



SURESH
GYAN VIHAR
UNIVERSITY
Accredited by NAAC with 'A+' Grade

Bachelor of Science

(B.Sc.)

INTRODUCTION TO COMPUTERS

Semester-II

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Subject Name: Introduction to Computer Applications

Course Objective:

This is a basic paper for Business Administration students to familiarize with basic principles of computer system including computer arithmetic, hardware, operating system, software applications, internet and world-wide web and their applications in the relevant fields.

Course Learning Outcomes :

After completing the course, the student shall be able to:

Course Outcome	Cognitive level
CO1 -Define the concept of Computer Fundamentals.	Remember
CO2 - Describe the conversion of one base to another base Number System.	Understand
CO3 - Explain the needs of hardware and software required for a computation task.	Understand
CO4 - Demonstrate the use of Operating system.	Understand
CO5 -Demonstrate how a document to be prepared and formatted.	Understand

SYLLABUS

INTRODUCTION TO COMPUTERS

UNIT - I

COMPUTER FUNDAMENTALS

Introduction, Characteristics of computers, Computer Generations, Types of computer applications, Computer structure, Operating Systems, Types of processors, Computer uses in Business

UNIT - II

DATA COMMUNICATION AND NETWORKING

Introduction - Data communication components, Communication media, Types of communication services, Modem, Computer Networks, Benefits of Networks, Types of Networks, Networking Terms, Teleconferencing tools, Interconnection Communication Model

UNIT - III

OPERATING SYSTEM FUNDAMENTALS

Introduction Operating Systems, Windows Operating System history, Tasks of Operating system, Windows API, Drivers and Unicode, Components of windows OS

UNIT - IV

MICROSOFT OFFICE PACKAGE

Introduction, MS office package, MS office installation 2013, MS office 365

UNIT - V

ADVANCED EXCEL AND MULTIMEDIA

Introduction, Excel working, Microsoft Excel starter 2010, Excel Built in Functions

UNIT

I

COMPUTER FUNDAMENTALS

STRUCTURE

- 1.1 Learning objective
- 1.2 Introduction
- 1.3 Definition of Computer
- 1.4 Characteristics of computers
- 1.5 Computer Generations
- 1.6 Types of Computers
- 1.7 Computer Structure
- 1.8 Operating Systems
- 1.9 Types of Processors
- 1.10 Computer uses in Business
- 1.11 Chapter Summary
- 1.12 Review Questions
- 1.13 Multiple Choice Questions



1.1 LEARNING OBJECTIVE

After completing this chapter, you will be able to:

- Understand the concepts of Computer.
- Understand characteristics of Computer.
- Learn and understand the generation of computers.
- Understand the general classifications of computers.
- Understand the structure of Computer.
- Understand the concept of Operating System.
- Understand Different types of Processors.
- Understand the use of computers in business.

1.2 INTRODUCTION

Today, almost all of us in the world make use of computers in one way or the other. It finds applications in various fields of engineering, medicine, commercial, research and others. Not only in these sophisticated areas, but also in our daily lives, computers have become indispensable. They are present everywhere, in all the devices that we use daily like cars, games, washing machines, microwaves etc. and in day-to-day computations like banking, reservations, electronic mails, internet and many more.

The word computer is derived from the word compute. Compute means to calculate. The computer was originally defined as a super-fast calculator. It had the capacity to solve complex arithmetic and scientific problems at very high speed. But nowadays in addition to handling complex arithmetic computations, computers perform many other tasks like accepting, sorting, selecting, moving, comparing various types of information. They also perform arithmetic and logical operations on alphabetic, numeric and other types of information. This information provided by the user to the computer is data. The information in one form which is presented to the computer is the input information or **input data**.

1.3 COMPUTER DEFINITION

The word 'computer' literally means 'something that computes' or 'calculates' but considering a computer to be merely calculating devices would be to severely limit its power. It may be defined as a device that can act upon information or data. This is done through the execution of a program.

The dictionary definition of computer is:

“An automatic electronic apparatus for making calculations or controlling operations that is expansible in numerical or logical term.”

1.4 CHARACTERISTICS OF COMPUTERS

NOTES 

- **Speed:** Internal process of computers operates at the speed of light, limited only by the programs that control this process, and the quantum of data under process. The speed with which computer performs it way beyond human capabilities to express it differently, a computer does in one minute what a human being could take a lifetime.
- **Accuracy:** The accuracy of a computer is consistently high. Errors can occur, but these are almost always due to human error rather than technological weakness. Imprecise thinking by the programmer, inaccurate data, or poorly designed systems is the origins of error. Computer error arising due to incorrect data input or unreliable programs are often referred to as GIGO (garbage- in — garbage -out).
- **Diligence:** The computer is a machine, that does not suffer from the human traits of tiredness. Nor does it lose concentration even after working continuously for a long time. This characteristic is especially useful for those jobs where a same task is done again and again. It can perform long and complex calculations with same speed and accuracy from the start till the end.
- **Versatility:** Versatility is one of the most wonderful things about computer. Multiprocessing features of computer makes it quite versatile in nature. One moment, it is preparing the results of particular examination, the next moment it is busy preparing electricity bills, and in-between it may be helping an office secretary to trace an important letter in seconds.
- It can perform different types of tasks with the same ease. All that is required to change its talent is to slip in a new program into it. Briefly, a computer is capable of performing almost any task provided that the task can be reduced to a series of logical steps.
- **Storage:** Large volumes of data and information can be stored in the computer and also retrieved whenever required. A limited amount of data can be stored, temporarily, in the primary memory. Secondary storage devices like floppy disk and compact disk can store a large amount of data permanently.

1.5 COMPUTER GENERATIONS (EVOLUTION OF COMPUTERS)



NOTES



The abacus was the earliest calculating machine probably originated in China about 3,000 years ago. It is still widely used in Asia for primary education. The name abacus is derived from abax; Greek word for slab. It may be because the counting was once done with pebbles placed in a hollow in a slab. In China it is also known as Swan Pan. Abacus consists of a rectangular wooden frame with horizontal rods. Beads made of stones, pearls wood or ivory (having holes in it to pass through the rods), are placed in these rods. Counting is done by shifting the beads from one place to another. It is a hand-used device for addition and subtraction. The abacus consists of several columns, farthest to the right represents 'ones', the next one tens, then the hundreds and so on.



Blaise Pascal was a French mathematician born on 19th June 1623 at Clermont-Ferrand, Auvergne. In 1642, when he was only 19 years old, he invented a calculating machine called Pascaline. It was the first mechanical digital calculator that could perform addition and subtraction on whole numbers. It had a system of interlocking rotating cog wheels. Each wheel had ten segments like in a millimeter. When one wheel completes a rotation, the next wheel moves by one segment. Numbers 0 to 9 are there on the circumference of the wheel. Pascal patented this machine in 1647, and produced it on a mass scale.

Later many attempts were made in this direction but the inventions of CHARLES BABBAGE, a professor at CAMBRIDGE UNIVERSITY, is worth mentioning. **He is considered being father of modern digital computers. He designed two computers:**

- The 'Different Engine' (1822) based on the mathematical principle of finite difference and used to solve calculations on large numbers. It was also used to solve trigonometric functions and polynomials.
- The 'Analytical Engine' (1842) a general-purpose computing device intended to be completely automatic. This could perform any mathematical operation and at a speed of 60 additions per minute.

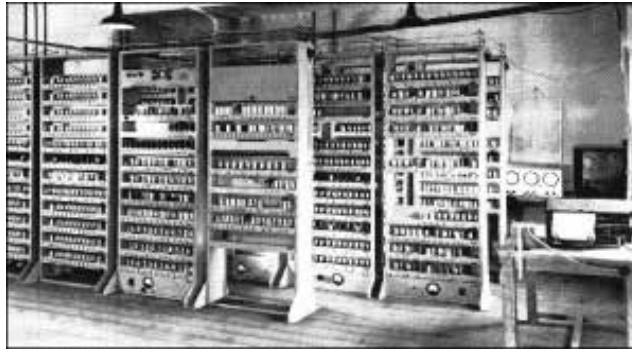
LET US DISCUSS THE VARIOUS GENERATIONS OF THE COMPUTERS

FIRST GENERATION

The period of first generation was from 1946-1959. The computers of first generation used vacuum tubes as the basic components for memory and circuitry for CPU (Central Processing Unit). These tubes, like electric bulbs, produced a lot of heat and the installations

used to fuse frequently. Therefore, they were very expensive and only large organizations were able to afford it.

In this generation, mainly batch processing operating system was used. Punch cards, paper tape, and magnetic tape was used as input and output devices. The computers in this generation used machine code as the programming language.



The main features of the first generation are:

- Vacuum tube technology
- Unreliable
- Supported machine language only
- Very costly
- Generated a lot of heat
- Slow input and output devices
- Huge size
- Need of AC
- Consumed a lot of electricity

Charles Babbage a British mathematician at Cambridge University invented the first analytical engine or difference engine. This machine could be programmed by instructions coded on punch cards and had mechanical memory to store the results. For his contributions in this field **Charles Babbage is known as 'the father of modern digital computer'**.

Some of the early computers included:

Mark I – This was the first fully automatic calculating machine. It was designed by Howard Aiken of Harvard University in collaboration with IBM. This machine was an electronic relay computer. Electromagnetic signals were used for the movement of mechanical parts. Mark I could perform the basic arithmetic and complex equations. Although this machine was extremely reliable, it was very slow (it took about 3-5 seconds per calculation) and was complex in design and large in size.

Atanasoff-Berry Computer (ABC) – This computer developed by John Atanasoff and Clifford Berry was the world's first general purpose electronic digital computer. It made use of vacuum tubes for internal logic and capacitors for storage.



ENIAC (Electronic Numeric Integrator and Calculator) – The first all-electronic computer was produced by a partnership between the US Government and the University of Pennsylvania. It was built using 18,000 vacuum tubes, 70,000 resistors and 1,500 relays and consumed 160 kilowatts of electrical power. The ENIAC computed at speed about thousand times faster than Mark I. However, it could store and manipulate only a limited amount of data. Program modifications and detecting errors were also difficult.

EDVAC – In the mid 1940's Dr. John von Neumann designed the Electronic Discrete Variable Automatic Computer with a memory to store both program and data. This was the first machine which used the stored program concept. It had five distinct units - arithmetic, central control, memory, input and output. The key element was the central control. All the functions of the computer were co-ordinate through this single source, the central control. The programming of the computers was done in machine language.

UNIVAC – Remington Rand designed this computer specifically for business data processing applications. The Universal Automatic Computer was the first general purpose commercially available computer.

SECOND GENERATION

The period of second generation was from 1959-1965. In this generation, transistors were used that were cheaper, consumed less power, more compact in size, more reliable and faster than the first-generation machines made of vacuum tubes. In this generation, magnetic cores were used as the primary memory and magnetic tape and magnetic disks as secondary storage devices. In this generation, assembly language and high-level programming languages like FORTRAN, COBOL were used. The computers used batch processing and multiprogramming operating system.

The first large scale machines that took advantage of the transistor technology were the early supercomputers, Stretch by IBM and LARC by Sperry Rand. These machines were mainly developed for atomic energy laboratories. Typical computers of the second generation were the IBM 1400 and 7000 series, Honeywell 200 and General Electric.

IBM 1401 was universally accepted throughout the industry and largest businesses routinely processed financial information using second generation computers. The machine language was replaced by assembly language. Thus, the long and difficult binary code was replaced with abbreviated programming code which was relatively easy to understand.

The stored program concept and programming languages gave the computers flexibility to finally be cost effective and productive for business use. The stored program concept implied that the instructions to run a computer for a specific task were held inside the computer's memory and could quickly be modified or replaced by a different set of instructions for a different function. Computers started finding vast and varied applications. The entire software industry began with the second-generation computers.

The main features of second generation are:

- Use of transistors

- Reliable in comparison to first generation computers
- Smaller size as compared to first generation computers
- Generated less heat as compared to first generation computers
- Consumed less electricity as compared to first generation computers
- Faster than first generation computers
- Still very costly
- AC required
- Supported machine and assembly languages

Some computers of this generation were:

- IBM 1620
- IBM 7094
- CDC 1604
- CDC 3600
- UNIVAC 1108

THIRD GENERATION

The period of third generation was from 1965-1971. The computers of third generation used Integrated Circuits (ICs) in place of transistors. A single IC has many transistors, resistors, and capacitors along with the associated circuitry. The IC was invented by Jack Kilby. This development made computers smaller in size, reliable, and efficient. In this generation remote processing, time-sharing, multi-programming operating system were used. High-level languages (FORTRAN-II TO IV, COBOL, PASCAL PL/1, BASIC, ALGOL-68 etc.) were used during this generation.

The main features of third generation are:

- IC used
- More reliable in comparison to previous two generations
- Smaller size
- Generated less heat
- Faster
- Lesser maintenance
- Costly
- AC required
- Consumed lesser electricity
- Supported high-level language

Some computers of this generation were:

- IBM-360 series



- Honeywell-6000 series
- PDP (Personal Data Processor)
- IBM-370/168
- TDC-316

FOURTH GENERATION

The period of fourth generation was from 1971-1980. Computers of fourth generation used Very Large Scale Integrated (VLSI) circuits. VLSI circuits having about 5000 transistors and other circuit elements with their associated circuits on a single chip made it possible to have microcomputers of fourth generation. Fourth generation computers became more powerful, compact, reliable, and affordable. As a result, it gave rise to Personal Computer (PC) revolution. In this generation, time-sharing, real-time networks, distributed operating system were used. All the high-level languages like C, C++, DBASE etc., were used in this generation.

The Intel 4004 chip, located all the components of a computer (central processing unit, memory, input and output controls) on a single chip and microcomputers were introduced. Higher capacity storage media like magnetic disks were developed. Fourth generation languages emerged and applications software's started becoming popular.

Computer production became inexpensive and the era of Personal Introduction to Computer System/7 Computers (PCs) commenced. In 1981, IBM introduced its personal computer for use in office, home and schools. In direct competition, the Macintosh was introduced by Apple in 1984. Shared interactive systems and user-friendly environments were the features of these computers.

The main features of fourth generation are:

- VLSI technology used
- Very cheap
- Portable and reliable
- Use of PCs
- Very small size
- Pipeline processing
- No AC required
- Concept of internet was introduced
- Great developments in the fields of networks
- Computers became easily available

Some computers of this generation were:

- DEC 10 19
- STAR 1000

- PDP 11
- CRAY-1 (Super Computer)
- CRAY-X-MP (Super Computer)

FIFTH GENERATION

The period of fifth generation is 1980-till date. In the fifth generation, VLSI technology became ULSI (Ultra Large-Scale Integration) technology, resulting in the production of microprocessor chips having ten million electronic components. This generation is based on parallel processing hardware and AI (Artificial Intelligence) software. AI is an emerging branch in computer science, which interprets the means and method of making computers think like human beings. All the high-level languages like C and C++, Java, .Net etc., are used in this generation.

AI includes:

- Robotics
- Neural Networks
- Game Playing
- Development of expert systems to make decisions in real-life situations
- Natural language understanding and generation

The main features of fifth generation:

- Development of true artificial intelligence
- Development of Natural language processing
- Advancement in Parallel Processing
- Advancement in Superconductor technology
- More user-friendly interfaces with multimedia features
- Availability of very powerful and compact computers at cheaper rates

Some computer types of this generation are:

- Desktop
- Laptop
- Notebook
- Ultra-Book
- Chrome Book

1.6 TYPES OF COMPUTERS

Minicomputer

A minicomputer is a type of computer that possesses most of the features and capabilities of a large computer but is smaller in physical size.

NOTES 

A minicomputer fills the space between the mainframe and microcomputer, and is smaller than the former but larger than the latter. Minicomputers are mainly used as small or mid-range servers operating business and scientific applications. However, the use of the term minicomputer has diminished and has merged with servers.

A minicomputer may also be called a mid-range computer.

**Microcomputer**

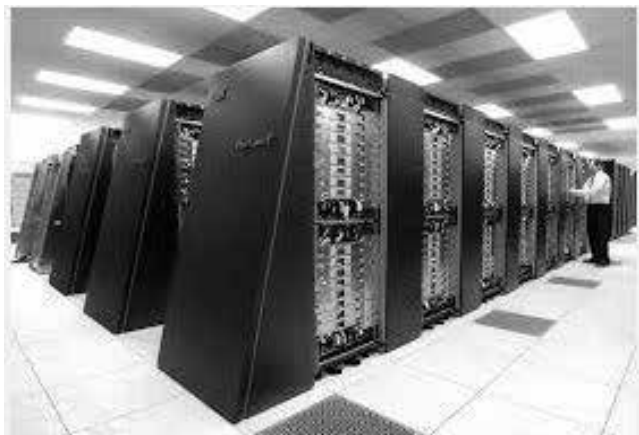
A microcomputer is a complete computer on a smaller scale and is generally a synonym for the more common term, personal computer or PC, a computer designed for an individual. A microcomputer contains a microprocessor (a central processing unit on a microchip), memory in the form of read-only memory and random access memory, I/O ports and a bus or system of interconnecting wires, housed in a unit that is usually called a motherboard.

**Mainframe Computer**

A data processing system employed mainly in large organizations for various applications, including bulk data processing, process control, industry and consumer statistics, enterprise resource planning, and financial transaction processing.

Mainframes use proprietary operating systems, most of which are based on Unix, and a growing number on Linux. Over the years, they have evolved from being room-sized to networked configurations of workstations and servers that are an extremely competitive and cost-effective platform for e-commerce development and hosting. Mainframes are so called because the earliest ones were housed in large metal frames.

NOTES 



Supercomputer

The term is commonly applied to the fastest high-performance systems available at a given time; current personal computers are more powerful than the supercomputers of just a few years ago. Supercomputers are used primarily for scientific and engineering work. Unlike conventional computers, they usually have more than one CPU, often functioning in parallel (simultaneously); even higher-performance supercomputers are now being developed through use of massively parallel processing, incorporating thousands of individual processors. Supercomputers have huge storage capacity and very fast input/output capability, and can operate in parallel on corresponding elements of arrays of numbers rather than on one pair of elements at a time.



CHECK YOUR PROGRESS

1. What is Computer? Discuss the Characteristics of Computer.
2. Discuss about second generation computers.
3. Discuss about third generation computers.
4. Discuss about different types of computers.
5. List various features of third and fourth generation computers.

1.7 COMPUTER STRUCTURE (BASIC ANATOMY OF THE COMPUTER)

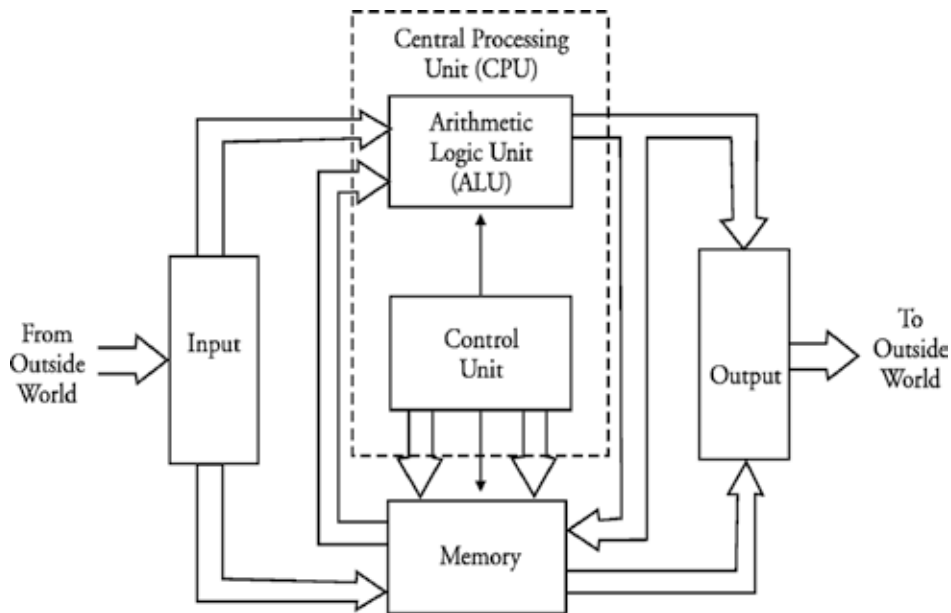
We should keep in mind that a computer is a programmable machine.

The two main characteristics of a computer are:

- It responds to a specific set of instructions in a well-defined manner
- It can execute a pre-recorded list of instructions (a program). Modern computers are electronic and digital.

The actual machinery - wires, transistors and circuits is called hardware; the instructions and data are called software.

All general purpose computers require the following hardware components:



Basic Computer Organisation

- **Central Processing Unit (CPU):** The 'brain' of the computer, the component that actually executes instructions.
- **Memory:** It enables a computer to store, at least temporarily, data and programs.
- **Input device:** Usually a keyboard or mouse is used to read data and programs into the computer.
- **Output device:** A display screen, printer, etc., that lets you see what the computer has accomplished.
- **Mass storage device:** It allows a computer to permanently store large amounts of data. Common mass storage devices include disk drive and tape drive.

In addition to these components, many others make it possible for the basic components of a computer to work together efficiently.

Input Unit

An input device is any device that provides input to a computer. There are dozens of possible input devices, but the two most common ones are a keyboard and mouse. Every key you press on the keyboard and every movement or click you make with the mouse sends a specific input signal to the computer. These commands allow you to open programs, type messages, drag objects, and perform many other functions on your computer.

Since the job of a computer is primarily to process input, computers are pretty useless without input devices. Just imagine how much fun you would have using your computer without a keyboard or mouse. Therefore, input devices are a vital part of every computer system.



While most computers come with a keyboard and mouse, other input devices may also be used to send information to the computer. Some examples include joysticks, MIDI keyboards, microphones, scanners, digital cameras, webcams, card readers, UPC scanners, and scientific measuring equipment. All these devices send information to the computer and therefore, are categorized as input devices. Peripherals that output data from the computer are called output devices.

Arithmetic Logic Unit (ALU)

After input unit transfers the information into the memory unit the information can then be further transferred to the ALU where comparisons or calculations are done and result sent back to memory unit.

Since all data and instruction are represented in numeric form, ALUs are designed to perform the four basic arithmetic operations: add, subtract, multiply, divide, and logical operations such as equal to, less than, greater than.

Output Unit

Since computers work with binary code, the result produced is also in binary form. The basic function of the output unit therefore is to convert these results into human readable form before providing the output through various output devices like terminals, printers etc.

Control Unit

It is the function of the control unit to ensure that according to the stored instructions, the right operation is done on the right data at the right time. It is the control unit that obtains instructions from the program stored in the main memory, interprets them, and ensure that other units of the system execute them in the desired order.

Central Processing Unit

The control unit, arithmetic Logic Unit along with the main memory are together known as Central Processing Unit (CPU). It is the brain of any computer system.

Secondary Storage

The storage capacity of the primary memory of computer is limited. Often, it is necessary to store large amounts of data. So traditional memory called secondary storage or auxiliary memory is used in most computer system.

Input Devices

An input device is any hardware device that sends data to the computer, without any input devices, a computer would only be a display device and not allow users to interact with it, much like a TV. The picture is a Logitech trackball mouse and an example of an input device.

Keyboard

Most common and very popular input device is keyboard. The keyboard helps in inputting the data to the computer. The layout of the keyboard is like that of traditional typewriter, although there are some additional keys provided for performing some additional functions.

Keyboards are of two sizes 84 keys or 101/102 keys, but now 104 keys or 108 keys keyboard is also available for Windows and Internet.



The keys are following

S. No.	Keys	Description
1	Typing Keys	These keys include the letter keys (A-Z) and digits keys (0-9) which generally give same layout as that of typewriters.
2	Numeric Keypad	It is used to enter numeric data or cursor movement. Generally, it consists of a set of 17 keys that are laid out in the same configuration used by most adding machine and calculators.
3	Function Keys	The twelve functions keys are present on the keyboard. These are arranged in a row along the top of the keyboard. Each function key has unique meaning and is used for some specific purpose.
4	Control keys	These keys provide cursor and screen control. It includes four directional arrow key. Control keys also include Home, End, Insert, Delete, Page Up, Page Down, Control (Ctrl), Alternate (Alt), Escape (Esc).
5	Special Purpose Keys	Keyboard also contains some special purpose keys such as Enter, Shift, Caps Lock, Num Lock, Space bar, Tab, and Print Screen.

Mouse

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

Generally, it has two buttons called left and right button and scroll bar is present at the mid. Mouse can be used to control the position of cursor on screen, but it cannot be used to enter text into the computer.



Advantages

- Easy to use
- Not very expensive
- Moves the cursor faster than the arrow keys of keyboard.

Joystick

Joystick is also a pointing device, which is used to move cursor position on a monitor screen. It is a stick having a spherical ball at its both lower and upper ends. The lower spherical ball moves in a socket. The joystick can be moved in all four directions. The function of joystick is similar to that of a mouse. It is mainly used in Computer Aided Designing (CAD) and playing computer games.



Light pen

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

When light pen's tip is moved over the monitor screen and pen button is pressed, its photocell sensing element detects the screen location and sends the corresponding signal to the CPU.



Track Ball

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

Since the whole device is not moved, a track ball requires less space than a mouse. A track ball comes in various shapes like a ball, a button and a square.



Scanner

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

Scanner captures images from the source which are then converted into the digital form that can be stored on the disc. These images can be edited before they are printed.



Optical Mark Reader (OMR)

OMR is a special type of optical scanner used to recognize the type of mark made by pen or pencil. It is used where one out of a few alternatives is to be selected and marked. It is specially used for checking the answer sheets of examinations having multiple choice questions.



Optical Character Reader(OCR)

OCR is an input device used to read a printed text. OCR scans text optically character by character, converts them into a machine readable code and stores the text on the system memory.



Magnetic Ink Card Reader (MICR)

MICR input device is generally used in banks because of a large number of cheques to be processed every day. The bank's code number and cheque number are printed on the cheques with a special type of ink that contains particles of magnetic material that are machine readable.

This reading process is called Magnetic Ink Character Recognition (MICR). The main advantage of MICR is that it is fast and less error prone.

OUTPUT DEVICES

Cathode-Ray Tube (CRT) Monitor

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

A finite number of characters can be displayed on a screen at once. The screen can be divided into a series of character boxes - fixed location on the screen where a standard character can be placed.

Most screens are capable of displaying 80 characters of data horizontally and 25 lines vertically.

There are some disadvantages of CRT:

- Large in Size
- High power consumption

Monitors

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



There are two kinds of viewing screen used for monitors:

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

Flat-Panel Display Monitor

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



The flat-panel displays are divided into two categories:

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

Printers

Printer is the most important output device, which is used to print information on paper. There are two types of printers:

- Impact Printers
- Non-Impact Printers



Impact Printers

The printers that print the characters by striking against the ribbon and onto the paper, are called impact printers.

Characteristics of Impact Printers are the following:

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

These printers are of two types:

- Character printers
- Line printer

Non-impact Printers

The printers that print the characters without striking against the ribbon and onto the paper are called Non-Impact Printers. These printers print a complete page at a time, also called as Page Printers.

These printers are of two types:

- Laser Printers
- Inkjet Printers

Characteristics of Non-impact Printers:

- Faster than impact printers.
- They are not noisy.
- High quality.
- Supports many fonts and different character sizes.

Character Printers

Character Printers are printers, which print one character at a time.

These are of further two types:

- Dot Matrix Printer (DMP)
- Daisy Wheel

Dot Matrix Printer

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

Inkjet Printers

Inkjet printers are non-impact character printers based on a relatively new technology. They print characters by spraying small drops of ink onto paper. Inkjet printers produce high quality output with presentable features.

They make less noise because no hammering is done and these have many styles of printing modes available. Colour printing is also possible. Some models of Inkjet printers can produce multiple copies of printing also.



Advantages

- High quality printing
- More reliable

Disadvantages

- Expensive as cost per page is high
- Slow as compared to laser printer

Laser Printers

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





Advantages

- Very high speed.
- Very high-quality output.
- Gives good graphics quality.
- Supports many fonts and different character sizes.

Disadvantage

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

Computer Output Microfilm (COM)

Computer output microfilm or “COM” is a process for copying and printing data onto microfilm from electronic media found on personal, mini, or mainframe computers.

COM consists of: 1) A high-speed recorder that transfers digital data onto microfilm using laser technology; and 2) A processor that develops the microfilm once exposed to a light source. A

COM recorder can operate “online” or “offline,” meaning that it can be connected to a single computer, a local area network, a minicomputer, or a mainframe computer. In addition, the recorder can operate independently as a stand-alone device that reads digital data from formatted magnetic media, such as tape.

A COM recorder generally operates with:

- A duplicator that generates copies of microfiche; and
- A sorter that separates duplicate microfiche cards into bins for easy, end-point distribution.

Each functional unit is connected to the next, providing a linear path from creation to endpoint distribution of the microfiche.

COM offers many advantages that assist agencies with efficient office operations and adherence to **sound records management principles**. **Key benefits include:**

- **Reduction of Paper:** One of the primary objectives of providing COM is to decrease paper use as allowed by Public Law 40 - 1979, Section 16, which authorizes recording, copying, and reproducing records by photo static, photographic, or micrographic process to reduce storage space. A one-cubic-foot box of paper records holds an average of only 3,000 pages. One microfiche card holds 230 documents (or images), and a one-cubic-foot records storage box holds 6,000 microfiches cards—a minimum of 1,380,000 pages. To store that many paper documents, 460 one-cubic-foot records storage boxes would be needed.
- **Cost Reduction:** Using COM to store or distribute information is more economical than most electronic media, and is even less expensive than paper. The cost of printing a standard 8” x 11” page from a centralized printer is approximately three



cents per sheet, versus only 0.0033 cents per sheet for COM microfiche. Other cost savings can be realized through the decrease in office and warehouse spaces needed to store paper documents.

- **Improved Quality:** The newest COM technology provides superior image quality for improved user productivity. Such features as enhanced titling, enlarged file breaks, and bar coding make access and filing easier. Improved quality also means reader and printer copies that are legible.
- **Improved Service:** The use of COM services outsourced by MIS helps reduce the risk of lost tapes and slow turn-around times from individually-contracted vendors, thereby offering agencies quick access to high-quality microfilm images. Initial transfer of information from the agency to the Micrographics lab is also simple and quick: database (ASCII or EBCDIC) or image (TIFF Group IV) files may be sent directly from your agency's computers to the Micrographics FTP site for transfer to fiche. Contact the Micrographics lab for specific filetype requirements and FTP address.
- **Electronic Record Retention/Archiving:** With the proliferation of electronic records, and with few rules governing the purchase and use of imaging systems, it is vitally important that state agencies have the means to archive records from a variety of electronic sources. Using COM, electronic records can be moved from diverse, incompatible electronic storage systems to a "universal" reader.

Voice Response System

Voice response system enables the computer to talk to its user. It consists of audio-response devices that produce the audio output. Voice response system is typically of two types: voice reproduction system and speech synthesizer.

- **Voice reproduction system:** A voice reproduction system produces audio output by selecting an appropriate audio output from a set of pre-recorded audio responses. The set of pre-recorded responses include words, phrases or sentences spoken by human beings, music or alarms generated by musical instruments.

The application of voice reproduction system are:

1. Audio help for guiding how to operate a system. For example, bank uses voice reproduction system in ATM (automatic teller machines) to guide customers about transactions.
 2. Automatic answering machines. For example, telephone enquiries for new telephone numbers in place of an old number or vacancy status of a particular flight or train is taken care by automatic answering machines.
- **Speech synthesizer:** A speech access system converts text to spoken words. The system consists of a synthesizer that does the speaking and the screen access program that directs the synthesizer. Some synthesizers and speech access program are linked and sold as a package, while others are sold independently.



Screen Image Projector

Screen image projector is an output device, which is used to project information from a computer on to a large screen, so that it can be simultaneously viewed by a large group of people. This output device is very useful for making presentations to a group of people with the direct use of a computer. Before such an output device was available, the contents of a presentation were prepared using a computer, the presentation material was then printed on a printer, the printout was next reproduced on overhead projector transparency sheets by using a copy machine, and finally, the presentation was made by using an overhead projector. Special marker pens had to be used for marking certain portions of the contents on the transparency sheets during the presentation.



A screen image projector greatly simplifies this job. It can be directly plugged to a computer system, and the presenter can make a presentation to a group of people by projecting the presentation material one after another on a large screen with the help of computer's keyboard or mouse. With this facility, the presenter can also directly point to mark or edit certain portions of the contents of the displayed material during the presentation to make the presentation more understandable. Additionally, a fully-fledged multimedia presentation with audio, video, image and animation can be prepared and made by using this facility to make the presentation livelier and more interesting, and also greatly simplify the job of the presenter.

Screen image projectors have become common presentation equipment today. They are commonly used with portable notebook computers to quickly setup a modem presentation facility at any place with great ease. Like monitors, screen image projectors provide a temporary, soft-copy output.

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NOTES

**SOFTWARE CONCEPTS****Computer Software**

Today's computer is highly versatile tools across a myriad disciplines and usages. They can perform varied tasks, from correspondence to maintaining inventory information to creating drawings and illustration and many more. The least is most never-ending. The most important thing to understand is that the computer hardware itself cannot perform this task. It requires instructions to successfully carry out this task. In fact computer hardware is useless without programs or software. Let us therefore distinguish between this two commonly used terms, hardware and software.

Relationship between Hardware and Software

Hardware constitutes the electronic circuits used in building the computer. The electronic, magnetic, and mechanical device together is referred to as computer hardware. Software, on the other hand, is the name given to set of instructions, or program to be executed by the computer. It is the hardware that executes the software. To take an analogy, a television set bought from the shop is hardware and the various entertainment program it receives, is its software. Thus, while hardware is necessary, software is vital. An important point that is brought out from the analogy is that hardware is a onetime expense while software is an on-going expense.

Computer software can be classified into two broad categories: system software, and application software:

- **System software:** System software includes general program written for the system that provide the environment to facilitate the writing of application software. System software is therefore the stuff that makes your computer work. The computer's basic operating system, whether it is Window 2000 on the PC or UNIX on as an HP server, all form a part of system software.
- **Application software:** Application software or programs or programs designed to perform specific functions directly for the use or, in some case, for another application program.



Some High-Level Languages

FORTRAN: Early computers were almost exclusively used by scientists. The first high-level language, FORTRAN was developed in 1956 by John Backus at IBM. This language was designed to solve scientific and engineering problem and is still one of the most popular languages for such applications.

COBOL: Cobol, the first languages intended for commercial applications, was developed by a committee of computer manufacturers and users under the leadership of Grace Hopper, a US Navy programmer, in 1959. The maintenance and further growth of the languages was handed over to a group called CODASYL.

BASIC: Basic was developed by two Dartmouth College Professors, John Kemeny and Thomas Kurtz, as a teaching tool for undergraduates in 1966. This language was primarily designed for beginners and is very easy to learn. It was immediately picked up for most business and general purpose application, particularly on small computer, BASIC subsequently became the primary language of the personal computer revolution.

PASCAL: Pascal was designed by a Nicholas Wirth, a Swiss Professor, in 1971. He developed a more structured language for teaching that he named Pascal. His primary aim was to provide a language that supported beginners learning good program solving the programming techniques.

ADA: PL/1, developed in the late 1960s by IBM, and ADA, developed in 1981 by the US Dept, of Defence, was for both business and scientific use.

LISP: LISP was developed by John McCarthy at the Massachusetts Institute of Technology in the early 1950s. It was implemented in 1959, and was a program that handled recursive algorithms better. It has become the standard languages for the artificial intelligence community.

1.8 OPERATING SYSTEM

An Operating System is a set of programs that controls and coordinates the use of computer hardware among various application programs. It provides an environment within which user can execute programs. A computer can be divided into four components: the hardware, the operating system, the applications programs, the users. It is the operating system that manages all the above components.

The various functions of the operating system are:

- Controlling Input/Output devices (Keyboard, Mouse, Monitor, Printer, Plotter etc...)
- Memory and File storage management
- CPU Scheduling and controlling processes
- Loading, initiating, executing and supervising user applications programs
- Handling errors and restarting

- Providing command interface between user and computer system

Examples of Operating system are: UNIX (Solaris, IRIX, HP UNIX, Linux, DEC UNIX) Microsoft Disk Operating System (MS-DOS), WIN95/98, WIN NT, OS/2 etc.

MS-DOS

Microsoft Disk Operating system is a single user, single tasking operating system. DOS has a command-line, text-based/ non-graphical user-interface commonly referred to as Character Based User Interface (CUI). When the computer is switched on, a small program checks all internal devices, electronic memory and peripherals. Once this process is completed, MS-DOS is loaded.

Introduction to Window

Though UNIX was a powerful operating system available, but it was not suitable for 8-bit 8086 microprocessor based Personal Computers. So there was a need for a small operating system that could work in 640K memory (RAM). DOS was a variant of CP/M (Control Program/Monitor) which ran for the first time on IBM-PC in 1981. It is called so because it resides on Floppy or Hard disk and provides command level interface between user and the computer hardware. The different versions of MS-DOS have evolved over a period of time with Microsoft introducing new features in each new release. Starting with MS-DOS 1.1, the latest version was MS-DOS6.22 released in 1994. There are various versions of DOS like MS-DOS (Microsoft), TO-DOS (IBM), Apple DOS etc.

WINDOWS was similar to APPLE Mach operating system interface on IBM-PC. The main features of Windows are easy to use graphical user interface (GUI), device independent graphics and multitasking support. The first version of Windows 1.0 was introduced in 1985. Windows was an application of MS-DOS using the basic commands of DOS. Windows for Workgroup (WIN3.11) released in 1992 was an integrated windows and networking package with file and printer sharing capabilities, a network mail (Microsoft Mail) and a workgroup scheduler (Schedule^) package in windows environment. WINDOWS-95 released in 1995 is a 32-bit operating system which includes MS-DOS7.0 and takes control of computer system after starting.

Windows-95

The most visible change in Windows 95 over earlier versions of Windows is the new user interface. **The full screen display you see when you boot your PC and from which you work with documents and applications:**

Icon: An icon is a picture. Windows 95 uses small video icons that represent objects - documents, applications, folder, devices, and computers. An icon has a text label that further describes the object.

Selection: Selecting an object is pointing to it without taking any further action. To select the object, move the mouse cursor onto the icon and press the left mouse button once. If the currently selected object is in a group, you can change the selected object with arrow keys. You can change groups with Tab and Shift- Tab keys and then use arrow keys to select an object in the selected group.





Drag and Drop: To drag and drop an object onto another object, move the mouse cursor onto the icon of the object to be dragged. Press down the left mouse button and hold it down while you move mouse cursor to be destination object's icon. Release the button from that position to complete the drop.

The Right Mouse Button: If you move the mouse to almost anywhere or anything on the desktop or in a Window and click the right mouse button, Windows 95 displays a menu with common commands for the object. To close the menu, click the left mouse button anywhere else on the desktop or press the keyboard's Esc key.

Icons on the Desktop: The upper left corner contain four icons. Those icons provide access to your files and documents. Four icons are: My Computer, Network Neighborhood, Recycle Bin and Briefcase.

My Computer: The "My Computer" icon on the desktops opens a view into the resources of the local computer. The contents of my computer Window depend on the disk drives on your PC and the network support that is installed.

Network Neighborhood: This icon displays the computers and shared printers connected on the windows network.

Recycle Bin: This icon receives all deleted objects like files, folders, documents, applications, etc. These deleted objects can be retrieved back by dragging it out of the recycle bin and dropping it onto the desktop or into a folder or they can be permanently deleted from the disk by choosing EMPTY RECYCLE BIN selection on the file menu.

Briefcase: The commonly used personal documents can be put or stored in the briefcase. This briefcase can be moved to a disk or copied across a network.

Putting new objects on the desktop: new objects can be added to the desktop by dragging and dropping them from other locations or creating them on the desktop.

Windows NT

Windows NT is a family of operating systems produced by Microsoft, the first version of which was released in July 1993. It was a powerful high-level-language-based, processor-independent, multiprocessing, multiuser operating system with features comparable to UNIX. It was intended to complement consumer versions of Windows that were based on MS-DOS. NT was the first fully 32-bit version of Windows, whereas its consumer-oriented counterparts, Windows 3.1x and Windows 9x, were 16-bit/32-bit hybrids. Windows 2000, Windows XP, Windows Server 2003, Windows Vista, Windows Home Server, Windows Server 2008, and Windows 7 are based on Windows NT, although they are not branded as Windows NT.

Windows 2000

There are four versions of Windows 2000:

- **Professional:** An operating system for business desktop and laptop systems. It is



used to run software applications, connect to Internet and intranet sites, and access files, printers, and network resources.

- **Server:** Both a Web server and an office server. Windows 2000 Server lets users build Web applications and connect to the Internet.
- **Advanced Server:** An operating for line-of-business applications and e-commerce. It contains all the functionality of the standard version of Windows 2000 Server, plus additional features for applications that require higher levels of scalability and availability.
- **Datacenter Server:** Developed to work in high-traffic computer networks, it is designed for enterprises that need reliable high-end drivers and software. It supports up to 64-way SMP and up to 64 GB of physical memory.

UNIX

UNIX is a family of operating systems designed to run in a mainframe environment. There has been some effort to make UNIX work on PCs, but for the most part it remains the domain of large business system. It has numerous user interfaces which tend to range from user hostile to badly outdated, but it works very, very effectively for server application.

LINUX

LINUX is the most popular attempt to create a Unix-like operating system for personal computers. Unit recently, Linux also had all of the limitations of UNIX; with the so! benefit that you could run it on an Intel based PC. This is one benefit has created an environment where pretty much anybody can write software for it, and they have. On the good side, both the operating system and most of the application for it are entirely free.

Supporting Utilities

Backup

Backing up is a crucial process that everyone should do in order to have a fail-safe, for when the inevitable happens. The principle is to make copies of particular data in order to use those copies for restoring the information ii a failure occurs (a data loss event due to deletion, corruption, theft, viruses, etc.).

You can perform the backup manually by copying the data to a different location, or automatically using a backup program. Backup4all is such a program and you can easily download below (opens in new Window so you can still continue reading the article):

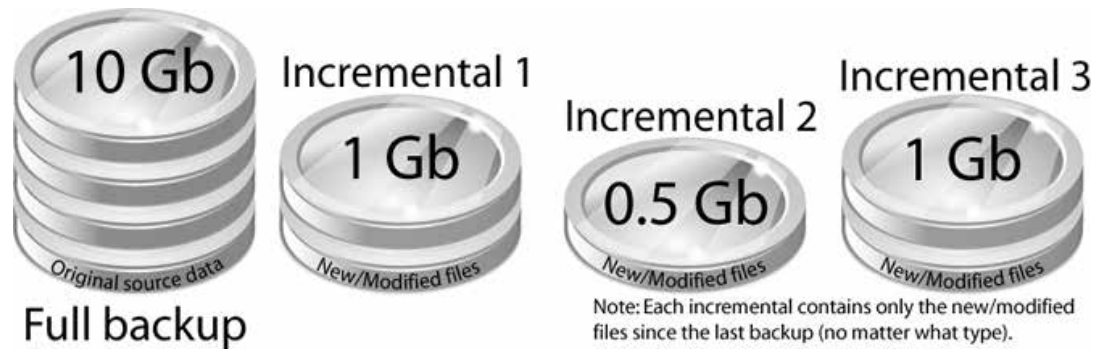
Each program has its own approach in executing the backup, but there are four common **backup types** implemented and generally used in most of these programs: **full backup**, **differential backup**, **incremental backup** and **mirror backup**. A type of backup actually defines how data is copied from source to destination and lays the grounds of a data repository model (how the backup is stored and structured).

NOTES 

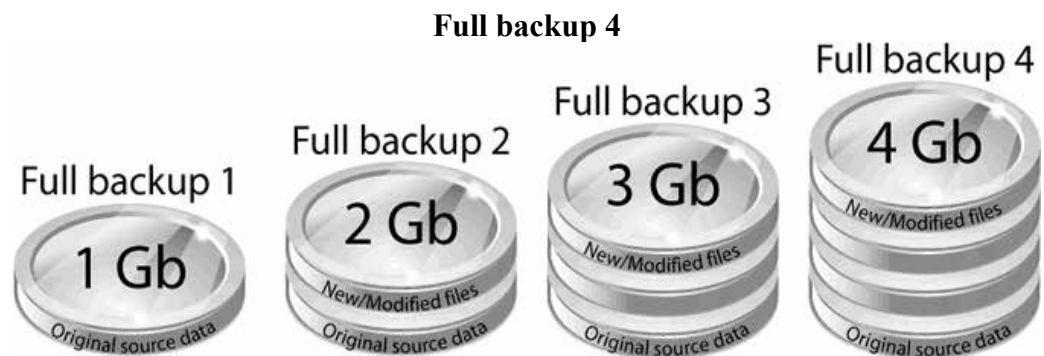
The image below provides an overview comparison between these backup types, for detailed information about each read the rest of the article:

Full Backup

Backup Type	Data Backed Up	Backup Time	Restore Time	Storage Space
Full backup	All data	Slowest	Fast	High
Incremental backup*	Only new/ modified files/ folders	Fast	Moderate	Lowest
Differential backup	All data since last full	Moderate	Fast	Moderate
Mirror backup	Only new/ modified files/ folders	Fastest	Fastest	Highest



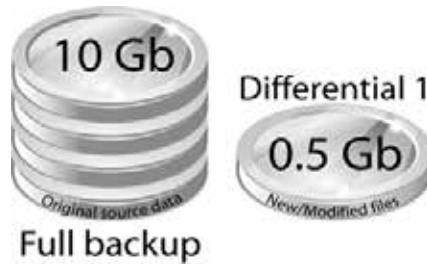
Full backup is the starting point for all other types of backup and contains all the data in the folders and files that are selected to be backed up. Because full backup stores all files and folders, frequent full backups result in faster and simpler restore operations. Remember that when you choose other backup types, restore jobs may take longer. As an example, for a full backup job that runs four times the representation below is conclusive on how the backed-up data will grow with every run:



Note: Full back up will always backup the entire source data. If you don't delete/exclude sources (only add/modify) it will always grow in size because it backs up everything.

Differential Backup

Differential backup contains all files that have changed since the last FULL backup. The advantage of a differential backup is that it shortens restore time compared to a full backup or an incremental backup. However, if you perform the differential backup too many times, the size of the differential backup might grow to be larger than the baseline full backup. In the image below you can see an example of how a differential backup would look like for a backup job that runs four times:

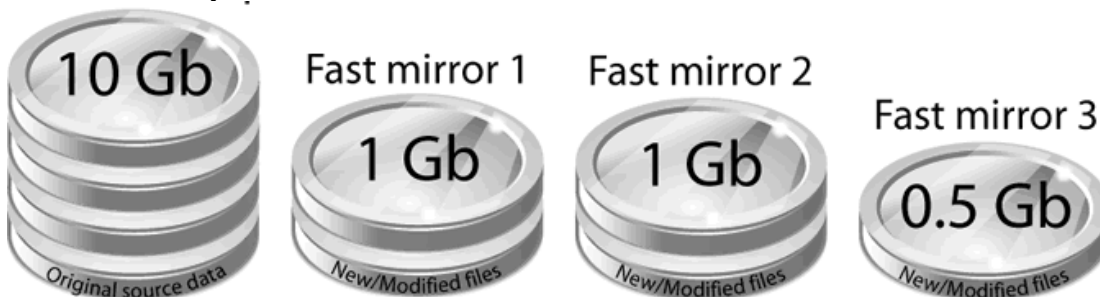


Note: Each differential backup includes all new/modified files since the last full backup.

Incremental Backup

Incremental backup stores all files that have changed since the last FULL, DIFFERENTIAL OR INCREMENTAL backup. The advantage of an incremental backup is that it takes the least time to complete. However, during a restore operation, each incremental backup must be processed, which could result in a lengthy restore job. The representation below shows how a backup job running four times would look like when using incremental:

Mirror Backup



Note: First time when it runs, mirror backup will back-up everything without archiving. After that only new/modified files.

Mirror backup is identical to a full backup, with the exception that the files are not compressed in zip files and they cannot be protected with a password. A mirror backup is most frequently used to create an exact copy of the source data. It has the benefit that the backup files can also be readily accessed using tools like Windows Explorer. The image below shows how a mirror backup job would look after four iterations (first mirror will back up everything, subsequent fast mirror backups will back up only new/modified files):

Antivirus

An antivirus program is designed to protect your computer from possible virus infections. Since most viruses are designed to run in the background, most users do not know when



their computer is infected. Virus protection programs serve to search for, detect, and remove these viruses. Antivirus programs must be kept up to date in order for them to be able to detect new viruses. So, downloading the program once and never getting the updates will leave you unprotected.

A virus is a program that replicates itself. It is usually spread by attaching itself to other files and programs. You can get a virus through an e-mail attachment, floppy diskettes, downloads, etc. All viruses are different. They can lay dormant for a while and then attack your machine or they can immediately begin causing problems as soon as your computer is infected.

Firewall

A firewall is software or hardware that checks information coming from the Internet or a network, and then either blocks it or allows it to pass through to your computer, depending on your firewall settings.

A firewall can help prevent hackers or malicious software (such as worms) from gaining access to your computer through a network or the Internet. A firewall can also help stop your computer from sending malicious software to other computers. The following illustration shows how a firewall works. Just as a brick wall can create a physical barrier, a firewall creates a barrier between the Internet and your computer. A firewall is not the same thing as an antivirus program. To help protect your computer, you need both a firewall and an antivirus and anti-malware program.

Screen Savers

A screen saver is an animated image that is activated on a personal computer display when no user activity has been sensed for a certain time. The original purpose of a screen saver was to prevent burn-in (the burning of an image into the phosphor inside the cathode ray tube after hours of the same image being rescanned). In fact, today's CRT display technology makes burn-in unlikely except under extreme conditions. (On larger displays used for room presentations, burn-in is still a possibility.)

Windows comes with built-in screen savers that you can select. If you purchase your computer with the operating system already installed, a screen saver may have been selected for you. You can set the screen saver using the task bar by selecting Start, then Settings, then Control Panel, then Display, and then Screen Saver, which lets you select one of the provided screen savers or one you have added to the Windows screen saver directory. The Mac also lets you set up a screen saver.

Spy ware

Any software that covertly gathers user's information through the user's Internet connection without his or her knowledge, usually for advertising purposes. Spyware applications are typically bundled as a hidden component of freeware or shareware programs that can be downloaded from the Internet; however, it should be noted that the majority of shareware and freeware applications do not come with spyware. Once installed, the spyware monitors



user activity on the Internet and transmits that information in the background to someone else. Spyware can also gather information about e-mail addresses and even passwords and credit card numbers.

Spyware is similar to a Trojan horse in that users unwittingly install the product when they install something else. A common way to become a victim of spyware is to download certain peer-to-peer file swapping products that are available today.

Aside from the questions of ethics and privacy, spyware steals from the user by using the computer's memory resources and also by eating bandwidth as it sends information back to the spyware's home base via the user's Internet connection. Because spyware is using memory and system resources, the applications running in the background can lead to system crashes or general system instability.

Software Licence

Allowing an individual or group to use a piece of software. Nearly all applications are licensed rather than sold. There are a variety of different types of software licenses. Some are based on the number machines on which the licensed program can run whereas others are based on the number of users that can use the program. Most personal computer software licenses allow you to run the program on only one machine and to make copies of the software only for backup purposes. Some licenses also allow you to run the program on different computers as long as you don't use the copies simultaneously.

What is a Software License?

A software license is usually an agreement that grants a right to use software code to someone else. A license usually grants less right than a sale of a copy of the software. The rights to use the code are defined by the terms of the license.

Software is important; therefore, software licenses are important. Today's businesses rely upon software to perform many critical functions. Software makes machines and systems work in every sector of the world economy - everything from applications that control advanced medical devices to programs that analyze the behavior of financial markets.

Software developers may want to make code available to other developers in order for applications to be more widely used in the market. Manufacturers and publishers may want to acquire rights to software that can make their products work in new ways or in ways compatible with customers' existing computer systems. In order to have the legal right to use software to achieve the required needs, the rights and limits in the associated software license take on critical importance.

Number of Software License

The number of licenses you purchase is the maximum number of users and the maximum number of users and the maximum number of computer system the purchased software can be installed on or that can access the software if on a network. If you purchase a single user license the software must only be accessible from one computer and there must be one user. To run the software on more than one computer a network, or provide for



additional users you must purchase a multiuser licence by setting the purchase quantity to the required number of user license.

Passport License

A passport is a travel document, usually issued by the government of a nation, that certifies the identity and nationality of its holder for the purpose of international travel. Standard passports contain the holder's name, place and date of birth, photograph, signature, and other identifying information. Passports are moving towards including biometric information embedded in a microchip embedded in the document, making them machine-readable and difficult to counterfeit.

A passport specifies nationality, but not necessarily the place of residence of the passport holder. A passport holder is normally entitled to enter the country that issued the passport, though to a passport may not be full citizens with right of abode. A passport is a proof of identity and nationality; having the document does not of itself grant any rights. It is protection by the consulate of the issuing country, although it may indicate that the holder human rights. Some passports attest to status as a diplomat or other official, entitled to rights and privileges such as immunity from arrest or prosecution, arising from international treaties.

Many countries normally allow entry to holders of passports of other countries, sometimes requiring a visa also to be held, but this is not an automatic right. Many other additional conditions, such as not being likely to become a public charge for financial or other reasons, and the holder not having been convicted of a crime, may be applicable. Where a country does not recognize another, or is in dispute with it, entry may be prohibited to holders of passports of the other party to the dispute, and sometimes to others who have, for example, visited the other country.

Some countries and international organizations issue travel documents which are not standard passports, but enable the holder to travel internationally to countries that recognize the documents. For example, stateless persons are not normally issued a national passport, but may be able to obtain a refugee travel document or the earlier "Nansen passport" which enables them to travel to countries which recognize them, and sometimes to return to the issuing country. A country may issue a passport to any person, including non-nationals.

Software Suites

A group of programs that are sold as a package to solve common problems. Although there are suites for graphics and mathematics, the most popular are "office suites." Also known as "productivity suites," they are a set of basic business programs designed with a uniform user interface and common functions such as spell checking. The primary programs are word processing, spreadsheet and presentation graphics such as Microsoft's Word, Excel and PowerPoint and Apple's Pages, Numbers and Keynote. All office suites are able to read Microsoft files but may be able to save documents only in their native formats.



Public Domain Software

Programs that are uncopyrighted because their authors intended to share them with everyone else are in the public domain. The UNIX community has developed a number of such programs over the years. Programs in the public domain can be used without restriction as components of other programs. When reusing such code, it is good to understand its history so that you can be sure it really is in the public domain.

Word Processing Software

Word processing is probably the most common among the “productivity” software applications in use. The computer was certainly adopted quickly as a replacement for the typewriter when users had increased access to computers and discovered its advantages in document creation, editing, formatting and saving - that is, its word processing capabilities. This is especially true when it comes to making changes to previously created documents. No longer is it necessary to re-type entire pages and/or documents in order to add, delete and make corrections, among other things. It has become as simple as retrieving the originally typed document from the computer (or storage device), making the necessary changes and either printing it with the “push of a button” (or few keystrokes) or putting the new version back into a file on the computer or on a storage device. In fact, there should be less chance of errors and typos because of such features as spelling and grammar checking options.

Software Piracy

Software piracy is the stealing of legally protected software. Under copyright law, software piracy occurs when copyright protected software is copied, distributed, modified or sold. Software piracy is considered direct copyright infringement when it denies copyright holders due compensation for use of their creative works.

1.9 TYPES OF PROCESSORS

General Purpose Processor

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

Microprocessor

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

There may be an on-chip memory and some interfaces for communicating with the external world like interrupt lines, other lines for the memory and ports for communicating with the external world. The ports often called the programmable ports that means, we can program these ports either to be acting as an input or as an output.



Microcontroller

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

Embedded Processor

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

Digital Signal Processor

The digital signal processor is one type of processor used for measuring, filtering and/or compress digital or analog signals. The signal processing means analysis and manipulation of signal. This processing can be done via computer or Application Specific Integrated Circuits (ASIC), Field Programmable Gate Array (FPGA) or Digital Signal Processor (DSP) to obtain the clear signal. The DSP processors are used in an oscilloscope, barcode scanners, mobile phones, printers, etc. These processors are fast and use for real-time applications.

Media Processor

The image/video processor is the media processor that is designed or created to deal with the data in real-time. The voice user interface and professional audio are the applications of the audio processor. Some of the media processors are TN2302AP IP, IN2602 AP IP, DM3730, DM3725, DM37385, DM388, TMS320DM6467, TMS320DM6431, etc.

Application-Specific System Processors (ASSPs)

The application-specific system processor is a semiconductor integrated circuit product used to implements a specific function. The performance, characteristics and die size of the application-specific system processor is the same as the ASIC. The ASSP's are used in various types of industries to perform video encoding or decoding and audio encoding or decoding. In place of embedded software, the application-specific system processor is used to run the application and it provides the solution faster. Example: IIM7100, W3100A

Application-Specific Instruction Set Processors (ASIPs)

The application-specific instruction-set processors are designed for specific applications. These processors have low power consumption, high computational speed, and good flexibility. Due to programmability, the data path utilization is high in ASIPs, and the performance of this instruction set processor is good.

ASIC Processors

The application-specific integrated circuits are built for specific applications. These chips are small in size and consume low power. The design cost of ASIC is high and this is the



main disadvantage. The application-specific integrated circuit chips are used in satellites, modems, computers, etc. Some of the top ASICs manufacturer companies are Ams AG. Listed Company, Bitfury. Private Company, XMOS Semiconductor Private Company, Analogix Semiconductor Private Company, EDaptive Computing Private Company, Lumen Radio Private Company, Integrated Device Technology, Hookit. Private Company, etc.

Multiprocessor

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

1.10 USES OF COMPUTERS IN BUSINESS

Just about every business you can think of uses computers in one way or another to carry out its functions. From generating reports to communicating with clients, computers do a lot for the efficiency with which a business is run. The computer has brought the business a long way from the age of pen and paper, and folders stored in dusty storage compartments. The uses of a computer are simply endless.

Not only do businesses use computers to carry out different functions, they also use many different types of computers to carry out those functions. These functions include laptops, PCs, servers, and even smartphones. Because of computers, concepts such as flexible working schedules and remote work forces have become possible – enabling employees to work from wherever they want and at whatever times they wish.

Computers Are Used for Communication

When it comes to establishing contact with clients, computers are a vital tool; they are also vital when it comes to maintaining that contact. This is a very important computer application in business, enabling a business to communicate with its clients via email, IM, Skype, collaboration software, and via various other communication solutions that a business might wish to use. When a business can keep in touch with its clients, it becomes easier for the clients to make inquiries of the business or to ask for more information about the services and products the business offers. It also becomes easier for the business to offer customer support to its clients in a timely, efficient manner. The business will also be able to keep the clients updated about any new developments concerning the business.

Communication goes beyond a business' clients. A business also needs to communicate with its employees, and computers play an important role. Rather than have time-wasting one-on-one meetings with employees, managers can simply email their employees or they can message them on any other acceptable communication platform. This saves time, and it also improves the internal communication of the business.



Computers Are Used for Marketing

Computers allow a business to perform a variety of tasks. For starters, with the help of the internet, computers help put a business on the map. With a computer, a business's team of IT developers can create a professional website complete with enticing graphics and content with different forms of media, such as text, images, and videos. They can do search engine optimization – SEO – for the website so that it appears prominently in Google's search results, which then attracts traffic, which, ultimately, will enable the business to sell those products to website visitors.

With a computer, a business can create and execute entire marketing campaigns that span across every social media platform on the internet. The business can create ads to run on websites and social media platforms, using special software, and it can also buy marketing services from other businesses – all connected to the internet. The computer is likely the greatest marketing device ever built!

Computers Are Used for Accounting

Accounting is a function in which accuracy is of the utmost importance. When you perform accounting functions – and you have nothing nothing except pen and paper - and you're relying solely on brain power, you expose yourself to errors. Accounting software helps prevent that from happening.

Accounting software enables a business to quickly and accurately obtain large- and small-scale pictures of the company's financial situation. All the employees need to do is to input his financial information into the software and – with a few clicks – the employees understand everything about the financial health of the business' operations.

Computers are also critical for tasks such as invoicing clients; maintaining data about debtors and creditors; calculating payroll, calculating and filing tax forms, as well as for a lot of other functions.

With the computer, accountants can now focus on the higher level picture of a business's finances, leaving the lower level stuff to the machines.

Computers Are Used for Storage

Businesses have come a long way from the era of filing cabinets thanks to computers. Although a filing cabinet will occupy a very large space but will store only a small amount of information, a computer will occupy only a fraction of that space but it will store thousands of times the amount of information. With computers and servers, businesses are able to store and sort millions of files, to enable the business to access at any time.

1.11 CHAPTER SUMMARY

A computer is an electronic device, operating under the control of instructions stored in its own memory that can accept data (input), process the data according to specified rules, produce information (output), and store the information for future use.

Any kind of computers consists of hardware and software. Computer hardware is the collection of physical elements that constitutes a computer system. Computer hardware refers to the physical parts or components of a computer such as the monitor, mouse, keyboard, computer data storage, hard drive disk (HDD), system unit (graphic cards, sound cards, memory, motherboard and chips), etc. all of which are physical objects that can be touched. Software is a generic term for organized collections of computer data and instructions, often broken into two major categories: system software that provides the basic non-task-specific functions of the computer, and application software which is used by users to accomplish specific tasks.

1.12 REVIEW QUESTIONS

SHORT ANSWER TYPE QUESTIONS

1. Discuss about Firewall.
2. Discuss some High Level Languages.
3. Discuss Screen Image Projector.
4. Discuss about voice recognition system.
5. Discuss about various computer generations.

LONG ANSWER TYPE QUESTIONS

1. Explain the concept of spyware.
2. Explain any 3 input devices.
3. Explain different types of processors
4. Explain different uses of computers in business.
5. Discuss Passport License.

1.13 MULTIPLE CHOICE QUESTIONS


1. The _____ was the earliest calculating machine probably originated in China about 3,000 years ago.
 - a) Abacus
 - b) Windows
 - c) Dos
 - d) Microsoft
2. An _____ device is any device that provides input to a computer.
 - a) Output
 - b) Input
 - c) Memory
 - d) Secondary



3. A _____ is a type of computer that possesses most of the features and capabilities of a large computer but is smaller in physical size.
 - a) Supercomputer
 - b) microcomputer
 - c) Minicomputer
 - d) Macrocomputer
4. Primary storage or the commonly referred Random Access Memory is the memory which is directly accessible to the _____.
 - a) Memory
 - b) Hard disk
 - c) Registers
 - d) CPU
5. _____ is also a pointing device, which is used to move cursor position on a monitor screen.
 - a) Joystick
 - b) Mouse
 - c) Keyboard
 - d) Screen
6. The printers that print the characters without striking against the ribbon and onto the paper are called _____.
 - a) Impact printers
 - b) Non-impact Printers
 - c) Character printers
 - d) Line printers
7. An _____ is a set of programs that controls and coordinates the use of computer hardware among various application programs.
 - a) Memory system
 - b) Operating System
 - c) Storage system
 - d) Registers
8. A _____ is a program that replicates itself. It is usually spread by attaching itself to other files and programs.
 - a) Antivirus
 - b) Operating system
 - c) Virus
 - d) Software

9. Accounting is a function in which _____ is of the utmost importance.
- a) Accuracy
 - b) Memory
 - c) Speed
 - d) Duplicity
10. When it comes to establishing contact with clients, _____ are a vital tool; they are also vital when it comes to maintaining that contact.
- a) Radio
 - b) Computers
 - c) Printers
 - d) Keyboards

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NOTES 

UNIT

II

DATA COMMUNICATION AND NETWORKING

STRUCTURE

- 2.1 Learning objective
- 2.2 Introduction
- 2.3 Data Communication Components
- 2.4 Network Media
- 2.5 Modem
- 2.6 Computer Networks
- 2.7 Networking Terms
- 2.8 Teleconferencing tools
- 2.9 Interconnection Communication Model (OSI Model)
- 2.10 Chapter Summary
- 2.11 Review Questions
- 2.12 Multiple Choice Questions

2.1 LEARNING OBJECTIVE

NOTES



After completing this chapter, you will be able to:

- Understand the concepts Data Communication.
- Understand various Data communication components.
- Learn and understand the concept of communication media.
- Understand the concept of Modem.
- Understand the networking terms.
- Understand the concept of Computer networks.
- Understand about Teleconferencing tools.
- Understand the concept of OSI Model.

2.2 INTRODUCTION

Data refers to the raw facts that are collected while **information** refers to processed data that enables us to take decisions. For example, when result of a particular test is declared it contains data of all students, when you find the marks, you have scored you have the information that lets you know whether you have passed or failed. The word data refers to any information which is presented in a form that is agreed and accepted upon by its creators and users.

Data communications are the exchange of data between two devices via some form of transmission medium such as a wire cable. For data communications to occur, the communicating devices must be part of a communication system. It refers to the transmission of the digital data between two or more computers and a computer network or data network is a telecommunications network that allows computers to exchange data. The physical connection between networked computing devices is established using either cable media or wireless media. The best-known computer network is the Internet.

The effectiveness of a data communications system depends on four fundamental characteristics:

1. **Delivery:** The data should be delivered to the correct destination and correct user.
2. **Accuracy:** The communication system should deliver the data accurately, without introducing any errors. The data may get corrupted during transmission affecting the accuracy of the delivered data.
3. **Timeliness:** Audio and Video data has to be delivered in a timely manner without any delay; such a data delivery is called real time transmission of data.
4. **Jitter:** It is the variation in the packet arrival time. Uneven Jitter may affect the timeliness of data being transmitted.



2.3 DATA COMMUNICATION COMPONENTS

A data communication system has five components:

- **Message:** The message is the data to be communicated. It can be text, numbers, pictures, audios and videos.
- **Sender:** The sender is the device that send the data message. It can be a computer, telephone, handset, video camera and so on.
- **Receiver:** The receiver is the device that receive the message. It can be a computer, telephone, handset, video camera and so on.
- **Transmission medium:** The transmission is the physical path by which a message travels from the sender to receiver. Some examples of transmission medium include twisted pair wire, coaxial cable, fiber-optic cable, radio waves and so on.
- **Protocol:** A protocol is a set of rules for two devices to communicate. Communication is not possible without a protocol.

Data Representation

Data (Information) today comes in different forms of text, numbers, audios, and videos.

- **Text:** Text is represented as a bit pattern, a sequences of bits (Os or Is). For text representation American Standard Code for Information Interchange (ASCII) Code are used.
- **Numbers:** Numbers are also represented by bit pattern here. ASCII codes are not used but a number is directly converted into binary numbers (Os or Is).
- **Images:** Images refers to the still picture. Images are also represented by a bit pattern. In its simplest form, an image is composed of matrix of pixels, where each pixel is a small dot. Numbers of pixels depends on the resolution.
- **Audio:** Audio refers to the recording or broadcasting of sound or music. Audio is by nature different from text, numbers or images. Audio is in continuous form.
- **Video:** Video refers to recording or broadcasting of a picture or movie. Video can either be produced as a continuous entity or it can be a combination of images, where each separate entity is arranged to convey an idea.

Data Transmission Mode (Data Flow)

- **Simplex Mode:** Simplex mode permits data to flow in only one direction. A terminal connected to such line is either to send only or receive only devices. This mode is generally not used.
- **Half Duplex Mode:** In this mode data can be transmitted back and forth between 2 stations, but data can only go in one of the 2 directions at any given point of time.
- **Full Duplex Mode:** In this mode data can be simultaneously send and receive between 2 stations. It is commonly used method.



Centralized Network

In centralized network, there is a main computer known as Server and the other computers connected to the Server are called nodes or workstations. The server does the entire process and the output is transferred to the node/s. It is best suited for companies which require centralized processing.

Distributed Processing (Decentralized Processing)

Processing can be centralized or decentralized. Most networks use distributed processing, in which a task is divided among multiple computers. Instead of one single large machine being responsible for all aspects of a process, separate computers (usually a personal computer) handle a subset.

2.4 NETWORK MEDIA

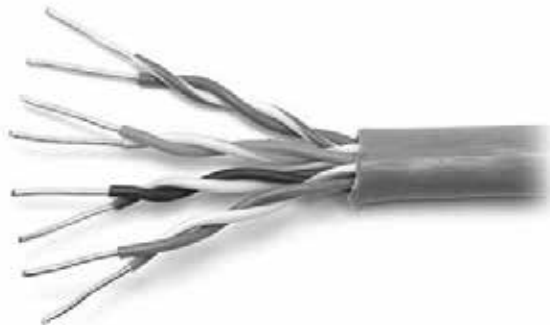
Network media refers to the means used to link a network's nodes together. There are many different types of transmission media, such as, twisted-pair wire, coaxial cable and fiber optic cable. In wireless networks, the atmosphere itself acts as the medium because it carries the wireless signals that nodes and servers use to communicate.

Guided Media (Wire-based Media)

It is defined as the physical medium through which the signals are transmitted. It is also known as Bounded media.

Different types of Guided Media are:

- **Twisted-pair Cable:** Normally consists of four pairs of wires. Individual pairs have two wires that are separately insulated in plastic, then twisted around each other and bound together in a layer of plastic. Except for plastic coating, nothing shields this type of wire from outside interface, so it is called as unshielded twisted-pair (UTP) wire; some twistedpair cable is not immune to the electromagnetic interference. Data is transferred using electrical current. Nowadays twisted-pair wires can support speed up to 1GBPS.



- **Coaxial Cable:** This cable has two conductors. One is a single wire in the centre of the cable, and the other is a mesh shield that surrounds the first wire, with an insulator between. Coaxial cable is immune to the electromagnetic interference.



Data is transferred using electrical current. It can support speed up to 10 MBPS.



- **Fiber-optic cable:** It is a thin thread of glass that transmits lively beams of light rather than electric current. Fiber-optic cable can carry data at a higher speed. Fiber-optic cable is immune to the electromagnetic interference. Nowadays it can support speed up to 100 GBPS.

Unguided Transmission Media (Wireless Media)

Unguided media transport electromagnetic waves without using a physical conductor. This type of communication is often referred to as wireless communication. Signals are normally broadcast through free space and thus are available to anyone who has a device capable of receiving them.

Unguided Transmission media is classified into three categories:

- Radio waves
- Microwave
- Infrared

Radio waves:

Waves ranging in frequencies between 3 kHz and 1 GHz are called radio waves. Radio waves, for the most part, are omnidirectional. When an antenna transmits radio waves, they are propagated in all directions. This means that the sending and receiving antennas do not have to be aligned. A sending antenna sends waves that can be received by any receiving antenna. The omnidirectional property has a disadvantage, too. The radio waves transmitted by one antenna are susceptible to interference by another antenna that may send signals using the same frequency or band.

Radio waves, particularly those waves that propagate in the sky mode, can travel long distances. This makes radio waves a good candidate for long-distance broadcasting such as AM radio. Radio waves, particularly those of low and medium frequencies, can penetrate walls. This characteristic can be both an advantage and a disadvantage. It is an advantage because, for example, an AM radio can receive signals inside a building. It is a disadvantage because we cannot isolate a communication to just inside or outside a building. The radio wave band is relatively narrow, just under 1 GHz, compared to the microwave band.

An example of radio wave is FM radio.

Applications of Radio waves:

- A Radio wave is useful for multicasting when there is one sender and many receivers.
- An FM radio, television, cordless phones are examples of a radio wave.

**Advantages of Radio waves:**

- Radio transmission is mainly used for wide area networks and mobile cellular phones.
- Radio waves cover a large area, and they can penetrate the walls.
- Radio transmission provides a higher transmission rate.

Microwave:

Electromagnetic waves having frequencies between 1 and 300 GHz are called microwaves. Microwaves are unidirectional. When an antenna transmits microwave waves, they can be narrowly focused. This means that the sending and receiving antennas need to be aligned. The unidirectional property has an obvious advantage. A pair of antennas can be aligned without interfering with another pair of aligned antennas.

The following describes some characteristics of microwave propagation:

- Microwave propagation is line-of-sight. Since the towers with the mounted antennas need to be in direct sight of each other, towers that are far apart need to be very tall. The curvature of the earth as well as other blocking obstacles do not allow two short towers to communicate by using microwaves. Repeaters are often needed for long distance communication.
- Very high-frequency microwaves cannot penetrate walls. This characteristic can be a disadvantage if receivers are inside buildings.
- The microwave band is relatively wide, almost 299 GHz. Therefore, wider sub bands can be assigned, and a high data rate is possible.
- Use of certain portions of the band requires permission from authorities.

Unidirectional Antenna

Microwaves need unidirectional antennas that send out signals in one direction. Two types of antennas are used for microwave communications: the parabolic dish and the horn. A parabolic dish antenna is based on the geometry of a parabola: Every line parallel to the line of symmetry (line of sight) reflects off the curve at angles such that all the lines intersect in a common point called the focus. The parabolic dish works as a funnel, catching a wide range of waves and directing them to a common point. In this way, more of the signal is recovered than would be possible with a single-point receiver. Outgoing transmissions are broadcast through a horn aimed at the dish. The microwaves hit the dish and are deflected outward in a reversal of the receipt path.

A horn antenna looks like a gigantic scoop. Outgoing transmissions are broadcast up a stem (resembling a handle) and deflected outward in a series of narrow parallel beams by the curved head. Received transmissions are collected by the scooped shape of the horn, in a manner similar to the parabolic dish, and are deflected down into the stem.

Infrared

Infrared links are light emitting diodes (LEDs) or Injection laser diodes (ILDs) and photodiodes to exchange data between stations. Infrared signals -are not capable of penetrating walls or other opaque objects and are diluted by strong light



CHECK YOUR PROGRESS

1. What is Computer Network? Discuss advantages of network.
2. Discuss various data communication components.
3. What do you mean by Communication Media?
4. Discuss Coaxial Cable and microwave communication.
5. What is radio waves? Discuss the application and advantages of radio waves.

2.5 MODEM

Modem stands for Modulation Demodulation. A modem converts the digital data signals into analogue data signals. They can be installed within the computer in a development slot applicable for it.

There are frequently two types of Modems that are as follows

Standard Modem

The standard modems use generic device drivers, and they can be internal and external ones. The internal modems do not need much physical structure. They can be installed into a compatible development slot. The external modem is connected through one of the COM port to the computer through a cable called a null-modem cable.

Window Modem

A window modem is a private plug and plays tool. It requires a particular device driver supported by the window operating framework to function correctly.

Features of Modems

The main features of modems are as follows

- They have high uploading and communication rates. An X2 modem provides an uploading bandwidth between 28.8 to 56 Kbps.
- They are upgradeable through a software patch to meet almost any universal standard.
- They enable high-speed downstream data transfers by digitally encoding all downstream data while upstream runs at conventional rates of 33.6 kbps.
- Some modems incorporate dual simultaneous voice and Data (DSVD), i.e., they can carry both analog voices and computer data.
- They can detect callers originating telephone number, and thus they can serve as caller ID.
- Some modems provide advanced voice mail features, and those modems serve as intelligent, answering machines or digital information systems.

2.6 COMPUTER NETWORK

Network is a group of computers and other devices, such as printers and scanners, connected by a communication link, enabling all the devices to interact with each other

and share applications, data and hardware components. Networks can be small or large, permanently connected through wires or cables, or temporarily connected through phone lines or wireless transmission. The largest network is the Internet, which is a worldwide group of networks.

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Benefits of Computer Network

- Network provides us to **communicate** over the network in a fast and efficient manner. For example, we can do video conferencing, email messaging, etc. over the internet.
- Computer network provides us to **share the files** with each other.
- Since the files are stored in the main server which is centrally located. Therefore, it is easy to take the **back up** from the main server.
- Network allows the **security** by ensuring that the user has the right to access the certain files and applications.
- Computer network can use the alternative source for the data communication in case of any hardware failure.
- Network must be scalable so that we can extend the network by adding new devices.

TYPES OF NETWORK

LAN (Local Area Network)

- It is a small network of connected computers, wherein computers are connected to each other physically with the help of wire or cable (Twisted Pair or Coaxial). (Though now days there are wireless LANs, they come under WIRELESS NETWORK and not LAN.)
- Each computer may work with peripheral devices such as printer, data storage devices.
- Connected computer must be within certain radius limit; generally, one kilometer. In other words, LAN is confined to a small area.
- In LAN at least one computer is designed as file server. In some LAN file server is referred to as network servers.
- The microcomputers managed by a file server are called as workstations or nodes.
- In LAN resources such as printers, data storage devices, software etc. can be shared.
- The file server manages the communication and sharing of peripheral devices.
- If required, LAN can contain more than one file server.
- Data transfer speed is measured in megabytes per second (mbps) (10 mbps or more).
- Two or more LANs can be connected to each other with the help of Bridges or Gateways.
- LAN is generally owned by an organisation (Privately owned)

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**MAN (Metropolitan Area Network)**

- It is a bigger network of connected computers, wherein computers are connected to each physically with the help of fiber optic cable.
- Each computer may work with peripheral devices such as printer, data storage devices.
- Connected computers must be within certain radius limit; generally 40 to 60 kilometres. In other word MAN is confined to a bigger area.
- Generally, man contains more than one file server.
- The microcomputer managed by the file server is called as workstations or nodes.
- In MAN resources such as printer, data storage devices, softwares can be shared.
- The file server manages the communications and sharing of peripheral devices.
- Data transfer speed is measured in megabytes per second (mbps) (20 mbps or more).
- Two or more MANs can be connected to each other with the help of Bridge or Gateways.
- MAN is generally not owned by a single organisation.

WAN (Wide Area Network)

- It is a large network of connected computers, wherein computers are connected to each other with the help of various communication facilities such as long distance telephone services, satellite transmission, under sea-cables etc.
- Each computer may work with peripheral devices such as printer, data storage devices.
- WAN covers wide geographical area. The connected computers can be anywhere in the world.
- Generally, WAN contains more than one file server.
- The microcomputers managed by the file server are called as workstations or nodes.
- In WAN resources such as data storages devices, software, etc., can be shared.
- The file server manages the communication and sharing of peripheral devices.
- Less freedom as compared to LAN, because public telecommunication is involved.
- MAN can be connected to WAN.

Network Structure (Architecture)**Server-based Network**

This type of network has certain computers (servers) that are especially dedicated to provide various services to the other computers (nodes). In this architecture, when a node requires any information from the server, it requests the file containing information, the file is then downloaded from the server to the node and then processing is done by the nodes.

Client Server Network:

This type of network has certain computers (services) that are especially dedicated to provide various services to other computers (clients). In this architecture, when a client requires any information from the server, it requests the server about the information; the server then, will process the data and return just the requested information to the client. Nodes works as Input/Output devices.

Peer to Peer Network

In peer-to-peer architecture, there is no dedicated server. All computers are equal and therefore termed as peer. Each computer functions as a server and a client. It is suitable only for limited number of users.

2.7 NETWORKING TERMS

WAN

It stands for Wide Area Network and covers a wide area such as a city.

LAN

It stands for Local Area Network and covers a small area such as a small office or home. It physically connects all the computers located in the premises.

Internet

It is a computer network system that connects the computers of the world. It is normally connecting through WAN and LAN.

Intranet

It is a close room computer network system, as it covers a small area and only authorized people can access it.

Extranet

It is also a sort of Internet the access to which is granted only to a few.

World Wide Web (WWW)

It is the service that is used on Internet to view and search contents (in the form of web-pages).

Instant messaging (IM)

It is an online facility that facilitates us to chat or talk. Such service is provided by Skype, Google Talk, Windows Live Messenger, Yahoo Messenger, etc.

Voice over Internet Protocol (VoIP)

It is a Protocol, which is used especially for voice transfer over IP network. Likewise, it facilitates users to make phone-calls by using internet.

**Really Simple Syndication (RSS)**

It is a technique, which is used for the dissemination of information, articles, etc. Users normally subscribe to the RSS channel in order to receive news. After subscription, users do not need to visit the respective website rather they receive emails regarding the same.

Web log

It is a sort of online inventory (normally on a specialized topics) that consists of a series of entries. These entries are arranged in opposite chronological order. The person who maintains the weblog regularly update it with a new information.

Podcast

It is a digital file that normally contains audio or video record and is available on the Internet as well.

Social networking websites

It refers to the websites that facilitate users with a common platform where they can share their message (in text, audio, or even video form), images, videos, etc. For example, Facebook, Google+, Twitter, LinkedIn, Myspace, etc.

Chat Rooms

It is a dedicated area on the Internet that facilitates users to communicate.

Public Switched Telephone Network (PSTN)

It is a technical expression for public telephone system.

Integrated Services Digital Network (ISDN)

It is a set of communication standards that transmits voice, video, data, and other network services simultaneously.

Asymmetric Digital Subscriber Line (ADSL)

It is a sort of digital subscriber line (DSL) technology that facilitates faster data transmission.

Download

It is a process that saves data from Internet onto a personal computer.

Upload

It is a process that transfers the saved data from a personal computer to Internet server.

Dial-up

It is a technique in which a phone line is used in order to connect to the Internet.

Broadband

It is a wide bandwidth data transmission that transports multiple signals and traffic types swiftly.

2.8 TELECONFERENCING TOOLS

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Teleconferencing means meeting through a telecommunications medium. It is a generic term for linking people between two or more locations by electronics. There are at least six types of teleconferencing: audio, audio graphic, computer, video, business television (BTV), and distance education. The methods used differ in the technology, but common factors contribute to the shared definition of teleconferencing. Education and healthcare are basic needs for human development. Technical innovation has broadened the access to higher quality health care and instruction without regard to time, distance or geopolitical boundaries. Distance learning has earned popularity as a way of learning in recent years due to widely distributed learners, busy schedules and rising travel prices. Teleconferencing is also a very useful tool as a distance learning method. Teleconference is a real-time and live interactive course of study in which one set of participants are at one or more localizations and the other set of participants are at some other. The teleconference allows for interaction, including sound recording and/or video, and possibly other modalities, between at least two websites.

Few examples of teleconferencing tools are:

- RingCentral
- Webex
- Microsoft Teams
- Google Meet
- GoToMeeting
- ClickMeeting
- AnyMeeting
- ezTalk Cloud Meeting
- Bluejeans Meetings
- Join.me
- Lifesize
- U Meeting
- Zoho Meeting
- Big Blue Button
- Zoom Meetings

2.9 OPEN SYSTEM INTERCONNECTION (OSI) MODEL

In 1977, the International Organization for Standardization (ISO), began to develop its OSI networking suite. OSI has two major components: an abstract model of networking (the Basic Reference Model, or seven-layer model), and a set of concrete protocols. The standard documents that describe OSI are for sale and not currently available online. Parts of OSI have influenced Internet protocol development, but none more than the

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abstract model itself, documented in ISO 7498 and its various addenda. In this model, a networking system is divided into layers. Within each layer, one or more entities implement its functionality. Each entity interacts directly only with the layer immediately beneath it, and provides facilities for use by the layer above it.

In particular, Internet protocols are deliberately not as rigorously architected as the OSI model, but a common version of the TCP/IP model splits it into four layers. The Internet Application Layer includes the OSI Application Layer, Presentation Layer, and most of the Session Layer. Its End-to-End Layer includes the graceful close function of the OSI Session Layer as well as the Transport Layer. Its Internetwork Layer is equivalent to the OSI Network Layer, while its Interface layer includes the OSI Data Link and Physical Layers. These comparisons are based on the original seven-layer protocol model as defined in ISO 7498, rather than refinements in such things as the Internal Organization of the Network Layer document.

Protocols enable an entity in one host to interact with a corresponding entity at the same layer in a remote host. Service definitions abstractly describe the functionality provided to a (N)-layer by an (N-1) layer, where N is one of the seven layers inside the local host

Layer 7: Application Layer

The application layer is the seventh level of the seven-layer OSI model. It directly to and interfaces performs common application services for the it also issues application processes; requests to the presentation layer. Note carefully services to user-defined that this layer provides application processes, and not to the end user. For example, it defines a file transfer protocol, but the end user must go through an application process to invoke file transfer. The OSI model does not include human interfaces. The common application services sublayer provides functional elements including the Remote Operations Service Element (comparable to Internet Remote Procedure Call), Association Control, and Transaction Processing (according to the ACID requirements). Above the common application service sublayer are functions meaningful to user application programs, such as messaging (X.400), directory (X.500), file transfer (FTAM), virtual terminal (VTAM), and batch job manipulation (JTAM).

Layer 6: Presentation Layer

The Presentation layer transforms the, data to provide a standard interface for the Application layer. MIME encoding, data encryption and similar manipulation of the presentation are done at this layer to present the data as a service or protocol developer sees fit. Examples of this layer are converting an EBCDIC-coded text file to an ASCII-coded file, or serializing objects and other data structures into and out of XML.

Layer 5: Session Layer

The Session layer controls the dialogues/connections (sessions) between computers. It establishes, manages and terminates the connections between the local and remote application. It provides for either full-duplex or half-duplex operation, and establishes



check pointing, adjournment, termination, and restart procedures. The OSI model made this layer responsible for “graceful close” of sessions, which is a property of TCP, and also for session check pointing and recovery, which is not usually used in the Internet protocols suite. Session layers are commonly used in application environments that make use of remote procedure calls (RPCs). iSCSI, which implements the Small Computer Systems Interface (SCSI) encapsulated into TCP/IP packets, is a session layer protocol increasingly used in Storage Area Networks and internally between processors and high-performance storage devices. iSCSI leverages TCP for guaranteed delivery, and carries SCSI command descriptor blocks (CDB) as payload to create a virtual SCSI bus between iSCSI initiators and iSCSI targets.

Layer 4: Transport Layer

The Transport layer provides transparent transfer of data between end users, providing reliable data transfer services to the upper layers. The transport layer controls the reliability of a given link through flow control, segmentation/de-segmentation, and error control. Some protocols are state and connection oriented. This means that the transport layer can keep track of the segments and retransmit those that fail.

The best-known example of a layer 4 protocol is the Transmission Control Protocol (TCP).

The transport layer is the layer that converts messages into TCP segments or User Datagram Protocol etc. (UDP), Stream Control Transmission Protocol (SCTP). etc. packets. Perhaps an easy way to visualize the Transport Layer is to compare it with a Post Office, which deals with the dispatch and classification of mail and parcels sent. Do remember, however, that a post office manages the outer envelope of mail. Higher layers may have the equivalent of double envelopes, such as cryptographic Presentation services that can be read by the addressee only.

Roughly speaking, tunneling protocols operate at the transport layer, such as carrying non-IP protocols such as IBM’s SNA or Novell’s IPX over an IP network, or end-to end encryption with IPsec. While Generic Routing Encapsulation (GRE) might seem to be a network layer protocol, if the encapsulation of the payload takes place only at endpoint, GRE becomes closer to a transport protocol that uses IP headers but contains complete frames or packets to deliver to an endpoint. L2TP carries PPP frames inside transport packets.

Layer 3: Network Layer

The Network layer provides the functional and procedural means of transferring variable length data sequences from a source to a destination via one or more networks while maintaining the quality of service requested by the Transport layer. The Network layer performs network routing functions, and might also perform fragmentation and reassembly, and report delivery errors. Routers operate at this layer-sending data throughout the extended network and making the Internet possible. This is a logical addressing scheme - values are chosen by the network engineer.



The addressing scheme is hierarchical. The best-known example of a layer3 protocol is the Internet Protocol (IP).

Perhaps it's easier to visualize this layer as managing the sequence of human carriers taking a letter from the sender to the local post office, trucks that carry sacks of mail to other post offices or airports, airplanes that carry airmail between major cities, trucks that distribute mail sacks in a city, and carriers that take a letter to its destinations. Think of fragmentation as splitting a large document into smaller envelopes for shipping, or, in the case of the network layer, splitting an application or transport record into packets.

Layer2: Data Link Layer

The Data Link layer provides the functional and between network procedural means to transfer data entities and to detect and the Physical possibly correct errors that may occur in layer. The best-known example of this is Ethernet. This layer manages the interaction of devices with a shared medium. Other examples of data link protocols are HDLC and ADCCP for point-to-point or packet-switched networks and Aloha for local area networks. On IEEE 802- local area networks, and some non-IEEE 802 networks such as FLDDI, this layer may be split into a Media Access Control layer (MAC) and the IEEE 802.2 Logical Link Control (LLC) layer. Its physical layer into arranges bits from the logical chunks of data, known as frames.

This is the layer at which the bridges and switches operate. Connectivity is only among locally attached network provided nodes broadcast forming layer 2 domains for unicast or forwarding. Other protocols may be imposed on the data frames to create tunnels and logically separated layer 2 forwarding domain. The data link layer might implement a sliding window flow control and acknowledgment mechanism to provide reliable delivery of frames; that is the case for SDLC and HDLC, and derivatives of HDLC such as LAPB and LAPD. In modern practice, only error detection, not flow control using sliding window, is present in modern data link protocols such as Point-to-Point Protocol (PPP), and, on local area networks, the IEEE 802.2 LLC layer is not used for most protocols on Ethernet, and, on other local area networks, its flow control and acknowledgment mechanisms are rarely used. Sliding window flow control and acknowledge merit is used at the transport layers by protocols such as TCP.

Layer 1: Physical Layer

The Physical layer defines all the electrical and physical specifications for devices. In particular, it defines the relationship between a device and a physical medium. This includes the layout of pins, voltages, and cable specifications. Hubs, repeaters, network adapters and Host Bus Adapters (HBAs used in Storage Area Networks) are physical layer devices. To understand the function of the physical layer in contrast to the functions of the data link layer, think of the physical layer as concerned primarily with the interaction of a single device with a medium, where the data link layer is concerned more with the interactions of multiple devices (i.e., at least two) with a shared medium. The physical layer will tell one device how to transmit to the medium, and another device how to receive from it, but

not, with modern protocols, how to gain access to the medium. Obsolescent physical layer standards such as RS-232 do use physical wires to control access to the medium.

The major functions and services performed by the physical layer are: Establishment and termination of a connection to a communications medium. Participation in the process whereby the communication resources are effectively shared among multiple users. For example, contention resolution and flow control. Modulation, or conversion between the representation of digital data in user equipment and the corresponding signals transmitted over a communications channel. These are signals operating over the physical cabling (such as copper and fiber optic) or over a radio link.

Parallel SCSI buses operate in this layer, although it must be remembered that the logical SCSI protocol is a transport-layer protocol that runs over this bus. Various physical-layer Ethernet standards are also in this layer; Ethernet incorporates both this layer and the data-link layer. The same applies to other local-area networks, such as token ring, FDDI, and IEEE 802.11, as well as personal area networks such as Bluetooth and IEEE 802.15.4.

2.10 CHAPTER SUMMARY

Data communications refers to the transmission of this digital data between two or more computers and a computer network or data network is a telecommunications network that allows computers to exchange data. The physical connection between networked computing devices is established using either cable media or wireless media. The best-known computer network is the Internet. A system of interconnected computers and computerized peripherals such as printers is called computer network. This interconnection among computers facilitates information sharing among them. Computers may connect to each other by either wired or wireless media.

Data communication networks deal with the transfer of data between two points. Data originates at the source and is finally delivered to the destination, which is also called a sink. It can also be classified according to the type of medium over which the signal propagates. In this case, there are two types of transmissions: guided transmission and wireless transmission; wireless transmission is also called unguided transmission. There are two ways in which data can be transferred from source to destination: switching and broadcasting. In a switched network, data is transferred from source to destination through a series of intermediate switching nodes. In a broadcast network, a transmission from a source is received by all nodes in the network. There are two network access techniques that are closely related to the transfer technique used: switched network access and broadcast network access.

A network can be categorized as a local area network (LAN), a metropolitan-area network (MAN), or a wide area network (WAN). A LAN is a data communication system within a building, plant, or campus, or between nearby buildings. A MAN is a data communication system covering an area the size of a town or city. A WAN is a data communication system spanning states, countries, or the whole world. An internet is a network of networks. The





Internet is a collection of many separate networks. TCP/IP is the protocol suite for the Internet. There are local, regional, national, and international Internet service providers (ISPs). A protocol is a set of rules that governs data communication; the key elements of a protocol are syntax, semantics, and timing. Standards are necessary to ensure that products from different manufacturers can work together as expected.

2.11 REVIEW QUESTIONS

SHORT ANSWER TYPE QUESTIONS

1. Discuss the concept of Modem.
2. Discuss Network layer of OSI Model.
3. What do you mean by Teleconferencing tools? Give some examples.
4. Discuss the concept of LAN and MAN.
5. Discuss Physical layer of OSI Model.

LONG ANSWER TYPE QUESTIONS

1. Discuss the concept of Gateway.
2. Discuss the advantages of Computer Network.
3. Discuss about MAN.
4. What do you mean by unguided media? Discuss different types.
5. Discuss guided media. Discuss different types.

2.12 MULTIPLE CHOICE QUESTIONS

1. _____ is also called Data Transmission.
 - a) Data communication
 - b) Data sender
 - c) Data optimization
 - d) Data Handling
2. _____ has certain computers (servers) that are especially dedicated to provide various services to the other computers (nodes).
 - a) Network-based Network.
 - b) Server-based Network
 - c) Particular-based Network
 - d) Client-based Network
3. The geometrical arrangement of resources, remote devices and communication facilities is known as _____ or network structure.
 - a) Network node
 - b) Network cable

- c) Network topology
 - d) Network session
4. _____ refers to the means used to link a network's nodes together.
- a) Network issue
 - b) Network area
 - c) Network collection
 - d) Network media
5. The term _____ is derived from 2 terms Modulator and Demodulator.
- a) Modem
 - b) Demo
 - c) Bridge
 - d) Mod-Demod
6. _____ are usually used to link LAN of different topologies.
- a) Bridge
 - b) Routers
 - c) Gateways
 - d) Cables
7. A _____ is a dedicated circuit between two specific locations.
- a) Direct transfer
 - b) Leased line
 - c) Coaxial connection
 - d) Gateway
8. _____ is a standard Internet protocol for transmitting files between computers on the Internet.
- a) SMTP
 - b) OSI
 - c) HTTP
 - d) FTP
9. _____ covers a small area such as a small office or home.
- a) LAN
 - b) MAN
 - c) WAN
 - d) SAN

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10. VoIP stands for _____
- a) Voice over Intranet Protocol
 - b) Voice over Internet Protocol
 - c) Voice on Internet Protocol
 - d) Voice over Internet Project

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UNIT

III

OPERATING SYSTEM FUNDAMENTALS

STRUCTURE

- 3.1 Learning objective
- 3.2 Introduction
- 3.3 Operating System Definition and Functions
- 3.4 Types of Operating System
- 3.5 Windows Operating System History
- 3.6 WINDOWS API
- 3.7 Drivers and Unicode
- 3.8 Components of windows OS
- 3.9 Chapter Summary
- 3.10 Review Questions
- 3.11 Multiple Choice Questions



3.1 LEARNING OBJECTIVE

After completing this chapter, you will be able to:

- Understand the concepts Operating System.
- Understand various Functions of Operating System.
- Learn and understand the types of Operating system.
- Understand the History of WINDOWS Operating system.
- Understand about WINDOWS API.
- Understand the concept of Drivers and Unicode.
- Understand about Teleconferencing tools.
- Understand the basic concepts of Windows.

3.2 INTRODUCTION

An operating system acts as an intermediary between the user of a computer and computer hardware. The purpose of an operating system is to provide an environment in which a user can execute programs conveniently and efficiently.

An operating system is a software that manages computer hardware. The hardware must provide appropriate mechanisms to ensure the correct operation of the computer system and to prevent user programs from interfering with the proper operation of the system.

A computer system has many resources (hardware and software), which may be require to complete a task. The commonly required resources are input/output devices, memory, file storage space, CPU etc. The operating system acts as a manager of the above resources and allocates them to specific programs and users, whenever necessary to perform a particular task. Therefore, operating system is the **resource manager** i.e., it can manage the resource of a computer system internally. The resources are processor, memory, files, and I/O devices.

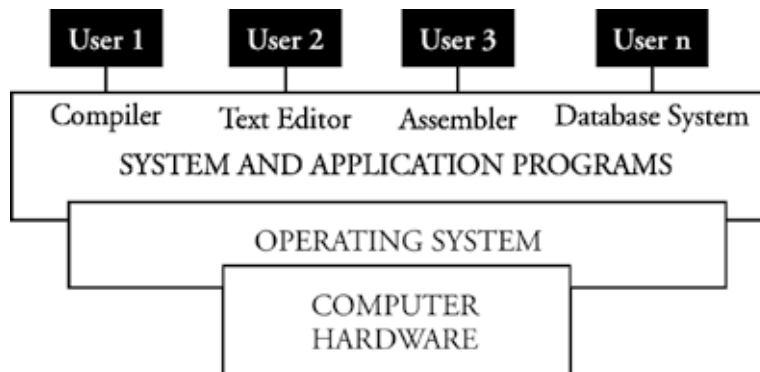
3.3 DEFINITION AND FUNCTIONS OF OPERATING SYSTEM

An Operating system is defined as an integrated set of programs which manage the various resources and operations of a computer system. The operating system acts as an interface between the humans and the computer.

One of the earliest operating systems was MS-DOS, developed by Microsoft for IBM PC. It was a **Command Line Interface (CLI)** OS that revolutionized the PC market. DOS was difficult to use because of its interface. The users needed to remember instructions to do their tasks. To make computers more accessible and user-friendly, Microsoft developed **Graphical User Interface (GUI)** based OS called **Windows**, which transformed the way people used computers.

There are two views of Operating System:

- User View
- System View



1. Operating System: User View

The user view of the computer refers to the interface being used. Such systems are designed for one user to monopolize its resources, to maximize the work that the user is performing. In these cases, the operating system is designed mostly for ease of use, with some attention paid to performance, and none paid to resource utilization.

2. Operating System: System View

Operating system can be viewed as a resource allocator also. A computer system consists of many resources like - hardware and software - that must be managed efficiently. The operating system acts as the manager of the resources, decides between conflicting requests, controls execution of programs etc.

FUNCTIONS OF OPERATING SYSTEM

Memory management - It manages both the primary and secondary memory such as RAM, ROM, hard disk, pen drive, etc. It checks and decides the allocations and deallocation of memory space to different processes. When a user interacts with a system, the CPU is supposed to read or write operations, in this case, OS decides the amount of memory to be allocated for loading the program instructions and data into RAM. After this program is terminated, the memory area is again free and is ready to be allocated to other programs by the OS.

As we know, computers have two types of memory-**primary** and **secondary**. Primary memory is **fast but expensive** and secondary memory is **cheap but slower**. OS has to strike a balance between the two to ensure that system performance is not hurt due to very less primary memory or system costs do not shoot up due to too much primary memory.

Input and output data, user instructions and data interim to program execution need to be stored, accessed and retrieved efficiently for high system performance. Once a program request is accepted, OS allocates it primary and secondary storage areas as per requirement. Once execution is completed, the memory space allocated to it is freed. OS uses many storage management techniques to keep a track of all storage spaces that are allocated or free.





Input/output management: It manages the input output devices and makes the I/O process smooth and effective. For example, it receives the input provided by the user through an input device and stores it in the main memory. Then it directs the CPU to process this input and accordingly provides the output through an output device such as a monitor.

File management: Data and information is stored on computers in form of files. Managing file system to enable users to keep their data safely and correctly is an important function of operating systems. Managing file systems by OS is called **file management**.

File management is required to provide tools for these file related activities

- Creating new files for storing data
- Updating
- Sharing
- Securing data through passwords and encryption
- Recovery in case of system failure

Processor management: A process is a program in execution. The processor is a hardware device which processes a sequence of instructions. Assigning of processors to the different tasks being executed by the computer is processor management.

It facilitates processor management, where it decides the order for the processes to access the processor as well as decides the processing time to be allocated for each process. Besides this, it monitors the status of processes, frees the processor when a process is executed then allocates it to a new process.

Device Management: The process of implementation, operation and maintenance of a device by operating system is called **device management**. Operating system uses a utility software called **device driver** as interface to the device.

When many processes access the devices or request access to the devices, the OS manages the devices in a way that efficiently shares the devices among all processes. Processes access devices through **system call interface**, a programming interface provided by the OS.

Data management: It helps in data management by offering and displaying directories for data management. You can view and manipulate files, folders, e.g., you can move, copy, name, or rename, delete a file or a folder.

Provides user interface: It acts as an interface between the user and the hardware. It can be a GUI where you can see and click elements on the screen to perform various tasks. It enables you to communicate with the computer even without knowing the computer's language.

Time Management: It helps CPU in time management. The Kernel OS keeps checking the frequency of processes that requests CPU time. When two or more processes that are equally important compete for the CPU time, then the CPU time is sliced into segments and allocated to these processes in a round-robin fashion to prevent a single process from monopolizing the CPU.

Deadlock Prevention: Sometimes a resource that is supposed to be shared by two or more processes is held by one process due to which the resource cannot continue. This situation is known as deadlock. The OS does not let this situation arise by carefully distributing the resources among the different processes.

Interrupt Handling: OS also responds to interrupts, which are signals generated by a program or a device to seek the attention of the CPU. The OS checks the priority of the interrupt, and if it is more important than the currently running process, it stops the execution of the current process and preserves this state of CPU then executes the requested process. Thereafter the CPU returns to the same state where it was stopped.

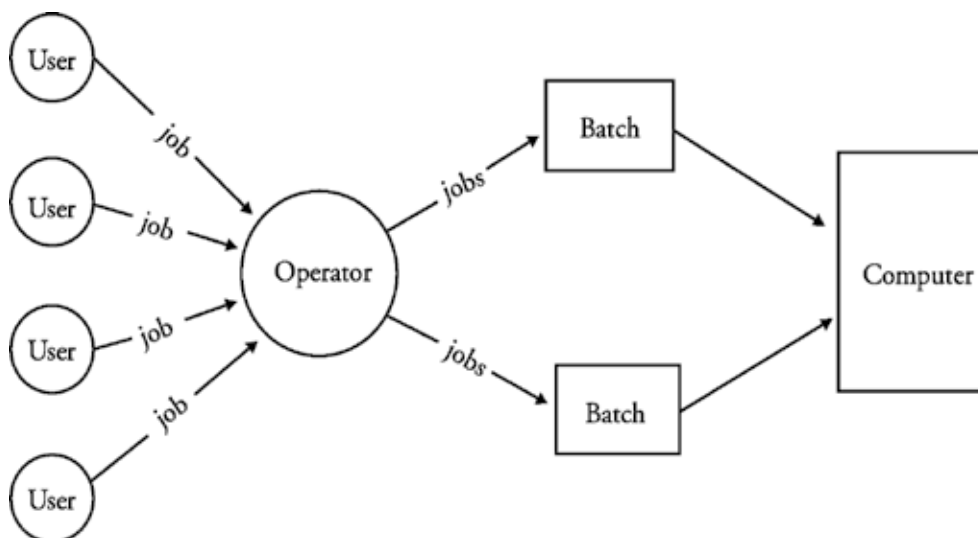
3.4 TYPES OF OPERATING SYSTEM

Batch Processing

In batch processing, a number of jobs are collected by the operator offline and when a batch of jobs gets collected, they are input to the computer for processing. The jobs are then processed without user intervention.

The interaction between a user and the computer does not occur in this system. The user is required to prepare jobs on punch cards in the form of batches and submit them to the computer operator. The computer operator sorts the jobs or programs and keeps similar programs or jobs in the same batch and run as a group to speed up processing. It is designed to execute one job at a time. Jobs are processed on a first-come, first-serve basis, i.e., in the order of their submission without any human intervention.

For example, in a payroll system, the salaries of employees of the company are calculated and generated through the batch processing system at the end of each month.



Advantages of Batch processing operating system:

- Repeated jobs can be completed easily without any human intervention.
- Hardware or system support is not required to input data in batch systems.



- It can work offline, so it causes less stress on the processor as it knows which task to process next and how long the task will last.
- It can be shared among multiple users.
- The timing of batch jobs can set so that when the computer is not busy, it can start processing the batch jobs such as at night or any other free time.

Disadvantages of multiprogramming system

- It is difficult to program a system because of complicated schedule handling.
- Tracking all tasks/processes is sometimes difficult to handle.
- Due to high load of tasks, long time jobs have to wait long.

Multiprocessing Operating System

In multiprocessing systems, two or more CPUs are connected together. Therefore, it is possible to execute instructions from different programs at the same time. Thus, more than one instruction can be executed simultaneously. The idle time of the computer reduces, since there is not user intervention in between jobs.

Execute different instructions of the same program. Different multiprocessing systems use different types of memory configurations. Some systems have a common main memory for all the CPUs, in some systems each system has its own main memory while in still others each CPU can have its own memory as well as share a common memory with other processors. Multiprocessing systems require a very complex and sophisticated operating system to coordinate all the activities of the multiple CPUs and other devices. Multiprocessing systems are also very expensive.

There are four major components, which are used in the Multiprocessor Operating System:

- **CPU – CPU** is capable to access memories as well as controlling the entire I/O tasks.
- **IOP – I/P processor** can access direct memories, and every I/O processor have to responsible for controlling all input and output tasks.
- **Input/output Devices** – These devices are used for inserting the input commands, and producing output after processing.
- **Memory Unit** – Multiprocessor system uses the two types of memory modules such as shared memory and distributed shared memory.

Advantages of Multiprocessor Operating System:

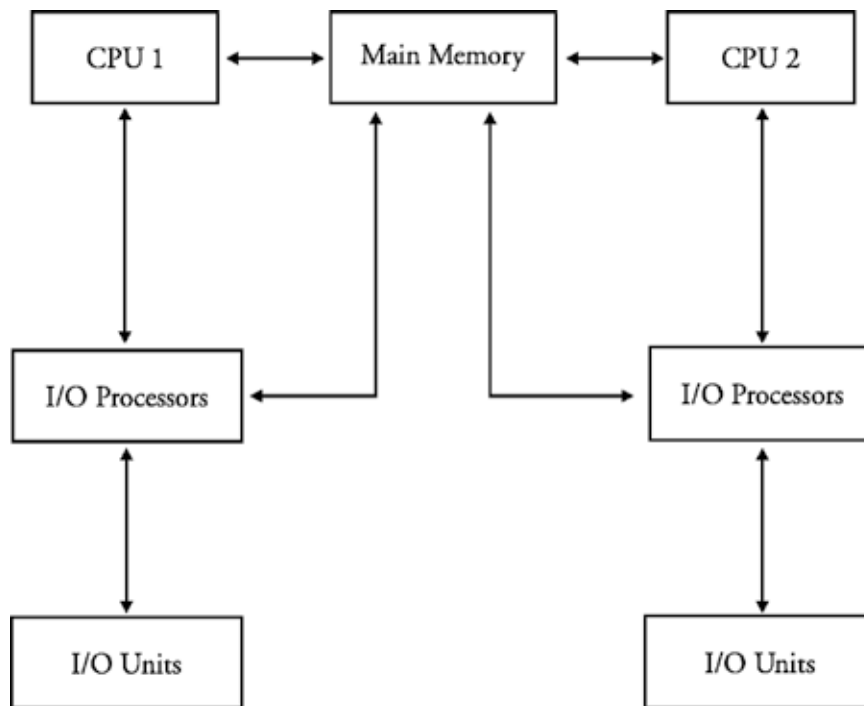
- If due to any reason, any one processor gets fails then do not worry because, entire system will do work properly.
- Enhancing the throughput of system, entire system is improved, if couples of processors work with getting collaboration.
- Multiprocessor systems are cost effective compare to single processor system in long life because this system is capable to share all input/output devices, power supplies system, and data storage centre.

- Multiprocessor O/S gets high performance due to parallel processing. In this system, single job is divided into various same small jobs, and execute them like as Parallel nature.

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Disadvantages of Multiprocessor Operating System:

- Multiprocessor has complicated nature in both form such as H/W and S/W.
- It is more expensive due to its large architecture.
- Multiprocessor operating system has a daunting task for scheduling processes due to its shareable nature.
- Multiprocessor system needs large memory due to sharing its memory with other resources.
- It has more time delay when processor receives message and take appropriate action.



Multiprocessor Operating System

Time Sharing Operating System

Time Sharing Operating system or Multitasking Operating system enables multiple users located at different terminals to use a computer system and to share the processor's time simultaneously. In other words, each task gets time to get executed, and thus all tasks are executed smoothly. It is considered to be a **logical** extension of multiprogramming because both does simultaneous execution but differ in their prime objectives.

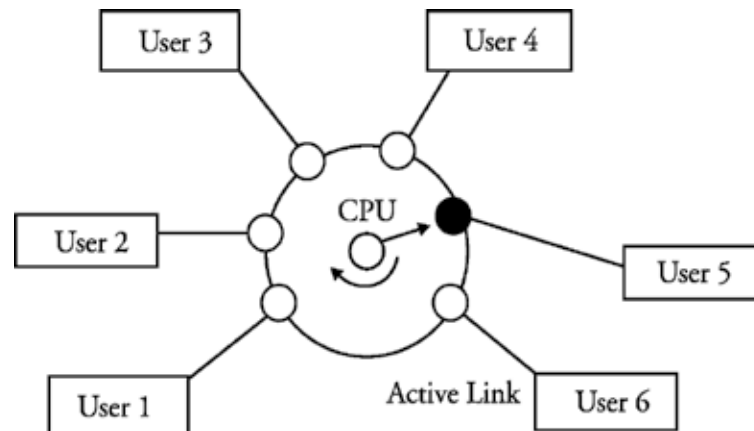
Each user gets the processor's time as they get while using a single system. The duration of time allocated to a task is called quantum or time slice; when this duration is over, OS starts the next task.

Advantages of Time-Sharing Operating System:

- It reduces CPU idle time and thus makes it more productive.
- Each process gets the chance to use the CPU.
- It allowed different applications run simultaneously.

Disadvantages of Time-sharing Operating System:

- It requires a special operating system as it consumes more resources.
- Switching between tasks may hang up the system as it serves lots of users and runs lots of applications at the same time, so it requires hardware with high specifications. It is less reliable.

**Distributed Operating System**

It uses or runs on multiple independent processors (CPUs) to serve multiple users and multiple real-time applications. The communication between processors is established through many communication lines such as telephone lines and high-speed buses. The processors may differ from each other in terms of size and function.

The availability of powerful microprocessor and advanced communication technology have made it possible to design, develop, and use the distributed operating system. Besides this, it is an extension of a network operating system that supports a high level of communication and integration of machines on the network.

To make it more simple, distributed systems are a collection of several separate (individual) systems which **communicate** (through a LAN or WAN) **and cooperate** with each other (using some software) in order to provide the users, access to various resources that the system maintains. One **important** point to note about distributed systems is that they are **loosely-coupled** i.e.; hardware and software may communicate with each other but they need not depend upon each other. One example is Solaris Operating System.

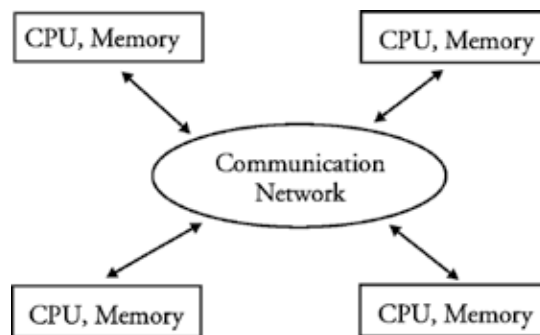
Advantages of distributed operating system:

- Its performance is higher than a single system as resources are being shared.
- If one system stops working, malfunctions, or breaks down, other nodes are not affected.

- Additional resources can be added easily.
- Shared access to resources like printer can be established.
- Delay in processing is reduced to a greater extent.
- Data sharing or exchange speed is high, owing to the use of electronic mail.

Disadvantages of distributed operating system:

- Security issue may arise due to sharing of resources
- Few messages may be lost in the system
- Higher bandwidth is required in case of handling a large amount of data
- Overloading issue may arise
- The performance may be low
- The languages which are used to set up a distributed system are not well defined yet
- They are very costly, so they are not easily available.



Network Operating System

Network Operating system connects computers and devices to a local area network and manages network resources. The software in a NOS enables the devices of the network to share resources and communicate with each other. It runs on a server and allows shared access to printers, files, applications, files, and other networking resources and functions over a LAN. Besides this, all users in the network are aware of each other's underlying configuration and individual connections. Examples: Ms Windows Server 2003 and 2008, Linux, UNIX, Novell NetWare, Mac OS X, etc.

Advantages of network operating system:

- The servers are centralized that can be accessed remotely from distant locations and different systems.
- It is easy to integrate advanced and recent technologies and hardware in this system.

Disadvantages of network operating system:

- The servers used in the system may be expensive.
- The system depends on the central location and requires regular monitoring and maintenance.



Real Time Operating System

It is developed for real-time applications where data should be processed in a fixed, small duration of time. It is used in an environment where multiple processes are supposed to be accepted and processed in a short time. RTOS requires quick input and immediate response, e.g., in a petroleum refinery, if the temperature gets too high and crosses the threshold value, there should be an immediate response to this situation to avoid the explosion. Similarly, this system is used to control scientific instruments, missile launch systems, traffic lights control systems, air traffic control systems, etc.

This system is further divided into two types based on the time constraints:

Hard Real-Time Systems:

These are used for the applications where timing is critical or response time is a major factor; even a delay of a fraction of the second can result in a disaster. For example, airbags and automatic parachutes that open instantly in case of an accident. Besides this, these systems lack virtual memory.

Soft Real-Time Systems:

These are used for application where timing or response time is less critical. Here, the failure to meet the deadline may result in a degraded performance instead of a disaster. For example, video surveillance (cctv), video player, virtual reality, etc. Here, the deadlines are not critical for every task every time.

Advantages of real-time operating system:

- The output is more and quick owing to the maximum utilization of devices and system
- Task shifting is very quick, e.g., 3 microseconds, due to which it seems that several tasks are executed simultaneously
- Gives more importance to the currently running applications than the queued application
- It can be used in embedded systems like in transport and others.
- It is free of errors.
- Memory is allocated appropriately.

Disadvantages of real-time operating system:

- A fewer number of tasks can run simultaneously to avoid errors.
- It is not easy for a designer to write complex and difficult algorithms or proficient programs required to get the desired output.
- Specific drivers and interrupt signals are required to respond to interrupts quickly.
- It may be very expensive due to the involvement of the resources required to work.



CHECK YOUR PROGRESS

1. What is Operating System? Discuss the functions of Operating System.
2. Discuss Distributed Operating System stating its advantages and disadvantages.
3. Discuss Real-Time Operating system stating its advantages and disadvantages.
4. Discuss Multiprocessing Operating system stating its advantages and disadvantages.
5. What is Network Operating System? Discuss Advantages of Network operating system.

3.5 WINDOWS OPERATING SYSTEM HISTORY

The history of Microsoft windows can be understood with the help of following table

Year	Event
1983	Bill Gates announced Microsoft Windows on November 10, 1983.
1985	Microsoft Windows 1.0 was introduced on November 20, 1985, and was initially sold for \$100.00.
1987	Microsoft Windows 2.0 was released on December 9, 1987, and was initially sold for \$100.00.
1987	Microsoft Windows/386 or Windows 386 was introduced on December 9, 1987, and was initially sold for \$100.00.
1988	Microsoft Windows/286 or Windows 286 was introduced in June 1988, and initially sold for \$100.00.
1990	Microsoft Windows 3.0 was released on May, 22 1990. Microsoft Windows 3.0 full version was priced at \$149.95 and the upgrade version was priced at \$79.95.
1991	Following its decision not to develop operating systems cooperatively with IBM, Microsoft changed the name of their version of OS/2, originally named NT OS/2 3.0, to Windows NT. Developed by David Cutler, Windows NT was built on a different architecture than IBM's OS/2 operating system.
1991	Microsoft Windows 3.0 or Windows 3.0a with multimedia was released in October 1991.
1992	Microsoft Windows 3.1 was released in April 1992 and sells more than one million copies in the first two months of its release.
1992	Microsoft Windows for Workgroups 3.1 was released in October 1992.
1993	Microsoft Windows NT 3.1 was released on July 27, 1993.
1993	Microsoft Windows 3.11, an update to Windows 3.1 was released on December 31, 1993.
1993	The number of licensed users of Microsoft Windows totaled more than 25 million in 1993.
1994	Microsoft Windows for Workgroups 3.11 was released in February 1994.
1994	Microsoft Windows NT 3.5 was released on September 21, 1994.

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1995	Microsoft Windows NT 3.51 was released on May 30, 1995.
1995	Microsoft Windows 95 was released on August 24, 1995, and sold more than one million copies within four days.
1995	Microsoft Windows 95 Service Pack 1 (4.00.950A) was released on February 14, 1996.
1996	Microsoft Windows NT 4.0 was released on July 29, 1996.
1996	Microsoft Windows 95 (4.00.950B) aka OSR2 with FAT32 and MMX support was released on August 24, 1996.
1996	Microsoft Windows CE 1.0 was released in November 1996.
1997	Microsoft Windows CE 2.0 was released in November 1997.
1997	Microsoft Windows 95 (4.00.950C) aka OSR2.5 was released on November 26, 1997.
1998	Microsoft Windows 98 was released in June 1998.
1998	Microsoft Windows CE 2.1 was released in July 1998.
1998	In October 1998, Microsoft announced that future releases of Windows NT would no longer have the initials of NT and that the next edition would be Windows 2000.
1999	Microsoft Windows 98 SE (Second Edition) was released on May 5, 1999.
1999	Microsoft Windows CE 3.0 was released in 1999.
2000	On January 4th, 2000, at CES, Bill Gates announced the new version of Windows CE will be called Pocket PC.
2000	Microsoft Windows 2000 was released on February 17, 2000.
2000	Microsoft Windows ME (Millennium) was released on June 19, 2000.
2001	Microsoft Windows XP was released on October 25, 2001.
2001	Microsoft Windows XP 64-bit edition (version 2002) for Itanium systems was released on March 28, 2003.
2003	Microsoft Windows Server 2003 was released on March 28, 2003.
2003	Microsoft Windows XP 64-bit edition (version 2003) for Itanium 2 systems was released on March 28, 2003.
2003	Microsoft Windows XP Media Center edition 2003 was released on December 18, 2003.
2004	Microsoft Windows XP Media Center edition 2005 was released on October 12, 2004.
2005	Microsoft Windows XP Professional x64 edition was released on April 24, 2005.
2005	Microsoft announced its next operating system, code-named "Longhorn," would be named Windows Vista on July 23, 2005.
2006	Microsoft released Microsoft Windows Vista to corporations on November 30, 2006.
2007	Microsoft released Microsoft Windows Vista and Office 2007 to the general public on January 30, 2007.

2008	Microsoft released Microsoft Windows Server 2008 to the public on February 27, 2008.
2009	Microsoft released Windows 7 on October 22, 2009.
2012	Microsoft released Windows Server 2012 on September 4, 2012.
2012	Microsoft released Windows 8 on October 26, 2012.
2013	Microsoft released Windows 8.1 on October 17, 2013.
2015	Microsoft released Windows 10 on July 29, 2015.
2021	Microsoft announced released Windows 11 on October 5, 2021.

3.6 WINDOWS API

The Windows API, informally WinAPI, is Microsoft's core set of application programming interfaces (APIs) available in the Microsoft Windows operating systems. The name Windows API collectively refers to several different platform implementations that are often referred to by their own names (for example, Win32 API); see the versions section. Almost all Windows programs interact with the Windows API. On the Windows NT line of operating systems, a small number (such as programs started early in the Windows startup process) use the Native API.

Developer support is available in the form of a software development kit, Microsoft Windows SDK, providing documentation and tools needed to build software based on the Windows API and associated Windows interfaces.

3.7 DRIVERS AND UNICODE

Driver

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

Unicode

Unicode is a universal character encoding standard that assigns a code to every character and symbol in every language in the world. Since no other encoding standard supports all languages, Unicode is the only encoding standard that ensures that you can retrieve or combine data using any combination of languages.

3.8 BASIC COMPONENTS OF WINDOWS

Windows is an essential part of a Computer. It's the most commonly used Operating System all around the world both individually and commercially. Since the beginning of the creation of Windows, there are many versions of Windows like Windows XP, Vista, 8, 10, etc.



Windows consists of the following components:

Desktop:

The desktop is the very first screen we see after windows start. Here, we can see folders like My Computer, Documents, etc. It is the main working area of many of your computer operations. You keep your special files on the desktop so you can access them easily and it gives access to other important functionalities as well such as search bar, taskbar, and file explorer.

Taskbar:

The taskbar is a simple row at the very bottom of the screen where all currently opened files or applications are listed. It helps you select what you want to keep opened and what you want to close.

Start Menu:

By clicking the start menu, in the bottom left corner of the screen, a vertical window consisting of the recently opened applications and saved locations will pop-up. Although the Start Menu was a major component of Windows before Windows 8, It was removed from Windows 8 and then brought back in Windows 10.

Maximize/Minimize/Close Buttons:

These buttons are located at the top right corner of our opened documents, and the area used to close, minimize or maximize the document window. They help us jump from one task to another fast and let us decide either we want to close an application or resize it's area on the screen or just hide it for a few moments.

My Computer:

When we double click on My Computer, We find ourselves looking at a window where we can navigate between Computer Drives and Control Panel tools. It also gives us access to different drives on our computer and the data which lies in those drives.

My Computer Right Click Menu:

When we right-click on My Computer or any other file or folder, we get a menu where we can look into different options related to that specific file, for example, Properties, etc.

Recycle Bin:

When we delete a file or folder, It goes into the Recycle Bin from where It can either be restored or permanently deleted from the Computer. Once, a file or folder is deleted from the Recycle Bin, It is very difficult to recover it again. Therefore, the utility of the recycle bin is very essential to use properly if you deal with important documents and files on a day-to-day basis.

Shortcut:

A shortcut creates a button or icon which typically is located on the Desktop. By clicking on this Shortcut, We can quickly open the document or application of which it is a shortcut.

It helps us save the tedious task of going to the main directory again and again and saves our time.

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Mouse Functions:

The mouse is an input device which is essential in the working of a computer. It performs several important functions on Windows like Scrolling, Right and Left Clicks, etc. It performs another very important function of modern windows which is pointing towards different things and giving special instructions whenever needed.

Highlight:

When we have opened a document, we can easily highlight the required portion of our document by using Mouse. It is essential for documents and helps keep track of useful information.

Copy/Cut/Paste:

These options are one of the most essential components of Windows. The copy is used to copy a portion of a document from one document to another or a file or folder from one location to another. The paste is used to paste the copied item on the desired location. While Cut is used to move an item to our desired location in the computer.

Toolbar:

The toolbar is a simple row where we can see different options to customize the look of our opened window. It has two types, Formatting Toolbar, and Standard Toolbar. The standard toolbar consists of options like new documents, save a document, etc. While Formatting Toolbar consists of options like font size, font type, etc.

Drag/Drop:

Dragging an object means to move an object (file or folder) from one location to another and when we reach our desired location, then we can drop the object to that location. It is one of the most used features of windows as you have to move files from one location to another.

File Extensions:

File extensions are used to define the type of the file. For example, an image file will have an extension of .jpg, .jpeg and a Word document will have an extension .docx, .xls, .txt etc. You could have different types of extensions and these extensions help you decide the type of software that will be used to access these files.

Multitasking:

The term Multitasking means to run more than one file or application on Windows at the same time. It is a very important component of Windows which saves our time as well as allow us to perform more tasks at the same time.

Virtual Keyboard:

A virtual keyboard is a software through which we can see a keyboard on our screen and use



it by our Mouse. It is mostly used in the cases when your keyboard is not working properly or you use windows on a touch device.

Disk Drives:

Disk Drives are drives used to store applications and files. Hard Drives and Floppy Drives are used for this purpose. They are very important for your instructions as well as your hardware to work properly.

Defragmenting Hard Drives:

Defragmenting a Drive means to erase all the data from that drive. It is also another important component of windows as users need to clean up their hard drives from time to time and it also comes as a built-in utility.

3.9 CHAPTER SUMMARY

Operating System (OS), Software that controls the operation of a computer, directs the input and output of data, keeps track of files, and controls the processing of computer programs. Its roles include managing the functioning of the computer hardware, running the applications programs, serving as an interface between the computer and the user, and allocating computer resources to various functions. When several jobs reside in the computer simultaneously and share resources (multitasking), the OS allocates fixed amounts of CPU time and memory in turn or allows one job to read data while another writes to a printer and still another performs computations.

Through a process called time-sharing, a large computer can handle interaction with hundreds of users simultaneously, giving each the perception of being the sole user. Modern computer operating systems are becoming increasingly machine-independent, capable of running on any hardware platform; a widely used platform-independent operating system in use today on mainframe computers is UNIX. Most personal computers run on Microsoft's Windows operating system, which grew out of and eventually replaced MS-DOS. There are many other things that are associated with an operating system like the concept of drivers, API, Unicode etc.

The Windows API, informally Win API, is Microsoft's core set of application programming interfaces (APIs) available in the Microsoft Windows operating systems. A driver, or device driver, is a set of files that tells a piece of hardware how to function by communicating with a computer's operating system. Unicode is a universal character encoding standard that assigns a code to every character and symbol in every language in the world.

3.10 REVIEW QUESTIONS

SHORT ANSWER TYPE QUESTIONS

1. Discuss the history of windows operating system.
2. Discuss Windows API.

3. Discuss Drivers and Unicode
4. Discuss any 4 components of WINDOWS Operating system.
5. Discuss the Terms Multitasking and Virtual Keyboard.

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LONG ANSWER TYPE QUESTIONS

1. Distinguish between Real Time and Multiprocessing Operating Systems.
2. Discuss various Real- Time Systems.
3. Discuss about Processor Management and Device Management Functions of OS.
4. What do you mean by recycle bin.
5. Discuss various types of operating system.

3.11 MULTIPLE CHOICE QUESTIONS

1. An _____ acts as an intermediary between the user of a computer and computer hardware.
 - a) Operative System
 - b) Operating system
 - c) Operation System
 - d) Job scheduling
2. One of the earliest operating systems was _____, developed by Microsoft for IBM PC.
 - a) MS-DOS
 - b) MS-WINDOWS
 - c) MS-WORD
 - d) MAC OS
3. A process is a program in _____.
 - a) Maintenance
 - b) Solution
 - c) Execution
 - d) Development
4. Operating system uses a utility software called _____ as interface to the device.
 - a) Operating system
 - b) Device driver
 - c) Scanner
 - d) Input device
5. In _____, a number of jobs are collected by the operator offline and when a batch of jobs gets collected, they are input to the computer for processing.
 - a) Real time



- b) Online
 - c) Network
 - d) Batch processing
6. In _____ systems, two or more CPUs are connected together.
- a) Multiprogramming
 - b) Multitasking
 - c) Multiprocessing
 - d) Real Time
7. _____ Operating system connects computers and devices to a local area network and manages network resources.
- a) Network
 - b) Real Time
 - c) Online
 - d) Distributed
8. _____ is a universal character encoding standard that assigns a code to every character and symbol in every language in the world.
- a) Barcode
 - b) Semi-code
 - c) Arc-code
 - d) Unicode
9. The Kernel OS keeps checking the frequency of processes that requests _____ time.
- a) CPU
 - b) GPU
 - c) Memory
 - d) Icon
10. The process of implementation, operation and maintenance of a device by operating system is called _____.
- a) Operating system
 - b) Device management
 - c) Memory management
 - d) Services management

◆◆◆◆

UNIT

IV

OFFICE PACKAGES

STRUCTURE

- 4.1 Learning objective
- 4.2 Introduction
- 4.3 Word processor
- 4.4 PowerPoint
- 4.5 Excel
- 4.6 MS office installation 2013
- 4.7 Office 365
- 4.8 Chapter Summary
- 4.9 Review Questions
- 4.10 Multiple Choice Questions



4.1 LEARNING OBJECTIVE

After completing this chapter, you will be able to:

- Understand the concepts Office Software.
- Understand various uses and Features of MS WORD.
- Learn and understand the use and features of MS POWERPOINT.
- Learn and understand the use and features of MS EXCEL.
- Learn the process of MS Office installation.
- Understand about Office 365.

4.2 INTRODUCTION

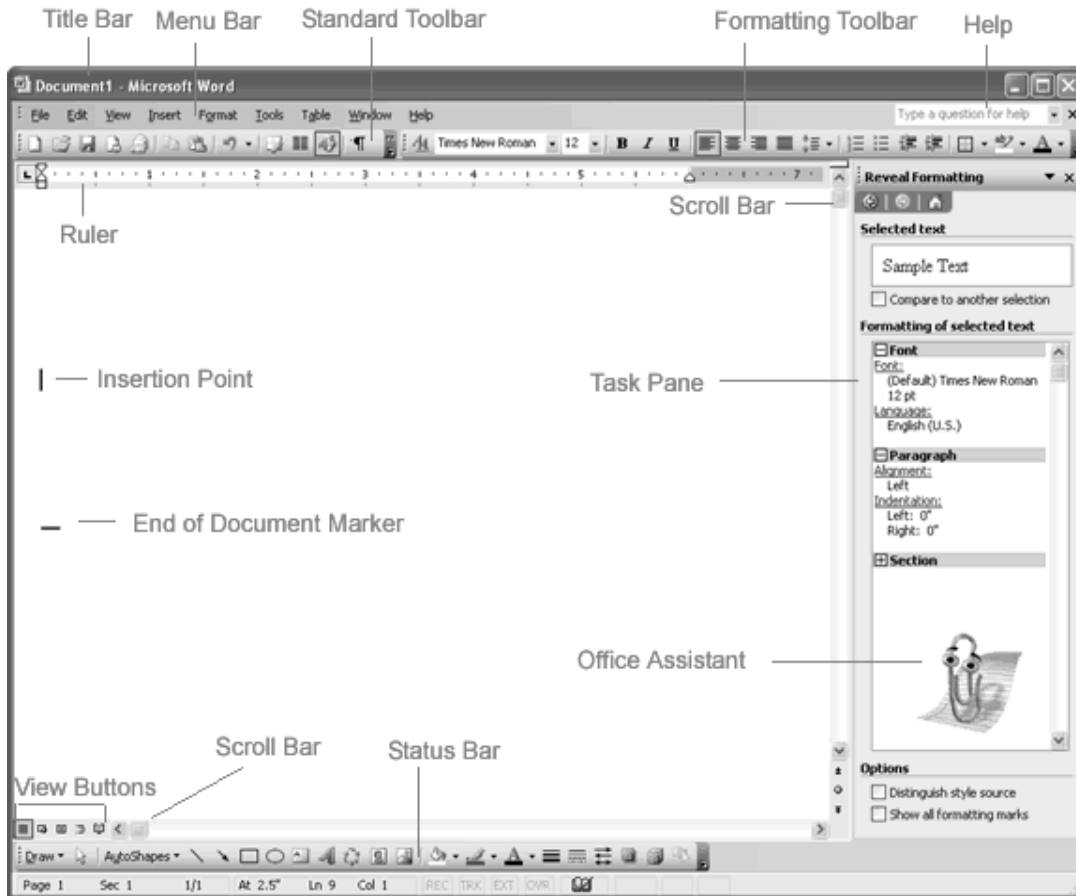
Microsoft Office (or simply Office) is a family of server software, and services developed by Microsoft. It was first announced by Bill Gates on August 1, 1988, in Las Vegas. The first version of Office contained Microsoft Word, Microsoft Excel, and Microsoft PowerPoint. Over the years, Office applications have grown substantially closer with shared features such as a common spell checker, data integration etc. Office is produced in several versions targeted towards different end-users and computing environments. The original, and most widely used version, is the desktop version, available for PCs running the Windows, Linux and Mac OS operating systems. Office Online is a version of the software that runs within a web browser, while Microsoft also maintains Office apps for Android and iOS.

Microsoft Office is a suite of desktop productivity applications that is designed specifically to be used for office or business use. It is a proprietary product of Microsoft Corporation and was first released in 1990. Microsoft Office is available in 35 different languages and is supported by Windows, Mac and most Linux variants. It mainly consists of Word, Excel, PowerPoint, Access, OneNote, Outlook and Publisher applications.

Microsoft Office was primarily created to automate the manual office work with a collection of purpose-built applications.

4.3 WORD PROCESSOR

A word processor, or word processing program, does exactly what the name implies. It processes words. It also processes paragraphs, pages, and entire papers. Some examples of word processing programs include Microsoft Word, WordPerfect (Windows only), Apple Works (Mac only), and Open Office.org.

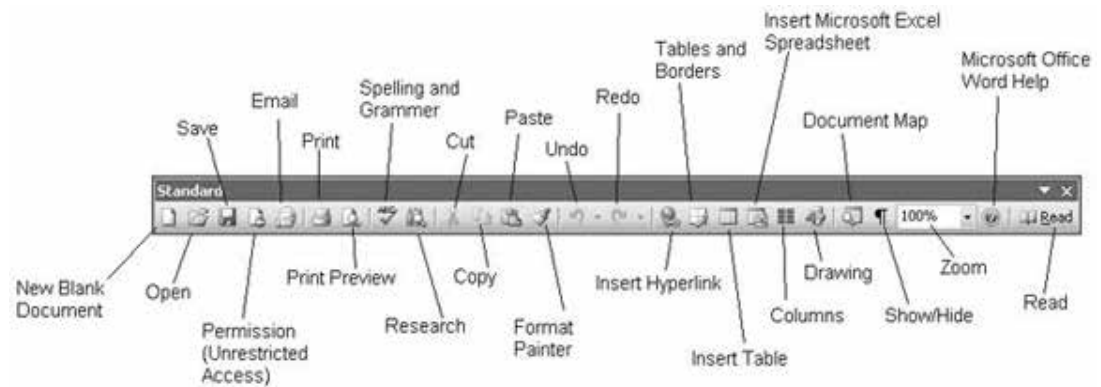


The first word processors were basically computerized typewriters, which did little more than place characters on a screen, which could then be printed by a printer. Modern word processing programs, however, include features to customize the style of the text, change the page formatting, and may be able to add headers, footers, and page numbers to each page. Some may also include a “Word Count” option, which counts the words and characters within a document.

While all these features can be useful and fun to play with, the most significant improvement over the typewriter is the word processor’s ability to make changes to a document after it has been written. By using the mouse, you can click anywhere within the text of a document and add or remove content. Since reprinting a paper is much easier than retyping it, word processing programs have made revising text documents a much more efficient process.

The term “text editor” can also be used to refer to a word processing program. However, it is more commonly used to describe basic word processing programs with limited features.

Toolbar and Their icons



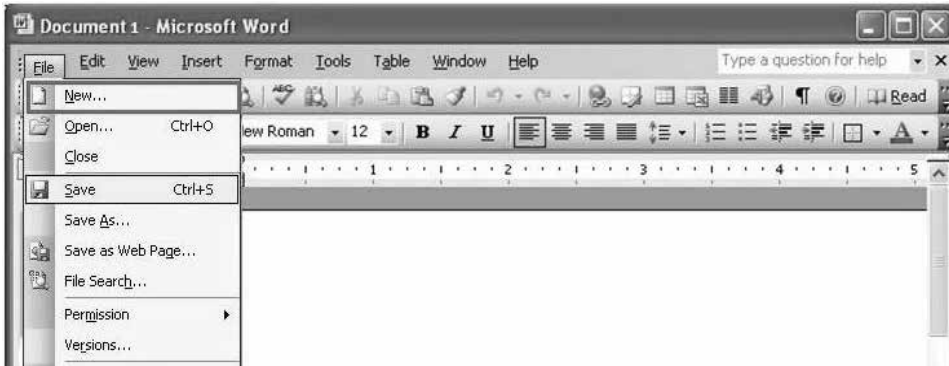
- **New:** Creates a new document based on normal templates. Shortcut = Ctrl + N.
- **Save:** Saves the active document or templates. Shortcut = Ctrl + S.
- **Open:** Opens an existing document or template. Shortcut = Ctrl + O.
- **E-mail:** It sends the contents of the document as the body of the e-mail message.
- **Print:** Prints the active document using current defaults. Shortcut = Ctrl + P.
- **Print Preview:** Display full page as they are printed. Shortcut = Ctrl + F2.
- **Spellings:** Check the spelling in the active document. Shortcut = F7.
- **Cut:** Cuts the selection and puts it on the Clipboard. Shortcut = Ctrl + X.
- **Copy:** Copies the selection and puts it on the Clipboard. Shortcut = Ctrl + C.
- **Paste:** Places the content of the clipboard at the insertion point. Shortcut = Ctrl + V.
- **Format painter:** Copies the format from a selected object or text and applies to other objects or text. Shortcut = Ctrl + Shift + C.
- **Undo:** Reverses the last command, use pull-down menu to undo several steps. Shortcut = Ctrl + Z.
- **Redo:** Reverses the action of the Undo button, use the pull-down menu to redo several steps. Shortcut = Ctrl + Y.
- **Insert Table:** Insert a table into the document, or make a table of selected text.
- **Insert an Excel Worksheet:** Insert an Excel spreadsheet into the Word document.
- **Columns:** Changes the number of columns in a document.
- **Zoom:** Enlarge or reduce the display of the active document.

Creating A New Document

Getting started with a basic document in Word is as easy as opening a new blank document. The steps are as follows:

- Click the **File** tab.
- Click **New**.

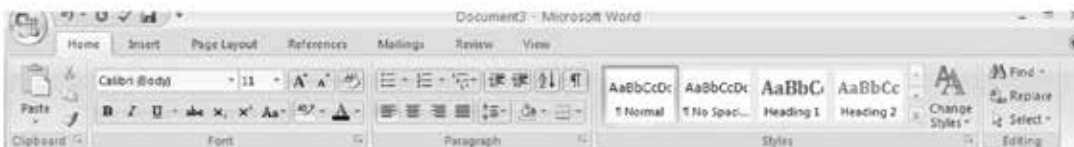
- Double-click **Blank document**.



Formatting of Document

Change font in your current document

To change the font in the document you are currently working on, find the **Styles** section in the **home** tab of the ribbon at the top. Right click on the **Normal** style, and select **Modify Style**.



A new window will appear. Use the **Formatting** section to make any changes you need. Any changes you make to the **Normal** style will affect the formatting of both your **in-text citations** and your **bibliography**. Some common changes include font, size, and line spacing. In this example, we have simply changed the font to Times New Roman and the size to 12pt. You can also use the dropdown menu in the bottom left corner marked **Format** to make more advanced changes if needed. When you are finished, click **OK**.

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You will notice that any changes you made to these styles should take effect in your document immediately.

Fonts

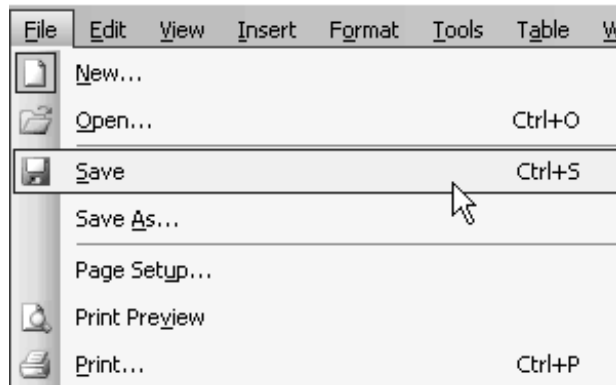
Font defines the font, font size, color, highlighting and style.

Paragraph

Paragraph defines justification, line spacing, shading, borders, indentation, formatting symbols and list style.

Saving Documents

Now since we have put in substantial amount of work creating this document, it might be a good idea to save it for posterity! In fact, for your entire subsequent document you must go on saving your work from time to time, let's say every 15 minutes or so, or after completing every section. Doing this ensures that if there is a problem like power off or your machine has gone into a hung state, etc. You only lose minimal work.



- Click the **File** tab.
- Choose **save**.
- Type the file name by which you want to save your file.
- Specify where you want to save your document. By default, **MS Word** saves your document in the default My Documents folder.
- Click on the **Save** button.

Closing The Document

When you finish working with a document, you would like to close it. Closing a document removes it from your computer screen and if you had other documents open, Word displays the last document you used otherwise, you see a blank Word window. Here are simple steps to close an opened document.

1. Choose **Close** command from the **File menu**.
2. When you select Close option and if document is not saved before closing, it will display following Warning box asking whether the document should be saved or not.

not.

3. Now it's up to you if you want to save the changes, then click **Save**, otherwise click **Don't Save** button.

Opening The Document

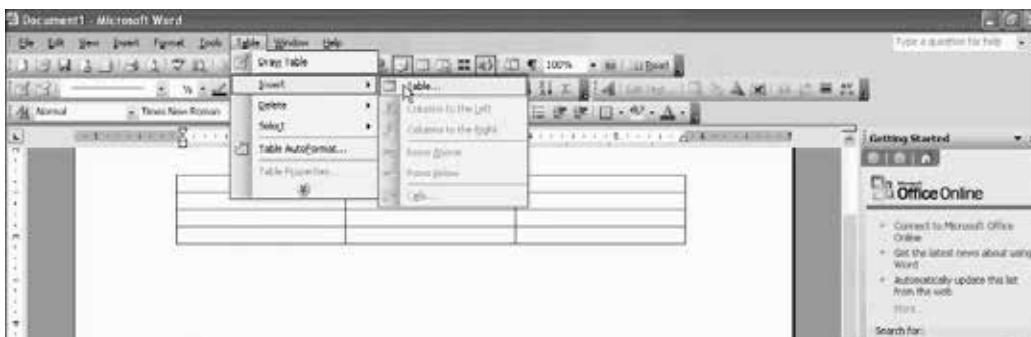
Once you've saved a document, you may want to access it again to make changes or print it out. This guide explains how to open a saved document in Microsoft Word 2010. Some steps may be different in earlier versions of Word, but similar in concept.

1. If you already have Microsoft Word opened, click **File** in the upper left-hand corner of the screen. Click **Open**.
2. An 'Open' dialogue box will pop up. From this, find your way to the folder in which your document is saved. Folders are shown down the left-hand side of the dialogue box.
3. Once you've located your document and clicked on it to select it, its name will be shown in the 'File name' box at the bottom of the dialogue box. - See more at: [http](http://). Click **Open**.
4. You can also open a document by navigating through the 'Start' menu. Click **Start**. From the menu that now appears, choose **Documents**. Navigate to find the document you're looking for through your folders and files. Double-click on the name of the document you want to open.

Creating Tables

Microsoft Word offers a number of ways to make a table. The best way depends on how you like to work, and on how simple or complex the table needs to be.

1. Click where you want to create a table.
2. Click **Insert Table** on the Standard toolbar.
3. Drag to select the number of rows and columns you want.



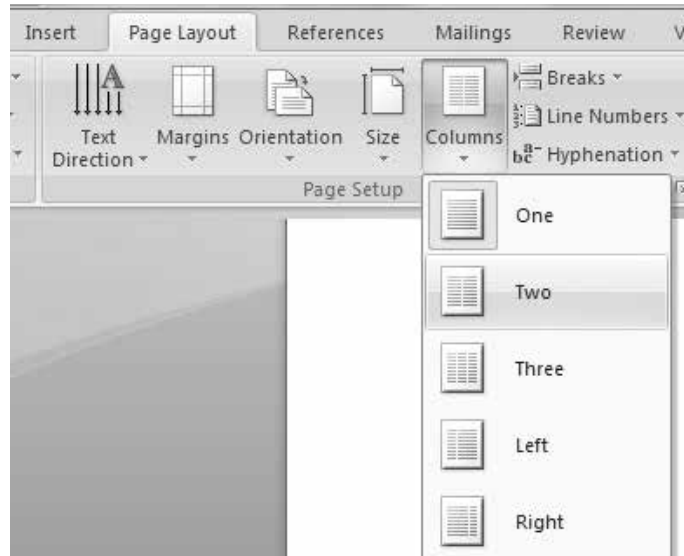
Inserting Columns

1. Select the text you want formatted in columns, or place your cursor where you want columns to begin.
2. On the **Page Layout** tab, in the **Page Setup** group, click **Columns**.
3. Click **More Columns**.



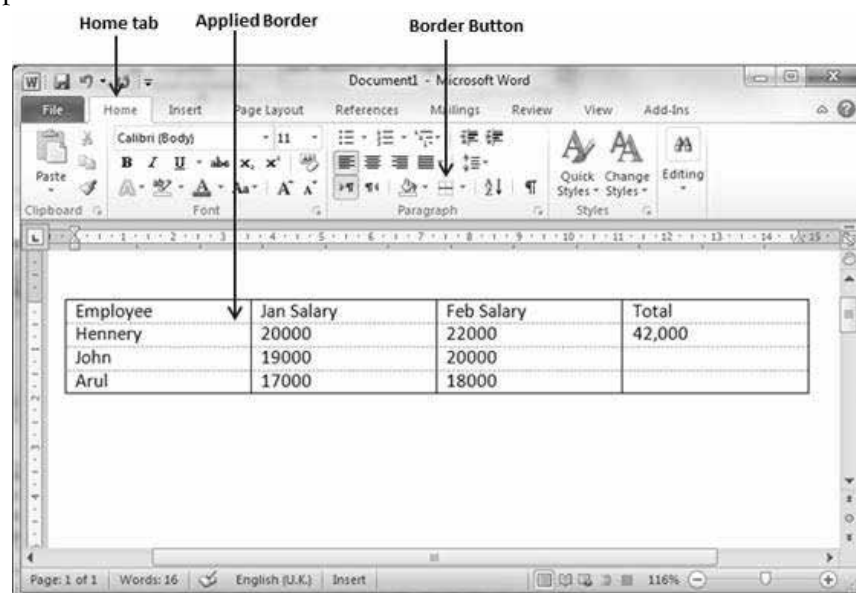
NOTES 

4. Click the number of columns that you want.
5. In the **Apply to** list, click selected text or this point forward.



Borders

- Select the table to which you want to add border. To select a table, click over the table anywhere which will make Cross Icon visible at the top-left corner of the table. Just click this cross icon to select the table.
- Click the **Border Button** to display a list of options to put a border around the selected table. You can select any of the option available by simply clicking over it.
- Try to add and remove different borders like left, right top or bottom by selecting different options from the border options.
- You can apply border to any of the selected row or column. You can try it yourself.
- To delete the existing border, simply select **No Border** option from the border options.

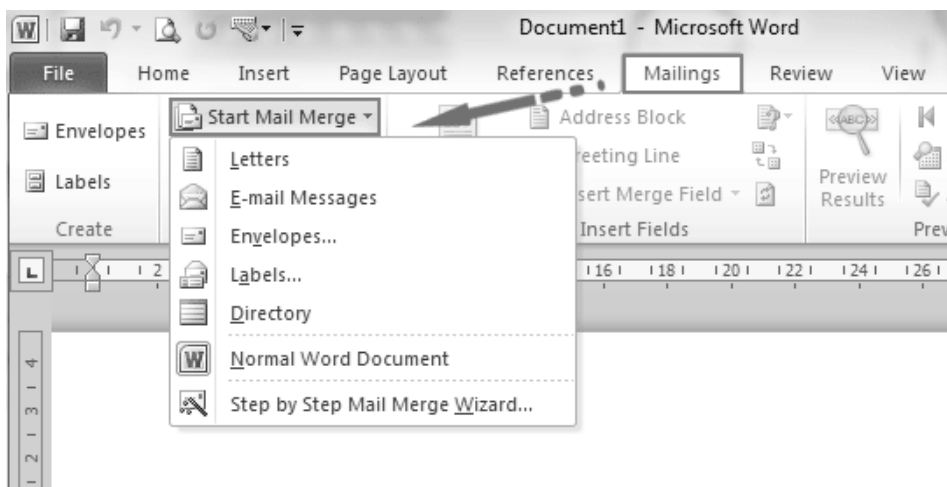


Mail Merge

You use mail merge when you want to create a set of documents, such as a form letter that is sent to many customers. Each document has the same kind of information, yet some of the content is unique. For example, in letters to your customers, you can personalize each letter to address each customer by name. The unique information in each letter comes from entries in a data source. Suppose that you need to send to each of your employees a letter or e-mail message containing personal tax withholding and salary information.

Creating each letter, e-mail message, or envelope individually would take hours. That's where mail merge comes in. Using mail merge, all you have to do is create one document that contains the information that is the same in each copy, and add some placeholders for the information that is unique to each copy. Word takes care of the rest.

Mail merge is a software function describing the production of multiple (and potentially large numbers of) documents from a single template form and a structured data source. The letter may be sent out to many "recipients" with small changes, such as a change of address or a change in the greeting line. MS Word Mail Merge allows a user to send letters or documents to many people simultaneously; users simply create one document that contains the information that will be the same in each version, and then add placeholders for the information that will be unique to each version.



Mail Merge is a useful tool that allows you to produce multiple letters, labels, envelopes, name tags, and more using information stored in a list, database, or spreadsheet. When performing a **Mail Merge**, you will need a **Word document**.

In order to understand how mail merge works you need to examine The elements involved in the process. In any mail merge, you'll deal with three different elements:

Main Document: Form letter, mailing label, envelope, or directory (a single document that stores addresses). Information that is identical in each copy, such as the main body text of a form letter. You only have to type this information once regardless of how many letters you intend to print. Placeholders for unique information. For example, in a form letter, the address block and greeting name would be unique in each copy.



Data Source: Information such as names and addresses. Files or tables that contain the data (information) that you will use to merge data into a merge document. The data will be the parts of the document that varies (names, addresses, etc.). Some examples of data sources are Microsoft Word tables, Microsoft Outlook contact list, Microsoft Excel worksheet, Microsoft Access database or text files.

Finished Documents: Mail merge documents that can serve as templates for future mailings. Merged main documents and data sources that creates your final products (i.e., labels, letters, and envelopes). They can then be used as templates for your future mail merge needs.

Macros

For many Word users, the term **macro** strikes fear in their heart, mainly because they do not fully understand Word macros and have most likely never created their own. Fortunately, creating and running macros isn't too difficult, and the resulting efficiency is well worth the time spent learning to use them.

Simply put, a **macro** is a series of commands that is recorded so it can be played back, or executed, later. There are a couple different ways to create Word macros: The first, and easiest way, is to use the macro recorder; the second way is to use VBA or Visual Basic for Applications. Further, Word macros can be edited by using the VBE, or Visual Basic Editor. Visual Basic and the Visual Basic Editor will be addressed in subsequent tutorials.

There are over 950 commands in Word, most of which are on menus and toolbars and have shortcut keys assigned to them. Some of these commands, however, are not assigned to menus or toolbars by default. Before you create your own Word macro, you should check to see if it already exists and can be assigned to a toolbar.

A macro is a small software program. A program is a series of instruction written by a computer language to execute a specific task or tasks. It enables a execution of a series of sequential and logical commands without having to give those commands one by one. It is a bit like having a very faithful and obedient servant - just showing him how to do anything once and he will faultlessly do it again whenever asked to do. In short, macros can save you considerable time and efforts by automating your respective tasks.

There are two states using macros:

- Creating macros, and
- Running macros

While creating a macro, you require two things:

- The actual commands/steps which are to be grouped together to run as one, and
- Assigning the macro. 'Assigning' means specifying to the computer how you would prefer to run this macro.

You can create macros in two ways:

- Record a series of steps/action using the keyboard and mouse, or

- Type a macro directly into a macro editing window using visual basic programming language.

Needless to say, the first option is easier, while the second is more powerful and flexible. For creating complex and sophisticated macros you can combine the two approaches - record as much as you can and then edit the result using Visual Basic Editor

You can assign a macro as follows:

- An option in any menu
- As an icon in a toolbar
- To a button
- To shortcut key (like function keys)
- To key combination

Given below are steps involved in recording a macro.

- Choose **Record New Macro** command from **Macro** option, in the **Tools** menu.
- Click on the **keyword** button to define the macro from the keyword. The following dialog box would be displayed.
- Click in this box **ALT** and **X** keys from the keyword together. This is now the macro shortcut.
- Click on **Assign** button to assign the macro to these two keys.
- Click on **Close** button to close this dialog box.

You would notice the small macro box on the left side.

- Choose a table with the dimension of **4 rows and 5 columns** from **Insert Table** icon on the standard toolbar.
- Fill in the details of the columns as shown below:
- Click on the **Stop Recording** button to stop recording the macro.
- Now presses **ALT + X** from the keyword together to see whether the macro that you have recorded actually works or not. You would notice that a table, just like the one that you have made, has been created.

Templates

A template is a special type of document that determines the basic layout of a document and can contain various document settings like fonts, page layout, toolbars, special formatting and styles. Using different templates is like having pre-printed stationery (examples letter heads, voucher forms, fax forms etc.) for different uses. Every word document is based on a template. There are two basic type of templates - Global templates and Document templates.

Global Templates

Global templates contain setting that is available to all documents. The normal template by design is always a Global template. This is because any settings added to the Normal



templates are always available to other documents. Whenever a new document is created in word, it is based on normal templates.

Document Templates

Documents templates contain settings that are available only to documents based on that template.

Letters, Faxes and Memos are some of the in-built document templates of MS word. If a new document is created using letter template, then that document will have all the document settings defined in the letter template as well as all the document settings contained in any global template.

Words provide a variety of document templates and allow you to modify the existing templates. It allows saving your own document design as a new template and the use it to create new templates.

Follow the steps below to save a document as templates:

- Create a sample document with the required set of styles.
- Choose **save as** from the **File menu**.
- In the save drop down box choose **Document template**. All templates have their extension name as **.DOT** unlike word files that have **.DOC** as their extension name.
- Type a name for your template. All the templates must be stored in the **Template** directory so that they can be used as a base for creating new documents.
- Click on the **Save** button to save your template.

CHECK YOUR PROGRESS

1. Discuss the Concept of Document Templates.
2. Discuss the concept of Mail-Merge.
3. Discuss the concept of Templates in WORD.
4. Discuss the concept of Tables in WORD.
5. Discuss about Document Templates.

4.4 PRESENTATION WITH POWER POINT

Creating a Basic Presentation

When you make your next presentation — whether it's to demonstrate a product, outline a project, or sell an idea — PowerPoint offers a way to take the focus of you and put it where it belongs: on what you have to say! In this skill, you'll learn how to create a polished presentation with minimal efforts.

What is PowerPoint

Use PowerPoint to create electronic slides that can liven up even the most apathetic crowd. If you don't give your presentation electronically, you can create vivid overhead transparencies and valuable audience handouts that will rival the most polished presenters.

With PowerPoint, you can create presentations that run automatically. Automated presentations are often used at kiosks at trade shows, but such presentations are seeing increased use of Internet.

Creating Your First Presentation

Every PowerPoint presentation consists of a series of slides: text or object displayed on a graphic background. You create your presentation by adding text and object to slides.

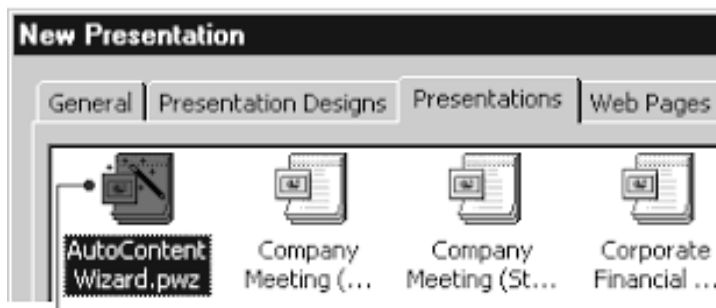
You'll go through a series of steps for every presentation you create in PowerPoint:

- Create the presentation, entering and editing text, and rearranging slides.
- Apply a presentation design. Modify the design if necessary.
- Format individual slides if you wish.
- Add objects to the presentation.
- Apply and modify transitions, animations efforts, and links for electronic presentations.
- Create audience's materials and speakers notes.
- Rehearse and add slide timings.
- Present the presentation.

When you launch PowerPoint, the PowerPoint dialog box opens.

NEW PRESENTATION

General | Presentation Designs Presentations | Web Pages |



Powerpoint Activate the AutoContent Wizard

Using the AutoContent Wizard

The AutoContent wizard works like any of the other wizards in Office 97. You are taken through a series of steps with additional question that helps design your presentation. In each step, click Next to advance, or back to return to a previous step. If you have just launched PowerPoint, choose AutoContent wizard from the PowerPoint dialog box, and click OK to start the wizard. If PowerPoint is already running from an earlier presentation, or if you closed the PowerPoint dialog box, choose file->New to open new presentation dialog box.



The first step explains the wizard. In the second step, choose a presentation type. Clicking one of the type buttons displays a list of topics in the list box.

In the third step, choose a presentation method. If you're creating slides to support a live presentation, choose presentation, informal meetings, handouts. If the presentation will be posted on a website or left running at a trade show or large meeting, choose Internet, kiosk.

In the fourth step, specify the output you want. The first four output options determine which set of design templates you'll choose from. For example, the On-screen presentation use colored background; the color overhead templates have no backgrounds; but colored graphic images.

In the fifth step, supply the presentation options that will appear on the first slide of the presentation: the name of your presentation, your name, and the name of your company or department.

Viewing Slides

The PowerPoint window includes a few features that aren't included in other Office 97. The AutoContent wizard had just closed and the presentation has been opened in **Outline view**, one of five ways to view a presentation.

Each view provides a different way to look at work with your presentation. In **Outline view**, presentation text appears in the document window. The standard and Formatting toolbars appears above the document window, and a vertical outlining toolbar is at the left edge of the window. You can see the contents of several slides at once in the outline and edit text as you would in word. Use the scroll bars through the outline.

Slide view lets you work with slides one at a time. If you double-click a slide's icon in outline view or a slide in slide sorter view, you move to slide view. In this view, use the PgUp and PgDn keys or previous slides and next buttons (at the bottom of the vertical scroll bar) to move between slides. You can edit text or place objects on slides and immediately see the impact of your changes and additions. Some users prefer to do all their editing in slide view.

Slide sorter view allows you to see a screen full of slide at one time. You can swap slides around, delete around, and add special effects. You cannot edit text or place object on slides in this view.

In **Notes page view**, you can add speakers' notes containing more detailed information to your slides. The Drawing toolbar opens automatically in Slides and Note page views.

Working in Outline View

In the early stages of your presentation's development, you'll probably want to work in outline view, which provides you with the most editing flexibility and allows you to see the texts from multiple slides at one time.

In the outline, each slide has a number in the left margin and a slide icon. Slides that only content text have a plain white icon next to them.

Slides that contain graphic objects have a small shape in the icon. The slides title is located next to the slide icon. Indented below the title is the body text.

NOTES



Entering and Editing Text

You will want to replace the content of the slides created by the wizard before making substantial formatting changes. To change the content, just double-click on the line or single-click in the left margin to select the line you want to change and type the new text. (In the left margin, the cursor changes to a four-headed arrow because you can drag the selected line to move it.) Each level in the outline has a different size or shapes of bullet, font size, and font attributes. There are five levels below the slide title.

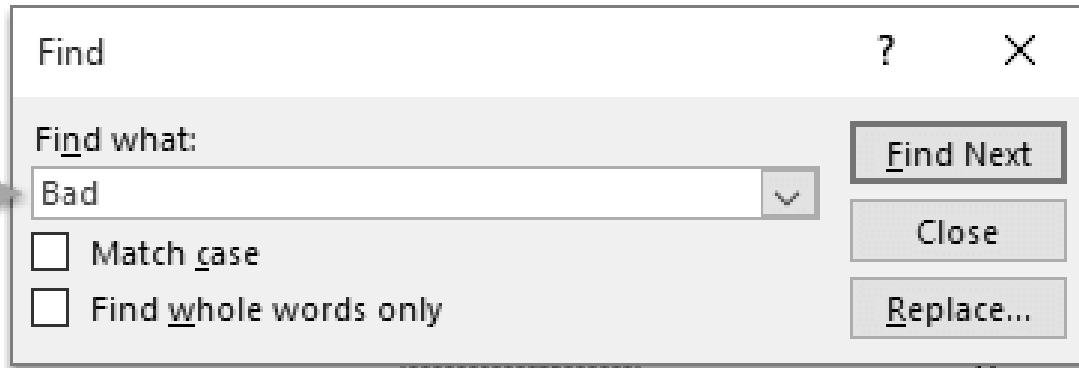
Checking Spelling

PowerPoint includes two spelling features. Auto Spell automatically underlines misspelled word that you enter. Right-click on the underlined word to see suggested correct spelling. Click the spelling button on the Standard toolbar to check for an entire presentation.

Using Find and Replace

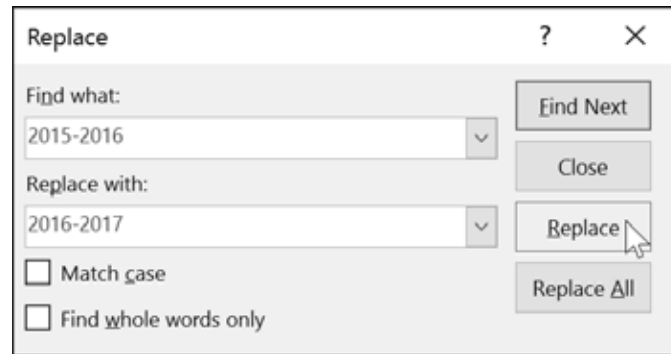
Use PowerPoint's find feature to locate a next string in your presentation. Choose Edit Find from the menu bar to open the Find dialog box.

In the Find What text box, enter the text string that you want to find, and then set the Find options.



Turn on the Match case option to only find those text strings in the presentation that exactly match the string you entered. If you entered Review, and turn to match case, find will locate Review but not review or REVIEW. To find Review but not Reviews, turn on Whole Words Only.

If you use Find in slide, outline, or Note Page View clicking Find Next will move to and select the next text string that matches the Find What string. In Slide Sorter view, there isn't a Find Next button; instead, the button is Find all. Clicking Find All select all the slides that contain Find What string.



You can replace each occurrence of one text string with another. For example, you've created a presentation for the Three-Year Project. The Three-Year Project has just been renamed Building sales Project. You can find every occurrence of Three Years Project and change it to Building sales Project. Choose Edit Replace, or if the Find dialog box is already open, click the Replace button in the Find dialog box. Enter the string you want to find in Find what and the string you want to replace it with in Replace with.

To replace all the occurrences, click replaces All. Or you can work through the replacement one at a time. To find the next occurrences, click Find Next. Click replaces to make the replacement, and Find Next to move to the next possible replacement. When you've replaced all occurrence of the text string, a message box appears to let you know that PowerPoint has searched the entire presentation and there aren't any more occurrences of the text string. A similar dialog box opens to let you know if the text string you entered in Find what doesn't appear in the presentation.

Working in Slide View

It's easy to put too much on one slide in Outline view, so that some lines of text run off the bottom of the slide. If you prefer, you can edit and format slides in slides view. Although you can work with only one slide at a time, Slide view gives you a better feel for how the slide will actually look when complete.

Most slides include two text boxes, one for the title and one for the body text. When you click on the title or body, a frame appears around the text box. You can point to the frame and drag the text box to another location on the slide. To format the text in the box, select the text by clicking or dragging as you would in outline view, then change formats using the Formatting toolbar or Format menu.

Using the Slide Sorter

In Slide Sorter view, you work with entire slides. You can't rearrange the text on a slide, but you can move or copy entire slides.

Click once on a slide to select it, or select multiple slides by holding shift while selecting. A selected slide has a dark border around it. To move a selected slide, drag the slide towards its new location. A gray vertical line will appear. Drag-and-drop to move the line, and the selected slide, to the new location. To copy a slide, hold the Ctrl key on the keyboard while

dragging; release Ctrl after dropping the slide in place. To delete slides in the slide sorter, select the slide then press the Delete key on the keyboard.

Adding Notes to the Notes Page

Notes page view, lets you keep separate notes about the slides in a presentation. You can use the Notes Page for speaker notes during a presentation, but you can also use them to keep track of other information about particular slide as you're creating a presentation: data that needs to be verified or alternative information or wording you've considered adding to the slide.

Notes Page view opens with a view of a single page. The slide is at the top of the page; the bottom half of the page is a single text box where you can type your notes. Change the Zoom percentage so that you can actually see what you're typing, and then click in the text box and enter your notes. When you're finished entering notes for a slide, you can use the Previous Slide and Next Slide buttons to move to another slide.

Building Presentations

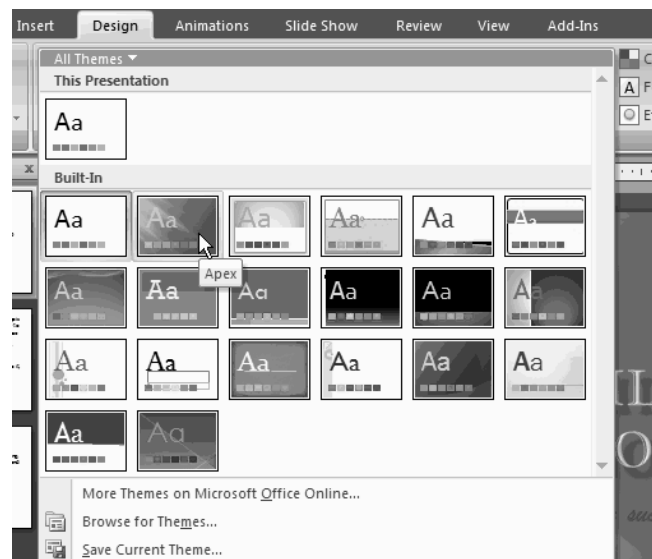
Their Ways to Create Presentation

The benefit of the AutoContent Wizard is that it helps you to develop your content. If you've already decided what should be in your presentation, you don't need to use the Wizard.

There are other ways you can create a presentation:

- Using a design template, which gives you a “look” without burdening you with text to alter or delete
- Borrowing the design from an existing presentation, which is useful if the presentation in your department should share a common design.
- “From scratch”: entering your text first, then applying a design
- Importing and modifying an existing Word outline

You can always apply another design template or presentation design to an existing presentation.



Using Design Templates or Blank Presentations

You can use the design elements from any presentation or templates in a new presentation. To create a presentation using a design saved as a template, either choose template in the dialog box that opens when you launch PowerPoint, or choose File New from the menu bar to open the New Presentation dialog box. The Presentation tab includes AutoContent Wizard and the templates that include content. The Presentation tab displays templates. Select a design template to see the sample title slide in the preview area. Double-click on a design template or click OK to choose the selected template.

To create a Presentation without a design, choose Blank Presentation when you Launch PowerPoint, or choose Blank Presentation from the new dialog box.

Selecting Slide's Layouts

If you begin a presentation with a design template or choose to create a blank presentation, the New Slide dialog box opens.

In the New Slide Dialog box, you select an Auto Layout for each new slide. When you click the thumbnail for the layout, a description appears. No choice that you may in this dialog box carved in stone: you can always change a slide's layout. Notice that there is a scroll bar in this dialog box; there are other layouts you might want to look at. Select the title Slide layout for the first slide in the presentation. After you've selected the slide layout, click the title text box and enter your title. (If you prefer, you can switch to outline view and enter all of the text for this slide.)

Applying a design uses a presentation's background, fonts, and formatting without any of the content. You can take entire slides from an existing presentation and add them to another presentation using the slide finder. Choose Insert Slides from Files to open the Slide Finder. Click the Browse button and select the file that contains the slide you want to add to your presentation, and then click the display button to add thumbnails of the slides to the slide Finder.

Inserting Slides from other Presentation

- Position the insertion point (in outline view) or slide selector (in slide sorter view) where you want to insert slides.
- Choose Insert Slides from files to open the Slide Finder.
- Select the presentation that includes the slides you want to insert.
- Click the Display button to view the slides.
- Select the slide (s) you want to insert then click insert to insert the slide in the current presentation. If you want to insert all the slides click the insert all the button.
- The Slide Finder remains open, so you can move a different location in the active presentation and insert other slides.
- When you are finished inserting, close the Slide Finder.



Modifying Visual Elements

Changing the Color Scheme

It is easiest to choose one of PowerPoint's design to establish the primary background for your presentation, then change the background or colors to meet your specific need. Consider the purpose of your presentation when changing color. For overheads, the lighter the better. Dark background work well for on-screen presentation, but if you need to show a presentation with room light on, choose a light background and dark text. Choosing Format slide color scheme dialog box. (You can't change the color scheme in a blank presentation; you must have already applied a design.)

The dialog box has tabs for standard and custom color schemes. The standard color schemes include the current color scheme, at least one alternate scheme, and one black-and-white choice. You can choose to apply a scheme to the current slide or to all the slides in the presentation. To see how a slide will look, click the preview button. (You'll have to move the dialog box out of the way to see the impact on the slide.) When you're satisfied, click Apply to change the selected slide or slides or apply to all to change every slide in the presentation.

Steps for Applying a Color Scheme

- Open the Design tab by clicking it on the Ribbon.
- Select a color scheme to use.
- Click the Theme Colors button and then choose Create New Theme Colors.
- Click the button for the color you want to change.
- Repeat step 3 for any other colors you want to change.
- Choose preview to see the changes before applying them. Click Apply to or Apply All to apply the scheme to the current slide or all slides in the presentation.

Adding Slide Footers

The master slide includes a footer area. You can have a date, slide number, or other footer appear on every slide by changing it in the master. Choose View => Headers and Footers from the menu bar to open the dialog box. For Date and Time, choose Update Automatically or fixed to add a changing or fixed date to each slide. Click the slide number text box to show to the slide number. If you want footer text, click the Footer text box and type the footer in the text box.

Steps for Setting Slide Footer

- Choose View Header and Footer to open Header and Footer dialog box.
- Turn on items you want displayed on all slides.
- Turn on Don't show on Title Slide if you don't want the footer to appear on the first slide in the presentation.
- Choose Apply to apply to the active or selected slide, or Apply to All to apply to every slide in the presentation. (If you open the dialog box from the Slide Master, you can only choose Apply to All.)

NOTES 

Steps for Customizing the Background Fills

- Choose Format Custom Background to open the custom background dialog box.
- Click the Omit Background Graphics from Master Check box to remove the background graphics from a particular slide or all the slides.
- Click the drop-down arrow next to the blank text box to select the fill option that you want to change.
- Choose from shadowed, patterned, or textured fill, or choose a picture from the Clipart folder. To return to the original fill, Choose automatic from the drop-down list. Checking Presentation Styles
- Click the option button to open the Style Checker Option dialog box. In the punctuation page, you can have the checker notify you if some title or body text doesn't match the case.

You select in the case drop-down list. Or you can turn off the Checking of title and body text case. In the End Punctuation section, you can have the checker remove, add, or ignore punctuation at the end of titles or in the body.

On the visual clarity page, set option for the maximum number of fonts, minimum font size, and number of points per slide that should be included in the presentation. When you have set all the option, close the dialog box and choose start to begin Style Checker with the settings you selected. Steps for Checking Style.

Steps for Adding Clip Art to a Slide

- In slide view, Choose Insert Picture <=> Clip Art or double-click a Clip Art placeholder to open the Clip Art folder or the Microsoft Clip Art Gallery.
- Select the picture you want to insert and click Insert.



Steps for Recoloring Clip Art

- In slide view, select the Clip Art object
- Click the Recolor picture button on the Picture toolbar.

- Choose to change Colors or Fills.
- Check and choose a new color you want to change.
- Click Preview to preview the change in the slide; Click OK to apply the changes. Sound and Video.

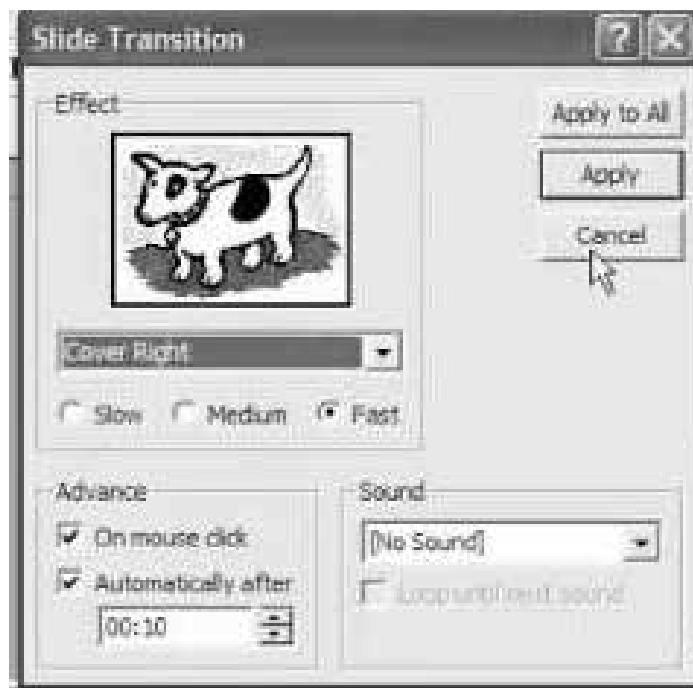
NOTES 

PowerPoint includes sounds and video you can play during you slide shows. Some sounds, like the typewriter or laser sound, are included are included on the Animation Effects toolbar. Other sounds, music, and videos are in Microsoft Clip Art Gallery.

Steps for inserting a Sound or Video File

1. In slide view, move to the slide you want to add an object to.
2. Choose Insert >=> Movies and Sounds Sound from Gallery or Video from Gallery.
3. In the Clip Gallery, select the sound or video you want to add. Click the play button to preview the selected sound or video.
4. Click Insert to insert the object or place a sound icon or video object on the slide.
5. To play the sound or video, double-click the icon or object in the slide show view.

Applying Transition, Animation Effects and Linking



An electronic presentation, or slide show, is a presentation displayed on a computer screen or projected with an LCD projector. Since slides are “changed” by the computer rather than by a hand, you can add computerized special effects to a slide show that aren’t possible when you use overheads for a presentation. A transition is a special effect added to the slide’s initial appearance on screen. The slide can appear from the right, dissolve in gradually, or fade through the background of a previous slide. Some of the design templates also include animated features: for example, one of the background object may streak into place.

NOTES 

Individual slides can include animation — different steps used to construct the slide, one placeholder at a time. For example, the slides can appear with a title only, one bulleted points can be added. Add transition in Slide Sorter view using the tools on the Slide Sorter toolbar. While you can add preset text animation in the slide sorter, you can't animate other object, so you'll generally want to work with animation in slide view.

Setting Transition Speed and Sound

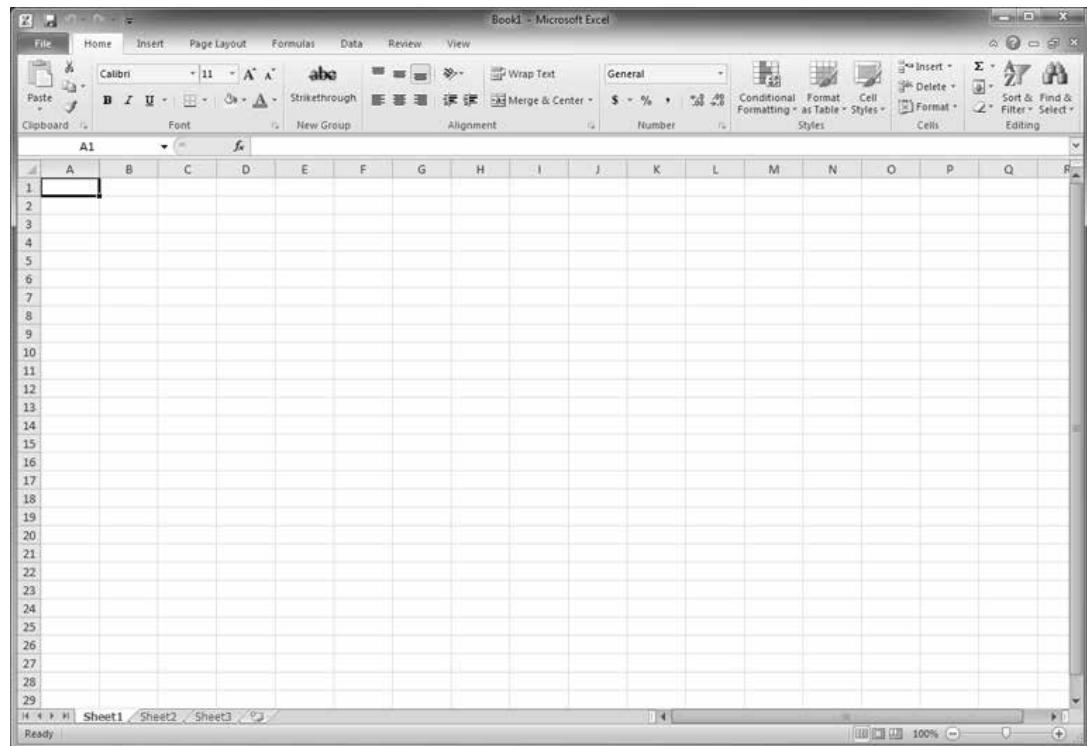
Each type of transition had a default speed. The default for wipes, for example, is fast. You can change the speed for transitions, choose a different transition, or add sound effects to accompany a transition in the Slides Transition dialog box.

4.5 EXCEL

It is important to know about the interface of an application to work in any environment with ease. Excel 2010 provides an excellent user interface based on the task you need to perform.

When you open Excel 2010, the application display two windows, one within the other. The outer window is the application window that allows you to interact with Excel 2010. The inner window is the workbook window that appears within the application window. The inner window is used to work with data.

An Excel file is also referred as workbook. It acts as a repository of related worksheets. A workbook has three worksheets by default: Sheet 1, Sheet2 and Sheet3. You can also add or remove worksheets in an Excel workbook.



The Excel 2010 application window includes the following components:

- **File Tab:** Provides common options that are used while working with Excel.
- **Quick Access Toolbar:** Provides access to frequently used commands in the application.
- **Title Bar:** Displays the name of the current workbook. It integrates the Quick Access Toolbar within it. The title bar is placed above the Ribbon panel.
- **Ribbon:** Displays the commands that you need to complete a task.
- **Formula Bar:** Displays the contents of the currently selected cell in a worksheet. In addition, it allows you to type the required formula or function.
- **Task Pane:** Displays various options for a selected command on the Ribbon panel. It appears on an as-needed basis.
- **Status Bar:** Contains features such as the dynamic zoom slider and the document layer option.

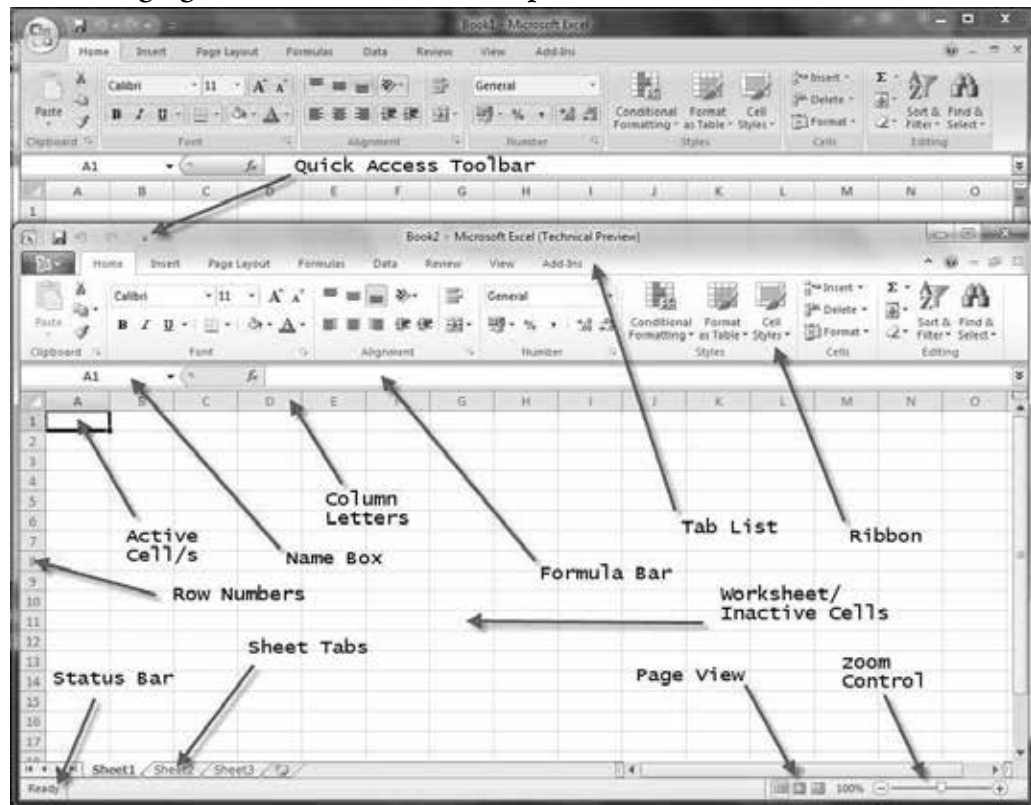
The Excel 2010 workbook window includes the following components:

- **Cell:** Is an intersection of a row and a column. Cells can contain various types of data. A cell is referred by the name of the column and the number of the row. For example, the first cell A1 is in column A and row 1.
- **Worksheet:** Is a work area comprising of rows and columns. It is used to store data. A worksheet consists of 16,384 columns and 1,048,576 rows. Rows are referred by the letter A continuing to letter Z. After 26th column (column Z), headings become double letters, from AA to AZ. After AZ, the letter pair starts again with columns BA through BZ, and so on, until all 16,384 columns have alphabetical headings, ending at XFD. Row heading begin with 1 and continue through 1,048,576.
- **Sheet Tab Bar:** This bar appears at the bottom of the workbook. It consists of the following components:
 - **Sheet Tabs:** These tabs help you to move between multiple worksheets in a workbook. To move to a particular worksheet, you need to click the corresponding Sheet tab.
 - **Tab Scrolling Buttons:** These buttons appear to the worksheet tabs. They allow you to scroll the display of the worksheet tabs one at a time. In addition, they help you to directly move to the first or last worksheet within a workbook.
 - **Insert Worksheet Tab:** This tab allows you to add new worksheets to the workbook. It appears to the right of the worksheet tabs.
 - **Horizontal Scroll Bar:** This bar serves as a tool to view the left or the right part of worksheet that is not displayed on the screen.
 - **Vertical Scroll Bar:** The bar serves as a tool to view the top or the bottom part of the worksheet that is not displayed on screen.

NOTES



The following figure shows the various components of the Excel 2010 window.



Exploring the File Tab

The File tab is placed at the top-left corner of the Excel interface. When you click File tab, the backstage view appears.

In addition to a set of options, the Backstage view displays additional information and properties of the worksheet. The Backstage view is portioned into three panes; left, centre, and right. The left pane consists of a set of options. The centre and the right pane display the section corresponding to the selected option in the left pane.

The Backstage view contains the following options:

- **Save:** This option is used to save a worksheet.
- **Save As:** This option enables you to save a copy of a worksheet. In addition, it enables you to
 - save a worksheet in different formats.
- **Open:** This option enables you to open a worksheet stored on your computer.
- **Close:** This option is used to close the currently active worksheet. In case you have not saved your worksheet, a Microsoft Excel message box appears, prompting you to save your worksheet.
- **Info:** This option displays additional information and properties of the worksheet. In addition, it enables you to recover the unsaved workbooks, protect your

worksheet, and check for issues. Moreover, it enables you to manage versions of the worksheet.

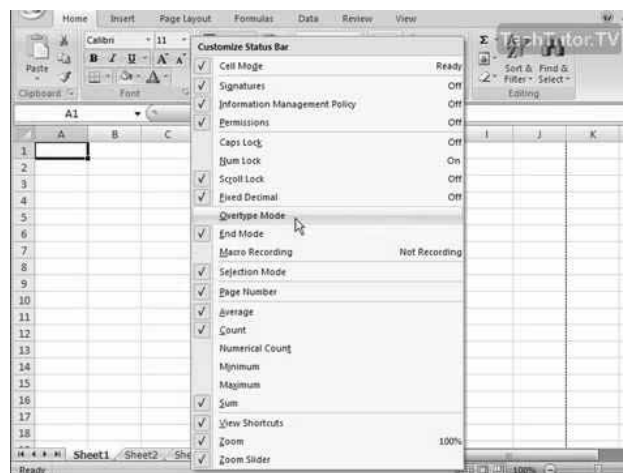
- **Recent:** This option displays all the recent workbooks in the centre pane along with the location of the recent workbook in the right pane. In addition, it provides the functionality to recover unsaved workbooks.
- **New:** This option enables you to create a new workbook.
- **Print:** This option allows users to preview and print worksheets.
- **Save and Send:** This option allows you to send a copy of your workbook to other users. You can send your workbook either through e-mail or through fax. In addition, this option lets you share your workbook with other people using SharePoint. Moreover, this option enables you to save your worksheet to the Web. It also enables you to save your worksheet as PDF/XPS.
- **Help:** This option provides you help on the Microsoft Office 2010 related queries.
- **Options:** This option enables you to customize the Ribbon and the Quick Access Toolbar. Moreover, it enables you to customize the display settings of your workbook. This option lets you change the Word correcting and formatting option. In addition, it allows you to manage the Add-ins and the privacy settings of the worksheet.
- **Exit:** This option lets you save and exit the Excel application.

Exploring the Status Bar

The Status bar is placed at the bottom of the Excel 2010 window. It is a bar that displays options such as page number and word count.

In addition, the Status bar provides additional features such as the dynamic zoom slider that help you to zoom in or zoom out the worksheet. The Status bar is shown in the following figure.

You can modify the information displayed on the status bar by right-clicking anywhere on the Status bar. This displays the Customized Status Bar pop-up-menu, as shown in the following figure.

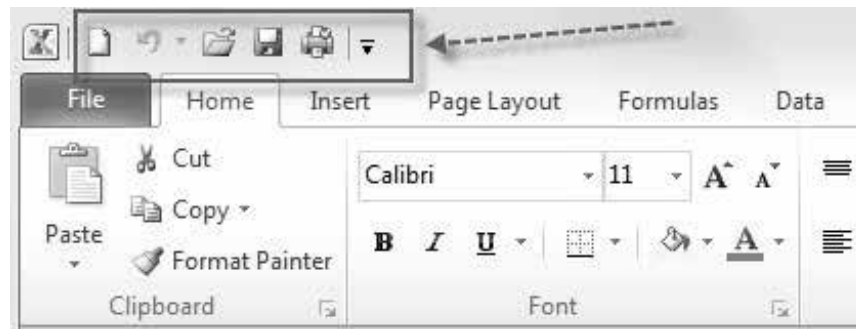


By default, the Status bar includes the following components:

- **Zoom level:** This button allows you to select or set the zoom percentage by using the zoom dialog box.
- **Zoom in:** This button enables you to have an enlarged view of the contents of a worksheet.
- **Zoom Out:** This button enables you to view the contents of a worksheet in a smaller size.
- **Zoom Slider:** This slider enables you a quickly magnify, in other words enlarge, or reduce the size of the worksheet to the required size.
- **Views:** These buttons display the different views of a workbook. Normal, page Layout, and Page Break Preview are the three default views.

Exploring the Quick Access Toolbar

The Quick Access Toolbar provides access to frequently used commands of Excel 2010. It is a part of the title bar. By default, the toolbar displays the save, undo, and redo commands.



Customizing the Quick Access Toolbar

Along with the default commands, frequently used commands can be added to the Excel 2010 interface by customizing or modifying the Quick Access Toolbars. In addition, you can customize the Quick Access Toolbar to hide those commands that you commonly do not use. To add the commands to the Quick Access Toolbar,

You need to perform the following steps:

- Click the Customize Quick Access Toolbar button present on Quick Access Toolbar. The Customize Quick Access Toolbar pop-up-menu appears.
- Select the More commands option from the pop-up-menu. The Excel options dialog box appears.
- Select the desired category from the Choose commands from drop-down list in the Customize the Quick Access Toolbar section.
- Select the command that you want to add to the Quick Access Toolbar from the list box below the Choose commands from drop-down list.
- Click the ADD button. The selected commands appear in the list box below the Customized Quick Access Toolbar drop-down list.



Exploring the Ribbon

The Ribbon is a component of the Excel 2010 window. It contains several task-specific commands that are grouped under various commands tabs. Additionally, the Ribbon provides instant access to the Excel 2010 help system, allowing you to search information easily. The Ribbons has various commands tabs.

The following tab appears on the Ribbon:

- Home
- Insert
- Page Layout
- Formulas
- Data
- Review
- View

Home Tab

The Home tab helps in performing clipboard operations, such as cut, copy, and paste and basic text and cell formatting.

The Home tab includes the following groups:

- **Clipboard:** Provides options to cut copy and paste content. In addition, it provides an option to format text.
- **Font:** Provides tools to format text.
- **Alignment:** Provides option to align, indent, and wrap text, and merge and unmerge cell. In addition, it provides an option to rotate text.
- **Numbers:** Provides option to specify number formatting for cells.
- **Style:** Provides options to conditionally format cell and tables, and modify styles.
- **Cells:** Provides option to insert and delete rows and columns. In addition, it provides options to format cells and worksheet.
- **Editing:** Provides options to find, select, sort, and filter data. In addition, it provides to sum, fill series, and clear option.

Insert Tab

The Insert tab is used to insert objects such as tables, charts, illustrations, text and hyperlink in a worksheet

The Insert tab includes the following groups:

- **Tables:** Provides options to insert tables and pivot tables.
- **Illustrations:** Provides options to insert pictures from various locations, such as a file, ClipArt or the SmartArt gallery.
- **Charts:** Provides options to insert several types of charts in a worksheet.



- **Sparkline:** Provides options to insert a tiny chart that fits in a cell, to visually trends in data.
- **Filter:** provides option to add slicer in a pivot table.
- **Links:** Provides options to insert a hyperlink into a worksheet.
- **Text:** Provides options to insert a text box, WordArt graphics, objects, header and footer, and signature lines.
- **Symbols:** Provides options for adding symbols and equations.

Page Layout Tab

The Page Layout tab is used to specify the page settings, layout, orientation, margins, and other related options such as themes and gridlines.

The Page Layout tab includes the following groups:

- **Themes:** Provides options to apply preset color, font, and present themes to a workbook.
- **Page Setup:** Provides options to customize a worksheet for printing, such as page margin, size, orientation, and background.
- **Scale to Fit:** Provides options to adjust the width, height, and scale of the worksheet that needs to be printed.
- **Sheet Options:** Provides options to display custom views, gridlines, and headings.
- **Arrange:** Provides option to arrange, align, group, order, and route shaped on a worksheet.

Formulas Tab

The Formulas Tab helps in working easily with formulas and functions.

The Formulas Tab includes the following groups:

- **Function Library:** Provides options to insert functions, such as financial function and trigonometric functions.
- **Defined Name:** Provides options to name the cell so that they can be referred in the formulas by their names.
- **Formula Auditing:** Provides functions to check for errors and to trace action. It also provides the Watch window that allows you to constantly track specific value.
- **Calculation:** Allows you to specify whether calculations within a workbook should be manual or automatic.

Data Tab

The Data tab helps in data-related-tasks, such as setting up connection, with external data sources and importing data within Excel worksheet.

**The Data tab includes the following groups:**

- **Get External Data:** Provides options to access and import data from external locations such as Microsoft Office Access 2010, and the Internet.
- **Connections:** Provides options to add, view, and work with connections to data sources.
- **Sort and Filter:** Provides options to perform data analysis.
- **Data Tools:** Provides tools to convert text or tables and remove duplicate values.
- **Outline:** Provides options to group cells and organize data into an outline for each group to provide additional clarity.

The Review Tab

The Review tab helps in accessing tools that can be used for reviewing an Excel worksheet. It also enables you to insert comments, ensure that the language used in the worksheet is correct, convert text to a different language, and share your workbook and worksheets.

The Review tab includes the following groups:

- **Proofing:** Provides proofing tools such as spelling, thesaurus and translate.
- **Language:** Provides option to translate the words used in the worksheet.
- **Comments:** Provides options to add comments and move between them.
- **Changes:** Provides option to accept or reject the changes made in a workbook or worksheet.

The View Tab

The View tab is used to view a worksheet in different views. In addition, it provides options to show or hide the element of a worksheet window, such as a ruler or gridlines.

The View tab includes the following groups:

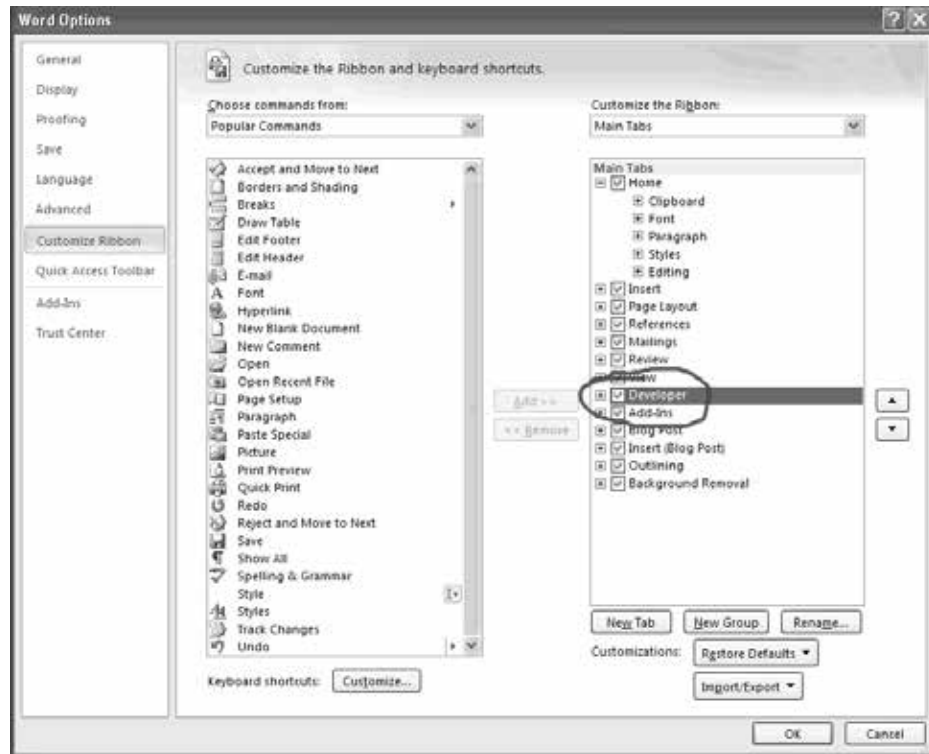
- **Workbook Views:** Provides options to display a worksheet in different type of views, such as the normal and Page Layout view.
- **Show:** Provides options to display or hide elements such as the ruler, gridlines, and formula bar in the worksheet.
- **Zoom:** Provides options to magnify a particular selection or the whole worksheet.
- **Window:** Provides options to arrange and size an application window.
- **Macros:** Provides options to perform a repetitive task with ease by recordings macros.

Customizing the Ribbon

You can customize the Ribbon the way you want it. To customize the Ribbons, **you need to perform the following steps:**

- Open MS Office Word 2010.
- Choose File —* Options —» Customize Ribbon.

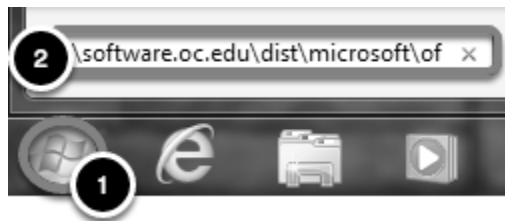
Under Main Tabs, select the tab that you want the new Ribbon tab to come before.



- New group is selected under New Tab.
- Choose commands from section and click ADD button.
- Right click the New Tab from Main Tab.
- Select Rename option from pop-up-menu.
- Type name in Display name text box.
- Click OK.
- Similarly rename New Group option.
- Click OK.

4.6 MICROSOFT OFFICE INSTALLATION 2013

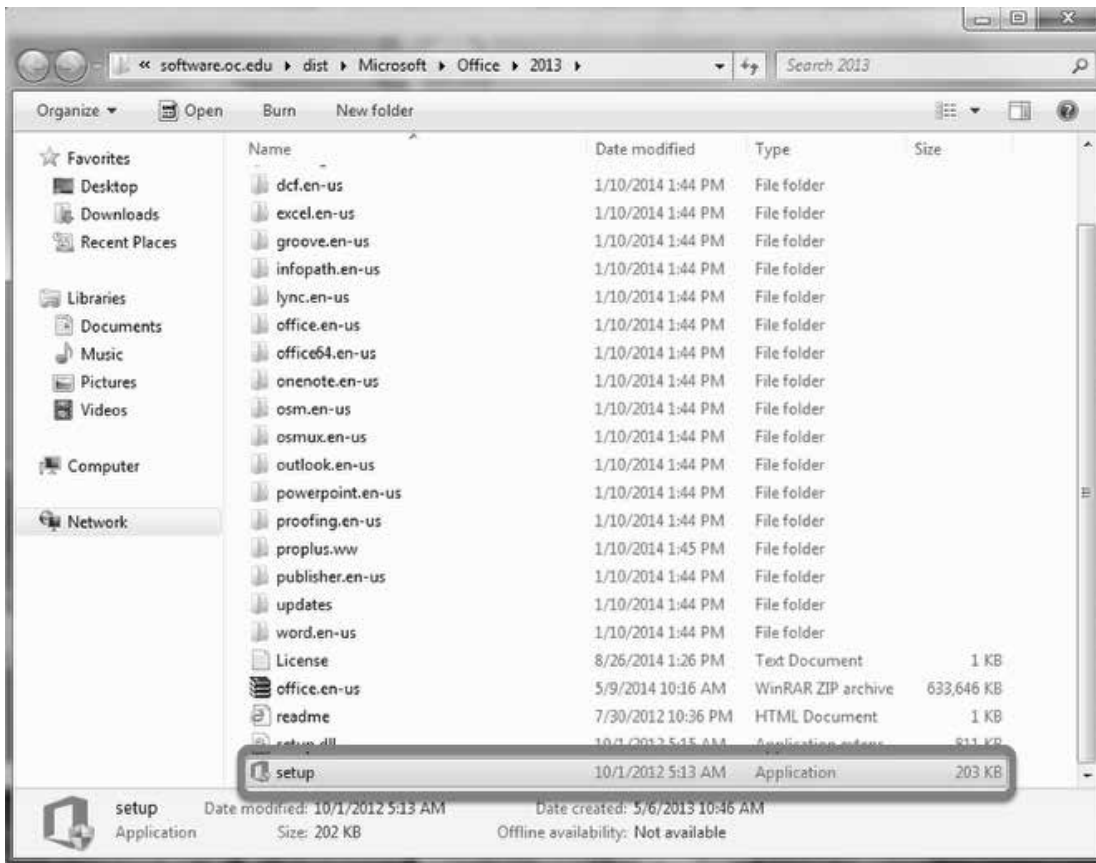
Connect to Server



1. Click on the Windows icon to open the Start menu.
2. Type \\software.oc.edu\dist\microsoft\office\2013 in the search box at the bottom of the screen, and press enter.

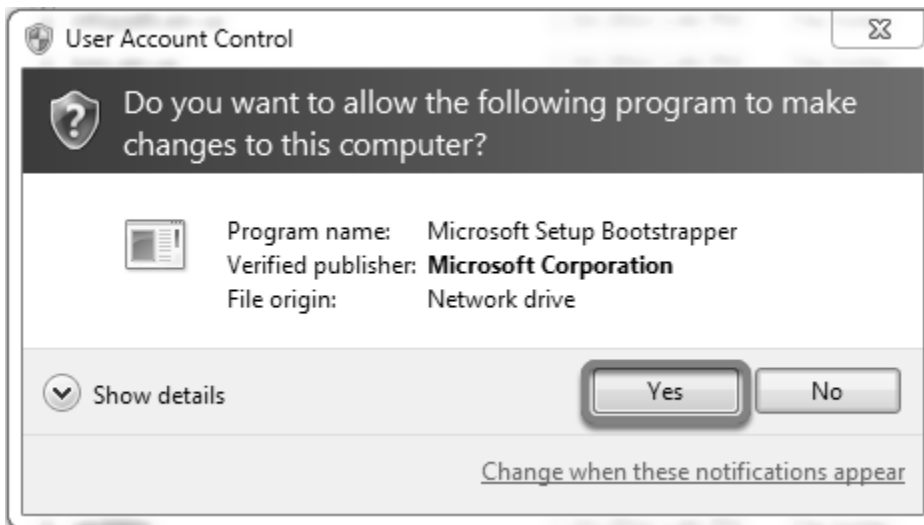
3. Launch the Installation

NOTES 



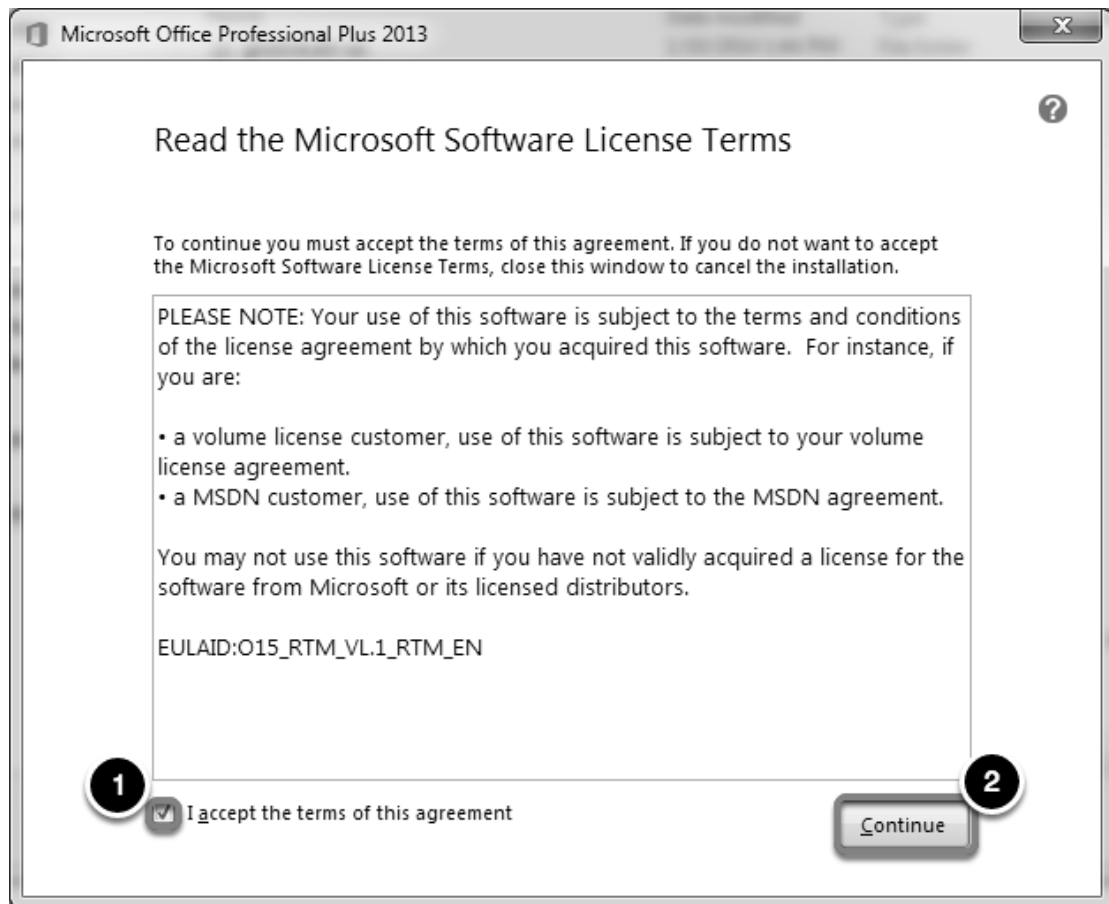
Double-click Setup to launch the installer.

Allow Changes

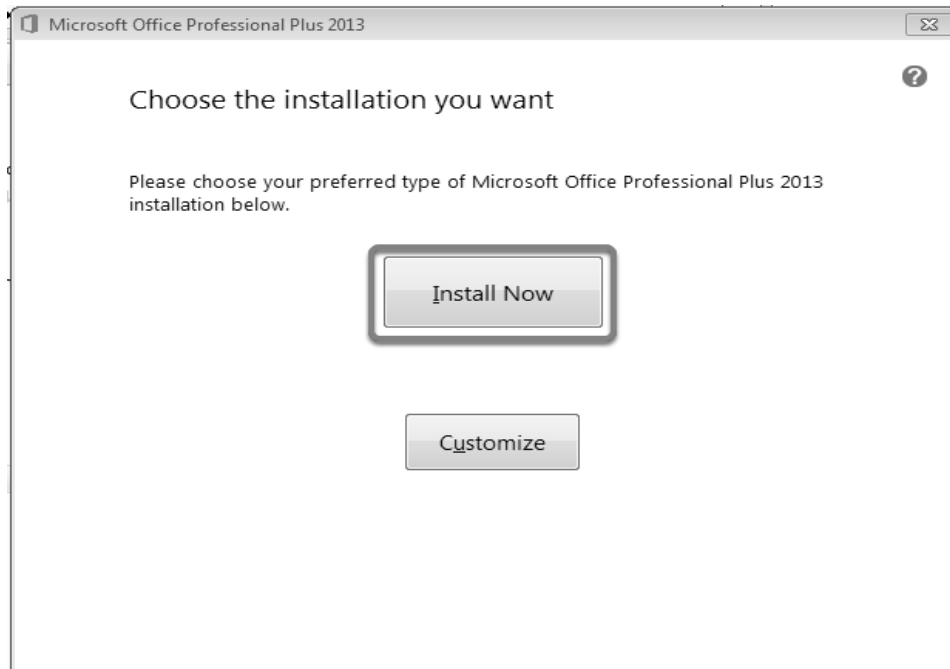


Click Yes to allow the program to make changes to your computer.

Accept the Software License Terms



1. Check the box to I accept the terms of this agreement
2. Click Continue
3. Install Now



Click **Install Now**

NOTES 

Wait



This could take several minutes.

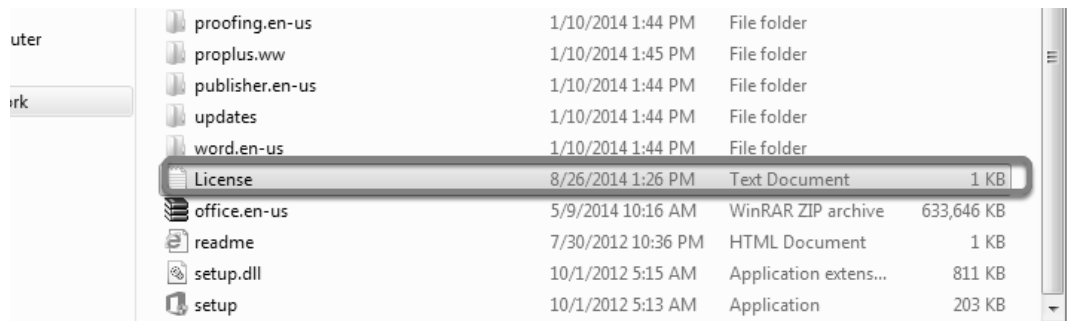
Finished!



This program will now be located in your Start Menu. Click Close.

Enter the Product Key

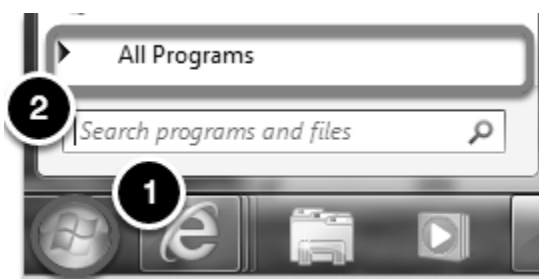
Find Product Key



The product key is located in the file called License in the same folder that holds the setup file \\software.oc.edu\dist\microsoft\office\2013

Follow the instructions below to enter the product key for Microsoft Office 2013.

Open All Programs



1. Click on the Windows icon to open the Start menu.
2. Click on All Programs

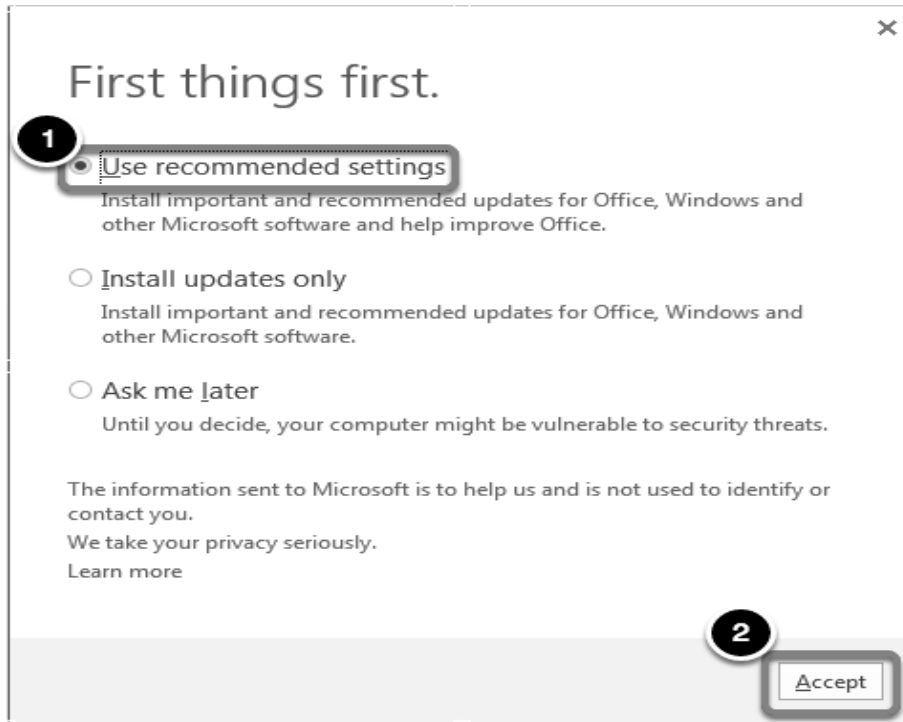
Open Any Microsoft Office 2013 Program



Click any Microsoft Office 2013 program to open it. This example will use Microsoft Word.

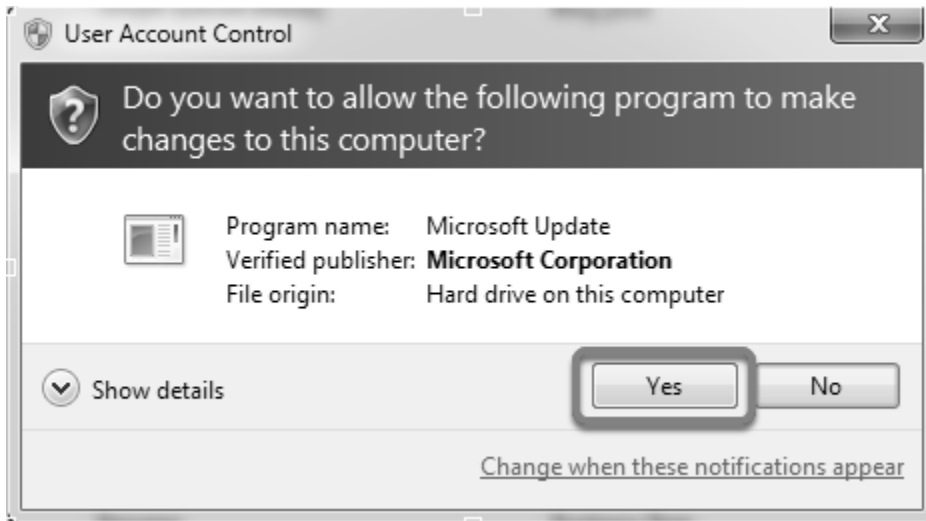
NOTES 

Use Recommended Settings



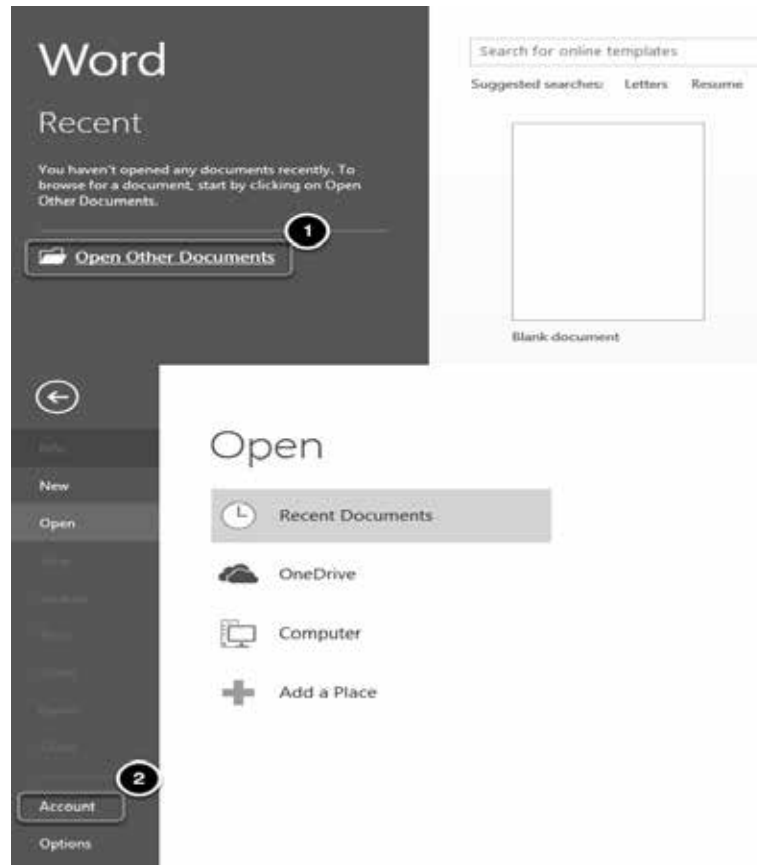
1. Select Use recommended settings
2. Click Accept

Allow Changes



Click Yes to allow the program to make changes to your computer.

Find Account



1. Select Open Other Documents
2. Select Account

Account

User Information



Office Background:

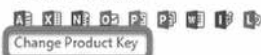
Office Theme:

Connected Services:

Product Information



Product Activated
 Microsoft Office Professional Plus 2013
 This product contains

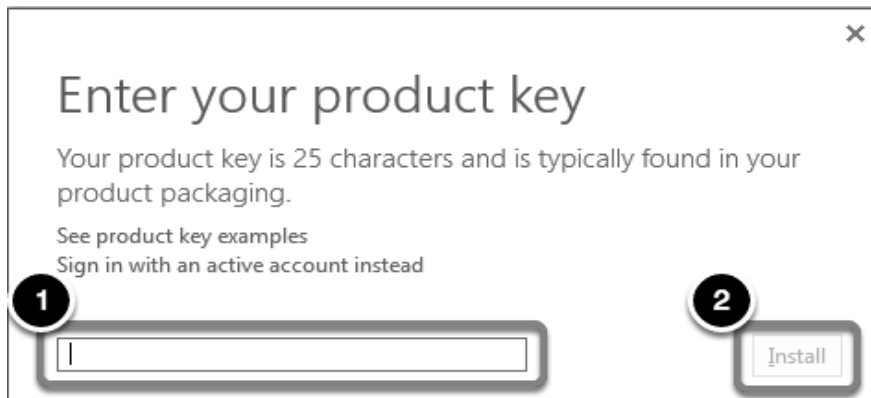


About Word

Learn more about Word, Support, Product ID, and Copyright information.

Click Change Product Key

Enter Product Key

NOTES 

1. Enter the product key found in the License file (view Find Product Key step above).
2. Click Install

Success!

You have successfully installed Office 2013 on Windows 7.

4.7 MICROSOFT OFFICE 365

Launched in 2001, Office 365 is a cloud-based, subscription model version of Microsoft's popular productivity suite Microsoft Office. Office 365 contains the same core applications as traditional versions of Office, including Word, Excel, PowerPoint, Outlook, OneNote, and depending on the plan purchased, may also include other apps and services such as Publisher, Planner, OneDrive, Exchange, SharePoint, Access, Skype, Yammer, and Microsoft Teams.

There are a number of different packages available when licensing Office 365, including versions for personal use, multi-user households, students, businesses, nonprofits, and education institutions.

There are also online- and mobile-only versions of Office, known as Office Online, through which users can get access to feature-limited versions of Office apps for free.

Although Office 365 does provide the actual Office package, this is merely a fraction of the features on offer. The real benefit is frequently underrated or even overlooked entirely. The Office 365 creates an integral and strategic direction within the enterprise. Besides features such as **Exchange Online**, **SharePoint Online** or **Skype for Business Online**, Office 365 enables **security functions**, **data analyses**, **project work**, **real-time communication**, **social networks** and much more.

How is Office 365 different from previous versions of Office?

Office 365 is a subscription-based service, meaning rather than buying a copy of the suite outright for a one-time, up-front cost, users instead pay a monthly subscription fee to access the service at a level of their choosing.



With Office 365's subscription-based model, users always have access to the latest version, as the platform is updated at Microsoft's end, whereas as perpetual, on premise users would have to buy a new copy of the latest edition to be able to use new features.

Office 365 is also built as a cloud-first application; although desktop versions of its apps are available with certain plans, it's designed to be used online. All applications, services, and data generated by Office 365 are hosted on Microsoft's servers.

Users don't need to install software or maintain any hardware on which to run it. Office 365 also comes with email hosting, and cloud storage space, so users can host their files online and have access to them wherever and whenever they need to, from any device that connects to the internet.

Being cloud-based, Office 365 also comes with a host of features not available in previous, perpetual versions.

4.8 CHAPTER SUMMARY

Microsoft Office (or simply Office) is a family of server software, and services developed by Microsoft. It was first announced by Bill Gates on August 1, 1988, in Las Vegas. The first version of Office contained Microsoft Word, Microsoft Excel, and Microsoft PowerPoint.

Microsoft Office 2010 programs have always been the most popular productivity software that is used by majority of the world population. Microsoft word has been one of the most useful ones and it provides a wide range of functionality and purposeful uses.

Microsoft Word 2010 is the most recent Word processing program and it is one of the mostly used one of the Microsoft Office Pack. Microsoft Word 2010 is highly sophisticated and it is used for composing letters, reports, academic papers, references, CVs, essays, term papers, articles, novels and many other things. You can print out what you produce, design it to make more attractive, add pictures, tables and list fact and figures by using graphics. You can save the word office document you have produced on the hard drive for later use or to edit further in future.

With the release of Office 2010, Microsoft made several improvements to the Office suite that includes Word, Excel, PowerPoint, Access, and Outlook.

Use PowerPoint to create electronic slides that can liven up even the most apathetic crowd. If you don't give your presentation electronically, you can create vivid overhead transparencies and valuable audience handouts that will rival the most polished presenters. With PowerPoint, you can create presentations that run automatically. Automated presentations are often used at kiosks at trade shows, but such presentations are seeing increased use of Internet. It is important to know about the interface of an application to work in any environment with ease. Excel 2010 provides an excellent user interface based on the task you need to perform.



When you open Excel 2010, the application displays two windows, one within the other. The outer window is the application window that allows you to interact with Excel 2010. The inner window is the workbook window that appears within the application window. The inner window is used to work with data.

Launched in 2001, Office 365 is a cloud-based, subscription model version of Microsoft's popular productivity suite Microsoft Office. Office 365 contains the same core applications as traditional versions of Office, including Word, Excel, PowerPoint, Outlook, OneNote, and depending on the plan purchased, may also include other apps and services such as Publisher, Planner, OneDrive, Exchange, SharePoint, Access, Skype, Yammer, and Microsoft Teams.

4.9 REVIEW QUESTIONS

SHORT ANSWER TYPE QUESTIONS

1. Discuss about Ribbon of MS EXCEL.
2. Discuss the concept of Status Bar in MS EXCEL.
3. How can we change the color scheme in Power Point.
4. Discuss the various ways to Build a Presentation.
5. How is Office 365 different from previous versions of Office?

LONG ANSWER TYPE QUESTIONS

1. Discuss the procedure of installing MS-OFFICE.
2. Discuss the File tab in Excel.
3. Explain the concept of Applying Transition, Animation Effects and Linking.
4. Discuss the File Tab of excel.
5. Discuss the procedure of adding footer in a presentation

4.10 MULTIPLE CHOICE QUESTIONS

1. _____ is a family of server software, and services developed by Microsoft.
 - a) Microsoft Office
 - b) Microsoft Outlook
 - c) Microsoft Office
 - d) Microsoft Excel
2. A _____ processes words.
 - a) Word processor
 - b) Spreadsheet Package
 - c) Powerpoint
 - d) Textprocessor



3. _____ is a software function describing the production of multiple (and potentially large numbers of) documents from a single template form and a structured data source.
 - a) Header
 - b) Footer
 - c) Mail merge
 - d) Merger
4. A _____ is a small software program.
 - a) Debugger
 - b) Scroller
 - c) Hard drive
 - d) Macro
5. A _____ is a special type of document that determines the basic layout of a document.
 - a) Document
 - b) Template
 - c) Heading
 - d) Mail Merge
6. Use PowerPoint to create electronic _____ that can liven up even the most apathetic crowd.
 - a) Slides
 - b) Pages
 - c) Spreadsheets
 - d) Documents
7. _____ lets you work with slides one at a time.
 - a) Book view
 - b) Bar Graph view
 - c) Print Layout view
 - d) Slide view
8. PowerPoint includes sounds and video you can play during you _____.
 - a) Slide views
 - b) Slide shows
 - c) Slide sorter
 - d) Slide optimization
9. An Excel file is also referred as _____.
 - a) Workbook

- b) Book
 - c) Document
 - d) Spreadsheet file
10. The master slide includes a footer area.
- a) First
 - b) Master
 - c) Document
 - d) Last

◆◆◆◆

NOTES 

UNIT

V

ADVANCED EXCEL AND MULTIMEDIA

STRUCTURE

- 5.1 Learning objective
- 5.2 Introduction
- 5.3 Excel Working
- 5.4 Functions in Excel
- 5.5 Multimedia
- 5.6 Chapter Summary
- 5.7 Review Questions
- 5.8 Multiple Choice Questions

5.1 LEARNING OBJECTIVE

NOTES 

After completing this chapter, you will be able to:

- Understand the working of Excel.
- Understand various Functions of MS Excel.
- Learn and understand about Multimedia.

5.2 INTRODUCTION

Microsoft Excel is a spreadsheet program used to record and analyze numerical and statistical data. Microsoft Excel provides multiple features to perform various operations like calculations, pivot tables, graph tools, macro programming, etc. It is compatible with multiple OS like Windows, mac OS, Android and iOS.

An Excel spreadsheet can be understood as a collection of columns and rows that form a table. Alphabetical letters are usually assigned to columns, and numbers are usually assigned to rows. The point where a column and a row meet is called a cell. The address of a cell is given by the letter representing the column and the number representing a row.

5.3 EXCEL WORKING

How to Use Excel

To use Excel, you only need to input the data into the rows and columns. And then you'll use formulas and functions to turn that data into insights.

We're going to go over the best formulas and functions you need to know. But first, let's take a look at the types of documents you can create using the software. That way, you have an overarching understanding of how you can use Excel in your day-to-day.

Documents You Can Create in Excel

Not sure how you can actually use Excel in your team? Here is a list of documents you can create:

- **Income Statements:** You can use an Excel spreadsheet to track a company's sales activity and financial health.
- **Balance Sheets:** Balance sheets are among the most common types of documents you can create with Excel. It allows you to get a holistic view of a company's financial standing.
- **Calendar:** You can easily create a spreadsheet monthly calendar to track events or other date-sensitive information.

Here are some documents you can create specifically for marketers.

- **Marketing Budgets:** Excel is a strong budget-keeping tool. You can create and track marketing budgets, as well as spend, using Excel.

- **Marketing Reports:** If you don't use a marketing tool such as Marketing Hub, you might find yourself in need of a dashboard with all of your reports. Excel is an excellent tool to create marketing reports.
- **Editorial Calendars:** You can create editorial calendars in Excel. The tab format makes it extremely easy to track your content creation efforts for custom time ranges.
- **Traffic and Leads Calculator:** Because of its strong computational powers, Excel is an excellent tool to create all sorts of calculators — including one for tracking leads and traffic
- This is only a small sampling of the types of marketing and business documents you can create in Excel.

5.4 FUNCTIONS IN EXCEL

Financial Functions

FV: Future value is one of the most important concepts in finance. Luckily, once you learn a few tricks, you can calculate it easily using Microsoft Excel or a financial calculator.

Let's look at an example to illustrate the process.

Assume you are trying save up enough money to buy a car at the end of six months. You already have \$10,000 in an account that pays 5% interest per year. You can add \$1,000 to the account at the end of each month. How much will you have to spend on a car at the end of six months?

How to Calculate Future Value Using Excel

- **The process will be easiest if you use the spreadsheet as a table to keep track of the different variables and periods you'll need for your calculation. First, label the cells in column A as follows:**
 - A1 = the time period — in this case, A1 = Months
 - A2 = Periodic Rate
 - A3 = Payment Amount
 - A4 = Present Value (PV)
 - A5 = Future Value (FV)
- **Next, fill in the information for the cells in each row.**
 - B1-H1 = Months 0-6
 - B2-H2 = 0.417% (to calculate the periodic rate, take the annual rate from the example and divide by the number of periods per year. Using our example, Periodic Rate = 5.0% / 12 = 0.417%)
 - C3-H3 = -\$1,000

B4 = -10,000

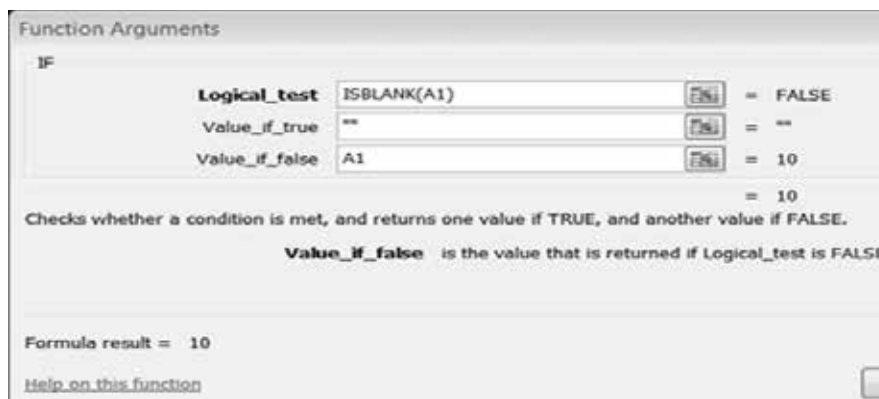
Note that because we're not making a payment today (at time 0), we don't put anything in cell B3. Also note that we've decided to make the amount negative because the \$1,000 payments are coming out of our wallets and going into the bank's account. They are cash outflows relative to you, the investor. We use the same idea for the present value of the money we've already set aside.

Your Excel spreadsheet should now look like this:

A	B	C	D	E	F • i	G	H
1 i Month	0	1	2	3	4	5	6
2 Periodic Rate	0.417%	0.417%	0.417%	0.417%	0.417%	0.417%	0.417%
3 Payment Amount	0	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000
4 Present Value	-10,000						
5 Future Value							

- Now that we have our table, we are ready to calculate FV. First, select the cell at B5.
- Next, click on the function button (fx) which is located right above the column labels. Once you click fx, a box will pop up.
- Select the "Financial" category from the drop down menu and choose the FV function from the list. Then click "OK."
- A new box will come up asking you to type in the amounts for each variable given. Use your table to help you fill in the boxes — you're being asked for all the information you already used to create your table. Once you have entered the amounts, the solution to FV will automatically appear in the bottom left corner of the box and be labeled "Formula result."

When you click "OK" to accept the solution, it will be displayed in the cell you selected next to future Value. Your Excel spreadsheet should now look like this with this correct solution for



NOTES 

PV: The PV (Present Value) function in Excel 2013 is found on the Financial button's dropdown menu on the Ribbon's Formulas tab (Alt+MI). The PV function returns the present value of an investment, which is the total amount that a series of future payments is worth presently.

The syntax of the PV function is as follows:

= PV (rate, nper, pmt, [fv], [type])

The FV and type arguments are optional arguments in the function (indicated by the square brackets). The FV argument is the future value or cash balance that you want to have after making your last payment. If you omit the FV argument, Excel assumes a future value of zero (0).

The type argument indicates whether the payment is made at the beginning or end of the period: Enter 0 (or omit the type argument)' when the payment is made at the end of the period, and use 1 when it is made at the beginning of the period.

The figure contains several examples using the PV function. All three PV functions use the same annual percentage rate of 1.25 per cent and term of 10 years. Because payments are made monthly, each function converts these annual figures into monthly ones.

For example, in the PV function in cell E3, the annual interest rate in cell A3 is converted into a monthly rate by dividing by 12 (A3/12). The annual term in cell B3 is converted into equivalent monthly periods by multiplying by 12 (B3 x 12).

Note that although the PV functions in cells E3 and E5 use the rate, nper, and pmt (\$218.46) arguments, their results are slightly different.

This is caused by the difference in the type argument in the two functions: the PV function in cell E3 assumes that each payment is made at the end of the period (the type argument is 0 whenever it is omitted), whereas the PV function in cell E5 assumes that each payment is made at the beginning of the period (indicated by a type argument of 1).

When the payment is made at the beginning of the period, the present value of this investment is \$0.89 higher than when the payment is made at the end of the period, reflecting the interest accrued during the last period.

The third example in cell E7 uses the PV function with an FV argument instead of the pmt argument. In this example, the PV function states that you would have to make monthly payments of \$7,060.43 for a 10-year period to realize a cash balance of \$8,000, assuming that the investment returned a constant annual interest rate of 1 1/4 per cent.

Note that when you use the PV function with the FV argument instead of the pmt argument, you must still indicate the position of the pmt argument in the function with a comma (thus the two commas in a row in the function) so that Excel doesn't mistake your FV argument for the pmt argument.



PMT: The PMT function, one of Excel's financial functions, can be used to calculate the payments for a loan or the future value of an investment.

The syntax for the PMT function is:

= PMT (rate, nper, pv, fv, type)

rate: the annual interest rate for the loan.

PPMT

This article describes the formula syntax and usage of the PPMT function in Microsoft Excel.

Description

Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate.

Syntax

PPMT (rate, per, nper, pv, [fv], [type])

Note For a more complete description of the arguments in PPMT, see PV.

The PPMT function syntax has the following arguments:

- **Rate:** The interest rate per period.
- **Per:** Required. Specifies the period and must be in the range 1 to nper.
- **Nper:** Required. The total number of payment periods in an annuity.
- **Pv:** Required. The present value — the total amount that a series of future payments is worth now.
- **Fv:** Optional. The future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, it is assumed to be 0 (zero), that is, the future value of a loan is 0.
- **Type:** Optional. The number 0 or 1 and indicates when payments are due.

IPMT

Description

The Microsoft Excel **IPMT function** returns the interest payment for an investment based on an interest rate and a constant payment schedule.

Syntax

The syntax for the Microsoft Excel **IPMT function** is:

IPMT(interest rate, period, number_payments, PV, [FV], [Type])NPER

Description

The Microsoft Excel **NPER function** returns the number of periods for an investment based on an interest rate and a constant payment schedule.

Syntax

The syntax for the Microsoft Excel **NPER function** is:

NPER (interest rate, payment, PV, [FV], [Type])

RATE:

Description

The Microsoft Excel **RATE function** returns the interest rate for an annuity.

Syntax

The syntax for the Microsoft Excel **RATE function** is:

RATE (number payments, payment, PV, [FV], [Type], [Estimate])

Parameters or Arguments

number payments is the number of payments for the annuity.

payment is the amount of the payment made each period.

PV is the present value.

FV is optional. It is the future value. If this parameter is omitted, the **RATE function** assumes a FV value of 0.

Type is optional. It indicates when the payments are due. Type can be one of the following values:

Value	Explanation
0	Payments are due at the end of the period, (default)
1	Payments are due at the beginning of the period.

If the Type parameter is omitted, the **RATE function** assumes a Type value of 0. Estimate is optional. It is your guess at what the rate will be. If this parameter is omitted, the **RATE function** assumes an Estimate of 10%.

NPV

Description

The Microsoft Excel **NPV function** returns the net present value of an investment.

Syntax

The syntax for the Microsoft Excel **NPV function** is:

NPV (discount rate, value I, [value2, ... value n])



Parameters or Arguments

- Discount rate is the discount rate for the period.
- Value 1, value2, ... value n are the future payments and income for the investment (ie: cash flows).

Note

Microsoft Excel's **NPV function** does not account for the initial cash outlay, or may account for it improperly depending on the version of Excel. However, there is a workaround.

This workaround requires that you **NOT** include the initial investment in the future payments/income for the investment (i.e.: value 1, value2, ... value n), but instead, you need to subtract from the result of the **NPV function**, the amount of the initial investment.

The workaround formula is also different depending on whether the cash flows occur at the **end of the period** (EOP) or at the beginning of the period (BOP).

If the cash flows occur at the end of the period (EOP), you would use the following formula:

= NPV(discount rate, value 1, value2, ... value n) - Initial Investment

If the cash flows occur at the **beginning of the period** (BOP), you would use the following formula:

= NPV (discount rate, value2, ... value n) - Initial Investment + value 1

IRR

Internal rate of return (IRR) that is also known as the discounted cash flow rate of return (DCFROR), is commonly used to evaluate the profitability of an investment. For folks who like to sign up for an investment plan, endowment plan and wealth accumulation plan to enhance their wealth management and diversification certainly would like to know the internal rate of return. Normally, the IRR is not mentioned in the plan, but can be easily calculated with Microsoft Office Excel application. With Microsoft Excel, you can calculate IRR yourself to avoid any misleading cases due to dishonest financial planner and agent.

For example, an investment plan requires you to invest \$6,000 annually for 10 years, and \$1,000 cash is returned as rebate from year 2 to year 10, followed by \$2,500 yearly cash rebate from year 11 - 19. For final year (20) which is when the plan is terminated, you can get back another one lump sum of \$80,000. So, what's the internal rate of return?

Formula to use in Excel is IRR (values, guess).

Note: guess is a number that you guess is close to the result of IRR; Excel will use the default value of 0.1 (10%) if omitted. It's normally no need to enter a guess value for the IRR calculation.

Formula = IRR (A1:A20) = 0.053 = 5.3%

The real effective interest rate of the plan A is 5.3% per year!

CHECK YOUR PROGRESS

1. Explain Rate Function.
2. Explain NPV Function.
3. Explain IRR Function.
4. Explain Working of Excel.
5. Discuss IPMT function in Excel.

DATABASE FUNCTIONS

VLOOKUP:

Description

The **VLOOKUP function** performs a vertical lookup by searching for a value in the left-most column of table array and returning the value in the same row in the index number position.

Syntax

The syntax for the Microsoft Excel **VLOOKUP function** is:

VLOOKUP (value, table array, index number, ^not exact match))

Parameters or Arguments

- Value is the value to search for in the first column of the table array.
- Table array is two or more columns of data that is sorted in ascending order. index number is the column number in table array from which the matching value must be returned. The first column is 1.
- Not exact match is optional. It determines if you are looking for an exact match based on value. Enter false to find an exact match. Enter true to find an approximate match, which means that if an exact match is not found, then the vlookup function will look for the next largest value that is less than value. If this parameter is omitted, the VLOOKUP function returns an approximate match.

Note

- If index number is less than 1, the **VLOOKUP function** will return #VALUE!.
- If index number is greater than the number of columns in table array, the **VLOOKUP function** will return #REF!.
- If you specify FALSE for the not exact match parameter and no exact match is found, then the **VLOOKUP function** will return #N/A.

HLOOKUP

The Microsoft Excel **HLOOKUP function** performs a horizontal lookup by searching for a value in the top row of table array and returning the value in the same column based on the index number.



Syntax

The syntax for the Microsoft Excel **HLOOKUP** function is:

HLOOKUP (value, table array, index number, [not_exact_match])

Parameters or Arguments

- Value is the value to search for in the first row of the table array.
- Table array is two or more rows of data that is sorted in ascending order.
- Index number is the row number in table array from which the matching value must be returned.

The first row is 1.

- Not exact match is optional. It determines if you are looking for an exact match based on value.
- Enter false to find an exact match. Enter true to find an approximate match, which means that
- If an exact match is not found, then the **hlookup** function will look for the next largest value
- That is less than value. If this parameter is omitted, **HLOOKUP** will return an approximate match.

Note

- If index number is less than 1, the **HLOOKUP** function will return #VALUE!
- If index number is greater than the number of columns in table array, the **HLOOKUP** function will return #REF!
- If you enter FALSE for the not exact match parameter and no exact match is found, then the **HLOOKUP** function will return #N/A.

Conditional Logic Functions

IF

Description

The Microsoft Excel **IF** function returns one value if a specified condition evaluates to TRUE, or another value if it evaluates to FALSE.

Syntax

The syntax for the Microsoft Excel IF function is:

IF(condition, [value_if_true], [value if'false])

Parameters or Arguments

- Condition is the value that you want to test.
- Value if true is optional. It is the value that is returned if condition evaluates to true.
- Value if false is optional. It is the value that is return if condition evaluates to false.

COUNTIF

Description

The Microsoft Excel **COUNTIF function** counts the number of cells in a range, that meets a given criterion. If you wish to apply multiple criteria, try using the COUNTRIES function.

Syntax

The syntax for the Microsoft Excel **COUNTIF function** is:

COUNTIF (range, criteria)

Parameters or Arguments

- Range is the range of cells that you want to count based on the criteria.
- Criteria are used to determine which cells to count.

SUMIF

Description

The Microsoft Excel **SUMIFS function** adds all numbers in a range of cells, based on a single or multiple criteria.

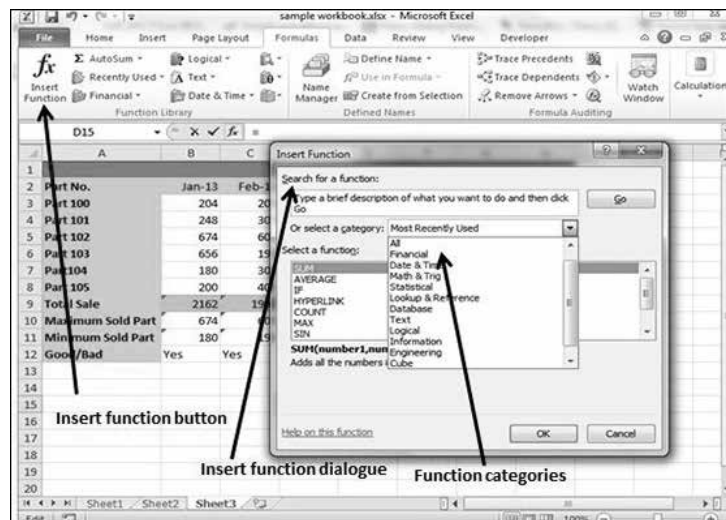
Syntax

The syntax for the Microsoft Excel **SUMIFS function** is:

SUMIF (sum range, criteria range 1, criterial, [criteria _range2, criteria2, ... criteria range n, criteria nl)

Parameters or Arguments

- Sum range is the cells to sum.
- Criteria range 1 is the range of cells that you want to apply criterial against.
- Criterial is used to determine which cells to add. criterial is applied against criteria range 1.



DATA ANALYSIS USING EXCEL

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Goal Seeks

If you know the result that you want from a formula, but are not sure what input value the formula needs to get that result, use the Goal Seek feature. For example, suppose that you need to borrow some money. You know how much money you want, how long you want to take to pay off the loan, and how much you can afford to pay each month. You can use Goal Seek to determine what interest rate you will need to secure in order to meet your loan goal.

Note: Goal Seek works only with one variable input value. If you want to accept more than one input value; for example, both the loan amount and the monthly payment amount for a loan, you use the Solver add-in. For more information about the Solver add-in, follow the links in the **See Also** section.

Step-by-step with an example

Let's look at the preceding example, step-by-step.

Because you want to calculate the loan interest rate needed to meet your goal, you use the **PMT** function. The **PMT** function calculates a monthly payment amount. In this example, the monthly payment amount is the goal that you seek.

Prepare the worksheet

- Open a new, blank worksheet.
- First, add some labels in the first column to make it easier to read the worksheet.
- In cell A1, type **Loan Amount**.
- In cell A2, type **Term in Months**.
- In cell A3, type **Interest Rate**.
- In cell A4, type **Payment**.
- Next, add the values that you know.
- In cell B1, type **100000**. This is the amount that you want to borrow.
- In cell B2, type **180**. This is the number of months that you want to pay off the loan.

Note: Although you know the payment amount that you want, you do not enter it as a value, because the payment amount is a result of the formula. Instead, you add the formula to the worksheet and specify the payment value at a later step, when you use Goal Seek.

- Next, add the formula for which you have a goal. For the example, use the **PMT** function:
- In cell B4, type = **PMT(B3/12,B2,B1)**. This formula calculates the payment amount. In this example, you want to pay \$900 each month. You don't enter that amount here, because you want to use Goal Seek to determine the interest rate, and Goal Seek requires that you start with a formula.

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The formula refers to cells B1 and B2, which contain values that you specified in preceding steps. The formula also refers to cell B3, which is where you will specify that Goal Seek put the interest rate. The formula divides the value in B3 by 12 because you specified a monthly payment, and the **PMT** function assumes an annual interest rate.

Because there is no value in cell B3, Excel assumes a 0% interest rate and, using the values in the example, returns a payment of \$555.56. You can ignore that value for now.

For more information about the **PMT** function, see the **See Also** section.

Use Goal Seek to determine the interest rate

- On the **Data** tab, in the **Data Tools** group, click **What-If Analysis**, and then click **Goal Seek**.
- In the **Set cell** box, enter the reference for the cell that contains the formula that you want to resolve. In the example, this reference is cell B4.
- In the **To value** box, type the formula result that you want. In the example, this is -900. Note that this number is negative because it represents a payment.
- In the **By changing cell** box, enter the reference for the cell that contains the value that you want to adjust. In the example, this reference is cell B3.

Note: The cell that Goal Seek changes must be referenced by the formula in the cell that you specified in the **Set cell** box.

- Click **OK**.

Goal Seek runs and produces a result, as shown in the following illustration.

The value in cell 04 is the result of the formula =PMT(03/12,02,01).		
	A	8
1	Loan Amount	\$ 100,000
2	Term in Months	180
3	Interest Rate	7.02% ⁱ
4	Payment	-- (\$900.00)

Goal seeks to determine the interest rate in cell B3 based on the payment in cell 04.

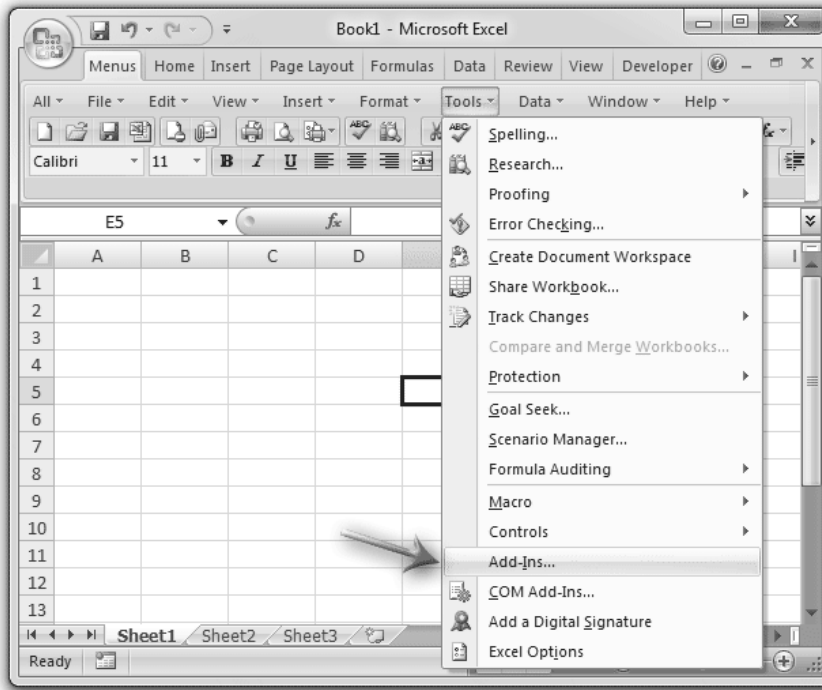
- Finally, format the target cell (B3) so that it displays the result as a percentage.
- On the **Home** tab, in the **Number** group, click **Percentage**.
- Click **Increase Decimal** or **Decrease Decimal** to set the number of decimal places.

Solver

The Solver is an add-in for Microsoft Excel which is used for the optimization and simulation of business and engineering models. It solves complex linear and non linear problems and can also be used in conjunction with VBA to automate tasks.

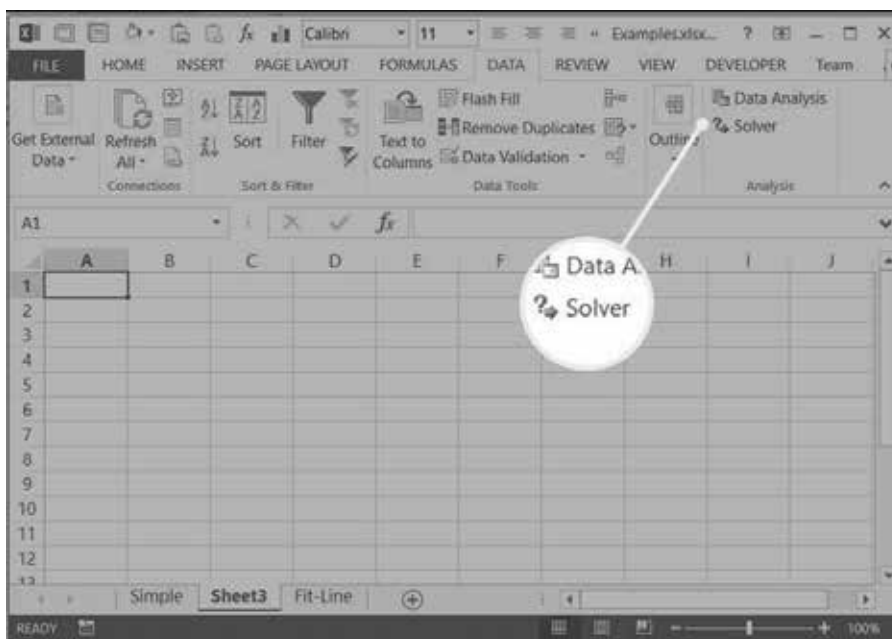
How To Enable The Solver Add-in

The add-in is included by default in MS Excel but kept disabled. In order to enable it, click the File Menu and choose Options. Now, in the Excel Options dialogue box, select Add-Ins from the left sidebar and then hit the GO button next to Manage Excel Add-ins at the bottom. What you have to do now is check the Solver Add-in option and hit OK to enable it.



How To Access The Solver Add-in

Solver is located under the Data tab as shown in the screenshot below.



How To Use Solver

Once you click the Solver option, it loads the dialogue box as shown below. Here you specify the parameters to run the solver.



These parameters will vary depending upon your problem, but let's see what are the most common and mandatory parameters and how they work so that you can utilize the solver in your daily life problems when needed. Followings are the three main parts of the solver which you should understand before applying the solver.

Target Cell

The target cell is the cell which will represent the objective or goal. Lets suppose a scenario in which the production manager of a firm would presumably want to maximize the profitability of the Product during each month. The cell that measures profitability would be the target cell.

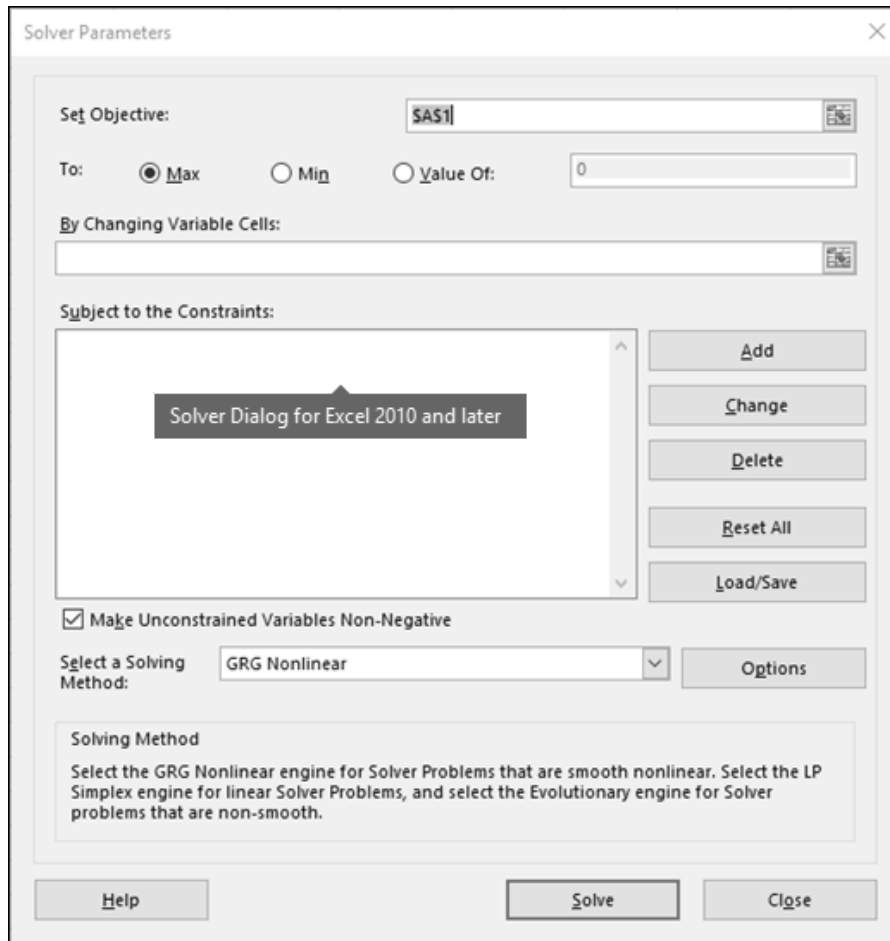
Changing Cells

Changing cells are those cells that can change or adjust to optimize the target cell. The production manager can adjust the amount produced for each product during a month. The cells in which these amounts are recorded are the changing cells.

Constraints

Constraints are restrictions/limitations that you apply on the changing cells. For example in the above scenario, the product manager can't use more of any available resource (for example, raw material and labour) than the amount of the available resource.

That's it, specify all of the above mentioned parameters as per your spreadsheet. Set Objectives represents the target cell, By changing Variable Cells represents the Changing cells and you can add the constraint by hitting the Add button.



Once done with the entire configuration, hit the Solve button to run the solver on your Excel spreadsheet.

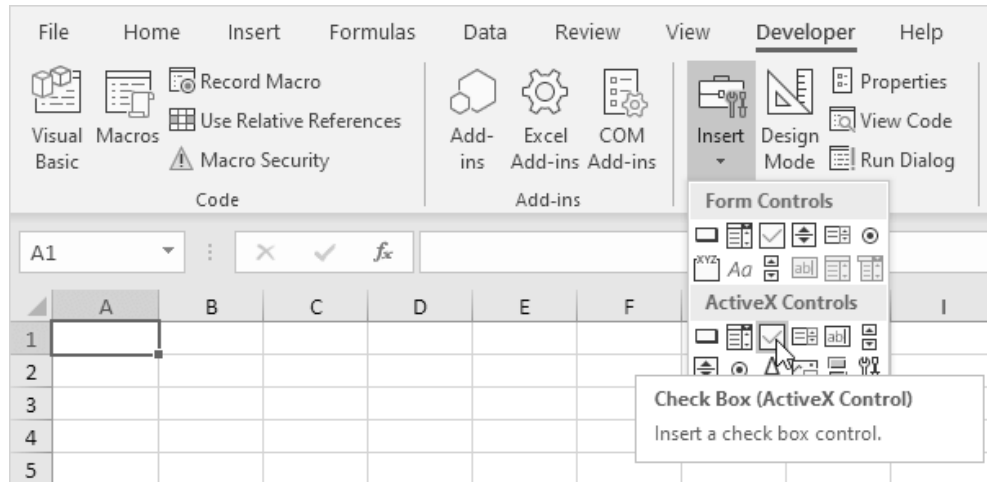
Creating Simple Macros

With **Excel VBA** you can automate tasks in Excel by writing so called macros. In this chapter, learn how to create a simple **macro** which will be executed after clicking on a command button. First, turn on the Developer tab.

Developer Tab

To turn on the Developer tab, execute the following steps.

- Right click anywhere on the ribbon, and then click Customize the Ribbon.
- Under Customize the Ribbon, on the right side of the dialog box, select Main tabs (if necessary).
- Check the Developer check box.
- Click OK.



- You can find the Developer tab next to the View tab.

Command Button

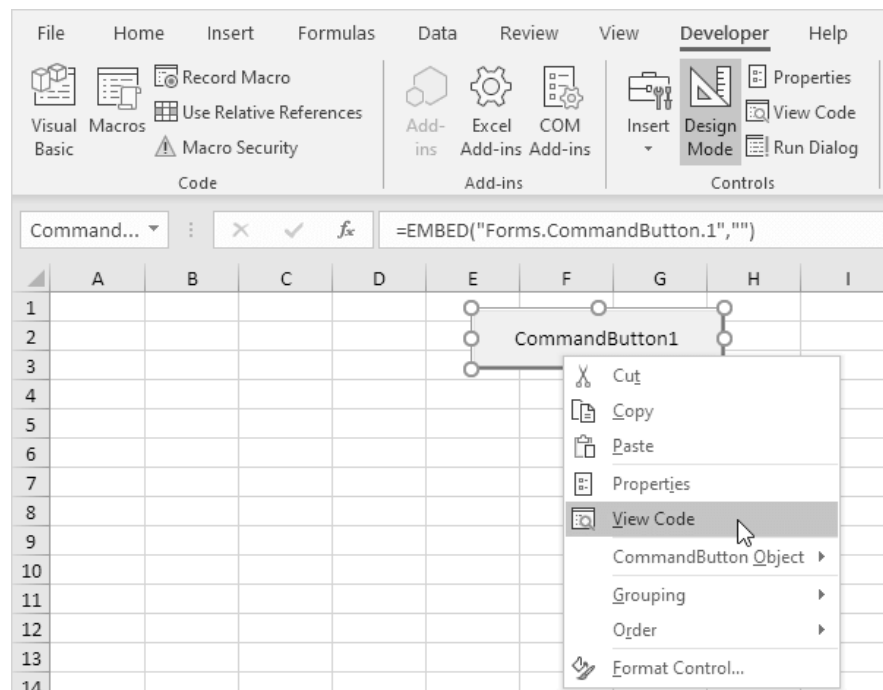
To place a command button on your worksheet, execute the following steps.

- On the Developer tab, click Insert.
- In the ActiveX Controls group, click Command Button.
- Drag a command button on your worksheet.

Assign a Macro

To assign a macro (one or more code lines) to the command button, execute the following steps.

- Right click Command Button (make sure Design Mode is selected).



The Visual Basic Editor appears.

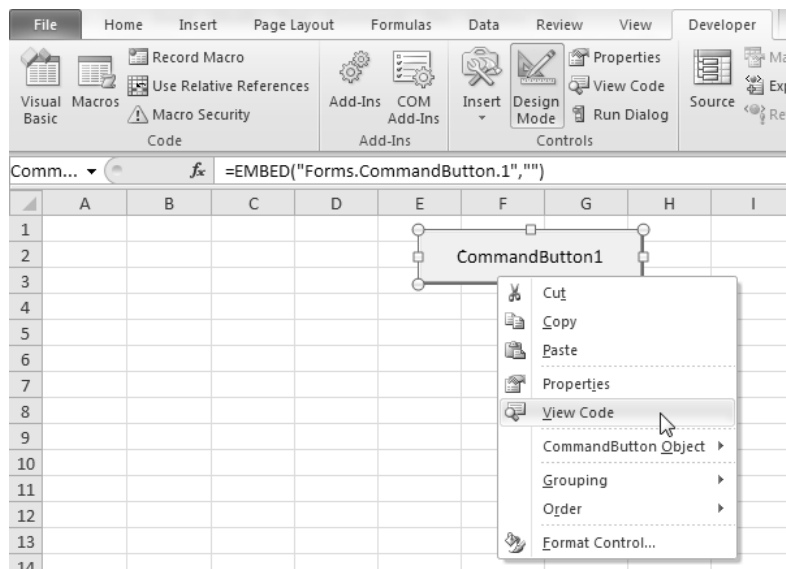
- Place your cursor between Private Sub CommandButton1_Click() and End Sub.

Microsoft Visual Basic for Applications - create-a-macro.xls - [Sheet1 (Code)]

Note: the window on the left with the names Sheet1, Sheet2 and Sheet3 is called the Project Explorer. If the Project Explorer is not visible, click View, Project Explorer. To add the Code window for the first sheet, click Sheet1 (Sheet1).

- Close the Visual Basic Editor.
- Click the command button on the sheet (make sure Design Mode is deselected).

Result:



Congratulations. You've just created a macro in Excel!

5.5 MULTIMEDIA

Definition

In simple words, multimedia means multi (many) and media refers to communication/transfer medium. Multimedia is any combination of text, graphics art, sound, animation and video elements delivered to you by your computer or any other electronic means. A computer's encyclopedia containing images, audio and video effects along with the content is a simple example of a multimedia application. Although the definition of multimedia is fairly simple, making it work can be quite complicated. You would need to understand the importance of each individual's element and also have knowledge about the usage of multimedia tools and technologies, to weave the element of multimedia in a meaningful manner.

Human interactivity forms the core of any multimedia application. This includes response to the commands (clicking on buttons, icons, menu items etc.) dictated by the end user. This

NOTES 

type of multimedia- where a user to controls what and when the elements are delivered-is referred to as **Interactive Multimedia**. When users are given navigational controls so that they are navigational control so that they can navigate from one element to another in a non-linear fashion, interactive multimedia becomes **Hypermedia**.



Importance of Multimedia

- Multimedia is characterized by an audio-visual interface, which provides an excellent medium for user interactivity. It improves information retention. (According to a research conducted by computer technology, people only retain 20% of what they see and 30% of what they hear. But they remember 50% of what they see and hear, and as much as 80% of what they see, hear, and do simultaneously.)
- Computer games are the most common application of multimedia. Other widely used application includes education CDs (CBT) and promotional information.
- Multimedia has also become an integral part of the internet. Webpages can contain animated images, videos and sound effects, in addition to text, to make them more appealing and interactive.

Multimedia Tools

Authoring Tools

The key to successful multimedia production is a seamless integration of multimedia element for graphic design, content management, production and packaging. The whole process of developing a multimedia package is called Authoring. An authoring system is a collection of software tools that help in various aspects of multimedia production. Multimedia elements are woven together using authoring tools. These tools are designed to manage individual multimedia element and provide user interaction. Multimedia authoring software can be used to make:

- Video productions
- Animations
- Games
- Presentations
- Interactive kiosk applications
- Interactive training
- Simulations, prototypes and technical visualisation

Steps in multimedia production

Media capture: Multimedia authoring systems streamline data capture by providing interface to a range of images and data capture devices.

Media conversion: Images, audio clips, animation, sequences and video clips exist in a variety of formats. A well-equipped multimedia authoring system will include a set of utilities for converting between many of the commonly used formats.

Media editing: After data has been captured and converted to the native format of the authoring system, it may need some polishing before it is suitable for presentation. For instance, 'noise' can be removed from audio clips, images can be touched up, and etc. Multimedia authoring system provides media-specific editors for these operations.

Media composition: The core of a multimedia authoring system includes a tool for combining media and specifying their spatial and temporal relationships.

Elements of Multimedia

Text

Text, containing words and symbols, is the most common form of communication. It is one of the popularly used mediums of appearance that is used to deliver information accurately and in detail. Usually text provides the core structure to the package. Words are vital elements of multimedia that can appear in the titles, menus, navigation aids and in the content of a multimedia application or project. It is most essential to use words that have the most precise and powerful meanings to express what you need to convey.

A major drawback of using text is that it is not user-friendly as compared to the other element of multimedia. For example: it is harder to read from a screen for long, as it tires the eyes more than w.-ding it in its print version.

Designing with text: from a design perspective, the choice of font size, style and other text attributes needs to be related both to the complexity of the message and to its venue.

Some useful tips for designing the text in your multimedia application:

- Use legible fonts that can be easily read.
- Vary the font size and style according to the importance of your message.



- Indent your paragraphs wherever required.
- Explore the effects of different colours and shadows to add depth to your application.
- Use menus for easy navigation and meaningful words for menu item.
- Use buttons, icons or symbols for user interaction.
- You can also use stylish fonts for displaying attention- grabbing results.

Graphics

Pictures/graphics enhance the overall look of a multimedia package. Picture express more than normal texts are generally considered as the most important element of a multimedia application.

It is often noticed that a webpage containing numerous images taken longer to download than a simple text-based webpage. Images files are therefore compressed to save memory and disk space of your computer. GIF and PNG are examples of compressed image file format.



Pictures can be created using any of the following ways:

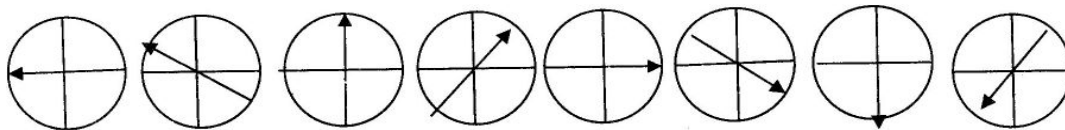
- You can use drawing tools like MS paint to create simple picture. Paint allows creating or assembling picture by drawing straight, ways or curved lines, using shapes like squares, circles and polygons, or simply by freehand drawing.
- You can insert images from the clipart gallery; a clipart collection typically contains a series of images for different categories. Clip art is available through CD-ROMs or from the internet.



- You can use scanner or digital camera to capture original picture in digested form. You can also scan images, created using traditional methods like water colors, crayons etc.
- Do not overload your application with too many images. This would not only make your application look clumsy, but it would also consume excessive computer resources.
- Do not include heavy graphics.
- Use context-sensitive image.

Animation

Animation gives visual impact to your multimedia application. In simple terms, it can be defined as an entity moving across the screen. This entity could be a text object or an image. An animation consists of a series of rapidly changing objects, which when blended together gives an illusion of movement. The speed with which each object is replaced by the next one is so rapid that the eye perceives this as motion.



Sound

Sound is used to set the rhythm or a mood in a package. Speech gives an effect of a language for instance. Proper usages of sound can make all the different between ordinary multimedia presentations and professional one.

Creating sound: Sound can be recorded using microphone, a synthesizer, or any other medium like tape or cassette player and then be digested using audio digesting software. Therefore, sound may be digitized from any source - natural or pre-recorded. Digitized sounds are stored as wave (.WAV) file. These can be played using windows media player.

APPLICATION OF MULTIMEDIA

Multimedia in Education

As compared to traditional 'stand and deliver' teaching methodology, training imparted using animated, interactive and instrumental multimedia applications has proven to be more useful. Apart from making the subject interesting, it increases information retention and learning capacity of the users. The potential for students of all ages to author as part of a creative educational programme that focuses on achievement of goals and competencies rather than time served, will help educators to shift from teacher to facilitator and mentor. Some applications of multimedia in education are stated below.

- Computer encyclopedia has gained considerable popularity in recent years as they allow users a non-linear navigation of text; users can quickly access the desired topic.



- Multimedia-based presentation and tutorials provide an easy-to-learn environment for the young generations. Reading and retention skills grows when concept are explained using animated pictures. It can be used as a homework helper or serve as a literature guide.
- Multimedia can be used for stimulating different types of environments used for training purposes.
- Multimedia can prove tremendously useful in the medical field. It gives an opportunity of in-depth, clear and interactive learning of new clinical advancement.

Multimedia in Entertainment

With the arrival of the CD-ROM and the internet, the entertainment industries made a huge leap into a new era with a winning card - multimedia. Armed with animated images, sounds, full-motion video and interactive capability, multimedia became a dominant factor in today's information age. The fast but steady growth of electronic technology allowed multimedia to gain popularity within a short span of time. Some application of multimedia in the entertainment field is stated below: Games are the first things that come to mind when we talk about multimedia. Multimedia capabilities are used to develop interactive games with sophisticated animation, 3D and sound effect. These games can be played on the computer, mobile devices or on the internet.

- Another common application of multimedia is the advent of animated e-greeting card for different occasions.
- Wedding albums and family histories can be created on the World Wide Web using the power of multimedia.
- Multimedia has also found its applications in hotels, pubs, shopping malls, museums, cinema halls, where stand-alone terminals or kiosks are made available for guiding users.
- Printers are also usually attached so that users can walk away with a printed copy of the desired information.

Multimedia in Marketing

Advertising has become very prevalent in our daily surroundings, so for a product to stand apart, it is very essential to present in a dynamic, visually stimulating manner to grab attention of consumer. The business world is slowly rejecting run of the mill traditional methods and adopting solutions from the electronic era. Only companies with a nerve to radically change their marketing strategies for the new millennium will survive and be able to cater to the ever-changing customer's mindset.

Application of multimedia in the marketing field includes:

- Presentation for launching the product of a company. Reaching the target audience with necessary technical services or products requires clear communications, stating the benefits and features, outlining its and any other products related details, all presented in a well- designed and interactive manner so that the users familiarize faster.

- Multimedia to create interactive product catalogues, training tutorials, buyer guides, and information directories with adequate search and navigation facilities to guide the user easily trace the desired information. A buyer guides can list the nearby dealers, a comparison of the top brands, maps of the city and other helpful guest services.
- e-Mail advertising or placing banner ads on the Internet - an extremely cost-effective method of launching a product, promoting an event or selling services. Effective use of multimedia in advertising can make potential clients sit up and make notice.

NOTES 

5.6 CHAPTER SUMMARY

Microsoft Excel is a spreadsheet program used to record and analyze numerical and statistical data. Microsoft Excel provides multiple features to perform various operations like calculations, pivot tables, graph tools, macro programming, etc. It is compatible with multiple OS like Windows, mac OS, Android and iOS.

Future value is one of the most important concepts in finance. Luckily, once you learn a few tricks, you can calculate it easily using Microsoft Excel or a financial calculator. In simple words, multimedia means multi (many) and media refers to communication/transfer medium. Multimedia is any combination of text, graphics art, sound, animation and video elements delivered to you by your computer or any other electronic means. A computer's encyclopedia containing images, audio and video effects along with the content is a simple example of a multimedia application. As compared to traditional 'stand and deliver' teaching methodology, training imparted using animated, interactive and instrumental multimedia applications has proven to be more useful. Apart from making the subject interesting, it increases information retention and learning capacity of the users.

5.7 REVIEW QUESTIONS

SHORT ANSWER TYPE QUESTIONS

1. Explain in brief the various elements of multimedia.
2. Write short note on application of multimedia.
3. Discuss Hlookup and vlookup functions.
4. Discuss the Solver and Goal seek feature of MS EXCEL.
5. Explain the tools of multimedia.

LONG ANSWER TYPE QUESTIONS

1. Explain PMT function of MS Excel.
2. Explain the role of Multimedia in Entertainment and Marketing.
3. Explain steps in multimedia production.
4. Discuss various financial functions of MS-Excel.
5. Discuss various Data Analysis features of Excel.



5.8 MULTIPLE CHOICE QUESTIONS

1. _____ is a spreadsheet program used to record and analyze numerical and statistical data.
 - a) Microsoft Excel
 - b) Microsoft Office
 - c) Microsoft PowerPoint
 - d) Microsoft Spreadsheet
2. _____ value is one of the most important concepts in finance.
 - a) Money
 - b) Current
 - c) Next
 - d) Future
3. The _____ function, one of Excel's financial functions, can be used to calculate the payments for a loan or the future value of an investment.
 - a) PMT
 - b) NV
 - c) IPMT
 - d) FV
4. Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate.
 - a) PV
 - b) IPMT
 - c) FV
 - d) PPMT
5. _____ that is also known as the discounted cash flow rate of return (DCFROR), is commonly used to evaluate the profitability of an investment.
 - a) PMT
 - b) PV
 - c) IRR
 - d) IPR
6. The _____ function performs a vertical lookup by searching for a value in the left-most column of table array and returning the value in the same row in the index number position.
 - a) VLOOKUP
 - b) HLOOKUP

- c) VERTICAL
 - d) SEARCH
7. The Microsoft Excel ___function returns one value if a specified condition evaluates to TRUE, or another value if it evaluates to FALSE.
- a) IF
 - b) SUM
 - c) COUNTIF
 - d) COUNTSUM
8. If you know the result that you want from a formula, but are not sure what input value the formula needs to get that result, use the _____ feature.
- a) Document
 - b) Goal Seek
 - c) Seeker
 - d) Auditing
9. Goal Seek works only with one _____ input value.
- a) Variable
 - b) Constant
 - c) Static
 - d) many
10. An authoring system is a collection of _____ tools that help in various aspects of multimedia production
- a) Hardware
 - b) Software
 - c) Freeware
 - d) Spyware

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Answer Key

UNIT-I

Ques. No.	Answer	Ques. No.	Answer
1.	a)	6.	b)
2.	b)	7.	b)
3.	c)	8.	c)
4.	d)	9.	a)
5.	a)	10.	b)

UNIT-II

Ques. No.	Answer	Ques. No.	Answer
1.	a)	6.	c)
2.	b)	7.	b)
3.	c)	8.	d)
4.	d)	9.	a)
5.	a)	10.	b)

UNIT-III

Ques. No.	Answer	Ques. No.	Answer
1.	b)	6.	c)
2.	a)	7.	a)
3.	c)	8.	d)
4.	b)	9.	a)
5.	d)	10.	b)

UNIT-IV

Ques. No.	Answer	Ques. No.	Answer
1.	c)	6.	a)
2.	a)	7.	d)
3.	c)	8.	b)
4.	d)	9.	a)
5.	b)	10.	b)

UNIT-V

Ques. No.	Answer	Ques. No.	Answer
1.	a)	6.	a)
2.	d)	7.	a)
3.	a)	8.	b)
4.	d)	9.	a)
5.	c)	10.	b)

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NOTE