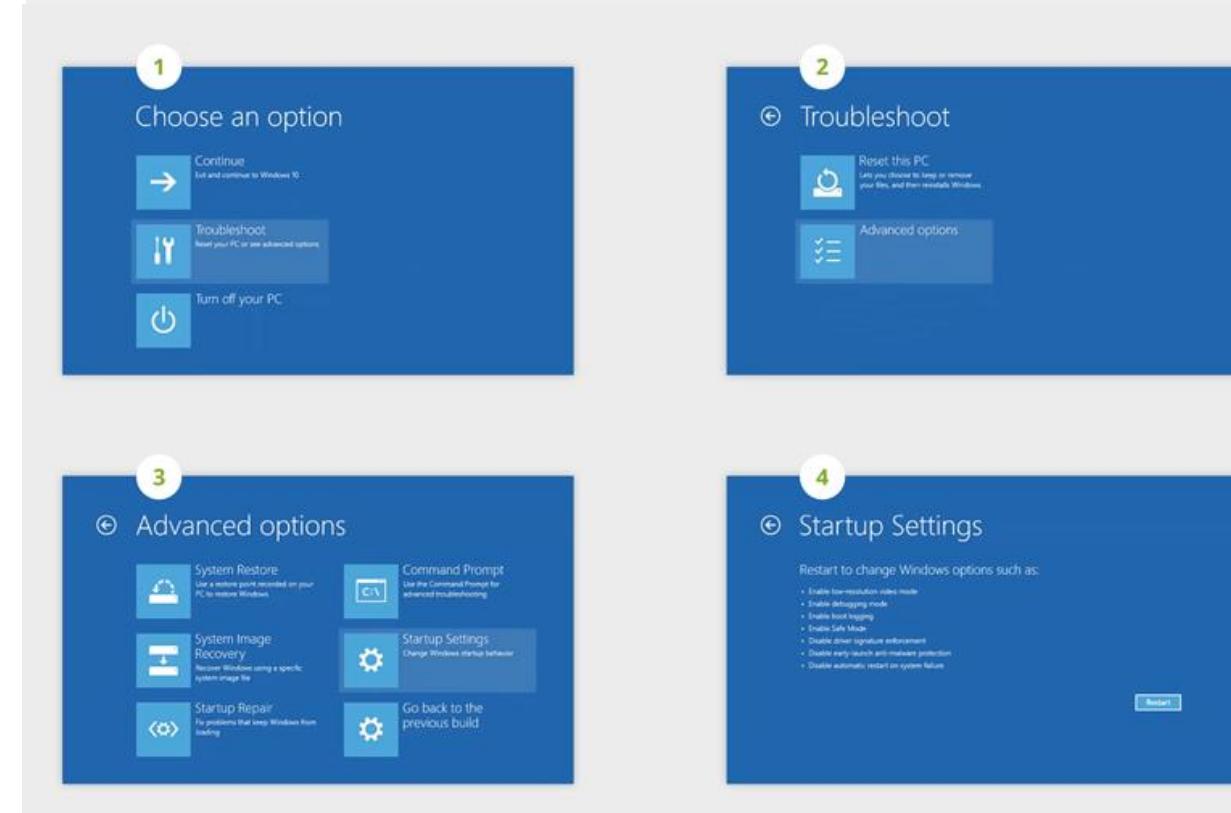


Image Source: <https://www.ccleaner.com/knowledge/how-to-boot-windows-in-safe-mode>

Concept of GUI, Modes of starting on different occasions.

Modes of starting on different occasions

- Restarting Your PC in Safe Mode
 - **Step 6:** Wait for your PC to load the Advanced Options screen.
 - **Step 7:** Click Troubleshoot.
 - **Step 8:** Click Advanced options.
 - **Step 9:** Click Startup Settings.
 - **Step 10:** Click Restart.

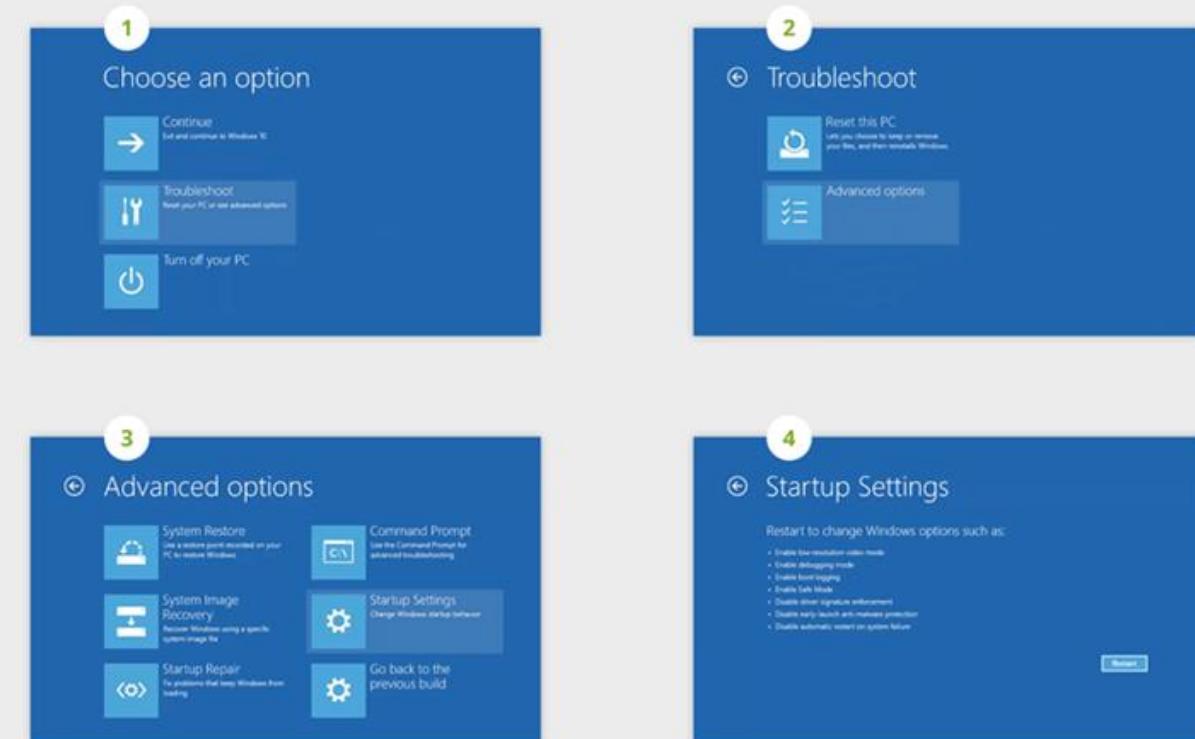


Image Source: <https://www.ccleaner.com/knowledge/how-to-boot-windows-in-safe-mode>

Concept of GUI, Modes of starting on different occasions.

Modes of starting on different occasions

- Restarting Your PC in Safe Mode
 - **Step 11:** Wait for your computer to restart.
 - **Step 12:** Press the 4 key. Doing so will select the "Safe Mode" option.
 - **Step 13:** Wait for your computer to finish restarting in safe mode.

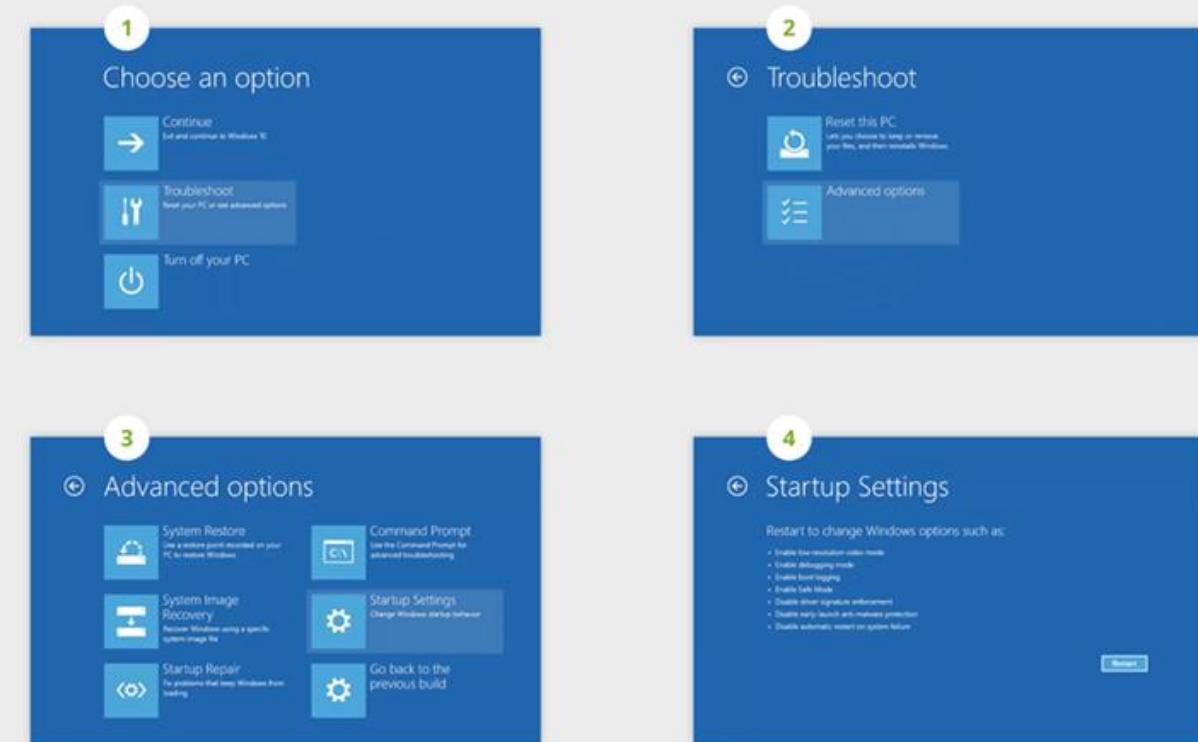


Image Source: <https://www.ccleaner.com/knowledge/how-to-boot-windows-in-safe-mode>

Desktop, Icon, selecting, choosing, drag and drop. My computer.

Desktop

- In the GUI, the desktop is a system of organization of icons on a screen.



Image Source: <https://www.turbosquid.com/3d-models/pc-desktop-gaming-model-1482256>

Desktop, Icon, selecting, choosing, drag and drop. My computer.

Icon

- It is a graphical representation of a program.
- By icon, the user can easily identify the application.



Image Source: <https://www.howtogeek.com/437371/how-to-make-windows-desktop-icons-extra-large-or-extra-small/>

Desktop, Icon, selecting, choosing, drag and drop. My computer.

Selecting and Choosing

- The user can select any of the applications like My Computer on the computer screen and click the icon on it and choose the folders or drives to work on it.

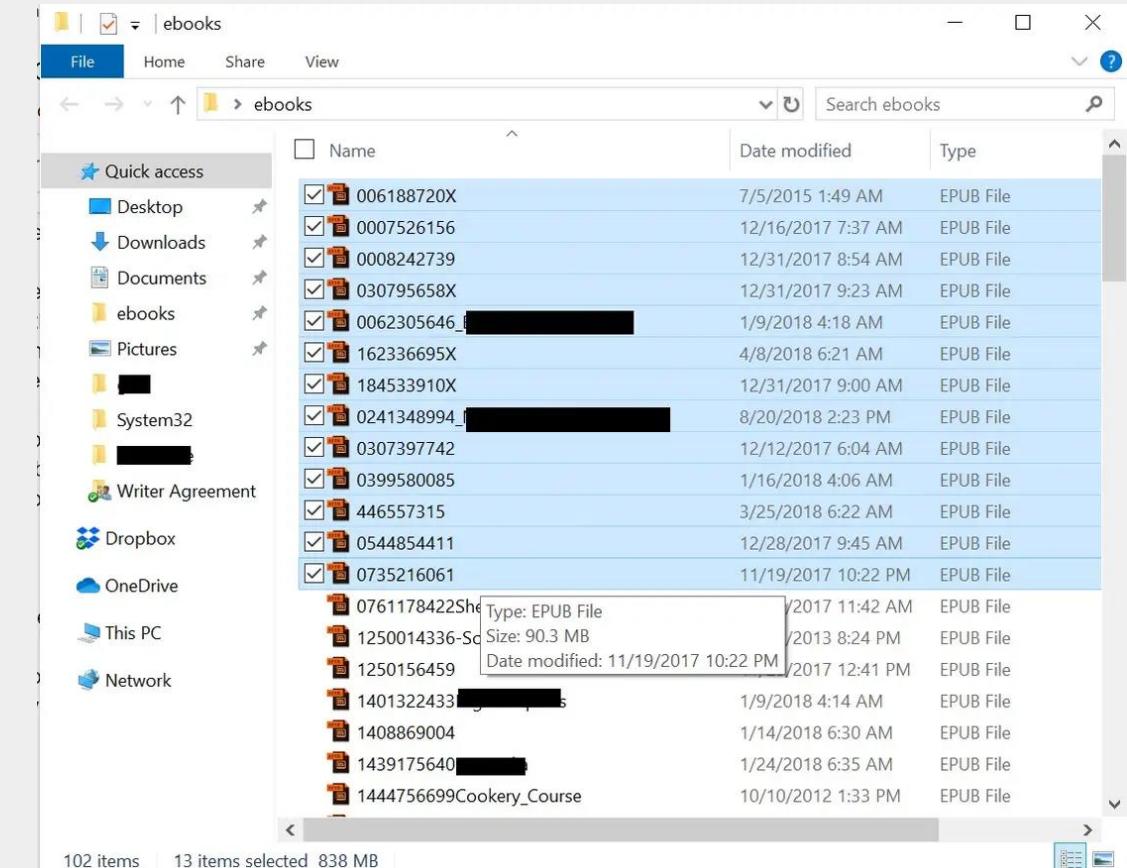


Image Source: <https://www.businessinsider.com/how-to-select-multiple-files-windows-10?IR=T>

Desktop, Icon, selecting, choosing, drag and drop. My computer.

Drag and Drop

- In the GUI, the drag and drop is a pointing device gesture in which user can select a virtual object by grabbing it and dragging it into the different location.

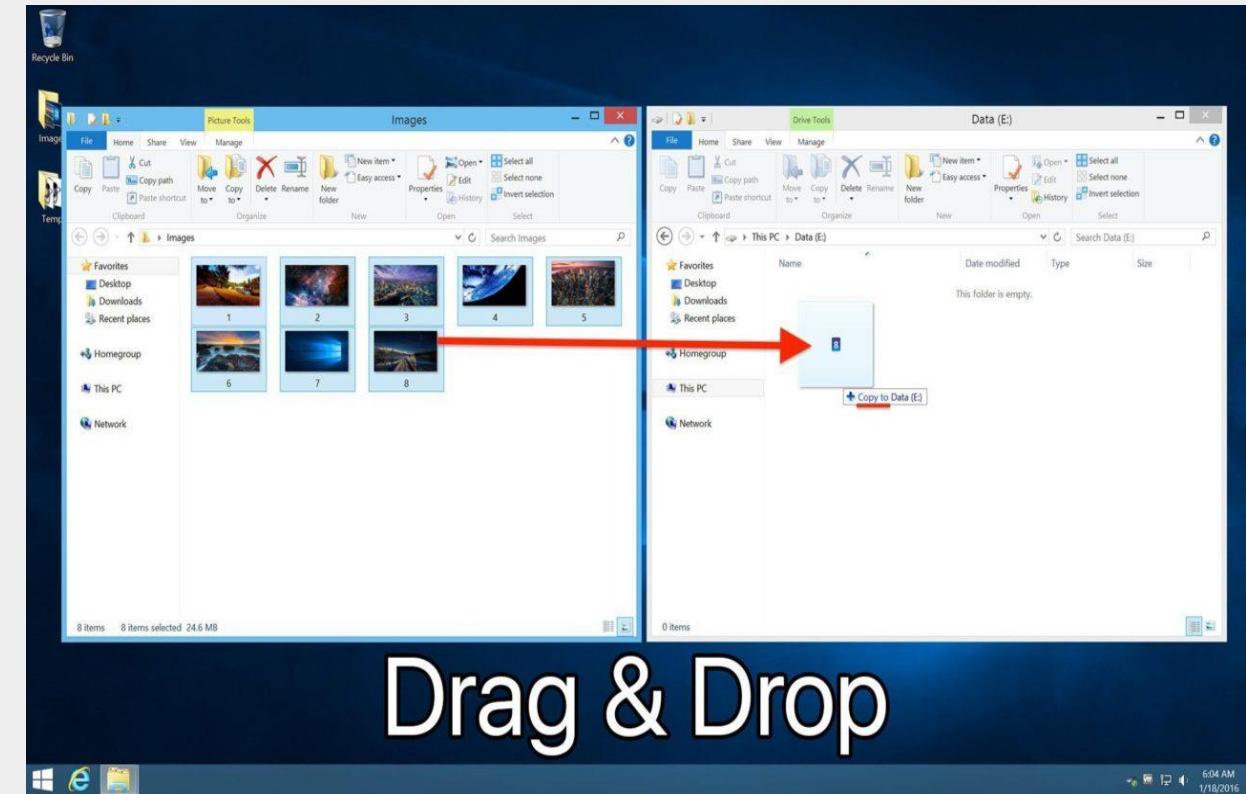


Image Source: <https://www.techjunkie.com/drag-and-drop-copy-move-shortcut-windows/>

Desktop, Icon, selecting, choosing, drag and drop. My computer.

My computer

- My computer icon is full of stored resources in a computer which includes drives, control panel, and data.



Image Source: <https://www.youtube.com/watch?reload=9&v=6fXlg6O4-1Y>

Recycle bin, task bar, start menu, tool bar, and menus.

Recycle bin

- The recycle bin is a location where the deleted files or folder temporarily stored in it.
- The deleted files are not permanently deleted from the hard drive.



Image Source: <https://computerhindinotes.com/how-to-restore-delete-file/how-to-recover-deleted-files-from-recycle-bin/>

Recycle bin, task bar, start menu, tool bar, and menus.

Task bar

- The taskbar is a GUI element which has a various purpose.
- It typically shows which programming is running currently in the system.

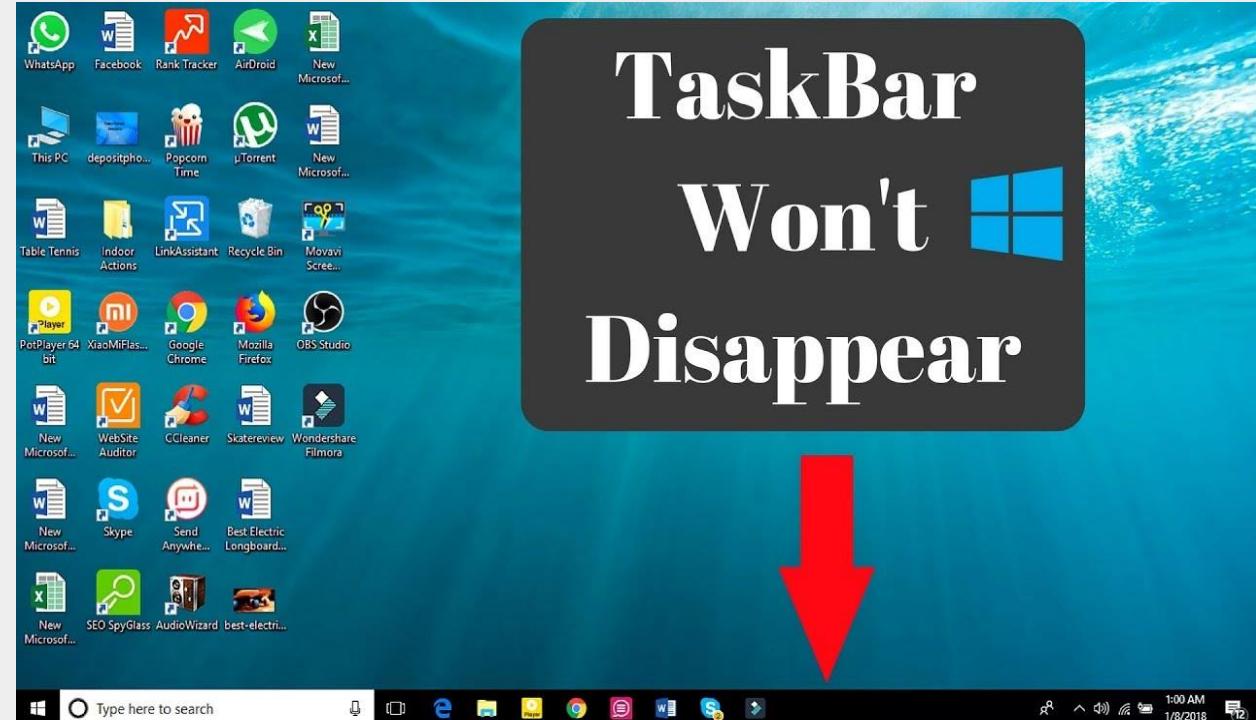


Image Source: <https://www.youtube.com/watch?v=P63hADET39Q>

Recycle bin, task bar, start menu, tool bar, and menus.

Start menu

- Start Menu is a primary location in windows to locate where the installed programs, files, and folders.

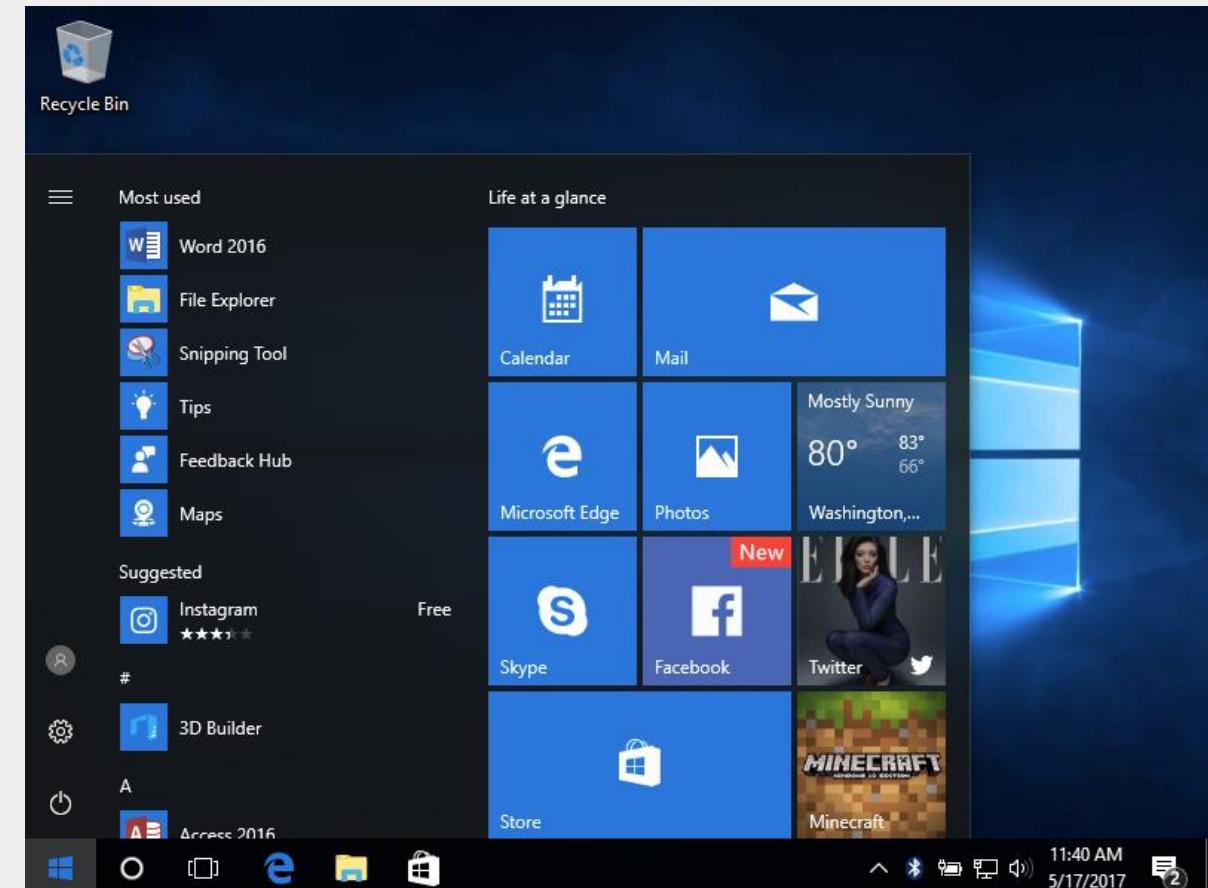
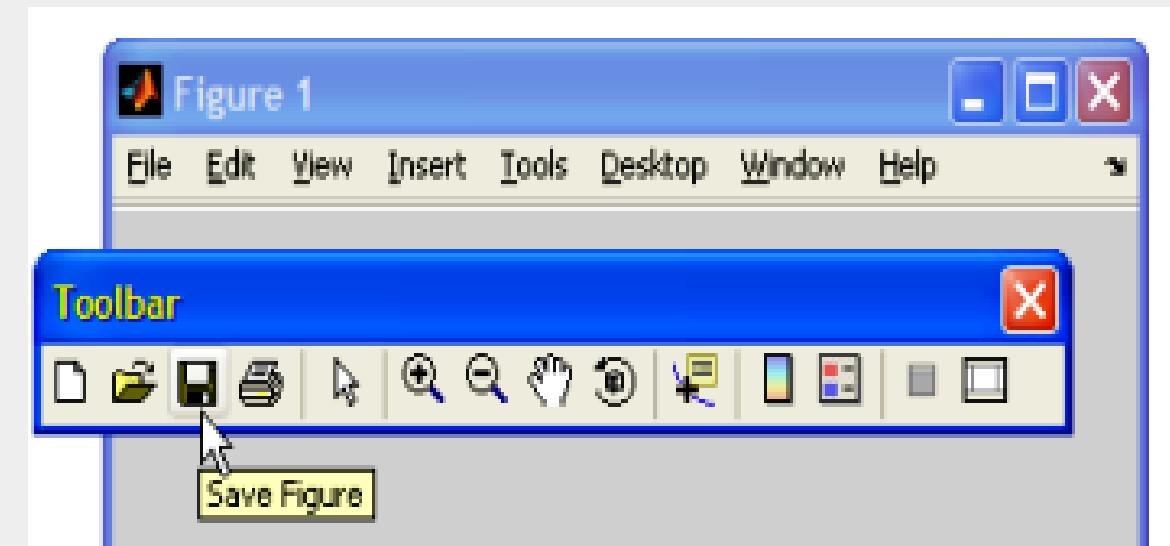


Image Source: <https://courses.lumenlearning.com/suny-wm-compapp/chapter/start-menu/>

Recycle bin, task bar, start menu, tool bar, and menus.

Tool bar

- A toolbar is a graphical control element on which on-screen buttons, menus, icons are placed.



Recycle bin, task bar, start menu, tool bar, and menus.

Menus

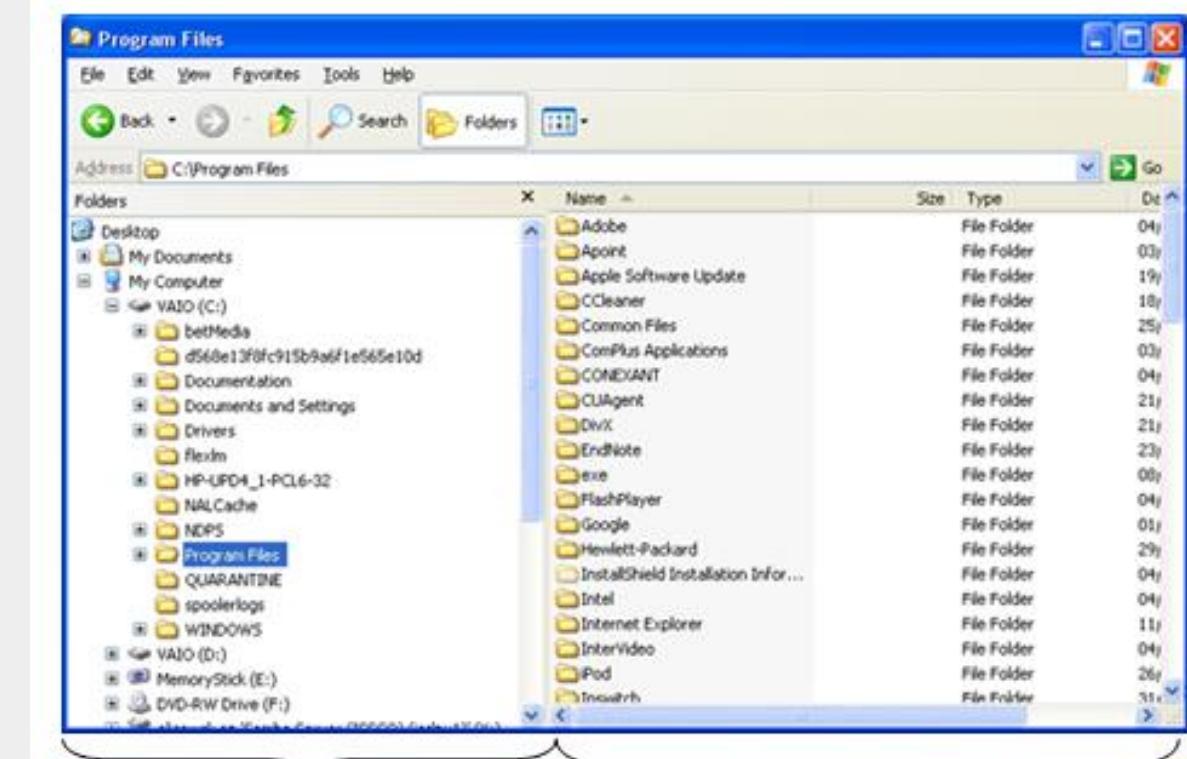
- The menu is a set of options presented to the user of a computer application to help the user find the information on it.



Windows Explorer. Properties of files and folders.

Windows Explorer

- Windows Explorer is also called as file explorer or file manager.
- It allows the user to manage the files, folder, and network connection, as well as search files and the related components.



Left pane: hierarchical tree showing drives and folders on your computer

Right pane: content of selected folder

Image Source: https://www.issco.unige.ch/en/research/tutoriel-informatique/EN/windows_explorer.html

Windows Explorer.

Properties of files and folders.

Properties of files and folders

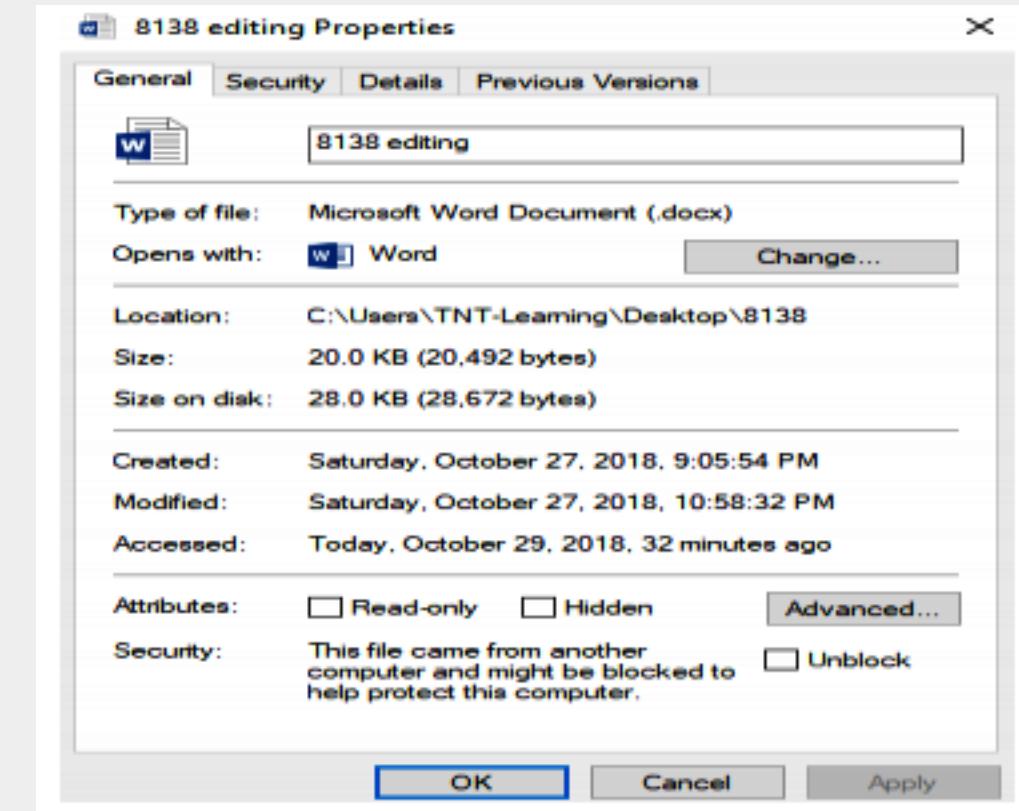
- **Files and Folders**
 - A file is an object which can store data, information, settings used by a computer program.
 - Folders provide a method for organizing the file like a file folder which contains papers documents in a file cabinet.



Windows Explorer. Properties of files and folders.

Properties of files and folders

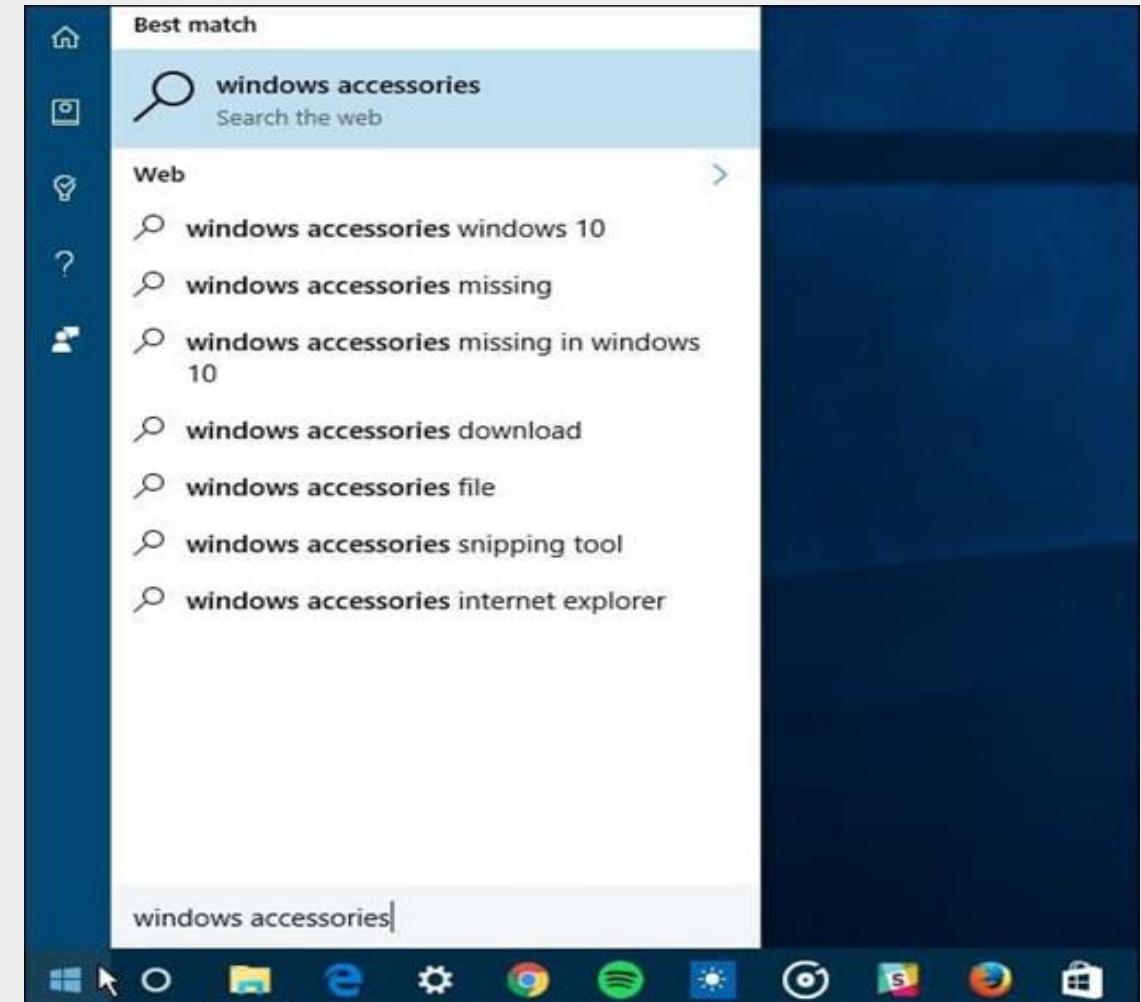
- Properties
 - The general tab of the properties dialogue box contains information such as the full path of the file or folder, size, the application configured to open it, and the date it was created, last modified and accessed.



Applications under windows / Linux accessories.

Windows accessories

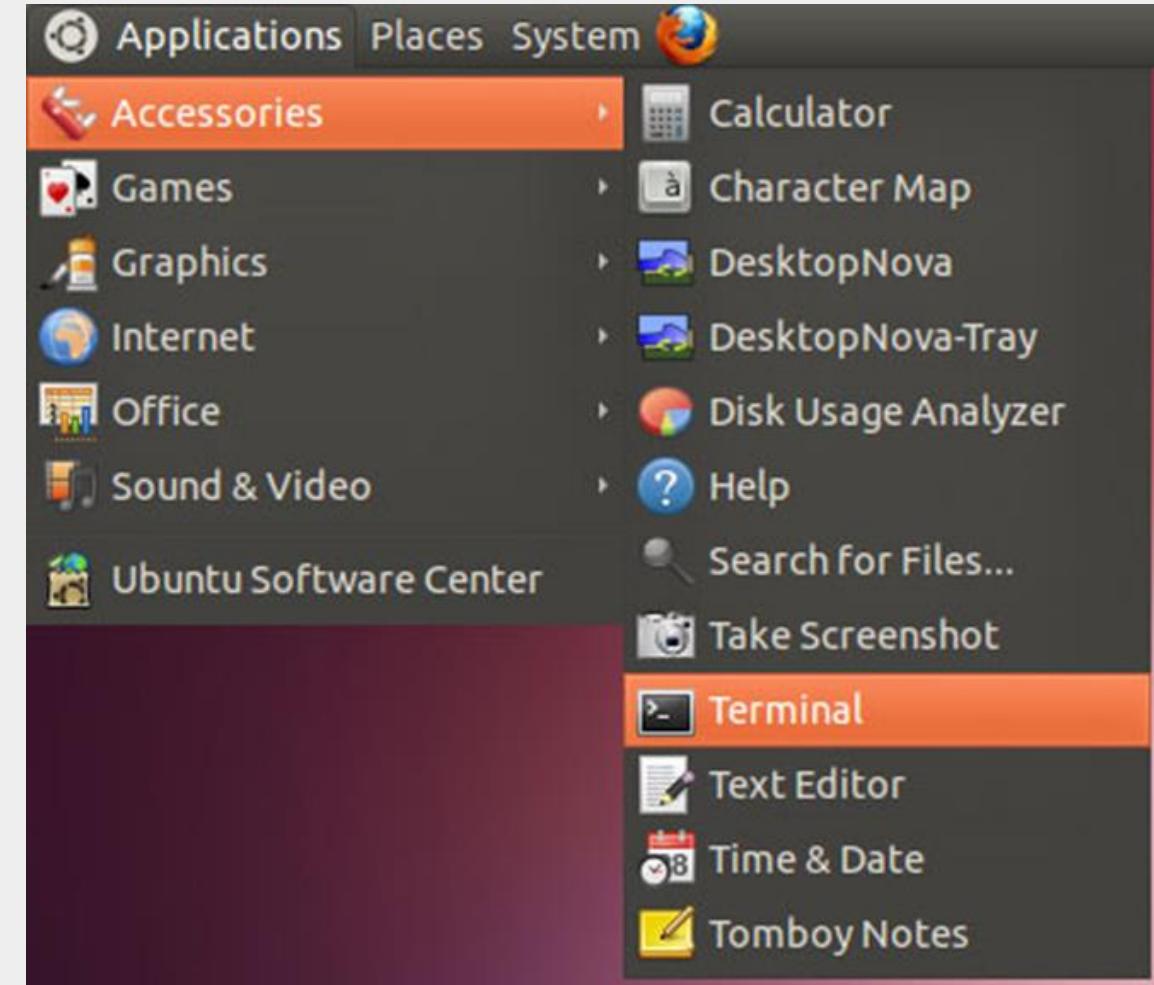
- The Accessories folder contains traditional apps like Paint, Notepad, Sticky Notes, Steps Recorder, Snipping Tool, and others.
- Microsoft has renamed the folder to “Windows Accessories”.



Applications under windows / Linux accessories.

Linux accessories

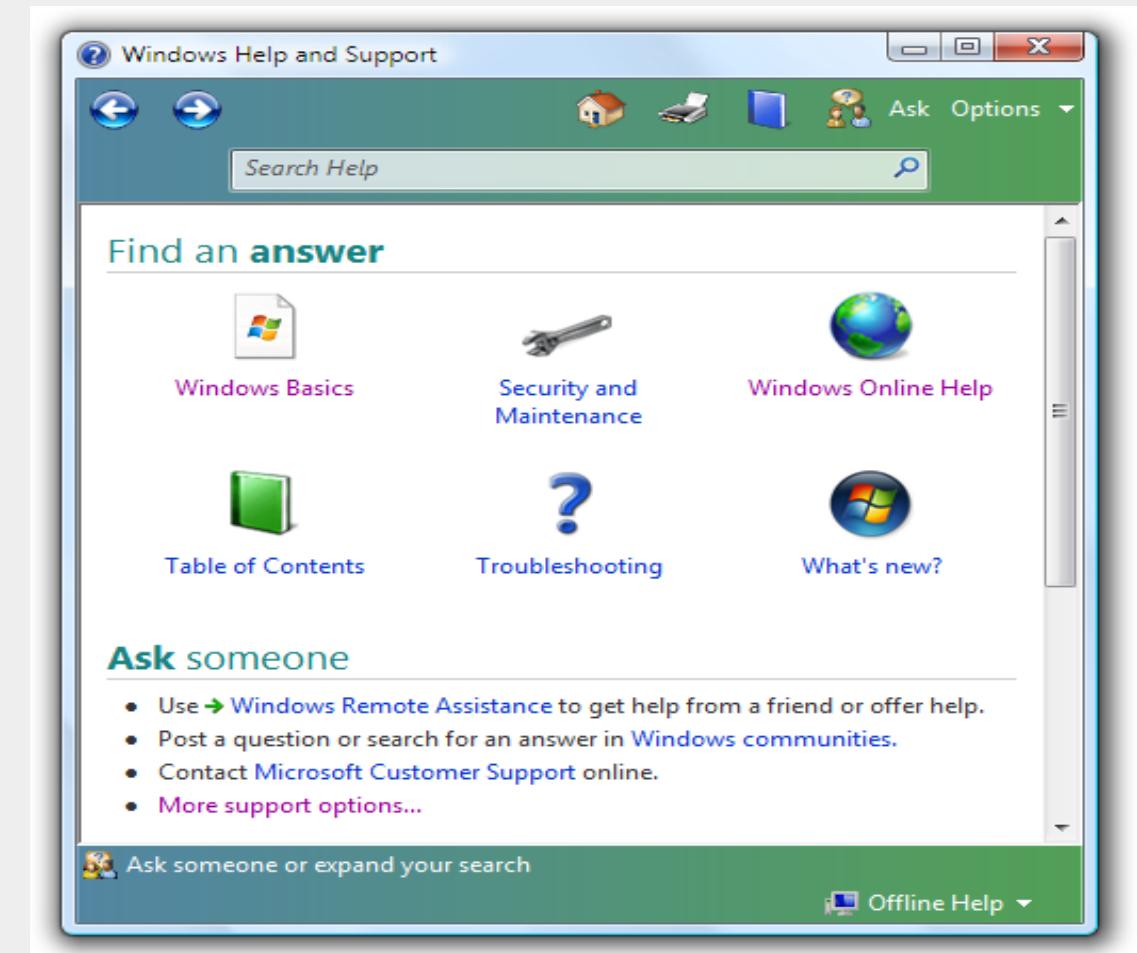
- A click on the Activities button top left in the panel opens the application bar, which contains the usual applications and tools.
- We can access the tiled view of all installed programs via the Show applications entry in the application bar.



Windows/Linux Help

Windows

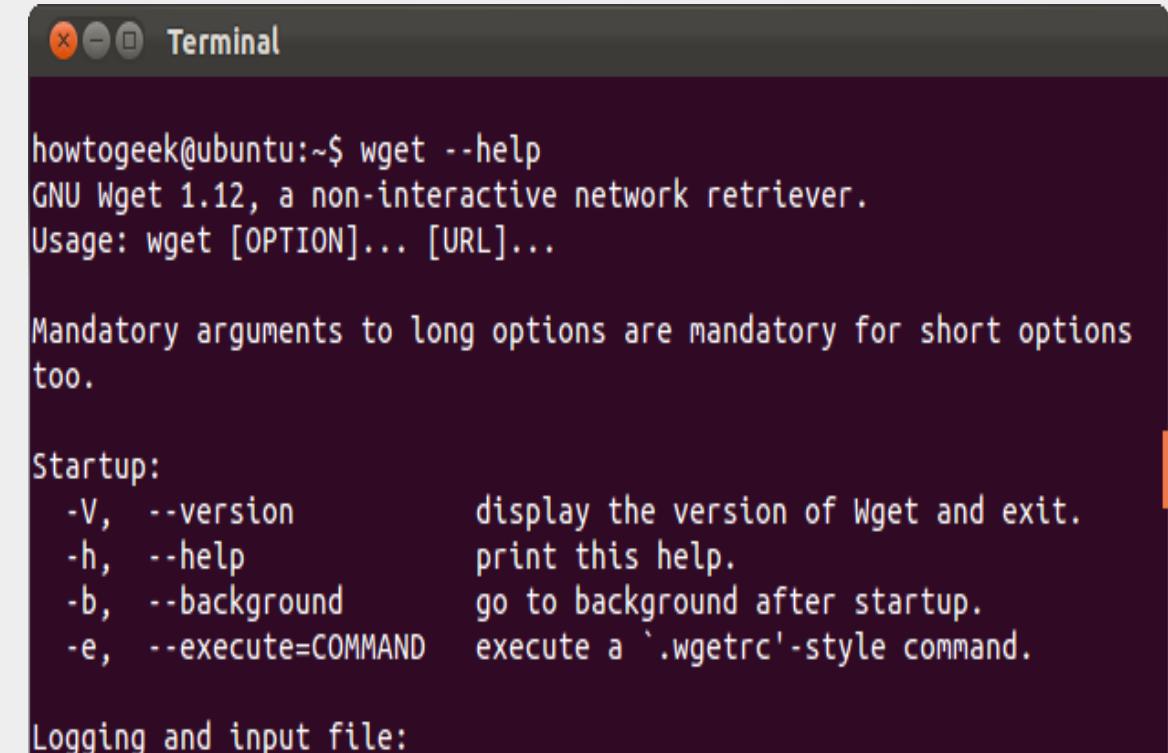
- Browse support.microsoft.com/windows to find answers.
- Get help - Select the Get help link when you're in Settings to learn more about the setting you're using and find answers to your questions.



Windows/Linux Help

Linux

- Launch the terminal by pressing **Ctrl+Alt+ T** or just click on the terminal icon in the task bar.
- Type ‘man’ in the terminal and after a space, write the name of the command whose manual you want and press enter.



Terminal

```
howto geek@ubuntu:~$ wget --help
GNU Wget 1.12, a non-interactive network retriever.
Usage: wget [OPTION]... [URL]...

Mandatory arguments to long options are mandatory for short options
too.

Startup:
  -V, --version          display the version of Wget and exit.
  -h, --help              print this help.
  -b, --background        go to background after startup.
  -e, --execute=COMMAND  execute a '.wgetrc'-style command.

Logging and input file:
```

Finding files, folders in computers

Steps to find files, folders in the computer

- Step 1: Choose Start→Computer.
- Step 2: Double-click an item to open it.
- Step 3: If the file or folder that you want is stored within another folder, double-click the folder or a series of folders until you locate it.
- Step 4: When you find the file you want, double-click it.

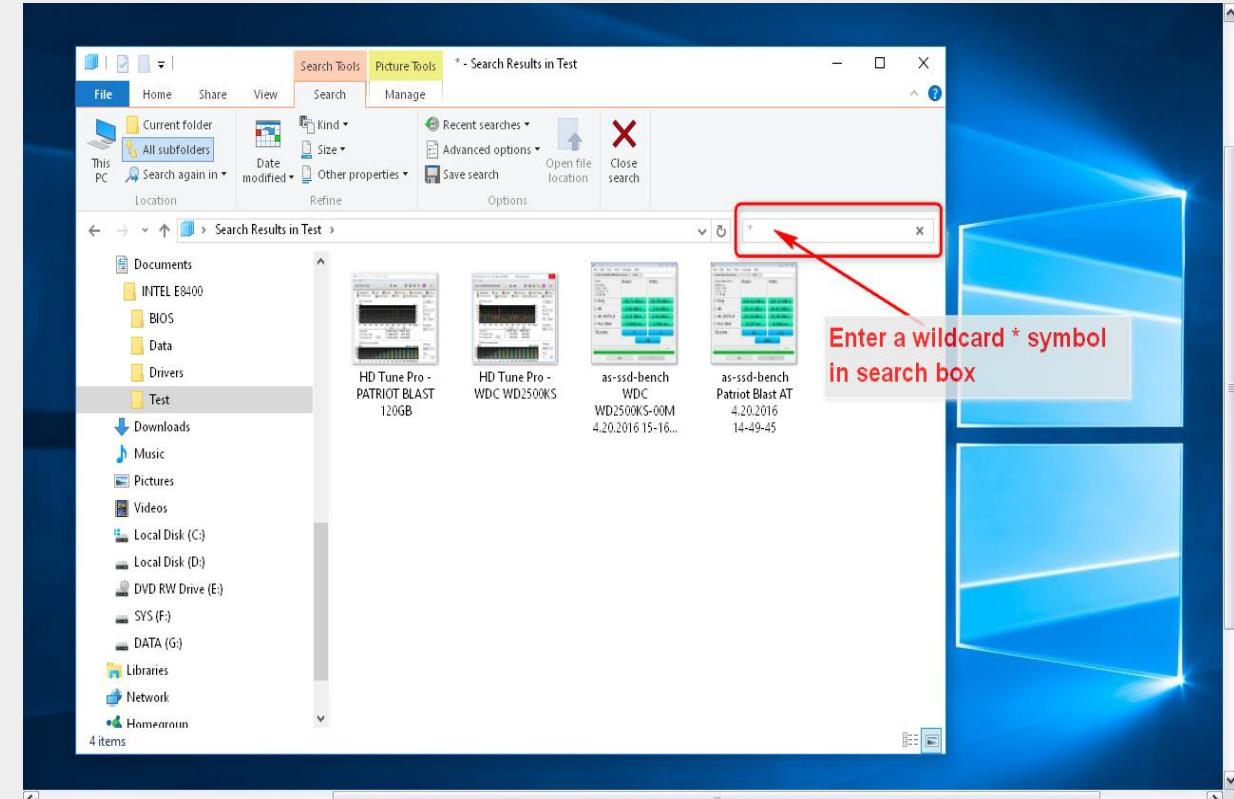


Image Source: <https://tehnoblog.org/microsoft-windows-10-how-to-search-find-all-files-within-directory/>

Finding files, folders in computers

Steps to find files, folders in the computer

- Step 5: Open the Start menu and type a search term in the search box at the bottom.
- Step 6: Click the See More Results link.
- Step 7: Click an item to view it.

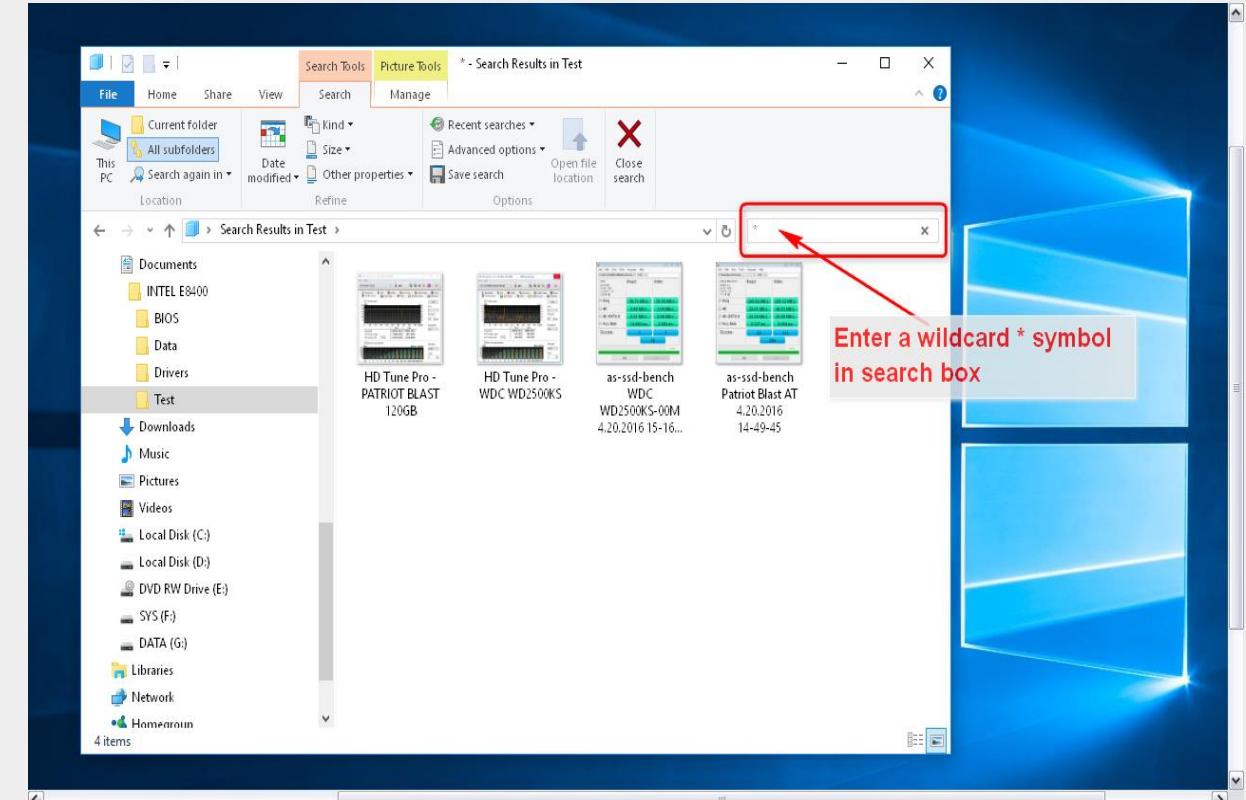
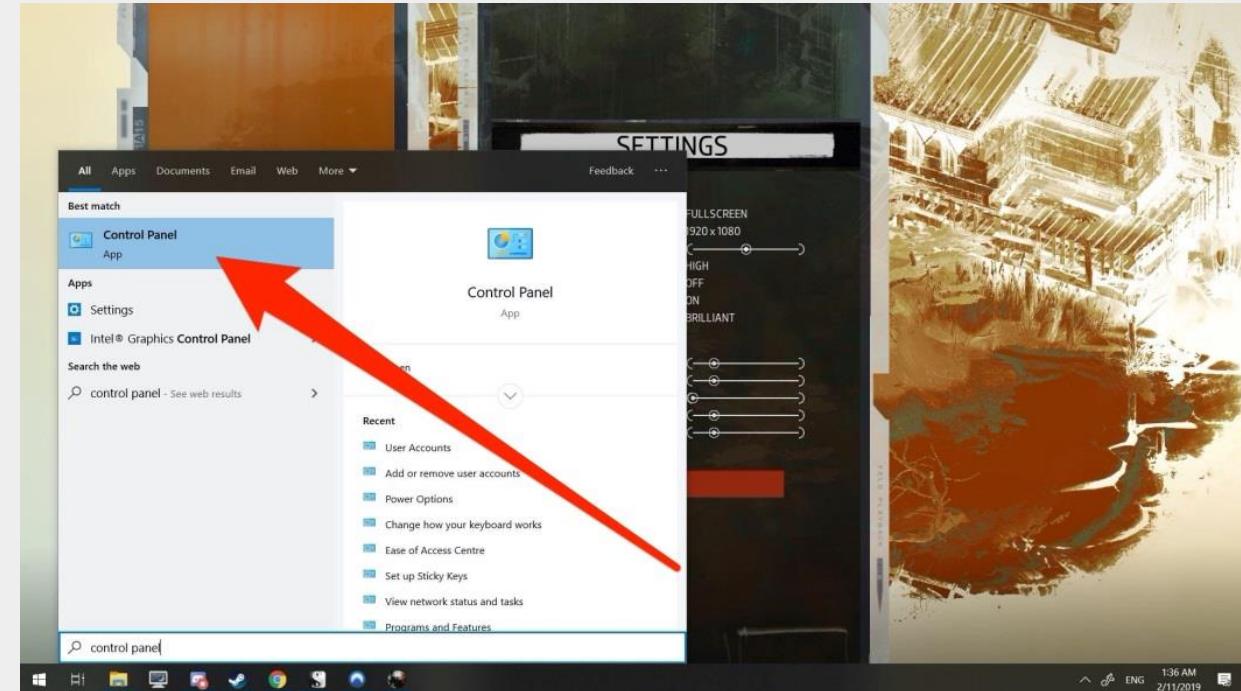


Image Source: <https://tehnoblog.org/microsoft-windows-10-how-to-search-find-all-files-within-directory/>

Control panel, installed devices and properties

Control panel

- The Control Panel is a component of Microsoft Windows that provides the ability to view and change system settings.
- Click the Start button, and then click Control Panel.

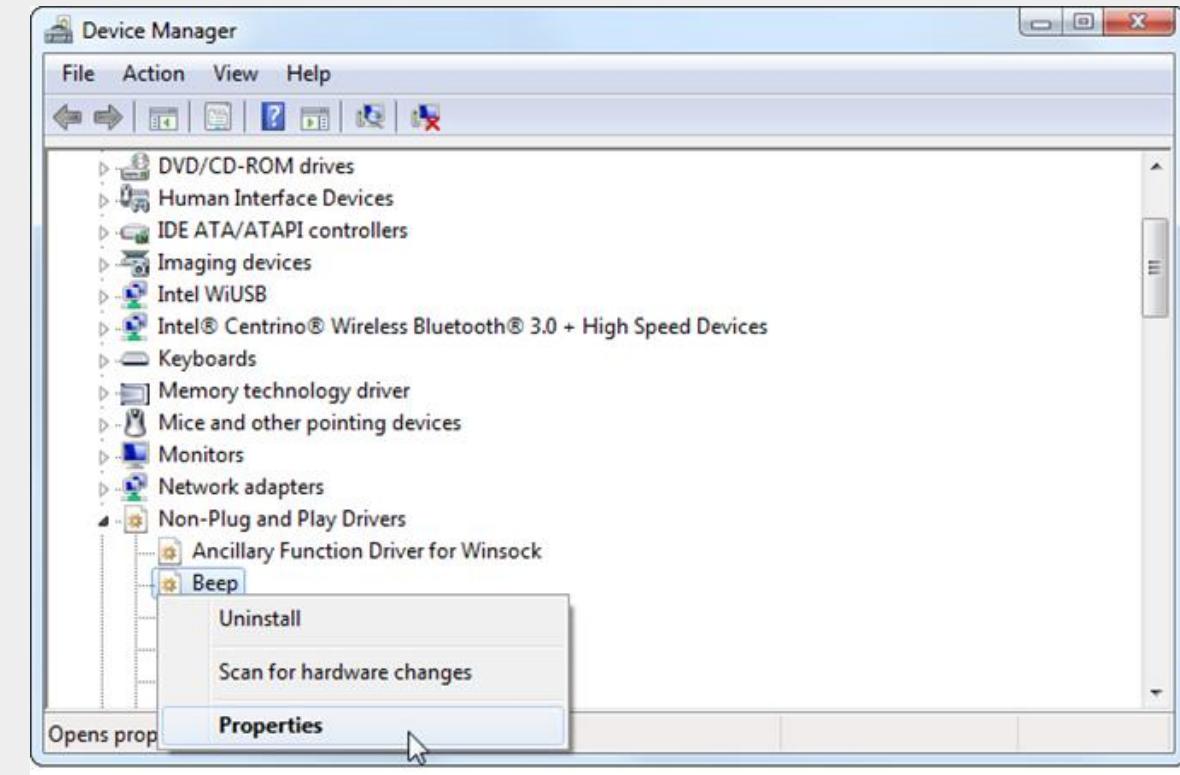


- Image Source: <https://www.businessinsider.in/tech/news/how-to-find-the-control-panel-on-a-windows-10-computer-in-2-ways-or-access-the-settings-app/articleshow/71905442.cms>

Control panel, installed devices and properties

Installed devices and properties

- Click Start, point to Administrative Tools, and then click Computer Management.
- Under System Tools in the console tree, click Device Manager.
- The devices that are installed on your computer are listed in the right pane.



- Image Source: <https://www.howtogeek.com/167094/how-to-use-the-windows-device-manager-for-troubleshooting/>

Able to manage PC in Window/Linux environment

(15 hours)

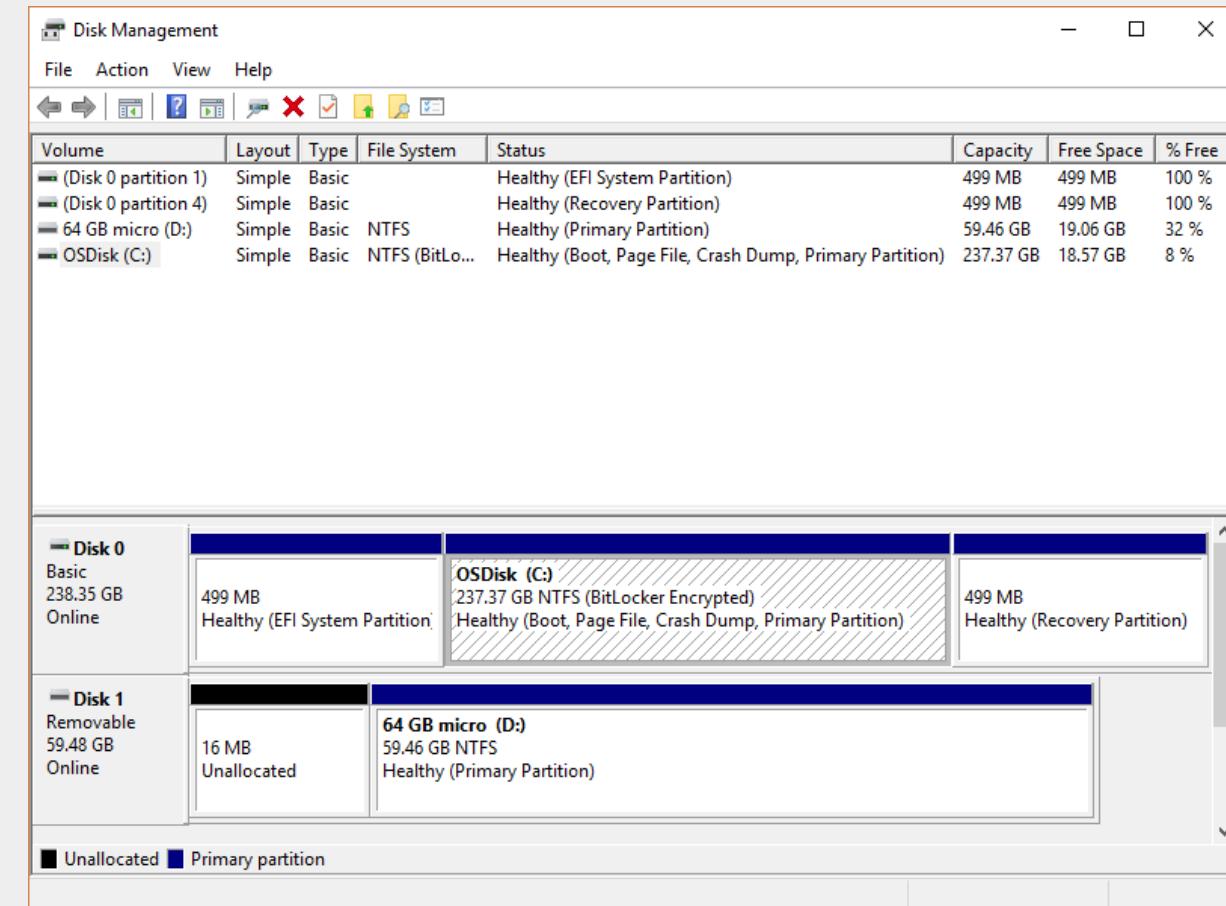
In this section, we will discuss:

- Familiarization with Disk management ,Task scheduler ,Event viewer ,Device manager ,Shared folders and Services and applications
- Virus and Different types of Viruses
- Using different types of firewalls - pocket firewalls, State-full firewalls, Application layer firewalls and Proxy firewalls

Familiarization of Disk Management

Disk Management

- Disk Management is a system utility in Windows that enables you to perform advanced storage tasks.
- Here are some of the things Disk Management is good for:
- To setup a new drive, see Initializing a new drive.
- To extend a volume into space that's not already part of a volume on the same drive, see Extend a basic volume.
- To shrink a partition, usually so that you can extend a neighbouring partition, see Shrink a basic volume.
- To change a drive letter or assign a new drive letter, see Change a drive letter.

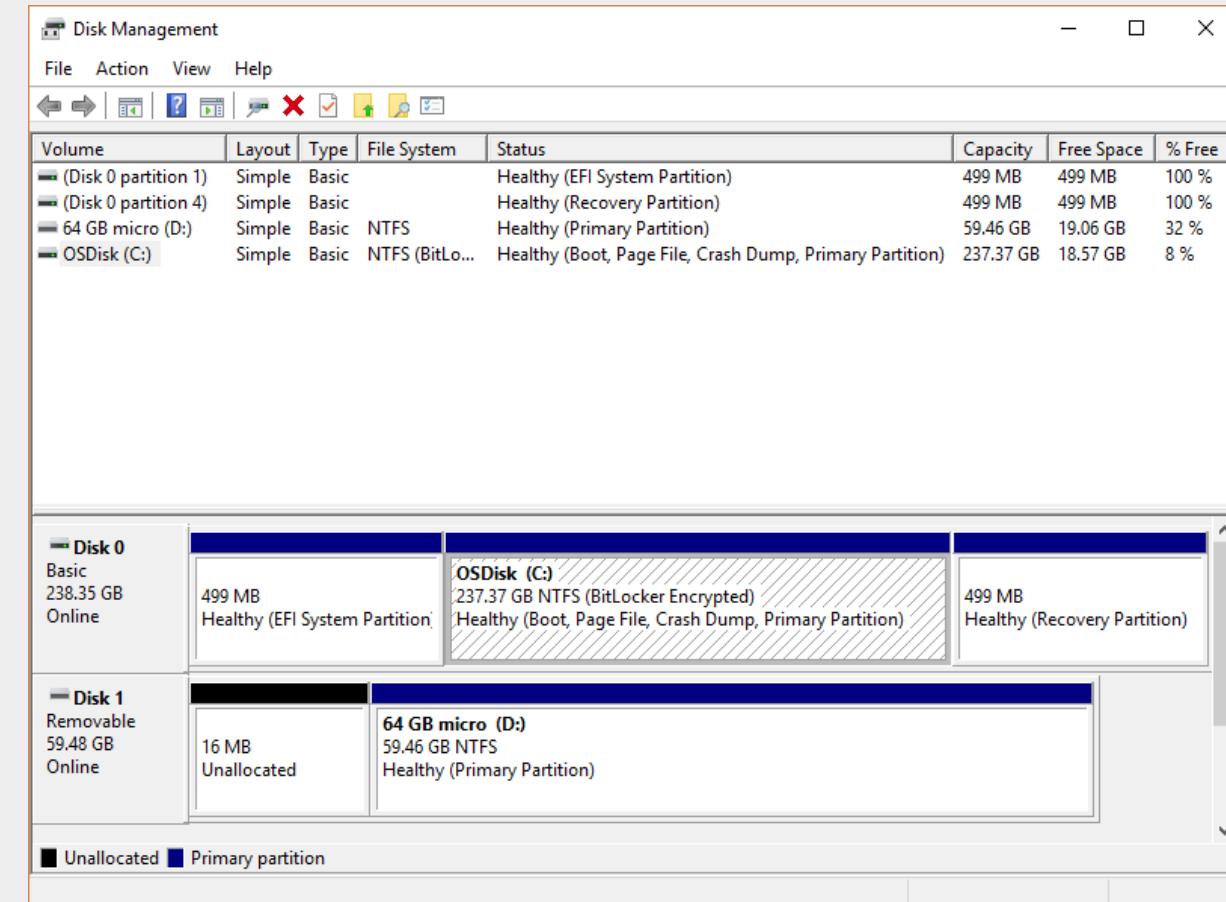


Familiarization of Disk Management

Disk Management

Partition Types- GPT and MBR

- Disks can be divided up into multiple chunks called partitions.
- Each partition - even if you have only one - has to have a partition style - GPT or MBR.
- Windows uses the partition style to understand how to access the data on the disk.
- To convert a disk from MBR to GPT or vice versa, you first have to delete all volumes from the disk, erasing everything on the disk.
- For more info, see Convert an MBR disk into a GPT disk, or Convert a GPT disk into an MBR disk.

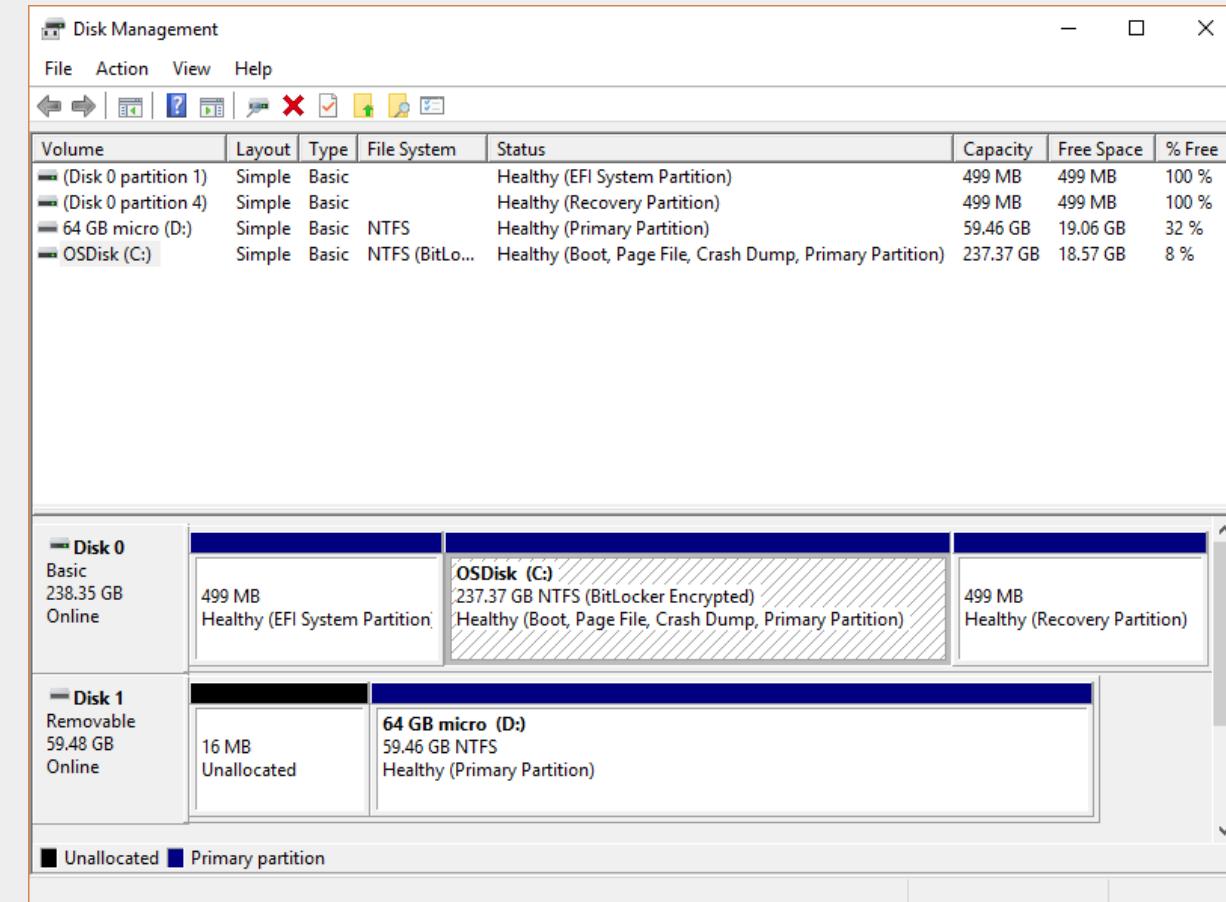


Familiarization of Disk Management

Disk Management

Convert an MBR disk into a GPT disk

- Master Boot Record (MBR) disks use the standard BIOS partition table.
- GUID Partition Table (GPT) disks use Unified Extensible Firmware Interface (UEFI).
- One advantage of GPT disks is that you can have more than four partitions on each disk.
- GPT is also required for disks larger than two terabytes (TB).

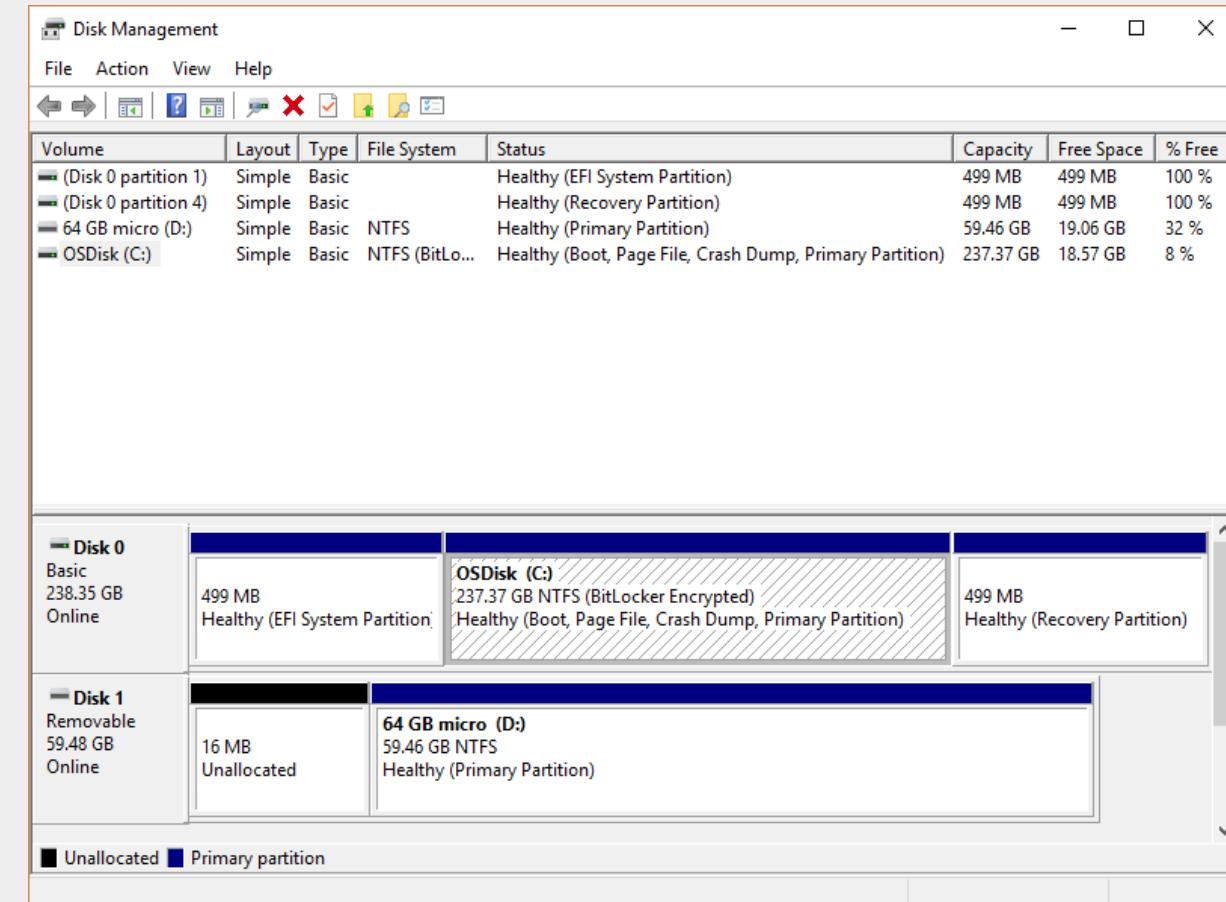


Familiarization of Disk Management

Disk Management

Convert a GPT disk into an MBR disk

- Master Boot Record (MBR) disks use the standard BIOS partition table.
- GUID Partition Table (GPT) disks use Unified Extensible Firmware Interface (UEFI).
- MBR disks do not support more than four partitions on each disk.
- The MBR partition method is not recommended for disks larger than two terabytes (TB).

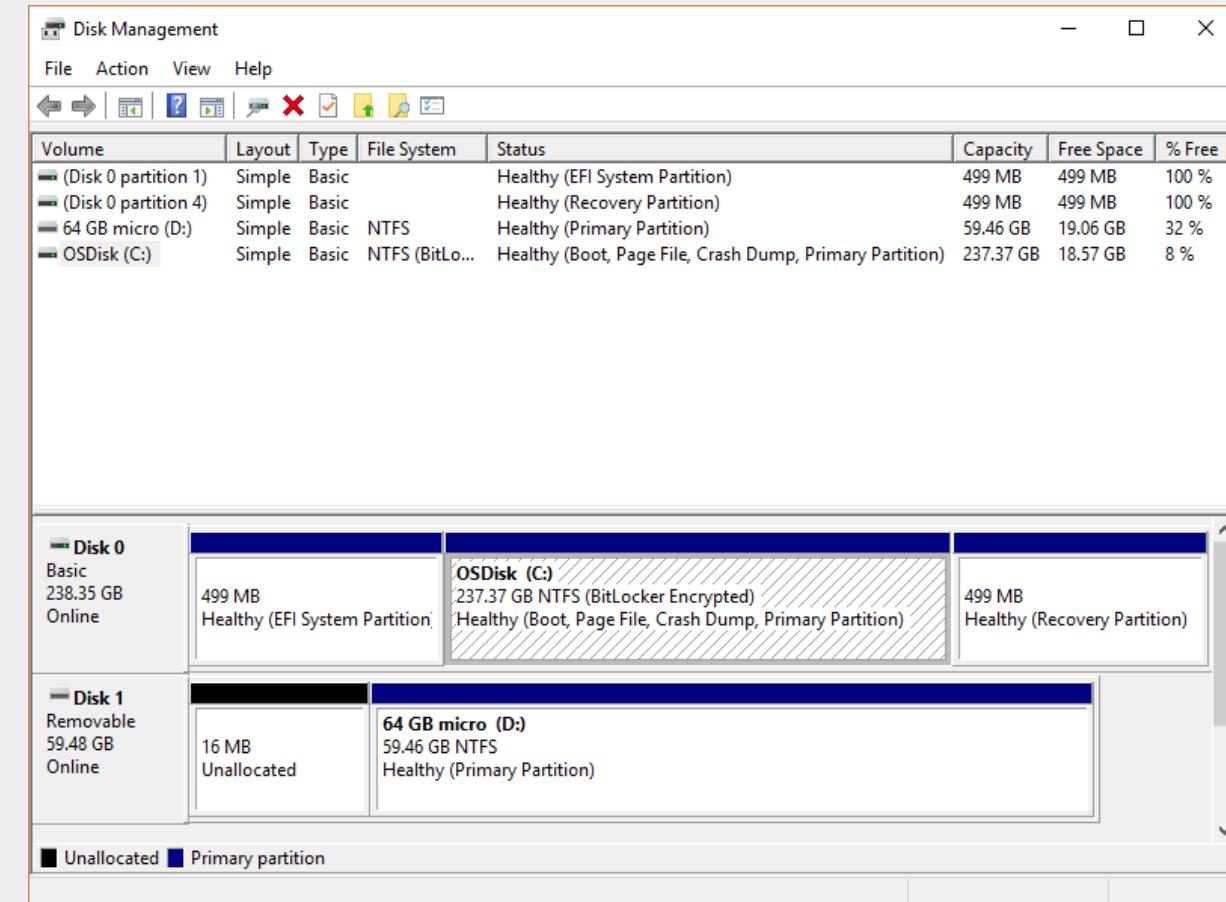


Familiarization of Disk Management

Disk Management

Convert a GPT disk into an MBR disk

- Master Boot Record (MBR) disks use the standard BIOS partition table.
- GUID Partition Table (GPT) disks use Unified Extensible Firmware Interface (UEFI).
- MBR disks do not support more than four partitions on each disk.
- The MBR partition method is not recommended for disks larger than two terabytes (TB).

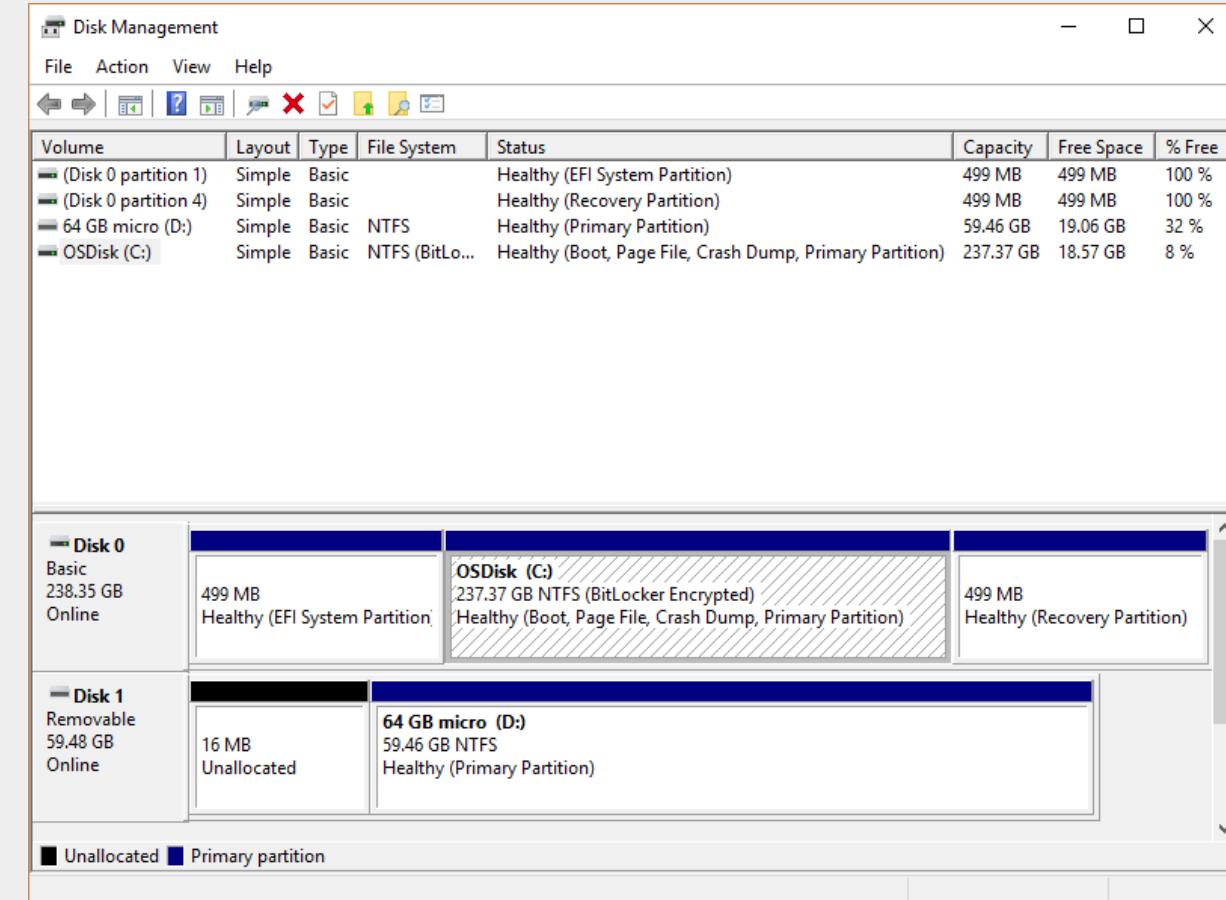


Familiarization of Disk Management

Disk Management

Manage Virtual Hard Disks (VHD)

- Virtual hard disks (VHDs) are virtualized hard disk files that, once mounted, appear and operate pretty much identically to a physical hard drive.
- They're most commonly used with Hyper-V virtual machines.
- VHDs appear just like physical disks in Disk Management.
- When a VHD has been attached (that is, made available to the system for use), it appears blue.
- If the disk is detached (that is, made unavailable), its icon reverts to gray.

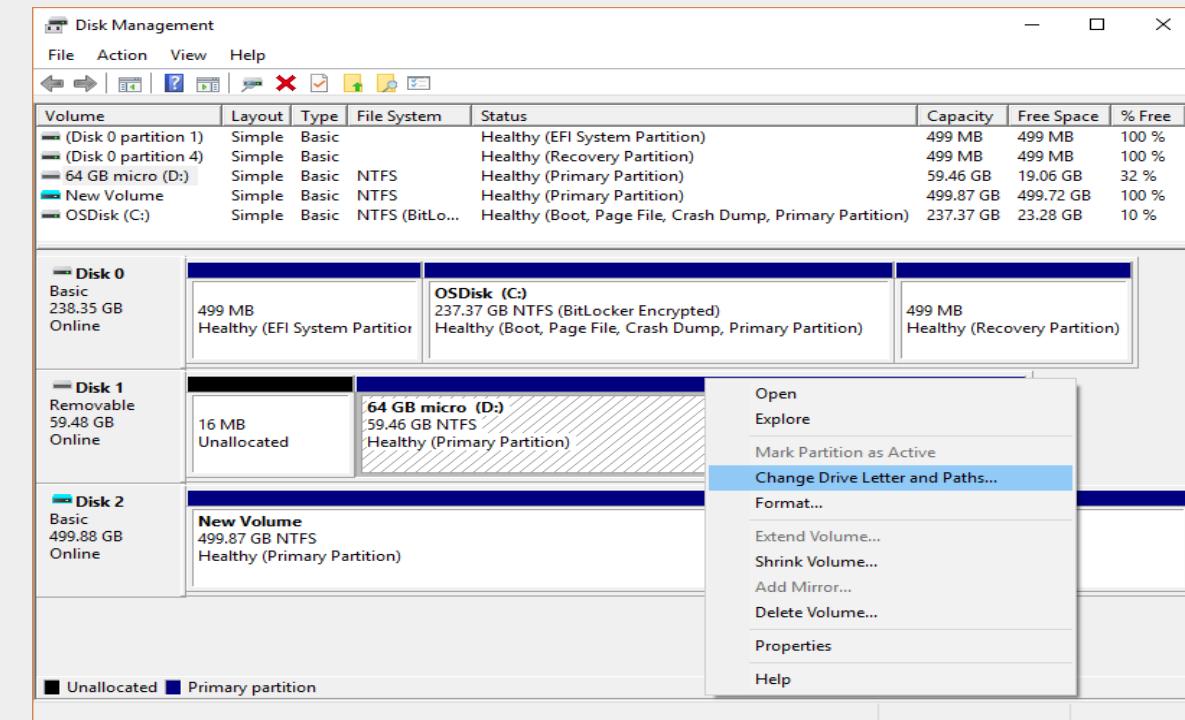


Familiarization of Disk Management

Disk Management

Change a drive letter

- If you don't like the drive letter assigned to a drive, or if you've got a drive that doesn't yet have a drive letter, you can use Disk Management to change it.
- To instead to mount the drive in an empty folder so that it appears as just another folder, see [Mount a drive in a folder](#).

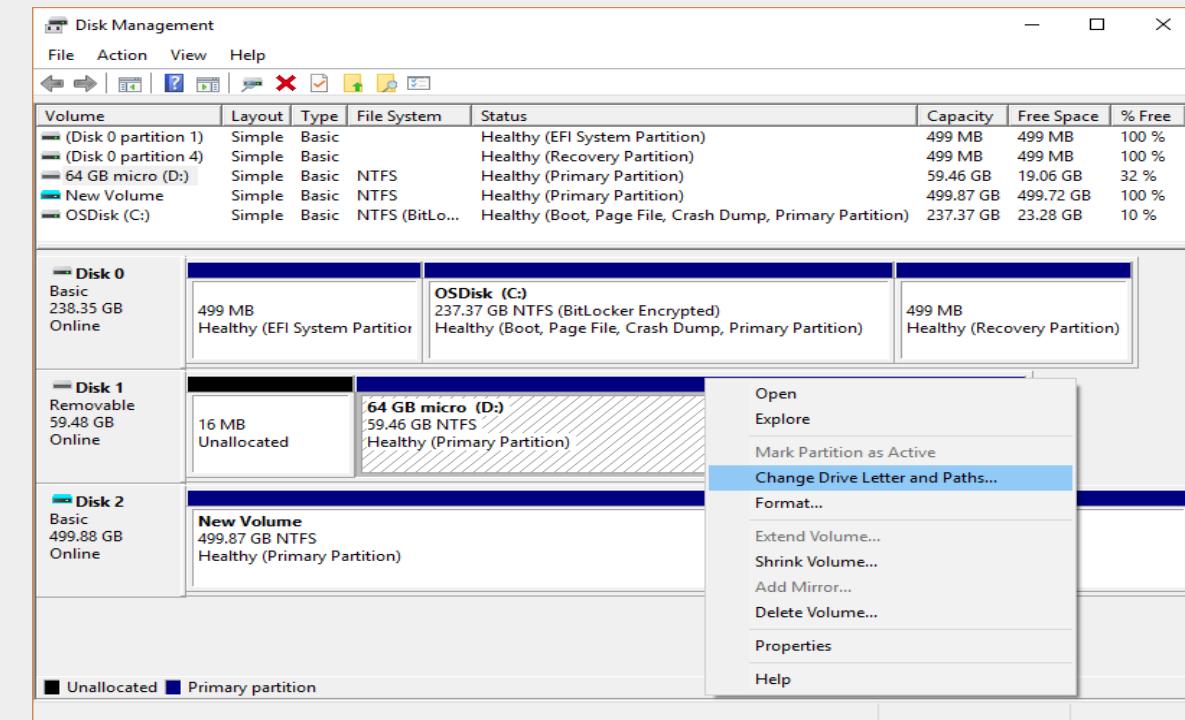


Familiarization of Disk Management

Disk Management

Change a drive letter

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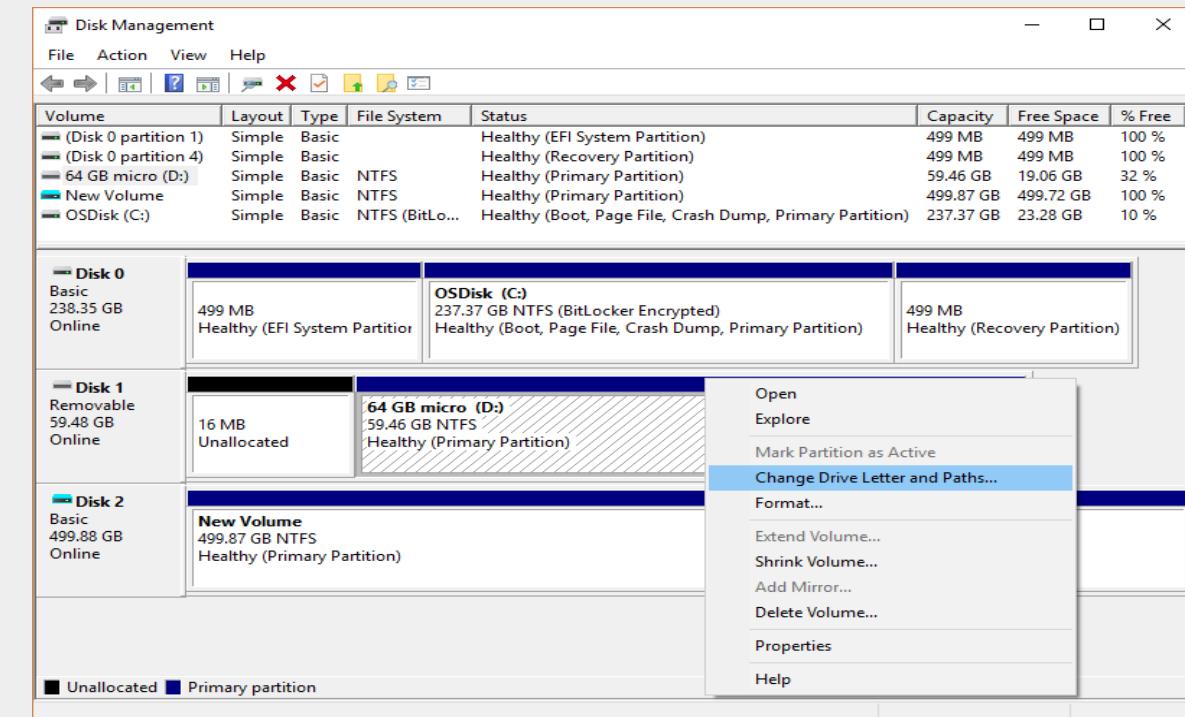


Familiarization of Disk Management

Disk Management

Mount a drive in a folder

- You can use Disk Management to mount (make a drive accessible) in a folder rather than a drive letter if you want.
- This makes the drive appear as just another folder.
- You can mount drives only in empty folders on basic or dynamic NTFS volumes.

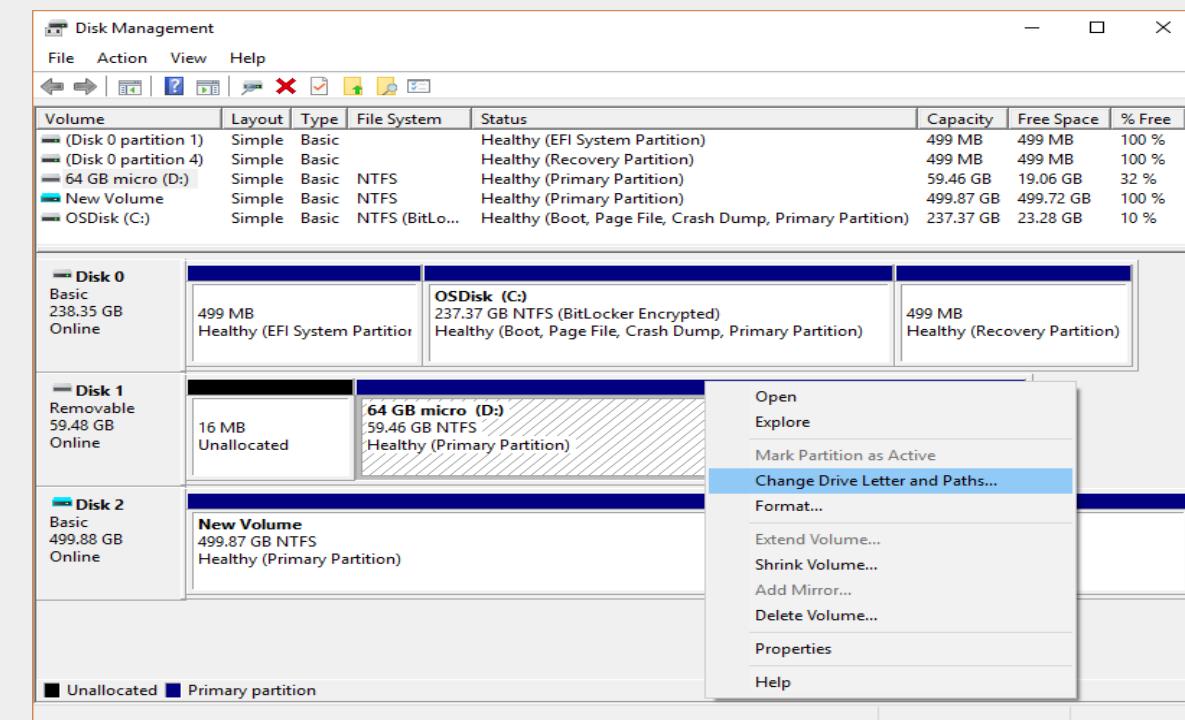


Familiarization of Disk Management

Disk Management

Extend a basic volume

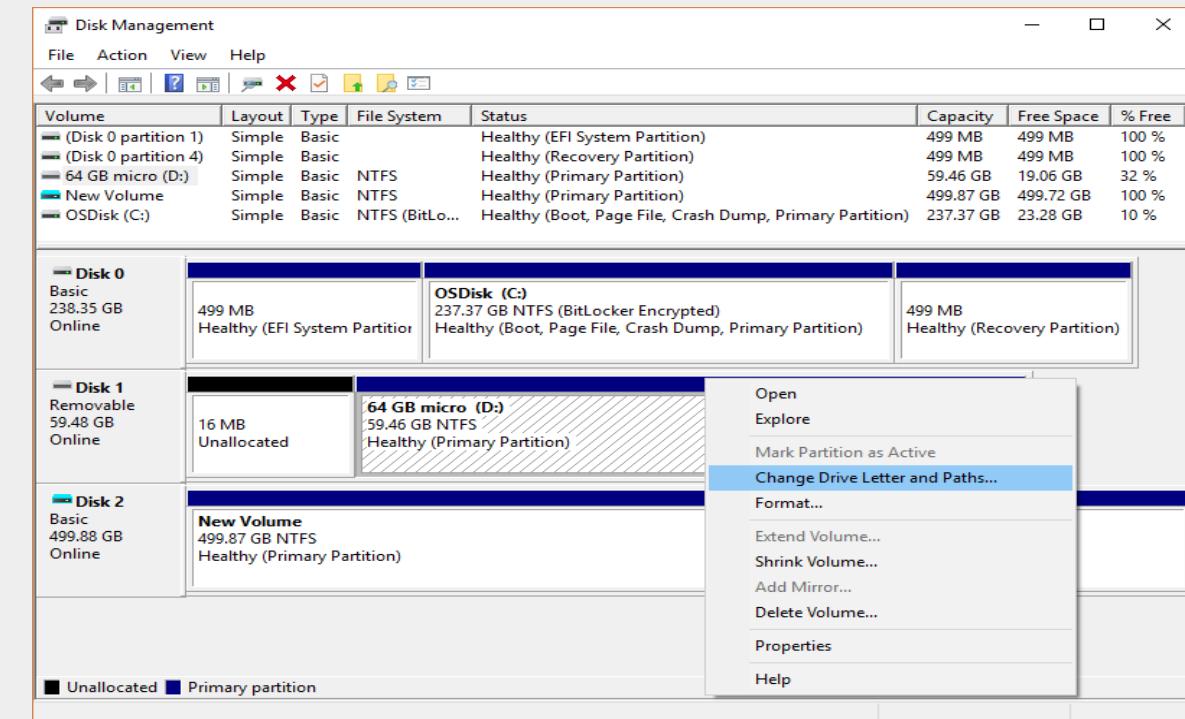
- You can use Disk Management to add space to an existing volume, extending it into empty space on the drive.
- But only if the empty space doesn't have a volume on it (it's unallocated) and comes immediately after the volume you want to extend, with no other volumes in-between, as shown in the following image.
- The volume to extend also must be formatted with the NTFS or ReFS file systems.



Familiarization of Disk Management

Disk Management

- **Shrink a basic volume**
- You can decrease the space used by primary partitions and logical drives by shrinking them into adjacent, contiguous space on the same disk.
- For example, if you discover that you need an additional partition but do not have additional disks.
- you can shrink the existing partition from the end of the volume to create new unallocated space that can then be used for a new partition.

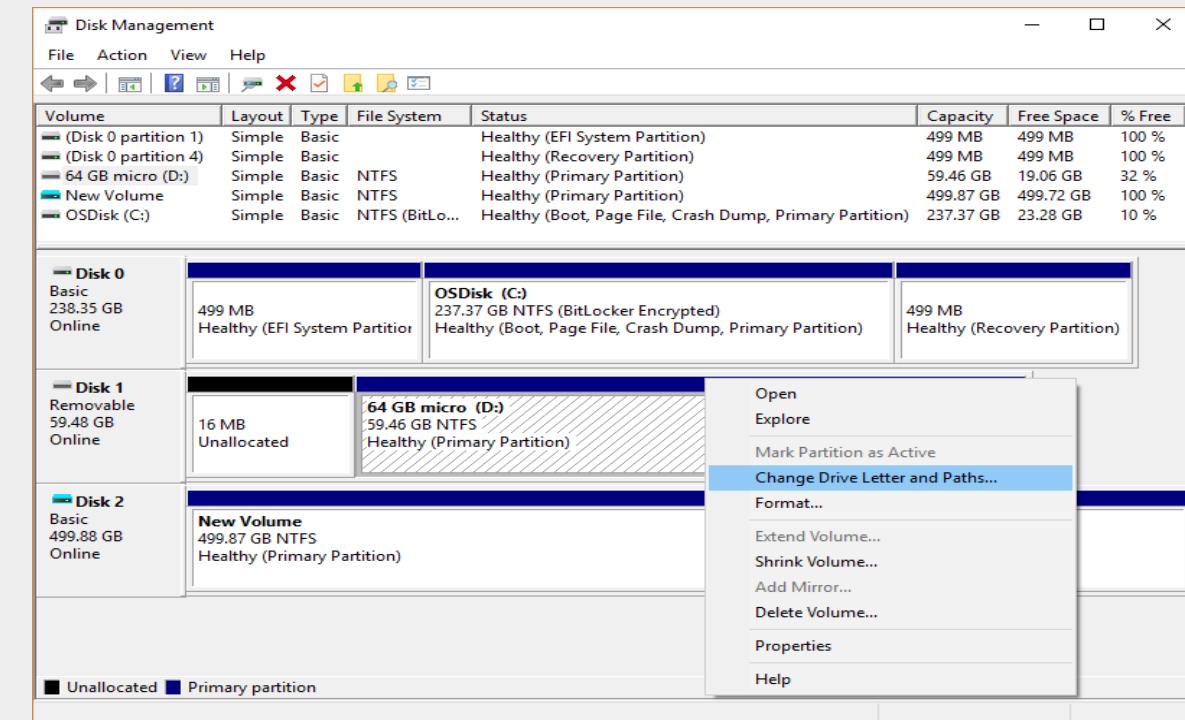


Familiarization of Disk Management

Disk Management

Troubleshooting Disk Management

- The main function of chkdsk is checking and repairing errors for NTFS and FAT file systems.
- Thus, if the error "Windows detected a hard disk problem" is caused by file system error, then the issue will be fixed after chkdsk.

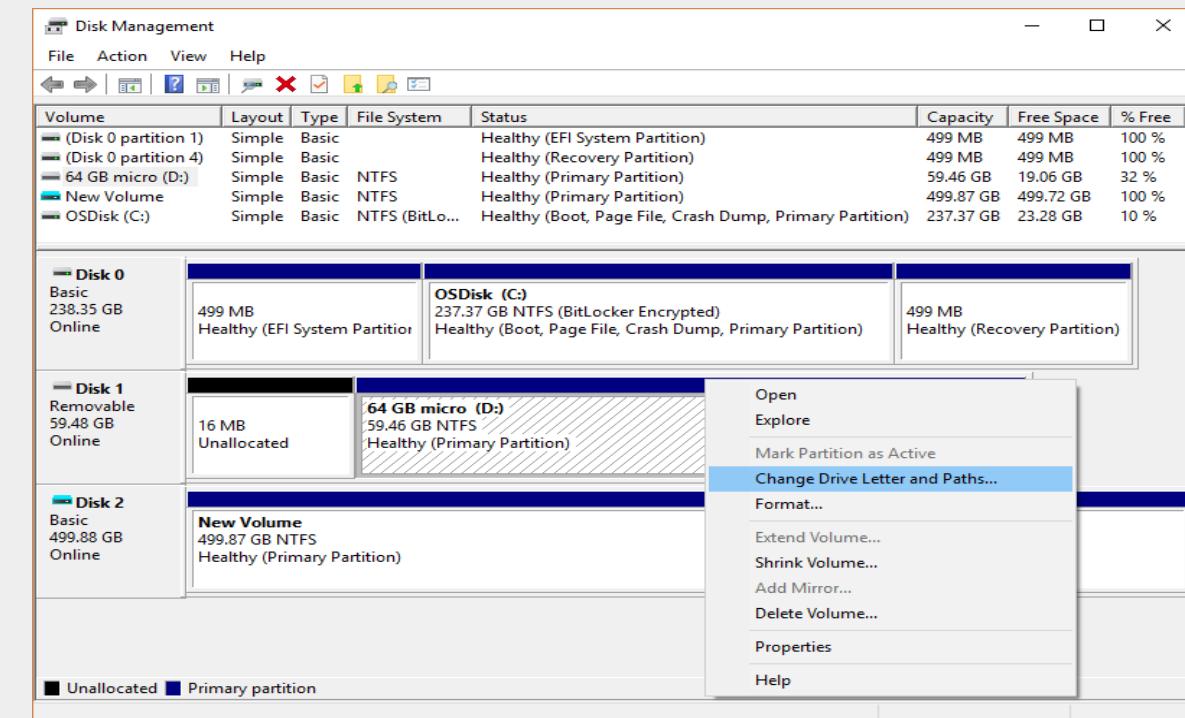


Familiarization of Disk Management

Disk Management

Advantages of Disk Management

- Disk Management comes pre-loaded on Windows 10 machines.
- It's an extension of the Microsoft Management Console that allows full management of the disk-based hardware recognised by the operating system.
- An important function of Disk Management in [Windows 10](#) is its ability to free up valuable disk space.
- If you have lots of files and folders not being used, you can use the utility for defragmenting hard drives, which rearranges your cluttered files and folders into a more logical order.
- Not only does this make it faster to find them, but it also combines drives together to produce a larger, single volume.

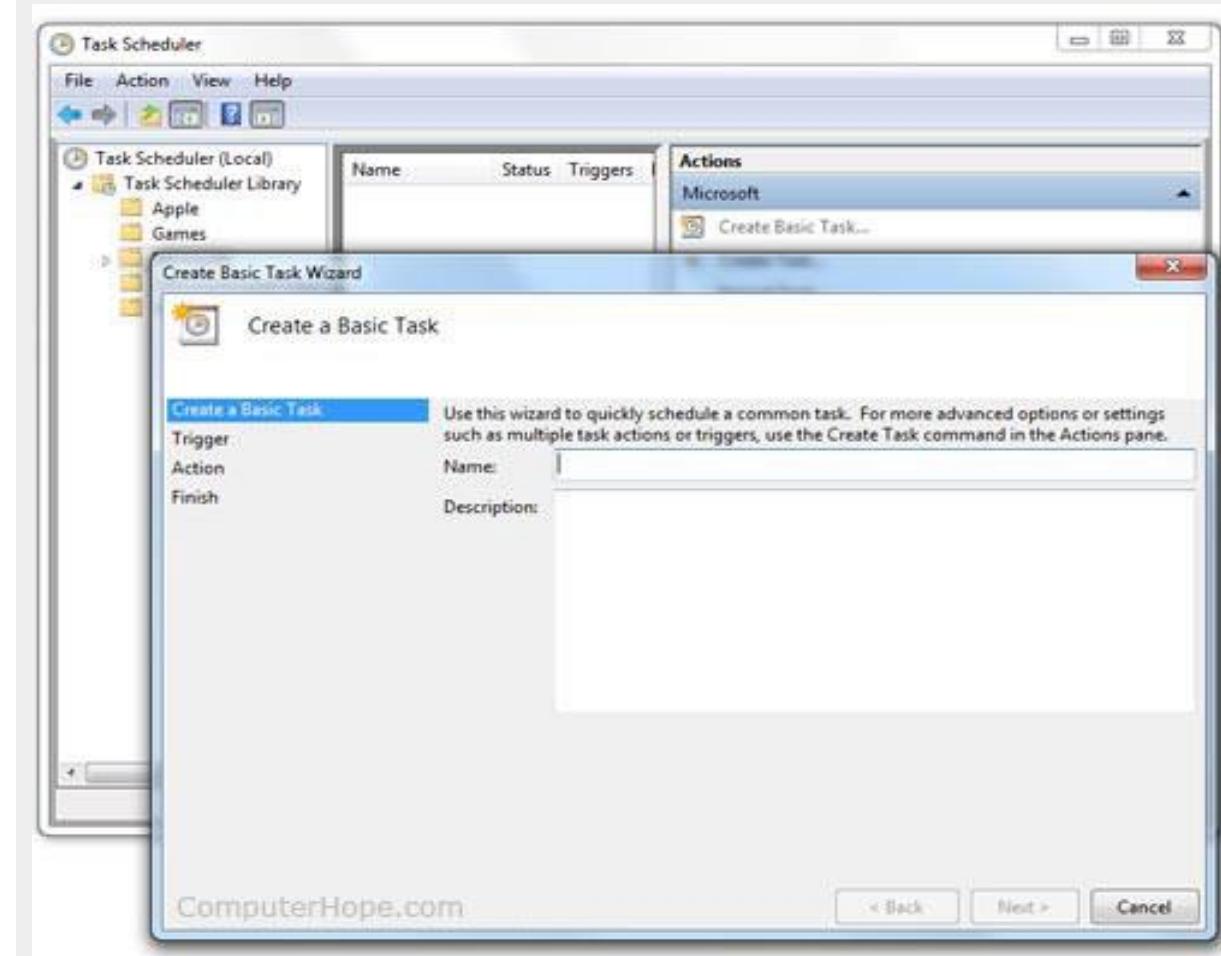


- Source: <https://docs.microsoft.com/en-us/windows-server/storage/disk-management/media/change-drive-letter.png>

Familiarization of Task Scheduler

Task Scheduler

- The Task Scheduler enables you to automatically perform routine tasks on a chosen computer.
- Tasks can be scheduled to execute in response to these events, or triggers.
- When a specific system event occurs.
- At a specific time.
- At a specific time on a daily schedule.
- At a specific time on a monthly day-of-week schedule.
- When the computer enters an idle state.
- When the task is registered.
- When the system is booted.
- When a user logs on.
- When a Terminal Server session changes state.

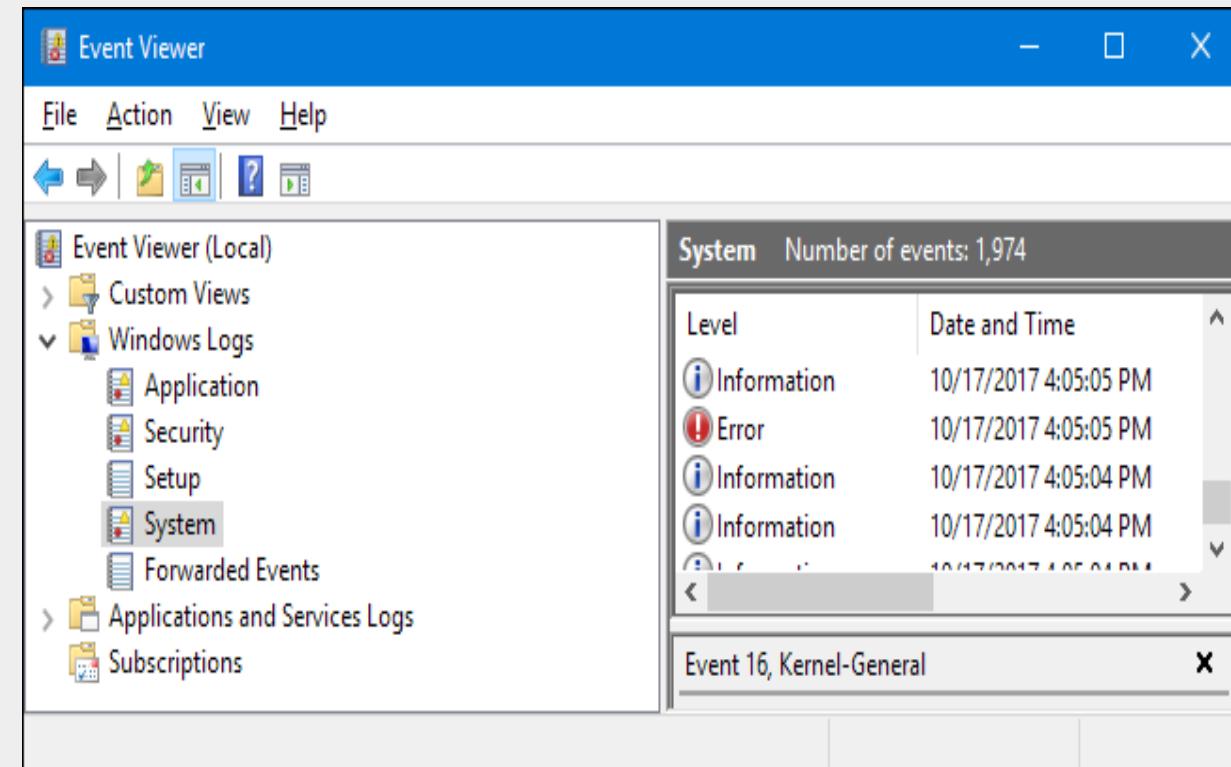


- Source: <https://www.computerhope.com/jargon/t/taskscheduler.jpg>

Familiarization of Event Manager

Event Manager

- **Event Viewer** is a component of [Microsoft's Windows NT operating system](#) that lets administrators and users view the [event logs](#) on a local or remote machine.
- [Applications](#) and operating-system components can use this centralized log service to report events that have taken place, such as a failure to start a component or to complete an action.
- In [Windows Vista](#), Microsoft overhauled the event system.^[1]

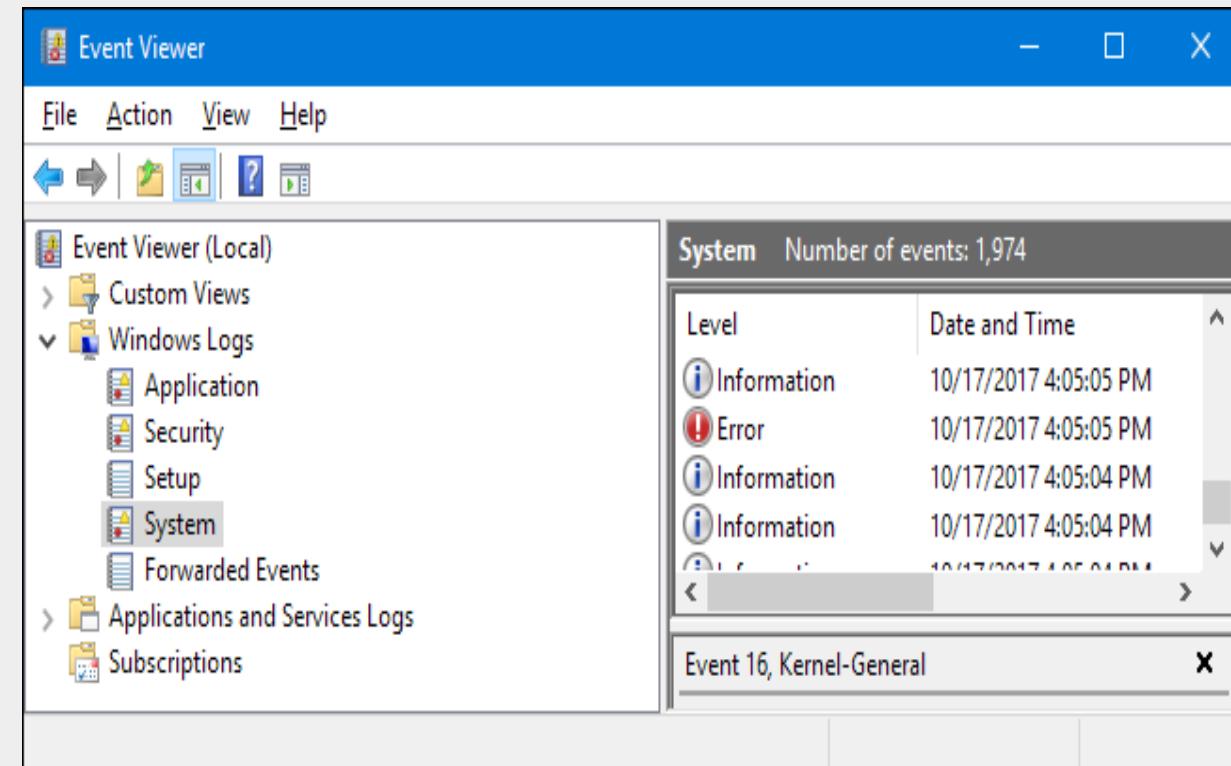


- Source: [https://www.howtogeek.com/wp-content/uploads/2017/11/xev_top.png.pagespeed\(gp+jp+jw+pj+ws+js+rj+rp+rw+ri+cp+md.ic.MIMT_A9aXV.png\)](https://www.howtogeek.com/wp-content/uploads/2017/11/xev_top.png.pagespeed(gp+jp+jw+pj+ws+js+rj+rp+rw+ri+cp+md.ic.MIMT_A9aXV.png))

Familiarization of Event Manager

Event Manager (Continued)

- While there are a lot of categories, the vast amount of troubleshooting you might want to do pertains to three of them:
- **Application:** The Application log records events related to Windows system components, such as drivers and built-in interface elements.
- **System:** The System log records events related to programs installed on the system.
- **Security:** When security logging is enabled (it's off by default in Windows), this log records events related to security, such as logon attempts and resource access.



- Source: [https://www.howtogeek.com/wp-content/uploads/2017/11/xev_top.png.pagespeed\(gp+jp+jw+pj+ws+js+rj+rp+rw+ri+cp+md.ic.MIMT_A9aXV.png\)](https://www.howtogeek.com/wp-content/uploads/2017/11/xev_top.png.pagespeed(gp+jp+jw+pj+ws+js+rj+rp+rw+ri+cp+md.ic.MIMT_A9aXV.png))

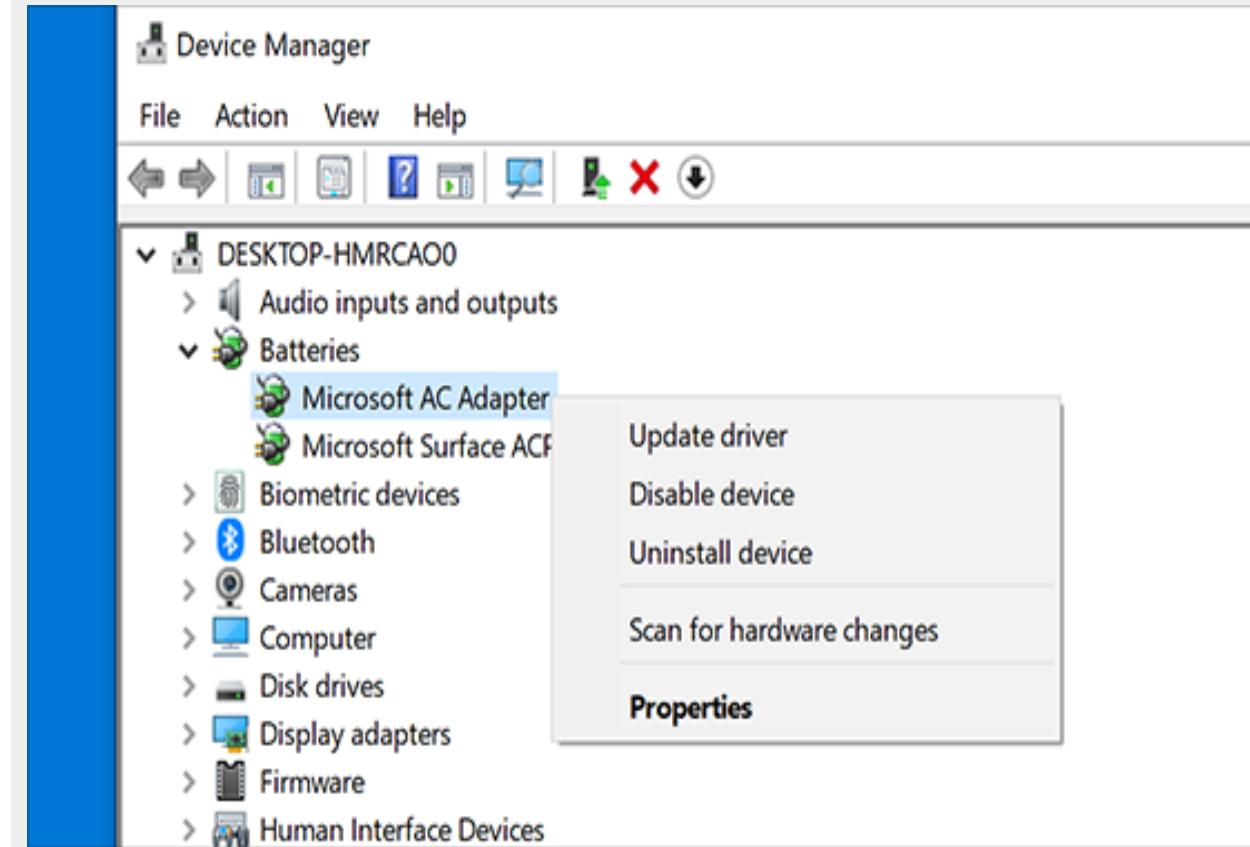
Familiarization of Device Manager

Device Manager

- **Device Manager** is a [Control Panel applet](#) in [Microsoft Windows](#) operating systems. It allows users to view and control the hardware attached to the computer.
- When a piece of hardware is not working, the offending hardware is highlighted for the user to deal with.
- The list of hardware can be sorted by various criteria.[\[1\]](#)

For each device, users can:

- Supply [device drivers](#) in accordance with the [Windows Driver Model](#)
- Enable or disable devices
- Tell Windows to ignore malfunctioning devices
- View other technical properties

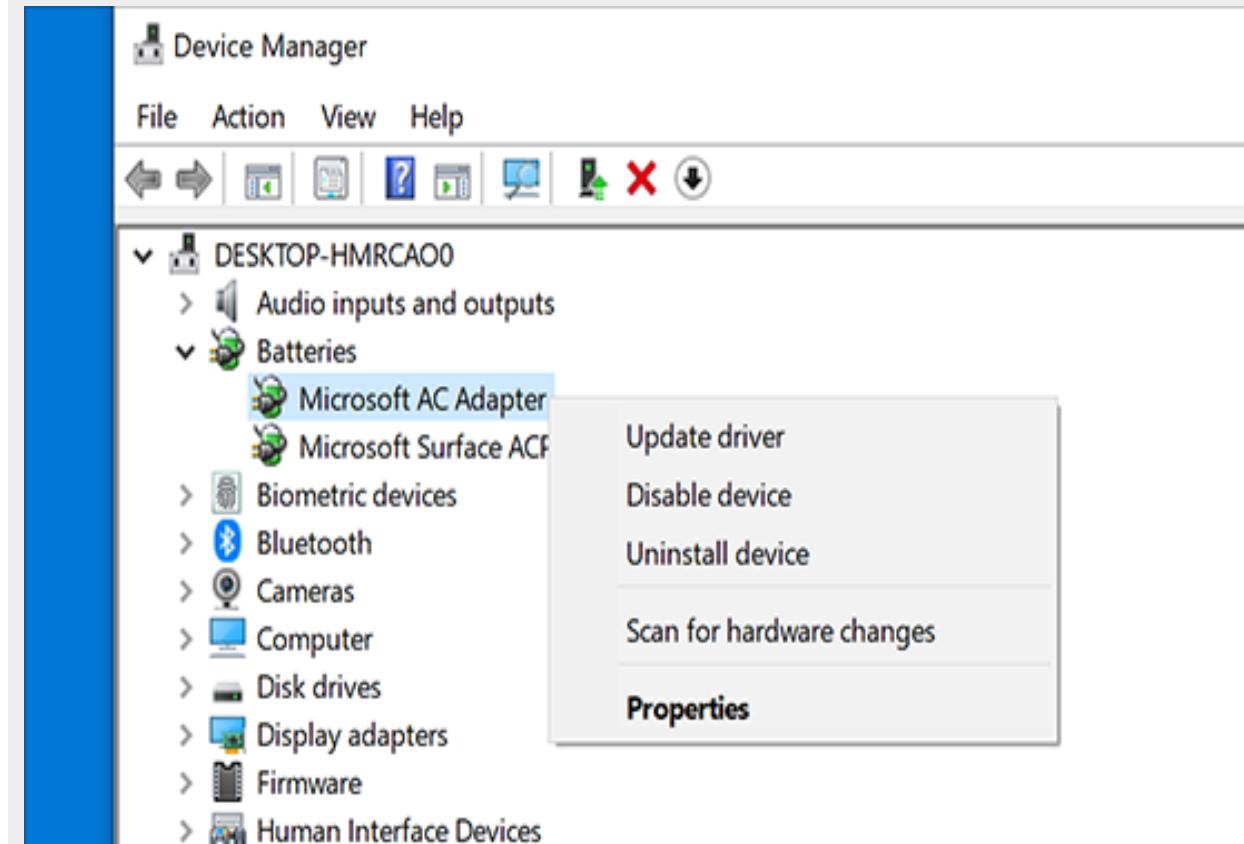


- Image Source:
<https://msegceporticoprodassets.blob.core.windows.net/inline-media/f00c3ee8-cf53-41ed-ba7f-1f5844f49f90-en>

Familiarization of Device Manager

Device Manager

- The Device Manager window divides all the devices on your computer into categories.
- To find a specific device, click the arrow next to its category, as shown in the image at the right.
- Doing so expands that category, listing all its devices. You can then double-click a specific device to view its properties, status, and driver information.

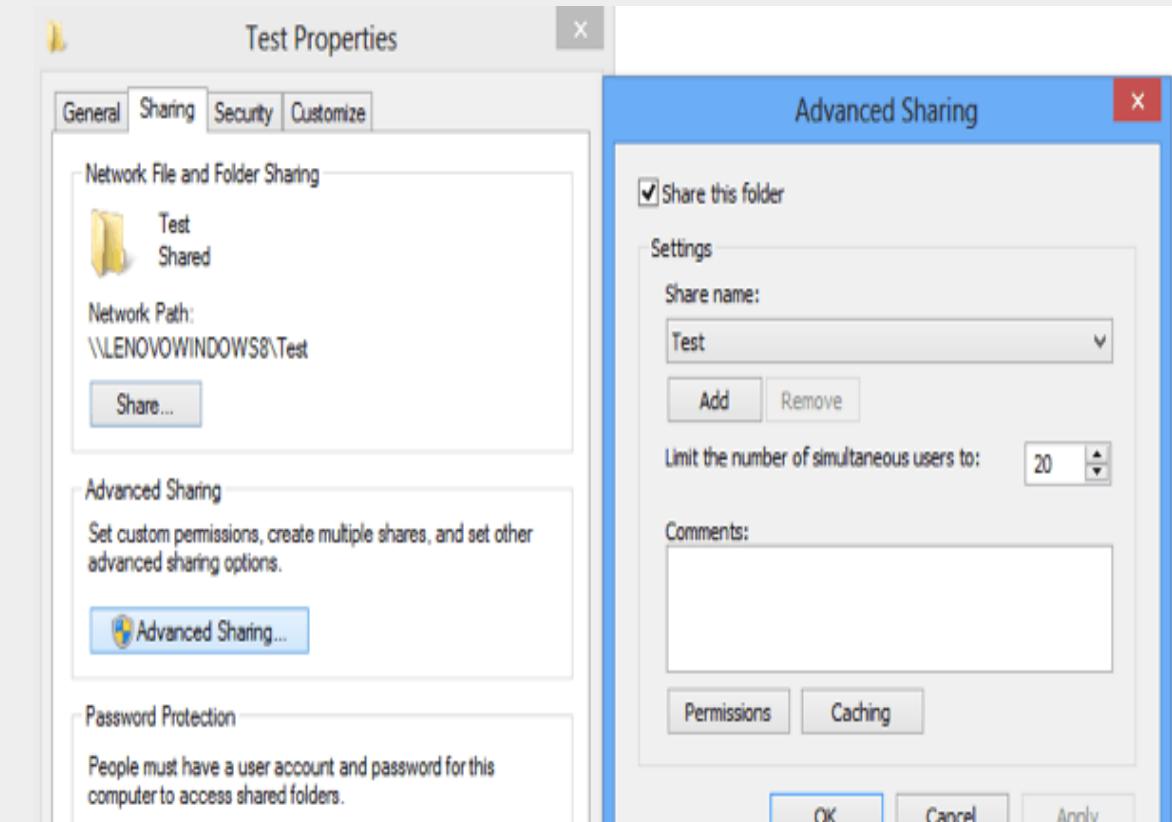


- Image Source:
<https://msegceporticoprodassets.blob.core.windows.net/inline-media/f00c3ee8-cf53-41ed-ba7f-1f5844f49f90-en>

Familiarization of Shared Folder

Shared Folder

- A shared folder is a special type of workspace that enables you to share the contents of a folder in your Windows file system across all computers on which you have your account, and with other users by invitation.
- When you invite people to join a shared folder, they select a folder for sharing on their computers.
- All members of a shared folder have access to its contents (files and subfolders).

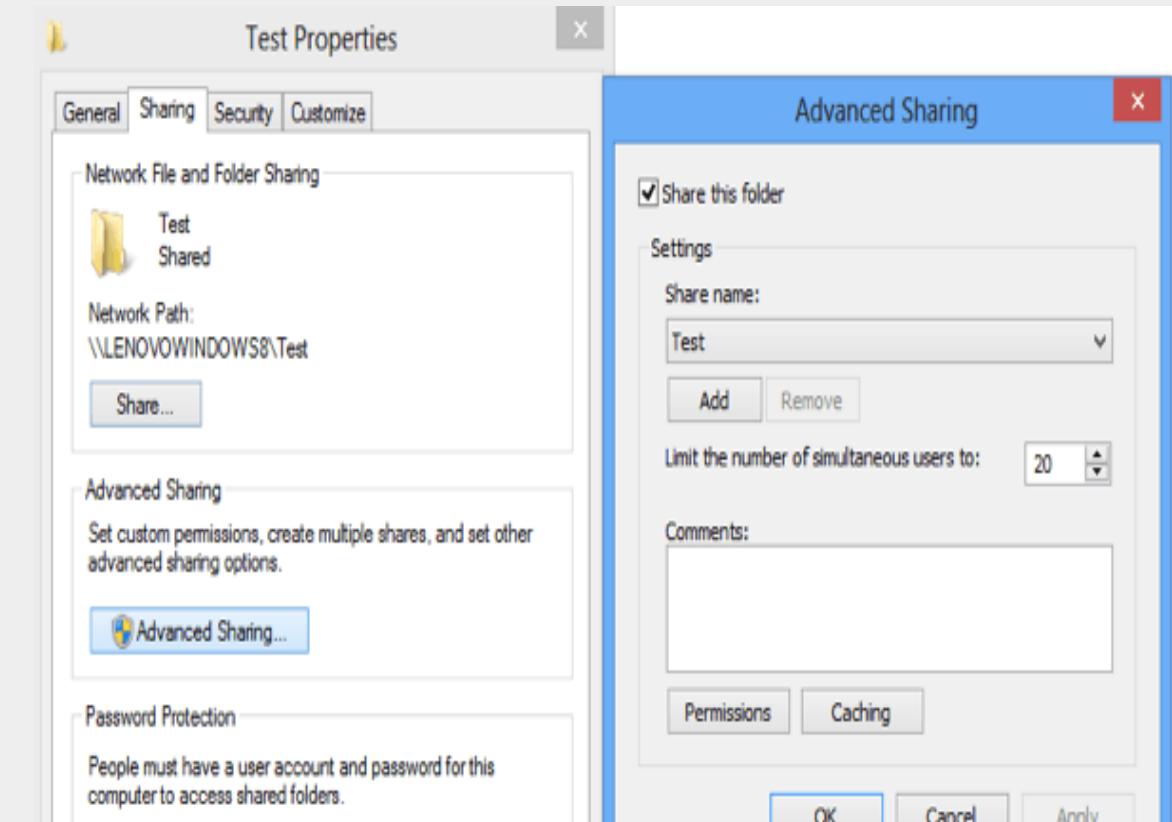


- Image Source: <https://www.online-tech-tips.com/wp-content/uploads/2012/09/shared-folder.png>

Familiarization of Shared Folder

Shared Folder

- **What do you want to do?**
- Create a shared folder
- Invite people to a shared folder
- Navigate to a shared folder
- Use a shared folder on another computer
- Chat in a shared folder
- Download files in a shared folder
- Change download settings in a shared folder
- Change roles and permissions in a shared folder
- Change permissions for folders in a shared folder
- Change alerts settings
- View shared folder properties
- Stop synchronizing a shared folder
- Read about shared folder restrictions and warnings

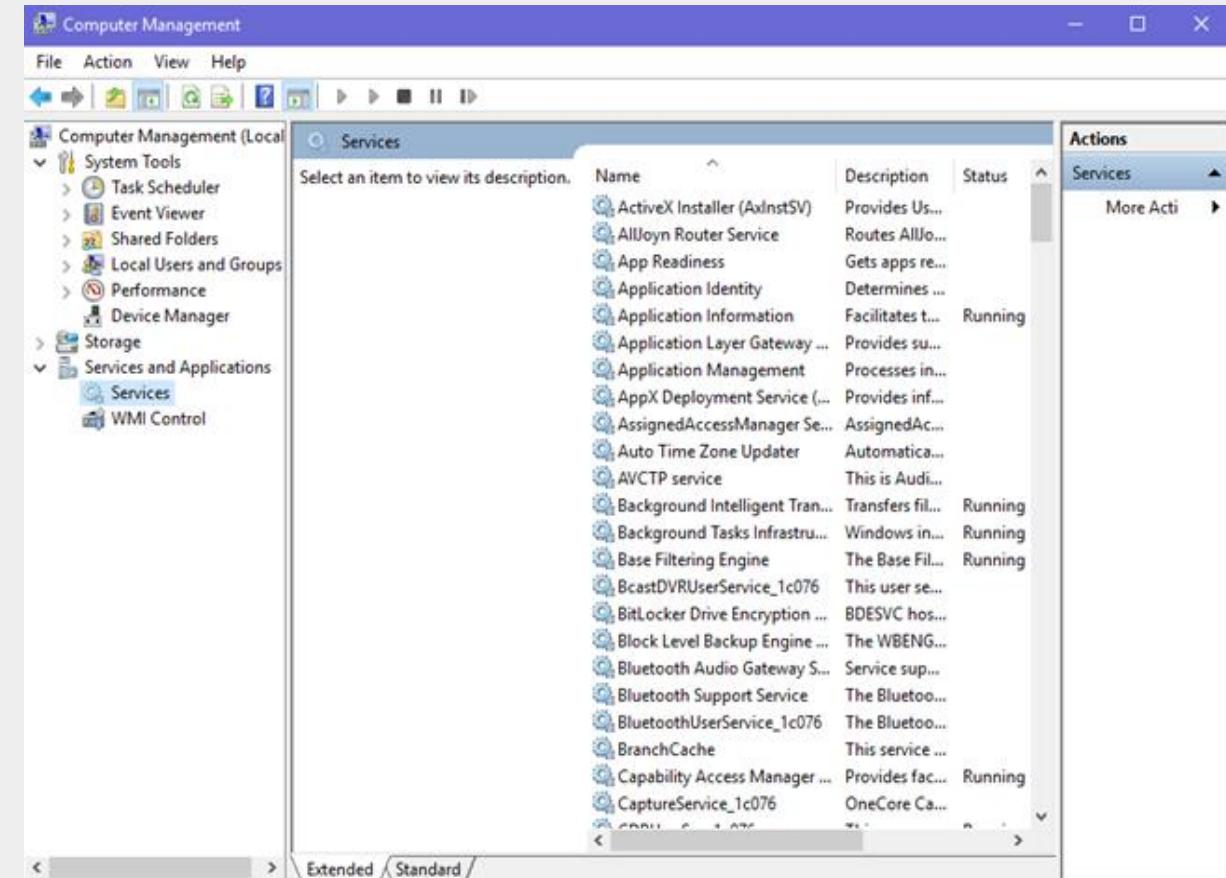


- Image Source: <https://www.online-tech-tips.com/wp-content/uploads/2012/09/shared-folder.png>

Familiarization of Services and Applications

Services in Windows

- The *Services* app in Windows lists all the services that are installed by the operating system, the drivers and apps that you are using.
- With it, you can set which services run when Windows starts, disable services you do not need, and perform other useful actions.
- If you need to view all the services that exist in Windows, you need to start the *Services* app.
- Here is how to do that in all versions of Windows.
- One way that works in all versions of Windows is to use search.
- If you are using Windows 10, click the search box near the Start button, and type "services."
- Then, click or tap the search result with the same name.

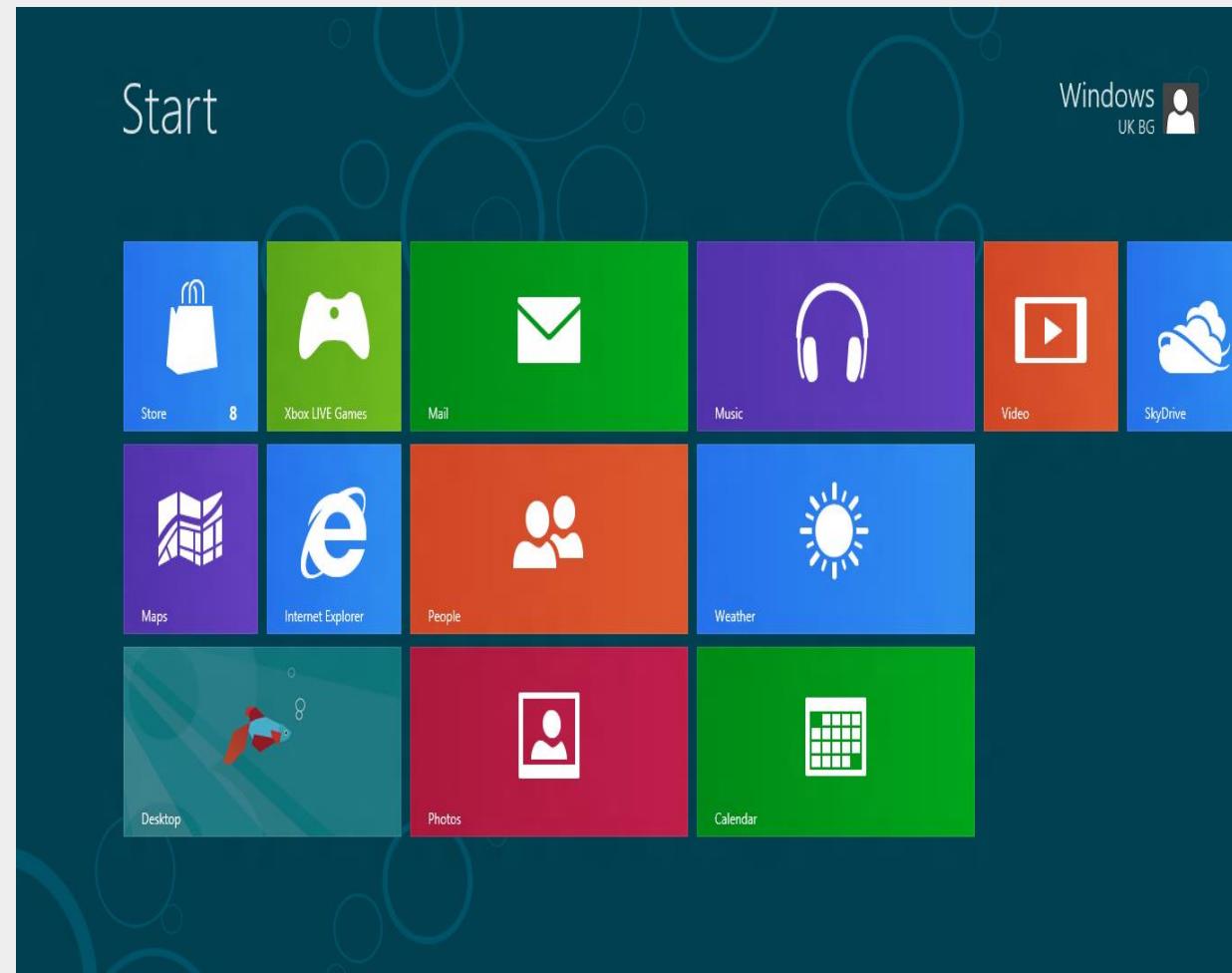


- Image Source:
https://www.digitalcitizen.life/sites/default/files/gdrive/win_services_start/start_services_10.png

Familiarization of Services and Applications

Applications in Windows

- Windows comes with several useful applications already installed.
- These applications can help you with many common tasks, including browsing the Internet, managing your calendar, and shopping for music.
- Most of these apps can be opened by clicking the Start button, then clicking the icon of the app you want to open.
- You may need to navigate the Start menu to find the app you're looking for.
- Take a look at our [Navigating Windows](#) lesson to learn more.

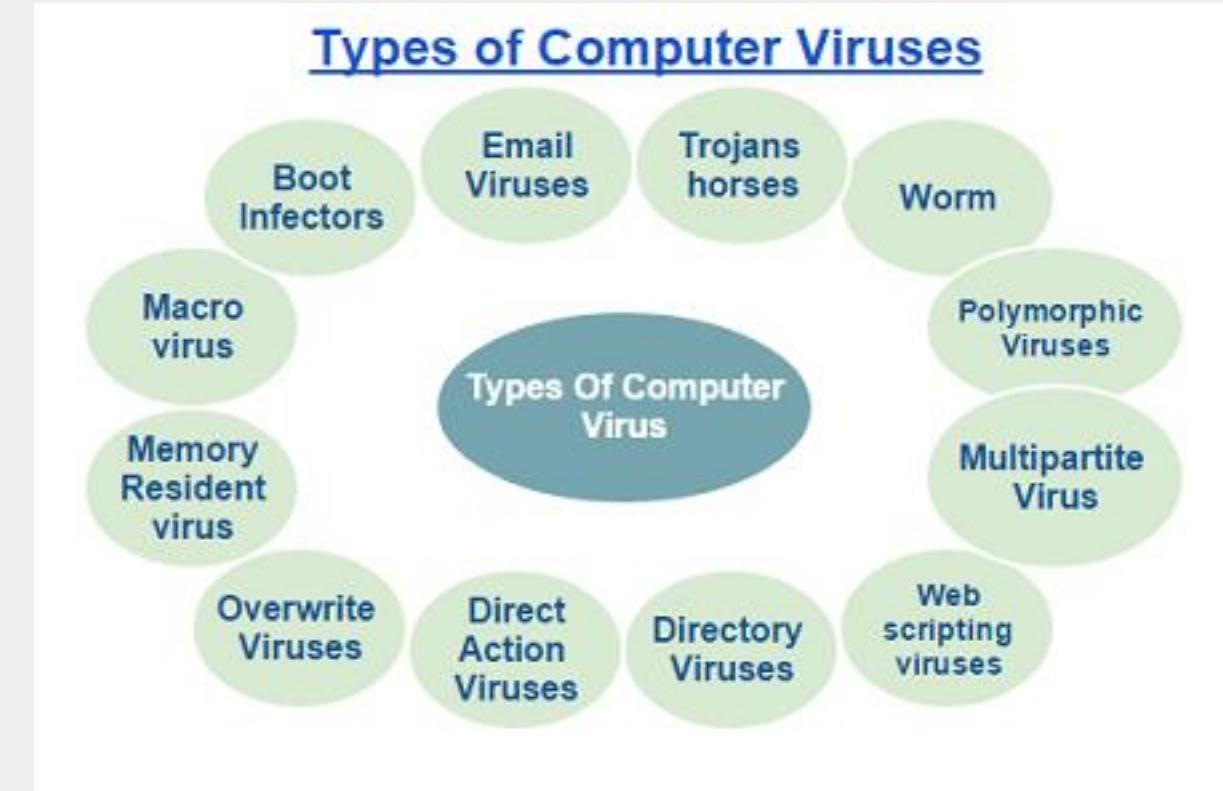


- Image Source: <https://tclab.in/wp-content/uploads/2018/10/optimisation-of-windows.png>

Familiarization of Virus

Virus and its types

- **Virus** -A computer virus is a piece of software that can 'infect' a computer, install itself and copy itself to other computers, without the users knowledge or permission. It usually attaches itself to other computer programs, data files, or the boot sector of a Hard drive.
- **Malware** -Malware is short for **malicious software**. Malware is the name that is given to any type of software that could harm a computer system, interfere with and gather a user's data, or make the computer perform actions without the owner's knowledge or permission.
- **Trojan horse** -A type of malware that uses malicious code to install software that seems ok, but is hidden to create back doors into a system. This typically causes loss or theft of data from an external source.

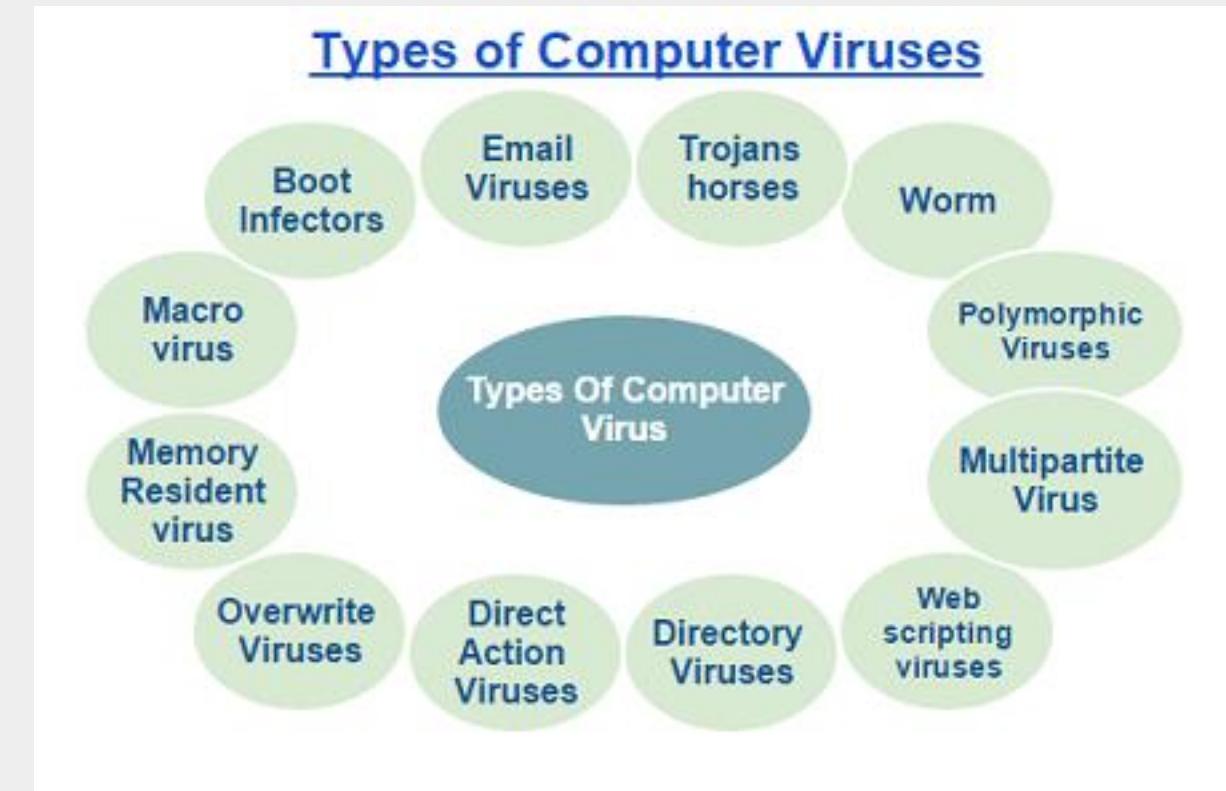


- Image Source:
<https://i.pinimg.com/originals/3f/40/f0/3f40f03d89f640e712e3eef4f0d287c1.png>

Familiarization of Virus

Virus and its types

- **Worm** -Unlike a virus, a worm, is a standalone piece of malicious software that replicates itself in order to spread to other computers. It often uses a computer network to spread itself, relying on security flaws on the target system to allow access.
- **Spyware** -Spyware is software that aids in gathering information about a person or organization without their knowledge. Spyware can monitor and log the activity that is performed on a target system, like log key strokes, or gather credit card and other information.
- **Adware** -Adware is software which can automatically cause pop-up and banner adverts to be displayed in order to generate revenue for its author or publisher. A lot of freeware uses Adware but not always in a malicious way. If it was malicious, it would then be classed as spyware or malware.



- Image Source:
<https://i.pinimg.com/originals/3f/40/f0/3f40f03d89f640e712e3eef4f0d287c1.png>

Familiarization of Virus

Antivirus Softwares

How Can a Computer Be Protected from Viruses?

- Install an anti-virus program and keep it up-to-date and regularly run scans.
- Install an anti-malware program to stop software installing without your knowledge.
- Never download and install software from the Internet unless you are certain it is from a trusted source.
- Do not open email attachments unless you have scanned them first, even a picture can carry a virus.
- Do not trust cracked or hacked software as they often contain malware, Trojans.



- Image Source: <https://ergonotes.com/wp-content/uploads/2017/12/antivirus-software-728x278.jpg>

Familiarization of Virus

Antivirus Softwares

- **Types of Antivirus Softwares:**
- 1) Norton Antivirus
- 2) McAfree Virus Scan Plus
- 3) Trend Micro (“PC-Cillin”) Internet Security
- 4) Bit Defender
- 5) AVG Antivirus



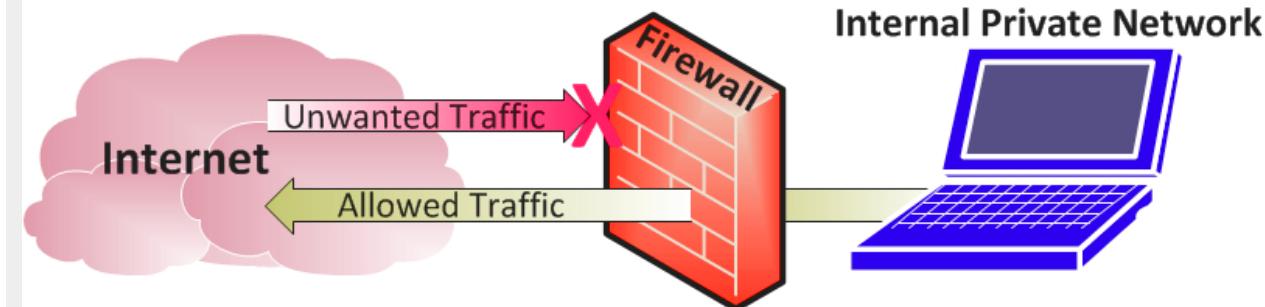
- Image Source: <https://ergonotes.com/wp-content/uploads/2017/12/antivirus-software-728x278.jpg>

Familiarization of Firewall

What is Firewall?

- A firewall is a type of cyber security tool that is used to filter traffic on a network.
- Firewalls can be used to separate network nodes from external traffic sources, internal traffic sources, or even specific applications.
- Firewalls can be software, hardware, or cloud-based, with each type of firewall having its own unique pros and cons.
- The primary goal of a firewall is to block malicious traffic requests and data packets while allowing legitimate traffic through.

Computer Firewalls



the first line of defense in network security

- Image Source:
<https://geekboots.sfo2.cdn.digitaloceanspaces.com/post/what-is-firewall-in-computer-1564659688771.jpg>

Familiarization of Firewall

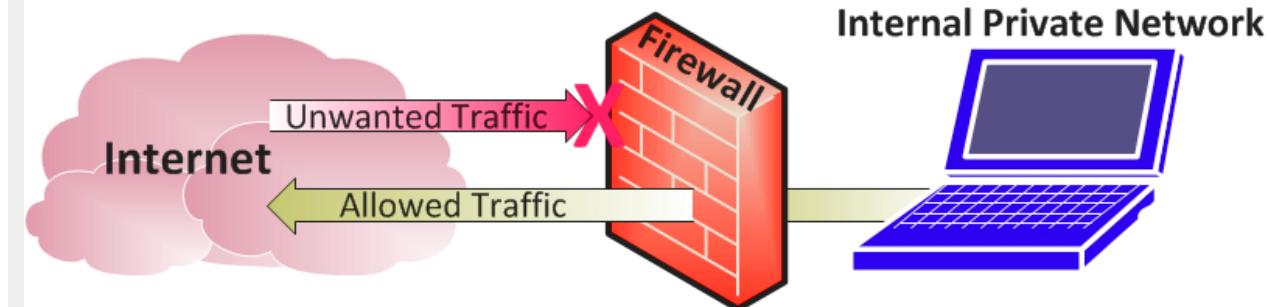
Types of Firewalls

Firewall types can be divided into several different categories based on their general structure and method of operation.

Here are eight types of firewalls:

- Packet-filtering firewalls
- Circuit-level gateways
- Stateful inspection firewalls
- Application-level gateways (a.k.a. proxy firewalls)
- Next-gen firewalls
- Software firewalls
- Hardware firewalls
- Cloud firewalls

Computer Firewalls



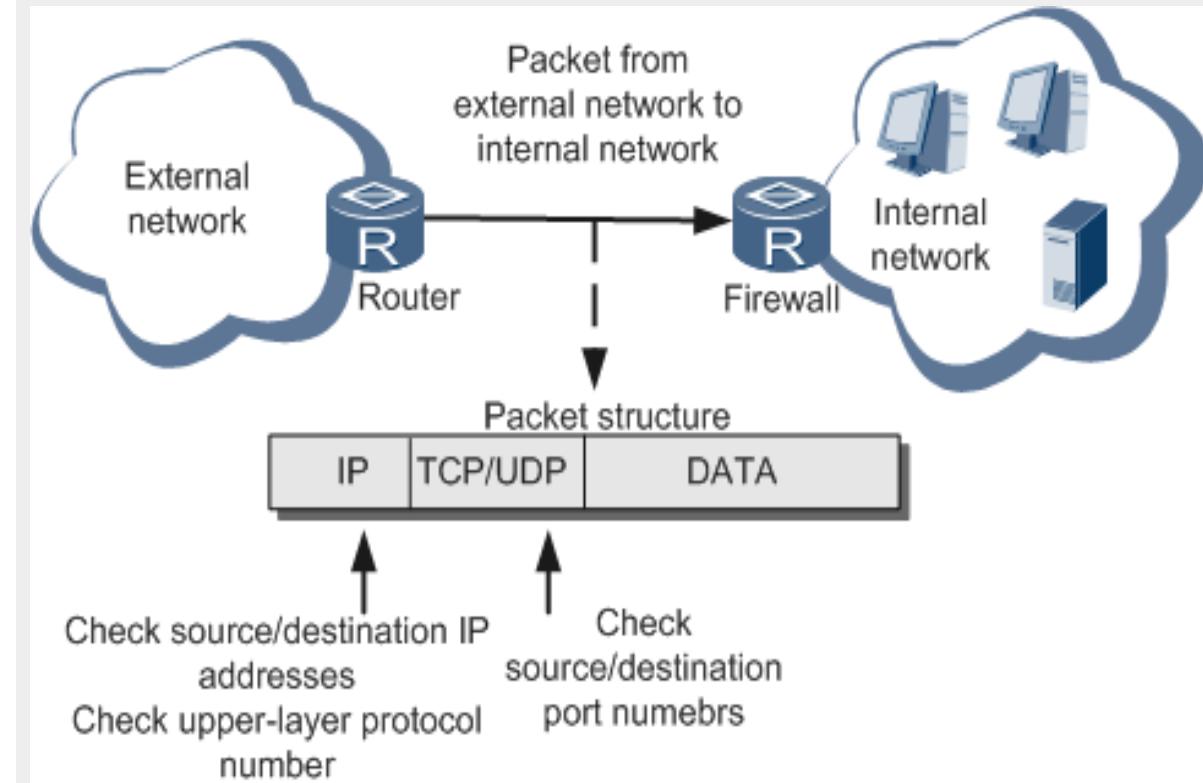
the first line of defense in network security

- Image Source:
<https://geekboots.sfo2.cdn.digitaloceanspaces.com/post/what-is-firewall-in-computer-1564659688771.jpg>

Familiarization of Firewall

Packet-Filtering Firewall

- As the most “basic” and oldest type of firewall architecture, packet-filtering firewalls basically create a checkpoint at a traffic router or switch.
- The firewall performs a simple check of the data packets coming through the router—inspecting information such as the destination and origination IP address, packet type, port number, and other surface-level information without opening up the packet to inspect its contents.

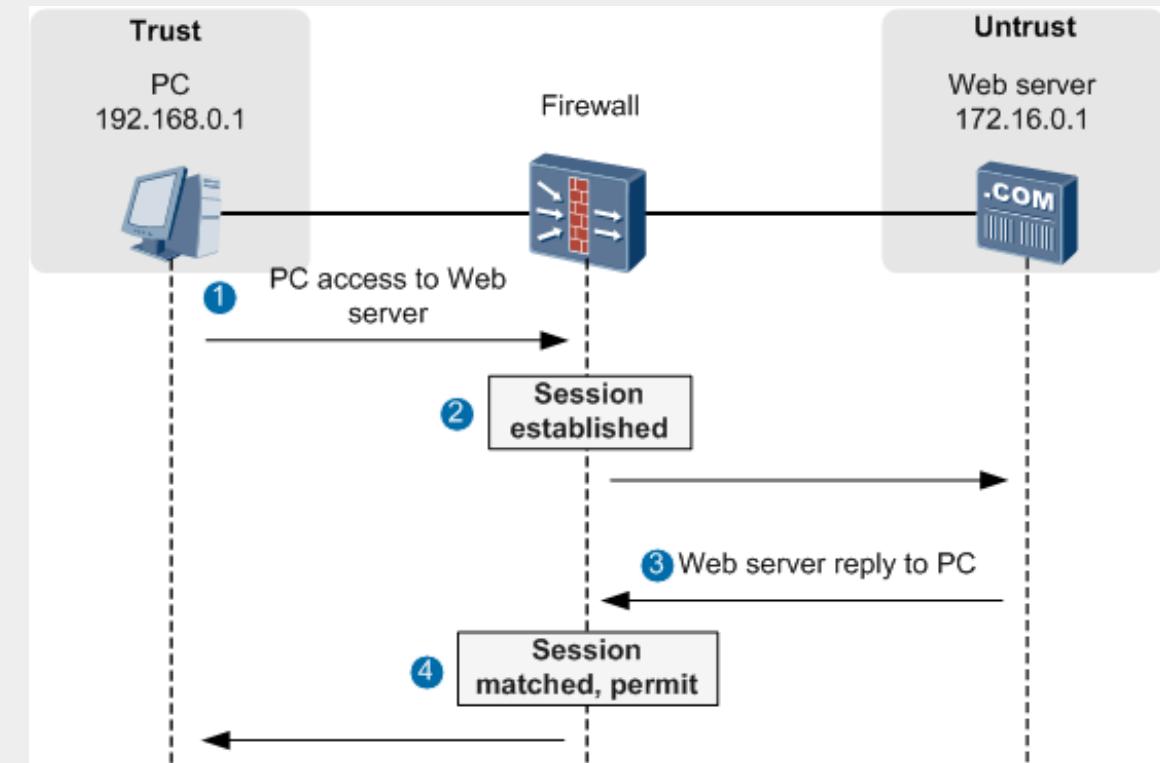


- Image Source:
<https://download.huawei.com/mdl/imgDownload?uuid=f64fae52154449f6b67ae34bd3297d04>

Familiarization of Firewall

Stateful Inspection Firewalls

- These firewalls combine both packet inspection technology and TCP handshake verification to create a level of protection greater than either of the previous two architectures could provide alone.
- However, these firewalls do put more of a strain on computing resources as well.
- This may slow down the transfer of legitimate packets compared to the other solutions.

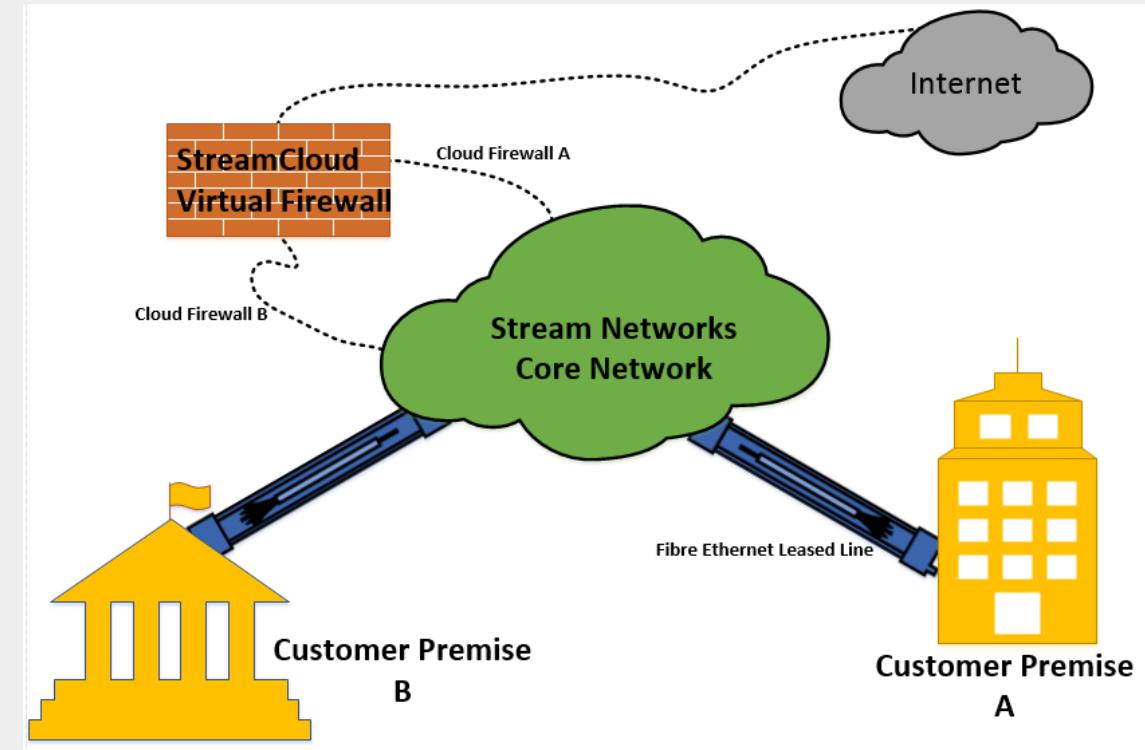


- Image Source:
<https://forum.huawei.com/enterprise/en/data/attachment/forum/dm/ecom/munity/uploads/2015/0324/09/5510c21b0d4b6.png>

Familiarization of Firewall

Cloud Firewalls

- Proxy firewalls operate at the application layer to filter incoming traffic between your network and the traffic source—hence, the name “application-level gateway.”
- These firewalls are delivered via a cloud-based solution or another proxy device.
- Rather than letting traffic connect directly, the proxy firewall first establishes a connection to the source of the traffic and inspects the incoming data packet.

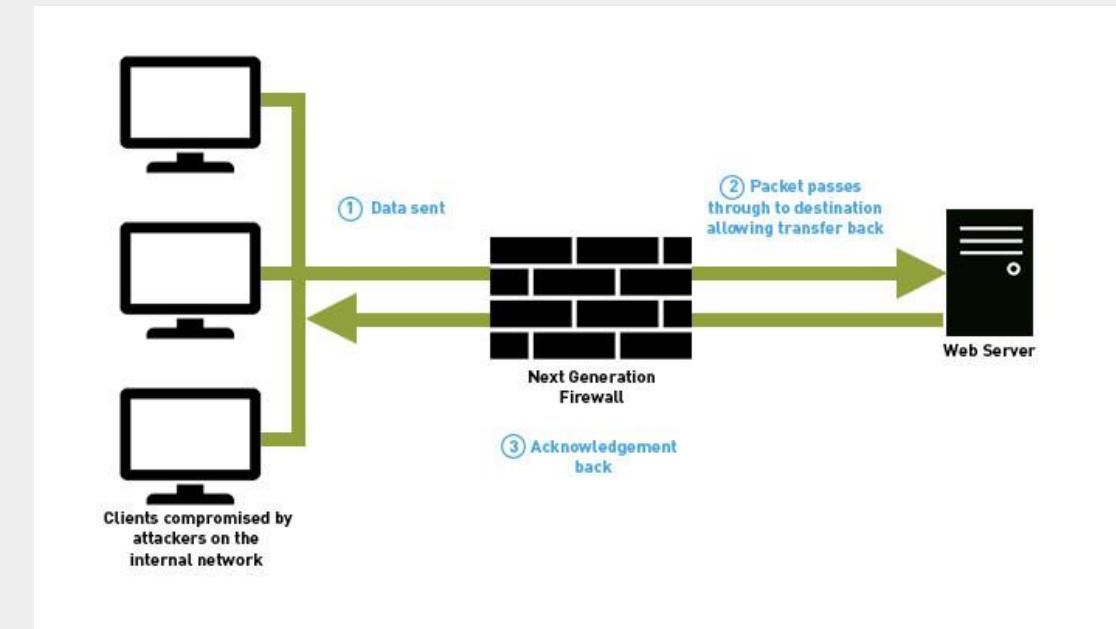


- Image Source: <https://www.streamnetworks.co.uk/wp-content/uploads/2017/12/cropped-Cloud-Firewall-Diagram-1.png>

Familiarization of Firewall

Next Generation Firewalls

- Many of the most recently-released firewall products are being touted as “next-generation” architectures.
- However, there is not as much consensus on what makes a firewall truly next-gen.
- Some common features of next-generation firewall architectures include deep-packet inspection (checking the actual contents of the data packet), TCP handshake checks, and surface-level packet inspection.
- Next-generation firewalls may include other technologies as well, such as intrusion prevention systems (IPSs) that work to automatically stop attacks against your network.

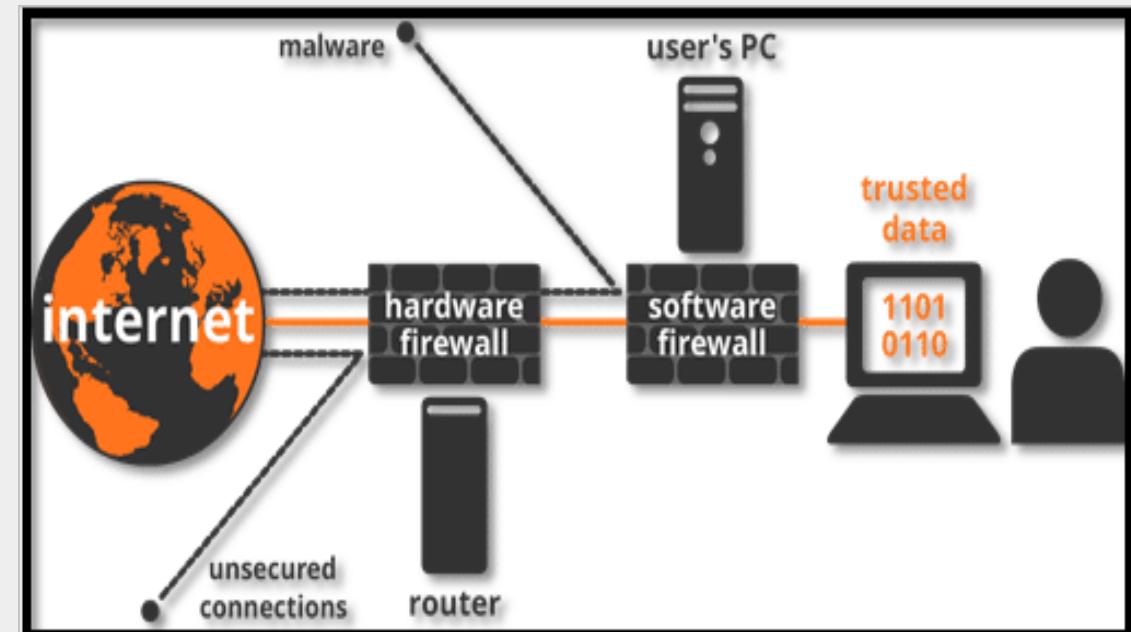


- Image Source: <https://www.nexor.com/wp-content/uploads/2015/12/firestorm-blog-firewall-image-700x405.jpg>

Familiarization of Firewall

Software Firewalls

- Software firewalls include any type of firewall that is installed on a local device rather than a separate piece of hardware (or a cloud server).
- The big benefit of a software firewall is that it's highly useful for creating defense in depth by isolating individual network endpoints from one another.
- However, maintaining individual software firewalls on different devices can be difficult and time-consuming.

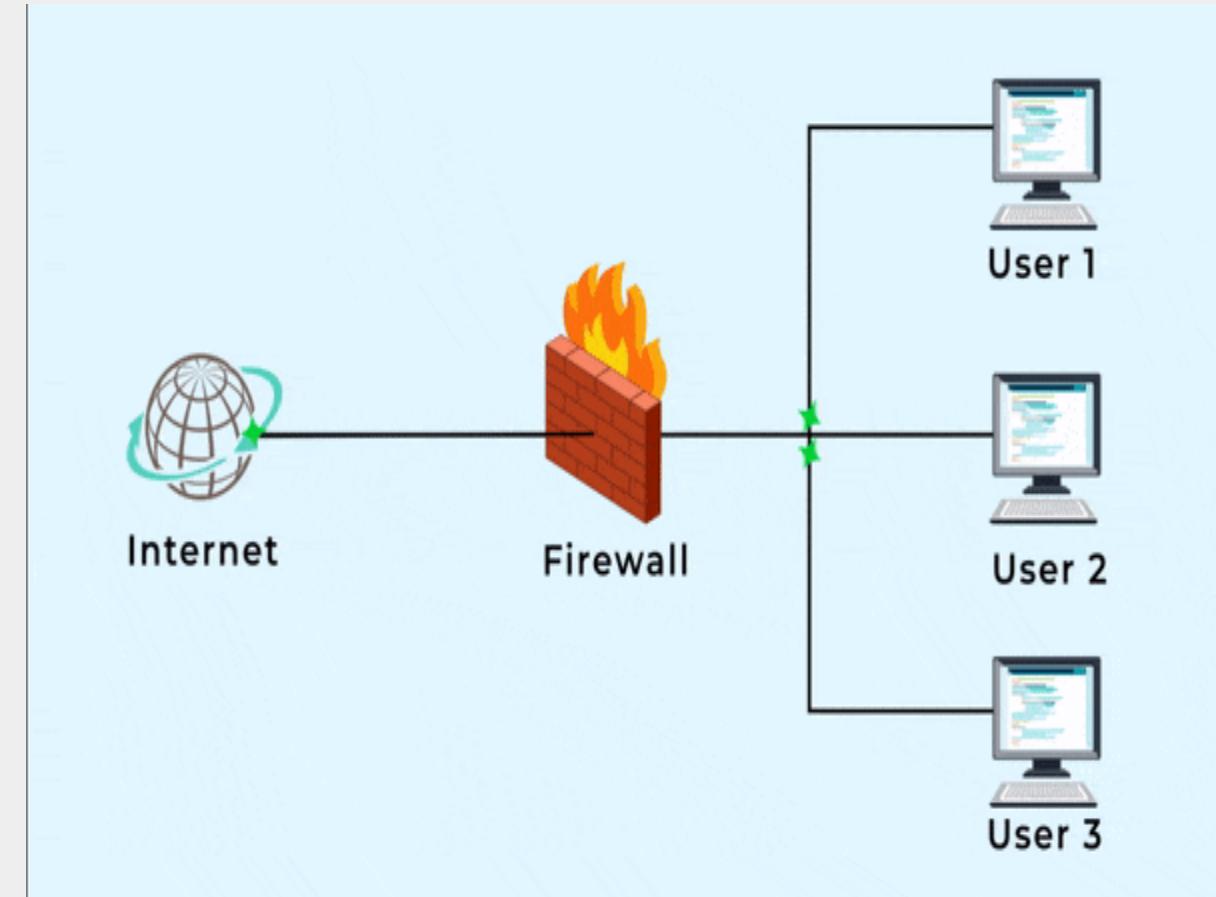


- Image Source: <https://cdn.softwaretestinghelp.com/wp-content/qa/uploads/2018/07/Basic-Firewall-Network-Example-1.png>

Familiarization of Firewall

Hardware Firewalls

- Hardware firewalls use a physical appliance that acts in a manner similar to a traffic router to intercept data packets and traffic requests before they're connected to the network's servers. Physical appliance-based firewalls like this excel at perimeter security by making sure malicious traffic from outside the network is intercepted before the company's network endpoints are exposed to risk. The major weakness of a hardware-based firewall, however, is that it is often easy for insider attacks to bypass them.



- Image Source: <https://www.milesweb.com/blog/wp-content/uploads/2019/12/HardwareFirewall.gif>

Able to perform
troubleshooting and
maintenance of PC based
on the faulty condition
(30 hours)

In this section, we will discuss:

- Explain and apply common prevention methods
- Explain Service Flow Sequence (SFS) and Trouble Shooting Chart (TSC) of PC
- Safety precautions in handling PC, sub assemblies and components, Important points to be considered while purchasing and replacing components. Concept of Preventive and corrective maintenance. Tools required, Active & Passive Maintenance, Maintenance scheduling. Need of diagnostics program. Features, limitations. Examples of commonly used diagnostic programs.

Explain and apply common prevention methods

Monitors

- Keep it clean-use periodic cleaning, dusting.
- Use simple cleaning solutions, not aerosol sprays, solvents, or commercial cleansers. DON'T use windows sprays on a monitor screen.
- Do not leave monitors on unattended for extended periods of time.



Image

Source: https://www.google.com/search?q=computer+monitors&tbm=isch&chips=q:computer+monitors,g_1:led:HVXaUfFPnhE%3D&hl=en&sa=X&ved=2ahUKEwixmeuDpP_rAhX3m0sFHbE0CymQ4IYobXoECAEQHQ&biw=1349&bih=657#imgrc=3qhDhAfnPNmqkM

Explain and apply common prevention methods

Monitors Continue...

- Don't attempt to work inside the cabinet unless you are properly trained to do so.
- Don't tamper with the monitor.
- DON'T use windows sprays on a monitor screen.



Image

Source: https://www.google.com/search?q=computer+monitors&tbm=isch&chips=q:computer+monitors,g_1:led:HVXaUfFPnhE%3D&hl=en&sa=X&ved=2ahUKEwixmeuDp_rAhX3m0sFHbE0CYMQ4IYnBXoECAEQHQ&biw=1349&bih=657#imgrc=acjXzdiK-QmehM

Explain and apply common prevention methods

Hard Disk Drives

- Avoid rough handling.
- Never move a hard disk when it is still spinning.
- Never expose the internal housing to open air.
- Perform regular data backups.



Image

Source: https://www.google.com/search?q=hard+disk&source=lnms&tbo=isch&sa=X&ved=2ahUKEwi464uvp__rAhVHfX0KHS_wDSEQ_AUoAneECA8QBA&biw=1366&bih=657#imgrc=qOllh-kNLQnEM&imgdii=l7ZdT9H3r-614M

Explain and apply common prevention methods

Floppy Disk Drives

- Do not expose the disks to magnets
- Never touch the exposed surface of a floppy disk.
- Do not allow smoking near a computer.



Image Source: https://en.wikipedia.org/wiki/Floppy_disk

Explain and apply common prevention methods

Keyboards and Pointing Devices

- Use a hand-held vacuum cleaner to remove dust from the small crevasses.
- Never use spray cleaners.
- Clean a mouse or trackball by removing the ball and cleaning the x and y rollers.
- When using a light pen, never touch the ends with your finger.



Explain and apply common prevention methods

Printers

- Printers are more mechanical than other peripherals and therefore require more attention.
- Because they use paper, ink, or carbon, printers generate pollutants that can build up and cause problems.
- Here are a few steps for cleaning the most popular types of printers:



Explain and apply common prevention methods

Printers Dot-Matrix Printers

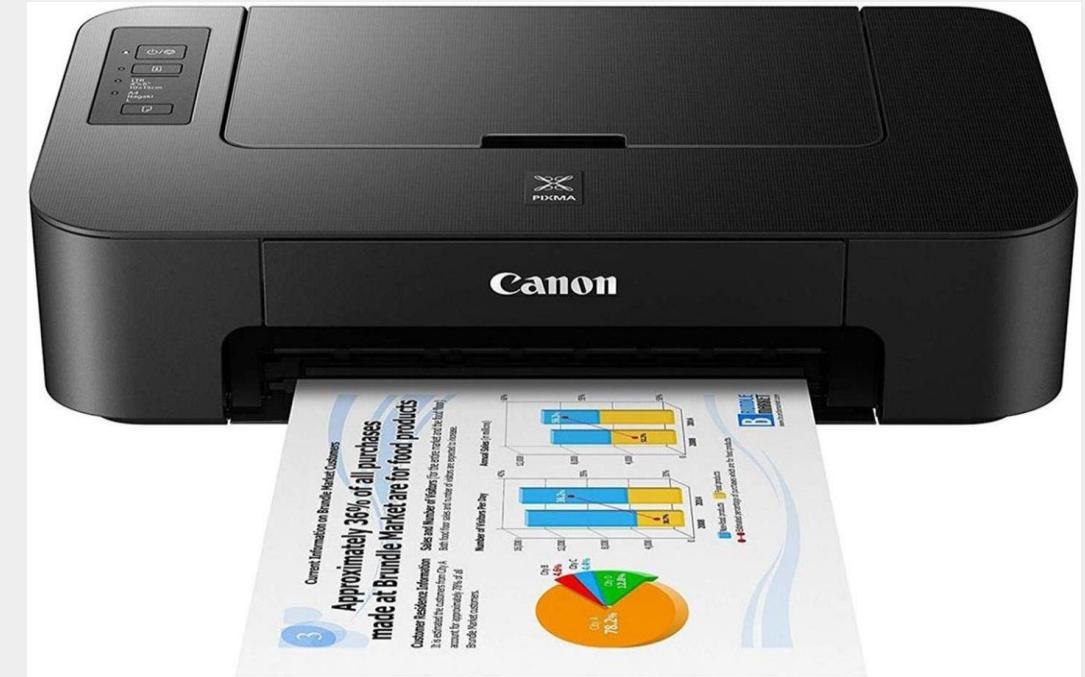
- Adjust the print-head spacing.
- Clean the printer's roller surfaces.
- Clean the surface of the platen.
- Clean the gear train of the paper-handling motor.
- Apply a light coating of oil to the rails.



Explain and apply common prevention methods

Printers Ink-Jet Printers

- Adjust the print-head spacing.
- Check the tension on the print-head-positioning belt.
- Clean the printer and its mechanism.
- Clean the printer's roller surfaces.
- Clean the gear train of the paper-handling motor.
- Move the carriage assembly to distribute the oil.



Explain and apply common prevention methods

Printers Laser Printers

- Vacuum to remove dust buildup and excess toner from the interior. Remove the toner cartridge before vacuuming.
- Clean the laser printer's rollers using a damp cloth or denatured alcohol.
- Clean the gear train of the paper-handling motor using a foam swab.
- Apply light oil to the gears using a foam swab.



Explain and apply common prevention methods

Summary

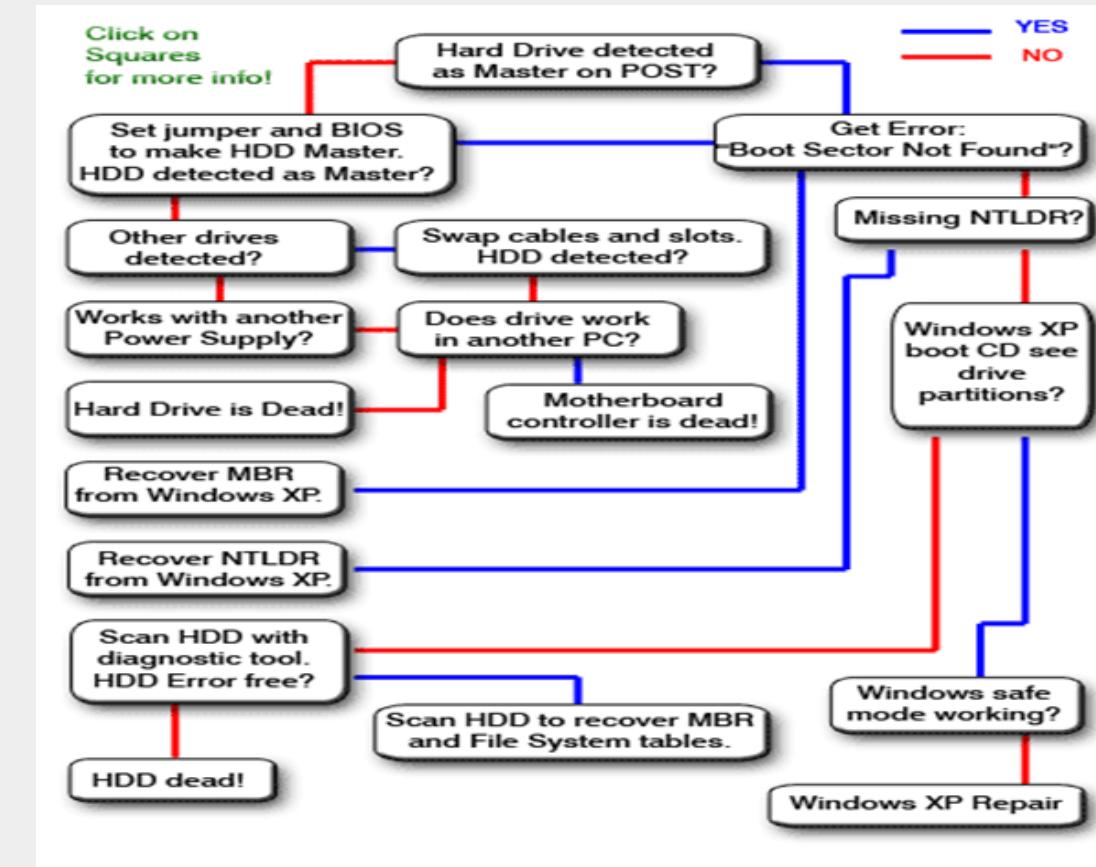
- The best preventive maintenance is to keep a computer clean.
- Never use solvent-based cleaners on a computer
- Never use liquids on the electrical components inside a computer.
- Create and implement a regular maintenance program for each computer under your care.



Explain Service Flow Sequence (SFS) and Trouble Shooting Chart (TSC) of PC

SFS

- Any problem that has anything to do with your HD can be diagnosed using this Flowchart



Safety precautions in handling PC

Finding a Place to Work

- The first thing you need to think about when planning your new homebuilt computer has nothing to do with parts, performance, or configuration.
- You need to find a place to work.

SAFETY PRECAUTIONS ➤

Observe safety rules when working inside the system and when handling computer components.

Avoid electric shock or personal injury by observing the following warning.

Hazardous Voltage

WARNING: before removing the system unit cover, turn off the power and **unplug** the system power cable. Power is removed only when the power cable is unplugged.

Safety precautions in handling PC

Staking Out your Work Area

- Professionals and die-hard home computer builders usually have work benches that are dedicated to nothing but computer work.
- You need a sturdy table or workbench
- The table should be clean and non-metallic.
- Avoid places that are damp, subject to temperature extremes, dirty, or dusty.

SAFETY PRECAUTIONS

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WARNING: before removing the system unit cover, turn off the power and **unplug** the system power cable. Power is removed only when the power cable is unplugged.

Safety precautions in handling PC

COMPUTER SAFETY TIPS Backups

- The most important precaution against any risk of data loss is a full, up-to-date backup.
- Tape backup drives are the wisest form of insurance for your computer
- Good tape drives are very inexpensive
- full backups weekly and partial backups daily is best

SAFETY PRECAUTIONS

Observe safety rules when working inside the system and when handling computer components.

Avoid electric shock or personal injury by observing the following warning.

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WARNING: before removing the system unit cover, turn off the power and **unplug** the system power cable. Power is removed only when the power cable is unplugged.

Safety precautions in handling PC

COMPUTER SAFETY TIPS

Telephone line danger

- One potential threat to your computer which most often goes unnoticed is your modem connection.
- Surges and power fluctuations can hit your system through your phone line and cause serious damage.
- Make sure your power strip or battery backup has telephone line protection.

SAFETY PRECAUTIONS

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Avoid electric shock or personal injury by observing the following warning.

Hazardous Voltage

WARNING: before removing the system unit cover, turn off the power and **unplug** the system power cable. Power is removed only when the power cable is unplugged.

Safety precautions in handling PC

COMPUTER SAFETY TIPS Battery backups

- A single power outage is not as damaging to your computer as the extreme surges and drops in power that occur during a blackout, brownout, or just your ordinary lightning storm.
- Your computer is very sensitive to power fluctuations - protect yourself against this.
- Uninterrupted Power Supplies (UPS) are available at most any computer store or Office supply store.

SAFETY PRECAUTIONS

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Safety precautions in handling PC

COMPUTER SAFETY TIPS

Turn off your computer

- Monsoon season is the exception to the rule.
- Whenever a storm or brownout is expected, your safest strategy is to turn off all computers and monitors.
- These precautions can save you a great deal of frustration and loss.

SAFETY PRECAUTIONS

Observe safety rules when working inside the system and when handling computer components.

Avoid electric shock or personal injury by observing the following warning.

Hazardous Voltage

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sub assemblies and components

sub-assemblies and components

- Subassemblies are electronic parts of the computer that are a portion or part of a functional area.
- A subassembly can contain pcbs or just electronic parts.
- Two or more components combined into a unit will form a subassembly.



sub assemblies and components

sub-assemblies and components

Some of the items you will find in subassemblies of computers are as follows

- Memory stacks of a memory unit.
- Dc-to-dc converters in modules.
- Dc switching regulators of a power supply.



sub assemblies and components

sub-assemblies and components

Basic PC Components:

- Motherboard
- Processor
- Memory (RAM)
- Case/chassis
- Power supply
- Hard drive



Image Source: <https://www.computerhope.com/jargon/m/mothboar.htm>

sub assemblies and components

sub-assemblies and components

Basic PC Components:

- ROM
- Keyboard
- Mouse
- Video card
- Monitor
- Sound card



Image Source: <https://www.amazon.in/ZAZZ-Basic-Wired-USB-Keyboard/dp/B07CNDCMPW>

Important points to be considered while purchasing and replacing components.

Three most important factors

The three most important factors to consider when purchasing computer hardware and software are:

- Quality
- Price
- Service after the sale



Important points to be considered while purchasing and replacing components.

Quality

You can determine quality by asking yourself the following questions:

- How well does this product meet my specific needs?
- Does it have the features and functions I require?
- How well is it made?
- How long will it last?



Important points to be considered while purchasing and replacing components.

Price

- Everyone has a budget, but that doesn't mean buying cheap is necessarily the way to go.
- if you purchase a product that breaks easily or doesn't fully meet your needs
- you'll end up needing to replace it, thereby busting your budget.



Important points to be considered while purchasing and replacing components.

Service after the sale

Here are a few aspects you'd be wise to look into before purchasing:

- Return policy
- Warranty
- Service agreement



Concept of Preventive and corrective maintenance.

TYPES OF MAINTENANCE

Preventive Maintenance

Preventive Maintenance (PM)

- Preventive maintenance can be defined as an equipment maintenance strategy based on replacing, or restoring, an asset at a fixed interval regardless of its condition.
- Scheduled restoration tasks and replacement tasks are examples of preventive maintenance tasks.

PC Preventive Maintenance Schedule		
Frequency	Component	Maintenance Description
Daily	System	Run a virus scan of the memory and hard disk.
	Hard Disk	Create a backup if you have updated important data or program files.
Monthly	Case	External cleaning.
	Hard Disk	Recover lost clusters and de-fragment.
	Keyboard	Clean and check for stuck keys.
	Mouse	Clean and check for wear.
	Monitor	Clean, degauss, and adjust.
	Printer	Clean and dust.
	System	Perform a diagnostics quick test.
	System	Install OS and software patches and updates.
On Failure	Floppy Disk	Clean floppy drive head.
	CDROM	Clean the pickup lens.
Yearly	Case	Open and dust.
	Mainboard	Check chips for chip lift and reseat if necessary.
	CMOS	Test the backup battery.
	Adapter Cards	Clean contacts with contact cleaner and reseat.
As Required	CMOS	Record and backup CMOS setup configuration.
	System	Keep written record of hardware and software configuration of PC system.

Concept of Preventive and corrective maintenance.

TYPES OF MAINTENANCE

Preventive Maintenance

Time Based Maintenance(TBM)

- Time-Based Maintenance refers to replacing or renewing an item to restore its reliability at a fixed time, interval or usage regardless of its condition.

Failure Finding Maintenance(FFM)

- Failure Finding Maintenance tasks are aimed at detecting hidden failures typically associated with protective functions.

Maintenance Checklist

Activity	Frequency	Auto?
Scan hard disk file systems for errors	Daily	Yes
Scan for viruses	Daily	Yes
Back up data	Daily	No
Clean monitor screen	Weekly	No
Defragment hard disks	Weekly	Yes
Scan for hard disk read errors	Weekly	Yes
Clean mouse and keyboard	Monthly	No
Check for full hard disk volumes and remove unnecessary files	Monthly	No
Update virus definition files	Monthly	Sometimes
Check power protection devices to ensure they are still protecting the system	Quarterly	No

Concept of Preventive and corrective maintenance.

TYPES OF MAINTENANCE

Preventive Maintenance

Risk Based Maintenance(RBM)

- Risk Based Maintenance (RBM) is when you use a risk assessment methodology to assign your scarce maintenance resources to those assets that carry the most risk in case of a failure (remembering that risk = likelihood x consequence).

Things You Should Do Every Week

- Run **Disk Clean-Up Utility** to get rid of temporary files, cookies, and other file debris. (Check [Windows 7](#), [Windows Vista](#), and [Windows XP](#) guides to set up an automatic schedule.)
- Check hard drives for errors and capacity with **Check Disk Utility**. (Check [Windows 7](#), [Windows Vista](#), and [Windows XP](#) guides to set up an automatic schedule.)
- Update malware and anti-virus software to download new virus definitions. (Check [Windows 7 & Windows Vista](#) for security settings.)
- Verify all connections to computer workstations, printers, networks, and other peripheral devices.

Concept of Preventive and corrective maintenance.

TYPES OF MAINTENANCE

Preventive Maintenance

Condition Based Maintenance(CBM)

- It may be possible to take action to prevent it from failing completely and/or to avoid the consequences of failure. Condition Based Maintenance as a strategy therefore looks for physical evidence that a failure is occurring or is about to occur.



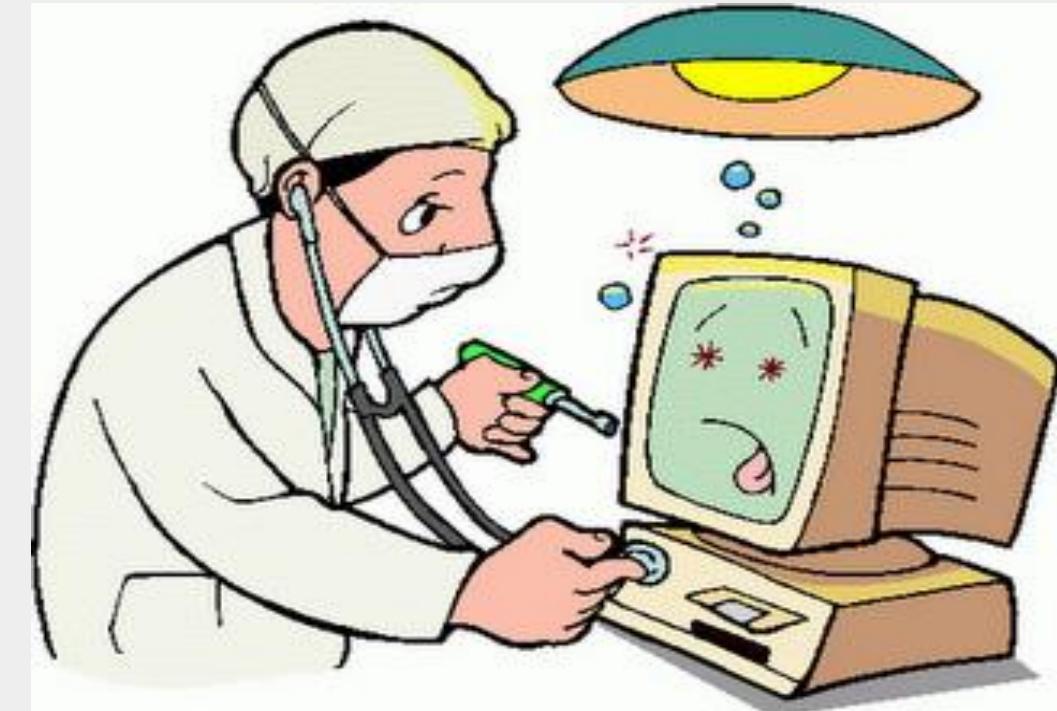
Concept of Preventive and corrective maintenance.

TYPES OF MAINTENANCE

Preventive Maintenance

Predictive Maintenance(PM)

- Predictive Maintenance (PDM) this was essentially as a synonym for Condition Based Maintenance.



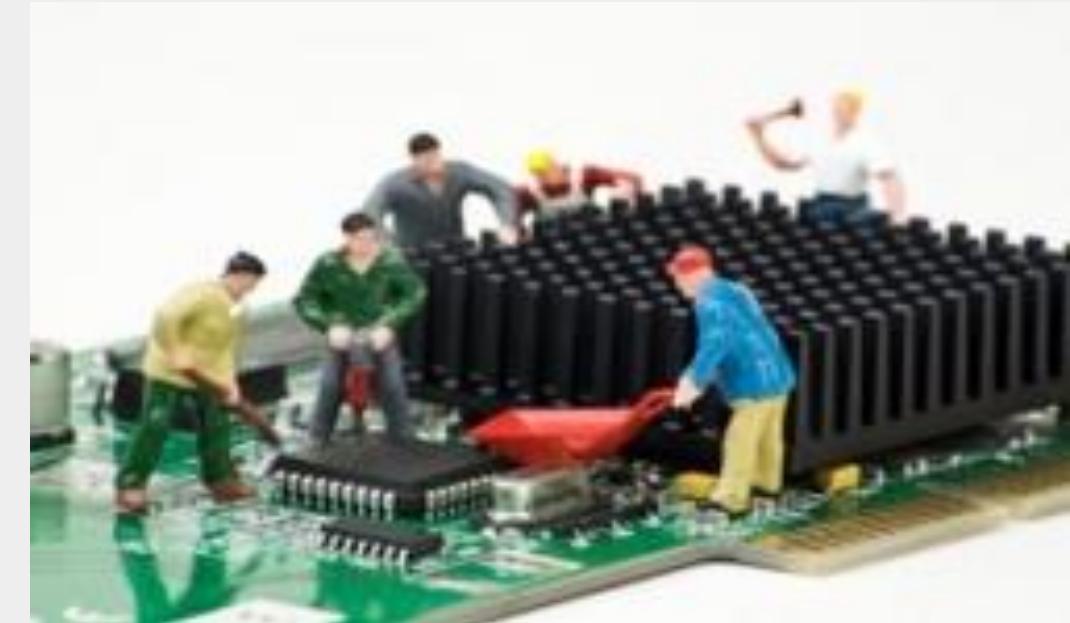
Concept of Preventive and corrective maintenance.

TYPES OF MAINTENANCE

Corrective Maintenance

Corrective Maintenance (CM)

- A Run to Failure or Corrective Maintenance strategy only restores the function of an item after it has been allowed to fail



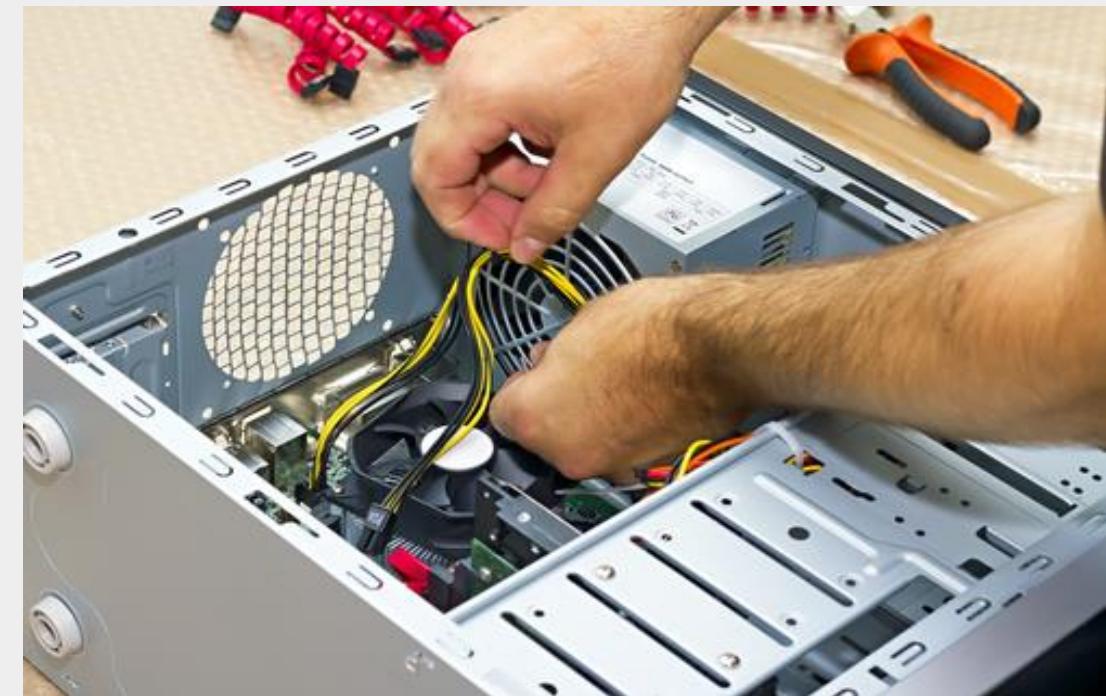
Concept of Preventive and corrective maintenance.

TYPES OF MAINTENANCE

Corrective Maintenance

Deferred Corrective Maintenance(DCM)

- when a corrective maintenance work request is raised it is essential that you prioritize it properly to make sure that where possible you defer the work request and give your team the time to properly plan and schedule the work.
- Emergency Maintenance(EM)



Concept of Preventive and corrective maintenance.

TYPES OF MAINTENANCE

Corrective Maintenance

Emergency Maintenance(EM)

- Emergency Maintenance is corrective maintenance that is so urgent that it breaks into your Frozen Weekly Schedule
- Emergency Maintenance is the one and only maintenance type that we really want to avoid as much as possible.



Image Source: <https://www.synopc.com/our-services>

Tools required

7 Must-Have Hand Tools

- Flat-Tip Screwdrivers
- Philips-Head Screwdrivers
- Torx Screwdrivers and Nut Drivers
- Wire Cutters



Image Source: <https://waneyhcsb.wordpress.com/2012/05/17/pc-tool-kits-and-their-functions/>

Tools required

7 Must-Have Hand Tools

- Needle-Nose Pliers
- Wire Strippers
- Crimpers

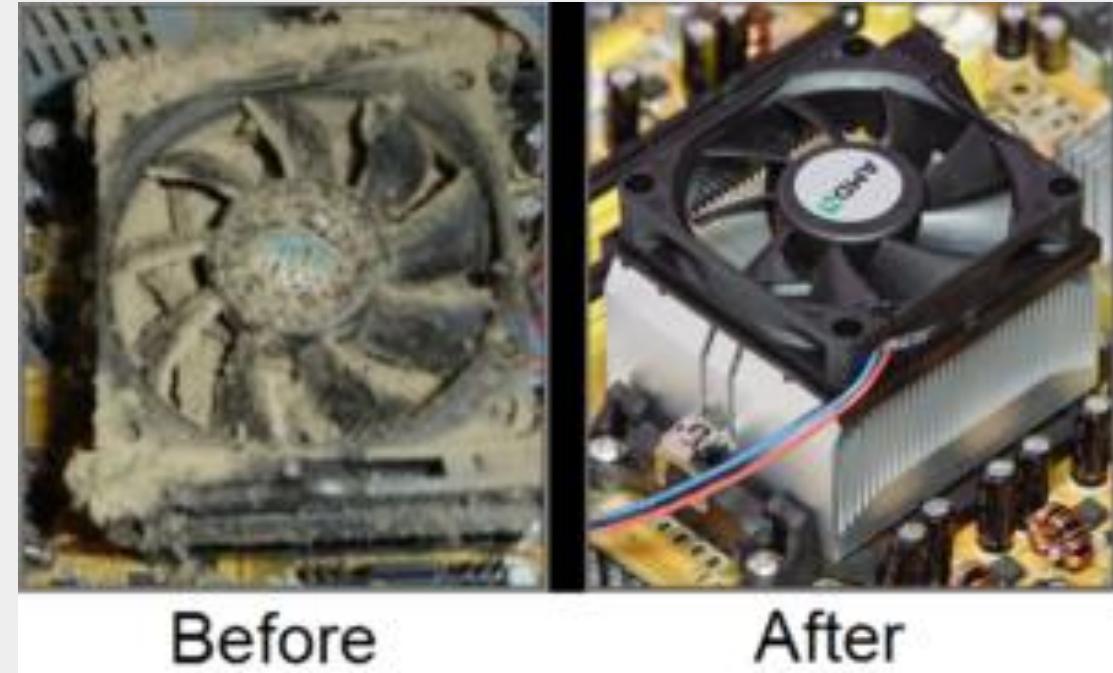


Active & Passive Maintenance

Active Maintenance

The following is a sample weekly disk-maintenance checklist:

- Back up any data or important files.
- Delete all temporary files.
- Empty the Recycle Bin.
- Check for and install antivirus software updates.
- Finally, run a disk-defragmenting program.



Before

After

Active & Passive Maintenance

Active Maintenance

The following are some monthly maintenance procedures you should perform:

- Create an operating system startup disk.
- Check for and install any BIOS updates.
- Check for and install any updated drivers for the video, sound, modem, and other devices.
- Check for and install any operating system updates.
- Clean the system
- Check that the cooling fans are operating properly.

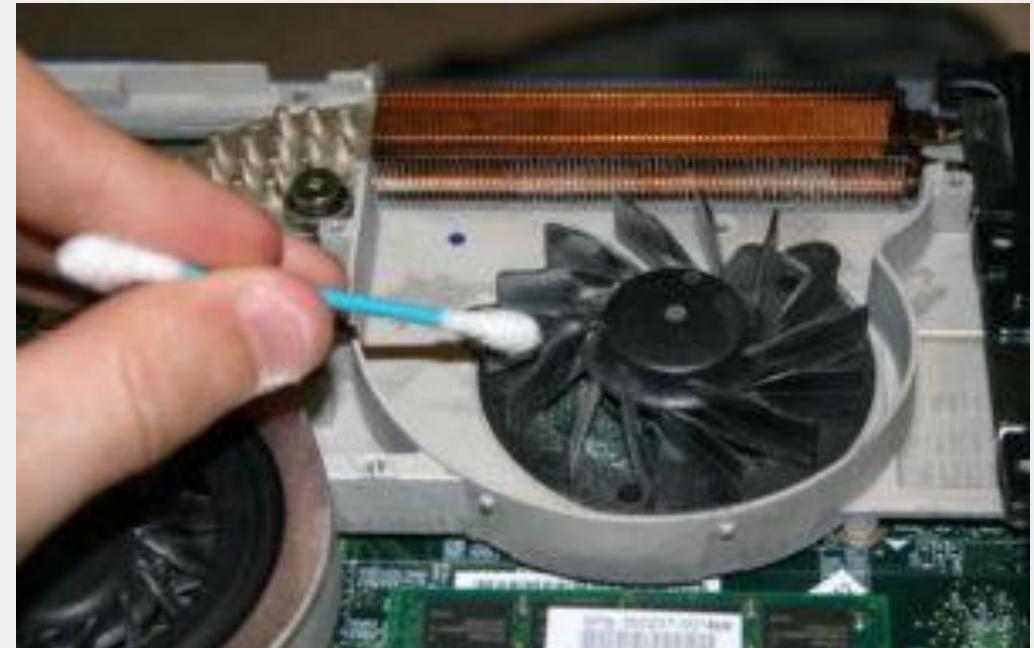


Image Source: <https://rheniumsolutions.co.ke/preventive-maintenance-2/>

Active & Passive Maintenance

Passive Maintenance

Passive preventive maintenance involves taking care of the system by providing the best possible environment—both physical and electrical—for the system.

- General System Care and Handling
- The Operating Environment
- Temperature, Humidity, and Altitude

Passive préventive maintenance

- It involves taking care of the system from physical environment and electrical problems.
- Physical conditions such as temperature, thermal stress, dust and smoke contamination and shock and vibration.
- Electrical issues such as ESD (Electro Static Discharge), power line noise and RFI (Radio frequency interference)

Physical contributors to system failure

1. Dust and pollutants

The power supply fan carries air borne particles through your system and they collect inside the system.

Prevention of dust and dirt

Use dust covers when not in use.

Use curtains on windows

Use air conditioners for computer room.

Avoid shoes into computer room.

Avoid smoking near a PC.

Use vacuum cleaner to clean the surrounding area of the PC frequently.

Maintenance scheduling

Maintenance scheduling

There are no universal maintenance schedules that work on every computer. Each schedule must be individualized to meet the needs of the work environment.

Do This Daily

- Back up data.
- Check computer ventilation to ensure that it is clear.
- Remove any paper, books, or boxes that might impede the flow of air into or out of the computer.

Maintenance Checklist

Activity	Frequency	Auto?
Scan hard disk file systems for errors	Daily	Yes
Scan for viruses	Daily	Yes
Back up data	Daily	No
Clean monitor screen	Weekly	No
Defragment hard disks	Weekly	Yes
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Clean mouse and keyboard	Monthly	No
Check for full hard disk volumes and remove unnecessary files	Monthly	No
Update virus definition files	Monthly	Sometimes
Check power protection devices to ensure they are still protecting the system	Quarterly	No

Image Source: <https://www.slideshare.net/RheighHenleyCalderon/5-pc-maintenance>

Maintenance scheduling

Maintenance scheduling

Do This Weekly

- Clean the outside of the case.
- Clean the screen.
- Run CHKDSK or ScanDisk on all hard disk drives.
- Run a current antivirus program and check all drives.
- Inspect all peripheral devices.

Maintenance Checklist

Activity	Frequency	Auto?
Scan hard disk file systems for errors	Daily	Yes
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Maintenance scheduling

Maintenance scheduling

Do This Monthly

- Clean the inside of the system.
- Clean the inside of any printers.
- Vacuum the keyboard.
- Clean the mouse ball and x and y wheels.
- Defragment all hard disk drives.
- Delete any unnecessary temporary files.

Maintenance Checklist

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Maintenance scheduling

Maintenance scheduling

Do This Every Six Months

- Perform an extensive preventive maintenance check
- Apply an antistatic solution to the entire computer.
- Check and reseat all cables.
- Run the printer's self-test programs.

Maintenance Checklist

Activity	Frequency	Auto?
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Maintenance scheduling

Maintenance scheduling

Do This Annually

- Reformat the hard disk drive and reinstall all software. Don't forget to back up data first
- Check all floppy disk drives.
- Consider an upgrade to your computer. Check to see that your components can handle your workload.

Maintenance Checklist

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Maintenance scheduling

Maintenance scheduling

Summary

- The best maintenance practice is to keep a computer clean.
- Never use solvent-based cleaners on a computer.
- Never use liquids on the electrical components inside a computer.
- Create and implement a regular maintenance program for each computer under your care.

Maintenance Checklist

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Need of diagnostics program Features, limitations.

Examples of commonly used diagnostic programs.

Need of diagnostics program

- Computer diagnostics tools are pieces of software that give you the knowledge you need to be able to potentially repair your own computer.
- Some of these tools come built in to your operating system while others come from 3rd party software developers.

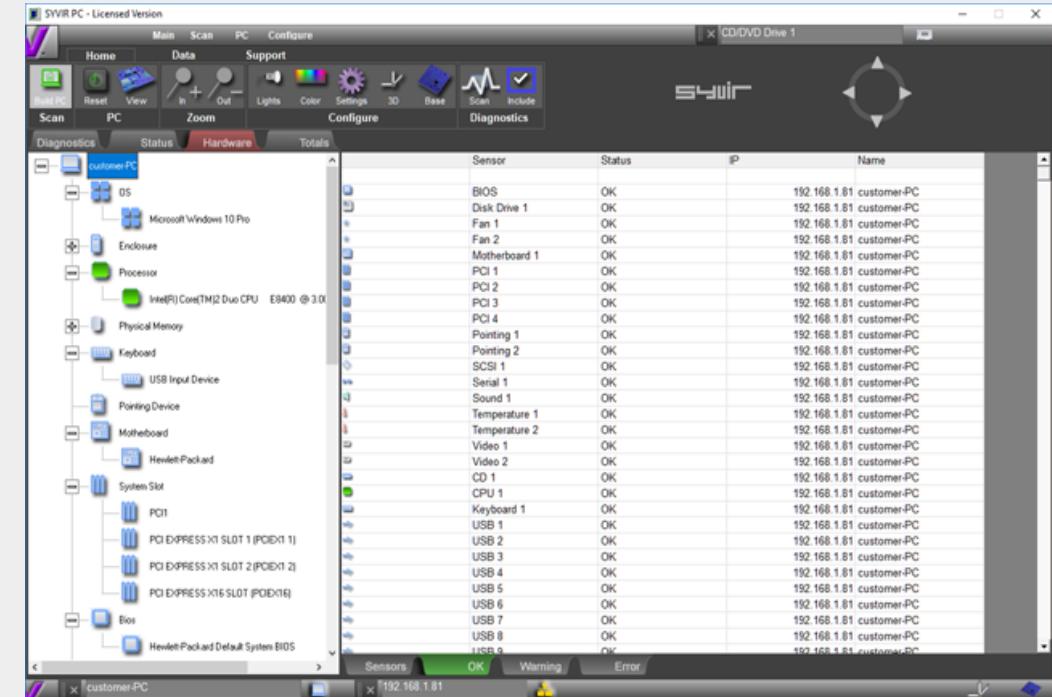


Image Source: https://www.syvir.com/pc_diagnostic.aspx

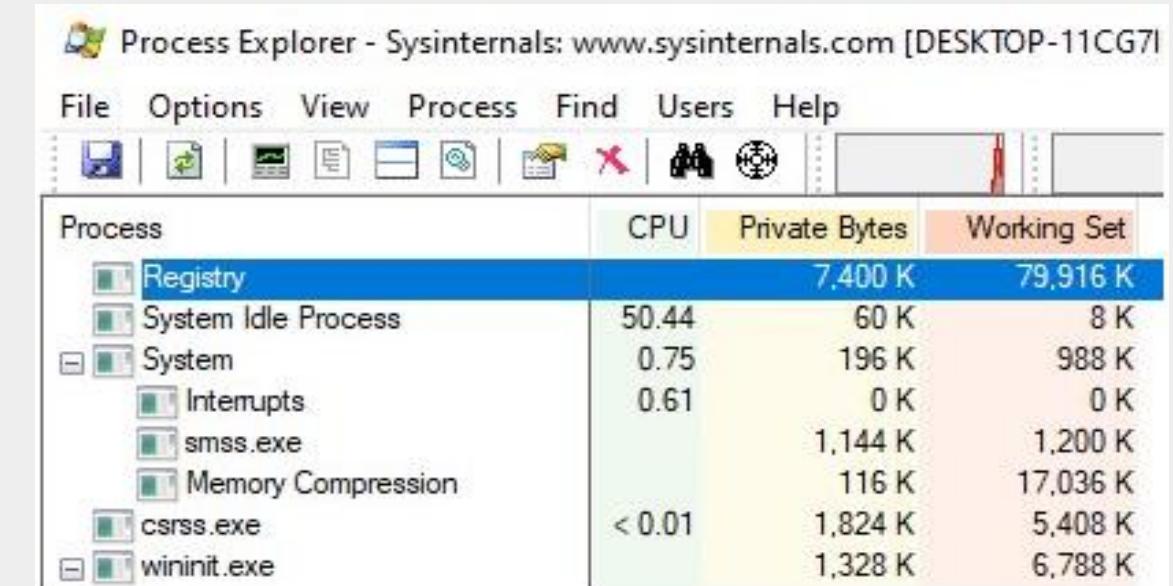
Need of diagnostics program Features, limitations.

Examples of commonly used diagnostic programs.

Need of diagnostics program

The best diagnostic tools to detect the problem in your Windows PC and fix it right away.

Process Explorer



Process	CPU	Private Bytes	Working Set
Registry	7.400 K	79,916 K	
System Idle Process	50.44	60 K	8 K
System	0.75	196 K	988 K
Interrupts	0.61	0 K	0 K
smss.exe		1,144 K	1,200 K
Memory Compression		116 K	17,036 K
csrss.exe	< 0.01	1,824 K	5,408 K
wininit.exe		1,328 K	6,788 K

Need of diagnostics program Features, limitations.

Examples of commonly used diagnostic programs.

Need of diagnostics program

Windows Sysinternal Suite

Autoruns - Sysinternals: www.sysinternals.com	
File Entry Options Help	
KnownDLLs Winlogon Winsock P	
Everything	Logon Explorer Internet E
Autorun Entry Description	
HKLM\SYSTEM\CurrentControlSet\Control\SafeBoot\AlternateShell	
<input checked="" type="checkbox"/> cmd.exe	Windows Command Processor
HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Run	
<input checked="" type="checkbox"/> RtHDVBg_PushButton	HD Audio Background Process
<input checked="" type="checkbox"/> RTHDVCPL	Realtek HD Audio Manager
<input checked="" type="checkbox"/> WavesSvc	Waves Maxx Audio Service Application
HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\Run	

Need of diagnostics program Features, limitations.

Examples of commonly used diagnostic programs.

Need of diagnostics program

Wifi Analyzer

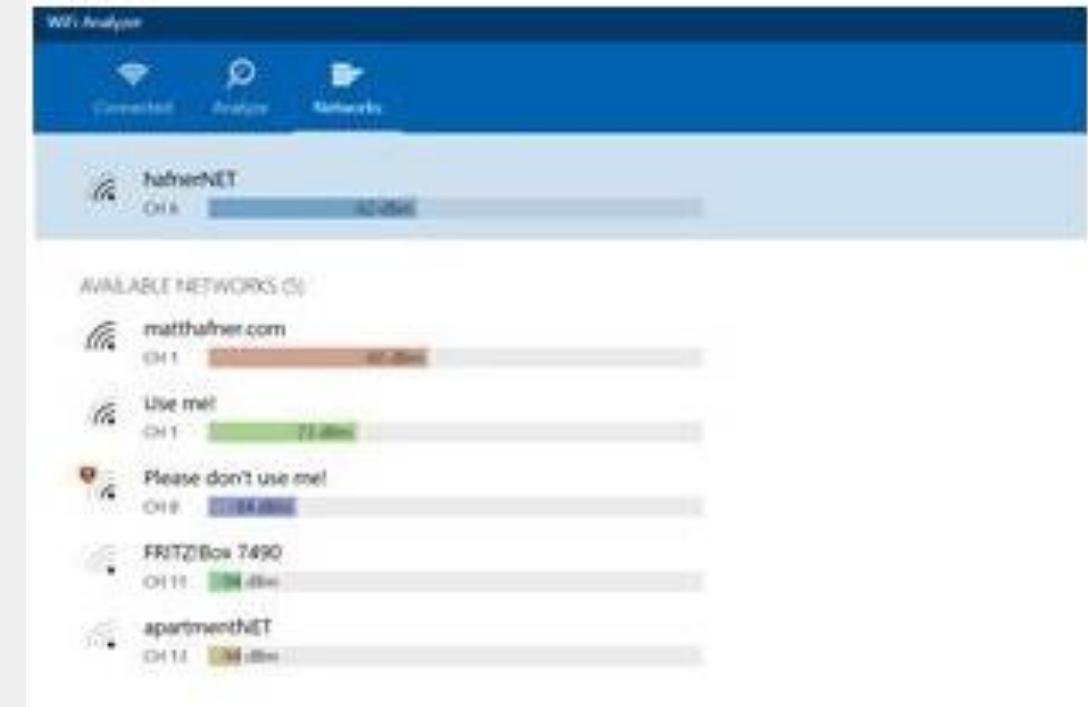
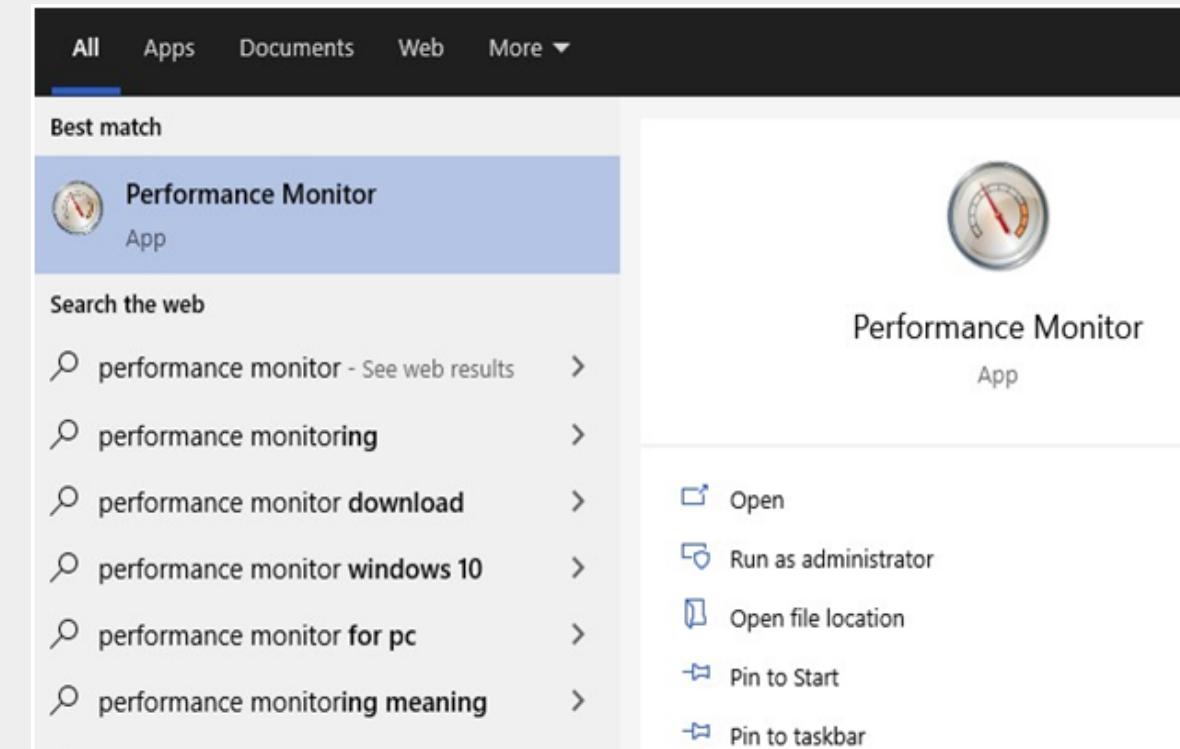


Image Source: <https://thegeekpage.com/hardware-diagnostic-tools/>

Need of diagnostics program Features, limitations. Examples of commonly used diagnostic programs.

Need of diagnostics program

Performance Monitor



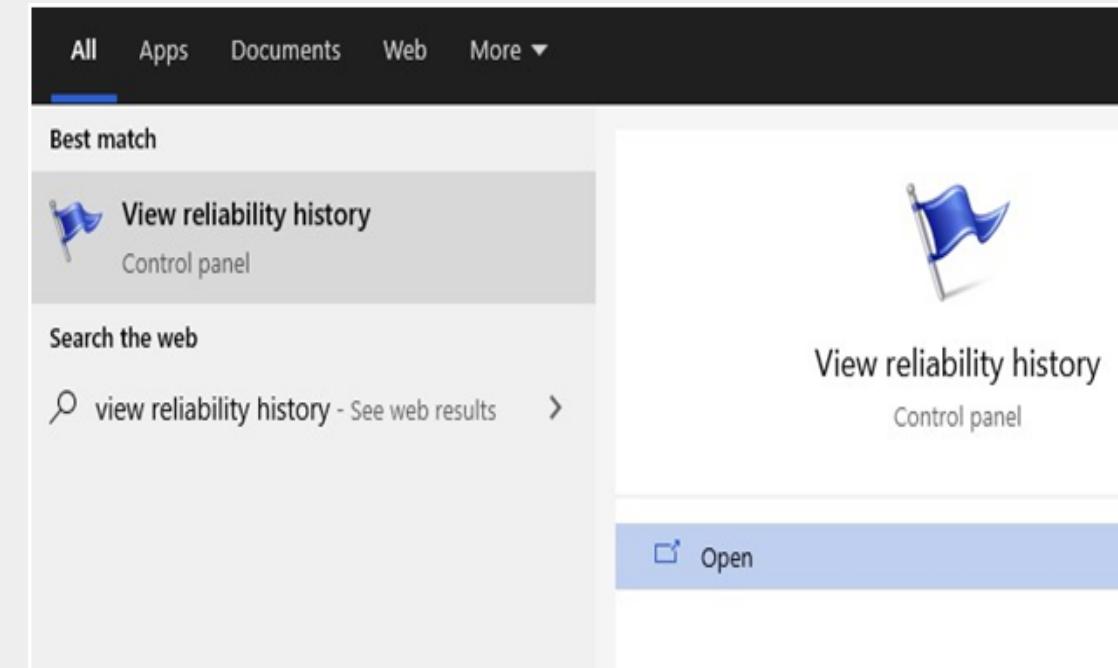
Need of diagnostics program

Features, limitations.

Examples of commonly used diagnostic programs.

Need of diagnostics program

Reliability Monitor



Need of diagnostics program Features, limitations.

Examples of commonly used diagnostic programs.

Need of diagnostics program

Resource Monitor



Need of diagnostics program Features, limitations. Examples of commonly used diagnostic programs.

Need of diagnostics program

ESET SysInspector

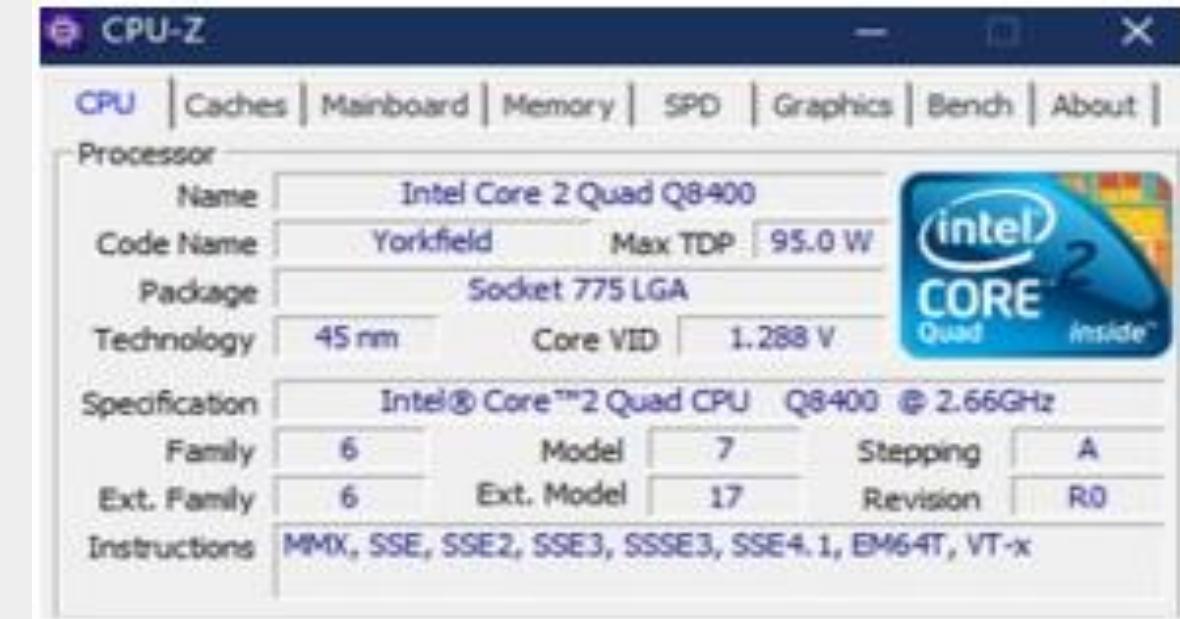


Need of diagnostics program

Features, limitations.

Examples of commonly used diagnostic programs.

Need of diagnostics program



CPU-Z

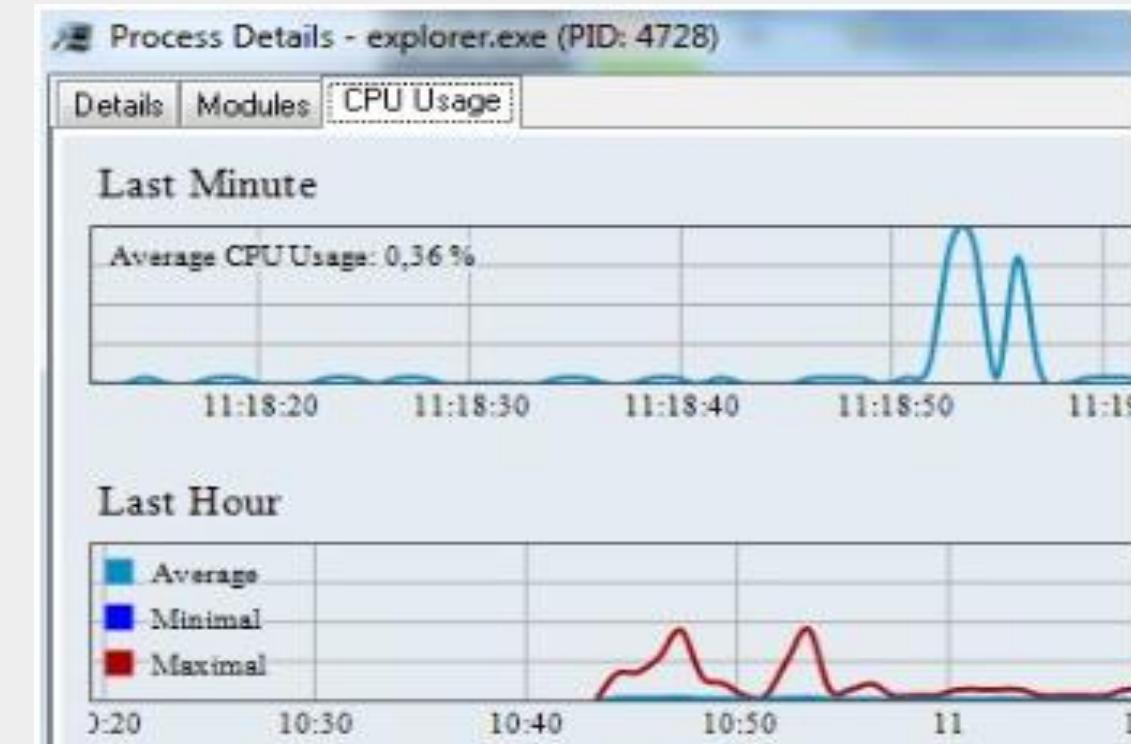
Need of diagnostics program

Features, limitations.

Examples of commonly used diagnostic programs.

Need of diagnostics program

System Explorer



Types of monitor, Monochrome and color

What is a Monitor ?

- A monitor is an electronic output device that is also known as a video display terminal (VDT) or a video display unit (VDU).



Image Source:

https://www.tutorialspoint.com/internet_technologies/internet_overview.htm

Types of monitor, Monochrome and color

Types of Monitor

- Cathode Ray Tube (CRT) Monitors
- Flat Panel Monitors
 - Liquid Crystal Display: LCD
 - Gas Plasma Display
 - Touch Screen Monitors
 - LED Monitors
 - OLED Monitors



Image Source:

https://www.tutorialspoint.com/internet_technologies/internet_overview.htm

Types of monitor, Monochrome and color

Types of Monitor(Cond.)

- Flat Panel Monitors
 - DLP Monitors
 - TFT Monitor
 - Plasma Screen Monitor



Image Source:

https://www.tutorialspoint.com/internet_technologies/internet_overview.htm

Types of monitor, Monochrome and color

Monochrome Monitor

- Also known as monochromatic monitors
- Used extensively during the middle to latter part of the 20th century
- Monochrome monitor is somewhat like that of a black and white television set



Image Source:

https://www.tutorialspoint.com/internet_technologies/internet_overview.htm

Types of monitor, Monochrome and color

CRT Monitor

- CRT Monitor display by using a combination of phosphors
- The phosphors are different colors
 - Beam Penetration Method
 - Shadow-Mask Method



Image Source:

https://www.tutorialspoint.com/internet_technologies/internet_overview.htm

Types of monitor, Monochrome and color

Beam Penetration Method

- It used with random-scan monitors
- CRT screen is coated with two layers of phosphor
- This method produces four colors only, red, green, orange and yellow

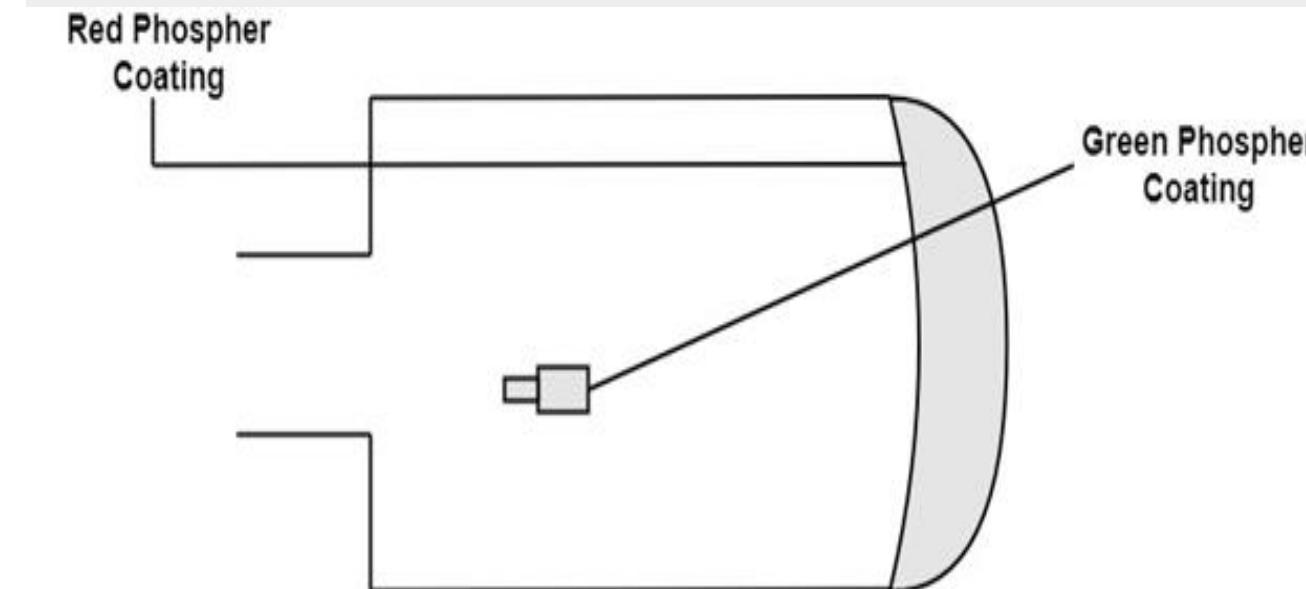


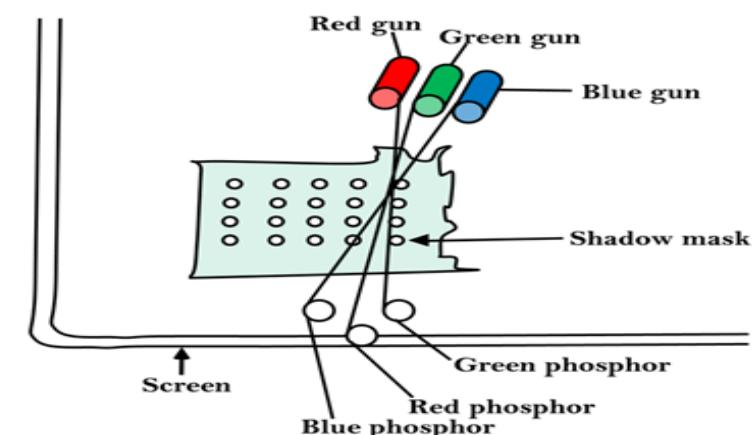
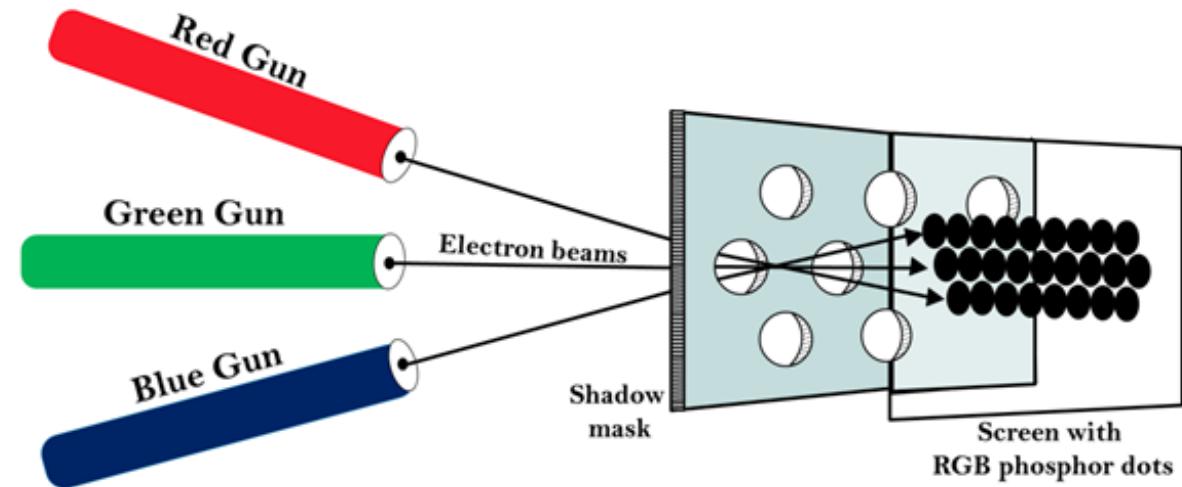
Image Source:

https://www.tutorialspoint.com/internet_technologies/internet_overview.htm

Types of monitor, Monochrome and color

Shadow-Mask Method

- It is commonly used in the Raster-Scan System
- It is used in the majority of color TV sets and monitors
- Shadow mask grid is pierced with small round holes in a triangular pattern.



The Shadow mask CRT

Image Source:

https://www.tutorialspoint.com/internet_technologies/internet_overview.htm/

CGA, EGA, VGA, SVGA, Digital Analogue

CGA(Color Graphics Adapter)

- The CGA standard, introduced in 1981
- CGA card came video memory different modes
 - **Text mode**
 - **Color Mode**
 - **Monochrome Graphics Mode**

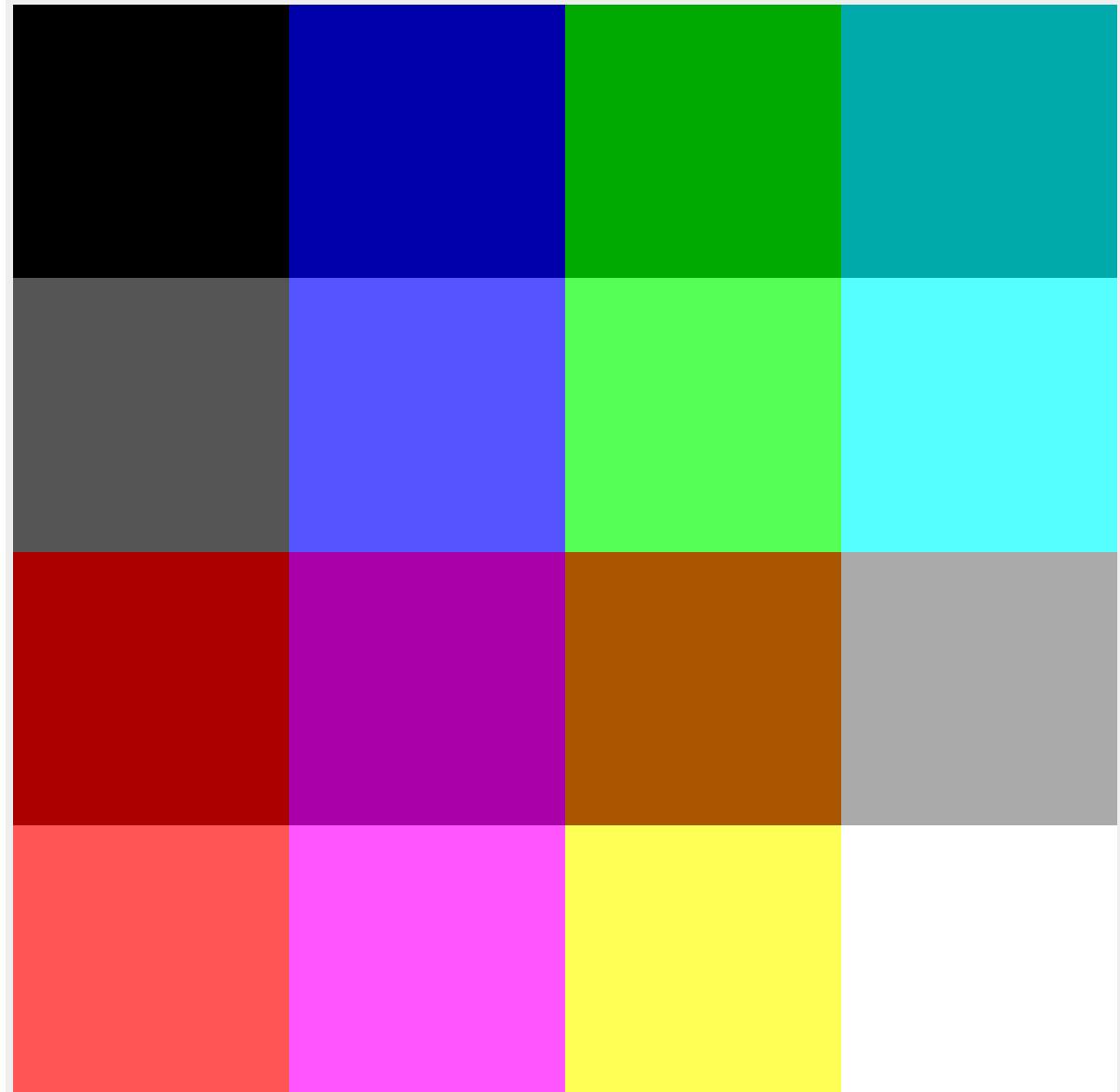


Image Source:

https://www.tutorialspoint.com/internet_technologies/internet_overview.htm

CGA, EGA, VGA, SVGA, Digital Analogue

EGA(Enhanced Graphics Adapter)

- Enhanced Graphics Adapter was introduced by IBM in 1984
- EGA increased resolution to 640×350 pixels in 16 colors
- 256KB of video memory to allow full implementation of all EGA modes
 - **High-resolution mode**
 - **CGA mode**
 - **MDA mode**

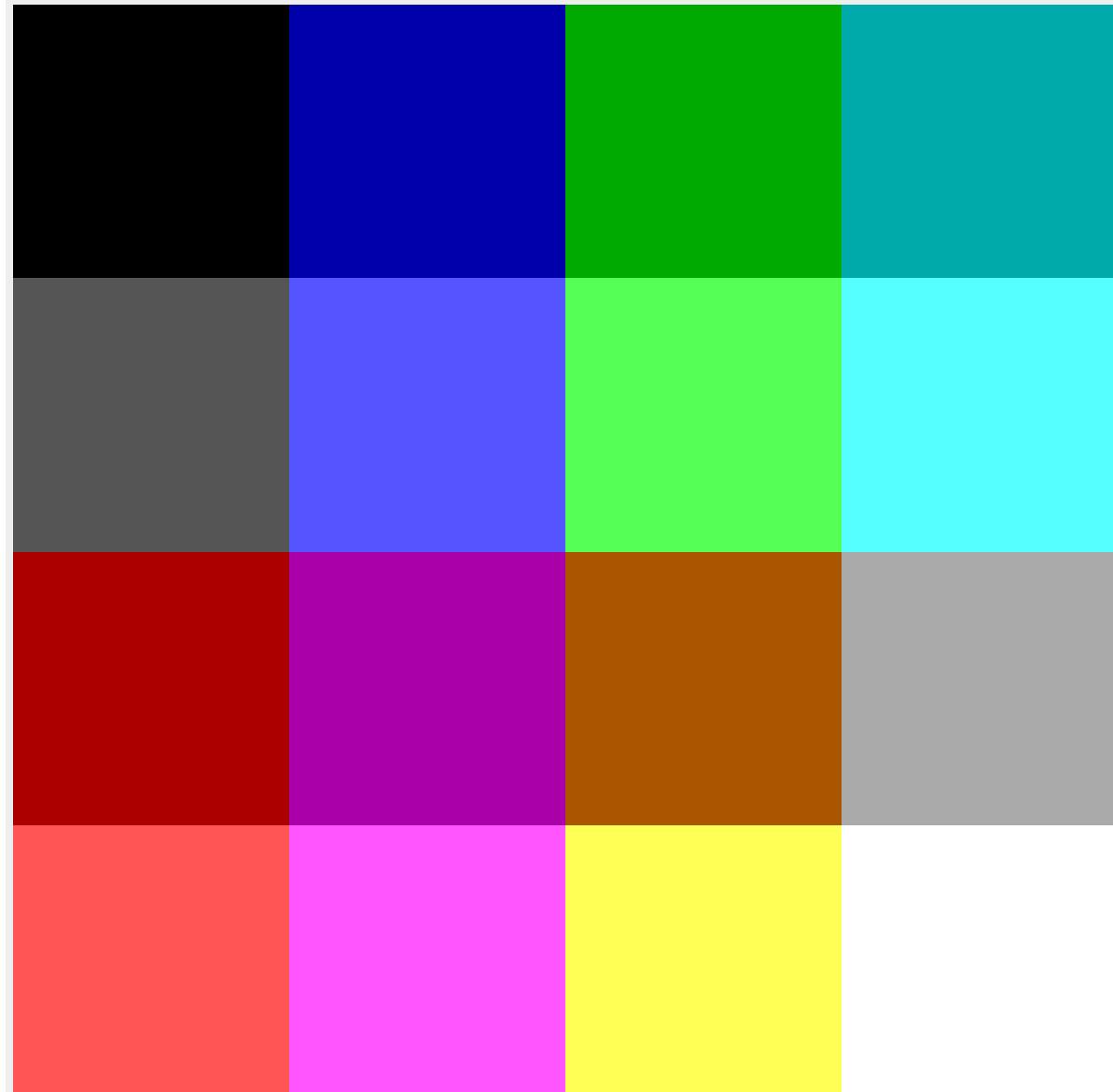


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CGA, EGA, VGA, SVGA, Digital Analogue

VGA(Video Graphics Array)

- VGA graphics started to come on the motherboard as a single chip
- VGA's 640×480 remains a sort of lowest common denominator for all graphics cards
- The VGA specification dictated 256KB of video RAM, 16- and 256-color modes



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CGA, EGA, VGA, SVGA, Digital Analogue

SVGA(Super Video Graphics Array)

- Super VGA was first defined in 1989
- It was invented by the Video Electronics Standards Association (VESA)
- SVGA evolved to 1024×768 with 256 colors and even higher resolutions and colors as time went on



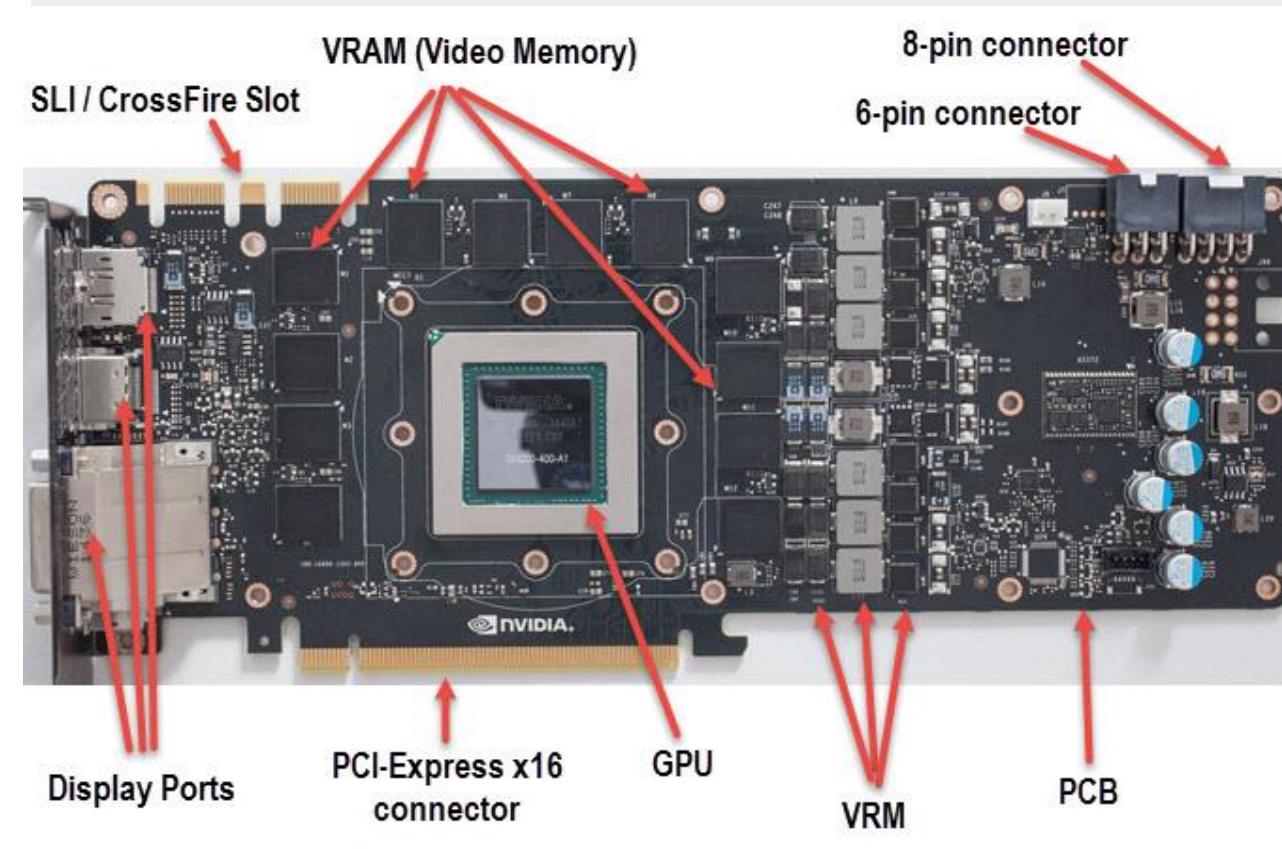
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Main components & connectors on Display

Components of Graphics Card

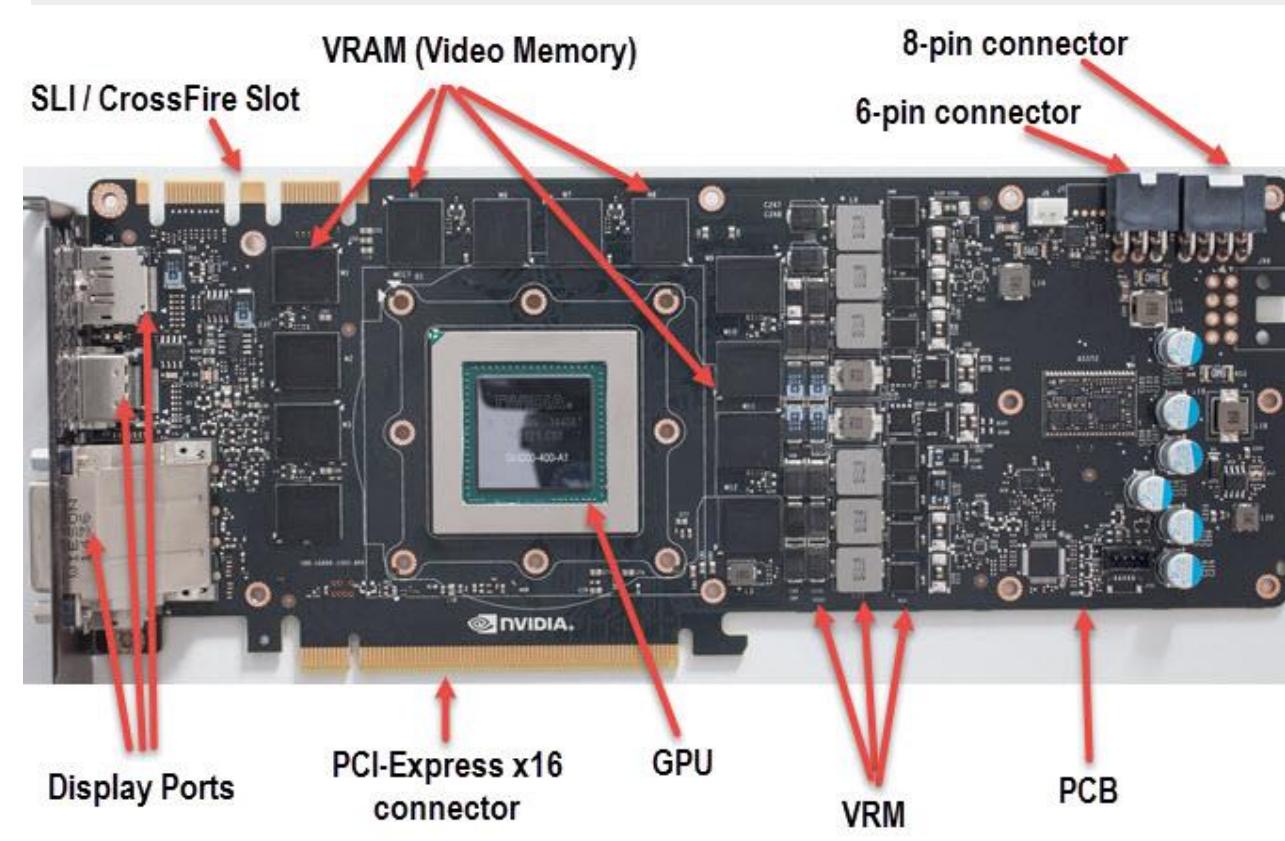
- GPU or **Graphics Processing Unit** is the main component and heart of the graphics card
- It is also known as Graphics Processor and does all the processing in your graphics card



Main components & connectors on Display

Components of Graphics Card

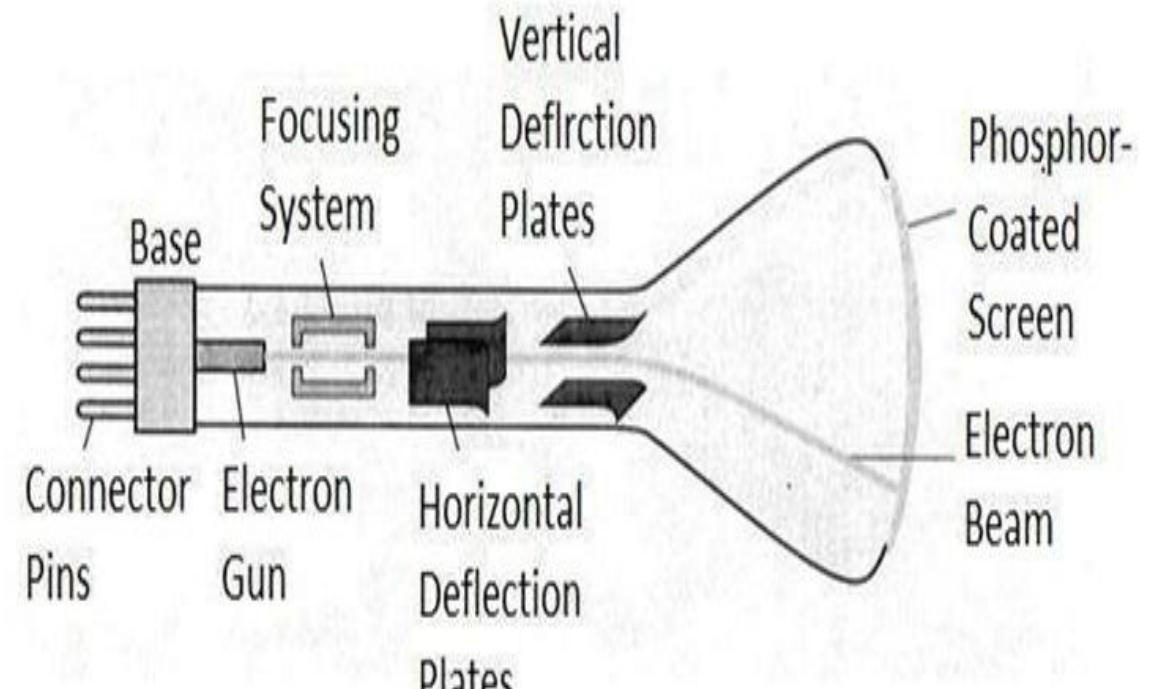
- VRAM
- VRM(Voltage Regulator Module)
- Cooler
- PCB
- PCI Express x16 connector
 - 8 Pin
 - 6 Pin
- SLI / Cross Fire Slot



LCD and CRT Monitors

CRT Monitors

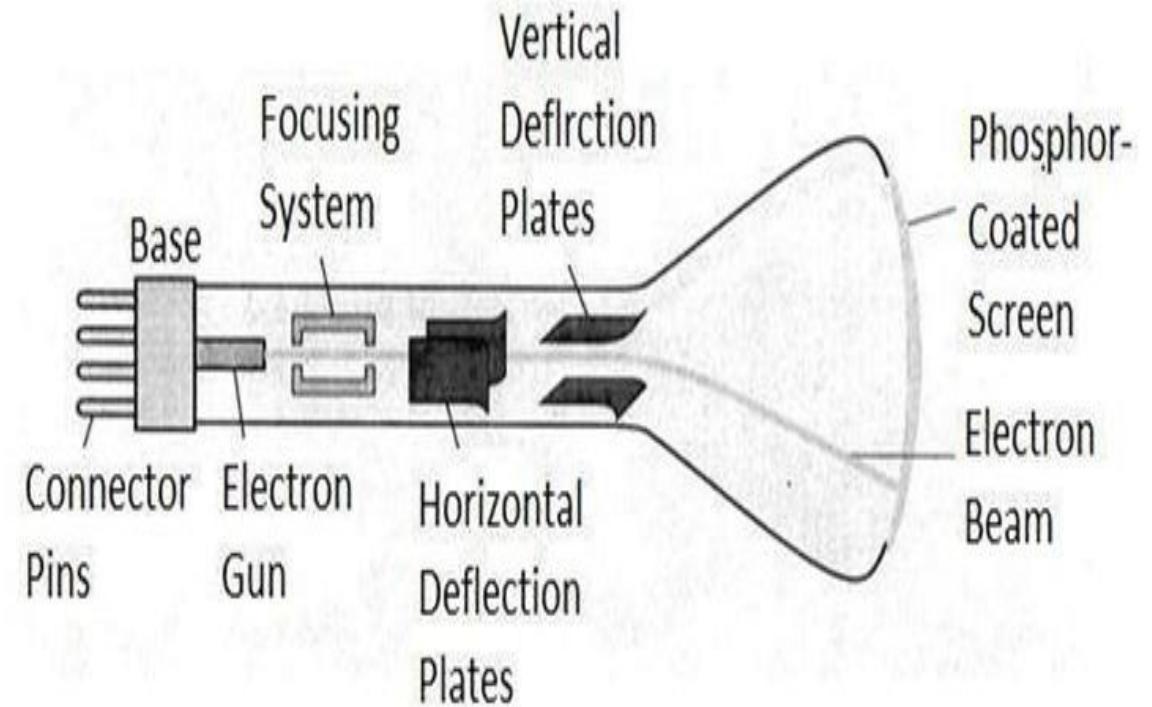
- It is an evacuated glass
- An electron gun at the rear of the tube produce a beam of electrons
- Inner side screen is coated with phosphor substance which gives light when it is stroked
- The control grid voltage determines how many electrons are actually in the electron beam.



LCD and CRT Monitors

CRT Monitors

- The voltage applied to vertical and horizontal deflection plates is control vertical and horizontal deflection, respectively.
- There are two techniques used for producing images on the CRT screen:
 1. Vector scan/Random scan
 2. Raster scan display



LCD and CRT Monitors

LCD Monitors

- The American inventor J. Fergason created the first working liquid crystal display in 1970.
- Even though liquid crystals were discovered a long time ago, at first, they were applied for different purposes. Molecules of liquid crystals under the influence of electricity



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LCD and CRT Monitors

LCD Monitors

- LCD screens are an array of small segments called pixels, which can be manipulated for information displaying.
- Such displays have several layers, where two panels, made of glass material free of sodium and called substrate.
- The liquid crystal panel is illuminated by a light source

How LCDs Work

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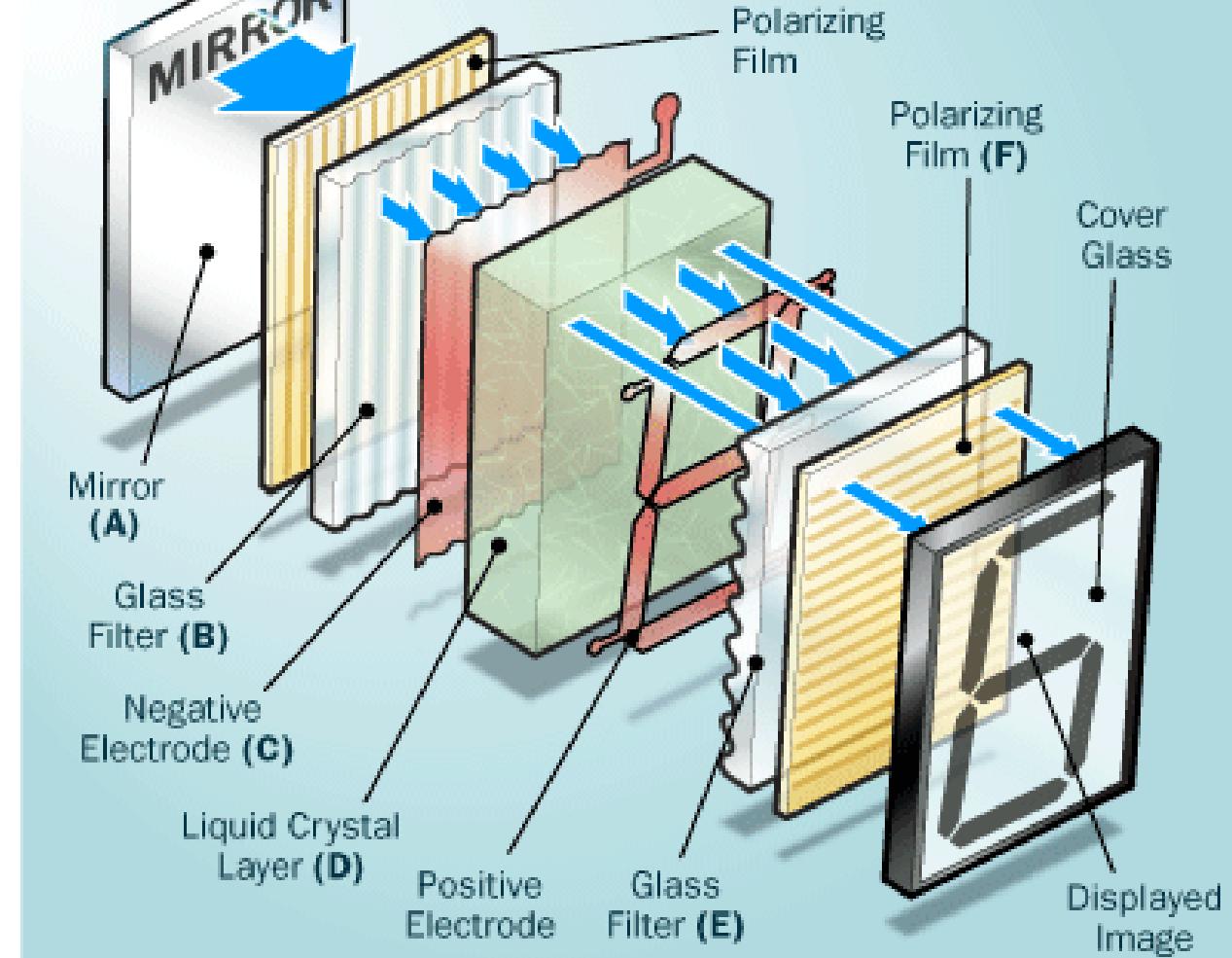


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LCD and CRT Monitors

LCD Monitors

- When an electric field appears, the molecules are partially aligned along it
- By producing screens using LCD monitor technology, the backlight of the monitor is used to output a color image so that light is generated at the back of the LCD monitors.
- By combining the three primary colors for each pixel of the screen, you can reproduce any color

How LCDs Work

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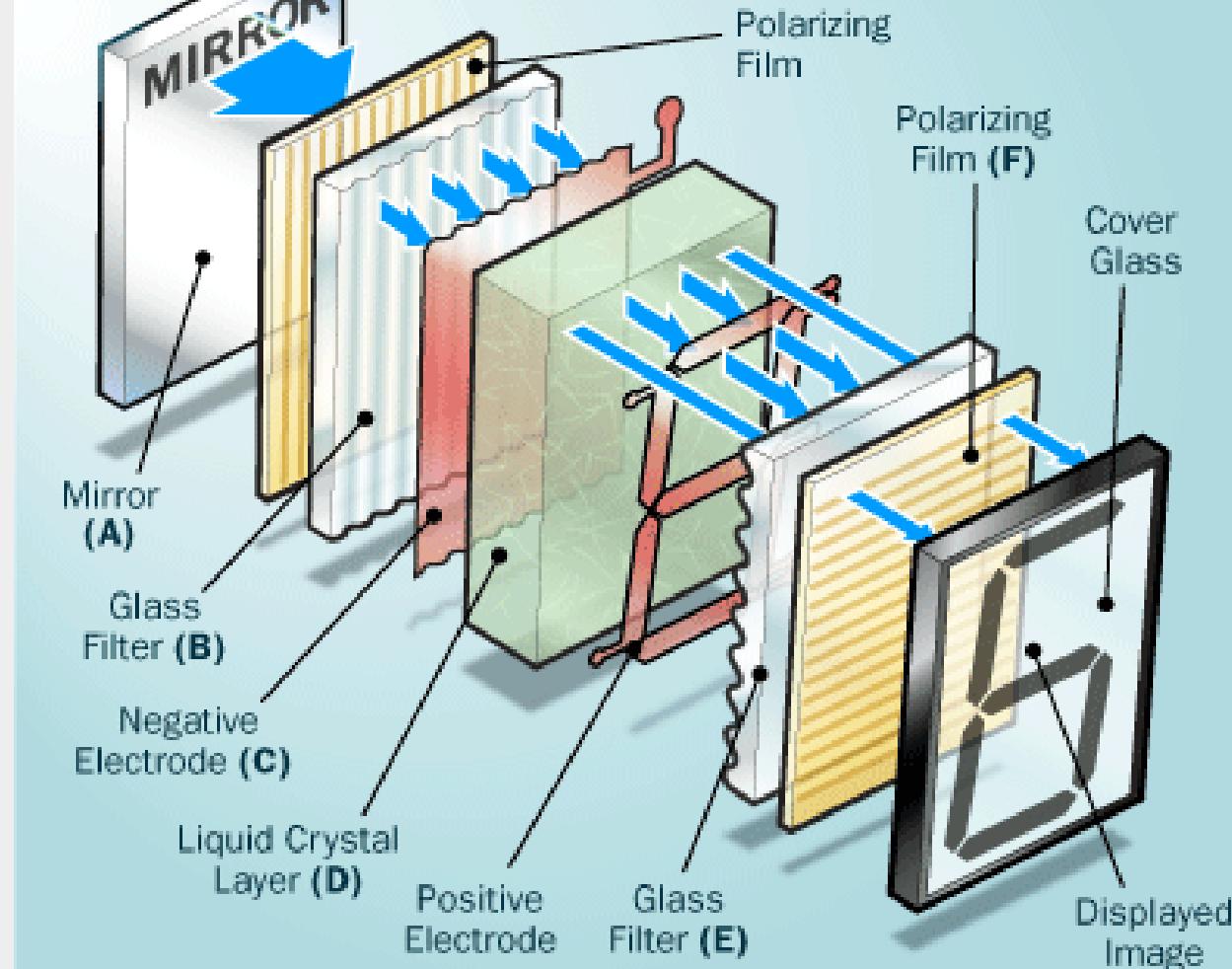


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Flat screens vs CRT display systems

BASIS FOR COMPARISON	CRT	LCD
Stands For	CRT stands for “Cathode Ray Tube”	LCD stands for “Liquid Crystal Display”.
Major components	Vacuum glass tube, phosphor screen,	Glass plates, nematic liquid

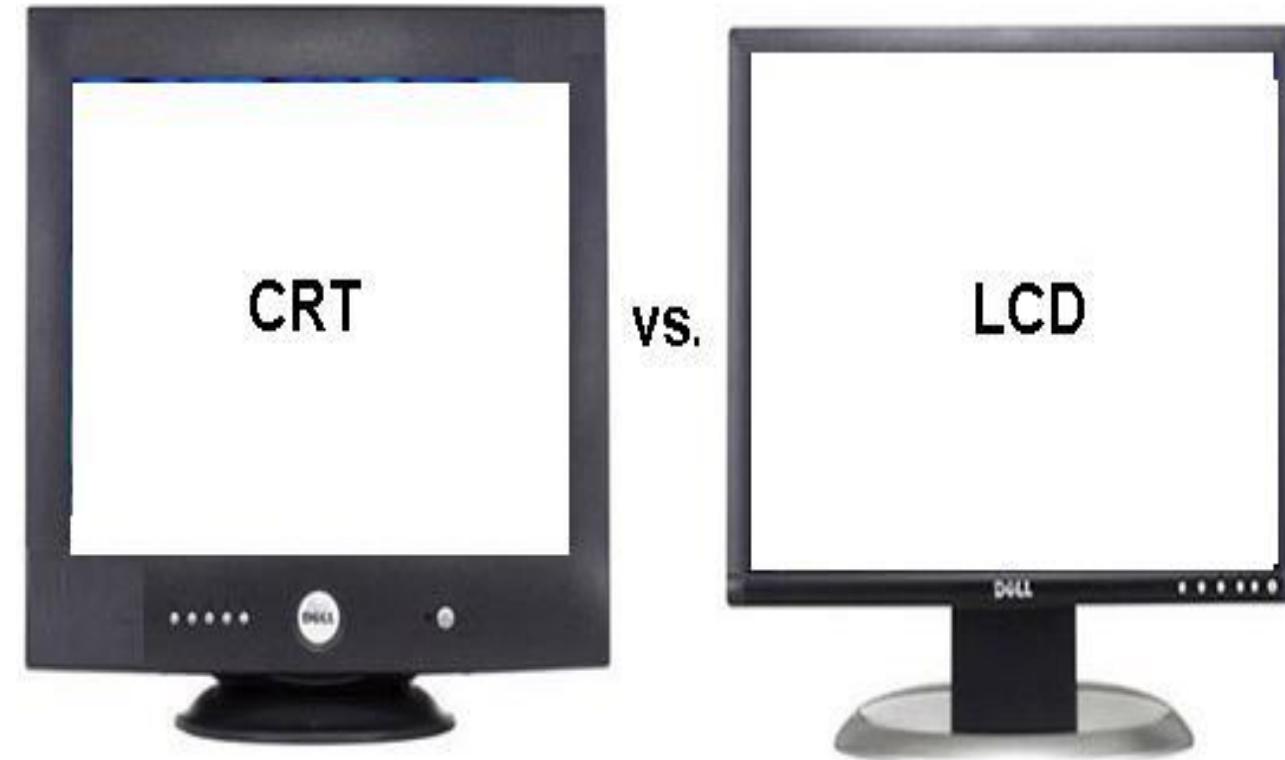


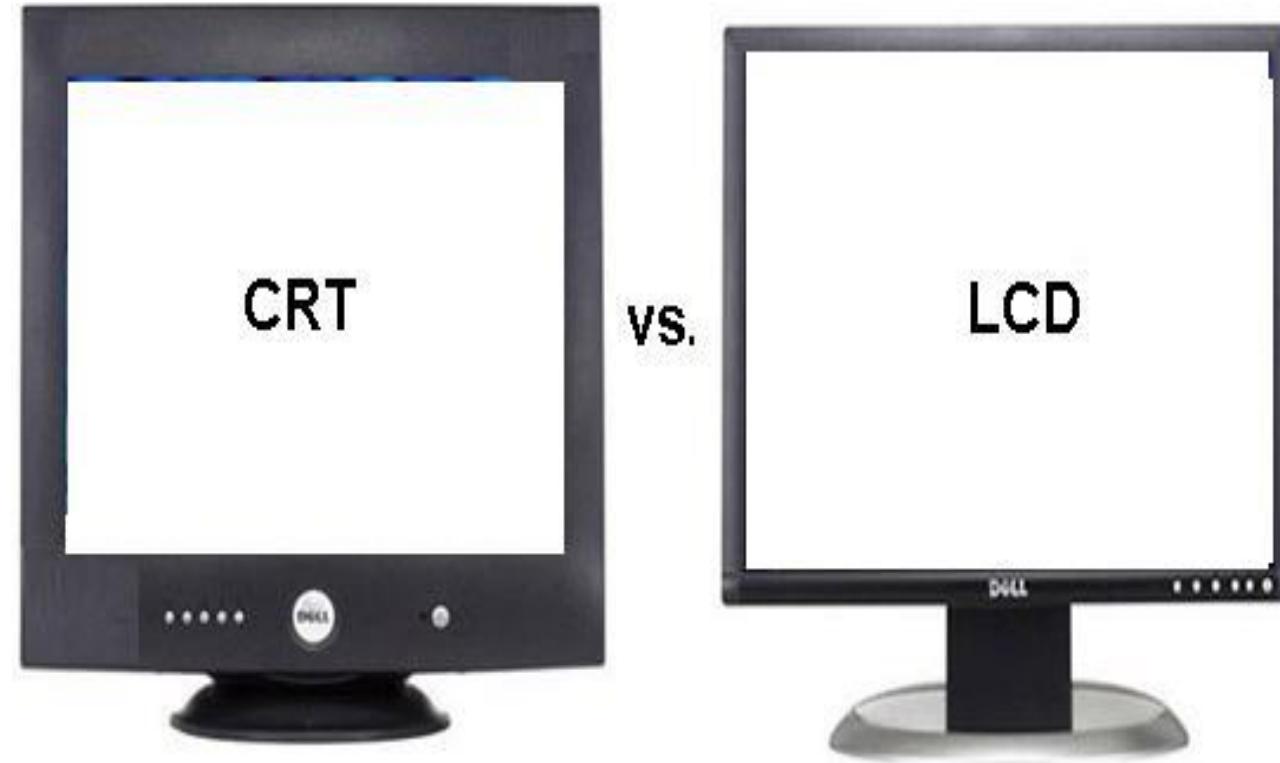
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Flat screens vs CRT display systems

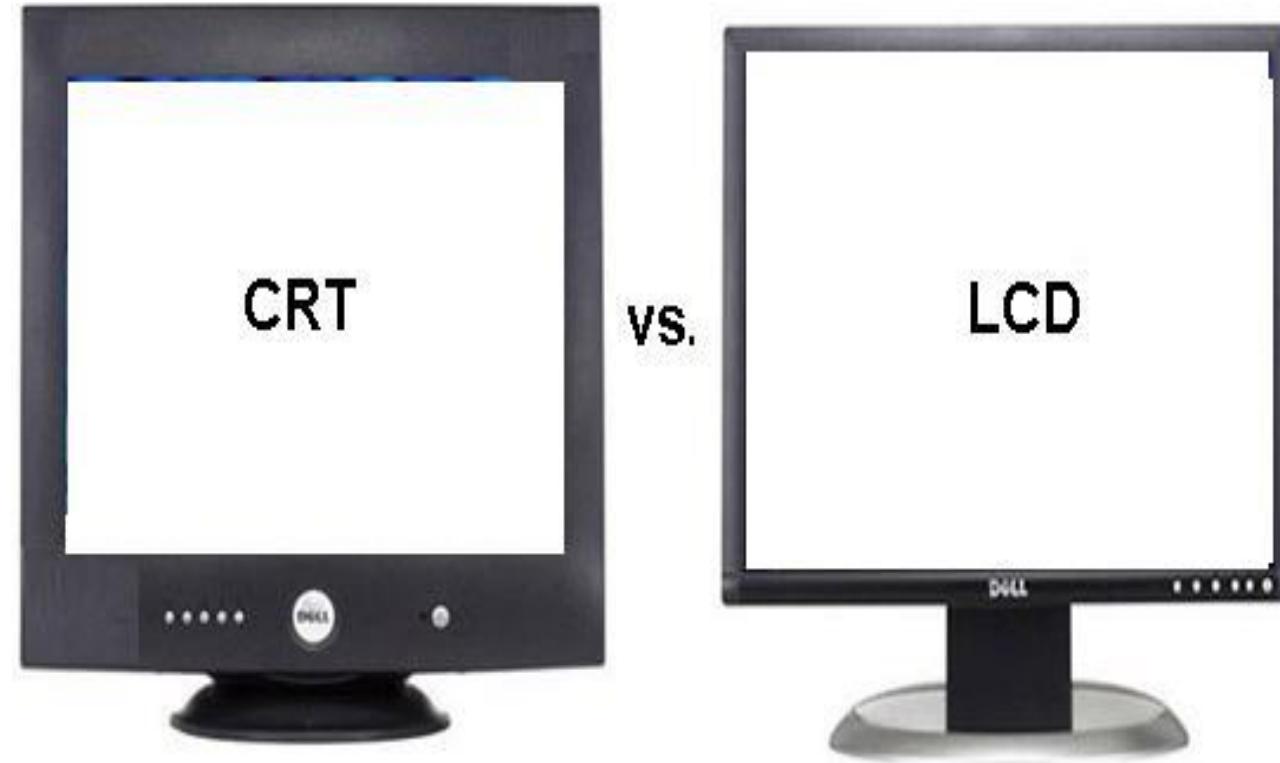
Differences

Weight	Heavier	Lighter
Power Consumption	It consumes High power.	It consumes Low power.
Power Consumption	It consumes High power.	It consumes Low power.
Image	Image	No Image



Flat screens vs CRT display systems

Differences		
Color	CRT is like Black.	The LCD is like White.
Image Retention	Image Retention is not there in CRT.	Image Retention is there in LCD.
Cost	It is less expensive.	It is more expensive.
Image	Electron Gun is	Liquid



Displays memory quality and performance

VRAM

- VRAM (video RAM) is a reference to any type of random access memory (RAM) used to store image data for a computer display.
- All types of VRAM are special arrangements of dynamic RAM (DRAM)



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Displays memory quality and performance

Types of VRAM

- **Multibank Dynamic RAM (MDRAM)**
- **Rambus Dynamic RAM (RDRAM)**
- **Synchronous Graphics RAM (SGRAM)**
- **Window RAM (WRAM)**



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