Hardware and Network Servicing

Level-II

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We would like to thank First of all God for giving me strength and health to start and finishing TTLM. And next we thanks Ministry of Labor and Skills that MoLS gives available environment like dormitory, hotel, water, coffee ceremony and other facilities for the all TVE trainers to work this Teaching, Training and Learning Materials (TTLM).

Acronym

List of abbreviation

I/O	Input or Output
VDU	visual display unit
OS	Operating system
HP-UX, AIX	Hewlett Packard Unix, Advanced Interactive Executive
Mac OS	Macintosh operating system
LAN	Local area network
WAN	Wide area network
VPN	Virtual private network
PSTN	public switched telephone network
Ipconfig	Internet Protocol Configuration
P2P	peer-to-peer
UTP	Unshielded twisted-pair
STP	Shielded twisted-pair
UTP	Unshielded twisted-pair
STP	Shielded twisted-pair
ASICs	application-specific integrated circuits
ASICs	application-specific integrated circuits
VLAN	Virtual Local Area Network
CLI	command-line interface
GUI	Graphical User Interface
HDD or SSD	Hard Disk Drive or Solid State Drive
CHKDSK and SFC	Check Disk and System File Checker

PDA Personal digital assistant

Introduction to the Module

This module provide you to acquire knowledge of Network devices and hardware peripherals that allow user interface and networking systems, how to connect network devices and computer hardware peripherals in general.

This module covers the units:

- Confirm requirements of client
- Obtain required peripherals
- Connect hardware peripherals
- Install peripherals to a network
- Use and maximize operating system
- Administer and support peripheral services
- Maintain peripherals and fix common problems
- Support input and output devices
- Configure peripheral services

Learning Objective of the Module

- Know the client requirements
- Know about network client and its purpose
- Understand remote system administration and available tools.
- Understand Operating system initialization
- To use the OS and to maximize skills
- To know the way of maintenance
- To support I/O devices
- Know how configuration of peripherals

Module Instruction

For effective use this modules trainees are expected to follow the following module instruction:

- Read the specific objectives of this Learning Guide.
- Read the information that this module contain.
- Complete the Self-check.
- Submit your accomplished Self-check.
- Do the Operations which in the module.
- Do the LAP test in page (if you are ready) and show your output to your teacher.

*Your teacher will assess your result either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to the next topic.

Unit one: Confirm requirements of client

This unit is developed to provide you the necessary information regarding the following content coverage and topics:

- Client peripheral requirements
- Client requirements and peripherals
- Client requirements
- Client support expectations

This unit will also support you to accomplish the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Classify and verify client peripherals requirements.
- Identify Client requirements and peripherals
- explain Client requirements
- Identify Client support expectations

1.1. Confirm requirements of client

Peripheral are the devices that are attached to the computer's system unit rear or front side.

Computer peripherals grouped into

A. I/O (Input or output),
B. Communications devices and
C. Secondary storage devices.

1.2. Client requirements

Clients and customers may include but not limited to:

- Internal departments
- External organizations
- Individual people
- Employee

1.3. Client requirements and peripherals

Network equipment should be included but not limited to:-

- LAN
- WAN
- VPN
- The internet
- The use of the PSTN for dial-up modems only
- Private lines
- Data and voice.
- Workstations
- Personal computers

Modems or other connectivity devices

- Printers
- Hard drives
- Monitors
- Switches
- Hubs
- Personal digital assistant (PDA)
- Other peripheral devices
- Software may included:-

- May include but is not limited to commercial,
- Domestic
- Packaged or adapted software.

Consumables may include:-

Consumables are goods used by individuals and businesses that must be replaced regularly because they wear out or are used up. They can also be defined as the components of an end product that is used up or permanently altered in the process of manufacturing such as semiconductor wafers and basic chemicals.

- ink cartridges
- toner cartridges
- Ribbons
- floppy disks
- CD-RW

Operational Health and Safety (OHS) standards may include:

- Correct posture
- Lighting
- Type of desk
- Type of monitor
- Style of chair
- Typing position
- Repetitive strain injury prevention
- Ventilation
- Light position
- Correct lifting method
- Length of time in front of computer
- Network operating system

May include but is not limited to Novell NetWare 5 or above or any operating system that has multi-user ability, Linux, Mac OS, Windows 7 or above.

Tools and Equipment

- Hardware peripherals and workstation
- Live network
- Cables
- Network operating system
- Soft wares
- Toolkit

- Cable tester
- Printer (laser printers and ink jet printers[mono or colored])
- Command line tools may include:
- Ping Localhost (127.0.0.1)
- Ipconfig
- Ipconfig/all
- Ping

Self check test-1.

Name: _____ IDNo_____ Date: _____

Time started: _____ Time finished: _____

Instruction:-Read all questions which given below and you to answer the correct one.(2 points each)

1. Follow Operational Health Safety (OH&S) guideline is not important at workplace.

A. True B. False

2. Warranty is not important to know what kind of support services are offered by the prospective supplier.

A. True B. False

3. From the following one is used to control the movement of cursor.

A. keyboard B. Mouse C. Printer D. None

3. All peripheral devices are Input devices.

A. True B. False

4. Which one of the following Input devices that help to write or enter the letters and numbers in to your computer?

A. Keyboard B. Printer C. Monitor Mouse

5. From the given alternatives One is output device

A. Monitor B. Printer C. Projector D. All are answers

Instruction: Match column A with column B.

Column A	Column B
6. Operational Health and Safety	A. Modem
7. Clients	B. input or output devices
8. Connectivity devices	C. Internal departments
9. Peripherals	D. Correct posture

Instruction: Say true or false

10. Output peripherals are show the product or display result of input.
11. Keyboard and mouse are not input peripherals
12. Communication devices are produce sounds capture pictures.

0peration sheet-1

Start up your computer

Step 1:- Connect the power cables on the system unit and monitor.

Step 2:-Connect hardware peripherals to the computer on the back side front side.

Step 3:- Boot you Computer.

Lap test 1

Instruction: Answer all the questions listed below, if you have some clarifications – feel free to ask your teacher.

Identify the following

1. *Operating System*

_____
_____
_____
_____
_____

2. Client

_____
_____
_____
_____
_____

3. Equipment

_____
_____
_____
_____
_____
_____

4. OHS

_____
_____
_____
_____
_____

- Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory, you can proceed to the next topic.

Unit Two: Obtain required peripheral

This Unit is developed to provide you the necessary information regarding the following content coverage and topics

- Obtaining peripheral
- Verifying client requirement
- Equipment inventory Verification

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to

- Verify obtaining peripherals
- Explain equipment inventory
- Identify and Verify client requirements

2.1. Obtaining peripheral

The first step in obtaining a peripheral device is to put suppliers of that device. Then, there are factors you need to consider about the supplier and the devices on offer, such as support provided and purchase price. This will help you to compare and choose the most appropriate supplier and the exact model of the device according to client requirements. Finally, you are ready to place an order for your organization or client to purchase the device.

2.2. Verifying client requirement

Locating the supplier

There are many ways to find a supplier of peripheral equipment. Some ways include:

i. Searching the Internet

The Internet provides different methods for searching for suppliers. Using search engines such as *Google* or *Yahoo* can help you find a hardware supplier anywhere in the world. Suppliers will often have their own websites that can provide you with catalogues of available equipment. Other ways to investigate suppliers are to follow links from a website such as a manufacturer's website, or to browse website directories that may be linked to search engine home pages.

ii. Telephone directory

A telephone directory is useful if you need to find a hardware supplier located within your local area.

iii. PC magazines

Computing magazines often contain a large section devoted to advertising current hardware suppliers.

iv. Brochures/advertising material

Many larger hardware suppliers use television, radio or leaflet deliveries to inform potential customers of their latest hardware.

v. Newspapers

Major newspapers have computer/IT sections or classified advertisements which can be a source for finding suppliers.

Contacting the manufacturer directly

Manufacturers generally have their own websites. These may list major suppliers in your area. Emailing or telephoning the manufacturer may also be a way to find out names of local suppliers.

vi. Choosing supplier

With so many choices of suppliers available, how do you find the right one? There are a few factors to consider:

vii. Selecting a peripheral

Once you have selected suitable suppliers you need to contact each supplier. Information you should find out from the supplier includes:

Model and manufacturer names of peripherals that will satisfy the majority of your clients requirements (including system specifications, physical dimensions, support)

You may find it helpful to keep a record of any details that you collect so you refer to this information quickly and easily.

viii. Placing the order

Before an order is submitted, it could also be necessary to obtain final approval from senior staff. Often an order form might require signatures from the manager or supervisor before it can be processed. A purchasing department might require written quotes from three suppliers, a recommendation and justification for the chosen supplier. Make sure that you find out from your supervisor or manager what procedures you need to follow when placing an order within your organization.

ix. Sample order form

From _____

Date _____

Code	Quantity	Description		Price	Supplier: name and telephone
Total price					

Delivery point _____

Budget holder's signature _____

Please come back to the Purchasing Department_____

2.3. Equipment inventory verification

Hardware inventory provides a simple way of finding basic information about your installed hardware. Hardware includes processors, memory, serial ports, parallel ports, power supplies, fans, graphics adapters, network adapters.

Hardware inventory organization means keeping a count of every piece of IT hardware within an inventory database and asset repository. Having solid hardware inventory organization helps you keep track of your assets, upgrade your inventory when needed, and avoid theft or losses.

Computer inventory management is a set of best practices used to keep track of computers within a systems environment, and it can include information about the following: Files, directories, and storage devices. Hardware inventory provides you with important information, such as the configuration and location of computers, which computers require an operating system upgrade, and which computers have the hardware that is required for a software upgrade.

Details that should be included within a hardware inventory include:

Description of hardware device	Serial number
Manufacturer	Warranty or maintenance conditions
Supplier	Components
Model number	Location
Number and identity of authorized users	Purchase price
	Date of purchase

Storing peripherals

Peripheral devices need to be located in a suitable environment — otherwise there may be potential problems. It is a good idea to refer to the manufacturer's manual to determine what guidelines should be followed.

When storing peripherals it is important to:

- Make sure equipment is kept in ideal working conditions
- Adhere to current Occupational Health and Safety guidelines
- Ensure the electrical safety of the device

- Consider security of the device.
- Keeping equipment in ideal working conditions

Each manufacturer will have their own recommendations on how to store their peripheral equipment. In order to guarantee that a peripheral will function correctly throughout its life it is important to follow guidelines that have been recommended by the manufacturer. Some common recommendations may include:

Keep equipment in the correct position — After unpacking, most devices will usually have a proper resting position. If a device is not kept in its natural position, there could be problems when trying to operate the device later on. For example, when a printer is stored in a vertical position, components such as the ink cartridges could leak or be dislodged.

Keep equipment away from weather, dust and other harmful material — When finding a storage location, consider what kind of elements the device may be subjected to. If, for example, you store a USB drive in a cabinet next to chalk, dust from the chalk could potentially damage the storage device's USB connection.

Do not expose equipment to extreme temperatures and high humidity — Sudden changes in temperature can cause condensation in many peripheral devices. For instance, if a video camera is taken from a cold place to a warm place, condensation may form on the lens and internal parts.

Avoid storing the device in direct sunlight — Exposure to direct sunlight could damage many of the external components of a device as well as subject the device to high temperatures.

Do not expose equipment to water or moisture — If water gets inside many peripheral devices there is a risk of electric shock.

When positioning peripherals in their permanent locations it is important to take into account many OH&S considerations as follows.

A. Positioning of the monitor

It is essential to position a monitor correctly to ensure it will suit the needs of the user. Tips include:

Try to make sure that monitor is in a position away from the glare of sunlight.

Check that the brightness and contrast controls of the screen have been adjusted to suit lighting conditions in the room.

The top of the screen should be the same level as the user's eye level.

A. Positioning of other equipment

Some general Occupational Health and safety guidelines to consider when positioning other peripheral equipment are:

Make sure that you can reach the peripheral device and its components without having to strain your back.

Place equipment such as scanners and printers at a suitable height so a user is easily able to reach paper trays, open scanner lids, etc.

Make sure that equipment such as speakers is easily accessible if settings such as volume control need to be changed.

B. Ensuring electrical safety

Some tips to ensure electrical safety are:

Do not be tempted to add too many extension cables or double socket adapters to your existing electrical sockets.

C. **Never use damaged plugs or leads**.

If possible, ask an electrician to check the safety of your system.

Position electrical leads where they will not cause tripping hazards to people.

D. Physical security of devices

In many situations it is important to consider the physical security of the peripheral devices. Some devices, such as digital cameras, data projectors and USB drives, may not be permanently connected to a computer so it will be necessary to find a secure location to store the device. Make sure that these kinds of devices are secured in a lockable storage cupboard, cabinet or safe when not required. Some organizations install security devices onto desks to guarantee that computers are secure and will not be able to be taken from their position unless unlocked.

Storing consumables

The term “consumables” are a product that is used once and then replaced by others

Example they include:-

Paper, CD or DVD and printer cartridge. These needs to placed at safe and dry environment

i. Paper

Paper needs to be stored in an area which is cool and dry, to prevent moisture from fusing pages together.

ii. Ink cartridges and toner

Make sure to store cartridges/toner in a cool dry place, away from sparks and open flames, with adequate ventilation and do not expose the device to high temperatures. Also ensure that the cartridges are not taken out of their packaging until they will be used within the printer, as the ink will dry out before use.

When possible, make sure that CDs are kept in their protective case, to minimize the chances of being scratched. Also keep them out of direct sunlight and extreme temperatures.

Self check test:-2

Name: _____ IDNo_____ Date: _____

Time started: _____ Time finished: _____

Instruction: Read the following questions bellow by writing True or False

2. Locating or placing hardware peripheral at suitable environment is not important.
3. Digital cameras, data projectors and USB drives are not security devices.
4. Check that the brightness and contrast controls of the screen have been adjusted to suit lighting conditions in the room.
5. When you use damaged plugs, your computer may be damaged immediately.
6. All consumables are used once and replaced by other.

Instruction: <u>Choice</u>

7. If you placing any kind of consumables direct to sunlight or on the wet place it may_____
   A. Damaged B. it may reduce its quality C. A & B D. No answer
8. _____ is a way of recording and counting hardware or software in simple manner.
   A. Inventory B. Audit C. data capture D. All
9. From the following questions one is the way to find a supplier of peripheral equipment.
   A. Searching of internet B. Newspaper C. Telephone directory D. All
10. Which one of the following is not consumables.
    A. Paper B. Ink cartridges and toner C. DVD and CD D. None

Instruction: Match column A with Column B

Column A	Column B
1. Physical security of devices	A. keeping a count of every piece of IT
2. Hardware inventory	B. Never use damaged plugs or leads
3. Ensuring electrical safety	C. Cupboard, cabinet box
4. Proper resting position	D. Locating a supplier
5. Brochures/advertising materials	E. Keep equipment in the correct position

Operation sheet 2

Documenting peripherals used with each computer

If the peripheral is an essential part of the computer system (for example mouse, keyboard or monitor) it is logical to record information about the device within the documentation for the computer to which it is connected. Individual computer inventories will often contain detailed information about the computer's related hardware and software. It may also be more practical to record information about the peripheral inside the computer's record, if the device is also permanently connected to a computer (for example a printer or scanner).

Example of Hardware inventory

Manufacturer:	Dell		
Model:	OptiPlex GX280MT Minitower—Power	Monitor:	Dell UltraSharp 1905FP flat panel,
Operating System:	Windows XP	Printer:	HP LaserJet IID
Serial number:	12345	Keyboard:	Dell USB keyboard
RAM:	128 Mb	Pointing device:	Dell USB 2-button optical mouse with scroll
Hard disk space:	160 Gb		

If the device is shared between several computers, it makes more sense to keep information about the peripheral as an individual entry in an inventory. Devices such as digital cameras, data projectors and USB drives would more likely to be used by many computers, thus it would make more sense to record their details separate to the computer details.

LOGO **Company Name**

Primary Business Address
Phone: 555-555-5555
Fax: 555-555-5555
E-mail: someone@example.com

Inventory List

Purpose:

Date:

Item#	Purchasing Date	Purchasing from	Description	Serial Number	Warranty	Value
					Total:	

Note: Add your special comments or notes here.

Below is a sample checklist for a typical inkjet printer.

- printer
- cartridge
- power cable
- USB cable
- sample paper
- feeding device
- CD driver

Be attentive when unpacking a peripheral device — handle the packaging and contents with care, as you do not want to damage your new device. Remove any packing material surrounding and also within the device. Some printers, for example, have soft foam and plastic pieces inside the device to ensure that parts are locked into the correct position. Make sure that you remove these pieces and foam before installation.

Lap test 2

Name: _____ IDNo _____Level _____

Time started: _____ Time finished: _____

Instructions: You are required to perform the following individually with the presence of your teacher.

1. Start up your computer
2. Open Ms Excel
   Write the form given bellow placing an order of peripherals in your word.

From _____

Date _____

Code	Quantity	Description		Price	Supplier: name and telephone
Total price					

Delivery point _____

Budget holder's signature _____

Please come back to the Purchasing Department_____

Unit Three: Connect hardware peripherals

This unit is developed to provide you the necessary information regarding the following content coverage and topics

- Schedule hardware installation time
- Remove old peripherals
- Connect the new peripherals
- Test peripherals

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to:

- Schedule installation time
- Explain removing old peripherals
- Explain connecting the new peripherals
- Identify configuration of a computer with the new peripherals
- Test peripherals

3.1. Schedule hardware installation time

Installation (or setup) of a computer program (including device drivers and plug-in), is the act of making the program ready for execution. Installation refers to the particular configuration of a software or hardware with a view to making it usable with the computer.

Thorough planning ensures that you have everything to meet all the prerequisites for the successful setup and installation of the system. Planning minimizes errors during installation and enables a quicker upgrade or installation.

Guidelines for hardware/software installation plan. Burn-in means to configure the hardware and run it for some period of time, usually 24-72 hours.





3.2. Remove old peripherals

Open the My Computer window, right-click on the peripheral device (usually labeled Removable Disk) and select Eject from the contextual menu. open the My Computer window, select the peripheral device (usually labeled Removable Disk) and then select Eject this Disk from the Common Tasks pane of the window.

To remove a piece of hardware or peripheral from your computer, use these steps:

1. Open Settings.
2. Click on Devices.
3. Click on Bluetooth & other devices.
4. Select the device that you no longer need.
5. Click the Remove device button.
6. Click View tab and select Show hidden devices.
7. Expand the branches in the device tree & look for the faded icons.
8. These indicate unused device drivers.
9. Right-click on it and select Uninstall.

How do I get my external keyboard off?

Just plug it into your laptop, either into the keyboard port or a USB port, whichever is available. You can start using the keyboard the second it's plugged in. Note that adding an external keyboard often doesn't disable the laptop's internal keyboard. You can use both!



Should you delete old drivers?

It is generally not recommended to uninstall GPU drivers solely through the operating system, as the process may leave some residual files and folders that can still cause conflicts.
Clean Unplugged Data once a device plugged into your computer, there will be some space available for it to release or save files. After unplugging, some data of the device may leave on your computer to occupy some space, Driver Booster can clean these unplugged data conveniently and thoroughly to spare more space.

Perform the following steps in the Device Manager window that appears:

1. Select View > Show Hidden Devices.
2. Expand the Network Adapters list.
3. Uninstall ALL of the grayed out network adapters (there will likely be several; do NOT delete drivers).
4. Uninstall any unknown devices.
5. Leave the other network devices alone.

How do I remove old Nic from registry?

Right-click the network adapter interface name (the long alphanumeric string) in the Windows Registry and select Delete.

3.3. Connect the new peripherals

Peripheral devices can be connected to your computer **via USB port, serial port, parallel port, specialized network card, or Ethernet network**. Local area networks (LANs) commonly use Ethernet networks for machine connection.

What is a new peripheral device?

Peripheral device, also known as peripheral, computer peripheral, input-output device, or input/output device, any of various devices (including sensors) used to enter information and instructions into a computer for storage or processing and to deliver the processed data to a human operator.

The most common peripherals are a **printer, scanner, keyboard, mouse, tape device, microphone, and external modem** that are externally connected to the computer.







3.4. Test peripherals

A test procedure is a formal specification of test cases to be applied to one or more target program modules. Test procedures are executable. A process called the VERIFIER applies a test procedure to its target modules and produces an exception report indicating which test cases, if any, failed. Simply right-click on the Windows button in the bottom-left corner of your screen, and then click System. In the window that opens, look near the middle for Device specifications. That's where you'll find the Device name, Processor, Installed RAM, and other information.

A typical hardware testing process

1. Create a testing environment (e.g., measurement hardware, test software, cabling, fixtures, etc.)
2. Place part into the condition needed for the measurement (apply pressure, voltage, temperature, etc.)
3. Take some measurements.
4. Put those measurements through one or more pass/fail criteria.

Use the device troubleshooter to diagnose and resolve the issue.

1. Open Settings.
2. Click on Update & Security.
3. Click on Troubleshoot.
4. Select the troubleshoot that matches the hardware with the problem.
5. Click the Run the troubleshooter button.

Self check test 3.

Name _____ IDNo _____ Level _____

Start time _____ Finishing time _____

Instruction :- Say true or false

1. Installation refers to the particular configuration of a software only.
2. A test procedure is a formal specification of test cases to be applied to one or more target program modules.
3. When you install a new hardware peripherals you never remove the old one.

Instruction: Write a short answer.

1. List down steps To remove a piece of hardware or peripheral from your computer?
   a. _____
   b. _____
   c. _____
   d. _____
   e. _____
   f. _____
   g. _____
   h. _____
   i. _____
2. What is test procedure means?

_____
_____
_____
_____
_____
_____

Instruction: Match the following columns

Column A	Column B
1. Installation	A. Measuring hardware
2. Test peripherals	B. Configuring hardware or software
3. Input/output	C. Peripherals

Unit Four:-Install and Configure peripherals to a network

This unit is developed to provide you the necessary information regarding the following content coverage and topics

- Connect peripherals to the network
- Configure security
- Configure workstation

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Meaningful names are used for peripherals and control queues
- How to install software and manage peripherals
- How to Allow access and security for users
- Test the cable correction and operation based on organizational requirement.
- How to locate peripherals its proper place
- How to connect peripherals to the network

4.1. Connect peripherals to the network

Computer networking refers to interconnected computing devices that can exchange data and share resources with each other. These networked devices use a system of rules, called communications protocols, to transmit information over physical or wireless technologies.

A computer network is a set of computers sharing resources located on or provided by network nodes. The computers use common communication protocols over digital interconnections to communicate with each other.

A computer network, also referred to as a data network, is a series of interconnected nodes that can transmit, receive and exchange data, voice and video traffic. Examples of nodes in a network include servers or modems. Computer networks commonly help endpoint users share resources and communicate.

Advantage of Networking:

- ✓ Share Documents
- ✓ Exchange e-mail messages
- ✓ Live audio and video broadcast
- ✓ Using one device for many computers like printer
- ✓ Sharing external memory like Hard disk.
- ✓ Security.

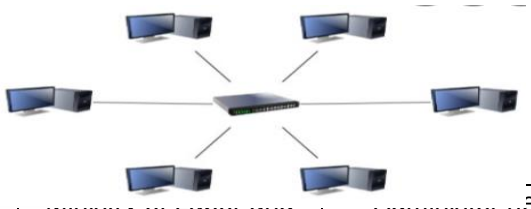
A computer network is mainly of four types by their geographical coverage:

1. LAN(Local Area Network)
2. PAN(Personal Area Network)
3. MAN(Metropolitan Area Network)
4. WAN(Wide Area Network)

LAN(Local Area Network)

A local area network (LAN) is a collection of devices connected together in one physical location, such as a building, office, or home.

LAN stands for local area network. A network is a group of two or more connected computers, and a LAN is a network contained within a small geographic area, usually within the same building. Home WiFi networks and small business networks are common examples of LANs.



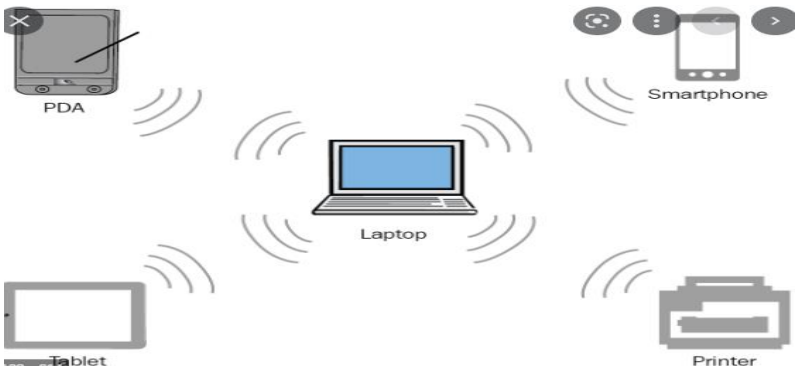
Personal area network (PAN)

A personal area network (PAN) is a computer network for interconnecting electronic devices within an individual person's workspace. A PAN provides data transmission among devices such as computers, smart phones, tablets and personal digital assistants.

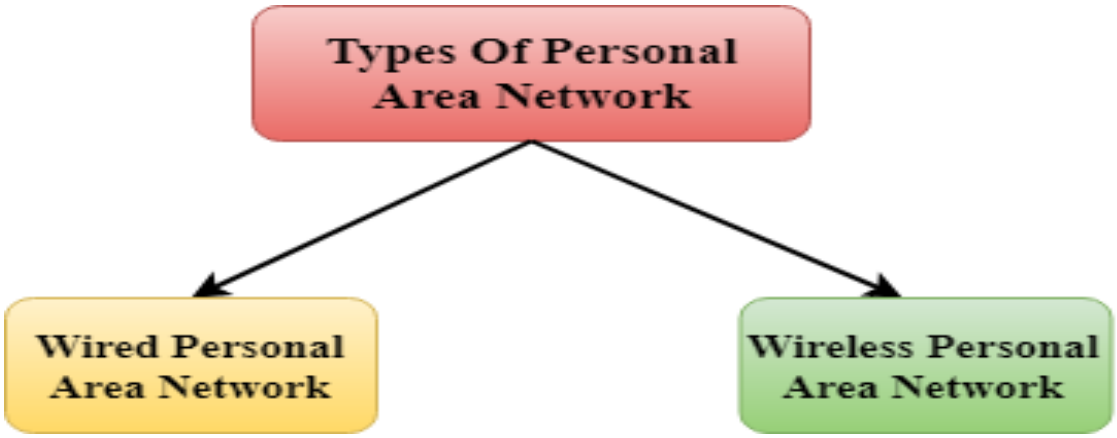
One of the most common real-world examples of a PAN is the connection between a Bluetooth earpiece and a Smartphone. PANs can also connect laptops, tablets, printers, keyboards, and other computerized devices.

Features of PAN :

- Low cost, little or No infrastructure setup.
- Short range communication.
- Small personal network , use anywhere.
- Wide range of devices.
- Low power consumption.
- No complex connectivity.



There are two types of Personal Area Network:



- Wired Personal Area Network
- Wireless Personal Area Network

Wireless Personal Area Network:

Wireless Personal Area Network is developed by simply using wireless technologies such as Wi-Fi, Bluetooth. It is a low range network.

Wired Personal Area Network:

Wired Personal Area Network is created by using the USB and Network cable.

MAN (Metropolitan Area Network)

A metropolitan area network is a network that covers a larger geographic area by interconnecting a different LAN to form a larger network.

Government agencies use MAN to connect to the citizens and private industries.

In MAN, various LANs are connected to each other through a telephone exchange line.

The most widely used protocols in MAN are RS-232, Frame Relay, ATM, ISDN, OC-3, ADSL, etc.

- It has a higher range than Local Area Network(LAN).



Uses Of Metropolitan Area Network:

- MAN is used in communication between the banks in a city.
- It can be used in an Airline Reservation.
- It can be used in a college within a city.
- It can also be used for communication in the military.

WAN (Wide Area Network)

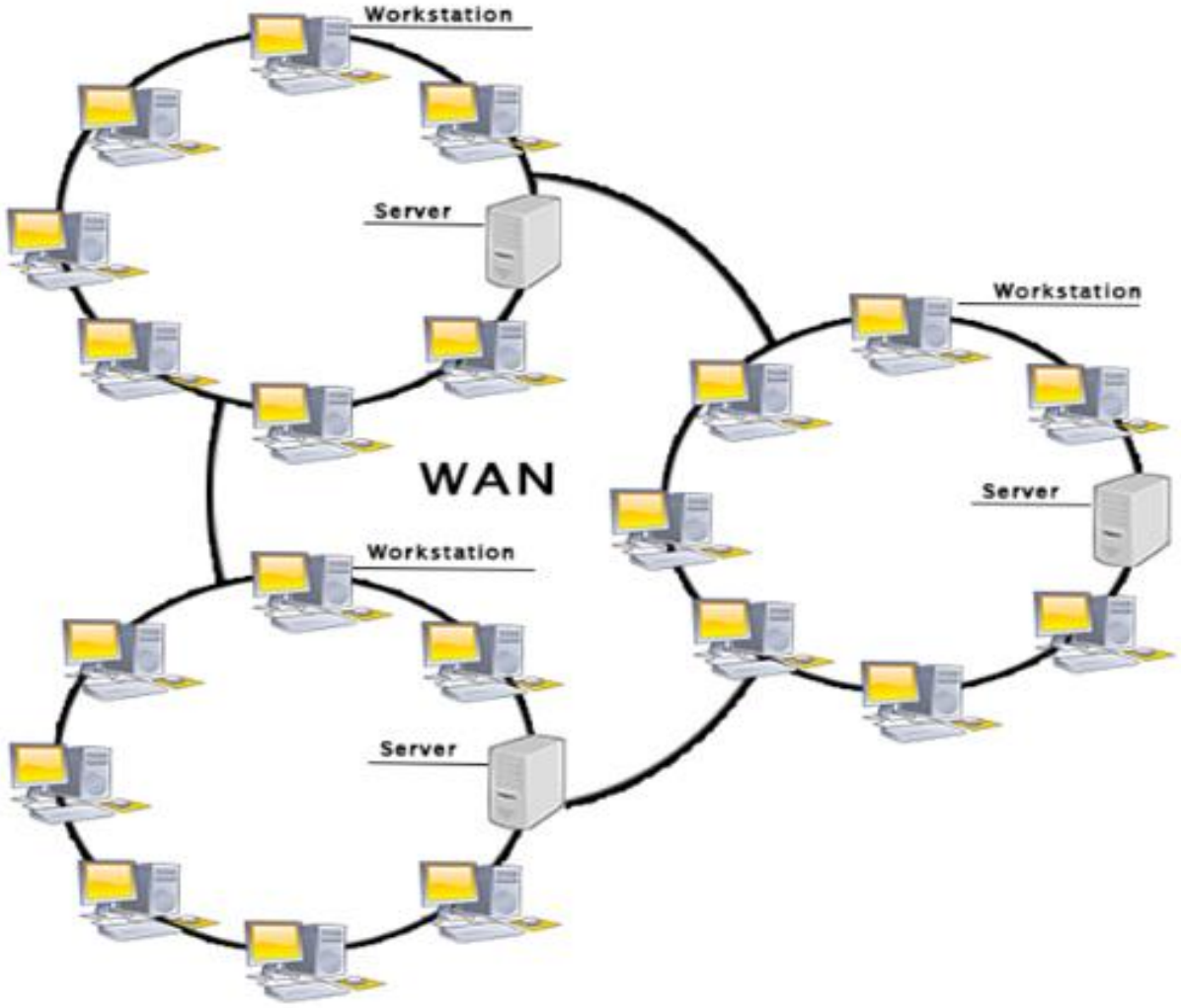
A Wide Area Network is a network that extends over a large geographical area such as states or countries.

A Wide Area Network is quite bigger network than the LAN.

A Wide Area Network is not limited to a single location, but it spans over a large geographical area through a telephone line, fibre optic cable or satellite links.

The internet is one of the biggest WAN in the world.

A Wide Area Network is widely used in the field of Business, government, and education.



Advantages of Wide Area Network:

Following are the advantages of the Wide Area Network:

a. **Geographical area:** A Wide Area Network provides a large geographical area. Suppose if the branch of our office is in a different city then we can connect with them through WAN. The internet provides a leased line through which we can connect with another branch.
b. **Centralized data:** In case of WAN network, data is centralized. Therefore, we do not need to buy the emails, files or back up servers.
c. **Get updated files:** Software companies work on the live server. Therefore, the programmers get the updated files within seconds.
d. **Exchange messages:** In a WAN network, messages are transmitted fast. The web application like Facebook, Whatsapp, Skype allows you to communicate with friends.

e. **Sharing of software and resources:** In WAN network, we can share the software and other resources like a hard drive, RAM.
f. **Global business:** We can do the business over the internet globally.
g. **High bandwidth:** If we use the leased lines for our company then this gives the high bandwidth. The high bandwidth increases the data transfer rate which in turn increases the productivity of our company.

Disadvantages of Wide Area Network:

The following are the disadvantages of the Wide Area Network:

a. **Security issue:** A WAN network has more security issues as compared to LAN and MAN network as all the technologies are combined together that creates the security problem.
b. **Needs Firewall & antivirus software:** The data is transferred on the internet which can be changed or hacked by the hackers, so the firewall needs to be used. Some people can inject the virus in our system so antivirus is needed to protect from such a virus.
c. **High Setup cost:** An installation cost of the WAN network is high as it involves the purchasing of routers, switches.
d. **Troubleshooting problems:** It covers a large area so fixing the problem is difficult.

Category of computer Network by its Functional Relationship:

1. Peer-to-Peer Networking:
2. Client-Server Network

Peer-to-Peer Networking:

In peer-to-peer (P2P) networking, a group of computers are linked together with equal permissions and responsibilities for processing data. Unlike traditional client-server networking, no devices in a P2P network are designated solely to serve or to receive data.

In a peer-to-peer network, computers on the network are equal, with each workstation providing access to resources and data. This is a simple type of network where computers are able to communicate with one another and share what is on or attached to their computer with other users.

The primary goal of peer-to-peer networks is to share resources and help computers and devices work collaboratively, provide specific services, or execute specific tasks. As mentioned earlier, P2P is used to share all kinds of computing resources such as processing power, network bandwidth, or disk storage space.

Other key uses of a P2P network include: File sharing: The use of P2P in file sharing is extremely convenient for businesses. P2P networking can also save you money with this feature because it eliminates the need to use another intermediate server to transfer your file.

Peer-to-Peer computer network is a network that relies on computing power at the edges of a connection, there is no hierarchy among the computers.

Advantages

- Much easier to set up than a client-server network - does not need specialist knowledge
- Less initial capital – no need for a dedicated server
- No need for system administration (administrator)

Disadvantages

- Ensuring that viruses are not introduced to the network is the responsibility of each individual user
- Decentralized – no central repository for the files and application.
- Security – does not provide the security available on a client/server network.

Client-Server Network

In the environment with more than 10 users, a peer to peer network will not adequate. There need comes to use a dedicated computer which optimized (increase) the service of network to clients quickly and ensure the security of files. Therefore, there will be one or more server computers which serve other station (client) computers to optimized network system. A dedicated computer with software that carries out some task on behalf of users.

What is Server?

Server is a dedicated computer that provide resources to Network users or Client computers.

Advantages of server-based network

- Centralized – resources and data security are controlled through the server
- Scalability – any or all elements can be replaced individually as need increase.
- Flexibility – new technology can be easily integrated into system
- Interoperability – all components (client/network/server) work together
- Accessibility – server can be accessed remotely and across multiple platforms.

Disadvantages of server-Based computer networks

- Expensive – requires initial investment in dedicated server
- Maintenance – large networks will require a staff to ensure efficient operations
- Dependence- when a server goes down, operations will cease across the network.
- Server may fail- incase the server failed, the entire network goes down

Types of Server:

- File and Printer server

- Mail server

- Communication server

- Directory service server

- Application server

- Fax server

- Backup Server

Network Topology

Network topology is the arrangement of the elements of a communication network. Network topology can be used to define or describe the arrangement of various types of telecommunication networks, including command and control radio networks, industrial field busses and computer networks.

Network topology is the topological structure of a network and may be depicted physically or logically.

The term topology, or more specifically, *network topology*, refers to the arrangement or physical layout of computers, cables, and other components on the network. “Topology” is the standard term that most network professionals use when they refer to the network’s basic design. In addition, the term “topology” you will find several other terms that are used to define a network’s:

Physical design network diagram/Map

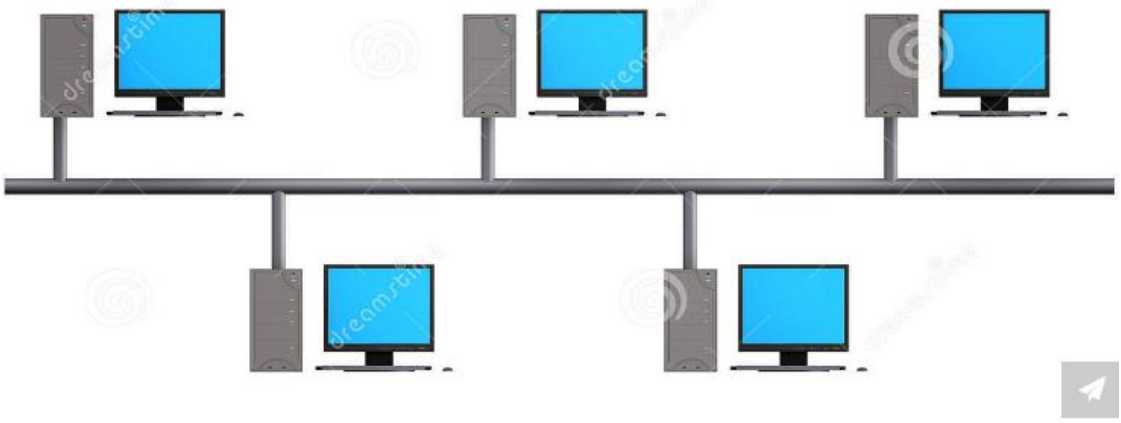
1. Bus Topology
2. Star Topology
3. Ring Topology
4. Mesh Topology
5. Hybrid Topology

Bus topology

, also known as line topology, is a type of network topology in which all devices in the network are connected by one central RJ-45 network cable or coaxial cable. The single cable, where all data is transmitted between devices, is referred to as the bus, backbone, or trunk.

An example of bus topology is connecting two floors through a single line. Ethernet networks also use a bus topology. In a bus topology, one computer in the network works as a server and

other computers behave as clients. The purpose of the server is to exchange data between client computers.



) image of a network bus topology

It is often referred to as a "*linear bus*" because the computers are connected in a straight line. This is the simplest and most common method of networking computers.

In a bus topology, all computers are connected to a shared communication line, called a *trunk or a backbone.*

The computers are connected to the backbone using T-connectors.

Both ends of the backbone use terminators in order to prevent reflection of signals.

If the terminator is missing or is deliberately removed, the data transmissions are disrupted.

There is no central device or any special configuration.

Advantages

- A bus network is the cheapest of all topologies.
- No special configuration is required.
- It is easy to install, and no special equipment is
- needed for installation.
- It needs less cable length than do other topologies.

Disadvantages

1. A break in cable or a missing terminator can
2. bring down the entire network.
3. It is not possible to add or remove computers
4. without disrupting the network.
5. It is difficult to troubleshoot and administer.

6. Addition of more computers degrades performance.

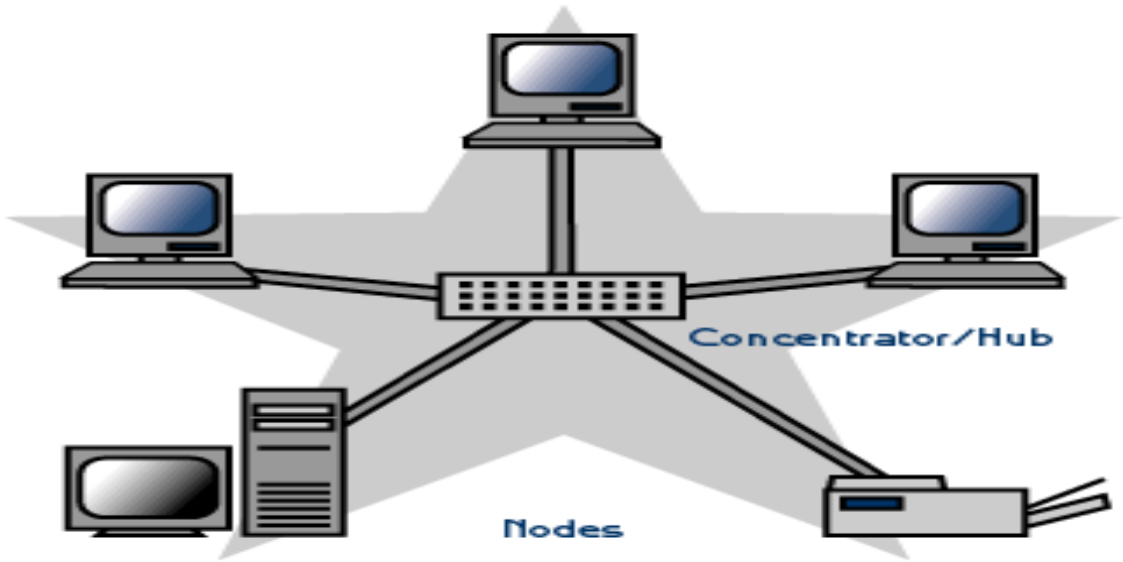
Star Topology

Star topology is a network topology in which each network component is physically connected to a central node such as a router, hub or switch. In a star topology, the central hub acts like a server and the connecting nodes act like clients.

A star network is a local area network (LAN) in which all nodes (workstations or other devices) are directly connected to a common central Hub or Switch.

Every workstation is indirectly connected to each other through the central Hub or Switch.

Data on a star network passes through the hub, switch, or concentrator before continuing to its destination. The hub, switch, or concentrator manages and controls all functions of the network. It also acts as a repeater for the data flow. This configuration is common with twisted pair cable; however, it can also be used with coaxial cable or fiber optic cable.



Advantages of a Star Topology

- Easy to install and wire.
- No disruptions to the network when connecting or removing devices.
- Easy to detect faults and to remove parts.

Disadvantages of a Star Topology

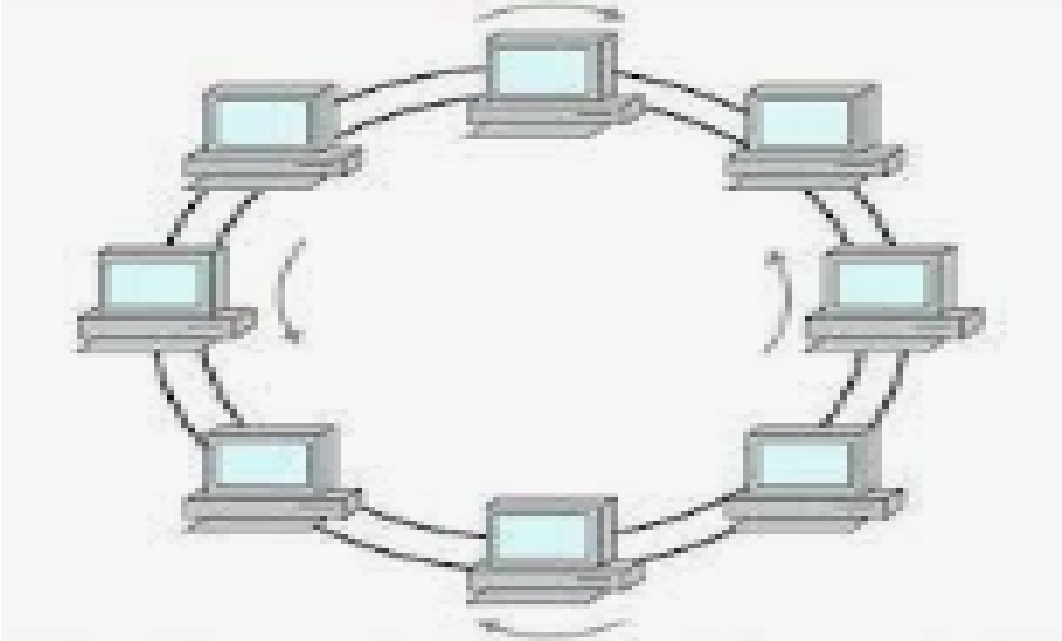
- Requires more cable length than a linear topology.

- If the hub, switch, or concentrator fails, nodes attached are disabled.
- More expensive than linear bus topologies because of the cost of the hubs, etc.

Ring topology

Ring topology is a type of network topology in which each device is connected to two other devices on either side via an RJ-45 cable or coaxial cable. This forms a circular ring of connected devices which gives it its name. Data is commonly transferred in one direction along the ring, known as a unidirectional ring.

A ring network is a network topology in which each node connects to exactly two other nodes, forming a single continuous pathway for signals through each node – a ring. Data travels from node to node, with each node along the way handling every packet.



A Comparison Table for Advantages and Disadvantages of Ring Topology

Advantages	Disadvantages
Fast Execution	Quite Expensive
Better Administration	Slow Activity Rate
Straightforward Adaptability	Unprotected use

Easy to install

Need for Hardiness

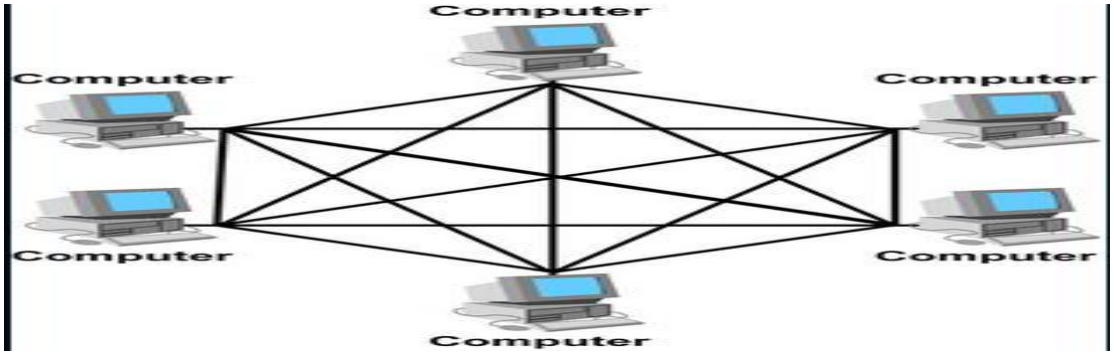
Break in a cable /fault computer can bring slow down entire network

Difficult to troubleshoot

Mesh Topology

A mesh topology is a network setup where each computer and network device is interconnected with one another. This topology setup allows for most transmissions to be distributed even if one of the connections goes down. It is a topology commonly used for wireless networks.

In a mesh topology, all computers in the network are connected to every other computer, forming a mesh of connections and each computer makes a point-to-point connection to every other computer.



There are *two types of mesh topology*

Full mesh topology

Each node (workstation or other device) is connected directly to each of the others.

Partial mesh topology

Some nodes are connected to all the others, but some of the nodes are connected only to those other nodes with which they exchange the most data.

Advantages

- A mesh network is highly reliable because of redundant multiple paths between computers.
- The failure of a single computer or a cable fault does not affect network operations.
- Computers can be added or removed without affecting the network.

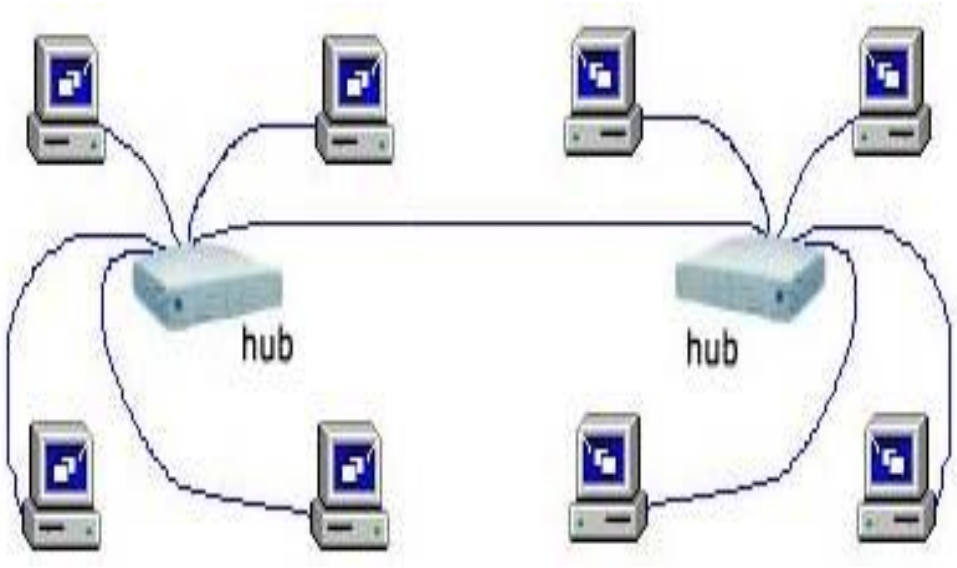
Disadvantages

- It is difficult to install and troubleshoot.
- It is very expensive because of the length of cable required to make multiple redundant connections.
- Only a limited number of computers can be connected in a mesh topology.

Hybrid Topology

It is combination of any two or more network topologies. These instances can occur where two basic network topologies, when connected together, can still retain the basic network character, and therefore not be a hybrid network.

A hybrid topology is a type of network topology that uses two or more differing network topologies. These topologies can include a mix of bus topology, mesh topology, ring topology, star topology, and tree topology.



Advantages of Hybrid Topology

- Used for a vast network
- Reliable to use
- Any topology can be combined to make a new network

- Scalable and very effective

Disadvantages of Hybrid Topology

- Costly very expensive
- Difficult to install
- Need more Hardware requirements
- Cable failure

Some of the major applications of the hybrid topology are the financial and banking sector, automated industries, multi-national companies, research organizations, and many educational institutions.

The best cabled network topology for large businesses is the star topology. This is because it is easier to control from a central console as the management software just needs to communicate with the switch to get full traffic management features.

Network Transmission Media

Transmission Media is the physical path between the transmitter and the receiver in a data communication system.

Transmission Media categorized in two categories:-

1. Wired/Guided
2. Wireless/Unguided.

Wire/Guided Transmission Media uses a "cabling" system that guides the data signals along a specific path. The data signals are bound by the "cabling" system. Guided Media is also known as Bound Media. Cabling is meant in a generic sense in the previous sentences and is not meant to be interpreted as copper wire cabling only.

Wireless/Unguided Transmission Media consists of a means for the data signals to travel but nothing to guide them along a specific path. The data signals are not bound to a cabling media and as such are often called Unbound Media.

Commonly types of guided transmission are:-

- Twisted Pair Cable
- Coaxial Cable
- Optical fiber cable
- Twisted pair cable

Twisted Pair Cable

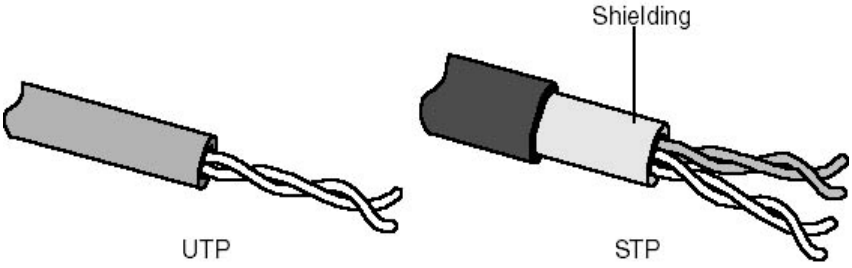
Twisted pair cabling is a type of wiring in which two conductors of a single circuit are twisted together for the purposes of improving electromagnetic compatibility.

Twisted-pair cable consists of two insulated strands of copper wire twisted around each other.

The oldest, least expensive and most commonly used transmission media.

Two types of twisted-pair cable:-

1. *Unshielded twisted-pair (UTP)*
2. *Shielded twisted-pair (STP)* cable.



Unshielded twisted pair (UTP)

Unshielded twisted pair (UTP) cables are widely used in the computer and telecommunications industry as Ethernet cables and telephone wires. In an UTP cable, conductors which form a single circuit are twisted around each other in order to cancel out electromagnetic interference (EMI) from external sources.

UTP cables are mostly used for LAN networks. They can be used for voice, low-speed data, high-speed data, audio and paging systems, and building automation and control systems. UTP cable can be used in both the horizontal and backbone cabling subsystems.



It is the most commonly used cable types in LANs.

It is made up of four twisted pairs enclosed in a plastic jacket.

Depending on the bandwidth offered there are seven types of UTP cables such as Cat-1,Cat-2,cat-3,cat-4,cat-5,cat-6 and cat-7

The Most commonly used UTP cables are category-5 cables and its bandwidth is 1000Mbps.



Shielded Twisted Pair (STP) cable

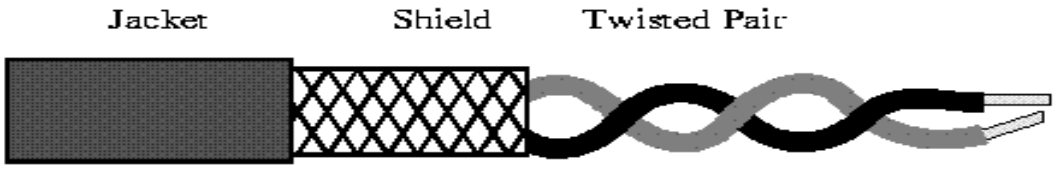
Uses a woven copper braid jacket and higher quality protective jacket. Also uses foil wrap b/n and around the wire pairs

Much less susceptible to interference and supports higher transmission rates than UTP

shielding makes it somewhat harder to install

same 100 meters limit as UTP

uses RJ-45 telephone-type connectors (larger than telephone and consists of eight wires vs. telephone's 4 wires)

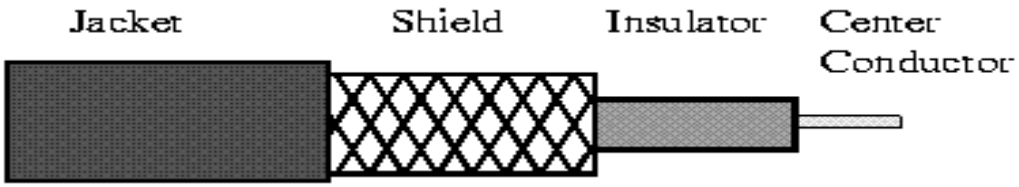


Coaxial Cable

Coaxial Cable consists of 2 conductors. The inner conductor is held inside an insulator with the other conductor woven around it providing a shield. An insulating protective coating called a jacket covers the outer conductor.

The outer shield protects the inner conductor from outside electrical signals. The distance between the outer conductor (shield) and inner conductor plus the type of material used for insulating the inner conductor determine the cable properties or impedance. Typical impedances for coaxial cables are 75 ohms for Cable TV, 50 ohms for Ethernet Thinnet and Thicknet. The excellent control of the

impedance characteristics of the cable allow higher data rates to be transferred than Twisted Pair cable.



Fiber optic (Optical Fiber)

Optical fiber is the technology associated with data transmission using light pulses travelling along with a long fiber which is usually made of plastic or glass. Metal wires are preferred for transmission in optical fiber communication as signals travel with fewer damages. Optical fibers are also unaffected by electromagnetic interference. The fiber optical cable uses the application of total internal reflection of light. An optical fiber consists of an extremely thin cylinder of glass, called the *core*, surrounded by a concentric layer of glass, known as the *cladding*. The fibers are sometimes made of plastic. Plastic is easier to install, but cannot carry the light pulses for as long a distance as glass.

The basic function of any optical fiber is to guide light, i.e., to act as a dielectric waveguide. Light injected into one end should stay guided in the fiber. In other words, it must be prevented from getting lost e.g. by reaching the outer surface and escaping there. We explain this here for glass fibers, but the operation principle of plastic optical fibers is the same.

In principle, the simplest solution for guiding light would be a homogeneous glass rod. If it is thin enough, it can also be bent to some degree. The outer surface can reflect light via total internal reflection. Due to the large refractive index contrast, this works for a considerable range of input beam angles, and in principle there don't need to be any power losses.

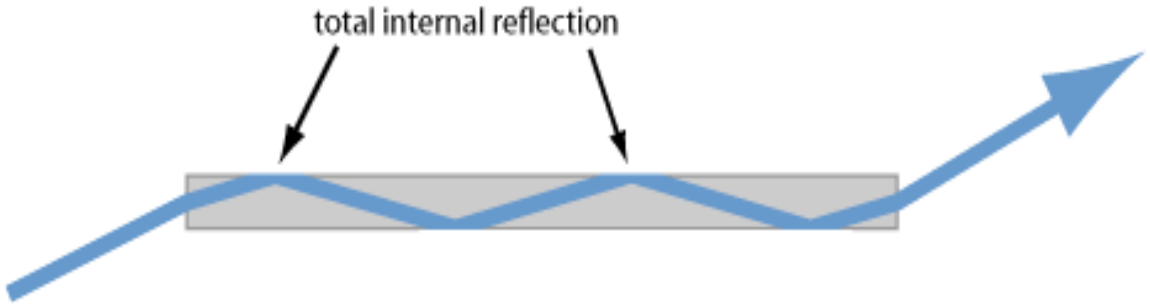


Figure 1: Total internal reflection can be used to guide light in a homogeneous fiber. Note that only partial reflection occurs at the end faces, where the angle of incidence is smaller.

However, this simple solution has some crucial disadvantages.

Due to the high index contrast, even tiny scratches of the glass on the outer surface could lead to substantial optical losses by scattering. Therefore, the outer surface would have to be made with high optical quality and well protected against damage and dirt. This problem can be mitigated only to some extent with some suitable buffer coating around the fiber. Such coatings, not being highly homogeneous, can hardly provide very low optical losses.

Even if the fiber were pretty thin (e.g., with a diameter of 0.1 mm), it would support a huge number of modes which is bad e.g. when preserving a high beam quality is important.

One can, however, modify the idea of a very clean coating. Use another glass region, having a slightly smaller refractive index than the core glass, as a cladding:

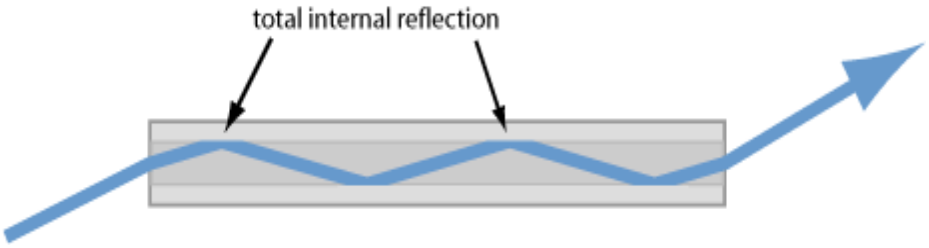


Figure 2: A multimode glass fiber with a cladding, made of glass with a slightly lower refractive index. Total internal reflection can occur at the glass/glass interface, but the incidence angles need to be larger.

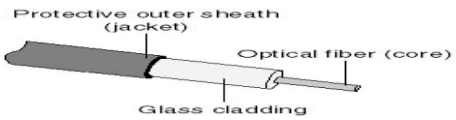
That gives us several advantages. Glass can be much more clean and homogeneous than a plastic buffer coating. That already reduces the losses.

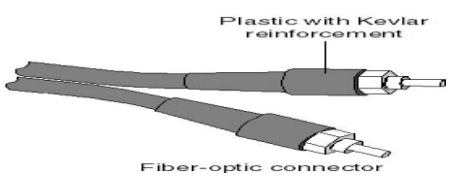
Due to the reduced index contrast at the reflection points, small irregularities of the interface do not cause as serious optical losses as for a glass/air interface. Irregularities at the outer interface do not matter anymore, as the light cannot “see” them.

The guiding region – called the fiber core – can now be made much smaller than the total fiber, if this is wanted. One can adapt the core size e.g. to the size of some small light emitter.

With a combination of small core size and weak index contrast one can even obtain single-mode guidance (see below).

Note, however, that smaller index contrasts imply a smaller acceptance angle: total internal reflection can only occur if the incidence angle is above the critical angle. The maximum angle of incidence at the input face of the fiber is then determined by the numerical aperture (NA).

Two 



types of optical

fiber are commonly available:

4. Single-mode and Multimode.

Single-mode fiber is used for long runs because it can transmit data 50 times further than multimode fiber and at a faster rate. For example, single-mode fiber might be used on an organization's corporate campus between buildings. Single-mode fiber (SMF), on the other hand, has a small core that allows only a single light beam to pass. The light transmissions in single-mode fiber pass through the core in a direct line, like a flashlight beam.

So what's better? Single mode or multimode Well, they are different.... Single mode cable is less expensive, supports higher bandwidths and longer distances; however, the cost of electronics is greater.



Single Mode

- Short distance cable runs (less than 1000ft.)
- Long distance cable runs (greater than 1000ft.)
- Highest bandwidth support
- Lower cable cost
- Higher electronics cost
- Harder to terminate due to smaller core size



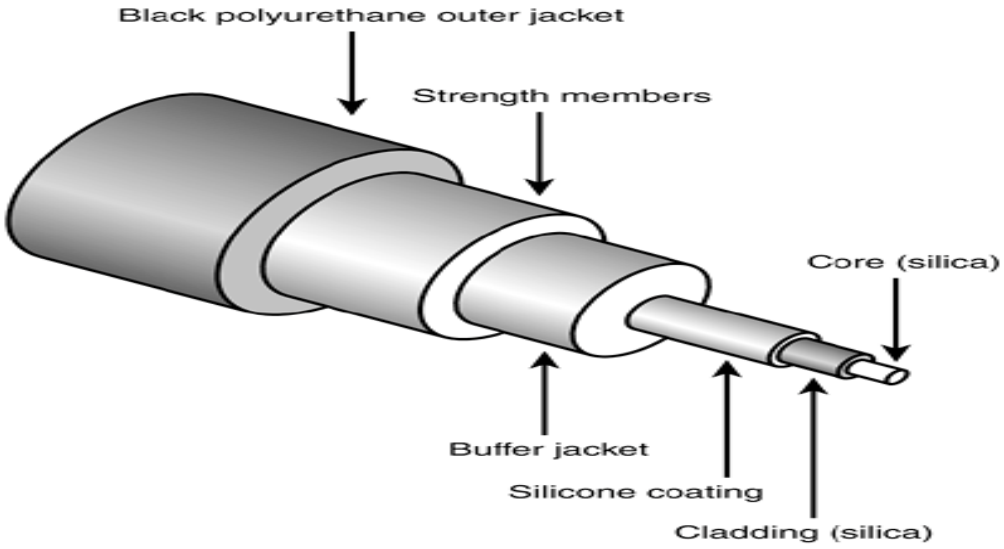
Multimode

- Short distance cable runs (less than 1000ft.)
- High bandwidth support
- Higher cable cost
- Lower electronics cost
- Easier to terminate due to larger core size

Multimode fiber (MMF)

Multimode fiber (MMF) has a larger core than single-mode. This larger core allows hundreds of light rays to flow through the fiber simultaneously.

The numerous light beams in multimode fiber bounce around inside the core, inching toward their destination. Because light beams bounce within the core, the light beams slow down, reduce in strength, and take some time to travel along the cable. Multimode fiber provides high bandwidth at high speeds over medium distances (up to about 3000 feet) but can be inconsistent for very long runs.



Types of LAN cables and connectors

Cable Type	Maximum Speed	Maximum Cable length	Advantages	Disadvantages	Connector used
STP	100Mbps	185m	Resistant to EMI	Expensive	D-shell connector
UPT	100Mbps	185m	Inexpensive Easy to install Resistant to physical stress	Not resistant to EMI	RJ-45 connector
Coaxial	10Mbps	185m, 500m or 10 km	Easy to install Less sensitive to EMI than UTP/STP	Not resistant to physical stress Expensive compared to UTP	BNC Connector T-connector Terminator
Optical Fiber	155Mbps-1000Mbps	10km depending on the fiber type	Resistant to EMI High data transfer rate	Expensive Difficult to install	SMA connector

Cabling system

Three types of Ethernet cables are available

Straight-through cable

Crossover cable

Rolled cable

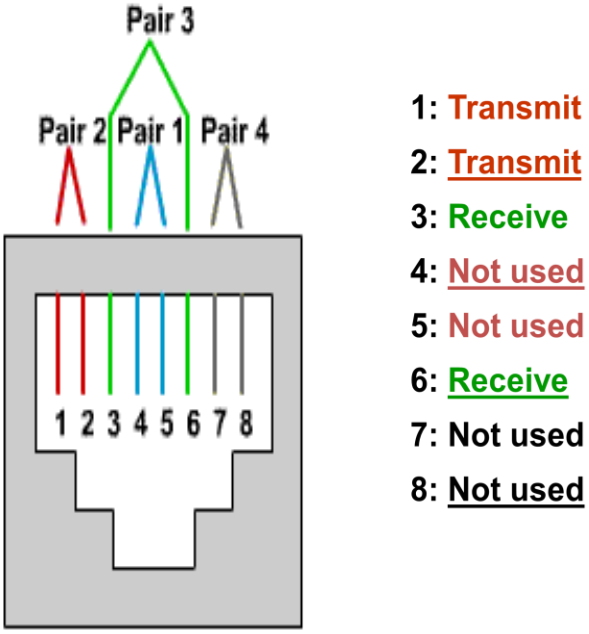
Making Ethernet 10Base-T cables:

- Straight-through cable: PC-to-HUB.
- Crossover cable: PC-to-PC.

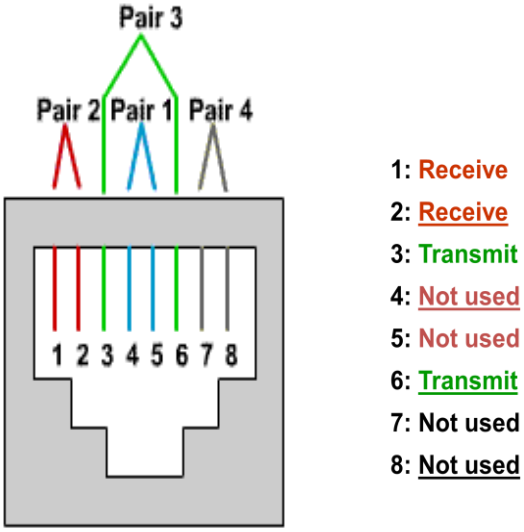
Making console cables:

Rollover cable:

10Base-T: NIC network port

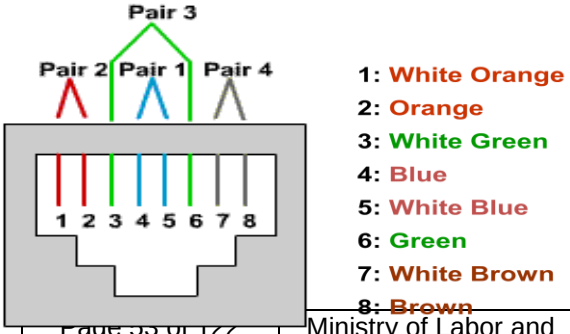


10Base-T: HUB network port

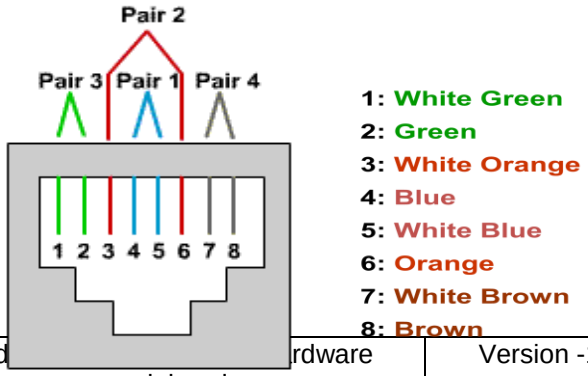


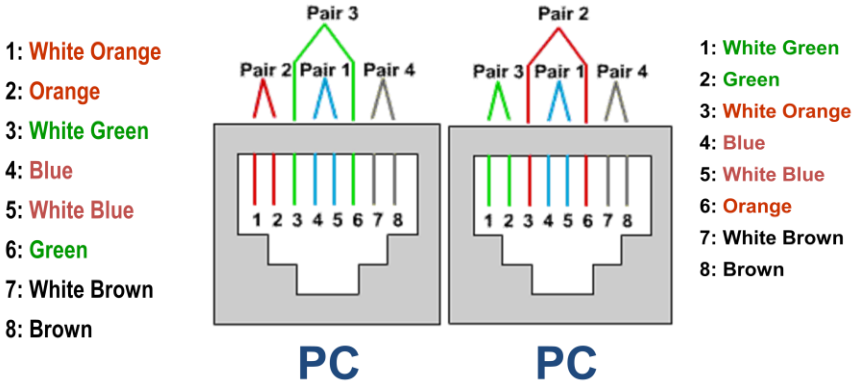
10Base-T: Cross Over cable

10Base-T: T568-B



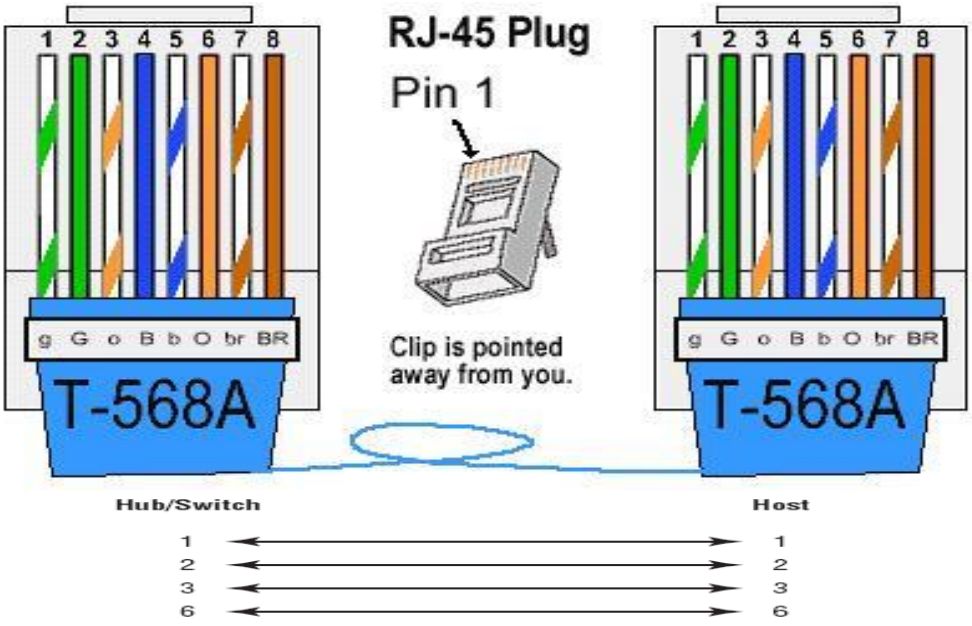
10Base-T: T568-A





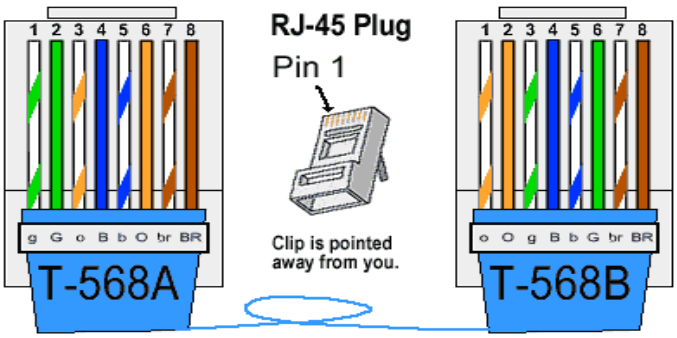
The straight-through cable is used to connect

- Host to switch or hub
- Router to switch or hub



The *crossover cable can be used to connect*

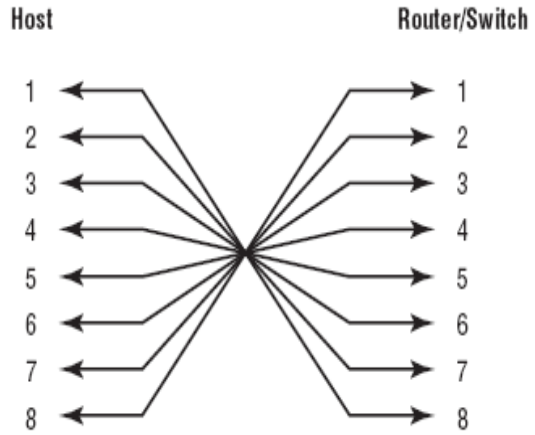
- Switch to switch
- Hub to hub
- Host to host
- Hub to switch
- Router direct to host

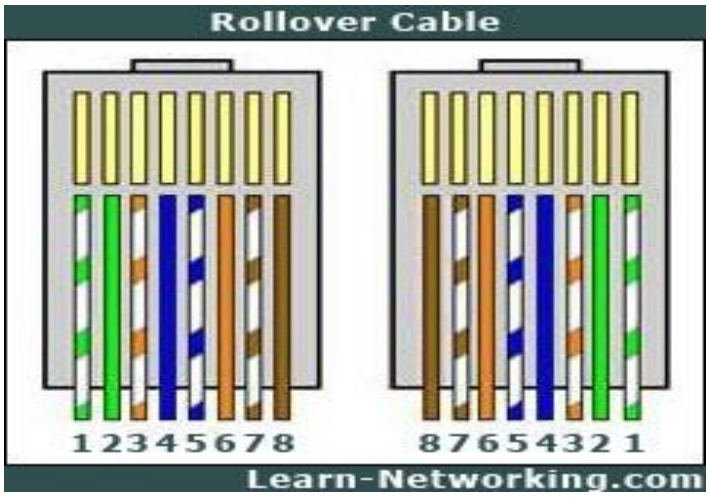


- Pc to Pc

Rolled Cable

You can use a rolled Ethernet cable to connect a host to a router console serial communication (com) port.





Connect peripherals with the computer

What are some common computer peripherals? There are three kinds of peripherals: input, input/output, and output devices. Some common computer peripherals include keyboards, mice, tablet pens, joysticks, scanners, monitors, speakers, printers, external hard drives, network devices and media card readers.

Keyboard, mouse, monitor, printer, scanner, and USB drive are examples of peripheral devices.

Networking Devices

The network device is one kind of device used to connect devices or computers together to transfer resources or files like fax machines or printers. 2). What are the examples of network devices? The examples are switch, hub, bridge, router, gateway, modem, repeater & access point.

Here is the common network device list:

- Hub
- Switch

- Router
- Bridge
- Gateway
- Modem
- Repeater
- Access Point

HUB

A network hub is a node that broadcasts data to every computer or Ethernet-based device connected to it. A hub is less sophisticated than a switch, the latter of which can isolate data transmissions to specific devices. Network hubs are best suited for small, simple local area network (LAN) environments.

In general, a hub refers to a hardware device that enables multiple devices or connections to connect to a computer. An example is a USB hub, which allows multiple USB devices to connect to one computer, even though that computer may only have a few USB connections.



There are three types of network hubs: passive, active, and intelligent. network. They do not improve the performance of local area networks (LANs), and may limit maximum media distances. Typically, passive hubs are connected to other devices in a star configuration.



Switch

Just like a hub and a bridge, a switch is also used to connect multiple devices in a LAN segment. A switch is the upgraded version of the bridge. Besides providing all the functionalities of a bridge, it also offers several additional features.

The biggest advantage of a switch is that it makes switching decisions in hardware by using application-specific integrated circuits (ASICs).

Unlike the generic processors that we use in our PC, ASICs are specialized processors built only to perform particular tasks. Usually, the ASICs in switches have a single task and that is switching the frames as fast as they can.

An ASIC occupied switch performs this task blazingly fast. For example, an entry-level 2960 Catalyst Switch can process 2.7 million frames per second.



Router

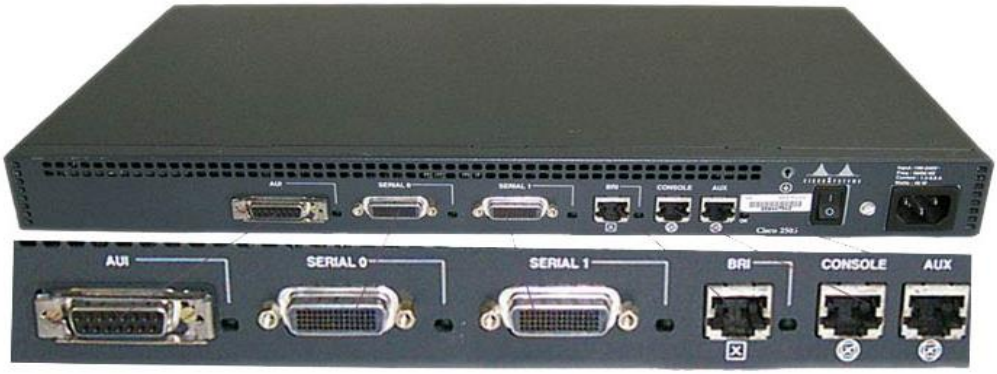
A router connects different network segments. It switches data packets between networks that are either located in different logical segments or constructed with different network-layer protocols.

A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet.

When a router receives a data packet on any of its interfaces, it checks the destination address of that packet, and based on that destination address, forwards that data packet to the interface that is associated with the destination address.

To forward data packets to their destination, the router keeps a record of the connected network. These records are maintained in a database table known as the routing table. Routing tables can be created statically or dynamically.

The following image shows two routers.



The main functions of routers are the following: -

3. To connect different network segments.
4. To connect different network protocols such as IP and IPX.
5. To connect several smaller networks into a large network.
6. To break a large network into smaller networks.
7. To connect two different media types such as UTP and Fiber optical.
8. To connect two different network architectures such as Token Ring and Ethernet.
9. To connect LAN network with Telco company's office.
10. To access DSL services.

Bridge

A bridge is used to divide a large network into smaller segments. The basic functions of a bridge are the following: -

1. Breaking a large network into smaller segments.
2. Connecting different media types such as UTP and fiber optic.
3. Connecting different network architectures such as Ethernet and the Token ring.

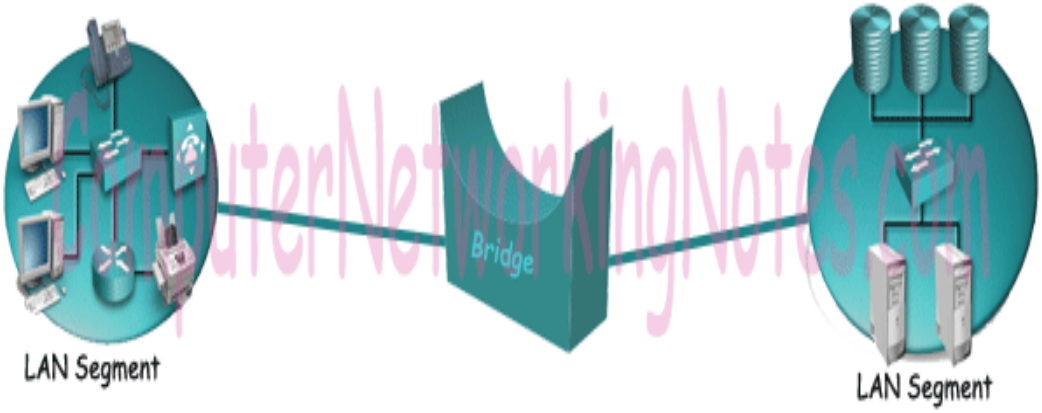
The following image shows an example of a bridge.



A bridge can connect two different types of media or network architecture, but it cannot connect two different types of network layer protocols such as TCP/IP or IPX. It requires the same network-layer protocols across all segments.

There are three types of bridge:-

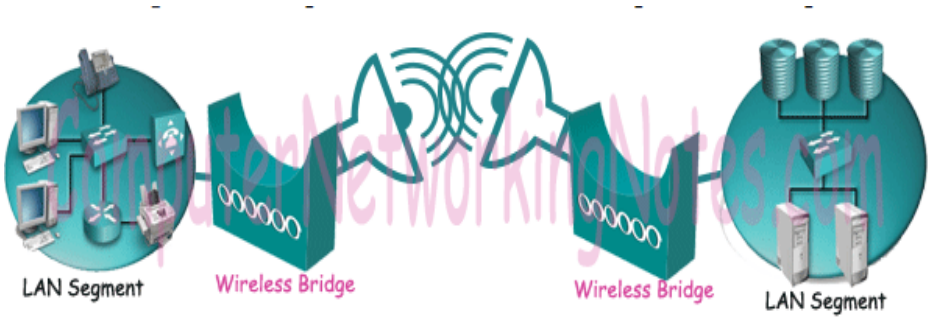
Local Bridge: - The Bridge directly connects two LAN segments. In Ethernet implementations, this is known as a transparent bridge. In the Token Ring network, this is called a source-routed bridge.



Remote Bridge: - This Bridge connects with another Bridge over the WAN link.



Wireless Bridge: - This Bridge connects with another Bridge without using wires. It uses radio signals for connectivity.



In networking models such as the OSI layers model and TCP/IP model, the functionalities of Bridges are defined in the physical layer and data link layer.

Just like a Hub, a Bridge is also no longer used in the computer network. Bridges have been replaced by switches.

Gateway

Gateway is used to forward packets that originate from a local host or a local network and are intended for remote networks. If a data packet does not get its destination address in the local network then it takes the help of the gateway device to find the destination address in the remote network. The gateway device knows the path to the remote destination address. If necessary, it also encapsulates the packet so that it can travel through other networks to reach its destination address.

The following image shows a gateway device.



Examples of the Gateway

Email Gateway: - An email gateway translates SMTP e-mails in standard X.400 format before forwarding.

GSNW Gateway: - A GSNW gateway allows Windows clients to access resources from the NetWare server.

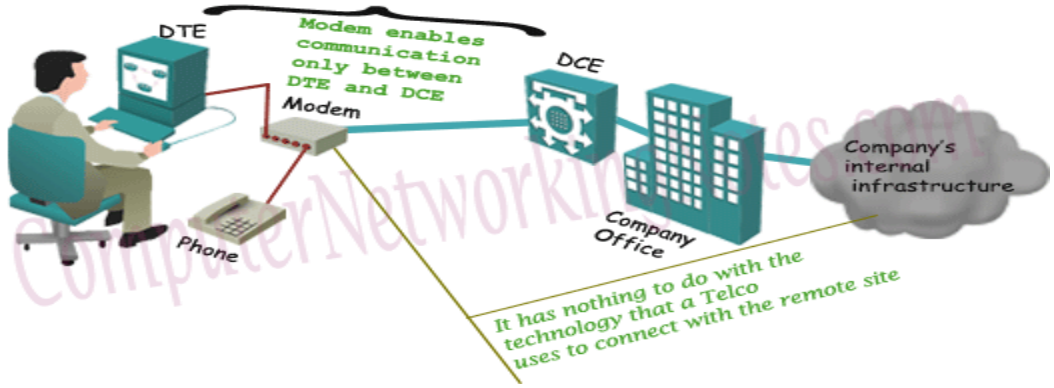
PAD Gateway: - A PAD gateway provides connectivity between a LAN network and an X.25 network.

Modem

In simple language, a modem is a device that is used to connect to the Internet. Technically, it is the device that enables digital data to be transmitted over telecommunication lines.

A Telco company uses entirely different data transmission technology from the technology that a PC uses for data transmission. A modem understands both technologies. When it receives signals from the PC, it converts them into the format that the Telco company understands. When it receives signals from the Telco company, it converts them into a format that the PC understands.

It enables communication between the PC (Known as the DTE device) and the Telecom company's office (Known as the DCE device).





Repeater

Repeaters are usually used to strengthen signals going long distances.

A repeater amplifies the signal it receives on one port before it transmits it on other ports.

Because the repeater does not check on the contents of the data it receives or retransmits, frames that are corrupted by noise and other factors can also be repeated.

The development of the hub replaced the repeater for all practical purposes, because it performs the same functions, and can include additional features.

Network Interface Cards (NICs)

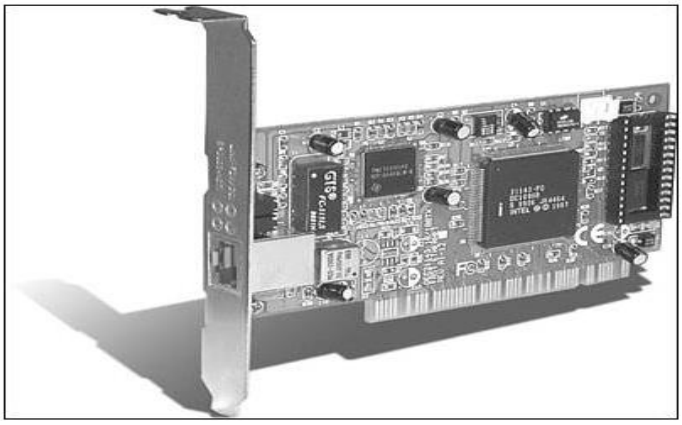
NICs are the mechanisms by which computers connect to a network.

NICs come in all shapes and sizes, and they come in prices to suit all budgets.

Known as network card, network adapter, and LAN adapter, etc.

When buying one consider

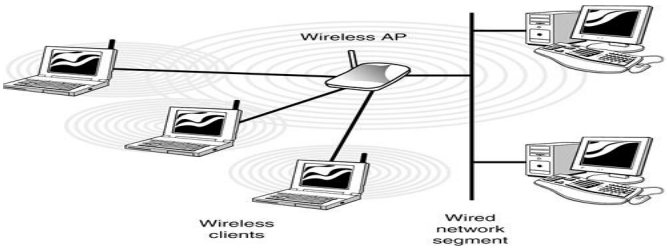
1. Network compatibility – Ethernet/Token Ring
2. Bus compatibility – PCI/ ISA /PCI-e
3. Port compatibility – UTP/ Fibre
4. Hardware compatibility – Easy to install / Recognized by many OS's



Wireless Access Point (WAP)

are a transmitter and receiver (transceiver) device used for wireless LAN (WLAN) radio signals.

Depending on the size of the network, one or more WAPs may be required. Additional WAPs are used to allow access to more wireless clients and to expand the range of the wireless network.



Transceivers

The term transceiver does not necessarily describe a separate network device but rather an integrated technology embedded in devices.

transceiver = transmitter and a receiver

device that receives data, converts it, and then sends it to another location

RF transceivers, fiber-optic transceivers, Ethernet transceivers, are examples

can also be used in pairs to insert a fiber segment into copper networks



Firewall

a hardware or software system that is used to separate one computer or network from another one.

The most common type is used to protect a computer or an entire network from unauthorized access from the Internet.

can also be used to control the flow of data to and from multiple networks within the same organization. Firewalls

can be programmed to filter data packets based on the information that is contained in the packets.

IP Terminology

Bit A bit is one digit, either a 1 or a 0.

Byte A byte is 7 or 8 bits, depending on whether parity is used.

Octet An octet, made up of 8 bits, is just an ordinary 8-bit binary number.

Network address This is the designation used in routing to send packets to a remote network for example, 10.0.0.0, 172.16.0.0, and 192.168.10.0.

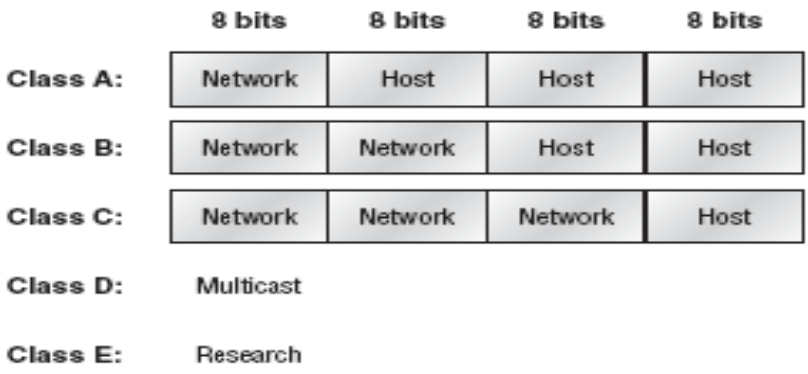
You can depict an IP address using one of three methods:

Dotted-decimal, as in 172.16.30.56

Binary, as in 10101100.00010000.00011110.00111000

Hexadecimal, as in AC.10.1E.38

Summary of the three classes of networks



Network Address Range: Class A

0xxxxxxx

00000000 = 0

01111111 = 127

Network Address Range: Class B

10000000 = 128

10111111 = 191

Network Address Range: Class C

11000000 = 192

11011111 = 223

Network Address Ranges: Classes D and E

The addresses between 224 to 255 are reserved for Class D and E networks.

Class D (224–239) is used for multicast addresses and Class E (240–255) for scientific purposes Private IP Addresses.

Address Class	Reserved Address Space
Class A	10.0.0.0 through 10.255.255.255
Class B	172.16.0.0 through 172.31.255.255
Class C	192.168.0.0 through 192.168.255.255

Subnet Masks

A subnet mask is a 32-bit value that allows the recipient of IP packets to distinguish the network ID portion of the IP address from the host ID portion of the IP address.

The network administrator creates a 32-bit subnet mask composed of 1s and 0s.

The 1s in the subnet mask represent the positions that refer to the network or subnet addresses.

4.2. Configure security

The Network Security Configuration feature lets apps customize their network security settings in a safe, declarative configuration file without modifying app code. These settings can be configured for specific domains and for a specific app.

How to Set Up a Secure Network: Back to Basics

1. Step One: Locate and Open Up Your Router Settings Page.
2. Step Two: Create a Password for Your Router.
3. Step Three: Change the Name of Your Network's SSID.
4. Step Four: Enable Network Encryption.
5. Step Five: Filter Out Your Mac Addresses.
6. Step Six: Reduce Your Wireless Signal's Range.

8 ways to improve wired network security

1. Perform auditing and mapping.
2. Keep the network up-to-date.
3. Physically secure the network.
4. Consider MAC address filtering.
5. Implement VLANs to segregate traffic.
6. Use 802.1X for authentication.
7. Use VPNs to encrypt select PCs or servers.
8. Encrypt the entire network.

Devices needed to be secured

These devices include routers, firewalls, switches, servers, load-balancers, intrusion detection systems, domain name systems, and storage area networks. These devices are ideal targets for malicious cyber actors because most or all organizational and customer traffic must pass through them.

4.3. Configure workstation

Start first with establishing neutral posture in the chair with your feet on the floor or footrest. Then progress to keyboard and mouse placement (keyboard tray), followed by desk height adjustment as able, then monitor height, and lastly, organize everything else within easy reach. Good ergonomics takes practice.

A good workstation ergonomic arrangement will allow any computer user to work in a neutral, relaxed, posture that will minimize the risk of developing any injury. An ideal keyboard arrangement is to place this on a height-adjustable negative-tilt tray.

Workstation management also involves Maintaining and monitoring them to ensure they are running efficiently. It's hard to monitor machines that are remote so there is a number of agents out there you can install to allow you to both manage and monitor machines both inside and outside your network.

- **How do you manage a workstation?**

Workstation management also involves Maintaining and monitoring them to ensure they are running efficiently. It's hard to monitor machines that are remote so there is a number of agents out there you can install to allow you to both manage and monitor machines both inside and outside your network.

- **How do you position your body at a computer workstation?**

Hands, wrists, and forearms are straight, in-line and roughly parallel to the floor. Head is level, forward facing, and balanced. Generally it is in-line with the torso. Shoulders are relaxed and upper arms hang normally at the side of the body.

- **Why it is important to have a workstation set up ergonomically?**

What aspects of your workspace can you make ergonomic? If you spend a lot of time sitting at your desk, it can wreak havoc on your body - even if the effects aren't immediately noticeable. Over time, a poor setup can mean pinched nerves, sore wrists, and other discomforts.

- **How do I make my computer workstation fit me?**

The lower part of the backrest should support the curve of your lower back. The lower part of the backrest (the lumbar support) of your chair should support the curve of your lower back. If your backrest is adjustable, raise or lower it so the lumbar support fits snugly against your lower back.



Self check-4

Name: _____ IDNo_____ Date: _____

Time started: _____ Time finished: _____

Instruction:-Choose the correct answer from the given alternatives and write your own choice.

1. If the break in a cable or fault computer can bring slow down entire network_____ type of topology.

   A. Mesh topology C. Bus topology
   B. Ring topology D. Hybrid topology
2. From the following comparison one is can explain Personal Area Network?
   A. Low cost little or No infrastructure setup.
   B. Short range communication.
   C. Small personal network , use anywhere.
   D. All are answers
3. Which one of the following network topology is fault tolerant?
   A. Mesh topology C. Ring topology
   B. Bus topology D. Hybrid topology
4. _____ refers physical arrangement or layout of the computer network devices & cables?
   A. Topology C. Server
   B. Network D. All
5. From the following one is an advantage of client-server based Network?

A. Centralized C. Accessibility
B. Scalability D. All

1. _____ usually used to strengthen signals going long distances.
   A. Switch B. Repeater C. HUB D. None
2. A device that is used to connect to the Internet and changes digital data to analog signal.
   A. Modem B. Digital camera C. NIC D. All
3. From the following alternatives one is an advantage client-server based network.
   A. Centralized
   B. Scalability
   C. Flexibility
   D. All are answers

Part II. Write "True" if the given question is correct and say "False" if it is incorrect.

4. A good workstation ergonomic arrangement is important for our health & minimize the risk of developing any injury.
5. Hub broadcasts data to every computer or Ethernet-based device connected to it.

Part III. Match the following their correct answers column A with B

Column A	**Column B**
6. Wide Area Network	A. has equivalent capacity
7. Server	B. Fault tolerant topology
8. Mesh topology	C. Internet
9. peer-to-peer	D. Hybrid topology
10. combination of any two or more network	E. dedicated computer that provide recourses

Operation sheet 3

How to Create Subnets

To create a subnet follows these steps:

1. Determine the number of required network IDs:
   - One for each subnet
   - One for each wide area network connection
2. Determine the number of required host IDs per subnet:
   - One for each TCP/IP host
   - One for each router interface
3. Based on the above requirements, create the following:
   - One subnet mask for your entire network
   - A unique subnet ID for each physical segment
   - A range of host IDs for each subnet

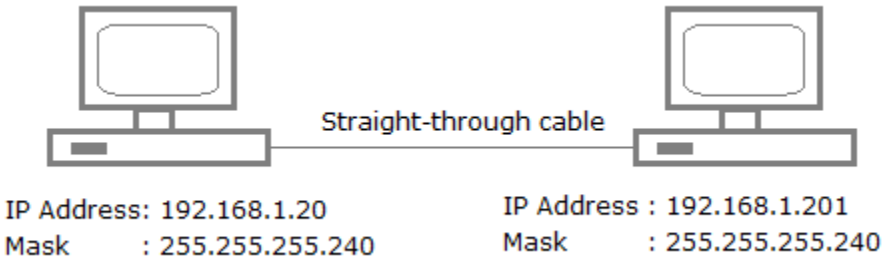
Lap test 4

Name: _____ IDNo_____ Date: _____

Time started: _____ Time finished: _____

Part I. Instruction:-Answer the following questions from number 1-3 and choose the correct one.

1. A network administrator is connecting hosts A and B directly through their Ethernet interfaces, as shown in the illustration. Ping attempts between the hosts are unsuccessful. What can be done to provide connectivity between the hosts?



1. A crossover cable should be used in place of the straight-through cable.
2. A rollover cable should be used in place of the straight-through cable.
3. The subnet masks should be set to 255.255.255.192.
4. A default gateway needs to be set on each host.
5. The subnet masks should be set to 255.255.255.0.

A. 1 only
B. 2 only
C. 3 and 4 only
D. 1 and 5 only
E. 2 and 5 only

Unit Five:- Administer and support peripheral services

This unit is developed to provide you the necessary information regarding the following content coverage and topics:-

- Indentify priority
- Configure network maintenance schedule settings
- Demonstrate peripheral supporting methods

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Explain and identifying priority
- Identify network configuring setting
- Demonstrating peripheral supporting methods

5.1. Indentify priority

Priority is defined as that **something or someone is more urgent or important than other things**. An example of priority is a claim that has to be processed right away and that jumps to the head of the line.

After establishing the physical or wireless connections of the computers, you can electronically connect them, test or check that they can "see" each other. Microsoft Windows 7 or 10 makes networking ridiculously easy.

Prioritize your technology initiatives and opportunities against value and cost drivers to align around a more effective roadmap.
How do you prioritize client issues?

Best Practices for Prioritizing Customer Requests

1. First come, first serve.
2. Allow customers to determine the level of urgency.
3. Create categories for types of requests.
4. Create categories for types of customers.
5. Respond quickly, no matter what.
6. Streamline your reassign process.
7. Create service level agreements (SLA's).

5.2. Configure network maintenance schedule settings

Maintenance schedules allow you to temporarily disable monitoring on specific resources (such as data backups and service restarts) so you can perform maintenance on the host machines. When the scheduled maintenance is completed, ipMonitor reactivates the affected monitors. This process ensures that your planned maintenance activities do not trigger alerts or negative results in your historic reports.
You can schedule maintenance based on rules (such as Microsoft Outlook rules) or while ipMonitor performs routine actions. This allows you to define a list of actions using the reboot server, restart service, or pause commands. You can configure credentials as required on a per-action basis, as well as schedule maintenance to disable monitors while actions outside of ipMonitor occur.

Maintenance Objectives

- Describe network maintenance tasks
- Explain the difference between proactive and reactive network maintenance.
- Describe well-known network maintenance models.
- Identify common maintenance procedures.
- Describe tools required for network maintenance.

Maintenance Tasks

- **Device installation and maintenance**: Includes tasks such as installing devices and software and creating and backing up configurations and software.
- **Failure response**: Includes tasks such as supporting users that experience network problems, troubleshooting device or link failures, replacing equipment, and restoring backups.
- **Network performance**: Includes tasks such as capacity planning, performance tuning, and usage monitoring.
- **Business procedures**: Includes tasks such as documenting, compliance auditing, and service level agreement (SLA) management.
- **Security**: Includes tasks such as following and implementing security procedures and security.

What is a Network Maintenance Plan?

A network maintenance plan is the range of services a company intends to use to keep the network running smoothly. That plan may include tasks performed by internal resources as well as those that are easier to team up with network hardware support experts to complete.

Maintaining your computer network is important because there are many factors that can go wrong on a daily basis. Regular maintenance can keep the big problems away, while helping to maintain your networks optimal performance.

The your networked computers should maintained regularly within 24 hours or in weeks.

You must build processes and procedures for performing your network maintenance tasks; this is called network maintenance planning.

Network maintenance planning includes the following:

1. Scheduling maintenance
2. Formalizing change-control procedures
3. Establishing network documentation procedures
4. Establishing effective communication
5. Defining templates/procedures/conventions standardization.
6. Disaster Recovery.

Scheduled Maintenance

✓ **The benefits of scheduled maintenance include the following:**

- Network downtime is reduced.
- Long-term maintenance tasks will not be neglected or forgotten.
- Predictable lead times for change requests.
- Disruptive maintenance tasks can be scheduled during assigned maintenance windows, reducing downtime during production hours.

During maintenance periods, ITS will be performing the following types of maintenance:

- File server maintenance.
- Email and antivirus maintenance.
- Firmware updates and directory maintenance on the Email and file servers.
- Switch and router firmware/software maintenance.
- Dorm-Net and Network Security Systems maintenance.

Things to Maintain and Repair Computer System and Networks

1. Back up your data.
2. Clean dust from your computer.
3. Clean up your cabling and everything else too.
4. Organize your installation disks.
5. Run antivirus and spyware and scans regularly.
6. Clean up your software.
7. Clean up your OS.

What is the importance of maintenance planning and scheduling?

- ❖ The basic goal of planning and scheduling is avoiding delay.
- ❖ The role of the Maintenance Planner is to improve work force productivity and work quality by anticipating and eliminating potential delays through planning and coordination of labor, parts and material, and equipment access.

Usage logs

Every activity within a network is considered a security event. Emails, firewall updates, and user activity are all recorded in a complex series of logs that define your network's environment. The resulting data logs contain a huge amount of information that would make threats impossible to detect with the human eye.



5.3. Demonstrate peripheral supporting methods

A peripheral device provides input/output (I/O) functions for a computer and serves as an auxiliary computer device without computing-intensive functionality.

A peripheral activity or issue is one which is not very important compared with other activities or issues. A peripheral or peripheral device is an auxiliary device used to put information into and get information out of a computer.

There are many other examples of peripherals, such as a microphone, web camera, headphones, external hard drive and flash drive. Most computer users have at least several of these peripheral devices.



Self check test 5.

Name _____ IDNo _____ Level _____

Start time _____ Finishing time _____

Instruction:- Write short answer for the given questions below.

1. What is maintenance schedule?

   _____
   _____
   _____
   _____
   _____
   _____
   _____

2. Write and discuss importance maintenance scheduling

   _____
   _____
   _____
   _____
   _____

   Instruction:

Instruction: Say True or False

3. Maintenance Scheduling procedures are for Maintenance use only.
4. Mechanics availability for work must be documented and used by scheduler.
5. A Prioritization system that correctly identifies jobs that can be planned from rush jobs is key to a proactive maintenance program.
6. The best priority system is one developed, controlled and executed by the Maintenance Organization.

   Instruction: Choice Part

7. The Best process for distributing Maintenance Work Schedules is:
   A. Job start and completion are assigned to crew and published more than 3 days prior to starting work.
   B. Schedules of job start, completion and crew assignments are distributed the day before starting the work.
   C. Schedules of job start, completion and crew assignments are distributed the day to do the work.

D. Job assignments are given out to crews 1 -2 days prior to starting work or the day to do the work.

8. Schedule performance is measured and reported until it exceeds 90%.
   A. True.
   B. False
9. Schedule breakers and reactive work are managed by and responsibility of:
   A. Planner and Scheduler
   B. Operations and Maintenance Manager
   C. Production and Maintenance Supervisors
   D. Mechanics and Operators
10. Maintenance and Production schedules should be combined into an integrated shop floor schedule to eliminate confusion on priorities, equipment out of service and work flow patterns.
    A. True
    B. False

Operation sheet 4

Here is a simple list to go over once per month to keep your equipment running at peak performance.

Be sure to always backup your data. This is one of the most crucial rules in the IT industry. Loss of company and customer data is a serious issue that can be easily prevented. Being proactive with backups will give you peace of mind, as well as protect your data from numerous possible threats.

1. **Regularly scheduled, automated backups** are a great resource to utilize. You can schedule them daily, weekly, or monthly, depending on the amount of critical data being stored. It is also strongly suggested that you store backups in a remote location in addition to the local network. Having a second secure location is beneficial in times of data corruption and hardware failure.
2. **Keep software and plug-in up-to-date.** Always look for new versions of any critical software and plug-in. Updated versions may have patches for functionality and security. It is best to then delete the ones you do not need. Any miscellaneous and extra plugins will likely slow down your machines.
3. **Remove server clutter.** It is a good idea to look at your server's RAM, CPU, and disk storage to be sure you are keeping only the essentials. If you are nearing peak capacity, it may be time to upgrade your server.
4. **Consolidate content.** While you are inspecting your resources, you may want to consolidate and archive any old content. Any databases, files, and scripts that are no longer useful or necessary are only taking up space and bogging down your server.
5. **Change passwords regularly.** Anyone using your server should be changing passwords frequently. Having strong password requirements helps to protect your company network from intrusions.
6. **Keep your equipment and equipment area clean.** Dust and dirt can wreak havoc on the components of IT equipment; be sure to keep areas clean. Maintaining proper temperatures and spacing is also crucial to decrease the risks of overheating and downtime.
7. **Have security measures in place.** Firewall and other security measures can help to protect company and customer data, as well as prevent security threats that bog down your system.

Lap test 4

Name _____ IDNo _____ Level _____

Start time _____ Finishing time _____

1. Write maintenance schedule in the check list below.

Instruction: Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory, you can proceed to the next topic.

Personal name _____ Date of issued _____

No	Maintenance description	component description	Daily	Weekly	Monthly	Annually	Remark
1.	Data backups						
2.	Virus protection						
3.	Network documentation updates						
4.	Device inventory						
5.	Power checks						
6.	Device filter dusting						
7.	Cable organization						
8.	Check security						
9.	Keep you equipment is clean						

Unit Six:- Use command line tools

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics

- Indentify command-line environment
- Differentiate command-line and graphical user interface
- Apply command-line tools

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Indentifying command line environment according to organizational guidelines
- Explain Differentiate command-line and graphical user interface
- Explain how to know command-line tools

6.1. Indentify command-line environment

What is command-line environment?

The environment of the command line refers to the settings and preferences of the current user. It enables users to set greetings, alias commands, variables, and much more.

To check if an environment variable Exists:-
Select Start > All Programs > Accessories > Command Prompt. In the command window that opens, enter echo %VARIABLE%. Replace VARIABLE with the name of the environment variable.

A command-line interpreter or command-line processor uses a command-line interface to receive commands from a user in the form of lines of text. This provides a means of setting parameters for the environment, invoking executables and providing information to them as to what actions they are to perform.

The command line, also called the Windows command line, command screen, or text interface, is a user interface that's navigated by typing commands at prompts, instead of using a mouse. For example, the Windows folder in a Windows command line is "C:\Windows>" (as shown in the picture).

A Command line is a horizontal line on an interface that allows the user to type in various commands. Typically, there is a command prompt at the left side of a screen, with a blank line extending to the right where commands are typed.

What is command line and types?

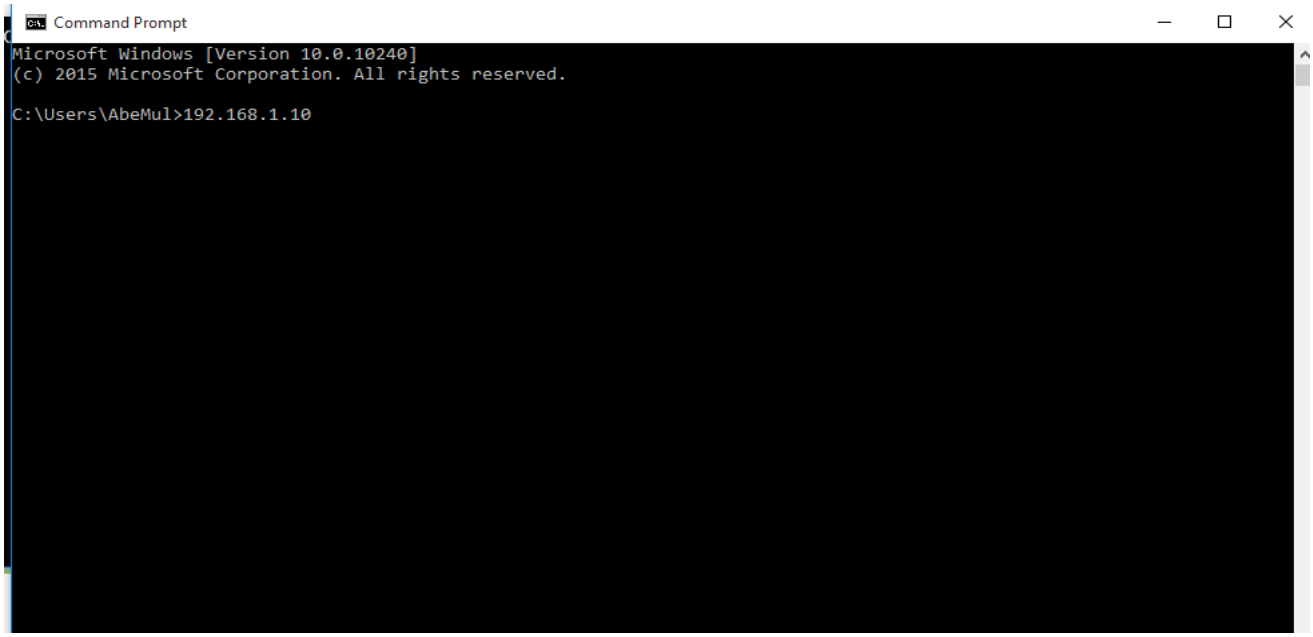
A command-line interface (CLI) is a text-based user interface (UI) used to run programs, manage computer files and interact with the computer. Command-line interfaces are also called command-line user interfaces, console user interfaces and character user interfaces.

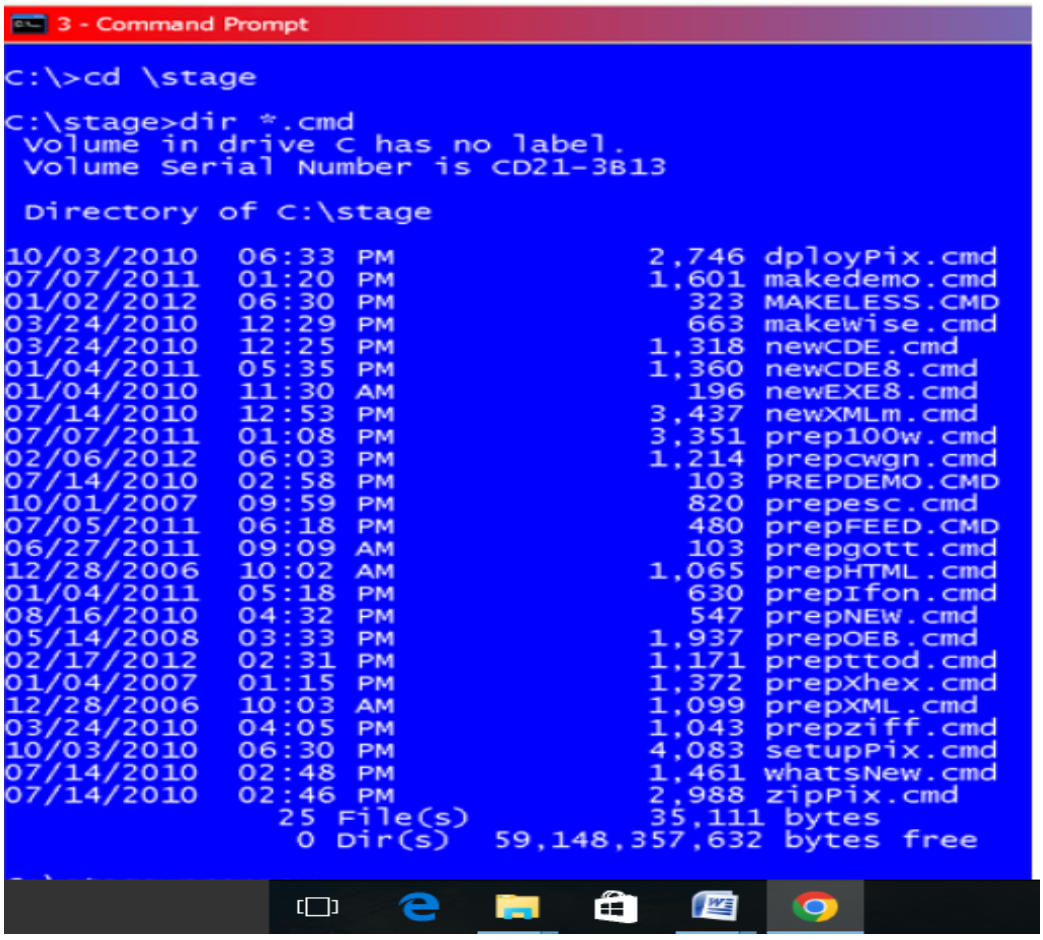
How to use command prompt/ Using command-line tools?

Right-click a Command Prompt shortcut.

Click Run As Administrator. When you open the Command Prompt window as Administrator, an operating-system dialog appears that asks you if you want to continue. Click Continue to proceed.

When you run these command-line tools from a Command Prompt, run them from a Command Prompt window that is launched by performing the following actions: Right-click a Command Prompt shortcut. Click Run As Administrator.


Command Prompt
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.
C:\Users\AbeMul>192.168.1.10


3 - Command Prompt
C:\>cd \stage
C:\stage>dir *.cmd
Volume in drive C has no label.
Volume Serial Number is CD21-3B13
Directory of C:\stage
10/03/2010 06:33 PM 2,746 dployPix.cmd
07/07/2011 01:20 PM 1,601 makedemo.cmd
01/02/2012 06:30 PM 323 MAKELESS.CMD
03/24/2010 12:29 PM 663 makewise.cmd
03/24/2010 12:25 PM 1,318 newCDE.cmd
01/04/2011 05:35 PM 1,360 newCDE8.cmd
01/04/2010 11:30 AM 196 newEXE8.cmd
07/14/2010 12:53 PM 3,437 newXMLm.cmd
07/07/2011 01:08 PM 3,351 prep100w.cmd
02/06/2012 06:03 PM 1,214 prepcwgn.cmd
07/14/2010 02:58 PM 103 PREPDEMO.CMD
10/01/2007 09:59 PM 820 prepesc.cmd
07/05/2011 06:18 PM 480 prepFEED.CMD
06/27/2011 09:09 AM 103 prepgott.cmd
12/28/2006 10:02 AM 1,065 prepHTML.cmd
01/04/2011 05:18 PM 630 prepIfon.cmd
08/16/2010 04:32 PM 547 prepNEW.cmd
05/14/2008 03:33 PM 1,937 prepOEB.cmd
02/17/2012 02:31 PM 1,171 prepttod.cmd
01/04/2007 01:15 PM 1,372 prepXhex.cmd
12/28/2006 10:03 AM 1,099 prepXML.cmd
03/24/2010 04:05 PM 1,043 prepziff.cmd
10/03/2010 06:30 PM 4,083 setupPix.cmd
07/14/2010 02:48 PM 1,461 whatsNew.cmd
07/14/2010 02:46 PM 2,988 zipPix.cmd
25 File(s) 35,111 bytes
0 Dir(s) 59,148,357,632 bytes free

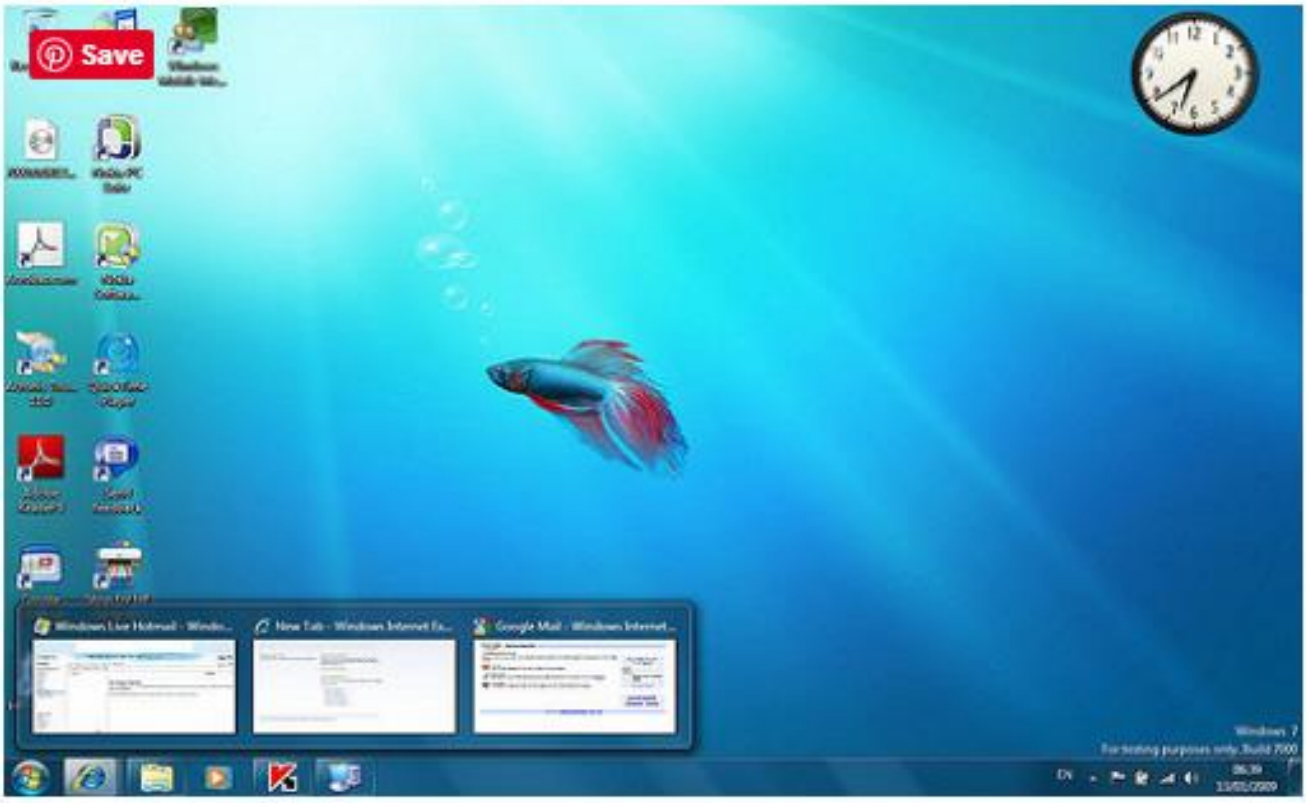
6.2. The Difference between Command-line and graphical user interface.

The main difference between GUI and CLI is that the Graphical User Interface (GUI) allows the user to interact with the system using graphical elements such as windows, icons, menus while the Command Line Interface (CLI) allows the user to interact with the system using commands.

An operating system is an interface between the user and the hardware components. It performs different tasks. An operating system provides GUI or CLI for the user to perform tasks. Some operating systems only provide CLI while others provide both GUI and CLI. A GUI consists of controls or widgets to interact with the computer. On the other hand, when using the CLI, the user should enter commands to perform the tasks. Overall, GUI is more user-friendly, but the execution speed is higher in CLI.

- **What is GUI**

GUI stands for **Graphical User Interface**. It takes the advantage of computer graphics. It allows the user to interact with the computer using components such as windows, icons, labels, text boxes, and radio buttons. It is easy for the user to perform tasks using GUI as it does not require remembering commands. He can easily click on icons, drag and drop objects using the mouse.



There are various GUI components. The window is the complete visible screen to the user. It has a rectangular shape and it can overlap with the area of other windows. A text box is a component

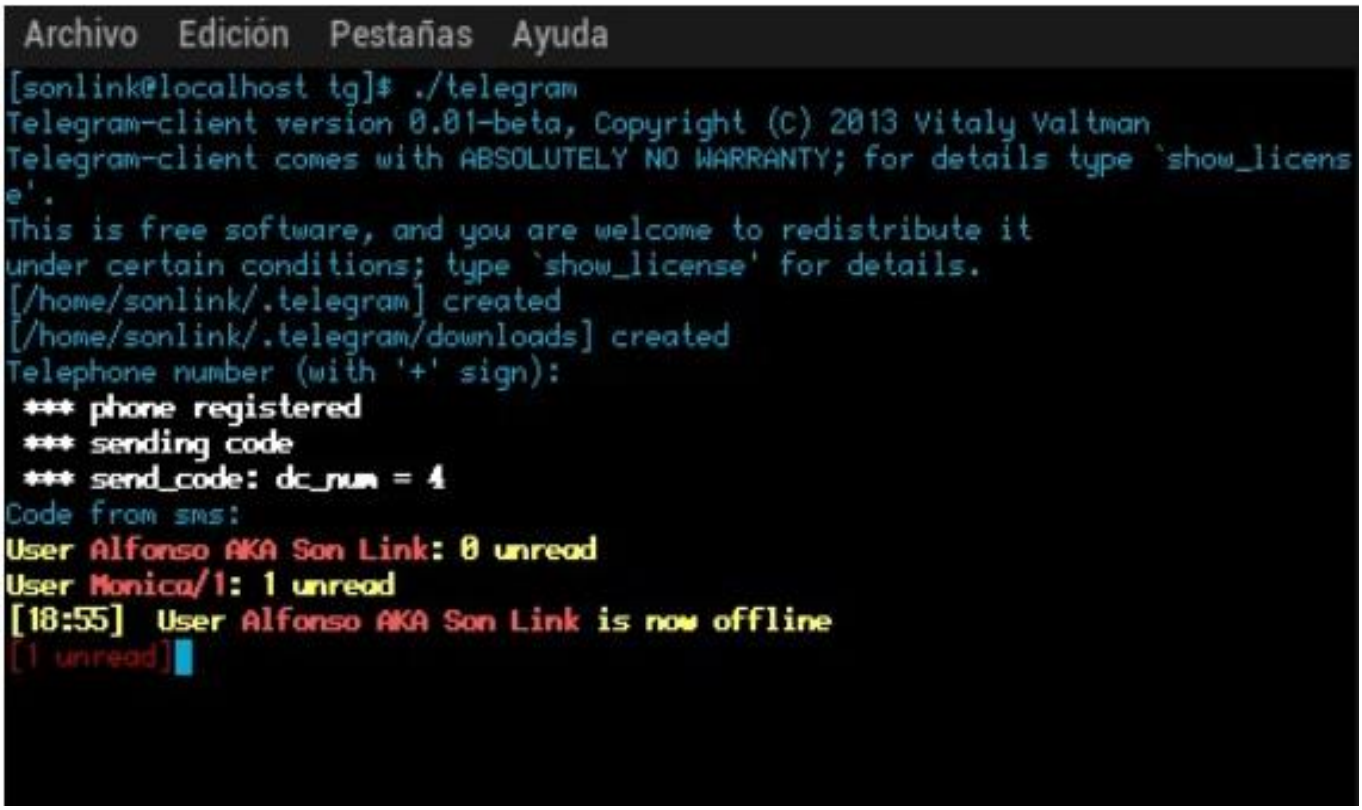
for the user to enter input data. A menu provides a list of options for the user to select an option. A button allows selecting one particular option. A radio button appears as a group and the user can select one option at a time. Moreover, checkbox is a graphical element that allows the user to select an option out of multiple alternatives.

Operating Systems such as Windows and Linux provide GUI. They contain windows, icons, search boxes, menus, drop down lists and many graphical elements. There is also application software designed for specific business requirements such as Human Resource Management systems, Library Management Systems, etc. They consist of GUIs to accomplish necessary tasks. Overall, a GUI is a user-friendly mechanism to interact with the system.

A GUI is a type of user interface that allows users to interact with electronic devices through graphical icons and visual indicators.

- **What is CLI**

CLI stands for **Command Line Interface**. CLI is also called **Command Language Interpreter, Console User Interface** or **Character User Interface**. It allows the users to enter commands to the terminal to perform the task. When the user enters a command and presses “enter” key, the terminal or the shell will interpret that command and will display the response back to the terminal. Likewise, the user can communicate with the operating system.



A CLI is an interface for the user to issue commands in the form of successive lines of text or command lines to perform the tasks.

Usability

It is easy to use the GUI. It is not necessary to have a vast knowledge to operate the system using the GUI. Even a beginner can easily handle the tasks using the GUI. On the other hand, CLI is complex. The user should have good knowledge of the commands. Miss pelt commands are of no use.

Memory Requirement

GUI requires more memory as it contains a lot of graphical components. CLI is a command interface, and it does not require more memory.

Speed

GUI is slower but the CLI is fast.

Customizability

The user can change the appearance of the GUI. There are customizable options to change the appearance. It is not possible to change the CLI.

Flexibility

GUI is more flexible whereas CLI is not much flexible.

6.3. Apply Command-line tools

Command line tools are scripts, programs, and libraries that have been created with a unique purpose, typically to solve a problem that the creator of that particular tool had himself. Because of that, we have divided this roundup of the best command line tools to include different categories, like Web Development, Utilities, Productivity, and others. Beyond being categorized, note that the following 50 command line tools are listed in no particular order — they're not ranked or rated, but are numbered simply to make a list easier to navigate.

Windows Command-line Tools

- PowerShell
- ConEmu
- PSReadLine
- Chocolatey
- Babun (optional)

A. PowerShell

Significantly closer to a real 'shell' than cmd.exe, offering us a powerful scripting environment for task automation. It's fair to compare it to Bash or zsh.

Auto completes directory and filenames

Auto completes application names

Has integrated aliases and commands (called cmdlets - e.g Select-String is like grep, Invoke-Elevated is like sudo, Sort-Object is like sort, Get-Process lists all active processes). If moving from another shell to PS, Set-Alias lets you map aliases you're used to to Windows equivalents. For example: Set-Alias server python -m http.server 8000 launches a Python server when the server alias is used.

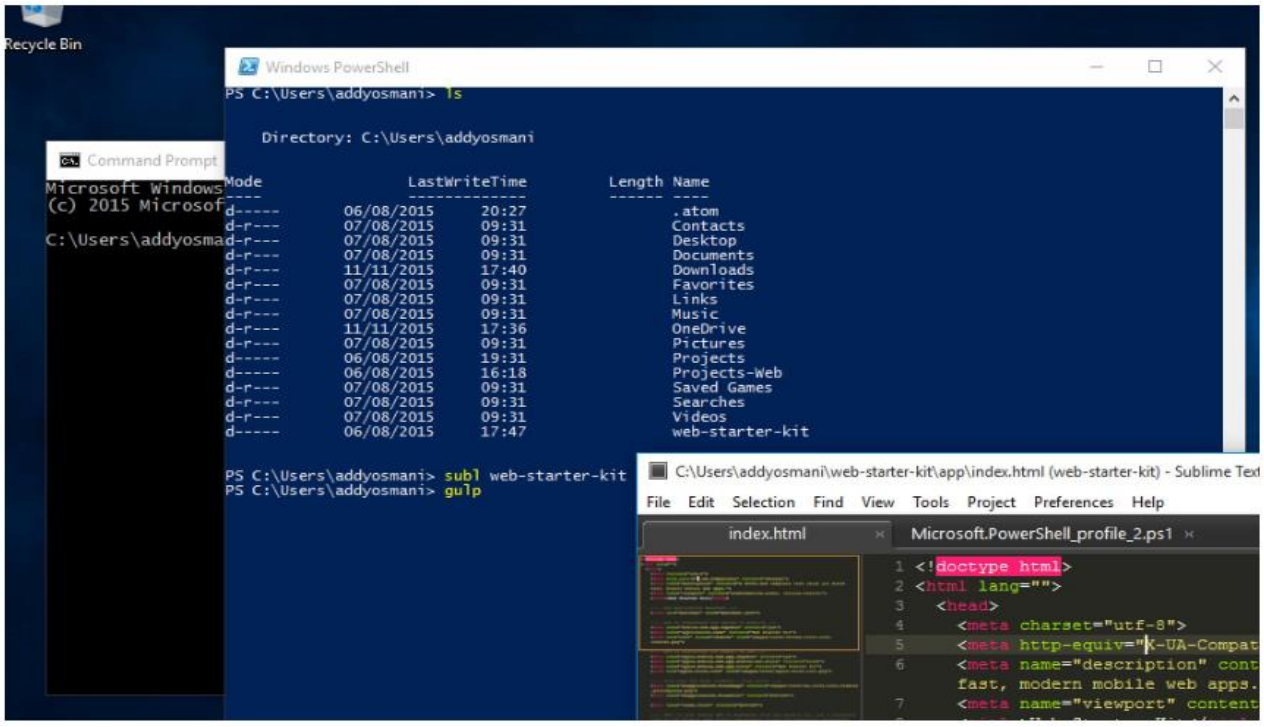
Aliases can be persisted in a PowerShell profile

Supports piping, like Unix. Unlike Unix, it pipes objects rather than text streams. This requires getting used to but avoids reparsing when you want to get out a property.

Supports modules. PSGet is a package manager for PowerShell allowing you to easily extend it.

Optionally consider Posh-Git, a PowerShell script for git to gain contextual tab-completion.

If you're interested in trivia, here's an answer to why MS created PowerShell from the lead architect.



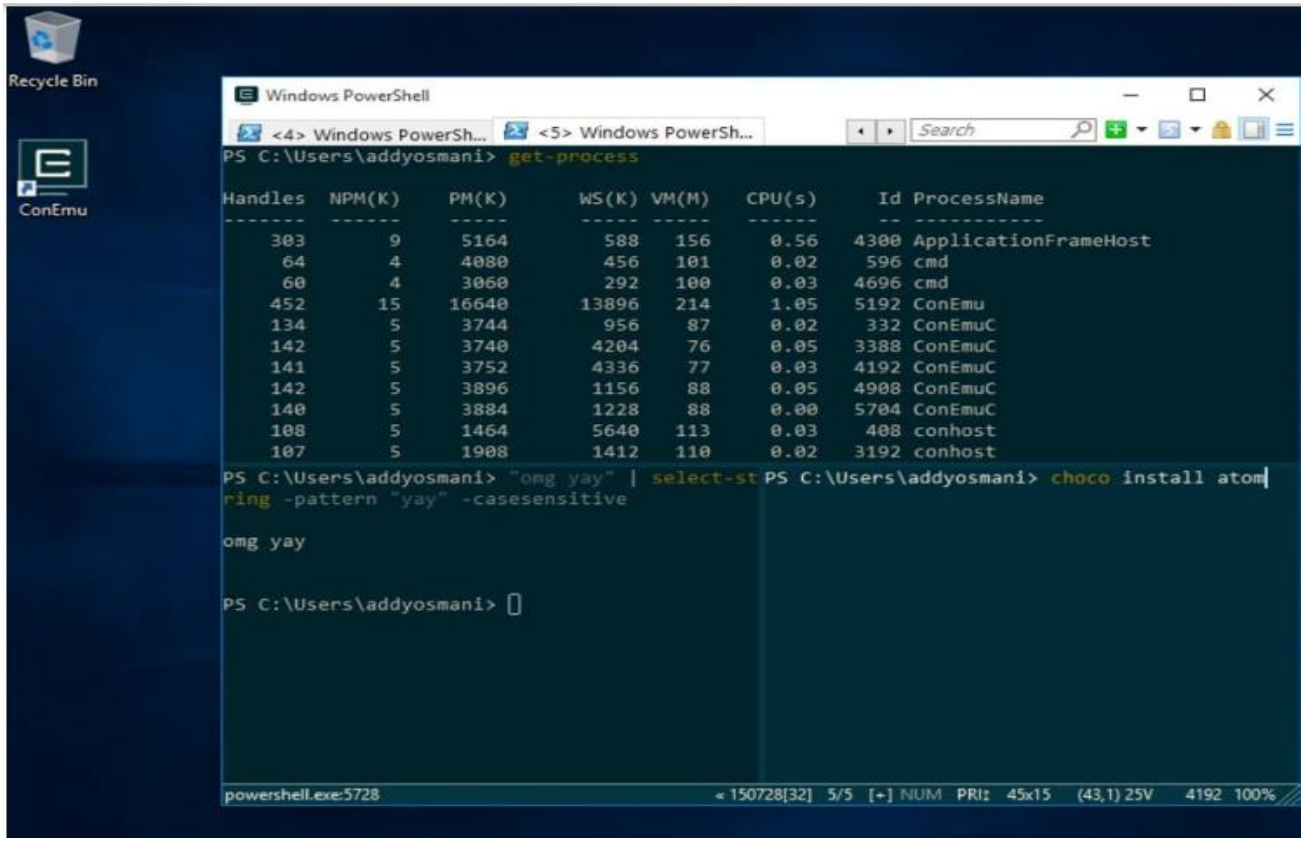
B. ConEmu(console host)

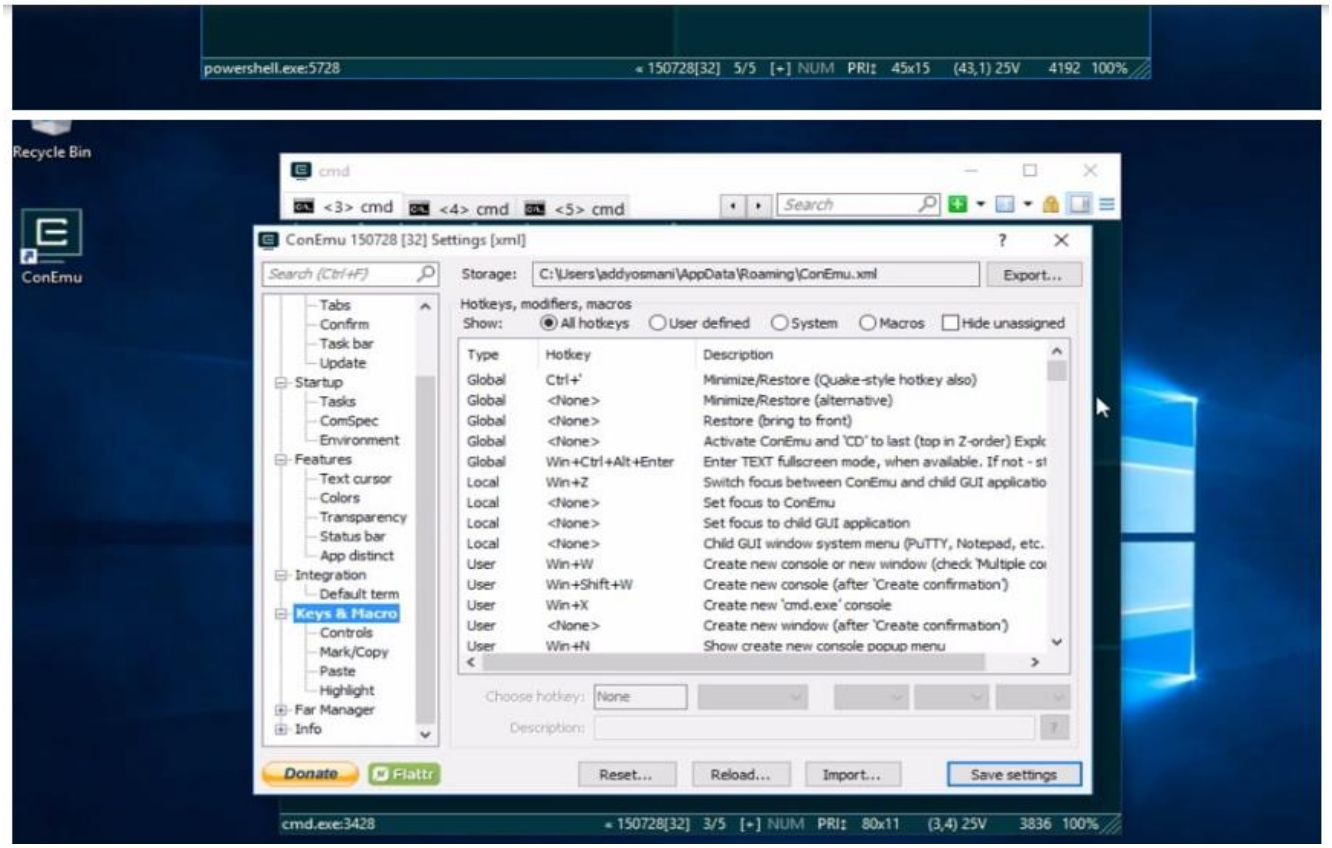
An advanced console emulator where you can run your shell of choice.

Supports opening multiple terminals in different tabs. Makes it trivial to launch terminals as different users.

Extremely customizable - everything from shortcuts to text selection and status bar colors can be changed.

- Supports a split-screen view
- Simple GUI apps can be run in tabs
- Support for Windows 7+ Jump Lists
- Supports smooth window resizing
- Windows font anti-aliasing
- Starting tabs can be fully customized to start in a particular directory
- Intelligent copy/paste





C. PSReadLine (console editing helpers)

Significantly improves the console editing experience

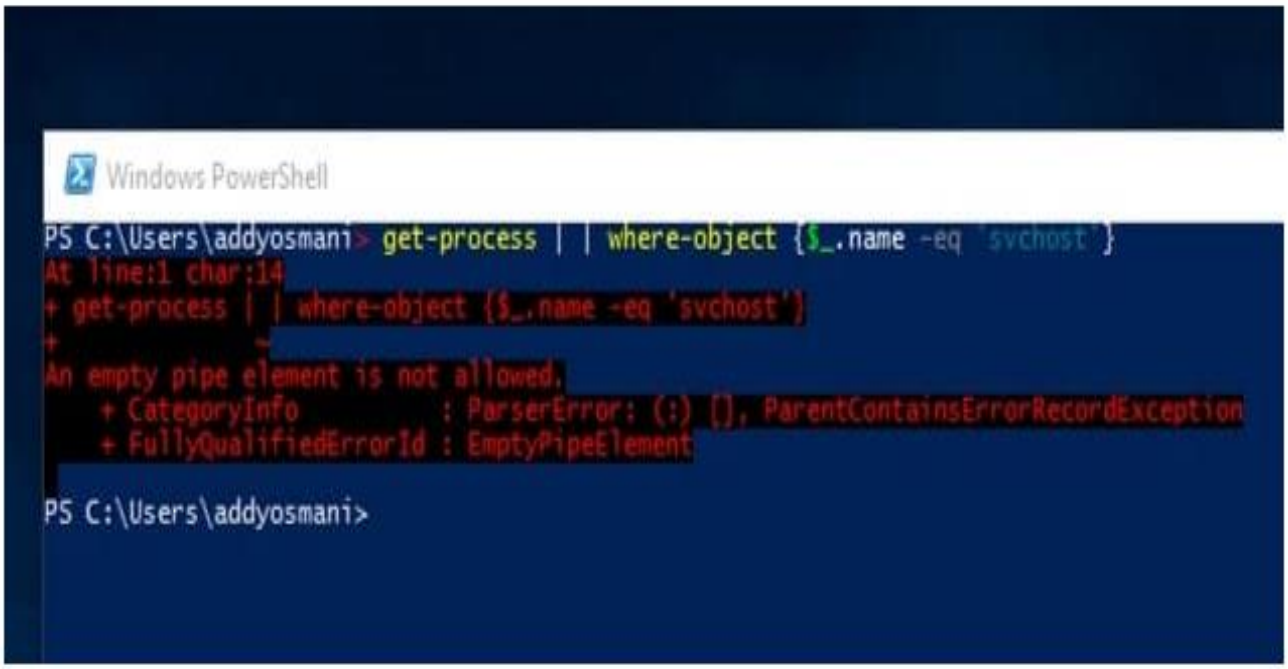
Syntax highlighting whenever you start typing commands. Clearly indicates syntax errors with a red ">" character.

Highly customizable key bindings

D. Bash-style autocompletion

Bash/zsh interactive history search (Ctrl + R). Powerful command history traversal too. Easily view previous multi-line commands using arrow keys rather than just the last line of the command.

- Proper support for copy/paste/cut (Ctrl+C/X/V should all work just fine)
- Good support for undo/redo
- History saving is automatic



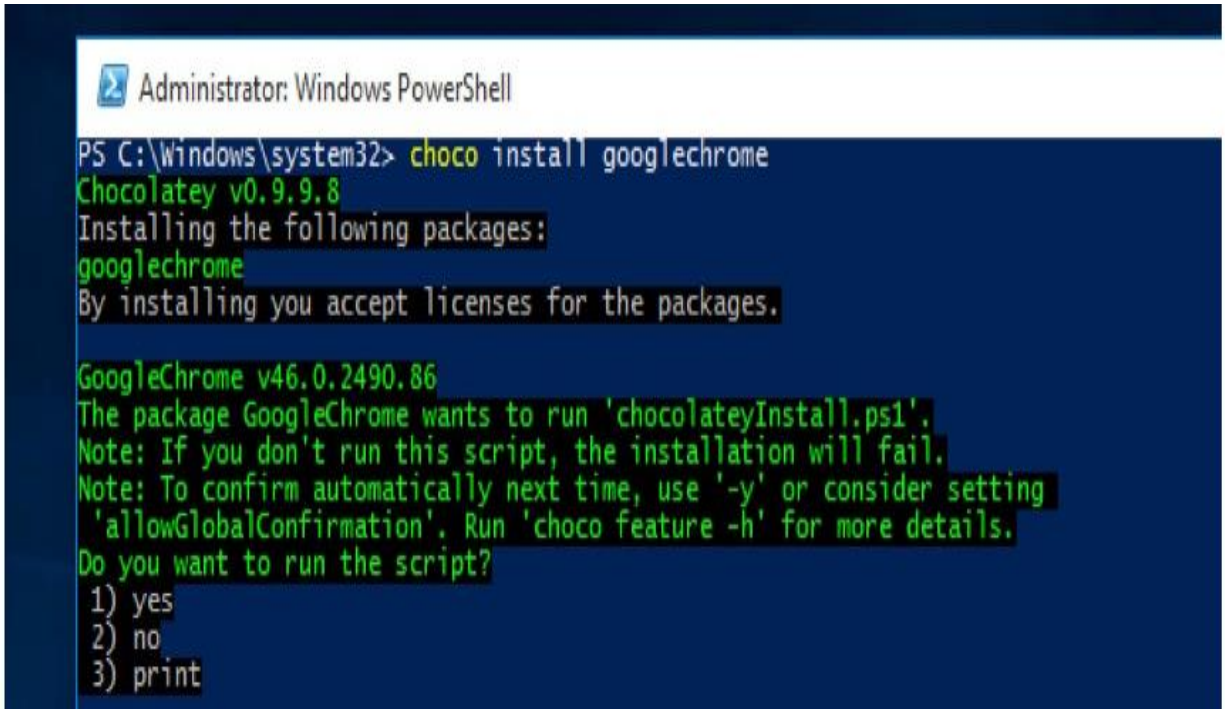
E. Chocolatey (package manager)

Basically homebrew for Windows, allowing you to pull in your favorite Windows apps conveniently. There are currently ~3K packages available that can be updated using Chocolatey directly.

Differs from Nuget. NuGet is for development libraries. Chocolatey is a binary machine package manager and is built on NuGet infrastructure.

Offers effectively silent builds

You may also be interested in learning about OneGet, Microsoft's package manager..manager, which should work with Chocolatey under Windows 10.



F. Babun (optional/ Cygwin preconfigured)

Cygwin (the Linux-like env for Windows) minus some of the historically known quirks. The overall setup is significantly more straight-forward using the Babun installer. If you're particularly experienced with Unix and would prefer to avoid learning PowerShell, cygwin/Babun are worth considering.

Includes a package manager called pact (a little similar to brew) similar to apt-get. This is a big deal as you currently have to re-run the Cygwin installer when adding packages vs. just using pact.

Vim pre-installed and pre-configured

Integrated support for oh-my-zsh

Auto-updates

Self check 6.

Name _____ IDNo _____ Level _____

Start time _____ Finish _____

Instruction:-Say true of False

1. A command-line interface is a text-based user interface used to run programs, manage computer files and interact with the computer.
2. GUI allows the user to interact with the computer using components
3. CLI requires more memory as it contains a lot of graphical components and GUI is a command interface, and it does not require more memory.
4. CLI is faster than but GUI requires more memory.
5. It is not possible to change the CLI that User to change the appearance

Instruction: Match the following a given columns

Column A	**Column B**
6. CLI	A. Slow
7. GUI	B. Highly customizable key bindings
8. Simple GUI apps can be run in tabs	C. Good support for undo/redo
9. Bash-style auto completion.	D. ConEmu(console host)
10. PSReadLine (console editing helpers)	E. Fast

Unit Seven: Maintain peripherals and fix common problems

This Unit is developed to provide you the necessary information regarding the following content coverage and topics

- Identify regular maintenance schedule
- Replace consumables
- Identify peripheral failures

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to

- Identify regular maintenance schedule according to guidelines
- Identify replacing consumables
- Identify command-line tools
- Identify peripheral failures

7.1. Identify regular maintenance schedule

How to Maintain Computer Peripherals

PC hardware maintenance is the process of auditing, upgrading, and maintaining a computer's physical parts to ensure the components perform optimally. IT hardware maintenance involves caring for components such as the keyboard, CD drives, hard disk, battery, and other peripherals. Hardware maintenance and support services are preventive and remedial services that physically repair or optimize hardware, including contract maintenance and per-incident repair.

Computer hardware maintenance involves taking care of the computer's physical components, such as its keyboard, hard drive and internal CD or DVD drives. Cleaning the computer, keeping its fans free from dust, and defragmenting its hard drives regularly are all parts of a computer hardware maintenance program.

- Update your firmware every 6 months.
- Keep your devices clean daily in 24 hours.
- Follow recommended maintenance schedules weekly or monthly.
- Adhere to the manufacturer's best practices.
- Use the recommended settings.
- Use the media recommended by the manufacturer.
- Keep device media in a well protected area.

7.2. Replace consumables

What is peripheral maintenance?

This activity entails the repair and maintenance of all types of computers and peripheral equipment (printers, displays, keyboards, modems, scanners, smart card readers, computer projectors etc.)

How do you clean computer parts and peripherals?

Use an anti-static cloth to lightly dust your computer casing. Do not use furniture cleaners or strong solvents. Use a can of compressed air to blow out debris from the air intake slots. Ammonia diluted with water—or glass cleaner comprised mostly of ammonia and water—is a safe cleaning solution for computer surfaces.

What is the first step to performing hardware maintenance?

What is the first step to performing hardware maintenance? Turn off the computer and remove its power source. All-in-one computers are easier to service and upgrade but occupy more space than desktop computers.

Why do we maintain computer hardware?

Keeping computers well maintained can prevent viruses and malware, and keep your computer in good working order. Regular maintenance ensures that your antivirus software is kept up to date and working properly. Nothing could be more annoying than a computer running too slowly.

Types of maintenance

- Predictive.
- Preventive.
- Corrective.

Predictive

Predictive maintenance (PdM) is a type of condition-based maintenance that monitors the condition of assets through sensor devices. These sensor devices supply data in real-time, which is then used to predict when the asset will require maintenance and thus, prevent equipment failure.

Predictive maintenance techniques are designed to help determine the condition of in-service equipment in order to estimate when maintenance should be performed. This approach promises cost savings over routine or time-based preventive maintenance, because tasks are performed only when warranted.

Predictive maintenance refers to maintenance based on the actual condition of a component. Maintenance is not performed according to fixed preventive schedules but rather when certain changes in characteristics are noted. A useful analogy can be made with automobile oil changes.

What is an example of predictive maintenance?

Some examples of using predictive maintenance and predictive maintenance sensors include vibration analysis, oil analysis, thermal imaging, and equipment observation.

What is required for predictive maintenance?

Some of the main components that are necessary for implementing predictive maintenance are data collection and preprocessing, early fault detection, fault detection, time to failure prediction, maintenance scheduling and resource optimization.

Predictive Maintenance allows for safety compliance, preemptive corrective actions, and increased asset life. By looking ahead, and knowing what failure is likely to occur when, pre-emptive investigations, maintenance schedule adjustments, and repairs can be performed before the asset fails.

What is advantage and disadvantage of predictive maintenance?

Predictive maintenance presents you with the best time to work on an asset so that maintenance frequency is minimal and reliability is as high as possible while eliminating unnecessary costs.

However, there are few disadvantages to predictive maintenance is

- High start-up costs and the need for specialized personnel.

Preventive

In preventive maintenance, equipment is repaired and serviced before failures occur. The frequency of maintenance activities is pre-determined by schedules. Preventive maintenance aims to eliminate unnecessary inspection and maintenance tasks, to implement additional maintenance tasks when and where needed and to focus efforts on the most critical items.

The higher the failure consequences, the greater the level of preventive maintenance that is justified.This ultimately implies a trade-off between the cost of performing preventive maintenance and the cost to run the equipment to failure.

Inspection assumes a crucial role in preventive maintenance strategies. Components are essentially inspected for corrosion and other damage at planned intervals, in order to identify corrective action before failures actually occur. Preventive maintenance performed at regular intervals will usually results in reduced failure rates. As significant costs are involved in performing preventive maintenance, especially in terms of scheduled downtime, good planning is vital.

Corrective maintenance

Corrective maintenance refers to action only taken when a system or component failure has occurred. It is thus a retro-active strategy. The task of the maintenance team in this scenario is usually to effect repairs as soon as possible. Costs associated with corrective maintenance include repair costs (replacement components, labor, and consumables), lost production and lost sales. To minimize the effects of lost production and speed up repairs, actions such as increasing the size of maintenance teams, the use of back-up systems and implementation of emergency procedures can be considered. Unfortunately, such measures are relatively costly and/or only effective in the short-term.

7.3. Identify peripheral failures

Common problems with PC hardware peripherals and how to fix them?

Hardware Fault means any fault, issue or matter relating to any Supported Equipment excluding. Hardware Fault means a Hardware fault arising solely or primarily from the failure of a physical

component of the Hardware but excluding any arising from any Application Fault or any Firewall Downtime.

Some of the most common PC hardware problems that need troubleshooting are:

- Your computer won't turn on.
- Your computer turns on, but still doesn't work.
- Your computer screen freezes.
- Your computer has insufficient memory.
- You get a CMOS error.
- Your operating system is missing or your hard drive isn't detected.
- Most Common Computer Problems

The Computer Won't Start. A computer that suddenly shuts off or has difficulty starting up could have a failing power supply.

The Screen is Blank.

- Abnormally Functioning Operating System or Software. ...
- Windows Won't Boot.
- The Screen is frozen.
- Computer is Slow.
- Strange Noises.
- Slow Internet.

How do I fix malfunctioning hardware?

- Use the device troubleshooter to diagnose and resolve the issue.
- Open Settings.
- Click on Update & Security.
- Click on Troubleshoot.
- Select the Troubleshoot that matches the hardware with the problem. ...
- Click the Run the troubleshooter button.

What causes a hardware failure?

Harsh environmental conditions such as extreme temperatures can damage hardware components. Unregulated power supply of any sort can damage hardware components. This includes power surges from the regular power line or from lightning.

What a Solutions to fix this problems:

- Check the power supply.
- Make sure the monitor or display is functional.

- Eliminate external hardware.
- Reinstall system.
- Restart the modem.
- Fix your Wi-Fi signal.
- Kill any unwanted background software.
- Contact your ISP.

Self check test-7

Name _____ IDNo_____ Level _____

Start time_____ Finish time _____

Instruction:-Read the given questions below and write your own answers on time.

I. **Match column A with column B**

A	**B**
1. Corrective maintenance	A. make to keep equipment failures
2. Preventive maintenance	B. Condition based maintenance
3. Predictive maintenance	C. Carried out to correct failure
	D. prevent unauthorized use

II. **Choice**

4. From the following given alternatives one is a method of to fix malfunctioning of hardware.
   A. Use the device troubleshooter to diagnose and resolve the issue, Open Settings.
   B. Click on Update & Security, Click on Troubleshoot
   C. Click the Run the troubleshooter button
   D. All are answers
5. From the following One is disadvantages of predictive maintenance.
   A. Reliability
   B. Condition-based maintaining activity
   C. High start-up costs
   D. Eliminating unnecessary costs

III. Say True or False

6. Maintaining hardware peripherals regularly is not important for hardware life.F
7. Turning off the computer and remove its power source is fundamental step or process.T
8. Preventive maintenance is cost and time effective maintenance.T
9. Predictive is not performed according to fixed preventive schedules but rather when certain changes in characteristics are noted.T
10. Unkind environmental conditions such as extreme temperatures can damage hardware components.T

Unit Eight:-Use and maximize operating system

This Unit is developed to provide you the necessary information regarding the following content coverage and topics

- Identify Configured Operating system
- Explain Install and upgrade application software
- Identify Use graphical user interface and command-line interface
- Use third-party operating system utilities

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to

- Types of peripheral devices
- Identifying peripheral devices
- Obtaining and storing peripheral devices

8.1. Identify Configured Operating system

What is an operating system?

An operating system (OS) is the program that, after being initially loaded into the computer by a boot program, manages all of the other application programs in a computer. The application programs make use of the operating system by making requests for services through a defined application program interface (API). In addition, users can interact directly with the operating system through a user interface, such as a command-line interface (CLI) or a graphical UI (GUI).

Why use an operating system?

The operating system (OS) manages all of the software and hardware on the computer. It performs basic tasks such as file, memory and process management, handling input and output, and controlling peripheral devices such as disk drives and printers.

An operating system brings powerful benefits to computer software and software development. Without an operating system, every application would need to include its own UI, as well as the comprehensive code needed to handle all low-level functionality of the underlying computer, such as disk storage, network interfaces and so on. Considering the vast array of underlying hardware available, this would vastly bloat the size of every application and make software development impractical.

Operating system types and examples

Although the fundamental roles of an operating system are ubiquitous, there are countless operating systems that serve a wide range of hardware and user needs.

General-purpose operating system.

A general-purpose OS represents an array of operating systems intended to run a multitude of applications on a broad selection of hardware, enabling a user to run one or more applications or tasks simultaneously. A general-purpose OS can be installed on many different desktop and laptop models and run applications from accounting systems to databases to web browsers to games. General-purpose operating systems typically focus on process (thread) and hardware management to ensure that applications can reliably share the wide range of computing hardware present.

Common desktop operating systems include the following:

- Windows is Microsoft's flagship operating system, the de facto standard for home and business computers. Introduced in 1985, the GUI-based OS has been released in many versions since then. The user-friendly Windows 95 was largely responsible for the rapid development of personal computing.
- Mac OS is the operating system for Apple's Macintosh line of PCs and workstations.

- Unix is a multiuser operating system designed for flexibility and adaptability. Originally developed in the 1970s, Unix was one of the first operating systems to be written in the Linux is a Unix-like operating system that was designed to provide PC users a free or low-cost alternative. Linux has a reputation as an efficient and fast-performing system.

Operating system functions

- Controls the backing store and peripherals such as scanners and printers.
- Deals with the transfer of programs in and out of memory.
- Organizes the use of memory between programs.
- Organizes processing time between programs and users.
- Maintains security and access rights of users.
- Uses of operating system
- Manage the computer's resources, such as the central processing unit, memory, disk drives, and printers,
- Establish a user interface, and
- Execute and provide services for applications software.

Windows 10 system requirements

- Processor: 1 gigahertz (GHz) or faster processor
- RAM: 1 gigabyte (GB) for 32-bit or 2 GB for 64-bit.
- Hard disk space: 16 GB for 32-bit OS or 20 GB for 64-bit OS.
- Graphics card: DirectX 9 or later with WDDM 1.0 driver

8.2. Explain Install and upgrade application software

Install and upgrade application software

What is application software?

Application Software is a type of computer program that performs specific functions. These functions, performed by application software, can be personal, business as well as educational. Thus, application Software is also known as end-user software or productivity software.

Application software enables the user to complete tasks such as creating documents, spreadsheets, databases, and publications, doing online research, sending email, designing graphics, running businesses, and even playing games.

When a user interacts directly with a piece of software, it is called application software. The sole purpose of application software is to assist the user in doing specified tasks. Microsoft Word and Excel, as well as popular web browsers like Firefox and Google Chrome, are examples of application software.

Who is the father of software?

Watts Humphrey, the “Father of Software Quality,” passed away at his residence in Florida on October 28, 2010. His unparalleled contribution to software engineering made him one of the icons of the discipline.

Types of Application Software

- Web browsers.
- Presentation software.
- Spreadsheet software.
- Graphic software.
- Word processors.
- Database software.
- Multimedia software.
- Education software.

Advantages of Application Software:

- Their single greatest favorable position is that it meets exact requirements of client.
- Business that accompanies it can confine access and may think of intends to monitor their organization additionally.

What are operating system utilities?

In computers, a utility is a small program that provides an addition to the capabilities provided by the operating system. In some usages, a utility is a special and nonessential part of the operating system. The print "utility" that comes with the operating system is an example.

Third Party Utilities means computer programs provided by third parties which OSHPD is authorized under this Agreement to access through the Services, where OSHPD is not obligated to enter into a separate agreement with a third party to use such computer programs.

What is the difference between OS and utility software?

This software is focused on how OS works on that basis it perform task to enable smooth functioning of computer.

How to design graphical user interface?

Best Practices for Designing an Interface

- Keep the interface simple.

- Create consistency and use common UI elements.
- Be purposeful in page layout.
- Strategically use color and texture.
- Use typography to create hierarchy and clarity.
- Make sure that the system communicates what's happening.
- Think about the defaults.
- Changing the GUI Appearance
- Create or load a saved session.
- In the Category dialog, click Window > Appearance.
- In the Font settings, click the Change… button.
- Select Font: Courier New, Regular Size: 10.
- Click Apply.

8.3. Identify Use graphical user interface and command-line interface

What are the 4 features of a graphical user interface?

Answer: the four features of A Graphical User Interface (GUI) are constituted of four main parts Windows, Icons, Menus and Pointer. They are also the Main Components of the Interface, also known as the WIMP system.

How can I Personalize my operating system?

- Windows 10 allows you to tweak the looks and feels of the OS, making it appear and work as you want. To access these customization options, press the “Win + I” shortcut keys on your keyboard to open the settings app and then select “Personalization” from the options.

How do I create a GUI in Windows 10?

- Click File > New, then select Dialog System Screen set on the New dialog box, and click OK. Click Yes on the message asking if you want to create a project. Select Windows GUI Project. Enter Welcome as the name of the project.

Types of user interfaces

1. Graphical user interface (GUI)
2. Command line interface (CLI)
3. Menu-driven user interface.
4. Touch user interface.

5. Voice user interface (VUI)
6. Form-based user interface.
7. Natural language user interface

8.4. Use third-party operating system utilities

Types of Utility Software

Antivirus

A virus is malicious software that enters the system along with a host program.

File Management System.

This utility software are used to manage files of the computer system.

1. Compression Tools.
2. Disk Management Tools.
3. Disk Cleanup Tool.
4. Disk Defragmenter.
5. Backup Utility.

Self check test-8

Name _____ IDNo _____ Level _____

Start time _____ finishing time _____

Instruction:- Read the following questions carefully and answers your choices.

I. **Choose the correct answer from 1-10 and write your answer.**

A. Small program that provides an addition to the capabilities provided by the _____.
   A. Application software C. Data base management
   B. Operating system D. None

B. An Application software provide for the end user _____.
   A. To complete the tasks like
   B. To run Business
   C. No answer
   D. A & B are

C. From the following alternatives one is well described about Operating system.
   A. Operating system Manages all of the software and hardware on the computer
   B. Operating system should be installed after Application software being installed
   C. All Operating system hasn't GUI
   D. None

D. Which one of the following is function of an operating system.
   A. Organizes the use of memory between programs
   B. Uses of operating system
   C. Maintains security and access rights of users
   D. Establish a user interface

E. What is an operating system?
   A. Interface between the hardware and application programs
   B. Collection of programs that manages hardware resources
   C. System service provider to the application programs
   D. All of the mentioned

6. Which one of the following errors will be handle by the operating system?
   A. Lack of paper in printer
   B. Connection failure in the network
   C. Power failure
   D. All of the mentioned

7. Where is the operating system placed in the memory?
   A. Either low or high memory (depending on the location of interrupt vector)
   B. In the low memory
   C. In the high memory
   D. None of the mentioned

8. The main memory accommodates _____
   C. Cpu C. operating system
   D. User processes D. all of the mentioned
9. The operating system is responsible for?
   A. bad-block recovery C. disk initialization
   B. booting from disk D. all of the mentioned
10. The operating system keeps a small table containing information about all open files called _____
   A. file table C. Open-file table
   B. directory table D. System table

II. From question number 11-13 say True if the question is correct and False if it is incorrect.

11. A user interacts directly with a piece of software called application software. T
12. Unix is a multiuser operating system designed for flexibility and adaptability developed in the 1970s. T

III. **Match the following columns**

A	**B**
1. Application software	A. Windows
2. Operating system	B. Web browsers
3. 1 gigahertz (GHz) processor speed	C.NIC
	D. Windows 10 requirements

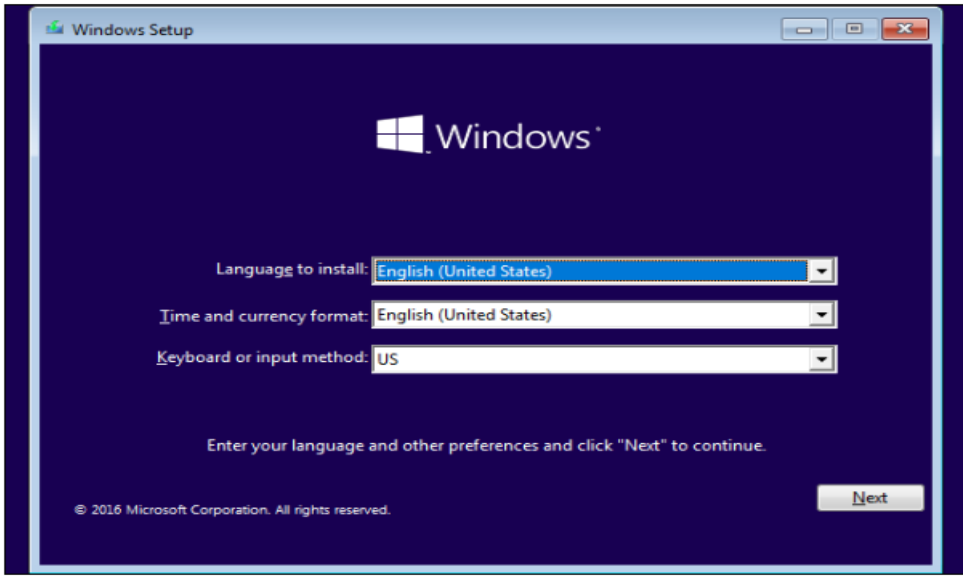
Operation Sheet 5.

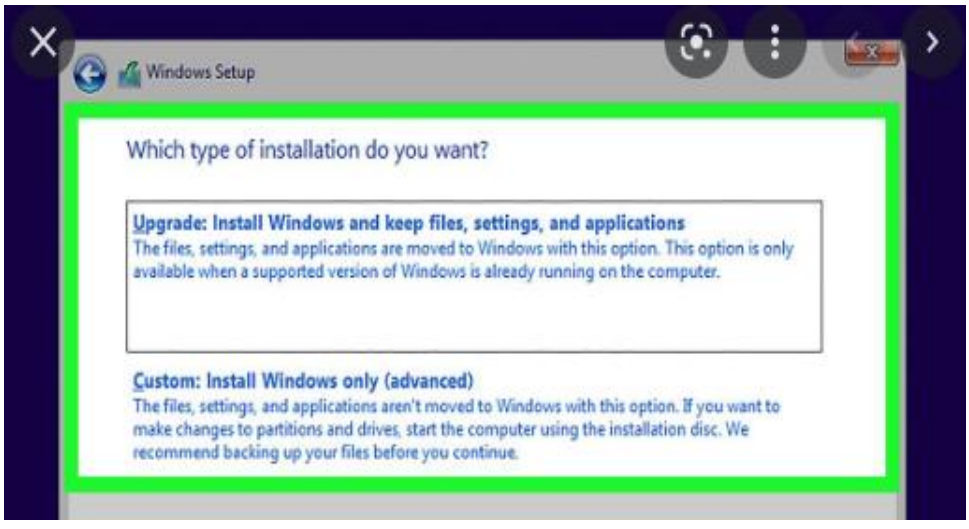
Install Windows 10

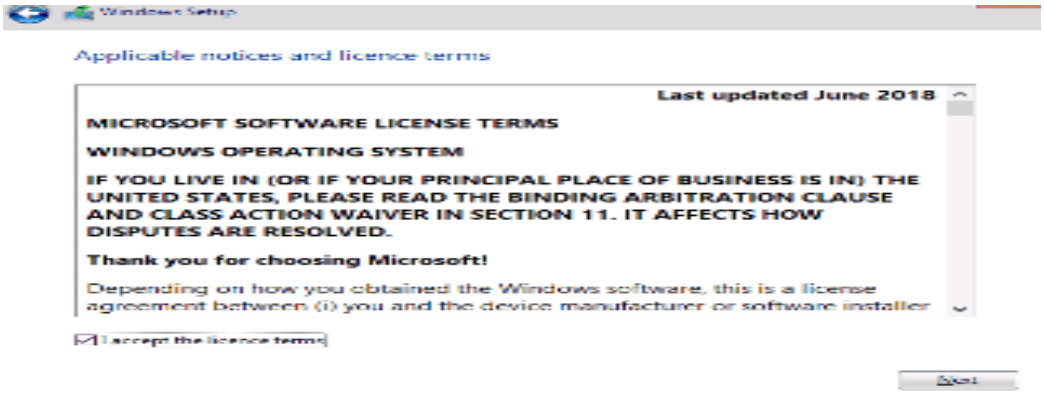
How to install Windows 10: Full installation

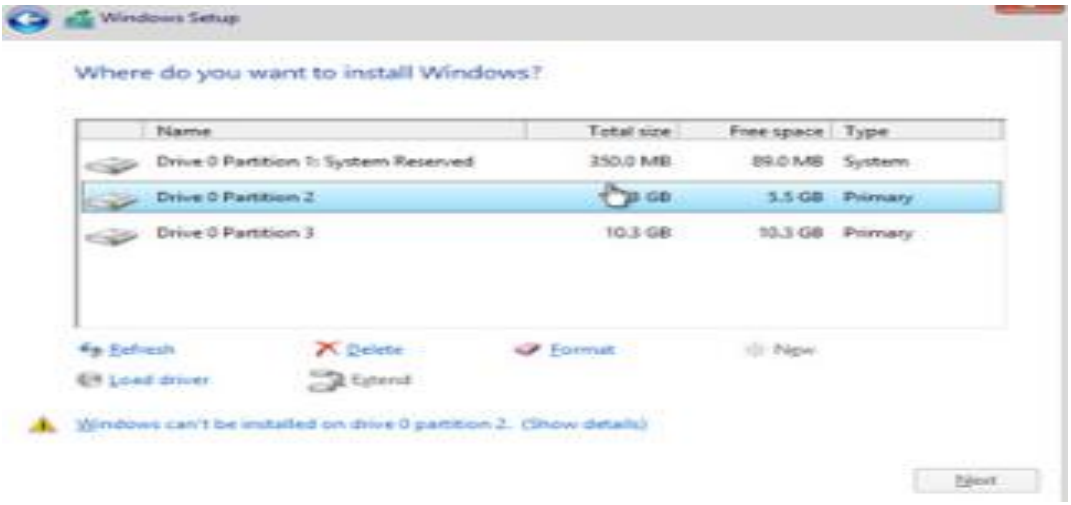
- Check your device meets the Windows 10 system requirements. ...
- Create USB installation media.
- Run the installer tool.
- Use your installation media.
- Change your computer's boot order.
- Restart your device.
- Complete the installation.
- Steps to install
- Insert your installation DVD or drive.
- Restart the PC.
- Select the option to boot from the media and press any key to start from media.
- Select your language preferences and click Next.
- Click Install Now.
- Enter your product key and click Next.
- Accept the terms.
- Follow the on-screen instructions.

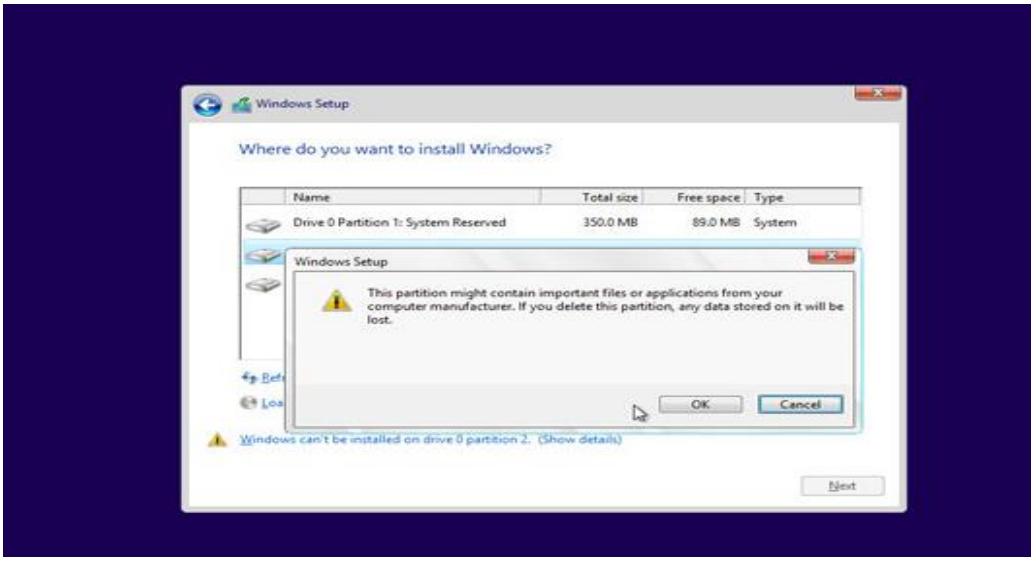

Windows Setup
Windows
Install now

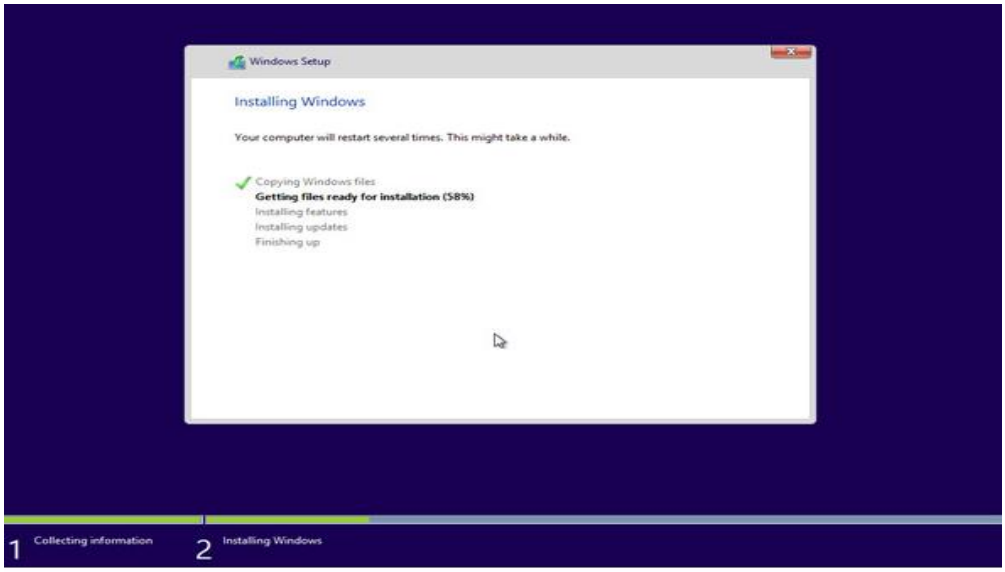

Windows Setup
Windows
Language to install: English (United States)
Time and currency format: English (United States)
Keyboard or input method: US
Enter your language and other preferences and click "Next" to continue.
© 2016 Microsoft Corporation. All rights reserved.
Next

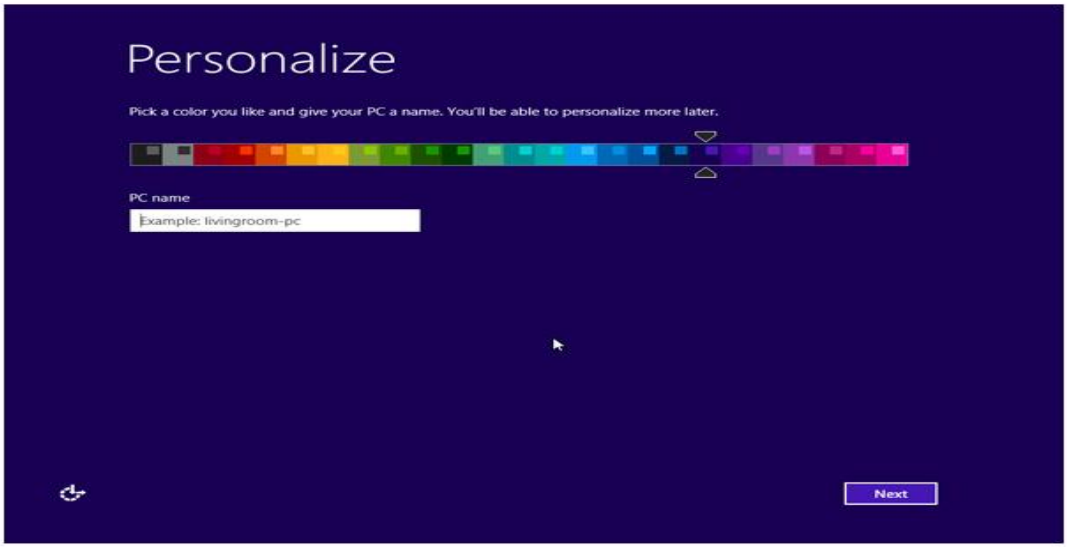

Windows Setup
Which type of installation do you want?
Upgrade: Install Windows and keep files, settings, and applications
The files, settings, and applications are moved to Windows with this option. This option is only available when a supported version of Windows is already running on the computer.
Custom: Install Windows only (advanced)
The files, settings, and applications aren't moved to Windows with this option. If you want to make changes to partitions and drives, start the computer using the installation disc. We recommend backing up your files before you continue.


Windows Setup
Applicable notices and licence terms
Last updated June 2018
MICROSOFT SOFTWARE LICENSE TERMS
WINDOWS OPERATING SYSTEM
IF YOU LIVE IN (OR IF YOUR PRINCIPAL PLACE OF BUSINESS IS IN) THE UNITED STATES, PLEASE READ THE BINDING ARBITRATION CLAUSE AND CLASS ACTION WAIVER IN SECTION 11. IT AFFECTS HOW DISPUTES ARE RESOLVED.
Thank you for choosing Microsoft!
Depending on how you obtained the Windows software, this is a license agreement between (i) you and the device manufacturer or software installer
I accept the licence terms
Next


Windows Setup
Where do you want to install Windows?
Name
Total size
Free space
Type
Drive 0 Partition 1: System Reserved
350.0 MB
89.0 MB
System
Drive 0 Partition 2
5.5 GB
Primary
Drive 0 Partition 3
10.3 GB
10.3 GB
Primary
Refresh
Delete
Format
New
Load driver
Extend
Windows can't be installed on drive 0 partition 2. (Show details)
Next


Windows Setup
Where do you want to install Windows?
Name
Total size
Free space
Type
Drive 0 Partition 1: System Reserved
350.0 MB
89.0 MB
System
Windows Setup
This partition might contain important files or applications from your computer manufacturer. If you delete this partition, any data stored on it will be lost.
OK
Cancel
Windows can't be installed on drive 0 partition 2. (Show details)
Next


Windows Setup
Installing Windows
Your computer will restart several times. This might take a while.
Copying Windows files
Getting files ready for installation (58%)
Installing features
Installing updates
Finishing up
1 Collecting information
2 Installing Windows


Personalize
Pick a color you like and give your PC a name. You'll be able to personalize more later.
PC name
Example: livingroom-pc
Next



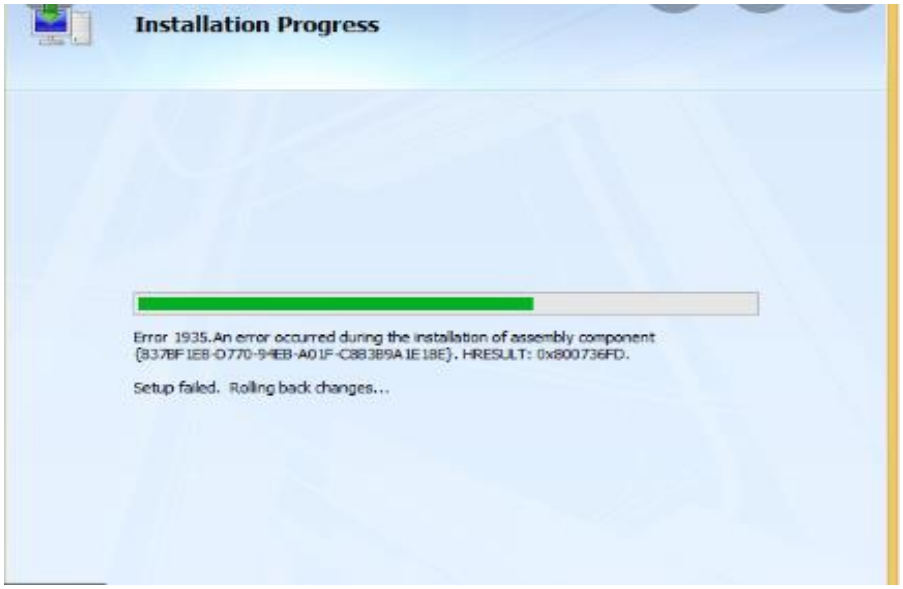
Operation sheet-6

Install and Microsoft Office

- Install Office 2007
- Insert your Office 2007 CD into the drive.
- When prompted, enter the product key.
- Read and accept the Microsoft Software License Terms, and then click Continue.
- Follow the prompts and after Office installs,
- click Close.




Choose the installation you want
Install Now
Customize


Installation Progress
Error 1935. An error occurred during the installation of assembly component {837BF1E8-D770-94EB-A01F-C8B3B9A1E18E}. HRESULT: 0x800736FD.
Setup failed. Rolling back changes...


Microsoft Office Enterprise 2007 encountered an error during setup.
Error 1935. An error occurred during the installation of assembly component {68B7C6D9-1DF2-54C1-A01F-C8B3B9A1E18E}. HRESULT: 0x800736FD.
Close

Lap test 5

1. Install Windows 10:

Follow Full installation procedure

1. Check your device meets the Windows 10 system requirements.
2. Create USB installation media.
3. Run the installer tool.
4. Use your installation media.
5. Change your computer's boot order.
6. Restart your device.
7. Complete the installation.
8. Create you account called ITL2

2. Install application software.

    1. Install Office 2007
    2. Insert your Office 2007 CD into the drive.
    3. When prompted, enter the product key.
    4. Read and accept the Microsoft Software License Terms, and then click Continue.
    5. Follow the prompts and after Office installs,
    6. Click Close.

3. Install antivirus
    1. Using an antivirus is essential when trying to keep your computer healthy and free from viruses.
    2. Install an Antivirus.
    3. Keep Your Software up to Date.
    4. Backup Your Computer.
    5. Use a Strong Password.
    6. Watch the Downloads.
    7. Install an Ad-block.
    8. Run a Virus Scan Often

Avast Free Antivirus really is free — you'll never need to pay for it and it'll provide you with essential online security and protection. If you're looking for more security and privacy features, our Avast Premium Security software is the right product for you.

Unit Nine:- Support input and output devices

This Unit is developed to provide you the necessary information regarding the following content coverage and topics

- Identify input/output devices functionality
- Explain appropriate driver installation

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to

- Input or output device functionality explained according to policy guidelines
- Identify deriver installation

9.1. Identify input/output devices functionality

Check Input and Output devices functionality

In computing, an input device is a piece of equipment used to provide data and control signals to an information processing system, such as a computer or information appliance. Examples of input devices include keyboards, mouse, scanners, cameras, joysticks, and microphones.

Input and output devices allow the computer system to interact with the outside world by moving data *into* and *out of* the system. An *input device* is used to bring data into the system. Some input devices are:

- Keyboard
- Mouse
- Microphone
- Bar code reader
- Graphics tablet

An Input/output device error on the computer happens when a drive is inaccessible. So when you try to open a drive, you would see the error message – the request could not be performed. I/O errors cause a panic because sometimes, your files may get deleted. And often, there is no feasible way to recover them.

An I/O device error (short for Input/output device error) happens when Windows is not able to perform an input/output action (such as reading or copying data) when it is trying to access a drive or disk. It can occur to many different types of hardware devices or media.

An I/O device error is a problem with the device that prevents Windows from perusing its content or writing on it. It can show up on the hard drive (HDD or SSD), external hard disk, USB, SD card, CD/DVD, and so on. If the external hard drive is showing a disk I/O error, you can't move PC data to and from that drive. The most common cause of a non-accessible I/O error is a disconnected cable. When the computer tries to access a device and it gets no response after several tries, it will generate this type of error. Another common cause is when a program tries to access a file that has been removed or deleted.

How to Fix a Disk I/O Error in Windows

- What Is an I/O Device Error? Input Output device errors are quite common.
- Restart Your Computer.
- Check Your Cables and Connections.
- Try an Alternative USB Port.
- Run CHKDSK and SFC.
- Update the Device Driver.
- Change Your Drive Letter. ...

- Use Speccy to Check Drive Health.

9.2. Explain appropriate driver installation

What is the use of driver?

A driver, or device driver, is a set of files that tells a piece of hardware how to function by communicating with a computer's operating system. All pieces of hardware require a driver, from your internal computer components, such as your graphics card, to your external peripherals, like a printer.

There are various types of device drivers for I/O devices such as keyboards, mice, CD/DVD drives, controllers, printers, graphics cards and ports. When a driver is included in an operating system, it may be referred to as a kernel-mode device driver.

Many parts of a computer need drivers, and common examples are:

- Computer printers.
- Graphic cards.
- Modems.
- Network cards.
- Sound cards.

Drivers are part of the OS. They run with the same privilege level as the OS kernel, and to write a driver you must know a good deal about the OS internals.

What would be the benefits of driver software?

Driver management software solves the lack of visibility, as it alerts the managers or dispatch team of any trouble in real-time. There will be alerts if accidents, mechanical trouble, or any other problems on the road occur, allowing the dispatch team or managers to respond quickly to the incident.

Check Driver software work properly

- Open Start
- Search for Device Manager and
- click the top result to open the experience.

Expand the branch for the device that you want to check the driver version.

Right-click the device and select the Properties option.

Self check Test 9.

Name _____ IDNo _____ Level _____

Start time _____ finishing time _____

Instruction: **Choice**

1. All peripheral devices are Input devices.

   A. True B. False

2. Which one of the following Input devices that help to write or enter the letters and numbers in to your computer?

A. Keyboard B. Printer C. Monitor Mouse

3. From the given alternatives One is output device

B. Monitor B. Printer C. Projector D. All are answers

4. From the following one is used to control the movement of cursor.

   A. keyboard B. Mouse C. Printer D. None

5. All peripheral devices are Input devices.

   A. True B. False

6. Which one of the following Input devices that help to write or enter the letters and numbers in to your computer?

   A. Keyboard B. Printer C. Monitor Mouse

7. From the given alternatives One is output device

   A. Monitor B. Printer C. Projector D. All are answers

Instruction: True or False

8. Drivers are part of the Operating System.
9. An input or output device error is a problem with the device that prevents Windows from perusing its content or writing on it.

Reference

1. Pakuwal, Bivek. “Graphical User Interface.” LinkedIn SlideShare, 17 Apr. 2015, Available here.
2. “Command-Line Interface.” Wikipedia, Wikimedia Foundation, 16 July 2018, Available here.

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Ministry of Labor and Skills