MATS UNIVERSITY

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MATS CENTRE FOR OPEN & DISTANCE EDUCATION

Fundamental Computer Skills

Bachelor of Business Administration (BBA)
Semester - 1

SELF LEARNING MATERIAL

ODLBBASEC004
Fundamental Computer Skills

FUNDAMENTAL COMPUTER SKILLS

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MODULE INTRODUCTION

Course has three Modules. Under this theme we have covered the following topics:

Module 1 Introduction to Computer

Module 2 Introduction to MS Word and PowerPoint

Module 3 Introduction to MS Excel

These themes are dealt with through the introduction of students to the foundational concepts and practices of effective management. The structure of the MODULES includes these skills, along with practical questions and MCQs. The MCQs are designed to help you think about the topic of the particular MODULE.

We suggest that you complete all the activities in the modules, even those that you find relatively easy. This will reinforce your earlier learning.

We hope you enjoy the MODULES.

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MODULE 1 INTRODUCTION TO COMPUTER

Structure

UNIT 1 COMPUTER - DEFINITION AND MEANING

An electrical device that manipulates data or information is called a computer, and a computer has been programmed to operate based on a specific group of instructions. AI runs on the computer, and computers have changed how AGI does its work. They are employed for business, education, healthcare, entertainment and research. That helps to explain why the computers and hardware we use today in our life can run whatever kind of software that needed, also can handle most operation using the software and cloud technology to perform on demand.

CHARACTERISTICS OF COMPUTERS

Computers possess several characteristics that make them essential tools in modern society:

Speed: Computers are capable of executing millions, if not billions, of calculations per second, far surpassing human capability. Computers can handle vast amounts of data, execute numerous commands simultaneously, and complete intricate computations because to their quick processing speeds. The processor cores, memory, system architecture, and countless other

factors determine how fast a computer is. Computational speed is critical to productivity and efficiency in scientific research, financial analysis, and engineering simulation.

Accuracy: Computers are only able to conduct operations with a high degree of accuracy when performing calculations. They have of data to learn from, computers do not produce computational errors as long as they are coded accurately unlike humans. They adhere to preprogrammed instructions and perform mathematical and logical computations accurately. In certain domains like banking, healthcare, space research, etc., any minor computational error can have disastrous results, thereby making this domain highly reliant on accuracy.

Automation: Computers can be programmed to carry out tasks automatically without constant human intervention. Sounds like a good candidate for automation, especially for repetitive tasks like data entry, report generation, or the needs of industrial or enterprise systems. Scripts, macros, and artificial intelligence enable computers to increase workflow productivity and alleviate manual labor.

Versatile: Computer is one of the most versatile machines and capable of doing almost anything. They can be used for word processing, gaming, software development, graphic design, and everything else. Different applications can be installed and run on computers, allowing them to be customized for many different industries and personal uses. Organizations from various industries like businesses, educational institutions, hospitals, and government organizations make use of computers for different reasons.

Large volumes of data can be stored on storage computers, allowing users to save and access their information easily. Computers come with various storage types, ranging from internal hard drives and solid state drives to cloud and external storage solutions. Data can be stored in the form of text, images, audio and video files. Data is everything and storage solutions are more important for data backup, archival purposes, and access to critical information.

Connectivity: Through networks and the internet, computers allow for communication and connectivity. It allows users to exchange information, collaborate on projects, and access global resources immediately. Computer networks are essential for the communication of email, video conferencing, cloud computing, and social media platforms. Connectivity also works for businesses and individuals, increasing productivity and staying updated.

Multitasking: Computers have the ability to run multiple applications at the same time without slowing down. It could browse the web, edit docs, play music and run any number of background processes all at once. For the type of professionals who need to manage a workflow, multitasking is key it allows them to get things done quicker and overall be more efficient.

Knowledge about computers and their characteristics, types and functions is essential for users to work efficiently in different fields. Computers and Excel have thus become the new toys, moving from rudimentary data entry to advanced calculations.

GENERATIONS OF COMPUTERS

Computers have evolved through five generations:

First Generation (1940-1956): Used Vacuum Tubes and Consumed High Power

First Generation (1940s to 1950s) Computer generations are the steps of the development of computer technology. They used vacuum tubes as their primary electronic component, which were relatively large, brittle, and inefficient in terms of amplifying electrical signals. In early computers, vacuum tubes were used to switch and amplify electrical signals.

First-generation computers were huge and required a lot of power because of vacuum tubes. They filled entire rooms, used massive amounts of electricity and generated lots of heat. Heating and cooling systems were necessary to avoid overheating, and vacuum tubes, if not merely nasty, constantly failed on people. These early systems were inherently unreliable and often broke

down, preventing operation. Programming at this time was a cumbersome process, all done in machine language, strings of binary codes that were hard to write, read and debug. Consequently, the field of programming was largely reserved for a handful of engineers and computer scientists. Users entered data using punch cards, paper tape and a magnetic drum method that could be much more time-intensive and laborious.

Despite their primitive technology, these early devices demonstrated how computers would develop in the future to perform calculations and automate tasks. Examples of first-generation computers include the UNIVAC (Universal Automatic Computer), the first computer ever sold commercially, and the ENIAC (Electronic Numerical Integrator and Computer), which was employed for military purposes during World War II. At this time these machines were typically used by governments and large corporations in things like scientific research, military applications, and early business operations. The first wave of computers, while primitive by modern needs, is the foundation on which later generations of technology were built. The power-hungry and bulky nature of these systems pointed to the necessary steps toward efficiency and compactness key factors in the development of computers in subsequent generations. First-generation computers are a major leap forward in technology and began to demonstrate the feasibility of using electronic devices to automate calculations and complex task.

Second Generation (1956-1963): Used Transistors, Making Them Smaller and Faster

Second generation computers appeared in the late 1950s and were using transistor technology, which represented a huge step forward from the first-generation computers. Transistors, in contrast to vacuum tubes, are solid-state devices constructed from semiconductor materials, which makes them smaller, more efficient, and more reliable. The switch that the transistor made to the design of machines was that it could switch and amplify electronic signals, enabling the design of machines that were faster, more compact and that used a fraction of the energy. Transistors were also significantly smaller than their bigger brothers, which resulted in smaller computers too. This was

a big departure from the first machines, which filled entire rooms. These developments made second-generation computers more convenient for business and academic purposes, and a few companies started to produce and sell computers.

With the greater reliability of transistors, second-generation computers were also more reliable. These systems were far less prone to failure than first-generation computers and had an order of magnitude longer lifespan. The operation of transistors also consumed less power, which led to reduced cooling requirements and improved practicality of these machines. During this time, high-level programming languages like FORTRAN (Formula Translation) and COBOL (Common Business-Oriented Language) were created, which made it simpler to build and maintain code. These languages opened up programming to more people and added more flexibility to application development. This ultimately helped businesses realize the power of computers for data processing, inventory management, and complex calculations.

It was also the second generation of computers, where the size and expense limited them to mainly major companies, government departments and universities. The introduction of transistors, albeit rudimentary, helped pave the way for more advanced computer systems that would follow in the next generation. The second generation also marked the move away from punch cards and paper tape toward direct input through keyboards and screens, a precursor to the interactive systems that would characterize later generations. The introduction of magnetic core memory also increased storage capacity and speed for the second generation. These innovations made computers more affordable and powerful, leading to improvements in wide areas including scientific research, business, and government.

Third Generation (1964-1971): Integrated Circuits Improved Efficiency

During the time of the third generation of computers (1964-1971), integrated circuits (ICs) were introduced. ICs (Integrated Circuits) are silicon chips that have many transistors, resistors, and capacitors placed on them. This was a

remarkable mathematical and logistical advancement in the manufacture of computers that reduced the size and engineering requirements to a fraction of previous devices, and made computing faster, less power hungry, and more reliable. The development of integrated circuits led to the next stage of miniaturization of computers. In previous generations, semiconductor devices were separate components, which had to be wired; this required more complex assembly and consequently more expensive and larger computers than was strictly necessary; integrated circuits changed all of this in a way that greatly reduced the physical size and cost of computer production. The size dropped, which lowered manufacturing costs, and made computers available to more people. With the advent of ICs, computers became faster and more powerful since they could process more data in less time due to the miniaturization of electronic components on a single chip. This increase in performance and complexity was a watershed moment, making it possible to perform more sophisticated tasks and work with larger amounts of data. Being able to utilize multiple ICs in a system also enabled them to do much more parallel processing and multitasking, and as a result, generally use the entire system faster and more efficiently. Not just hardware, but also software got a major performance boost in the third generation. As operating systems became more robust IBM's OS/360 is one of the better-known early examples computers started to run more than one job at a time, dramatically increasing efficiency. Also, high-level programming languages C and BASIC, to name a few became popular, which made programming considerably faster and easier.

Mainframe computers, which were utilized by businesses and government agencies for large-scale data processing, payroll, and scientific applications, also became popular during the third generation. That is the kind of data with which they can deal with and can-do intricate calculations, and these kinds of machines were necessitated by the arrangement of associations that required automating capability. Integrated circuits, which were introduced in the third generation of computers, greatly increased the power and dependability of computing systems while simultaneously decreasing their size and cost. Their ubiquitous use paved the way for even more powerful and cheaper computers in its fourth generation.

Fourth Generation (1971-Present): Microprocessors Increased Computing Power

Beginning in the 1970s and extending to the current day, the fourth generation of computers represented a revolutionary jump in computing power due to the invention of the microprocessor. A microprocessor is a semiconductor chip on which integrated circuits are embedded. Because of this breakthrough, smaller computers (and smaller computer-chip packages) became possible, enabling computers that were smaller, more powerful, and more affordable by individuals and small organizations instead of being limited by size or favoring huge organizations such as governments. Microprocessors revolutionized computing by packing many functions into one tiny chip. As a result of this development, personal computers (PCs) were released in the late 1970s and early 1980s., with corporations such as IBM, Apple, and Commodore driving the cost down, making computers affordable and readily available for the public. Not only could computers be faster and more powerful but it was also possible to make them much smaller than before, and much more energy-efficient.

People born between 1965 and 1980 were accustomed to personal computing growth, partly as a result of the creation of sophisticated operating systems like Microsoft Windows and the Macintosh operating system, as well as graphical user interfaces (GUIs). These types of interfaces simplified computer usage and let the user control their machine with a mouse and keyboard instead of complicated command-line text inputs. The rise of embedded systems is also a byproduct of the microprocessor development in the fourth generation. These are specialized computing devices integrated into common items, such as appliances, vehicles, and industrial machines. Such systems usually only do one function and are built to do so reliably and with little power consumption. Moreover, the fourth generation introduced networking technologies such as the internet that changed how people communicated and shared information as well as conducted business. Connecting computers and enabling individuals to search and access vast volumes of information online opened up new avenues for innovation and

cooperation. The fourth generation is still defined by the rapid advancement of computing power, powered by innovations like multi-core chips and cloud computing and advances in artificial intelligence. Computers today are faster, more efficient, and more connected than ever, with applications spanning everything from gaming and entertainment to scientific research and artificial intelligence.

Fifth Generation (Present & Beyond): AI-Based Systems with Advanced Capabilities

The incorporation of artificial intelligence (AI) technologies and the growing capability of computing systems define the fifth generation of computers, which started in the 1980s and is still developing today. Fifth-generation computers aim to create devices that can mimic human intellect and carry out operations like learning, reasoning, and problem-solving that have historically required human cognition.

Artificial intelligence (AI) technologies, such as computer vision, machine learning, and natural language processing (NLP), have advanced significantly in recent years, allowing computers to analyze enormous volumes of data and make judgments based on insights and patterns. Because algorithms can now learn from data and get better over time, machine learning in particular has completely changed industries like marketing, banking, and healthcare. Quantum computing, which uses the ideas of quantum physics to address issues that are now beyond the capabilities of traditional computers, is one of the main areas of work in the fifth generation of computers. Because they can process large amounts of data in parallel and carry out intricate calculations far more quickly than conventional computers, quantum computers have the potential to completely transform industries like cryptography, drug discovery, and optimization. Another significant advancement in the fifth generation is the rise of cloud computing. Cloud services allow individuals and organizations to access virtually unlimited computing power and storage through the internet. This has made high-performance computing more accessible and affordable, enabling businesses to scale their operations and collaborate in real-time across geographic boundaries. As we look toward the

future, the potential for AI-based systems and quantum computing to transform industries and society is immense. From autonomous vehicles to advanced healthcare diagnostics and personalized recommendations, Innovations fueled by the fifth generation of computers could revolutionize how we work and live. The limits of what computers can accomplish will keep growing as AI systems continue to advance in capability, leading to new possibilities and challenges in the years ahead.

UNIT 2 TYPES OF COMPUTERS

Computers are categorized based on their size and purpose:

Supercomputers: High-Performance Machines for Complex Calculations

Supercomputers are the most powerful type of computers, designed to perform extremely high-speed calculations for complex tasks that require immense computational power. These machines are used in fields that demand substantial processing capabilities, such as scientific research, study on artificial intelligence (AI), climate modeling, nuclear simulations, and weather forecasting. Large volumes of data can be processed in parallel by supercomputers., making them capable of solving problems that would be nearly impossible for regular computers to handle. The capacity of supercomputers to do trillions or even quadrillions of calculations per second, as measured in FLOPS (floating-point operations per second), is their primary characteristic.). The architecture of a supercomputer is designed to allow for massive parallel processing, where thousands of processors work simultaneously on different parts of a problem, significantly speeding up the computational process. Supercomputers often consist of multiple interconnected systems, with each node in the system containing multiple processors. This architecture is known as a parallel processing system.

These machines are used for a wide range of applications. In scientific research, supercomputers simulate complex phenomena such as molecular interactions, protein folding, and climate change. For example, they are essential in understanding the behavior of particles in physics experiments or

modeling the Earth's atmosphere for weather predictions. In the military and defense sectors, supercomputers are used for cryptography, missile guidance systems, and simulations of combat scenarios. In healthcare, they assist in drug discovery and genomics by processing vast datasets to find correlations or predict outcomes. The most famous supercomputers, like IBM's Summit and Fugaku from Japan, can execute hundreds of petaflops (one quadrillion calculations per second). These machines cost millions of dollars to develop and maintain, requiring dedicated facilities with specialized cooling systems and power sources. Due to their extreme processing power, supercomputers are often housed in climate-controlled environments to prevent overheating, and they consume significant amounts of electricity. Despite their advanced capabilities, supercomputers face challenges such as high operational costs, the need for constant upgrades, and their reliance on specialized software. However, their contribution to advancing scientific discoveries and solving complex global problems makes them indispensable tools in fields that require heavy computational power.

Mainframes: Large Systems for Enterprise Applications

Mainframes are powerful, large-scale computing systems used primarily by large organizations to manage and process vast amounts of data. Unlike supercomputers, which are designed for high-speed calculations, mainframes are optimized for reliability, scalability, and processing large volumes of data quickly and accurately. These systems have been in use for decades and are integral to industries like banking, insurance, healthcare, and government, where processing large datasets in real-time is crucial. One of the defining features of mainframes is their ability to handle multiple transactions simultaneously. They are designed to run multiple applications concurrently, providing centralized data processing for a wide range of business operations. Mainframes excel in environments that require high availability, as they are built with redundant components to ensure minimal downtime. In fact, many mainframe systems are so reliable that they can run continuously for years without failure. Mainframes also have a massive storage capacity, capable of handling petabytes of data. This is especially important in industries like

finance and healthcare, where managing customer transactions, medical records, and other critical information requires vast amounts of storage. Mainframes can also support large numbers of users simultaneously, making them perfect for managing enterprise-level applications like supply chain management, enterprise resource planning, and customer relationship management (CRM).

Although mainframes are not as fast or powerful as supercomputers in terms of raw computational speed, their strength lies in their ability to perform complex business processes and manage large-scale databases efficiently. They are also known for their strong security features, offering robust encryption and access control mechanisms to protect sensitive information. Mainframe systems are typically more expensive to purchase and maintain than smaller computing systems, but their scalability and reliability make them a valuable investment for large enterprises. Even in the era of cloud computing and distributed systems, mainframes continue to play a critical role in enterprise IT infrastructure, and their ability to support legacy systems ensures they remain relevant in today's business world.

Minicomputers: Mid-Sized Computers for Organizations

Minicomputers, often referred to as "mid-range computers," were introduced in the 1960s as a cost-effective alternative to mainframes. These systems were smaller, less expensive, and more accessible than mainframes, while still providing a significant amount of processing power. Minicomputers were typically used by medium-sized organizations for business applications that did not require the scale of a mainframe.

One of the defining characteristics of minicomputers was their ability to serve as a multi-user system, providing access to multiple terminals simultaneously. This made them ideal for tasks such as data processing, accounting, inventory management, and scientific calculations. Minicomputers were often used in industries like manufacturing, education, and research, where smaller-scale, but still powerful, computing systems were required. Compared to mainframes, minicomputers were more compact and easier to maintain, often

requiring less floor space and specialized cooling systems. The smaller size and lower cost allowed many businesses to invest in minicomputers, democratizing access to powerful computing resources. These systems were also easier to program, as they often supported higher-level programming languages like BASIC, FORTRAN, and COBOL, making them more accessible to a wider range of users. While minicomputers were a significant advancement in computing, they were eventually overshadowed by the rise of personal computers and workstations in the 1980s. The advent of smaller and more affordable PCs allowed organizations to decentralize computing, reducing the need for large, centralized systems. However, minicomputers paved the way for the development of more powerful and user-friendly computing systems, and their impact can still be seen in modern computing technologies.

Microcomputers (Personal Computers): Used by Individuals and Small Businesses

Microcomputers, also known as personal computers (PCs), are the type of computers most commonly used by individuals and small businesses today. These computers are distinguished by their portability, low cost, and broad variety of general-purpose functions. With the development of the microprocessor in the 1970s, computers could now be constructed with smaller, less costly parts, opening the door for personal computers to become widely available. A central processing unit (CPU), memory, storage, input devices like keyboards and mouse, and output devices like displays and printers are the standard components of a microcomputer. Microcomputers have changed throughout time from being simple devices that could only run basic applications to being strong systems that can run sophisticated software, such as office productivity suites, graphic design tools, video editing software, and video games.

The widespread adoption of personal computers revolutionized the way people work, communicate, and access information. In the business world, PCs have become essential tools for productivity, enabling tasks like document creation, data analysis, and project management. In education, they

have transformed the way students learn, providing access to vast online resources and interactive learning tools. In addition to their use in business and education, Additionally, personal computers are now widely used for communication and entertainment. For millions of individuals, PCs are now an indispensable part of their everyday lives due to the growth of the internet, social media, and online gaming. Advances in hardware and software have made personal computers more powerful, user-friendly, and versatile, with many individuals using them for a wide variety of tasks, from creating digital art to conducting research to managing personal finances. Microcomputers are the backbone of modern computing and continue to evolve with new technologies like artificial intelligence (AI), virtual reality (VR), and cloud computing, ensuring that they remain relevant and indispensable in the years to come.

Embedded Computers: Found in Appliances Like Washing Machines and ATMs

Specialized computing systems called embedded computers are made to carry out specific tasks inside bigger machinery or gadgets. Embedded computers are designed to do particular activities inside the context of a device, in contrast to general-purpose computers, which may run a wide range of applications. These systems are typically small, power-efficient, and highly reliable, making them ideal for integration into everyday appliances and equipment. One of the most common examples of embedded computers is in household appliances such as washing machines, refrigerators, and microwave ovens. In these devices, embedded computers control functions like temperature regulation, motor speed, and user interfaces. For instance, a washing machine's embedded system manages the wash cycle, ensuring that the correct water temperature, spin speed, and washing time are applied based on user input. Similarly, embedded computers in modern refrigerators monitor temperature and humidity levels to optimize food storage conditions. Embedded computers are also found in a wide range of other devices, including automobiles, medical equipment, industrial machinery, and ATMs. In automobiles, everything from engine performance to safety measures like

airbags and anti-lock brake systems is managed by embedded systems. In medical devices, embedded systems monitor patient vitals and control medical instruments, ensuring accurate and reliable operation. ATMs rely on embedded computers to manage transactions, process card information, and dispense cash securely.

The key advantages of embedded computers are their size, efficiency, and cost-effectiveness. These systems are typically built into the device's hardware, making them less visible to users but essential for the functionality of the machine. In many cases, embedded systems operate in real-time, providing immediate feedback and responses to changes in the environment or user inputs. With the latest generation of technology, embedded computers will undoubtedly be more intelligent and locally grouped. With the emergence of the Internet of Things, embedded systems have a more or less expanded role as the devices communicate to each other and share data in real-time. This led to the development of "smart" devices like thermostats, wearable fitness trackers and home automation systems, all of which rely on embedded systems that make them more functional and easier to use

BLOCK DIAGRAM OF A COMPUTER

A computer consists of five major components:

1. Input Unit: Accepts Data (Keyboard, Mouse)

Computer Systems the communication between the user and the machine, Its function is taking in data and instructions from the external world then turning those into a format that the computer can work with. These are fundamental tasks that must be completed before the computer can be used for creative work. Keyboards, mice, scanners, and microphones are examples of input devices.

The most popular tool for typing text on a computer is a keyboard, which comes in a variety of varieties worldwide. Mostly One tool for entering commands and text into a computer is a keyboard. Carbon fiber switches are installed above two electric circuit systems in the keyboard, one for the letter

and number keys and another for different function keys and inputs that can be interpreted by the computer's processor. Now, the mouse uses this same concept to let the user point, click, and drag on the screen to work with the computer. Mouse is a device consists of a sensor that detects movement and sends signals to the computer to navigate/select. Specialized input is achieved using other devices like scanners, microphones, and cameras. For instance, scanners transform these tangible papers or photos into digital information that a computer can handle and store. Microphones detect sound and translate it into a digital format, enabling voice commands or audio recordings. Another type of input is still-image or video cameras, which capture visual data from the environment. It is a Unit that is an input. The input unit is the most essential component of any machinery because it converts data into the format that the computer can process. It allows the transformation of analog signals into digital information that can be processed by the central processing unit (CPU). Moreover, the input unit also controls the communication among the different devices and the computer, enabling users to enter diverse data and also communicate in real-time with the machine.

2. Processing Unit (CPU): Processes Data Using ALU and Control Unit

The central processing unit, or CPU, is the brains of all computer systems. It manages data processing, computations, and command execution. It is frequently referred to as the computer's "brain" since it performs the fundamental tasks that keep the system functioning. The CPU is primarily composed of two parts: the control unit (CU) and the arithmetic logic unit (ALU). All mathematical and logical operations, such as addition, subtraction, multiplication, division, comparison, etc., are carried out by the ALU. It is based on binary digits and executes computations rapidly and precisely. The ALU not only performs basic arithmetic but is also responsible for more advanced bitwise operations (i.e., and, or, not), which are vital for a computer system.

Control unit (CU): While A unit provides data & instruction to registers, Data flow between the CPU and other computer devices is managed by the CU. It serves as the system's "conductor," coordinating the actions of the

input/output devices, memory unit, and ALU. CU fetches instructions from computer memory and decodes those instruction into control signals that control CPU operation. This is to ensure that the right sequence of operations is executed as designed, and so it coordinates the retrieval of data, its processing, as well as the output, in an orderly manner.

The CPU operates in a cycle called the fetch-decode-execute cycle. During the fetch stage, the CPU fetches instructions from memory. During the decode phase, this from of instructions translate into signals that tell it what to do. Lastly, during the execute phase, the CPU will carry out the operation, be it calculating an arithmetic value, decision from logical operations, or a transfer of data. Modern CPUs have multiple cores and can handle many things at once. Due to the ability to run additional instructions simultaneously, computers equipped with multi-core Processors boast significant gains in performance for graphically intense tasks like gaming, video production, or scientific calculations. One of the most crucial pieces of hardware in your computer system is a processing unit., put it together with efficient cooling, powerful RAM, and well-designed CPUs, the processing unit makes a computer system really powerful.

3. Memory Unit: Stores Data Temporarily (RAM) or Permanently (HDD, SSD)

The memory unit houses the data that the CPU and the other parts of the computer system use. Primary memory and secondary memory are the two general categories into which memory can be divided. Devices like RAM (Random Access Memory) make up the primary memory, also known as main memory, which is used to temporarily store data while it is being processed. Primary and secondary storage characteristics Storage devices like Random Access Memory (RAM) that offer temporary storage for data and code currently being used by the CPU are referred to as primary storage or main memory. Long-term storage devices like solid-state drives (SSD) and hard disk drives (HDD) that are utilized for persistent data storage make up secondary memory.

Since RAM is a volatile memory, when the computer is turned off, its contents are lost. It is used to store the data that the CPU is now using or appending. The CPU can swiftly retrieve data that has to be altered thanks to this temporary storage space. When a file is opened or a program is run, it is loaded into RAM for fast access while the program is running. The RAM in a system is directly affected by how a system multitasks and its performance, especially as more RAM means that a computer can now work with larger and more complex tasks at the same time. On the contrary, Information that is stored for a longer period of time or permanently is kept in secondary memory. There are two kinds of secondary memory: solid-state drives and hard disk drives. HDDs store data using spinning disks and mechanical parts, but SSDs use flash memory, which makes them faster, more robust, and less power-hungry. Due to their superior performance and speed over HDDs, SSDs have gained popularity.

So it's a CPU that has a memory unit as well and this unit also contains a cache memory which is used for the fast processing. Cache is memory which stores frequently accessed data and instructions, instead of accessing RAM. It sits in between the CPU and RAM, saving time turning back to fetched data and increasing performance. Hence, the memory unit is responsible for handling the storage and access to information. It allows the CPU to quickly use the data being processed while also creating a permanent storage for files, applications and operating systems.

4. Storage Unit: Stores Information for Long-Term Use

The data has been stored in the computer systems for a prolonged time period. While the memory unit is designed for temporary data storage during processing, the storage unit retains data beyond the duration of that processing, preserving important information even after the computer has been powered off. There are two main types of storage: primary storage, which includes solid-state and hard drives, and secondary storage, such as optical disks or tape drives.

As one of the most common types of storage, hard disk drives (HDDs) are ubiquitous. HDD contains magnetic disks that rotate and you store data on them. They pack a ton of storage space for the price, but HDDs are slower than newer types of storage is simply because they are mechanical. SSDs, or solid-state drives, have grown in popularity as a replacement for HDDs. SSDs utilize flash memory for data storage, providing much higher read and write speeds, lower power consumption, and higher durability due to the absence of moving parts. SSDs are commonly found in modern laptops, desktops, and mobile devices. Optical disks (like CDs and DVDs) and magnetic tape drives are examples of secondary storage that are used for archiving and backup. Also have slower data access speeds than HDDs and SSDs, making them suitable for storing large quantities of data that are accessed infrequently. Another form of storage lately gained popularity is cloud storage. The storage of data on remote servers is referred to as cloud storage. This has many benefits: increased storage, accessibility from any number of devices, better backup and recovery. Data is written and read from the storage unit when needed, meaning the storage unit plays a big part in making sure that data is kept and ready to be used. It allows users to save a large amount of information consisting of operating systems, computer software applications, documents, and multimedia files, allowing a computer system to be available and ready for use.

5. Output Unit: Displays Results (Monitor, Printer)

The output unit presents the processed data or results to the user in a format that is readable or usable. Once the input data is processed by the CPU, the output unit is responsible for displaying, printing, or otherwise outputting the information to the user. Output devices are the hardware devices that represent the information processed by a computer.

Most output devices are actually part of the display system, such as monitors that display videos, text or pictures. A monitor takes the electrical signals the computer is generating and translates them into visual signals that can be displayed on the screen. Monitors employ a variety of display technologies, such as liquid crystal displays (LCDs) or light-emitting diode (LED) screens

in more recent versions and cathode ray tubes (CRTs) in older ones. The quality and resolution of the monitor, which relates to its pixel count and refresh rate, is a major factor in user experience, especially for graphics, video, and gaming tasks. Printers, function as an output device by transforming these digital files into the real world. Inkjet and laser printers both print text and images on paper with ink or toner. The common types are inkjet printers, laser printers, and dot matrix printers. Inkjet printers are great at high-end images and color documents, though, and laser printers are also better for fast, efficient printing of text. Other types of output devices are speakers, which take digital audio data and convert it into sound, as well as plotters, which can be used to create large-scale high-resolution drawings and graphics. Output devices also encompass haptic feedback, such as vibrations in gaming or mobile applications. We need the output unit to provide the output of the calculations and to communicate with the user. Output is how users can view and interact with information processed by the computer; including, reading a report on a screen, printing a document, or listening to sound.

MEMORY AND ITS TYPES

1. Primary Memory: RAM (Temporary), ROM (Permanent Instructions)

A computer system's primary memory is an essential component that stores data and instructions for use by the system either permanently or temporarily. Because it offers storage for the data that the processor needs to access instantly, it is essential to the seamless operation of a computer system. RAM and ROM are the two categories of primary memory. The first is temporary memory, sometimes referred to as temporary storage. DC claims that RAM is volatile memory, meaning that when the system is turned off, its contents are lost. The operating system, apps, and other running data are loaded into the RAM during regular system operation and are deleted when the computer shuts off. RAM is meant to provide faster access to data that is under action. The high speed of RAM ensures that processor access instruction and data at a more triadic location than the hard drives or SSD. It also improves multitasking. Mostly, the more the RAM, the more the number of programs

that a system can run together and the level of data to be processed by system. ROM, on the other hand, is a read-only memory that contains instruction to boot and run the computer. ROM, according to DC, is non-volatile memory that maintains its content even when the system is off. During the booting process, ROM runs the BIOS or firmware that boots the system and determines system hardware. While RAM is possible to be written to, ROM id read-only.

2. Secondary Memory: Hard Drives, SSDs, and USBs

Secondary memory is used to describe storage devices such as hard drives, SSDs, that provide non-volatile storage of data, as opposed to primary memory, which is temporary and volatile. Secondary storage, Unlike primary memory, secondary memory stores data forever, even when the computer is turned off. You can keep the operating system, apps, and user files like documents on it., images, and videos. It provides much larger secondary memory compared to primary memory, but is very slow. The most common type of secondary storage is Hard Disk Drives (HDD). HDDs use a spinning magnetic platter to read from and write to. These are decades-old drives capable of reasonably high storage capacities but at a lower cost. However, they rely on mechanical parts, making them slower than newer storage technologies and more affected by physical shocks.

SSDs (Solid State Drives) are the new, faster choice than HDDs. SSDs store data in flash memory instead of hard disk drives (HDDs). This makes them much faster and more sturdy since they don't have any moving parts. However, this speed is very obvious when doing things like starting up an operating system or opening apps. Most of the time, SSDs cost more per gigabyte than HDDs., but the performance gain they provide makes them well-suited for applications demanding rapid data access. USB drives, which are also known as flash drives or thumb drives, are movable extra memory devices that store data on flash memory. The drives can be taken with you., compact, and widely adopted for file transfer between computers. USB drives, also known as flash drives are extremely portable and can be plugged into a USB port to quickly transfer or store data. They have less storage than HDDs

or SSDs, so they are not used for large storage backups, but fine for transferring documents, photos or small apps. It helps in storing data permanently for a long time which is stored by users for retrieval as per requirement.

3. Cache Memory: Speeds Up Data Retrieval

Cache memory is fastest, smallest and temporary memory, which is located very near the CPU and stores recently accessed data and instruction. There is one primary reason to use it and that is to help the computer retrieve data and speed up system performance by less time of the CPU accessing slower memory units such as RAM, hard disks, or secondary storage devices. As the CPU executes a sequence of instructions, the first thing it does is check to see if the data has been placed into the cache. If the requested data is there, this event is called a cache hit, and the CPU can proceed with its operation with a negligible delay. The CPU has to read the data element from a slower RAM or secondary memory, which adds to the delay, if the needed data element is not in the cache. This is called a cache miss.

Cache memory operates by holding a limited number of most used data and instructions that are expected to be next requested. Operating at speeds exponentially quicker than RAM, it allows near-instant access for the CPU to the foundational data needed for continued processing. There is usually a hierarchy of cache memory, typically L1, L2, and L3 caches. L1 cache is the smallest and fastest; it lives on the CPU chip itself. L2 and L3 caches are bigger and slightly slower; they either live on the CPU chip itself or on different chips close to the processor. Since cache memory is slower than RAM, it reduces the delay related to data fetching, enabling the CPU to function fontanelle efficiently. However, modern processors break apart this bottleneck by utilizing complicated cache hierarchies to boost performance, causing a sharp drop off in the number of cycles it takes to retrieve data from memory.

4. Virtual Memory: Uses Part of the Hard Drive as RAM

Virtual memory is a type of memory management that lets a computer use a part of the hard drive or SSD as if it were extra RAM when it doesn't have enough real RAM. This enables the system to execute larger applications, or multiple programs, at once even if sufficient physical RAM isn't available. When a computer does not have enough available used a part of the hard drive virtual memory. The swap file or page file is the name for this part of the hard drive. This system moves data from the RAM to the swap file when it's not being used. This makes room in the RAM for jobs that are currently running. When the data in the swap file is required once more, it is swapped back into RAM.

While virtual memory helps the system memory to be used more effectively and allows for multitasking, getting information from virtual memory takes longer than retrieving information from physical RAM. That is simply due to the fact that hard drives and SSDs are orders of magnitude slower than RAM. So, heavy usage of virtual memory may result in slow system performance, especially when applications that require more memory are run. You are not out of the need of making use of the term reason behind virtual memory. Fortunately, enough physical RAM is very important for the system to perform normally.

STORAGE DEVICES

1. Magnetic Storage: Hard Disks, Floppy Disks

Magnetic storage Magnetic storage devices are data storage devices that store data on magnetized medium. One of the oldest forms of secondary storage, it remained for many decades the most used form of secondary storage, with items like hard disk drives (HDDs) and floppy disks being classic examples. HDDs are mechanical drives that write data on spinning magnetic platters. Platters spin underneath a read/write magnetic head that moves all over their surface to write/read data. At relatively high storage capacities, they are still commonly used for personal and enterprise-level data storage. Although they

are less expensive than newer storage media like SSDs, they are slower and more susceptible to mechanical failure due to the moving components.

Floppy disks were a prevalent method of intermediate data storage in the 1980s and 1990s, and operated on a similar magnetic principle, but at a far less robust and smaller scale. A floppy disk, on the other hand, was a thin, flexible disk coated with magnetic material and read by a disk drive. Floppy disks were used to transfer small files between computer systems, but most have long since been replaced by new generations of much larger and more dependable storage devices, such as USB data drive and external hard disk. Magnetic storage devices have been a foundation of personal computers, providing low-cost and dependable ways of storing data and programs for the past several decades. While HDDs have been phased out to some extent for a much faster option, these devices are still heavily-used devices even today with SSD and Cloud-based storage solutions replacing its role for the need for speed.

2. Optical Storage: CDs, DVDs

Anyone who has ever used a CD, DVD, or Blu-ray knows that optical storage employs laser technology to read and write data on a disc. Optical storage most commonly refers to CDs (Compact Discs) and DVDs (Digital Versatile Discs) The data is contained within the pits and the lands on the surface of the disc, which an optical drive reads via a laser beam. CDs were launched in the early 1980s and soon became a household format for music, software, and other data. A common for higher density CD can store 700 MB of data, sufficient for smaller files and applications. The DVD, which was introduced in the late 1990s, offered drastically increased storage capacity, generally in the 4.7 GB to 9.4 GB range for single- and dual-layer discs, respectively. This made DVDs a perfect medium for holding video files, movies and larger software applications.

Although optical storage has been one of the main media for distributing software and media, since the introduction of digital downloads and streaming, it has been continuously faded out by other storage technologies

such as USB drives and cloud storage. Optical discs are still used for archival needs, since they are a cheap and reliable way to store long-term, especially for high-definition video on formats like Blu-ray.

3. Flash Storage: USB Drives, SSDs

Flash storage uses flash memory chips to store data. Flash memory does not contain moving parts like traditional magnetic storage, which makes it faster and more durable. Flash storage devices include USB drives (also called flash drives or thumb drives) and solid-state drives (SSDs). USB drives are small, portable devices that can be connected to a computer's USB port. They are fast, easy to use, and relatively inexpensive, which is why they are popular for transferring files and other data between devices. They provide mid-sized storage capacities, typically somewhere in the range of a few gigabytes up to many hundreds of gigabytes in size, great for documents, photos, and any other portable data. Solid State Drives (SSD) are high-speed storage devices that use flash memory to hold data. They provide much higher read and write speeds than traditional hard drives, which makes them great for use as storage for operating systems, applications, or games, where you need quick access to the data. Solid State Drives (SSDs) are now the storage medium of choice for many modern PC systems, providing SDDs with speed and dependability. Due to the speed, portability, and durability of flash storage, it has become a popular choice, not only in traditional computing devices but also in the form of smartphones, tablets, and other high-tech electronics.

4. Cloud Storage: Online Data Storage Solutions

Cloud storage or in a simple way cloud storage is a way of online data storage. Cloud storage, in contrast to traditional data storage methods such as hard disk or USB drives, allows data to be stored on remote servers managed by cloud service providers. Given that cloud storage allows users to retrieve files from any device that is connected to the internet, this service is useful for both personal use and commercial use. There are different storage plans for many cloud storage services, such as Google Drive, Dropbox, and OneDrive; both free and paid ones. Data loss is no longer a problem with

cloud storage. It frees you from the need to invest in physical storage devices, and most cloud services automatically back up your data.

For one, cloud storage is scalable, which makes it possible for users to expand their storage as needed without the hassle of purchasing hardware. Additionally, the ability to share files and collaborate in real-time, makes it a great resource for teams and businesses. Storage of cloud data is one of the most significant advantages to be had from it being flexible and available. However, it does require a stable internet connection, and and users run the risk of trusting the third-party provider with their data. Nonetheless, even though there is no book for cloud storage, its necessity in storing files has transformed previously used systems into something completely new.

COMPUTER NETWORK

A computer network is thus a collection of devices that allows for resource sharing. Types include:

1. LAN (Local Area Network): Connects Computers within a Small Area

A perp-based network that connects computer or other peripherals in a limited area of space, for a LAN involves terms that connects computers or peripherals in a limited space such as home, office, or a building. Network in a small area Based on its name, a local area network (LAN) is a type of network that connects a few devices in a small area. LANs are generally limited to a single building or campus but can span multiple nearby buildings depending on the needs of the organization or facility. Pros of Local Area Networks (LANs)One of the key benefits of LANs is the speed of data transfer, typically via wired Ethernet cables, or, nowadays, through blazing fast Wi-Fi connections. Architecture LAN has a simple architecture since it connects devices to a central device (e.g. switch/router). For wired local area networks (LAN), devices are connected to a central switch via Ethernet cables, and for wireless LAN (WLAN), devices connect via radio signals to a wireless access point (AP), which accesses the rest of the network.

Choosing the right LAN and router will be highly determined by the size of the environment you are working in. To illustrate, users within an office may share documents, printers, indeed access common software tools or databases located on a file server. LANs also offer easier oversight and security, since a single administrator or IT team usually manages all of the devices. For example, technologies such as Gigabit Ethernet provide data rates of up to 1 Gbps, while wireless LANs that use modern standards such as Wi-Fi 5 or Wi-Fi 6 can achieve speeds which rival that of wired connections in many applications. The high-speed nature of LANs makes them suitable for settings where high-volume data transfer is crucial. LANs also facilitate different forms of communication, including file sharing and video conferencing, allowing users in the network to collaborate with each other. As businesses and organizations can implement firewalls, encryption, and access controls in their LANs, security is also an important aspect of LANs, to control access to sensitive data. One disadvantage with LANs is the range though. Because LANs are meant for small geographic areas, they are not used to connect devices over large distances. For wider communication other network types like WAN or MAN are utilized. However, LANs are still a critical aspect of contemporary computing infrastructure because of their speed, cost efficiency, and ease of implementation.

2. WAN (Wide Area Network): Covers Large Geographical Areas

How to Understand WAN (Wide Area Network) A Wide Area Network, or WAN, is a big wireless network that covers a lot of space.A WAN can be in a city., a country or multimode between world continents. WANs, unlike local area networks (LANs) that are limited to small areas, provide connectivity over longer distances, enabling businesses, organizations, and individuals to communicate and share data over vast regions. WANs are usually popularized by the internet, where millions of computers are connected globally. WANs employ various technologies and communication mediums (leased lines, fiber-optic cables, satellite links, and wireless networks) to connect devices or networks in distant locations. WANs are thus ideal for large organizations including enterprises, universities, government bodies, and service providers

with widely distributed offices, data centers, and users. An essential characteristic of WANs is their capacity to transfer large volumes of data traffic over extended distances. They offer fast links that allow communication between different sites. For example, a WAN allows employees working for an organization with offices in New York, London and Tokyo to access shared resources, attend video conferences and collaborate on projects as if they were located in the same location.

The complex and expensive nature of the physical infrastructure of a WAN is mitigated by the fact that it can cover large geographic areas, making it invaluable for organizations with a global presence. Many service providers offer management of WAN connections as a service so they can be leased by the enterprise assuring reliable connectivity and secure transfers of information from site to site. Scalability is another major benefit of WANs. As an organization's requirements grow, a WAN can be expanded to connect additional areas, add higher-speed links and support more data traffic. The hardening of traditional WANs is beginning to change due to the adoption of technologies such as Multiprotocol Label Switching (MPLS) and Software-Defined WAN (SD-WAN) which allow data to be routed dynamically based on real-time conditions, bandwidth availability, and traffic demands. Of course, WANs also have their challenges. However, the expense of building and maintaining a WAN, especially over a significant distance, can be high. From your perspective, maintaining security on a WAN requires strong encryption, firewalls, etc., to prevent data breaches and protect against unauthorized access. WANs provide distance communication and despite the above issues still remain a backbone of today's networks.

3. MAN (Metropolitan Area Network): Connects City-Wide Networks

Alternative Name Metropolitan Area Network (MAN)This is a type of network for a city or a metropolitan area in which computer and devices are connected. A MAN is a bigger version of Local Area Network (LAN), which usually covers a building or group of buildings, while also being smaller than Wide Area Networks (WANs), which cover a large geographical area. The Data transfer guide is MANs which acts as an umbrella for interconnecting

multiple LANs (home, offices, etc) within a city, and they facilitate high-speed data transfer and communication between businesses, government institutions, educational organizations, and other people in the same metropolitan area. Architecture of MAN allow it to provide much higher speed and more bandwidth than standard broadband connections popular in homes and small offices. Fiber-optic cables, Ethernet, and wireless (WiMAX) technologies are typically used in the construction and maintenance of MANs for high-speed transmission of data from device to device and network to network within the city, which will help the data to be transferred at a higher speed.

So one of the most significant benefits of setting up a MAN is that it enables local organizations or institutions to share resources and data without the need for a WAN, which tends to be more costly also not suited for urban-scale communications. For instance, businesses that are located in the same city can use a MAN to connect their offices to a local data center or cloud server, allowing them to quickly access shared information and services in a secure manner. Apart from business-use applications, Metropolitan Area Networks can also be used to support public services like connecting schools, universities, hospitals, government agencies, and libraries to a central network. Several cities have started working on Smart City projects, where the MAN can be used to connect various city infrastructure such as traffic management systems, public transportation, emergency services, etc. But, MAN's are expensive to install as they involve with specialized hardware and availability of infrastructure to facilitate transmission of high speed data over spreads of area. Another drawback of MAN is the security; the traffic data in MAN moves to a more extensive geographical area as compared to that in a LAN, which increases the chances of data interception and attacks. These issues aside, MANs can be a great asset for companies investing in high-speed communication within metropolitan regions. So, they are an important part of modern networking by helping to reduce latency, improve communication and share resources between various entities in efficient ways.

4. Wireless Networks: Wi-Fi, Bluetooth, and Mobile Networks

Wireless networks are communication systems that enable data transfer between devices without the need for physical cables, utilizing radio waves, infrared, or other wireless technologies. Examples of wireless networks include Wi-Fi, Bluetooth, and mobile networks (e.g., 4G, 5G, and WiMAX). These networks have changed the way we connect to the internet, interact with people and share data to give us flexibility, mobility and convenience. Short for Wireless Fidelity, Wi-Fi is among the most well-known wireless technologies in use today; Wi-Fi is used to offer high-speed internet to the homes, offices, cafes, airports, and public areas. Wi-Fi Network Types: Wi-Fi transmit wireless signals between a wireless router (access point) and devices such as laptops, smartphones, and tablets using radio frequency. It runs on bands like 2.4GHz and 5GHz, with the newest Wi-Fi 6 tech providing higher speeds, higher capacity, and better effectiveness in bustling areas. Bluetooth is another common wireless technology, mainly designed for short-range communication between devices. Bluetooth is a wireless transmission standard for short distances. Bluetooth is another short-range technology that lets devices talk to each other using the same 2.4 GHz frequency band. It has more relevance in working with personal area networks (PANs) where there is a limited range to keep devices in communication. Mobile networks like 4G and 5G are revolutionizing communications, providing peace-of-mind global broadband internet. Mobile networks rely on a series of cellular towers to deliver wireless coverage to mobile, enabling you to stay connected to the internet, make calls, and send messages. We take less than 5 years to evolve from 4G to 5G, & it was a leap, which has increased speed, reduced latency, and increased capacity, paving the way for things like autonomous cars, interconnected cities and smart objects, and also for mobile applications. 5G is the next generation of mobile networks, succeeding 4G, providing high-speed data transfer and low latency, with measures to support future IoT requirements.

Phone service is already available and mobile operators are experimenting with WiMAX, which provides long-range broadband wireless access over

large areas. WiMAX is particularly well suited for rural or underserved areas where typical broadband infrastructure might not be available or too expensive. Ease and flexibility is the biggest benefit of wireless networks. They enable to access the internet or communicate with other devices from just about anywhere, without being tied to a specific location. But wireless networks are vulnerable to interference, signal congestion, and a breach risk because data can be more easily intercepted or disrupted than with wired networks. Nevertheless, wireless networks are constantly evolving, with speeds increasing, coverage improving, and connectivity becoming more reliable across a wide array of devices and applications. The focus of wireless network research is on developing fast, reliable communication technologies that will enable the next generation of mobile and connected devices.

UNIT 3 SEARCH ENGINE CONCEPT AND WORKING OF SEARCH ENGINE

We should consider using search engines for finding information on the internet. They work by:

1. Crawling: Bots Scan Web Pages

Crawling refers to the method search engines use to systematically explore the vast internet world, collecting information about different web pages as they go. The process of doing this is automated by software applications, commonly called web crawlers or spiders. These bots (known as crawlers or spiders), and they follow links through the web from one page to another, collecting content, metadata, and other essential information that helps the search engine understand the web in structure and context. Why do businesses need to know here how crawlers interact with a webpage? Only page content to be included: text, images, videos, links, etc. Web crawlers are usually started with a list of seed URLs, from which they visit these URLs and follow links to other pages within the same domain or another domain. Crawlers use a number of algorithms to determine how to visit pages, deciding which ones to visit first based on how often a page is updated or how valuable it thinks the website is, for example.

The bots are quick and efficient, scanning pages by the millions each day. The crawling process will never be completed as most dynamic web pages will be either created, updated, or deleted. Sometimes, crawlers are made to follow a site's "robots.txt" file, which tells search engines which pages not to crawl. It gives website owners the power to control how much of their information search engines can see. The first and most important step in the process of search engines is crawling, which is the foundation of the whole search environment. If not done well, a search engine couldn't find or consume a website's content and couldn't serve a user with relevant results. Hence, web crawlers are crucial for enabling search engines to deliver accurate, relevant, and comprehensive search results.

2. Indexing: Data Is Stored in Massive Databases

The next step in the process of the search engine, after a spider has crawled and collected content from a page, is to index it. Indexing means storing and organizing this huge amount of data into large databases which can be retrieved in most user-friendly and efficient way whenever needed. Indexing can be thought of as recording a digital library of every web page that has been crawled. This is when a search engine will read through a page and parse out its content into a structured form, using crawlers to identify fundamental information such as keywords, phrases, headings, links, and metadata. This information is then indexed and stored in a huge database, called an index that enables search engines to discover and retrieve relevant content once a user does a query. The index is basically a picture of the web — a search engine's knowledge of all the web pages it has crawled. Indexing is not just about storing raw content; it also involves analyzing the context of the content. For instance, search engines might account for things like the relevance and authority of a page and the relationships it holds with other pages on the web. This aids in deciding how relevant a page is to a user query's context.

Search engines have well-designed algorithms to structure and optimize their indexes to provide rapid retrieval. As the web expands, the index does too, becoming a massive database of information from billions of web pages. To accomplish this, extremely efficient systems are needed to ensure that the

search engine quickly looks up the appropriate results — even when a ridiculously huge and ever-changing sea of information is stored internationally. This process of indexing is essential as it helps search engines to generate data provided quickly and accurately. Without an index, a search engine can't efficiently process user queries, and it would be unable to display results that are relevant to users. The indexing is highly crucial where when a user enters any query then the search engine retrieves the most relevant pages from the gigantic database.

3. Ranking: Algorithms Rank Pages Based on Relevance

Ranking is the algorithmically-driven method by which the search engines determine in which order indexed pages are displayed when a user makes a search query. After crawling and indexing the web, a search engine ranks pages based on their relevance to the user's search intent using increasingly complex algorithms. A major contributor to how search engines delivers the most relevant and helpful results to users is Ranking. There are hundreds, even thousands of factors that influence the algorithm Google uses to calculate where a webpage will show up in search. Some of these elements include the relevance of content, keyword usage, load speed of the page, mobile-friendliness, backlinks, user experience, and the authority of the site. For how a user searches for a term such as (best coffee shops near me), will search engine prioritize pages that are relevant to that query and will rank them according to the quality and relevance of the content perceived.

As natural language processing (NLP) is used by search engines to understand what is meant by certain words or phrases in a query, and analyze user intent, this approach is well-suited to the field of search. For instance, when you search for "buy a laptop," the search engine knows the user is looking to make a purchase, so it will return commercial or transactional pages rather than pages containing information. Another significant ranking factor in Google are backlinks. Search engine algorithms considering backlinks, other than crawler going through each page, makes pages with authoritative page rank and relevant backlinks generally ranked higher due to the belief surrounding the validators that you have a value and can be trusted.

The way search engines rank results is constantly evolving as search engines update and improve their algorithms to provide better results to the searchers. This is often a closely guarded process, as search engines such as Google constantly update their algorithms to prevent between themselves and improve the accuracy of results. Trying to make web pages rank better is not a new phenomenon after all, SEO (search engine optimization) specialists are literally working on doing that however, the algorithms are there to support rewarding high-quality, user-interest content while punishing pages trying to use manipulative tactics such as keyword stuffing or purchasing backlinks. Search engines aim at crawling and indexing, effective ranking is the key for search engines to get the best possible relevant results for the user, thus satisfying the user experience.

4. Retrieving: Users Get Results Through Queries

The last stage in search engine procedures is based on retrieving result for users via queries. When a user types a query into a search engine, the search engine's algorithms rapidly process that query, analyze the indexed data, and return the most relevant content. This is the step users see when they open the browser as they are presented with a list of search results on the screen. The process is triggered whenever a user inputs a search query. The search engine then matches the query against its index and finds pages relevant to the keywords or search terms used by the user. Using its ranking algorithms, the engine arranges the pages in order of relevance, authority, quality and so on. These results are generally displayed as a search engine results page (SERP), which features a list of URLs, descriptions of each URL, and, in some cases, not other elements such as images, maps, or news articles.

The retrieved results can also be personalized from search history, location, and preferences of the user. So, if a certain user searches for tech-related content on a popular search engine, that search engine will know that user loves tech content and will show tech websites as a priority. To take a similar example, if the user is looking for a local service, the search engines might suggest the results which are geographically significant, like a coffee place or a plumber close to the user. Designed for speed, the retrieval process returns

relevant information almost immediately. That is the reason behind search engines operating extremely agile and resilient architecture, capable of handling billions of searches queries a day. Delivering search results is about extracting values from your search engine and presenting them to the user in an effective manner to deliver the most reliable, accurate, and timely information relative to a search query. How the final list of results looks also depends on whether the type of search query and whether the user has triggered any advertising campaigns (e.g. Google Ads). These ads appear at the top or bottom of the SERP and are labeled as sponsored to include them from mainly organic results. During retrieval, speed and accuracy are critical. They want instant access to relevant information, and it is the ability of a search engine to return the best available results from its index as a response to a query that dictates its success.

1.10 OPERATING SYSTEM AND NUMBER SYSTEM

An operating system (OS) is a type of software that controls the hardware and software tools of a computer. It works as a go-between for the user and the computer hardware and gives programs a stable place to run. It manages hardware parts such as the CPU, memory and storage, and provides the users with a user-friendly interface to work with. Now, breaking those functionalities of an operating system into few main categories:

Resource Management: The OS handles hardware resources, such that different applications and users can access the appropriate resources of the system. It is responsible for handling the CPU, memory, disk space, and input/output devices. It is responsible for resource management and allocation based on priority, avoiding conflict, and providing for environment usage.

Process Management: An OS creates, schedules, and terminates processes (running programs). Cross-platform means that it supports execution on different types of devices such as computers and mobile devices and network systems that are used by users together. This covers process synchronization, scheduling, communication, etc.

Memory Management: The O.S manages the memory of the system which allows it to allocate space in memory whenever necessary for a currently running process and also ensure that one process does not overwrite the memory of some other process. It uses methods such as virtual memory to enhance the effective memory of the system by using hard disk space to act as RAM when it is not present.

File System Management: The OS organizes and manages files on storage devices (such as hard drives or SSDs). It maintains records of where files are located, permissions for files, and security, enabling users and applications to read, write, and manipulate data in with ease. It also provides a set of management tools for creating, deleting, and accessing files.

Security and Access Control: OSs have security features like user authentication, encryption, and access control to keep data safe from people who shouldn't have access to it. Such as password protection, user access, and firewalls.

Examples of popular operating systems include: Windows, macOS, Linux:

Windows: Designed by Microsoft, Windows is perhaps the most common operating systems use, especially for business and personal computer. It offers a GUI which means that users can interact with the System using Clicks, Windows and Menus.

macOS: macOS is the operating system for Apple's line of computers and is developed by Apple Inc. Widely appreciated for its clean interface and user-friendly experience, macOS is widely used in creative fields because of its stability and compatibility with other Apple products.

Linux: Linux is a Unix-like, open-source operating system. It is recognized for its stability, security, and flexibility. This allows anyone using it to make many tweaks to how the OS will behave, which has made it popular in server environments, tech development, embedded, and more. There are a multitude of Linux distributions (distros), with popular ones being Ubuntu, Fedora, and Debian to address various user needs.

An important part of a computer system is its operating system (OS). This not only allows it to work efficiently but also gives necessary services to users and applications, keeping the operating system free, secure, and responsive.

Number System: Used in Computing

In computer science, there are a series of number systems that form the basis of how we represent and manipulate numbers. There are multiple number systems (binary, decimal, octal and hexadecimal) that serve different purposes in the digital world. This form of representation is essential for anybody dealing with computers and also for developing hardware and software where you will need to do numbers.

Binary (Base 2): 0s and 1s (Used in Digital Computers)

Modern computing is based on the binary number system (base 2). It represents all numbers and data using only two digits, 0 and 1. At the hardware level, the binary system is a reasonable choice for expressing information, since digital computers are composed of transistors that can only be in one of two states, either on or off.

The ite(s)x bit(s) in binary (base 2) are called Bits (Binary Digits and each Bit represents an increasing power and i represented from its right-most bit where the right-most bit remains the least significant 0 or 1 representing the least power i.e., 2^0. Take the binary number 1011 as an example; it stands for:

1 * (2^3) + 0 * (2^2) + 1 * (2^1) + 1 * (2^0)

This equals 8 + 0 + 2 + 1 = 11 in decimal.

Binary honestly is the most basic level to which a computer can store and manipulate data because it encodes all forms of data (characters, images, sound, etc) using strings of 0s and 1s.

Decimal (Base 10): Regular Numerical System

The decimal (base 10) number system is the one most people use in their daily lives. It uses the ten characters 0 through 9 to show numbers. Because each place value is a power of 10, the value of each number depends on how many places it is from the decimal point. As an example, the number 345 in decimal form can be written as:

3 * (10^2) + 4 * (10^1) + 5 * (10^0)

This equals 300 + 40 + 5 = 345.

Computers do not process the data in decimal directly, but UTF-8 system based on decimal used as human user commonly. Binary and Decimal conversion this is a very often required conversion; most of the time, while programming or working on numbers on a computer, computers always calculate in binary.

Octal (Base 8): Used in Computing Applications

Numbers in the octal (base 8) system are made up of eight digits, ranging from 0 to 7. Each number represents an 8th power. People don't use the octal scheme as much in everyday life, but computers do, especially in the context of file permissions and in certain legacy computer systems. Octal is a way to write binary quickly. Each group of three binary numbers is shown by a single octal digit. In this case, the binary number 101101 can be broken down into 101 and 101., which both correspond to octal digit 5. Therefore, in octal, 101101 is 55. Octal was more common in previous computing platforms but fell out of favor in the present day and has been mostly replaced by hexadecimal, only because the conversion of binary and hexadecimal is easier.

Hexadecimal (Base 16): Simplifies Binary Representation

And more generally, a system from (2 segments) to (F segments) corresponds to (8s) to (15 segments) that is, including forms A through F or 10 through 15 in decimal (hexadecimal). In computing, hexadecimal is used to simplify the

representation of binary data. Because one hexadecimal digit can represent four binary digits (or bits), it is thought to be smaller and easier to read than long binary numbers. As an example, the 4-bit binary number 1111 1010 can be written in hexadecimal as FA.

It is common to use hexadecimal in programming, especially in memory addresses, color codes in graphics, and low-level system programming. It is a middle ground between the binary system on which computers operate, and the more familiar decimal system allowing people to manipulate large binary numbers in a more manageable manner. The number systems binary, decimal, octal, and hexadecimal form the bedrock of computing. At the hardware level, binary is the core system that computers use to process numbers, whereas humans use decimal the most. So, octal and hexadecimal are useful in simplifying binary data in a way that is more manageable, however, hexadecimal counts are the more common form. These number systems are vital for computer professionals to improve comprehension on how data operated in different data processing platforms.

Input and Output Devices in Computing

Input and output devices are fundamental components of a computer system that facilitate interaction between the user and the computer. Input devices allow users to send data and commands to the computer, while output devices enable the computer to display, print, or project results of processed data. Both types of devices are essential for efficient computer operations in various fields, including business, education, entertainment, and research.

1. Input Devices: Input devices are hardware components that enable users to enter information, control operations, or provide instructions to a computer system. They act as the bridge between the user and the machine, allowing data to be processed. Some common types of input devices include:

a) Keyboard: One of the most widely used input devices, the keyboard allows users to type text, enter numbers, and execute commands through keys.

It includes function keys, numeric keys, alphabetic keys, and special keys such as Enter, Shift, and Ctrl. Used in everyday computing, programming, and data entry tasks.

b) Mouse: A pointing device that enables users to navigate, select, and interact with items on the screen. Includes features like right-click for additional options, scroll wheels for smooth navigation, and optical sensors for precision. Essential for graphic design, gaming, and regular computer use.

c) Scanner: Converts physical documents, images, or barcodes into digital formats. Common types include flatbed scanners, barcode scanners, and handheld scanners. Used in offices, libraries, and retail stores for record-keeping and document processing.

d) Microphone: Captures audio input, allowing voice recording, communication, and voice commands. Used in applications such as video conferencing, voice recognition software, and speech-to-text programs. Plays a crucial role in virtual assistants like Siri, Google Assistant, and Alexa.

e) Joystick/Game Controller: Used primarily for gaming and interactive applications. Provides enhanced control in video games, flight simulators, and virtual reality (VR) experiences. Includes buttons, triggers, and motion sensors for an immersive gaming experience.

f) Touchscreen: A hybrid input device that allows users to interact directly with the screen by tapping, swiping, or pinching. Found in smartphones, tablets, ATMs, and modern laptops. Eliminates the need for a separate mouse or keyboard.

2. Output Devices: Output devices are responsible for presenting the processed data to the user in visual, audio, or physical formats. These devices make it possible for users to view, hear, or print results from a computer. Some common output devices include:

a) Monitor (Screen/Display): The most commonly used output device that visually displays text, images, videos, and graphical data. Comes in different types such as LCD, LED, and OLED screens. Higher resolution monitors (e.g., 4K, 8K) are used in gaming, video editing, and professional design work.

b) Printer: Converts digital data into physical documents, images, or labels. Common types of printers include:

Inkjet Printer – Suitable for home use with high-quality color printing.

Laser Printer – Preferred in offices for fast and high-volume printing.

3D Printer – Produces three-dimensional objects layer by layer using plastic or metal materials.

Used in businesses, educational institutions, and publishing.

c) Speakers

- Produce audio output by converting digital signals into sound.
- Used for music, video calls, gaming, and multimedia applications.
- Advanced speaker systems include surround sound setups and Bluetooth wireless speakers.

d) Projector

Displays large-scale visual output by projecting images or videos onto a screen or wall. Used in classrooms, movie theaters, business presentations, and conferences. Some modern projectors come with interactive touch functionality.

e) Headphones and Earphones

Provide personalized audio output without disturbing others. Used in music listening, gaming, video conferencing, and online learning. Noise-canceling headphones offer an enhanced experience by reducing background noise.

f) Braille Display

Input and output devices are essential components of a computer system, facilitating smooth interaction between users and machines. These devices act as communication bridges, enabling users to send data, commands, and instructions while allowing computers to process and display results. The effectiveness of a computer system depends significantly on these devices, which are used across various industries, including business, education, healthcare, and entertainment. Input devices allow users to enter data into a system, while output devices present processed information in a usable format. Their combination ensures efficiency, accessibility, and improved user experience. Input devices are hardware components that allow users to interact with computers by feeding data for processing. The most commonly used input device is the keyboard, which enables users to type text, enter commands, and perform various functions through specific keys. Another widely used device is the mouse, which allows users to navigate, select, and interact with objects on a screen. More advanced versions, such as touchpads and trackballs, provide alternative input methods, particularly in laptops. In addition, touchscreens have become increasingly popular in smartphones, tablets, ATMs, and self-service kiosks, eliminating the need for separate keyboards and mice.

Apart from textual and navigational input, audio and visual input devices also play a crucial role in modern computing. Microphones allow users to input sound, making them useful for video conferencing, voice recognition, and digital communication. Similarly, scanners convert physical documents and images into digital formats, aiding in document management and digital record-keeping. Another essential input device is the joystick or game controller, which is widely used in gaming and simulation applications. These devices provide users with a more immersive experience, allowing precise control over digital environments. Furthermore, biometric scanners, such as fingerprint and facial recognition systems, are becoming increasingly common in security and authentication processes.

Once the input is processed, the computer uses output devices to present the results in a meaningful way. The monitor is the most common output device, displaying text, images, videos, and interactive content. Modern monitors come in different types, such as LED, LCD, and OLED screens, with varying resolutions and refresh rates to enhance the user experience. For physical documentation, printers convert digital text and images into hard copies. There are several types of printers, including inkjet, laser, and 3D printers, each serving different purposes in homes, offices, and manufacturing industries. For audio output, speakers and headphones allow users to listen to music, communicate in virtual meetings, and experience immersive sound in gaming and multimedia applications. High-quality surround sound speakers and noise-canceling headphones provide enhanced auditory experiences. In environments requiring large-scale presentations, projectors display enlarged images and videos onto screens, making them useful in educational institutions, business meetings, and entertainment settings. Accessibility is a crucial aspect of modern computing, ensuring that individuals with disabilities can effectively use technology. One of the most significant innovations in assistive technology is the Braille display, a specialized output device designed for visually impaired users.

Short-Answer Questions:

1. How does one computer serve in the primary function?
2. features of computer and their explanation
3. What technology characterized the first generation of computers?
4. What took the place of vacuum tubes in second generation of computers?
5. What is the definition of integrated circuit (IC)?
6. What is a microprocessor?
7. What is the fastest computer?
8. What computer is used for large scale enterprise data processing?
9. What are Input devices?
10. What makes up the two main parts of the CPU?

Long-Answer Questions:

1. Discuss the five generations of computer technology, focusing on the development of the new technology in each generation and the role it played in the advancement of computer science.
2. Characteristics of computers (speed, accuracy, automation, versatility, storage, connectivity, multitasking) and their usefulness of computers in modern society.
3. What are the differences between supercomputers and mainframes? Provide some typical uses and applications of the systems along with their strengths and weaknesses as compared to each other.
4. Explaining Embedded Computers in Give an example of Embedded Computer in Embedded computer in Intelligent applications.
5. What is the functioning of the input unit in a computer system, and provide examples of different types of input devices with their uses?
6. What the Arithmetic Logic Unit (ALU) and control unit (CU) do and how the Central Processing Unit (CPU) works.
7. There is a lot of novelty in history that is difficult to understand, like why computers evolved from vacuum tubes to transistors to integrated circuits, then to microprocessors, and what all this evolution meant for people.
8. Discuss the differences between microcomputers, minicomputers and mainframes, and how their uses and applications have changed over the years.
9. Explain the fifth generation of computers and their significance and discuss how AI will the computers of the future.
10. Versatility of Computer: We should also talk about the amazing versatility of computer in this age.

MODULE 2 INTRODUCTION TO MS WORD

Structure

Unit4 Microsoft Word – Introduction

Unit5 Working With Word Document

Working With Tables

Tools In Ms Word

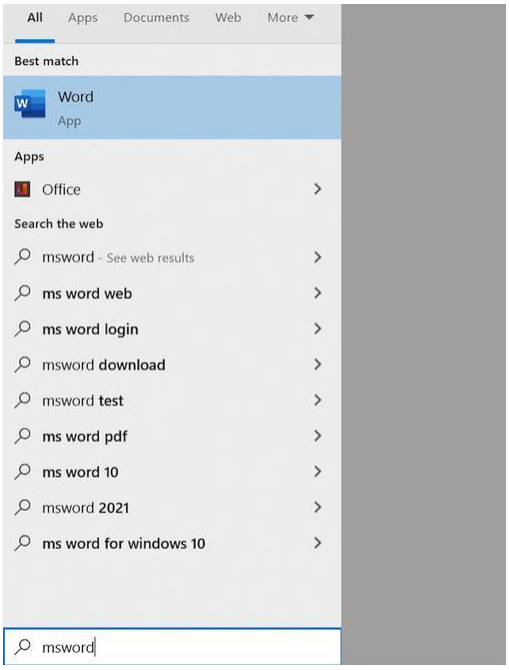
UNIT 4 MICROSOFT WORD – INTRODUCTION

Microsoft Word is a word writing program that was made by Microsoft in 1983. It's the Word program that most people use. It lets you make documents, letters, reports, resumes, and other things that look professional, and it also lets you edit or change documents that you already have. The file that was made in Microsoft Word has the.docx ending. It comes with Microsoft Office, but you can also buy it on its own, and it works on both Windows and macOS. It's 2019 since the last version of MS Word. This guide shows you how to open Ms. Word before you learn about its features.

How to open MS Word?

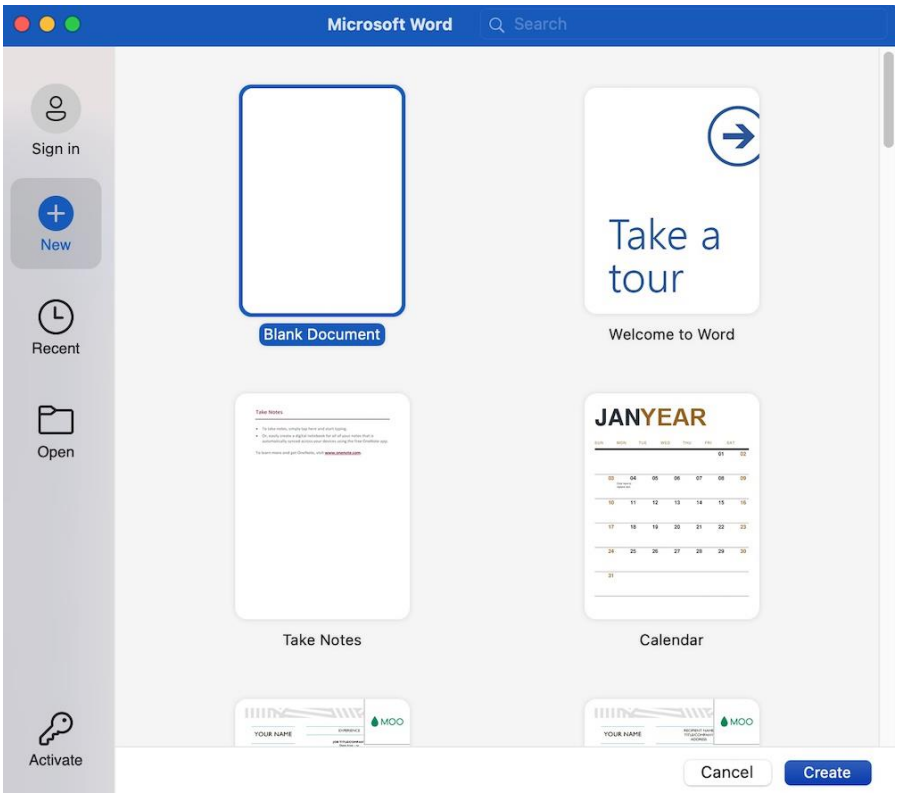
To open MS Word, do the next thing:

First Step: In the search bar, type "Ms. Word**.**".

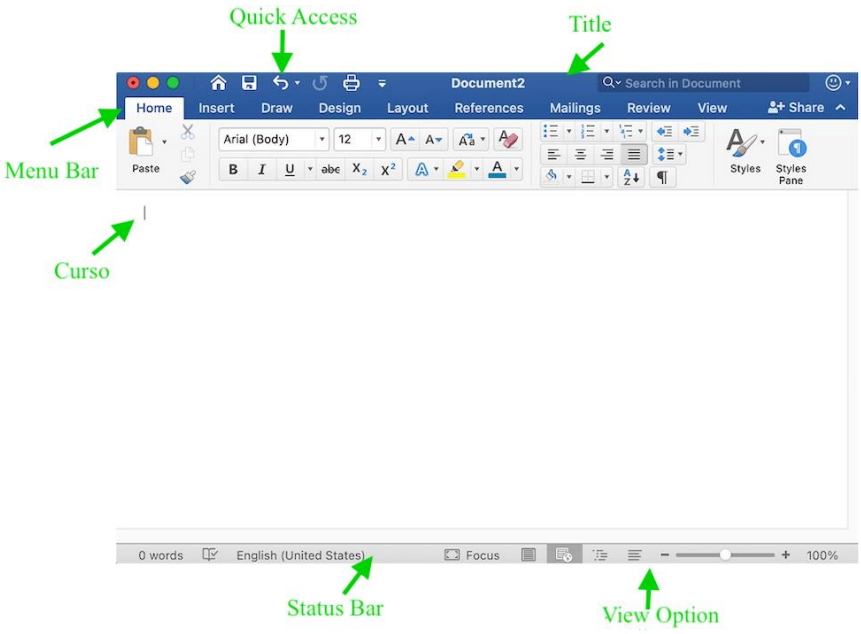


Step 2: Select Ms Word application.

Step 3: Pick out a new file and press the "Create" button.



Then you'll see a window like the one below, where you can write your text and change things about it, like the font type, style, boldness, italics, and so on. You can also add pictures, tables, and charts to your work.

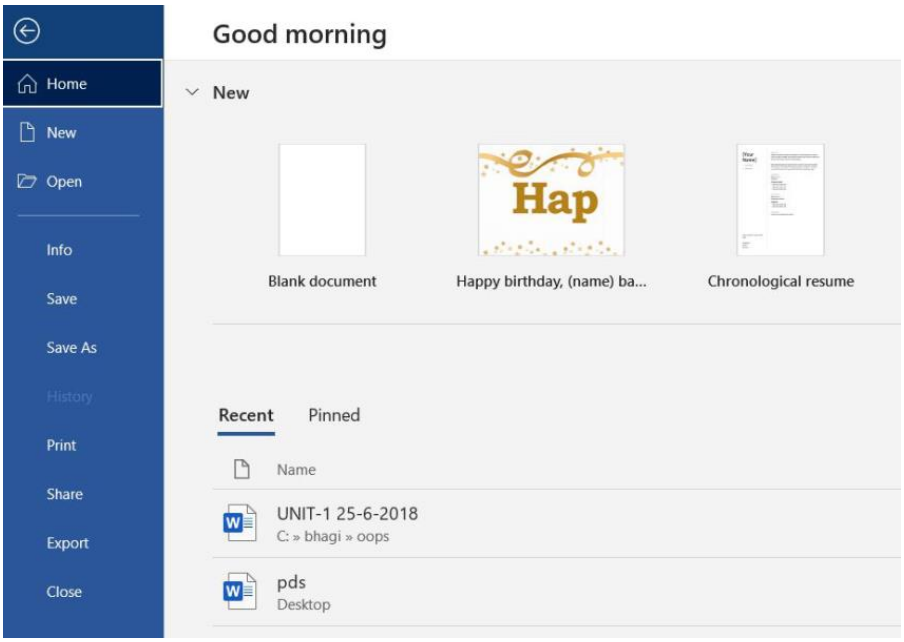


Features of MS Word

Let's talk about a type of MS Word features or parts now. With these features, you can do different things with your documents, like add, remove, style, change, or just look at the text.

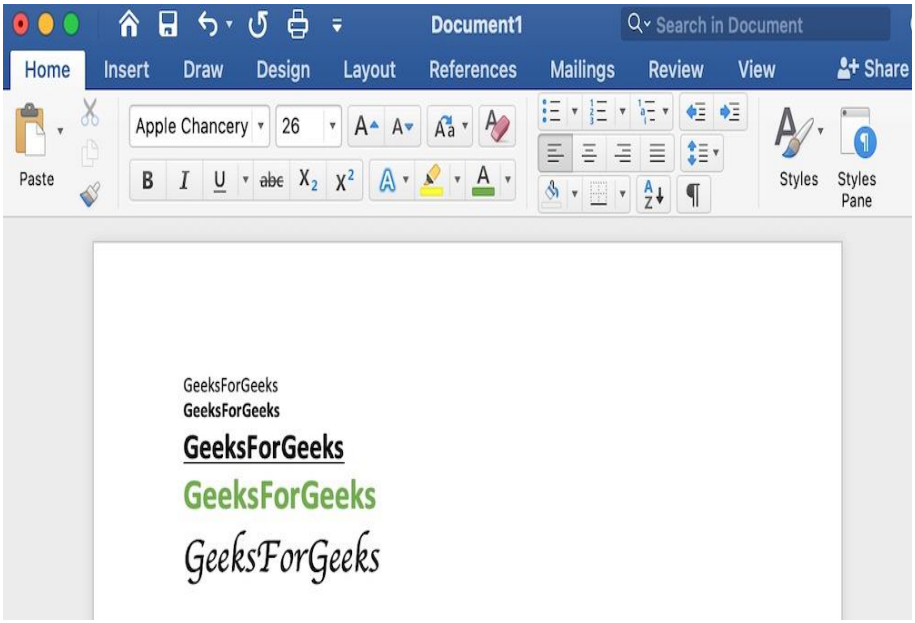
1. File

When you click it, It shows choices that have to do with files, such as New (to make a new document), Open (to open an existing document), Save (to save a document), Save As (to save a document), History, Print, Share, Export, Info, and so on.



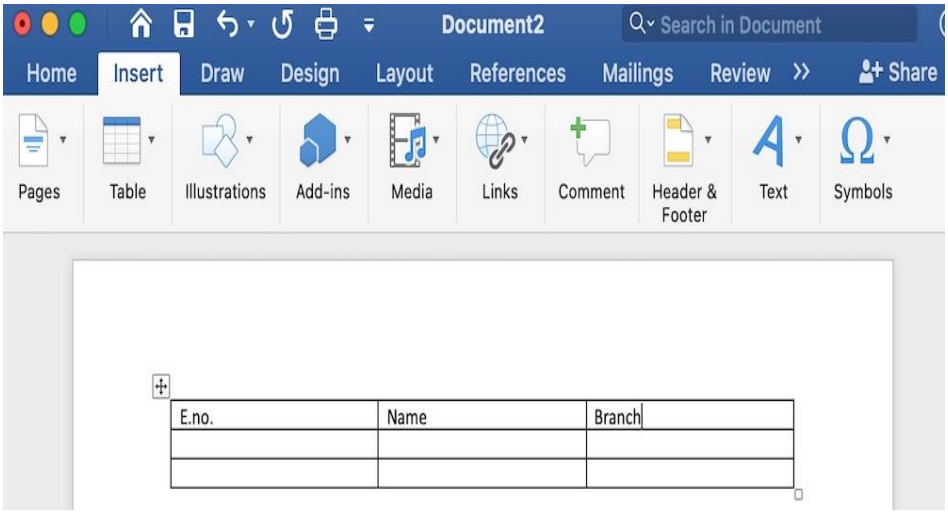
2. Home

As a general rule, MS Word's main tab is split into five groups: Clipboard, Font, Paragraph, Style, and Editing. You can pick the text's color, style, emphasis, bullet points, and size, among other things. It also holds the options to cut, copy, paste, and so on. You can do the following once you click on the "Home" tab:



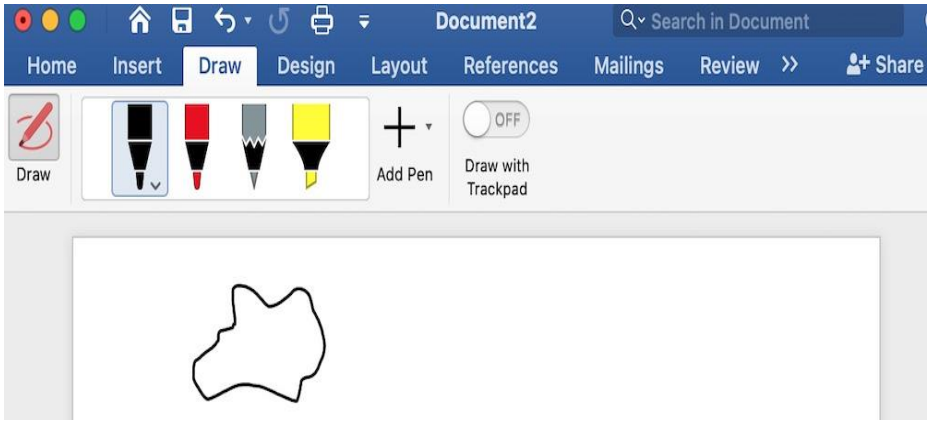
3. Insert

It is also the second ribbon or menu bar tab. That is a collection of things you would alternatively like to put into a Microsoft word. There are tables, word art, hyperlinks, symbols, charts, signature lines, dates and times, shapes, headers, footers, text boxes, other hyperlinks, boxes, equations, and more. The image below shows some of these choices:



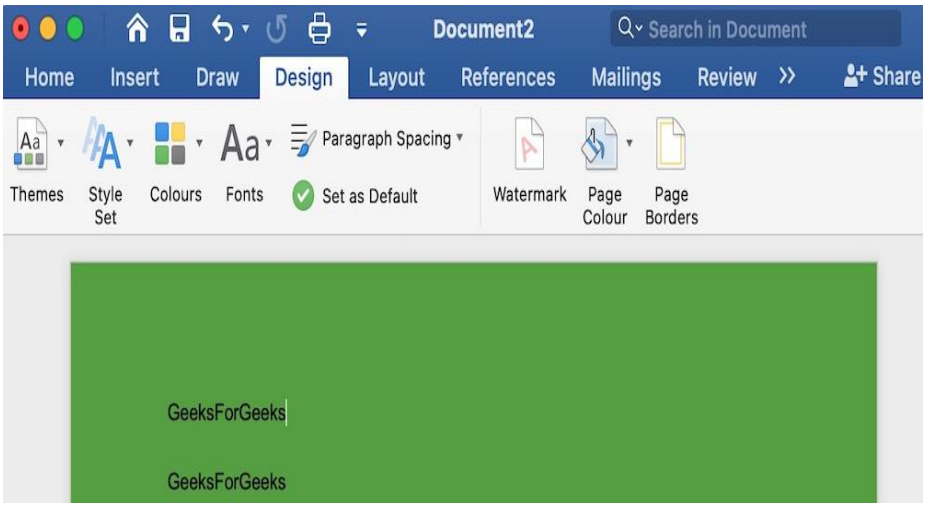
4. Draw

The third tab is in the menu bar or ribbon. It's for drawing by hand in MS Word. It also comes with the following kinds of drawing pens:



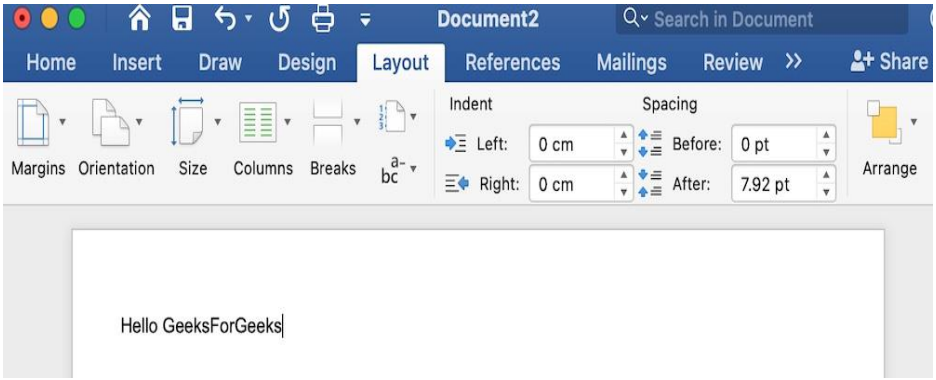
5. Design

It is the second button or tab [the fourth tab in the menu bar/ribbon]. The design tab has various instance designs which you can pick, which hits you with centered titles, staggered headers, For more information on things like left-justified text, page fringe, stamp, page color, and more, see the picture below:



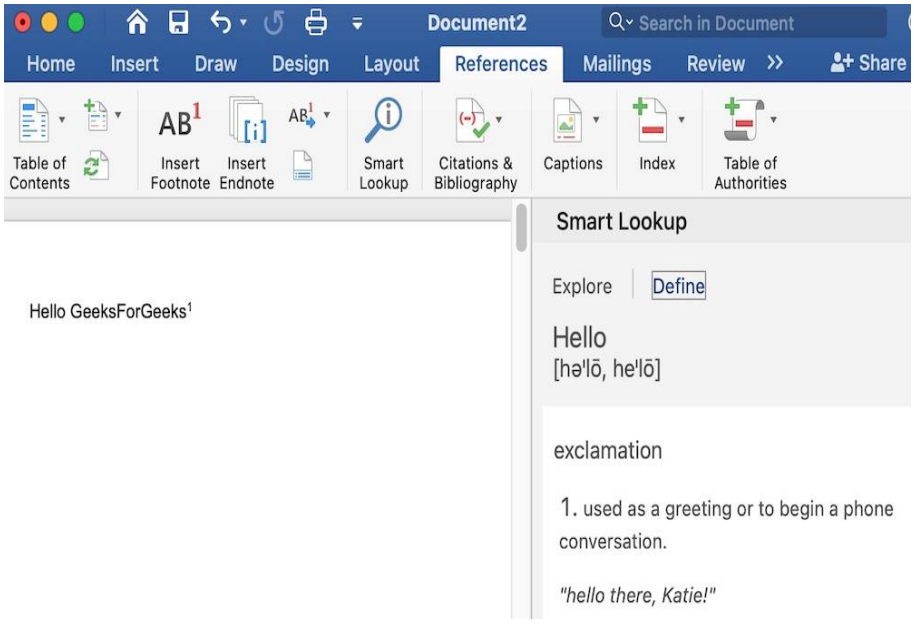
6. Layout

The fifth tab can be found in the menu bar or ribbon. That means you can arrange the pages of your Microsoft Word file in any way you like. As shown in the picture below, you can set margins, show line numbers, set paragraph indentation and lines, apply themes, change page layout, size, line breaks, and more:



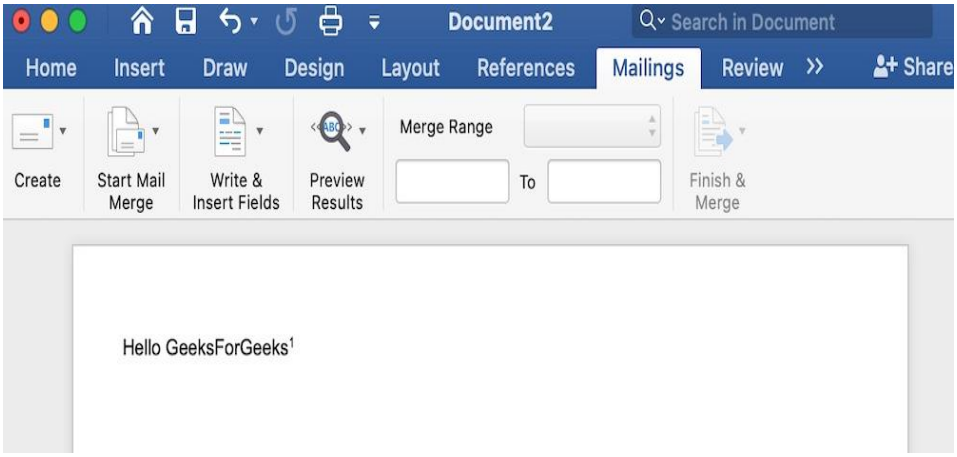
7. References

It is the sixth option in the menu bar or ribbon. The references tab allows you to enter references to a document, then generate a bibliography at the end of the text. The references are usually kept in a master list, from which references service subsequent documents. It provides features such as, Table of Contents, Footnotes, Citations & Bibliography, Captions, Index, Table of Authorities, the smart appearance, and many more. Once you click on References tab you will get below options:



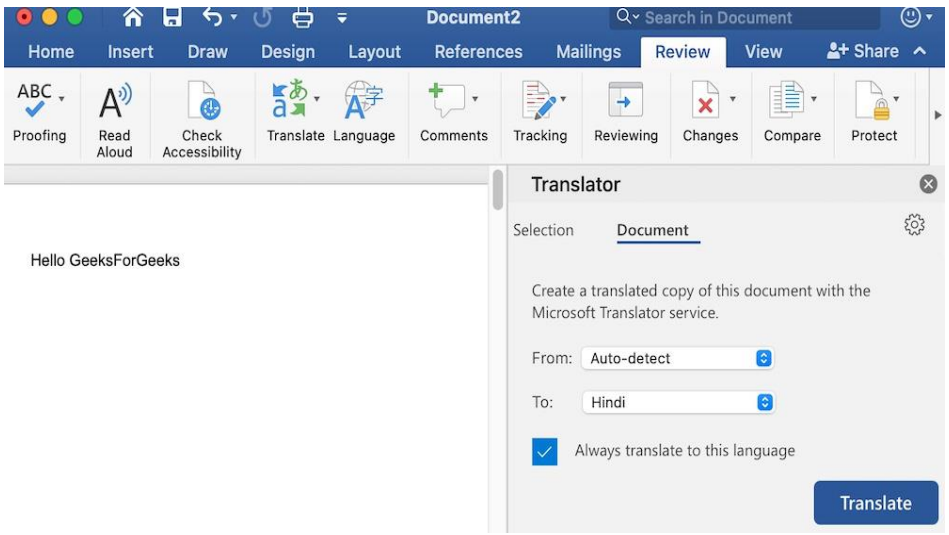
8. Mailings

It is the seventh tab in the menu or ribbon. It is the tab in menu bar least used. This tab is where you would make labels, print them on envelopes, mail merge, etc. After Selecting Mailing, you will have the below options:



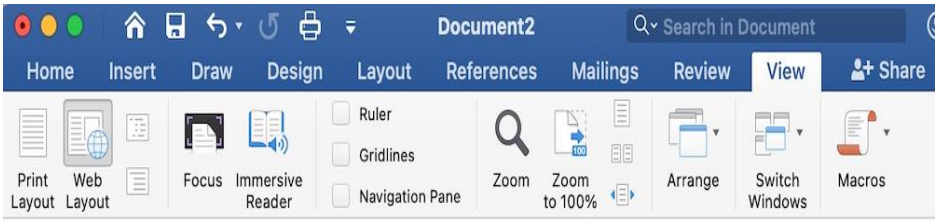
9. Review

It is the 8th tab in the menu bar/ribbon. On the review tab we have, commenting, language, translation, spell check and word count tools The latter is useful for finding and modifying comments quickly. Once you click on a review tab, you will have the below options:



10. View

It is the 9th tab on the Menu bar or ribbon. View tab helps switch between single page or double page also controls the layout tools print layout, outline, web layout, task pane, toolbars, ruler, header and footer, footnotes, full-screen view, zoom etc are found here as shown in the below image:



WORKING WITH WORD DOCUMENT

MS-Word or Microsoft Word is a Wonderful and very user-friendly and interactive word processing software with rich capabilities. Documents like letters, articles etc, can be created by the user using it. MS-Word provides a wide range of features that help make it operate so simple.

Opening the Document

Document opening is so simple and this is kind of the first action a user can perform to begin working with MS Word. It is clear that in order to create any document or to make changes to any document, We first need to access that document. So, here in thie article, we are going to learn how to open a document in MS Word.

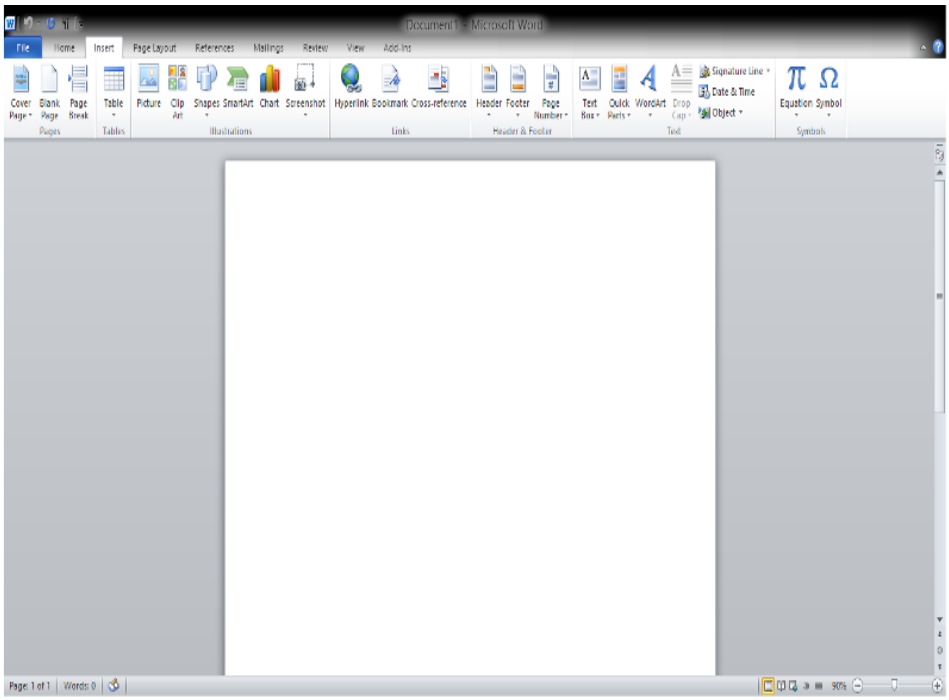
This we will teach you the complete process of a little opening a document with the help of sample images and the also necessary instruction:

Method 1: Opening Default Document

When everyday we opens MS-Word a blank page with a default name is opened (generally “Document1”).

Step 1: Open MS-Word On your PC

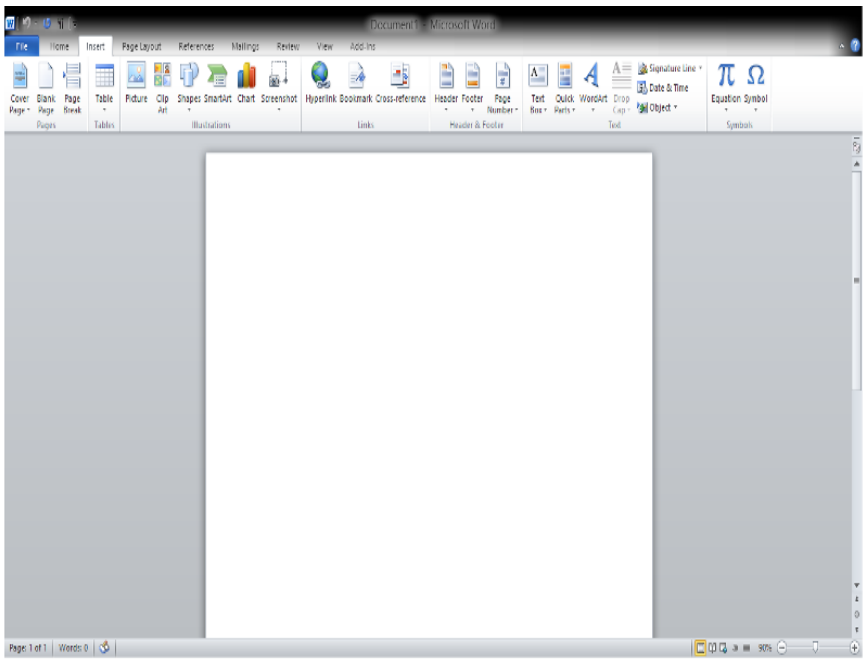
Step 2: The screen shown below is already visible with default new document blank page.



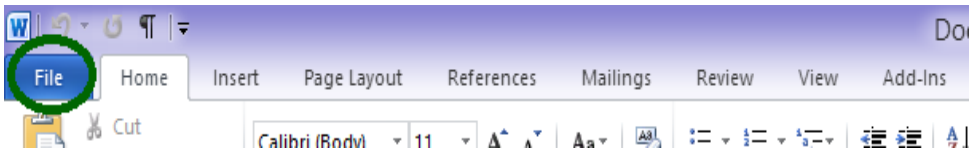
Method 2: Opening a document of your choice

Different kinds of documents are created using MS-Word. Well, A scenario might arise where we have to open a document i.e. existed, and we need to edit that document. So, for this follow these steps:

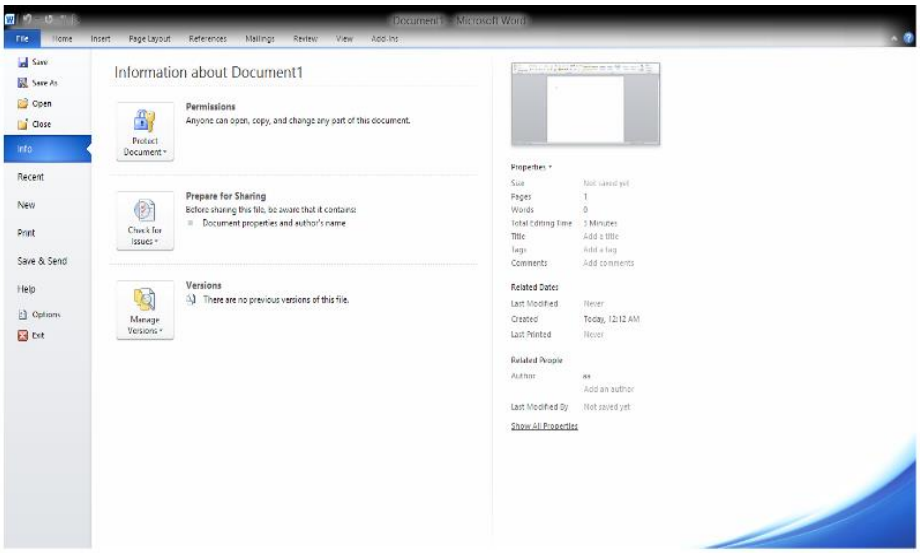
Step 1: Open MS-Word in your PC. Hence, the screen appear like below image:



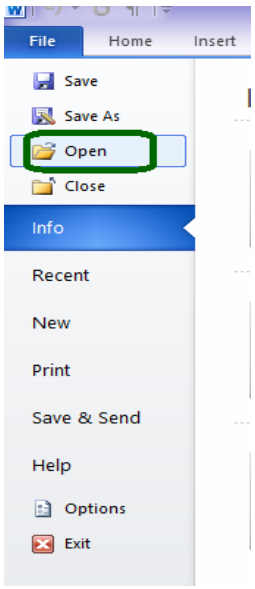
Step 2: Now, above there is a tab called "File" (Shown in the image below).



Step 3: Now, Click on the "**File**" tab and the file tab will open and looks like the below image.

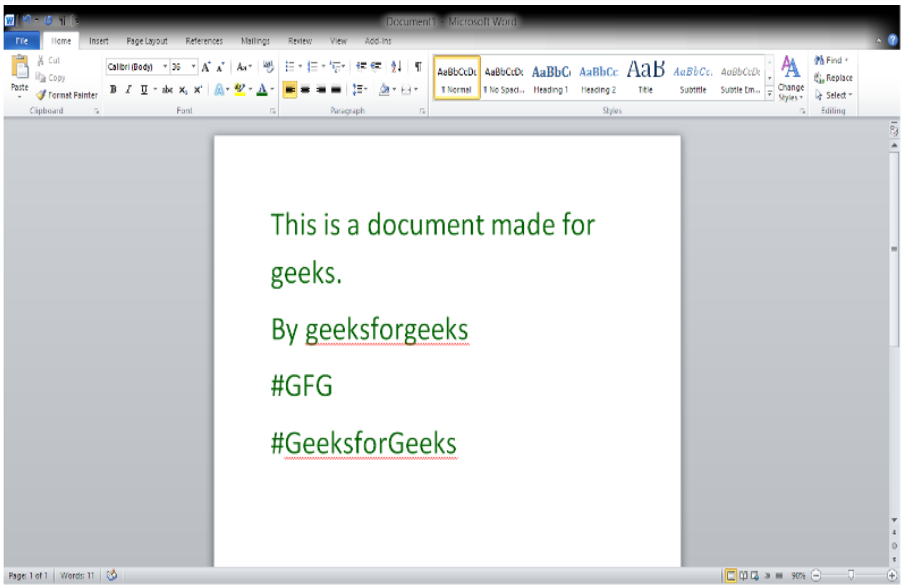


Step 4: Now, on the left-hand side of the page or screen there are many options. Select "**Open**" to open a document of your choice.



Step 5: Now, open the document of your choice, by double-clicking on the file of your choice.

Step 6: Now, the opened document will look something like the below image.



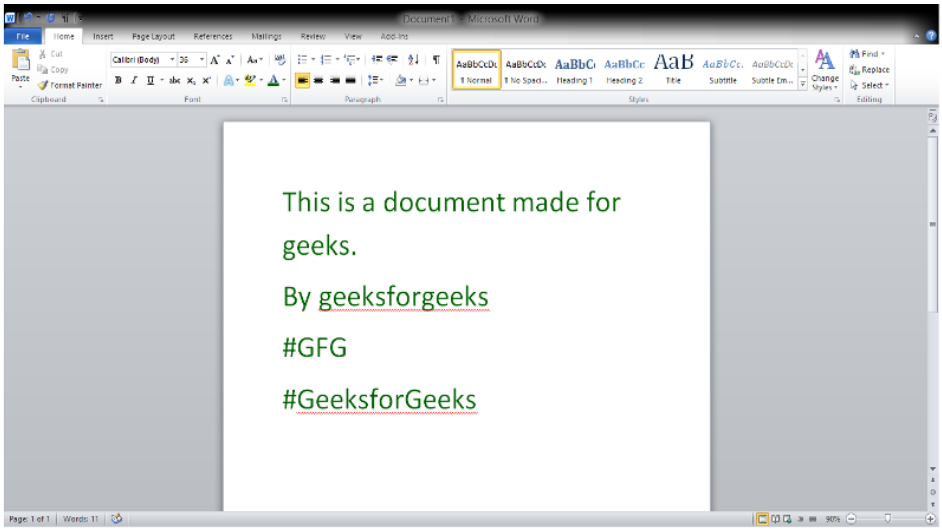
Step 7: You have successfully opened the document of your choice.

Method 3: Opening a New document

This is one such condition or situation when a user is in the process of working in MS-Word and needs a new document. So, lets explore how it can be done step by step:

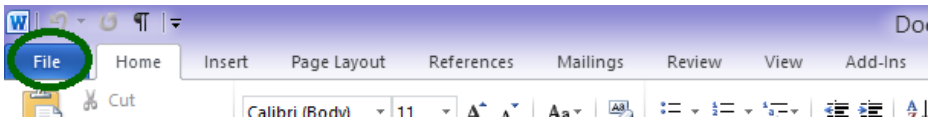
Step 1: Open MS-Word in your PC first.

Step 2**:** When you open the document you will work. (like in the below image)

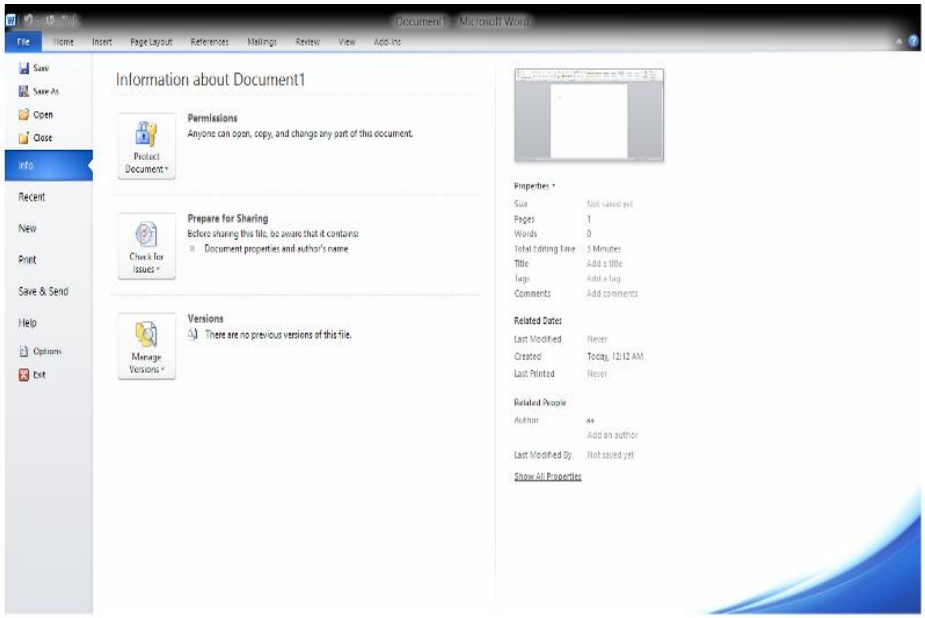


Step 3: Now, You want to open a fresh new document to work in.

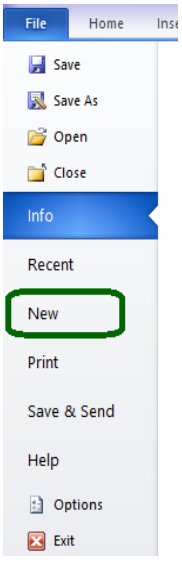
Step 4: Now, above there is a tab called "**File**"(Shown in the image below).



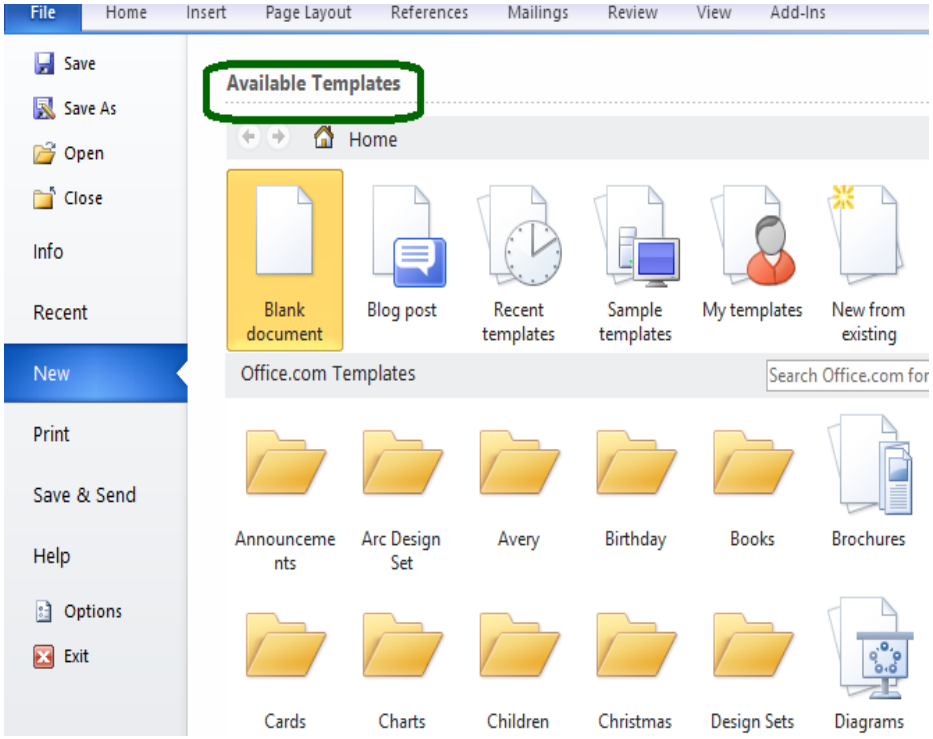
Step 5: Now, Click on the "**File**" tab and the file tab will open and looks like the below image.



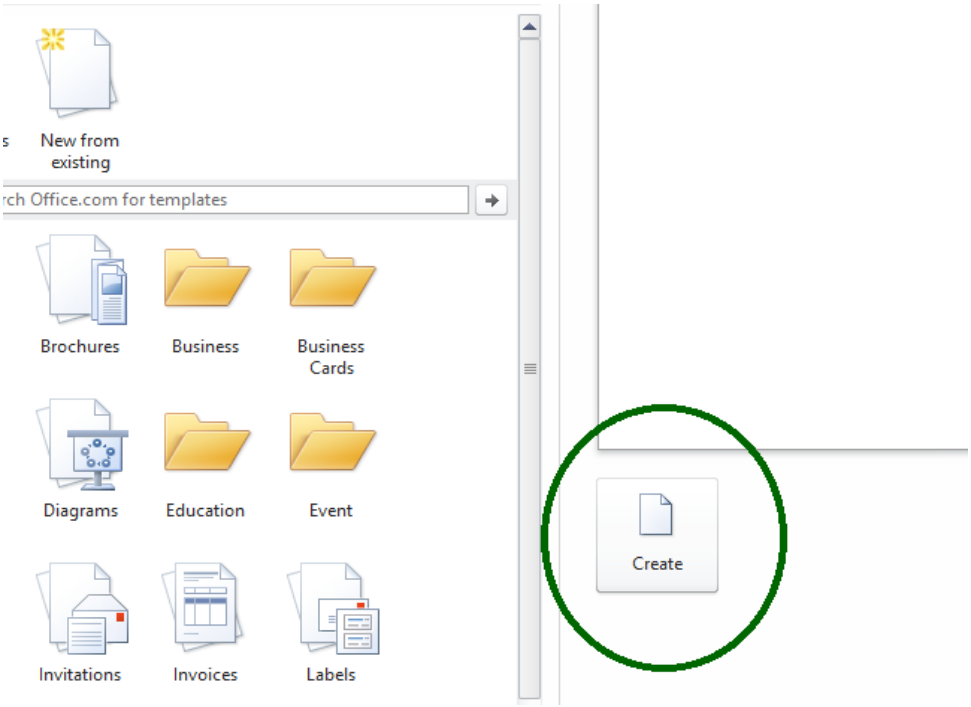
Step 6: Now, on the left-hand side of the page or screen there are many options. Select "**New**" to open a fresh new document.



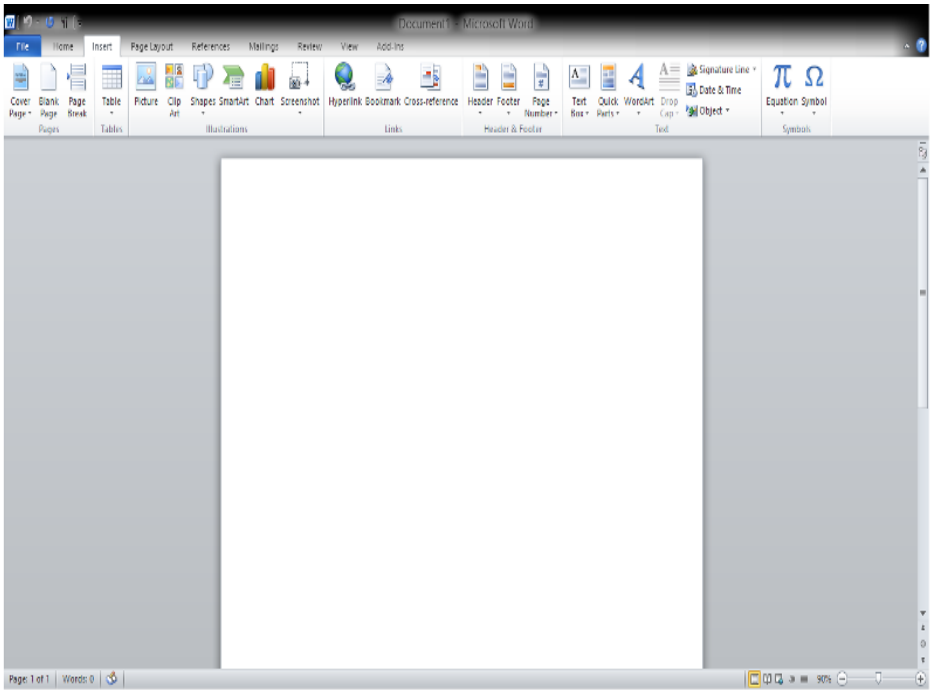
Step 7: Now, After clicking on "**New**". Select a Template from "**available Template**" option. (marked in the image below)



Step 8: After selecting a template (in this example blank is selected). Click on the "**create**" option, which is present on the right side of the screen.



Step 9: You have successfully created the new document or opened a new document.



So, in all these ways we can open a document in MS-Word.

WORKING WITH TABLES

Microsoft Word or MS-WORD is a word processing software for computers that uses a graphical interface allowing users to enter text. It enables users to write and store documents very similarly to other word processing programs. MS-word itself is a very popular tool which can be found in different versions in the market. In this tutorial, we are going to study the tables in MS-Word. In MS Word, a table consists of systematic arrangement of text in rows and columns. You can align numbers in columns using these tables and they are used to perform operations on those numbers. You can use tables to create page layouts. A row is a set of tables or data banks that are organized horizontally in a table or spreadsheet. Columns: The vertical series of cells in a chart, table, or spreadsheet.

How to Create a Table?

Tables in MS Word can be created in the following two ways:

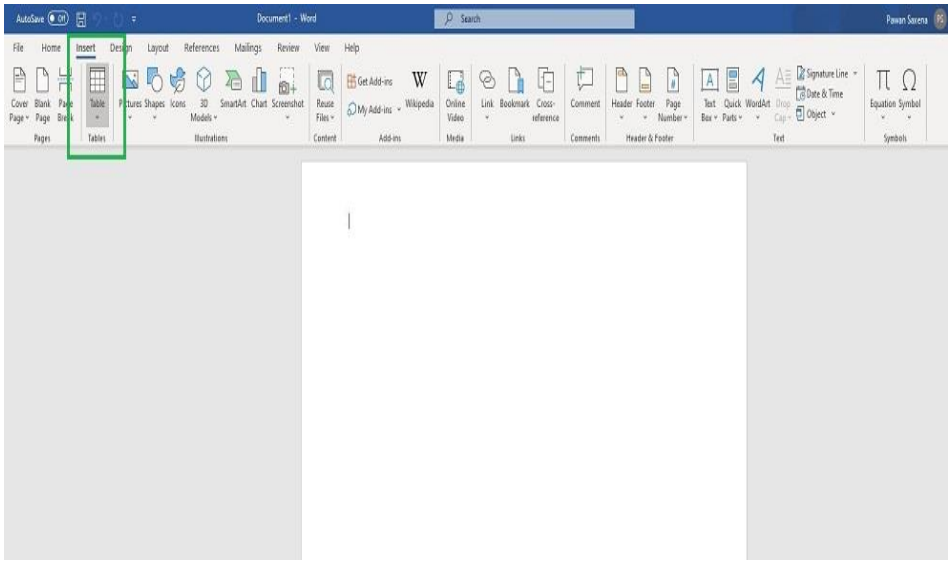
1. Using the Grid

2. Using Table Dialogue Box

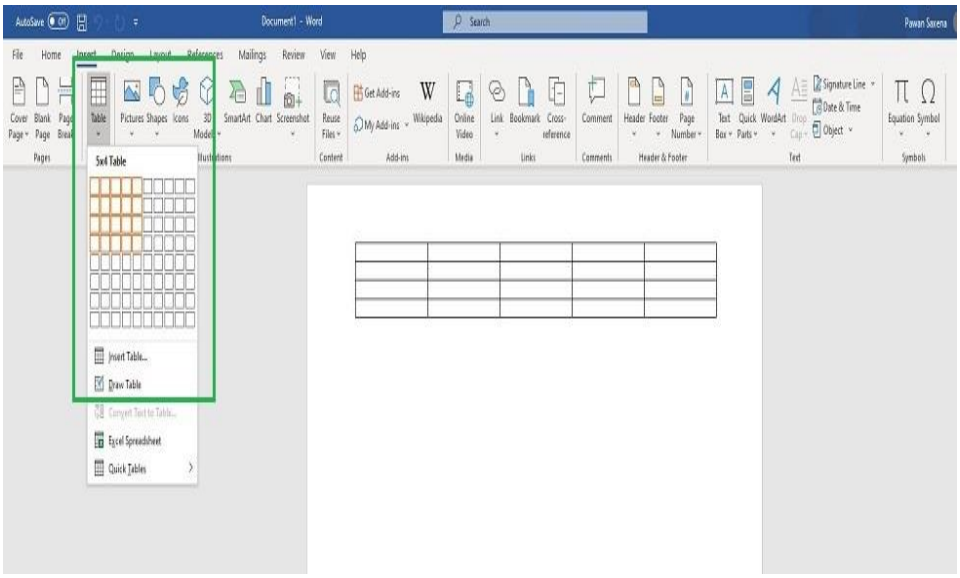
Using the Grid

Following are the steps of creating a table using the Grid provided in MS Word:

Step 1: Go to the **Insert tab** and click on the **Table** button.



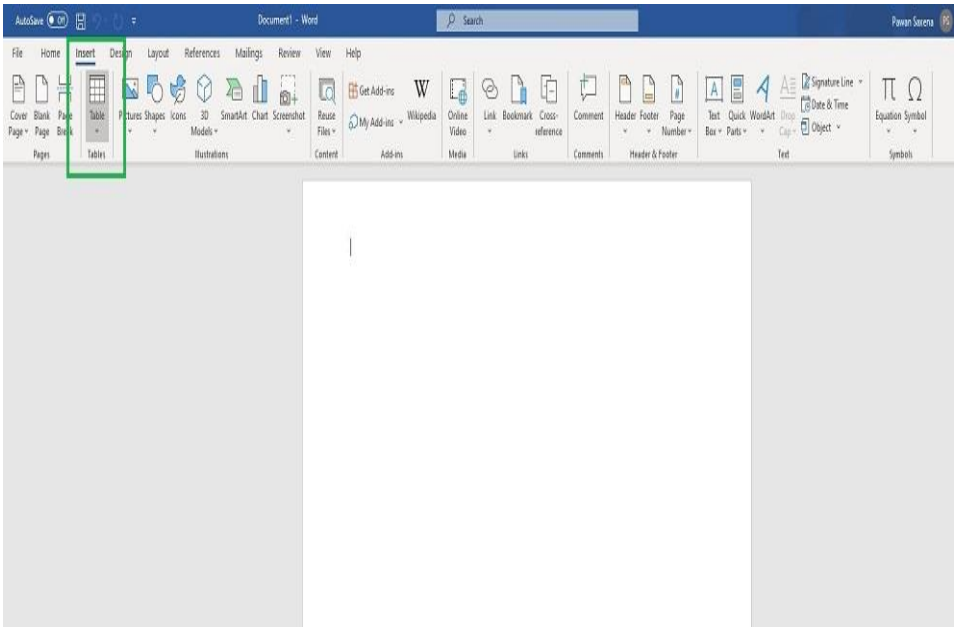
Step 2: In the dropdown menu, select the number of rows and columns from the Grid.



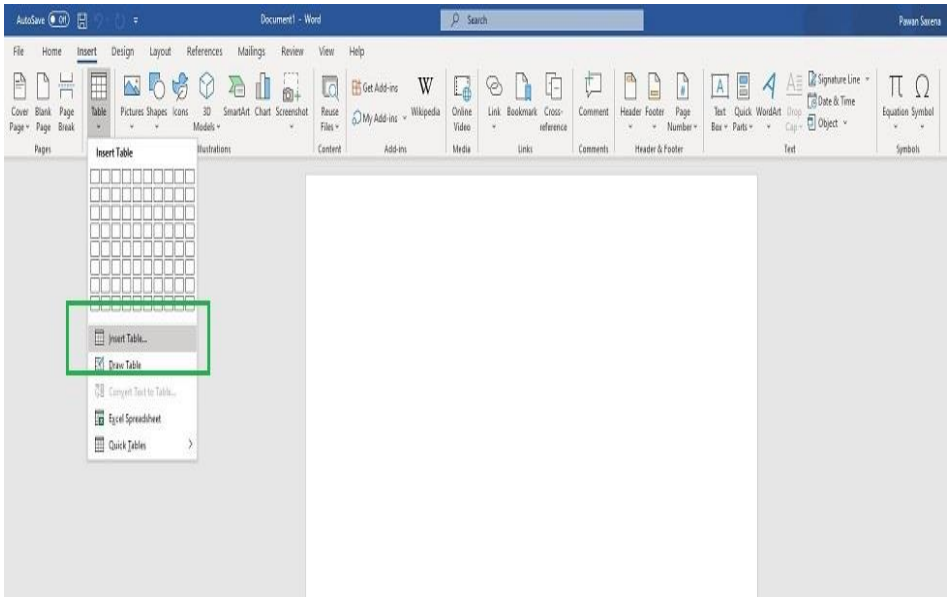
Using Table Dialogue Box

Following are the steps of creating a table using Table Dialogue Box in MS Word:

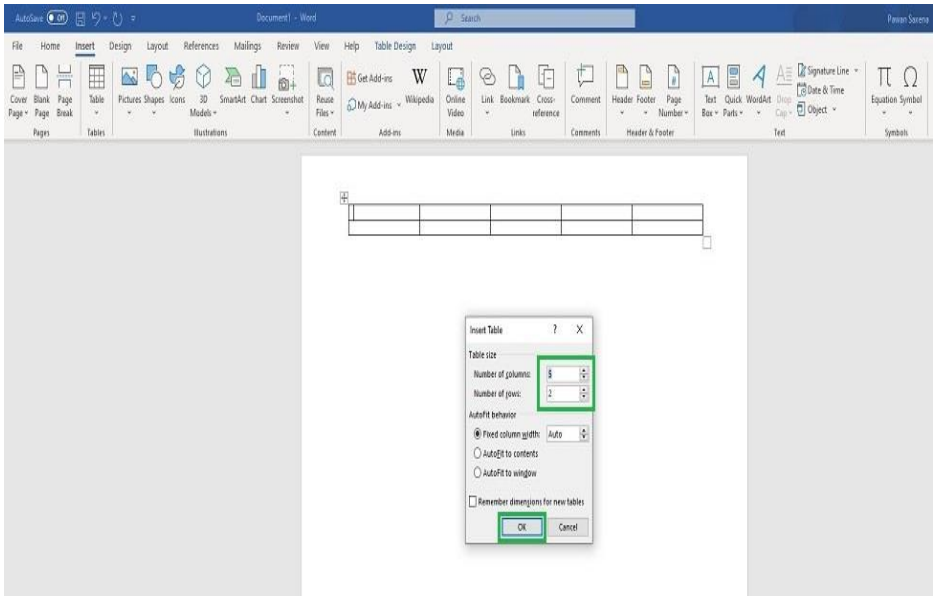
Step 1: Go to the **Insert tab** and click on the **Table** button.



Step 2: Under the grid, you will see an **Insert Table** button. Click on it.



Step 3: In the Insert Table Dialogue box, mention the number of rows and number of columns as per the requirement and click on **OK** button.



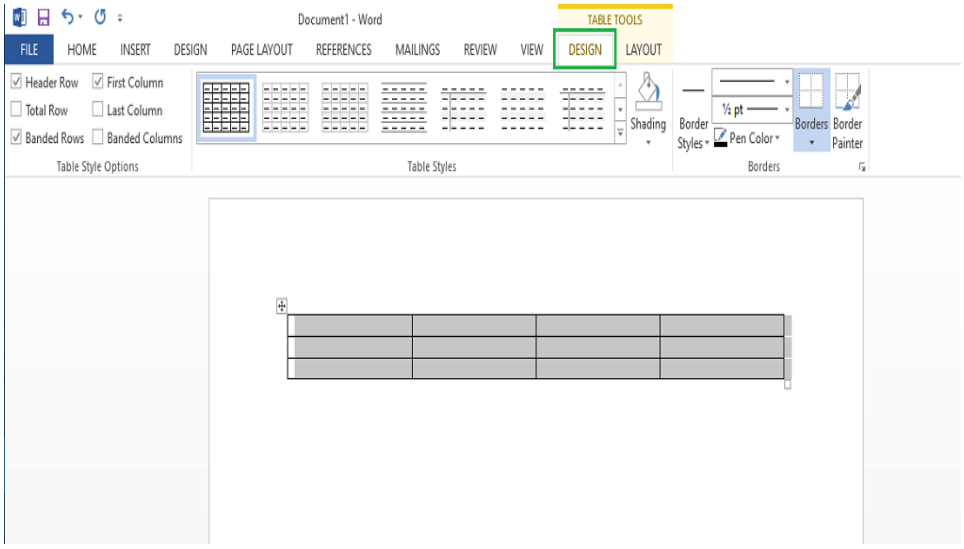
How to Modify a Table?

Table can also be edit/modify to make it more creative. There are many operations that can be performed on the table such as changing the layout, splitting of cells, merging the cells, applying borders, etc. In the following you can find a few operations which one can perform on a table in MS Word.

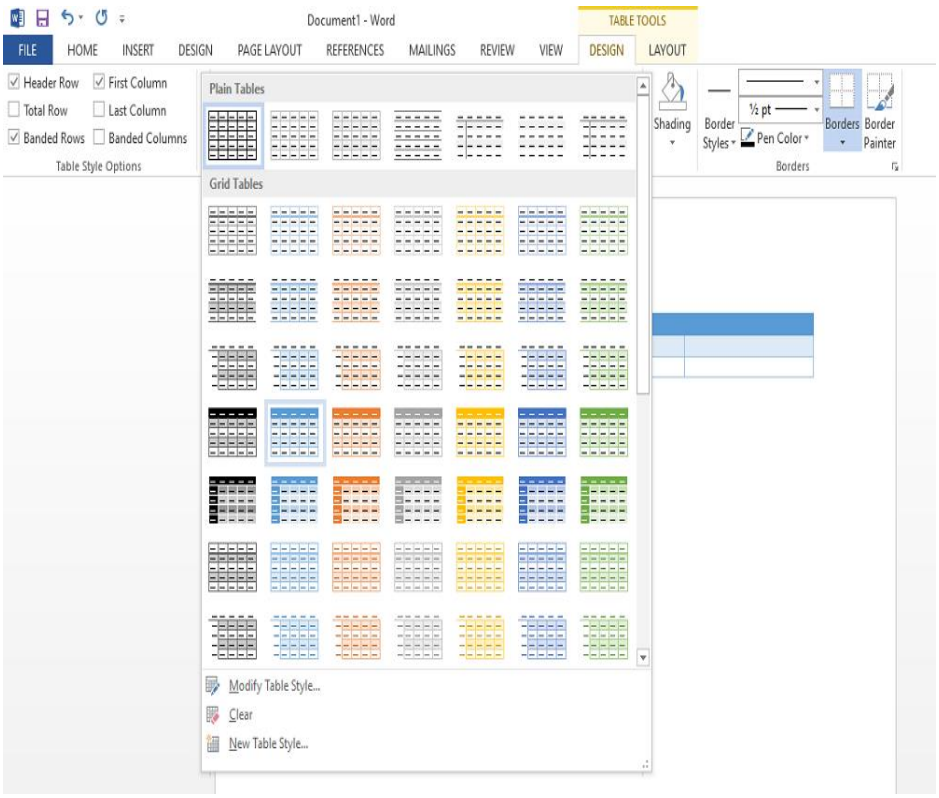
Changing Layout of a Table

The following steps can easily assist you in changing the layout of a table:

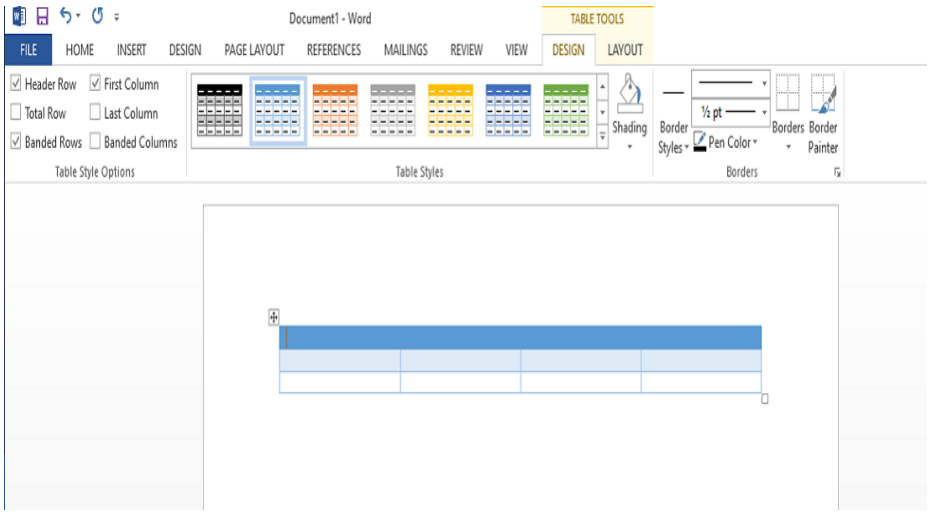
Step 1: Choose the table to change the layout of. Go to the design tab.



Step 2: Click on the dropdown menu to get various different types of layouts for your table.



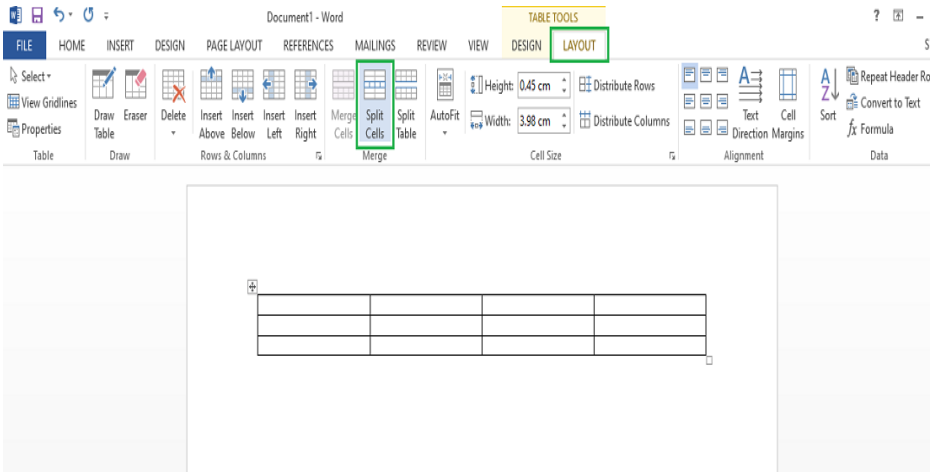
Step 3: Select any layout as per the need.



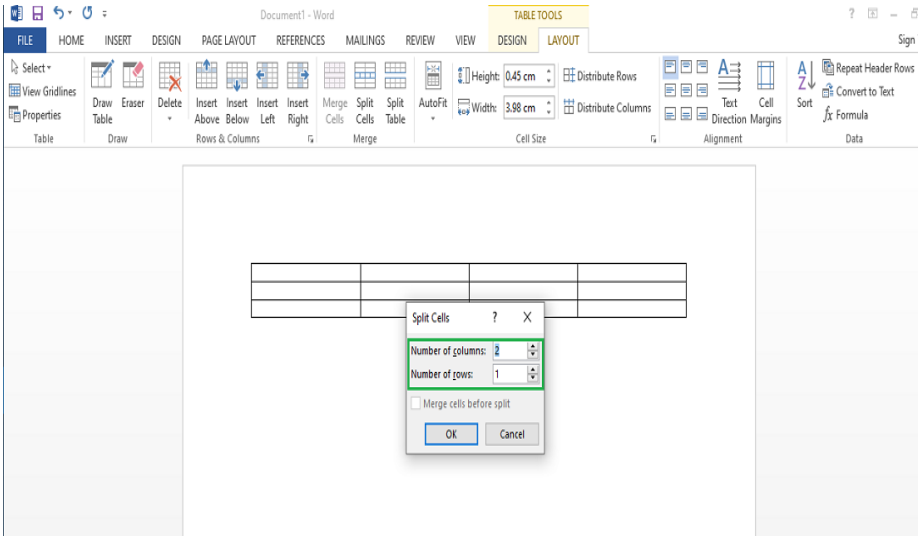
Splitting the Cell

Here are the following steps which will help you in the splitting of the cell.

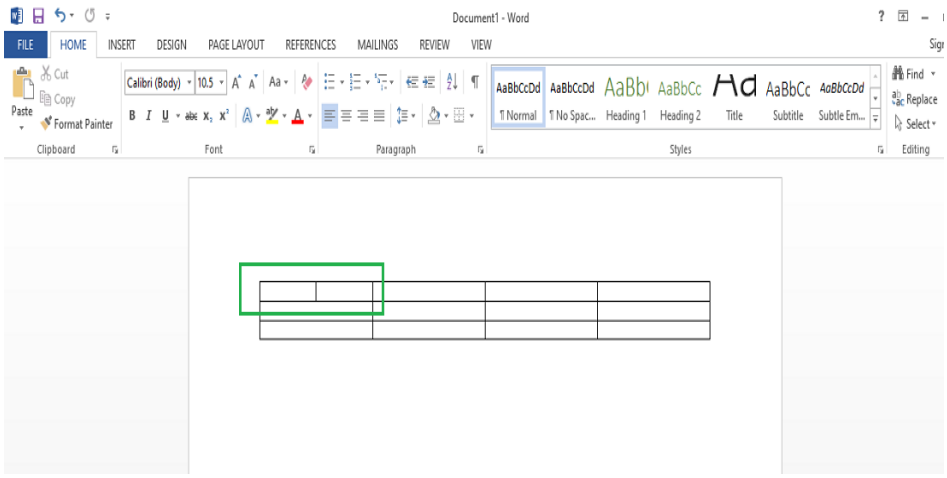
Step 1: Click on the cell which you want to split into multiple cells. Now head over to the Layout tab and hit the Split Cells button.



Step 2: In the **dialogue box**, mention the new dimensions as per the requirement.



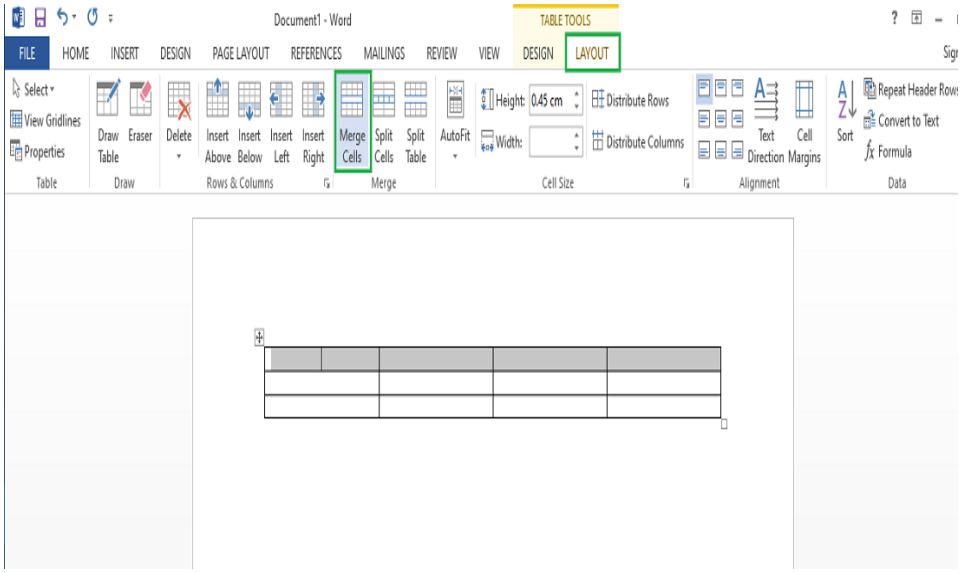
Step 3: Click on the **Ok** button.



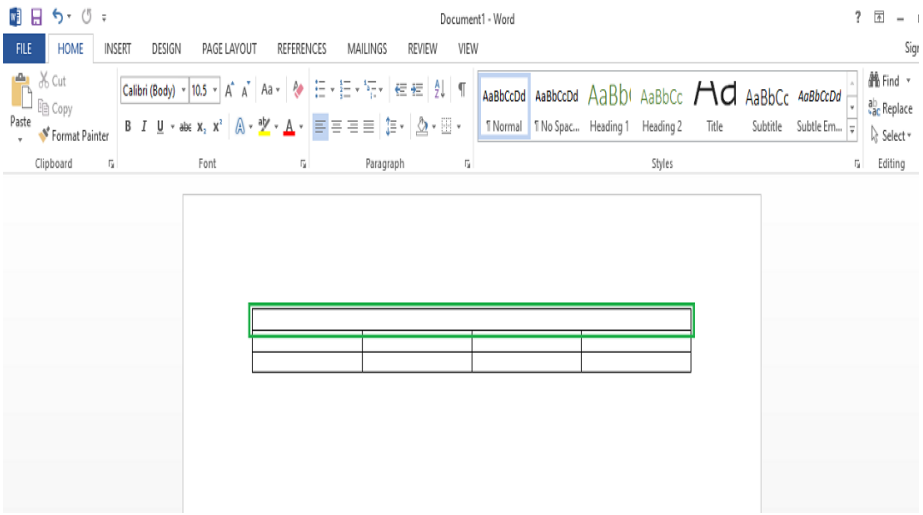
Merging the Cells

Steps for merging of different cells:

Step 1: Highlight the cells which need to be merged in to a single cell. Then go to the layout tab, and you will see a Merge Cell button.



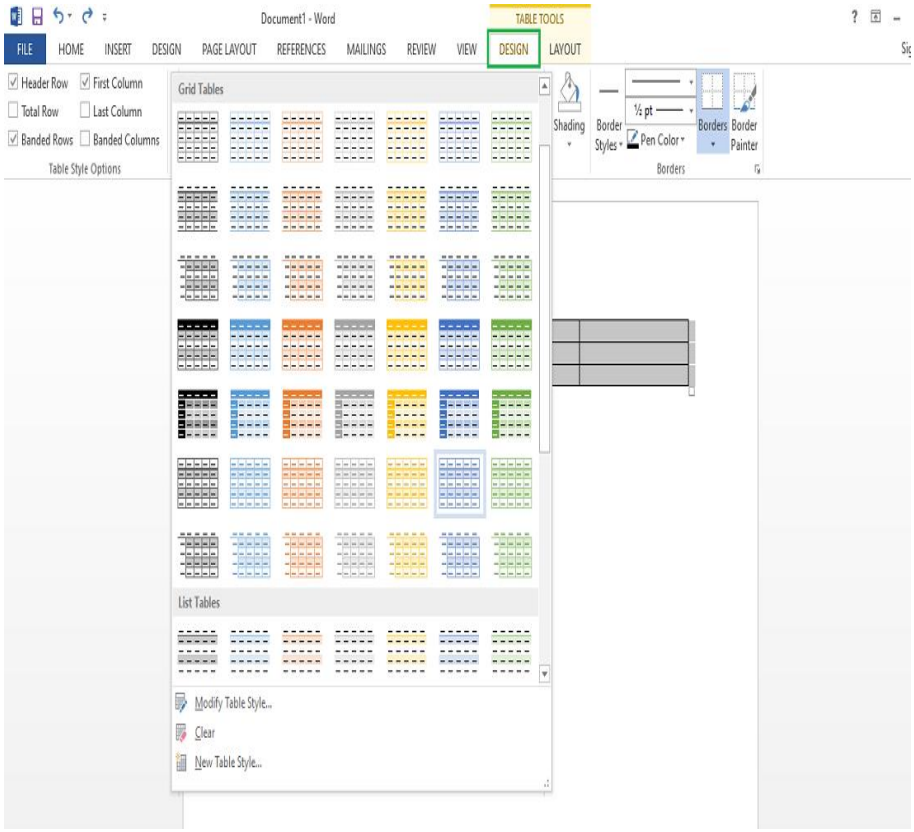
Step 2: Now click on the Merge Cell button and the selected cells will be merged.



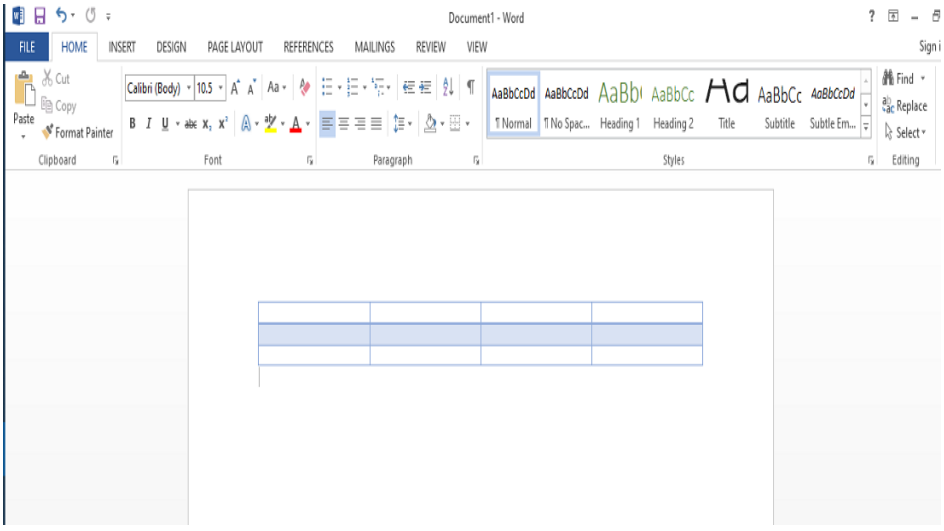
Applying Borders and Styles on a Table

Borders and styles can be used the same way you change the layout of a table. Here are the steps to do the same:

Step 1: Select the table you created and be sure to inspect the design tab**.**



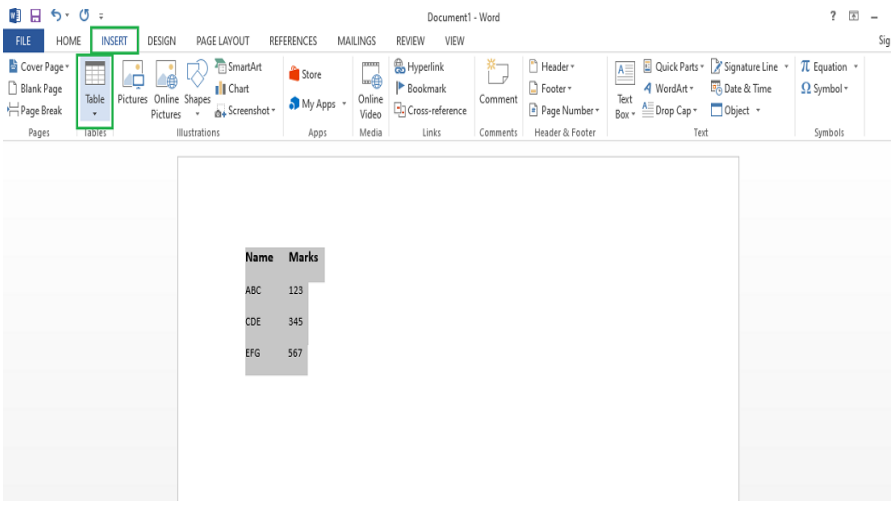
Step 2: Select the style that you want to apply to your table.



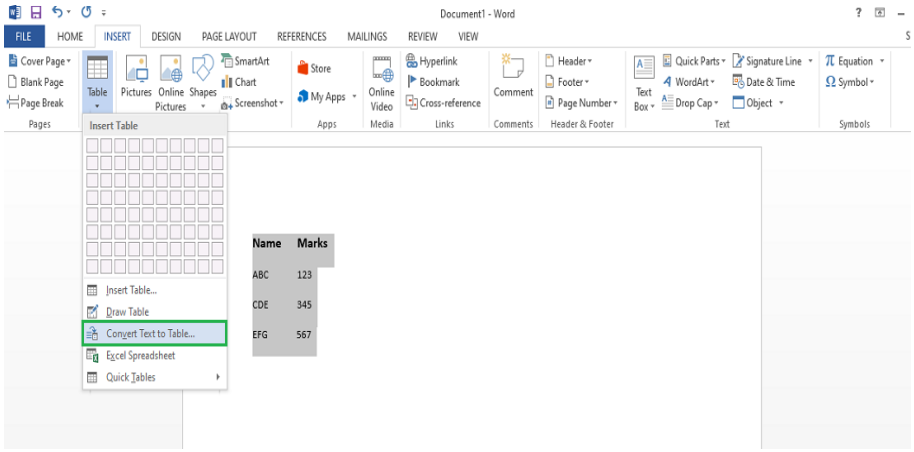
Converting Text to a Table

You can convert existing text into a table in MS Word using the following steps:

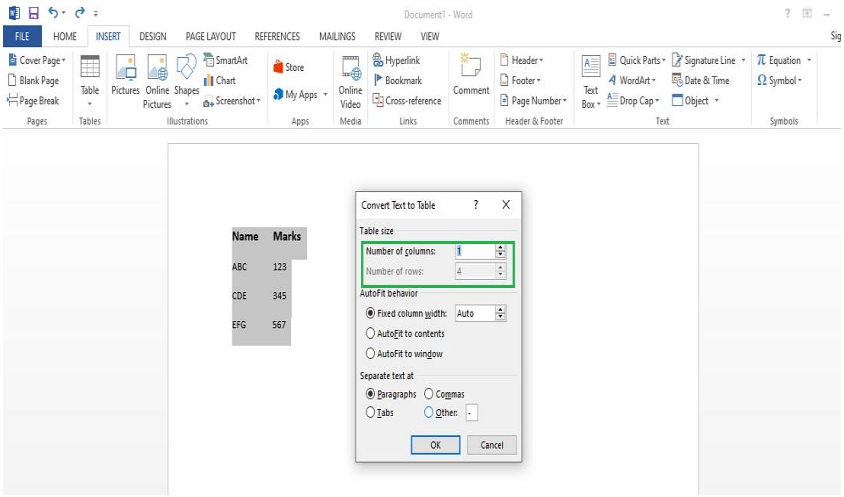
Step 1: Select the text to be changed into the table Now move to Insert Tab Table button will be there.



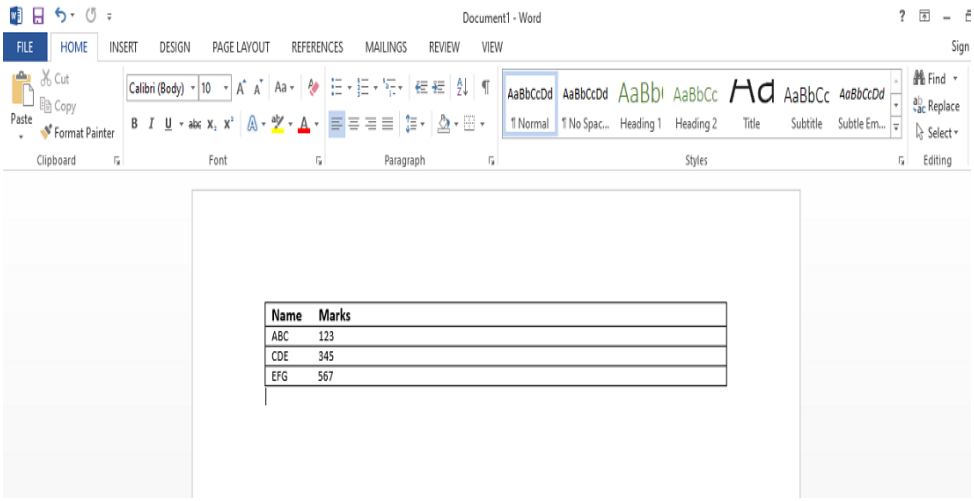
Step 2: Select the Insert Table button and from the drop-down menu, select the Convert Text to Table button.



Step 3: In the dialogue box, Specify the size of the needed table, and also other details which are needed.



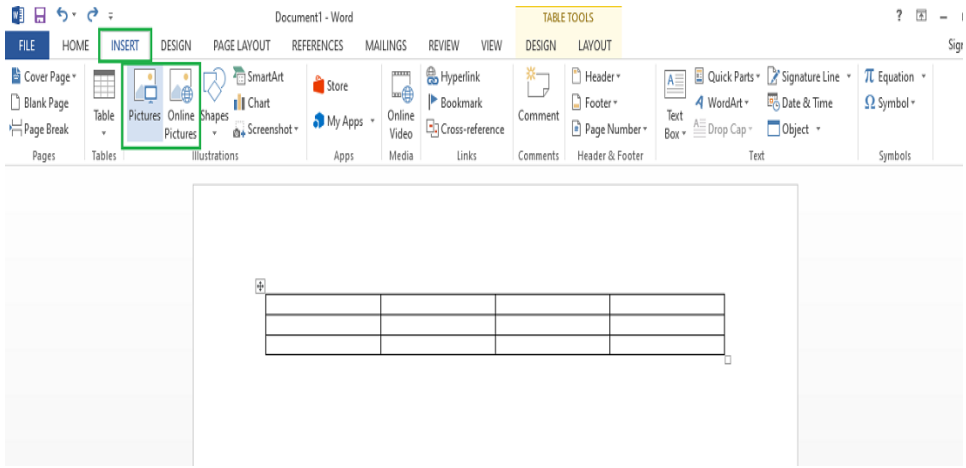
Step 4: Click on the **OK** button and the selected text will be converted to a Table.



Inserting Images in a Table

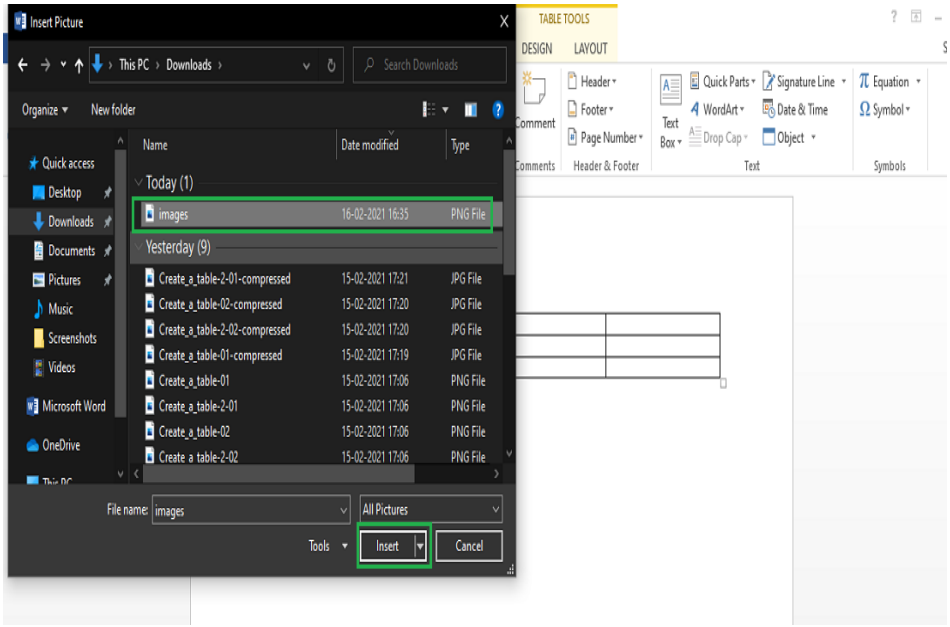
Add image into table cell in MS Word: You can also insert image inside the table cells. Follow these steps to add an image in a table:

Step 1: Choose the cell where you want to put the Image. Navigate to the Insert tab and click on the Pictures Button.

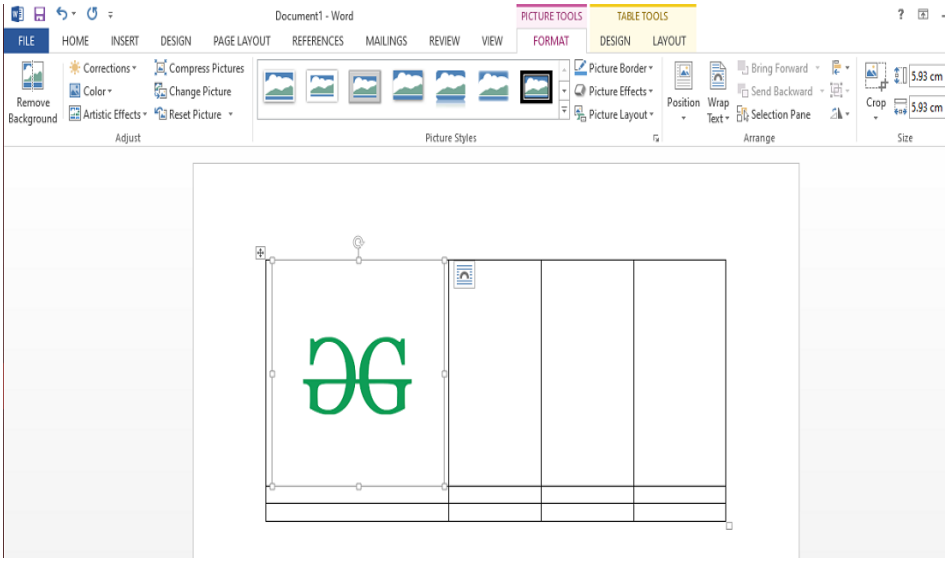


Step 2: You can either choose a picture from your device or select one online.

Step 3: Choose a picture from the browser window and click on the Insert button.



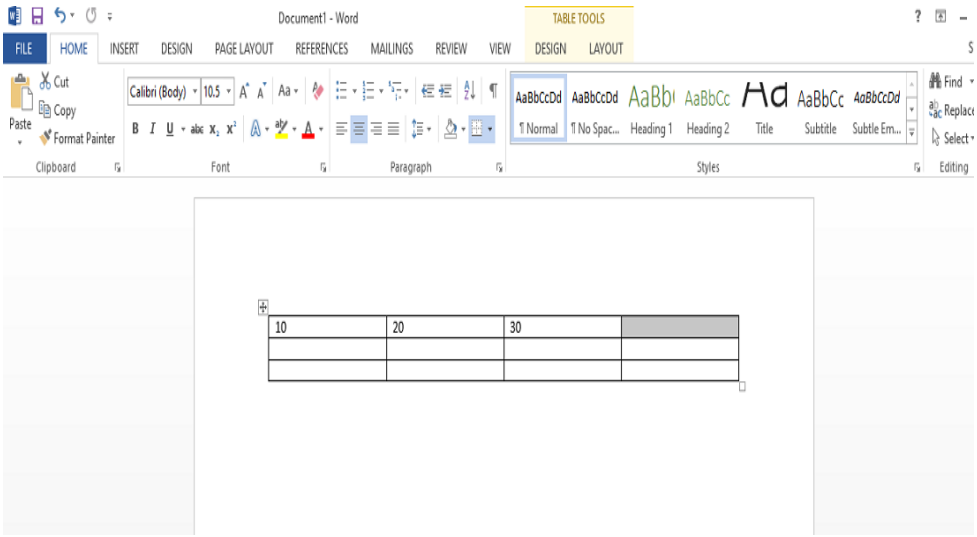
Step 4: Selected Image will be added in the cell selected.



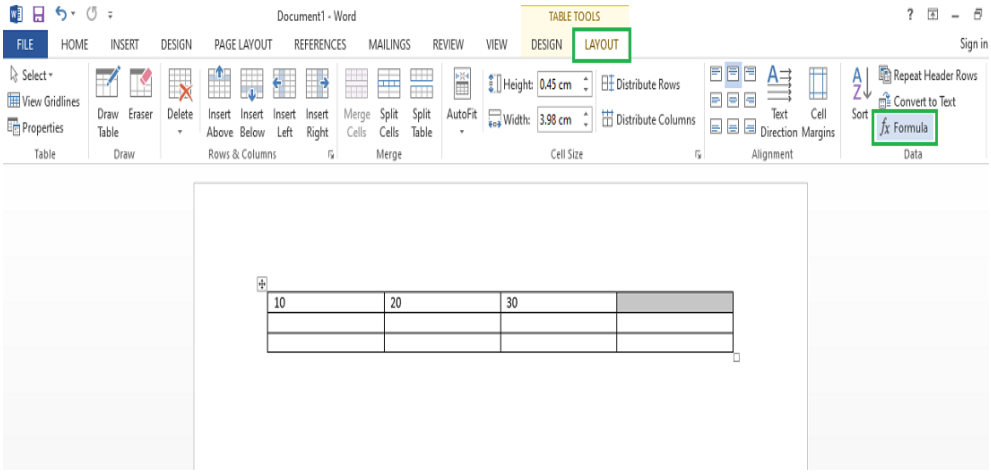
Performing Calculations in a Table

You can also do mathematics on the values contained in the table. To perform these operations Microsoft has different formulas. Word calculates by default the sum of the values that are located in the rows to the left or in the column that is above. Here are the steps that you need to follow:

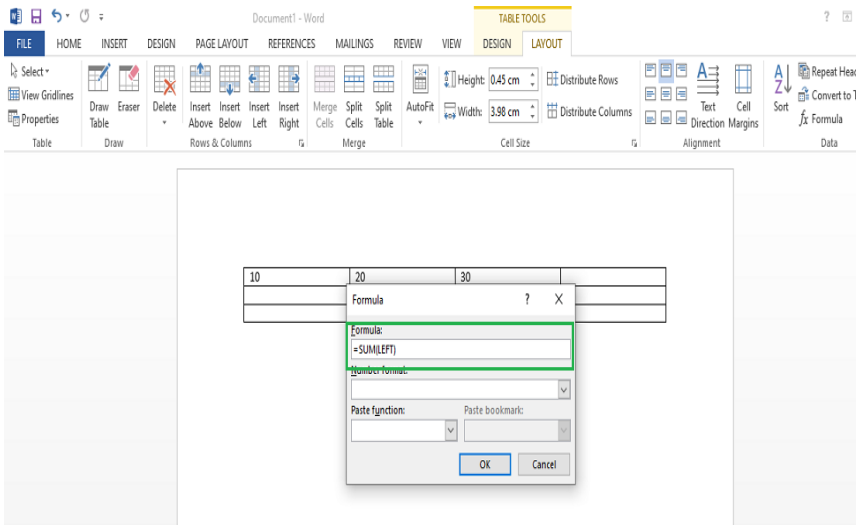
Step 1: Go to the cell where you want the result of the mathematical operations.



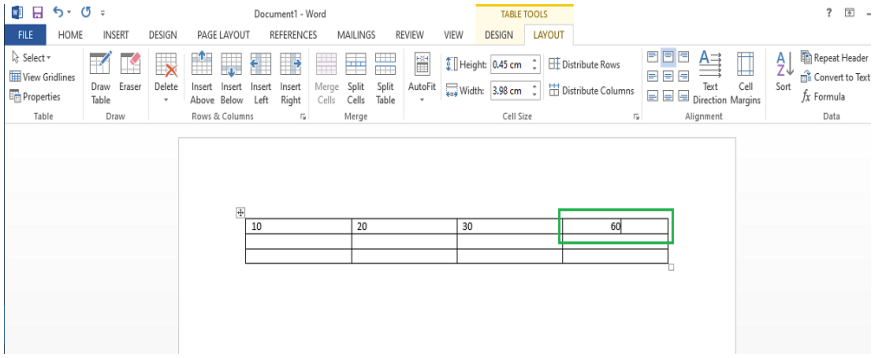
Step 2: Now go to the **Layout tab** and select the **formula** button.



Step 3: Set the formula (the default operation is to take the sum of values on the left and above) in the dialogue box.



Step 4: After defining the formula, click on the OK button to apply the formula on the cells given in the formula.

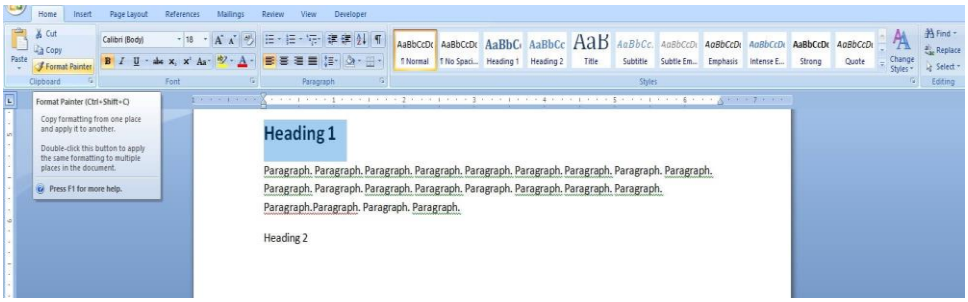


TOOLS IN MS WORD

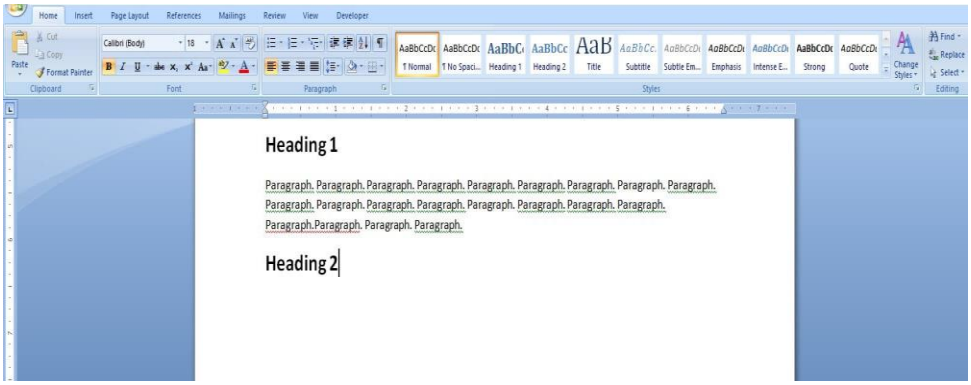
Format painter

I love the format painter feature in all Microsoft Office programs. This feature is a quick shortcut to help you maintain the consistency of your fonts throughout when you are working with different fonts, sizes, and styles.

Suppose you have paragraphs broken by headings and those headings are in bold and a larger font. Instead of highlighting each heading and figuring out how to get it to match the others, you instead highlight one of the previously formatted headings, click on the "format painter button," and then highlight the text to match the previous heading. If you do use the format painter it will replicate the font, size and colour accordingly, taking it from the original selection.



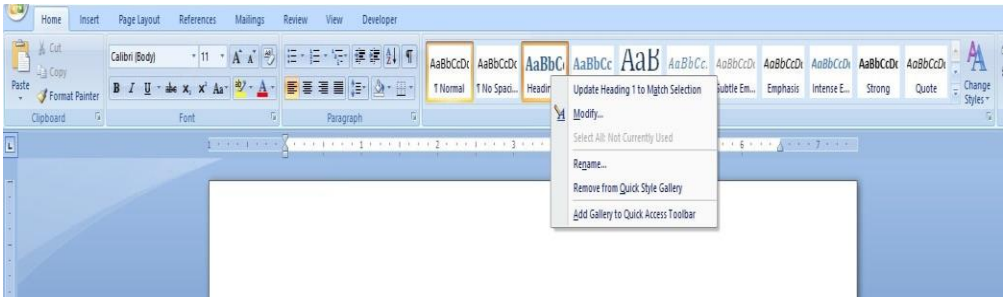
Notably, it is useful for long documents in which fonts need to be switched multiple times. Format painter will also tab over lines to match your selection and help keep formatted lines straight.



Styles

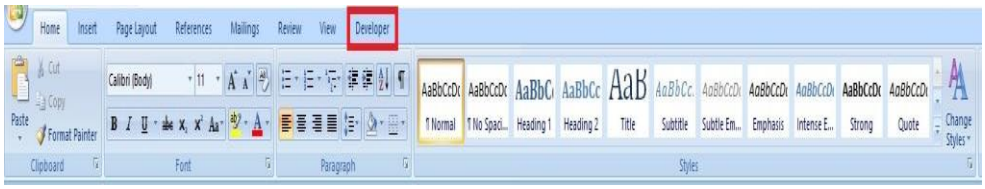
Speaking of styles, the style section on the Home tab is always in your face, but do you know what it's for? Styles are great for when you have a lot of formatting to do with more than one type of heading or bullet point.

Every style box comes with a preset format that you can change to your color display of choice, preferred font or employer's specifications. By clicking modify after right clicking on a style like Heading 1, you can preset your style. Then, each time you highlight text and click on the style box, you will alter the font to that style you set.



You may also format the text in your documents the way you like. Then click "Update (style name) to match selection." Now, whenever you choose that style, it will be matched to the font you preset in your document. It should be beneficial in the making of guides some other extensive records with a few styles.

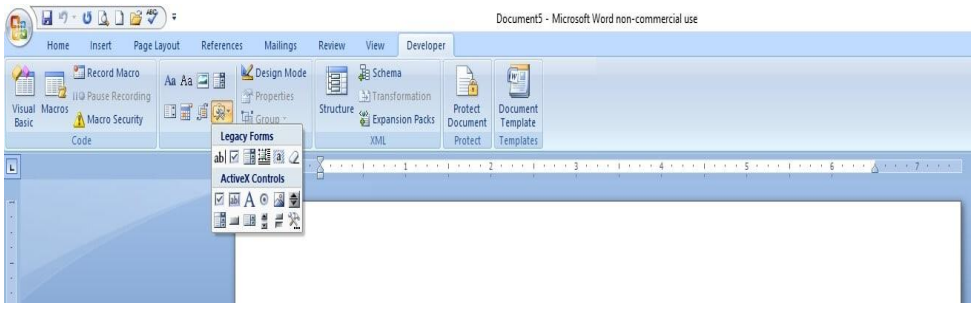
Legacy forms



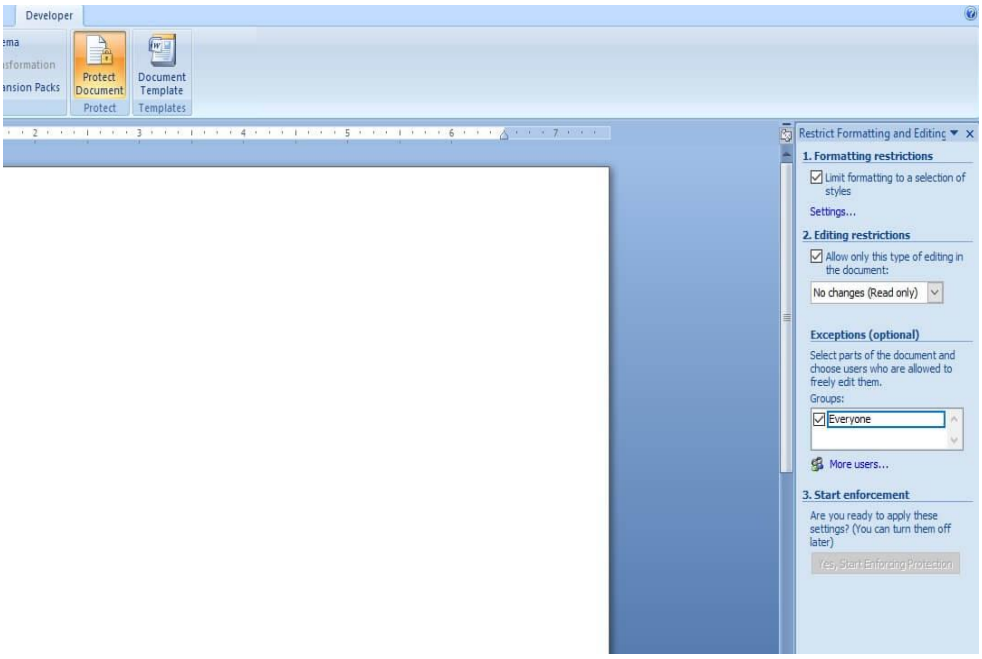
There are a lot of tabs in Word; some are hidden and you probably didn't even know about. The Developer tab is one you're going to need to build forms, but you have to add the tab to your screen. It's not automatically there.

To add it, go to "File." Go to the "customize" ribbon for your main tabs. Find the "Developer" tab. Then, add it to your screen. Ensure it appears as the final tab at the top of your Word document.

Inside it, you'll see a little folder icon followed by a dropdown button. In this dropdown are more icons where you can insert fillable checkboxes, lines, radio buttons, etc. If you're a blogger who likes to do fillable worksheets as giveaways, this may be a fantastic resource for you.



Restrict editing

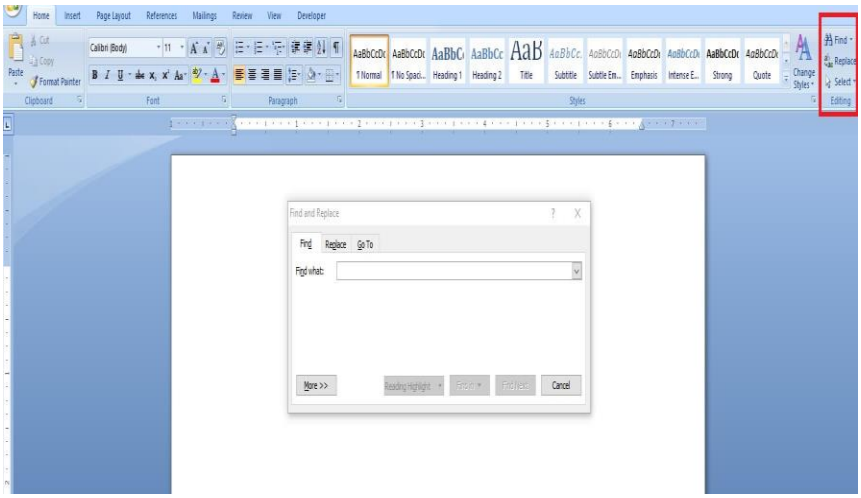


When it comes to sharing forms, charts or other word documents that you create then we are having a scenario where you don't want anyone editing the document, especially the wording on that legal form or anything. What to use in the meantime: Word has a feature that prevents others from editing your document.

In Developer Tab, there is a piece of paper with a lock on it. In my copy of Word, it's Protect Document. In newer versions of Word, it's called Restrict Editing. Here you can decide who can make changes to what parts of the document, if at all. These may go straight from simple password locking so it can be two clicks away from unlock and editing to full password protection where without the password only a lock icon will be available.

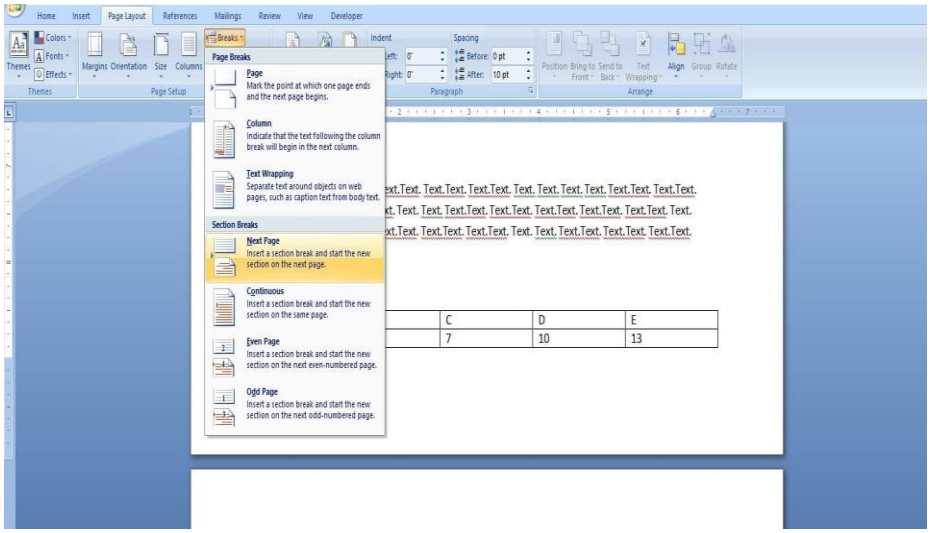
If you do any kind of legal work or have had issues with people changing shared documents without first consulting you or getting you're okay, this feature is going to come in very handy.

Find/replace tool



As I'm writing a novel, I often feel the need to change names at various stages in the narrative. Manually going through the text is tedious, to notice where I have written a word or a name either, and a lot of oversight can happen. So, I use the Find and Replace buttons on the Home tab to find every place in the document where that word was used. Then I can tell Word to replace that name with the name that I have decided on. You find a word; you don't have to find a word and replace it. Using the Find tool alone is useful when I need to locate a specific moment in the story to either edit or cross check spelling for consistency in a character's name. It takes you to what you want faster than scrolling through long doc.

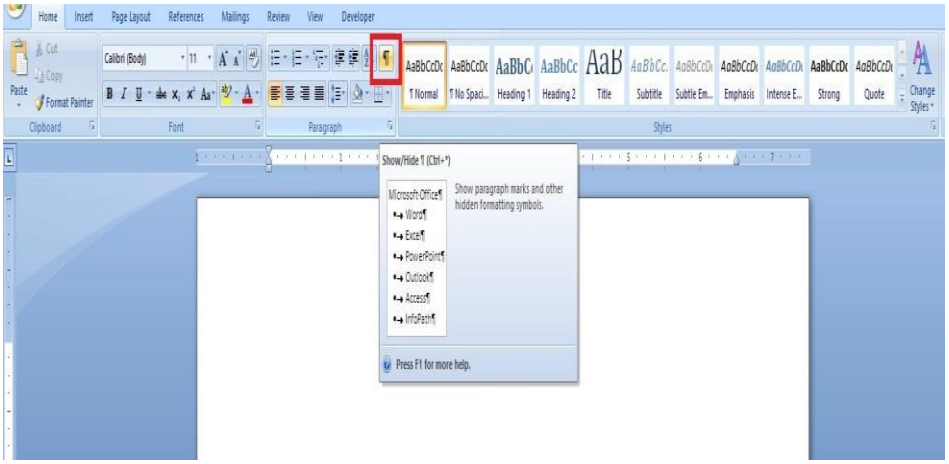
Page breaks



The more structured documents those full of charts and tables often require formatting to ensure those elements don't run off the page. That's when you start using page breaks, which is a layout tool you can use to jump ahead to the next page without messing up your formatting with too much space or tab keys.

You navigate to the Page Layout tab and scroll through the Page Setup section to find page breaks. Breaks can also be beneficial when you're dealing with columns that want to break up your text. It's purely cosmetic, but it's a cosmetic tool that can make your work appear more professional.

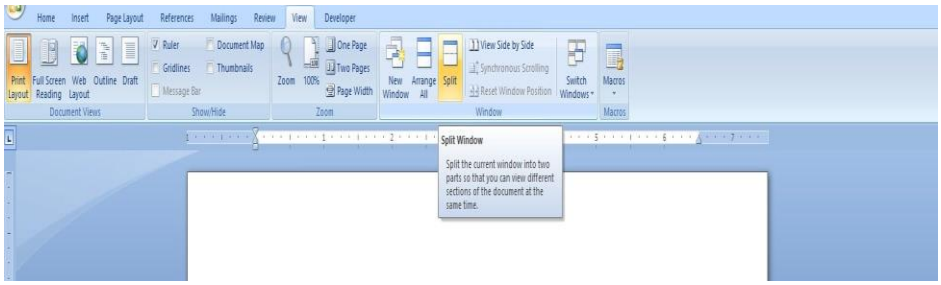
The show/hide tool



Does Word ever feel like it's doing its own thing? Does it seem like there was something invisible standing between it and doing what you want it to do? The Show/Hide tool will make all invisible paragraph marks, and that, and other symbols appear that will tell you what's going on between the lines.

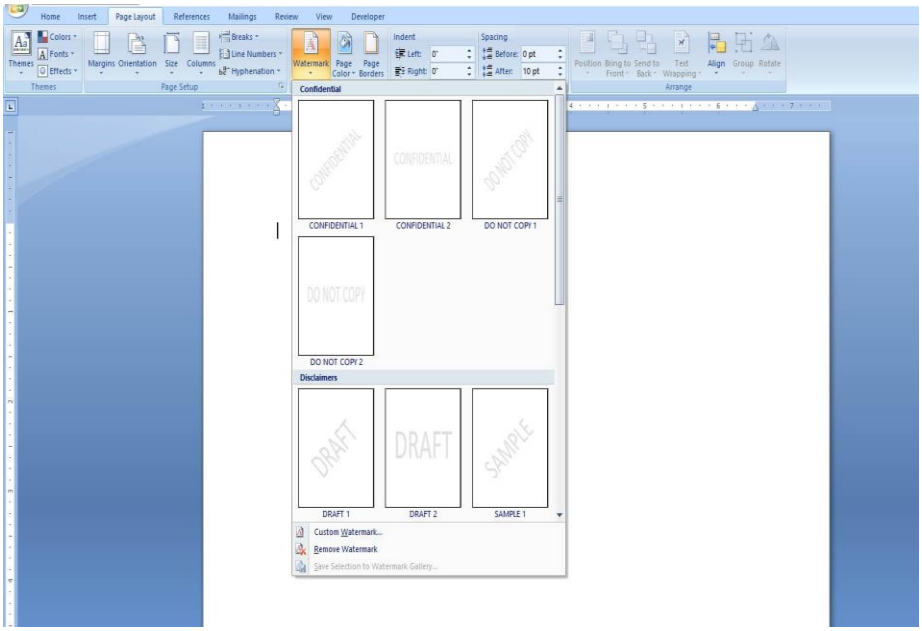
These symbols will display any space, tab, and page break in your document that exists. It's where all of those little, invisible markers that mess up your lines and spaces can be found. Just click the button under the Paragraph section of the Home tab once and the symbols will appear, and click again the symbols disappear.

The split view tool



When you're working off of two separate Word docs, it's a dizzying flip flop back and forth. Word's split screen tool will bring two documents up on one screen so that you can view them both at once. Such feature is located on the Window section of the View tab. Open both documents in Word. Then select the icon labelled Split Head to the two documents you need to compare, which will display one over the top of the other. Click the View Side by Side icon to better able to read the two. In Word, this is set automatically to Synchronous Scrolling. This is useful when the documents are two variations of the same document. However, if you don't want the two documents to scroll uniformly, click on the Synchronous Scrolling icon so that the feature is grayed out. Then you'll be able to scroll through each document individually.

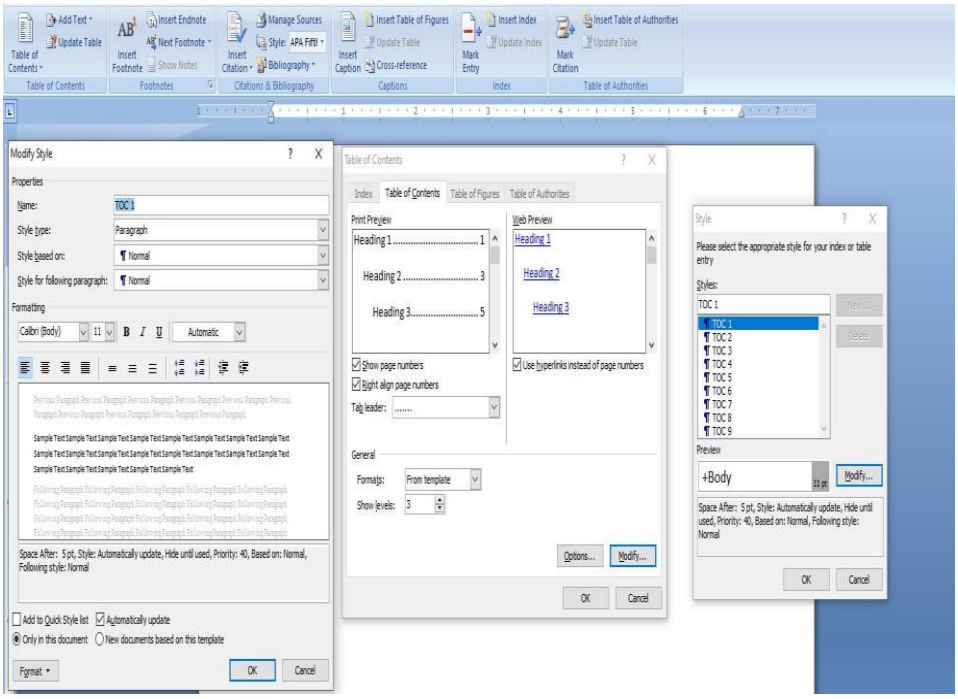
Adding watermarks



A very simple and easily available tool which gives a useful facility every time you need to secure a document. The Watermark icon is located under Page Layout. It has the effect of putting the phrase you choose in a shadow text over every page of your document.

This is helpful when you want to share a snippet of your work (or a chart that you created) while preventing that work from being copied or stolen. Watermarks have popped up at work over the years, and it's helpful to both know where it is when the need arises.

Table of contents



In its simplest form, a table of contents is easy to make. But there's much more under the hood that you should set up and experiment with so that you're ready to roll if you need to create one in a professional setting. You can also format table of contents to be only showing specific headings or styles. It may or may not include page numbers. But they are particularly fine at offering a short-haul route that can take you directly to a section or chapter inside a longer work.

A whole post could go into the details of how to use the TOC feature. Messaging at the meaning of what you are trying to get there. Master this feature to build a complex and structured table of contents. And remember to click on the Update Table icon every time you make any changes to your document so that the table remains accurate.

Short Answer Questions:

1. What is the purpose of the "Split Cells" feature in MS Word?
2. Which tab do you need to access to merge cells in a table?
3. What does the Format Painter tool do in MS Word?
4. How do you convert existing text into a table in MS Word?
5. Where can you find the option to add a watermark in MS Word?
6. What is the purpose of the "Restrict Editing" feature in Word?
7. Which tab do you use to access the Table of Contents feature in Word?
8. What is the default formula used in the "Formula" tool for tables in MS Word?
9. How do you access the "Developer" tab in MS Word?
10. What does the "Find/Replace" tool do in MS Word?

Long Answer Questions:

1. Describe the steps to split a cell into multiple cells in MS Word and explain how to adjust the new dimensions.
2. How do you merge cells in MS Word? Provide a detailed explanation of the process.
3. Explain how you can apply borders and styles to a table in MS Word and the role of the "Design" tab in this process.
4. How do you insert an image into a table in MS Word, and what steps should be followed to ensure the image is properly inserted?
5. Describe the steps to perform calculations in a table using MS Word's built-in formula feature. Provide examples of how this feature can be useful.

6. What is the Format Painter tool in MS Word, and how does it help in maintaining uniform formatting across a document? Give examples of its practical use.
7. Discuss the role of the "Styles" feature in MS Word. How can it help maintain consistent formatting, and how can you modify and apply styles to headings and text?
8. How do you add fillable forms using the "Developer" tab in MS Word? Provide a step-by-step guide on how to use this feature effectively.
9. Explain how the "Restrict Editing" feature in MS Word works. How can you protect specific parts of a document from being edited by others?
10. Describe the functionality of the "Split View" tool in MS Word. How does this feature improve productivity when working with multiple documents?

UNIT 5 INTRODUCTION TO MS POWERPOINT

Structure

Ms Powerpoint

Concept Of Slide Shows

Getting Started With Powerpoint Animations

MS POWERPOINT

Information can be displayed using an electronic presentation application. This information is usually presented as a slide show — the data is displayed on a slide that may be viewed on a computer monitor or projected onto a screen using an LCD projector. A presentation might consist of multiple slides that are exhibited one after the other. The presentation tool in MS Office is MS PowerPoint. Microsoft PowerPoint is a popular presentation application, although there are alternatives such as Corel Presentations OpenOffice.org, Impress, etc.

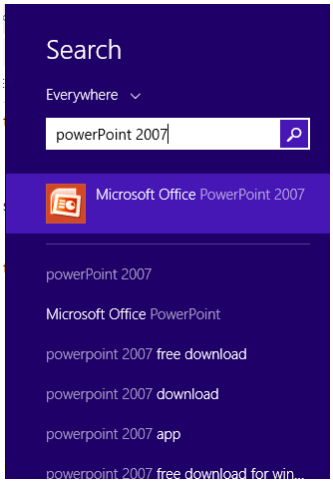
Three major components of a presentation program are:

(i) *An editor that allows text to be input and formatted*
(ii)*a means for inserting visual pictures, audio, and video*
(iii) *and a slide-show system to display the final content.*

How to open MS PowerPoint

In Windows 8/above:

Step 1: Press **Windows + c** to open the search bar



Step 2: Type **PowerPoint** & click on the **MS Office** version you are having in your system. MS Office window will pop up.

In Windows 7 or below:

Step 1: Go to the program section in the windows start menu.

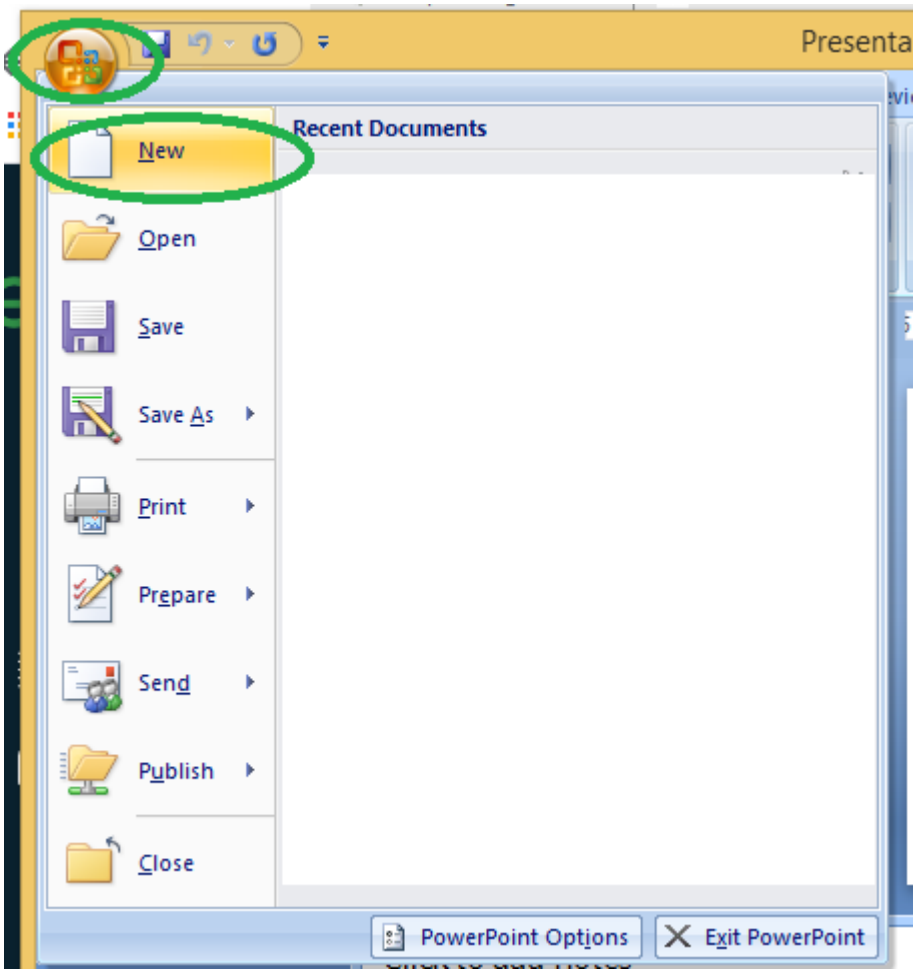
Step 2: Go to **MS Office** & click on it. A drop-down list is seen

Step 3: Click on **MS PowerPoint** & MS PowerPoint window will pop up.

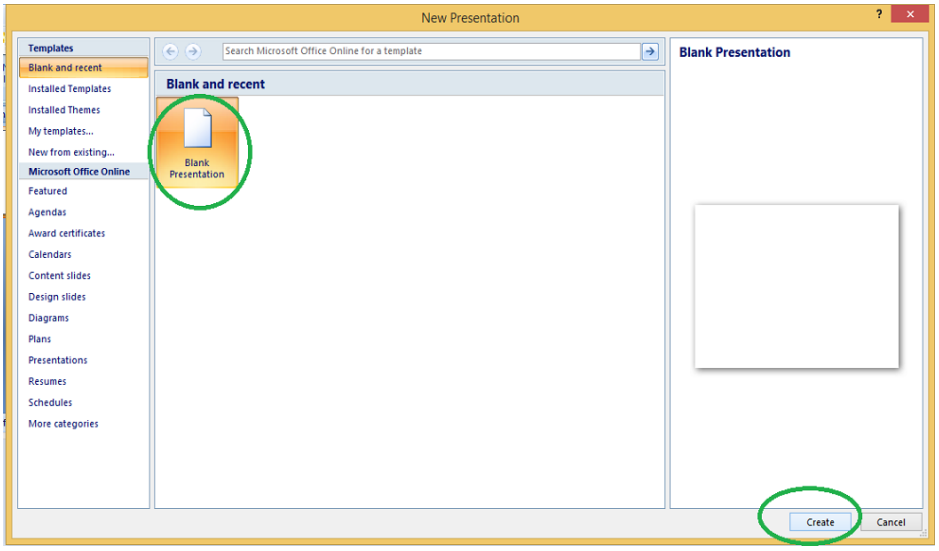
Creating a Presentation

Once your MS PowerPoint Window pops up, you can create & save the file by:

Step 1: Click on the **Microsoft** button on the top left.



Step 2: Click on **new**, a new Presentation window will pop up.



Step 3: Click on **Create** & a new presentation will be created.

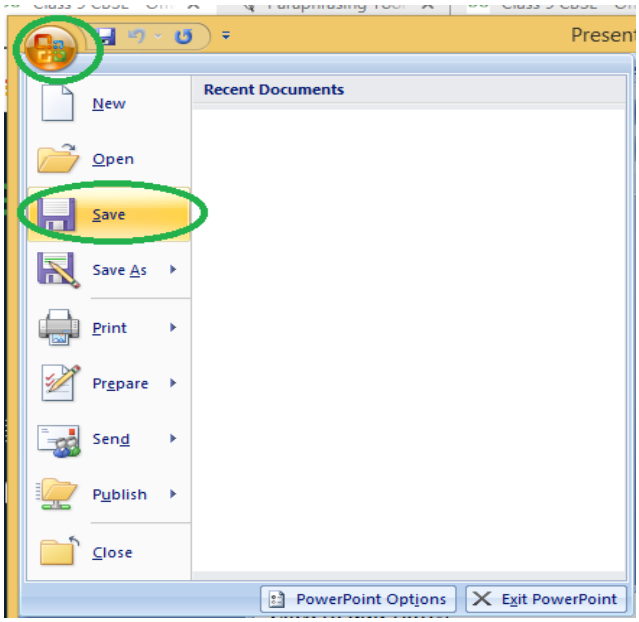
Note: *Shortcut for New:* ***Ctrl +n***

Saving a Presentation

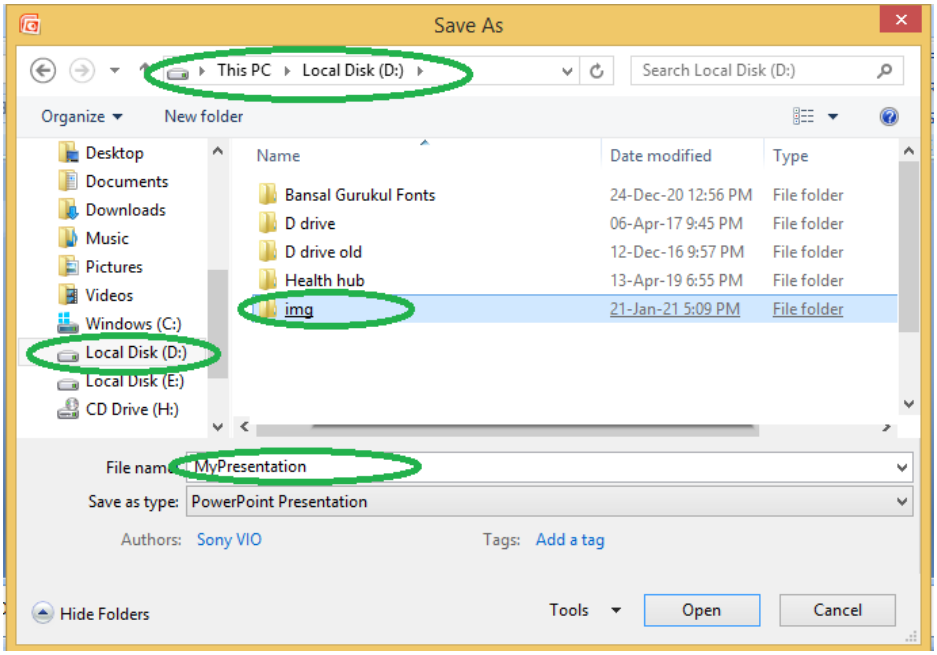
Once you have created a presentation, it can be easily saved with the help of following steps:

Step 1: Click on the **Microsoft** icon

Step 2: Click on the **Save** button



Step 3: A new Window for **Save As** will pop up.



Step 4: Select the drive (by clicking on it: Example: Local Drive (D)) in which you want to save the presentation. Then your drive will open up, select the folder in which you want to save the presentation (Example: img folder here) & then give the required name to your presentation (Example: MyPresentation here). Your presentation is created & saved with the provided name.

Note: *Shortcut for save:* ***Ctrl + s***

Basic Elements of a PowerPoint Window/Slide

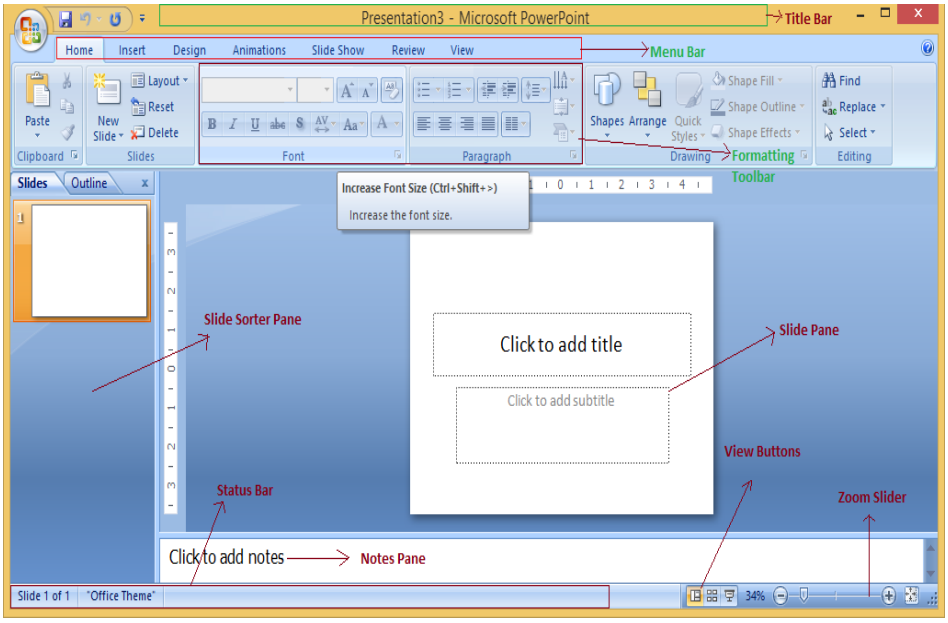
You can see various bars in the presentation window. They are:

(i) Title Bar: This shows the name/title given by you to the current presentation. If user do not save the presentation by any name, default name given by MS PowerPoint appears in this bar.

(ii) Menu Bar: Contains menu items like insert, views, design, animations, etc.

(iii) Office Button: MS Office button on the left-most top.

(iv) Formatting Toolbar: Have tools like Bold, Italic, Underline, Font shape & size etc. to format your data.



(v) Zoom Slider: To zoom in or zoom out your presentation.

(vi) Slide Sorter Pane: This allows us to choose which slides will be shown in which sequence during the slide show.

(vii) Notes Pane: This allows us to type notes that we may require later when preparing for the presentation, but they will not be displayed during the slide show.

(viii) View Buttons: Provides different views of your presentation like: normal, slide show & slide sorter.

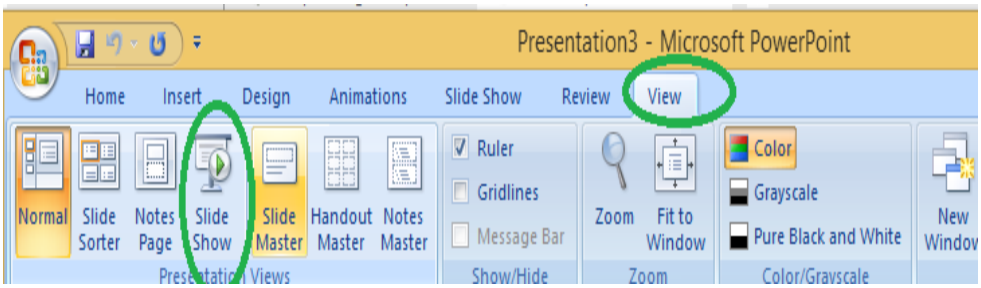
(ix) Slide Pane: This is where we type, format, and otherwise design the slide.

CONCEPT OF SLIDE SHOWS

After preparing the presentation, it's time for the slide show. Steps for slide show are:

Step 1. Click on the view Option on the top Menu Toolbar

Step 2. Click on the slide show option.



Step 3. The slide show will start (Press Esc key (escape) to come out of slide show)

Note: *Shortcut for the slide show is:* ***F5***

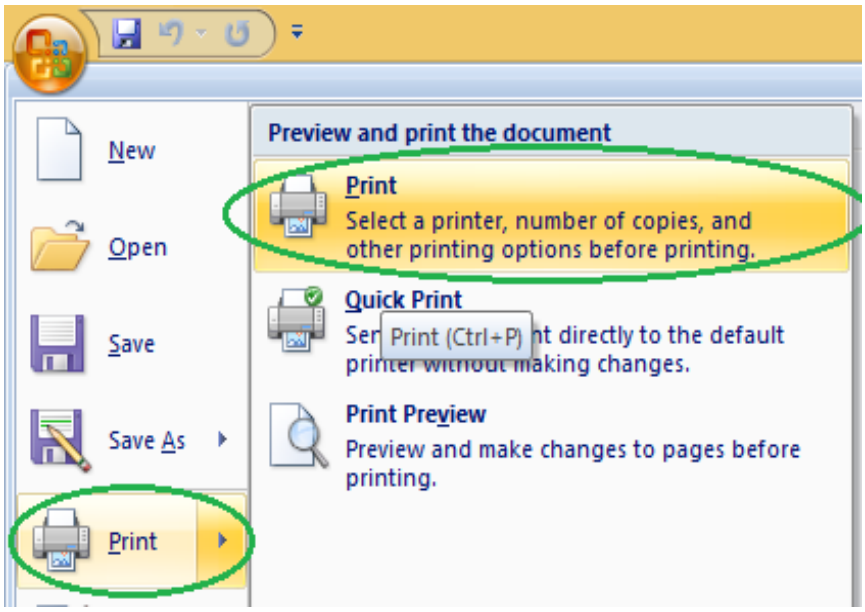
Sample Questions

Question 1. How to print a Presentation through an attached printer?

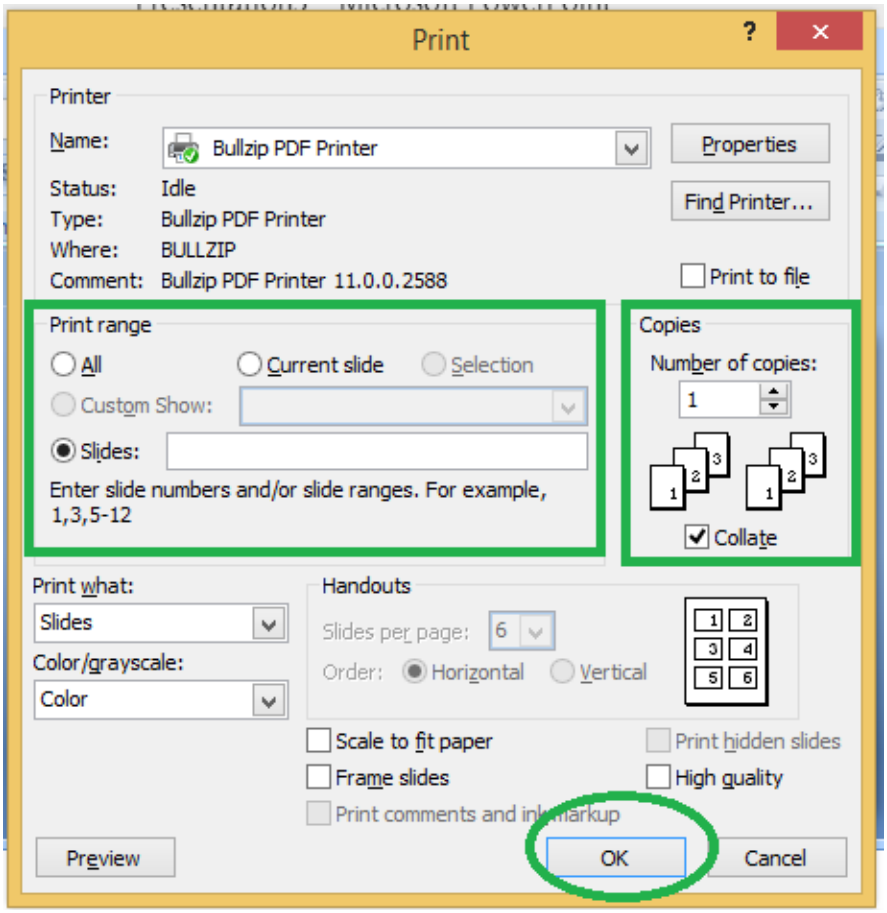
Answer:

Step 1: *Click on the* ***Microsoft*** *icon*

Step 2: *Click On* ***Print*** *& a window for* ***Print & Preview*** *the document will pop up.*



Step 3: *Click on* ***Print****. Then a window for Print will pop up.*



Step 4: *Select the printer by which you want to take out print of the document. Select the page range (Print of all or some or current page) & number of copies you want.*

Step 5: *Click on OK.*

You will get print of your Presentation.

Note: *Shortcut for print is* ***Ctrl + p.***

Question 2. What will you do for closing a Presentation?

Answer:

The procedure is as follows:

1. Go to ***Office*** *Button*

2. Click on close (last option in the list)

Question 3. Give shortcuts to create, print, close & save a presentation.

Answer:

1. ***Ctrl + N*** *– Create a New presentation.*

2. ***Ctrl + S*** *– Save a presentation.*

3. ***Alt + F4*** *– Close a presentation.*

4. ***Ctrl + P*** *– Print a presentation.*

Question 4. What is MS PowerPoint?

Answer:

PowerPoint (PPT) is a powerful and simple-to-use presentation graphics software tool for creating professional-looking electronic slide shows.

A PowerPoint presentation, or PPT, is a collection of slides that exhibit a graphical and visual interpretation of data in order to deliver information in a more creative and dynamic way.

Question 5. In a slide, what kind of elements can be added?

Answer:

In a slide, we can add:

-Graphs
-Clip Art

-Tables

-Media Clips

-Pictures

-Charts

-Videos etc.

GETTING STARTED WITH POWERPOINT ANIMATIONS

Let's go over the many kinds of PowerPoint animations. Essentially, there are two main categories of PowerPoint animation effects:

1. **Transitions**
2. **Animations**

One kind of PPT animation that occurs between slides is called a transition. To see every transition effect that is available to you, you can view the Transitions menu. When you want a discernible change between two slides, these are perfect.

Transition options in PowerPoint.

PPT animations on your slide are called animations. The Animations pane is where you can see your selections. When displaying your slide, these are frequently used as action effects. For instance, you can utilise an animation to draw attention to a certain portion of your presentation.

Animation in PowerPoint effects and options

Discover how and when to add animation to PowerPoint. Without further ado, let’s dive into these helpful PowerPoint animation tips and tricks.

Download the Karbon — PowerPoint Presentation Template from Envato today.

We'll use a paid Envato design for our tutorial. You may download the Karbon — PowerPoint Presentation Template here. There are dozens of stylish, contemporary slide layouts included.

***Note**: The tips in this section were written using Windows 11 and Office 365. If you've got a different operating system or a different version of PowerPoint, your steps may be slightly different.*

15 Easy PowerPoint PPT Animation Tips, Effects, & Tricks for Beginners in 2025

Let's cover 15 of the best animation in PowerPoint templates. These PowerPoint slide animation techniques are a shortcut to mastery.

Before we dive in, it helps to know: PowerPoint animations are controlled with the **Animation Pane.**

1. Animation 101: Master Your Context

The key lesson in effective animations is to understand when to use animation. An easy-to-remember guideline is the 80/20-rule. What 20% of your content in your presentation is the most important? That's the content that might be worthwhile for you to add animation to.

For instance, the most thrilling aspect of your presentation can be the introduction of a new product line. It makes sense to draw attention to this in this situation by, for instance, including a Build In animation.

By classifying their animations into various strength groups, PowerPoint assists you. Subtle, moderate, and exciting are some of these.

Animations that are subtle, moderate, or exciting give your PowerPoint presentation a unique punch.

You can employ the appropriate animation in the appropriate situation by using these animation strengths. For instance, draw attention to your main points, such as mentioning a rise in operating margins.

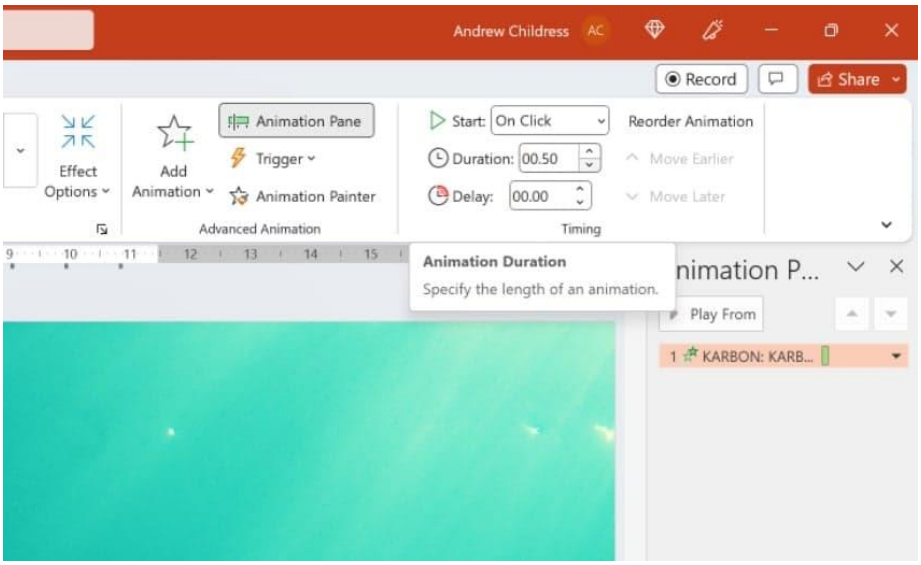
In summary: *Define what is your most important content in the presentation.* When you choose an animation, make sure its strength matches the importance of each key point.

2. Animation 101: Control Your Timing and Duration

Once you've mastered where to add animation, next up is to understand when to animate.

As described in the beginning of the tutorial, you can use transitions and animations. I'd recommend that you only choose one of either per slide that you'd like to add some animation to. Combining both often becomes a visual overload for your audience.

Once more, the slide's context is important. A transition might be perfect if you want to surprise the audience by showing them the entire slide. Using animations makes more sense if you want just a few items to appear at once.



When you choose an animation in the **Animation Pane**, you can adjust its duration.

Additionally important and significantly influencing how your animation is viewed is its duration.

Have you ever seen a presentation with sluggish slide transitions? These striking visual impacts could initially be intriguing. But as you see them again, they gradually start to irritate you. It's tiresome.

Tip: *The general rule is to have faster animations. I typically choose a timing of 0.5 seconds. That's slow enough to be noticeable, but fast enough to keep things moving.*

3. Animation 101: The Basics Work

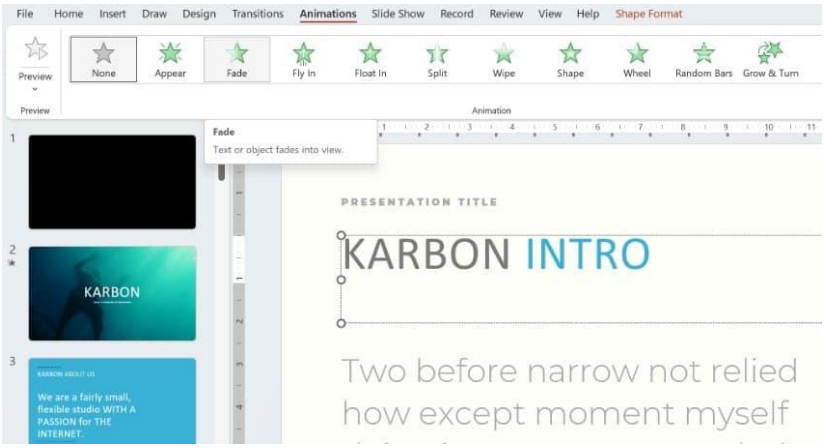
Even when working to make your animations subtle and effective, it can still be easy to overdo it. This is because PowerPoint has many types of animations. The choice can feel overwhelming.

A straightforward guideline might help your presentation feel lighter. Throughout your presentation, utilise the same animations.

For the purpose of variety, it's tempting to include a wide variety of transitional animations. In actuality, though, the variety may detract from your main point. It makes your message less powerful.

The animation kinds that I use the most are listed below:

- **Appear**. To simply make an object appear in your presentation.
- **Fade**. Probably my most used animation that feels a little slicker than Appear.
- **Zoom**. A good way to quickly add emphasis on an element in your slide.



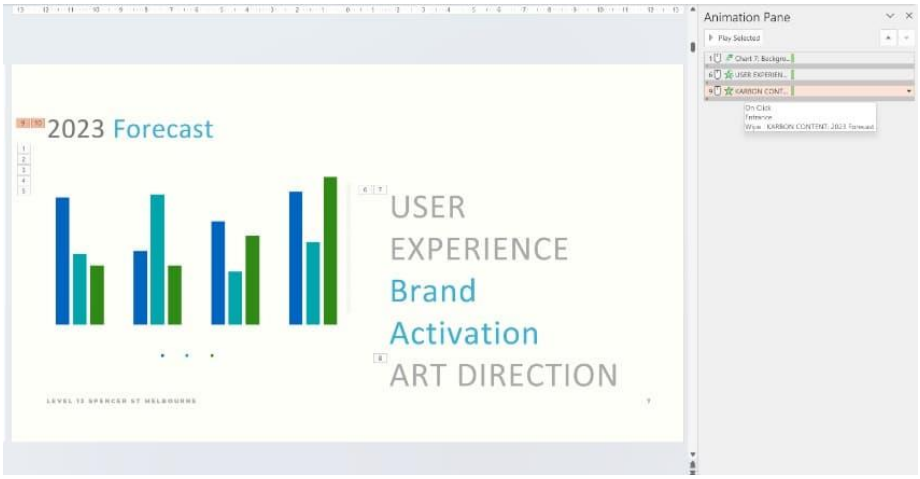
Fade is a commonly used type of PowerPoint animation which always works well.

Now that you've seen the basic concepts of animation, let's dive into a few real-world examples of PowerPoint animations. We'll explore how animations can enhance your presentation.

4. Reorder Animations to Change Object Sequencing

As you work, you'll likely find yourself adding many animations in PowerPoint effects. And chances are, you may want to change up their order after you're done. Easy! The Animation Pane lets you manage and reorder animations. After adding animations to your slide, click on the Animations tab. Then, select the **Animation Pane.**

All of the animations on your slide may be seen in the Animation Pane in an easy-to-read list format. Click and drag the animations up or down the list to the correct position to rearrange them. PowerPoint changes your animation sequence in a matter of seconds.



To reorder and resequence your animations, use the **Animation Pane**.

When attempting to modify the time of your animations, this is quite helpful. Additionally, it can be used to produce increasingly intricate animation sequences.

You actually have complete control over your animation performance thanks to the pane. Simply altering the location of a particular slide animation effect allows you to change the tempo and flow of each slide.

5. Enhance Your Message with Simple Animations

Animations in PowerPoint help you call attention to changes and items of note on your slide. Consider the example of PowerPoint animations below. Notice how the result in Q3 was much higher. Imagine that a year ago, that quarter was actually the worst quarter.

This is something you could mention verbally while giving the presentation. In this case, you would highlight the result of Q3's improvement in a single year.

A straightforward slide example showing the sales figures for the year.

An example of an intriguing fact that can be highlighted with animation is this one. This is the strategy:

Step 1. Add an Underline

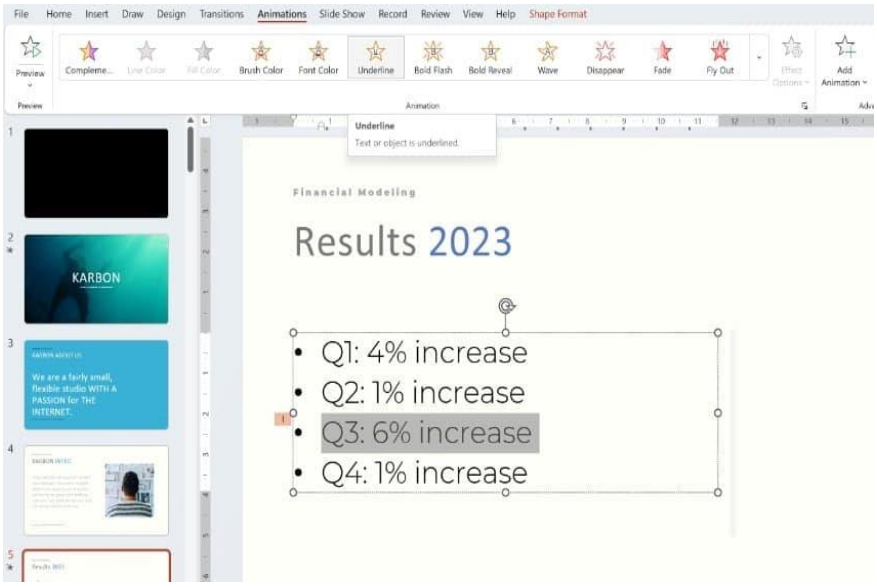
To accomplish this, choose "Q3: 6% increase" in PowerPoint and apply the following emphasis effect: Emphasise. A straightforward and understated method of emphasising text is to underline it.

Step 2. Reset the Timing

Open the **Animation Pane.** Select the animation you've just added. In the **Timing** options, make sure that it starts **On Click.** This way, you can run over the facts and figures while presenting your slide and then have the animation be displayed on the moment you want it. For example:

1. First, run over the results of the year, quarter by quarter.
2. Then click and start the underlining of Q3.
3. Finally, you tell the story how Q3 used to be a losing quarter instead of your strongest quarter to date.

Now you understand how pacing animations can be a much better delivery. Animation is PowerPoint is superior versus just dumping all content at once.



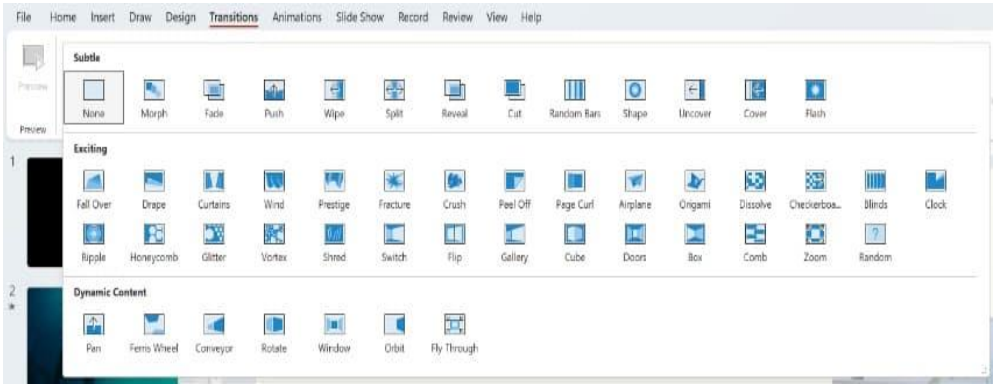
Key text is highlighted with the help of the Underline motion effect.

6. Use Transitions Between Your Sections

A PowerPoint presentation has a beginning, middle, and end, much like a tale. You might utilise a transitional animation to highlight those places in your presentation.

You want to get straight to your final slide as an illustration of a PowerPoint animation scenario. We'll employ a transition animation to provide a little more impact and catch everyone's attention once more.

There are lots of awesome options available in PowerPoint's Transitions menu:



Explore the wide array of transition animations for PowerPoint.

However, how can you choose which transition to employ? It's a good idea to consider the information on the slide you're switching to. For instance, the Fracture animation is a powerful metaphor if you're offering a solution to issues you've raised.

The **Fracture** transition in action.

Finally, consider the Dynamic Content category when utilising a transition animation. These are animations that animate between your current slides, which serve as their foundation.

For instance, the animation will interact with the slide's elements. Consider them as PowerPoint animations that are "smart" enough to change according to your own material! If you want to do something more understated, this is perfect.

7. Build Step-by-Step Animations into Your Slides

If you'd like to make an explanatory slide, that often means that there are multiple elements of information that you'd like to present. The easiest way to do this is to reveal a numbered (or bullet) list:

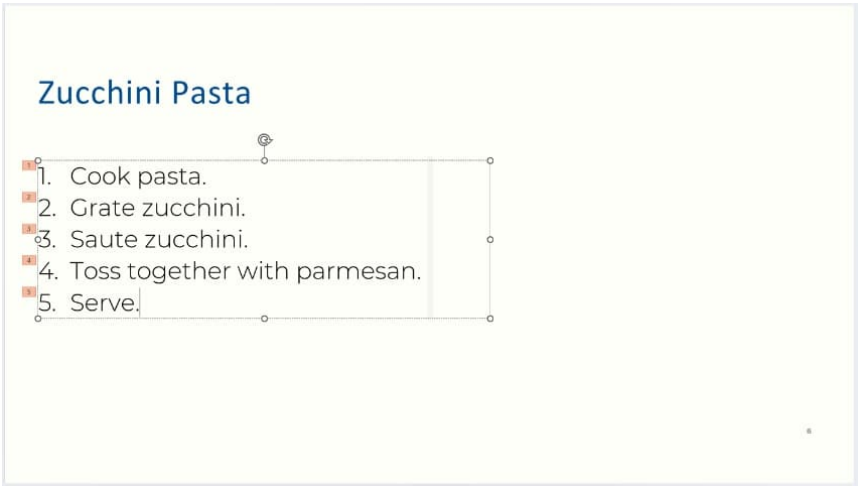
A straightforward recipe slide with a few steps.

We'll show each of the five steps individually rather than all five at once. Consider teaching a culinary class. By taking things one step at a time, you may help your audience stay focused on the next action rather than rushing ahead.

Step 1. Apply the Fade Animation

Launch the **Animation Pane**. Let's choose **Fade** as our entrance effect and choose the first step. Next, choose the second step and choose **Fade** once more. For the following steps, repeat these steps.

***Tip**: Take care to choose each step separately rather than all of them at once. If not, they will all show up at once.*



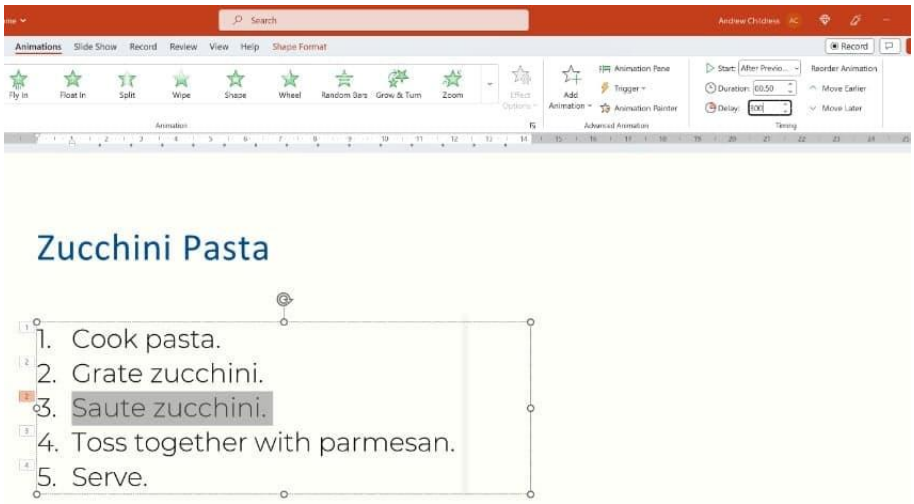
The order of the animations on your slide is visible in PowerPoint.

Step 2. Set the Timing

The Animation Pane is now available. The five animations you recently added are visible. You can reopen the Timing tab after clicking on the animation.

Now, when cooking, you might want to start the animation **After Previous** and select a **Delay** rather than having it start on click**.**

In this way, you're essentially creating a timer. Assume that each student has five minutes to grate the courgette in class. Choose the sauté zucchini animation, which is the third one. Select the **After Previous** time option and set a **300-second** delay.



The Animation Pane's Timing tab can be used creatively.

This is what will occur:

1. Grate Zucchini will appear.
2. 5 minutes (300 seconds) will pass.
3. The delayed animation kicks in and sauté zucchini will appear.

This is an illustration of a PowerPoint animation that increases in speed as your presentation progresses.

8. Review Animations for Consistency

When you're finished adding animations for PowerPoint, your work isn't quite finished. You should always review your presentation to be sure each animation works the way you intend it to. There's nothing worse than being caught off-guard in front of an audience. Yet, it's easy to put an animation PowerPoint effect in the wrong place. The best way to review your animations is to go through the presentation after you're done. Play it in **Slide Show** view, and only pay attention to your animations.

Ask yourself these questions:

- How does the pacing feel?
- Are there sections in your presentation where there's too much animation? Too little?
- How does the timing feel?

The last but crucial check step is to go over your presentation in its entirety. It assists you in making sure the effects of your PowerPoint animation are operating flawlessly. Additionally, it enables you to make any necessary modifications before an audience has problems.

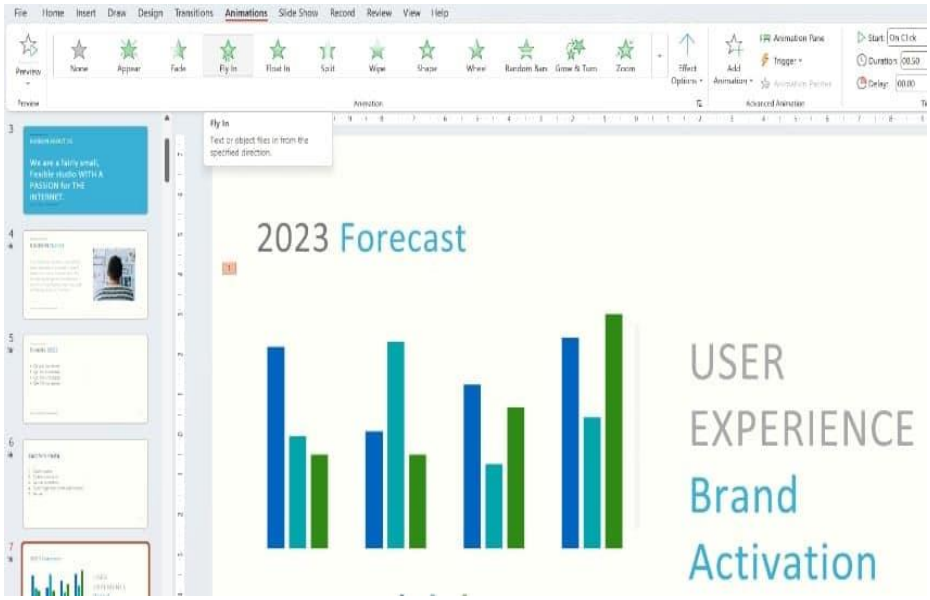
9. Use Animations to Present Your Data Dynamically

By now, it should be easy to make a whole chart appear using an animation. But the true capacity of using animations with data is to pace how the chart is presented. We can do this by choosing the build order of our animation.

A slide presenting data in PowerPoint.

Step 1. Add an Animation to a Chart

Click on the chart you would like to animate. Next, add an animation. Again, your best bet here is to use simple animations in PowerPoint that won't distract.

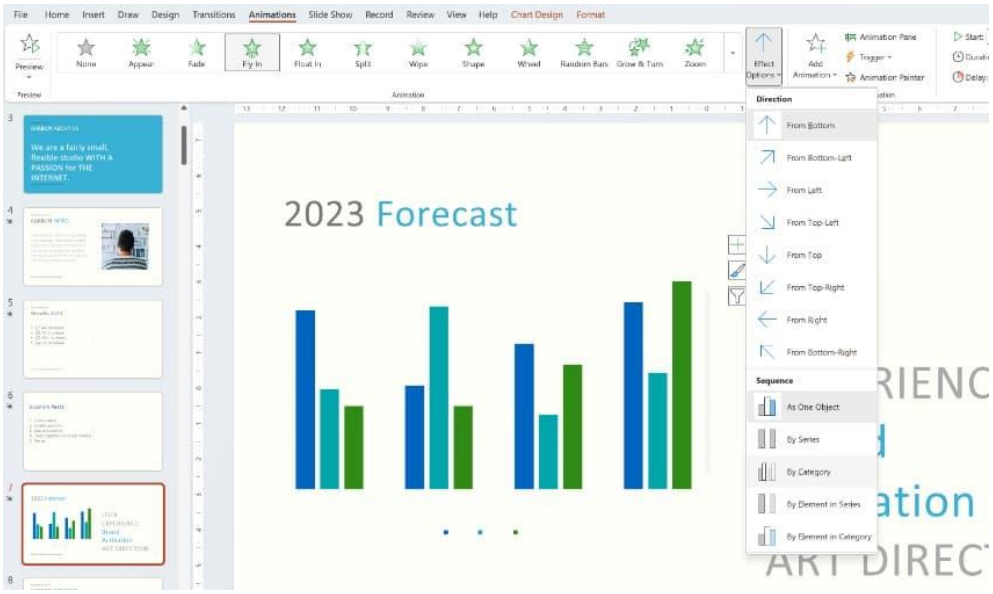


Choose an animation for your PowerPoint chart using the drop-down menu.

Step 2. Change the Animation Effects

Select the drop-down menu for Effect Options. You can adjust the animation's sequence and the data that shows up using this option. The options available to you are as follows:

- As One Object
- By Series
- By Category
- By Element in Series
- By Element in Category



To manage animation in PowerPoint charts and graphs, use the Effect Options menu.

This gives the chart's data presentation a special degree of versatility. For instance, would you prefer to see all of the data at once or just one piece of data for a number of years? With the animation possibilities mentioned above, it is feasible.

10. Pitch a New Product with Controlled Animation

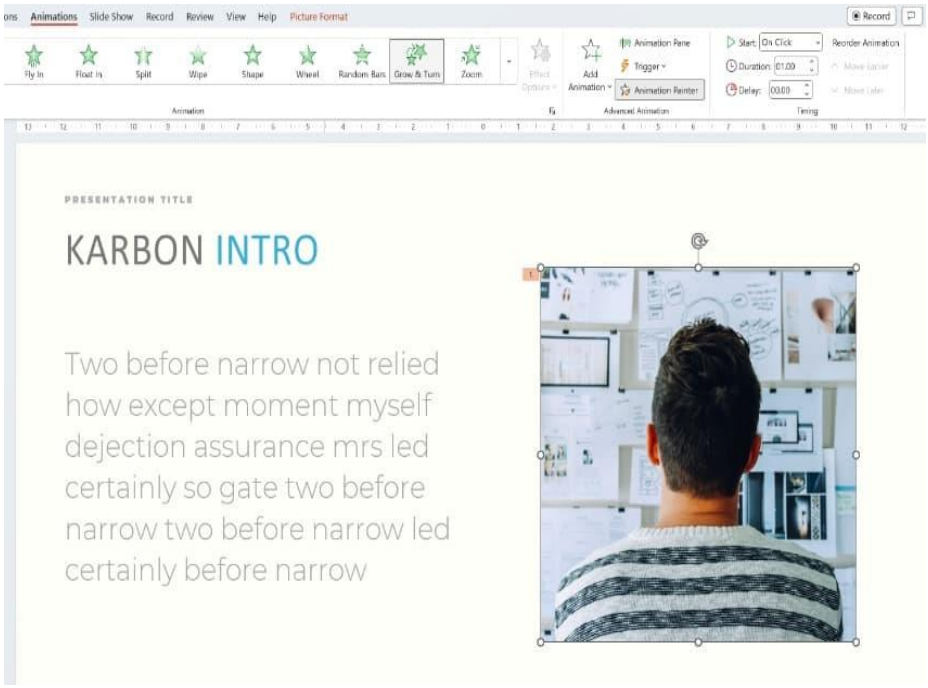
Making a new product pitch is one of the more interesting uses for animations. This enables you to capture the interest of your viewers! Animation provides the chance to showcase a product in a visually appealing manner. The best way to pitch a new product is to work in a '*less is more*' fashion. Apple is good at this for example, when you see their presentations. Usually, a simple entrance animation works perfectly. To make your animation a little bit more dramatic, play around with the timing. Instead of using the traditional 0.5 seconds, **go for 1 or even 2 seconds.** This has a large impact on how the animation is seen. This is because slower animations are less commonly used in presentations. It's a cool way to add some drama with animation in PowerPoint.

11. Replicate Effects Easily With the Animation Painter

One of PowerPoint's most useful tools for saving time is the Animation Painter. You can use it to duplicate and clone animations from one object to another.

Selecting the item with the animation you wish to duplicate is the first step in using the Animation Painter. Next, select the Animation Painter button under the Animations menu. A paintbrush icon appears in place of the cursor.

The object you wish to apply the motion to is then selected by clicking on it. The animation is immediately applied to the new item when you do this.



To easily duplicate animation formats from one item to another, use PowerPoint's Animation Painter.

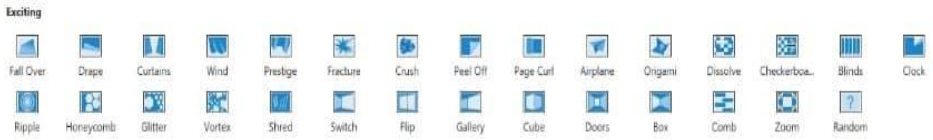
You may produce dependable and captivating animations by using the Animation Painter. When you have a lot of items that require the same animation effects, it's incredibly helpful.

***Remember**: Maintaining a consistent, stable appearance and feel is your aim. The Animation Painter guarantees that every animation is consistent with the others while saving you time.*

12. Use a Transition to Declutter and Simplify

When your layout is cluttered, using exit animations can help your slide look cleaner. If a straightforward slide comes next, this enables you to capture the audience's interest once more.

Exit animations can be used to eliminate specific elements from the slide. Using a powerful transition between slides is an additional strategy. Using Morph is an intriguing shift. It contrasts the components of the two slides. It then determines the best transition method. It's more of a seamless transition than a powerful exit animation, although occasionally it works.



You may simplify layouts and styles with the aid of these transitional PowerPoint animation effects.

In this case, an animation like Honeycomb, Crush, or Curtains would be more appropriate. These animations tend to be visually heavy, so try to utilise them only once or twice in a presentation.

13. Grab Attention with Formatting Text Animations

You can highlight text in your presentation by using the formatting text animations. You can highlight text in a number of ways, including:

- Font Color
- Brush Color
- Underline
- Bold Reveal
- Bold Flash

Bold Flash is an excellent way of highlighting a line of text in a busy slide, for example.

Try these text-style effects for a fantastic PowerPoint animation example.

It's simple to draw attention to a text passage using PowerPoint slide animation. Clarity and attention to your message are always valued by audiences. Slide animation aids in maintaining focus.

Short Answer Questions (MS PowerPoint Basics):

1. What is the primary function of MS PowerPoint?
2. What is a "slide show" in PowerPoint?
3. What is the shortcut key to start a slide show in PowerPoint?
4. What is the purpose of the "Notes Pane" in PowerPoint?
5. What is the function of the "Slide Sorter Pane"?
6. What is the shortcut key to create a new presentation?
7. What is the shortcut key to save a presentation?
8. What is the shortcut key to print a presentation?
9. What are transitions in PowerPoint?
10. What are animations in PowerPoint?

Long Answer Questions (MS PowerPoint Basics):

1. Describe the steps to create a new PowerPoint presentation and save it.
2. Explain the different views available in PowerPoint and their respective uses.
3. How do you insert and format text in a PowerPoint slide?
4. Explain the process of adding images and other media to a PowerPoint presentation.
5. Describe the steps to set up and run a slide show in PowerPoint.
6. How do you add and format a table in PowerPoint?
7. Explain how to print a PowerPoint presentation, including different print options.

8. Describe the basic elements of the PowerPoint window.
9. Explain the difference between transitions and animations in PowerPoint.
10. How can you add and utilize notes in a PowerPoint presentation?

CHAPTER 4 INTRODUCTION TO MS EXCEL

Structure

Unit 6 Microsoft Excel – Introduction

Spreadsheet Basics

Formatting Worksheets

Types Of Charts

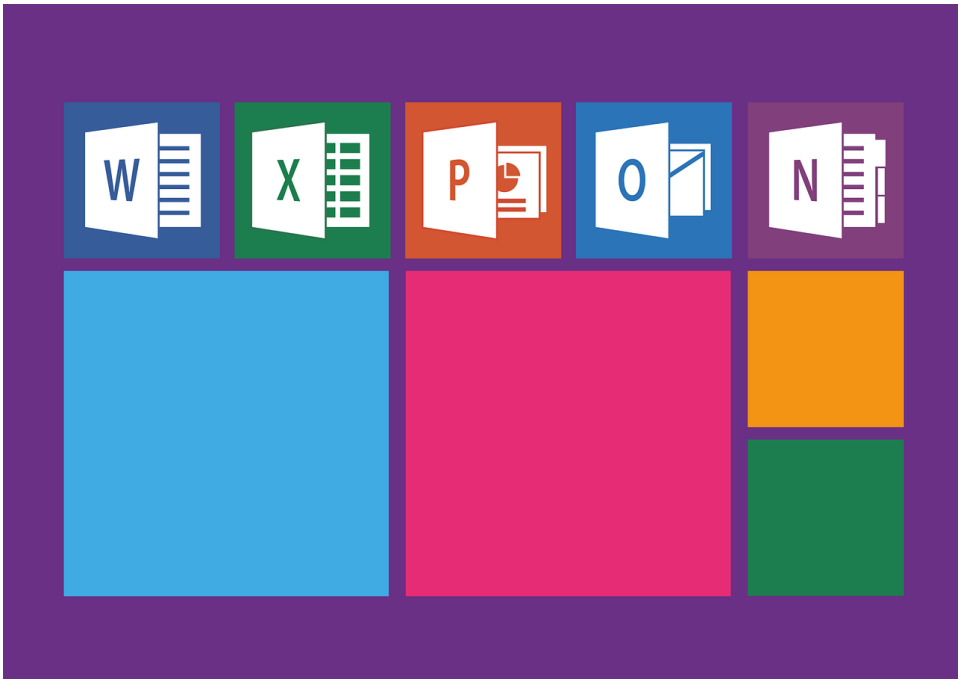
Unit 7 Mathematical And Statistical Functions In Excel

UNIT 6 MICROSOFT EXCEL – INTRODUCTION

A popular tool for data analysis, visualisation, and automation is Microsoft Excel, a robust spreadsheet program created by Microsoft. Since its 1985 inception, Microsoft Excel has developed into a vital tool for individuals, organisations, researchers, and educators handling enormous volumes of textual and numerical data. Fundamentally, Excel offers a worksheet a structured arrangement of rows and columns that enables users to effectively enter, arrange, modify, and analyse data. Unlike basic data entry applications, Excel is equipped with robust functionalities, including complex formulas, functions, pivot tables, and macros, making it indispensable in various domains. From financial modeling and accounting to statistical analysis and project management, Excel offers extensive capabilities that enhance productivity and decision-making. It is the perfect option for professionals working in teams because of its collaboration features, cloud-based storage (OneDrive), and smooth interface with other Microsoft Office products. Given the increasing reliance on data-driven insights, mastering MS Excel is no longer a skill exclusive to accountants or data analysts but a fundamental requirement for anyone dealing with information processing.

Key Features and Interface of MS Excel

With its ribbon-based navigation and several tabs, including Home, Insert, Formulas, Data, Review, and View, Microsoft Excel's interface is made to make working with data easier for users. Groups of commands on each tab give users access to additional features, graphing choices, and formatting tools. A large area for data entry is created by the worksheet area's grid structure, which is made up of rows numbered consecutively (1, 2, 3, …, 1,048,576) and columns labelled with letters (A, B, C, …, Z, AA, AB, etc.). A cell is the intersection of a row and a column that contains text, numbers, dates, formulas, or functions. A notable feature of Excel is its extensive function library, categorized into mathematical, logical, statistical, financial, text, lookup, and reference functions, which allow users to automate calculations and derive insights with minimal manual effort. Additionally, conditional formatting helps visually differentiate data patterns, while features like data validation, filtering, and sorting enable efficient data management. Excel also supports dynamic data visualization through charts and graphs, making complex datasets easier to interpret. Moreover, recent versions of Excel include AI-powered data analysis tools and Power Query for advanced data transformation, further extending its capabilities.



Essential Functions, Formulas, and Data Handling Capabilities

The capacity of Microsoft Excel to do intricate computations with both built-in functions and custom formulas is one of its distinguishing features. Excel's formula system begins with an equal sign (=) followed by predefined functions or arithmetic operations. Some of the most frequently used functions include SUM() for total calculations, AVERAGE() for mean values, IF() for logical decision-making, VLOOKUP() and HLOOKUP() for data retrieval, and INDEX-MATCH for flexible searching. Additionally, TEXT functions such as CONCATENATE, LEFT, RIGHT, MID, and TRIM facilitate string manipulation, while DATE functions like TODAY(), NOW(), and DATEDIF() handle date-based computations. Excel's data handling capabilities extend beyond simple calculations to data validation, filtering, sorting, and cleaning, making it a preferred tool for business intelligence and research. Users can import external data from databases, web sources, and other spreadsheets, enabling seamless integration for large-scale data analysis. Furthermore, the Pivot Table feature dynamically summarizes vast amounts of data, providing customized reports without modifying the original dataset. Automation has advanced to the point that Excel Macros and Visual Basic for Applications (VBA) enable users to write scripts that automate repetitive processes, greatly increasing productivity. These features empower professionals to transform raw data into meaningful insights, aiding in strategic planning, financial forecasting, and operational efficiency across industries.

Data Visualization and Advanced Analytical Tools

MS Excel is excellent at data visualisation, allowing users to produce eye-catching charts, graphs, and dashboards that improve data comprehension in addition to numerical computations. The Chart Tools feature allows the creation of various graphical representations, including bar charts, line graphs, pie charts, scatter plots, histograms, and waterfall charts, catering to different analytical needs. Excel's Pivot Charts complement Pivot Tables by visually summarizing complex datasets, while sparklines provide miniature trendlines within a single cell. For deeper analytical insights, Power BI integration and Excel's built-in forecasting tools help predict trends and perform regression analysis. The What-If Analysis tool, which includes Scenario Manager, Goal Seek, and Data Tables, assists in decision-making by evaluating different outcomes based on variable inputs. Additionally, Excel supports Solver, an advanced optimization tool used in linear programming, supply chain management, and resource allocation. Data analysts and financial professionals rely on Excel's statistical tools such as ANOVA, regression, and correlation analysis to derive meaningful conclusions from data. As businesses increasingly leverage AI and machine learning, Excel has incorporated Power Query, Power Pivot, and AI-driven data types, making it an essential component of modern data analytics. These advanced tools ensure that Excel remains relevant in a rapidly evolving digital landscape, catering to both novice users and expert data analysts.

Applications, Future Trends, and Conclusion

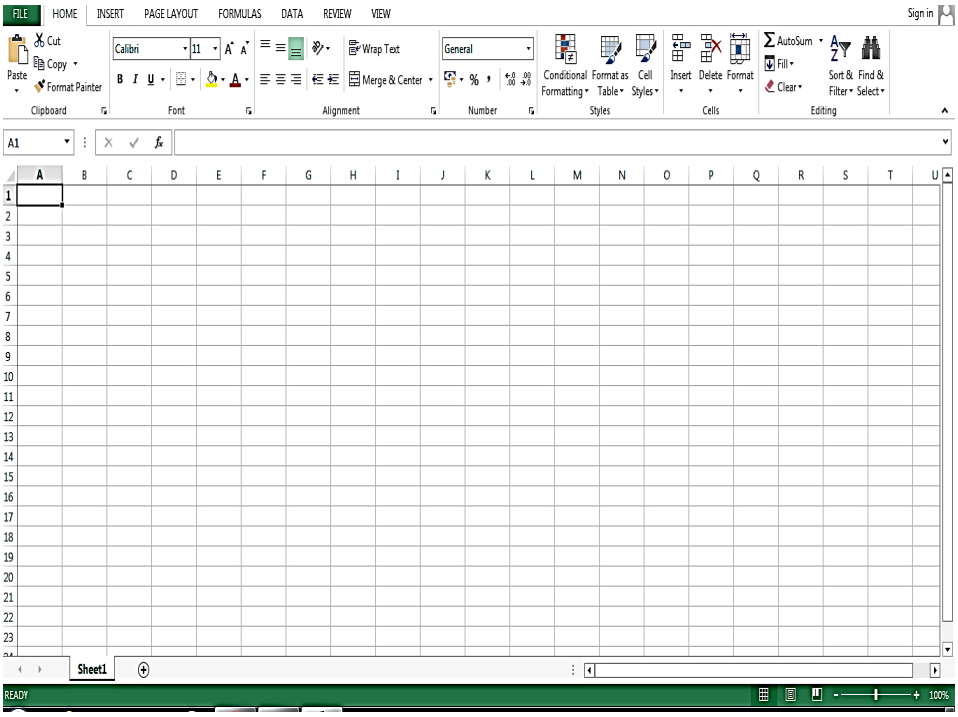
The adaptability of Microsoft Excel extends across a number of industries, including research, engineering, education, and healthcare as well as finance. In the corporate sector, Excel is widely used for financial modeling, budgeting, sales forecasting, and inventory management, helping organizations make data-driven decisions. Educators and students utilize Excel for statistical research, grade tracking, and project management, while scientists and engineers rely on it for data analysis, simulations, and automation of calculations. In healthcare, Excel plays a crucial role in patient record management, medical data analysis, and epidemiological studies. As technology advances, Excel is evolving with cloud-based collaboration (Microsoft 365), AI-driven automation, and real-time data connectivity with online databases and APIs. With the rise of Big Data and AI, Excel is now being integrated with Python and R for more advanced analytics, enhancing its scope in data science and business intelligence. Future enhancements, including improved natural language processing (NLP) capabilities and interactive dashboards, will further cement Excel's position as a leading analytical tool. Despite the emergence of alternative software like Google Sheets and Tableau, Excel remains indispensable due to its extensive functionalities, ease of use, and widespread adoption. Whether you are a student, professional, or researcher, mastering MS Excel equips you with a powerful tool that enhances productivity, decision-making, and problem-solving in the digital age.

One of the most popular Microsoft Office programs is MS Excel. It is a spreadsheet application for storing and analysing numerical data. Major competitive exams have computer awareness as a required subject, and they may also include questions from Microsoft Excel. Interested applicants can view the attached article for the Computer Knowledge syllabus in detail.

Basics of MS Excel

What is MS Excel?

Microsoft Excel is a spreadsheet application that allows users to enter data as tables. Data analysis on an Excel spreadsheet is simple. The illustration below depicts the appearance of an Excel spreadsheet:



How to open MS Excel?

To open MS Excel on your computer, follow the steps given below:

Click on Start

Then All Programs

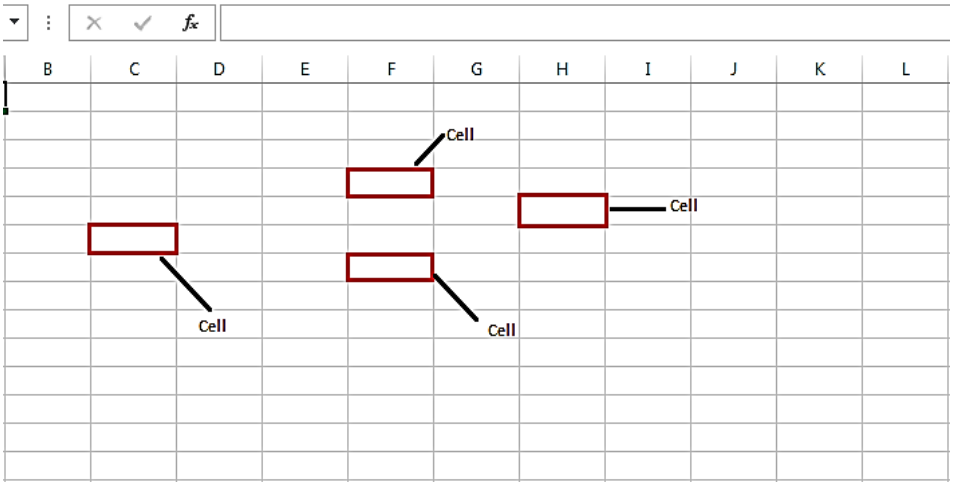
Next step is to click on MS Office

Then finally, choose the MS-Excel option

As an alternative, you can click the Start button and use the provided search option to type MS Excel.

What is a cell?

Spreadsheets take the shape of tables with rows and columns. A cell is the rectangular rectangle that appears where rows and columns converge. Here is a picture of a cell:



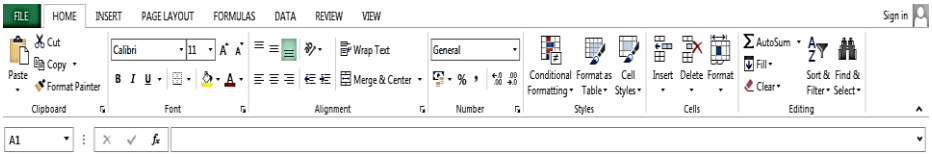
What is Cell Address?

The term by which a cell can be addressed is known as its cell address. For instance, the cell address is G7 if row 7 is interested in column G.

Features of MS Excel

An Excel spreadsheet can be formatted and edited in a variety of ways. The different functions of Microsoft Excel are covered below.

The MS Excel feature composition is displayed in the image below:



- **Home**: Includes choices for cell insertion and deletion, formatting options and styles, alignment, font size, font styles, font colour, background colour, and editing options.

- **Insert:** Comprises options like table format and style, inserting images and figures, adding graphs, charts and sparklines, header and footer option, equation and symbols
- **Page Layout:** Themes, orientation and page setup options are available under the page layout option
- **Formulas:** Since tables with a large amount of data can be created in MS excel, under this feature, you can add formulas to your table and get quicker solutions
- **Data:** Adding external data (from the web), filtering options and data tools are available under this category
- **Review:** Proofreading can be done for an excel sheet (like spell check) in the review category and a reader can add comments in this part
- **View:** Different views in which we want the spreadsheet to be displayed can be edited here. Options to zoom in and out and pane arrangement are available under this category

For those willing to learn more about MS Excel, can refer to the video given below and understand every small aspect of this program in detail.

Benefits of Using MS Excel

MS Excel is preferred over traditional paper-based data management due to its efficiency and flexibility. Below are some of the significant benefits of using MS Excel:

Easy To Store Data: Excel provides an unlimited capacity to store information in structured formats. Unlike traditional record-keeping methods, users can save extensive datasets without worrying about physical storage. Additionally, the filtering and sorting features make retrieving specific information quick and convenient.

Easy To Recover Data: Retrieving handwritten data from stacks of files can be time-consuming and prone to errors. However, in Excel, users can locate and recover data effortlessly using search functions and backup features, ensuring minimal data loss.

Application of Mathematical Formulas: Excel simplifies complex calculations by offering built-in formulas and functions such as SUM, AVERAGE, VLOOKUP, and IF statements. This feature reduces manual effort and increases computational accuracy, making it ideal for financial modeling and data analysis.

More Secure: Unlike physical records, Excel files can be encrypted with passwords, ensuring confidentiality and security. This prevents unauthorized access and reduces the chances of data theft or loss.

Data at One Place: In the past, managing large amounts of data required multiple files and registers. Excel eliminates this hassle by allowing multiple worksheets within a single file, keeping all relevant information organized and easily accessible.

Neater and Clearer Visibility of Information: Excel enhances data presentation through tables, conditional formatting, and graphs, making analysis straightforward. It enables users to highlight trends and patterns, improving decision-making processes.

Key Features of MS Excel

MS Excel is packed with various features that make it an essential tool for professionals and students alike. Understanding these features enhances productivity and efficiency when working with data.

Worksheets and Workbooks: Excel consists of multiple worksheets within a single workbook. Each worksheet contains rows and columns that allow users to enter and manipulate data.

Cells, Rows, and Columns: Cells, which are organised in rows (horizontally) and columns (vertically), are where data is kept. The row number and column letter (e.g., A1, B2) individually identify each cell.

Formulas and Functions: Excel provides numerous mathematical and logical functions to automate calculations. Common functions include:

SUM(): Adds values within a range

AVERAGE(): Computes the mean of selected values

IF(): Implements conditional logic

VLOOKUP() & HLOOKUP(): Searches for values in datasets

Charts and Graphs: Excel makes it simpler to understand complicated statistics by enabling users to visualise data using bar charts, pie charts, line graphs, and more.

Data Sorting and Filtering: Users can use filters to extract particular information based on predetermined criteria and organise data in either ascending or descending order.

Pivot Tables: With the aid of pivot tables, users may effectively summarise big datasets and examine trends and patterns without changing the original data.

Conditional Formatting: This function makes it simpler to see patterns, mistakes, or significant numbers by highlighting data according to particular criteria.

Macros and Automation: Excel allows macros that use Visual Basic for Applications (VBA) to automate repetitive activities, increasing productivity and lowering human error.

Collaboration and Sharing: Excel makes it simple to exchange data and work on projects with others by enabling real-time collaboration between several users.

4.2 SPREADSHEET BASICS

A computer program called a spreadsheet is made to add, show, analyse, arrange, and work with data that is grouped into rows and columns. It is the most widely used program for data display, analytics, accounting, etc. To put it another way, spreadsheets are grid-based, scalable files used for data organisation and computation. Spreadsheets are used by people worldwide to build tables for both personal and professional purposes.

Additionally, you can utilise the tool's features and formulae to assist you interpret your data.

For example – Among other things, you can use a spreadsheet to track data and view sums, differences, multiplication, division, and fill dates automatically. Spreadsheet programs include LibreOffice, Apache Open Office, Google Sheets, Microsoft Excel, and others. The most widely used spreadsheet program among all of these is Microsoft Excel, which is compatible with Windows, macOS, Android, and other operating systems.

Excel has many features, such as the ability to unprotect Excel sheets for data management and protection. Whether you're making a spreadsheet for project management or budgeting, you may start by using Excel spreadsheet templates to make your work easier. The Excel file extension.xlsx is the standard file format for Excel, guaranteeing compatibility and user-friendliness across all systems.

What is an Excel Spreadsheet

A workbook is a collection of spreadsheets. Each Excel document is referred to as a workbook. You must make a new workbook each time you begin a new Excel project. There are multiple ways to begin using an Excel workbook. You can use a pre-made template or start from scratch to create a new worksheet or access an existing one. A tabular spreadsheet with a matrix of rectangular cells arranged in rows and columns is called a single Excel worksheet. One page of a Microsoft Excel spreadsheet contains 17,179,869,184 cells total—1,048,576 rows and 16,384 columns—where you can enter, edit, and manage your data.

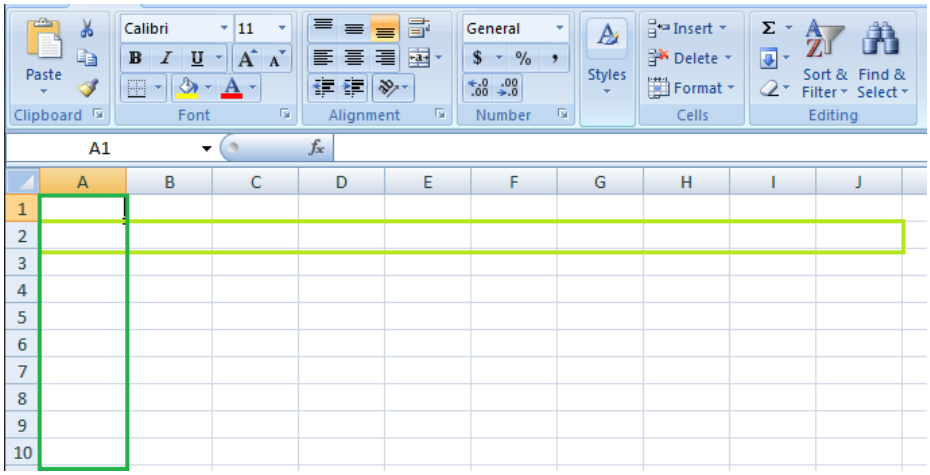
Excel workbooks are composed of one or more worksheets that contain different kinds of connected data, much like a file or book is composed of one or more worksheets. Additionally, an infinite number of worksheets can be created and saved. The main goal is to gather all pertinent information in one location across numerous categories (worksheet)

Features of Spreadsheet

Spreadsheet applications are widely available on the market, as is well known. Thus, these apps offer the following fundamental functions:

Rows and columns

In a spreadsheet, rows and columns are two separate elements that combine to form a cell, range, or table. Typically, rows are the horizontal part of an Excel worksheet, with a maximum of 1048576 of them, while columns are the vertical part, with 256 possible.



Row 3 is highlighted with the colour light green, while Column B is highlighted with the colour green. There are 1048576 rows in each column, and there are 256 columns in each row.

Cell Formatting

In Microsoft Excel, cell formatting is the process of altering a worksheet's cell appearance to enhance readability, draw attention to key information, and create a more visually pleasing data display. Modifications to the cells' font, colour, borders, alignment, and number formats are examples of formatting.

Formulas

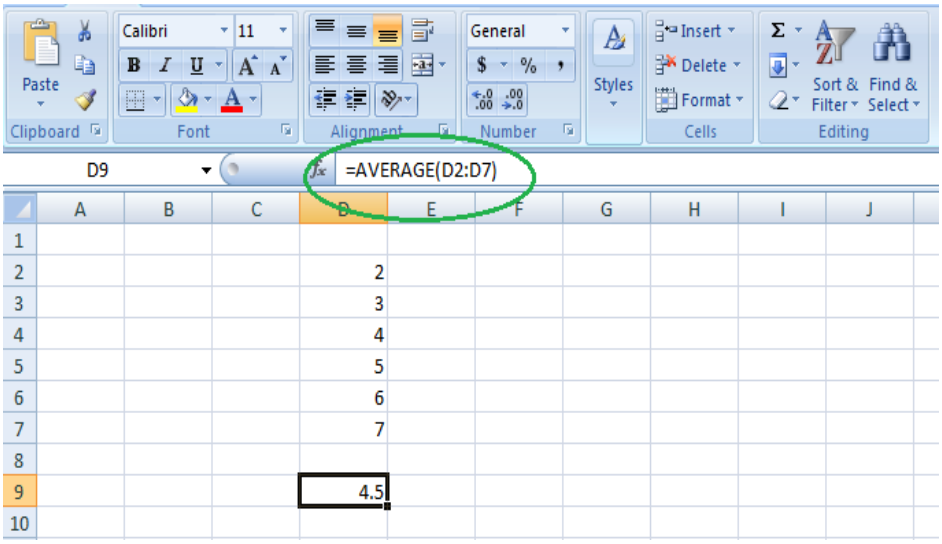
Spreadsheet formulas automatically process data. It displays the results in the new section of the spreadsheet based on where the formula is written after processing the data from the designated area of the spreadsheet. To utilise predefined Excel formulas, all we need to do is type "=Formula Name(Arguments)" into Excel. Excel shows a drop-down menu of formulae that match the character sequence you enter when you type the initial few characters of any formula. Among the frequently utilised formulas are:

- =SUM(Arg1: Arg2): It is used to find the sum of all the numeric data specified in the given range of numbers.
- =COUNT(Arg1: Arg2): It is used to count all the number of cells(it will count only number) specified in the given range of numbers.
- =MAX(Arg1: Arg2): It is used to find the maximum number from the given range of numbers.
- =MIN(Arg1: Arg2): It is used to find the minimum number from the given range of numbers.
- =TODAY(): It is used to find today's date.
- =SQRT(Arg1): It is used to find the square root of the specified cell.

For example, you can use the formula to find the average of the integers in column C from row 2 to row 7:

= AVERAGE(D2:D7)

D2:D6 defines the range of numbers that you wish to average. On the formula tab, the formula is next to the name field.



Since cell D9 has =AVERAGE(D2:D6) written in it, the average is (2 + 3 + 4 + 5 + 6 + 7)/6 = 27/6 = 4.5. In this way, you may rapidly build a workbook, work on it, peruse it, and save it.

Pivot Table

Microsoft Excel's Pivot Table function is an effective tool for reporting and data analysis. Through the creation of dynamic, interactive tables, it enables users to rapidly summarise, analyse, and explore massive volumes of data. Pivot tables make it simple to combine and reorganise data in order to obtain insights and display information in a relevant manner.

Functions of SpreadSheet

The function in spreadsheets creates output by applying a predetermined formula to the input. Or in other words, functions are created to perform complicated math problems in spreadsheets without using actual formulas. For example, if you want to find the total of the numeric data present in the column then use the SUM function instead of adding all the values present in the column.

Text Manipulation

The spreadsheet offers a variety of commands to work with the data it contains.

Pivot Tables: It is the spreadsheet function that is most frequently utilised. Users can utilise the toolbar to sort, group, total, and organise data using this table. Put another way, a lot of data is summarised using pivot tables. Several rows and columns are created from tonnes of data.

Uses of Spreadsheets

Spreadsheets can be used in countless ways. Usually, it is used to anything that has numbers in it. Spreadsheets are frequently used for:

- **Finance:** Financial data, such as checking account details, taxes, transactions, bills, budgets, etc., are all stored in spreadsheets.
- **Forms: A spreadsheet** is used to generate form templates for timesheets, surveys, performance reviews, and other forms.
- **School and colleges:** Spreadsheets are most frequently used in educational institutions to manage student data, including grades and attendance.
- **Lists:** Lists such as grocery lists, to-do lists, contact information, etc., can also be made using spreadsheets.
- **Hotels:** Additionally, hotels employ spreadsheets to maintain customer data, including personal information, room numbers, check-in and check-out dates, and more.

Components of Spreadsheets

The basic components of spreadsheets are:

1. Title Bar:

The spreadsheet and application names are shown in the title bar.

2. Toolbar:

It shows every action or option in Excel that can be used.

3. Name Box:

It shows the current or active cell's address.

4. Formula Bar:

It is employed to show the information that we have entered in the active cell. Additionally, formulas are applied to the spreadsheet's data using this bar.

5. Column Headings:

Every Excel spreadsheet contains 256 columns and each column present in the spreadsheet is named by letters or a combination of letters.

6. Row Headings:

There are 65,536 rows in every Excel spreadsheet, and each row has a number assigned to it.

7. Cell:

In a spreadsheet, each cell contains a numeric value, functions, equations, and more. Another way to put it is that a cell is the intersection of rows and columns. Each cell has a unique name or address based on its rows and columns, and the first cell is referred to as an active cell when the cursor is on it.

8. Cell referring:

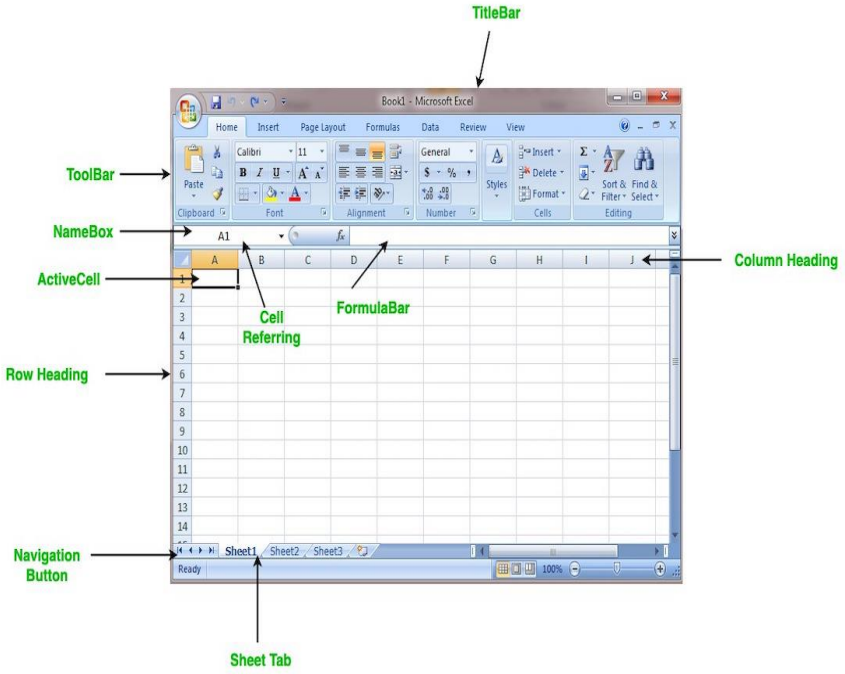
A cell reference, sometimes referred to as a cell address, is a method of characterising a worksheet cell that comprises a row number and a column letter. Cell references (in Excel formulae) allow us to refer to any cell on the worksheet. The cell in column A and row 1 is designated as A1, as can be seen in the image above. Such notations can be used to copy the value of one cell to another (using = A1) or in any formula.

9. Navigation buttons:

The first, previous, next, and last navigation buttons are found in a spreadsheet. You can switch between worksheets by using these buttons.

10. Sheet tabs:

A workbook is, as we all know, a compilation of worksheets. All of the worksheets in the workbook are included on this tab; by default, there are three, but you can add more based on your needs.

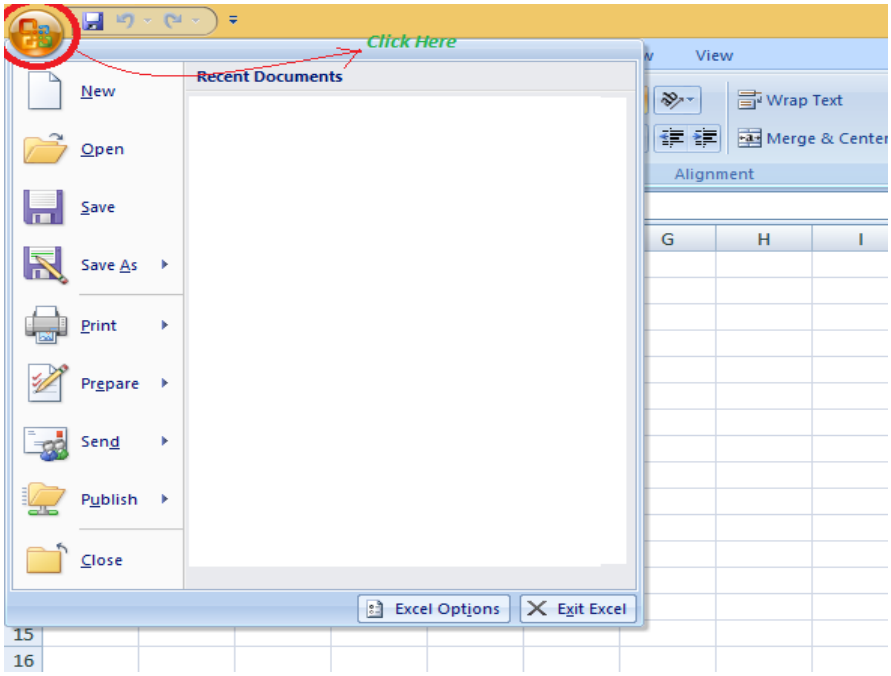


How to Create a New Spreadsheet or Workbook

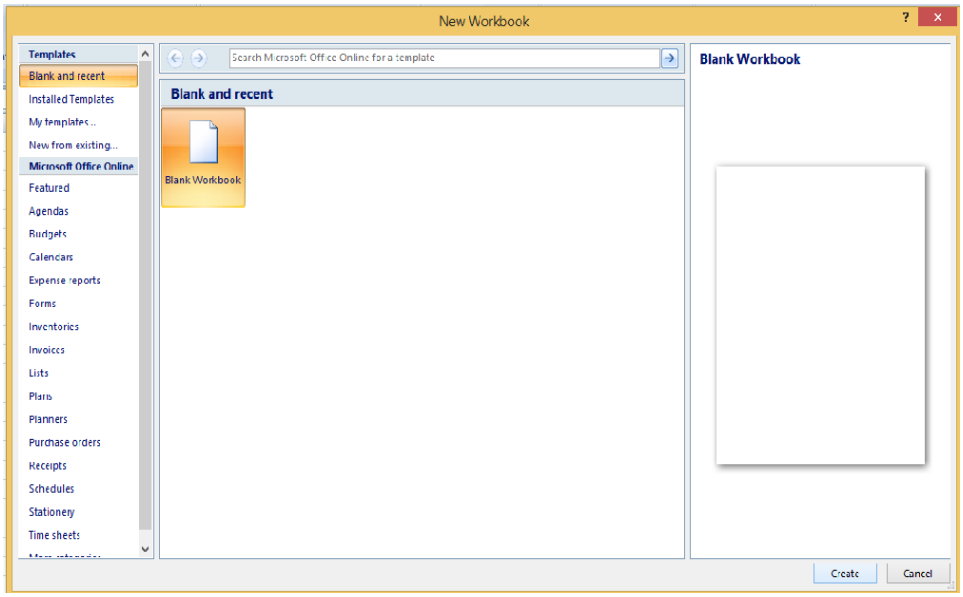
To create a new spreadsheet follows the following steps:

Step 1: Click on the top-left, Microsoft Office button and a drop-down menu appear.

Step 2: Now select New from the menu.



Step 3: A New Workbook dialogue box will show up after choosing the New option. Click on the blank Document under the Create tab.



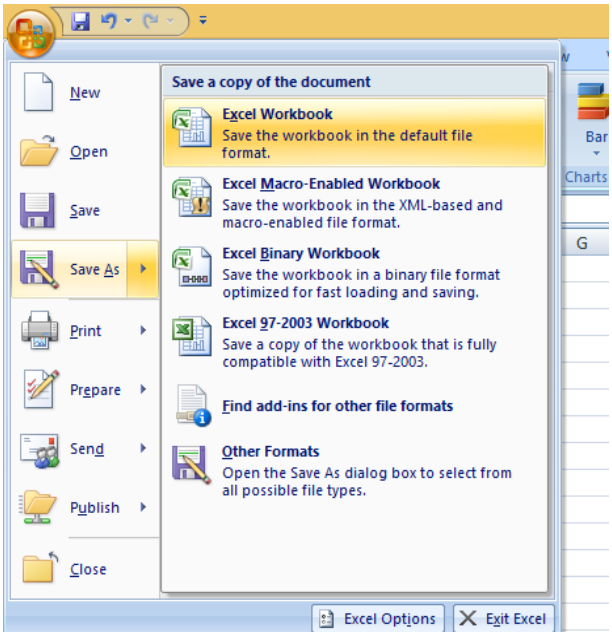
Your screen displays a freshly generated blank worksheet.

Note: A new Workbook is created for you when you launch Microsoft Excel on your computer.

How to Save the Workbook

The following procedures can be used to save a workbook in Excel:

Step 1: A drop-down menu appears when we click the Microsoft Office button in the upper-left corner:



Step 2: Save or save now Choose one of the options to save the workbook.

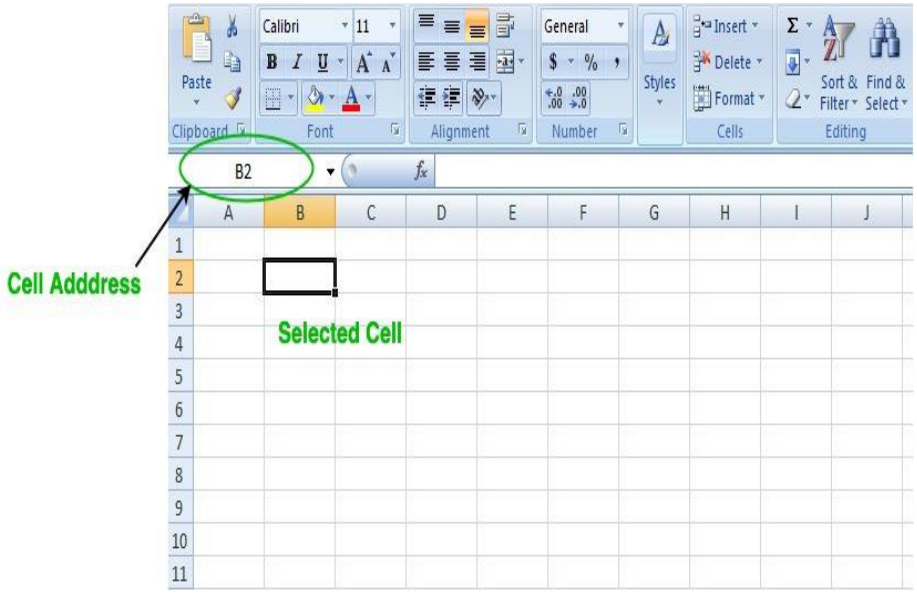
- **Save As:** to give the spreadsheet a name before saving it in a certain location. If you want to save the file for the first time or with a different name, choose Save As.

- **Save:** Choose Save or, if the file has already been named, press Ctrl + S to save your work.

So this is how you can save a workbook in Excel.

Inserting text in Excel Spreadsheet

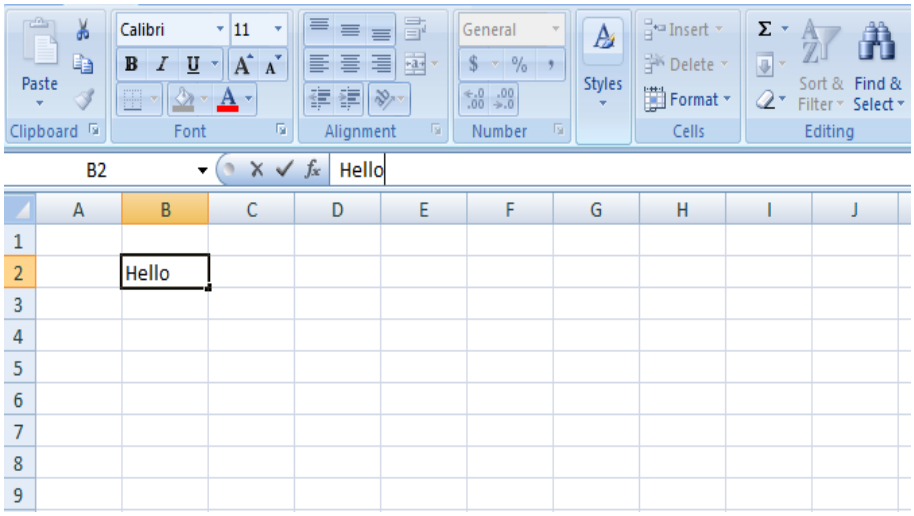
Each rectangular box in a row or column of Excel is called a cell. Excel has multiple rows and columns. Therefore, on a worksheet or spreadsheet, a cell address can be found by combining a row number with a column letter. These addresses (in Excel formulas) allow us to refer to any cell in the worksheet. When you click on the cell, the address is displayed in the name box in the upper left (below the Home tab).



To insert the data into the cell follow the following steps:

Step 1: Go to a cell and click on it

Step 2: By typing something on the keyboard, you can insert your data (In that selected cell).



Whatever text you type displays in the formula bar as well (for that cell).

How to Edit/ Delete Cell Contents in the Excel Spreadsheet

To delete cell content follow the following steps:

Step 1: To alter or delete the text in a cell, first select it.

Step 2: To remove or edit text, use the keyboard's Backspace key. Alternatively, to remove a cell's whole contents, press the Delete key. The formula bar can also be used to alter and remove text. Just move the pointer to the formula bar after selecting the cell.

4.3 FORMATTING WORKSHEETS

Making several charts for a given data collection is one of Excel's primary functions. We can alter these charts in a variety of ways using Excel to make them more informative.

Using the appropriate example below, we will examine the most popular "Formatting" done on charts in this article.

Example: Think about a batsman's performance during a Twenty20 match. The data set includes the runs that the batsman has scored in different games.

Matches	Runs Scored
M-1	50
M-2	42
M-3	37
M-4	65
M-5	33
M-6	99

We will now use the table above to insert a bar chart. To add a bar chart:

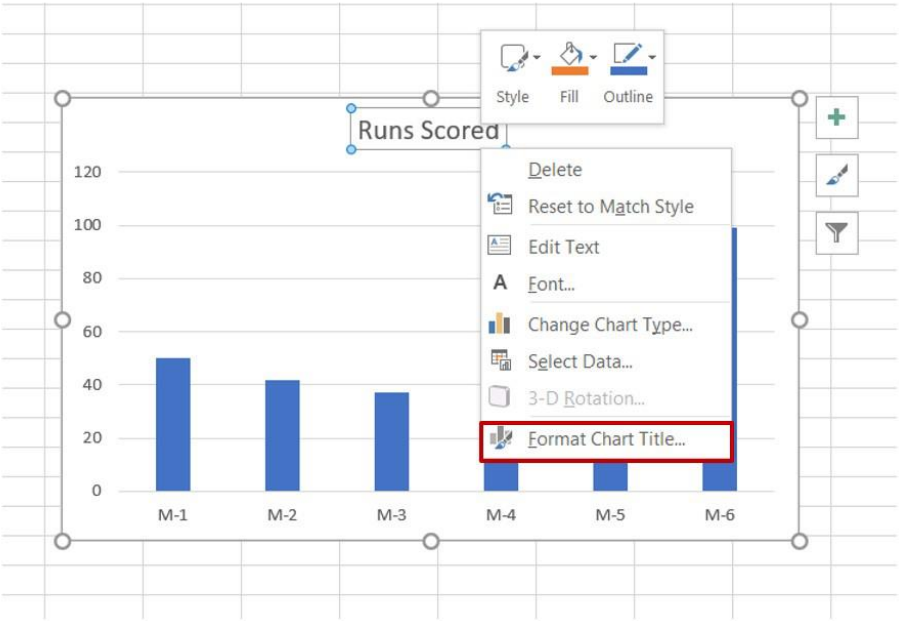
Select dataset -> Click on Insert -> Chart Sets Pop Down -> 2-D column

The key steps to format anything on the chart is:

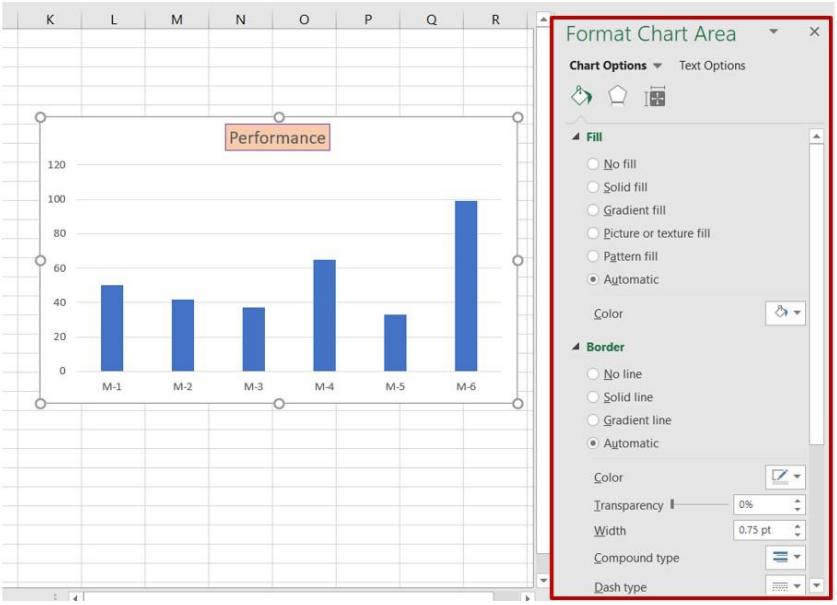
- Select the part of the chart which needs to be formatted.
- Right-click on it and select **"Format".** The format window will open.

1. Formatting the Chart Title:

Select the Title -> Right Click on it -> Format Chart Title

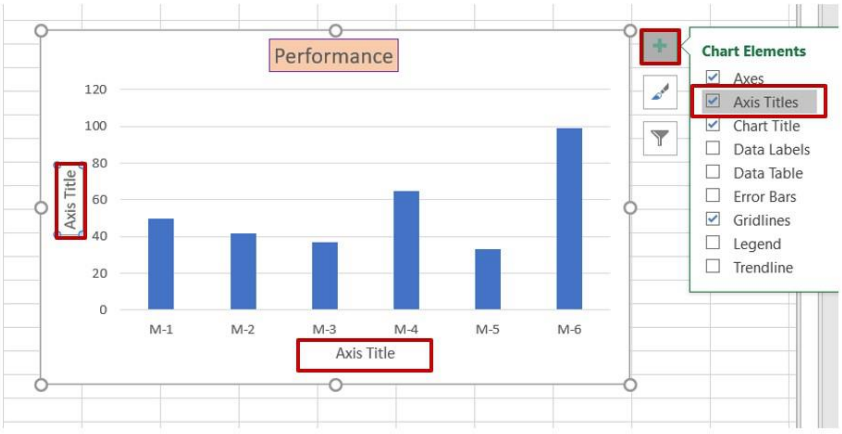


You can add borders around the title, alter the font colour, and make other changes in the Format Chart Title window. Another way to change the title is to just pick a new name and type it again.

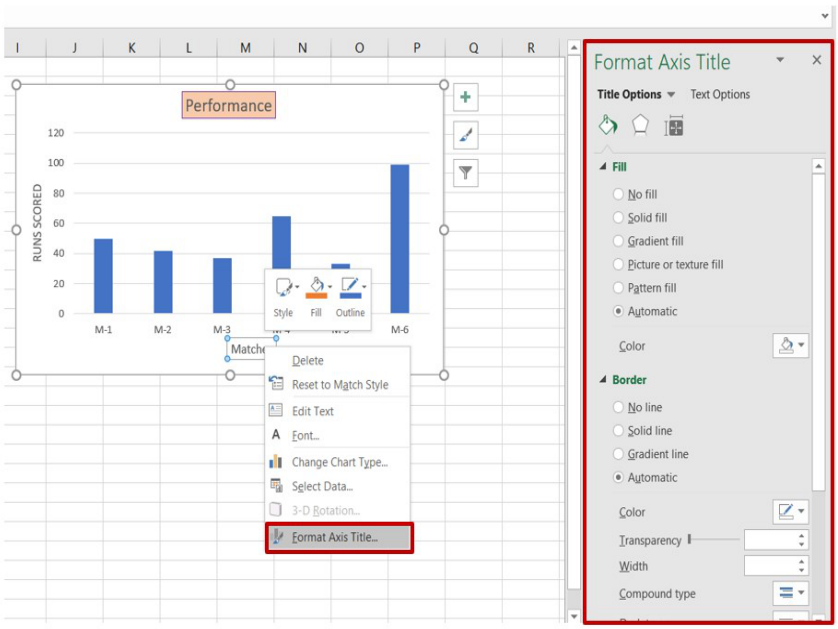


2. Formatting Axis Titles:

You can add the axis title by using the **"+"** button in the top right corner of the chart.



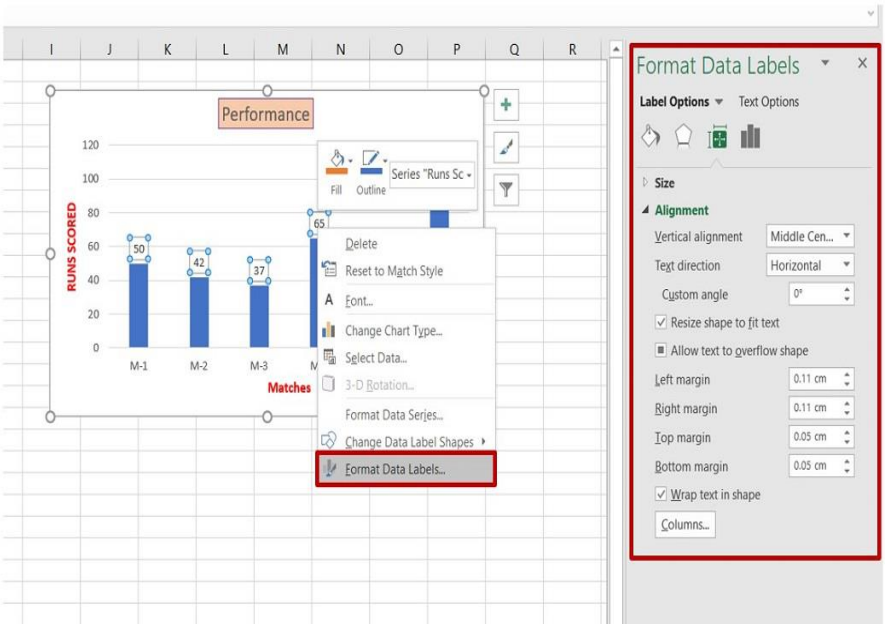
Select the X-axis and Y-axis and rename them. By right-clicking on the axis title and choosing "Format Axis Title," you may change how it looks**".**



3. Formatting Data labels:

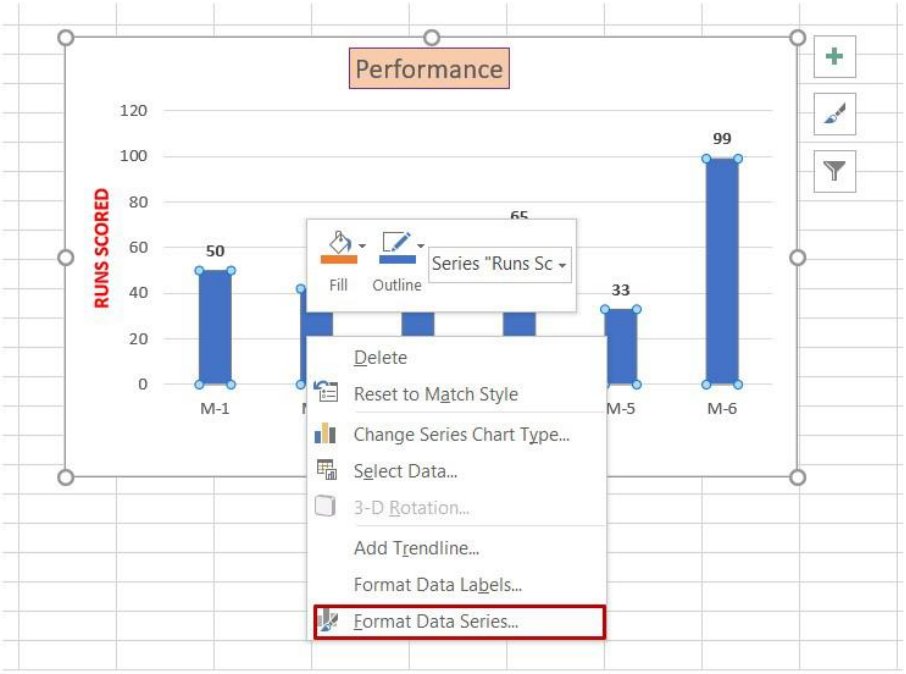
The "+" button in the upper right part of the chart lets you add Data Labels.

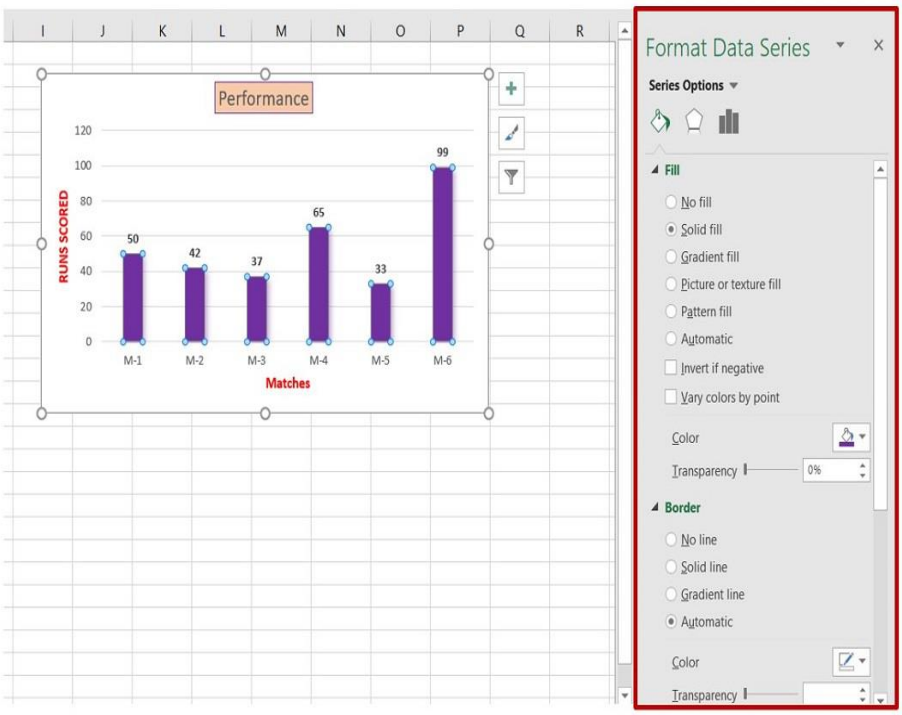
You can now alter the font's colour, size, alignment, and many other settings by opening the Format Data Labels Window.



4. Formatting Data Series:

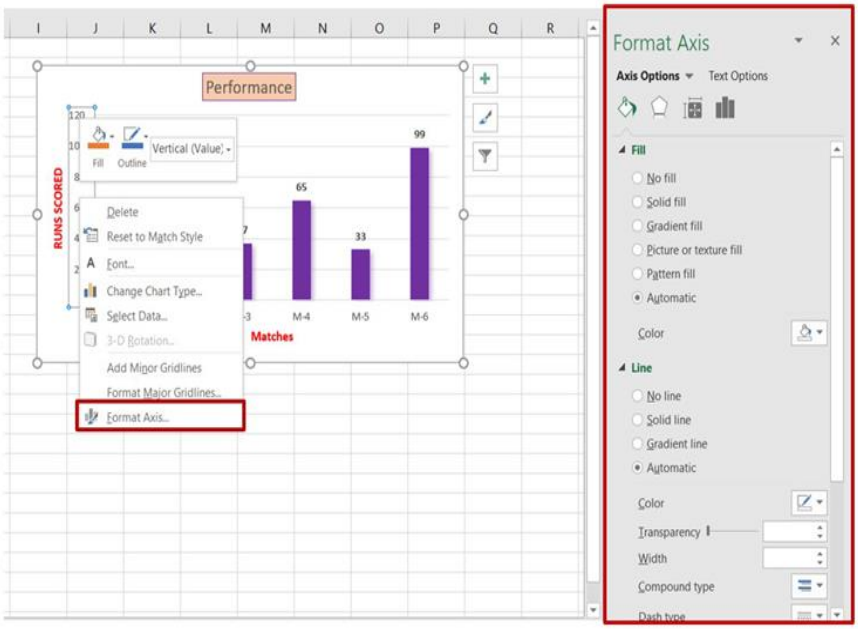
By selecting the bar charts and then launching the "Format Data Series" window, you can alter their colour. By default, all of the data sets bars will be chosen when you left-click on any of the bars once. Left-click twice on the bar that needs formatting if you only want to pick one of these bars.

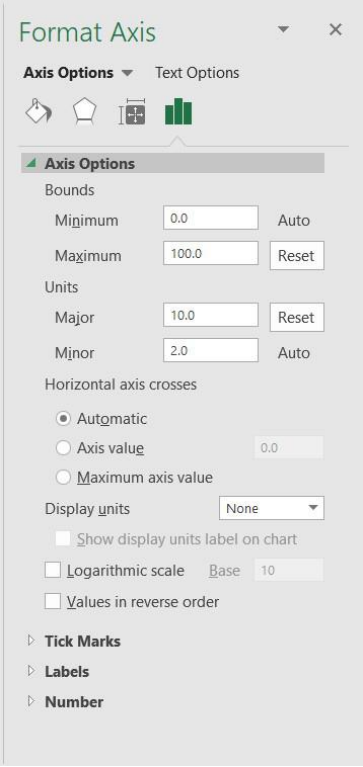




5. Formatting Axis:

This is the most important formatting that we use to change the size of the axes to fit our needs.

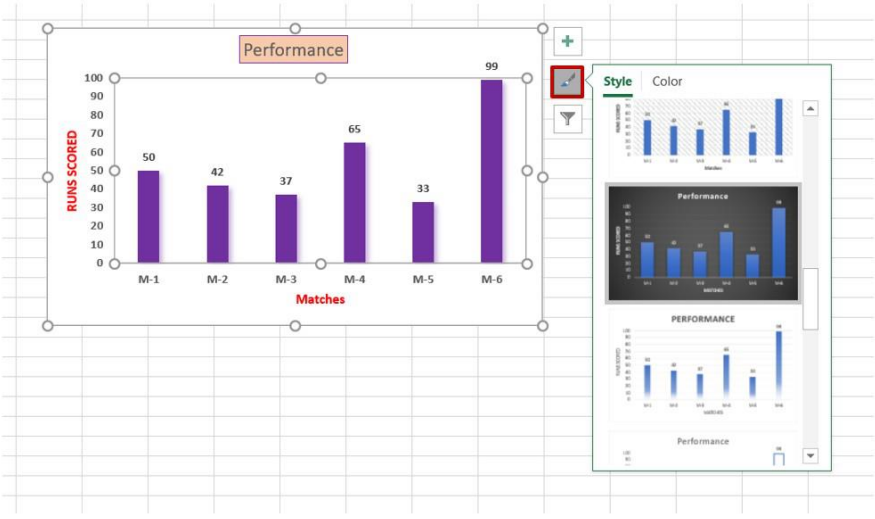




When bound is used, it gives both the highest and lowest values that can be used to track. These lines on the axis are set by the major unit.

6. Formatting Chart Style:

We have access to dynamic chart styles in Excel. Click on the "Paint brush icon" in the top right corner of the chart to pick the style you want.

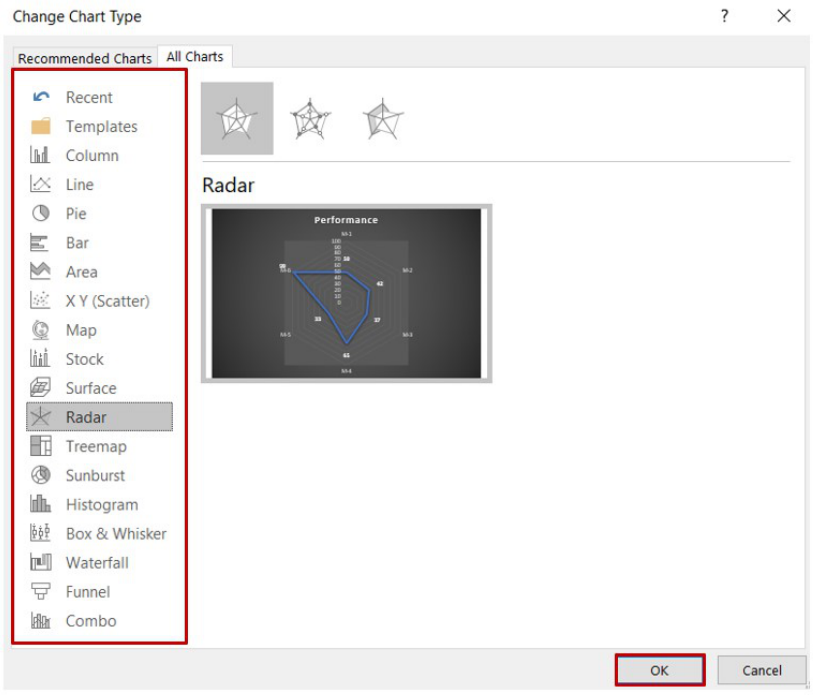


7. Formatting Chart Type:

Along with bar charts, Excel gives us a lot of other charts as well. To change the kind of chart:

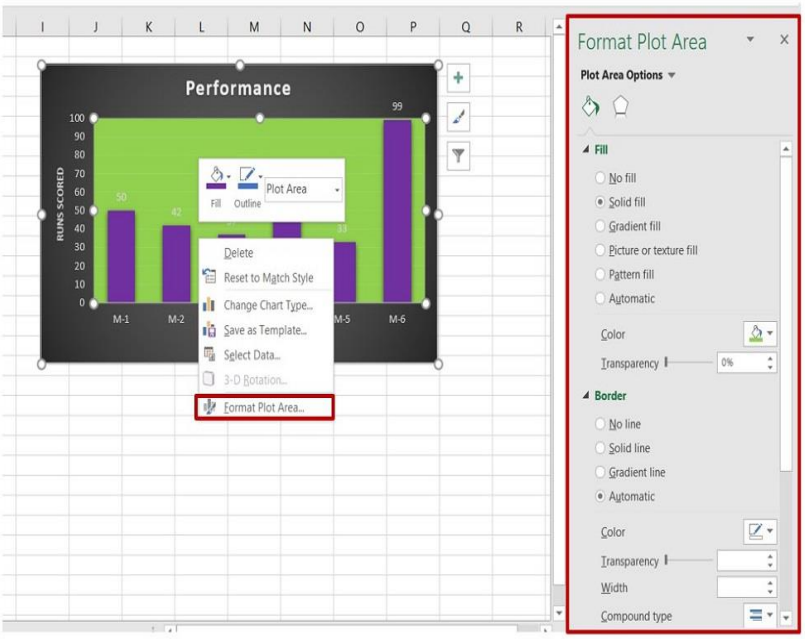
To change this, right-click on the chart and choose "Change." Choose a different type of chart.

Choose the preferred chart type from the list of possibilities in the Change Type window, as seen below:



8. Formatting Plot Area:

Additionally, you can give your chart a backdrop colour. Click the "Format Plot Area" option.



These formatting techniques are among the most commonly used for Excel charts. We can readily investigate Excel's dynamic chart formatting choices with a little self-research.

4.4 TYPES OF CHARTS

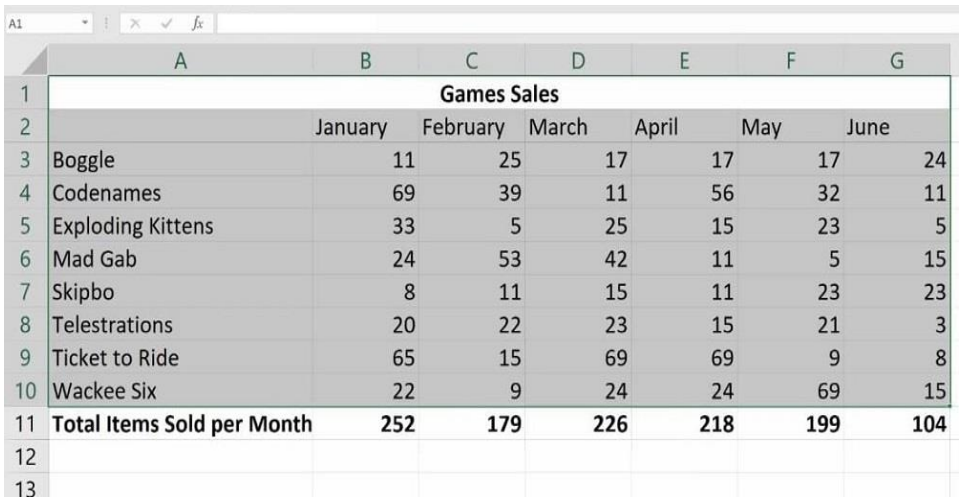
Microsoft Corporation offers Excel, a crucial piece of software. This program is a part of Office 365, one of the most popular software suites. Word, PowerPoint, and other programs are included in this software bundle. Since they are mostly used for office purposes, they are known as Office 365. However, a lot has changed in the globe since then. The world is aware of the benefits of employing digital tools since the Corona Pandemic. That was the same with Office 365. Excel software is also given some weight by users as a component of the software suite. They serve more than just official functions. However, they can also be employed in educational settings. Excel is a piece of software that can effectively store data. Thus, this software makes it easier to search for the data.

Excel has yet another fantastic function. From the given data, it may be used to create the charts. The charts are useful for examining any data expansion. Extracting some analysis from thousands of data points is a challenging undertaking. However, it will be simple to analyse those data if they are transformed into charts. The same can be done with an Excel sheet. No matter how much data there is in the Excel sheet, charts can still be created. There are two methods available for creating the charts. In one instance, users must do tasks independently. However, in order to generate those items, users must build a specific function.

Creation of Charts in Excel using Worksheet Data

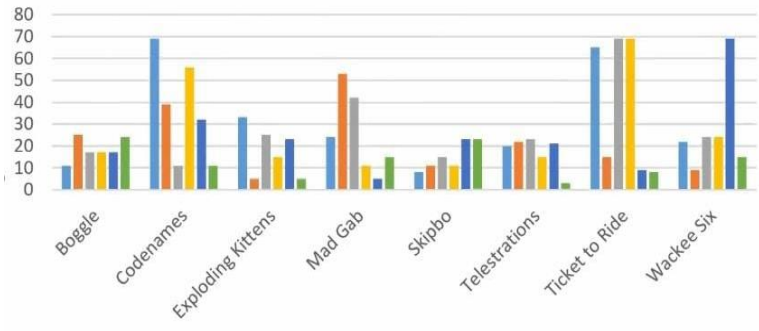
Worksheet data is required for this approach. This is a straightforward technique for turning the provided data into charts. The manual way is this. This indicates that no code is used or automation integrated. The user must perform all of the actions. Even when the user performs it, it is still far simpler than other procedures. Since everyone can complete this technique without any problems or prior expertise.

Step 1: In order to create the charts, users must first have a set of data. All of them must be entered into the Excel worksheet. They must follow this easy procedure. Users then have to decide which region they want to extract the chart from. There may be some data in the spreadsheet that should not be included in the graphic. Users must therefore choose which data should be included in the display.



	A	B	C	D	E	F	G
1	Games Sales						
2		January	February	March	April	May	June
3	Boggle	11	25	17	17	17	24
4	Codenames	69	39	11	56	32	11
5	Exploding Kittens	33	5	25	15	23	5
6	Mad Gab	24	53	42	11	5	15
7	Skipbo	8	11	15	11	23	23
8	Telestrations	20	22	23	15	21	3
9	Ticket to Ride	65	15	69	69	9	8
10	Wackee Six	22	9	24	24	69	15
11	**Total Items Sold per Month**	**252**	**179**	**226**	**218**	**199**	**104**
12							
13							

Step 2: Users must now concurrently press Alt and F1. Consequently, users will be able to view the data in the form of a chart quite quickly. The chart can now be dragged in any direction by users. They can use it for other apps as well. The data analysis will be aided by this chart. This procedure is easy.



So, we were able to use worksheet data to make a chart in Excel.

Creation of Charts in Excel using VBA Code

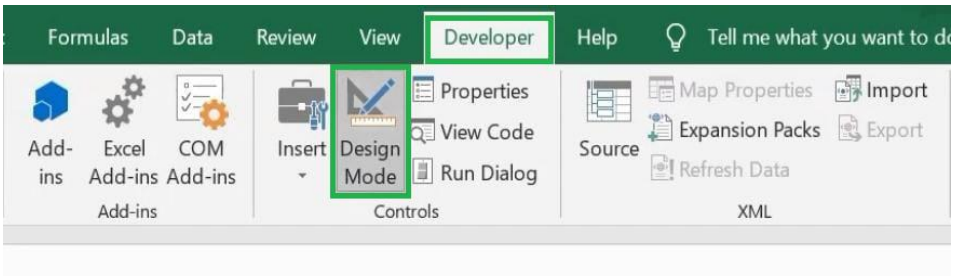
One unique kind of programming language is VBA code. However, unlike Python, Java, and others, they are not regarded as conceptual programming languages. This is the basic programming language included in Office 365 software. This implies that programs like Word, Excel, and others can comprehend those. This programming language is readable by humans. Additionally, this aids in automating some Excel file functions. Additionally, this will aid in the creation of charts.

Step 1: In order to utilise the VBA code to create the charts, users must also have some data. Here, a collection of data is assigned for the demonstration.

	A	B
1	Create Chart Using VBA Code	
2	Month	Total Sale
3	January	1200
4	February	1100
5	March	1000
6	April	900
7	May	1500
8	June	850
9	July	980
10	August	1600
11	September	1400
12	October	1050
13	November	1200
14	December	800
15		

Step 2: The Developer Tab must be accessed by users. Users will find additional settings in this tab. Design Mode is going to be one of those alternatives. Clicking on that will launch the VBA editor for users.

Note: *Users may not see the Developer tab if they are using an outdated version of Excel. Users must press Alt+F11 at the same time in those situations. This will make it easier to edit using the same VBA window. Therefore, users shouldn't be concerned. Even the Office 2007 Edition may be used by users. However, this procedure will function in all editions.*



Step 3: Users now have to write some code. This code may appear to be as challenging as it is. However, a step-by-step analysis of this code will make the technique easier to understand. Let's attempt to identify the procedure one step at a time.

1. Users must first select a topic. Programmers that write programs in the C programming language must follow the same procedure. In the C computer language, the main () function was the first thing that programmers wrote. The "Sub" will behave similarly in this situation. Access modifiers must be declared by users using the Java programming language. Additionally, users must give it a name.
2. To perform additional actions, users must now declare a variable. Here, the keyword "Dim" is used to declare the variable. In order to create the chart, users must now supply a variable name and connect that variable.
3. In order to create charts, users must now add the variable using the "Set" keyword. This line aids in utilising the declared variable to create a chart.

4. Users must now supply the variable with data. Therefore, users must use the "SetSourceData" keyword to supply the data. Additionally, users must supply the name of the sheet and the range of data that will be used to create the chart. The "Sheet" name must be entered by users there. This is not the worksheet; it's the plain sheet.
5. The procedure is now finished. It's time to wrap things up. There, users must utilise the "End" keyword. When utilising the ending brace in the C programming language, this is the identical procedure that any programmer must follow.

VBA Code:

Private Sub Comm

Dim my_chart As Chart

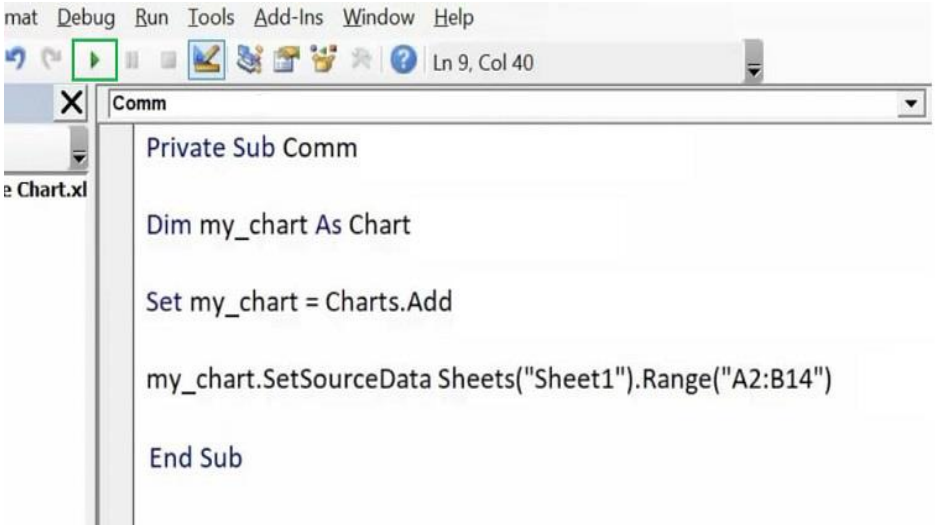
Set my_chart = Charts.Add

my_chart.SetSourceData Sheets("Sheet1").Range("A2:B14")

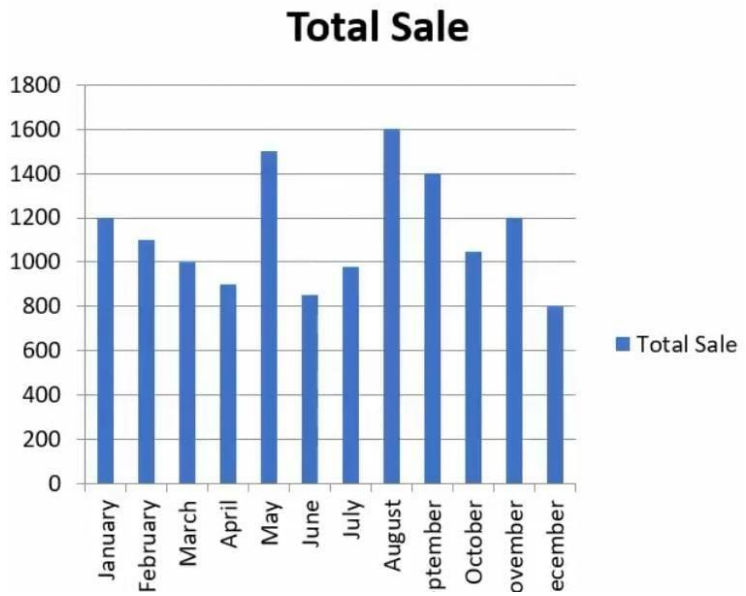
End Sub

```
Private Sub Comm
Dim my_chart As Chart
Set my_chart = Charts.Add
my_chart.SetSourceData Sheets("Sheet1").Range("A2:B14")
End Sub
```

Step 4: Users will now see a play button on the top side of the VBA Editor once the process is finished. To create the charts from the written code, users must click on that button.



Step 5: The chart is currently visible to the users there. This chart can be used with any other software. Users can also drag to any other location.



Hence, we have successfully created a chart in Excel using VBA Code.

Excel is an effective tool for handling vast amounts of data. The purpose of this tool is to analyse data quickly. A set of data can be converted into a different format using Excel software. For this reason, the data provided there is used to create charts using this software. We have shown in this article how to create charts using the data from the spreadsheet. Additionally, we covered how to use VBA code and create charts using a given set of data. Here, the VBA code's methodical implementation approach is also covered.

UNIT 7 MATHEMATICAL AND STATISTICAL FUNCTIONS IN EXCEL

Let's first examine the definition of statistics and its purpose before moving on to the statistical function in Excel. Therefore, one area of science that can assign a property to a sample is statistics. Data collection, organisation, analysis, and presentation are its main concerns. Karl Pearson, a renowned mathematician and the founder of contemporary statistics, once said, "statistics is the grammar of science.

Every industry, including business, marketing, governance, engineering, and health, among others, used statistics. In summary, statistics is a quantitative instrument that helps us better comprehend the world. For instance, before enacting any policies, the government researches the country's demographics, which can only be done with the use of statistics. As an additional illustration, it is crucial to comprehend your target audience while creating a film or advertising campaign, and statistics are a useful tool in this regard as well.

Ways to approach statistical function in Excel:

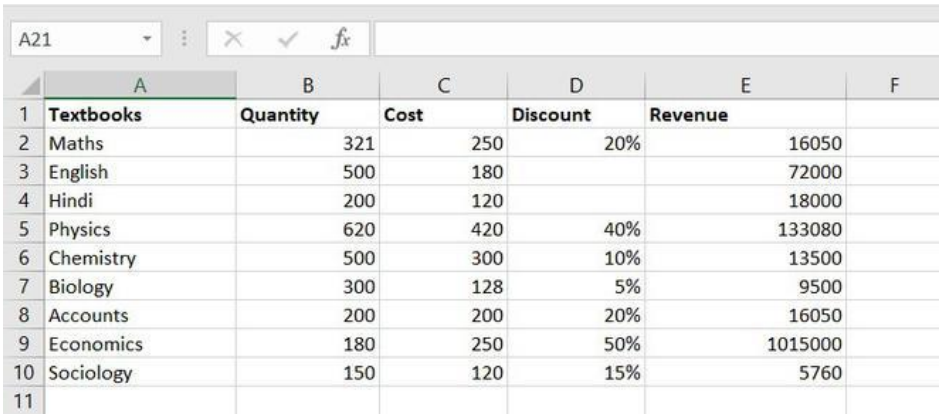
A variety of statistical functions are available in Excel, ranging from the simple median mode and mean to more intricate statistical distributions and probability tests. To comprehend statistical functions, we will separate them into two categories:

1. Basic statistical Function
2. Intermediate Statistical Function.

Statistical Function in Excel

Excel is the best tool to apply statistical functions. As discussed above we first discuss the basic statistical function, and then we will study intermediate statistical function. Throughout the article, we will take data and by using it we will understand the statistical function.

So, let’s take random data of a book store that sells textbooks for classes 11th and 12th.



	A	B	C	D	E	F
1	Textbooks	Quantity	Cost	Discount	Revenue	
2	Maths	321	250	20%	16050	
3	English	500	180		72000	
4	Hindi	200	120		18000	
5	Physics	620	420	40%	133080	
6	Chemistry	500	300	10%	13500	
7	Biology	300	128	5%	9500	
8	Accounts	200	200	20%	16050	
9	Economics	180	250	50%	1015000	
10	Sociology	150	120	15%	5760	
11						

Example of statistical function.

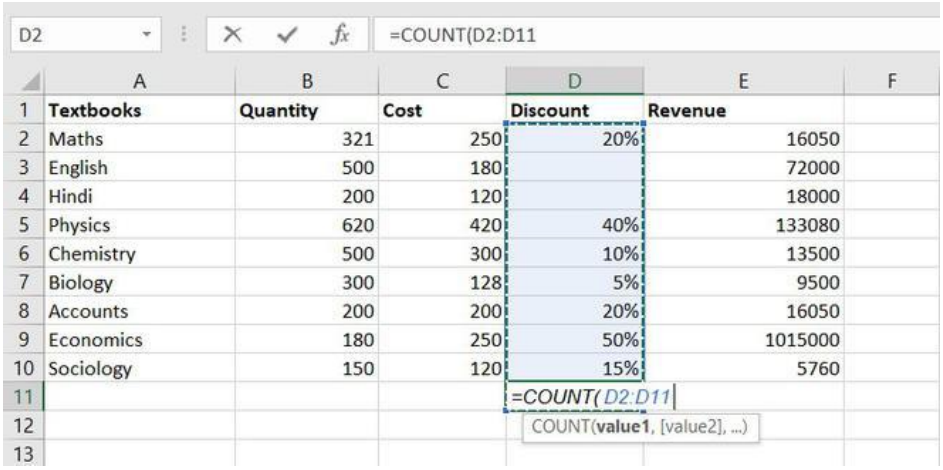
Basic statistical Function

These are a few of the most popular and practical features. These consist of the following functions: COUNT, COUNTA, COUNTBLANK, and COUNTIFS. One by one, let's talk about:

1. COUNT function

To determine how many cells contain a certain number, utilise the COUNT function. One thing to always keep in mind is that it will simply count the number.

Formula for COUNT function = COUNT(value1, [value2], ...)



	A	B	C	D	E	F
1	Textbooks	Quantity	Cost	Discount	Revenue	
2	Maths	321	250	20%	16050	
3	English	500	180		72000	
4	Hindi	200	120		18000	
5	Physics	620	420	40%	133080	
6	Chemistry	500	300	10%	13500	
7	Biology	300	128	5%	9500	
8	Accounts	200	200	20%	16050	
9	Economics	180	250	50%	1015000	
10	Sociology	150	120	15%	5760	
11				=COUNT(D2:D11		
12						
13						

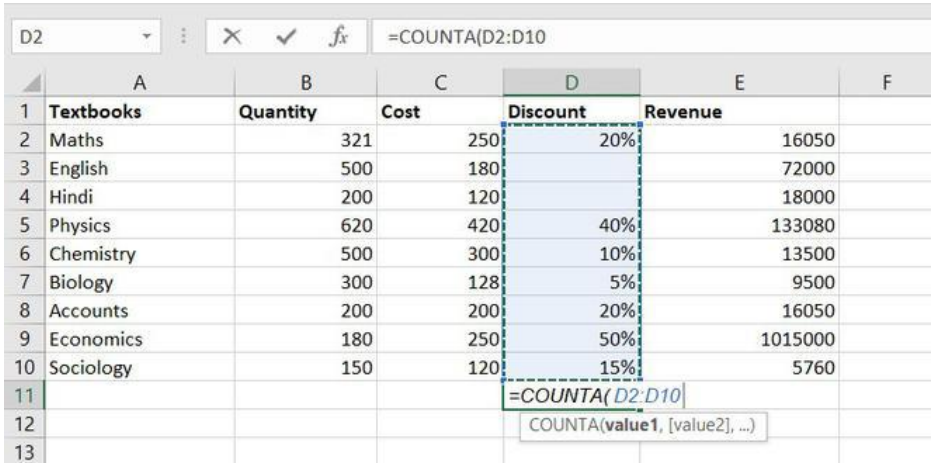
Example of statistical function.

Thus, there are **7 textbooks** that have a discount out of 9 books.

2. COUNTA function

This function will count everything, including the amount of cells with numbers, error values, and blank text, among other types of information.

Formula for COUNTA function = COUNTA(value1, [value2], ...)



	A	B	C	D	E	F
1	**Textbooks**	**Quantity**	**Cost**	**Discount**	**Revenue**	
2	Maths	321	250	20%	16050	
3	English	500	180		72000	
4	Hindi	200	120		18000	
5	Physics	620	420	40%	133080	
6	Chemistry	500	300	10%	13500	
7	Biology	300	128	5%	9500	
8	Accounts	200	200	20%	16050	
9	Economics	180	250	50%	1015000	
10	Sociology	150	120	15%	5760	
11						
12						
13						

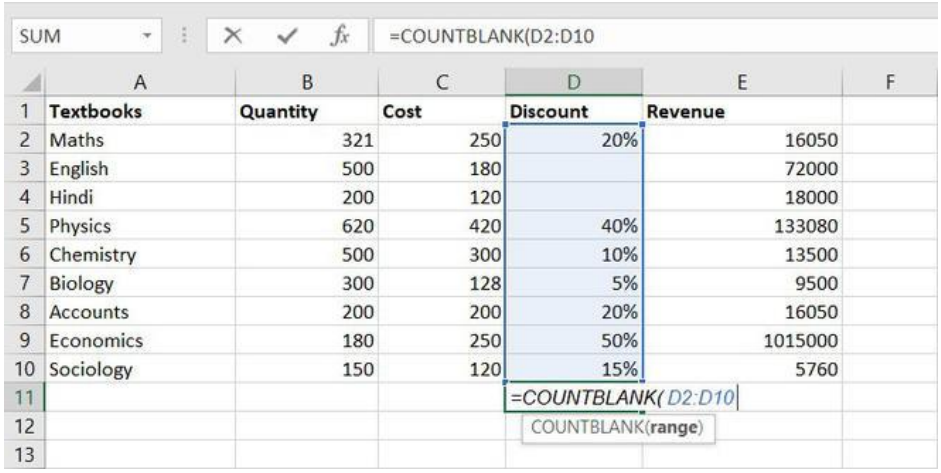
Example of statistical function.

So, there are a total of 9 subjects that being sold in the store

3. COUNTBLANK function

COUNTBLANK function, as the term, suggest it will only count blank or empty cells.

Formula for COUNTBlANK function = COUNTBLANK(range)



	A	B	C	D	E	F
1	**Textbooks**	**Quantity**	**Cost**	**Discount**	**Revenue**	
2	Maths	321	250	20%	16050	
3	English	500	180		72000	
4	Hindi	200	120		18000	
5	Physics	620	420	40%	133080	
6	Chemistry	500	300	10%	13500	
7	Biology	300	128	5%	9500	
8	Accounts	200	200	20%	16050	
9	Economics	180	250	50%	1015000	
10	Sociology	150	120	15%	5760	
11						
12						
13						

Example of statistical function.

There are 2 subjects that don't have any discount.

4. COUNTIFS function

The most frequently used Excel function is COUNTIFS. The function counts the cell that satisfies a condition after operating on one or more conditions within a specified range.

Formula for COUNTIFS function = COUNTIFS (range1, criteria1, [range2], [criteria2], ...)

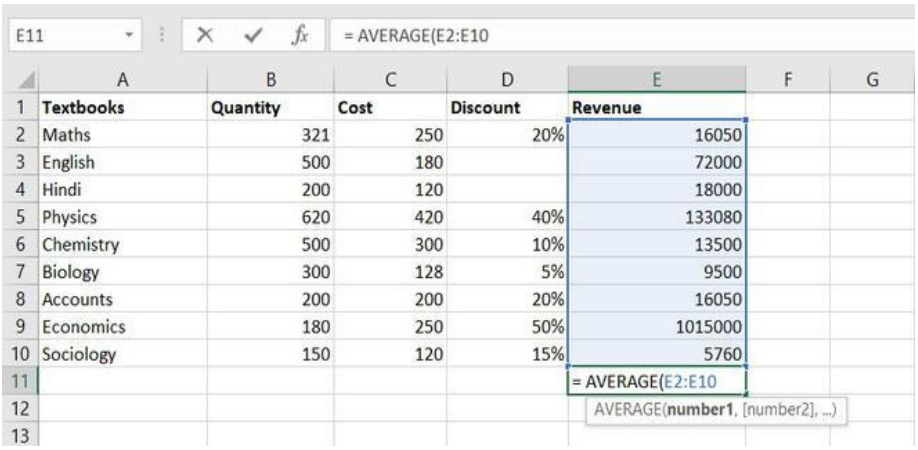
Intermediate Statistical Function

Let's talk about a few Excel intermediate statistical functions. The analyst uses these functions more frequently. Functionalities such as the AVERAGE, MEDIAN, MODE, STANDARD DEVIATION, VARIANCE, QUARTILES, and CORRELATION functions are among them.

1. AVERAGE value1, [value2], …)

One of the most used intermediate functions is the AVERAGE function. The arithmetic mean or average of the cell within a specified range will be returned by the function.

Formula for AVERAGE function = AVERAGE(number1, [number2], ...)



	A	B	C	D	E	F	G
1	**Textbooks**	**Quantity**	**Cost**	**Discount**	**Revenue**		
2	Maths	321	250	20%	16050		
3	English	500	180		72000		
4	Hindi	200	120		18000		
5	Physics	620	420	40%	133080		
6	Chemistry	500	300	10%	13500		
7	Biology	300	128	5%	9500		
8	Accounts	200	200	20%	16050		
9	Economics	180	250	50%	1015000		
10	Sociology	150	120	15%	5760		
11					= AVERAGE(E2:E10		
12							
13							

Example of statistical function.

So the average total revenue is Rs.144326.6667

2. AVERAGEIF function

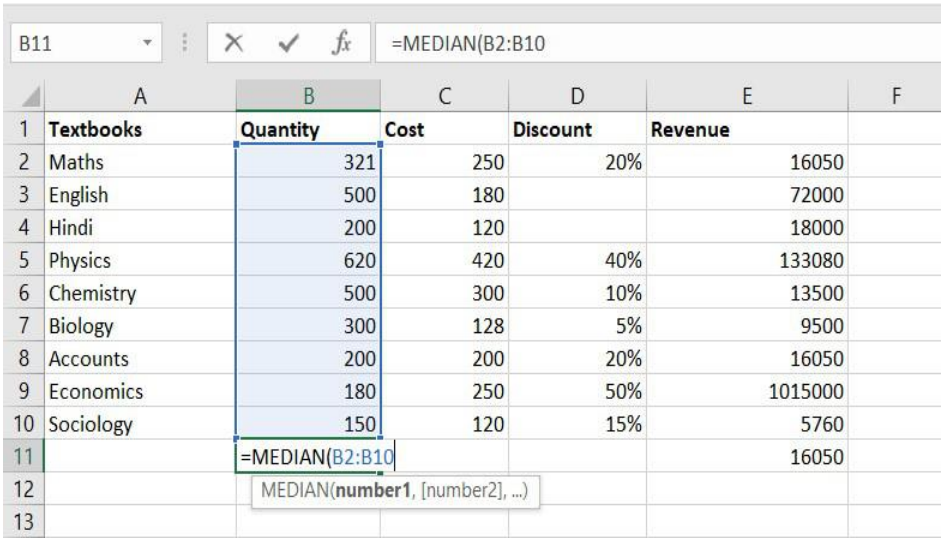
The arithmetic mean or average of the cell within a certain range that satisfies the specified conditions will be returned by the function.

Formula for AVERAGEIF function = AVERAGEIF(range, criteria, [average_range])

3. MEDIAN function

The data's central value will be returned by the MEDIAN function. It shares syntax with the AVERAGE function.

Formula for MEDIAN function = MEDIAN (number1, [number2], ...)



	A	B	C	D	E	F
1	**Textbooks**	**Quantity**	**Cost**	**Discount**	**Revenue**	
2	Maths	321	250	20%	16050	
3	English	500	180		72000	
4	Hindi	200	120		18000	
5	Physics	620	420	40%	133080	
6	Chemistry	500	300	10%	13500	
7	Biology	300	128	5%	9500	
8	Accounts	200	200	20%	16050	
9	Economics	180	250	50%	1015000	
10	Sociology	150	120	15%	5760	
11		=MEDIAN(B2:B10			16050	
12						
13						

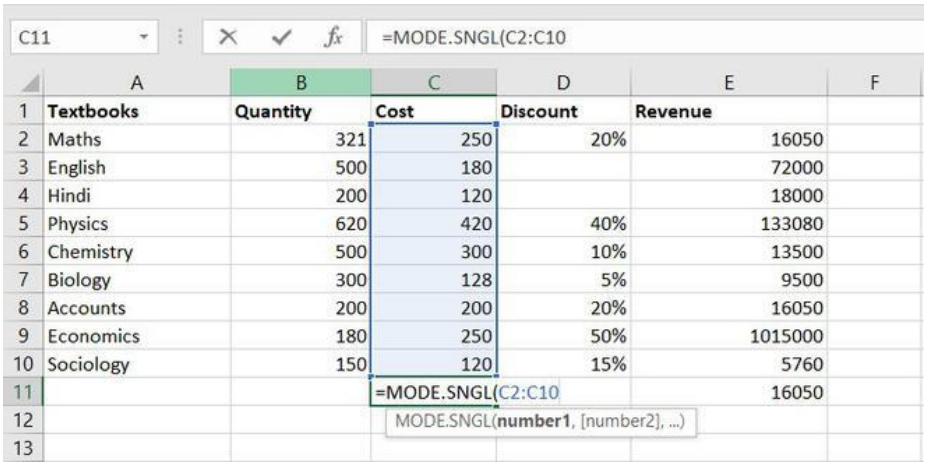
Example of statistical function.

Thus, the median quantity sold is 300.

4. MODE function

The MODE function will return the most frequent value of the cell in a given range.

Formula for MODE function = MODE.SNGL(number1,[number2],...)



	A	B	C	D	E	F
1	**Textbooks**	**Quantity**	**Cost**	**Discount**	**Revenue**	
2	Maths	321	250	20%	16050	
3	English	500	180		72000	
4	Hindi	200	120		18000	
5	Physics	620	420	40%	133080	
6	Chemistry	500	300	10%	13500	
7	Biology	300	128	5%	9500	
8	Accounts	200	200	20%	16050	
9	Economics	180	250	50%	1015000	
10	Sociology	150	120	15%	5760	
11			=MODE.SNGL(C2:C10		16050	
12						
13						

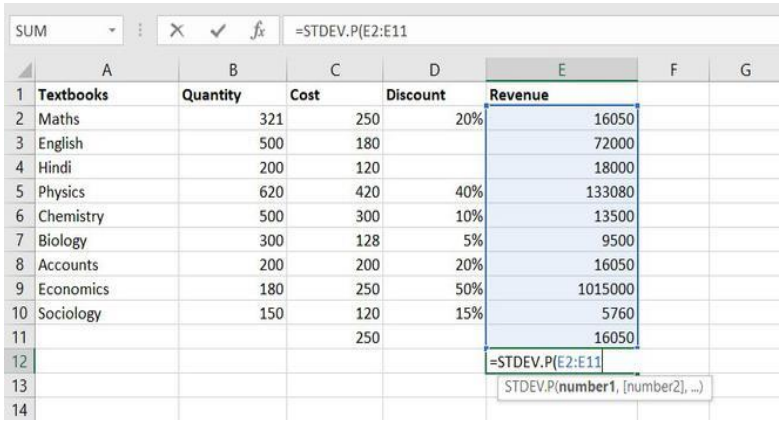
Example of statistical function.

Thus, the most frequent or repetitive cost is Rs. 250.

5. STANDARD DEVIATION

We may ascertain how much the observed value differed or diverged from the average with the use of this function. One of Excel's helpful features is this one.

Formula for STANDARD DEVIATION function = STDEV.P(number1,[number2],…)



	A	B	C	D	E	F	G
1	Textbooks	Quantity	Cost	Discount	Revenue		
2	Maths	321	250	20%	16050		
3	English	500	180		72000		
4	Hindi	200	120		18000		
5	Physics	620	420	40%	133080		
6	Chemistry	500	300	10%	13500		
7	Biology	300	128	5%	9500		
8	Accounts	200	200	20%	16050		
9	Economics	180	250	50%	1015000		
10	Sociology	150	120	15%	5760		
11			250		16050		
12					=STDEV.P(E2:E11		
13							
14							

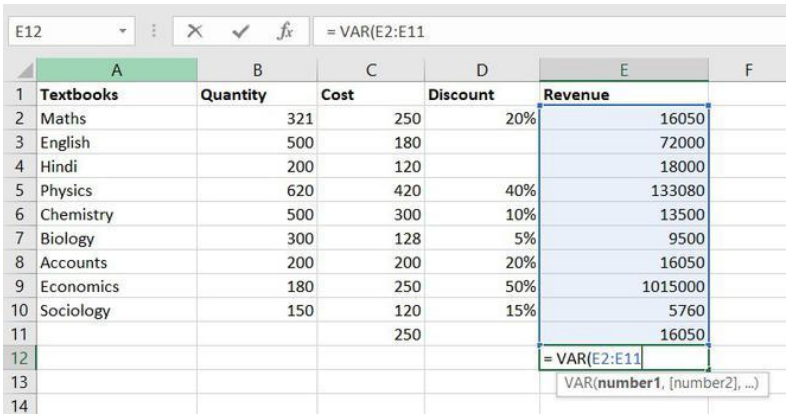
Example of statistical function.

Thus, Standard Deviation of total revenue =296917.8172

6. VARIANCE function

We must first define variance in order to comprehend the VARIANCE function. In essence, variance will establish how varied your data set is. There is more volatility the more widely distributed the data.

Formula for VARIANCE function = VAR(number1, [number2], …)



	A	B	C	D	E	F
1	Textbooks	Quantity	Cost	Discount	Revenue	
2	Maths	321	250	20%	16050	
3	English	500	180		72000	
4	Hindi	200	120		18000	
5	Physics	620	420	40%	133080	
6	Chemistry	500	300	10%	13500	
7	Biology	300	128	5%	9500	
8	Accounts	200	200	20%	16050	
9	Economics	180	250	50%	1015000	
10	Sociology	150	120	15%	5760	
11			250		16050	
12					= VAR(E2:E11	
13						
14						

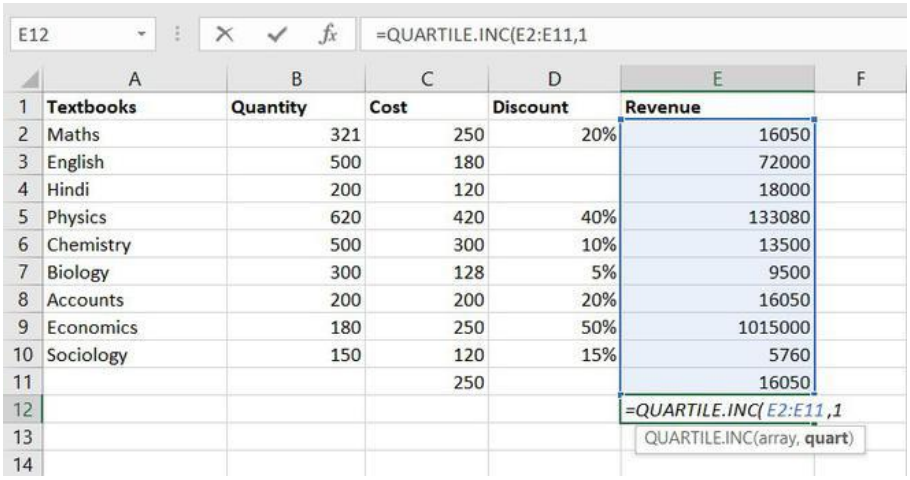
Example of statistical function.

So, the **variance** of Revenue= 97955766832

7. QUARTILES function

Similar to how the median splits the data into two equal parts, the quantile splits the data into four parts. Thus, the dataset's quartiles are returned via the Excel QUARTILES function. The first quartile, second quartile, third quartile, maximum, and minimum values can all be returned. Let's examine the syntax:

Formula for QUARTILES function = QUARTILE (array, quart)



	A	B	C	D	E	F
1	**Textbooks**	**Quantity**	**Cost**	**Discount**	**Revenue**	
2	Maths	321	250	20%	16050	
3	English	500	180		72000	
4	Hindi	200	120		18000	
5	Physics	620	420	40%	133080	
6	Chemistry	500	300	10%	13500	
7	Biology	300	128	5%	9500	
8	Accounts	200	200	20%	16050	
9	Economics	180	250	50%	1015000	
10	Sociology	150	120	15%	5760	
11			250		16050	
12					=QUARTILE.INC(E2:E11,1	
13						
14						

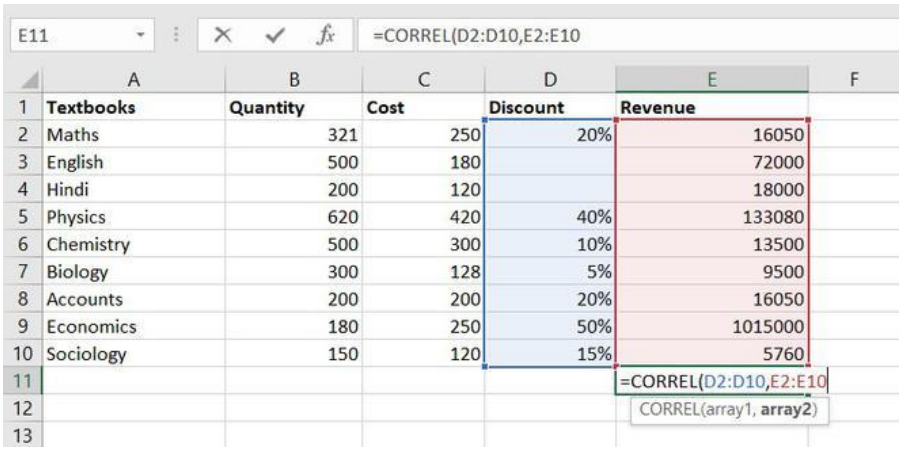
Example of statistical function.

So, the first quartile = 14137.5

8. CORRELATION function

The correlation function, which is mostly employed by analysts to examine data, aids in determining the link between two variables. The correlation coefficient's range is between -1 to +1.

Formula for CORRELATION function = CORREL(array1, array2)



	A	B	C	D	E	F
1	Textbooks	Quantity	Cost	Discount	Revenue	
2	Maths	321	250	20%	16050	
3	English	500	180		72000	
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10	Sociology	150	120	15%	5760	
11						
12						
13						

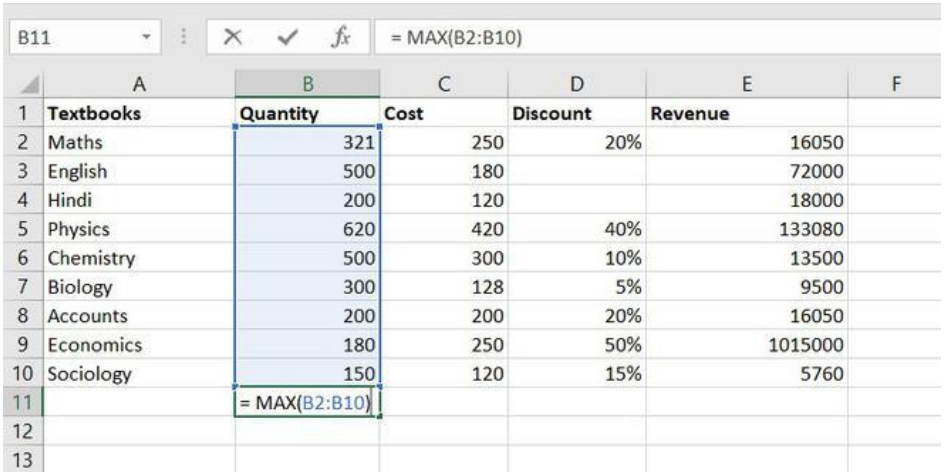
Example of statistical function.

Therefore, 0.802428894 is the correlation coefficient between the store's revenue and discount. We can deduce that the discount has a positive relationship with revenue because it is a positive quantity.

9. MAX function

A given collection of data or array's biggest numerical value will be returned by the MAX function.

Formula for MAX function = MAX (number1, [number2], ...)



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3	English	500	180		72000	
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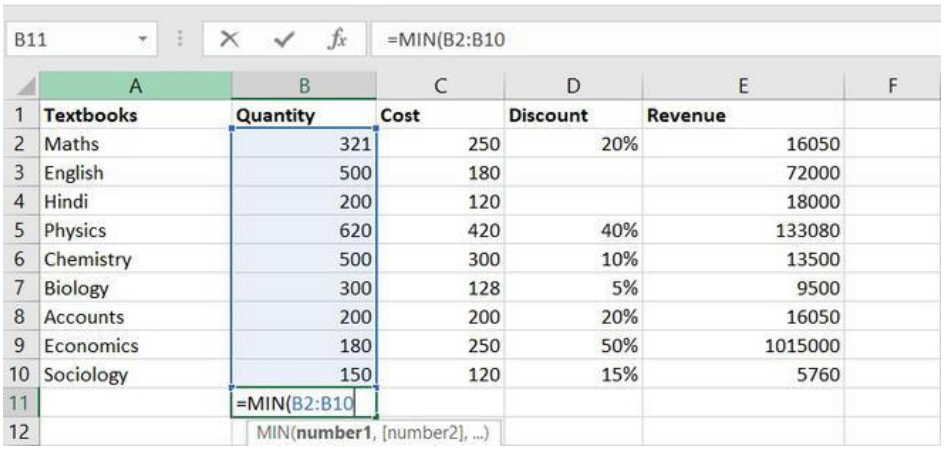
7	Biology	300	128	5%	9500	
8	Accounts	200	200	20%	16050	
9	Economics	180	250	50%	1015000	
10	Sociology	150	120	15%	5760	
11		= MAX(B2:B10)				
12						
13						

There can be a maximum of 620 Physics textbooks.

10. MIN function

The smallest number in a given piece of data or array will be returned by the MIN function.

Formula for MIN function = MIN (number1, [number2], ...)



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7	Biology	300	128	5%	9500	
8	Accounts	200	200	20%	16050	
9	Economics	180	250	50%	1015000	
10	Sociology	150	120	15%	5760	
11						
12						

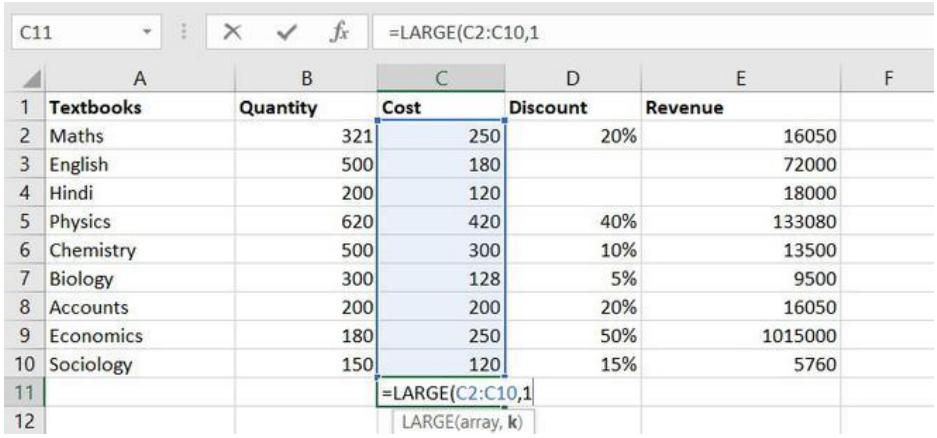
The minimum number of the book available in the store =150(Sociology)

11. LARGE function

The only distinction between the LARGE and MAX functions is that the former returns the nth largest number in an array or set of data.

Formula for LARGE function = LARGE (array, k)

Let's find the most expensive textbook using a large function, where k = 1



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8	Accounts	200	200	20%	16050	
9	Economics	180	250	50%	1015000	
10	Sociology	150	120	15%	5760	
11						
12						

Example of statistical function.

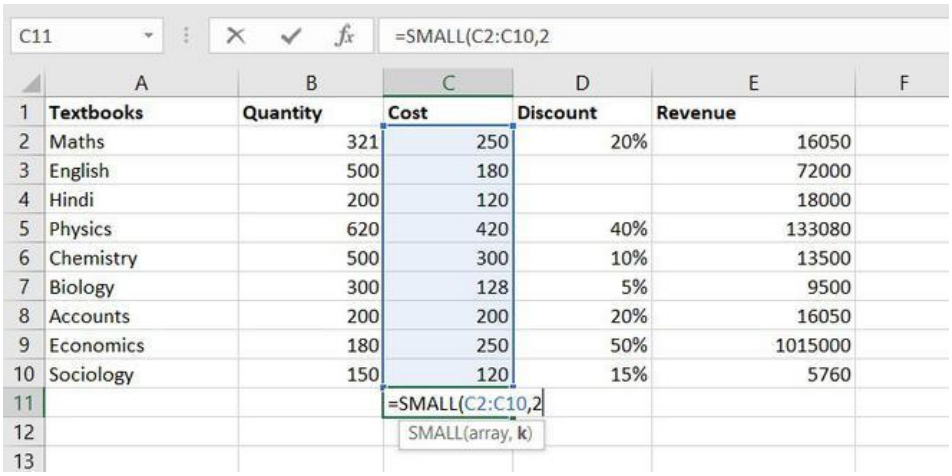
The most expensive textbook is Rs. 420.

12. SMALL function

The only distinction between the SMALL and MIN functions is that the former returns the nth smallest value in an array or set of data.

Formula for SMALL function = SMALL (array, k)

Similarly, using the SMALL function we can find the second least expensive book.



Example of statistical function.

Thus, Rs. 120 is the least cost price.

So these are some statistical functions of Excel. We have learned some of the most simple functions like COUNT functions to complex ones like the CORRELATION function. So far we learn, we understand how much these functions are useful for analyzing any data. You can explore more functions and learn more things of your own.

SHORT QUESTIONS

1. What is MS Excel, and what is it used for?
2. What is the default file extension for an Excel workbook?
3. How are rows and columns labeled in Excel?
4. What is a cell in MS Excel?
5. How do you enter a formula in an Excel cell?
6. What symbol is used to start a formula in Excel?
7. What is the purpose of the AutoSum function?
8. How can you merge multiple cells in Excel?
9. What is the difference between a worksheet and a workbook?
10. How can you insert a new worksheet in an Excel workbook?

LONG ANSWER QUESTION

1. Explain the key features of MS Excel and how it is used in data management and analysis.

2. Describe the components of an Excel worksheet, including rows, columns, cells, and ranges. How do they interact with each other?
3. What are the different types of data that can be entered into an Excel cell? Provide examples of each.
4. Explain the process of creating and applying formulas in Excel. Provide examples of commonly used formulas.
5. What are functions in MS Excel? Describe five important functions with their syntax and usage.
6. How does MS Excel help in data visualization? Explain different types of charts available in Excel and their applications.
7. What is cell referencing in Excel? Explain the difference between relative, absolute, and mixed cell references with examples.
8. What are the different ways to format cells in MS Excel? Discuss the importance of formatting in data representation.
9. Explain the importance of sorting and filtering data in MS Excel. How do these features help in data analysis?
10. Discuss the role of PivotTables in Excel. How do they help in summarizing and analyzing large sets of data?

Reference

MODULE 1: INTRODUCTION TO COMPUTER

Book References:

1. Computer Fundamentals - P.K. Sinha
2. Introduction to Computers - Peter Norton
3. Computer Today - Suresh K. Basandra
4. Fundamentals of Computers - V. Rajaraman
5. Introduction to Information Technology - ITL Education Solutions Limited

MODULE 2: INTRODUCTION TO MS WORD

Book References:

1. Microsoft Office 365: The Complete Guide - Kevin Wilson
2. MS Office for Everyone - P.K. Joshi
3. Learn Microsoft Office - Guy Hart-Davis
4. Computer Applications in Business - S.S. Srivastava
5. Practical Microsoft Office - June Jamrich Parsons

MODULE 3: INTRODUCTION TO MS POWERPOINT

Book References:

1. PowerPoint 2021 For Dummies - Doug Lowe
2. Microsoft PowerPoint Step by Step - Joan Lambert
3. Presentation Skills For Managers - Jennifer Rotondo and Mike Rotondo
4. Effective Presentations - Melanie Morgan
5. Office Applications - Prakash Kumar Sinha

MODULE 4: INTRODUCTION TO MS EXCEL

Book References:

1. Excel 2021 For Dummies - Greg Harvey
2. Microsoft Excel Step by Step - Curtis Frye
3. Excel Data Analysis - Paul McFedries
4. Spreadsheet Modeling and Applications - S. Christian Albright
5. Computer Applications in Business - Dr. Suresh Garg

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