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Transforming the skill landscape



Skilling India in Electronics

Participant Handbook

Sector:
Electronics

Sub-Sector:
IT - Hardware

Occupation:
After Sales Support

Reference ID:
ELE/Q4606



Field Technician - Networking & Storage

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Shri Narendra Modi
Prime Minister of India

“ Skilling is building a better India.
If we have to move India towards
development then Skill Development
should be our mission. ”



COMPLIANCE TO
QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARD

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CEO

Electronics Sector Skills Council of India

About this Book

This Participant Handbook is designed to enable training for the specific Qualification Pack (QP). Each National Occupational (NOS) is covered across Unit/s. Key Learning Objectives for the specific NOS mark the beginning of the Unit/s for that NOS. The symbols used in this book are described below.

Symbols Used



Key Learning
Outcomes



Steps



Role Play



Tips



Notes



Unit
Objectives



Activity

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1. Introduction to Computers and Networking

Unit 1.1 – Computer Fundamentals

Unit 1.2 – Networking Fundamentals

Unit 1.3 – Software Basics



Key Learning Outcomes



At the end of this module, you will be able to:

- Describe the basics of computers
- Explain computer peripherals
- Explain what is a network and types of network
- Describe different types of networking devices
- Describe software

UNIT 1.1: Computer Fundamentals

Unit Objectives



At the end of this unit, you will be able to:

- Define computer and its types
- Describe computer peripherals

1.1.1 Introduction to Computer

A computer is an electronic device which transforms data into meaningful information. The following image shows a computer:



Fig. 1.1.1: A computer

The basic functionality of computers, irrespective of their size or make, is shown in the following figure:

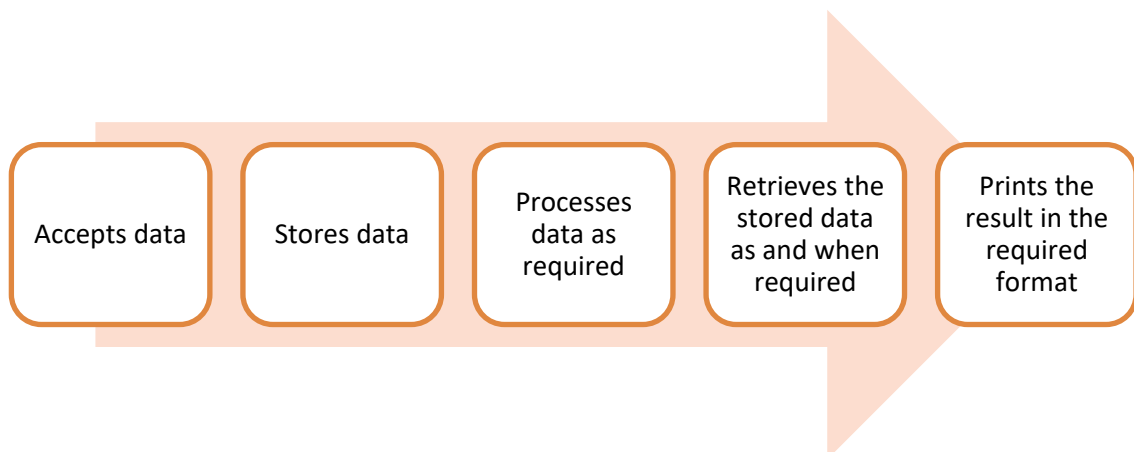


Fig. 1.1.2: The basic function of a computer

Some characteristics that have made usage of computers almost a necessity in life are they are fast, accurate, diligent, adaptable and have good storage capacity.

A computer consists of various units or parts that enables it to perform its functions.

The following figure shows a block diagram of the functional units of a computer:

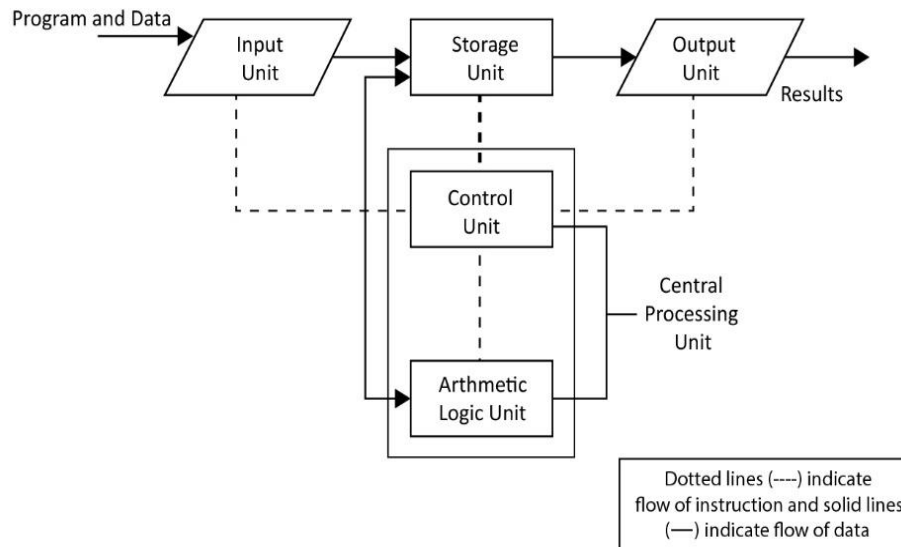


Fig. 1.1.3: Block diagram of functional units of a computer

The four main functional units of a computer is described in the following figure:

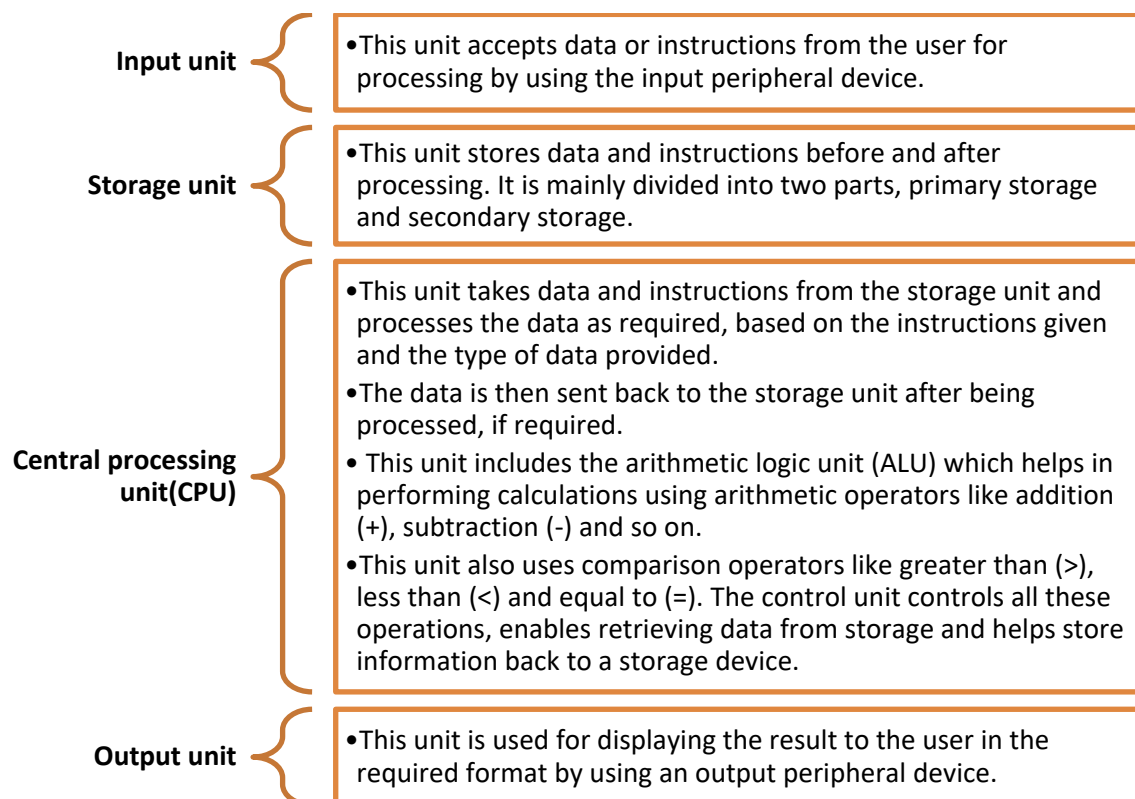





Fig. 1.1.4: Functional units of a computer

Types of Computers

Computers can be classified according to their size, speed and computing power. The following table lists the different types of computers:

Type	Description	Image
Microcomputer	<p>It is a single user computer system with a single chip and moderately powerful microprocessor. The different types of microcomputers are:</p> <ul style="list-style-type: none"> • Desktop Computer • Laptop Computer • Notebook • Tablet 	
Mini Computer	<p>It is a computer which can support hundreds of users simultaneously and has more powerful processors than a microcomputer. It is also called mid-range computer.</p>	
Main Frame	<p>It is a multi-user system, like a minicomputer but the technology is different than that of a minicomputer. It is used to handle and process large amount of data such as in banks and government offices.</p>	

Super Computer

It is the fastest and most expensive computer system. It is used for complex scientific computations and numerical calculations such as weather forecasting, nuclear simulations and astrophysics.



Computers are commonly classified as:

- Laptop
- Desktop
- Server

Laptop

Laptop is a battery or alternate current (AC)-powered, portable, wireless personal computer (PC), generally smaller than the size of a briefcase. It is a small personal computer with a "clamshell" form factor, a thin Liquid Crystal Display (LCD) or Light Emitting Diode (LED) computer screen on the upper portion and a keyboard on the lower part of the "clamshell".

The following image shows a laptop and internal view of the laptop:

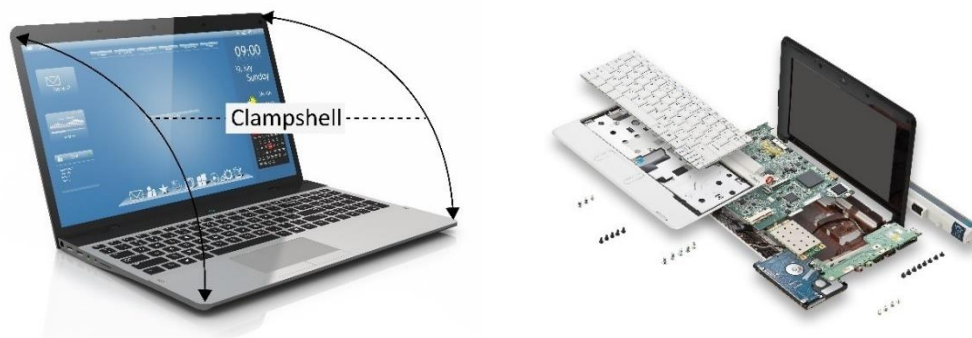


Fig. 1.1.5 Exterior and interior of a laptop computer

Desktop

A desktop is a PC that is made to be used on or near a desk or a table, and is not portable. A desktop PC has a mouse, a keyboard and a base unit which includes the computer's components. Some newer models have the base unit within the monitor to save space.

The following image shows a desktop computer along with its system unit or CPU and peripherals:

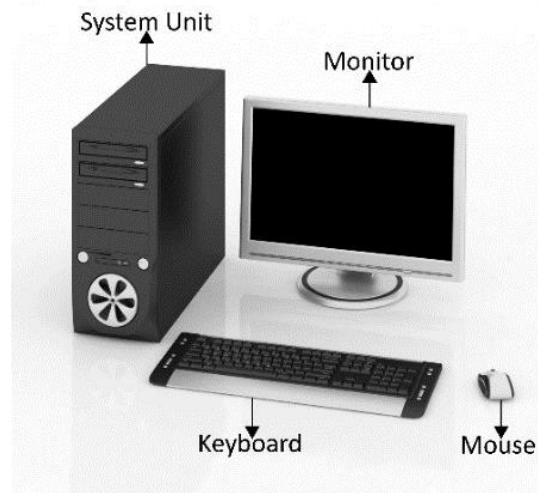


Fig. 1.1.6: A desktop computer along with its CPU and peripherals

Server

A server computer is a central computer, which comprises of collection of data and programs. It is also known as a network server as it allows all the connected systems to share and store data and applications. File servers and application servers are the two main types of servers. The following image shows a server computer connected to various other computers:

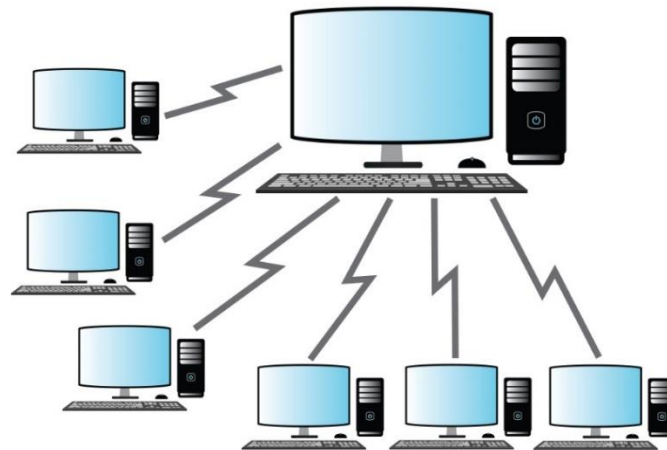


Fig. 1.1.7: A server computer linked to other computers

1.1.2 Types of Computer Peripherals

Peripheral devices are the input/output devices that are typically used to feed information and instructions into a computer for storage or processing, and to show an output.

The peripheral devices are categorized as shown in the following figure:

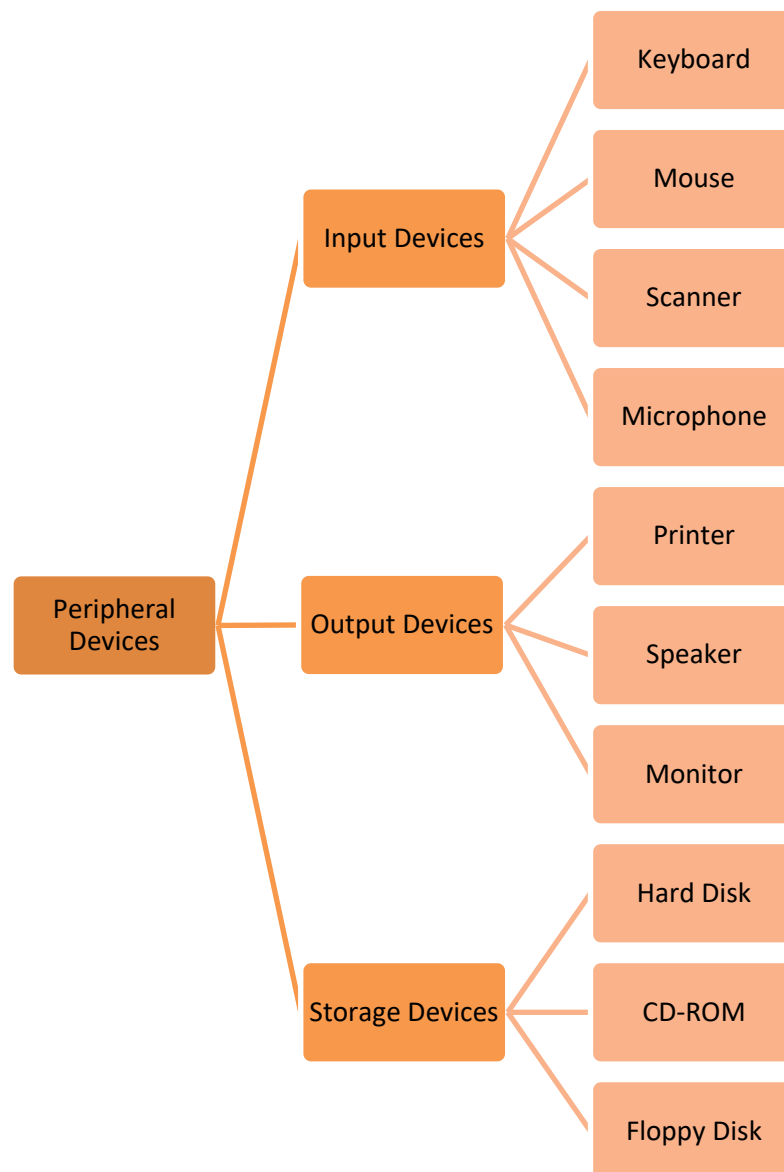


Fig.1.1.8: Different types of peripheral devices

Input Devices

An input device is any device that provides input to a computer. There are many input devices such as a keyboard and mouse. Some input devices are explained as follows:

Mouse

The mouse is an input device, used to make selections and move objects on a computer screen. A mouse can be with a laser or a ball, wired or wireless.

Some different types of mouse are shown in the following image:



Fig. 1.1.9: Different types of mouse

Though the mouse is considered as a peripheral, it is a vital device and essential for using computers.

Keyboard

A keyboard is one of the primary input devices and it looks similar to those found on electric typewriters. The following image shows a keyboard:



Fig. 1.1.10: A keyboard

Keyboards allow users to enter letters, numbers and other symbols into a computer that can serve as commands or be used to type text.

Scanner

A scanner reads documents (text and photographs) and stores it in the computer to which it is connected. The physical document is converted to digital format after it gets scanned. The digital document can be viewed and modified on a computer. Earlier a software needs to be installed in the computer for scanners to work but now all the systems have inbuilt settings to detect the scanner automatically. Basic scanning software allows the user to import data from it.

Scanners with flat scanning surface are suitable for books, pages, photographs and so on. The following image shows a scanner:



Fig. 1.1.11: A scanner

Output Devices

An output device receives information from the CPU and presents it to the user in the required format. The processed data, stored in the memory of the computer is sent to the output unit, which then converts it into a form that can be understood by the user. The output is typically presented either on a display device such as a monitor, or on paper (hard copy) with the help of a printer.

Some output devices are explained as follows:

Monitor

The monitor is an output device, also called a visual display unit (VDU) that shows the graphical and textual information of the computer. The following image shows a LCD monitor:



Fig. 1.1.12: A monitor

Printer

Printer is a peripheral device which is used to display graphics or text on paper. They are a great resource but they should be used in a controlled way. Their overuse puts unnecessary wear and tear on them and also uses up expensive ink and paper. There are thr types of printers based on its usage:

- **Personal printers:** These printers are designed for personal use and may be connected to only a single computer. They are used for low-volume smaller printing, requiring minimal setup time to produce a hard copy of a given document.
- **Networked or shared printers:** These are typically used for high-volume and faster printing. They are shared by multiple users on a network.
- **Virtual printer:** It is a piece of software whose user interface resembles a printer driver but it is not connected to a computer printer. It is generally used for archival purposes or as an input for another software.

Speakers

Speakers receive audio signals as input from the sound card of the computer and produce them in the form of sound waves as audio output. The following image shows speakers:



Fig. 1.1.13: Speakers

Storage Devices

Storage devices, also called storage media, are hardware devices which are used to store data or information. It can store information temporarily or permanently. These devices can be added to computers externally or internally. Storage devices are of two types:

- **Magnetic storage:** Includes hard disk drive, magnetic tapes, floppy drive and so on.
- **Optical storage:** Includes CD-R, CD-RW, Blue ray disk, DVD, flash drive and so on. It uses laser ray or light to access data in it.

Hard Disks

A hard disk is a device that stores data on a computer permanently. A hard drive is collection of one or more disks or platters shielded with magnetic material to which data is written with the help of a magnetic head. Hard disks are connected to the motherboard using special cables such as PATA (Parallel ATA), SATA (Serial ATA), USB or SAS (Serial attached SCSI) cables and they are powered by a power supply unit.

The following images shows hard disk drives:

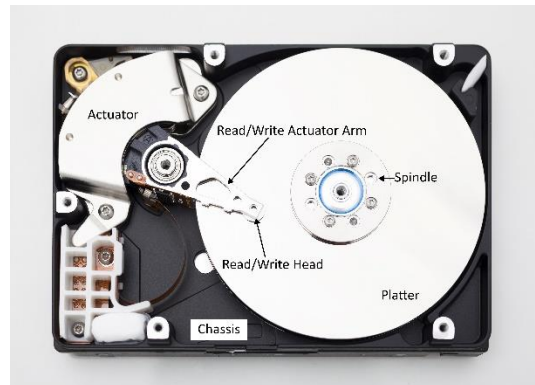


Fig. 1.1.14: Hard disk drives

In case of a laptop, the hardware components and devices that come along in the package are same as that of a desktop except a few changes; instead of mouse, laptops have touchpads or track pads and instead of external power source, laptops have an internal battery.

CD/DVD

CD/DVDs are types of optical disk drives that use laser light or electromagnetic waves for reading and writing data. Different types of CD/DVDs are:

- CD/DVD-R where R stands for recordable. CD/DVD can be written once and read many times.
- CD/DVD-RW where RW stands for rewritable. CD/DVD-RW allows reading of data many times and also the data can be erased and written again.
- CD/DVD-ROM where ROM stands for read only memory. CD/DVD-ROM allows reading of data which is already present on the CD.

Floppy Disk Drive

Floppy disk drive was a common storage device and can be still found in many old desktop computers. It can be read and written using a floppy disk drive. It is a disk of thin and flexible magnetic storage which is sealed in a rectangular plastic enclosure. Floppy disks are available in different sizes:

- 8-inch (200 mm)
- 5¼-inch (133 mm)
- 3½-inch (90 mm)

Activity

Match the following devices with their types:

1.	Mouse	a.	Optical disk drive
2.	Keyboard	b.	Magnetic disk
3.	Hard Disk	c.	Sound waves
4.	CD/DVD	d.	Pointing device
5.	Speakers	e.	Input device

UNIT 1.2: Networking Fundamentals

Unit Objectives



At the end of this unit, you will be able to:

- Define network
- Identify the types of network
- Describe networking devices

1.2.1 What is a Network?

A network is an interconnection of a group of computers that can communicate and share resources such as hard disks and printers. It is a group of computers and other devices that are connected by some type of transmission media. The initial idea of a network was perceived by the department of defense (DOD) in USA for the purpose of security.

Some advantages of networks are:

- Sharing of information across different systems (connected in a network)
- Optimum utilization of hardware resources
- Centralization of data management

Based on the physical connectivity or distance, that a network can span, the network is classified into different types.

Types of Networks

The following figure shows the different types of networks used for sharing information:

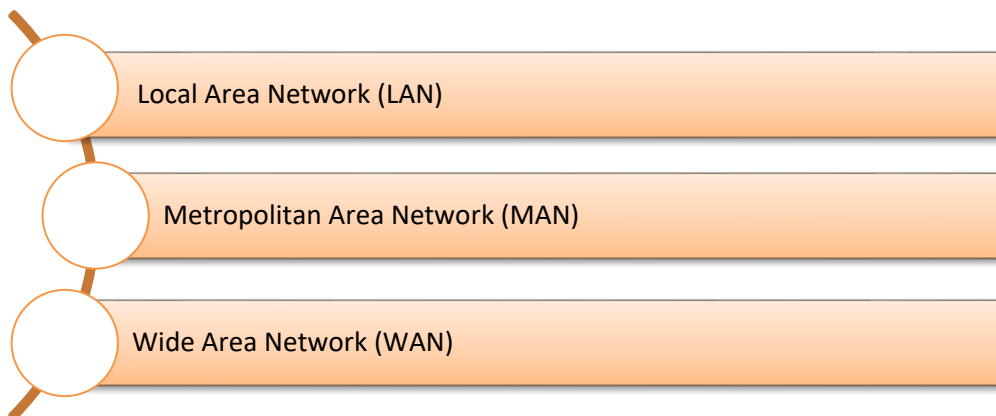


Fig. 1.2.1: Different types of networks

LAN

It is the interconnection of computers that share information over relatively small distances such as within an office building, residence, school premises and locality.

The following image shows interconnection of computers in LAN:

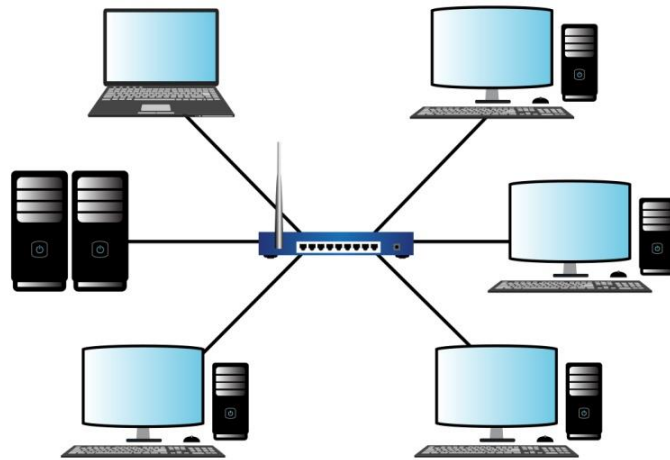


Fig. 1.2.2: Interconnection of computers in LAN

MAN

It is the interconnection of users with computer resources in a region larger than that covered by LAN but smaller than the area covered by wide area network (WAN).

The following image shows interconnection of users using MAN:

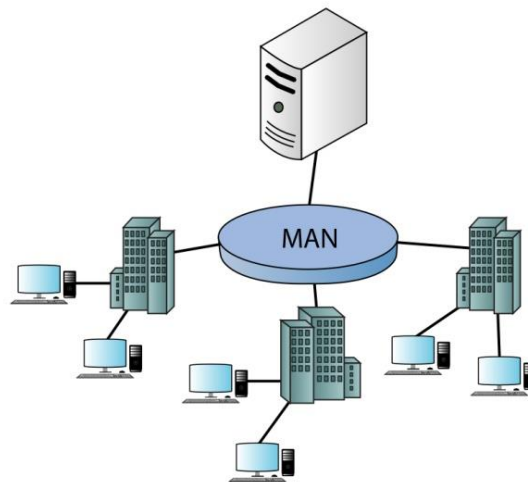


Fig. 1.2.3: Interconnection of users using MAN

WAN

WAN is used to connect devices over much larger distances than LAN. It is established by connecting LANs using routers. It is not limited to a single person or organization, for example, the Internet, which is a network of networks spread across the globe for exchange of information and services.

The following image shows connectivity of users using WAN:

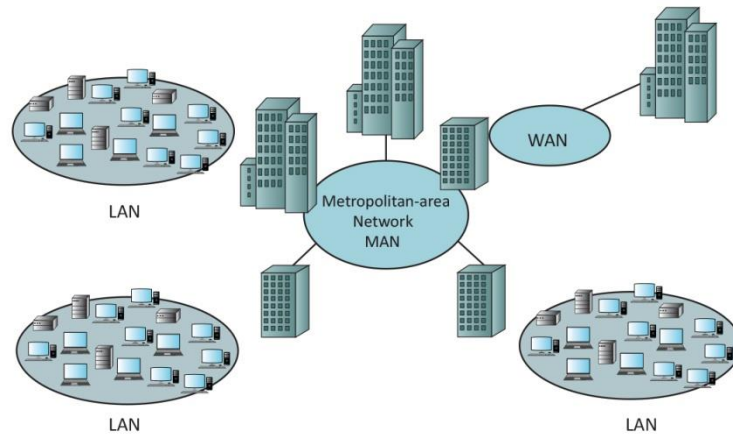


Fig. 1.2.4: Connectivity of users using WAN

1.1.2 Network Architecture

Network architecture is a structural model that specifies the type, layout and components of a network along with data format, different protocols and services provided. The following figure shows the types of network architecture:

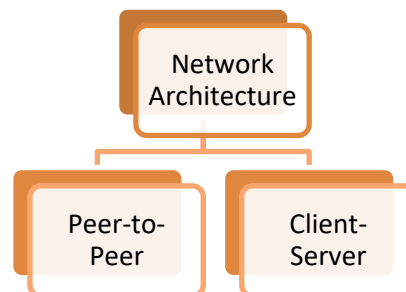


Fig. 1.2.5: Types of network architecture

Peer-to-Peer Network Architecture

Peer-to-peer is a type of network architecture in which all the computers connected to the network have similar capabilities to use the resources that are available on it. There is no central server in this architecture and each workstation on the network shares its files equally with the others. Peer-to-peer networks are usually simple but they do not offer the same performance in case of heavy network loads.

The following image shows a peer to peer network architecture:

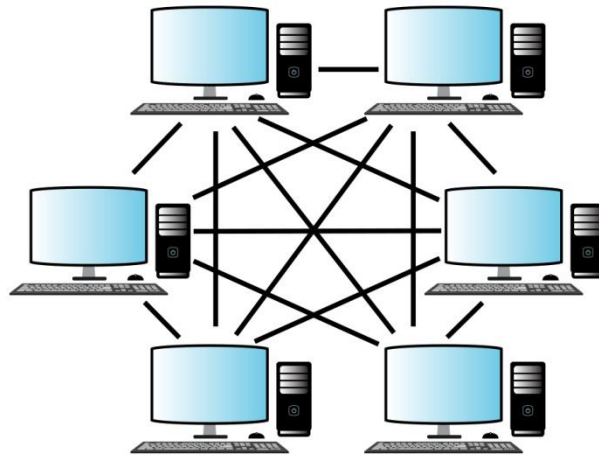


Fig1.2.6: Peer to peer network architecture

Client-Server Network Architecture

Client-server is a type of network architecture in which each computer on the network is either a client or a server. The following image shows a client-server network architecture:

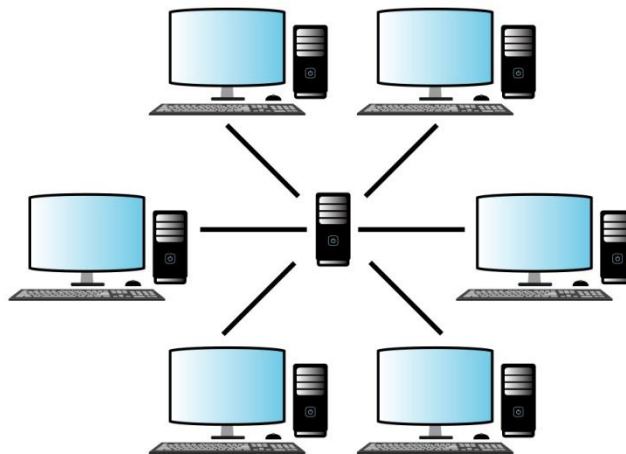


Fig. 1.2.7: Client- server network architecture

Server

A computer which holds programs, network operating systems and the shared files is called a server. Servers are computers dedicated to manage disk drives (file servers), printers (print servers) or network traffic (network servers). They provide access to the network resources to all the devices which are using the network. There are different kinds of servers such as file servers, communication servers, print servers, database servers, mail servers, fax servers and so on.

The following figure lists some types of servers along with their description:

File Server

- It provides data such as data files, e-mail and printer access programs, which are shared among various clients in the network.
- It has large hard disks which all users in the network share.
- Application software and shared data reside in this server.

Print Server

- It acts as a buffer for the print jobs sent by the users to the shared printers or centralised printers.

Communication Server

- It grants the outside users access to the network through a telephone line.

Mail Server

- It provides electronic mails (e-mails) to users of the network.

Fig. 1.2.8: Different types of servers

Client

Client computers access the network and use various shared resources in the network. They rely on servers for resources, such as files, devices and even processing power. They receive services from the servers as per their request.

2.1.3 Network Devices

Network devices are components which are used to connect computers and other electronic devices to share resources such as printers, fax machines, database and so on. The functions of network devices, working together, are as follows:

- Controlling traffic: Network devices filter and isolate the data traffic.
- Providing connectivity: Using various network protocols, network devices connect different types of networks.
- Addressing as per hierarchy : These devices segment the network and deliver data to the right destination using the destination address.

The following figure enlists devices used in networking:

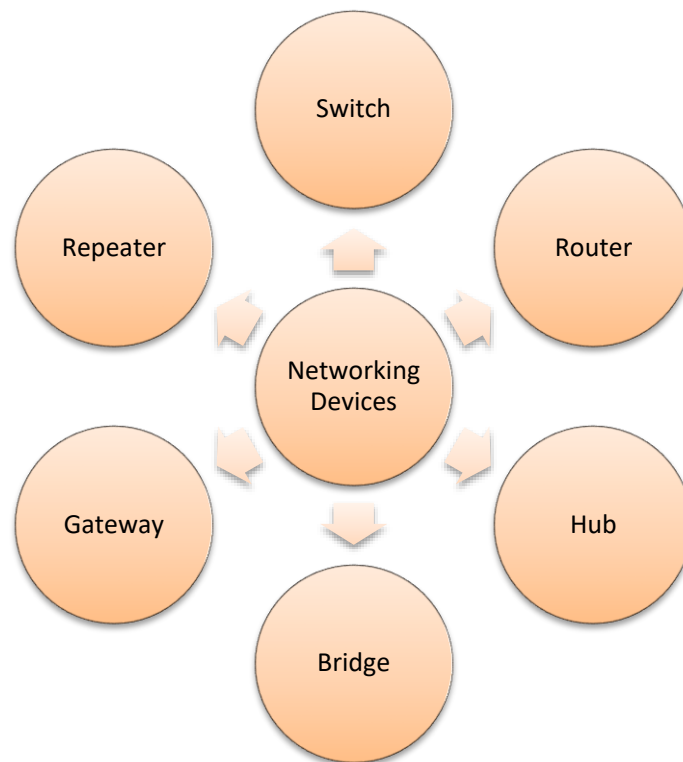


Fig 1.2.9: Networking devices

Switch

A switch, in a computer network, connects other devices electrically and logically. It enables communication between networking devices by plugging data cables into them. It transmits network packets to their assigned destination and thus manages flow of data in the network. Each networked device is identified by its network address, which allows the switch to regulate traffic and increase the efficiency of the network.

When an ethernet switch replaces a hub, the scope of collision is reduced as the single large collision domain of the hub is split into smaller parts and leads to increase in the potential throughput. A switch works at the second layer of the open system interconnection (OSI) model.

The following image shows the interconnection of devices with a switch:

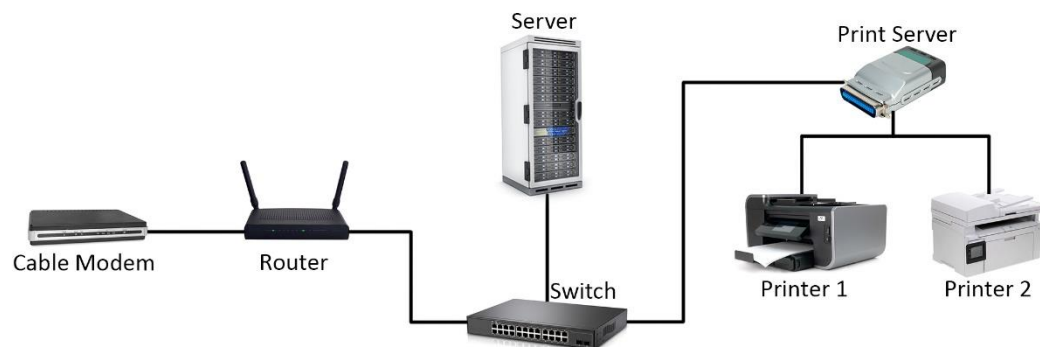


Fig. 1.2.10: Interconnection of devices with a switch

Router

IP routing is the process of sending packets from a host on one network to another host on another remote network. This process is done by routers. They examine the destination IP address of a packet, determine the next-hop address and forward the packet. They use routing tables to determine the next hop address to which the packet should be forwarded. The following image shows a router:



Fig 1.2.11: A router

Consider the following image which is representing IP routing:

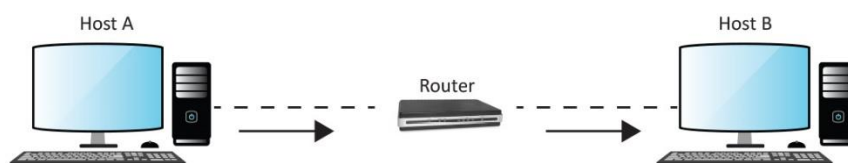


Fig 1.2.12: IP routing

Host A wants to communicate with host B but host B is on another network. Host A is configured to send all packets destined for remote networks to router R1. Router R1 receives the packets, examines the destination IP address and forwards the packet to the outgoing interface associated with the destination network.

Hub

A hub, also known as network hub, is a hardware network device that connects ethernet devices together, making them a single network. A signal is introduced at one of the input ports of the hub and it appears at every output port except the original one. It operates at the physical layer of the OSI model.

A hub lacks the intelligence to determine where the information has to be sent as it has no routing table unlike a switch and a router. It broadcasts information across each connection (multiple ports), which increases risk issues. Earlier, a hub was preferred over a switch and a router because it was cheaply available. However, now switch is in demand as it is of the same cost as a hub and a router and has better transmission of information. The following image shows connection of a hub with other devices:

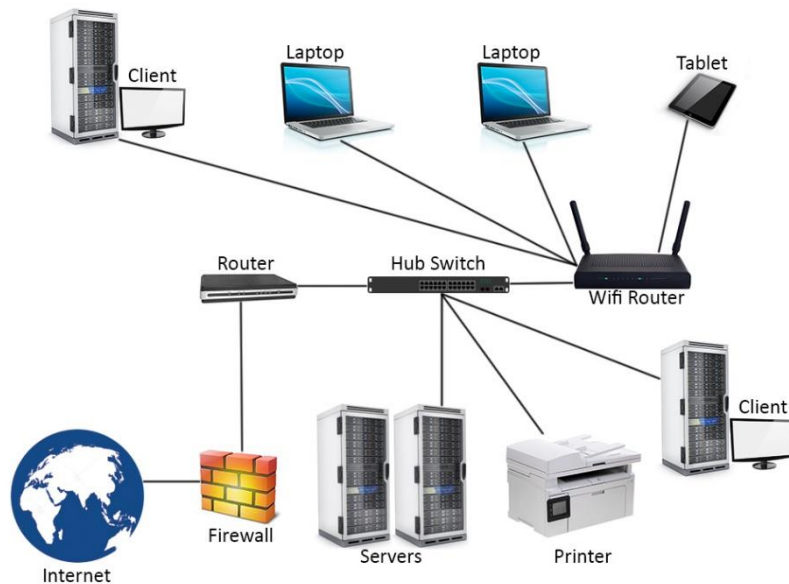


Fig 1.2.13: Connection of a hub with other devices

Bridge

A network bridge helps to join two otherwise separate computer networks together to enable communication between them. Bridge devices are used with LANs to extend their reach and cover larger physical areas.

They inspect incoming network traffic and determine whether to forward or discard it according to its intended destination. An Ethernet bridge, for example, inspects each incoming Ethernet frame - including the source and destination MAC addresses and sometimes the frame size - in making individual forwarding decisions. Bridge devices operate at the data link layer (Layer 2) of the OSI model.

The following image shows connection of a bridge in a network:

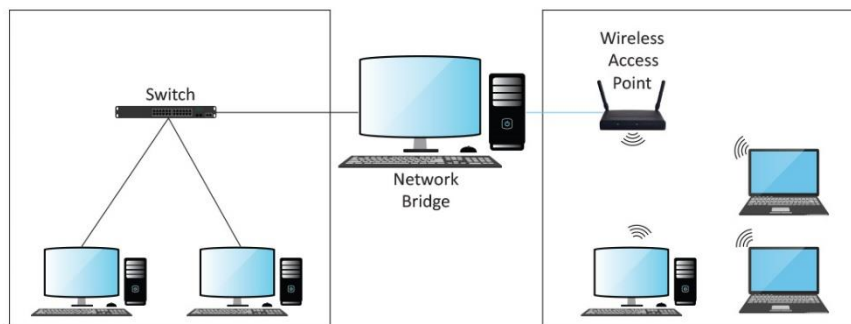


Fig 1.2.14: Connection of a bridge in a network

Gateway

A gateway acts as an interface between dissimilar networks with different protocols translating one data format to another. It is responsible for communication and sending of data back and forth. It can operate at any network layer of the OSI model.

Gateways are nodes that connect different networks. A gateway node is a computer that controls traffic among company networks and provides connection to the internet users.

The following image shows a gateway connection with a switch and a hub:

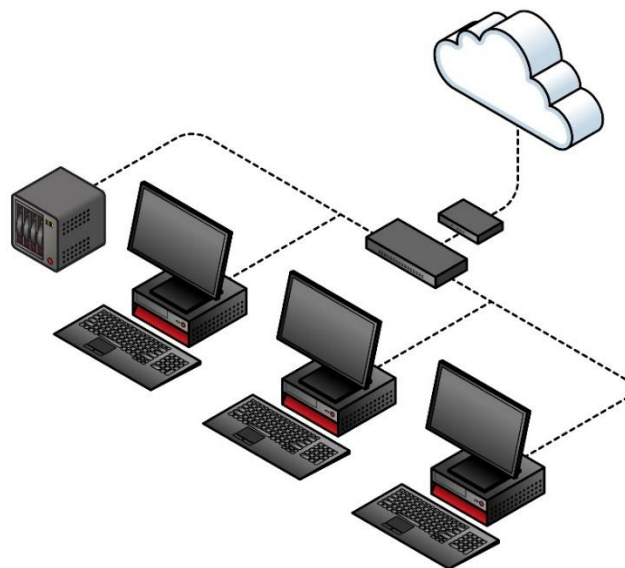


Fig 1.2.15: A gateway connection with a switch and a hub

Repeater

A repeater is a networking device which is used in a transmission system to regenerate distorted signals. It receives the signal and regenerates it to transmit it over long distances so that it can be received on the other side. It regenerates the network signals so that they can travel longer distances on the network.

The following image shows the connection of a repeater in an antenna for transmission of information:



Fig 1.2.16: Connection of a repeater in an antenna for transmission of information

Activity

Choose the correct answer for the following questions:

1. Which of the following networking devices has no routing table?
a. Hub b. Router c. Switch
2. At which layer of the OSI model does a switch operate?
a. Physical layer b. Data link layer c. Network layer
3. Which network is the largest?
a. LAN b. MAN c. WAN
4. Which networking device is used to regenerate signals?
a. Switch b. Repeater c. Router

Practical

Perform the task of networking of two computers.

Hardware:

1. Network Card
2. Wireless Network Adapter
3. CAT5 strait-trough Cables
4. Networking Hub or Wireless Router

UNIT 1.3: Software Basics

Unit Objectives

At the end of this unit, you will be able to:

- Explain operating system
- Define application software
- Explain security software and its importance

1.3.1 Introduction to Operating System

An operating system is a type of system software that serves as an interface between programs or applications and the computer hardware. It manages computer hardware and software resources to provide services to the user, except the firmware such as ROM BIOS. Apart from giving an interface to the user, it performs tasks like memory management, process management, file management, and controlling input/output devices (I/O). The following figure shows a block diagram of a computer with respect to the operating system:

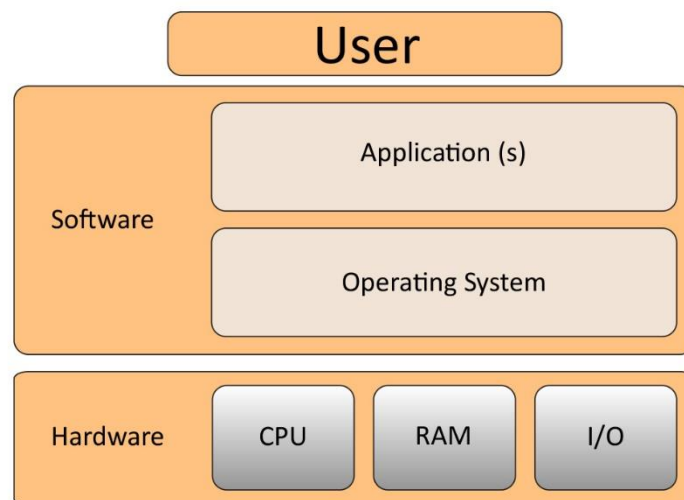


Fig. 1.3.1: Block diagram of a computer with respect to the operating system

The operating system architecture or framework is broadly classified into kernel mode and user mode as shown in the following figure:

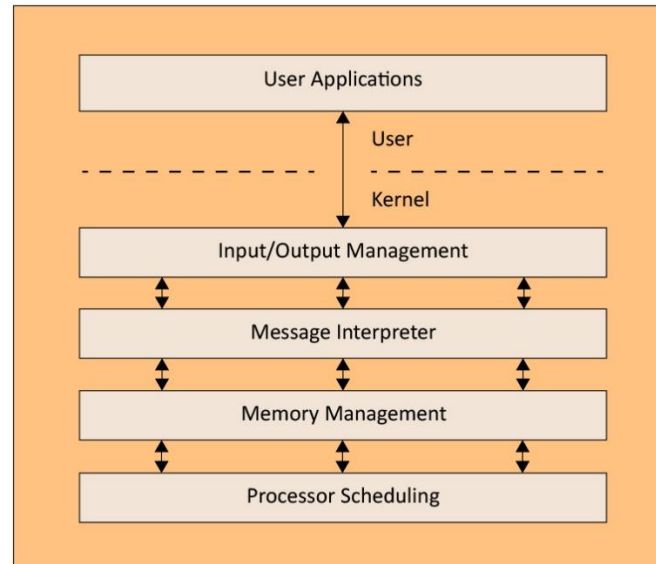


Fig. 1.3.2: Operating system architecture or framework

Kernel is the core of the operating system and is the first program that gets loaded in the computer system at start up. It then supports the start-up process and handles the hardware. In kernel mode, CPU instructions are executed and memory is referenced for storing data. A crash of kernel stops the functioning of the computer system.

In contrast, the CPU instruction, codes or programs running in the user mode has no direct access to the hardware or memory. They request the system application programming interface(APIs) to access these. Because of a layer of system API, user mode is recoverable in case a crash happens. Most of the codes running in the computer will execute in the user mode.

The following figure shows some of the important functions of an operating system:

User Interface	<ul style="list-style-type: none"> • Provides a user interface for example, graphical user interface (GUI) and command line (text based)
Resource Management	<ul style="list-style-type: none"> • Handles system resources such as computer's memory and sharing of the CPU time by various applications or peripheral devices
Memory Management	<ul style="list-style-type: none"> • Keeps track of primary memory usage such as, being used by whom, what parts are not in use • Does priority-wise memory allocation for a process request in case of multiple programs being executed • De-allocates the memory when a process no longer needs it or has been terminated
Processor Management	<ul style="list-style-type: none"> • Keeps track of processor and status of process with the help of a program known as traffic controller • Allocates the processor (CPU) to a process • De-allocates the processor when a process is no longer required
Device Management	<ul style="list-style-type: none"> • Keeps track of all devices with the help of a program known as the I/O controller • Decides which process gets the device when and for how much time • Allocates the device in an efficient way • De-allocates devices
File Management	<ul style="list-style-type: none"> • Keeps track of information, location, uses and status and also maintains the file system
Security	<ul style="list-style-type: none"> • Enables use of passwords to prevent unauthorized access to data or the system
System Performance Management	<ul style="list-style-type: none"> • Manages system performance such as recording delays between a request for a service and response from the system
Coordination	<ul style="list-style-type: none"> • Assigns software such as, compilers, interpreters, assemblers and other software to the computer systems, other software and users
Communication	<ul style="list-style-type: none"> • Enables network communication by establishing connection between network devices and the computer or any other program
Error Detection	<ul style="list-style-type: none"> • Provides debugging and error detecting aids and gives appropriate error messages

Fig. 1.3.3: Functions of an operating system

Windows

Windows is an OS which is owned by Microsoft. It is different from any open source software in the sense that only Microsoft can make changes to the code. It can be installed on different kinds of computers, by various manufacturers, giving a wide range of choice for hardware to the user.

The latest version Windows is 10 which includes touchscreen support. This combines the usability of a touchscreen tablet and the power of a desktop/laptop computer. It also includes the "Play To" and "Remote Media Streaming," features that allow a user to play media from the computer on another device. These features also allow the user to access media when away from his/her computer.

Configuration/Installation

The steps that should be performed in order to install the Windows operating system on a computer are shown in the following figure:

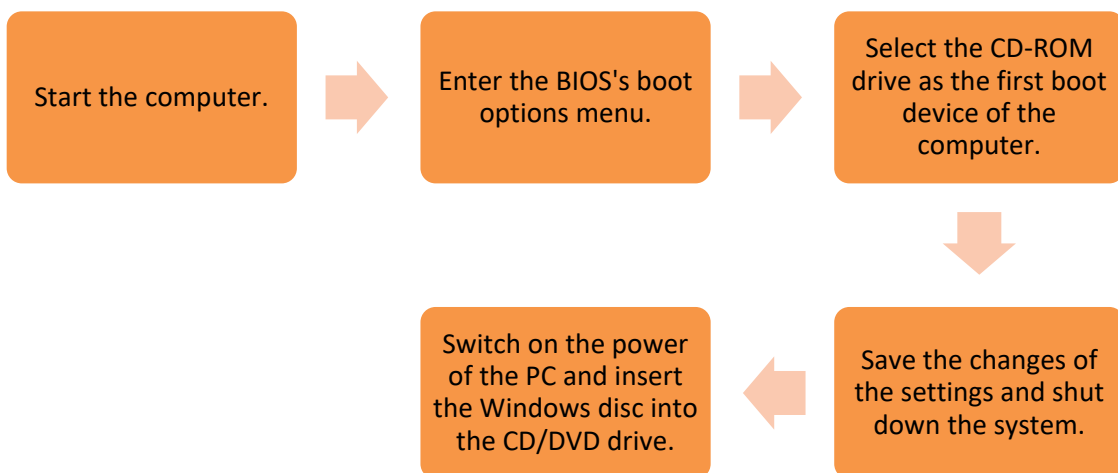


Fig. 1.3.4: Steps to install windows operating system

Linux

Linux is a free and open-source software. The main component of the Linux OS is the Linux kernel.

The user interface, called shell, may be a command-line interface (CLI) or a GUI. For any desktop system, the default mode is usually GUI. The CLI is also available either through a terminal emulator Windows or an independent virtual console.

Configuration/Installation

Installing, updating or removing a software in Linux is usually done through the use of package managers such as:

- Synaptic Package Manager
- Package Kit
- Yum Extender

Most of the major Linux distributions contain extensive repositories. However, all the software that can run on Linux are not available from these official repositories. Users can:

- download the pre-compiled packages from websites directly
- install the packages from unofficial repositories or
- compile the source code by themselves.

Mac OS

Mac OS which was known as Mac OS X earlier, is a Unix-based graphical OS developed by Apple Inc. and is designed to be run only on Apple's Macintosh computers. After Microsoft Windows, Mac OS is the second most widely used desktop OS. In the earlier years, Mac OS had a negligible number of types of spyware and malware which have affected the Windows users. The share of usage of Mac OS is smaller compared to Windows. Apple regularly releases security updates for Mac OS. The latest version of this is Mac OS 10.12 Sierra.

Configuration/Installation

One can install Mac OS over any earlier version, without removing the data. The following figure lists the steps to reinstall the Mac OS:

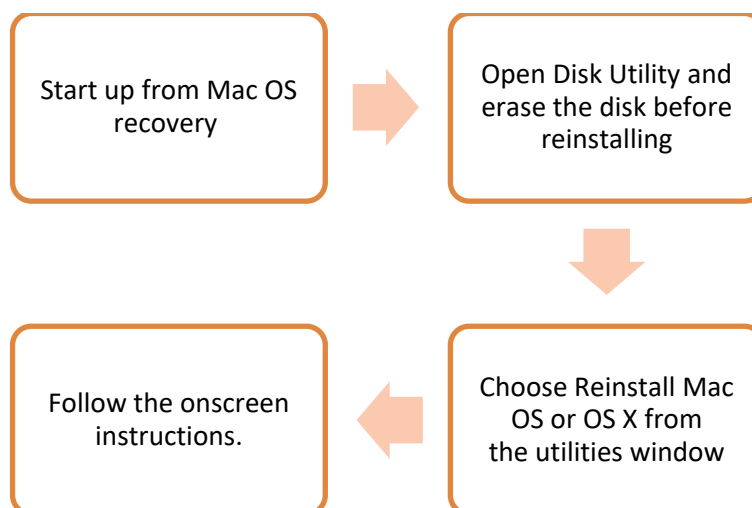


Fig. 1.3.5: Steps to reinstall Mac OS

1.3.2 Application Software

Application software are the end user program designed to create documents and spreadsheets; do online research and online business; and play online games. The two-basic application software are:

- Microsoft Office (MS-Office)
- Web Browsers

MS-Office

MS Office is a suite of computer programs developed by Microsoft. Although meant for all users, it offers different versions that cater specifically to students, home users and business users. All the programs are compatible with both, Windows and Macintosh.

Most Popular Office Products

Some of the most popular and universally used MS Office applications are:

- **Microsoft Word:** Allows users to type text and add images to a document.
- **Microsoft Excel:** Allows users to enter data into a spreadsheet and create calculations and graphs.
- **Microsoft PowerPoint:** Allows users to add text, pictures and media and create slideshows and presentations.
- **Microsoft Outlook:** Allows users to send and receive email.
- **Microsoft OneNote:** Allows users to make drawings and notes with the feel of a pen on paper.
- **Microsoft Access:** Allows users to store data over many tables.

Web Browsers

A web browser is used to retrieve and go through information resources available on the world wide web (www).

It is a software application which provides a way to look at and interact with the information on the web. It is a client program which uses Hypertext Transfer Protocol (HTTP) for making requests to the Web servers through the Internet on behalf of the user of the browser.

The following image shows the basic layout of a web browser:

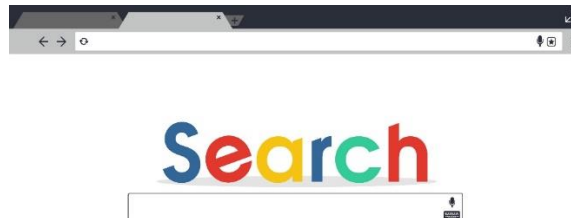


Fig. 1.3.6: Layout of a web browser

Configuring a Web Browser

The web browser can be customized by configuring it with the help of settings menu on the browser. A browser can be configured for managing privacy, network connection settings, appearance of the browser, download location and user accounts by going to 'Show Advanced Settings'.

The following screenshots show configuring network connection settings from a browser:

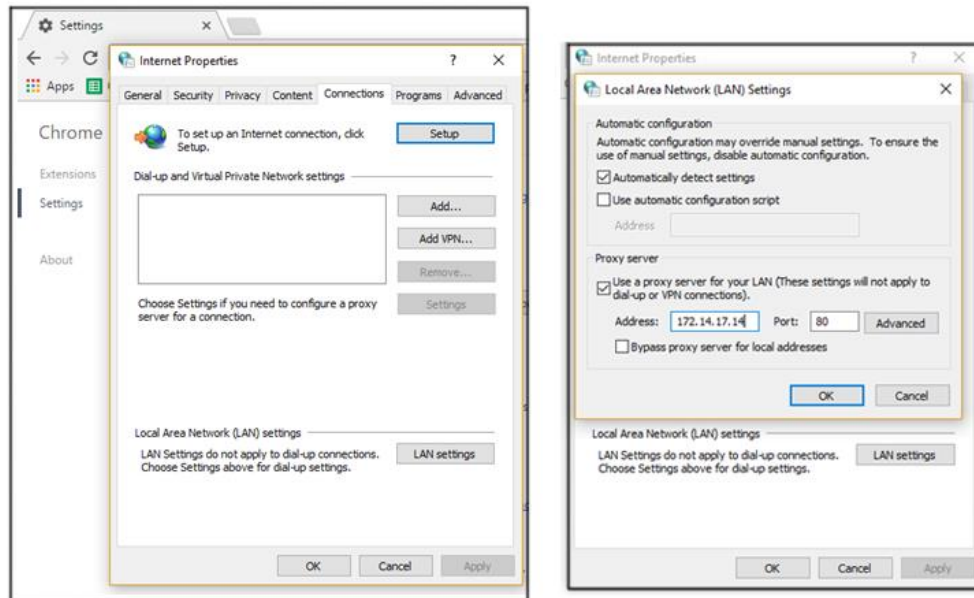


Fig. 1.3.7: Configuring network connection settings from a browser

Privacy settings of a browser help the user to manage the cache and cookies. The following screenshot shows privacy settings option of a browser:

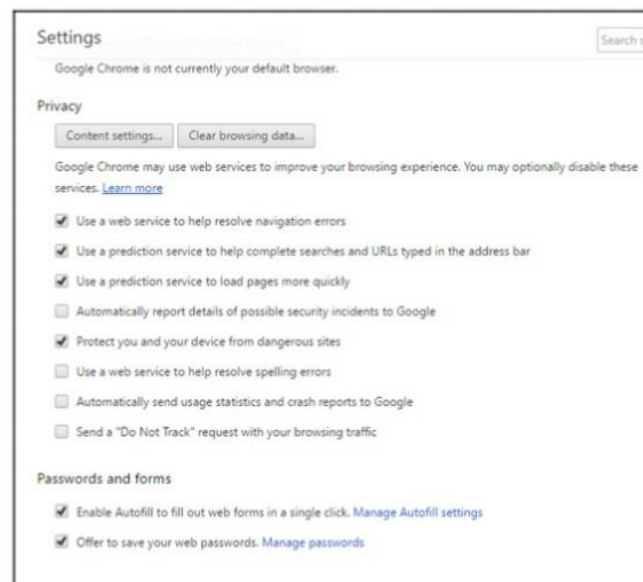


Fig. 1.3.8: Privacy settings option of a browser

1.3.3 Security Software

The security of a computer depends on the proper working of various technologies. An OS provides access to the resources available to the software which are running on the system and also to the external devices such as networks through the kernel. The OS contains various built-in tools, such as antivirus utilities and firewall set up, for protecting the system against security threats. These are known as security software.

Some of the security software are as discussed below:

- Firewall
- Antivirus
- Anti-Spyware

Firewall

A firewall is a utility software which monitors sending and receiving of files and blocks unauthorised network. It enables network security as it monitors incoming and outgoing network traffic thereby facilitating controlled data access between the networks.

The following image shows firewall security in a computer:



Fig 1.3.9: Firewall security in a computer

Antivirus Software

An antivirus is also known as anti-malware software. It is a set of programs that are used to prevent, detect and remove software viruses, worms, adware, Trojans and so on. This software needs to be up-to-date as a system without an antivirus can be infected within a few minutes of being connected to the Internet.

The following image shows an antivirus software installed in a computer:



Fig. 1.3.10: An antivirus software installed in a computer

Anti-Spyware

A spyware is a malware that collects a user's personal information such as credit card and browsing history and passes it to a third party without the user's knowledge.

An anti-spyware is a utility program that removes such malware or unwanted programs which could be present in the computer, to protect the user's personal information. Avast anti-spyware is a popular software to remove malware.

Activity

Fill in the blanks for the following statements:

1. The security software which monitors sending and receiving of files is known as _____.
a. Firewall b. Antivirus c. Antispyware
2. A web browser is a _____ used to search information online.
a. Application software b. System software c. Security software
3. An operating system serves as an interface between programs and _____.
a. System hardware b. System software c. Applications

Practical



Perform the task of creating restore point and restoring computer for windows 8.

Hardware:

1. Computer with windows 8 system



2. Basic Electronics

Unit 2.1 – Fundamentals of Electronics

Unit 2.2 – Other Electronic Concepts



Key Learning Outcomes



At the end of this module, you will be able to:

- Explain the fundamentals of electronics
- Define electronic circuits and components
- Define fundamentals of electricity
- Describe PCB and its layout
- Explain other concepts of electronics

UNIT 2.1: Fundamentals of Electronics

Unit Objectives

At the end of this unit, you will be able to:

- Define electronics
- Explain the basics concepts of electronics
- Identify electronic components
- Explain the fundamentals of electricity

2.1.1 Introduction to Electronics

Electronics is the branch of science which involves the study of flow and control of electrons (electricity) and their behaviour and effects. This branch deals with electrical circuits involving active electronic components such as transistors, diodes and integrated circuits and passive electronic components such as resistors, capacitors and inductors, along with interconnection technologies.

The following figure shows some concepts that form the basics of electronics:

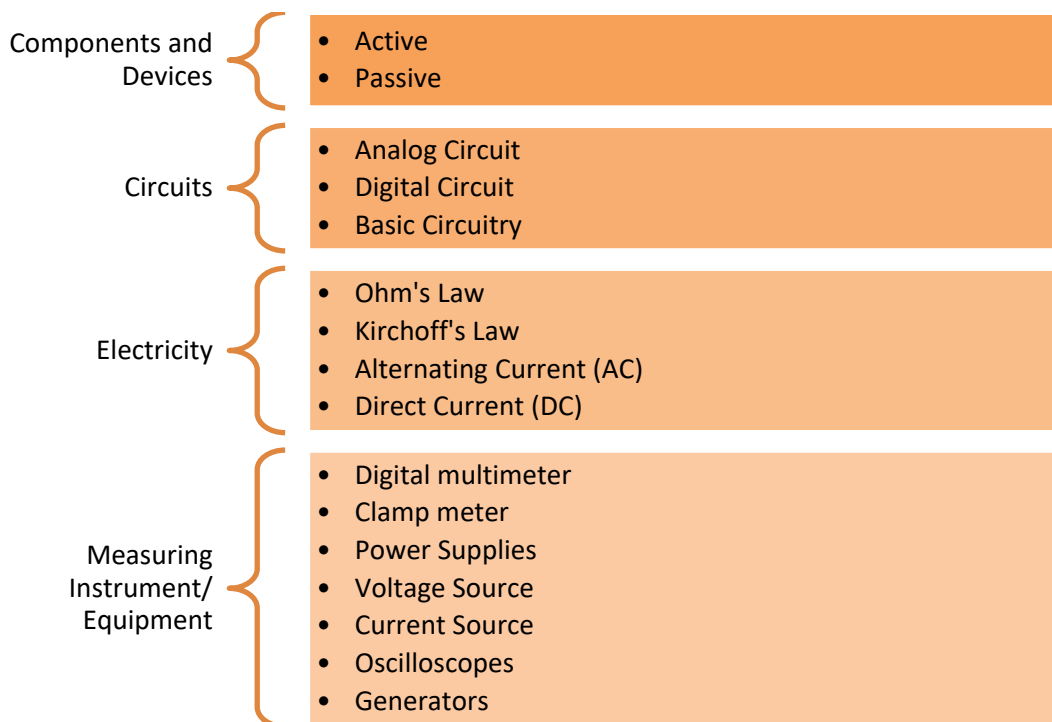


Fig. 2.1.1: Concepts of basic electronics

2.1.2 Electronic Components

All the circuits of a computer are made up of various basic electronic components. These components are the fundamental building blocks of the electrical/electronic circuits. They are generally found on the hard disk drive, motherboard and on the other parts of a computer and its peripherals. For a field technician, it is necessary to identify these components correctly.

The electronic components are embedded on Printed Circuit Boards (PCBs). A PCB acts as a base for the components that are mounted on its surface and soldered. The components are generally soldered on the circuit board according to a specified design. The circuits are initially build and tested on a breadboard before being embedded on a PCB. The following image shows a mother board PCB and a few electronic components embedded on it:

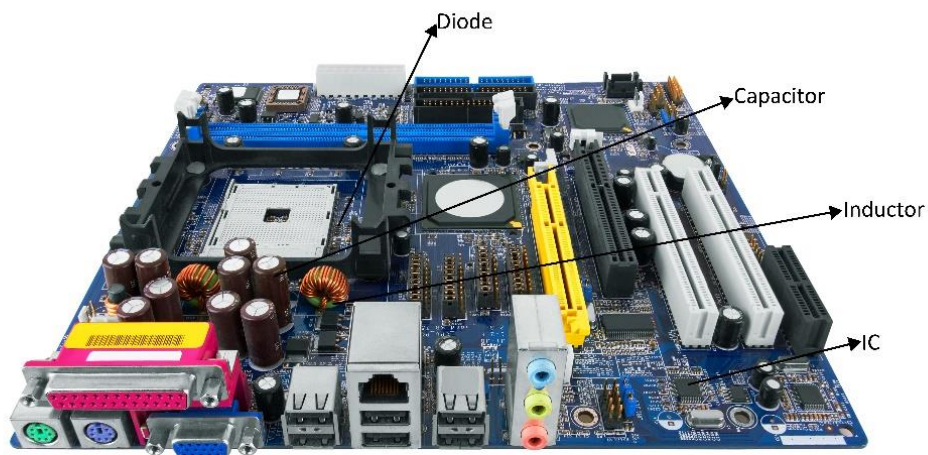


Fig. 2.1.2: Some electronic components on a motherboard's PCB

Electronic components that may be embedded on a PCB are of two types:

- Active
- Passive

Active Components

These components depend on a source of energy to perform their functions. They can amplify current and produce a power gain. The following figure represents a list of active components:

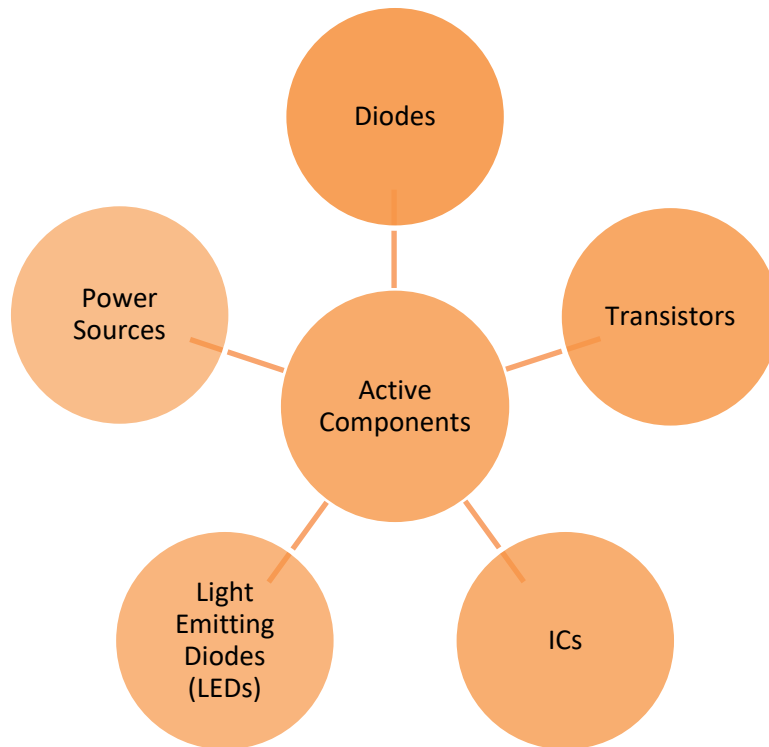


Fig. 2.1.3: Active components

Diode

A diode is a specialized electronic component with two terminals known as the anode and the cathode. It has asymmetric conductance, which means that it conducts mainly in one direction. It has very less resistance (ideally zero), to the flow of current in one direction. It has high resistance (ideally infinite), in the other direction. Diodes are usually made up of semiconductor materials such as germanium, silicon or selenium. The following image shows diodes:



Fig. 2.1.4: Diodes

Transistors

A transistor is an electronic device, made up of semiconductor material. Usually, it has at least three terminals to connect to an external circuit. It is used to amplify or switch electrical power and electronic signals. The following image shows a transistor:

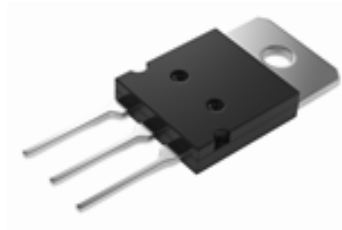


Fig. 2.1.5: A transistor

IC

An IC, also known as a microchip, is a semiconductor wafer on which a number of small resistors, capacitors and transistors are fabricated. It can work as an oscillator, an amplifier, a timer, a counter, a microprocessor or as computer memory. The following image shows an IC:



Fig. 2.1.6: An IC

Light Emitting Diode (LED)

It is a p-n junction diode which gives out light when it is activated. It is a two-lead semiconductor source of light. Energy is released as photons when a suitable voltage is applied to the leads. The following image shows an LED:



Fig. 2.1.7: An LED

Power Source

A power source is a source which provides power to a circuit. Generally, it is a generator or a battery.

The following image shows a battery:

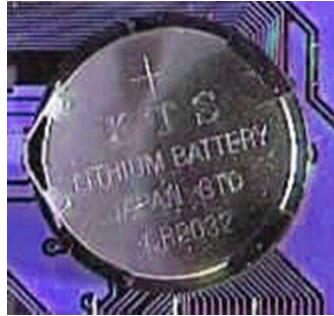


Fig. 2.1.8: A battery

Passive Components

These components do not require any power source to perform their specific functions. They are not capable of controlling the current. The following figure lists different passive components in a circuit:

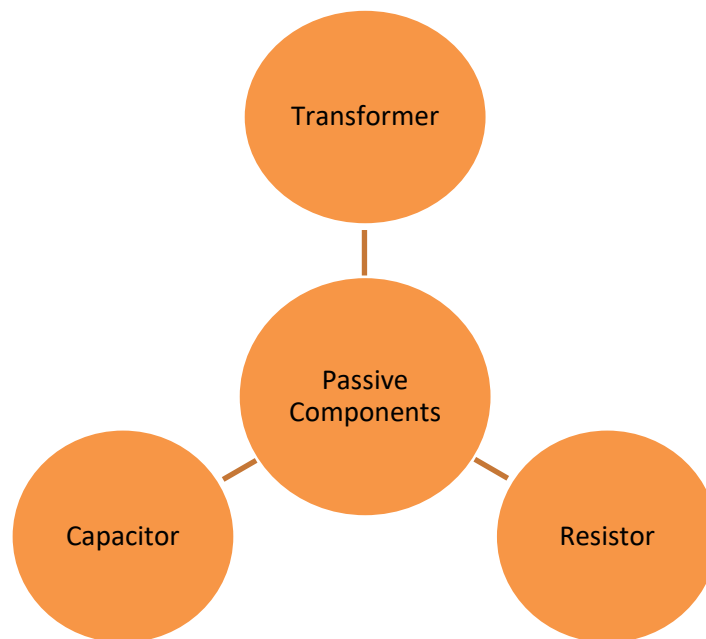


Fig. 2.1.9: Passive components

Transformer

A transformer consists of a metal core with coils of wire around it. It is a device used to convert AC to the required values by decreasing or increasing the alternating voltages in an electronic or electric system.

The following image shows a transformer:

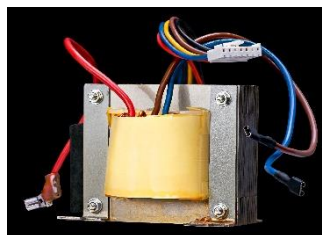


Fig 2.1.10: A Transformer

Resistor

A resistor is a component in an electronic circuit which is built to resist or limit the flow of current in that circuit. It may be a small carbon device or a big wire-wound power resistor. Its size varies in length from 5mm up to 300mm. The following image shows different types of resistors:

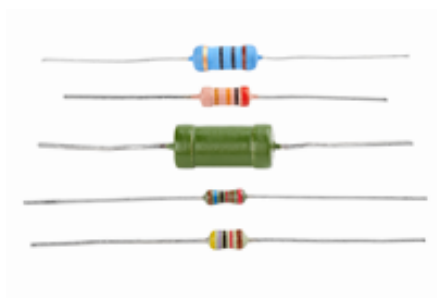


Fig. 2.1.11: Resistors

Capacitors

A capacitor is a device which is made up of one or more pairs of conductors and an insulator separating them. It is used to store electric charge. The following image shows capacitors:



Fig. 2.1.12: Capacitors

2.1.3 Fundamentals of Electricity

Electricity is a natural force that comes into existence whenever there is a flow of electric charge between any two components. The flow of electric charge is called current. Voltage is the potential difference between negative and positive charged components. When working with circuits, basic knowledge of electricity is very important to ensure that all connections are

correct. A wrong connection in a circuit may cause high damage to people and the circuit components.

Introduction to PCB

In personal computers, a motherboard is the PCB that provides connectors for peripherals and has many important components on the board.

It is the main circuit board of a computer. A motherboard includes the following devices:

- CPU
- Chipset
- I/O ports
- BIOS
- ROM chip
- Memory
- Expansion slots
- Peripheral controllers

Motherboard is also known as “Main board” or “System Board”.

Types of PCB

There are two types of mother boards:

- **Non-Integrated PCB (older):**

Peripheral controllers were not on the motherboard. Addition boards (called add-on-cards) were installed in expansion slots as per requirement. For example, video card, floppy disk drive (FDD) controller card, hard disk drive (HDD) controller card, Serial and parallel port card and sound card.

- **Integrated PCB (latest):**

Most of the peripheral controller cards are integrated on the mother-board itself. Electronics of these logics are integrated on the motherboard and connectors are visible on the rear panel of the PC.

Chipset:

A chipset is a motherboard component that includes the CPU and other chips that support basic functions of the computer.

The two main chips in the chipset are:

Northbridge:

North bridge is the part of the computer chipset that provides a network between the CPU and the other interfaces of the computer. These interfaces may include memory, Accelerated Graphics Port (AGP) port and Peripheral Component Interconnect (PCI) bus. It is also linked to the south bridge.

Southbridge:

South bridge is the portion of the computer chipset that provides a network between the north bridge and the slower speed interfaces and then further connects the interfaces to the

CPU. These interfaces may include parallel ports, serial ports, Universal Serial Bus (USB) ports and PS/2 ports.

The south bridge controls the slower I/O components like the Serial ports, USB ports and the integrated development environment (IDE).

The following image shows the connection of south bridge and north bridge in a PCB:

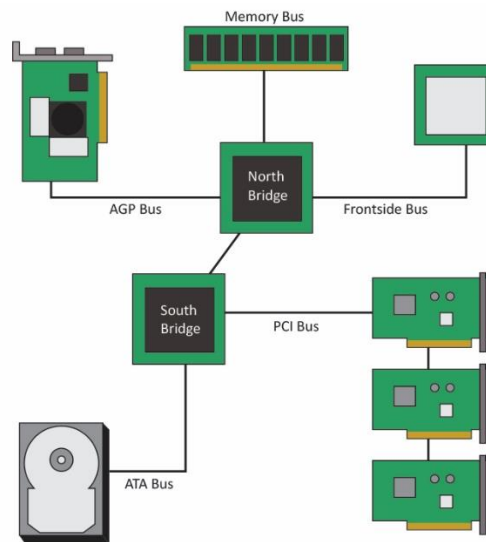


Fig 2.1.13: Connection of south bridge and north bridge in a PCB

The form factor of the motherboard determines the physical organization, general shape, the sorts of cases and power supply usage of PCB. It also specifies the physical layout, order of the board and the arrangement of mounting holes in the PCB. For example, a company can manufacture two motherboards with the same functionality but having a different form factor. The real differences lie in the physical layout and the position of the components on the board.

PCB Components

PCB has many components embedded in it. The two main components are:

- Processors
- Buses

Processors

A processor is a logical circuitry unit embedded in a PCB (or motherboard), which helps in running the system software such as OS and other applications such as window office. It also executes instructions given by the user.

It is also known as CPU and contains a silicon chip. It can perform complex calculations.

There are different types of processors such as advanced micro devices (AMD), digital signal processors (DSP) and Intel processors.

A processor contains three basic components:

- I/O unit
- Control unit (CU)

- Arithmetic logic unit (ALU)

The following image shows the basic components of a processor:

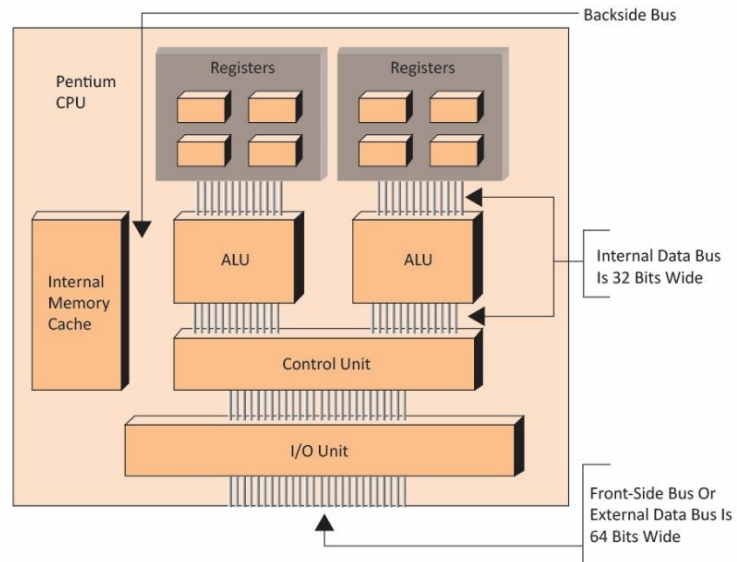


Fig 2.1.14: The basic components of a processor

The components of a processor are discussed in the following figure:

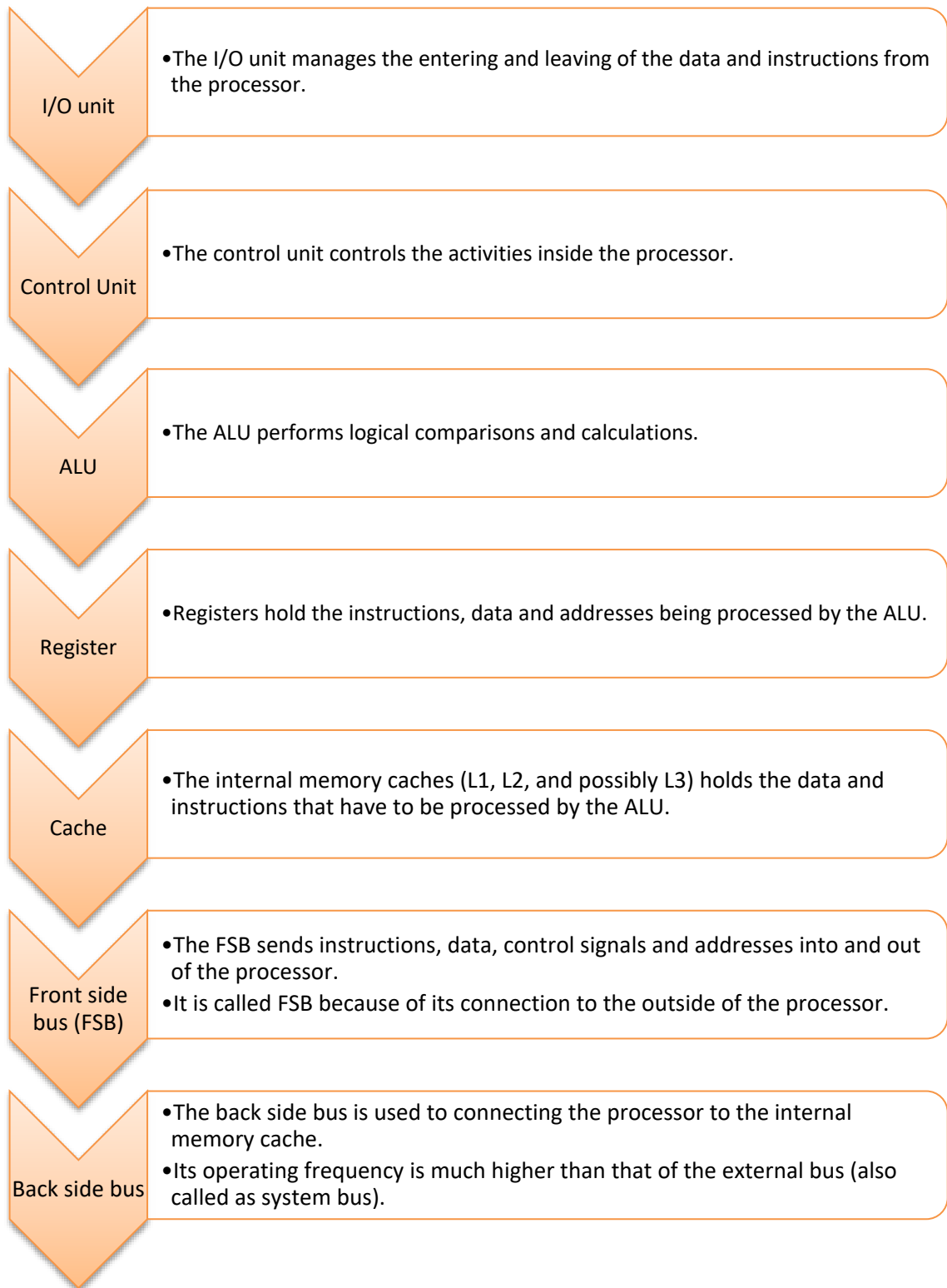


Fig. 2.1.15: Components of a processor

Processor Frequency or Speed

The speed of the processor at which it operates internally is known as processor frequency. For example, the processor's internal operating speed is 3.2 GHz but external operating speed is 800 MHz. In this case, 3.2 GHz is the frequency of the processor and 800 MHz is the frequency of the system bus.

Processor Technologies

Processor technologies can be used by AMD only, by Intel only or by both the vendors. These technologies help in distinguishing in between different processors in terms of their performance or features.

The processor technologies can be classified as:

- Over clocking
- Voltage regulator module (VRM)
- Throttling
- Hyper threading (HT Technology)

Overclocking

The default frequencies of motherboard and processors can be altered just by changing a BIOS set-up setting. Over clocking is the process in which a motherboard or processor work at a higher speed or velocity than that recommended by the manufacturer. Stability of the speed is not guaranteed in running the motherboard or processor in overclocking. Hence, it is inadvisable to run the motherboard or processor in it. In addition, a much higher speed or velocity can create overheating, which can damage the processor. So, the major area of concern to deal with while overclocking a system is overheating.

VRM

A CPU is a collection of transistors. These transistors work at a specific voltage level. If excessive voltage is supplied to the transistor, it will burn off. Hence the motherboard manufacturers have to take special care of the CPU voltages.

Throttling

Throttling is a process which is responsible for maintaining the rate at which the processing of application is conducted. Whenever the system is overheated, it lowers down the frequency which also helps in conserving power. It is also known as dynamic frequency scaling.

HT Technology

Intel developed a technology known as HT Technology. Two execution threads are processed by the HT technology inside a processor. On enabling it in the BIOS of the system, the single processor appears as two processors to the operating system.

Buses

In the architecture of a computer, a bus works as a communication system that transmits data amidst various computers or components within a computer. A computer is comprised of many components such as the CPU, I/O devices and the memory chips. A bus is a common passage or a group of wires that interconnects all these subsystems of a computer. Thus, the different components are able to exchange information through the bus.

Based on the flow of data between different devices, buses are classified as follows:

Types of buses

There are four types of buses connecting different devices as shown in the following figure:

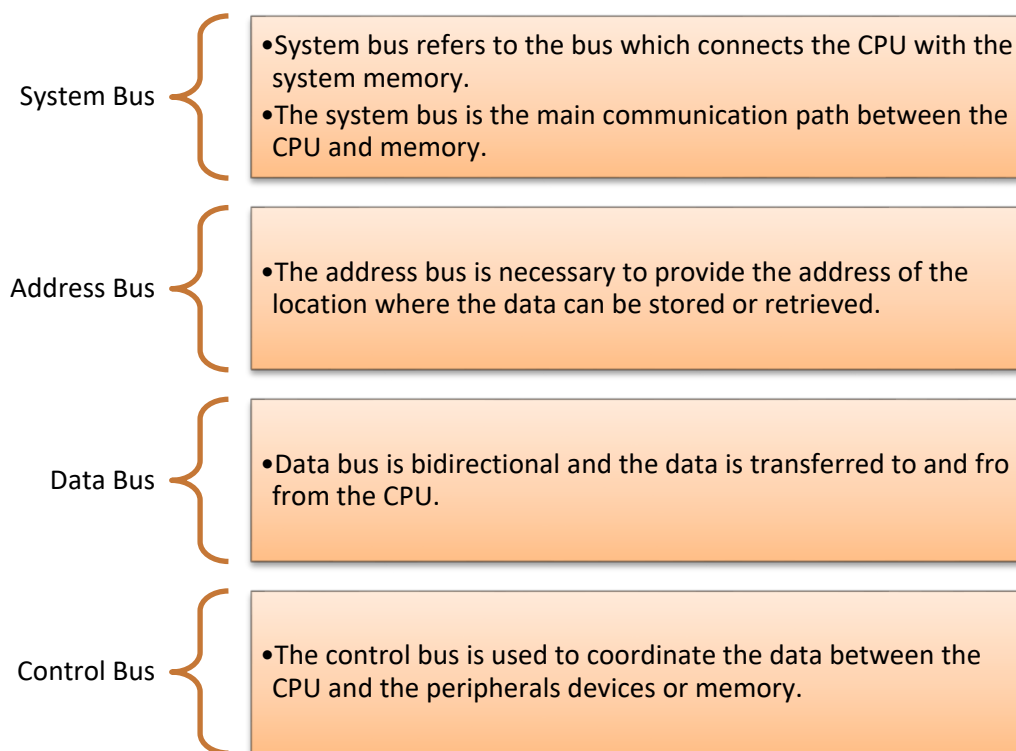


Fig. 2.1.16: Types of buses

The following image shows the connection of different buses with the devices:

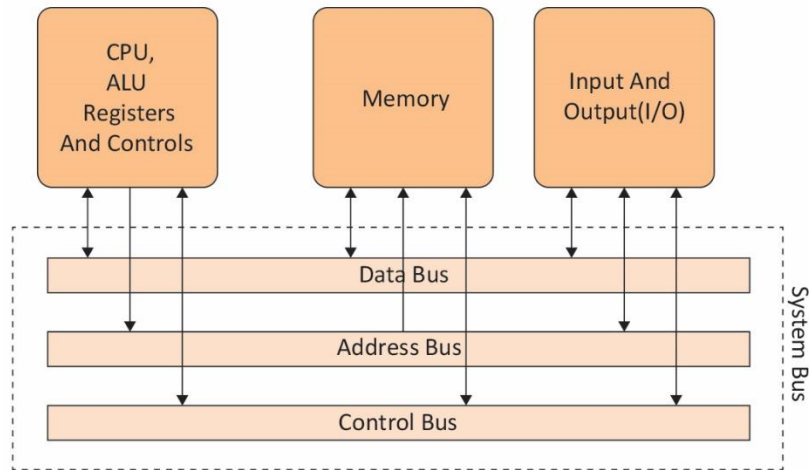


Fig 2.1.17: Connection of different buses with the devices

The various bus slots differentiated on the base of their features are discussed as follows:

- Industrial Standard Architecture (ISA) Bus Slots:
 - The expansion slots are used to enhance the features of the PC.
 - An ISA bus is present in 80286, 80386, 80486 and in Pentium systems and is of 16-bit slot.
 - Jumpers or switches are used to configure the ISA card.

The architecture of an ISA bus slot is as shown in the following image:

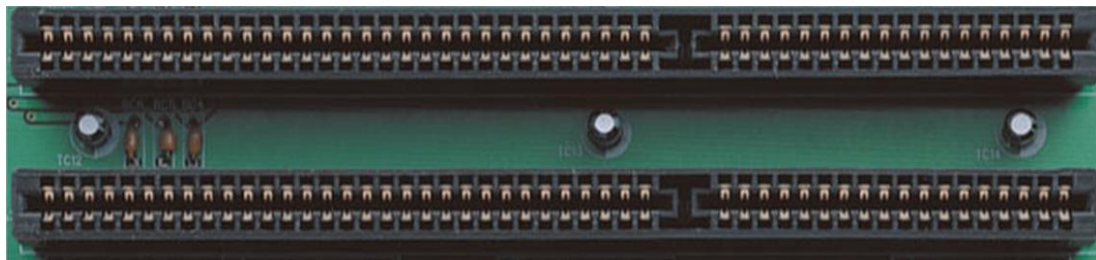


Fig. 2.1.18: Architecture of an ISA bus slot

- PCI Bus Slots:
 - It supports plug and play and it is self-configuring.
 - It operates at a speed of either 33 MHz or 66 MHz.
 - It is a 64-bit bus.
 - It communicates with the processor via a bridge circuit.

The following image shows PCI bus slot inside a motherboard:

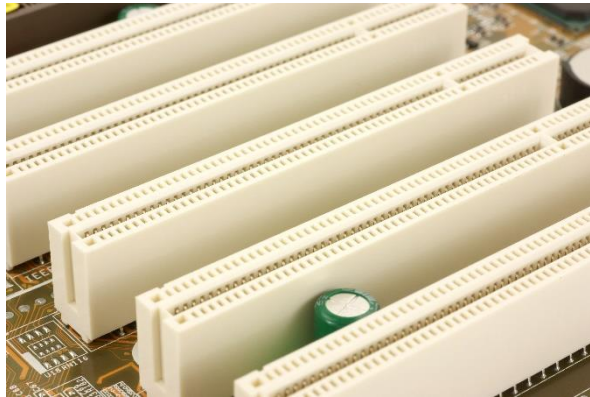


Fig. 2.1.19: PCI bus slot inside a motherboard

- Peripheral Component Interconnect Extension (PCI-X) Bus Slots:
 - Speed of operation: 133 MHz bus speed
 - Offered Bandwidth: 64-bit
 - Data transfer rate: 1 GB/sec
 - Efficient bus operation supported: Yes
 - Backward compatibility is provided: Yes

The following image shows PCI-X bus slots inside a motherboard:

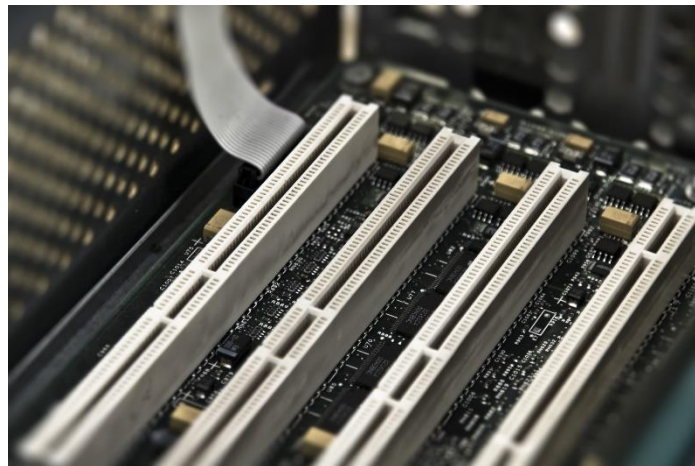


Fig 2.1.20: PCI-X bus slots inside a motherboard

- Extended Industry Standard Architecture (EISA) Bus Slots:
 - EISA bus has a feature called bus mastering which enables the components to communicate with each other without the interference of the CPU.

The following image shows various bus slots of EISA:

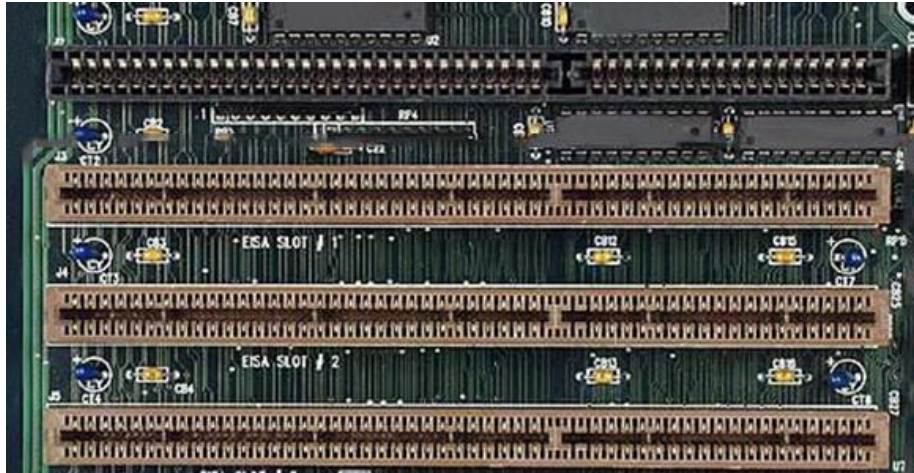


Fig. 2.1.21: Various bus slots of EISA

- Micro Channel Architecture (MCA) Bus Slots:
 - MCA bus supports additional features like 32-bit data transfer and automatic configuration of expansion cards.

The following image shows the architecture of an MCA bus slot:



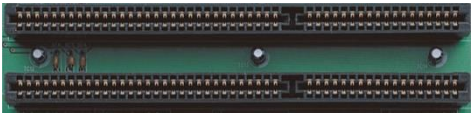
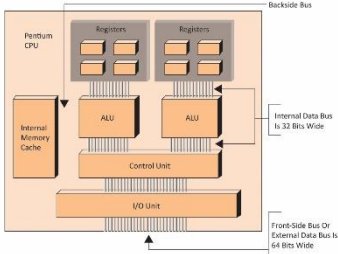


Fig. 2.1.22: Architecture of an MCA bus slot

- Video Electronics Standard Association (VESA) Bus Slots:
 - It is designed to hold the video cards of days prior to Accelerate Graphics Port (AGP).

Activity

Match the following devices with their respective images:

1.	Processor	A.	
2.	ISA bus slot	B.	
3.	PCI-X bus slot	C.	
4.	EISA bus slot	D.	

UNIT 2.2: Other Electronic Concepts

Unit Objectives

At the end of this unit, you will be able to:

- Define voltage and power
- Identify voltage and power requirement for different hardware devices

2.2.1 Voltage and Power

Voltage is the potential difference between a negatively charged component and a component with positive charge. It is the amount of energy carried by the charge and is the "energy per unit charge". It is measured in volts.

Power is the amount of electrical energy per unit time given by an electric circuit. It is measured in watts (W) or joules per second.

Voltage and Power Requirement by Hardware Devices

Computer is an electronic machine and hence it can only be operated with a source of energy. It requires a standard power and voltage range for its operation. Every electronic device or circuit is fed by the power supply unit (PSU).

2.2.2 Computer Power Supply Voltages

All the hardware components present in a computer, require some amount of DC voltage to function. This amount may differ from component to component. The following table lists a few components and their voltage requirement:

Component	Voltage Requirement (in volts)
Mainboard or motherboard	12
CPU	3.3
Graphic cards	12
CPU fan	5
USB ports	5

So, in a computer broadly three types of DC voltages are required, which are +12V, -12V, +5V, -5V, and +3.3Volt.



Power ratings and voltages outside the permissible range can cause system failure.

PSU

A PSU draws the AC voltage from the source (generally from the socket) and converts it to the desired level of DC voltage. It is usually found at the back side of a computer case. The following figure lists the parts found on the backside of a PSU:

A point of connection for connecting the power cord to the computer.

A fan opening for drawing out the air from the power supply.

A red switch for changing the voltage of the power supply.

A rocker switch for turning on and off the power supply.

Fig. 2.2.1: Components of a PSU

The following image shows a PSU:

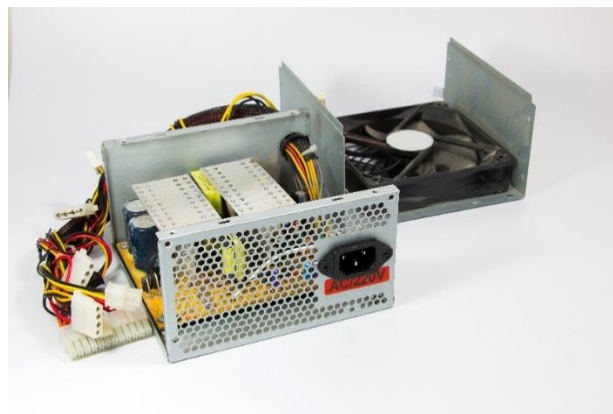


Fig. 2.2.2: Interior view of a PSU

There are different types of power supplies available in the market, but switched-mode power supplies are globally used today in personal computers.

There is also a stack of different coloured cables inside a PSU.

The following figure lists the colour codes of the PSU cables:

Black Wires	<ul style="list-style-type: none">•These wires are used to provide grounding.•Every other color should be paired with a black wire.
Yellow Wires	<ul style="list-style-type: none">•These wires denote +12V
BlueWires	<ul style="list-style-type: none">•These wires denote -12V
Red Wires	<ul style="list-style-type: none">•These wires denote +5V
White Wires	<ul style="list-style-type: none">•These wires denote -5V
Orange Wires	<ul style="list-style-type: none">•These wires denote 3.3V
Green Wires	<ul style="list-style-type: none">•These are control wires to check the DC voltage
Purple wires	<ul style="list-style-type: none">•These wires denote +5V on standby mode

Fig. 2.2.3: Colour codes of PSU cables



Power supply and computer can be protected from a surge and voltage drops by simply adding a UPS (backup) to the computer.

Activity

Write the voltage requirement of the given components:

1. USB ports
2. CPU fan
3. Motherboard
4. Graphic cards
5. CPU



3. Networking Essentials

Unit 3.1 – Networking Concepts

Unit 3.2 – TCP/IP Protocol

Unit 3.3 – Wireless Network

Unit 3.4 – Cables and Connectors



Key Learning Outcomes



At the end of this module, you will be able to:

- Understand basic concept of networking
- Describe TCP/IP protocol and their layers
- Discuss wireless networks
- Identify cables and connectors

UNIT 3.1: Networking Concepts

Unit Objectives



At the end of this unit, you will be able to:

- Define network topology
- Identify different types of topology
- Describe the Open system interconnection (OSI) model and its layers

3.1.1 Network Topology

Network topology refers to the arrangement of the different elements (links and nodes) of a network. It is the layout of a network and may be depicted as:

- Physical topology: It is the arrangement of the various network components.
- Logical topology: It describes how data flows in a network.

Distances between the nodes, physical connections, rate of transmission or types of signal may differ between two networks, but still topologies may be identical.

Types of Topology

There are five types of network topologies based on the type of exchange of information through the network. They are as discussed:

Bus Topology

In bus topology, each node is connected to a single cable using interface connectors. The central cable, known as bus, is the backbone of the network. The packets that are transmitted in both directions along the bus contain the destination address. As single high capacity cable is required, this topology needs minimum cabling and the cost is also low. The entire cable setup needs to be reconfigured to add a node. It is a time consuming process to troubleshoot as every point needs to be checked to locate the fault.

The following figure shows bus topology where all nodes are connected to the same terminal:

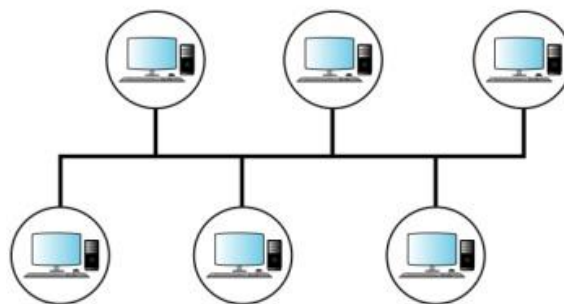


Fig. 3.1.1: Bus topology

Star Topology

The star topology links the nodes over a network, utilizing a central control unit which is known as hub. Nodes in a star-based network can be easily attached to the hub. All the nodes are connected to the hub, thus, requiring lot of cabling and high cost. A faulty hub can disrupt the entire network.

The following figure shows star topology:

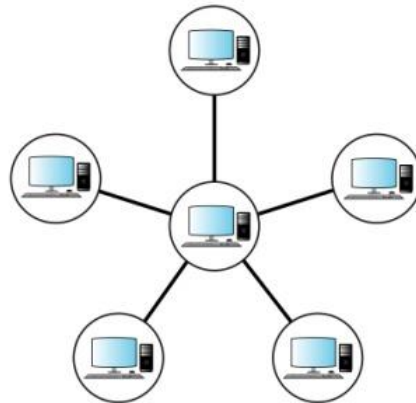


Fig. 3.1.2: Star topology

Ring Topology

The ring topology links the nodes through a point-to-point connection over a network. It is easy to locate cable faults in a ring and if any of the nodes in the network malfunctions, the entire network stops functioning.

The nodes in the network make a closed loop. The flow of data is unidirectional around the ring. The data is passed through the nodes from the sender to the receiver.

The following figure shows the closed loop connection in ring topology:

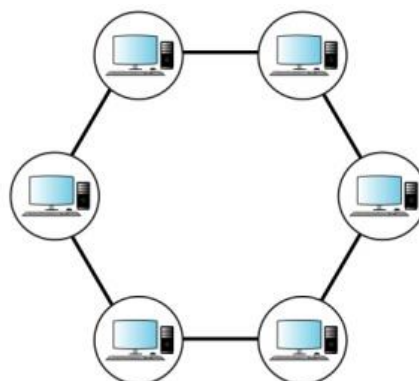


Fig. 3.1.3: Closed loop connection in ring topology

Mesh Topology

The mesh topology involves point-to-point connection between every node in the network. It is highly reliable as network connectivity does not depend on any one node. It is used for large network connections. It involves high installation and setup costs due to the complex

cabling required to connect each node with the other. This topology becomes difficult to manage if the size of the network increases.

The following figure shows the architecture of mesh topology:

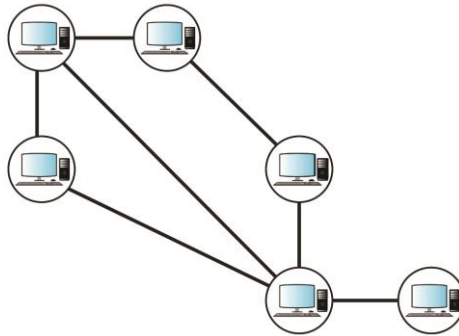


Fig. 3.1.4: The architecture of mesh topology

Cellular Topology

The cellular topology is a wireless topology, where geographic area is divided into cells or regions. Each cell is a separate entity that is controlled by a central station. This topology operates on wireless media which does not require cabling.

It is easy to install as the only requirement is the availability of a central location and signal strength. Data transmission happens in a cellular digital packet data (CDPD) format.

The following figure shows a cellular topology connection:

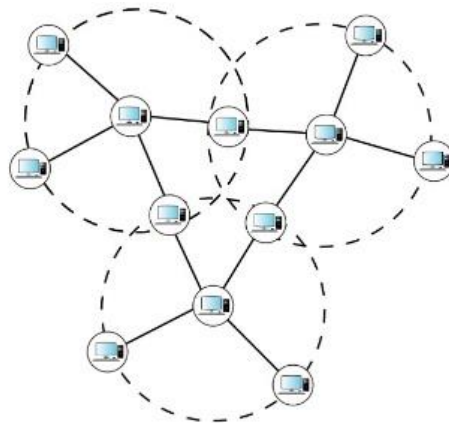


Fig. 3.1.5: A cellular topology connection

3.1.2 OSI Model

The OSI model is a conceptual or networking framework designed to implement a set of rules, known as protocols, for transfer of information between different layers. It was designed by the International Organization for Standardization (ISO).

The model divides network communications into seven layers:

- Physical layer
- Data Link layer
- Network layer
- Transport layer
- Session layer
- Presentation layer
- Application layer

The following figure describes the seven layers of an OSI model:

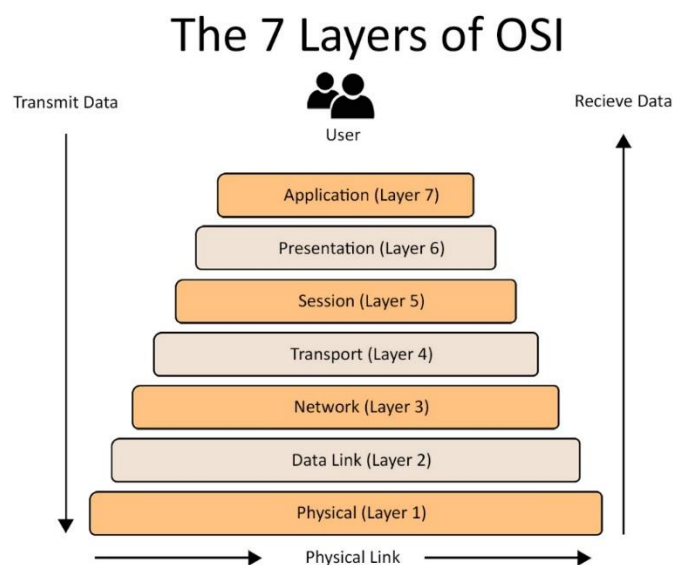


Fig. 3.1.6: The OSI model

Every layer protocol performs specific services which is unique for that layer. The protocol interacts with the protocols which are directly above and below it, while performing the services.

The description of the seven layers on the basis of their functions are as follows:

Physical Layer

It is the first layer of the OSI model. This layer protocol transmits bits rather than packets in the form of a physical signal over the connecting network. It interfaces with the data link layer and performs coding, decoding and transmission of information in the form of bits. It passes the information bit by bit and detects and accepts signals which are passed to the data link layer. It monitors error rates in data but cannot perform error corrections.

The following figure shows flow of data from the data link layer to the physical layer and vice-versa:

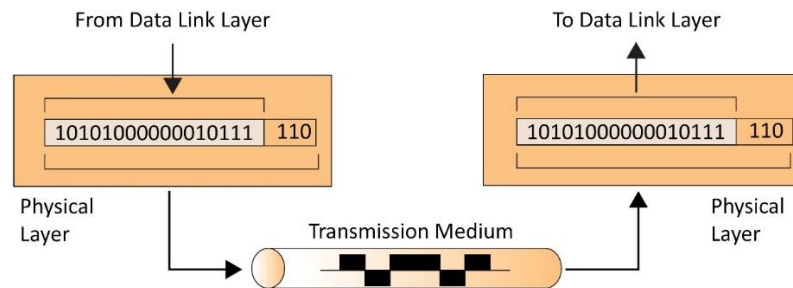


Fig. 3.1.7: Flow of data from the physical layer to the data link layer and vice-versa

Data link Layer

It is the second layer of the OSI model which transmits information in the form of packets. These packets contain the source and the destination address which are required to transmit them to their assigned destination. It also performs error checking, which is not done by the physical layer, to ensure that the packets arrive error free.

The main functions of data link layer are:

- It provides interface to the network layer
- It deals with transmission error to ensure that the frame arrives without any problem
- It controls the flow of data

The following figure shows the flow of data from the network layer to the data link layer:

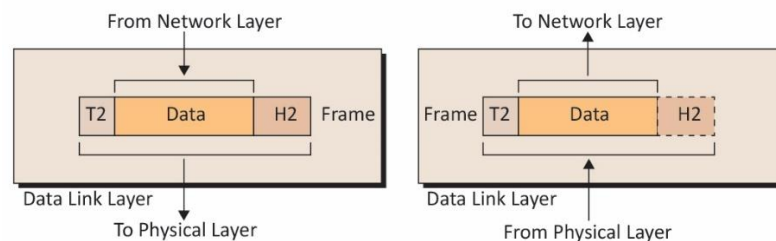


Fig. 3.1.8: Flow of data from the network layer to the data link layer

Network Layer

It is the third layer of the OSI model. It transmits data packets in a logical way and assigns network addresses to these packets which is translated into their equivalent physical addresses. Every device in the network has a unique identification number which is known as addressing. There are two types of address assigned to each node:

- Network address
- Physical address

In this protocol layer, each packet is assigned a network address which works on a hierarchical addressing design. It accepts the data segments, which are known as packets,

from the transport layer. The header part of these packets are added with the logical addressing information before being sent back to the transport layer.

The following image shows the flow of data in packets from the transport layer to the network layer:

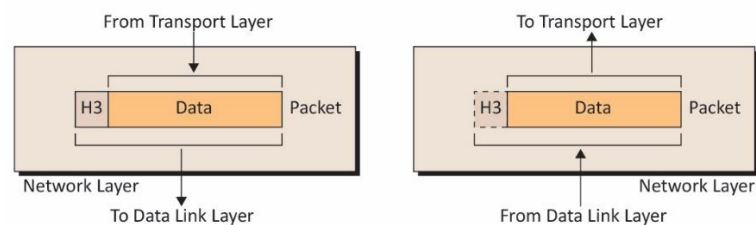


Fig. 3.1.9: Flow of data in packets from the transport layer to the network layer

Transport Layer

The fourth layer in the OSI model is the transport layer. On the basis of its application, this layer can be either connection oriented or connectionless.

It accepts data from the layer above it (session layer) and performs end to end delivery of the data. It ensures that the data is transferred from the sender to the receiver without any error and is understandable by the receiver.

This layer protocol forms data packets and assigns sender's and receiver's address to the header part of the packets. This is known as multiplexing of data.

The following image shows the flow of data in segments from the session layer to the transport layer:

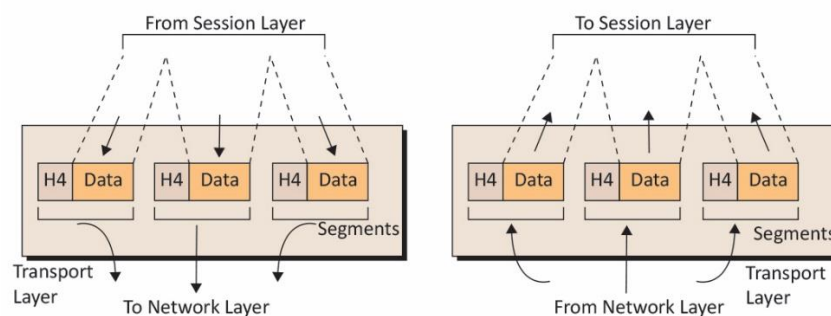


Fig. 3.1.10: Flow of data in segments from the session layer to the transport layer

Session Layer

It is the fifth layer of the OSI model. This layer performs different functions between two nodes in the network:

- Coordinates and maintains communication between nodes
- Establishes and maintains a secure communication link between the nodes

The following image shows the flow of data from the presentation layer to the session layer:

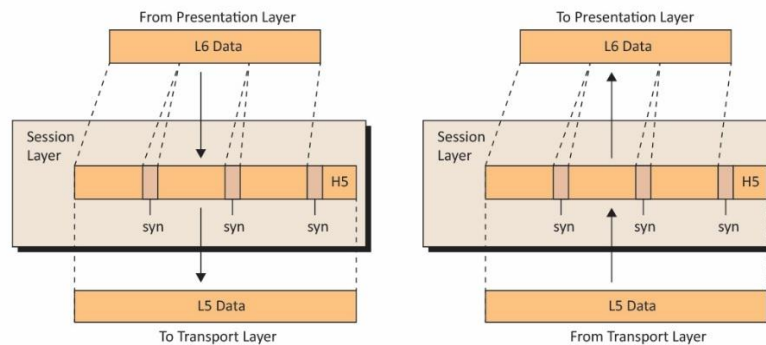


Fig. 3.1.11: Flow of data from the presentation layer to the session layer

Presentation Layer

It is the sixth layer of the OSI model. Its function is to accept data from the layer above it (application layer) and format the information.

It acts as a translator and performs the function of compressing and encoding the information received from the above layer. This layer performs various functions such as:

- Data encryption
- Data compression
- Data conversion

The following image shows the flow of data from the application layer to the presentation layer:

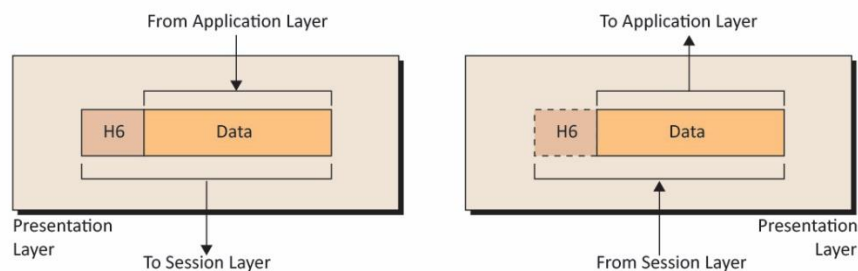


Fig. 3.1.12: Flow of data from the application layer to the presentation layer

Application Layer

It is the top layer of the OSI Model. It deals with the user end applications such as e-mail, transfer of files, dealing with software and web browsing.

Unlike other layers, it does not serve but can interact with the layer below it to transfer its data to the host.

The following image shows the connection of user and presentation layer with the application layer:

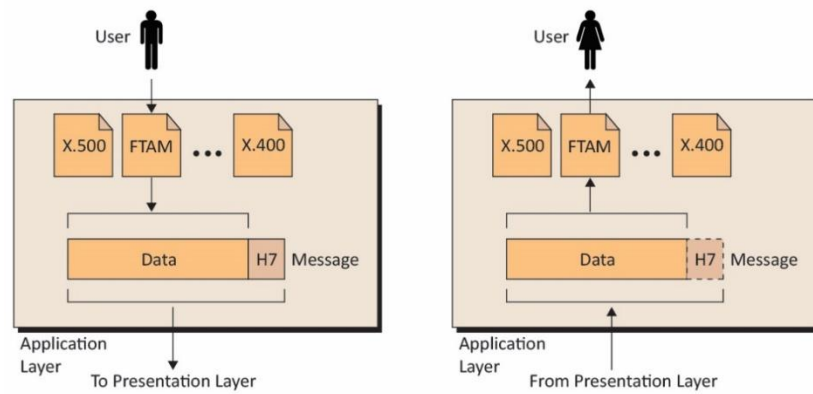
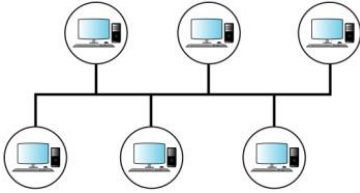
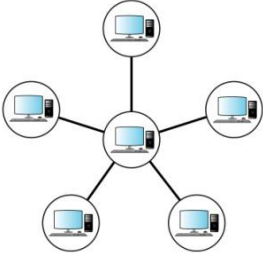
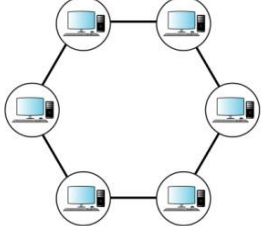
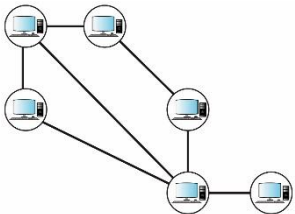


Fig. 3.1.13: Connection of the user and the presentation layer with the application layer

Activity

Match the following images with their respective topologies.

1.		A.	Star Topology
2.		B.	Ring Topology
3.		C.	Mesh Topology
4.		D.	Bus Topology

UNIT 3.2: TCP/IP Protocol

Unit Objectives



At the end of this module, you will be able to:

- Explain TCP/IP protocol and its layers
- Describe IP addressing
- Discuss IPv4 addressing

3.2.1 Introduction to TCP/IP Protocol

TCP/IP is the communication protocol for Internet. It is a protocol suite which has two protocols:

- Transmission Control Protocol:
 - Assembles the message to be transmitted over network into smaller data packets
 - Reassembles the received packets into the original message
- Internet Protocol:
 - Manages the address of each data packet so that the data packet reaches the right destination. This is known as IP addressing.

It is also known as Internet Protocol Suite. TCP/IP is based on the client/server model of communication. The client computer sends requests to the server such as opening a web page. The server provides services such as connecting to the web page and giving access to that web page. Each client request in TCP/IP is an independent request, not related to the previous one. Hence it does not require a dedicated connection.

TCP/IP Model

The TCP/IP model is a set of protocols which defines how two or more computers can communicate with each other on Internet. There are many protocols working within the TCP/IP model. These protocols provide various functionalities which are important for the data transmission over the networks.

TCP/IP is composed of four layers, as shown in the following figure:

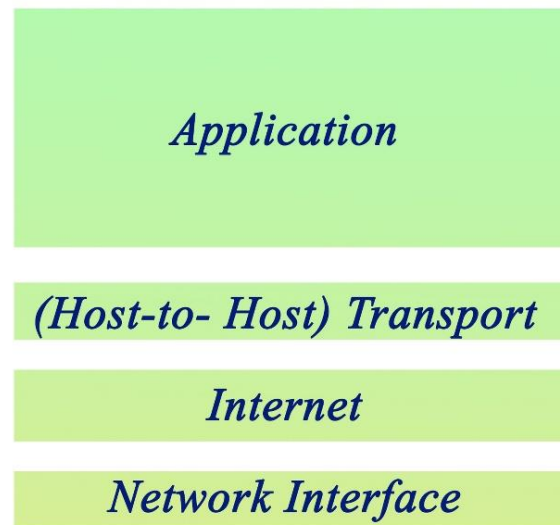


Fig. 3.2.1: Layers of TCP/IP network

The following image shows the description of TCP/IP layers:

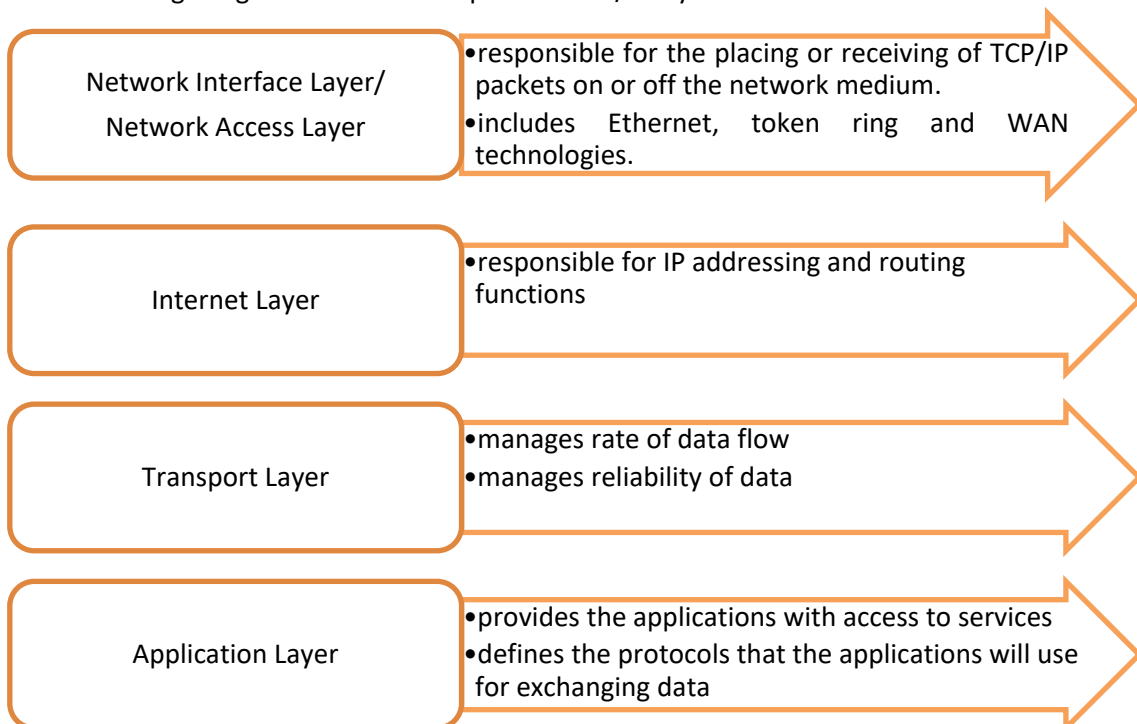


Fig. 3.2.2: Description of TCP/IP layers

Layers of TCP/IP Protocol

There are four layers of TCP/IP protocol which are further classified on the basis of their functionalities as shown in the following image:

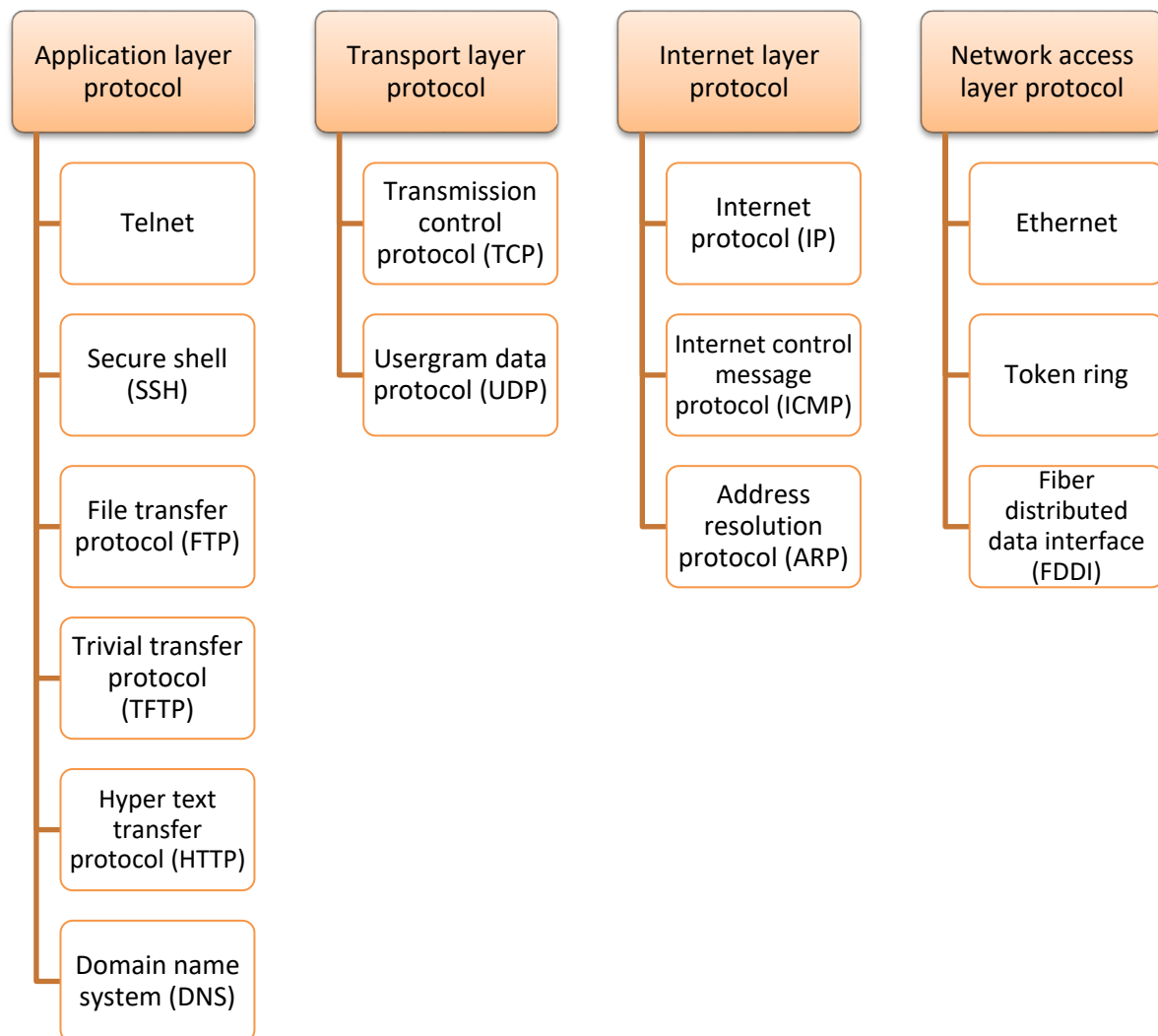


Fig. 3.2.3: Layers of the TCP/IP protocol

Application Layer Protocol

This layer provides the applications with access to services and defines the protocols that the applications will use for exchanging the data

It is further subdivided into six layers as described below:

Telnet

Telnet is a protocol used by the network users to communicate with and to access the network devices. To access telnet, the user must have installed telnet client software.

SSH

It is a network protocol which is used by the administrators to access a remote device in a secure way. Unlike telnet, SSH uses encryption, which means that all the data is transmitted securely over the network.

FTP

It is a standard protocol. It is responsible for the transfer of computer files to the client from a server using the server-client model architecture. FTP supports user authentication and sends all data in clear text.

TFTP

It is a utility internet software used to transfer simpler files between remote devices. Unlike FTP, TFTP is less capable of transferring heavy files and lacks advanced features of FTP.

HTTP

HTTP is an application protocol also known as client-server protocol. It allows the client to request web pages from the web servers. It is the base for data communication of World Wide Web (www).

DNS

DNS is an internet service protocol. It is responsible for translating domain names into their corresponding IP addresses. It is user friendly because domain names are easier to remember than IP addresses.

Transport Layer Protocol

Transport layer protocol is also known as host to host protocol because it provides host to host services such as flow control, reliability and communication services. The two main layers of transport protocol are described as follows:

TCP

It assembles the message to be transmitted over network into smaller data packets and reassembles the received packets into the original message. It is connection-oriented, which means before data is sent, a connection between the two hosts must be established.

UDP

UDP is a transport layer protocol and it is used with internet layer protocol for transmission of data between applications running on a TCP/IP network.

UDP is also considered to be a connectionless protocol, since no virtual circuit is established between the two endpoints before the data transfer takes place. Because it does not provide as many features as TCP, it uses lesser network resources than TCP.

Internet Layer Protocol

Internet layer protocol performs IP addressing as well as routing functions. It enables the packet to travel on its own to the destination. The pattern in which the packets are received is altered before they are dispatched.

The list of important protocols at the internet layer are described as follows:

IP Protocol

IP protocol is a set of internetworking methods in the IP suite. Its responsibility is to send packets from the host to the destination, as described by the IP address. This IP address is defined by the IP.

ICMP

ICMP is also known as error reporting protocol because it is used by the networking devices like router to generate or send error messages such as, error in delivery of IP datagrams (packets) or non-availability of a requested service.

ARP

It is a communication protocol which is used to map an IP address to its corresponding physical or hardware address.

Network Access Layer Protocol

It is responsible for the placing or receiving of TCP/IP packets on or off the network medium and includes Ethernet token ring and WAN technologies.

The protocols used at network access layer are as discussed:

Ethernet

It is a local area network (LAN) technology which describes how the networking devices format the data for transmission to other network devices. It is in connection with the first layer or the second layer of the OSI model.

Token Ring

It is another LAN technology where all the computers are linked together in the form of ring or star topology. In this, to prevent the data collision between two computers, a token scheme is used.

FDDI

FDDI is used for data transmission of information. It uses fiber optic lines as its physical medium in a LAN. It works on token ring scheme and its range can extend up to 200 km.

3.2.2 Introduction to IP Addressing

An IP address is an exclusive identifier for a computer or any other device attached to the network. It is a 32-bit value. IP addresses are written in four decimal numbers, which are separated by dots. Each section ranges from 0 to 255. For example, 172.16.254.2 would be

the IP address of a node. When the address is converted to binary, each section contains 8-bit, which is called an octet.

IP Terminology

- **Bit:** It represents either 1 or 0.
- **Byte:** A byte consists of 7 or 8 bits, depending on the parity digit.
- **Octet:** An octet is made up of 8 bits.
- **Network Address:** It is the starting up address of a network. It is the identity of that network.
- **Broadcast Address:** It is the last IP Address of a network and is used to send information to all the available nodes on the same network.

The following figure depicts the dotted decimal notation of the given IP address:

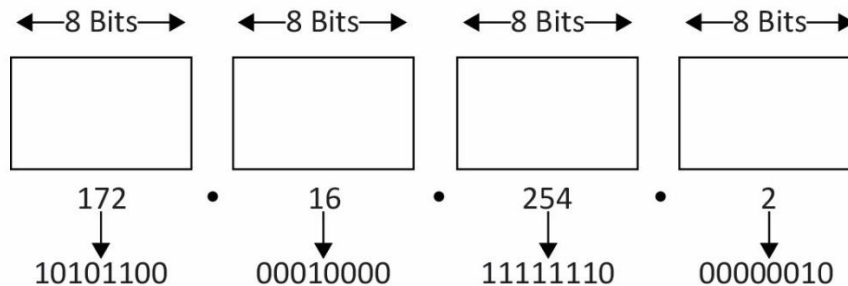


Fig. 3.2.4: Example of an IP address

IP addresses are also known as host addresses.

In a TCP/IP network the routers pass data packets between networks without knowing exact location of the destined host. They only know the network of the host. They deliver a packet to the network and then using the information stored in the router, the packet is delivered to the host. For this purpose, the IP address contains two parts:

- First part is the network address
- Second part is the host address.

To locate devices in a distributed environment, which is different networks connected to each other, the nodes are assigned explicit addresses which identify the network in which the device is on and also identify the device in that particular network. When these two unique identifiers are combined, it is a globally unique address.

Example

IP Address: 192.168.13.123

Network Address: 192.168.13.0

Host Address: 0.0.0.123

Types of IP Addresses

Based on their operational characteristics, the IP addresses are divided into three categories as shown in the following figure:

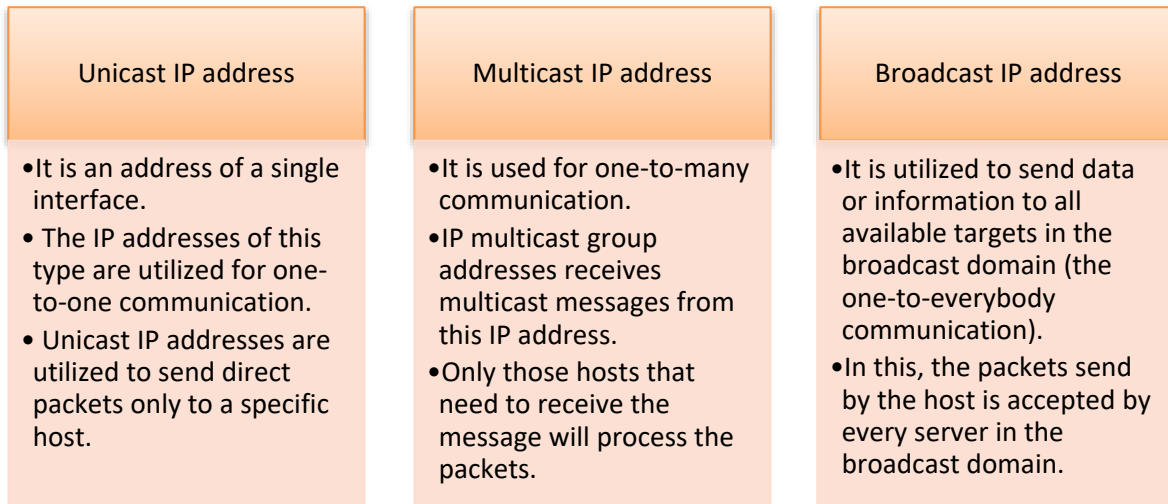


Fig. 3.2.5: IP addresses

3.2.3 IPv4 Addressing

IPv4 is a 32 bit address which is displayed in dotted decimal notation.

In this, the five classes of IP addresses, which are class A, B, C, D, and E, are defined by TCP/IP. Each class has a unique set of valid IP addresses.

The class is determined by the value of the first octet. Host address uses the first three classes of IP addresses (A, B and C). The remaining two classes are used for other purposes such as class D for multicast and class E for experimental purpose.

The following table represents different types of classes used in IPv4 addressing:

Class	Leading Bits	Number of Networks	Address per Network	Start Address	End Address
Class A	0	128 (2^7)	16,777,216 (2^{24})	0.0.0.0	127.255.255.255
Class B	10	16,384 (2^{14})	65,536 (2^{16})	128.0.0.0	191.255.255.255
Class C	110	20,97,152 (2^{21})	256 (2^8)	192.0.0.0	223.255.255.255
Class D (multicast)	1110	Not defined	Not defined	224.0.0.0	239.255.255.255
Class E (reserved)	1111	Not defined	Not defined	240.0.0.0	255.255.255.255

Activity

Find out the network address and host address for the given IP addresses.

IP Address	Network Address	Host Address
10.10.48.80		
28.212.250.254		
10.10.250.1		

UNIT 3.3: Wireless Network

Unit Objectives



At the end of this unit, you will be able to:

- Define wireless network
- Identify different types of wireless networks
- Define bluetooth

3.3.1 Wireless Network

A wireless network uses wireless connections between two network nodes. Wireless networking helps to avoid the costly process of setting up cable connections in a building. Examples of wireless network are Bluetooth, cellular network and so on.

Types of Wireless Network

Wireless networks are classified on the basis of the coverage area or span (range) in which they can operate.

Wireless Local Area Network (WLAN)

WLAN is used to connect two or more devices that are available over a short distance. A wireless distribution method is needed to set up a WLAN. It gives a connection for accessing the Internet through the access point. It is utilized to associate network connection in two or more buildings without introducing a wired connection. The following figure shows WLAN:



Fig. 3.3.1: WLAN

Wireless Wide Area Network (WWAN)

WWAN is used to connect different devices over a large area. It covers a large geographical area using wireless technology.

The following figure shows WWAN:

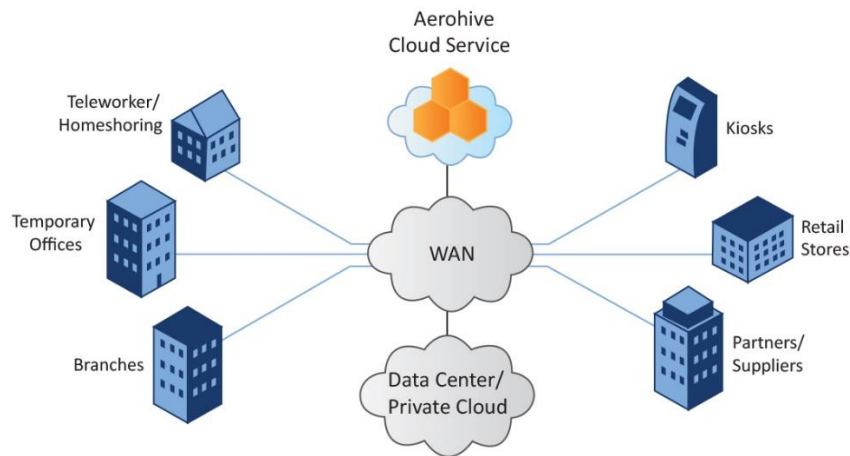


Fig. 3.3.2: WWAN

Wireless Personal Area Network (WPAN)

WPAN is a wireless network used to connect devices around an individual's workplace. It spreads within a range of 10 meters (short range). It is used to connect peripheral devices like two computers within the assigned range.

The following figure shows WPAN:

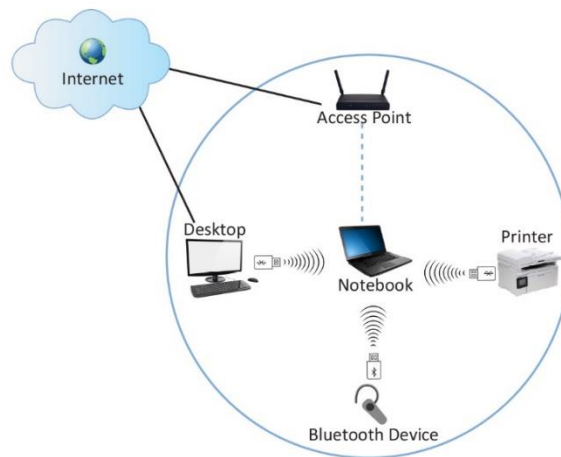


Fig. 3.3.3: WPAN

Standards for WLAN

Institute of Electrical and Electronics Engineers (IEEE) has set a few standards for WLAN, some of which are as follows:

- IEEE 802.11
- IEEE 802.11a
- IEEE 802.11b
- IEEE 802.11g
- IEEE 802.11n

- IEEE 802.11ac

Bluetooth

Bluetooth provides a wireless technology standard to exchange data from any fixed or mobile device over a short distance and thus build a personal area network (PAN).

The specifications of bluetooth are:

- Range: 3-6 meters
- Low-speed
- Operating frequency: 2.5 GHz

Using this technology, a user can talk and listen on the Bluetooth headset while the phone is in the pocket of the user. Bluetooth cannot operate on high bandwidth for devices like printer but can be used for a wireless mouse.

IEEE organization has developed the standards for Bluetooth which is 802.15.

The following figure shows a Bluetooth headset:



Fig. 3.3.4: Bluetooth

UNIT 3.4: Cables and Connectors

Unit Objectives


At the end of this unit, you will be able to:


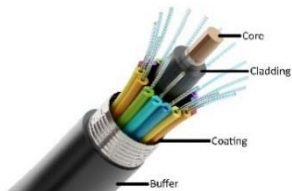

- Define cable and its types
- Explain connectors
- Describe the process of crimping



3.4.1 Cables

Cable form the transmission media for a network. Transmission media or channels, also known as links, lines or path, are used to interconnect the nodes in a network. Transmission channels are of different types of communication wires and cables such as coaxial/helix cable, optical fibre cable, twisted pair cable and cross over cable.

The following table lists different types of cables used in networking:

Type of Cable	Image	Description
Twisted pair		<p>Have two conductors that are twisted together to cancel out the electromagnetic interference that may come from external sources. This type of cable is almost the same as a paired cable. The difference is in the two twined inner wires which are insulated unlike the paired cable.</p> <p>Used for transmission of data over networks such as, LAN.</p>

Coaxial/Helix cable		<p>Has a thin conducting wire inside a tubular conducting shield, which is protected by a tubular insulating jacket.</p> <p>Used to connect video equipment and carry television signals.</p>
Optical fibre cable		<p>Contains one or more optical fibres for carrying light. The optical fibres are coated with plastic layers and secured in a protective tube.</p> <p>Used for long distance communication.</p>
Optical fibre cable (Single Mode)		<p>Has small sized diametric core and permits a single mode of light to propagate through it. As a result, it reduces the number of light reflections when the light passes through the centre. This decreases the attenuation and enables the signal to travel further.</p> <p>Used for a long-distance coverage with a very high bandwidth requirement.</p>

Optical fibre cable (Multi Mode)		<p>Has big diametric core and permits several modes of light to propagate through it. The number of light reflections formed when the light passes through the centre are more. This enables larger quantity of data to pass through at a given time. The strength of the signal decreases over long distances because of the increased dispersion and attenuation.</p> <p>Used for backbone applications in buildings because of the reliability and high capacity.</p>
Cross over cable		<p>Connects computing devices, often of the same type such as two switches.</p>

3.4.2 Connectors

There are various connectors used for connecting cables in networking as shown in the following figure:



Fig 3.4.1: Connectors

3.4.3 Crimping

Crimping means joining of two pieces of metal, generally a wire and a connector, together by deforming one of them and enabling one to hold the other. The resultant deformity is known as a crimp. The following image shows the various steps involved in crimping:

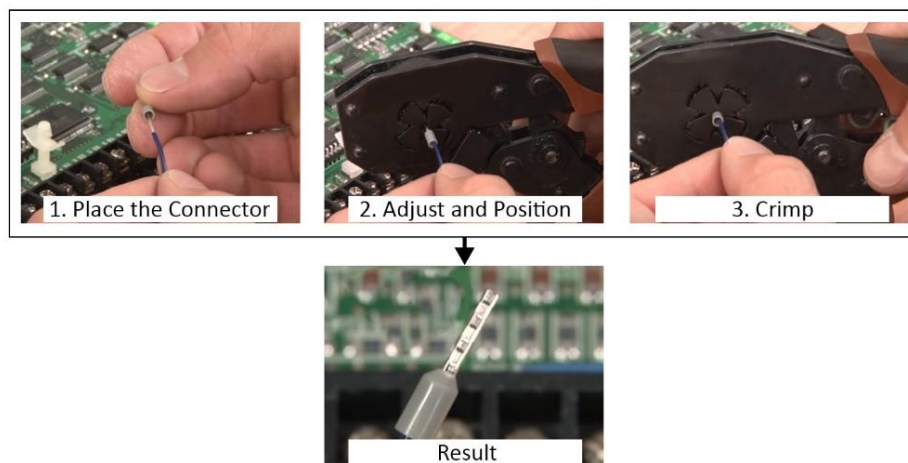


Fig. 3.4.2: Crimping



- In case of crimping, pliers should not be used as the deformity cannot be formed properly.
- If there is air in between the crimp and the connector, it collects moisture. This eventually causes corrosion in the wire and can lead to a connection failure.

Steps for Crimping RJ45 Cable

For crimping RJ45 cable a colour code of the internal wires is to be followed.

- To make a straight cable, the colour code is listed in the following figure:

Orange-White

Orange

Green-White

Blue

Blue-White

Green

Brown-White

Brown

Fig. 3.4.3: Color code for crimping RJ45 straight cable

- To make a crossover cable, the colour code is listed in the following figure:

Green- white

Green

Orange-White

Blue

Blue-white

Orange

Brown-White

Brown

Fig. 3.4.4: Color code for crimping RJ45 crossover cable

The steps for crimping RJ45 cable are as follows:

Step 1: Strip 2 inches of the outer cover from the cable end with a utility knife as shown in the following figure:

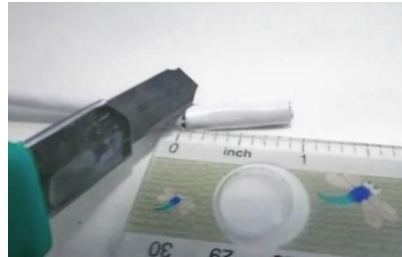


Fig. 3.4.5: Stripping the cable

Step 2: Pull the twisted pairs of wires backward and cut the core as represented in the following figure:

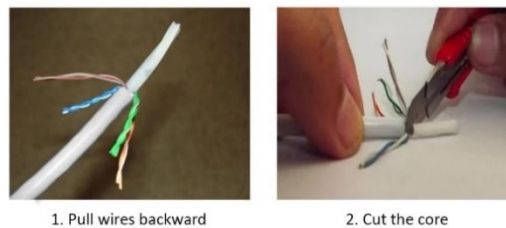


Fig. 3.4.6: Cutting the core

Step 3: Make the twisted wires straight using tweezers and keep them arranged in a row as shown in the following figure:

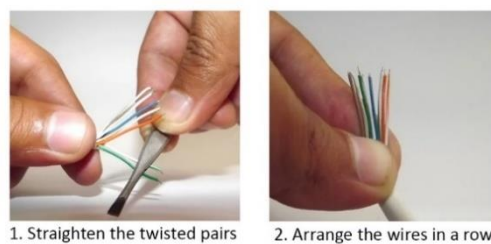


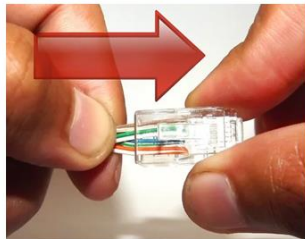
Fig. 3.4.7: Straightening and arranging the wires

Step 4: Place the untwisted wires in a position from right to left according to the color code of the wires and then trim the wires up to a suitable length as shown in the following figure.

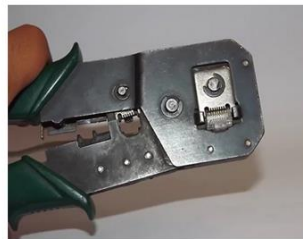


Fig. 3.4.8: Trimming of wires

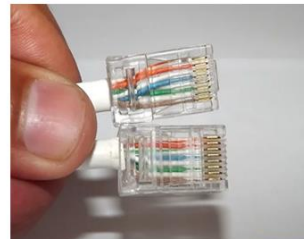
Step 5: The wires are to be inserted into RJ-45 connector. RJ45 connector must be crimped to the cable using a crimping tool by compressing the jacket as well as the cable into the connector in such a way that the wedge at the base of the connector is pushed into the jacket as shown in the following figure:



1. Insert into connector



2. Crimp



3. Result

Fig. 3.4.9: Crimping the connector

Activity

Identify the different cables and write down their name in the box given below:

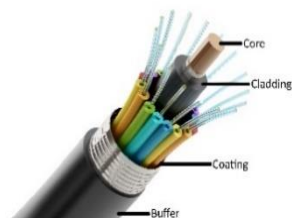
1.



2.



3.



4.



5.



4. Installing Hardware and Software



Unit 4.1 – Installing hardware

Unit 4.2 – Configuring and setting up peripherals

Unit 4.3 – Completing the Installation Process



Key Learning Outcomes



At the end of this module, you will be able to:

- Install the hardware
- Configure and set up peripherals
- Set up the software
- Verify the installations

UNIT 4.1: Installing Hardware

Unit Objectives



At the end of this unit, you will be able to:

- Explain the installation procedures
- Identify the specifications for setting up the system
- Check site conditions and customer requirements
- Connect the system
- Follow standard operating procedures

4.1.1 Installation Requirements – Reading Product Manuals

A field technician is responsible for visiting a customer's site, reading the product or equipment manual and understanding how the equipment works and should be installed. Reading the manual plays a vital role in the correct installation/repair of the product. One of the common causes of non-functioning of components of a system may be its improper installation, which may happen due to non-compliance of user manual instructions. Hence, it is important for a field technician to always follow the process and guidelines mentioned in the product manual.

Product manuals, also known as user manuals, contain all essential information for the user to make full use of the computer system. They include a description of the system functions and capabilities, contingencies and alternate modes of operation and step-by-step procedures for system access and use.

A user manual generally has five sections. The following figure shows the five sections of a user manual:

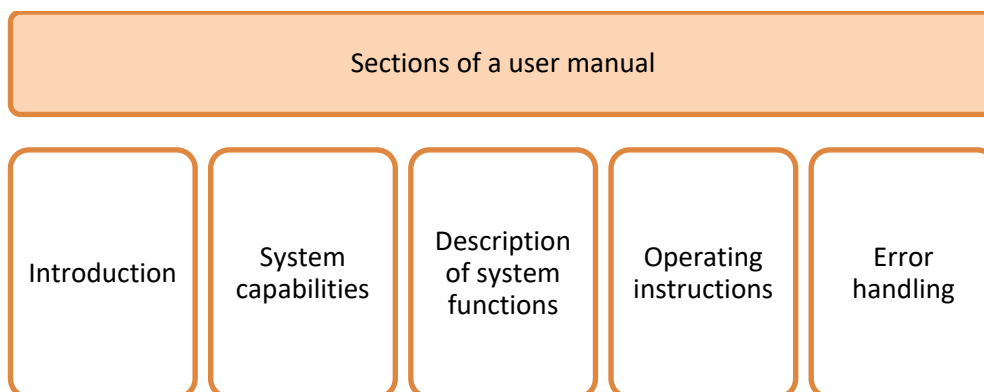


Fig. 4.1.1: Sections of a user manual

There is a help facilities section also available in the manual which describes a help desk facility that the user can contact for error resolution. Help desk telephone numbers are also included.

There are various sections in a typical help book of particular equipment. As a procedure for installing equipment and devices, the field technician should educate and inform the customer about the various help and user tips that can be referred to by the customer when using the system/equipment.

4.1.2 Specifications for Setting up a System

To be utilized productively, all computer software need certain hardware components or other software assets to be available on a computer. These essentials components are known as computer system necessities and are frequently utilized as guidelines as opposed to an absolute rule.

Most of the software specifies two types of system necessities that are the minimum requirements and are recommended. With expanding interest for higher processing power and assets in latest versions of software, system necessities need some increment after some time. Industry experts recommend that this pattern has a greater influence in driving upgrades to existing computer systems than technological advancements.

Some manufacturers of software often provide the consumer with a set of requirements that are different from those that are needed to run usual software. These requirements are generally known as the recommended requirements. They are always at a level above that of the minimum requirements. They show an ideal situation which is required to run the software.

It is also recommended that a field technician, prior to a client visit, checks the site conditions. This will help in the analysis and identification of the actual conditions at a customer's site.

4.1.3 Setting up the System

There are certain steps involved in complete setting up of a new system or new networking device. The following figure lists the main steps involved in a system set up:

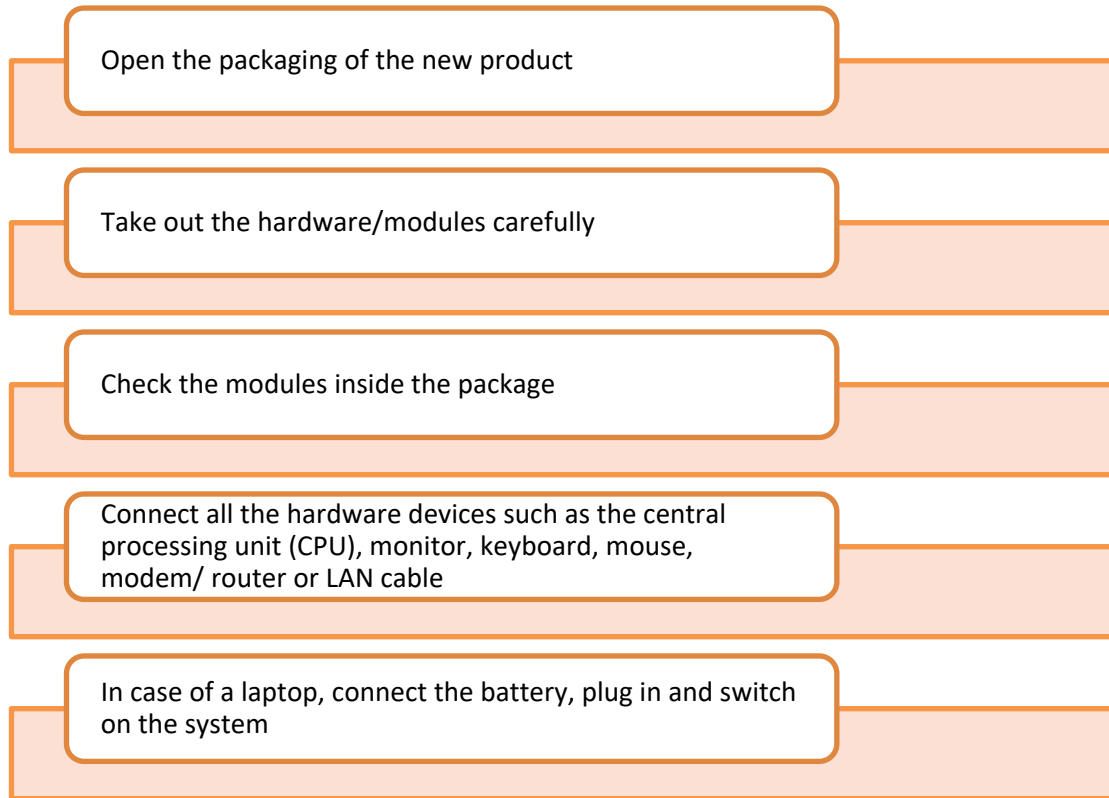


Fig.4.1.2: Steps involved in setting up a system

Open the Packaging

After getting the system to the site, remove the package carefully and check the modules inside it. They should match the checklist.

For example, the following figure represents the steps involved for unpacking the system to ensure proper installation of a new desktop computer:

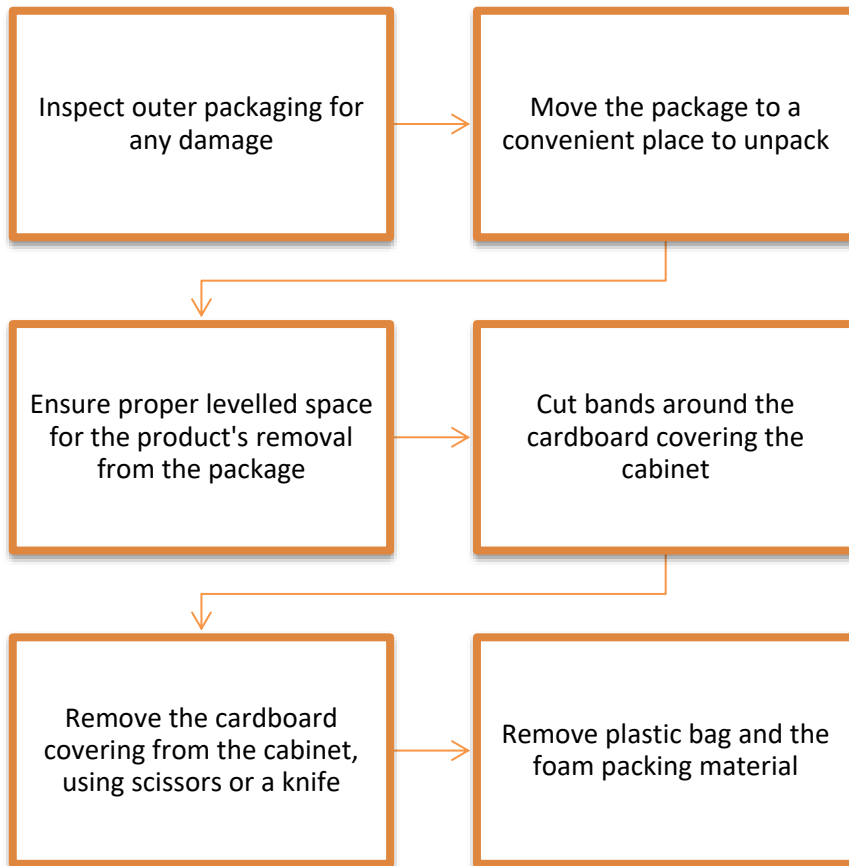


Fig. 4.1.3: Steps for unpacking a system

The tools used for handling and unpacking the system are shown in the following figure:

Utility knife



Cutter



Fig. 4.1.4: Tools used in handling and unpacking a system

Take out the Hardware/Modules

Take out all the hardware/modules carefully from the package. Check and understand the symbols on the package to know about the cautions and warnings related to the installation.

The following figure depicts some common warning symbols along with their meanings:



A triangle with an exclamation mark within it represents a warning or a notice that is important. .



A triangle with a hand that is crossed out is the symbol used to represent a product that is sensitive to electroStatic discharge (ESD).



A triangle with a lightning bolt is a symbol used to represent a warning for the potential of an electrical shock.



An F with two C's represents the FCC and is a symbol found on a package that meets the FCC (Federal Communications Commission) guidelines.



An umbrella icon on a package warns that the contents of the package are sensitive to water and should be protected.



A wine glass with a crack is a symbol used to indicate that the contents of a package are fragile.



One or two arrows with a line underneath them indicate the direction in which the box should be positioned. The line shows the bottom and the arrows point upwards.

Fig. 4.1.5: Common warning symbols on a package

Check the Modules

To ensure smooth installation, the modules inside the package must be checked so that if any module is missing or any damage is found, it can be informed to the company as early as possible. In addition, do the following things:

- Check all the modules for any damage that may be caused during shipping. If any damage is found, it should be reported to the carrier and the dealer
- Check for any cracks or depressions on the monitor screen
- Match the accessories against the delivery checklist

Connect all the Hardware Devices

After checking all the modules, the next step is to connect all the hardware devices such as mouse, keyboard, Ethernet and so on to their respective ports. Computer ports are connecting points which act as an interface with peripheral devices, which work to communicate with the computer. For making the connection, correct identification of these ports is necessary. These ports are usually located at the backside of the CPU (in case of desktop computers). The following image shows the different connection ports for connecting mouse, keyboard, USB and so on:

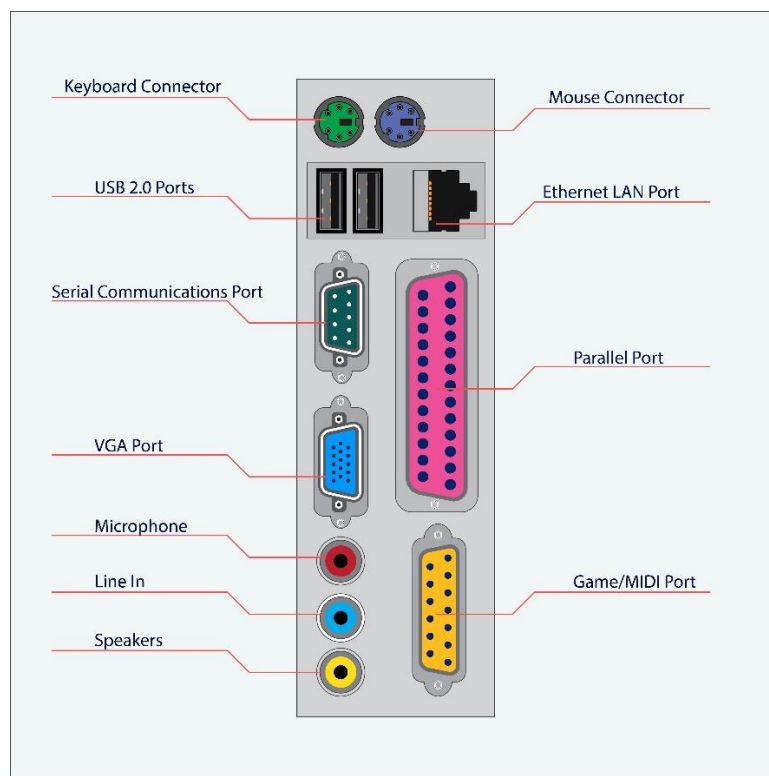


Fig. 4.1.6: Different connection ports in a desktop computer

In the case of laptop computers, the keyboard is attached to the monitor and other connection ports are located on the side of the laptop as shown in the following image:



Fig. 4.1.7: Different connection ports in a laptop computer

Provide Power Source

The last step of the assembling process is to provide power to the computer. In case of a desktop computer, the power can be provided by simply inserting the power plug into the socket and turning it on. In case of laptops, first the battery should be placed into its correct location. It needs to be charged after getting drained. For this purpose, an adapter is used, which generally comes along with the laptop.

4.1.4 Standard Operating Procedures

Standard operating procedures provide a stable platform for performance measurements. All companies, be it small or large, have documented work standards to ensure consistent progress. It is the responsibility of the field technician to follow these standards. The technician should adhere to work standards to meet the targets and achieve sustainability in the workplace. The technician should also follow the safety standards to stay safe while working with electrical and electronic components.

The following figure lists a few standard operating procedures for a field technician:



Fig. 4.1.8: Standard operating procedures for a field technician

ESD

ESD is the sudden build-up of static electricity when two differently charged objects are brought together. While installing and repairing electronic products, ESD is one of the issues that arise, as it can cause damage to the electronic devices and components.

The following figure represents some causes of ESD:

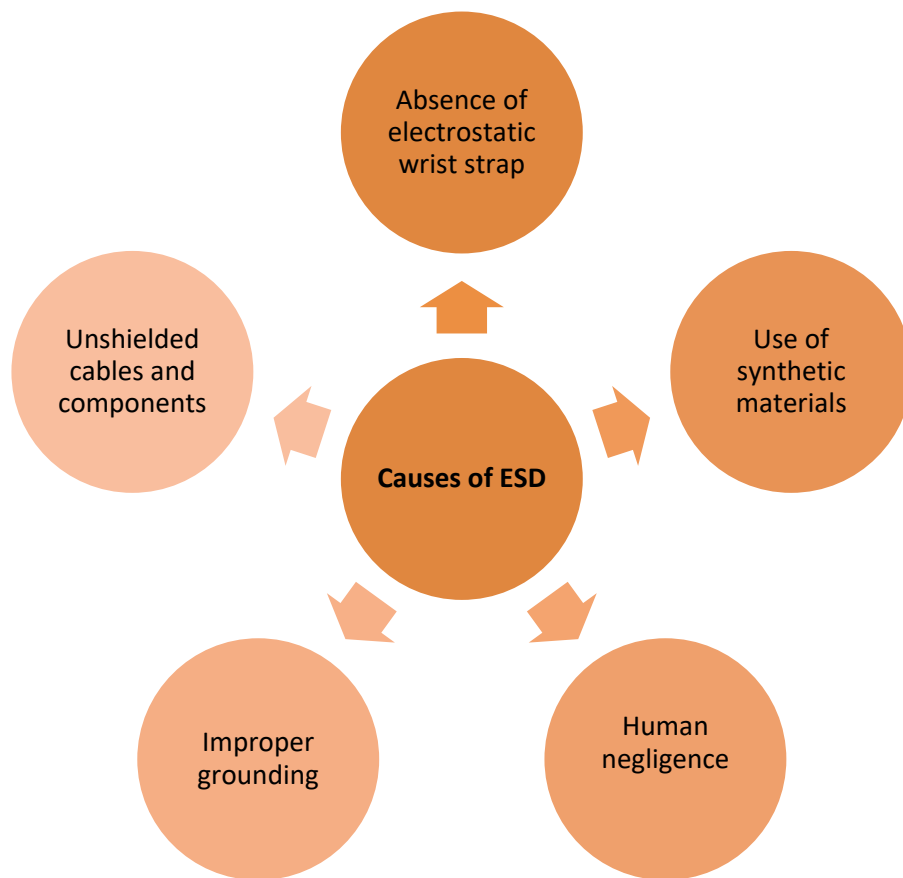







Fig. 4.1.9: Causes of ESD

Activity

Match the following:

- | | |
|--|--|
| 1.  | a. The contents of the package are sensitive to water and should be protected. |
| 2.  | b. A package that meets the FCC guidelines |
| 3.  | c. A product that is sensitive to ESD. |
| 4.  | d. A warning for the potential of an electrical shock. |
| 5.  | e. A warning or a notice that is important. |

Practical

A customer has recently purchased a new hard disk for his computer since the old one had crashed. Perform a task of installation of new hard disk to the computer.

Component:

Hardware:

1. Phillips and flat blade screwdrivers (small and medium size)
2. A 3-claw part grabber
3. A chip inserter and chip extractor
4. A TORX head screwdriver
5. A 1/4" and 3/16" nut driver
6. A container to hold small parts and screws

Software:

1. Operating system
2. Bootable disk with FDISK.EXE and FORMAT.COM copied onto disk
3. Disk Manager

Practical

Perform the task of Installation of a Network Interface card in a new desktop system in the network.

Hardware:

1. Phillips and flat blade screwdrivers (small and medium size)
2. A 3-claw part grabber
3. A chip inserter and chip extractor
4. A TORX head screwdriver
5. A 1/4" and 3/16" nut driver
6. A container to hold small parts and screws
7. A computer system

UNIT 4.2: Configuring and Setting up Peripherals

Unit Objectives

At the end of this unit, you will be able to:

- Identify the customer's peripheral requirements and their placement
- Connect all the peripherals
- Install the peripherals

4.2.1 Customer Requirements

Understanding the needs of a customer is one of the foremost responsibilities of a technician's job role. This includes the following practices:

- Greet the customer and talk politely
- Understand the customer's requirement
- Provide the best possible and cost effective solution to the customer
- Ensure that the customer is satisfied with the service

When work is allocated, it is important for the field technicians to understand and analyse the requirement before going ahead with the plan of action or visiting the customer's site. This means that they should be able to understand what their customers want and also know how to satisfy their needs. They need to know how to deal effectively with the customers.

Requirement of some customers is such that they ask for additional peripherals apart from those which are provided by the manufacturer. A few of the peripherals which they want are printers, scanners, webcams, microphones, tape drives and speakers. It is important to understand which peripherals should be carried while visiting the customer's site. This can be achieved by talking to the customer prior to the visit.

Further, the technician should place all the peripherals as per the customer's need. Primarily, the field technician must listen to the customer, even if the viewpoint is the same – let the customer vent it off. After the customer has finished, express feeling and then respond accordingly.

Provide immediate response to the problem reported by the customer, if possible. At times, it may mean bending the rules, but customer satisfaction is the key to success and going out of the way can hit the nail on its head.

4.2.2. Connecting and Installing the Peripherals

After the correct placement of the peripherals, the next step is to connect them with the computer. Most printers, scanners, speakers and other peripheral devices are connected to

the system via USB ports. The following figure shows how to connect various peripheral devices to the system:

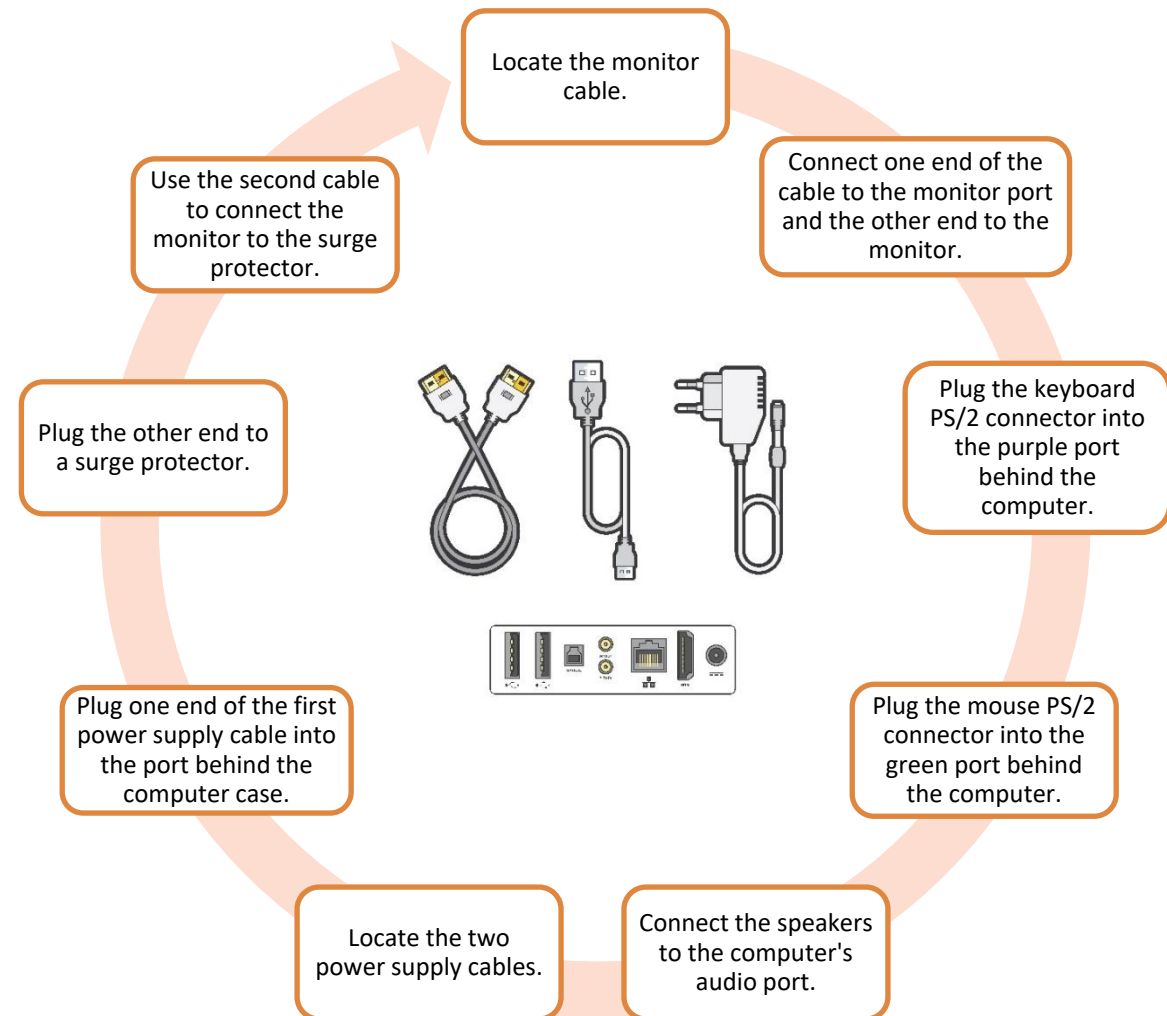


Fig. 4.2.1: Connection of peripherals

Installing a Printer

A typical printer includes components such as a cord, cable, ribbon and cartridges. Papers placed in the printer's tray are a part of the printing stationary and not of the printer.

The following figure lists the steps to install a printer:

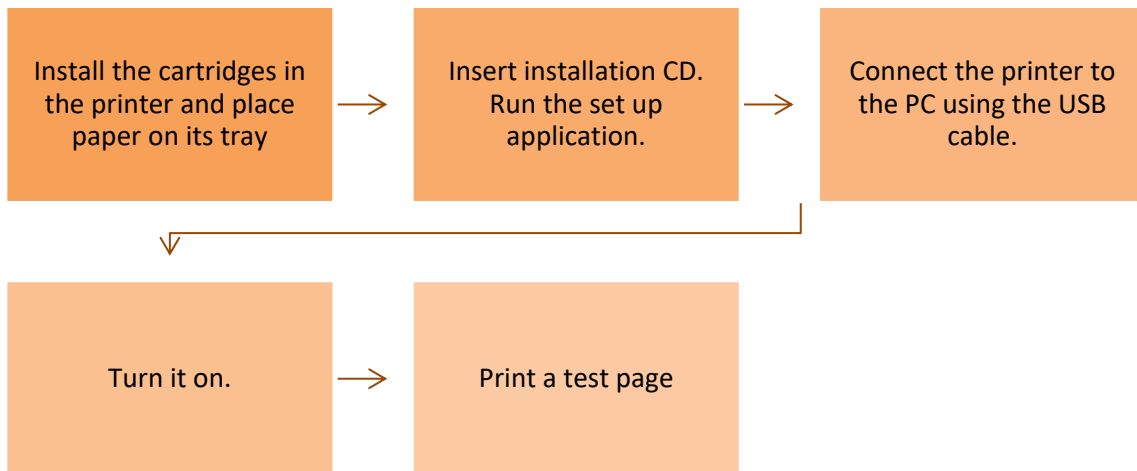


Fig. 4.2.2: Steps to install a printer

Installing a Scanner

The following figure lists the steps to install a scanner:

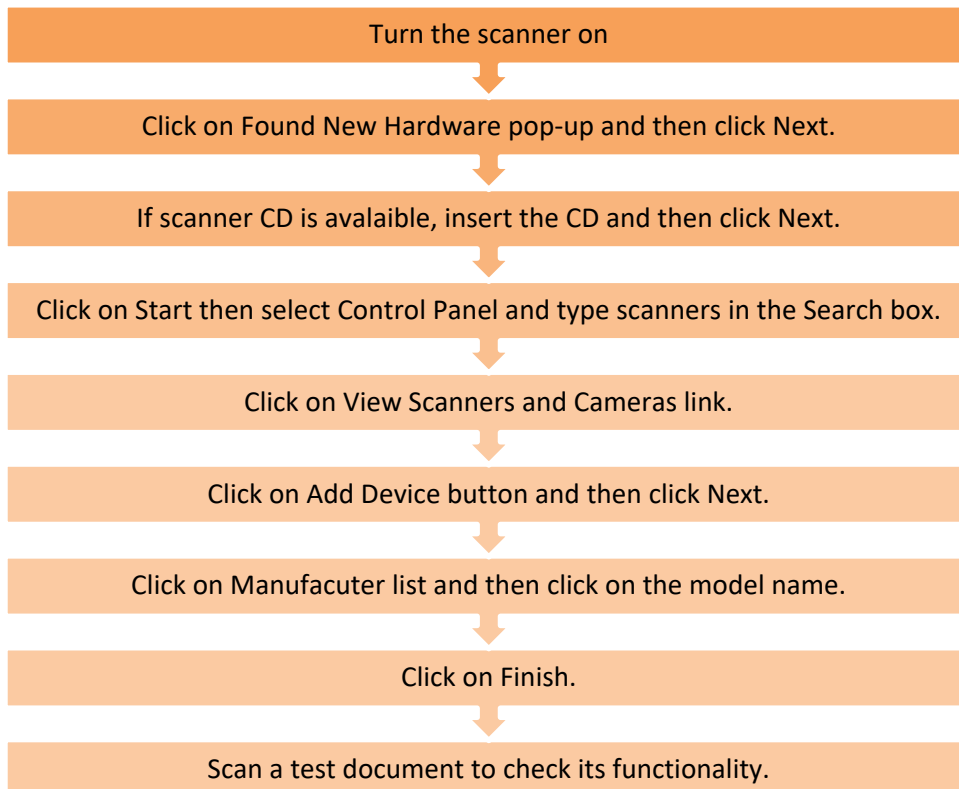


Fig. 4.2.3: Steps to install a scanner

Installing a Webcam

A very small amount of user input is required to install the modern webcams. Most of the webcams automatically get installed after being plugged in. If they do not get installed automatically, then the driver file from the manufacturer's website needs to be downloaded. The following figure lists the steps to install a webcam:

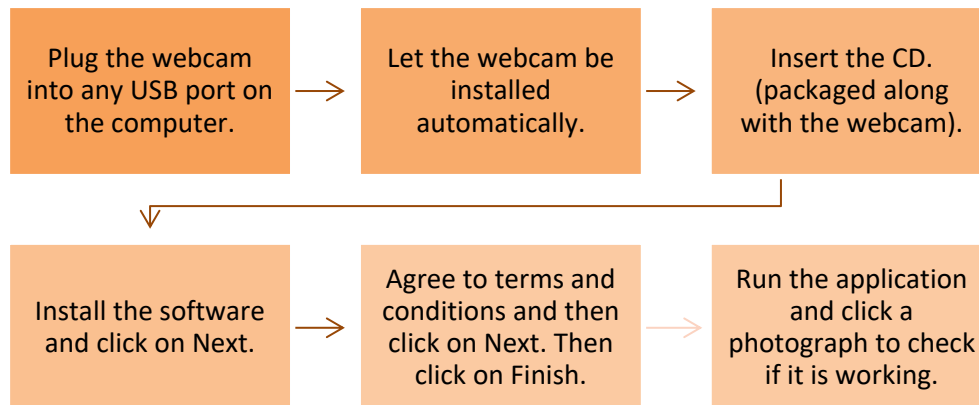


Fig. 4.2.4: Steps to install a webcam

Installing Speakers

There are two types of speakers that can be installed in a system, USB speakers and headphone jack speakers. The following figures list the steps to install both the types of speakers:

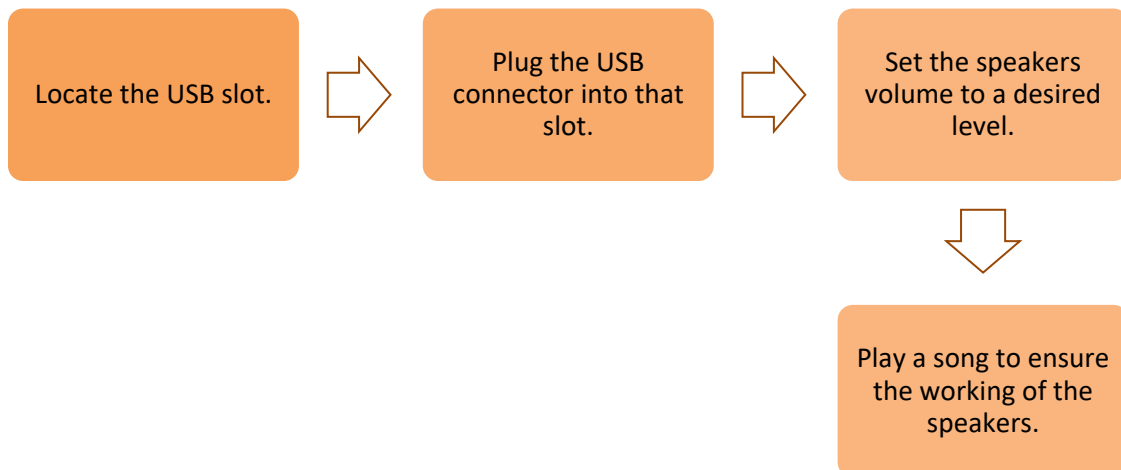
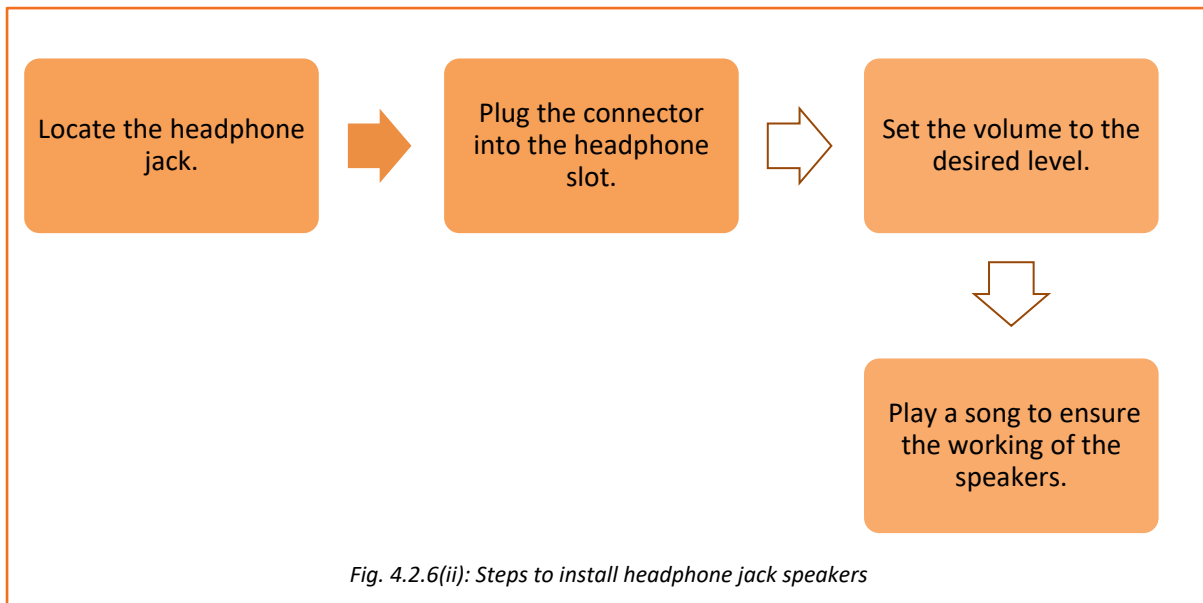


Fig. 4.2.6(i): Steps to install USB speakers



4.2.3. Installing Software

Software is a part of a computer which helps the hardware to function properly. It also helps the input/output devices to communicate with the CPU. It comprises of the operating system along with various programs of the computer.

A field technician is responsible for installing the operating system software on the customer's system. Prior to the installation process, it is mandatory to check the system requirements which include the storage capacity of the hard disk and random access memory (RAM). In addition, he/she should be able to install additional software as per standard customer requirement.

Installing the Anti-Virus Software

Antivirus software, also referred to as anti-malware software, is a software that helps to prevent, detect and remove unwanted, malicious software from a computer. Malicious software or malware is used to harm the computer and disrupt its functioning with the intention of gathering personal information from it. In the absence of good antivirus software, hackers can infect the computers with malware and steal sensitive data such as passwords, personal data and identity.

The following figure shows the steps for standard antivirus installation:

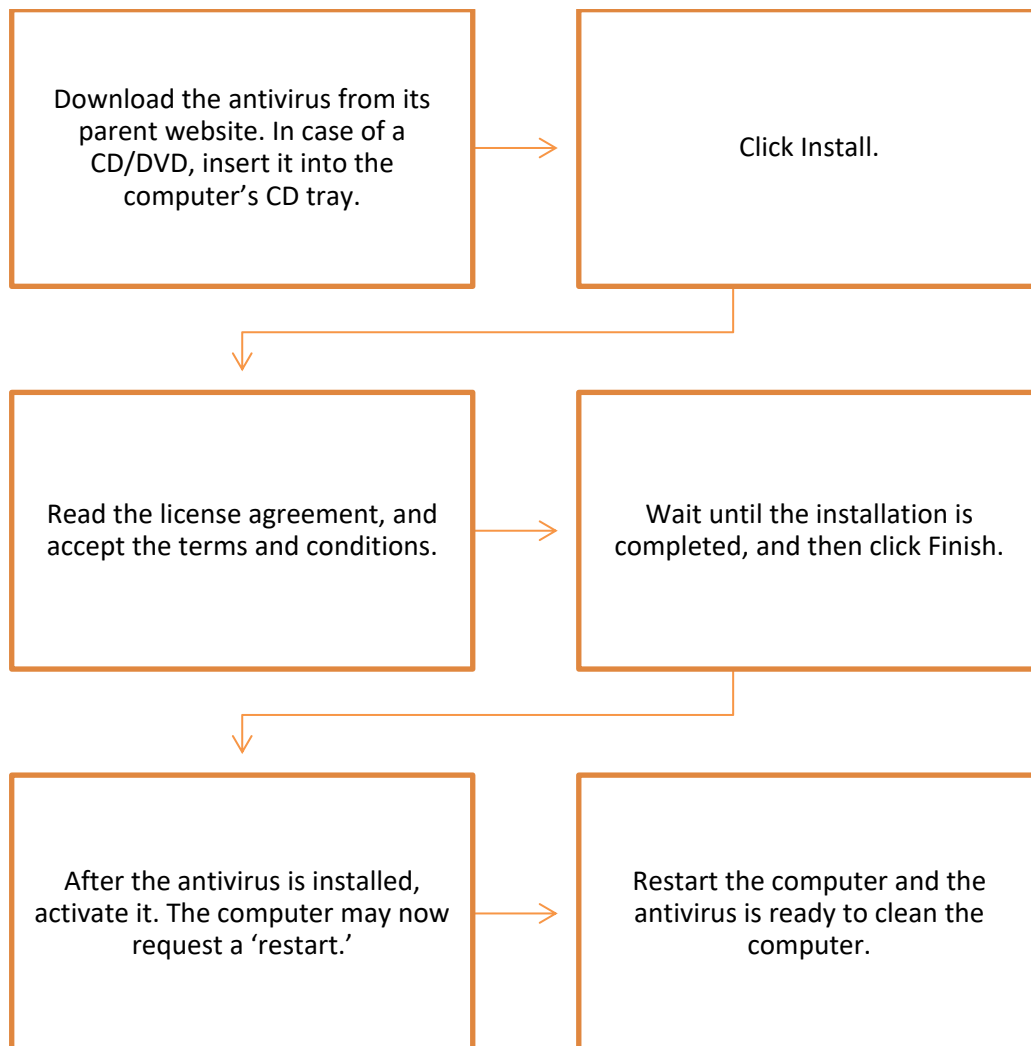


Fig. 4.2.7: Steps for standard antivirus installation

4.2.4. Safety Procedures

The field technician must adhere to the safety procedures. There are certain guidelines that must be followed to ensure own safety and that of the co-workers. These guidelines provide a sound, safe and flexible environment to work.

The following figure explains the general safety guidelines that must be followed by a field technician:

Check if the tools and equipment are in a good working condition

Wear personal protective equipment

Keep the work area clean and free from clutter

Maintain proper body posture at work

Follow safety rules and guidelines

Report any breach of safety

Fig. 4.2.8: Safety procedures

Practical

Perform the steps to install a printer and connect it to a desktop. Test its functioning after installation.

Equipment:

- Working system/Desktop
- Printer and cartridges
- Paper

Hint:

The participant must be able to perform the following steps:

- Install the cartridges in the printer and place paper on its tray
- Insert installation CD. Run the set up application.
- Connect the printer to the PC using the USB cable.
- Turn it on.
- Print a test page

Practical

Perform the steps to install Microsoft Office (MS Office) 2016 on Windows 10.

The participant must be able to perform the following steps:

1. Start the system.
2. Insert the MS Office media disc into the DVD drive.
3. The Windows will launch setup automatically.
4. Enter the product key when prompted and click "Continue." Read the license terms and then check "I Accept the Terms of This Agreement."
5. Click "Continue."
6. If there is a need to install some of the products, click "Customize."
7. Select the first program or tool from the list.
8. Repeat the previous steps for each application or feature.
9. Click "Install Now" to install MS Office on the laptop.

Activity

While testing the laptop you realize that it is not giving audio output. How would you troubleshoot the problem?

Components:

- System with faulty sound card
- Flat/Phillips screwdrivers
- Screws
- Sound card
- Correct drive cables [Integrated Drive Electronics (IDE) or Small Computer System Interface (SCSI)]
- Audio cable to attach CD-ROM drive to sound card
- Installation disk for the new sound card

UNIT 4.3: Completing the Installation Process

Unit Objectives

At the end of this unit, you will be able to:

- Check the functioning of the system
- Check the functioning of the installed software such as antivirus
- Ensure product functions are tested
- Provide demo to the customer
- Resolve customer queries
- Take feedback from the customer

4.3. 1 Check the System's Functioning

After installing all the required peripherals and software, it is mandatory to check the working of the system, to identify problems (if any) and to ensure its smooth functioning. For computing and display systems, keeping a check on problems at the initial stage ensures the longevity of hardware and software applications. The following figure lists some basics questions that must be answered to ensure the proper functioning of a system:

Is the computer switching on?

Are there any error messages?

Has any new hardware or software been added?

Has the computer been shifted?

Have there been any power outages or electrical storms?

Have all the power cords been reconnected and checked?

Is it a hardware/software issue?

Is there any malware or virus in the computer?

Fig. 4.3.1: Basic questions to answer to ensure the system's proper functioning

In addition, testing should also be performed to check the performance of a system as shown in the following figure:

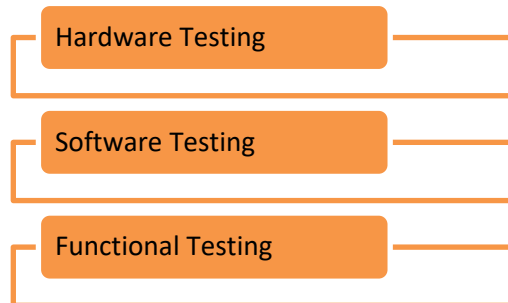


Fig. 4.3.2: Testing required for checking the system's functioning

Hardware Testing

Hardware failures are responsible for problems, such as the computer not getting switched on by the user, getting overheated or appearance of a blue screen. A computer can function only when all the components work well together. Consider a scenario; there is a broken hard drive due to some physical damage, which implies that it does not work. Alternatively, the computer is slow or gives an error message on the screen informing that one of the hardware components is having an issue.

As compared to software issues, hardware issues are harder to tackle, as a process is needed to find out exactly which component is not working properly. Hardware diagnostics is run on most computers. It is used to check the health of the system and detect faults in normal operations of computers.

Software Testing

When testing the software of a computer, the field technician should ensure that correct drivers are installed on that system. The technician should know how to use hardware troubleshooter, how to configure a device and how to download as well as install and update device drivers.

To run the Hardware and Devices Troubleshooter in Windows 7:

1. Select the Start button and click on Control Panel
2. Type 'troubleshooter' in the search box and click on Troubleshooting
3. Select Configure a device under Hardware and Sound tab

To download and install a driver:

1. Select the Start button, enter "device manager" in the search box, and then click on Device Manager.
2. Find the device that needs to be updated.
3. Double-click on the device name.
4. Click the Driver tab and select Update Driver.

To update a device driver using windows update:

1. Select the Start button, type "Windows Update" in the search box
2. Select Windows Update
3. In the left pane, click on Check for updates
4. Select the updates that need to be installed. Then select the check box for the driver that needs to be installed, and then select OK.
5. On the Windows Update page, select Install updates.

Functional Testing

Functional testing can be done at the end. This implies that the computer should be used as desired and then checked to see if its performance is up to expectations. For example, boot up the computer and browse the internet after connecting it to a network through a wireless fidelity (Wi-Fi). This action will check the working of the browser, the functionality of the Wi-Fi hardware and the configuration of the network connection.

4.3.2 Check the Functioning of the Installed Software

After installing the software, it is mandatory to check its functioning. If there is any software problem, it will manifest itself into various issues: freezing of the computer, pages not getting loaded, glitches during playing games or movies from the computer. A computer needs device drivers to perform these functions. If the correct drivers are not installed, it will lead to software issues. The only way to resolve such a situation is to install correct drivers followed by re-installing the software or upgrading the Windows program.

Check the Functioning of an Anti-Virus Software

The typical steps to run an antivirus are shown in the following figure:

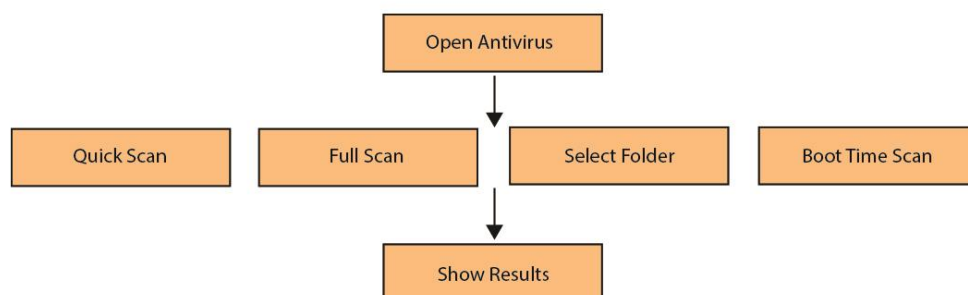


Fig. 4.3.3: Steps to run antivirus software

Open the antivirus user interface by double-clicking the icon on the computer and select any of the following options:

- Quick scan - This will guide the antivirus to perform a scan on an area on the computer most susceptible to malware infection.

- Full scan – This performs an in-depth scan of the computer. All the files are scanned. It can take time to complete as it is a detailed scan.
- Select folder scan – If malicious files are only in a particular folder, select the folder(s) and perform the scan either on the specific folder or multiple folders.
- Boot-time scan – Some viruses are in the system but they do not show up after the computer is started. Perform a boot-time scan to detect and remove such viruses while booting.

After the scanning is complete (irrespective of the option), a notification will appear with the scan result. If threat(s) is detected, click 'show result' to view the automatic action taken by the software. Action on a threat(s) can also be taken manually.

Providing Guidance to the Customer

Demonstrating a product is a way of promoting or showing the operation of equipment to the users. The goal of demonstrating the workability of equipment, such as a newly installed desktop, peripheral device, software or hardware, to the customer is to make them aware of the operation of that equipment and answer their queries related to its operation.

There is nothing better than a good demonstration session. It is only after a demonstration (demo) that the users understand the operation of particular equipment.

There are a few rules which must be considered while preparing for the demo. The following figure lists these rules:

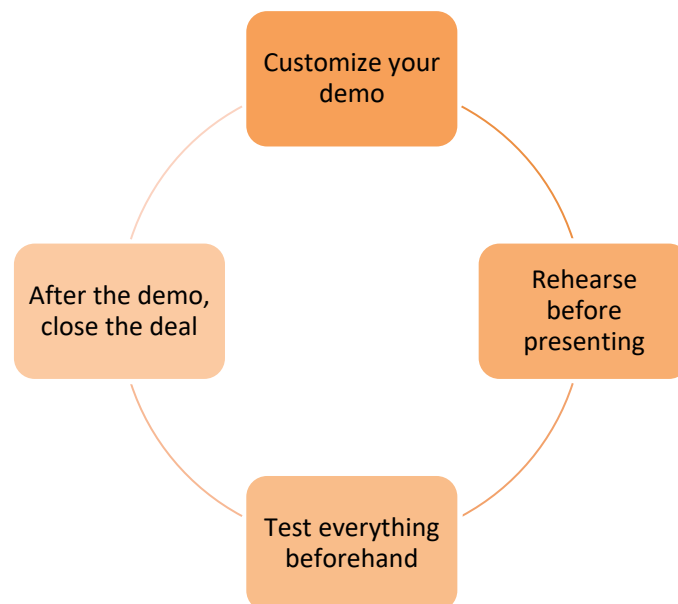


Fig. 4.3.4: Rules to be followed to prepare for an effective demo

In addition, it is the responsibility of a field technician to make the customers aware of the user manual and tell them how to read it.

It can be a user manual which contains instructions for the installation of a software/hardware or it may be a help book giving solutions to common problems that may arise with some equipment. The following figure lists the steps for reading a manual:

Step 1: Determine information	One must be able to determine and read the specified requirement rather than reading the entire document.
Step 2: Scan the document	Scan the document to determine its layout style and get a better idea about the manner in which the content is presented.
Step 3: Find information	Look up for the required information using headings, index or the table of contents.
Step 4: Take notes	It is essential to take notes for any important topic that one may come across while reading the document. Tips and warnings mentioned in the manual should also be noted.
Step 5: Use glossary	A person may come across technical terms while reading the document. Meanings of such terms can be looked up in the glossary section at the end of the manual.

Fig. 4.3.5: Steps to read a manual

Customers can have varied queries and issues. It is the core responsibility of the field technician to respond to them.

Take Feedback from Customer

Just like it is essential to address issues within the facility, it is also important to get feedback of the customer. The customer is always special and the customer's feedback is the most important thing for an organization.

The procedure as shown in the following figure should be followed:



Fig. 4.3.6: Procedure to be followed for taking customer feedback

The time taken to resolve an issue and the difficulties that a customer encountered while communicating the problem should be understood. The misunderstandings observed during the interaction should be clearly documented.

The methods of interaction and behavioural aspects also need to be considered in drawing conclusions after each task or problem handling routine. Getting honest feedback from the clients helps to improve the organizational functioning.

The field technician can get a feedback form filled by the customer at the facility.

The following figure shows a typical template for a customer feedback form:

Customer Feedback Form

Please fill the form. We value your feedback.

Date: _____ Location: _____

Service: Complaint ☐ New Connection ☐

1. How would you rate our service?

Very Good

☐

Good

☐

Poor

☐

2. Did the technician come with all the necessary tools and equipment to do the job?

Yes No

☐ ☐

3. Did the technician behave politely with you?

Yes No

☐ ☐

4. Did the wireman have knowledge of the work to be done?

Yes No

☐ ☐

5. Any suggestion which you would like to share.

Fig. 4.3.7: A sample customer feedback form

Practical

Perform the steps to set automatic updates of an antivirus.

Components:

- Desktop/laptop
- An older version of an installed antivirus

5. Installation and Configuration of Storage and Networking Devices



Unit 5.1 – Installation and Configuration of Networking Devices

Unit 5.2 – Installation and Configuration of Storage Devices



Key Learning Outcomes

At the end of this module, you will be able to:

- Install and configure networking devices
- Install and configure storage devices

UNIT 5.1: Installation and Configuration of Networking Devices

Unit Objectives



At the end of this unit, you will be able to:

- Define networking devices
- Identify networking components
- Define internet, intranet and extranet
- Install networking devices
- Configure networking devices

5.1.1 Networking Devices

Network devices are components which are used to connect computers in a network and other electronic devices to be shared within the network. These shared devices or resources can be printers, fax machines, database servers, and so on. For proper functioning of such devices, it is important to configure and install them properly before their use.

Components of the Network

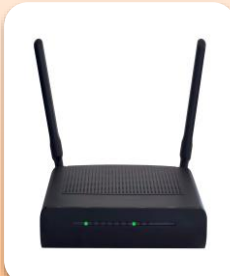
The passage taken by the data packets (message) from its source to destination can be simple as connecting two computers by a single cable or could be complex as a network that stretches to the globe. The platform that supports the network is known as network infrastructure. The main advantage of network infrastructure is that it keeps the communication channel stable and reliable.

The following figure enlists the three categories of network components that network infrastructure contains:



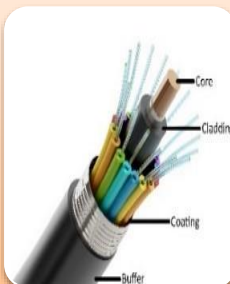
End Devices

- It act as an interface between communication network and users.
- It is also known as host device.
- It can be a source or destination of the information(message) sent over a network.
- Example of end devices are: Network printers, laptop, workstation, mobile devices (tablet, scanner, PDAs).



Intermediate Devices

- It is responsible to interconnect end devices and maintain the flow of data over the network.
- It can connect a host to the network or form a internetwork by connecting a group of networks.
- It uses host address along with the information about interconnection of networks, to sent the message on the correct path.
- Example of intermdiate devices are: firewall, router, switch and bridge.



Media Devices

- It provides a path or channel to transmit information over the network.
- It encodes information into electrical signals, electromagnetic waves or visible light depending upon the media through which it is transmitted over.
- Example of media devices are: fiber optic cables and copper cables.

Fig. 5.1.1: Components of networking devices

The physical components of the network are the devices and the media. Whereas, the hardware of the network constitutes of the components such as system (desktop or laptop), wireless access point (WAP), switch router, cables and so on. At times, many components of the network are hidden for example in case of wireless media, the data packets are travelled through the air (using invisible infrared waves or RF frequency).

In addition, components of the network are utilized to provide services and processes. These services and processes are nothing but the communication programs which is commonly known as software, which runs on the networking devices. An example of the services can be common network applications such as email and web hosting services.

Representation of the Network

Network representation can be defined as a visual representation of devices, which are used to interconnect networks. It is helpful in understanding the complex connections of internetwork.

It can also be defined as a language of networking that uses sets of symbols to represent the networking devices as mentioned above in a large operational area.

The following image represents symbols used for networking devices:



Fig. 5.1.2: Symbols used for networking devices

5.1.2 Internet

Internet is a network that is available globally. Billions of computers and various electronic devices interconnected together, establish the global system of network. It is possible to

communicate with anyone anywhere in the world and get access to any information. The following image shows Internet connectivity around the world:



Fig. 5.1.3: Internet connectivity around the world

Internet can also be described as the wired or wireless communication network with the help of which one can transmit and receive information for single or multiple operations. By using Internet one can browse different websites, download files, pictures and videos, upload files, listen to music, connect with people and do lots of other things.

Working of Internet

Various devices can be connected to a network with the help of physical cables or via wireless connection such as Wi-Fi and 3G/4G. The following image shows how two computers are connected to the Internet:

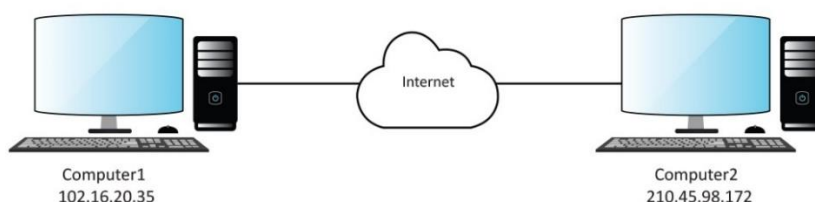


Fig. 5.1.4: Two computers connected through Internet

One computer having IP address 102.16.20.35 is connected to the other computer having IP address 210.45.98.172 via Internet. Internet here can be represented as an abstract object between the two computers. Generally, a cloud symbol is used for depicting Internet.

The following image shows the working of Internet:

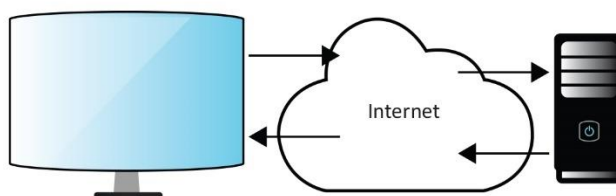


Fig. 5.1.5: Working of Internet

When a website is visited by the user, the browser sends a request to the server over internet. A web server is a computer program which listens to the requests from browsers and executes them. The server after getting the request, locates the required document and returns that to the browser.

Intranet

Intranet is a network of computers that is designed for a group of users. It serves as a private Internet for an organization. The authorized users or the employees of an organization can access intranet from Internet but the number of users is less. For example, intranet is used in an organization to share information with its employees only.

Extranet

Extranet refers to an intranet which can be accessed by authorized users outside the intranet but partially. It enables business to share information in a secure way over the Internet. For example, when an organization wants to exchange some information with another organization such as their customers or vendors, it may provide access to its intranet to the employees of the other organization.

The following image shows the intranet, extranet and the Internet:

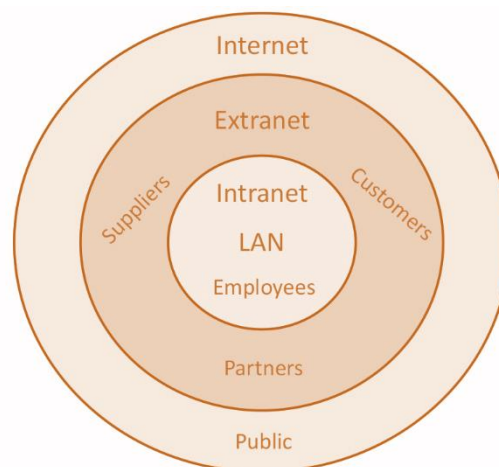


Fig 5.1.6: Intranet, Extranet and Internet

Types of Internet Connection

The Internet access using different types of connections is shown in the following figure:

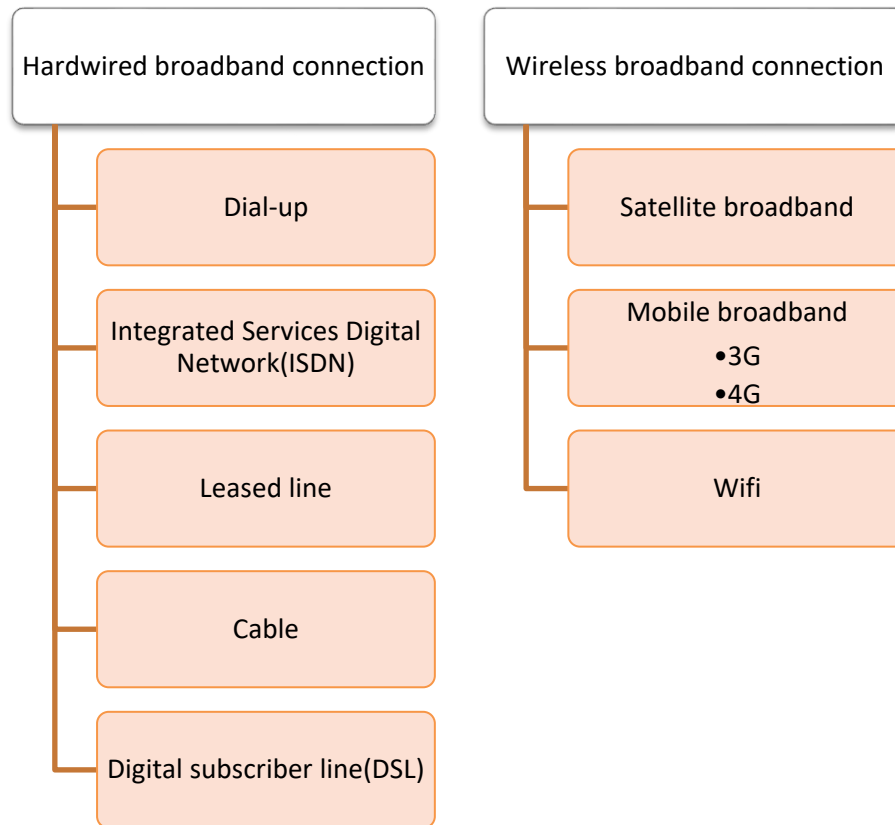


Fig. 5.1.7: Types of Internet connection

Hardwired Broadband Connection

Hardwired broadband connection is set up by connecting the devices with cables. This type of connection is further categorized into:

Dial-up

A dial-up connection is made through modem connected to an active telephone line which is not in use. The phone line is connected to the modem and the other end is inserted into the phone jack. The computer must be configured for the dial-up connection. The user has to dial a specific number that is provided by the ISP to access Internet on the computer.

The following figure shows the dial-up connection:

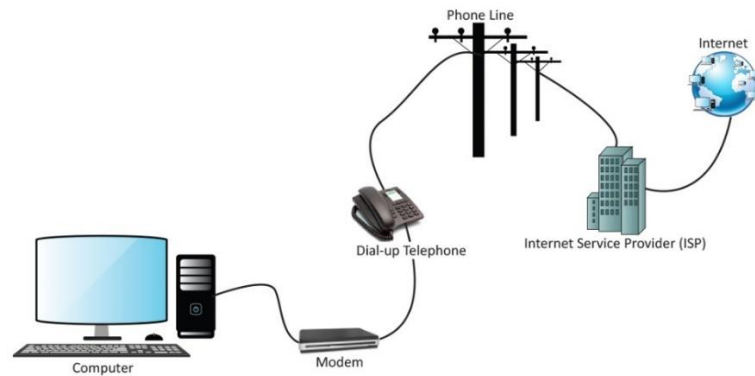


Fig. 5.1.8: Dial-up Internet connection

ISDN

ISDN is a network technology which can transport voice and digital data. Transmission of digital data is carried out over standard phone lines. There are two types of channels in ISDN connection:

- Bearer (B) channel: *B channels* are used for data
- Data (D) channel: *D channels* are mainly used for signalling and control

Various communication services such as voice calls, fax transmissions and so on can be transmitted over ISDN network. The basic ISDN line allows multiple communication devices, having different numbers to simultaneously operate and use parallel connections. End users require special phones or faxes which are capable of making ISDN connections. The following figure shows the ISDN connection:



Fig. 5.1.9: ISDN connection

Leased line

Leased line provides a dedicated connection to the network for all time. It offers symmetric data connection having fixed-bandwidth.

The following figure shows the use of leased line:

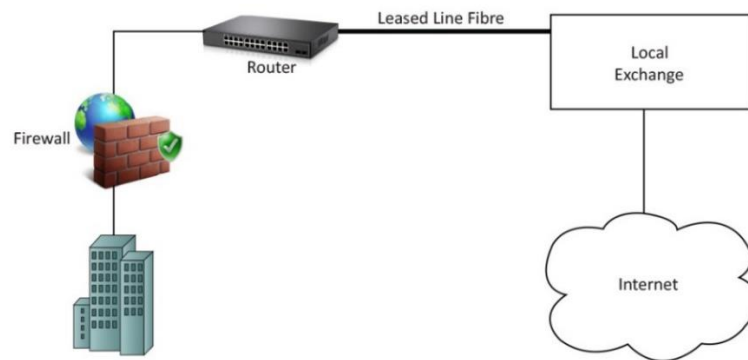


Fig. 5.1.10: Leased line connection

Cable Connection

Cable Internet connection provides access to Internet using a cable modem. Hybrid fiber coaxial cables are used for wiring. It provides network connectivity from the ISP to the end user. The following figure shows the cable connection:

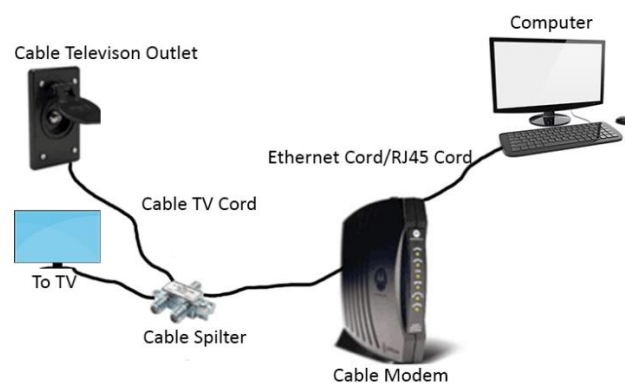


Fig. 5.1.11: Cable Connection

Digital Subscriber Line (DSL)

DSL can be operated using a single telephone line but normal use of the telephone is not affected during the use of Internet.

The following figure shows the use of DSL line for making a connection:

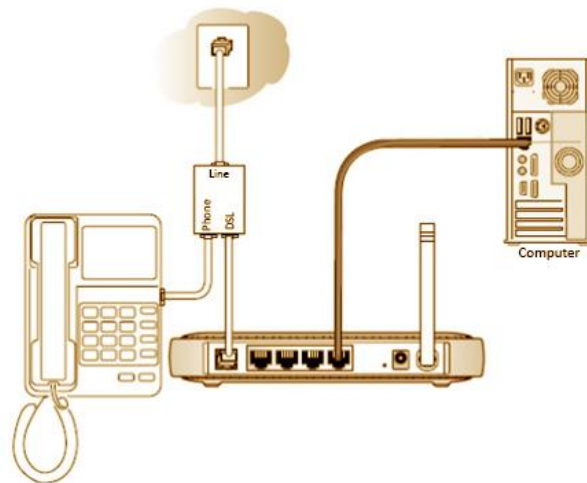


Fig. 5.1.12: DSL connection

Wireless Broadband Connection

Wireless broadband access is further categorized into:

Satellite Broadband

Satellite Internet connection provides Internet access of the following types:

- fixed,
- portable and
- mobile

Satellite connection uses the orbiting satellites for transmitting and receiving data. It is used in those areas where wired broadband technologies such as DSL and cable are unavailable. The following image shows satellite broadband which is used for remote area:



Fig. 5.1.13: Satellite broadband

Mobile Broadband

Mobile broadband provides a wireless Internet access using a USB wireless modem, portable modem, mobile phone and other mobile devices. New mobile technology and infrastructure lead to a change in fundamental nature of the service, peak data rates and new frequency bands every ten years. These changes are known as generations.

Wi-Fi

The full form of Wi-Fi is Wireless Fidelity. Wi-Fi is a communication protocol that facilitates data transfer through wireless connection. The following figure shows Wi-Fi connection:

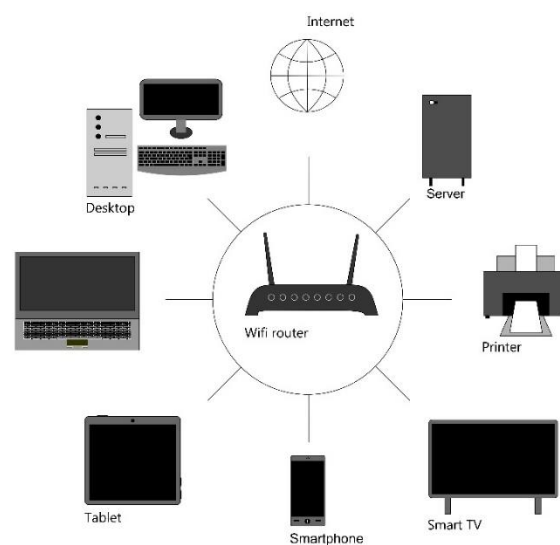


Fig. 5.1.14: Wi-Fi connection

A device within the range of Wi-Fi modem connection can be connected wirelessly to the Internet. The frequencies emitted from the connectivity ranges from 2.4GHz to 5GHz depending on the amount of data over the network.

5.1.3 Installation and Configuration of Networking Devices

Network configuration and installation is defined as the process that allows system administrator to set up network's flow, control and connection to support internetwork communication.

Some common networking devices that are installed and configured in mostly all LANs and MANs are:

- Switch
- Router
- Modem
- Firewall
- Bridge

Configuration/Installation of a Switch

Before installation process, it is necessary to check that all the components must be there which are used to connect switch with other devices.

A package of switch contains following components:

- Console cable
- Network switch
- Power cord
- Installation guide booklet

The steps that should be performed in order to install the switch are shown in the following figure:

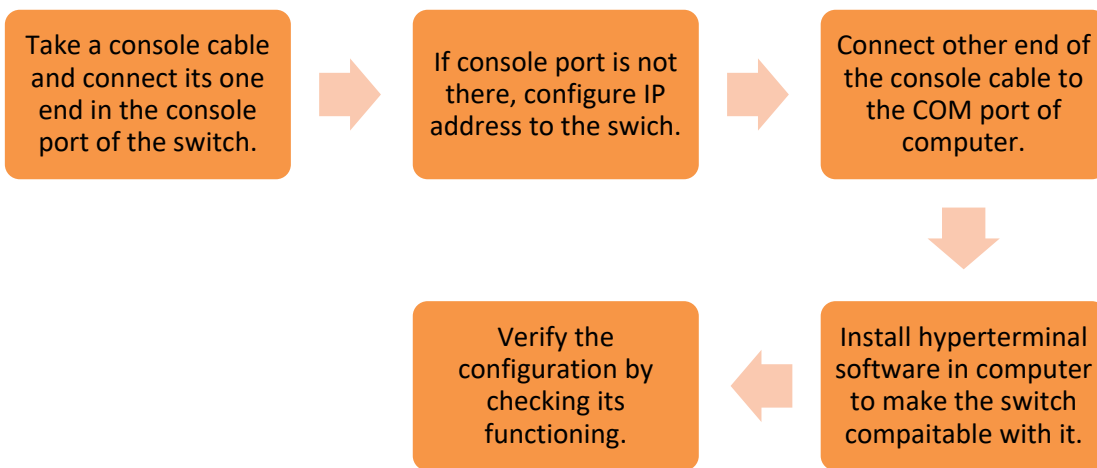


Fig. 5.1.15: Steps to install a switch

Configuration/Installation of a Router

A package of router contains following components:

- Ethernet cable
- Network router
- Power cord
- Installation guide booklet
- Drivers CD

The steps that should be performed in order to install a router are shown in the following figure:

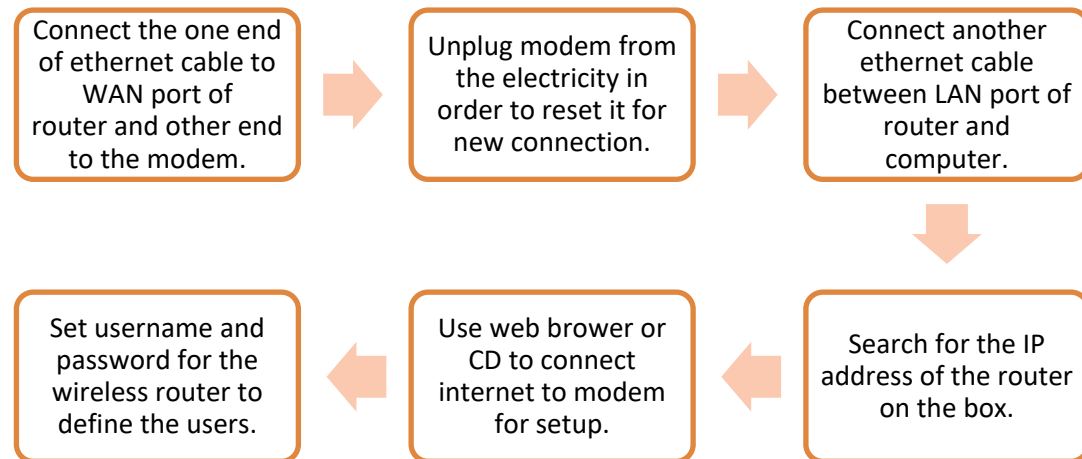


Fig. 5.1.16: Steps to install a router

Configuration/Installation of a Modem

A package of router contains following components:

- Ethernet cable
- Modem
- Power cord
- Filters
- Phone cable

The steps that should be performed in order to install a modem are shown in the following figure:

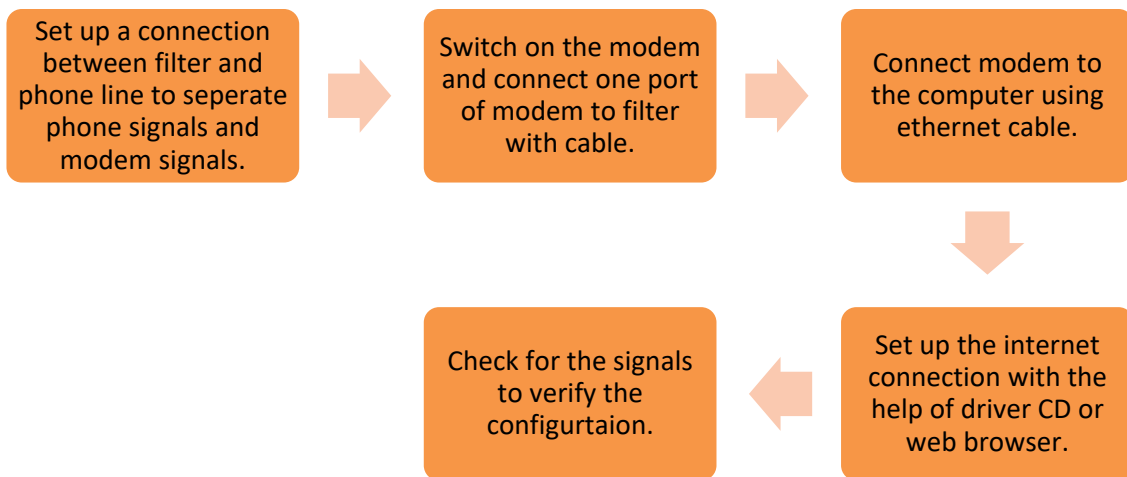


Fig. 5.1.17: Steps to install a modem

Configuration/Installation of a Bridge

The steps that should be performed in order to configure a bridge connection between devices in Windows XP are shown in the following figure:

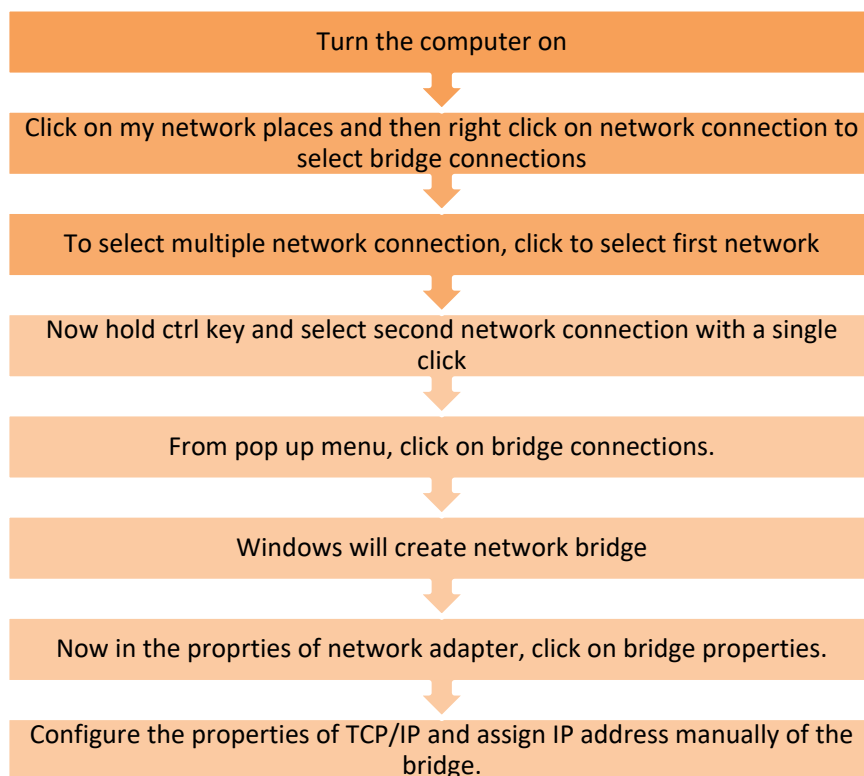


Fig. 5.1.17: Steps to configure a bridge connection between devices in Windows XP

Configuration/Installation of Firewall

A package of firewall contains following components:

- LAN cable
- Firewall hardware
- Power adapter

The steps that should be performed in order to install and configure firewall are shown in the following figure:

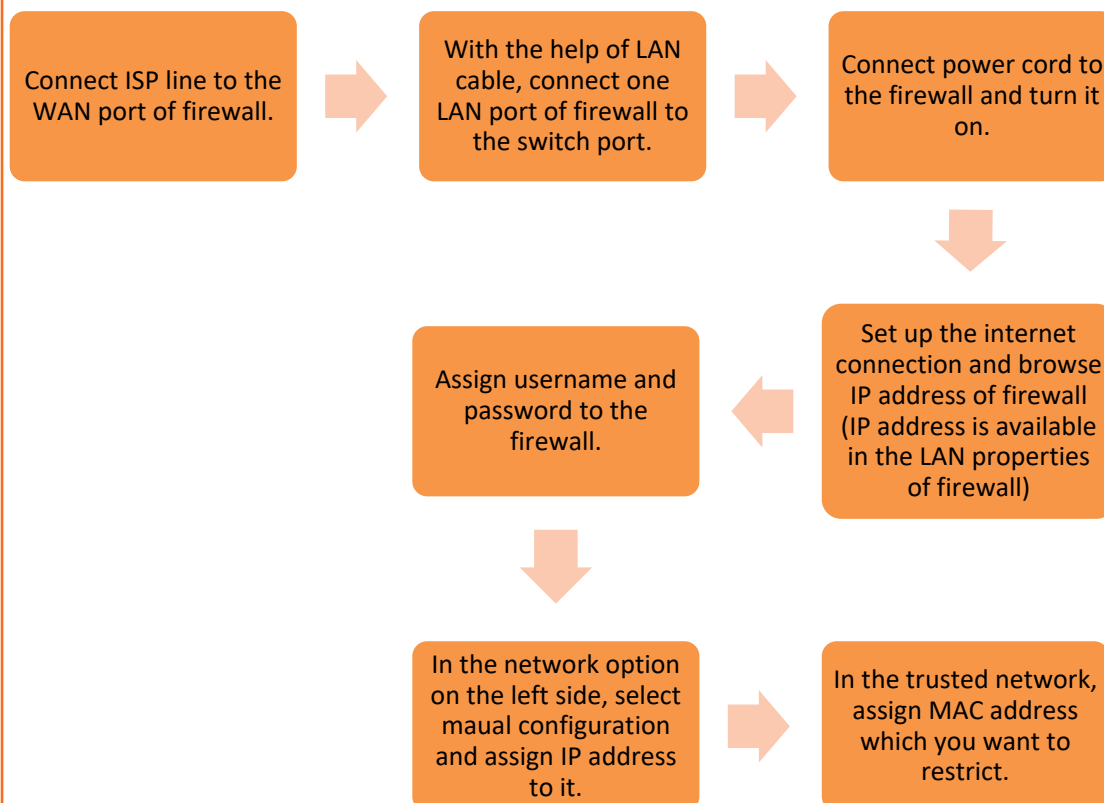


Fig. 5.1.18: Steps to install and configure firewall

Activity

Match the following.

- | | |
|-----------------------------------|---|
| 1. Hardwired Broadband Connection | a. is a network technology which can transport voice and digital data. |
| 2. Dial-up | b. provides a dedicated connection to the network for all time. |
| 3. ISDN | c. is made through modem connected to an active telephone line which is not in use. |
| 4. Leased lines | d. is set up by connecting the devices with cables |

Practical

Perform the task of installing and configuring of CSF (Config Server Firewall) on CentOS 7.

Hardware/Software:

1. System
2. CentOS 7
3. Root privileges

The participant must be able to perform the following steps:

1. Install the dependencies for CSF.
2. Install CSF.
3. Configure CSF.
4. Basic CSF commands.
5. Advanced Configuration.

Practical



Perform the setup of a home network router and then configure the network security features.

Hardware/Software:

1. System
2. Router
3. Ethernet cables
4. Browser

The participant must be able to perform the following steps:

1. Choose a suitable location for placing the router
2. Connect the computer to the router.
3. Open the administration console of the router.
4. Update the MAC address of the router.
5. Configure addition network security features.

UNIT 5.2: Installation and Configuration of Storage Devices

Unit Objectives



At the end of this unit, you will be able to:

- Install storage devices
- Configure storage devices

5.2.1 Storage Devices

Storage devices, also called storage media, are hardware devices which are used to store data or information. It can store information temporarily or permanently. These devices can be added to computers externally or internally.

Network Attached Storage (NAS)

NAS is a file storage device which acts as a server and is linked to a computer network facilitating data access to different group of users. The following image shows NAS:



Fig 5.2.1 Network attached storage drive

NAS functions as a self-sufficient computer which is linked to a network. It provides data storage facility to the devices connected on the network. NAS utilizes its OS and other software programs to allow the users to access the data and files.

The following figure lists some advantages of NAS devices:

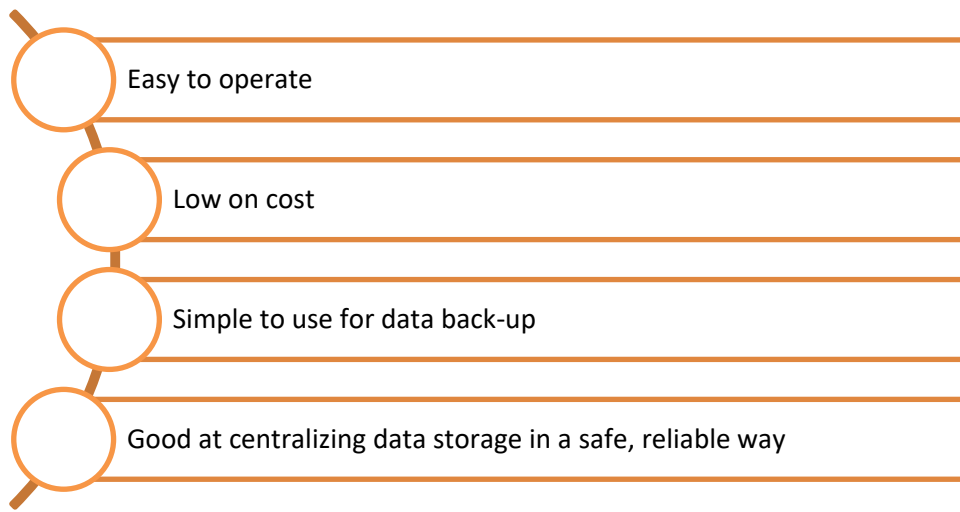


Fig. 5.2.2: Advantages of NAS devices

5.2.2 Installation and Configuration of Storage devices

The configuration and installation process of some storage devices are as shown:

Configuration/Installation of CD/DVD Drive

After the setting up of software and other hardware, it is essential to install storage devices.

The steps that should be performed in order to install CD/DVD are shown in the following figure:

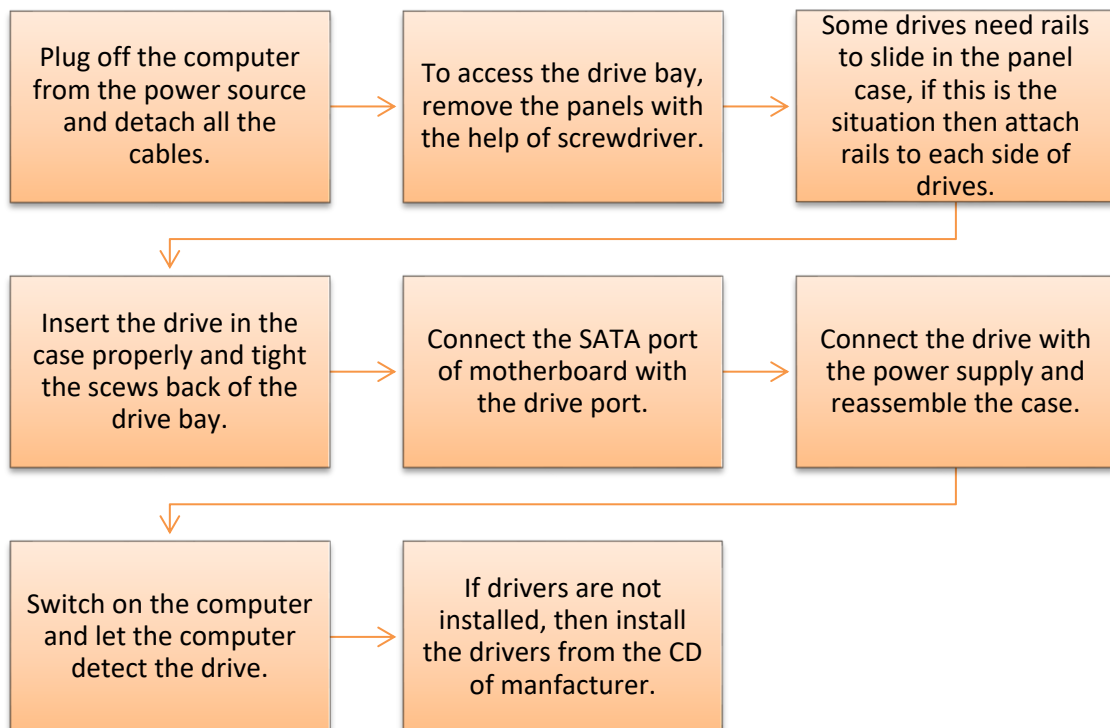


Fig. 5.2.3: Steps to install a CD/DVD Drive

Configuration/Installation of Hard Drive

The steps that should be performed in order to install hard disk in the computer are shown in the following figure:

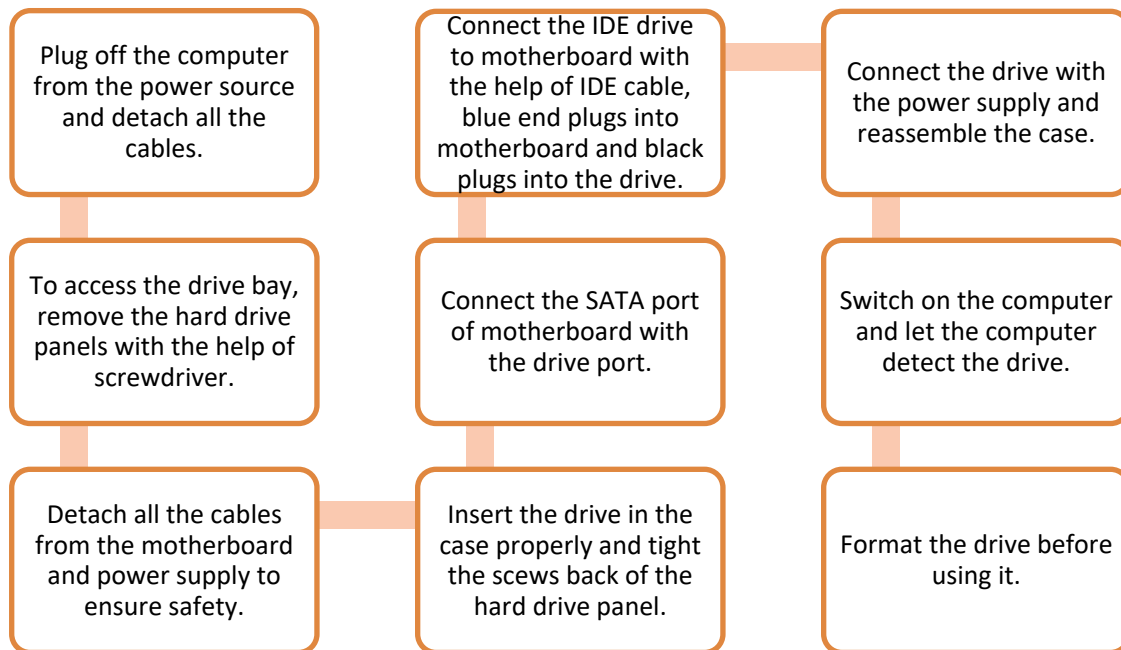


Fig. 5.2.4: Steps to install a hard drive

Practical

A customer has recently purchased a new hard disk for a computer since the old one had crashed. Perform a task of installation of the new hard disk on the computer.

Components:

Hardware:

1. Phillips and flat blade screwdrivers (small and medium size)
2. A 3-claw part grabber
3. A chip inserter and chip extractor
4. A TORX head screwdriver
5. A 1/4" and 3/16" nut driver
6. A container to hold small parts and screws

Software:

1. Operating system
2. Bootable disk with FDISK.EXE and FORMAT.COM copied onto the disk
3. Disk Manager

6. Troubleshooting of Networking Devices, Storage and Other Components



- Unit 6.1 – Understanding Customer Complaints
- Unit 6.2 – Troubleshooting Process
- Unit 6.3 – Completing Repairs
- Unit 6.4 – Reporting to Superior



Key Learning Outcomes



At the end of this module, you will be able to:

- Classify customer complaints
- Identify system level problem on field
- Troubleshoot storage and other devices
- Complete the repairs
- Report to superior

UNIT 6.1: Classify Customer Complaints

Unit Objectives

At the end of this unit, you will be able to:

- Identify the concerns of the customers
- Interact with the customer on phone
- Commence field trip based on the type of complaint
- Explain product warranty, terms and conditions
- Identify the type of problem and carry relevant tools and equipments
- Assess to do replacement or repair
- Carry approved and verified replaceable parts

6.1.1. Identify the Concerns of Customers

A field technician is responsible for the installation or repair/maintenance of the computer and its peripherals. When work is allocated, it is important to understand and analyse the requirement before going ahead with the plan of action or visiting the customer's site. The following figure shows the main tasks involved in the role of a field technician:

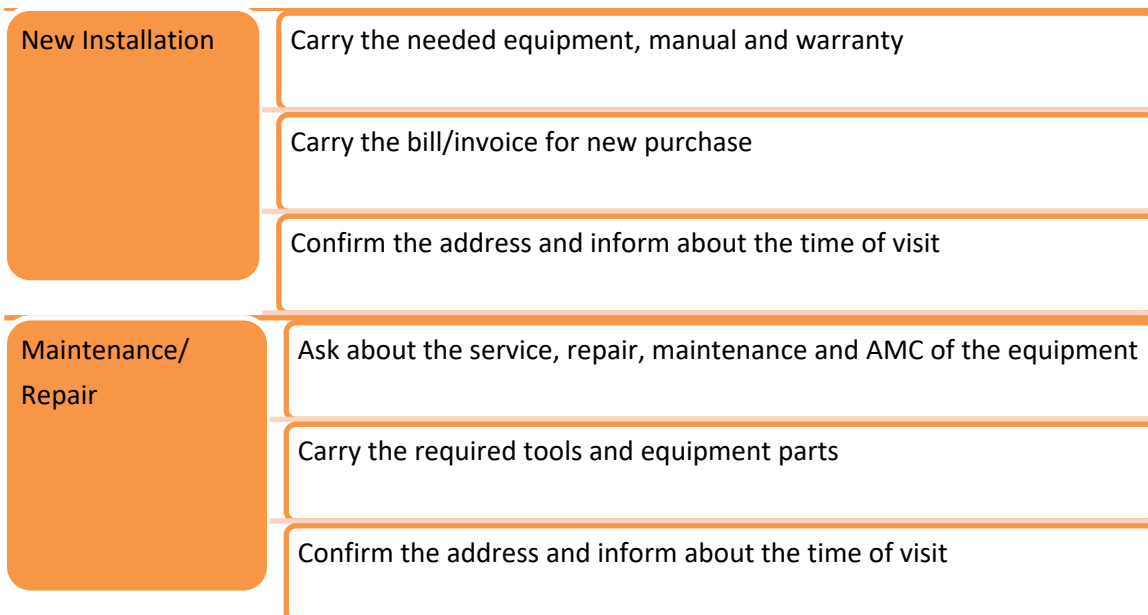


Fig. 6.1.1: Workflow for installation and repair

Before visiting the customer for installation or repair, it is important to understand the requirement of the customer.

The following figure represents the various activities which should be done before a visit to the customer's site is scheduled:

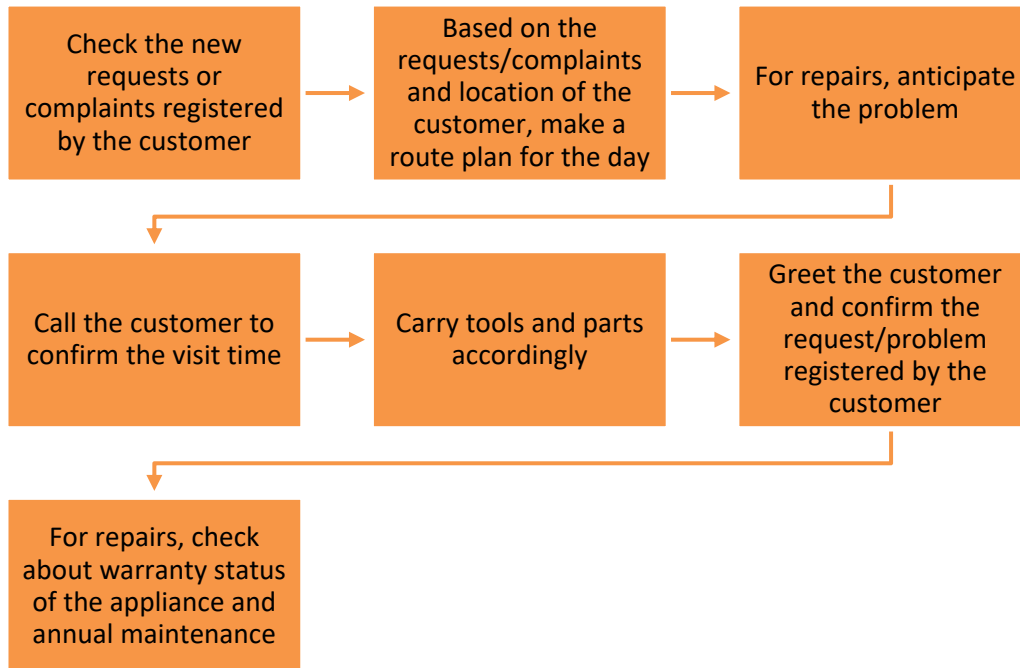


Fig. 6.1.2: To-do list for a technician

6.1.2. Interact with Customer on Phone

Prior to visiting the customer premises for repairing/servicing of the computer, it is important to know the details of the problem and accordingly suggest a corrective measure. This can be achieved by calling the customer and asking them about the problem in detail and then suggesting them a possible solution. It is also important that the customer should be satisfied with the suggested solution.

The following figure highlights the to-do list to be followed on a call with the customer before visiting the customer's premises:

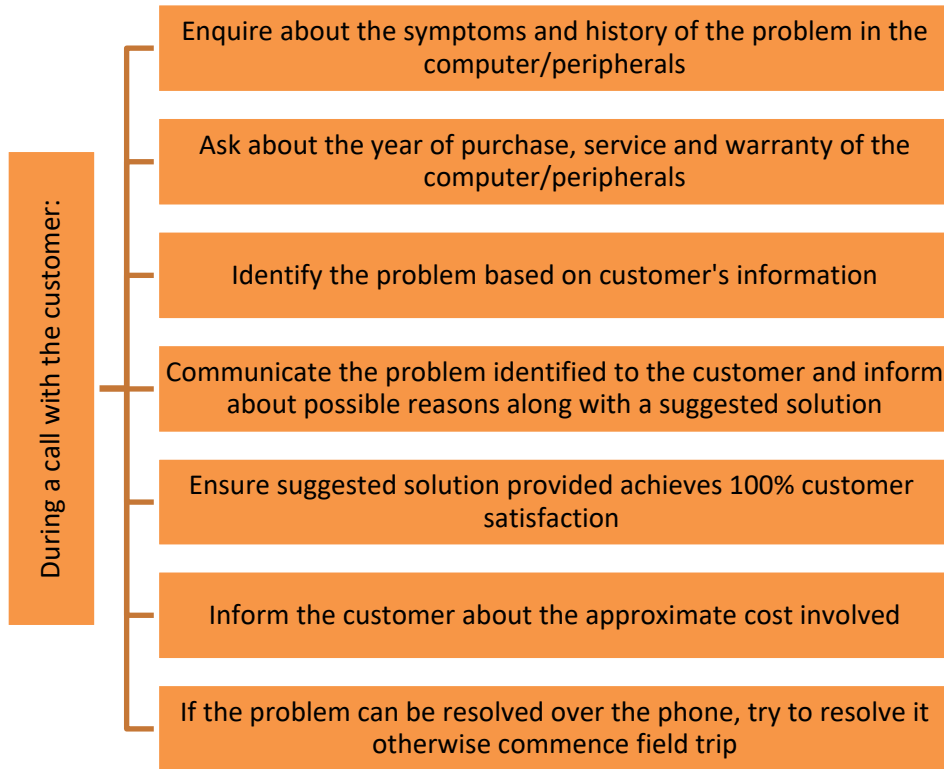


Fig 6.1.3: To-do list to be followed on a call with the customer

6.1.3. Troubleshooting

Troubleshooting refers to the repair of faulty products or processes. Troubleshooting begins with searching the source of a problem and ends with finding the solution to that problem to ensure that the product or process functions properly. Good troubleshooting consists of the following four steps:

- Identification of the symptoms of a problem
- Elimination of the causes of a problem
- Verification of the solution
- Restoration of the product or process

In other words, the first thing to do is to identify the symptoms that are causing a failure in the system. The next step is to diagnose the cause of that malfunction, till a solution is reached. This is followed by returning the product to its original state.

Proper knowledge and understanding of the behaviour of each of the components that make up a computer system is necessary.

The field technician should follow some simple steps for troubleshooting as shown in the following figure:

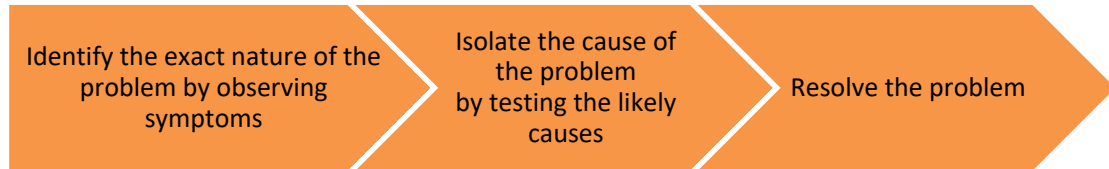


Fig. 6.1.4: Steps for troubleshooting

6.1.4. Understanding Product Warranty and ID

A field technician should know the terms and conditions of buying a product and should be able to read and understand the warranty provided. The field technician should search for information such as shown in the following figure:

Tenure of the warranty

Time of beginning and expiring of the warranty

The conditions that may void the coverage

The contact details to get warranty service

What the company will do if the product fails—replace the product or refund the cost

Parts and issues covered

Coverage of consequential damage

Conditions or limitations of the warranty (some warranties provide coverage only if you maintain or use the product as directed)

Fig. 6.1.5: Required warranty information

In addition, the field technician should be able to make the customer understand about the warranty details.

Reading Serial Number and Product ID

The field technician should have the knowledge of the product labelling of any software or hardware component. Serial number and product id uniquely identify the component. The format of serial number varies with the type of product and its manufacturers. The series of letters and numbers in a serial number may specify the manufacturer information, country of origin, year of production and number of unit. The following image shows serial number of a product:



Fig. 6.1.6: Serial number of a product

The following figure lists some examples of serial number and product id of different products:



Fig. 6.1.7: Serial number and product id of different products

The field technician should be able to find the product identification label for different products. For a notebook, the identification label may be in a different location as shown in the following figure:



Fig. 6.1.8: Identification label at different location

Software serial numbers, also known as product keys, are included on the CD with its packaging.

Reading Manufacturing and Warranty Date

A field technician should know how to read the manufacturing and warranty date as per the product whether it is hardware or software. It helps in educating the customer about the life time of the products and how to maintain them for longer use. These dates are available on the back side of the product box and in the documents also.

The following figure shows the manufacturing date on different products:



Fig 6.1.9: Manufacturing date on different products

6.1.5. Problem Identification

The most important step of identifying the problem is to determine whether the problem is caused by a failure of hardware or software.

Software Problems

Software problem manifests itself as freezing of computer, pages not getting loaded or glitches during playing games or movies from the computer. A computer needs device drivers to perform these functions. If the correct drivers are not installed, it will lead to software issues. The only way to resolve such a situation is to install correct drivers followed by re-installing the software or upgrading the Windows program.

Hardware Problems

Hardware failures are responsible for problems such as when the user is not able to switch on the computer or is faced with a blue screen or overheating of the computer. A computer can function only when all the components work well together. Consider a scenario, where there is a broken hard drive, which implies that it doesn't work. Alternatively, the computer can also mean that it is slow or gives an error message on the screen informing that one of the hardware components is having an issue.

As compared to software issues, hardware issues are harder to tackle as a process is needed to find out exactly which component is not working properly.

After identifying the type of problem, the field technician must decide whether to replace or repair the faulty part. It is also important to carry approved and verified replaceable parts.

Practical



A customer has recently purchased a new hard disk for their computer since the old one had crashed. Perform a task of installation of new hard disk to the computer.

Component:

Hardware:

1. Phillips and flat blade screwdrivers (small and medium size)
2. A 3-claw part grabber
3. A chip inserter and chip extractor
4. A TORX head screwdriver
5. A 1/4" and 3/16" nut driver
6. A container to hold small parts and screws

Software:

1. Operating system
2. Bootable disk with FDISK.EXE and FORMAT.COM copied onto disk
3. Disk Manager

UNIT 6.2: Troubleshooting Process

Unit Objectives



At the end of this unit, you will be able to:

- Identify the customer's problems at their premises
- Use appropriate tools and equipment
- Perform root-cause analysis
- Disassemble and check each part of the computing system
- Follow standard operating procedures
- Identify the solution design and troubleshoot the storage devices
- Perform soldering
- Identify and fix the errors

6.2.1. Identify the Customer Problems

Within an organization, a customer's issues are reported to the field technician either through an email or through a telephone call. These issues are logged into the system by the field technician or by the reporting person. Depending on the severity of the issue, the issues are resolved by the field technician.

There are many cases where the issues cannot be resolved remotely and need the field technician to visit the customer's facility for resolution. When the field technician visits a customer's facility, then there are certain work processes that they need to follow.

There are some common work processes at the customer's facility that a field technician needs to adhere to.

The following figure lists these work processes:

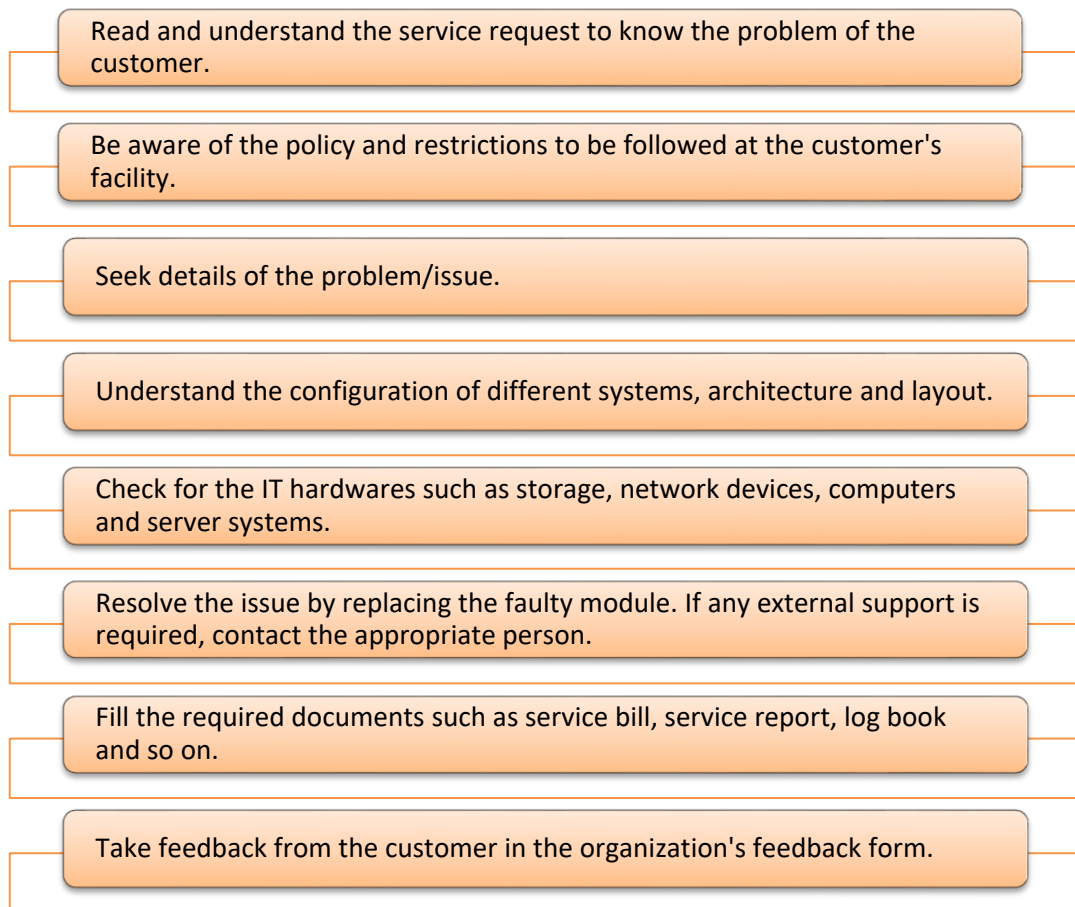


Fig.6.2.1: Common work processes at the customer's facility

6.2.2. Assess Applications and Equipment in Use

The field technician should be aware of the types of applications that run on the systems of customers and the importance of these applications to the customer. Furthermore, they also need to be aware of the critical hardware used at the customer's facility. Typically, server systems and network configurations are the most critical equipments and hardware in any organisation.

To analyse and identify the critical applications and hardware at customer's site, the field technician should follow some key points, as shown in the following figure:

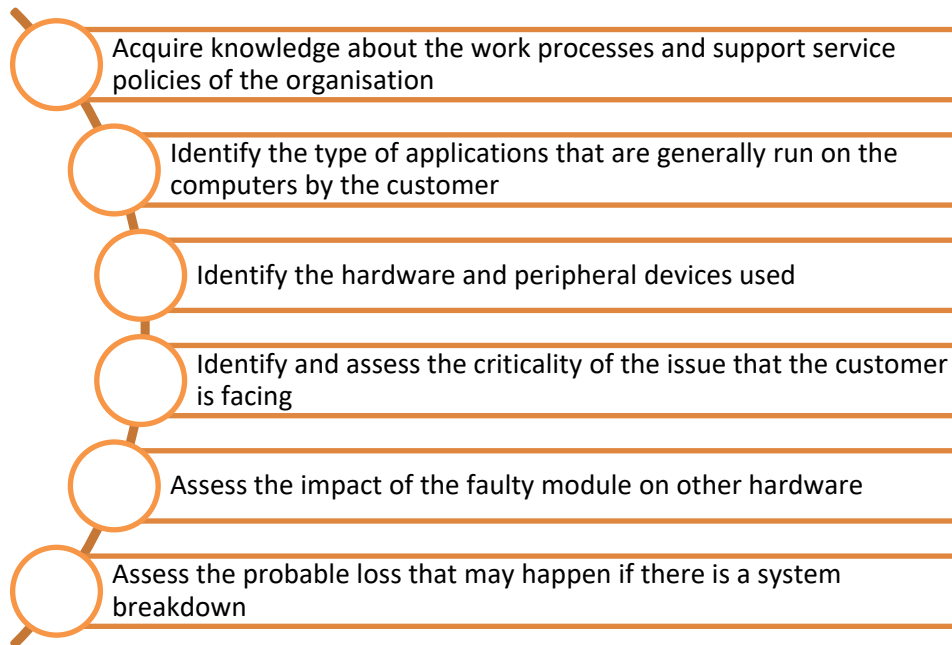


Fig. 6.2.2: Key points for assessing critical issues

Also, the field technician should check the call log database to be aware of similar problems faced by other customers. This helps in faster resolution of issues and thus saves time and effort. Therefore, it is imperative that based on the log database, the field technician stocks the replacement spares for regularly occurring problems.

For example, a customer reports that the router is not working properly. The customer has also tried switching the modem on/off and unplugging the router. The field technician has tried to resolve the issue remotely by suggesting the customer to check the router connection and its software setting. But the problem is not resolved. The light on the router is on but it's not able to access the internet.

Now, the field technician would typically check the log database and from there come to know that the primary issue in such cases is that the cable is not connected to the WAN port of the router or there is a problem from Internet service provider (ISP). Therefore, when he visits the customer site to resolve this issue, it is ideal for him to carry a new router and cables along with the invoice.

6.2.3. Perform Root Cause Analysis

Field technician needs to identify whether the root cause of the problem lies in the hardware of networking devices or software. Hence, they need to troubleshoot the related components to look into the details of the problem.

For example, the client's modem is not working properly. To resolve the problem, the field technician should check:

- Whether there is a problem in the connection
- Or in the modem
- Or in the driver installation

In addition, a field technician should be aware of fault tolerance and fault handling techniques. Fault tolerance means the ability of a system to continue working in the event of a fault that may be due to hardware or software. It becomes easy to troubleshoot a device when the system is equipped with these techniques.

Fault handling means that once the fault has been identified, the field technician should be aware of all possible causes and their corresponding resolutions.

The overall action plan for handling software faults is shown in the following figure:

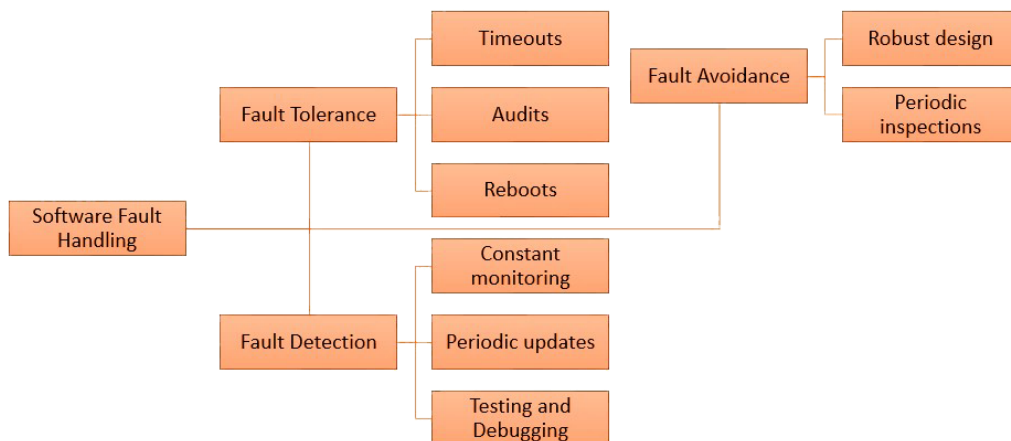


Fig. 6.2.3: Action plan for handling software faults

The overall action plan for handling hardware faults is shown in the following figure:

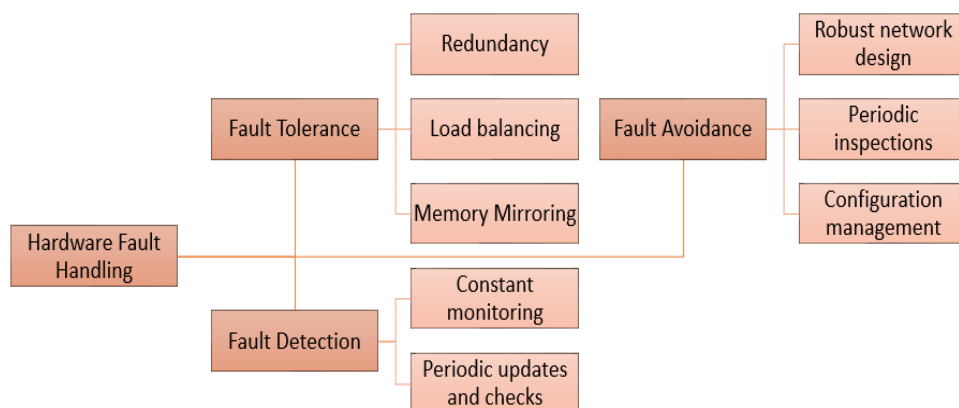


Fig.6.2.4: Action plan for handling hardware faults

6.2.4. Disassembling the System

The desktop or laptop needs to be disassembled and then again assembled if the components inside a laptop or a desktop need to be repaired or cleaned. The steps to disassemble a desktop are shown in the following figure:

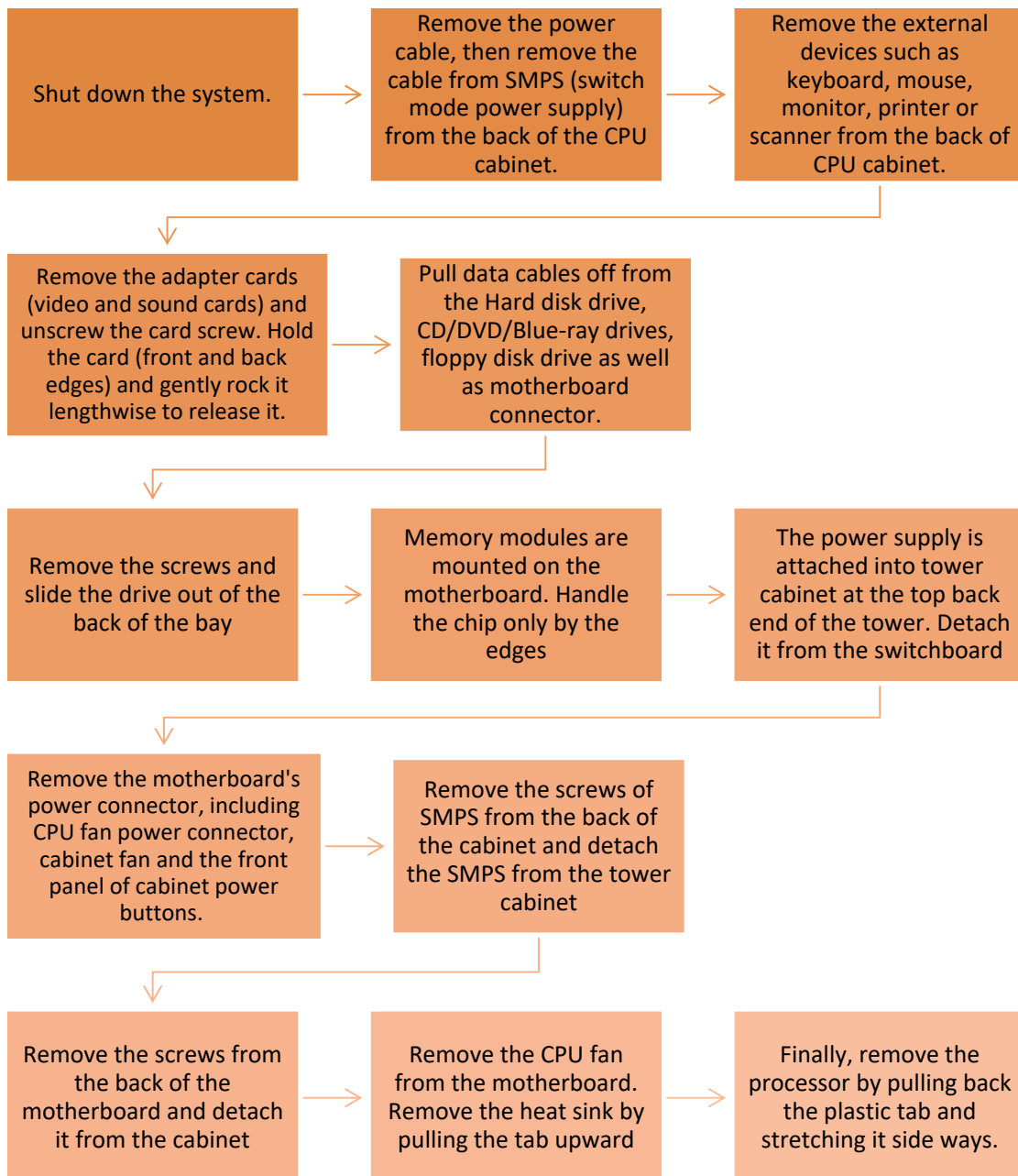


Fig. 6.2.5: Steps for disassembling a desktop

The steps to disassemble a laptop are shown in the following figure:

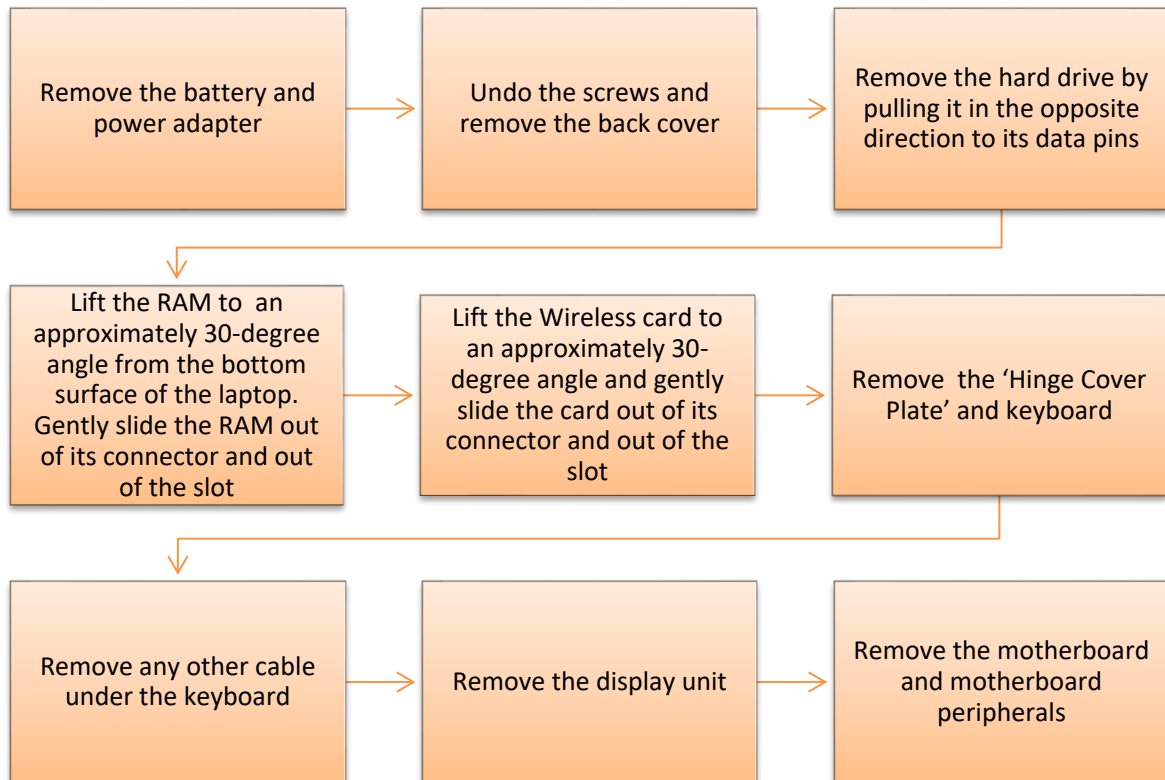


Fig. 6.2.6: Steps for disassembling a laptop

6.2.5. Identifying and Fixing Errors/Issues

A networking system consists of networking devices and peripherals to maintain the flow of data from one computer to another through the networking devices. Usually, networking hardware is reliable but it may get damaged over a period of time. It is essential to maintain the hardware system to keep the system functional. In addition, the software also needs to be maintained periodically. For example, a modem helps the computer system to access internet. A proper set up and installation of driver files is important to run the modem properly.

There may be certain circumstances when networking devices are not maintained properly and various issues are faced by the operator. When a field technician is called up for the repair, then he/she should be efficient enough to find the issue and fix them accurately.

Software Issues on Windows

A field technician should ensure that correct drivers are installed on the system, while searching for software issues in it. The individual should know how to use the hardware troubleshoot options, how to configure a device and how to download as well as install and update device drivers.

Using Windows 7 Troubleshoot Option:

- Select the Start button and click on Control Panel.
- Type "troubleshoot" in the search box and click on Troubleshooting.
- Select configure a device under Hardware and Sound tab.

Download and Install a Driver:

- Select the **Start** button, enter "device manager" in the search box and then click on **Device Manager**.
- Find the device that needs to be updated.
- Double-click on the device name.
- Click the **Driver** tab and select Update Driver.

Update a Device Driver Using Windows Update:

- Select the **Start** button, type "Windows Update" in the search box.
- Select **Windows Update**.
- In the left pane, click on **Check for updates**.
- On the **Select the updates you want to install** page, select the check box for the driver that needs to be installed, and then select **OK**.
- On the **Windows Update** page, select **Install updates**.

Soldering

Soldering is the process of joining two or more objects that are usually made of metal by melting and pouring a filler metal, called solder, into the joint. The solder component has a lower melting point than the other two metals that are to be joined.

While replacing the faulty parts, soldering of some components may be required. So, a field technician should have a basic knowledge of how to use the manual hand soldering iron unit to solder the components or parts. The following figure shows a typical soldering process:

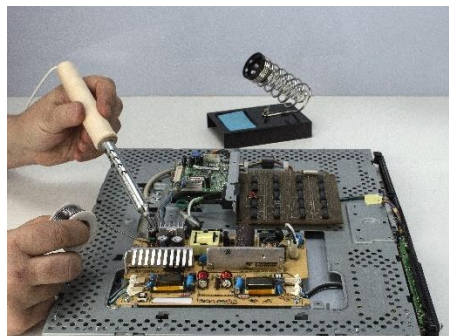


Fig. 6.2.7: Soldering process

Soldering Procedure

The steps of soldering technique are as follows:

Step 1: Heat up the soldering iron sufficiently.

Step 2: Clean the soldering iron with a damp sponge, if it is dirty. If a soldering station is used, adjust its temperature.

Step 3: Apply suitable flux to remove any type of oxide when soldering.

Step 4: Coat the soldering iron's tip with a thin layer of solder. This process of tinning helps in transferring heat between tip and the component to be soldered.

Step 5: Use pliers for bending the lead of the component being soldered so that it can easily be embedded

Step 6: Hold the soldering iron and place the iron tip in such a way that it touches both the surface and the lead of the component on the board.

Step 7: Touch the solder to the iron tip and move that around the joint by keeping the iron tip fixed. Let the solder melt and flow till the joint is covered.

Step 8: Remove the iron after removing the solder and make sure that the joint is kept stationary till it cools down.

Handling Issues Not within Scope

There may be certain circumstances when a field technician is unable to resolve the software or hardware problems at customer sites. Some of the typical examples of such cases are:

- Some systems, such as ERP or data management systems, where a lot of customization has been done for the client by the service provider or the implementation partner, the customization is like a black box for an IT service engineer. This is because its code/program may not be shared. Also, there might be a separate team to support these systems.
- There are some hardware servers or systems which are under the control and support of an external vendor. Thus, the service engineer may not have any role to play in this scenario.

In both the scenarios, one may take external support or escalate the issue. However, if one is not sure under whose purview the issue lies, a senior person should be consulted before approaching the problem.

Escalate Problems to the Vendor

Software developers write code to meet the client's requirements in such a way that only they can understand the system's behaviour. So, it is difficult to troubleshoot such a system and also time consuming. It is always recommended to take external support of the developer to solve such issues.

Escalate Problems to a Senior

If the field technician is not aware of the developer of a particular system, then it becomes difficult to contact and resolve the issue. In most of the organizations, there is a list of all software and systems that are being used. This list also contains a point of contact for each software or system. To refer to this list, a senior person should be consulted.

6.2.6. Identify the Faulty Module and Perform Troubleshooting

The table lists some basic troubleshooting tips of networking, storage devices and other components:

New Component	Issue	Actions
Router	No connection message id displayed on the computer	<ul style="list-style-type: none"> • Switch off the router • Unplug from the adapter and wait for a few minutes. • Reset the connection and configure it.
	Access Denied to internet	<ul style="list-style-type: none"> • Reboot the computer and plug off the system. • Check the cable connections. • Check network drivers are properly installed. • Check whether the adapter is working properly.
		<ul style="list-style-type: none"> • Check the temperature of the router. • Sometimes overheating causes blockage of vents. • Put the router in an airy place for proper airflow.
		<ul style="list-style-type: none"> • Reposition the router <ul style="list-style-type: none"> ○ Sometimes signals get blocked due to large metallic objects like microwave or cordless phones. ○ Ensure that the router's antenna is placed vertically rather than horizontally.
		<ul style="list-style-type: none"> • Change configuration settings of the router <ul style="list-style-type: none"> ○ Reset the router to its default factory settings ○ Reconfigure the router and change the name of the wireless network including passphrase.

		<ul style="list-style-type: none"> • MAC address restriction <ul style="list-style-type: none"> ○ Some router allows MAC address filtering. ○ Make sure that the MAC address of the router should be included in the connection list of computers. ○ Either MAC address filtering can be disabled.
Modem	Link light doesn't come on	<ul style="list-style-type: none"> • Disable all the connections. <ul style="list-style-type: none"> ○ Check whether the ethernet cable is connected to the port of the computer. ○ Check the cable type.
	Poor connectivity	<ul style="list-style-type: none"> • Plug off the modem from the adapter. • Change the location of the modem. • Reconfigure all the settings of the modem.
	No connection	<ul style="list-style-type: none"> • Turn off the modem and unplug all the devices from the phone socket including modem, filters and other devices. • Connect the telephone into the socket without filter and check whether the dial tone is free from any noise interference. • If handset is working fine, then plug modem directly into the phone socket. • Connect computer with the modem and try to visit a website. • If site is not opening, check the cable connections or try connecting the modem with the help of new ethernet cable.
		<ul style="list-style-type: none"> • Connect the modem directly with the phone socket. • Connect the filter and other equipments one by one. • If modem gets disconnected while connecting filters and other equipments, there is a problem with the other devices. • Check for the faulty part and replace it with the new module.

	Modem light is continuously blinking	<ul style="list-style-type: none"> • Check the connectivity of the telephone line, receiver, fax machines and other equipments. • They should be connected with the filters except modem. • Connect phone cable directly to the wall outlet. • Check whether any interference is there in phone line. • Reboot the computer and reconfigure the modem settings.
		<ul style="list-style-type: none"> • Check the connection of router with the modem • Connect modem directly to the computer • Change the IP address in case it is a static IP address.
	Ethernet light is not lit	<ul style="list-style-type: none"> • Check the connection of ethernet cable with the modem. • Remove and re-insert the cable in the modem. • Bypass the router and connect the modem directly with the computer. • Check the cable that connects the modem with the computer.
Switch	No connectivity between switches	<ul style="list-style-type: none"> • Check the connection between all the switches by passing signals. • Check that there is proper neighbour ship formed between them. • Check for the MTU mismatch between router and switch.
		<ul style="list-style-type: none"> • Ping the device <ul style="list-style-type: none"> ○ Ping the device to check the connectivity between console and switch. ○ Check the connection of switch by using show interface command ○ Check the cable connections. ○ Check the duplex and speed of the switches. ○ Make sure that all switches are running on same IOS version.

	Duplex and speed mismatching	<ul style="list-style-type: none"> • Enable auto negotiation on network ports and at the user ends. • Manually change the duplex and speed settings on both sides of the switch.
Firewall	Setup problem	<ul style="list-style-type: none"> • Check all the cable connections for the link light. • Cable should be cross over. • Ping the appliance IP address. • Set the computer IP address as per the appliance IP address for proper communication.
	Internet connection is absent	<ul style="list-style-type: none"> • Set the user name and password for the appliance as required by ISPs • Set the host name, domain name and MAC address on the set-up page of appliance. • Set the static IP address on the static IP and DNS page of appliance.
	Cannot receive mail from the server	<ul style="list-style-type: none"> • Check the domain name of the server. • It should be fully qualified domain name.
	Problem in network connectivity	<ul style="list-style-type: none"> • Check the connectivity by performing connectivity test from source server to receiver server. <ul style="list-style-type: none"> ○ Open command prompt on server and check connectivity of telnet. ○ If the command prompt hangs, try to ping the router. ○ Use proper domain name and IP address. • Check for the proper domain name, IP address and the ports of server.
Bridge	Slow transfer speed	<ul style="list-style-type: none"> • Turn off the bridge for a few minutes. • Pair the bridges manually. • Do factory reset on the bridge manually. • Again, pair the bridges. • Unplug the client unit and connect it to the computer or laptop. • Make sure that the Wi-Fi is off. • Now check the connection between the client and the computer. • Ping the computer

	No connection	<ul style="list-style-type: none"> • Ping the computer. <ul style="list-style-type: none"> ○ Check the cable connection between the switch and the router to which it is connected. ○ Check the IP address of the system. ○ Check the network interface card drivers. • Ping the bridge <ul style="list-style-type: none"> ○ An error in reply indicates improper connection. ○ Check cabling between the switch and the bridge. ○ Change the duplex settings of bridge. Set the speed and duplex settings manually. • Ping the server <ul style="list-style-type: none"> ○ In case of error, check the hub, cabling and the network card. • Check the IP properties of server.
Hard Drive	Computer does not boot and no error message appears on the screen	<ul style="list-style-type: none"> • Check whether the BIOS supports drives. <ul style="list-style-type: none"> ○ Turn off the computer and remove the new drive ○ Shift the jumper onto the alternate-capacity jumper. ○ Remount the drive in the computer ○ Insert a bootable system diskette into drive A and turn on the computer. ○ Insert the Disc Wizard diskette into drive A ○ Type A: XDM and press ENTER. ○ Follow the Disk Manager instructions ○ Install the dynamic drive overlay and partition and format the new drive ○ Reboot the system
	Blank screen when the system is powered up	<ul style="list-style-type: none"> • Plug-in the monitor. • Ensure the video card is in its slot • Secure it with mounting screws. • Turn off the computer • Remove the drive host adapter • If the screen turns on after the reboot, the host adapter may be incompatible or defective.

	The system does not recognize the drive	<ul style="list-style-type: none"> • Check all the cables • Check the power supply • Reboot the computer • Check whether the drive motor starts up • If the drive motor does not start up, recheck all the drive cables. • Check the drive-type listed in the system setup program for each drive • Press the CTRL+ALT and DELETE keys simultaneously to reboot the computer • If the computer has a turbo switch, set it to slow speed before turning the computer on. • If there is no turbo switch, use keyboard commands. • Return the processor to the fast speed after the computer is running, • Or warm-boot the computer after every power-on. • Check for I/O address conflicts. • Ensure that the drive and host adapter are compatible with the computer. • Turn off the computer • Take out the peripheral adapter cards except for the video card and host adapter. • If the computer recognizes the drive after rebooting, turn off the computer. • Reinstall the other peripheral cards, one at a time, until the conflict reoccurs. • Isolate the source of the address conflict • Resolve the conflict by changing the I/O address of the peripheral that appears to cause the conflict. • Check that there is no diskette in drive A and reboot.
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	The system hangs in FDISK or fails to create/save the partition record	<ul style="list-style-type: none"> • Check all the cables • Ensure that the setup system diskette is not corrupted. • Use a backup diskette • Make smaller partitions • Change the interrupt jumper setting on the host adapter. • Disable the Track 0 protection feature in the system setup program before using FDISK. • Re-enable this feature when FDISK is done.
	The DOS message "Disk Boot Failure," "Non-System Disk" or "No ROM Basic - SYSTEM HALTED" appears	<ul style="list-style-type: none"> • Use the DOS SYS utility to reinstall the DOS system files. • Check all the cables. • Use FDISK to verify that the primary partition is active. • Check for viruses.
	The system error message, "HDD controller failure" appears	<ul style="list-style-type: none"> • Confirm the jumper settings on the drive. • Verify the drive-type settings in the system setup program
	System in-operative. Keyboard lights are on, power indicator lights are lit and hard drive is spinning.	<ul style="list-style-type: none"> • Expansion card is partially dislodged from expansion slot on the motherboard. <ul style="list-style-type: none"> ○ Turn off the computer. ○ Ensure all expansion cards are securely seated in slots ○ Press down firmly on expansion card, using even pressure on both ends of the expansion card. • Defective floppy disk drive or tape drive. <ul style="list-style-type: none"> ○ Turn the system off. ○ Disconnect the cables from one of the floppy drives. Turn on the system and check to see if the keyboard operates normally. ○ Repeat until the defective unit has been located.

	System does not boot from hard disk drive but can be booted from floppy disk drive	<ul style="list-style-type: none"> • Check the connector between hard drive and system board <ul style="list-style-type: none"> ○ Check the cable running from the disk to the disk controller on the board. ○ Check that both ends are securely plugged in ○ Check the drive type in the Standard CMOS Setup • Damaged Hard Disk or Disk Controller. <ul style="list-style-type: none"> ○ Format the hard disk ○ If unable to do so, the hard disk may be defective. • Hard Disk directory or FAT is scrambled. <ul style="list-style-type: none"> ○ Run the FDISK program ○ Format the hard drive. ○ Copy the backup data back onto the hard drive.
	System only boots from Floppy Disk. Hard Disk can be read and applications can be used, but booting from Hard Disk is impossible	<ul style="list-style-type: none"> • Hard Disk boot program has been damaged. <ul style="list-style-type: none"> ○ Create back up of data and applications files. ○ Reformat the Hard Drive. ○ Re-install the applications and data using backup disks. ○ Check the cable running from the disk to the disk controller on the board. ○ Make sure both ends are securely plugged in. ○ Check the drive type in the Standard CMOS Setup
	Screen message says, "Invalid Configuration" or "CMOS Failure"	<ul style="list-style-type: none"> • Check the configuration program. • Replace any incorrect information.
	Cannot boot system after installing second hard drive.	<ul style="list-style-type: none"> • Ensure that the master /Slave jumpers are set correctly. • Run SETUP program and select correct drive types.

New Network Card	Unable to connect to a server	<ul style="list-style-type: none"> • Load the driver and ensure that the protocols are bound. • Check the Device Properties list • Use the diagnostic utilities to test the NIC adapter • Check if additional networking software needs to be installed.
Monitor	Picture is not visible	<ul style="list-style-type: none"> • Check the signal cable connections • Ensure that the computer is switched on • Check the brightness control
	Screen not in the center position	<ul style="list-style-type: none"> • Adjust the H-Size, H-Phase or V-Size, V-Center controls. • Check the signal timing of the computer
	Too bright or too dark screen	<ul style="list-style-type: none"> • Check the Brightness or contrast control • Check the specified voltage • Check the signal timing of the computer system • Check the horizontal frequency.
	The screen is shaking	<ul style="list-style-type: none"> • Move all the objects such as a motor or transformer, which emit magnetic field, away from the monitor. • Check the specified voltage • Check the signal timing of the computer system

The following table lists some common system problems and their solutions

Issue	Diagnosis	Solution
A Program is Not Responding.	The Computer is Frozen	<ul style="list-style-type: none"> • Press the Ctrl +Alt and Delete keys simultaneously. • Open the Task Manager and highlight the program's name. Then press the End Task button. • Manually turn off the computer by pressing the on/off button. • Once the computer responds again, run a virus check.

New Hardware or Software is Working Incorrectly.	Incompatibility Issue with System Configuration	<ul style="list-style-type: none"> • Check that the computer meets the requirements of the program or utility. • Uninstall the program and then reinstall it.
PC Not Connecting to the Network through LAN	Problem in Network Configuration	<ul style="list-style-type: none"> • Go to network setting and check that the Ethernet is enabled. • Check the working of the modem. • Check all the wires and connections. • Check the LAN card. • Check the IP Address and DNS settings.
No Power	Improper Connection Faulty PSU or SMPS Unit	<ul style="list-style-type: none"> • Ensure that the power cord is plugged into the supply. • Check whether PSU is putting out enough voltage. • Switch off the computer and detach all the devices. • Reinstall each device one by one. • Switch on the computer after each device. • If the system does not come on after installing a particular component, replace it. • Check the SMPS unit. • If the system doesn't come on after reinstalling all the devices, it may be a motherboard or CPU problem.
Computer Doesn't Power Up		<ul style="list-style-type: none"> • Ensure that the power cable is connected to the CPU and to the monitor. • Check the power socket. • Replace the power socket with a different one, or if power extension board is used, plug the power directly into the socket. • Replace the power cable. • Check if the LED at front of the monitor is in On position. If yes, then CPU must be at fault. • If LED at CPU is in On position then it might be a monitor issue. • If none of the LEDs are in On position, then it may be a local power issue.

Blank Screen, Nothing Appears on the Screen	Improper Connection or Display Settings	<ul style="list-style-type: none"> • Check if monitor and CPU power is in On position. • Check if monitor is plugged into the CPU. • Ensure that the power cable is plugged into the monitor and is not loose. • Some CPU has multiple ports for display, check each port by plugging in securely. • When the power button is pressed on the monitor and some status is displayed, it means the power to the monitor is in On position and the screen display is okay. • Check the cable running from the CPU to the monitor. • Check the brightness level using the menu button on the monitor. It may have been set to dark. • Check that the computer is not in the screensaver or sleep mode.
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Some Common problems and their Solutions

Problem/ Symptoms	Action
No Operating System Found or Similar Message	<ul style="list-style-type: none"> • Ensure that the system is set to boot from the right device. • Ensure that the proper boot order is listed under the Boot menu. • Remove any non-bootable DVD from the drive. • Ensure that the boot drive is the first option. • Once boot drive is found, the OS begins to load it.
Non-Working Devices/Device Not Recognized	<ul style="list-style-type: none"> • Ensure that cables are plugged in. • Ensure that the cables are firmly connected to the device • Check that the add-on cards are seated in their slots. • Check the device drivers. • Try to reinstall the device driver or download the latest version. • Try to uninstall and reinstall the device.

Problems After Installing New Software or Device Driver	<ul style="list-style-type: none"> • Uninstall the software or driver • Return the system to a previous working state by using System Restore. • Try to boot to Safe Mode and then perform a restore. • Restart the system • Press the F8 key continuously. • Select Safe Mode from the menu displayed and press enter. • Start system restore.
Nothing Happens when Power Button is hit	<ul style="list-style-type: none"> • Check the power connection. • Ensure that the wire from the case power button is connected to the right connector on the motherboard. • Check the power connections to the motherboard. • Check the floppy power cable. • Unplug everything from the motherboard except power cable, power button wire, video card, memory and processor. • If it does not power up, that means the motherboard or the case power supply is defective.
System Freezes Intermittently while Installing the OS	<ul style="list-style-type: none"> • Verify that the heat sink fan is spinning • Ensure that the heat sink is firmly mounted • Check that the heat sink is parallel to the surface of the processor.

6.2.7. Replacing Faulty Modules

A field technician also provides hardware and related software service and maintenance which may include installation or repair of hardware equipment or associated software by monitoring, troubleshooting and replacing faulty modules. While replacing faulty modules, it's the responsibility of the field technician to check the warranty on the faulty module while replacing it and also ensure that no damage is done to the other hardware.

The following figure lists the steps to be followed in order to replace a faulty module:

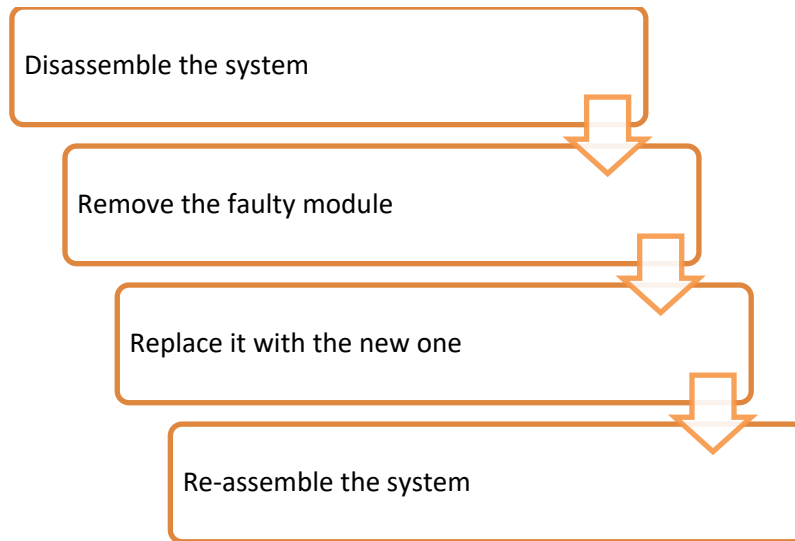


Fig. 6.2.8: Steps for replacing a faulty module

New Product Models

Since IT industry evolves at a very fast pace, the field technicians need to be updated with the latest products, their software ecosystem and methods to operate the technologically advanced machines. New tech savvy hardware comes with a specific set of rules and operating methods. Therefore, field technicians need to acquire complete knowledge about their functioning. A field technician should do the following when working with a new product:

- Keep in mind the constraints related to the use of the new product to avoid any hardware or software failure.
- Comply with the codes put in place for the use of any machine or software.

Practical

Perform the task of replacement of hard disk drive for desktop.

Hardware:

1. SATA and IDE drives

UNIT 6.3: Completing Repairs

Unit Objectives

At the end of this unit, you will be able to:

- Report percentage of call closure in multiple visits against the benchmark
- Ensure no sub-standard or unverified parts are used in replacing
- Complete the function within the agreed Turn Around Time (TAT)
- Meet monthly or daily targets given

6.3.1. Report Percentage of Call Closure

The job of a field technician does not end with just examining or maintaining the equipment. Once an equipment, for example a computer is worked upon, the technician is required to create a detailed report on the changes made, specify the next supposed date when the hardware or the software on the system may require repair or update and in how many days the assigned task was completed. For example, a task was to be completed in two visits but the technician took three visits to complete it then they need to report why they took more time to complete the task. In addition, they also need to specify the reason of delay such as appropriate tools missing, spare part unavailable at store and so on.

6.3.2. Use Only Verified Parts

As the cost of verified parts/modules is greater than that of sub-standard and unverified ones, so many people prefer the unverified parts. The unverified parts can stop working at any time. In addition, they can cause damage to the system's performance. So, it is the responsibility of the field technician to make use of only verified parts while replacing the parts and also make the customers aware of its advantages.

6.3.3. Complete the Work in Turnaround Time (TAT)

In most organizations, conflicts between co-workers occur due to tight schedules and deadlines. Employees working on deadlines are required to work on short turnaround times, resulting in frustration and stress. Strategic planning in advance is the best way to avoid such circumstances. Irrespective of the team size, this can be achieved by deploying tools to communicate deadlines.

The following figure shows key points which will help in timely completion of work:

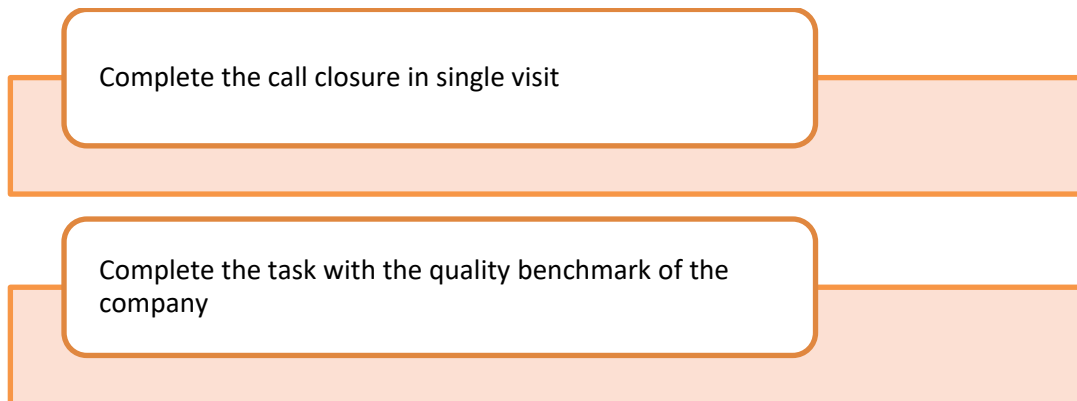


Fig. 6.3.1: Key points for timely completion of work

6.3.4. Meet the Targets

Just like any other job profile in an organization, meeting the targets set down by the management is very important. A field technician needs to be clear about the goals and visions of the organization to achieve all the designated targets. The following figure shows the key points which will help a field technician to meet the expected targets:

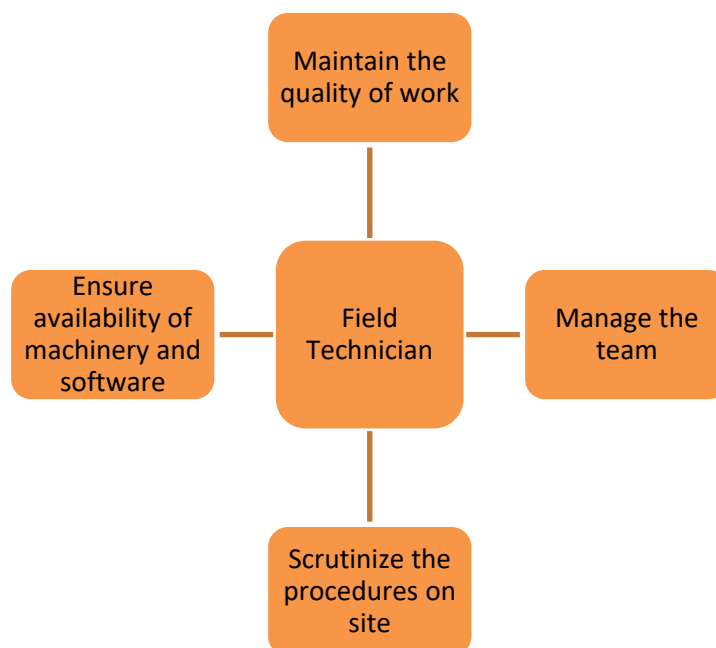


Fig.6.3.2: Key points to remember for meeting targets

The quality of work needs to be maintained at all times in compliance with the referral handbook of the company. Making sure that individual roles and responsibilities are understood by the personnel is vital. Timely check of the machinery and software systems needs to be done to avoid any bottlenecks in achieving weekly or monthly targets.

UNIT 6.4: Reporting to Superior

Unit Objectives

At the end of this unit, you will be able to:

- Take work order from the Supervisor
- Report 100% on time completion
- Submit the feedback form
- Report work status accurately
- Create knowledge bank

6.4.1. Understand the Work Requirement

For a person to work, it is important to understand the work requirements. The work requirements for a field technician include certain responsibilities as shown in the following figure:

Take work order from the supervisor or customer care about the complaint registered

Understand the work requirements

Follow the line of authority

Issue on time the tools and the equipments

Keep upto date with new products and developments

Plan, organize and control work for efficiency

Report on the work load and completion status

Find solutions to customer complaints and queries that are unresolved in the field or escalate issues of concern to the supervisor

Fig. 6.4.1: Meaning of work requirement

Work requirement is also a document which has the date, location and the details of a particular task which has to be done. It is the record of the task which is to be performed. The technician should be able to understand the task assigned and its requirements.

6.4.2. Quality and Timely Completion of Work

A few simple principles, if adhered to, can ensure quality work. As a field technician, maintenance of quality and timely completion of work can be done in the following ways:

- Ensure that work is done as per the guidelines and standard of the company.
- Plan and organize the allocated work for the day.
- Follow the proposed plan of action.
- Inform the supervisor in case of any deviation or emergency.
- Work to ensure 100% customer satisfaction.

The field technician would get a job sheet or work allocation from the supervisor. The supervisor will also share a plan of action with field technician to ensure adherence to timeliness and quality for the work assigned and should specify the reason for not meeting the target. For example, a field technician should repair or replace hardware with reference to an agreed target and time or specify the reasons for not meeting target. The following figure highlights the points which will help a field technician in understanding the plan to achieve 100% quality and timely completion of work:



Fig. 6.4.2: Achieving quality and timely completion of work

6.4.3. Submit the Feedback Form

Once the issue/problem is solved, feedback from the customer is very important. Feedback helps to create a reference guide for the field technician in an organization if the same problem creeps up again. Having discussions with the supervisor in relation to the problem and its solution solves a lot of intangible problems in the organization.

The customer is always special for an organization and therefore, customer's feedback is the most important aspect of providing service for an organization. A technician should take

customer feedback in a feedback form provided by the company. The following figure represents a procedure to take feedback from the customer:

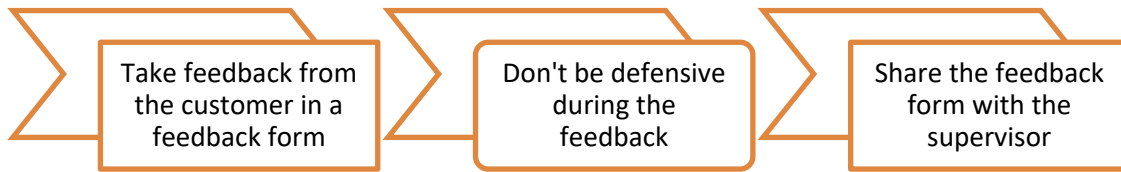


Fig. 6.4.3: Procedure for taking the feedback

6.4.4. Documentation

After completing the installation at the site, the technician should complete the documentation to record the details related to installation. They should also create knowledge bank on the complex repairs made through documentation. Along with completing the documentation, the field technician should tell the customer about some dos and don'ts for using the computer and its peripherals. A field technician should know how to use MS-Word, MS-Excel to properly insert the information about the work done at the customer's site.

The field technician will also tell the customer about important pages to be referred to from the product manual such as the webcam switch and its functionality. The documents may include the following:

- Work status report
- Customer hand over slip
- Customer feedback form
- Servicing date or period
- Warranty documents

Tests performed on the networking/storage with results, in case there is a complaint or an issue in the already installed networking/storage.





7. Interacting with Customers

Unit 7.1 – Identify Customers' Requirements

Unit 7.2 – Interacting with Customers Prior to Site Visit

Unit 7.3 – Suggesting Solutions to Customers' Problems

Unit 7.4 – Maintaining Schedules and Records

Unit 7.5 – Achieving Productivity and Quality



Key Learning Outcomes



At the end of this module, you will be able to:

- Identify customers' requirements
- Learn how to interact with customers
- Suggest resolutions to the problems of customers
- Learn how to maintain records of customers' complaints and resolutions
- Describe the importance of productivity and quality

UNIT 7.1: Identify Customers' Requirements

Unit Objectives



At the end of this unit, you will be able to:

- Identify a customer's requirement
- Educate customers about different aspects of installing and repairing hardware

7.1.1 Understand a Customer's Requirement

Understanding the needs of a customer is one of the foremost parts of a technician's job role. This includes the following practices:

- Call the customer as per the complaint registered to understand the issues
- Check the time of visiting the location
- Greet the customer and talk politely
- Understand the customer's requirement
- Provide the best possible and cost effective solution to the customer
- Ensure that the customer is satisfied with the service
- Address the queries and issues raised by the customer about the hardware devices

7.1.2 Educate and Inform the Customer

Educating the customer about the products and their operation is an important aspect of a field technician's job. For the satisfaction of the customer, a field technician should inform him/her about the operational behaviour of the hardware installed at the site or premises and also give other information related to it.

The following figure shows a list of information about the hardware which is to be used by the customer:

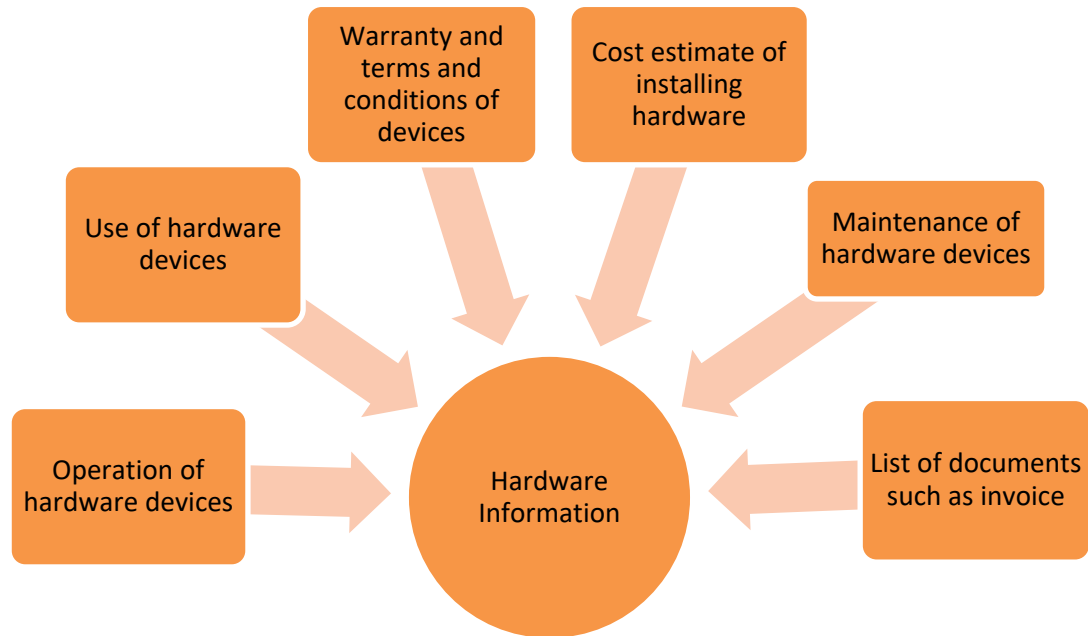


Fig 7.1.1: List of information about hardware

UNIT 7.2: Interacting with Customers Prior to Site Visit

Unit Objectives



At the end of this unit, you will be able to:

- Analyse location requirements for the hardware devices
- Ask customers about their issues
- Inform customers about the repair procedure and warranty coverage of devices
- Educate customers about the annual maintenance contract

7.2.1 Analyse Location Requirements

For a field technician, it is important to analyse the location before installing the hardware components and other peripherals, for their proper handling and to prevent them from any damage.

While analysing the location, the customer's requirements should be understood such as where the hardware should be installed and whether it can be installed at that location or should be taken to the service centre for any changes.

Some points that should be kept in mind while analysing the location requirements for hardware installation are as shown in the following figure:



Location should be dirt free.



It should be away from wet area.



It should be spacious.



It should not be in a high temperature or high humidity zone.

Fig. 7.2.1: Analysing the location requirements for hardware installation

7.2.2 Ask Questions

Asking Questions is also a skill. They may be asked to get more details or to be sure of something. A field technician should ask the customer questions to analyse the problems being faced and seek inputs to understand the symptoms.

The following figure enlists the points to be asked or ensured at a customer's premises:

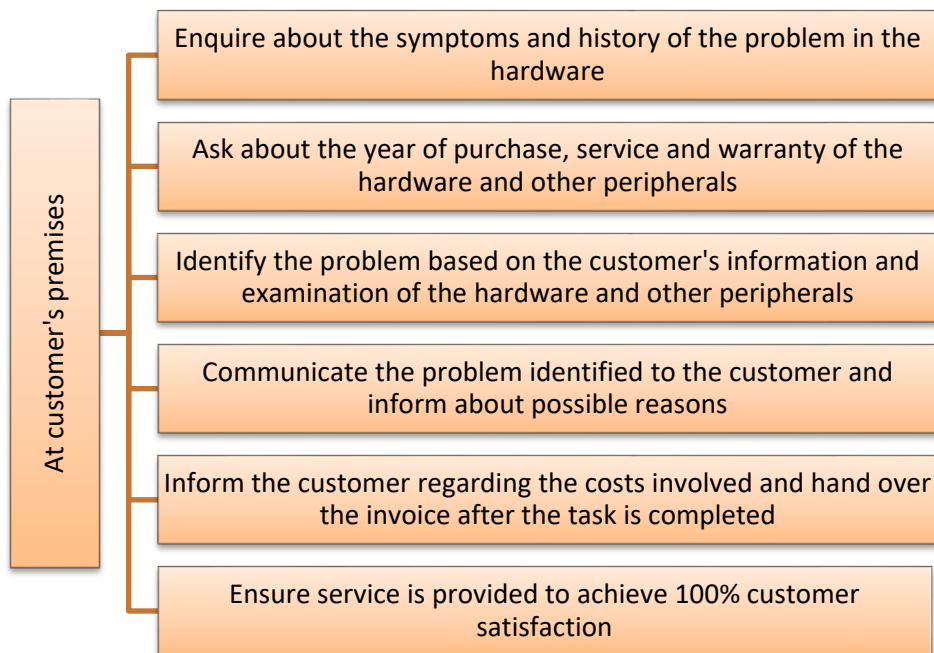


Fig. 7.2.2: Points to be asked or ensured at a customer's premises

Depending upon the intention of asking a question, it can be:

- Close ended questions – are mainly yes, no answer type questions. The purpose of asking such questions is to get specific details. The following table shows close ended questions:

Example	Question Tag
Did you come yesterday?	Do, Did, Is, Can, Could, Will, Would, Shall, Should and so on
Can you finish this task in 2 hours?	
Shall I do it now?	

- Open ended questions – are mainly questions which do not demand a specific answer but are probing for details. The following table shows pattern of open ended questions:

Example	
What do you think about the meeting yesterday?	
How was your day?	
Where have you been all afternoon?	

7.2.3 Warranty Coverage and Annual Maintenance Contract

A warranty coverage is an agreement between the manufacturer and the buyer which assures the customer of a free repair service till the mentioned date of warranty. A field technician should enquire about the warranty coverage after inspecting the device which is to be replaced or repaired.

If the device is out of warranty coverage, the customer should be informed about the initial charges of replacing the damaged part.

The following figure shows a warranty card template:

Name _____

Address _____

Zip code _____ State _____

Email _____ Contact number _____

Model number _____ Serial number _____
(these can be found on the base of the machine)

Date of purchase _____ Place of purchase _____

A barcode is located next to the Serial number field, and a red arrow points to it.

Fig. 7.2.3: A warranty card template

Inform Customer about Replacement or Repair Process

A technician is responsible for informing a customer about the replacement or repair procedure of a defective hardware. The customer has to be told whether the repairing would take place at the premises or at the service centre and about the estimated cost of repairing.

Annual Maintenance Contract

It is defined as a contract between two parties about the maintenance of a product owned by one of the parties, on some terms and conditions, which are negotiated in the beginning and are maintained in the form of a legal contract.

A technician should educate the customer about this contract and its benefits regarding product maintenance and legal terms and conditions, so that in future the customer would be able to use this contract to repair the damaged products.

The following image shows template for annual maintenance contract of hardware and peripherals:

[illegible]

Fig 7.2.4: Template for annual maintenance contract of hardware and peripherals

UNIT 7.3: Suggesting Solutions to Customers' Problems

Unit Objectives



At the end of this unit, you will be able to:

- Provide solutions to the customers' problems
- Inform the customer about the estimated cost of repairing under warranty and time required to repair the faulty equipment
- Explain to the customer the reasons for replacement, if the module requires it

7.3.1 Suggest a Solution to the Customer

After identifying the issue, a field technician needs to offer solutions to the customer. All the possible solutions should be explained along with their associated cost. The technician should then propose the best solution and let the customer decide whether to go ahead with it or not.

The following figure shows the steps involved in offering solutions to a customer:

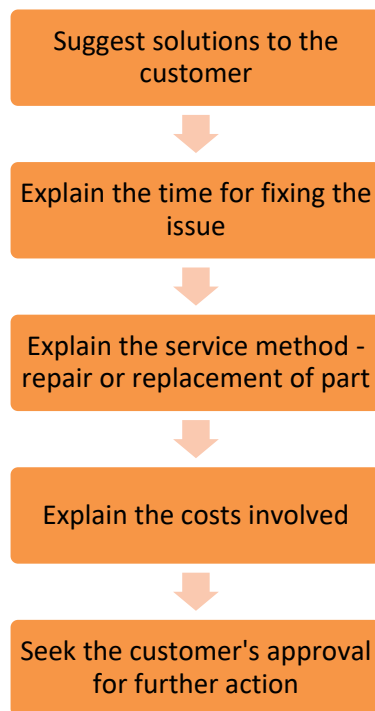


Fig 7.3.1: Suggesting a solution to the customer for an issue

7.3.2 Inform and Explain to the Customer about Modules Replacement

A technician is required to inform the customer whether the faulty module has to be replaced or repaired along with reasons. For instance, if the product is under warranty coverage then the customer has to be told about the estimated cost of repairing and the time required to repair it.

The following figure shows the steps required to inform the customer about modules replacement:

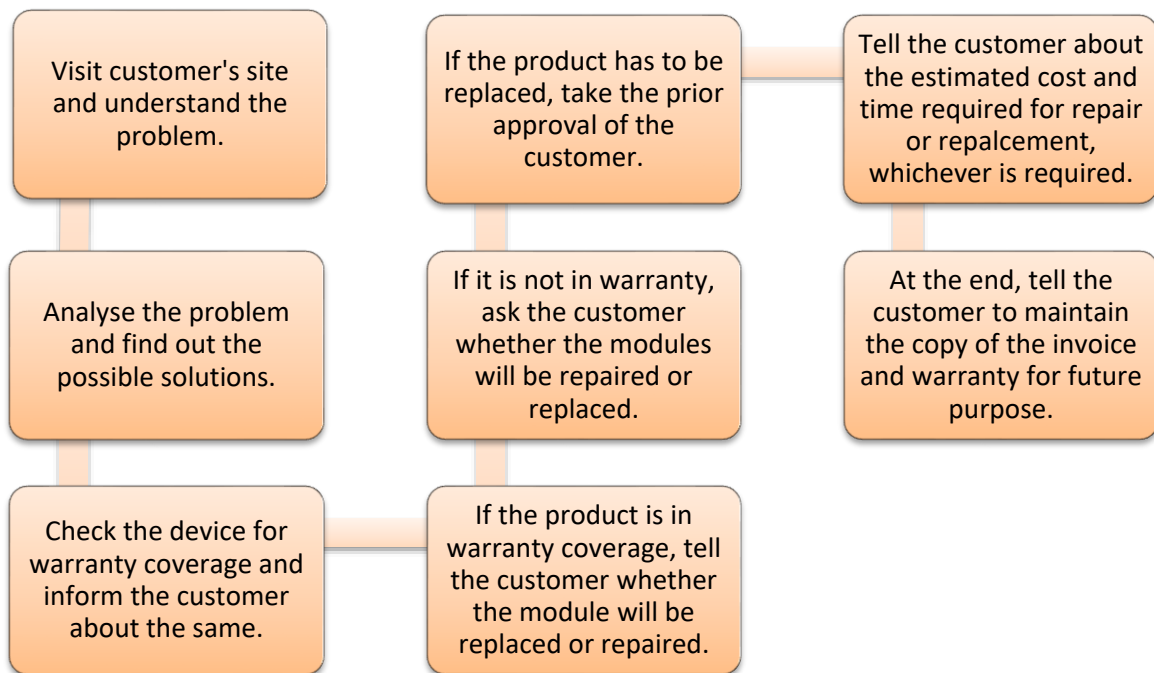


Fig 7.3.2: Steps required to inform the customer about modules replacement

UNIT 7.4: Maintaining Schedules and Records

Unit Objectives

At the end of this unit, you will be able to:

- Explain maintenance schedules
- Tell the customer to retain the copy of the invoice and provide the same

At the end of this unit, you will be able to:

- Explain maintenance schedules
- Tell the customer to retain the copy of the invoice and provide the same

7.4.1 Maintenance Schedule

A maintenance schedule is vital for keeping records of servicing, repairing and performing preventive maintenance. A field technician should maintain service records and next servicing schedules to be able to inform the customer about the maintenance of the components at the facility. The technician needs to perform hardware and software maintenance.

The following screenshot shows a sample maintenance schedule report:

Home
Calendar
Location
Assets
Services
Work Orders
Recurring Tasks
Reports
Administration
Help
Log out

Search

Status:

Active

Service Routine Name:

Asset Type:

Select Asset Type

Asset Name:

Select Asset Name

Manufacturer:

Select Manufacturer

Next Service Date:
From:

To:

Location:

Select Location

Service Routines (By Asset)

Page

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Per Page:

15

Report

Displaying 76 - 90 of 93

Name	Description	Service Type	Last Service	Next Service
Synthetic Oil PM	Annual Preventative Maintenance	Preventive Maintenance		02/01/2019
Test	Testing Purpose	Preventive Maintenance		08/02/2019
Test PM		Preventive Maintenance		08/02/2019
Test Oil		Preventive Maintenance		08/02/2019
Test Wheel		Preventive Maintenance		08/02/2019
Testing Drive	Testing Assets in WIS	Preventive Maintenance		08/02/2019
Wheelend		Preventive Maintenance		08/02/2019
Wheelend		Preventive Maintenance		08/02/2019
Tires - AC PM	Semi Annual PM on (2) AC WHEELS	Preventive Maintenance	08/08/2019	1/28/2020
Tires - UPE PM	Annual PM on (2) 55-072387	Preventive Maintenance	1/28/2020	1/28/2020
UOIL, Overhaul	Annual PM on (2) 01C19887	Preventive Maintenance	02/01/2019	02/01/2019
UOIL, Overhaul	Annual PM on (2) P0102010204	Preventive Maintenance	02/01/2019	02/01/2019
UOIL, Overhaul	Annual PM on (2) 01C19887	Preventive Maintenance	02/01/2019	02/01/2019
UPE USE	Unscheduled Maintenance on UPE	Unscheduled Maintenance		1/28/2020
WHEELS - AC PM	Semi Annual PM on (2) AC WHEELS	Preventive Maintenance	12/01/2019	04/01/2020

Fig. 7.4.1: Sample maintenance schedule report

Hardware Maintenance

The field technician should assess the condition of the hardware components and upgrade them if required. He/she should be aware of the compatibility issue. The technician also needs to maintain the warranty details of the components. If the warranty period is going to expire, the person should communicate that with the customer and ask if any extended warranty is required.

In this case, there are two ways:

- The customer can ask for extension of the warranty period.
- The customer doesn't want to extend it. If there is any problem, he will buy a new one.

The field technician needs to communicate about the above two ways and then tell the details of further procedure.

The following image shows a sample maintenance requirement form:

Fig. 7.4.2: Sample maintenance requirement form

The technician should maintain a checklist for scheduling the maintenance. The following figure shows a maintenance checklist:

Activity	Frequency	Auto?
Check power supply fan for ventilation and dirt build-up and clean if necessary	Quarterly	No
Back up CMOS information	Quarterly	No
Check processor temperature, inspect heat sink and fan to ensure they are working	Annually or Whenever case is open	No
Check hard disk for temperature and vibration	Annually (or whenever case is opened)	No
Clean exterior of case	Annually	No
Clean exterior of monitor	Annually	No
Check and clean interior, motherboard and expansion cards if necessary	Annually	No
Check internal connections and cables	Annually	No

Fig. 7.4.3: A maintenance checklist

7.4.2 Maintain the Copy of Invoice

Invoice is defined as a non-negotiable instrument given by the seller to the customer after purchases of the goods and services. It acts as the bill of sale or contract of sale.

- Trading parties (seller and customer)
- Quantity of items sold
- Date of shipment
- Mode of transport
- Rate and discount
- Delivery and payment terms

The following image shows sample of an invoice template:

[illegible]

UNIT 7.5: Achieving Productivity and Quality

Unit Objectives

At the end of this unit, you will be able to:

- Deliver service within the service level agreement (SLA) time
- Identify customers' requirements and put them at ease by providing appropriate solutions
- Achieve customers' satisfaction
- Maintain no repeat or second escalation from a customer

7.5.1 Deliver Service within SLA time

To achieve a customer's satisfaction, it is necessary to deliver the service within the time as mentioned in the SLA. Managing the expectation of a customer is not easy for a field technician. The expectations can turn into a grave problem if the responsibilities and the roles of both the parties are not clearly defined on paper and agreed upon by both the customer and the service provider.

An agreement of a sort is therefore important to understand that both the parties – customer and organisation– have duties and responsibilities to each other and these must be properly detailed. This is where an SLA comes in. An SLA is a formal contract between the service provider and the customer, defining services, responsibilities, scope and duties of both the parties. For instance, an IT hardware company may offer routine inspection and maintenance service for a certain period of time as part of one time cost at the time of purchase of an equipment.

The following image shows an SLA:



Fig. 7.5.1: Writing out an SLA

It is important for the field technician to read and understand the SLA before visiting a customer, so that all the queries, support and service can be addressed according to the terms specified. This will minimize all the issues related to service expectations of a customer.

The following figure enlists practices required to be followed to achieve a customer's satisfaction:

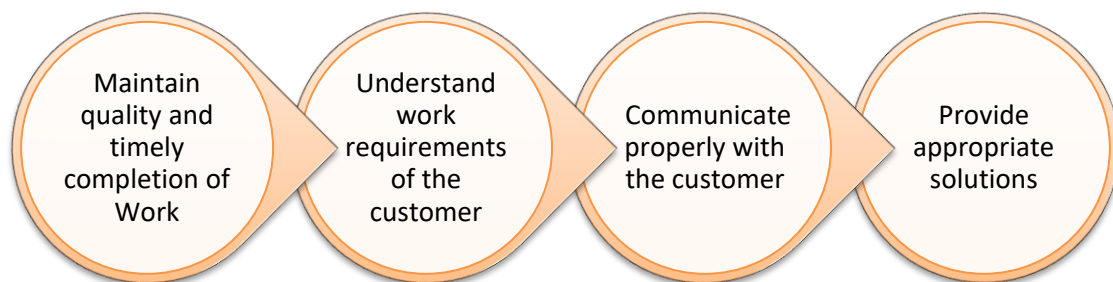


Fig 7.5.2: Practices to be followed to achieve a customer's satisfaction

Maintain Records of Activity

One of the most important parts of good customer service is maintaining accurate records, containing details of dealings with the customers. Customers' records can help to gather information about how best to market a company's services and also help to ensure that the organisation runs smoothly. Most records are stored electronically on a database.

Objectives of Documentation

- To record all the problems reported by users
- To record the timing of the corrective action
- To record the issues that are escalated and to whom
- To record what action has been taken and by whom
- To record when the outstanding requests got cleared.

7.5.2 Maintain No Repeat or Second Escalation from a Customer

Zero defect in work can be achieved in the following ways:

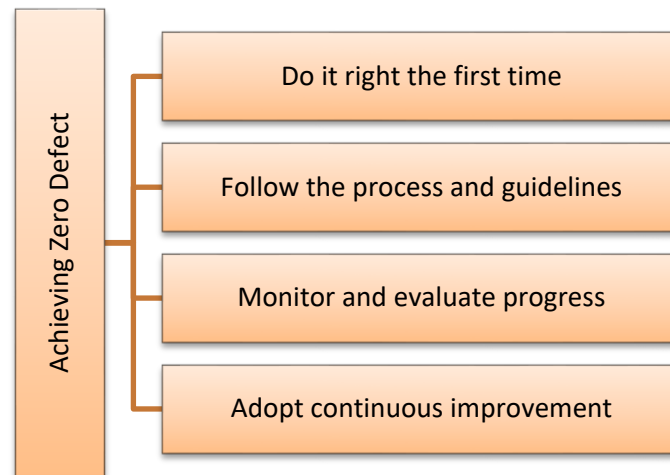


Fig. 5.5.3: Measures to achieve zero defect in work

Escalation Process

There may be a case where a customer's request is not closed within the agreed SLA time frame. In such a situation, the technician should escalate the matter to the superior/ back line support and the escalation manager. The supervisor is responsible for ensuring that all escalated enquiries are dealt with and resolved promptly. However, the technician should try to exhaust all the options at his level before escalating any enquiry to the supervisor.

A customer enquiry should reach the supervisor only if there is a need to oversee the issue from a holistic viewpoint. They will evaluate the situation, facilitate the issue resolution and act as an advocate on behalf of the customer.

Complaints escalation process

The technician should do everything to resolve an issue at the first instance. To facilitate the fast and efficient resolution of the issues at the first point of contact, a complaint process needs to be designed and followed.

If an issue is unresolved and needs expert guidance, the technician should clearly explain the escalation options to the customer before proceeding further.

The following figure illustrates the steps of a complaint resolution process:

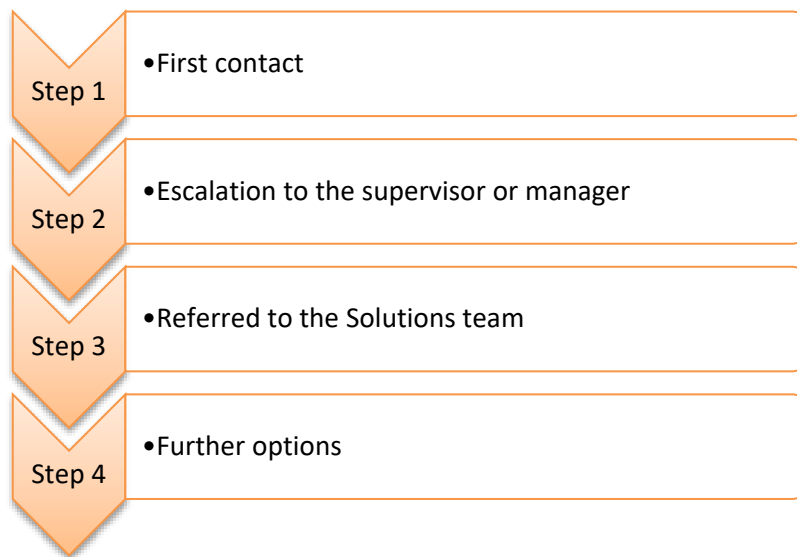


Fig. 7.5.4: A complaint resolution process

Step 1: First contact

A field technician needs to be suitably empowered to resolve first level complaints as well as complex issues and make rational customer service decisions.

Step 2: Escalation to the supervisor or manager

If the technician is unable to resolve a complaint, it can be escalated to the supervisor or manager. The manager will review the problem, respond to the complainant and attempt to resolve the issue to the customer's satisfaction.

In circumstances where the manager is unable to resolve the complaint to the customer's satisfaction, it will be referred to the Solutions team.

Step 3: Referred to the Solutions team

The Solutions team will review and try to resolve the issue to the customer's satisfaction in accordance with the industry code and regulation.

Step 4: Further options

Most of the complaints can be handled internally by utilizing all the possible avenues available for resolving it. However, if the customer is still not satisfied with the handling of the complaint, then as a last resort the technician may seek complaint mediation or further assistance from the supervisor.



8. Understanding Organizational Policies and Standards



Unit 8.1 – Explain Company's Policies

Unit 8.2 – Identify Company's Product/Quality Standards

Unit 8.3 – Describe Company's Safety Policies and Standards

Unit 8.4 – Interact with Supervisor

Unit 8.5 – Interact with Colleagues



Key Learning Outcomes



At the end of this module, you will be able to:

- Explain company's policies
- Identify company's product/quality standards
- Describe company's safety policies and standards
- Interact with supervisor
- Interact with colleagues

UNIT 8.1: Company's Policies

Unit Objectives

At the end of this unit, you will be able to:

- Identify the company's customer care policies
- Identify the company's code of conduct policies
- Describe the organisation culture and typical customer profile
- Explain the company's reporting structure
- Define company's policy on product's warranty
- Identify the company's line of business, product portfolio and competitors

8.1.1. Customer Care Policies

A technician needs to meet the requirements, needs and expectations of the customers. This can be done by providing timely resolutions to queries and complaints. The goal is to minimize the system's downtime and improve the customer's overall experience of getting a device installed or serviced.

Therefore, a technician needs to follow certain policies laid down by the organization for ensuring that the maximum customer satisfaction is achieved. The following figure lists some features of the customer care policies that a technician needs to adhere to:

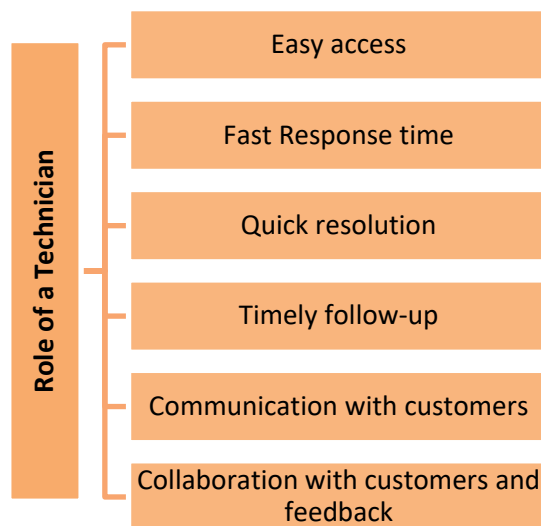


Fig. 8.1.1: Role of a technician

8.1.2. Code of Conduct Policies

In an organization, the code of conduct means the core values, ethics, responsibilities, commitments and virtues that every employee of that organization needs to comply with. It

lays down the general guidelines that the organization expects from its employees in specific situations. Thus, it is necessary to follow a proper code of conduct in terms of behaviour and work output delivered.

8.1.3. Organisational Culture

Organizational culture is defined as the shared values, beliefs and norms within an organization and the demands of a job role. A field technician represents the organization in front of the customers and has direct interaction with them. The following figure represents the characteristics of organizational culture which a technician should reflect:

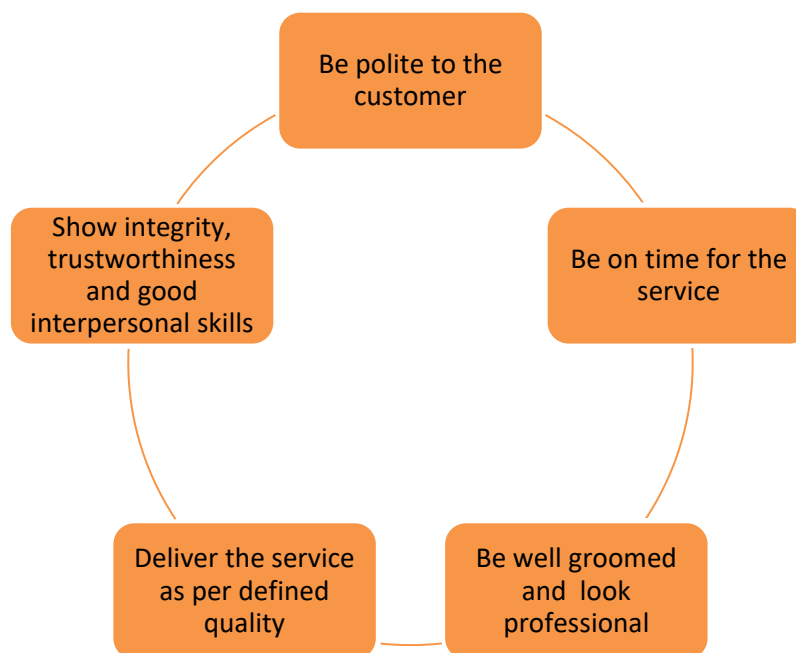


Fig. 8.1.2: Characteristics of organizational culture

As a field technician, the individual may need to cater to different sets of customers, from different backgrounds.

The following figure represents the broad classification of customer profiles:

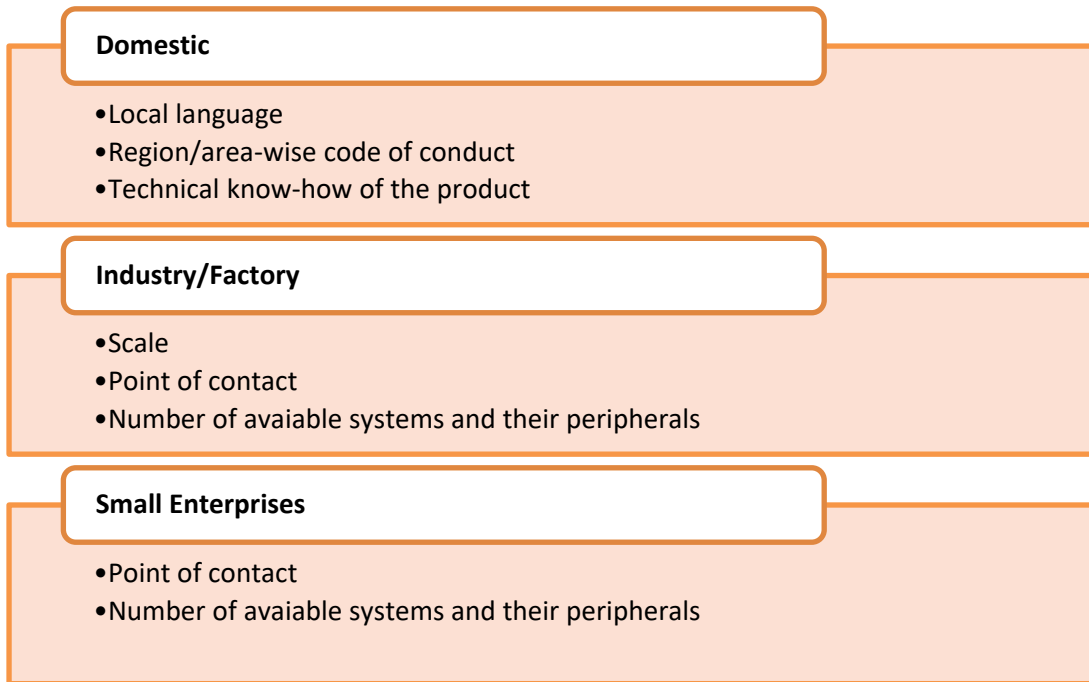


Fig. 8.1.3: Classification of customer profiles

Company's Policies and Rules

If a company's policies and rules are not defined clearly, then the employees may not comply with the disciplinary standards wholeheartedly. The following figure lists a few examples of a company's policies:

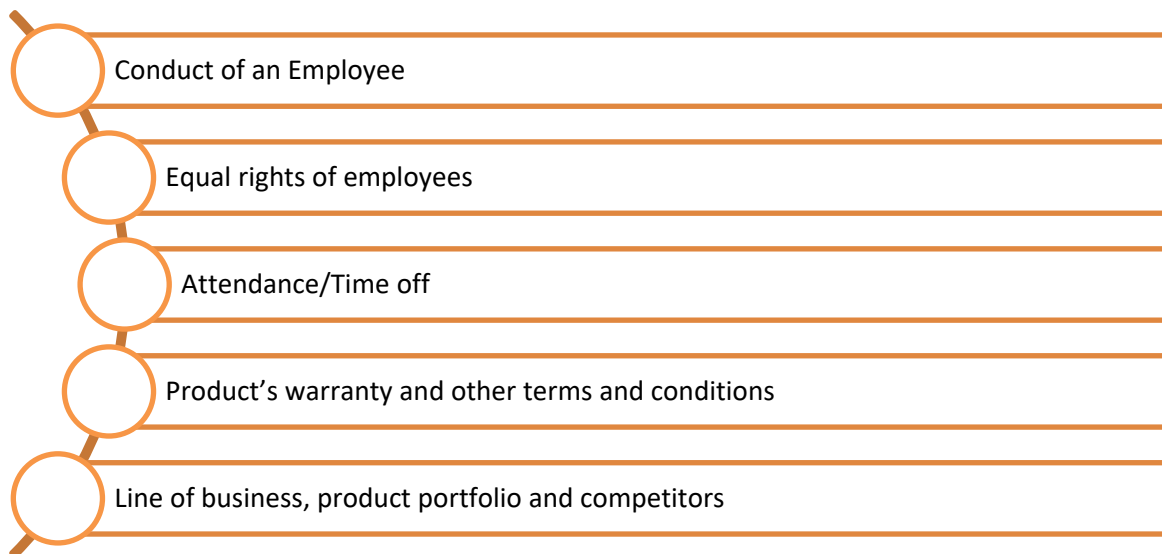


Fig. 8.1.4: A company's common policies

Reporting Structure

There are set rules and regulations within an organization which an employee needs to follow. These outline responsibilities of both the employers and the employees. The following figure lists the key points of the reporting and documentation process a field technician needs to ensure while working in an organization:



Fig. 8.1.5: Reporting and documentation process

Documentation

Right documentation can make a lot of the difference in getting quick resolutions. To achieve this, certain steps need to be taken as shown in the following figure:

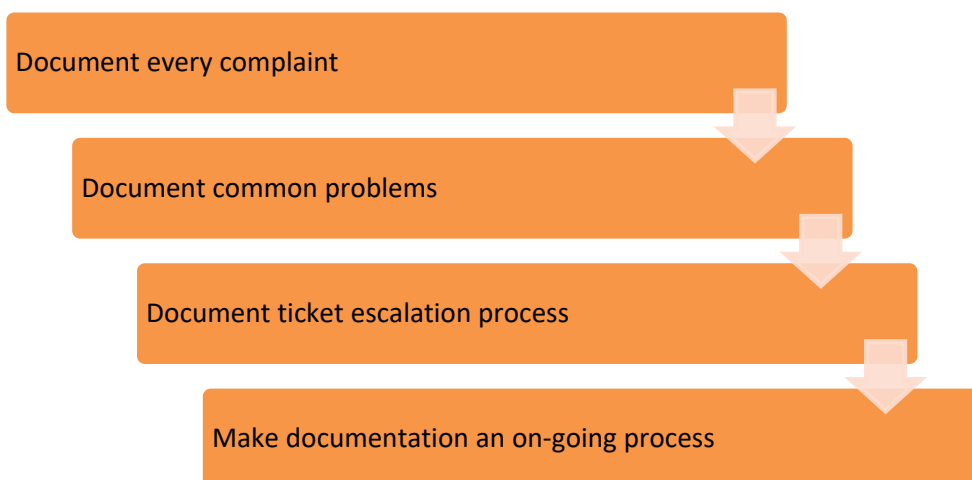


Fig. 8.1.6: Steps for right documentation

Document Every Complaint

The field technicians need to document issues as they come in. In addition to recording the symptoms described by the customers, they should probe for the right symptoms. For example, if a customer says that his computer is running slow, the technician needs to

differentiate whether the problem is caused by a virus or a malfunctioning hardware or an unpatched system.

The field technician should know how to ask the right questions to try and resolve an issue within the first call.

Document Common Problems

Majority of the issues can be reduced to a handful of common problems. If there is a good documentation process that has resolution paths for all common problems, then the field technician does not have to reinvent the wheel for every ticket. He can use the internal help desk knowledge base and time tested processes to resolve the issues quickly.

A well organised process enables the field technician to respond to a ticket quickly and resolve most of the customers' problems immediately.

Document Ticket Escalation Process

A good escalation process makes sure that when the field technician is not able to resolve a problem, he/she addresses ticket escalation promptly. The ticket gets send to the next level of customer support and the customer does not have to wait for days for it to get resolved.

Documentation should be an on-going effort

Documentation is not a onetime effort; it needs to be an on-going process. The field technicians should regularly optimize the issue resolution procedures and processes. This ensures that the customers' issues are resolved promptly.

UNIT 8.2: Company's Product/Quality Standards

Unit Objectives



At the end of this unit, you will be able to:

- Identify the company's products and the reporting of recurring problems

Company's Products and Recurring Problems Reported

The Computer and Peripherals industry produces a wide range of products for sale to just about all businesses and consumers. It can consist of products like printer, scanner, mouse, monitor and other devices as mentioned in the above modules.

An overview of a company's product is as shown in the following image:



Fig. 8.2.1 An overview of a company's product

Occurrence of Recurring Problems

When a field technician visits a customer's site for repairing or replacing faulty modules, the person should keep a record of the visit and educate the customer about the procedure of repairing, so that if in future the problem persists, it can be tackled.

But, sometimes, these problems occur frequently.

In this case, a field technician should perform the following steps to troubleshoot the recurring problems in the device as shown in the following figure:

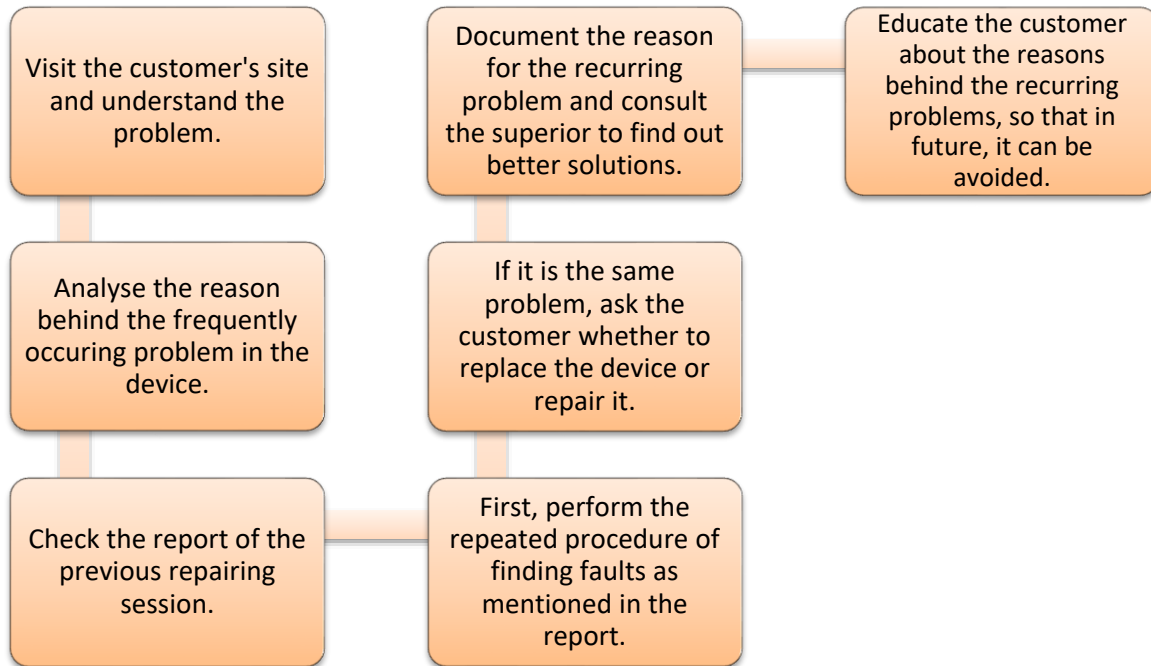


Fig 8.2.2 Steps to troubleshoot the recurring problems in a device

UNIT 8.3: Company's Safety Policies and Standards

Unit Objectives



At the end of this unit, you will be able to:

- Identify the safety procedures to follow
- Identify the quality standards to be followed
- Explain electrostatic discharge(ESD)

8.3.1. Safety Procedures

As a field technician, there are certain guidelines that must be followed to ensure own safety and that of the co-workers. These guidelines provide a sound, safe and flexible environment to work. The following figure represents the general safety guidelines to be followed at workplace:

Always follow the correct procedures to ensure zero accidents at work.

Always use an appropriate tool for the respective task.

Always read labels and instructions given on the components.

Always wear appropriate clothing and remove metal objects before working.

Use prescribed protective safety equipment only.

Always follow electrical safety rules when working with electrical machinery or equipment.

Report all unsafe acts or unsafe conditions to the supervisor.

Fig 8.3.1. Safety guidelines

8.3.2. Quality Standards

A few simple principles, if adhered to, can ensure production of quality work. As a field technician, maintenance of quality and timely completion of work can be done in the following ways:

- Ensure that work is done as per the guidelines and standard of the company.
- Plan and organize the allocated work for the day.
- Follow the proposed plan of action.
- Inform the supervisor in case of any deviation or emergency.
- Work to ensure 100% customer satisfaction.

The field technician would get a job sheet or a work allocation from the supervisor. The supervisor would also share a plan of action with the field technician to ensure adherence to timelines and quality for the work assigned. The following figure highlights the points which help a field technician in understanding the plan to achieve 100% quality and timely completion of work:

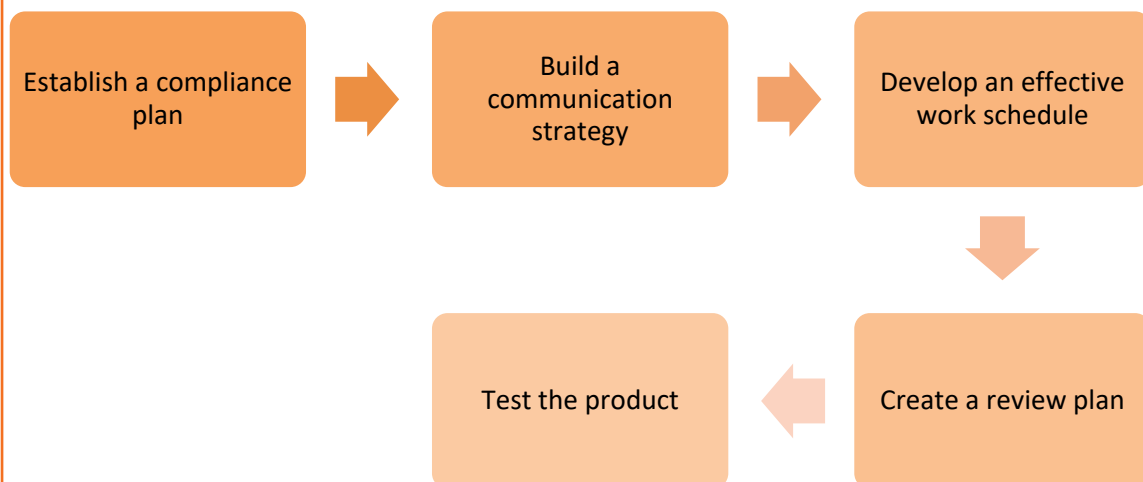


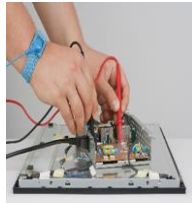
Fig. 8.3.2: Achieving quality and timely completion of work

8.3.3. ESD Protection

ESD protection is essential for sensitive components, during and after production, while shipping, during assembly of the device and in the finished device. ESD can cause severe damage to components such as microchips. Grounding is imperative for ESD prevention. An ESD simulator having special output circuit called human body model (HBM) is generally utilized to test the vulnerability of electronic devices to ESD from human contact.

The following protective gears should be used while handling components that are prone to ESD:

Wire strap



Gloves



Safety Clothes



Fig. 8.3.3: Safety gears for prevention of ESD

Activity

Tick the actions which can prove to be a threat to the health and safety of a field technician.

- | | |
|--|--------------------------|
| Smoking near combustible substances | <input type="checkbox"/> |
| Oil spill near customer interaction area | <input type="checkbox"/> |
| Tools lying on a table of a field technician | <input type="checkbox"/> |
| Tools lying on the floor | <input type="checkbox"/> |
| Entering a 'No Entry' zone at customer site | <input type="checkbox"/> |
| Touching a live wire hanging out of a panel | <input type="checkbox"/> |
| Working in dim light | <input type="checkbox"/> |
| Walking on a wet floor | <input type="checkbox"/> |

UNIT 8.4: Interacting with Supervisor

Unit Objectives



At the end of this unit, you will be able to:

- Describe and assess work requirements
- Identify the targets and incentives
- Explain documentation of work on enterprise resource planning (ERP) software
- Resolve personnel issues
- Communicate potential hazards at a particular location
- Deliver work of expected quality despite constraints

8.4.1. Work Requirement

As a field technician, one of the major roles and responsibilities is to understand the work requirements. The major roles of a field technician are as follows:

- If there are any issues in the hardware and software, a field technician needs to come-up with solutions as soon as possible to eliminate any bottlenecks in terms of productivity. It is an integral part of maintaining a smoothly running working environment having zero tolerance for even major delays.
- Coordinating with customers, co-workers, subordinates and superiors is also defined as one of the major roles of a field technician.
- A field technician needs to have a clear picture of the work requirements as it determines the smooth functioning of an organization.

Understand Work Requirements and Targets

The targets and short term goals set by the organization determine the targets for the personnel. The field technician needs to understand the goals set by the superiors. These may be set with respect to timespan as listed in the following figure:

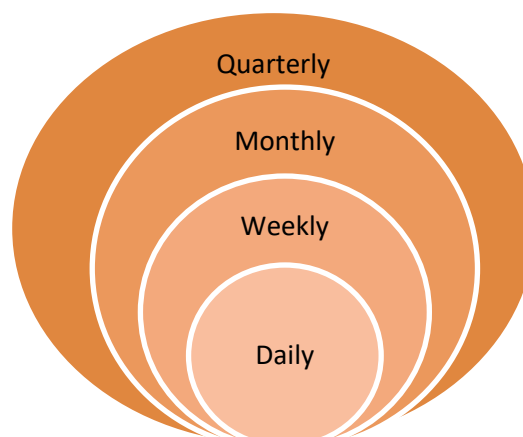


Fig. 8.4.1: Goals set by superiors

These goals then further define the targets to be assigned to the team responsible for all hardware related personnel. The incentive policy should be clear so that the employees can understand it well. It will motivate them to put maximum effort in maintaining hardware facility of an organization.

Any ambiguity in understanding the work requirements defined by the supervisor results in time delays and confusions. A field technician needs to avoid such instances at all costs. For example, failing to understand the priority of jobs or tasks assigned by the supervisor for the day. Understanding the technical requirement is also equally important. So, while replacing faulty modules, a field technician should check the warranty on the faulty module and also ensure that the other hardware is undamaged.

8.4.2 Documentation of Work on Enterprise Resource Planning (ERP) Software

One of the most important parts of good customer service is maintaining accurate records, which contain details of dealings with the customers. Customer records can help gather information about how best to market a company's services and also help to ensure that the organisation runs smoothly. Most records are stored electronically on a database.

ERP software is used in a company to maintain the records of work performed by the field technician. It is defined as a business management software that consists of integrated applications required to manage the documentation process and control back office related functions such as human resources and other technologies.

The following screenshots show samples of ERP software used in an organisation:

The screenshot displays a comprehensive ERP sales order form. The top section contains a menu bar with options like Home, Help, CRM, and Ship To. Below this is a toolbar with icons for New, Save, Undo, Find, Void, Print, Customer Detail, Create Purchase Order, Create Drop Ship Order, Duplicate Sales Order, Import Sales Quote, and Convert To Sales Invoice. The main form area is divided into several tabs: Order, Customer, Payment, Sales Rep, History, Audit Trail, Attachments, MaxMind, and Shipment List. The Order tab is active, showing fields for Order Code, Order Date, Customer PO, Payment Term, Shipping Method, Currency, Contact, Alternate Order #, Location, Web Store, Source, Coupon Code, Ship Date, Opportunity, and various dropdowns for Accounts Receivable, Freight, Discount Given, and Other. Below the form fields is a table for inventory items with columns for Item Code, Quantity, Allocate, Reserved, UM, Description, Location, Type, Sales Price, Net Price, and Ext Price. At the bottom, there are sections for Addresses (Bill To, Ship To) and a Summary section with Sub Total, Freight, Other, Sales Tax, Due Total, Credits, Payments, and Balance.

Functional Processes	ERP Function - Asset Management	Customer Perform/Use Today	Customization	Notes/Comments
General				
1	Commodities	Yes	No	Not an active market - No focus on active market
2	Refined Assets	Yes	No	
3	Refined Assets	Yes	No	Future need - Refinement has been talking about
4	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
5	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
6	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
7	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
8	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
9	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
10	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
11	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
12	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
Adding and Maintaining Assets				
13	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
14	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
15	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
16	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
Asset Budgeting				
17	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
18	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
19	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
20	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
Reporting & Analysis				
21	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
22	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
23	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
24	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
25	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
26	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
27	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
28	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
29	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks
30	Refined Assets	Yes	No	Currently implementing - moving from 1 to 2 weeks

Fig 8.4.2: Samples of ERP software used in an organisation

8.4.3 Work Ethics

Work ethics mean differentiating between the right and the wrong way of doing a job and adopting the right conduct. They involve certain principles as shown in the following figure:



Fig 8.4.3: Work ethics

Consider an example: Pawan finished the task assigned to him. He has done the work on time and in an efficient manner. He also informed his supervisor regarding a major safety breach which helped in preventing an accident situation. Pawan was awarded an incentive for the best work done in that month. Later on, for his alertness and proactive stance he was also awarded by the MD of the company.

Resolve Personnel Issues

Resolving personnel issues involves the followings:

- Communicating effectively with the personnel ensures positive feedback in the organization. Two-way communication within and beyond the facility is also advised for a field technician in any organization.
- All conflicts of interest, misunderstandings and personnel grievances need to be understood and then reported to the higher authority.
- Suggestions on resolving the problems is important as it helps the facility staff to concentrate on the job at hand.

Any personal issue or grievance also needs to be attended to by the field technician himself before pushing the issue through to the supervisors. Managing the personnel is the most important part of team effort towards a unified goal.

Delivery of Work of Expected Quality

Delivery of work as per expected quality should be maintained in the following ways:

- Ensure the work done is as per the guidelines and standard of the company.
- Plan and organize work for the day.
- Follow the plan.
- Inform supervisor in case of any deviation or emergency.

The following figure highlights the points which help the employers in developing a plan to achieve 100% quality and timely work completion:

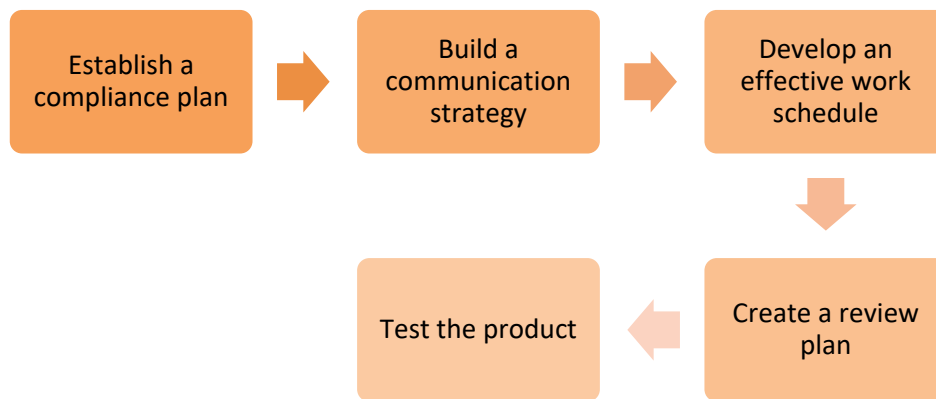


Fig. 8.4.4: Achieving quality and timely work completion

Inform Superior about Potential Hazards

Understanding all possible hazards that can happen in a facility is the responsibility of a field technician. One possible cause of hazard could be the lack of clear understanding about the company's code of conduct or the reference handbook which puts constraints on the use of equipment for purpose that is against the code of conduct. A field technician can handle the hazards by following these practices:

- Communicating any such hazard to the supervisor to prevent unaffordable downtimes which could otherwise hamper critical functioning of the organization.
- Having clear communication with the other staff members and getting in place early warning systems for potential threats in another dimension.
- Making risk assessment is an integral part of a field technician job description. Potential hazards should be assessed with precision and supported with practical evidence.
- Adopting a systematic approach is another dimension of communicating potential hazards.

The following figure shows a systematic approach for handling hazards:

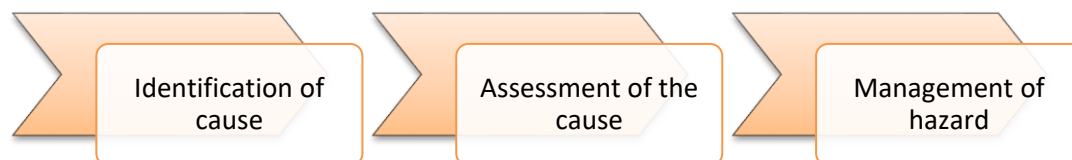


Fig. 8.4.5: Systematic approach for handling hazards

Role Play

Ravi is new at the workplace and he has to be briefed about the work, line of communication, safety measures to be adopted and so on. The supervisor has assigned this task to one of Ravi's colleague. Perform the role play.

Hints:

- One participant can act as the supervisor.
- Another participant acts a colleague, while a third one acts as Ravi.
- The Supervisor briefs the field technicians about work and shows the line of hierarchy chart, and tells about safety and tools.
- The Supervisor also asks the colleague to provide details about work, safety tools and equipment that will be used and the work completion report format to be used.

UNIT 8.5: Interacting with Colleagues

Unit Objectives

At the end of this unit, you will be able to:

- Receive spares from tool room or stores or deposit faulty modules and tools to stores
- Pass on customer complaints to colleagues
- Assist colleagues in resolving field problems
- Resolve conflicts and achieve smooth workflow

8.5.1 Interpersonal Relationship

Every worker works towards a common goal in an organization, still all of them are divided by certain roles and activities and the way they accomplish that objective. Inter-personal communication – whether formal or informal - is the most common and important key to accomplish productivity and perform social functions in an organization.

The primary objective of a field technician is to understand the process and the health of the communication taking place among the co-workers in order to improve its quality. To maintain a healthy interpersonal relationship, it is important to adhere to the points shown in the following figure:

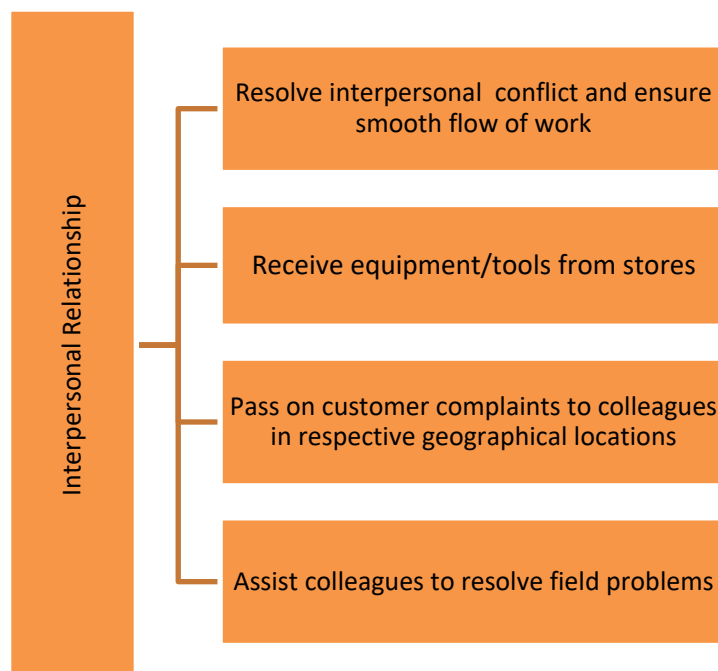


Fig 8.5.1: Managing interpersonal relationship

Resolve Conflicts

As discussed earlier, individuals are divided by roles and responsibilities in an organization despite working towards a common goal. Hence possibility of conflicts is nearly unavoidable. A few tips to reinstate better communication among co-workers in such quandary are as follows:

- **Clarify of roles and responsibilities**

Going to the basics is the best way to resolve a problem. The role of a field technician is to ensure a glitch-free workflow in an organization. The technician and his team will participate in addressing IT issues, whether small or big. Providing a more rounded perspective of job roles and responsibilities offers inculcation of a positive and resolute approach for problems among co-workers. Also, this enables people with less job experience to take up things in a more constructive manner.

- **Plan strategically**

In most organizations, conflicts between co-workers occur due to tight schedules and deadlines. Employees working on deadlines are required to work on short turnaround times, resulting in frustration and stress. Strategic planning in advance is the best way to avoid such circumstances. Irrespective of the team size, this can be achieved by deploying tools like Calendar to communicate deadlines. The following image shows planning using a calendar:



Fig. 8.5.2: Planning using a calendar

Receive Equipment/Tools from Stores

Getting the job done in a process depends on information communication. Furthermore, accuracy of the end result entirely depends on effective inter-personal communication. For example, the IT department of an organization wants to replace old computers with the new ones, accurately and smoothly. The entire exchange process depends on how effectively the IT department communicated the requirement for infrastructure upgrade to the person in charge at the store.

Customer Complaints in the Respective Geographical Area

Serving customers at an organization with a wide spectrum of consumer base poses additional challenges. Maintaining service quality in such cases can be a challenging task, owing to cultural and social diversity. However, such barriers can be overcome in a better way by giving the opportunity to a worker hailing from the respective geographical area. Addressing such problems in this way can improve the ability of an organization to

implement strategies aimed at improving the service quality. The following images show the segmentation of the customer base to collect their complaints accordingly:

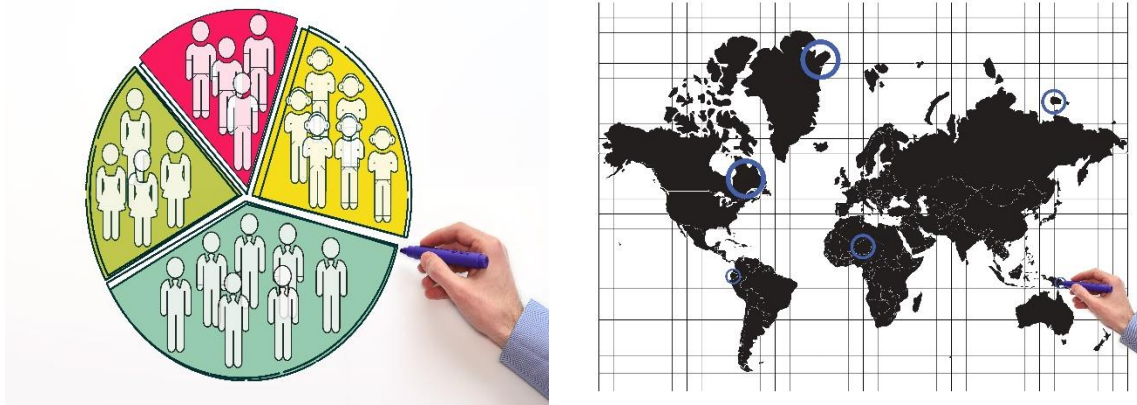


Fig. 8.5.3: Segmentation of customer base

Assist Colleagues

Be it work allocation, manpower distribution or identification of areas of high responsiveness, healthy communication is the key to improve service quality. Informal communication is what is usually seen to be dominant in most workplaces. People asking for help from the person sitting at the adjacent desk to troubleshoot a hardware issue, rather than consulting a field technician, is one of the most common examples of informal communication. The communication is spontaneous and successful in achieving the goal, paving the way to formal inter-personal communication. Despite having established communication procedures, informal communications occur in every organization and help in resolving problems and conflicts in real time. Hence, the role of a field technician is to understand potential of this form of communication and further it with the help of modern-day technologies.

The following image shows colleagues assisting each other:



Fig. 8.5.4: Colleagues assisting each other

Activity: Role Play

You are assigned the task to install a hardware at a customer's site. You reach the customer's site along with your colleague. Your colleague starts arguing and shouting at you in front of the customer. What will you do?

Perform the role play.

Hints:

Ask one participant to play the role of the technician and the other to play the role of the colleague who is shouting. Ask a third participant to be the customer.

After the role play, discuss with other participants/viewers about what the players could have done better or if they missed a step/process.





9. Soft Skills

Unit 9.1 – Writing skills

Unit 9.2 – Interacting with People

Unit 9.3 – Decision Making

Unit 9.4 – Team Work and Multitasking

Unit 9.5 – Relative and Critical Thinking

Unit 9.6 – Personal Grooming



Key Learning Outcomes



At the end of this module, you will be able to:

- Write reports and fill forms as needed for the role
- Interact with people
- Make decisions
- Work in a team and perform multitasking
- Identify how to enable relative and critical thinking while performing tasks
- Identify various aspects of personal grooming

UNIT 9.1: Writing Skills

Unit Objectives



At the end of this unit, you will be able to:

- Write down the problems and details of the work done on the job sheet.
- Make reports and fill forms

9.1.1. Writing Information in a Job Sheet

A job sheet is a document prepared by a senior at a workplace, typically a supervisor, for the technicians to fill each time they undertake a task (a job, such as fixing a hardware or installing a new device). It serves the purpose of storing records for later reference as well as acts as a proof of the job completed along with the effectiveness and efficiency with which it was completed.

A job sheet has various fields/columns that correspond to the description of the job such as when was the job assigned; what is the customer's name, address and phone number; is the product under warranty; was the job completed on time; who was assigned the job; the customer's signature and other such fields.

A technician needs to, therefore, possess certain writing skills to ensure that the documents are filled correctly and legitimately. The handwriting needs to be clear and easily readable to the customers as well as the supervisors. Moreover, the technician should be able to read and then fill the right information in the specific fields.

The following figure shows a sample of a job sheet that the field technicians are required to fill for every job assigned to them:

Work Job Sheet	
Name of the employee: _____	
Employee ID: _____	
Department: _____	
Assigned job date: _____	
Completed on: _____	
Job assigned by: _____	
Customer Information	
Name: _____	Phone: _____
Address: _____	Email: _____
City: _____	Source of Contact: _____
State: _____	<input type="checkbox"/> Email <input type="checkbox"/> Phone
Pin Code: _____	
Complaint Details	
Type of Complaint: _____	
Description: _____	
In warranty: _____	
For Office Use Only	
Total cost involved: _____	
Mode of payment: _____	
Sign of the customer	Sign of the employee

Fig. 9.1.1: A sample of a job sheet

9.1.2. Filling Information in an Invoice

Though an invoice is generally system generated after the sale of a product, but sometimes, a technician may be required to fill a few fields in the invoice at a customer's site, depending on the circumstances. For example, in case of a faulty part in a printer, a field technician may have to carry a new part to replace it and the invoice sheet for that part. But, the invoice will be filled with the details only if the faulty part is beyond repair and the customer agrees to pay for the new part.

The following figure shows a sample of an invoice that a field technician may be required to fill for a specific job assigned to him/her:

Invoice			
ABC Company XYZ city 9102993000 www.abc.domain.in			
Name: Address: Phone: Email: City: State: Pin Code:			
Product Description	Price	Quantity	Total
Authorised Signature		Customer Signature	

Fig. 9.1.2: A sample of an invoice

9.1.3. Filling a Checklist

In addition to other forms, a field technician may also need to fill a checklist for a specific job/task. To be able to fill it, the technician should know how to read it correctly and then fill the right responses based on the task completed. Typically, a checklist has a Yes or No format where the columns/fields have to be simply ticked. But sometimes, there may be a few fields for which the small sentences or statements may have to be written.

The following figure shows a sample of a checklist that a field technician is required, sometimes, to fill for a job; for example, fixing a faulty hard drive:

Task	Daily	Weekly	Monthly	Quarterly	Half - Yearly	Yearly
Run Microsoft Update (critical update)						
Update antivirus scanner signature						
Run antivirus scan						
Run malware scanner						
Vacuum the system exterior						
Scan/clean/compact registry						
Defrag hard drive						
Run scandisk on your drives						
Full system back up						
Check for optical drive firmware updates						
Check for video adapter updates						
Refresh achieve backups						
Check for motherboard BIOS updates						
Clean system thoroughly, inside and out						

Fig. 9.1.3: A sample of a checklist

UNIT 9.2: Interacting with People

Unit Objectives

At the end of this unit, you will be able to:

- Identify the basic communication skills
- Define listening, communication, critical thinking and decision making
- Identify critical thinking skills
- Recognize factors that limit decision making skills

9.2.1 Listening

No matter where a technician may be, whether in a field or in an organization, the person does not want only to be heard but also to be understood. Therefore, active listening plays a vital role while interacting with people. This skill can be developed with practice and patience.

What is Listening?

In a layman's term, listening means paying attention. It means full concentration, engagement and absorption of what the other person is trying to convey. It includes expressing and giving responses by various actions as listed in the following figure:

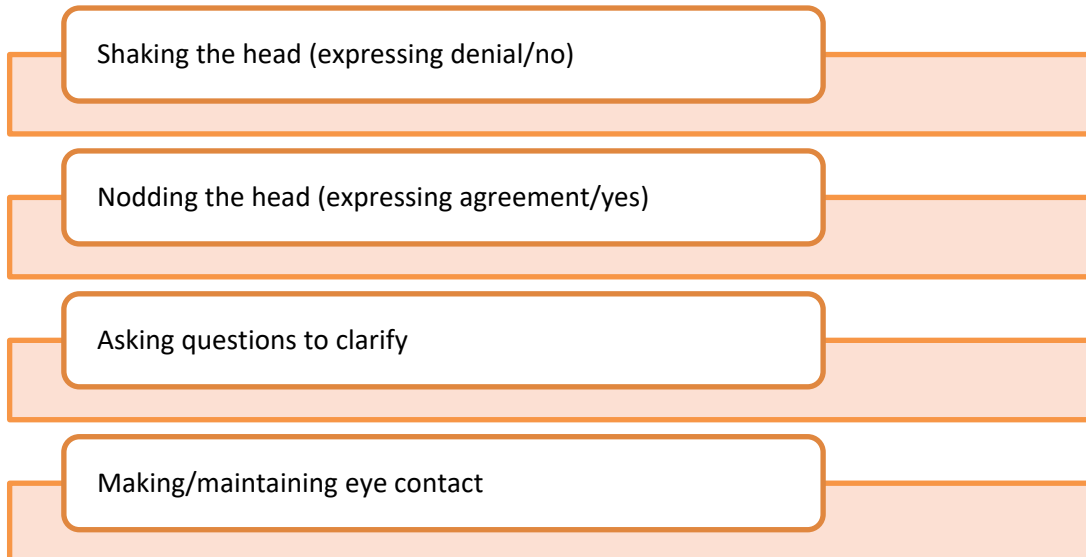


Fig. 9.2.1: Ways of expressing and giving response to show active listening

Why is Listening Important?

In the field, while working with a customer, supervisors and colleagues, there are three major reasons as to why listening is essential.

The following figure lists these three major reasons:

Shows respect for colleagues and earns their trust

- Given the amount of pressure and stress at a workplace, people like to have understanding and supportive colleagues.
- A person's value increases when they show understanding and reach out.

Helps to understand issues and provide solutions

- An active listener gains a better insight into the colleague's concerns.
- A deeper understanding of the problem results in providing better and accurate solutions.

Helps to diffuse conflict

- A workplace loaded with ideas is subject to conflict of interests.
- A person's openness to opinions and different perceptions revolving around a situation helps in diffusion of conflicts.

Fig. 9.2.2: Importance of listening

How Does Listening Improve Workplace Performance?

One can notice the benefits, if emphasis is laid on effective listening at work. It results in better productivity, timely achievement of goals and a better coordination between employees. The following figure lists the factors that help in improving workplace performance:

Reduces Conflicts	Reflects Caring Attitude	Increases Working Rate	Decreases Duplication of Efforts
<ul style="list-style-type: none"> • People if not heard tend to look for other opportunities because it builds resentment. • A good listener always helps colleagues and reduces the communication gap. 	<ul style="list-style-type: none"> • Employees react to the open door policy in a positive manner. • Employees are aware that they will be heard and the issues will be resolved with the best solution. 	<ul style="list-style-type: none"> • When employees listen effectively, the tasks are accomplished before time and the pace of work is much faster. • This step helps in maintaining focus and clarity towards the task. 	<ul style="list-style-type: none"> • Good listeners tend to make less mistakes while working, leading to higher productivity. • For someone who is not an effective listener, the productivity is low due to less comprehension.

Fig.9.2.3: Factors that help in improving workplace performance

9.2.2 Communication

Communication means sending/receiving information by writing or speaking. There are a lot of technicians who often struggle while communicating.

When on a visit to a customer's site, to ensure good service, the customer's requirement should be understood and a solution should be suggested.

The following figure represents the points to be taken care of while communicating with a customer:

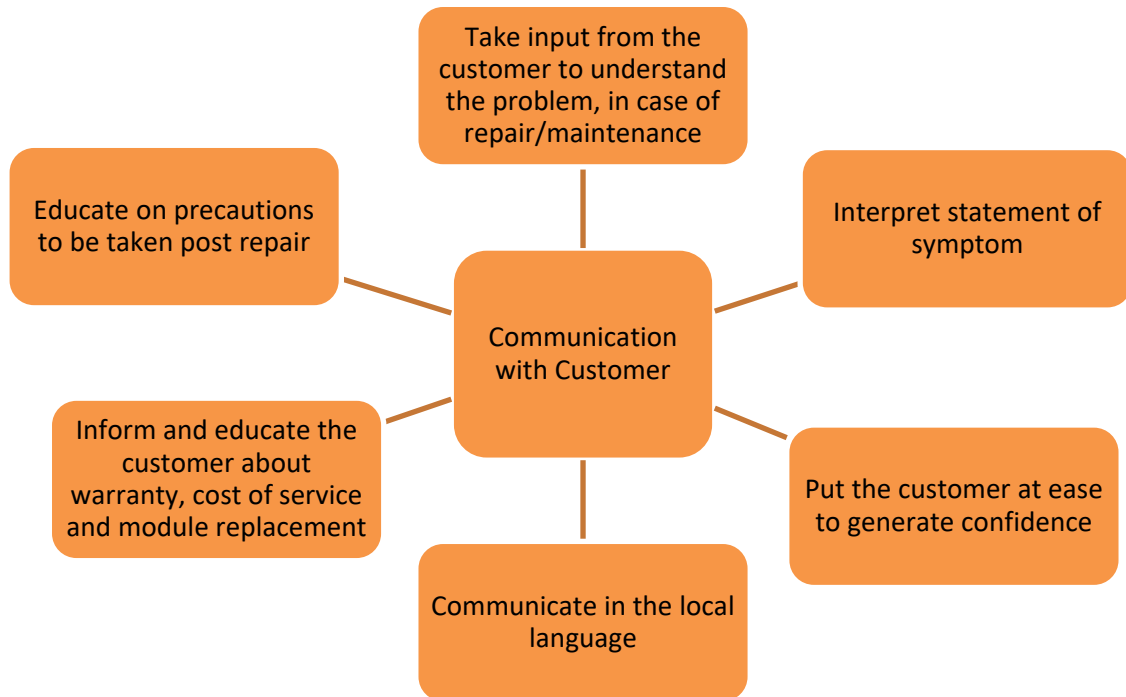


Fig 9.2.4: Communicating with a customer

There may be instances during conflicts when people may lose their temper. It is important for a person to control anger at all times, as it leads to mistakes. The following figure lists a few points on how to communicate when angry:



Fig. 9.2.5: Steps on how to communicate when angry

In case a person is very angry, it is advisable to stop and step back to breathe. Take a few minutes to calm down. Once the anger subsides, try to think and figure out what the real problem was and where/how the situation worsened. Finally, go ahead and talk to the concerned person. After talking, listen carefully to what the other person is saying and try to understand his/her feeling.

UNIT 9.3: Decision Making

Unit Objectives

At the end of this unit, you will be able to:

- Make on-spot decisions in the field
- Decide whether to call customer care or not

9.3.1. Making Decisions in the Field

The ability to choose the best between multiple courses of action is called decision making. It involves using either a person's intuition or reasoning, or both.

Deciding upon something using the 'gut-feeling' is called as intuition. It typically involves a person making decisions on the basis of prior work experience, values or both. Reasoning involves using factual data to interpret a situation and take a final decision. Emotional aspects are usually ignored while taking such decisions.

Numerous issues can limit a person from taking the right decision. The following figure explains the factors responsible for this problem:

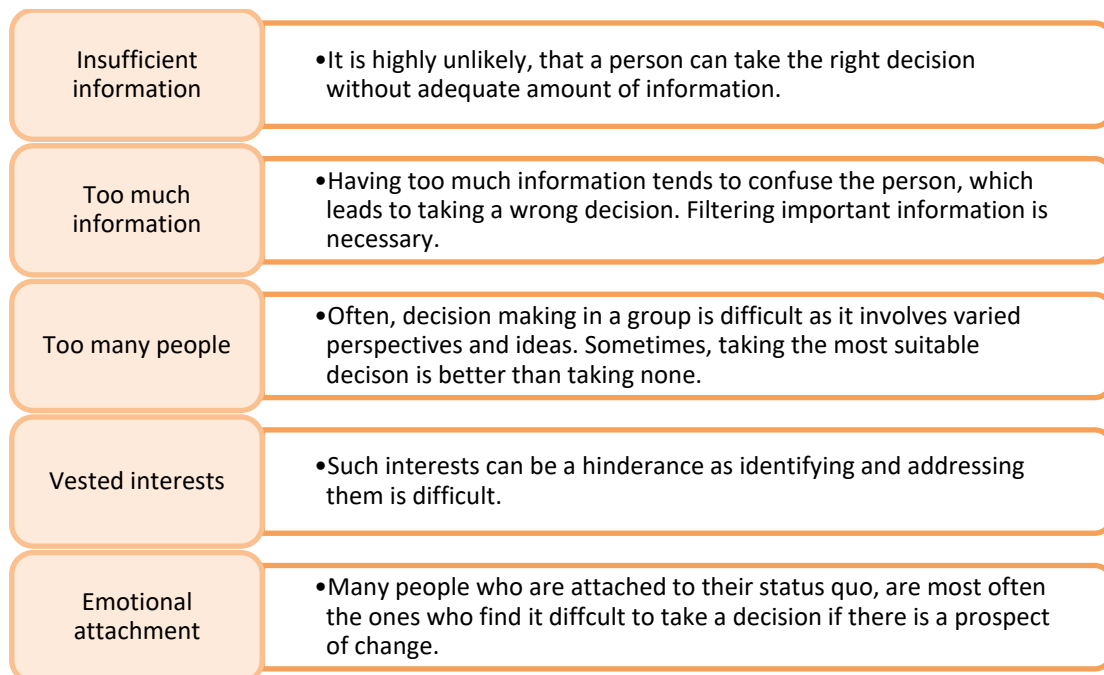


Fig. 9.3.1: Factors that limit decision making

9.3.2. Points to Consider for Decision Making

While making decisions in the field, the points listed in the following figure need to be considered:



Fig. 9.3.2: Points to be considered for decision making

When making important decisions related to work, a field technician needs to ask the following questions and the answers to these questions would help make the correct decision at the right time:

- What decision needs to be taken? Is it a spontaneous decision? Can it be made at a technician level and is it absolutely necessary to make the decision immediately?
- What are the choices and risks involved? Analyse the risks that are involved if the technician does make a decision and implements it in the field. If the risks are too high, it is best to avoid making the decision. Then, analyse all the choices available and the best choice which involves the least risk.
- What is the best choice? Compare the choices and evaluate the options to arrive at the best choice.
- Which seems to be the best possible choice for the current situation in the given time frame? Select the best possible option based on the circumstances and time.
- Will the results be as expected? Implement the decision and check the results.

UNIT 9.4: Team Work and Multitasking

Unit Objectives

At the end of this unit, you will be able to:

- Identify essential aspects of working in a team
- Share work load as required
- Achieve the targets given on service and sales

9.4.1 Working in a Team

A field technician needs to be able to work in a team. To do this, a technician should be able to get along with fellow technicians, respect others and always show a cooperative behaviour.

Working in and as a team enables some positive aspects as listed in the following figure:

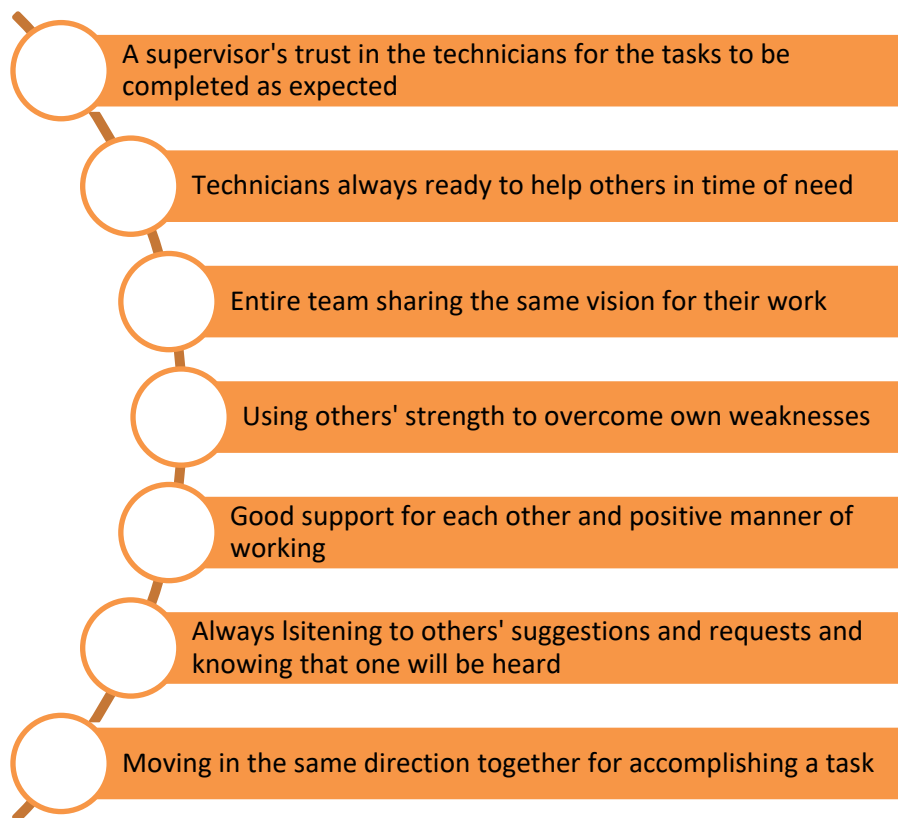


Fig. 9.4.1: Points to be considered while working in team

To make teamwork effective at workplace, the points listed in the following figure need to be considered:

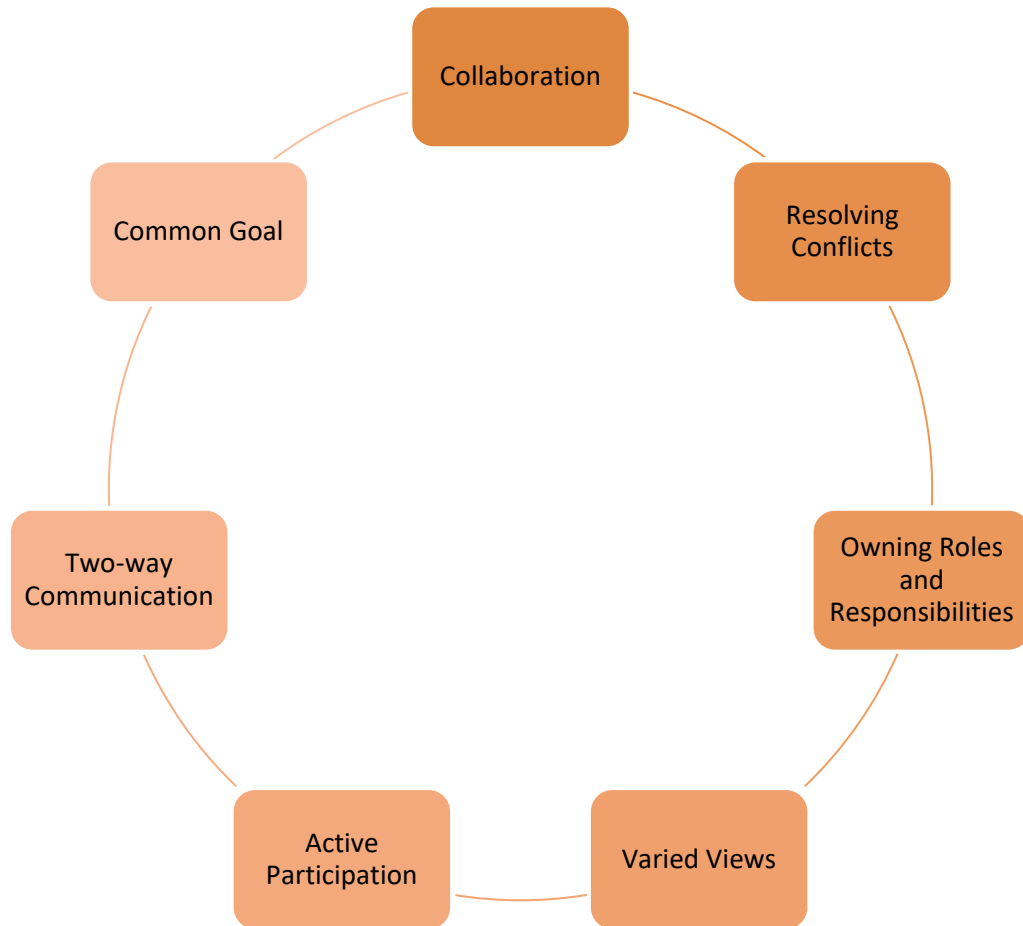


Fig. 9.4.2: Points to be considered for effective teamwork

Activity: Discussion

Case study discussion: Understanding behaviour type

You have a colleague who is always pressed for work. He never seems to have time for completing his work. He comes late to work, is continuously on his job without taking a break, and at the end of the day is scolded by his superior for not completing his work. He is also bullied by some colleagues, who give their work to him because of which he is unable to complete his own work.

How will you, as a colleague, help him resolve his problem?

UNIT 9.5: Reflective and Critical Thinking

Unit Objectives

At the end of this unit, you will be able to:

- Define reflective thinking
- Use critical thinking to improve work processes
- Reduce repetition of errors
- Spot process disruptions and delays
- Report customer concerns to superiors without delay

9.5.1. Improving Work Processes using Critical Thinking

Reflective thinking is enabled by deep thought and depends more on prior understanding and thinking about the subject.

Another important skill that a field technician should possess is critical thinking. It allows a person to make critical decisions and enables a person to judge a situation while the speaker is talking.

Critical thinking is defined as a person's ability to make logical decisions in a particular situation, keeping all the emotions aside. This quality enables a technician to:

- Collect information for analysis of a situation
- Generate ample solutions to resolve a problem
- Get feedback
- Add value to business solutions

Critical thinking helps a person to go through many possible solutions for a situation by analysing it, and coming up with the best possible solution.

The following figure lists the benefits of critical thinking and reflective thinking:

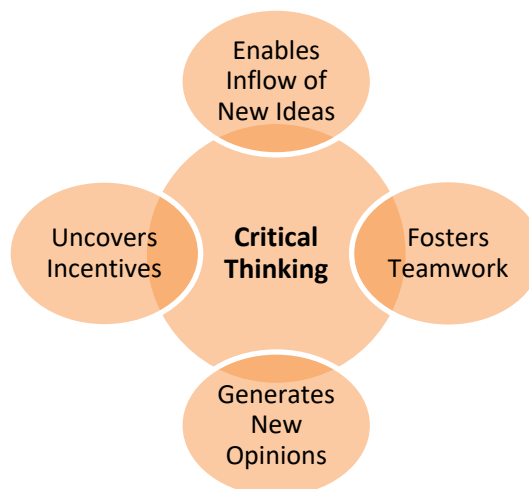


Fig. 9.5.1: Benefits of critical thinking

Critical thinking can be divided into three fundamental skills. The following figure lists these skills:

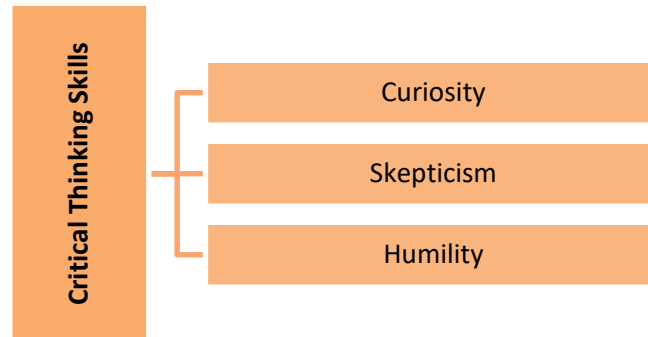


Fig. 9.5.2: Critical thinking skills

Curiosity is the hope of learning and garnering more information/knowledge as well as looking for evidence and welcoming new ideas. Scepticism includes not believing everything that a person comes across and putting questions to get convinced fully. Humility involves acceptance by a person if an idea gets rejected or is not considered suitable. At the same time, the person is open to new ideas.

The following figure lists other skills which are essential for critical thinking:

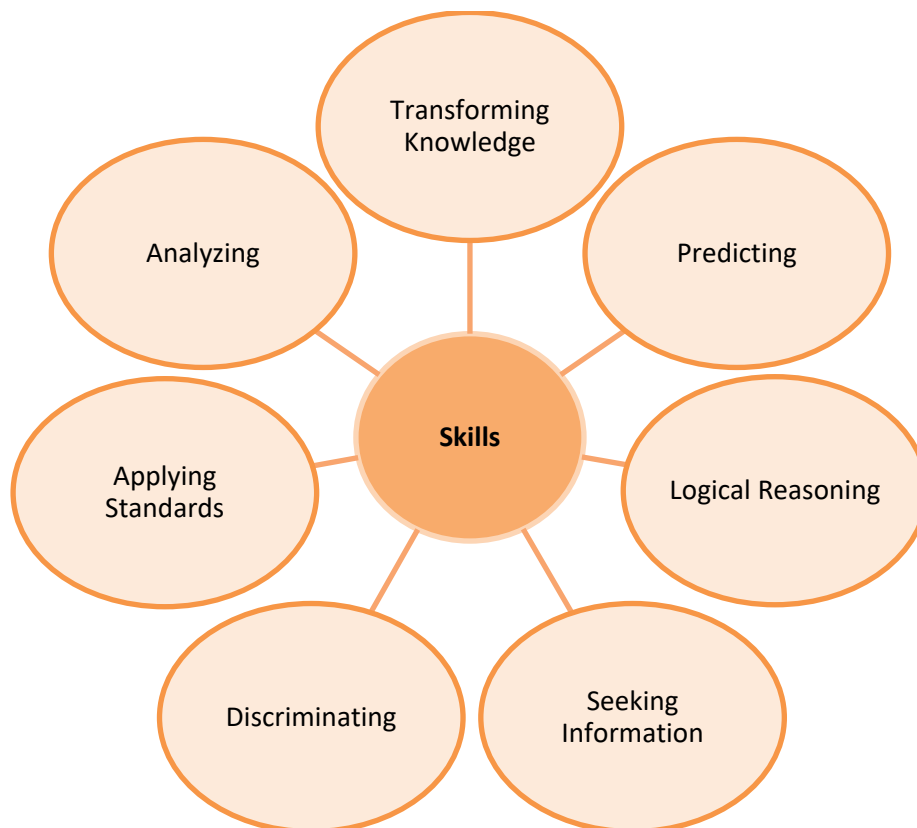


Fig. 9.5.3: Other critical thinking skills

Activity: Discussion

Shyam is a smart field technician who has recently joined an organization. After about a fortnight at work, he realizes that there are many issues, which if handled properly can increase productivity and morale of the people. There are more than two people doing the same work whereas it can be done by one. Role duplicity seems to be the case.

Also, there are two or more supervisors commanding all the field technician and they do not communicate among themselves. Thus, these field technicians pass the buck on each other. Field technician also take long breaks to have negative discussions, which sets in a bad morale in the rest of the wiremen.

What should Shyam do to improve the situation? Also, what should be the correct steps for him to follow? Discuss and write the measures.

UNIT 9.6: Personal Grooming

Unit Objectives



At the end of this unit, you will be able to:

- Identify the importance of personal grooming
- Use proper etiquette during customer interaction

9.6.1. Importance of Personal Grooming

Apart from having technical knowledge, it is important for a field technician to develop some basic personality traits and skills, such as personal grooming. Being well groomed at workplace reflects a positive and professional attitude towards work. The following figure shows the various aspects of personal grooming:

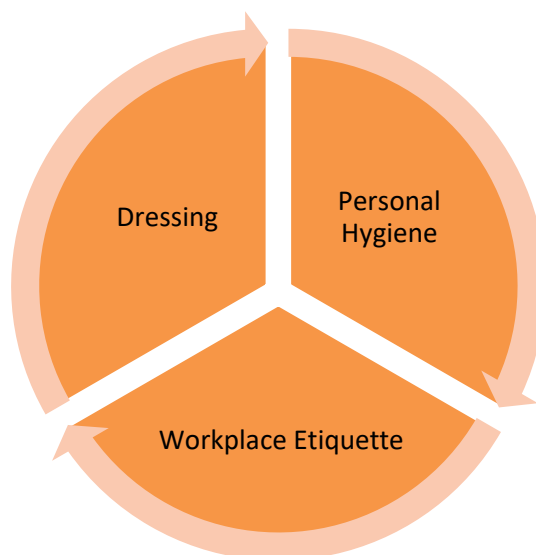


Fig. 9.6.1: Aspects of grooming

The following image lists a few of the good practices classified under different aspects of grooming:

		
<p>Dressing</p> <p>Clothes should be neat and clean.</p> <p>Clothes should be ironed.</p> <p>Uniform should be worn, if the company has such a requirement.</p>	<p>Personal Hygiene</p> <p>Hair should be neatly combed and trimmed.</p> <p>Nails and hair should be cut.</p> <p>Teeth should be clean.</p> <p>Bath should be taken everyday.</p> <p>Body odor and sweating should be taken care of.</p>	<p>Workplace Etiquette</p> <p>Smile and greet the customer.</p> <p>Be punctual.</p> <p>Apologize on making a mistake.</p> <p>Be polite.</p> <p>Be careful of body language.</p>

Fig. 9.6.2: A few of the good practices for grooming

Field technicians need to possess qualities as shown in the following figure to ensure that they excel in their job:

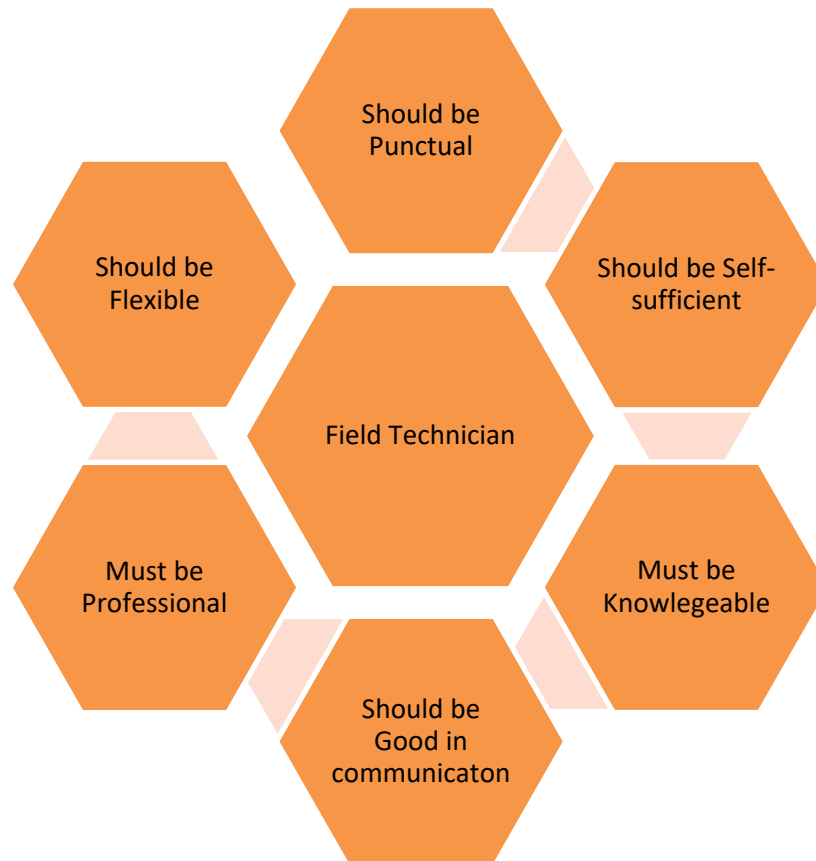


Fig. 9.6.3: A few qualities that a field technician must possess

Activity: Group Discussion

Get together in groups of three or four.

List down at least three things related to grooming which you should do and which you should avoid while on a visit to a customer's site.

Use the following table to make the list.

	Dressing	Personal Hygiene	Etiquette
To Do			
To Avoid			



10. Employability & Entrepreneurship Skills



Unit 10.1 – Personal Strengths & Value Systems

Unit 10.2 – Digital Literacy: A Recap

Unit 10.3 – Money Matters

Unit 10.4 – Preparing for Employment & Self-Employment

Unit 10.5 – Understanding Entrepreneurship

Unit 10.6 – Preparing to be an Entrepreneur



Key Learning Outcomes



At the end of this module, you will be able to:

1. Explain the meaning of health
2. List common health issues
3. Discuss tips to prevent common health issues
4. Explain the meaning of hygiene
5. Discuss the purpose of Swacch Bharat Abhiyan
6. Explain the meaning of habit
7. Discuss ways to set up a safe work environment
8. Discuss critical safety habits to be followed by employees
9. Explain the importance of self-analysis
10. Discuss motivation with the help of Maslow's Hierarchy of Needs
11. Discuss the meaning of achievement motivation
12. List the characteristics of entrepreneurs with achievement motivation
13. List the different factors that motivate you
14. Discuss the role of attitude in self-analysis
15. Discuss how to maintain a positive attitude
16. List your strengths and weaknesses
17. Discuss the qualities of honest people
18. Describe the importance of honesty in entrepreneurs
19. Discuss the elements of a strong work ethic
20. Discuss how to foster a good work ethic
21. List the characteristics of highly creative people
22. List the characteristics of highly innovative people
23. Discuss the benefits of time management
24. List the traits of effective time managers
25. Describe effective time management technique
26. Discuss the importance of anger management
27. Describe anger management strategies
28. Discuss tips for anger management
29. Discuss the causes of stress
30. Discuss the symptoms of stress
31. Discuss tips for stress management
32. Identify the basic parts of a computer
33. Identify the basic parts of a keyboard
34. Recall basic computer terminology
35. Recall the functions of basic computer keys
36. Discuss the main applications of MS Office
37. Discuss the benefits of Microsoft Outlook
38. Discuss the different types of e-commerce
39. List the benefits of e-commerce for retailers and customers
40. Discuss how the Digital India campaign will help boost e-commerce in India
41. Describe how you will sell a product or service on an e-commerce platform
42. Discuss the importance of saving money
43. Discuss the benefits of saving money

44. Discuss the main types of bank accounts
45. Describe the process of opening a bank account
46. Differentiate between fixed and variable costs
47. Describe the main types of investment options
48. Describe the different types of insurance products
49. Describe the different types of taxes
50. Discuss the uses of online banking
51. Discuss the main types of electronic funds transfers
52. Discuss the steps to prepare for an interview
53. Discuss the steps to create an effective Resume
54. Discuss the most frequently asked interview questions
55. Discuss how to answer the most frequently asked interview questions
56. Discuss basic workplace terminology
57. Discuss the concept of entrepreneurship
58. Discuss the importance of entrepreneurship
59. Describe the characteristics of an entrepreneur
60. Describe the different types of enterprises
61. List the qualities of an effective leader
62. Discuss the benefits of effective leadership
63. List the traits of an effective team
64. Discuss the importance of listening effectively
65. Discuss how to listen effectively
66. Discuss the importance of speaking effectively
67. Discuss how to speak effectively
68. Discuss how to solve problems
69. List important problem solving traits
70. Discuss ways to assess problem solving skills
71. Discuss the importance of negotiation
72. Discuss how to negotiate
73. Discuss how to identify new business opportunities
74. Discuss how to identify business opportunities within your business
75. Explain the meaning of entrepreneur
76. Describe the different types of entrepreneurs
77. List the characteristics of entrepreneurs
78. Recall entrepreneur success stories
79. Discuss the entrepreneurial process
80. Describe the entrepreneurship ecosystem
81. Discuss the purpose of the Make in India campaign
82. Discuss key schemes to promote entrepreneurs
83. Discuss the relationship between entrepreneurship and risk appetite
84. Discuss the relationship between entrepreneurship and resilience
85. Describe the characteristics of a resilient entrepreneur
86. Discuss how to deal with failure
87. Discuss how market research is carried out
88. Describe the 4 Ps of marketing

89. Discuss the importance of idea generation
90. Recall basic business terminology
91. Discuss the need for CRM
92. Discuss the benefits of CRM
93. Discuss the need for networking
94. Discuss the benefits of networking
95. Discuss the importance of setting goals
96. Differentiate between short-term, medium-term and long-term goals
97. Discuss how to write a business plan
98. Explain the financial planning process
99. Discuss ways to manage your risk
100. Describe the procedure and formalities for applying for bank finance
101. Discuss how to manage your own enterprise
102. List important questions that every entrepreneur should ask before starting an enterprise

UNIT 10.1: Personal Strengths & Value Systems

Unit Objectives

At the end of this unit, participant will be able to:

1. Explain the meaning of health
2. List common health issues
3. Discuss tips to prevent common health issues
4. Explain the meaning of hygiene
5. Discuss the purpose of Swacch Bharat Abhiyan
6. Explain the meaning of habit
7. Discuss ways to set up a safe work environment
8. Discuss critical safety habits to be followed by employees
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11. Discuss the meaning of achievement motivation
12. List the characteristics of entrepreneurs with achievement motivation
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25. Describe effective time management technique
26. Discuss the importance of anger management
27. Describe anger management strategies
28. Discuss tips for anger management
29. Discuss the causes of stress
30. Discuss the symptoms of stress
31. Discuss tips for stress management

10.1.1 Health, Habits, Hygiene: What is Health?

As per the World Health Organization (WHO), health is a “State of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity.” This means being healthy does not simply mean not being unhealthy – it also means you need

to be at peace emotionally, and feel fit physically. For example, you cannot say you are healthy simply because you do not have any physical ailments like a cold or cough. You also need to think about whether you are feeling calm, relaxed and happy.

Common Health Issues

Some common health issues are:

- Allergies
- Asthma
- Skin Disorders
- Depression and Anxiety
- Diabetes
- Cough, Cold, Sore Throat
- Difficulty Sleeping
- Obesity

Prevent Health Issues

Taking measures to prevent ill health is always better than curing a disease or sickness. You can stay healthy by:

- Eating healthy foods like fruits, vegetables and nuts
- Cutting back on unhealthy and sugary foods
- Drinking enough water everyday
- Not smoking or drinking alcohol
- Exercising for at least 30 minutes a day, 4-5 times a week
- Taking vaccinations when required
- Practicing yoga exercises and meditation

How many of these health standards do you follow? Tick the ones that apply to you.

- | | |
|--|--------------------------|
| 1. Get minimum 7-8 hours of sleep every night. | <input type="checkbox"/> |
| 2. Avoid checking email first thing in the morning and right before you go to bed at night. | <input type="checkbox"/> |
| 3. Don't skip meals – eat regular meals at correct meal times. | <input type="checkbox"/> |
| 4. Read a little bit every single day. | <input type="checkbox"/> |
| 5. Eat more home cooked food than junk food. | <input type="checkbox"/> |
| 6. Stand more than you sit. | <input type="checkbox"/> |
| 7. Drink a glass of water first thing in the morning and have at least 8 glasses of water through the day. | <input type="checkbox"/> |

- 8. Go to the doctor and dentist for regular check-ups. ☐
- 9. Exercise for 30 minutes at least 5 days a week. ☐
- 10. Avoid consuming lots of aerated beverages. ☐

What is Hygiene?

As per the World Health Organization (WHO), “Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases.” In other words, hygiene means ensuring that you do whatever is required to keep your surroundings clean, so that you reduce the chances of spreading germs and diseases.

For instance, think about the kitchen in your home. Good hygiene means ensuring that the kitchen is always spick and span, the food is put away, dishes are washed and dustbins are not overflowing with garbage. Doing all this will reduce the chances of attracting pests like rats or cockroaches, and prevent the growth of fungus and other bacteria, which could spread disease.

How many of these health standards do you follow? Tick the ones that apply to you.

- 1. Have a bath or shower every day with soap – and wash your hair with shampoo 2-3 times a week. ☐
- 2. Wear a fresh pair of clean undergarments every day. ☐
- 3. Brush your teeth in the morning and before going to bed. ☐
- 4. Cut your fingernails and toenails regularly. ☐
- 5. Wash your hands with soap after going to the toilet. ☐
- 6. Use an anti-perspirant deodorant on your underarms if you sweat a lot. ☐
- 7. Wash your hands with soap before cooking or eating. ☐
- 8. Stay home when you are sick, so other people don't catch what you have. ☐
- 9. Wash dirty clothes with laundry soap before wearing them again. ☐
- 10. Cover your nose with a tissue/your hand when coughing or sneezing. ☐

See how healthy and hygienic you are, by giving yourself 1 point for every ticked statement! Then take a look at what your score means.

Your Score

0-7/20: You need to work a lot harder to stay fit and fine! Make it a point to practice good habits daily and see how much better you feel!

7-14/20: Not bad, but there is scope for improvement! Try and add a few more good habits to your daily routine.

14-20/20: Great job! Keep up the good work! Your body and mind thank you!

We have already discussed the importance of following good hygiene and health practices for ourselves. But, it is not enough for us to be healthy and hygienic. We must also extend this standard to our homes, our immediate surroundings and to our country as a whole.

Swachh Bharat Abhiyan

The 'Swachh Bharat Abhiyan' (Clean India Mission) launched by Prime Minister Shri Narendra Modi on 2nd October 2014, believes in doing exactly this. The aim of this mission is to clean the streets and roads of India and raise the overall level of cleanliness. Currently this mission covers 4,041 cities and towns across the country. Millions of our people have taken the pledge for a clean India. You should take the pledge too, and do everything possible to keep our country clean!

What are Habits?

A habit is a behaviour that is repeated frequently. All of us have good habits and bad habits. Keep in mind the phrase by John Dryden: "We first make our habits, and then our habits make us." This is why it is so important that you make good habits a way of life, and consciously avoid practicing bad habits.

Some good habits that you should make part of your daily routine are:

- Always having a positive attitude
- Smiling! Make it a habit to smile as often as possible
- Making exercise a part of your daily routine
- Making time for family and friends
- Reading motivational and inspirational stories
- Going to bed early and waking up early

Some bad habits that you should quit immediately are:

- Skipping breakfast
- Smoking, drinking alcohol and doing drugs
- Snacking frequently even when you are not hungry
- Spending more money than you can afford
- Eating too much fattening and sugary food
- Worrying about unimportant issues
- Staying up late and waking up late



- Following healthy and hygienic practices every day will make you feel good mentally and physically.
- Hygiene is two-thirds of health – so good hygiene will help you stay strong and healthy.

10.1.2: Safety: Tips to Design a Safe Workplace

Every employer is obligated to ensure that his workplace follows the highest possible safety protocol. When setting up a business, owners must make it a point to:

- Use ergonomically designed furniture and equipment to avoid stooping and twisting
- Provide mechanical aids to avoid lifting or carrying heavy objects
- Have protective equipment on hand for hazardous jobs
- Designate emergency exits and ensure they are easily accessible
- Set down health codes and ensure they are implemented
- Follow the practice of regular safety inspections in and around the workplace
- Ensure regular building inspections are conducted
- Get expert advice on workplace safety and follow it

Non-Negotiable Employee Safety Habits

Every employer is obligated to ensure that his workplace follows the highest possible safety protocol. When setting up a business, owners must make it a point to:

- Immediately report unsafe conditions to a supervisor
- Recognize and report safety hazards that could lead to slips, trips and falls
- Report all injuries and accidents to a supervisor
- Wear the correct protective equipment when required
- Learn how to correctly use equipment provided for safety purposes
- Be aware of and avoid actions that could endanger other people
- Take rest breaks during the day and some time off from work during the week



- Be aware of what emergency number to call at the time of a workplace emergency
- Practice evacuation drills regularly to avoid chaotic evacuations

10.1.3 Self-Analysis – Attitude, Achievement Motivation

To truly achieve your full potential, you need to take a deep look inside yourself and find out what kind of person you really are. This attempt to understand your personality is known as self-analysis. Assessing yourself in this manner will help you grow, and will also help you to identify areas within yourself that need to be further developed, changed or eliminated. You can better understand yourself by taking a deep look at what motivates you, what your attitude is like, and what your strengths and weaknesses are.

What is Motivation?

Very simply put, motivation is your reason for acting or behaving in a certain manner. It is important to understand that not everyone is motivated by the same desires – people are motivated by many, many different things. We can understand this better by looking at Maslow's Hierarchy of Needs.

Maslow's Hierarchy of Needs

Famous American psychologist Abraham Maslow wanted to understand what motivates people. He believed that people have five types of needs, ranging from very basic needs (called physiological needs) to more important needs that are required for self-growth (called self-actualization needs). Between the physiological and self-actualization needs are three other needs – safety needs, belongingness and love needs, and esteem needs. These needs are usually shown as a pyramid with five levels and are known as Maslow's Hierarchy of Needs.

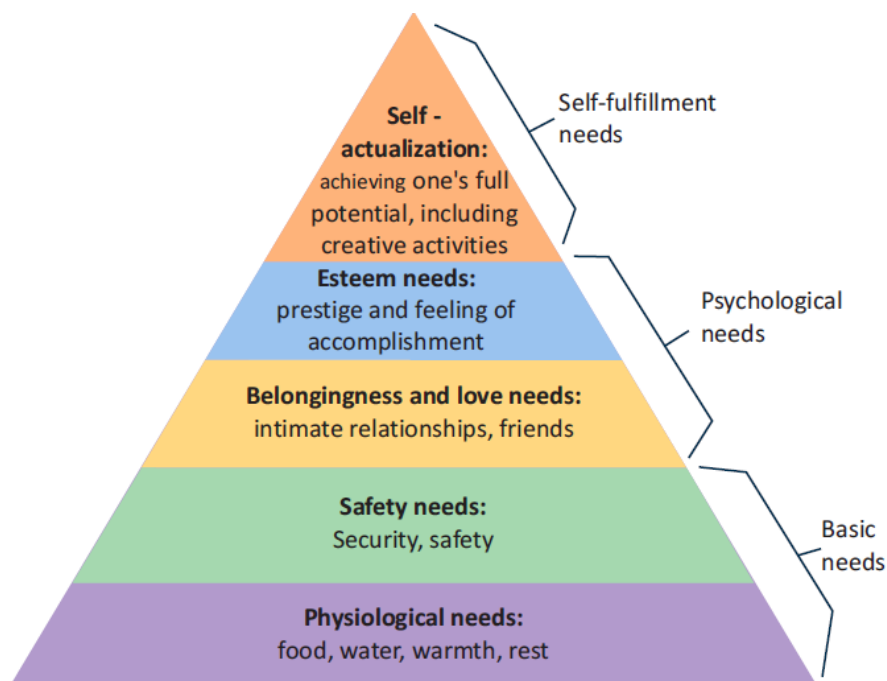


Fig. 10.1.1: Maslow's Hierarchy of Needs

As you can see from the pyramid, the lowest level depicts the most basic needs. Maslow believed that our behaviour is motivated by our basic needs, until those needs are met. Once they are fulfilled, we move to the next level and are motivated by the next level of needs. Let's understand this better with an example.

Rupa comes from a very poor family. She never has enough food, water, warmth or rest. According to Maslow, until Rupa is sure that she will get these basic needs, she will not even think about the next level of needs – her safety needs. But, once Rupa is confident that her basic needs will be met, she will move to the next level, and her behaviour will then be motivated by her need for security and safety. Once these new needs are met, Rupa will once again move to the next level, and be motivated by her need for relationships and friends. Once this need is satisfied, Rupa will then focus on the fourth level of needs – her esteem needs, after which she will move up to the fifth and last level of needs – the desire to achieve her full potential.

Understanding Achievement Motivation

We now know that people are motivated by basic, psychological and self-fulfilment needs. However, certain people are also motivated by the achievement of highly challenging accomplishments. This is known as Achievement Motivation, or 'need for achievement'. The level of motivation achievement in a person differs from individual to individual. It is important that entrepreneurs have a high level of achievement motivation – a deep desire to accomplish something important and unique. It is equally important that they hire people who are also highly motivated by challenges and success.

What Motivates You?

What are the things that really motivate you? List down five things that really motivate you. Remember to answer honestly!

I am motivated by:

Characteristics of Entrepreneurs with Achievement Motivation

Entrepreneurs with achievement motivation can be described as follows:

- Unafraid to take risks for personal accomplishment
- Love being challenged
- Future-oriented
- Flexible and adaptive
- Value negative feedback more than positive feedback
- Very persistent when it comes to achieving goals
- Extremely courageous
- Highly creative and innovative
- Restless - constantly looking to achieve more
- Feel personally responsible for solving problems

Think about it:

- How many of these traits do you have?
- Can you think of entrepreneurs who display these traits?

What is Attitude?

Now that we understand why motivation is so important for self-analysis, let's look at the role our attitude plays in better understanding ourselves. Attitude can be described as your tendency (positive or negative), to think and feel about someone or something. Attitude is the foundation for success in every aspect of life. Our attitude can be our best friend or our worst enemy. In other words:

Now that we understand why motivation is so important for self-analysis, let's look at the role our attitude plays in better understanding ourselves. Attitude can be described as your

tendency (positive or negative), to think and feel about someone or something. Attitude is the foundation for success in every aspect of life. Our attitude can be our best friend or our worst enemy. In other words:

“The only disability in life is a bad attitude.”

When you start a business, you are sure to encounter a wide variety of emotions, from difficult times and failures to good times and successes. Your attitude is what will see you through the tough times and guide you towards success. Attitude is also infectious. It affects everyone around you, from your customers to your employees to your investors. A positive attitude helps build confidence in the workplace while a negative attitude is likely to result in the demotivation of your people.

How to Cultivate a Positive Attitude?

The good news is attitude is a choice. So, it is possible to improve, control and change our attitude, if we decide we want to!

The following tips help foster a positive mindset:

- Remember that you control your attitude, not the other way around
- Devote at least 15 minutes a day towards reading, watching or listening to something positive
- Avoid negative people who only complain and stop complaining yourself
- Expand your vocabulary with positive words and delete negative phrases from your mind
- Be appreciative and focus on what's good in yourself, in your life, and in others
- Stop thinking of yourself as a victim and start being proactive
- Imagine yourself succeeding and achieving your goals

What Are Your Strengths and Weaknesses?

Another way to analyse yourself is by honestly identifying your strengths and weaknesses. This will help you use your strengths to your best advantage and reduce your weaknesses.

Note down all your strengths and weaknesses in the two columns below. Remember to be honest with yourself!

Strengths	Weaknesses



- Achievement motivation can be learned.
- Don't be afraid to make mistakes.
- Train yourself to finish what you start.
- Dream big.

10.1.4 Honesty & Work Ethics: What is Honesty?

Honesty is the quality of being fair and truthful. It means speaking and acting in a manner that inspires trust. A person who is described as honest is seen as truthful and sincere, and as someone who isn't deceitful or devious and doesn't steal or cheat. There are two dimensions of honesty – one is honesty in communication and the other is honesty in conduct.

Honesty is an extremely important trait because it results in peace of mind and builds relationships that are based on trust. Being dishonest, on the other hand, results in anxiety and leads to relationships full of distrust and conflict.

Qualities of Honest People

Honest individuals have certain distinct characteristics. Some common qualities among honest people are:

1. They don't worry about what others think of them. They believe in being themselves – they don't bother about whether they are liked or disliked for their personalities.
2. They stand up for their beliefs. They won't think twice about giving their honest opinion, even if they are aware that their point of view lies with the minority.
3. They are thick skinned. This means they are not affected by others judging them harshly for their honest opinions.
4. They forge trusting, meaningful and healthy friendships. Honest people usually surround themselves with honest friends. They have faith that their friends will be truthful and upfront with them at all times.
5. They are trusted by their peers. They are seen as people who can be counted on for truthful and objective feedback and advice.

Importance of Honesty in Entrepreneurs

One of the most important characteristics of entrepreneurs is honesty. When entrepreneurs are honest with their customers, employees and investors, it shows that they respect those that they work with. It is also important that entrepreneurs remain honest with themselves.

Let's look at how being honest would lead to great benefits for entrepreneurs.

- **Honesty and customers:** When entrepreneurs are honest with their customers it leads to stronger relationships, which in turn results in business growth and a stronger customer network.
- **Honesty and employees:** When entrepreneurs build honest relationships with their employees, it leads to more transparency in the workplace, which results in higher work performance and better results.

- **Honesty and investors:** For entrepreneurs, being honest with investors means not only sharing strengths but also candidly disclosing current and potential weaknesses, problem areas and solution strategies. Keep in mind that investors have a lot of experience with start-ups and are aware that all new companies have problems. Claiming that everything is perfectly fine and running smoothly is a red flag for most investors.
- **Honesty with oneself:** The consequences of being dishonest with oneself can lead to dire results, especially in the case of entrepreneurs. For entrepreneurs to succeed, it is critical that they remain realistic about their situation at all times, and accurately judge every aspect of their enterprise for what it truly is.

What are Work Ethics?

Being ethical in the workplace means displaying values like honesty, integrity and respect in all your decisions and communications. It means not displaying negative qualities like lying, eating and stealing.

Workplace ethics play a big role in the profitability of a company. It is as crucial to an enterprise as high morale and teamwork. This is why most companies lay down specific workplace ethic guidelines that must compulsorily be followed by their employees.

These guidelines are typically outlined in a company's employee handbook.

Elements of a Strong Work Ethic

An entrepreneur must display strong work ethics, as well as hire only those individuals who believe in and display the same level of ethical behaviour in the workplace. Some elements of a strong work ethic are:

- **Professionalism:** This involves everything from how you present yourself in a corporate setting to the manner in which you treat others in the workplace.
- **Respectfulness:** This means remaining poised and diplomatic regardless of how stressful or volatile a situation is.
- **Dependability:** This means always keeping your word, whether it's arriving on time for a meeting or delivering work on time.
- **Dedication:** This means refusing to quit until the designated work is done, and completing the work at the highest possible level of excellence.
- **Determination:** This means embracing obstacles as challenges rather than letting them stop you, and pushing ahead with purpose and resilience to get the desired results.
- **Accountability:** This means taking responsibility for your actions and the consequences of your actions, and not making excuses for your mistakes.
- **Humility:** This means acknowledging everyone's efforts and hard work, and sharing the credit for accomplishments.

How to Foster a Good Work Ethic?

As an entrepreneur, it is important that you clearly define the kind of behaviour that you expect from each and every team member in the workplace. You should make it clear that you expect employees to display positive work ethics like:

- **Honesty:** All work assigned to a person should be done with complete honesty, without any deceit or lies.
- **Good attitude:** All team members should be optimistic, energetic, and positive.
- **Reliability:** Employees should show up where they are supposed to be, when they are supposed to be there.
- **Good work habits:** Employees should always be well groomed, never use inappropriate language, conduct themselves professionally at all times and so on.
- **Initiative:** Doing the bare minimum is not enough. Every team member needs to be proactive and show initiative.
- **Trustworthiness:** Trust is non-negotiable. If an employee cannot be trusted, it's time to let that employee go.
- **Respect:** Employees need to respect the company, the law, their work, their colleagues and themselves.
- **Integrity:** Each and every team member should be completely ethical and must display above board behaviour at all times.
- **Efficiency:** Efficient employees help a company grow while inefficient employees result in a waste of time and resources.



- Don't get angry when someone tells you the truth and you don't like what you hear.
- Always be willing to accept responsibility for your mistakes.

10.1.5 Creativity & Innovation: What is Creativity?

Creativity means thinking outside the box. It means viewing things in new ways or from different perspectives, and then converting these ideas into reality. Creativity involves two parts: thinking and producing. Simply having an idea makes you imaginative, not creative. However, having an idea and acting on it makes you creative.

Characteristics of Highly Creative People

Some characteristics of creative people are:

- They are imaginative and playful
- They see issues from different angles
- They notice small details
- They have very little tolerance for boredom
- They detest rules and routine
- They love to daydream
- They are very curious

What is Innovation?

There are many different definitions of innovation. In simple terms, innovation means turning an idea into a solution that adds value. It can also mean adding value by

implementing a new product, service or process, or significantly improving on an existing product, service or process.

Characteristics of Highly Innovative People

Some characteristics of highly innovative people are:

- They embrace doing things differently
- They don't believe in taking shortcuts
- They are not afraid to be unconventional
- They are highly proactive and persistent
- They are organized, cautious and risk-averse



- Take regular breaks from your creative work to recharge yourself and gain fresh perspective.
- Build prototypes frequently, test them out, get feedback, and make the required changes.

10.1.6 Time Management: What is Time Management?

Time management is the process organizing your time, and deciding how to allocate your time between different activities. Good time management is the difference between working smart (getting more done in less time) and working hard (working for more time to get more done).

Effective time management leads to an efficient work output, even when you are faced with tight deadlines and high pressure situations. On the other hand, not managing your time effectively results in inefficient output and increases stress and anxiety.

Benefits of Time Management

Time management can lead to huge benefits like:

- Greater productivity
- Better professional reputation
- Higher chances for career advancement
- Higher efficiency
- Reduced stress
- Greater opportunities to achieve goals

Not managing time effectively can result in undesirable consequences like:

- Missing deadlines
- Substandard work quality
- Stalled career
- Inefficient work output
- Poor professional reputation
- Increase in stress and anxiety

Traits of Effective Time Managers

Some traits of effective time managers are:

- They begin projects early
- They set daily objectives
- They modify plans if required, to achieve better results
- They are flexible and open-minded
- They inform people in advance if their help will be required
- They know how to say no
- They break tasks into steps with specific deadlines
- They continually review long term goals
- They think of alternate solutions if and when required
- They ask for help when required
- They create backup plans

Effective Time Management Techniques

You can manage your time better by putting into practice certain time management techniques. Some helpful tips are:

- Plan out your day as well as plan for interruptions. Give yourself at least 30 minutes to figure out your time plan. In your plan, schedule some time for interruptions.
- Put up a “Do Not Disturb” sign when you absolutely have to complete a certain amount of work.
- Close your mind to all distractions. Train yourself to ignore ringing phones, don’t reply to chat messages and disconnect from social media sites.
- Delegate your work. This will not only help your work get done faster, but will also show you the unique skills and abilities of those around you.
- Stop procrastinating. Remind yourself that procrastination typically arises due to the fear of failure or the belief that you cannot do things as perfectly as you wish to do them.
- Prioritize. List each task to be completed in order of its urgency or importance level. Then focus on completing each task, one by one.
- Maintain a log of your work activities. Analyse the log to help you understand how efficient you are, and how much time is wasted every day.
- Create time management goals to reduce time wastage.



- Always complete the most important tasks first.
- Get at least 7 – 8 hours of sleep every day.
- Start your day early.
- Don’t waste too much time on small, unimportant details.
- Set a time limit for every task that you will undertake.
- Give yourself some time to unwind between tasks.

10.1.7 Anger Management: What is Anger Management?

Anger management is the process of:

1. Learning to recognize the signs that you, or someone else, is becoming angry
2. Taking the best course of action to calm down the situation in a positive way

Anger management does not mean suppressing anger.

Importance of Anger Management

Anger is a perfectly normal human emotion. In fact, when managed the right way, anger can be considered a healthy emotion. However, if it is not kept in check, anger can make us act inappropriately and can lead to us saying or doing things that we will likely later regret.

Extreme anger can:

- **Hurt you physically:** It leads to heart disease, diabetes, a weakened immune system, insomnia, and high blood pressure.
- **Hurt you mentally:** It can cloud your thinking and lead to stress, depression and mental health issues.
- **Hurt your career:** It can result in alienating your colleagues, bosses, clients and lead to the loss of respect.
- **Hurt your relationships:** It makes it hard for your family and friends to trust you, be honest with you and feel comfortable around you.

This is why anger management, or managing anger appropriately, is so important.

Anger Management Strategies

Here are some strategies that can help you control your anger:

Strategy 1: Relaxation

Something as simple as breathing deeply and looking at relaxing images works wonders in calming down angry feelings. Try this simple breathing exercise:

1. Take a deep breath from your diaphragm (don't breathe from your chest)
2. Visualize your breath coming up from your stomach
3. Keep repeating a calming word like 'relax' or 'take it easy' (remember to keep breathing
4. deeply while repeating the word)
5. Picture a relaxing moment (this can be from your memory or your imagination)
6. Follow this relaxation technique daily, especially when you realize that you're starting to feel angry.

Strategy 2: Cognitive Restructuring

Cognitive restructuring means changing the manner in which you think. Anger can make you curse, swear, exaggerate and act very dramatically. When this happens, force yourself to replace your angry thoughts with more logical ones. For instance, instead of thinking 'Everything is ruined' change your mindset and tell yourself 'It's not the end of the world and getting angry won't solve this'.

Strategy 3: Problem Solving

Getting angry about a problem that you cannot control is a perfectly natural response. Sometimes, try as you may, there may not be a solution to the difficulty you are faced with. In such cases, stop focusing on solving the problem, and instead focus on handling and

facing the problem. Remind yourself that you will do your best to deal with the situation, but that you will not blame yourself if you don't get the solution you desire.

Strategy 4: Better Communication

When you're angry, it is very easy to jump to inaccurate conclusions. In this case, you need to force yourself to stop reacting, and think carefully about what you want to say, before saying it. Avoid saying the first thing that enters your head. Force yourself to listen carefully to what the other person is saying. Then think about the conversation before responding.

Strategy 5: Changing Your Environment

If you find that your environment is the cause of your anger, try and give yourself a break from your surroundings. Make an active decision to schedule some personal time for yourself, especially on days that are very hectic and stressful. Having even a brief amount of quiet or alone time is sure to help calm you down.

Tips for Anger Management

The following tips will help you keep your anger in check:

- Take some time to collect your thoughts before you speak out in anger.
- Express the reason for your anger in an assertive, but non-confrontational manner once you have calmed down.
- Do some form of physical exercise like running or walking briskly when you feel yourself getting angry.
- Make short breaks part of your daily routine, especially during days that are stressful.
- Focus on how to solve a problem that's making you angry, rather than focusing on the fact that the problem is making you angry.



- Try to forgive those who anger you, rather than hold a grudge against them.
- Avoid using sarcasm and hurling insults. Instead, try and explain the reason for your frustration in a polite and mature manner.

10.1.8 Stress Management: What is Stress?

We say we are 'stressed' when we feel overloaded and unsure of our ability to deal with the pressures placed on us. Anything that challenges or threatens our well-being can be defined as a stress. It is important to note that stress can be good and bad. While good stress keeps us going, negative stress undermines our mental and physical health. This is why it is so important to manage negative stress effectively.

Causes of Stress

Stress can be caused by internal and external factors.

Internal causes of stress

- Constant worry
- Rigid thinking
- Unrealistic expectations
- Pessimism
- Negative self-talk
- All in or all out attitude

External causes of stress

- Major life changes
- Difficulties with relationships
- Having too much to do
- Difficulties at work or in school
- Financial difficulties
- Worrying about one's children and/or family

Symptoms of Stress

Stress can manifest itself in numerous ways. Take a look at the cognitive, emotional, physical and behavioural symptoms of stress.

Cognitive Symptoms	Emotional Symptoms
<ul style="list-style-type: none"> • Memory problems • Concentration issues • Lack of judgement • Pessimism • Anxiety • Constant worrying 	<ul style="list-style-type: none"> • Depression • Agitation • Irritability • Loneliness • Anxiety • Anger

Physical Symptoms	Behavioural Symptoms
<ul style="list-style-type: none"> • Aches and pain • Diarrhoea or constipation • Nausea • Dizziness • Chest pain and/or rapid heartbeat • Frequent cold or flu like feelings 	<ul style="list-style-type: none"> • Increase or decrease in appetite • Over sleeping or not sleeping enough • Withdrawing socially • Ignoring responsibilities • Consumption of alcohol or cigarettes • Nervous habits like nail biting and pacing

Tips to Manage Stress

The following tips can help you manage your stress better:

- Note down the different ways in which you can handle the various sources of your stress.
- Remember that you cannot control everything, but you can control how you respond.
- Discuss your feelings, opinions and beliefs rather than reacting angrily, defensively or passively.

- Practice relaxation techniques like meditation, yoga or tai chi when you start feeling stressed.
- Devote a part of your day towards exercise.
- Eat healthy foods like fruits and vegetables. Avoid unhealthy foods especially those containing large amounts of sugar.
- Plan your day so that you can manage your time better, with less stress.
- Say no to people and things when required.
- Schedule time to pursue your hobbies and interests.
- Ensure you get at least 7-8 hours of sleep.
- Reduce your caffeine intake.
- Increase the time spent with family and friends.



- Force yourself to smile even if you feel stressed. Smiling makes us feel relaxed and happy.
- Stop yourself from feeling and thinking like a victim. Change your attitude and focus on being proactive.

UNIT 10.2: Digital Literacy: A Recap

Unit Objectives

At the end of this unit, you will be able to:

1. Identify the basic parts of a computer
2. Identify the basic parts of a keyboard
3. Recall basic computer terminology
4. Recall the functions of basic computer keys
5. Discuss the main applications of MS Office
6. Discuss the benefits of Microsoft Outlook
7. Discuss the different types of e-commerce
8. List the benefits of e-commerce for retailers and customers
9. Discuss how the Digital India campaign will help boost e-commerce in India

10.2.1 Computer and Internet basics: Basic Parts of a Computer

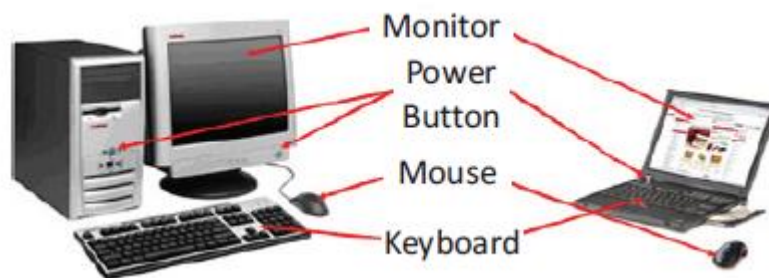


Fig.10.2.1. Parts of a Computer

- **Central Processing Unit (CPU):** The brain of the computer. It interprets and carries out program instructions.
- **Hard Drive:** A device that stores large amounts of data.
- **Monitor:** The device that contains the computer screen where the information is visually displayed.
- **Mouse:** A hand-held device used to point to items on the monitor.
- **Speakers:** Devices that enable you to hear sound from the computer.
- **Printer:** A device that converts output from a computer into printed paper documents.

Basic Parts of a Keyboard

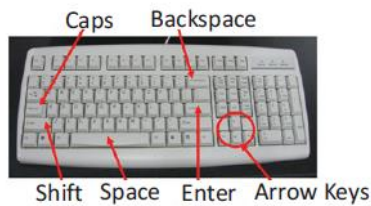


Fig.10.2.2. Parts of a Keyboard

- **Arrow Keys:** Press these keys to move your cursor.
- **Space bar:** Adds a space.
- **Enter/Return:** Moves your cursor to a new line.
- **Shift:** Press this key if you want to type a capital letter or the upper symbol of a key.
- **Caps Lock:** Press this key if you want all the letters you type to be capital letters. Press it again to revert back to typing lowercase letters.
- **Backspace:** Deletes everything to the left of your cursor.

Basic Internet Terms

- **The Internet:** A vast, international collection of computer networks that transfers information.
- **The World Wide Web:** A system that lets you access information on the Internet.
- **Website:** A location on the World Wide Web (and Internet) that contains information about a specific topic.
- **Homepage:** Provides information about a website and directs you to other pages on that website.
- **Link/Hyperlink:** A highlighted or underlined icon, graphic, or text that takes you to another file or object.
- **Web Address/URL:** The address for a website.
- **Address Box:** A box in the browser window where you can type in a web address.



- When visiting a .com address, there no need to type http:// or even www. Just type the name of the website and then press Ctrl + Enter. (Example: Type 'apple' and press Ctrl + Enter to go to www.apple.com)
- Press the Ctrl key and press the + or - to increase and decrease the size of text.
- Press F5 or Ctrl + R to refresh or reload a web page.

10.2.2 MS Office and Email: About MS Office

MS Office or Microsoft Office is a suite of computer programs developed by Microsoft. Although meant for all users, it offers different versions that cater specifically to students, home users and business users. All the programs are compatible with both, Windows and Macintosh.

Most Popular Office Products

Some of the most popular and universally used MS Office applications are:

- **Microsoft Word:** Allows users to type text and add images to a document.
- **Microsoft Excel:** Allows users to enter data into a spreadsheet and create calculations and graphs.
- **Microsoft PowerPoint:** Allows users to add text, pictures and media and create slideshows and presentations.
- **Microsoft Outlook:** Allows users to send and receive email.
- **Microsoft OneNote:** Allows users to make drawings and notes with the feel of a pen on paper.
- **Microsoft Access:** Allows users to store data over many tables.

Why Choose Microsoft Outlook?

A popular email management choice especially in the workplace, Microsoft Outlook also includes an address book, notebook, web browser and calendar. Some major benefits of this program are:

- **Integrated search function:** You can use keywords to search for data across all Outlook programs.
- **Enhanced security:** Your email is safe from hackers, junk mail and phishing website email.
- **Email syncing:** Sync your mail with your calendar, contact list, notes in One Note and...your phone!
- **Offline access to email:** No Internet? No problem! Write emails offline and send them when you're connected again.



- Press Ctrl+R as a shortcut method to reply to email.
- Set your desktop notifications only for very important emails.
- Flag messages quickly by selecting messages and hitting the Insert key.
- Save frequently sent emails as a template to reuse again and again.
- Conveniently save important emails as files.

10.2.3 E-Commerce: What is E-Commerce?

E-commerce is the buying or selling of goods and services, or the transmitting of money or data, electronically on the internet. E-Commerce is the short form for “electronic commerce.”

Examples of E-Commerce

Some examples of e-commerce are:

- Online shopping
- Online auctions
- Online ticketing
- Electronic payments
- Internet banking

Types of E-Commerce

E-commerce can be classified based on the types of participants in the transaction. The main types of e-commerce are:

- **Business to Business (B2B):** Both the transacting parties are businesses.
- **Business to Consumer (B2C):** Businesses sell electronically to end-consumers.
- **Consumer to Consumer (C2C):** Consumers come together to buy, sell or trade items to other consumers.
- **Consumer-to-Business (C2B):** Consumers make products or services available for purchase to companies looking for exactly those services or products.
- **Business-to-Administration (B2A):** Online transactions conducted between companies and public administration.
- **Consumer-to-Administration (C2A):** Online transactions conducted between individual and public administration.

Benefits of E-Commerce

The e-commerce business provides some benefits for retailers and customers.

Benefits for retailers

- Establishes an online presence
- Reduces operational costs by removing overhead costs
- Increases brand awareness through the use of good keywords
- Increases sales by removing geographical and time constraints

Benefits for customers

- Offers a wider range of choice than any physical store
- Enables goods and services to be purchased from remote locations
- Enables consumers to perform price comparisons

Digital India Campaign

Prime Minister Narendra Modi launched the Digital India campaign in 2015, with the objective of offering every citizen of India access to digital services, knowledge and information. The campaign aims to improve the country’s online infrastructure and increase internet connectivity, thus boosting the e-commerce industry.

Currently, the majority of online transactions come from tier 2 and tier 3 cities. Once the Digital India campaign is in place, the government will deliver services through mobile connectivity, which will help deliver internet to remote corners of the country. This will help the e-commerce market to enter India's tier 4 towns and rural areas.

E-Commerce Activity

Choose a product or service that you want to sell online. Write a brief note explaining how you will use existing e-commerce platforms, or create a new e-commerce platform, to sell your product or service.



- Before launching your e-commerce platform, test everything.
- Pay close and personal attention to your social media.

UNIT 10.3: Money Matters

Unit Objectives

At the end of this unit, you will be able to:

1. Discuss the importance of saving money
2. Discuss the benefits of saving money
3. Discuss the main types of bank accounts
4. Describe the process of opening a bank account
5. Differentiate between fixed and variable costs
6. Describe the main types of investment options
7. Describe the different types of insurance products
8. Describe the different types of taxes
9. Discuss the uses of online banking
10. Discuss the main types of electronic funds transfers

10.3.1 Personal Finance – Why to Save? Importance of Saving

We all know that the future is unpredictable. You never know what will happen tomorrow, next week or next year. That's why saving money steadily through the years is so important. Saving money will help improve your financial situation over time. But more importantly, knowing that you have money stashed away for an emergency will give you peace of mind. Saving money also opens the door to many more options and possibilities.

Benefits of Saving

Inculcating the habit of saving leads to a vast number of benefits. Saving helps you:

- **Become financially independent:** When you have enough money saved up to feel secure you can start making your choices, from taking a vacation whenever you want, to switching careers or starting your own business.
- **Invest in yourself through education:** Through saving, you can earn enough to pay up for courses that will add to your professional experience and ultimately result in higher paying jobs.
- **Get out of debt:** Once you have saved enough as a reserve fund, you can use your savings to pay off debts like loans or bills that have accumulated over time.
- **Be prepared for surprise expenses:** Having money saved enables you to pay for unforeseen expenses like sudden car or house repairs, without feeling financially stressed.
- **Pay for emergencies:** Saving helps you deal with emergencies like sudden health issues or emergency trips without feeling financially burdened.
- **Afford large purchases and achieve major goals:** Saving diligently makes it possible to place down payments towards major purchases and goals, like buying a home or a car.
- **Retire:** The money you have saved over the years will keep you comfortable when you no longer have the income you would get from your job.



- Break your spending habit. Try not spending on one expensive item per week, and put the money that you would have spent into your savings.
- Decide that you will not buy anything on certain days or weeks and stick to your word.

10.3.2 Types of Bank Accounts, Opening a Bank Account

Types of Bank Accounts

In India, banks offer four main types of bank accounts. These are:

- Current Accounts
- Savings Accounts
- Recurring Deposit Accounts
- Fixed Deposit Accounts

Current Accounts

Current accounts offer the most liquid deposits and thus, are best suited for businessmen and companies. As these accounts are not meant for investments and savings, there is no imposed limit on the number or amount of transactions that can be made on any given day. Current account holders are not paid any interest on the amounts held in their accounts. They are charged for certain services offered on such accounts.

Saving Accounts

Savings accounts are meant to promote savings, and are therefore the number one choice for salaried individuals, pensioners and students. While there is no restriction on the number and amount of deposits made, there are usually restrictions on the number and amount of withdrawals. Savings account holders are paid interest on their savings.

Recurring Deposit Accounts

Recurring Deposit accounts, also called RD accounts, are the accounts of choice for those who want to save an amount every month, but are unable to invest a large sum at one time. Such account holders deposit a small, fixed amount every month for a pre-determined period (minimum 6 months). Defaulting on a monthly payment results in the account holder being charged a penalty amount. The total amount is repaid with interest at the end of the specified period.

Fixed Deposit Accounts

Fixed Deposit accounts, also called FD accounts, are ideal for those who wish to deposit their savings for a long term in return for a high rate of interest. The rate of interest offered depends on the amount deposited and the time period, and also differs from bank to bank. In the case of an FD, a certain amount of money is deposited by the account holder for a fixed period of time. The money can be withdrawn when the period expires. If necessary, the depositor can break the fixed deposit prematurely. However, this usually attracts a penalty amount which also differs from bank to bank.

Opening a Bank Account



Opening a bank account is quite a simple process. Take a look at the steps to open an account of your own:

Step 1: Fill in the Account Opening Form

This form requires you to provide the following information:

- Personal details (name, address, phone number, date of birth, gender, occupation, address)
- Method of receiving your account statement (hard copy/email)
- Details of your initial deposit (cash/cheque)
- Manner of operating your account (online/mobile banking/traditional via cheque, slip books)

Ensure that you sign wherever required on the form.

Step 2: Affix your Photograph

Stick a recent photograph of yourself in the allotted space on the form.

Step 3: Provide your Know Your Customer (KYC) Details

KYC is a process that helps banks verify the identity and address of their customers. To open an account, every individual need to submit certain approved documents with respect to photo identity (ID) and address proof. Some Officially Valid Documents (OVDs) are:

- Passport
- Driving License
- Voters' Identity Card
- PAN Card
- UIDAI (Aadhar) Card

Step 4: Submit All your Documents

Submit the completed Account Opening Form and KYC documents. Then wait until the forms are processed and your account has been opened!



- Select the right type of account.
- Fill in complete nomination details.
- Ask about fees.
- Understand the rules.
- Check for online banking – it's convenient!
- Keep an eye on your bank balance.

10.3.3 Costs: Fixed vs Variable: What are Fixed and Variable Costs?

Fixed costs and variable costs together make up a company's total cost. These are the two types of costs that companies have to bear when producing goods and services. A fixed cost does not change with the volume of goods or services a company produces. It always remains the same.

A variable cost, on the other hand, increases and decreases depending on the volume of goods and services produced. In other words, it varies with the amount produced.

Differences Between Fixed and Variable Costs

Let's take a look at some of the main differences between fixed and variable costs:

Criteria	Fixed Costs	Variable Costs
Meaning	A cost that stays the same, regardless of the output produced.	A cost that changes when the
Nature	Time related.	Volume related.
Incurred	Incurred irrespective of units being produced.	Incurred only when units are produced
Unit cost	Inversely proportional to the number of units produced	Remains the same, per unit.
Examples	Depreciation, rent, salary, insurance and tax	Material consumed, wages, commission on sales and packing expenses



- When trying to determine whether a cost is fixed or variable, simply ask the following question: Will the particular cost change if the company stopped its production activities? If the answer is no, then it is a fixed cost. If the answer is yes, then it is probably a variable cost.

10.3.4 Investment, Insurance and Taxes: Investment

Investment means that money is spent today with the aim of reaping financial gains at a future time. The main types of investment options are as follows:

- **Bonds:** Bonds are instruments used by public and private companies to raise large sums of money – too large to be borrowed from a bank. These bonds are then issued in the public market and are bought by lenders.

- **Stocks:** Stocks or equity are shares that are issued by companies and are bought by the general public.
- **Small Savings Schemes:** Small Savings Schemes are tools meant to save money in small amounts. Some popular schemes are the Employees Provident Fund, Sukanya Samriddhi Scheme and National Pension Scheme.
- **Mutual Funds:** Mutual Funds are professionally managed financial instruments that invest money in different securities on behalf of investors.
- **Fixed Deposits:** A fixed amount of money is kept aside with a financial institution for a fixed amount of time in return for interest on the money.
- **Real Estate:** Loans are taken from banks to purchase real estate, which is then leased or sold with the aim of making a profit on the appreciated property price.
- **Hedge Funds:** Hedge funds invest in both financial derivatives and/or publicly traded securities.
- **Private Equity:** Private Equity is trading in the shares of an operating company that is not publicly listed and whose shares are not available on the stock market.

Insurance

There are two types of insurance – Life Insurance and Non-Life or General Insurance.

Life Insurance

Life Insurance deals with all insurance covering human life.

Life Insurance Products

The main life insurance products are:

- **Term Insurance:** This is the simplest and cheapest form of insurance. It offers financial protection for a specified tenure, say 15 to 20 years. In the case of your death, your family is paid the sum assured. In the case of your surviving the term, the insurer pays nothing.
- **Endowment Policy:** This offers the dual benefit of insurance and investment. Part of the premium is allocated towards the sum assured, while the remaining premium gets invested in equity and debt. It pays a lump sum amount after the specified duration or on the death of the policyholder, whichever is earlier.
- **Unit-Linked Insurance Plan (ULIP):** Here part of the premium is spent on the life cover, while the remaining amount is invested in equity and debt. It helps develop a regular saving habit.
- **Money Back Life Insurance:** While the policyholder is alive, periodic payments of the partial survival benefits are made during the policy tenure. On the death of the insured, the insurance company pays the full sum assured along with survival benefits.
- **Whole Life Insurance:** It offers the dual benefit of insurance and investment. It offers insurance cover for the whole life of the person or up to 100 years whichever is earlier.

General Insurance

General Insurance deals with all insurance covering assets like animals, agricultural crops, goods, factories, cars and so on.

General Insurance Products

The main general insurance products are:

- **Motor Insurance:** This can be divided into Four-Wheeler Insurance and Two-Wheeler insurance.
- **Health Insurance:** The main types of health insurance are individual health insurance, family floater health insurance, comprehensive health insurance and critical illness insurance.
- **Travel Insurance:** This can be categorised into Individual Travel Policy, Family Travel Policy, Student Travel Insurance and Senior Citizen Health Insurance.
- **Home Insurance:** This protects the house and its contents from risk.
- **Marine Insurance:** This insurance covers goods, freight and cargo against loss or damage during transit by rail, road, sea and/or air.

Taxes

There are two types of taxes – Direct Taxes and Indirect Taxes.

Direct Tax

Direct taxes are levied directly on an entity or a person and are non-transferrable. Some examples of Direct Taxes are:

- **Income Tax:** This tax is levied on your earning in a financial year. It is applicable to both, individuals and companies.
- **Capital Gains Tax:** This tax is payable whenever you receive a sizable amount of money. It is usually of two types – short term capital gains from investments held for less than 36 months and long term capital gains from investments held for longer than 36 months.
- **Securities Transaction Tax:** This tax is added to the price of a share. It is levied every time you buy or sell shares.
- **Perquisite Tax:** This tax is levied on perks that have been acquired by a company or used by an employee.
- **Corporate Tax:** Corporate tax is paid by companies from the revenue they earn.

Indirect Tax

Indirect taxes are levied on goods or services. Some examples of Indirect Taxes are:

- **Sales Tax:** Sales Tax is levied on the sale of a product.
- **Service Tax:** Service Tax is added to services provided in India.
- **Value Added Tax:** Value Added Tax is levied at the discretion of the state government. The tax is levied on goods sold in the state. The tax amount is decided by the state.
- **Customs Duty & Octroi:** Customs Duty is a charge that is applied on purchases that are imported from another country. Octroi is levied on goods that cross state borders within India.
- **Excise Duty:** Excise Duty is levied on all goods manufactured or produced in India.



- Think about how quickly you need your money back and pick an investment option accordingly.
- Ensure that you are buying the right type of insurance policy for yourself.
- Remember, not paying taxes can result in penalties ranging from fines to imprisonment.

10.3.5 Online Banking, NEFT, RTGS etc.: What is Online Banking?

Internet or online banking allows account holders to access their account from a laptop at any location. In this way, instructions can be issued. To access an account, account holders simply

Internet banking can be used to:

- Find out an account balance
- Transfer amounts from one account to another
- Arrange for the issuance of cheques
- Instruct payments to be made
- Request for a cheque book
- Request for a statement of accounts
- Make a fixed deposit

Electronic Funds Transfers

Electronic funds transfer is a convenient way of transferring money from the comfort of one's own home, using integrated banking tools like internet and mobile banking. Transferring funds via an electronic gateway is extremely convenient. With the help of online banking, you can choose to:

- Transfer funds into your own accounts of the same bank.
- Transfer funds into different accounts of the same bank.
- Transfer funds into accounts in different bank, using NEFT.
- Transfer funds into other bank accounts using RTGS.
- Transfer funds into various accounts using IMPS.

NEFT

NEFT stands for National Electronic Funds Transfer. This money transfer system allows you to electronically transfer funds from your respective bank accounts to any other account, either in the same bank or belonging to any other bank. NEFT can be used by individuals, firms and corporate organizations to transfer funds between accounts.

In order to transfer funds via NEFT, two things are required:

- A transferring bank
- A destination bank

Before you can transfer funds through NEFT, you will need to register the beneficiary who will be receiving the funds. In order to complete this registration, you will require the following information:

- Recipient's name
- Recipient's bank's name
- Recipient's account number
- Recipient's bank's IFSC code

RTGS

RTGS stands for Real Time Gross Settlement. This is a real-time fund transfer system which enables you to transfer funds from one bank to another, in real time or on a gross basis. The transferred amount is immediately deducted from the account of one bank, and instantly credited to the other bank's account. The RTGS payment gateway is maintained by the Reserve Bank of India. The transactions between banks are made electronically. RTGS can be used by individuals, companies and firms to transfer large sums of money. Before remitting funds through RTGS, you will need to add the beneficiary and his bank account details via your online banking account. In order to complete this registration, you will require the

- Name of the beneficiary
- Beneficiary's account number
- Beneficiary's bank address
- Beneficiary's bank's IFSC code

IMPS

IMPS stands for Immediate Payment Service. This is a real-time, inter-bank, electronic funds transfer system used to transfer money instantly within banks across India. IMPS enables users to make instant electronic transfer payments using mobile phones through both, Mobile Banking and SMS. It can also be used through ATMs and online banking. IMPS is available 24 hours a day and 7 days a week. The system features a secure transfer gateway and immediately confirms orders that have been fulfilled.

- Register for IMPS with your bank
- Receive a Mobile Money Identifier (MMID) from the bank
- Receive a MPIN from the bank

To transfer money through IMPS, the you need to:

Once you have both these, you can login or make a request through SMS to transfer a particular amount to a beneficiary.

For the beneficiary to receive the transferred money, he must:

1. Link his mobile number with his respective account
2. Receive the MMID from the bank

In order to initiate a money transfer through IMPS, you will need to enter the following information:

1. The beneficiary's mobile number
2. The beneficiary's MMID
3. The transfer amount
4. Your MPIN

As soon as money has been deducted from your account and credited into the beneficiary's account, you will be sent a confirmation SMS with a transaction reference number, for future reference.

Differences Between NEFT, RTGS & IMPS

Criteria	NEFT	RTGS	IMPS
Settlement	Done in batches	Real-time	Real-time
Full form	National Electronic Fund Transfer	Real Time Gross Settlement	Immediate Payment Service
Timings on Monday – Friday	8:00 am – 6:30 pm	9:00 am – 4:30 pm	24x7
Timings on Saturday	8:00 am – 1:00 pm	9:00 am – 1:30 pm	24x7
Minimum amount of money transfer limit	₹1	₹2 lacs	₹1
Maximum amount of money transfer limit	₹10 lacs	₹10 lacs per day	₹2 lacs
Maximum charges as per RBI	Up to 10,000 – ₹2.5 above 10,000 – 1 lac – ₹5 above 1 – 2 lacs ₹15 above 2 – 5 lacs ₹25 above 5 – 10 lacs ₹25	above 2 – 5 lacs ₹25 above 5 – 10 lacs ₹50	Up to 10,000 – ₹5 above 10,000 – 1 lac – ₹5 above 1 – 2 lacs – ₹15



- Never click on any links in any e-mail message to access your online banking website.
- You will never be asked for your credit or debit card details while using online banking.
- Change your online banking password regularly.

UNIT 10.4: Preparing for Employment & Self Employment

Unit Objectives

At the end of this unit, you will be able to:

1. Discuss the steps to prepare for an interview
2. Discuss the steps to create an effective Resume
3. Discuss the most frequently asked interview questions
4. Discuss how to answer the most frequently asked interview questions
5. Discuss basic workplace terminology

10.4.1 Interview Preparation: How to Prepare for an Interview?

The success of your getting the job that you want depends largely on how well your interview for that job goes. Therefore, before you go in for your interview, it is important that you prepare for it with a fair amount of research and planning. Take a look at the steps to follow in order to be well prepared for an interview:

1. Research the organization that you are having the interview with.

- Studying the company beforehand will help you be more prepared at the time of the interview. Your knowledge of the organization will help you answer questions at the time of the interview, and will leave you looking and feeling more confident. This is sure to make you stand out from other, not as well informed, candidates.
- Look for background information on the company. Try and find an overview of the company and its industry profile.
- Visit the company website to get a good idea of what the company does. A company website offers a wealth of important information. Read and understand the company's mission statement. Pay attention to the company's products/services and client list. Read through any press releases to get an idea of the company's projected growth and stability.
- Note down any questions that you have after your research has been completed.

2. Think about whether your skills and qualifications match the job requirements.

- Carefully read through and analyse the job description.
- Make a note of the knowledge, skills and abilities required to fulfil the job requirements.
- Take a look at the organization hierarchy. Figure out where the position you are applying for fits into this hierarchy.

3. Go through the most typical interview questions asked, and prepare your responses.

- Remember, in most interviews a mix of resume-based, behavioural and case study questions are asked.
- Think about the kind of answers you would like to provide to typical questions asked in these three areas.
- Practice these answers until you can express them confidently and clearly.

4. Plan your attire for the interview.

- It is always safest to opt for formal business attire, unless expressly informed to dress in business casual (in which case you should use your best judgement)
- Ensure that your clothes are clean and well-ironed. Pick neutral colours – nothing too bright or flashy.
- The shoes you wear should match your clothes, and should be clean and suitable for an interview.
- Remember, your aim is to leave everyone you meet with the impression that you are a professional and highly efficient person.

5. Ensure that you have packed everything that you may require during the interview.

- Carry a few copies of your resume. Use a good quality paper for your resume print outs.
- Always take along a notepad and a pen.
- Take along any information you may need to refer to, in order to fill out an application form.
- Carry a few samples of your work, if relevant.

6. Remember the importance of non-verbal communication.

- Practice projecting confidence. Remind yourself to smile and make eye contact. Practice giving a firm handshake.
- Keep in mind the importance of posture. Practice sitting up straight. Train yourself to stop nervous gestures like fidgeting and foot-tapping.
- Practice keeping your reactions in check. Remember, your facial expressions provide a good insight into your true feelings. Practice projecting a positive image.

7. Make a list of questions to end the interview with.

- Most interviews will end with the interviewer(s) asking if you have any questions. This is your chance to show that you have done your research and are interested in learning more about the company.
- If the interviewer does not ask you this question, you can inform him/her that you have some queries that you would like to discuss. This is the time for you to refer to the notes you made while studying the company.
- Some good questions to ask at this point are:
 - What do you consider the most important criteria for success in this job?
 - How will my performance be evaluated?
 - What are the opportunities for advancement?
 - What are the next steps in the hiring process?
- Remember, never ask for information that is easily available on the company website.



- Ask insightful and probing questions.
- When communicating, use effective forms of body language like smiling, making eye contact, and actively listening and nodding. Don't slouch, play with nearby items, fidget, chew gum, or mumble.

10.4.2 Preparing an Effective Resume: How to Create an Effective Resume?

A resume is a formal document that lists a candidate's work experience, education and skills. A good resume gives a potential employer enough information to believe the applicant is worth interviewing. That's why it is so important to create a résumé that is effective. Take a look at the steps to create an effective resume:

Step 1: Write the Address Section

The Address section occupies the top of your resume. It includes information like your name, address, phone number and e-mail address. Insert a bold line under the section to separate it from rest of your resume.

Example:

Khyati Mehta
Breach Candy, Mumbai – India
Contact No: +91 2223678270
Email: jasmine.watts@gmail.com

Step 2: Add the Profile Summary Section

This part of your resume should list your overall experiences, achievements, awards, certifications and strengths. You can make your summary as short as 2-3 bullet points or as long as 8-10 bullet points.

Example:

Profile Summary

- A Floor Supervisor graduated from University of Delhi having 6 years of experience in managing a retail outlet.
- Core expertise lies in managing retail staff, including cashiers and people working on the floor.

Step 3: Include Your Educational Qualifications

When listing your academic records, first list your highest degree. Then add the second highest qualification under the highest one and so on. To provide a clear and accurate picture of your educational background, it is critical that include information on your position, rank, percentage or CPI for every degree or certification that you have listed.

If you have done any certifications and trainings, you can add a Trainings & Certifications section under your Educational Qualifications section.

Example:

Educational Qualifications

<Enter qualification> <enter date of qualification> from <enter name of institute> with <enter percentage or any other relevant scoring system>.

Step 4: List Your Technical Skills

When listing your technical skills, start with the skills that you are most confident about. Then add the skills that you do not have as good a command over. It is perfectly acceptable to include just one skill, if you feel that particular skill adds tremendous value to your résumé. If you do not have any technical skills, you can omit this step.

Example:

Technical Skills

- *<Enter your technical skill here, if applicable>*

Step 5: Insert Your Academic Project Experience

List down all the important projects that you have worked on. Include the following information in this section:

- Project title
- Contribution
- Organization
- Description
- Platform used

Example:

Academic Projects

Project Title: *<Insert project title>*

Organization: *<Insert the name of the organization for whom you did the project>*

Platform used: *<Insert the platform used, if any>*

Contribution: *<Insert your contribution towards this project>*

Description: *<Insert a description of the project in one line>*

Step 6: List Your Strengths

This is where you list all your major strengths. This section should be in the form of a bulleted list.

Example:

Strengths

- Excellent oral, written and presentation skills
- Action-oriented and result-focused
- Great time management skills

Step 7: List Your Extracurricular Activities

It is very important to show that you have diverse interests and that your life consists of more than academics. Including your extracurricular activities can give you an added edge over other candidates who have similar academic scores and project experiences. This section should be in the form of a bulleted list.

Example:

< Insert your extracurricular activity here. E.g.: Member of, _____ played (name of sport) at _____ level, won (name of prize/award) for _____ >

Step 8: Write Your Personal Details

The last section of your résumé must include the following personal information:

- Date of birth
- Gender & marital status
- Nationality
- Languages known

Example:**Personal Details**

- Date of birth: 25th May, 1981
- Gender & marital status: Female, Single
- Nationality: Indian
- Languages known: English, Hindi, Tamil, French



- Keep your resume file name short, simple and informational.
- Make sure the resume is neat and free from typing errors.
- Always create your resume on plain white paper.

10.4.3 Interview FAQs

Take a look at some of the most frequently asked interview questions, and some helpful tips on how to answer them.

Q1. Can you tell me a little about yourself?**Tips to answer:**

- Don't provide your full employment or personal history.
- Offer 2-3 specific experiences that you feel are most valuable and relevant.
- Conclude with how those experiences have made you perfect for this specific role.

Q2. How did you hear about the position?**Tips to answer:**

- Tell the interviewer how you heard about the job – whether it was through a friend (name the friend), event or article (name them) or a job portal (say which one).
- Explain what excites you about the position and what in particular caught your eye about this role.

Q3. What do you know about the company?**Tips to answer:**

- Don't recite the company's About Us page.
- Show that you understand and care about the company's goals.
- Explain why you believe in the company's mission and values.

Q4. Why do you want this job?**Tips to answer:**

- Show that you are passionate about the job.
- Identify why the role is a great fit for you.
- Explain why you love the company.

Q5. Why should we hire you?**Tips to answer:**

- Prove through your words that you can not only do the work, but can definitely deliver excellent results.
- Explain why you would be a great fit with the team and work culture.
- Explain why you should be chosen over any other candidate.

Q6. What are your greatest professional strengths?**Tips to answer:**

- Be honest – share some of your real strengths, rather than give answers that you think sound good.
- Offer examples of specific strengths that are relevant to the position you are applying for.
- Provide examples of how you've demonstrated these strengths.

Q7. What do you consider to be your weaknesses?**Tips to answer:**

- The purpose of this question is to gauge your self-awareness and honesty.
- Give an example of a trait that you struggle with, but that you're working on to improve.

Q8. What are your salary requirements?**Tips to answer:**

- Do your research beforehand and find out the typical salary range for the job you are applying for.
- Figure out where you lie on the pay scale based on your experience, education, and skills.
- Be flexible. Tell the interviewer that you know your skills are valuable, but that you want the job and are willing to negotiate.

Q9. What do you like to do outside of work?**Tips to answer:**

- The purpose of this question is to see if you will fit in with the company culture.
- Be honest – open up and share activities and hobbies that interest and excite you.

Q10. If you were an animal, which one would you want to be?**Tips to answer:**

- The purpose of this question is to see if you are able to think on your feet.
- There's no wrong answer – but to make a great impression try to bring out your strengths or personality traits through your answer.

Q11: What do you think we could do better or differently?**Tips to answer:**

- The purpose of this question is to see if you have done your research on the company, and to test whether you can think critically and come up with new ideas.
- Suggest new ideas. Show how your interests and expertise would help you execute these ideas.

Q12: Do you have any questions for us?**Tips to answer:**

- Do not ask questions to which the answers can be easily found on the company website or through a quick online search.
- Ask intelligent questions that show your ability to think critically.



- Be honest and confident while answering.
- Use examples of your past experiences wherever possible to make your answers more impactful.

10.4.4 Work Readiness – Terms & Terminologies: Basic Workplace Terminology

Every employee should be well versed in the following terms:

- **Annual leave:** Paid vacation leave given by employers to employees.
- **Background Check:** A method used by employers to verify the accuracy of the information provided by potential candidates.
- **Benefits:** A part of an employee's compensation package.
- **Breaks:** Short periods of rest taken by employees during working hours.
- **Compensation Package:** The combination of salary and benefits that an employer provides to his/her employees.
- **Compensatory Time (Comp Time):** Time off in lieu of pay.
- **Contract Employee:** An employee who works for one organization that sells said employee's service to another company, either on a project or time basis.
- **Contract of Employment:** When an employee is offered work in exchange for wages or salary, and accepts the offer made by the employer, a contract of employment exists.
- **Corporate Culture:** The beliefs and values shared by all the members of a company, and imparted from one generation of employees to another.
- **Counter Offer/Counter Proposal:** A negotiation technique used by potential candidates to increase the amount of salary offered by a company.
- **Cover Letter:** A letter that accompanies a candidate's resume. It emphasizes the important points in the candidate's resume and provides real examples that prove the candidate's ability to perform the expected job role.
- **Curriculum Vitae (CV)/Resume:** A summary of a candidate's achievements, educational work experience, skills and strengths.
- **Declining Letter:** A letter sent by an employee to an employer, turning down the job offer employer to the employee.
- **Deductions:** Amounts subtracted from an employee's pay and listed on the employee's pay slip.
- **Discrimination:** The act of treating one person not as favourably as another person.
- **Employee:** A person who works for another person in exchange for payment.
- **Employee Training:** A workshop or in-house training that an employee is asked to attend by his or her superior, for the benefit of the employer.
- **Employment Gaps:** Periods of unemployed time between jobs.
- **Fixed-Term Contract:** A contract of employment which gets terminated on an agreed-upon date.
- **Follow-Up:** The act of contacting a potential employer after a candidate has submitted his or her resume.
- **Freelancer/Consultant/Independent Contractor:** A person who works for him or herself for temporary jobs and projects with different employers.
- **Holiday:** Paid time-off from work.
- **Hourly Rate:** The amount of salary or wages paid for 60 minutes of work.
- **Internship:** A job opportunity offered by an employer to a potential employee, called an at the employer's company for a fixed, limited time period.

- **Interview:** A conversation between a potential employee and a representative of an order to determine if the potential employee should be hired.
- **Job Application:** A form which asks for a candidate's information like the candidate's name, details and work experience. The purpose of a candidate submitting a job application, is to show that candidate's interest in working for a particular company.
- **Job Offer:** An offer of employment made by an employer to a potential employee.
- **Job Search Agent:** A program that enables candidates to search for employment opportunities by selecting criteria listed in the program, for job vacancies. background, made by the and pitches intern, to work employer, in address, contact
- **Lay Off:** A lay off occurs when an employee is temporarily let go from his or her job, due to the employer not having any work for that employee.
- **Leave:** Formal permission given to an employee, by his or her employer, to take a leave of absence from work.
- **Letter of Acceptance:** A letter given by an employer to an employee, confirming the offer of employment made by the employer, as well as the conditions of the offer.
- **Letter of Agreement:** A letter that outlines the terms of employment.
- **Letter of Recommendation:** A letter written for the purpose of validating the work skills of a person.
- **Maternity Leave:** Leave taken from work by women who are pregnant, or who have just given birth.
- **Mentor:** A person who is employed at a higher level than you, who offers you advice and guides you in your career.
- **Minimum wage:** The minimum wage amount paid on an hourly basis.
- **Notice:** An announcement made by an employee or an employer, stating that the employment contract will end on a particular date.
- **Offer of Employment:** An offer made by an employer to a prospective employee that contains important information pertaining to the job being offered, like the starting date, salary, working conditions etc.
- **Open-Ended Contract:** A contract of employment that continues till the employer or terminates it.
- **Overqualified:** A person who is not suited for a particular job because he or she has too many years of work experience, or a level of education that is much higher than required for the job, or is currently or was previously too highly paid.
- **Part-Time Worker:** An employee who works for fewer hours than the standard number of hours normally worked.
- **Paternity Leave:** Leave granted to a man who has recently become a father.
- **Recruiters/Head-hunters/Executive Search Firms:** Professionals who are paid by employers to search for people to fill particular positions.
- **Resigning/Resignations:** When an employee formally informs his or her employer that he or she is quitting his or her job.
- **Self-Employed:** A person who has his or her own business and does not work in the capacity of an employee.
- **Time Sheet:** A form that is submitted to an employer, by an employee, that contains the number of hours worked every day by the employee.

UNIT 10.5: Understanding Entrepreneurship

Unit Objectives

At the end of this unit, you will be able to:

1. Discuss the concept of entrepreneurship
2. Discuss the importance of entrepreneurship
3. Describe the characteristics of an entrepreneur
4. Describe the different types of enterprises
5. List the qualities of an effective leader
6. Discuss the benefits of effective leadership
7. List the traits of an effective team
8. Discuss the importance of listening effectively
9. Discuss how to listen effectively
10. Discuss the importance of speaking effectively
11. Discuss how to speak effectively
12. Discuss how to solve problems
13. List important problem solving traits
14. Discuss ways to assess problem solving skills
15. Discuss the importance of negotiation
16. Discuss how to negotiate
17. Discuss how to identify new business opportunities
18. Discuss how to identify business opportunities within your business
19. Explain the meaning of entrepreneur
20. Describe the different types of entrepreneurs
21. List the characteristics of entrepreneurs
22. Recall entrepreneur success stories
23. Discuss the entrepreneurial process
24. Describe the entrepreneurship ecosystem
25. Discuss the purpose of the Make in India campaign
26. Discuss key schemes to promote entrepreneurs
27. Discuss the relationship between entrepreneurship and risk appetite
28. Discuss the relationship between entrepreneurship and resilience
29. Describe the characteristics of a resilient entrepreneur
30. Discuss how to deal with failure

10.5.1 Concept Introduction (Characteristic of Entrepreneur, types of firms / types of enterprises)

Entrepreneurs and Entrepreneurship

Anyone who is determined to start a business, no matter what the risk, is an entrepreneur. Entrepreneurs run their own start-up, take responsibility for the financial risks and use creativity, innovation and vast reserves of self-motivation to achieve success. They dream big and are determined to do whatever it takes to turn their idea into a viable offering. The aim of an entrepreneur is to create an enterprise. The process of creating this enterprise is known as entrepreneurship.

Importance of Entrepreneurship

1. Entrepreneurship is very important for the following reasons:
2. It results in the creation of new organizations
3. It brings creativity into the marketplace
4. It leads to improved standards of living
5. It helps develop the economy of a country

Characteristics of Entrepreneurs

All successful entrepreneurs have certain characteristics in common.

They are all:

- Extremely passionate about their work
- Confident in themselves
- Disciplined and dedicated
- Motivated and driven
- Highly creative
- Visionaries
- Open-minded
- Decisive

Entrepreneurs also have a tendency to:

- Have a high-risk tolerance
- Thoroughly plan everything
- Manage their money wisely
- Make their customers their priority
- Understand their offering and their market in detail
- Ask for advice from experts when required
- Know when to cut their losses

Examples of Famous Entrepreneurs

Some famous entrepreneurs are:

- Dhirubhai Ambani (Reliance)
- Dr. Karsanbhai Patel (Nirma)
- Azim Premji (Wipro)
- Anil Agarwal (Vedanta Resources)

Types of Enterprises

As an entrepreneur in India, you can own and run any of the following types of enterprises:

Sole Proprietorship

In a sole proprietorship, a single individual owns, manages and controls the enterprise. This type of business is the easiest to form with respect to legal formalities. The business and the owner have no separate legal existence. All profit belongs to the proprietor, as do all the losses the liability of the entrepreneur is unlimited.

Partnership

A partnership firm is formed by two or more people. The owners of the enterprise are called partners. A partnership deed must be signed by all the partners. The firm and its partners have no separate legal existence. The profits are shared by the partners. With respect to losses, the liability of the partners is unlimited. A firm has a limited life span and must be dissolved when any one of the partners dies, retires, claims bankruptcy or goes insane.

Limited Liability Partnership (LLP)

In a Limited Liability Partnership or LLP, the partners of the firm enjoy perpetual existence as well as the advantage of limited liability. Each partner's liability is limited to their agreed contribution to the LLP. The partnership and its partners have a separate legal existence.



- Learn from others' failures.
- Be certain that this is what you want.
- Search for a problem to solve, rather than look for a problem to attach to your idea.

10.5.2 Leadership & Teamwork: Leadership and Leaders

Leadership means setting an example for others to follow. Setting a good example means not asking someone to do something that you wouldn't willingly want to do yourself.

Leadership is about figuring out what to do in order to win as a team, and as a company.

Leaders believe in doing the right things. They also believe in helping others to do the right things. An effective leader is someone who:

- Creates an inspiring vision of the future.
- Motivates and inspires his team to pursue that vision.

Leadership Qualities That All Entrepreneurs Need

Building a successful enterprise is only possible if the entrepreneur in charge possesses excellent leadership qualities. Some critical leadership skills that every entrepreneur must have are:

1. **Pragmatism:** This means having the ability to highlight all obstacles and challenges, in order to resolve issues and reduce risks.
2. **Humility:** This means admitting to mistakes often and early, and being quick to take responsibility for your actions. Mistakes should be viewed as challenges to overcome, not opportunities to point blame.
3. **Flexibility:** It is critical for a good leader to be very flexible and quickly adapt to change. It is equally critical to know when to adapt and when not to.
4. **Authenticity:** This means showing both, your strengths and your weaknesses. It means being human and showing others that you are human.
5. **Reinvention:** This means refreshing or changing your leadership style when necessary. To do this, it's important to learn where your leadership gaps lie and find out what resources are required to close them.
6. **Awareness:** This means taking the time to recognize how others view you. It means understanding how your presence affects those around you.

Benefits of Effective Leadership

Effective leadership results in numerous benefits. Great leadership leads to the leader successfully:

- Gaining the loyalty and commitment of the team members
- Motivating the team to work towards achieving the company's goals and objectives
- Building morale and instilling confidence in the team members
- Fostering mutual understanding and team-spirit among team members
- Convincing team members about the need to change when a situation requires adaptability

Teamwork and Teams

Teamwork occurs when the people in a workplace combine their individual skills to pursue a common goal. Effective teams are made up of individuals who work together to achieve this common goal. A great team is one who holds themselves accountable for the end result.

1. **Unity of purpose:** All the team members should clearly understand and be equally committed to the purpose, vision and goals of the team.
2. **Great communication skills:** Team members should have the ability to express their concerns, ask questions and use diagrams, and charts to convey complex information.
3. **The ability to collaborate:** Every member should feel entitled to provide regular feedback on new ideas.
4. **Initiative:** The team should consist of proactive individuals. The members should have the enthusiasm to come up with new ideas, improve existing ideas, and conduct their own research.
5. **Visionary members:** The team should have the ability to anticipate problems and act on these potential problems before they turn into real problems.

6. **Great adaptability skills:** The team must believe that change is a positive force. Change should be seen as the chance to improve and try new things.
7. **Excellent organizational skills:** The team should have the ability to develop standard work processes, balance responsibilities, properly plan projects, and set in place methods to measure progress and ROI.



- Don't get too attached to your original idea. Allow it to evolve and change.
- Be aware of your weaknesses and build a team that will complement your shortfalls.
- Hiring the right people is not enough. You need to promote or incentivize your most talented people to keep them motivated.
- Earn your team's respect.

10.5.3 Communication Skills: Listening & Speaking the Importance of Listening Effectively

Listening is the ability to correctly receive and understand messages during the process of communication. Listening is critical for effective communication. Without effective listening skills, messages can easily be misunderstood. This results in a communication breakdown and can lead to the sender and the receiver of the message becoming frustrated or irritated. It's very important to note that listening is not the same as hearing. Hearing just refers to sounds that you hear. Listening is a whole lot more than that. To listen, one requires focus. It means not only paying attention to the story, but also focusing on how the story is relayed, the way language and voice is used, and even how the speaker uses their body language. The ability to listen depends on how effectively one can perceive and understand both, verbal and non-verbal cues.

How to Listen Effectively?

To listen effectively you should:

- | | |
|--|---|
| • Stop talking | • Pay attention to the tone that is being used |
| • Stop interrupting | • Pay attention to the speaker's gestures, facial expressions and eye movements |
| • Focus completely on what is being said | • Not try and rush the person |
| • Nod and use encouraging words and gestures | • Not let the speaker's mannerisms or habits irritate or distract you |
| • Be open-minded | |

- Think about the speaker's perspective
- Be very, very patient

The Importance of Speaking Effectively

How successfully a message gets conveyed depends entirely on how effectively you are able to get it through. An effective speaker is one who enunciates properly, pronounces words correctly, chooses the right words and speaks at a pace that is easily understandable.

Besides this, the words spoken out loud need to match the gestures, tone and body language used. What you say, and the tone in which you say it, results in numerous perceptions being formed. A person who speaks hesitantly may be perceived as having low self-esteem or lacking in knowledge of the discussed topic. Those with a quiet voice may very well be labelled as shy. And those who speak in commanding tones with high levels of clarity, are usually considered to be extremely confident. This makes speaking a very critical communication skill.

How to Speak Effectively?

To speak effectively you should:

- Incorporate body language in your speech like eye contact, smiling, nodding, gesturing etc.
- Build a draft of your speech before actually making your speech.
- Ensure that all your emotions and feelings are under control.
- Pronounce your words distinctly with the correct pitch and intensity. Your speech should be crystal clear at all times. Use a pleasant and natural tone when speaking. Your audience should not feel like you are putting on an accent or being unnatural in any way.
- Use precise and specific words to drive your message home. Ambiguity should be avoided at all costs.
- Ensure that your speech has a logical flow.
- Be brief. Don't add any unnecessary information.
- Make a conscious effort to avoid irritating mannerisms like fidgeting, twitching etc.
- Choose your words carefully and use simple words that the majority of the audience will have no difficulty understanding.
- Use visual aids like slides or a whiteboard.
- Speak slowly so that your audience can easily understand what you're saying. However, be careful not to speak too slowly because this can come across as stiff, unprepared or even condescending.
- Remember to pause at the right moments.



- If you're finding it difficult to focus on what someone is saying, try repeating their words in your head.
- Always maintain eye contact with the person that you are communicating with, when speaking as well as listening. This conveys and also encourages interest in the conversation.

10.5.4 Problem Solving & Negotiation Skills: What is a Problem?

As per The Concise Oxford Dictionary (1995), a problem is, "A doubtful or difficult matter requiring a solution"

All problems contain two elements:

1. Goals
2. Obstacles

The aim of problem solving is to recognize the obstacles and remove them in order to achieve the goals.

How to Solve Problems?



Solving a problem requires a level of rational thinking. Here are some logical steps to follow when faced with an issue:

Step 1: Identify the problem

Step 2: Study the problem in detail

Step 3: List all possible solutions

Step 4: Select the best solution

Step 5: Implement the chosen solution

Step 6: Check that the problem has really been solved

Important Traits for Problem Solving

Highly developed problem solving skills are critical for both, business owners and their employees. The following personality traits play a big role in how effectively problems are solved:

Being open minded

Not panicking

Asking the right questions

Having a positive attitude

Being proactive

Focusing on the right problem

How to Assess for Problem Solving Skills?

As an entrepreneur, it would be a good idea to assess the level of problem solving skills of potential candidates before hiring them. Some ways to assess this skill are through:

1. Application forms: Ask for proof of the candidate's problem solving skills in the application form.
2. Psychometric tests: Give potential candidates logical reasoning and critical thinking tests and see how they fare.

3. Interviews: Create hypothetical problematic situations or raise ethical questions and see how the candidates respond.
4. Technical questions: Give candidates examples of real life problems and evaluate their thought process.

What is Negotiation?

Negotiation is a method used to settle differences. The aim of negotiation is to resolve differences through a compromise or agreement while avoiding disputes. Without negotiation, conflicts are likely to lead to resentment between people. Good negotiation skills help satisfy both parties and go a long way towards developing strong relationships.

Why Negotiate?

Starting a business requires many, many negotiations. Some negotiations are small while others are critical enough to make or break a start-up. Negotiation also plays a big role inside the workplace. As an entrepreneur, you need to not only know how to negotiate yourself, but also how to train employees in the art of negotiation.

How to Negotiate?



Take a look at some steps to help you negotiate:

Step 1: Pre-Negotiation Preparation	Agree on where to meet to discuss the problem, decide who all will be present and set a time limit for the discussion.
Step 2: Discuss the problem	This involves asking questions, listening to the other side, putting your views forward and clarifying doubts.
Step 3: Clarify the Objective	Ensure that both parties want to solve the same problem and reach the same goal.
Step 4: Aim for a Win-Win Outcome	Try your best to be open minded when negotiating. Compromise and offer alternate solutions to reach an outcome where both parties win.
Step 5: Clearly Define the Agreement	When an agreement has been reached, the details of the agreement should be crystal clear to both sides, with no scope for misunderstandings.
Step 6: Implement the Agreed Upon Solution	Agree on a course of action to set the solution in motion



- Know exactly what you want before you work towards getting it
- Give more importance to listening and thinking, than speaking
- Focus on building a relationship rather than winning
- Remember that your people skills will affect the outcome
- Know when to walk away – sometimes reaching an agreement may not be possible

10.5.5 Business Opportunities Identification: Entrepreneurs and Opportunities

“The entrepreneur always searches for change, responds to it and exploits it as an opportunity.”

Peter Drucker

The ability to identify business opportunities is an essential characteristic of an entrepreneur.

What is an Opportunity?

The word opportunity suggests a good chance or a favourable situation to do something offered by circumstances.

Common Questions Faced by Entrepreneurs

A critical question that all entrepreneurs face is how to go about finding the business opportunity that is right for them.

- Some common questions that entrepreneurs constantly think about are:
- Should the new enterprise introduce a new product or service based on an unmet need?
- Should the new enterprise select an existing product or service from one market and offer it in another where it may not be available?
- Should the enterprise be based on a tried and tested formula that has worked elsewhere?

It is therefore extremely important that entrepreneurs must learn how to identify new and existing business opportunities and evaluate their chances of success.

When is an Idea an Opportunity?

An idea is an opportunity when:

- It creates or adds value to a customer
- It solves a significant problem, removes a pain point or meets a demand
- Has a robust market and profit margin
- Is a good fit with the founder and management team at the right time and place

Factors to Consider When Looking for Opportunities

Consider the following when looking for business opportunities:

- | | |
|--|--------------------------------|
| • Economic trends | • Market trends |
| • Changes in funding | • Changes in political support |
| • Changing relationships between vendors, partners and suppliers | • Shift in target audience |

Ways to Identify New Business Opportunities

1. Identify Market Inefficiencies

When looking at a market, consider what inefficiencies are present in the market. Think about ways to correct these inefficiencies.

2. Remove Key Hassles

Rather than create a new product or service, you can innovatively improve a product, service or process.

3. Create Something New

Think about how you can create a new experience for customers, based on existing business models.

4. Pick a Growing Sector/Industry

Research and find out which sectors or industries are growing and think about what opportunities you can tap in the same.

5. Think About Product Differentiation

If you already have a product in mind, think about ways to set it apart from the existing ones.

Ways to Identify Business Opportunities Within Your Business

1. SWOT Analysis

An excellent way to identify opportunities inside your business is by creating a SWOT analysis. The acronym SWOT stands for strengths, weaknesses, opportunities, and threats. SWOT analysis framework:

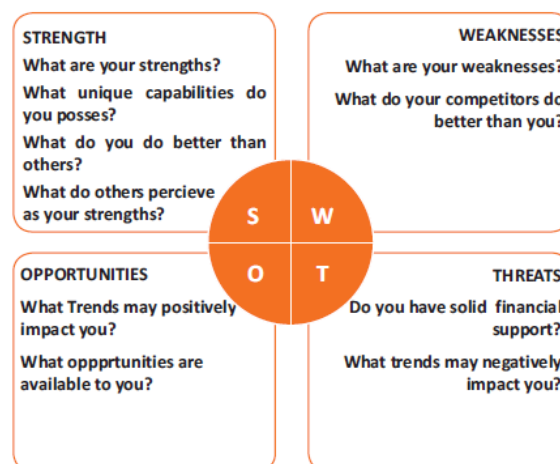


Fig.10.5.1. SWOT Analysis

Consider the following when looking for business opportunities:

By looking at yourself and your competitors using the SWOT framework, you can uncover opportunities that you can exploit, as well as manage and eliminate threats that could derail your success.

2. Establishing Your USP

Establish your USP and position yourself as different from your competitors. Identify why customers should buy from you and promote that reason.

Opportunity Analysis

Once you have identified an opportunity, you need to analyse it.

To analyse an opportunity, you must:

- Remember, opportunities are situational.
- Avoid the latest craze.

- Look for a proven track record.
- Love your idea.

10.5.6 Entrepreneurship Support Eco-System: Who is an Entrepreneur?

An entrepreneur is a person who:

- Does not work for an employee
- Runs a small enterprise
- Assumes all the risks and rewards of the enterprise, idea, good or service

Types of Entrepreneurs

There are four main types of entrepreneurs:

1. **The Traditional Entrepreneur:** This type of entrepreneur usually has some kind of skill – they can be a carpenter, mechanic, cook etc. They have businesses that have been around for numerous years like restaurants, shops and carpenters. Typically, they gain plenty of experience in a particular industry before they begin their own business in a similar field.
2. **The Growth Potential Entrepreneur:** The desire of this type of entrepreneur is to start an enterprise that will grow, win many customers and make lots of money. Their ultimate aim is to eventually sell their enterprise for a nice profit. Such entrepreneurs usually have a science or technical background.
3. **The Project-Oriented Entrepreneur:** This type of entrepreneur generally has a background in the Arts or psychology. Their enterprises tend to be focus on something that they are very passionate about.
4. **The Lifestyle Entrepreneur:** This type of entrepreneur has usually worked as a teacher or a secretary. They are more interested in selling something that people will enjoy, rather than making lots of money.

Characteristics of an Entrepreneur

Successful entrepreneurs have the following characteristics:

- They are highly motivated
- They are creative and persuasive
- They are mentally prepared to handle each and every task
- They have excellent business skills – they know how to evaluate their cash flow, sales and revenue
- They are willing to take great risks
- They are very proactive – this means they are willing to do the work themselves, rather than wait for someone else to do it
- They have a vision – they are able to see the big picture
- They are flexible and open-minded
- They are good at making decisions

Entrepreneur Success Stories

Dhiru Bhai Ambani

Dhirubhai Ambani began his entrepreneurial career by selling “bhajias” to pilgrims in Mount Girnar on weekends. At 16, he moved to Yemen where he worked as a gas-station attendant, and as a clerk in an oil company. He returned to India with Rs. 50,000 and started a textile trading company. Reliance went on to become the first Indian company to raise money in global markets and the first Indian company to feature in Forbes 500 list.

Dr. Karsanbhai Patel

Karsanbhai Patel made detergent powder in the backyard of his house. He sold his product door-to-door and offered a money back guarantee with every pack that was sold. He charged Rs.3 per kg when the cheapest detergent at that time was Rs.13 per kg. Dr. Patel eventually started Nirma which became a whole new segment in the Indian domestic detergent market.

The Entrepreneurial Process

Let's take a look at the stages of the entrepreneurial process.

Stage 1: Idea Generation. The entrepreneurial process begins with an idea that has been thought of by the entrepreneur. The idea is a problem that has the potential to be solved.

Stage 2: Germination or Recognition. In this stage a possible solution to the identified problem is thought of.

Stage 3: Preparation or Rationalization. The problem is studied further and research is done to find out how others have tried to solve the same problem.

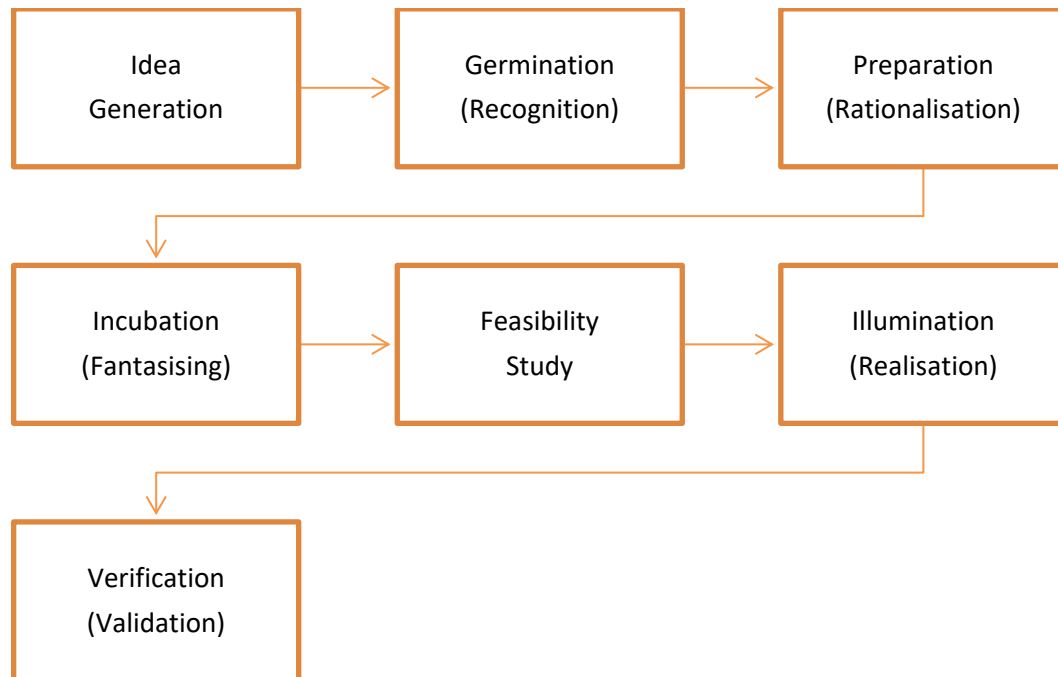
Stage 4: Incubation or Fantasizing. This stage involves creative thinking for the purpose of coming up with more ideas. Less thought is given to the problem areas.

Stage 5: Feasibility Study: The next step is the creation of a feasibility study to determine if the idea will make a profit and if it should be seen through.

Stage 6: Illumination or Realization. This is when all uncertain areas suddenly become clear. The entrepreneur feels confident that his idea has merit.

Stage 7: Verification or Validation. In this final stage, the idea is verified to see if it works and if it is useful.

Take a look at the diagram below to get a better idea of this process.



Introduction to the Entrepreneurship Ecosystem

The entrepreneurship support ecosystem signifies the collective and complete nature of entrepreneurship. New companies emerge and flourish not only because of the courageous, visionary entrepreneurs who launch them, but they thrive as they are set in an environment or 'ecosystem' made of private and public participants. These players nurture and sustain the new ventures, facilitating the entrepreneurs' efforts. An entrepreneurship ecosystem comprises of the following six domains:

1. **Favourable Culture:** This includes elements such as tolerance of risk and errors, valuable networking and positive social standing of the entrepreneur.
2. **Facilitating Policies & Leadership:** This includes regulatory framework incentives and existence of public research institutes.
3. **Financing Options:** Angel financing, venture capitalists and micro loans would be good examples of this.
4. **Human Capital:** This refers to trained and untrained labour, entrepreneurs and entrepreneurship training programmes, etc.
5. **Conducive Markets for Products & Services:** This refers to an existence or scope of existence of a market for the product/service.
6. **Institutional & Infrastructural Support:** This includes legal and financing advisers, telecommunications, digital and transportation infrastructure, and entrepreneurship networking programmes.

These domains indicate whether there is a strong entrepreneurship support ecosystem and what actions should the government put in place to further encourage this ecosystem.

The six domains and their various elements have been graphically depicted.

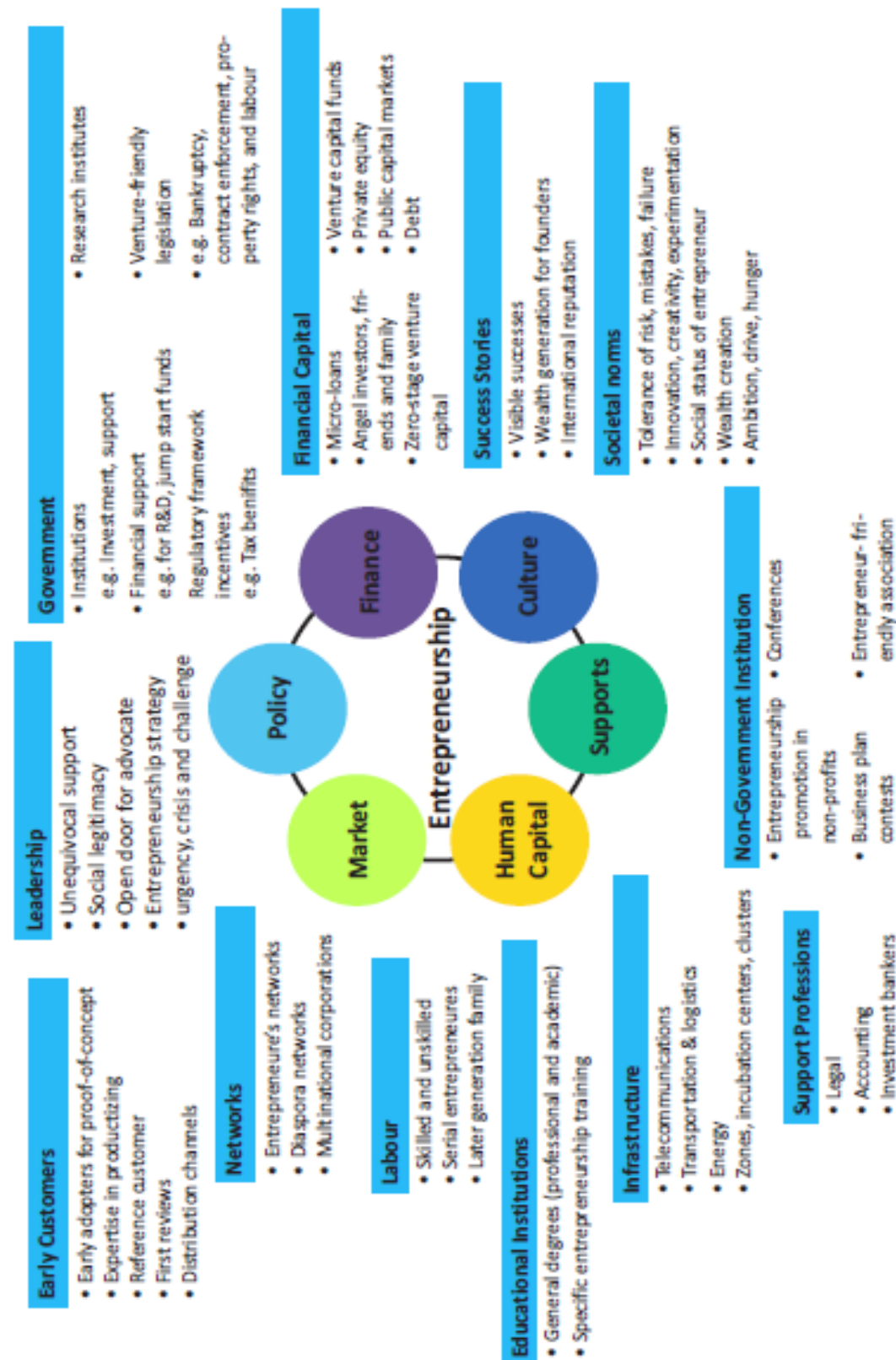


Fig.10.5.2. Entrepreneurship at a Glance

Every entrepreneurship support ecosystem is unique and all the elements of the ecosystem are interdependent. Although every region's entrepreneurship ecosystem can be broadly described by the above features, each ecosystem is the result of the hundred elements interacting in highly complex and particular ways.

Entrepreneurship ecosystems eventually become (largely) self-sustaining. When the six domains are resilient enough, they are mutually beneficial. At this point, government involvement can and should be significantly minimized. Public leaders do not need to invest a lot to sustain the ecosystem. It is imperative that the entrepreneurship ecosystem incentives are formulated to be self-liquidating, hence focussing on sustain ability of the environment.

Make in India Campaign

Every entrepreneur has certain needs. Some of their important needs are:

- To easily get loans
- To easily find investors
- To get tax exemptions
- To easily access resources and good infrastructure
- To enjoy a procedure that is free of hassles and is quick
- To be able to easily partner with other firms

The Make in India campaign, launched by Prime Minister Modi aims to satisfy all these needs of young, aspiring entrepreneurs. Its objective is to:

- Make investment easy
- Support new ideas
- Enhance skill development
- Safeguard the ideas of entrepreneurs
- Create state-of-the-art facilities for manufacturing goods

Key Schemes to Promote Entrepreneurs

The government offers many schemes to support entrepreneurs. These schemes are run by various Ministries/Departments of Government of India to support First Generation Entrepreneurs. Take a look at a few key schemes to promote entrepreneurship:

Sl. Name of the Scheme

1. Pradhan Mantri MUDRA Yojana - Micro Units Development and Refinance Agency (MUDRA),
2. STAND UP INDIA
3. Prime Minister Employment Generation Programme (PMEGP)
4. International Cooperation
5. Performance and Credit Rating
6. Marketing Assistance Scheme
7. Reimbursement of Registration Fee for Bar Coding
8. Enable Participation of MSMEs in State/District level Trade Fairs and Provide Funding Support
9. Capital Subsidy Support on Credit for Technology up gradation
10. Credit Guarantee Fund for Micro and Small Enterprise (CGFMSE)
11. Reimbursement of Certification Fees for Acquiring ISO Standards

12. Agricultural Marketing
13. Small Agricultural Marketing
14. Mega Food Park
15. Adivasi Mahila Sashaktikaran Yojana

1. Pradhan Mantri MUDRA Yojana, - Micro Units Development and Refinance Agency (MUDRA),

Description

Under the aegis support of Pradhan Mantra MUDRA Yojana, MUDRA has already created its initial products/schemes. The interventions have been named 'Shisha', 'Kishore' and 'Taren' to signify the stage of growth/development and funding needs of the beneficiary micro unit/entrepreneur and also provide a reference point for the next phase of graduation/growth to look forward to:

- a. Shisha: Covering loans up to Rs. 50,000/-
- b. Kishor: Covering loans above Rs. 50,000/- and up to Rs.5 lakh
- c. Tarun: Covering loans above Rs. 5 lakh to Rs.10 lakh

Who can apply?

Any Indian citizen who has a business plan for a non-farm sector income generating activity such as manufacturing, processing, trading or service sector and whose credit need is less than Rs.10 lakh can approach either a Bank, MFI, or NBFC for availing of MUDRA loans under Pradhan Mantri Mudra Yojana (PMMY).

2. Stand Up India

Description

The objective of the Standup India scheme is to facilitate bank loans between Rs.10 lakh and Rs.1 crore to at least one Schedule Caste (SC) or Scheduled Tribe (ST) borrower and at least one woman borrower per bank branch for setting up a Greenfield enterprise. This enterprise may be in manufacturing, services or the trading sector. In case of non-Individual enterprises at least 51% of the shareholding and controlling stake should be held by either an SC/ST or Woman Entrepreneur.

Who can apply?

ST, SC & Women

3. Prime Minister Employment Generation Programme (PMEGP)

Description

The Scheme is implemented by Khadi and Village Industries Commission (KVIC), as the nodal agency at the National level. At the State level, the Scheme is implemented through State KVIC Directorates, State Khadi and Village Industries Boards (KVIBs) and District Industries Centres (DICs) and banks. The Government subsidy under the Scheme is routed by KVIC through identified banks for eventual distribution to the beneficiaries/entrepreneurs in their bank accounts.

Nature of assistance

The maximum cost of the project/unit admissible under manufacturing sector is Rs.25 lakh and under business/service sector is Rs.10 lakh. Levels of funding under PMEGP

Categories of beneficiaries under PMEGP	Beneficiary's contribution (of project cost)	Rate of Subsidy (of project cost)
Area (location of project/unit)		Urban Rural
General Category	10%	15% 25%
Special (including SC / ST / OBC / Minorities / Women, Ex-servicemen, Physically handicapped, NER, Hill and Border areas, etc.	05%	25% 35%

The balance amount of the total project cost will be provided by Banks as term loan as well as working capital.

Who can apply?

Any individual, above 18 years of age. At least VIII standard pass for projects costing above Rs.10 lakh in the manufacturing sector and above Rs.5 lakh in the business/service sector. Only new projects are considered for sanction under PMEGP. Self Help Groups (including those belonging to BPL provided that they have not availed benefits under any other Scheme), Institutions registered under Societies Registration Act,1860; Production Co-operative Societies, and Charitable Trusts are also eligible. Existing Units (under PMRY, REGP or any other scheme of Government of India or State Government) and the units that have already availed Government Subsidy under any other scheme of Government of India or State Government are NOT eligible.

4. International Cooperation

Description

The Scheme would cover the following activities:

- Deputation of MSME business delegations to other countries for exploring new areas of technology infusion/upgradation, facilitating joint ventures, improving market of MSMEs products, foreign collaborations, etc.
- Participation by Indian MSMEs in international exhibitions, trade fairs and buyer-seller meets in foreign countries as well as in India, in which there is international participation.
- Holding international conferences and seminars on topics and themes of interest to the MSME.

Nature of assistance

IC Scheme provides financial assistance towards the airfare and space rent of entrepreneurs. Assistance is provided on the basis of size and the type of the enterprise.

Who can apply?

- State/Central Government Organisations;
- Industry/Enterprise Associations; and

c. Registered Societies/Trusts and Organisations associated with the promotion and development of MSMEs

5. Performance and Credit Rating for Micro and Small Enterprises

Description

The objective of the Scheme is to create awareness amongst micro & small enterprises about the strengths and weaknesses of their operations and also their credit worthiness.

Turn Over	Fee to be reimbursed by Ministry of MSME
Up to Rs.50 lacs	75% of the fee charged by the rating agency subject to a ceiling Rs. 15,000/-
Above Rs.50 lacs to Rs.200 Lacs	75% of the fee charged by the rating agency subject to a ceiling of Rs.30,000/-
Above Rs.200 lacs	75% of the fee charged by the rating agency subject

Nature of assistance

Who can apply?

Any enterprise registered in India as a micro or small enterprise is eligible to apply.

6. Marketing Assistance Scheme

Description

The assistance is provided for the following activities:

- Organizing exhibitions abroad and participation in international exhibitions/trade fairs
- Co-sponsoring of exhibitions organized by other organisations/industry associations/agencies
- Organizing buyer-seller meets, intensive campaigns and marketing promotion events

Nature of assistance

Financial assistance of up to 95% of the airfare and space rent of entrepreneurs. Assistance is provided on the basis of size and the type of the enterprise. Financial assistance for co-sponsoring would be limited to 40% of the net expenditure, subject to maximum amount of Rs.5 lakh.

Who can apply?

MSMEs, Industry Associations and other organizations related to MSME sector.

7. Reimbursement of Registration Fee for Bar Coding

Description

The financial assistance is provided towards 75% reimbursement of only one-time registration fee and 75% of annual recurring fee for first three years paid by MSEs to GS1 India for using bar coding.

Nature of assistance

Funding support for reimbursement of 75% of one time and recurring bar code registration fees.

Who can apply?

All MSMEs with EM registration.

8. Enabling Participation of MSMEs in State/District Level Trade Fairs and Provide Funding Support

Description

Provide marketing platform to manufacturing MSMEs by enabling their participation in state/district level exhibitions being organized by state/district authorities/associations.

Nature of assistance

1. Free registration for participating in trade fairs

Note: *The selection of participants would be done by the MSME-DIs post the submission of application.*

2. Reimbursement of 50% of to and fro actual fare by shortest distance/direct train (limited to AC II tier class) from the nearest railway station/bus fare to the place of exhibition and 50% space rental charges for MSMEs (General category entrepreneurs).

3. For Women/SC/ST entrepreneurs & entrepreneurs from North Eastern Region Govt. of India will reimburse 80% of items listed above in Point (2).

Note: The total reimbursement will be max. Rs. 30,000/- per unit for the SC/ST/Women/Physically Handicapped entrepreneurs, while for the other units the max. limit will be Rs. 20,000/- per person per MSME unit.

Note: *The participant is required to submit follow-up proofs post attending the event to claim reimbursement. The proofs can be submitted after logging in online under the section "My Applications" or directly contacting a DI office.*

Who can apply?

All MSMEs with EM registration.

9. Capital Subsidy Support on Credit for Technology Upgradation

Description

MSMEs can get a capital subsidy (~15%) on credit availed for technology upgradation.

Nature of assistance

Financial assistance for availing credit and loan.

Who can apply?

1. Banks and financial institutions can apply to DC-MSME for availing support.
2. MSMEs need to directly contact the respective banks for getting credit and capital subsidy.

How to apply?

If you are a financial institution, click on the "Apply Now" button or else you can also directly contact the Office of DC-MSME. You can view the contact details of Office of DC-MSME. If you are an MSME, directly contact the respective banks/financial institutions as listed in the scheme guidelines.

10. Provision of Collateral Free Credit for MSMEs

Description

Banks and financial institutions are provided funding assistance under this scheme so that they can in turn lend collateral free credit to MSMEs.

Nature of assistance

Funding support to banks and financial institutions for lending collateral-free credit to MSMEs.

Who can apply?

Banks and financial institutions can apply to office of DC-MSME/MSME-DIs for availing support. MSMEs need to directly contact the respective banks for getting credit.

11. Reimbursement of certification fees for acquiring ISO standards

ISO 9000/ISO 14001 Certification Reimbursement.

Description

The GoI assistance will be provided for one-time reimbursement of expenditure to such MSME manufacturing units which acquire ISO 18000/ISO 22000/ISO 27000 certification.

Nature of assistance

Reimbursement of expenditure incurred on acquiring ISO standards.

Who can apply?

MSMEs with EM registration.

12. Agricultural Marketing

Description

A capital investment subsidy for construction/renovation of rural godowns . Creation of scientific storage capacity and prevention of distress sale.

Nature of assistance

Subsidy @ 25% to farmers, 15% of project cost to companies.

Who can apply?

NGOs, SHGs, companies, co-operatives.

13. Small Agricultural Marketing

Description

Business development description provides venture capital assistance in the form of equity, and arranges training and visits of agri-preneurs

Farmers' Agriculture Business Consortium

Business development description provides venture capital assistance in the form of equity, and arranges training and visits of agri-preneurs.

Nature of assistance

Financial assistance with a ceiling of Rs.5 lakh.

Who can apply?

Individuals, farmers, producer groups, partnership/propriety firms, SGHs, agri-preneurs, etc.

14. Mega Food Park**Description**

Mechanism to link agricultural production and market to maximize value addition, enhance farmer's income, create rural employment.

Nature of assistance

One-time capital grant of 50% of project cost with a limit of Rs.50 crore.

Who can apply?

Farmers, farmer groups, SHGs.

15. Adivasi Mahila Sashaktikaran Yojana**Description**

Concessional scheme for the economic development of ST women.

Nature of assistance

Term loan at concessional rates up to 90% of cost of scheme.

Who can apply?

Scheduled Tribes Women.



- Research the existing market, network with other entrepreneurs, venture capitalists, angel investors, and thoroughly review the policies in place to enable your entrepreneurship.
- Failure is a stepping stone and not the end of the road. Review yours and your peers' errors and correct them in your future venture.
- Be proactive in your ecosystem. Identify the key features of your ecosystem and enrich them to ensure self-sustainability of your entrepreneurship support ecosystem.

10.5.7 Risk Appetite & Resilience: Entrepreneurship and Risk

Entrepreneurs are inherently risk takers. They are path-makers not path-takers. Unlike a normal, cautious person, an entrepreneur would not think twice about quitting his job (his sole income) and taking a risk on himself and his idea.

An entrepreneur is aware that while pursuing his dreams, assumptions can be proven wrong and unforeseen events may arise. He knows that after dealing with numerous problems, success is still not guaranteed. Entrepreneurship is synonymous with the ability to take risks. This ability, called risk-appetite, is an entrepreneurial trait that is partly genetic and partly acquired.

What is Risk Appetite?

Risk appetite is defined as the extent to which a company is equipped to take risk, in order to achieve its objectives. Essentially, it refers to the balance, struck by the company, between possible profits and the hazards caused by changes in the environment (economic ecosystem, policies, etc.). Taking on more risk may lead to higher rewards but have a high probability of losses as well. However, being too conservative may go against the company as it can miss out on good opportunities to grow and reach their objectives. The levels of risk appetite can be broadly categorized as “low”, “medium” and “high.” The company’s entrepreneur(s) have to evaluate all potential alternatives and select the option most likely to succeed. Companies have varying levels of risk appetites for different objectives.

The levels depend on:

- The type of industry
- Market pressures
- Company objectives

For example, a start-up with a revolutionary concept will have a very high risk appetite. The start-up can afford short term failures before it achieves longer term success. This type of appetite will not remain constant and will be adjusted to account for the present circumstances of the company.

Risk Appetite Statement

Companies have to define and articulate their risk appetite in sync with decisions made about their objectives and opportunities. The point of having a risk appetite statement is to have a framework that clearly states the acceptance and management of risk in business. It sets risk taking limits within the company. The risk appetite statement should convey the following:

- The nature of risks the business faces.
- Which risks the company is comfortable taking on and which risks are unacceptable.
- The nature of risks the business faces.
- Which risks the company is comfortable taking on and which risks are unacceptable.
- How much risk to accept in all the risk categories.
- The desired trade-off between risk and reward.
- Measures of risk and methods of examining and regulating risk exposures.

Entrepreneurship and Resilience

Entrepreneurs are characterized by a set of qualities known as resilience. These qualities play an especially large role in the early stages of developing an enterprise. Risk resilience is an extremely valuable characteristic as it is believed to protect entrepreneurs against the threat of challenges and changes in the business environment.

What is Entrepreneurial Resilience?

Resilience is used to describe individuals who have the ability to overcome setbacks related to their life and career aspirations. A resilient person is someone who is capable of easily and quickly recovering from setbacks. For the entrepreneur, resilience is a critical trait. Entrepreneurial resilience can be enhanced in the following ways:

- By developing a professional network of coaches and mentors

- By accepting that change is a part of life
- By viewing obstacles as something that can be overcome

Characteristics of a Resilient Entrepreneur

The characteristics required to make an entrepreneur resilient enough to go the whole way in their business enterprise are:

- A strong internal sense of control
- Ability to diversify and expand
- Strong social connections
- Survivor attitude
- Skill to learn from setbacks
- Cash-flow conscious habits
- Ability to look at the bigger picture
- Attention to detail



- Cultivate a great network of clients, suppliers, peers, friends and family. This will not only help you promote your business, but will also help you learn, identify new opportunities and stay tuned to changes in the market.
- Don't dwell on setbacks. Focus on what you need to do next to get moving again.
- While you should try, and curtail expenses, ensure that it is not at the cost of your growth.

10.5.8 Success & Failures: Understanding Successes and Failures in Entrepreneurship

Shyam is a famous entrepreneur, known for his success story. But what most people don't know, is that Shyam failed numerous times before his enterprise became a success. Read his interview to get an idea of what entrepreneurship is really about, straight from an entrepreneur who has both, failed and succeeded.

Interviewer: Shyam, I have heard that entrepreneurs are great risk-takers who are never afraid of failing. Is this true?

Shyam: Ha ha, no of course it's not true! Most people believe that entrepreneurs need to be fearlessly enthusiastic. But the truth is, fear is a very normal and valid human reaction, especially when you are planning to start your own business! In fact, my biggest fear was the fear of failing. The reality is, entrepreneurs fail as much as they succeed. The trick is to not allow the fear of failing to stop you from going ahead with your plans. Remember, failures are lessons for future success!

Interviewer: What, according to you, is the reason that entrepreneurs fail?

Shyam: Well, there is no one single reason why entrepreneurs fail. An entrepreneur can fail due to numerous reasons. You could fail because you have allowed your fear of failure to defeat you. You could fail because you are unwilling to delegate (distribute) work. As the saying goes, "You can do anything, but not everything!" You could fail because you gave up too easily – maybe you were not persistent enough. You could fail because you were focusing your energy on small, insignificant tasks and ignoring the tasks that were most important. Other reasons for failing are partnering with the wrong people, not being able to sell your product to the right customers at the right time at the right price... and many more reasons!

Interviewer: As an entrepreneur, how do you feel failure should be looked at?

Shyam: I believe we should all look at failure as an asset, rather than as something negative. The way I see it, if you have an idea, you should try to make it work, even if there is a chance that you will fail. That's because not trying is failure right there, anyway! And failure is not the worst thing that can happen. I think having regrets because of not trying, and wondering 'what if' is far worse than trying and actually failing.

Interviewer: How did you feel when you failed for the first time?

Shyam: I was completely heartbroken! It was a very painful experience. But the good news is, you do recover from the failure. And with every subsequent failure, the recovery process gets a lot easier. That's because you start to see each failure more as a lesson that will eventually help you succeed, rather than as an obstacle that you cannot overcome. You will start to realize that failure has many benefits.

Interviewer: Can you tell us about some of the benefits of failing?

Shyam: One of the benefits that I have experienced personally from failing is that the failure made me see things in a new light. It gave me answers that I didn't have before. Failure can make you a lot stronger. It also helps keep your ego in control.

Interviewer: What advice would you give entrepreneurs who are about to start their own enterprises?

Shyam: I would tell them to do their research and ensure that their product is something that is actually wanted by customers. I'd tell them to pick their partners and employees very wisely and cautiously. I'd tell them that it's very important to be aggressive – push and market your product as aggressively as possible. I would warn them that starting an enterprise is very expensive and that they should be prepared for a situation where they run out of money. I would tell them to create long term goals and put a plan in action to achieve that goal. I would tell them to build a product that is truly unique. Be very careful and ensure that you are not copying another start-up. Lastly, I'd tell them that it's very important that they find the right investors.

Interviewer: That's some really helpful advice, Shyam! I'm sure this will help all entrepreneurs to be more prepared before they begin their journey! Thank you for all your insight!



- Remember that nothing is impossible.
- Identify your mission and your purpose before you start.
- Plan your next steps – don't make decisions hastily.

UNIT 10.6: Preparing to be an Entrepreneur

Unit Objectives

At the end of this unit, you will be able to:

1. Discuss how market research is carried out
2. Describe the 4 Ps of marketing
3. Discuss the importance of idea generation
4. Recall basic business terminology
5. Discuss the need for CRM
6. Discuss the benefits of CRM
7. Discuss the need for networking
8. Discuss the benefits of networking
9. Discuss the importance of setting goals
10. Differentiate between short-term, medium-term and long-term goals
11. Discuss how to write a business plan
12. Explain the financial planning process
13. Discuss ways to manage your risk
14. Describe the procedure and formalities for applying for bank finance
15. Discuss how to manage your own enterprise
16. List important questions that every entrepreneur should ask before starting an enterprise

10.6.1 Market Study / The 4 Ps of Marketing / Importance of an IDEA: Understanding Market Research

Market research is the process of gathering, analysing and interpreting market information on a product or service that is being sold in that market. It also includes information on:

- Past, present and prospective customers
- Customer characteristics and spending habits
- The location and needs of the target market
- The overall industry
- Relevant competitors

Market research involves two types of data:

- Primary information. This is research collected by yourself or by someone hired by you.
- Secondary information. This is research that already exists and is out there for you to find and use.

Primary research

Primary research can be of two types:

- Exploratory: This is open-ended and usually involves detailed, unstructured interviews.
- Specific: This is precise and involves structured, formal interviews. Conducting specific

Secondary research

Secondary research uses outside information. Some common secondary sources are:

- **Public sources:** These are usually free and have a lot of good information. Examples are government departments, business departments of public libraries etc.
- **Commercial sources:** These offer valuable information but usually require a fee to be paid. Examples are research and trade associations, banks and other financial institutions etc.
- **Educational institutions:** These offer a wealth of information. Examples are colleges, universities, technical institutes etc.

The 4 Ps of Marketing

The 4 Ps of marketing are Product, Price, Promotion and Place. Let's look at each of these 4 Ps in detail.

Product

A product can be:

- A tangible good
- An intangible service

Whatever your product is, it is critical that you have a clear understanding of what you are offering, and what its unique characteristics are, before you begin with the marketing process.

Some questions to ask yourself are:

- What does the customer want from the product/service?
- What needs does it satisfy?
- Are there any more features that can be added?
- Does it have any expensive and unnecessary features?
- How will customers use it?
- What should it be called?
- How is it different from similar products?
- How much will it cost to produce?

Price

Once all the elements of Product have been established, the Price factor needs to be considered. The Price of a Product will depend on several factors such as profit margins, supply, demand and the marketing strategy.

Some questions to ask yourself are:

• What is the value of the product/service to customers?	• Is the customer price sensitive?
• Do local products/services have established price points?	• Should discounts be offered?
	• How is your price compared to that of your competitors?

Promotion

Once you are certain about your Product and your Price, the next step is to look at ways to promote it. Some key elements of promotion are advertising, public relations, social media marketing, email marketing, search engine marketing, video marketing and more.

Some questions to ask yourself are:

- Where should you promote your product or service?
- What is the best medium to use to reach your target audience
- When would be the best time to promote your product?
- How are your competitors promoting their products?

Place

According to most marketers, the basis of marketing is about offering the right product, at the right price, at the right place, at the right time. For this reason, selecting the best possible location is critical for converting prospective clients into actual clients.

Some questions to ask yourself are:

- Will your product or service be looked for in a physical store, online or both?
- What should you do to access the most appropriate distribution channels?
- Will you require a sales force?
- Where are your competitors offering their products or services?
- Should you follow in your competitors' footsteps?
- Should you do something different from your competitors?

Importance of an IDEA

Some questions to ask yourself are:

Ideas are the foundation of progress. An idea can be small or ground-breaking, easy to accomplish or extremely complicated to implement. Whatever the case, the fact that it is an idea gives it merit. Without ideas, nothing is possible. Most people are afraid to speak out their ideas, out for fear of being ridiculed. However, if are an entrepreneur and want to remain competitive and innovative, you need to bring your ideas out into the light.

Some ways to do this are by:

- Establishing a culture of brainstorming where you invite all interested parties to contribute
- Discussing ideas out loud so that people can add their ideas, views, opinions to them
- Being open minded and not limiting your ideas, even if the idea who have seems ridiculous
- Not discarding ideas that you don't work on immediately, but instead making a note of them and shelving them so they can be revisited at a later date.



- Keep in mind that good ideas do not always have to be unique.
- Remember that timing plays a huge role in determining the success of your idea.
- Situations and circumstances will always change, so be flexible and adapt your idea accordingly.

10.6.2 Business Entity Concepts: Basic Business Terminology

If your aim is to start and run a business, it is crucial that you have a good understanding of basic business terms. Every entrepreneur should be well versed in the following terms:

- **Accounting:** A systematic method of recording and reporting financial transactions.
- **Accounts payable:** Money owed by a company to its creditors.
- **Accounts Receivable:** The amount a company is owed by its clients.
- **Assets:** The value of everything a company owns and uses to conduct its business.
- **Balance Sheet:** A snapshot of a company's assets, liabilities and owner's equity at a given moment.
- **Bottom Line:** The total amount a business has earned or lost at the end of a month.
- **Business:** An organization that operates with the aim of making a profit.
- **Business to Business (B2B):** A business that sells goods or services to another business.
- **Business to Consumer (B2C):** A business that sells goods or services directly to the end user.
- **Capital:** The money a business has in its accounts, assets and investments. The two main types of capital are debt and equity.
- **Cash Flow:** The overall movement of funds through a business each month, including income and expenses.
- **Cash Flow Statement:** A statement showing the money that entered and exited a business during a specific period of time.
- **Contract:** A formal agreement to do work for pay.
- **Depreciation:** The degrading value of an asset over time.
- **Expense:** The costs that a business incurs through its operations.
- **Finance:** The management and allocation of money and other assets.
- **Financial Report:** A comprehensive account of a business' transactions and expenses.
- **Fixed Cost:** A one-time expense.
- **Income Statement (Profit and Loss Statement):** Shows the profitability of a business during a period of time.
- **Liabilities:** The value of what a business owes to someone else.
- **Marketing:** The process of promoting, selling and distributing a product or service.
- **Net Income/Profit:** Revenues minus expenses.
- **Net Worth:** The total value of a business.
- **Payback Period:** The amount of time it takes to recover the initial investment of a business.
- **Profit Margin:** The ratio of profit, divided by revenue, displayed as a percentage.

- **Return on Investment (ROI):** The amount of money a business gets as return from an investment.
- **Revenue:** The total amount of income before expenses are subtracted.
- **Sales Prospect:** A potential customer.
- **Supplier:** A provider of supplies to a business.
- **Target Market:** A specific group of customers at which a company's products and services are aimed.
- **Valuation:** An estimate of the overall worth of the business.
- **Variable Cost:** Expenses that change in proportion to the activity of a business.
- **Working Capital:** Calculated as current assets minus current liabilities.
- **Business Transactions:** There are three types of business transactions. These are:
 - **Simple Transactions** – Usually a single transaction between a vendor and a customer. For example: Buying a cup of coffee.
 - **Complex Transactions** – These transactions go through a number of events before they can be completed. For example: Buying a house.
 - **Ongoing transactions** – These transactions usually require a contract. For example: Contract with a vendor.

Basic Accounting Formulas

Take a look at some important accounting formula that every entrepreneur needs to know.

1. **The Accounting Equation:** This is value of everything a company owns and uses to conduct its business.

Formula: $\text{Assets} = \text{Liability} + \text{Owner's Equity}$

2. **Net Income:** This is the profit of the company.

Formula: $\text{Net Income} = \text{Revenues} - \text{Expenses}$

3. **Break-Even Point:** This is the point at which the company will not make a profit or a loss. The total cost and total revenues are equal.

Formula: $\text{Break-Even} = \text{Fixed Costs} / \text{Sales Price} - \text{Variable Cost per Unit}$

4. **Cash Ratio:** This tells us about the liquidity of a company.

Formula: $\text{Cash Ratio} = \text{Cash} / \text{Current Liabilities}$

5. **Profit Margin:** This is shown as a percentage. It shows what percentage of sales are left over after all the expenses are paid by the business.

Formula: $\text{Profit Margin} = \text{Net Income} / \text{Sales}$

6. **Debt-to-Equity Ratio:** This ratio shows how much equity and debt a company is using to finance its assets, and whether the shareholder equity can fulfil obligations to creditors if the business starts making a loss.

Formula: $\text{Debt-to-Equity Ratio} = \text{Total Liabilities} / \text{Total Equity}$

7. **Cost of Goods Sold:** This is the total of all costs used to create a product or service, which has been sold.

Formula: $\text{Cost of Goods Sold} = \text{Cost of Materials/Inventory} - \text{Cost of Outputs}$

8. **Return on Investment (ROI):** This is usually shown as a percentage. It calculates the profits of an investment as a percentage of the original cost.

Formula: $\text{ROI} = \text{Net Profit} / \text{Total Investment} * 100$

9. **Simple Interest:** This is money you can earn by initially investing some money (the principal).

Formula:

$$A = P(1 + rt); R = r * 100$$

Where:

A = Total Accrued Amount (principal + interest)

P = Principal Amount

I = Interest Amount

r = Rate of Interest per year in decimal; $r = R/100$

t = Time Period involved in months or years

10. **Annual Compound Interest:** The calculates the addition of interest to the principal sum of a loan or deposit.

Formula:

$$A = P (1 + r/n)^{nt}$$

Where:

A = the future value of the investment/loan, including interest

P = the principal investment amount (the initial deposit or loan amount)

r = the annual interest rate (decimal)

n = the number of times that interest is compounded per year

t = the number of years the money is invested or borrowed for

10.6.3 CRM & Networking: What is CRM?

CRM stands for Customer Relationship Management. Originally the expression Customer Relationship Management meant managing one's relationship with customers. However, today it refers to IT systems and software designed to help companies manage their relationships.

The Need for CRM

The better a company can manage its relationships with its customers, the higher the chances of the company's success. For any entrepreneur, the ability to successfully retain existing customers and expand the enterprise is paramount. This is why IT systems that focus on addressing the problems of dealing with customers on a daily basis are becoming more and more in demand.

Customer needs change over time, and technology can make it easier to understand what customers really want. This insight helps companies to be more responsive to the needs of their customers. It enables them to modify their business operations when required, so that their customers are always served in the best manner possible. Simply put, CRM helps companies recognize the value of their clients and enables them to capitalize on improved customer relations.

Benefits of CRM

CRM has a number of important benefits:

- It helps improve relations with existing customers which can lead to:
 - Increased sales

- Identification of customer needs
- Cross-selling of products
- It results in better marketing of one's products or services
- It results in better marketing of one's products or services
- It enhances customer satisfaction and retention
- It improves profitability by identifying and focusing on the most profitable customers

What is Networking?

In business, networking means leveraging your business and personal connections in order to bring in a regular supply of new business. This marketing method is effective as well as low cost. It is a great way to develop sales opportunities and contacts. Networking can be based on referrals and introductions, or can take place via phone, email, and social and business networking websites.

The Need for Networking

Networking is an essential personal skill for business people, but it is even more important for entrepreneurs. The process of networking has its roots in relationship building. Networking results in greater communication and a stronger presence in the entrepreneurial ecosystem. This helps build strong relationships with other entrepreneurs. Business networking events held across the globe play a huge role in connecting like-minded entrepreneurs who share the same fundamental beliefs in communication, exchanging ideas and converting ideas into realities. Such networking events also play a crucial role in connecting entrepreneurs with potential investors. Entrepreneurs may have vastly different experiences and backgrounds but they all have a common goal in mind – they all seek connection, inspiration, advice, opportunities and mentors. Networking offers them a platform to do just that.

Benefits of Networking

Networking offers numerous benefits for entrepreneurs. Some of the major benefits are:

- Getting high quality leads
- Meeting positive and enthusiastic people
- Increased business opportunities
- Increased self-confidence
- Good source of relevant connections
- Satisfaction from helping others
- Advice from like-minded entrepreneurs
- Building strong and lasting friendships
- Gaining visibility and raising your profile



- Use social media interactions to identify needs and gather feedback.
- When networking, ask open-ended questions rather than yes/no type questions.

10.6.4 Business Plan: Why Set Goals?

Setting goals is important because it gives you long-term vision and short-term motivation. Goals can be short term, medium term and long term.

Short-Term Goals

- These are specific goals for the immediate future.

Example: Repairing a machine that has failed.

Medium-Term Goals

- These goals are built on your short-term goals.
- They do not need to be as specific as your short-term goals.

Example: Arranging for a service contract to ensure that your machines don't fail again.

Long-Term Goals

These goals require time and planning.

They usually take a year or more to achieve.

Example: Planning your expenses so you can buy new machinery

Why Create a Business Plan?

A business plan is a tool for understanding how your business is put together. It can be used to monitor progress, foster accountability and control the fate of the business. It usually offers a 3-5 year projection and outlines the plan that the company intends to follow to grow its revenues. A business plan is also a very important tool for getting the interest of key employees or future investors.

A business plan typically comprises of eight elements.

Executive Summary

The executive summary follows the title page. The summary should clearly state your desires as the business owner in a short and business like way. It is an overview of your business and your plans. Ideally this should not be more than 1-2 pages.

Your Executive Summary should include:

- The Mission Statement: Explain what your business is all about.

Example: Nike's Mission Statement

Nike's mission statement is "To bring inspiration and innovation to every athlete in the world."

- **Company Information:** Provide information like when your business was formed, the names and roles of the founders, the number of employees, your business location(s) etc.
- **Growth Highlights:** Mention examples of company growth. Use graphs and charts where possible.
- **Your Products/Services:** Describe the products or services provided.
- **Financial Information:** Provide details on current bank and investors.
- **Summarize future plans:** Describe where you see your business in the future.

Business Description

The second section of your business plan needs to provide a detailed review of the different elements of your business. This will help potential investors to correctly understand your business goal and the uniqueness of your offering.

Your Business Description should include:

- A description of the nature of your business
- The market needs that you are aiming to satisfy
- The ways in which your products and services meet these needs
- The specific consumers and organizations that you intend to serve
- Your specific competitive advantages

Market Analysis

The market analysis section usually follows the business description. The aim of this section is to showcase your industry and market knowledge. This is also the section where you should lay down your research findings and conclusions.

Your Market Analysis should include:

- Your industry description and outlook
- Information on your target market
- The needs and demographics of your target audience
- The size of your target market
- The amount of market share you want to capture
- Your pricing structure
- Your competitive analysis
- Any regulatory requirements

Organization & Management

This section should come immediately after the Market Analysis.

Your Organization & Management section should include:

- Your company's organizational structure
- Details of your company's ownership
- Details of your management team
- Qualifications of your board of directors
- Detailed descriptions of each division/department and its function
- The salary and benefits package that you offer your people

Service or Product Line

The next section is the service or product line section. This is where you describe your service or product, and stress on their benefits to potential and current customers. Explain in detail why your product of choice will fulfil the needs of your target audience.

Your Service or Product Line section should include:

- A description of your product/service
- A description of your product or service's life cycle
- A list of any copyright or patent filings
- A description of any R&D activities that you are involved in or planning

Marketing & Sales

Once the Service or Product Line section of your plan has been completed, you should start on the description of the marketing and sales management strategy for your business.

Your Marketing section should include the following strategies:

- **Market penetration strategy:** This strategy focuses on selling your existing products or services in existing markets, in order to increase your market share.
- **Growth strategy:** This strategy focuses on increasing the amount of market share, even if it reduces earnings in the short-term.
- **Channels of distribution strategy:** These can be wholesalers, retailers, distributors and even the internet.
- **Communication strategy:** These can be written strategies (e-mail, text, chat), oral strategies (phone calls, video chats, face-to-face conversations), non-verbal strategies (body language, facial expressions, tone of voice) and visual strategies (signs, webpages, illustrations).

Your Sales section should include the following information:

- **A salesforce strategy:** This strategy focuses on increasing the revenue of the enterprise.
- **A breakdown of your sales activities:** This means detailing out how you intend to sell your products or services – will you sell it offline or online, how many units do you intend to sell, what price do you plan to sell each unit at, etc.

Funding Request

This section is specifically for those who require funding for their venture.

The Funding Request section should include the following information:

- How much funding you currently require.
- How much funding you will require over the next five years. This will depend on your long-term goals.
- The type of funding you want and how you plan to use it. Do you want funding that can be used only for a specific purpose, or funding that can be used for any kind of requirement?
- Strategic plans for the future. This will involve detailing out your long-term plans – what these plans are and how much money you will require to put these plans in motions.
- Historical and prospective financial information. This can be done by creating and maintaining all your financial records, right from the moment your enterprise started, to the present day. Documents required for this are your balance sheet which contains details of your company's assets and liabilities, your income statement which lists your company's revenues, expenses and net income for the year, your tax returns (usually for the last three years) and your cash flow budget which lists the cash that came in, the cash that went out and states whether you had a cash deficit (negative balance) or surplus (positive balance) at the end of each month.

Financial Planning



Before you begin building your enterprise, you need to plan your finances. Take a look at the steps for financial planning:

Step 1: Create a financial plan. This should include your goals, strategies and timelines for accomplishing these goals.

Step 2: Organize all your important financial documents. Maintain a file to hold your investment details, bank statements, tax papers, credit card bills, insurance papers and any other financial records.

Step 3: Calculate your net worth. This means figure out what you own (assets like your house, bank accounts, investments etc.), and then subtract what you owe (liabilities like loans, pending credit card amounts etc.) the amount you are left with is your net worth.

Step 4: Make a spending plan. This means write down in detail where your money will come from, and where it will go.

Step 5: Build an emergency fund. A good emergency fund contains enough money to cover at least 6 months' worth of expenses.

Step 6: Set up your insurance. Insurance provides long term financial security and protects you against risk.

Risk Management

As an entrepreneur, it is critical that you evaluate the risks involved with the type of enterprise that you want to start, before you begin setting up your company. Once you have identified potential risks, you can take steps to reduce them. Some ways to manage risks are:

- Research similar business and find out about their risks and how they were minimized.
- Evaluate current market trends and find out if similar products or services that launched a while ago are still being well received by the public.
- Think about whether you really have the required expertise to launch your product or service.
- Examine your finances and see if you have enough income to start your enterprise.
- Be aware of the current state of the economy, consider how the economy may change over time, and think about how your enterprise will be affected by any of those changes.
- Create a detailed business plan.



Ensure all the important elements are covered in your plan.

Scrutinize the numbers thoroughly.

Be concise and realistic.

Be conservative in your approach and your projections.

Use visuals like charts, graphs and images wherever possible.

10.6.5 Procedure and Formalities for Bank Finance: The Need for Bank Finance

For entrepreneurs, one of the most difficult challenges faced involves securing funds for start-ups. With numerous funding options available, entrepreneurs need to take a close look at which funding methodology works best for them. In India, banks are one of the largest funders of start-ups, offering funding to thousands of start-ups every year.

What Information Should Entrepreneurs Offer Banks for Funding?

When approaching a bank, entrepreneurs must have a clear idea of the different criteria that banks use to screen, rate and process loan applications. Entrepreneurs must also be aware of the importance of providing banks with accurate and correct information. It is now easier than ever for financial institutions to track any default behaviour of loan applicants. Entrepreneurs looking for funding from banks must provide banks with information relating to their general credentials, financial situation and guarantees or collaterals that can be offered.

General Credentials

This is where you, as an entrepreneur, provide the bank with background information on yourself. Such information includes:

- Letter(s) of Introduction: This letter should be written by a respected business person who knows you well enough to introduce you. The aim of this letter is set across your achievements and vouch for your character and integrity.
- Your Profile: This is basically your resume. You need to give the bank a good idea of your educational achievements, professional training, qualifications, employment record and achievements.
- Business Brochure: A business brochure typically provides information on company products, clients, how long the business has been running for etc.
- Bank and Other References: If you have an account with another bank, providing those bank references is a good idea.
- Proof of Company Ownership or Registration: In some cases, you may need to provide the bank with proof of company ownership and registration. A list of assets and liabilities may also be required.

Financial Situation

Banks will expect current financial information on your enterprise. The standard financial reports you should be prepared with are:

- | | |
|-----------------------|--------------------------------|
| • Balance Sheet | • Profit-and-Loss Account |
| • Cash-Flow Statement | • Projected Sales and Revenues |
| • Business Plan | • Feasibility Study |

Guarantees or Collaterals

Usually banks will refuse to grant you a loan without security. You can offer assets which the bank can seize and sell off if you do not repay the loan. Fixed assets like machinery, equipment, vehicles etc. are also considered to be security for loans.

The Lending Criteria of Banks

Your request for funding will have a higher chance of success if you can satisfy the following lending criteria:

- Good cash flow
- Adequate security
- Good reputation
- Adequate shareholders' funds
- Experience in business

The Procedure



To apply for funding the following procedure will need to be followed.

1. Submit your application form and all other required documents to the bank.
2. The bank will carefully assess your credit worthiness and assign ratings by analysing your business information with respect to parameters like management, financial, operational and industry information as well as past loan performance.
3. The bank will make a decision as to whether or not you should be given funding.



- Get advice on funding options from experienced bankers.
- Be cautious and avoid borrowing more than you need, for longer than you need, at an interest rate that is higher than you are comfortable with.

10.6.6 Enterprise Management - An Overview: How to Manage Your Enterprise?



To manage your enterprise effectively you need to look at many different aspects, right from managing the day-to-day activities to figuring out how to handle a large-scale event. Let's take a look at some simple steps to manage your company effectively.

Step 1: Use your leadership skills and ask for advice when required.

Let's take the example of Ramu, an entrepreneur who has recently started his own enterprise. Ramu has good leadership skills – he is honest, communicates well, knows how to delegate work etc. These leadership skills definitely help Ramu in the management of his enterprise. However, sometimes Ramu comes across situations that he is unsure how to handle. What should Ramu do in this case? One solution is for him to find a more experienced manager who is willing to mentor him. Another solution is for Ramu to use his networking skills so that he can connect with managers from other organizations, who can give him advice on how to handle such situations.

Step 2: Divide your work amongst others – realize that you cannot handle everything yourself.

Even the most skilled manager in the world will not be able to manage every single task that an enterprise will demand of him. A smart manager needs to realize that the key to managing his enterprise lies in his dividing all his work between those around him. This is known as delegation. However, delegating is not enough. A manager must delegate effectively if he wants to see results. This is important because delegating, when done incorrectly, can result in you creating even more work for yourself. To delegate effectively, you can start by making two lists. One list should contain the things that you know you need to handle yourself. The second list should contain the things that you are confident can be given to others to manage and handle. Besides incorrect delegation, another issue that may arise is over-delegation. This means giving away too many of your tasks to others. The problem with this is, the more tasks you delegate, the more time you will spend tracking and monitoring the work progress of those you have handed the tasks to. This will leave you with very little time to finish your own work.

Step 3: Hire the right people for the job.

Hiring the right people goes a long way towards effectively managing your enterprise. To hire the best people suited for the job, you need to be very careful with your interview process. You should ask potential candidates the right questions and evaluate their answers carefully. Carrying out background checks is always a good practice. Running a credit check is also a good idea, especially if the people you are planning to hire will be handling your money. Create a detailed job description for each role that you want filled and ensure that all candidates have a clear and correct understanding of the job description. You should also have an employee manual in place, where you put down every expectation that you have from your employees. All these actions will help ensure that the right people are approached for running your enterprise.

Step 4: Motivate your employees and train them well.

Your enterprise can only be managed effectively if your employees are motivated to work hard for your enterprise. Part of being motivated involves your employees believing in the vision and mission of your enterprise and genuinely wanting to make efforts towards pursuing the same. You can motivate your employees with recognition, bonuses and rewards for achievements. You can also motivate them by telling them about how their efforts have led to the company's success. This will help them feel pride and give them a sense of responsibility that will increase their motivation. Besides motivating your people, your employees should be constantly trained in new practices and technologies. Remember, training is not a one-time effort. It is a consistent effort that needs to be carried out regularly.

Step 5: Train your people to handle your customers well.

Your employees need to be well-versed in the art of customer management. This means they should be able to understand what their customers want, and also know how to satisfy their needs. For them to truly understand this, they need to see how you deal effectively with customers.

This is called leading by example. Show them how you sincerely listen to your clients and the efforts that you put into understanding their requirements. Let them listen to the type of questions that you ask your clients so they understand which questions are appropriate.

Step 6: Market your enterprise effectively.

Also, hire a marketing agency if you feel you need help in this area. Now that you know what is required to run your enterprise effectively, put these steps into play, and see how much easier managing your enterprise becomes!



- Get advice on funding options from experienced bankers.
- Be cautious and avoid borrowing more than you need, for longer than you need, at an interest rate that is higher than you are comfortable with.

10.6.7 20 Questions to Ask Yourself Before Considering Entrepreneurship

1. Why am I starting a business?
2. What problem am I solving?
3. Have others attempted to solve this problem before? Did they succeed or fail?
4. Do I have a mentor or industry expert that I can call on?
5. Who is my ideal customer?
6. Who are my competitors?
7. What makes my business idea different from other business ideas?
8. What are the key features of my product or service?
9. Have I done a SWOT analysis?
10. What is the size of the market that will buy my product or service?
11. What would it take to build a minimum viable product to test the market?
12. How much money do I need to get started?
13. Will I need to get a loan?
14. How soon will my products or services be available?
15. When will I break even or make a profit?
16. How will those who invest in my idea make a profit?
17. How should I set up the legal structure of my business?
18. What taxes will I need to pay?
19. What kind of insurance will I need?
20. Have I reached out to potential customers for feedback?



- It is very important to validate your business ideas before you invest significant time, money and resources into it.
- The more questions you ask yourself, the more prepared you will be to handle to highs and lows of starting an enterprise.

Footnotes:

1. A mentor is a trusted and experienced person who is willing to coach and guide you.
 2. A customer is someone who buys goods and/or services.
 3. A competitor is a person or company that sells products and/or services similar to your products and/or services.
 4. SWOT stands for Strengths, Weaknesses, Opportunities and Threats. To conduct a SWOT analysis of your company, you need to list down all the strengths and weaknesses of your company, the opportunities that are present for your company and the threats faced by your company.
 5. A minimum viable product is a product that has the fewest possible features, that can be sold to customers, for the purpose of getting feedback from customers on the product.
 6. A company is said to break even when the profits of the company are equal to the costs.
 7. The legal structure could be a sole proprietorship, partnership or limited liability partnership.
 8. There are two types of taxes – direct taxes payable by a person or a company, or indirect taxes charged on goods and/or services.
 9. There are two types of insurance – life insurance and general insurance. Life insurance covers human.
- life while general insurance covers assets like animals, goods, cars etc



Notes





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