

MAR GREGORIOS COLLEGE OF ARTS & SCIENCE

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Affiliated to the University of Madras
Approved by the Government of Tamil Nadu
An ISO 9001:2015 Certified Institution



DEPARTMENT OF COMPUTER APPLICATION

SUBJECT NAME: OFFICE AUTOMATION

SUBJECT CODE: SE51B

SEMESTER: I

PREPARED BY: PROF. A. HENCY JULIET

OBJECTIVE

- The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point. The course is highly practice oriented rather than regular class room teaching.

OUTCOMES:

- To perform documentation
- To perform accounting operations
- To perform presentation skills

UNIT - I

Introductory concepts: History - Generation - Classification - Block diagram - Memory unit – CPU.

UNIT - II

Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS – UNIX – Windows. Introduction to Programming Languages: C, C++ and its features.

UNIT - III

Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing – Preview, options, merge .

UNIT - IV

Spreadsheets: Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying; Charts – creating, formatting and printing.

UNIT - V

Power point: Introduction to Power point - Features – Understanding slide types – creating & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects.

TEXT BOOKS:

1. Alexis Leon and Mathews Leon, "*Fundamentals of information technology*", Leon Press 1999, 2nd Edition.
2. Peter Norton, "*Introduction to Computers*", Tata McGraw Hill.

REFERENCE BOOK:

1. Jennifer Ackerman Kettel, Guy Hat-Davis and Curt Simmons, "*Microsoft 2003*", Tata McGraw Hill.

WEB REFERENCE:

- NPTEL & MOOC courses titled Office Automation.
- https://www.livewireindia.com/microsoftoffice_automation_software_training.php

UNIT I

HISTORY OF COMPUTERS

The first counting device was used by the primitive people. They used sticks, stones and bones as counting tools. As human mind and technology improved with time more computing devices were developed. Some of the popular computing devices starting with the first to recent ones are described below;

Abacus

The history of computer begins with the birth of abacus which is believed to be the first computer. It is said that Chinese invented Abacus around 4,000 years ago.

It was a wooden rack which has metal rods with beads mounted on them. The beads were moved by the abacus operator according to some rules to perform arithmetic calculations. Abacus is still used in some countries like China, Russia and Japan. An image of this tool is shown below;

GENERATIONS OF COMPUTERS

A generation of computers refers to the specific improvements in computer technology with time. In 1946, electronic pathways called circuits were developed to perform the counting. It replaced the gears and other mechanical parts used for counting in previous computing machines.

In each new generation, the circuits became smaller and more advanced than the previous generation circuits. The miniaturization helped increase the speed, memory and power of computers. There are five generations of computers which are described below;

First Generation Computers

The first generation (1946-1959) computers were slow, huge and expensive. In these computers, vacuum tubes were used as the basic components of CPU and memory. These computers were mainly depended on batch operating system and punch cards. Magnetic tape and paper tape were used as output and input devices in this generation;

Some of the popular first generation computers are;

- **ENIAC** (Electronic Numerical Integrator and Computer)
- **EDVAC** (Electronic Discrete Variable Automatic Computer)
- **UNIVACI**(Universal Automatic Computer)
- **IBM-701**
- **IBM-650**

Second Generation Computers

The second generation (1959-1965) was the era of the transistor computers. These computers used transistors which were cheap, compact and consuming less power; it made transistor computers faster than the first generation computers.

In this generation, magnetic cores were used as the primary memory and magnetic disc and tapes were used as the secondary storage. Assembly language and programming languages like COBOL and FORTRAN, and Batch processing and multiprogramming operating systems were used in these computers.

Some of the popular second generation computers are;

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

Third Generation Computers

The third generation computers used integrated circuits (ICs) instead of transistors. A single IC can pack huge number of transistors which increased the power of a computer and reduced the cost. The computers also became more reliable, efficient and smaller in size. These generation computers used remote processing, time-sharing, multi programming as operating system. Also, the high-level programming languages like FORTRON-II TO IV, COBOL, PASCAL PL/1, ALGOL-68 were used in this generation.

Some of the popular third generation computers are;

- **IBM-360 series**
- **Honeywell-6000 series**
- **PDP(Personal Data Processor)**
- **IBM-370/168**
- **TDC-316**

Fourth Generation Computers

The fourth generation (1971-1980) computers used very large scale integrated (VLSI) circuits; a chip containing millions of transistors and other circuit elements. These chips made this generation computers more compact, powerful, fast and affordable. These generation computers used real time, time sharing and distributed operating system. The programming languages like C, C++, DBASE were also used in this generation.

Some of the popular fourth generation computers are;

- **DEC 10**
- **STAR 1000**
- **PDP 11**
- **CRAY-1(Super Computer)**
- **CRAY-X-MP(Super Computer)**

Fifth Generation Computers

In fifth generation (1980-till date) computers, the VLSI technology was replaced with ULSI (Ultra Large Scale Integration). It made possible the production of microprocessor chips with ten million electronic components. This generation computers used parallel processing hardware and AI (Artificial Intelligence) software. The programming languages used in this generation were C, C++, Java, .Net, etc.

Some of the popular fifth generation computers are;

- **Desktop**
- **Laptop**
- **NoteBook**
- **UltraBook**
- **ChromeBook**

TYPES OF COMPUTER

We can categorize computer in two ways: on the basis of data handling capabilities and size.

On the basis of data handling capabilities, the computer is of *three* types:

- Analogue Computer
- Digital Computer
- Hybrid Computer

1) Analogue Computer

Analogue computers are designed to *process analogue data*. Analogue data is continuous data that changes continuously and cannot have discrete values. We can say that analogue computers are used where we don't need exact values always such as speed, temperature, pressure and current.

Analogue computers directly accept the data from the measuring device without first converting it into numbers and codes. They measure the continuous changes in physical quantity and generally render output as a reading on a dial or scale. *Speedometer* and *mercury thermometer* are examples of analogue computers.

Advantages of using analogue computers:

- It allows real-time operations and computation at the same time and continuous representation of all data within the range of the analogue machine.
- In some applications, it allows performing calculations without taking the help of transducers for converting the inputs or outputs to digital electronic form and vice versa.
- The programmer can scale the problem for the dynamic range of the analogue computer. It provides insight into the problem and helps understand the errors and their effects.

Types of analogue computers:

- **Slide Rules:** It is one of the simplest types of *mechanical analogue computers*. It was developed to perform *basic mathematical calculations*. It is made of two rods. To perform the calculation, the hashed rod is slid to line up with the markings on another rod.
- **Differential Analysers:** It was developed to perform *differential calculations*. It performs integration using wheel-and-disc mechanisms to solve differential calculations.
- **Castle Clock:** It was invented by *Al-Jarazi*. It was able to save programming instructions. Its height was around 11 feet and it was provided with the display of time, the zodiac, and the solar and lunar orbits. This device also could allow users to set the length of the day as per the current season.
- **Electronic Analogue Computer:** In this type of analogue computer, electrical signals flow through capacitors and resistors to simulate physical phenomena. Here, the mechanical interaction of components does not take place. The voltage of the electrical signal generates the appropriate displays.

2) Digital Computer

Digital computer is designed to perform calculations and logical operations at high speed. It accepts the raw data as input in the form of digits or binary numbers (0 and 1) and processes it with programs stored in its memory to produce the output. All modern computers like laptops, desktops including smartphones that we use at home or office are digital computers.

Advantages of digital computers:

- It allows you to store a large amount of information and to retrieve it easily whenever you need it.
- You can easily add new features to digital systems more easily.
- Different applications can be used in digital systems just by changing the program without making any changes in hardware

- The cost of hardware is less due to the advancement in the IC technology.
- It offers high speed as the data is processed digitally.
- It is highly reliable as it uses error correction codes.
- Reproducibility of results is higher as the output is not affected by noise, temperature, humidity, and other properties of its components.

3) Hybrid Computer

Hybrid computer has features of both analogue and digital computer. It is *fast like an analogue* computer and has memory and *accuracy like digital computers*. It can process both continuous and discrete data. It accepts analogue signals and convert them into digital form before processing. So, it is widely used in specialized applications where both analogue and digital data is processed. For example, a processor is used in petrol pumps that converts the measurements of fuel flow into quantity and price. Similarly, they are used in airplanes, hospitals, and scientific applications.

Advantages of using hybrid computers:

- Its computing speed is very high due to the all-parallel configuration of the analogue subsystem.
- It produces precise and quick results that are more accurate and useful.
- It has the ability to solve and manage big equation in real-time.
- It helps in the on-line data processing.

ON THE BASIS OF SIZE, THE COMPUTER CAN BE OF FIVE TYPES:

1) Supercomputer

Supercomputers are the *biggest and fastest computers*. They are designed to process huge amount of data. A supercomputer can *process trillions of instructions in a second*. It has thousands of interconnected processors.

Supercomputers are particularly used in *scientific and engineering applications* such as weather forecasting, scientific simulations and nuclear energy research. The first supercomputer was developed by *Roger Cray in 1976*.

Characteristics or applications of supercomputers:

- It has the ability to decrypt your password to enhance protection for security reasons.
- It produces excellent results in animations.
- It is used for virtual testing of nuclear weapons and critical medical tests.

- It can study and understand climate patterns and forecast weather conditions. It can run in NOAA's system (National Oceanic and Atmospheric Administration) that can execute any type of simple and logical data.
- It helps in designing the flight simulators for pilots at the beginner level for their training.
- It helps in extracting useful information from data storage centres or cloud system. For example, in insurance companies.
- It has played a vital role in managing the online currency world such as stock market and bitcoin.
- It helps in the diagnosis of various critical diseases and in producing accurate results in brain injuries, strokes, etc.
- It helps in scientific research areas by accurately analysing data obtained from exploring the solar system, satellites, and movement of Earth.
- It also used in a smog control system where it predicts the level of fog and other pollutants in the atmosphere.

2) Mainframe computer

Mainframe computers are designed to support hundreds or thousands of users simultaneously. They can support multiple programs at the same time. It means they can execute different processes simultaneously. These features of mainframe computers make them ideal for big organizations like banking and telecom sectors, which need to manage and process high volume of data.

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Characteristics of Mainframe Computers:

- It can process huge amount of data, e.g. millions of transactions in a second in the banking sector.
- It has a very long life. It can run smoothly for up to 50 years after proper installation.
- It gives excellent performance with large scale memory management.
- It has the ability to share or distribute its workload among other processors and input/output terminals.
- There are fewer chances of error or bugs during processing in mainframe computers. If any error occurs it can fix it quickly without affecting the performance.

- It has the ability to protect the stored data and other ongoing exchange of information and data.

Applications of mainframe computers:

- In *health care*, it enabled hospitals to maintain a record of their millions of patients in order to contact them for treatment or related to their appointment, medicine updates or disease updates.
- In the *field of defence*, it allows the defence departments to share a large amount of sensitive information with other branches of defence.
- In the *field of education*, it helps big universities to store, manage and retrieve data related to their courses, admissions, students, teachers, employees and affiliated schools and colleges.
- In the *retail sector*, the retail companies that have a huge customer base and branches use mainframe computers to handle and execute information related to their inventory management, customer management, and huge transactions in a short duration.

3) Miniframe or Minicomputer

It is a *midsize multiprocessing computer*. It consists of two or more processors and can support *4 to 200 users at one time*. Miniframe computers are used in institutes and departments for tasks such as billing, accounting and inventory management. A minicomputer *lies between the mainframe and microcomputer* as it is smaller than mainframe but larger than a microcomputer.

Characteristics of miniframe or minicomputer:

- It is light weight that makes it easy to carry and fit anywhere.
- It is less expensive than mainframe computers.
- It is very fast compared to its size.
- It remains charged for a long time.
- It does not require a controlled operational environment.

Applications of minicomputers:

A minicomputer is mainly used to perform three primary functions, which are as follows:

- **Process control:** It was used for process control in manufacturing. It mainly performs two primary functions that are collecting data and feedback. If any abnormality occurs in the process, it is detected by the minicomputer and necessary adjustments are made accordingly.

- **Data management:** It is an excellent device for small organizations to collect, store and share data. Local hospitals and hotels can use it to maintain the records of their patients and customers respectively.
- **Communications Portal:** It can also play the role of a communication device in larger systems by serving as a portal between a human operator and a central processor or computer.

4) Workstation

Workstation is a *single user computer* that is designed for *technical or scientific applications*. It has a faster microprocessor, a large amount of RAM and high speed graphic adapters. It generally *performs a specific job with great expertise*; accordingly, they are of different types such as graphics workstation, music workstation and engineering design workstation.

Characteristics of workstation computer:

- It is a high-performance computer system designed for a single user for business or professional use.
- It has larger storage capacity, better graphics, and more powerful CPU than a personal computer.
- It can handle animation, data analysis, CAD, audio and video creation and editing.

Any computer that has the following *five features*, can be termed as a workstation or can be used as a workstation.

- **Multiple Processor Cores:** It has more processor cores than simple laptops or computers.
- **ECC RAM:** It is provided with Error-correcting code memory that can fix memory errors before they affect the system's performance.
- **RAID (Redundant Array of Independent Disks):** It refers to multiple internal hard drives to store or process data. RAID can be of different types, for example, there can be multiple drives to process data or mirrored drives where if one drive does not work than other starts functioning.
- **SSD:** It is better than conventional hard-disk drives. It does not have moving parts, so the chances of physical failure are very less.
- **Optimized, Higher end GPU:** It reduces the load on CPU. E.g., CPU has to do less work while processing the screen output.

5) Microcomputer

Microcomputer is also known as a personal computer. It is a general-purpose computer that is designed for individual use. It has a microprocessor as a central processing unit, memory, storage area, input unit and output unit. Laptops and desktop computers are examples of microcomputers. They are suitable for personal work that may be making an assignment, watching a movie, or at office for office work.

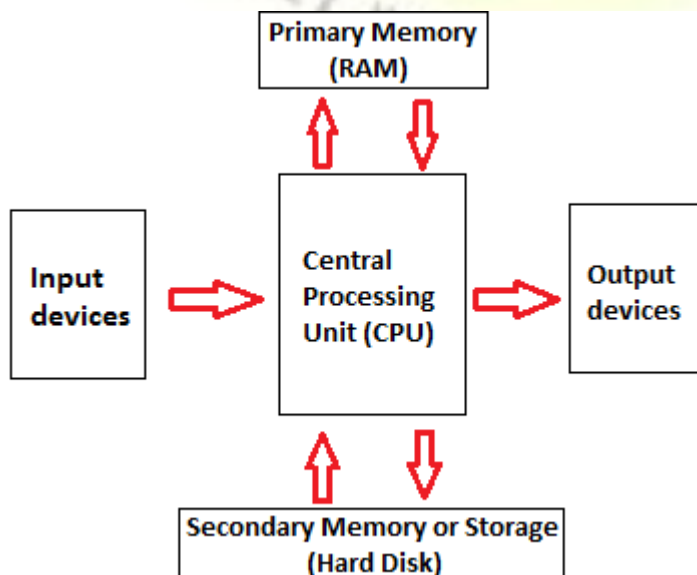
Characteristics of a microcomputer:

- It is the smallest in size among all types of computers.
- A limited number of software can be used.
- It is designed for personal work and applications. Only one user can work at a time.
- It is less expensive and easy to use.
- It does not require the user to have special skills or training to use it.
- Generally, comes with single semiconductor chip.
- It is capable of multitasking such as printing, scanning, browsing, watching videos, etc.

COMPUTER COMPONENTS

There are 5 main computer components that are given below:

- Input Devices
- CPU
- Output Devices
- Primary Memory
- Secondary Memory



The operations of computer components are given below:

1) Inputting: It is the process of entering raw data, instructions and information into the computer. It is performed with the help of input devices.

2) Storing: The computer has primary memory and secondary storage to store data and instructions. It stores the data before sending it to CPU for processing and also stores the processed data before displaying it as output.

3) Processing: It is the process of converting the raw data into useful information. This process is performed by the CPU of the computer. It takes the raw data from storage, processes it and then sends back the processed data to storage.

4) Outputting: It is the process of presenting the processed data through output devices like monitor, printer and speakers.

5) Controlling: This operation is performed by the control unit that is part of CPU. The control unit ensures that all basic operations are executed in a right manner and sequence.

COMPUTER MEMORY

The computer memory holds the data and instructions needed to process raw data and produce output. The computer memory is divided into large number of small parts known as cells. Each cell has a unique address which varies from 0 to memory size minus one.

Computer memory is of two types: Volatile (RAM) and Non-volatile (ROM). The secondary memory (hard disk) is referred as storage not memory.

But, if we categorize memory on behalf of space or location, it is of four types:

- Register memory
- Cache memory
- Primary memory
- Secondary memory

FUNCTIONALITIES OF A COMPUTER

1. High Speed

- Computer is a very fast device.
- It is capable of performing calculation of very large amount of data.
- The computer has units of speed in microsecond, nanosecond, and even the picosecond.
- It can perform millions of calculations in a few seconds as compared to man who will spend many months to perform the same task.

2. Accuracy

- In addition to being very fast, computers are very accurate.
- The calculations are 100% error free.
- Computers perform all jobs with 100% accuracy provided that the input is correct.

3. Storage Capability

- Memory is a very important characteristic of computers.
- A computer has much more storage capacity than human beings.
- It can store large amount of data.
- It can store any type of data such as images, videos, text, audio, etc.

4. Diligence

- Unlike human beings, a computer is free from monotony, tiredness, and lack of concentration.
- It can work continuously without any error and boredom.
- It can perform repeated tasks with the same speed and accuracy.

5. Versatility

- A computer is a very versatile machine.
- A computer is very flexible in performing the jobs to be done.
- This machine can be used to solve the problems related to various fields.
- At one instance, it may be solving a complex scientific problem and the very next moment it may be playing a card game.

6. Reliability

- A computer is a reliable machine.
- Modern electronic components have long lives.
- Computers are designed to make maintenance easy.

7. Automation

- Computer is an automatic machine.
- Automation is the ability to perform a given task automatically. Once the computer receives a program i.e., the program is stored in the computer memory, then the program and instruction can control the program execution without human interaction.
- Reduction in Paper Work and Cost
- The use of computers for data processing in an organization leads to reduction in paper work and results in speeding up the process.
- As data in electronic files can be retrieved as and when required, the problem of maintenance of large number of paper files gets reduced.
- Though the initial investment for installing a computer is high, it substantially reduces the cost of each of its transaction.

Disadvantages of Computers

Following are certain disadvantages of computers.

No I.Q.

- A computer is a machine that has no intelligence to perform any task.
- Each instruction has to be given to the computer.
- A computer cannot take any decision on its own.

Dependency

It functions as per the user's instruction, thus it is fully dependent on humans.

Environment

The operating environment of the computer should be dust free and suitable.

No Feeling

- Computers have no feelings or emotions.
- It cannot make judgment based on feeling, taste, experience, and knowledge unlike humans.

Applications of Computer**Business**

- A computer has high speed of calculation, diligence, accuracy, reliability, or versatility which has made it an integrated part in all business organizations.
- Computer is used in business organizations for –
- Payroll calculations
- Budgeting
- Sales analysis
- Financial forecasting
- Managing employee database
- Maintenance of stocks, etc.

Banking

- Computer Banking
- Today, banking is almost totally dependent on computers.
- Banks provide the following facilities –
- Online accounting facility, which includes checking current balance, making deposits and overdrafts, checking interest charges, shares, and trustee records.
- ATM machines which are completely automated are making it even easier for customers to deal with banks.

Insurance

- Computer Insurance
- Insurance companies are keeping all records up-to-date with the help of computers. Insurance companies, finance houses, and stock broking firms are widely using computers for their concerns.
- Insurance companies are maintaining a database of all clients with information showing –
- Procedure to continue with policies
- Starting date of the policies
- Next due installment of a policy
- Maturity date
- Interests due
- Survival benefits
- Bonus

Education - Computer Educational

- The computer helps in providing a lot of facilities in the education system.
- The computer provides a tool in the education system known as CBE (Computer Based Education).
- CBE involves control, delivery, and evaluation of learning.
- Computer education is rapidly increasing the graph of number of computer students.
- There are a number of methods in which educational institutions can use a computer to educate the students.
- It is used to prepare a database about performance of a student and analysis is carried out on this basis.

Marketing

- In marketing, uses of the computer are following –
- Computer Marketing
- Advertising – With computers, advertising professionals create art and graphics, write and revise copy, and print and disseminate ads with the goal of selling more products.
- Home Shopping – Home shopping has been made possible through the use of computerized catalogues that provide access to product information and permit direct entry of orders to be filled by the customers.

Healthcare

- Computers have become an important part in hospitals, labs, and dispensaries. They are being used in hospitals to keep the record of patients and medicines. It is also used in scanning and diagnosing different diseases. ECG, EEG, ultrasounds and CT scans, etc. are also done by computerized machines.
- Following are some major fields of health care in which computers are used.
- Computer Healthcare
- Diagnostic System – Computers are used to collect data and identify the cause of illness.
- Lab-diagnostic System – All tests can be done and the reports are prepared by computer.
- Patient Monitoring System – These are used to check the patient's signs for abnormality such as in Cardiac Arrest, ECG, etc.
- Pharma Information System – Computer is used to check drug labels, expiry dates, harmful side effects, etc.
- Surgery – Nowadays, computers are also used in performing surgery.

Engineering Design

- Computers are widely used for Engineering purpose.
- One of the major areas is CAD (Computer Aided Design) that provides creation and modification of images. Some of the fields are –
- Computer Engineering
- Structural Engineering – Requires stress and strain analysis for design of ships, buildings, budgets, airplanes, etc.

- Industrial Engineering – Computers deal with design, implementation, and improvement of integrated systems of people, materials, and equipment.
- Architectural Engineering – Computers help in planning towns, designing buildings, determining a range of buildings on a site using both 2D and 3D drawings.

Military - Computer Military

Computers are largely used in defence. Modern tanks, missiles, weapons, etc. Military also employs computerized control systems. Some military areas where a computer has been used are

- Missile Control
- Military Communication
- Military Operation and Planning
- Smart Weapons
- Communication
- Communication is a way to convey a message, an idea, a picture, or speech that is received and understood clearly and correctly by the person for whom it is meant.

Computer Communication

- E-mail
- Chatting
- Usenet
- FTP
- Telnet
- Video-conferencing

Government - Computer Government

- Budgets
- Sales tax department
- Income tax department
- Computation of male/female ratio
- Computerization of voters lists
- Computerization of PAN card
- Weather forecasting

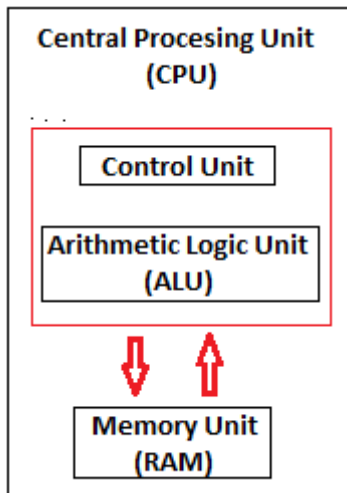
CENTRAL PROCESSING UNIT (CPU)

A Central Processing Unit is also called a processor, central processor, or microprocessor. It carries out all the important functions of a computer. It receives instructions from both the hardware and active software and produces output accordingly. It stores all important programs like operating systems and application software. CPU also helps Input and output devices to communicate with each other. Owing to these features of CPU, it is often referred to as the brain of the computer.

CPU is installed or inserted into a CPU socket located on the motherboard. Furthermore, it is provided with a heat sink to absorb and dissipate heat to keep the CPU cool and functioning smoothly.

Generally, a CPU has three components:

- ALU (Arithmetic Logic Unit)
- Control Unit
- Memory or Storage Unit



Control Unit: It is the circuitry in the control unit, which makes use of electrical signals to instruct the computer system for executing already stored instructions. It takes instructions from memory and then decodes and executes these instructions. So, it controls and coordinates the functioning of all parts of the computer. The Control Unit's main task is to maintain and regulate the flow of information across the processor. It does not take part in processing and storing data.

ALU: It is the arithmetic logic unit, which performs arithmetic and logical functions. Arithmetic functions include addition, subtraction, multiplication division, and comparisons. Logical functions mainly include selecting, comparing, and merging the data. A CPU may contain more than one ALU. Furthermore, ALUs can be used for maintaining timers that help run the computer.

Memory or Storage Unit/ Registers: It is called Random access memory (RAM). It temporarily stores data, programs, and intermediate and final results of processing. So, it acts as a temporary storage area that holds the data temporarily, which is used to run the computer.

What is CPU Clock Speed?

The clock speed of a CPU or a processor refers to the number of instructions it can process in a second. It is measured in gigahertz. For example, a CPU with a clock speed of 4.0 GHz means it can process 4 billion instructions in a second.

Types of CPU:

CPUs are mostly manufactured by Intel and AMD, each of which manufactures its own types of CPUs. In modern times, there are lots of CPU types in the market. Some of the basic types of CPUs are described below:

Single Core CPU: Single Core is the oldest type of computer CPU, which was used in the 1970s. It has only one core to process different operations. It can start only one operation at a time; the CPU switches back and forth between different sets of data streams when more than one program runs. So, it is not suitable for multitasking as the performance will be reduced if more than one application runs. The performance of these CPUs is mainly dependent on the clock speed. It is still used in various devices, such as smartphones.

Dual Core CPU: As the name suggests, Dual Core CPU contains two cores in a single Integrated Circuit (IC). Although each core has its own controller and cache, they are linked together to work as a single unit and thus can perform faster than the single-core processors and can handle multitasking more efficiently than Single Core processors.

Quad Core CPU: This type of CPU comes with two dual-core processors in one integrated circuit (IC) or chip. So, a quad-core processor is a chip that contains four independent units called cores. These cores read and execute instructions of CPU. The cores can run multiple instructions simultaneously, thereby increases the overall speed for programs that are compatible with parallel processing.

Quad Core CPU uses a technology that allows four independent processing units (cores) to run in parallel on a single chip. Thus by integrating multiple cores in a single CPU, higher performance can be generated without boosting the clock speed. However, the performance increases only when the computer's software supports multiprocessing. The software which supports multiprocessing divides the processing load between multiple processors instead of using one processor at a time.

History of CPU:

Some of the important events in the development of CPU since its invention till date are as follows:

- In 1823, Baron Jons Jakob Berzelius discovered silicon that is the main component of CPU till date.
- In 1903, Nikola Tesla got gates or switches patented, which are electrical logic circuits.
- In December 1947, John Bardeen, William Shockley, and Walter Brattain invented the first transistor at the Bell Laboratories and got it patented in 1948.
- In 1958, the first working integrated circuit was developed by Robert Noyce and Jack Kilby.
- In 1960, IBM established the first mass-production facility for transistors in New York.
- In 1968, Robert Noyce and Gordon Moore founded Intel Corporation.
- AMD (Advanced Micro Devices) was founded in May 1969.
- In 1971, Intel introduced the first microprocessor, the Intel 4004, with the help of Ted Hoff.

- In 1972, Intel introduced the 8008 processor; in 1976, Intel 8086 was introduced, and in June 1979, Intel 8088 was released.
- In 1979, a 16/32-bit processor, the Motorola 68000, was released. Later, it was used as a processor for the Apple Macintosh and Amiga computers.
- In 1987, Sun introduced the SPARC processor.
- In March 1991, AMD introduced the AM386 microprocessor family.
- In March 1993, Intel released the Pentium processor. In 1995, Cyrix introduced the Cx5x86 processor to give competition to Intel Pentium processors.
- In January 1999, Intel introduced the Celeron 366 MHz and 400 MHz processors.
- In April 2005, AMD introduced its first dual-core processor.
- In 2006, Intel introduced the Core 2 Duo processor.
- In 2007, Intel introduced different types of Core 2 Quad processors.
- In April 2008, Intel introduced the first series of Intel Atom processors, the Z5xx series. They were single-core processors with a 200 MHz GPU.
- In September 2009, Intel released the first Core i5 desktop processor with four cores.
- In January 2010, Intel released many processors such as Core 2 Quad processor Q9500, first Core i3 and i5 mobile processors, first Core i3 and i5 desktop processors. In the same year in July, it released the first Core i7 desktop processor with six cores.
- In June 2017, Intel introduced the first Core i9 desktop processor.
- In April 2018, Intel released the first Core i9 mobile processor.

UNIT II

INPUT DEVICES

Input device enables the user to send data, information, or control signals to a computer. The Central Processing Unit (CPU) of a computer receives the input and processes it to produce the output.

Some of the popular input devices are:

1. Keyboard
2. Mouse
3. Scanner
4. Joystick

5. Light Pen
 6. Digitizer
 7. Microphone
 8. Magnetic Ink Character Recognition (MICR)
 9. Optical Character Reader (OCR)
 10. Digital Camera
 11. Paddle
 12. Steering Wheel
 13. Gesture recognition devices
 14. Light Gun
 15. Touch Pad
 16. Remote
 17. Touch screen
 18. VR
 19. Webcam
 20. Biometric Devices
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1) Keyboard

The keyboard is a basic input device that is used to enter data into a computer or any other electronic device by pressing keys. It has different sets of keys for letters, numbers, characters, and functions. Keyboards are connected to a computer through USB or a Bluetooth device for wireless communication.

2) Mouse

The mouse is a hand-held input device which is used to move cursor or pointer across the screen. It is designed to be used on a flat surface and generally has left and right button and a scroll wheel between them. Laptop computers come with a touchpad that works as a mouse. It lets you control the movement of cursor or pointer by moving your finger over the touchpad. Some mouse comes with integrated features such as extra buttons to perform different buttons.

The mouse was invented by Douglas C. Engelbart in 1963. Early mouse had a roller ball integrated as a movement sensor underneath the device. Modern mouse devices come with optical technology that controls cursor movements by a visible or invisible light beam. A mouse is connected to a computer through different ports depending on the type of computer and type of a mouse.

Common types of the mouse:**(i) Trackball Mouse:**

It is a stationary input device that has ball mechanism to move the pointer or cursor on the screen. The ball is half inserted in the device and can be easily rolled with finger, thumb or the palm to move the pointer on the screen. The device has sensor to detect the rotation of ball. It remains stationary; you don't need to move it on the operating surface. So, it is an ideal device if you have limited desk space as you don't need to move it like a mouse.

ii) Mechanical Mouse:

It has a system of a ball and several rollers to track its movement. It is a corded type of mouse. A mechanical mouse can be used for high performance. The drawback is that they tend to get dust into the mechanics and thus require regular cleaning.

iii) Optical Mouse:



An optical mouse uses optical electronics to track its movement. It is more reliable than a mechanical mouse and also requires less maintenance. However, its performance is affected by the surface on which it is operated. Plain non-glossy mouse mat should be used for best results. The rough surface may cause problems for the optical recognition system, and the glossy surface may reflect the light wrongly and thus may cause tracking issues.

iv) Cordless or Wireless Mouse:



As the name suggests, this type of mouse lacks cable and uses wireless technology such as IrDA (infrared) or radio (Bluetooth or Wi-Fi) to control the movement of the cursor. It is used to improve the experience of using a mouse. It uses batteries for its power supply.

3) Scanner

The scanner uses the pictures and pages of text as input. It scans the picture or a document. The scanned picture or document then converted into a digital format or file and is displayed on the screen as an output. It uses optical character recognition techniques to convert images into digital ones. Some of the common types of scanners are as follows:

Types of Scanner:**i) Flatbed Scanner:**

It has a glass pane and a moving optical CIS or CCD array. The light illuminates the pane, and then the image is placed on the glass pane. The light moves across the glass pane and scans the document and thus produces its digital copy. You will need a transparency adapter while scanning transparent slides.

ii) Handheld Scanner:

It is a small manual scanning device which is held by hand and is rolled over a flat image that is to be scanned. The drawback in using this device is that the hand should be steady while scanning; otherwise, it may distort the image. One of the commonly used handheld scanners is the barcode scanner which you would have seen in shopping stores.

iii) Sheetfed Scanner:

In this scanner, the document is inserted into the slot provided in the scanner. The main components of this scanner include the sheet-feeder, scanning module, and calibration sheet. The light does not move in this scanner. Instead, the document moves through the scanner. It is suitable for scanning single page documents, not for thick objects like books, magazines, etc.

iv) Drum Scanner:

Drum scanner has a photomultiplier tube (PMT) to scan images. It does not have a charge-coupled device like a flatbed scanner. The photomultiplier tube is extremely sensitive to light. The image is placed on a glass tube, and the light moves across the image, which produces a reflection of the image which is captured by the PMT and processed. These scanners have high resolution and are suitable for detailed scans.

v) Photo Scanner:

It is designed to scan photographs. It has high resolution and color depth, which are required for scanning photographs. Some photo scanners come with in-built software for cleaning and restoring old photographs.

4) Joystick



A joystick is also a pointing input device like a mouse. It is made up of a stick with a spherical base. The base is fitted in a socket that allows free movement of the stick. The movement of stick controls the cursor or pointer on the screen.

The first joystick was invented by C. B. Mirick at the U.S. Naval Research Laboratory. A joystick can be of different types such as displacement joysticks, finger-operated joysticks, hand operated, isometric joystick, and more. In joystick, the cursor keeps moving in the direction of the joystick unless it is upright, whereas, in mouse, the cursor moves only when the mouse moves.

5) Light Pen



A light pen is a computer input device that looks like a pen. The tip of the light pen contains a light-sensitive detector that enables the user to point to or select objects on the display screen. Its light sensitive tip detects the object location and sends the corresponding signals to the **CPU**. It is not compatible with **LCD** screens, so it is not in use today. It also helps you draw on the screen if needed. The first light pen was invented around 1955 as a part of the Whirlwind project at the Massachusetts Institute of Technology (MIT).

6) Digitizer

Digitizer is a computer input device that has a flat surface and usually comes with a stylus. It enables the user to draw images and graphics using the stylus as we draw on paper with a pencil. The images or graphics drawn on the digitizer appear on the computer monitor or display screen. The software converts the touch inputs into lines and can also convert handwritten text to typewritten words.

It can be used to capture handwritten signatures and data or images from taped papers. Furthermore, it is also used to receive information in the form of drawings and send output to a **CAD** (Computer-aided design) application and software like AutoCAD. Thus, it allows you to convert hand-drawn images into a format suitable for computer processing.



7) Microphone



The microphone is a computer input device that is used to input the sound. It receives the sound vibrations and converts them into audio signals or sends to a recording medium. The audio signals are converted into digital data and stored in the computer. The microphone also enables the user to telecommunicate with others. It is also used to add sound to presentations and with webcams for video conferencing. A microphone can capture audio waves in different ways; accordingly the three most common types are described below:

i) Dynamic:

It is the most commonly used microphone with a simple design. It has a magnet which is wrapped by a metal coil and a thin sheet on the front end of the magnet. The sheet transfers vibrations from sound waves to the coil and from coil to electric wires which transmit the sound like an electrical signal.

**ii) Condenser:**

It is designed for audio recording and has a very sensitive and flat frequency response. It has a front plate called diaphragm and a back plate parallel to the front plate. When sound hits the diaphragm, it vibrates the diaphragm and alters the distance between the two plates. The changes in distance are transmitted as electric signals.

iii) Ribbon:

It is known for its reliability. It has a thin ribbon made of aluminum, duraluminum, or nanofilm suspended in a magnetic field. The sound waves cause vibrations in the ribbon, which generate a voltage proportional to the velocity of the vibration. The voltage is transmitted as an electrical signal. Early ribbon microphones had a transformer to increase the output voltage, but modern ribbon microphones come with advanced magnets to produce a strong signal.



8) Magnetic Ink Character Recognition (MICR)



MICR computer input device is designed to read the text printed with magnetic ink. MICR is a character recognition technology that makes use of special magnetized ink which is sensitive to magnetic fields. It is widely used in banks to process the cheques and other organizations where security is a major concern. It can process three hundred cheques in a minute with hundred-percent accuracy. The details on the bottom of the cheque (MICR No.) are written with magnetic ink. A laser printer with MICR toner can be used to print the magnetic ink.

The device reads the details and sends to a computer for processing. A document printed in magnetic ink is required to pass through a machine which magnetizes the ink, and the magnetic information is then translated into characters.

9) Optical Character Reader (OCR)



OCR computer input device is designed to convert the scanned images of handwritten, typed or printed text into digital text. It is widely used in offices and libraries to convert documents and books into electronic files.

It processes and copies the physical form of a document using a scanner. After copying the documents, the OCR software converts the documents into a two-color (black and white), version called bitmap. Then it is analyzed for light and dark areas, where the dark areas are selected as characters, and the light area is identified as background. It is widely used to convert hard copy legal or historic documents into PDFs. The converted documents can be edited if required like we edit documents created in ms word.

10) Digital camera:



It is a digital device as it captures images and records videos digitally and then stores them on a memory card. It is provided with an image sensor chip to capture images, as opposed to film used by traditional cameras. Besides this, a camera that is connected to your computer can also be called a digital camera.

It has photosensors to record light that enters the camera through the lens. When the light strikes the photosensors, each of the sensors returns the electrical current, which is used to create the images.

11) Paddle:



It is a simple input device that is widely used in games. It is a wheel that is held by hand and looks like a volume knob on a stereo that is used to increase or decrease the volume. Paddle moves or controls cursor or any other objects in the game in a back-and-forth motion. It is widely used as an alternative to the joystick. Besides this, the term paddle also refers to many handheld devices designed to control a function in an electronic device, computer, etc.

12) Steering wheel:



It is used as an input device in racing video games such as car racing games or in driving programs as virtual simulators to steer a vehicle. It works like the real steering wheel by allowing you to take a right or left turn. A steering wheel may be provided with acceleration and brake pedal devices and a mechanism for shifting gears. Thus, it makes racing games more adventurous and entertaining.

13) Gesture recognition devices:



These devices take human gestures as input. There are many such devices that respond to gestures. For example, Kinect is one such device that observes the movement of a player's body and interprets these movements as inputs to video games. This feature is also available in certain tablets and smartphones where you can perform certain tasks such as taking pictures using finger gestures such as swiping, pinching, etc.

14) Light Gun:



As the name suggests, it is a pointing input device that is designed to point at and shoot the targets on the screen in a video game, or arcade, etc. The light gun was used for the first time on the MIT Whirwind computer. When the gun is pointed at the target on the screen and the trigger is pulled, the screen goes blank for a fraction of a second. During this moment, the photodiode, which is present in the barrel, determines where the gun is pointed. For example, shooting ducks in a duck hunt game.

15) Touchpad:



It is usually found in laptops as a substitute for the mouse. It allows you to move or control the cursor on the screen using your finger. Just like a mouse, it also has two buttons for right and left click. Using the touchpad, you can perform all the tasks that you do with a mouse, such as selecting an object on the screen, copy, paste, delete, open a file or folder, and more.

16) Remote:



It is a [hardware device](#) designed to control the functioning of a device, e.g., a TV remote that can be used to change channels, increase or decrease the volume, from a distance without leaving the seat. The first cordless TV remote was invented by Dr. Robert Adler of Zenith in 1956. The remote sends the electromagnetic waves to communicate with the device. These waves can be infrared rays, radio waves, etc.

17) Touch screen:

It is the display screen of a device such as a smartphone, tablet, etc., that allows users to interact or provide inputs to the device by using their finger. Today, most of the electronic devices come with touchscreen as an alternative to a mouse for navigating a graphical user interface. For example, by touching, you can unlock your phone, open emails, open files, play videos, etc. Besides this, it is used in lots of devices such as Camera, Car [GPS](#), Fitness machine, etc.

The concept of the touch screen was first introduced and published by E.A. Johnson in 1965. The first touch screen was developed at the beginning of the 1970s by CERN engineers Frank Beck and Bent Stumpe.



18) VR:



VR stands for virtual reality. It is an artificial or virtual environment which is generated by computers. A person can interact with virtual objects of this artificial environment using some input devices such as headsets, gloves, headphones, etc. For example, he or she can find himself or herself walking on a beach, watching a football match, walking in the sky, etc., without actually doing all this.

19) Webcam:



Any camera which is connected to a computer is called a webcam. The in-built camera provided on a computer can also be considered a webcam. It is an input device as it can take pictures, and can be used to record videos if required. The pictures and videos are stored in the [computer memory](#) and can be displayed on the screen if required. Although it works almost the same as the digital camera, it is different from a digital camera, as it is designed to take compact digital photos that can be uploaded easily on the webpages and shared with others through the internet.

20) Biometric Devices:

[Biometrics](#) refers to a process in which a person is identified through his or her biological features such as fingerprints, eye cornea, face structure, etc. It is done by using biometric devices, which can be of different types based on their scanning features and abilities, such as:

i) Face Scanner:



It is designed to identify a person by scanning his or her face. It takes the face measurements of a person. For example, the distance between eyes, nose, and mouth, etc., accordingly, it confirms the identity of a person. Besides this, it is smart enough to differentiate between a person's picture and the real person.

ii) Hand Scanner: The hand of a person can also be used to verify his or her identity as every person has a unique pattern of veins in the palm, just like fingerprints. This device takes advantage of this feature; it identifies a person by scanning the palm of his hand. It uses infrared light to scan veins' patterns and blood flowing in them. Palm is even more unique than fingerprints.



iii) Fingerprint Scanner:



It scans the fingerprints to identify people or for biometric authentication. This device is developed, keeping in mind the fact that no two persons in the world can have the same fingerprints. It is widely used in companies as a fingerprint attendance system to mark the attendance of employees. This type of scanners captures the pattern of valleys and ridges found on a finger and store it in the memory or database. When you press your finger on the given space, it verifies the identity by using its pattern-matching software.

iv) Retina or Iris Scanner:

It scans the retina or iris of a person's eye to confirm the identity. This device is more secure than others as it is next to impossible to copy the retina or iris. It works by mapping the retina's blood vessel patterns of the eye. The blood vessels of retina absorb light more easily as well as can be identified with appropriate lighting.

In this scan, a beam of low-energy infrared light falls on the retina through the scanner's eyepiece. Then, the software captures the network of blood vessels in the retina and uses it to verify a person's identity.



v) Voice Scanner:



It records the voice of a person and digitizes it to create a distinctive voice print or template. The voiceprints are stored in the database, and are used to verify the voice of a person to confirm his or her identity. The person is required to speak in the normal or same voice that was used to create a voice template. It is not much reliable as it can be misused using a tape recording.

Output Devices

The output device displays the result of the processing of raw data that is entered in the computer through an input device. There are a number of output devices that display output in different ways such as text, images, hard copies, and audio or video.

Some of the popular output devices are:

1. Monitor

- CRT Monitor
- LCD Monitor
- LED Monitor
- Plasma Monitor

2. Printer

- Impact Printers
 - A. Character Printers
 - i. Dot Matrix printers
 - ii. Daisy Wheel printers
 - B. Line printers
 - i. Drum printers
 - ii. Chain printers
- Non-impact printers
 - A. Laser printers
 - B. Inkjet printers

3. Projector

1) Monitor

The monitor is the display unit or screen of the computer. It is the main output device that displays the processed data or information as text, images, audio or video.

The types of monitors are given below. **i) CRT Monitor**



CRT monitors are based on the cathode ray tubes. They are like vacuum tubes which produce images in the form of video signals. Cathode rays tube produces a beam of electrons through electron guns that strike on the inner phosphorescent surface of the screen to produce images on the screen. The monitor contains millions of phosphorus dots of red, green and blue color. These dots start to glow when struck by electron beams and this phenomenon is called cathodoluminescence.

The main components of a CRT monitor include the electron gun assembly, deflection plate assembly, fluorescent screen, glass envelope, and base. The front (outer surface) of the screen onto which images are produced is called the face plate. It is made up of fiber optics.

There are three electron beams that strike the screen: red, green, and blue. So, the colors which you see on the screen are the blends of red, blue and green lights. The magnetic field guides the beams of electrons. Although LCDs have replaced the CRT monitors, the CRT monitors are still used by graphics professionals because of their color quality.

ii) LCD Monitor



The LCD monitor is a flat panel screen that is compact and light-weight as compared to CRT monitors. It is based on liquid crystal display technology which is used in the screens of laptops, tablets, smart phones, etc. An LCD screen comprises two layers of polarized glass with a liquid crystal solution between them. When the light passes through the first layer, an electric current aligns the liquids crystals. The aligned liquid

crystals allow a varying level of light to pass through the second layer to create images on the screen.

The LCD screen has a matrix of pixels that display the image on the screen. Old LCDs had passive-matrix screens in which individual pixels are controlled by sending a charge. A few electrical charges could be sent each second that made screens appear blurry when the images moved quickly on the screen.

Modern LCDs use active-matrix technology and contain thin film transistors (TFTs) with capacitors. This technology allows pixels to retain their charge. So, they don't make screen blurry when images move fast on the screen as well as are more efficient than passive-matrix displays.

iii) LED monitor



The LED monitor is an improved version of an LCD monitor. It also has a flat panel display and uses liquid crystal display technology like the LCD monitors. The difference between them lies in the source of light to backlight the display. The LED monitor has many LED panels, and each panel has several LEDs to backlight the display, whereas the LCD monitors use cold cathode fluorescent light to backlight the display. Modern electronic devices such as mobile phones, LED TVs, laptop and computer screens, etc., use a LED display as it not only produces more brilliance and greater light intensity but also consumes less power.

iv) Plasma Monitor



The plasma monitor is also a flat panel display that is based on plasma display technology. It has small tiny cells between two glass panels. These cells contain mixtures of noble gases and a small amount of mercury. When voltage is applied, the gas in the cells turns into a plasma and emits ultraviolet light that creates images on the screen, i.e., the screen is illuminated by a tiny bit of plasma, a charged gas. Plasma displays are brighter than liquid crystal displays (LCD) and also offer a wide viewing angle than an LCD.

Plasma monitors provide high resolutions of up to 1920 X 1080, excellent contrast ratios, wide viewing angle, a high refresh rate and more. Thus, they offer a unique viewing experience while watching action movies, sports games, and more.

2) Printer

A printer produces hard copies of the processed data. It enables the user, to print images, text or any other information onto the paper.

Based on the printing mechanism, the printers are of two types: Impact Printers and Non-impact Printers.

- **Impact Printers: They are of two types:**
 - A. Character Printers
 - i. Dot Matrix printers
 - ii. Daisy Wheel printers
 - B. Line printers
 - i. Drum printers
 - ii. Chain printers
- **Non-impact printers: They are of two types:**
 - A. Laser printers
 - B. Inkjet printers

Impact Printer

The impact printer uses a hammer or print head to print the character or images onto the paper. The hammer or print head strikes or presses an ink ribbon against the paper to print characters and images.

Impact printers are further divided into two types.

- A. Character Printers
- B. Line printers

A) Character Printers

Character printer prints a single character at a time or with a single stroke of the print head or hammer. It does not print one line at a time. Dot Matrix printer and Daisy Wheel printer are character printers. Today, these printers are not in much use due to their low speed and because only the text can be printed. The character printers are of two types, which are as follows:

i) Dot Matrix Printer



Dot Matrix Printer is an impact printer. The characters and images printed by it are the patterns of dots. These patterns are produced by striking the ink soaked ribbon against the paper with a print head. The print head contains pins that produce a pattern of dots on the paper to form the individual characters. The print head of a 24 pin dot matrix contains more pins than a 9 pin dot matrix printer, so it produces more dots which results in better printing of characters. To produce color output, the black ribbon can be changed with color stripes. The speed of Dot Matrix printers is around 200-500 characters per second.

ii) Daisy Wheel Printer

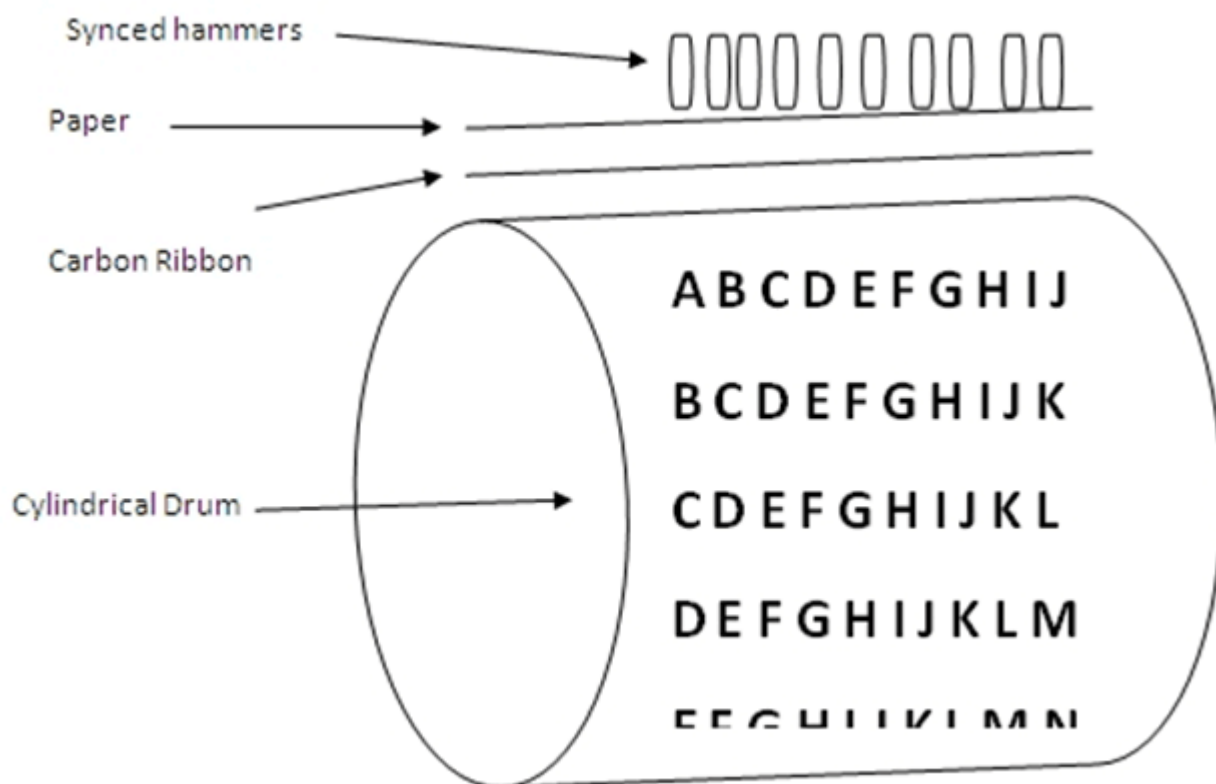


Daisy Wheel Printer was invented by David S. Lee at Diablo Data Systems. It consists of a wheel or disk that has spokes or extensions and looks like a daisy, so it is named Daisy Wheel printer. At the end of extensions, molded metal characters are mounted. To print a character the printer rotates the wheel, and when the desired character is on the print location the hammer hits disk and the extension hits the ink ribbon against the paper to create the impression. It cannot be used to print graphics and is often noisy and slow, i.e., the speed is very low around 25-50 characters per second. Due to these drawbacks, these printers have become obsolete.

B) Line Printers:

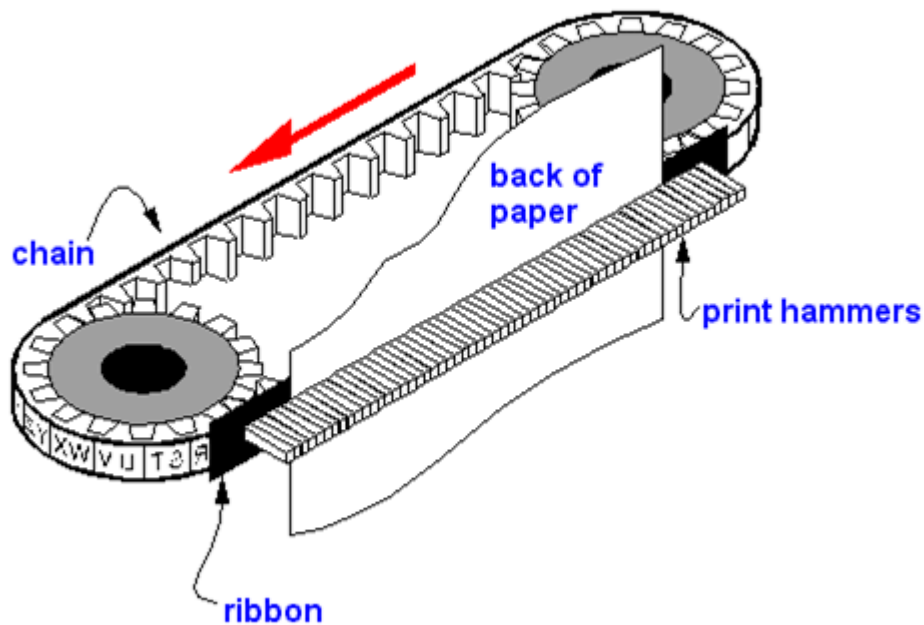
Line printer, which is also as a bar printer, prints one line at a time. It is a high-speed impact printer as it can print 500 to 3000 lines per minute. Drum printer and chain printer are examples of line printers.

i) Drum Printer:



Drum printer is a line printer that is made of a rotating drum to print characters. The drum has circular bands of characters on its surface. It has a separate hammer for each band of characters. When you print, the drum rotates, and when the desired character comes under the hammer, the hammer strikes the ink ribbon against the paper to print characters. The drum rotates at a very high speed and characters are printed by activating the appropriate hammers. Although all the characters are not printed at a time, they are printed at a very high speed. Furthermore, it can print only a predefined style as it has a specific set of characters. These printers are known to be very noisy due to the use of hammering techniques.

ii) Chain Printer:



Chain printer is a line printer that uses a rotating chain to print characters. The characters are embossed on the surface of the chain. The chain rotates horizontally around a set of hammers, for each print location one hammer is provided, i.e., the total number of hammers is equal to the total number of print positions.

The chain rotates at a very high speed and when the desired character comes at the print location, the corresponding hammer strikes the page against the ribbon and character on the chain. They can type 500 to 3000 lines per minute. They are also noisy due to the hammering action.

Non-Impact Printer:

Non-impact printers don't print characters or images by striking a print head or hammer on the ink ribbon placed against the paper. They print characters and images without direct physical contact between the paper and the printing machinery. These printers can print a complete page at a time, so they are also known as page printers. The common types of non-impact printers are Laser printer and Inkjet printer:

i) Laser Printer:

A laser printer is a non-impact printer that uses a laser beam to print the characters. The laser beam hits the drum, which is a photoreceptor and draws the image on the drum by altering electrical charges on the drum. The drum then rolls in toner, and the charged image on the drum picks the toner. The toner is then printed on the paper using heat and pressure. Once the document is printed, the drum loses the electric charge, and the remaining toner is collected. The laser printers use powdered toner for printing instead of liquid ink and produce quality print objects with a resolution of 600 dots per inch (dpi) or more.

ii) Inkjet Printer:

The inkjet printer is a non-impact printer that prints images and characters by spraying fine, ionized drops of ink. The print head has tiny nozzles to spray the ink. The printer head moves back and forth and sprays ionized drops of ink on the paper, which is fed through the printer. These drops pass through an electric field that guides the ink onto the paper to print correct images and characters.

An inkjet printer has cartridges that contain ink. Modern inkjet printers are color printers that have four cartridges containing different colors: Cyan, Magenta, Yellow, and Black. It is capable of printing high-quality images with different colors. It can produce print objects with a resolution of at least 300 dots per inch (dpi).

3) Projector



A projector is an output device that enables the user to project the output onto a large surface such as a big screen or wall. It can be connected to a computer and similar devices to project their output onto a screen. It uses light and lenses to produce magnified texts, images, and videos. So, it is an ideal output device to give presentations or to teach a large number of people.

Modern projects (digital projectors) come with multiple input sources such as HDMI ports for newer equipment and VGA ports that support older devices. Some projectors are designed to support Wi-Fi and Bluetooth as well. They can be fixed onto the ceiling, placed on a stand, and more and are frequently used for classroom teaching, giving presentations, home cinemas, etc.

A digital projector can be of two types:

Liquid Crystal Display (LCD) digital projector: This type of digital projectors are very popular as they are lightweight and provide crisp output. An LCD projector uses transmissive technology to produce output. It allows the light source, which is a standard lamp, to pass through the three colored liquid crystal light panels. Some colors pass through the panels and some are blocked by the panels and thus images are on the screen.

Digital Light Processing (DLP) digital projector: It has a set of tiny mirrors, a separate mirror for each pixel of the image and thus provide high-quality images. These projectors are mostly used in theatres as they fulfill the requirement of high-quality video output.

INTRODUCTION TO OPERATING SYSTEMS

As the name suggests, an operating system is a type of software without which you cannot operate or run a computer. It acts as an intermediary or translation system between computer hardware and application programs installed on the computer. In other words, you cannot directly use computer programs with computer hardware without having a medium to establish a connection between them.

Besides this, it is also an intermediary between the computer user and the [computer hardware](#) as it provides a standard user interface that you see on your computer screen after you switch on your computer. For example, the Windows and the Mac OS are also operating systems that provide a graphical interface with icons and pictures to enable users to access multiple files and applications simultaneously.

So, although the operating system is itself a program or software, it allows users to run other programs or applications on the system. We can say that it works behind the scenes to run your computer.

Major 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.
- **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/ hardware management:** The operating system also contains drivers to manage devices. A driver is a type of translation software that allows the operating system to communicate with devices, and there are different drivers for different devices as each device speaks a different language.
- **Run software applications:** It offers the environment to run or use software applications developed to perform specific tasks, for example, Ms Word, Ms Excel, Photoshop, etc.
- **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.
- **Evaluates the system's health:** It gives us an idea about the performance of the hardware of the system. For example, you can see how busy the CPU is, how fast the data is retrieved from the hard disk, etc.
- **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.
- **I/O 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.
- **Security:** It has a security module to protect the data or information stored in the memories of the computer against malware and unauthorized access. Thus, it not only manages your data but also helps to protect it.
- **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.

DOS

Stands for "Disk Operating System." DOS was the first operating system used by IBM-compatible computers. It was originally available in two versions that were essentially the same, but marketed under two different names. "PC-DOS" was the version developed by IBM and sold to the first IBM-compatible manufacturers. "MS-DOS" was the version that Microsoft bought the rights to, and was bundled with the first versions of Windows.

DOS uses a command line, or text-based interface, that allows the user to type commands. By typing simple instructions such as pwd (print working directory) and cd (change directory), the user can browse the files on the hard drive, open files, and run programs. While the commands are simple to type, the user must know the basic commands in order to use DOS effectively (similar to UNIX). This made the operating system difficult for novices to use, which is why Microsoft later bundled the graphic-based Windows operating system with DOS.

The first versions of Windows (through Windows 95) actually ran on top of the DOS operating system. This is why so many DOS-related files (such as .INI, .DLL, and .COM files) are still used by Windows. However, the Windows operating system was rewritten for Windows NT (New Technology), which enabled Windows to run on its own, without using DOS. Later versions of Windows, such as Windows 2000, XP, and Vista, also do not require DOS.

DOS is still included with Windows, but is run from the Windows operating system instead of the other way around. The DOS command prompt can be opened in Windows by selecting "Run..." from the Start Menu and typing

WINDOWS OPERATING SYSTEM

Microsoft Windows is one of the most popular Graphical User Interface (GUI). Multiple applications can execute simultaneously in Windows, and this is known as "**Multitasking**".

Windows Operating System uses both Keyboard and mouse as input devices. Mouse is used to interact with Windows by clicking its icons. Keyboard is used to enter alphabets, numerals and special characters.

Some of the functions of Windows Operating System are:

- Access applications (programs) on the computer (word processing, games, spread sheets, calculators and so on).
- Load any new program on the computer.

- Manage hardware such as printers, scanners, mouse, digital cameras etc.,
- File management activities (For example creating, modifying, saving, deleting files and folders).
- Change computer settings such as colour scheme, screen savers of your monitor, etc.

INTRODUCTION TO PROGRAMMING LANGUAGES: C

C is a general-purpose high level language that was originally developed by Dennis Ritchie for the Unix operating system. It was first implemented on the Digital Equipment Corporation PDP-11 computer in 1972.

The Unix operating system and virtually all Unix applications are written in the C language. C has now become a widely used professional language for various reasons.

- Easy to learn
- Structured language
- It produces efficient programs.
- It can handle low-level activities.
- It can be compiled on a variety of computers.

Facts about C

- C was invented to write an operating system called UNIX.
- C is a successor of B language which was introduced around 1970
- The language was formalized in 1988 by the American National Standard Institute (ANSI).
- By 1973 UNIX OS almost totally written in C.
- Today C is the most widely used System Programming Language.
- Most of the state of the art software have been implemented using C

Features of C Programming Language:

1. Procedural Language
 2. Fast and Efficient
 3. Modularity
 4. Statically Type
 5. General Purpose Language
 6. Rich set of built in Operators
 7. Libraries with rich Functions
 8. Middle Level Language
 9. Portability
 10. Easy to Extend
1. **Procedural Language:** In a procedural language like C step by step predefined instructions are carried out. C program may contain more than one function to perform a particular task. New people to programming will think that this is the only way of a particular programming language works. There are other programming paradigms as well in the programming world. Most of the commonly used paradigm is an object-oriented programming language.

2. **Fast and Efficient:** Newer languages like java, python offer more features than c programming language but due to additional processing in these languages, their performance rate gets down effectively. C programming language as the been middle-level language provides programmers access to direct manipulation with the computer hardware but higher-level languages do not allow this. That's one of the reasons C language is considered as the first choice to start learning programming languages. It's fast because statically typed languages are faster than dynamically typed languages.
3. **Modularity:** The concept of storing of C programming language code in the form of libraries for further future uses is known as modularity. This programming language van does a very little on its own most of its power is held by its libraries. C language has it's own library to solve common problems like in this we can use a particular function by using a header file stored in its library.
4. **Statically Type:** C programming language is a statically typed language. Meaning the type of variable is checked at the time of compilation but not at run time. Means each time a programmer type a program they have to mention the type of variables used.
5. **General Purpose Language:** From system programming to photo editing software, C programming language is used in various applications. Some of the common applications where it's used are as follows:
 - Operating systems: Windows, Linux, iOS, Android, OXS
 - Databases: PostgreSQL, Oracle, MySQL, MS SQL Server etc.
6. **Rich set of built-in Operators:** It is a diversified language with a rich set of built-in operators which are used in writing complex or simplified C programs.
7. **Libraries with rich Functions:** Robust libraries and functions in C help even a beginner coder to code with ease.
8. **Middle-Level Language:** As it is a middle-level language so it has the combined form of both capabilities of assembly language and features of the high level language.
9. **Portability:** C language is lavishly portable as programs which are written in C language can run and compile on any system with either none or small changes.
10. **Easy to Extend:** Programs written in C language can be extended means when a program is already written in it then some more features and operations can be added into it.

INTRODUCTION TO C++ PROGRAMMING LANGUAGE

- Difficulty Level : Easy
- Last Updated : 17 Feb, 2021
- C++ is a general-purpose programming language that was developed as an enhancement of the C language to include object-oriented paradigm. It is an imperative and a **compiled** language.
- C++ is a middle-level language rendering it the advantage of programming low-level (drivers, kernels) and even higher-level applications (games, GUI, desktop apps etc.). The basic syntax and code structure of both C and C++ are the same.

Some of the *features & key-points* to note about the programming language are as follows:

- **Simple:** It is a simple language in the sense that programs can be broken down into logical units and parts, has a rich library support and a variety of data-types.
- **Machine Independent but Platform Dependent:** A C++ executable is not platform-independent (compiled programs on Linux won't run on Windows), however they are machine independent.

- **Mid-level language:** It is a mid-level language as we can do both systems-programming (drivers, kernels, networking etc.) and build large-scale user applications (Media Players, Photoshop, Game Engines etc.)
- **Rich library support:** Has a rich library support (Both standard ~ built-in data structures, algorithms etc.) as well 3rd party libraries (e.g. Boost libraries) for fast and rapid development.
- **Speed of execution:** C++ programs excel in execution speed. Since, it is a compiled language, and also hugely procedural. Newer languages have extra in-built default features such as garbage-collection, dynamic typing etc. which slow the execution of the program overall. Since there is no additional processing overhead like this in C++, it is blazing fast.
- **Pointer and direct Memory-Access:** C++ provides pointer support which aids users to directly manipulate storage address. This helps in doing low-level programming (where one might need to have explicit control on the storage of variables).
- **Object-Oriented:** One of the strongest points of the language which sets it apart from C. Object-Oriented support helps C++ to make maintainable and extensible programs. i.e. Large-scale applications can be built. Procedural code becomes difficult to maintain as code-size grows.
- **Compiled Language:** C++ is a compiled language, contributing to its speed.

Applications of C++:

C++ finds varied usage in applications such as:

- Operating Systems & Systems Programming. e.g. *Linux-based OS (Ubuntu etc.)*
- Browsers (*Chrome & Firefox*)
- Graphics & Game engines (*Photoshop, Blender, Unreal-Engine*)
- Database Engines (*MySQL, MongoDB, Redis etc.*)
- Cloud/Distributed Systems

Some interesting facts about C++:

Here are some awesome facts about C++ that may interest you:

1. The name of C++ signifies the evolutionary nature of the changes from C. “++” is the C increment operator.
2. C++ is one of the predominant languages for the development of all kind of technical and commercial software.
3. C++ introduces Object-Oriented Programming, not present in C. Like other things, C++ supports the four primary features of OOP: encapsulation, polymorphism, abstraction, and inheritance.
4. C++ got the OOP features from Simula67 Programming language.
5. A function is a minimum requirement for a C++ program to run.(at least main() function)

UNIT II

WORD PROCESSING: OPEN, SAVE AND CLOSE WORD DOCUMENT

While you are creating a document, it is often important to save it for future use. The saved document now becomes a file. A file is a complete, named collection of information, such as a user-created document. It is the basic unit of storage that enables a computer to distinguish one set of information from another. It is a collection of data that a user can retrieve, change, delete, save, or send to an output device, such as a printer or e-mail program.

From the foregoing explanation, you realize that a saved document can be retrieved, viewed and reused. Here are the steps involved in opening/retrieving a saved document/file in Word environment.

1. On the *Menu bar*, click **File**, and then click **Open**. The *Open dialog box* appears.
2. In the **Look in** list, click the drive or folder that contains the file you want to open.
3. Click the file.
4. You'll see a preview of the selected file in the **Preview box**.
5. Click **Open**.

Open a File as Copy in Microsoft Word

This feature allows you to open a copy of a document which you can edit and save, without such changes altering the content of the original file. When you open a file as a copy, a duplicate of the file is created in the older that contains the original file. You can, however, save the copy you opened in a different location (drive and folder) and with a different filename, using the *Save As* command in the *File* menu.

Use this method if you want to work on a file of which you do not want the new changes to reflect on the original document.

Steps:

1. On the *Menu bar*, click **File** and then click **Open**. The *Open dialog box* appears.
2. In the **Look in** list, double-click the drive or folder that contains the file you want to open.
3. Select the file whose copy you want to open.
4. Click the drop-down arrow next to the **Open** button to display a drop down list.
5. From the drop-down list, click **Open as Copy**.

Save a Document in Microsoft Word

As you create a document, you will need to store it for future reference or use. In **Word**, you to save your documents in various ways. You can save all open documents at the same time. You can also save a copy of the active document with a different name or in a different location. If you share documents with people who use previous versions of **Word**, and you want to be sure the documents look the same when they're opened in the earlier versions, you can turn off features that are not part of that version.

To save a document:

1. Open the **File** menu and click **Save**. *The Save As dialog box appears.*
2. In the **File name** box, enter a desired name for the document.
3. To save the document in a folder or a drive other than the default, click the drop-down arrow in the **Save in** box, and then choose the desired folder or drive.
4. To save the document in a *new* folder within the current drive, click the **Create New Folder** button on the toolbar within the *Save As* dialog box, directly below the title bar of the *Save As* dialog box.
5. Click **Save**.

Save a File/Document to another Format in Word

You can save a Word document in a format that makes it possible to access or edit in other/earlier versions of *Word* or in other word processors such as WordPerfect. When you save your work in *Word*, it is stored in the default document format of the particular version of *Word* you are using. The file name of the saved document is automatically followed by a **.doc** extension. To be able to share documents with people who use other word processors or who use versions of *Word* that have a different file format, you will have to save documents in file formats that such word processors or other versions of *Word* can understand/read. For example, you can open a document created in WordPerfect, make changes to it in *Word*.

Steps to save a file to another format in Microsoft Word:

1. On the *File menu*, click **Save As**.
2. In the **File name** box, enter a new name for the file.
3. Click the **Save as type** list, and then click the file format that you want the file saved in.
4. Click **Save**.

Close a Document

When you are through working in a document, you need to close it. This will help prevent unintended changes from being made to it, and also to free the computer working memory [*Random Access Memory (RAM)*] some space.

Note, however, that closing a document means *simply closing the active document* (using the *Close* command or alternatives), **without** actually quitting the entire *Word* window.

There are several ways of *closing a document* in Word. These methods use:

- The *File* menu
- The *Close Window* button on the menu bar
- Shortcut keys

Closing a Document Using the *File* Menu

1. From the Menu bar, choose **File**.
2. From the **File** menu, click **Close**.

Close a Document Using the *Close Window* Button on the Menu Bar

Simply click the *Close Window (X)* button to the extreme right of the Menu bar. The active document will be closed, leaving the Word program still running. *Word* or the *Office Assistant* will prompt you to save your document, if you have unsaved changes in the document.

Close a Document Using Shortcut Keys

To close the current document without exiting Word, you can use any of the following shortcut keys, if you are a keyboard fan:

- Press **Ctrl** and **F4** keys simultaneously on the keyboard (*Ctrl + F4*).
- OR
- Press **Ctrl** and **W** keys simultaneously on the keyboard (*Ctrl + W*).

TYPING AND EDITING TEXT

1. Start typing your **text**.
2. To start a new paragraph, press Enter.
3. To add extra space between paragraphs, press Enter twice.
4. To move the cursor in a document, click where you want to insert it or use the keyboard arrow keys to move it.
5. To edit **text**, click in the **word** you want to change.

HOW TO CREATE A BULLET LIST IN MICROSOFT WORD

1. Position the cursor where you want to insert the bullet list.
2. On the *Home* tab in the Ribbon, click the bullet list button, as shown at the top of the page.
3. If successful, a bullet should appear. Type any text and press **Enter** to start the next bullet. To end the bullet list, press **Enter** twice.

Below is an example of a bullet list.

- One bullet
- Two bullet

HOW TO CREATE A NUMBERED LIST IN MICROSOFT WORD

To create a numbered list in Microsoft Word, follow the steps below.

1. Position the cursor where you want to insert the number list.
2. On the *Home* tab in the Ribbon, click the number list button, as shown at the top of the page.
3. If successful, a number one should appear. Type any text and press **Enter** to start the next number in the numbered list. To end the numbered list, press **Enter** twice.

HOW TO CREATE A NUMBERED LIST WITH LETTERS

To create a numbered list that also contains a letter list in Microsoft Word, follow the steps below.

1. Position the cursor where you want to insert the number list.
2. On the *Home* tab in the Ribbon, click the down arrow next to the number list button.



3. In drop-down window that appears, select one of the numbered list options with letters.
4. Type the text for the first lettered bullet item.

5. Press **Enter** to add additional lettered bullet items.

Below is an example of a numbered list using letters instead of numbers.

- A. First bullet using letter
- B. Second bullet using letter
- C. Third bullet using letter

To create a numbered list that also contains a letter list in Microsoft Word, follow the steps below.

1. Position the cursor where you want to add a bulleted item using a letter.
2. Press **Enter** and then **Tab**.
3. Press **Enter** again to add additional lettered bullet items.

Below is an example of a numbered list with letters in it.

1. One numbered
2. Two
 - a. Two numbered again
 - b. Two numbered again
3. Final numbered

DOCUMENT FORMATTING

Document formatting refers to the way a document is laid out on the page—the way it looks and is visually organized—and it addresses things like font selection, font size and presentation (like bold or italics), spacing, margins, alignment, columns, indentation, and lists. Basically, the mechanics of how the words appear on the page. A well formatting document is consistent, correct (in terms of meeting any stated requirements), and easy to read.

The **visual appeal** of a document has an effect on the reader and how they perceive the information, so it's important in any piece of writing or documentation to be concerned with its formatting. Formatting also makes information more accessible to the reader by creating and labeling sections (headings), highlighting key words or ideas (bold, italics, or lists), and making a good impression (professional look and feel, appropriate font choice for the document type).

There are many ways to format a technical or professional document. Assignments may specify formatting requirements, but if a style is not dictated, maintain a clear and consistent format throughout the document.

Especially when combining work from multiple team members, details like slight differences in font size or line spacing are easy to miss, but these subtle inconsistencies detract from the overall professionalism of your document. Sloppy formatting will reflect poorly on your abilities, and your audience may lose confidence in your message.

Basic Formatting Standards for Lab Documents

A few standards that should be used in most lab documents, unless specified otherwise:

- 11-12 pt. font in a consistent style throughout, including headers, footers, and visual labels
- 14 pt font for section headings (and “Memo” or other document label within a header)
- A standard, professional font (e.g., Times New Roman, Cambria, Calibri)
- Single or 0.15 line spacing, with no indentation on the first line of the paragraph
- Additional line break between paragraphs
- Left-justified body text
- Page numbers at bottom right corner (starting the first page of the main text, i.e. not the cover page or Table of Contents)
- 1in. margins

PARAGRAPH ALIGNMENT

There are four types of paragraph alignment you can set within Word:

- ***Left-aligned.*** All lines in the paragraph butt up against the left text margin. No extra spaces are added to the line. The text of each line does not line up with the right margin, so traditional typesetting terminology often refers to left-aligned text as *ragged right*.
- ***Center-aligned.*** All lines in a paragraph are centered between the left and right text margins. No extra spaces are added to the line. The text lines up with neither the left nor right margins.
- ***Right-aligned.*** All lines in a paragraph butt up against the right text margin. No extra spaces are added to the line. The text of each line does not line up with the left margin, so traditional typesetting terminology often refers to right-aligned text as *ragged left*.
- ***Justified.*** All lines in a paragraph are expanded so they butt up against both the left and right text margins. Space is added, between words and characters, as necessary to fill out the line. In some typesetting references justified text is also referred to as "full justified."

There is also an undocumented alignment for paragraphs called "distributed text justification." This alignment is very similar to Justified alignment, except it also forces the last line of the paragraph—regardless of how short it is—to be stretched all the way to the right margin. You can only access this alignment type by placing the insertion point within the paragraph and pressing **Ctrl+Shift+J**.

INDENTATION

indent or **indentation** is the increase or decrease of space between the left and right margin of a paragraph. To indent text, move the cursor to the front of the line and press the **Tab** on the keyboard.

The shortcut key **Ctrl+M** or **Ctrl+>** (Ctrl and greater than) indents all highlighted text and **Ctrl+Shift+M** or **Ctrl+<** to decrease the indent of selected text in Word and other programs

A typical indent is five spaces from the left or right side of the page.

Text programs that support a tab also support multiple indents. For example, you could press **Tab** three times to indent a line fifteen spaces from the left side.

HOW TO INSERT A HEADER AND FOOTER IN MICROSOFT WORD DOCUMENT?

In Microsoft Word, Headers and Footers are used to insert additional information such as title, file name, date, page numbers, etc. The presence of both header and footer in the Word document makes your document more professional and easier to read as well as understand.

Headers appear at the top margin of the Word document, while Footers appear at the bottom margin of the Word document

To insert a header and footer in Microsoft Word, follow the below given basic steps -

Step 1: Open the new or an existing Word document in which you want to insert header and footer.

Step 2: Go to the Insert tab at the top of the Ribbon.

Step 3: Click on either header or footer drop-down menu in the Header & Footer section.

Step 4: A Header or Footer drop-down menu will display on the screen with a list of built-in Header or Footer options. Select your desired option from the Built-in list.

Step 5: A Design tab with Header & Footer option will appear at the top of the document (on the Ribbon), as shown in the below screenshot.

Step 6: Type your desired information into the header or footer section.

Step 7: Once you type your desired text in the Header section, click on Close Header and Footer under the Design section on the Ribbon or press the Esc key from the keyboard to remove the dotted underline. Now, you can see that the Header is inserted to the Word document.

CHECK SPELLING AND GRAMMAR

On the Review tab, click Spelling & Grammar. If Word finds a potential error, the Spelling & Grammar dialog box will open, spelling errors will be shown as red text, and grammatical errors will be shown as green text. To fix an error, do one of the following: Type the correction in the box and then click Change.

Run the spelling and grammar checker manually

SPELLING AND GRAMMAR CHECKING

Open most Office programs, click the Review tab on the ribbon. In Access or InfoPath you can skip this step. In Project you'll go to the Project tab.

1. Click Spelling or Spelling & Grammar.
2. Spelling and grammar button on the Review ribbon
3. If the program finds spelling mistakes, a dialog box appears with the first misspelled word found by the spelling checker.
4. After you decide how to resolve the misspelling (ignoring it, adding it to the program's dictionary, or changing it), the program moves to the next misspelled word.

FIND AND REPLACE

Go to Home > Replace or press Ctrl+H. Enter the word or phrase you want to locate in the Find box. Enter your new text in the Replace box.

Introduction

While working on editing a document you come across a situation very frequently when you want to search a particular word in your document and many times you will be willing to replace this word with another word at a few or all the places throughout the document

Find Command

The Find command enables you to locate specific text in your document. Following are the steps to find a word document in the following screen –

Find & Replace Operation

We assume you are an expert in searching a word or phrase in a word document as explained above. This section will teach you how you can replace an existing word in your document. Following are the simple steps –

Step 1 – Click the Replace option in the Editing group on the Home tab or press Ctrl + H to launch the Find and Replace dialog box shown in Step 2 –

Step 2 – Type a word which you want to search. You can also replace the word using the Find and Replace dialog box as in the following screenshot –

Step 3 – Click the Replace button available on the Find and Replace dialog box and you will see the first occurrence of the searched word would be replaced with the replace with word. Clicking again on Replace button would replace next occurrence of the searched word. If you will click Replace All button then it would replace all the found words in one go. You can also use Find Next button just to search the next occurrence and later you can use Replace button to replace the found word.

Step 4 – You can use More >> button available on the dialog box to use more options and to make your search more specific like case sensitive search or searching for whole word only etc.

Step 5 – Finally, if you are done with the Find and Replace operation, you can click the Close (X) or Cancel button of the dialog box to close the box.

PRINT PREVIEW

Print preview is a feature that displays on the screen what a hard copy would look like when printed. Using print preview, you can find any errors that may exist or fix the layout before printing, which can save ink or toner and paper by not having to print more than once.

To open the print preview feature, click the print preview icon on the toolbar, like that shown in the picture, or click *File* and choose the *Print Preview* option.

PRINTING LANGUAGE

To print a document, your computer needs to be connected to a printer. Being able to print is not necessary in order to use Word, but if you want to send a letter in the post or print out a poster, you'll need to have access to a printer.

Step 1: Open an existing Microsoft Word document or start a new document, if you have Windows 10 you can use Cortana to search for it. Before you print, type your text in the blank document or insert an image.

Step 2: When you are ready, click on **File** in the top left-hand corner of your document. Then, click on Print

MAIL MERGE

Mail merge consists of combining mail and letters and pre-addressed envelopes or mailing labels for mass mailings from a form letter.^[1]

This feature is usually employed in a word processing document which contains fixed text (which is the same in each output document) and variables (which act as placeholders that are replaced by text from the data source word to word).

Some word processors can insert content from a database, spreadsheet, or table into text documents.^{[2][3]}

It is a powerful tool for writing a personalized letter or e-mail to many people at the same time. It imports data from another source such as a spreadsheet and then uses that to replace placeholders throughout the message with the relevant information for each individual that is being messaged.

How to Use Mail Merge in Microsoft Word

1. In a blank Microsoft **Word** document, click on the Mailings tab, and in the Start **Mail Merge** group, click Start **Mail Merge** .
2. Click Step-by-Step **Mail Merge** Wizard .
3. Select your document type. ...
4. Select the starting document. ...
5. Select recipients. ...
6. Write the letter and add custom fields.

Explanation on Six Steps to Completing a Mail-Merge

Mail merging means to plug data from an address table into form letters, e-mail messages, envelopes, address labels, or a directory (a list or catalog, for example).

To start a mail merge, choose **Tools | Letters and Mailings | Mail Merge Wizard** to open the Mail Merge task pane.

Step 1: Select a Document Type

The first step is to select what Word calls a “document type” in the Mail Merge task pane, what kind of mail-merge you want to undertake: form letters, e-mail messages, envelopes for mass-mailings, labels for mass-mailings, or a directory (a list or catalog). Choose an option button and click **Next** at the bottom of the task pane to go to step 2.

Step 2: Select a Starting Document

What Word calls the “starting document” is the document in which the merging takes place. In other words, the address or other data you retrieve will land in the document you choose or create now.

You can create a new start document or use an existing one. In the case of labels and envelopes, you tell Word what size labels or envelopes you intend to print on. In the case of form letters, e-mail messages, and directories, you supply the text either by making use of a document you’ve written already or writing a new document.

Step 3: Select Recipients

In step 3, you tell Word where to get the data that you will merge into the starting document you created or supplied in step 2. You can retrieve the data from a table in a Word document, an Access database table or query, or the address book or contact list where you store your addresses. You can also create a new list for the data if you haven’t entered the data in a file yet.

Step 4: Write/Arrange Your Document

In step 4, you insert the merge fields, the parts of the starting document that differ from recipient to recipient. By inserting merge fields, you tell Word where to plug information from the data source into the starting document. You also tell Word which data to take from the data source. Word offers special tools for entering an address block – the recipient’s address, including his or her name, company, title, street address, city, and zip code.

Step 5: Preview Your Document

In step 5, you get a chance to see what your form letters, e-mail messages, envelopes, labels, or directory will look like after they are printed or sent. In this step, you find out what the document will look like when real data is plugged into it.

If something is amiss in the document, you can click the Previous link to return to step 4, the Write/Arrange your document task pane, and make changes there.

Step 6: Complete the Merge

Step 6 is where you complete the merge by either printing a new document or saving the new file and printing it later. By saving the merged data in a new file, you can edit the file before printing it. In the case of e-mail messages, you click the Electronic Mail link to tell Word to send the e-mail messages.

QUESTION AND ANSWERS

1. What is the use of Bullets and Numbering?

In **bulleted lists**, each Item will begin with a **bullet** character. In **numbered** lists, each item begins with an expression that includes a **number** or letter and a separator such as a period or parenthesis.

2. Write the Components of Microsoft Word – Title bar, Menu Bar, Tool Bar, document area, status bar, scroll bar

3. Write a note on

- (i) Creating a document
- (ii) Saving a document
- (iii) Opening a document
- (iv) Closing a document

- (i) File □ New, to create new empty document
- (ii) [Ctrl+S], File □ Save, enter a name to save a file
- (iii) [Ctrl+O], File □ Open, To open an existing file
- (iv) [Alt+F+C], File □ Close, to close a file

4. Various formatting facilities of MS Word.

Move a text, Copy and paste a text, Select a text, Setting Font name, style and size, Highlighting text etc...

5. Explain various operations performed on Worksheet.

- Deleting a Column or a Row
- Click on the column or row header to highlight the entire column or row to be deleted. Right-click on any cell in the highlighted column or row. Click on Delete from the menu.
- Inserting a Column
- Click on the column header *directly to the right* of where you want to insert a new column. Right-click on any cell in the highlighted column. Click on Insert from the menu.
 - Inserting a Row
 - Click on the row header *directly below* where you want to insert a new row. Right-click on any cell in the highlighted row. Click on Insert from the menu.
 - Sorting
 - Click on the grey rectangle between the "A" column header and the "1" row header in the upper left corner of the worksheet to select the entire worksheet. Click on Data on the menu bar, and then Sort... Under Sort by, select the column to sort by and select either Ascending or Descending order.

6. What is the use of Microsoft Word?

To prepare documents. It allows edit/delete/insert operations on text

7. Write the Command to save the MS Word document – File □ Save (or) Ctrl+S

8. Write the steps to create a Table in MS Word.

Click on **Table** from the menu bar. Select Insert, and then **Table**

- Enter the desired number of rows and columns.
- Choose AutoFit behavior if you want the **table's** cells to automatically expand to fit the text inside them. ...
- Click OK to insert your **table**.

9. Write a note on (i) Bullets and Numbering (ii) Font

- In **bulleted lists**, each paragraph begins with a **bullet** character. In **numbered lists**, each paragraph begins with an expression that includes a **number** or letter and a separator such as a period or parenthesis. The numbers in a **numbered list** are updated automatically when you add or remove paragraphs in the list.
- **Word** comes with the default **font face** set to Calibri, a **Microsoft** specific **font face**. Changing the default to a more common **font face**, Arial for example, will ensure that your document displays properly for everyone who views it.

10. Concept Text Formatting

Formatted text is any **text** that contains special **formatting** such as font size, font color, bold, italic, etc. When copying **text**, **formatted text** is any **text** that keeps its settings from where it is copied.

11. How will you change font in Microsoft Word?

Home tab □ Font or [control + shift + F]

12. List the features of MS Word.

Editing / Updation, Document, Mail merge, Table and Chart Creation

13. Write a note on Border and Shading from Microsoft Word.

- Select the text you need to apply **borders** or **shading**.
- Click Menus tab.
- Move to Format menu.
- Choose **Borders and Shading** in the drop down menu.

14. How will you perform Cut, Copy, Paste and Select a portion of text in word?

Cut – Erase the text from original place, and paste it in required place [Ctrl+X]

Copy – copy the text from original place, and paste it in required place [Ctrl+C]

Paste – Paste text in required place [Ctrl+V]

Select- Select all will select all the text of the document [Ctrl+A]

15. What is the use of the function “Abs”?

Used to find absolute value of a number

16. Write the steps of Table Creation. Create a Table for your class Time table.

Click on **Table** from the menu bar. Select Insert, and then **Table... ..**

- Enter the desired number of rows and columns.
- Choose AutoFit behavior if you want the **table's** cells to automatically expand to fit the text inside them. ...
- Click OK to insert your **table**.

17. Write the steps to do the Mail Merge Concept.

- In a blank Microsoft Word document, click on the Mailings tab, and in the Start **Mail Merge** group, click Start **Mail Merge** .
- Click **Step-by-Step Mail Merge Wizard** .
- Select your document type.
- Select the starting document.
- Select recipients.
- Write the letter and add custom fields.
- Press Enter on your keyboard and click Greeting line... to enter a greeting.
- In the Insert Greeting Line dialog box, choose the greeting line format by clicking the drop-down arrows and selecting the options of your choice, and then click OK.
- Note that the address block and greeting line are surrounded by chevrons (« »). Write a short letter and click Next: Preview your letters.

UNIT - IV

SPREADSHEETS

A spreadsheet is essentially a matrix of rows and columns. Consider a sheet of paper on which horizontal and vertical lines are drawn to yield a rectangular grid. The grid namely a cell, is the result of the intersection of a row with a column. Such a structure is called a Spreadsheet.

A spreadsheet package contains electronic equivalent of a pen, an eraser and large sheet of paper with vertical and horizontal lines to give rows and columns. The cursor position uniquely shown in dark mode indicates where the pen is currently pointing. We can enter text or numbers at any position on the worksheet. We can enter a formula in a cell where we want to perform a calculation and results are to be displayed. A powerful recalculation facility jumps into action each time we update the cell contents with new data.

MS-Excel is the most powerful spreadsheet package brought by Microsoft. The three main components of this package are

- ❖ Electronic spreadsheet
- ❖ Database management
- ❖ Generation of Charts.

Each workbook provides 3 worksheets with facility to increase the number of sheets. Each sheet provides 256 columns and 65536 rows to work with. Though the spreadsheet packages were originally designed for accountants, they have become popular with almost everyone working with figures. Sales executives, book-keepers, officers, students, research scholars, investors bankers etc, almost any one find some form of application for it.

Excel definition: a software program created by Microsoft that uses spreadsheets to organize numbers and data with formulas and functions. **Excel** analysis is ubiquitous around the world and used by businesses of all sizes to perform financial analysis.

Microsoft Excel is a **spreadsheet** program. That means it's used to create grids of **text, numbers** and **formulas** specifying calculations. That's extremely valuable for many businesses, which use it to record expenditures and income, plan budgets, chart data and succinctly present fiscal results.

Features of Microsoft Excel

- Add Header and Footer. MS Excel allows us to keep the header and footer in our spreadsheet document.
- Find and Replace Command. ...
- Password Protection. ...
- Data Filtering. ...
- Data **Sorting**. ...
- Built-in formulae. ...
- Create different charts (Pivot Table Report) ...
- Automatically edits the result.

CREATING TABLES

1. Open the **Excel** spreadsheet.
2. **Use** your mouse to select the cells that contain the information for the **table**.
3. Click the "Insert" tab > Locate the "**Tables**" group.
4. Click "**Table**". ...
5. If you have column headings, check the box "My **table** has headers".
6. Verify that the range is correct > Click [OK].

USING TABLES AND CREATING GRAPHS

1. Enter your data into Excel.
2. Choose one of nine **graph** and chart options to **make**.

3. Highlight your data and 'Insert' your desired **graph**.
4. Switch the data on each axis, if necessary.
5. Adjust your data's layout and colors.
6. Change the size of your chart's legend and axis labels.

QUESTION AND ANSWERS FROM MICROSOFT EXCEL - SPREADSHEET

1. What is the use of Excel Worksheet - Creating grids of text, numbers and formulas for calculations. That's extremely valuable for many businesses, which **use** it to record expenditures and income, plan budgets, chart data and succinctly present fiscal results
2. How will you insert and delete a row and column in a worksheet?
 Insert a worksheet: click on the insert Worksheet icon [Ctrl+F11]
 Delete a Worksheet: click on respective worksheet icon & press Delete
3. Explain any ten functions of MS Excel with example.
 - SUM - Find the **SUM of sequence of numbers**. ...
 - AVERAGE - Find the **AVERAGE of sequence of numbers**. ...
 - COUNT - **COUNT of appearance**
 - TRIM - Removes the spaces
 - MAX - Find the maximum
 - MIN – Find the minimum
 - Abs – Find the absolute value of a number
 - Round – Round the fractional part to its next position
 - AND – To Apply and logic
 - OR – Apply or logic
4. Define Cell – is an intersection of row and column. Cell address is referred by column name and row number. Ex. A1
5. Explain the following operations performed on worksheet.
 - (i)Insert (ii) Delete (iii)Move (iv) Copy
 - Click on new worksheet icon which is available in status bar or [shift +F11]
 - Delete a Worksheet: click on respective worksheet icon & press Delete
 - Move – Erase the text from original place, and paste it in required place [Ctrl+X] & to Paste text in required place [Ctrl+V]
 - Copy – copy the text from original place, and paste it in required place [Ctrl+C] & to Paste text in required place [Ctrl+V]
6. List different Chart Types. Write the steps to create a chart.
 - The *Pie Chart*. A *Pie Chart* can only display one series of data. The *Column Chart*. The *Column Chart* very effectively shows the comparison of one or more series of data points. The *Line Chart*. The *Bar Chart*. The *Area Chart*. The *Scatter Chart*.

STEPS

- Select data for the **chart**.
- Select Insert Recommended **Charts**.

- Select a **chart** on the Recommended **Charts** tab, to preview the **chart**. Note: You can select the data you want in the **chart** and press ALT + F1 to **create a chart** immediately, but it might not be the best **chart** for the data. ...
 - Select a **chart**.
 - Select OK.
7. Write the steps to insert worksheet.
- Click on new worksheet icon which is available in status bar or [shift +F11]
8. What is the use of the function “Round”?
- Used to round the decimal number to next position
9. Explain the Features of MS Excel. Add Header and Footer. **MS Excel** allows us to keep header and footer in our spreadsheet document.
- Find and Replace Command. ... Password Protection. ...
 - Data Filtering. ... Data Sorting. ... Built in formulae. ...
 - Create different charts (Pivot Table Report) ... Automatically edits the result.
10. Explain various operations performed on MS Excel.
- Deleting a Column or a Row
 - Click on the column or row header to highlight the entire column or row to be deleted. Right-click on any cell in the highlighted column or row. Click on Delete from the menu.
 - Inserting a Column
 - Click on the column header *directly to the right* of where you want to insert a new column. Right-click on any cell in the highlighted column. Click on Insert from the menu.
 - Inserting a Row
 - Click on the row header *directly below* where you want to insert a new row. Right-click on any cell in the highlighted row. Click on Insert from the menu.
 - Sorting
 - Click on the grey rectangle between the "A" column header and the "1" row header in the upper left corner of the worksheet to select the entire worksheet. Click on Data on the menu bar, and then Sort... Under Sort by, select the column to sort by and select either Ascending or Descending order.

UNIT V

MS-POWERPOINT

PowerPoint (PPT) is a powerful, easy-to-use presentation graphics software program which allows you to create professional-looking electronic slide shows. PPT is used to present information in an organized manner to an individual or group. Using clip art, sound clips, movie clips, graphs, organization charts, imported Web screens, and many other features, you can easily

create a presentation that will impress your audience and convey your message clearly and professionally Customize Color Schemes.

- Add Animation effects.
- Use the Slide, Notes and Handout Masters.
- Create, Edit and Import Charts.
- Create and Edit Tables.
- Manage Hyperlinks.
- Create Custom Shows.
- Export Outlines & **Presentation** Slides to Word.

CREATING SLIDES AND SLIDESHOW

A **slide** is a single page of a presentation. Collectively, a group of **slides** may be known as a **slide** deck. ... In the digital age, a **slide** most commonly refers to a single page developed using a presentation program such as MS PowerPoint, Apple Keynote, Google **Slides** or Apache Open Office

Select a design template

1. In the PPT Start-up Window, click “From Design Template” located on the right-hand side of the screen under the heading “New.”
2. Scroll down to see the various templates and click on one of them.

(Slide 1, cont.) – Add title and subtitle

1. Click once on “Click to add title” (this is the title placeholder) and type **How to Use PowerPoint.**
2. Click once on “click to add subtitle” and type **Building an Effective Presentation.**

(Slide 2) – Add a Bulleted List slide

1. Click on the “New Slide” button at the toolbar located at the top of the screen.
2. Click once on the title placeholder and type **What you can do with PowerPoint.**
3. Click once on “Click to add text” (this is the text placeholder) and type the following text (hit <Enter> at the end of each line):
 - Create electronic presentations
 - **Use special features to enhance your slides**
 - **Practice and time your slide show**

(NOTE: To format bullets, click on the “Format” menu and then click on “Bullets and Numbering.”)

(Slide 3) – Add a Text & Content Layout Slide

1. Click on the “New Slide” button.
2. On the right side, scroll down until you see the “Text and Content Layout” options.
3. Click once on the option of your choice.
4. Type **Content Options** in the title placeholder.
5. In the text placeholder, add the following text (hit <Enter> after each line):
 - Clip Art
 - **Photographs**
 - **Charts**
 - **Graphs**
 - **Tables**
 - **Diagrams**
 - **Media Clips**
6. Click on the Clip Art icon in the “add content” area.
7. Enter **medicine** in the search window.
8. Scroll through the results and double-click on the Clip Art of your choice.

(Hint: Type “photograph” in the Clip Art search window to see the clip art photo options)

(Slide 4) – Add another Text & Content slide

1. Click on the “New Slide” button.
 2. Type **Advantages to Using a Variety of Content** in the title placeholder.
- In the text placeholder, type the following text (hit <Enter> at the end of each line):
- Graphics keep a presentation lively
 - **Graphics are effective teaching tools**
 - **Graphics keep the audience awake!**
3. Add the Clip Art of your choice to the slide

(Slide 5) – Add a Chart

1. Click on the “New Slide” button.
2. Scroll down to “Other Layouts” and click on the “Title and Chart” option (the last option).
3. Type **Simple Charts** in the title placeholder.
4. Double-click on the chart placeholder.
5. A datasheet will appear. Make changes if you like.
6. Click once in your slide (outside the datasheet) to add the chart to your slide.

Congratulations! You have completed a basic slide show. In the next lesson, we will enhance the presentation to make it more interesting.

EXERCISE: Enhancing Your Slide Show

Adding Transitions

- Click on the “Slide Sorter View” button on the bottom, left-hand corner of your screen.
- Click the “Slide Show” menu and then click on “Slide Transition.”
- Click the “Edit” menu and click “Select All”
- To the right, click a transition of your choice. This will apply to all the selected slides. (Note: Select “Random Transition” – the last option – to have a variety of transitions in your slide show)

Animating Text

- All slides should still be selected (if they aren’t, click the “Edit” menu and then “Select All”).
- Click the “Slide Show” menu.
- Click on “Animation Schemes.”

At the right, choose an Animation Scheme. You will see a preview within your slide sorter view.

(Note: to apply a different Animation Scheme to each slide, you will have to select each slide individually and then choose a scheme for each one.)

Please Note: For more advanced Animation options, you will need to utilize the “Custom Animation” options. These are covered in the Advanced PPT class.

Running the Slide Show

- Click once on the first slide to select it.
- Click on the “Slide Show” button on the bottom left-hand corner of the screen.
- **To advance** to the next slide, click the mouse once.
- **To draw on the slide**, right-click, select “pointer options,” and “pen”. Hold down the mouse and write. Any marks you make are NOT permanent. Hit <Esc> to return to the pointer.
- **To go back one slide** use the left arrow key.
- **To Exit** the slide show quickly, hit <Esc>.

Importing Web Screens

- Start with a **blank slide** in Normal View.
- Minimize the PPT program by clicking on the “minus” sign in the upper right corner.
- Go into the Web and locate the screen you’d like to use in your presentation.
- When the screen you want is displayed, hit the <**Print Screen**> key on your keyboard. This automatically saves the screen to the computer’s clipboard.
- Minimize the web program (the minus button at the top right) and then maximize the PPT program (click on the Microsoft PowerPoint button at the bottom of your screen).

Click on the **Paste** icon on the toolbar (looks like a clipboard). The screen you saved will now appear on your blank slide.

- **Click once** on the image and then **drag the corners** to fill the screen.

Note: You may want your slide to have a white background to better display the Web screen shot. To do this, click the “Format” menu, click “Background,” and select white from the pull-down menu of colors. You might also want to click “Omit background graphics.” **Be sure to click “Apply” and NOT “Apply to All”!**

Inserting Pictures into Your Slides

You can easily add pictures to your PPT slides. To do so, you must first save the picture to the hard drive of your computer. Then insert it into your presentation:

- In Normal View, display the slide on which you’d like the picture to appear.
- From the **Insert** menu, choose the **Picture from File** command.
- Locate the file of the picture you have previously saved and double-click the file name.
- The picture will now appear on your slide.
- You may move and resize the picture as you like.

WHAT IS SLIDE TRANSITION

A **slide transition** is how one **slide** is removed from the screen and the next **slide** is displayed during a presentation. ... The transitions tab contains the Transitions to This **Slide** group. From this group choose a special effect to be applied during the **transition** between the previous **slide** to the next **slide**. Slide transitions are the animation-like effects that happen when you move from one slide to the next during a presentation. Add slide transitions to bring your PowerPoint presentation to life.

Select the slide you want to add a transition to.

Select the **Transitions** tab and choose a transition.

Select a transition to see a preview.

Select **Effect Options** to choose the direction and nature of the transition.

Select **Preview** to see what the transition looks like.

To remove a transition, select **Transitions > None**.

ANIMATION EFFECT

In PowerPoint, you can **animate** text and objects such as clip art, shapes, and pictures. Animation—or movement—on the slide can be used to **draw the audience's attention** to specific content or to make the slide easier to read.

The four types of animations

There are several animation effects you can choose from, and they are organized into four types.

- **Entrance:** These control how the object enters the slide. For example, with the **Bounce** animation the object will "fall" onto the slide and then bounce several times.

Emphasis: These animations occur while the object is on the slide, often triggered by a **mouse click**. For example, you can set an object to **spin** when you click the mouse.

Exit: These control how the object exits the slide. For example, with the **Fade** animation the object will simply fade away.

Motion Paths: These are similar to **Emphasis** effects, except the object moves within the slide along a predetermined path, like a **circle**.

To apply an animation to an object:

1. Select the object you want to animate.

On the **Animations** tab, click the More drop-down arrow in the **Animation** group.

A drop-down menu of animation effects will appear. Select the desired effect.

The effect will apply to the object. The object will have a small **number** next to it to show that it has an animation. In the Slide pane, a **star** symbol also will appear next to the slide.

At the bottom of the menu, you can access even more effects.

EFFECT OPTIONS

Some effects will have **options** you can change. For example, with the **Fly In** effect you can control **which direction** the object comes from. These options can be accessed from the **Effect Options** command in the Animation group.

To remove an animation:

1. Select the small **number** located next to the animated object.
2. Press the **Delete** key. The animation will be deleted.

Animations are best used in moderation. Adding too many animations can make your presentation look a little silly and can even be distracting to your audience. Consider using mostly subtle animations, or not using animations at all.

Working with animations

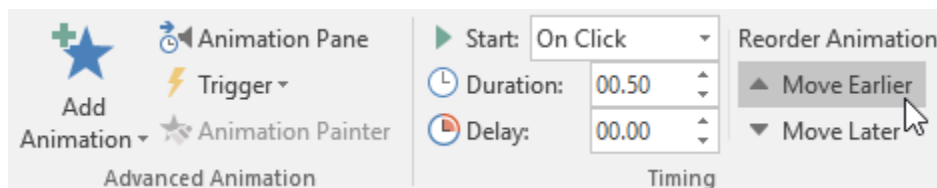
To add multiple animations to an object:

If you select a new animation from the the menu in the Animation group, it will **replace the object's current animation**. However, you'll sometimes want to place **more than one animation** on an object, like an **Entrance** and an **Exit** effect. To do this, you'll need to use the **Add Animation** command, which will allow you to keep your current animations while adding new ones.

1. Select an object.
2. Click the **Animations** tab.
3. In the **Advanced Animation** group, click the **Add Animation** command to view the available animations.
4. Select the desired animation effect.
5. If the object has more than one effect, it will have a different **number** for each effect. The numbers indicate the **order** in which the effects will occur.

To reorder the animations:

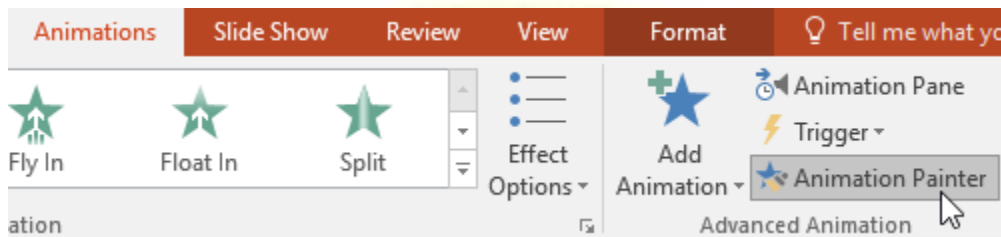
1. Select the **number** of the effect you want to change.
2. From the **Animations** tab, click the **Move Earlier** or **Move Later** commands to change the ordering.



To copy animations with the Animation Painter:

In some cases, you may want to apply the same effects to more than one object. You can do this by **copying** the effects from one object to another using the **Animation Painter**. In our example, we want to copy an animation from one slide to another because they have similar layouts.

1. Click the **object** that has the **effects** you want to copy. In our example, we'll click our answer text.
2. From the **Animations** tab, click the **Animation Painter** command.

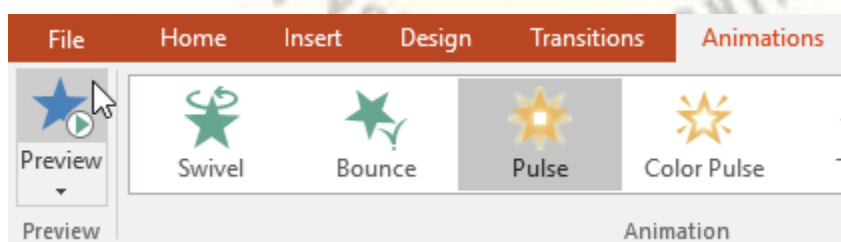


3. Click the **object** you want to copy the effects to. In our example, we'll click the answer text on the next slide. Both objects now have the same effect.

To preview animations:

Any animation effects you have applied will show up when you play the slide show. However, you can also quickly **preview** the animations for the current slide without viewing the slide show.

1. Navigate to the **slide** you want to preview.
2. From the **Animations** tab, click the **Preview** command. The animations for the current slide will play.

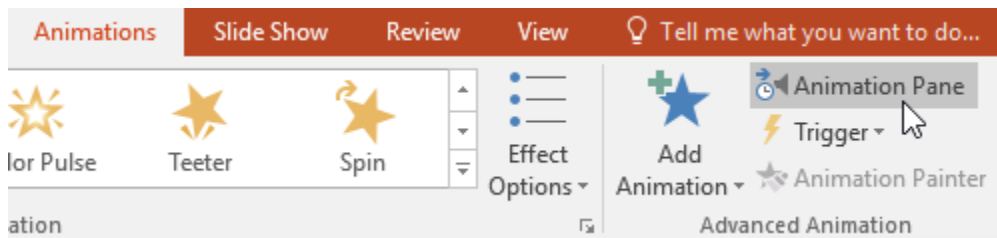


The Animation Pane

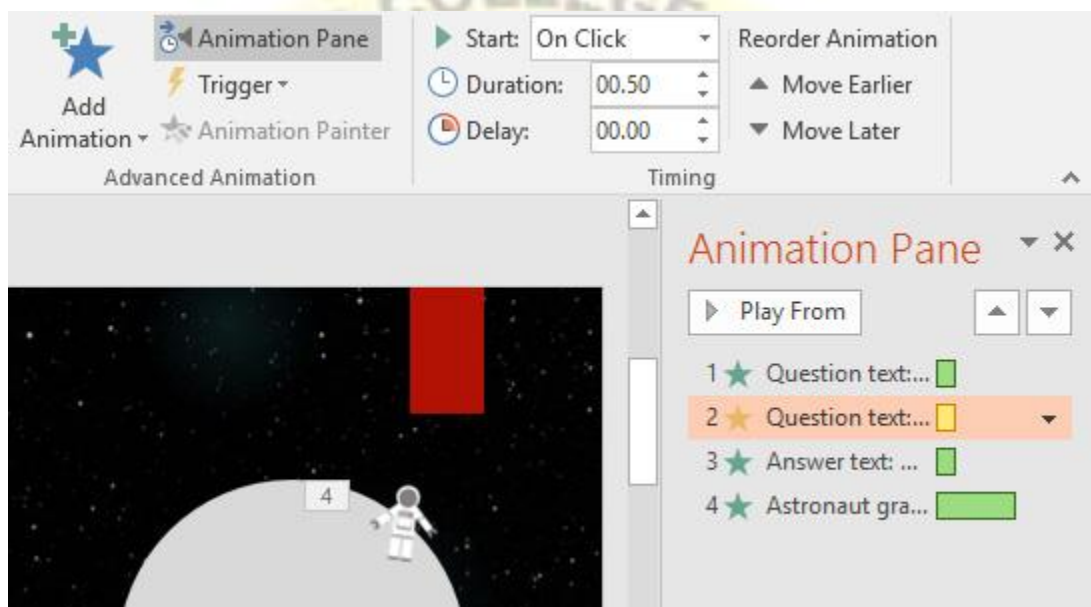
The **Animation Pane** allows you to view and manage all of the effects that are on the current slide. You can **modify** and **reorder** effects directly from the Animation Pane, which is especially useful when you have several effects.

To open the Animation Pane:

1. From the **Animations** tab, click the **Animation Pane** command.



2. The Animation Pane will open on the right side of the window. It will show all of the effects for the current slide in the order in which they will appear.



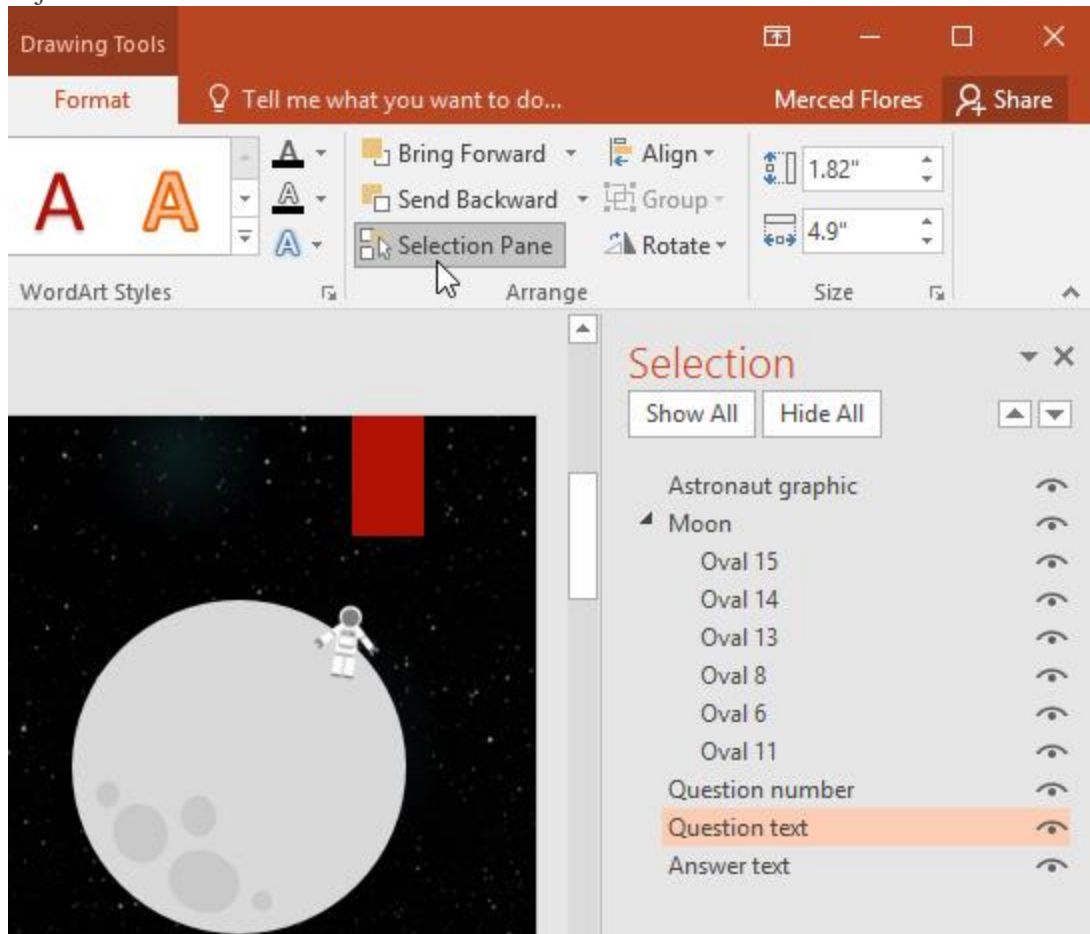
If you have several animated objects, it may help to rename the objects before reordering them in the Animation Pane. You can rename them in the **Selection Pane**. To open the Selection Pane, click an **object**, then from the **Format** tab click **Selection Pane**. Double-click the name of an

object

to

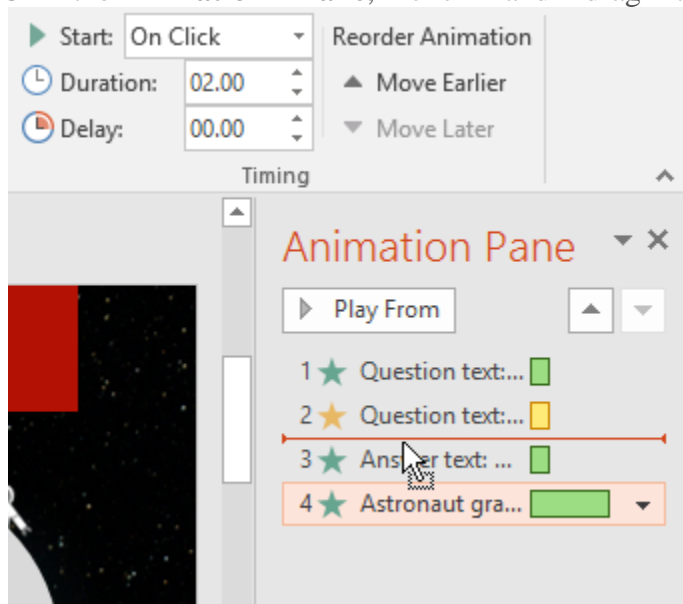
rename

it.



To reorder effects from the Animation Pane:

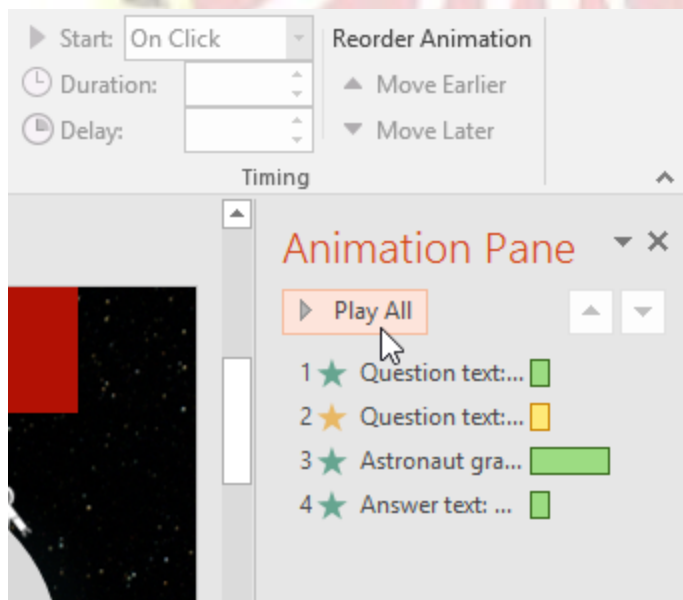
1. On the **Animation Pane**, click and drag an effect up or down.



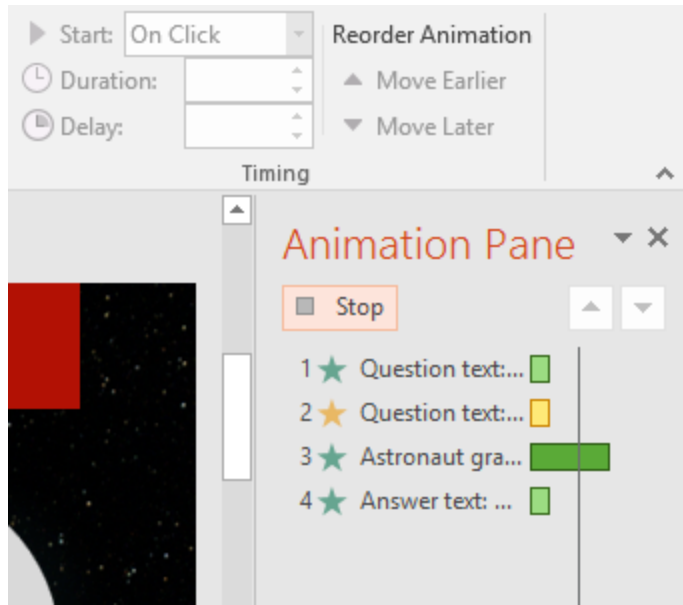
2. The effects will reorder themselves.

To preview effects from the Animation Pane:

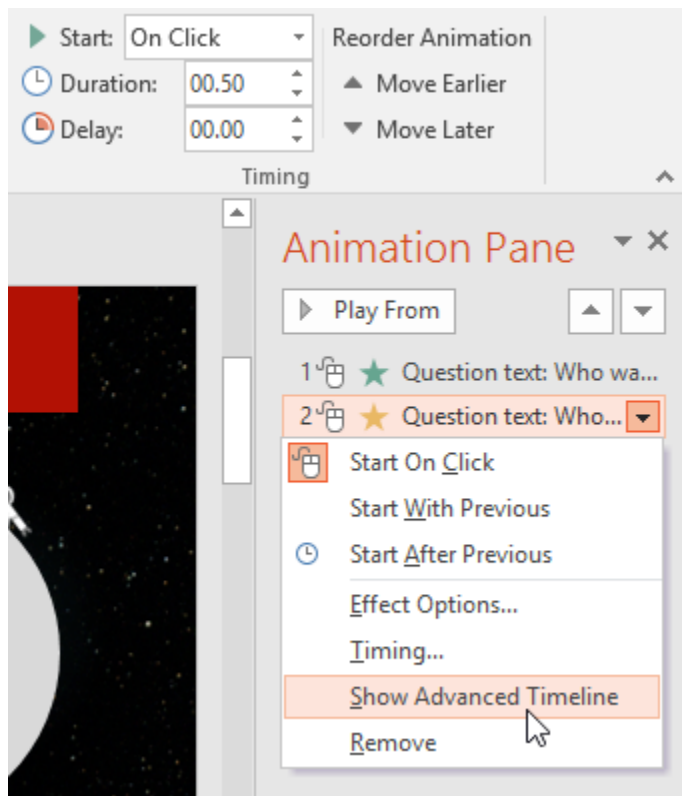
1. From the **Animation Pane**, click the **Play** button.



2. The effects for the current slide will play. On the right side of the Animation Pane, you will be able to see a **timeline** that shows the progress through each effect.



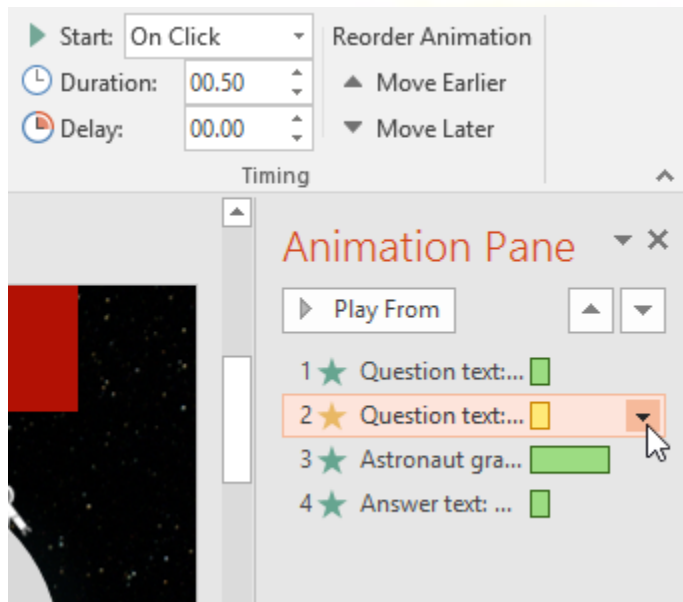
If the timeline is not visible, click the drop-down arrow for an effect, then select **Show Advanced Timeline**.



To change an effect's start option:

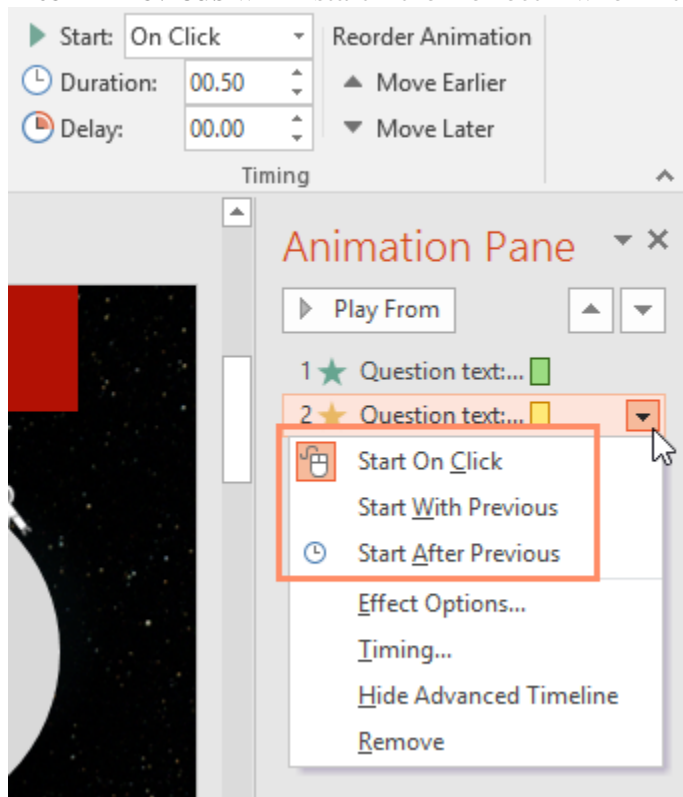
By default, an effect starts playing when you click the mouse during a slide show. If you have multiple effects, you will need to click multiple times to start each effect individually. However, by changing the **start option** for each effect, you can have effects that automatically play **at the same time** or **one after the other**.

1. From the **Animation Pane**, select an effect. A drop-down arrow will appear next to the effect.



2. Click the drop-down arrow and select one of the three desired start options. **Start on Click** will start the effect when the mouse is clicked, **Start With Previous** will start the effect at the same time as the previous effect, and **Start**

After Previous will start the effect when the previous effect ends.



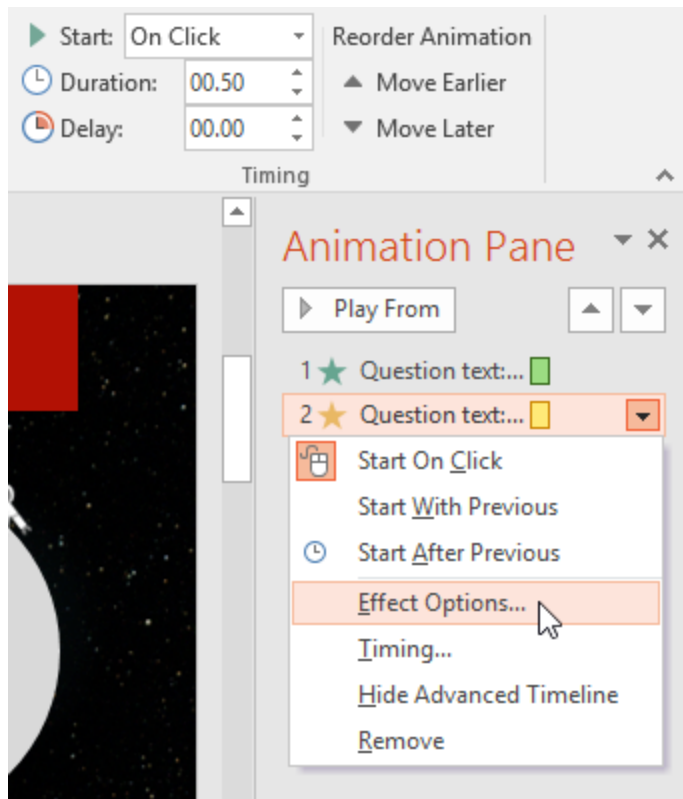
When you **preview** the animations, all of the effects will play through automatically. To test effects that are set to **Start on Click**, you will need to play the slide show.

The Effect Options dialog box

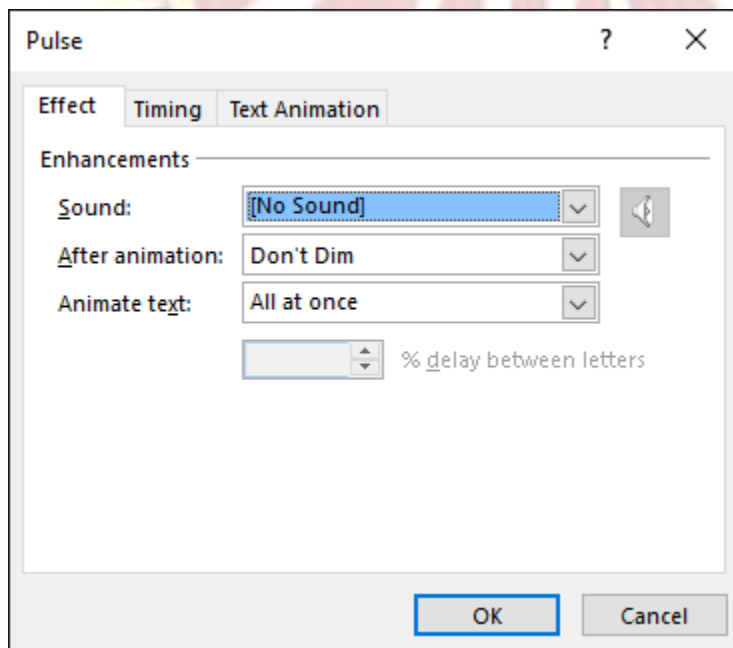
From the Animation Pane, you can access the **Effect Options** dialog box, which contains more advanced options you can use to fine tune your animations.

To open the Effect Options dialog box:

1. From the **Animation Pane**, select an effect. A drop-down arrow will appear next to the effect.
2. Click the drop-down arrow, then select **Effect Options**.



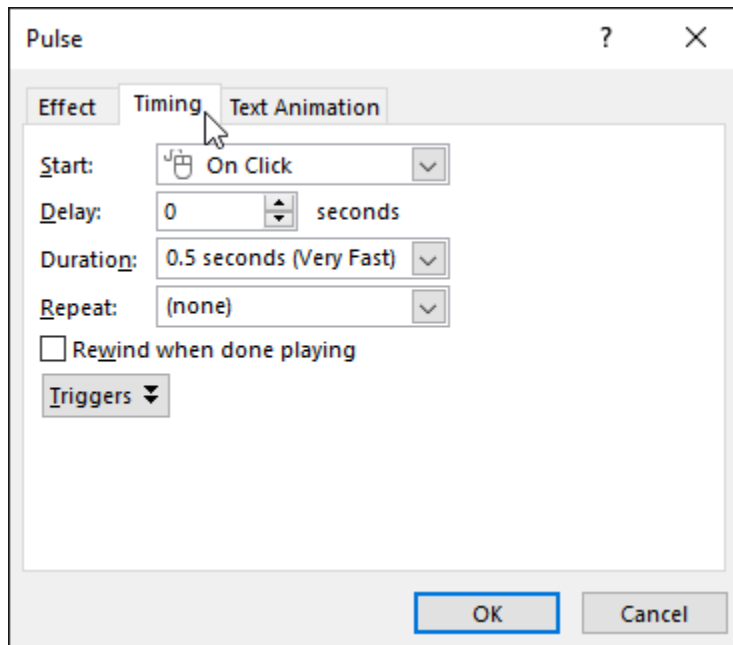
3. The Effect Options dialog box will appear. Click the drop-down menus and select the desired enhancement. You can add a **sound** to the animation, add an effect **after** the **animation** is over, or **animate text** in a different sequence.



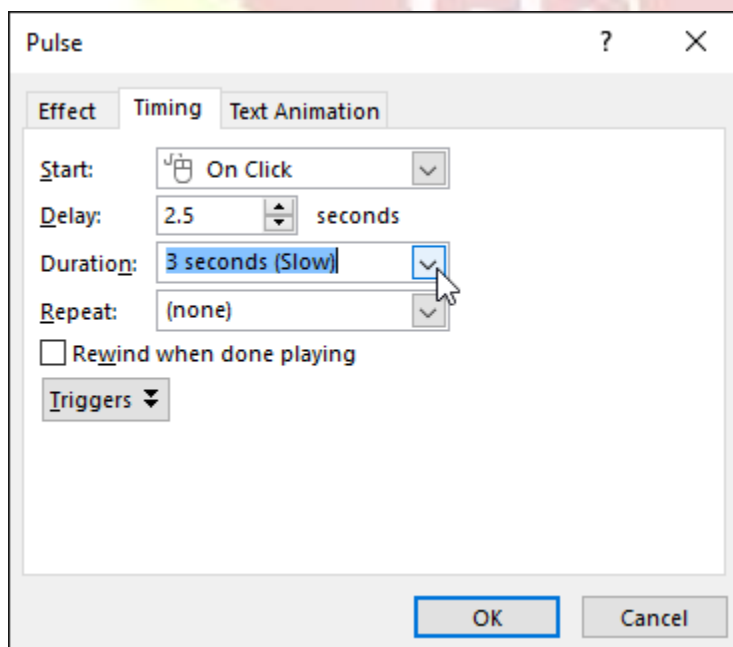
Some effects have **additional options** you can change. These will vary depending on which effect you have selected.

To change the effect timing:

1. From the **Effect Options** dialog box, select the **Timing** tab.



2. From here, you can add a **delay** before the effect starts, change the **duration** of the effect, and control whether the effect **repeats**.



Challenge!

1. Open our **practice presentation**. If you already downloaded our presentation in order to follow along with the lesson, be sure to download a fresh copy.
2. On slide 2, select the text box that contains **Answer: Neil Armstrong**, and add a **Pulse** animation from the **Emphasis** group.
3. In the same text box, add a **Wipe** animation from **Entrance** group.
4. Change the **Effect Options** so it wipes **From Left**.
5. **Reorder** the animations so the **Wipe** animation will happen first.
6. Change the **Start options** for the **Pulse** animation so it starts **After Previous**.
7. Use the **Animation Painter** to copy your animations to the **Answer: Mercury** text box on slide 3.
8. **Remove** the animations from the text box on slide 3 containing **What planet is closest to the sun?**
9. When you're finished, play your presentation. Slides 2 and 3 should look something like this:

Apply multiple animation effects to one object

- Select the object on the slide that you want to animate.
- On the Animations tab, click **Animation Pane**.
- Click Add **Animation**, and pick an **animation effect**.
- To apply additional **animation** effects to the same object, select it, click Add **Animation** and pick another **animation effect**.

LET YOUR LIGHT SHINE