S.Y.B.COM.

(ACCOUNTING & FINANCE)

SEMESTER - III

INFORMATION TECHNOLOGY IN ACCOUNTANCY - I

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Sr. No.	Modules	No. of Lectures
1	Introduction to Computers	10
2	Office Productivity Tools	20
3	Web	10
4	Introduction to Internet and other emerging technologies	10
5	Electronic Commerce	10
	Total	**60**

Sr. No.	Modules / Units
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1

INTRODUCTION TO COMPUTERS

Unit Structure

1.0 OBJECTIVES

By the end of this module, you should be able to :

1) Identify and name computer parts, other type of computers

2) Define basic concepts used in computer

3) Describe the functions of computer hardware

4) Use of computer software

5) Identify the memory and storage devices and various functions of it

6) Identify the networks and topologies

1.1 COMPUTER DEFINITION

The simple meaning of a computer is a machine that can calculate. However, modern computers are not just a calculating device anymore. They can perform a variety of tasks. In simple terms, a computer is a programmable electronic machine used to store, retrieve, and process data.

"A computer is a programmable electronic device that takes data, performs instructed arithmetic and logical operations, and gives the output."

Whatever is given to the computer as input is called 'data', while the output received after processing is called 'information'.

A computer is a general purpose electronic device that can be programmed to carry out a set of arithmetic or logical operations.

Computers can be categorized in several ways. For example, computers can be analog or digital based on their data representation. Some computers are designed for use by one person, some are meant to be used by groups of people. Computers can also be categorized by their speed at which they operate and types of tasks they can perform.

The computer not only processes data, but also stores it. It uses various electronic means for data and information storage. This stored data can be modified by the computer using its instructions and can transform the data into information. The data stored on digital computers is in tiny units called bits. The stored data is measured using these units. The data is stored, processed and given out to the user using its different parts.

1.2 HISTORY OF COMPUTERS

The term 'Computer' was first introduced in 1640 and referred to as 'one who calculates'. It was derived from the Latin word 'computare', which meant 'to calculate'. In 1897, it was known as the 'calculating machine'. Later in 1945, the term 'computer' was introduced as 'programmable digital electronic computer, which is now called a 'computer'.

When the computers were introduced, they were large and could fill an entire room. Some computers were operated using large-sized vacuum tubes. In 1833, **Charles Babbage** (known as the father of the computer) invented an early calculator, which was named as the '**difference engine**'. Later in 1837, he introduced the first mechanical, general-purpose computer '**Analytical Engine'**. Over time, computers became powerful in performance and small in size.

1.2.1 Generations of Computer

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

In each new generation, the circuits became smaller and more advanced than the previous generation circuits. The miniaturization helped increase the speed, memory and power of computers.

There are five generations of computers which are described below :

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

Some popular first generation computers are :

ENIAC (Electronic Numerical Integrator and Computer)

EDVAC (Electronic Discrete Variable Automatic Computer)

UNIVACI (Universal Automatic Computer)

IBM-701

IBM-650

Second Generation (1959 - 1965) : The second generation (1959-1965) was the era of the transistor computers. These computers used transistors which were cheap, compact and consuming less power; it made transistor computers faster than the first generation computers. In this generation, magnetic cores were used as the primary memory and magnetic disc and tapes were used as the secondary storage. Assembly language and programming languages like COBOL and FORTRAN, and Batch processing and multiprogramming operating systems were used in these computers.

Some of the popular second generation computers are :

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

Third Generation (1965 - 1971) : The third generation computers used integrated circuits (ICs) instead of transistors. A single IC can pack a huge number of transistors which increases the power of a computer and reduces the cost. The computers also became more reliable, efficient and smaller in size. These generation computers used remote processing, time-sharing, and multi-programming as operating systems.

Some of the popular third generation computers are :

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

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

Some of the popular fourth generation computers are :

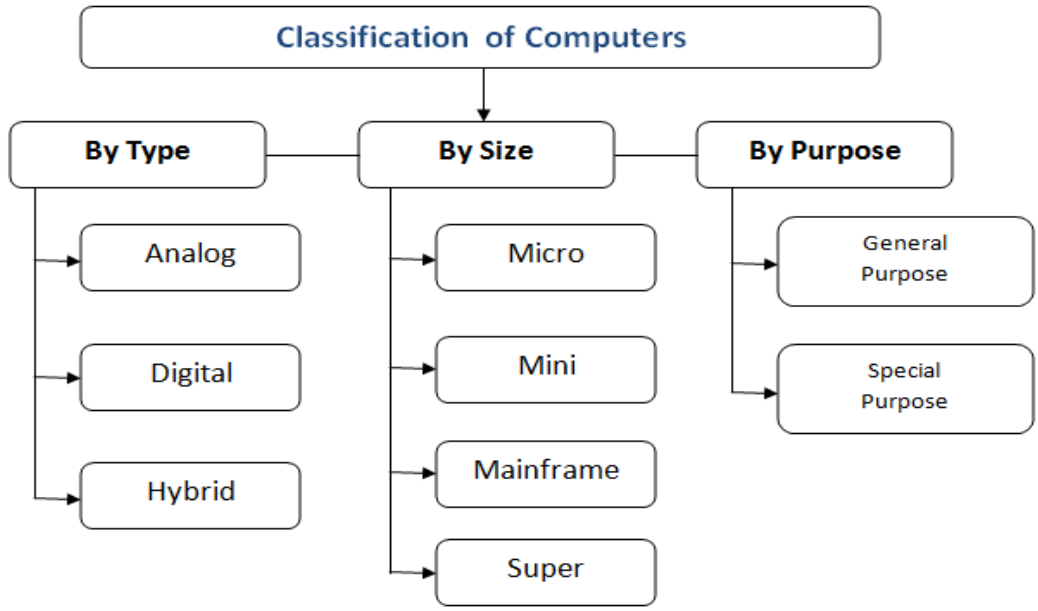
DEC 10, STAR 1000, PDP 11, CRAY-1(Supercomputer)

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

Some of the popular fifth generation computers are :

Desktop, Laptop, NoteBook, UltraBook, ChromeBook

1.2.2 Type of Computers



A) On the basis of size, computers can be of five types :

1) Supercomputer

Supercomputers are the **biggest and fastest computers.** They are designed to process huge amounts of data. A supercomputer can **process trillions of instructions in a second**.

It has thousands of interconnected processors. Supercomputers are particularly used in **scientific and engineering applications** such as weather forecasting, scientific simulations and nuclear energy research.

The first supercomputer was developed by **Roger Cray in 1976**.

Characteristics or applications of supercomputers :

- It has the ability to decrypt passwords to enhance protection for security reasons.
- It produces excellent results in animations.
- It is used for virtual testing of nuclear weapons and critical medical tests.
- It can study and understand climate patterns and forecast weather conditions.
- It helps in designing the flight simulators for pilots at the beginner level for their training.
- It helps in extracting useful information from data storage centres or cloud systems.
- It helps in the diagnosis of various critical diseases and in producing accurate results in brain injuries, strokes, etc.
- It helps in scientific research areas by accurately analysing data obtained from exploring the solar system, satellites, and movement of Earth.
- It is also used in a smog control system where it predicts the level of fog and other pollutants in the atmosphere.

2) Mainframe Computer

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

Characteristics of Mainframe Computers :

- It can process huge amounts of data, e.g. millions of transactions in a second in the banking sector.
- It has a very long life. It can run smoothly for up to 50 years after proper installation.
- It gives excellent performance with large scale memory management.
- It has the ability to share or distribute its workload among other processors and input/output terminals.

- There are fewer chances of error or bugs during processing in mainframe computers. If any error occurs it can fix it quickly without affecting the performance.

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

Applications of mainframe computers :

- In **health care,** it enabled hospitals to maintain a record of their millions of patients in order to contact them for trea2tment or related to their appointment, medicine updates or disease updates.

- In the **field of defence**, it allows the defence departments to share a large amount of sensitive information with other branches of defence.

- In the **field of education**, it helps big universities to store, manage and retrieve data related to their courses, admissions, students, teachers, employees and affiliated schools and colleges.

- In the **retail sector**, the retail companies that have a huge customer base and branches use mainframe computers to handle and execute information related to their inventory management, customer management, and huge transactions in a short duration.

3) Minicomputer

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

Characteristics of miniframe or minicomputer :

- It is light weight that makes it easy to carry and fit anywhere.

- It is less expensive than mainframe computers.

- It is very fast compared to its size.

- It remains charged for a long time.

- It does not require a controlled operational environment.

Applications of minicomputers :

- **Process control** : It was used for process control in manufacturing. It mainly performs two primary functions that are collecting data and

feedback. If any abnormality occurs in the process, it is detected by the minicomputer and necessary adjustments are made accordingly.

- **Data management** : It is an excellent device for small organizations to collect, store and share data. Local hospitals and hotels can use it to maintain the records of their patients and customers respectively.

- **Communications Portal** : It can also play the role of a communication device in larger systems by serving as a portal between a human operator and a central processor or computer.

4) Workstation

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

Characteristics of workstation computer :

- It is a high-performance computer system designed for a single user for business or professional use.

- It has larger storage capacity, better graphics, and a more powerful CPU than a personal computer.

- It can handle animation, data analysis, CAD, audio and video creation and editing.

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

1) Multiple Processor Cores: It has more processor cores than simple laptops or computers.

2) ECC RAM: It is provided with Error-correcting code memory that can fix memory errors before they affect the system's performance.

3) RAID (Redundant Array of Independent Disks): It refers to multiple internal hard drives to store or process data. RAID can be of different types, for example, there can be multiple drives to process data or mirrored drives where if one drive does not work then the other starts functioning.

4) SSD: It is better than conventional hard-disk drives. It does not have moving parts, so the chances of physical failure are very less.

5) Optimized, Higher end GPU: It reduces the load on CPU. E.g., the CPU has to do less work while processing the screen output.

5) Microcomputer

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

Characteristics of a microcomputer :

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

B) On the basis of type of data handling capabilities, computers can be of three types :

1) Analogue Computer

It is particularly designed to process analogue data. Continuous data that changes continuously and cannot have discrete values is called analogue data. So, an analogue computer is used where we don't need exact values or need approximate values such as speed, temperature, pressure etc.

It can directly accept the data from the measuring device without first converting it into numbers and codes.

It measures the continuous changes in physical quantity.

It gives output as a reading on a dial or scale. For example speedometer, mercury thermometer etc.

2) Digital Computer

Digital computers are designed in such a way that it can easily perform calculations and logical operations at high speed. It takes raw data as an input and processes it with programs stored in its memory to produce the final output. It only understands the binary input 0 & 1, so the raw input data is converted to 0 and 1 by the computer and then it is processed by

the computer to produce the result or final output. For example all modern computers like laptops, desktops including smartphones.

3) Hybrid Computer

It is made by combining both analog and digital computers. They are fast like an analog computer and have memory and accuracy like a digital computer, so it has the ability to process both continuous and discrete data. It is widely used in specialized applications where both analog and digital data is required to be processed. For example, A processor which is used in petrol pumps that converts the measurements of fuel into quantity and price.

C) On the basis of purpose, computers can be of two types :

1. General Purpose

General computers can do various everyday tasks such as writing a word processing letter, document preparation, recording, financial analysis, Printing documents, creating databases, and calculations with accuracy and consistency.

The size, storage capacity, and cost of such computers are mainly less. The ability of these computers is limited in performing specialized tasks. Still, it is versatile and useful for serving people's basic needs at home or in the workplace in the environment.

For example, Desktops, laptops, smartphones, and tablets are used on a daily basis for general purposes.

2. Special Purpose

These computers are designed to perform a particular or specialized task. The size, storage capacity, and cost of such computers mainly depend on the nature and size of the work.

The function of these computers is consistent with any particular task. The special computer needs specific input and devices as well as a compatible motherboard with the processor to conduct work efficiently.

These computers are used for special purposes in weather forecasting, space research, agriculture, engineering, meteorology, satellite operation, traffic control, and research in chemical sciences.

For example, Automatic teller machines (ATM), Washing machines, Surveillance equipment, Weather-forecasting simulators, Traffic-control computers, Defense-oriented applications, Oil-exploration systems, Military planes controlling computers.

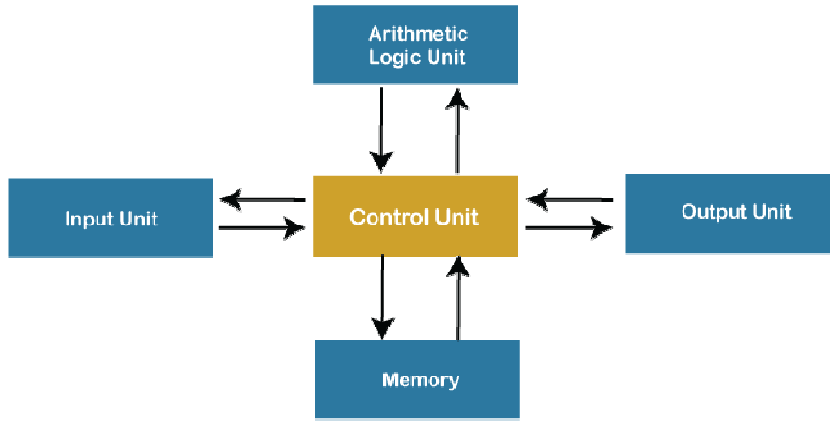
1.3 BASIC STRUCTURE OF PC

The whole computer system is made up of different components that differ with respect to its functionality and form. The three major components comprise of the hardware, software and data.

Hardware is any part of the computer you can touch. It is made up of interconnected electronic devices. The hardware of a computer system consists of mechanical devices to insert data, store it, process it and give the output in various forms.

Software is a set of instructions that makes the computer perform tasks. The software of a computer system supports the hardware devices in their respective activities.

Data consists of individual facts or pieces of information. The computers' primary job is to process this data into useful information. This information in a computer system can be in various forms like, simple text, graphics, videos etc.



The above figure represents the structure of a simple computer system.

Several types of input devices are used to insert the data in the computer system. This data is stored on memory devices in the system. To process the data, the central processing unit communicates with the available memory devices.

To display the data to the users, various output devices are used that form the part of the computer system.

1.4 PARTS OF A COMPUTERS

There are five main computer components that are given below :

1) Input Devices

2) CPU

3) Output Devices

4) Primary Memory

5) Secondary Memory

1.4.1 Operations of computer components

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

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

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

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

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

1.5 INPUT DEVICES

These are external hardware devices of a computer system that are used to insert data inside the computer system. The data can be in the form of text, images, video or command signals.

Some of the popular input devices are explained below :

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

or a Bluetooth device for wireless communication.

Types of keyboards : There can be different types of keyboards based on the region and language used. Some of the common types of keyboards are as follows :

1) QWERTY Keyboard :

It is the most commonly used keyboard with computers in modern times. It is named after the first six letters of the top row of buttons and is even popular in countries that do not use Latin-based alphabet.

2) AZERTY Keyboard :

It is considered the standard French keyboard. It is developed in France as an alternative layout to the QWERTY layout and is mainly used in France and other European countries.

Its name is derived from the first six letters that appear on the top left row of the keyboard. The Q and W keys in the AZERTY keyboard are interchanged with A and Z keys in the QWERTY keyboard.

Furthermore, in the AZERTY keyboard the M key is located to the left of the L key.

AZERTY keyboard differs from QWERTY keyboard not only in the placement of letters but also in many other ways, e.g., it gives emphasis on accents, which is required for writing European languages like French.

3) DVORAK Keyboard :

This type of keyboard layout was developed to increase the typing speed by reducing the finger movement while typing. The most frequently used letters are kept in a home row to improve typing.

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

Types of mouse :

1) Trackball Mouse:

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

2) Mechanical Mouse:

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

3) Optical Mouse :

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

4) Cordless or Wireless Mouse :

As the name suggests, this type of mouse lacks cable and uses wireless technology such as IrDA (infrared) or radio (Bluetooth or Wi-Fi) to

control the movement of the cursor. It is used to improve the experience of using a mouse. It uses batteries for its power supply.

1.5.3 Scanner – The scanner uses the pictures and pages of text as input. It scans the picture or a document. The scanned picture or document is then converted into a digital format or file and is displayed on the screen as an output. It uses optical character recognition techniques to convert images into digital ones.

Types of Scanner :

1) Flatbed Scanner :

It has a glass pane and a moving optical CIS or CCD array. The light illuminates the pane, and then the image is placed on the glass pane. The light moves across the glass pane and scans the document and thus produces its digital copy.

2i) Handheld Scanner :

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

3) Sheetfed Scanner :

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

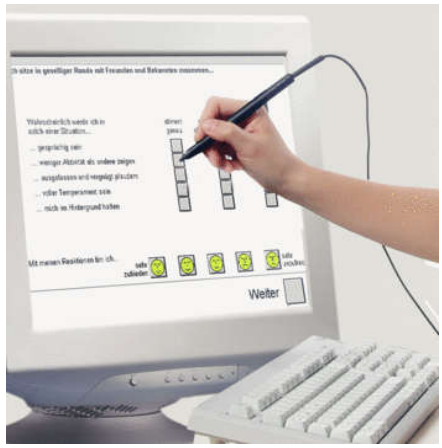
4) Drum Scanner :

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

5) Photo Scanner :

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

1.5.4 Light pen -



A light pen is a computer input device that looks like a pen. The tip of the light pen contains a light-sensitive detector that enables the user to point to or select objects on the display screen. Its light sensitive tip detects the object location and sends the corresponding signals to the CPU. It is not compatible with LCD screens, so it is not in use today.

1.5.5 Digital Camera –

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

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

1.5.6 Microphone – The microphone is a computer input device that is used to input the sound. It receives the sound vibrations and converts them into audio signals or sends them to a recording medium. The audio signals are converted into digital data and stored in the computer. The microphone

also enables the user to telecommunicate with others. It is also used to add sound to presentations and with webcams for video conferencing.

1.5.7 Gesture recognition devices -

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

1.5.8 Touch Screen :

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

1.5.9 Webcam -

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

1.5.10 Biometric Devices - it refers to a process in which a person is identified through his or her biological features such as fingerprints, eye cornea, face structure, etc. It is done by using biometric devices, which can be of different types based on their scanning features and abilities such as face scanner, hand scanner, fingerprint scanner etc.

1.6 OUTPUT DEVICES

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

Some of popular output devices are described below :

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

Types of monitor

1) CRT Monitor -

CRT monitors are based on the cathode ray tubes. They are like vacuum tubes which produce images in the form of video signals. Cathode rays tube produces a beam of electrons through electron guns that strike on the inner phosphorescent surface of the screen to produce images on the screen. The monitor contains millions of phosphorus dots of red, green

and blue color. These dots start to glow when struck by electron beams and this phenomenon is called cathodoluminescence.

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

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

2) LCD Monitor -

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

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

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

3) LED monitor -

The LED monitor is an improved version of an LCD monitor. It also has a flat panel display and uses liquid crystal display technology like the LCD monitors. The difference between them lies in the source of light to backlight the display. The LED monitor has many LED panels, and each panel has several LEDs to backlight the display, whereas the LCD monitors use cold cathode fluorescent light to backlight the display.

Modern electronic devices such as mobile phones, LED TVs, laptop and computer screens, etc., use a LED display as it not only produces more brilliance and greater light intensity but also consumes less power.

4) Plasma Monitor -

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

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

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

Types of Printer :

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

Types of impact printer :

A) Character Printer - Character printer prints a single character at a time or with a single stroke of the print head or hammer. It does not print one line at a time. Today, these printers are not in much use due to their low speed and because only the text can be printed.

Types of character printer :

i) Dot Matrix Printer -

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

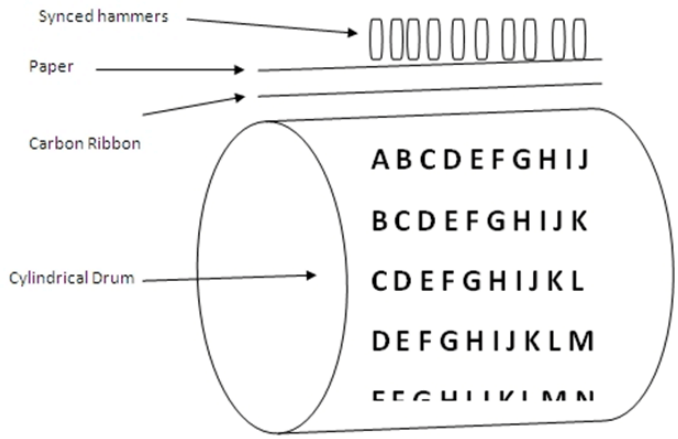
ii) Daisy Wheel Printer

It consists of a wheel or disk that has spokes or extensions and looks like a daisy, so it is named Daisy Wheel printer. At the end of extensions, molded metal characters are mounted. To print a character the printer rotates the wheel, and when the desired character is on the print location the hammer hits the disk and the extension hits the ink ribbon against the paper to create the impression. It cannot be used to print graphics and is often noisy and slow, i.e., the speed is very low, around 25-50 characters per second.

B) Line Printers - It is also a bar printer, prints one line at a time. It is a high-speed impact printer as it can print 500 to 3000 lines per minute.

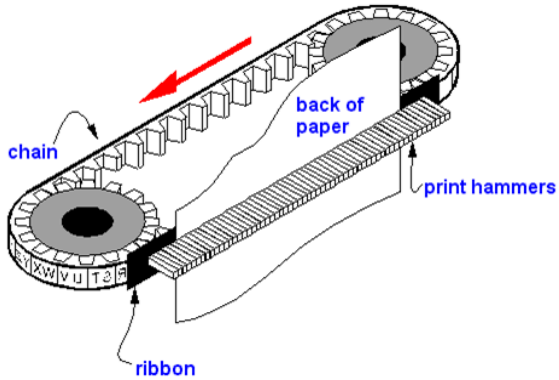
Types of Line Printer :

i) Drum Printer -



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

ii) Chain Printer -



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

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

2) Non-Impact Printer : They print characters and images without direct physical contact between the paper and the printing machinery. These printers can print a complete page at a time, so they are also known as page printers.

Types of Non-Impact printer :

i) Laser Printer :

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

ii) Inkjet Printer :

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

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

1.6.3 Projector

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

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

1.6.4 Speakers

For audio output from a computer, devices like speakers are connected to it. The computer processes the digital signals to analog and sends it to the speakers.

1.7 CENTRAL PROCESSING UNIT (CPU)

It is also called a processor, central processor, or microprocessor. It carries out all the important functions of a computer. It receives instructions from both the hardware and active software and produces output accordingly.

It stores all important programs like operating systems and application software.

CPU also helps Input and output devices to communicate with each other. Owing to these features of the CPU, it is often referred to as the brain of the computer.

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

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

Generally, a CPU has three components :

1) ALU (Arithmetic Logic Unit) - It is the arithmetic logic unit, which performs arithmetic and logical functions. Arithmetic functions include addition, subtraction, multiplication division, and comparisons. Logical functions mainly include selecting, comparing, and merging the data.

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

3) Memory or Storage Unit - It is called Random access memory (RAM). It acts as a temporary storage area that holds the data temporarily, which is used to run the computer. It stores the data in binary format. Binary format uses two symbols as 0 and 1, also known as bits. The computer memory and computer data size is measured in bytes.

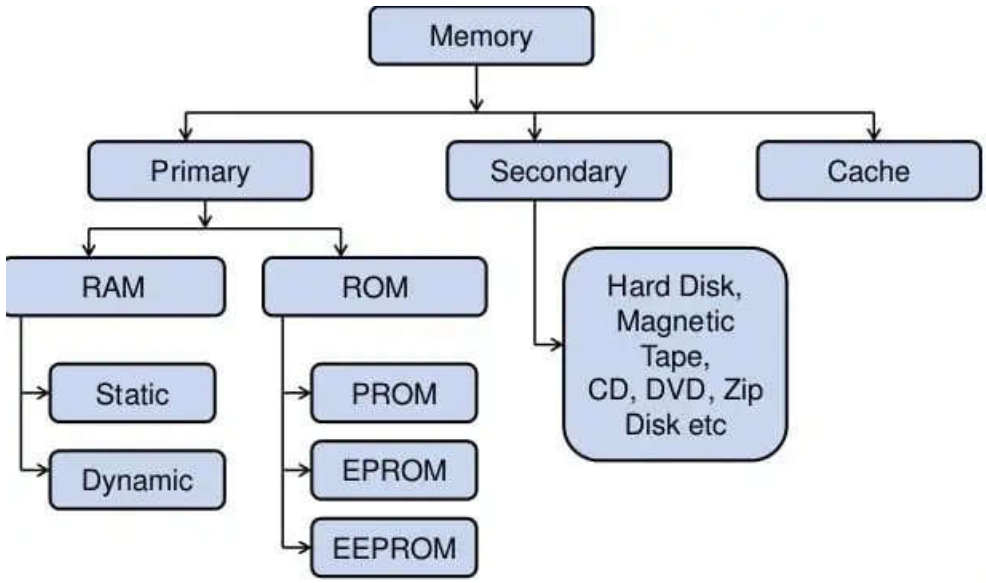
The following table shows a few measurement units used in the digital world.

1 bit	**Binary digit**
8 bits	1 byte
1024 bytes	1 Kilo Byte (KB)
1024 KB	1 Mega Byte (MB)
1024 MB	1 Giga Byte (GB)
1024 GB	1 Tera Byte (TB)

1024 TB	1 Peta Byte (PB)
1024 PB	1 Exa Byte (EB)
1024 EB	1 Zetta Byte (ZB)
1024 ZB	1 Yotta Byte (YB)
1024 YB	1 Bronto Byte
1024 Bronto Byte	1 Geop Byte

* Geop Byte is the highest memory.

1.8 COMPUTER MEMORY



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

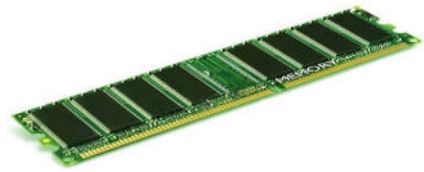
Computer memory is of two types :

1) Volatile (Random Access Memory) - It is a volatile memory, meaning it does not store data or instructions permanently. When you switch on the computer the data and instructions from the hard disk are stored in RAM. CPU utilizes this data to perform the required tasks. As soon as you shut down the computer the RAM loses all the data.

2) Non-volatile (Read Only Memory) - It is a non-volatile memory. It means it does not lose its data or programs that are written on it at the time of manufacture. So it is a permanent memory that contains all important data and instructions needed to perform important tasks like the boot process.

The **secondary memory** (hard disk) is referred to as **storage not memory.**

1.8.1 RAM



RAM is a volatile memory, which means it does not store data or instructions permanently. When you switch on the computer the data and instructions from the hard disk are stored in the RAM, e.g., when the computer is rebooted, and when you open a program, the operating system (OS), and the program are loaded into RAM, generally from an HDD or SSD. CPU utilizes this data to perform the required tasks. As soon as you shut down the computer, the RAM loses the data. So, the data remains in the RAM as long as the computer is on and lost when the computer is turned off. The benefit of loading data into RAM is that reading data from the RAM is much faster than reading from the hard drive.

RAM comes in the form of a chip that is individually mounted on the motherboard or in the form of several chips on a small board connected to the motherboard. It is the main memory of a computer. It is faster to write to and read from as compared to other memories.

A computer's performance mainly depends on the size or storage capacity of the RAM. If it does not have sufficient RAM to run the OS and software programs, it will result in slower performance. So, the more RAM a computer has, the faster it will work.

Types of RAM :

1) Static RAM (SRAM) - The word **static** indicates that the memory retains its contents as long as power is being supplied. However, data is lost when the power gets down due to volatile nature. SRAM chips use a matrix of 6-transistors and no capacitors.

Transistors do not require power to prevent leakage, so SRAM need not be refreshed on a regular basis.

There is extra space in the matrix, hence SRAM uses more chips than DRAM for the same amount of storage space, making the manufacturing costs higher.

SRAM is thus used as cache memory and has very fast access.

Characteristic of Static RAM are :

1) Long life

2) No need to refresh

3) Faster

4) Used as cache memory

2) Dynamic Ram (DRAM) - DRAM, must be continually refreshed in order to maintain the data. This is done by placing the memory on a refresh circuit that rewrites the data several hundred times per second. DRAM is used for most system memory as it is cheap and small. All DRAMs are made up of memory cells, which are composed of one capacitor and one transistor.

Characteristics of Dynamic RAM :

1) Short data lifetime

2) Needs to be refreshed continuously

3) Slower as compared to SRAM

4) Used as RAM

5) Smaller in size

1.8.2 ROM

ROM stands for Read Only Memory. The memory from which we can only read but cannot write on it. This type of memory is non-volatile. The information is stored permanently in such memories during manufacture. A ROM stores instructions that are required to start a computer. This operation is referred to as bootstrap.

ROM chips are not only used in the computer but also in other electronic items like washing machines and microwave ovens.

Types of ROM :

1) PROM (Programmable Read only Memory) - PROM is a blank version of ROM. It is manufactured as blank memory and programmed after manufacturing. It is kept blank at the time of manufacturing. You can purchase and then program it once using a special tool called a programmer.To write data onto a PROM chip; a device called PROM programmer or PROM burner is used. The process or programming a PROM is known as burning the PROM. Once it is programmed, the data

cannot be modified later, so it is also called a one-time programmable device.

For example, cell phones, video game consoles, medical devices etc.

2) EPROM (Erasable and Programmable Read Only Memory) - EPROM is a type of ROM that can be programmed and erased many times. The method to erase the data is very different; it comes with a quartz window through which a specific frequency of ultraviolet light is passed for around 40 minutes to erase the data. So, it retains its content until it is exposed to ultraviolet light.

It needs a special device called a PROM programmer or PROM burner to reprogram the EPROM.

For example, It is used in some micro-controllers to store programs.

3) EEPROM (Electrically Erasable and Programmable Read Only Memory) - ROM is a type of read only memory that can be erased and reprogrammed repeatedly, up to 10000 times. It is also known as Flash EEPROM as it is similar to flash memory. It is erased and reprogrammed electrically without using ultraviolet light. Access time is between 45 and 200 nanoseconds. The data in this memory is written or erased one byte at a time; byte per byte, whereas, in flash memory data is written and erased in blocks. So, it is faster than EEPROM. It is used for storing a small amount of data in computer and electronic systems and devices such as circuit boards.

For example, the BIOS of a computer is stored in this memory.

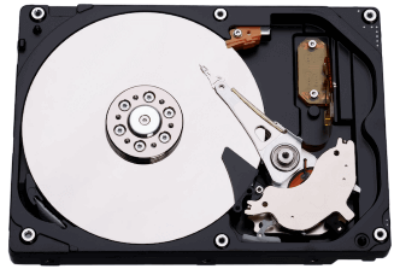
1.8.3 Secondary Memory

The secondary storage devices which are built into the computer or connected to the computer are known as a secondary memory of the computer.

The secondary memory is accessed indirectly via input/output operations. It is non-volatile, so it permanently stores the data even when the computer is turned off or until this data is overwritten or deleted. The CPU can't directly access the secondary memory. First, the secondary memory data is transferred to primary memory then the CPU can access it.

Some of the secondary memory devices are as follows :

1) Hard Disk :



The hard disk is also known as a hard drive. It is a rigid magnetic disc that stores data permanently, as it is a non-volatile storage device. The hard disk is located within a drive unit on the computer's motherboard and comprises one or more platters packed in an air-sealed casing. The data is written on the platters by moving a magnetic head over the platters as they spin. The data stored on a computer's hard drive generally includes the operating system, installed software, and the user's files and programs, including pictures, music, videos, text documents, etc.

2) Solid-state Drive :

SSD (Solid State Drive) is also a non-volatile storage medium that is used to hold and access data. Unlike a hard drive, it does not have moving components, so it offers many advantages over SSD, such as faster access time, noiseless operation, less power consumption, and more.

As the cost of an SSD has come down, it has become an ideal replacement for a standard hard drive in desktop and laptop computers. It is also suitable for notebooks, and tablets that don't require lots of storage.

3) Pen drive :

Pen drive is a compact secondary storage device. It is also known as a USB flash drive, thumb drive or a jump drive. It connects to a computer via a USB port. It is commonly used to store and transfer data between computers. For example, you can write a report using a computer and then copy or transfer it in the pen drive. Later, you can connect this pen drive to a computer to see or edit your report. You can also store your important documents and pictures, music, videos in the pen drive and keep it at a safe place.

Pen drive does not have movable parts; it comprises an integrated circuit memory chip that stores the data. This chip is housed inside a plastic or aluminium casing. The data storage capacity of the pen drive generally

ranges from 2 GB to 128 GB. Furthermore, it is a plug and play device as you don't need additional drives, software, or hardware to use it.

4) SD Card :

SD Card stands for Secure Digital Card. It is most often used in portable and mobile devices such as smartphones and digital cameras. You can remove it from your device and see the things stored in it using a computer with a card reader.

There are many memory chips inside the SD card that store the data; it does not have moving parts. SD cards are not created equal, so they may differ from each other in terms of speed, physical sizes, and capacity. For example, standard SD cards, mini SD cards, and micro SD cards.

5) Compact Disk (CD) :

Compact Disk is a portable secondary storage device in the shape of a round medium disk. It is made of polycarbonate plastic. The concept of CD was co-developed by Philips and Sony in 1982. The first CD was created on 17 August 1982 at the workshop of Philips in Germany.

In the beginning, it was used for storing and playing sound recordings, later it was used for various purposes such as for storing documents, audio files, videos, and other data like software programs in a CD.

6) DVD :

DVD is short for digital versatile disc or digital video disc. It is a type of optical media used for storing optical data. Although it has the same size as a CD, its storage capacity is much more than a CD. So, it is widely used

for storing and viewing movies and to distribute software programs as they are too large to fit on a CD. DVD was co-developed by Sony, Panasonic, Philips, and Toshiba in 1995.

Types of DVDs :

1) DVD-ROM (Read-Only) : These types of DVDs come with media already recorded on them, such as movie dvds. As the name suggests, data on these discs cannot be erased or added, so these discs are known as a read-only or non-writable DVD.

2) DVD-R (Writable) : It allows you to record or write information to the DVD. However, you can write information only once as it becomes a read-only DVD once it is full.

3) DVD-RW (Rewritable or Erasable) : This type of discs can be erased, written, or recorded multiple times.

1.8.4 Cache Memory

Cache memory is a high-speed memory, which is small in size but faster than the main memory (RAM). The CPU can access it more quickly than the primary memory. So, it is used to synchronize with high-speed CPUs and to improve its performance.

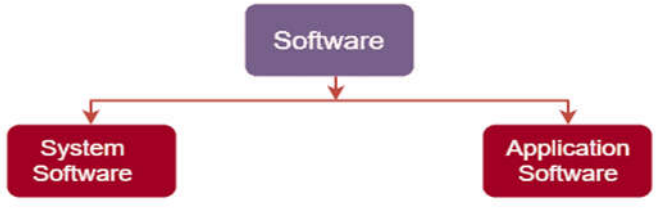
Cache memory can only be accessed by CPU. It can be a reserved part of the main memory or a storage device outside the CPU. It holds the data and programs which are frequently used by the CPU. So, it makes sure that the data is instantly available for the CPU whenever the CPU needs this data.

In other words, if the CPU finds the required data or instructions in the cache memory, it doesn't need to access the primary memory (RAM). Thus, by acting as a buffer between RAM and CPU, it speeds up the system performance.

1.9 COMPUTER SOFTWARE

Software, which is abbreviated as SW or S/W, is a set of programs that enables the hardware to perform a specific task.

All the programs that run the computer are software.



Types of Software

The software can be of two types :

1) System Software : The system software is the main software that runs the computer. When you turn on the computer, it activates the hardware and controls and coordinates their functioning. The application programs are also controlled by system software.

Examples of System Software :

Operating System : An operating system is the system software that works as an interface to enable the user to communicate with the computer. It manages and coordinates the functioning of hardware and software of the computer. The commonly used operating systems are Microsoft Windows, Linux etc.

Some other examples of system software include:

BIOS : It stands for basic input output system. It is a type of system software, which is stored in Read Only Memory (ROM) located on the motherboard. However, in advanced computer systems, it is stored in flash memory. BIOS is the first software that gets activated when you turn on your computer system. It loads the drivers of the hard disk into memory as well as assists the operating system to load itself into the memory.

Boot Program : Boot refers to starting up a computer. When you switch on the computer, the commands in the ROM are executed automatically to load the boot program into memory and execute its instructions. The BIOS program has a basic set of commands that enables the computer to perform the basic input/output instructions to start the computer.

Assembler : It plays the role of a converter as it receives basic computer instructions and converts them into a pattern of bits. The processor uses these bits to perform basic operations.

Device driver : This system software controls hardware devices connected to a computer. It enables the computer to use the hardware by providing an appropriate interface. The kernel of a Computer's CPU communicates with different hardware through this software. Operating systems generally come with most of the device drivers.

2) Application Software - Application software is a set of programs designed to perform a specific task. It does not control the working of a computer as it is designed for end-users. A computer can run without application software. Application software can be easily installed or uninstalled as required. It can be a single program or a collection of small programs. Microsoft Office Suite, Adobe Photoshop, and any other software like payroll software or income tax software are application software.

Examples of Application Softwares :

1. Utility Software - It assists the Operating System to manage, organize, maintain and optimize the functioning of the computer system. Some of the notable examples of utility software are anti-virus software, compression tools, file management tools, disk management tools, etc.

2. Presentation Software - Presentation software is one such category of application program mainly used to create sequences of words and pictures mainly used to conduct a public presentation of information. Presentation software could be business presentation software and general multimedia authoring software, but it's overall about tools that allow users to create both professional-looking business presentations and general multimedia presentations.

3. Spreadsheet Software - it is capable of organizing, storing and analyzing data in tabular form. Often known as a spreadsheet program or spreadsheet application, the software has succeeded in replacing several paper-based systems, especially in the business world.

4. Database Software - The next in line among the different types of software is the database software. Popular examples of databases include Oracle, MySQL, Microsoft SQL Server, PostgreSQL, MongoDB, and IBM Db2.

5. Multimedia Software - It is one consisting of Photo editing, media player, and video editing programs. In general multimedia software do come pre-installed on some operating systems, are also available free online, or taught in classrooms.

6. Word Processors - Word processor software is used to create text-based documents. These types of software are mainly used to create memos, faxes and letters, this software can be even considered for creating reports and personalized pages on the web. Some of the popular examples of Word Processing software are Google Docs, Microsoft Word, WordPad and Notepad.

7. Web Browsers - Everyone who uses a computer, must know or know about web browsers. Web browsers are an essential part because these programmes allow you to browse the internet. They assist users in locating and accessing info on the internet.

For example, Google Chrome, Internet Explorer, Microsoft Edge, Firefox, Opera etc.

1.10 NETWORKING

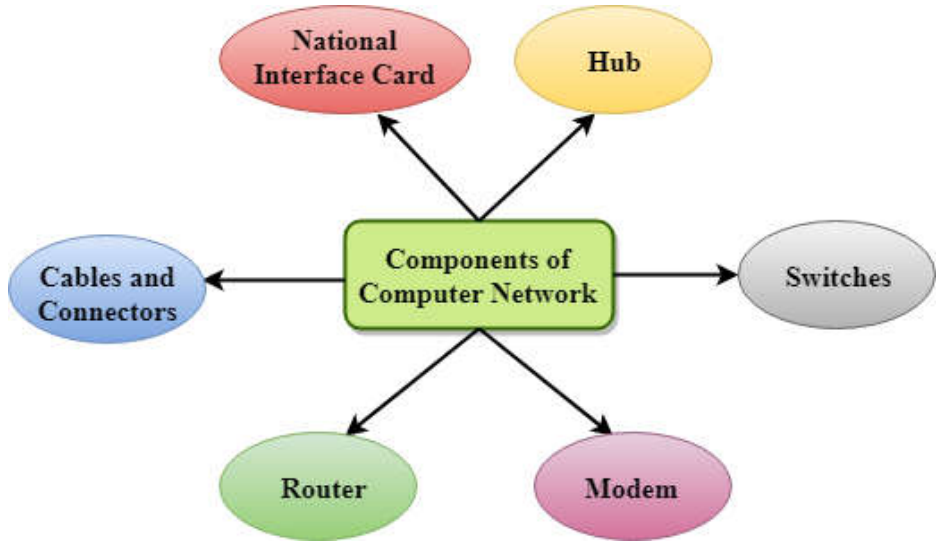
1.10.1 Computer Network

Computer Network is a group of computers connected with each other through wires, optical fibres or optical links so that various devices can interact with each other through a network.

The aim of the computer network is the sharing of resources among various devices.

In the case of computer network technology, there are several types of networks that vary from simple to complex level.

1.10.2 Components Of Computer Network



1) NIC(National interface card) - NIC is a device that helps the computer to communicate with another device. The network interface card contains the hardware addresses to identify the system on the network so that it transfers the data to the correct destination.

Types of NIC :

A) Wireless NIC : All the modern laptops use the wireless NIC. In Wireless NIC, a connection is made using the antenna that employs the radio wave technology.

B) Wired NIC : Cables use the wired NIC to transfer the data over the medium.

2) Hub - Hub is a central device that splits the network connection into multiple devices. When a computer requests for information from a computer, it sends the request to the Hub. Hub distributes this request to all the interconnected computers.

3) Switches - Switch is a networking device that groups all the devices over the network to transfer the data to another device. A switch is better than Hub as it does not broadcast the message over the network, i.e., it sends the message to the device for which it belongs. Therefore, we can say that the switch sends the message directly from source to the destination.

4) Cables and connectors - Cable is a transmission media that transmits the communication signals.

There are three types of cables :

A) Twisted pair cable : It is a high-speed cable that transmits the data over 1Gbps or more.

B) Coaxial cable : Coaxial cable resembles a TV installation cable. Coaxial cable is more expensive than twisted pair cable, but it provides a high data transmission speed.

C) Fibre optic cable : Fibre optic cable is a high-speed cable that transmits the data using light beams. It provides high data transmission speed as compared to other cables. It is more expensive as compared to other cables, so it is installed at the government level.

5) Router - Router is a device that connects the LAN to the internet. The router is mainly used to connect the distinct networks or connect the internet to multiple computers.

6) Modem - Modem connects the computer to the internet over the existing telephone line. A modem is not integrated with the computer motherboard. A modem is a separate part on the PC slot found on the motherboard.

1.10.3 Uses Of Computer Network

1) Resource sharing : Resource sharing is the sharing of resources such as programs, printers, and data among the users on the network without the requirement of the physical location of the resource and user.

2) Server-Client model : Computer networking is used in the server-client model. A server is a central computer used to store the information and maintained by the system administrator. Clients are the machines used to access the information stored in the server remotely.

3) Communication medium : Computer networks behave as a communication medium among the users. For example, a company containing more than one computer has an email system which the employees use for daily communication.

4) E-commerce : Computer networks are important in businesses because businesses need the internet. For example, amazon.com is doing their business over the internet.

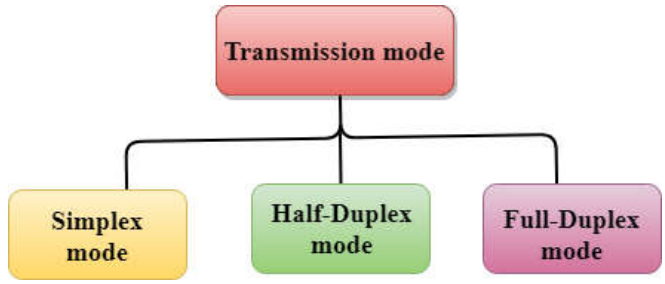
1.10.4 Transmission modes

The way in which data is transmitted from one device to another device is known as **transmission mode**.

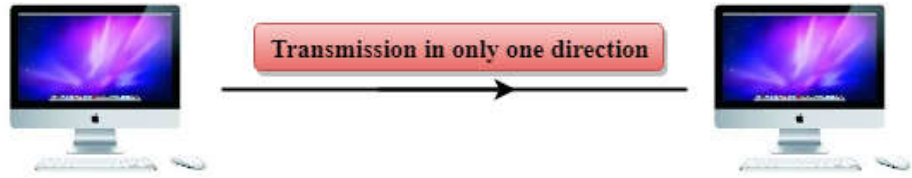
The transmission mode is also known as the communication mode.

Each communication channel has a direction associated with it, and transmission media provide the direction. Therefore, the transmission mode is also known as a directional mode.

The Transmission mode is divided into three categories :



A) Simplex mode :



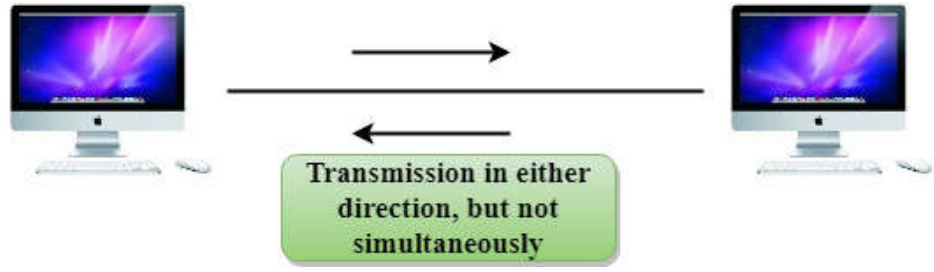
In Simplex mode, the communication is unidirectional, i.e., the data flows in one direction.

A device can only send the data but cannot receive it or it can receive the data but cannot send the data.

This transmission mode is not very popular as mainly communications require the two-way exchange of data. The simplex mode is used in the business field as in sales that do not require any corresponding reply.

For example, the **radio station** is a simplex channel as it transmits the signal to the listeners but never allows them to transmit back, **Keyboard** and **Monitor** are the examples of the simplex mode as a keyboard can only accept the data from the user and monitor can only be used to display the data on the screen.

B) Half-Duplex mode :



In a Half-duplex channel, direction can be reversed, i.e., the station can transmit and receive the data as well.

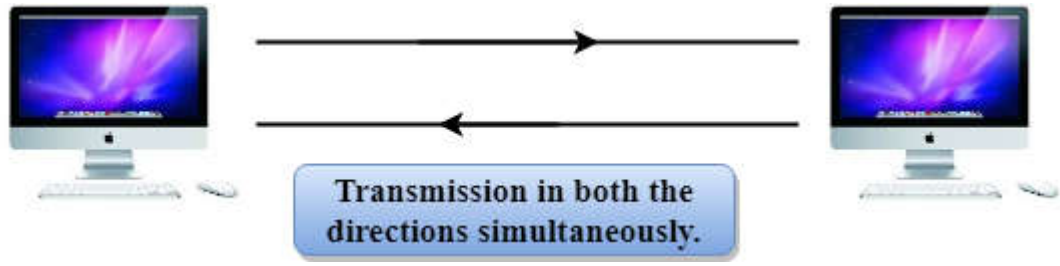
Messages flow in both directions, but not at the same time.

The entire bandwidth of the communication channel is utilized in one direction at a time.

In half-duplex mode, it is possible to perform the error detection, and if any error occurs, then the receiver requests the sender to retransmit the data.

For example, a **Walkie-talkie** is an example of the Half-duplex mode. In Walkie-talkie, one party speaks, and another party listens. After a pause, the other speaks and the first party listens. Speaking simultaneously will create a distorted sound which cannot be understood.

C) Full-duplex mode :



In Full duplex mode, the communication is bi-directional, i.e., the data flow in both the directions.

Both the stations can send and receive the message simultaneously.

Full-duplex mode has two simplex channels. One channel has traffic moving in one direction, and another channel has traffic flowing in the opposite direction.

The Full-duplex mode is the fastest mode of communication between devices.

For example, **telephone networks** are an example of full duplex mode, when two people are communicating with each other by a telephone line, both can talk and listen at the same time.

1.10.5 Connections

Two or more devices connected to a link are called a network. A link is a communication channel that transfers data from one device to another.

Types of connections :

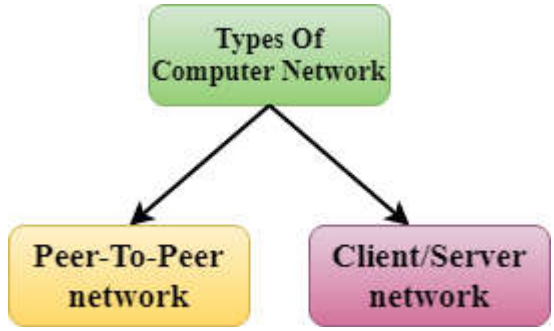
A) Point-to-point - It provides a dedicated link between two devices. For example, a computer connected to a printer.

B) Multi-point - More than two specific devices share a single link, also known as multi-drop configuration. The networks having multipoint configuration are called **Broadcast networks.**

1.10.6 Computer Network Architecture

Computer Network Architecture is defined as the physical and logical design of the software, hardware, protocols, and media of the transmission of data. Simply it is how computers are organized and how tasks are allocated to the computer.

Types of network architectures :



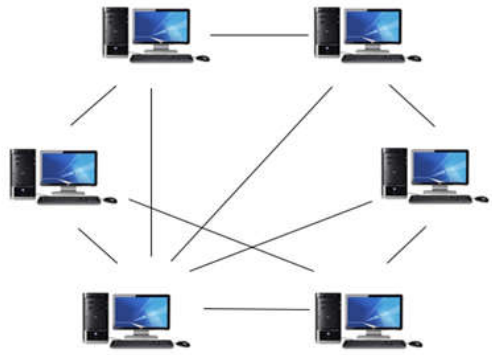
1) Peer-To-Peer network

Peer-To-Peer network is a network in which all the computers are linked together with equal privilege and responsibilities for processing the data.

Peer-To-Peer network is useful for small environments, usually up to 10 computers.

Peer-To-Peer network has no dedicated server.

Special permissions are assigned to each computer for sharing the resources, but this can lead to a problem if the computer with the resource is down.



Advantages :

It is less costly as it does not contain any dedicated server.

If one computer stops working, other computers will not stop working.

It is easy to set up and maintain as each computer manages itself.

Disadvantages :

In the case of the Peer-To-Peer network, it does not contain the centralized system . Therefore, it cannot back up the data as the data is different in different locations.

It has a security issue as the device is managed itself.

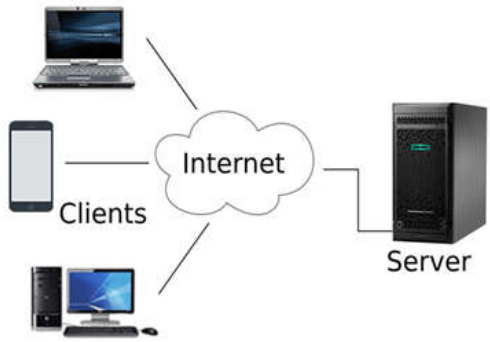
2) Client/Server Network

Client/Server network is a network model designed for the end users called clients, to access the resources such as songs, video, etc. from a central computer known as Server.

The central controller is known as a server while all other computers in the network are called clients. A server performs all the major operations such as security and network management.

A server is responsible for managing all the resources such as files, directories, printer, etc.

All the clients communicate with each other through a server. For example, if client1 wants to send some data to client 2, then it first sends the request to the server for the permission. The server sends the response to client 1 to initiate its communication with client 2.



Advantages :

A Client/Server network contains the centralized system. Therefore we can back up the data easily.

A Client/Server network has a dedicated server that improves the overall performance of the whole system.

Security is better in Client/Server network as a single server administers the shared resources.

It also increases the speed of sharing resources.

Disadvantages :

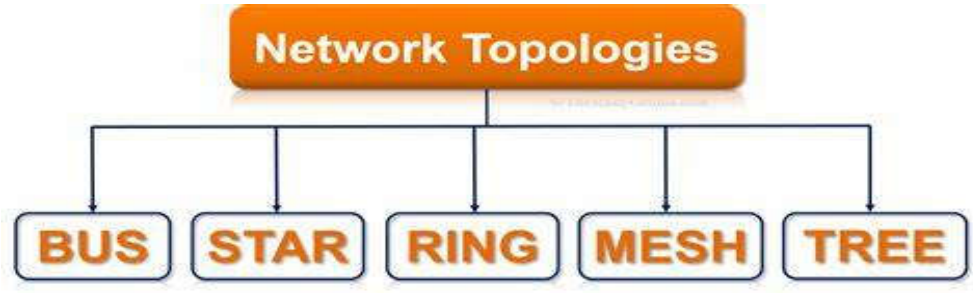
Client/Server network is expensive as it requires the server with large memory.

A server has a Network Operating System(NOS) to provide the resources to the clients, but the cost of NOS is very high.

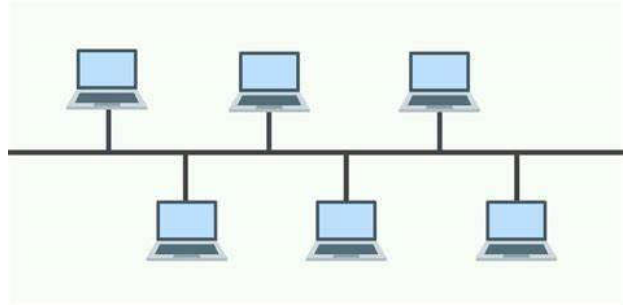
It requires a dedicated network administrator to manage all the resources.

1.10.7 Physical Topology

The **Topology** defines the structure of the network of how all the components are interconnected to each other.



1) Bus Topology :



It is a multipoint, one long cable that acts as a backbone to link all the devices on a network. It transmits data in only one direction and every device is connected to a single cable. A dropline is a connection running between the device and the main cable.

Advantages :

Low-cost cable : Nodes are directly connected to the cable without passing through a hub. Therefore, the initial cost of installation is low.

Moderate data speeds : Coaxial or twisted pair cables are mainly used in bus-based networks that support upto 10 Mbps.

Familiar technology : Bus topology is a familiar technology as the installation and troubleshooting techniques are well known, and hardware components are easily available.

Limited failure : A failure in one node will not have any effect on other nodes.

Disadvantages :

Extensive cabling : A bus topology is quite simple, but still it requires a lot of cabling.

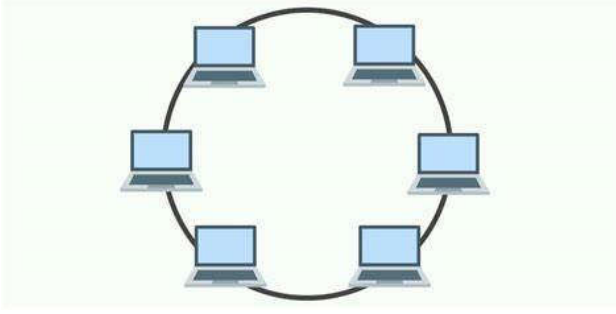
Difficult troubleshooting : It requires specialized test equipment to determine the cable faults. If any fault occurs in the cable, then it would disrupt the communication for all the nodes.

Signal interference : If two nodes send the messages simultaneously, then the signals of both the nodes collide with each other.

Reconfiguration is difficult : Adding new devices to the network would slow down the network.

Attenuation : Attenuation is a loss of signal that leads to communication issues. Repeaters are used to regenerate the signal.

2) Ring Topology :



Each device has a dedicated point-to-point connection with only the two devices on either side of it. A signal is passed along a ring in one direction, from device to device, until it reaches its destination.

Each device in a ring incorporates a repeater. When a device receives a signal intended for another device its repeater regenerates the bits and passes them along.

Advantages :

Network Management : Faulty devices can be removed from the network without bringing the network down.

Product availability : Many hardware and software tools for network operation and monitoring are available.

Cost : Twisted pair cabling is inexpensive and easily available. Therefore, the installation cost is very low.

Reliable : It is a more reliable network because the communication system is not dependent on the single host computer.

Disadvantages :

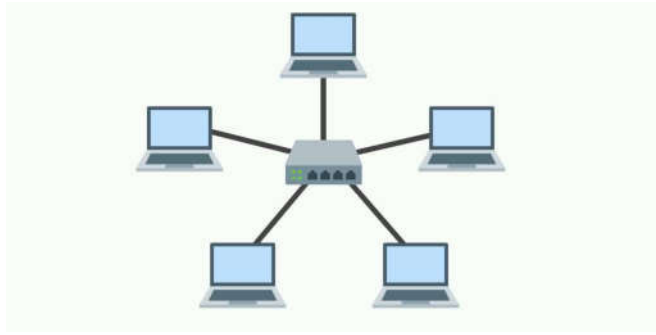
Difficult troubleshooting : It requires specialized test equipment to determine the cable faults. If any fault occurs in the cable, then it would disrupt the communication for all the nodes.

Failure : The breakdown in one station leads to the failure of the overall network.

Reconfiguration is difficult: Adding new devices to the network would slow down the network.

Delay : Communication delay is directly proportional to the number of nodes. Adding new devices increases the communication delay.

3) Star Topology :



Star topology is an arrangement of the network in which every node is connected to the central hub, switch or a central computer.

The central computer is known as a **server**, and the peripheral devices attached to the server are known as **clients**. Hubs or Switches are mainly used as connection devices in a **physical star topology**. Star topology is the most popular topology in network implementation.

Advantages :

Efficient troubleshooting : Troubleshooting is quite efficient in a star topology as compared to bus topology. In a bus topology, the manager has to inspect the kilometers of cable. In a star topology, all the stations are connected to the centralized network. Therefore, the network administrator has to go to the single station to troubleshoot the problem.

Network control : Complex network control features can be easily implemented in the star topology. Any changes made in the star topology are automatically accommodated.

Limited failure : As each station is connected to the central hub with its own cable, therefore failure in one cable will not affect the entire network.

Familiar technology : Star topology is a familiar technology as its tools are cost-effective.

Easily expandable : It is easily expandable as new stations can be added to the open ports on the hub.

Cost effective : Star topology networks are cost-effective as it uses inexpensive coaxial cable.

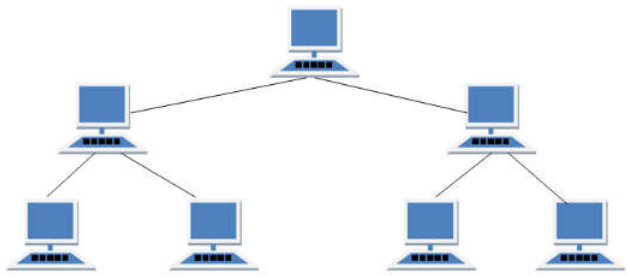
High data speeds : It supports a bandwidth of approx 100Mbps.

Disadvantages :

A Central point of failure : If the central hub or switch goes down, then all the connected nodes will not be able to communicate with each other.

Cable : Sometimes cable routing becomes difficult when a significant amount of routing is required.

4) Tree Topology :



Tree topology combines the characteristics of bus topology and star topology.

A tree topology is a type of structure in which all the computers are connected with each other in hierarchical fashion.

The top-most node in tree topology is known as a root node, and all other nodes are the descendants of the root node. There is only one path between two nodes for the data transmission. Thus, it forms a parent-child hierarchy.

Advantages :

Support for broadband transmission : Tree topology is mainly used to provide broadband transmission, i.e., signals are sent over long distances without being attenuated.

Easily expandable : We can add the new device to the existing network. Therefore, we can say that tree topology is easily expandable.

Easily manageable : In tree topology, the whole network is divided into segments known as star networks which can be easily managed and maintained.

Error detection: Error detection and error correction are very easy in a tree topology.

Limited failure : The breakdown in one station does not affect the entire network.

Point-to-point wiring : It has point-to-point wiring for individual segments.

Disadvantages :

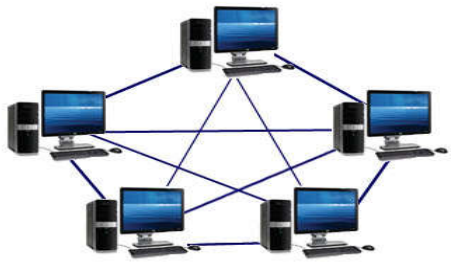
Difficult troubleshooting : If any fault occurs in the node, then it becomes difficult to troubleshoot the problem.

High cost : Devices required for broadband transmission are very costly.

Failure : A tree topology mainly relies on the main bus cable and failure in the main bus cable will damage the overall network.

Reconfiguration is difficult : If new devices are added, then it becomes difficult to reconfigure.

5) Mesh Topology :



Mesh technology is an arrangement of the network in which computers are interconnected with each other through various redundant connections.

There are multiple paths from one computer to another computer, every device has a dedicated point-to-point link to every other device, dedicated means that the link carries traffic only between two devices it connects.

It does not contain the switch, hub or any central computer which acts as a central point of communication.

For example, the Internet is an example of mesh topology, it is mainly used for wireless networks.

Advantages :

Reliable : The mesh topology networks are very reliable as if any link breakdown will not affect the communication between connected computers.

Fast Communication : Communication is very fast between the nodes.

Easier Reconfiguration : Adding new devices would not disrupt the communication between other devices.

isadvantages :

Cost : A mesh topology contains a large number of connected devices such as a router and more transmission media than other topologies.

Management : Mesh topology networks are very large and very difficult to maintain and manage. If the network is not monitored carefully, then the communication link failure goes undetected.

Efficiency : In this topology, redundant connections are high that reduces the efficiency of the network.

Exercise Questions

Multiple Choice Questions.

1) _____ is also known as a personal computer which is used for general purpose.

a) Microcomputer b) Minicomputer c) Workstation
d) Mainframe

2) One of the following is not an input device.

a) Printer b) Scanner c) Biometrics d) Microphone

3) One of the following is not an output device.

a) Printer b) Speaker c) Light pen d) Projector

4) RAM is a _____ memory.

a) non volatile b) volatile c) software d) hardware

5) _____ is a device that helps the computer to communicate with other devices.

a) NIC b) Hub c) Switch d) Modem

True or False.

1) Router is a device that connects the LAN to the internet.

2) In Simplex mode communication is bi-directional.

3) Secondary memory is a non-volatile memory which stores data permanently.

4) Clock speed of the CPU is measured in KB.

5) Special purpose computers are designed to perform general tasks.

Short answer or define.

1) Computer

2) Memory

3) System software

4) Hub

5) Topology

Long answer questions.

1) Write a short note on generations of computers.

2) What are the types of computers?

3) Explain the basic structure of a PC.

4) What are the types of keyboard?

5) Explain types of scanners.

6) Write a short note on output devices.

7) Explain in brief types of memory.

8) What are the types of software?

9) Define computer networks.

10) What are the components of a data communication system?

11) Write a short note on :

a) Bus Topology

` b) Ring Topology

c) Star Topology

d) Mesh Topology

12) What are transmission modes in networks?

13) Write a short note on peer to peer architecture.

References :

1. www.geeksforgeeks.org
2. www.tutorialspoint.com
3. www.javatpoint.com
4. www.computerhope.com
5. www.wikihow.com
6. homepage.cs.uri.edu
7. www.computerhistory.org
8. www.toppr.com

2

OFFICE PRODUCTIVITY TOOLS

Unit Structure

2.0 OBJECTIVES

By the end of this module, you should be able to :

1) Identify and name MS word toolbar

2) Create, save, export, format & print documents

3) Work with mail merge

4) Create & copy worksheets, create formulae

5) Work with different types of charts & print worksheet

6) Create presentations, adding animation in presentations

7) Apply themes, insert images and effects of animations

8) Identify & define vouchers, invoice, reports

2.1 MS WORD

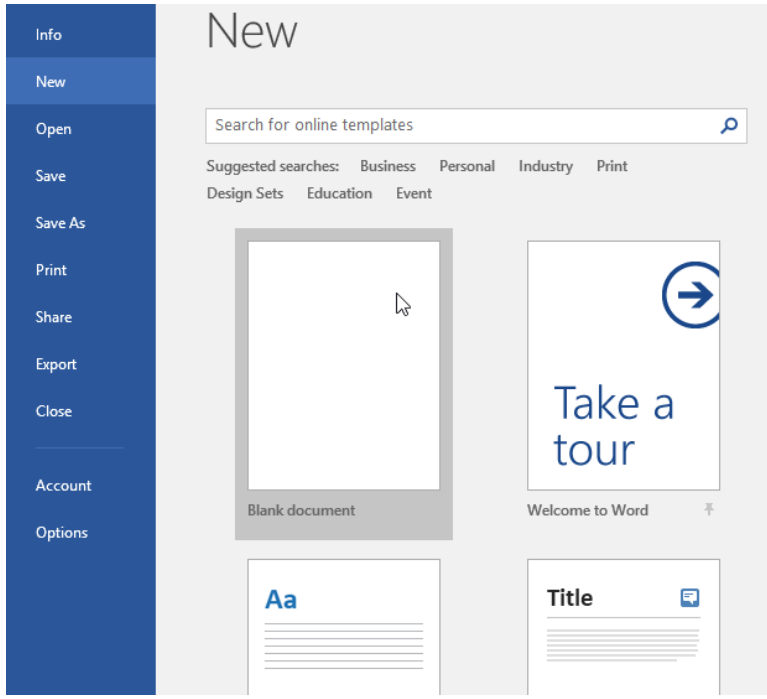
1 Microsoft Word :

Microsoft Word 2016 is a **word processing** application that allows you to create a variety of **documents**, including letters, resumes, and more.

1.1 The Word interface :

When we open Word for the first time, the **Start Screen** will appear. From here, we will be able to create a **new document**, choose a **template**, and access your **recently edited documents**.

From the **Start Screen**, locate and select the **Blank document** to access the Word interface.

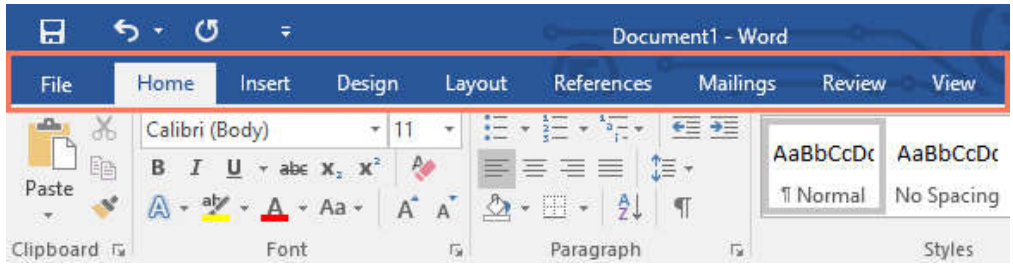


1.2 Working with the Word environment

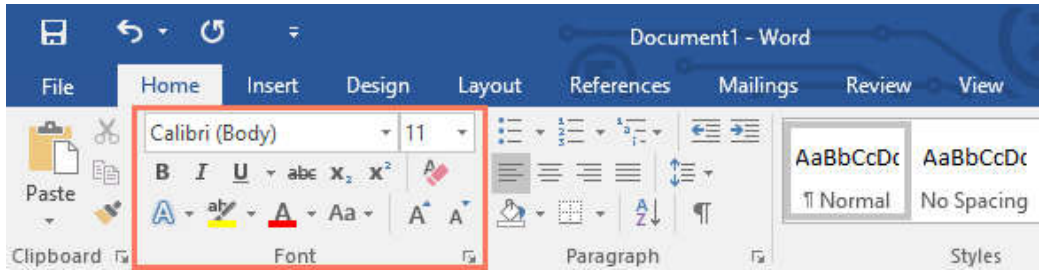
Like other recent versions, Word 2016 continues to use features like the **Ribbon** and the **Quick Access Toolbar** where we will find commands to perform common tasks in Word as well as **Backstage view**.

1.2.1 The Ribbon

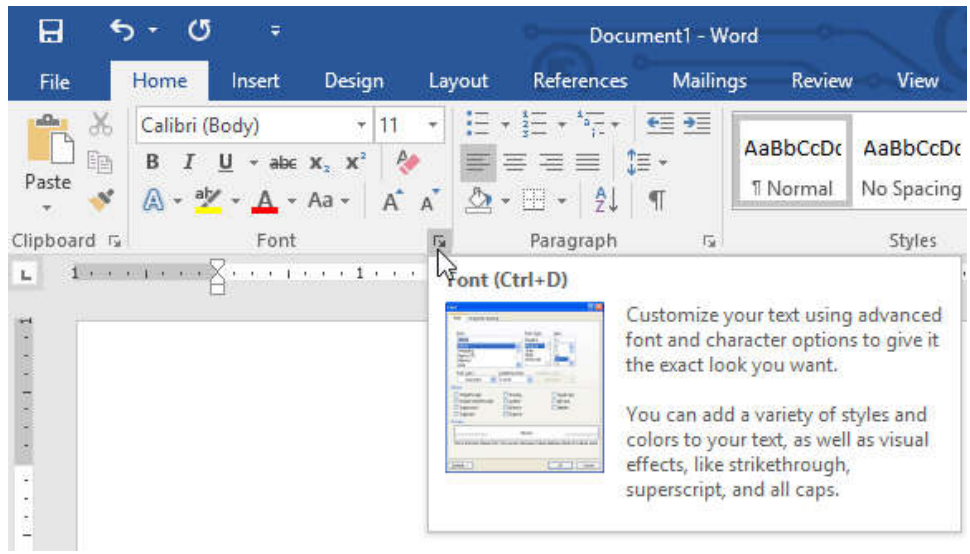
Word uses a **tabbed Ribbon system** instead of traditional menus. The **Ribbon** contains **multiple tabs**, which we can find near the top of the Word window.



Each tab contains several **groups of related commands**. For example, the **Font** group on the Home tab contains commands for formatting text in our document.

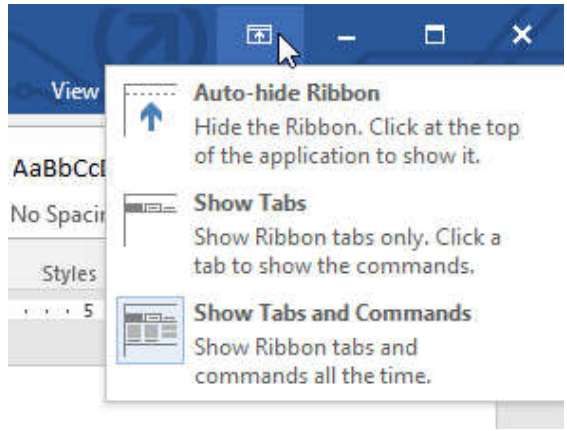


Some groups also have a **small arrow** in the bottom-right corner that we can click for more options.



Showing and hiding the Ribbon :

If we find that the Ribbon takes up too much screen space, we can hide it. To do this, click the **Ribbon Display Options** arrow in the upper-right corner of the Ribbon, then select the desired option from the drop-down menu:



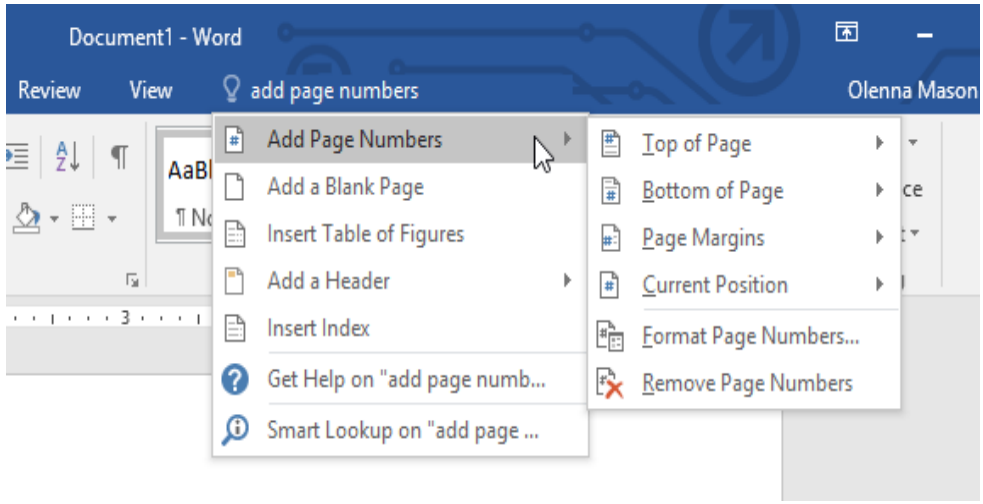
Auto-hide Ribbon : Auto-hide displays our document in full-screen mode and completely hides the Ribbon from view. To show the Ribbon, click the **Expand Ribbon** command at the top of the screen.

Show Tabs : This option hides all command groups when they're not in use, but tabs will remain visible. To show the Ribbon, simply click a tab.

Show Tabs and Commands : This option maximizes the Ribbon. All of the tabs and commands will be visible. This option is selected by default when you open Word for the first time.

1.3 Tell me feature :

The **Tell Me** feature works just like a regular search bar : Type what we want looking for, and a list of options will appear. We can then use the command directly from the menu without having to find it on the Ribbon.

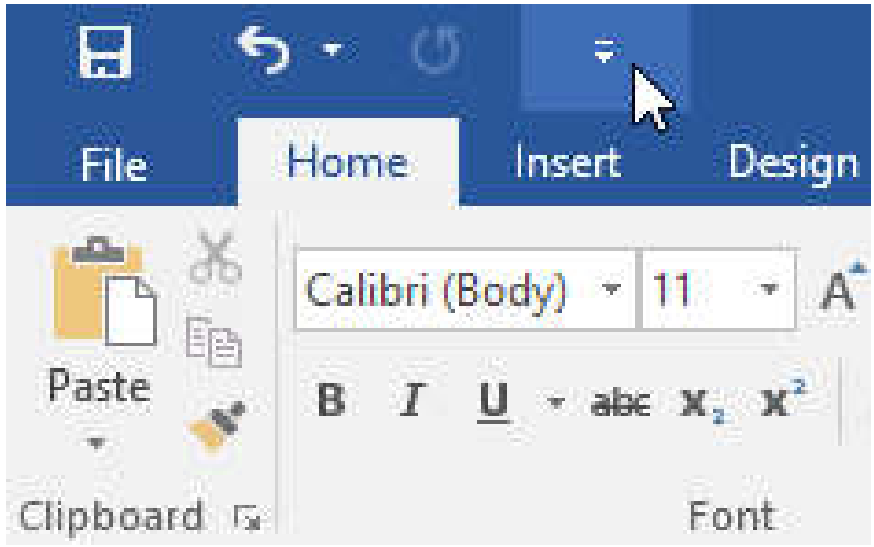


1.4 The Quick Access Toolbar

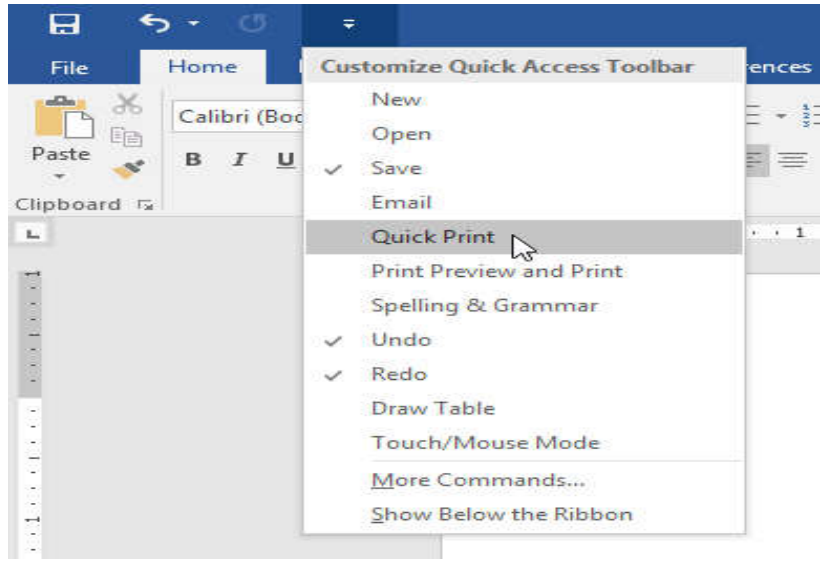
Located just above the Ribbon, the **Quick Access Toolbar** lets access common commands no matter which tab is selected. By default, it shows the **Save**, **Undo**, and **Redo** commands, but we can add other commands depending on our needs.

To add commands to the Quick Access Toolbar :

1)Click the **drop-down arrow** to the right of the **Quick Access Toolbar**.



2) Select the **command** we want to add from the menu.



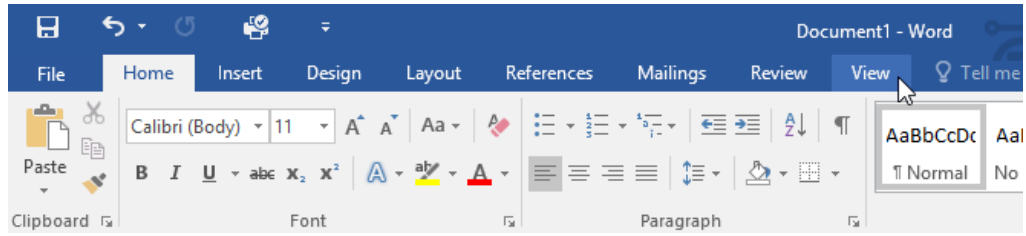
3) The command will be **added** to the Quick Access Toolbar.

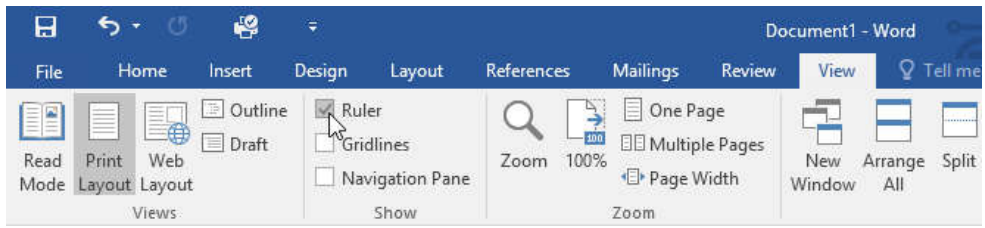
1.5 The Ruler

The **Ruler** is located at the top and to the left of our document. It makes it easier to **adjust** our document with precision. If we want, we can hide the Ruler to create more screen space.

To show or hide the Ruler:

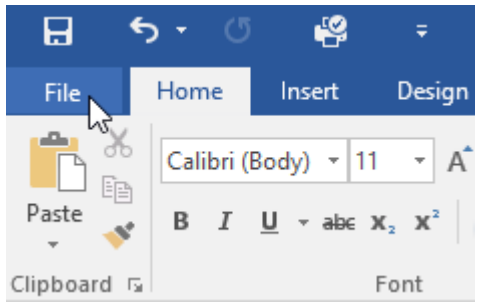
1) Click the **View** tab.



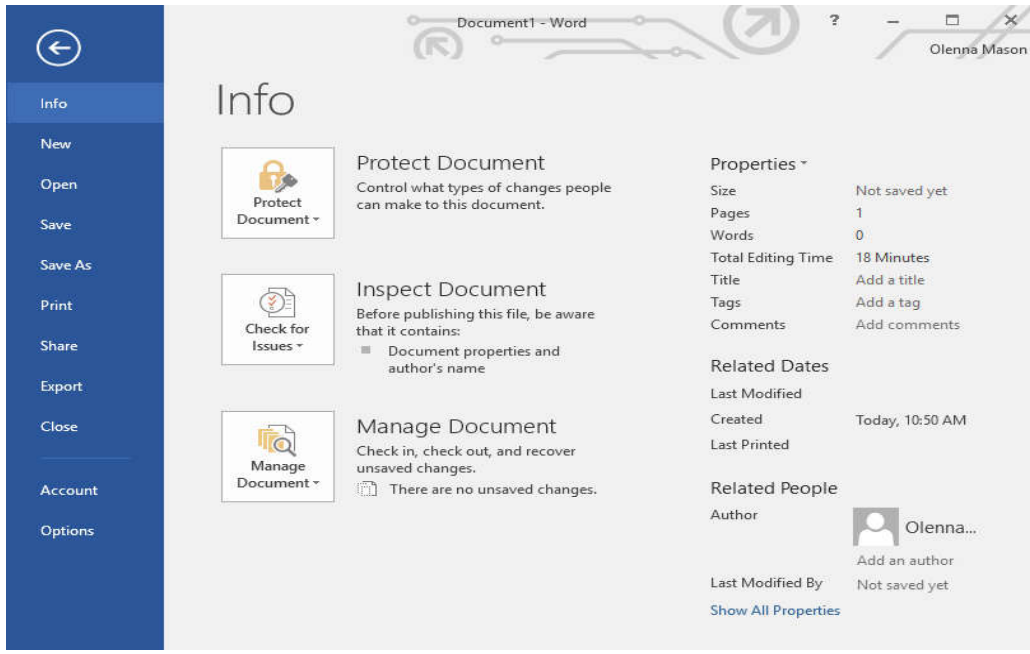


1.6 Backstage view

Backstage view gives you various options for saving, opening a file, printing, and sharing your document. To access Backstage view, click the **File** tab on the **Ribbon**.



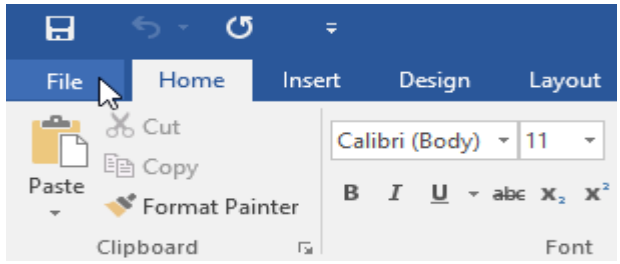
Following options are available under File tab.



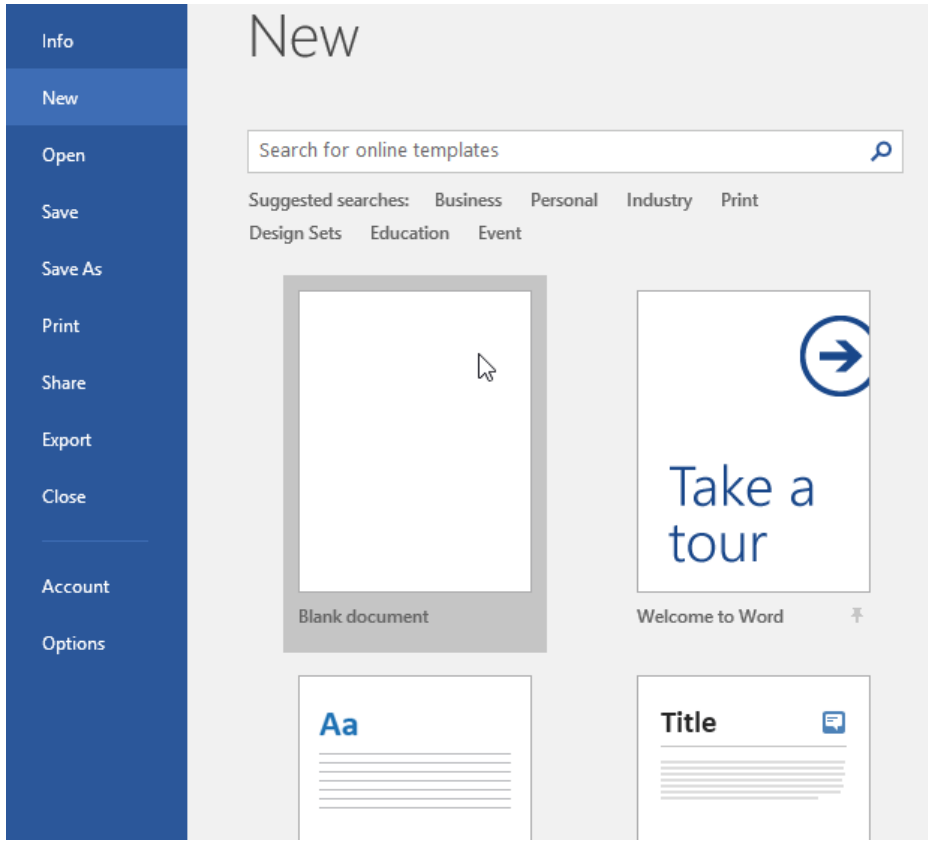
1.7 Create a new blank document :

When beginning a new project in Word, we will start with a new blank document.

1) Select the **File** tab to access **Backstage view**.



2) Select **New**, then click **Blank document**.



3) A new blank document will appear.

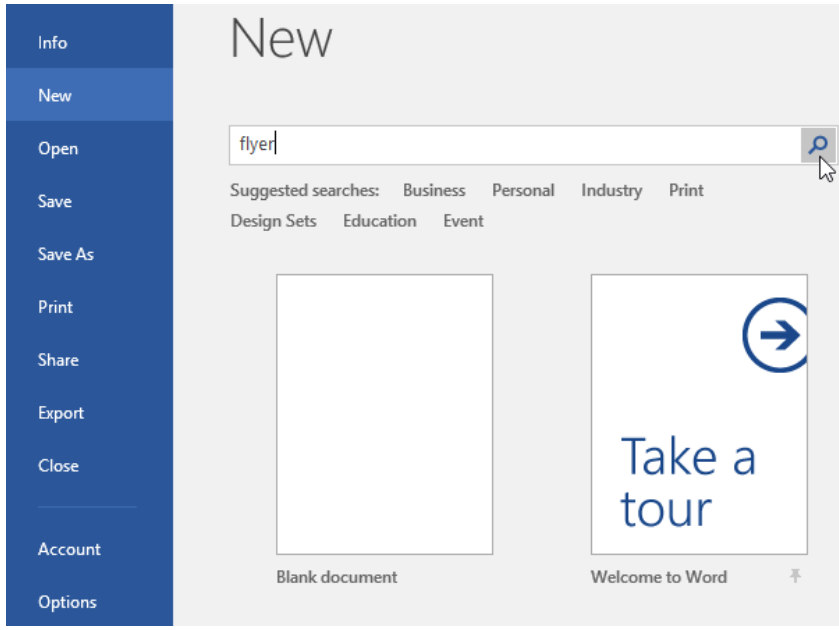
1.8 To create a new document from a template :

A **template** is a **predesigned document** we can use to create a new document quickly. Templates often include **custom formatting** and **designs**, so they can save a lot of time and effort when starting a new project.

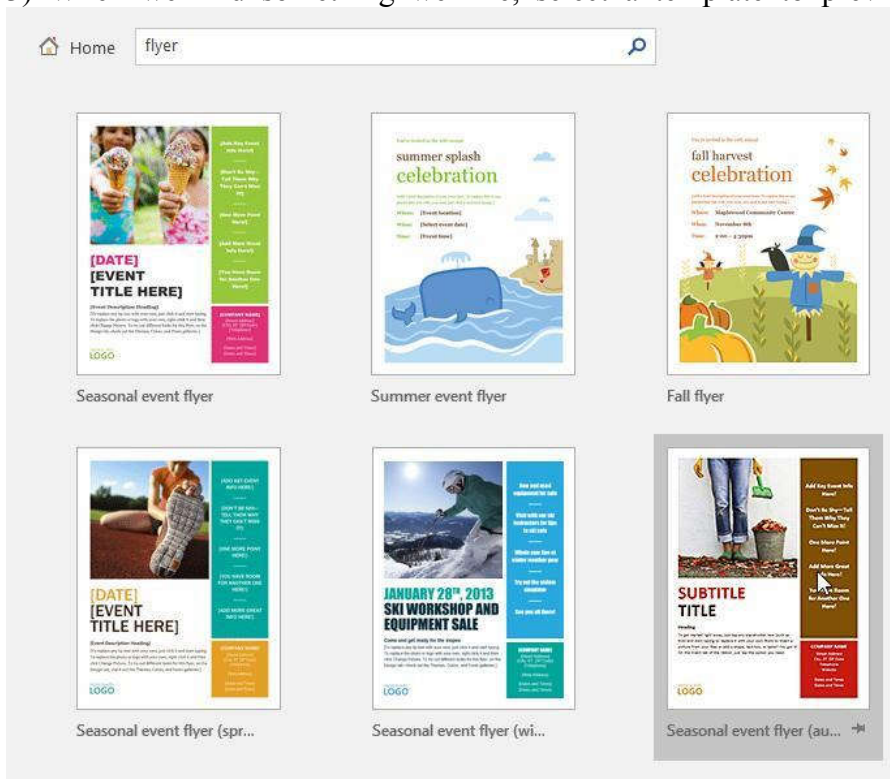
1) Click the **File** tab to access **Backstage view**, then select **New**.

2) Several templates will appear below the **Blank document** option.

We can also use the search bar to find something more specific. In our example, we'll search for a **flyer** template.



3) When we find something we like, select a template to preview it.



4) A **preview** of the template will appear. Click **Create** to use the selected template.

5) A new document will appear with the **selected template**.

1.9 Saving Document :

When we create a new document in Word, we need to know how to **save** it so we can access and edit it later.

A) Save and Save As :

Word offers two ways to save a file : **Save** and **Save As**.

These options work in similar ways, with a few important differences.

i) Save : When we save a file, we only need to choose a file name and location the first time. After that, we can click the Save command to save it with the same name and location.

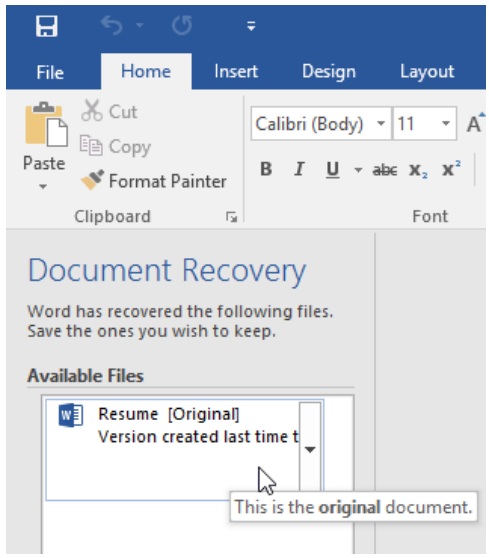
ii) Save As : It is used to create a **copy** of a document while keeping the original. When we use Save As, we need to choose a different name and/or location for the copied version.

B) AutoRecover :

Word automatically saves our documents to a temporary folder while we are working on them. If we forget to save our changes or if Word crashes, we can restore the file using **AutoRecover**.

1) Open Word. If **autosaved versions** of a file are found, the **Document Recovery** pane will appear on the left.

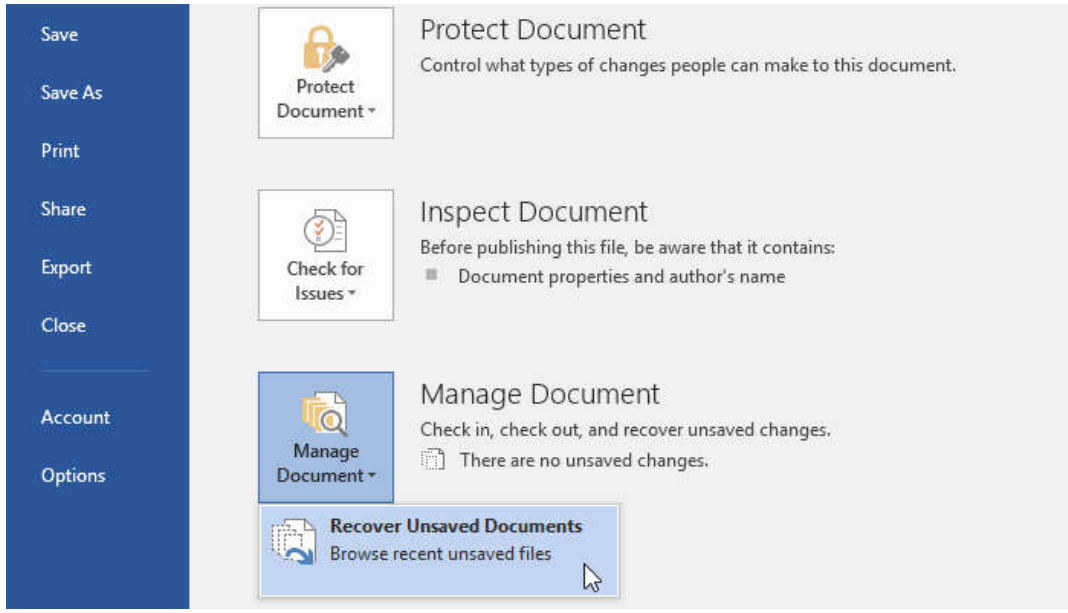
2) Click to **open** an available file. The document will be **recovered**.



3) By default, Word autosaves every 10 minutes. If we are editing a document for less than 10 minutes, Word may not create an autosaved version.

4) If we don't see the file we need, we can browse all autosaved files from **Backstage view**.

5) Select the **File** tab, click **Manage Versions**, then choose **Recover Unsaved Documents**.



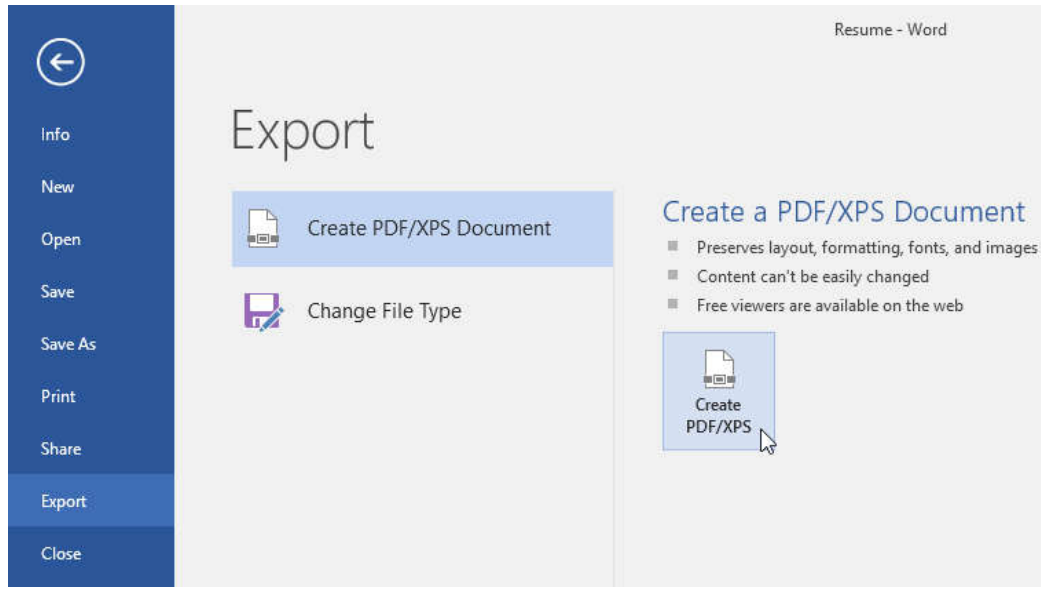
C) Exporting documents :

By default, Word documents are saved in the **.docx** file type. However, there may be times when we need to use **another file type**, such as a **PDF** or **Word 97-2003 document**. It's easy to **export** our document from Word to a variety of file types.

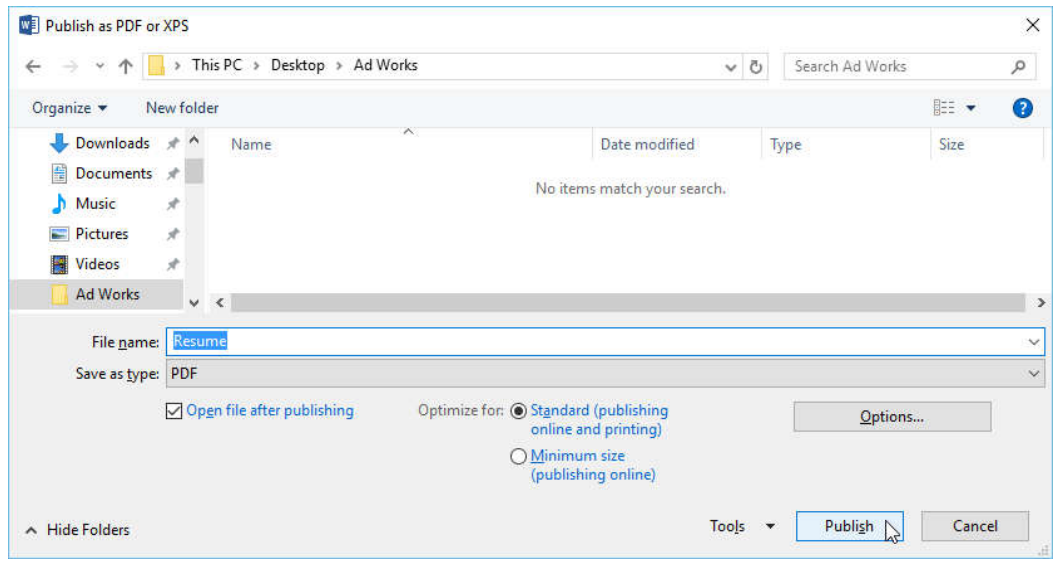
To export a document as a PDF file :

Exporting our document as an **Adobe Acrobat document**, commonly known as a **PDF file**, can be especially useful if we are sharing a document with someone who does not have Word. A PDF file will make it possible for recipients to view but not edit the content of our document.

1) Click the **File** tab to access **Backstage view**, choose **Export**, then select **Create PDF/XPS**.



2) The **Save As** dialog box will appear. Select the **location** where we want to export the document, enter a **filename**, then click **Publish.**

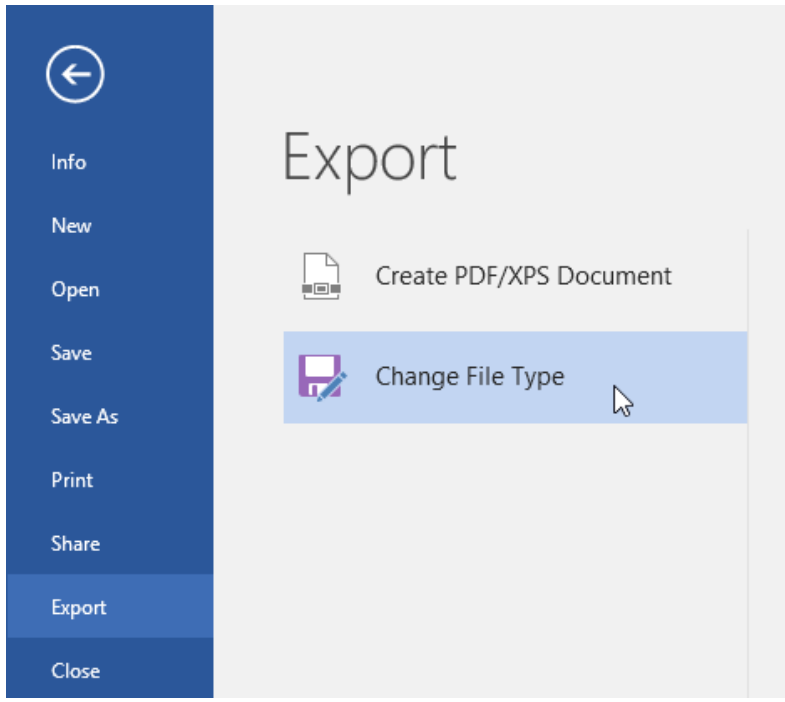


To export a document to other file types :

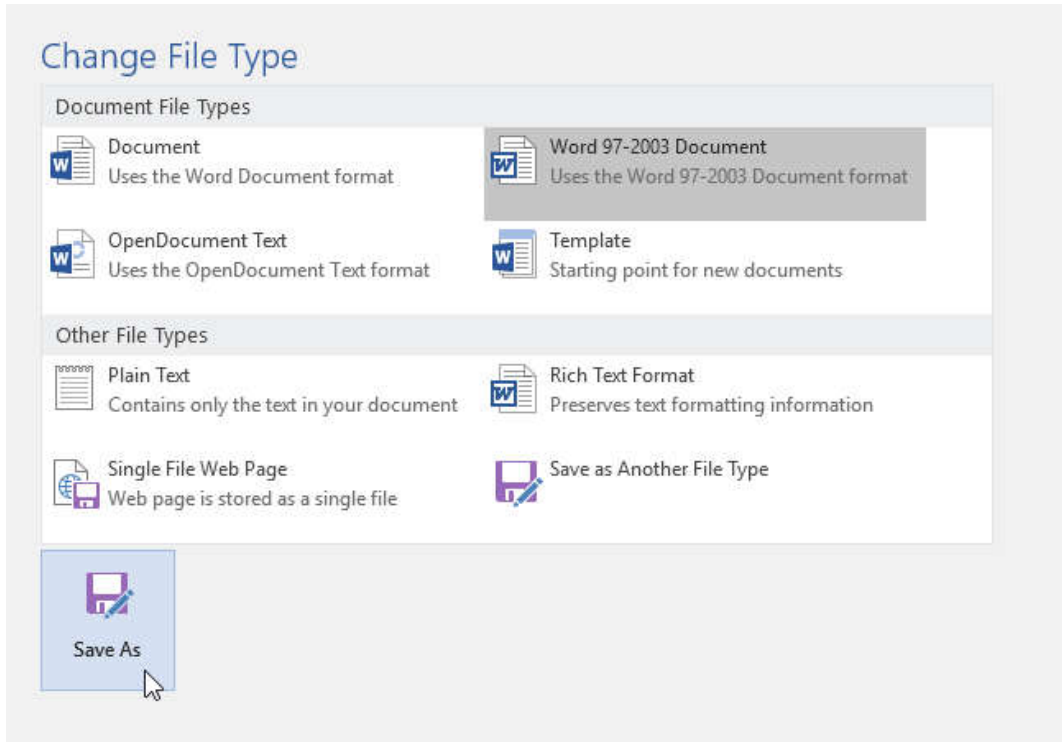
It may also find it helpful to export our document to other file types, such as a **Word 97-2003 Document** if we need to share with people using an

older version of Word or as a **.txt file** if we need a **plain-text** version of our document.

1) Click the **File** tab to access **Backstage view**, choose **Export**, then select **Change File Type**.

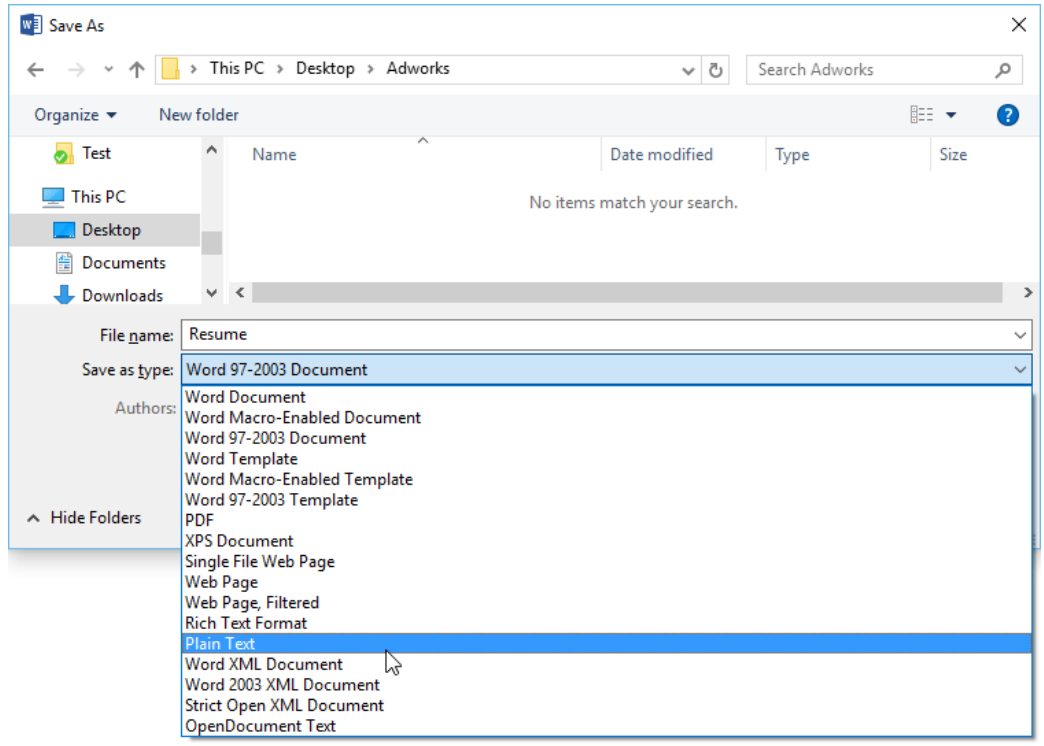


2) Select a **file type**, then click **Save As**.



3) The **Save As** dialog box will appear. Select the **location** where we want to export the document, enter a **filename**, then click **Save**.

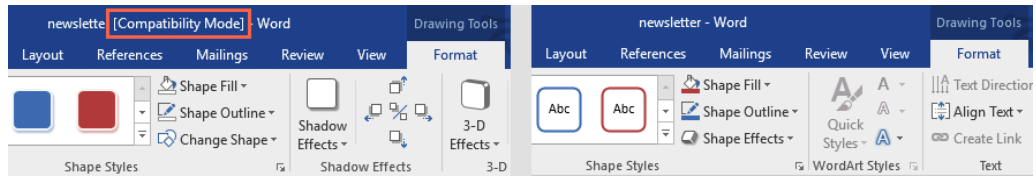
4) We can also use the **Save as type** drop-down menu in the **Save As** dialog box to save documents to a variety of file types.



1.10 Compatibility Mode :

Sometimes we need to work with documents that were created in earlier versions of Microsoft Word, such as Word 2010 or Word 2007. When we open these types of documents, they will appear in **Compatibility Mode**.

Compatibility Mode **disables** certain features, so we will only be able to access commands found in the program that was used to create the document. For example, if we open a document created in Word 2007 we can only use tabs and commands found in Word 2007.

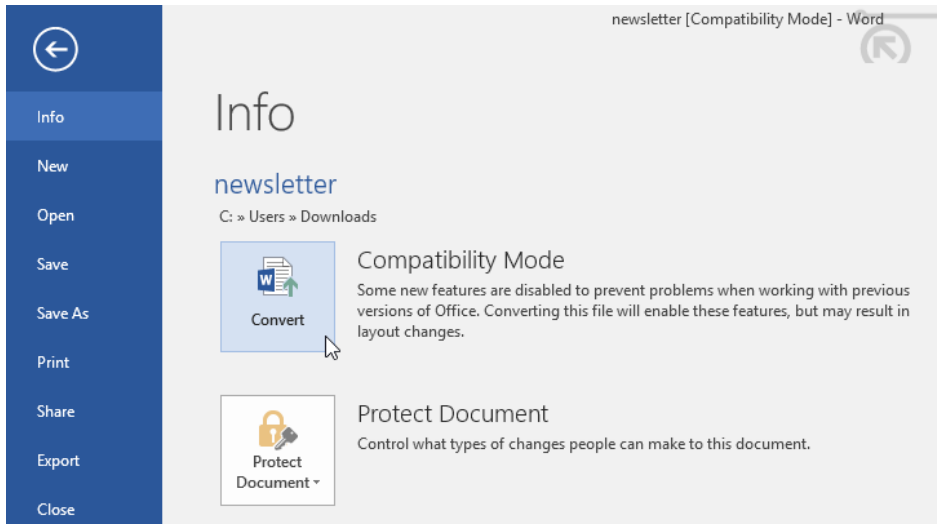


To exit Compatibility Mode, we need to **convert** the document to the current version type.

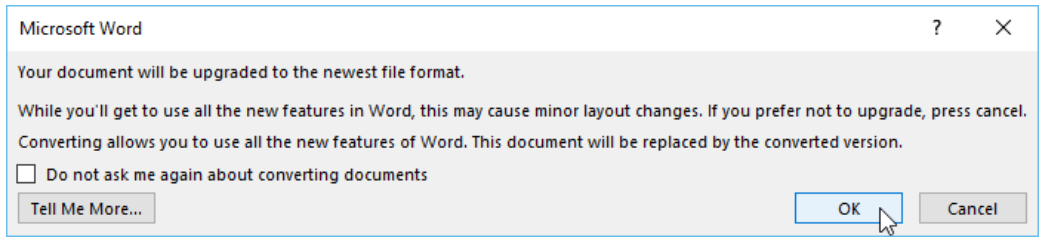
To convert a document :

If we want access to all Word 2016 features, we can **convert** the document to the 2016 file format.

1) Click the **File** tab to access Backstage view, then locate and select the **Convert** command.



2) A dialog box will appear. Click **OK** to confirm the file upgrade.



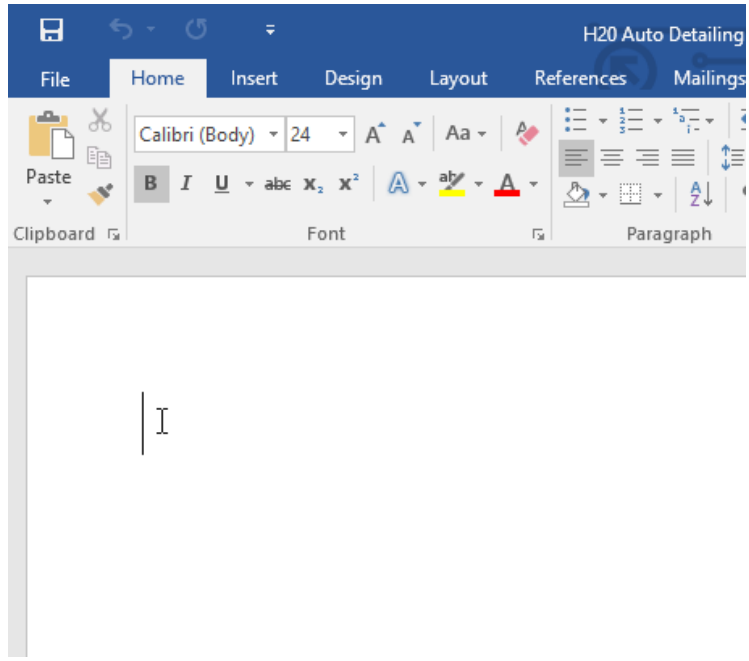
3) The document will be converted to the newest file type.

1.11 Formatting documents :

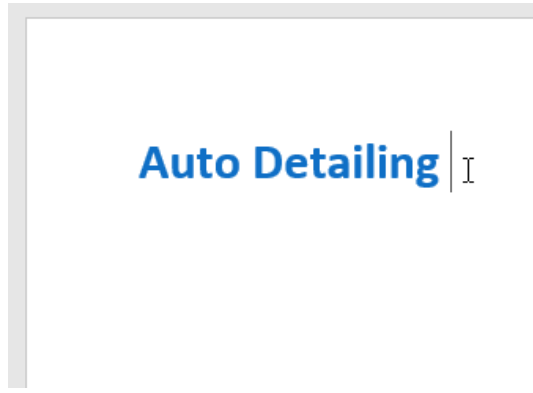
Formatting documents include basic tasks such as add, delete, move text, cut, copy, paste, adjusting text including font, size, color, text alignment, find & replace in our document.

Using the insertion point to add text - The **insertion point** is the blinking vertical line in our document. It indicates where we can enter **text** on the page.

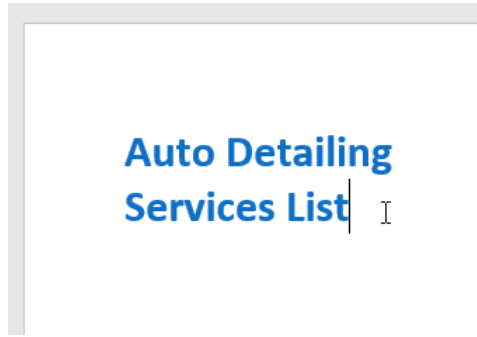
Blank document : When a new blank document opens, the insertion point will appear in the top-left corner of the page. If we want, we can begin typing from this location.



Adding spaces: Press the **spacebar** to add **spaces** after a word or in between text.



New paragraph line : Press **Enter** on our keyboard to move the insertion point to the next paragraph line.



Manual placement : Once we begin typing, we can use the mouse to move the insertion point to a specific place in our document. Simply click the **location** in the text where we want to place it.

Arrow keys : we can also use the arrow keys on our keyboard to move the insertion point. The **left** and **right** arrow keys will move between **adjacent**

characters on the same line, while the **up** and **down** arrows will move between **paragraph lines**. We can also press **Ctrl+Left** or **Ctrl+Right** to quickly move between entire words. In a new blank document, we can double-click the mouse to move the insertion point anywhere on the page.

To delete text : There are several ways to delete or remove text.

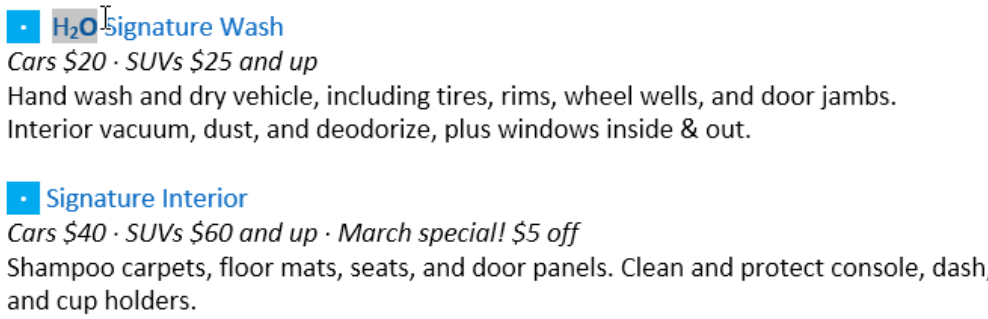
1) To delete text to the **left** of the insertion point, press the **Backspace** key on our keyboard.

2) To delete text to the **right** of the insertion point, press the **Delete** key on our keyboard.

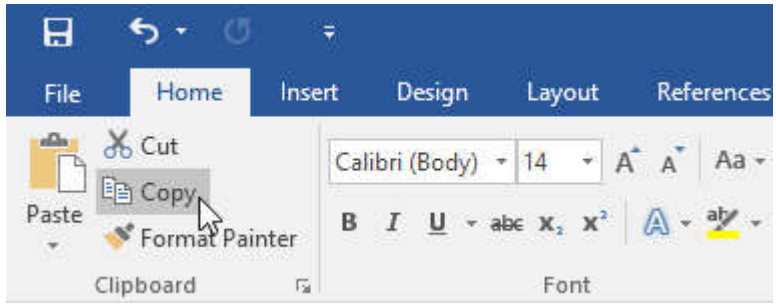
3) Select the **text** we want to remove, then press the **Delete** key.

Copying and moving text : Word allows us to copy text that's already in our document and paste it in other places, which can save a lot of time and effort. If we want to move text around in our document, we can cut and paste.

1) Select the **text** you want to copy.

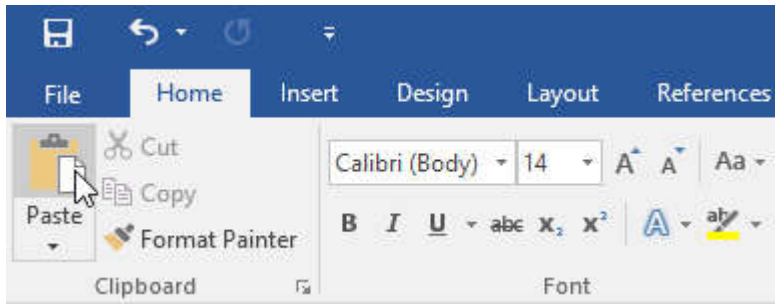


2) Click the **Copy** command on the **Home** tab. Alternatively, we can press **Ctrl+C** on your keyboard.

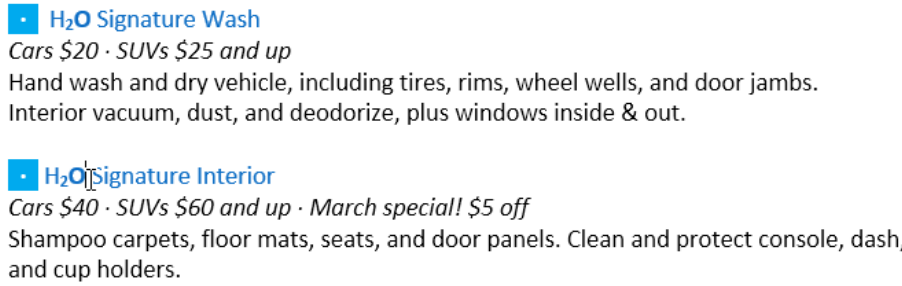


3) Place the insertion point where we want the text to appear.

4) Click the **Paste** command on the Home tab. Alternatively, we can press **Ctrl+V** on your keyboard.

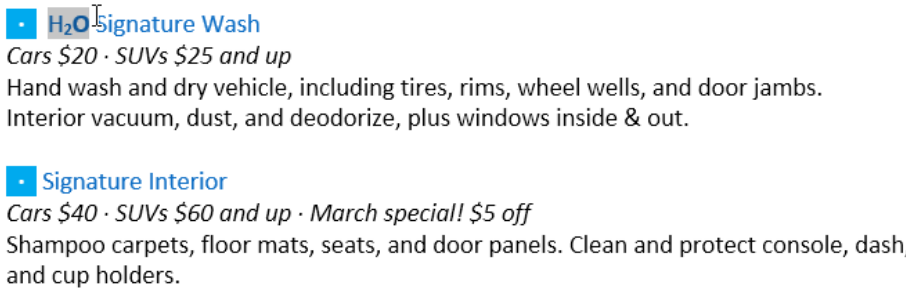


5) The text will appear.

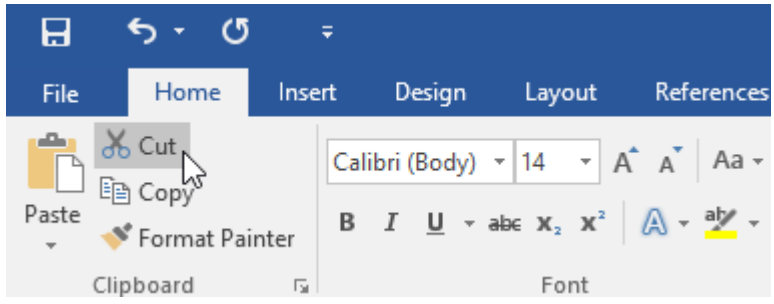


To cut and paste text :

1) Select the **text** you want to cut.

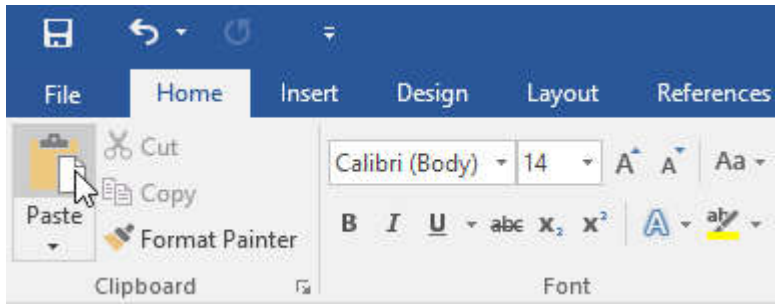


2) Click the **Cut** command on the **Home** tab. Alternatively, we can press **Ctrl+X** on your keyboard.



3) Place your insertion point where you want the text to appear.

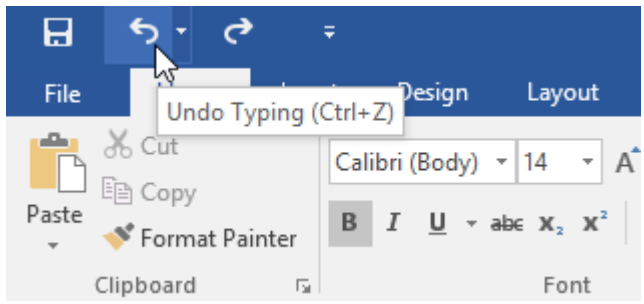
4) Click the **Paste** command on the **Home** tab. Alternatively, we can press **Ctrl+V** on your keyboard.



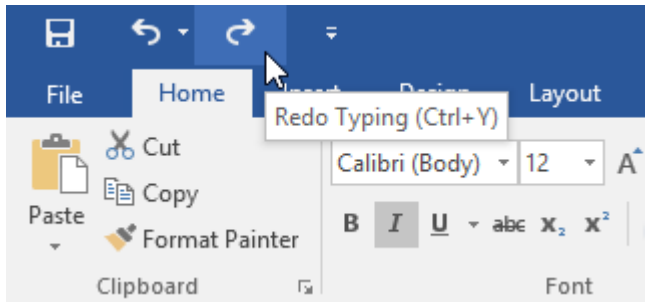
5) The text will appear.

Undo and Redo : **If we are working on a document and accidentally delete some text. Word allows us to undo our most recent action when we make a mistake like this.**

To do this, locate and select the **Undo** command on the Quick Access Toolbar. Alternatively, we can press **Ctrl+Z** on our keyboard. We can continue using this command to undo multiple changes in a row.



By contrast, the **Redo** command allows us to reverse the last undo. We can also access this command by pressing **Ctrl+Y** on your keyboard.



Symbols :

If we need to insert an unusual character that's not on our keyboard, such as a copyright (©) or trademark (™) symbol, we can usually find them with the **Symbol** command.

1) Place the insertion point where you want the symbol to appear.

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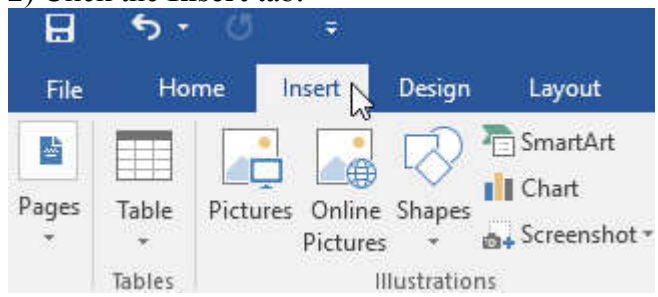
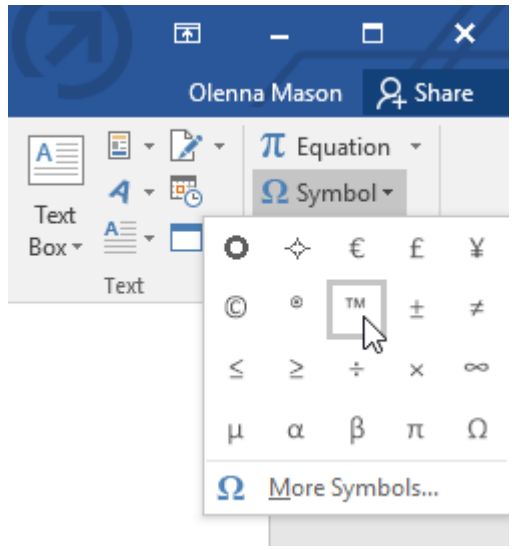
H_2O Mobile Wash & Valet | Just leave the details to us

Prices may vary depending on size of vehicle. Heavily soiled vehicles are subject to an additional charge.

2) Click the **Insert** tab.



3) Locate and select the **Symbol** command, then choose the desired symbol from the drop-down menu. If we don't see the one we want, select **More Symbols**.



4) The symbol will appear in the document.

Schedule your appointment today!
Contact Hank Odum at 321-555-5400 or hank@H2Omobile.com
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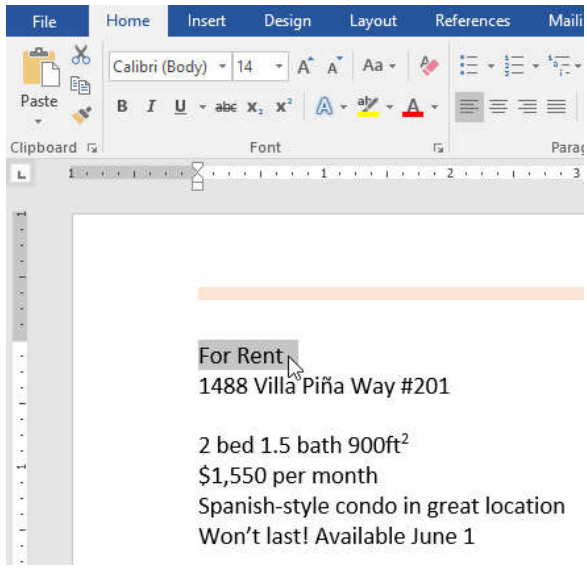
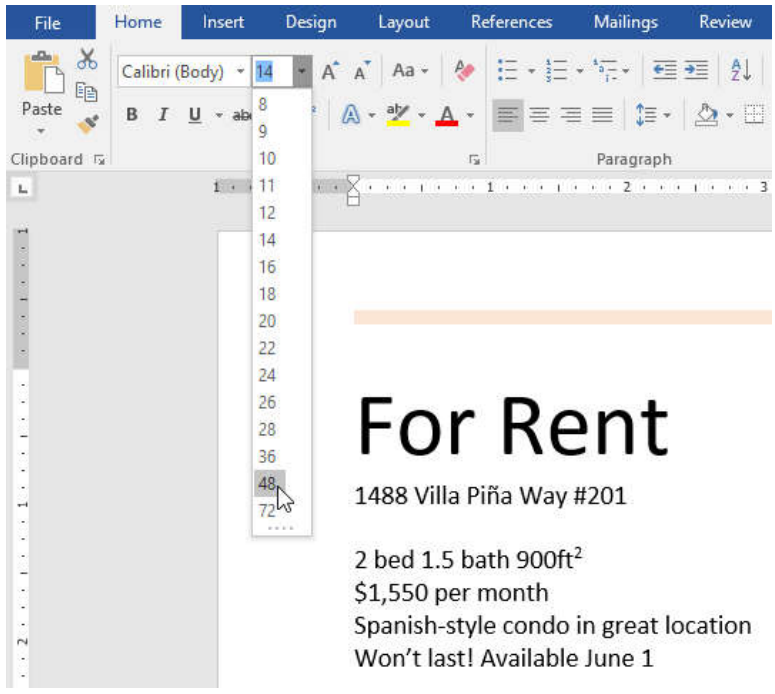
Prices may vary depending on size of vehicle. Heavily soiled vehicles are subject to an additional ch

Change the font size :

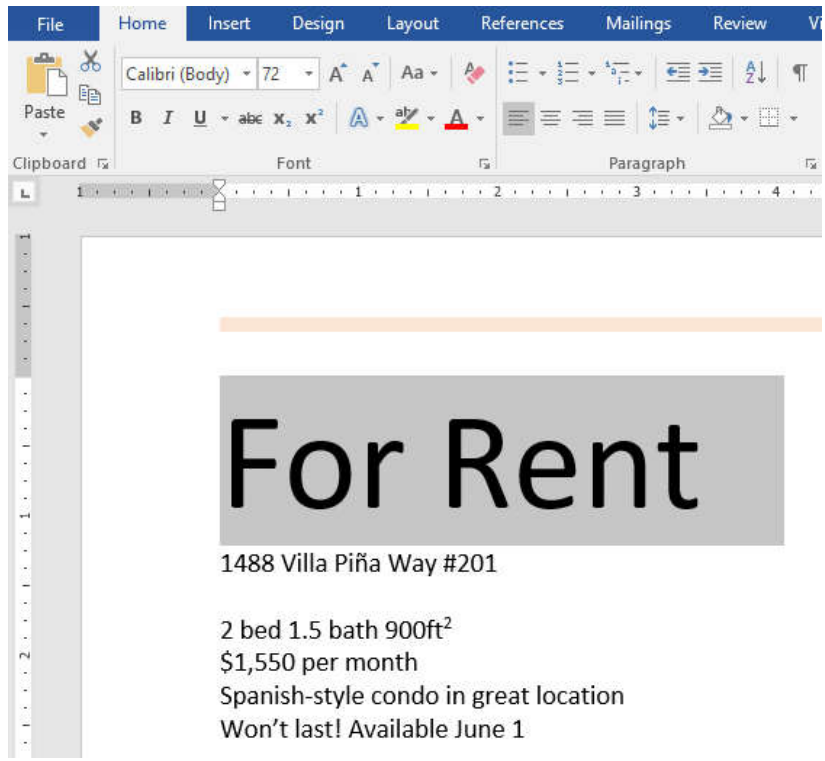
1) Select the text you want to modify.



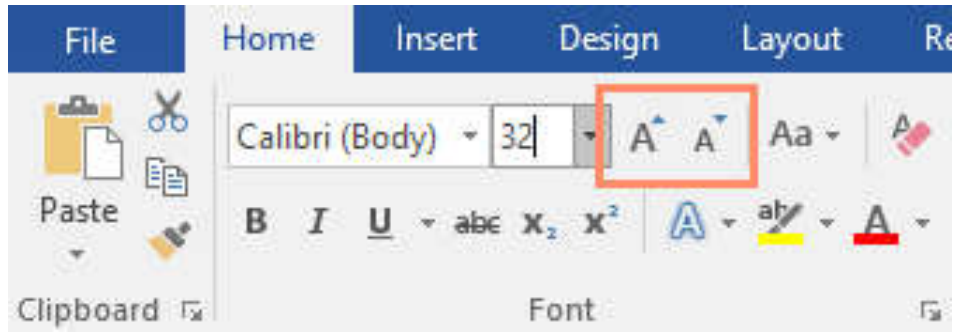
2) On the **Home** tab, click the Font size drop-down arrow. Select a font size from the menu. If the font size we need is not available in the menu, you can click the Font size box and **type** the desired font size, then press **Enter**.



3) The font size will change in the document.



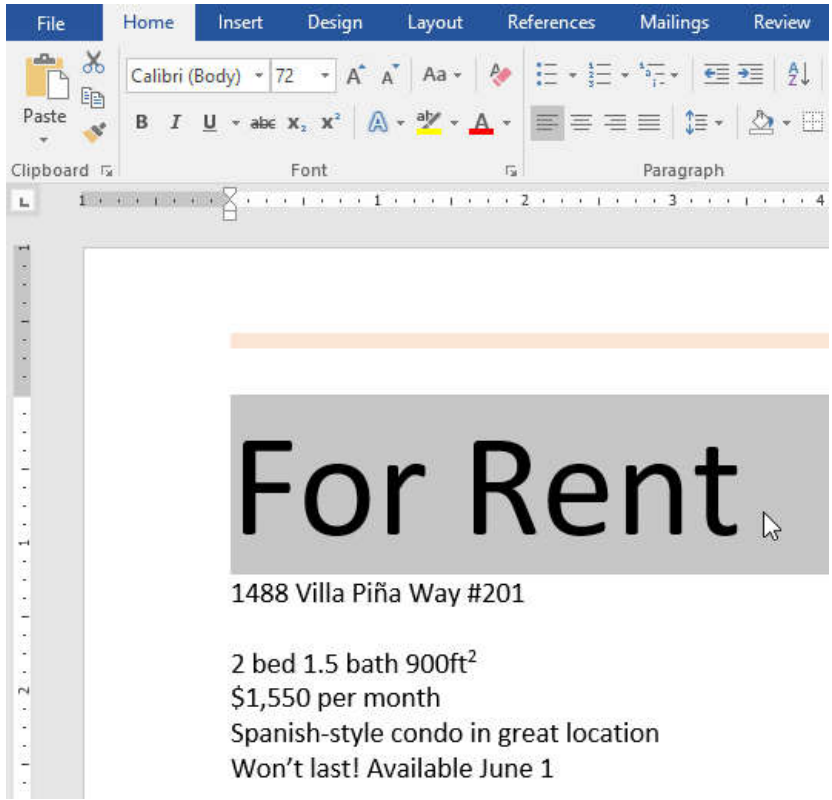
4) We can also use the **Grow Font** and **Shrink Font** commands to change the font size.



To change the font :

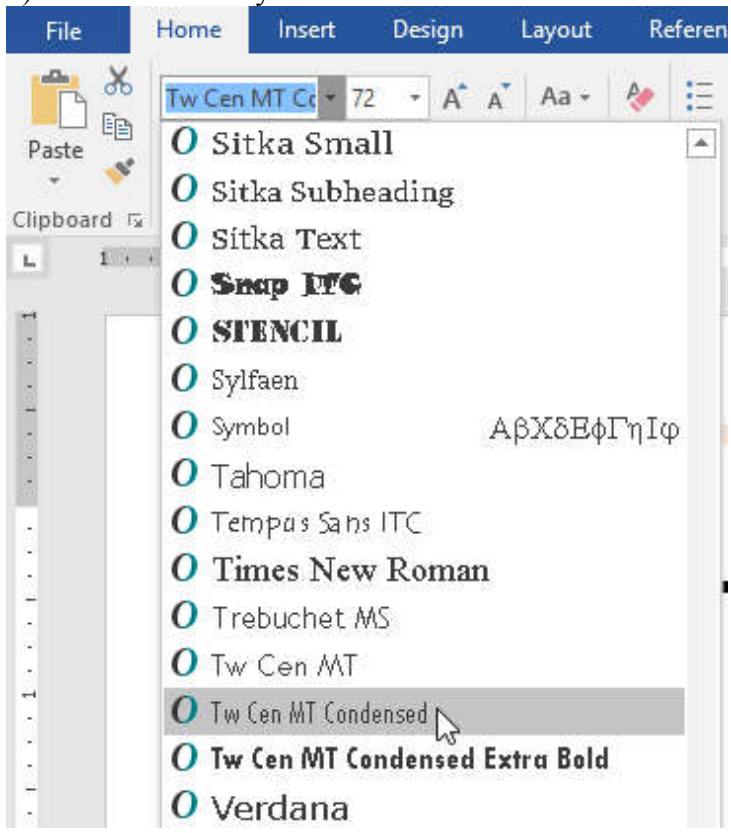
By default, the font of each new document is set to Calibri. However, Word provides many other fonts to customize text.

1) Select the text you want to modify.

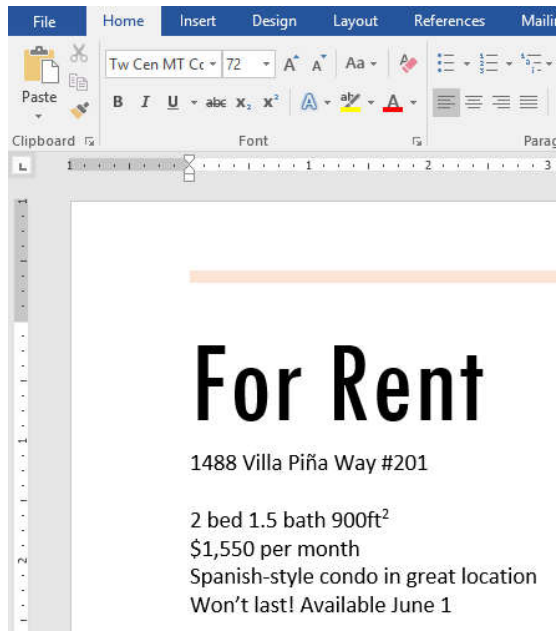


2) On the **Home** tab, click the **drop-down arrow** next to the **Font** box. A menu of font styles will appear.

3) Select the font style we want to use.



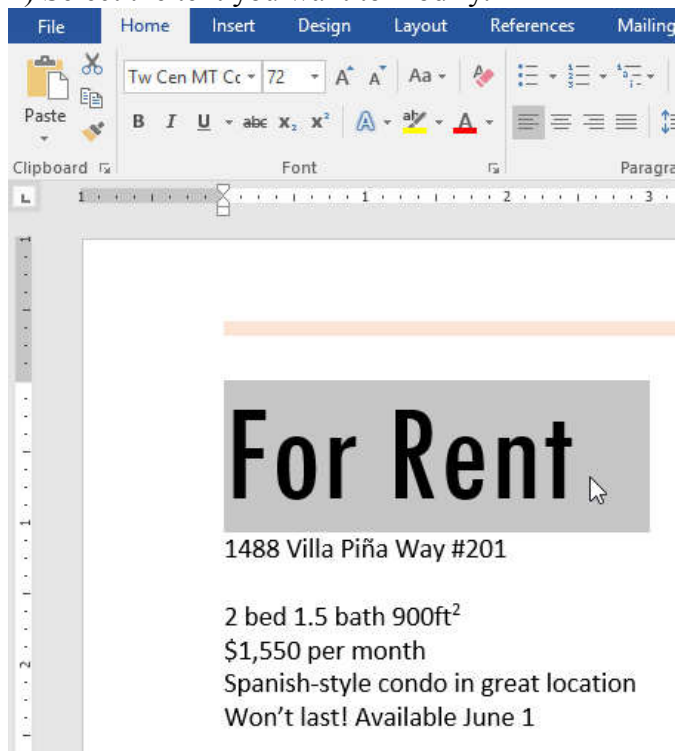
4) The font will change in the document.



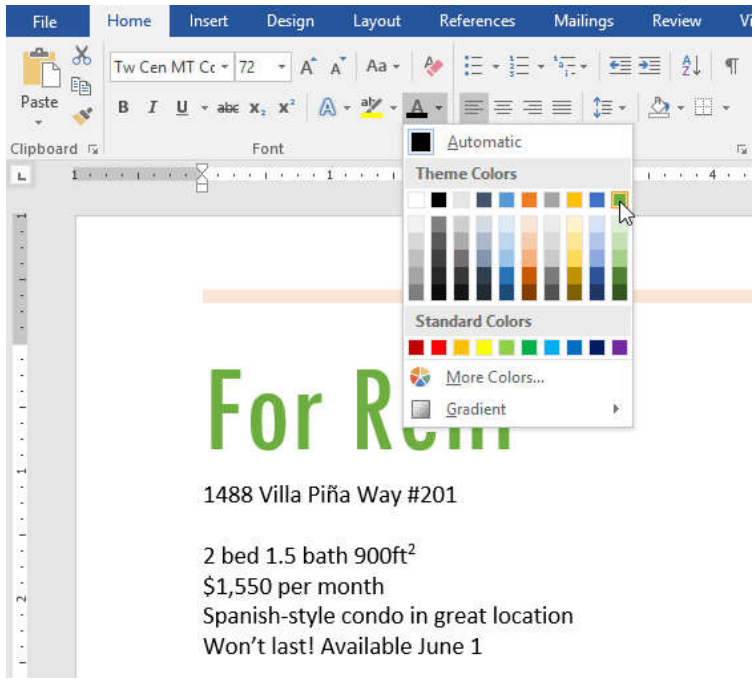
When creating a professional document or a document that contains multiple paragraphs, we need to select a font that's easy to read. Along with Calibri, standard reading fonts include Cambria, Times New Roman, and Arial.

To change the font color :

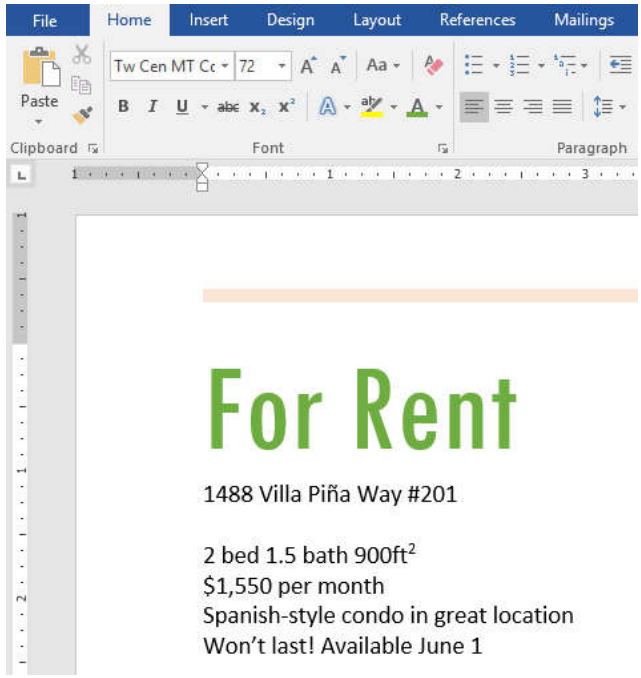
1) Select the text you want to modify.



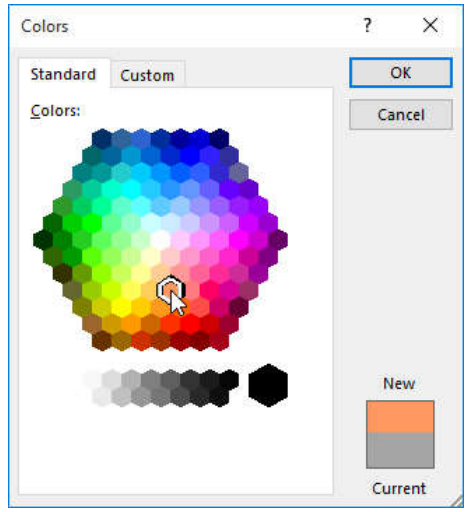
2) On the **Home** tab, click the **Font Color** drop-down arrow. The **Font** Office Productivity Tools **Color** menu appears.



3) Select the font color we want to use. The font color will change in the document.



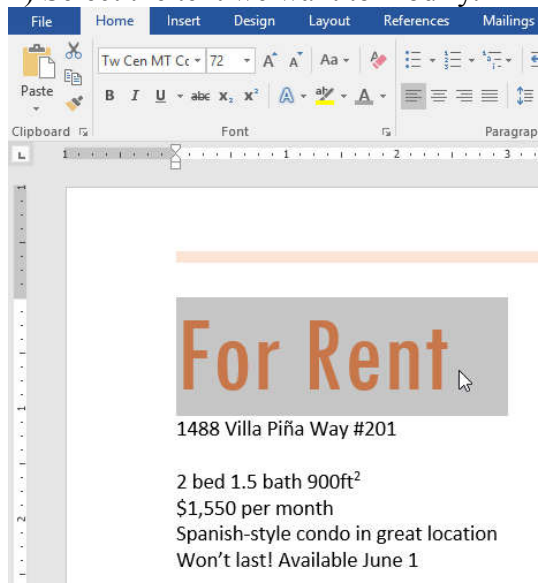
Our color choices aren't limited to the drop-down menu that appears. Select **More Colors** at the bottom of the menu to access the **Colors** dialog box. Choose the color we want, then click **OK**.



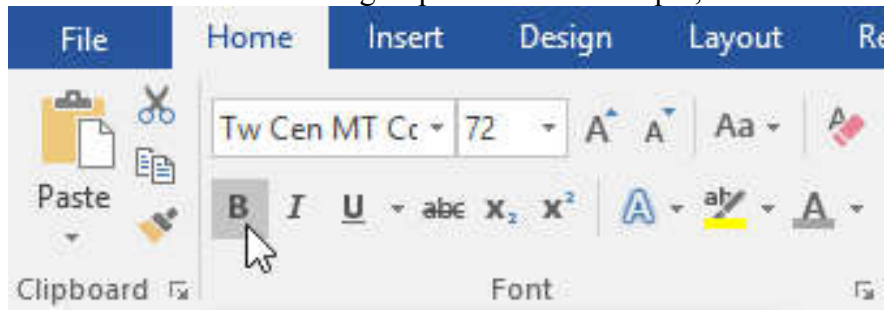
The Bold, Italic, and Underline commands :

The Bold, Italic, and Underline commands can be used to help draw attention to important words or phrases.

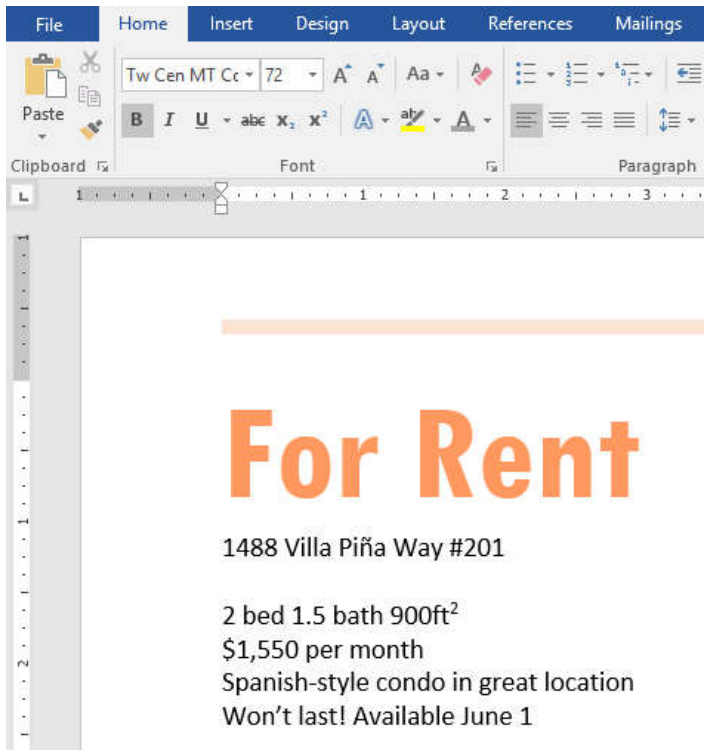
1) Select the text we want to modify.



2) On the Home tab, click the Bold (**B**), Italic (I), or Underline (U) command in the **Font** group. In our example, we'll click Bold.



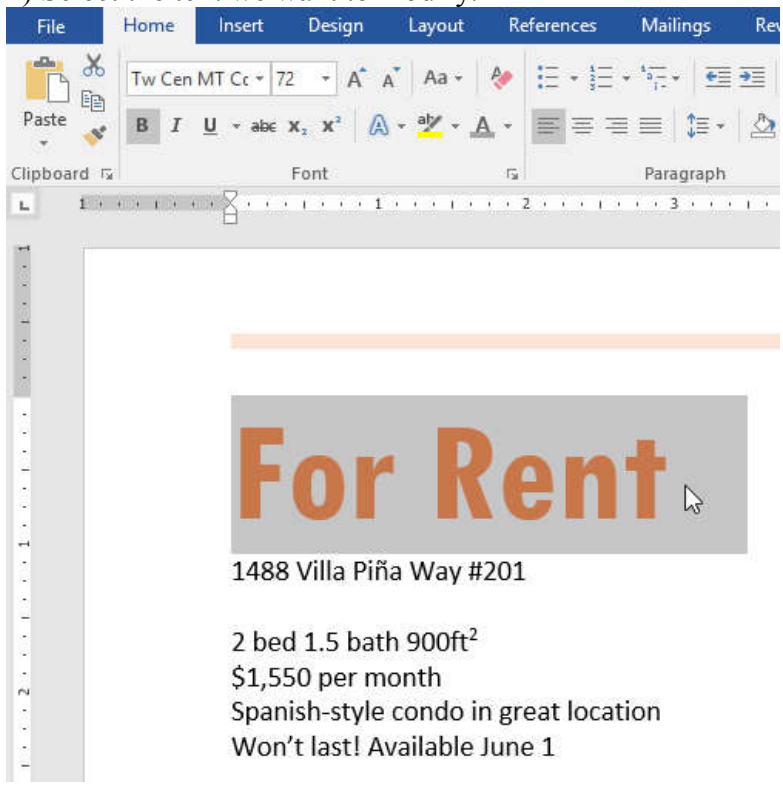
3) The selected text will be modified in the document.



To change text case :

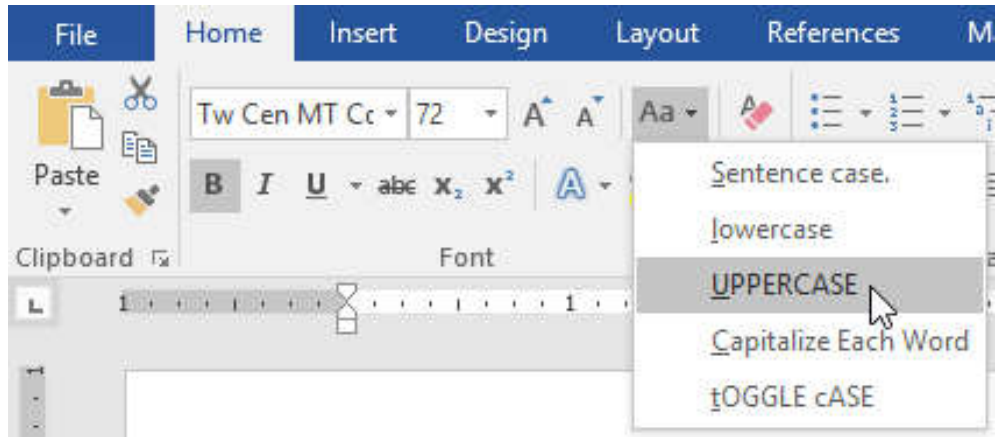
When we need to quickly change a text case, we can use the **Change Case** command instead of deleting and retyping text.

1) Select the text we want to modify.

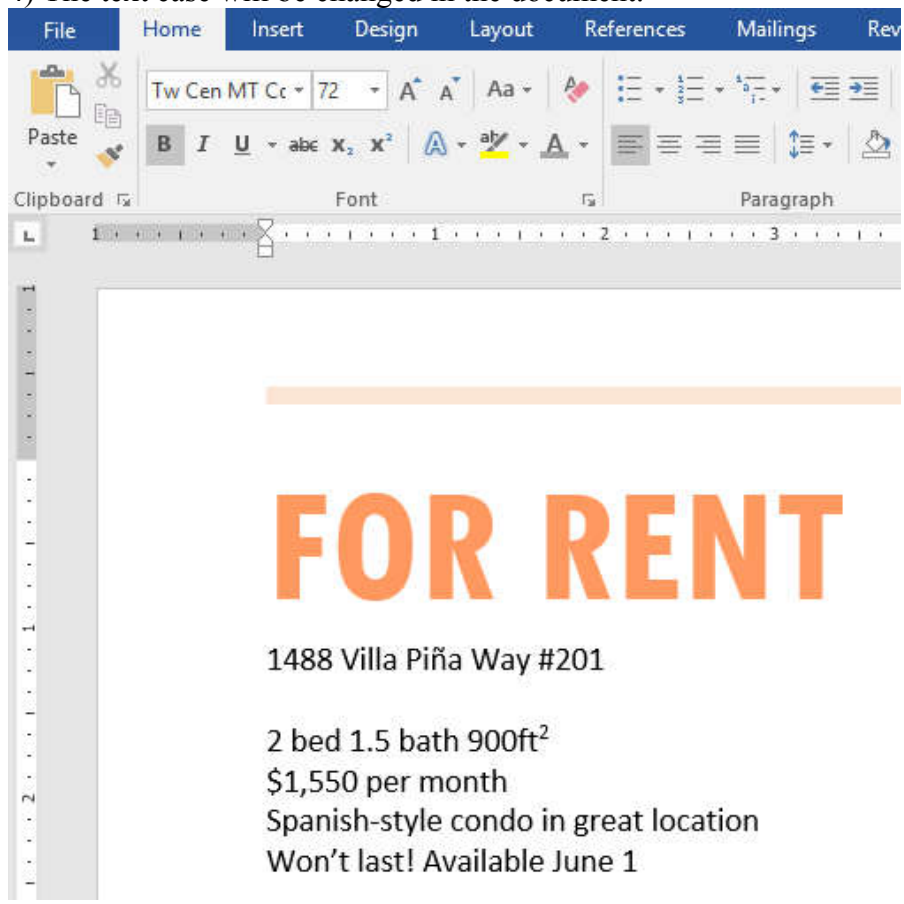


2) On the Home tab, click the **Change Case** command in the **Font** group.

3) A drop-down menu will appear. Select the desired case option from the menu.



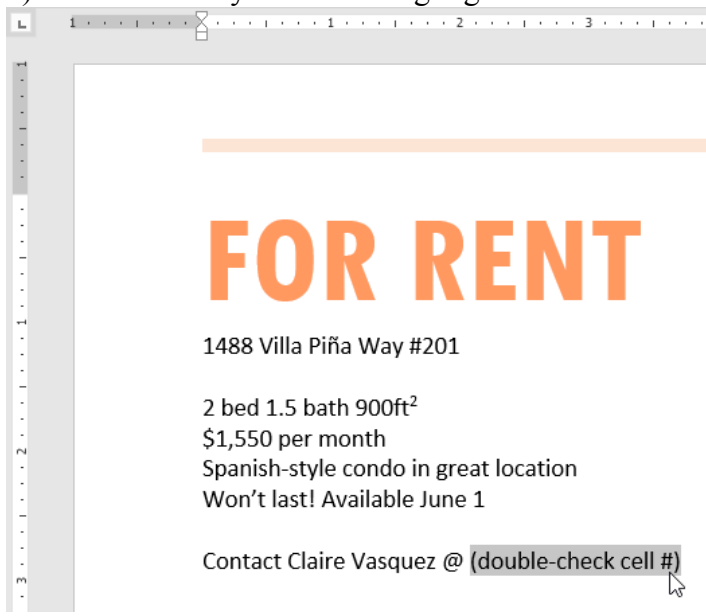
4) The text case will be changed in the document.



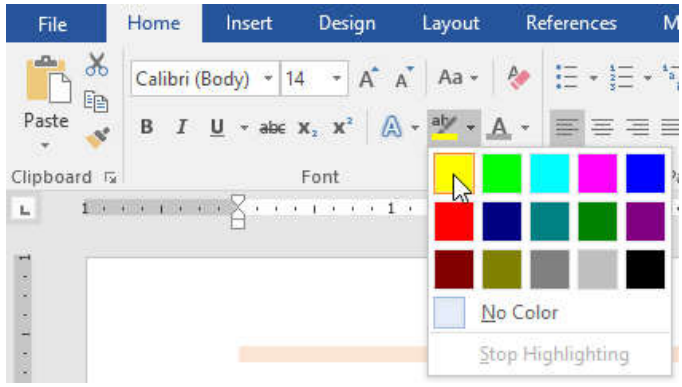
To highlight text :

Highlighting can be a useful tool for marking important text in your document.

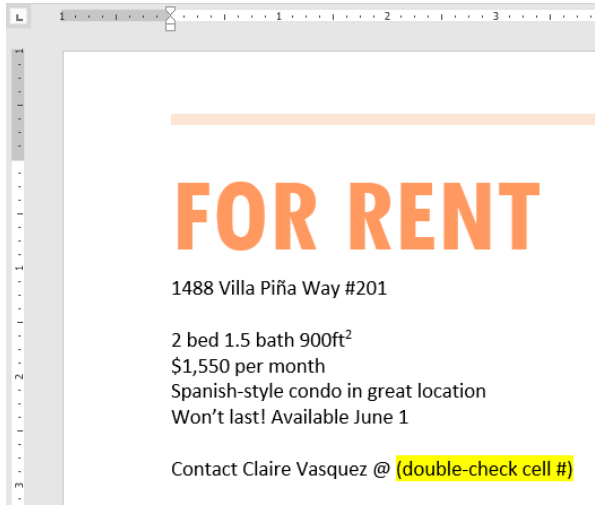
1) Select the text you want to highlight.



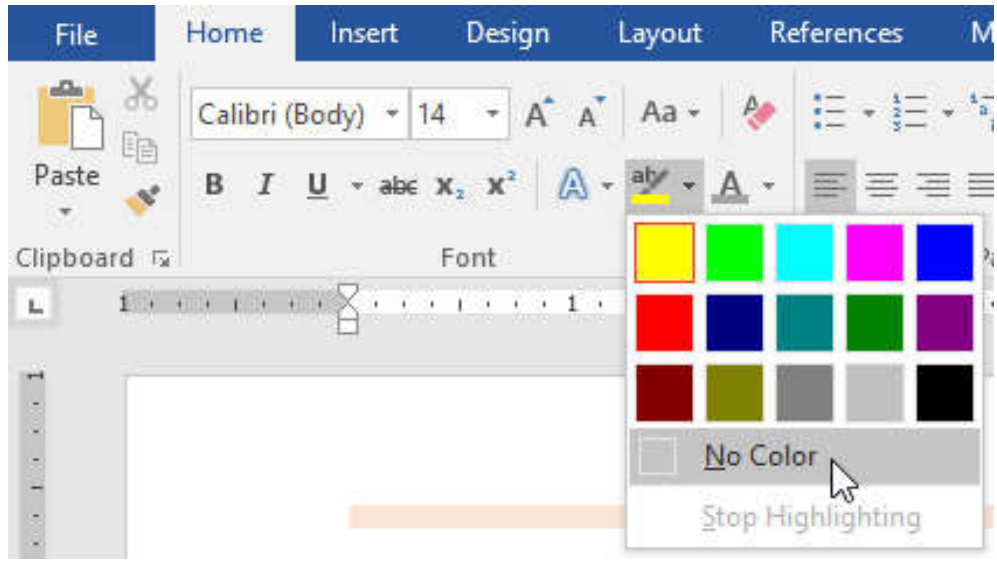
2) From the **Home** tab, click the **Text Highlight Color** drop-down arrow. The **Highlight Color** menu appears.



3) Select the desired highlight **color**. The selected text will then be highlighted in the document.



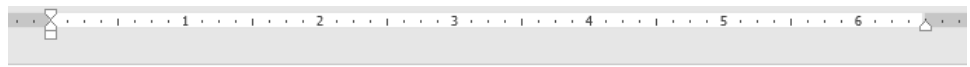
To remove highlighting, select the highlighted text, then click the **Text Highlight Color** drop-down arrow, and Select **No Color** from the drop-down menu.

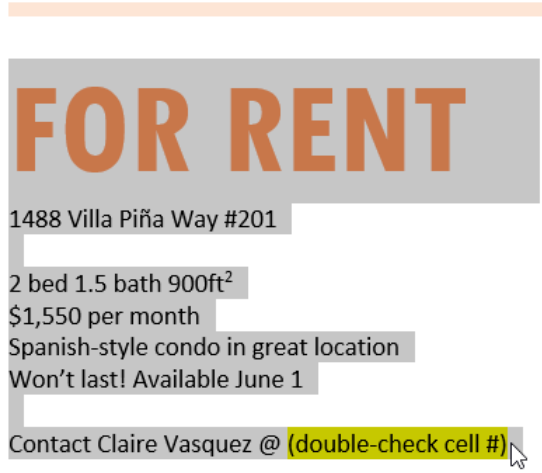


To change text alignment :

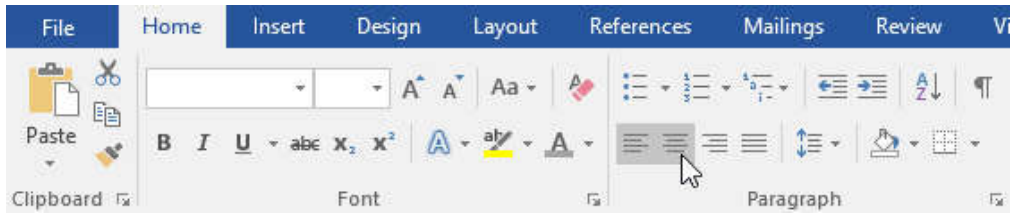
By default, Word aligns text to the **left margin** in new documents. However, there may be times when we want to adjust text alignment to the center or right.

1) Select the text you want to modify.





2) On the **Home** tab, select one of the four alignment options from the **Paragraph** group. In our example, we've selected **Center Alignment**.



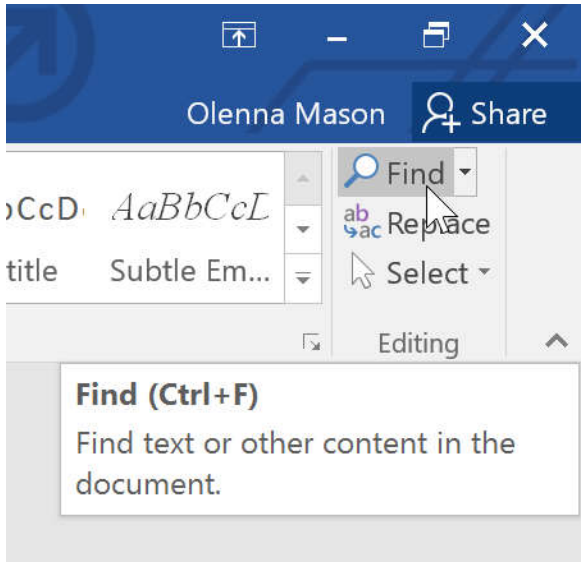
3) The text will be realigned in the document.

Justify : Justified text is equal on both sides. It lines up equally to the right and left margins. Many newspapers and magazines use full justification.

Find & Replace : When we are working with longer documents, it can be difficult and time consuming to locate a specific word or phrase. Word can automatically search our document using the Find feature, and it allows us to quickly change words or phrases using Replace.

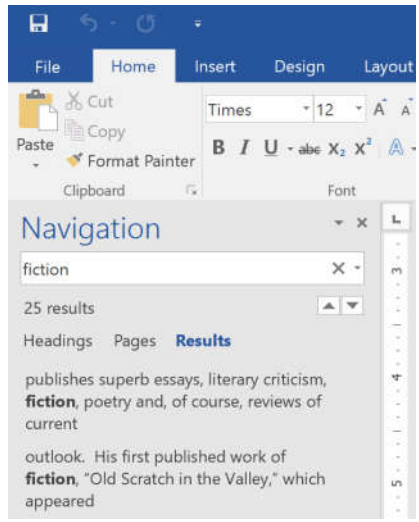
To find text :

1) From the Home tab, click the Find command. Alternatively, you can press Ctrl+F on your keyboard.

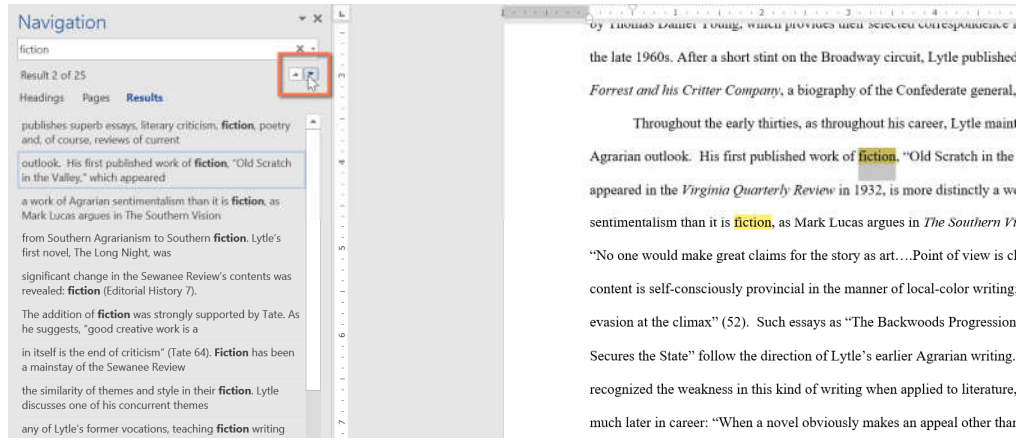


2) The navigation pane will appear on the left side of the screen.

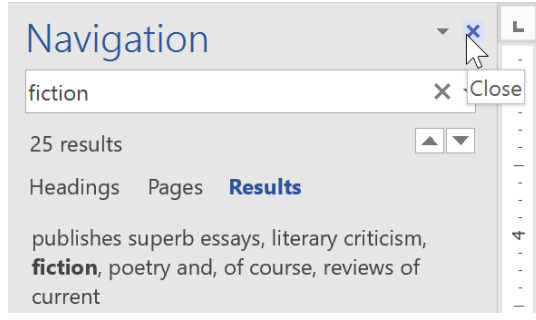
3) Type the text we want to find in the field at the top of the navigation pane. In our example, we'll type the word we're looking for.



4) If the text is found in the document, it will be highlighted in yellow and a preview of the results will appear in the navigation pane. Alternatively, you can click one of the results below the arrows to jump to it.

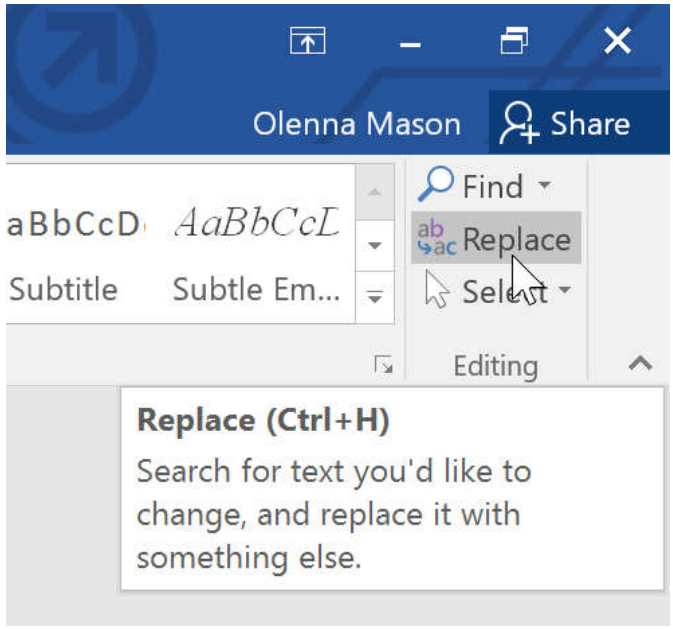


5) When you are finished, click the X to close the navigation pane. The highlight will disappear.



To replace text :

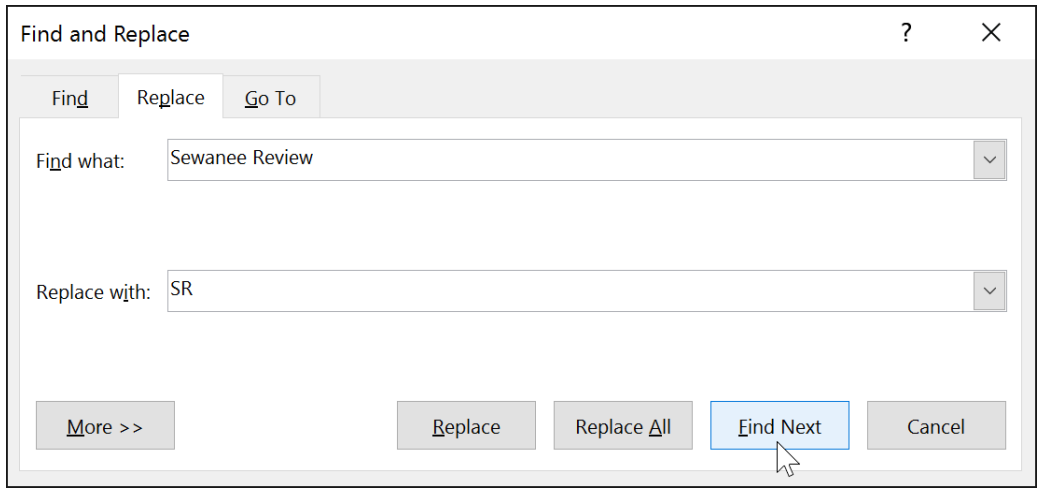
1) From the Home tab, click the Replace command. Alternatively, you can press Ctrl+H on your keyboard.



2) The Find and Replace dialog box will appear.

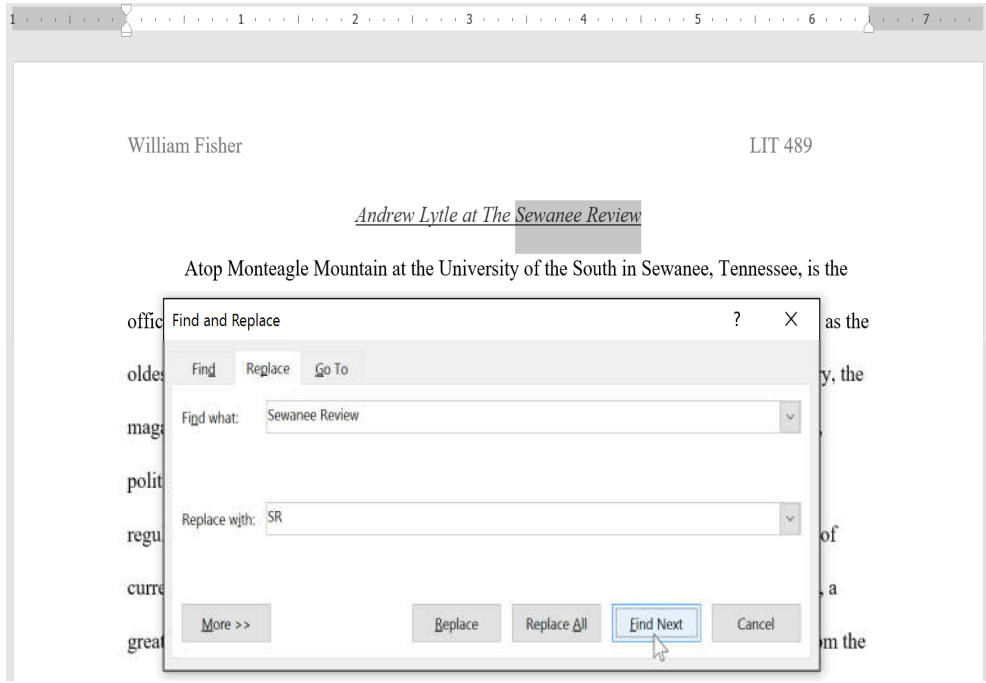
3) Type the text we want to find in the Find what: field.

4) Type the text we want to replace it with in the Replace with: field. Then click Find Next.



5) Word will find the first instance of the text and highlight it in gray.

6) Review the text to make sure you want to replace it. In our example, the text is part of the title of the paper and does not need to be replaced. We'll click Find Next again to jump to the next instance.

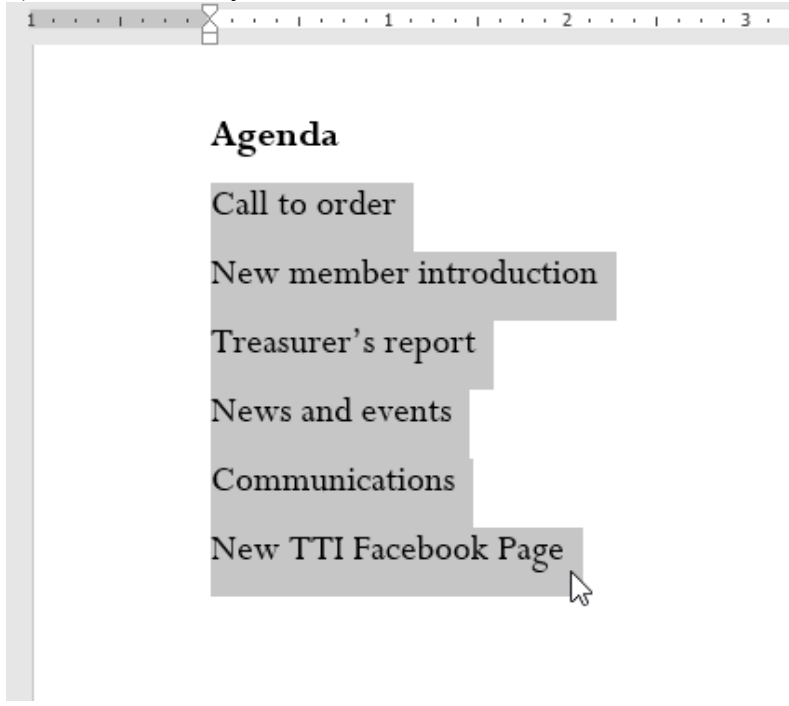


7) If we want to replace it, we can click Replace to change individual instances of text. Alternatively, we can click Replace All to replace every instance of the text throughout the document.

8) The text will be replaced.
9) When you're done, click Close or Cancel to close the dialog box.

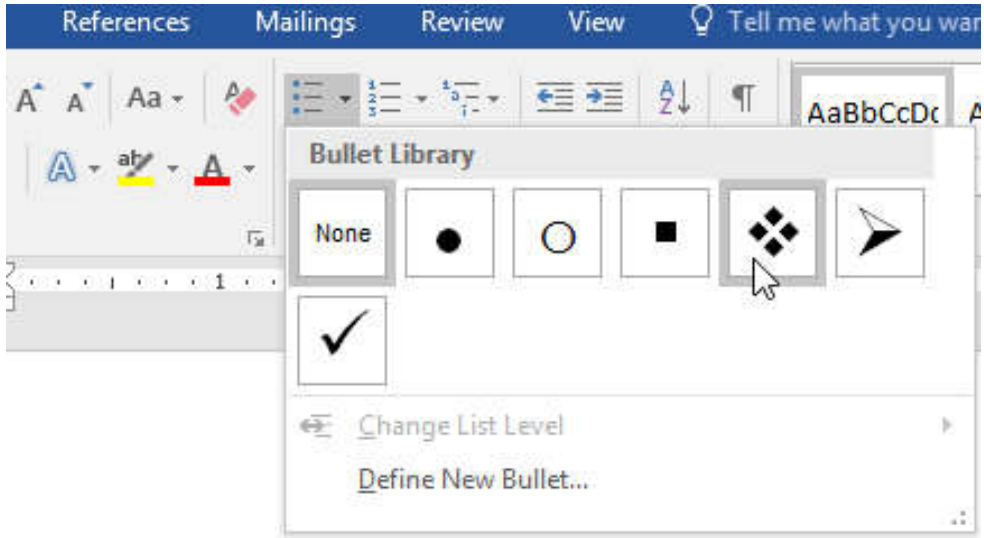
Bulleted and numbered lists : It can be used in our documents to outline, arrange, and emphasize text.

1) Select the text you want to format as a list.

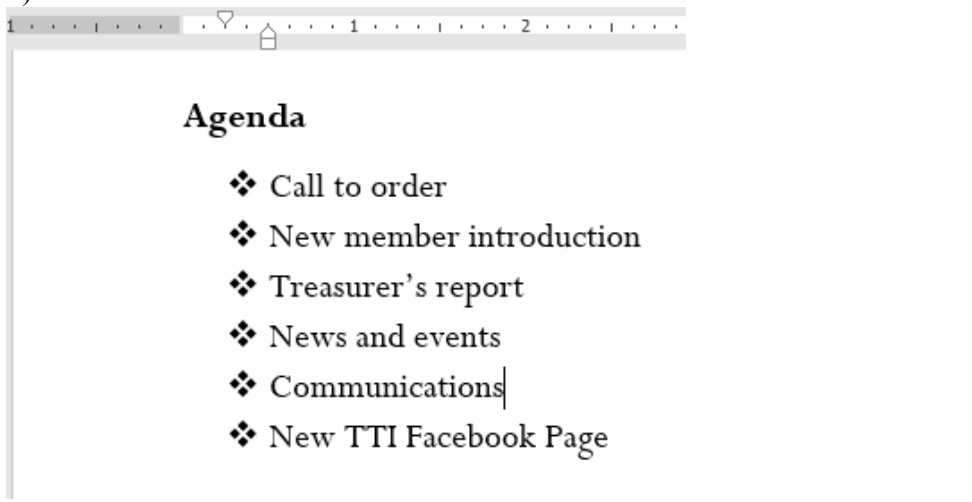


2) On the Home tab, click the drop-down arrow next to the Bullets Office Productivity Tools command. A menu of bullet styles will appear.

3) Move the mouse over the various bullet styles. A live preview of the bullet style will appear in the document. Select the bullet style you want to use.

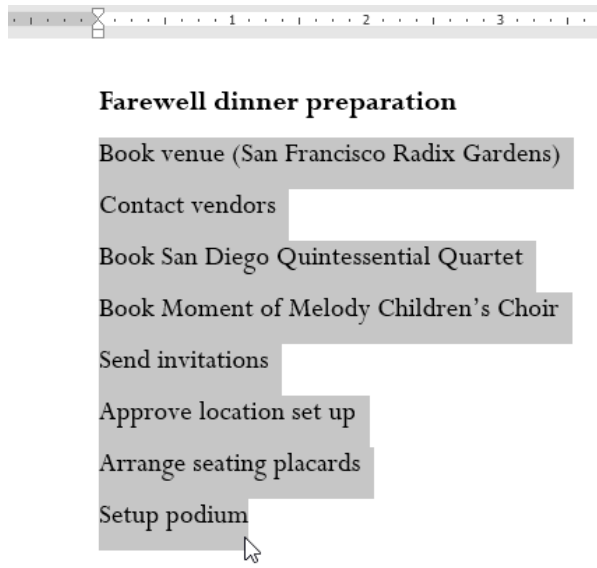


4) The text will be formatted as a bulleted list.



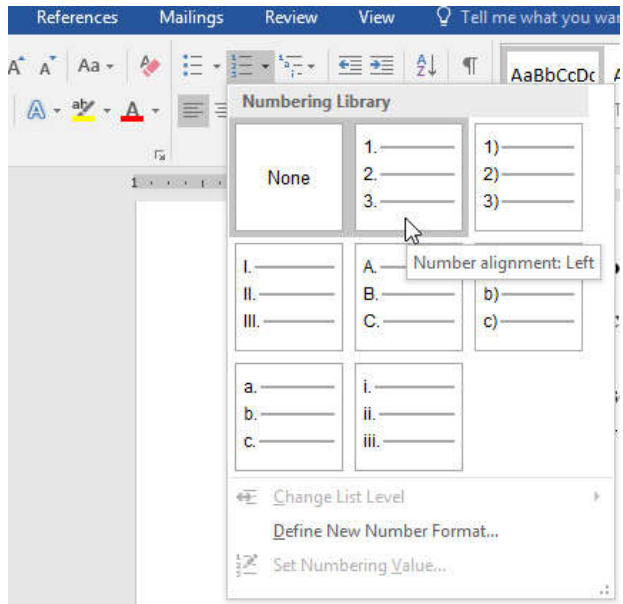
To create a numbered list : When we need to organize text into a numbered list, Word offers several numbering options. We can format your list with numbers, letters, or Roman numerals.

1) Select the text you want to format as a list.



2) On the Home tab, click the drop-down arrow next to the Numbering command. A menu of numbering styles will appear.

3) Move the mouse over the various numbering styles. A live preview of the numbering style will appear in the document. Select the numbering style you want to use.



4) The text will format as a numbered list.

Farewell dinner preparation

1. Book venue (San Francisco Radix Gardens)
2. Contact vendors
3. Book San Diego Quintessential Quartet
4. Book Moment of Melody Children's Choir
5. Send invitations
6. Approve location set up
7. Arrange seating placards
8. Setup podium

Restart a numbered list : If we want to restart the numbering of a list, Word has a Restart at 1 option. It can be applied to numeric and alphabetical lists.

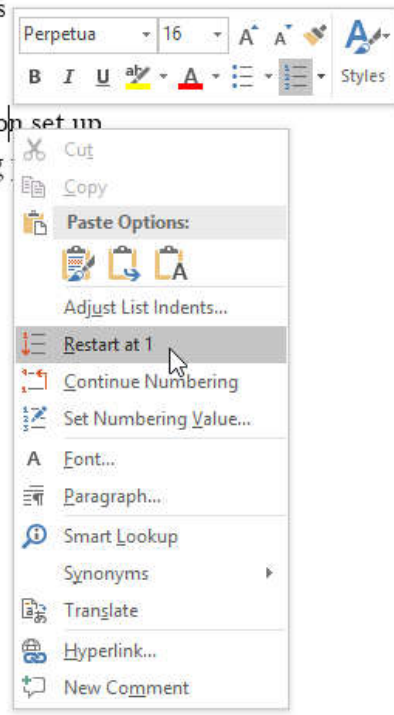
1) Right-click the list item you want to restart the numbering for, then select Restart at 1 from the menu that appears.

Farewell dinner preparation

1. Book venue (San Francisco Radix Gardens)
2. Contact vendors
3. Book San Diego Quintessential Quartet
4. Book Moment of Melody Children's Choir
5. Send invitations

Day of the dinner

6. Approve location set up
7. Arrange seating
8. Setup podium



2) The list numbering will restart.

Farewell dinner preparation

1. Book venue (San Francisco Radix Gardens)
2. Contact vendors
3. Book San Diego Quintessential Quartet
4. Book Moment of Melody Children's Choir
5. Send invitations

Day of the dinner

1. Approve location set up
2. Arrange seating placards
3. Setup podium

Customizing bullets : Customizing the look of the bullets in our list can help us emphasize certain list items and personalize the design of our list. Word allows us to format bullets in a variety of ways. We can use symbols and different colors, or even upload a picture as a bullet.

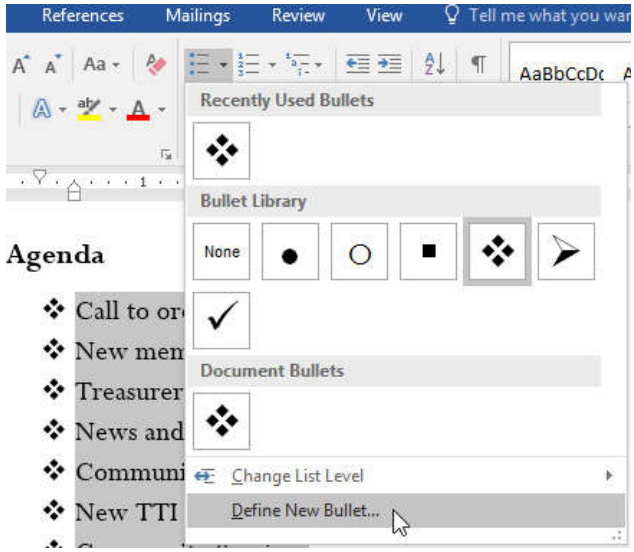
1) Select an existing list you want to format.

Agenda

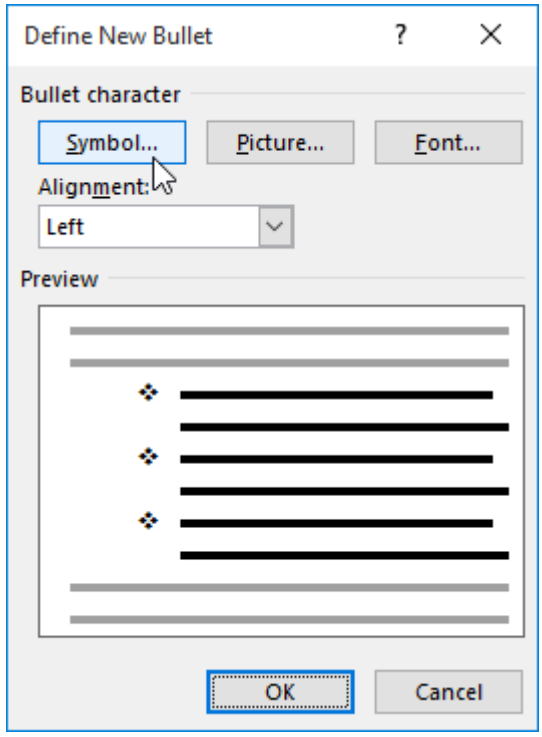
- Call to order
- New member introduction
- Treasurer's report
- News and events
- Communications
- New TTI Facebook Page
- Community Service
- Fundraising
- Chair's Report
- Adjournment

Additional Notes:

2) On the Home tab, click the drop-down arrow next to the Bullets command. Select Define New Bullet from the drop-down menu.



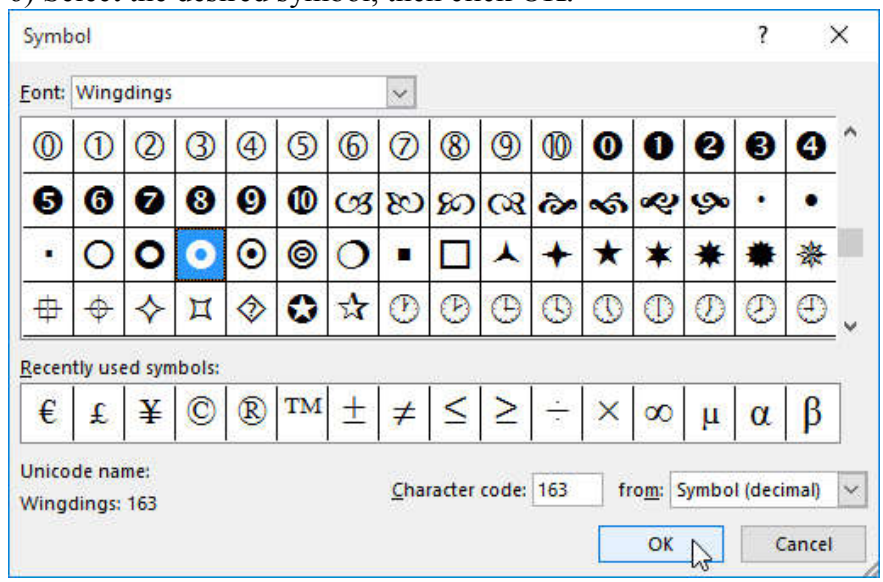
3) The Define New Bullet dialog box will appear. Click the Symbol button.



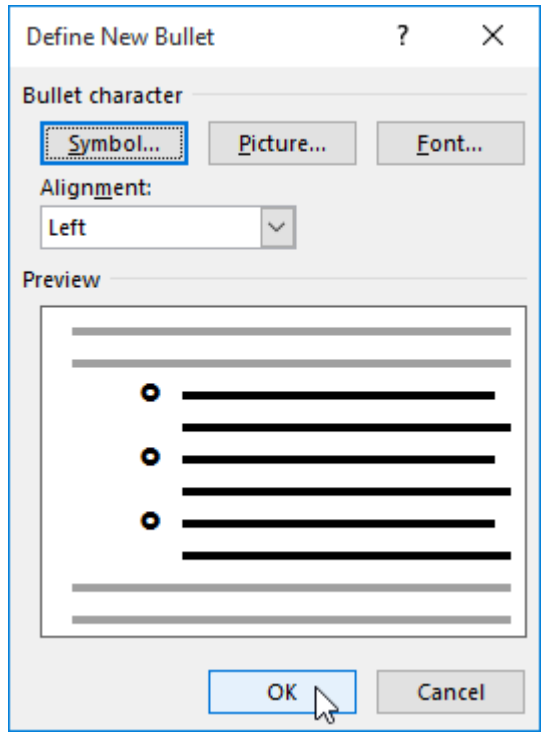
4) The Symbol dialog box will appear.

5) Click the Font drop-down box and select a font. The Wingdings and Symbol fonts are good choices because they have many useful symbols.

6) Select the desired symbol, then click OK.



7) The symbol will appear in the Preview section of the Define New Bullet dialog box. Click OK.



8) The symbol will appear in the list.

Agenda

- Call to order
- New member introduction
- Treasurer's report
- News and events
- Communications
- New TTI Facebook Page
- Community Service
- Fundraising
- Chair's Report
- Adjournment

Additional Notes:

To change the bullet color :

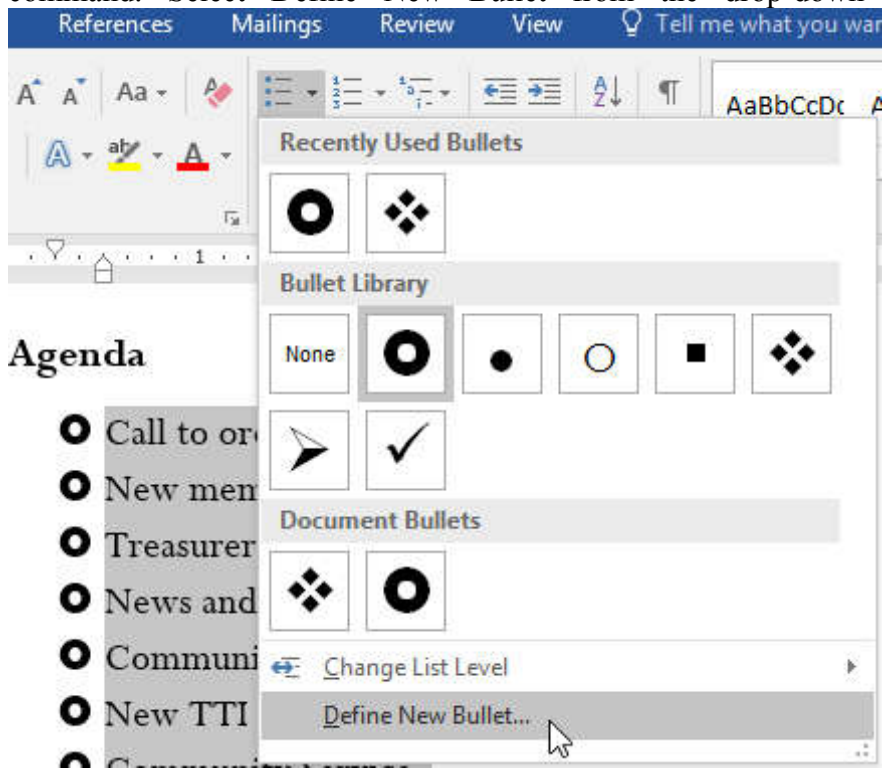
1) Select an existing list you want to format.

Agenda

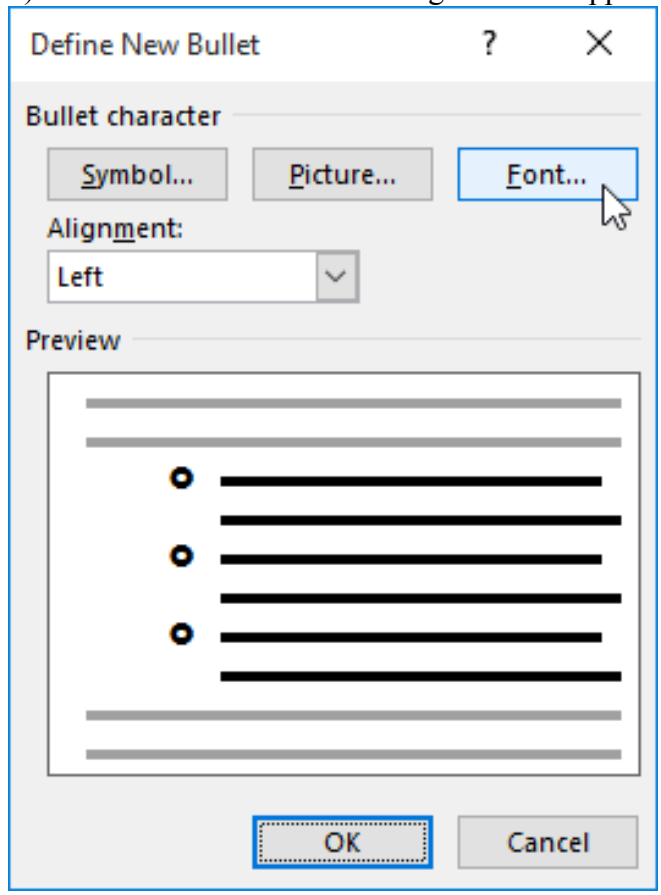
- Call to order
- New member introduction
- Treasurer's report
- News and events
- Communications
- New TTI Facebook Page
- Community Service
- Fundraising
- Chair's Report
- Adjournment

Additional Notes:

2) On the Home tab, click the drop-down arrow next to the Bullets command. Select Define New Bullet from the drop-down menu.

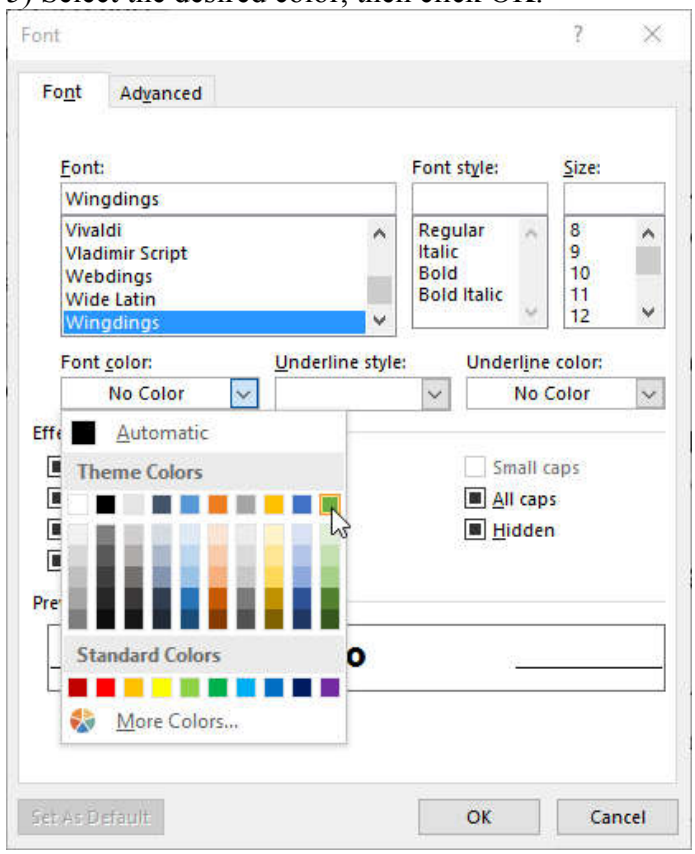


3) The Define New Bullet dialog box will appear. Click the Font button.

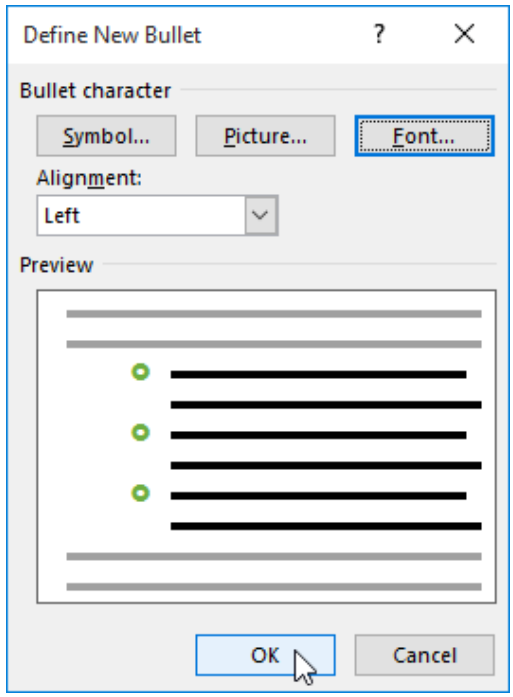


4) The Font dialog box will appear. Click the Font Color drop-down box. A menu of font colors will appear.

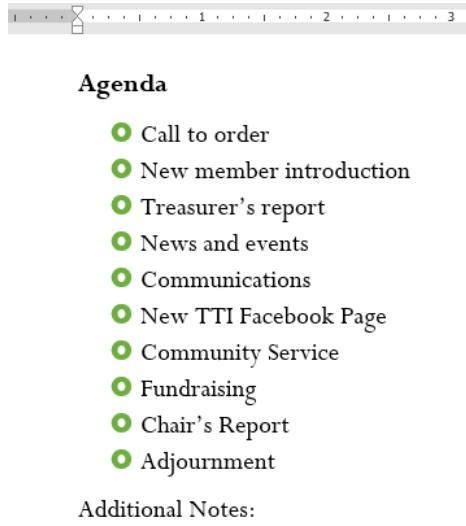
5) Select the desired color, then click OK.



6) The bullet color will appear in the Preview section of the Define New Bullet dialog box. Click OK.



7) The bullet color will change in the list.



Agenda

- Call to order
- New member introduction
- Treasurer's report
- News and events
- Communications
- New TTI Facebook Page
- Community Service
- Fundraising
- Chair's Report
- Adjournment

Additional Notes:

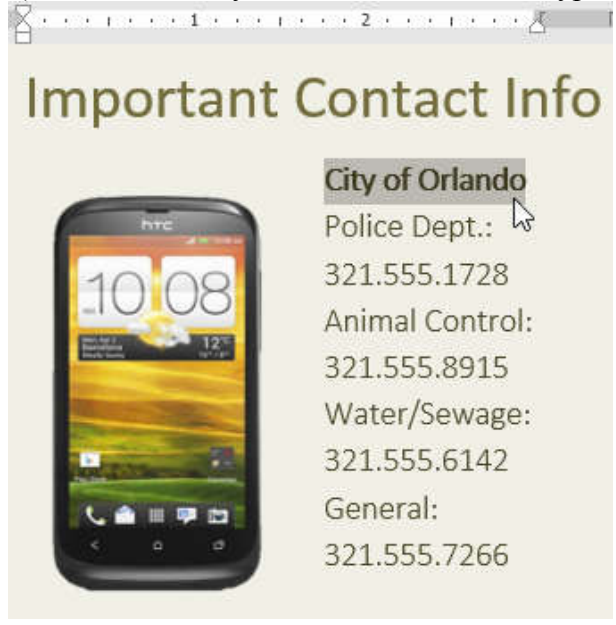
Adding hyperlinks : Adding hyperlinks to text can provide access to websites and email addresses directly from our document. There are a few ways to insert a hyperlink into our document.

Hyperlinks have **two basic parts** : the address (URL) of the webpage and the **display text**. For example, the address could be **http://www.popsci.com**, and the display text could be **Popular Science Magazine**.

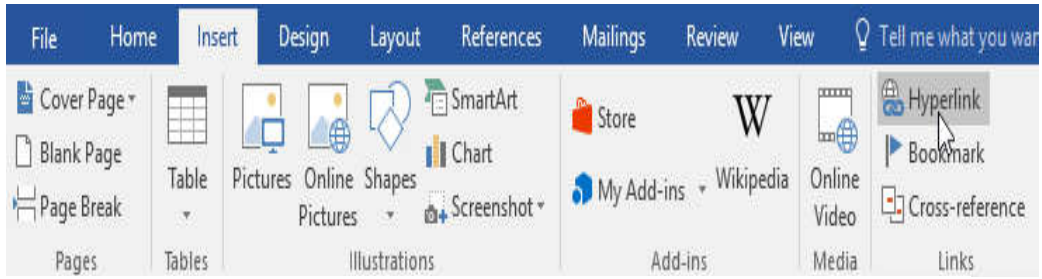
When we create a hyperlink in Word, we would be able to choose both the address and the display text.

Word often recognizes email and web addresses as we type and will automatically format them as hyperlinks after we press **Enter** or the **spacebar**.

1) Select the text you want to format as a hyperlink.



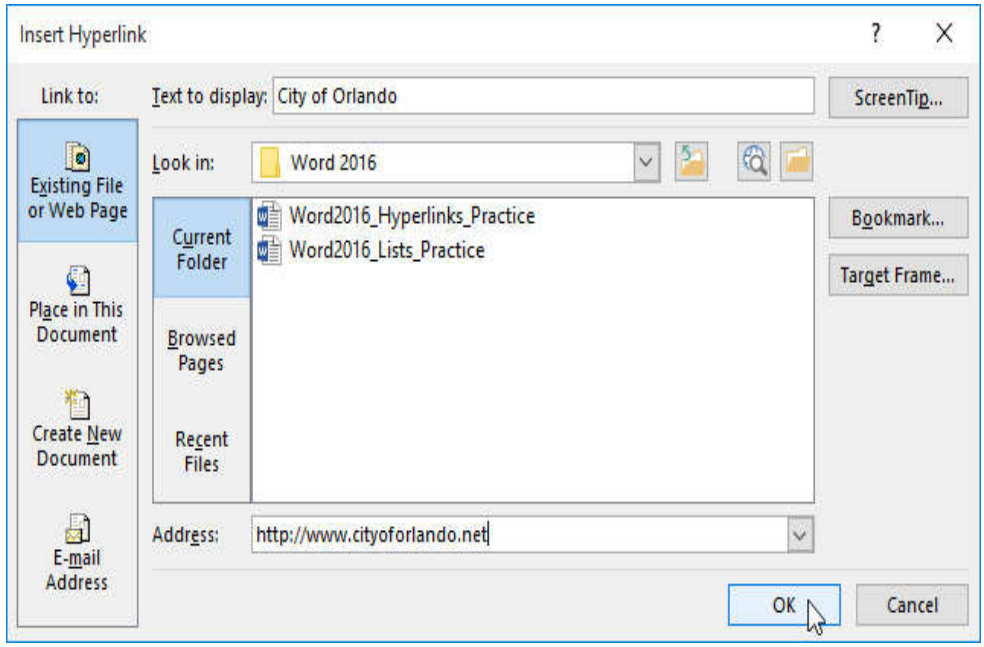
2) Select the **Insert** tab, then click the **Hyperlink** command. (Alternatively, you can open the Insert Hyperlink dialog box by right-clicking the selected text and selecting **Hyperlink...** from the menu that appears.)



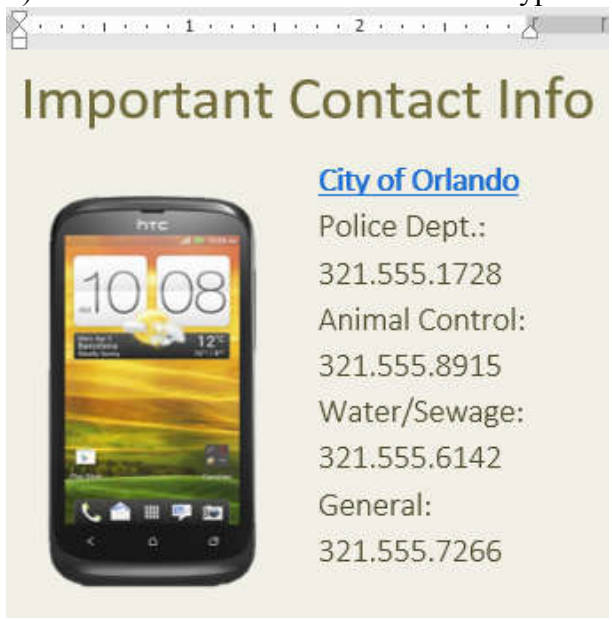
3) The **Insert Hyperlink** dialog box will appear. Using the options on the left side, you can choose to link to a **file**, **webpage**, **email address**, **document**, or a **place in the current document**.

4) The selected text will appear in the **Text to display :** field at the top. We can change this text if we want.

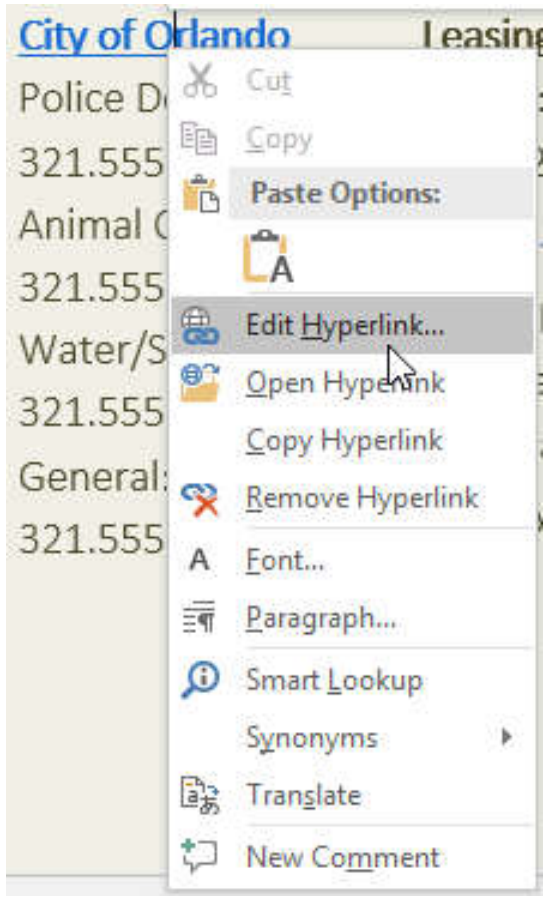
5) In the **Address** : field, type the address we want to link to, then click **OK**.



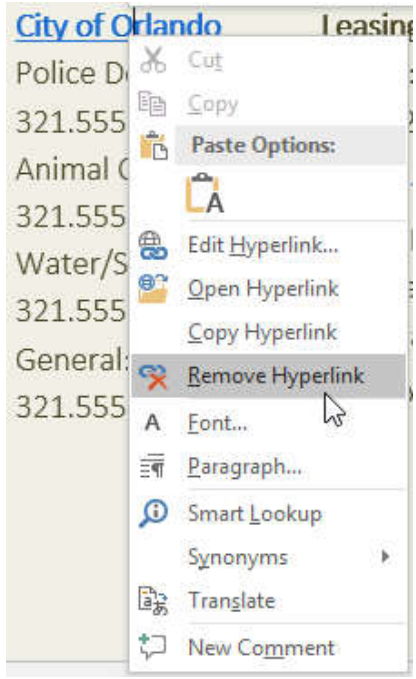
6) The text will then be formatted as a hyperlink.



Editing and removing hyperlinks : Once we have inserted a hyperlink, we can right-click the hyperlink to edit, open, copy, or remove it.



To remove a hyperlink, right-click the hyperlink and select **Remove Hyperlink** from the menu that appears.



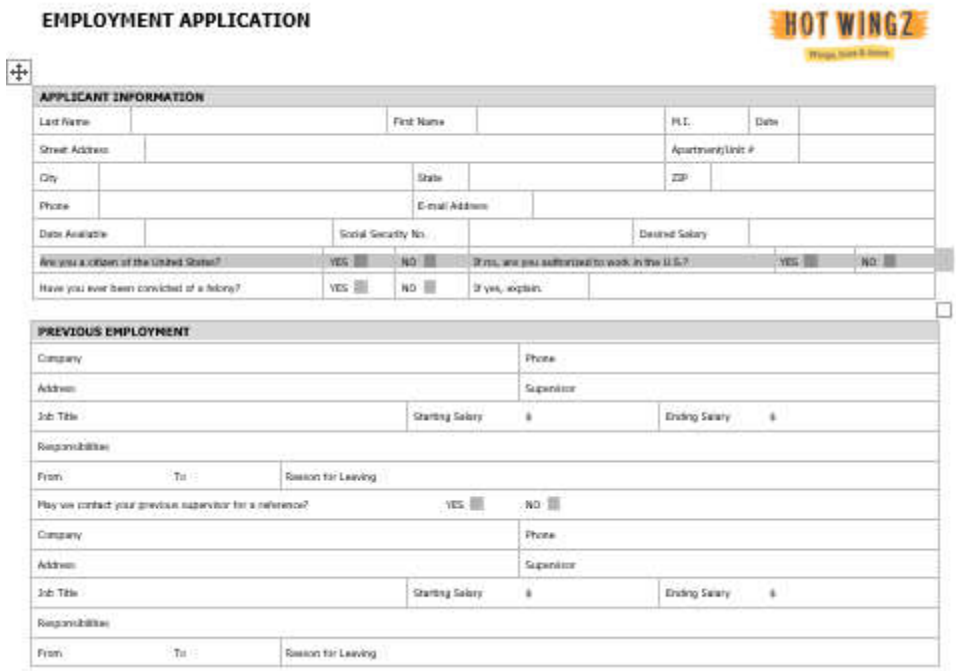
1.12 Page Layout :

Word offers a variety of page layout and formatting options that affect how content appears on the page. We can customize the page orientation, paper size, and page margins depending on how we want our document to appear.

Page orientation

Word offers two page orientation options : **landscape** and **portrait**.

1) Landscape means the page is oriented **horizontally**.

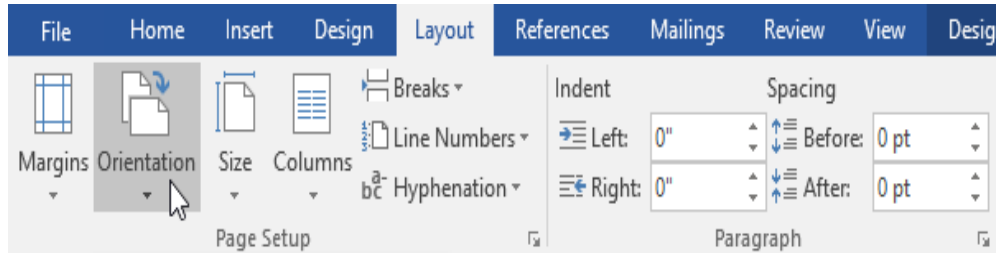


2) Portrait means the page is oriented **vertically**.

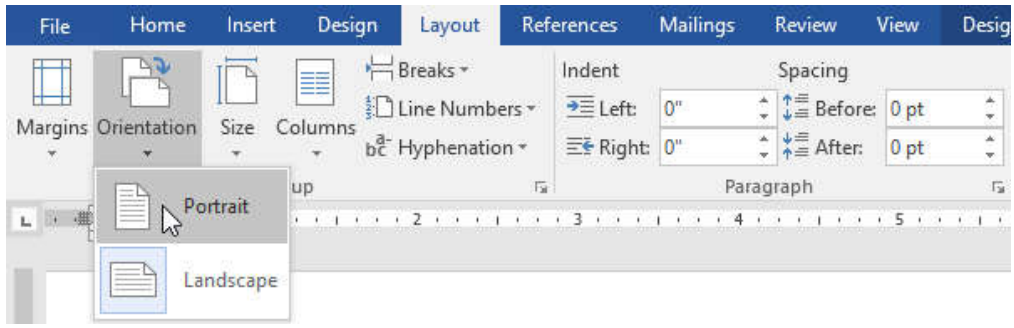
To change page orientation :

1) Select the **Layout** tab.

2) Click the **Orientation** command in the Page Setup group.



3) A drop-down menu will appear. Click either **Portrait** or **Landscape** to change the page orientation.



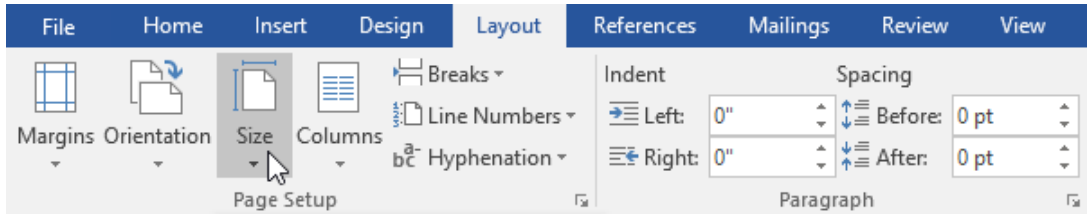
4) The page orientation of the document will be changed.

Page size :

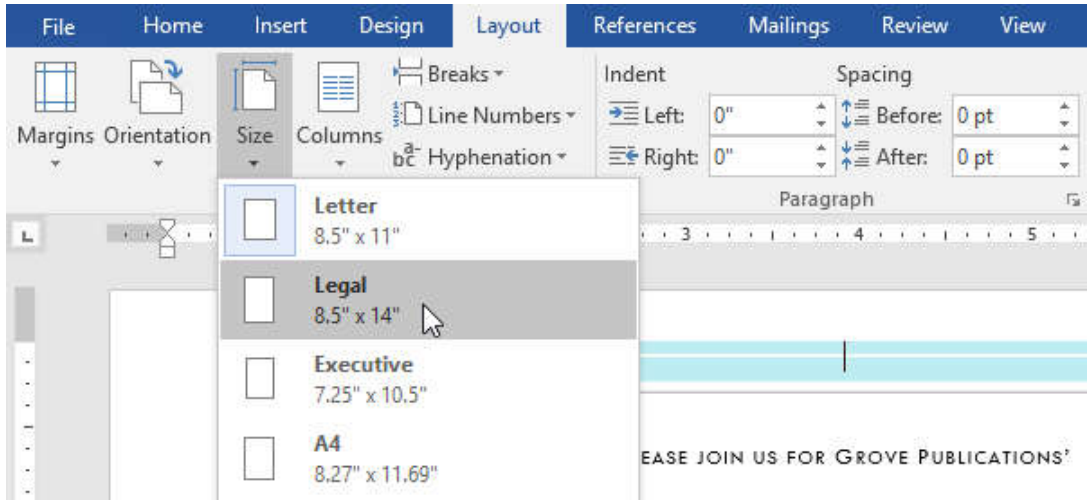
By default, the **page size** of a new document is 8.5 inches by 11 inches. Depending on our project, we may need to adjust our document's page size.

Word has a variety of **predefined page sizes** to choose from.

1) Select the **Layout** tab, then click the **Size** command.



2) A drop-down menu will appear. The current page size is highlighted. Click the desired **predefined page size**.

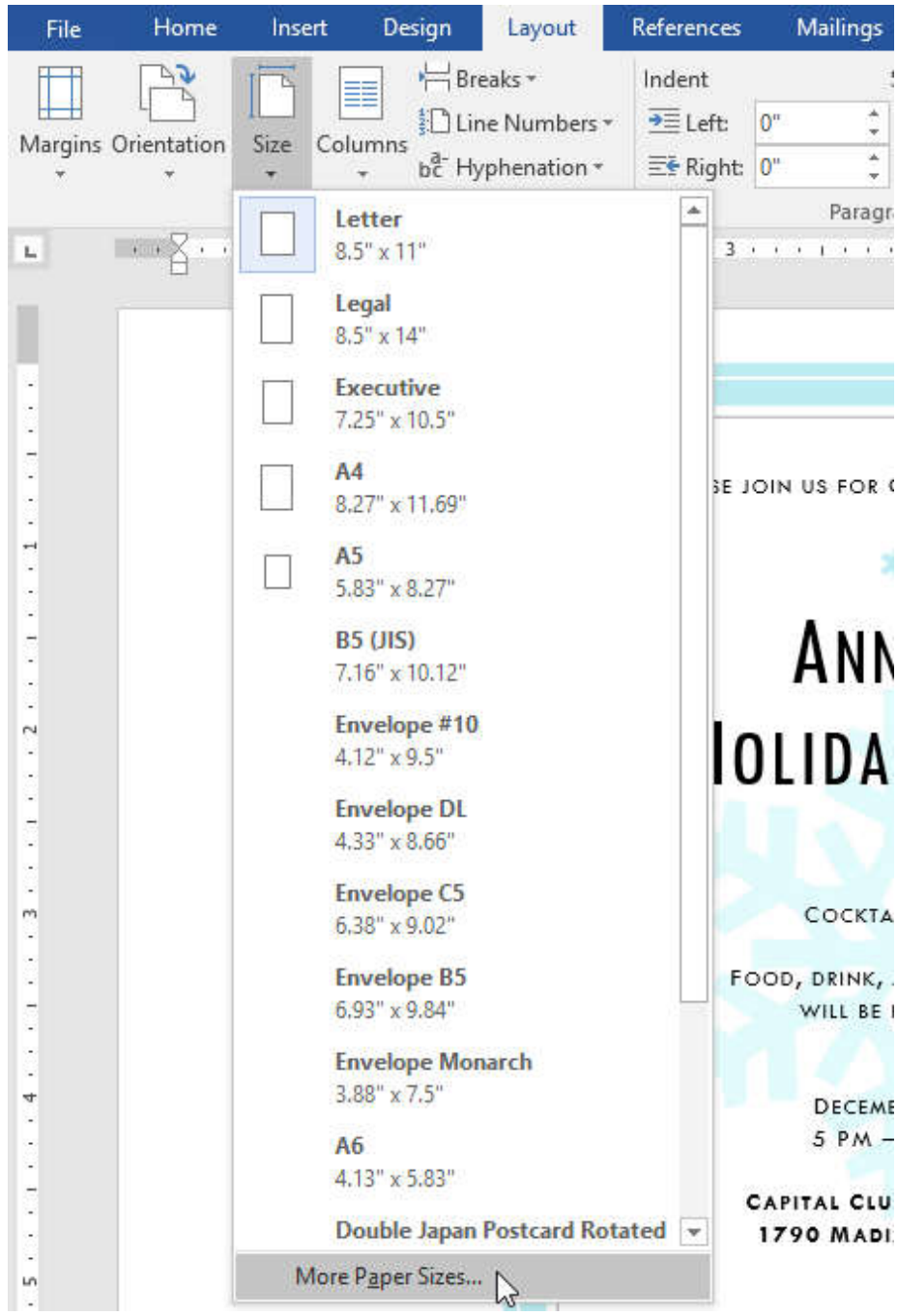


3) The page size of the document will be changed.

To use a custom page size :

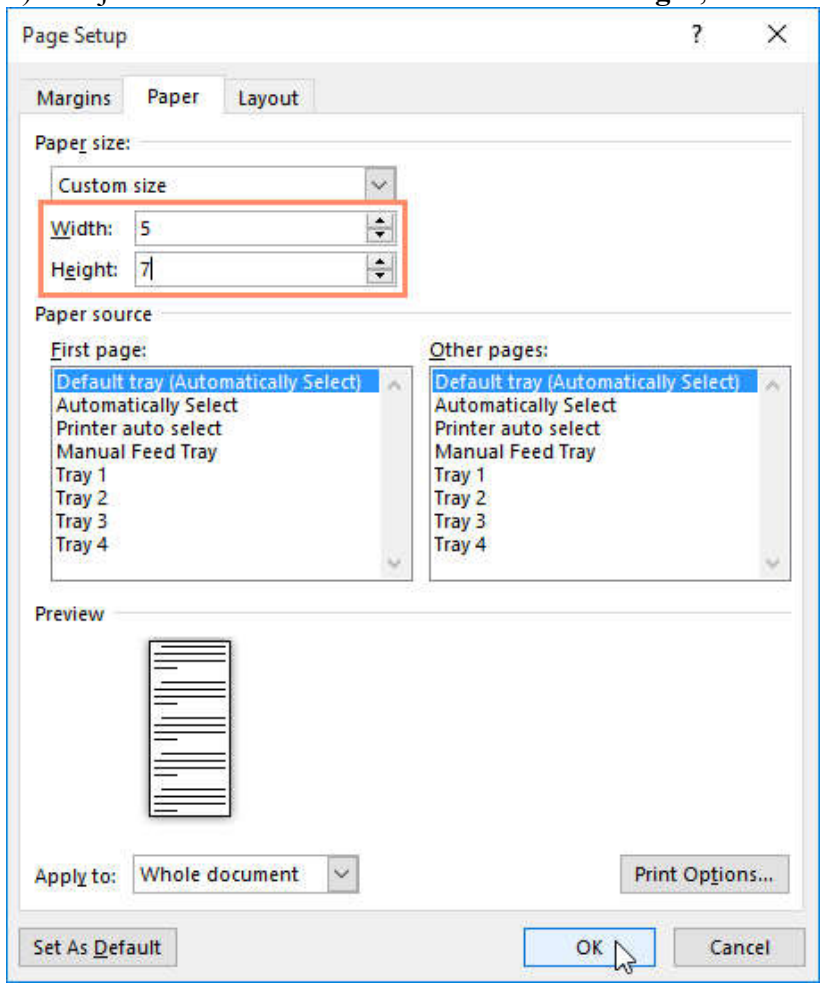
Word also allows you to customize the page size in the **Page Setup** dialog box.

1) From the **Layout** tab, click **Size**. Select **More Paper Sizes** from the drop-down menu.



2) The **Page Setup** dialog box will appear.

3) Adjust the values for **Width** and **Height**, then click **OK**. Office Productivity Tools



4) The page size of the document will be changed.

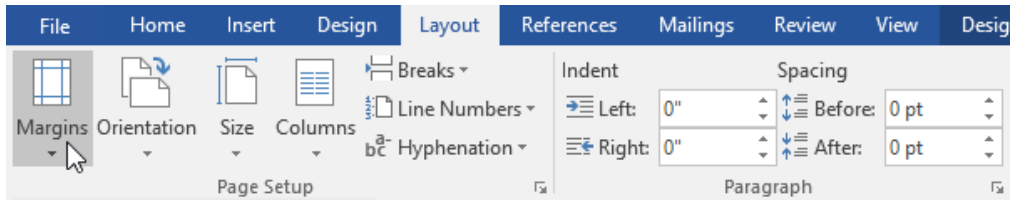
Page margins :

A **margin** is the **space** between the text and the edge of your document. By default, a new document's margins are set to **Normal**, which means it has a one-inch space between the text and each edge. Depending on our needs, Word allows us to change our document's margin size.

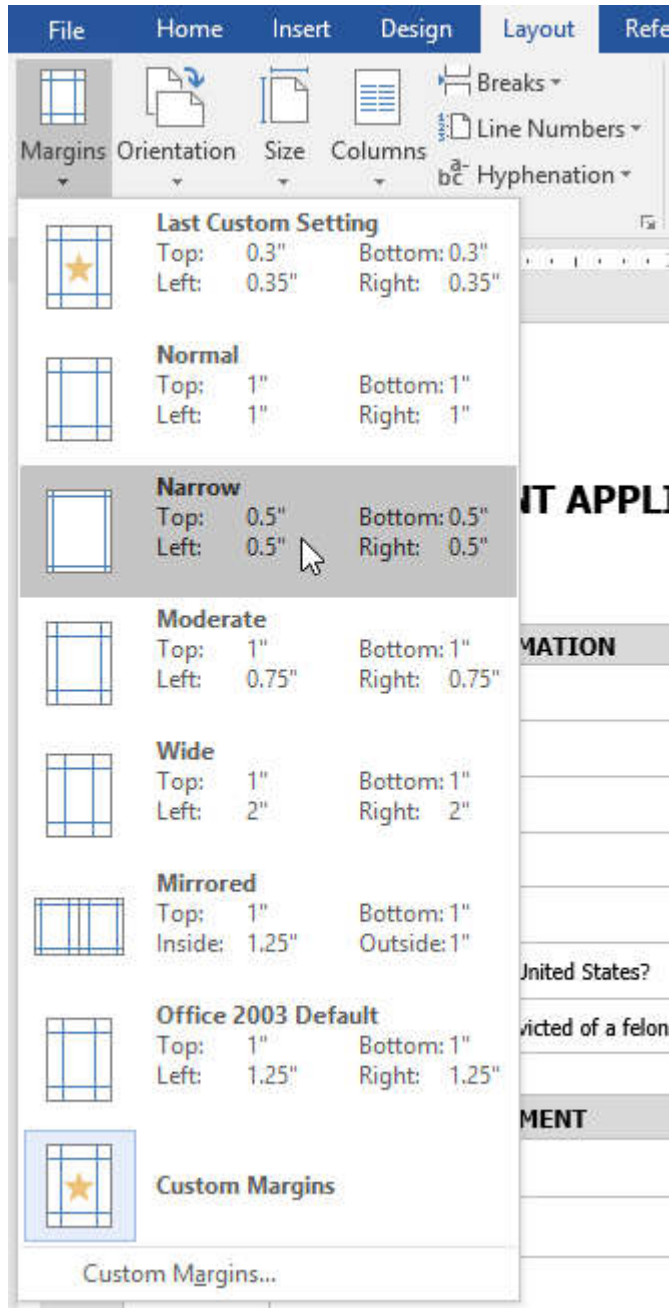
Word has a variety of **predefined margin sizes** to choose from.

1) Select the **Layout** tab, then click the **Margins** command

.



2) A drop-down menu will appear. Click the **predefined margin size** you want.

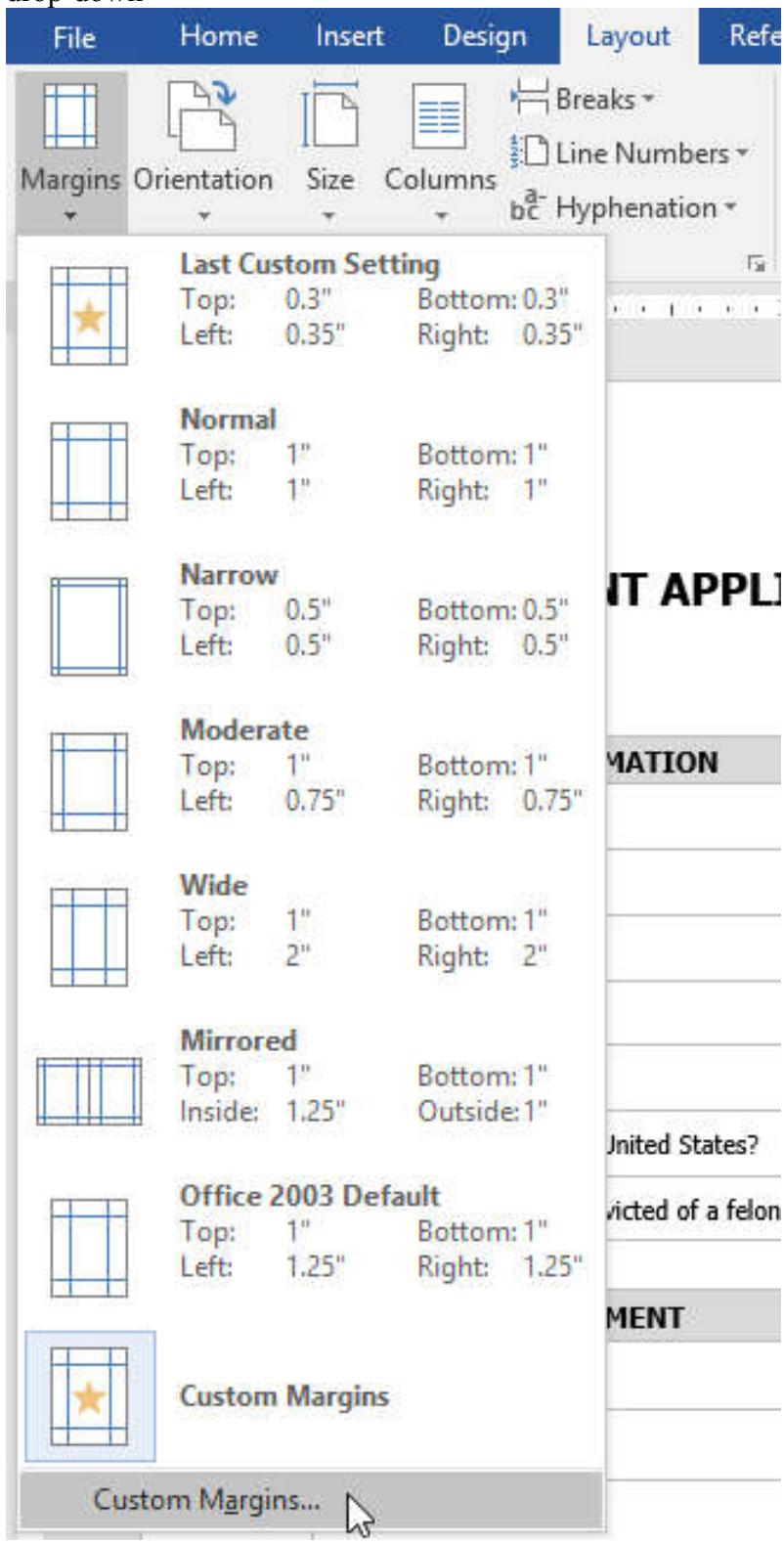


3) The margins of the document will be changed.

To use custom margins :

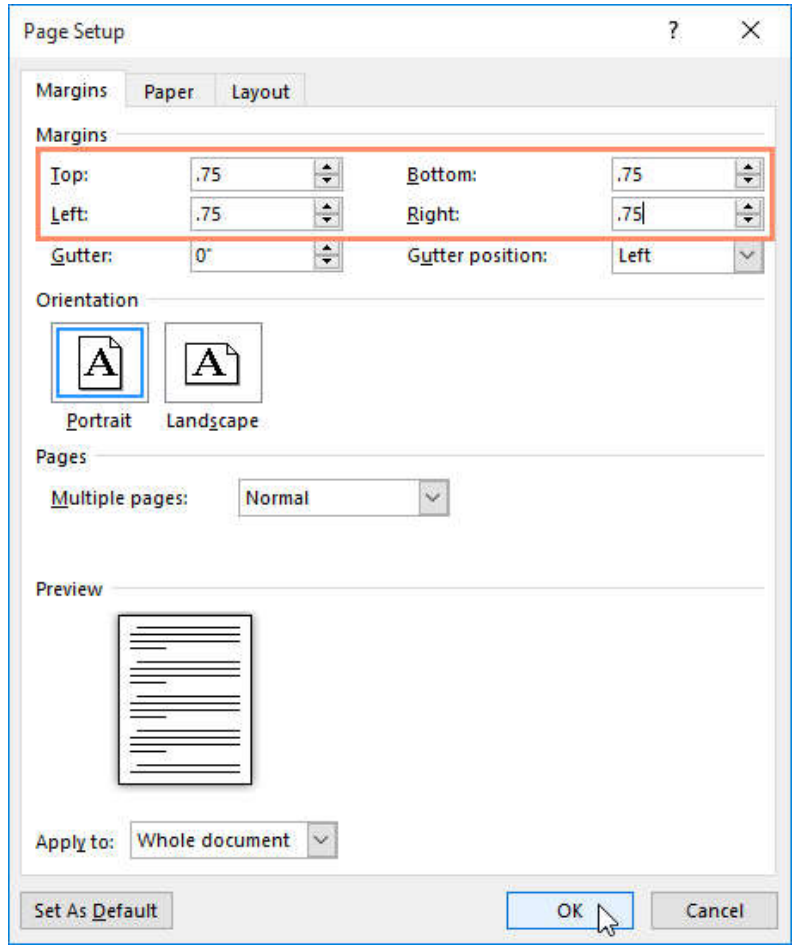
Word also allows us to customize the size of our margins in the **Page Setup** dialog box.

1) From the **Layout** tab, click **Margins**. Select **Custom Margins** from the drop-down menu.



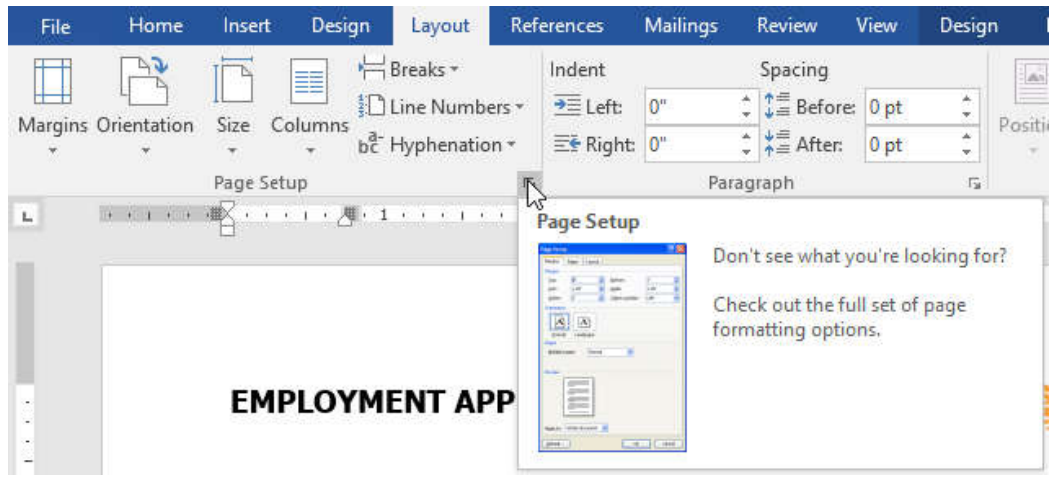
2) The **Page Setup** dialog box will appear.

3) Adjust the values for each margin, then click **OK**.



4) The margins of the document will be changed.

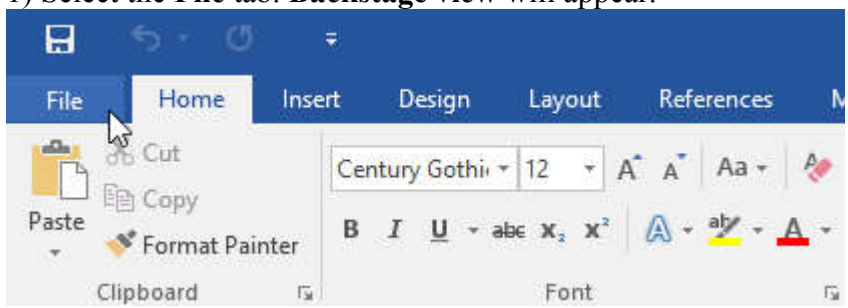
Alternatively, we can open the Page Setup dialog box by navigating to the Layout tab and clicking the small **arrow** in the bottom-right corner of the **Page Setup** group.



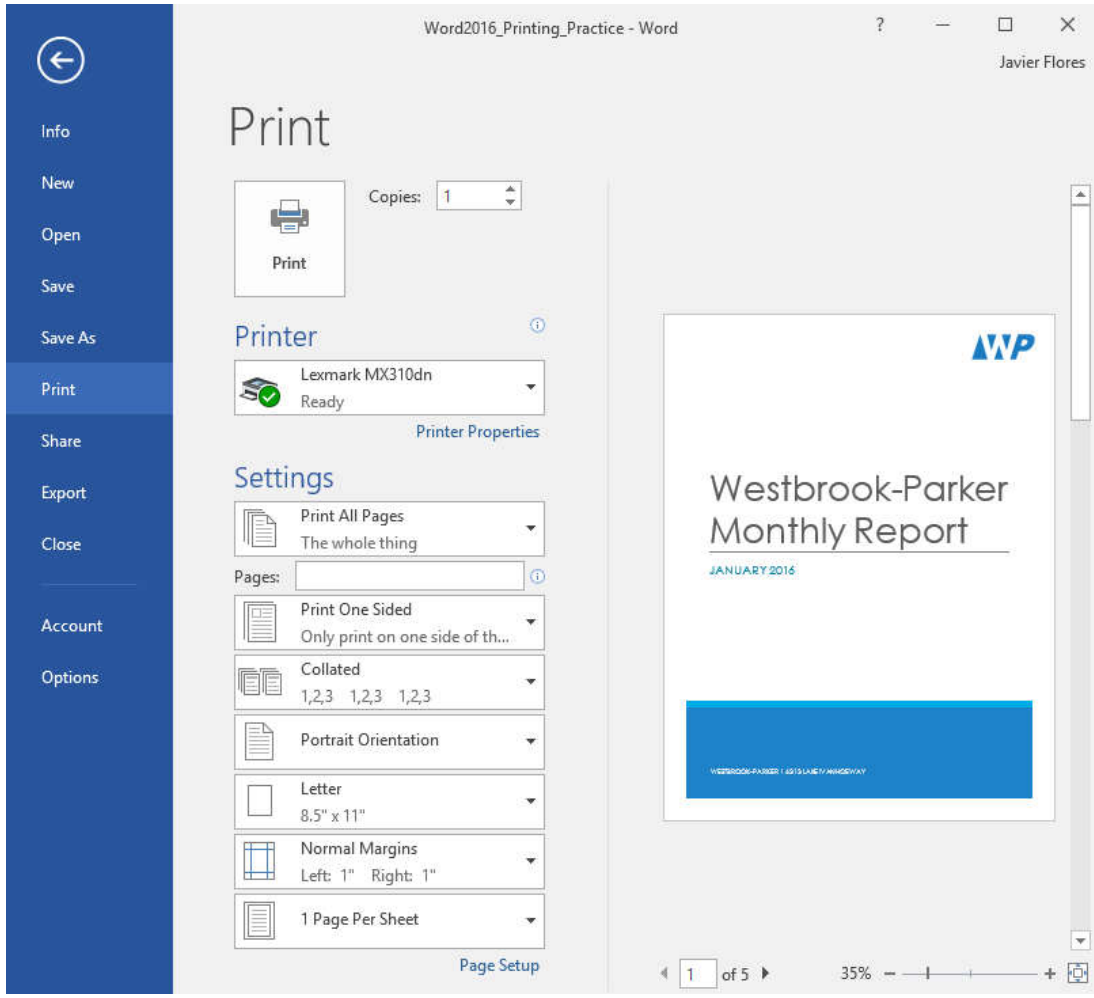
1.13 Printing documents :

Once we have created our document, we may want to **print** it to view and share our work **offline**. It's easy to preview and print a document in Word using the **Print** pane.

1) Select the **File** tab. **Backstage view** will appear.

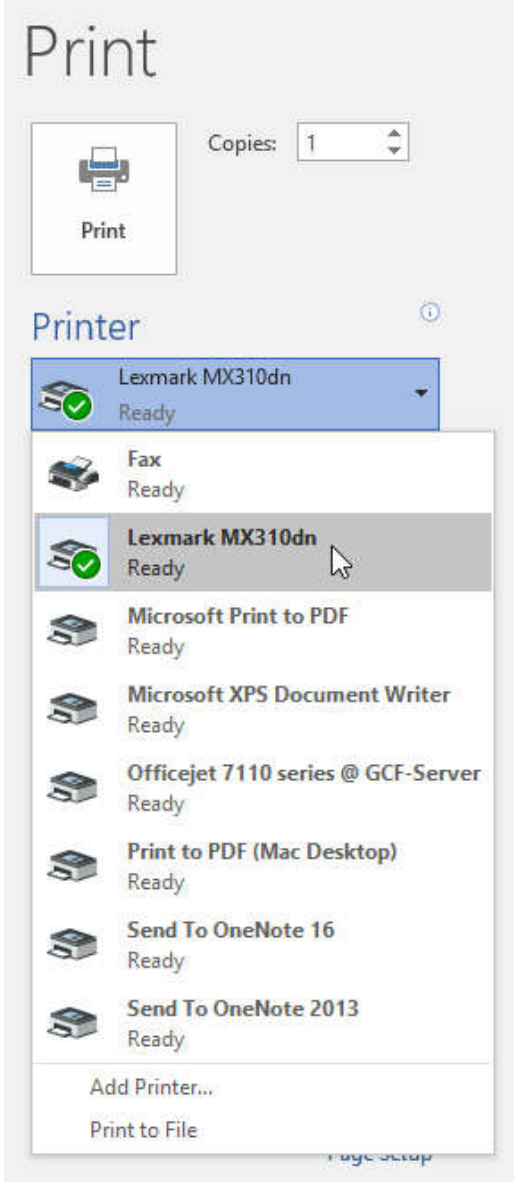


2) Select **Print**. The **Print** pane will appear. We can also access the Print pane by pressing **Ctrl+P** on your keyboard.

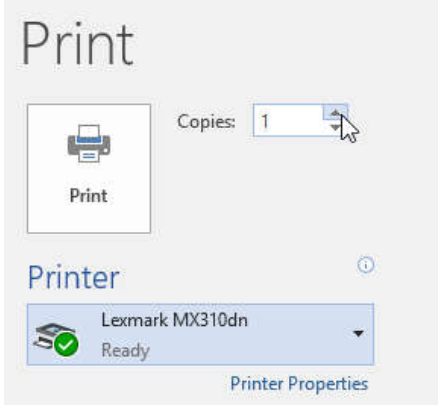


To print a document :

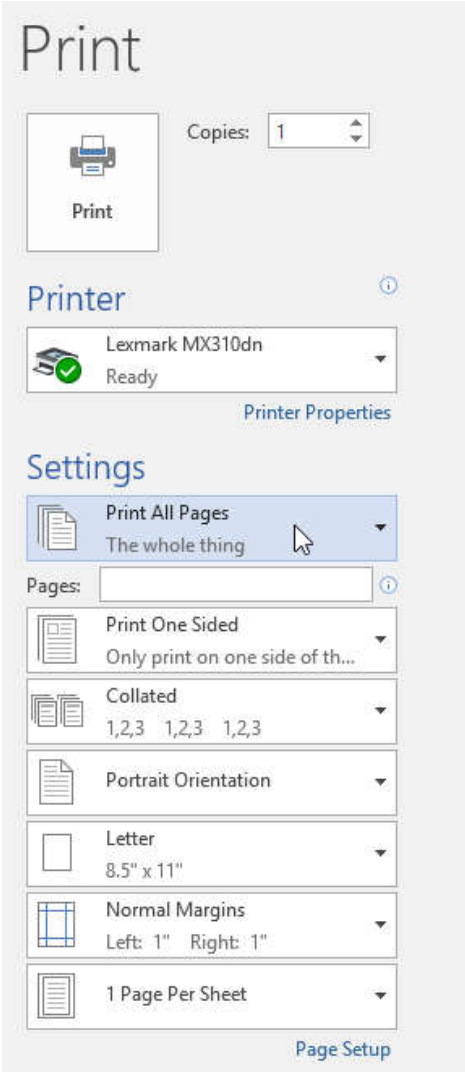
1) Navigate to the **Print** pane, then select the desired **printer**.



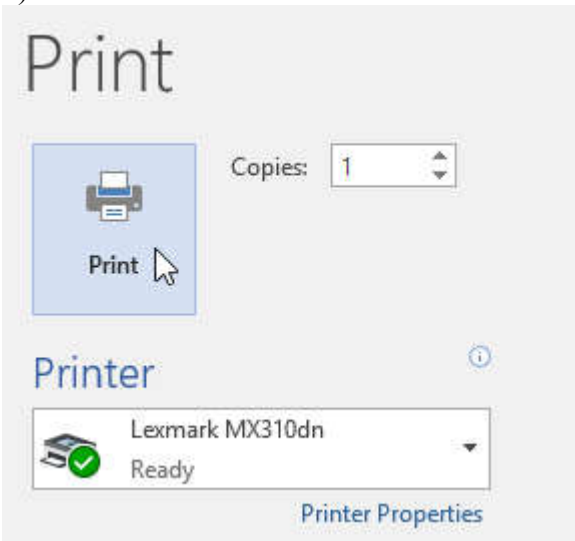
2) Enter the number of **copies** we want to print.



3) Select any additional **settings** if needed.



4) Click **Print**.



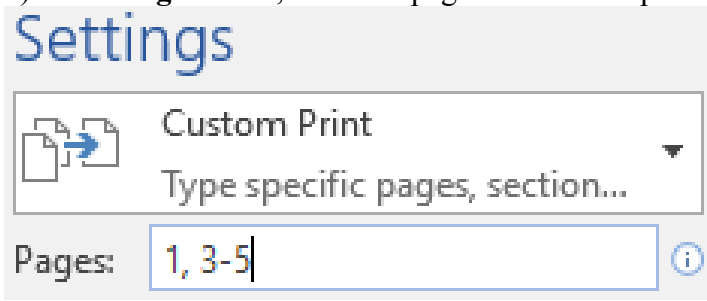
Custom printing :

Sometimes we find it unnecessary to print our entire document, in this case **custom printing** is more suitable for us. Word allows us to **specify** exactly which pages we would like to print.

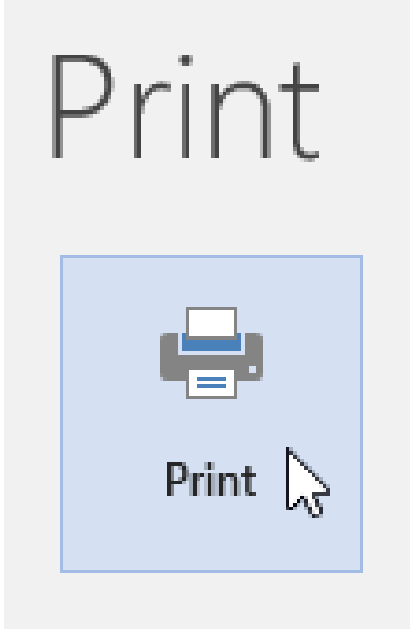
If we would like to print individual pages or page ranges, we need to separate each entry with a **comma** (1, 3, 5-7, or 10-14 for example).

1) Navigate to the **Print** pane.

2) In the **Pages:** field, enter the pages we want to print.



3) Click **Print**.

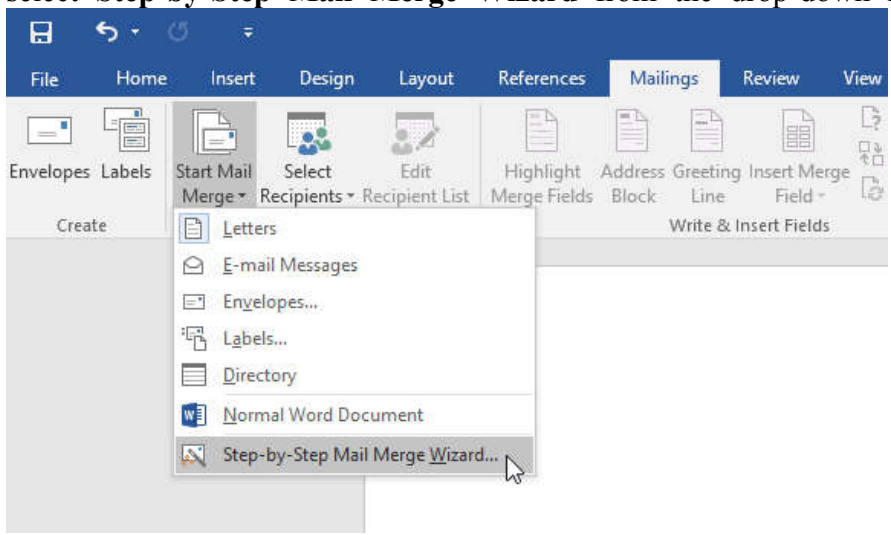


1.14 Mail merge

Mail Merge is a useful tool that allows us to produce multiple letters, labels, envelopes, name tags, and more using information stored in a list, database, or spreadsheet. When performing a **Mail Merge**, we will need a **Word document** (we can start with an existing one or create a new one) and a **recipient list**, which is typically an **Excel workbook**.

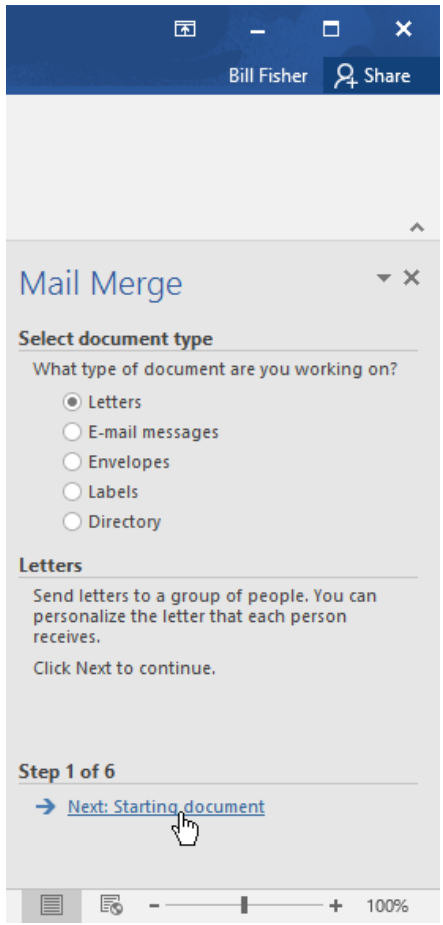
1) Open an **existing** Word document, or create a **new** one.

2) From the **Mailings** tab, click the **Start Mail Merge** command and select **Step-by-Step Mail Merge Wizard** from the drop-down menu.

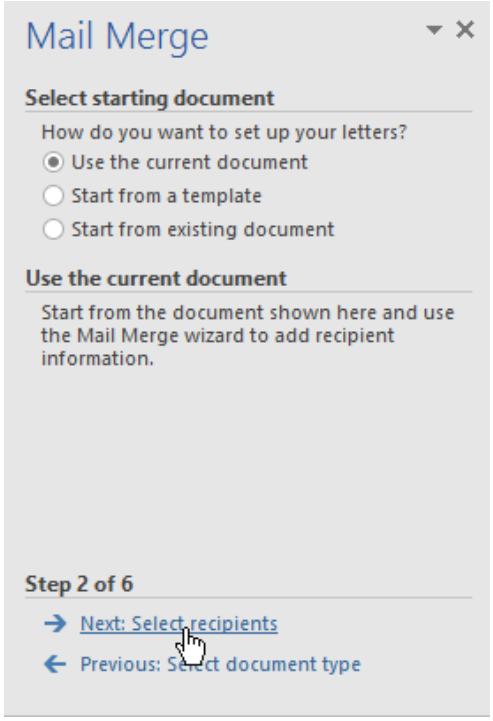


3) The Mail Merge pane will appear and guide us through the **six main steps** to complete a merge. The following example demonstrates how to create a form letter and merge the letter with a **recipient list**.

Step 1 : From the Mail Merge task pane on the right side of the Word window, choose the type of document we want to create. In our example, we'll select Letters. Then click Next: Starting document to move to Step 2.

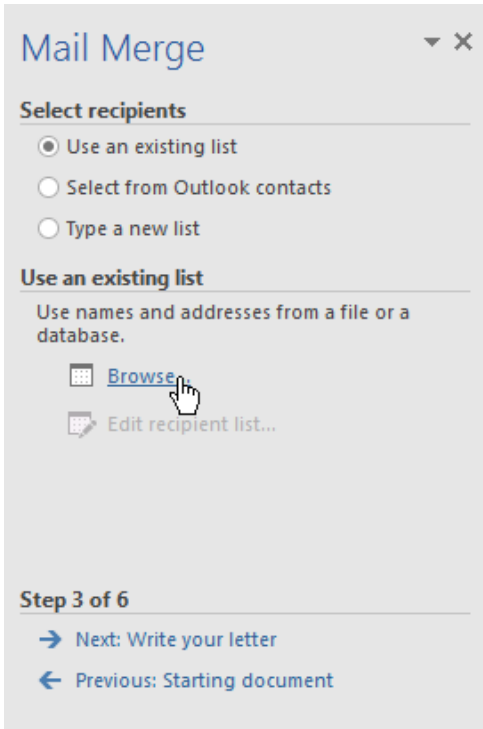


Step 2 : Select Use the current document, then click Next: Select recipients to move to Step 3 .

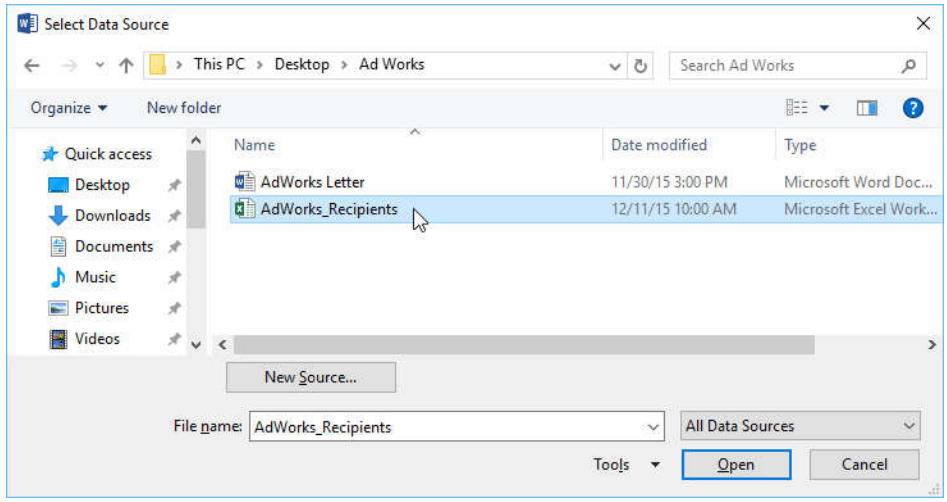


Step 3 : Now we need an address list so Word can automatically place each address into the document. The list can be in an existing file, such as an Excel workbook, or we can type a new address list from within the Mail Merge Wizard.

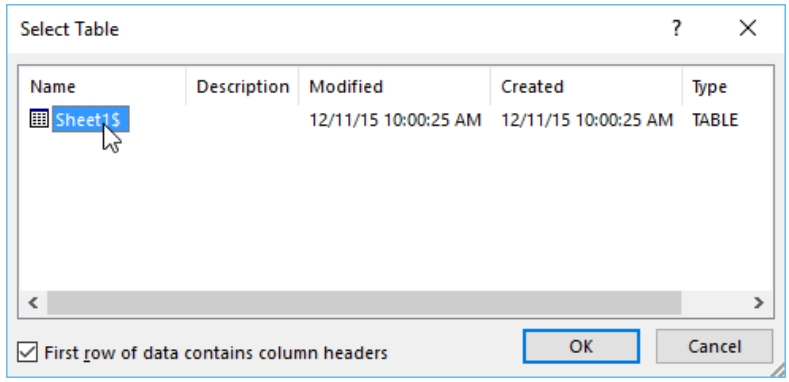
1) Select **Use an existing list**, then click **Browse** to select the file.



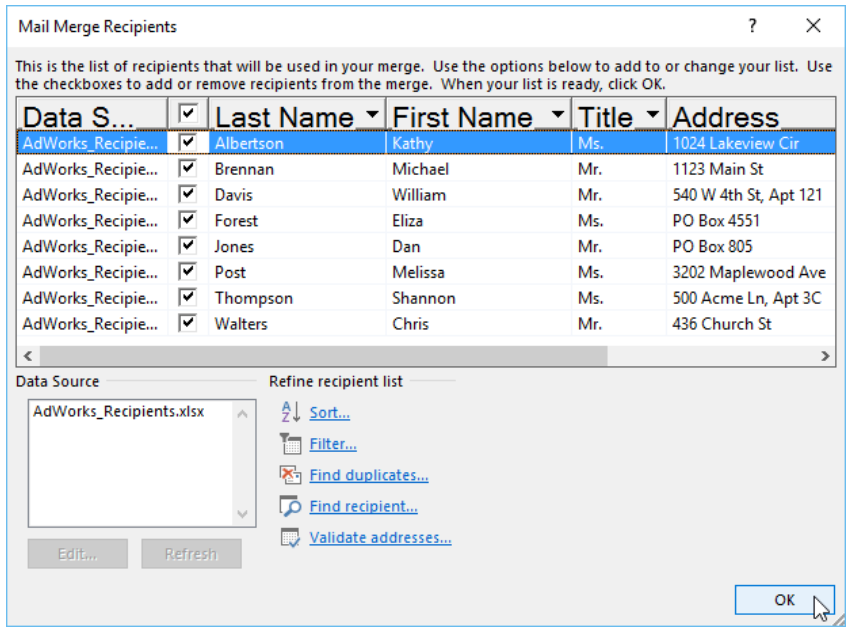
2) Locate your file, then click **Open**.



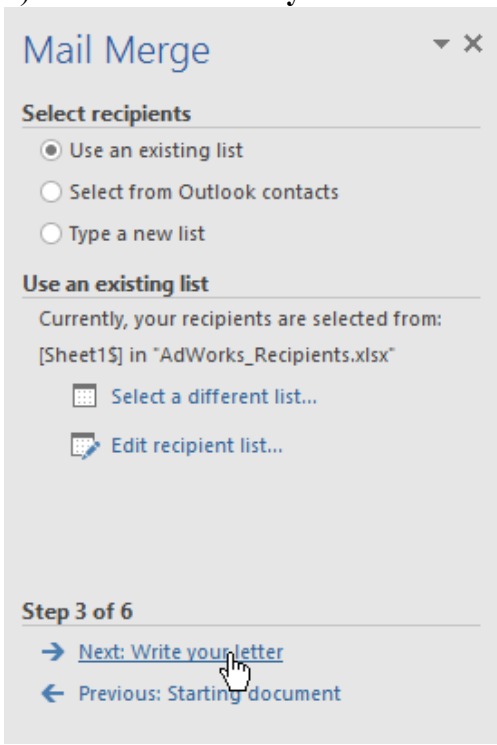
3) If the address list is in an Excel workbook, select the **worksheet** that contains the list, then click **OK**.



4) In the **Mail Merge Recipients** dialog box, we can **check** or **uncheck** each box to control which recipients are included in the merge. By default, all recipients should be selected. When we are done, click **OK**.



5) Click **Next: Write your letter** to move to Step 4.

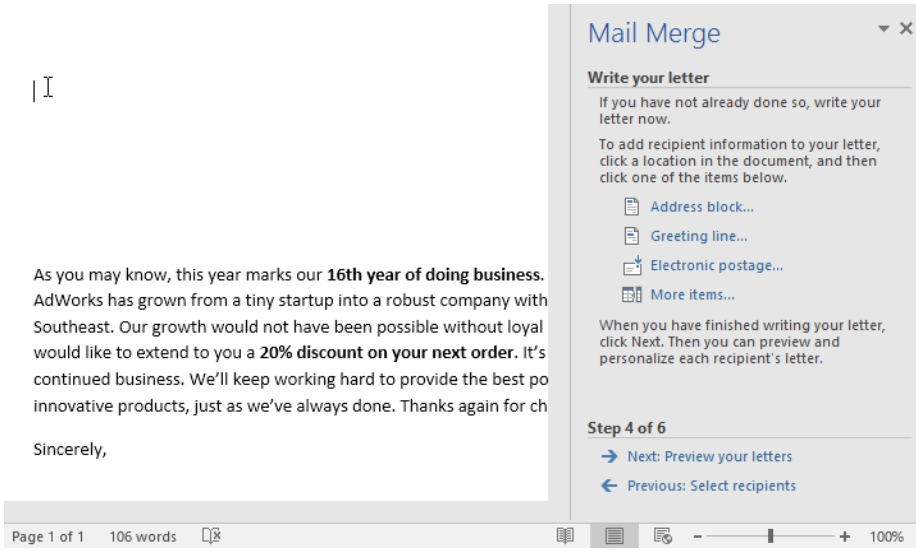


If we don't have an existing address list, we can click the **Type a new list** button and click **Create**, then type our address list manually.

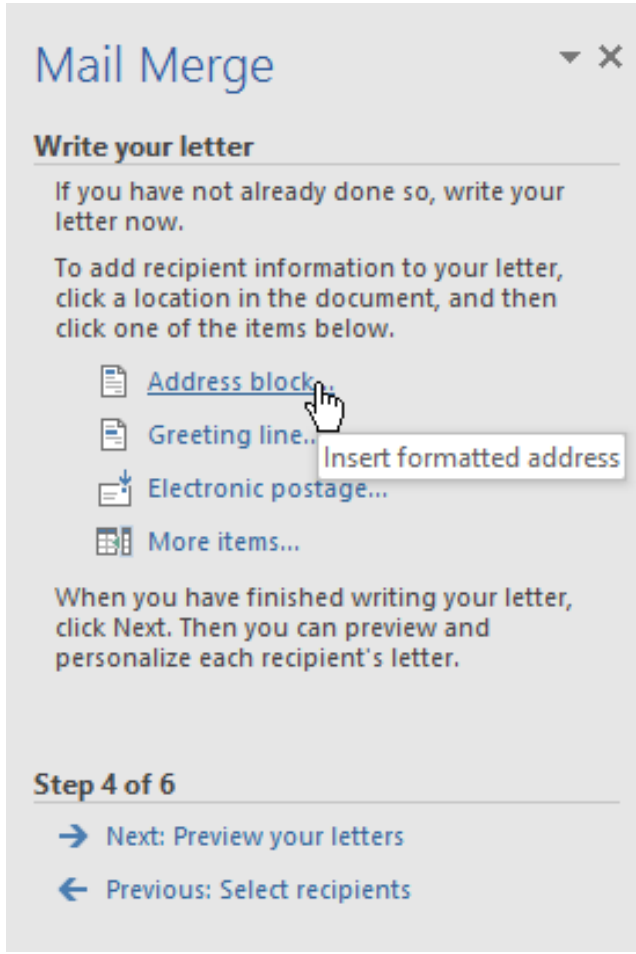
Step 4 : Now we are ready to write our letter. When it's printed, each copy of the letter will basically be the same; only the recipient data (such as the name and address) will be different. We will need to add placeholders for the recipient data so Mail Merge knows exactly where to add the data.

To insert recipient data :

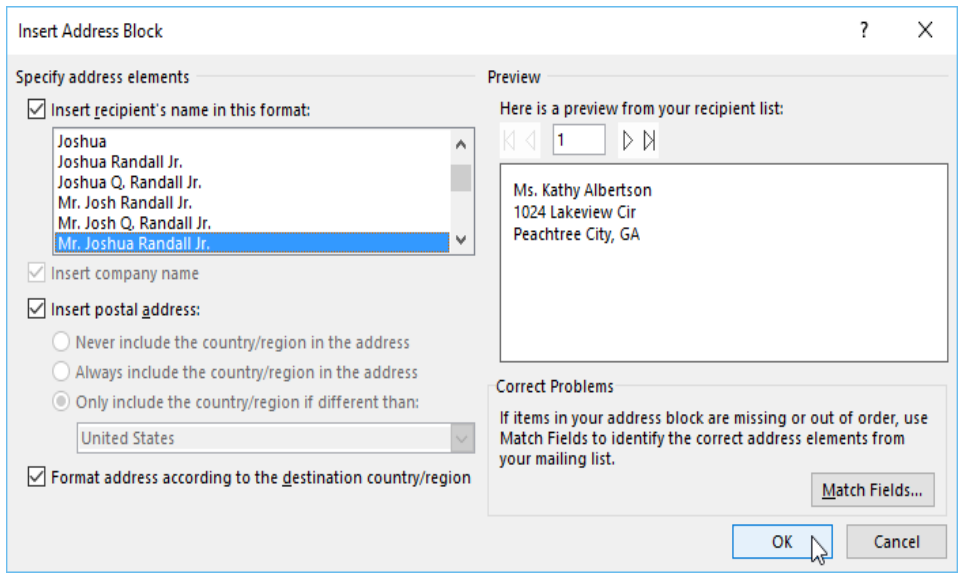
1) Place the insertion point in the document where you want the information to appear.



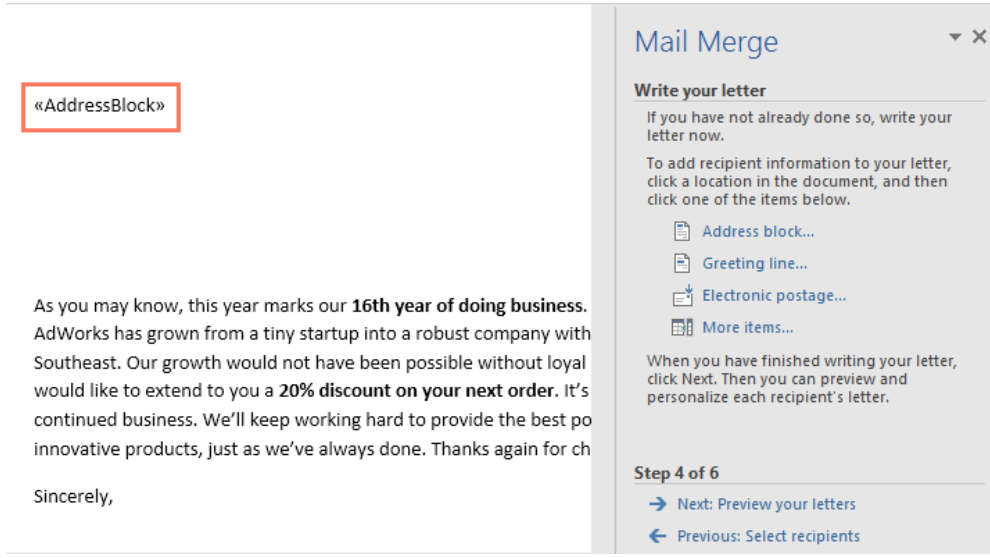
2) Choose one of the **placeholder** options. In our example, we'll select the Office Productivity Tools Address **block**.



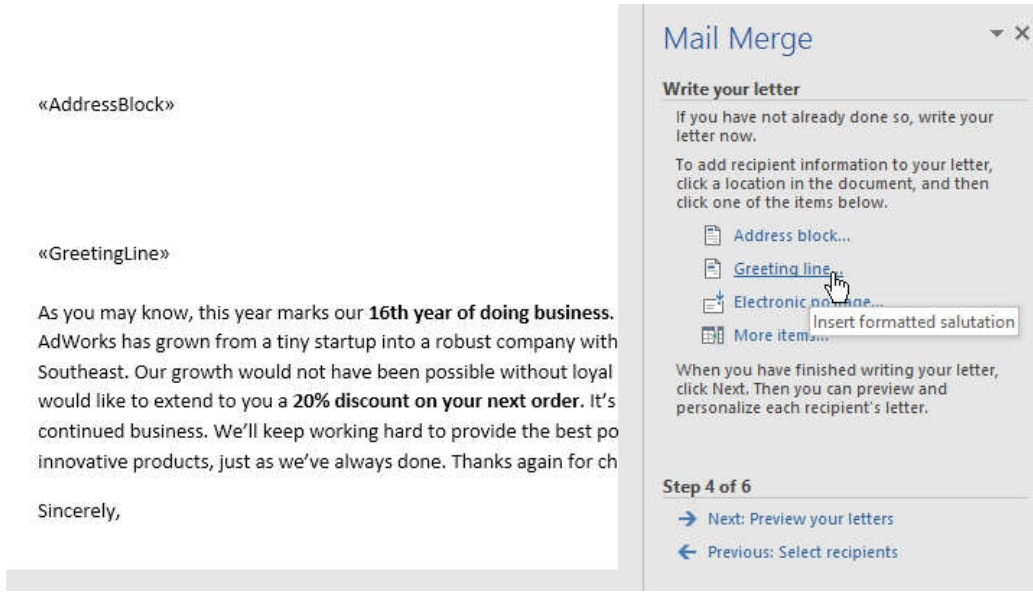
3) Depending on your selection, a dialog box may appear with various customization options. Select the desired options, then click **OK**.



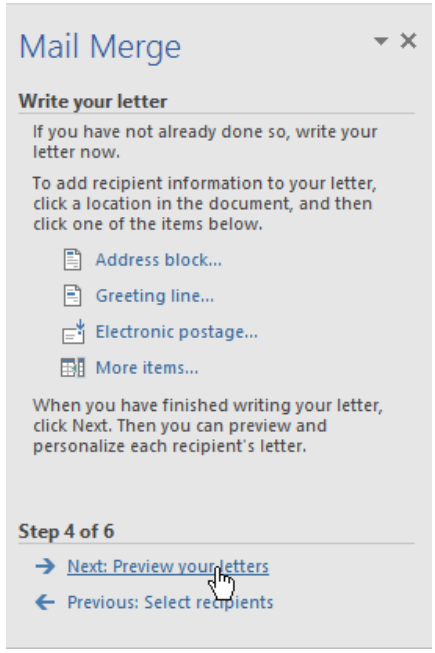
4) A placeholder will appear in your document (for example, **«Address Block»**).



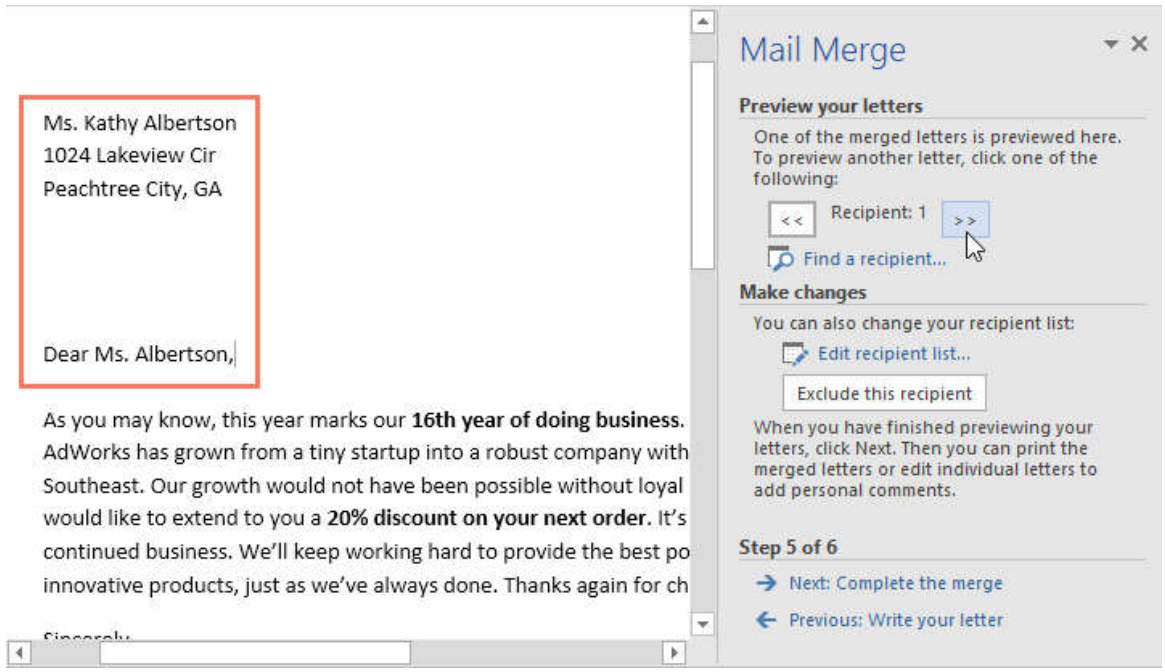
5) Add any other placeholders we want. In our example, we'll add a **Greeting line** placeholder just above the body of the letter.



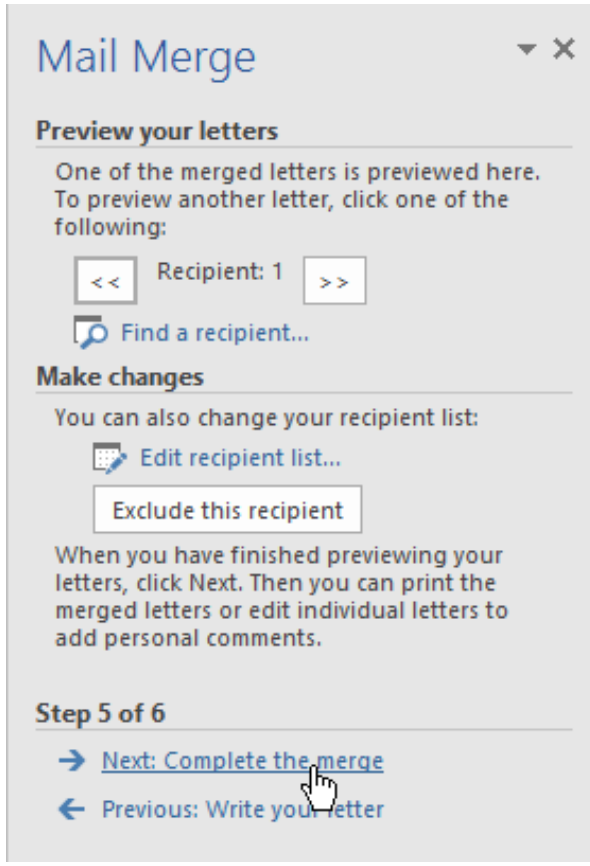
6) When we are done, click **Next: Preview your letters** to move to Step 5. Office Productivity Tools



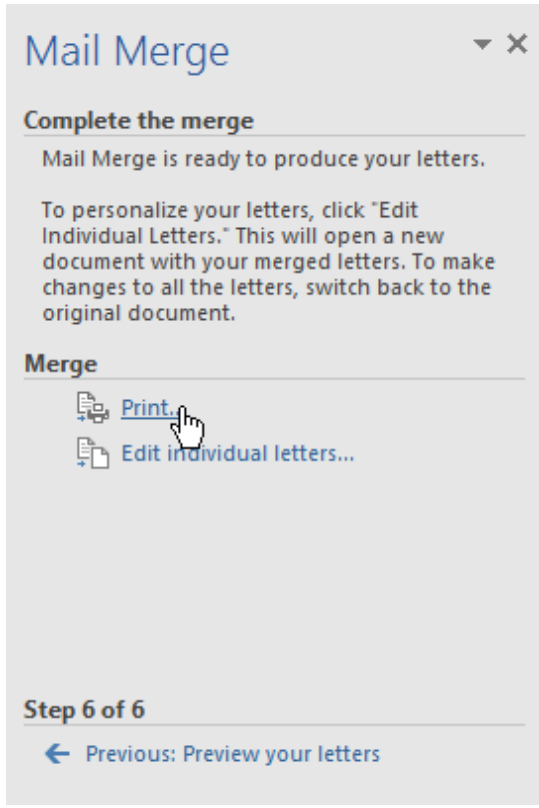
Step 5 : Preview the letters to make sure the information from the recipient list appears correctly in the letter. We can use the left and right scroll arrows to view each version of the document.



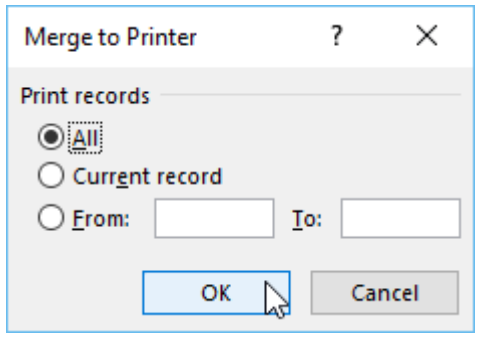
If everything looks correct, click **Next: Complete the merge** to move to Step 6.



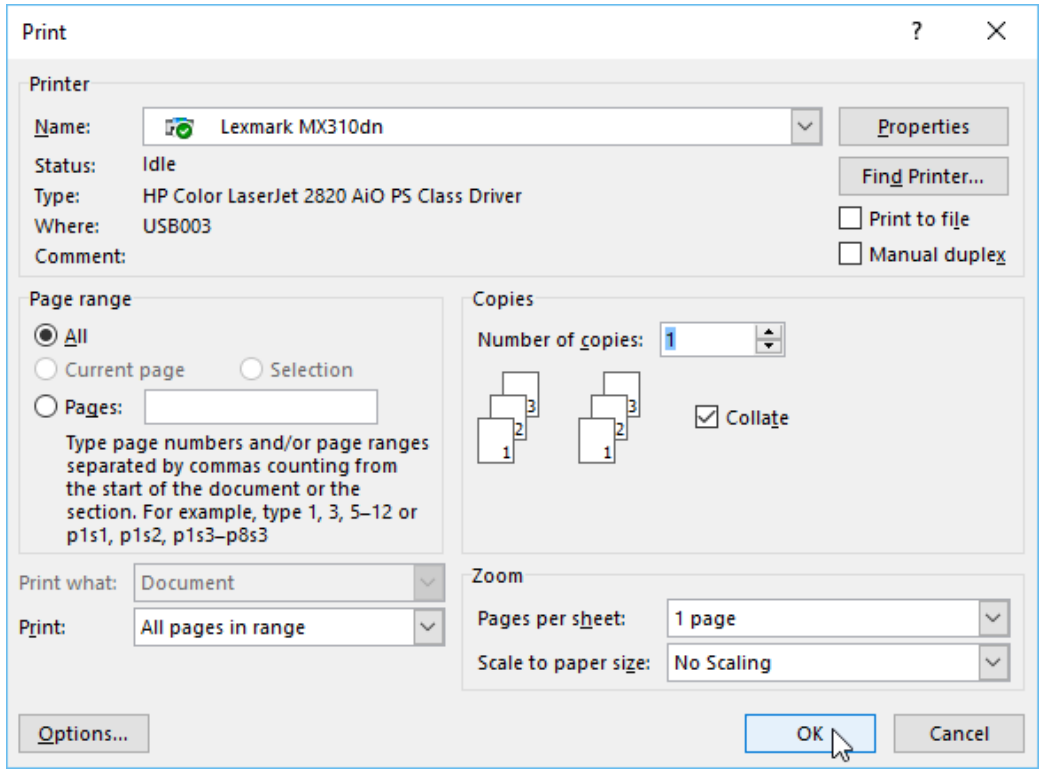
Step 6 : Click Print to print the letters.



1) A dialog box will appear. Decide if we want to print **All** of the letters, the current document (record), or only a select group, then click **OK**. In our example, we'll print all of the letters.



2) The **Print** dialog box will appear. Adjust the print settings if needed, then click **OK**. The letters will be printed.



2.2 MS EXCEL

Microsoft Excel is an office use application designed by Microsoft.

It is one of the most suitable spreadsheet programs that help us to store and represent the data in tabular form, manage and manipulate data, create optically logical charts, and more.

Excel provides a worksheet to create a new document in it. We can save the Excel file with the **.xls** extension.

2.1 Features of Microsoft Excel :

1) AutoFormat : It allows the Excel users to use predefined table formatting options.

2) AutoSum : AutoSum feature helps us to calculate the sum of a row or column automatically by inserting an additional formula for a range of cells.

3) List AutoFill : It automatically develops cell formatting when a new component is added to the end of a list.

4) AutoFill : This feature allows us to quickly fill cells with a repetitive or sequential record such as chronological dates or numbers and repeated documents. AutoFill can also be used to copy functions. We can also alter text and numbers with this feature.

5) AutoShapes : AutoShapes toolbar will allow us to draw some geometrical shapes, arrows, flowchart items, stars, and more. With these shapes, we can draw our graphs.

6) Wizard : It guides us to work effectively while we work by displaying several helpful tips and techniques based on what we are doing. Drag and Drop feature will help us to reposition the record and text by simply dragging the data with the help of the mouse.

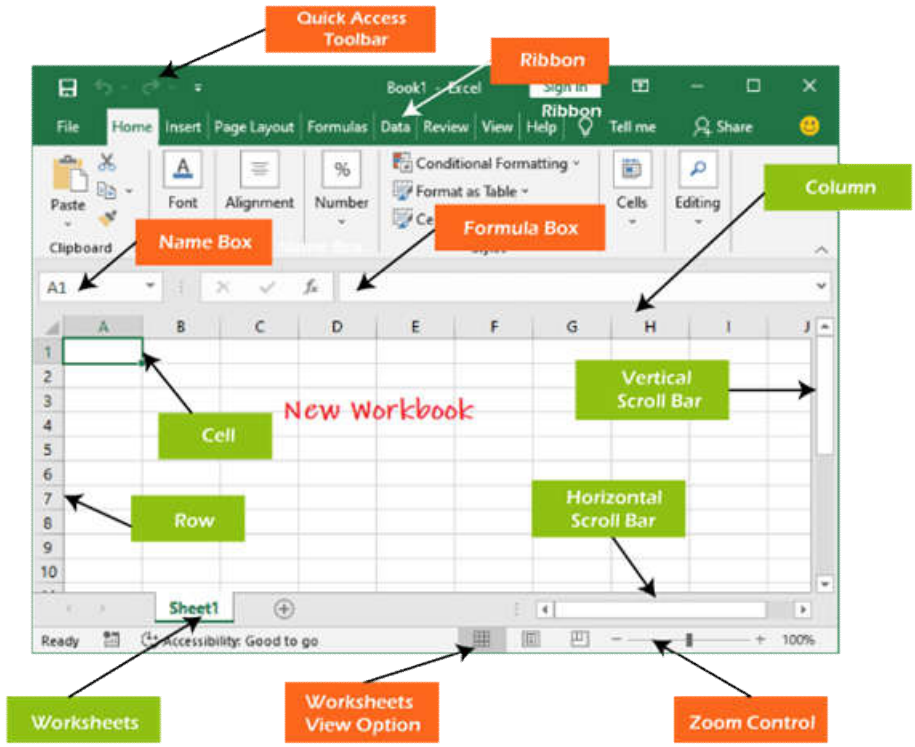
7) Charts : This feature will help you to present the data in graphical form by using Pie, Bar, Line charts, and more.

8) PivotTable : It flips and sums data in seconds and allows us to execute data analysis and generate documents like periodic financial statements, statistical documents, etc. We can also analyze complex data relationships graphically.

9) Shortcut Menus : The shortcut menu helps users to get the work done through shortcut commands that need a lengthy process.

2.2 Excel Interface :

It is the main interface of an Excel worksheet, where we work and store our data. This interface contains various components.

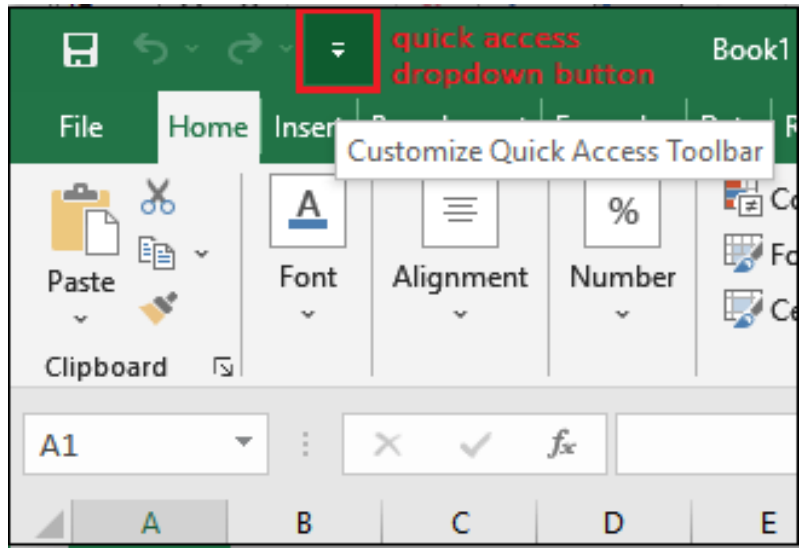


Quick Access Toolbar : It contains some common and most used commands of Excel, which users repeatedly need while working with Excel. By default, Save, Undo, and Repeat commands are added in the quick access toolbar.

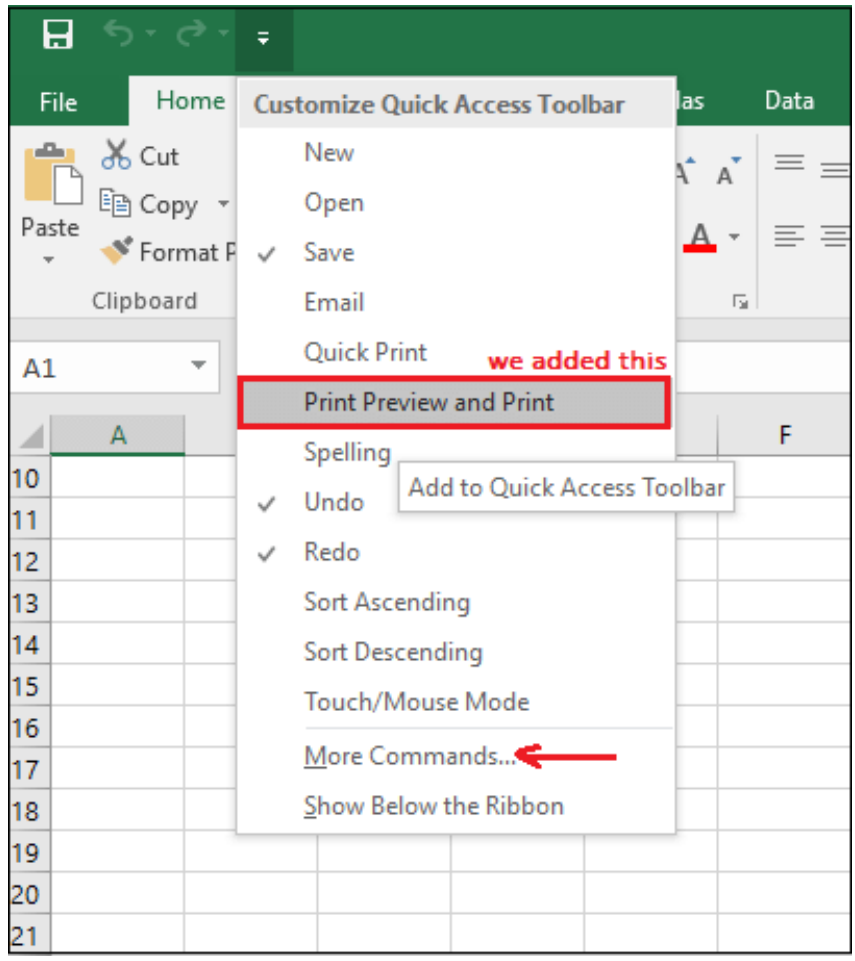
It provides fast access to its users by adding most-used commands in it. This quick access toolbar is customizable. It means you can add other commands, whichever you need most.

Add commands to the Quick Access toolbar :

1) Click on the drop-down arrow to the right of the Quick Access toolbar.

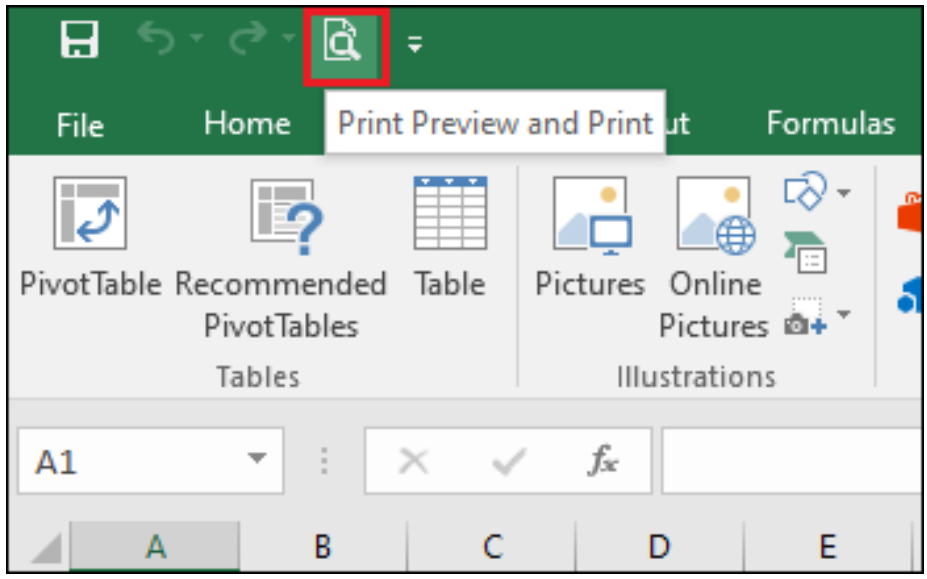


2) Select the command you wish to add in the quick access toolbar from the drop-down menu.



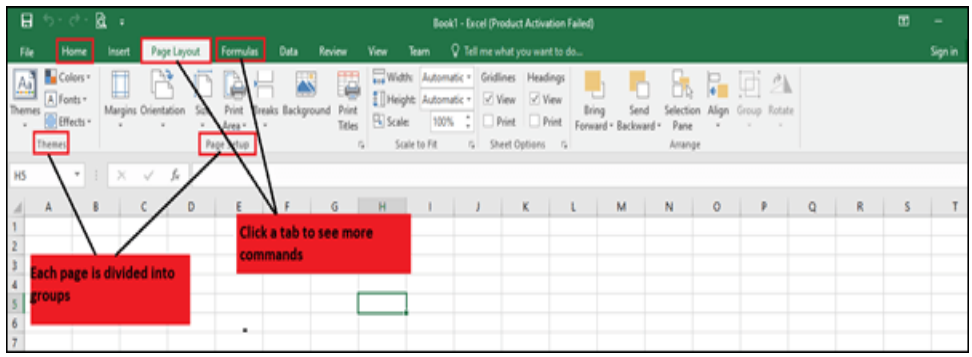
For more commands, which are not available here, click on **More Commands** and choose from there.

3) Here, we have selected the command **Print Preview and Print** that has been added to the Quick Access toolbar along with other commands.



Excel Ribbon : Excel 2016 utilizes a tabbed Ribbon system instead of traditional menus. The Ribbon includes multiple tabs, each with several groups of commands. We will use these tabs to perform the most common function in Excel.

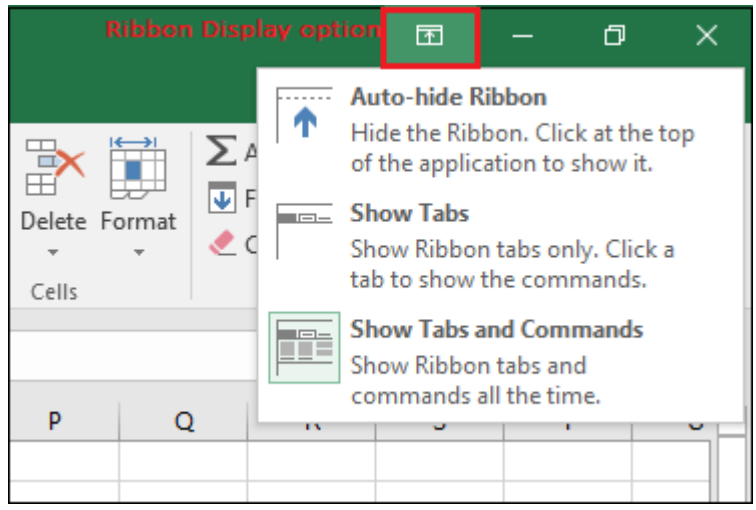
File, Home, Insert, Page Layout, Formula, Data, Review, View, and **Help** are the tabs consisting of the Excel ribbon.



Each tab of Excel Ribbon contains its related operations list. **For example**, the formula tab contains all the mathematical, logical, text, string, finance, Date, and time functions.

To minimize and maximize the Ribbon : The Ribbon is designed to respond to our current function, but we can choose to minimize it if we find that it takes up too much screen space.

1) To click the Ribbon Display Options arrow in the upper-right corner of the Ribbon.



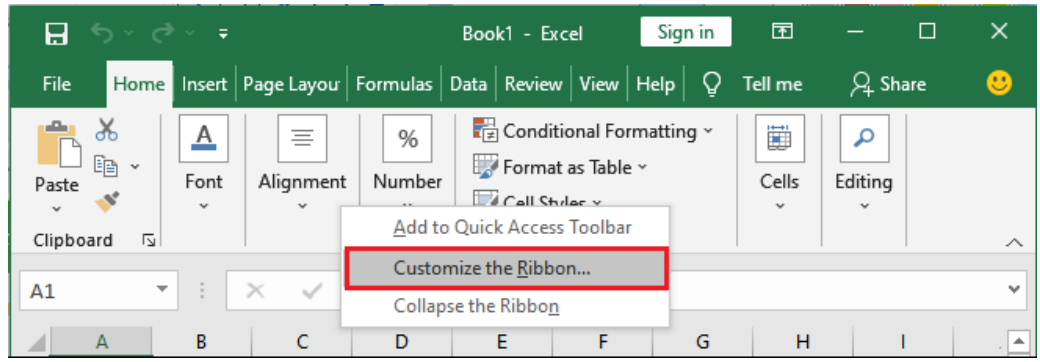
2) Select the desired minimizing options from the drop-down menu.

Auto-hide Ribbon : Auto-hide shows our workbook in full-screen mode and hides the Ribbon completely. To **show the Ribbon**, click the Expand **Ribbon** command at the top of the screen.

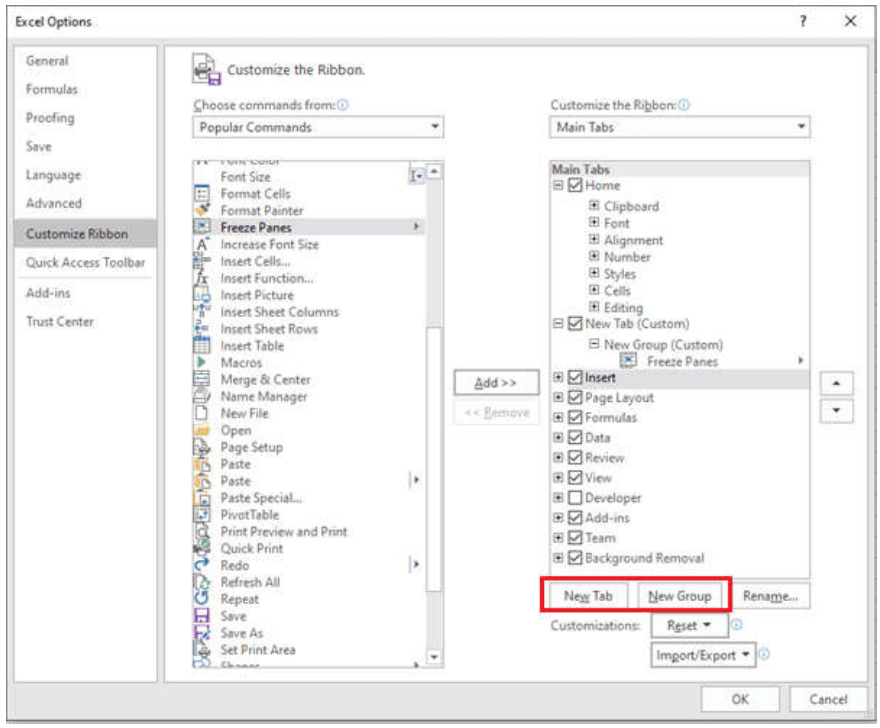
Show Tabs : This option hides all command groups when not in use, but **tabs** will remain there. To **show the Ribbon**, simply click on any of the tabs.

Show Tabs and Commands: This option maximizes the Ribbon. All of the tabs and commands will always be visible to the user. This option is selected by default when we open Excel for the first time.
Customize the Ribbon in Excel 2016 :

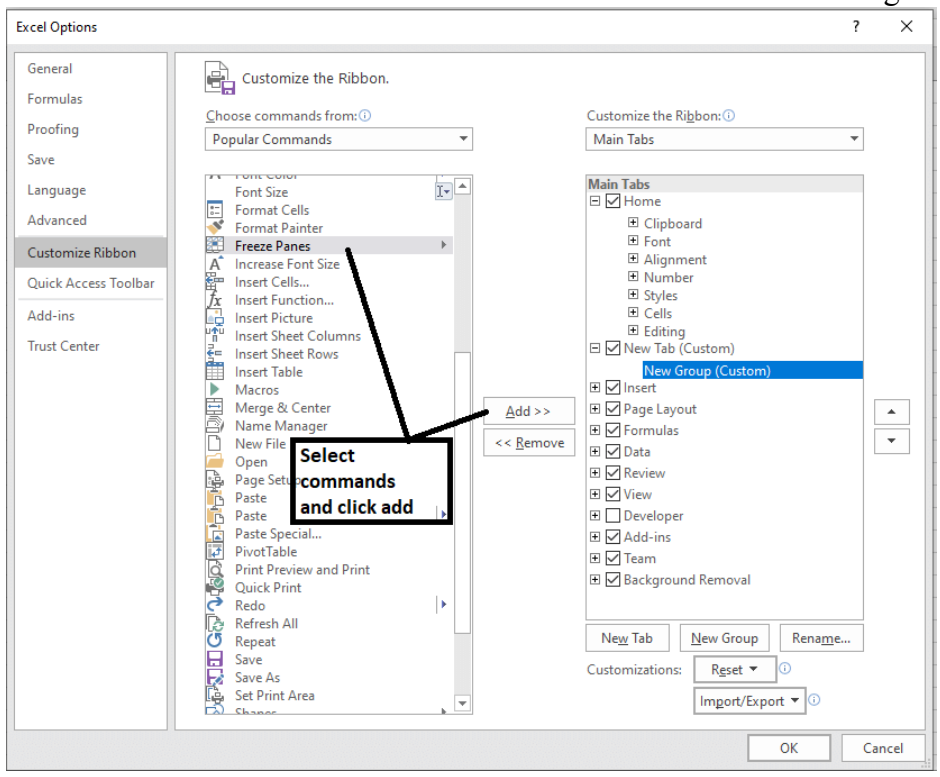
1) Right-click the **Ribbon** and then choose **Customize** the Ribbon from the drop-down menu.



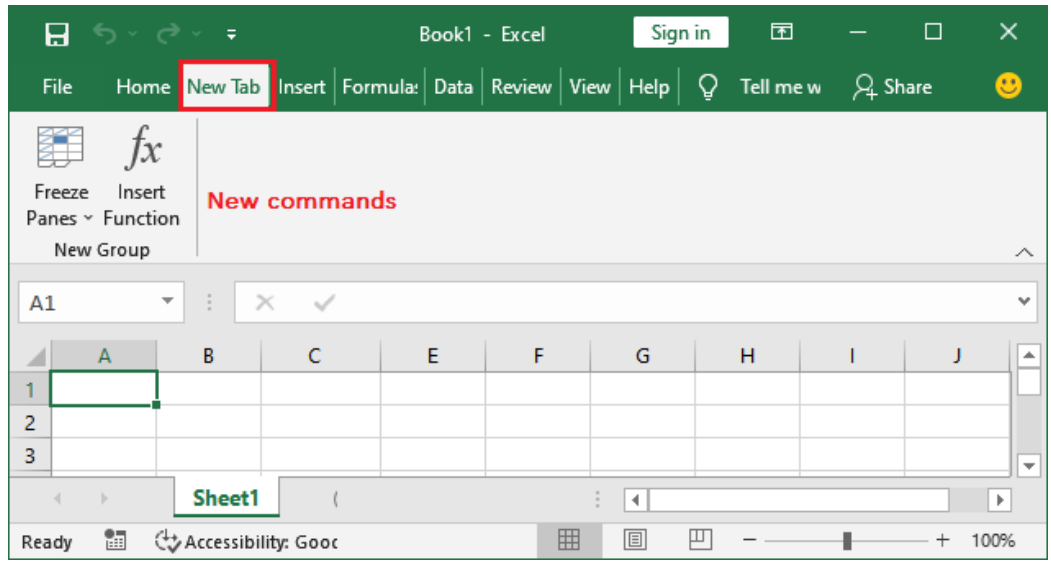
2) The **Excel Options Dialog** box will occur. Locate and select **New Tab** or **New group**, whichever you want to add.



3) Now, select a command from the left panel and click the Add button to the new customized tab/group. You can also drag the commands directly into a group.

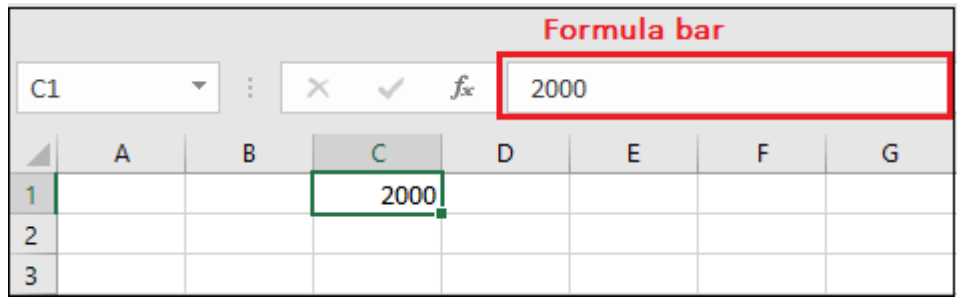


4) When you are done adding commands, click OK. The commands will be added to the Ribbon in a new tab like this.



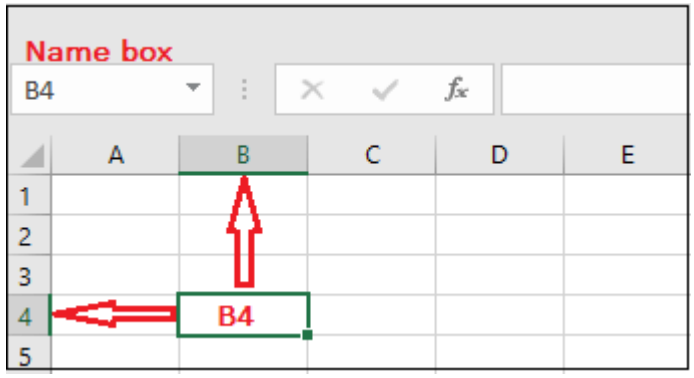
Formula Bar : In the formula bar, we can enter or edit data, a formula, or a function that will occur in a specific cell. It allows us to write the function and formulas to manipulate the data.

In the image below, cell C1 is selected, and 2000 is entered into the formula bar.

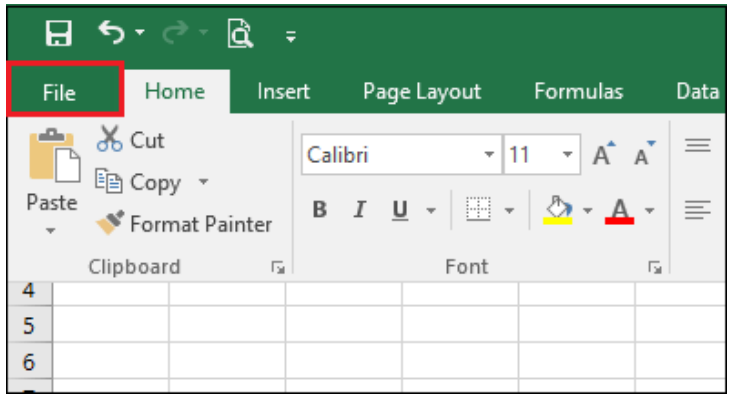


Name Box : The Name box presents the location or "name" of a selected cell.

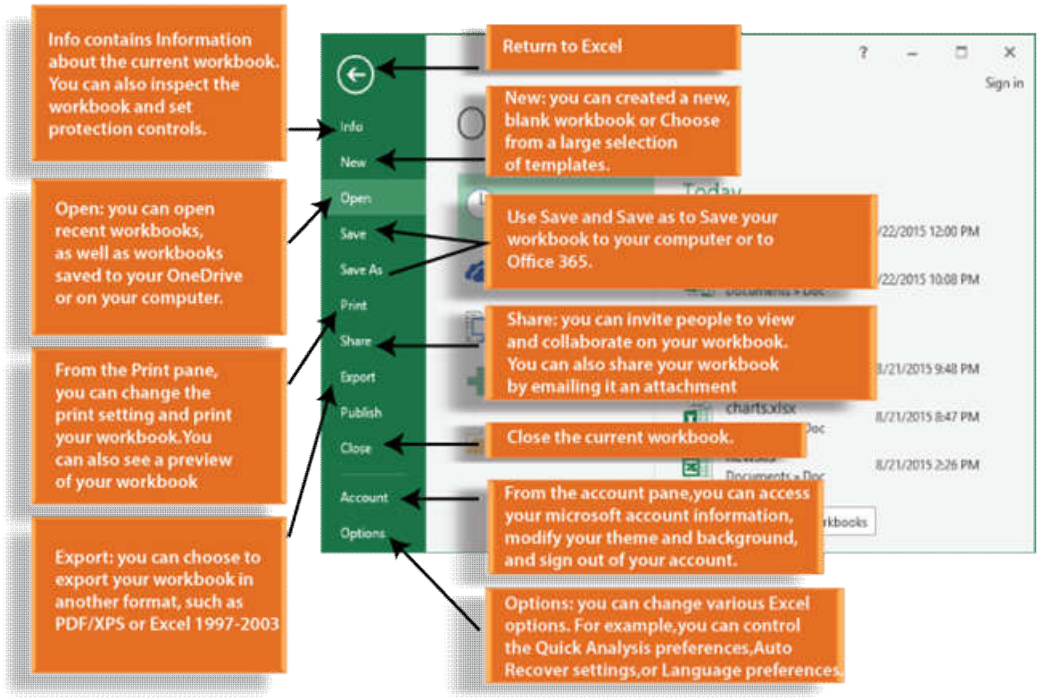
In the image below, cell B4 is selected. Note that cell B4 is where column B and row 4 intersect.



The Backstage View (The File Menu) : Click the File tab on the Ribbon. The Backstage view will emerge.

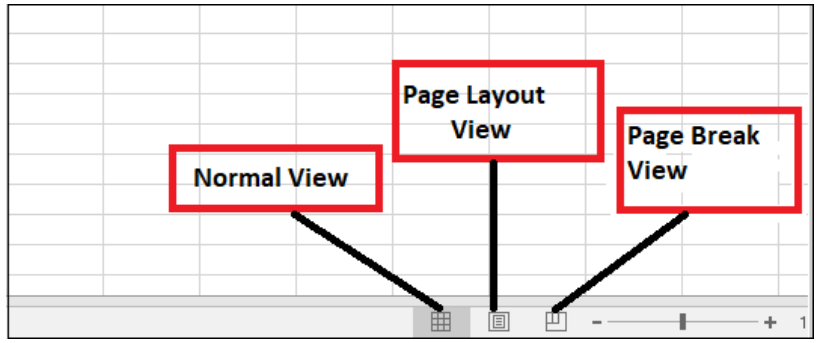


It is the backstage view of MS Excel and information about the options it contains.

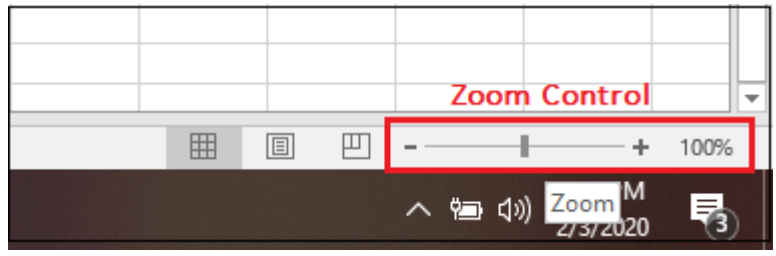


The Worksheet Views : Excel 2016 has a variety of displaying options that change how our workbook is shown. We can choose to view any workbook in the Normal view, Page Layout view, or Page Break view. These views can be useful for several tasks, especially if we're planning to print the spreadsheet.

To change the worksheet views, locate and choose the desired worksheet view command in the bottom-right corner of the Excel window.



Zoom Control : To use a Zoom control, click and drag the slider. The number to the right of the slider reverses the zoom percentage. It is presented at the bottom right corner of the Excel worksheet.

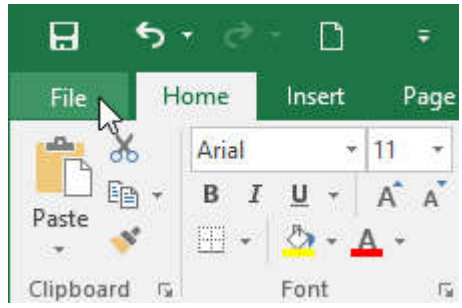


2.3 Creating Worksheet

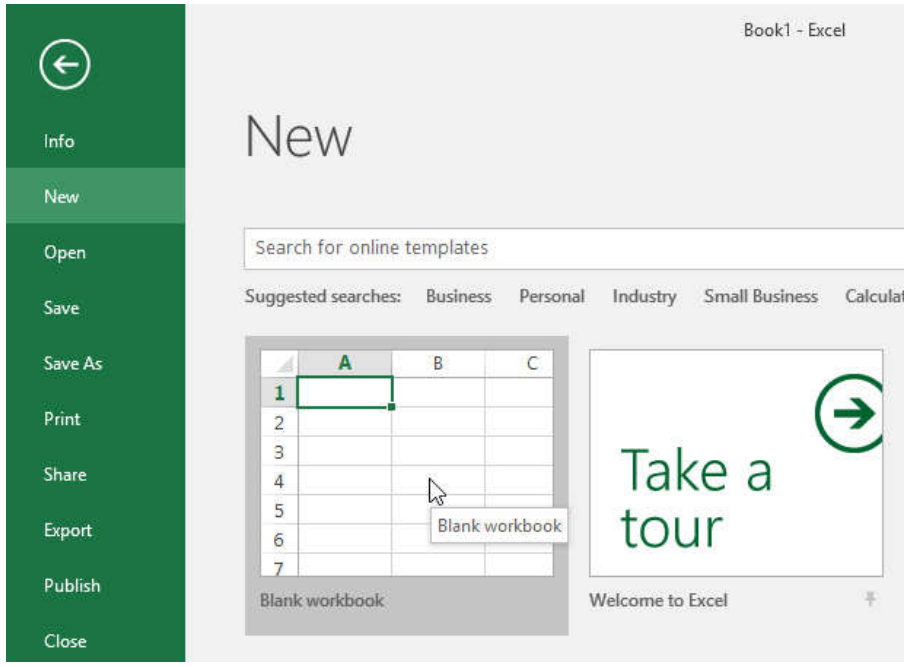
We can choose to create a new worksheet either with a blank worksheet or a predesigned template or open an existing worksheet.

Create a new workbook :

1) Select the **File** tab. **Backstage view** will appear.



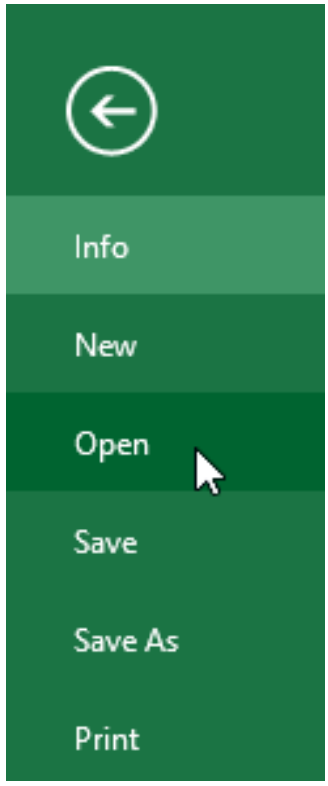
2) Select **New**, then click **Blank workbook**.



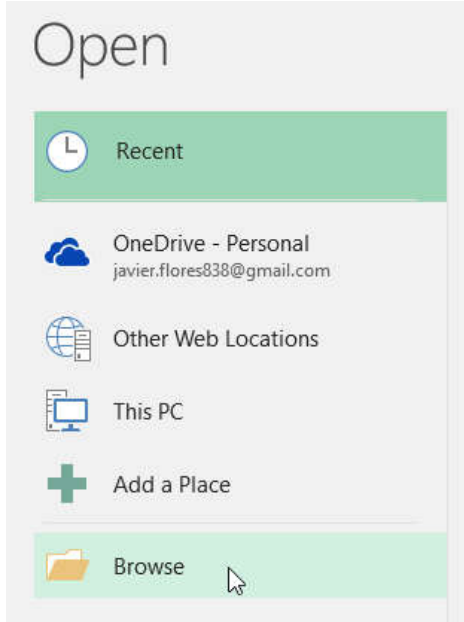
3) A new blank workbook will appear.

To open existing worksheet :

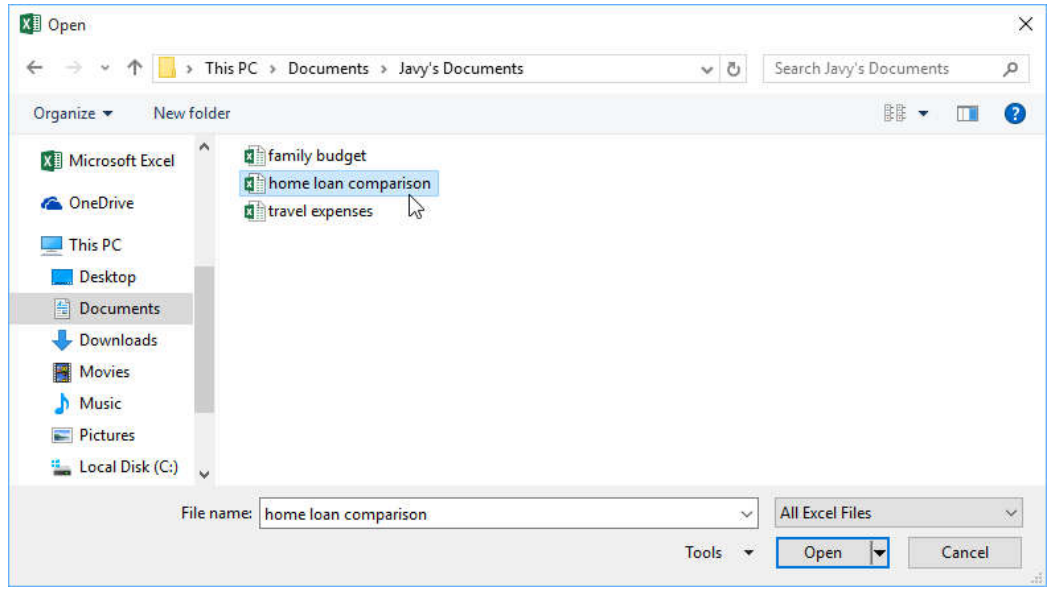
1) Navigate to the **Backstage view**, then click **Open**.



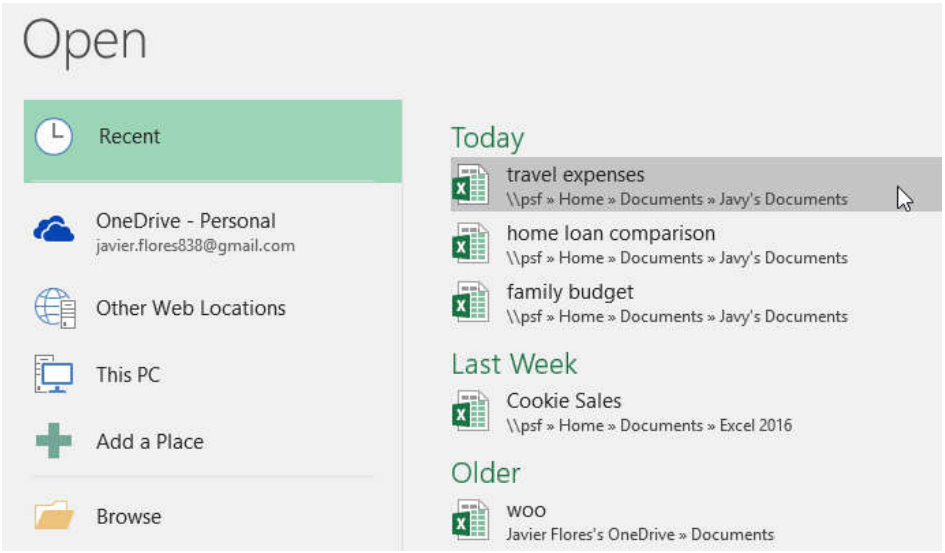
2)Select **Computer**, then click **Browse**. Alternatively, you can choose **OneDrive** to open files stored on your **OneDrive**.



3) The **Open** dialog box will appear. Locate and select your **workbook,** then click **Open**.



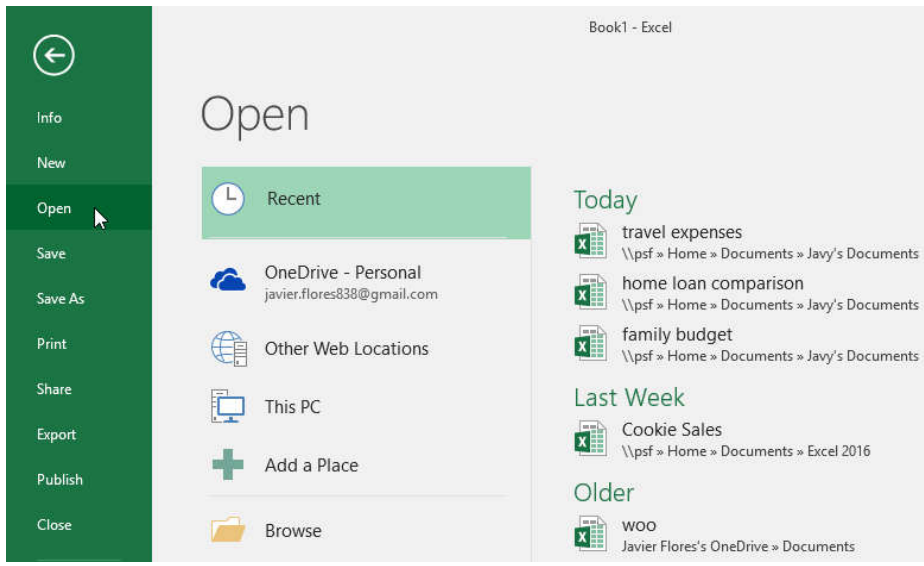
4) If we have opened the desired workbook recently, we can browse your **Recent Workbooks** rather than search for the file.



To pin a workbook :

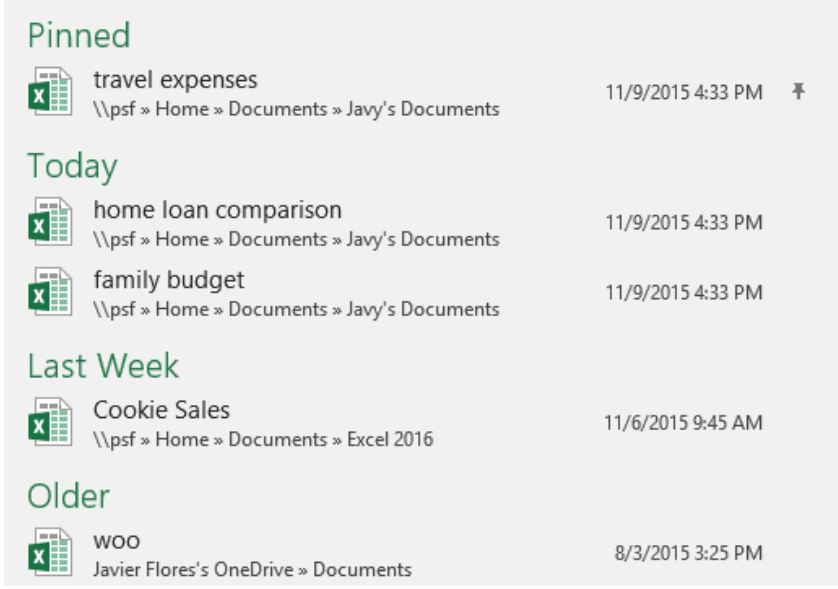
If we frequently work with the **same workbook**, we can **pin it** to Backstage view for faster access.

1) Navigate to the **Backstage view**, then click **Open**. Your **recently edited workbooks** will appear.



2) Hover the mouse over the **workbook** you want to pin. A **pushpin icon** will appear next to the workbook. Click the **pushpin icon**.

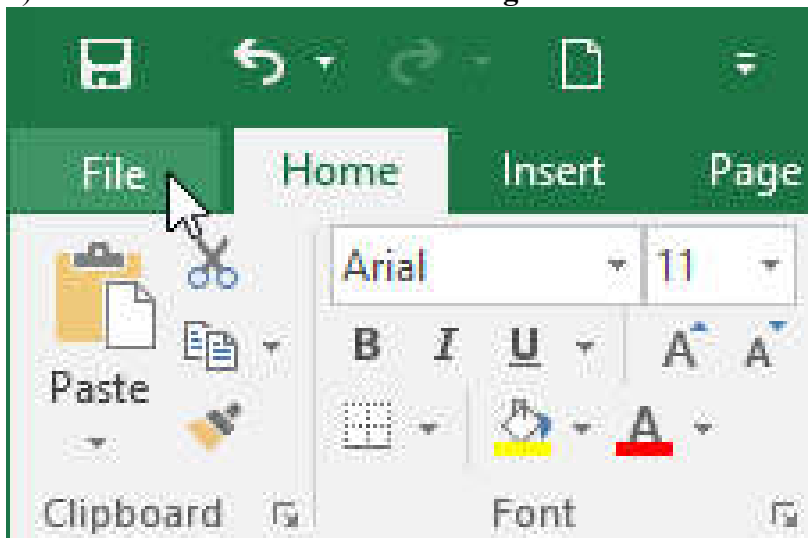
3) The workbook will stay in Recent Workbooks. To **unpin** a workbook, simply click the pushpin icon again.



Using templates :

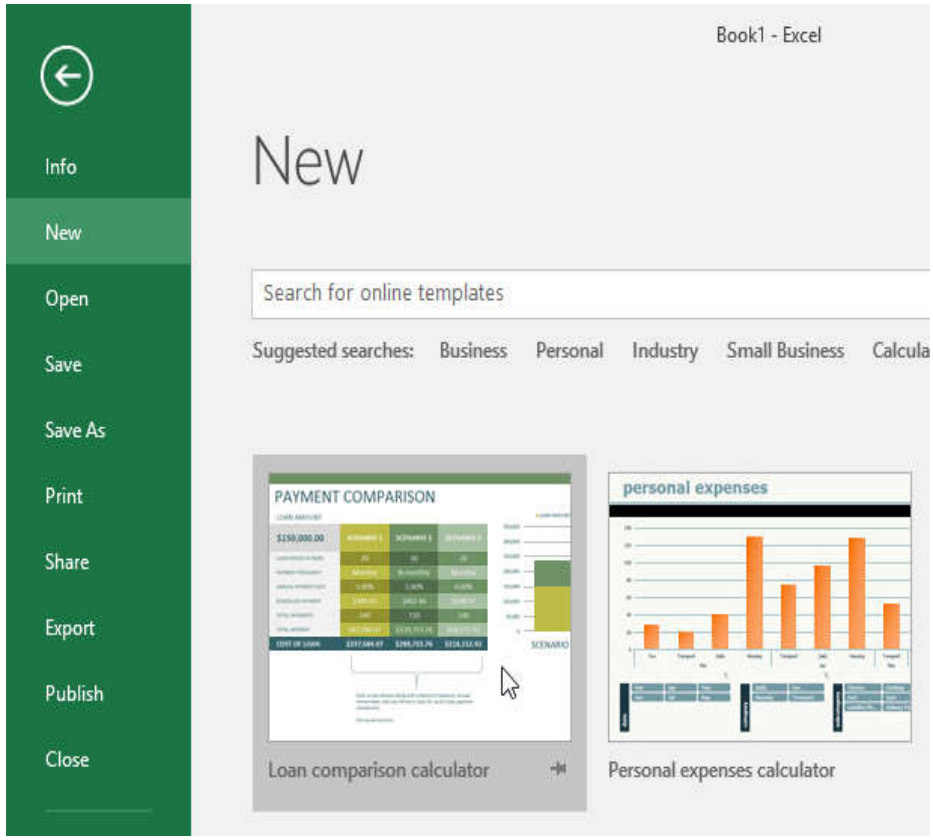
A **template** is a **predesigned spreadsheet** we can use to create a new workbook quickly. Templates often include **custom formatting** and **predefined formulas**, so they can save our lot of time and effort when starting a new project.

1) Click the **File** tab to access **Backstage view**.



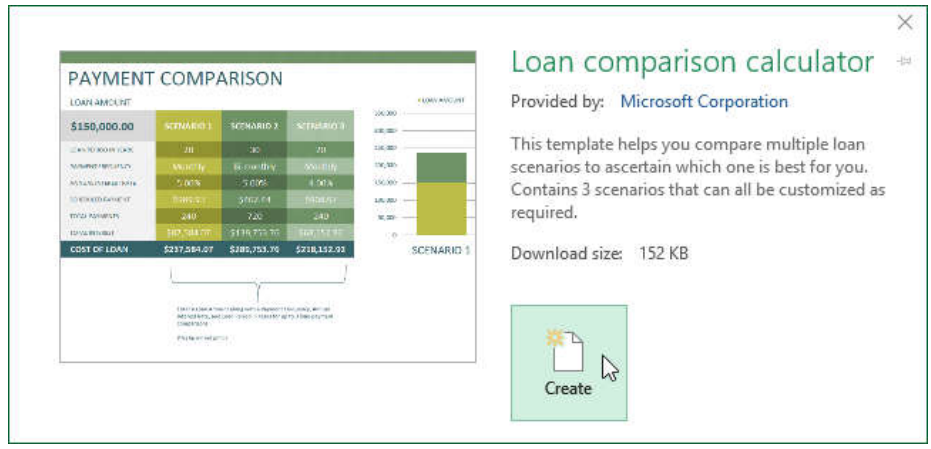
2) Select **New**. Several templates will appear below the **Blank workbook** option.

3) Select a **template** to review it.



4) A **preview** of the template will appear, along with **additional information** on how the template can be used.

5) Click **Create** to use the selected template.



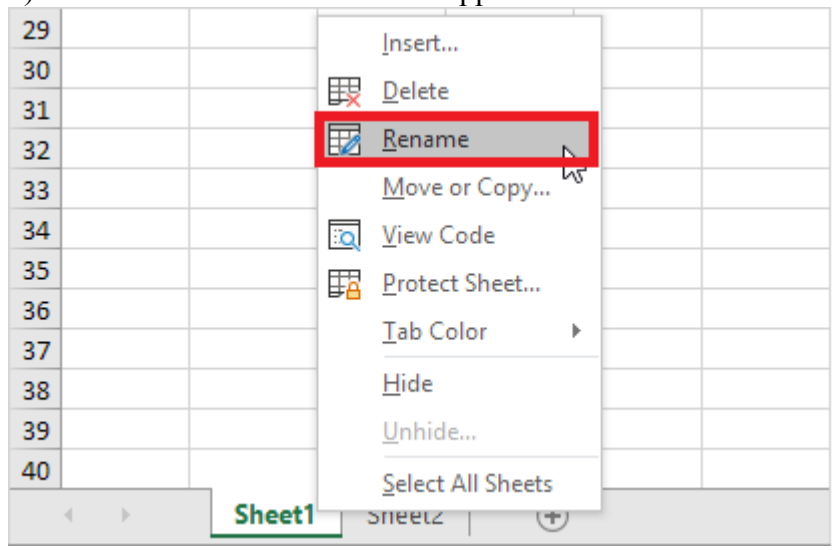
6) A new workbook will appear with the **selected template**.

2.4 Rename a Worksheet

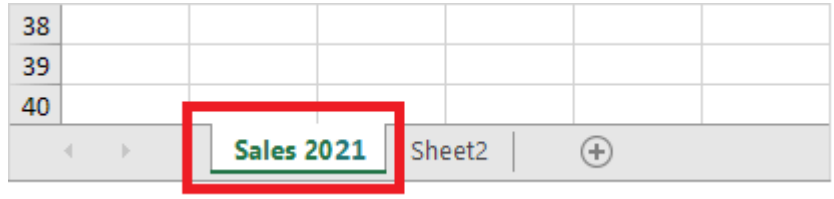
To rename our worksheet with a customized and appropriate name we can follow below steps.

1) Right-click on the sheet tab for which you wish to change the name.

2) The toolbar window will appear. Choose the **Rename** option.



3) Type your preferred name. For instance, in the below screenshot, we have renamed 'Sheet1' to Sales 2021.

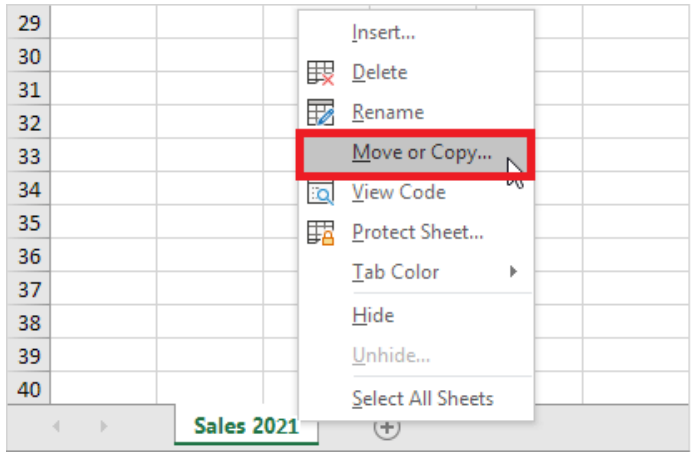


2.5 Copy a Worksheet

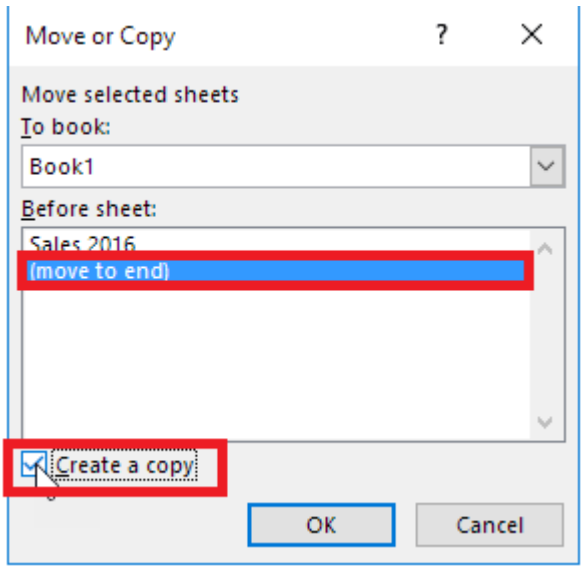
While working many times, the Excel users require copying and pasting the data of one worksheet to another and making some changes. Excel provides easy steps to copy the data of one worksheet to another.

1) Right-click on the sheet tab that we want to copy.

2) The toolbar window will appear. Click on the 'Move or Copy' option.



3) The 'Move or Copy' dialog box will be displayed. In the Before Sheet section, select the '**move to end**' option and make sure to check in the 'create a copy'.



4) Click **OK**. Our data will be **copied** to the new worksheet.

2.6 Creating Formulae

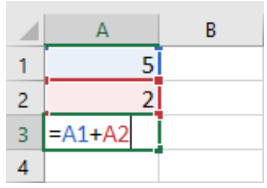
One of the most powerful features in Excel is the ability to calculate numerical information using formulas. Just like a calculator, Excel can add, subtract, multiply, and divide.

Excel uses standard operators for formulas, such as a plus sign for addition (+), a minus sign for subtraction (-), an asterisk for multiplication (*), a forward slash for division (/), and a caret (^) for exponents.

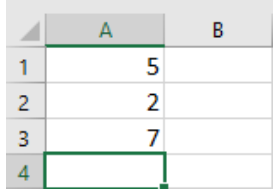
All formulas in Excel must begin with an equals sign (=). This is because the cell contains, or is equal to, the formula and the value it calculates.

While we create simple formulas in Excel using numbers (for example, =2+2 or =5*5), most of the time we will use cell addresses to create a formula. This is known as making a **cell reference.** Using cell references will ensure that our formulas are always accurate because we can change the value of referenced cells without having to rewrite the formula.

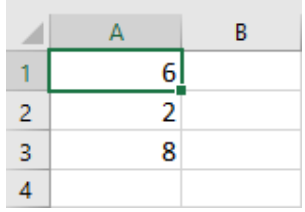
For example, In the formula below, cell A3 adds the values of cells A1 and A2 by making cell references:



When you press Enter, the formula calculates and displays the answer in cell A3:



If the values in the referenced cells change, the formula automatically recalculates:

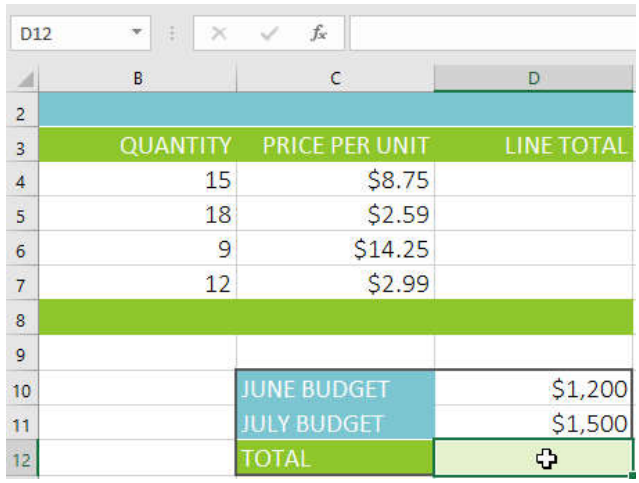


By combining a mathematical operator with cell references, we can create a variety of simple formulas in Excel. Formulas can also include a combination of cell references and numbers, as in the examples below:

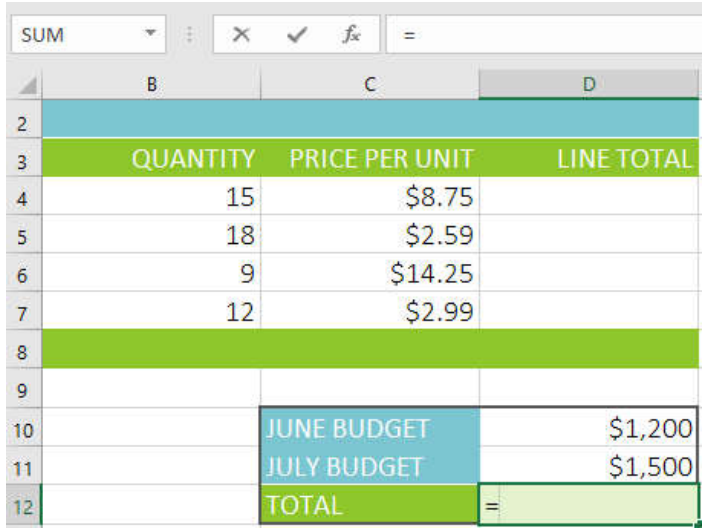
=A1+A2	Adds cells A1 and A2
=C4-3	Subtracts 3 from cell C4
=E7/J4	Divides cell E7 by J4
=N10*1.05	Multiplies cell N10 by 1.05
=R5^2	Finds the square of cell R5

To create a formula : In our example below, we'll use a simple formula and cell references to calculate a budget.

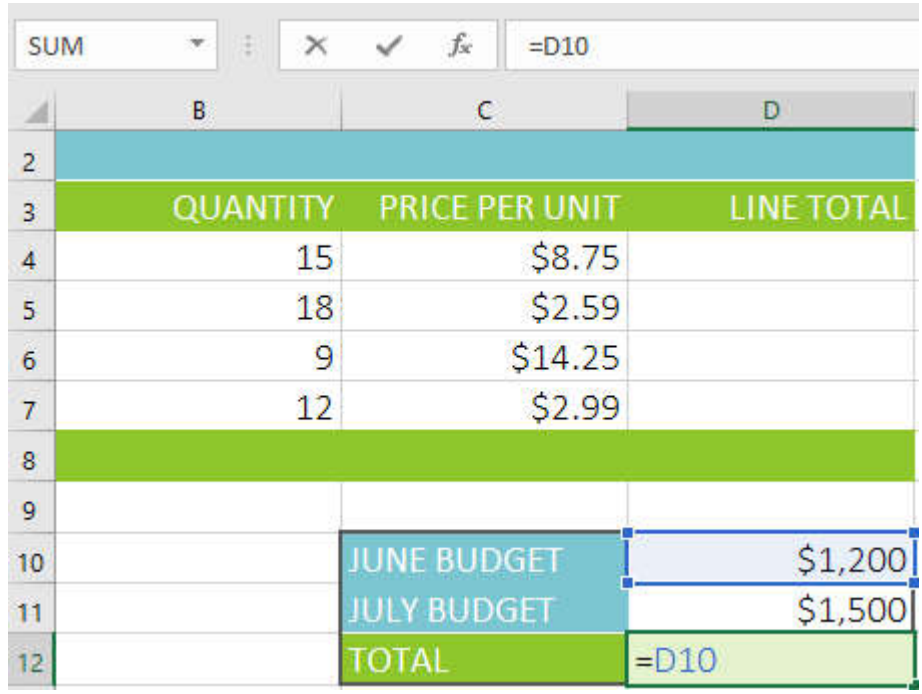
1) Select the cell that will contain the formula. In our example, we'll select cell D12.



2) Type the equals sign (=). Notice how it appears in both the cell and the formula bar.

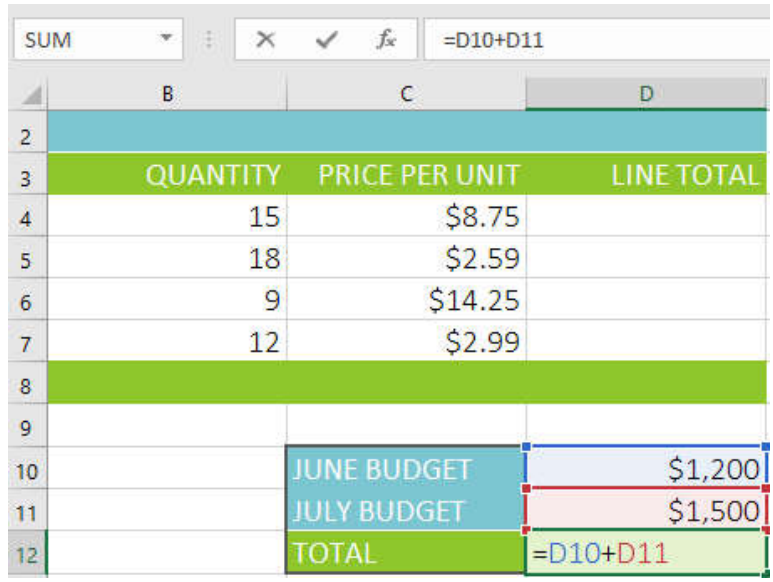


3) Type the cell address of the cell we want to reference first in the formula: cell D10 in our example. A blue border will appear around the referenced cell.

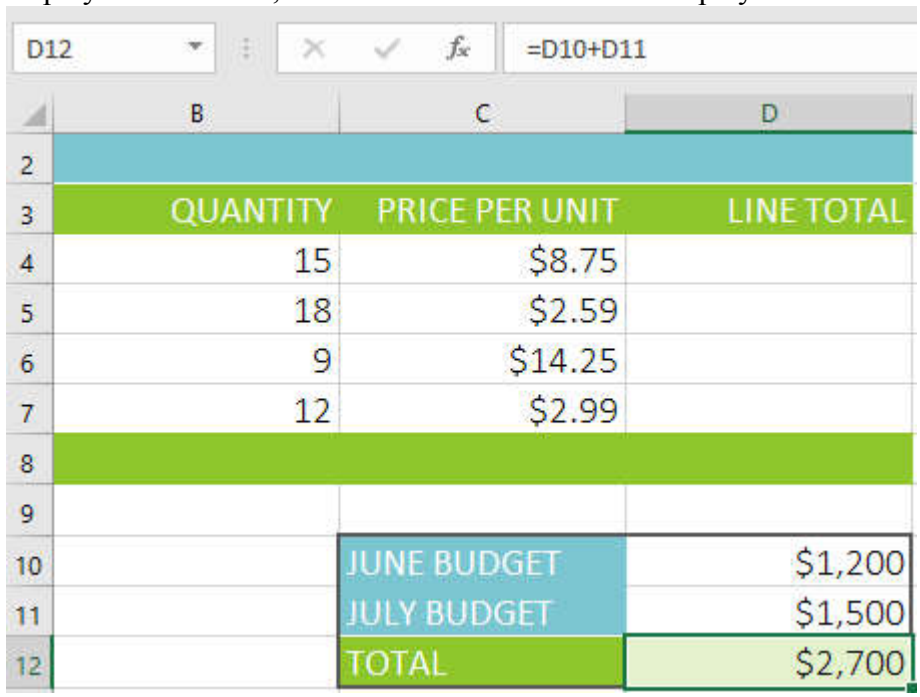


4) Type the mathematical operator we want to use. In our example, we'll type the addition sign (+).

5) Type the cell address of the cell you want to reference second in the formula: cell D11 in our example. A red border will appear around the referenced cell.



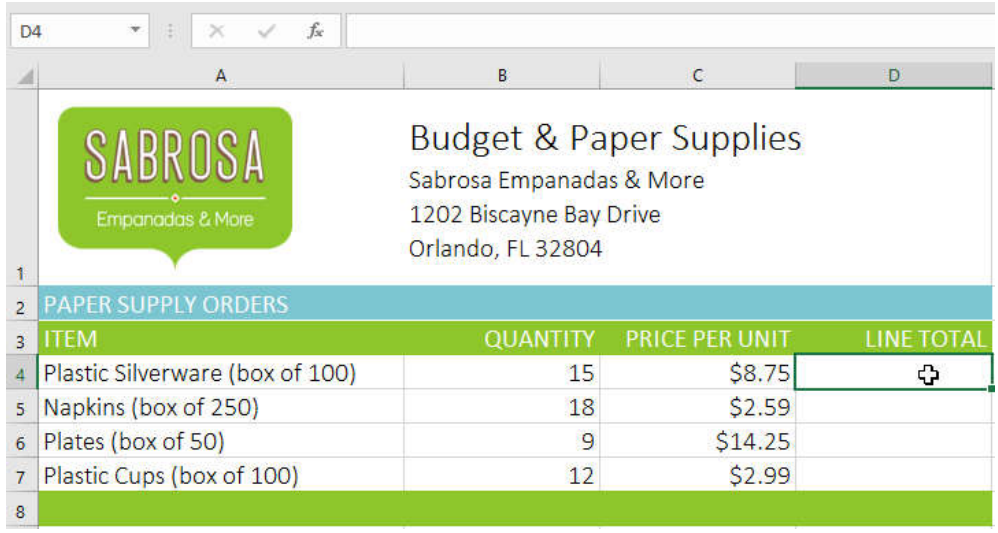
6) Press Enter on our keyboard. The formula will be calculated, and the value will be displayed in the cell. If we select the cell again, the cell displays the result, while the formula bar displays the formula.



7) If the result of a formula is too large to be displayed in a cell, it may appear as pound signs (########) instead of a value. This means the column is not wide enough to display the cell content. Simply increase the column width to show the cell content.

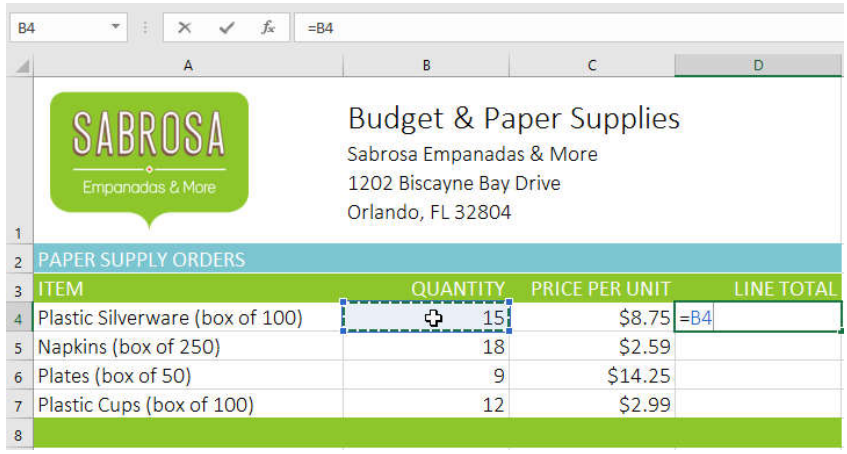
To create a formula using the point-and-click method : Instead of typing cell addresses manually, we can point and click the cells we want to include in our formula. This method can save a lot of time and effort when creating formulas. For example, we'll create a formula to calculate the cost of ordering several boxes of plastic silverware.

1) Select the cell that will contain the formula. In our example, we'll select cell D4.



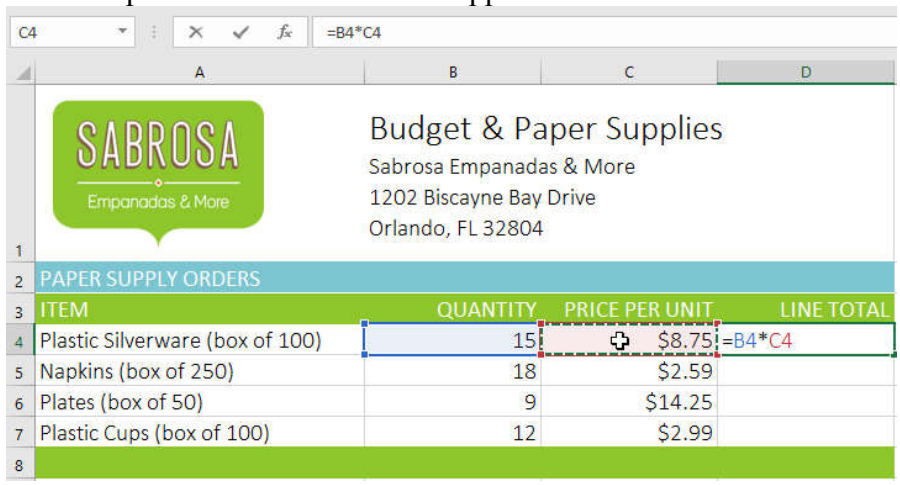
2) Type the equals sign (=).

3) Select the cell you want to reference first in the formula: cell B4 in our example. The cell address will appear in the formula.

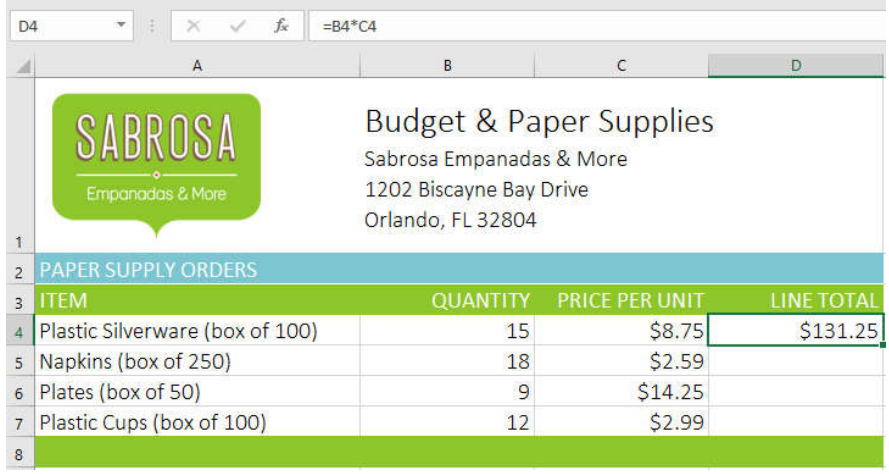


4) Type the mathematical operator you want to use. In our example, we'll type the multiplication sign (*).

5) Select the cell you want to reference second in the formula: cell C4 in our example. The cell address will appear in the formula.

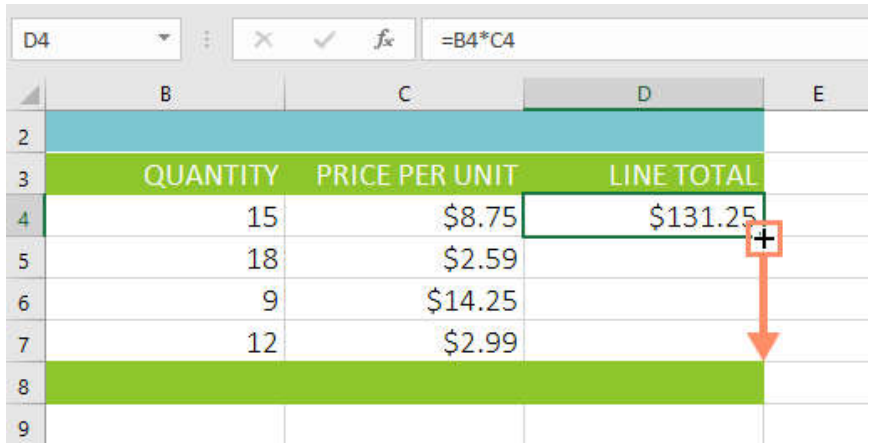


6) Press Enter on your keyboard. The formula will be calculated, and the value will be displayed in the cell.

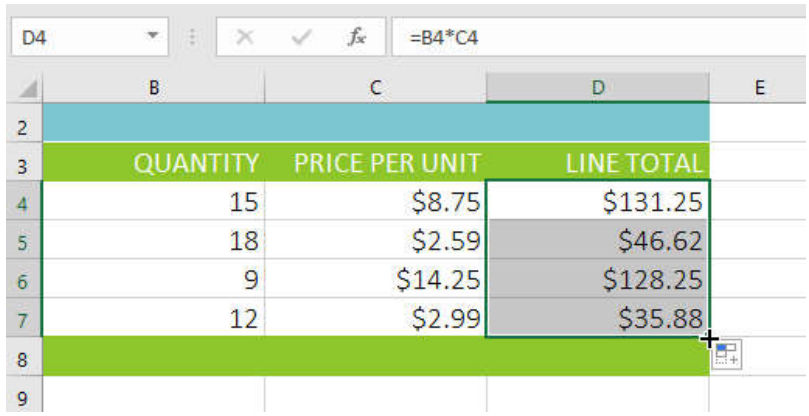


Copying formulas with the fill handle : Formulas can also be copied to adjacent cells with the fill handle, which can save a lot of time and effort if we need to perform the same calculation multiple times in a worksheet. The fill handle is the small square at the bottom-right corner of the selected cell(s).

1) Select the cell containing the formula you want to copy. Click and drag the fill handle over the cells you want to fill.



2) After you release the mouse, the formula will be copied to the selected cells.



2.7 Various Formulae/Functions used in Excel :

1) SUM : The SUM() function, as the name suggests, gives the total of the selected range of cell values. It performs the mathematical operation which is addition.

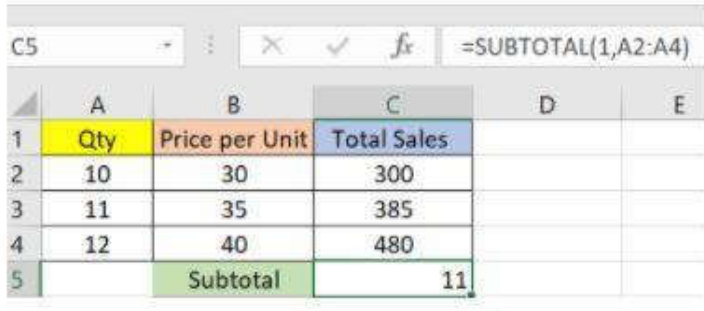
2) AVERAGE : The AVERAGE() function focuses on calculating the average of the selected range of cell values. As seen from the below example, to find the avg of the total sales, you have to simply type in "AVERAGE(C2, C3, C4)".

	A	B	C	D	E
1	Qty	Price per Unit	Total Sales		
2	10	30	300		
3	11	35	385		
4	12	40	480		
5		Total	1165		
6		Average	388.3333333		

3) COUNT : The function COUNT() counts the total number of cells in a range that contains a number. It does not include the cell, which is blank, and the ones that hold data in any other format apart from numeric.

	A	B	C	D
1	Qty	Price per Unit	Total Sales	
2	10	30	300	
3	11	35	385	
4	12	40	480	
5		Count	3	

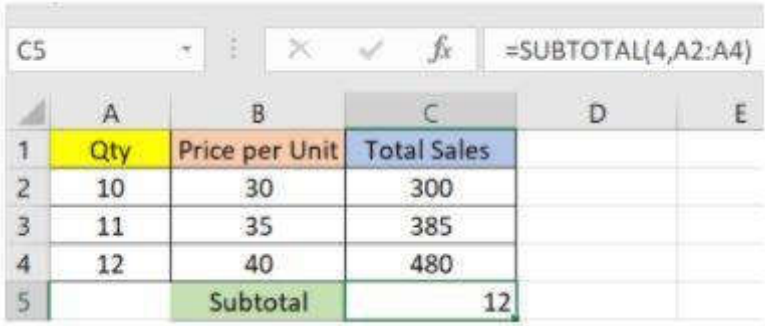
4) SUBTOTAL : The SUBTOTAL() function returns the subtotal in a database. Depending on what you want, you can select either average, count, sum, min, max, min, and others.



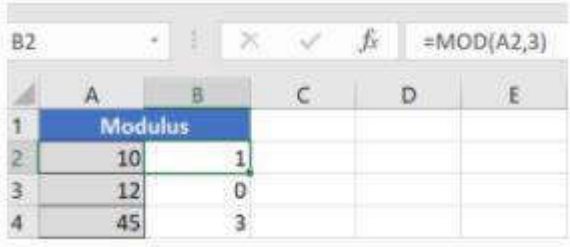
	A	B	C	D	E
1	Qty	Price per Unit	Total Sales		
2	10	30	300		
3	11	35	385		
4	12	40	480		
5		Subtotal	11		

In the example above, we have performed the subtotal calculation on cells ranging from A2 to A4. As you can see, the function used is "=SUBTOTAL(1, A2: A4), in the subtotal list "1" refers to average. Hence, the above function will give the average of A2: A4 and the answer to it is 11, which is stored in C5.

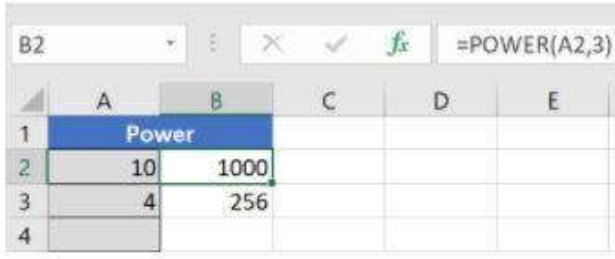
Similarly, "=SUBTOTAL(4, A2: A4)" selects the cell with the maximum value from A2 to A4, which is 12. Incorporating "4" in the function provides the maximum result.



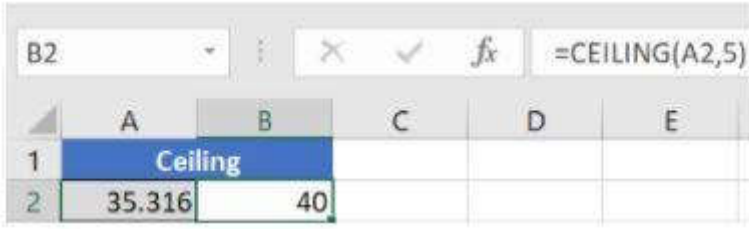
5) MODULUS : The MOD() function works on returning the remainder when a particular number is divided by a divisor.



6) POWER : The function "Power()" returns the result of a number raised to a certain power.

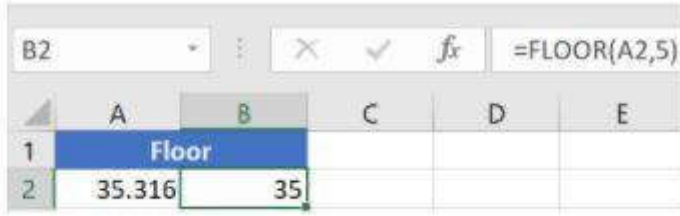


7) CEILING : Next, we have the ceiling function. The CEILING() function rounds a number up to its nearest multiple of significance.



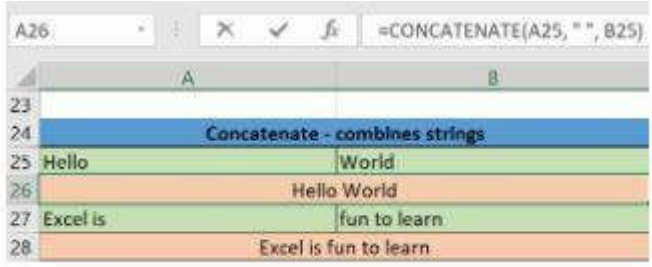
The nearest highest multiple of 5 for 35.316 is 40.

8) FLOOR : Contrary to the Ceiling function, the floor function rounds a number down to the nearest multiple of significance.

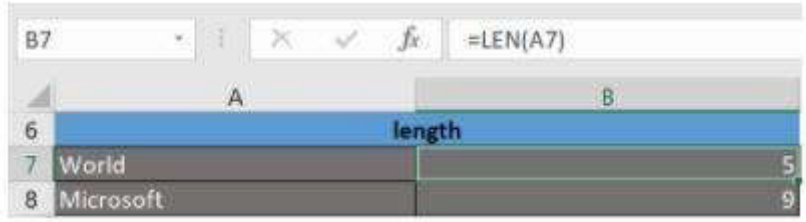


The nearest lowest multiple of 5 for 35.316 is 35.

9) CONCATENATE : This function merges or joins several text strings into one text string. In this example, we have operated with the syntax =CONCATENATE(A25, " ", B25)



10) LEN : The function LEN() returns the total number of characters in a string. So, it will count the overall characters, including spaces and special characters.



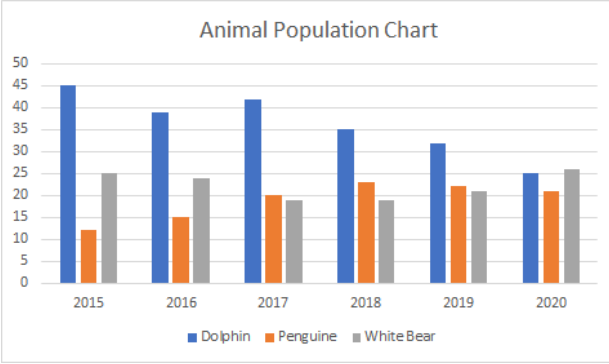
2.8 Creating Charts

It can be difficult to interpret Excel workbooks that contain a lot of data. Charts allow us to illustrate our workbook data graphically, which makes it easy to visualize comparisons and trends.

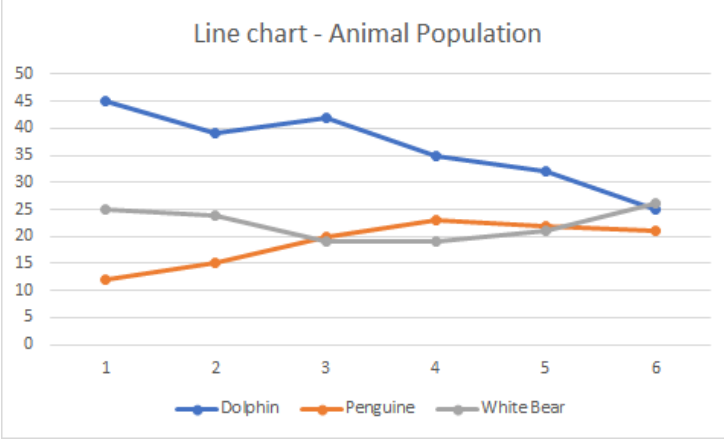
2.8.1 Types of charts : Excel offers many charts to represent the data in different manners, such as - Pie charts, Bar charts, Line charts, Stock charts, Surface charts, Radar charts, and many more. We can use them according to our data and analysis.

Column Charts : A column chart is basically a vertical chart that is used to represent the data in vertical bars. It works efficiently with different

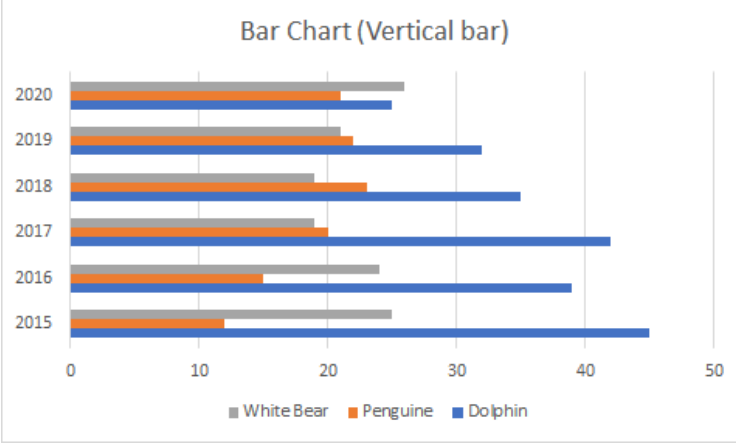
types of data, but it is usually used for comparing the information. Excel Office Productivity Tools offers 2D and 3D column charts.



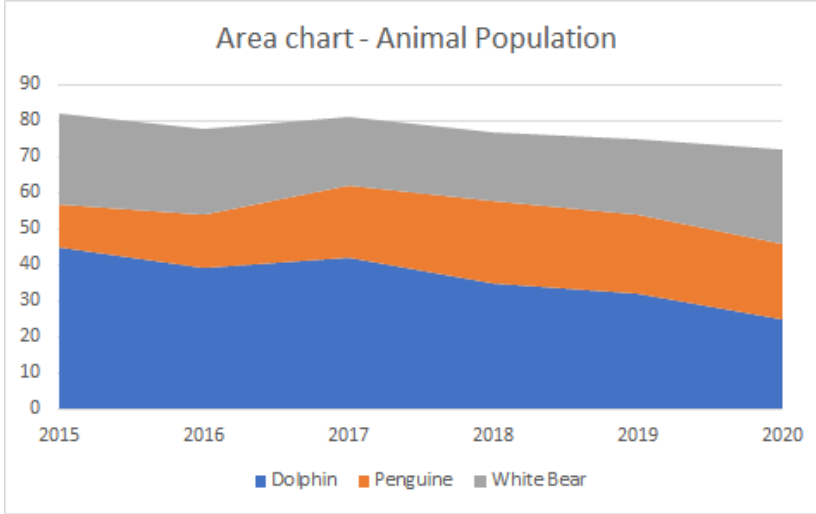
Line Chart : Line charts are most useful for showing trends. Using this chart, you can easily analyze the ups and downs in your data over time. In this chart, data points are connected with lines.



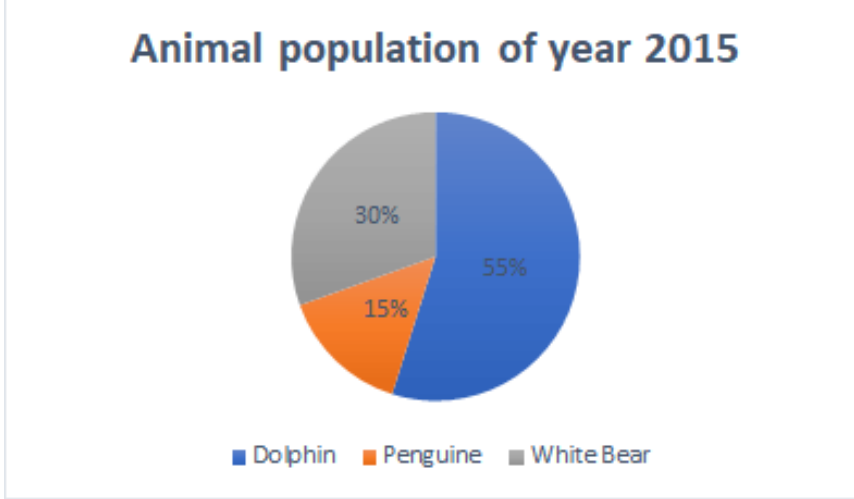
Bar chart : Bar charts are horizontal bars that work like column charts. Unlike column charts, Bar charts are horizontally plotted. Or we can say that bar charts and column charts are just opposite to each other.



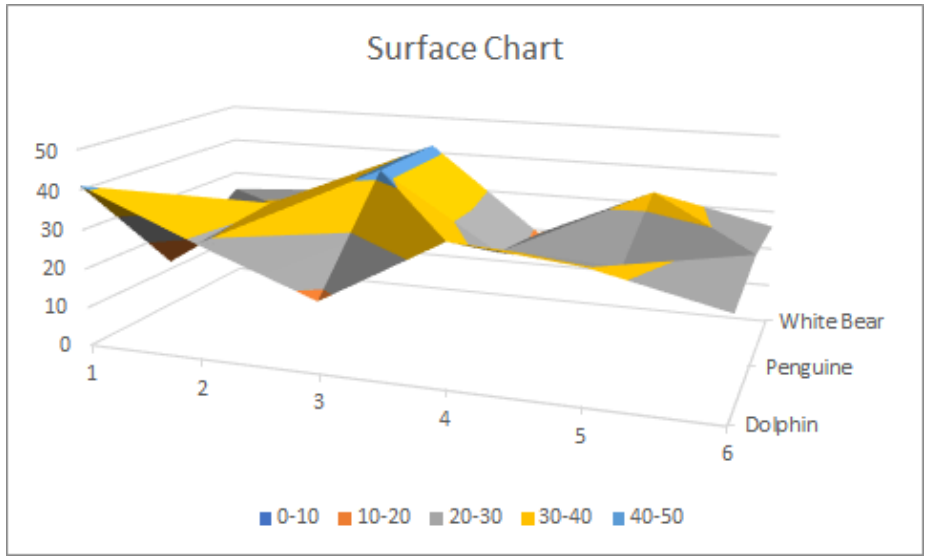
Area chart : Area charts are just like line charts. Unlike the line charts, gaps are filled with color in area charts. Area charts are easy to analyze the growth in business as it shows ups and downs through line.



Pie chart : A pie chart is a rounded shape graph that is divided into slices of pie. Using this chart, you can easily analyze data that is divided into slices. It makes the data easy to compare the proportion. Pie chart is also known as Doughnut chart.



Surface chart : Surface chart is actually a 3D chart that helps to represent the data into a 3D landscape. These charts are best to use with a large dataset. This chart allows displaying a variety of data at the same time. A large dataset is not easy to represent using other charts. Surface charts solve this problem that allows displaying large datasets using this 3D chart.

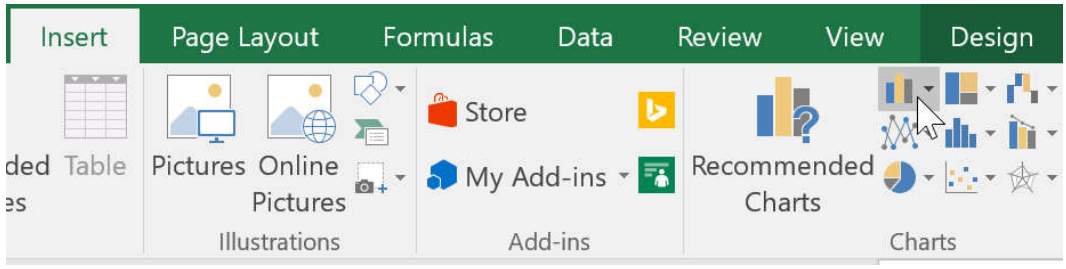


2.8.2 Insert Chart for data :

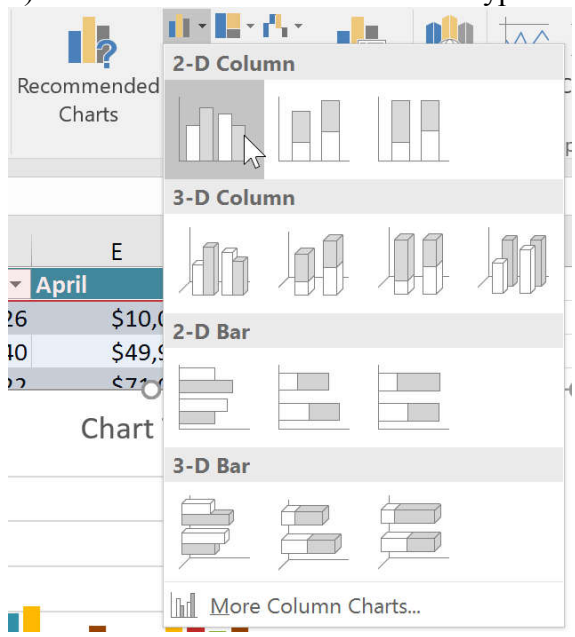
1) Select the cells you want to chart, including the column titles and row labels. These cells will be the source data for the chart. In our example, we'll select cells A1:F6.

	A	B	C	D	E	F	G
1	Genre	January	February	March	April	May	
2	Classics	$18,580	$49,225	$16,326	$10,017	$26,134	
3	Mystery	$78,970	$82,262	$48,640	$49,985	$73,428	
4	Romance	$24,236	$131,390	$79,022	$71,009	$81,474	
5	Sci-Fi & Fantasy	$16,730	$19,730	$12,109	$11,355	$17,686	
6	Young Adult	$35,358	$42,685	$20,893	$16,065	$31,388	
7							
8							

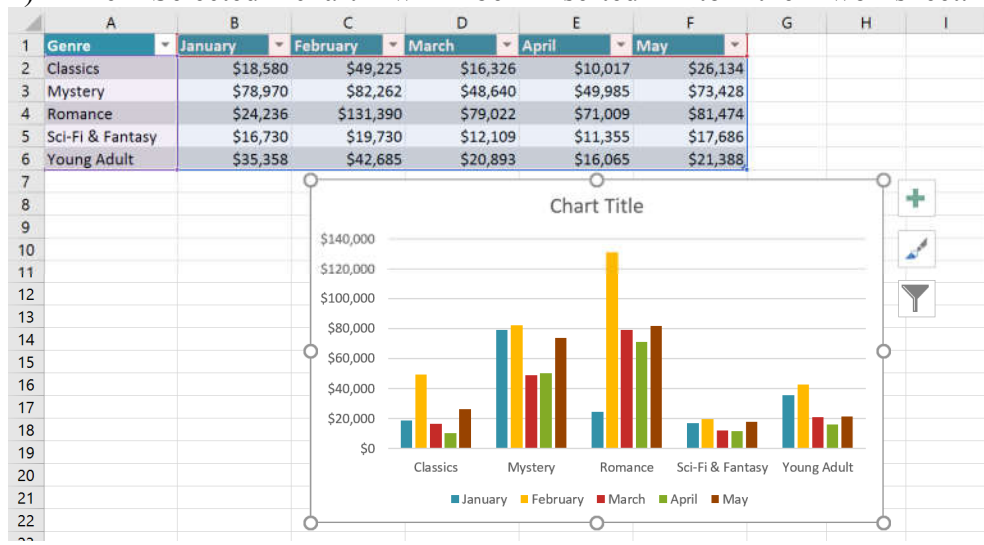
2) From the Insert tab, click the desired Chart command. In our example, we'll select Column.



3) Choose the desired chart type from the drop-down menu.



4) The Selected chart will be inserted into the worksheet.

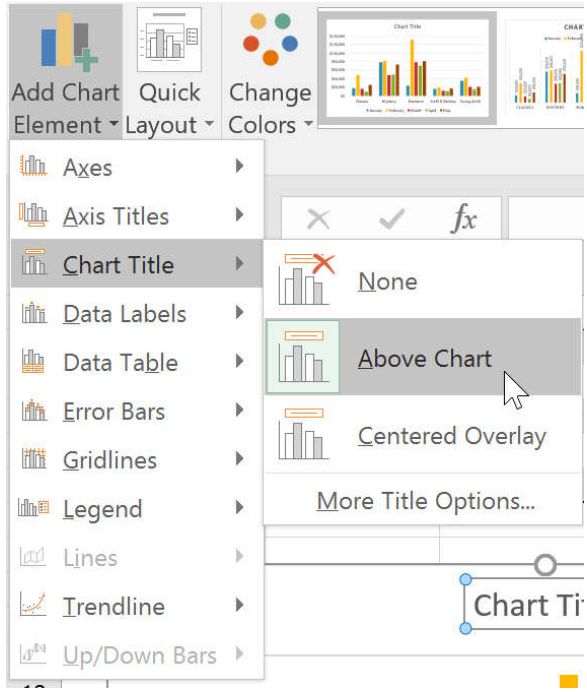


Genre	January	February	March	April	May
Classics	$18,580	$49,225	$16,326	$10,017	$26,134
Mystery	$78,970	$82,262	$48,640	$49,985	$73,428
Romance	$24,236	$131,390	$79,022	$71,009	$81,474
Sci-Fi & Fantasy	$16,730	$19,730	$12,109	$11,355	$17,686
Young Adult	$35,358	$42,685	$20,893	$16,065	$21,388

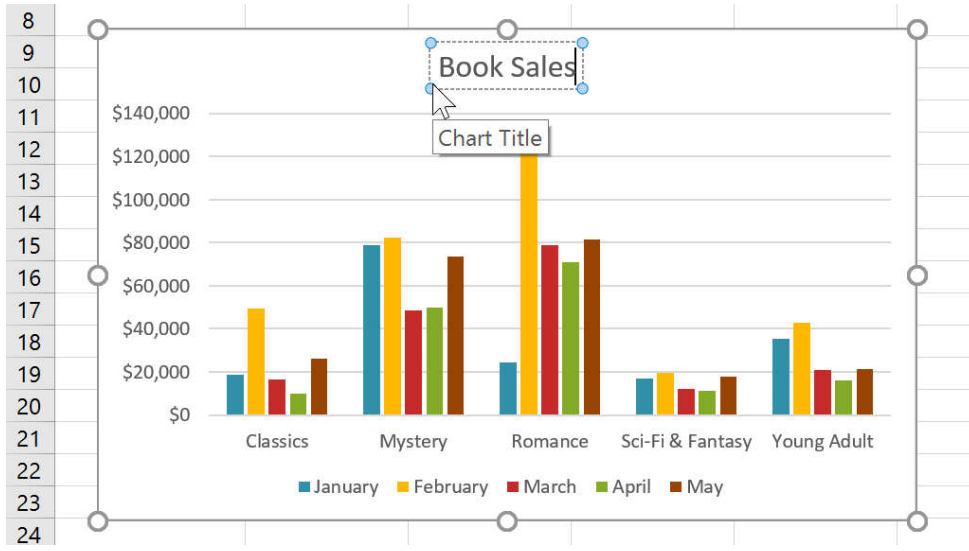
2.8.3 Chart Layout Styles

Excel allows you to add chart elements such as chart titles, legends, and data labels to make your chart easier to read.

To add a chart element, click the Add Chart Element command on the Design tab, then choose the desired element from the drop-down menu.

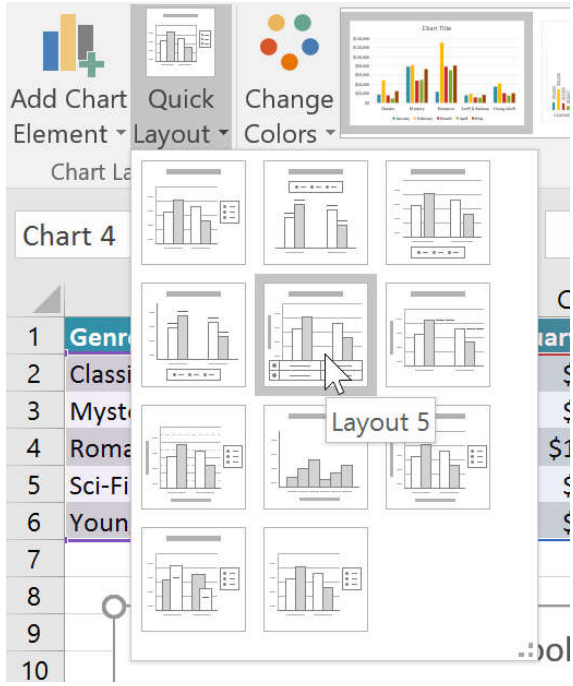


To edit a chart element, like a chart title, simply double-click the placeholder and begin typing.



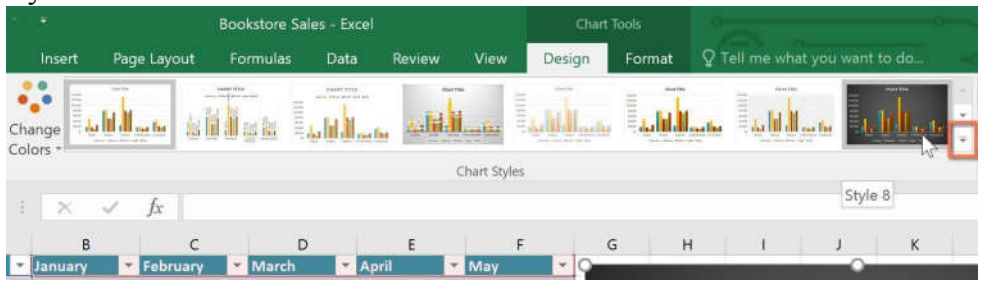
If we don't want to add chart elements individually, we can use one of Excel's predefined layouts.

Simply click the Quick Layout command, then choose the desired layout from the drop-down menu.



Excel also includes several chart styles, which allow us to quickly modify the look and feel of our chart.

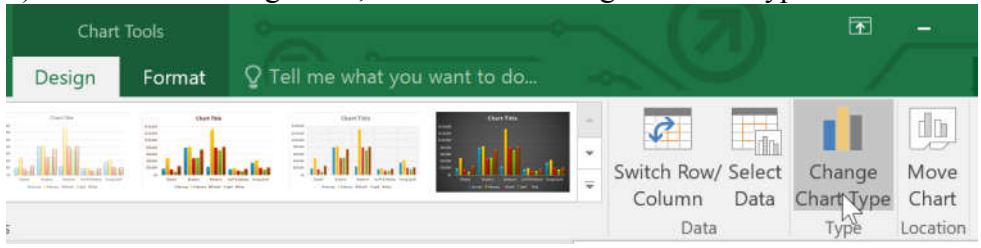
To change the chart style, select the desired style from the Chart styles group. We can also click the drop-down arrow on the right to see more styles.



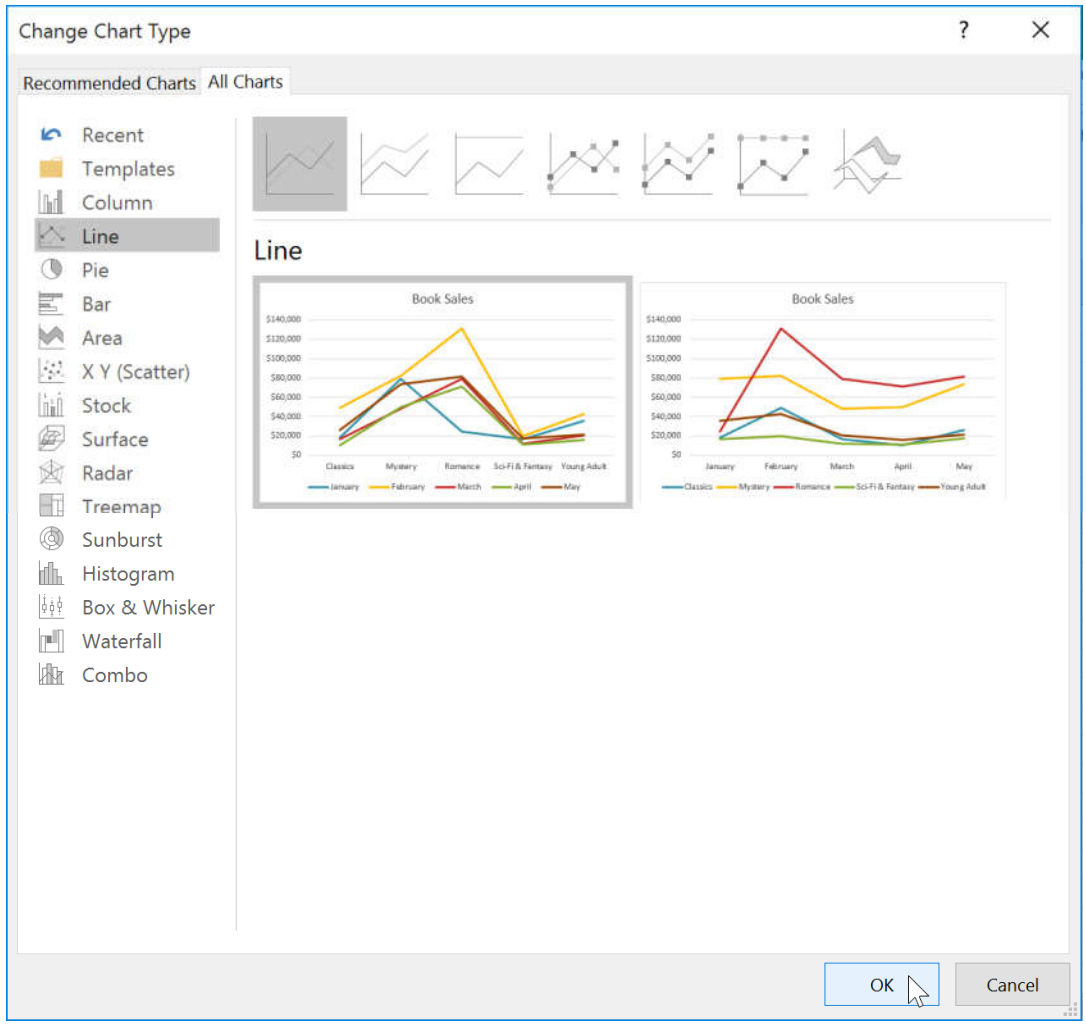
To change the chart type : If we find that our data isn't well suited to a certain chart, it's easy to switch to a new chart type.

In our example, we'll change our chart from a column chart to a line chart.

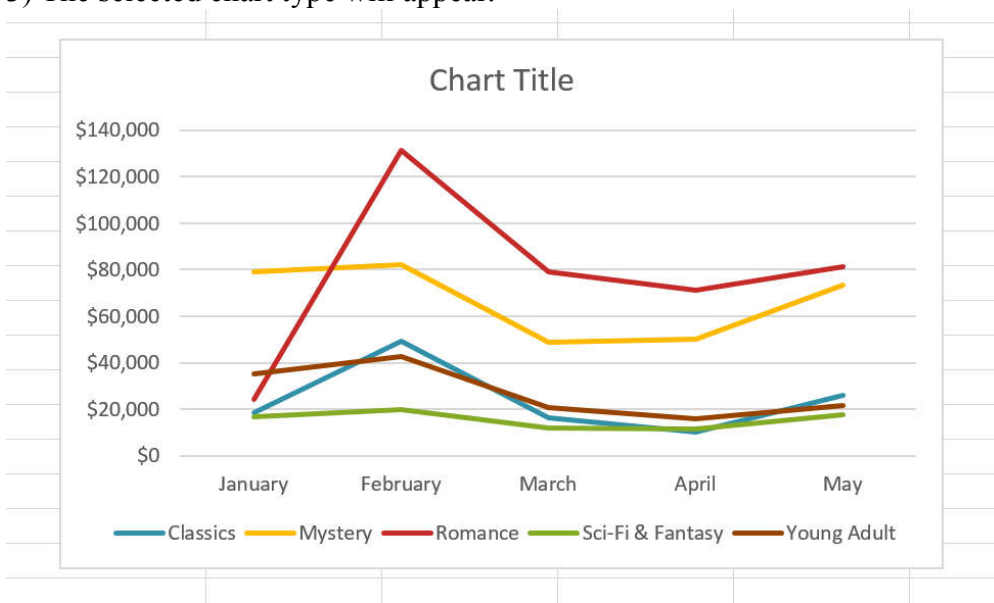
1) From the Design tab, click the Change Chart Type command.



2) The Change Chart Type dialog box will appear. Select a new chart type and layout, then click OK. In our example, we'll choose a Line chart.



3) The selected chart type will appear.



2.9 Using Tools

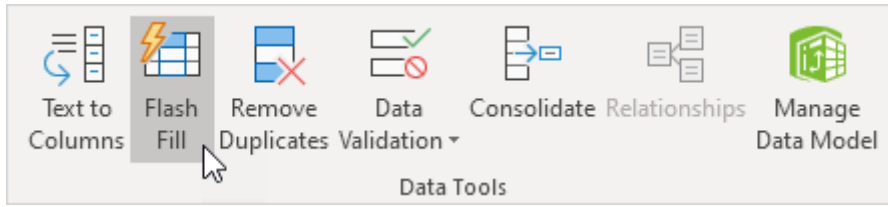
2.9.1 Flash fill : Flash fill in Excel automatically combines data. Flash only works when it recognizes a pattern.

Example 1 : Use flash fill in Excel to extract the numbers in column A below.

1) First, tell Excel what you want to do by entering the value 4645 into cell B1.

	A	B	C	D	E	F	G	H
1	WETJR/4645/CVKFRS	4645						
2	HPDHFH/9234/FGFHB							
3	BVCMIJ/51857/FALPG							
4	DFFLAZ/652/FWQP							
5	WMPDJFD/3/FSJQLX							
6	TRPMC/729/HJEIPNW							
7								

2) On the Data tab, in the Data Tools group, click Flash Fill (or press CTRL + E).



Result:

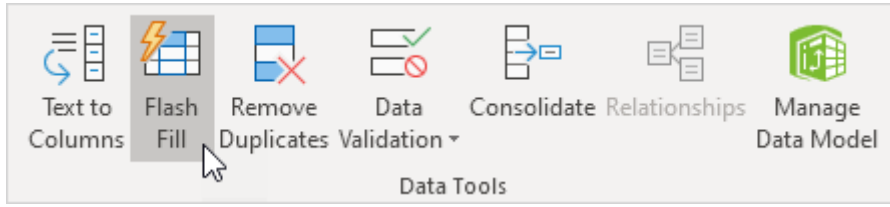
	A	B	C	D	E	F	G	H
1	WETJR/4645/CVKFRS	4645						
2	HPDHFH/9234/FGFHB	9234						
3	BVCMIJ/51857/FALPG	51857						
4	DFFLAZ/652/FWQP	652						
5	WMPDJFD/3/FSJQLX	3						
6	TRPMC/729/HJEIPNW	729						
7								

Example 2 : Use flash fill in Excel to join the last names in column A below and the first names in column B below to create email addresses.

1) First, tell Excel what you want to do by entering a correct email address in cell C1.

	A	B	C	D	E	F	G
1	Baker	John	john.baker@company.com				
2	Cooper	Sandra					
3	Jones	Miles					
4	Parker	Amy					
5	Smith	Peter					
6	Carter	Crissy					
7							

2) On the Data tab, in the Data Tools group, click Flash Fill (or press CTRL + E).



Result:

	A	B	C	D	E	F	G
1	Baker	John	john.baker@company.com				
2	Cooper	Sandra	sandra.cooper@company.com				
3	Jones	Miles	miles.jones@company.com				
4	Parker	Amy	amy.parker@company.com				
5	Smith	Peter	peter.smith@company.com				
6	Carter	Crissy	crissy.carter@company.com				
7							

2.9.2 Sorting Data : Content can be sorted alphabetically, numerically, and in many other ways.

Types of sorting : When sorting data, it's important to first decide if we want the sort to apply to the entire worksheet or just a cell range.

Sort sheet organizes all of the data in our worksheet by one column. Related information across each row is kept together when the sort is applied. In the example below, the Contact Name column (column A) has been sorted to display the names in alphabetical order.

	A	B	C	D
1	Customer Contact List			
2	CONTACT NAME	BILLING ADDRESS	PHONE	EMAIL ADDRESS
3	Chaturvedi, Rick	2428 S Redding St #2 B	360-555-5422	info@newhaventraders.com
4	Dean, Hank	3034 Foggy Wharf Loo	308-555-1050	hdean@venturebrewing.com
5	Figgis, Mallory	3520 Sleepy Hearth Dr	425-555-5370	malloryf@archerproperties.com
6	Finn, Jake	1407 Dusty Fawn Ln So	605-555-6435	jake@adventureoutfitters.com
7	Kinkade, Chris	1028 Quiet Dale Rd Ho	443-555-4942	chris.kinkade@placervilleins.com
8	Lawson, Miranda	5316 Colonial Pkwy Est	575-555-9255	mlawson@massairlines.com
9	Reyes, Felicia	8544 Lazy Bluff Ave Wh	316-555-3256	felicia@everlypublishing.com
10	Sebastian, Lil	9060 Easy Evening Ln V	207-555-7225	lil@knopeequestrian.com
11	Silva, Vivica	8595 Thunder Brook Ci	360-555-4289	vivica@rileygardensupply.com
12	Stark, Katie	971 Cinder Butterfly St	603-555-2460	katie.stark@ariarealestate.com
13	Torrance, Jill	3160 Amber Gate Rd R	605-555-4495	jtorrance@overlookinn.com
14	Yuen, Phillip	5108 Crystal Gate Blvd	913-555-5928	yuenp@corepharmaceuticals.com

Sort range sorts the data in a range of cells, which can be helpful when working with a sheet that contains several tables. Sorting a range will not affect other content on the worksheet.

	A	B	C	D	E
1					
2	EXERCISES		SET 1		SET 2
3		REPS	WEIGHT (lbs)	REPS	WEIGHT (lbs)
4	Bench Press	14	65	12	75
5	Bench Press (Decline)	10	60	8	70
6	Triceps Extension	15	35	20	35
7	Average	13.9	50.5	12.5	54
8					

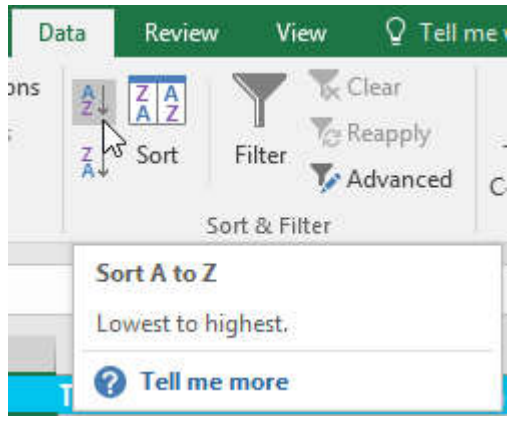
	Running Log		
10	Date	Distance (miles)	Time (hrs:mins)
11	25-Jun	2.8	0:45
12	26-Jun	3	0:44
13	27-Jun	2.75	0:42
14	29-Jun	3.25	0:44
15	30-Jun	3.25	0:45
16	2-Jul	2.5	0:44
17	3-Jul	3	0:30
18	Total	20.55	
19			

To sort a sheet :

1) Select a cell in the column you want to sort by. In our example, we'll select cell C2.

	A	B	C	D	E
1	Homeroom #	First Name	Last Name	T-Shirt Size	Payment Method
2	105	Christiana	Chen	Medium	Check Bounced
3	105	Derek	MacDonald	Large	Cash
4	105	Esther	Yaron	Small	Pending
5	105	Melissa	White	Small	Debit Card
6	105	Nathan	Albee	Medium	Check
7	105	Sidney	Kelly	Medium	Check
8	110	Gabriel	Del Toro	Medium	Cash
9	110	Kris	Ackerman	Large	Money Order

2) Select the Data tab on the Ribbon, then click the A-Z command to sort A to Z, or the Z-A command to sort Z to A. In our example, we'll sort A to Z.



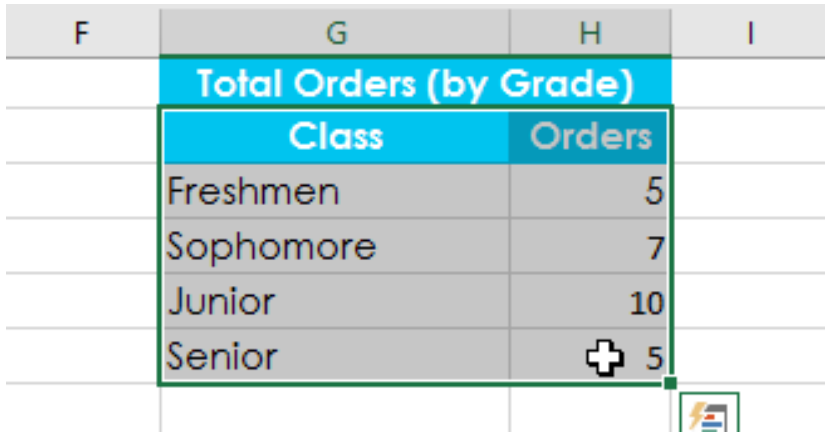
3) The worksheet will be sorted by the selected column. In our example, the worksheet is now sorted by last name.

Office Productivity Tools

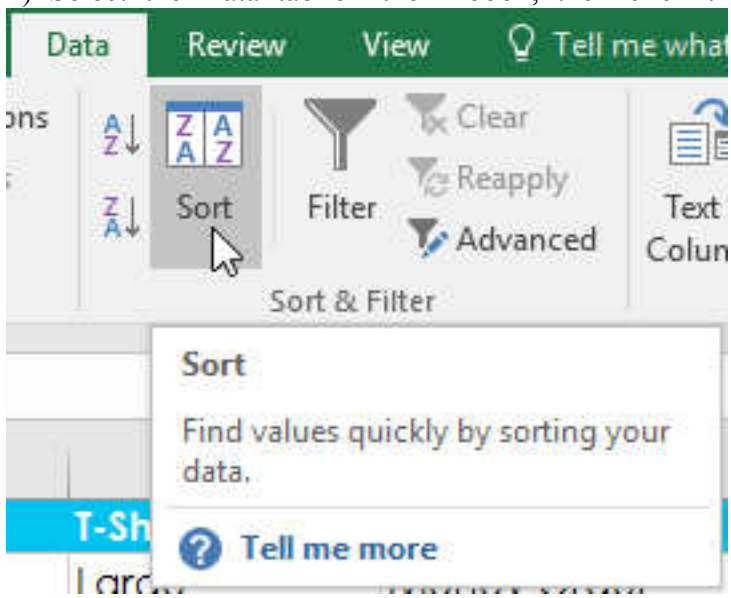
	A	B	C	D	E
1	Homeroom #	First Name	Last Name	T-Shirt Size	Payment Method
2	110	Kris	Ackerman	Large	Money Order
3	105	Nathan	Albee	Medium	Check
4	220-B	Samantha	Bell	Medium	Check
5	110	Matt	Benson	Medium	Money Order
6	105	Christiana	Chen	Medium	Check Bounced
7	110	Gabriel	Del Toro	Medium	Cash
8	220-A	Brigid	Ellison	Small	Cash
9	220-A	Juan	Flores	X-Large	Pending

To sort a range :

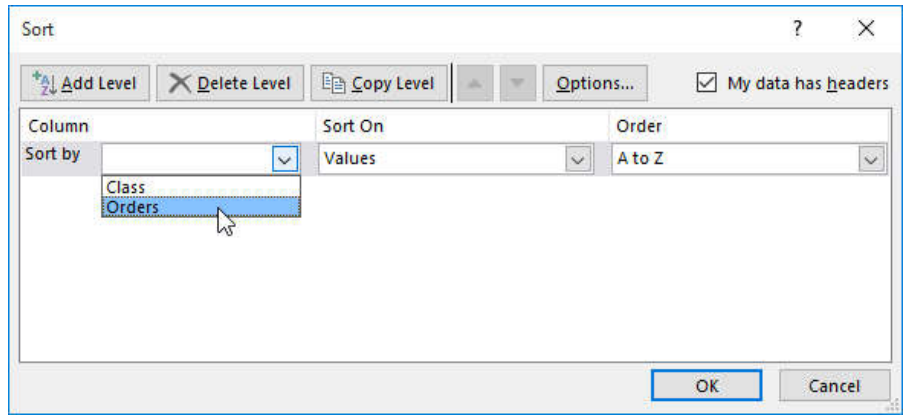
1) Select the cell range you want to sort. In our example, we'll select cell range G2:H6.



2) Select the Data tab on the Ribbon, then click the Sort command.

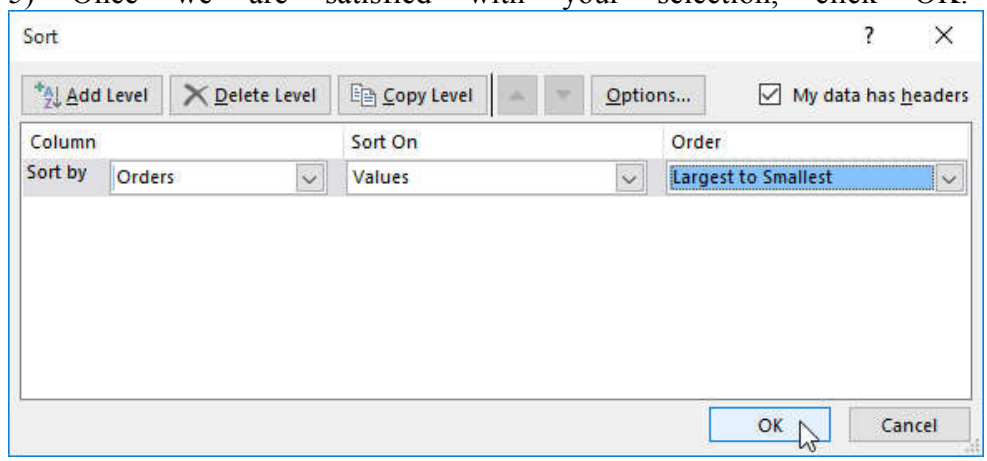


3) The Sort dialog box will appear. Choose the column we want to sort by. In our example, we want to sort the data by the number of T-shirt orders, so we'll select Orders.

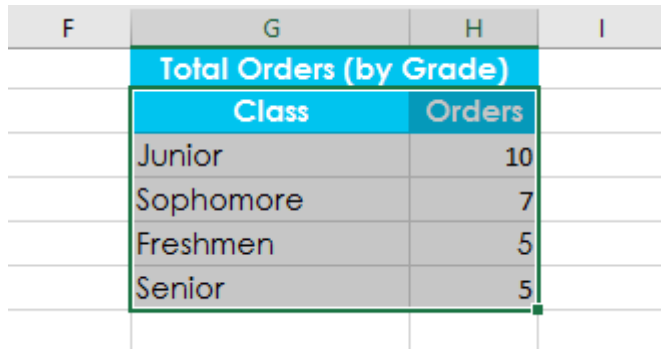


4) Decide the sorting order (either ascending or descending). In our example, we'll use Largest to Smallest.

5) Once we are satisfied with your selection, click OK.



6) The cell range will be sorted by the selected column. In our example, the Orders column will be sorted from highest to lowest. Notice that the other content in the worksheet was not affected by the sort.



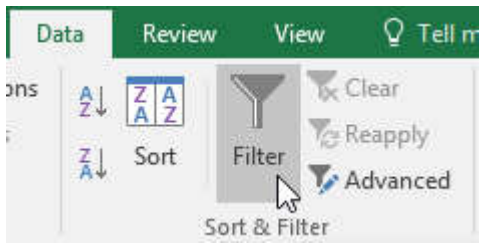
2.9.3 Filtering Data : Filters can be used to narrow down the data in your worksheet, allowing you to view only the information you need.

In our example, we'll apply a filter to an equipment log worksheet to display only the laptops and projectors that are available for checkout.

1) In order for filtering to work correctly, our worksheet should include a **header row**, which is used to identify the name of each column.

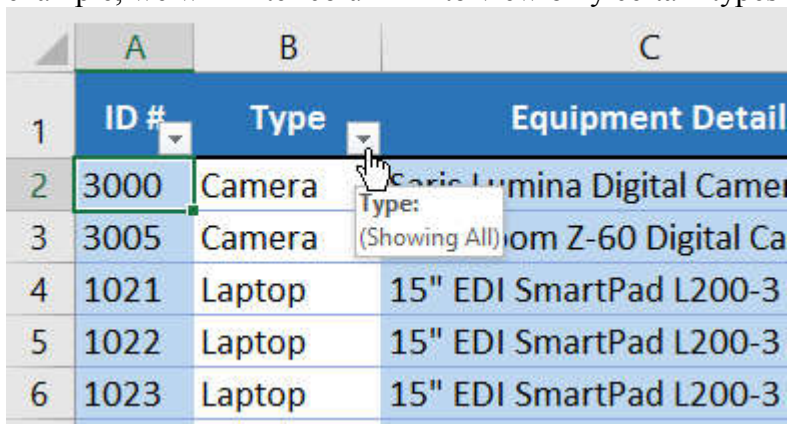
	A	B	C	D	E	F
1	ID #	Type	Equipment Detail	Checked Out	Checked In	Checked Out By
2	3000	Camera	Saris Lumina Digital Camera	12-May-15	15-May-15	Shannon Nguyen
3	3005	Camera	Saris Zoom Z-60 Digital Camera	27-Jul-15	06-Aug-15	Sela Shepard
4	1021	Laptop	15" EDI SmartPad L200-3 Laptop	15-Sep-15	01-Oct-15	Sofie Ragnar
5	1022	Laptop	15" EDI SmartPad L200-3 Laptop	14-Aug-15	16-Aug-15	Hank Sorenson
6	1023	Laptop	15" EDI SmartPad L200-3 Laptop	08-Aug-15	15-Aug-15	Jennifer Weiss
7	3070	Camera	Omega PixL Digital Camcorder	06-Oct-15		Min Seung
8	1025	Laptop	15" EDI SmartPad L200-4X	26-Sep-15	04-Oct-15	Min Seung
9	1031	Laptop	17" Saris X-10 Laptop	04-Oct-15		Nick Ortiz
10	1032	Laptop	17" Saris X-10 Laptop	19-Sep-15		Stanley Geyer
11	1033	Laptop	17" Saris X-10 Laptop	24-Sep-15	26-Sep-15	George D'Agosta

2) Select the **Data** tab, then click the **Filter** command.



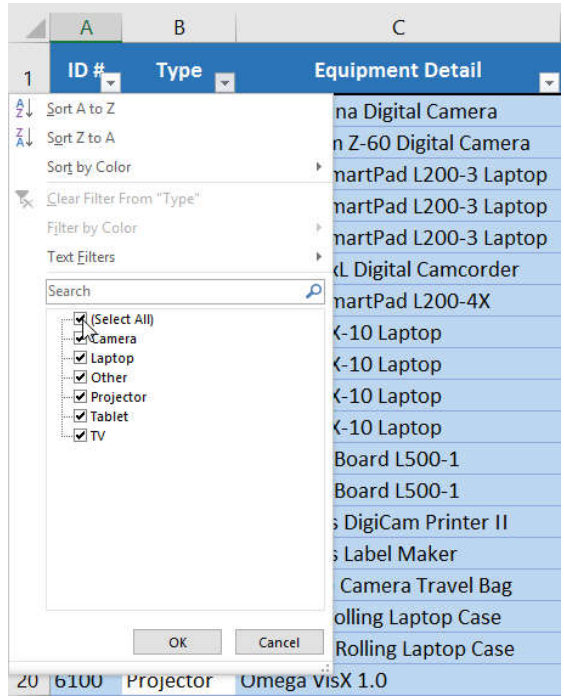
3) A **drop-down arrow** will appear in the header cell for each column.

4) Click the **drop-down arrow** for the column we want to filter. In our example, we will filter column **B** to view only certain types of equipment.



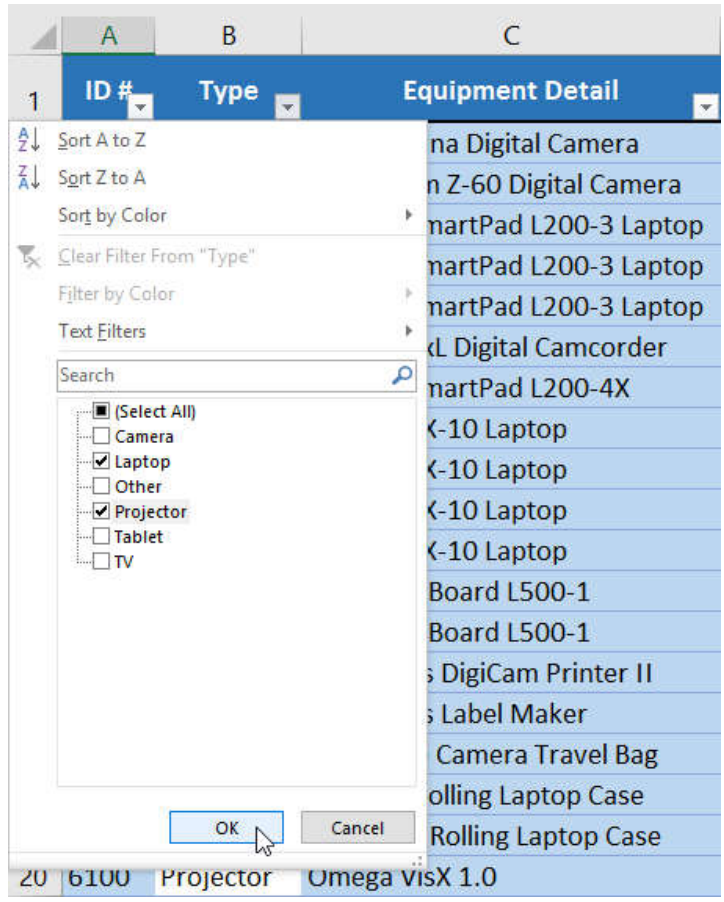
5) The **Filter menu** will appear.

6) **Uncheck** the box next to **Select All** to quickly deselect all data.



7) **Check** the boxes next to the data you want to filter, then click **OK**.

In this example, we will check **Laptop** and **Projector** to view only these types of equipment.



8) The data will be **filtered**, temporarily hiding any content that doesn't match the criteria. In our example, only laptops and projectors are visible.

	A	B	C	D	E	F
1	ID #	Type	Equipment Detail	Checked Out	Checked In	Checked Out By
4	1021	Laptop	15" EDI SmartPad L200-3 Laptop	15-Sep-15	01-Oct-15	Sofie Ragnar
5	1022	Laptop	15" EDI SmartPad L200-3 Laptop	14-Aug-15	16-Aug-15	Hank Sorenson
6	1023	Laptop	15" EDI SmartPad L200-3 Laptop	08-Aug-15	15-Aug-15	Jennifer Weiss
8	1025	Laptop	15" EDI SmartPad L200-4X	26-Sep-15	04-Oct-15	Min Seung
9	1031	Laptop	17" Saris X-10 Laptop	04-Oct-15		Nick Ortiz
10	1032	Laptop	17" Saris X-10 Laptop	19-Sep-15		Stanley Geyer
11	1033	Laptop	17" Saris X-10 Laptop	24-Sep-15	26-Sep-15	George D'Agosta
12	1034	Laptop	17" Saris X-10 Laptop	25-Aug-15	27-Aug-15	Jay Peralta
20	6100	Projector	Omega VisX 1.0	28-Sep-15	01-Oct-15	Win Armitage
21	6101	Projector	Omega VisX 1.0	26-Sep-15	27-Sep-15	Michael Earley
22	6102	Projector	Omega VisX 1.0	22-Aug-15	23-Aug-15	Jamila Kyle
23	6200	Projector	Saris Lux T-80	01-Sep-15	04-Sep-15	Jolie Chaturvedi
24	6301	Projector	Saris Lux T-81 Lite	10-Sep-15		Marques Herndon
25	6302	Projector	Saris Lux T-81 Lite	08-Sep-15	15-Sep-15	Dean Sorenson
31						
32						

Filters are **cumulative**, which means we can apply **multiple filters** to help narrow down our results.

2.9.4 Conditional Formatting : it provides another way to visualize data and make worksheets easier to understand.

It allows us to automatically apply formatting such as **colors**, **icons**, and **data bars** to one or more cells based on the **cell value**. To do this, we need to create a **conditional formatting rule**.

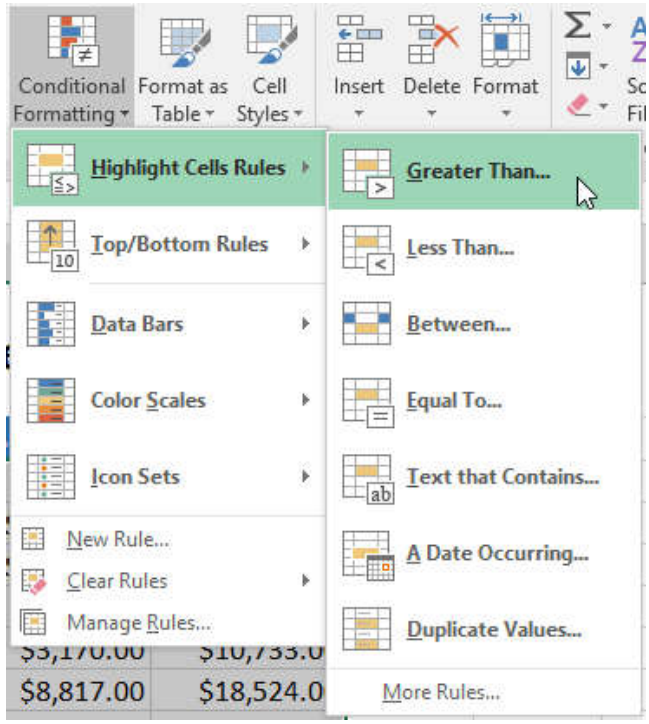
For example, we have a worksheet containing sales data, and we'd like to see which salespeople are meeting their monthly sales goals. The sales goal is $4000 per month, so we'll create a conditional formatting rule for any cells containing a value higher than 4000.

1) Select the **desired cells** for the conditional formatting rule.

	A	B	C	D	E	F	G
1				Westbrook Parker Sales Data			
2	Salesperson	May	June	July	August	September	October
3	Albertson, Kathy	$3,799.00	$557.00	$3,863.00	$1,117.00	$8,237.00	$8,690.00
4	Allenson, Carol	$18,930.00	$1,042.00	$9,355.00	$1,100.00	$10,185.00	$18,749.00
5	Altman, Zoey	$5,725.00	$3,072.00	$6,702.00	$2,116.00	$13,452.00	$8,046.00
6	Bittiman, William	$1,344.00	$3,755.00	$4,415.00	$1,089.00	$4,404.00	$20,114.00
7	Brennan, Michael	$8,296.00	$3,152.00	$11,601.00	$1,122.00	$3,170.00	$10,733.00
8	Carlson, David	$3,945.00	$4,056.00	$3,726.00	$1,135.00	$8,817.00	$18,524.00
9	Collman, Harry	$8,337.00	$4,906.00	$9,007.00	$2,113.00	$13,090.00	$13,953.00
10	Counts, Elizabeth	$3,742.00	$521.00	$4,505.00	$1,024.00	$3,528.00	$15,275.00
11	David, Chloe	$7,605.00	$3,428.00	$3,973.00	$1,716.00	$4,839.00	$13,085.00
12	Davis, William	$5,304.00	$1,562.00	$2,945.00	$1,176.00	$9,642.00	$13,714.00
13	Dumlao, Richard	$9,333.00	$2,779.00	$7,549.00	$1,101.00	$5,850.00	$15,065.00
14	Farmer, Kim	$1,103.00	$3,470.00	$3,862.00	$1,040.00	$10,024.00	$18,389.00
15	Ferguson, Elizabeth	$1,333.00	$1,913.00	$4,596.00	$1,126.00	$5,503.00	$10,686.00
16	Flores, Tia	$12,398.00	$2,883.00	$2,142.00	$2,014.00	$13,547.00	$21,983.00
17	Ford, Victor	$3,251.00	$4,931.00	$8,283.00	$1,054.00	$9,543.00	$11,967.00
18	Hodges, Melissa	$4,624.00	$4,798.00	$8,420.00	$1,389.00	$10,468.00	$12,677.00
19	Jameson, Robinson	$2,552.00	$4,459.00	$2,248.00	$1,058.00	$6,267.00	$14,982.00
20	Kellerman, Frances	$4,281.00	$4,172.00	$11,074.00	$1,282.00	$2,365.00	$9,380.00

2) From the **Home** tab, click the **Conditional Formatting** command. A drop-down menu will appear.

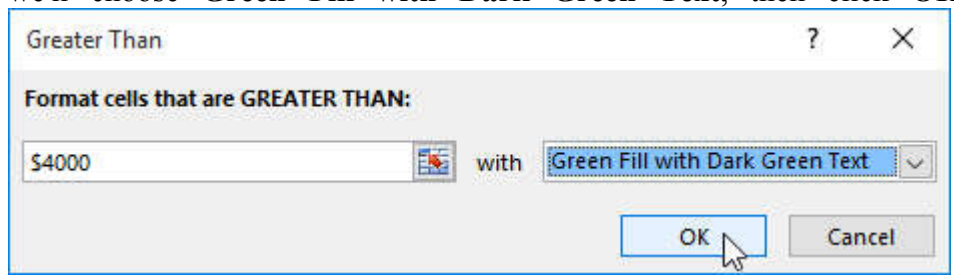
3) Hover the mouse over the desired **conditional formatting type**, then select the **desired rule** from the menu that appears. In our example, we want to **highlight cells** that are **greater than** $4000.



4) A dialog box will appear. Enter the **desired value(s)** into the blank field.

In our example, we'll enter 4000 as our value.

5) Select a **formatting style** from the drop-down menu. In our example, we'll choose **Green Fill with Dark Green Text**, then click **OK**.



6) The conditional formatting will be applied to the selected cells. In our example, it's easy to see which salespeople reached the $4000 sales goal for each month.

	A	B	C	D	E	F	G
1				Westbrook Parker Sales Data			
2	Salesperson	May	June	July	August	September	October
3	Albertson, Kathy	$3,799.00	$557.00	$3,863.00	$1,117.00	$8,237.00	$8,690.00
4	Allenson, Carol	$18,930.00	$1,042.00	$9,355.00	$1,100.00	$10,185.00	$18,749.00
5	Altman, Zoey	$5,725.00	$3,072.00	$6,702.00	$2,116.00	$13,452.00	$8,046.00
6	Bittiman, William	$1,344.00	$3,755.00	$4,415.00	$1,089.00	$4,404.00	$20,114.00
7	Brennan, Michael	$8,296.00	$3,152.00	$11,601.00	$1,122.00	$3,170.00	$10,733.00
8	Carlson, David	$3,945.00	$4,056.00	$3,726.00	$1,135.00	$8,817.00	$18,524.00
9	Collman, Harry	$8,337.00	$4,906.00	$9,007.00	$2,113.00	$13,090.00	$13,953.00
10	Counts, Elizabeth	$3,742.00	$521.00	$4,505.00	$1,024.00	$3,528.00	$15,275.00
11	David, Chloe	$7,605.00	$3,428.00	$3,973.00	$1,716.00	$4,839.00	$13,085.00
12	Davis, William	$5,304.00	$1,562.00	$2,945.00	$1,176.00	$9,642.00	$13,714.00
13	Dumlao, Richard	$9,333.00	$2,779.00	$7,549.00	$1,101.00	$5,850.00	$15,065.00
14	Farmer, Kim	$1,103.00	$3,470.00	$3,862.00	$1,040.00	$10,024.00	$18,389.00
15	Ferguson, Elizabeth	$1,333.00	$1,913.00	$4,596.00	$1,126.00	$5,503.00	$10,686.00
16	Flores, Tia	$12,398.00	$2,883.00	$2,142.00	$2,014.00	$13,547.00	$21,983.00
17	Ford, Victor	$3,251.00	$4,931.00	$8,283.00	$1,054.00	$9,543.00	$11,967.00
18	Hodges, Melissa	$4,624.00	$4,798.00	$8,420.00	$1,389.00	$10,468.00	$12,677.00
19	Jameson, Robinson	$2,552.00	$4,459.00	$2,248.00	$1,058.00	$6,267.00	$14,982.00
20	Kellerman, Frances	$4,281.00	$4,172.00	$11,074.00	$1,282.00	$2,365.00	$9,380.00

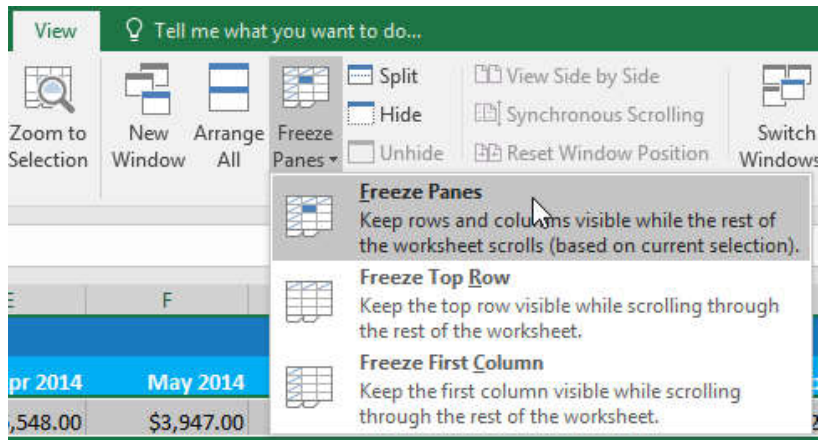
2.9.5 Freeze Pane : Excel includes several tools that make it easier to view content from different parts of our workbook at the same time, including the ability to freeze panes and split our worksheet.

We want to see certain rows or columns all the time in our worksheet, especially header cells. By freezing rows or columns in place, we'll be able to scroll through our content while continuing to view the frozen cells.

1) Select the row below the row(s) we want to freeze. In our example, we want to freeze rows 1 and 2, so we'll select row 3.

	A	B	C	D	E	F
1	2014-2015 Sales Data					
2	Salesperson	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014
3	Albertson, Kathy	$3,799.00	$4,162.00	$10,491.00	$6,548.00	$3,947.00
4	Allenson, Carol	$18,930.00	$3,993.00	$9,133.00	$19,845.00	$4,411.00
5	Altman, Zoey	$5,725.00	$4,848.00	$8,741.00	$11,138.00	$2,521.00
6	Bittiman, William	$1,344.00	$3,693.00	$15,346.00	$17,253.00	$4,752.00

2) On the View tab, select the Freeze Panes command, then choose Freeze Panes from the drop-down menu.



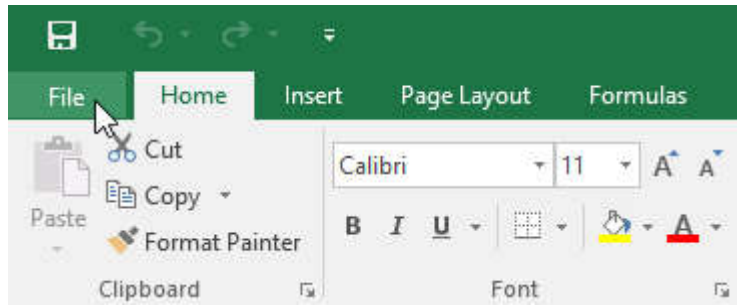
3) The rows will be frozen in place, as indicated by the gray line. We can scroll down the worksheet while continuing to view the frozen rows at the top. In our example, we've scrolled down to row 18.

	A	B	C	D	E	F
1	2014-2015 Sales Data					
2	Salesperson	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014
18	Hodges, Melissa	$4,624.00	$14,772.00	$19,830.00	$6,303.00	$5,667.00
19	Jameson, Robinsor	$2,552.00	$1,627.00	$4,382.00	$9,083.00	$4,269.00
20	Kellerman, France:	$4,281.00	$7,375.00	$17,730.00	$19,998.00	$3,502.00
21	Mark, Katharine	$4,679.00	$3,058.00	$1,497.00	$5,722.00	$5,853.00

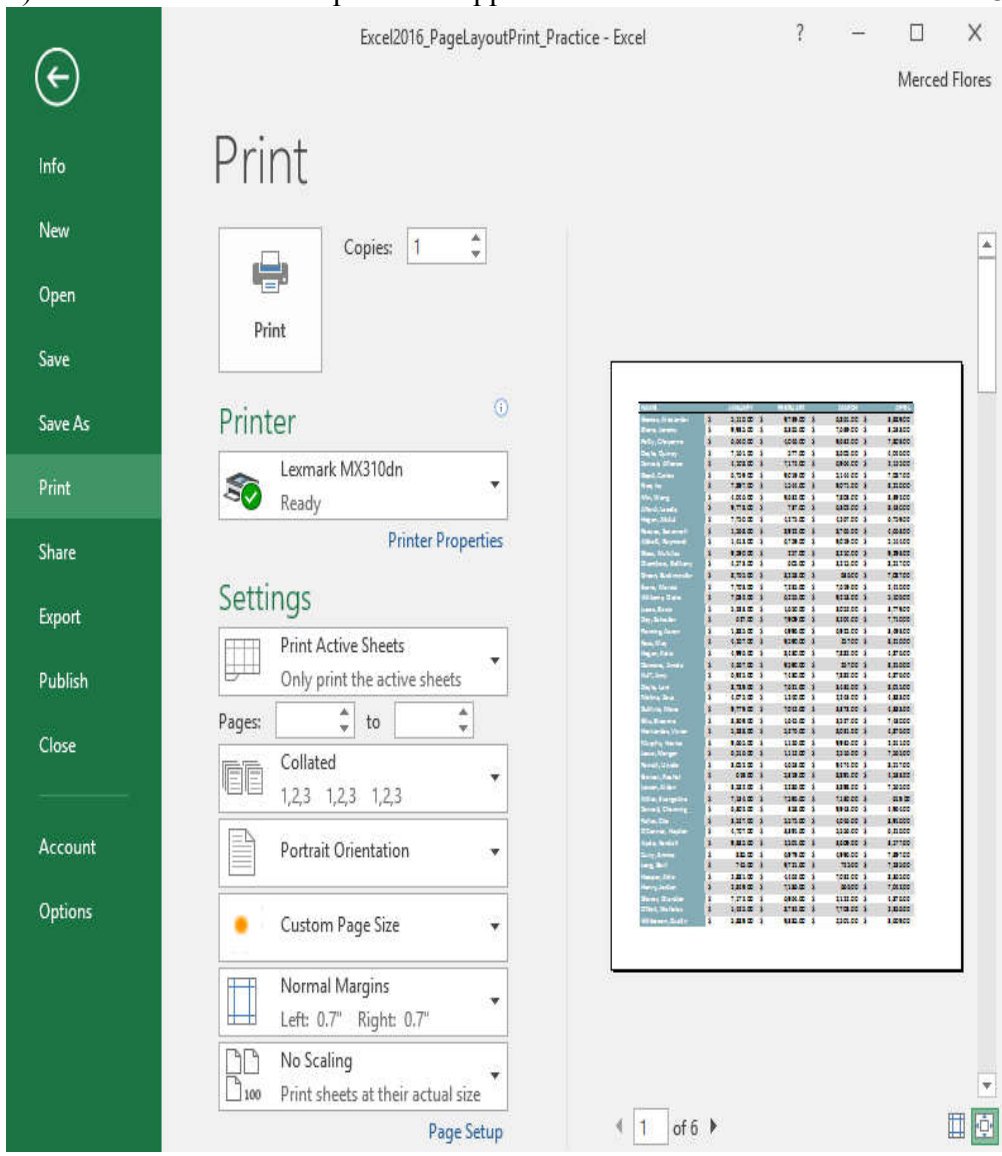
2.10 Printing Review & Set up

When we want to print a workbook to view and share our data offline, we will choose our page layout settings. To access the Print pane:

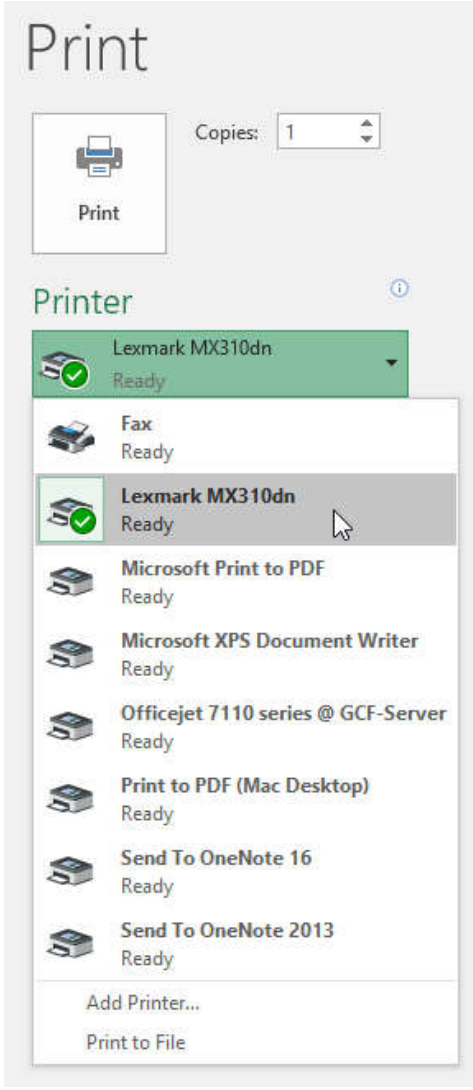
1) Select the File tab. Backstage view will appear.



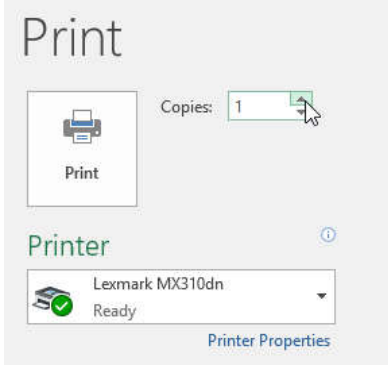
2) Select Print. The Print pane will appear.



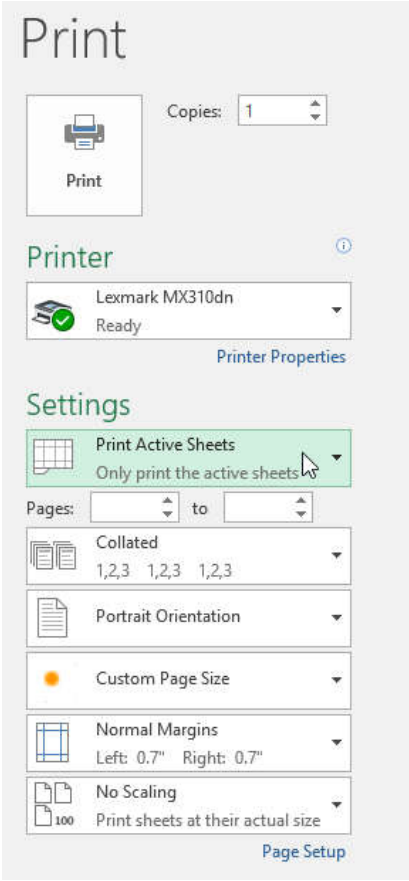
3) Navigate to the Print pane, then select the desired printer.



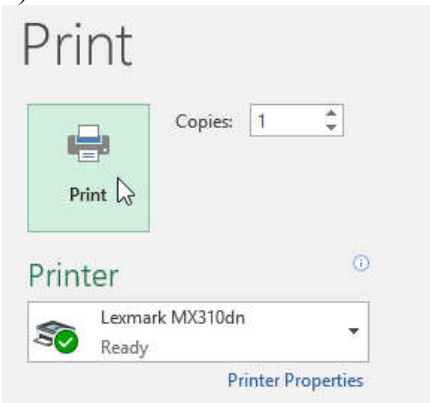
4) Enter the number of copies we want to print.



5) Select any additional settings if needed.



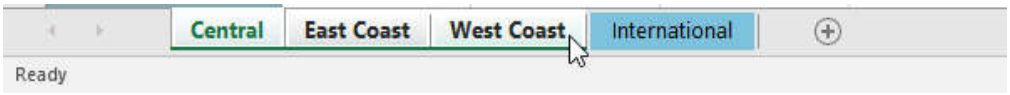
6) Click Print.



Choosing a print area : Before we print an Excel workbook, it's important to decide exactly what information we want to print.

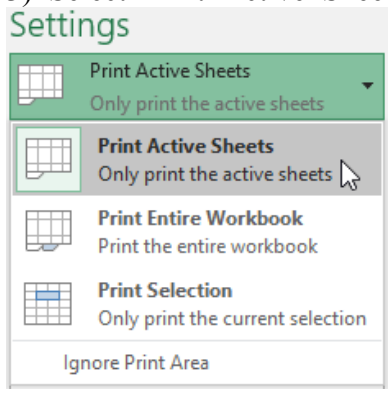
A) To print active sheets : Worksheets are considered active when selected.

1) Select the worksheet we want to print. To print multiple worksheets, click the first worksheet, hold the Ctrl key on our keyboard, then click any other worksheets we want to select.

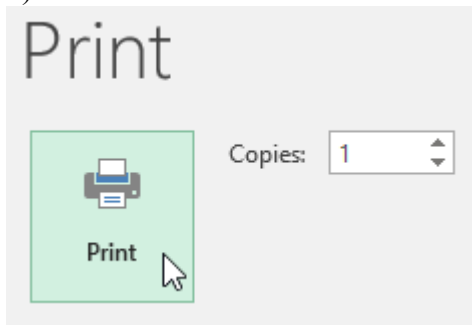


2) Navigate to the Print pane.

3) Select Print Active Sheets from the Print Range drop-down menu.



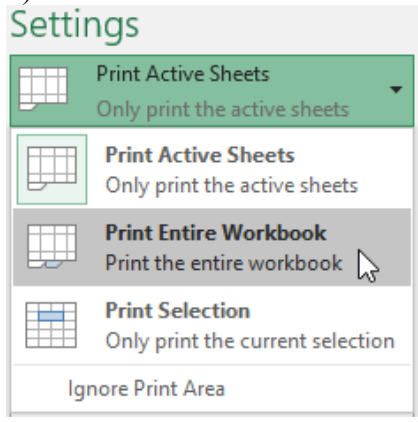
4) Click the Print button.



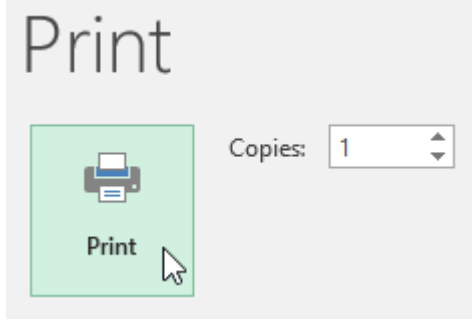
B) To print the entire workbook :

1) Navigate to the Print pane.

2) Select Print Entire Workbook from the Print Range drop-down menu.

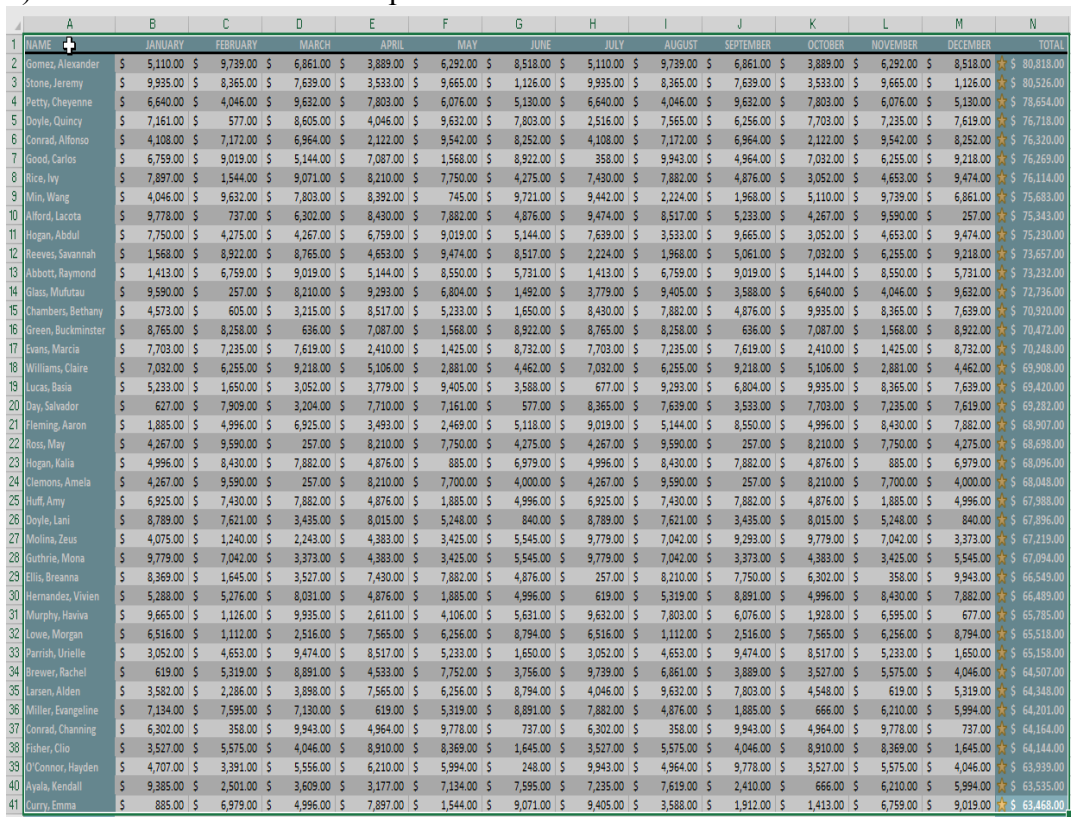


3) Click the Print button.



C) To print a selection : In our example, we'll print the records for the top 40 salespeople on the Central worksheet.

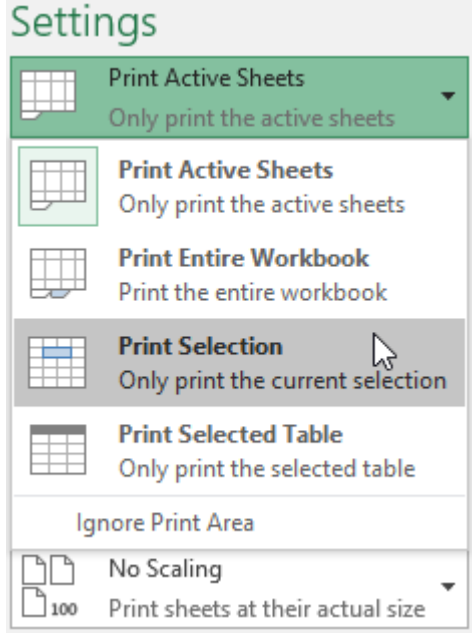
1) Select the cells we want to print.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	NAME	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
2	Gomez, Alexander	$ 5,110.00	$ 9,739.00	$ 6,861.00	$ 3,889.00	$ 6,292.00	$ 8,518.00	$ 5,110.00	$ 9,739.00	$ 6,861.00	$ 3,889.00	$ 6,292.00	$ 8,518.00	$ 80,818.00
3	Stone, Jeremy	$ 9,935.00	$ 8,365.00	$ 7,639.00	$ 3,533.00	$ 9,665.00	$ 1,126.00	$ 9,935.00	$ 8,365.00	$ 7,639.00	$ 3,533.00	$ 9,665.00	$ 1,126.00	$ 80,526.00
4	Petty, Cheyenne	$ 6,640.00	$ 4,046.00	$ 9,632.00	$ 7,803.00	$ 6,076.00	$ 5,130.00	$ 6,640.00	$ 4,046.00	$ 9,632.00	$ 7,803.00	$ 6,076.00	$ 5,130.00	$ 78,654.00
5	Doyle, Quincy	$ 7,161.00	$ 577.00	$ 8,605.00	$ 4,046.00	$ 9,632.00	$ 7,803.00	$ 2,516.00	$ 7,565.00	$ 6,256.00	$ 7,703.00	$ 7,235.00	$ 7,619.00	$ 76,718.00
6	Conrad, Alfonso	$ 4,108.00	$ 7,172.00	$ 6,964.00	$ 2,122.00	$ 9,542.00	$ 8,252.00	$ 4,108.00	$ 7,172.00	$ 6,964.00	$ 2,122.00	$ 9,542.00	$ 8,252.00	$ 76,320.00
7	Good, Carlos	$ 6,759.00	$ 9,019.00	$ 5,144.00	$ 7,087.00	$ 1,568.00	$ 8,922.00	$ 358.00	$ 9,943.00	$ 4,964.00	$ 7,032.00	$ 6,255.00	$ 9,218.00	$ 76,269.00
8	Rice, Ivy	$ 7,897.00	$ 1,544.00	$ 9,071.00	$ 8,210.00	$ 7,750.00	$ 4,275.00	$ 7,430.00	$ 7,882.00	$ 4,876.00	$ 3,052.00	$ 4,653.00	$ 9,474.00	$ 76,114.00
9	Min, Wang	$ 4,046.00	$ 9,632.00	$ 7,803.00	$ 8,392.00	$ 745.00	$ 9,721.00	$ 9,442.00	$ 2,224.00	$ 1,968.00	$ 5,110.00	$ 9,739.00	$ 6,861.00	$ 75,683.00
10	Alford, Lacota	$ 9,778.00	$ 737.00	$ 6,302.00	$ 8,430.00	$ 7,882.00	$ 4,876.00	$ 9,474.00	$ 8,517.00	$ 5,233.00	$ 4,267.00	$ 9,590.00	$ 257.00	$ 75,343.00
11	Hogan, Abdul	$ 7,750.00	$ 4,275.00	$ 4,267.00	$ 6,759.00	$ 9,019.00	$ 5,144.00	$ 7,639.00	$ 3,533.00	$ 9,665.00	$ 3,052.00	$ 4,653.00	$ 9,474.00	$ 75,230.00
12	Reeves, Savannah	$ 1,568.00	$ 8,922.00	$ 8,765.00	$ 4,653.00	$ 9,474.00	$ 8,517.00	$ 2,224.00	$ 1,968.00	$ 5,061.00	$ 7,032.00	$ 6,255.00	$ 9,218.00	$ 73,657.00
13	Abbott, Raymond	$ 1,413.00	$ 6,759.00	$ 9,019.00	$ 5,144.00	$ 8,550.00	$ 5,731.00	$ 1,413.00	$ 6,759.00	$ 9,019.00	$ 5,144.00	$ 8,550.00	$ 5,731.00	$ 73,232.00
14	Glass, Mufutau	$ 9,590.00	$ 257.00	$ 8,210.00	$ 9,293.00	$ 6,804.00	$ 1,492.00	$ 3,779.00	$ 9,405.00	$ 3,588.00	$ 6,640.00	$ 4,046.00	$ 9,632.00	$ 72,736.00
15	Chambers, Bethany	$ 4,573.00	$ 605.00	$ 3,215.00	$ 8,517.00	$ 5,233.00	$ 1,650.00	$ 8,430.00	$ 7,882.00	$ 4,876.00	$ 9,935.00	$ 8,365.00	$ 7,639.00	$ 70,920.00
16	Green, Buckminster	$ 8,765.00	$ 8,258.00	$ 636.00	$ 7,087.00	$ 1,568.00	$ 8,922.00	$ 8,765.00	$ 8,258.00	$ 636.00	$ 7,087.00	$ 1,568.00	$ 8,922.00	$ 70,472.00
17	Evans, Marcia	$ 7,703.00	$ 7,235.00	$ 7,619.00	$ 2,410.00	$ 1,425.00	$ 8,732.00	$ 7,703.00	$ 7,235.00	$ 7,619.00	$ 2,410.00	$ 1,425.00	$ 8,732.00	$ 70,248.00
18	Williams, Claire	$ 7,032.00	$ 6,255.00	$ 9,218.00	$ 5,106.00	$ 2,881.00	$ 4,462.00	$ 7,032.00	$ 6,255.00	$ 9,218.00	$ 5,106.00	$ 2,881.00	$ 4,462.00	$ 69,908.00
19	Lucas, Basia	$ 5,233.00	$ 1,650.00	$ 3,052.00	$ 3,779.00	$ 9,405.00	$ 3,588.00	$ 677.00	$ 9,293.00	$ 6,804.00	$ 9,935.00	$ 8,365.00	$ 7,639.00	$ 69,420.00
20	Day, Salvador	$ 627.00	$ 7,909.00	$ 3,204.00	$ 7,710.00	$ 7,161.00	$ 577.00	$ 8,365.00	$ 7,639.00	$ 3,533.00	$ 7,703.00	$ 7,235.00	$ 7,619.00	$ 69,282.00
21	Fleming, Aaron	$ 1,885.00	$ 4,996.00	$ 6,925.00	$ 3,493.00	$ 2,469.00	$ 5,118.00	$ 9,019.00	$ 5,144.00	$ 8,550.00	$ 4,996.00	$ 8,430.00	$ 7,882.00	$ 68,907.00
22	Ross, May	$ 4,267.00	$ 9,590.00	$ 257.00	$ 8,210.00	$ 7,750.00	$ 4,275.00	$ 4,267.00	$ 9,590.00	$ 257.00	$ 8,210.00	$ 7,750.00	$ 4,275.00	$ 68,698.00
23	Hogan, Kalia	$ 4,996.00	$ 8,430.00	$ 7,882.00	$ 4,876.00	$ 885.00	$ 6,979.00	$ 4,996.00	$ 8,430.00	$ 7,882.00	$ 4,876.00	$ 885.00	$ 6,979.00	$ 68,096.00
24	Clemons, Amela	$ 4,267.00	$ 9,590.00	$ 257.00	$ 8,210.00	$ 7,700.00	$ 4,000.00	$ 4,267.00	$ 9,590.00	$ 257.00	$ 8,210.00	$ 7,700.00	$ 4,000.00	$ 68,048.00
25	Huff, Amy	$ 6,925.00	$ 7,430.00	$ 7,882.00	$ 4,876.00	$ 1,885.00	$ 4,996.00	$ 6,925.00	$ 7,430.00	$ 7,882.00	$ 4,876.00	$ 1,885.00	$ 4,996.00	$ 67,988.00
26	Doyle, Lani	$ 8,789.00	$ 7,621.00	$ 3,435.00	$ 8,015.00	$ 5,248.00	$ 840.00	$ 8,789.00	$ 7,621.00	$ 3,435.00	$ 8,015.00	$ 5,248.00	$ 840.00	$ 67,896.00
27	Molina, Zeus	$ 4,075.00	$ 1,240.00	$ 2,243.00	$ 4,383.00	$ 3,425.00	$ 5,545.00	$ 9,779.00	$ 7,042.00	$ 9,293.00	$ 9,779.00	$ 7,042.00	$ 3,373.00	$ 67,219.00
28	Guthrie, Mona	$ 9,779.00	$ 7,042.00	$ 3,373.00	$ 4,383.00	$ 3,425.00	$ 5,545.00	$ 9,779.00	$ 7,042.00	$ 3,373.00	$ 4,383.00	$ 3,425.00	$ 5,545.00	$ 67,094.00
29	Ellis, Breanna	$ 8,369.00	$ 1,645.00	$ 3,527.00	$ 7,430.00	$ 7,882.00	$ 4,876.00	$ 257.00	$ 8,210.00	$ 7,750.00	$ 6,302.00	$ 358.00	$ 9,943.00	$ 66,549.00
30	Hernandez, Vivien	$ 5,288.00	$ 5,276.00	$ 8,031.00	$ 4,876.00	$ 1,885.00	$ 4,996.00	$ 619.00	$ 5,319.00	$ 8,891.00	$ 4,996.00	$ 8,430.00	$ 7,882.00	$ 66,489.00
31	Murphy, Haviva	$ 9,665.00	$ 1,126.00	$ 9,935.00	$ 2,611.00	$ 4,106.00	$ 5,631.00	$ 9,632.00	$ 7,803.00	$ 6,076.00	$ 1,928.00	$ 6,595.00	$ 677.00	$ 65,785.00
32	Lowe, Morgan	$ 6,516.00	$ 1,112.00	$ 2,516.00	$ 7,565.00	$ 6,256.00	$ 8,794.00	$ 6,516.00	$ 1,112.00	$ 2,516.00	$ 7,565.00	$ 6,256.00	$ 8,794.00	$ 65,518.00
33	Parrish, Urielle	$ 3,052.00	$ 4,653.00	$ 9,474.00	$ 8,517.00	$ 5,233.00	$ 1,650.00	$ 3,052.00	$ 4,653.00	$ 9,474.00	$ 8,517.00	$ 5,233.00	$ 1,650.00	$ 65,158.00
34	Brewer, Rachel	$ 619.00	$ 5,319.00	$ 8,891.00	$ 4,533.00	$ 7,752.00	$ 3,756.00	$ 9,739.00	$ 6,861.00	$ 3,889.00	$ 3,527.00	$ 5,575.00	$ 4,046.00	$ 64,507.00
35	Larsen, Alden	$ 3,582.00	$ 2,286.00	$ 3,898.00	$ 7,565.00	$ 6,256.00	$ 8,794.00	$ 4,046.00	$ 9,632.00	$ 7,803.00	$ 4,548.00	$ 619.00	$ 5,319.00	$ 64,348.00
36	Miller, Evangeline	$ 7,134.00	$ 7,595.00	$ 7,130.00	$ 619.00	$ 5,319.00	$ 8,891.00	$ 7,882.00	$ 4,876.00	$ 1,885.00	$ 666.00	$ 6,210.00	$ 5,994.00	$ 64,201.00
37	Conrad, Channing	$ 6,302.00	$ 358.00	$ 9,943.00	$ 4,964.00	$ 9,778.00	$ 737.00	$ 6,302.00	$ 358.00	$ 9,943.00	$ 4,964.00	$ 9,778.00	$ 737.00	$ 64,164.00
38	Fisher, Clio	$ 3,527.00	$ 5,575.00	$ 4,046.00	$ 8,910.00	$ 8,369.00	$ 1,645.00	$ 3,527.00	$ 5,575.00	$ 4,046.00	$ 8,910.00	$ 8,369.00	$ 1,645.00	$ 64,144.00
39	O'Connor, Hayden	$ 4,707.00	$ 3,391.00	$ 5,556.00	$ 6,210.00	$ 5,994.00	$ 248.00	$ 9,943.00	$ 4,964.00	$ 9,778.00	$ 3,527.00	$ 5,575.00	$ 4,046.00	$ 63,939.00
40	Ayala, Kendall	$ 9,385.00	$ 2,501.00	$ 3,609.00	$ 3,177.00	$ 7,134.00	$ 7,595.00	$ 7,235.00	$ 7,619.00	$ 2,410.00	$ 666.00	$ 6,210.00	$ 5,994.00	$ 63,535.00
41	Curry, Emma	$ 885.00	$ 6,979.00	$ 4,996.00	$ 7,897.00	$ 1,544.00	$ 9,071.00	$ 9,405.00	$ 3,588.00	$ 1,912.00	$ 1,413.00	$ 6,759.00	$ 9,019.00	$ 63,468.00

2) Navigate to the Print pane.

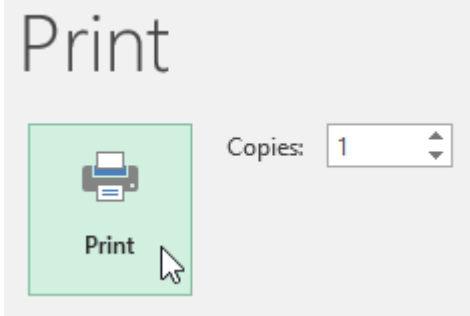
3) Select Print Selection from the Print Range drop-down menu.



4) A preview of your selection will appear in the Preview pane.

NAME	JANUARY	FEBRUARY	MARCH	APRIL
Gomez, Alexander	$ 5,110.00	$ 9,739.00	$ 6,861.00	$ 3,889.00
Stone, Jeremy	$ 9,935.00	$ 8,365.00	$ 7,639.00	$ 3,533.00
Petty, Cheyenne	$ 6,640.00	$ 4,046.00	$ 9,632.00	$ 7,803.00
Doyle, Quincy	$ 7,161.00	$ 577.00	$ 8,605.00	$ 4,046.00
Conrad, Alfonso	$ 4,108.00	$ 7,172.00	$ 6,964.00	$ 2,122.00
Good, Carlos	$ 6,759.00	$ 9,019.00	$ 5,144.00	$ 7,087.00
Rice, Ivy	$ 7,897.00	$ 1,544.00	$ 9,071.00	$ 8,210.00
Min, Wang	$ 4,046.00	$ 9,632.00	$ 7,803.00	$ 8,392.00
Alford, Lacota	$ 9,778.00	$ 737.00	$ 6,302.00	$ 8,430.00
Hogan, Abdul	$ 7,750.00	$ 4,275.00	$ 4,267.00	$ 6,759.00
Reeves, Savannah	$ 1,568.00	$ 8,922.00	$ 8,765.00	$ 4,653.00
Abbott, Raymond	$ 1,413.00	$ 6,759.00	$ 9,019.00	$ 5,144.00
Glass, Mufutau	$ 9,590.00	$ 257.00	$ 8,210.00	$ 9,293.00
Chambers, Bethany	$ 4,573.00	$ 605.00	$ 3,215.00	$ 8,517.00
Green, Buckminster	$ 8,765.00	$ 8,258.00	$ 636.00	$ 7,087.00
Evans, Marcia	$ 7,703.00	$ 7,235.00	$ 7,619.00	$ 2,410.00
Williams, Claire	$ 7,032.00	$ 6,255.00	$ 9,218.00	$ 5,106.00
Lucas, Basia	$ 5,233.00	$ 1,650.00	$ 3,052.00	$ 3,779.00
Day, Salvador	$ 627.00	$ 7,909.00	$ 3,204.00	$ 7,710.00
Fleming, Aaron	$ 1,885.00	$ 4,996.00	$ 6,925.00	$ 3,493.00
Ross, May	$ 4,267.00	$ 9,590.00	$ 257.00	$ 8,210.00
Hogan, Kalia	$ 4,996.00	$ 8,430.00	$ 7,882.00	$ 4,876.00
Clemons, Amela	$ 4,267.00	$ 9,590.00	$ 257.00	$ 8,210.00
Huff, Amy	$ 6,925.00	$ 7,430.00	$ 7,882.00	$ 4,876.00
Doyle, Lani	$ 8,789.00	$ 7,621.00	$ 3,435.00	$ 8,015.00
Molina, Zeus	$ 4,075.00	$ 1,240.00	$ 2,243.00	$ 4,383.00
Guthrie, Mona	$ 9,779.00	$ 7,042.00	$ 3,373.00	$ 4,383.00
Ellis, Breanna	$ 8,369.00	$ 1,645.00	$ 3,527.00	$ 7,430.00
Hernandez, Vivien	$ 5,288.00	$ 5,276.00	$ 8,031.00	$ 4,876.00
Murphy, Haviva	$ 9,665.00	$ 1,126.00	$ 9,935.00	$ 2,611.00
Lowe, Morgan	$ 6,516.00	$ 1,112.00	$ 2,516.00	$ 7,565.00
Parrish, Urielle	$ 3,052.00	$ 4,653.00	$ 9,474.00	$ 8,517.00
Brewer, Rachel	$ 619.00	$ 5,319.00	$ 8,891.00	$ 4,533.00
Larsen, Alden	$ 3,582.00	$ 2,286.00	$ 3,898.00	$ 7,565.00
Miller, Evangeline	$ 7,134.00	$ 7,595.00	$ 7,130.00	$ 619.00
Conrad, Channing	$ 6,302.00	$ 358.00	$ 9,943.00	$ 4,964.00
Fisher, Clio	$ 3,527.00	$ 5,575.00	$ 4,046.00	$ 8,910.00
O'Connor, Hayden	$ 4,707.00	$ 3,391.00	$ 5,556.00	$ 6,210.00
Ayala, Kendall	$ 9,385.00	$ 2,501.00	$ 3,609.00	$ 3,177.00
Curry, Emma	$ 885.00	$ 6,979.00	$ 4,996.00	$ 7,897.00
Long, Bert	$ 745.00	$ 9,721.00	$ 725.00	$ 7,235.00
Hooper, Aiko	$ 2,881.00	$ 4,462.00	$ 7,032.00	$ 8,365.00
Henry, Jordan	$ 2,849.00	$ 7,186.00	$ 666.00	$ 7,042.00
Glover, Chandler	$ 7,172.00	$ 6,964.00	$ 2,122.00	$ 4,876.00
O'Neil, Nicholas	$ 1,425.00	$ 8,732.00	$ 7,703.00	$ 2,356.00
Wilkerson, Dustin	$ 5,889.00	$ 9,385.00	$ 2,501.00	$ 3,609.00

5) Click the Print button to print the selection.



2.3 POWER POINT

PowerPoint, is a software program developed by Microsoft to produce effective presentations. It is a part of Microsoft Office suite.

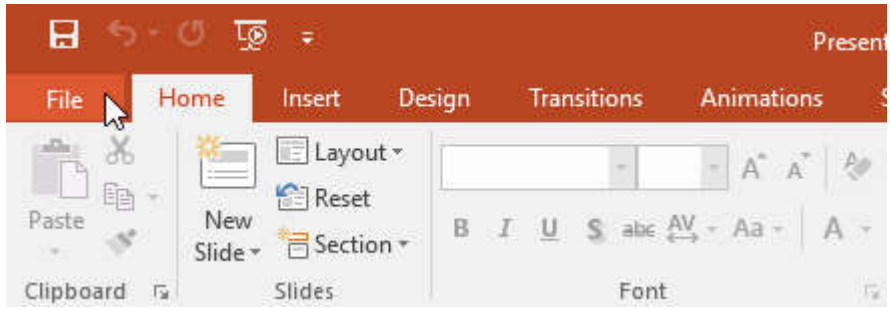
The program comprises slides and various tools like word processing, drawing, graphing and outlining. Thus it can display text, table, chart, graphics and media in the slides.

We can save powerpoint files with the .pptx extension.

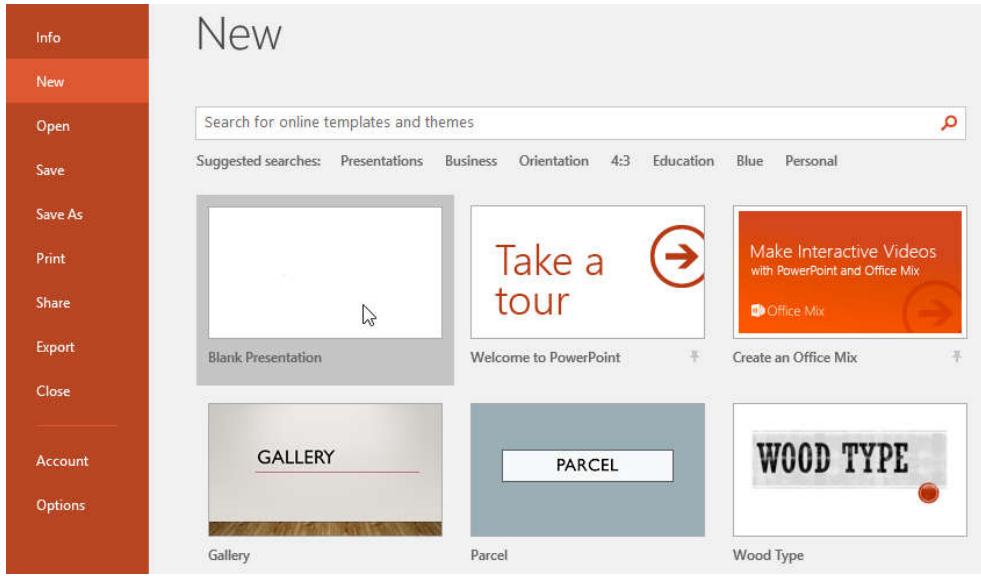
3.1 Creating Presentation

When beginning a new project in PowerPoint, we want to start with a new blank presentation.

1) Select the **File** tab to go to **Backstage view**.



2) Select **New** on the left side of the window, then click **Blank Presentation**.

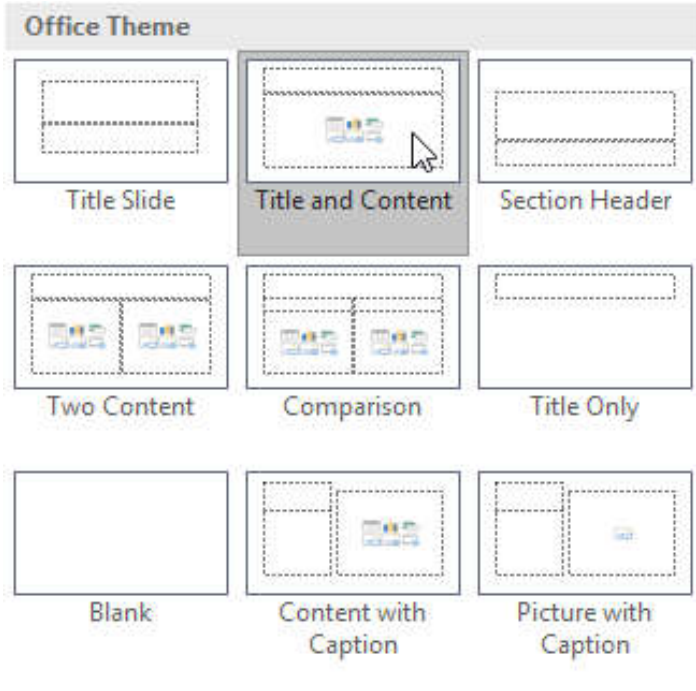


3) A new presentation will appear.

3.2 Creating Slides

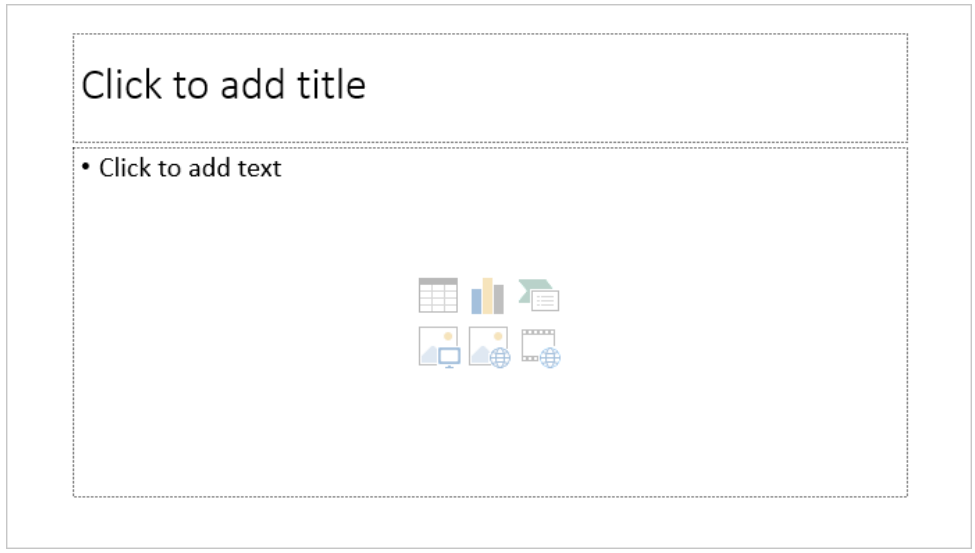
Every PowerPoint presentation is composed of a series of slides.

When you insert a new slide, it will usually have placeholders to show us where content will be placed. Slides have different layouts for placeholders, depending on the type of information we want to include. Whenever we create a new slide, we'll need to choose a slide layout that fits our content.



Placeholders can contain different types of content, including text, images, and videos. Many placeholders have thumbnail icons we can click to add specific types of content.

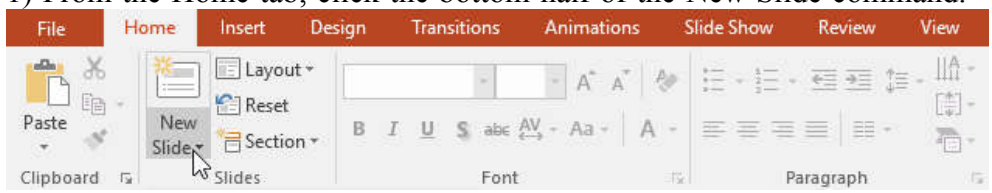
In the example below, the slide has placeholders for the title and content.



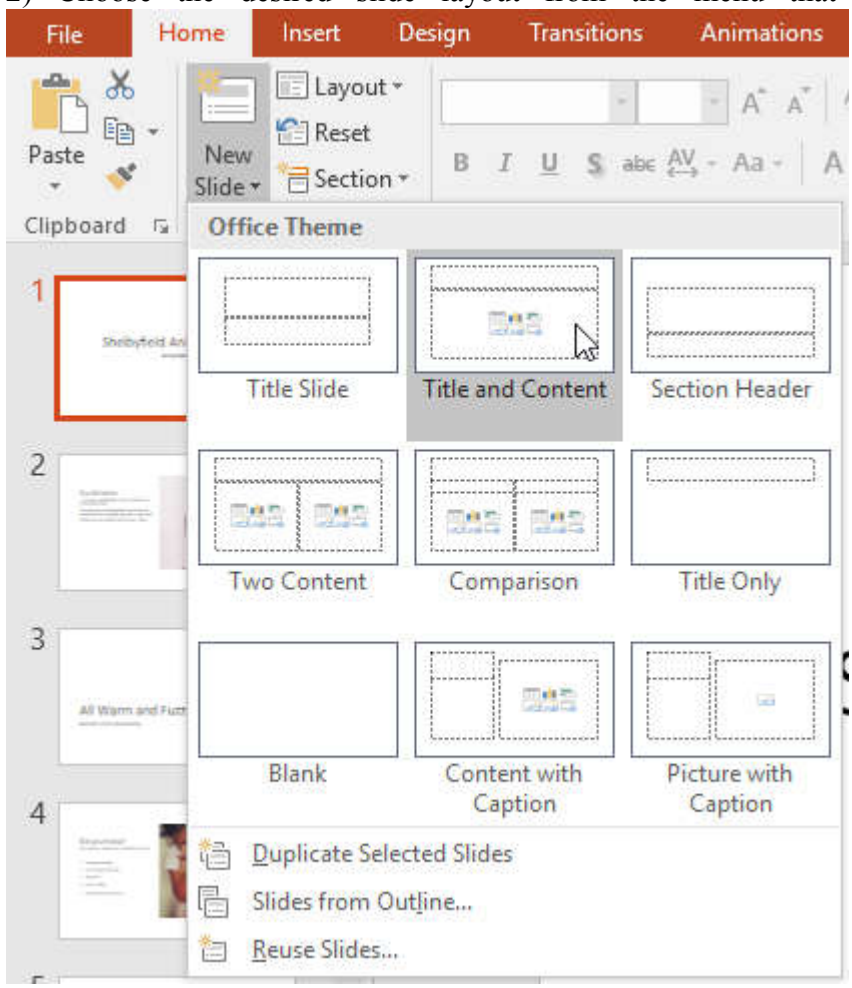
To insert a new slide :

Whenever we start a new presentation, it will contain one slide with the Title Slide layout. We can insert as many slides as we need from a variety of layouts.

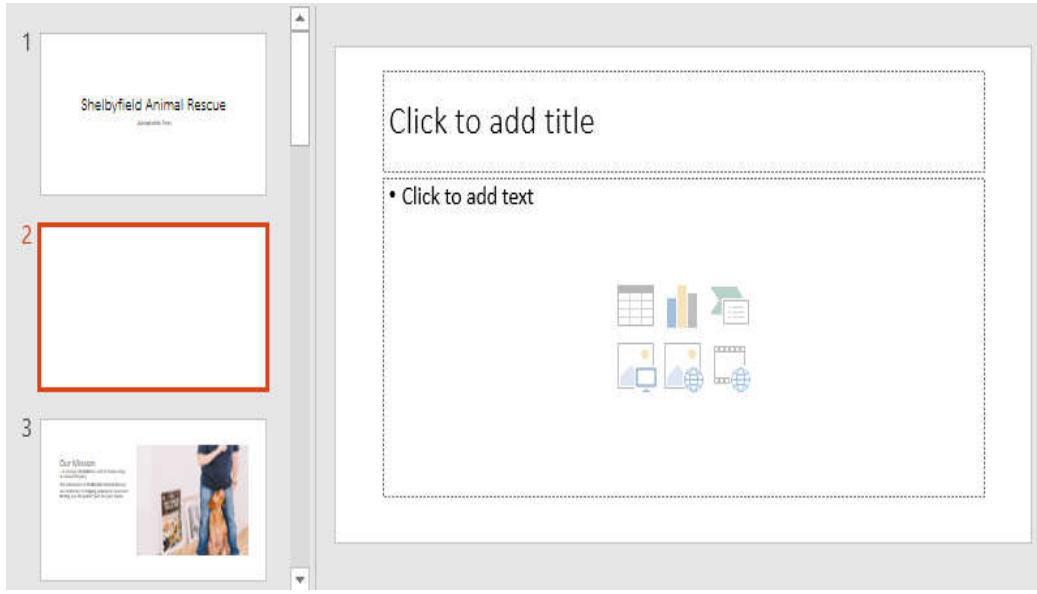
1) From the Home tab, click the bottom half of the New Slide command.



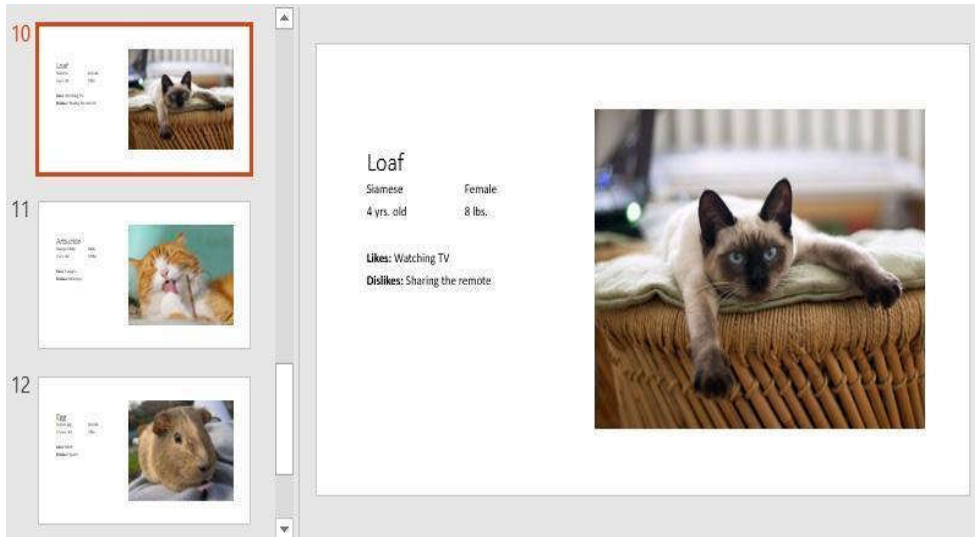
2) Choose the desired slide layout from the menu that appears.



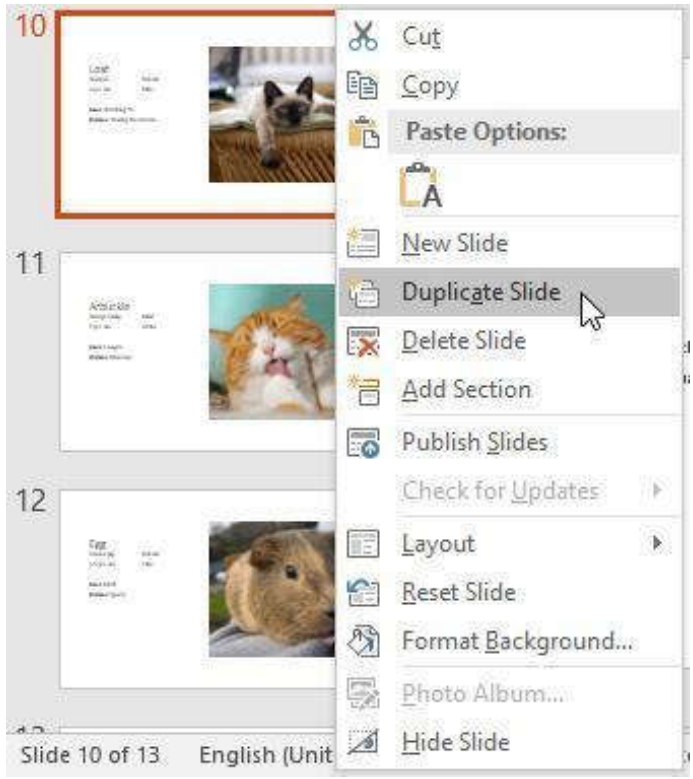
3) The new slide will appear. Click any placeholder and begin typing to add text. We can also click an icon to add other types of content, such as a picture or a chart.



Organizing Slides : The Slide Navigation pane on the left side of the screen makes it easy to organize our slides. From there, we can duplicate, rearrange, and delete slides in our presentation.



Duplicate slides : If we want to copy and paste a slide quickly, we can **duplicate** it. To duplicate slides, select the slide we want to **duplicate**, right-click the mouse, and choose **Duplicate Slide** from the menu that appears. We can also duplicate **multiple slides** at once by selecting them first.



Move slides : It's easy to change the **order** of our slides. Just click and drag the **desired slide** in the Slide Navigation pane to the desired position.

Delete slides : If we want to remove a slide from our presentation, we can **delete** it. Simply select the slide we want to delete, then press the **Delete** or **Backspace** key on our keyboard.

Customizing slide layouts : Sometimes we may find that a slide layout doesn't exactly fit our needs. PowerPoint makes it easy to adjust slide layouts as needed.

Adjusting placeholders : Hover the mouse over the edge of the placeholder and click (you may need to click the text in the placeholder first to see the border). A selected placeholder will have a solid line instead of a dotted line.

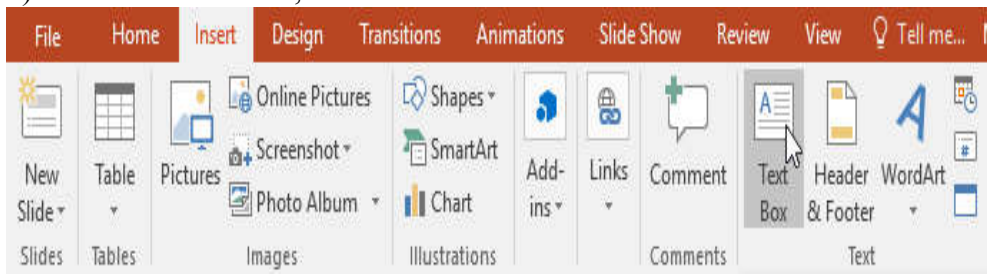
To move a placeholder : Select the placeholder, then click and drag it to the desired location.

To resize a placeholder : Select the placeholder we want to resize. **Sizing handles** will appear. Click and drag the **sizing handles** until the placeholder is the desired size. We can use the corner sizing handles to change the placeholder's **height** and **width** at the same time.

To delete a placeholder : Select the placeholder we want to delete, then press the **Delete** or **Backspace** key on our keyboard.

To add a text box : Text can be inserted into both placeholders and text boxes. Inserting text boxes allows us to add to the slide layout. Unlike placeholders, text boxes always stay in the same place, even if you change the theme.

1) From the **Insert** tab, select the **Text Box** command.

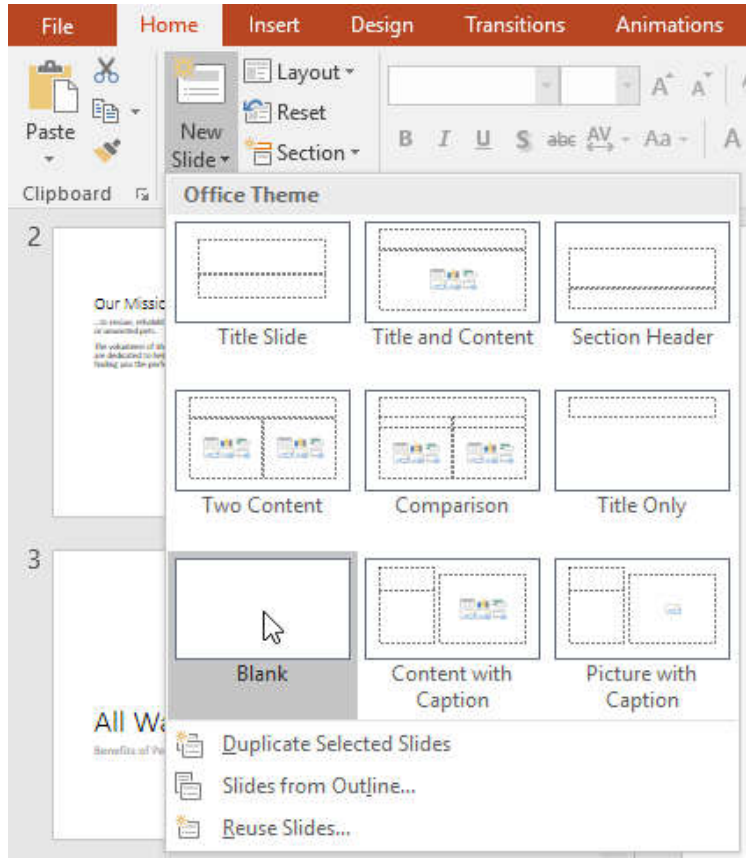


2) Click and drag to draw the text box on the slide.

3) The text box will appear. To add text, simply click the text box and begin typing.

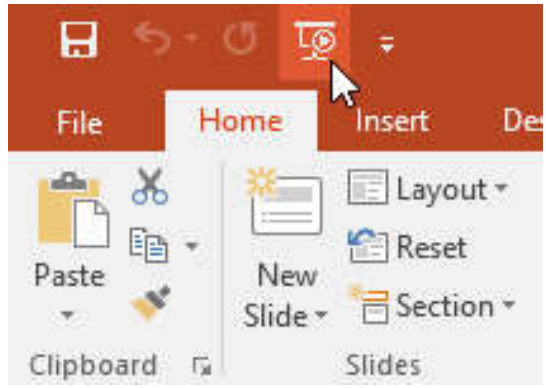
Using blank slides : If we want even more control over our content, we may prefer to use a blank slide, which contains no placeholders. Blank slides can be customized by adding our own text boxes, pictures, charts, and more.

1) To insert a blank slide, click the bottom half of the **New Slide** command, then choose **Blank** from the menu that appears.



To play the presentation : Once we have arranged our slides, we may want to play our presentation.

1) Click the **Start From Beginning** command on the Quick Access Toolbar to see our presentation.



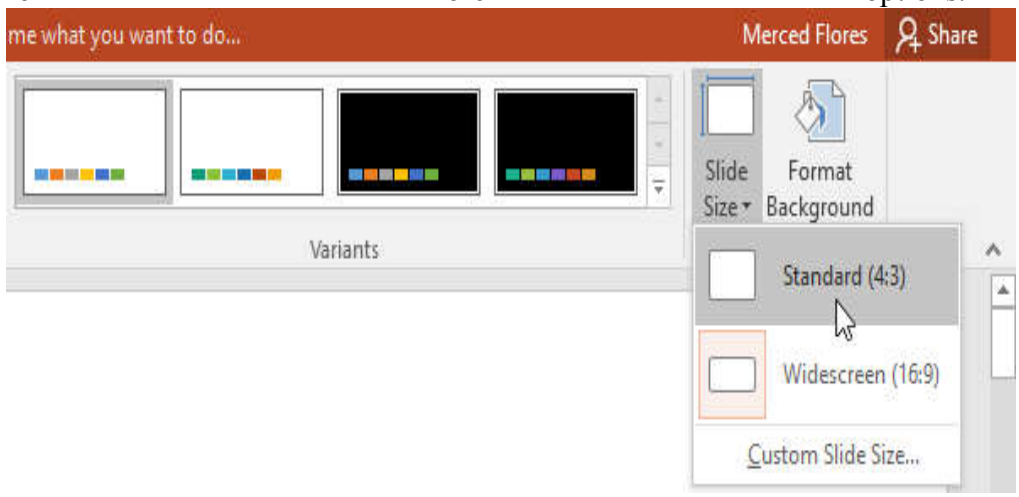
2) The presentation will appear in full-screen mode.

3) We can advance to the next slide by **clicking your mouse** or pressing the **spacebar** on our keyboard. Alternatively, we can use the **arrow keys** on our keyboard to move forward or backward through the presentation.

4) Press the **Esc** key to exit presentation mode.

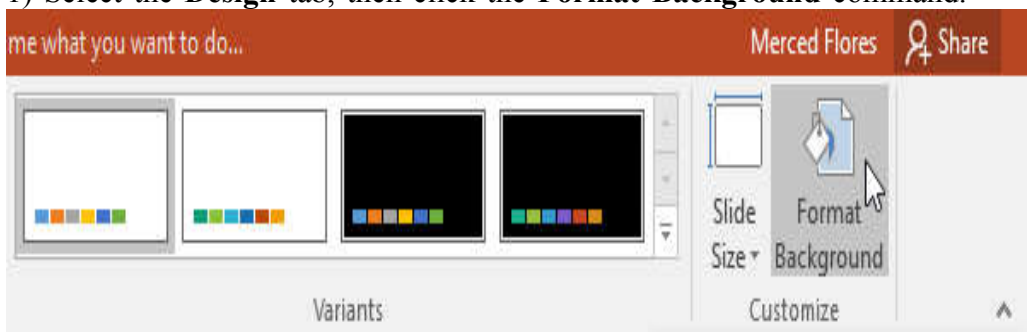
To change the slide size : By default, all slides in PowerPoint 2013 use a 16-by-9 or widescreen aspect ratio. Widescreen slides will work best with widescreen monitors and projectors.

1) Select the Design tab, then click the Slide Size command. Choose the desired slide size from the menu that appears, or click Custom Slide Size for more options.



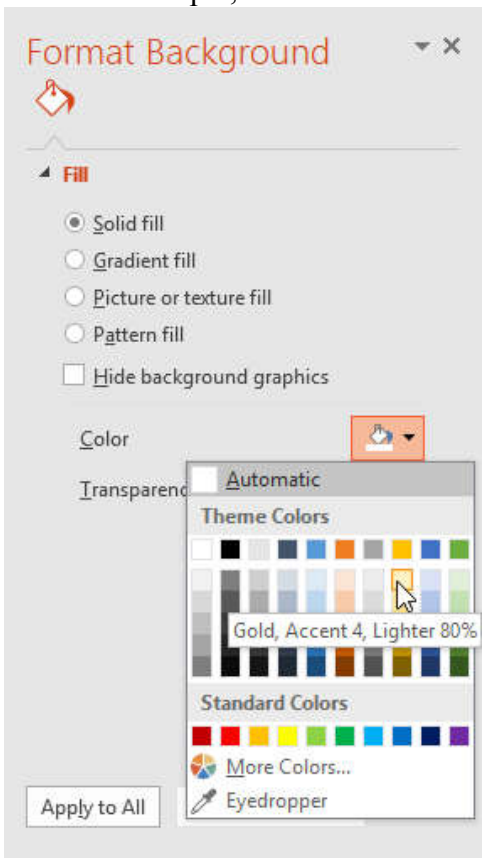
To format the slide background : By default, all slides in our presentation use a white background. Backgrounds can have a solid, gradient, pattern, or picture fill.

1) Select the **Design** tab, then click the **Format Background** command.



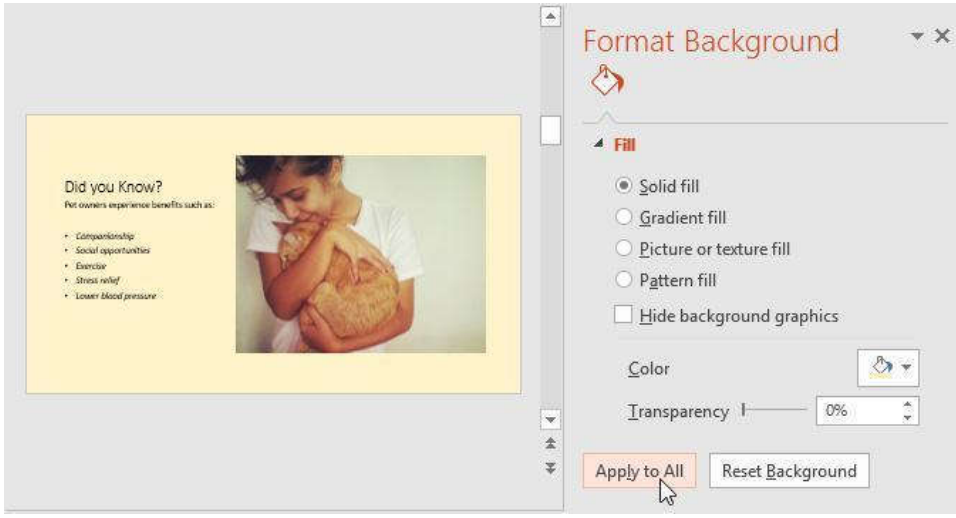
2) The **Format Background** pane will appear on the right. Select the desired fill options.

In our example, we'll use a **Solid fill** with a **light gold** color.



3) The background style of the selected slide will update.

4) If we want, we can click **Apply to All** to apply the same background style to all slides in our presentation.



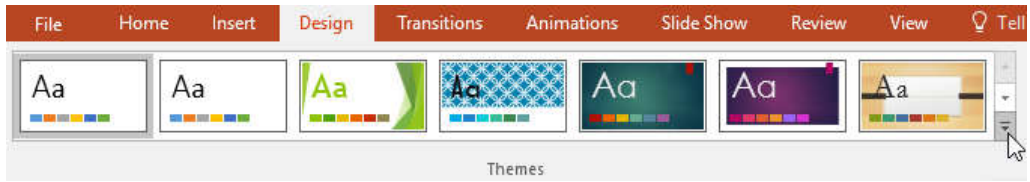
3.3 Themes

Themes give us a quick and easy way to change the design of our presentation. They control our primary color palette, basic fonts, slide layout, and other important elements. All of the elements of a theme will

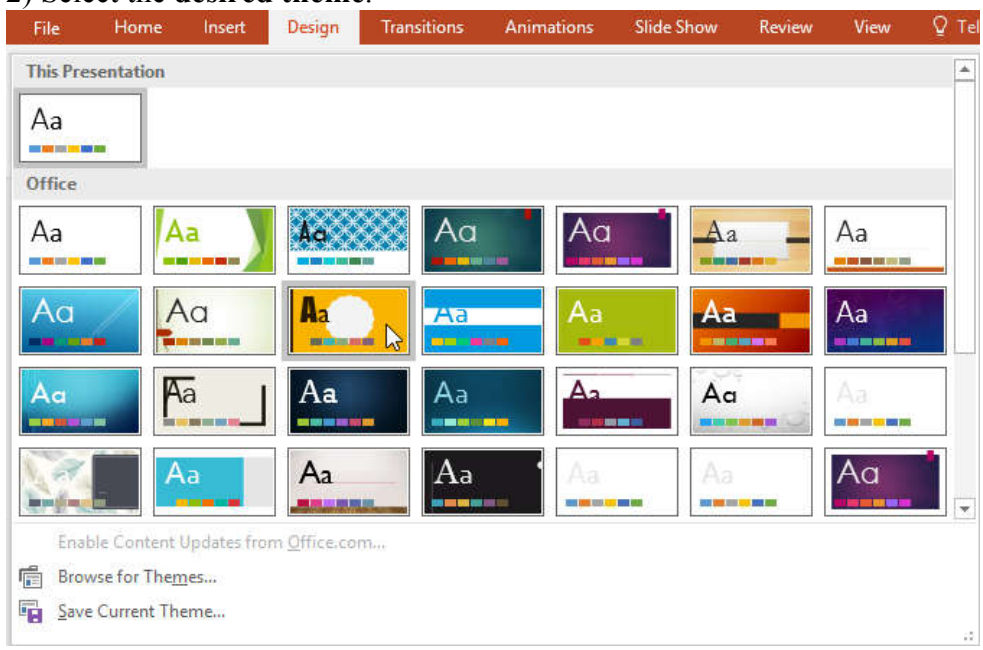
work well together, which means we won't have to spend as much time formatting our presentation.

Each theme uses its own set of slide layouts. These layouts control the way our content is arranged, so the effect can be dramatic. Different themes also use different slide layouts, which can change the arrangement of our existing placeholders.

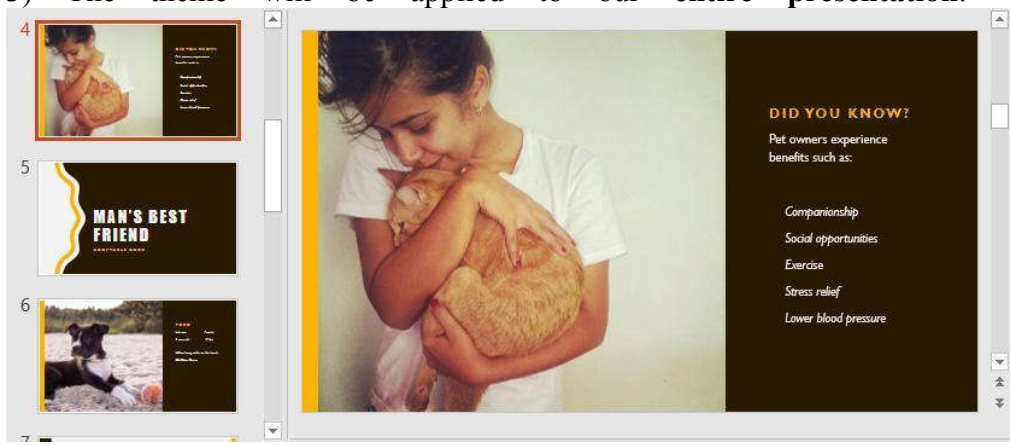
1) Select the Design tab on the Ribbon, then click the More drop-down arrow to see all of the available themes.



2) Select the **desired theme**.



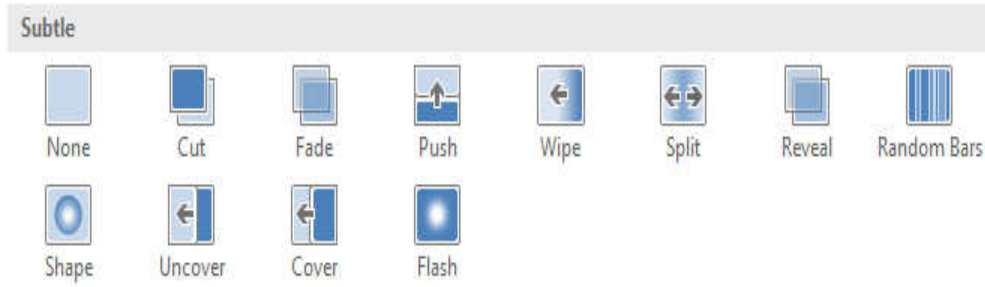
3) The theme will be applied to our **entire presentation**.



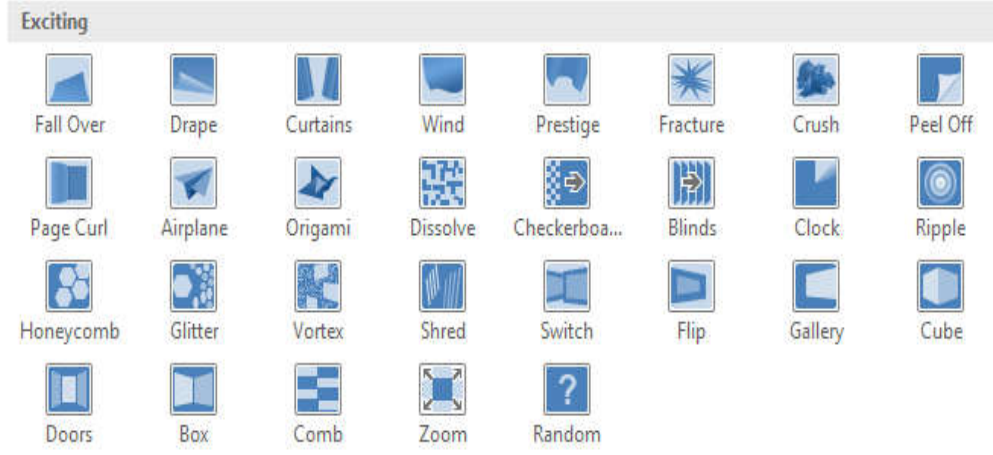
To apply Transitions : A transition can be as simple as fading to the next slide or as flashy as an eye-catching effect. PowerPoint makes it easy to apply transitions to some or all of our slides, giving our presentation a polished, professional look.

There are three categories of unique transitions to choose from, all of which can be found on the Transitions tab.

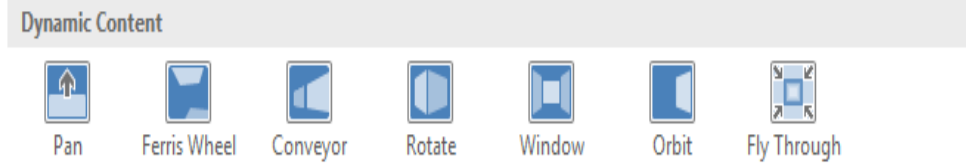
1) Subtle : These are the most basic types of transitions. They use simple animations to move between slides.



2) Exciting : These use more complex animations to transition between slides. They are more visually interesting than Subtle transitions.



3) Dynamic Content : If we're transitioning between two slides that use similar slide layouts, dynamic transitions will move only the placeholders, not the slides themselves. When used correctly, dynamic transitions can help unify our slides and add a further level of polish to our presentation.

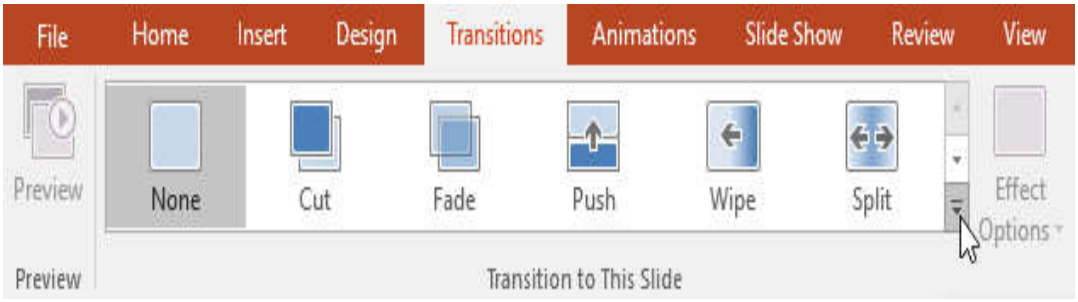


To apply a transition :

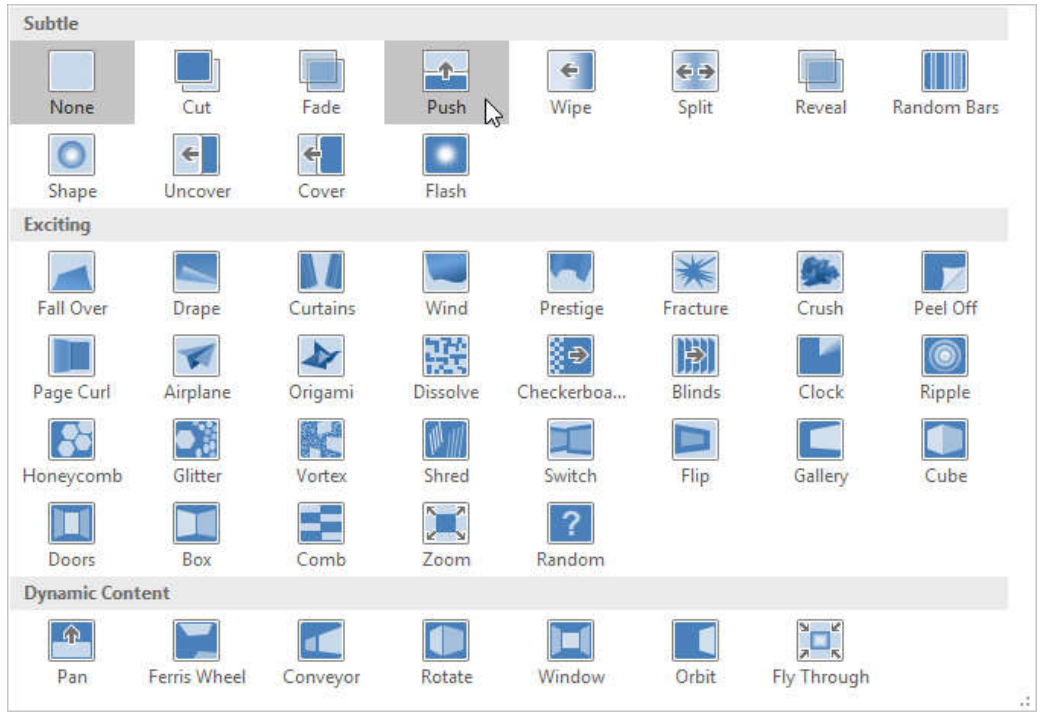
1) Select the desired slide from the Slide Navigation pane. This is the slide that will appear after the transition.

2) Click the Transitions tab, then locate the Transition to This Slide group. By default, None is applied to each slide.

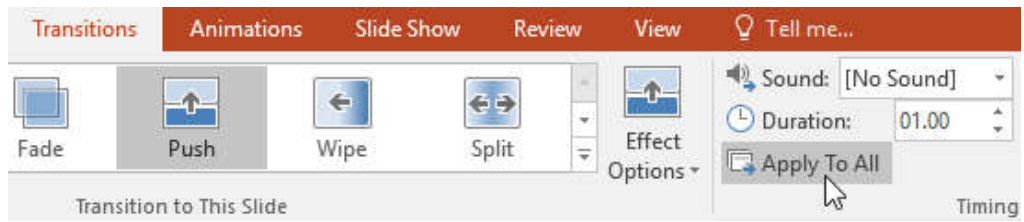
3) Click the More drop-down arrow to display all transitions.



3) Click a transition to apply it to the selected slide. This will automatically preview the transition.

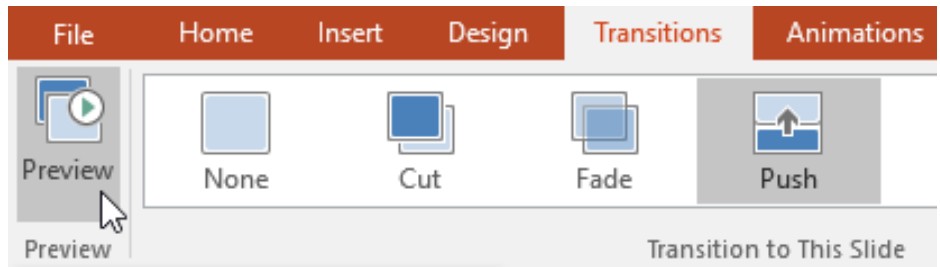


5) We can use the Apply To All command in the Timing group to apply the same transition to all slides in our presentation.

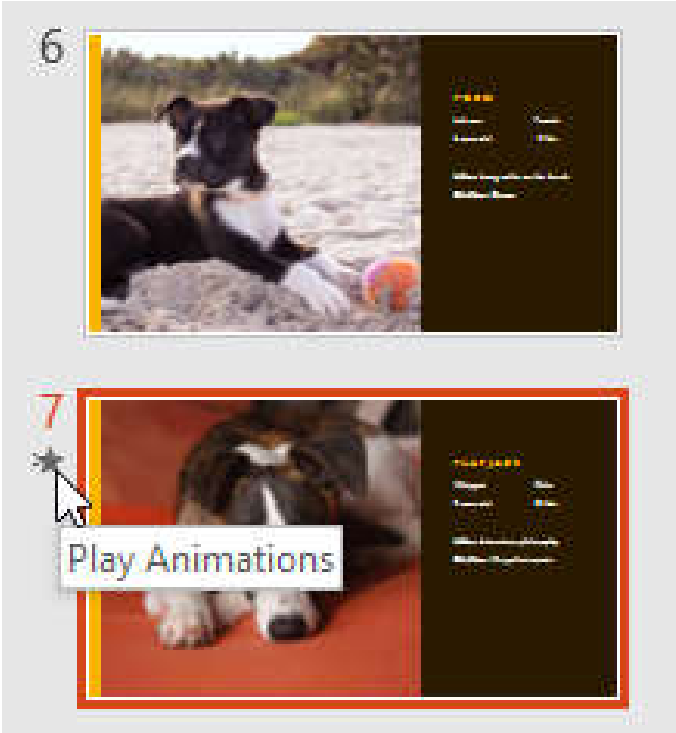


To preview a transition : We can preview the transition for a selected slide at any time using either of these two methods:

1) Click the Preview command on the Transitions tab.



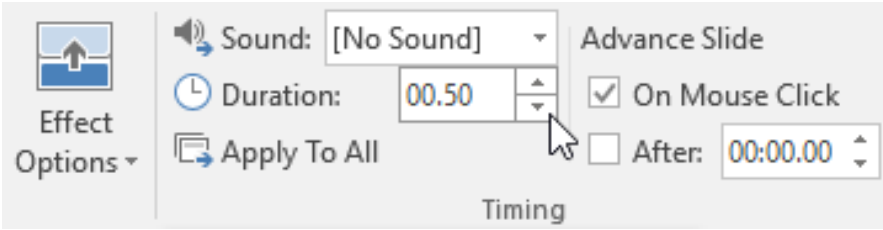
2) Click the Play Animations command in the Slide Navigation pane.



To modify the transition duration :

1) Select the slide with the transition we want to modify.

2) In the Duration field in the Timing group, enter the desired time for the transition. In this example, we'll decrease the time to half a second or 00.50 to make the transition faster.

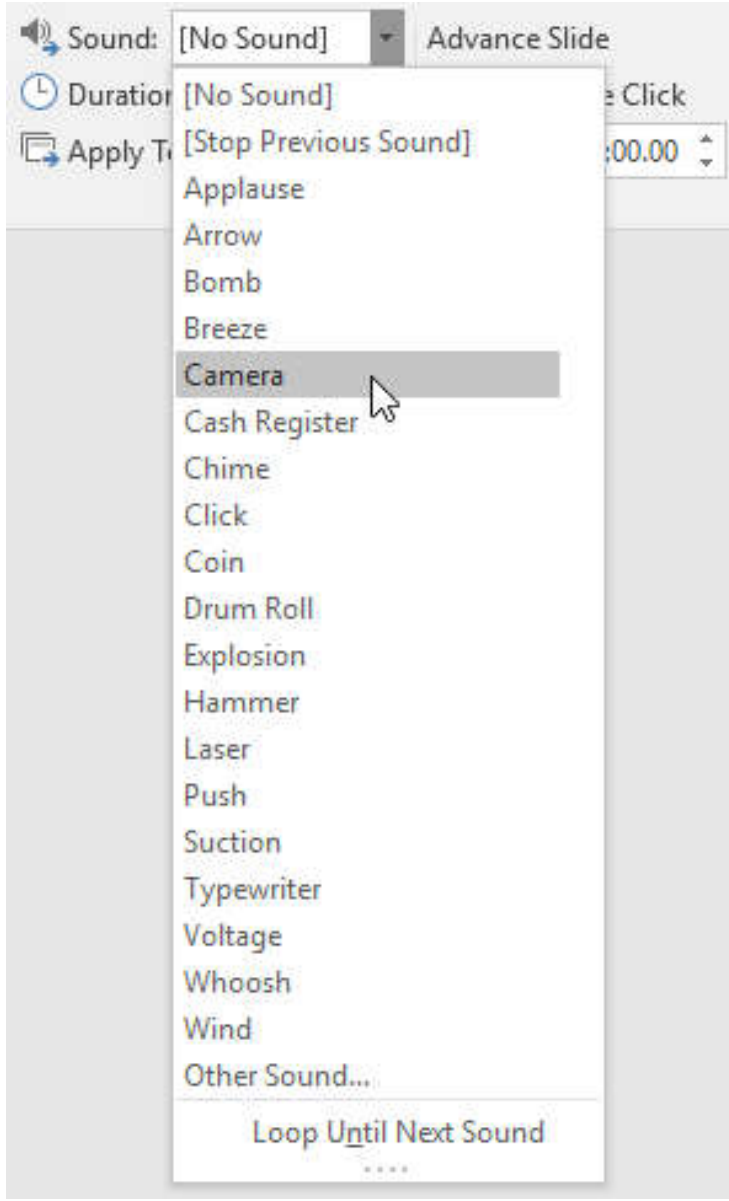


To add sound :

1) Select the slide with the transition we want to modify.

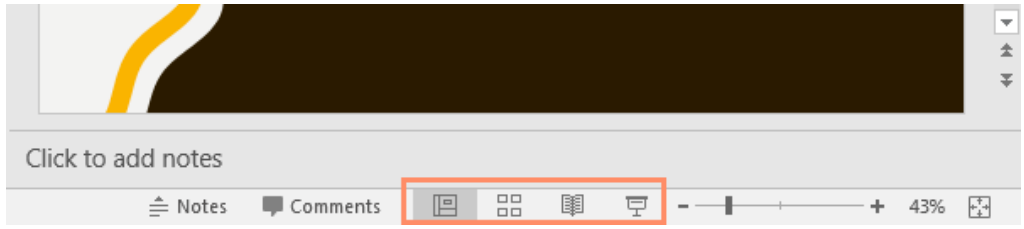
2) Click the Sound drop-down menu in the Timing group.

3) Click a sound to apply it to the selected slide, then preview the transition to hear the sound.



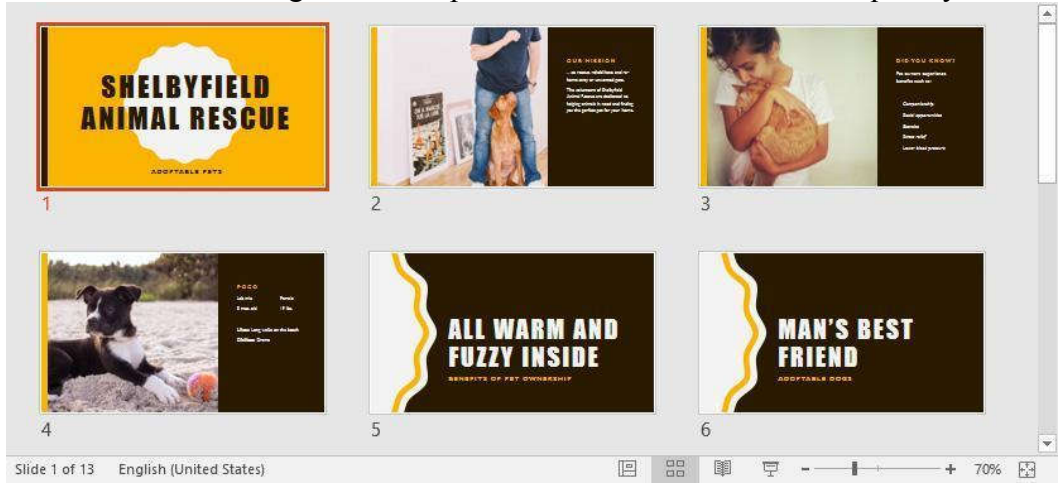
Slide Views : PowerPoint includes several different slide views, which are all useful for various tasks. The slide view commands are located in the bottom-right of the PowerPoint window.

There are four main slide views.



1) Normal view : This is the default view, where we create and edit slides. We can also move slides in the Slide Navigation pane on the left.

2) Slide sorter view : In this view, we'll see a thumbnail version of each slide. We can drag and drop slides to reorder them quickly.

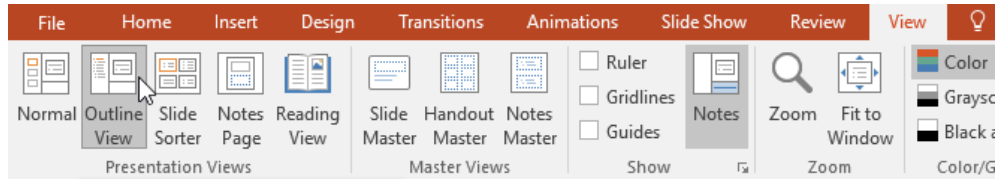


3) Reading view : This view fills the PowerPoint window with a preview of our presentation. It includes easily accessible navigation buttons at the bottom-right.

4) Slide show view : This command will begin the presentation from the current slide. We can also press F5 on our keyboard to start from the beginning. A menu will appear in the bottom-left corner when we move the mouse. These commands allow ou to navigate through the slides and access other features, such as the pen and highlighter.

Outline view : Outline view shows our slide text in outline form. This allows us to quickly edit our slide text and view the content of multiple slides at once. We could use this layout to review the organization of our slide show and prepare to deliver our presentation.

1) From the View tab, click the Outline View command.

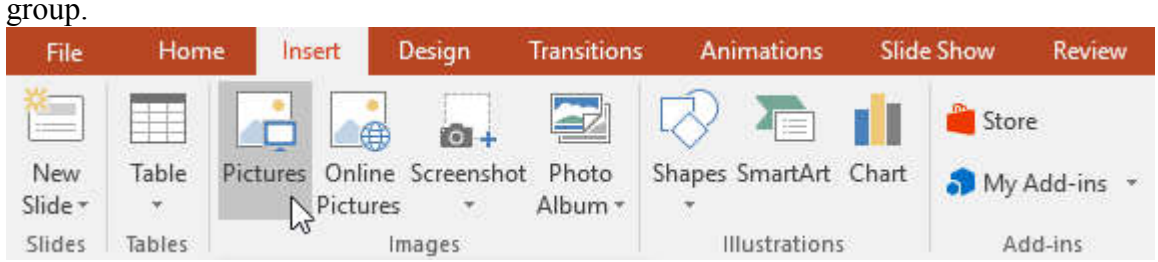


2) An outline of your slide text will appear in the slide navigation pane.

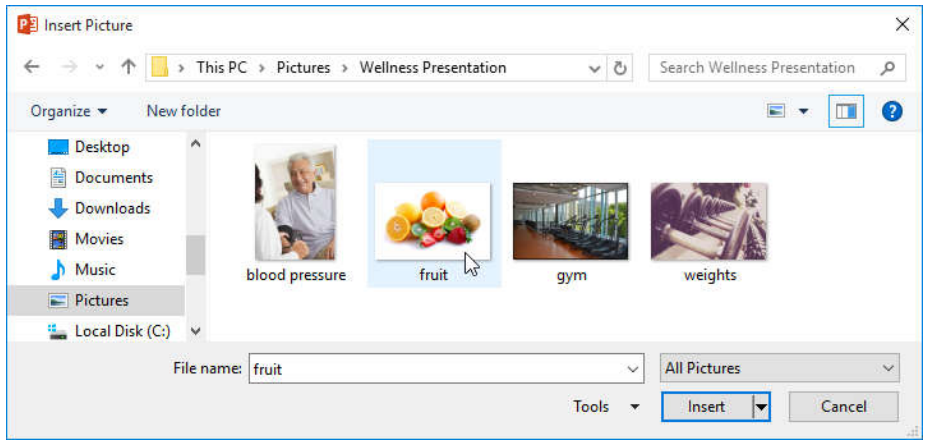
3) You can type directly in the outline to make changes to your slide text.

Adding pictures can make our presentations more interesting and engaging. We can insert a picture from a file on our computer onto any slide. PowerPoint even includes tools for finding online pictures and adding screenshots to our presentation.

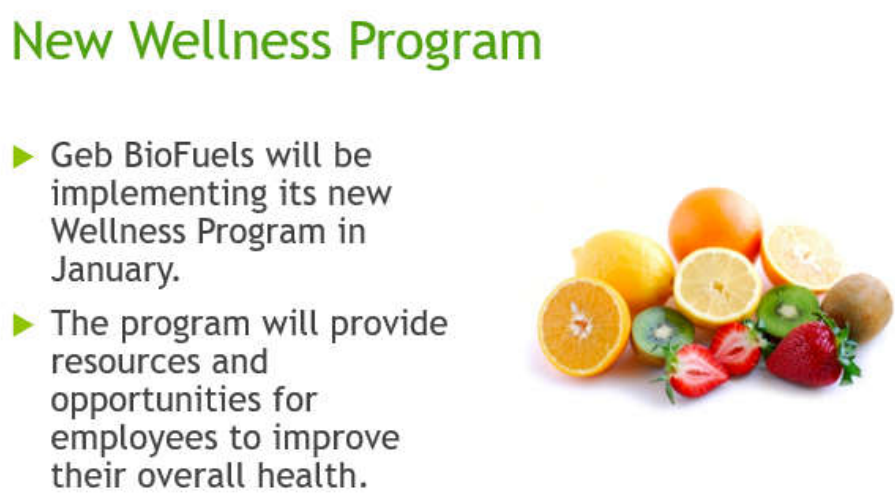
1) Select the Insert tab, then click the Pictures command in the Images group.



2) A dialog box will appear. Locate and select the desired image file, then click Insert.



3) The picture will appear on the currently selected slide.

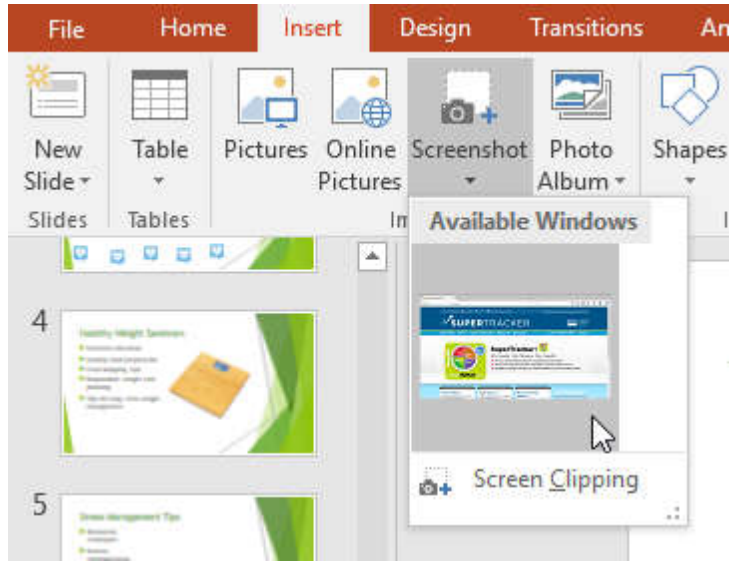


Inserting screenshots : Screenshots are basically snapshots of our computer screen. We can take a screenshot of almost any program, website, or open window. PowerPoint makes it easy to insert a screenshot

of an entire window or a screen clipping of part of a window in our presentation.

1) Select the Insert tab, then click the Screenshot command in the Images group.

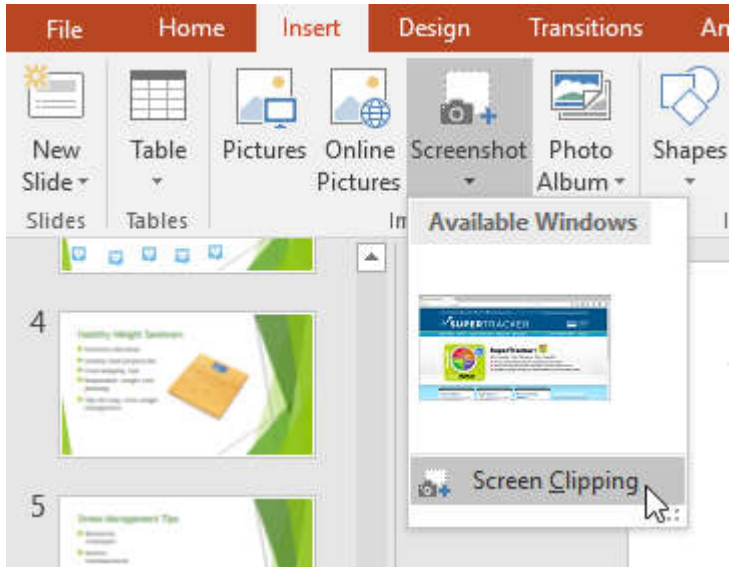
2) The Available Windows from our desktop will appear. Select the window we want to capture as a screenshot.



3) The screenshot will appear on the currently selected slide.

To insert a screen clipping :

1) Select the Insert tab, click the Screenshot command, then select Screen Clipping.



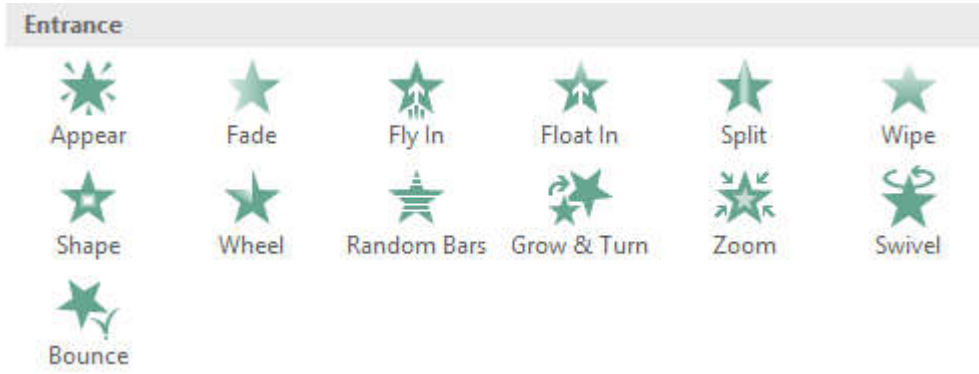
2) A view of other open windows will appear. Click and drag to select the area we want to capture as a screen clipping.

3.5 Animation

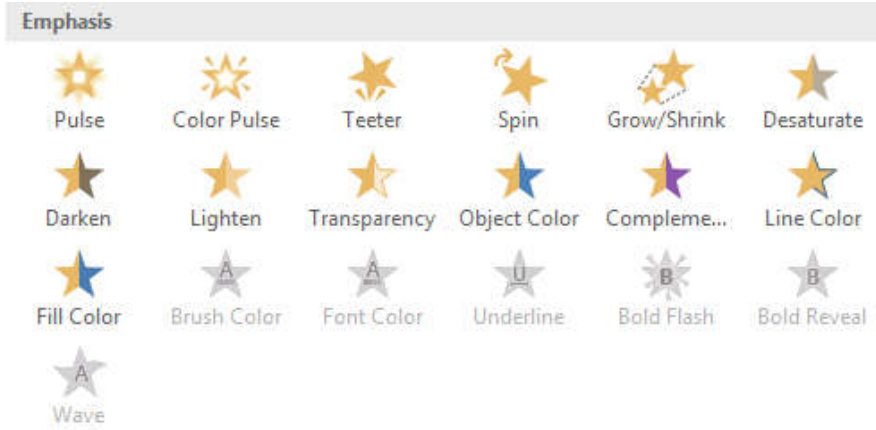
In PowerPoint, we can animate text and objects such as clip art, shapes, and pictures. Animation or movement on the slide can be used to draw the audience's attention to specific content or to make the slide easier to read.

Types of Animation :

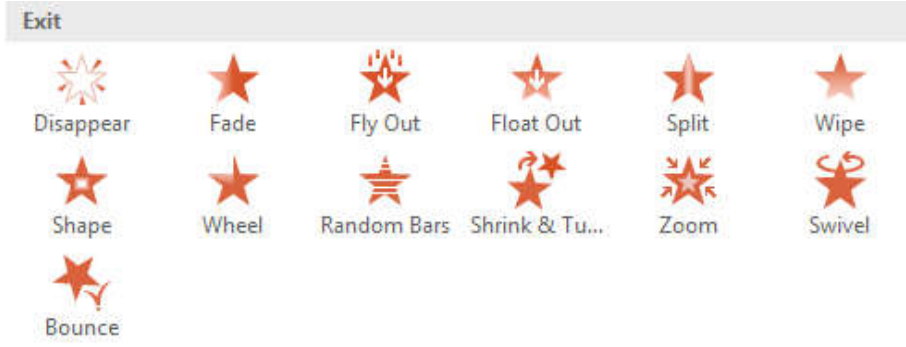
1) Entrance : These control how the object enters the slide. For example, with the **Bounce** animation the object will "fall" onto the slide and then bounce several times.



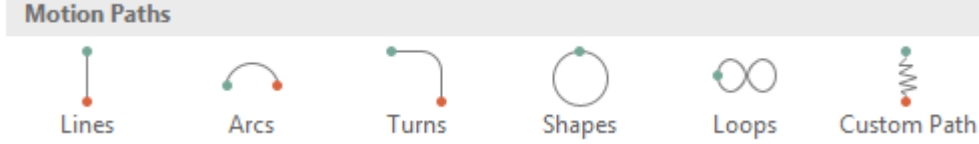
2) Emphasis: These animations occur while the object is on the slide, often triggered by a **mouse click**. For example, we can set an object to **spin** when we click the mouse.



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



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

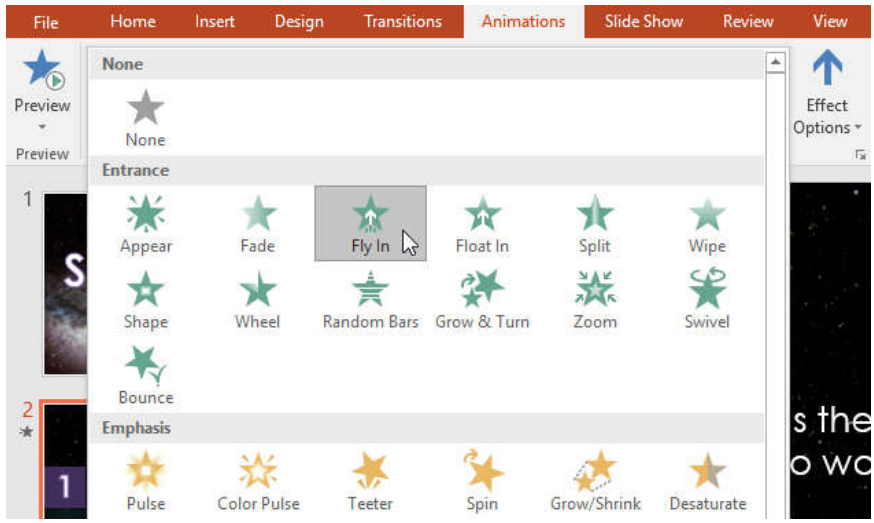


To apply an animation to an object :

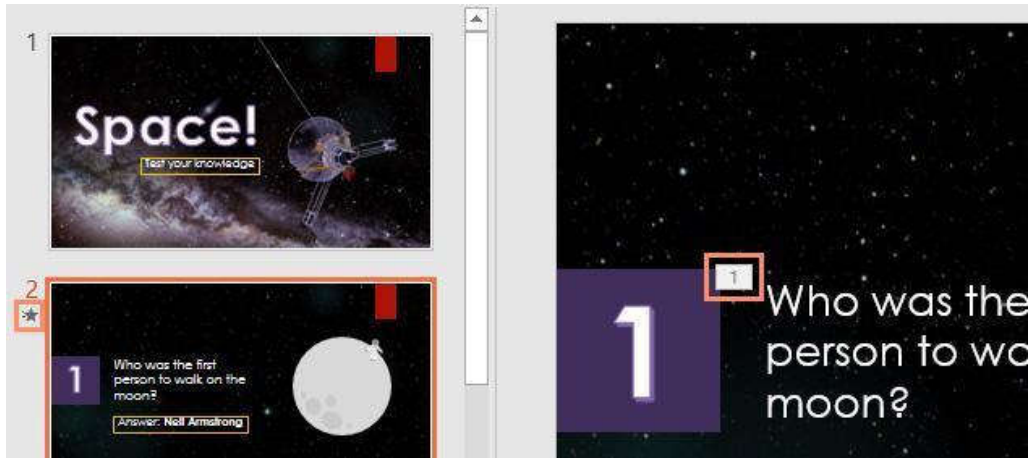
1) Select the object you want to animate.

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

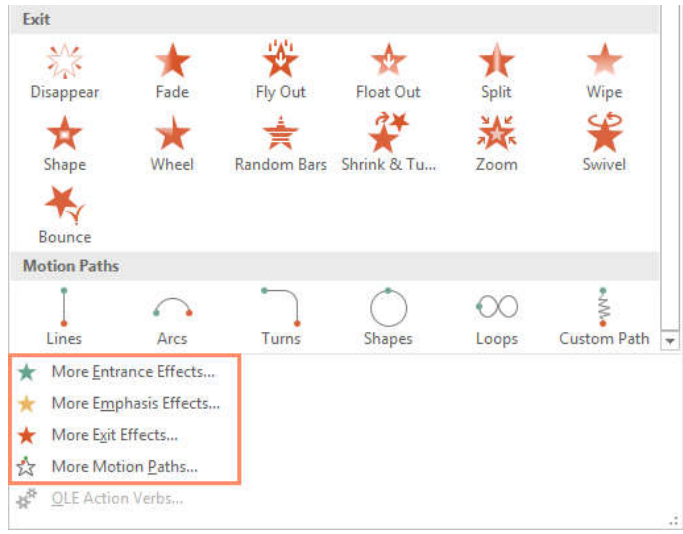
3) A drop-down menu of animation effects will appear. Select the desired effect.



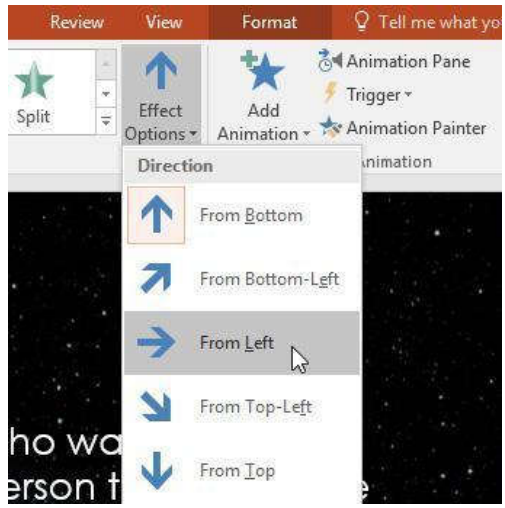
4) The effect will apply to the object. The object will have a small **number** next to it to show that it has an animation. In the Slide pane, a **star** symbol also will appear next to the slide.



5) At the bottom of the menu, we can access even more effects.



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



To remove an animation :

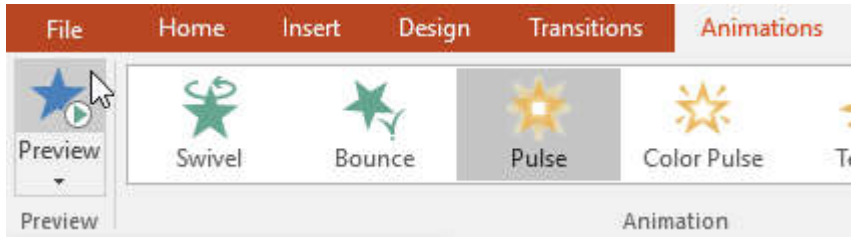
1) Select the small **number** located next to the animated object.

2) Press the **Delete** key. The animation will be deleted.

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

1) Navigate to the **slide** we want to preview.

2) From the **Animations** tab, click the **Preview** command. The animations for the current slide will play.



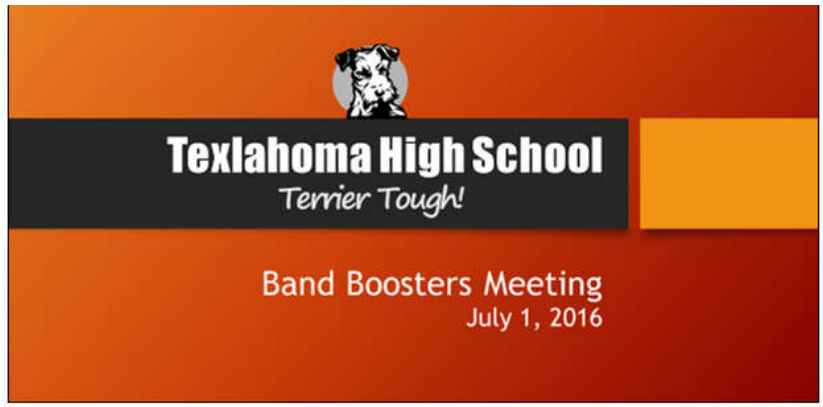
3.6 Print Review & Set-up

PowerPoint presentations are designed to be viewed on a computer, there may be times when we want to print them. We can even print custom versions of a presentation, which can be especially helpful when presenting our slide show. The Print pane makes it easy to preview and print your presentation.

Print layouts : PowerPoint offers several layouts to choose from when printing a presentation. The layout we choose will mostly depend on why we are printing the slide show. **Types of print layouts :**

1) Full Page Slides : This prints a full page for each slide in your presentation. This layout is most useful if we need to review or edit a printed copy of our presentation.

2) Notes Pages : This prints each slide, along with any speaker notes for the slide. If we have included a lot of notes for each slide, we could keep a printed copy of the notes with us while presenting.



Meeting goals:

- Thanks previous year's officers
- Introduce new officers
- Discuss yearly fundraising goals
- Plan for next meeting

Leslie will be in the Terry the Terrier costume to help pump up the crowd!

3) Outline : This prints an overall outline of the slide show. We could use this to review the organization of our slide show and prepare to deliver our presentation.

1 Band Boosters Meeting
July 1, 2016

2 **Agenda**
- New Officers
  - Elections and Thank You
  - Announce New Officers
  - Distribute Officer Contact Info
- Fundraising
  - Past and Present Ideas
  - Review Yearly Results

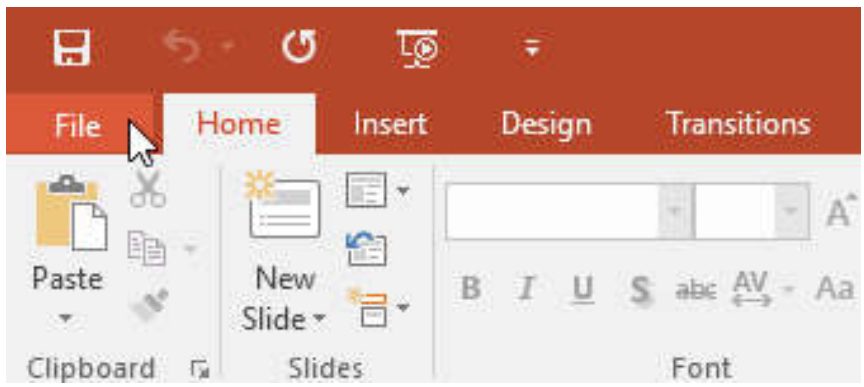
3 **New Officer Announcement**
2016-2017 School Year

4 **Elections and Appreciation**

4) Handouts : This prints thumbnail versions of each slide, with optional space for notes. This layout is especially useful if we want to give our audience a physical copy of the presentation. The optional space allows them to take notes on each slide.

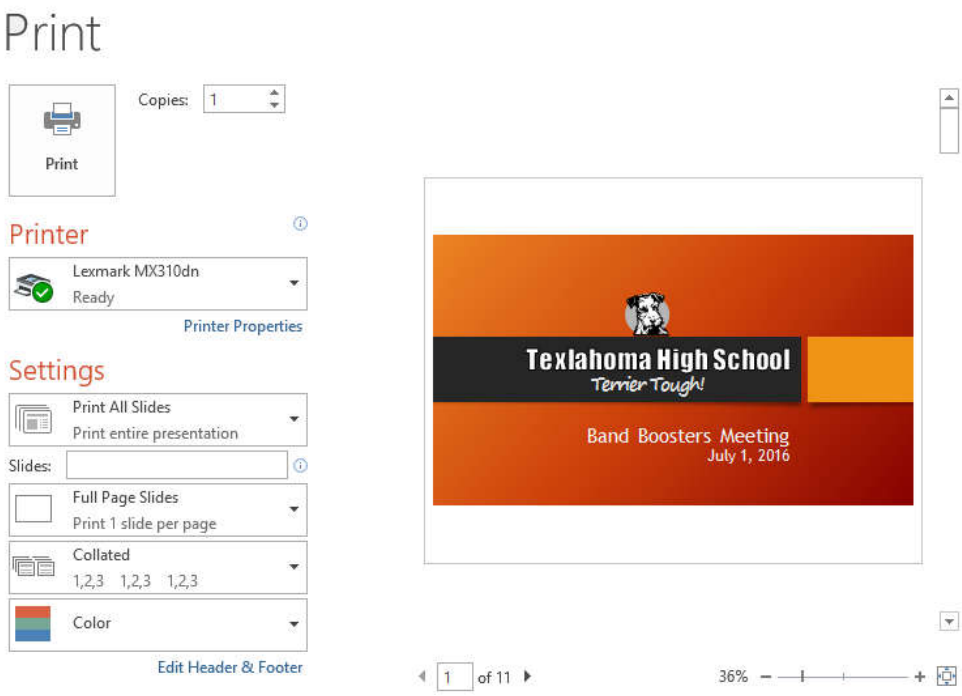
To access the Print pane :

1) Select the File tab. Backstage view will appear.



2) Select Print. The Print pane will appear.

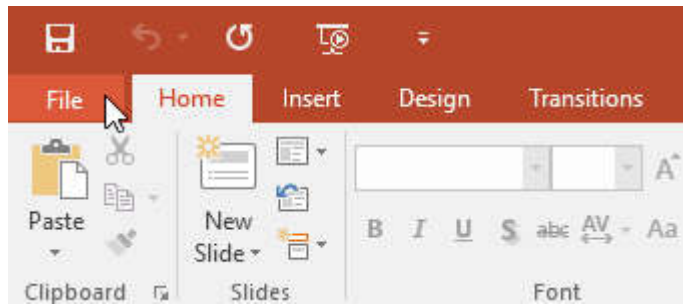
3) Click the buttons in the interactive below to learn more about using the Print pane.



4) We can also access the Print pane by pressing Ctrl+P on our keyboard.

To print a presentation :

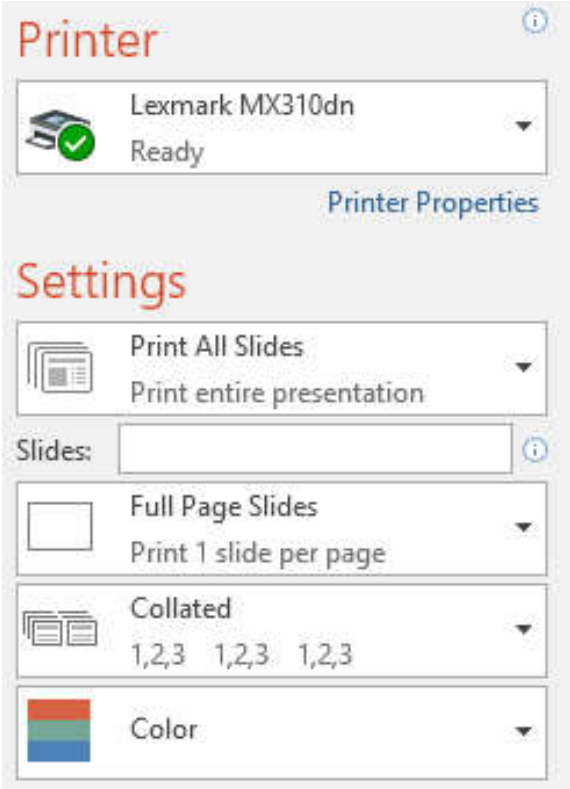
1) Select the File tab. Backstage view will appear.



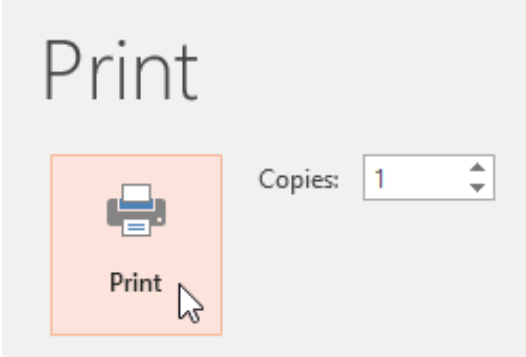
2) Select Print. The Print pane will appear.

3) Choose the desired printer and print range.

4) Choose the desired print layout and color settings.



5) When we are done modifying the settings, click Print.



2.4 USE OF TOOLS IN ACCOUNTING

4.1 Vouchers

A Voucher is an internal document used for supporting the entries in accounting books.

It is treated as a redeemable transaction bond, has monetary value and is useful for specific purposes.

Types of Accounting Vouchers :

1) Cash Voucher – These vouchers get prepared by a firm solely for cash transactions like receipts and payments.

It can be a Debit Voucher that a firm prepares only for cash payments to suppliers or vendors to purchase raw materials and semi-finished goods for production, purchase of assets or payments of expenses.

It can also be a **Credit Voucher** that a firm prepares only for cash receipts from customers or vendors to sell goods to the customer, sale of assets or receipt of income.

2) Non-Cash Voucher – These vouchers are also known as transfer vouchers, and they are prepared for credit transactions only.

Examples of such transactions are credit purchase or sale of goods, purchase or sale of fixed assets on credit, etc.

The preparation of vouchers depends on how a transaction gets recorded in the account books. Based on the complexity of a transaction, the vouchers can be classified as follows :

A) Transaction Voucher – It is a voucher prepared by the firm when one account gets debited and another account gets credited for a transaction.

B) Compound Voucher – It is a voucher prepared by the firm for two types of transactions. The first type is where more than one account gets debited, but only one account gets credited for a transaction. And the second type is where more than one account gets credited, but only one account gets debited for a transaction.

C) Complex Voucher – It is a voucher prepared by a firm when multiple accounts are debited and credited for a transaction.

4.1.1 Preparation of Vouchers

Vouchers includes various supporting documents, which are as follows :

1) The invoice that the supplier receives from the firm

2) The details of the supplier like name, address and contact number

3) The details of the payment like the amount, discounts or the due date of payment

4) The details related to the initial purchase order that the company had made with the supplier

5) The receipt with details of the transaction confirming that the company had received the goods or the services as mentioned in the invoice

6) The details of the ledger accounts related to the particular transaction

7) The signature of the company's authorised signatory validating the purchase of goods or services along with receipt of the payment

8) The proof of the payment that is in the documentation for the voucher

4.1.2 Steps involved in the preparation of vouchers

1) The company gets in touch with the supplier to place an order for raw materials or semi-finished goods. If the supplier agrees with the order's specifications and the amount, then the firm places the order with them.

2) The supplier prepares and sends the order consignment to the firm. There is a quality control check to see if there are no defective or damaged items in that consignment. The person/s responsible for quality control also checks if the order matches the specifications.

3) After the firm is satisfied with the order, it creates a voucher for the transaction with the relevant details and supporting documents.

4) The voucher and the supporting documents get thoroughly checked by both parties to ensure zero errors. Post that, the company pays the supplier for the consignment.

4.2 Invoices

An invoice is a document given to the buyer by the seller to collect payment. It includes the cost of the products purchased or services rendered to the buyer. Invoices can also serve as legal records, if they contain the names of the seller and client, description and price of goods or services, and the terms of payment.

4.2.1 Functions of invoices

Companies need to deliver invoices in order to demand payments.

An invoice is a legally binding agreement showing both parties' consent to the quoted price and payment conditions.

Other benefits of invoices :

1) Maintaining records : The most important benefit of an invoice is the ability to keep a legal record of the sale. This makes it possible to find out when a good was sold, who bought it, and who sold it.

2) Payment tracking : An invoice is an invaluable tool for accounting. It helps both the seller and the buyer to keep track of their payments and amounts owed.

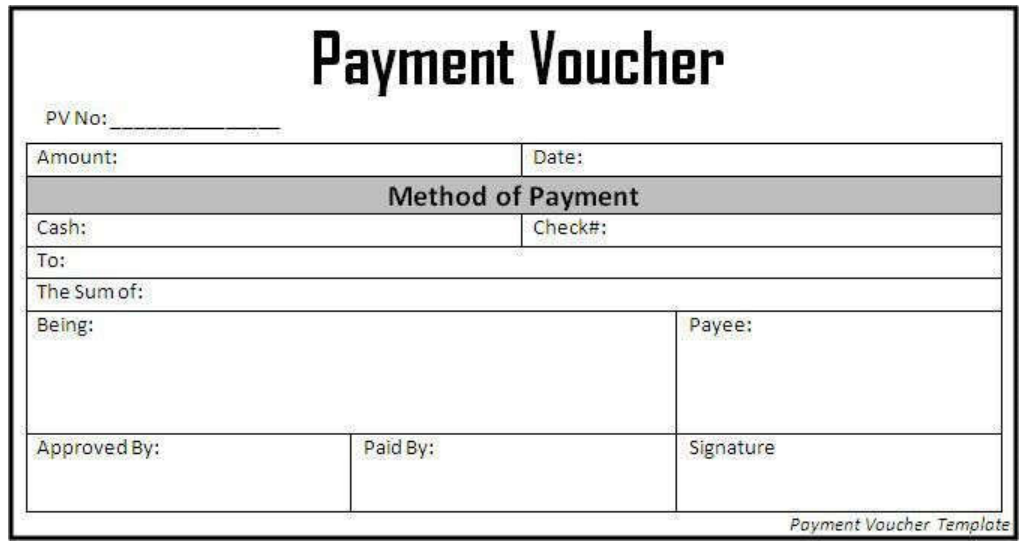
3) Legal protection : A proper invoice is legal proof of an agreement between the buyer and seller on a set price. It protects the merchant from fraudulent lawsuits.

4) Easy tax filing : Recording and maintaining all sale invoices helps the company report its income and ensure that it's paid the proper amount of taxes.

5) Business analytics : Analyzing invoices can help businesses gather information from their customers' buying patterns and identify trends,

popular products, peak buying times, and more. This helps to develop effective marketing strategies.

Example : Payment Voucher



Payment Voucher

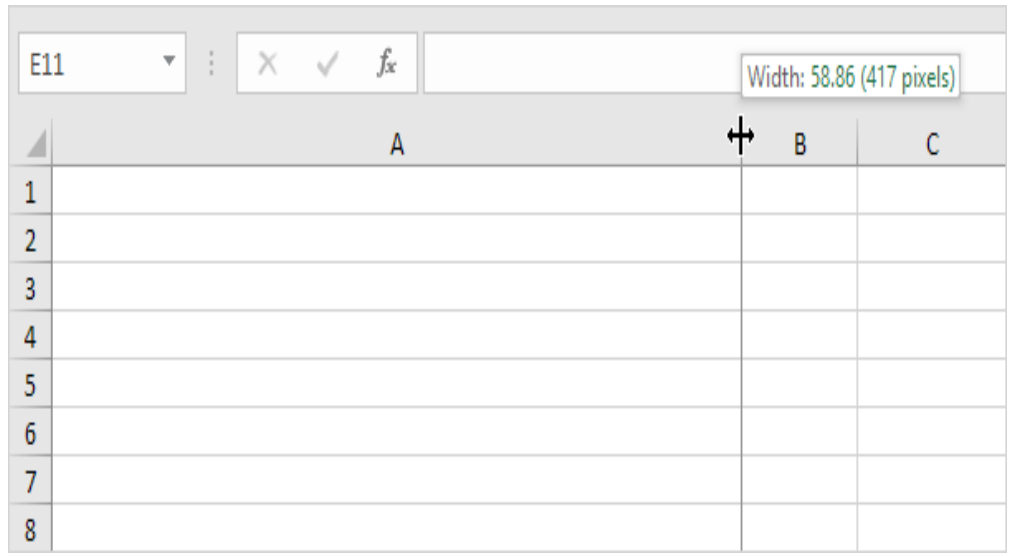
PV No:_____

Amount:	Date:
Method of Payment	
Cash:	Check#:
To:	
The Sum of:	
Being:	Payee:
Approved By: / Paid By:	Signature

Payment Voucher Template

4.2.2 Creating Invoice in Excel

1) Our invoice template is 3 columns wide. Column A: 417 pixels. Column B: 70 pixels. Column C: 90 pixels. Click on the right border of a column header to change the column width.



2) Enter some data.

	A	B	C
1	Excel-easy.com	INVOICE	
2	2010 Spreadsheet Street		
3	New York, NY 20000		
4	Phone: 123456789	Date:	
5		Invoice nr:	100
6	Bill to:		
7	Caroline Martin		
8	2007 Excel Road		
9	Los Angeles, CA 87457		
10			
11			
12	Description		Amount
13	Gantt Chart		10
14	Pareto Chart		5
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32		Total	
33			
34			
35	Payment due within 30 days from date of invoice.		
36	Thank you for your business!		

3) On the Home tab, in the Font group, we can use the different commands to change font sizes, font styles, add borders, change background colors, etc.

4) To remove the gridlines, select all cells by clicking on the square above row 1 and to the left of column A and change the background color to white.

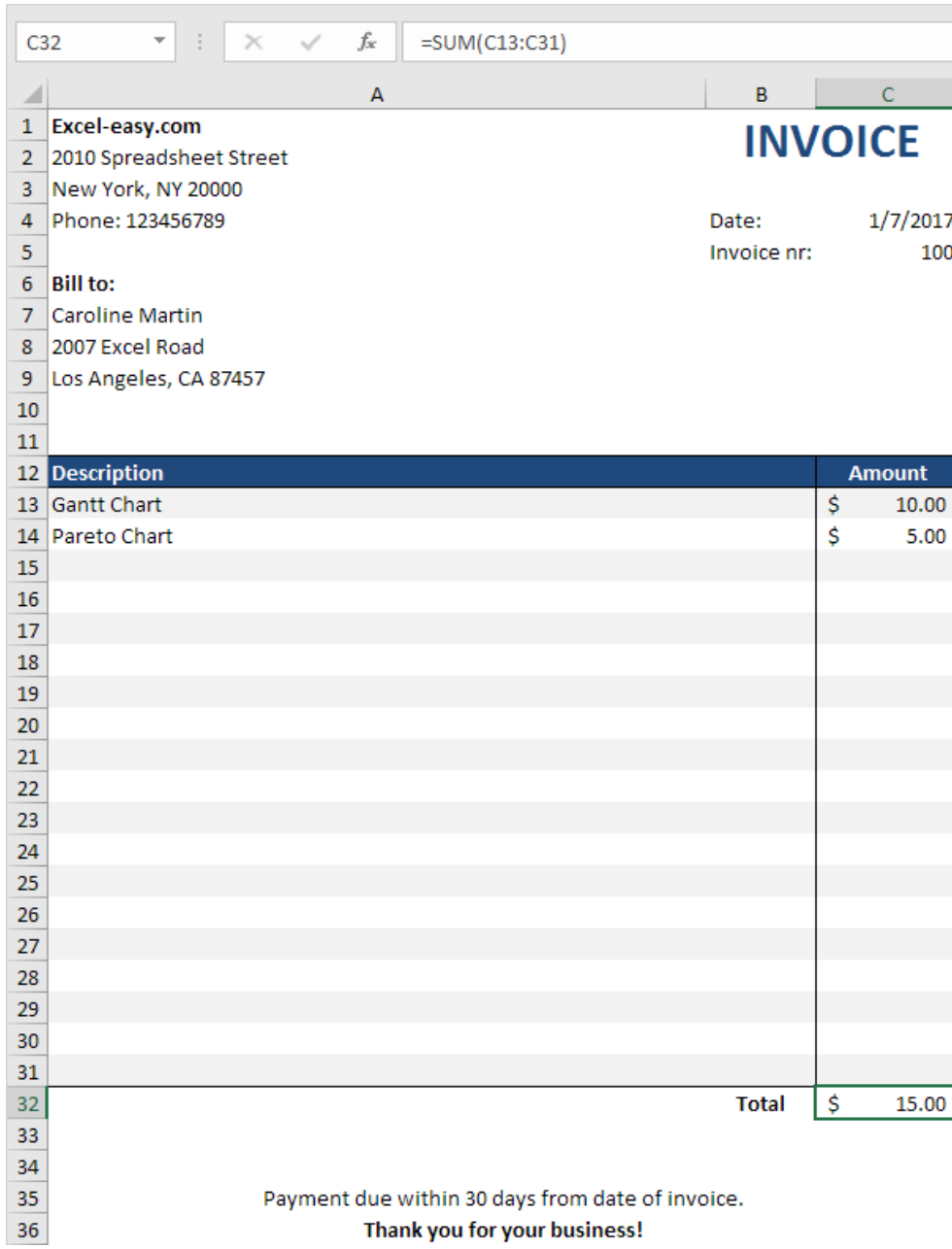
5) On the Home tab, in the Alignment group, you can use the different commands to align text.

	A	B	C
1	**Excel-easy.com**		**INVOICE**
2	2010 Spreadsheet Street		
3	New York, NY 20000		
4	Phone: 123456789	Date:	
5		Invoice nr:	100
6	**Bill to:**		
7	Caroline Martin		
8	2007 Excel Road		
9	Los Angeles, CA 87457		
10			
11			
12	**Description**		**Amount**
13	Gantt Chart		10
14	Pareto Chart		5
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32		**Total**	
33			
34			
35	Payment due within 30 days from date of invoice.		
36	**Thank you for your business!**		

6) Select the range C13:C32 and change the number format to Accounting.

7) Enter the TODAY function into cell C4.

8) Enter the SUM function into cell C32. To achieve this, select cell C32, type =SUM(, select the range C13:C31, close with a ")" and press Enter.



C32 =SUM(C13:C31)

	A	B	C
1	**Excel-easy.com**		**INVOICE**
2	2010 Spreadsheet Street		
3	New York, NY 20000		
4	Phone: 123456789	Date:	1/7/2017
5		Invoice nr:	100
6	**Bill to:**		
7	Caroline Martin		
8	2007 Excel Road		
9	Los Angeles, CA 87457		
10			
11			
12	**Description**		**Amount**
13	Gantt Chart		$ 10.00
14	Pareto Chart		$ 5.00
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32		**Total**	$ 15.00
33			
34			
35	Payment due within 30 days from date of invoice.		
36	**Thank you for your business!**		

4.3 Reports

Reports are financial documents that are integral to the success of any business, large or small. Preparing accounting reports allows us to track our financial history, project future revenue and have accurate records for tax purposes. Many companies create accounting reports monthly and some create additional reports for specific purposes.

4.3.1 Types of Reports

1) Income statement : It is a report that details overall expenses and revenue to determine a company's overall net profit. Sometimes an income statement is called a profit-and-loss report.

To prepare an income statement, accountants use data from ledgers and accounting journals. The statement includes both primary and secondary sources of income to get an accurate number. Similarly, primary and secondary expenses are included in the income statement.

2) Cash flow statement : It shows where cash is coming from (cash flow sources) and where cash is going (cash flow expenditures). This helps a business see how well they are generating cash. Executives and decision-makers can use this report to see where cash is coming from and then where it is going, which could include : Business operations, Financing, Investments

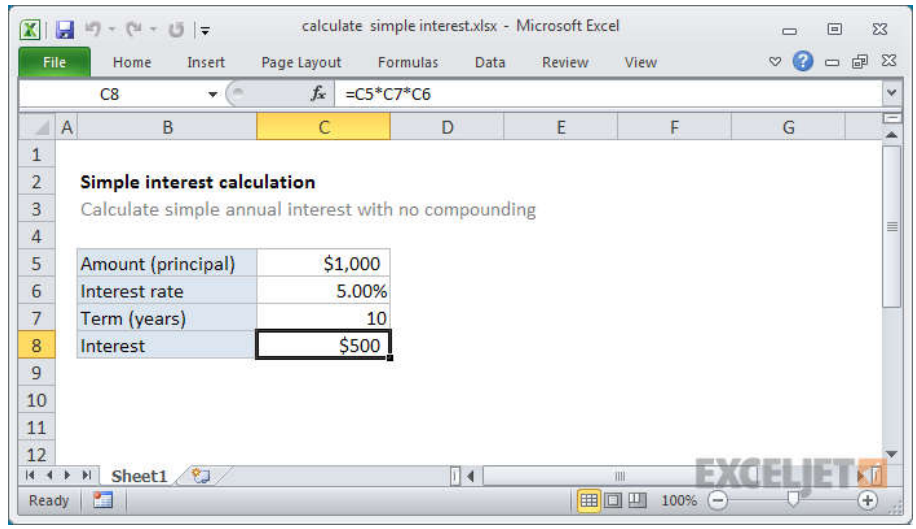
A cash flow statement measures the cash flow between two dates. To prepare a cash flow statement, an accountant looks at the cash flow in every account, which may include equity accounts, liability accounts, expense accounts, revenue accounts and asset accounts.

3) Balance sheet : It shows an ending balance at one specific point in time. It often includes balances for assets, liability and equity. The balance sheet gives the business an opportunity to evaluate its financial reserves as well as liquid assets. It also helps potential investors or lenders see the financial state of the company.

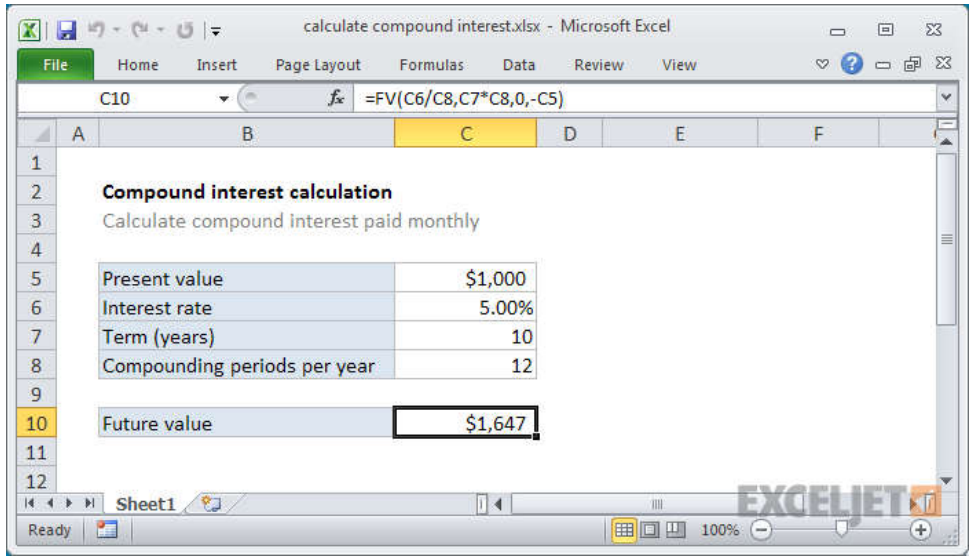
4.4 Calculation of interest

Interest refers to the cost of money borrowed from a lender. Usually a percentage of the principal amount borrowed, interest can be either simple or compound.

Simple interest = principal * rate * terms;



Compound interest = FV(rate, nper, pmt, pv)



Explanation of FV function : FV function calculates compound interest and returns the future value of an investment. To configure we need the rate, the number of periods, the periodic payment, the present value.

To get the rate we use annual rate/periods or C6/C8.

To get the number of periods we use term * periods or C7 * C8.

There is no periodic payment, so we use 0.

The present value(pv) is input as a negative value, since $1000 'leaves our wallet' and goes to the bank during the term.

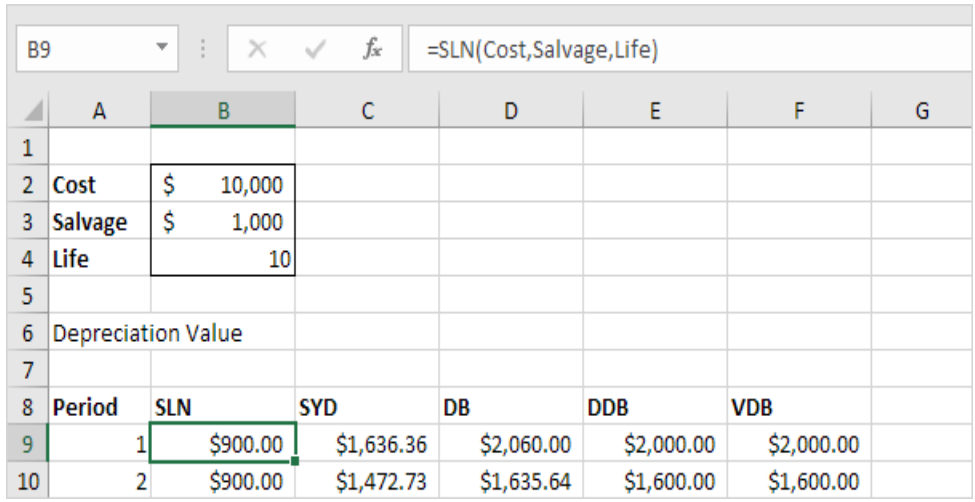
4.5 Calculation of Depreciation

Depreciation is defined as the reduction of the recorded cost of a fixed asset in a systematic manner until the value of the asset becomes zero or negligible.

Excel offers five different depreciation functions.

We consider an asset with an initial cost of $10,000, a salvage value (residual value) of $1000 and a useful life of 10 periods (years).

1) SLN : The SLN (Straight Line) function is easy. Each year the depreciation value is the same.

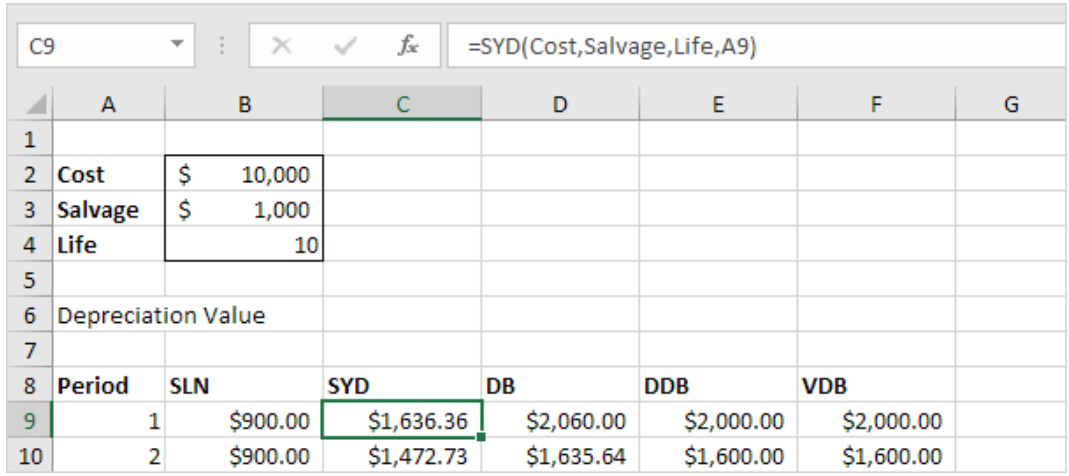


	A	B	C	D	E	F	G
1							
2	**Cost**	$ 10,000					
3	**Salvage**	$ 1,000					
4	**Life**	10					
5							
6	Depreciation Value						
7							
8	**Period**	**SLN**	**SYD**	**DB**	**DDB**	**VDB**	
9	1	$900.00	$1,636.36	$2,060.00	$2,000.00	$2,000.00	
10	2	$900.00	$1,472.73	$1,635.64	$1,600.00	$1,600.00	

The SLN function performs the following calculation. Depreciation Value = (10,000 - 1,000) / 10 = 900.00. If we subtract this value 10 times, the asset depreciates from 10,000 to 1000 in 10 years

	A	B	C	D	E	F	G
1							
2	**Cost**	$ 10,000					
3	**Salvage**	$ 1,000					
4	**Life**	10					
5							
6	Depreciation Value						
7							
8	**Period**	**SLN**	**SYD**	**DB**	**DDB**	**VDB**	
9	1	$900.00	$1,636.36	$2,060.00	$2,000.00	$2,000.00	
10	2	$900.00	$1,472.73	$1,635.64	$1,600.00	$1,600.00	
11	3	$900.00	$1,309.09	$1,298.70	$1,280.00	$1,280.00	
12	4	$900.00	$1,145.45	$1,031.17	$1,024.00	$1,024.00	
13	5	$900.00	$981.82	$818.75	$819.20	$819.20	
14	6	$900.00	$818.18	$650.08	$655.36	$655.36	
15	7	$900.00	$654.55	$516.17	$524.29	$524.29	
16	8	$900.00	$490.91	$409.84	$419.43	$419.43	
17	9	$900.00	$327.27	$325.41	$335.54	$338.86	
18	10	$900.00	$163.64	$258.38	$268.44	$338.86	
19							
20	Asset Value						
21							
22	**Period**	**SLN**	**SYD**	**DB**	**DDB**	**VDB**	
23	0	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	
24	1	$9,100.00	$8,363.64	$7,940.00	$8,000.00	$8,000.00	
25	2	$8,200.00	$6,890.91	$6,304.36	$6,400.00	$6,400.00	
26	3	$7,300.00	$5,581.82	$5,005.66	$5,120.00	$5,120.00	
27	4	$6,400.00	$4,436.36	$3,974.50	$4,096.00	$4,096.00	
28	5	$5,500.00	$3,454.55	$3,155.75	$3,276.80	$3,276.80	
29	6	$4,600.00	$2,636.36	$2,505.67	$2,621.44	$2,621.44	
30	7	$3,700.00	$1,981.82	$1,989.50	$2,097.15	$2,097.15	
31	8	$2,800.00	$1,490.91	$1,579.66	$1,677.72	$1,677.72	
32	9	$1,900.00	$1,163.64	$1,254.25	$1,342.18	$1,338.86	
33	10	$1,000.00	$1,000.00	$995.88	$1,073.74	$1,000.00	
34							

2) SYD : The SYD (Sum of Years' Digits) function is also easy. As we can see below, this function also requires the period number.



C9 =SYD(Cost,Salvage,Life,A9)

	A	B	C	D	E	F	G
1							
2	**Cost**	$ 10,000					
3	**Salvage**	$ 1,000					
4	**Life**	10					
5							
6	Depreciation Value						
7							
8	**Period**	**SLN**	**SYD**	**DB**	**DDB**	**VDB**	
9	1	$900.00	$1,636.36	$2,060.00	$2,000.00	$2,000.00	
10	2	$900.00	$1,472.73	$1,635.64	$1,600.00	$1,600.00	

The SYD function performs the following calculations. A useful life of 10 years results in a sum of years of 10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 = 55. The asset loses 9000 in value. Depreciation value period 1 = 10/55 * 9000 = 1,636.36. Deprecation value period 2 = 9/55 * 9000 = 1,472,73, etc. If we subtract these values, the asset depreciates from 10,000 to 1000 in 10 years (figure after SLN)

4.6 Calculation of TDS

Tax Deducted at Source or TDS is the amount which is deducted from the income of an individual by an authorised deductor and deposited to the IT department.

For example, ABC Pvt Ltd has to make payment of Rs 1,00,000 to Mr. XYZ for professional fees. TDS rate specified on professional fee is 10%.

TDS required to be deducted = 10% on Rs 1,00,000 = Rs 10,000

Net payment to Mr. XYZ = Gross Amount – TDS Deducted = Rs 1,00,000 – Rs 10,000 = Rs 90,000

TDS to be deposited to Government by ABC Pvt Ltd = Rs 10,000

4.7 Calculation of Salary

Basic Salary is the base part of the total salary which doesn't include any other allowances. Overtime, bonus, medical allowance, etc. are not part of the basic salary. Adding all other allowances to the basic salary comes out the total salary received by an employee. So, the basic salary is a fixed amount for an employee of a company.

CTC : CTC means 'Cost To Company' which indicates the total amount of expenses a company spends on an employee including the Gross Salary and all other benefits an employee gets during the service period.

Pf : PF (Provident Fund) refers to the amount which is deducted from the salary and put away in a PF account. It is designed to ensure enough funds are saved to get an employee through retirement adequately.

Gross salary : is aggregate of the total amount of pay that an employee will get in every month, it includes all the allowances including basic pay. The simple definition of gross salary is basic salary plus allowances like dearness allowances, house rent allowances, medical allowances, conveyance allowances, and special allowances, etc.

Example to calculate salary from Gross Salary :

1) Suppose, we have a data set of the Gross Salary of the employers of a company and the percentage of Gross Salary which will denote the Basic Salary of the employees.

Dataset for Gross Salary

Employee	Gross Salary	Basic Salary Percentage
Mike	$10,000.00	40%
Adam	$12,000.00	40%
David	$18,000.00	40%
Hopper	$25,000.00	40%
Robin	$30,000.00	40%
Lilly	$35,000.00	40%

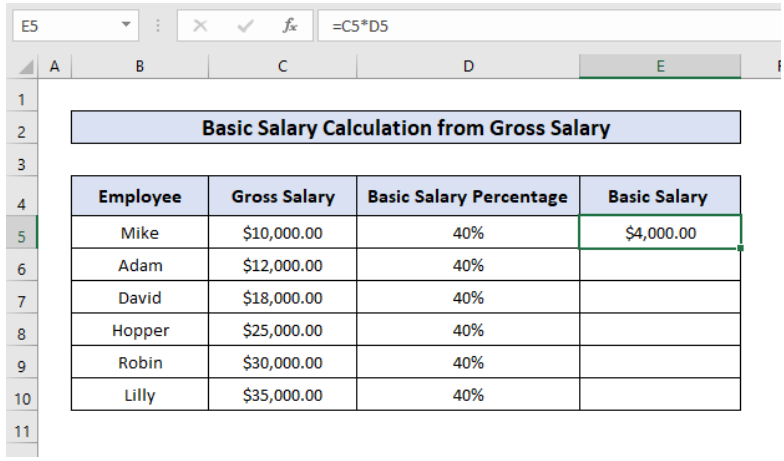
2) Enter formula for salary = gross salary * basic salary percentage or C5 * D5.

D5 =C5*D5

Basic Salary Calculation from Gross Salary

Employee	Gross Salary	Basic Salary Percentage	Basic Salary
Mike	$10,000.00	40%	=C5*D5
Adam	$12,000.00	40%	
David	$18,000.00	40%	
Hopper	$25,000.00	40%	
Robin	$30,000.00	40%	
Lilly	$35,000.00	40%	

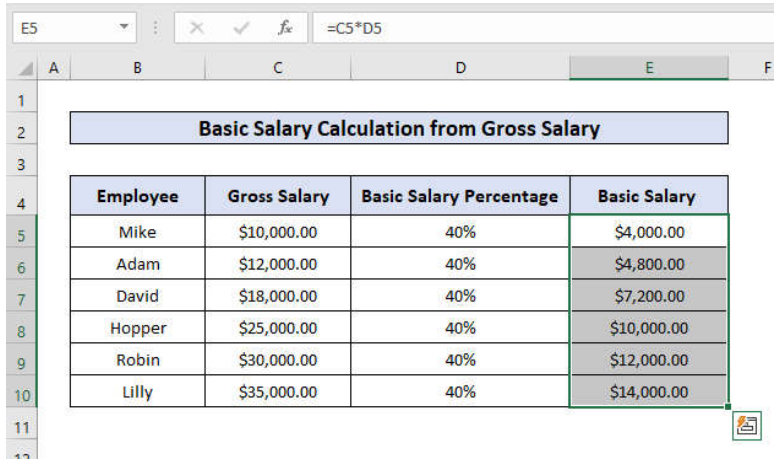
3) Click **ENTER** and the desired output will come.



E5 =C5*D5

	A	B	C	D	E
1					
2		Basic Salary Calculation from Gross Salary			
3					
4		Employee	Gross Salary	Basic Salary Percentage	Basic Salary
5		Mike	$10,000.00	40%	$4,000.00
6		Adam	$12,000.00	40%	
7		David	$18,000.00	40%	
8		Hopper	$25,000.00	40%	
9		Robin	$30,000.00	40%	
10		Lilly	$35,000.00	40%	
11					

4) Now we can drag the formula to every cell so that will get the basic salary of every employee.



E5 =C5*D5

	A	B	C	D	E	F
1						
2		Basic Salary Calculation from Gross Salary				
3						
4		Employee	Gross Salary	Basic Salary Percentage	Basic Salary	
5		Mike	$10,000.00	40%	$4,000.00	
6		Adam	$12,000.00	40%	$4,800.00	
7		David	$18,000.00	40%	$7,200.00	
8		Hopper	$25,000.00	40%	$10,000.00	
9		Robin	$30,000.00	40%	$12,000.00	
10		Lilly	$35,000.00	40%	$14,000.00	
11						

Similarly we can calculate salary from CTC, deducting pf etc.

4.8 Calculation of Taxes

In some regions, income tax is taken by the company accountant from your income.

We can keep all details of our income, expenses, and expenditure in an Excel worksheet.

From there we can easily calculate the income tax on the stored data.

Income tax is a tax taken by the central government on your income earned during the financial year. This financial year starts from April 1 and ends on March 31 every year.

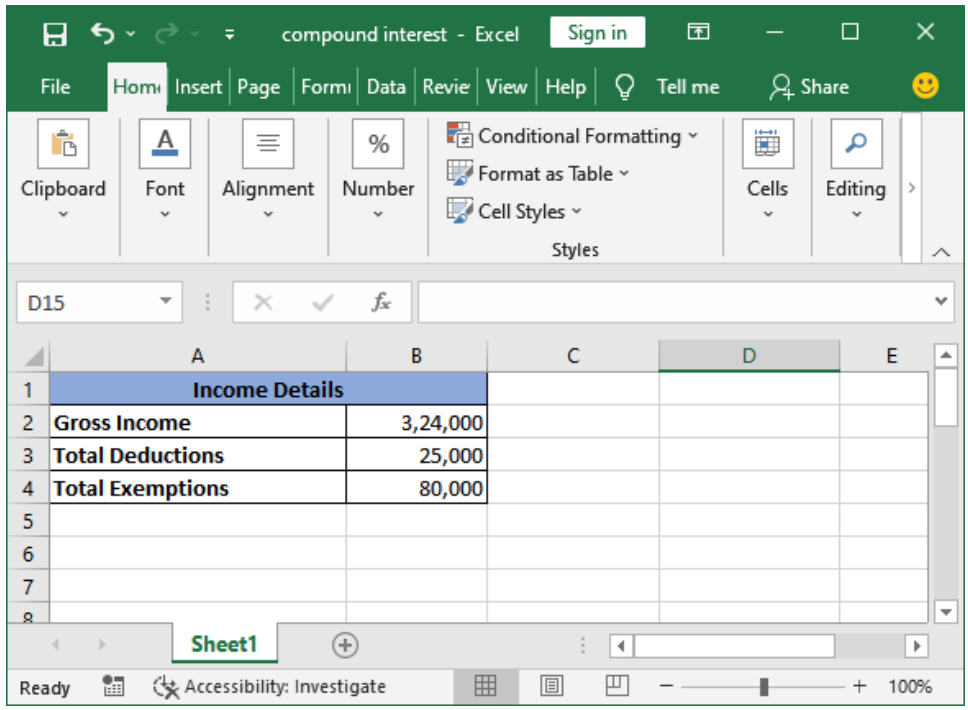
Income tax is a direct tax imposed on an individual or business, Individual's income or business's profit.

Gross income & taxable income : Gross income is the income coming from all the income sources. For example, salary, house rent, FDs, and all,

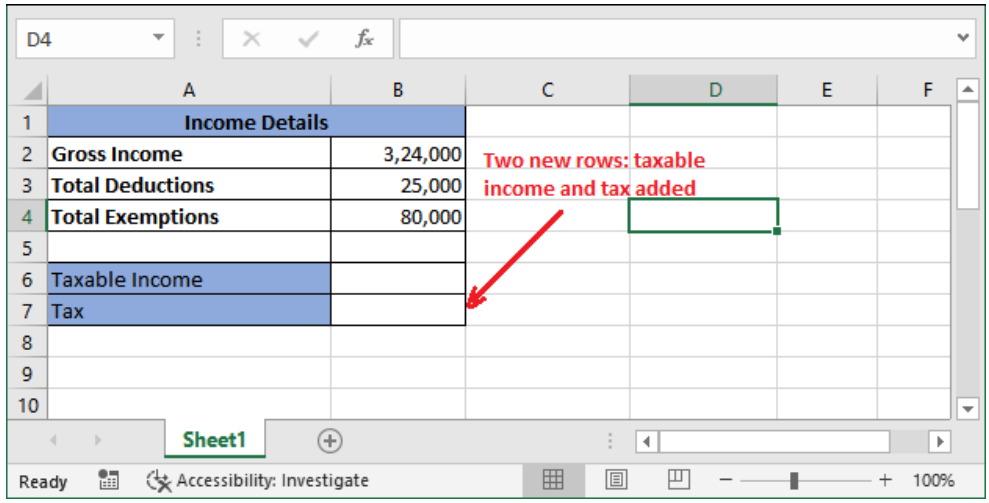
taxable income is extracted from the gross income by excluding exemptions and deductions.

Example :

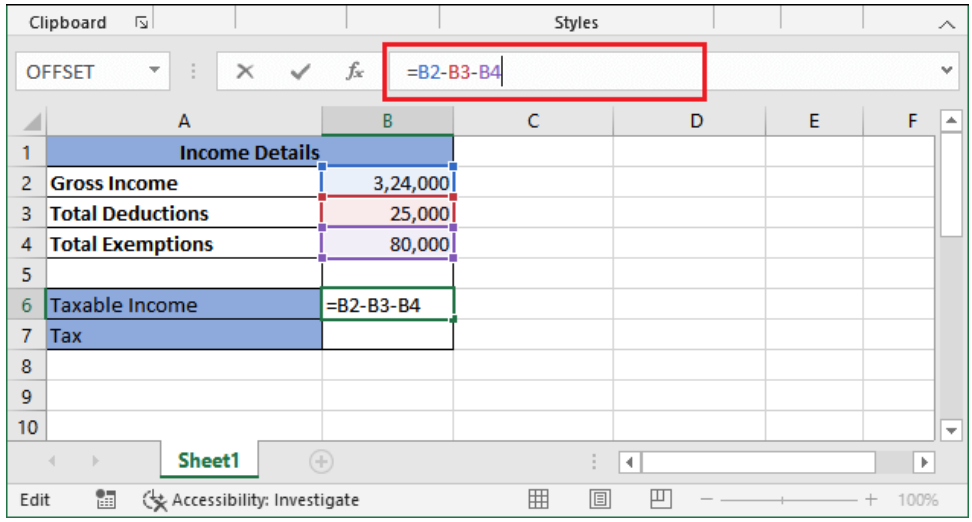
1) Open the Excel worksheet that contains the income details of someone. We are using the following income dataset.



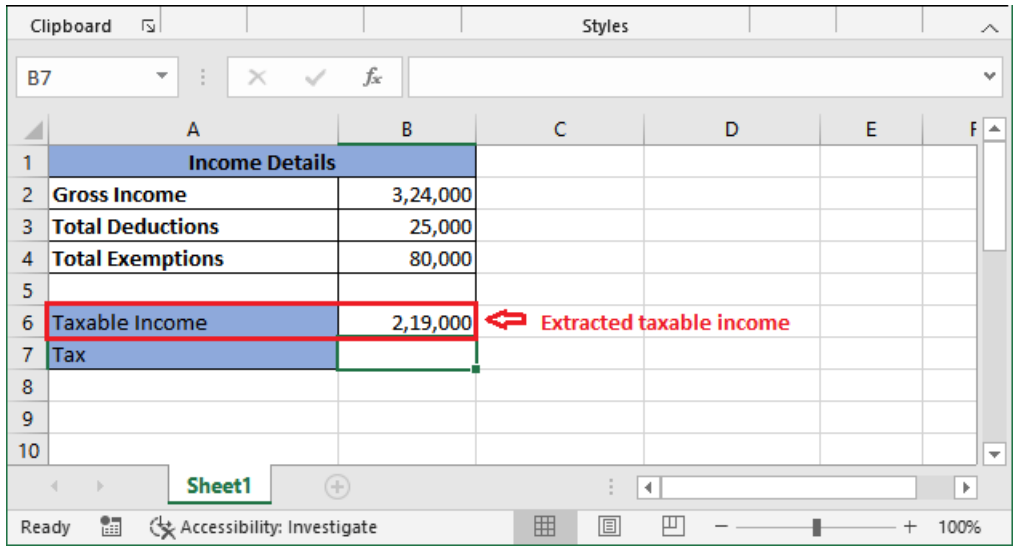
2) As we want to calculate the taxable income and tax. So, create two rows: one for the taxable value and another for the tax.



3) Select a cell where you want to place the calculated result and subtract the expenses (exemptions and deduction) from the gross income. Write the formula =B2-B3-B4 inside the formula bar and press the Enter key.



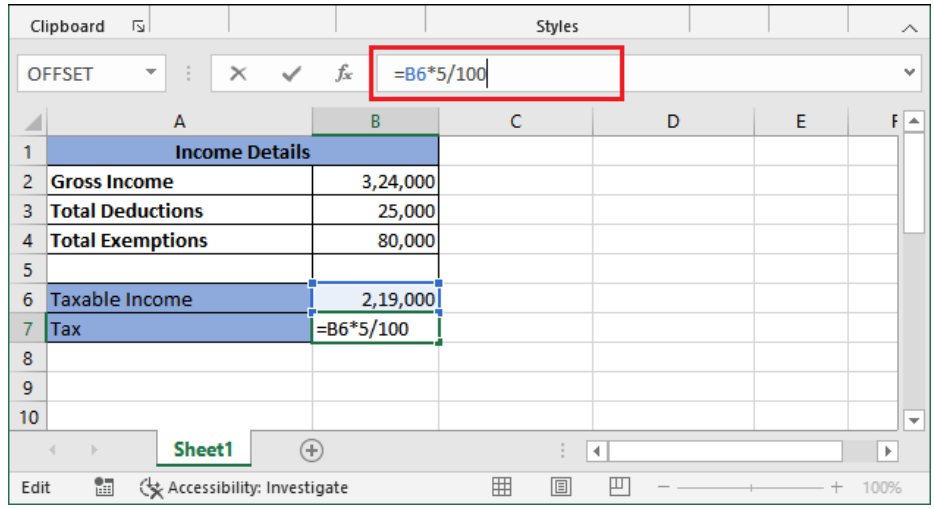
4) Taxable income is now extracted from gross income, which is 2,19,000. "Taxable income is on which we apply the tax."



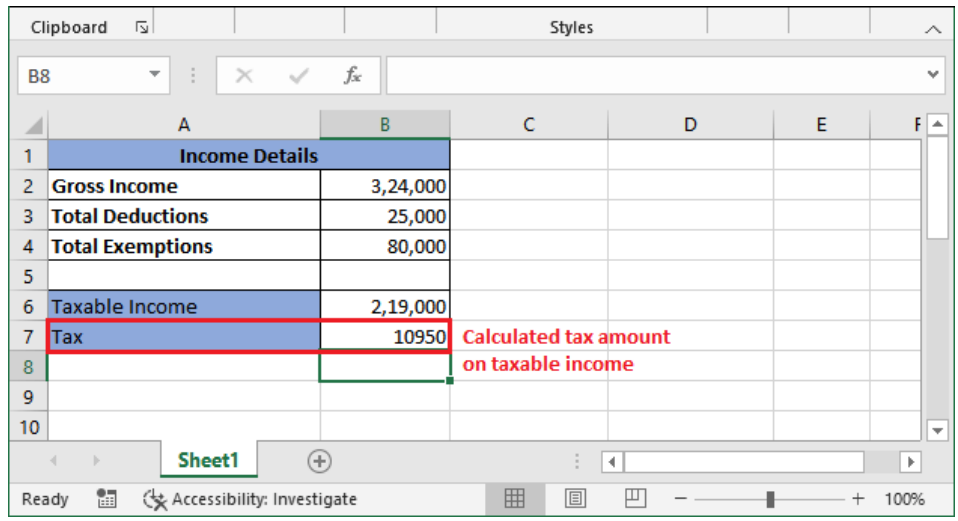
"Tax is 5% on income below 2,50,000." As the taxable value is between 1.5 to 2.5 lakhs so that 5% will apply to income.

5) Now, calculate the tax on extracted taxable value. Apply the following formula in cell

B7: =B6*5/100



6) Press the Enter key and get the income tax value calculated on the taxable income. See that the returned tax value is 10,950.



Conclusion : Now, for this income, this user needs to pay 10950 rupees as the income tax.

4.9 Calculation of Inventory

Inventory is basically products, goods, raw material which are not utilized by the business and expected to be used. So basically, businesses produce goods to sell in the market and the products which are still lying with the business are part of the inventory.

Inventory is part of a company's balance sheet and is categorized under current assets. The reason is that it is expected that it will be sold in the coming months.

If a company has too much inventory, it means that the company is not able to sell the products and it can result in cash flow problems and eventual losses because inventory will become obsolete.

On the other hand if it is very less, it means that business is not able to cope up with the demand and it can result in loss of clients and businesses.

Another key point to keep in mind is that Inventory is reported at its cost and not at its selling price.

Simple Example for inventory calculation : Let say company A has an opening inventory balance of 50,000 for the month of July. During the remaining financial year, the company has made purchases amounting 20,000 and during that time, on the company's income statement, the cost of goods sold is 40,000.

	A	B
4		
5	**Particulars**	**Amounts**
6	Beginning Inventory	50,000
7	Inventory Purchases	20,000
8	Cost of Goods Sold	40,000
9		

Ending Inventory = Beginning Inventory + Inventory Purchases – Cost of Goods Sold

	A	B	C	D	E	F
4						
5	**Particulars**	**Amounts**				
6	Beginning Inventory	50,000				
7	Inventory Purchases	20,000				
8	Cost of Goods Sold	40,000				
9						
10	Ending Inventory is calculated using the formula given below					
11	**Ending Inventory = Beginning Inventory + Inventory Purchases – Cost of Goods Sold**					
12						
13	**Ending Inventory Formula**	**=B6+B7-B8**				
14	**Ending Inventory**	**30,000**				
15						

Ending inventory = 50,000 + 20,000 – 40,000

Ending inventory = 30,000

4.10 Calculation of Reconciliation

A bank reconciliation statement (BRS) is a statement of the document which measures and compares the cash balance (respective company's balance sheet) to the corresponding amount on the respective bank statement. The main purpose to compare those accounts, i.e., to reconcile those accounts is to identify whether there is any need for accounting changes.

Bank reconciliation will be measured and closed at the regular interval of time.

It helps the company or an organization to make sure that all their cash records are correct. Thus, it is easy for a company to detect in case of any cash manipulation or even fraud.

In simple words, a bank reconciliation statement (BRS) is a document that will be prepared for reconciling the dissimilarities between the balance as per the passbook given respective date and cash books bank column.

Example : Let's consider a company XYZ. XYZ has a balance as per the passbook of $2000 as of 30th April 2021. It has a balance as per the cash book as of 30th April 2021 of $2150. Additional details are given below.

1) A cheque worth $500 was deposited. But it was not collected by the bank.

2) Recorded – $100 as bank charge in the passbook. But it is not recorded in the cash book.

3) $300 cheque worth has been processed and issued. But it is not presented for payment.

4) Recorded – $150 as bank interest in a passbook. But it is not recorded in the cash book.

Solution:

Particulars	Amount	Amount
PassBook Balance	-	$2000
Add: Deposited, but was not collected check	$500	-
The charges of the bank not recorded on the cash book	$100	$600
Less: Issued check not presented for the payment	$300	-
Received bank interest. But not recorded in cash book	$150	($450)
Cash Book Balance	-	$2150

Exercise Questions

Multiple Choice Questions.

1) The _____ feature in MS word works just like a regular search bar.

a) Tell me b) Show tabs c) Rular d) Backstage view

2) By default, word documents are saved in the _____ file type.

a) .rtf b) .docx c) .txt d) .pdf

3) By default, excel documents are saved in the _____ file type.

a) .rtf b) .docx c) .xls d) .pdf

4) _____ can provide access to websites and email addresses directly from documents.

a) Hyperlink b) Page size c) mail merge d) margin

5) One of the following is not a type of chart.

a) Line b) Bar c) Area d) Flash fill

True or False.

1) Charts in MS Excel help us to present data in graphical form.

2) The Ruler is located at the top and to the left of our document.

3) We cannot change the bullet colors in MS Word.

4) Widescreen slides work best with monitors & projectors.

5) Voucher is a document given to the buyer by the seller to collect payment.

Short answer or define.

1) Mail merge

2) AutoFill in MS excel

3) Formulae in MS excel

4) Conditional formatting

5) Invoice

Long answers.

1) How to create a document in MS Word and save it?

2) Explain Mail Merge.

3) How to print documents?

4) What are features of MS Excel?

5) How can we create formulas in MS Excel?

6) Write a short note on inbuilt functions.

7) How to create charts in MS Excel?

8) What are the types of charts?

9) How to sort & filter data?

10) Write a short note on conditional formatting in MS Excel.

11) Write a short note on :

a) Calculation of Salary

` b) TDS

c) Reconciliation & Inventory

d) Taxes

12) Write a short note on Presentations.

13) How to apply themes in presentations?

14) Write a short note on transitions.

15) What are the views of presentations?

16) How to insert images in slides?

17) How to apply animations in slides?

18) Write a short note on vouchers, invoices & reports.

References :

1. https://edu.gcfglobal.org/en/
2. www.geeksforgeeks.org
3. www.tutorialspoint.com
4. www.javatpoint.com
5. www.udemy.com
6. www.computerhope.com
7. www.wikihow.com
8. www.techonthenet.com
9. www.investopedia.com
10. www.wallstreetmojo.com
11. www.accountingtools.com
12. www.profitbooks.net
13. www.zoho.com
14. www.datapine.com

❖❖❖❖

3

WEB

Unit Structure

3.0 OBJECTIVES

After studying this chapter you should be able to understand.

- The difference between Internet and WWW
- Working and type of web browsers
- The different searching tools
- Steps to download data from internet

3.1 WHAT IS INTERNET? DEFINITION, USES, WORKING, ADVANTAGES AND DISADVANTAGES

Internet is the foremost important tool and the prominent resource that is being used by almost every person across the globe. It connects millions of computers, webpages, websites, and servers. Using the internet we can send emails, photos, videos, messages to our loved ones. Or in other words, the internet is a widespread interconnected network of computers and electronics devices(that support internet). It creates a communication medium to share and get information online. If your device is connected to the Internet then only you will be able to access all the applications, websites, social media apps, and many more services. Internet nowadays is considered as the fastest medium for sending and receiving information.

Origin Of Internet: The internet came in the year 1960 with the creation of the first working model called ARPANET (Advanced Research Projects Agency). It allowed multiple computers to work on a single network that was their biggest achievement at that time. ARPANET use packet switching to communicate multiple computer systems under a single network. In October 1969, using ARPANET first message was transferred from one computer to another. After that technology continues to grow.

How is the Internet set up?

The internet is set up with the help of physical optical fiber data transmission cables or copper wires and various other networking mediums like LAN, WAN, MAN, etc. For accessing the Internet even the 2g, 3g, and 4g services and the wifi require these physical cable setup to access the Internet. There is an authority named ICANN (Internet Corporation for Assigned Names and Numbers) located in the USA which manages the Internet and protocols related to it like IP addresses.

How does the internet works?

The actual working of the internet takes place with the help of clients and servers. Here the client is a laptop that is directly connected to the internet and servers are the computers connected indirectly to the Internet and they are having all the websites stored in those large computers. These servers are connected to the internet with the help of ISP (Internet Service Providers) and will be identified with the IP address. Each website has its Domain name as it is difficult for any person to always remember the long numbers or strings. So, whenever you search any domain name in the search bar of the browser the request will be sent to the server and that server will try to find the IP address from the Domain name because it cannot understand the domain name. After getting the IP address the server will try to search the IP address of the Domain name in a Huge phone directory that in networking is known as a DNS server (Domain Name Server). For example, if we have the name of a person and you can easily find the Aadhaar number of him/her from the long directory as simple as that.

So after getting the IP address the browser will pass on the further request to the respective server and now the server will process the request to display the content of the website which the client wants. If you are using a wireless medium of Internet like 3g and 4g or other mobile data then the data will start flowing from the optical cables and will first reach to towers from there the signals will reach your cell phones and Pc's through electromagnetic waves. And if you are using routers then optical fiber connecting to your router will help in connecting those light-induced signals into electrical signals and with the help of ethernet cables internet reaches your computers and hence the required information.

What is an IP address?

IP address stands for internet protocol address. Every PC/Local machine is having an IP address and that IP address is provided by the Internet Service Providers (ISP's). These are some sets of rules which govern the flow of data whenever a device is connected to the Internet. It differentiates computers, websites, and routers. Just like human identification cards like Aadhaar cards, Pan cards, or any other unique identification documents. Every laptop and desktop has its own unique IP address for identification. It's an important part of internet technology. An IP address is displayed as a set of four-digit like 192.154.3.29. Here each number on the set ranges from 0 to 255. Hence, the total IP address range from 0.0.0.0 to 255.255.255.255.

You can check the IP address of your Laptop or desktop by clicking on the windows start menu ->then right click and go to network ->in that go to status and then Properties their you can see the IP address. There are four different types of IP addresses are available:

1. Static IP address
2. Dynamic IP address
3. Private IP address
4. Public IP address

3.2 WORLD WIDE WEB

The worldwide web is a collection of all the web pages, web documents that you can see on the Internet by searching their URLs (Uniform Resource Locator) on the Internet. For example, www.geeksforgeeks.org is a URL of the GFG website and all the content of this site like webpages and all the web documents are stored on the worldwide web. Or in other words, the world wide web is an information retrieval service of the web. It provides users a huge array of documents that are connected to each other by means of hypertext or hypermedia links. Here, hyperlinks are known as electronic connections that link the related data so that users can easily access the related information and hypertext allows the user to pick a word or phrase from text, and using this keyword or word or phrase can access other documents that contain additional information related to that word or keyword or phrase. World wide web is a project which is created by Timothy Berner's Lee in 1989, for researchers to work together effectively at CERN. It is an organization, named World Wide Web Consortium (W3C), which was developed for further development in the web.

Difference between World Wide Web and Internet

Internet	WWW
The Internet allows you to link your computer to any other computer on the planet.	The World Wide Web is a collection of information accessible through the Internet.
The Internet is a worldwide network of interconnected computer networks that connect devices using the TCP/IP protocol.	The World Wide Web refers to HTML-formatted online material that may be accessed using the HTTP protocol.
The Internet can be compared to a large bookstore.	The web can be considered as a store with a collection of books.
Internet is superset of WWW.	The World Wide Web is a subset of the Internet.
It first appeared in the late 1960s.	Tim Berners-Lee, an English scientist, created the World Wide Web in 1989.
The Internet is mostly based on hardware.	In comparison to the Internet, the WWW is more software-oriented.

Uses of the Internet

Some of the important usages of the internet are:

1. **Online Businesses (E-commerce):** Online shopping websites have made our life easier, e-commerce sites like Amazon, Flipkart, Myntra are providing very spectacular services with just one click and this is a great use of the Internet.

2. **Cashless transactions:** All the merchandising companies are offering services to their customers to pay the bills of the products online via various digital payment apps like Paytm, Google pay, etc. UPI payment gateway is also increasing day by day. Digital payment industries are growing at a rate of 50% every year too because of the INTERNET.

3. **Education:** It is the internet facility that provides a whole bunch of educational material to everyone through any server across the web. Those who are unable to attend physical classes can choose any course from the internet and can have the point-to-point knowledge of it just by sitting at

home. High-class faculties are teaching online on digital platforms and providing quality education to students with the help of the Internet.

4. Social Networking: The purpose of social networking sites and apps is to connect people all over the world. With the help of social networking sites, we can talk, share videos, images with our loved ones when they are far away from us. Also, we can create groups for discussion or for meetings.

5. Entertainment: The Internet is also used for entertainment. There are numerous entertainment options available on the internet like watching movies, playing games, listening to music, etc. You can also download movies, games, songs, TV Serial, etc., easily from the internet.

Advantages of the Internet

1. **Online Banking and Transaction:** The Internet allows us to transfer money online by the net banking system. Money can be credited or Debited from one account to the other.

2. **Education, online jobs, freelancing:** Through the Internet, we are able to get more jobs via online platforms like Linkedin and to reach more job providers. Freelancing on the other hand has helped the youth to earn a side income and the best part is all this can be done via INTERNET.

3. **Entertainment:** There are numerous options of entertainment online we can listen to music, play games can watch movies, web series, listening to podcasts, youtube itself is a hub of knowledge as well as entertainment.

4. **New Job roles:** The Internet has given us access to social media, and digital products so we are having numerous new job opportunities like digital marketing and social media marketing online businesses are earning huge amounts of money just because the internet being the medium to help us to do so.

5. **Best Communication Medium:** The communication barrier has been removed from the Internet. You can send messages via email, Whatsapp, and Facebook. Voice chatting and video conferencing are also available to help you to do important meetings online.

6. **Comfort to humans:** Without putting any physical effort you can do so many things like shopping online it can be anything from stationeries to clothes, books to personal items, etc. You can books train and plane tickets online.

7. **GPS Tracking and google maps:** Yet another advantage of the internet is that you are able to find any road in any direction, areas with less traffic with the help of GPS in your mobile.

Disadvantages of the Internet

1. **Time wastage:** Wasting too much time on the internet surfing on social media apps and doing nothing decreases your productivity rather

than wasting time on scrolling social media apps one should utilize that time in doing something skillful and even more productive.

2. **Bad impacts on health**: Spending too much time on the internet causes bad impacts on your health physical body needs some outdoor games exercise and many more things. Looking at the screen for a longer duration causes serious impacts on the eyes.

3. **Cyber Crimes:** Cyberbullying, spam, viruses, hacking, and stealing data are some of the crimes which are on the verge these days. Your system which contains all the confidential data can be easily hacked by cybercriminals.

4. **Effects on children:** Small children are heavily addicted to the Internet watching movies, games all the time is not good for their overall personality as well as social development.

5. **Bullying and spreading negativity:** The Internet has given a free tool in the form of social media apps to all those people who always try to spread negativity with very revolting and shameful messages and try to bully each other which is wrong.

Can You Use the Web Without the Internet?

It's not really possible to browse the web without using the internet. To access a web resource (like a website) that's on another server, you have to use the internet to connect to it. Otherwise, your device has no connection to the network that the other device is on.

The Web is distinguished from other systems by its use of HTTP (Hypertext Transfer Protocol), which in turn is just a system for standardizing the use of HTML (HyperText Markup Language). HTML is the language of the Web, and HTTP is the grammar rules for using it. In the same way that English is the language of business or French the language of love, HTML is the language of the Web.

Accessing the Web requires a Web browser (like Internet Explorer, Chrome, Safari or Firefox) to make sense of HTML and allow Web pages to display properly.

3.3 WHAT IS WEB BROWSER?

Web Browsers are software installed on your PC. To access the Web, you need a web browser, such as Netscape Navigator, Microsoft Internet Explorer or Mozilla Firefox.

On the Web, when you navigate through pages of information, this is commonly known as web browsing or web surfing.

There are some leading web browsers − Edge, Chrome, Firefox, and Safari, but there are many others browsers available.

Internet Explorer

Internet Explorer (IE) is a product from software giant Microsoft. This is the most commonly used browser in the universe. This was introduced in 1995 along with Windows 95 launch and it has passed Netscape popularity in 1998.

Google Chrome

This web browser is developed by Google and its beta version was first released on September 2, 2008 for Microsoft Windows. Today, chrome is known to be one of the most popular web browsers with its global share of more than 50%.

Mozilla Firefox

Firefox is a new browser derived from Mozilla. It was released in 2004 and has grown to be the second most popular browser on the Internet.

Safari

Safari is a web browser developed by Apple Inc. and included in Mac OS X. It was first released as a public beta in January 2003. Safari has very good support for latest technologies like XHTML, CSS2 etc.

Opera

Opera is smaller and faster than most other browsers, yet it is full-featured. Fast, user-friendly, with keyboard interface, multiple windows, zoom functions, and more. Java and non Java-enabled versions available. Ideal for newcomers to the Internet, school children, handicap and as a front-end for CD-Rom and kiosks.

Konqueror

Konqueror is an Open Source web browser with HTML 4.01 compliance, supporting Java applets, JavaScript, CSS 1, CSS 2.1, as well as Netscape plugins. This works as a file manager as well as it supports basic file management on local UNIX filesystems, from simple cut/copy and paste operations to advanced remote and local network file browsing

What is a Web browser? [Definition]

A web browser is basically a client program that connects with the webserver for any information as per the request of the user. After the request is received the webserver circulates the data back to the browser

and later it displays the results on the screen of the user. In the background, the browser sends a request to the Web servers all across the internet by using HTTP - Hypertext Transfer Protocol.

Features of Web Browser

These are most common features of web browsers.

1. **Home button**: The home button helps you to go to the predefined homepage of any website.

2. **Refresh button**: You can reload the web pages of any website by using the refresh button. At times due to the caching mechanism, you are unable to know the updated information. In such cases, when you hit the refresh button, you are able to see that particular information.

3. **Stop button**: if you wish to disconnect the connection between the web browser and the server you can use the stop button. For instance, if there is any outside attack of malicious content on the browser, you can protect yourself with the help of this button.

4. **Web address bar**: the space where you enter any web address is known as the web address bar.

5. **Bookmarks**: bookmarks help you to save a particular website on your device for later use.

6. **Tabbed browsing**: you can access multiple websites in a single window with the help of tabbed browsing. For instance, whenever you search for a topic on your browser, you get a list of options in front of you. You can open several tabs by clicking right on every link. This is tabbed browsing.

What is URL?

Every website has a unique address that is known as a uniform resource locator or URL. It is like the address of your house, but instead of land, it is on the internet. Whenever you type any URL in the address bar of the browser and hit enter, the browser redirects you to the page tagged along with that URL. For instance, www.abc.com.

A URL consists of the following:

- To access any resource, it uses the HTTP protocol.
- A fragment identifier is used.
- It defines the location of any server with the help of IP addresses.

History of Web Browsers

The first-ever web browser was WORLD WIDE WEB, developed by Tim Berners-Lee in the year 1990. After two years, a text-based browser

named the Lynx browser was launched. It had several limitations, for instance, it was unable to display the graphical content.

Moving forward, in the year 1993, the first popular browser in the world was introduced known as Mosaic. After improvising a few aspects, Netscape Navigator came into the picture, in the year 1994. Then came the Internet Explorer, launched by the tech giant Microsoft, in the year 1995.

A few years later in 2003, Apple launched its own browser known as Safari, specially built for Mac computers. Later in 2004, Mozilla launched Firefox. In 2008, the most popular browser of today, Google Chrome was invented. After that, Opera Mini, a mobile-based browser, was released in 2011. In 2015, the Microsoft Edge browser entered the market.

Different types of web browser

There is an ample list of web browsers available for your use, but the most common ones are here with an elaborated explanation. For instance, Internet Explorer, Mozilla Firefox, Google Chrome, Safari, and Microsoft Edge.

1. Internet Explorer

The software giant Microsoft launched this product back in 1995. Internet Explorer ruled the market at one time. It was one of the most popularly used web browsers.

Features :

i. Smart search suggestion

ii. Enhanced performance

iii. 33 language support

iv. Reader mood to view a webpage

Microsoft has currently discontinued Internet Explorer.

2. Mozilla Firefox

Mozilla Firefox has managed to be on the list of most popular browsers over the internet. It was launched in 2004. You can avail of this web browser on Windows, Mac, as well as Linux operating systems.

Features :

i. High security and performance

ii. Fast page loading

iii. 75 language support

iv. Inbuilt download manager

v. Backed by a gecko engine

3. Google Chrome

Google Chrome is a web browser that has brought a tremendous revolution in the history of web browsers. At present, it is the most widely used browser. It is known for its strong browser performance.

Features :

i. Theme support

ii. Extremely fast and secure

iii. Fast page loading

iv. 50 language support

v. Incognito mode and new tabs

4. Safari

Apple Inc. invented this web browser. By default, this web browser is present on all Apple devices. Safari supports the latest technologies like XHTML, CSS2, etc.

Features :

i. Smart address bar

ii. Full-screen video and geolocation

iii. Extended support for HTML5

iv. Tabbed browsing

v. Private browsing

5. Microsoft Edge

Microsoft Edge was invented by the tech giant Microsoft in 2015. It replaced internet explorer as the default web browser on all its devices. Features :

1) Implementation of Cortana

2) Reading view

3) Doodle on a web page

4) Integrated share panel

5) Newsfeed on the startup page

6. Opera

Opera is a powerfully packed full-featured web browser. It is smaller than other competitors. This browser is designed majorly for mobile phones or

smartphones. It uses the Java ME platform which is ideal for everyone as it is user-friendly and fast.

7. Netscape Navigator

Netscape Navigator was released in 1994 by Netscape. Once internet explorer hit the market, the usage of Netscape sharply decreased.

8. Tor browser

Tor works on the concept of onion routing. Onion routing has nested layers that are responsible to encrypt data multiple times.

Features :

i. Cross-platform availability

ii. Anonymous usage of servers

iii. You can visit locked websites

iv. Does not reveal the IP of the source

v. Portable

3.4 Information Searching Tools

Internet has in offer a variety of search tools such as search engines, search directories to locate the information on web.

A search on web is a simple process and can be conducted by simply issuing a query to the search tool. The search tool in return will look for the information in its web based information databases and retrieves those, which are relevant to the query. Searching is an iterative process i.e. one needs to keep working on their query unless the exact information is located.

The very first tool used for searching on the Internet was Archie. The name stands for "archive" without the "v." It was created in 1990 by Alan Emtage, a student at McGill University in Montreal. Veronica (Very Easy Rodent-Oriented Net-wide Index to Computerised Archives) and Jughead (Jonsy's Universal Gopher Hierarchy Excavation And Display) were two other popular search programs.

There are three basic types of search tools that most people use to find what they are looking for on the Web: Search Engines, Subject Directories and Meta Search Tools.

SEARCH ENGINES

Search engine is a tool for locating information from a collection. Search engines uses information about the information (such as metadata, catalogue) stored in the database to locate information. Sometimes they perform full text search within the document from first character to last character.

The search is done on pattern matching algorithm whether it is a database or full text.

TYPES OF SEARCH TOOLS

- **Search Directory**

Search directories are classified collections of documents. They are good for searching with a context. These directories are good for browsing. In subject directories, documents are pre classified by a person. Librarians' Internet Index; Google Directory; Yahoo!; dmoz are some of the examples of subject directories.

There are two basic types of directories:

❖ Academic and Professional Directories: These are often created and maintained by subject experts to support the needs of researchers. INFOMINE, from the University of California, is a good example of an academic directory.

❖ Commercial Directories: These cater to the needs of general public. Directories of Yahoo! and Google are examples of commercial directories.

- **Search Engines**

World Wide Web is a network of several information databases. In recent years, an exponential growth in these databases has made it difficult to locate a particular piece of information. Internet offers a powerful tool known as search engine to manage, filter and retrieve the information for their users.

Search engines are automated tools for searching information from a collection using metadata stored in the database of search engine. In other words, it is an information retrieval system and assists in locating information on web.

Google and Yahoo! are most popular search engines.

- **Meta-search Engines**

Meta Search engines are online tools (search engines) which performs simultaneous search on more than one search engine at a time. These search engines aggregates the results into a single list and displays them according to their source. e.g. Dogpile is a metasearch engine and gets its results from Google, Yahoo, MSN Search, Ask , About, MIVA, LookSmart, and more.

Example: Dogpile, WebCrawler, Browsys

FEATURES OF SEARCH TOOLS

The searching tools follows pattern matching algorithm. There are many types of searches can be done using search tools. Some searching types given below.

- **Keyword Search**

When searching is done using a keyword it is known as Keyword searching. Keyword may occur at any place in the document or in the metadata field. This kind of search has higher recall value.

- **Boolean Search**

Logical AND, OR and NOT are known as Boolean operators. When Boolean operators are used for searching it is known as Boolean search. The operators are used for combining more than one word with certain conditions. These kind of searching also known as Combinatorial search.

❖ **AND**

This operator will retrieve all the documents which contains all the keywords occurring at both ends of the AND operator.

Syntax: <Search Term A> AND <Search Term B>

Example: Library AND Information

Output:

1) The above query will retrieve only those documents which contains both the terms

Library and Documentation

2) The precision in search is more. The number of documents retrieved will be less hence less is the recall value.

❖ **OR**

This operator will retrieve all the documents which contains all the keywords occurring at both ends of the OR operator.

Syntax: <Search Term A> OR <Search Term B>

Example: Library OR Information

Output:

1) The above query will retrieve all documents which contains both the terms Library and Documentation

2) The recall in search is more. The number of documents retrieved will be more but the precision in retrieved documents will be less.

❖ **NOT or AND NOT**

These operators increase the precision of the search result. The query can be made more specific by using these operators. Using the capitalised AND NOT operator preceding a search term eliminates documents that contain that term.

Syntax

<Words to be searched> AND NOT <Words not to be searched>

Example:

If user is looking for information on Drivers and do not want documents that include information relating to the Screw Drivers the query could be "Driver" AND NOT Screw.

Search Engine Components

Generally there are three basic components of a search engine as listed below:

- Web Crawler
- Database
- Search Interfaces
- **Web crawler**

It is also known as spider or bots. It is a software component that traverses the web to gather information.

- **Database**

All the information on the web is stored in database. It consists of huge web resources.

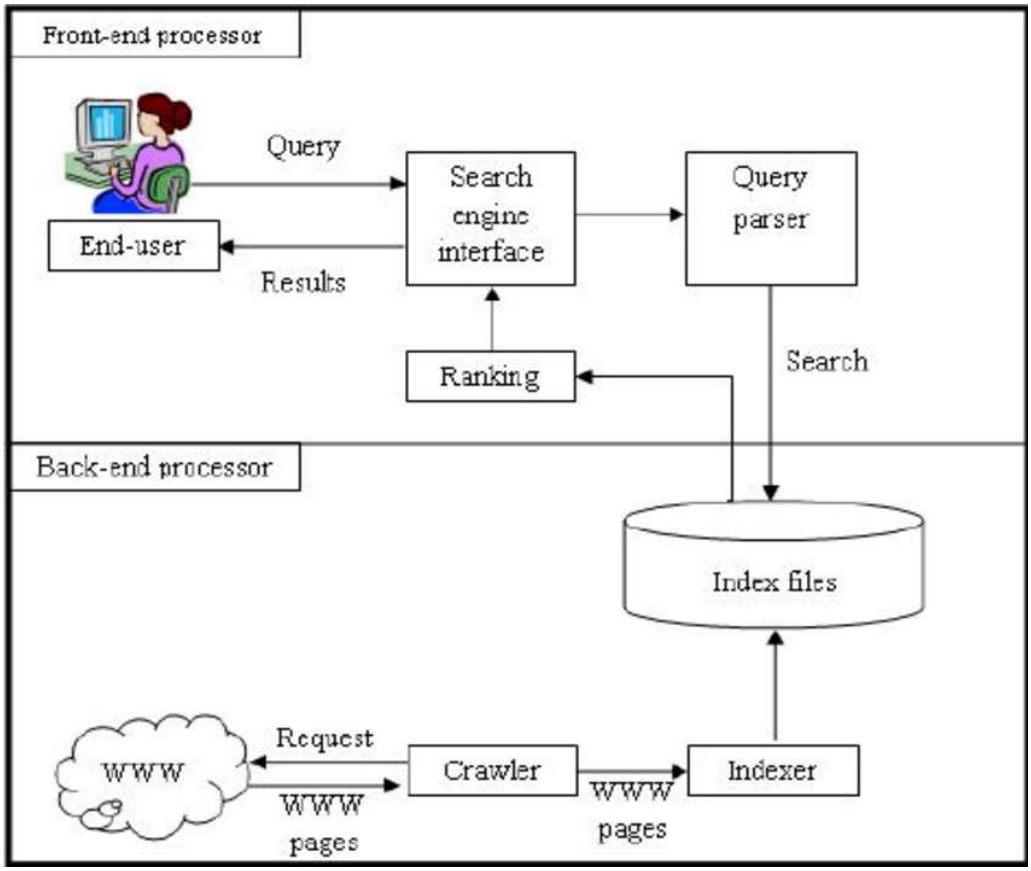
- **Search Interfaces**

This component is an interface between user and the database. It helps the user to search through the database.

Search Engine Working

Web crawler, database and the search interface are the major component of a search engine that actually makes search engine to work. Search engines make use of Boolean expression AND, OR, NOT to restrict and widen the results of a search. Following are the steps that are performed by the search engine:

- The search engine looks for the keyword in the index for predefined database instead of going directly to the web to search for the keyword.
- It then uses software to search for the information in the database. This software component is known as web crawler.
- Once web crawler finds the pages, the search engine then shows the relevant web pages as a result. These retrieved web pages generally include title of page, size of text portion, first several sentences etc.
- User can click on any of the search results to open it.



Architecture and Main components of Standard Search Engine Model

Following are the several search engines available today:

Search Engine	Description
Google	It was originally called BackRub. It is the most popular search engine globally.
Bing	It was launched in 2009 by Microsoft. It is the latest web-based search engine that also delivers Yahoo's results.
Ask	It was launched in 1996 and was originally known as Ask Jeeves. It includes support for match, dictionary, and conversation question.
AltaVista	It was launched by Digital Equipment Corporation in 1995. Since 2003, it is powered by Yahoo technology.
AOL.Search	It is powered by Google.
LYCOS	It is top 5 internet portal and 13th largest online property according to Media Matrix.
Alexa	It is subsidiary of Amazon and used for providing website traffic information.

3.5 DOWNLOADING

What is downloading?

Downloading is the transmission of a file or data from one computer to another over a network, usually from a larger server to a user device. Download can refer to the general transfer of data or to transferring a specific file. It can also be called to download, DL or D/L.

All internet use requires downloading data. While browsing websites or using apps, the computer or mobile device is downloading data. This data could be the text, images or videos used on the pages or apps that users visit. Most of this data is only kept for long enough for it to be used once and then removed from the device.

When users want to keep the data on their device, they download the data to it. This could be a file, document or app that they want to keep permanently. When they download it, users make a copy of the data from what is on the central computer, called the server.

In general use, the word download is used for both the process of copying the data and for the resulting file. Download is also mostly used in the context of copying data from a larger central server. While not a hard-and-fast rule, if the data is moving between two peer client devices or between two pieces of local data storage, such as from a compact disc to a hard disk drive, it would be called transferring data and not downloading.

Taking data or a file from a client device and copying it to a server is called an upload.

What is download speed?

Download speed is a measure of how much data can be transferred from an arbitrary internet location to a user's device in a second. It is typically measured in megabits per second (Mbps). The higher the number, the faster the connection. The maximum capacity to transfer data of a wired or wireless network in a certain amount of time is referred to as bandwidth.

For most home or personal internet connections, the upload speed is lower than the download. This is because, for most people, they need to download far more data than they need to upload, so downloads are prioritized by the internet service provider (ISP). Businesses may benefit from having the same upload speed as their download; this is called having a symmetrical internet connection.

An ISP will advertise the fastest possible theoretical download speed, but many factors can affect real-world download speed. Older home networking or Wi-Fi routers may not be able to provide fast enough connections to support modern internet connections. Poor cellphone or Wi-Fi signal strength also results in slow downloads. In addition, the speed of the server that users are downloading from may not be especially fast.

For example, large companies have many servers with exceptionally fast internet connections that can support many devices downloading at high speed simultaneously. But smaller companies may only have one server that is easily overwhelmed by many people trying to download something, and the resulting download is slow.

What is the difference between download, cache and stream?

When transferring a file to a device, such as for music or a video, users may have the option to download, cache or stream it. While there is not a hard-and-fast rule for how different companies use these terms, in general, a download is a permanent copy, a cache is a temporary copy and a stream is only copied as it is used.

To download the data means to have a permanent copy. The full data is kept on a local device. Usually, end users manage the copy and have access to use it as much as they want. They may be able to copy it to another device. An example download would be to save a copy of a document to a device so it is always available.

A cached copy is generally a whole copy that is on the device, but it is managed by the program and not the user. It may not be complete and may require that the service be contacted before it can be used again. The program decides how long the cache copy will exist and may delete it as needed. Having cached data is beneficial because less data needs to be transferred and it makes the content available faster. Usually, the user will not be able to use the data outside the program. An example of a cache would be a music service having a cache so the songs don't need to transfer data each time they are played or so that they can be available for offline playback.

A streamed copy is when the data is only sent to the device just before it is needed and is not kept after it has been used. This is most often used for music and movies. Often, only a few moments ahead of what is being viewed is sent to the end-user device. The data is kept in a temporary buffer before it is shown. Once the content is finished, the data is deleted. If the person wants to view it again, another copy needs to be streamed from the server. An example of a stream is when an online video service sends the video data as it is needed, but if the internet is removed, the stream ends.

Ways to download

There are a variety of ways to download data, including the following.

1. Hypertext Transfer Protocol (HTTP) downloads use the same protocol as browsing websites to send the file data. It is the most popular way to download files from the internet. All web browsers use this to download files directly. HTTP does not support pausing or resuming failed downloads natively.

2. File Transfer Protocol (FTP) is one of the oldest protocols for downloading files. It is used by a dedicated program to log on to an FTP server to browse and download. It can be used with passwords and be encrypted by using FTP Secure.

3. Peer-to-peer (P2P) downloads use special clients and protocols to send and receive files without a central host. A popular P2P protocol is BitTorrent.

Download an app, file, or program from the Internet

How to download on a computer using different browsers ?

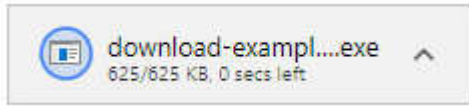
1) To initiate a download from a website, you must first click a download link. A link is usually denoted by different-colored text with an underline, but it may also be an icon or button.

2) After clicking a file link, the browser starts the download or asks what to do, depending on the browser you're using.

Below is additional information on how each modern browser handles downloads.

✔ **Google Chrome**

1) After the download is completed, a prompt appears in the lower-left corner of the browser window.

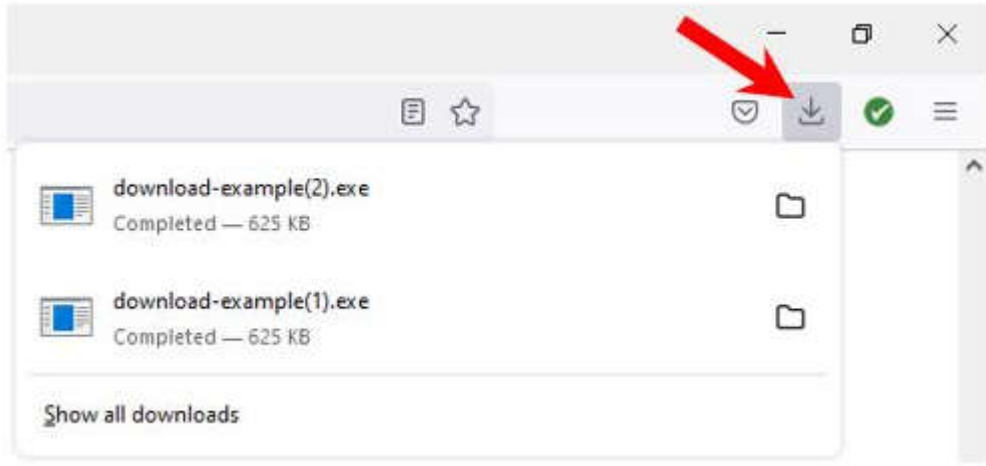


2) Click the downloaded file to open it.

✔ **Mozilla Firefox**

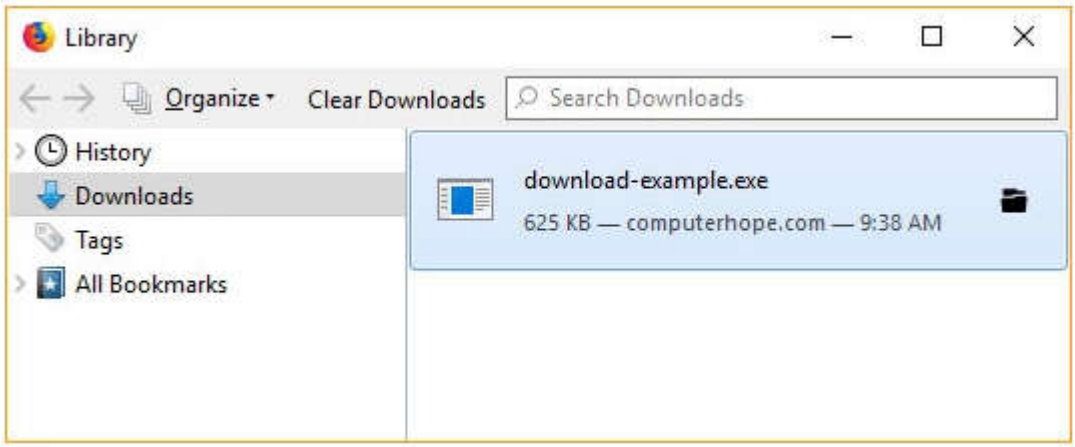
1) After the download has completed, a prompt appears in the center of the browser window. Click Save File and select where to save the file on your computer.

2) After the file is saved, click the downloads progress icon in the upper-right corner of the browser window, and then click the downloaded file to open it.



Alternatively, press Ctrl+J to open the Downloads section of the Library.

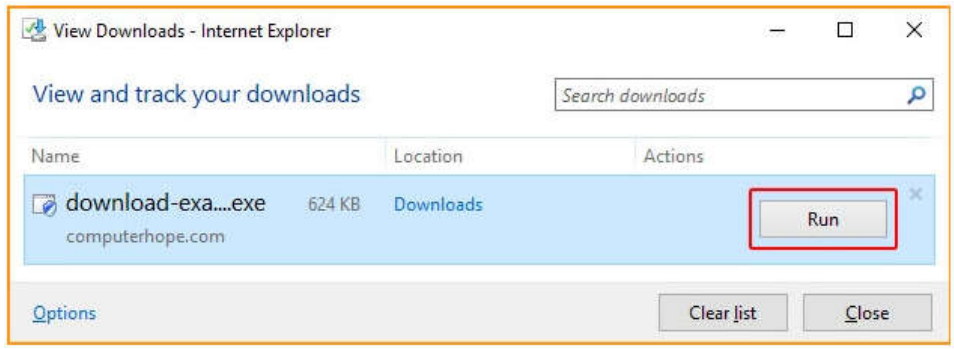
3) In the Library window, double-click the downloaded file to open it.



✔ Internet Explorer

1) After the download is completed, a prompt appears at the bottom of the browser window in the middle. Choose **Run** or **Save** to open the downloaded media.

2) Press Ctrl+J to view your downloads.



3) Click **Run** to open any of the downloaded files.

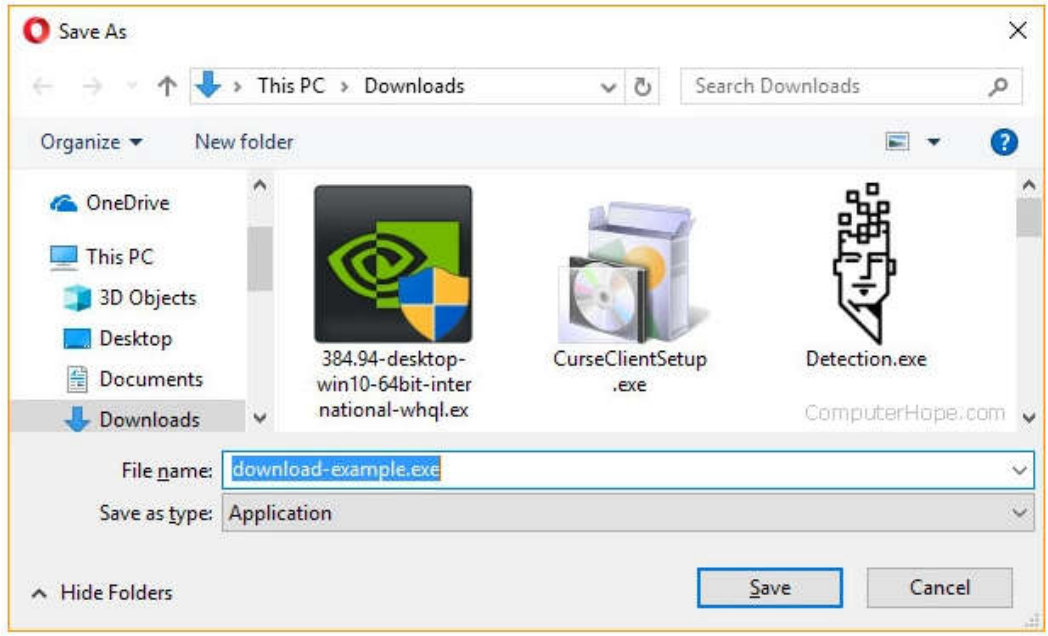
✔ **Microsoft Edge**

1) After the download has completed, press Ctrl+J to view your recent downloads.

2) Click the downloaded file to open it.

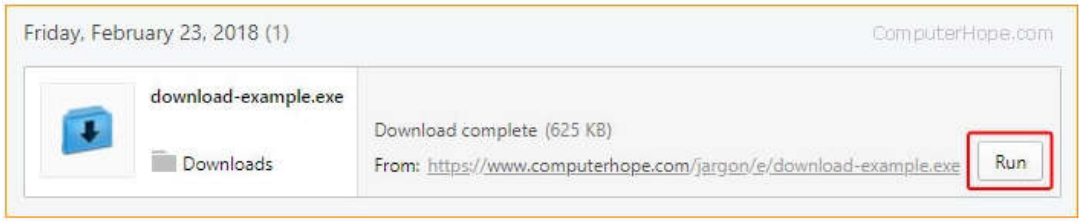
✔ **Opera**

1) After clicking a download link, you are prompted to choose a location where the file should be saved. Select a location and click Save.



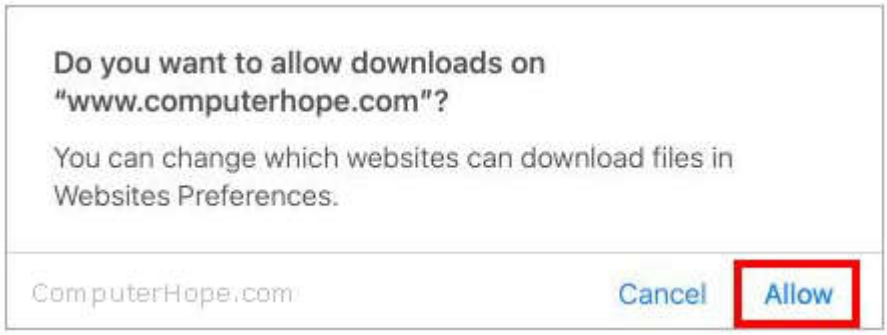
2) When the download completes, press Ctrl+J to view your recent downloads.

3) In the window that appears, locate your downloaded file and click the Run button to open it.

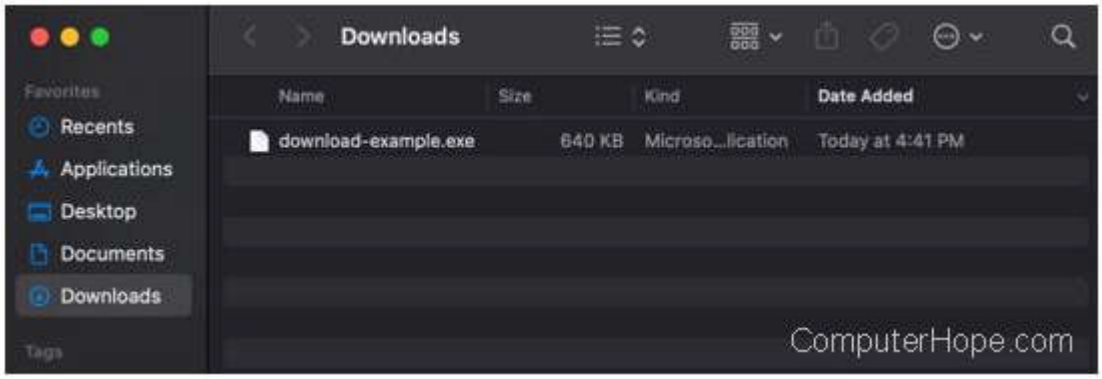


✔ **Safari**

1) Upon clicking a download link, you may be asked if you want to allow downloads from the website. Click Allow.



2) After the download has completed, click the Downloads app in the Dock, usually located next to the Trash app, to view your downloads.



3) Double-click the downloaded file to open it.

How to download on a smartphone or tablet ?

Depending on the type of phone or tablet follow the instructions given below.

✔ **Android phone or tablet**

1) Open the Chrome browser.

2) Navigate to a web page containing a file you want to download.

3) Tap and hold your finger on the file's download link until a menu of options appears, then release your finger.

4) Tap the Download link or Download image option in the menu.

5) If necessary, tap the Download option again, which may be required for some files to complete the download.

6) Open the Downloads or My Files app on your Android phone to view the downloaded files.

✔ **iPhone or iPad**

1) Open the Safari browser.

2) Navigate to a web page containing a file you want to download.

3) Tap and hold your finger on the file's download link until a menu of options appears, then release your finger.

4) Tap the Download Linked File option in the menu.

5) If a small window appears asking if you want to download the file, tap Download.

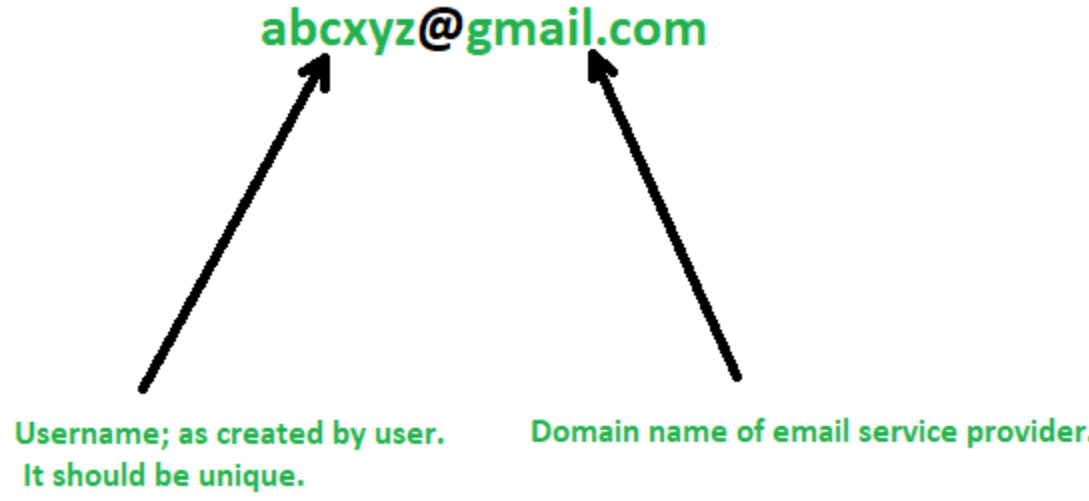
6) To view the downloaded files, click the blue circle icon with a down-pointing arrow inside, located to the right of the address bar.

7) A list of downloaded files is displayed. If compatible with the iPhone, you can tap a file name to view it or execute the file.

3.6 CREATE NEW EMAIL ID

What is an Email Address?

An email address is the identification of an electronic mailbox. It has two parts, namely, a local part and the domain. The local part usually contains the username of the user while the domain name depends on what email service provider you are using. The local part can contain words, numbers, or periods while the domain name depends on what kind of service provider you are using.



The topmost popular email providers are:

- G-mail
- Yahoo Mail
- Microsoft Outlook
- GMX Mail
- Zoho Mail
- iCloud
- AOL Mail
- ProtonMail

Here we will be talking about Gmail which is the most used email service. It provides 15 GB of free storage. Each email sent can be of max 25 MB size, including attachments. Attachment includes documents, photos, and videos. If the total attachment size is more than 25 MB then they get uploaded to Google drive then their link is generated and gets written in the message.

How to create your Email Address?

Step 1: Open Google Chrome on your desktop. Click on Gmail at the top right corner under the bookmarks bar.

Step 2: Click on "**Create Account**".

Step 3: Fill in the credentials and click "**Next**".

Step 4: Provide your mobile number and click on "**Next**".

Step 5: Enter the verification code sent on the number provided. Click on "**Verify**".

Step 6: Fill in the details. Click on "**Next**".

Step 7: Click on "**Yes, I'm in**".

Step 8: Your email ID is now ready to use.

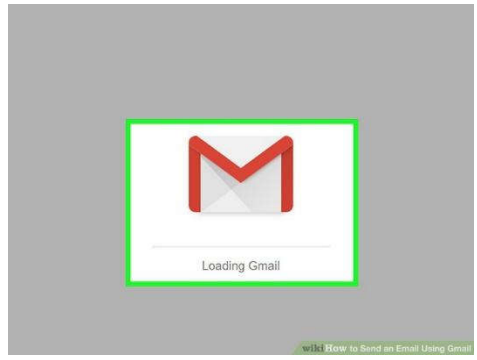
3.7 Sending Data through email.

Taking Gmail for reference :

On Desktop / Laptop

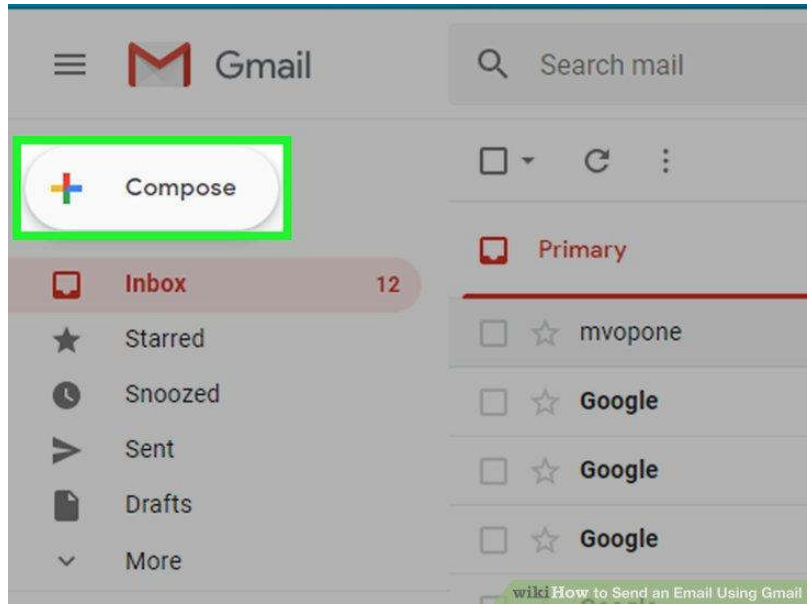
1.Open Gmail. Go to https://www.gmail.com/ in your computer's web browser. This will open your Gmail inbox if you're logged in.

- If you aren't logged into your Gmail account, enter your email address and password when prompted.



2. Click "Compose". It's in the upper-left side of your Gmail inbox. Doing so opens a "New Message" window in the lower-right corner of the page.

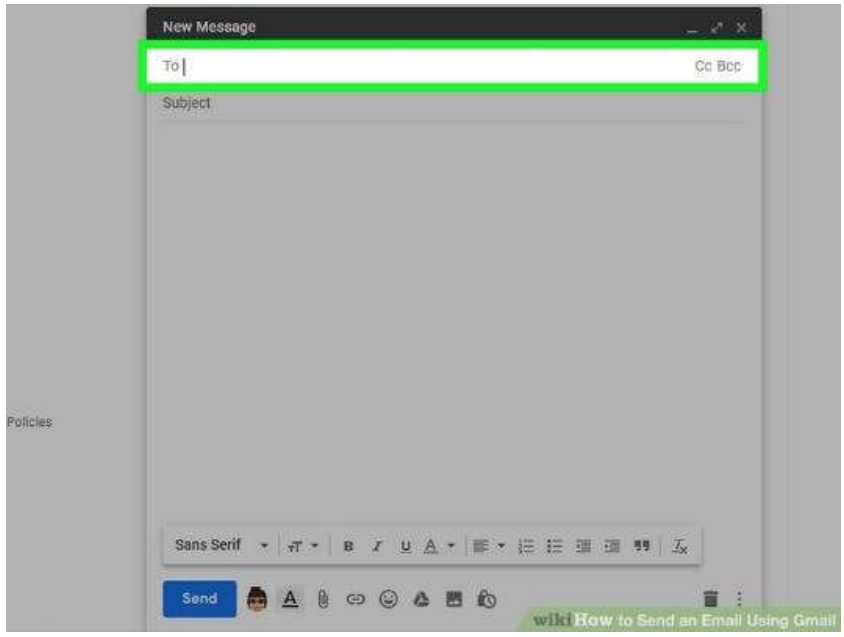
- If you're using the old version of Gmail, you'll click COMPOSE here instead.



3. Enter the other person's email address. Click the "To" or "Recipients" text box at the top of the New Message window, then type in the email address of the person to whom you want to send your email.

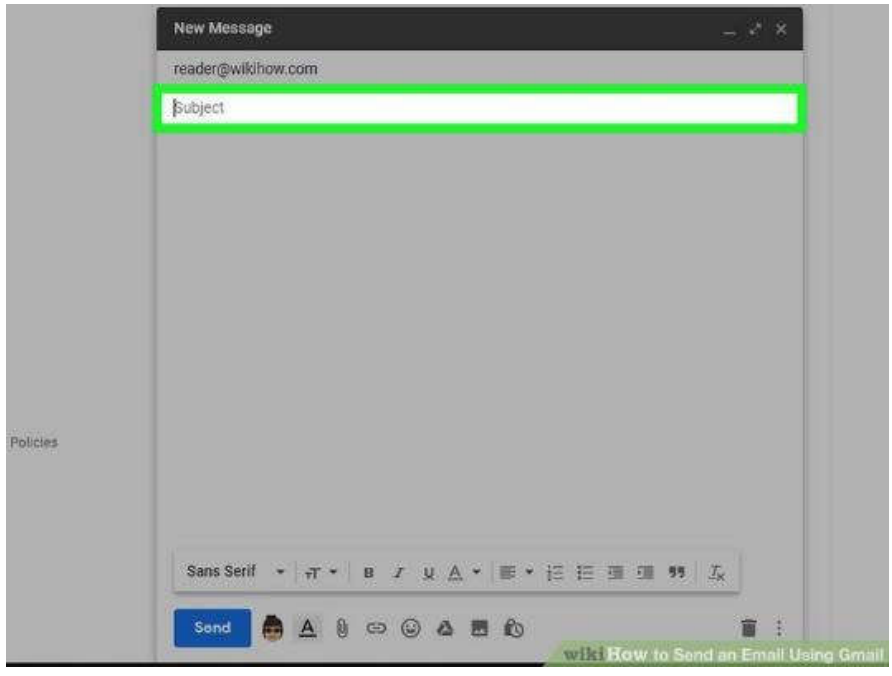
- To add multiple email addresses, type in the first email address, press Tab ↹, and repeat with the other email addresses.

- If you want to CC or BCC someone on the email, click either the Cc link or the Bcc link in the far-right side of the "To" text field, then type the email address you want to CC or BCC into the "Cc" or "Bcc" text field, respectively.

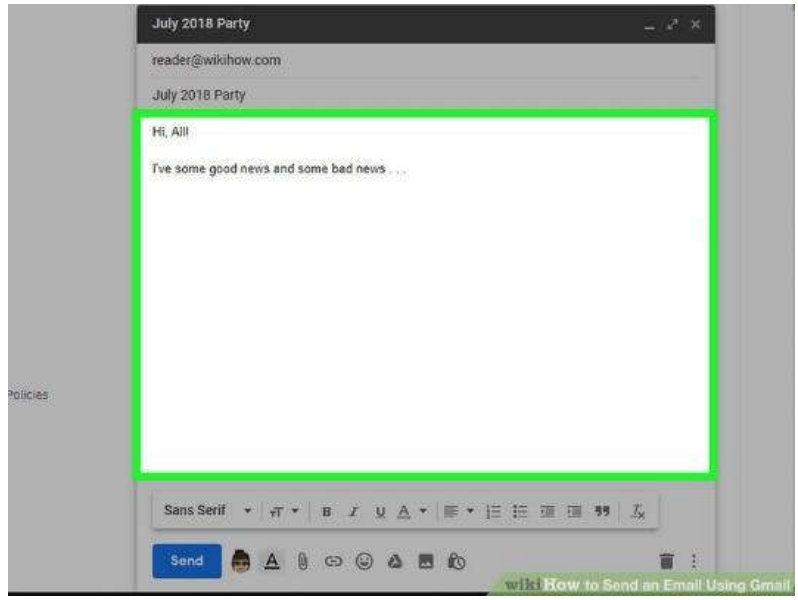


4. **Add a subject**. Click the "Subject" text field, then type in whatever you want the subject of the email to be.

- Typically speaking, an email subject describes the gist of the email's message in a few words.

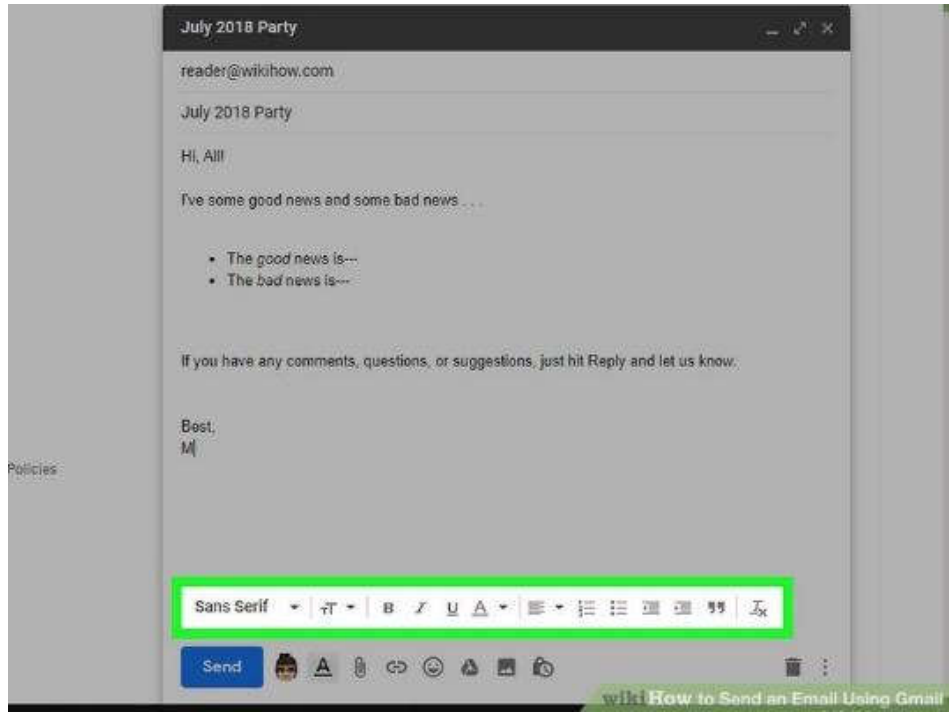


5. Enter your email message. In the large text box below the "Subject" text box, type in whatever you want for your email message.



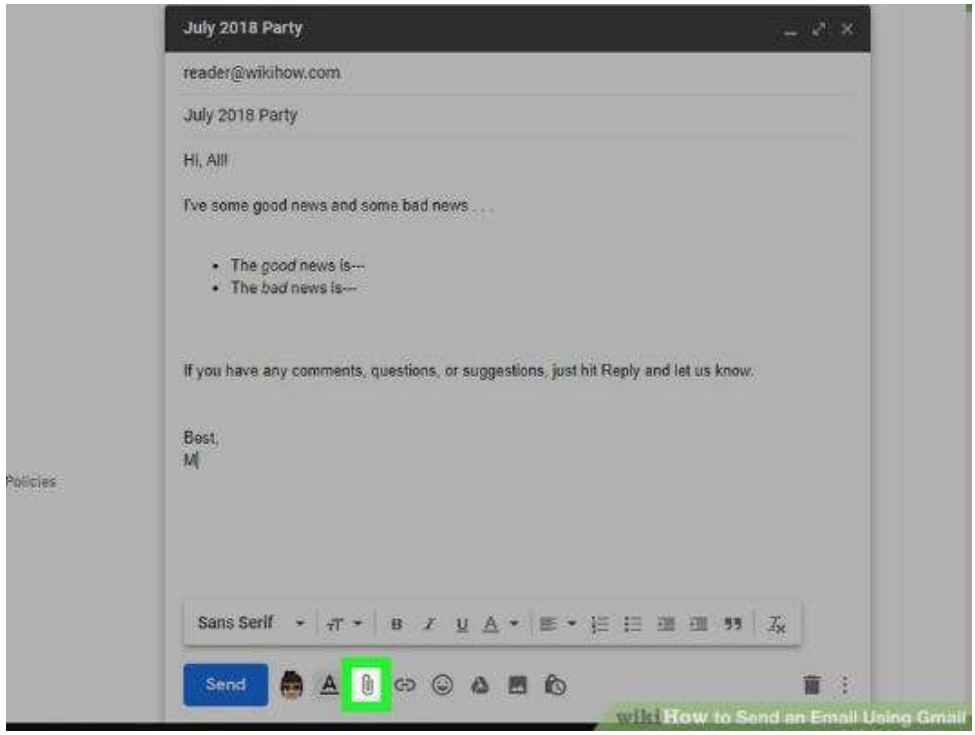
6. Format your email's text if needed. If you want to apply formatting to your text (e.g., bolding, italics, or bullet points), highlight the text to which you want to apply the formatting, then click one of the formatting options at the bottom of the email window.

- For example, to bold a section of text, you would highlight the text and then click B at the bottom of the email.

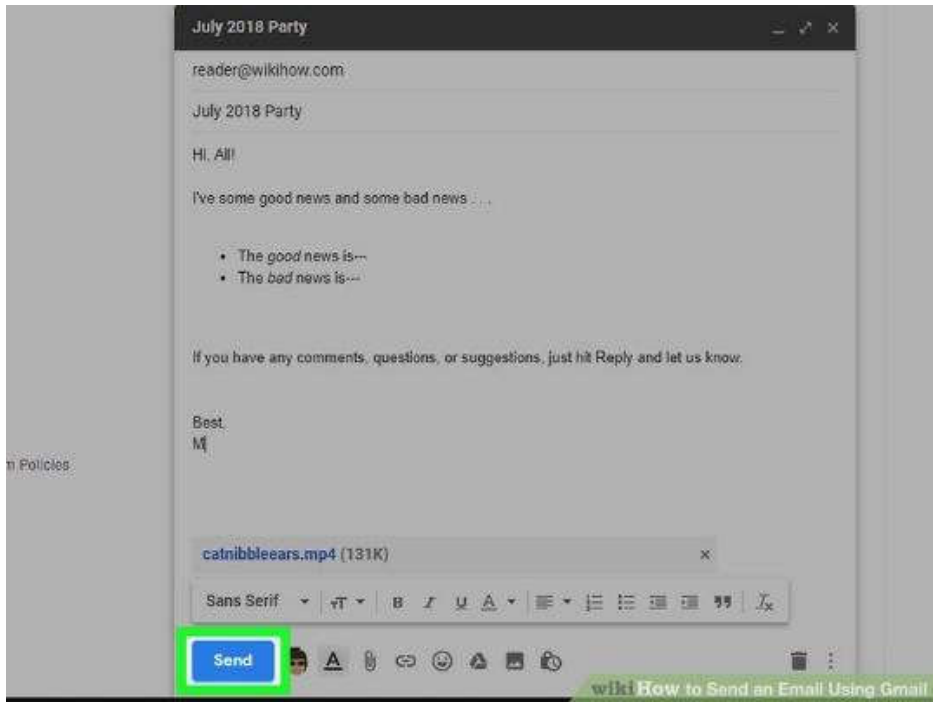


7. Attach a file if you like. To add a file from your computer, click the "Attachments" pin icon at the bottom of the window, then select the file(s) you want to upload and click **Open** (or **Choose** on a Mac).

- You can add photos in this way, or you can upload photos directly to the email's body by clicking the "Photos" icon at the bottom of the window, clicking **Upload**, clicking **Choose photos to upload**, and selecting photos as needed.



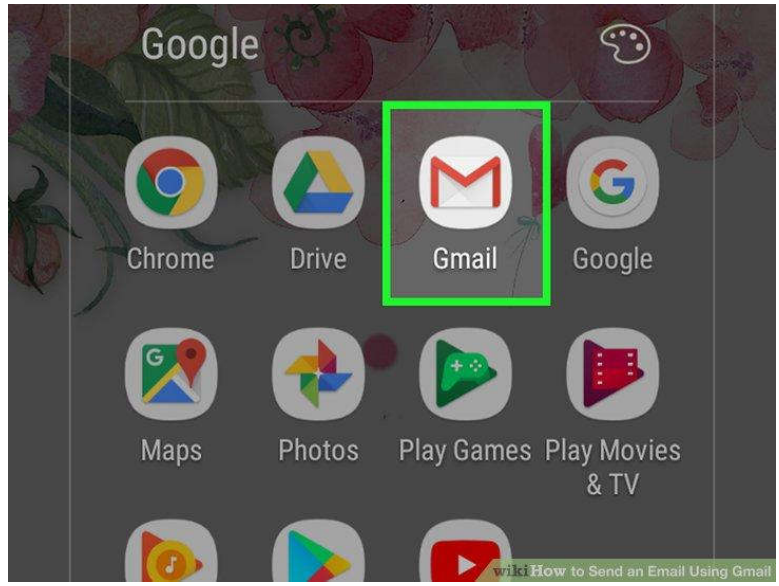
8. **Click Send.** It's a blue button in the bottom-left corner of the email window. Doing so will send your email to the specified email address(es).



On Mobile

1. Open Gmail. Tap the Gmail app icon, which resembles a red "M" on a white background. This will open your Gmail inbox if you're logged in.

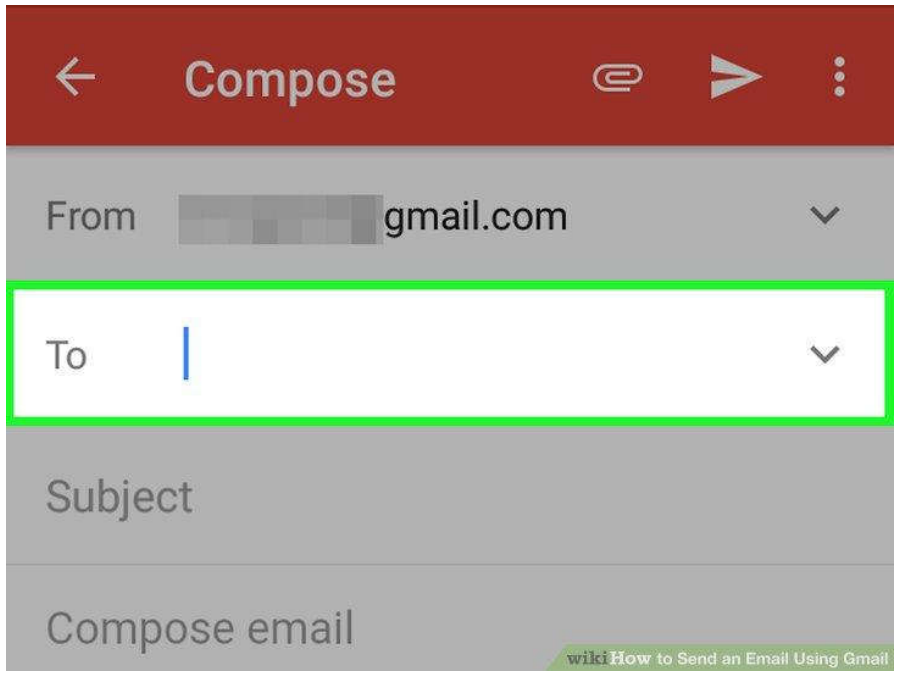
- If you aren't logged in, select your account and/or enter your email address and password to log in.



2. Tap the "Compose" icon. It's in the bottom-right corner of the screen. Doing so brings up a new message window.

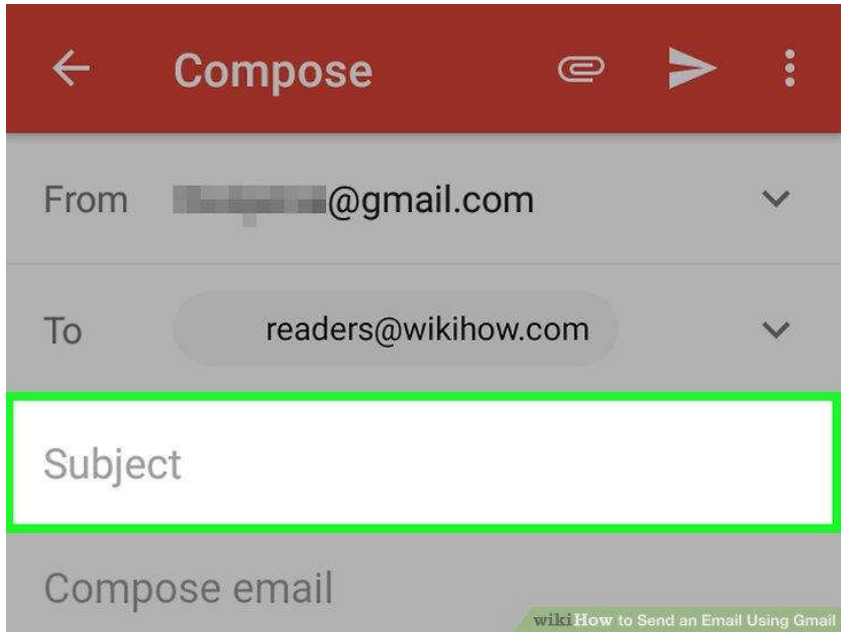
3. Enter an email address. Tap the "To" text box, then type in the email address of the person to whom you want to send an email.

- If you want to CC or BCC anyone on the email, tap ⌄ on the far-right side of the "To" text box, tap either Cc or Bcc, and type in the email address you want to use.

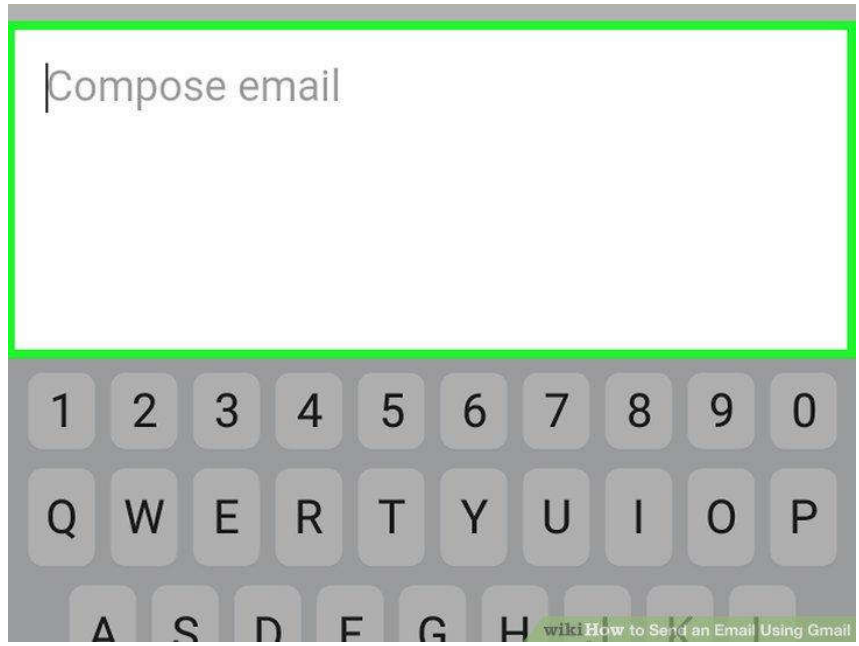


4. Enter a subject. Tap the "Subject" text box, then enter the subject you want to use.

- Generally, a subject summarizes the email in a few words.

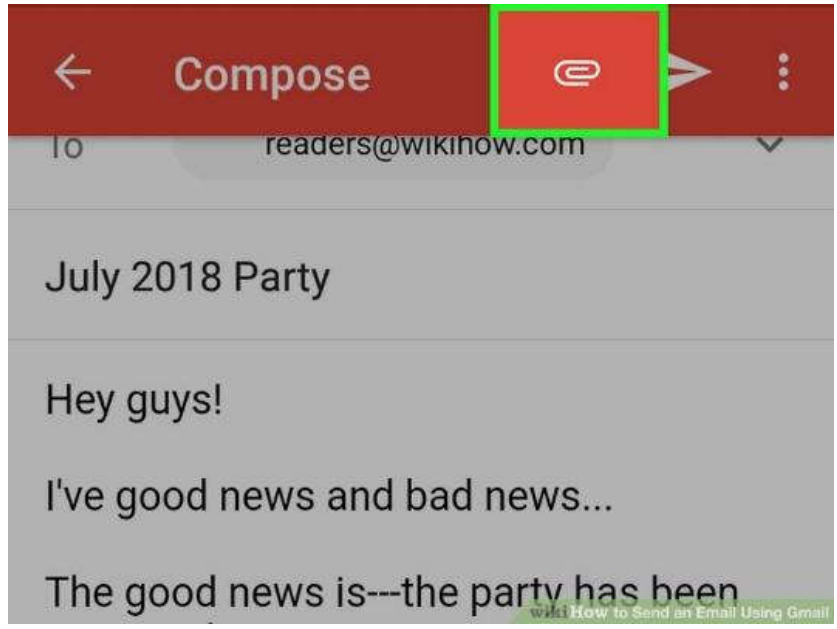


5. Enter your email's message. Tap the "Compose email" text box, then type in whatever you want to use for your email.

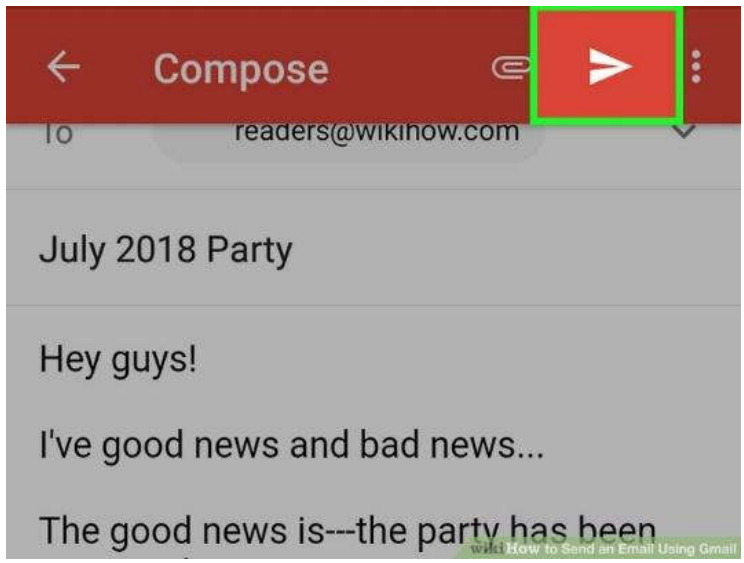


6.Add files or photos if necessary. If you want to place a file or photo in your email, do the following:

- Tap 📎 at the top of the screen.
- Tap Camera roll (iPhone) or Attach file (Android).
- Select the photo or file you want to use.



7. **Tap the "Send"** ➢ icon. It's a paper plane-shaped icon in the top-right corner of the screen. Your email will be sent.



3.8 SEARCH ENGINE OPTIMISATION.

Search engine optimization (SEO) is the process of improving the ranking (visibility) of a website in search engines. The higher (or more frequently) a website is displayed in a search engine list (like Google), the more visitors it is expected to receive.

SEO considers how search engines work, what people search for, and which search terms (words) are typed. Optimizing a website may involve editing the content to increase its relevance to specific keywords. Promoting a site to increase the number of links, is another SEO tactic.

Effective search engine optimization may require changes to the HTML source code of a site and to the site content. SEO tactics should be incorporated into the website development and especially into the menus and navigation structure.

Why is SEO important?

1. **To help gain more visitors:** majority of users click on only the top 4-5 web pages appearing in search results, so it's very important for a website to appear in the top results of a search engine.

2. **Important for social promotion of a website:** if a website appears in top results of a search engine such as Google, Bing, etc. then it gains instant popularity and to some extent trust of a user.

3. **It plays an important role in improving the business of a commercial site:** if two websites are selling the same product, for example, both Myntra and Koovs focus on selling fashion clothing, then the site having a better position in the search result of a search engine has chances of getting more users as compared to the other.

4. **Improving user experience:** SEO doesn't focus only on improving search results but also on improving the user experience and usability of a website so that a website is more appealing to a user.

Basic principles in the working of a Search Engine

Following are majority steps involved in the working of a search engine:

1. **Crawling:** Process of fetching all the web pages linked to a website. This task is performed by a software, called a crawler or a spider (or Googlebot, in the case of Google).

2. **Indexing:** Process of creating index for all the fetched web pages and keeping them into a giant database from where it can later be retrieved. Essentially, the process of indexing is identifying the words and expressions that best describe the page and assigning the page to particular keywords.

3. **Processing:** When a search request comes, the search engine processes it, i.e. it compares the search string in the search request with the indexed pages in the database.

4. **Calculating Relevancy:** It is likely that more than one page contains the search string, so the search engine starts calculating the relevancy of each of the pages in its index to the search string.

5. **Retrieving Results:** The last step in search engine activities is retrieving the best matched results. Basically, it is nothing more than simply displaying them in the browser.

3.9 EXERCISE QUESTIONS

Multiple Choice Questions.

1) The _____ is a collection of all the web pages, web documents that you can see on the Internet by searching their URLs on the Internet.

a) worldwide web b) IP address c) Internet d) SEO

2) The Internet cannot be used for one of the following.

a) social networking b) transactions c) education d) raining

3) Chrome is a web browser developed by _____.

a) Google b) Mozilla c) Apple d) Microsoft

4) All the information on the web is stored in _____.

a) database b) hard disk c) pendrive d) SSD

5) Download speed is measured in _____.

a) mbps b) gbps c) kbps d) tbps

True or False.

1) IP address is provided by the Internet Service Providers.

2) The Internet is a subset of WWW.

3) Safari is a web browser developed by google.

4) Downloading is the transmission of a file or data from one computer to another over a network.

5) FTP is a protocol for browsing the data.

Define or short answer.

1) IP address

2) Web browser

3) URL

4) Search Engine

5) Web crawler

Long answer.

1) What are the advantages & disadvantages of the internet?

2) What is meant by email address and how to create it?

3) Write a short note on Search engine optimization.

4) Explain basic principles in search engines.

5) What are different types of web browsers?

3.10 REFERENCES :

1. www.geeksforgeeks.org
2. www.makeuseof.com
3. www.pageonepower.com
4. www.tutorialspoint.com
5. www.monovm.com
6. www.egyankosh.ac.in
7. www.techtarget.com
8. www.computerhope.com
9. www.wikihow.com

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4

INTRODUCTION TO INTERNET AND OTHER EMERGING TECHNOLOGIES

Unit Structure

4.0 OBJECTIVES

After studying this chapter you should be able to understand

- The basic of internet and its components
- The use of ecommerce and security and risk associated with it
- The importance of Electronic Data Interchange
- The working of Electronic Payment System

4.1 INTRODUCTION

The Internet is at once a world-wide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals through computers irrespective of geographic locations.

The Internet is a global network of computers that allows people to send email, view web sites, download files such as mp3 and images, chat, post messages on newsgroups and forums and much more.

The Internet was created by the Advanced Research Projects Agency (ARPA) of the U.S. government in 1960's and was first known as the ARPANet. At this stage the Internet's first computers were at academic and government institutions and were mainly used for accessing files and to send emails. From 1983 onwards the Internet as we know it today started to form with the introduction of the communication protocol TCP/IP to ARPANet. Since 1983 the Internet has accommodated a lot of changes and continues to keep developing. The last two decades has seen the Internet accommodate such things as network LANs and ATM and frame switched services. The Internet continues to evolve with it becoming available on mobile phones and pagers and possibly on televisions in the future.

4.2 INTERNET COMPONENTS

There are three basic components of the internet.

1. Client : The data interaction primarily occurs between the client and the server. The client requests data from the server. The client and server may be situated very far from each other but are linked via a network.

2. Server : The main job of a server is to respond to the request of the client. The device or programme is set up in the way that they provide the appropriate information to the client. This functionality of client and server works on a model called – call and response. The server performs several tasks in order to deliver the right information for each request. From investigating the client's permission of data access to formatting numerous responses in order to fetch the most accurate information, the server performs so many functions within seconds.

3. Protocols : In the language of networking, protocols can be defined as a set of rules that guide data transmission between computing devices. These rules make sure that the data request is sent and received by the client without any problem. The most important internet protocols are – Transmission Control Protocol (TCP) and Internet Protocol (IP).

Every single commuting device has its own unique IP address. These unique addresses make it easier for computers to recognize each other. The TCP/IP protocols make the data request and receiving possible between two computers via server.

4.3 ELECTRONIC COMMERCE

Electronic commerce or e-commerce has been defined as the ability to perform transactions involving the exchange of goods or services between two or more parties using electronic tools and technique. Consumers can easily buy products or services like magazines and airlines tickets via Internet.

E-commerce uses key standards and technologies including Electronic Data Interchange (EDI), Technical Data Interchange (TDI), Hypertext Markup Language (HTML), Extensible Mark-up Language (XML), and the Standard for Exchange of Product model data (STEP). E-commerce is made possible through the expanded technologies of the Internet, the World Wide Web, and Value-Added Networks.

E-commerce transaction model can be in terms of business to business (B2B), business to customer (B2C) or customer to customer (C2C).

4.4 E-COMMERCE APPLICATIONS

Most Common Applications of Ecommerce:

1. Retail and Wholesale

Ecommerce has numerous applications in this sector. E-retailing is basically a B2C, and in some cases, a B2B sale of goods and services through online stores designed using virtual shopping carts and electronic catalogs. A subset of retail ecommerce is m-commerce, or mobile commerce, wherein a consumer purchases goods and services using their mobile device through the mobile optimized site of the retailer. These retailers use the E-payment method: they accept payment through credit or debit cards, online wallets or internet banking, without printing paper invoices or receipts.

2. Online Marketing

This refers to the gathering of data about consumer behaviors, preferences, needs, buying patterns and so on. It helps marketing activities like fixing price, negotiating, enhancing product features, and building strong customer relationships as this data can be leveraged to provide customers a tailored and enhanced purchase experience.

3. Finance

Banks and other financial institutions are using e-commerce to a significant extent. Customers can check account balances, transfer money to other accounts held by them or others, pay bills through internet banking, pay insurance premiums, and so on. Individuals can also carry out trading in stocks online, and get information about stocks to trade in from websites that display news, charts, performance reports and analyst ratings of companies.

4. Manufacturing

Supply chain operations also use ecommerce; usually, a few companies form a group and create an electronic exchange and facilitate purchase and sale of goods, exchange of market information, back office information like inventory control, and so on. This enables the smooth flow of raw materials and finished products among the member companies and also with other businesses.

5. Online Booking

This is something almost every one of us has done at some time – book hotels, holidays, airline tickets, travel insurance, etc. These bookings and reservations are made possible through an internet booking engine or IBE. It is used the maximum by aviation, tour operations and hotel industry.

6. Online Publishing

This refers to the digital publication of books, magazines, catalogues, and developing digital libraries.

7. Digital Advertising

Online advertising uses the internet to deliver promotional material to consumers; it involves a publisher, and an advertiser. The advertiser provides the ads, and the publisher integrates ads into online content. Often there are creative agencies which create the ad and even help in the placement. Different types of ads include banner ads, social media ads, search engine marketing, retargeting, pop-up ads, and so on.

8. Auctions

Online auctions bring together numerous people from various geographical locations and enable trading of items at negotiated prices, implemented with e-commerce technologies. It enables more people to participate in auctions. Another example of auction is bidding for seats on an airline website – window seats, and those at the front with more leg room generally get sold at a premium, depending on how much a flyer is willing to pay.

4.5 ELECTRONIC DATA EXCHANGE (INTERCHANGE) - EDI

Electronic Data Exchange is the direct exchange of data and important business documents through the Internet and in a very professional manner. Two different companies sitting at the extreme corners of the world can very easily interchange information or documents (like sales orders, shipping notices, invoices, etc) with the help of EDI.

EDI Documents:

The most common documents exchanged via EDI are:

Invoices

Purchase Orders

Financial Information letters

Transaction Bills

Shipping requests and notifications

Acknowledgment and feedback

Transcripts

Claims

Business Correspondence letters

EDI Users:

Central and state government agencies

Industry

Banking

Retailing

Manufacturing

Insurance

Healthcare

Automotive

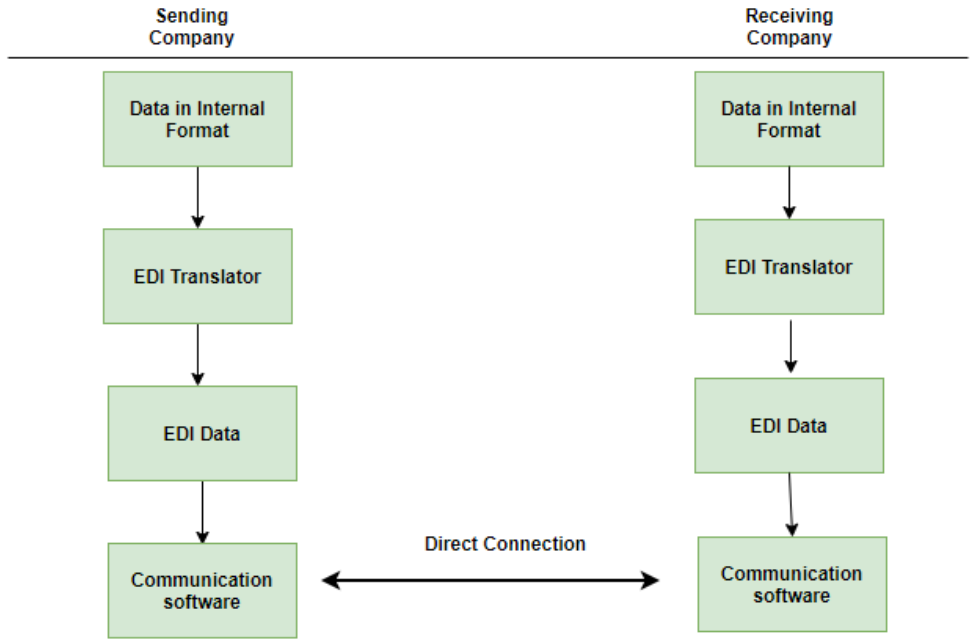
Electronics

Grocery

Transportation

How EDI works?

The data or the information that one company sends the other first gets prepared to be sent, then the information/document is translated into EDI format. The document is then connected and transmitted to the other business, the connection is direct and point to point.



Advantages of EDI:

There are several advantages to Electronic Data Interchange:

1. **The paper usage reduced**: The expense of storing, printing, recycling, reduces up to the maximum amount due to the EDI.

2. **Improved quality of Data**: The data entry errors are reduced due to EDI.

3. **Speed Increases**: The best advantage is the increase in the speed of the data interchange. With everything going online, the speed of the information transfer increases exponentially.

4. **Security**: By following the Protocols and the standard rules, the security of all the important documents is always secure and safe.

5. **Information accuracy**: Since the information exchanged is based on standards agreed by the sender and receiver both, the correct information is always transferred regardless of where they belong to.

6. **Less Cost**: With very less errors, fast response time, every thing becoming automated, and no use of paper, the cost automatically reduces.

Disadvantages of EDI:

1. The initial setup of the EDI is very Time-consuming.
2. EDI standards keep on changing after some amount of time.
3. A very systematic and proper back up is required as the entire data relies on EDI.
4. The setup and maintenance of the EDI is very Expensive.

4.6 EXTRANET

An extranet is a private network that enterprises use to provide trusted third parties -- such as suppliers, vendors, partners, customers and other businesses -- secure, controlled access to business information or operations.

Some use cases for extranets include the following examples:

- exchanging large volumes of data using electronic data interchange;
- sharing product catalogs exclusively with wholesalers;
- collaborating with other companies on joint development projects;
- jointly developing and using training programs with other companies;
- providing services to a group of other companies, such as an online banking application managed by one company on behalf of affiliated banks; and
- sharing news of common interest exclusively with partner companies.

What are the advantages of using an extranet?

Extranets offer significant benefits for enterprises, employees and external partners:

- **Enhanced engagement and communication.** Extranets provide a platform for communicating important updates, making announcements or sharing important news relevant to all stakeholders. This approach can lead to increased participation and engagement from employees and external partners.

- **Enhanced efficiency.** Businesses of all sizes, including startups, often work with multiple partners and external vendors to develop products and complete tasks. An extranet helps manage these workflows.

- **Enhanced collaboration and knowledge sharing.** Before the emergence of popular team collaboration tools, like Asana, Trello and Jira, companies mostly depended on extranets and intranets to improve collaboration. This approach ensured seamless document sharing and real-time updates, while providing a secure environment to work with sensitive company data or project data.

What are the disadvantages of using an extranet?

Extranets also come with some drawbacks:

- **Capital expenditure.** Setting up and maintaining an extranet can be resource-intensive. The price includes the cost of on-premises hardware and software, as well as the costs associated with hiring information technology staff who must build it and maintain it. As a result, an extranet may not the best option for companies that do not have the financial resources to set up and manage it. Alternatively, managed or cloud-hosted extranets, such as Microsoft SharePoint, can help mitigate some of these upfront expenses.

- **Data security.** Using an extranet requires steps to mitigate risk. If security measures are lax, unauthorized users can potentially get in and access sensitive data. This may lead to the loss of proprietary or confidential data and competitive advantage. As such, extranets are best managed by in-house professionals who can help mitigate the risk of data leaks.

4.7 ELECTRONIC PAYMENT SYSTEMS

Type 1: Payment Through an Intermediary - Payment Clearing Services

In order to be used as a substitute for face-to-face payments, online payment systems must incorporate all or some of these stages within their payment functions. The lack of face-to-face interaction also leads to more secure methods of payment being developed for electronic commerce, to deal with the security problems for sensitive information and uncertainty about identity. Consequently, electronic commerce transactions require

intermediaries to provide security, identification, and authentication as well as payment support.

Figure 4.7.1 shows a stylized transaction for online commerce using an intermediary. In this model, the intermediary not only settles payments, it also takes care of such needs as confirming seller and buyer identities, authenticating and verifying ordering and payment information and other transactional requirements lacking in virtual interactions. In the figure, two boxes delineate online purchasing and secure or off-line payment clearing processes. Payment settlement in this figure follows the example of the traditional electronic funds transfer model which uses secured private value networks. The intermediary contributes to market efficiency by resolving uncertainties about security and identity and relieving vendors of the need to set up duplicative hardware and software to handle the online payment clearing process. The payment information transmitted by the buyer may be one of three types. First, it may contain only customer order information such as the identity of the buyer and seller, name of the product, amount of payment, and other sale conditions but no payment information such as credit card numbers or checking account numbers. In this case, the intermediary acts as a centralized commerce enabler maintaining membership and payment information for both sellers and buyers. A buyer need only send the seller his identification number assigned by the intermediary. Upon receiving the purchase order, the intermediary verifies it with both the buyer and seller and handles all sensitive payment information on behalf of both.

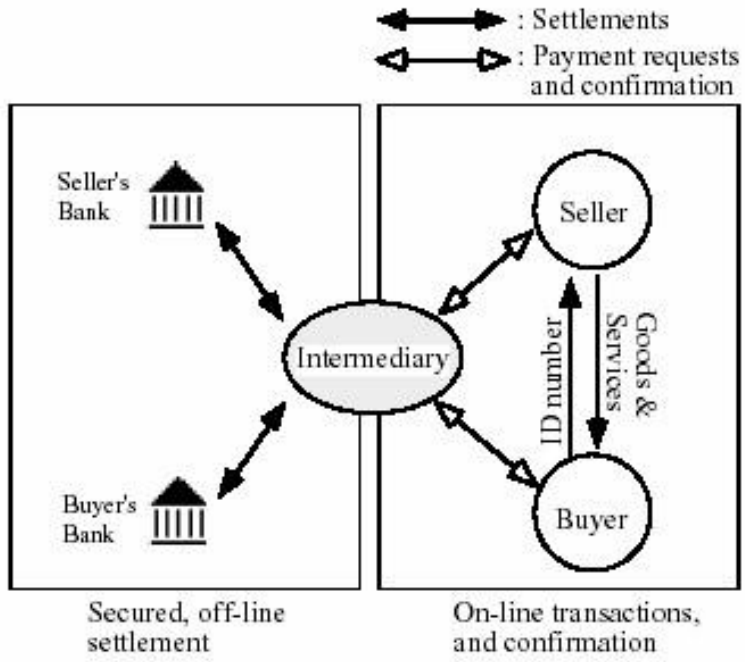


Figure 4.7.1: Transactions with an intermediary

The key benefit of this payment clearing system is that it separates sensitive and nonsensitive information and only non-sensitive information is exchanged online. This alleviates the concern with security that is often

seen as a serious barrier to online commerce. In fact, First Virtual does not even rely on encryption for messages between buyers and sellers. A critical requisite for this system to work is the users' trust in the intermediaries.

Type 2: Payment Based on EFT - Notational Funds Transfer

The second type of payment systems does not depend on a central processing intermediary. Instead, sensitive payment information (such as credit card or bank account number) is transmitted along with orders, which is in effect an open Internet implementation of financial electronic data interchange (EDI) (see Figure 4.7.2). An electronic funds transfer (EFT) is a financial application of EDI, which sends credit card numbers or electronic checks via secured private networks between banks and major corporations. To use EFTs to clear payments and settle accounts, an online payment service will need to add capabilities to process orders, accounts and receipts. In its simplest form, payment systems may use digital checks —simply an image of a check— and rely on existing payment clearing networks. The Secure Electronic Transaction (SET) protocol - a credit card based system supported by Visa and MasterCard - uses digital certificates, which are digital credit cards. We call this type of payment system as notational funds transfer system since it resembles traditional electronic fund transfers and wire transfers which settle notational accounts of buyers and sellers.

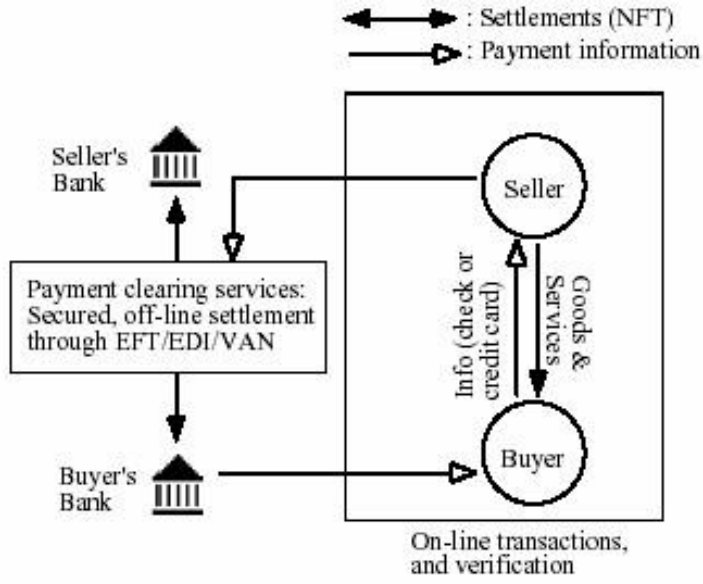


Figure 4.7.2: Notational funds transfer system

Notational funds transfer systems differ from payment clearing services in that the 'payment information' transferred online contains sensitive financial information. Thus, if it is intercepted by a third party, it may be abused like stolen credit cards or debit cards. A majority of proposed electronic payment systems fall into this second type of payment systems. The objective of these systems is to extend the benefit and convenience of EFT to consumers and small businesses. However, unlike EFTs, the

Internet is open and not as secure as private value added networks (VANs). The challenge to these systems is how to secure the integrity of the payment messages being transmitted and to ensure the interoperability between different sets of payment protocols.

Type 3: Payment Based on Electronic Currency

The third type of payment systems transmit not payment information but a digital product representing values: electronic currency. The nature of digital currency mirrors that of paper money as a means of payment. As such, digital currency payment systems have the same advantages as paper currency payment, namely anonymity and convenience. As in other electronic payment systems, here too security during transmission and storage is a concern, although from a different perspective, for digital currency systems doubles pending, counterfeiting, and storage become critical issues whereas eavesdropping and the issue of liability (when charges are made without authorization) are important for notational funds transfers. Figure 4.7.3 shows a digital currency payment scheme.

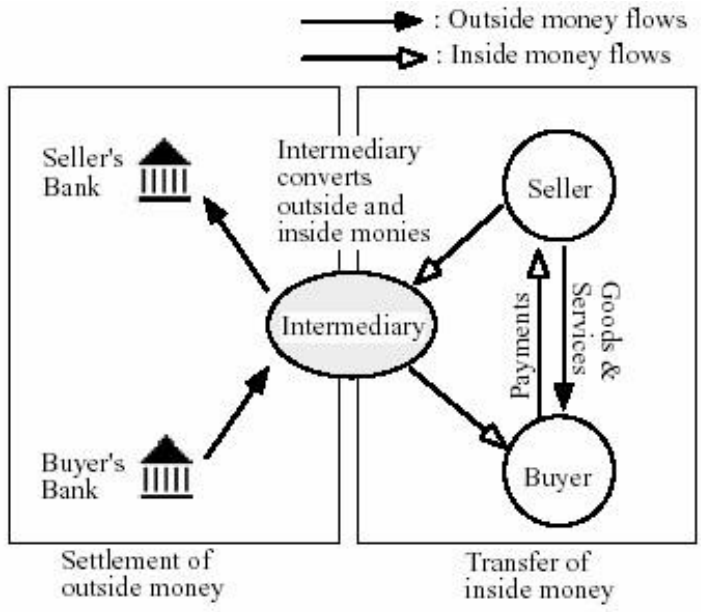


Figure 4.7.3: Digital Currency Payment Scheme

The only difference from Figure is that the intermediary in Figure 4.7.3 acts as an electronic bank which converts outside money, into inside money (e.g. tokens or e-cash) which is circulated within online markets. However, as a private monetary system, digital currency will have wide ranging impact on money and monetary system with implications extending far beyond mere transactional efficiency. Already digital currency has spawned many types of new businesses: software vendors for currency server systems; hardware vendors for smart card readers and other interface devices; technology firms for security, encryption and authentication; and new banking services interfacing accounts in digital currency and conventional currency.

4.8 RISKS AND SECURITY CONSIDERATIONS

Common Security Threats to Ecommerce

1. Financial frauds

There are two common frauds that are used to target the e-commerce industry: credit card frauds and fake returns.

- Credit card fraud happens when a criminal uses stolen credit card data to purchase goods or services on an e-commerce store. When payment authorisation based solely on passwords and security questions does not verify a person's identification. If someone else obtains our credentials, this might result in a fraud prosecution. This allows the third party to effortlessly take money.

- Fake returns are unauthorized transactions made to false requests for returns. Businesses reimburse unlawfully obtained merchandise or damaged goods in refund fraud, which is a typical financial scam.

2. Phishing

Phishing is a cybercrime that aims at stealing user's confidential data — login and passwords. This is achieved via mass email campaigns run on behalf of popular brands, as well as personal messages inside of the various services like social networks.

Messages often contain a direct link on a fake website that looks exactly like the real one, or on a website that redirects the user somewhere else. When the user lands on a fake page, cybercriminals try to make the user enter his login and password that he uses to access a specific website, which allows villains to get access to bank accounts.

3. Spam

Emails are recognized for being a powerful medium for increasing sales, but they are also one of the most often utilized channels for spamming. Nonetheless, leaving infected URLs in comments on your blog or contact forms is an open invitation for internet spammers to damage you. They frequently send them through your social media inbox and wait for you to click on them. Furthermore, spamming not only compromises the security of your website, but it also slows it down.

4. Bots

Bots are automated software applications programmed to perform specific tasks. Web crawlers, probably the most known type of bots, are those that define websites' rankings by systematically browsing all the exiting pages on the internet.

However, there are bots specifically created to crawl websites for their pricing and inventory information. Cybercriminals use this technique to

change the pricing of your online store, or to garner the best-selling inventory in shopping carts, resulting in a decline in sales and revenue.

5. DDoS Attacks

DDoS (distributed denial of service) assaults have evolved from a small annoyance that may have caused modest harm to a huge security risk that is easily damaging and shutting down the business continuity of the world's largest and most powerful corporations.

A DDoS assault aims to prevent a company from operating until the attack is effectively prevented or the attacker ceases. This attacks can harm your website or app by generating a large number of requests which eventually can crash the whole system and make it unavailable for the end-user. This eventually disrupts your site and affects sales.

6. Brute Force Attacks

The brute force attack is one of the most common password-cracking techniques. This approach presupposes that a hacker tries to use as many character combinations as possible in order to figure out the correct password.

7. SQL Injections

SQL injection is a cyber-attack aimed to entry your website's database by targeting your query submission forms. Hackers inject malicious code into your database to read, delete, change, collect or add data.

8. Cross-Site Scripting (XSS)

Cross-site scripting is an attack that comes in the form of a piece of browser code script (HTML). When the attacked user opens the browser and the website, the malicious script starts running and receives access to the various types of user's sensitive data that must be protected.

9. Trojan horses

Malware, a program usually downloaded by customers as legitimate software, is called a trojan horse. To this category belong programs that can gather data about credit or debit cards, transfer this information to the hacker, as well as crash users' computers or use PC resources for hacker's goals without permission of the user. These programs get any sensitive data with ease and may also infect your website.

10. Man in the middle

A cybercriminal may eavesdrop on the communication between a store consultant and a customer. If the client is connected to a vulnerable Wi-Fi or network, hackers can take advantage of that to steal sensitive data.

E-commerce security solutions

1. HTTPS and SSL certificates

SSL certificate is one of the ways to protect user's personal data on the internet.

You may have seen that there are two types of browser addresses — HTTP and HTTPS. Both abbreviations stand for communication protocol. The protocol is a set of rules that defines data exchange between browser and server, what kind of information should exist there and what to do with that data.

HTTPS is a protected version of HTTP. It's an SSL protocol, that gets activated after SSL-certificate is set and encrypts personal data before the information is transferred to the e-commerce website or app owner.

This kind of protection is really useful when you have transactions to be done on your website. Whenever customers enter their credit card information it can be stolen by hackers and used by them later on. Thus, using an SSL certificate will make payments on your website secure and clients won't be afraid of scams.

2. Anti-malware

Anti-malware is software that detects and deletes computer viruses, as well as other undesirable or harmful programs. Anti-malware also reestablishes files that have already been harmed by viruses and prevent further file or software modification that can be done by malicious code.

Anti-malware is used against worms, viruses, and Trojan horses.

3. Secure server and the admin panel

Using passwords that contain different characters and are hard to guess is a key. You should also change them frequently. Another good practice is restricting user access and defining user roles. Let everyone perform only what they have to on the admin panel. Making the panel notify you if a foreign IP tries to access it is an extra step for your security.

4. Secure payment gateway

Don't store clients' credit card information on your database. Alternatively, use Stripe and PayPal as a third party to manage the payment transactions away from your website.

5. Deploy firewall

A firewall is a network security system that controls and filters network traffic (incoming and outgoing) according to defined rules and eliminates e-commerce security threats.

Efficient firewalls protect your website against XSS, SQL injection, and other cyber-attacks.

6. Additional e-commerce security measures

- Tell your clients to use resources that are familiar to them, click on saved links, use the official internet banking app and check out where they get their messages from.
- Make scanning your website from malware your constant routine.
- Increase your data protection by using multi-layer security and backing up your data.
- Use efficient plugins for e-commerce security and update your systems often.

4.9 LEGAL ISSUES

Legal Issues Associated with E-commerce

1. Contracts

The ability for parties to make genuine and legally enforceable contracts online is at the heart of e-commerce. As parties replace paper documents with electronic equivalents, basic problems arise about how e-contracts may be made, performed, and enforced. The Information Technology Act of 2000 governs contractual elements of electronic record use, including attribution, acknowledgment, dispatch time and location, and reception. The IT Act, however, should be read in connection with the Indian Contracts Act, 1872, because it is just an enabling Act. The Contract Act requires three key factors for the formation of every contract. There must be an offer, which must be accepted without alteration, and there must be some kind of remuneration for the contract. E-contracts would benefit from these elements.

Additionally, this will require certain types of contracts and the impossibility of determining the true consumer's age, with the standard age to enter into contracts set at 18. As a result, it's critical that an online business portal considers this possibility and includes a form on its website saying that the person with whom it's dealing or entering into an e-contract has reached the age of majority.

2. Privacy and Data Protection

The privacy of its users is a vital factor for every e-commerce company. Individuals and organisations can easily get personal and sensitive information thanks to breakthrough technology and a lack of safe processes. When it comes to internet enterprises, privacy is a big concern that may lead to issues for both the company and its consumers. Consumers exchange personal information with companies via the internet and expect the sellers to keep it private. When an e-commerce firm caters to customers in other countries, those countries may have laws that render the e-commerce corporation accountable for infringing the privacy rights of the foreign customer. For example, if Company A in India collects personal data from a European Union customer and distributes it to firms

in the United States, it may be accountable for infringing on the customer's privacy rights. When it comes to internet enterprises, privacy is a big concern that may lead to issues for both the company and its consumers. Consumers exchange personal information with companies via the internet and expect the sellers to keep it private.

3. Intellectual Property Rights

All trademarks and copyrights for the items, words, and symbols to be utilised must be protected. India, on the other hand, has a well-defined legal and regulatory framework for the protection of intellectual property rights. Furthermore, the regulations have yet to be entirely updated for total efficiency in the virtual world. For example, there is no law against the misrepresentation and abuse of domain names.

Using content from another firm while creating material for your e-commerce website might be a serious legal issue. This might mark an end to your e-business. There are several royalty-free websites that allow you to access their information and photos. You may utilise those websites to generate online content for your company's website.

E-commerce websites are often built and administered by third companies that are experts in the sector. A third party is frequently in charge of the material. Thus, unless the parties agreement expressly states that IP rights are protected, there is a risk of trademark, copyright, or patent infringement on an online platform.

4. Jurisdictional Issues

In India, there is a scarcity of jurisprudence on questions of jurisdiction in the e-commerce sector. Due to the occurrence of several transactions, resolving disputes in the B2C sector is particularly difficult. Aside from the design of the corporate structure, judgments must be made on the jurisdiction in which the corporate structure should be located since this will decide the scope of any responsibility that may emerge against the website. Apart from the form of the corporate structure, decisions must be taken on the jurisdiction in which it should be based since this will determine the scope of any liability that may arise against the website.

This means that you can be sued in a foreign court even if you are not physically present in that nation, as long as your website has just a minimum connection to that nation. As a result, a business should include an applicable choice of law and forum provisions in its online contract, identifying the jurisdiction to which the contractual parties would be subject. In general, much local legislation allows for a long-arm jurisdiction, which means that the execution of such local laws has extraterritorial applicability if an act or omission has resulted in some illegal or adverse consequence inside the country's territory.

4.10 OTHER EMERGING TECHNOLOGIES

1. AI (Artificial Intelligence) for a personalized shopping experience

With this tech trend, when a visitor comes online, then AI bot vets out the customer's profile and information, and quickly finds out the relevant insights to shape up the users' shopping journey.

It goes through transaction history, previous interaction, product preference, and location to suggest the ideal products. but it doesn't stop here and creates and delivers product recommendations through widgets, pop-ups, and ads. This enables visitors to get a personalized feel and set their foot forward in the right direction.

2. Blockchain for fraud detection

To start with, Blockchain technology was developed and designed primarily for bitcoin transactions, and other cryptocurrency-related affairs. But over the period of time, its capabilities found an extension, and have now become purposeful for the eCommerce sector as well.

Since blockchain works, sans any centralized authority, it enables everyone to access all the information within while being unable to alter any details. And this very characteristic of this tech-trend is used primarily in the eCommerce sector to enhance the process of product traceability. Further, it also supports offering a shield against online fraud, and protects and prevents cyberattack on users' account or card details.

3. Internet of Things for improved tracking

The very concept of IoT- the Internet of Things has let different devices communicate with each other. And this technology has opened a floodgate of opportunity to share information and relay commands for offering better coordination for tracking.

IoT for eCommerce helps in improving inventory management. Further, the inclusion of RFIDs and sensors enable customers to closely monitor to-be delivered products in real-time and let not the quality get compromised.

On the other hand, the warehouse staff can keep a check on the available stock, and keep the space for upcoming products. It also streamlines the coordination between sellers and customers, by offering accurate location and real-time information of the package.

4. Chatbots for an enhanced user experience

The intelligent AI-powered chatbots have gradually turned out to be a never-stopping support system. These bots are trained to handle customer requests on simple product queries and issues that are either repetitive or easy to be resolved.

With the constant advancement made in artificial intelligence and NLP, the ecosystem that runs behind the chatbots has also turned smarter, and capable of handling complex customer interactions.

They mimic human emotions and empathize with the customers to give them a most human-like experience while chatting. These bots are the most incredible piece of technology, that has the potential to engage visitors to influence and enhance their shopping experience.

5. VR for a futuristic shopping

The digital kiosk and digital driving are some of the most prominent use cases of VR in the eCommerce industry. Today, shopping through the futuristic mode of VR is the need of the hour, and addressing the demand of millennials effortlessly.

4.11 EXERCISE QUESTIONS

Multiple Choice Questions.

1) _____ technology was developed and designed primarily for bitcoin transactions, and other cryptocurrency-related affairs.

a) Blockchain b) AI c) IoT d) SEO

2) The ability for parties to make genuine and legally enforceable contracts online is at the heart of _____.

a) software b) e-commerce c) hardware d) computer

3) Malware, a program usually downloaded by customers as legitimate software, is called a _____.

a) Google b) avast c) trojan horse d) Microsoft

4) _____ are automated software applications programmed to perform specific tasks.

a) DDoS b) spam c) extranet d) Bots

5) _____ certificates are one of the ways to protect user's personal data on the internet.

a) SSL b) FTP c) SMTP d) HTTP

True or False.

1) Anti-malware is software that detects and deletes computer viruses, as well as other undesirable or harmful programs.

2) An extranet is a private network that enterprises use to provide trusted third parties.

3) Online Publishing refers to the digital publication of books, magazines, catalogues, and developing digital libraries.

4) Online Marketing refers to the gathering of data about consumer behaviors, preferences, needs, buying patterns and so on.

5) TheDDoS attack is one of the most common password-cracking techniques.

Define or short answer.

1) E-commerce

2) Electronic data exchange

3) Phishing

4) Contracts

5) Blockchain

Long answer.

1) Write a short note on extranet.

2) What are common security threats to e-commerce?

3) Explain electronic payment systems.

4) Explain security solutions for e-commerce.

5) What are applications of e-commerce?

4.12 REFERENCES:

1. www.geeksforgeeks.com
2. www.medium.com
3. www.lawcorner.in
4. www.thenexttech.com

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5

E-COMMERCE

Unit Structure

5.0 OBJECTIVES

After studying this chapter you should be able to understand

- E-commerce and E-business
- Infrastructure requirements of Ecommerce
- Threats to Ecommerce
- Plan to implement Ecommerce

5.1 MEANING OF ECOMMERCE

5.1.1 What is Ecommerce ?

Electronic commerce or e-commerce has been defined as the ability to perform transactions involving the exchange of goods or services between two or more parties using electronic tools and technique. Consumers can easily buy products or services like magazines and airlines tickets via Internet.

DEFINITION

The word commerce is the basic concept for electronic commerce, pertaining to buying and selling of goods while 'commercial' denotes business practice and activities intended to make profits. Electronic commerce, like any other business, deals with the exchange of money for soft or hard goods and services.

Electronic Commerce (e-commerce) is electronic business. It's using the power of computers, the Internet and shared software to send and receive product specifications and drawings; bids, purchase orders and invoices; and any other type of data that needs to be communicated to customers, suppliers, employees or the public.

E-commerce is the new, profitable way to conduct business which goes beyond the simple movement of information and expands electronic transactions from point-of-sale requirements, determination and production scheduling, right through to invoicing, payment and receipt.

E-commerce uses key standards and technologies including Electronic Data Interchange (EDI), Technical Data Interchange (TDI), Hypertext Markup Language (HTML), Extensible Mark-up Language (XML), and the Standard for Exchange of Product model data (STEP). E-commerce is made possible through the expanded technologies of the Internet, the World Wide Web, and Value-Added Networks.

E-commerce includes purchases of goods, services and other financial transactions in which the interactive process is mediated by information or digital technology at both locationally separate, ends of the interchange.

E-commerce transaction model can be in terms of business to business (B2B), business to customer (B2C) or customer to customer (C2C).

5.1.2 FEATURES OF E-COMMERCE TECHNOLOGY

SEVEN UNIQUE FEATURES OF E-COMMERCE TECHNOLOGY	
Dimension of E-commerce Technology	**Significance in Business**
Ubiquity Internet/Web technology is available every where: at work, at home, and elsewhere via mobile devices, anytime.	The marketplace is extended beyond traditional boundaries and is removed from a temporal and geographic location. "Marketspace" is created; shopping can take place anywhere. Customer convenience is enhanced, and shopping costs are reduced.
Global Reach The technology reaches across national boundaries, around the earth.	Commerce is enabled across cultural and national boundaries seamlessly and without modification. "Marketspace" includes potentially billions of consumers and millions of businesses worldwide.
Universal Standards There is one set of technology standards, namely internet standards.	There is one set of technical media standards across the globe.
Richness Video, audio, and text messages are possible.	Video, audio, and text marketing messages are integrated into a single marketing message and consuming experience.
Interactivity The technology works through interaction with the users.	Consumers are engaged in a dialog that dynamically adjusts the experience to the individual, and makes the consumer a coparticipant in the process of delivering goods to the market.
Information Density The technology reduces information costs	Information processing, storage, and communication costs drop dramatically, while currency, accuracy, and timeliness
and raises quality.	improve greatly. Information becomes plentiful, cheap, and accurate.

Personalization / Customization The technology allows personalized messages to be delivered to individuals as well as groups.	Personalization of marketing messages and customization of products and services are based on individual characteristics.

5.1.3 NEED FOR E-COMMERCE

The global business environment is moving faster than ever before. Increased competition at home and abroad means quality as well as profitability must be preserved by corporate houses. This pressure has led to a reappraisal of the accepted existing business practice in the search for greater efficiently.

Traditionally, the response in the face of competitive threat has been to reduce costs by L rationalizing production, shedding labour and restructuring business, coupled with investments in .technology to improve productivity and generate profit.

Whether business to business (B2B) or business to customer (B2C) there are benefits to all parties, customers or suppliers. A reduction in acquisition times and costs, lower prices for goods and services, an expanded number and quality of suppliers, an increase in buyer productivity. Better management information and better inventory control is possible. A Reduction time to market is also achievable giving improved operating efficiencies and improved product quality at reduced cost. The payment process can also be improved and finally and most importantly a greatly expanded customers base. B2B e-commerce was born out of an attempt to solve an administrative problem. It developed a new computer standard to handle these needs, which became known as EDI, Electronic Data Interchange. Today its descendant, XML, a lighter, simpler data interchange standard is used by B2B sites. Simple e-commerce sites first appeared in 1992. The early e-commerce sites were virtual catalogues, simply listing products for sale. Ordering was off-line, through e-mail, phone or fax. By 1996 the technology had advanced greatly to produce virtual stores with shopping carts, client accounts and, with the development of protocols such as Secure Socket Layer (SSL), enabled customers to order and pay for their purchase on-line directly by credit card.

E-commerce quickly became popular with consumers and suppliers. For customers, it was fast, easy and efficient, allowing them to compare products, price and service before purchase. For suppliers, it allowed them to reach an unlimited international audience, 24 hours a day, 7 days a week at reduced costs. Today e-commerce is widely used and growing fast. B2B is the largest, fastest growing and most profitable market. According to IDC, this year, it is expected to account for two thirds of world wide e-commerce. B2C is also expected to grow, boosted by Broadband (high-speed) Internet access to more online households. Future advances include digital money and e-wallets, and 'personal agents' that

help users find what they are looking for. Sites can work with fulfilment centres providing customers with excellent service and suppliers with information, and can support the newest trend for human interaction in E-commerce customer service. The Internet is creating unprecedented and seeming infinite opportunities for both customers and businesses. Yet it one of its major problems is that it is changing so fast that both parties are overwhelmed by the speed of change and the sheer number of choices available to them. In addition web businesses win by following rules quite different than those which traditional businesses may follow.

E-commerce appears to be exempt from the kinds of constraints that have limited companies historically. An e-commerce environment handled in a proper manner, with the right customisation of products and services, in innovative ways, can lead to win-win situations. The customers can get the right product at the right time and for the right price, companies can set new standards in efficiency and profitability.

5.1.4 LEVELS OF E-COMMERCE

There are five major segments under the broader category of e-business. However, the following are some popular e-commerce models used by companies engaged in ecommerce:-

- Business to business e-commerce (B2B)
- Business to consumers e-commerce (B2C)
- Consumers to consumers e-commerce (C2C}
- Business to employees e-commerce (B2E) and
- Consumer to business e-commerce (C2B)

5.1.4.1 Business to Business E-commerce (B2B)

E-business is the process of conducting business on the Internet. In a B2B transaction, the interaction is between businesses. For example, a website that is catching for the steel industry might have a facility for buyers and sellers to list their requirements and post their products. It helps them in quickly closing the transactions and the buyer can get quality, material and can choose from different suppliers.

Business to Business e-commerce provides small and medium enterprises (SMES) with an excellent opportunity to access new markets, improve customer service and reduce costs.

In this form of e-commerce, a business firm places orders for supplies with another business firms directly over the Internet. Paperwork and time required for processing the order and delivery of the goods are thus reduced to a great extent.

5.1.4.2 Business to Consumers E-commerce (B2C)

B2C e-commerce involves selling of goods and services to consumers or end users. It allows them to browse the product catalogue, select products or services and complete the order online.

For example, the most popular site is amazon.com, which is the first online bookseller which has proved a potential competitor to the traditional bricks and mortar booksellers such as Barrens and Noble.

In this category of e-commerce, businesses use the internet to offer to consumers sales and services around the world 24 hours a day, seven days a week and 365 days a year, The sites Amazon, Rediff and Uphar are among those belonging to this category. These websites are meant for selling goods directly to consumers through the internet. The twoway accessibility of the internet enables operating companies to directly ascertain customer preference and buying trends. Businesses are using these consumer insights to formulate marketing strategies and offer to the customers what they want and when they want. E-business in this mode significantly reduces the costs associated with intermediaries, service centres and mass marketing campaigns. Since e-commerce makes just in time delivery possible, the supplier does not have to store the goods. He can procure them from the suppliers as and when he gets the order from the buyer through the internet.

5.1.4.3 Consumer to Consumer E-commerce (C2C)

Here interaction is between consumer to consumer. For example, in sites like e-Buy Bid or Buy.com, Baazi.com which are auction sites, one can virtually sell and buy any goods (either used or new ones).

This form of e-commerce is nothing but the cyber version of the good old auction houses. If anyone wants to sell anything, all one has to do is post a message on the site, giving details of the product and the expected price and wait for an interested customer to turn up and buy it. The buyer gets in touch with the seller through the Internet and the deal is crossed once the amount is finalised. Online message boards and barters are also examples of C2C e-commerce.

5.1.4.4 Consumer-to-Business E-commerce (C2B)

E-commerce, by empowering the customer, has been strategically redefining business. An example of C2B model of e-commerce is the site Price line.Com, which allows prospective airline travellers, tourists in need of hotel reservations etc. to visit its websites and indicate their preferred price for travel between any two cities. If an airline is willing to issue a ticket on the customers offered price, the consumer can then travel to the mentioned destination at his terms.

5.1.4.5 Business to Employees E-commerce (B2E)

This is concerned more with marketing a corporation's internal processes more efficiently. Customer care and support activities also hold ground. The requirement is that are all self-service with applications on the web that the employees can use themselves.

5.2 THE BENEFITS OF E-COMMERCE (Advantages)

The global nature of the technology, low cost, opportunity to reach hundreds of millions of people, interactive nature, variety of possibilities, and resourcefulness and growth of the supporting infrastructure (especially the web) result in many potential benefits to organisations, individuals, and society.

5.2.1 Benefits to Organizations

The benefits to organizations are as follows:

- Electronic commerce expands the market lace to national and international market with minimal capital outlay, a company can easily and quickly locate more customers, the best suppliers, and the most suitable business partners worldwide.
- Electronic commerce decreases the cost of creating, processing, distributing, storing, and retrieving paper-based information. For example, by introducing an electronic procurement system, companies can cut the purchasing administrative costs by as much as 85 percent.
- Ability for creating highly specialized businesses. For example, dog toys which can be purchased only in pet shops or department and discounts stores in the physical world are sold now in a specialized www.dogtoys.com (also see www.cattoys.com).
- Electronic commerce allows reduced inventories and overhead by facilitating “pull” type supply chain management. In a pull-type system the process starts from customer orders and uses just-in-time manufacturing.
- The pull-type processing enables expensive customization of products and services which provides competitive advantage to its implementers.
- Electronic commerce reduces the time between the outlay of capital and the receipt of products and services.
- Electronic commerce initiates business processes reengineering projects By changing processes, productivity of salespeople, knowledge workers, and administrators can increase by 100 percent or more.
- Electronic commerce lowers telecommunication cost the internet is much cheaper than value added networks.

- Other benefits include improved image, improved customer service, new found business partners, simplified processes, compressed cycle and delivery time, increased productivity, eliminating paper, expediting access to information, reduced transportation costs, and increased flexibility.

5.2.2 Benefits to Consumers

The benefits of E-Commerce to consumers are as follows:

- Electronic commerce enables customers to shop or do other transactions 24 hours a day, all year round, from almost any location.
- Electronic commerce provides customers with more choices; they can select from many vendors and from many more products.
- Electronic commerce frequently provides customers with less expensive products and services by allowing them to shop in many places and conduct quick comparisons.
- In some cases, especially with digitized products, E-Commerce allows quick delivery.
- Customers can receive relevant and detailed information in seconds, rather than days or weeks.
- Electronic commerce makes it possible to participate ate in virtual auctions.
- Electronic commerce allow customers to interact with other customers in electronic communities and exchange ideas as well as compare experiences.
- E-commerce facilitates competition, which results in substantial discounts..

. 5.2.3 Benefits to Society

The benefits of E-Commerce to society are as follows:

- Electronic commerce enables more individuals to work at home and to do less traveling for shopping, resulting in less traffic on the roads and lower air pollution.
- Electronic commerce allows some merchandise to be sold at lowest prices, so less affluent people can buy more and increase their standard of living.
- Electronic commerce enables people in third world countries and rural areas to enjoy products and services that otherwise are not available to them.
- Electronic commerce facilitates delivery of public services, such as health care, education, and distribution of government social services

at a reduced cost and/or improved quality. Health care services, e.g., can reach patients in rural areas.

5.3 THE LIMITATIONS OF E-COMMERCE

The limitations of E-Commerce can be grouped into two categories which are:

- Technical limitations and
- Non-technical limitations

5.3.1 Technical Limitations of E-COMMERCE

The technical limitations of E-Commerce are as follows:

- There is a lack of s stem security, reliability, standards and communication protocols.
- There is insufficient telecommunication bandwidth.
- The software e development tools are still evolving and changing rapidly.
- It is difficult to integrate the Internet and E-Commerce software with some existing applications and databases.
- Vendors may need special Web servers and other infrastructures in addition to the network servers.
- Some E-Commerce software might not fit with some hardware or may be incompatible with some operating systems or other components.
- As time passes, these limitations will lessen or be overcome; appropriate planning can minimize their impact.

5.3.2 Non-technical Limitations

Of the many non-technical limitations that slow the spread of E-Commerce, the following are the major ones:

1) Lack of Awareness

The single most important challenge today pertains to increasing awareness of the benefits of e-commerce to potential customers, educate the market and the customers will themselves opt for these services. So, the e-commerce fraternity should accept the fact that the customers are extremely demanding and that they should be geared up towards this end and surpass the expectations of customers. .

2) Lack of Infrastructure

The lack of infrastructure, if made available as required, will ensure that the investment in e- commerce starts flowing in because the business is

happening and infrastructure will grow. The high cost of infrastructure development for e-business is also including the cost of leased lines.

3) Lack of Confidence

The people in India still show hesitancy in buying through the Net. Lack of quality products, timely delivery of products as some of them tend to go out of stock, lack of solutions security are the potential reasons for not developing e-commerce. People do not understand this new way of buying and selling products, i.e. the services in a digital environment which are available online.

4) Skeptic Attitude

Though the Internet is continuing to grow at a rapid rate, along with e-commerce transactions, the shoppers are still skeptical about safety and have not been quick to trust sending personal information such as credit card numbers or address over the Net. The risk adverse attitude of the people is conspicuous and waiting for others to lead is also another attitude.

5) Credit Cards Frauds

The bigger problem is that of security. All credit cards related transactions are approved offline and given the high incidence of frauds, the banks are extremely wary of approving them. In-fact, there are some unconfirmed reports of a multi-national bank refusing to approve credit card transactions carried out by a large Indian portal.

6) Absence of Tax Laws

E-commerce over the Net has effectively eliminated national borders. This has posed an important question as to tax on the transactions over the internet. Net business posed many peculiar technological and legal problems making it difficult to impose tax and formulate a sound taxation policy. The following are the various tax implications of ecommerce:

- There is no fixed physical location for the internet.
- It is difficult to monitor or prevent transmissions of information or electronic cash across the Net.
- Neither the users, administrators nor intermediaries have any control on the type of information, either transactions or cybercash and traveling through their networks.
- There is no emphasis on national boundaries, and messages travel across the boundaries of several countries globally. So, it means no difference, whether the information or electronic money sought to be transmitted are within one jurisdiction or between several.
- A person's location and identity is necessary for tax purposes. Since these two are difficult, the anonymity on the Net would pose a big problem for taxations.

- Electronic commerce eliminates intermediaries or middlemen. Though it is an advantageous feature, it also has negative effects because they could have served as leverage points for collection of tax also as information sources for transactions entered by the customers.
- In addition to technology problems, certain legal hurdles may also be encountered with reference to international taxation laws.
- The difficulties in defining service incomes as distinguished from sale of products, income or royalties cannot be ignored.

So, it is desirable that the Net be turned as a potential free trade zone.

7) Cyber Laws

Another important problem is lack of comprehensive cyber laws so as to ensure safety and protection. There should not be any legal regulations, or barriers to faster and increased development of e-commerce. The crying need of the hour is urgent action to be taken by the Government to enact cyber laws including electronic fund transfer, and amendments of official Secrets Act.

In addition to them, the fear regarding the security aspects of online transactions without proper government directives and the existing policy machinery contribute to cyber criminality. Adding to them, separate cyber laws and amendments are also required to many existing laws like Companies Act, Evidence Act, Copyright Act, Bankers Book Evidence Act, Indian Penal Code, Contract Act etc. The country entered into a cyber space and documents through the computers should be made acceptable in a court of law.

8) Stock Dilemma

A key source of dissatisfaction is the out of stock dilemma. In most cases, advertised products or services are not available. The options of feedback and not receiving suggestions are also reasons for annoyance.

9) Internet Outrage

Failures in networks and the Net itself can play havoc. We read of frequent press reports of internet outrages. The IT industry is not yet attempting to improve network reliability to prevent these outrages. Reliability is a major issue in net business that needs to be attended.

10) Inadequate Government Role

The government is not taking a serious view of e- commerce related information technology in terms of its promotion. Spreading awareness, imparting education, of the benefits of e-commerce, enacting new cyber laws, amendments to existing commercial laws, developing strong, communication infrastructure are the key domestic roles for the government to play.

11) Inactive Indian Software Houses

Software houses particularly in India are not devoted to ensuring strong expertise in the supply chain and distribution management solutions. Efforts are lacking to ensure strategic working on development of systems which will provide a comprehensive open e-business solutions environment, comprising of enterprise applications, internet applications and service and a special technology to enable companies to participate in the emerging online economy.

12) Difficulty of Reengineering

The web business structure will have to undergo a drastic change and be reengineered. It is not just about having a website or about sticking a web address on conventional advertising or transferring a few people to a new division and designation. It is about breaking free and creating new web services to satisfy the existing customers.

13) Blocking and Censorship

People worldwide are under virtual slavery. It has been ISS reported in some media that many countries are blocking their citizens from accessing the Net, either partially or wholly. Censorship is enforced by some countries by stopping either a total ban on the Net or controlling the access traffic or installing filters blocking access to websites. Indian citizens enjoy unprecedented degree of freedom of speech and therefore may constitute a threat to the government. Development in any field may prove detrimental if it does not appreciate the code of ethics.

E-commerce has yet to take off in India, because Indian consumers are wary of leaving their credit card numbers on the Net. They eye the neighbourhood shopkeeper with suspicion and drive a hard bargain. So, e-commerce websites are losing thousands of customers.

5.4 ROLE OF STRATEGY IN ECOMMERCE - TECHNOLOGY AND MARKETING STRATEGY

In today's information-intensive environment, where complex marketing processes are generating new distribution and communication channels, multiple pricing options, and customized products and services, the traditional marketing mix strategies using product, price, place and promotion are not sufficient. Organizations have to use the technology to be enabled to dynamically allocate marketing resources to those activities that generate the best return and have to consider the following issues:

1. How marketing challenges such as global competition can be faced through technology?
2. What should be the technology infrastructure and technology applications for marketing management?

3. How information can affect the decision making and marketing strategies?

4. How can technology help to reduce the complexity and to lower the cost while the firm expands into new market?

5. What cost effective strategies can be used to market and advertise effectively?

For developing marketing strategy in reference to above mentioned issues with the application of technology, organizations can look at the following:

1) **Marketing Decision Support Systems**

The increased competition and changing market structure have led the shortening of a product life cycle and for the survival and profitability, organizations require new product innovations. For this, detailed, accurate and timely information relevant to the product is needed.

- **Data Mining and Decision Support:** Data mining is an emerging solution for marketing decision support in organizations to get optimum performance by knowledge workers. It enables to access and manipulate data easily, and knowledge workers can use the data creatively.

- In general, data in the data warehouse has certain characteristics that **Customer Order – Planning, Forecasting and Fulfillment:** To know what, when, and where the customer demand the products to be delivered, order processing system is examined. It helps in managing all parts of the supply chain. Improved inventory control by understanding this customer order processing system helps the organizations to meet customers' needs. So, the business firms can reduce the inventory costs through improved stock control by understanding customer ordering and can result in effective planning, forecasting and fulfillment of customer order.

- **Customer Relationship Management (CRM):** CRM is a marketing function and has a strong impact on marketing strategies. To know the wants and preferences of customers in a well defined manner, and the level of reliability of information, management can use technology. Business firms also use this technology to analyze the global trends and for understanding why breaking down of sales cycle has happened.

- **Trend Analysis:** With the use of data mining technology organizations can precisely be able to know the classification of sales which would help in predicting some items experiencing low turn and others high. This classification trend analysis also help in sales and profit mix planning and inventories can be adjusted accordingly.

- **Channel Management:** Technology allowing business organization to interact directly with customers and react to changes in demand,

ultimately affect the supply chain. Better customer values can only be provided through a marketing mix strategy that contributes to lower system costs or improved differentiation for the entire supply chain. So channel management provides a new impetus for integrating marketing processes, distribution, and manufacturing.

differentiate data mining from the conventional operational systems.

These include:

- Data is not organized for a specific process or application, but as per the managers desire to view it. So the data is subject oriented. oData from many sources where it is usually inconsistent is transferred to the data warehouse and integrated through a consistent naming convention.
- Data should be collected and organized over time for identifying trends and forecasting. So the data must be time variant.
- Data in the data warehouse is nonvolatile and neither updated nor changed, but only accessed and reloaded.

2) **Marketing Decision Support Applications**

The applications can be classified as follows:

5.5 VALUE CHAIN IN E-COMMERCE

A business model that outlines the entire process of creating new products or services is known as a value chain. The stages involved in moving a product from conceptualization to distribution, and just about everything in between, like obtaining raw materials, manufacturing operations, and marketing activities make up a value chain for an organisation. The purpose of a value chain is to increase the value of a product at each stage before it is supplied to customers.

5.5.1 There are 5 aspects to primary activities

- **Inbound logistics:** Receiving, storage, and inventory management are all part of inbound logistics.
- **Operations:** Procedures for transforming raw materials into a final product are included in operations.
- **Outbound logistics:** It refers to the activities involved in getting a finished product to a customer.
- **Marketing and Sales:** Advertising, promotion, and pricing are all strategies used in marketing and sales to increase visibility and target the right customers.
- **Services:** Customer service, servicing, restoration, refund, and exchange are examples of service programmers that keep products running smoothly and improve the customer experience.

5.5.2 Primary activity explained using Example

1) Inbound Logistics

Products supplied through Amazon's own fulfillment services, as well as data center resources that power Amazon Web Services (AWS), are the company's key inputs. Amazon can make use of its size as a major company to cut the cost per unit of items by outsourcing.

2) Operations

Amazon can go beyond in-house distribution capabilities thanks to co-sourcing and outsourcing from various local companies. Robotics is used at Amazon's 109 fulfillmentcenters to provide quick and cost-effective warehousing labor.

3) Outbound Logistics

This is the point at which Amazon converts its inputs into outputs. Amazon's fundamental product, its ecommerce marketplace, provides a secure venue for both users and merchants to conduct e-commerce transactions. Their two-day delivery is a significant advantage over competitors.

4) Marketing And Sales

Amazon spent billions on advertising and marketing in the last decade or so, demonstrating the economic power of a large corporation to preserve its position among the most recognized brands in the world. Amazon is noted for its straightforward and easy return process, including its client satisfaction scores for AWS cloud services.

5.6 INFRASTRUCTURE FOR ECOMMERCE - REQUIREMENTS

1. Marketing. Of all the infrastructure elements, marketing may be the most important. To succeed, your website must be found. Once visitors are on your site, you need to keep them there and compel them to buy from you. That’s the job of your marketing team. Whether it’s website design, social media, search marketing, merchandising, email, or other forms of advertising, it’s all about marketing.

2. Facilities. A key competitive advantage that ecommerce businesses have over brick-and-mortar stores is not having to invest in physical facilities. In many cases, you can run your business out of a home office, basement, or garage. If you drop ship or outsource fulfillment, you may be able to do that for a long period of time. Even with many employees, you can set up your offices in class B or C space, as you have no need for a fancy store in a high-traffic location.

3. Customer service. There are many choices today for delivering high-quality customer service. You can manage those activities in-house or outsource to a third party. Basic customer service for sales and post-sales

activities can be handled using email and, for more extensive needs, phone support. A customer-management system will make those activities easier, but for smaller companies, it is not a requirement.

4. Information technology. Choosing an ecommerce platform is one of the most important decisions you will make in your business. Do you want to build and host your own system, outsource the development and then manage the system going forward, or use a hosted, software-as-a-service platform that is turn-key and externally managed?

If you build and host your own system, you may need more cash upfront and skilled administrators and developers on your staff. By using a SaaS platform, you will not need to host or manage the system in-house, but you may still need web developers on staff. Choosing to outsource the development and hosting will reduce your staffing costs, but you will incur higher costs for any future enhancements or changes to your websites.

5. Fulfillment. Another key decision is whether you will manage your own inventory or outsource those activities to a fulfillment house or through drop shipping arrangements with your suppliers.

Managing your own inventory will provide a high level of control, but you will tie up cash in warehouse space and fulfillment staff. In some industries — such as the jewelry supply industry that my previous business was in — managing your own inventory was the most logical choice. We had no alternative for drop shipping, and most items were purchased in bulk and were very small. We did not trust preparation and fulfillment to an outside service.

6. Finance and administration. You can manage your finance and administration activities in-house, outsource them, or use a hybrid of the two. If your ecommerce platform is tightly integrated into your accounting system, you may have very little need for an in-house bookkeeper. If you use separate systems for your website, order management, and accounting, you may need more help for data entry and making sure that the information is properly managed.

7. Human Resources. Many small-business owners avoid the human resources function. Recruiting, setting up compensation, maintaining compliance, and other HR activities are specialized and time-consuming. You may choose to bring the resources in-house. But, should you outsource, there are many individuals and agencies well equipped to do the job.

5.7 WEB BASED TOOLS FOR ECOMMERCE

1. An e-commerce platform

The first and most important tool for a successful e-commerce enterprise is the platform itself. Platforms such as Shopify and WooCommerce were designed specifically for e-commerce storefronts. These platforms come

preloaded with a slew of tools and services to help you manage your business. Each platform has its own themes and included services.

2. Digital payment processing systems

You can convert more business by making your products or services purchasable on your website. Thankfully, several third-party payment providers make online transactions trouble-free and easy to manage. PayPal and Stripe are two of the most popular solutions available today. Nearly all e-commerce platforms can integrate these payment solutions into their website infrastructure.

3. Email marketing platforms and print marketing

To let new and existing customers know about products, you can turn to email marketing. This is a great way to get the word out about your brand.

Another effective way to spread the word about your brand is through direct mail. With direct mail, you can break through the constant digital noise and land in your target customers' hands.

4. Advanced analytics and tracking

Once your e-commerce site is up and running, you need to track and analyze all pertinent sales information for your company.

5. Shipping service integrations

All online businesses need to have a solid understanding of how to handle their logistics efforts.

6. Social media management solutions

Every successful company needs to maintain its social media presence. That being said, keeping social media profiles updated regularly is extremely time-consuming, especially for smaller teams. With the integration of social media management solutions for your e-commerce storefront, you can keep customers engaged while automating the legwork required to do so.

7. Customer relationship management software

Regardless of all the tools and services you use to benefit your e-commerce setup, nothing is more important than your customers' satisfaction.

5.8 ECOMMERCE SOFTWARE

5.8.1 Types

There are two general classifications of ecommerce software and they pertain to the type of deployment:

1. **On-Premise.** Installed on a local server or computer and managed on-site by a team that handles manual updates, fix problems, and do general troubleshooting. Online sellers early on initially went with on-premise solutions because they allowed greater hands-on management compared to hosted solutions.

2. **Software as a Service.** SaaS or hosted solutions are technically the hands-off option since all updates, patches, and newly-released features are done automatically or with one-click integrations. Hosted ecommerce software has evolved dramatically to allow wide customization and flexibility, previously exclusive to on-premise, making it now a sufficient solution for most online retailers. Furthermore, SaaS software can be launched quickly and comes in affordable packages.

5.8.2 What does ecommerce software do?

1. **Manage customers and orders.** Managing a customer's order from product selection to payment, to checkout and delivery is vital. eCommerce software takes care of managing orders, check order status, and making quick changes if needed. It can handle payment processing, keep transaction records, manage customer information, create billing and invoicing, undertake accurate accounting, provide analytics and reporting, among others.

2. **Manage products and inventory.** You get product specifics and variations (size, color, quantity) to names and images, allowing you to organize and catalog items. You're also notified and made aware if stocks are low and what particular items are fast-moving and need replenishing.

3. **Simplify marketing.** Built-in SEO(Search Engine Optimization) allows online stores to rank higher in organic search engines for increased online discovery and presence as well as lower customer acquisition costs.

4. **Automates shipping and taxation.** Printing shipping labels, calculating sales taxes based on customer location, and sending notification emails to customers can be done automatically and more accurately.

5. **Enhance customer experience.** ecommerce software is meant to enable customers quickly and efficiently find what they need in your store. Hosted solutions offer service-level agreements to guarantee 100% uptime and simple but robust website management, allowing you to provide your customers with the best online shopping experience.

5.8.3 How does ecommerce software work?

1. A shopper visits your website which displays products and categories that are loaded/stored in the website database.

2. The customer uses a shopping cart to add items and creates an account with all information saved in the database.
3. Once the customer is in the checkout stage, the website normally goes into secure mode displaying a lock symbol and using an SSL certificate.
4. While in checkout the website may utilize third-party software or services to provide the customer with delivery options, shipping rates, and expected delivery date.
5. When the customer enters the credit card number, the information is sent to a payment processor or payment gateway such as PayPal.
6. The customer order is now completed and all sensitive information is stored with the payment processor (not with the ecommerce website).
7. You can have the payment deposited in your merchant account (a service usually provided by a payment gateway) or transferred to your bank account.

5.9 SECURITY THREATS TO ECOMMERCE

NOTE : Already discussed in Module / Unit 4. Refer to 4.8

5.10 IMPLEMENTING SECURITY FOR ECOMMERCE

NOTE : Already discussed in Module / Unit 4. Refer to 4.8

5.11 ELECTRONIC PAYMENT SYSTEM

NOTE : Already discussed in Module / Unit 4. Refer to 4.7

5.12 STRATEGIES FOR MARKETING

NOTE : Already discussed in Module / Unit 5. Refer to 5.4

5.13 ELECTRONIC MARKET

An electronic market is an inter-organizational information system they allow the participating buyers and sellers to exchange information about prices and product offerings. The firm operating the system is referred to as the intermediary, which may be a market participant- a buyer or seller, an independent third party, or a multi-firm consortium.

Electronic markets are the foundation or of electronic commerce. They potentially integrate advertising, product ordering, delivery of products, and payment systems. Many electronic markets also offer additional services, such as payment or logistics services that help members complete a transaction. They may also support community activities like distributing industry news, sponsoring online discussions, and providing

research on customer demand or industry forecasts for components and raw materials.

5.13.1 Functions of E-Markets:-

E-markets serve three particular functions:

1. They act as an exchange for business transactions-not only purchasing but also for checking price and stock availability, invoicing and order chasing.
2. They manage catalog content, converting product information into a common format understood by all parties.
3. They provide additional services to support the trading process such as shipping, payment, tendering and determining a company's financial status.

Other functions performed by the e-markets:-

- E-markets provide an electronic or online method to facilitate transactions between buyers and sellers. They present ideal structures for commercial exchange, because of market efficiency attained by tightening and automating the relations between sellers and buyers of products and services.
- Electronic markets bring together their member companies into trading communities united by common business interest, thus improving speed and efficiency. They offer both buyers and sellers forums to reduce transaction costs, to enhance sales, to streamline distribution processes, to deliver and consume value-added services, and to streamline customer management.
- Electronic markets minimize the inefficiency by tightening the relationships between supplier and buyer, promoting price transparency, reducing supply chain costs, and increasing the reach of suppliers.
- By bringing buyers and sellers together online, electronic markets play the role of digital intermediaries. For example, demand and supply information can be aggregated and disseminated, and buyers and sellers can be matched in electronic markets.
- E-markets also provide the possibility of forwarding and reverse auctions. The forward auction brings together many buyers and on a seller. By this model, the price can only increase. It is most beneficial for companies that are looking to unload surplus inventory. The reverse auction model brings together many sellers and few buyers. The buyer drives the price, so in this model, prices are driven downwards.
- E-markets provide an efficient and cost-effective means of conducting trade. They automate and streamline multiple steps in the buying

process and thus have evolved as new channels for corporate purchasing. For example, buyers can save a significant amount of time and money on simplified product searches through online catalogs. They can create online requests for proposals to solicit service providers and these providers can respond to potential buyers at a low cost.

- E-markets provide open transaction networked when a large number of potential buyers and sellers are able to participate without the restrictions of time and space. Automated transactions save on communication and people cost and result in fewer ordering errors.
- E-markets also assist order tracking, payments, and collections as well as easy reordering and product replenishment.

5.14 BUSINESS PLAN FOR IMPLEMENTING ELECTRONIC COMMERCE

1. Strategic business planning and roadmaps – Strategy is about making the right choices that will help reach the stated business objectives.

There should to be a clear cut vision, mission and objective about what will be achieved, in how much time, within what budget, identification of the right resources for and constraints in the face of execution of the strategy mentioned in the business plan, and what elements will be considered for roadmap.

Knowledge and deep understanding of the digital marketing tools and techniques that will help in reaching and acquiring customers is required. Your business must reach out to customers who are online across multiple dimensions and devices.

2. Customer acquisition – Online or popular digital marketing encompasses multiple tools for reaching out to the new generation of customers, who are actively engaged in using multiple devices, through search engine optimization, search engine marketing (paid advertisement that includes both cost per click and cost per thousand impressions), social media marketing (that includes both cost per click and cost per thousand impressions), email campaigns, display advertisements using various ad networks, referral programs and re-targeting campaigns.

3. Customer engagement – Customers these days are actively seeking to engage with brands to understand the core benefits and unique value proposition that the brand offers, discount and offers during special seasons, a robust support mechanism for queries/clarifications regarding the products displayed and interaction with customer support executives to know more about policies on returns and exchange, etc.

4. Customer retention –With the advent of sophisticated e-commerce technologies, new age retailers will be able to leverage an almost one-to-one customer experience and that's the best a customer can really expect.

5. Optimization based on key metrics – Some of the key metrics to measure the health of an ecommerce venture are the total revenue generated, cost of customer acquisition, % of customers converted, and % of customers entering the website through various channels.

5.15 EXERCISE QUESTIONS

Multiple Choice Questions.

1) In a _____ transaction, the interaction is between businesses.

a) B2B b) B2C c) C2B d) SEO

2) _____ is a marketing function and has a strong impact on marketing strategies.

a) CRM b) e-commerce c) hardware d) computer

3) A business model that outlines the entire process of creating new products or services is known as a _____ chain.

a) value b) block c) net d) tech

4) _____ is an inter-organizational information system that allows the participating buyers and sellers to exchange information about prices and product offerings.

a) DDoS b) CRM c) electronic market d) Bots

5) _____ refers to the activities involved in getting a finished product to a customer.

a) Services b) Operations c) Outbound logistics d) Inbound logistics

True or False.

1) E-business is the process of conducting business on the Internet.

2) In C2C, interaction is between consumer and business.

3) Electronic commerce decreases the cost of creating, processing, distributing, storing, and retrieving paper-based information.

4) E-markets provide an electronic or online method to facilitate transactions between buyers and sellers.

5) The purpose of a value chain is to increase the quality of a product at each stage before it is supplied to customers.

Define or short answer.

1) E-commerce

2) B2B e-commerce

3) **Strategic business planning and roadmaps for e-commerce**

4) E-market

5) E-commerce softwares

Long answer.

1) Discuss functions performed by e-markets..

2) What are web based tools for e-commerce?

3) Explain levels of e-commerce.

4) How can e-commerce softwares be used?

5) What are requirements for e-commerce?

5.16 REFERENCES :

1) www.clickpost.ai

2) www.practicalecommerce.com

3) www.mimeo.com

4) www.financesonline.com

5) www.solutionweb.in

6) www.embitel.com

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